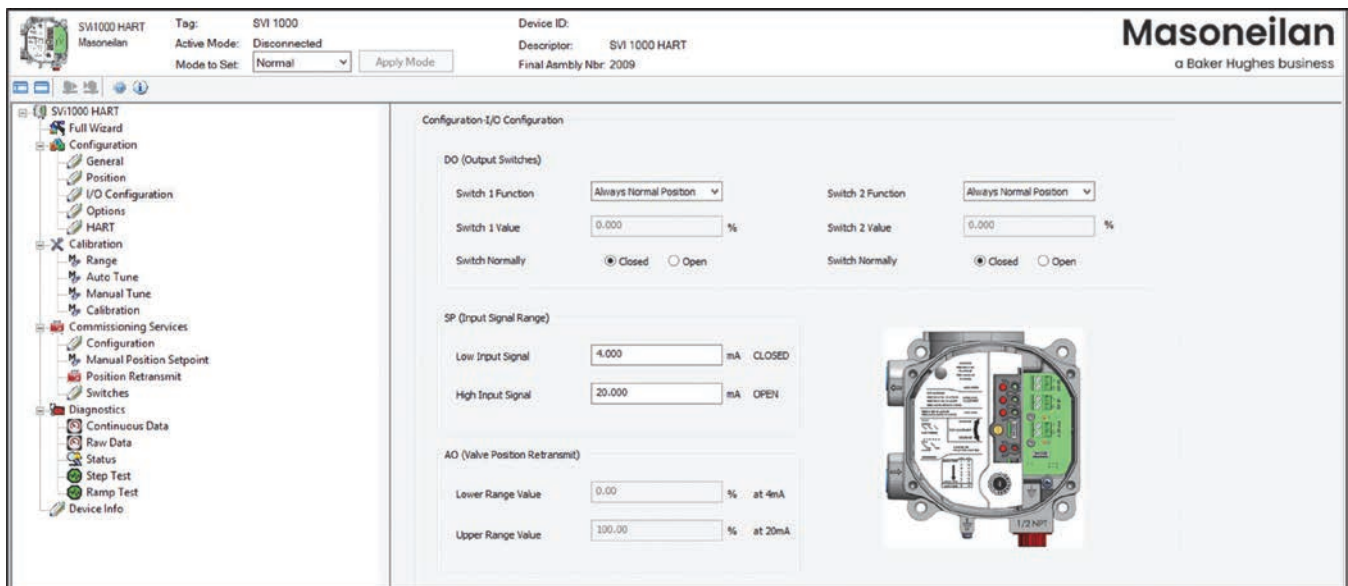


SVi™ 1000 DTM Software

Instruction Manual (Rev. E)



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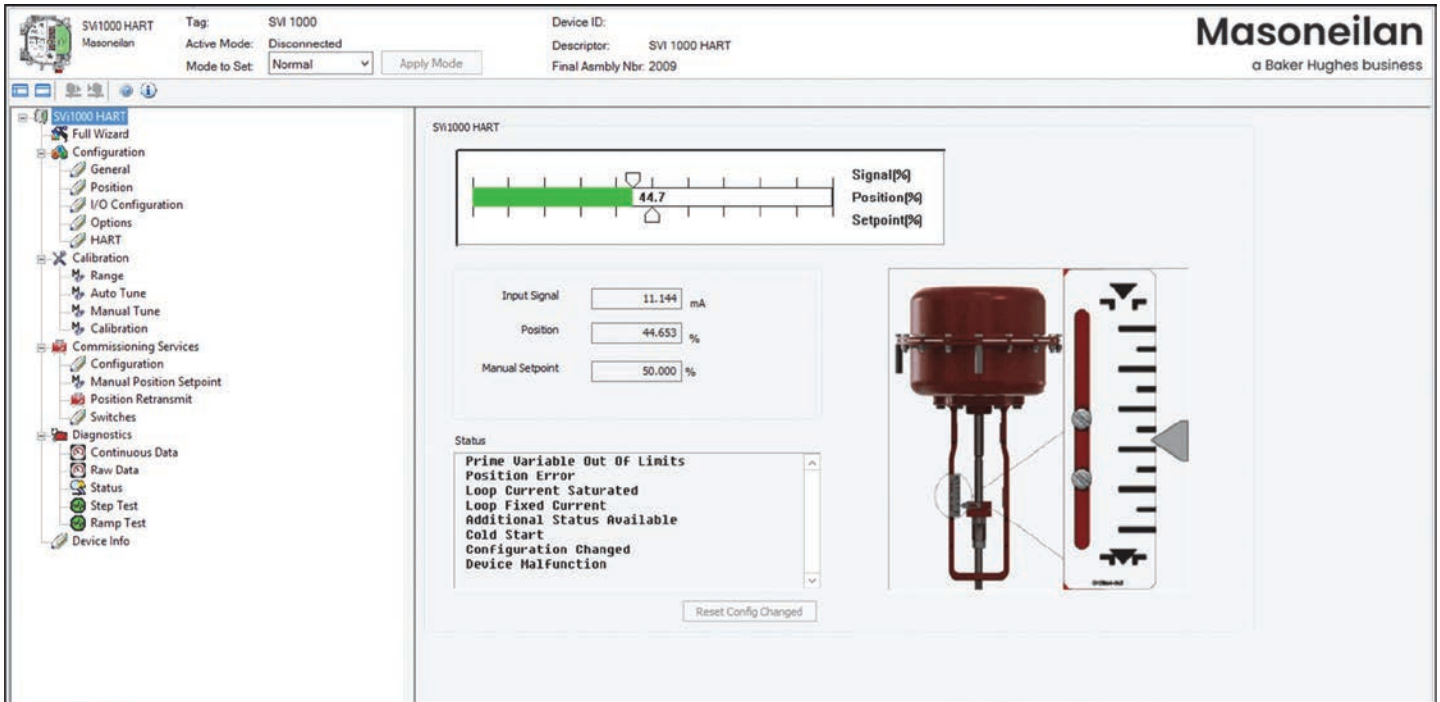
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1. Introduction

The SVi1000 DTM is a user friendly interface that facilitates the setup and diagnostics of a control valve.



SVi1000 DTM

SVi1000 DTM Software

SVi1000 DTM provides, through a variety of proprietary host software, the ability to quickly and easily set up the SVi1000 you can also monitor operation and diagnose some problems with the DTM diagnostic capabilities. This help file explains the operation of the SVi1000 DTM using **Masoneilan™ ValVue™3 Software**.

SVi1000 DTM is a user friendly, graphical interface that allows an efficient setup of an SVi1000 mounted on any control valve assembly.

SVi1000 DTM functionality includes:

- Full Wizard
- Diagnostic functionality, including:
 - Continuous Data tab
 - Step and Ramp tests
- Remote display of valve position,
- Set calibration parameters
- Set configuration parameters
- Monitor status/error indicators
- Input/Output configuration
- Remote calibration of the SVi1000
- Remote configuration of the SVi1000
- Remote operation of the SVi1000
- Backup and restore configuration
- Trend setpoint, valve position

Available Options

Available options for the SVi1000 are:

- Two Contact Outputs User Linked to Various Status and Alarm Flags
- Terminal boards:
 - Switch
 - Position Retransmit
 - Basic

About This Help File

These instructions are intended to help a field engineer install, setup, and calibrate an SVi1000 in the most efficient manner possible. If you experience problems that are not documented, contact your local Baker Hughes 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 SVi1000 display window, for emphasis on important items and for fields where data appears or for user entered data.
- Actions performed on buttons, check boxes, etc. appear **bolded**.



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



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

Note: Indicates important facts and conditions.

Documentation Resources

Baker Hughes publishes several different resources for Masoneilan documentation:

- Bench quick starts contain information related to configuration and testing in a bench top environment.
- 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 manuals represent the same source material as the online help.

- Handheld documents: Gives the DD mappings for the product.
Check the website: <https://valves.bakerhughes.com/resource-center>

Related Documentation for the SVi1000 DTM

- Masoneilan ValVue documentation: The SVi1000 DTM works inside various software (such as PACTware®), however it is designed to work best with ValVue 3 software. See the Masoneilan ValVue Software Manual (Ref. 31426).
- Masoneilan SVi1000 DTM Software Instruction Manual (current Manual).
- Masoneilan SVi1000 Positioner Instruction Manual (Ref. 19527).
- SVi1000 Bench Quick Start Manual.

Masoneilan Help Contacts

- Email: svisupport@bakerhughes.com
- Phone: 888-SVI-LINE (888-784-5463)

2. Installation and Registration

Requirements

The SVi1000 DTM installation procedures require basic knowledge of Microsoft Windows operating systems and the Masoneilan SVi1000 positioner. For additional information describing the SVi1000, consult the SVi1000 Instruction Manual (Ref. 19527).

Operation of the SVi1000 DTM requires installation of the following software components:

- SVi1000 DTM software
- ValVue3

Additionally, you can use the following software to access the SVi1000 DTM:

- PACTware software, which includes Generic HART® DTM software and HART Communications software
- AMS Version 13 or above
- PRM software from Yokogawa®
- FDM® by Honeywell
- fdtContainer® by M&M Software®

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

Hardware and Operating System Requirements

To successfully install and run SVi1000 DTM software, your computer system must meet or exceed the following minimum hardware and software requirements.

- Windows Server® 2008 R2 SP1, Windows Server® 2008 SP2, Windows Server® 2012, Windows Server® 2016, Windows® 7 sp1, Windows® 8.0 or Windows® 10
- 4 G of RAM
- Microsoft .NET Framework 2.0 SP2, Microsoft .NET Framework 4.0 FULL, and Microsoft .NET Framework 3.5 SP1
- 10 G of free hard disk space

HART Related Issues

Before installing SVi1000 DTM software, determine which port the computer uses for serial (RS 232 or USB) communication. The HART modem uses this port for communication with the SVi1000 positioner.

HART Compliance

The SVi1000 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 to 20 mA current loops

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

CAUTION

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 verify that the DCS is compatible with HART, before connecting a HART modem and using the SVi1000 DTM.

Communicate Failure

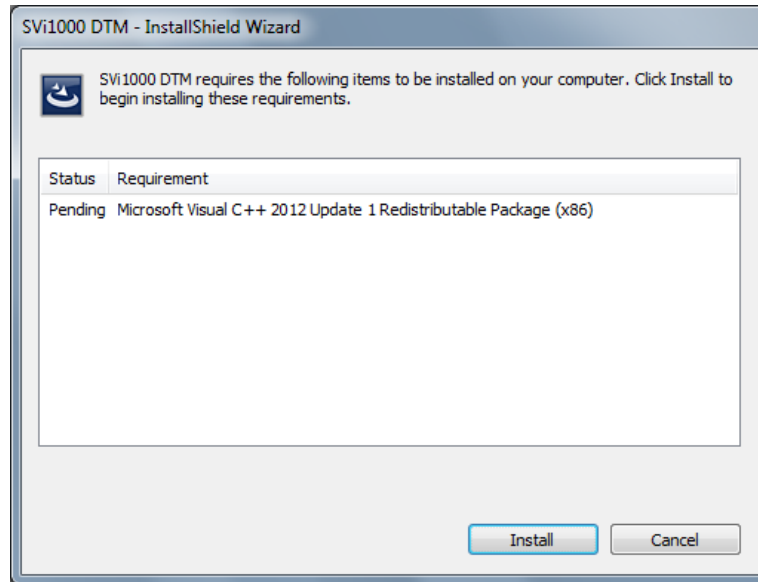
If the PC (using a modem) fails to communicate with the HART or SVi1000 DTM the PC displays either the message *No Devices Found* in the DTM main screen, a COM port communication error occurs, or the message *HART I/O Failed* appears if the device communications fails during the session. Communication 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.

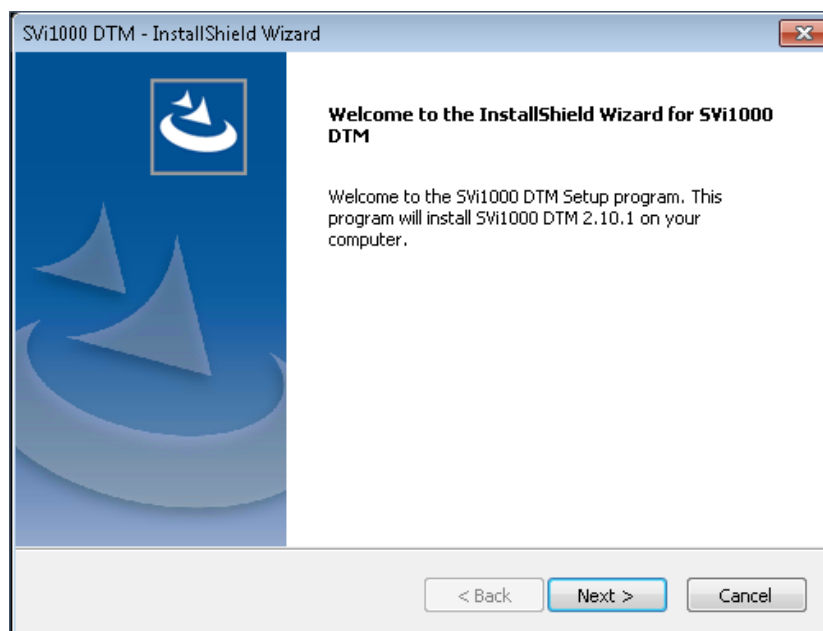
Installing SVi1000 DTM Software

1. Double-click **setup.exe** and the *Install Visual C++* dialog appears.



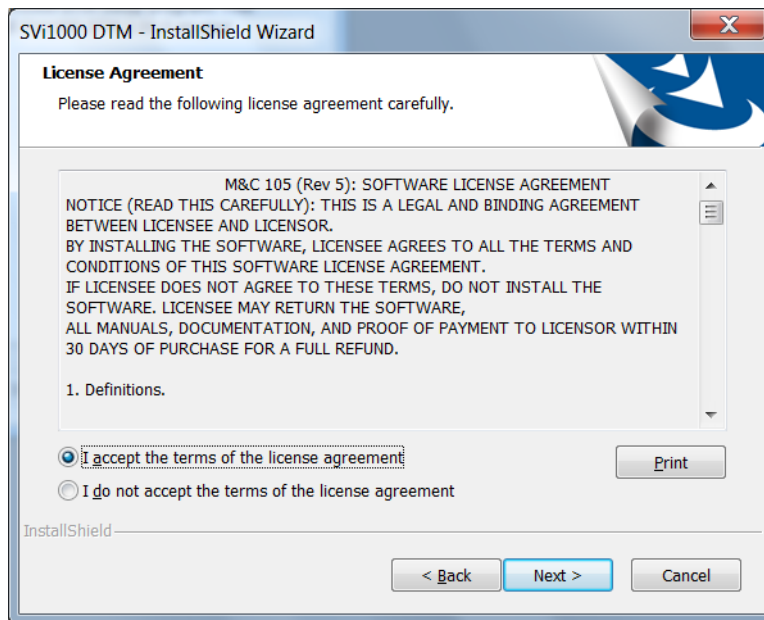
Install Visual C++

2. Click **Install** and the Visual C++ is installed and the *SVi1000 DTM Install Welcome Screen* appears.



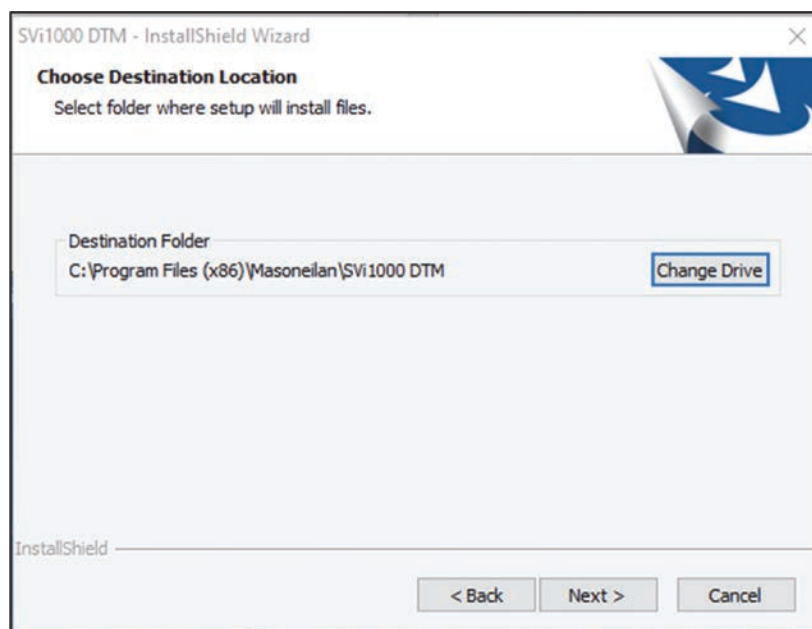
SVi1000 DTM Install Welcome Screen

3. Click **Next** and *SVi1000 DTM License Screen* appears.



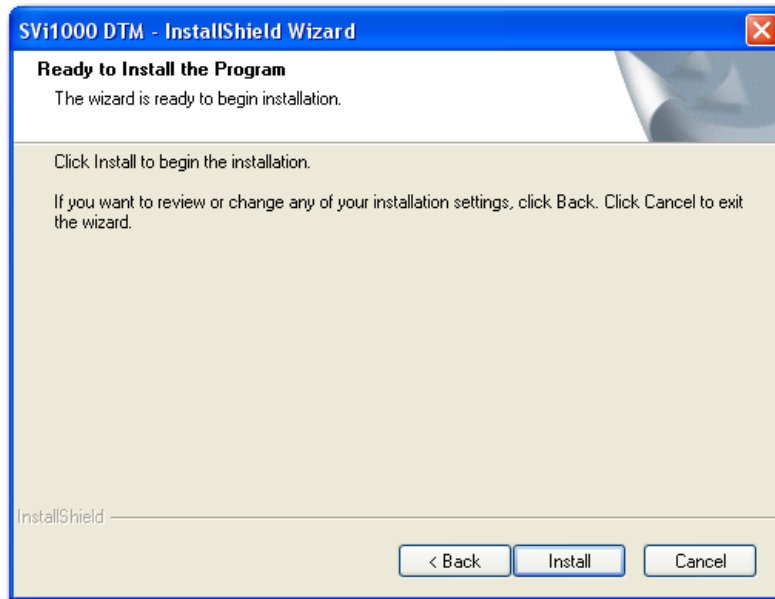
SVi1000 DTM License Screen

4. Click **I accept the terms of the license agreement**, then **Next** and *SVi1000 DTM Choose Destination Folder Screen* appears.



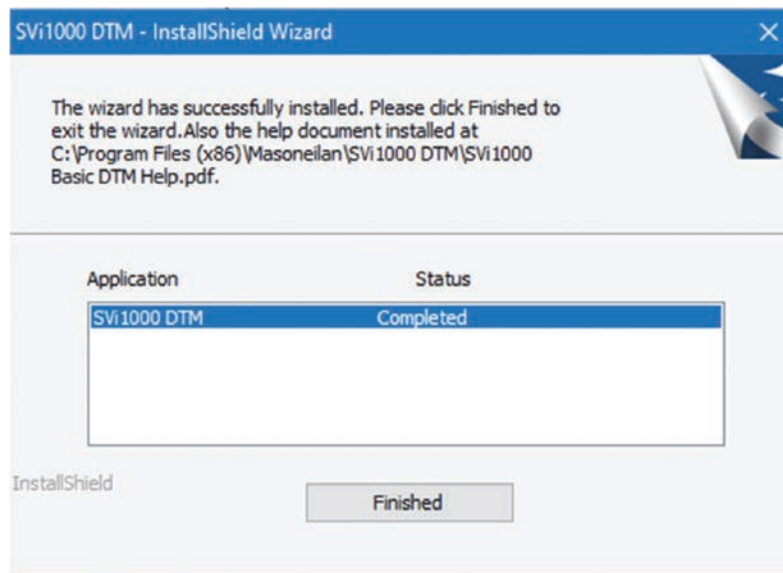
SVi1000 DTM Choose Destination Folder Screen

5. Click **Change** and navigate to the target directory or just click **Next** and *SVi1000 DTM Ready to Install the Program Screen* appears.



SVi1000 DTM Ready to Install the Program Screen

6. Click **Install** and a *Setup Status* screen appears, followed by *SVi1000 DTM Finish Screen*.



SVi1000 DTM Finish Screen

Registration Process

Licensing

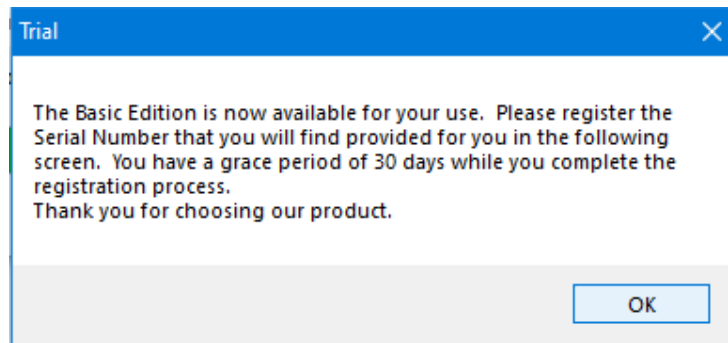
This section is meant to be a generic discussion of the licensing process for ValVue and Masoneilan software DTMs. License Dialogs that appear differ based on the Masoneilan software in use

- For ValVue3 or DTM registration you must have Administrator rights to install the frame application (i.e. ValVue3, PACTware etc).
- This also applies when using Masoneilan DTMs inside of PACTware® or other vendor and updating licensing.
- If you are performing these functions on a Masoneilan DTM using ValVue3 and ValVue3 is run as an Administrator, then the DTMs inherit the Windows Administrator properties from ValVue3.
- DTM is auto licensed when ValVue3 is registered with advanced edition.

Registration During the Trial Period

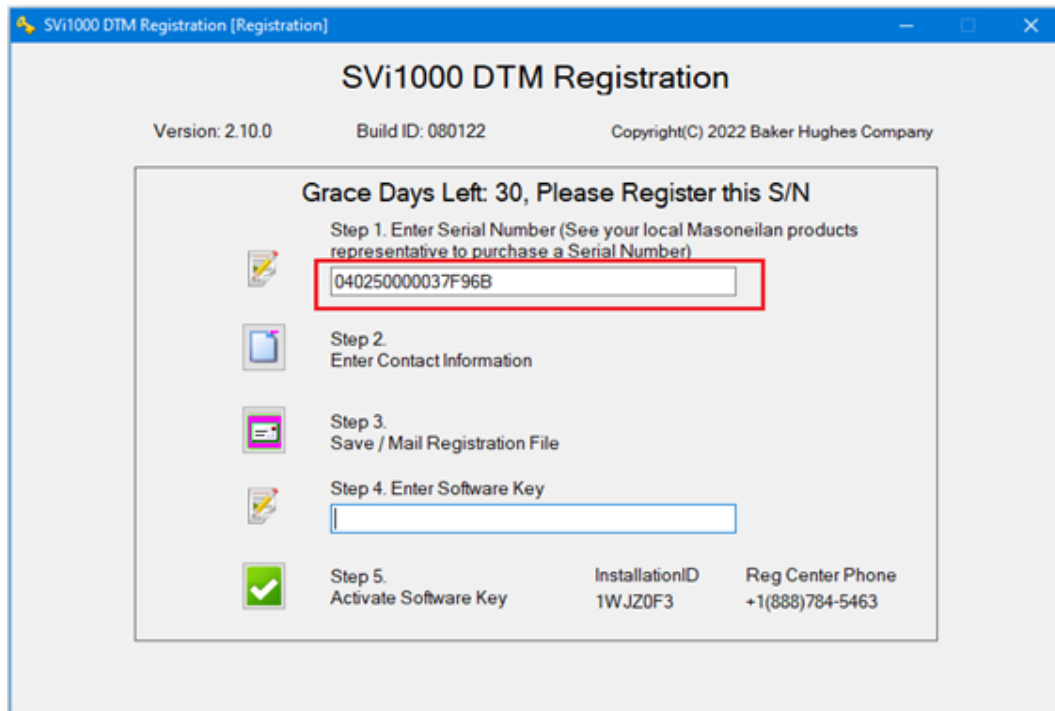
The license trial period works as follows:

1. Once you install and open the ValVue, you are granted a 30 days trial period. We strongly encourage you to register your license with us as soon as possible. During the 30 days, you have access to all the advanced features of ValVue. 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.
2. The first time you open SVi1000 DTM, if the product is on trial, a dialog appears.



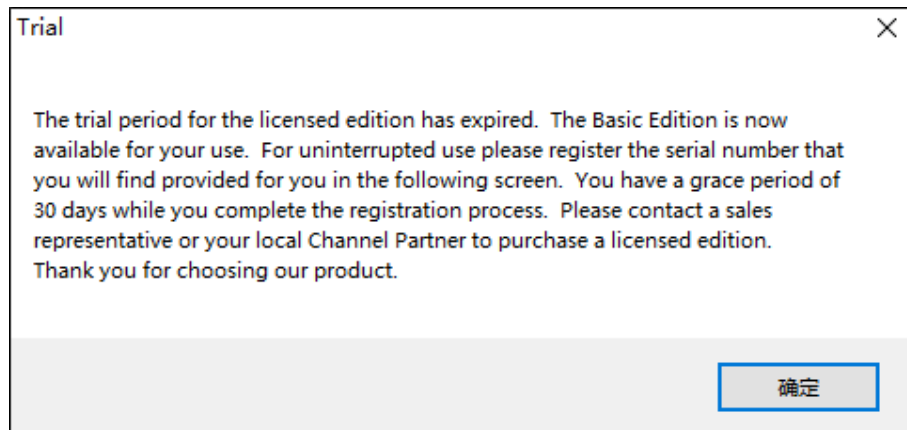
Trial Registration Dialog: Newly Installed

And then DTM registration window appears with Serial Number: 04025000037F96B



DTM Registration

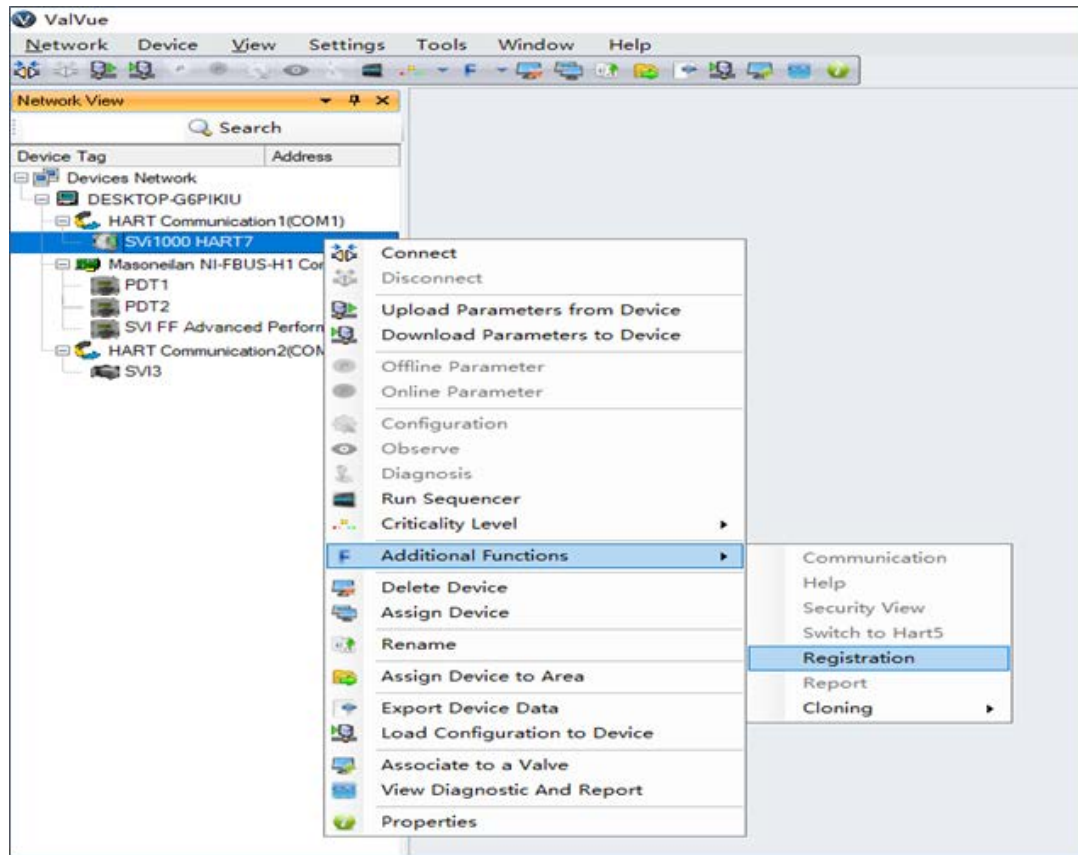
After 30 days without purchase or registration, the first time you open the DTM, the trial period expired dialog appears.



Trial Expired

Registration Process

1. Open a Masoneilan DTM, select a device and then select Additional Functions > DTM Licensing (DTM Registration Path)

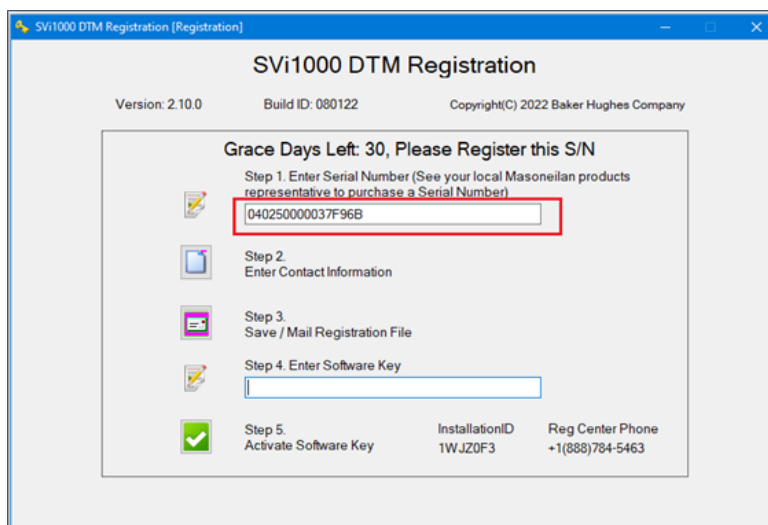


DTM Registration Path

2. Use the registration dialog to:

- **Register the Product** - Required before use or at the end of the 30 days trial period

- 1) The Serial Number auto-fills for this Edition.




- 2) Click  (associated with Step 2) and Contact Information appears.

Contact Information



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

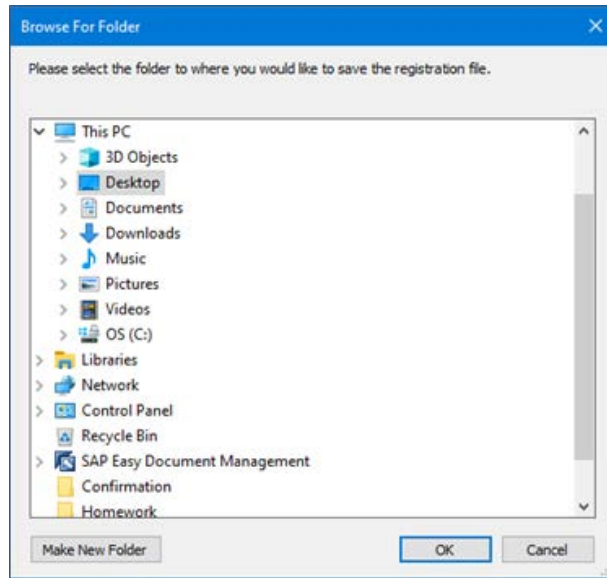
3) Enter all required information, as marked by *, click  to store the information.

4) Click  and Email Registration dialog appears

Email Registration

Click **Yes** and the registration email appears using your default email setup. The email has an .xml attachment containing licensing information-> Send the email. A return email is sent containing the software key.

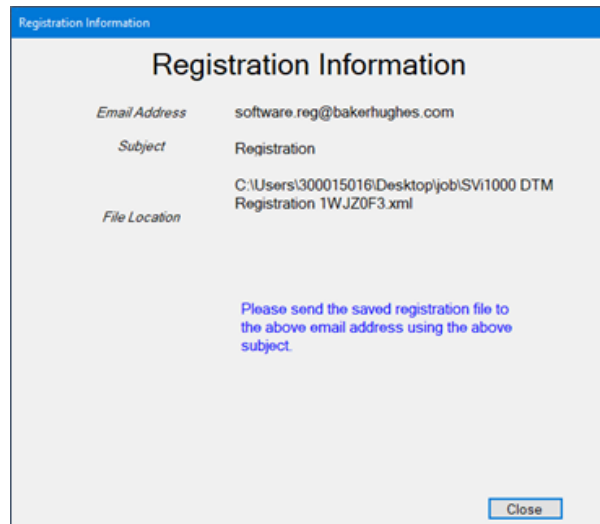
If you do not have email access or want to send from another location, click No and the dialog “Browse for folder” appears.



Browse for Folder

Browse to the desired folder (or make a folder), click OK and “Registration Information” appears.

Registration Information



This dialog contains:

- The information for the email address to send the file
- The email Subject
- The File Location


These three items can be copied and pasted into a text file for ease of use.

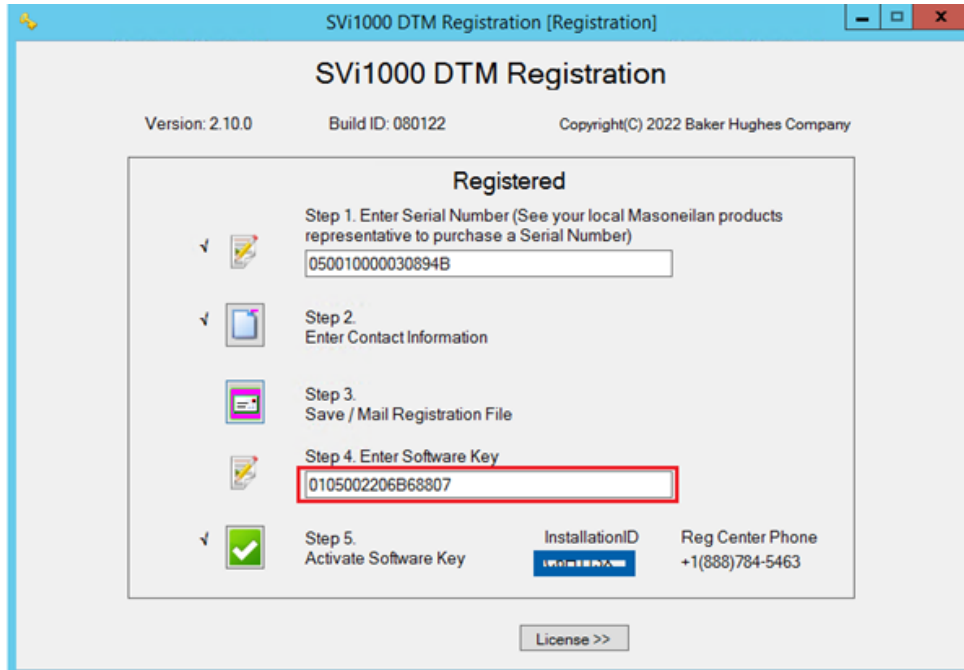
Click **Close** and copy the .xml file to a laptop with an email server. In this case, if you have multiple .xml file from multiple upgrades, you can attach them to one email. 3.

Then send the email-> A return email is sent containing the activation code.

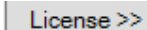
- **Activate License-** Required before use or at the end of the 30 days trial period

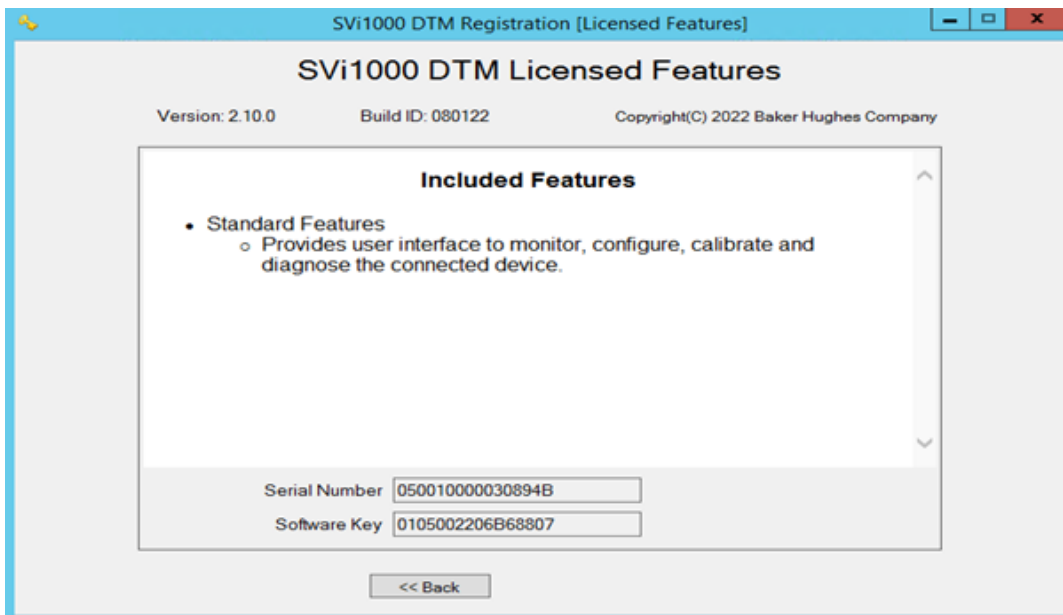
To activate the license:

1. Enter the emailed or channel partner acquired software key.
2. Click  to activate the software.



DTM Registration-Registered

2. Click  "Features" appears.



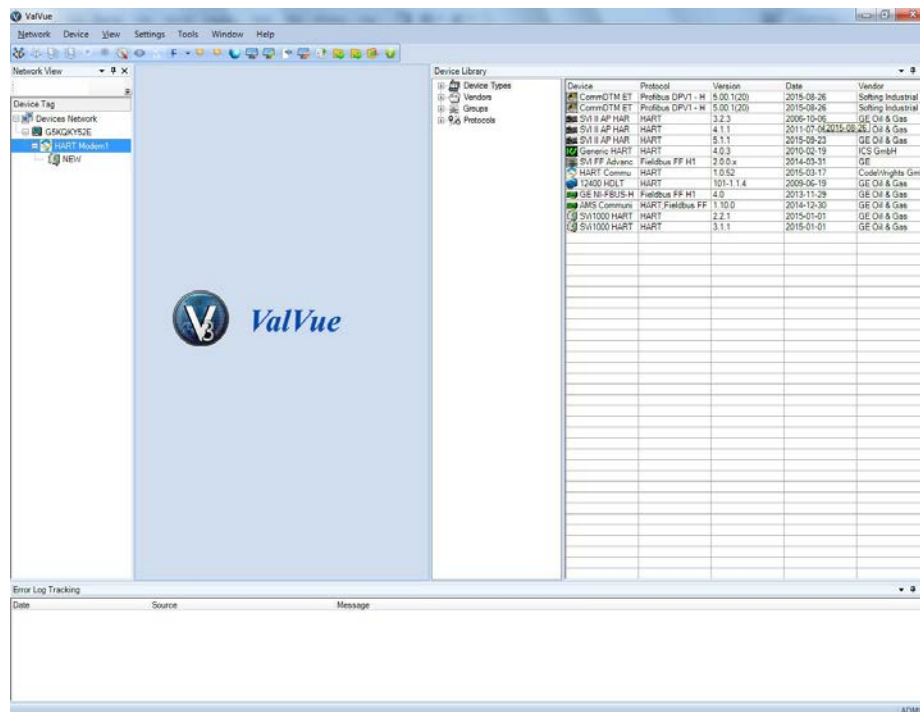
Included Features

3. ValVue Work Environment

ValVue Work Environment

This section describes the ValVue main screen and how to accomplish general ValVue tasks. After you have successfully launched and logged into the ValVue, *ValVue Main Screen* appears. The main screen includes four main components:

- “Command Area”, which includes the title bar, main menu and the toolbar.
- DTM “UI Panel” on [page 24](#), which displays the UI interface for the specific device DTM.
- Various “Docked Panes” on [page 25](#), which include the topology pane, device library, help, and error log tracking.
- “Status Bar” on [page 29](#)



ValVue Main Screen

Command Area

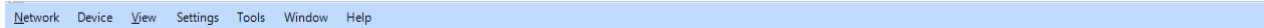
Command area is composed of three components:

- Title bar: lists the application name and information about current project and current opened DTM UI and has buttons to minimize/maximize and close.



Title Bar

- Main menu: Provides items for all functions of the DTM software. See the individual menu discussions.



Main Menu



- Toolbar: An icon-driven representation of the main menu. The number of items and those that are active depend on the item selected in the topology. See *Network* menu for more description of the icons.

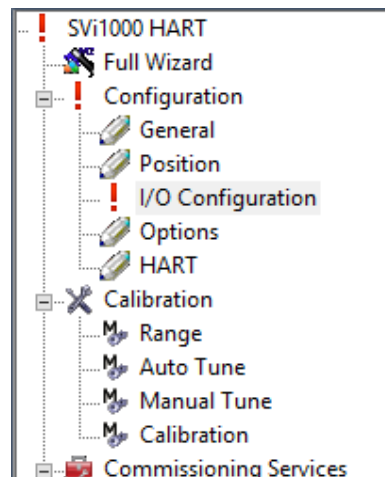


Toolbar

Exclamation Point and Pencil Icons

Throughout ValVue3 and the Masoneilan DTMs a:

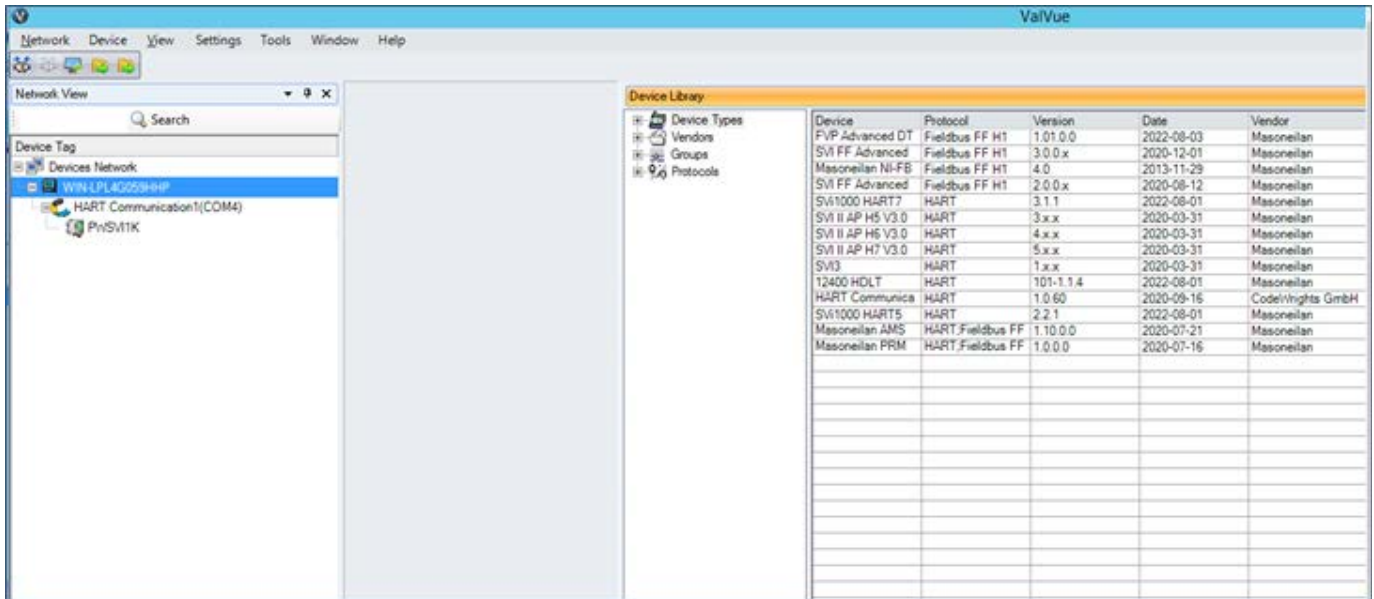
- Red exclamation point () indicates a value in the associated field is out of range.
- Pencil icon () indicates a value that has not been saved. These icons also appear in the topology tree to indicate a tab where there is an out of range or and unsaved value. The out of range exclamation point always takes precedence.



Topology Tree with Icons

UI Panel

The UI panel depends on the device installed and selected. For Masoneilan products see the individual DTM help. See vendor documentation for non Masoneilan products.



UI Panel

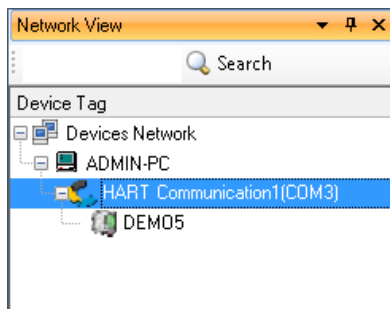
Docked Panes

ValVue Topology Pane

The topology pane (*ValVue Topology Pane: Network View*) is used to navigate the various areas and devices in each area and open a device's proprietary DTM. This navigation tree can be changed to one of four different views:

- Topology View*
- Area View*
- Protocol View*
- Manufacturer View*

See Device menu for a more detailed explanation.



ValVue Topology Pane: Network View

The tree is broken down into the following functional areas:

- View*: Listed just below the yellow bar is the view in use.
- Field Network* or *Area*: One level below is either the protocol in use or a listing of the user-defined areas.
- Protocol*: Next is the protocol in use.
- Device*: Next is a list of the devices added.

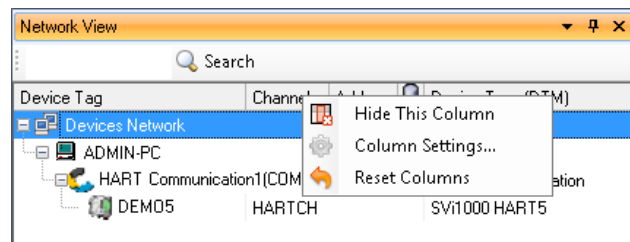
Column Settings

You can add and remove columns appearing in the topology pane. The default is to display a minimal amount of columns and the columns available depend on the active *Network View*. These items are useful in identify particular valve/positioners. It may be necessary to pull the topology pane to display the fields. Columns available for display include:

To configure columns:


- Device Tag*
- Address*
- Channel*
- Device Type (DTM)*
- Changed*: Indicates an unsaved parameter change using the pencil icon.

1. Right-click at the device tag level.



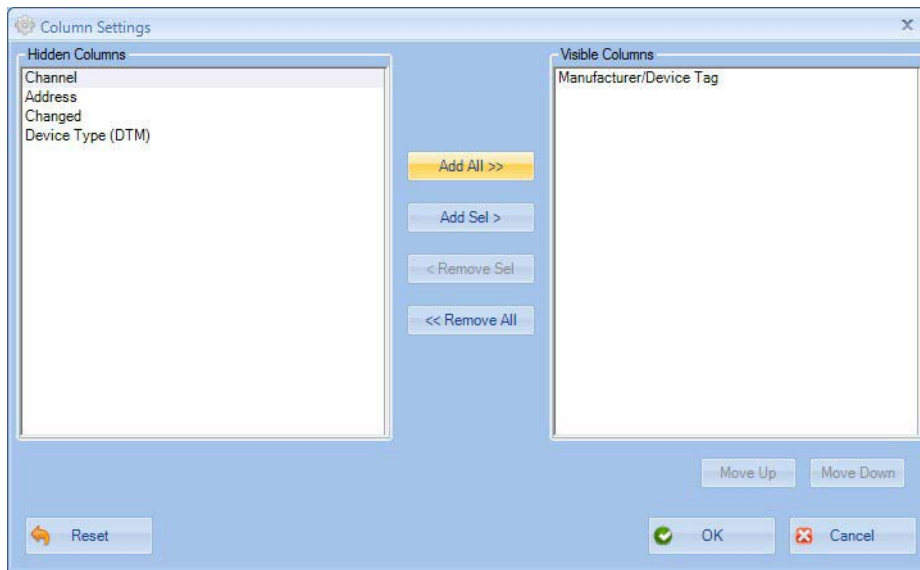
Column Settings Right Click Menu

The image shows the menu when more than the default columns are shown. Only *Column Settings* appears then.

Use the *Reset Columns* menu item or  on the *Column Settings* dialog to reset the column configuration to default.

Use the *Hide This Column* menu item to hide a selected column.

2. Click **Column Settings** and the dialog appears.



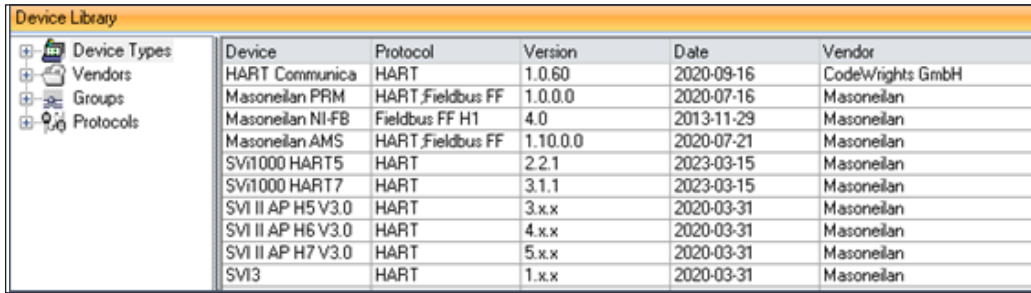
Column Settings

3. Use the **Add and Remove** buttons to add/remove items from the *Hidden Columns* or *Visible Columns* lists.
4. Use the move buttons to arrange the order and click **OK**.

The topology pane appears with the columns appearing and arranged as dictated.

Device Library

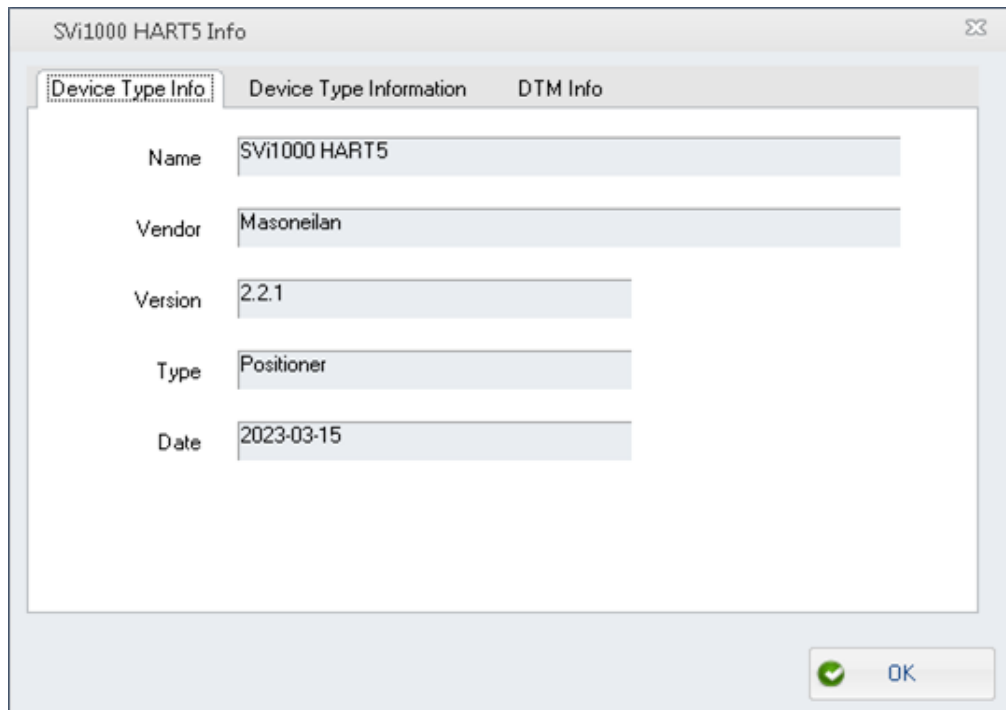
Use the *Device Library* to view lists of protocols and devices in the *DTM Library*. In the *DTM Library* means that they are installed and ready for use by ValVue. Other protocols and DTM may be on the system, but not ready. See *DTM Library Management* for instructions on how to manage DTMs.



Device	Protocol	Version	Date	Vendor
HART Communica	HART	1.0.60	2020-09-16	CodeWrights GmbH
Masoneilan PRM	HART_Fieldbus FF	1.0.0.0	2020-07-16	Masoneilan
Masoneilan NI-FB	Fieldbus FF H1	4.0	2013-11-29	Masoneilan
Masoneilan AMS	HART_Fieldbus FF	1.10.0.0	2020-07-21	Masoneilan
SVi1000 HART5	HART	2.2.1	2023-03-15	Masoneilan
SVi1000 HART7	HART	3.1.1	2023-03-15	Masoneilan
SVI II AP H5 V3.0	HART	3.x.x	2020-03-31	Masoneilan
SVI II AP H6 V3.0	HART	4.x.x	2020-03-31	Masoneilan
SVI II AP H7 V3.0	HART	5.x.x	2020-03-31	Masoneilan
SVI3	HART	1.x.x	2020-03-31	Masoneilan

Device Library

If you right-click on an item in the *Device* list you can access a dialog with display only *DTM Info*.



SVi1000 HART5 Info

Device Type Info | Device Type Information | DTM Info

Name: SVi1000 HART5

Vendor: Masoneilan

Version: 2.2.1

Type: Positioner


Date: 2023-03-15

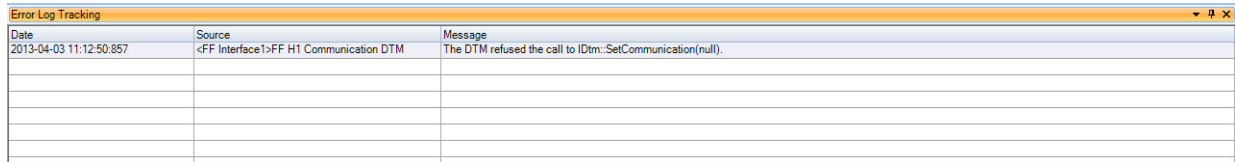
OK

DTM Info

Note: To see the correct version of ValVue3 or an individual DTM, click *Help > About for ValVue3* or the *About icon* for a DTM (). Do not reference the *Version* field in *DTM Library Management*.

Error Log Tracking

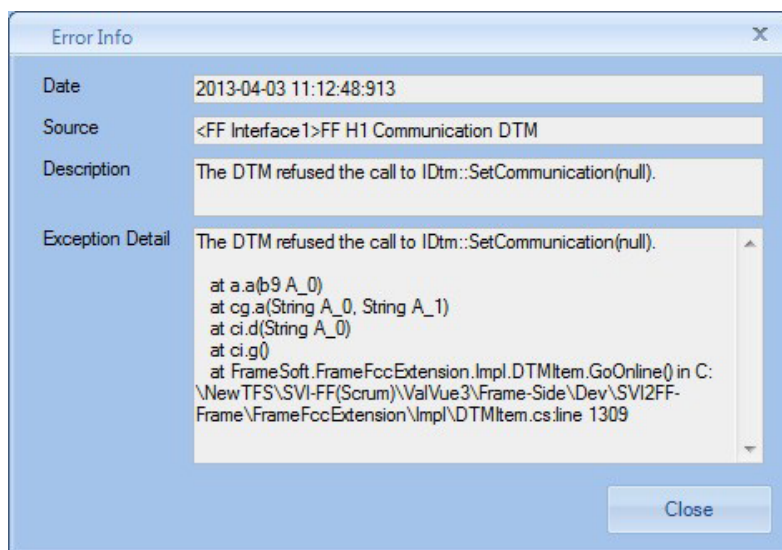
Accessed from the *View* menu and clicking  in the status bar, use this, via a right-click menu, to view errors, clear errors and view details (*Error Info*).



Date	Source	Message
2013-04-03 11:12:50.857	<FF Interface1>FF H1 Communication DTM	The DTM refused the call to IDtm::SetCommunication(null).


Error Log Tracking Pane

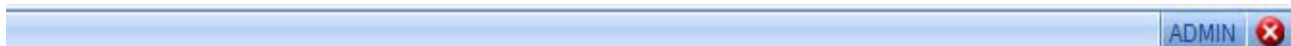
Information in the *Error Info* dialog can be copied and pasted for troubleshooting purposes.



Error Info

Status Bar

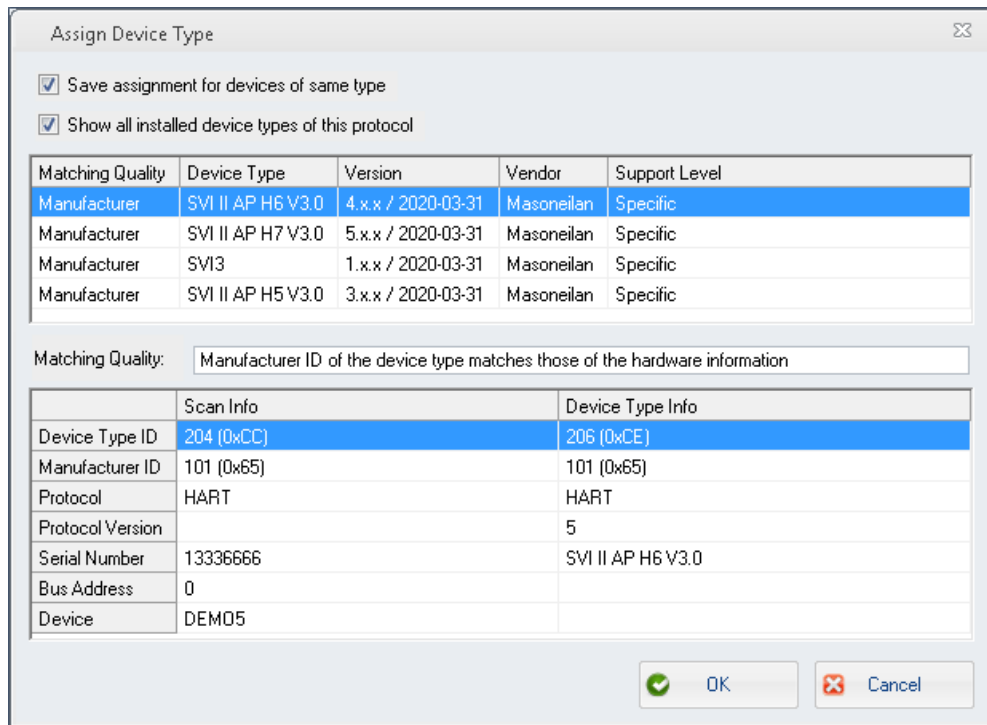
This displays the current user and an icon to indicate errors exist. When you mouse over the user label, the tooltip shows the role information. If you click the error icon , the *Error Log Tracking* appears.



Status Bar

Assign Device Type

If the scan detects a device that is unknown or has unknown device properties, the *Assign Device Type* dialog appears. Use this dialog to review the information gathered during the network scan and to add or edit to that data. You can then save the assigned data for use with that device type. Only device types that match the specific DTM appear (FF won't appear if using an SVI II AP DTM).



Assign Device Type

Fields and Buttons

Save assignment for devices of same type

Click this checkbox to save configuration changes made using this dialog for devices of the same type once is clicked.

Show all installed device types of this protocol

Click this checkbox to display all devices scanned that are for the detected protocol. This is useful to see related information as reference.

Matching Quality

Detects the common quality detected. In this case, this is the protocol.

Device Type

Displays the device type detected.

Version

Displays the version detected.

Vendor

Displays the vendor detected.

Support Level

Displays the support level detected.

Matching Quality Displays text associated with the detected Matching Quality as an explanation.

Scan Info Displays the scanned data for:

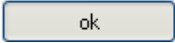
- Device Type ID*
- Manufacturer ID*
- Protocol*
- Protocol Version*
- Serial Number*
- Bus Address*
- Device*

Device Type Info Enter amended data for the scanned data for:

- Device Type ID*
- Manufacturer ID*
- Protocol*
- Protocol Version*
- Serial Number*
- Bus Address*
- Device*

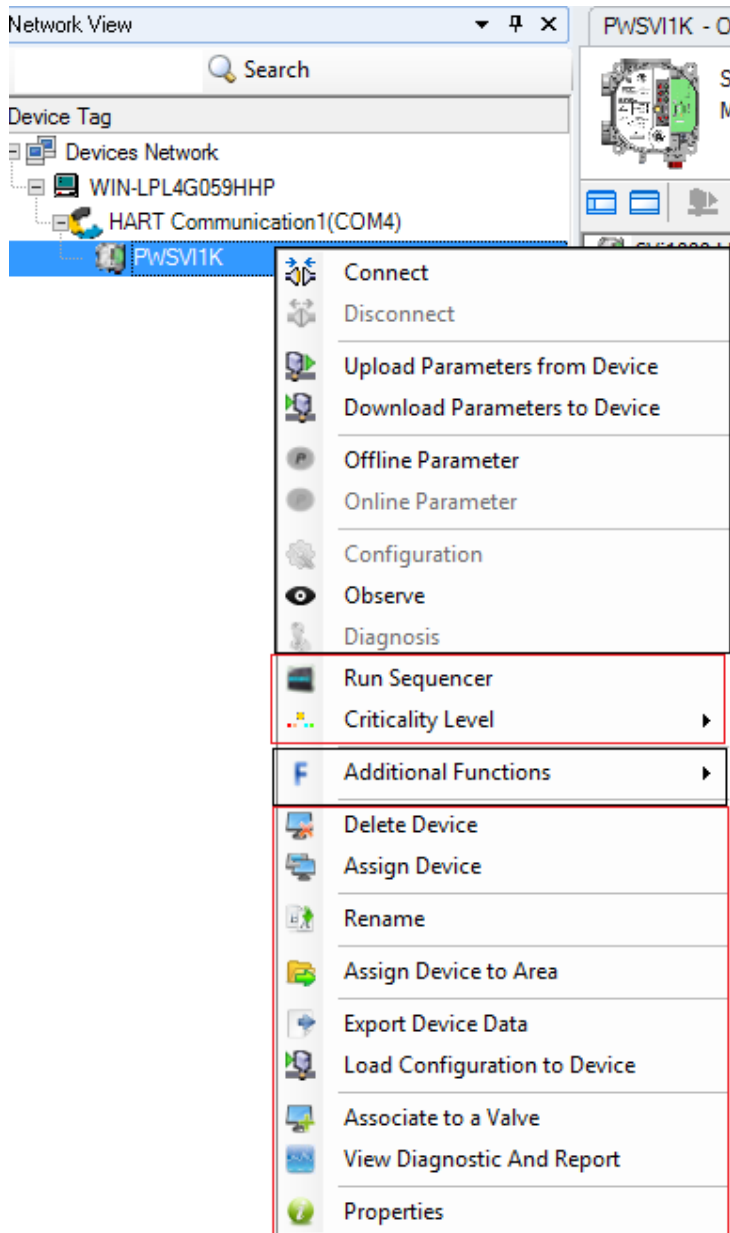
Configure Assign Device Type

If the *Assign Device Type* dialog appears:

1. Review the Scan Info fields and ensure that all information is accurate.
2. Click **Show all installed device types of this protocol** to see information for reference, if required.
3. Click **Save assignment for devices of same type** and click  .

Topology Right-Click Menu

Use the topology view right-click menu to access functions some of which are ValVue 3 related and some SVI II AP DTM related. Figure shows which items are related to positioner DTM operations and which to ValVue 3 (Black boxes are SVI1000 operations and red are ValVue 3).

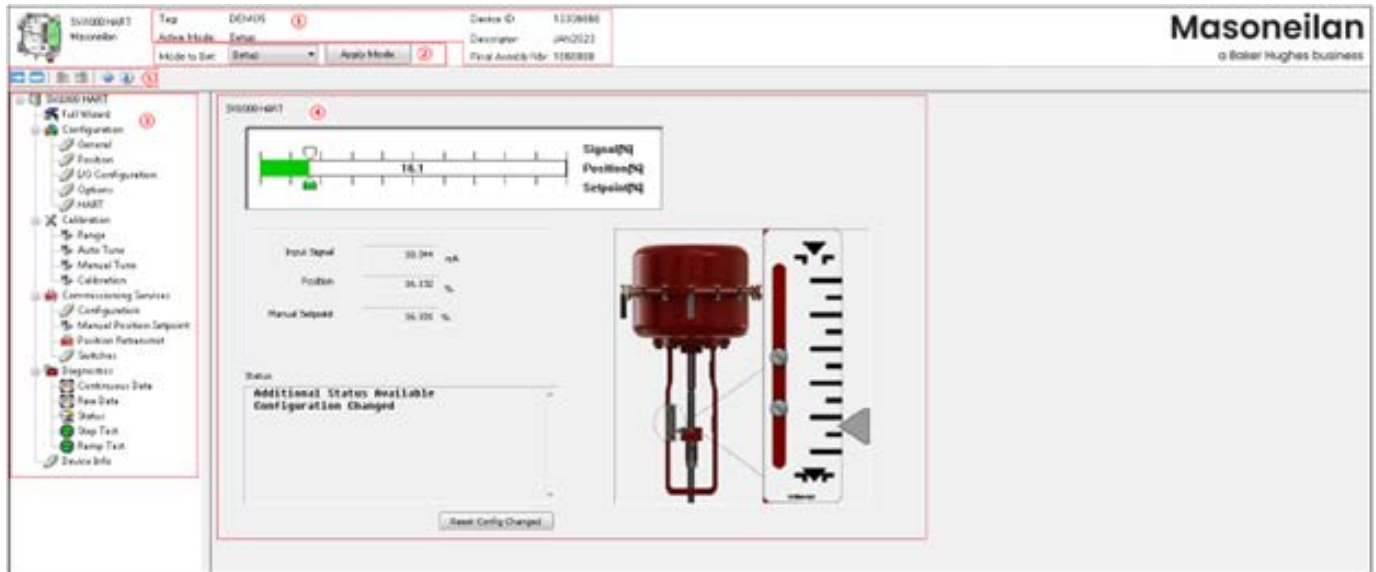


Topology Right-Click Menu

4. SVi1000 HART Screen

SVi1000 HART Screen Overview

This section describes the SVi1000 DTM main screen and how to accomplish general SVi1000 DTM tasks. After you have successfully launched and logged into the SVi1000 DTM the *SVi1000 DTM Main Screen* appears.



SVi1000 DTM Main Screen

Buttons and Fields

1 Tag

- Tag
- Descriptor
- Device ID
- Final Assembly Nbr
- Active Mode

This data appears at the same location on all screens but can only be changed on the *Full Wizard* (“Full Wizard Screen” on [page 38](#)), *General* screen (see “Configuration General Screen” on [page 44](#)) and the *Configuration* screen for *Tag* only. (See “Commissioning Services Configuration Screen” on [page 78](#)).

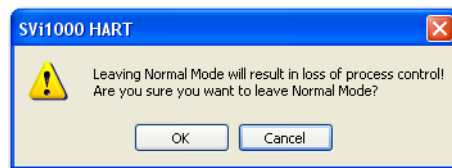
2 Mode to Set

Use the *Mode to Set* button located at the top of all SVi1000 DTM screens (*SVi1000 DTM Main Screen*: red box) to change the operating mode. There are three operating modes and a fail- safe mode:

- Normal*: The SVi1000 follows the 4 to 20 mA input signal and positions the valve accordingly (indicator green).
- Manual*: The valve setpoint is set by the valve software, the local user interface buttons or a HART compatible system. When changing to this mode the setpoint becomes the actual position.
- Setup*: The following tasks are available:
 - Set Characterization (Linear, equal%(30,50,Camflex), Quick Open and Custom*
 - Enable or Disable Bumpless Transfer*
 - Configure Tight Shutoff*
 - Set Lower and Upper Position Limits*
 - Configure Position Fault Limits (Position Error Band and Time 1*
 - Configure Switch I/O*
 - Run Find Stops*
 - Run AutoTune*
 - Perform a Manual Find Stops*
 - Set Open Stop Adjustment*
 - Set Valve Position*
 - Command valve to full open or closed*
- Failsafe*: When the SVi1000 cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until you reset from the *Diagnostics* screen.

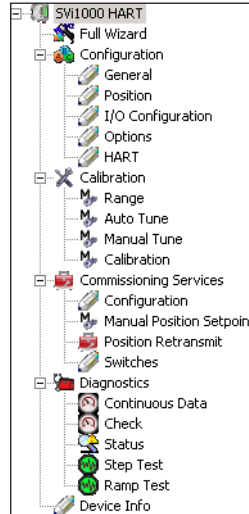
Whenever you leave the Normal mode, a warning appears (*Leaving Normal Mode Warning*).

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



Leaving Normal Mode Warning

- 3 **SVi1000 DTM Directory Tree:** The directory tree (SVi1000 DTM Directory Tree) is used to navigate the various screens.



SVi1000 DTM Directory Tree

The tree is broken down into the following functional areas:

- **Full Wizard:** One screen to perform automatic positioner/valve setup for stops and to perform autotuning. See “Full Wizard” on [page 38](#).
- **Configuration:** A series of six screens for manual configuring a wide range of settings. See “Configuration” on [page 44](#).
- **Calibration:** A series of five screens for calibrating sensors and valve travel. See “Calibration” on [page 59](#).
- **Commissioning Services:** A series of four screens for configuring parameters concerned with initial commissioning. See “Commissioning” on [page 76](#).
- **Diagnostics:** A series of seven screens for fault analysis, checking continuous data, to perform step and ramp tests, for viewing data to analyze positioner/valve performance and to reset faults. See “Diagnostics” on [page 83](#).

4 **Signal and Status Displays three values:**

- **Signal:** Indicates the value of the input signal strength expressed in mA of the configured signal range. In Normal mode this is the position setpoint. In MANUAL mode, the setpoint is the target position to which the SVi1000 is controlling the valve. The range is set on the “Configuration I/O Configuration Screen” on [page 51](#).

- **Position:** Displays the numerical valve position. 0% is always closed and 100% is open.

Because the travel of a valve may exceed its nominal travel, positions greater than 100% are possible (see “Calibration Range Screen” on [page 60](#)).

Setpoint: Displays 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 SVi1000 is controlling the valve.


In NORMAL mode, the setpoint is the target position based on the characterized input.

Displays a bar graph that contains:

- **Signal:** Indicates the value of the input signal strength expressed in mA of the configured signal range.
- **Position:** Contains a center green bar showing the actual valve position in % of valve opening.
- **Setpoint:** Contains an indicator showing the valve setpoint.

Status message field: Displays health indicators. When there is a fault code from the SVi1000, Additional Status Available appears. The fault codes also appear on the "Diagnostics Status Screen" on [page 87](#).

The status block also contains other status codes returned by HART. These include *Configuration Changed*, *Device malfunction*, and *Variable out of limits*.

Reset Config Changed  : Click to reset the HART configuration changed flag. This clears the references on the *Status* area.

5 SVi1000 DTM Icon Bar The DTM menu bar contains the following items:



Toggles the Project pane off/on.



Toggles the banner off/on.



Loads parameters from the device to the SVi1000 DTM software.



Saves user-configured parameters from the software to the device.



Opens the SVi1000 DTM help.



Opens a dialog containing the version, build and copy right information.

On Screen Messages

As you use the program status messages appear, usually above the field or buttons, to indicate warnings or other information.



Indicates that data has changed and needs to be written to the positioner.



Indicates that the data for that field is out of range (invalid).

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5. Full Wizard

Full Wizard Screen

From the *Full Wizard* screen you can rapidly setup the SVi1000 by configuring some basic parameters. You can set the device identification, perform a travel calibration, and autotune the positioning parameters. When the selected tasks are started a progress screen appears. To customize the valve setup refer to “Calibration Manual Tune Screen” on [page 72](#). You can either run the entire wizard or pick and choose which components to run.

To run the Full Wizard you must first be in Setup mode. See Mode to Set in “SVi1000 HART® Screen Overview” on [page 33](#) for information on changing modes.

Full Wizard Screen

Running the *Full Wizard* is one way to set up the SVi1000. When you decide to run the setup you can either run the entire wizard or pick and choose which components to run. This wizard has the advantage of accessing diagnostics tests, which is useful for troubleshooting and during initial commissioning. If you choose not to use the *Full Wizard*, you can use the components it accesses to configure components separately on the following tabs:

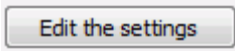
- “Calibration Range Screen” on [page 60](#) tab to run *Find Stops* and *Open Stop Adjustment*
- “Calibration Autotune Screen” on [page 69](#)
- “Calibration Manual Tune Screen” on [page 72](#)
- “Calibration Calibration Screen” on [page 74](#)
- Run “Diagnostics Start Step Test” on [page 93](#) or “Diagnostics Start Ramp Test” on [page 107](#)

The *Device Information* and *Position* fields are configurable when checked in the fields to the right.



The valve must be Out-of-Service and isolated from the process during this process.

Buttons and Fields

Procedure Area	
No.	Displays the number of the procedure.
Procedure name and checkbox	Displays the procedure as listed on the tab where fields are configured. Use the checkbox to activate the procedure for use by the wizard. The options (except <i>Change Device Mode</i>) are inactive until Setup mode is active. These options include: <ul style="list-style-type: none">□ 1 Device Information:<ul style="list-style-type: none">□ <i>Set Tag</i>: Sets the physical device tag.□ <i>Descriptor</i>: Enter a description for the device.□ <i>Message</i>: Enter a device-related message.□ <i>Date</i>: Enter date the device placed in service, etc.□ <i>Air Action</i>: Displays the device air action that is factory set.□ <i>Long Tag (HART 6/7 only)</i>: Enter a tag for a HART 7 device. This appears only if connected to a HART 7 device.□ 2 Find Stop: Runs all <i>Find Stops</i> operations. Click Edit Settings to open the “Calibration Range Screen” on page 62 to configure settings.□ 3 Auto Tune: Runs all <i>Auto Tune</i> procedures, including; <i>Aggressiveness</i> and <i>Supply Pressure</i>. See “<i>Calibration Autotune Screen</i>” on page 69.□ 4 Position: Sets the position related parameters as described on the “Configuration Position Screen” on page 50.□ 5 Step Test: Runs a <i>Step Test</i>. See “<i>Diagnostics Start Step Test</i>” on page 93.□ 6 Ramp Test: Runs a <i>Ramp Test</i>. See “<i>Diagnostics Start Ramp Test</i>” on page 107.□ 7 Change Device Mode: Changes the positioner to mode selected in the <i>Apply Mode</i> field.
Status	Displays a progress bar during execution for each selected item.
Check All	Click the checkbox to select/deselect all <i>Procedure Name</i> items
Parameter Area	
No.	Displays a number for each parameter associated with the <i>Procedure Name</i> selected in the procedure area.
Parameter	Lists the parameters associated for the <i>Full Wizard</i> for the <i>Procedure Name</i> selected.
Value	Lists the parameter value read from the tab where it is configured.
	Click the button and you are taken to the tab where the values are input. Return to the <i>Full Wizard</i> tab to continue the process.
Edit the settings button	
Full Wizard Graph	Displays a graph of % (percentage of the procedure complete) vs. <i>Time with Supply Pressure</i> (red) and <i>Position</i> (blue) traces during the procedure.

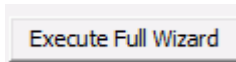
General Graph functionality

All graphs have some common functionality, including:

- 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.
- Right-click menu: There is a menu available by right-clicking any axis that has three selections:
 - *Tracking Enabled*: enables/disables tracking.
 - *Update Resume Values*: Store the axis scale for the *Tracking Enabled*. The next time *Tracking Enabled* is engaged, the tracking restores the axis to the stored scale instead the initial scale.
 - *Zoom to Fit*: Activates a function that sizes the graph to fit the selected display area.

Full Wizard Log

Displays basic information about test run time and device, along with test-related messages and outcome.



Click to begin execution of configured items.

*Execute Full
Wizard button*

CAUTION

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

SVI1000 HART Masonelan Tag: PWSVI1K Device ID: 13336666
Active Mode: Setup Descriptor: JAN2022
Mode to Set: Setup Apply Mode Final Assembly Nbr. 16661

No.	Procedure Name	Status
1	Device Information	<input type="checkbox"/>
2	Find Stops	<input checked="" type="checkbox"/>
3	Auto Tune	<input type="checkbox"/>
4	Position	<input type="checkbox"/>
5	Step Test	<input type="checkbox"/>
6	Ramp Test	<input type="checkbox"/>
7	Change Device Mode	<input type="checkbox"/>

No.	Parameter	Value	Unit
1	Find Stops Type	Auto Stop Limit	

Full Wizard Graph

Position: %

Time (Sec)	Position (%)
0.0	0
5.0	100
10.0	100
15.0	0

Full Wizard Log

Date Executed: Sep 06 2040
Started: 15:16:44
By: Administrator
Device Tag: PWSVI1K
Device ID: 13336666

Full Wizard

-----Step 1 Find Stops-----

Find Stops Type: Auto Stop Limits

Auto Stop Limits Started
Auto Stop Limits Finished
Open Stop Adjustment had been set to 100%
Sensor range is -10383 ~ 2026
Auto Stop Limits - Success

Execute Full Wizard

Full Wizard Screen: Device Info

Run the Full Wizard

To run the Full Wizard:

1. Set the *Current Slot* to either 0 for ATO or 8 for ATC.

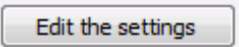



WARNING

This procedure moves the valve.

CAUTION

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

1. Place the system in *Setup (Out of Service)* mode.
2. Click an item in the *Procedure Name* list or click **Check All**.
3. Click an individual line in the *Procedure Name* list and the items related to that appear in the *Parameter Area*.
4. Click  and the tab related to the settings appears.
5. Enter values into fields as required.
6. Repeat steps 3, 4 and 5 as required.
7.  Click and the wizard commences.

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6. Configuration

Configuration Screen

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

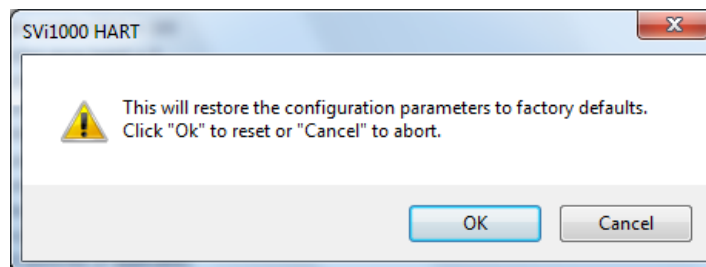


Configuration Screen

Reset data

To reset offline data:

1. Click **Reset Basic Config and Cal To Defaults** and a dialog appears.



Reset Config and Cal to Defaults Message

2. Click **OK**.

Buttons and Fields

Position Limits

The SVi1000 allows you to establish software limit stops. If enabled, during correct operation of the SVi1000, the control functions of the SVi1000 will not allow the valve position to be lower than the lower position limit or above the upper position limit.

This option does not provide mechanical stops for the valve. In an electrical or air failure the valve goes to the fail safe position without regard to the software limit stops.

Tight Shutoff Enabled/Tight Shut-off

Use this checkbox to enable/disable the use of *Tight Shutoff's* value. Activates a *Tight Shutoff* field. If the input signal would position the valve below the *Tight Shutoff* value, then air is supplied to fully seat the valve. Range: -0.99 and 19.99%. For ATO, the SVi1000 may not close the valve completely, The Tight shut-off function must be employed to ensure tight shut-off.

Position Lower Limits Enabled/Position Lower Limits

Use this checkbox to enable/disable the use of the value in the field. Activates a software limit stop. No valve position lower than this occurs when enabled. This is software only. During electrical/air failure, the valve moves to failsafe position. This stop is ignored during manual full open or close operations.

CAUTION

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

Position Upper Limits Enabled/Position Upper Limits

Use this checkbox to enable/disable the use of the value in the field. Activates a software limit stop. No valve position higher than this occurs when enabled. This is software only. During electrical/air failure, the valve moves to failsafe position. This stop is ignored during manual full open or close operations.

Position Error Limits

Position Error Enable

Activates/deactivates the actions dictated by the Position Error Band and Position Error Time field.

Position Error Band

Use this to configure how position errors are handled. A position error occurs when the valve position differs from the requested position (from the input signal in Normal mode or the manual setpoint in Manual mode) by more than the Position Error Band for more than the Time. When this occurs, a status flag is set which is reported during the next HART message. Ranges: Position Error Band: .5 to 200% and Time: 1 to 327 seconds.

Position Error Time

Enter a time after which if the Position Error Band is exceeded a flag is set.

Position Rate Limits

UP/ DOWN

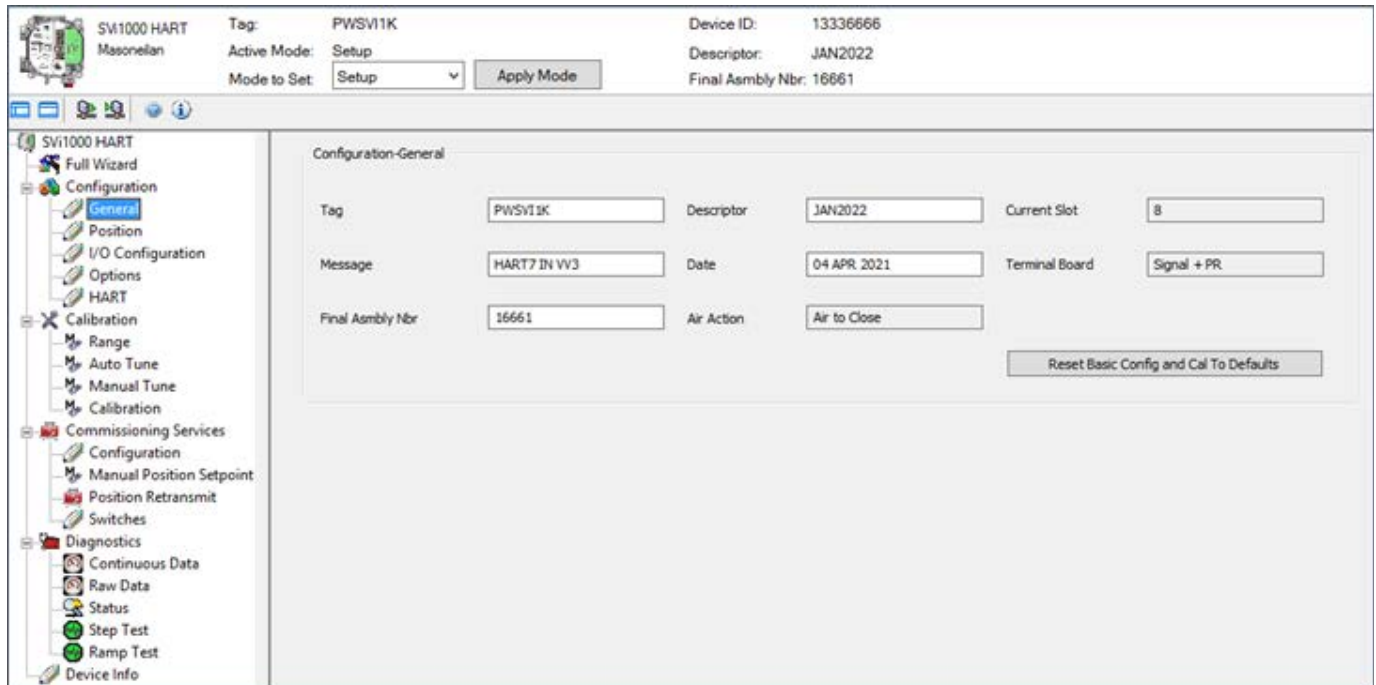
Activates/deactivates the limit dictated in Position Rate Limits for each direction.

Position Rate Limits

Enter a value that limits the %/s. Range: 0.8 to 100.10 %/s.

Configuration General Screen

Use this screen to configure *Tag Information, Descriptor, Date*, etc. You can read parameters from the positioner in Setup, Manual and Normal modes and write in Setup mode.



Configuration General Screen

Buttons and Fields

Tag Enter up to eight characters long and is used to identify the positioner in the system and appears throughout the program.

Long Tag Enter up to 32 characters long and is used to identify the positioner in the system and appears throughout the program. For HART 6 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.

Final Asmbly Nbr Entered at the factory. Usually not changed.

Air to Action Display only as this is factory configured.

Current Slot Displays the slot number displayed using the SVI1000 device slot selector.

Terminal Board Displays the type of terminal board.

Reset Config and Cal to Defaults button:

Click  to reset all online configuration parameters to factory set values.

Buttons and Fields

DO Output Switches

Note: The contacts are OPEN when the SVi1000 is unpowered and may be made to be open or closed when the flag is asserted after boot.

- Switch 1 Function/*
Switch 2 Function
- The SVi1000 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 SVi1000 detects. Use this pull-down to select the type of action:
- Always Normal Position:* The switch is not controlled by the SVi1000 and remains in its 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 SVi1000 is in Failsafe mode.
 - Reset:* The switch is activated whenever a reset has occurred and the switch remains activated until the SVi1000 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).
 - Alarm Low:* The switch is activated whenever the valve position is less than the position setting of this switch control.
 - Alarm High:* 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 SVi1000 is in Manual, or Setup mode.

<i>Switch 1 Value/ Switch 2 Value</i>	Use this to enter a value for each switch that determines at what percentage of the switch operates. These field activate when <i>Low Input Signal</i> or <i>High Input Signal</i> are in use.
<i>Switch 1 Normally Open/Closed</i>	Use this to set the switch 1 as normally open or closed. If DO1 Function/ DO2 Function is set to Always normal position, then the switch always remains in the selected state.
<i>Switch 2 Normally Open/Closed</i>	Use this to set the switch 2 as normally open or closed. If DO1 Function/ DO2 Function is set to Always normal position, then the switch always remains in the selected state.
<i>SP (Input Signal Range)</i>	Use this parameter to adjust the current range Input Signal the low and high signal values. The low value must between 3.8 and 14 mA and the high value must be between 8 and 20.2 mA. The role of these fields is opposite for a reverse acting valve.
<i>Low Input Signal</i>	Enter a value for the low end for the input signal.
<i>High Input Signal</i>	Enter a value for the high end for the input signal.
<i>AO (Valve Position Retransmit)</i>	Use this to set the lower and upper range for the position retransmit function. The SVi1000 has the ability to retransmit the position signal as an output to another device with 4 - 20 mA current output proportional to position.
<i>Lower Range Value</i>	Enter a value for the low end for the output signal.
<i>Upper Range Value</i>	Enter a value for the high end for the output signal.

Set Switch Parameters

Set DO Switch Parameters

To set switch parameters:

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

- | | | |
|--|--|---|
| <input type="checkbox"/> Always Normal Position | <input type="checkbox"/> Failsafe | <input type="checkbox"/> Reset |
| <input type="checkbox"/> Position Error | <input type="checkbox"/> Tight Shutoff Active | <input type="checkbox"/> Alarm Low |
| <input type="checkbox"/> Alarm High | <input type="checkbox"/> 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.*

2. Use the *Switch Normally* radio buttons to select an action: **Closed** or **Open**.
3. Use the *Switch 1 Value/Switch 2 Value* fields to enter a value at which the switch operates.
4. Edit the values in *SP (Input Signal Range)* for the *Low Input Signal* or *High Input Signal* fields, as required.
5. Click the **Store to Device** icon on the menu bar.

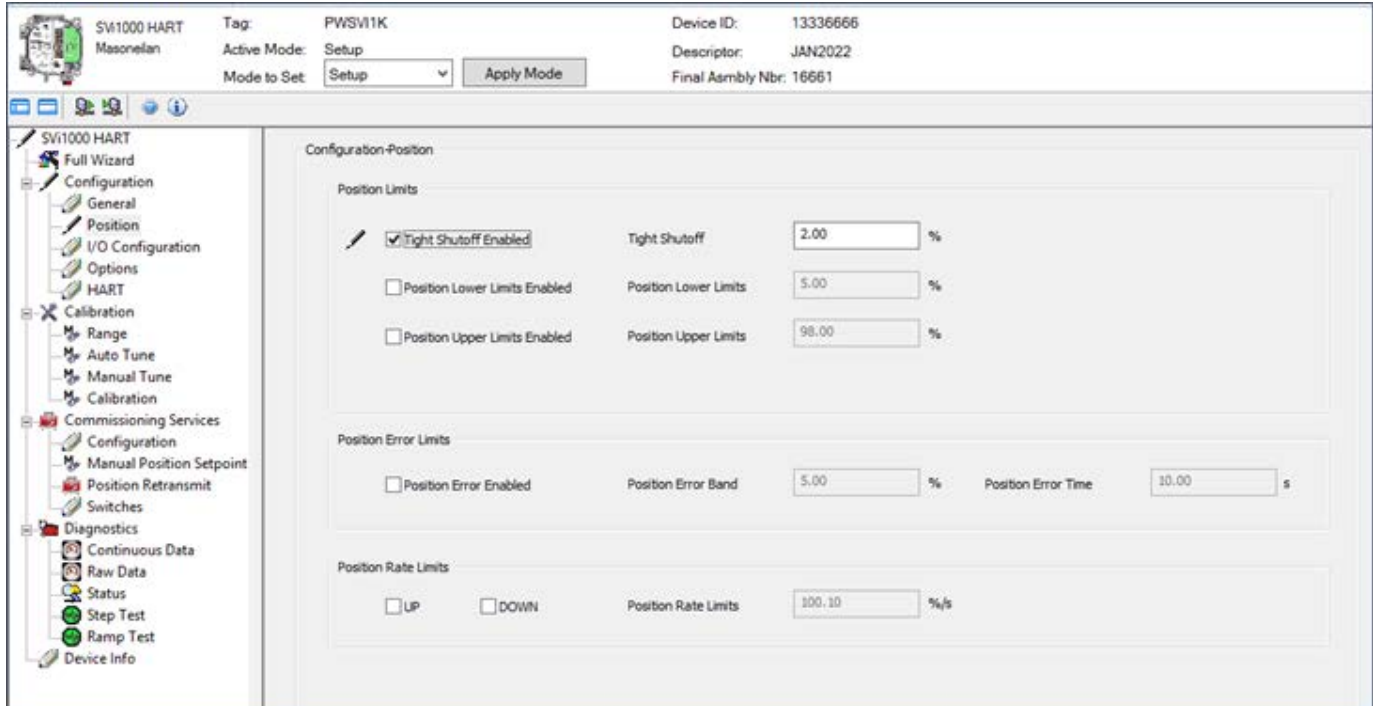
Set Position Retransmit Switch Parameters

To set switch parameters:

1. Edit the values in *AO (Valve Position Retransmit)* for the *Lower Range Value* or *Upper Range Value* fields, as required. These fields are inactive if the Position Retransmit board is not present.
2. Click the **Store to Device** icon on the menu bar.

Configuration Position Screen

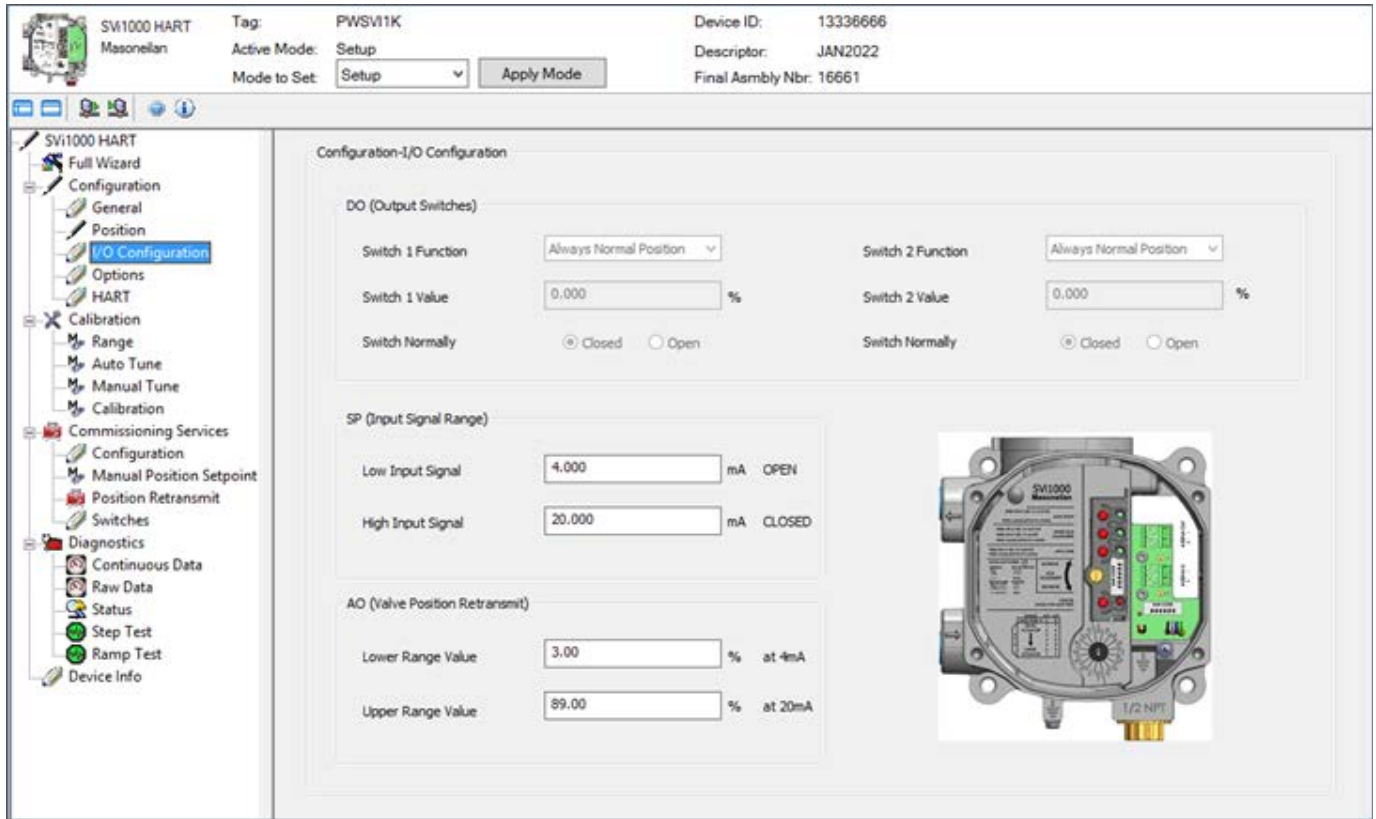
Use the *Configuration Position Screen* to set all position based limits.



Configuration Position Screen

Configuration I/O Configuration Screen

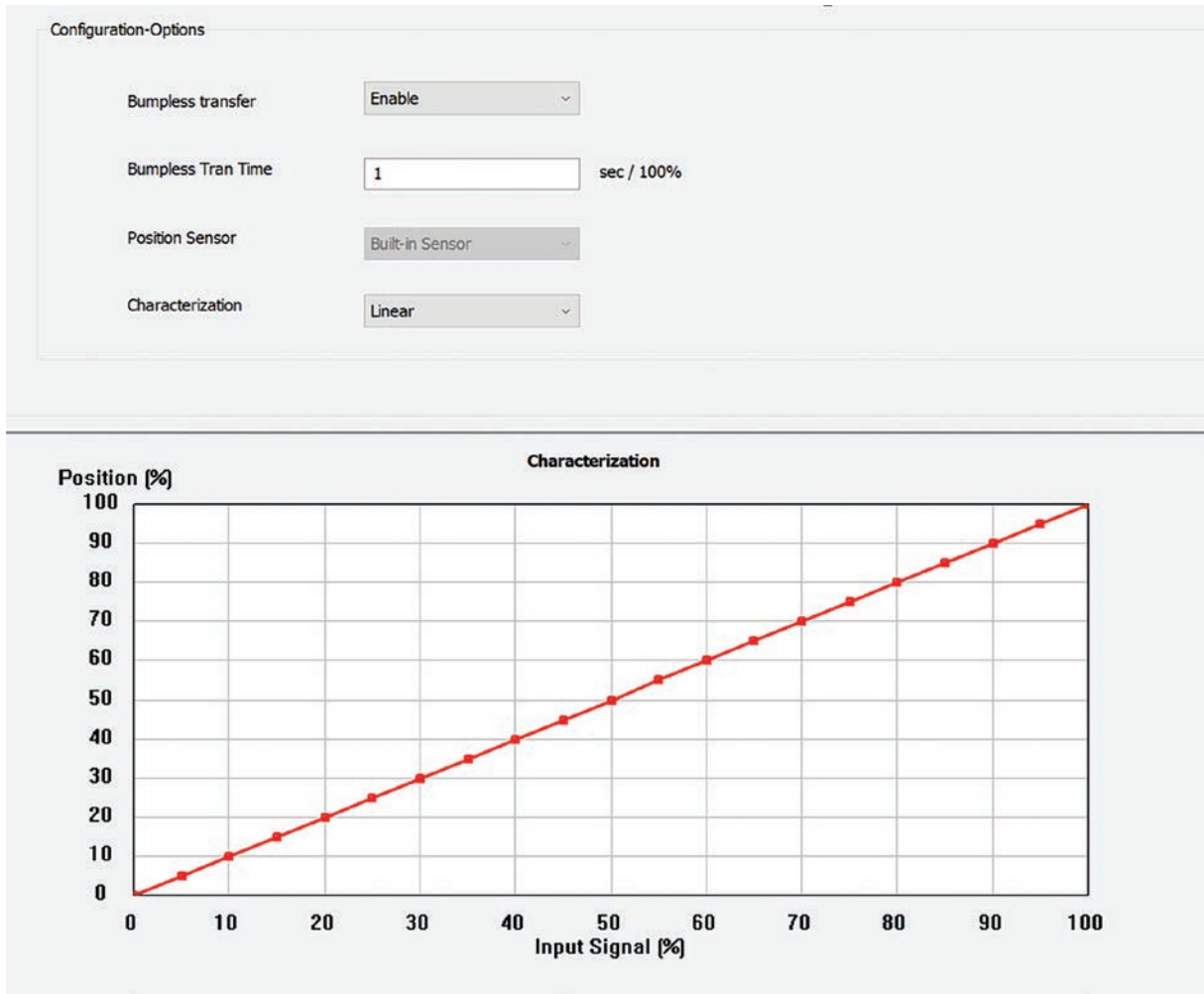
Use the *Configuration I/O Configuration Screen* to configure switch states, activate/ deactivate digital input, configure the input signal range. The type of board detected dictates whether this tab's fields are active.



Configuration I/O Configuration Screen

Configuration Options Screen

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



Configuration Options Screen

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 *Bumpless Tran Time*.

Bumpless Tran Time

A number between 1 and 255 and is approximately the number of seconds required to move the valve 100% toward the signal position.

Position Sensor

Displays the type of sensor installed. Factory dictated and for display only.

Characterization

Use the pulldown list to select the characterization type. Each graph shows *Position (%) vs Input Signal (%)*.

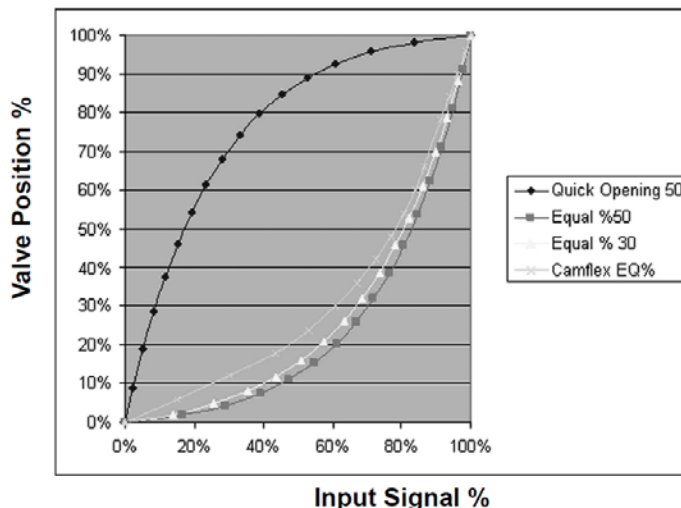
Position

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 SVi1000 positioner. Several characterizations are available:

Input Signal

- Linear*: Causes the valve to open proportionally with the input signal. Select this option if non linear trim is used in the valve.
- Equal % (30)*: An equal percentage characterization with R=30.
- Equal % (50)*: An equal percentage characterization with R=50.
- Quick Open*: The quick opening characterization is the inverse to the *Equal Percentage 50%* characterization curve.
- Custom*: Selecting this option activates the fields in the custom graph area below 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 Masoneilan™ Camflex™ valve with settings of *Linear* and *Equal 50%*.

Characterization Curves shows the characterization curves in a graphical format.



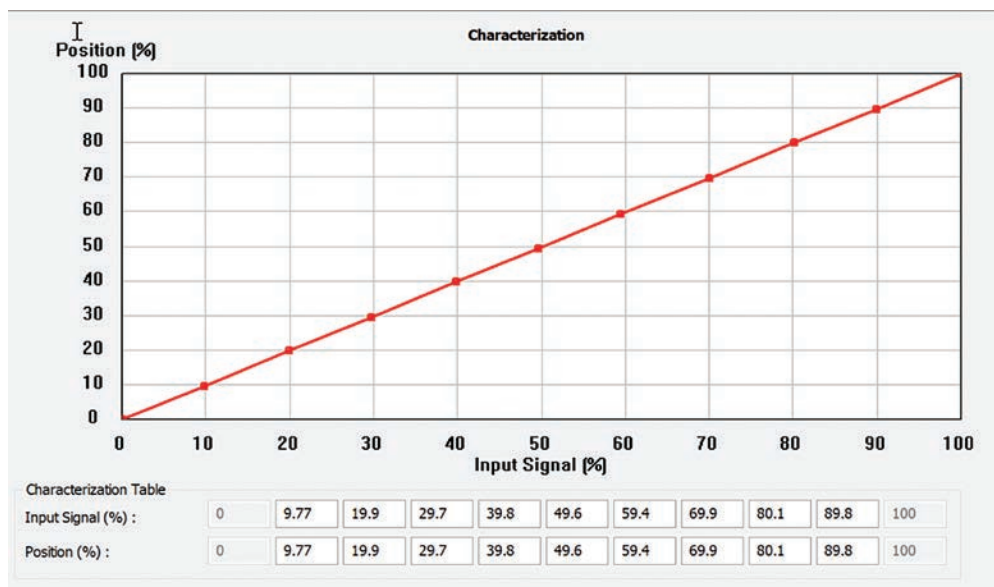
Input Signal % Characterization Curves

Custom Characterization

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

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

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



Custom Characterization Graph

Input Signal (%) / Position (%)

Activated by selecting Custom in Characterization.

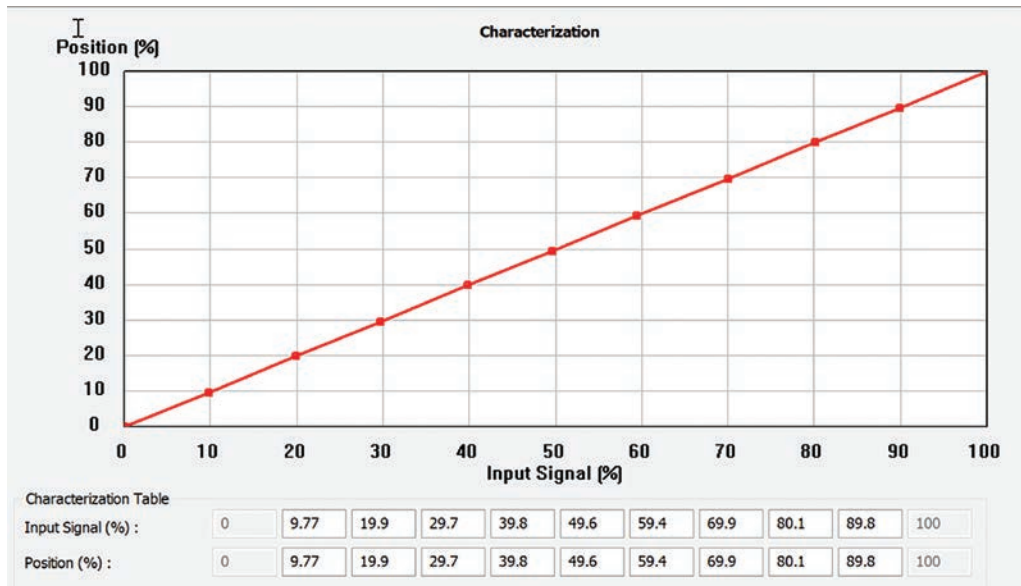
A custom characterization defines the relationship between the input signal and the output position of the valve. The characterization may contain up to nine XY pairs and the position is linearly interpolated between the pairs. The first position is always 0, 0 and the last position is always 100,100. Both first and last positions indicate 0 and 100 percent and are not counted as any of the nine points allowed. See “Create a Custom Characterization” on [page 55](#).

Create a Custom Characterization

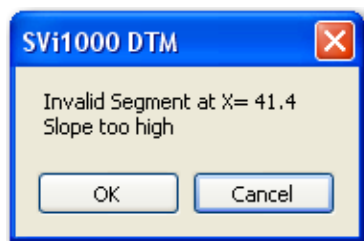
A custom characterization defines the relationship between the input signal and the output position of the valve. The characterization may contain up to 9 XY pairs and the position is linearly interpolated between the pairs. The first position must be 0, 0 and the last position must be 100,100. Both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

To create a custom characterization:

1. Use the *Characterization* pulldown to select **Custom** and the fields in *Custom Characterization Graph* activate.



2. Enter values in the *Input Signal (%)*/*Position (%)* fields from lowest to highest. If there is too drastic a slope change a dialog appears. Adjust values accordingly.



Invalid Segment Dialog

3. Click **Apply**.

Configuration HART® Screen

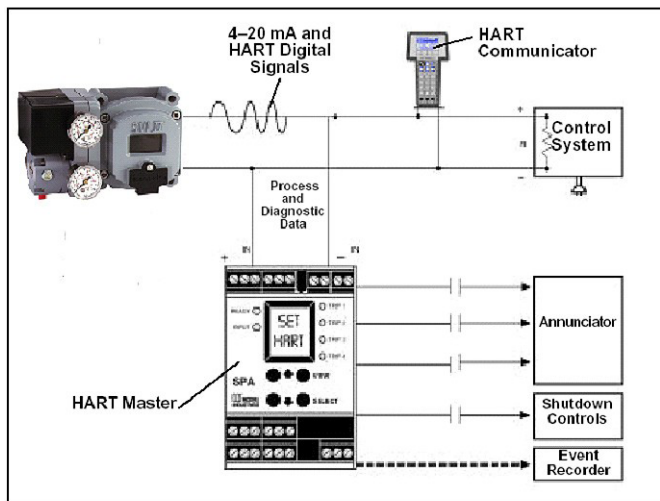
The Burst mode is when the HART device continuously sends out data for a device not capable of being polled by a Master. Use this mode only for devices that are passive (i.e. not a HART master), such as a HART to Analog converter (SPA from Moore Industries, Tri Loop by Rosemount). Turning on Burst mode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

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

Table 1 Burst Mode Data Return

Variable	Description
SVi1000 (firmware 1.1.1, 2.2.1 and 3.1.1 (3.1.1 for HART 7 only - Burst Mode not available))	
PV (Primary Variable):	Valve position
SV (Secondary Variable)	Not used
Supply Pressure	The pressure generated by the air supply.

Connecting the SPA with the SVi1000

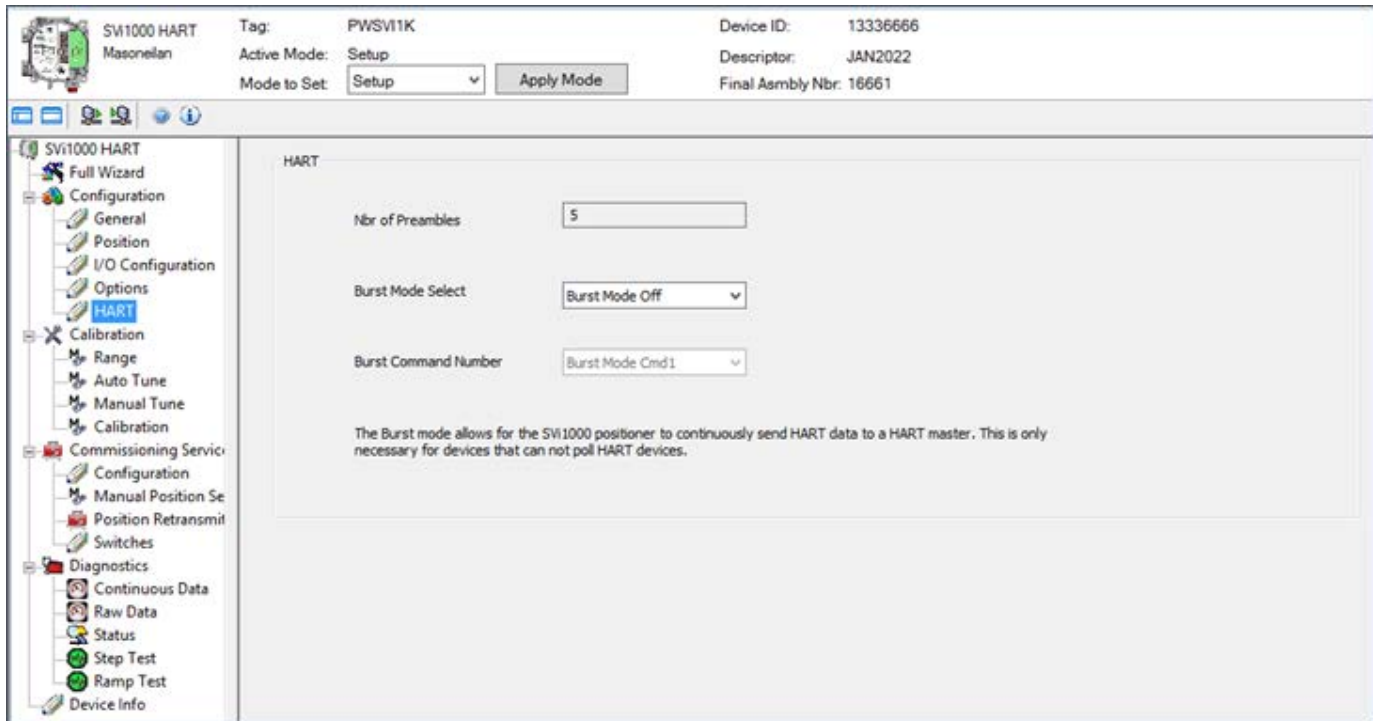


DTM must be set as a secondary master if the SPA is in polling mode to be able to connect.

- PV = Position
- TV = Supply Pressure

- 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.

Burst Mode Configuration



Configuration HART Screen

Buttons and Fields

Nbr 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. The string is a *preamble*. The number of preambles prefixed to each HART command sent to a device varies from device to device. The valid range is 2 to 20. Recommended values for this parameter are 3 to 5 when using the *Mux*.

Burst Mode Select

Use the pulldown list to activate/deactivate the mode. Disabled for HART 7.

Burst Command Number

Use the pulldown to select the data from transmission.

- Cmd 1*: Reads the PV only
- Cmd 2*: Read the current.
- Cmd 3*: Reads all variables, including: PV and SV.

Configure Burst Mode

To configure burst mode:

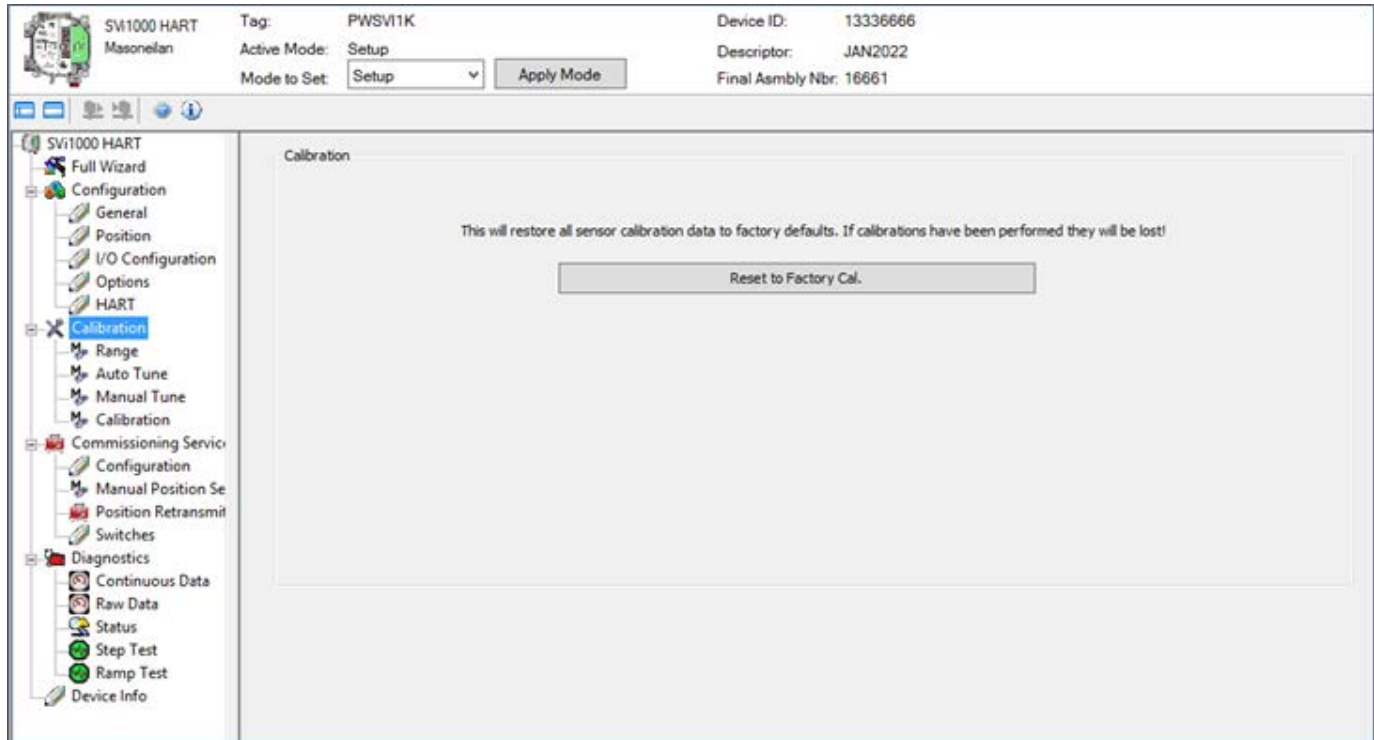
1. Use the *Burst Mode Select* pulldown to select an action: **Enter** (enables the mode) or **Exit**.
2. Use the Burst Command Number pulldown to select the data sent:
 - Cmd 1**: Reads the PV only
 - Cmd 2**: Read the current.
 - Cmd 3**: Reads all variables, including: PV and SV.

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7. Calibration

Calibration Screen

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



Calibration Screen

Buttons and Fields

 Resets sensor data to factory defaults.

Calibration Range Screen

Use this tab to automatically search for the mechanical valve travel limits.

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 and Ramp Test) should **NOT** be invoked if the ValVue sequencer is running.*

Determining Values to Disable Tight Shutoff Below, and Limits

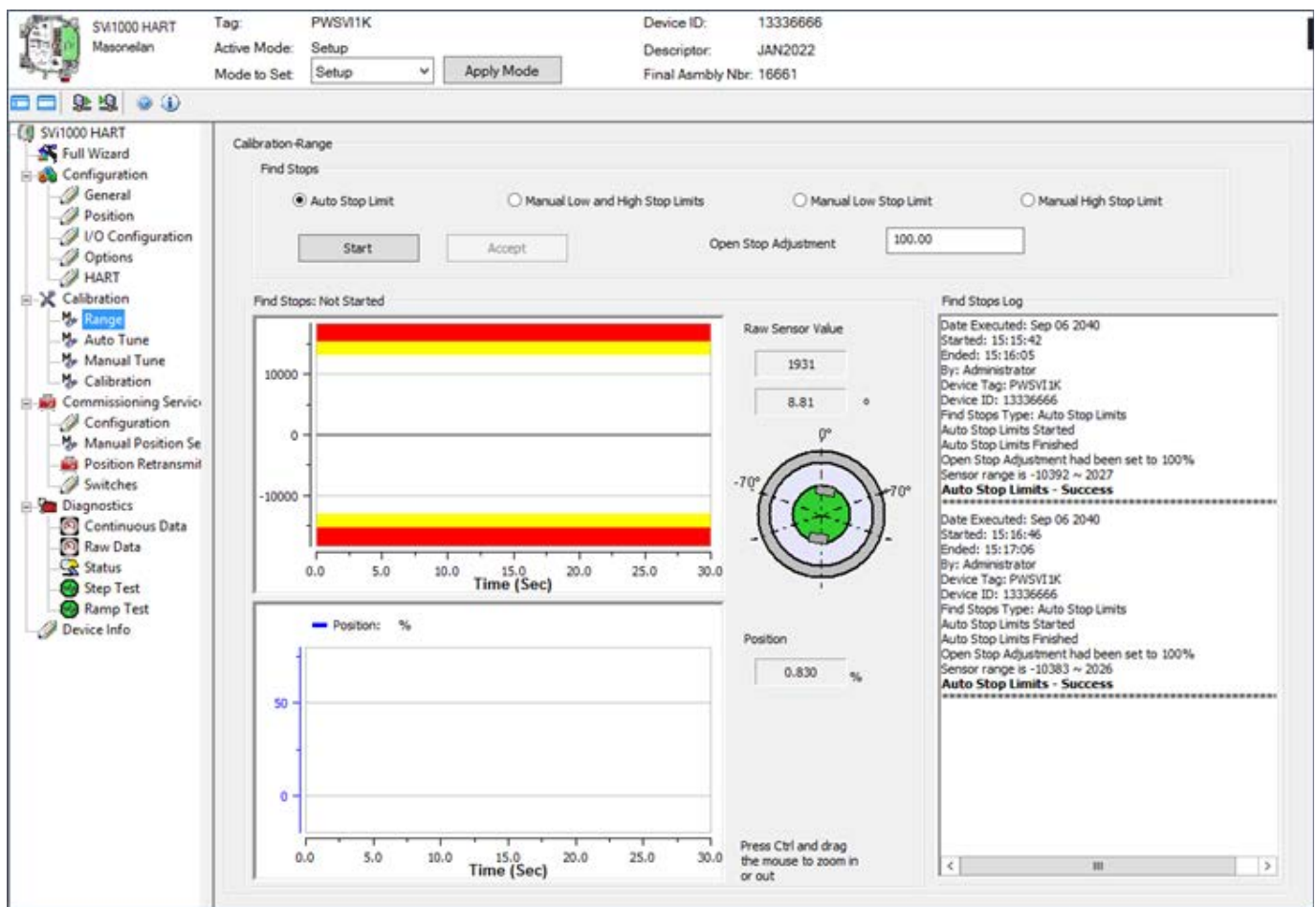
If *Travel Limits* have been readjusted after performing *Find Stops*, then the values that disable the *Tight Shutoff Below*, *Position Lower Limit*, and *Position Upper Limit* functions must be determined by testing the limits. To disable these functions, set them 10% above the full open mechanical stop position or 10% below fully closed mechanical stop position.

Note: *When calculating the relationship between Open Stop Adjustment and Tight Open use the following equation:*

$$\text{Tight Open}_{\text{New}} = \text{Open Stop Adjustment}_{\text{Previous}} / \text{Open Stop Adjustment}_{\text{New}} \times \text{Tight Open}_{\text{Previous}}$$

Limit Testing

1. Isolate the valve from the process.
2. Place the SVi1000 in manual operating state. The valve must be calibrated and supplied with correct supply pressure.
3. Measure closed position - Enter a *Set Point* of *-10%*. After the valve reaches it's final value, record the actual position of the closed mechanical stop. The actual position must be less negative than the target position to verify the valve has reached the stop. If the actual position and target position are equal reduce the *Set Point* until the valve reaches the stop.
4. Disable *Tight Shutoff Below*, and *Position Lower Limit* by deducting 10% from the recorded value.
5. Measure open position - Enter a *Set Point* of *110%*. After the valve reaches it's final value, record the actual position of the open mechanical stop. The actual position must be less than the target position to verify the valve has reached the stop. If the actual position and target position are equal increase the *Set Point* until the valve reaches the stop.



Calibration Range Screen

Buttons and Fields

Auto Stop Limits

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 SVI1000 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 64](#).

Manual High and Low Stop Limit

Use this radio button to perform a procedure that sets the *Low Stop Limit*. See “Find Stops Procedures” on [page 64](#).

Manual Low Stop Limit

Use this radio button to perform a procedure that sets the *High Stop Limit*. See “Find Stops Procedures” on [page 64](#).

Manual High Stop Limit

Use this radio button to run the manual stops.

Manual Stop Limits

On some actuators, use this field and 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.

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

Open Stop Adjustment

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

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

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

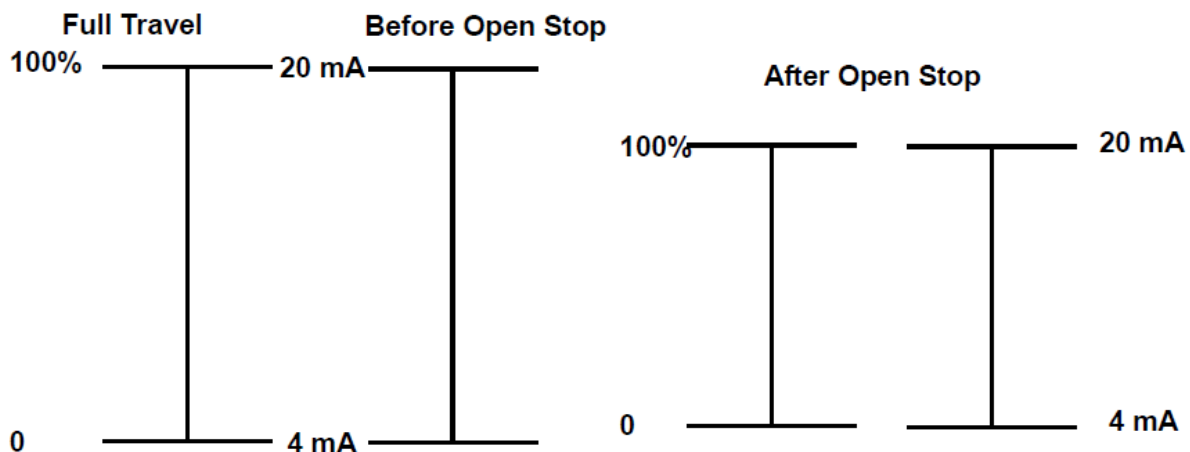


Figure 1 - Open Stop Adjustment Diagram

Note: When calculating the relationship between Open Stop Adjustment and Tight Open use the following equation:

$$\text{Tight Open}_{\text{New}} = \text{Open Stop Adjustment}_{\text{Previous}} / \text{Open Stop Adjustment}_{\text{New}} \times \text{Tight Open}_{\text{Previous}}$$

Click to start the procedure selected above.

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

Counts vs. Time Graph Displays the procedure results graphically.

See “Counts vs. Time Graph” on [page 63](#) 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 HHI 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.

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

- 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 runtime and results.

Counts vs. Time Graph

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



Counts versus Time Graph

Note 1: The red line in Counts versus Time Graph indicates that the valve sensor is rotated to an angle where the reading of the position is impossible. The Find Stops is failing.

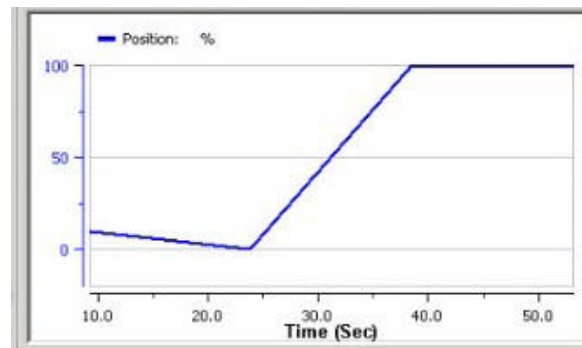
Note 2: The yellow line in Counts versus Time Graph indicates that the sensor is too close to the maximum position and this is a warning condition. The Find Stops will work, but the position sensor resolution may not be high.

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

- -54 to +54 green appears
- -70 to -54 or 54 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.



Pressure versus Time Graph

Find Stops Procedures

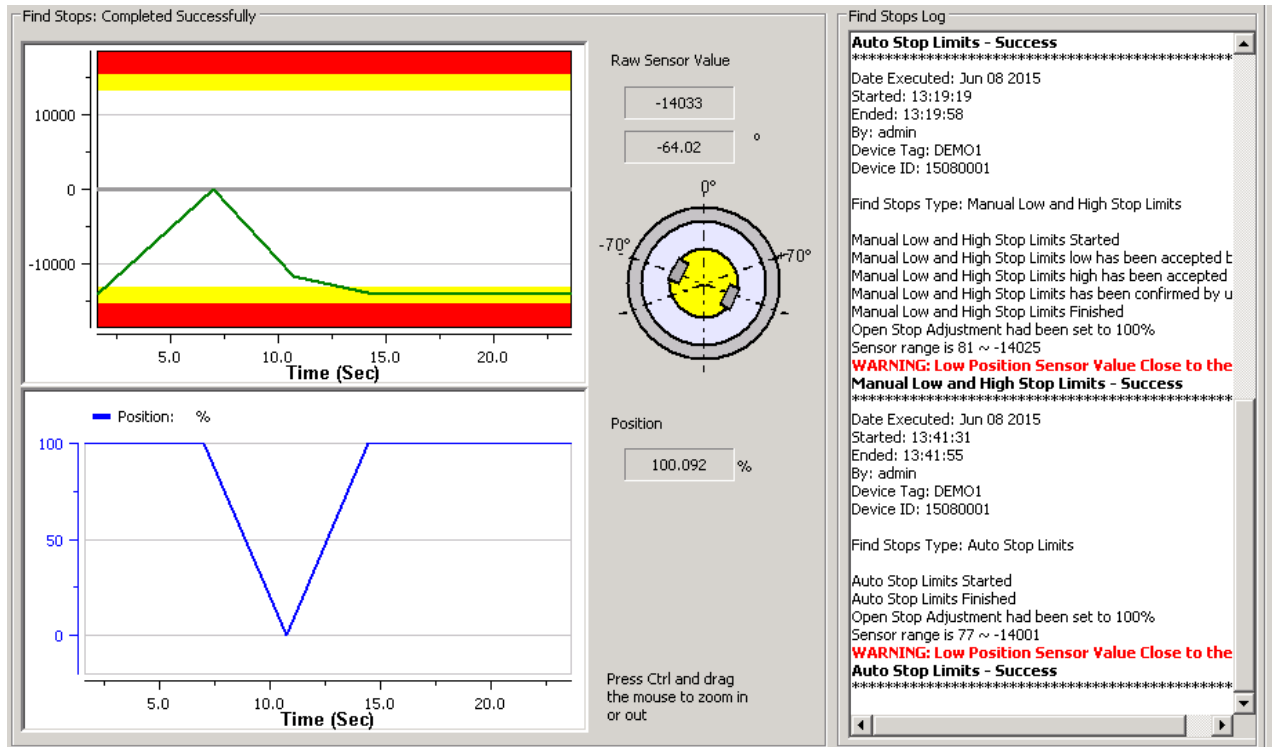
CAUTION

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

Auto Stop Limits

⚠ WARNING *Tuning strokes the valve over its entire travel (100% travel = 1 stroke). Isolate the valve from the process prior to calibration.*

1. Ensure the system is in OOS mode.
2. Click **Auto Stop Limits**.
3. Click , the two graphs begin showing results, the *Find Stops Log* lists detected values, test results appears (*Auto Stop Limits Results: Succeeded*).



Auto Stop Limits Results: Succeeded

Manual High and Low Stop Limit



Tuning strokes the valve over its entire travel (100% travel = 1 stroke). Isolate the valve from the process prior to calibration.

1. Ensure the system is in OOS mode.
2. Click **Manual High and Low Stop Limit**.
3. Click , the two graphs begin showing results. The test seeks the *Low Stop* position and the button appears.



Ensure that the Raw Sensor Value stabilizes before proceeding.

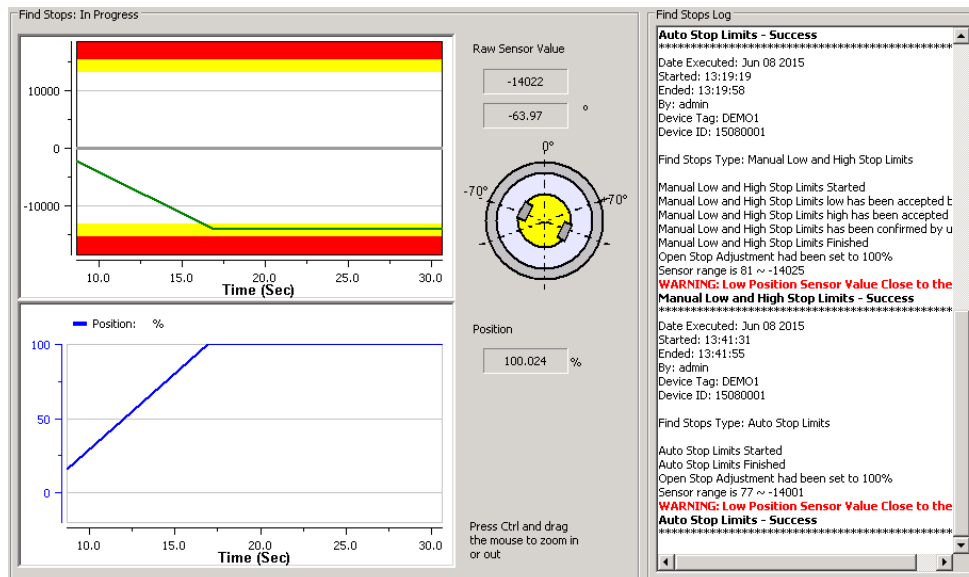
4. Click , the test seeks the *High Stop* position and the button appears.



Ensure that the Raw Sensor Value stabilizes before proceeding.

The button appears.

5. Click , the *Find Stops Log* lists detected values, test results appears (*Manual Low and High Stop Limits Results: Succeeded*) and if the test fails a list of reasons.



Manual Low and High Stop Limits Results: Succeeded

Manual Low Stop Limit



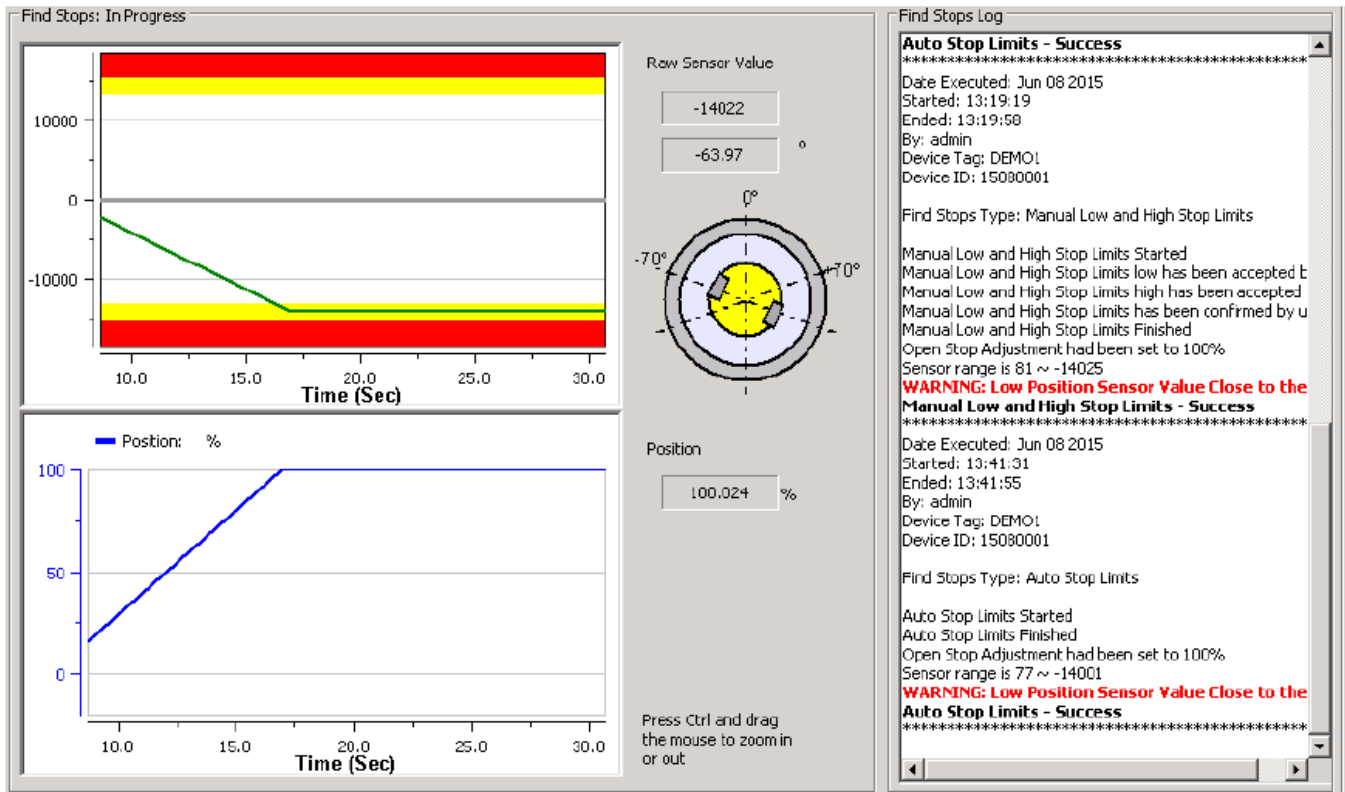
Tuning strokes the valve over its entire travel (100% travel = 1 stroke). Isolate the valve from the process prior to calibration.

1. Ensure the system is in OOS mode.
2. Click **Manual Low Stop Limit**.
3. Click , the two graphs begin showing results. The test seeks the *Low Stop* position and the button appears.



Ensure that the Raw Sensor Value stabilizes before proceeding.

4. Click and the button appears.
5. Click , the *Find Stops Log* lists detected values, test results appears (*Manual Low Stop Limit Results: Succeeded*) and if the test fails a list of reasons.



Manual Low Stop Limit Results: Succeeded

Manual High Stop Limit



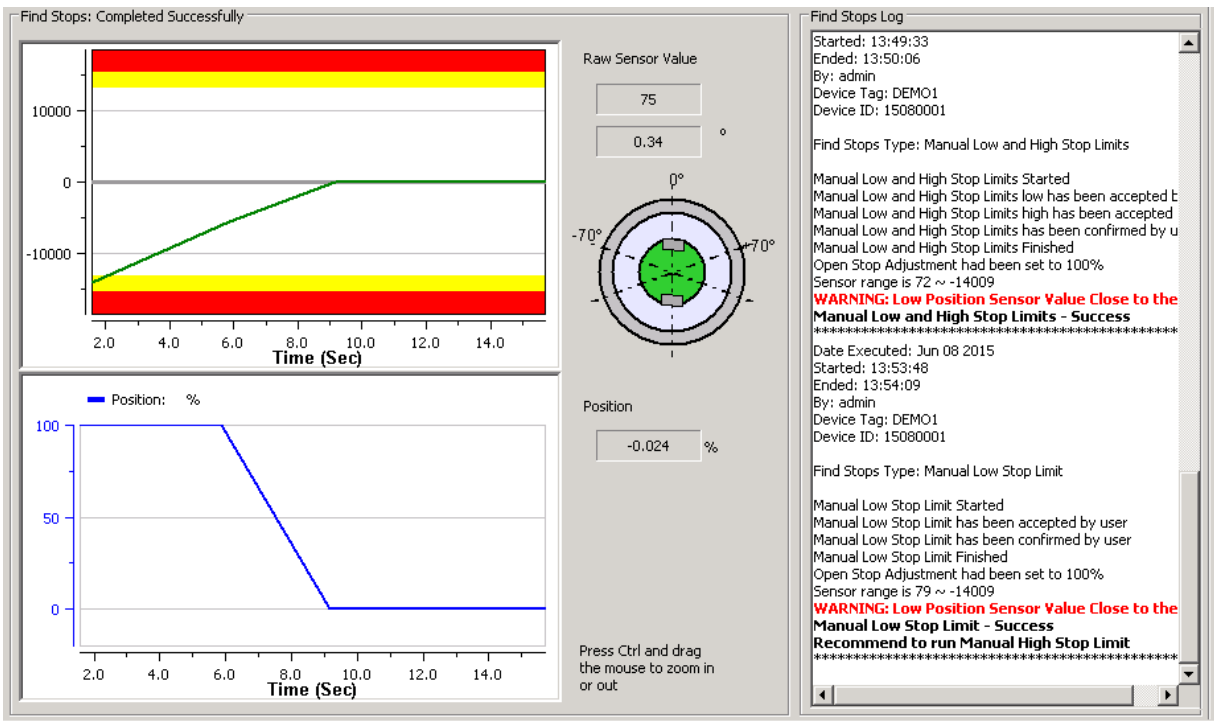
Tuning strokes the valve over its entire travel (100% travel = 1 stroke). Isolate the valve from the process prior to calibration.

1. Ensure the system is in OOS mode.
2. Click **Manual High Stop Limit**.
3. Click , the two graphs begin showing results. The test seeks the *High Stop* position and the button appears.



Ensure that the Raw Sensor Value stabilizes before proceeding.

4. Click and the button appears.
5. Click , the Find Stops Log lists detected values, test results appears (Manual High Stop Limit Results: Succeeded) and if the test fails a list of reasons.



Manual High Stop Limit Results: Succeeded

Calibration Autotune Screen

Use the *Calibration Auto Tune* screen for commissioning a valve positioner. It includes the ability to configure PID parameters and aggressiveness while tuning. It is most useful for first time setup of the positioner.

There are three different methods for tuning the SVi1000:

- Presets; The fastest is to use a preset (from SVi1000 itself) tuning for the actuator in use. Using presets saves time as you do not run Auto Tune.
- Auto Tune: If required, run Auto Tune. Auto Tune is successful for most valves. However, very large actuators or high hysteresis may require manual tuning.

The *Current Slot* must be either 0 for ATO or 8 for ATC to perform an Auto Tune. See the “Calibration Manual Tune Screen” on [page 72](#) to change this setting, which can only be done on the SVi1000 hardware.

- PID Settings: The third method is to manually tune PID settings for fine tuning, if required.

CAUTION

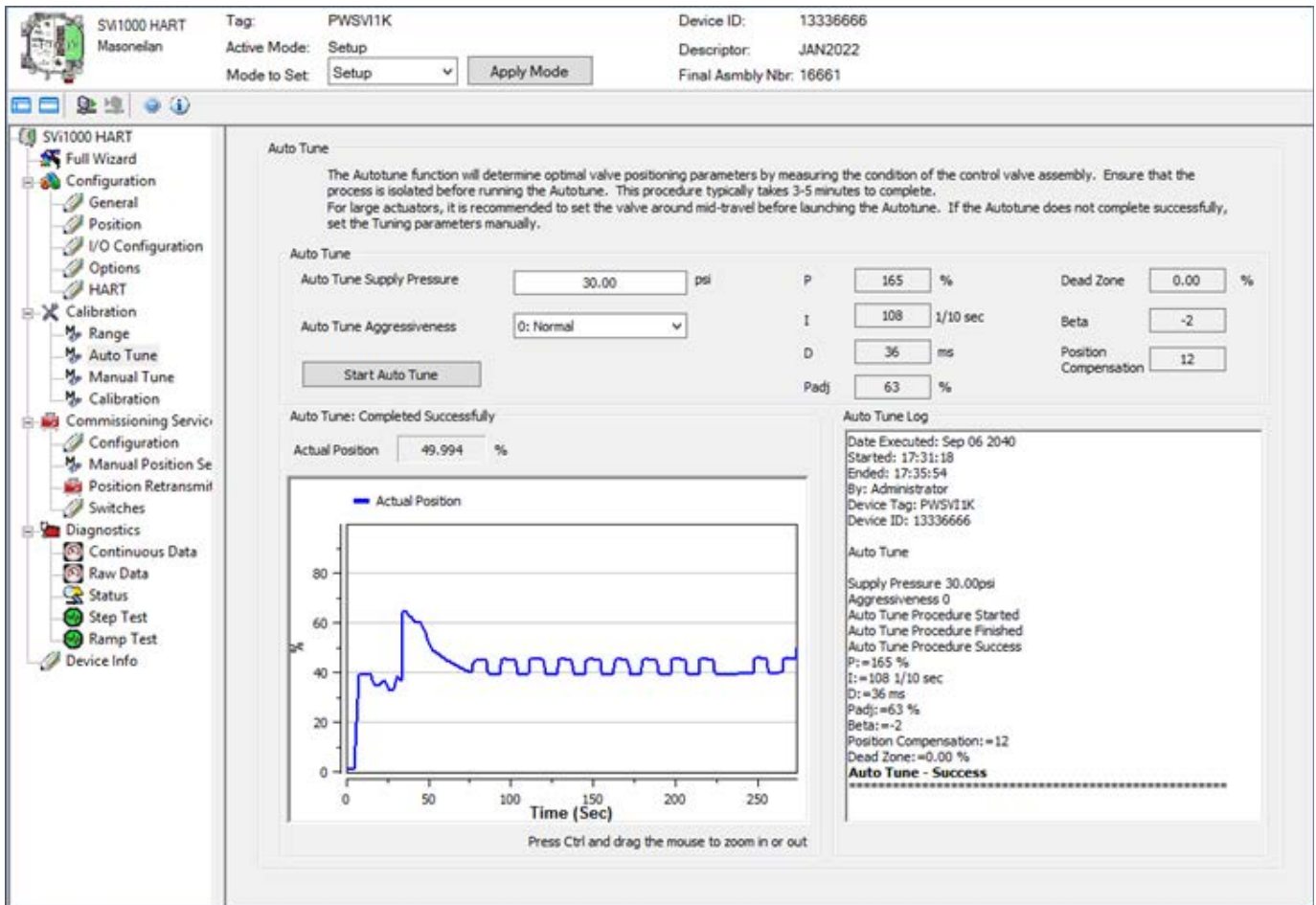
*Procedures (e.g. Find Stops, Auto Tune, Step Test and Ramp Test) should **NOT** be invoked if the ValVue sequencer is running.*

CAUTION

Do not Auto Tune if manual tuning has been used. Auto Tune creates new parameters that override the manual tuning parameters.

! WARNING

*Before beginning the Auto or Manual range calibration, confirm that the valve is isolated from the process. This procedure exhausts and then fills the valve actuator to supply pressure and therefore strokes the valve over its full range (100% travel = 1 stroke). Supply pressure **MUST NOT** exceed the actuator pressure rating marked on the actuator. Positioner supply pressure **MUST BE** at least 5 psi higher than the upper spring range of the valve.*



Calibration Autotune Screen

Buttons and Fields

Auto Tune Aggressiveness Enter a value that tends the valve to either a slow response (-9) to or overshoot (9). It is advised to increment the value one digit at a time to see the operational results. The default is 0. See “Notes on Aggressiveness” on [page 71](#).

Auto Tune Supply Pressure Enter a value for the expected supply pressure.

PID Configuration Parameters Displays the values for these parameters. The PID parameters update after Auto Tune. See “Calibration Manual Tune Screen” on [page 72](#) for further discussion of the parameters.

Auto Tune Click to start the tuning procedure. Updates appear in the *Auto Tune Log*.

Progress messages appear in this area.

Actual Position Dynamically displays the position as a percent of the configured range.

Position vs. Time Graph Displays the time-based results during the *Auto Tune* procedure:

- 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.

Auto Tune Log Displays test information for completed tests.

Notes on Aggressiveness

Setting Aggressiveness

While the SVi1000 DTM and the DD allow you to set Aggressiveness, the pushbuttons do not. In all three methods, however, the Aggressiveness value is inherited from any previously performed tuning (Autotune or manual). Once Aggressiveness, and other tuning values are determined, they are stored in NVRAM.

The SVi1000 provides a user define Aggressiveness Level for auto-tuning, the allowable range varies from -9 to +9 where 0 (Zero) is consider normal tuning. The Aggressiveness Level influences stroking speed and over-shoot. A negative value will SLOW stroking speed and help minimized over-shoot. A positive value will INCREASE stroking speed and may add some over-shoot. The recommended values for Aggressiveness is 0 for control valves with- out volume boosters.

In applications with volume boosters and/or quick exhaust valves are used the Aggressiveness Level is not as influential. For Auto-tuning it is usually between 0 and 3. Reduce the volume boosters sensitivity by opening the integral bypass needle valve about 1 to 2 turns. Use caution when adjusting the needle valve so as to not to damage the seat, close gently to seat and then open 1 or 2 turns.

Aggressiveness Dynamic

Lower values of aggressiveness lead to lower PID values and slower response and less overshoot. Higher values lead to higher PID values and quicker response and more overshoot. Once you have a preferred aggressiveness and you tune once, all future autotunes automatically use that same value, until user-changed.

Run Autotune



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

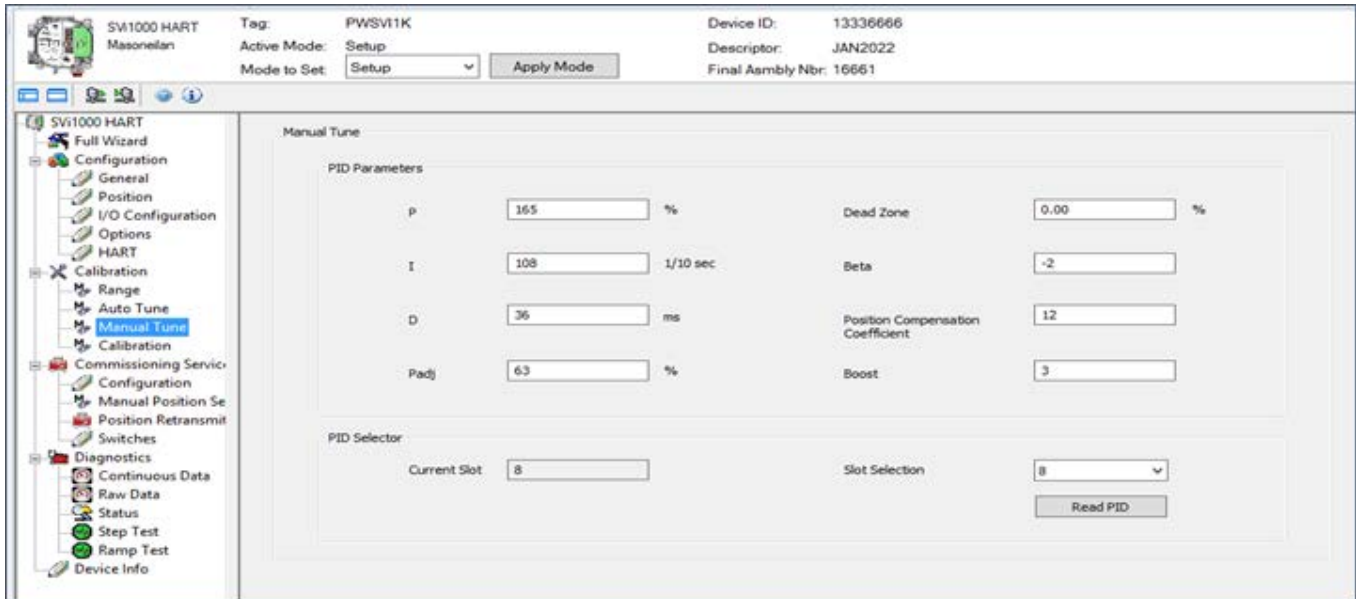
Note: The Current Slot value does NOT update automatically when the connected device slot is changed manually. You must disconnect and reconnect the DTM to get the correct current slot value.

To run autotune:

1. Set the *Current Slot* to either 0 for ATO or 8 for ATC on the SVI1000 unit.
2. Enter a *Auto Tune Supply Pressure* and *Auto Tune Aggressiveness*,
 click .

Calibration Manual Tune Screen


Use the *Calibration Manual Tune Screen* to enter manual tuning parameters.



Calibration Manual Tune Screen

Buttons and Fields

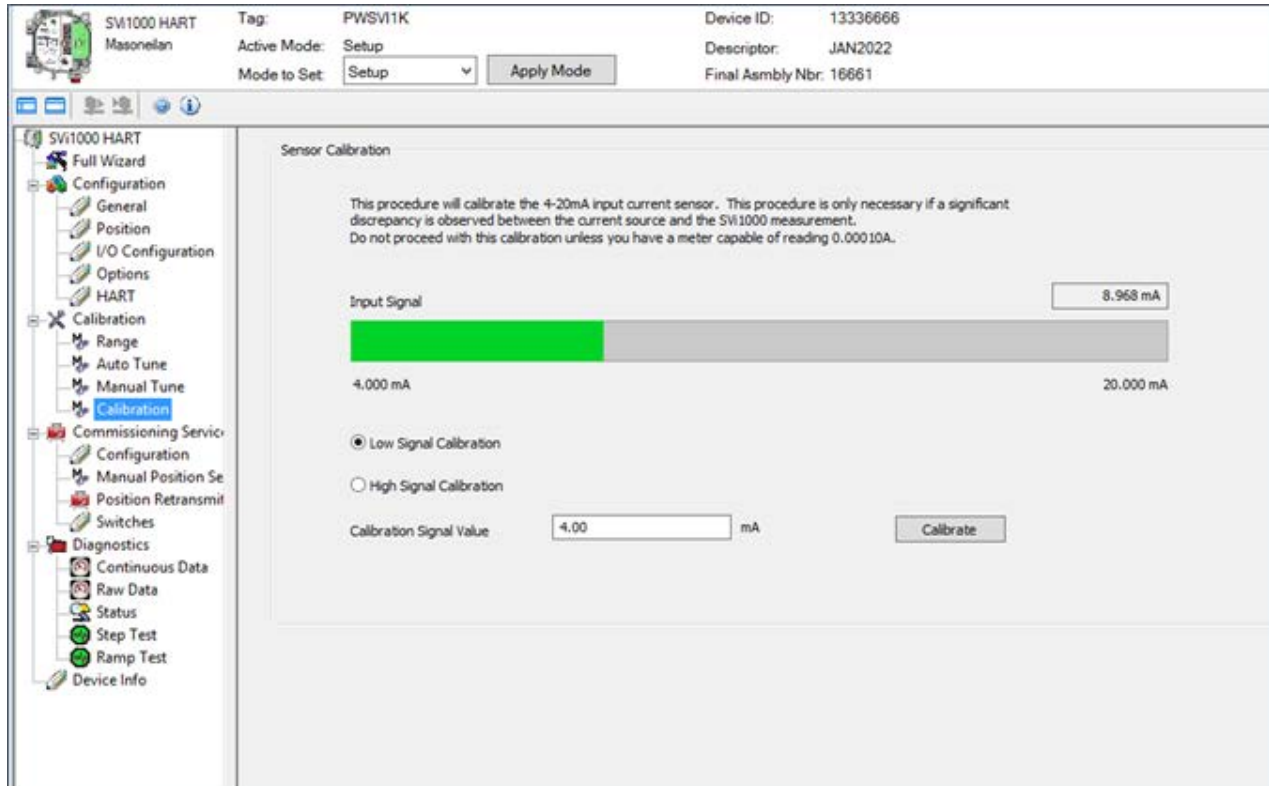
PID Parameters

<i>P</i>	Proportional gain in %. Common values for the positioner are 50 for small valves up to 4000 for large valves.
<i>I</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.
<i>D</i>	Derivative time or rate time (msec) is the time constant of derivative control. Common values are 10 to 100.
<i>Padj</i>	Valves often have significantly different response when filling verses exhausting. The proportional gain is adjusted by adding <i>Padj</i> (%) to <i>P</i> when the valve is exhausting.
<i>Dead Zone</i>	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%.
<i>Beta</i>	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.
<i>Position Compensation Coefficient</i>	The response of the valve is different when the valve is nearly closed than when the valve is nearly open. This is a number between 2 and 20 used to make adjustments to equalize the valve response. The normal value is 6. For springless actuators it is 15.
<i>Boost</i>	This field controls a supplemental pressure or boost to speed up initial valve response from setpoint from 0 to 100%
<i>PID Selector</i>	Use this area to select a slot, 0 for ATO or 8 for ATC, and read PID values, which can then be configured in the <i>PID Parameters</i> area. You can only edit the PID parameters when current slot is 0 (for ATO) or 8 (for ATC) on local user interface.
<i>Current Slot</i>	Displays the current slot.
<i>Slot Selection</i>	Use the pulldown to select the desired slot and click Read PID to display values.
<i>Read PID</i>	 Reads the PID values for the <i>Slot Selection</i> and displays them in the <i>PID Parameters</i> area.

Calibration Calibration Screen

Use the *Sensor Calibration Screen* to recalibrate the SVi1000 signal sensor. The sensor is calibrated at the factory and does not usually require recalibration, but if needed, this dialog provides a convenient method.

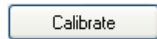
The currently measured signal value appears.



Sensor Calibration Screen

Buttons and Fields


<i>Input Signal</i>	Displays the current system input signal in a bar graph and text field.
<i>Low Signal Calibration</i>	Click this radio button to activate the <i>Calibration Signal Value</i> field for a low signal.
<i>High Signal Calibration</i>	Click this radio button to activate the <i>Calibration Signal Value</i> field for a high signal.
<i>Calibration Signal Value</i>	Enter the signal value for a high or low signal calibration. A red ! appears next to the field if an out of range value is entered.



Click this to perform the signal calibration.

Calibrate Input Signal

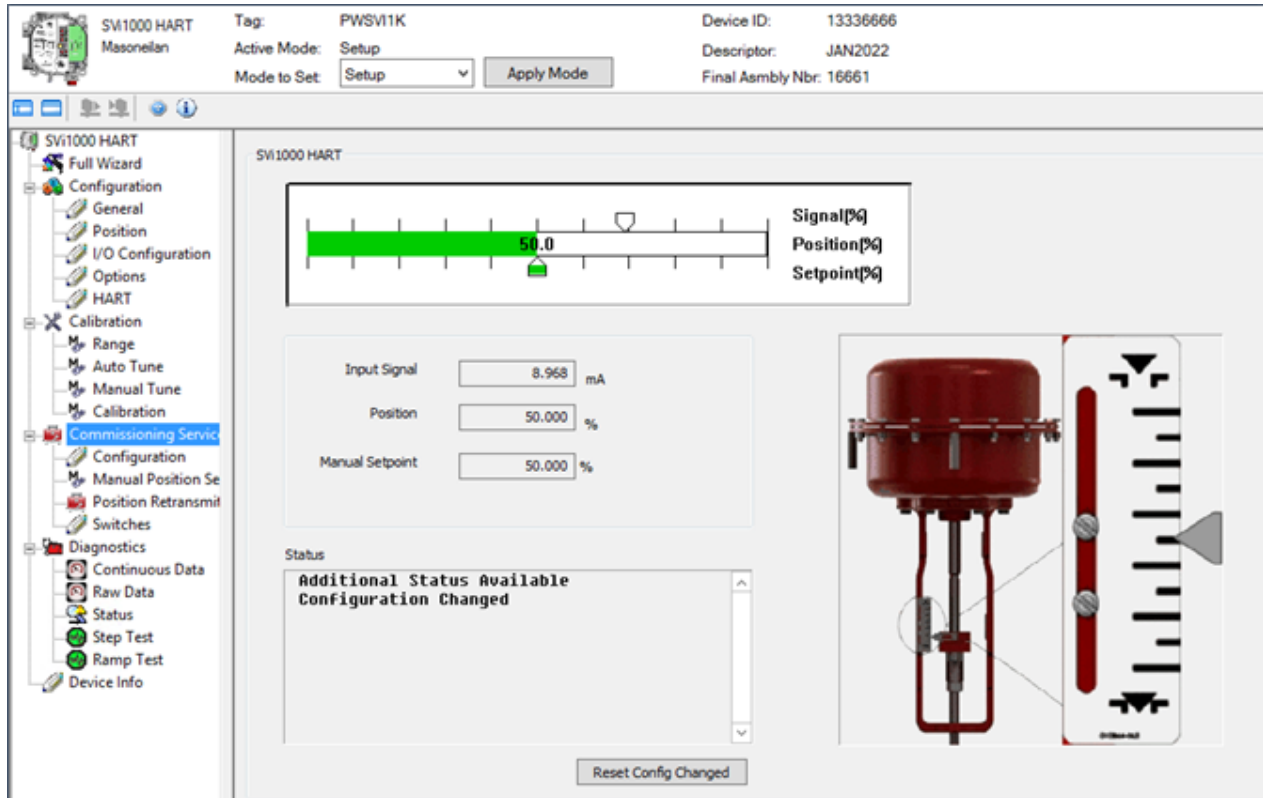
To do this:

1. Ensure that the positioner is in Setup mode.
2. Click either the *High Signal Calibration* or *Low Signal Calibration* radio button.
3. Enter a value in the *Calibration Signal Value* field.
4.  Click and if a valid value is used *Calibration Signal is completed* appears.

8. Commissioning

Commissioning Services Screen

Use the *Commissioning Services Screen* to monitor signal, position and setpoint on one screen.



Commissioning Services Screen

Buttons and Fields

Signal/Position and Setpoint bar graph

The signal strength appears on the bar graph. You can use the thumb tab to drag the signal position.

The position from 1 to 100% percent appears on the bar graph.

The *Manual Setpoint* value from 1 to 100% percent appears on the bar graph. You can use the thumb tab to drag the setpoint position

Input Signal

Displays the input signal strength in mA as a bar graph and in a text box. The signal strength value appears in the text box.

Position

Displays the valve position as a bar graph and in a text box. The position from 1 to 100% percent appears in the text box.

Manual Setpoint

Displays the *Manual Setpoint* set on the *Manual Position Setpoint* screen (“Commissioning Services Manual Position Setpoint Screen” on [page 79](#)). The value from 1 to 100% percent appears on the bar graph and the user-configured limit appears in the text box.

Status Message Field

Displays health indicators. When there is a fault code from the SVi1000, *Additional Status Available* appears. The fault codes also appear on the *Diagnostics Status* screen.

The status block also contains other status codes returned by HART. These include *Configuration Changed*, *Device malfunction*, and *Variable out of limits*.

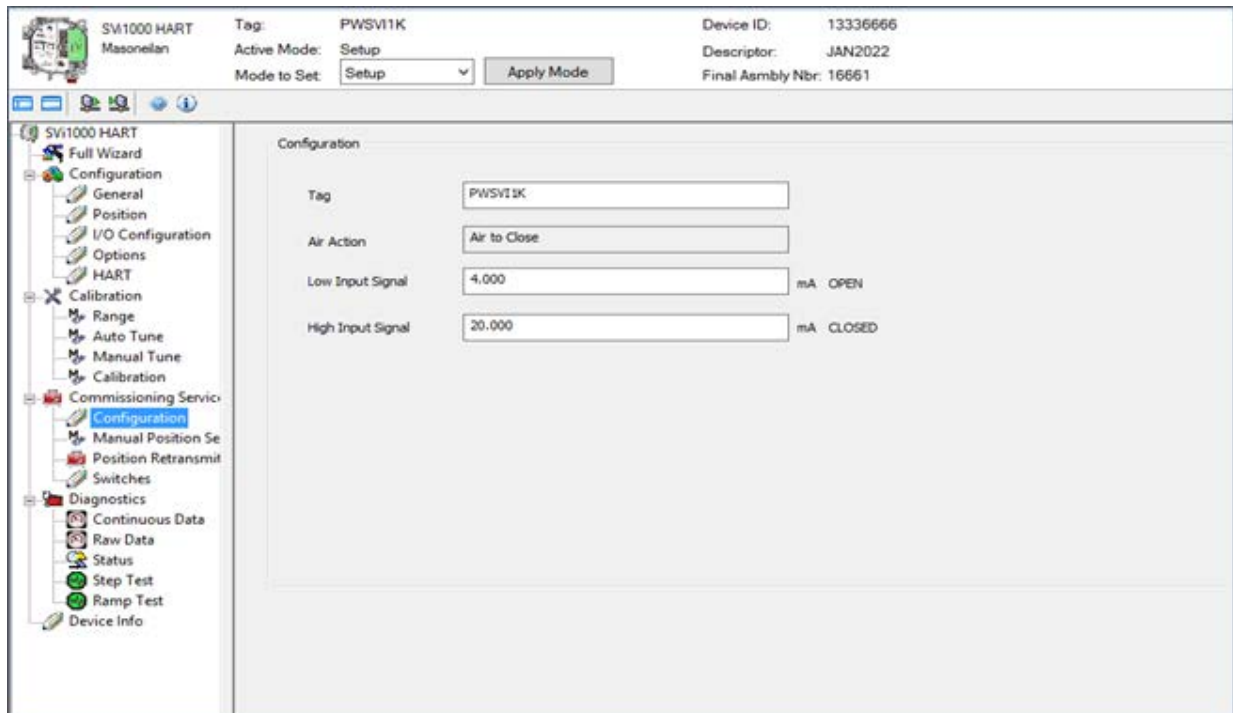


Click to reset the HART configuration changed flag. This clears the references on the *Status* area.

Reset Config Changed Button

Commissioning Services Configuration Screen

Use the *Commissioning Services Configuration Screen* to change Tag and to configure the input signal high/low.



Commissioning Services Configuration Screen

Buttons and Fields

- Tag** Enter up to eight characters long and is used to identify the positioner in the system and appears throughout the program.
- Air Action** A display only field.
- Low Signal** Enter the lower range value of input signal for valve closed (direct acting) or valve open (reverse acting). Range: 3.8 mA and 14 mA.
- High Signal** Enter the high range value of input signal for valve closed (direct acting) or valve open (reverse acting). Range: 8 mA and 20.2 mA. *High Signal* minus *Low Signal* > 5 mA. Use the *Store to Device* icon on the menu bar to save.

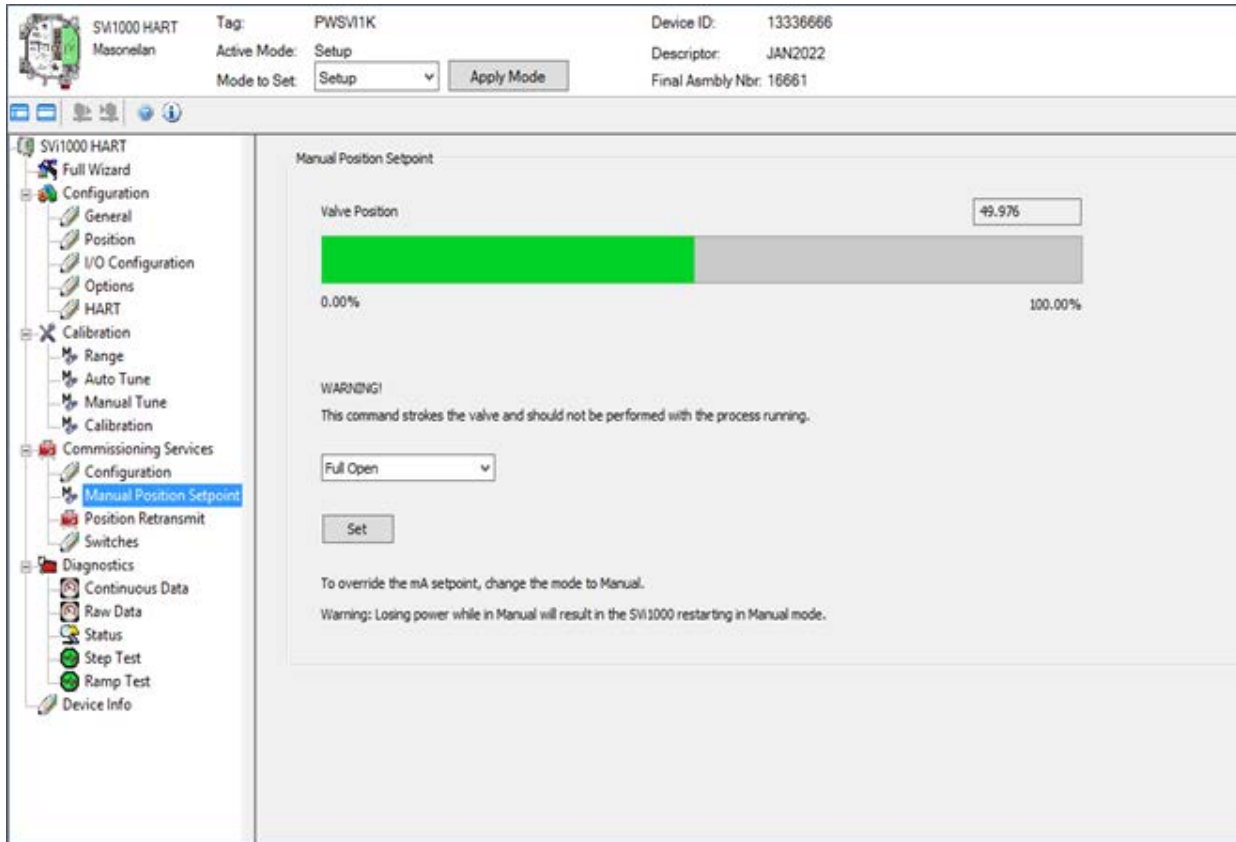
Configure Low/High Signal

To do this:

1. Ensure the positioner is connected.
2. Enter a value in either field.
3. Select **Project > Store to Device (s)**.

Commissioning Services Manual Position Setpoint Screen

Use the *Commissioning Services 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).



Commissioning Services Manual Position Setpoint Screen

Buttons and Fields

Valve Position

Displays the valve position in a display bar and in a text field. The bar displays up to 100% of configured travel range. The text box displays the actual percentage. For example, if the valve is configured to travel 113% and it is at maximum travel, 113% appears.

Full Open

Select and click **Set** and the valve opens to fully open. This command takes the valve out of closed loop control and sends a high or low signal to the I/P. This is available only in Manual or Setup mode.

Full Close

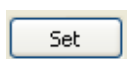
Select and click **Set** and the valve closes fully. This takes the valve out of closed loop control and sends a high or low signal to the I/P. This is available only in Manual or Setup mode.

Set Valve Position in %

Click and text field that appears. Enter a value and click **Set**.

Set Valve Position in mA

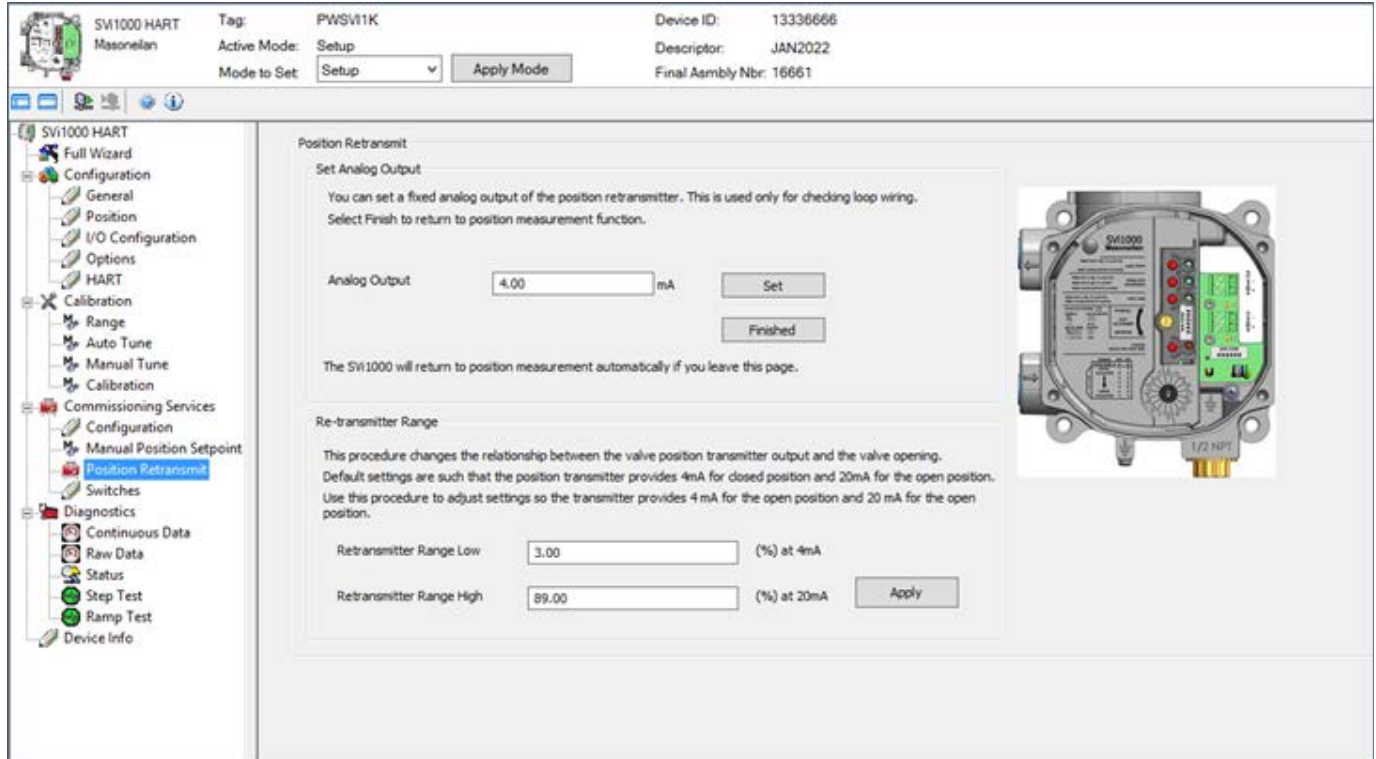
Click and text field that appears. Enter a value and click **Set**.



Sets the configured items to the positioner.

Commissioning Services Position Retransmit Screen

Use the *Commissioning Services Position Retransmit Screen* to configure the settings when the SVi1000 is configured to send a retransmit signal. This feature requires purchasing an SVi1000 with the PR board.



Commissioning Services Position Retransmit Screen

Buttons and Fields

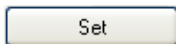
Set Analog Output

Use this area to test loop wiring current for the position retransmit function. This can be used to test the accuracy of the retransmit function.

Analog Output

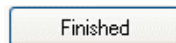
Enter a test amperage in mA.

Set Button



Click to commence the loop test. This removes the SVi1000 from performing position measurement until you click **Finish**.

Finish Button



Click to finish the loop test and return the SVi1000 to position measurement.

Retransmitter Range

Use this function to change the high amperage value to designate when the valve is open or closed. This is done as a percentage of when the valve is opened or closed. Normally, 20 mA indicates the valve is open and 4 mA that it is closed. You can reassign these values or you can assign different values.

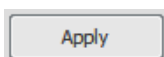
Retransmitter Range Low

Enter a new percentage value for when the valve is closed.

Retransmitter Range High

Enter a new percentage value for when the valve is open.

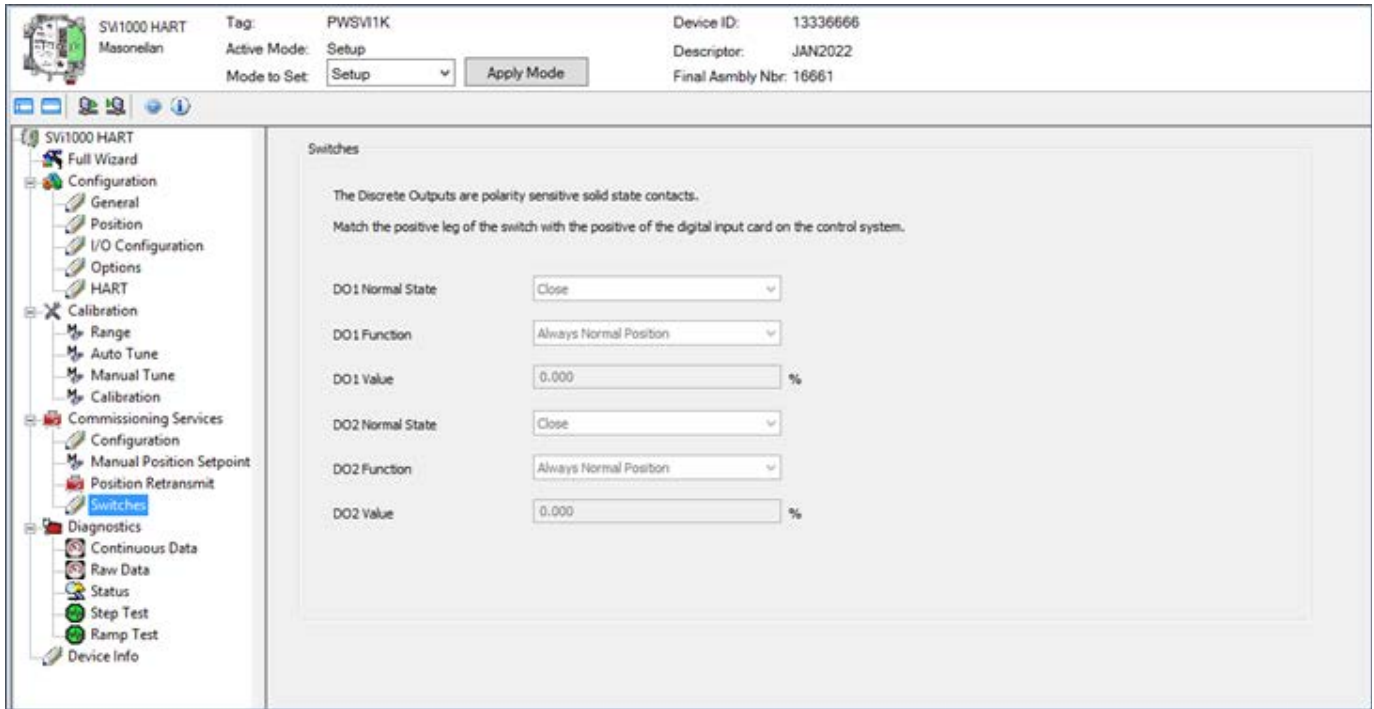
Apply Button



Click this button to save these values to the positioner.

Commissioning Services Switches Screen

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



Commissioning Services Switches Screen

Note: The contacts are OPEN when the SVI1000 is unpowered and may be made to be open or closed when the flag is asserted after boot.

Buttons and Fields

DO1 Normal State/
DO2 Normal State

The SVi1000 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 SVi1000 detects. Use this pulldown to select the type of action:

- Always Normal Position*: The switch is not controlled by the SVi1000 and remains in its 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 SVi1000 is in Failsafe mode.
- Reset*: The switch is activated whenever a reset has occurred and the switch remains activated until the SVi1000 status is cleared.
- 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). For ATO, the SVi1000 may not close the valve completely, The Tight shut-off function must be employed to ensure tight shut-off.
- Position Error*: The switch is activated whenever a position error has occurred and is deactivated when the position recovers to the correct position.
- Alarm Low*: The switch is activated whenever the valve position is less than the position setting of this switch control.
- Alarm High*: 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 SVi1000 is in Manual, or Setup mode.

DO1 Normal State/
DO2 Normal State

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

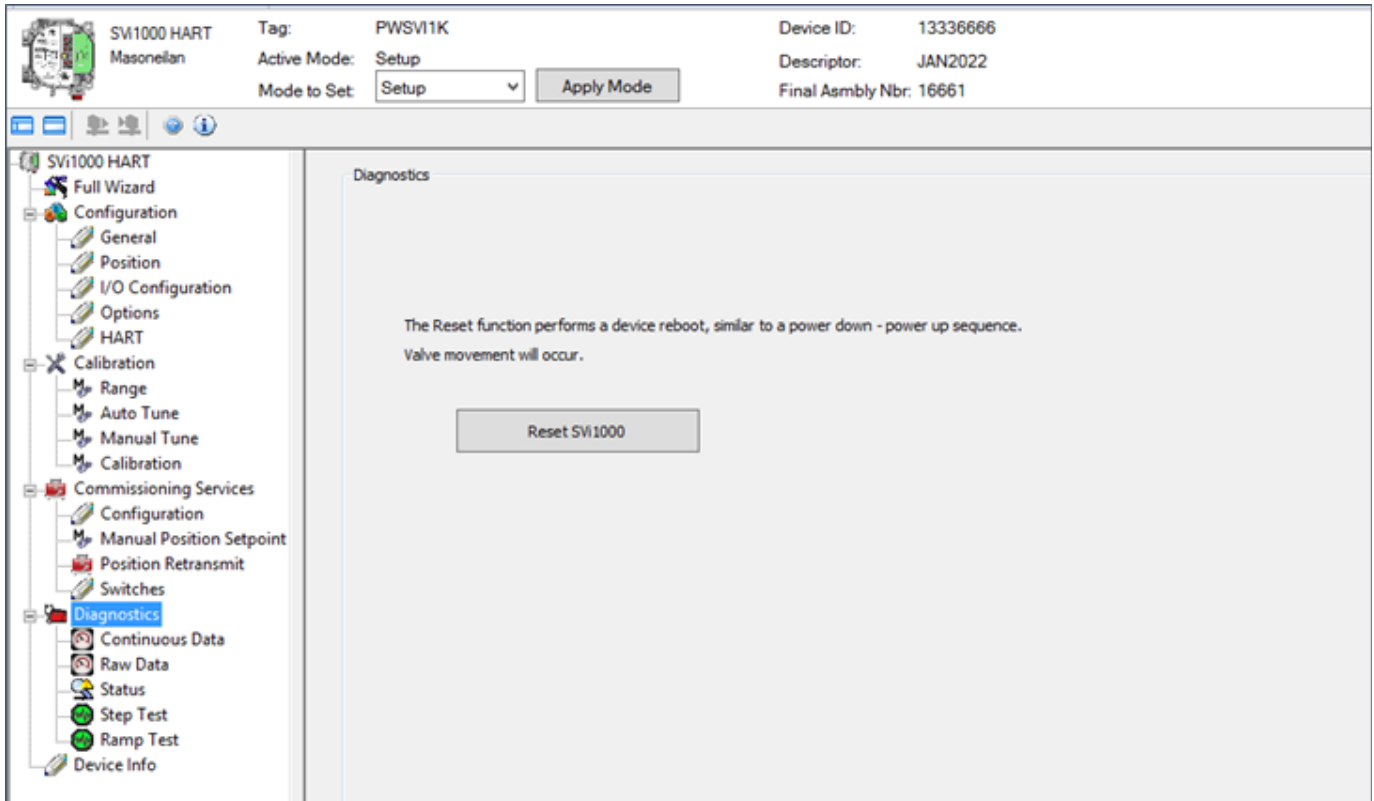
DO1 Value/
DO2 Value

Enter the value for the switch position limit.

9. Diagnostics

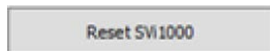
Diagnostics Screen

Use the *Diagnostics Screen* to perform a device reboot of the SVi1000 while in Manual, Normal, Setup and Failsafe mode.



Diagnostics Screen

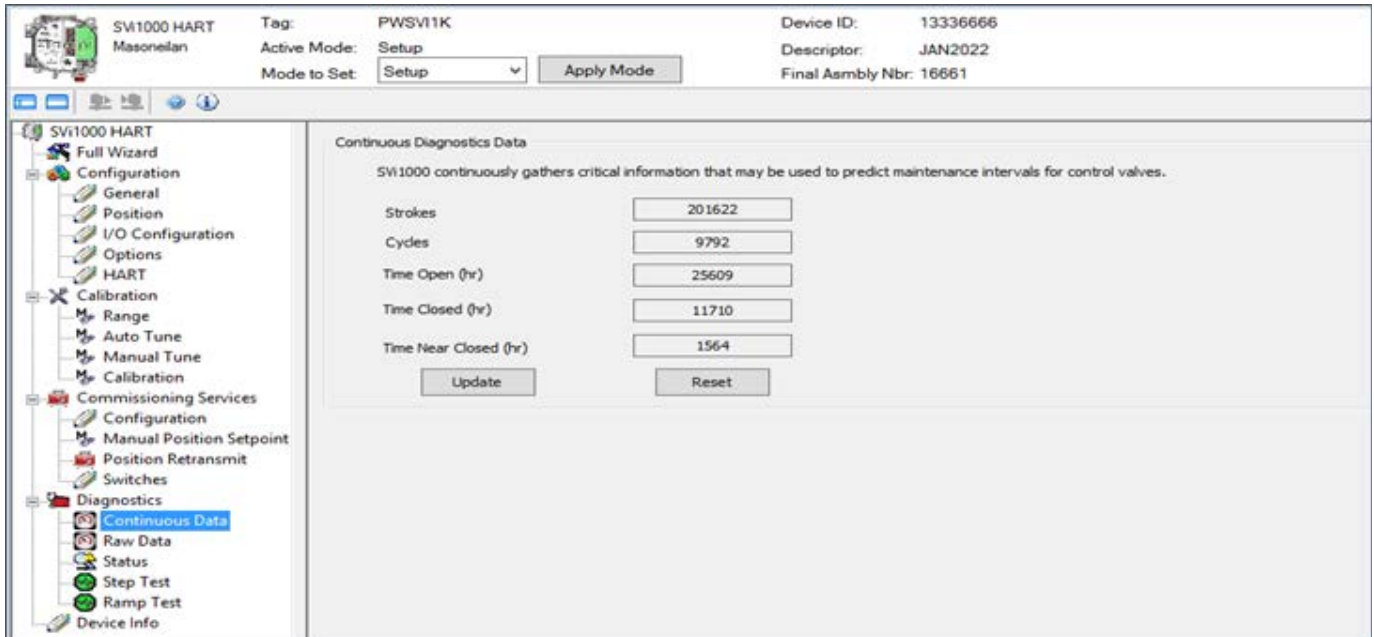
Buttons and Fields



Click this to reset the SVi1000.

Continuous Data Screen

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



Continuous Data Screen

Buttons and Fields

Strokes Displays the number of strokes (100% travel = 1 stroke).

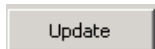
Cycles Displays the number of cycles.

Time Open (hr) Displays the total open time in hours.

Time Closed (hr) Displays the total closed time in hours.

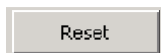
Time Near Closed (hr) Displays the total near closed time in hours.

Update Button



Click this to read the screen values from the positioner.

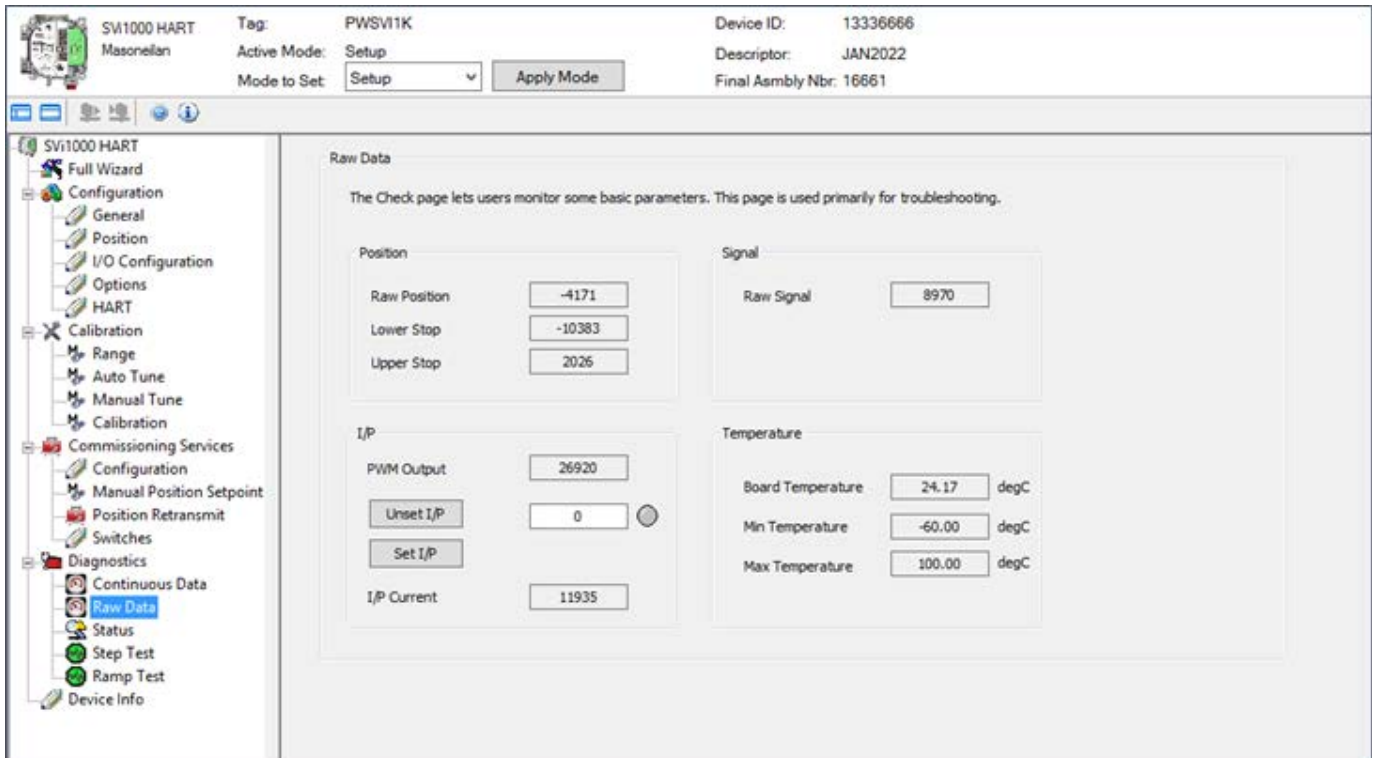
Reset Button



Click this to reset all historian values to zero.

Diagnostics Check Raw Data Screen

Use this screen to view the raw counts of status of signals, temperatures and I/Os. Additionally, you can monitor and *Set I/P* and *Unset I/P*. This screen displays positioner tag information, 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 this screen SVi1000 DTM must be in the Setup mode.



Diagnostics Check Raw Data Screen

Buttons and Fields

Position

Raw Position

Displays the raw A/D values for position, which is useful to Masoneilan™ engineers for diagnostic purposes. Displays the data strength in counts in a text box.

Lower Stop

Displays the position raw counts at the lower stop.

Upper Stop

Displays the position raw counts at the upper stop.

Signal

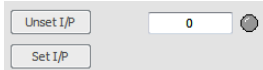
Raw Signal

Displays the input signal strength in counts as counts in a text box.

I/P

PWM Output

Displays the I/P output in counts 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. 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 counts in a text box.

Temperature

Board Temperature

Displays the actual circuit board temperature in degrees as counts in a text box.

Min Temperature

Displays the historical low temperature to which the positioner was exposed as counts in a text box.

Max Temperature

Displays the historical high temperature to which the positioner was exposed as counts in a text box.

Set I/P

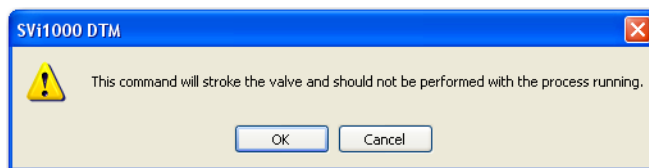
Setting the I/P removes the valve from normal control and sends a constant, user defined signal to the I/P. This is useful for troubleshooting. This command is only available in Setup mode.

To set the I/P:

1. Enter a number between *500* and *65000* in the *Set I/P* edit box.

2. Click .

A warning dialog appears.



Set IP Warning Dialog

3. Click **OK**. The LED should appear red. To resume normal control:

□ Click . Turn off *Set I/P* and return the valve to normal control.

Diagnostics Status Screen

Use the *Status* tab to see the SVi1000 operating and internal status. The tab 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

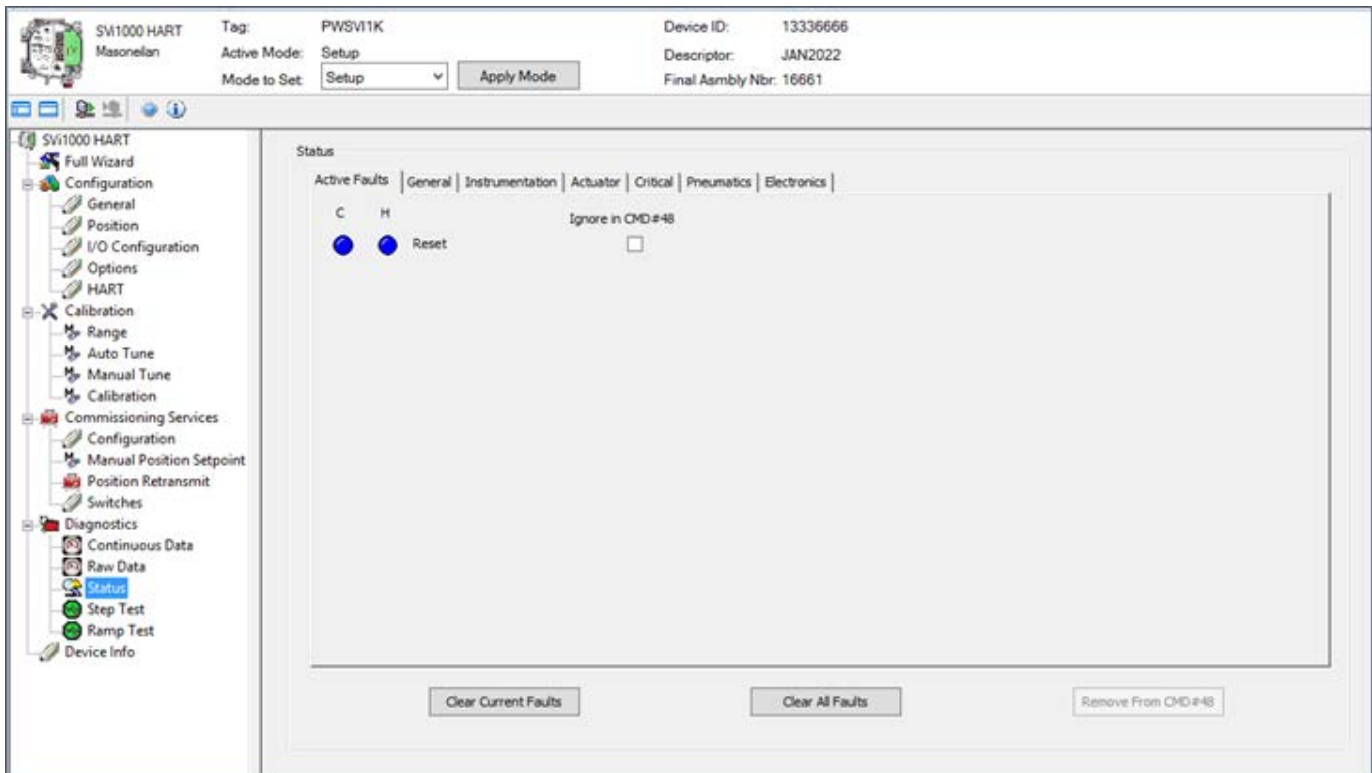
On the *Status* tab you can reset the *Current Faults* or *All Faults* (Current and Historical). The window has selectable tabs that display the associated parameters for each tab.

When you are on the *Active Faults* tab the current active faults appears (*Status Tab: Active Faults*).

Mouse hover over a fault for a fault definition.

Active Faults

The *Status Tab: Active Faults* tab displays all current faults and provides current and historical information on each fault. You can clear current and historical faults.



Status Tab: Active Faults

Buttons and Fields


Current Faults

Faults that have occurred but been cleared from *Current Faults*.

Historical Faults

Faults that have occurred but been cleared from *Current Faults*.

Ignore in CMD #48

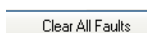
Click an individual checkbox to remove that fault's status from any Command 48 status updates. You must click  to complete configuration.

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.

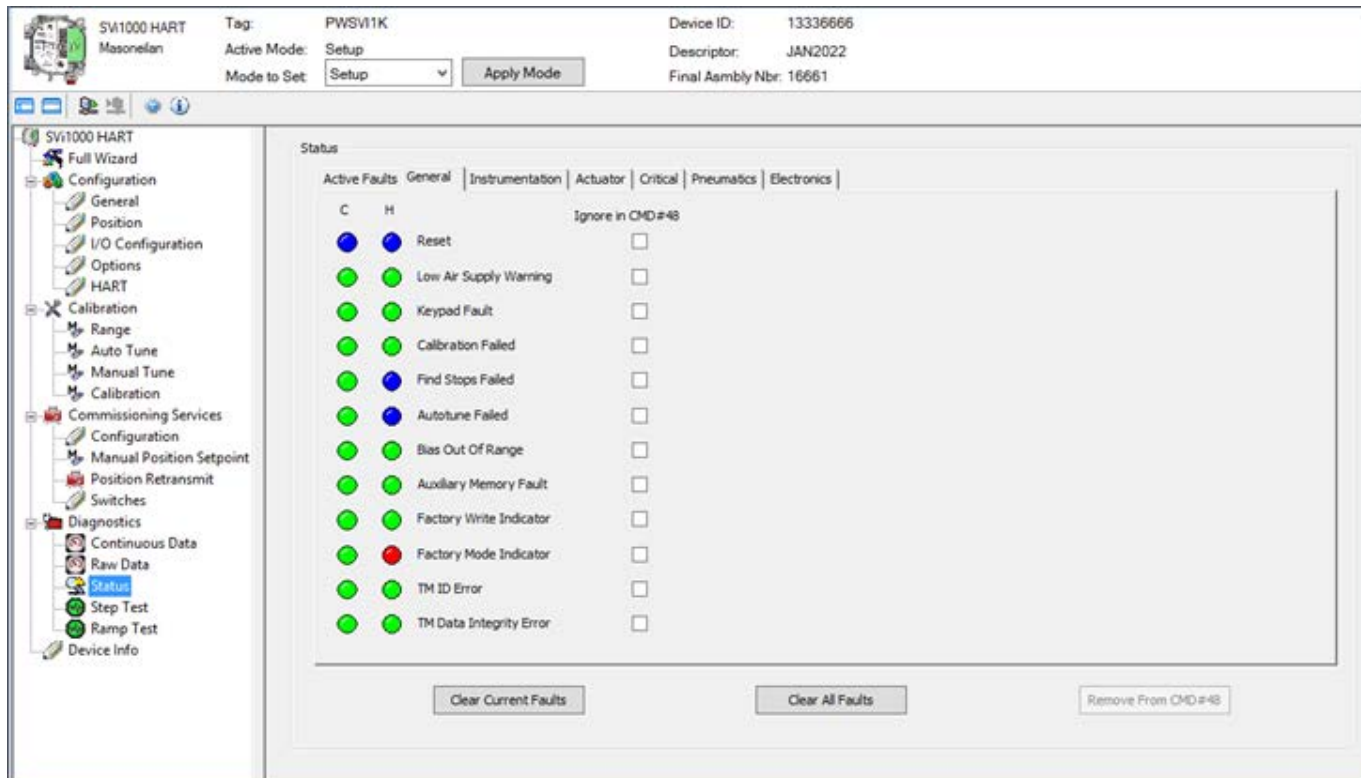
Remove from CMD #48 Button



Click to remove Command 48 status returns for user-selected individual *Ignore in CMD #48* checkboxes on each tab.

General

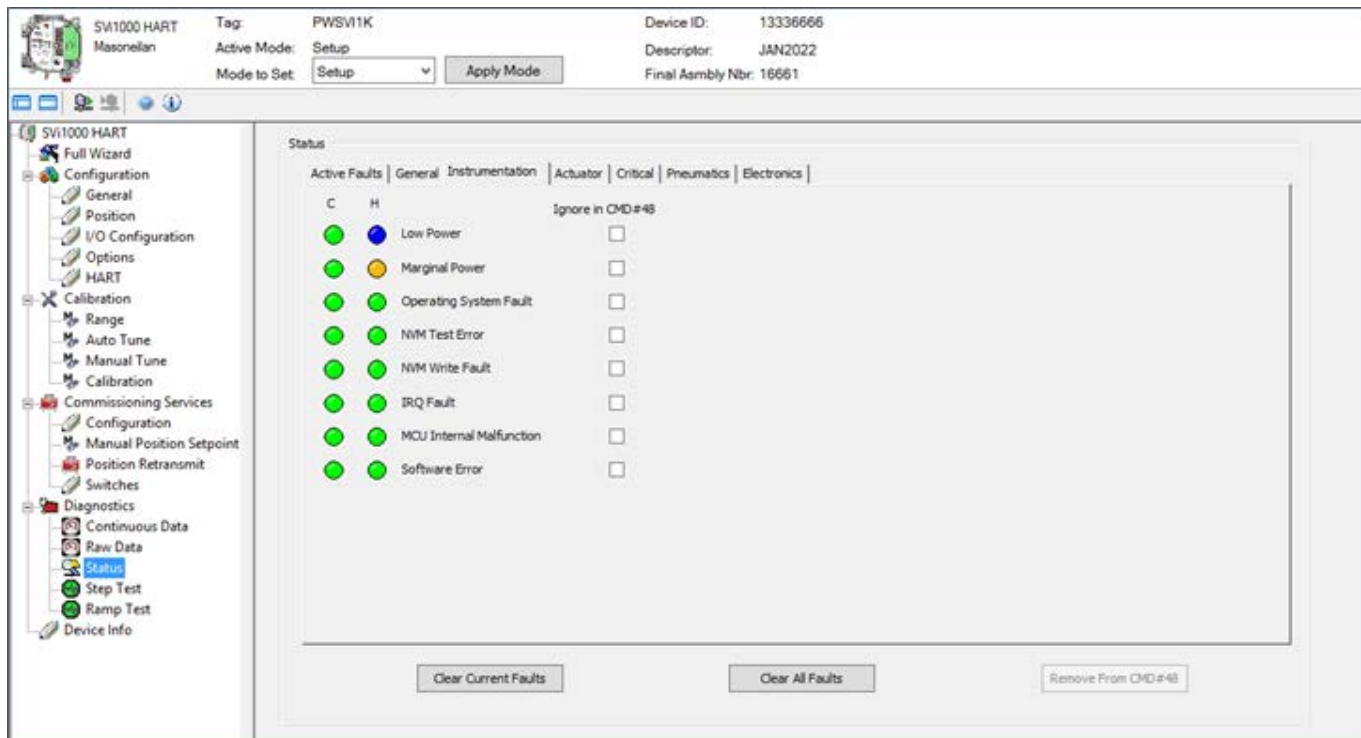
The *General* tab displays general faults.



Status Tab: General

Instrumentation

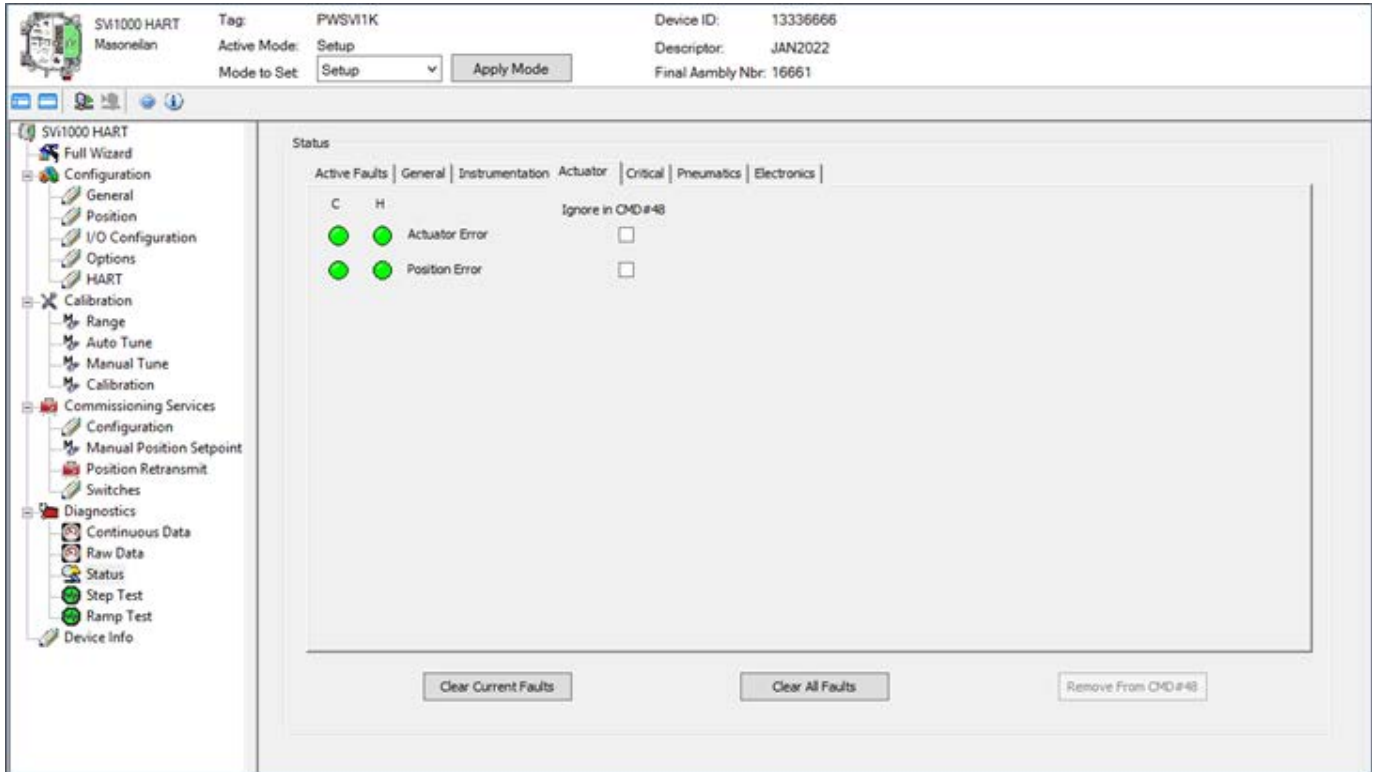
The *Instrumentation* status tab displays a fault related to instrumentation operations.



Status Tab: Instrumentation

Actuator

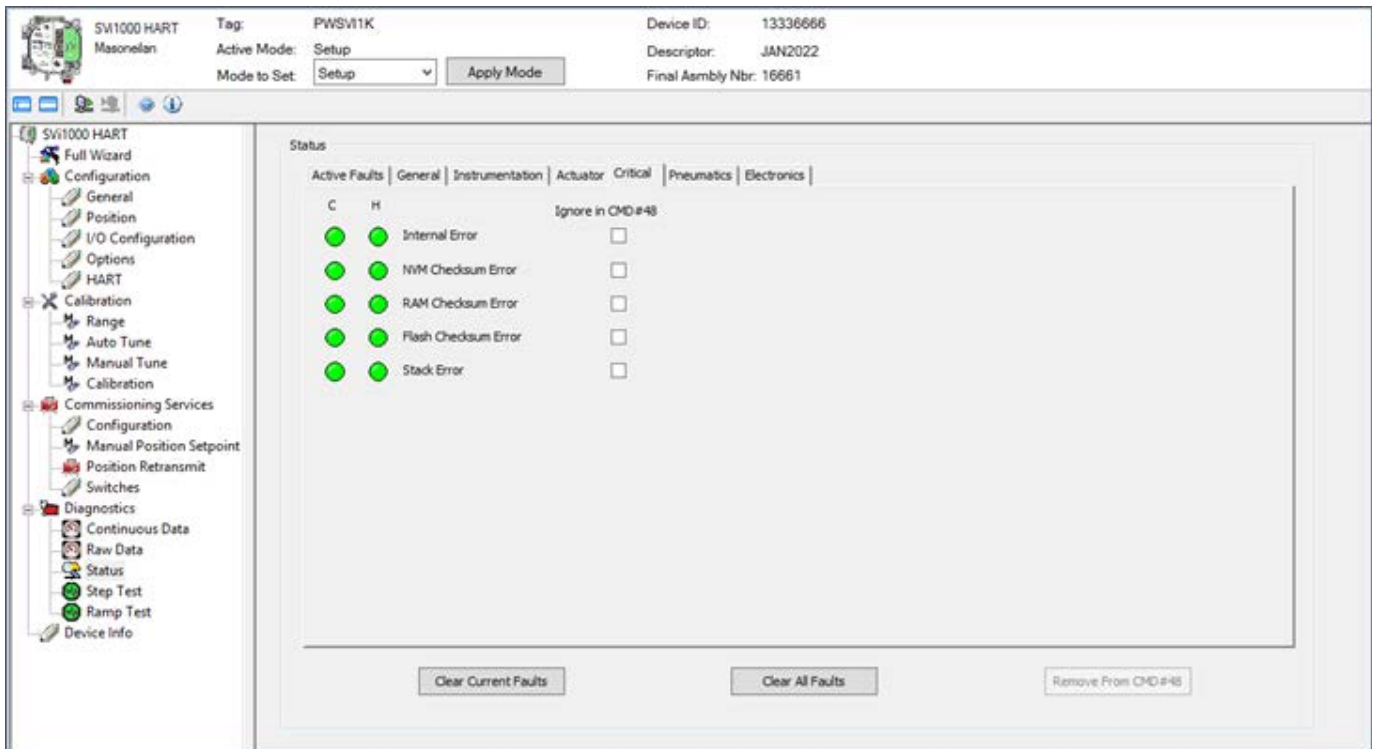
The *Actuator* status tab displays actuator faults.



Status Tab: Actuator

Critical

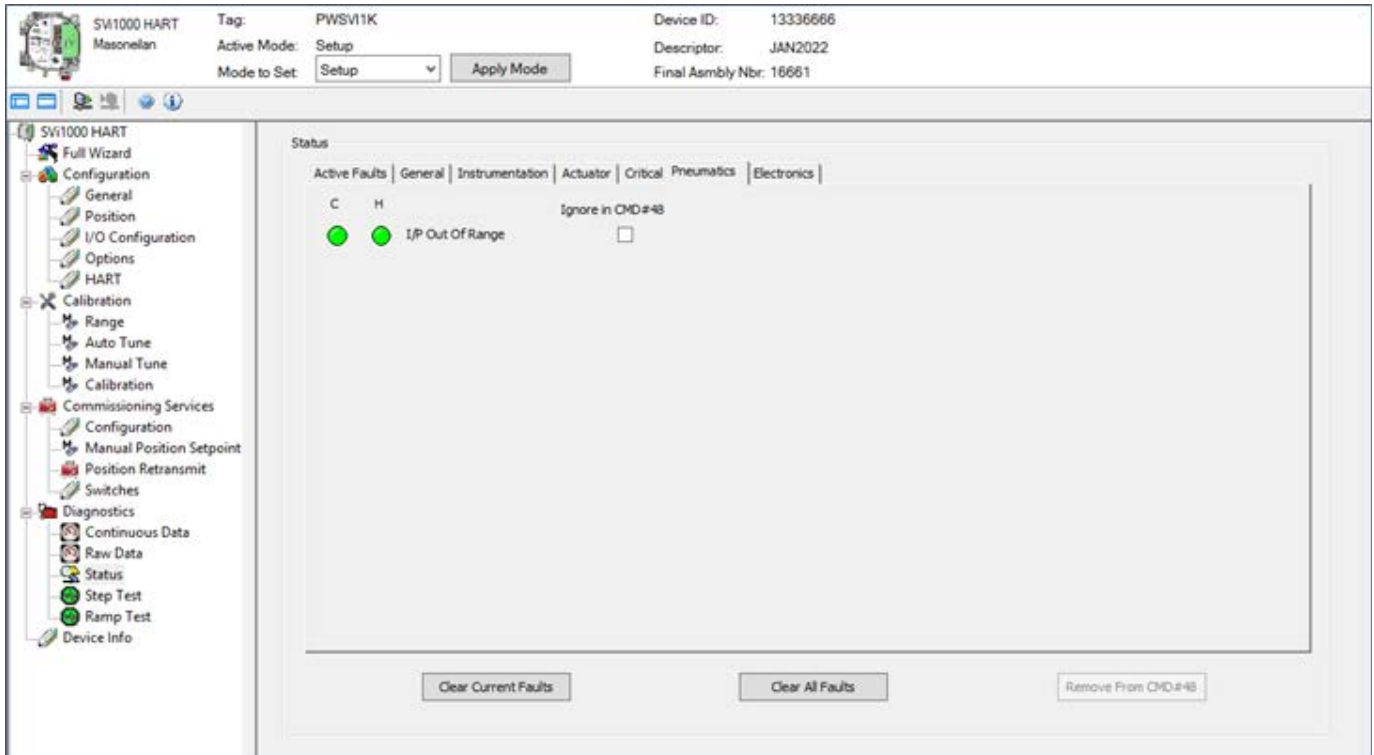
The *Critical* status tab displays all critical errors.



Status Tab: Critical

Pneumatics

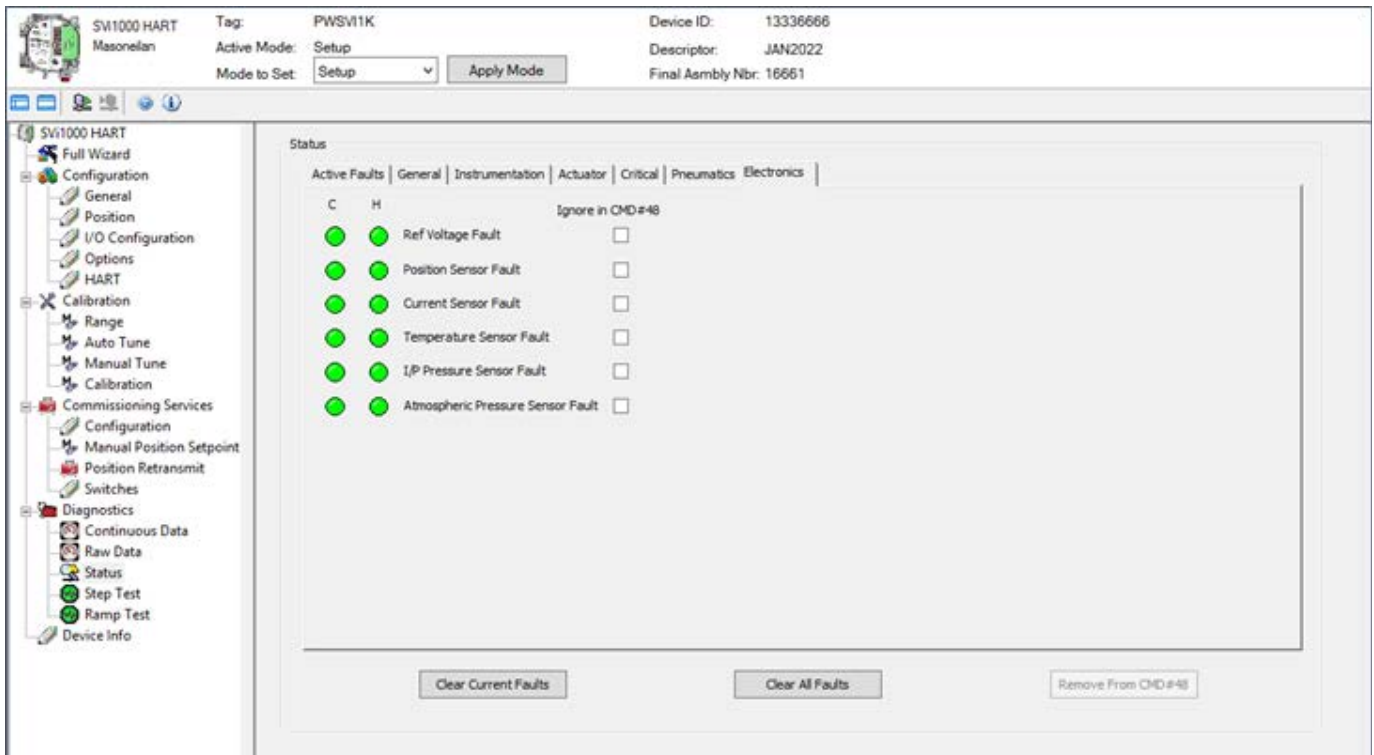
The *Pneumatics* status tab displays all pneumatics related errors.



Status Tab: Pneumatics

Electronics

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



Status Tab: Electronics

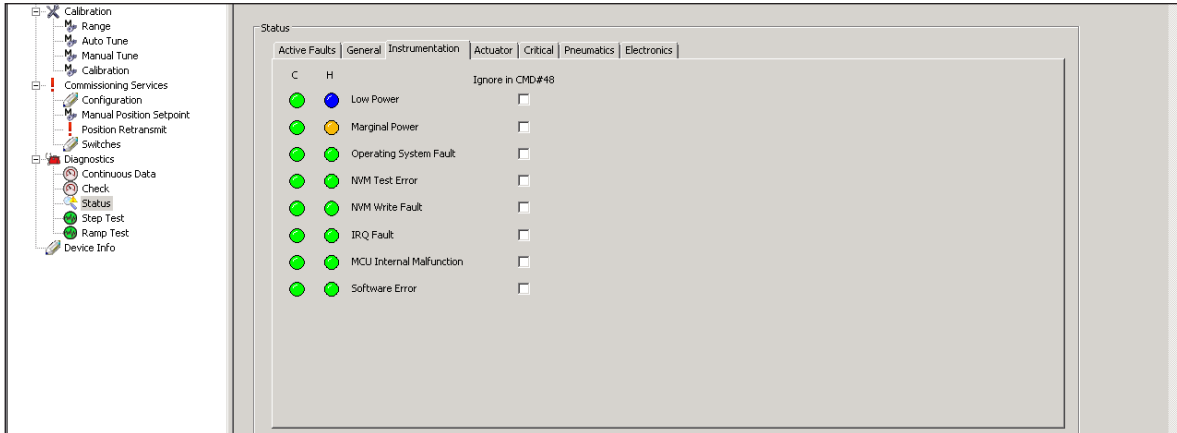
Clear Current Faults

When you click **Clear Current Faults**, SVi1000 resets the status in the SVi1000 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.



Current Faults Cleared

Clear All Faults

When you click **Clear All Faults** SVi1000 resets the status bit in the SVi1000 for all faults, both historical and current and all indicators, current and historical, revert to green.

To clear all faults:

- Click **Clear All Faults** and click **Yes** on the dialog that appears. There should be no faults listed as current and historical on any tab.

Diagnostics Signature Measurement: General Discussion

The signature function is a component of the diagnostic function. This function protects the valve from degradation failure and reports on the condition of the control valve or the positioner by comparing the history of signature characterization. To accomplish this objective a positioner must have the ability to measure and retain data describing the characteristics of the control valve and the positioner.

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.

CAUTION

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

The SVi1000 with this option supports two types of user signature functions:

- “Diagnostics Start Step Test” on [page 93](#)
- “Diagnostics Start Ramp Test” on [page 107](#)

Diagnostics Start Step Test

Use this tab to configure and run a Step Test.

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

The step test starts at the starting position and makes steps according to the Step Size field until the ending position is reached. For each step, the SVi1000 measures the position at even time intervals for the amount of time specified in Time. If Both Ways is specified, when the end position is reached, the procedure is repeated from the end position to the start position.

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

- **Single Step** The single step test consists of a single step response test, with a start time, start point and end point for the test incremented by the step time.
- **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.
- **Pre-Defined Steps** This test consists of steps where step size and timing are configurable. See “Run Pre-Defined Steps” on [page 105](#).
- **Custom** Displays an empty table below where you can add settings to customize a test. See “Run Custom: Step Test” on [page 107](#).

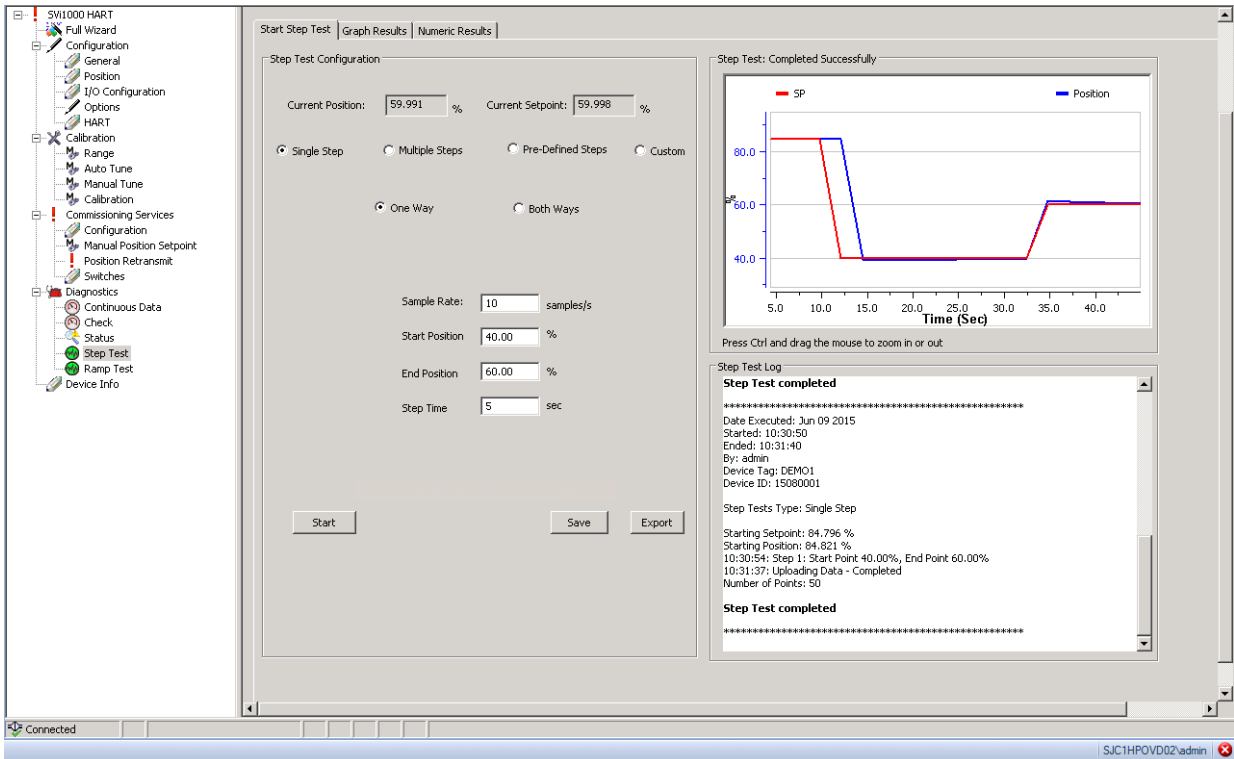
The measurement parameter is the output signal of control valve system.

! WARNING

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

CAUTION

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



Diagnostics Start Step Test

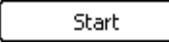
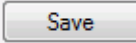
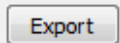
Buttons and Fields

Step Test Configuration

Current Position	Displays the current position as a percent of fully open or closed.
Current Setpoint	Displays the current setpoint as a percent.
Step Test Type	Use the radio buttons to select the test type: <ul style="list-style-type: none"> <input type="checkbox"/> <i>Single Step</i>: Displays fields to configure a <i>One Way</i> or <i>Two Way</i> test. See “Run a Single Step Test” on page 96. <input type="checkbox"/> <i>Multiple Steps</i>: Displays fields to configure a <i>One Way</i> or <i>Both Ways</i> test where you can set <i>Step Size</i> during the test time. See “Run a Multiple Steps Step Test” on page 100. <input type="checkbox"/> <i>Pre-Defined Steps</i>: Displays fields to configure a test where you can dictate settings for steps. See “Run Pre-Defined Steps” on page 102. <input type="checkbox"/> <i>Custom</i>: Displays an empty table below where you can add settings to customize a test. See “Run Custom: Step Test” on page 104.
One Way	Click to conduct the test only from the <i>Start Position</i> to the <i>End Position</i> .
Both Ways	Click to conduct the test only from the <i>Start Position</i> to the <i>End Position</i> and back to the <i>Start Position</i> . The values of the <i>Start Position</i> and the <i>End Position</i> determine the direction of the valve stem movement. When the value of the <i>Start Position</i> is more than that of the <i>End Position</i> , the valve steps down in one way trip, then steps up at return trip, if <i>Both Ways</i> is used.
Sample Rate	Enter the a rate in samples per second. Larger numbers make for longer tests.
Start Position	Enter the position for the valve positioning before the test start.
End Position	Enter the final position for the valve positioning during the test.
Step Time	Enter the time to for each step during the test. The software then operates the test between the <i>Start Position</i> and <i>End Position</i> in this time-frame.
Step Size	Enter the size for each step during a <i>Multiple Steps</i> test.

Buttons and Fields

Step Test Configuration (cont.)

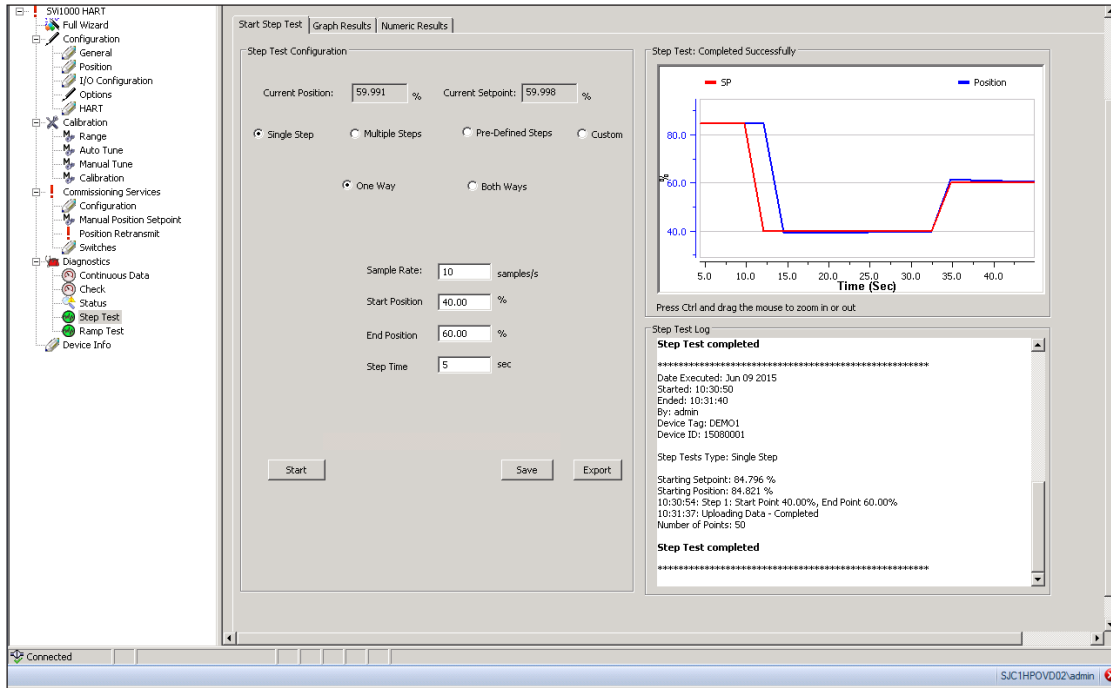
Around Middle	Click to run the <i>Pre-Defined Steps</i> test centered on the middle of the test range (<i>Pre-Defined Steps</i> test only).
Around Current	Click to run the <i>Pre-Defined Steps</i> test centered on the <i>Current Setpoint</i> (<i>Pre-Defined Steps</i> test only).
Setpoint	
Up and Down/Up/Down	Click one to run the test both ways or only one direction (<i>Pre-Defined Steps</i> test only).
Step Increase	Enter a percentage per each step. This is the step size, limited by <i>Max Step</i> , which along with the <i>Step Time</i> dictates the number of steps performed in the test range (<i>Pre-Defined Steps</i> test only).
Max Step	Enter a percentage for limiting the maximum step size per step of the test range (<i>Pre-Defined Steps</i> test only).
Custom test Table	Enter values for <i>No.</i> (number of steps), <i>Initial Time</i> , <i>Start Position</i> , <i>End Position</i> and <i>Step Time</i> per test execution line. You can add, rearrange and delete multiple lines of test actions to configure a test.
Step Test Log	Displays progress message, values and error messages as the test proceeds.
Step Test Graph	Displays graphical results as the test proceeds. The test status appears above the graph.
	Click to start the test. Updates appear in the <i>Step Test Log</i> .
	Click to save the results. You can load back the result in the selection <i>Show Saved Result</i> in Graph/Numeric tabs. See “Save Step Test Results” on page 110 .
	Click and a dialog appears to export the results to an Excel file. See “Export Step Test Results” on page 111 .

Run a Single Step Test

CAUTION

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

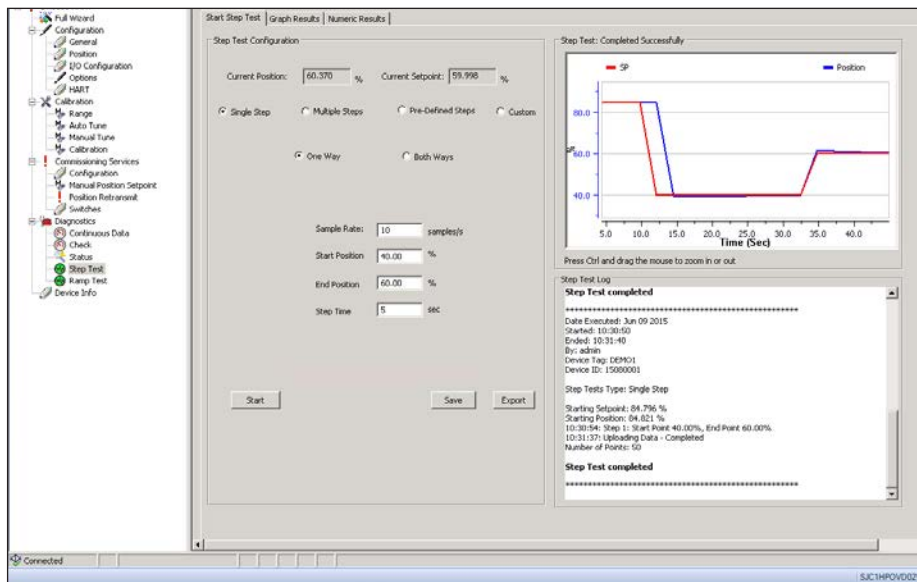
1. Ensure the system is in *Setup* mode.
2. Click **Single Step**.



Diagnostics Start Step Test

3. Click **One Way** or **Both Ways**.
4. Enter values for Sample Rate, Start Position, End Position, and Step Time and click **Start**.

The *Step Test Log* begins displaying test data. The results appear.

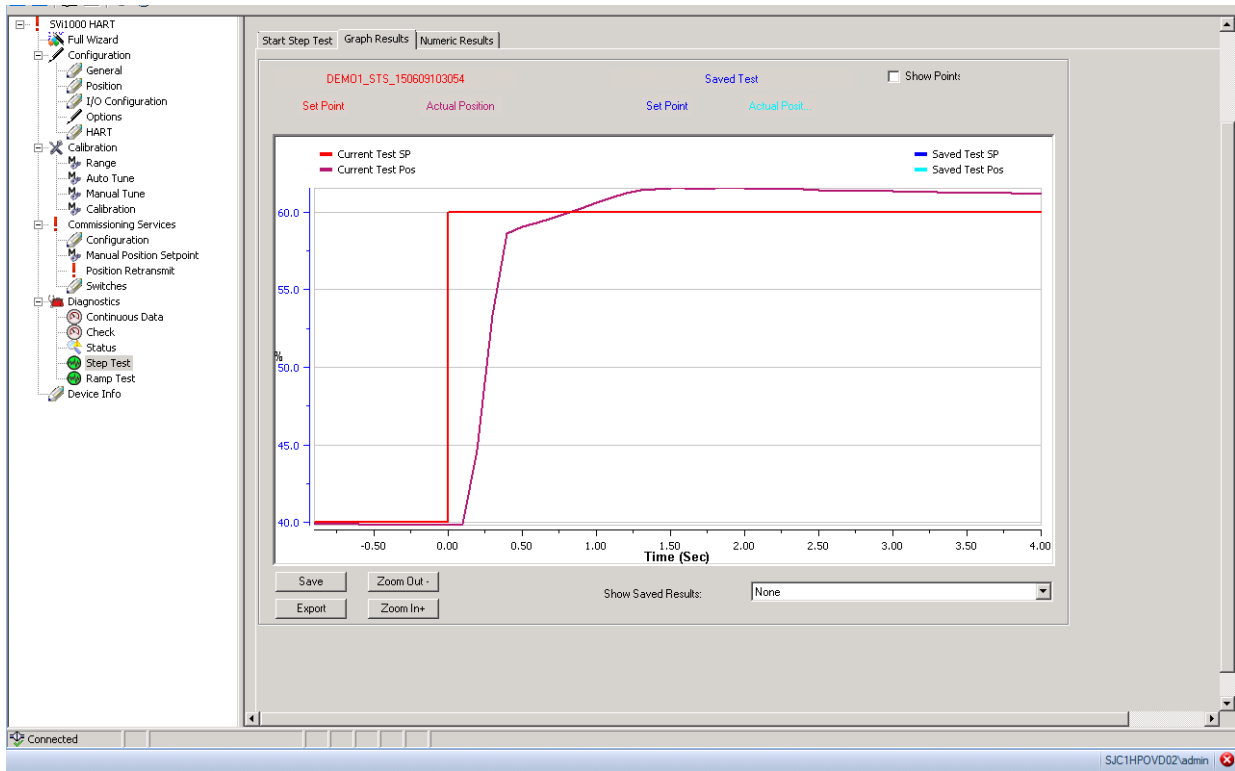


Diagnostics Step Test Complete: Single Step One Way

You can now "Save Test Results" on [page 110](#) or "Export Test Results" on [page 111](#).

Single Step Graph Results

Use this tab to view numeric results. See “Single Step Numeric Results” on [page 99](#) for further explanation of screen components.



Single Step One Way Graph Result

Buttons and Fields

General Graph Functionality

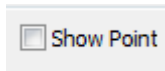
All graphs have some common functionality, including:

- 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.
- Right-click menu: There is a menu available by right-clicking any axis that has three selections:
 - Tracking Enabled*: Enables/disables tracking.
 - Update Resume Values*: Store the axis scale for the *Tracking Enabled*. The next time *Tracking Enabled* is engaged, the tracking restores the axis to the stored scale instead the initial scale.
 - Zoom to Fit*: Activates a function that sizes the graph to fit the selected display area.

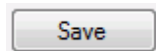
% vs. Time (sec) Graph

- Left axis displays a scale for the percentage of step complete.
- Bottom axis displays time.
- The red line represents the current test setpoint.
- The purple line represents the current test position.
- The navy blue line represents a saved test setpoint.
- The light blue line represents a saved test position.
- Toggles the appearance of the data points on/off.

Show Point

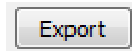


Save



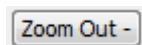
Click to save the results. You can load back the result in the selection *Show Saved Result* in *Graph/Numeric* tabs.

Export



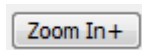
Exports the results as a .csv file. See "Export Step Test Results" on [page 110](#) for instructions.

Zoom Out -



Toggles the view out according to preset values to two times.

Zoom In +

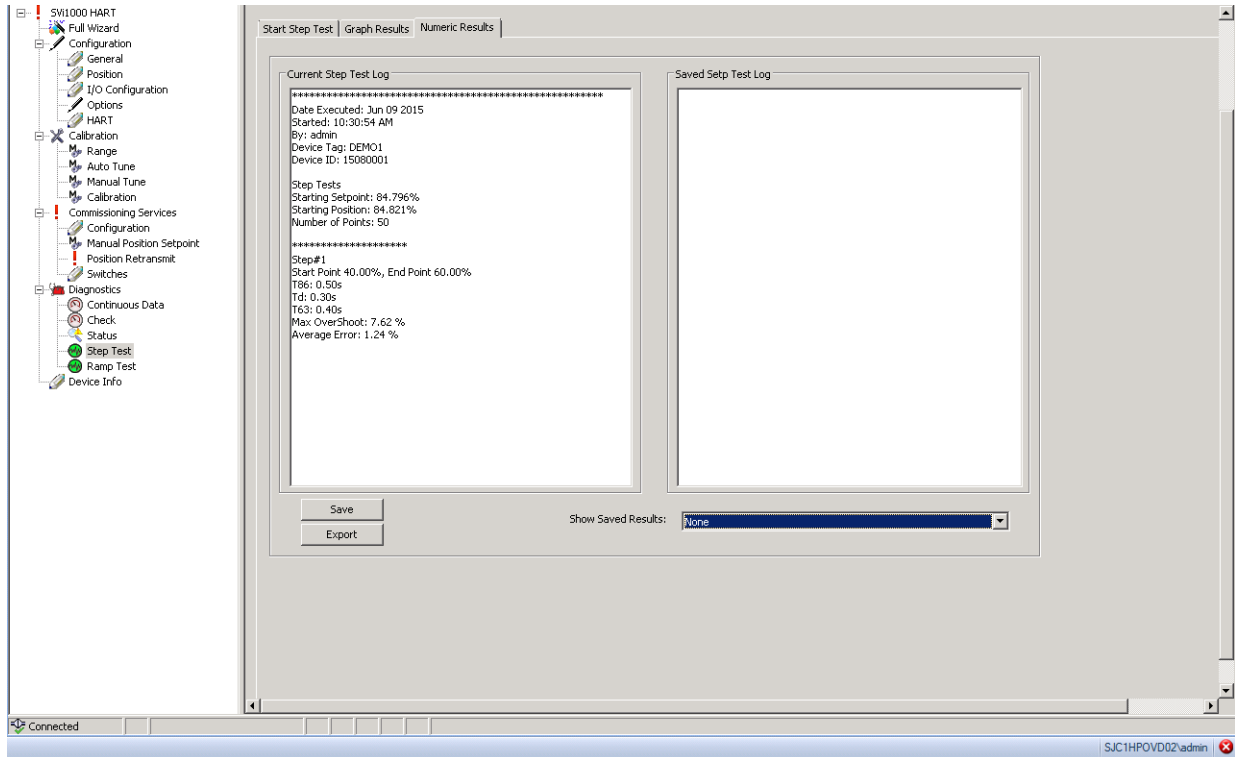


Toggles the view in according to preset values to 50%.

Show Saved Results

Use the pulldown to select a results file and the graph is populated. See "Diagnostics Status Screen" on [page 87](#) for instructions on how to create these files.

Single Step Numeric Results



Single Step One Way Numeric Result

Buttons and Fields

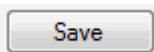
Currents Step Test Log

Displays the results from a current step test. These results can be saved or exported.

Saved Step Test Log

Displays the results from an historical step test accessed using the *Show Saved Results* pulldown.

Save



Click to save the results. You can load back the result in the selection *Show Saved Result* in *Graph/Numeric* tabs.

Export



Exports the results as a .csv file. See "Export Step Test Results" on [page 111](#) for instructions.

Show Saved Results

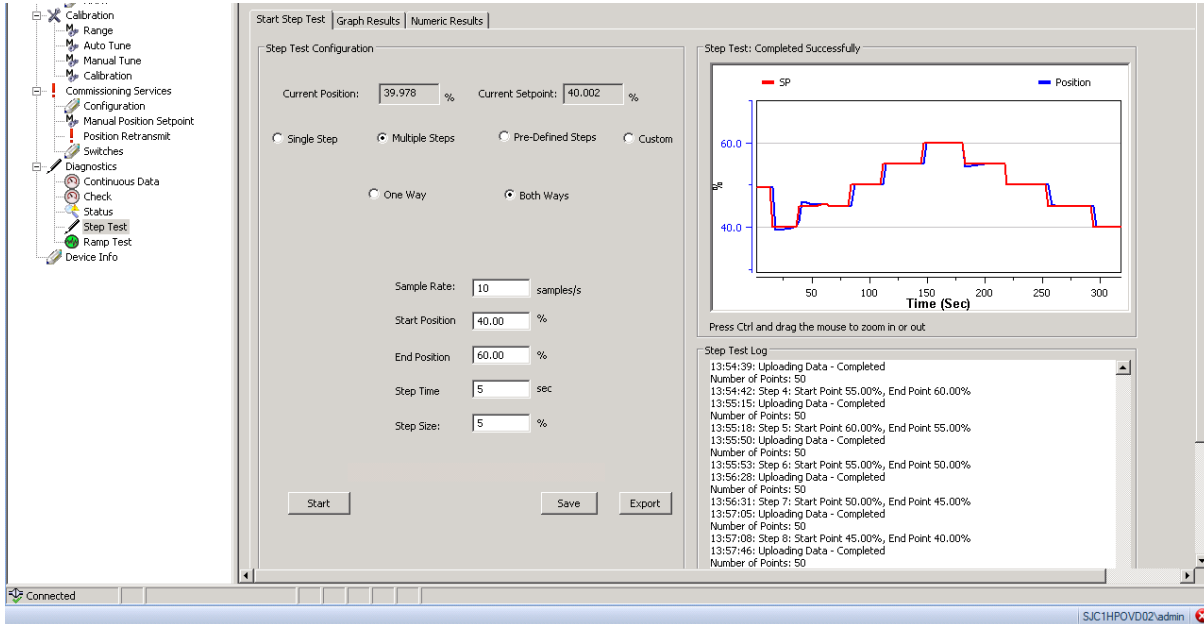
Use the pulldown to select a results file and the graph is populated. See "Diagnostics Status Screen" on [page 87](#) for instructions on how to create these files.

Run a Multiple Steps Step Test

CAUTION

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

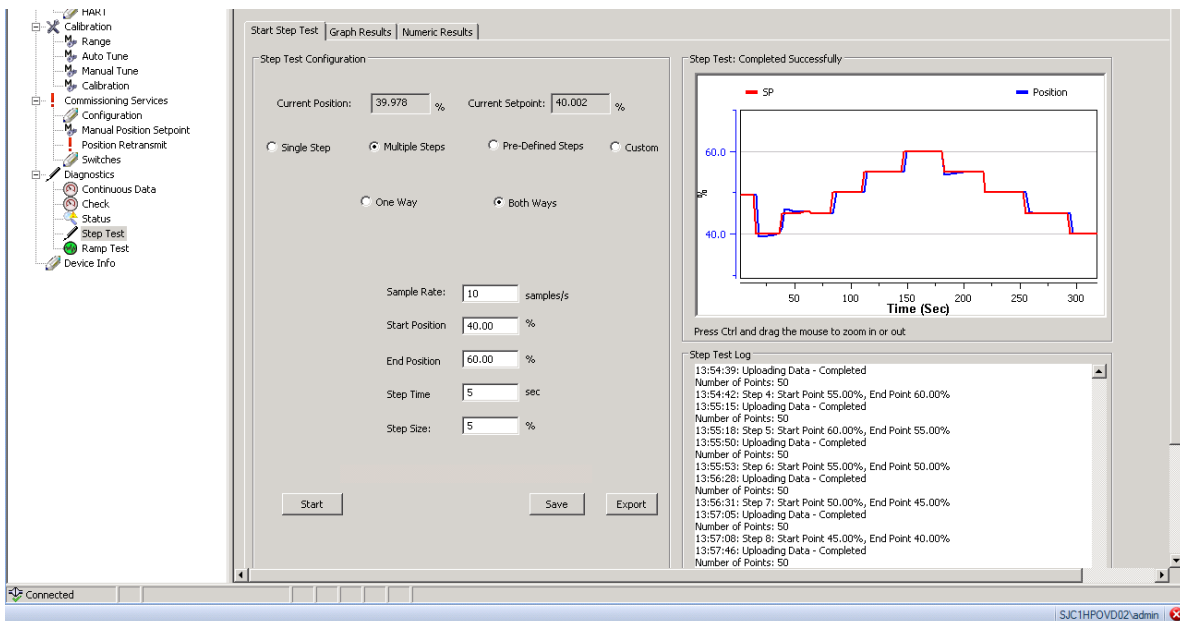
1. Ensure the system is in *Setup* mode.
2. Click **Multiple Steps**.



Diagnostics Start Step Test: Multiple Steps

3. Click **One Way** or **Both Ways**.
4. Enter values for Sample Rate, Start Position, End Position, Step Time and Step Size and click **Start**

The *Step Test Log* begins displaying test data. The results appear.

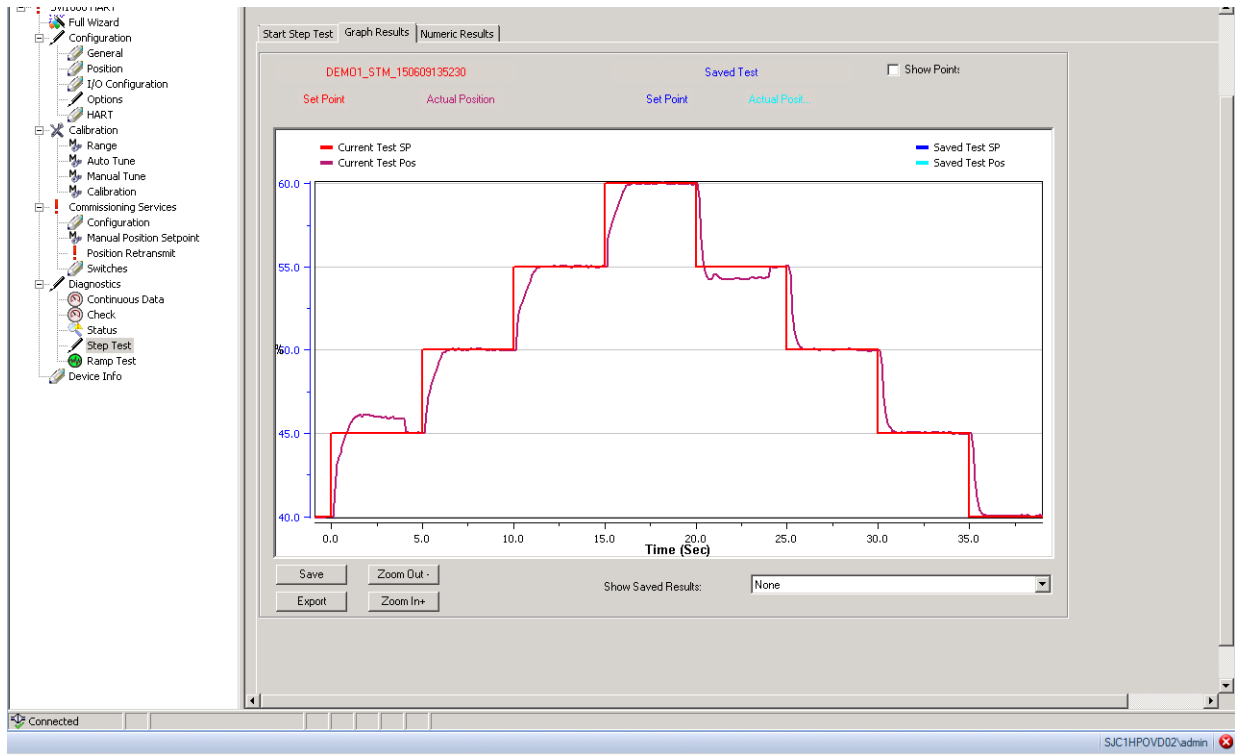


Diagnostics Step Test Complete: Multiple Steps Both Ways

You can now "Save Test Results" on [page 110](#) or "Export Test Results" on [page 111](#).

Multiple Steps Graph Results

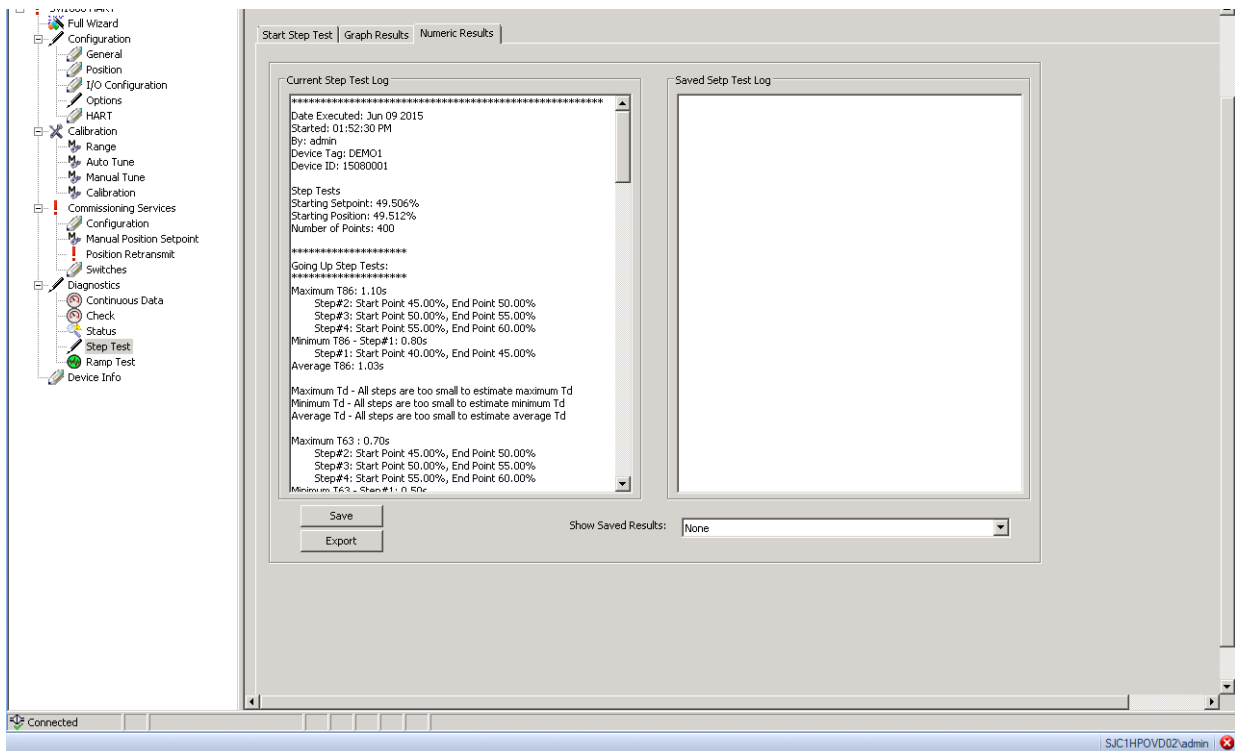
Use this tab to view the graphical results and compare with a previous test. See “Single Step Graph Results” on [page 97](#) for further discussion of screen components.



Multiple Steps Graph Results

Multiple Steps Numeric Results

Use this tab to view numeric results. See “Single Step Numeric Results” on [page 99](#) for further explanation of screen components.



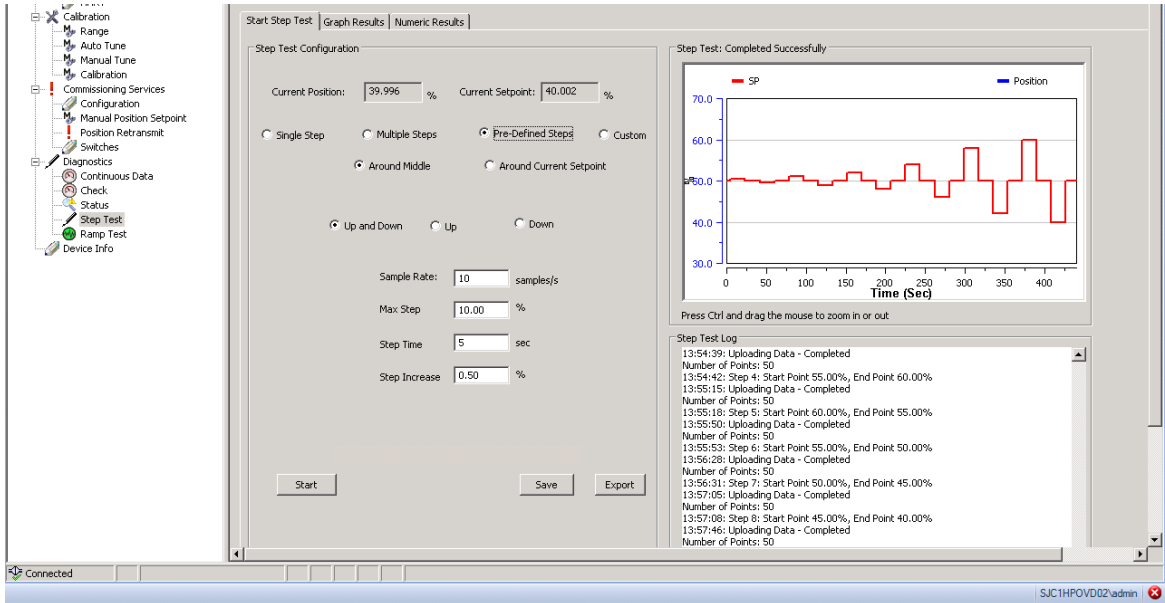
Multiple Steps Numeric Results

Run Pre-Defined Steps

CAUTION

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

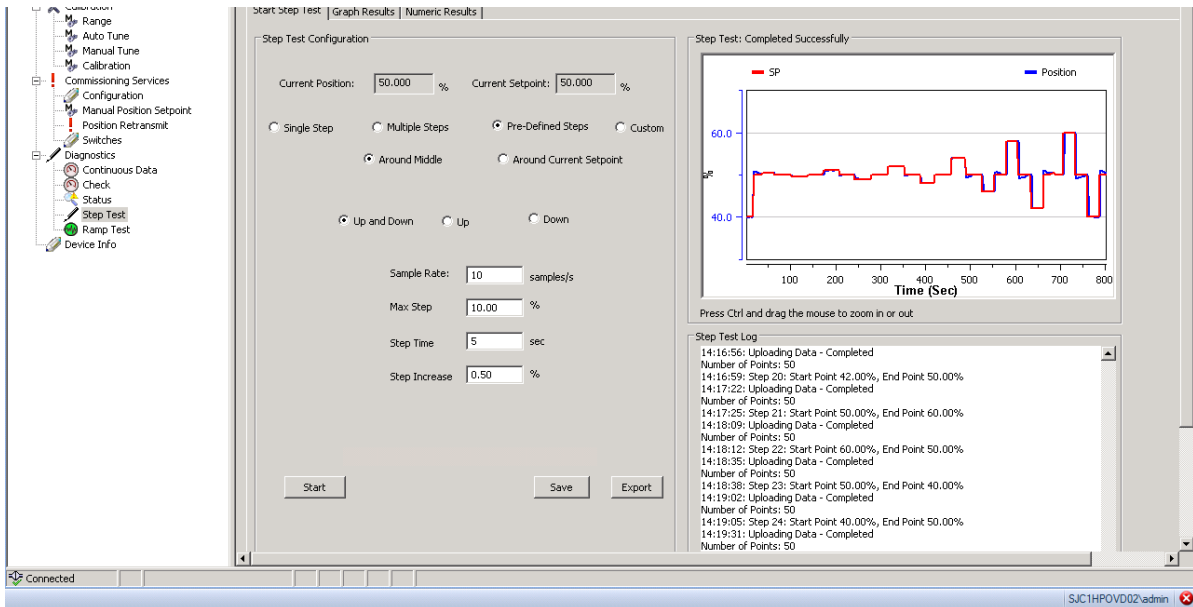
1. Ensure the system is in *Setup* mode.
2. Click **Pre-Defined Steps**.



Diagnostics Start Step Test: Pre-Defined Steps

3. Click **Around Middle** or **Around Current Setpoint**.
4. Enter values for **Sample Rate**, **Max Step**, **Step Time** and **Step Increase** and click **Start**

The *Step Test Log* begins displaying test data. The results appear.

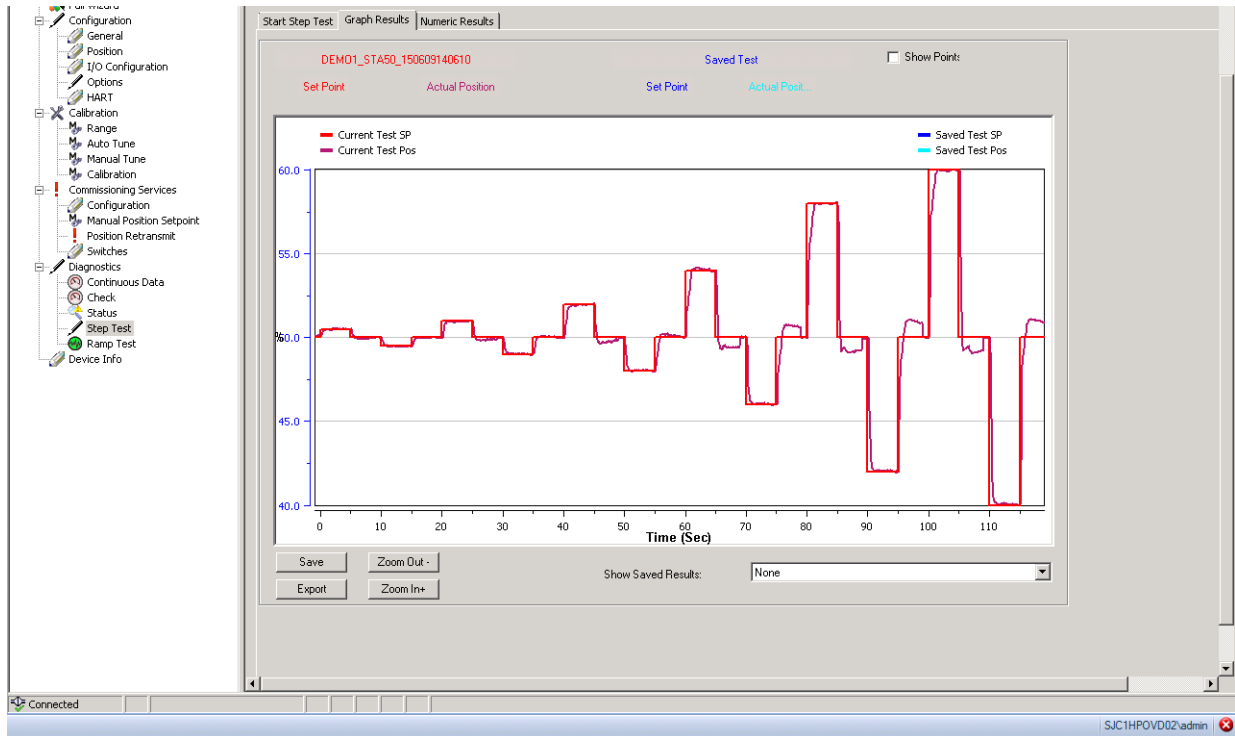


Diagnostics Step Test Complete: Pre-Defined Steps Around Middle

You can now “Save Test Results” on [page 110](#) or “Export Test Results” on [page 111](#).

Pre-Defined Steps Graph Results

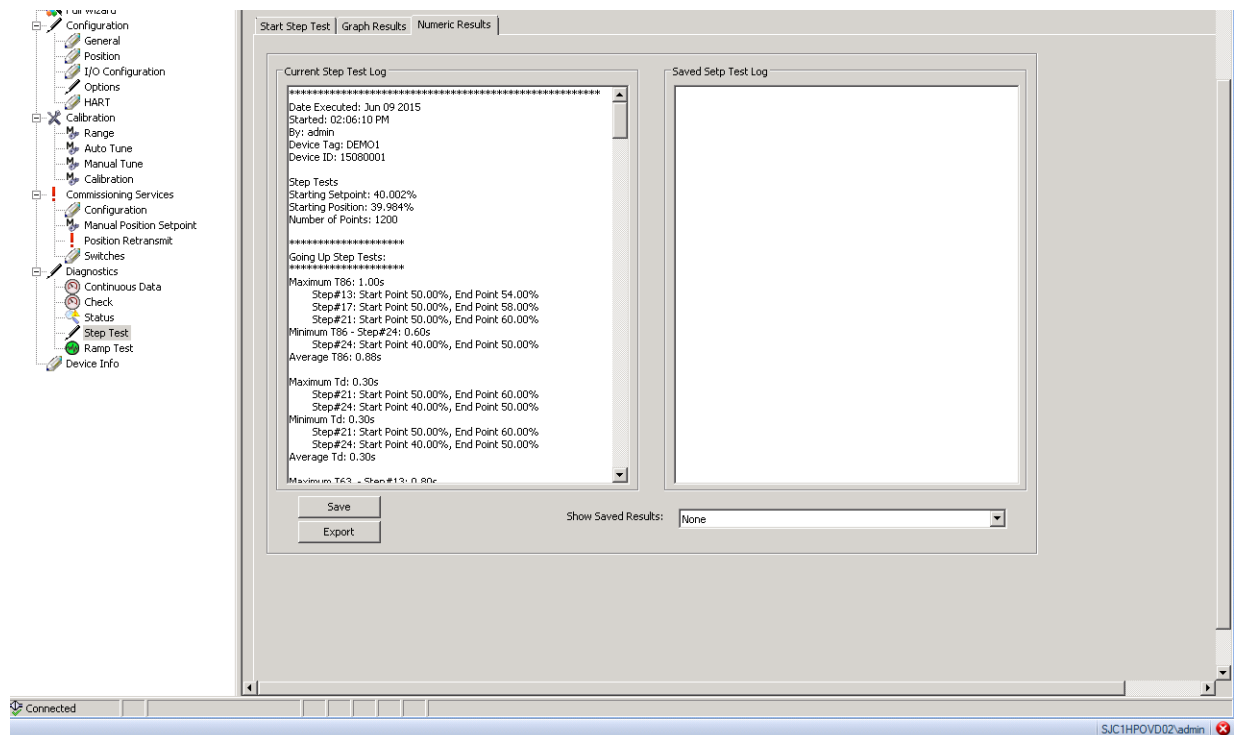
Use this tab to view the graphical results and compare with a previous test. See “Single Step Graph Results” on [page 97](#) for further discussion of screen components.



Pre-Defined Steps Graph Results

Pre-Defined Steps Numeric Results

Use this tab to view numeric results. See “Single Step Numeric Results” on [page 99](#) for further explanation of screen components.



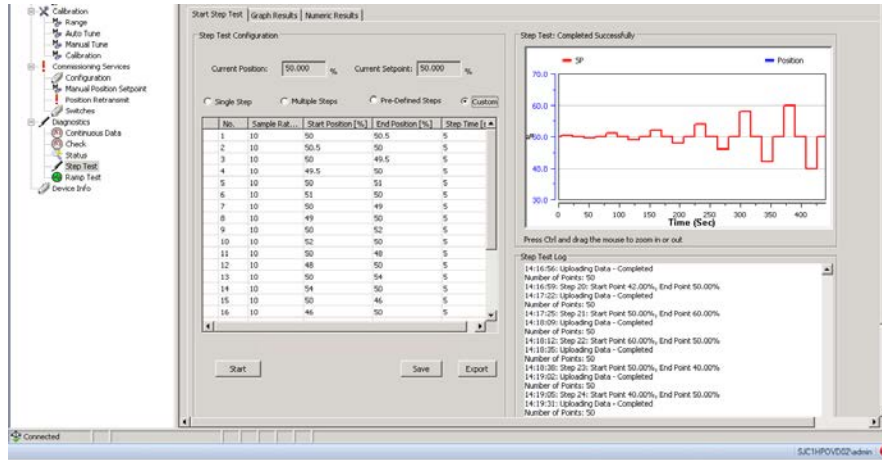
Pre-Defined Steps Numeric Results

Run Custom: Step Test



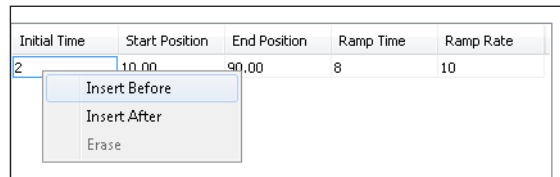
Procedures (e.g. Find Stops, Auto Tune, Step Test and Ramp Test) should **NOT** be invoked if the ValVue sequencer is running.

1. Ensure the system is in *Setup* mode.
2. Click **Custom**.



Diagnostics Start Step Test: Custom Step

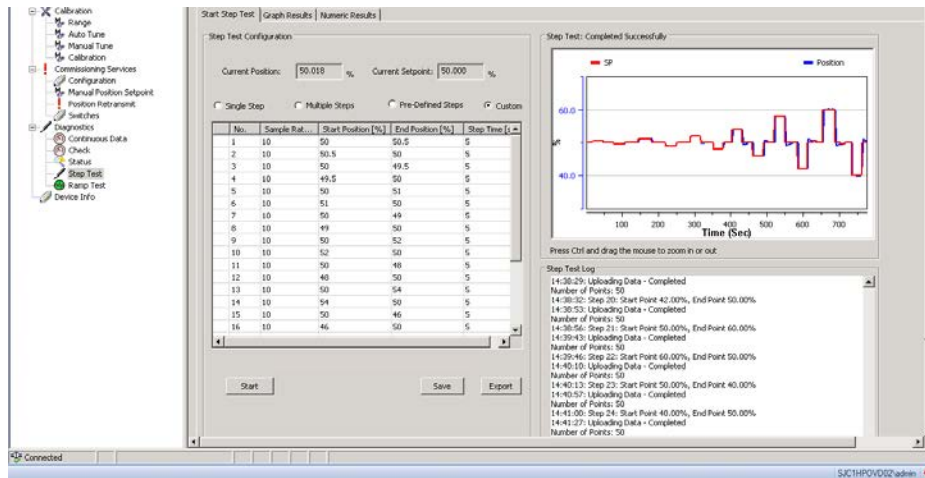
3. Enter values for No., Sample Interval, Start Position, End Position, and Step Time
4. Right-click in the row and a menu appears to add rows or erase selected rows (Custom Test Manage Rows).



Custom Test Manage Rows

5. Right-click and select Insert Before or Insert After or Erase to manage the test sequence.
6. Enter the data from step 2 for all subsequent steps.
7. Click

The Step Test Log begins displaying test data. The results appear.

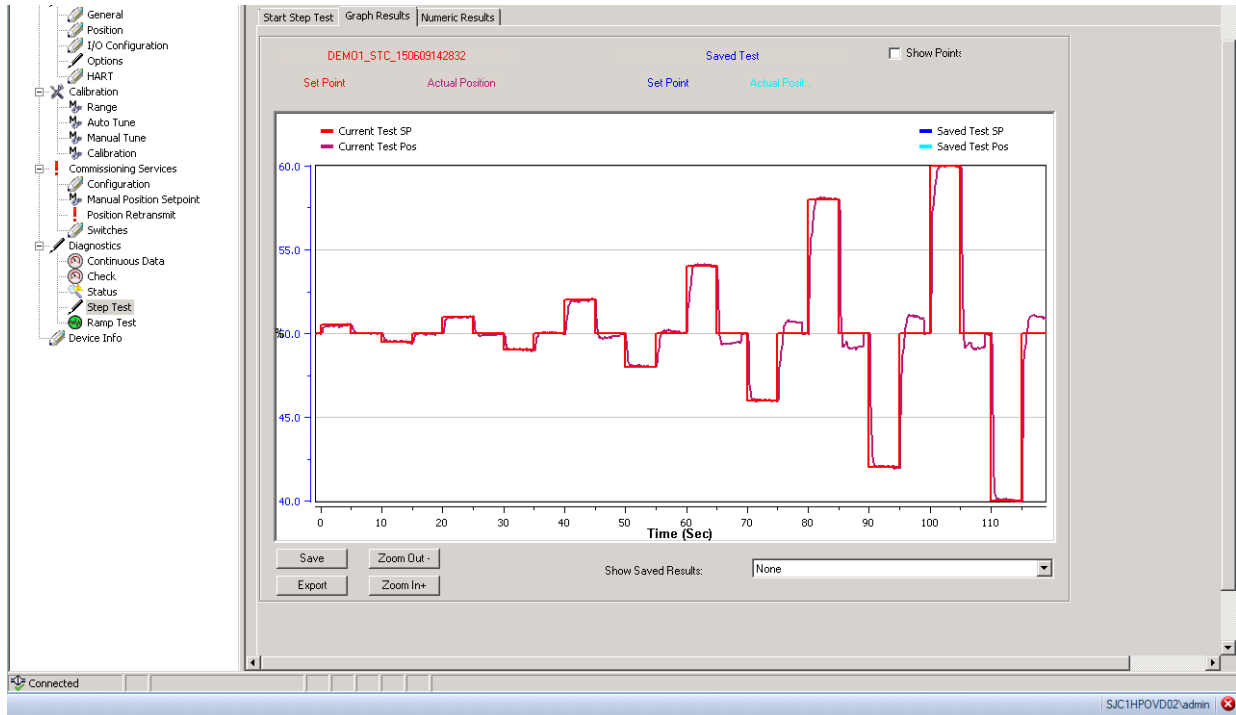


Diagnostics Step Test Complete: Custom Step

You can now “Save Test Results” on [page 110](#) or “Export Test Results” on [page 111](#)

Custom Step Graph Results

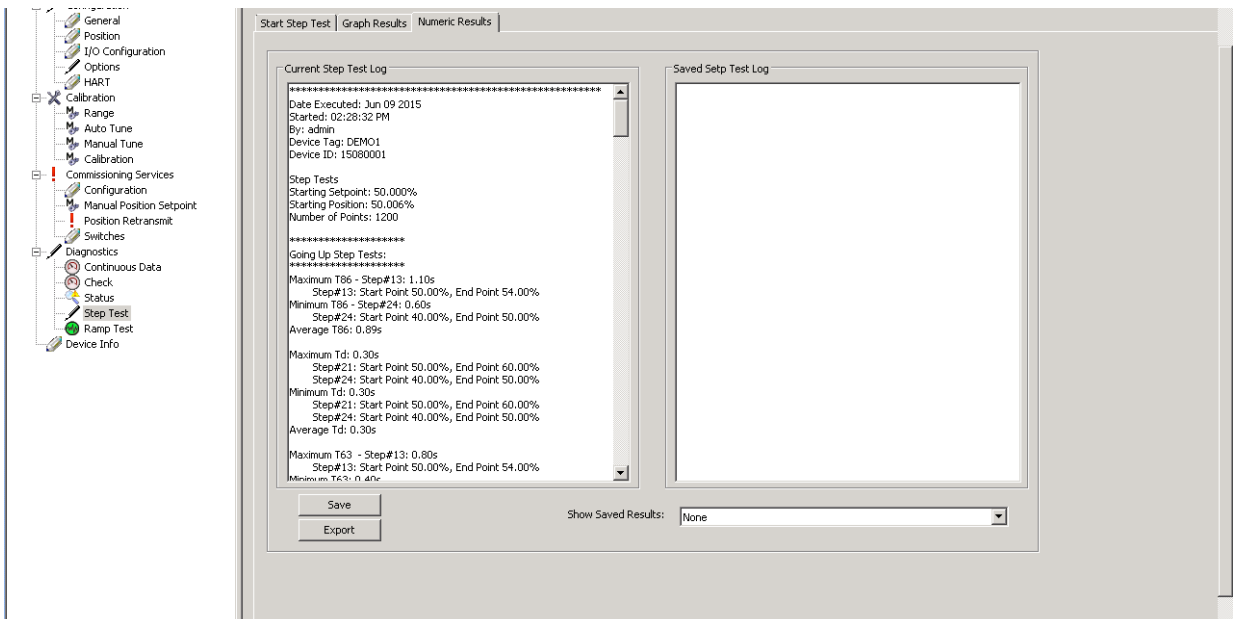
See “Single Step Graph Results” on [page 97](#) for further explanation.



Custom Step Graph Results

Custom Step Numeric Results

Use this tab to view numeric results. See “Single Step Numeric Results” on [page 99](#) for further explanation of screen components.



Custom Step Numeric Results

Save Step Test Results - See “Save Test Results” on [page 110](#).

Export Step Test Results - See “Export Test Results” on [page 111](#).

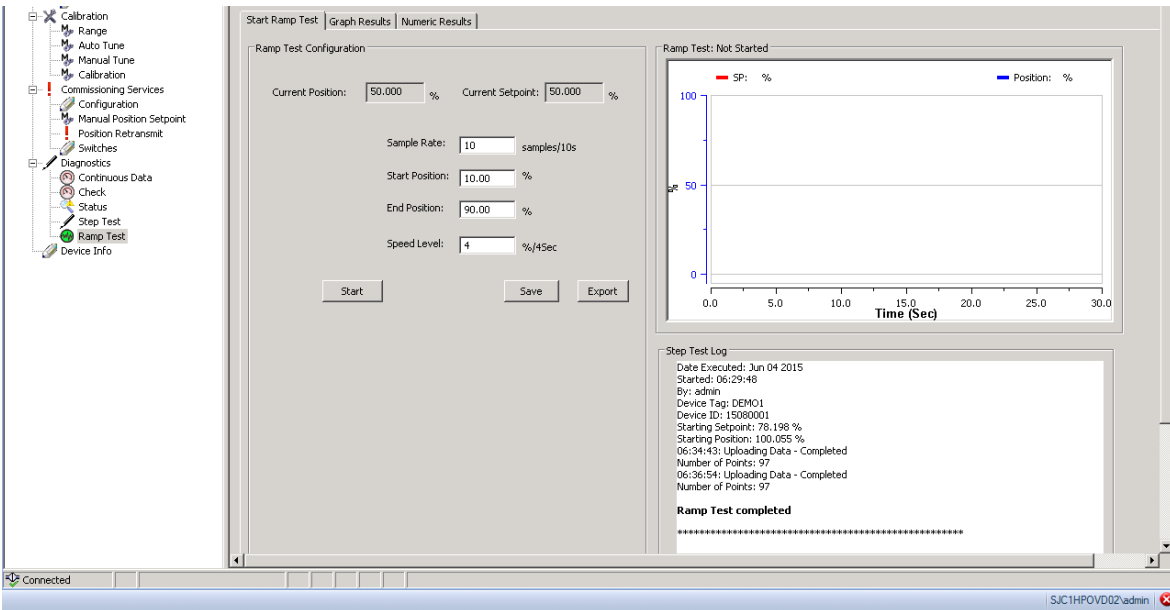
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Diagnostics Start Ramp Test

Use this tab to configure and run a *Ramp Test*.

CAUTION

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



Diagnostics Start Ramp Test

Buttons and Fields

Ramp Test Configuration

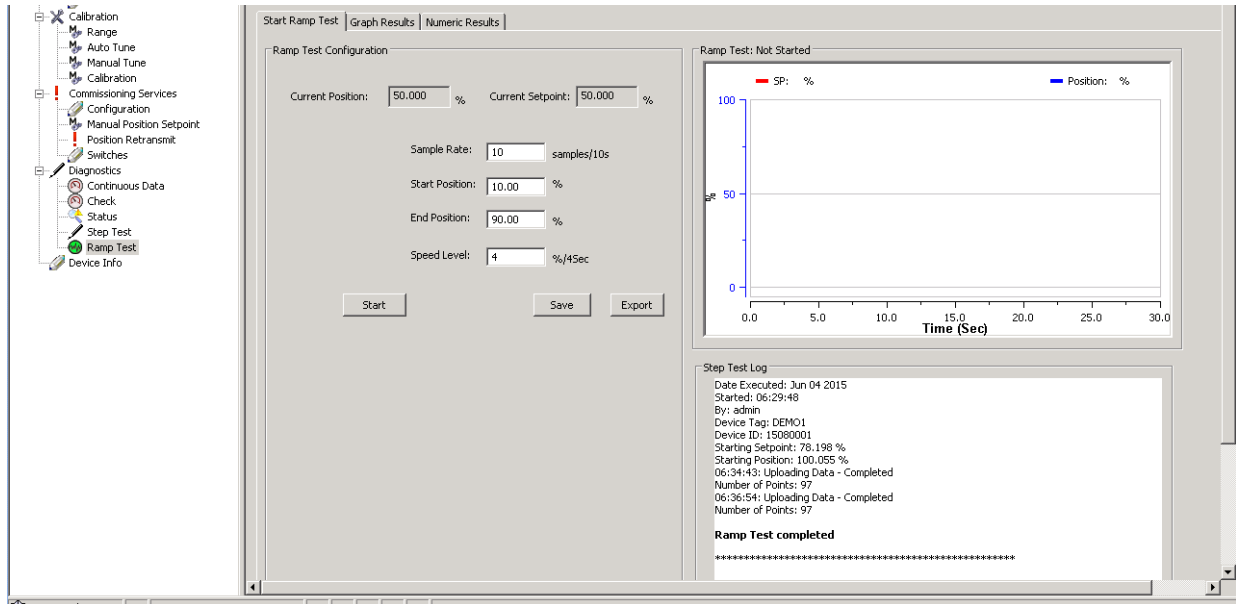
Current Position	Displays the current position as a percent of fully open or closed.
Current Setpoint	Displays the current setpoint as a percent.
Sample Rate	Enter the a rate in samples per 10 seconds. Larger numbers make for longer tests.
Start Position	Enter the position for the valve positioning before the test start.
End Position	Enter the final position for the valve positioning during the test.
Speed Level	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 4. This field can be adjusted to account for larger (larger volume involved) or smaller valves (smaller volume involved).
Ramp Test Log	Displays progress message, values and error messages as the test proceeds
Ramp Test Graph	Displays graphical results as the test proceeds. The test status appears above the graph.
Start	Click to start the test. Updates appear in the <i>Ramp Test Log</i> .
Save	Click to save the results. You can load back the result in the selection <i>Show Saved Result</i> in <i>Graph/Numeric</i> tabs.
Export	Click and a dialog appears to export the results to an Excel file. See “ <i>Export Ramp Test Results</i> ” on page 111 .

Run Ramp Test


CAUTION

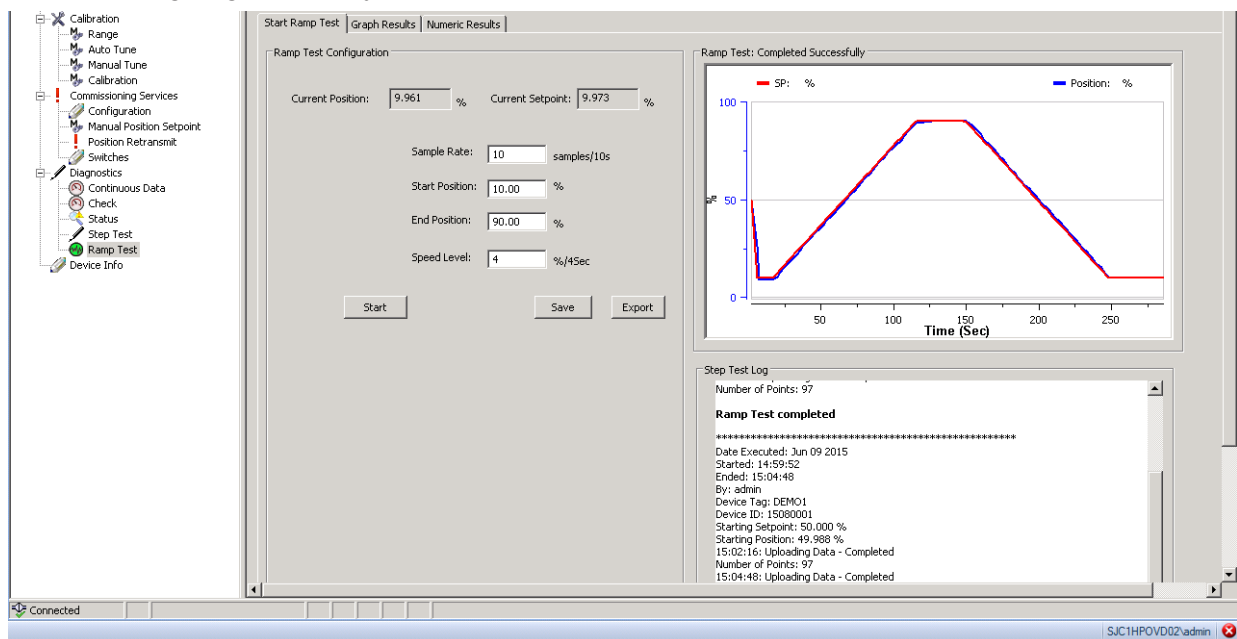
Procedures (e.g. Find Stops, Auto Tune, Step Test and Ramp Test) should **NOT** be invoked if the ValVue sequencer is running.

1. Ensure the system is in *Setup* mode.



Diagnostics Start Ramp Test

2. Enter values for Sample Rate, Start Position, End Position, and Speed Level and click . The Ramp Test Log begins displays test data.



Diagnostics Ramp Test Complete

You can now “Save Ramp Test Results”.

Save Ramp Test Results - See “Save Test Results” on [page 110](#).

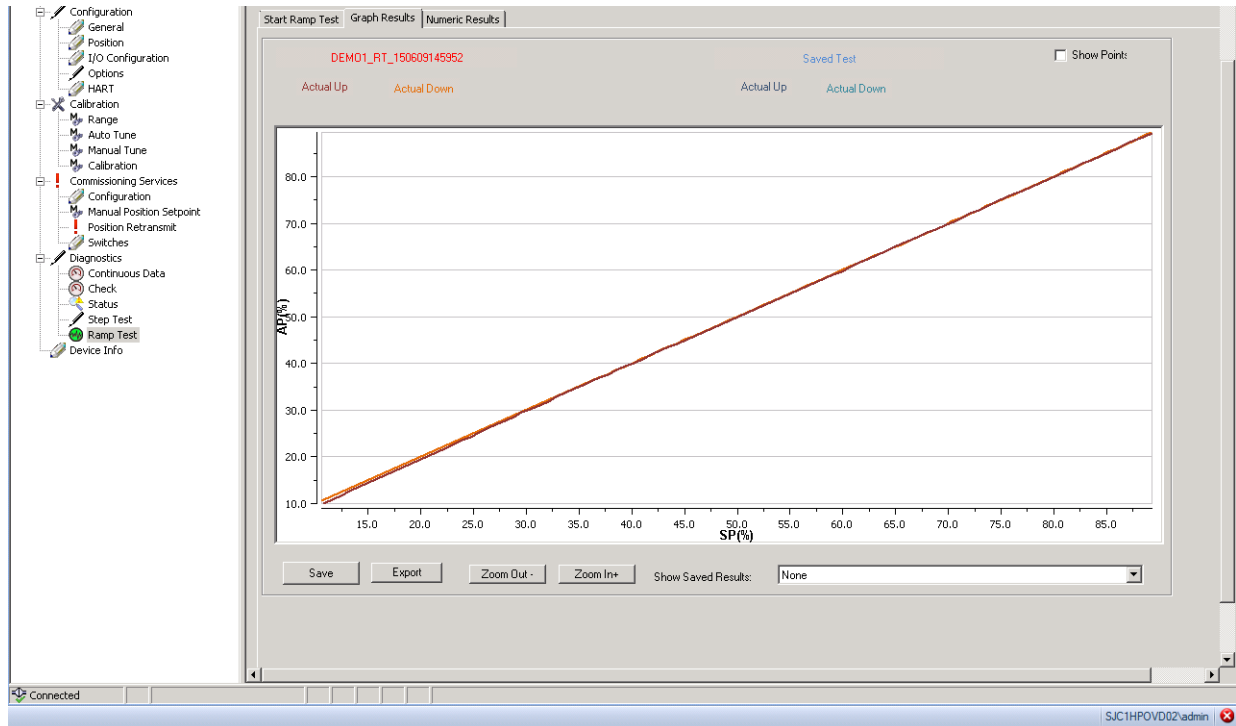
Export Ramp Test Results - See “Export Test Results” on [page 111](#).

Diagnostics Ramp Test Graph Results

CAUTION

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

Use this tab to view the graphical results.



Diagnostics Ramp Test Graph Results

Buttons and Fields

Ramp Test Graph Results

General Graph Functionality

All graphs have some common functionality, including:

- 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.
- Right-click menu: There is a menu available by right-clicking any axis that has three selections:
 - Tracking Enabled*: Enables/disables tracking.
 - Update Resume Values*: Store the axis scale for the *Tracking Enabled*. The next time *Tracking Enabled* is engaged, the tracking restores the axis to the stored scale instead of the initial scale.
 - Zoom to Fit*: Activates a function that sizes the graph to fit the selected display area.

Unit Name

Displays the name of the SVi1000 unit.

Setpoint

Displays the setpoint.

Actual Up

Shows the distance up for valve position.

Actual Down

Shows the distance down for valve position.

Setpoint vs. Error Graph

Displays a graph of the setpoint versus the calculated error.

Buttons and Fields

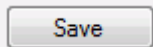
Ramp Test Graph Results (Cont.)

AP (Actual Position) vs. Setpoint or Time Graph

Displays a graph of the valve position versus the setpoint or versus time.

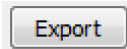
- Left axis displays a scale for the counts.
- Bottom axis displays time.
- The red line represents the current test setpoint.
- The brown line represents the current AP up position.
- The orange line represents current AP down position.
- The blue line represents the current test setpoint.
- The green line represents the saved test AP up position.
- The orange line represents saved test AP down position.

Save



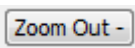
Click to save the results. You can load back the result in the selection *Show Saved Result* in *Graph/Numeric* tabs.

Export



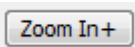
Exports the results as a .csv file. See "Export Step Test Results" on [page 111](#) for instructions.

Zoom Out -



Toggles the view out according to preset values to two times.

Zoom In +



Toggles the view in according to preset values to 50%.


Show Saved Results

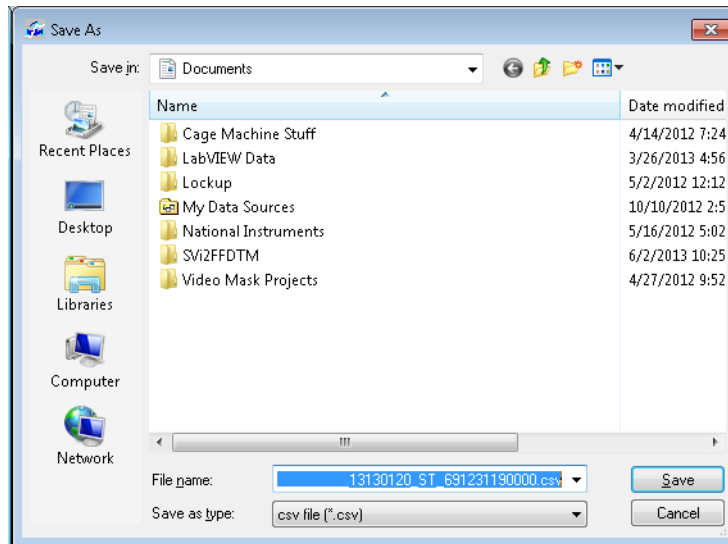
Use the pulldown to select a results file and the graph is populated. See "Diagnostics Status Screen" on [page 87](#) for instructions on how to create these files.

Save Test Results

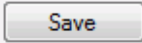
- Click  and the test data is saved in a proprietary format.

Export Test Results

1. Click  and the *Save As* dialog appears. The software adds a default file name (*Export Test Results*) in .csv format. The *Filename* shown below is different for a Ramp test.

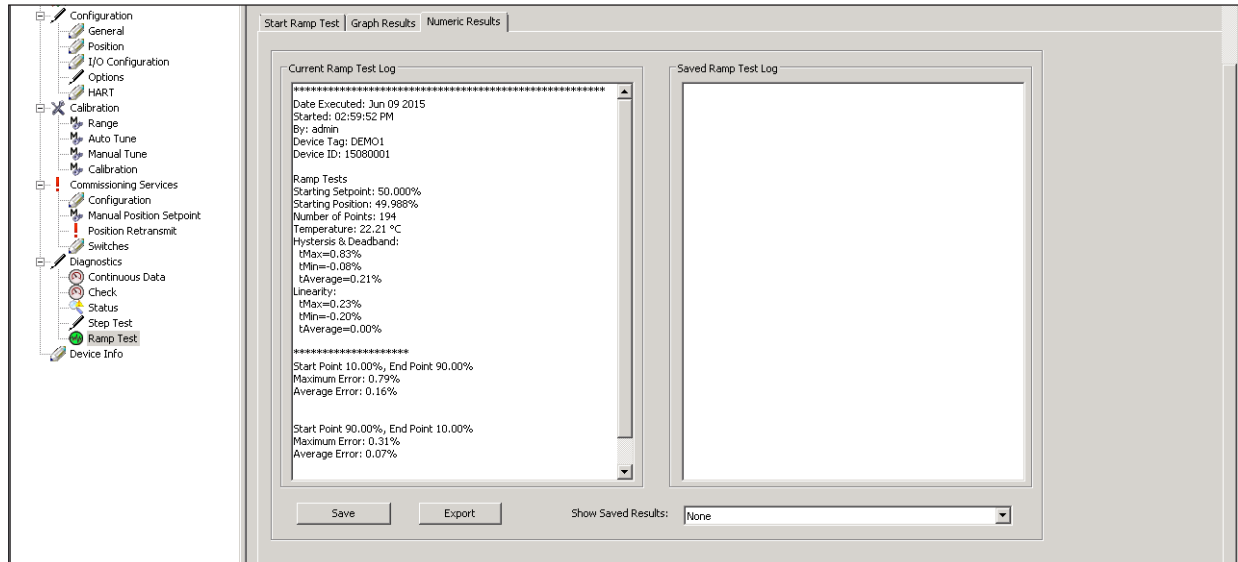


Export Test Results

2. Edit the file name, if required, navigate to a directory and click 

Diagnostics Ramp Test Numeric Results

Use this tab to view log results.



Diagnostics Ramp Test Numeric Results

See “Save Test Results” and “Export Test Results” on [pages 110](#) and [111](#).

Buttons and Fields

Diagnostics Ramp Test Numeric Results

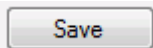
Current Ramp Test Log

Displays the results from a current ramp test. These results can be saved or exported.

Ramp Test Log

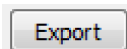
Displays the results from an historical ramp test accessed using the *Show Saved Results* pulldown.

Save



Click to save the results. You can load back the result in the selection *Show Saved Result* in *Graph/Numeric* tabs.

Export



Exports the results as a .csv file. See “Export Ramp Test Results” on [page 111](#) for instructions.

Show Saved Results

Use the pulldown to select a results file and the graph is populated. See “Diagnostics Status Screen” on [page 87](#) for instructions on how to create these files.

Fault Matrix

Table describes SVi1000 faults and helps determine the cause and corrective action.

Fault Matrix

Sequence, Byte #, Bit #	FAULT Name (Anchor)	TEXT For SVi1000 DTM English	HELP For SVi1000 DTM English	Criticality	Probable Cause	Recommended Action
1, 0, 0	RESET	Reset	Device reset indicator	3	Device reboot. The power recovered. Incoming signal was below 2.9 mA.	Reset the flag using the SVi100 DTM or HART Host.
2, 0, 1	LOW_POWER	Low Power	Input current < 3.2 mA	3	Device power is below 3.15 mA.	Increase mA only if calibration or diagnostics are to be performed.
3, 0, 2	ACTUATOR	Actuator Error	Unable to position the valve normally.	2	1: Air supply is insufficient. 2: Handwheel or mechanical stop present. 3: Valve stuck or sticking excessively. 4: Unbalance forces on valve trim exceeds actuator capability.	1: Increase air supply above spring final value + 10 psig. 2: Verify if mechanical stop is present. 3: Perform valve Step Test using the SVi1000 DTM. 4: If possible, move valve under process conditions. Validate sizing of actuator against process condition using ValSpeQ™.
4, 0, 3	AIR_SUPPLY_LOW	Low Air Supply Warning	Supply Pressure below low limit	2	Air supply is not turned on or is set below 10 psig.	Increase air supply above spring final value + 10 psig.

Fault Matrix (Continued)

Sequence, Byte #, Bit #	FAULT Name (Anchor)	TEXT For SVi1000 DTM English	HELP For SVi1000 DTM English	Criticality	Probable Cause	Recommended Action
5, 0, 4	POSITION_ERROR	Position Error	If T1 error is configured AND the position error outside the error band for time T1.	2	<p>1: Controller is slow to follow command signal due to physical valve wear, such as tight packing, stem build up, throttling surface friction or actuator friction.</p> <p>2: Valve is slow to follow command signal due to large volume actuator.</p> <p>3: Valve will not follow command signal due to insufficient or no air supply.</p> <p>4: Valve does not move because the device's mode is not set to Normal.</p> <p>5: Valve will not follow command signal due to poor controller tuning for current valve status.</p> <p>6: Valve will not follow command signal due to controller malfunction such as I/P or Relay.</p> <p>7: Valve will not follow command signal due to in line obstruction.</p>	<p>1: Perform step test using the SVi1000 DTM. Verify that air supply droop during filling is less than 15% or the set pressure.</p> <p>2: Validate that the air supply set to the instrument is greater than the spring final + 10 psig.</p> <p>3: Set the mode to Normal using the SVi1000 DTM or HART Host.</p> <p>4: Perform Autotune or Manual tuning using the SVi1000 DTM or HART Host.</p> <p>5: Verify if Bias Out Range or I/P Out of Range events are active.</p>
6, 0, 5	I2CBUS				Hardware failure: Main Board I2C bus failure.	
7, 0, 6	KEYPAD	Keypad Fault	Possible moisture inside or connector or mechanical failure.	2	The local user interface and display is defective or pushbutton pressed for more than seven seconds.	Replace the local user interface and display assembly.
8, 0, 7	MARGINAL_POWER	Marginal Power		2	The input current is less than 3.85 mA.	Increase loop current to 4 mA only if calibration and diagnostics are to be performed.
9, 1, 0	CALIBRATION_FAILED	Calibration Failed	Calibration of AO or pressure failed.	3	Calibration of the input sensors was outside the acceptable range when attempting to calibrate.	Using precision measuring equipment, perform calibration according to boundary limits of input sensors.

Fault Matrix (Continued)

Sequence, Byte #, Bit #	FAULT Name (Anchor)	TEXT For SVi1000 DTM English	HELP For SVi1000 DTM English	Criticality	Probable Cause	Recommended Action
10, 1, 1	FIND- _STOPS_ _FAILED	Find Stops Failed	Find Stops process failed,	3	<p>1: When calibrating stops (Zero / Span) the travel sensor moved outside the acceptable limits.</p> <p>2: A procedure timeout occurred due to an extremely large volume of actuator to displace.</p> <p>3: Valve position could not stabilize when deenergizing or when energizing the actuator.</p>	<p>1: Using the SVi1000 DTM or HART Host, verify that travel sensor counts is 0 +/- 1000 with the valve closed. For a 90° valve, measured sensor count is done at 50% travel.</p> <p>2: Using the SVi1000 DTM or HART Host, performs a Manual Stop calibration.</p> <p>3: Verify that air supply is adequate. Verify that accessories (boosters, quick exhausts, etc.) are not creating instability.</p>
11, 1, 2	AUTOTUNE_ _FAILED	Autotune Failed	Self tuning failed to converge on acceptable parameters.	3	<p>1: When performing an Autotune, procedure failed to complete due valve hysteresis beyond 50%.</p> <p>2: Air supply is insufficient.</p> <p>3: Air supply droops significantly during actuator filling.</p>	<p>1: Using the SVi1000 DTM or HART Host, perform an Autotune with an aggressiveness level between 2 and 4. Or manual tune the parameters according to the instruction manual.</p> <p>2: Increase air supply above spring final value + 10 psig.</p> <p>3: Perform 5 to 10% steps and observe air supply gauge on the controller.</p>
14, 1, 5	RTOS_ _SCHEDUL- _ING	Operating System Fault.	An internal error from which the device recovered automatically	2		
17, 2, 0	BIAS_OUT_ _OF_RANGE	Bias Out Of Range	An important internal parameter is out of range.	1	The servo signal to the current to pressure converter is outside of normal throttling range.	
18, 2, 1	IP_OUT_ _OF_ _RANGE	I/P Out Of Range	I/P current feedback is out of range.	1	The loop current to the internal current to pressure converter is outside of normal range.	

Fault Matrix (Continued)

Sequence, Byte #, Bit #	FAULT Name (Anchor)	TEXT For SVi1000 DTM English	HELP For SVi1000 DTM English	Criticality	Probable Cause	Recommended Action
24, 2, 7	AUX_MEM0	Activation related: indicates failure of the Serial Number Hardware.			Activation related: indicates failure of the Serial Number Hardware.	
25, 3, 0	NVM_ - CHECKSUM0	NVM Checksum Error	The device failed to read critical data from non volatile memory.	1	A permanent corruption of the content in non volatile memory occurred.	1: Remove power to the device for 2 minutes and restart the device. 2: If the failure persist, replace the device.
26, 3, 1	RAM_ - CHECKSUM	RAM Checksum Error	An internal error from which the device recovered automatically.	2	A corruption of the content in volatile memory occurred.	Notify Baker Hughes at svilup- port@ bakerhughes.com.
27, 3, 2	FW_ CHECKSUM	Flash Checksum Error	A critical internal fault.	1	Invalid firmware check- sum due to data corruption.	1: Remove power to the device for 2 minutes and restart it. 2: If the failure persists, Replace device.
28, 3, 3	STACK	Stack Error	An internal error from which the device recovered automatically.	2	A problem with the memory stack occurred.	Clear the condition using the DTM or HART Host.
29, 3, 4	FACTORY- WRITE	Factory Write Indicator	Indicator of writes to non volatile memory allowed only for firmware upgrade.	1		
30, 3, 5	NVM_ TEST	NVM Test Error	An error in non volatile memory could not be repaired.	2	A problem occurred when testing non volatile memory.	Clear the condition using the DTM or HART Host.
32, 3, 7	FACTORY- MODE	Factory Mode Indicator	Device performs factory authorized operations.	1	Device is in the factory mode.	1. Remove power to the device for two minutes and restart the device. 2. Clear the alarm using ValVue or HART Host. 3. If the failure persists, replace the complete device or electronics module.

Fault Matrix (Continued)

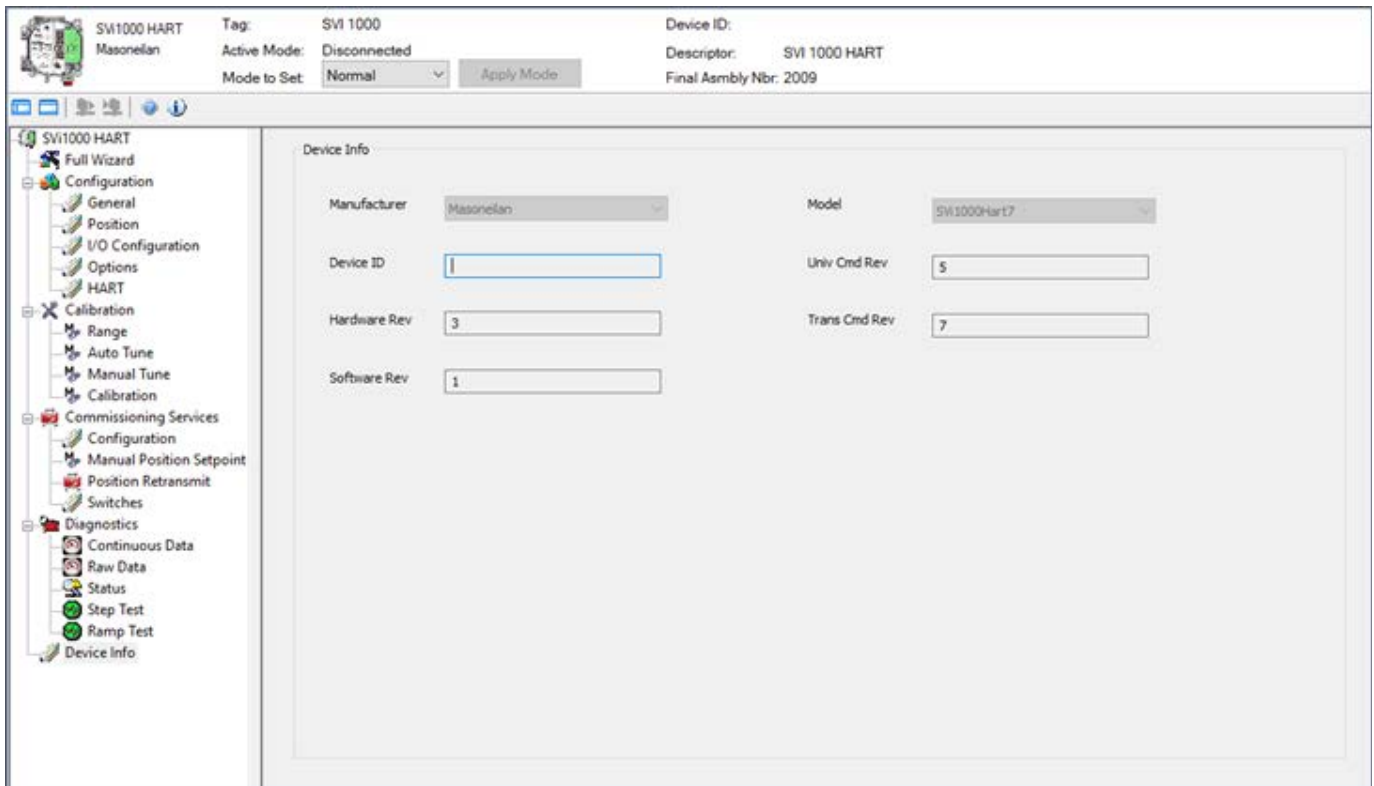
Sequence, Byte #, Bit #	FAULT Name (Anchor)	TEXT For SVi1000 DTM English	HELP For SVi1000 DTM English	Criticality	Probable Cause	Recommended Action
33, 4, 0	REF_VOLTAGE	Ref Voltage Fault	May indicate faulty A/D sub- system.	1	A component problem is affecting the circuit board's reference voltage.	Replace device and report the problem at svisupport@bakerhughes.com.
34, 4, 1	POSITION_SENSOR	Position Sensor Fault		1	Electronic Hall sensor component and related components failed.	Replace device and report the problem at svisupport@bakerhughes.com.
35, 4, 2	CURRENT_SENSOR	Current Sensor Fault		1	Electronic input loop current sensor is damaged.	Replace device and report the problem at svisupport@bakerhughes.com.
36, 4, 3	TEMPERATURE_SENSOR	Temperature Sensor Fault		1	Electronic temperature sensor is damaged.	Replace device and report the problem at svisupport@bakerhughes.com.
41, 5, 0	PRESSURE4	I/P Pressure Sensor Fault		1	1: Pressure sensor has been overpressurized and damaged. 2: Pressure sensor has failed due to some malfunction.	Replace device and report the problem at svisupport@bakerhughes.com.
42, 5, 1	PRESSURE5	Atmospheric Pressure Sensor Fault		2	1: Pressure sensor has been overpressurized and damaged. 2: Pressure sensor has failed due to some malfunction.	Replace device and report the problem at svisupport@bakerhughes.com.
44, 5, 3	NVM_WRITE_NVM	NVM Write Fault	A write to non volatile memory failed; data may be lost on reset.	2	An error occurred when attempting to write to non volatile memory.	1: Clear the condition using the DTM or HART Host. 2: If condition persists, replace device and report problem at svisupport@bakerhughes.com.
45, 5, 4	IRQ_FAULT	IRQ Fault	An internal error from which the device recovered automatically.	2	The circuit board interrupt request failed.	1: Clear the condition using the DTM or HART Host. 2: If condition persists, replace device and report problem at svisupport@bakerhughes.com.
47, 5, 6	SELF_CHECK	MCU Internal Malfunction	A critical internal fault.	1	A general self check failed.	1: Clear the condition using the SVi1000 DTM or HART Host. 2: If condition persists, replace device and report problem at svisupport@bakerhughes.com.

Fault Matrix (Continued)

Sequence, Byte #, Bit #	FAULT Name (Anchor)	TEXT For SVi1000 DTM English	HELP For SVi1000 DTM English	Criticality	Probable Cause	Recommended Action
48, 5, 7	SOFTWARE	Software Error	An internal error from which the device recovered automatically.	2	Operating system failed in conducting a task.	1: Clear the condition using the SVi1000 DTM or HART Host. 2: If condition persists, replace device and report problem at svisupport@bakerhughes.com .
49, 6, 0	HARDWARE_MODULE_IDENT	Terminal Module ID error	Terminal Module identification error	2	1. Board ID was not written correctly during manufacturing. 2. The Data Storage on the Terminal Module is not functioning correctly. 3. Hardware failure.	Service required, report problem at svisupport@bakerhughes.com .
50, 6, 1	RETRAN_DATA_INTEGRITY	Terminal Module data integrity error	Retransmit Module Data Integrity Error	2	1. Data on the Retransmit Module were not written properly during manufacturing. 2. Data on the Terminal Module are corrupted. 3. The Data storage is not functioning correctly.	Service required, report problem at svisupport@bakerhughes.com .

Device Info Screen

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



Device Info Screen

Buttons and Fields

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

10. Device Cloning

Additional Function: Device Cloning

Use this procedure to clone the settings for the purpose of either:

- Replacing the positioner without going through a commissioning sequence that takes the positioner out of process control.
- Using an existing positioner configuration as a basis for another positioner.


This process is two parts:

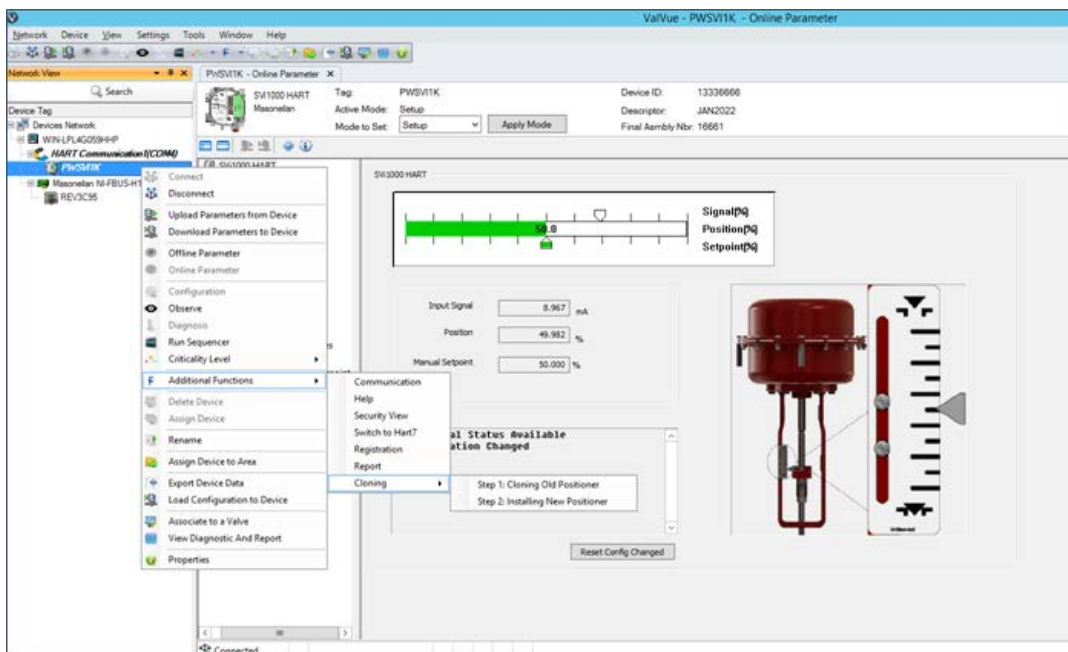
1. “Cloning Old Positioner”
2. “Installing New Positioner”

WARNING Valve must be locked or stay in failsafe position all the time during device cloning process.

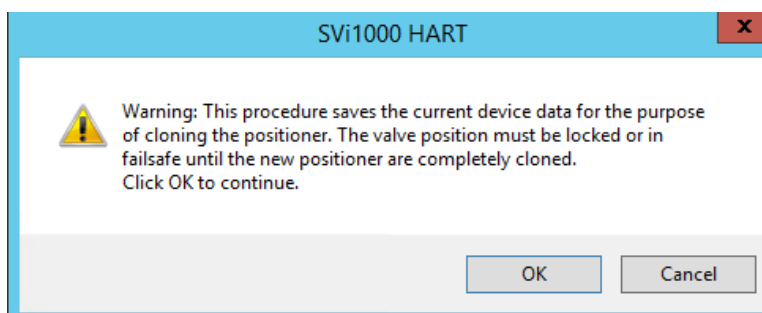
Cloning Old Positioner

This procedure assumes you are using ValVue3 and the SVi1000 DTM:

1. Open ValVue3 and the SVi1000 DTM->Click the Connect icon () and ensure that the system properly connects.
2. Ensure the valve is in Setup mode or you are prompted to do so.
3. Right click on the SVi1000 device ->Find Cloning under Additional Functions



4. Click Step 1: “Cloning Old Positioner” in the menu and Save Data dialog appears.

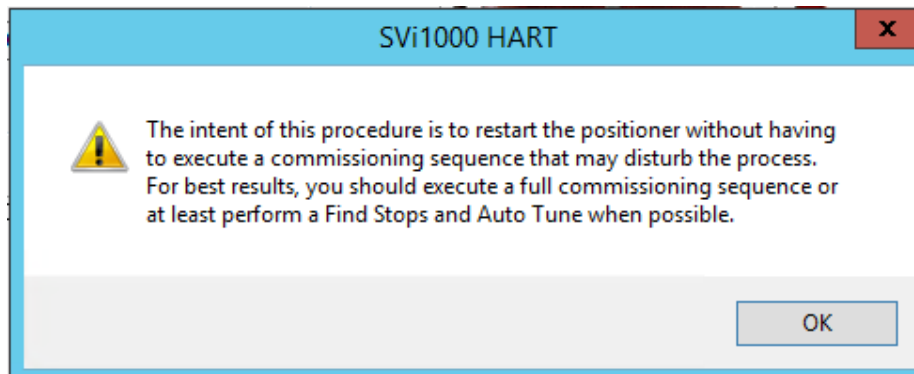


Device Cloning (Cont.)

5. Click OK and follow the instructions on the DTM to run the sequence and save the data.
6. Note the file name for the second part of the procedure.
7. Ensure all conditions that appear on DTM screen are met and then click OK and proceed to Section “Installing New Positioner”.

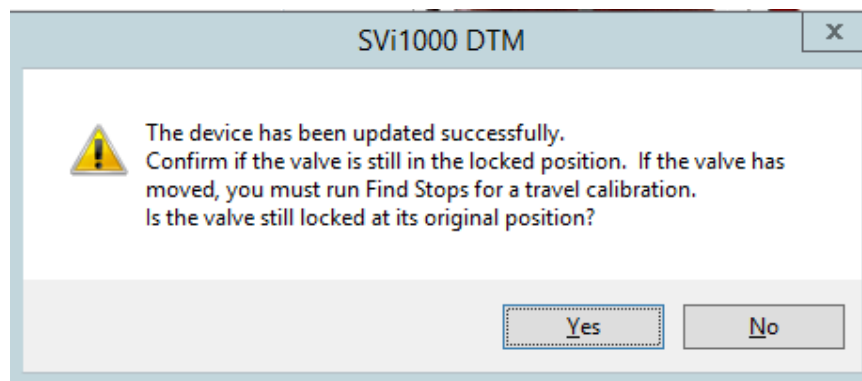
Installing New Positioner

1. Open ValVue3 and the SVi1000 DTM->Click the Connect icon () and ensure that the system properly connects.
2. Ensure the valve is in Setup mode or you are prompted to do so.
3. Click Step 2 “Installing New Positioner” in the menu and Load Data dialog appears.



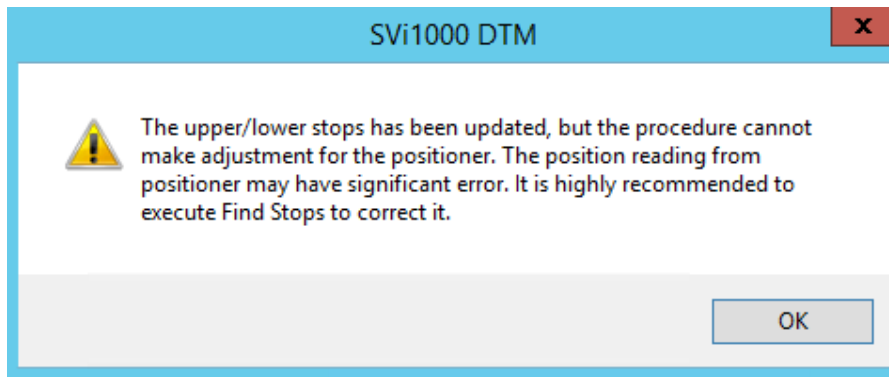
Load Data to Clone Device

4. Click OK and follow the instructions on the DTM to run the sequence and load the data to Clone Device.
6. Once complete, Device Update Successfully dialog appears. Figure 110 Device Update Successful



Device Updated Successfully

7. Click:
 - Yes, if the valve is still locked at the original position->the procedure is complete
 - No, if the valve is not at the original position and DTM recommends running Find Stop

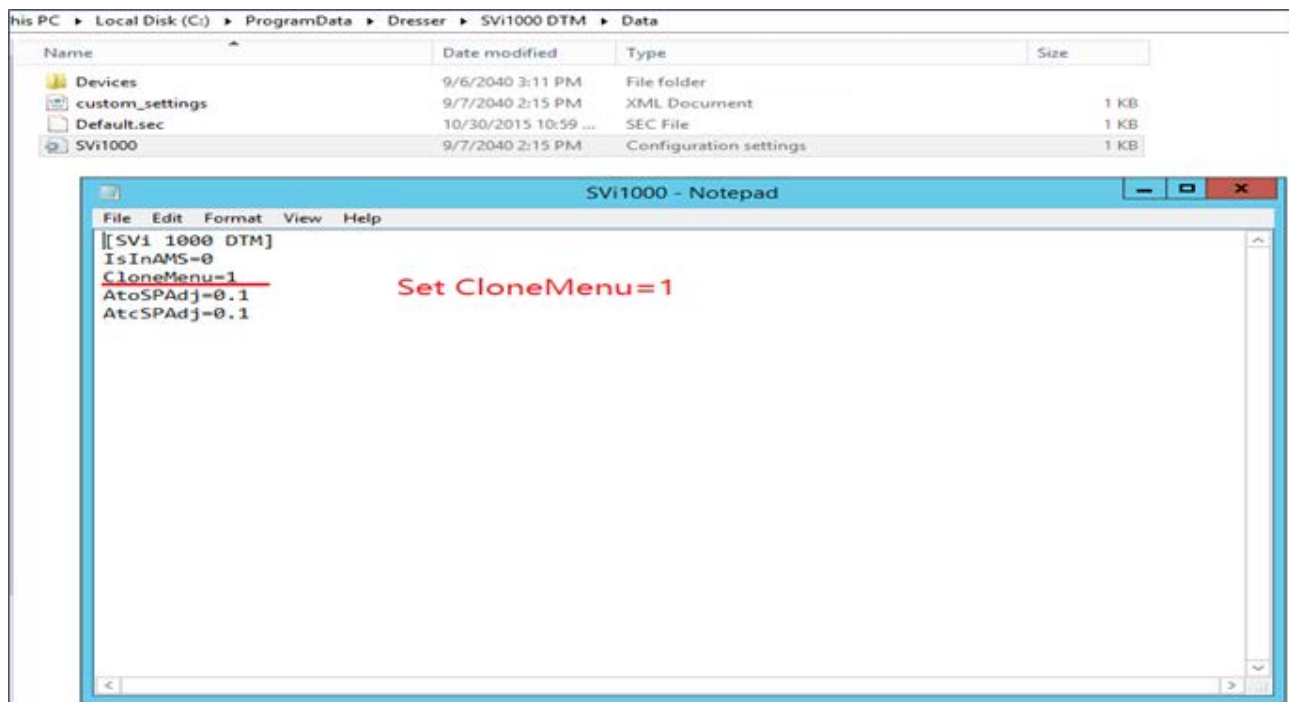


Execute Find Stops Recommendation

Note:

Device Cloning function in SVi1000 DTM is disabled in default.

To enable Device Cloning, please set "CloneMenu=1" in SVi1000 configuration file that is under C:\ProgramData\Dresser\SVi1000 DTM\Data



11. How Do I?

The lists below give you an idea of what tasks you need to accomplish using the SVi1000 DTM. 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.

Getting Started Tasks

- “ValVue Licensing” on [page 16](#) leads you through the entire registration process.
- “Full Wizard” on [page 38](#) explains how to use the wizard to do the initial setup.

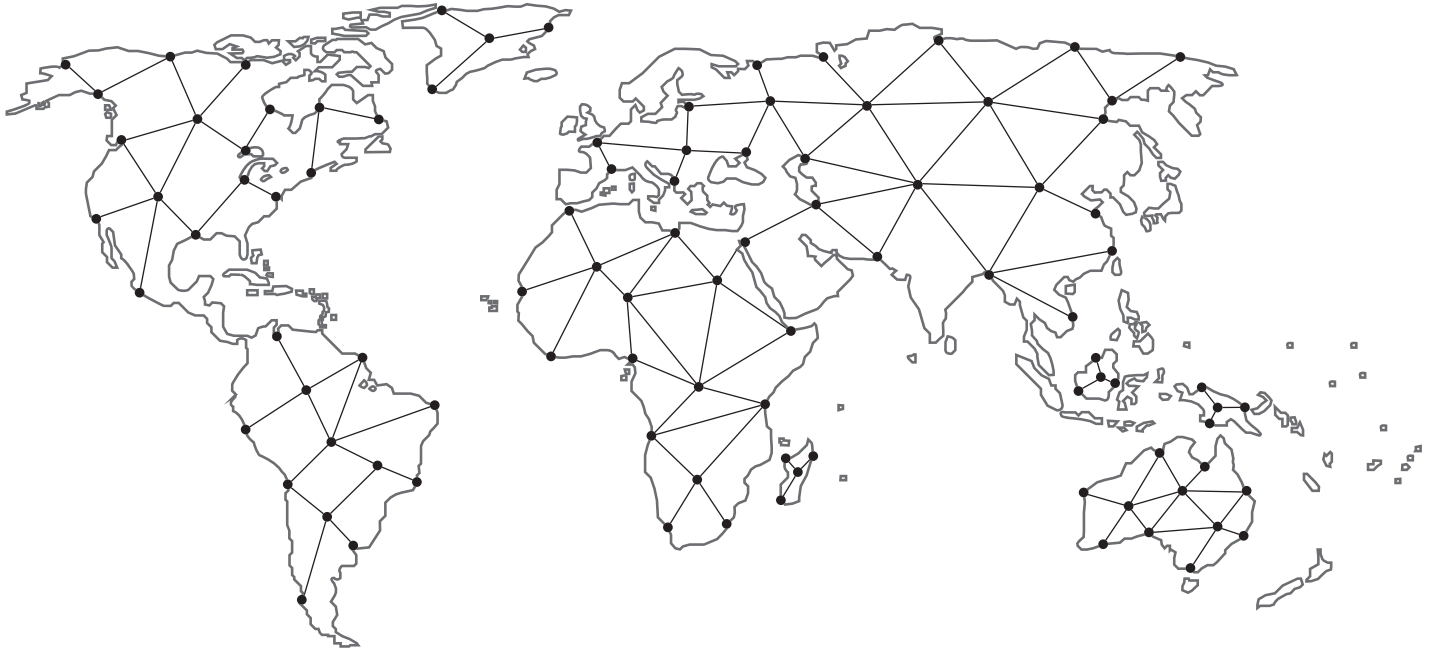
Common Tasks

- “SVi1000 HART Screen Overview” on [page 33](#) explains the operations of the screen where you view process information, change mode and change the setpoint.
- “Calibration Autotune Screen” on [page 69](#): to run autotune.
- “Configuration General Screen” on [page 46](#): to configure Tag Information, Descriptor, Date, etc. You can read parameters from the positioner in Setup, Manual and Normal modes and write in Setup mode.
- “Configuration Position Screen” on [page 50](#): to set all position based limits.
- “Configuration I/O Configuration Screen: on [page 51](#): to configure switch states, activate/ deactivate digital input, configure the input signal range.
- “Configuration Options Screen” on [page 52](#): to configure the parameters related to valve characterization and bumpless transfer.
- “Configuration HART Screen” on [page 56](#): to configure and work with Burst mode.
- “Commissioning Services Configuration Screen” on [page 78](#): to change Tag and to configure the input signal high/low.
- “Calibration Screen” on [page 59](#):to restore the factory calibration data for all sensors.
- “Calibration Range Screen” on [page 60](#): to automatically search for the mechanical valve travel limits.
- “Calibration Autotune Screen” on [page 69](#): to commission a valve positioner. It includes the ability to configure PID parameters and aggressiveness while tuning.
- “Calibration Manual Tune Screen” on [page 72](#): to enter manual tuning parameters.
- “Commissioning Services Screen” on [page 76](#): to monitor signal, position and setpoint.
- “Commissioning Services Manual Position Setpoint Screen” on [page 79](#): 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).
- “Commissioning Services Position Retransmit Screen” on [page 80](#): to configure the settings when the SVi1000 is configured to send a retransmit signal
- “Diagnostics Screen” on [page 83](#): to perform a device reboot of the SVi1000 while in Manual, Normal and Failsafe mode.
- “Diagnostics Check Raw Data Screen” on [page 85](#): to view the raw counts of status of signals, temperatures and I/Os. Additionally, you can monitor and Set I/P and Unset I/P.

- “Diagnostics Signature Measurement: General Discussion” on [page 93](#): to begin using the diagnostic tests. “Commissioning Services Switches Screen” on [page 81](#): to set the default operating position for the switches.
- “Continuous Data Screen” on [page 84](#): to view data about valve operations at closing and opening, which useful in valve operation analysis.
- “Diagnostics Status Screen” on [page 87](#): to see the SVi1000 operating and internal status. You can reset the Current Faults or All Faults (Current and Historical).
- “Device Info Screen” on [page 119](#): to view device Info data.

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