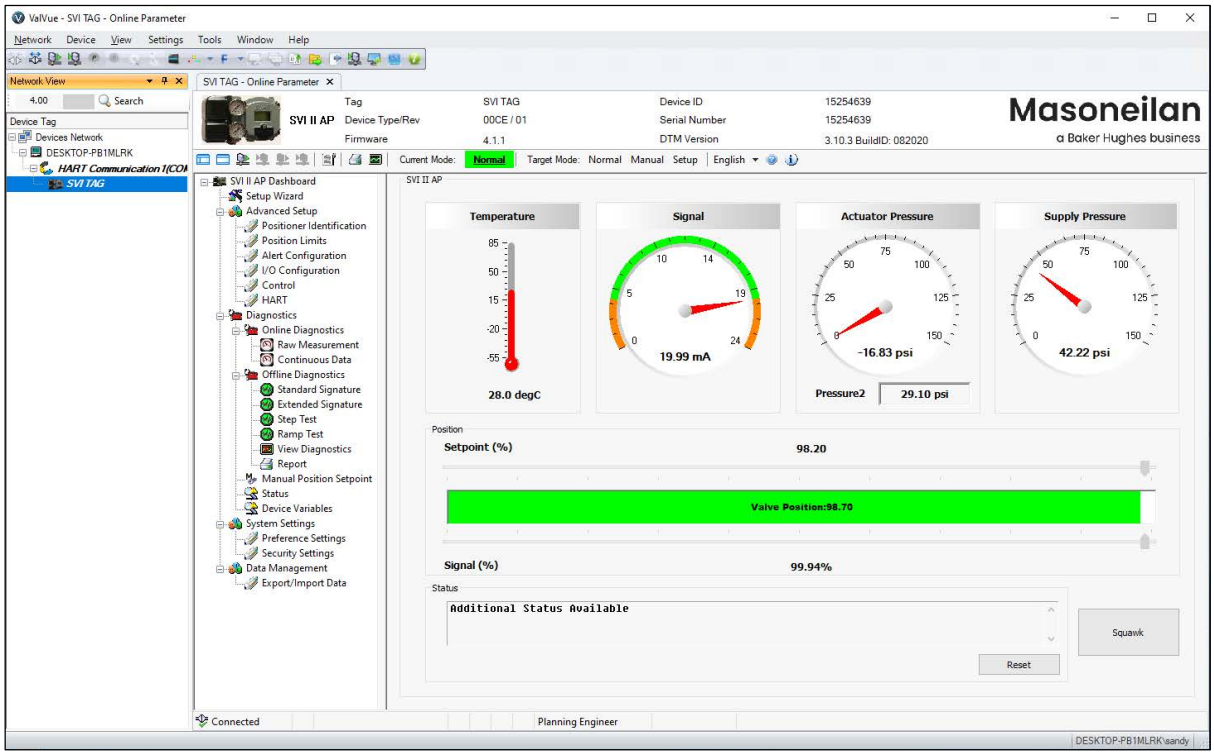
Masoneilan™
SVI™ II AP DTM Software

Online Help Manual For DTM3.x (Rev. E)



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Baker Hughes Data Classification: Public

About this Guide

This help applies to the following instruments and approved software:

- √ SVI II AP
  - √ with Firmware version 311, 313, 321, 323, 325, 327, 329, 411, 511, 513, 514 and 515
  - √ with ValVue version 3.5x or higher
  - √ with handheld communicator with DD published for SVI II AP

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Document Changes

Version/Date	Changes
A/06-2019	Original release
B/09-2019	Changed digital upgrade instructions. Added explanation of units in Portion Rate Limit. Added explanation of issue with Custom Characterization table.
C/03-2020	Updated screens for logo change. Updated to Baker Hughes guidelines. Updated Request and Install Upgrades sections.
D/04-2020	Updated Advanced Control screen for Position Rate Limit. Added Last Run to Load Data From choices in all Results and Log graph right-click menu.
E/02-2021	Renamed manual on front cover.

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1. Introduction

SVI II AP DTM Introduction

The SVI II AP Advanced DTM (Figure 1) is a user-friendly interface that facilitates the setup and diagnostics of a control valve. This release of the software **will not** work with ValVue 2.x.

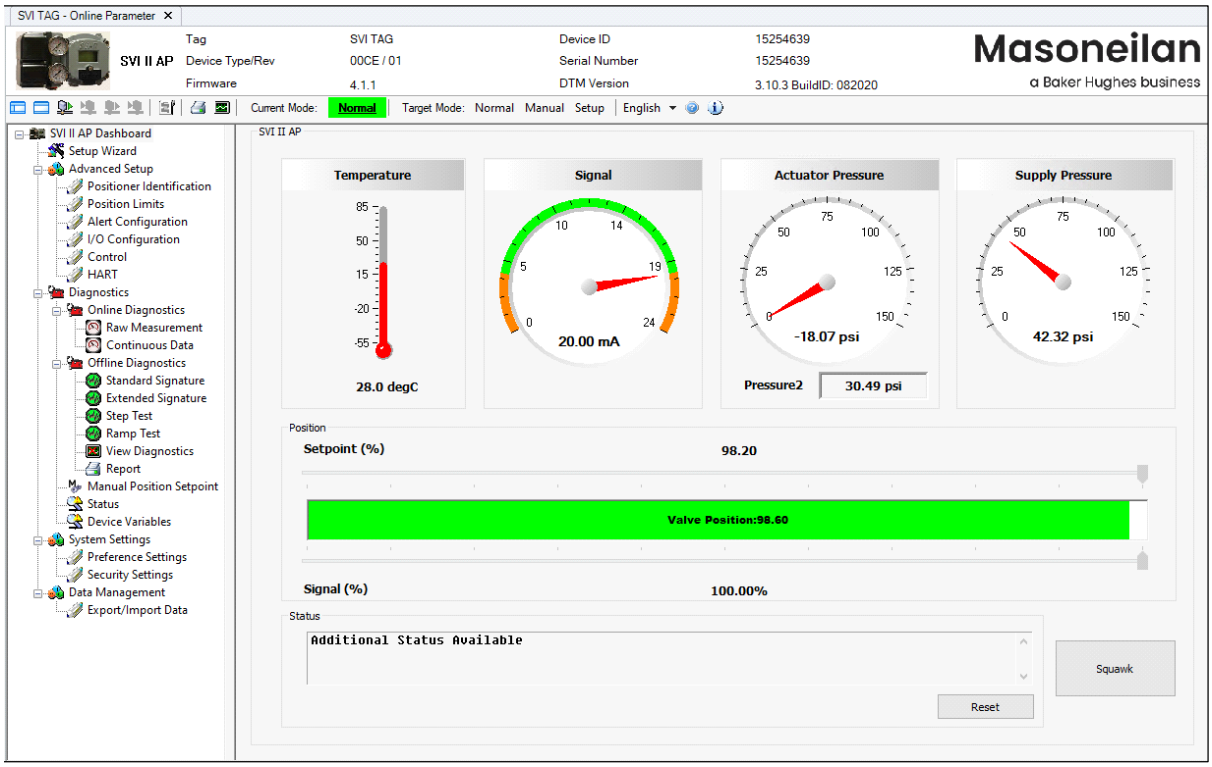

Figure 1 SVI II AP Advanced DTM

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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.

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
- √ Set calibration parameters
- √ Monitor status/error indicators
- √ Trend setpoint, valve position, actuator pressure and view the trend as a stand-alone display
- √ Perform diagnostic test procedures
- √ Import and export data and positioner configuration
- √ Set preferences for directory path for data collection
- √ Set configuration parameters
- √ Input/Output configuration
- √ Display comparative test results
- √ Perform digital upgrade
- √ Set security settings
- √ User Comments
- √ Report

Advanced and Online Diagnostics

The SVI II AP offers various levels of control valve diagnostics. Up to five pressure sensors and 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: *valves.bakerhughes.com/resource-center*.

Table 1 SVI II AP Standard versus Advanced Edition

DTM Features		Standard Edition	Advanced Edition
Offline Configuration		x	x
Setup Wizard		x	x
Trending			x
Upload Parameters		x	x
Download Parameters		x	x

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Table 1 (Continued) SVI II AP Standard versus Advanced Edition

DTM Features		Standard Edition	Advanced Edition
Advanced Setup	Positioner Identification	x	x
	Position Limits	x	x
	Alert Configuration	x	x
	I/O Configuration	x	x
	Control	x	x
Online Diagnostics	Raw Measurement	x	x
	Continuous Data	x	x
	Manual Position Setpoint	x	x
	Fault Status	x	x
	Device Variable		x
Offline Diagnostics	Standard Signature	x	x
	Extended Signature		x
	Step test		x
	Ramp Test		x
	View Diagnostics		x
Preference Setting	File Path Configuration	x	x
	Security View	x	x
Additional Functions	Digital Upgrade	x	x
	Report	x (*)	x
	Data management	x	x
	Adding Comments		x

Notes:

(*) -- Standard Edition DTM can run standard signature test and report standard signature test, but extended signature test, ramp test and step test cannot be executed and reported.

Security View -- Available for administrator user only

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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 Baker Hughes 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.

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Baker Hughes Documentation Resources for Masoneilan Products

Baker Hughes publishes several different resources for documentation on Masoneilan products:

- √ Hardware quick starts contain installation information and other basic information related to getting a device installed and very generally configured.
- √ Hardware instruction manuals contain more complete information for configuration of a device. This manual also includes information on background functionality and special circumstances useful in installation, configuration and operation/ troubleshooting.
- √ Software manuals contain more complete information for the software configuration of a device. This manual also includes information on background functionality and special circumstances useful in configuration and operation (including diagnostics and their interpretation). These manual represent the same source material as the online help.
- √ Handheld documents: Give the DD mappings for the product.

Check the website: *valves.bakerhughes.com/resource-center*.

Related Documentation for the SVI II AP DTM

- √ ValVue documentation: The SVI II AP DTM works inside various software (such as PACTware), however it is designed to work best with our ValVue3 software. See Masoneilan Products ValVue3 Software Manual (Ref. 31426).
- √ Masoneilan SVI II AP Digital Positioner Advanced Performance Quick Start Guide (Ref. 19679)
- √ Masoneilan SVI II AP Digital Positioner Advanced Performance Installation and Maintenance Manual (Ref. 19681)
- √ Masoneilan SVI II AP Advanced Performance Digital Positioner Bench Quick Start (Ref. 32138)
- √ Emerson 475 Handheld and Push Button Guide for Masoneilan SVI II AP (Ref. 31376)

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2. Registration Process

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 differ based on the Masoneilan software is use. For example, the SVi 1000 and 12400 DTMs have only 30 days trial period.

See“Registration During the Trial Period” on page 18 for further details.

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Registration Process

In this discussion, ValVue3 is used as an example. The DTMs use the same registration process. To open the registration dialog:

√ Open *ValVue3*, select **Tools** > **ValVue Licensing** for ValVue (Figure 2).

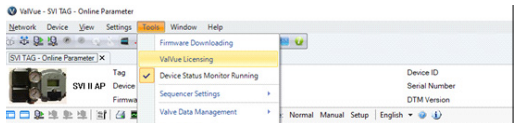

Figure 2 ValVue3 License Path

√ Open a Masoneilan DTM, select a device and then select **Additional Functions > DTM Licensing** (Figure 3).

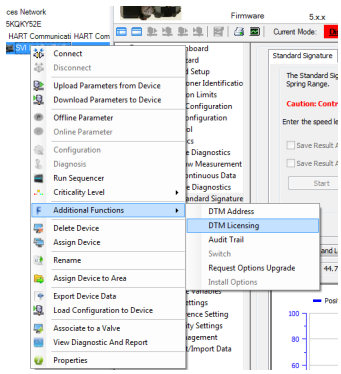

Figure 3 Sample DTM Registration Path

1. Use the registration dialog (Figure 4) to:

   √ “Register the Product” on page 14 - Required before use or at the end of the 30 days trial period.

   √ “Activate License” on page 17 - Required before use or at the end of the 30 days trial period.

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The Masoneilan *ValVue Serial Number* is obtained by contacting one of our channel partners or by contacting Baker Hughes directly (svisupport@bakerhughes.com). On download (*valves.bakerhughes.com/resource-center*), install and first use, your trial period starts. To buy/register, contact a channel partner or contact svisupport@bakerhughes.com.

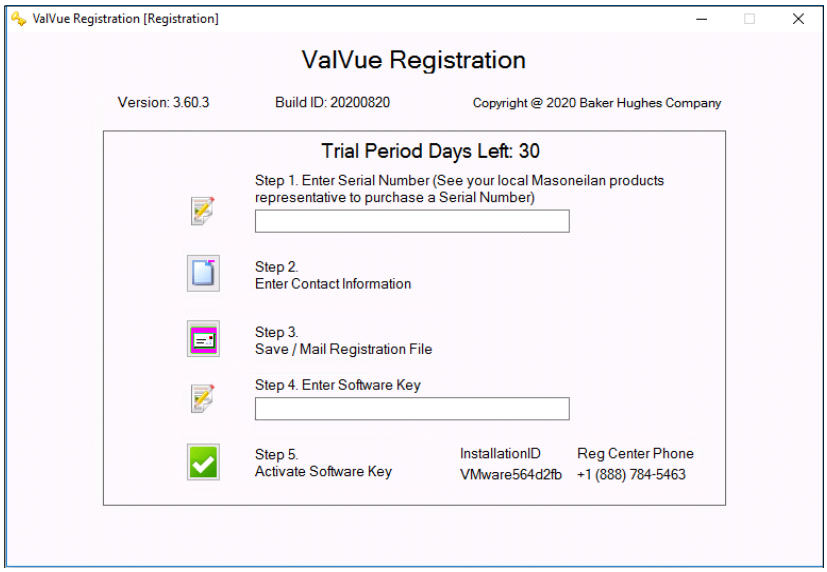

Figure 4 ValVue Registration

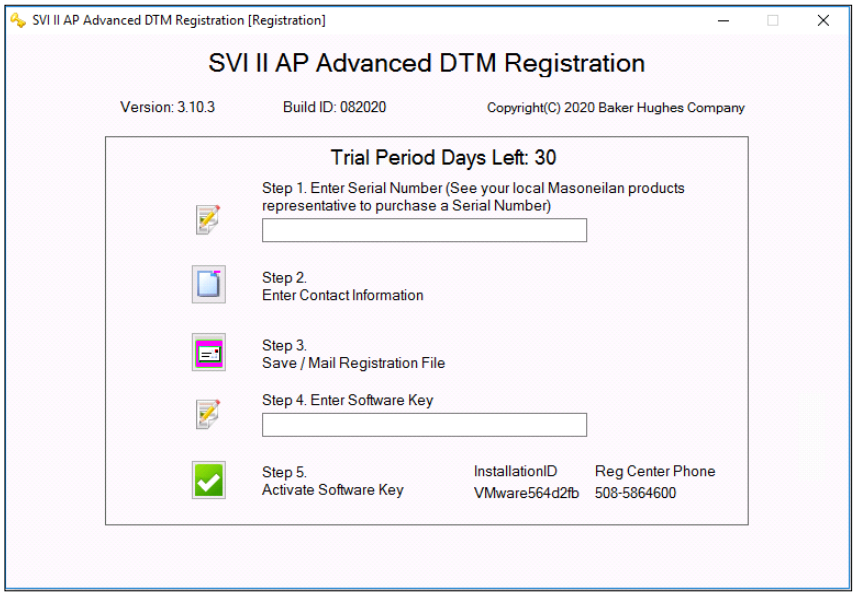

Figure 5 DTM Registration

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Register the Product

To register the product:

1. Enter the serial number in *Step 1* of Figure 4. The *Serial Number* auto-fills for the *Basic Edition*.
2. Click (associated with *Step 2* of Figure 4) and Figure 6 appears.

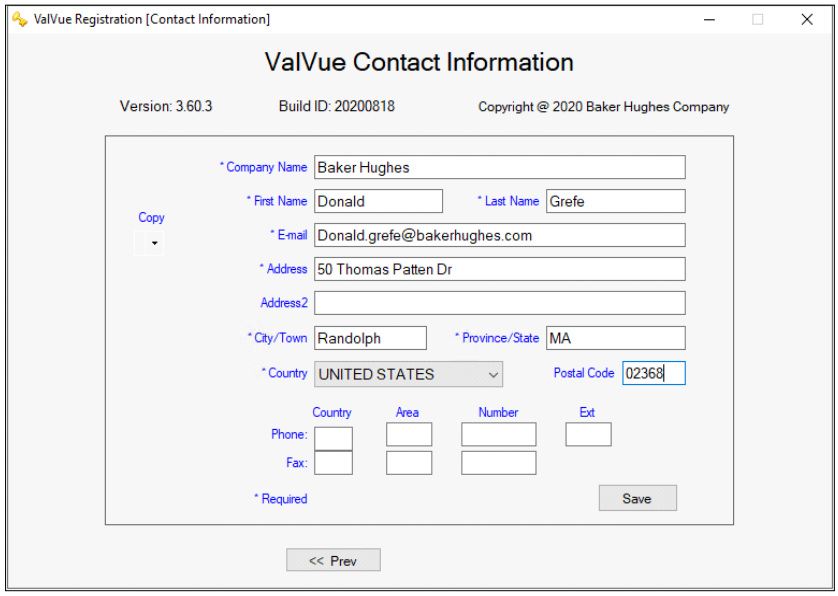

Figure 6 Contact Information

NOTE

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

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3. Enter all required information, as marked by *, click Save then and click

   and Figure 7 appears, if email access is detected.

   If you do not have email access, or want to send from another location and click **No**, see “Register the Product From Another Laptop” on page 16.

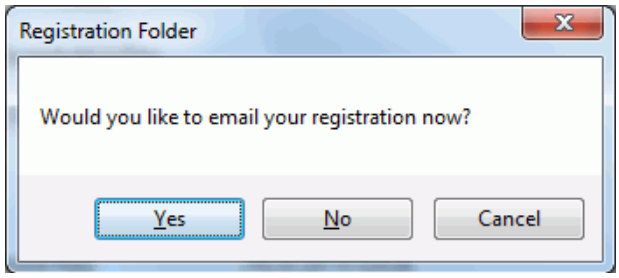

Figure 7 Email Registration

4. Click **Yes** and the registration email appears using your default email setup. The email has an *.xml* attachment containing licensing information. Skip to step 5.
5. Send the email. A return email is sent containing the activation code. Proceed to “Activate License” on page 17.

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Register the Product From Another Laptop

If you do not have email access, Figure 8 appears (or want to send from another location and clicked **No). Use** Figure 8 to save the .xml file to a location for use.

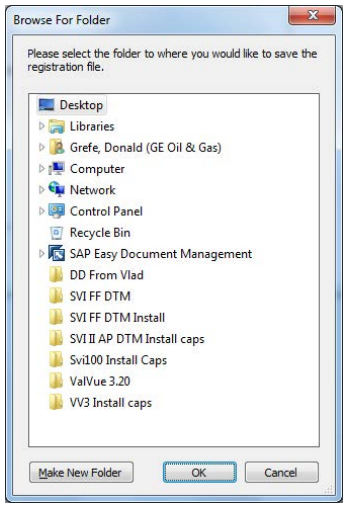

Figure 8 Browse for Folder

1. Browse to the desired folder (or make a folder), click **OK** and Figure 9 appears.

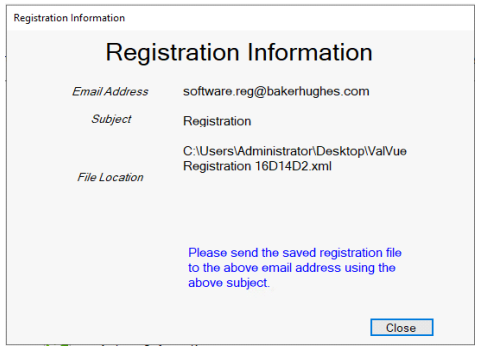

Figure 9 Registration File and Information

This dialog contains the information for the email address to send the file, the email *Subject* line and the File Location. These three items can be copied and pasted into a text file for ease of use.

2. Click **Close** and copy the .xml file to a laptop with an email server. In this case, if you have multiple .xml file from multiple upgrades, you can attach them to one email.
3. Send the email. A return email is sent containing the activation code. Proceed to “Activate License” on page 17.

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Activate License

To activate the license:

1. Enter the emailed or channel partner acquired software key (Figure 4 on page 13).
2. Click and Figure 10 appears.

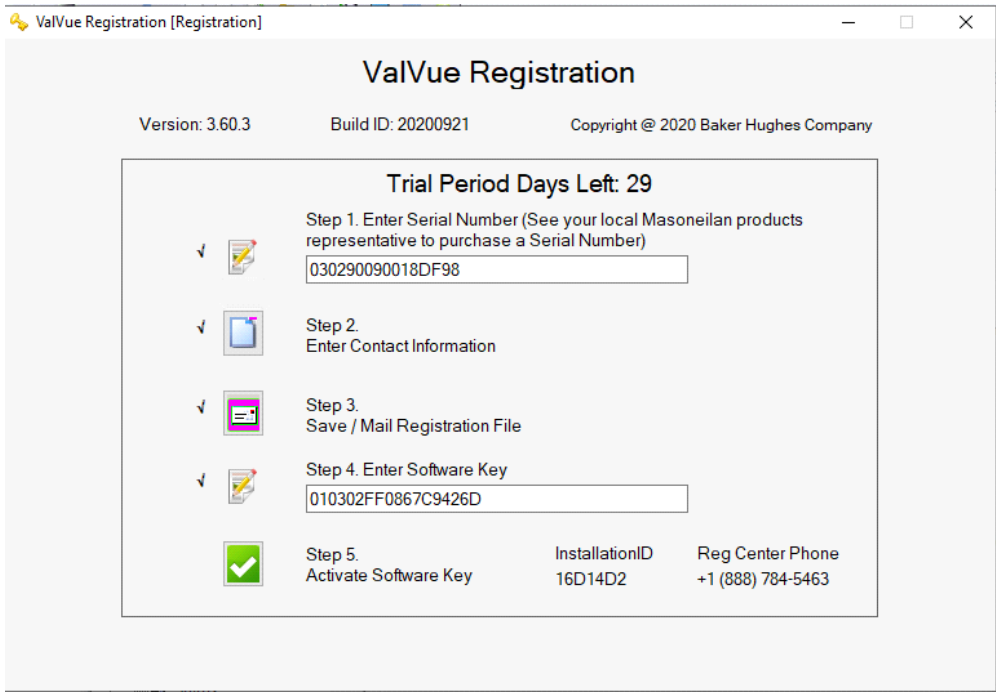

Figure 10 ValVue Registration-Registered

3. Click **Close**.

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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 days trial period. We strongly encourages 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 days period, after which you must register to continue using the product. Contact Baker Hughes at svisupport@bakerhughes.com.

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

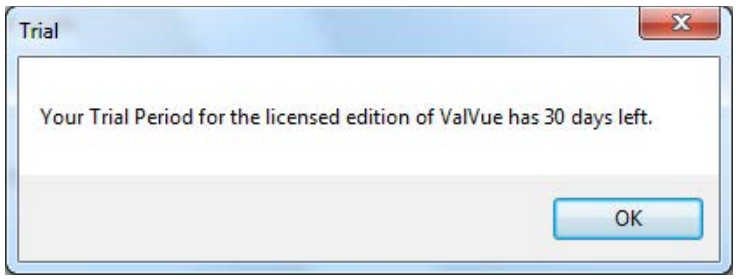

Figure 11 Trial Registration Dialog: Newly Installed

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

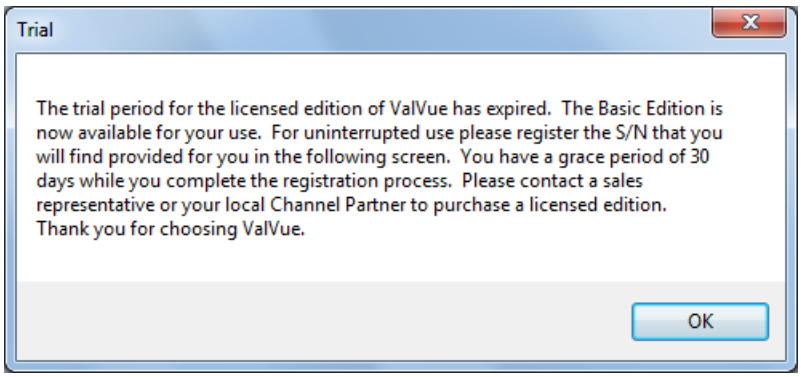

Figure 12 Advanced Features Expired

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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 14).

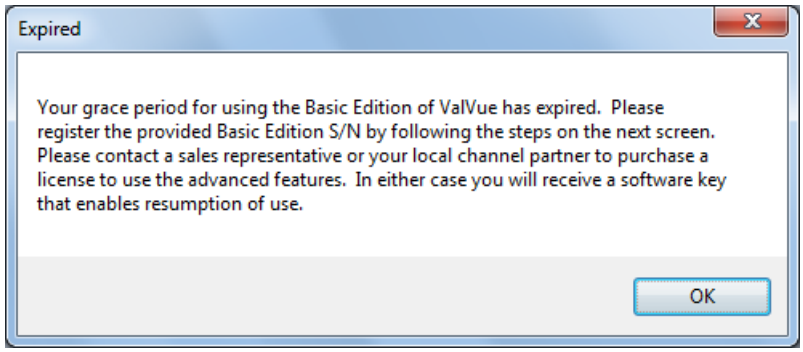

Figure 13 Ongoing Expiration

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 14).

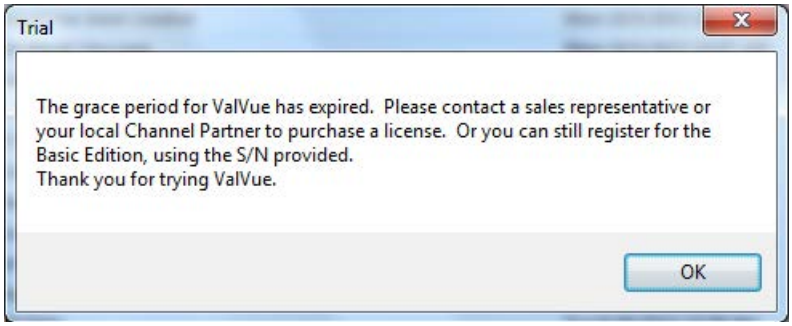

Figure 14 Trial Expired

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3. How Do I Interface with ValVue3?

The lists below give you an idea of what tasks you need to accomplish using ValVue3 (or PactWARE® , fdtContainer,® etc.). The tasks are split into *Getting Started Tasks* that are necessary at least the first time you configure and *Common Tasks* for tasks performed at anytime. All tasks are listed using the title by which you can find them in the ValVue3 help.

Getting Started Tasks

- √ Add a Field Network
- √ Work with Device Areas
- √ Add New Device
- √ Update DTM Library (Done automatically (ver 3.30 or later) or manually by ValVue3.)
- √ Add/Remove DTMs in the DTM Updates List
- √ Installation and Logon
- √ Add an Area and Move Device (s)
- √ Import Configuration (Done automatically (ver 3.30 or later) or manually by ValVue3.)

Common Tasks

- √ Add a Field Network
- √ Work with Device Areas: Use this for creating device areas and child areas. Once areas are created, existing specific devices and groups of devices can be assigned to that area.
  At the higher level you can assign multiple devices to a new area or an existing area. An individual device can be reassigned to a newly created are or an existing area.
- √ Add New Device
- √ Add an Area and Move Device (s)
- √ Delete Device Areas
- √ Assign Criticality to a Device or Area
- √ Register the Product
- √ View Events Details
- √ Filter Events
- √ Create Report of Event and Audit Trail
- √ Export Event and Audit Trail Report
- √ Update DTM Library
- √ Add/Remove DTMs in the DTM Updates List
- √ Edit a Field Network

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- √ Sequencer Settings: Sequencer Settings is comprised of:
  - √ Task Settings: Use this to assign values to they system task performed during a user-configured sequence.
    Tasks are predefined and are categorized into three categories: *Configuration*, *Calibration*, and *Diagnostics* tasks.
  - √ Sequencer Management: Use this to add, edit and delete sequences of tasks configured in Task Settings.
    A sequencer is a set of tasks that ValVue requests device/DTM to perform silently.
  - √ Execute Sequencer: Execution of a sequencer can apply to one or multiple devices. You can choose whether a sequencer is executed concurrently or sequentially. The execution can also be schedule based.
  - √ Sequencer Execution Management: Use this dialog to view a listing of all sequencer executions (All tab), sequencer executions that have been run (History tab) and those that have just been scheduled (Scheduled tab), but not executed.
- √ Valve Data Management: This section discusses the capabilities to associate a positioner with a valve and in doing so associate, view and analyze test data for that valve.
- √ Signature Management: Use this feature to view a list of signatures, filter the list, import and export signatures and delete signatures.

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4. ValVue3 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 Server® 2008 R2 SP1, Windows Server® 2008 SP1, Windows Server® 2012, Windows Server® 2016, Windows® 7 sp1, Windows® 8 or Windows® 10
- √ An available serial communication port or USB port
- √ Microsoft Visual C++ 2012 Update 1 Redistributable Package (x86) or Microsoft Visual C++ 2015 Update 3 Redistributable Package (x86)
- √ A HART® modem
- √ 10 G of free hard disk space
- √ Microsoft .NET Framework 2.0 SP2, Microsoft .NET Framework 4.0 FULL, and Microsoft .NET Framework 3.5 SP1

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Installing ValVue Software

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

NOTE

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

NOTE

During the install, SQL is installed.

It is highly recommended that you check for ValVue updates on the Baker Hughes website (valves.bakerhughes.com/resource-center) every six months to keep this program current for security issues.

To install the software:

1. Double-click **ValVue3Installer.exe** and Figure 15 appears.

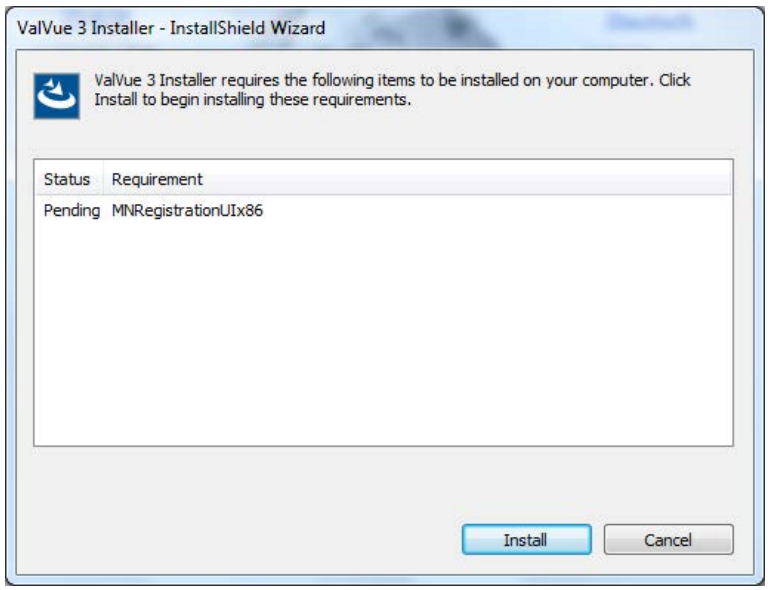

Figure 15 Install MN Registration

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2. Click **Install** and Figure 16 appears.

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.

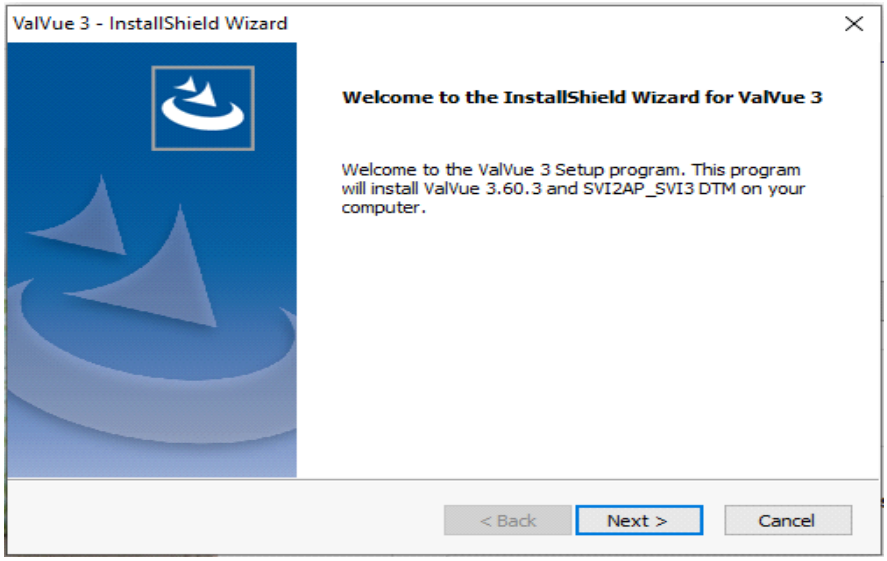

Figure 16 ValVue Install Welcome

3. Click **Next** and Figure 17 appears.

Figure 17 ValVue License

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4. Click **I accept the license**....., **Next** and Figure 18 appears.

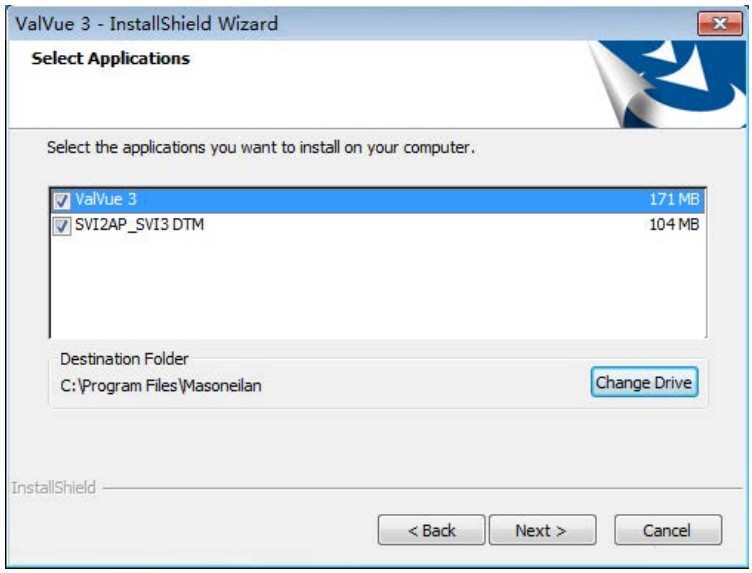

Figure 18 Select Applications

5. Click **Change Drive**, navigate to or create the target folder, click **OK** and the dialog reappears.
6. Select the applications you need to install or update. Click **Next** and Figure 19 appears.

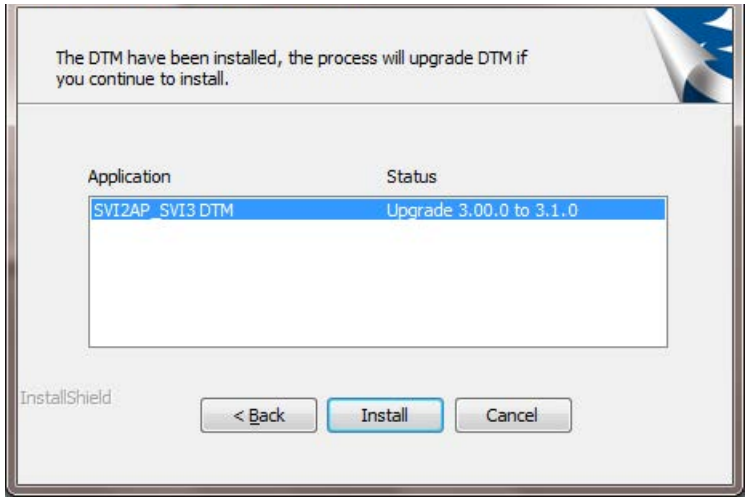

Figure 19 Applications Installing

7. Click **Install** and the process of uninstalling any previous versions and installing the newer versions begins. Once complete, the *InstallShield Wizard Complete* dialog appears (Figure 20).

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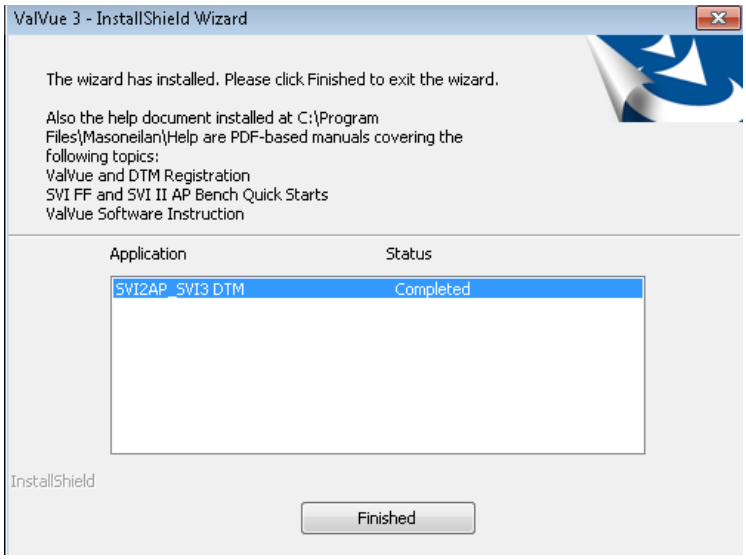

Figure 20 Install Complete

8. Click **Finish**.

Log On

1. Select **Start > All Programs > Masoneilan > ValVue3 > ValVue** and Figure 21 appears.

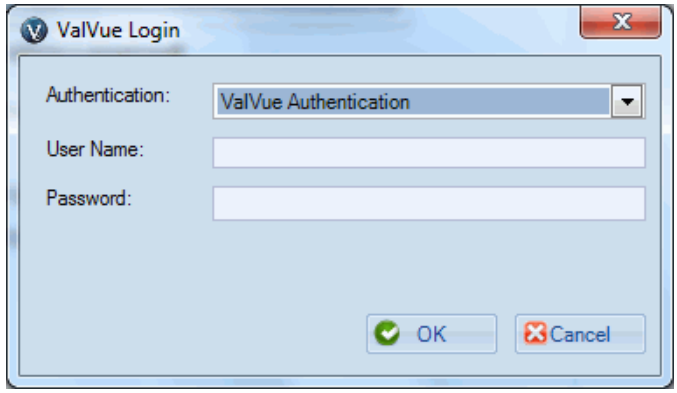

Figure 21 ValVue Login

NOTE

If you have installed/deleted DTMs or updated ValVue, a dialog appears when you open ValVue3: 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:

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√ *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 Figure 22 appears.

Figure 22 Change Password

You must change your password according to the constraints shown in Figure 23.

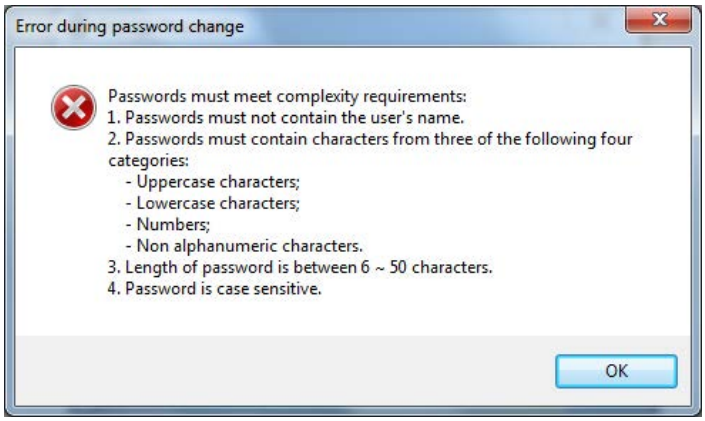

Figure 23 Passwords Constraints

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

√ *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.

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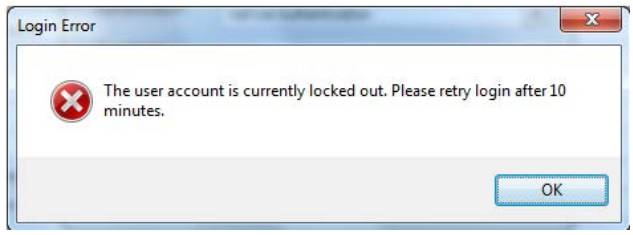
NOTE

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.

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5. Installing SVI II AP Advanced DTM Software

Requirements

Using the 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.
- √ ValVue3 or one of the items listed below to access the SVI II AP Advanced DTM:

  PACTWare software, which includes generic HART® DTM software and HART® communications software

  AMS Version 13 or above

  PRM software from Yokogawa

  Field Device Manager (FDM) from Honeywell

  fdtContainer from M&M Software GmbH

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

If you are new to DTM technology there is a good explanation given on the fdtgroup home page. Visit: https://fdtgroup.org/technology/components/ for an explanation of basic frame and DTM concepts.

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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 Server® 2008 R2 SP1, Windows Server® 2008 SP1, Windows Server® 2012, Windows Server® 2016, Windows® 7 sp1, Windows® 8 or Windows® 10
- √ Windows® Pentium® or compatible microprocessor
- √ An available serial communication port or USB port
- √ A HART® modem
- √ 10 G of free hard disk space
- √ 1 G of RAM
- √ Microsoft Visual C++ 2012 Update 1 Redistributable Package (x86) or Microsoft Visual C++ 2015 Update 3 Redistributable Package (x86)
- √ Microsoft .NET Framework 2.0 SP2, Microsoft .NET Framework 4.0 FULL, and Microsoft .NET Framework 3.5 SP1

Notes

Your current windows login user account has administrator privileges.

Your PC must have .Net framework 3.5 SP1 installed. he following options can enable .Net framework 3.5:

- √ If you install ValVue3 on a computer with Windows Server 2008 R2 SP1 or Windows 8, Windows10, Windows Server 2012, you must enable .NET Framework 3.5 SP1 before you install ValVue3.x installer.

  Control Panel -> Programs and Features -> Turn Windows Features on or off

- √ If .NET Framework 3.5 SP1 is not installed, ValVue3.x installer displays an error message that includes a link to the download center, or you can download .NET 3.5 SP1 from Windows Update. To avoid interruption during installation, you can download and install .NET 3.5 SP1 separately.

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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.

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Failure to Communicate

If the PC (using a modem) fails to communicate with the HART® or SVI II AP Advanced DTM the PC displays then either the message *No Devices Found* in the DTM main screen, or a COM port communication error occurs, or 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 or a busy port (wait for COM port to clear or use another port)
- √ 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.

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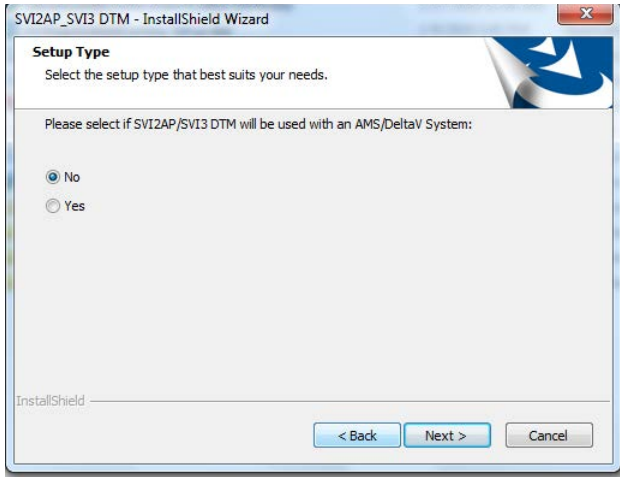
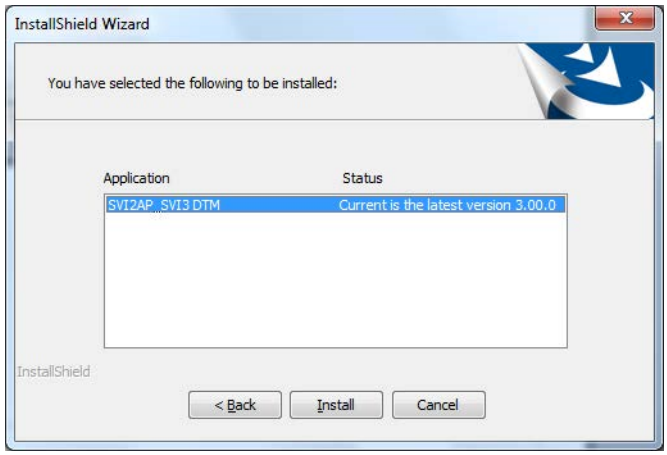
Software Install and Configuration

1. During installation, the following dialog appears to make a selection as to the existence of AMS Snap-On software:



NOTE

If you are installing a new version over an existing version, the following dialog appears indicating whether the version is the most recent. If you choose to proceed, the existing version is uninstalled and then either the existing version is reinstalled or a newer version is installed:



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Once installation is complete and you open ValVue3, you are prompted to update your DTM library. Click Yes and the library is updated and the DTM Library appears with the SVI II AP items added (red box in Figure 24).

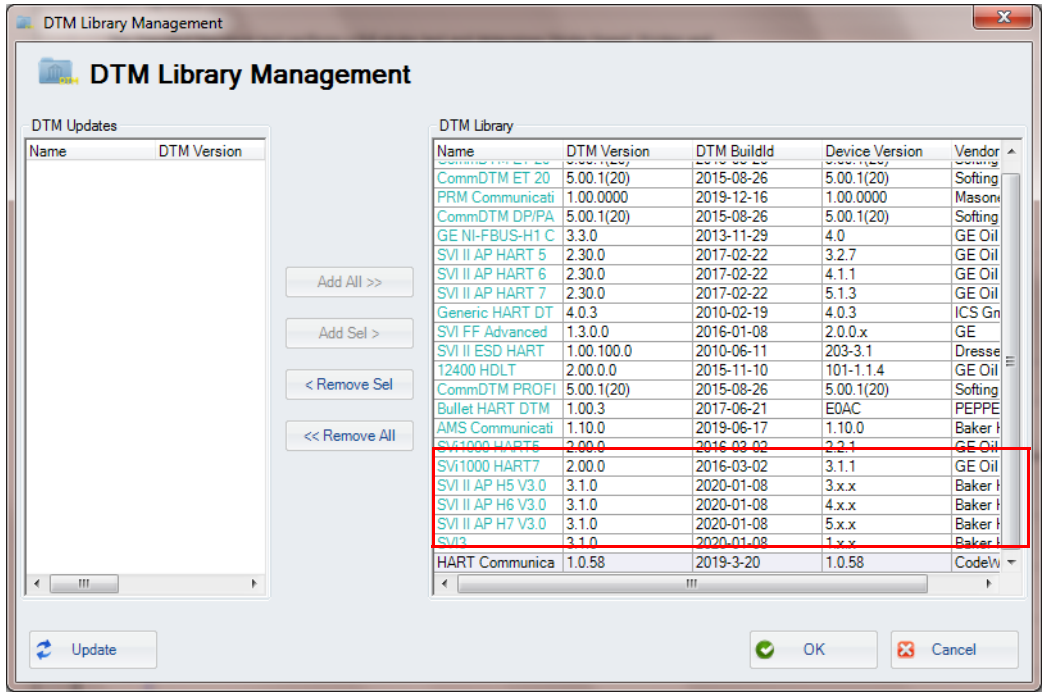

Figure 24 New SVI II AP Items

NOTE

The items in the red box for a new install of the DTM appear in the DTM Updates pane to the left. Select them and click Add Sel to add them to the library.

The new items for the SVI II AP include: SVI II AP H5 V3.0, SVI II AP H6 V3.0, SVI II AP H7 V3.0

2. Download the Codewrights HART® Communication DTM and install.
3. Sign on to ValVue3 with default values:

   User name *admin*.

   Password *ValVue3*.

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NOTE

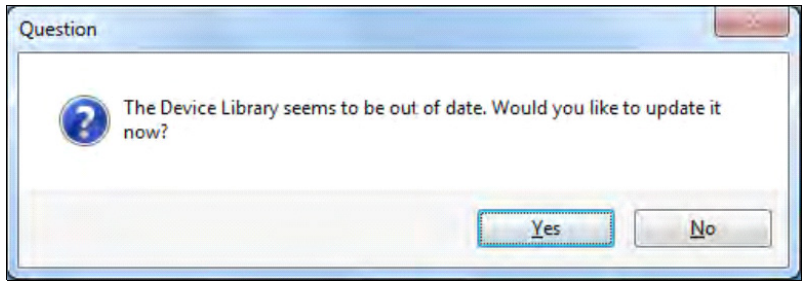
For security purposes, you are forced to change your password during the first use.

The ValVue and SVI AP DTM license trial period works as follows:
1. Once you download and install the ValVue software, you are granted a 30 days trial period. During the 30 days, you have access to all the advanced features of ValVue and the SVI II AP DTM.
2. Once the first 30 days expires, you lose the advanced features of both ValVue and the SVI II AP DTM. You then have an additional 30 days period with just standard features, after which you must register to continue using the product. We strongly encourage you to register your license with us as soon as possible. Contact Baker Hughes at software.reg@bakerhughes.com.

The evaluation periods for both are independent of each other and commence with first use.

NOTE

If you have updated ValVue, a dialog appears when you open ValVue3:



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.*

ValVue version 3.30 or later and SVI II AP 2.20 or later. For earlier versions continue with manual DTM Library update.

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4. Click **Settings > DTM Library** and Figure 25 appears.

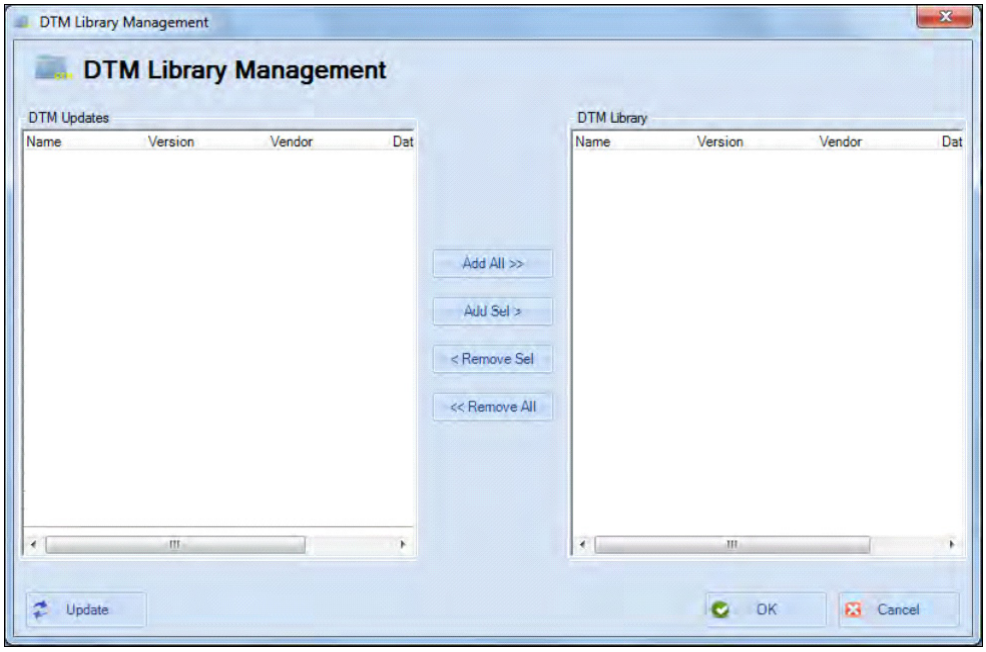

Figure 25 DTM Library Management: Before Update

5. Click **Update** and once the *DTM Updates* list refreshes, select the **HART Communications** and the **SVI II AP HART 5**, **HART 6** or **HART 7**.

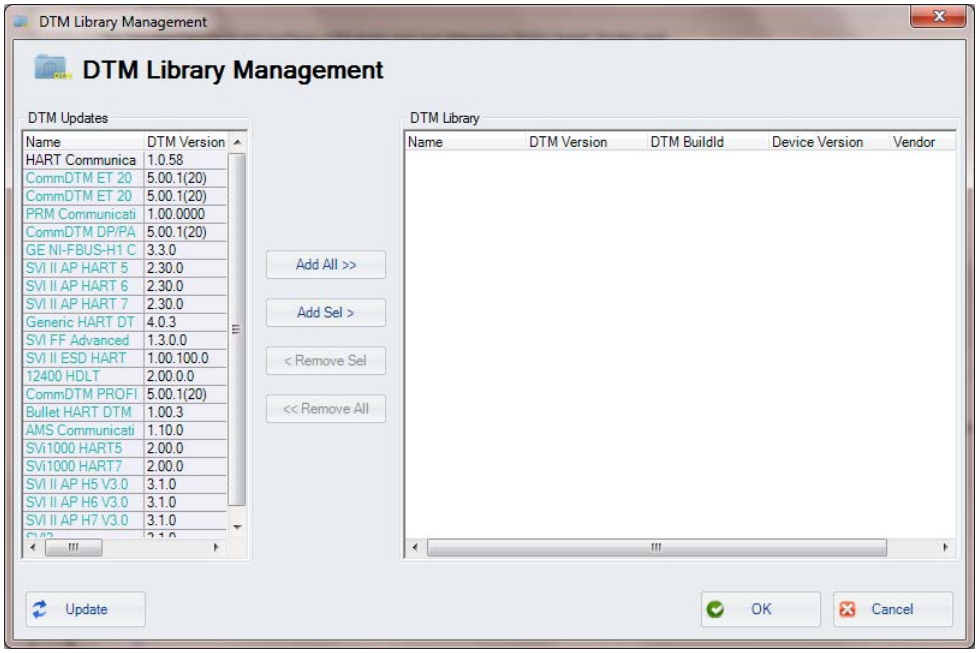

Figure 26 DTM Library Management: After Update

6. Click **Add Sel** and then click **OK** to close *DTM Library Management* dialog.

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7. Click **Settings > Field Networks**, click **Add** and Figure 27 appears. Select **HART Modem** and click **OK**.

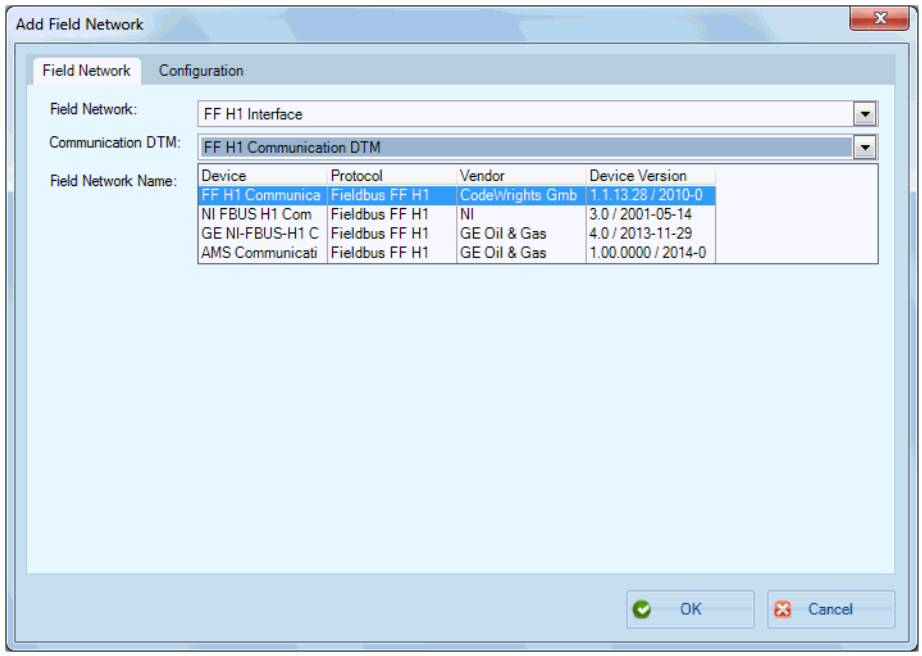

Figure 27 Add Field Network

8. Click **OK** again to add the *HART Modem* to *Network View* and Figure 28 appears.

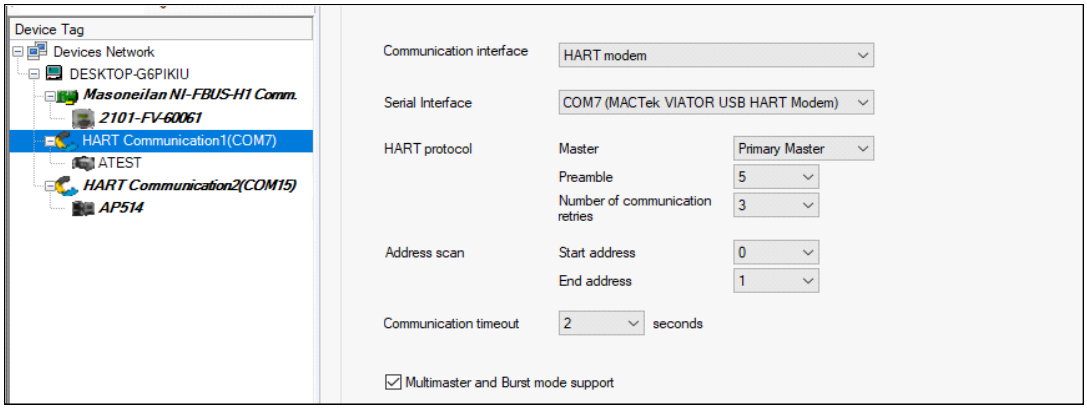

Figure 28 HART Modem Configuration Tab

9. Ensure the *Serial Interface* pulldown and the *Address scan* fields are correct. Click **Apply** and then **OK**.

NOTE

If device is connected (or powered through DCS), set Master to Secondary Master.

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10. Right-click on the **HART Modem** and do one of the following:

    Selecting **Network > Rebuild Network**.

    or

    Selecting **Open Connected Device**

    or

    Clicking **Add New Device,** Figure 29 appears, highlighting **SVI II AP HART 5**, **6** or **7** and clicking **OK**.

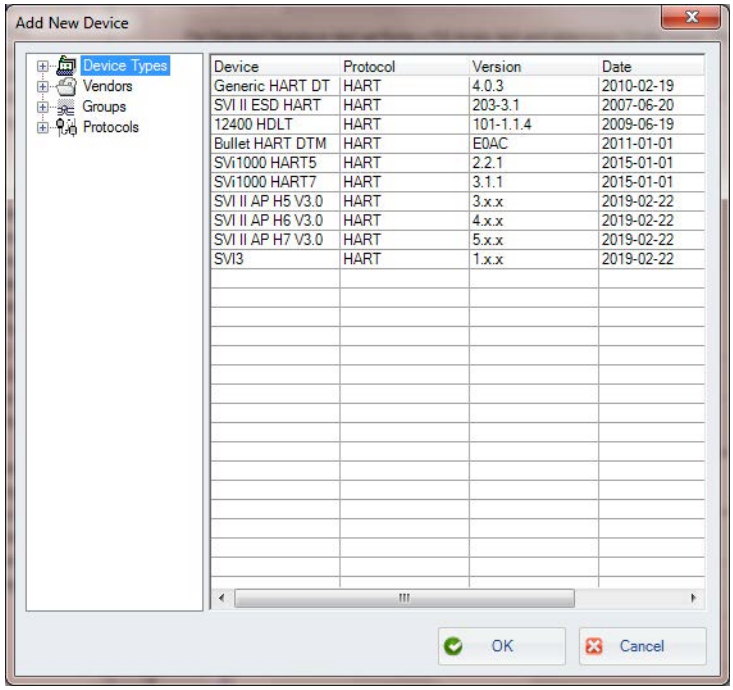

Figure 29 Add New Device

11. Right-click on the SVI II AP in the *Project* pane and click **Connect**.
12. Click **OK** to the DTM evaluation period warning, if it appears. The SVI II AP DTM opens.
    If the SVI II AP DTM doesn't open automatically: Select the SVI II AP device you added, right-click and select **Online Parameter**.

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13. Check that the SVI II AP is connected (see red oval in Figure 30).

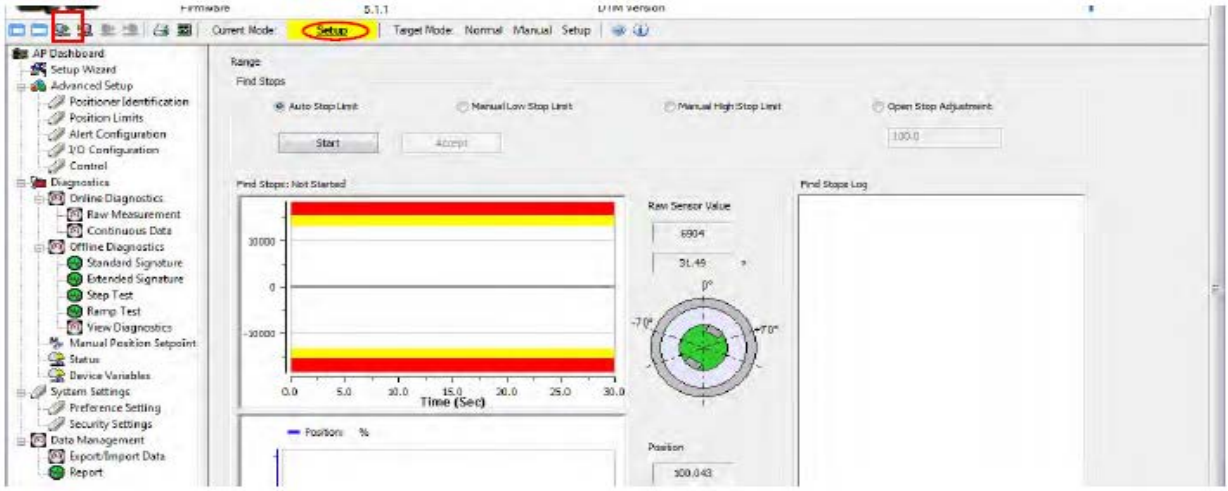

Figure 30 Connected

If not it does not connect:

Right-click on the device in the topology pane, select **Additional Functions** > **Communication** and Figure 31 appears. Correct the *Polling Address* and click **Apply**. Disconnect and then reconnect.

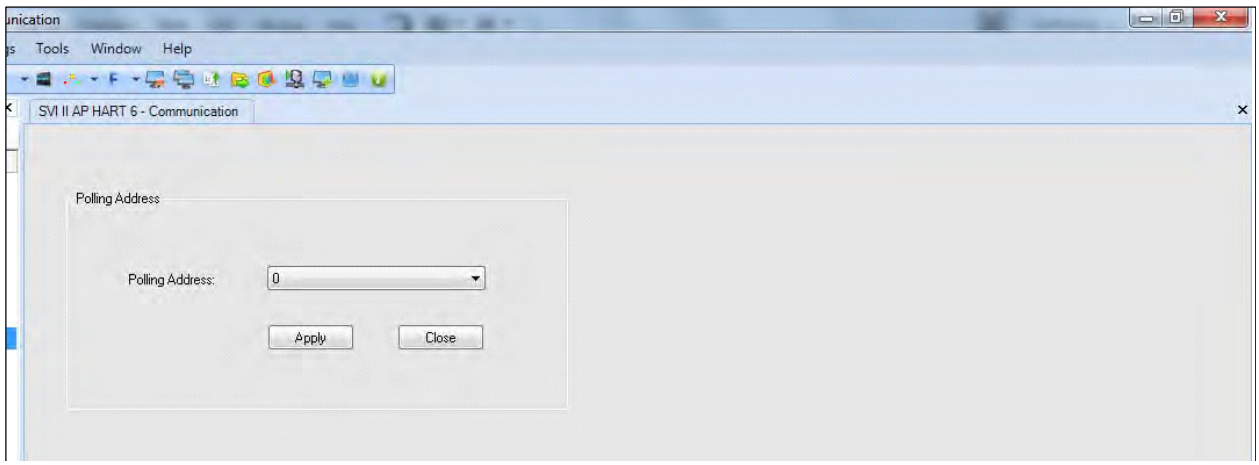

Figure 31 Communication Tab

14. Click **Upload All Parameters** icon (see red box in Figure 30).

NOTE

Upload means to pull data from the SVI II AP and load data into DTM onto the PC. Download puts data from the DTM into the SVI II AP.

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6. SVI II AP DTM Work Environment

Overview

This section describes the SVI II AP Advanced DTM main screen (Figure 32) 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 Figure 32 appears.

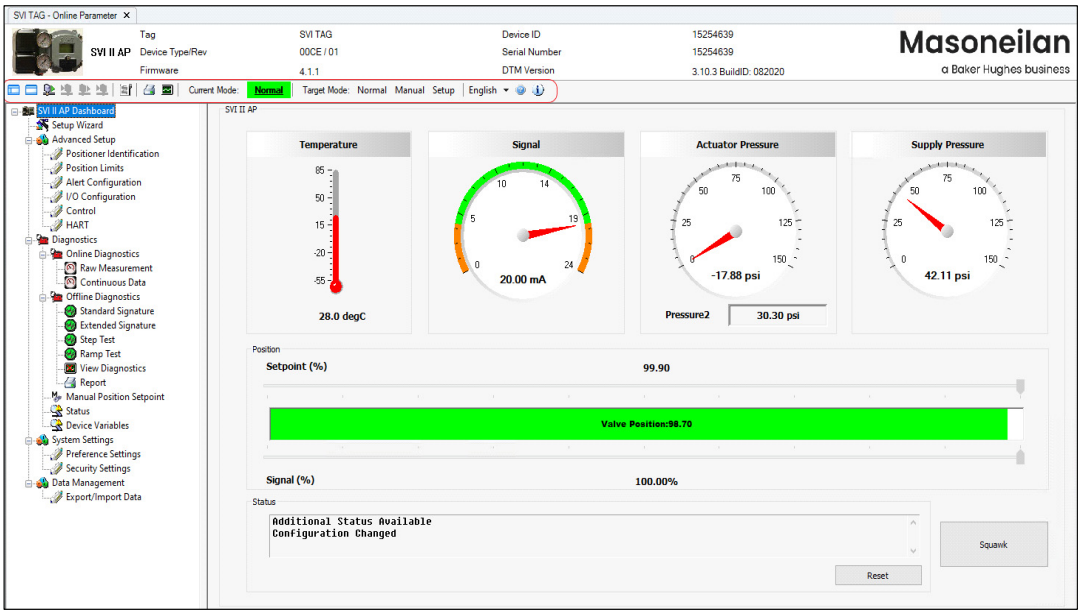

Figure 32 SVI II AP Advanced DTM Main Screen

NOTE

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

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SVI II AP DTM Specific Icon Bar Items

There are several items on the icon bar that are specific to the SVI II AP DTM (Table 2).

Table 2 SVI II AP DTM Specific Icon Bar Items

Icon	Description
	Toggles the DTM directory on/off.
	Toggles the area at the top of the screen with the *Tag*, *Device ID*, etc. on/off.
	Uploads all the data from the device.
	Downloads all the data from the SVI II AP DTM to the device.
	Uploads only the data from the active tab from the device.
	Downloads only the data from the active tab to the device.

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Table 2 SVI II AP DTM Specific Icon Bar Items (Continued)

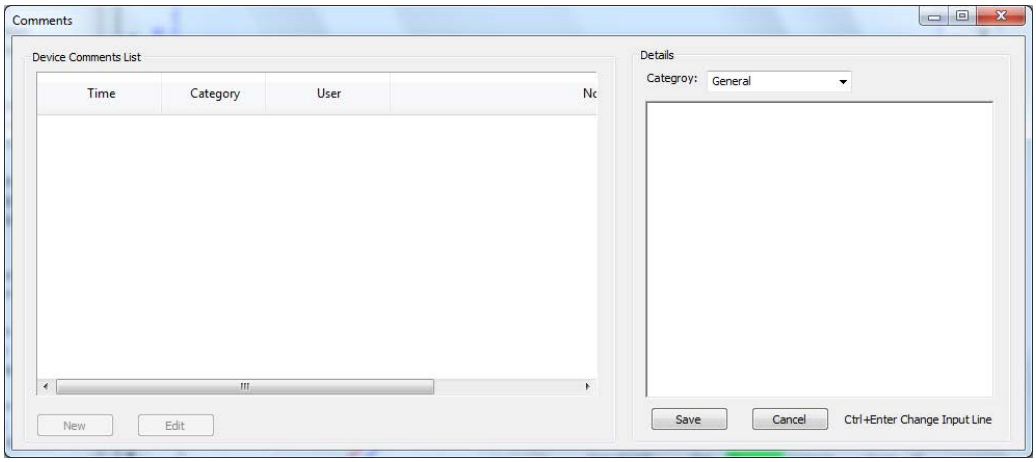
Icon	Description
	Opens a dialog to add a notes to the DTM data (Figure 33).  **Figure 33 SVI II AP Comments Dialog** The first time this dialog is used you can add comments without clicking *Add New*. All comments are timestamped, assigned the *User ID* of the person who is signed into the program and once *Save* is clicked added to the *Notes* field. √ Click **Add New** to enter new comments. You then can add new notes. √ Use the *Category* pulldown to select an area of relevance for the note: **Configuration**, **Diagnostics**, **General** or **Repair**. Once saved, this *Category cannot* be edited. √ Click **Save** to save comments. The comment is tied to the positioner and is preserved even when a newer version of the software is installed. √ Click **Edit** to make changes to existing notes. To edit an existing note: 1. Select the note. 2. Click **Edit** and the text *only* is opened for edit. Click **Ctrl+Enter** to move to the next line. 3. Click **Save**.
	Click to generate a pdf report of the SVI II AP DTM and its settings. See “Report” on page 123.
	Click to open the *Trend* feature. See “Standalone Trend” on page 54.

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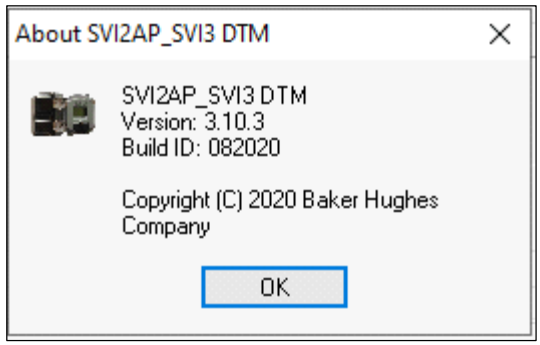
Table 2 SVI II AP DTM Specific Icon Bar Items (Continued)

Icon	Description
English	Click the down arrow to choose a language. This changes the display language for the SVI II AP DTM. It does not change the language in use for the communication DTM. Languages supported include: √ *English* √ *Chinese - simplified* √ *Russian* √ *Spanish* √ *Italian* √ *Japanese* √ *French* √ *German*
	Click to open the Help pdf.
	Click to open the *About SVI II AP DTM* dialog (Figure 34).  **Figure 34 About SVI II AP DTM**

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Current Mode and Target Mode

Use this area located at the top of all *SVI II AP Advanced DTM* screens (Figure 32) to view the current status of the SVI II AP and to change the operating mode.

Current Mode

The *Current Mode* displays either the current mode of the SVI II AP or its status as in Table 3.

Table 3 Current Mode Indicators

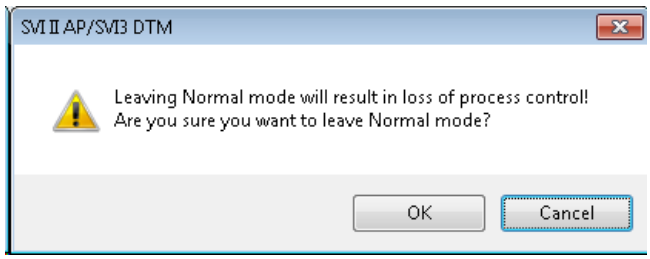
Indicator	Description
Normal	Indicates normal operation where the SVI II AP follows the 4 - 20 mA input signal and positions the valve accordingly. Whenever you leave the *Normal* mode, a warning appears (Figure 35).  **Figure 35 Leaving Normal Mode Warning** Click **OK** to continue the mode change.
Manual	Indicates that the SVI II AP is in *Manual* mode. 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. 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 Dashboard" on page 57 or on the "Diagnostics: Manual Position Setpoint" on page 156). **WARNING** *The positioner should not be left in this mode after required tasks are complete as it cannot automatically respond to process changes.*

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Table 3 Current Mode Indicators (Continued)

Indicator	Description
Setup	Indicates that the SVI II AP is in *Setup* mode. You can set calibration and configuration parameters. Additionally, you can run response time tests, a standard actuator signature test and an extended actuator signature test (if capability is purchased). **WARNING** *The positioner should not be left in this mode after required tasks are complete as it cannot automatically respond to process changes.*
FailSafe	Indicates that the SVI II AP is in *Failsafe* mode. 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. Refer to "Troubleshooting Guide" on page 207 for guidance in resolving issues causing this condition.
Marginal Power	Indicates that the SVI II AP has marginal power.Device is still functional. MARGINAL_POWER: Input current ≥ 3.2 mA and below ≈ 3.75 mA. Refer to "Troubleshooting Guide" on page 207 for guidance in resolving issues causing this condition.
Low Power	Indicates that the SVI II AP has low power. Device is not functional. LOW_POWER: Input current < 3.2 mA. Refer to "Troubleshooting Guide" on page 207 for guidance in resolving issues causing this condition.
Disconnected	Indicates that the SVI II AP is disconnected. Select the positioner in the topology pane, right-click and select **Connect** or click the icon ( ) in the ValVue icon bar. If unable to reconnect, refer to "Troubleshooting Guide" on page 207.

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Target Mode

Use this feature to quickly move between modes (Figure 36).

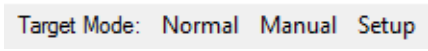

Figure 36 Target Mode

To change modes:

√ Click the mode. When leaving *Normal* mode a dialog appears (Figure 37).

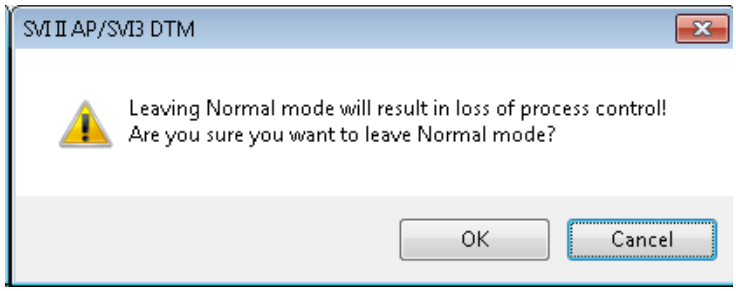

Figure 37 Leaving Normal Mode

Configure the Setpoint Using the Position Indicator

The system must be in Manual or Setup mode.

To configure the setpoint:

1. Either:

   √ Use the arrow and drag it to the required setpoint. While dragging, the number in the center bar shows the selected manual setpoint and this setpoint will be automatically written to the device (Figure 38).

Figure 38 Position Indicator Set Button with Pen

or

   √ Enter a value directly into the text field and Figure 38 appears.

2. Click **Set**.

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Tab Navigation

On tabs that exist as part of groups, such as *Advanced Setup*, three buttons appear:

Click to navigate back to the previous tab in the group. Inactive when on the first page in the group.

Click to download the changes made on the tab to the device. Inactive when disconnected and if no changes have been made.

Click to navigate back to the next tab in the group. Inactive when on the last page in the group.

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SVI II AP Advanced DTM Directory Tree

The directory tree (Figure 39) is used to navigate the various screens.

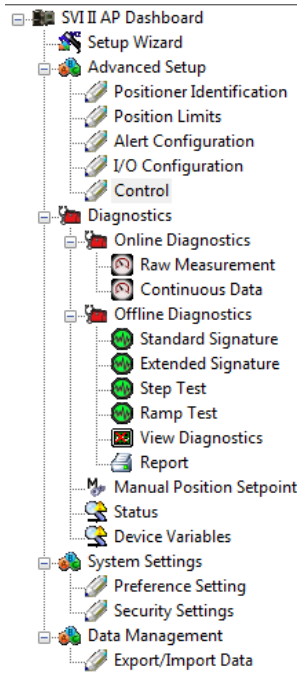

Figure 39 SVI II AP Advanced DTM Directory Tree

The tree is broken down into the following functional areas:

- √ *AP Dashboard* - Screen that displays operational signal readings. See “SVI II AP Dashboard” on page 57.
- √ *Setup Wizard* - Screen to perform automatic positioner/valve setup for stops and to perform autotuning. See “Setup Wizard” on page 61.
- √ *Advanced Setup* - A series of screens and sub tabs for manual configuring a wide range of advanced settings. See “Advanced Setup” on page 65.
- √ *Diagnostics* - A series of screens and sub-tabs for fault analysis and for viewing data numerically and graphically to analyze positioner/valve performance. This area is broken into two groups: *Online* and *Offline Diagnostics*. See “Diagnostics” on page 127.
- √ *System Settings* - Screens for manual configuring paths for the reports and data files associated with the particular positioner. See “Preference Settings” on page 169. and a screen for configuring access to various system functions. See “Function Settings for DTM” on page 170.
- √ *Data Management* - Screens for data export/import and generating a positioner configuration report. See “Data Management: Export/Import Data” on page 175.

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Topology Right-Click Menu

Use the topology view right-click menu to access functions some of which are ValVue3 related and some SVI II AP DTM related. Figure 40 shows which items are related to positioner DTM operations and which to ValVue3 (Black boxes are SVI II AP operations and red are ValVue3). Descriptions for all of these can be found in the ValVue3 help and the help print manual. See “How Do I Interface with ValVue3?” on page 21.

NOTE

The items available from Valvue3 may not be available if you use PACTware or other DTM and run a Masoneilan specific positioner DTM inside of it.

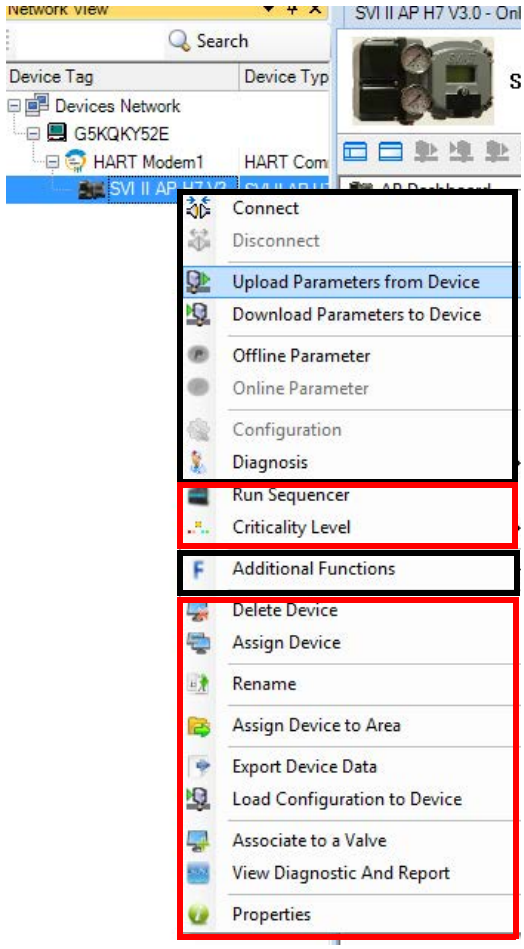

Figure 40 Topology Right-Click Menu

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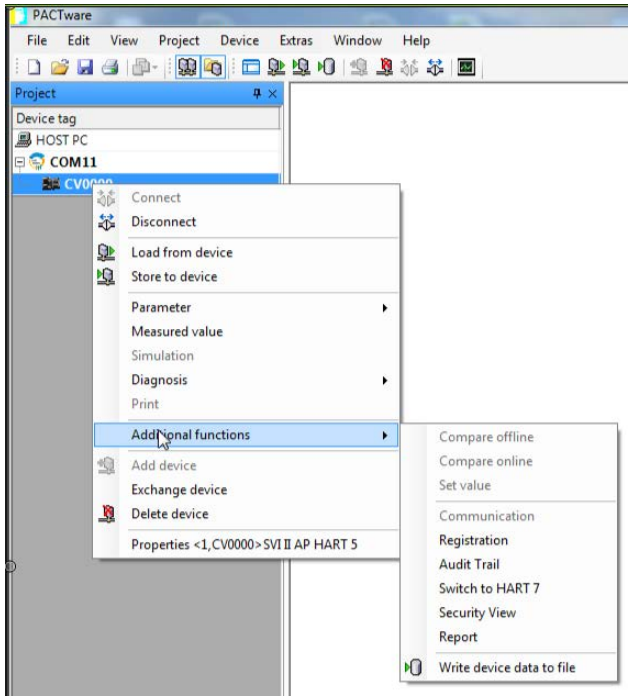
PACTware Topology Menu

The PACTware menu is discussed here as an example of features that are available if you operate the SVI II AP DTM inside of Masoneilan's ValVue3, but are absent if you use another vendor's overall DTM. Figure 41 shows the topology pane right-click menu for ValVue3 and PACTware side-by-side.

PACTware



ValVue3

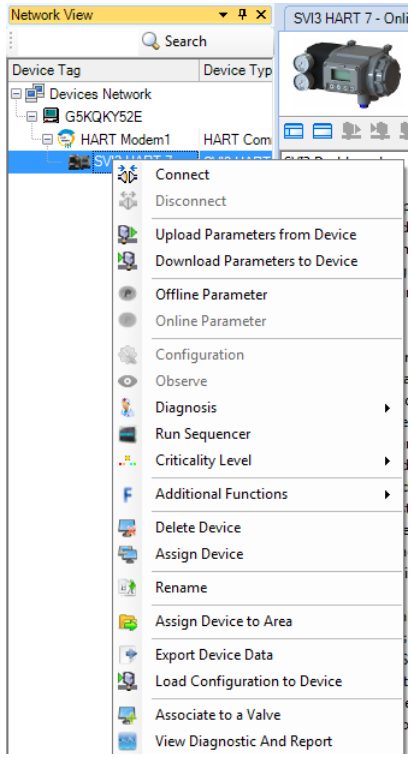


Figure 41 Topology Pane Comparison

Features offered by ValVue3 include:

- √ Criticality Level
- √ Run Sequencer
- √ Associate to Valve - without this you cannot link a positioner and a valve together for analysis.
- √ Assign Device to Area - without this you cannot assign a device to an area or view.
- √ Export Device Data- export device data for later use.
- √ View Diagnostic and Report - Opens the Signature History dialog to select a test result or results to view. Test results can also be imported or exported to an Unified Signature format (.usf).

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Standalone Trend

Use the standalone *Trend* (Figure 42) to observe the valve real time performance. The process trend graph is useful for troubleshooting a control valve and for tuning the PID positioning parameters. The process trend graph can be detached as a separate window for viewing while performing calibration and diagnostic tasks. As the X axis is defined in seconds, the process trend graphs are zoomed only on the Y axis.

See “Diagnostics: Offline Diagnostics” on page 133 for a further description of functionalities.

To open the trend:

√ Click the *Trend* icon .

In manual or setup mode, user can enter setpoint to change the valve position.

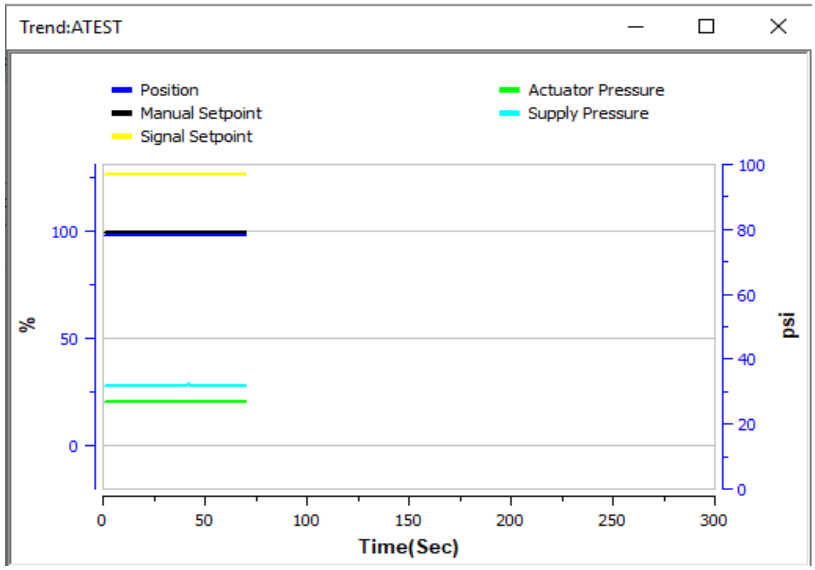

Figure 42 Standalone Trend

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Pencil/Exclamation Point

Throughout the use of the Masoneilan DTMs and ValVue3, there are two common indications that appear:

- √ Pencil ( ): This indicates that a field has been changed and there needs to be a save or a save and download to the device.
- √ Exclamation Point (!): This indicates that a field requires information or that the entry is not allowed.

These icons also appear in the topology tree to indicate a tab where there is an out of range or and unsaved value (Figure 43). The out of range exclamation point always takes precedence.

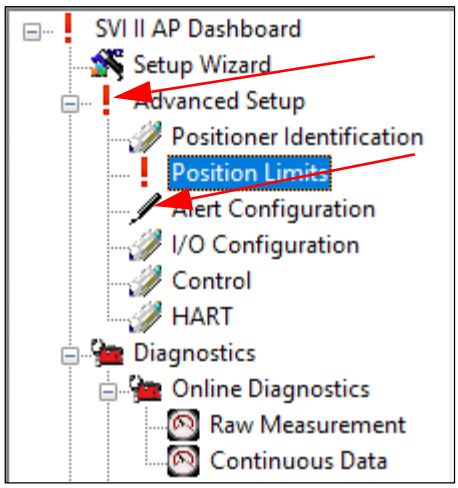

Figure 43 Topology Tree with Icons

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7. SVI II AP Dashboard

SVI II AP Dashboard Screen

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

√ Double-click **SVI II AP Dashboard.**

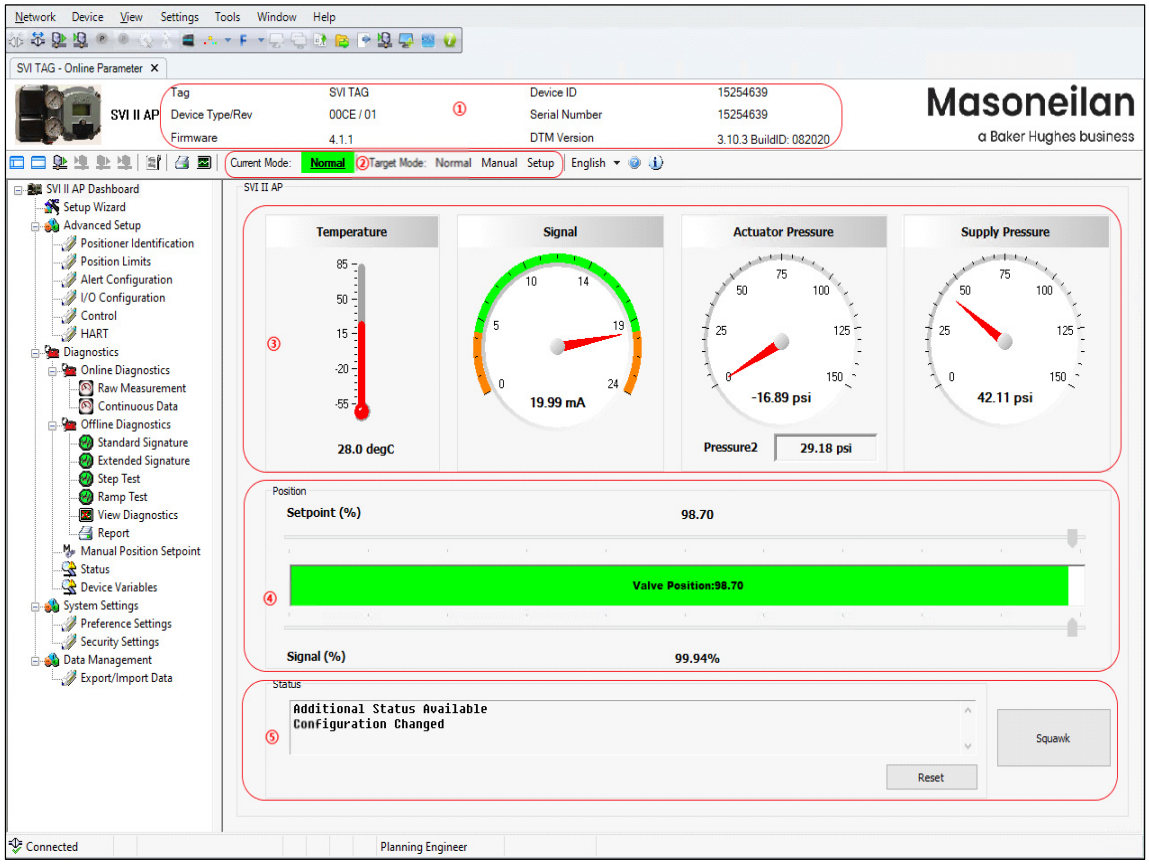

Figure 44 SVI II AP Dashboard Screen

NOTE

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

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Buttons and Fields

① *Information* in DTM Header	√ *Tag* √ *Device Type/Rev* √ *Firmware: Firmware revision* √ *Device ID* √ *Serial Number* √ *DTM Version* This data appears at the same location on all screens but can only be changed on the *Positioner Identification* screen (“Advanced Setup: Positioner Identification” on page 67).
② *Mode* area	√ *Current Mode* √ *Target Mode* These items appear at the same location on all screens and is used to view and change mode. See “Current Mode and Target Mode” on page 47.
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 (“Advanced Setup” on page 65). √ *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 (appears if detected). √ *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).

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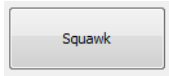
④ *Position area*

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. In NORMAL mode, the setpoint is the target position based on the characterized input. See “Configure the Setpoint Using the Position Indicator” on page 49.
- √ *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 “Advanced Setup: Control: Travel Calibration” on page 95.
  The range is set on the “Advanced Setup: I/O Configuration: Input Signal” on page 81 or “Configure the Setpoint Using the Position Indicator” on page 49.
- √ *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: Active Faults” on page 158.)
  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. For an SVI II AP using HART® 6, you need to push any button on the SVI II AP to clear the command from the LCD. With a HART® 7 unit, you can send a temporary squawk where *Squawk* appears on the LCD display for two seconds.
- √

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

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8. Setup Wizard

Setup Wizard

Running the Setup Wizard is an automated task, where the only choice you make is whether the valve is *Air-to-Open* or *Air-to-Close*. The wizard then configures based on valve type detected. Once the wizard is complete, if necessary, you can use “Advanced Setup” on page 65 to customize settings. The Setup Wizard can dramatically reduce commissioning time in the field.

To run the Setup Wizard you must first be in Setup mode. See “Current Mode and Target Mode” on page 47 for information on changing modes.

Figure 45 Setup Wizard

To configure the items on this tab manually see “Advanced Setup” on page 65.

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Run the Setup Wizard

WARNING

This procedure moves the valve.

1. Place the system in *Setup* mode.
2. Select the *Air Action*:

   √ **Air to Close**

   √ **Air to Open.**

   A warning appears above and the procedure runs. During the procedure the *Trend* graph shows the valve function. If successful Figure 46 appears.

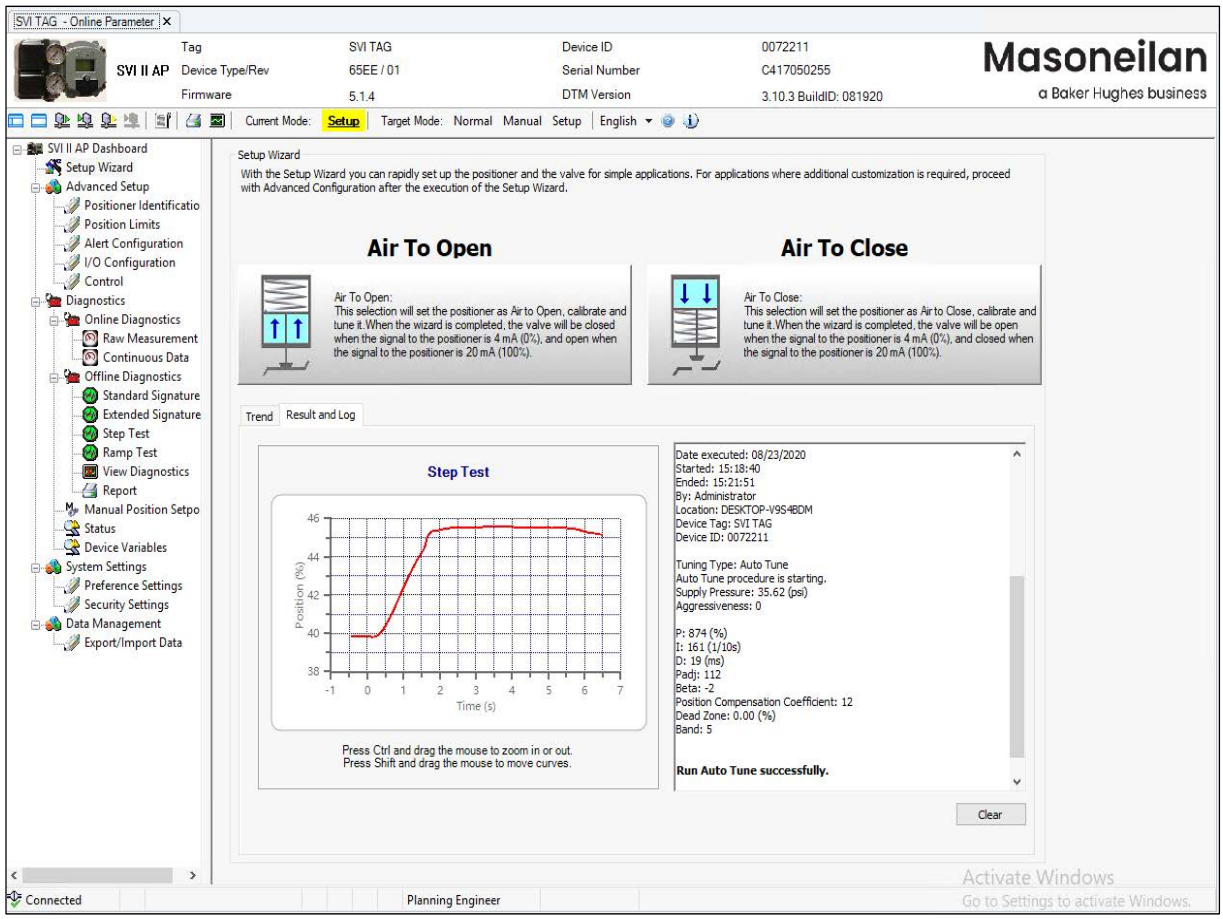

Figure 46 Auto Tune Successful

Here you can see the results graphically and the settings configured by the Auto Tune procedure in the *Results and Log* area that automatically appears.

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3. Set the mode back to *Normal*.

   If the procedure fails:

   1. Reset the SVI II AP on the *Diagnostics* screen (see “Diagnostics” on page 127).
   2. Rerun *Auto Tune*.

   If it fails again, manually tune. See “Advanced Setup: Control: Tuning” on page 106.
4. Set the mode back to *Normal*.

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9. Advanced Setup

Configuration

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

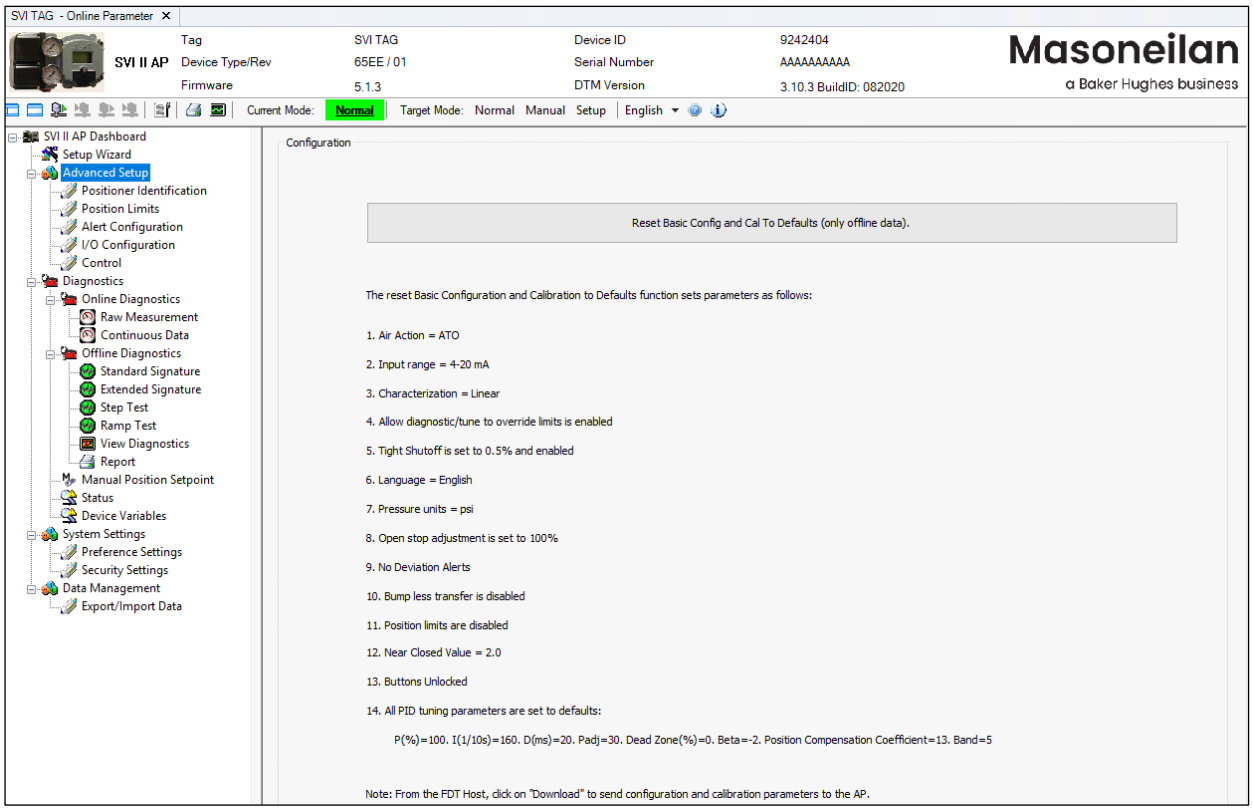

Figure 47 Configuration

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Reset Data

To reset data:

1. Ensure you are in *Setup* mode.
2. Click Reset Basic Config and Cal To Defaults (only offline data). and Figure 48 appears.

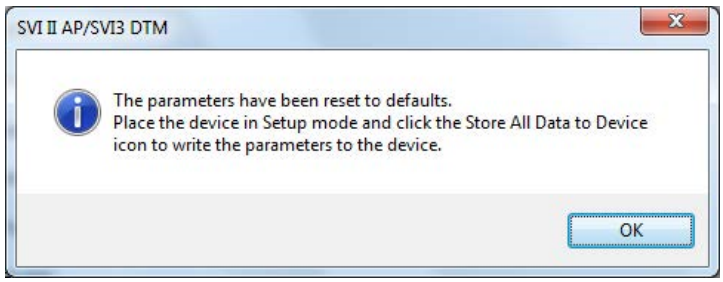

Figure 48 Reset Basic Config and Cal to Defaults Message

3. Click **OK**.
4. Ensure the device is in Setup mode.
5. Click the **Store All Data to Device** icon.

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Advanced Setup: Positioner Identification

Use this screen to configure Descriptor, Message and Date information, display positioner module information. You can write the parameters on this screen under Normal, Manual and Setup mode.

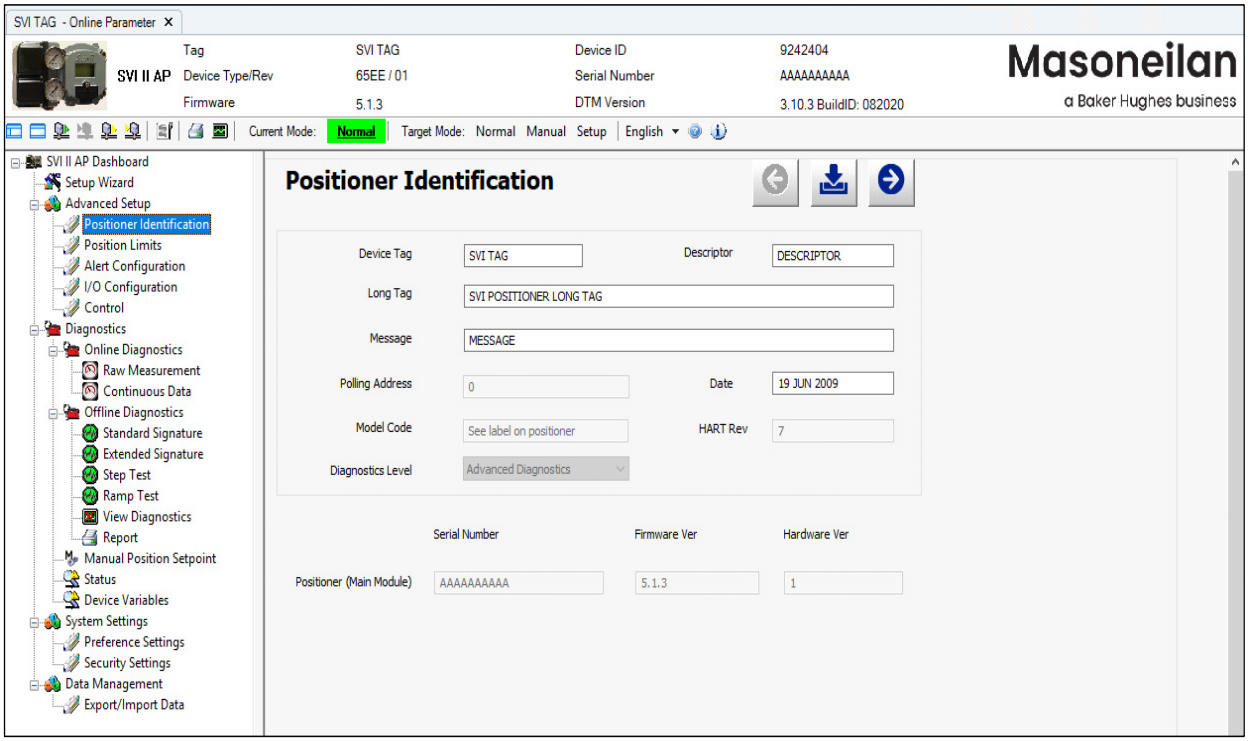

Figure 49 Advanced Setup: Positioner Identification

Buttons and Fields

Device Tag	Enter up to eight characters long and is used to identify the positioner in the system and appears throughout the program. This can be taken from a plant drawing or control diagram. Use by HART® to identify the device.
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 and 7 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.
Polling Address	Enter the polling address used to identify a field device; usually *0*.
Model Code	Refers user to positioner label.
HART® Rev	Displays the HART revision for the device.

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Diagnostics Level	Displays the diagnostic level of the positioner: √ For AP, there are three diagnostic levels: Easy Smart, Standard diagnostics and advanced diagnostics
All Modules	When connected to the positioner, presents the information for all detected modules (boards): √ *Positioner (Main Module)*: Must be present in all units. The following data appears in the fields below for each: √ *Serial Number* √ *Firmware Ver* √ *Hardware Ver*

Edit Positioner Identification

To configure these items:

1. Enter data as required into the text fields and pulldown lists.
2. Click to download the changes to the positioner.

NOTE

If you change the Device Tag field, make sure you keep a record of the previous name.

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Advanced Setup: Position Limits

Use the *Position Limits* tab (Figure 50) parameters to limit the valve, force the valve to close tightly or open fully at specified positions. You can also activate a deviation warning.

Once the value is out of range, a red exclamation point (**!**) appears.

CAUTION

Position Limit parameters are powerful tools to alter the valve performance to be non-linear. Use them with caution and only when the process requires special performance.

When Tight Shutoff is configured to a positive value, small flows are not controllable.

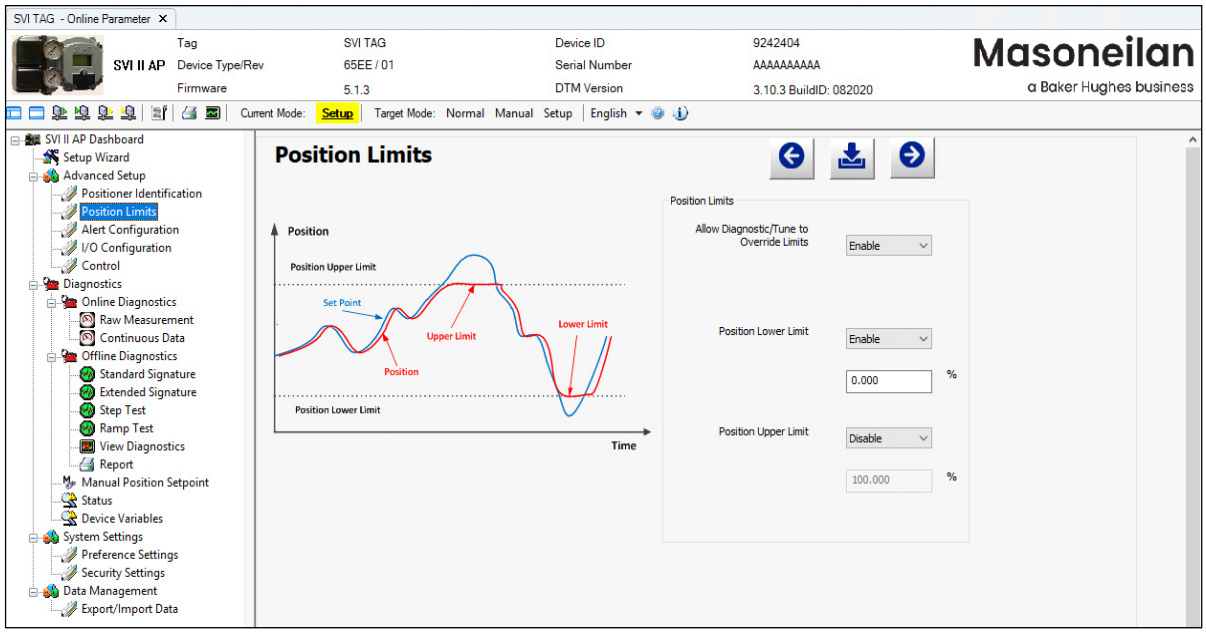

Figure 50 Advanced Setup: Position Limits

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Buttons and Fields

Positioner Limits

Allow Diag/ Tune to Override Limits	Use this pulldown to enable/disable autotuning and diagnostics to override position limits. The override only extends to these two situations for tuning and diagnostics purposes; once the operations are complete position limits are obeyed.
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.

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Advanced Setup: Alert Configuration

Use the *Alert Configuration* screen (Figure 51) to set the position-based limits.

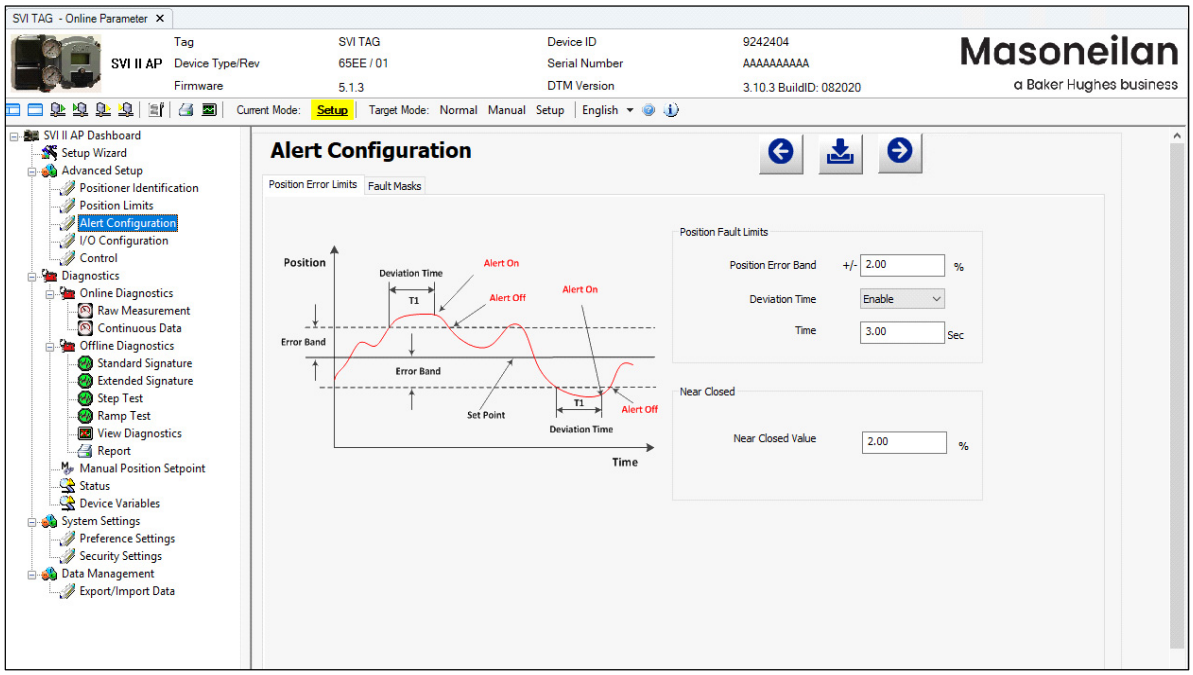

Figure 51 Advanced Setup: Alert Configuration

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. Only that a flag is set is reported. Ranges: .5 to 200% and 1 to 328 seconds.
Deviation Time	Use this pulldown to enable/disable the use of *Time*'s value. Activates a time field below.
Time	Enter a time after which if the *Position Error Band* is exceeded a flag is set.

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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.

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Advanced Setup: Fault Masks

Use the *Fault Masks* screen (Figure 52) 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. This tab is not available for HART® 5 and 6.

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

The window has selectable tabs that display the associated parameters for each tab. Mouse hover over a fault for a fault definition.

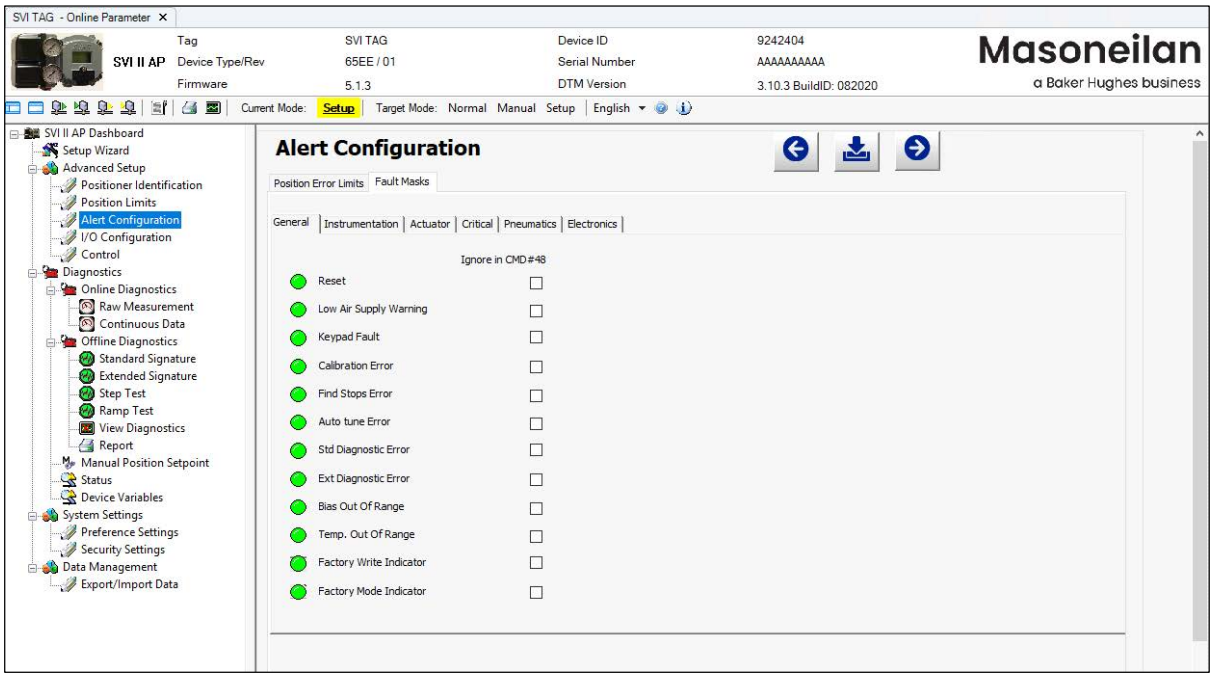

Figure 52 Advanced Setup: Fault Masks

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Buttons and Fields

Ignore in CMD #48

Click an individual checkbox to remove that fault's status from any Command 48 status updates. You must click to complete configuration.

A warning dialog appears (Figure 53) asking to confirm the masking/unmasking of the faults (s).

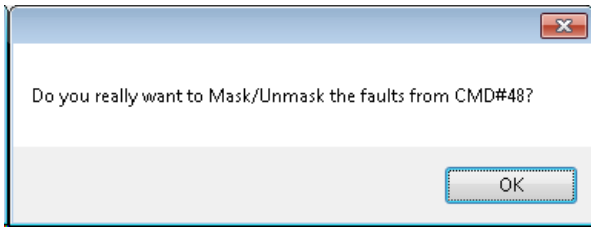

Figure 53 Mask/Unmask Faults in CMD #48

This functionality does not appear for HART® 5 or 6.

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General

The *General* tab displays general faults.

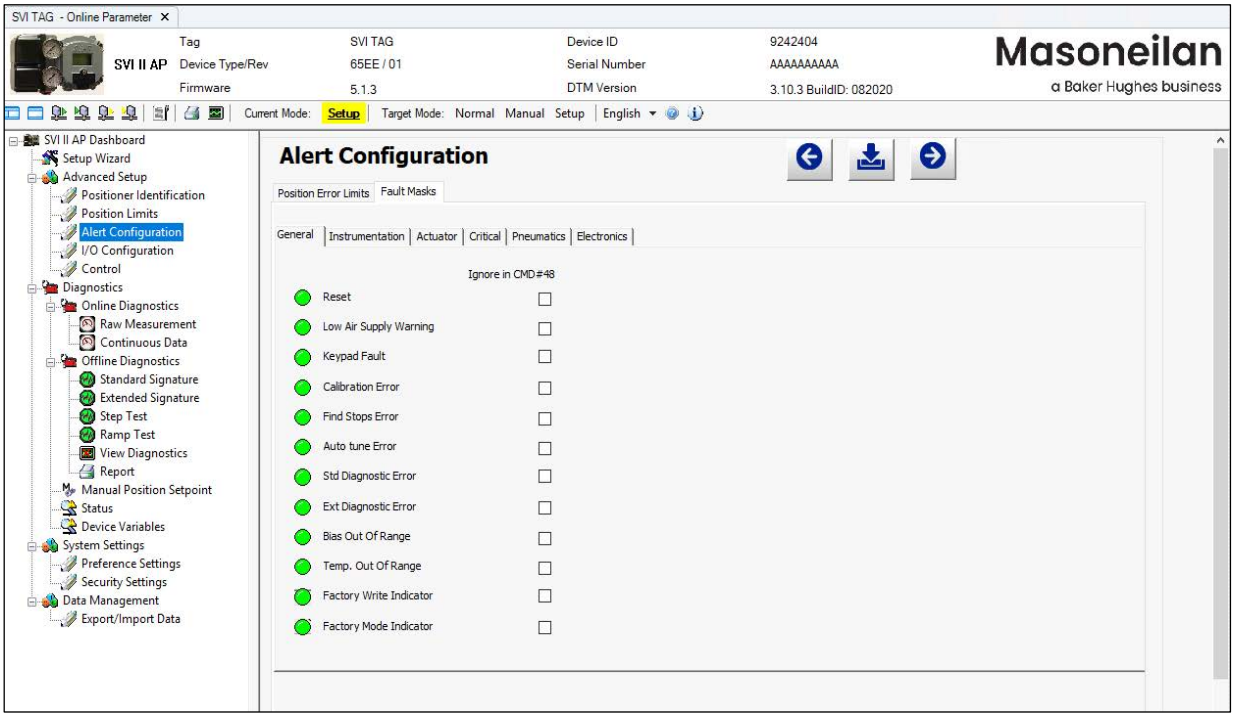

Figure 54 Advanced Setup: Fault Masks: General

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Instrumentation

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

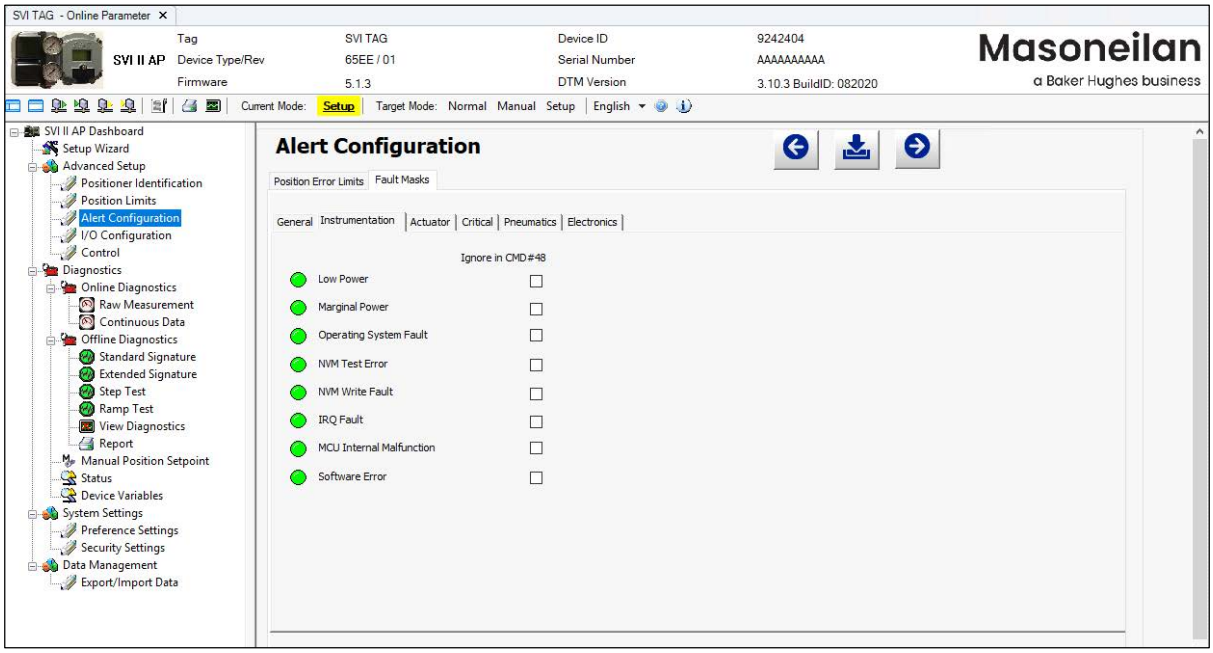

Figure 55 Advanced Setup: Fault Masks: Instrumentation

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Actuator

The *Actuator* status tab displays actuator faults.

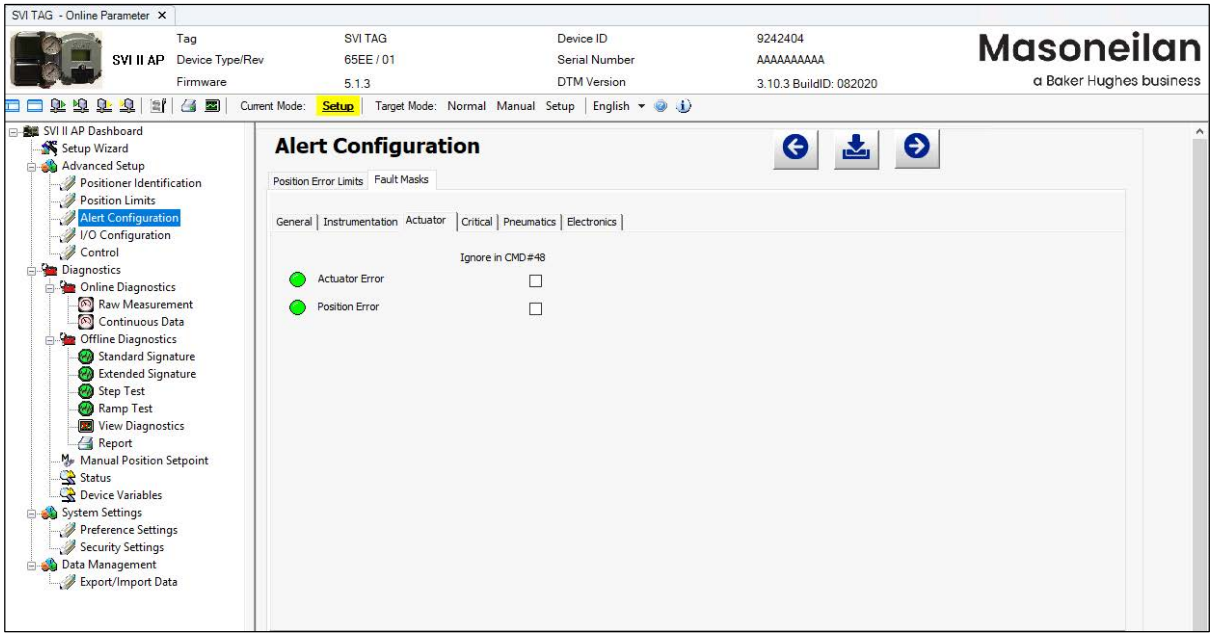

Figure 56 Advanced Setup: Fault Masks: Actuator

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Critical

The *Critical* status tab displays all critical errors.

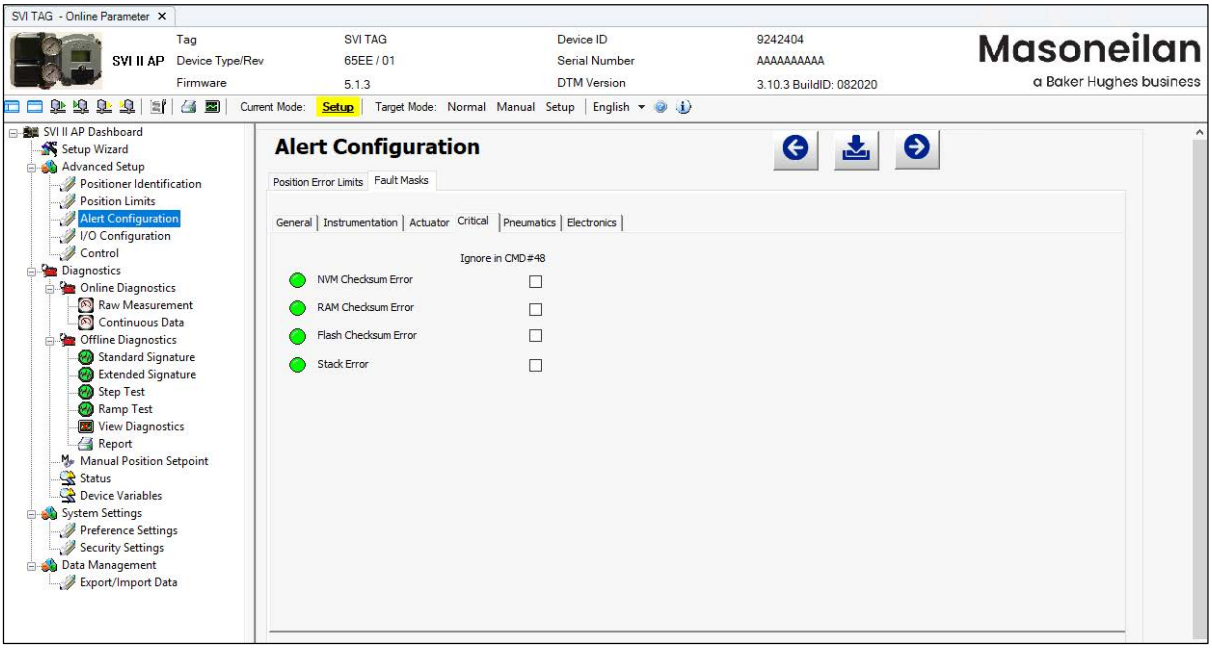

Figure 57 Advanced Setup: Fault Masks: Critical

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Pneumatics

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

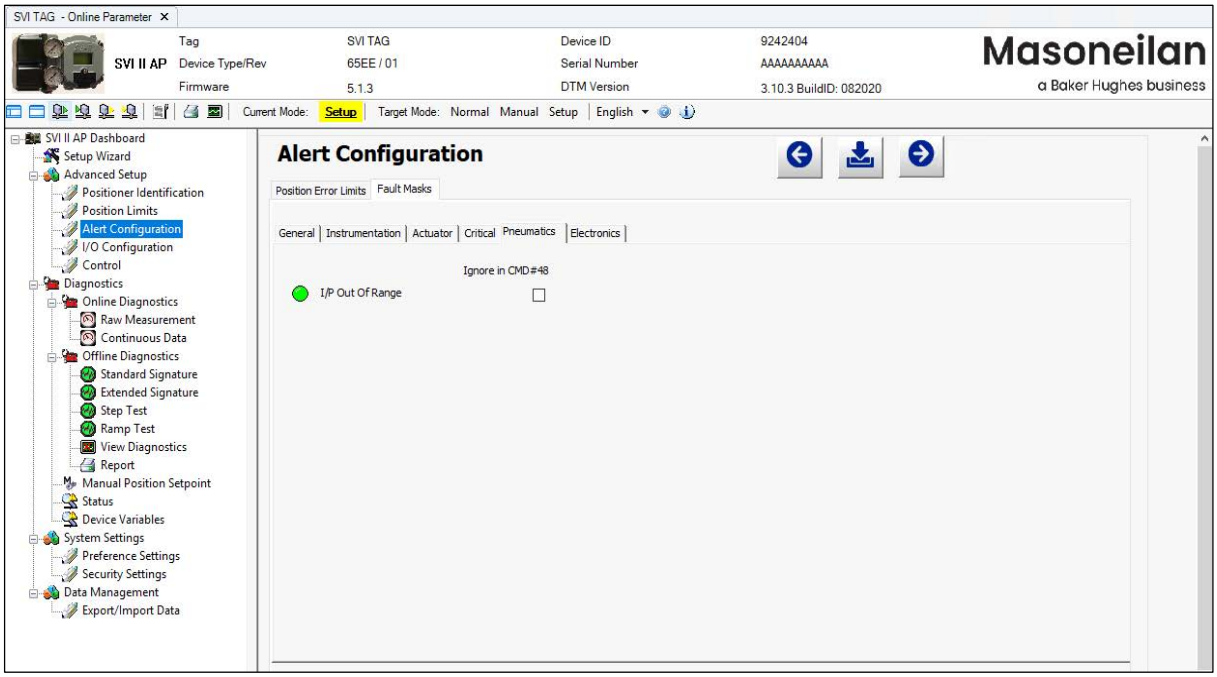

Figure 58 Advanced Setup: Fault Masks: Pneumatics

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Electronics

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

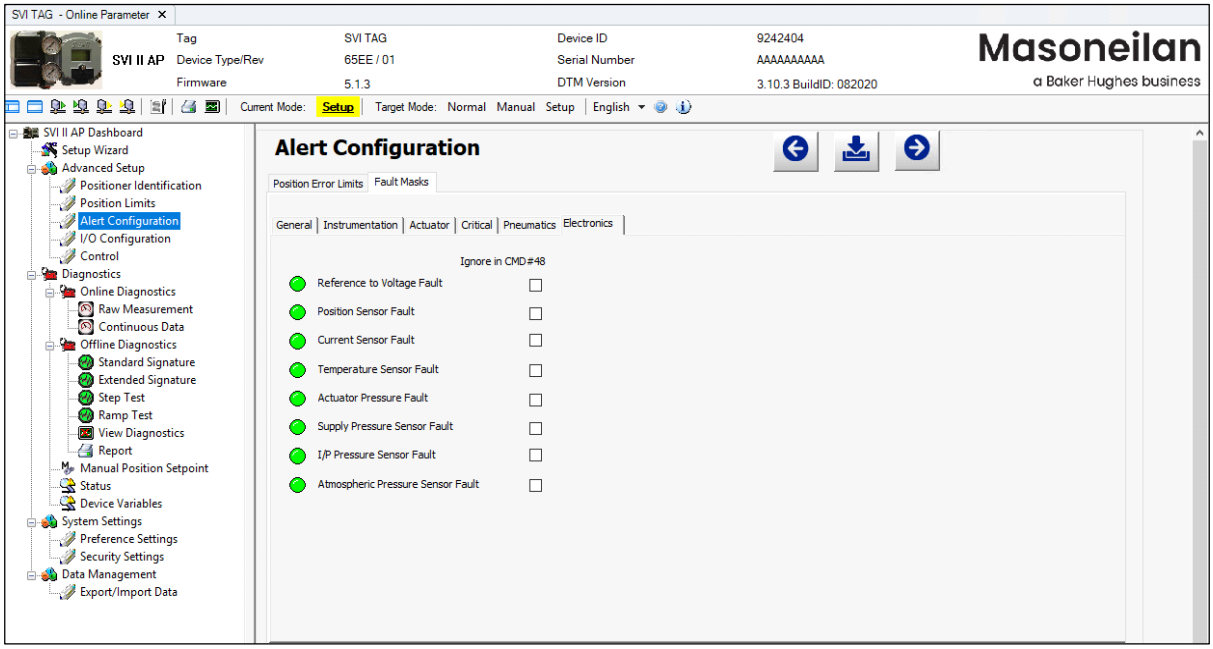

Figure 59 Alert Configuration: Fault Mask: Electronics

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Advanced Setup: I/O Configuration: Input Signal

Use this tab to:

- √ Set the input signal range.
- √ Calibrate the loop current or the loop current gain to match what is physically measured.

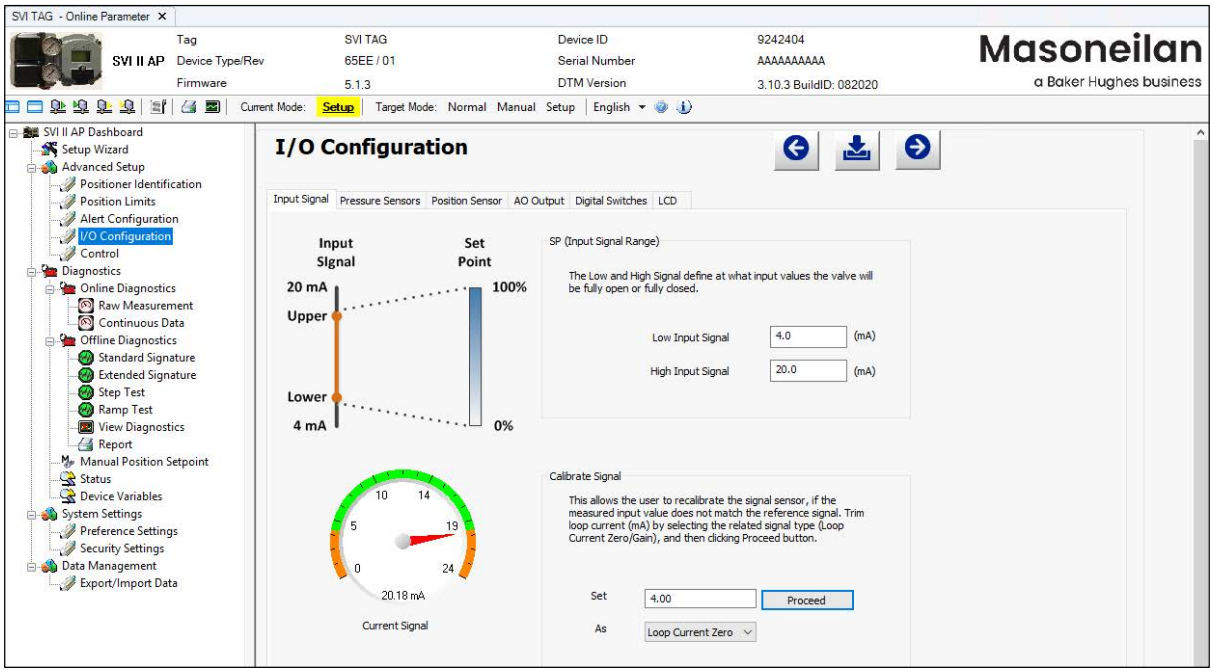

Figure 60 Advanced Setup: I/O Configuration: Input Signal

Buttons and Fields

SP (Input Signal Range)

Input Signal to Setpoint graphic	Shows the relationship between the valve position input signal and valve setpoint (static only).
Low Input Signal	Enter the input signal low range value for valve closed (direct-acting) or valve open (reverse-acting). Range: 3.8 to 14 mA. The span between lower and upper range must be 5 mA.

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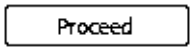
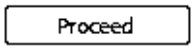
High Input Signal	Enter the input signal high range value for valve open (direct-acting) or valve closed (reverse-acting). Range: 8 to 20.2 mA. The span between lower and upper range must be 5 mA.
Calibrate Signal	
Set field	Input the value physically measured.
As pulldown	Use the pulldown to select either **Loop Current Zero** or **Loop Current Gain**.
 *Proceed* button	Click this button to calibrate the signal.
Current Signal graphic	Displays the value of the signal in mA.

Set Loop Current zero or Loop Current Gain

1. Ensure the SVI II AP is in *Setup* mode.
2. Input the value physically measured.
3. Use the pulldown to select either **Loop Current Zero** or **Loop Current Gain**.
4. Click  .

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Advanced Setup: I/O Configuration: Pressure Sensors

Use this tab to set pressure units, monitor all pressures, and recalibrate pressure sensors at zero psi.

The pressure 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.

NOTE *For single-acting, Actuator Pressure 2 displays N/A.*

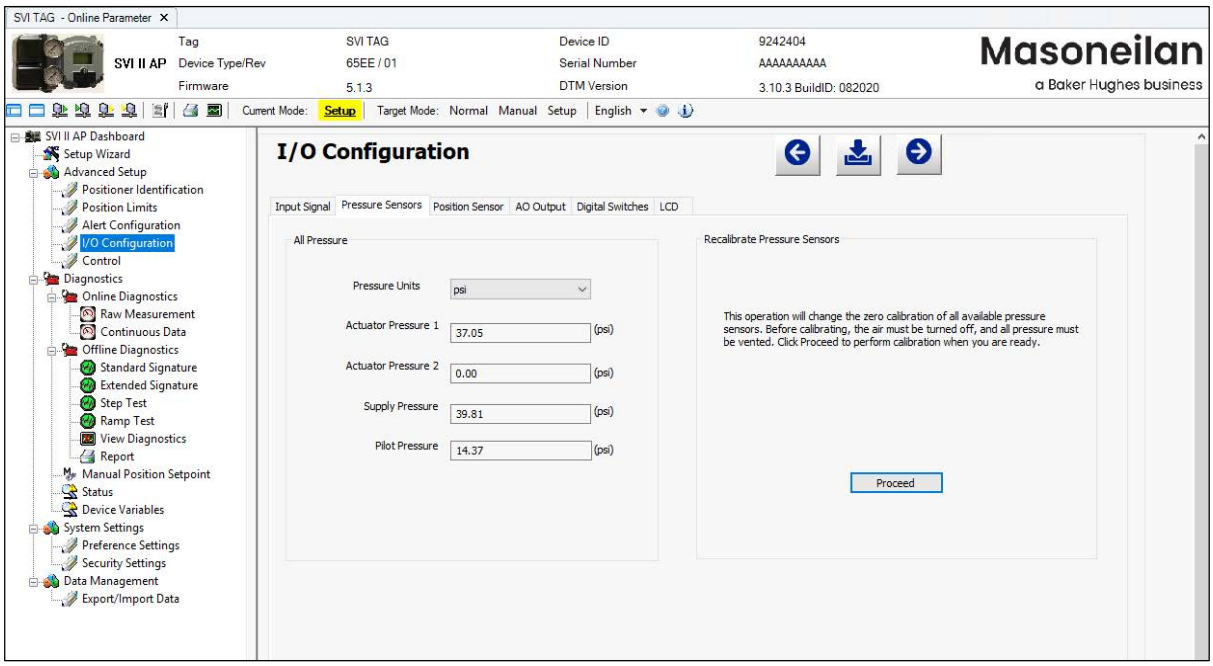

Figure 61 Advanced Setup: I/O Configuration: Pressure Sensors

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Buttons and Fields

All Pressure	
Pressure Units	A pulldown list for selecting the pressure units for use: *psi*, *bar* or *kPa*.
Actuator Pressure 1	Displays the value detected.
Actuator Pressure 2	Displays the value detected.
Supply Pressure	Displays the pressure generated by the air supply.
Pilot Pressure	Displays the pressure detected by the pilot pressure sensor.
Proceed *Proceed* button	Click this button change zero calibration of all available pressure sensors.

Set Sensors Zero Calibration

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.

1. Ensure the air supply is turned off.
2. Vent the valve/positioner.
3. Ensure the SVI II AP is in *Setup* mode.
4. Click Proceed .

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Advanced Setup: I/O Configuration: Position Sensor

Use this tab to configure the position sensor as either build-in or remote position.

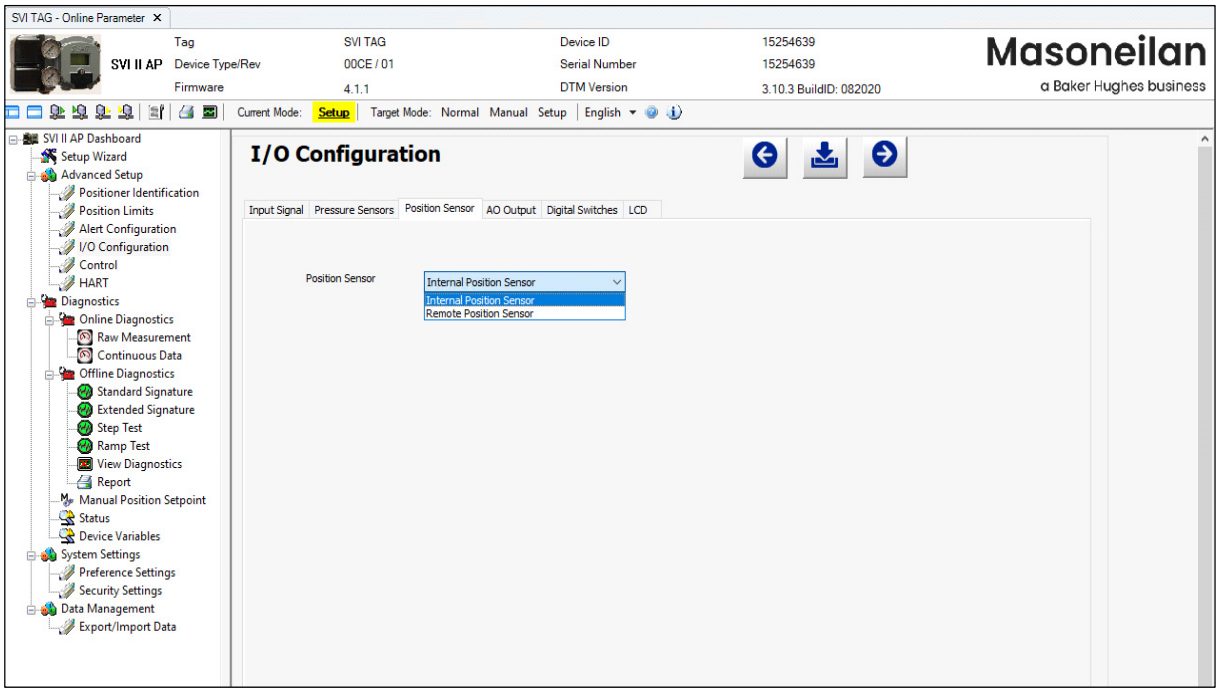

Figure 62 Advanced Setup: I/O Configuration: Position Sensor

Buttons and Fields

Position Sensor A pulldown list for selecting the position sensor type: *Internal Position Sensor, Remote Position*.

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Set Position Sensor

1. Ensure the SVI II AP is in *Setup* mode.
2. Ensure the remote position sensor unit is installed as per manufacturer instructions. For Masoneilan's RPS see *Masoneilan™ Remote Position Sensor (RPS) Quick Start Guide*, which is downloadable at valves.bakerhughes.com/resource-center.
3. Use the position sensor pulldown to select: **Internal Position Sensor, Remote Position**.

   A warning dialog appears (Figure 63).

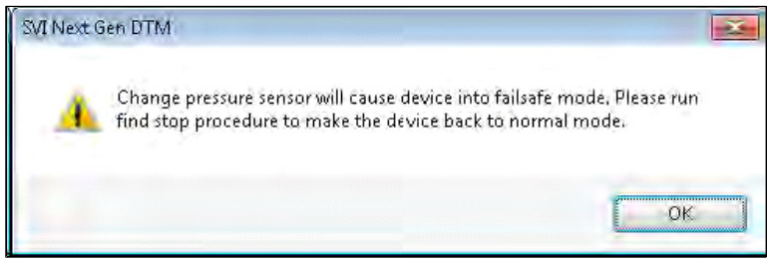

Figure 63 Warning Dialog

4. Click to download to the device.

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Advanced Setup: I/O Configuration: AO Output

Use this tab to:

- √ Change the configuration for the re-transmitter option for closed at 4 mA/open at 20 mA to closed at 20mA/open at 4 mA.
- √ Set a fixed analog output for the position retransmitter for a loop wire check. This is part of the optional Option Module and is grayed out if not present.

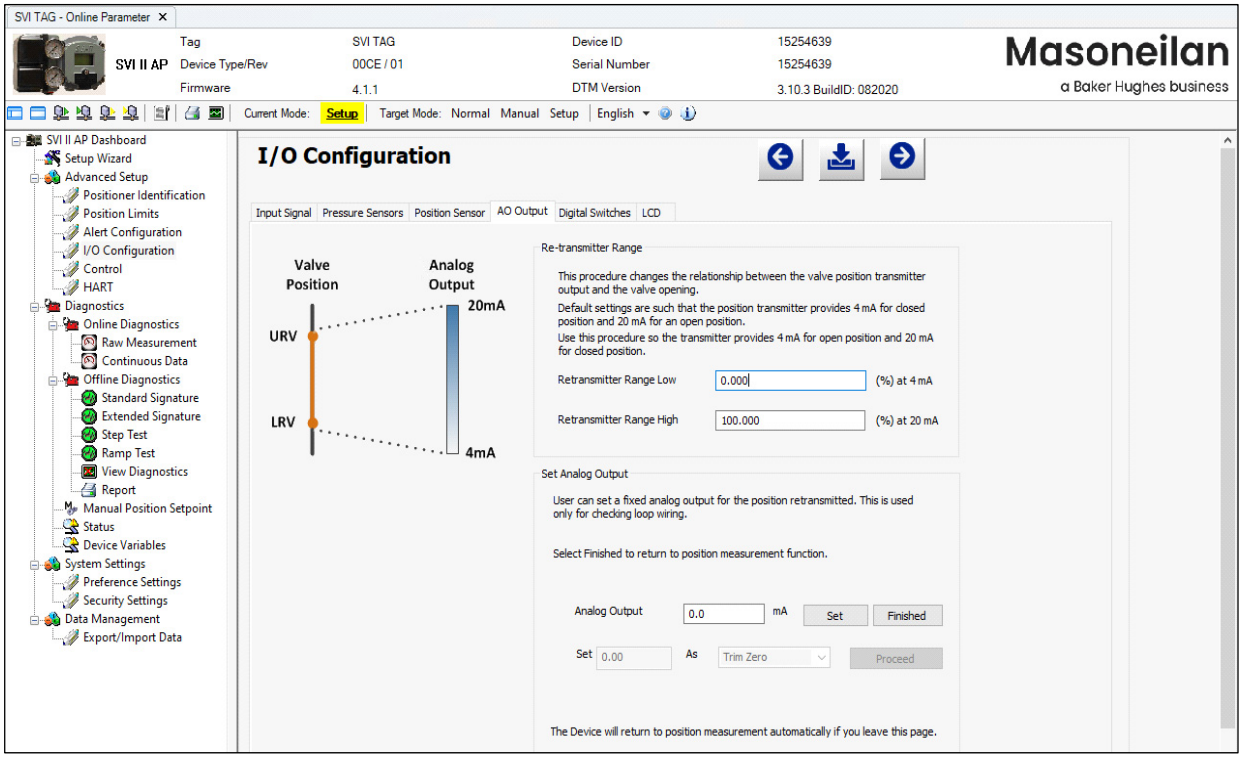

Figure 64 Advanced Setup: I/O Configuration: AO Output

Buttons and Fields

Re-transmitter Range

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.

Set Analog Output

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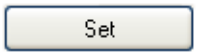
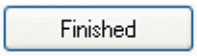
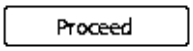
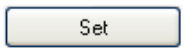
Analog Output	Enter a fixed value for the position retransmitter. Enter *0* to place the transmitter out of the fixed output mode.
 *Set* button	Click to set the value for the loop test.
 *Finished* button	Click to place the system back into position measurement mode.
Set	Enter a value associated with the trim type (mA).
As	Use the pulldown to select the trim type to: √ *Trim Zero*: This is usually 4 mA, but can be set between: 3.5 to 8 mA. √ *Trim Gain*: This trims the mA span of the device. can be set between: 16 to 22 mA.
 *Proceed* button	Click to set the value for the trim type selected.

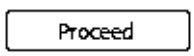
Set Retransmitter Range

1. Ensure the SVI II AP is in *Setup* mode.
2. Enter a value into the *Retransmitter Range Low* and *Retransmitter Range High* fields.
3. Click to download to the device.

Set Analog Output

1. Ensure the SVI II AP is in *Setup* mode.
2. Install a multimeter in your setup appropriately to measure current.
3. Enter a value into the *Analog Output* field.
4. Click  to observe the current.
5. Click to complete the test and return the positioner to position measurement.

Set Trim

1. Ensure the SVI II AP is in *Setup* mode.
2. Install a multimeter in your setup appropriately to measure current.
3. Enter a value into the *Set* field.
4. Select **Time Zero** or **Trim Gain** and click  to observe the current.
5. Click to complete the test and return the positioner to position measurement.

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Advanced Setup: I/O Configuration: Digital Switches

Use this tab to default operating position for the digital input and two digital output switches.

NOTE

The DI/DO switch configuration is allowed even if the hardware is not present. However, you are warned when trying to download configuration.

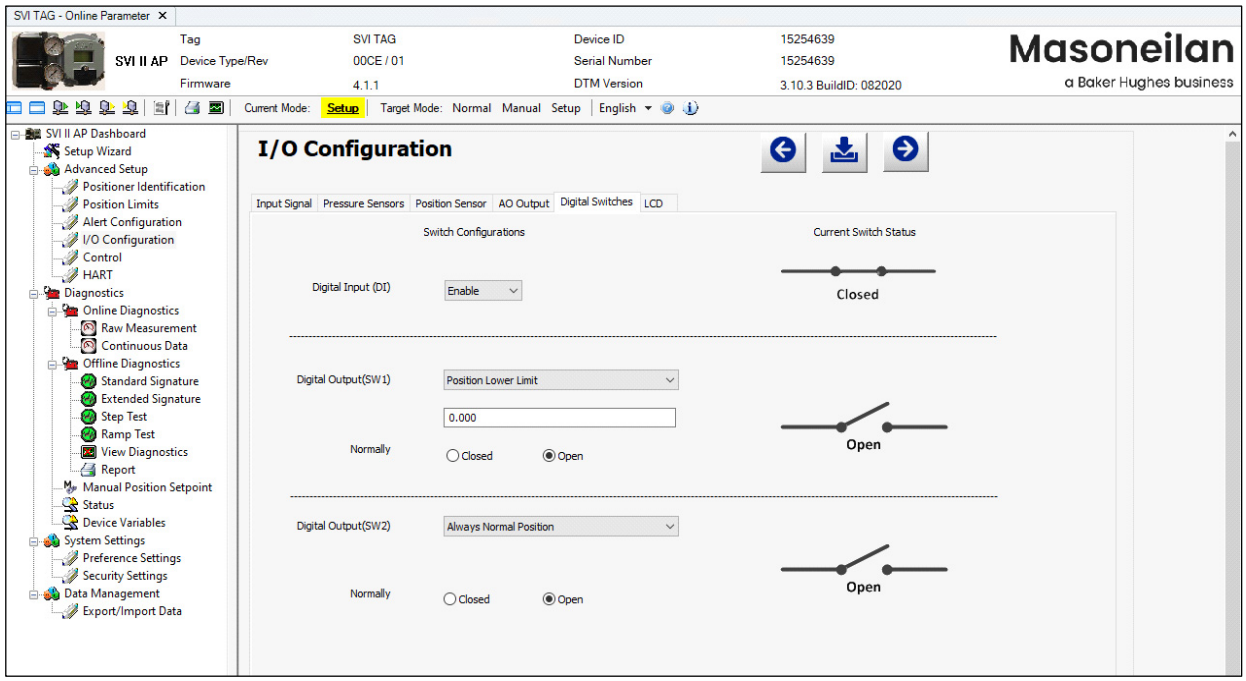

Figure 65 Advanced Setup: I/O Configuration: Digital Switches

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.

NOTE

See the Output Switches section in the Masoneilan SVI II AP Digital Positioner Advanced Performance Installation and Maintenance Manual (Ref. 19681) for instructions on the maximum load the switches can carry.

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Buttons and Fields

Digital Input (D/I)

Use the pulldown to enable/disable this switch.

Digital Output (SW1)/Digital Output (SW2)

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

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, mode.

CAUTION

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

Digital Output (SW1) Value/ Digital Output (SW2) Value

Use this to set the switch position limit.

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Set Digital Input Switch

1. Ensure the SVI II AP is in *Setup* mode.
2. Use the associated pulldown to enable/disable.
3. Click to download to the device.

Set Digital Output Switch

1. Ensure the SVI II AP is in *Setup* mode.
2. Use the associated pulldown to select a condition:

√ 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.*

3. Use the value field below to enter a limit setting (*Position Low Limit* and *Position Upper Limit* only).
4. Click either the **Closed** or **Open** radio button.
5. Click .

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Advanced Setup: I/O Configuration: LCD

Use this tab to set the permissions level for the local buttons and to set the LCD language.

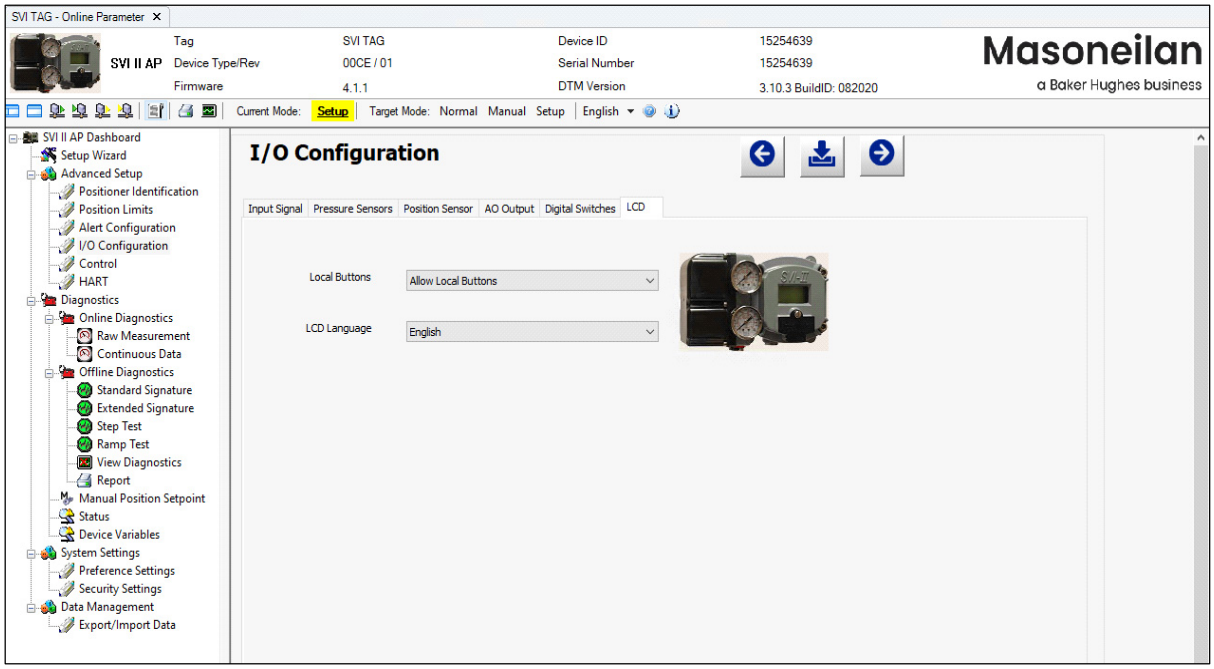

Figure 66 Advanced Setup: I/O Configuration: LCD

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Buttons and Fields

Local Buttons	A pulldown list to select security level for SVI II AP pushbuttons. 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.

Set Local Buttons Configuration

1. Ensure the SVI II AP is in *Setup* mode.
2. Use the associated pulldown to choose the permission level.
3. Click to download to the device.

Set LCD Language

1. Ensure the SVI II AP is in *Setup* mode.
2. Use the associated pulldown to select a language.
3. Click .

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Advanced Setup: Control: Actuator

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

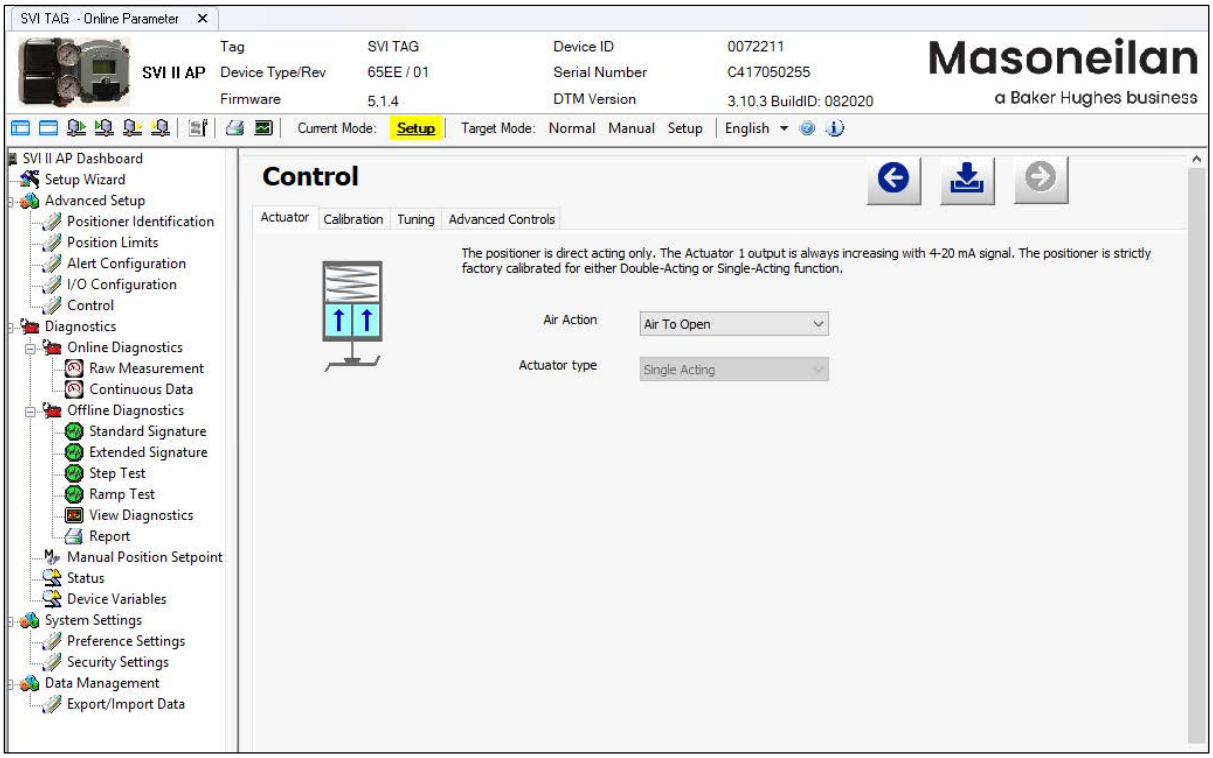

Figure 67 Advanced Setup: Control: Actuator

Buttons and Fields

Air to Action	A pulldown list to select *Air To Open* or *Air To Close*.
Actuator Type	Factory set.

Set Air Action

1. Ensure the SVI II AP is in *Setup* mode.
2. Use the associated pulldown to choose the action.
3. Click to download to the device.

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Advanced Setup: Control: Travel Calibration

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

Auto 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 Low Stop Limit/ Manual High Stop Limit	On some actuators, it is possible that the *Automatic Stop Limit* procedure will not find the correct end positions of the travel. A semi-automatic method of calibrating the stop positions is provided. These move the valve to either the full closed or full opened and you respond when the valve reaches the closed or 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. Figure 69 on page 97 shows how this works. This calibrates the position with the full travel of the valve.

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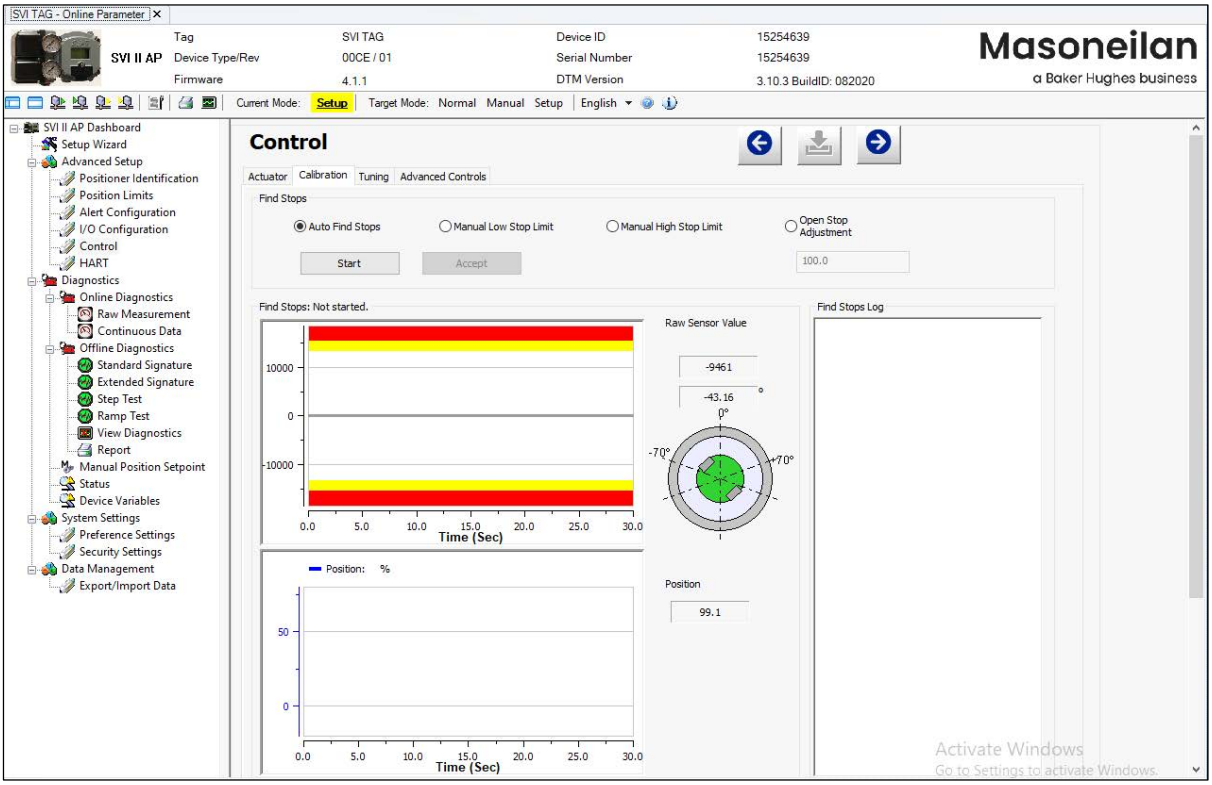

Figure 68 Advanced Setup: Control: Travel Calibration

Buttons and Fields

Auto Find Stops

Use this radio button 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 is 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.

See “Find Stops Procedures” on page 100.

Manual Low Stop Limit

Use this radio button to perform a procedure that sets the *Low Stop Limit*.

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.

See “Find Stops Procedures” on page 100.

Manual High Stop Limit

Use this radio button to perform a procedure that sets the *High Stop Limit*.

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.

See “Find Stops Procedures” on page 100.

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Open Stop Adjustment

Use this field and Start to recompute the position scale so that at the value entered in the *Open Stop Adjustment* edit box as a percent of full stops, becomes 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.

Figure 69 shows how this works. This calibrates the position with the full travel of the valve.

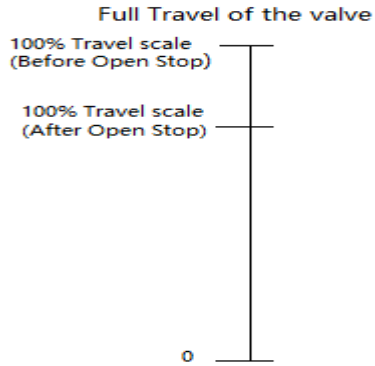

Figure 69 Open Stop Adjustment Diagram

Start

Click to start the procedure selected above.

Accept

Click, once the calibration is complete, to accept the values.

Counts vs. Time graph

Displays the procedure results graphically.

See "Counts vs. Time Graph" for a full description of functionality.

- √ Left axis displays raw positioner sensor value.
- √ Bottom axis displays time.
- √ Click-and-hold on any axis' legend to drag along the axis.
- √ The red line represents a HIHI alert condition.
- √ The yellow represents a HI alert condition.
- √ Press the **CTRL** button and mouse drag to zoom/unzoom on the graph.

Raw Sensor Value

Displays the temperature compensated value; in counts. The value typically is between -15000 and +15000 counts. Just below that a percentage appears that represents the angle computed using the raw sensor value.

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Position vs. Time graph	Use this graph to graphically see the position versus time during the *Find Stops* procedure. See "Position vs. Time Graph". √ Left axis displays a scale for the position (blue trace). √ Bottom axis displays time. √ Click-and-hold on any axis' legend to drag along the axis. √ Press the **CTRL** button and mouse drag to zoom/unzoom on the graph.
Position	Displays the position determined from the procedure.
Find Stops Log	Displays device nameplate information, procedural messages during the run-time and results.

Find Stops

Use this tab to automatically search for the mechanical valve travel limits and tune the valve position PID control algorithm.

The following list details actuators that must be tuned manually. Actuators that may require manual tuning include:

√ Actuators with internal leaks, such as pistons.

√ Large actuators with high spring ranges.

CAUTION

*Procedures (e.g. Find Stops, Auto Tune, Step Test, Ramp Test, Signature) should **NOT** be invoked if the ValVue sequencer is running.*

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Counts vs. Time Graph

Use this graph to graphically see the counts versus time during the *Find Stops* procedure.

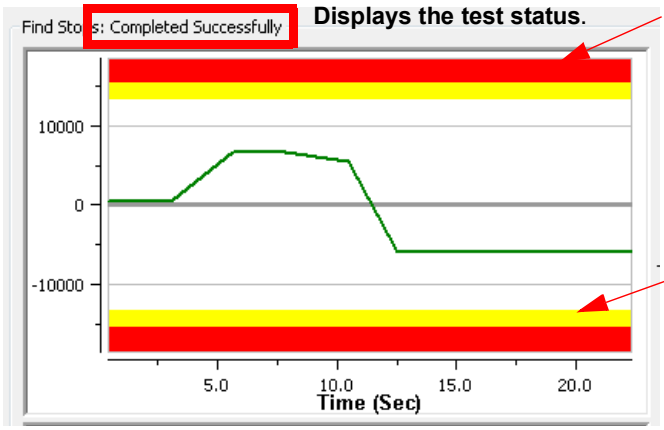

Figure 70 Counts versus Time Graph

The magnet graphic displays the rotation real-time degree of the magnet sensor:

- √ -60° to 60° green appears
- √ -60° to -70° or 60 to 70° yellow appears
- √ Less than -70° or greater than 70° red appears

Position vs. Time Graph

Use this graph to graphically see the pressure and position versus time during the *Find Stops* procedure.

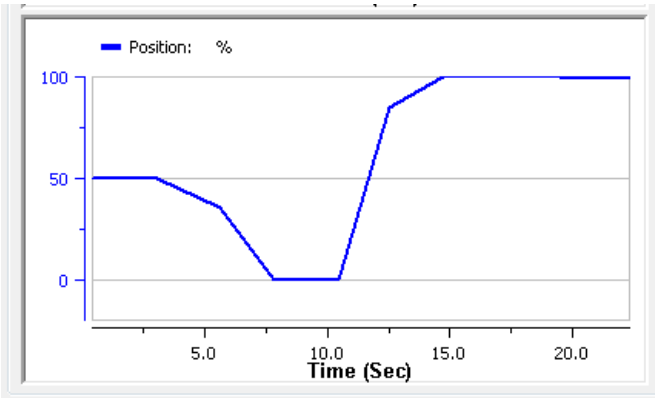

Figure 71 Position versus Time Graph

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Find Stops Procedures

CAUTION

*Procedures (e.g. Find Stops, Auto Tune, Step Test, Ramp Test, Signature) should **NOT** be invoked if the ValVue sequencer is running.*

Auto Find Stop Limits

WARNING

Tuning strokes the valve over its entire travel. Isolate the valve from the process prior to calibration.

1. Ensure the system is in Setup mode.
2. Click **Auto Find Stop Limit**.
3. Enter and *Open Stop Adjustment* value. See “Find Stops” on page 98 to perform *Open Stop Adjustment*.

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4. Click Start, the two graphs beginning showing results, the *Find Stops Log* lists detected values, test results appears (Figure 72) and if the test fails a list of reasons.

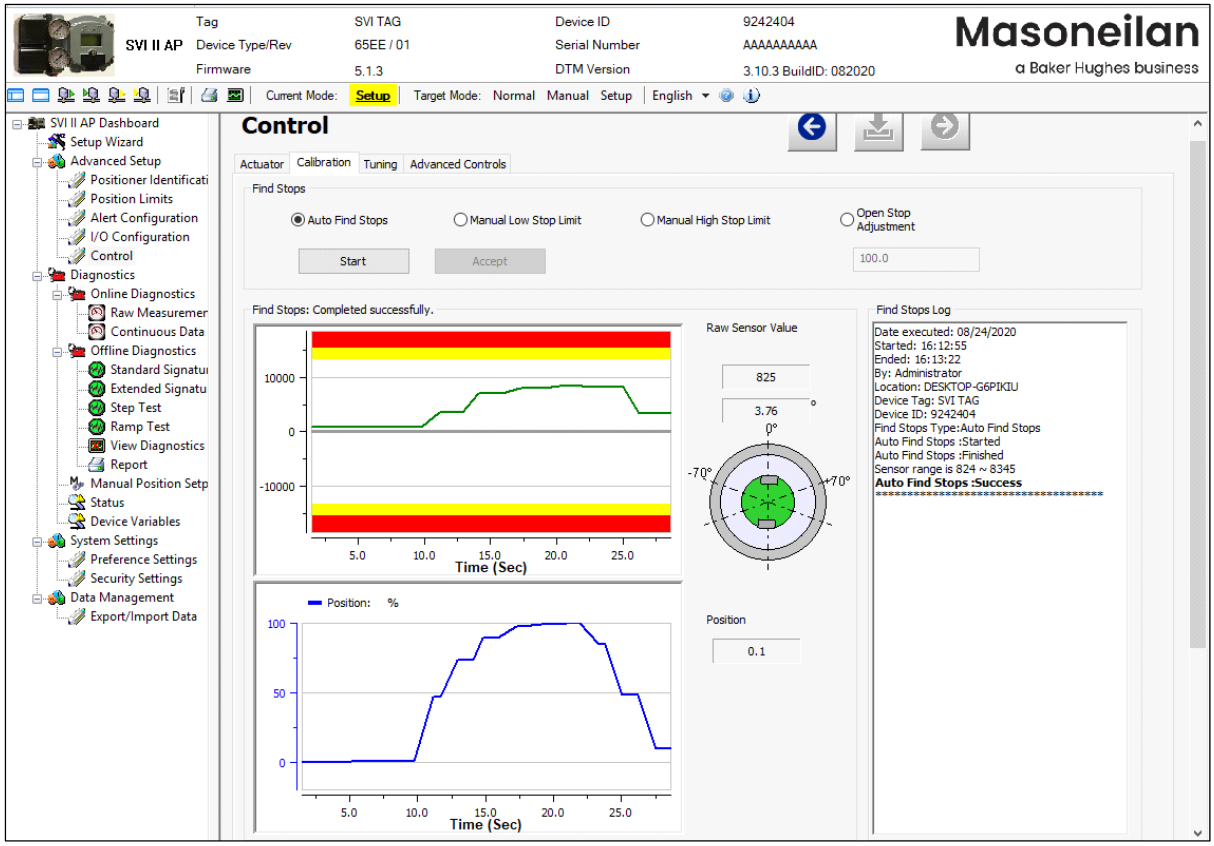

Figure 72 Auto Find Stop Limits Results: Succeeded

5. Click Confirm.

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Manual Low Stop Limit

WARNING

Tuning strokes the valve over its entire travel. Isolate the valve from the process prior to calibration.

1. Ensure the system is in Setup mode.
2. Click **Manual Low Stop Limit**.
3. Click Start , the two graphs beginning showing results. The test seeks the *Low Stop*

   position and the Accept Low button appears.

CAUTION

Ensure that the Raw Sensor Value stabilizes before proceeding.

4. Click Accept Low and the Confirm button appears.
5. Click Confirm , the *Find Stops Log* lists detected values, test results appears (Figure 73) and if the test fails a list of reasons.

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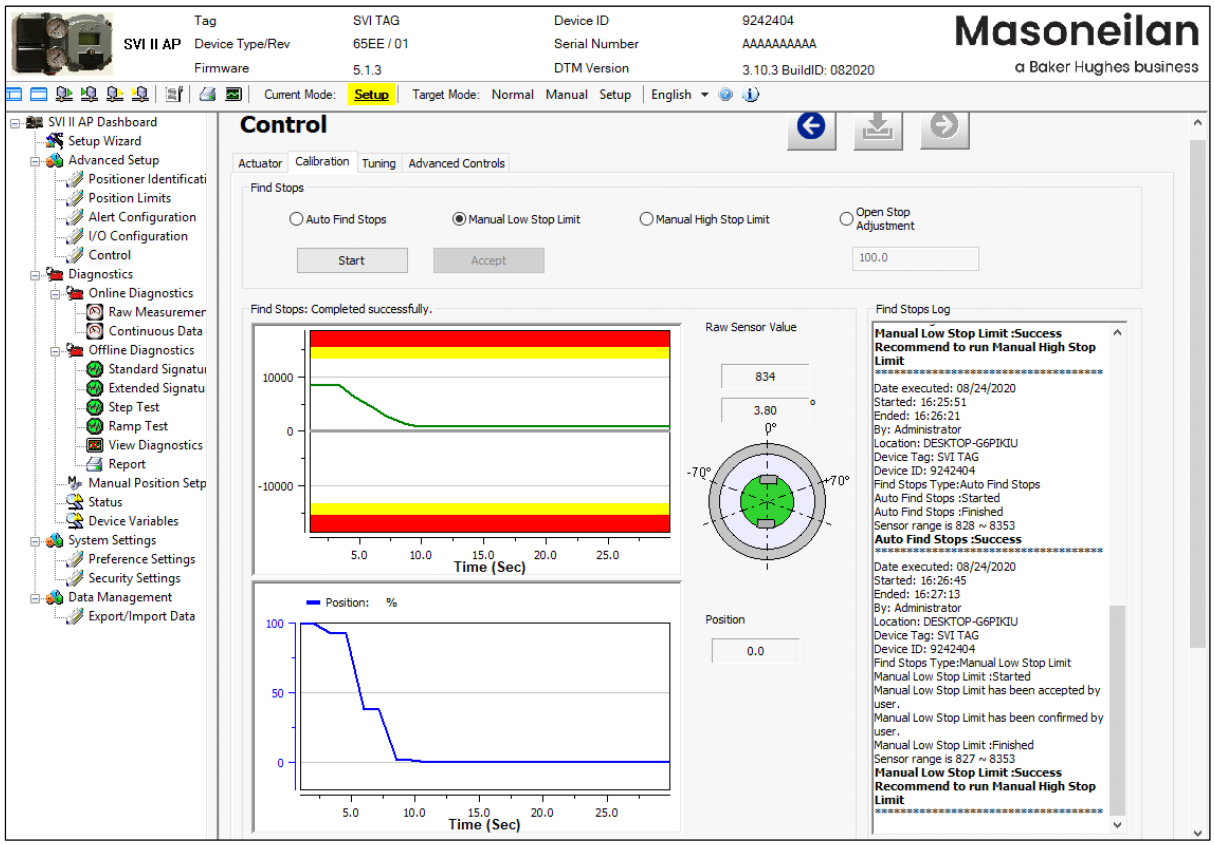

Figure 73 Manual Low Stop Limits Results: Succeeded

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Manual High Stop Limit

Tuning strokes the valve over its entire travel. Isolate the valve from the process prior to calibration.

1. Ensure the system is in Setup mode.
2. Click **Manual High Stop Limit**.
3. Enter and *Open Stop Adjustment* value. See “Find Stops” on page 98 to perform *Open Stop Adjustment*.
4. Click Start, the two graphs beginning showing results. The test seeks the *High Stop*

   position and the Accept Low button appears.

Ensure that the Raw Sensor Value stabilizes before proceeding.

5. Click Accept Low and the Confirm button appears.

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6. Click Confirm, the *Find Stops Log* lists detected values, test results appears (Figure 74) and if the test fails a list of reasons.

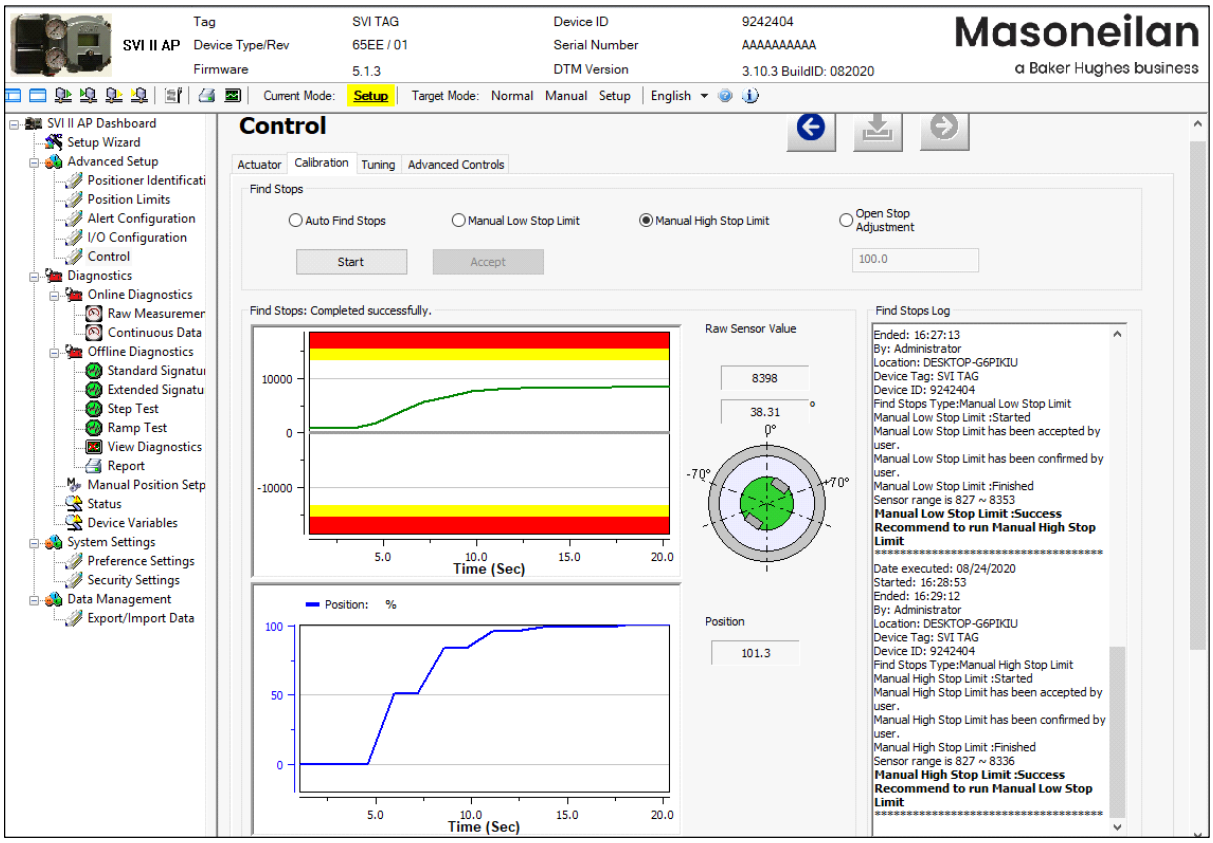

Figure 74 Manual High Stop Limits Results: Succeeded

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Advanced Setup: Control: Tuning

Use the *Tuning* screen to enter manual tuning parameters and view the results of those parameters on the *Trend* display and *Results and Log*. A standalone *Trend* is available from the SVI II AP DTM icon bar (“Standalone Trend” on page 54).

Actuators that may require manual tuning include:

- √ Actuators with internal leaks, such as pistons.
- √ Large actuators with high spring ranges.

Additionally, this screen access the *Live Tuning* dialog (“Live Tuning” on page 111).

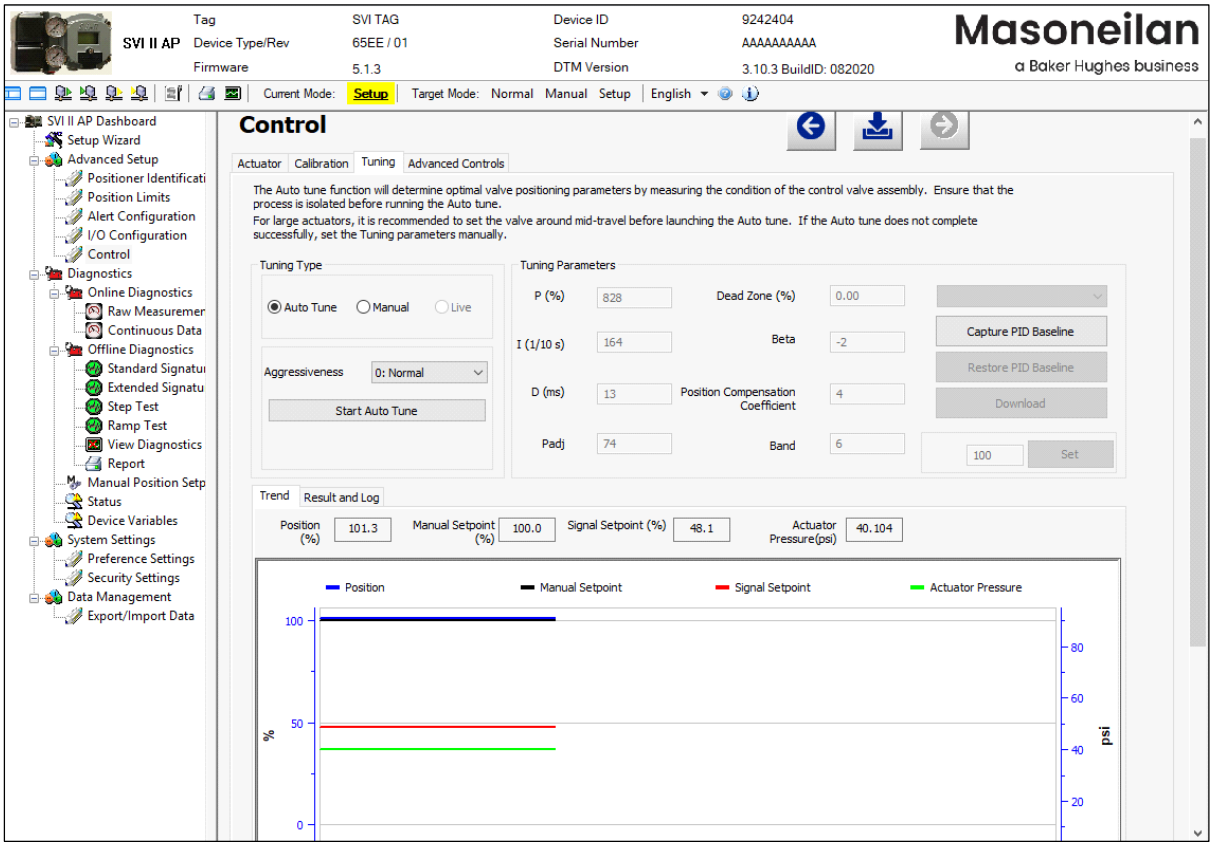

Figure 75 Advanced Setup: Control: Tuning

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Buttons and Fields

Tuning Type	Click a radio button to start one of the three tuning types: √ *Auto Tune*: See “Auto Tune” on page 108. √ *Manual*: See “Manual Tune” on page 110. √ *Live:* See “Live Tuning” on page 111.
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.
Start Auto Tune *Start Auto Tune* button	Click to start the Auto Tune process. See “Auto Tune” on page 108.
Tuning Parameters	Activates only if Auto Tune is unsuccessful so that a manual tune can be done.
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.
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.
Band	This controls a supplemental pressure, or boost, to speed up initial valve response. This compensates for pneumatic deadband. Range: 0 to 20.

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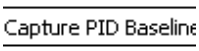
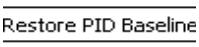
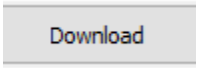
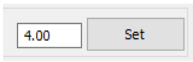
 *Capture PID Baseline* button	Click and the PID results are saved as the baseline PID results. The baseline data set represents the best example of proper valve/positioner function.
 *Restore PID Baseline* button	Click and the PID results most recently saved as the baseline set are restored. The baseline data set represents the best example of proper valve/positioner function.
 *Download* button	Click to download to the positioner.
 *Position* button	Click to move valve and monitor the valve response in the *Trend*. This useful as a check of recently set tuning parameters.
Trend	See “Diagnostics: Offline Diagnostics” on page 133 for an explanation of functionality.
Result & Log	Displays the results by test for each test parameter reported and a log of activity during the test.

Auto Tune

Use *Autotune* (Figure 75) 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 *Trend* area below with *Results and Log* displaying non-graphic test sequence and result.

Auto Tune is successful for most valves. However, very large actuators or high hysteresis may require manual tuning.

If Auto Tune succeeds the results are automatically saved to the DTM database.

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WARNING

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

To run autotune:

1. Ensure that you are in *Setup* mode.
2. Click the **Auto Tune** radio button.
3. Set the *Aggressiveness* as required.
4. Click Start Auto Tune and the tune starts.
5. Once complete the *Results and Log* appears (Figure 76).

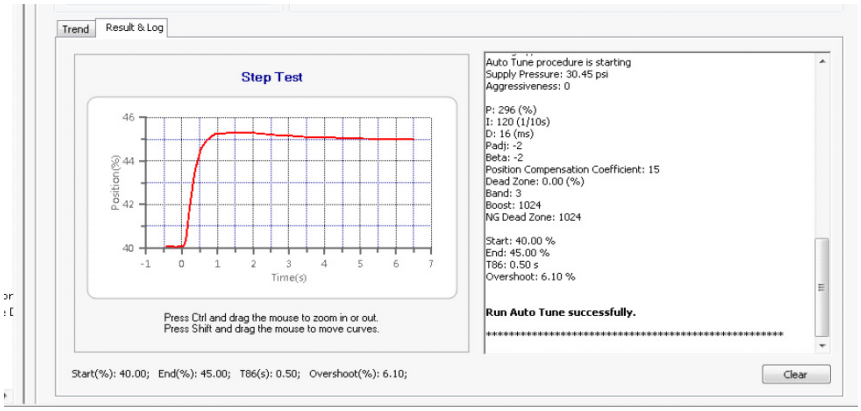

Figure 76 Auto Tune Success

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Manual Tune

Manual tuning is only enabled when device is setup mode. When Manual tuning is selected, Tuning Parameters become active.

Click **Apply Parameters** and the DTM saves all tuning parameters to the device. The existing device tuning parameters are stored as previous tuning parameters. Click the **Reset Last** button to reset tuning parameter to previously stored parameters.

WARNING

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

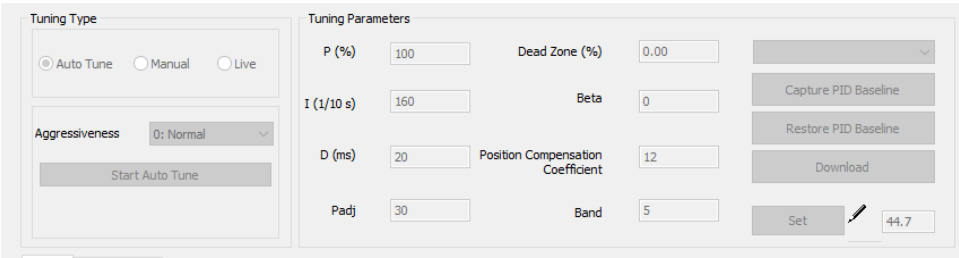

Figure 77 Manual Tune

1. Ensure that you are in *Manual* mode.
2. Click the **Manual** radio button.
3. Set the *Tuning Parameters* as required.
4. Click **Start Manual Tune** and the tune starts.
5. Once complete the *Results and Log* appears (Figure 78).

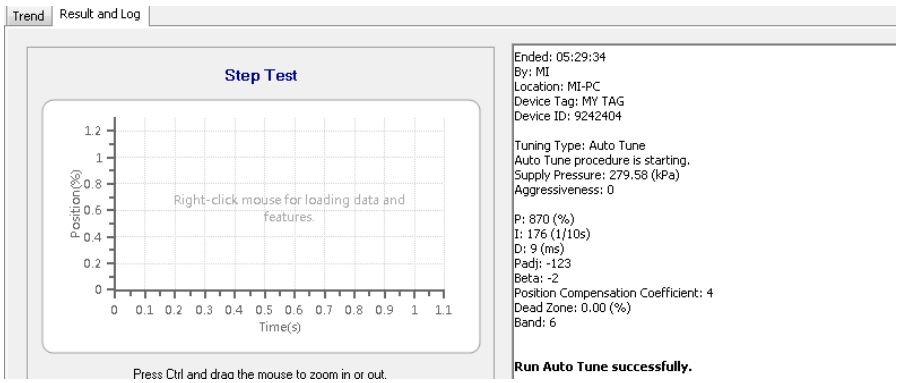

Figure 78 Manual Tune Success

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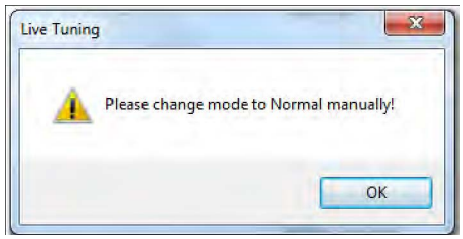
Live Tuning

In Normal mode, experienced users can tune PID parameters live. *Only experienced users should use this feature.* Live tuning involves only *P*, *I*, *D* and *Padj* and only these selections are active.

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 the **Live** radio button and Figure 79 appears.

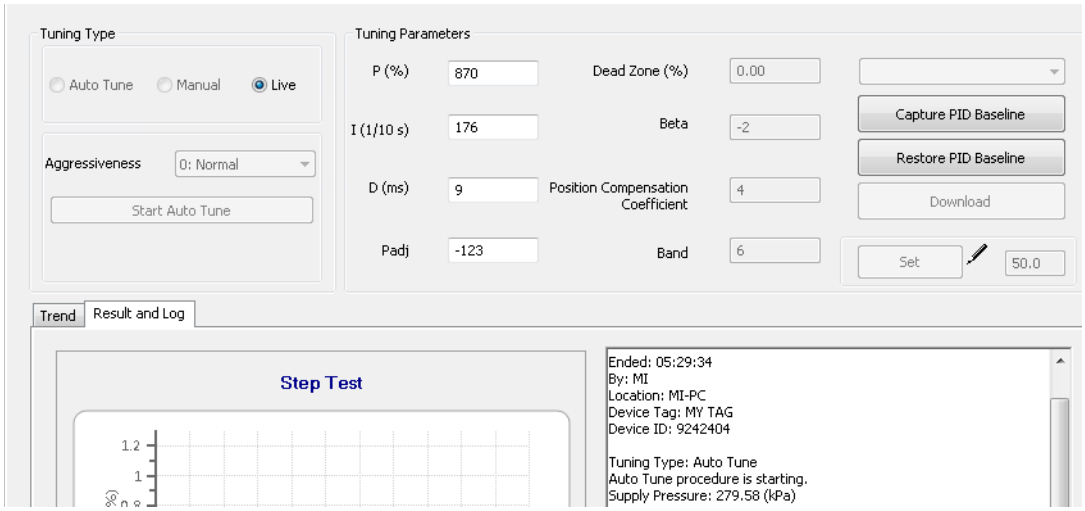


Figure 79 Live Tuning Selected

2. Configure the desired parameters to study the behavior.

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Advanced Setup: Control: Advanced Controls

Use the *Advanced Controls* screen to configure the parameters related to valve characterization, tight shutoff, position rate limits and bumpless transfer and to view the results of those parameters on the *Trend* display and *Results and Log*. A standalone *Trend* is available from the SVI II AP DTM icon bar (“Standalone Trend” on page 54).

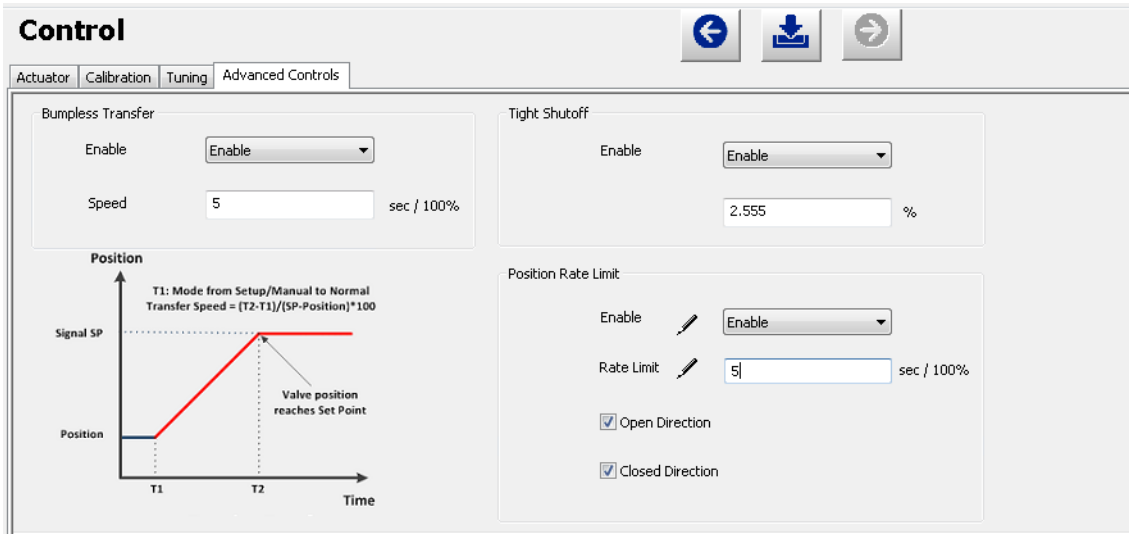

Figure 80 Advanced Setup: Control: Advanced Controls

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Buttons and Fields

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 *Speed* 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.
Tight Shutoff	
Enable 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 field	Enter a percentage. 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 to 19.99%.
Position Rate Limit	Click the associated radio button to configure whether the position rate limit applies to: √ *Both Directions* √ *Open Direction* √ *Closed Direction* See "Configure Rate Position" on page 116. The unit is in seconds for the time for stroke valve (0 ~ 100%). Valid range is 0-250.
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.

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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%*.

Figure 81 shows the characterization curves in a graphical format.

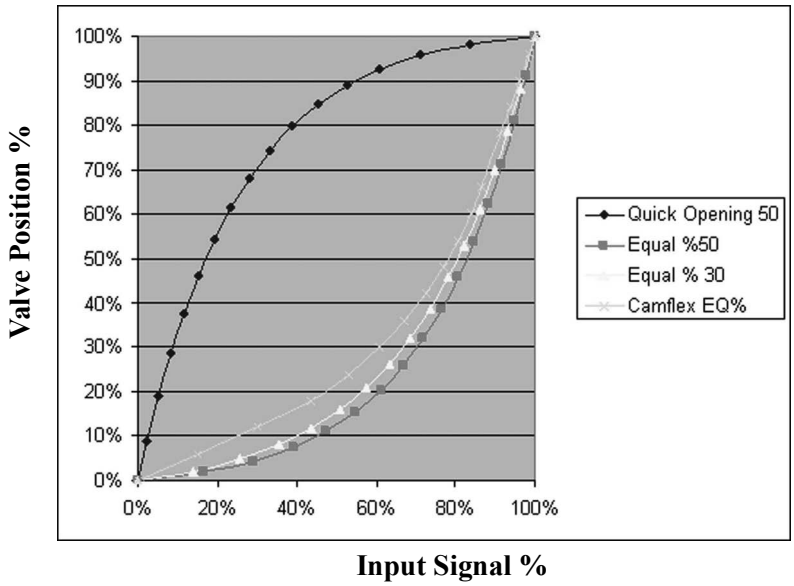

Figure 81 Characterization Curves

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Custom Characterization

Custom characterization is accomplished using the bottom portion of the *Advanced Control* screen (Figure 82). See “Create a Custom Characterization” on page 117.

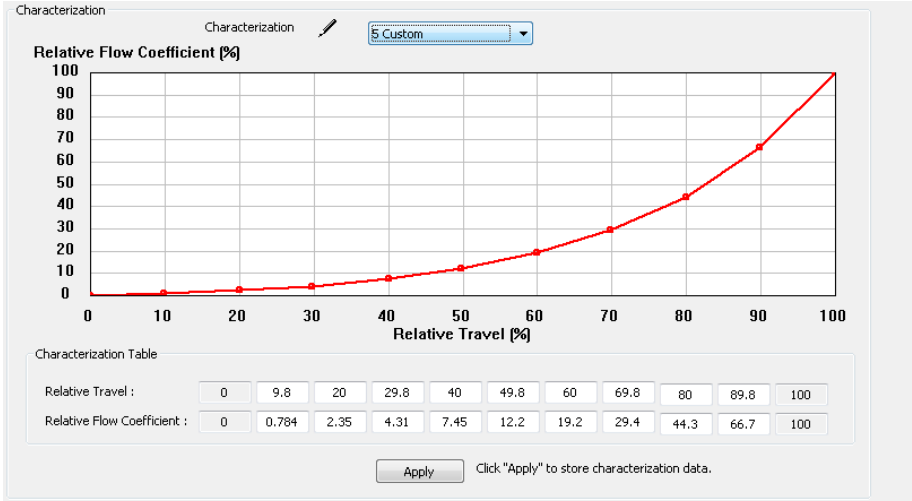

Figure 82 Custom Characterization

Notes on Characterization Table Function:

You cannot enter a number which is:

√ Larger than the number in the box to the right.

√ Smaller than the number in the box to the left.
In both instances above, ValVue does not provide an error/warning message. It simply doesn’t accept the new value, and it automatically changes the value back the original value.

The values are assigned as an integer in the code, which has a range of 0-255. Thus, not all available decimal numbers are available between 0 and 100. Users may experience a slight change of numbers after clicking **Apply**, based on automatic scaling to the available integer range.

Relative Travel/ Relative Setpoint Coefficient

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 117.

Apply button

Click to store the *Custom Characterization* data to the positioner.

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Configure Rate Position

CAUTION

This setting is one of tuning parameters. Before changing this parameter, upload all PID tuning parameters. The DTM must ensure all other PID parameters are synced with the device when writing the Position Rate Limit.

1. Select the radio button dissociated with the correct function.
2. Enter the *Rate Limit*.
3. Click to download to the device.

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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 nine 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 nine points allowed. To create a custom characterization:

1. Use the *Characterization* pulldown to select **Custom** and the *Edit* button appears.
2. Click **Edit** and Figure 83 appears on the bottom of the screen, along with the *Custom Data* field on the *Options* tab. The *Custom Data* field displays the data points once configuration is complete.

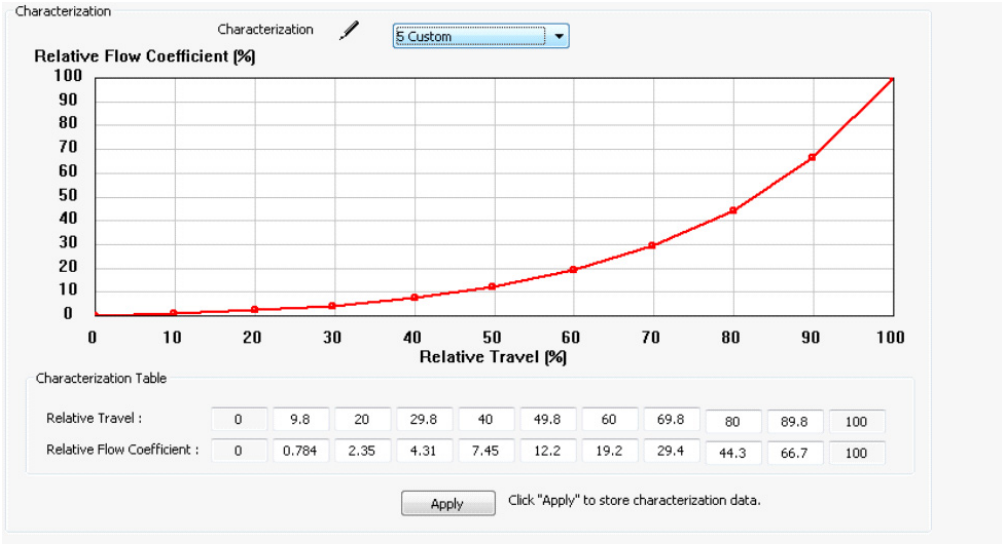

Figure 83 Custom Characterization

Relative Travel and *Relative Flow Coefficient* fields activate.

3. Enter values in the *Relative Travel* and *Relative Flow Coefficient* fields from lowest to highest. If there is too drastic a slope change a dialog appears. Adjust values accordingly.

   A dialog appears prompting you to save.
4. Click **OK**.

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Advanced Setup: HART®

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 (firmware ver. 511/513, 514, 515).

Table 4 provides a summary of the data returned from the Burst mode (HART® Command #3 equivalent to Process-Vars-Current).

Table 4 Burst Mode Data Return

Variable	Description
SVI II AP (firmware 311, 313, 321, 323, 325, 327, 329, 411, 511, 513, 514 and 515)	
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 (100% travel = 1 stroke).
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.

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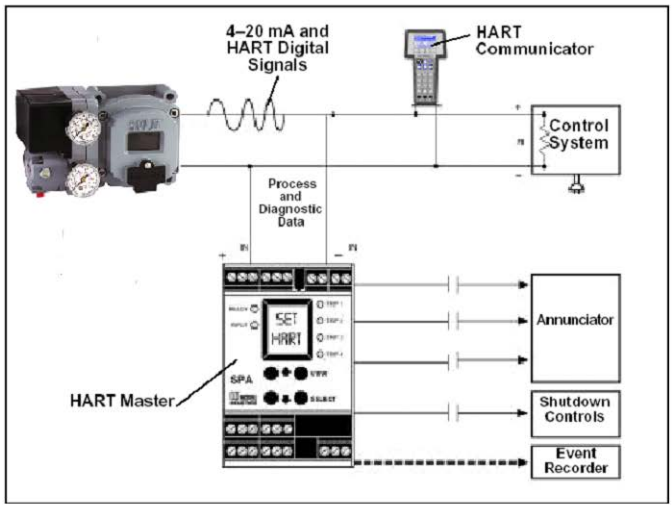
Table 4 Burst Mode Data Return (Continued)

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 84 Burst Mode Configuration

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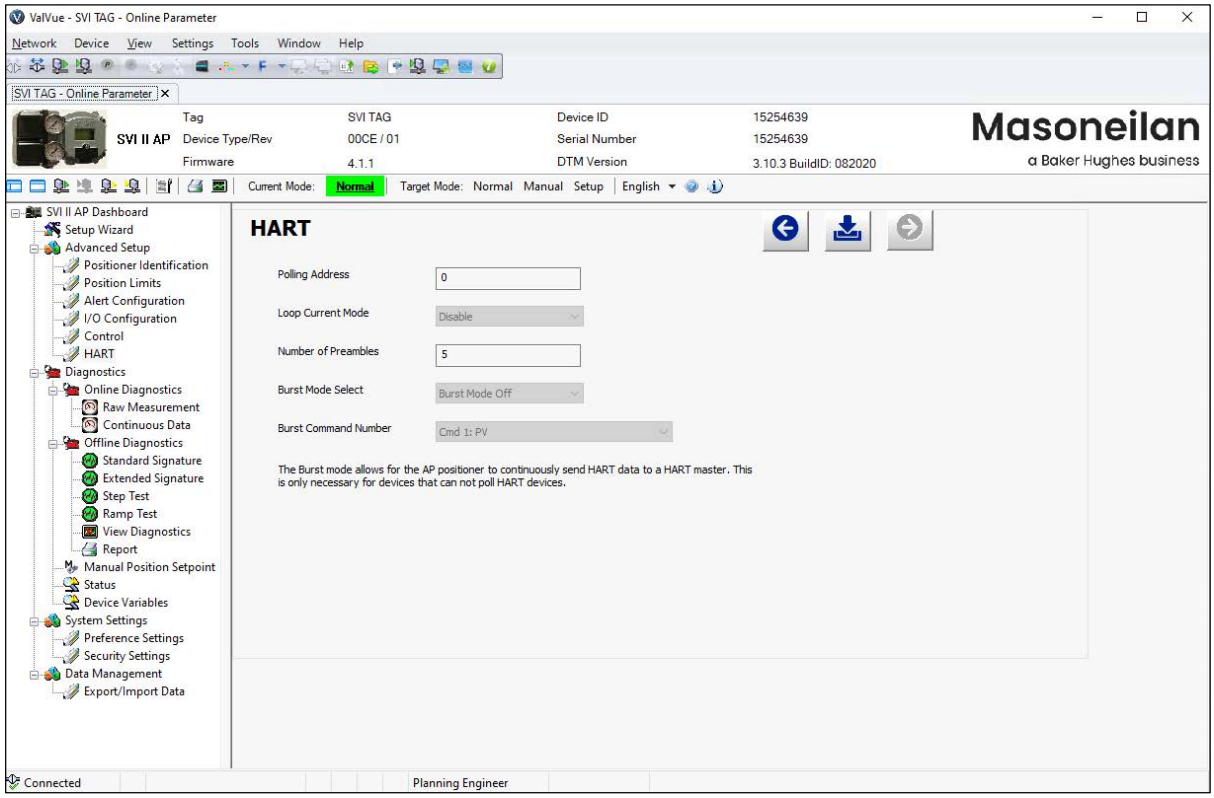

Figure 85 Advanced Setup: HART® Screen for HART® 6

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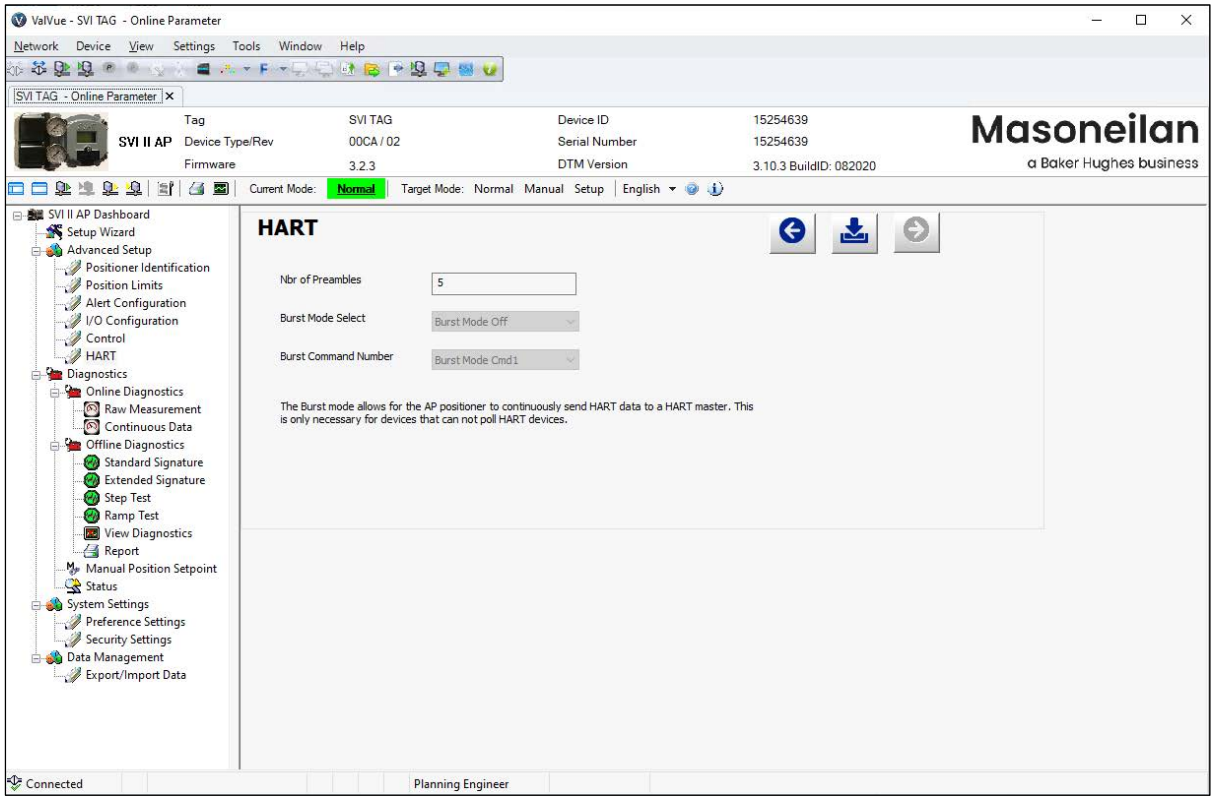

Figure 86 Advanced Setup: HART® Screen for HART® 5

Buttons and Fields

Polling Address	Enter the polling address used by the host to identify a field device; usually *0*. For HART® 6 only.
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*.

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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 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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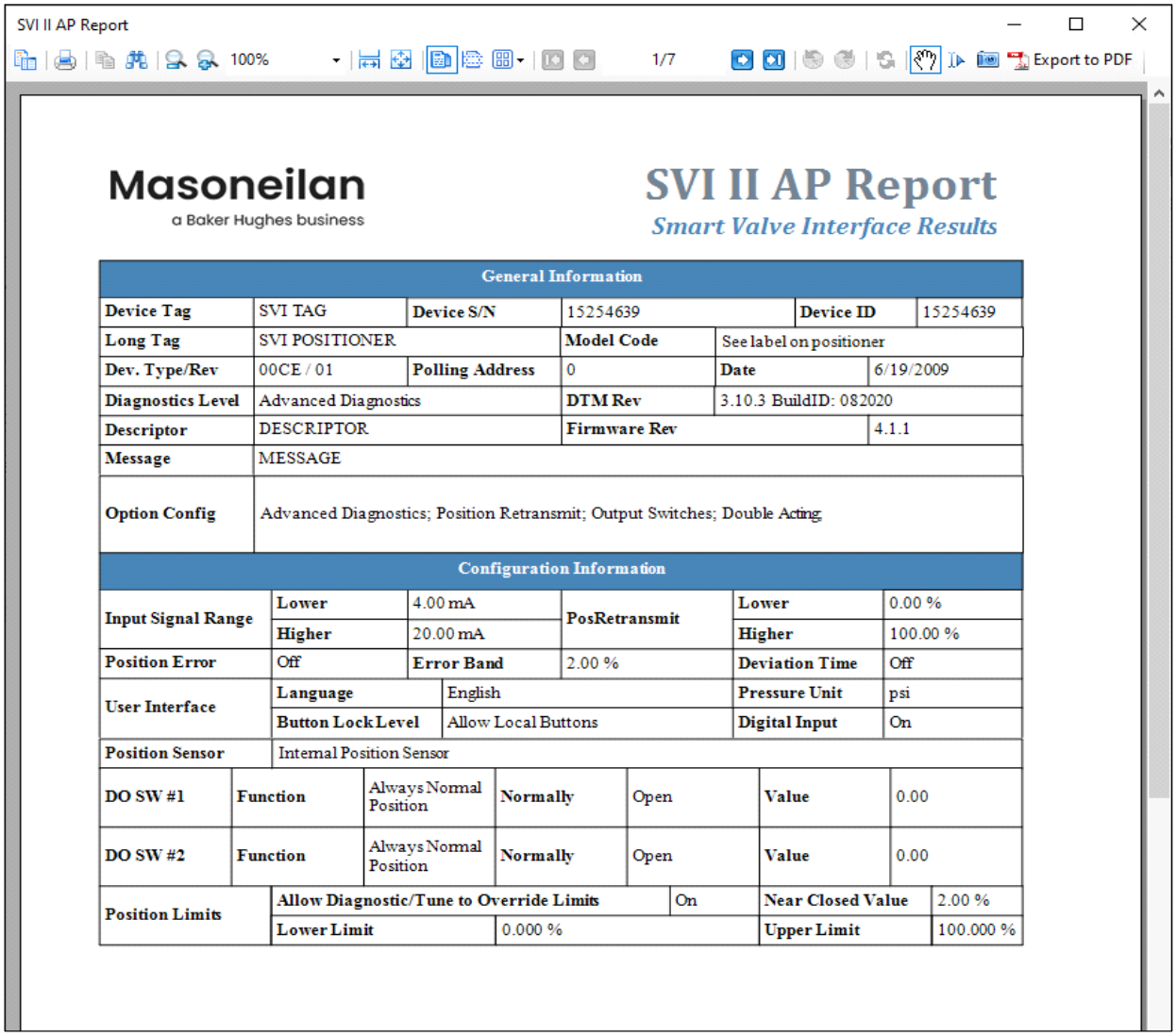
10. Report

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:

√ Click the *Print* icon in the SVI II AP DTM toolbar.



General Information					
Device Tag	SVI TAG	**Device S/N**	15254639	**Device ID**	15254639
Long Tag	SVI POSITIONER		**Model Code**	See label on positioner	
Dev. Type/Rev	00CE / 01	**Polling Address**	0	**Date**	6/19/2009
Diagnostics Level	Advanced Diagnostics		**DTM Rev**	3.10.3 BuildID: 082020	
Descriptor	DESCRIPTOR		**Firmware Rev**	4.1.1	
Message	MESSAGE				
Option Config	Advanced Diagnostics; Position Retransmit; Output Switches; Double Acting				

Configuration Information						
Input Signal Range	**Lower**	4.00 mA	**PosRetransmit**	**Lower**	0.00 %	
	Higher	20.00 mA		**Higher**	100.00 %	
Position Error	Off	**Error Band**	2.00 %	**Deviation Time**	Off	
User Interface	**Language**	English		**Pressure Unit**	psi	
	Button Lock Level	Allow Local Buttons		**Digital Input**	On	
Position Sensor	Internal Position Sensor					
DO SW #1	**Function**	Always Normal Position	**Normally**	Open	**Value**	0.00
DO SW #2	**Function**	Always Normal Position	**Normally**	Open	**Value**	0.00
Position Limits	**Allow Diagnostic/Tune to Override Limits**		On	**Near Closed Value**	2.00 %	
	Lower Limit	0.000 %		**Upper Limit**	100.000 %	

Figure 87 Report

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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.

Refresh

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.

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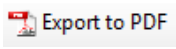
Snapshot

Use to take a snapshot of a selected area.



Export to PDF

Exports the report to a selected directory.

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11. Diagnostics

Diagnostics

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

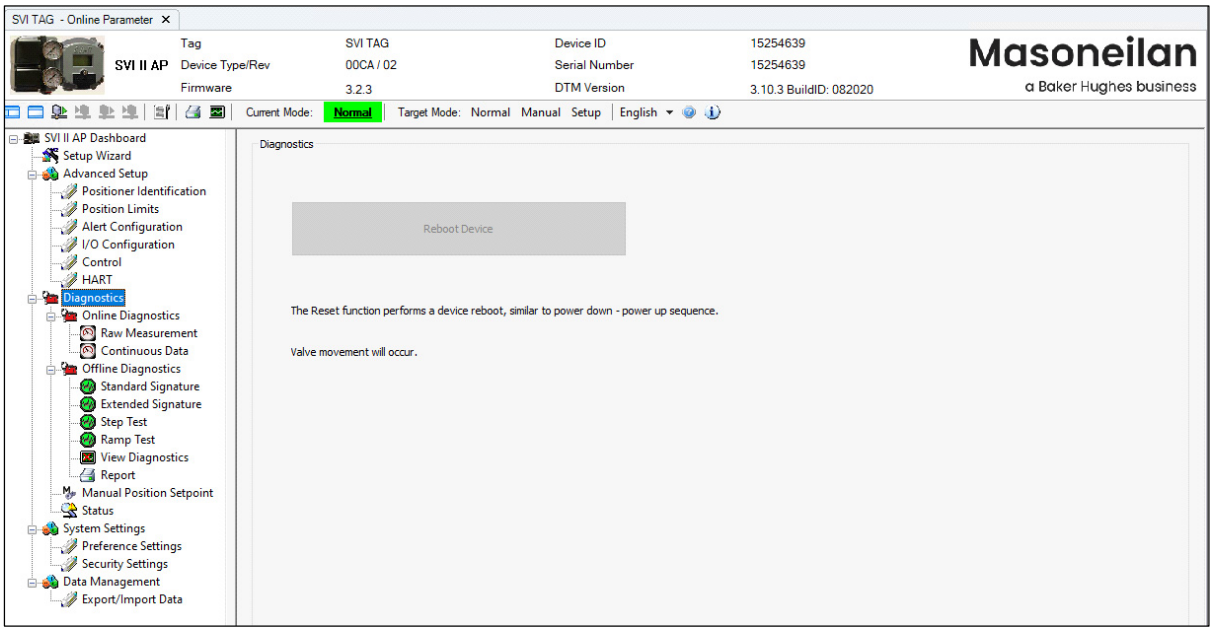

Figure 88 Diagnostics Screen

Buttons and Fields

Reboot Device button	Reboot Device	Click this to reset the SVI II AP.

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Diagnostics: Online Diagnostics: Raw Measurement

Use this screen to view the raw counts of status of signals, pressure, temperatures and I/Os. Additionally, you can *Set I/P* and *Unset I/P*. The current continuous diagnostics information and is updated every time the screen is selected. This screen is used primarily for troubleshooting. To perform any action on the *Raw Measurement* screen you must be in the Setup mode.

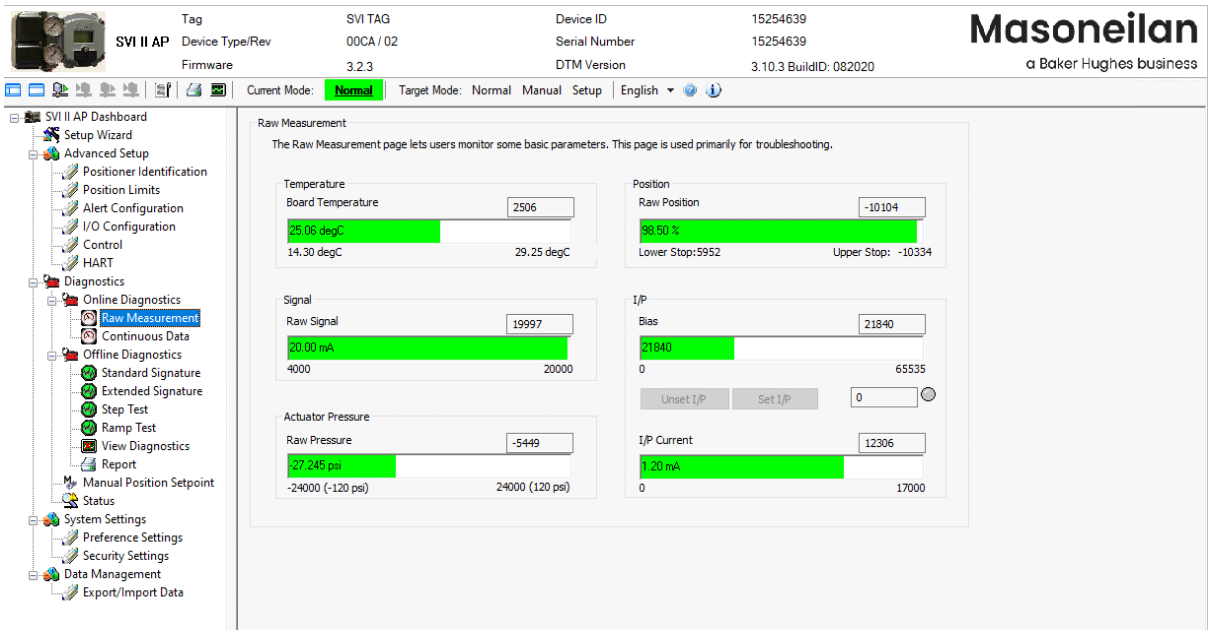

Figure 89 Diagnostics: Online Diagnostics: Raw Data Screen

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.
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 Baker Hughes 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 Baker Hughes 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.

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Lower Stop	Displays the position raw counts at the stop.
Upper Stop	Displays the position raw counts at the stop.
I/P	
Bias	Displays the bias 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	Displays the I/P current in mA as a bar graph and as counts in a text box.

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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 (Figure 90).

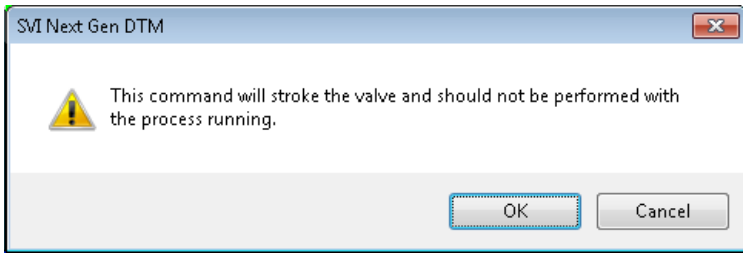

Figure 90 Set IP Warning Dialog

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

To resume normal control:

√ Click Unset I/P.

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Diagnostics: Online Diagnostics: Continuous Data

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

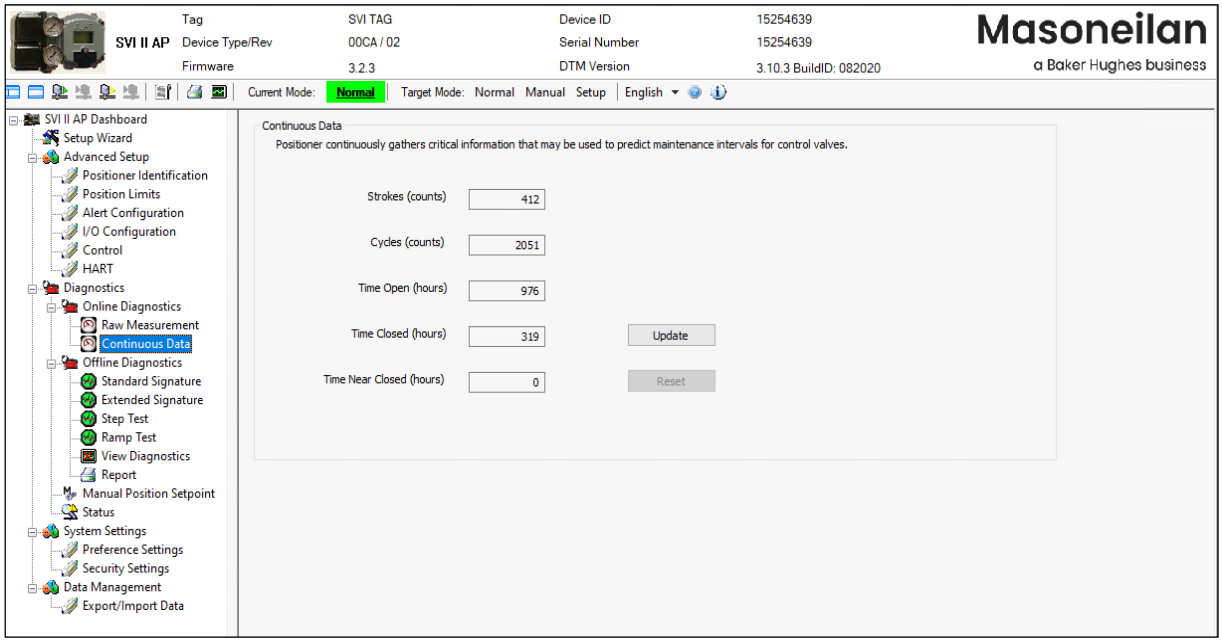

Figure 91 Diagnostics: Online Diagnostics: Continuous Data

Buttons and Fields

Strokes (counts)	Displays the total number of strokes (100% travel = 1 stroke).
Cycles (counts)	A count of the number of direction changes in the position of the valve
Time Open (hours)	Displays the total open time of the valve in hours.
Time Closed (hours)	Displays the total closed time of the valve in hours.

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Time Near Closed (hours)	A accumulated time of near closed, of a valve with severe service when near the seat.
Update button	Click this to read the screen values from the positioner.
Reset button	Click this to reset all historian values to zero.

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Diagnostics: Offline Diagnostics

SVI II AP DTM allows four diagnostic tests to be performed (*Standard Signature, Extended Signature, Step* and *Ramp* tests) and displays test results in the *Trend* and *Results & Log* windows. There is also in SVI II AP DTM, a View results screen for performing comparison and analysis of tests (present and historical). Additionally, valve parameters including, *Position* and *Actuator Pressure* appear for reference (*Manual Setpoint* for *Ramp Test*). These tests are run with the valve/positioner connected but the system not in the control loop.

For an SVI II AP with:

- √ Advanced Diagnostics: you can run Standard Signature, Step Response, Ramp tests, and Extended Actuator Signature tests.
- √ Standard Diagnostics: you can run a Ramp Test and a Step Test. As the Standard unit does not have a second pressure sensor, results are presented as Position vs. Signal and Position vs. Time, respectively.

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To check whether or not you have SVI II AP DTM is licensed to provide advanced diagnostics capability and you have an AP unit with Advanced Diagnostics:

√ Open SVI II AP DTM and go to advanced setup-->positioner identification-->Figure Positioner Identification appears with diagnostics level of the AP unit.

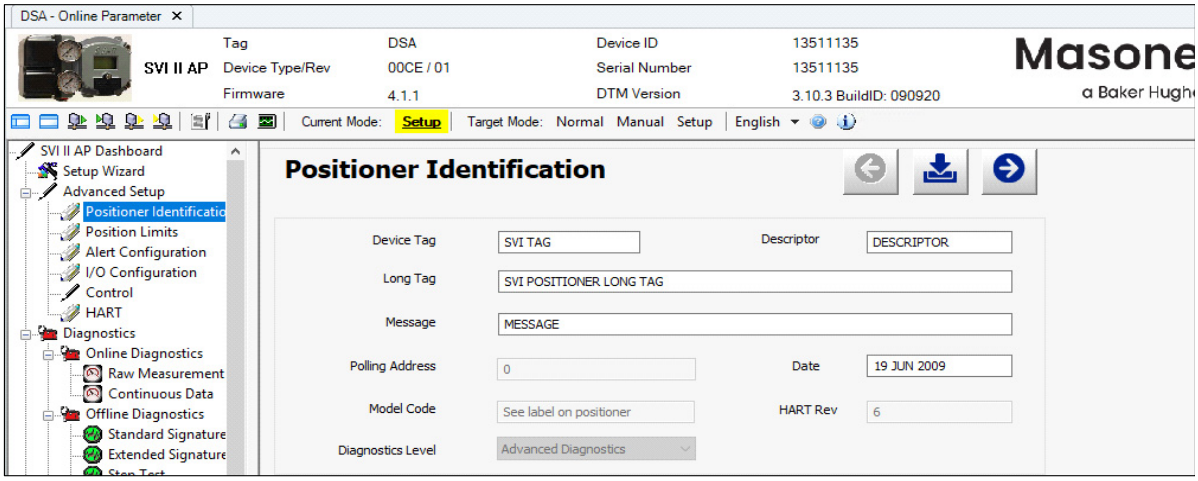

Figure 92 Positioner Identification

√ Right-click on the positioner in the topology pane and select **Additional Functions-> DTM Licensing** (Figure 93) and Figure 94 appears with *Advanced* listed, if applicable.

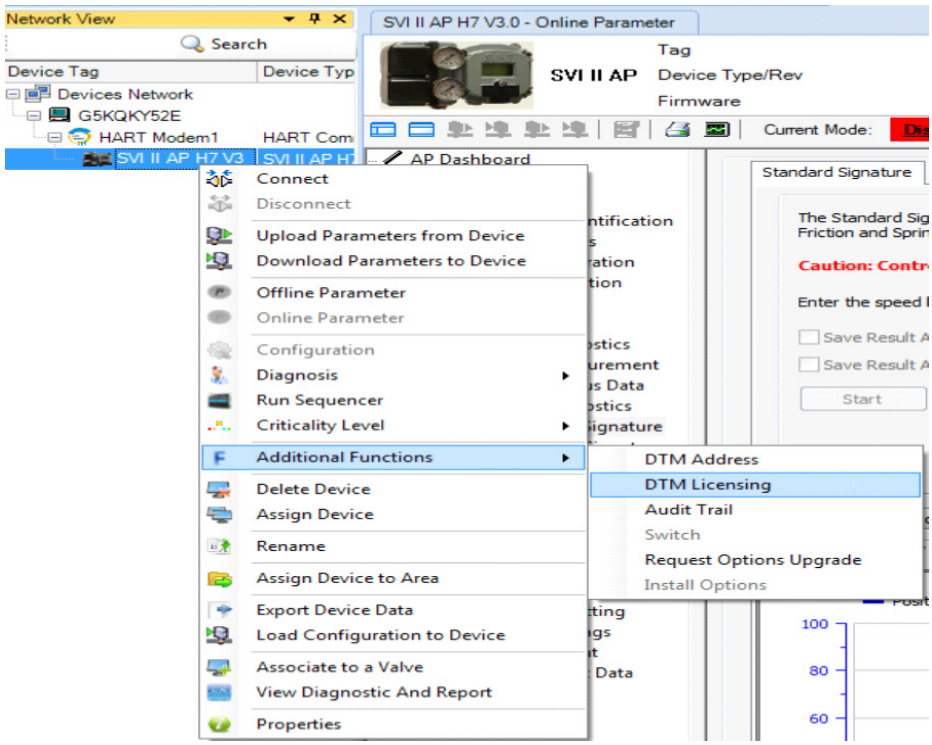

Figure 93 Select Registration

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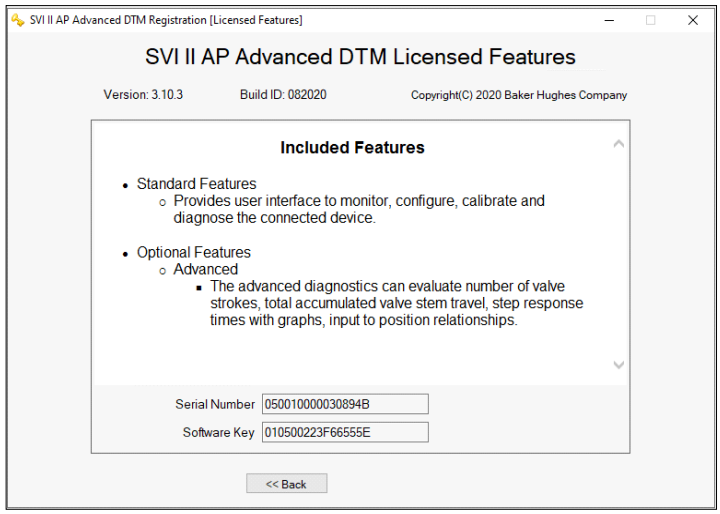

Figure 94 Licensed Features

Table 5 breaks down the diagnostics options available.

Table 5 The diagnostics options available

Edition	SVI2 AP Positioner Diagnostic level	Standard Signature	Extended Signatures	Step Test	Ramp Test
SVI2 AP DTM Advanced Edition	Easy Smart				
	Standard Diagnostics	**Execute Response Test (Only check stroke open time and stroke close time)**		X	X
	Advanced Diagnostics	X	X	X	X
SVI2 AP DTM Standard Edition	Easy Smart				
	Standard Diagnostics	**Execute Response Test (Only check stroke open time and stroke close time)**			
	Advanced Diagnostics	X			

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Diagnostics: Offline Diagnostics: Standard Signature

Use this tab to perform a *Standard Signature* test. The *Standard 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 this test measures the friction, spring range and response time.

Measurement procedures for signature of the control valve and the positioner force the control valve to move the stem position; thus the measurement procedures must be performed while the process is off line and the device is in Out of Service state.

During the *Standard 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 *Trend* and the *Signature Results* graphs.

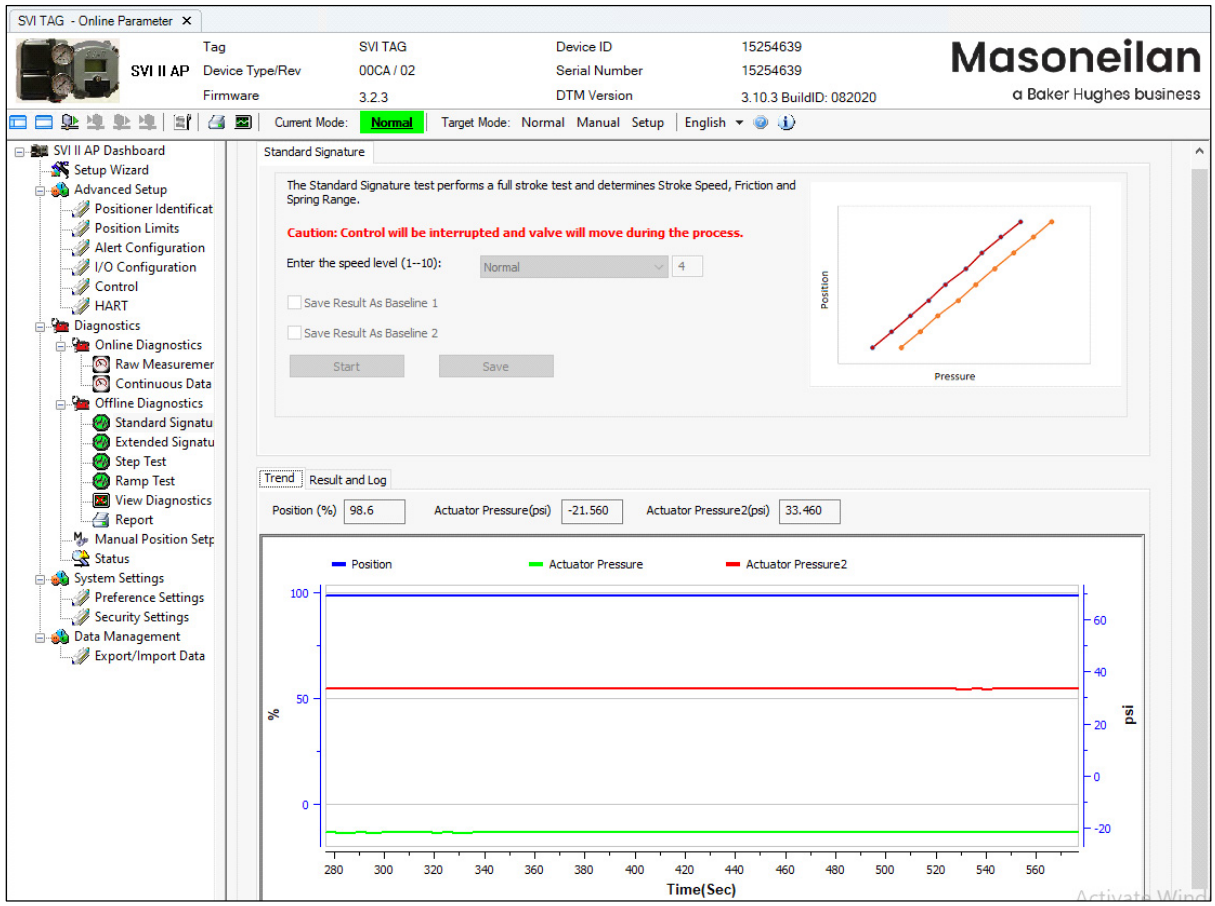

Figure 95 Diagnostic: Offline Diagnostics: Standard Signature

Buttons and Fields

Standard Signature

Static graph The graph is the upper right-hand corner is a static representation of the test type selected.

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Speed Level

Use the pulldown to select **Slow**, **Normal**, **Fast** or **Custom**. The speed level is the rate of speed at which the valve is moved as the test is performed, The default speed level is *Normal* (4). This field can be adjusted to account for larger (larger actuator area involved) or smaller valves (smaller actuator area involved). *Custom* activates a field to the right where you can set the speed from *1* to *10*.

Save Results as Baseline 1 /Save Results as Baseline 2

Click after the test is run and the results are saved as a baseline curve to which you can compare other curves. The baseline curve represents the best example of proper valve/positioner function. Saving a new baseline, either 1 or 2, over-writes an older one.

Start button

Click to commence the test. This button changes to a *Cancel* button. Click the *Signature Results* tab to see data once the test completes.

Trend

Above the graph appear the presently detected values for the items shown on the graph.

The graph displays these curves by color as:

- √ *Position* - blue line on the graph vs. *Time*. Displays the position of the valve is in percentage of valve opening at the top of the graph. 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.
- √ *Actuator Pressure* - green on the graph vs. *Time*. Displays the pressure read by the sensor at the top of the graph.

Zoom the graph by right-clicking in the graph and dragging an area.

Unzoom by right-clicking in the graph.

Drag the graph by left-clicking, holding and moving the graph.

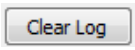
See “Results and Log Right-Click Menu” on page 138 for an explanation of graph functionality.

Results and Log

Displays the latest completed result: *Position* vs *Pressure* as a plot and the log of events to the right.

Click **Add Comment**

to open the *Comment* dialog to add related notes. See Table 2 on page 44 for an explanation of functionality.

Click **Clear Log** 

to clear the log space.

See “Results and Log Right-Click Menu” on page 138 for an explanation of graph right-click menu.

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Results and Log Right-Click Menu

Table 6 lists the right-click items and describes their functionality.

Table 6 Results and Log Right-click Menus

Item	Description
Print Graph	Prints the graphs to the default printer.
Scales Setup	Opens this dialog to upper and lower ranges for the scale for each graph. The test type dictates what range is available based on whether it is for pressure, time, etc.
Show Legend	Adds a legend for the curves based on the test type and how many individual tests are represented.
Show Data Points	Adds data points to each test result for a graph.
Show Setpoints	Adds setpoints to the display for a *Step Test* only.
Grid Line	Adds or formats each graph grid line. Choices are: *Solid*, *Dot* or *None*.
Result Analysis	Opens the *Result Analysis* dialog. This dialog has content based on the test type (Figure 96).

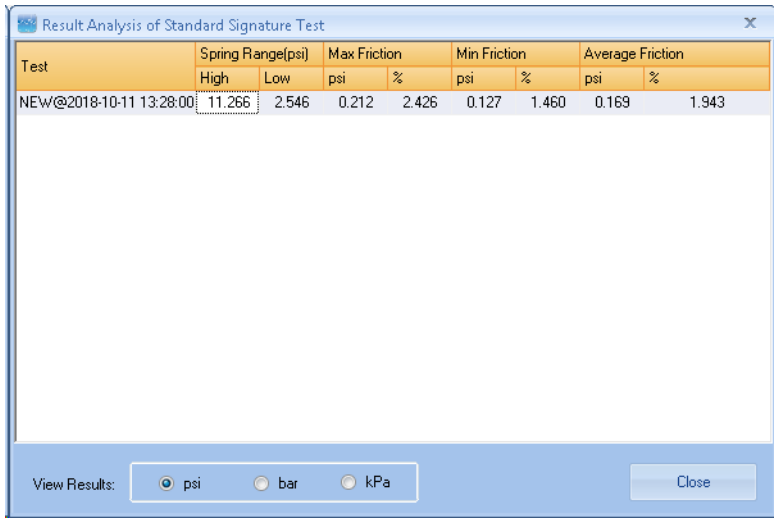

Figure 96 Results Analysis

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Table 6 Results and Log Right-click Menus (Continued)

Item	Description
Load Data From	Use the popup menu to select: √ *Baseline 1*: Loads the last performed test of the same type that was saved as a baseline. If there was no baseline test saved it is inactive. √ *Baseline 2*: Loads the second to last performed test of the same type that was saved as a baseline. If there was no baseline test saved it is inactive. √ *Last Run*: Loads the last saved test of the same type. If there was no saved test it is inactive √ *Internal Data*: Opens a *Load Test* dialog that lists all step test that have been performed (stored in the database) and you can load one for comparison. √ *External File*: Opens an *Open* dialog that lists all tests that have been performed and saved so you can load one for comparison. Once you select a test, you then get the *Load Test* dialog to choose the particular test (s) yo want from the file. This directory has a default of *C:\ProgramData\Dresser\SVI2AP_SVI3 DTM\Data\Export*, but can be changed. if it is changed, make note of the new path. The files type supported is .devdata. The functionality of this selection is useful for analyzing ongoing valve performance to note any performance degradation.
Hide This Graph	Hides the selected graph. Once hidden you can retrieve the graph using the *View* menu.
Show This Graph Only	Leaves only the selected graph displayed.
Zoom Out	This item is activated once you change the graph scale in the graph setup.
Remove Selected Curve	Removes the selected curve from the graph.
Export to Excel	Opens a *Save As* dialog to export the data for the displayed items to an .xls file.

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Perform a Standard Signature Test

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 **Standard Signature** tab and enter the *Speed Level* (Figure 95).
3. Enter a *Speed Level*, click Start and a warning appears.

   The *Status* field displays relevant messages and traces appear in the *Trend* graph (Figure 97).

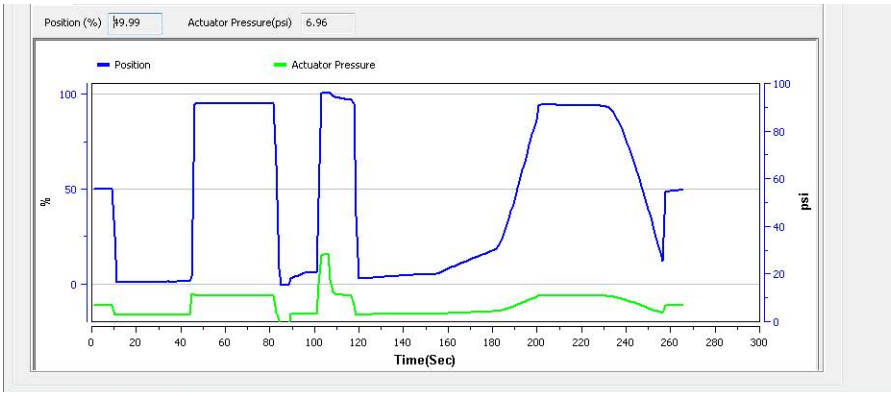

Figure 97 Diagnostics Standard Signature Test Traces

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Diagnostics: Offline Diagnostics: Extended Signature

Use this tab to run the *Extended Signature Test*, which 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.

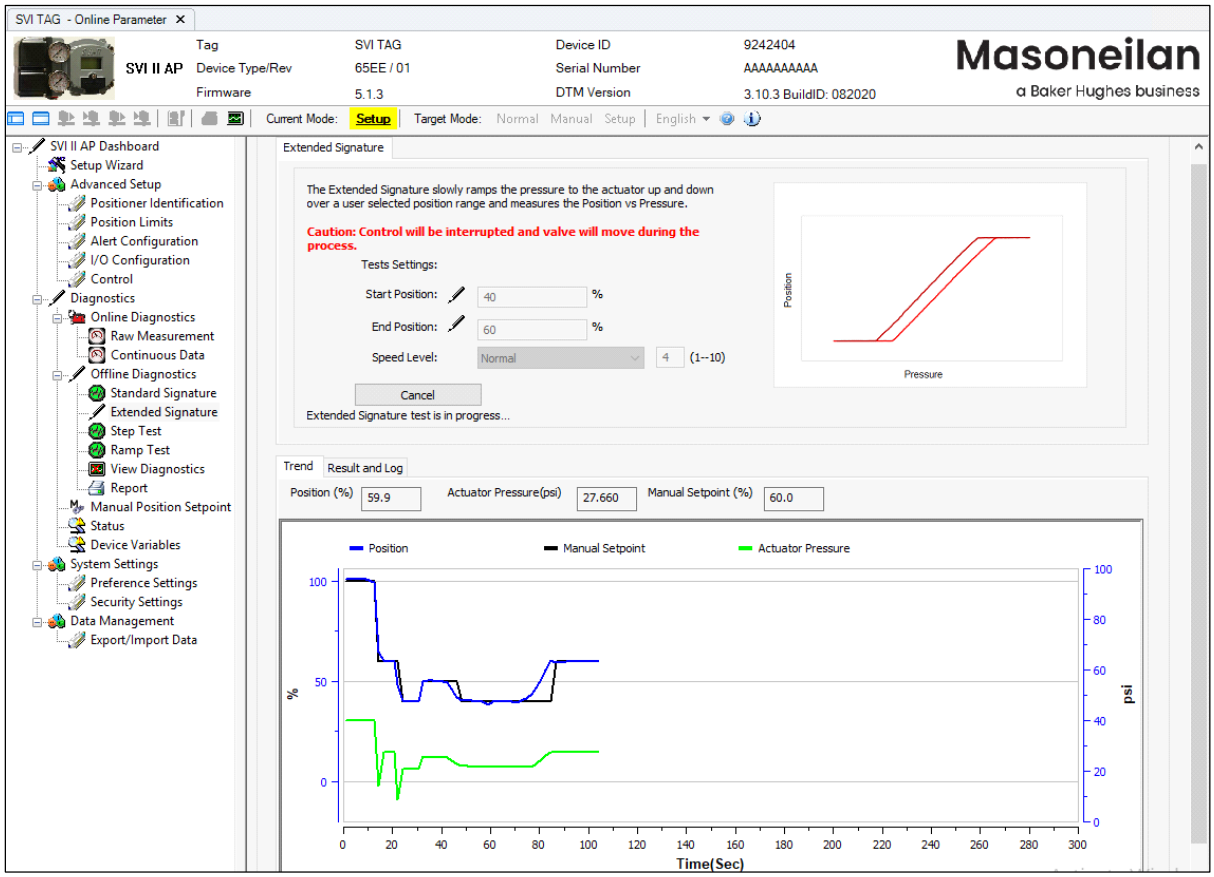

Figure 98 Diagnostic: Offline Diagnostics: Extended Signature

Buttons and Fields

Extended Signature

Static graph The graph is the upper right-hand corner is a static representation of the test type selected.

Speed Level Use the pulldown to select **Slow**, **Normal**, **Fast** or **Custom**. The speed level is the rate of speed at which the valve is moved as the test is performed, *1* is the slowest and *10* the fastest. The default speed level is *Normal* (4). This field can be adjusted to account for larger (larger actuator area involved) or smaller valves (smaller actuator area involved). *Custom* activates a field to the right where you can set the speed from *1* to *10*.

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Start Position (%)	Enter the start position for the step test as percentage of valve open.
End Position (%)	Enter the stop position for the step test as percentage of valve open.
Start button	Click to commence the test. This button changes to a *Cancel* button. Click the *Signature Results* tab to see data once the test completes.
Trend	Above the graph appear the presently detected values for the items shown on the graph. The graph displays these curves by color as: √ *Position* - blue line on the graph vs. *Time*. Displays the position of the valve is in percentage of valve opening at the top of the graph. 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. √ *Actuator Pressure* - green on the graph vs. *Time*. Displays the pressure read by the sensor at the top of the graph. Zoom the graph by right-clicking in the graph and dragging an area. Unzoom by right-clicking in the graph. Drag the graph by left-clicking, holding and moving the graph. See “Results and Log Right-Click Menu” on page 138 for an explanation of graph functionality.
Results and Log	Displays the latest completed result: *Position* vs *Pressure* as a plot and the log of events to the right. Click **Add Comment** to open the *Comment* dialog to add related notes. See Table 2 on page 44 for an explanation of functionality. Click **Clear Log** to clear the log space. See “Results and Log Right-Click Menu” on page 138 for an explanation of graph functionality.

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Perform an Extended Signature Test

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 the **Extended Signature** tab.
3. Enter the *Start Position*, *End Position* and *Speed Level*.
4. Click Start and a warning appears.

   The *Status* field displays relevant messages and traces appear in the *Trend* graph (Figure 99).

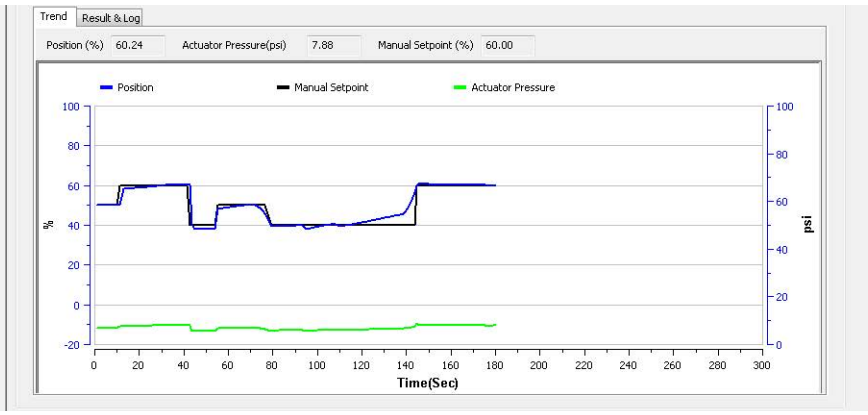

Figure 99 Diagnostics Extended Signature Test Traces

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Diagnostics: Offline Diagnostics: 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 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 sample rate, the step time, 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 Time* field until the ending position is reached. For each step, the SVI II AP measures the position at even time intervals using the *Sample Rate*. 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 *Trend* and the *Results and Log* graphs.

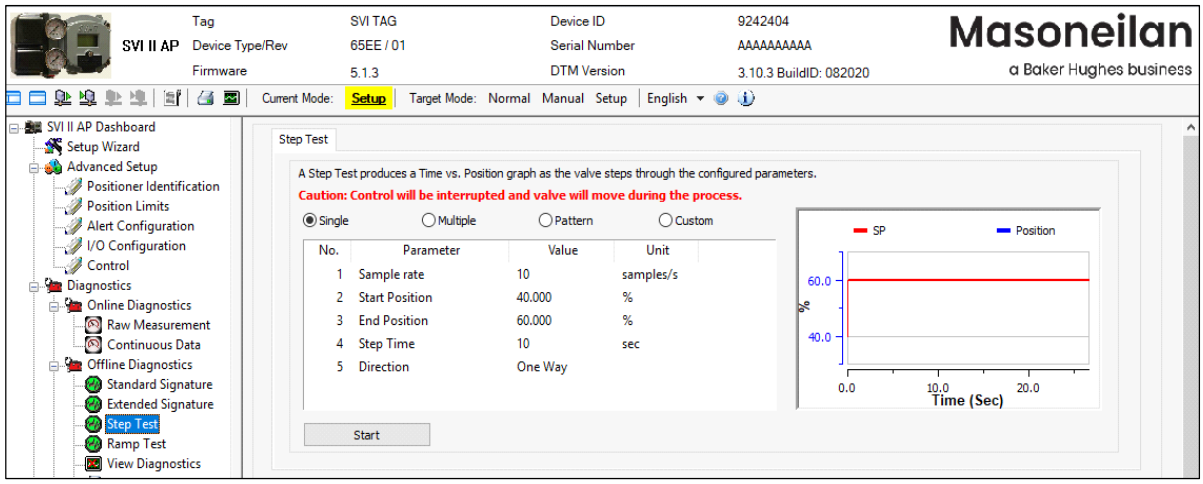

Figure 100 Step Test Single: Configuration

This test measures the step response characteristic of control valve system. There are four types of step response test:

√ *Single* — The single step test consists of a single step response test, with a sample rate, start position and end position for the test incremented by the step time and direction. See “Perform a Step Test: Single” on page 147.

√ *Multiple Steps* — The multiple step response test consists of a series of single step response tests, with new set point for each following test incremented by the step size, executed consecutively in the overall user-specified range. All individual single step tests use the same user-specified step size except the last one, which uses the step size of the remaining portion. See “Perform a Step Test: Multiple” on page 148.

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- √ *Patterns* — This test consists of steps where step size and timing are configurable. See "Perform a Step Test: Patterns" on page 149.
- √ *Custom* — Displays an empty table below where you can add settings to customize a test. See "Perform a Step Test: Custom" on page 150.

Buttons and Fields

Step Test	
Static graph	The graph is the upper right-hand corner is a static representation of the test type selected.
Sample Rate (samples/s)	Enter the number of samples to take per second. A higher rate produces a graph with more data points. This extends the test time.
Start Position (%)	Enter the start position for the step test as percentage of valve open.
End Position (%)	Enter the stop position for the step test as percentage of valve open.
Step Time (sec)	Enter the time for each step. The software then measures the position at even time intervals for the this amount of time.
Step Size (%)	Enter the size for each step during a *Multiple Steps* test only.
Around Type	√ *Around Middle*: Click to run the test centered on the middle of the test range (Multi Steps test only). √ *Around Current Setpoint*: Click to run the test centered on the Current Set-point (Multi Steps test only).
Up/Down	Click one to run the test both ways or only one direction (Multi Steps test only): √ *Both Ways*: Click to conduct the test only from the Start Position to the *End Position* and back to the *Start Position*. The values of the *Start Position* and the *End Position* determine the direction of the valve stem movement. When the value of the *Start Position* is more than that of the *End Position*, the valve steps down in one way trip, then steps up at return trip, if Both Ways is used. √ *One Way/Two Way*: Click a button to determine if the test is for open or open and close.
Step Time	Enter the time to for each step during the test. The software then operates the test between the *Start Position* and *End Position* in this timeframe.
Step Inc(rease) (%)	Enter a percentage per each step. This is the step size, limited by *Max Step*, which along with the *Step Time* dictates the number of steps performed in the test range (Multi Steps test only).
Max Step (%)	Enter a percentage for limiting the maximum step size per step of the test range (Multi Steps test only).
Direction: One Way/Two Way	Click a button to determine if the test is for open or open and close.

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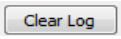
 Start button	Click to commence the test. This button changes to a *Cancel* button. Click the *Signature Results* tab to see data once the test completes.
Trend	Above the graph appear the presently detected values for the items shown on the graph. The graph displays these curves by color as: √ *Position* - blue line on the graph vs. *Time*. Displays the position the valve is in percentage of valve opening at the top of the graph. 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. √ *Actuator Pressure* - green on the graph vs. *Time*. Displays the pressure read by the sensor at the top of the graph. Zoom the graph by right-clicking in the graph and dragging an area. Unzoom by right-clicking in the graph. Drag the graph by left-clicking, holding and moving the graph. See “Results and Log Right-Click Menu” on page 138 for an explanation of graph functionality.
Results and Log	Displays the latest completed result: *Position* vs *Pressure* as a plot and the log of events to the right. Click **Add Comment** to open the *Comment* dialog to add related notes. See Table 2 on page 44 for an explanation of functionality. Click **Clear Log**  to clear the log space. See “Results and Log Right-Click Menu” on page 138 for an explanation of graph functionality. See “View Diagnostics” on page 155 to View Diagnostics tab.

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Perform a Step Test: Single

WARNING

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

1. Ensure the system is in Setup mode.
2. Click the **Step Test** tab and click the **Single** radio button.
3. Enter a *Sample Rate*, *Start Position, End Position, Step Time* and *Direction.*
4. Click Start and a warning appears.

   The *Status* field displays relevant messages and traces appear in the *Trend* graph (Figure 101).

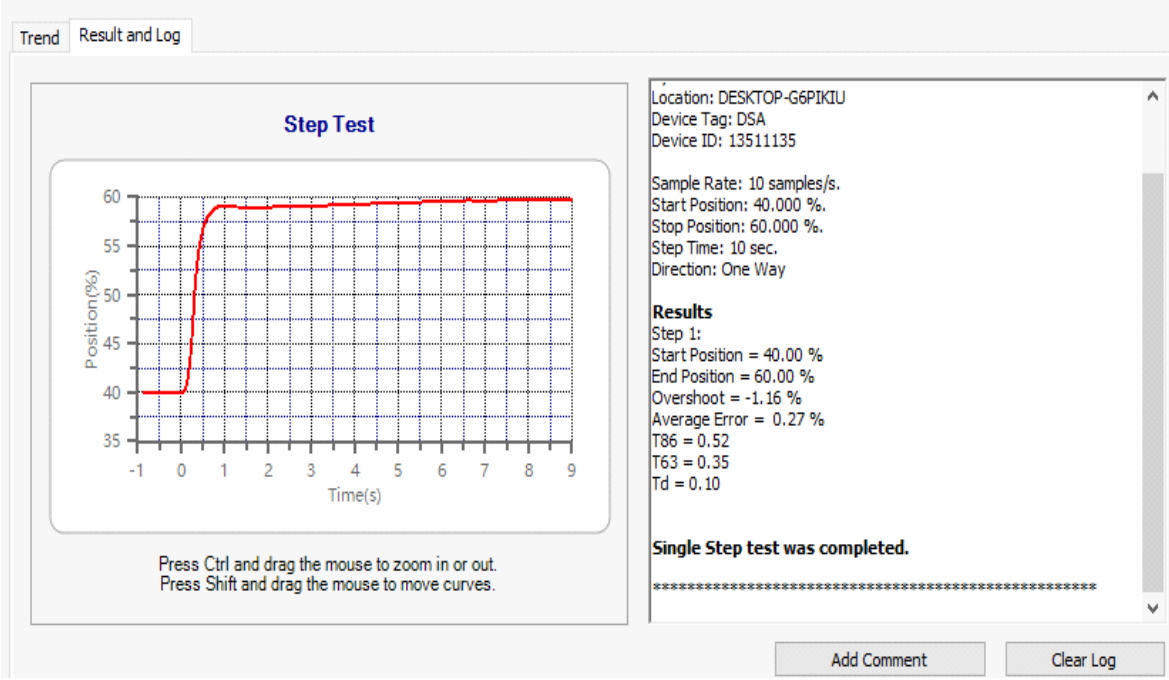

Figure 101 Diagnostics Step Test Complete: Single

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Perform a Step Test: Multiple

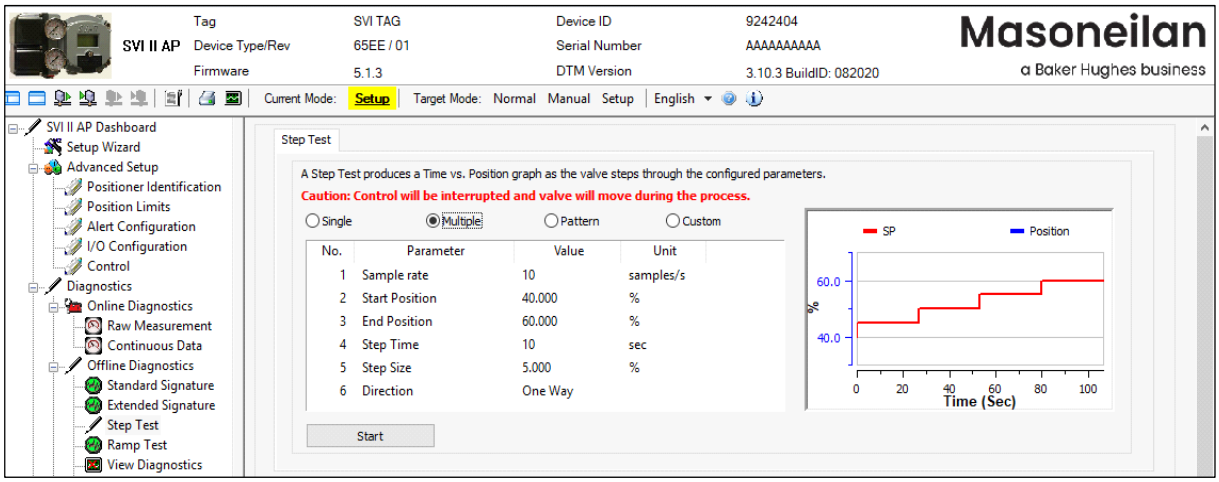

Figure 102 Step Test Multiple: Configuration

WARNING

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

1. Ensure the system is in Setup mode.
2. Click the **Step Test** tab and click the **Multiple** radio button.
3. Enter a *Sample Rate*, *Start Position, End Position, Step Time, Step Size* and *Direction.*

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4. Click Start and a warning appears.

   The *Status* field displays relevant messages and traces appear in the *Trend* graph (Figure 103).

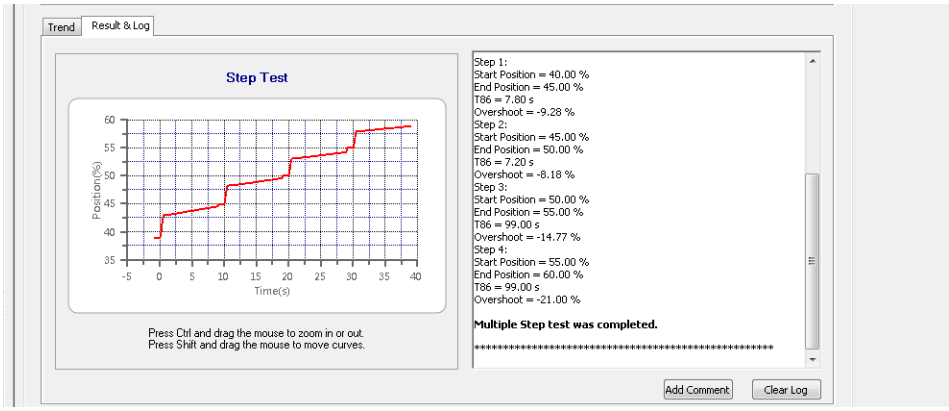

Figure 103 Diagnostics Step Test Results: Multiple

Perform a Step Test: Patterns

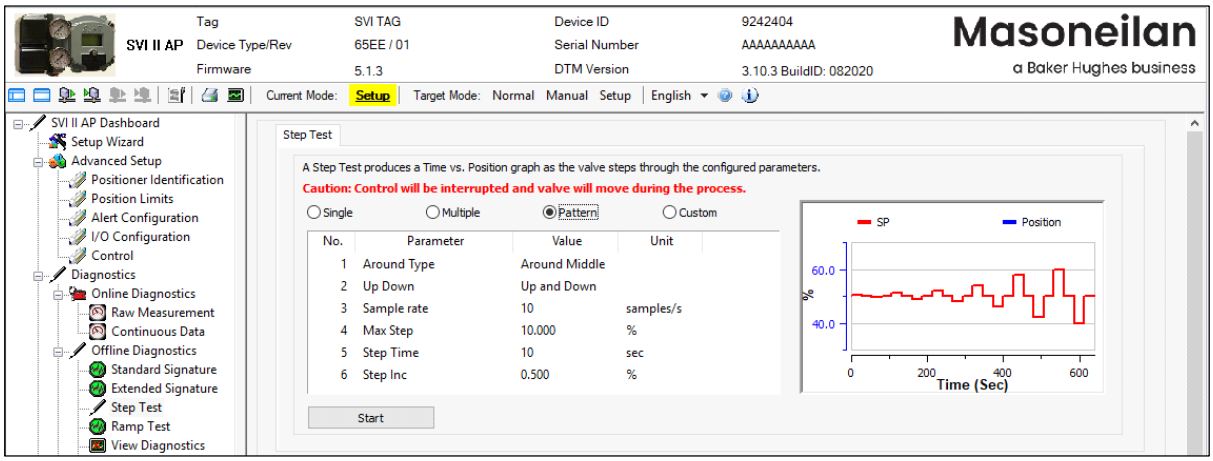

Figure 104 Step Test Patterns: Configuration

WARNING

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

1. Ensure the system is in Setup mode.
2. Click the **Step Test** tab and click the **Patterns** radio button.
3. Enter a *Around Type, Up Down, Sample Rate*, *Max Step, Step Time* and *Step increment.*

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4. Click Start and a warning appears.

   The *Status* field displays relevant messages and traces appear in the *Trend* graph (Figure 105).

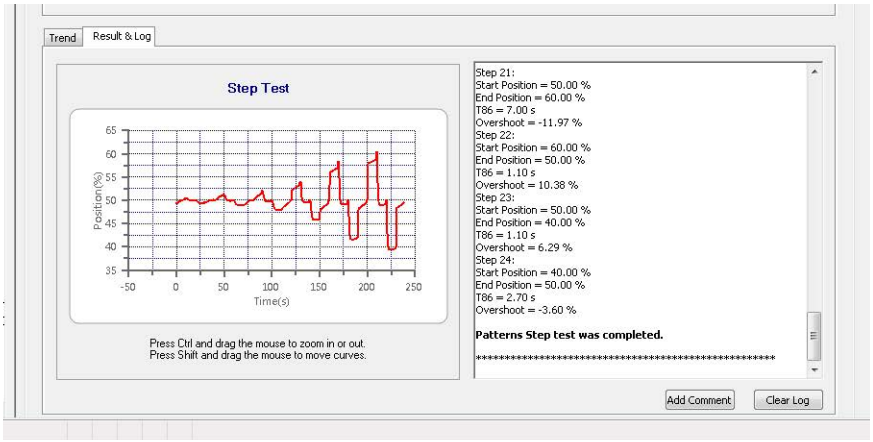

Figure 105 Diagnostics Step Test Traces: Patterns

Perform a Step Test: Custom

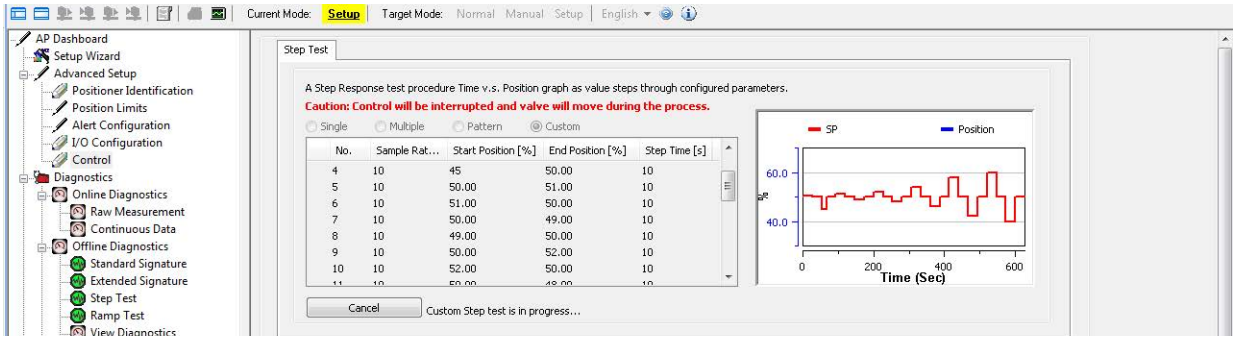

Figure 106 Step Test Custom: Configuration

WARNING

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

NOTE

The fields are the same as for a Single Test.

1. Ensure the system is in Setup mode.

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2. Click the **Step Test** tab and click the **Custom** radio button.
3. Enter a *Sample Rate*, *Start Position, End position* and *Step Time* for as many points as necessary.
4. Click Start and a warning appears.

   The *Status* field displays relevant messages and traces appear in the *Trend* graph (Figure 107).

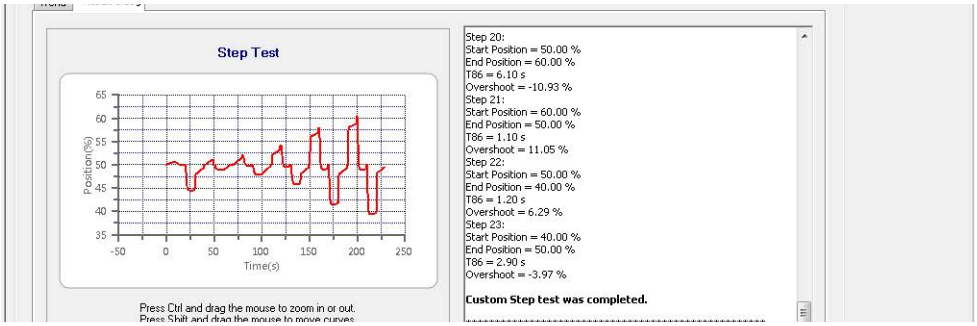

Figure 107 Diagnostics Step Test Results: Custom

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Diagnostics: Offline Diagnostics: Ramp Test

Use this tab to run the Ramp Test, which produces a *Setpoint* vs. *Position* graph for both directions of movement.

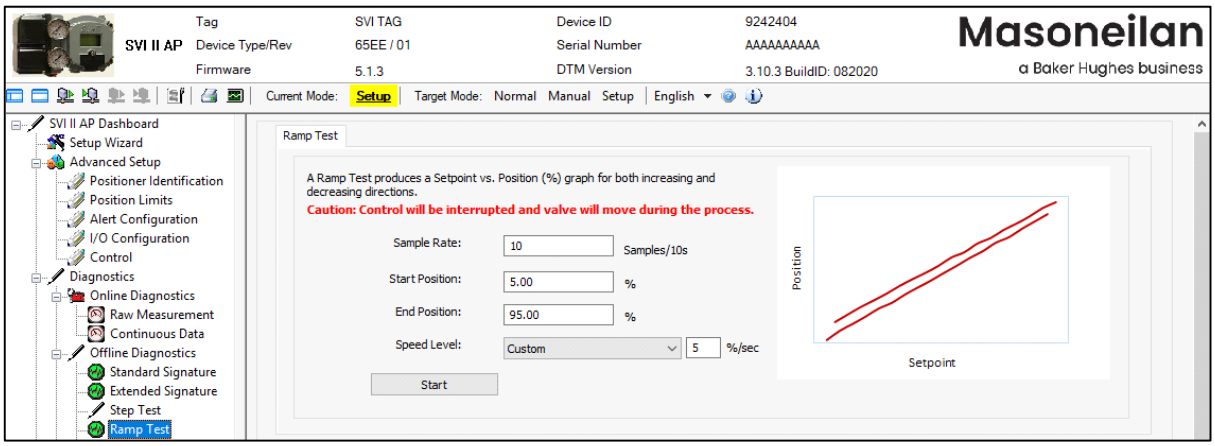

Figure 108 Ramp Test: Configuration

Buttons and Fields

Ramp Test

Static graph	The graph is the upper right-hand corner is a static representation of the test type selected.
Sample Rate (samples/s)	Enter the number of samples to take per second. A higher rate produces a graph with more data points. This extends the test time.
Start Position (%)	Enter the start position for the step test as percentage of valve open.
End Position (%)	Enter the stop position for the step test as percentage of valve open.
Speed Level	The speed level is the rate of speed at which the valve is moved as the test is performed, Use the pulldown to select **Slow**, **Normal**, **Fast** or **Custom**. The default speed level is *Normal*. This field can be adjusted to account for larger (larger actuator area involved) or smaller valves (smaller actuator area involved). *Custom* activates a field to the right where you can set the speed as %/sec.
Start *Start* button	Click to commence the test. This button changes to a *Cancel* button. Click the *Signature Results* tab to see data once the test completes.

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Trend

Above the graph appear the presently detected values for the items shown on the graph.

The graph displays these curves by color as:

- √ *Position* - blue line on the graph vs. *Time*. Displays the position of the valve is in percentage of valve opening at the top of the graph. 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.
- √ *Actuator Pressure* - green on the graph vs. *Time*. Displays the pressure read by the sensor at the top of the graph.

Zoom the graph by right-clicking in the graph and dragging an area.

Unzoom by right-clicking in the graph.

Drag the graph by left-clicking, holding and moving the graph.

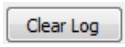
See “Results and Log Right-Click Menu” on page 138 for an explanation of graph functionality.

Results and Log

Displays the latest completed result: *Position* vs *Pressure* as a plot and the log of events to the right.

Click **Add Comment**

to open the *Comment* dialog to add related notes. See Table 2 on page 44 for an explanation of functionality.

Click **Clear Log** 

to clear the log space.

See “Results and Log Right-Click Menu” on page 138 for an explanation of graph functionality.

See “View Diagnostics” on page 155 to View Diagnostics tab.

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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. This test is also called a positioner signature test.

The *Status* field displays relevant messages and traces appear in the *Trend* 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 the **Ramp Test** tab.
3. Enter a *Sample Rate, Start Position, End Position,* and *Speed Level.*
4. Click Start and a warning appears.

   The *Status* field displays relevant messages and traces appear in the *Trend* graph (Figure 109).

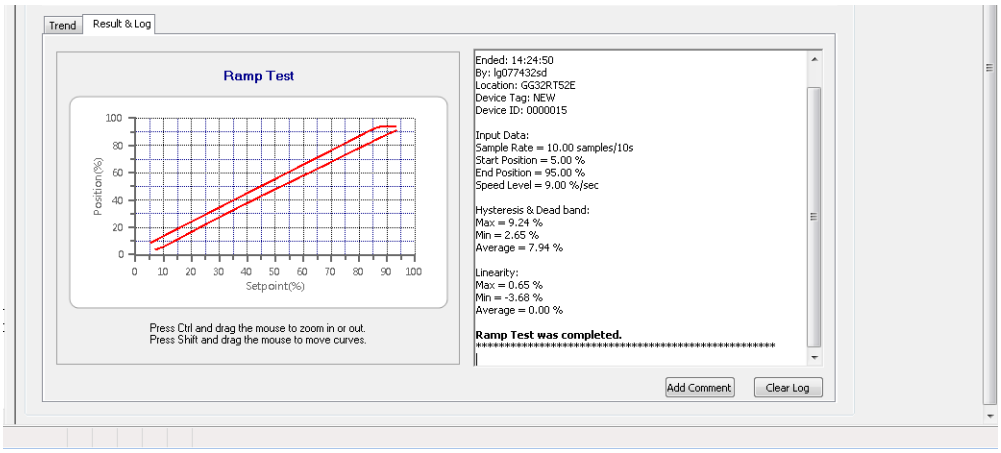

Figure 109 Diagnostics Ramp Test Results

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View Diagnostics

Use this tab to view a test that has just been run and load test of the same type for comparison from file or from the database. Use the right-click menu to import results and to format the graph as required. See “Results and Log Right-Click Menu” on page 138 for an explanation of functionality.

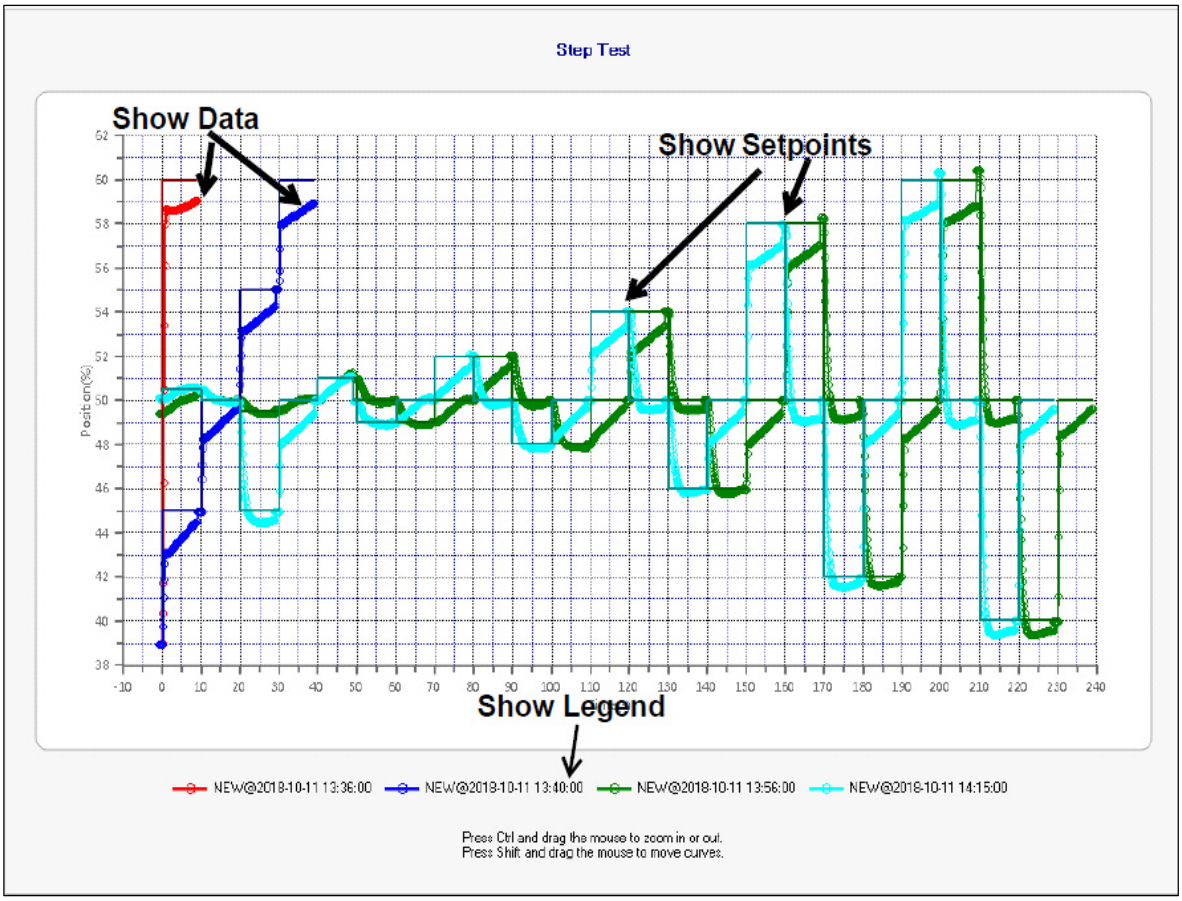

Figure 110 View Diagnostics

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Diagnostics: Manual Position Setpoint

Use the *Manual Position Setpoint* 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).

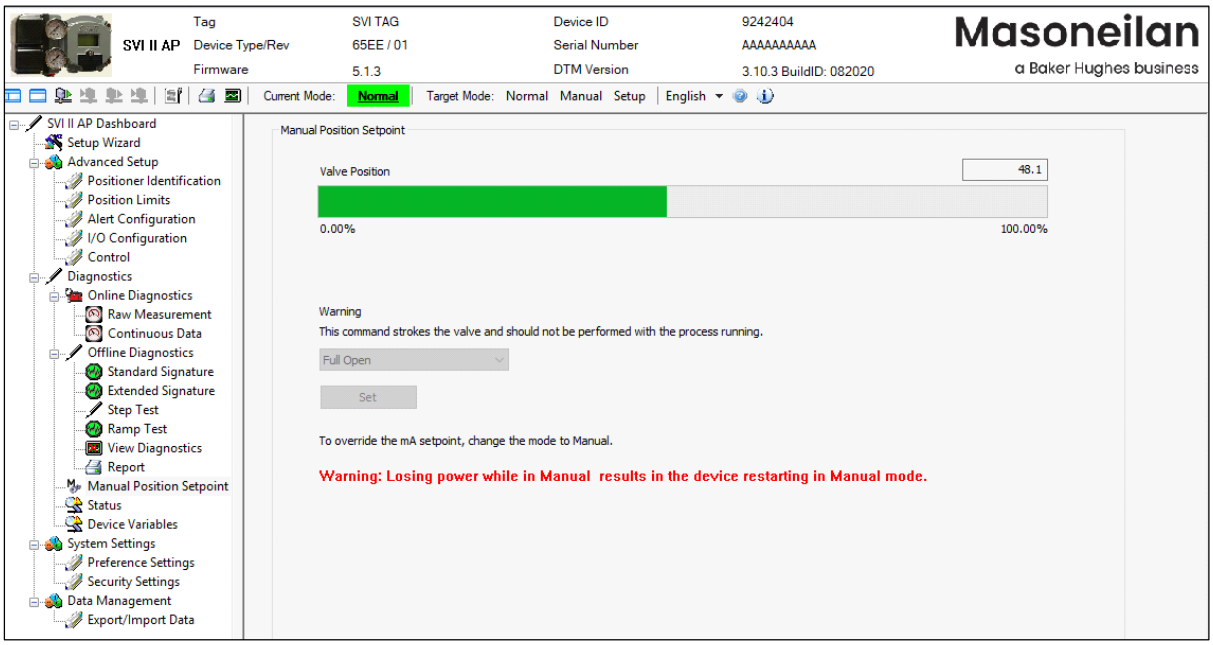

Figure 111 Diagnostics: Manual Position Setpoint

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 Setup mode.
Full Close	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 Setup mode.

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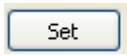
As a Position in %	Click and text field that appears. Enter a value and click **Set**. Range: -5 to 160%. To override this setting change the mode to *Setup* or *Manual*. This is available in Setup and Manual mode.
As Signal in mA	Click and text field that appears. Enter a value and click **Set**. Range 4 to 20 mA. To override this setting change the mode to *Setup* or *Manual*. This is available in Setup and Manual mode.
Set button	 Sets the configured items to the positioner.

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Diagnostics: Status: Active Faults

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 112). Mouse hover over a fault for a fault definition.

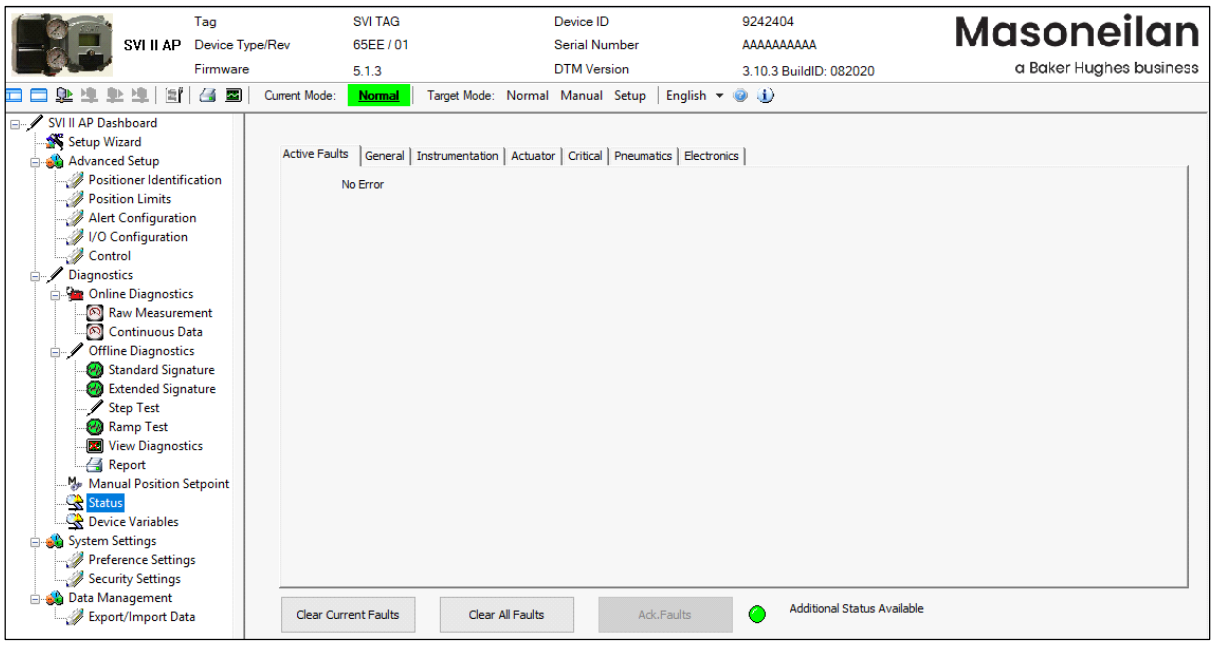

Figure 112 Diagnostics: Active Faults

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The ValVue3 *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 ValVue3 *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 ValVue3 help or *Ref. 31426 Masoneilan Products ValVue3 Software Manual*.

Buttons and Fields

Clear Current Faults button

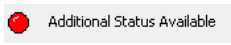
Click to clear *Current Faults*, if the fault cause no longer exists.

Clear All Faults button

Click to clear *Current Faults* and *Historical Faults*, if the fault cause no longer exists.

Ack. Faults button

Click to acknowledge all the faults on this tab. This does not clear the cause of the fault.



Additional Status indicator

Indicates that additional information is available. See the individual *Status* tabs.

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Diagnostics: Status: General

The *General* tab displays general faults.

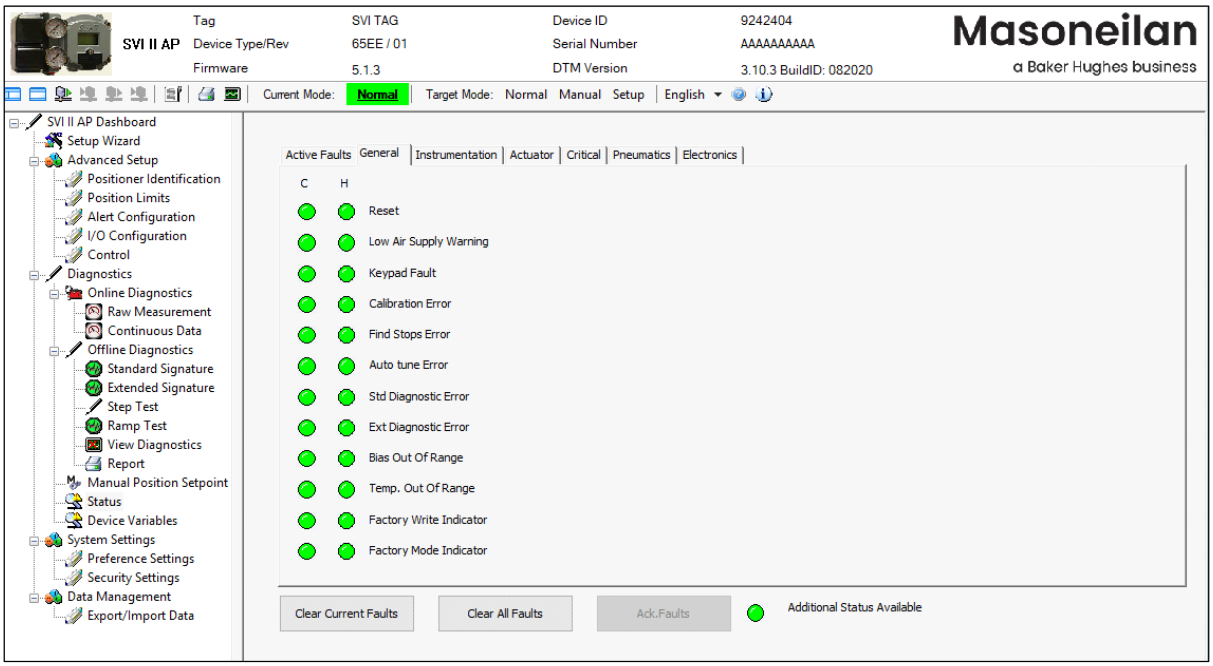

Figure 113 Diagnostics: Status: General

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Diagnostics: Status: Instrumentation

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

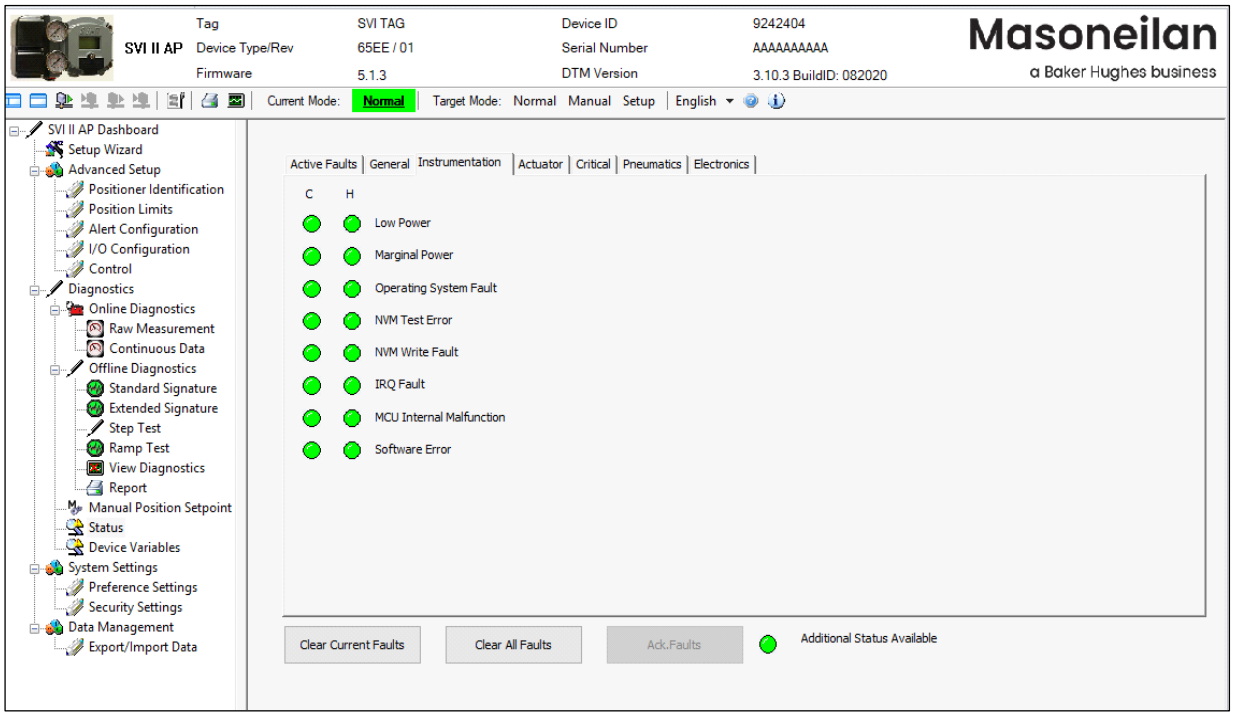

Figure 114 Diagnostics: Status: Instrumentation

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Diagnostics: Status: Actuator

The *Actuator* status tab displays actuator faults.

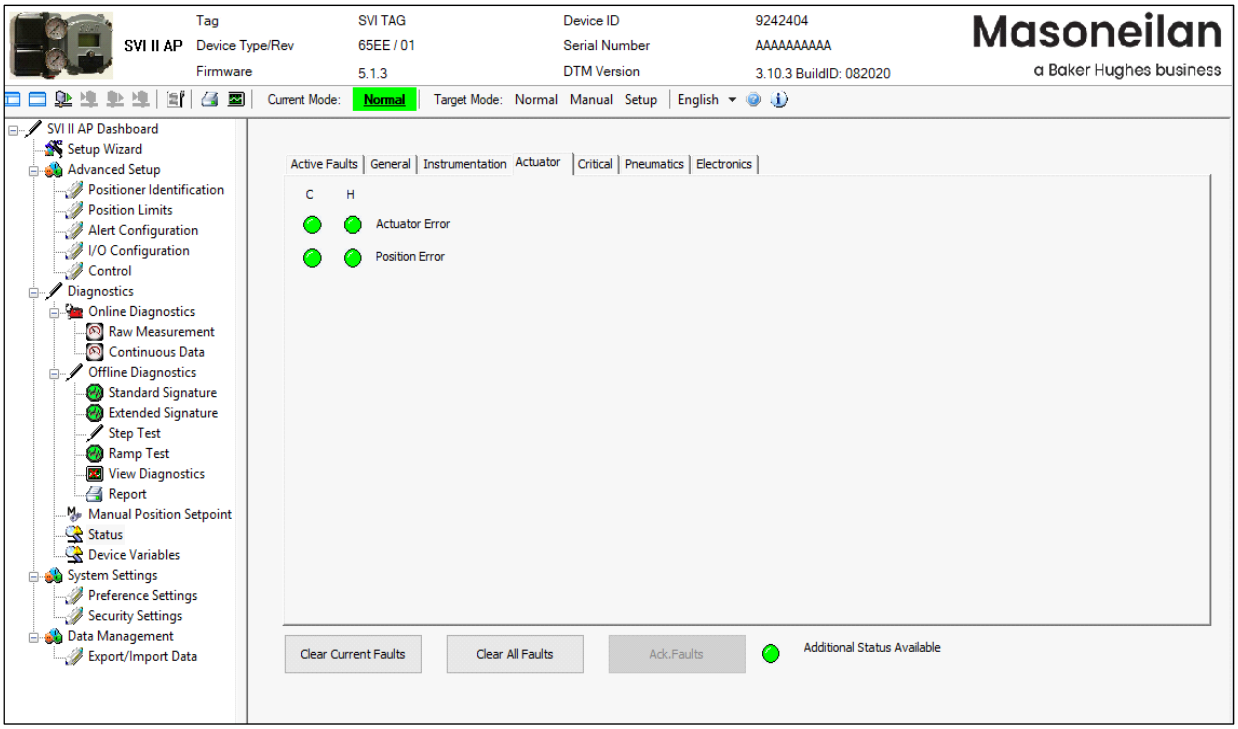

Figure 115 Diagnostics: Status: Actuator

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Diagnostics: Status: Critical

The *Critical* status tab displays all critical errors.

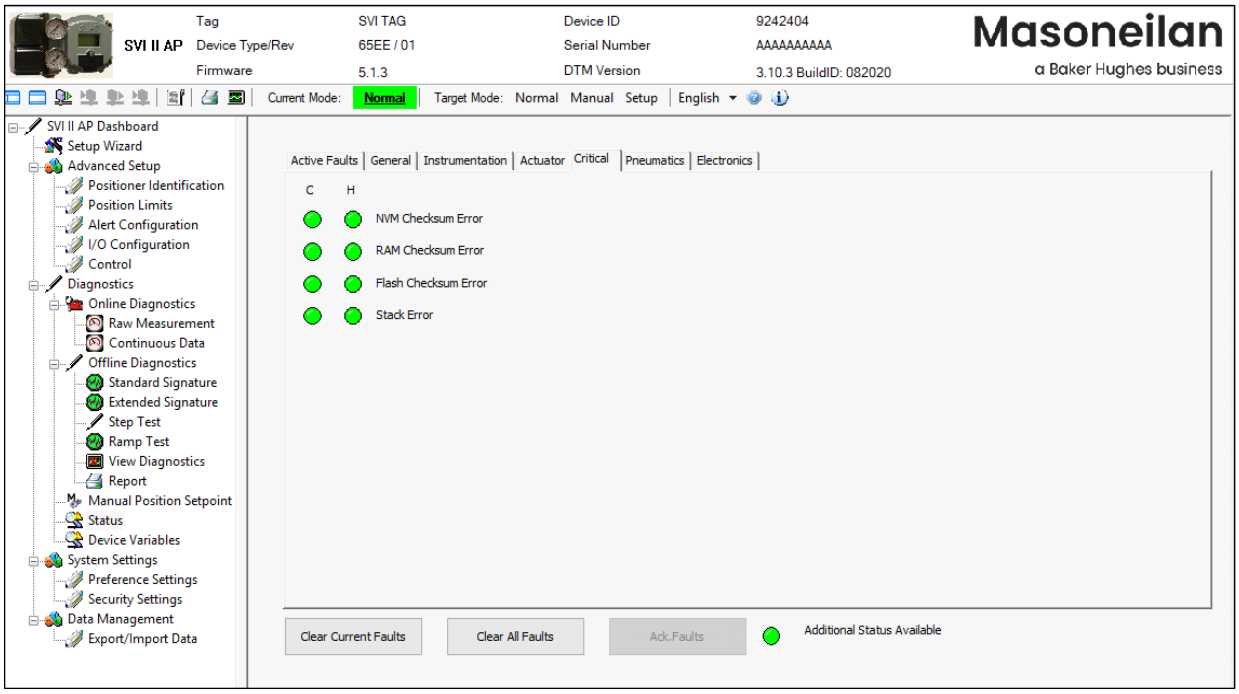

Figure 116 Diagnostics: Status: Critical

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Diagnostics: Status: Pneumatics

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

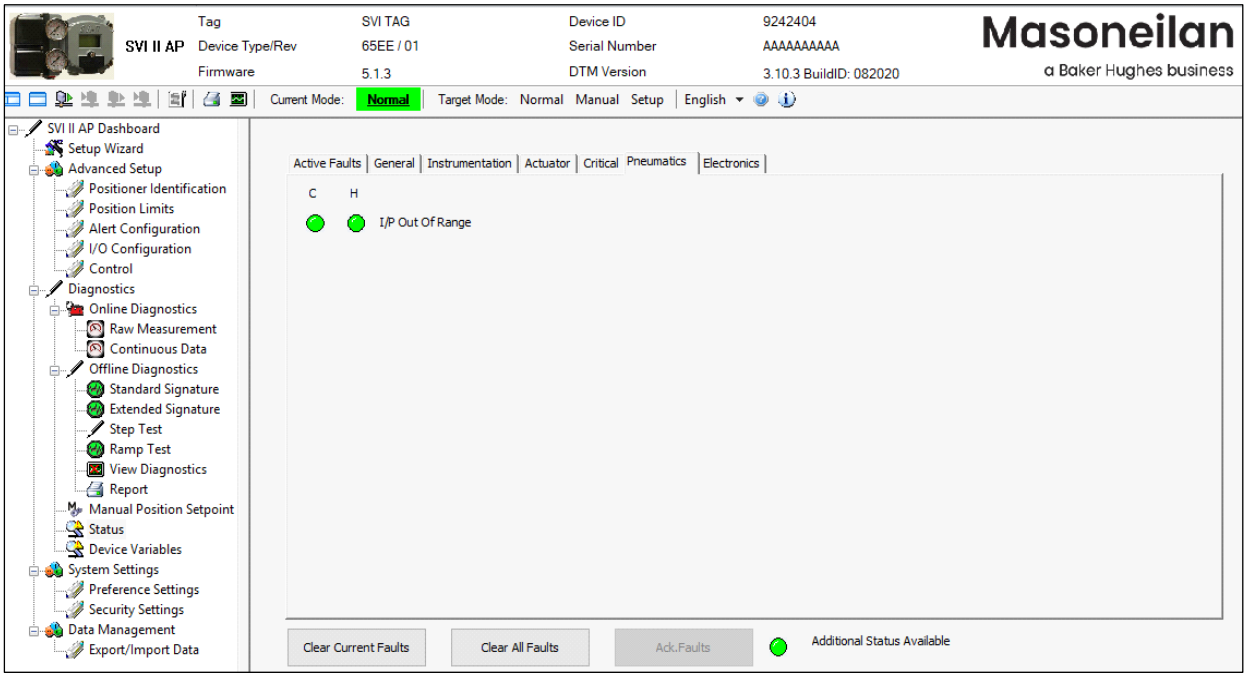

Figure 117 Diagnostics: Status: Pneumatics

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Diagnostics: Status: Electronics

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

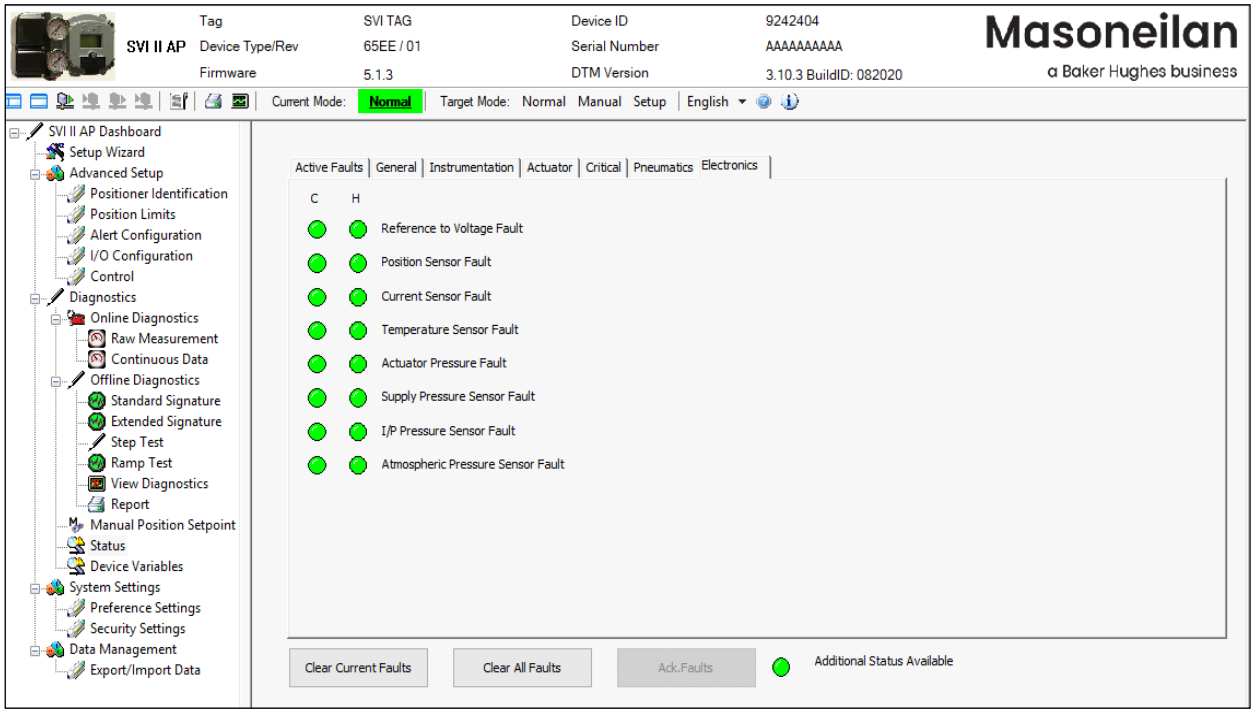

Figure 118 Diagnostics: Status: Electronics

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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.

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.

Ack Faults

When you click **Ack. Faults** SVI II AP acknowledges all command 48 faults that have not been previously masked. All current indicators, current and historical, revert to green.

To acknowledge faults:

√ Click **Ack. Faults** and click **Yes** on the dialog that appears.

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Diagnostics: Device Variables

Use this screen 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.

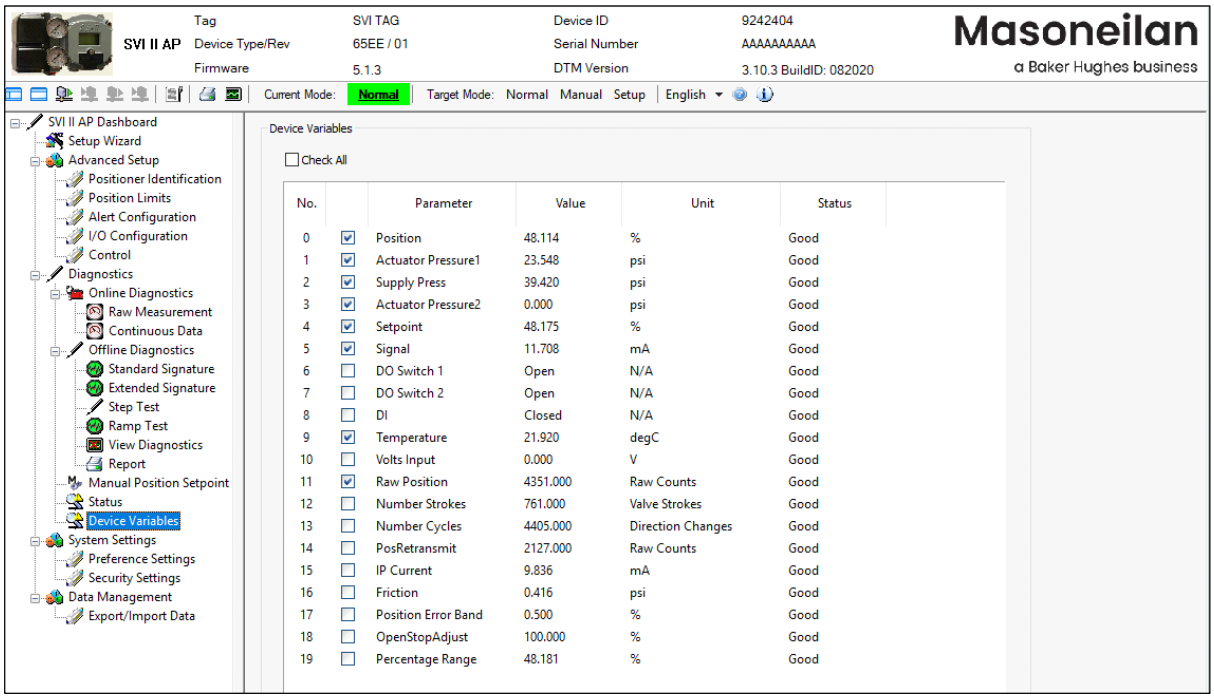

Figure 119 Diagnostics: Device Variables

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12. System Settings

Preference Settings

Use this screen to set user preferred settings for the DTM.

Settings

Use this area to configure target locations for various file types.

Function Setting for DTM

Use this area to configure some general behaviors seen throughout DTM operations,

the file paths to where you want various reports and data saved, and configure DTM settings.

CAUTION

After a new install of the program, these settings will return to their defaults.

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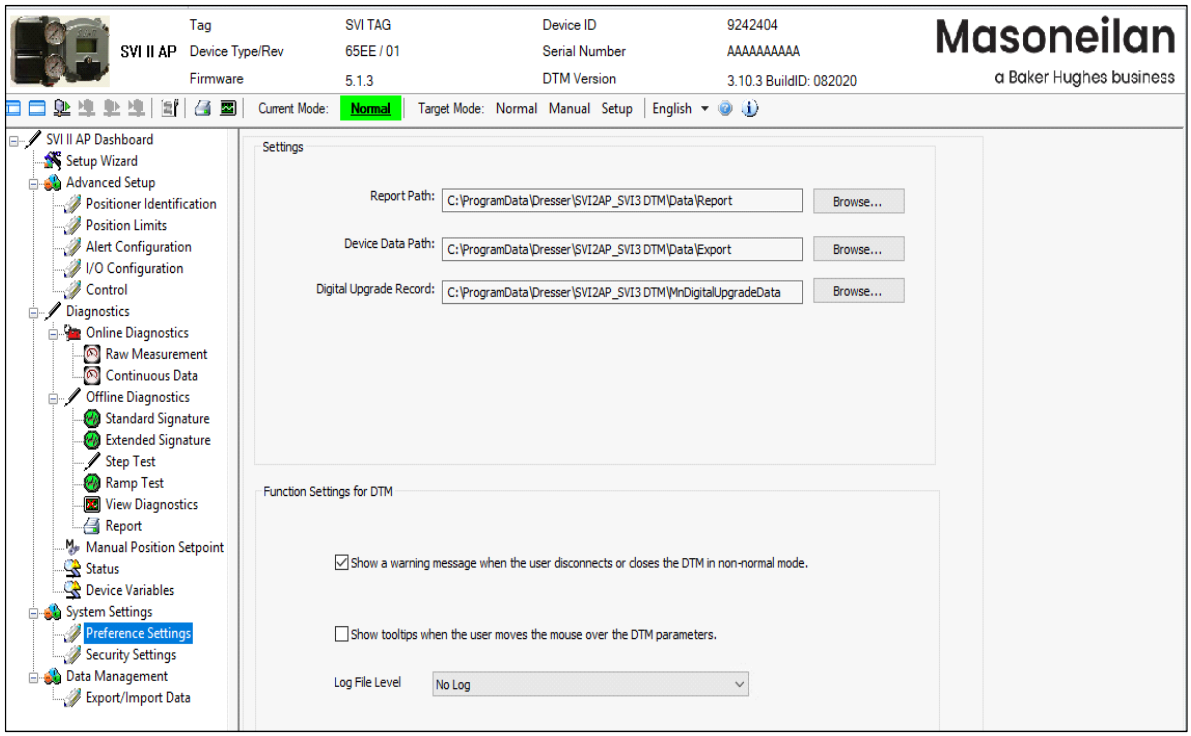

Figure 120 Preference Settings

Settings

Report Path	This is the report generated using the *Print Report* icon from the DTM icon bar.
Device Data Path	The path where the device data is saved. This is useful when transferring data for offline study on another PC.
Digital Upgrade Record	The path where the digital upgrade data is saved as a database record.

Function Settings for DTM

Warning Message Status	Activate to display a warning message when the DTM is closed while not in *Normal* mode and click **Apply**.

WARNING *If the DTM is closed in any other mode, the control loop **will not** be engaged, which represents a dangerous state.*

Tooltips	Activate to turnoff tooltips and click **Apply**.

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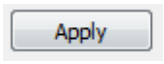
Log File Level

Use the pulldown list to select the type of log file to keep:

- √ *No Log*: Disables logging of events.
- √ *Log Error Only*: Enables logging of error level events, including exceptions and internal errors.
- √ *Log Detail*: Enable logging of HART® communication events.



Apply button

Click **Apply** to save any path or log file changes.

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Security Settings

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 173) 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 173). The default file settings are represented in Figure 121.

To access this screen (available to administrator only):

1. Click a device.
2. Select **System Settings > Security Settings**.

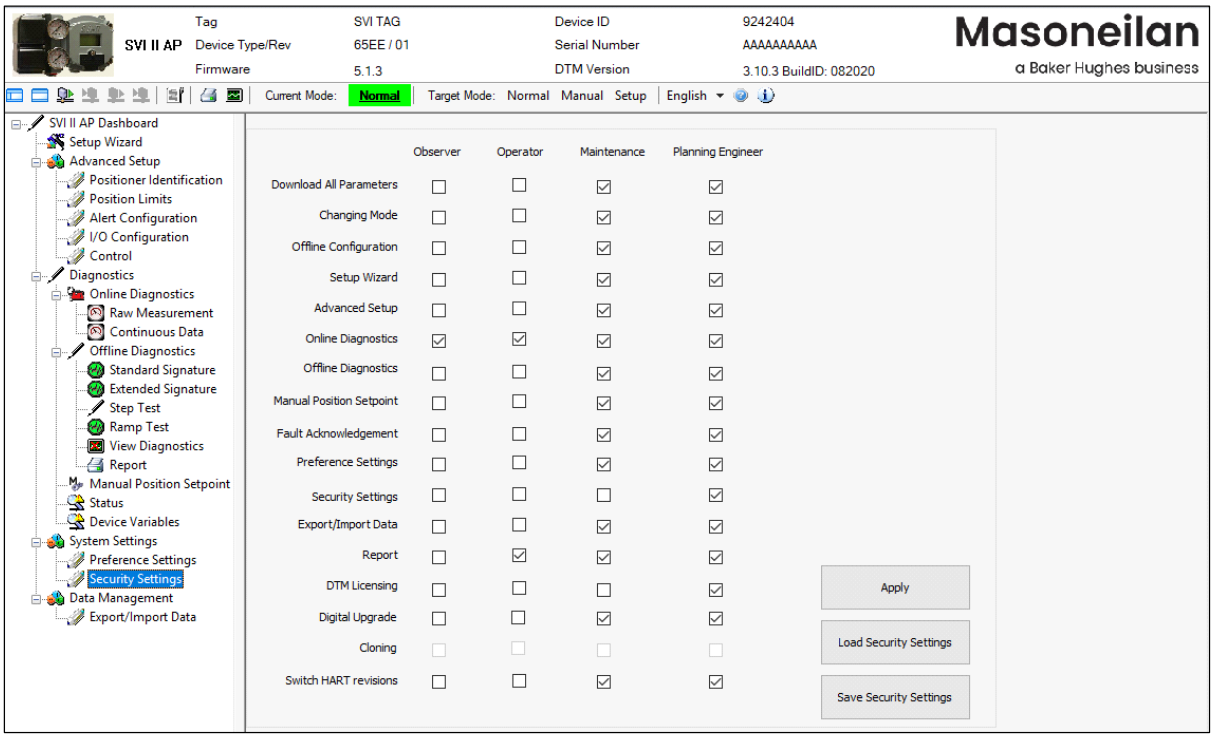

Figure 121 Security Settings

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Change Privileges

To change privileges:

1. Change the user role's checkboxes as required.
2. Click Apply.

Load Security Settings from File

1. Click Load Security Settings and a dialog appears.

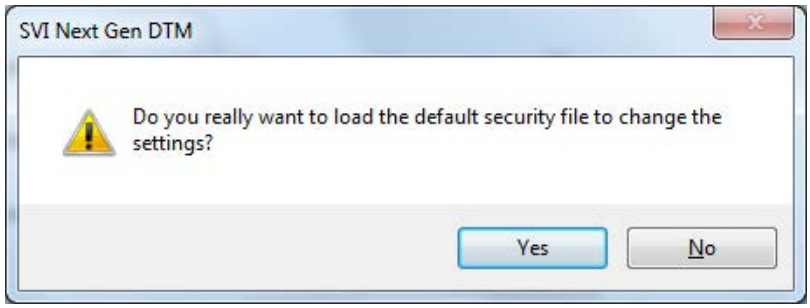

Figure 122 Load Security Settings

2. Click Yes and the settings are loaded and the settings from the default file populate into the tab.
3. Change the user role's checkboxes as required.
4. Click Apply.

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 123).

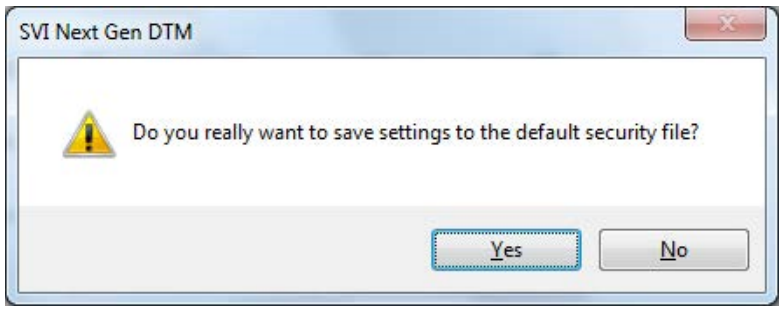

Figure 123 Save Security Settings to Default File Confirmation

2. Click Yes and the settings are saved.

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13. Data Management

Data Management: Export/Import Data

Use this tab to manage data:

- √ *Configuration*: Manage just configuration for the positioner/valve. See “Configuration” on page 176.
- √ *Diagnostics Results*: Manage just diagnostics results for the positioner/valve. See “Diagnostic Results” on page 180.

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Configuration

Use this tab to:

√ *Import Configuration*: Depends on which tab you are on. If on the *Configuration* tab, Import only imports configuration. If on the *Diagnostic* result tab, import only import tests (*.devdata* file).

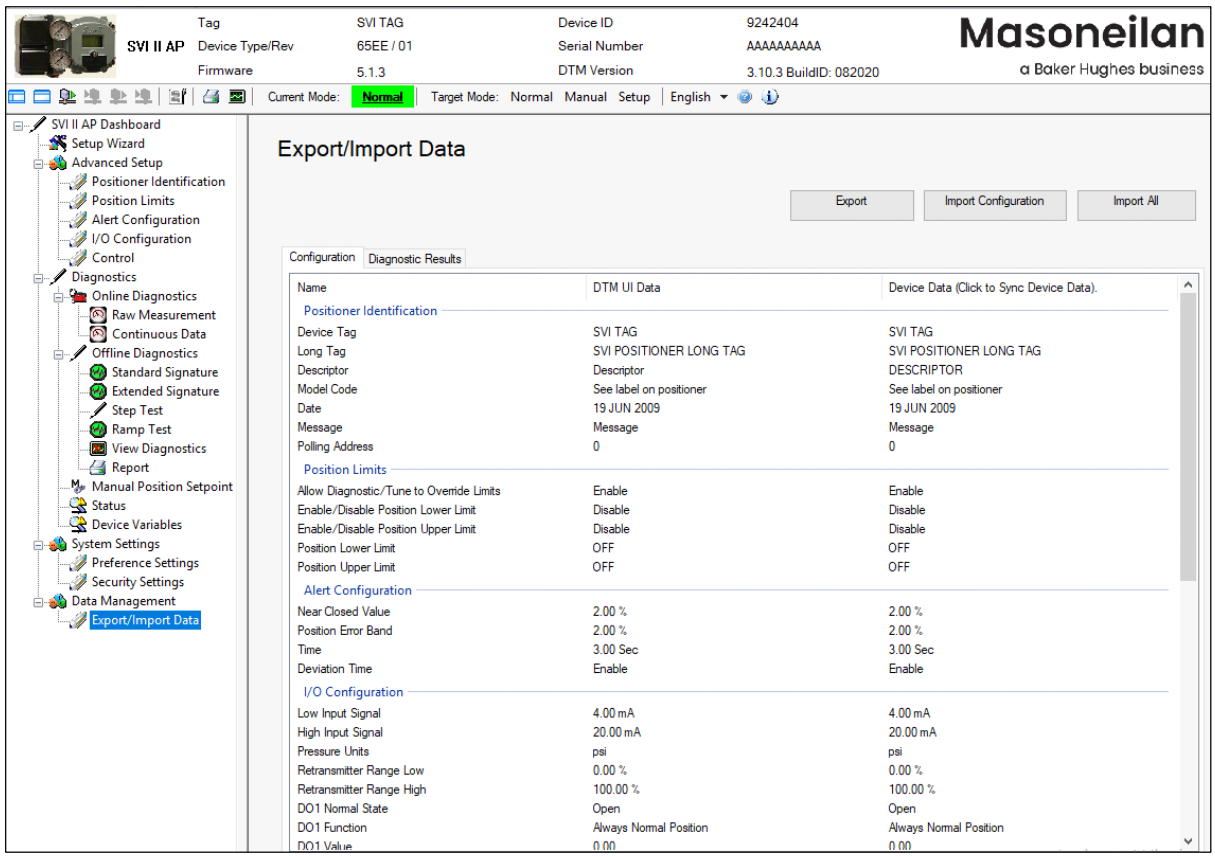
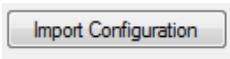


Figure 124 Data Management: Configuration

Buttons and Fields

Import Configuration



Click this radio button click and an *Open* dialog appears to import an existing positioner configuration as a device template file**.** A *.devdata* is usable. Once imported you can select desired data and download. See “Import Configuration” on page 177.

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Import Configuration

1. Click **Import Configuration** button and Figure 125 appears.

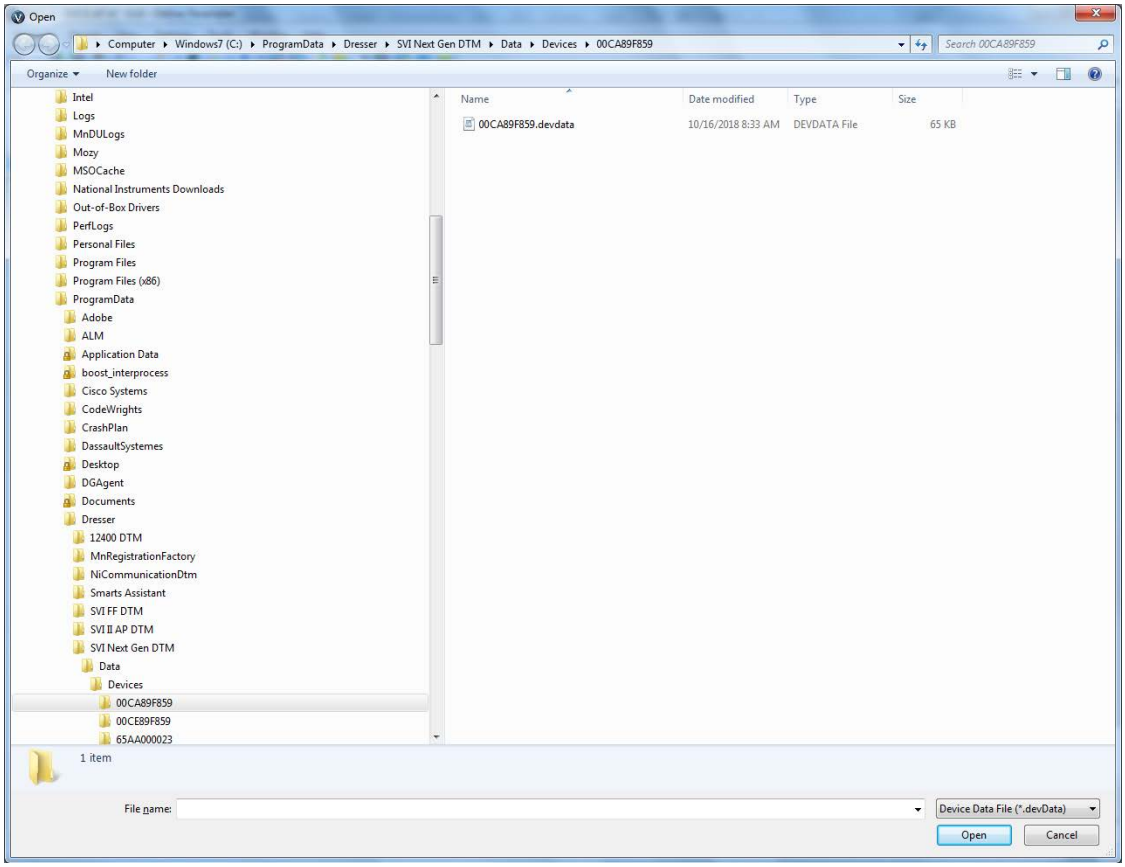

Figure 125 Import Configuration: Open

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2. Navigate to the required directory, select the file and click **Open** and Figure 126 appears. This was saved to the default directory - the target directory can be changed, but ensure you record any change.

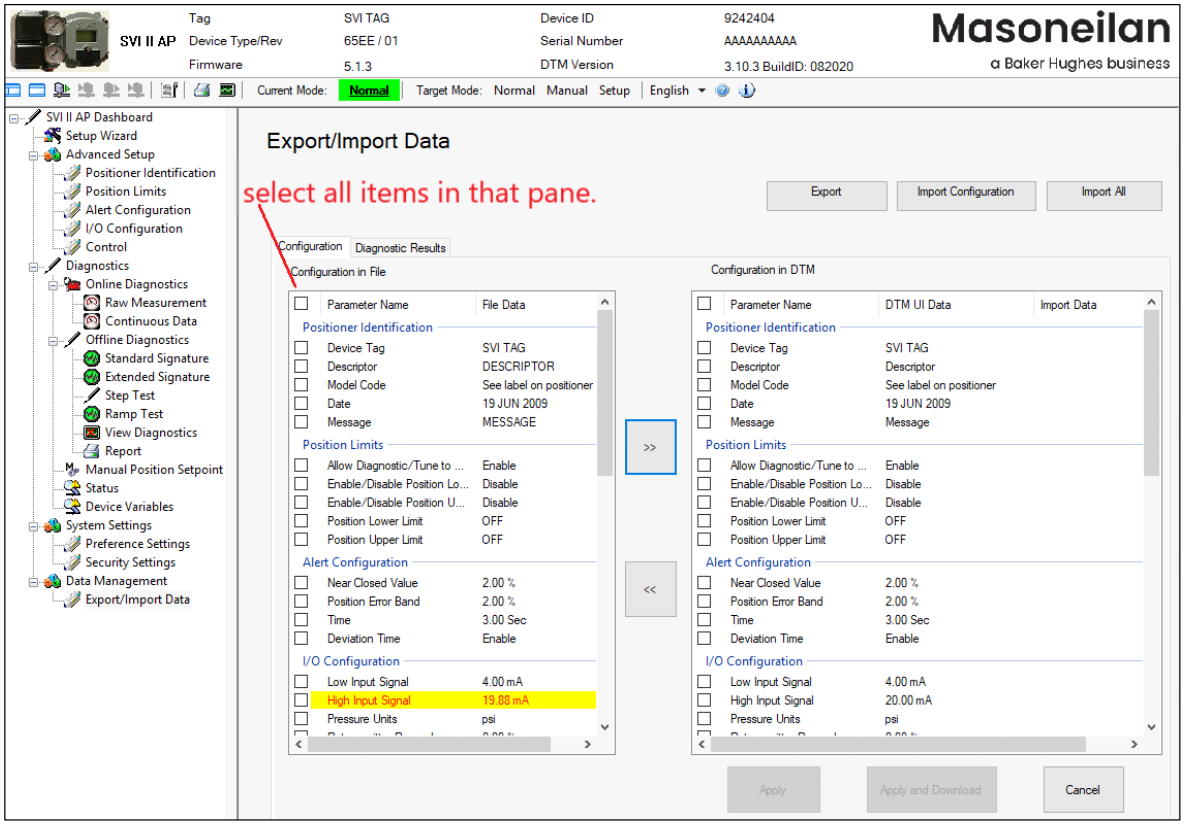

Figure 126 Import Configuration: Select Desired Data

The system changes to show the *Configuration in File* in the left pane and the *Configuration in DTM*, current positioner data, in the right pane.

3. Select all the data from the *Configuration in File* pane or use the checkboxes to select individual data items.
4. Click the right arrows and these items are updated to the *Configuration in DTM* pane. Updated items appear in yellow in the *Imported Data* column.

At this point you review your choices. If there is an item in the Configuration in DTM pane that is unwanted, click its associated checkbox and click the back arrows to remove it.

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5. Ensure all your selections are valid and either:

   √ Click **Apply** and Figure 127 appears.

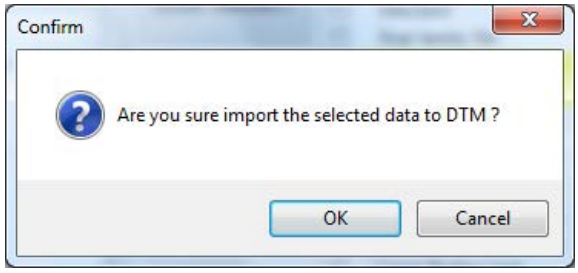

Figure 127 Apply

   or

   √ Click **Apply and Download** to apply and at the same time download to the positioner and a dialog appears**.**

6. Click **OK.**

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Diagnostic Results

Use this tab to:

√ *Import Diagnostic*: Imports all diagnostic results, from file (..*devdata* file).

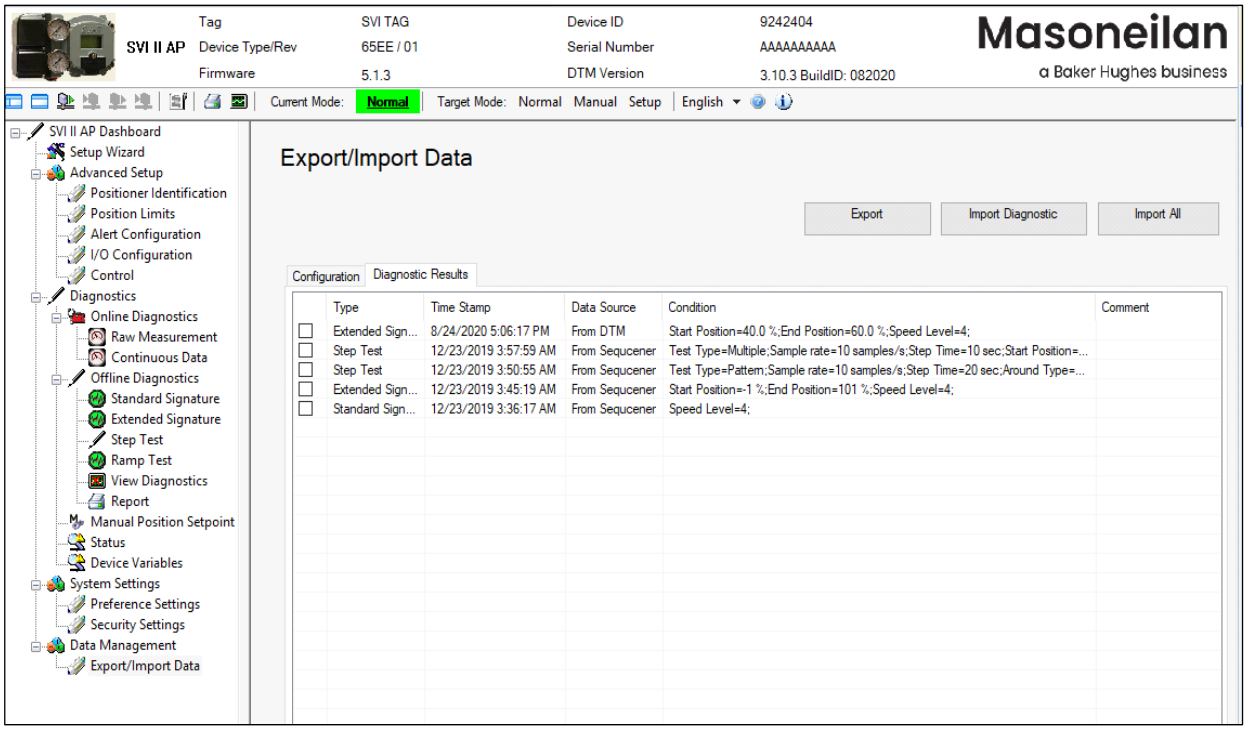
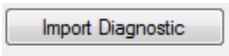


Figure 128 Data Management: Diagnostic Results

Buttons and Fields

Import Diagnostic 	Click this radio button click and an *Open* dialog appears to import an existing positioner's diagnostic results**.** A ..*devdata* is usable. Once imported you can select desired data and download. See "Import Diagnostic" on page 181.

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Import Diagnostic

1. Click **Import Diagnostic** button and Figure 129 appears. SVI II AP DTM allows to import diagnostic test data through four types of files: DevData, DDF (including DDF and DDF2) and Dgn formats.

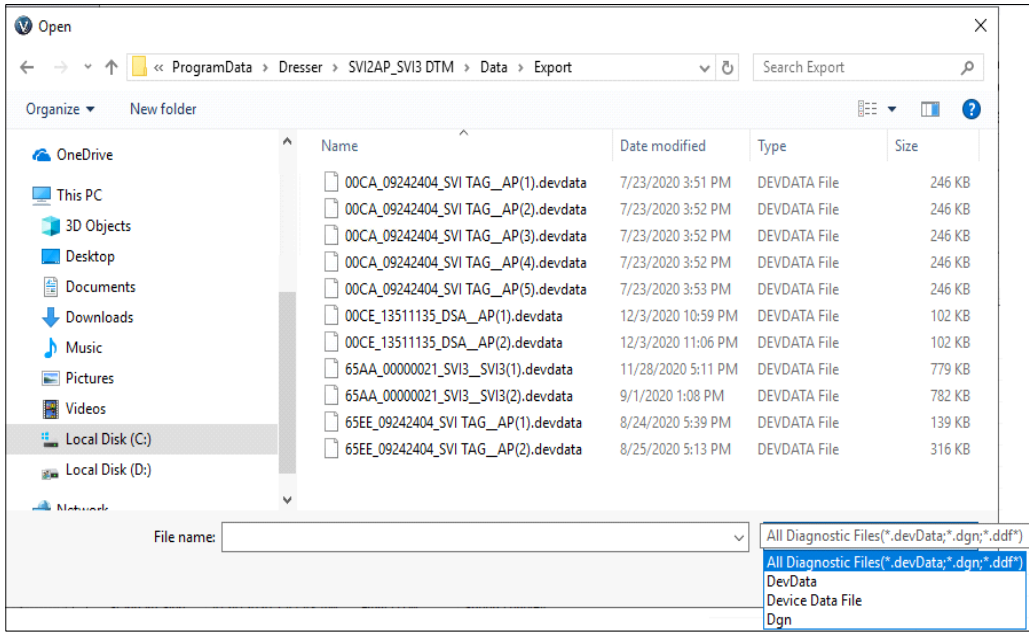

Figure 129 Import Diagnostic: Open

2. Select the file and click **Open** and Figure 130 appears.

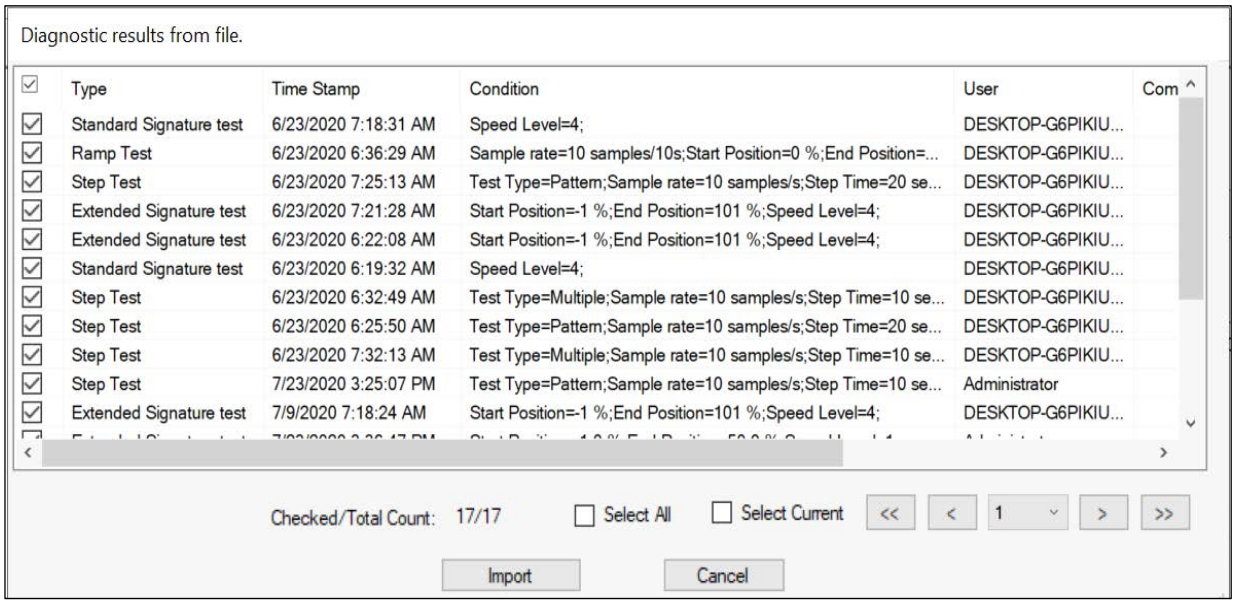

Figure 130 Diagnostic Results From File

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3. Select the file types required, click **Import** and appears.

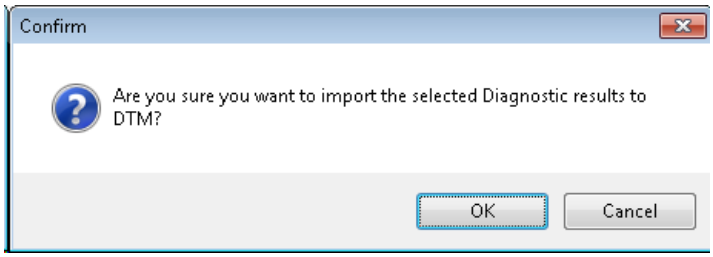

Figure 131 Confirm Import

4. Click **OK** and Figure 132 appears with the items imported.

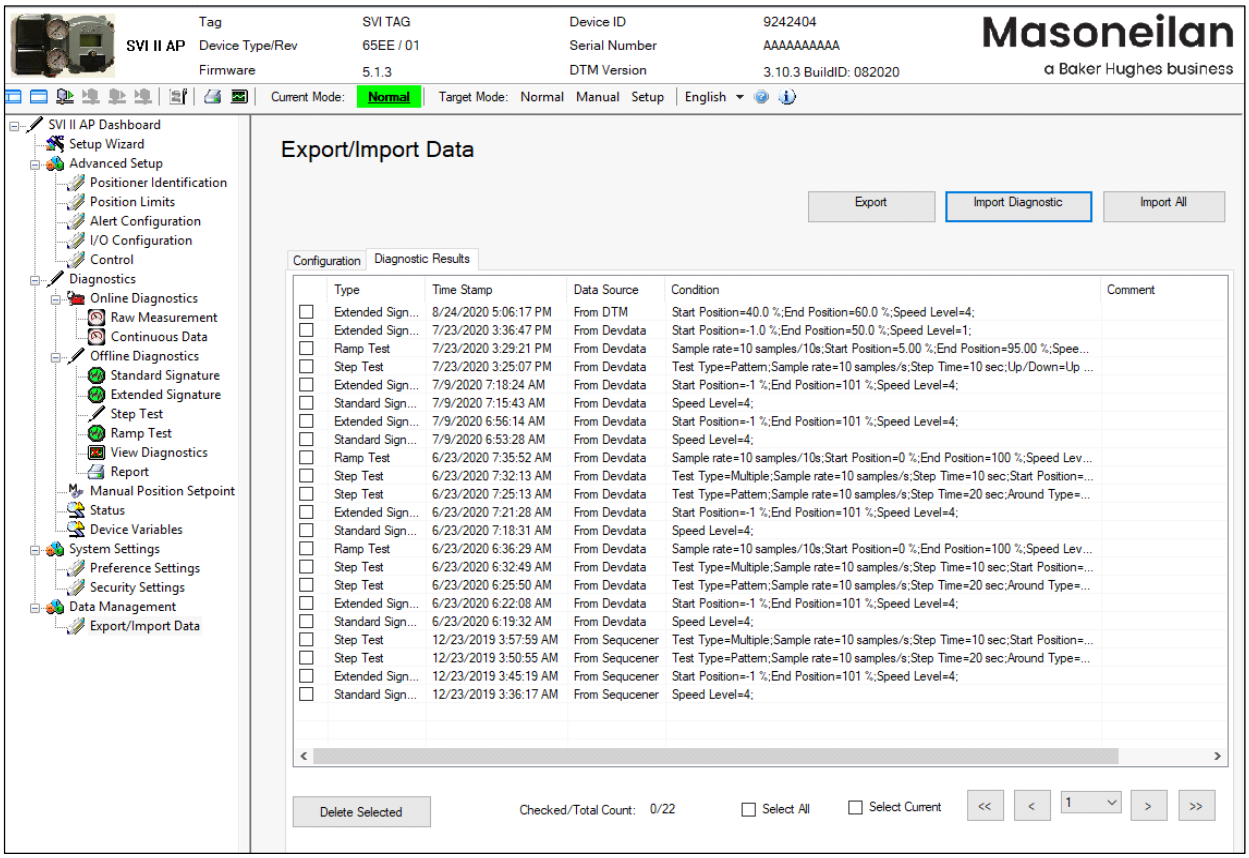

Figure 132 Diagnostic Results Imported

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Export

Click **Export** button on DTM Data Management page, the following message appears. A Devdata file is generated under the path that displays in the message.

The devdata file contains configuration data, diagnostic tests of current DTM.

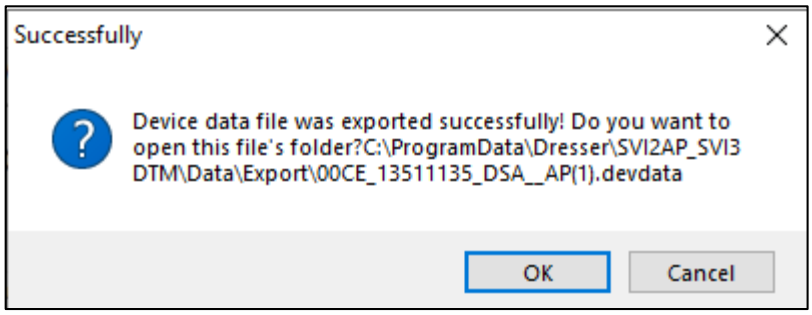

Figure 133 Export Devdata file successfully

Import All

Click **Import All** button on DTM Data Management page, an Open window as below appears, then navigate to a directory where Devdata files are stored.

Choose one Devdata file to open, the data saved in the devdata file including configuration, diagnostic test can be imported into the current DTM instance.

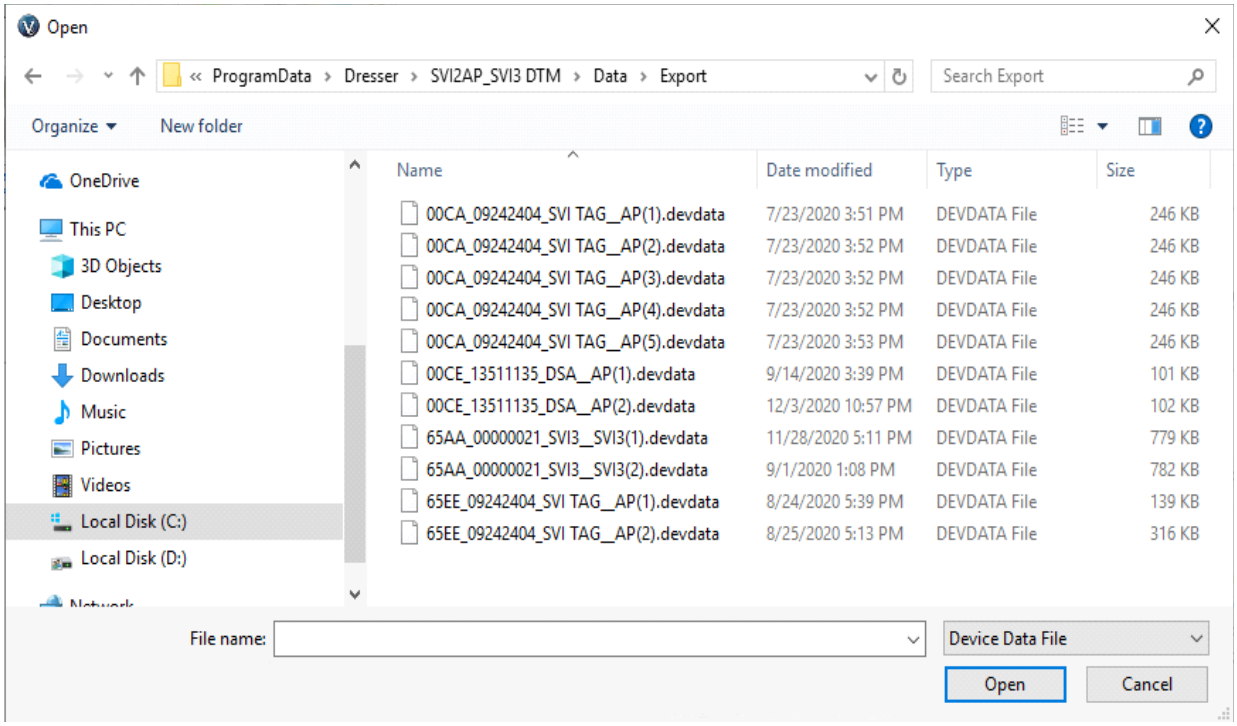

Figure 134 Import All: Open

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14. Additional Functions

Access these menu item, select the positioner, right-click, and select **Additional Functions**.

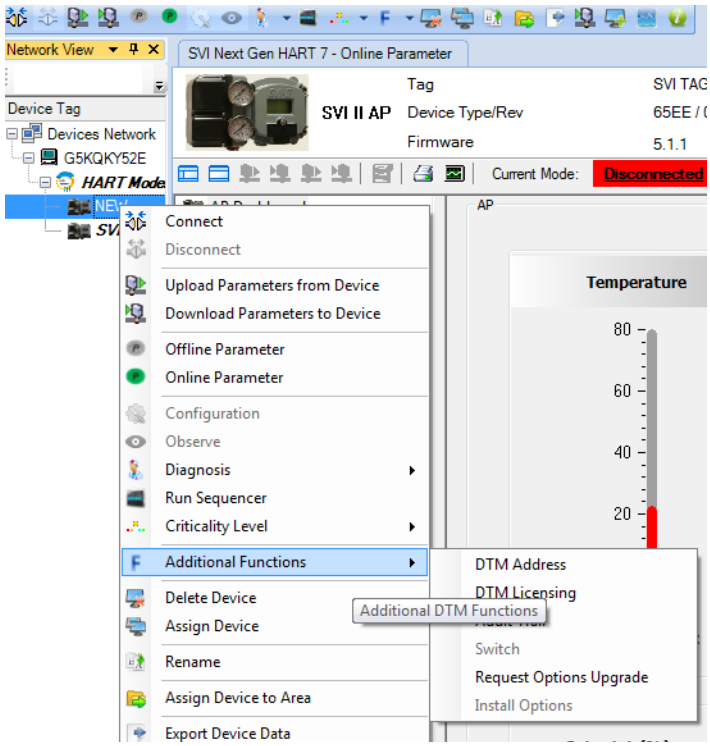

Figure 135 Additional Functions Items

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Additional Functions: DTM Address

Use this screen (Figure 136) to change the polling address where the device you want to connect to the DTM is located.

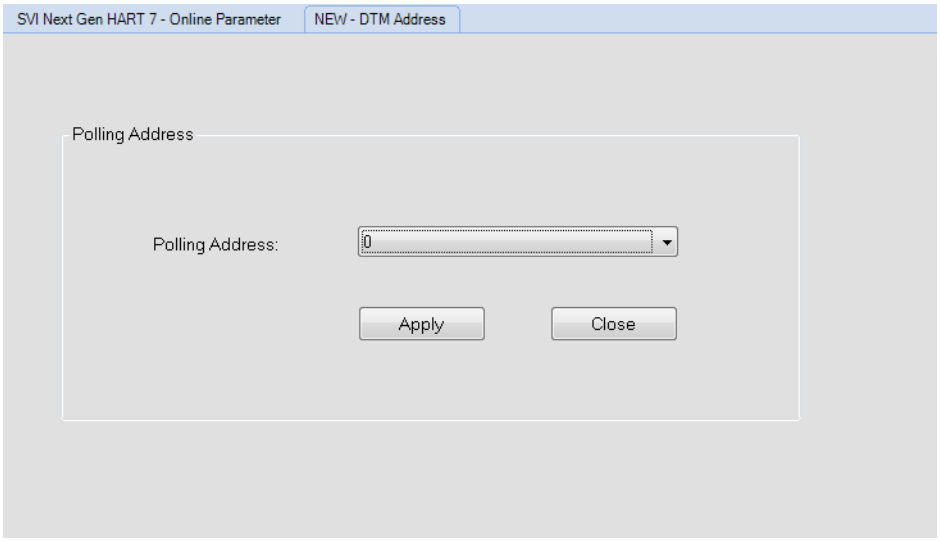

Figure 136 Polling Address

1. Use the pulldown to select the desired polling address.
2. Click **Apply**.
3. Right-click on the positioner in the topology pane and click **Connect**.

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Additional Functions: DTM Licensing

Use this screen to view the specifics of your license.

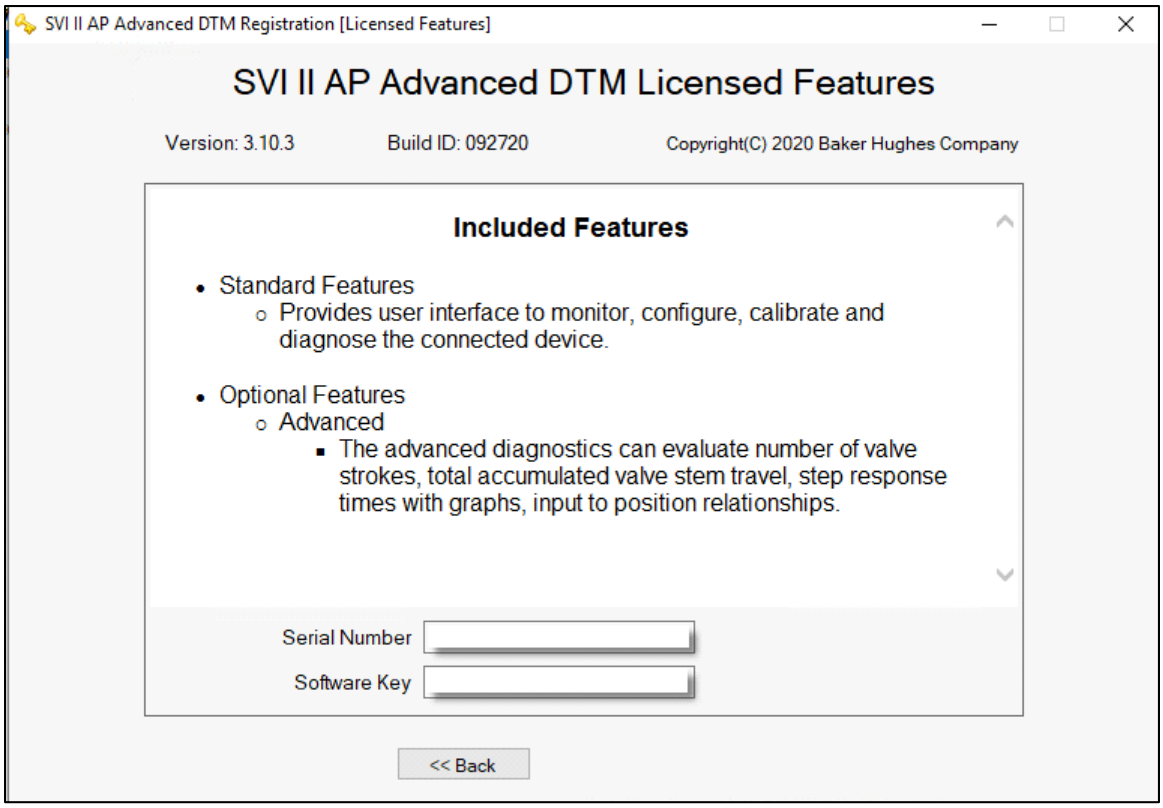

Figure 137 Additional Functions: Device License

This functionality is explained in “Registration Process” on page 11.

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Additional Functions: Switching HART® Versions

Use this feature to switch between HART versions.

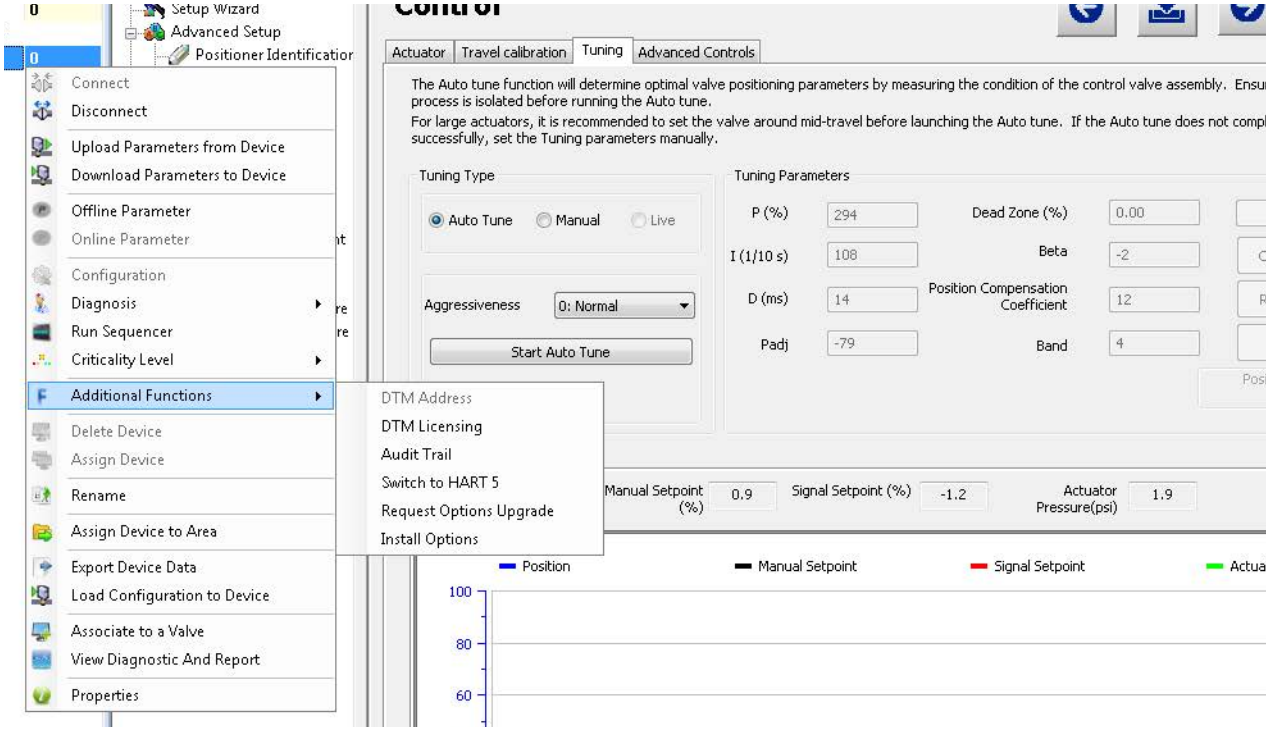

Figure 138 Additional Functions: Switching HART® Versions

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
- √ 3.2.7 to 5.1.3 you can change to HART® 7
- √ 3.2.8 to 5.1.4 you can change to HART® 7

Certain firmware versions allow the device to operate in multiple HART® versions as follows:

- √ Firmware 3.2.3/4.1.1 – HART® 5 (3.2.3) and HART® 6 (4.1.1) capable
- √ Firmware 3.2.5/5.1.1 – HART® 5 (3.2.5) and HART® 7 (5.1.1) capable
- √ Firmware 3.2.7/5.1.3 – HART® 5 (3.2.7) and HART® 7 (5.1.3) capable
- √ Firmware 3.2.8/5.1.4 – HART® 5 (3.2.8) and HART® 7 (5.1.4) capable

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Table 7 HART® Device Information

Item	Definition[1]
Model Name	SVI2 AP
Device Type Code	238 or 0xEE (firmware 5.x.x) 206 or 0xCE (firmware 4.1.1) 202 or 0xCA (firmware 3.x.x and below)
Device Revision	1 if firmware 5.1.x, 4.1.1, or 3.1.x 2 if firmware 3.2.x
HART® Protocol Revision	Firmware 3.2.8/5.1.4 (HART® 5 /HART® 7 switchable) Firmware 3.2.7/5.1.3 (HART® 5 /HART® 7 switchable) Firmware 3.2.5/5.1.1 (HART® 5/HART® 7 switchable) Firmware 3.2.3/4.1.1 (HART® 5/HART® 6 switchable) Firmware 3.2.1, 3.1.2, 3.1.1 (HART® 5)
Number of Device Variables	20 (in HART® 7 for firmware 5.x.x 15 (in HART® 6 for firmware 4.x.x
Physical Layers Supported	FSK
Physical Device Category	Digital Advanced Valve Positioner, Non-DC-isolated Bus Device

√ [1]Devices carrying firmware 3.2.8/5.1.4 can switch between HART® versions to operate the device in HART® 5 or HART® 7. Similarly, firmware 3.2.3/4.1.1 can operate in HART® 5 (3.2.3) or HART® 6 (4.1.1).

To access this function (available to administrator only):

1. Select the positioner and right-click and select **Connect.** Parameters should be uploaded.
2. Select **Additional Functions > Switch**. The actual menu item changes depending on the HART® version to which you can switch. A dialog appears to confirm the latest version added before switching hart revision.

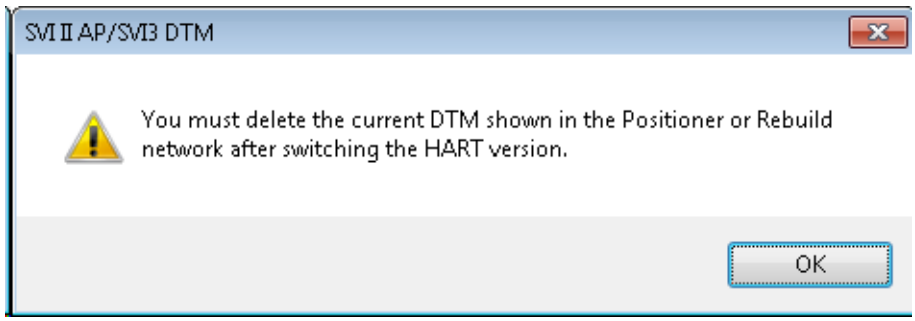

Figure 139 HART® Switch

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3. Click **OK** and a dialog appears indicating success.
4. Click **OK**.
5. Either:

   √ Ensure the modem is connected, select the HART® modem under which you want the positioner, right-click and select **Rebuild Network**. If you use *Rebuild Network*, appears (Figure 140). Select the correct device type and click **OK**. The *Assign Device Type* dialog l only list the DTMs that match with the connected device. The figure below is for information used only.

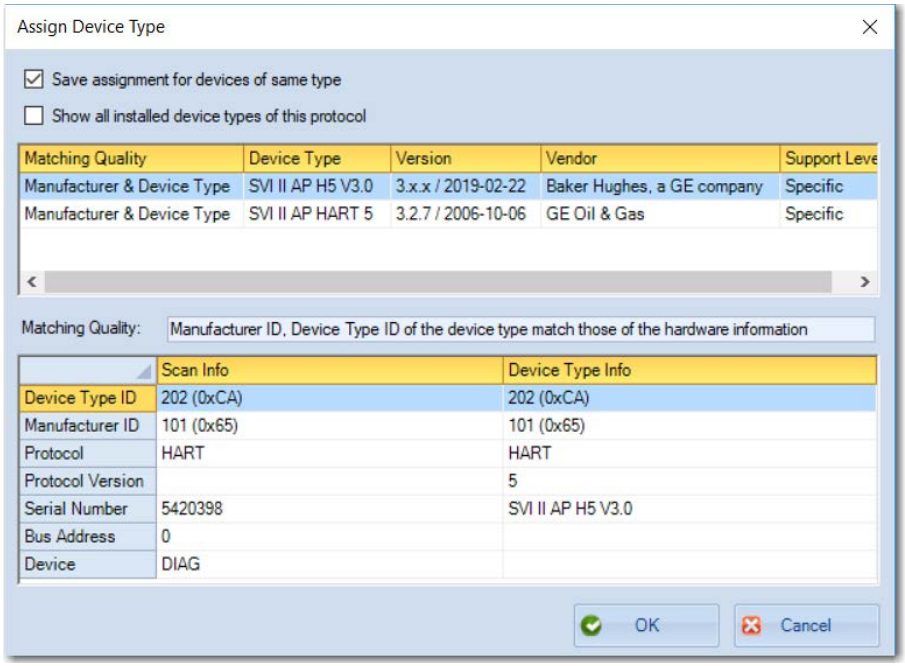

Figure 140 Assign Device Type

or

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

If the change fails, a dialog appears. Click **OK**. If it fails, check your hardware/ firmware to ensure it is compatible with the HART® version to which you are attempting to switch.

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Additional Functions: 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 Figure 141 appears.

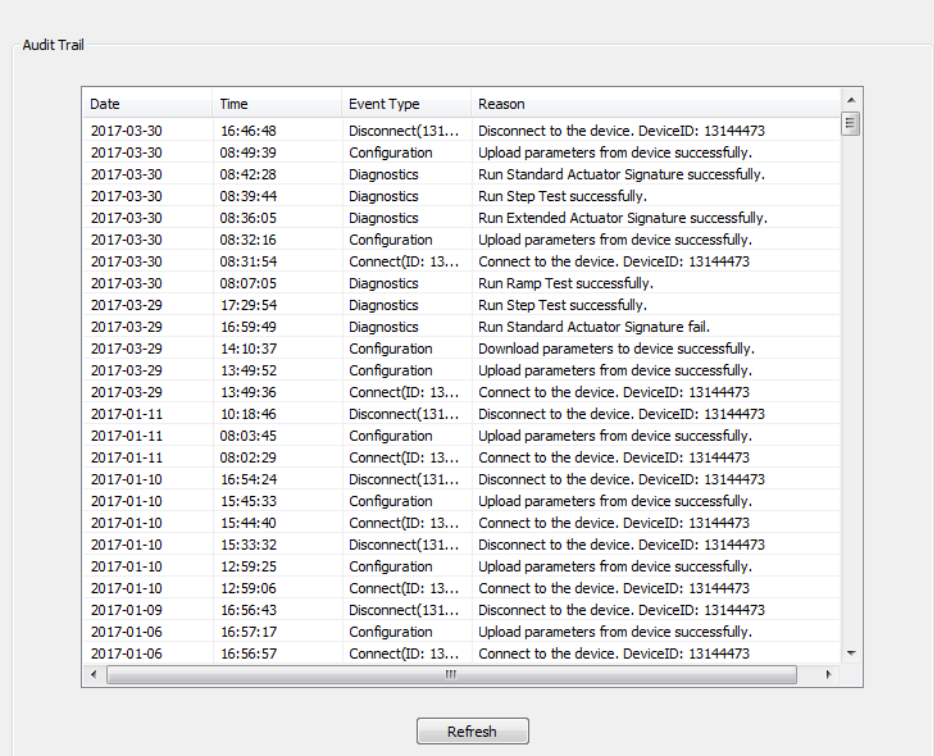

Figure 141 Audit Trail

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Buttons and Fields

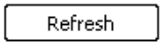
Date	Displays the date the event occurred.
Time	Displays the time the event occurred.
Event Type	Displays the event type.
Reason	Displays the reason for the event.
Refresh button	 Click to populate the screen with events since the screen was opened.

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Table 8 lists the events specific to the SVI II AP.

Table 8 Audit Trail Events for the SVI II AP

Event Category	Event Description
Diagnostics	Run Ramp Test successfully
	Run Ramp Test fail.
	Run Standard Actuator Signature fail.
	Run Standard Actuator Signature successfully.
	Run Step test successfully.
	Run Step Test fail.
	Reset Continuous Diagnostic Data successfully.
	Run Clear All Faults successfully.
	Run Clear Current Faults successfully.
	Reset SVI II AP successfully.
Calibration	Run Autotune successfully.
	Run Autotune fail.
	Run Automatic Find Stops successfully.
	Run Automatic Find Stops fail.
	Set Valve Position to XXXXXX as signal in mA.
	The full closed done.
	The full open done.
	Write Open Stop Adjustment parameter successfully.
	Run Live Tuning successfully.
	Run Manual Find Stops successfully.
	Run Manual Find Stops fail.
	The calibration has been reset.
	The pressure calibration changed.
	The signal calibration finished.
	Run Pressure calibration failed.
	The open stop adjustment changed.

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Table 8 Audit Trail Events for the SVI II AP

Event Category	Event Description
Configuration	Download parameters to device successfully.
	Write Commission configuration parameters successfully.
	Write Retransmitter Range parameters successfully.
	Write Output Switches parameters successfully.
	Write Device Info parameters successfully.
	Write Air Action parameters successfully.
	Write PID configuration parameters successfully.
	Write Position limits configuration parameters successfully.
	Write General configuration parameters successfully.
	Write HART configuration parameters successfully.
	Write I/O configuration parameters successfully.
	Write Option configuration parameters successfully.
	Reset Configuration Changed status.
Digital Upgrade	Records digital upgrade event.
Reset	Reset incidents.
Connect	Connect to the device. DeviceID: xxxxxxxxxxxxxx
Disconnect	Disconnect to the device. DeviceID: xxxxxxxxxxxxx
Factory Edition	Record the event that ValVue3 temporarily upgrades the diagnostic level of SVI II AP device to run Signature tests through SVI II AP DTM
Data Management	Record the events that user exports/Imports device data at DTM Side
Report	Record print DTM report event

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Additional Functions: Digital Upgrade

The SVI2AP digital upgrade process starts from customer to place an order for purchasing upgrades at iStore based on part numbers listed below:

Part Numbers	Features to be upgraded
720005457-888-0000	Enable digital switches and position retransmit
720005458-888-0000	Upgrade to Advanced Diagnostics
720005459-888-0000	Upgrade to Advanced Diagnostics, enable digital switches and position retransmit

Upon receipt of the order, Baker Hughes will send an email response to user with Upgrade Key. With this Upgrade Key, combining with user contact information and device serial numbers, user can generate an Upgrade Request file (.xdev) by using **Request Options Upgrade** of DTM, and send to Baker Hughes.

Baker Hughes will then provide user an option file (.xopt) for performing the digital upgrade.

Figure 142 is a flowchart of the entire process for requesting and installing an upgrade.

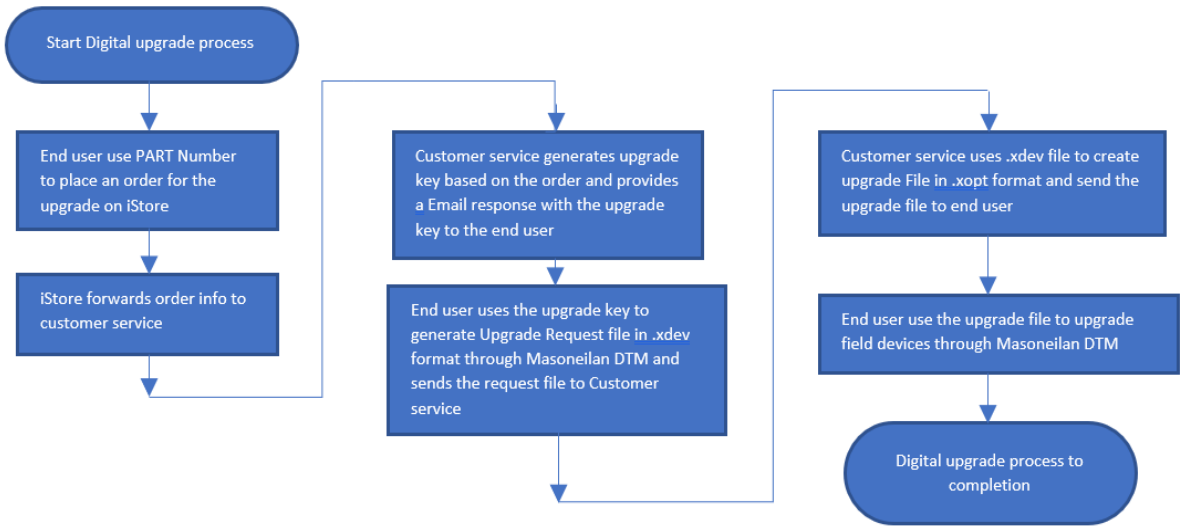

Figure 142 Order Process Flowchart

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Request Upgrade

1. Select any positioner of the Masoneilan type that supports this feature, including an off-line positioner from the topology view, right-click and select **Additional Functions > Request Options Upgrade.**

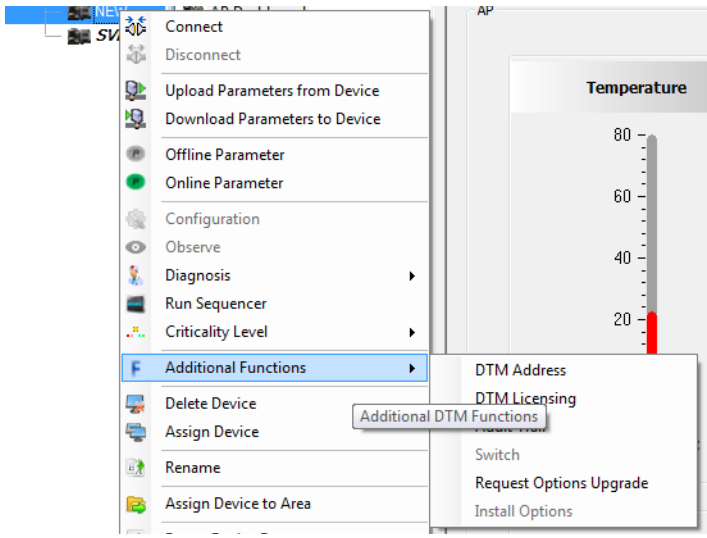

Figure 143 Additional Functions Items

Figure 144 shows an empty form. Otherwise, the data last saved appears. For ease-of-use, connecting to a device displays the *Serial Number* of the connected device. The check box is checked if the device is active.

See *Buttons and Fields* below for explanations of screen features.

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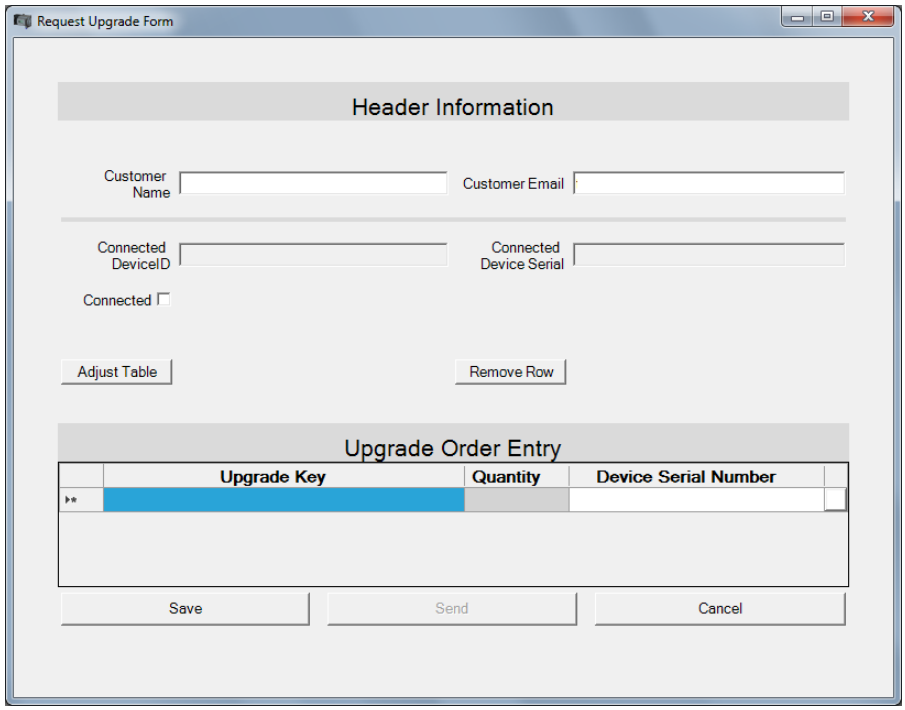

Figure 144 Request Options Upgrade

2. Fill in the *Header Information* and enter the order information. Click the ... button to enter an additional *Device Serial Number* pertaining to an *Upgrade Key*. For an explanation of the fields see *Buttons and Fields* below. All editable fields are required. A red exclamation point (*!*) indicates that the information is required.

NOTE

Issue for original installation of version SVI2_SVI3 AP DTM 3.00.0*: The Upgrade Key field is labeled as Part Number.*
The version of the screen (Figure 144) for 3.0.0 differs in other fields, some of which are required for processing but are included in the Upgrade Key for version 3.0.1 or later.

3. Click Save when you are ready to preserve what you entered before clicking *Send* or *Cancel*.
4. Click Send when you are ready to send us your completed order form and one of two dialogs appear. Click **Cancel** if you are not ready to send, but need to exit the dialog for whatever reason. See Send button or Cancel button for details.

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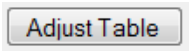
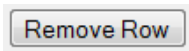
Buttons and Fields

Customer Name	Enter the name for the installation site company.
Customer Email	Enter the email for the installation site contact. The options file that enables the digital upgrade is emailed to this address.
Connected Device ID	Displays the *Device ID* associated with the detected device. Once a device is disconnected, this field maintains that data until the screen is closed or the upgrade is sent or completed.
Connected Device Serial	Displays the serial number associated with the detected device. Once a device is disconnected, this field maintains that data until the screen is closed or the upgrade is sent or completed. The connected device's serial number can be copied and pasted into the order entry to add it to the order.
Connected	Displays a check if the device is connected. The device need not be connected to order an upgrade, but must be connected to complete an upgrade.
 *Adjust Table* button	Click this button to access a right-click menu to adjust how data is formatted in the Upgrade Order Entry grid: √ *Auto Resize Columns include Headers*: Resizes the contents to fit the cell including headers. Once selected, you cannot resize or reorder rows until you select **Auto Resize Columns to Fill**. √ *Auto Resize Columns exclude Headers*: Resizes the contents to fit the cell excluding headers. Once selected, you cannot resize or reorder rows until you select **Auto Resize Columns to Fill**. √ *Auto Resize Columns to Fill*: Resizes its columns automatically to fill the width of the available display area. This is the default. With this selected, you can resize or reorder rows.
 *Remove Row* button	Click this button to delete a selected row, excluding the last empty row.
Add Device for Upgrade button	Indicates a new line where you can add another device serial number (s) for another upgrade key. Another * line appears when the cell entry is completed (the user leaves the cell).
Add License Serial Number button	Click this button to add another *Device Serial Number* column. The cursor appears in the cell preciously occupied by the clicked button. You can begin typing immediately.

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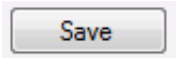

Save button

Click this at least once to save your work to an *.xdev* file. This file is saved in the *Active Request* folder.

√ It is sent during the present session, then it is moved to the *Archive* folder in the same directory.

√ The *Request Digital Upgrade* dialog is closed without sending. In this case it is kept in the *Active Request* folder. You can select the *Request Options Upgrade* menu item and that same request opens with all saved data.

If you click **Cancel** before saving data entered since last save is lost. But you are prompted to not cancel before the data is lost.

Send button

Click this at least once to send the file (as an .xdef file) to Masoneilan for processing (You must save before this button activates.). This opens a dialog (if Outlook is detected on the machine,) where you can click:

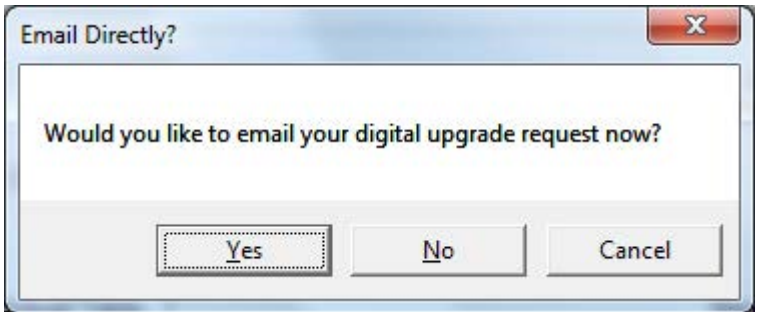

Figure 145 Email Directly?

If Outlook is not detected on the machine, the *Email Error* dialog appears. See the description from *Email Error* down.

√ **Yes**: If you performed a save, the program automatically attaches the file to an email, which you can send for processing. Sends the email using Microsoft Outlook (). If this program is not installed or a version is installed that cannot be accessed automatically, then the following dialog appears:

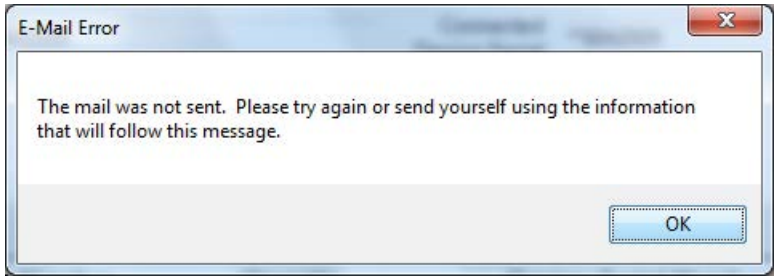

Figure 146 Email Error

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Click **OK** and a dialog appears containing information for emailing later:

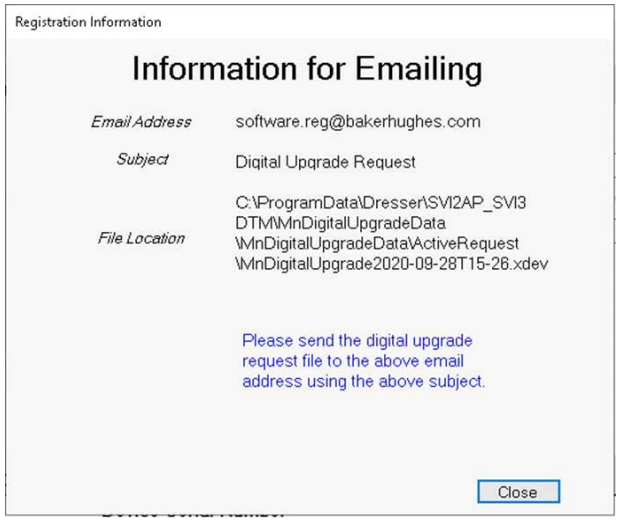

Figure 147 Information for Emailing

Either copy the file path and email address into another program or take a screen shot for use in emailing.

√ **No**: Email at a later time by:
1. Copying the file location field and using it to navigate to the directory where the upgrade request file is located or copying the file either to a media device or to somewhere on a network where an email server is available.
2. Manually opening the email program, addressing the email as in the dialog, attaching the digital upgrade file and send.
You cannot perform another upgrade request until this request (.xdef file) is sent as the newer upgrade deletes the existing file.

√ **Cancel**: Cancels the process if not saved. If saved, see the discussion for selecting *Yes* above. The program remains open and you can proceed to add additional Upgrade Keys. You can then email later; see the description of the Send button. If you click *Cancel* before saving data entered since last save is lost. But you are prompted to not cancel before the data is lost.

Cancel button

Click this to cancel the process if not saved. If saved, see the discussion for selecting *Yes* above. *Cancel* closes the dialog without sending or saving the form. If the form was modified since it was last saved, the user is prompted to save.

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Additional Functions: Install Options Upgrade

Use this feature to install a digital upgrade once the .xopt file is returned to you. See “Perform Upgrade” on page 201.

Figure 142 on page 195 is a flowchart of the entire process for requesting and installing an upgrade.

NOTE

The fields on this screen allow you to copy them, including copying header information as well as individual fields. As you can copy data, the fields appear to allow editing, however, no edits are allowed.

Perform Upgrade

1. Ensure the positioner is connected, in *Setup* mode and that the system is offline.

NOTE	
	A red exclamation point (!) indicates that the information is required.

2. Select the target positioner from the DTM *Topology View*, right-click and select **Additional Functions** > **Install Options Upgrade** and a form appears. (If you are not connected to a positioner/valve, this item is grayed out) The form will be empty if an .xopt file containing the target device serial number has not been previously loaded; otherwise, the form will contain options related information about the target device.

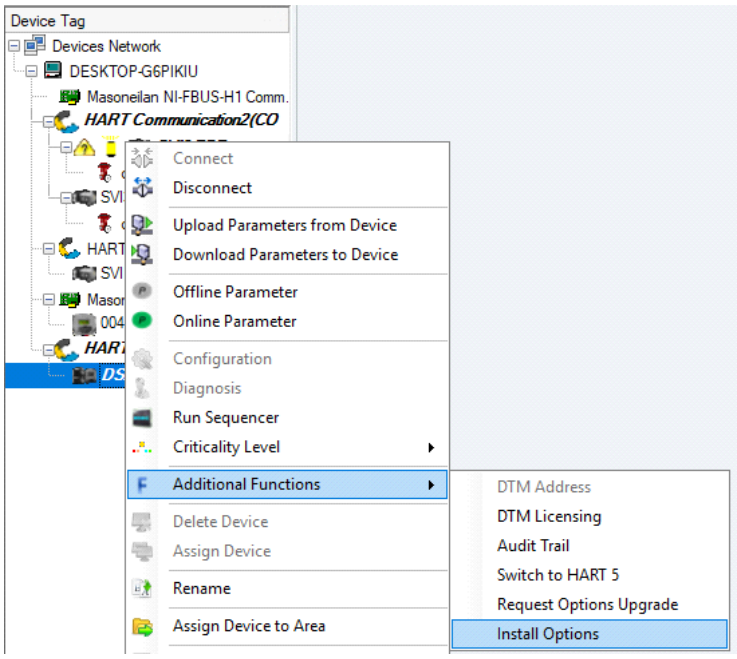

Figure 148 Upgrade Menu Selection

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The screen appears.

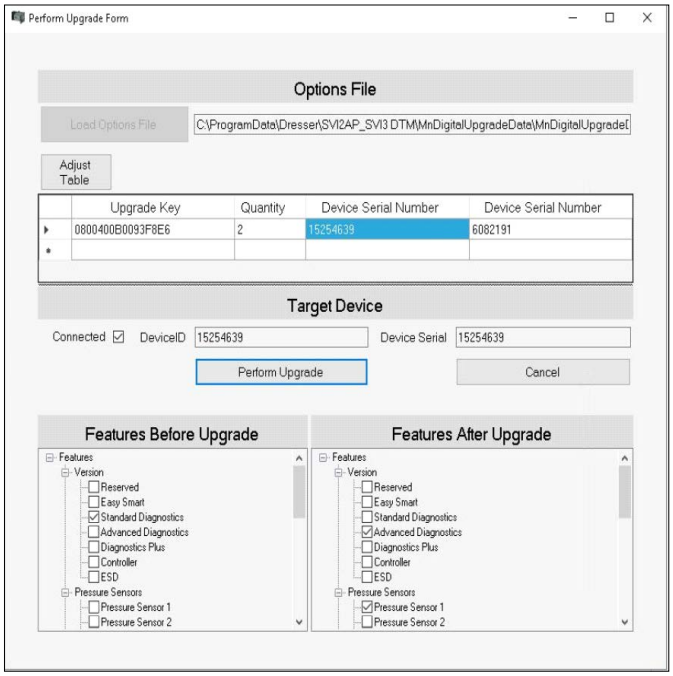

Figure 149 Perform Screen

3. Import the .xopt file:

   Option 1: Drag-and-drop the file directly from the email message from Baker Hughes containing the upgrade file, or from a file explorer after you have saved the .xopt file attachment to the local drive.
   Then click Load Options File .

   Option 2: Save the .xopt file attachment to the local drive.
   Then click Load Options File and an *Open* dialog appears.

   Browse to the folder where you saved the file, select it and click **Open**.

If the *Serial Number* for the connected device is not a match to any of the device serial numbers in the file, the dialog below appears.

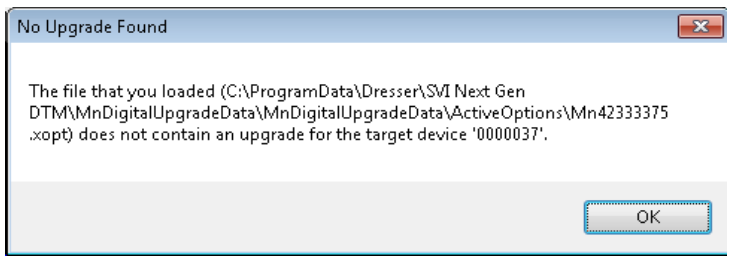

Figure 150 Unmatched Serial Number

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See *"Background Information"* for more information on *Serial Numbers* and xopt functionality during this process.

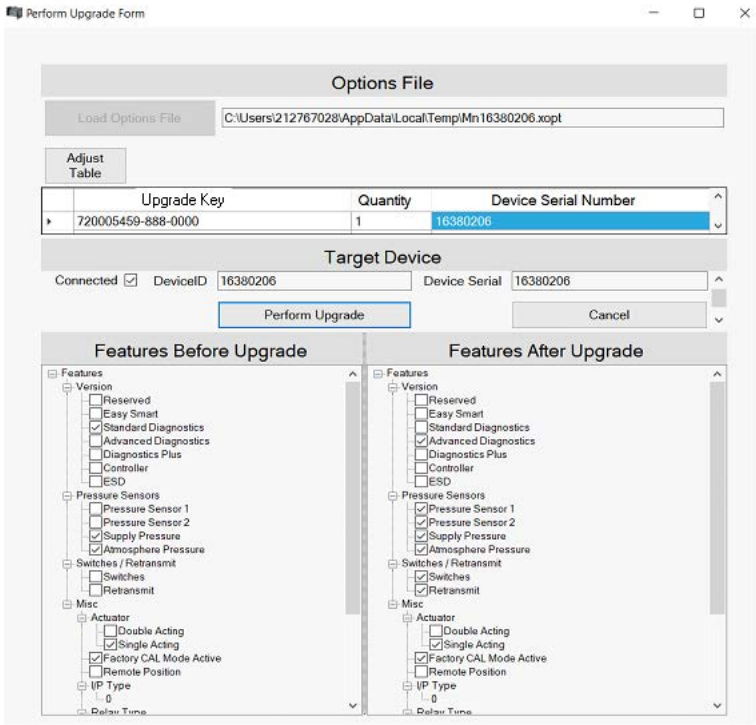

Figure 151 File Loaded

NOTE

The fields on this screen allow you to copy them, including copying header information as well as individual fields. As you can copy data, the fields appear to allow editing, however, no edits are allowed.

4. Click Perform Upgrade to write the new options to the device. The dialog closes. Then a message dialog appears that reports the outcome of the action. If desired, see *"Verification Procedure"* for a procedure to verify the installs success.

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Background Information

Once you have imported the file, you will not have to do it for each positioner listed in the file as it will automatically load the .xopt file containing the device serial number of the connected device when you subsequently select to perform upgrade from the DTM menu.

The file path appears in a window. The screen is filled from the information provided in the loaded .xopt file. (If the .xopt file contains many devices to upgrade, the display may not show all the devices clearly. You can manipulate the size of the table elements by dragging as per normal Windows functionality or use the *Adjust Table* button as per the description provided in Buttons and Fields below. The display settings are remembered the next time the digital upgrade is selected.

The device serial number matching the target device serial is highlighted. Also, device serial numbers in the table that have already been upgraded are highlighted with a lighter color. You must connect to a device whose device serial number appears in the file. If you are not sure to which device the .xopt file pertains, connect to any Masoneilan device that supports this process and you can use the information in the table to connect to the appropriate device. The current options set for the connected device appear in the *Features Before Upgrade* tree and the options that will be set after the upgrade is performed are shown in the *Features After Upgrade* tree. You might want to verify that it is what you want before actually performing the upgrade.

Verification Procedure

1. Connect to the device.
2. Select the perform upgrade.
3. Load the options file again pertaining to the upgrade. (It is loaded automatically if there are more devices to upgrade in the options file). The S/N of the connected device appears highlighted in blue in the data view cell, indicating that it was upgraded.
4. Ensure that the *Features Before Upgrade* and the *Features After Upgrade* trees are identical to indicate the upgrade options set.

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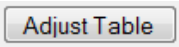
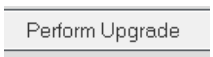
Buttons and Fields

 Load Options File button	Click this button and an *Open* dialog appears to select the file containing the upgrade data.
 *Adjust Table* button	Click this button to access a right-click menu to adjust how data is formatted in the *Upgrade Order Entry* grid: √ *Auto Resize Columns include Headers*: Resizes the contents to fit the cell including headers. Once selected, you cannot resize or reorder rows until you select **Auto Resize Columns to Fill**. √ *Auto Resize Columns exclude Headers*: Resizes the contents to fit the cell excluding headers. Once selected, you cannot resize or reorder rows until you select **Auto Resize Columns to Fill**. √ *Auto Resize Columns to Fill*: Resizes its columns automatically to fill the width of the available display area. This is the default. With this selected, you can resize or reorder rows.
Device ID	Displays the ID of the connected device.
Device Serial	Displays the serial number associated with the connected device.
Connected	Displays a check if the device is connected.
Upgrade grid	Lists the *Upgrade Key, Quantity and Device Serial Number* related to each line in the sales order for which an upgrade is being performed. The device serial number matching the target device serial is highlighted. Also, device serial numbers in the table that have already been upgraded are highlighted with a lighter color.
 Adjust Table button	Click this button to access a right-click menu to adjust how data is formatted in the *Upgrade Order Entry* grid: √ *Auto Resize Columns include Headers*: Resizes the contents to fit the cell including headers. Once selected, you cannot resize or reorder rows until you select **Auto Resize Columns to Fill**. √ *Auto Resize Columns exclude Headers*: Resizes the contents to fit the cell excluding headers. Once selected, you cannot resize or reorder rows until you select **Auto Resize Columns to Fill**. √ *Auto Resize Columns to Fill*: Resizes its columns automatically to fill the width of the available display area. This is the default. With this selected, you can resize or reorder rows.
 *Perform Upgrade* button	Click this to commence the upgrade process.
Features Before Upgrade	Lists the features present before upgrade. After the upgrade is successfully completed this matches *Features After Upgrade.*
Features After Upgrade	Lists the features present after upgrade.

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15. Troubleshooting

Table 9 Troubleshooting Guide

Symptom	Possible Cause	Probability	Troubleshooting Analysis	Corrective Action
No response to a 4-20 mA input	Insufficient air supply	High	Read air supply on top gauge or use ValVue/ handheld/EDDL.	Ensure air supply is > 5 psi (.35 bar, 34.5 kPa) above the final spring range.
	Improper device mode	High	Read mode on display, or use ValVue/handheld/ EDDL.	Set device to NORMAL mode.
	Insufficient loop voltage	Medium	Verify that there's ≥ 10.5 VDC at 4 mA using a resistive load instead of the positioner. Measure in parallel on the wires in the positioner's location.	Increase voltage using a signal conditioner.
No response to a 4-20 mA input	Device in failsafe	High	Verify that display shows FAILSAFE (or use Val-Vue/handheld/EDDL).	1. Clear alarms. 2. Change mode to Manual. 3. Change mode to Normal. If Failsafe persists 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. Set the calibrator to apply 1.5 mA maximum to the I/P and verify that there's full output. More than 1.5 mA damages the I/P.	If both steps don't work, replace the I/P module. Contact Baker Hughes or channel partner.

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	Corrective Action
No response to a 4-20 mA input.	Defective relay - Single-Acting	Low	1. Check if air is blowing through the vent. 2. Remove pilot plug assembly and check for debris on plug/seat.	1. Clear relay using clean dry air and a clean cloth to validate air cleanliness. Recheck response. 2. Replace the relay if the problem is unsolved.
	Defective relay - Double-acting	Low	If P1 or P2 isn't reacting to 4-20 mA input, remove pilot plug assembly and check for debris on plug/seat.	1. Clear relay using clean dry air and a clean cloth to validate air cleanliness. Recheck response. 2. Replace the relay if the problem is unsolved.
	Defective circuit board	Low	1. Verify that the voltage across the loop terminals is between 8 and 9.5 VDC @ 20 mA and 10 and 11.5 VDC @ 4 mA. 2. Verify that there are no active electronic alarms.	Change the circuit board if the voltage is above range or if active electronic alarms can't be cleared. NOTE: If *Travel Sensor* alarm is active, this could simply be the magnet being out of range.
Failsafe appears on display	Travel sensor out of range (magnet or remote mount)	Low	Using ValVue, handheld or DTM, verify the value for Raw Travel Sensor count. Ensure it is within the yellow/red zone on the *Calibration* > *Range* page of the DTM.	Re-align magnets or the Remote Positioner Sensor (if used); Run Find Stops.
	Circuit board malfunction	Low	Check for electronic failure alarms.	Clear alarm; if alarm persists, change circuit board.

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	Corrective Action
Find Stops calibration failure	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 read more than spring final (+ 5 psi (.35 bar, 34.5 kPa) for spring return actuator or 30 psi (2.1 bar, 206.8 kPa) minimum for double- acting actuators	Verify that the mounting bracket is correctly installed (correct holes in use). Then redo *Find Stops*. Time out may happen even on a small valves if the friction is high, the pressure is low and some other factors.
	Positioner timed out trying to find the mechanical stops	High	The Find Stops procedure canceled after 15 seconds while the valve is still moving.	For large actuators, execute *Manual Stops* procedure instead of automatic stops.
Autotune doesn’t complete	Feedback slipping, loose	High	Rotary installation: magnet assembly rotates using hands. Reciprocating bracket: the turnbuckle, rod-end, and take off arm aren't secured.	Secure all set screws and locking nuts. Check reciprocating assembling for binding during operation. In general, Autotune may fail if the valve is too slow - in this case manually tune.
	Magnet far away from housing	Low	Rotary installation: the face of the magnet holder isn't flush with the face of the mounting bracket. Cannot be recessed by more than 1/8"	Loosen the set screws holding the magnet assembly in the magnet holder and pull the magnet so it is flush with the mounting bracket. In general, Autotune may fail if the valve is too slow - in this case manually tune.

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	Corrective Action
Autotune doesn't 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. In general, Autotune may fail if the valve is too slow - in this case manually tune.
Position oscillation - Fast	Positioner gain (P) set high	High	Position overshoots by more than 20% of the step and oscillates more than twice. Position may be oscillating if the friction is high and the integral part is fast.	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 oscillates 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

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	Corrective Action
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 5% increments until oscillation has reduced. 2. Reduce the Integral Gain (I) 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. Increase the integral Gain (I) by 25% until the oscillation *stretches* out to a flat line. 2. Set *DeadZone* parameter to 0.25%
	Loose feedback	Medium	Rotary installation: magnet assembly rotates using hands. Reciprocating bracket: the turnbuckle, rod-end, and take off arm aren't secured.	Tighten set screws and lock nuts as necessary.

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	Corrective Action
Responds to 4-20 mA but no HART® communication	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. 2. Add a temporary 100 to 300 Ohm resistor in series with the 4-20 mA signal. 3. 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 Ohm 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 verify that HART® communication isn't working using ValVue or a handheld.	Replace the circuit board.
	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	Check for cracks or pinched wires. Wiggle the cable around and see if the LCD turns on.	Replace LCD assembly with cable/connector.
	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.
	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.

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	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- 20 mA	Insufficient voltage	High	Verify that the voltage across the loop terminals is between 8 and 9.5 VDC @ 20 mA and 10 and 11.5 VDC @ 4 mA.	Change the circuit board if the voltage is above range or if active electronic alarms can’t be cleared.
	Defective circuit board	Low	Verify that the voltage across the loop terminals is between 8 and 9.5 VDC @ 20 mA and 10 and 11.5 VDC @ 4 mA.	Change the circuit board if the voltage is above range or if active electronic alarms can’t be cleared.

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	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.	1. Run Autotune if possible or Live Tuning using ValVue to modify the P gain while the process is running. 2. Increase the gain by 5% 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 to Normal mode and move the setpoint from 4-20 mA. Compare 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%.	Provide air supply with higher capacity (a local air container). Change the pipes to a bigger diameter.
	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.

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	Corrective Action
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.
Switches don't change state. Always closed	Switch feature not available/activated	High	The part number on the SVI II AP isn't SVI II AP-xxxx3xx2x or using ValVue or handheld, read the Options of SVI II AP.	Contact Baker Hughes 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 a multimeter, test the switch. Observe whether the switch is always open or closed with ValVue or the handheld, which indicates that the switch is bad.	Replace the circuit board.

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	Corrective Action
No 4-20 mA output from position transmitter	Transmitter feature not available/activated	High	The part number on the SVI II AP isn't SVI II AP-xxxx3xx2x or using ValVue or handheld, read the Options of SVI II AP.	Contact Baker Hughes 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.
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	1. Disconnect the I/P and verify that there's no output. 2. Set the calibrator to apply 1.5 mA maximum to the I/P and verify that there's full output. More than 1.5 mA damages the I/P.	If both steps don’t work, replace the I/P module. Contact Baker Hughes or channel partner.

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Table 9 Troubleshooting Guide (Continued)

Symptom	Possible Cause	Probability	Troubleshooting Analysis	Corrective Action
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 to see if the valve travels 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, see if the valve has friction greater than 50% of the spring range or √ Observe the valve and see if 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 setting. It must be set to 5 psi (.35 bar, 34.5 kPa) greater than the spring final. For double-acting actuator, the air supply must be that required 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, check that the Characterization parameter setting.	Set the Characterization to Linear.

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16. Continuous Valve Diagnostics Concept

Since its introduction HART has been well accepted by customers for the opportunity it provides for device diagnostics. The device health and status are even more important for the final control elements used in a controlled process – positioners, and analog and discrete output devices.

This document describes the diagnostic features integrated in the SVI II AP positioner and provides some guidelines how they can be used in applications.

Introduction

Evaluation of the valve/positioner state requires:

1. Appropriate conditions to collect informative data
2. Data collection
3. Data processing

Different measures to estimate the valve health may require different conditions, rate of data collection and often put special requirements on the amount of data collected and speed of data processing. In order to provide the best information, the SVI II AP provides three different diagnostic approaches:

- √ "Off Line Diagnostics": Off Line diagnostics are used when the application process is not running. Off-line diagnostics procedure execution requires significant changes of valve setpoint, which disturbs the application process.
- √ Continuous diagnostics: Gives a detailed descriptions on how continuous diagnostics can be used for estimation of the device status.

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Off Line Diagnostics

Off Line diagnostics are used when the application process is not running. Off-line diagnostics procedure execution requires significant changes of valve setpoint, which disturbs the application process.

When Off Line diagnostic procedures are executed, the data is collected in the SVI II AP positioner at a very high rate (e.g. between 10 and 60 times per second) and then it is uploaded and presented by the SVI II AP DTM.

Step Test

Step test evaluates how the positioner is responding on a request to change in the set point significantly for a short time. It gives a good measure of the actuator/valve speed.

Ramp Test

Ramp test measures the relationship between the set point and actual actuator/valve position, when the setpoint is changed at a limited rate.

Signature

Valve Signature provides a relationship between the actuator pressure and the actuator/valve actual position.

DTM

The SVI II AP DTM can provide a basic level of online diagnostic by presenting the data from the positioner in numeric or graphical form. You can also export the data for further analysis with external tools.

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Continuous Diagnostics

Continuous diagnostics are executed in the device and continuously evaluate the status of the positioner, the actuator and the valve.
The diagnostics described in this section are implemented in the firmware or in the positioner hardware. The problem detection algorithms are running continuously and provide immediate notification for detected events. The SVI II AP positioner can detect two basic groups of events:

- √ Problems in the positioners performance
- √ Problems in the actuator/valve control

Positioner Diagnostics

Positioner diagnostics are used to evaluate the state of the positioner itself. The positioner is designed so that it continues to communicate, if the detected problem so allows. A limited number of severe failures detected in the hardware and the positioner may not be able to report when a failure is detected. In this case, the positioner continues to control the valve if possible. If control of the valve is not possible, the positioner de-energizes its output, driving the valve to de-energized position, as defined by the actuator.

Processor Failure

Failures in the processor program execution are reported in this group of alerts. Examples of this kind of failure include:

- √ Program execution failure detected by a watch dog
- √ Program memory failure
- √ NV memory failure, etc.

Sensor Failure

This failure is reported when the diagnostic procedures detects problem in the supporting sensors, embedded in the positioner. These are:

- √ Supply pressure sensor
- √ Temperature sensor, etc.

Valve Control

Problems detected with valve control are reported in this group. If the actual position cannot be driven to follow the setpoint, a valve control failure is reported. There may be multiple reasons for this failure:

- √ Problem with the supply pressure
- √ Obstacle in the valve movement, etc.

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Commissioning

This problem is reported if the positioner has not been calibrated. The Find Stops procedure must be executed to clear the problem. If the positioner is shipped installed on the valve, it is factory calibrated and this problem won't occur.

Air Supply

This problem is reported if the supply pressure is out of the spec (most likely too low).

Supporting Hardware

This problem is reported if a failure in one of the supporting accessories is detected:

- √ Local LCD display
- √ Remote Position Sensor, etc.

Valve/Actuator Diagnostics

The SVI II AP positioner collects information from multiple sensors. This information is used to evaluate the quality of valve and actuator control and the working conditions.

Valves and applications may have significant differences in the expected behavior – e.g. small valves usually are fast and are able to reduce the error between the setpoint and actual position within seconds, valve wear may be significantly impacted by the content and temperature of the fluid being processed or by the material used to make the valve.

To adjust to the variety of applications, SVI II AP positioners provide a set of parameters, which can be modified to adjust to the specifics of the process being controlled. Adjustable alert points and dead bands (where applicable) are provided for the monitored parameters and can be modified from default settings to reflect the specifics of the application.

An alert is set when the monitored value crosses the point defined by the Alert Point and stays active until the alert is cleared or the monitored value is restored to within the expected limits. Dead band can be used to avoid multiple notifications for the same event.

For each alert the SVI II AP provides an Historic Alert – a flag indicating if the alert happened since the alert has been cleared.

Position

Position alerts is set if the actual valve position has been out of the expected alert limit for a period of time that can be configured by DTM. The alert is cleared when the position is within the limits again (including Position Error Band).

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Reporting Diagnostic Condition to the DTM/DD

All parameters related to the diagnostic alerts are described in the DDs and can be read at any moment. The SVI II AP DTM also provides a detailed graphical presentation about the current diagnostic conditions detected by the device.

Discrete Switch Configuration

The SVI II AP has a discrete switch (contact) DS1, which can be used to drive external equipment. Discrete Switch 1 can be activated if one of the following diagnostic conditions is detected:

- √ A failure in position control algorithm and the actuator is in Fault (de-energized) State
- √ The position control algorithm is not In Normal state
- √ Position Error Occurred
- √ Position HI Limit
- √ Position LO Limit
- √ Position control algorithm has been re-initialized

This switch can be used (with minimal external equipment – e.g. one solenoid and no additional logic) to keep the valve in place when the supply pressure drop or when the valve position is above the High Limit and Hi Position Alert is reported.

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17. Export/Import Diagnostic Data from ValVue3 and the DTM

The purpose of this document is to provide an instruction for exporting and importing diagnostic test data from ValVue3 and DTM side.

Matrix for Export/Import for Diagnostic Data

Table 10 gives the compatibility for the various version of SVI II AP DTM and ValVue3.

Table 10 Matrix for Export/Import for Diagnostic Data Format

Diagnostic Data Format	Export Entry				Import Entry			
	SVI II AP DTM 2.x	SVI II AP DTM 3.x	ValVue 2	ValVue 3	SVI II AP DTM 2.x	SVI II AP DTM 3.x	ValVue 2	ValVue 3
DGN	●	×	●	×	●	●	●	●
DevData	×	●	×	×	×	●	×	●
USF	×	×	×	●	×	×	×	●
DDF	×	×	×	●	×	●	×	●
DDF2	×	×	×	●	×	●	×	●

Note: ×: Not Supported ●: Supported

ValVue 3.40 or earlier does not support DevDat format

ValVue 3.50 or earlier does not support DDF2 format

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Import and save diagnostic data in SVI II AP DTM

1. SVI II AP DTM provides the capability to *Import Diagnostic* at Data Management-Export/Import Data tab to import DGN, DEVDATA and DDF file.

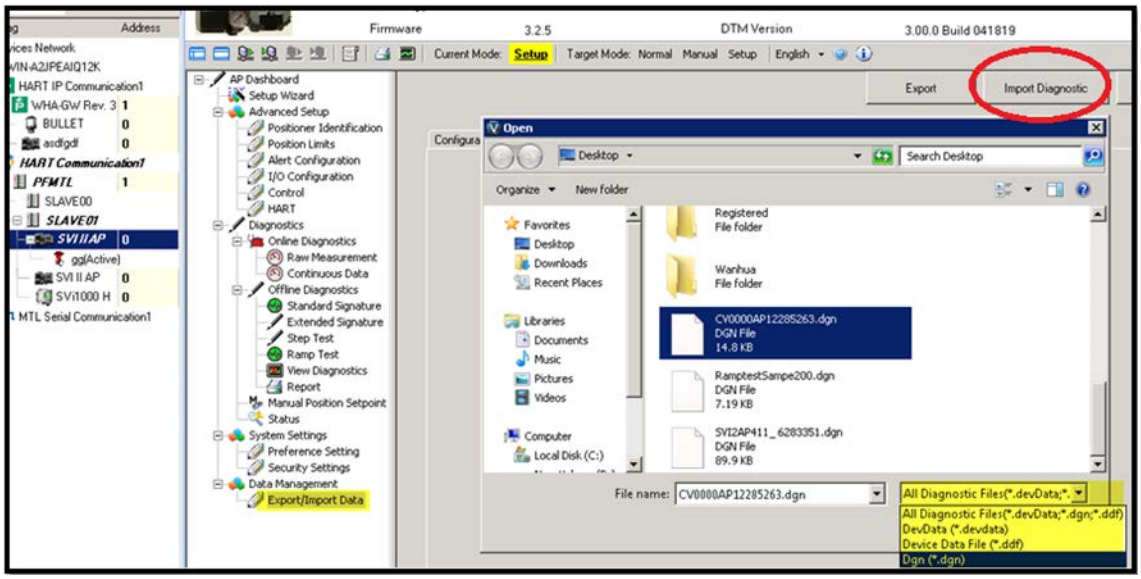

Figure 152 Import Diagnostic

2. Once the file is imported, the test data that was stored in the imported file can be **saved** in current DTM instance.

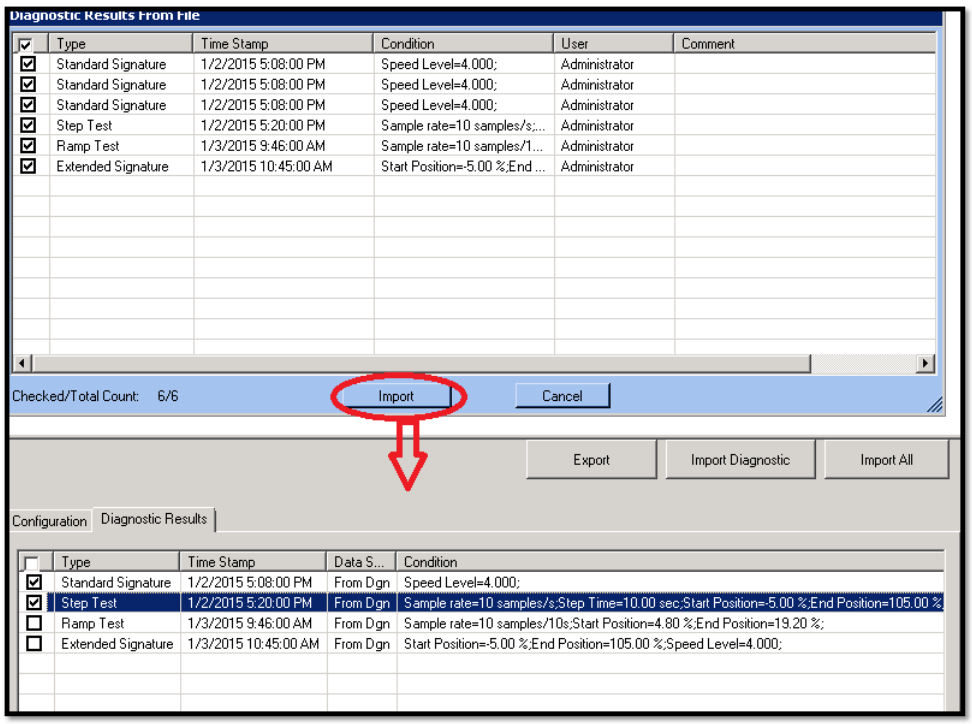

Figure 153 Import to Current DTM

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View DIAGNOSTIC DATA Using the SVI II AP DTM

The SVI II AP DTM graph control provides *Load from external*… function to load a DGN, DEVDATA and DDF file. After the loading, the diagnostic test data that was stored in the file can be displayed on the DTM, and you can view the test result, test conditions and test curves on the DTM; but this test data will not be saved in the DTM instance. If you close the DTM, the data is lost.

There are several pages with the graph controls in SVI II AP DTM, not all the control graphs can load all types of diagnostic tests, that depends on what page you are on. Table 11 lists is a reference for viewing the diagnostic data.

Table 11 Viewing the Diagnostic Data

Graph control page	The test data can be viewed
Graph control on View Diagnostic page	Standard Signature Test, Extended Signature Test, Ramp Test and Step Test
Graph control on Control-Tuning page	Step Test
Graph control on Standard Signature test page	Standard Signature Test
Graph control on Extended Signature test page	Extended Signature Test
Graph control on Ramp test page	Ramp Test
Graph control on Step test page	Step Test

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Import and Save Diagnostic Data in ValVue3.x Frame

ValVue3 also provides several interfaces for the user to import DGN, DEVDATA, DDF, USF file, and save the diagnostic test data that was stored in the imported file to ValVue3 database.

√ Import DDF and DEVDATA file by right-clicking on HART Communication DTM, and then selecting **Import and Add New Device** (Figure 154).

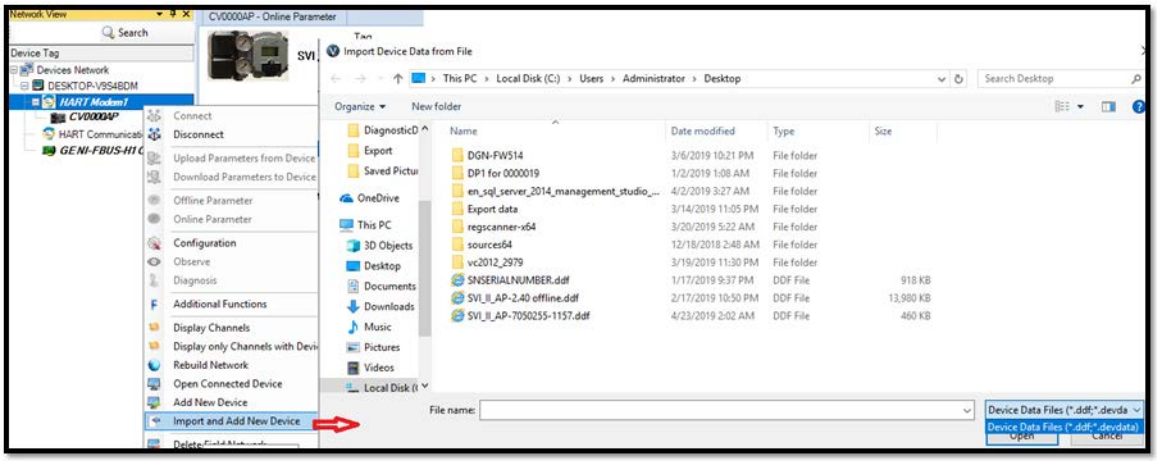

Figure 154 Import DDF or Devdata File

√ Import DGN file by:

a. Associating a valve under the positioner.

b. Right-clicking on the associated valve and clicking **Import Diagnostic Data** > **Choose** (Figure 155).

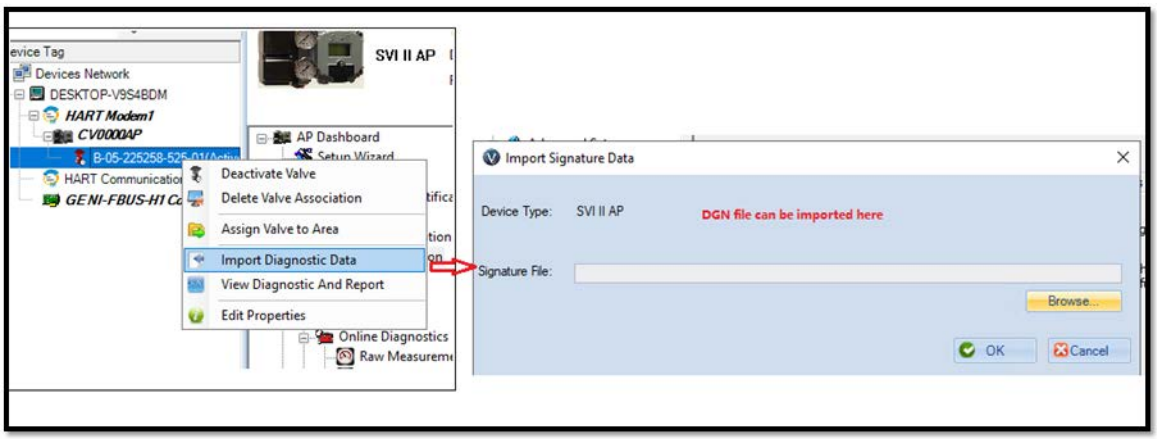

Figure 155 Import DGN File

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√ Import USF file by:

a. Clicking **Tools/Valve Data Management > Signature Management** and then clicking **Open on** the dialog (Figure 156).

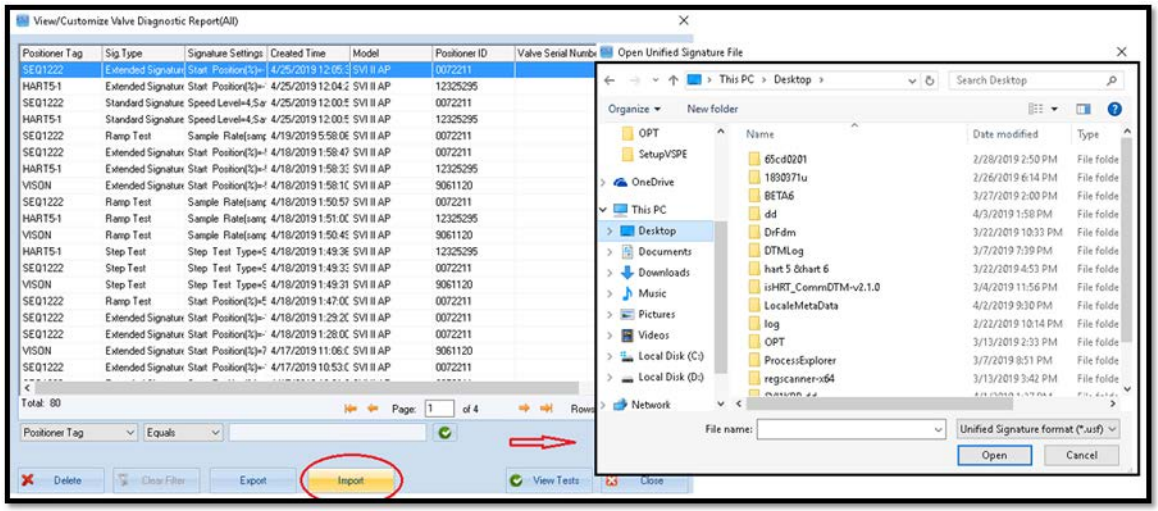

Figure 156 Import USF File

b. Clicking **Import** to load USF file

Export Diagnostic Test Data

ValVue, AP DTM and SVI II AP DTM software have four types of data file: DGN, DEVDATA, DDF and USF files. User can export diagnostic data from DTM and ValVue3 into these files for test data collection or data migration.

√ Export DGN file: DGN file can be exported from ValVue2 and SVI II AP DTM 2.40.0 (including the version before2.40.0) after a diagnostic test finished.

√ Export DEVDATA file: SVI II AP DTM 3.00 uses DEVDATA file to save the diagnostic test data instead of DGN file:

a. Open the **Switch to Diagnostic Results** tab

b. Select **Data Management-Export/Import Data** of SVI II AP DTM and switch to **Diagnostic Results** tab.

c. Click **Export** to export all the diagnostic test data to a DEVDATA file (Figure 157).

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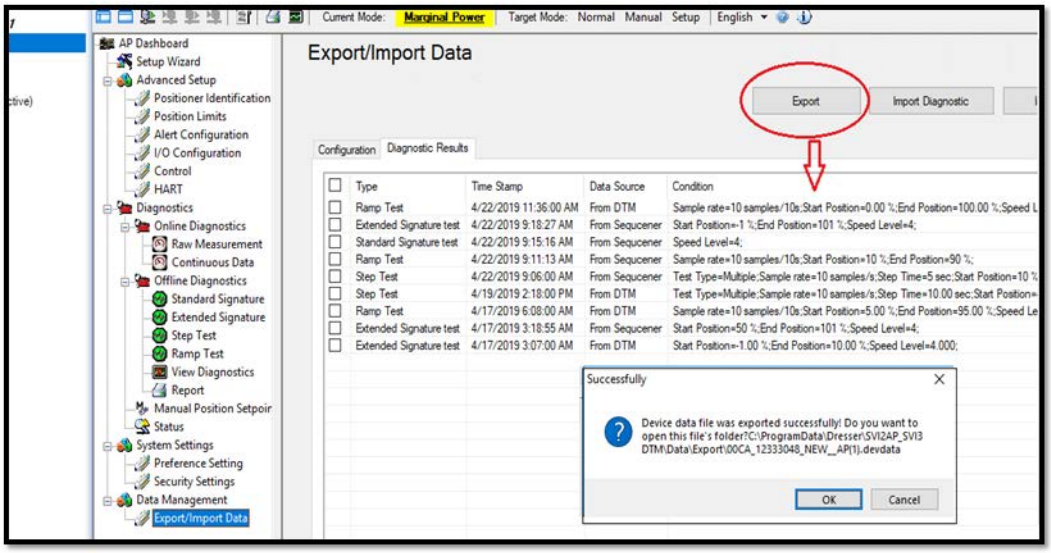

Figure 157 Export Devdata

√ Export USF file: USF file can be exported from ValVue3 frame. USF file not only contains the diagnostic test from AP device but also from SVi1000, SVI FF, FVP device:

a. Select **Tools/Valve Data Management** > **Signature Management**.

b. Choose the tests that you want to export and click **Export** to export the selected tests into a USF file (Figure 158).

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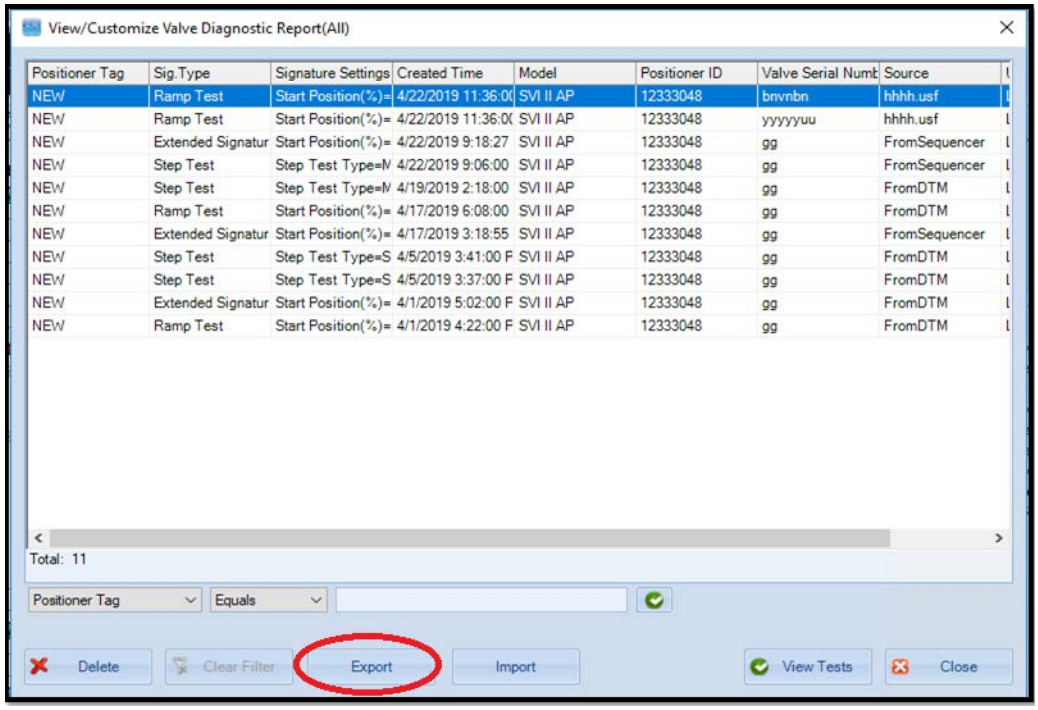

Figure 158 Export USF File

√ Export DDF file: Since ValVue3.40.0, ValVue3 frame supports exporting DDF file that contains associated valve information, the related DTM information, diagnostic tests and sequencer information:

a. In ValVue3 Device Network View, choose a device DTM and right-click on it.

b. Export a DDF file by clicking **Export**.

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