GE Oil & Gas

Masoneilan^{*} Products ValVue* Software v2.8 (Rev C) Software Manual

ValVue is a device management software suite designed exclusively for all Masoneilan digital products.





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Document Changes

Version/Date	Changes
B/6-2012	Added HART 6 functionality.
	Updated screen captures throughout.
	Added Burst section.
	Updated ValVue Options screen for ValVue 2.8 functionality.
	Reconfigured book to include sections for all ValVue components as opposed to just SVI1000 and SVI II AP.
C/3-2014	Added SVI, SVI2, HDLT and 12400 to the book.
	Changed description of how to physically configure digital switches.

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Check Tab	654
Menu - Check	656
Menu Bar and Footer Buttons	657

Introduction

1

The ValVue software package provides a powerful interface to Masoneilan Smart Valve Interfaces, the 12400 Digital Level Transmitter (HDLT), and other HART instruments. This manual describes the functionality of ValVue software and contains information needed to install and use ValVue with the SVI II AP, SVI1000, DLT 12400 positioners and the VECTOR *Wireless*HART adapter.

ValVue Lite and ValVue Trial

ValVue has a 60-day free trial period before a license is required. After the 60-day trial period, ValVue will not execute. The trial period allows you to evaluate advanced functions such as:

- Diagnostic Procedures
- □ Report Generation
- □ Password Administration

ValVue Lite is offered without registration. It provides sufficient functions to fully commission, configure, and start up a positioner on a control valve.

Stand-Alone or Integrated ValVue

ValVue can be accessed as a standalone application or it can be accessed as a SNAP-ON to the Emerson Process Management AMS, or a Plug In Application to Yokogawa system. Procedures for finding and selecting devices are different in the two contexts. ValVue standalone offers login, user administration, and device selection. For AMS SNAP-ON users, the AMS login, user administration, and device selection, methods are used. The SNAP-ON application requires a license. Contact the factory for licensing information.

ValVue Tasks

The SVI II AP and SVi1000 can be configured, calibrated, and operated locally or remotely using ValVue software on a Windows based computer with a HART modem. Normal control signaling is with 4 to 20 mA DC current (ANSI/ISA-50.1-1982 - (R1992)). For more information on the individual devices, refer to SVI II AP Instruction Manual (GEA19681) or the SVi1000 Instruction Manual (GEA19363), Model V1100 Wireless Adapter Instruction Manual (GEA19362) or 12400 Series Level Transmitter Instruction Manual an Safety Guide (GEA19367).

By using ValVue software it is possible to monitor, configure, calibrate, control and perform valve diagnostics, remotely. ValVue can also provide a basic interface to other HART instruments.

About this Manual

This manual is intended to assist you in easily installing, administrating, and using ValVue to set up, configure, calibrate, monitor operation, and troubleshoot the ValVue family of positioners. This manual contains subsections for each device.

2

ValVue Software Installation and Administration

Requirements

Using the ValVue installation procedures detailed in this chapter requires basic knowledge of Microsoft Windows operating systems and Masoneilan positioners.

NOTE

For installation and administration of AMS, see instructions provided with AMS.



Hardware and Software Requirements

ValVue is distributed on a CD-ROM and runs on a standard IBM-compatible computer. To successfully install and run ValVue, your computer system must meet or exceed the following minimum hardware and software requirements.

- Windows XP SP2, Window Server 2003 SP1 or Window Server 2003 R2, Windows Server 2008, or Windows 7
- □ Windows Pentium or compatible microprocessor; 64 Mb RAM
- □ CD-ROM or DVD-ROM drive
- □ An available serial communication port or USB port
- □ A HART modem
- □ RS232/485 converter for HART Multiplexor
- □ 500 MB of free hard disk space to install and run ValVue

Before Installing ValVue

Before installing ValVue, determine which port the computer uses for serial (RS-232 or USB) communication. The HART modem and RS232/485 or USB converter for ValVue multiplexor configuration both use this port for communication with the positioner.

HART Compliance

The positioner requires a HART compliant communications loop. The HART protocol specifies the noise level, impedance requirements, and configuration of the loop. Conventional communications loops consisting of the following components meet requirements for HART compliance.

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

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



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

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

Failure to Communicate

If the PC (using a modem) fails to communicate with the HART positioner the message *No Devices Found* appears in the *Connected Devices* page. The message *HART I/O Failed* appears if the device communications fails during the session. Communication failure prevents the PC from establishing a link. Possible causes of communications failure related to installation include:

- □ Insufficient Loop Current and Voltage
- Poor wiring contacts
- □ Improper connection of the HART modem to the computer
- □ Incorrect serial port
- □ Using ValVue 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 ValVue to multidrop)

If HART compliance problems are suspected 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 ValVue

Use this procedure to install ValVue software. If the ValVue installer finds a previously installed version of ValVue, it uninstalls the old version. A dialog box asks your permission to uninstall. Run the installer again to install the new version.

- 1. Insert the ValVue installation CD into your CD-ROM drive.
- 2. Select **Start->Run** from the taskbar.
 - □ Select Enter or OK.
 - □ Follow the prompts on your screen to complete the installation process.

ValVue - InstallShield Wizard		\mathbf{X}
	Welcome to the InstallShield Wizard for ValVue	
	Welcome to the ValVue Setup program. This program will install ValVue 2.80.0 on your computer	
	< Back Next > Cancel	

Figure 1 ValVue Installation Wizard

ValVue - InstallShield Wizard	×
License Agreement Please read the following license agreement carefully.	
 END-USER LICENSE AGREEMENT FOR SOFTWARE OF DRESSER, INC. This End-User License Agreement ("EULA") is a legal agreement between you (either an individual person or a single legal entity, who will be referred to in this EULA as "You") and Dresser, Inc. (who is referred to in this EULA as "Dresser") for the software product that accompanies this EULA. By selecting Accept or by using the software, you agree to be bound by the terms of this agreement. If you do not agree to the terms of this agreement, select Not Accept. Grant of License: This License Agreement permits you to use one copy of the specified version of the software identified above on any single computer. I accept the terms of the license agreement I do not accept the terms of the license agreement 	
InstallShield Kack Next > Cancel)

Figure 2 License Agreement

ValVue - Ir	nstallShield Wizard	
Choose D Select fo	estination Location Ider where setup will install files.	
	Install ValVue to: C:\Program Files\DFC\ValVue	Change
InstallShield –		< Back Next > Cancel

Figure 3 ValVue Default Destination Location

ValVue - InstallShield Wizard	×
Ready to Install the Program The wizard is ready to begin installation.	
Click Install to begin the installation.	
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.	
InstallShield	_
< Back Install Cancel	

Figure 4 Install ValVue

ValVue - InstallShield Wiza	ard
	InstallShield Wizard Complete The InstallShield Wizard has successfully installed ValVue. Click Finish to exit the wizard.
	< Back Finish Cancel

Figure 5 Finish Installation

Administration

An administrative program, *ValVue 2 Administration*, is installed along with ValVue. After successful installation, the ValVue system administrator should change the default login and password using the administrative program. There are two default login names installed and they are both case sensitive (Table 1).

Login Name	Password	Permission Level
admin	(No password needed)	9
masoneilan	new	8 (Used only for training)

Store the ValVue setup CD-ROM in a secure location to provide system security.

ValVue System Administration, Passwords, and Privilege Levels

In a system having many users with various levels of training and responsibility it is recommended to restrict certain user's access to a limited range of functions. Starting the ValVue program requires a valid account with a user name and a password for each user. The privilege level associated with a ValVue account determines which functions of the program the user is allowed to access.

The ValVue Administration program, *ValVue2Admin.exe*, allows the administrator to perform all user account administrative functions, run ValVue and control access to the functionality of HART positioner. AMS handles security with passwords differently from ValVue. See the AMS documentation.

The administrative functions include:

- $\hfill\square$ Adding new user accounts
- Deleting existing user accounts
- □ Changing existing user accounts
- □ Adjusting privilege levels

Starting Administration Program

To start the ValVue Administration program:

1. Select **Start > All Programs > Dresser > ValVue > ValVue Tools > ValVue Administration** and Figure 6 appears.

Administer Program		
Select the program to administe	r.	
C Valvue		
C AMS Masoneilan Snap-on		
Cancel	Help	

Figure 6 ValVue Administration Program Startup



System administration, users, and licensing for the AMS SNAP-ON differ from similar functions in ValVue. See the AMS instruction manual.

2. Select ValVue and click OK and Figure 7 appears.

ValVue2 Administration	. – 🛛
Help	
ValVue Administration - Info	
User Name	
Password	
Login	
ValVue2 Administration	
ExitHelp	

Figure 7 ValVue Administration Login

3. Enter **admin** as *User Name*. The system is case sensitive; you must enter the default names in lower case. Leave *Password* blank for the first time.

ValVue2 Administration			
Help			
ValVue Administration - Info Admi	inistration		
User Names		Privilege	
admin	00000	9	Enable Checking of User Name
Masonerran	02203	0	and Password when application starts
Delete			
User Name	Password	Password	Again Privilege Level
			4 💌
Add			
Save Revert			
			Exit Help

4. Select Login to start an Administration window (Figure 9).

Figure 8 ValVue Administration Screen



Use permission level 8 for training only. Level 8 allows the positioner to be disconnected from the process control system.

The administration program, when first installed, contains two accounts. One account is the administrator account that you are using. The other account has User Name of masoneilan in lower case and password of new also in lower case. The masoneilan account is assigned privilege level 8 that allows use of the process control simulator for training purposes. The process control simulator duplicates, in software, a process with a dead time of one second and a lag of five seconds. Never assign permission level 8 to basic users.



The administrator should change the login names and passwords. Continued use of the login account names and passwords renders the system insecure.

ValVue Lite does not require the administration program, and does not require passwords. If restricted access is required, distribution of the ValVue Lite program software must be limited.

Add Users

To add users:



If you need to discard your changes click the **Revert** button.

- 1. Enter the User Name.
- 2. Enter a password in the *Password* field and re-enter the password in the *Password Again* field.
- 3. Assign a privilege level (refer to "Privilege Level" on page 29).
- 4. Select Add

ValVue2 Administration				
Help				
ValVue Administration - Info Adr	ninistration			
User Names		Privilege		
admin	00000	9	Enable Checking of User Name	
masoneilan	02283	8	and Password when application starts	
Delete User Name John Smith	Password	Password	Again Privilege Level	
Add				
			ExitHelp	

Figure 9 Adding a ValVue User

- 5. Enter additional users.
- 6. Select **Save** and select **Exit** (Figure 10).

ValVue2 Administration				
Help				
ValVue Administration - Info Administra	ation			
(1
User Names		Privilege		
admin	00000	9	Enable Checking of User Name	
masoneilan	02283	8	and Password when application	
John Smith	00433	8	starts	
Delete				
Liser Name	Password	Password As	Thin Privilege Level	
John Smith	×××××			
	1			
Add				
Save Revert				
<u>1</u> 2				
			Exit Help	

Figure 10 Saving New User

Editing User Accounts

To edit a user account:

- 1. Select the account you need to edit.
- 2. Delete the selected account.
- 3. Create an account with the changes.

Deleting a User Account

To delete a user's account:

- 1. Select the user account in the list box.
- 2. Select the **Delete** button.
- 3. Select **Save** to apply your changes.
- 4. Select **Exit**.

Privilege Level

Each user is assigned an account with an associated privilege level associated. You provide ValVue users an appropriate privilege level so you can keep field devices secure from the actions of unknowledgeable or unauthorized users.

Privilege level ranges from 0 (lowest) to 9 (highest). Table 2 defines several privilege levels that control access to specific functions of the ValVue program.

It is recommended that the administrator be assigned a second login name and password with lower privilege, such as level 4, for routine use.

Privilege Level Details

Security Level	Description
Level 0	Allows you to login to ValVue only if the connected positioner is in normal operating mode. You can send commands that replies with configuration, calibration, and status information, but you cannot change any information. Level 0 users cannot go to manual mode.
Level 1	Allows you access to either normal operating mode or manual mode. You can transfer from one to another mode (i.e. you can take the positioner out of normal mode and put it in manual mode). However, you cannot change the calibration or configuration.
Level 3	Allows you to change the configuration or calibration values, but does not allow you to perform operations that stroke the valve (Find Stops and diagnostics).
Level 4	Allows you to perform all operations except <i>Save Factory</i> standard valve signature and <i>Restore SVI Memory</i> .
Level 8	This level is intended for training and should be used cautiously. It grants all of the privileges of level 4 plus allows access to the simulation mode of the optional process controller. The process controller is an available option. The simulation mode of the controller allows you to run the process controller without connecting a process variable input to the positioner and is useful for learning how to operate the process controller. Never assign level 8 to ordinary users!
Level 9	Allows access to all positioner functions. In addition, it is the only level allowed to login to the administration program. The administrator has an account of privilege level 9. There must be at least one user of privilege level 9.

Table 2 ValVue Privilege Levels

Starting ValVue

The ValVue program provides a Windows based interface that can operate, configure, calibrate, and diagnose positioners and controllers. ValVue can also communicate with other HART devices at a basic level (using HART Universal Commands) as well. To communicate with a positioner, you need to connect the device to the computer RS-232 serial port through a HART modem, or through an MTL multiplexor and an RS232-485 converter. When there is no connected HART device, ValVue allows you to run offline with a simulated positioner.

ValVue provides an on-line help utility that provides information on how to use functions of the positioner with ValVue. To access the help utility, select the appropriate Help from the Help menu in various ValVue screens. After completing the hardware connections, communication with a positioner can begin.

Always return control of the device to the control system before ending a ValVue communications session. If communications to the positioner are interrupted by a computer system failure, if Windows stops responding, always reboot the computer and return control to the control system before ending the *ValVue* communication session

To start ValVue

 $\hfill\square$ Double-click on the ValVue icon.

or

□ Select Start > Programs > Dresser > ValVue > ValVue.

Registering ValVue

When you start ValVue for the first time the registration window launches. ValVue software must be registered to activate the permanent installation. ValVue can be used without registration for 60 days. Registration allows the factory to keep track of all of ValVue users so that we can notify you of any changes or important information about new software features and updates. A registration card is included with the installation CD.

The software package contains a serial number. Keep a record of the serial number in a secure location. Do not discard the registration card. To register your software, you must launch ValVue to obtain an installation ID number, then contact the factory by mail, telephone, email or Fax, and provide your name, company's name, contact information, the CD-ROM serial number, and the installation ID number from the ValVue login display. Contact information is provided on the registration card that is part of the software package.

Your serial number is located on the ValVue package and on the enclosed sticker. Place the serial number sticker on the detachable card included with the Registration Instruction card and store the card in a secure location. You need the serial number to move ValVue to a different computer.

Masoneilan Software Registration Center provides you with software keys that you enter the next time you run the program. Contact Software Registration Center for a new software key if you are moving ValVue to a different computer or, if you do not have a serial number.

To register ValVue:

- 1. Start ValVue either by clicking on the desktop icon or using the Start programs selection.
- 2. When you start ValVue Figure 11 appears.

ValVue Registration		—
GE GE	E Energy	
ValVue 2.80.0 Copyright (C) 20 (This is an unregis Name Company Serial Number	Build ID: 052412 112 General Electric Company tered copy of the software.) (Leave Serial Number blank for trial) <u>QK</u> <u>C</u> ancel	

Figure 11 ValVue Owner and Product Key Registration Window

3. Enter Name, Company and Serial Number and click OK.

ValVue Registration		— ×
Geo G	E Energy	
ValVue 2.80.0 Copyright (C) 2 (This is an unreg Name Company Serial Number	Build ID: 052412 2012 General Electric Company istered copy of the software.) John Smith Any Company 00000000 (Leave Serial Number blank for trial) QK Qancel	

Figure 12 Applying Owner and Product Key Information

The software key registration window appears (Figure 13).

4. If you need a software key for the Mux option, click the box next to Mux.

ValVue Registration
GE Energy
Software Key
Optional Features (Click the Unlock Key area to enter unlock key)
Optional Features Unlock Keys
Mux
(Leave Software Key blank for trial. To obtain Software Key / Unlock Keys, check feature(s) to be registered and then click Registration)
OK Cancel Registration

Figure 13 Software and Mux Key Window

5. After selecting optional features, click **Registration** and Figure 14 appears.

Registration					
 Fill up all the information and click Save to File. Send the saved registration file to Masoneilan Software Registration Center to obtain the Software Key. Email address: software.reg@ge.com Phone number: 888-784-5463 					
Company:	GE				
User:	Last Name Smith First Name John				
Address:	85 Bodwell Street				
City:	Avo Province/State: MA 💌				
Country:	United States Postal Code: 02332				
Phone:	508-568-9085 Fax:				
E-mail:	john.smith@ge.com				
	Save To File				

Figure 14 Registration Window

- Enter your name and the name of your company. You are now ready to make contact with this information, to obtain your software keys. There are four methods shown on the Registration Instruction Card:
 - 🗆 Mail
 - □ Phone
 - 🗆 Fax
 - 🗆 Email
- 7. Click **Save to File** in Figure 14 to save your registration file and Figure 15 appears. Save the registration information in a text file.



Figure 15 Save Registration Information

Figure 16 appears.



Figure 16 Registration File Saved Dialog

- 8. To email the registration information click **Yes**.
- 9. When you select email registration info, ValVue launches your email service and automatically attaches the registration and Masoneilan Software Registration Center (Figure 17). Click **Send** to email the registration.

If your email program fails to start, contact the software registration center by the email address, phone number, address, or fax number given on the registration card (contained with the ValVue CD).

	-	• <u>A</u>	B		* *
<u>File</u> dit	<u>V</u> iew <u>I</u> nsert F	ormat <u>T</u> ools	<u>A</u> ctions	<u>H</u> elp	
Send	- 4 %	b (((((((((((((((((((:::	options	? *
O This mes	sage has not bee	en sent.			
То	softwarereg				
<u>C</u> c					
	,				
Subject:	Re: Registration	n for ValVue			
Subject: Dear Mas Center:	Re: Registration	for ValVue	egist	ration	

Figure 17 Emailing Registration Info

A dialog indicating the email has been sent appears.

MNRegistration	×
🛕 The en	nail has been sent
	ОК

Figure 18 Registration Email Sent Dialog

10. Click **OK** to close the dialog.

Entering Software Keys

After you have sent the registration info, you are provided you with software keys for ValVue and optional features (when applicable).

Once you have your key, enable the program by:

- 1. Start ValVue.
- 2. Choose View Registration from the Help menu.

3. Enter the *Serial Number* (if not already entered) and click **OK**. On the 2nd registration screen, enter the software key returned to you.

ValVue Registration	×
GE Energy	
Software Key	
5	
Optional Features (Click the Unlock Key area to enter unlock key)	
Optional Features Unlock Keys	
(Leave Software Key blank for trial. To obtain Software Key / Unlock Keys, check feature(s) to be registered and then click Registration) OK Cancel Registration	

Figure 19 Entering Software Key

4. If you have the Mux option and need to enter the software key, click on the screen, under the *Unlock Keys* field and the field becomes active. Enter the Mux software key.

ValVue Registra	tion	
ee ØG	GE Energy	
	Software Key	
	53377E	
	Optional Features (Click the Unlock Key area to enter unlock key)	
	Optional Features Unlock Keys	
	Mux X	
(Lo Ur Be	eave Software Key blank for trial. To obtain Software Key / nlock Keys, check feature(s) to be registered and then click egistration) OK Cancel Registration	

Figure 20 Entering Mux Unlock Key
5. Click **OK** and Figure 21 appears.



Figure 21 Successful Registration Message

Using Unregistered Software

You can use ValVue full version, without a software key, for 60 days after initial installation.

Starting Unregistered Software

To start the unregistered version of ValVue:

- Double click on the ValVue icon.
- or
- 1. Select Start >Programs->Dresser > ValVue > ValVue.

A dialog indicating the number of days remaining in the trial period appears, and then the registration window appears.

2. Click OK.

Offline Mode

There is an offline mode available in ValVue to work with a disconnected HART device.

The Offline options serve two purposes:

- □ Viewing configuration, calibration and diagnostic data, for a positioner using a dump file (.dp1 or .dp2)
- □ Learn the features and functions of a positioner and ValVue

When a positioner is started in the Offline mode you are prompted to select a *dump file* with a *dp1* (or .dp2) extension that contains configuration and calibration data used for running the device.

Offline Operation

To run ValVue in offline mode:

1. Click a **Tag** in the *Connected Devices* screen and click the **Select** button (or double click the selected line). The HDLT Level transmitter offline file is also included. See the HDLT instruction manual.

A *File Open* window appears to select a dump file as a simulated device. The dump files are installed with ValVue in the same location as the program files (Figure 22).

2. Select the sub-folder for the selected device type, then select **Data** and then choose a file. There is a default demo file that can be used for demonstration purposes. There can also be files of actual devices in your plant that been saved in the default folder.

Open					? ×
Look in:	🔁 Data 💌	+	£	-111	
SVI2A	My Documents	ľ			
5V12A	Local Disk (C:) Program Files				
	DFC VaVue 2 SVI2AB				
	Data Second Apps\$ on 'Avo111sfs1' (G:)		_		_
Files of tu	😨 zz-barbara.hulme on 'avo111sfs1\use 🧝 Sandbox\$ on 'Avo111sfs1' (I:)		- न	Cano	n j
Thes of (y)	Service Pdm\$ on 'Avo111sfs1' (N:) Mkting on 'Avo111sfs1\Shared\$' (P:)	_	<u> </u>		
	≥ Shared\$ on 'Avo111sfs1' (S:) My Network Places ■ Pacture				
	🔲 Баскир 🛅 Zip Docs				

Figure 22 Open Offline File

3. Click Open.

If you select a file for a device that is incompatible with the selected device, Figure 23 appears.

ValVue_SVI	×
File contains data from di device type. Choose and	fferent other file.
ок 👌	

Figure 23 Incompatible Device/Data Warning

Go back and check that the subdirectory for the specific device type has been used.

Selecting **OK** reopens the *Open File* dialog. Selecting the matching file type opens up *Monitor* page. SVI II AP Offline appears in the top left corner, indicating the file that ValVue is using a dump file to simulate operations.

ValVue SVI II AP - Offline NEW				
Tools Help				
Monitor Trend Configure Calibrate Diagnostics Status Check	()			
SVI II AP	Signal (%) Signal (mA) Position (%) Setpoint (%) Pressure (psi) Pressure 2			
Tag NEW	Supply Pressure			
Descriptor				
Message	Signal (%)			
Date 15 JUL 2005	0.0 Position (%)			
Assembly Number 0	Setpoint (%)			
	Send Cmd			
Status				
Setup Wizard				
Change Mode 🔶 Mode: Manual	Exit Help			

Offline Mode

Figure 24 Offline Monitor Page

This page intentionally left blank.

ValVue Setup

3

Overview

This section provides information on setting up ValVue. There are several features that you can set up in ValVue before executing operation:

- □ "Configure the Set Options" on page 41
- © "Configure Multiplexor Setup and Operation" on page 45
- □ "Configuring Burst Mode" on page 51

Configure the Set Options

When login is complete, the *Connected Devices* page appears. To configure ValVue for your system:

Vue						
ls Help						
fo Connected	d Devices					
	1-	1944				
Tag	Descriptor	Channel	Mfg.	Device	ID	
No. 2 No.	No Devices Found		10 S.	and the second	Set Options	
SVI	Offline	99 00 00 00	Dresser	SVI		12
SVI2	Offline	98 00 00 00	Dresser	SVI2	Mux Setup	Select
SVI2 AP	Offline	97 00 00 00	Dresser	SVI2 AP	Mux Reset	
HDLT	Offline	96 00 00 00	Dresser	HDLT	Burst Mode Co	ntrol nd by Tac
12400	Offline	95 00 00 00	Dresser	12400		
SVi1000	Offline	94 00 00 00	Dresser	SVi1000	0	Be-Scan
VECTOR	Offline	93 00 00 00	Dresser	VECTOR	0	
						seed.

1. Right-click on the **Connected Devices** page, in the gray area (Figure 25).



2. Select **Set Options** to open the *Options* dialog (Figure 26).

34. Options	
Com Port	Hart Polling Option C From 0 To 63 C Specific 0,1,15 C Ancel
🗖 Use HART serve	Master Mode C Primary Master er Secondary Master
🔲 Load Device Ad	dresses from File
	New File
🗆 Use Multiplexor	MTL-Cornerstone 💌
Baud Rate	Nodes Search Select
© 9600	C Scan all nodes Node 0
C 19200	Selected nodes Node 2
C 38400	Node 4

Figure 26 ValVue Options Dialog

3. Configure as required and click **OK**.

Figure 27 shows the dialog when PF-WHA-GW for a wireless gateway is selected. In this case you need to configure the IP *Address* and *Port*.

34. Options		
Com Port	Hart Polling Option C From 0 To 63 © Specific 0,1,15	OK Cancel
	Master Mode	
	O Primary Master	
🗆 Use HART server	Secondary Master	
Load Device Addresses from File		
Use Multiplexor	PF-WHA-GW	
Address 10 . 40 . 160 . 43		
Port 5094		

Figure 27 ValVue Options for Wireless

Buttons and Fields

Com Port	Select the <i>COM Port</i> on your PC that is connected to the HART modem. If you're not sure which COM port the modem is con- nected to, access Windows' <i>Device Manager</i> to validate the com port number assigned to the PC.
Hart Polling Option	When more than one device is connected on a loop or if polling addresses other than <i>0</i> have been assigned to devices, use these fields. ValVue supports HART devices with non-zero polling addresses and supports multiple positioners on the same loop (for split ranging, for example). If neither box is checked, ValVue looks for devices only at polling address <i>0</i> . Click either:
	 From and choose an address range from 0 to 63. Choosing a range limits scan time.
	 Specific and enter an address or addresses, where you enter one or multiple addresses separated by commas. This also limits scan time.

Master Mode	ValVue communicates with a HART device as a primary master or as a secondary master. HART is a Master-Slave communication proto- col, where the slave (field device) replies to commands sent by the master. The HART protocol lets a device communicate simultane- ously with two masters, as long as they are different Masters: one being a Primary Master and the other being a Secondary Master. A Primary Master is defined as a host (or system interface) that is con- nected permanently with a slave, such as a control system. A Sec- ondary Master is a host (or interface) connected temporarily to the slave (a handheld or laptop computer) and that is not part of the control system.
	When used with a multiplexor, operation is allowed when a second HART master, such as a DCS system, is communicating. The ValVue program must be configured to match the configuration of the mul- tiplexor. If the multiplexor is a primary master, ValVue must also be configured to be a primary master.
	See "Configure Multiplexor Setup and Operation" on page 45.
Use HART server	Check to use a HART server.
Using a Device List File	When you select the Load Device Addresses from File option, each time you connect a device to ValVue the address for the scanned device is saved to a device list file. The device list file eliminates res- canning each time Connect is selected and is useful in a multiplexor setup.
	Uplace Load Davices Addresses from File is selected as an option

Unless **Load Devices Addresses from File** is selected as an option, the device addresses used are temporary and ValVue rescans for the device's address for each program start. If selected, you designate the file where the device list is saved. This device list file is read and appears when the program starts. To change the device list file or create a new one:

1. Click **Load Devices Addresses from File**, click **New File** and Figure 28 appears.

Save As			? ×
Save in: 🗨 Local Disk (C:)		• 🗢 🗈	💣 🎟 •
Cache	MANTA		RECYCLER
Config.Msi	🚞 MSOCache		🚞 System Volume
📄 🗀 dell	🚞 orant		🚞 Temp
Documents and Settings	🛅 P18		C WINDOWS
FVP110 QS Guide	🚞 Peter		
i 1386	🚞 Program Files		
•			F
File name:			Save
Save as type: Device List File	\$	-	Cancel

Figure 28 Device List Save As Window

2. Navigate to the required directory to either locate the old device list file, or to create a new one.

Use Multiplexor Use this option to set ValVue for multiplexor operation. When checked then the *MUX Setup*, and *MUX Reset* controls appear on the *Connected Devices* page context (right click) menu.

This checkbox also activates the multiplexor pulldown list, *Baud Rate* and *Nodes Search*. Multiplexor choices include:

- D MTL-AMS
- □ MTL-Cornerstone
- □ PF-2700F
- □ PF-2700G
- □ SoftMux
- D PF-WHA-GW

Do not check Use Multiplexor unless ValVue is connected to Multiplexor hardware.



Baud Rate

Set a baud rate that is equal to the baud rate set on the multiplexor hardware. The MTL multiplexor supports baud rates of 9600, 19200, and 38400.

Nodes SearchScan all nodes - Click this radio button and when you click **Re-Scan**
on the Connected Devices screen ValVue scans all 32 nodes to find
the connected devices.

Selected Nodes - Click this radio button and the *Select* list appears for selecting a particular node (s) that are scanned when you click **Re-Scan** on the *Connected Devices* screen.

Configure Multiplexor Setup and Operation

ValVue supports the MTL HART multiplexor to monitor and operate many HART devices from a single computer.

The MTL 4840 HART maintenance system is a widely used multiplexor for communicating with HART instruments. Connected to a computer serial port with a RS232/RS485 converter, the multiplexor is capable of supporting up to 31 nodes, each with the capability of supporting up to 16 sub nodes. Each sub node can control 16 loops. Therefore, the multiplexor provides the potential to communicate with a maximum of 7936 HART loops, i.e., 31 (nodes) x 16 (sub nodes) x 16 (loops) using one computer interface. Additionally, the multiplexor supports the multidrop connection of HART devices on a single loop. Therefore, using the multidrop feature it is possible to expended capacity of a system beyond 7936 HART devices.

For more information regarding the MTL multiplexor, refer to the MTL documentation.

Using the multiplexor capability of ValVue and the MTL multiplexor, monitoring and communicating with many SVI's and other HART devices is possible.

Mux Setup

To setup the nodes used on the MTL multiplexor:

- 1. After you have checked **Use Multiplexor** and selected the baud rate and node in the *Set Options* (see "Use Multiplexor" on page 45), select **Connected Devices**.
- 2. Right-click on the *Connected Devices* page background and Select **Mux Setup** on the context menu.

Va	Vue					
То	ls Help					
h	fo Connected	Devices				
	Tag	Descriptor	Channel	Mfg. Device	ID	Set Options
		No Devices Found				Mux Setup
	SVI	Offline	99 00 00 00	Dresser SVI	0	Mux Reset
	SVI2	Offline	98 00 00 00	Dresser SVI2	0	I
	SVI2 AP	Offline	97 00 00 00	Dresser SVI2 AP	0	Burst Mode Control
	HDLT	Offline	96 00 00 00	Dresser HDLT	0	Find by Tag
	12400	Uttline	95 00 00 00	Dresser 12400	U	
	SVITUUU	Uffline	94 00 00 00	Dresser SV(1000	U	Re-Scan
						-
	,					_

Figure 29 Context Menu with Mux Functions

Figure 30 appears and prompts for the nodes to be configured.

37. Device Address			
Devid	e Address		
Node:			
		ОК	
		Cancel	

Figure 30 Device Address

3. Enter a number between 1 and 31 for the desired node and select **OK** and Figure 31. The node address must match the DIP switch setting on the Mux hardware.

35. Multiplexor Setup × Tag MUX2 Descriptor MUX 2 **Retry Count** 3 Master Mode-Preamble Count 5 Secondary Master C Primary Master Scan Age Time 30 (sec.) - Search Method-Scan Option-C Polling Address 0 only Scanning OFF One Device C Scan Cmd 1 C Multidrop C Scan Cmd 2 C Scan Cmd 3

The Multiplexor Setup dialog appears (Figure 31).

Figure 31 Options and Mux Setup

Cancel

Buttons and Fields

0K

TagEnter up to eight characters long and is used to identify the MTL
multiplexor node in the system. The tag is displayed in *Device List*
box on *Connected Devices* screen.DescriptorEnter a description with up to 15 characters for the MTL multi-
plexor node.

Retry Count	Enter the number of times the multiplexor retries sending a com- mand to a Hart device before returning with an error. The valid range for this number is 0 to 5. The recommended number for use with Val- Vue is 3.		
Preamble Count	Enter the number of preambles. A Host using the HART protocol sends a short <i>preamble</i> string of characters at the beginning of each communication to <i>wake up</i> the other device. 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.		
Scan Age Time	Enter the maximum scan time in seconds that scan data remains valid. An error is returned when scan data is requested more than the age time since the data was last updated. This parameter is available here to set for other applications that use the multiplexo ValVue does not support the scanning feature.		
Master Mode Primary Mas- ter/Secondary Masters	Select such that ValVue is configured to be the same type of master as the multiplexor. Use both the <i>Options</i> and <i>Multiplexor Setup</i> dia- logs to check and compare the selection. Both can be primary or both can be secondary; they cannot be different.		
Search Method	When building a device list, the multiplexor can use one of three ways:		
	 Polling Address 0 only: This method looks only at polling address 0 for each loop. Any devices on a loop with a non-zero polling address are not found. 		
	One Device: For each loop, all polling addresses are searched until a device is found. The multiplexor does not continue the search on a loop after the first device is found.		
	Multidrop: Polling addresses 0 - 31 are searched as per the selections on the Options dialog ("Configure the Set Options" on page 41), and any devices found are added to the device list.		
Scan Option	The MTL multiplexor has the capability to continually scan the con- nected Hart devices to report the results. ValVue does not use this feature, but the option is provided to configure the multiplexor as needed by other applications.		

Mux Reset

Click and the multiplexor rebuilds its table of live devices. You are prompted for the node that is to be reset. When reset, the multiplexor node re-scans all of the devices connected to it and depending upon the options set for the multiplexor, can take some time to complete. If hardware has been added to the Mux or connected to different Mux channels a rescan must be performed before the ValVue re-scan can be used. The *Mux Reset* is necessary when adding or removing HART devices on a Mux network. This function updates the Mux's Look Up Table utilized by ValVue to map devices.



The Mux hardware re-scan is different from the re-scan performed by ValVue from the Re-scan button. No communication between ValVue and any device takes place on the node until the reset is completed. This can take several minutes, depending on MUX loading.

Use the multiplexor to request information about HART devices

- 1. Select the **MUX Reset** popup menu function to issue a reset command to a node of the multiplexor. You are prompted for the node that is to be reset.
- 2. Reset the node. The multiplexor node re-scans all of the devices connected to the node (this hardware rescan is different from the rescan done by ValVue from the *Rescan* right-click menu). Depending upon the options set for the multiplexor, this can take a while to complete. No communication can be done with devices on the selected node until the reset is completed.
- 3. Select **Rescan** popup menu function to build a device list.

To find a device by its tag

A device list is arranged in the order found on the multiplexor's channels. This list can be very long if there are many connected devices.

- 1. Select the **Find by Tag** button to open a text entry dialog.
- 2. Enter a tag name for ValVue to search the device list for a device with a matching tag. If found, the device is selected and the window scrolled so that its line is visible.
- 3. Selecting the **Rescan** popup menu function causes ValVue to build a new device list. All nodes are polled. If there are a large number of devices connected to the multiplexor, this function can take some time to complete. When the re-scan is completed, save the device list to a file so that rescanning is not necessary every time ValVue is started.

Troubleshooting ValVue Mux

Problem	Cause	Corrective Action
No devices found	Both ValVue and AMS are connected to the Mux	Connect ValVue to the device with a modem. If the installation is correct connect the input to the MTL 4046P Isolator. In a general purpose system, connect directly to the device wires.
	The MTL Mux is config- ured for AMS mode	Reconfigure the Mux for Cornerstone communi- cations mode with MTL provided software.
Mismatch of the baud rate set- ting between the Mux and ValVue	Mux	Use Set Options in ValVue to match the setting of the Mux. Refer to the dip switch setting on the Mux.
HART converter (RS-232 to RS485) not working properly.	Check for loose wires Check for power cabling between con- verter and Mux	Check configuration of converter. Refer to the manufacturer's instructions.
Expected device is not found in Connected Devices list	Device was added after the Mux per- formed its last scan	Click the Rescan mode Powering on/off/on the Mux can also help. However, this impacts the communication on all devices.
Devices all have the same tag name in Connected Devices	ValVue and Mux are not configured as the same type of master	Set Mux and ValVue so both are Primary Master or both are Secondary Master.

Table 3 Troubleshooting ValVue Used with Mux

Configuring Burst Mode

The Burst mode is a mode where the HART device continuously sends out data without being polled by a Master. This mode is useful 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). It is not necessary to set the burst mode to allow communications with a control system since the control system is a master capable of polling the device. Turning on Burst mode in cases where it is not required affects the communication bandwidth.

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

Variable	Description	Units/Range			
SVI II AP (firmware 3.1.1, 3.1.2, 3.2.1, 3.3.3 and 4.1.1), SVI II (Firmware 12x) or SVi1000 (1.1.1)					
PV (Primary Variable):	Valve position	0-100%			
SV (Secondary Variable)	Actuator Pressure	0-150psig (0-120psig for firmware 12x)			
TV (Tertiary Variable)	Not used (Future)				
QV (Quaternary Variable)	Not used (Future)				
SVI					
PV (Primary variable):	Valve position	0-100%			
SV (Secondary variable)	Actuator Pressure	0-150psig			
TV (Tertiary variable)	Process Variable	According to device setting			
QV (Quaternary variable)	Controller setpoint	According to device setting			
HDLT					
PV (Primary variable):	Level	According to device setting			
SV (Secondary variable)	Actuator Pressure	0-150psig			
TV (Tertiary variable)	Controller Setpoint	According to device setting			
QV (Quaternary variable)	Board Temperature	According to device setting			

Table 4 Burst Mode Data Return

Use this procedure to configure a burst mode.

1. Select the intended device from the *Connected Devices* page.

2. Right-click on the gray background of the window and select **Burst Mode Control** and Figure 32 appears.



Figure 32 Burst Mode Control

- 3. Select the desired command.
- 4. Select OK.

Connecting the SPA with the SVI II



- Valvue must be set as as a secondary master if the SPA is in polling mode to be able to connect
- PV = Position
- SV = Actuator Pressure
- TV = Not Defined Yet
- QV = Not Defined Yet

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

Figure 33 Burst Mode Configuration

Connecting Devices

4

Connected Devices

After you have successfully logged in, ValVue opens the *Connected Devices* window and searches the com port for connected devices. The devices that are found are listed. To stop the searching process, select the **Stop** button. The list includes offline device files and live devices. Scanning can take a few seconds if multidrop is selected. When a Multiplexor is used, the process can take a longer time, depending upon how many devices are connected. If the device file is enabled it displays previously scanned devices listed in the device file.

í ag	Descriptor	Channel	Mfg.	Device	ID	•	
SVI	Offline	99 00 00 00	Dresser	SVI	0		
5VI2	Offline	98 00 00 00	Dresser	SVI2	0		Select
SVI2 AP	Offline	97 00 00 00	Dresser	SVI2 AP	0		
IDLT	Offline	96 00 00 00	Dresser	HDLT	0		Find by Tar
2400	Offline	95 00 00 00	Dresser	12400	0		- Ind by Tog
SVi1000	Offline	94 00 00 00	Dresser	SVi1000	0		Bassian
/ECTOR	Offline	93 00 00 00	Dresser	VECTOR	0		nescan
						-	
						_	
N							
M							

Figure 34 Connected Devices

Selecting a Device

- 1. Click on the device you wish to run.
- 2. Click Select Device.

or

□ Double-click on a Tag name.

When connected through a multiplexor, any device connected to the multiplexor can be selected. If the device is an SVI II AP, ValVue opens the device at the Monitor page.

When connected through a multiplexor, the select action is ignored if the selected device is a node or sub node. If the selected HART device is not a Smart Valve Interface, only universal HART messages are sent.

Find by Tag

Use this procedure to save scan time with the Mux when there are multiple devices.

To find a device by its tag name:

1. Select Find by Tag and Figure 35 appears.

Input Value	
Enter Tag	
1	
ŀ	
OK Canad	

Figure 35 Input Value

2. Enter a tag name and click **OK**.

The software searches for a device with a matching tag. When found, the device is selected.

Re-Scan

To build a new device list:

- 1. Select Re-scan:
 - □ In the direct-connect configuration of ValVue all polling addresses are checked if the options allow multidrop.

- □ In the multiplexor configuration of the program, all nodes are checked. If there are a large number of devices connected to the multiplexor, this function takes time to complete.
- 2. When the rescan is completed, you can save the device list to a file so that rescanning is not necessary every time ValVue is started. If there is only one device on the loop, select Stop when it has been found to save scan time.

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Advanced Setup with ValVue

5

Methods to Set Up the SVI II AP

There are two methods of setting up the SVI II AP with ValVue:

- 1. Run Setup Wizard from the Monitor screen.
- 2. Advanced Setup of the SVI II AP by and advanced user.

The Setup Wizard automatically runs through the specified setup routines and is executed from the *Monitor* screen. The Setup Wizard is the preferred and recommended method for initializing an SVI II AP (refer to "Setup Wizard" on page 82 of this manual for instructions).

Advanced Setup

An advanced user may want to customize the setup beyond the parameters provided by the *Setup Wizard*.

Steps to Set Up SVI II AP

To set up the SVI II AP:

- 1. Configure the SVI II AP.
 - □ Read and Set Configuration Parameters
- 2. Calibrate the SVI II AP.
 - a. Run Find Stops or Manual Find Stops
 - b. Run AutoTUNE
 - c. View Calibration Parameters

NOTE



Before making any configuration or calibration changes ValVue must be in Setup mode.

Configuration Parameters

Refer to "Configure Screen" on page 99 of this manual for all configuration instructions.

Calibration Steps

Run Find Stops

To determine valve position, the positioner must measure and save the closed and open positions of the valve. This can be done automatically by running the *Find Stops* procedure from the *Calibrate* screen.

The SVI II AP first exhausts the actuator and measure the position, then fills the actuator and measures the position. From these measurements the valve position can be determined. Correction can be made for nominal valve travel if it is less than full travel.

To run *Find Stops* from the *Calibrate* screen:

1. Right-click and select **Run Find Stops**.

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	
Monitor Trend Configure Calibrate Diagnostics Status Check	
Tag NEW Descriptor	PID Parameters Run Find Stops Manual Find Stops Open Stop Adjustment Run Auto Tune Advanced Parameters Full Open Full Closed Set Valve Position Reset to Factory Cal
Current Input Signal 12.00 mA Calib. Signal Current Pressure 13.54 psi Calib. Pressure	Live Tuning Setup Detach Trend Help 100.0 (%) Set Open Stop Adj.
	Apply:
Change Mode 🔷 Mode: Setup	Exit Help

Figure 36 Selecting Run Find Stops

Figure 37 appears.



Figure 37 Starting Run Find Stops

2. Click OK.

When Find Stops is complete, Figure 38 appears.

Position Calibration	
Position Calibration	
Find Stops	 Finished Find Stops Complete
Elapsed Time (Task): 00:00:01 Elapsed Time (Total): 00:00:01	Cancel Current Task Cancel All Continue

Figure 38 Starting Run Find Stops

3. Click **Continue** to close the dialog and return to the *Calibrate* screen.

Manual Find Stops

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

Manual Find Stops moves the valve to full closed and you are asked to respond when the valve has reached the closed position. The valve is then moved to full open and you are asked to respond when the valve has reached the full open position.

For some valves where the travel exceeds the nominal travel of the valve, see "Open Stop Adjustment" on page 61 for details about how to trim the open stop.

To run Manual Find Stops:

1. Right-click and select Manual Find Stops (Figure 39).

🚰 ValVue SVI II AP - Offline NEW					
Tools Help					
Monitor Trend Configure Calibrate Diagno	stics Status Check				
Tag NEW Descriptor		ID Parameter 100 160 20 30	s P (%) I (1/10 s) D (ms) Padj (%)	Advanced Parameters	
Current Input Signal 12.00 mA	Run Find Stops Manual Find Stops Open Stop Adjustment	ien Stop Adj	ustment		
Current Pressure 13.54 psi	Run Auto Tune	100.0	(%)	Set Open Stop Adj.	
	Full Open Full Closed Set Valve Position				
	Reset to Factory Cal		Apply		
	Live Tuning Setup Detach Trend Help				
Change Mode 🔷 Mode:	Setup			Exit Help	

Figure 39 Selecting Manual Find Stops

Figure 41 appears.

Manual Find Stops 🛛 🔀
This command will stroke the valve. Continue?
OK Cancel

Figure 40 Stroke Valve Dialog

2. Click **OK**. ValVue moves the valve to the fully closed position and Figure 41 appears. Observe the valve until it is fully closed.

Manual Find Stops		
When the valve is fully closed click OK		
OK Cancel		

Figure 41 Valve Closed Dialog

- 3. Click **OK**. ValVue moves the valve to the fully open position and Figure 42 appears. Observe the valve until it is fully open.
- 4. Click OK.

Manual Find Stops		
When the valve is fully open click OK		
OK Cancel		

Figure 42 Valve Open Dialog

Open Stop Adjustment

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

In some values the travel exceeds the nominal value travel. The SVI II AP allows you to compensate for this so that the value position reads 100% at the nominal travel.

To make this correction:

- 1. Enter 100 in the Open Stop Adjustment edit box.
- 2. Select **Find Stops** from the context menu.
- 3. Return to manual mode and adjust the valve to its nominal travel and note the position reading.

- 4. Return to calibrate mode, enter the position that was measured at nominal travel into the *Open Stop Adjustment* edit box.
- 5. Select **Open Stop Adjustment** from the menu. The valve now reads 100% at the nominal travel of the valve.



Figure 43 Open Stop Adjustment Diagram

Tri-Loop Configuration

Figure 44 is a simplified schematic showing the SVI II and Tri-Loop and a control system connection

The input channel from the control system must have an impedance of at least 250 Ohms or else the HART signal becomes attenuated and the Tri-Loop won't function properly. Also, channel one must be enabled and set for Primary Variable with a range of 0-100%. You can enable channel 2 and 3 even if you don't connect them.



Consult the TRI-LOOP instruction manual for wring diagrams. Masoneilan is not responsible for improperly wiring the TRI-LOOP. This document simplifies the setup requirement of an SVI II with a device such as a TRI-LOOP. A resistor might be required on the positive leg of Channel 1 to limit the current to the TRI-LOOP.



Figure 44 Tri-Loop Configuration

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SVI II AP Software Manual



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ValVue SVI II AP Work Environment



Overview

This section describes the working environment of ValVue and how to accomplish SVI II AP tasks. After you have successfully launched and logged into ValVue and selected a device the *Monitor* screen appears (Figure 45).

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	Clicking on Tabs selects other ValVue Screens
Right clicking on background displays the Screen related menu Context-Sensitive Help. SVI II AP	Signal (%) 50.0 Signal (mA) 12.00 Position (%) 50.0 Setpoint (%) 50.0 Pressure (psi) 13.5 Pressure 2 0.0
Tag NEW Descriptor	Supply Pressure n/a Signal (%) 50.0 Position (%)
Assembly Number 0	Setpoint (%)
Setup Wizard	
Change Mode 🔷 Mode: Manual	Exit Help

Figure 45 ValVue Work Environment

Working in ValVue

ValVue is set up as a typical Windows program, with tabs, menus, dialogs, windows and toolbars. After you have successfully logged into ValVue, the selected device appears in ValVue's *Monitor* screen. You can either perform operation on the *Monitor* screen or select another screen to display another ValVue screen.

Toolbar

The toolbar at the top of every ValVue screen has two menu items; Tools and Help.

Tools Menu

The Tools menu changes according to the selected screen.

Help Menu

The Help menu is the same on every screen and contains:

- □ *Help* launches the help file table of contents
- □ Firmware Info displays information about the firmware loaded into the SVI II AP
- □ About displays information about ValVue

ValVue Help

ValVue offers help in many forms. Help changes according to the active screen. Every screen has access to the entire ValVue Help system through the Help command button located at the bottom of every screen and through the Help menu located at the top of every screen. Each screen also provides context sensitive Help that is pertinent to the active screen.

🚰 ValVue SVI II AP - Offi	line NEW	
Tools Help		
Full Open Full Closed Set to Fail Position	Calibrate Diagnostics Status Check	
Cancel Transfer Reset		Signal (%) 50.0 Signal (mA) 12.00 Position (%) 50.0 Setpoint (%) 50.0
Report Setup Report	SVI II AP	Pressure (psi) 13.5 Pressure 2 0.0
Save SVI Data Restore SVI Data	W	Supply Pressure n/a
Backup NVM		Signal (%)
Update Configured Data	UL 2005	50.0 Position (%)
		Send Cmd
Status Setup Wizard	Accesses Active Screen C	ontext Sensitive Help
Change Mode	🔿 Mode: Manual	Exit Help

Figure 46 Accessing Context Sensitive Help - Tools Menu

🗺 ValVue SVI II AP - Offline NEW		
Tools Help		
Monitor Trend Configure Calibrate Diagnostics Status Check		
SU SV		Signal (%) 50.0 Signal (mA) 12.00 Position (%) 50.0 Setpoint (%) 50.0
Tag NEW	Full Open Full Closed Set to Fail Position	Pressure (psi) 13.5 Pressure 2 0.0 Supply Pressure n/a
Descriptor	Cancel Transfer Reset	Signal (%)
Date 15 JUL 2005 Assembly Number 0	Report Setup Report	50.0 Position (%)
,	Save SVI Data Restore SVI Data	Send Cmd
Status	Detach Irend	
Setup Wizard		
Change Mode 🔷 Mode:	Manual	

Figure 47 Accessing Context Sensitive Help - Right Click Menu

Exit

Clicking **Exit** quits the program.

Change Mode

The *Change Mode* button located at the bottom left of all SVI II AP screens allows you to change the operating SVI II AP mode. There are three operating modes:

- □ *Normal* In this mode the SVI II AP follows the 4 20 mA input signal and positions the valve accordingly (indicator green).
- □ *Manual* in this mode the valve setpoint is set by the valve software, the local pushbutton or a HART compatible Host system. When changing to this mode the setpoint becomes the actual position.
- Setup In this mode you can set calibration and configuration parameters.
 Additionally, for SVI II AP, you can step response tests, and positioner signatures (indicator yellow).

Failsafe Mode

□ *Failsafe* – When the SVI II AP cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until the user intervenes (indicator red).

ValVue Screens

There are seven screens, correlating to the seven tabs available at the top level of ValVue:

- Monitor Use this screen to adjust current operating parameters of the selected SVI II AP, perform HART commands and run positioner setup (See "SVI II AP Monitor Screen" on page 73).
- □ *Trend* Use this screen to view in a graphical format the live operation of the selected SVI II AP and capture the current data as a bitmap and save it to the computer clipboard. You can then paste the graphical contents into any program that accepts a bmp file; e.g. Microsoft Word, Excel, Power Point, etc.
- □ *Configure* Use this screen to view and adjust the current SVI II AP configuration parameters. To adjust the positioner configuration, ValVue must be in the *Setup* or *Manual* mode.
- □ *Calibrate* Use this screen to view and calibrate the stop positions and the feedback control parameters (PID tuning parameters).
- □ *Diagnostics* Use this screen to view continuous diagnostics information and perform diagnostic tests.
- □ Status Use this screen to see the operating and internal status of the SVI II AP.
- □ *Check* Use this screen to monitor some of the basic parameters. This screen is used primarily for troubleshooting.

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SVI II AP Monitor Screen

2

What You Can Do on the Monitor Screen

The *Monitor* screen is the first window displayed on starting ValVue. From the *Monitor* screen, you can view the basic functions of the SVI II AP including; tag and identification, characteristics, setpoint, position, and status. The *Setup Wizard* provides for rapid setup of the positioner in four easy steps. You can:

- $\hfill\square$ Monitor the live operation of the SVI II AP $\hfill\square$ Monitor the current positioner
- Monitor the current positioner characteristics
- Send a HART command and view the result
- View the Position Indicator (graphical representation)

□ Generate reports

□ Run the Setup Wizard

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	
Monitor Trend Configure Calibrate Diagnostics Status Check	Positioner Operations
SVI II AP	Signal (%) 50.0 Signal (mA) 12.00 Position (%) 50.0 Setpoint (%) 50.0
Positioner Tag Information	Pressure (psi) 13.5 Pressure 2 0.0
Tag NEW	Supply Pressure n/a
Descriptor	Positioner Indicator
Message	Signal (%)
Date 15 JUL 2005	50.0 Position (%)
Assembly Number 0	Setpoint (%)
	Send Cmd
Status O	Send Command Menu
Status Display	Send Command Display Window
Setup Wizard Launch Setup Wizard	×
Change Mode 🔶 Mode: Manual	Exit Help

Figure 48 Monitor Screen

Button and Fields

Positioner Tag Information

Tag	A user-assigned name for the valve with a maximum eight characters. The value appears in many views but can only be changed from the Configure screen (see "What You Can Do on the Configure Screen" on page 99), using the Setup Wizard (see "Setup Wizard" on page 82) or using a command ("Changing Tag Information on the Monitor Screen" on page 78).
Long Tag	A user-assigned name for the valve with a maximum thirty two characters. Only available for HART 6.
	Use this field for any information desired. The value appears in many views but can only be changed from the <i>Configure</i> screen (see "What You Can Do on the Configure Screen" on page 99).
Descriptor	A user-defined field with up to 16 characters. This field is commonly used to describe valve use.
	The value appears in many views but can only be changed from the Configure screen (see "What You Can Do on the Configure Screen" on page 99), using the Setup Wizard (see "Setup Wizard" on page 82) or using a command ("Changing Tag Information on the Monitor Screen" on page 78).
Message	A user-defined field with up to 32 characters. Use this field for any information desired.
	The value appears in many views but can only be changed from the Configure screen (see "What You Can Do on the Configure Screen" on page 99), or using the Setup Wizard (see "Setup Wizard" on page 82).
Date	Use the date field as needed. The preferred format is <i>dd MMM yyyy</i> (e.g. 14 NOV 2001). The program also accepts dates formatted as <i>dd/mm/yy</i> (e.g. 14/11/01). Years greater than 70 are assumed to be in the 1900s and years 70 or less assumed to be in the 2000s. The day precedes the month. Dates as <i>dd/mm/yyyy</i> are also accepted.
	The value appears in many views but can only be changed from the Configure screen (see "What You Can Do on the Configure Screen" on page 99), using the Setup Wizard (see "Setup Wizard" on page 82) or using a command ("Changing Tag Information on the Monitor Screen" on page 78).
Status Display	Displays health indicators. When there is a fault code from the SVI II AP, Addi- tional Status Available appears.
	The status block also contains other status codes returned by HART. These include <i>Configuration Changed</i> , <i>Device malfunction</i> , and <i>Variable out of limits</i> .
Assembly Number	A user-assigned number. Value can be between 0 and 16,777,215.
	Use this field for any information desired. The value appears in many views but can only be changed from the Configure screen (see "What You Can Do on the Configure Screen" on page 99) or using the Setup Wizard (see "Setup Wizard" on page 82).

Positioner Operations	
Signal	Indicates the input analog signal expressed in % and in mA of the configured signal range.
Position	Indicates the actual valve position in % of valve opening. 0% is always closed and 100% is open. Because the travel of a valve may exceed its nominal travel, positions greater than 100% are possible (see "Open Stop Adjustment" on page 61).
Setpoint	In NORMAL mode, the setpoint is the target position based on the characterized input. In MANUAL mode, it is the target position to which the SVI II AP is control- ling the valve. The manual setpoint may be changed by dragging the <i>lower thumb</i> on the position indicator.
Pressure	The SVI II AP continuously monitors the actuator pressure and displays accord- ing to the configured units (psi, bar, or kPa).
Position Indicator	 This shows the valve position graphically and consists of three parts: The upper part contains an indicator showing the value of the input signal. In Normal mode this is the position setpoint. WARNING! - In manual mode, this is the position that the valve moves to if normal mode is selected. The center green bar shows the valve position in percent. The numerical valve position is shown in the center. The lower part contains an indicator (that can be dragged when active) showing the valve setpoint. In operating mode, this is the same as the signal. In manual mode it is the valve setpoint. You can drag the indicator to change the valve setpoint. While dragging, the number in the center bar shows the manual setpoint that is selected when you release the indicator.
Send Command menu	Use this pulldown to send HART commands whose responses are seen in the Send Command Display window.
Send Command Display window	Displays results of HART commands.
Setup Wizard button	Setup Wizard Click to launch the Setup Wizard ("Setup Wizard Selections" on page 83).

Changing the Setpoint

To change the manual setpoint the SVI II AP must be in manual mode. There are three ways to change the position indicator:

- 1. Entering the setpoint value in the Setpoint dialog.
- 2. Dragging the position indicator.
- 3. Left clicking on either side of the position indicator modifies the setpoint by 5%.

🚰 ValVue SVI II AP - O	Offline NEW		
Tools Help			
Monitor Trend Configu	ire Calibrate Diagnostics Status Check		1
	SVI II AP		Signal (%) 50.0 Signal (mA) 12.00 Position (%) 50.0 Setpoint (%) 50.0 Pressure (psi) 13.5 Pressure 2 0.0
Tag	NEW	г	- 3appl y R es sare - n /a
Descriptor		Ι	
Message		1	Signal (%)
Date	15 JUL 2005	i.	50.0 Position (%)
Assembly Number	0	Ľ	Setpoint (%)
			Send Cmd
Status	0		
Setup wizard			
Change Mode	🔶 Mode: Manual		Exit Help

Position Indicator Active (Manual Mode)

Figure 49 Position Indicator Active

Entering Setpoint Value

To enter a value for the position indicator setpoint:

- 1. Right-click inside the position indicator area and Figure 50 appears.
- 2. Enter the setpoint percentage and click OK.

Setpoint	
Enter a Setpoin	t (%)
78	
ОК	Cancel

Figure 50 Changing Position Indicator

Status on the Monitor Screen

The SVI II AP provides several health indicators. When there is a fault code from the SVI II AP *Additional Status Available* appears.

To retrieve fault codes:

- 1. Select Read Status from the Send Command drop pulldown list.
- 2. Click **Send**. The results appear in the lower left box. The fault codes also appear on the *Status* screen.



Figure 51 Monitor Screen - Additional Status Available

Tag Information

Changing Tag Information on the Monitor Screen

There are two methods of changing Tag Information on the *Monitor* screen:

- □ Activate the Setup Wizard and execute Step 1. See "Setup Wizard Step 1" on page 83.
- □ Use a command:

1. Select the **Write Tag and Descriptor** command from the command drop down list and appears.

Input Tag Data	
Tag Descriptor Date	NEW 15 JUL 2005
OK	Cancel

Figure 52 Input Data Tag

3. Enter the *Tag* information in the dialog box and click **OK**.

Send Command

You can send HART commands to the SVI II AP and view the results in the box below the *Send Command* pulldown list. To send a command:

1. Select the command from the drop down list (Figure 53).

🚰 ValVue SVI II AP - Offi	ine NEW	
Tools Help		
Monitor Trend Configu	ure Calibrate Diagnostics Status Check	1
	SVI II AP	Signal (%) 50.0 Signal (mA) 12.00 Position (%) 50.0 Setpoint (%) 50.0 Pressure (psi) 13.5 Pressure 2 0.0
Tag	NEW	Supply Pressure n/a
Descriptor		
Message		Signal (%)
Date	15 JUL 2005	50.0 Position (%)
Assembly Number	0	Setpoint (%)
Long Tag	N/A	003 Read All Variables Send Cmd
Status	•	
Setup Wizard		
Change Mode	🔷 Mode: Manual	Exit Help

Figure 53 Selecting a Command to Send

2. Click Send Cmd button (Figure 54).

Tag Descriptor	SVI II AP	Signal (%) 50.0 Signal (mA) 12.00 Position (%) 50.0 Setpoint (%) 50.0 Pressure (psi) 13.5 Pressure 2 0.0
Tag Descriptor	NEW	
Descriptor	· · · · · · · · · · · · · · · · · · ·	Supply Pressure n/a
Message		Signal (%)
Date	15 JUL 2005	50.0 Position (%)
Assembly Number	0	' ' ' 💻 ' ' ' Setpoint (%)
Long Tag	N/A	003 Read All Variables Send Qmd
Status	•	
Setup Wizard	1	*

Figure 54 Executing Send Command

3. Read the results below (Figure 55).

🝻 ValVue SVI II AP - Off	line NEW	
Tools Help		
Monitor Trend Config	ure Calibrate Diagnostics Status Check	1
80	SVI II AP	Signal (%) 50.0 Signal (mA) 12.00 Position (%) 50.0 Setpoint (%) 50.0 Pressure (psi) 13.5 Pressure 2 0.0
Tag	NEW	Supply Pressure n/a
Descriptor		
Message		Signal (%)
Date	15 JUL 2005	50.0 Position (%)
Assembly Number	0	Setpoint (%)
Long Tag	N/A	003 Read All Variables
Status Setup Wizard	Image: Contract of the second secon	Current=12.00 mA Position=50.02 % Pressure=13.54 psi
Change Mode		Exit Help

Figure 55 Send Command Results Displayed

List of Available HART Commands

When you click on the drop down arrow, ValVue displays the available HART commands. Scroll through the list until you locate the command you wish to execute:

- □ 000 Read Identifier Returns the unique identifier from the device including the device ID, device type, and the manufacturers ID.
- □ 001 *Read Primary Variable* Returns the position in percent open.
- □ 002 Read Current Returns the input signal in mA.
- □ 003 Read All Variables Returns the input signal and the position in percent open
- O11 Read ID from Tag Prompts the user for a tag name. The tag name is sent in a HART command and if received by a device with a matching tag name, the ID of the device is returned. The format of the ID is the same as command 001 Read Identifier.
- 012 Read Message Reads the message that was stored in the device when it was configured
- □ 013 Read Tag & Descriptor Reads the tag name, date, and the descriptor that was stored in the device when it was configured
- □ 016 Read Assembly Number Reads the final assembly number that was stored in the device when it was assembled at the factory

- □ 017 Write Message This command allows the user to enter a message (up to 32 characters) that is stored in the SVI II AP.
- 018 Write Tag & Descriptor This command allows the user to enter a tag name (up to 8 characters) and a description (up to 16 characters) that are stored in the SVI II AP.
- □ 19 Write Final Assembly This command allows the user to enter an identifying number (0 to 16 million) which is stored in the SVI II AP.
- □ 038 Reset Configuration Changed Flag This command sets the HART configuration changed bit back to 0. The bit is set whenever a value in the device has changed.
- □ 072 Squawk Send this command using ValVue and a specific device audibly indicates the reception of the command.
- 210 Read Configuration Reads the configuration data from the device and displays it in the response box. The data includes all of the data describing the device set on the Configure screen including Air-To-Open/Air-To-Close, Tight Shutoff status, Software Position Limit Stops, etc.
- □ 200 Read Option Configuration Reads basic (hardware) configuration information about the positioner.
- □ 211 Read Custom Characterization Reads the custom characterization information about the positioner.
- □ 212 Read Error Limits Reads and displays the position range and time-outs associated with position and pressure errors
- □ 213 Read Calibration Data Reads and displays the input signal that corresponds to the open and closed positioning of the valve.
- □ 216 Read PID Reads and displays the valve positioning tuning parameters
- 136 Read Status Reads and displays the status flags. These flags describe error conditions that have occurred since the last time they were cleared. See "Status Code List" on page 150 of this manual for a complete list of possible codes.
- □ 138 Clear Status Clears the status flags. See also "Status Code List" on page 150.
- □ 142 Read Switches Reads the status of the contact switches
- 139 Read Continuous Diagnostic Data Reads and displays the continuous diagnostic data including number of full strokes the valve has made, the number of cycles (direction changes), the time the valve has spent open, the time the valve has been closed, and the time the valve has spent throttling near the seat
- □ 191 Read Standard Diagnostic Data Displays the valve response time open and response time closed
- □ 154 Read Setpoint Reads the manual setpoint of the positioner.
- 141 Read Raw Data Returns information from the SVI II AP that is useful to engineers for diagnostic purposes. The information includes the input current on the auxiliary input channel, the A/D values from the pressure, signal, and position

measurements, the D/A value of the signal to the I/P, and the internal SVI II AP temperature.

- □ 143 Read Temperatures Reads the historical low and high range to which the positioner was be exposed and reads the actual circuit board temperature
- □ 201 Read All Pressures Reads the Actuator, Supply and IP pressure (available with the Advanced Diagnostics version)
- □ 249 *Read Operating Mode* Reads and displays the positioner operating mode.

Setup Wizard

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

From the *Setup Wizard* screen you can rapidly setup the SVI II AP by configuring some basic parameters. By selecting the appropriate check boxes you can set the device identification, select the air action, perform a travel calibration, and autotune the positioning parameters. When the selected tasks are started, ValVue displays a progress screen.

To customize the valve setup refer to "Advanced Setup with ValVue" on page 57 of this manual.

🚰 ValVue SVI II AP - Offi	line NEW	
Tools Help		
Monitor Trend Configu	ure Calibrate Diagnostics Status Check	1
<u>E</u>	SVI II AP	Signal (%) 50.0 Signal (mA) 12.00 Position (%) 50.0 Setpoint (%) 50.0 Pressure (psi) 13.5 Pressure 2 0.0
Tag	NEW	Supply Pressure n/a
Descriptor		
Message		Signal (%)
Date	15 JUL 2005	50.0 Position (%)
Assembly Number	0	Setpoint (%)
Long Tag	N/A	003 Read All Variables
Status	•	Current=12.00 mA Position=50.02 % Pressure=13.54 psi
Setup Wirard		
Change Mode	Mode: Manual	Help

Setup Wizard Button

Figure 56 Starting the Setup Wizard

Setup Wizard Selections

After you start the *Setup Wizard* Figure 57 appears where you can select the setup features to perform:

Setup Wizard 🛛 🗙
Step 1: Set Tag and Descriptor Tag NEW Descriptor Message
Step 2: Set Air Action Reset Configuration to factory defaults Air-to-Open Air-to-Close
Step 3:
Step 4: Autotune Supply Pressure 30.0 psi
Step 5:
Apply Cancel

Figure 57 Setup Wizard Selections

Setup Wizard Step 1

When selected, the device *Tag*, *Long Tag* (HART 6 only), *Descriptor*, and *Message* are modified.

Setup Wizard Step 2

When selected you can set the air action. You can also reset the configuration and calibration parameters to factory defaults; *Air Action, Travel*, and *PID* (tuning) parameters.

Setup Wizard Step 3

When selected, you can perform a travel calibration. To determine valve position, the positioner must measure the closed and open positions of the valve. The SVI II AP first exhausts the actuator and measures the position, then fills the actuator and measures the position. From these measurements the valve position can be determined.

Additionally, you can enter the expected Supply Pressure.

Wizard Step 4- Autotune

The SVI II AP has a built-in positioning Autotune feature. At the moment of setting up the positioner on a valve, this feature automatically computes the optimal parameters for the positioning algorithm. This feature does not require valve specific parameters in order to complete successfully. The patented algorithm analyzes the dynamic behavior of the valve assembly, and determines values for the tuning algorithm that are configured for tight and accurate position control.

The Autotune feature can be launched using the local pushbuttons, a handheld communicator loaded with the device (DD), a control system loaded with the DD or ValVue software.

Wizard Step 5- Report & Backup

Creates a report of the positioner parameters using your default *Report Setup* choice: Wordpad or Word. This report opens at the end of the wizard process.

Setting the Tag and Descriptor Data

- 1. Click Set Tag and Descriptor.
- 2. Click in the field (s) for modification and edit.

Setup Wizard
Step 1: Tag NEW Descriptor Message
Step 2: Set Air Action Reset Configuration to factory defaults Air-to-Open Air-to-Close
Step 3:
Step 4: Autotune Supply Pressure 30.0 psi
Step 5:
Apply Cancel

Figure 58 Setting Tag and Descriptor



The changes you make to tag and descriptor will not take place until you click Apply. Do not click Apply until after you have made all your Setup Wizard selections.

Setting the Air Action

The *Set Air Action* step allows you to set the action of the air supply by making one of the following selections:

- □ *Air to Open* air pressure is used through the SVI II AP to open the valve
- □ *Air to Close* air pressure is used through the SVI II AP to close the valve
- □ *Reset configuration to factory defaults* resets the calibration and configuration parameters to the factory defaults; *Air Action, Travel*, and *PID* parameters

To set the air action:

- 1. Click Set Air Action.
- 2. Select either the Air-to-Open or Air-to-Close.
- 3. Click Reset configuration to factory defaults, if required.



The changes you make to air action will not take place until you click Apply. Do not click Apply until after you have made all your Setup Wizard selections.

Calibrate Travel

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

To calibrate positioner travel:

□ Click Calibrate Travel.



The calibrate travel function will not take place until you click Apply. Do not click Apply until after you have made all your Setup Wizard selections.

Autotune

To autotune the SVI II AP:

Click Autotune.



The autotune function will not take place until you click Apply. Do not click Apply until after you have made all your Setup Wizard selections.

Setup Selections Made

1. After you have selected the desired steps click **Apply (**Figure 59).

Setup Wizard	X
Step 1:	
🗹 Set Tag and D	escriptor
Tag	FV 101
Descriptor	Cooling Flow
Message	Masoneilan Positioner
Step 2: Set Air Action Air-to-Oper	Reset Configuration to factory defaults e
Step 3: Calibrate Trave	9
Step 4:	Supply Pressure 30.0 psi
Step 5:	ue
	Apply Cancel

Figure 59 Applying Setup Wizard Selections

Figure 60 appears indicating the actions selected.

ValVue SVi1000	—
Setup will perform: - Set Tag and Descriptor - Reset Config to Default - Run Find Stops - Run Autotune - Create report & backup	
ОК	ancel

Figure 60 Setup Dialog

2. Click **OK and** Figure 61 appears.



Figure 61 Running Setup Wizard Dialog

3. Click **OK**.

Progress Dialog

Some calibration and diagnostic processes that ValVue launches can be of a long duration. These processes include find stops, autotune, diagnostics, and the setup wizard. While these processes run, a dialog is provided to show the progress and allow you to cancel the process earlier if necessary.

Setup Wizard				
Setup Wizard Progress				
Set Tag and Descriptor	0	Finished		
Reset Configuration to Defaults	0	Finished		
Find Stops	0			
AutoTune	0			
Create Report_Backup	0			
Elapsed Time (Task): 00:00:01 Elapsed Time (Total): 00:00:02	Cancel Currer	nt Task	Cancel All	Continue

Figure 62 Setup Wizard Progress

PID Values			×
Previous		New	
100	Р	100	
160	I.	160	
20	D	20	
30	Padj	30	
13	Pos Comp	13	
-2	Beta	-2	
0.00	Dead Zone	0.00	
4	Boost	4	
Exit			

After the wizard completes, Figure 63 appears.

Figure 63 PID Values Displayed after Autotuning

4. Click Exit.

Setup Wizard	
Setup Wizard Progress	
Set Tag and Descriptor	Finished
Reset Configuration to Defaults	🥝 Finished
Find Stops	🥝 Finished
AutoTune	🥝 Finished
Create Report_Backup	🕘 Finished
	Setup Wizard Complete
Elapsed Time (Task): 00:00:15 Elapsed Time (Total): 00:00:23	Cancel Current Task Cancel All Continue

Figure 64 Setup Wizard Complete

5. Click **Continue**.

Parameter Definitions

Ρ	Proportional gain in %. Common values for the positioner are 50 for small valves up to 4000 for large valves.
I	Integral time or reset time in 1/10th sec, is the time constant of integral control. Higher values of I cause less integral action, how- ever a value of 0 gives no integral action. Common values are 10 to 200.
D	Derivative time or rate time (msec) is the time constant of deriva- tive control. Common values are 10 to 100
PAdjust	Valves often have significantly different response when filling verses exhausting. The proportional gain is adjusted by adding Padj (%) to P when the valve is exhausting.
Beta	Beta 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. Typical beta value for a valve position controller is 7 or 8.
Position Compensation Coefficient	The response of the valve is different when the valve is nearly closed than when the valve is nearly open. The position compensa- tion coefficient, which is a number between 0 and 20. Make adjust- ments to try to equalize the valve response. The normal value is 6. For springless actuators the value is 15.
Dead Zone	When the valve position is within the setpoint +/- the dead zone, no additional position control is performed. This value is normally 0%, however for high friction valves (e.g. valves with graphite packing) a higher dead zone (%) helps avoid limit cycling due to the stick/slip action of the valve. In these cases the dead zone chosen might be 0.5% to 1%. Range: 0 to 5%
Boost	The boost field in the PID adjustments controls a supplemental pressure, or boost, to speed up initial valve response. This compensates for pneumatic deadband. Range: 0 to 20.

The values determined above provide sufficient response for most applications. However these values are determined by a target set of performance criteria built into the SVI II AP. You may want performance different than this set and may therefore want to set the PID values differently than determined by Autotune. You can individually set tuning values from the *Calibrate* screen.

Monitor Context Menu

Full Onen		
Full Open Full Closed Set to Fail Position	01/54000	Signal (%) 1.2 Signal (mA) 4.19 Position (%) 10.5 Setpoint (%) 50.0
Cancel Transfer Reset	SVI1000	
Report Setup Report	200	
Save SVI Data Restore SVI Data)10	10.5 Position (%)
Detach Trend Help		Send Cmd
Status	•	

Right-click on the Monitor screen and a context menu appears (Figure 65).

Figure 65 Monitor Screen Context Sensitive Menu

The following items appear and are greyed out based on the actual SVI II AP mode.

- □ *Full Open* Moves the valve to full 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 Closed* Moves the valve to full closed. 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 to Fail Position Sets the Output Pressure (P1) to 0 psig. Moves the valve full open or full closed, whichever is the fail position of the actuator.
- □ *Cancel Transfer* Returns the SVI II AP to manual mode from the bumpless transfer mode (available during a bumpless transfer).
- □ *Reset* Issues a master reset to the device, causing it to go through its startup routine and re-initializing all of its operating parameters from non-volatile memory.

WARNING

The valve moves during the reset operation.



- □ *Report Setup* Allows you to select a report setup set report template file and report printing program
- □ *Report* Generates a report of the SVI II AP parameters
- □ Save SVI Data Saves the SVI II AP internal parameters in a file that can be read and restored by ValVue.
- □ *Restore SVI Data* Restores the contents of a dump file to a Masoneilan device. This can be used to *clone* an SVI II AP into a new SVI II AP. Items like tag, which must be unique, and position calibrations which differ on each positioner are not cloned. This command is available only in manual mode.
- □ *Backup NVM* Backups up the Non Volatile Memory (NVM). This is useful for factory engineer to help troubleshoot an SVI II AP.
- □ *Detach Trend* Removes the *Trend* display from the anchored screen format and creates a separate trend display.
- □ *Help* Displays the help file at the *Monitor* screen instructions.

Restore SVI Data

To restore SVI data:

1. Right-click and select Restore SVI Data and appears.

ValVue SVI II AP
This operation will restore configuration data to device.
Do you want to continue?
Yes No

Figure 66 Restore SVI Data

2. Click **OK** and Figure 67 appears.



Figure 67 Time Warning

- 3. Click **OK** and an *Open* dialog appears.
- 4. Navigate to the dump file and click **Open**.

Reports

One of the functions available on the *Monitor* screen is the ability to generate reports. ValVue provides the ability to extract information about the SVI II AP operation and dump the information into a report format. When ValVue extracts the information from a device it requires a template file into which to dump the data. To generate a report with ValVue you must first create a report template file that includes the parameters to include in the report as well as personalization. There are three basic steps to create reports:

- 1. Set up the report create a report template file
- 2. Select the report setup (report template file) using the *Report Setup* command from the *Monitor* context menu.
- 3. Generate the report using the *Report* command from the *Monitor* context menu.

Report Setup

1. Right-click on the *Monitor* screen and select **Report Setup** and Figure 68 appears.

Report Setup	×
Report Template File Name	
	Browse
Report Program to use	Province
Auto Find MS Word Word Pad	Browse
OK Cancel	

Figure 68 Report Setup Dialog

- 2. Use the browser or type the path for the *Report Template* file name.
- 3. Select the program for report generation by clicking **Auto Find** or click the **Browse** button and manually locate the.exe.

Report Setup	X
Report Template File Name	
C:\ProgramData\Dresser\ValVue\SVi1000\Report\SVI1000I	Browse
Report Program to use	
C:\Program Files\Microsoft Office\Office14\WINWORD.EXE	Browse
Auto Find MS Word Word Pad	
Cancel	

Figure 69 Report Setup Completed

Creating Report Template Files

You can create a custom SVI II AP report by creating a rich text format (RTF). The default template is located in:

C:\ProgramData\Dresser\ValVue\SVI2 AP\Report\

Prior to selecting the set up of the report, you must create the report template file in an rtf format. The report template should include the operation parameters that you would like populated in the report.

ValVue substitutes the values of SVI II AP parameters into the text file where ever it finds a parameter name that matches an SVI II AP parameter. For each parameter you would like included in the report place \$\$ in front of the parameter name.

For example:

Tag =

When creating the report template file, use an application that can save the report template file to an rtf or text file such as WordPad or Microsoft Word.



rtf files are preferred as you can apply special formatting to the file that can contain fonts, sizes, tabs, etc. and bitmaps. Some .rtf formatting is accepted in Word which is not available in WordPad.

The allowed SVI II AP parameters are listed in Table 5. Use the report file (report.rtf) shipped with the application for examples.

Report Parameter	Information Provided in Report
\$\$Tag	Tag Name
\$\$Descriptor	Descriptor
\$\$Date	Date
\$\$Message	Message
\$\$AssemblyNumber	Final Assembly Number
\$\$MfgID	Manufacturer's ID (101 for Masoneilan)
\$\$DeviceType	Device Type (200 for the SVI II AP)
\$\$DeviceID	Hart DeviceID
\$\$HWRev	Hardware Revision

Table 5 Report Setup Parameters

Report Parameter	Information Provided in Report
\$\$SWRev	Software Revision
\$\$CmdRev	Firmware Command Revision
\$\$PollingAddress	PollingAddress
\$\$Position	Position
\$\$Signal	Input Signal
\$\$Pressure	Actuator Pressure
\$\$IPOutput	Signal to the I/P in Counts (0 - 65000)
\$\$Temperature	Circuit Board Temperature
\$\$LowTemperature	Historical Low Temperature
\$\$HighTemperature	Historical High Temperature
\$\$Output	Output from the process controller
\$\$Mode	SVI II AP Mode
\$\$SignalPercent	Input Signal as Percent
\$\$AirAction	Air-to-Open/Air-to-Close
\$\$ActuatorType	Single/Double Acting Actuator
\$\$PosErrorBand	Position Error Band
\$\$PosErrorTime	Position Deviation Time
\$\$Charact	Characterization (Linear, Equal Percentage, etc.)
\$\$CustomCharact	Displays the Custom Characterization constants
	Individual items of the characterization curve may be selected by enter- ing: \$\$CustomCharact[n] - where n is a number between 0 and 17
\$\$ButtonLock	Button Lock Level
\$\$Bumpless	Bumpless Transfer On/Off
\$\$BumplessSpeed	Time to move from Manual to Normal (operating) mode
\$\$TightShutoff	Tight Shutoff On/Off
\$\$TSValue	Tight Shutoff Value

Table 5 Report Setup Parameters (Continued)

Report Parameter	Information Provided in Report
\$\$ULimitStop	Upper Position Limit On/Off
\$\$ULSValue	Upper Position Limit
\$\$LLimitStop	Lower Position Limit On/Off
\$\$LLSValue	Lower Position Limit
\$\$NearClosed	Value below which is considered Near Closed
\$\$PosUnits	Position Units of Measure (always %)
\$\$PresUnits	Pressure Units (psi, bar, or kPa
\$\$SignalUnits	Signal Units (always mA)
\$\$Language	SVI II AP Display Language
\$\$LowSignal	Low Calibration Value
\$\$HighSignal	High Calibration Value
\$\$P	Proportional Gain In Positioner
\$\$Padjust	Adjustment to P when valve is exhausting
\$\$1	Integral action of positioner
\$\$Beta	Step size adjustment in positioner
\$\$D	Derivative action of positioner
\$\$PosComp	Position range compensation of positioner
\$\$DeadZone	Dead zone of positioner
\$\$Damping	Damping coefficient of positioner
\$\$Travel	Total strokes of the valve
\$\$Cycles	Total cycles of the valve
\$\$TimeOpen	Total time open of the valve
\$\$TimeClosed	Total time closed of the valve
\$\$TimeNearClosed	Amount of time valve was nearly closed
\$\$ResponseOpen	Time require to open valve
\$\$ResponseClosed	Time required to close valve
\$\$Switch1Type	Condition under which Switch 1 operates

Table 5 Report Setup Parameters (Continued)

Report Parameter	Information Provided in Report	
\$\$Switch1Value	Value at which Switch 1 activates	
\$\$Switch1Action	Switch is Normally Closed or Normally Open	
\$\$RawSignal	Signal Value in A/D Counts	
\$\$RawPosition	Position Value in A/D Counts	
\$\$PositionStopLow	Position A/D Counts at the Lower Stop	
\$\$PositionStopHigh	Position A/D Counts at the Upper Stop	
<pre>\$\$OptionConfig \$\$OptionConfigEx0 \$\$OptionConfigEx1 \$\$OptionConfigEx2 \$\$OptionConfigEx3</pre>	Data describing the hardware installed on the positioner	
\$\$Friction	Friction Measured from a Standard Actuator Signature	
\$\$FLowerSpringRange	Lower Spring Range measured from a standard actuator signature	
\$\$FupperSpringRange	Upper Spring Range measured from a standard actuator signature	
\$\$LowPressureActual	Pressure when the actuator is exhausted	
\$\$HighPressureActual	Supply Pressure	
\$\$Speed	Speed at which the last diagnostic test was run	
\$\$SpeedSaved	Speed at which the saved standard signature was run	
\$\$SpeedBaseline	Speed at which the baseline standard signature was run	
\$\$LowerSpringRange \$\$LowerSpringRangeSaved \$\$LowerSpringRangeBaseline	Lower Spring Range calculated from the current, saved, or baseline stan- dard signature	
\$\$UpperSpringRange \$\$UpperSpringRangeSaved \$\$UpperSpringRangeBaseline	Upper Spring Range calculated from the current, saved, or baseline stan- dard signature	
\$\$Signature	Position/Pressure Pairs -gathered during the Standard Signature Test	
\$\$SignatureSaved	Position/Pressure Pairs - saved in the Saved Standard Signature	
\$\$SignatureBaseline	Position/Pressure Pairs- saved in the Baseline Standard Signature	

Table 5 Report Setup Parameters (Continued)

(Generate) Report

To generate a report:

□ Right-click and select **Report**.

ValVue populates the report template. An example of a report is shown in Figure 70.



Smart Valve Interface 2AP - Configuration Data Sheet

General Information

NEW
0
101
206
5010001
32
1
1
0

Operating Data

Position	50.0 %
Signal	12.00 mA
Pressure	13.54 psi
Pressure2	0.00 psi
Supply Pressure	N/A psi
Switch 1	Closed

Configuration Information

Air A	ction	ATO
Actua	ator Type	Single
Posit	ion Error Band	5.0 %
Position Error Time		Off
Charactacterization		Linear
Cust	om Charact.	
In	100.0	
Out	100.0	

Figure 70 Report Sample Using ValVue Template

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Configure Screen

What You Can Do on the Configure Screen

From the *Configure* screen, you can configure the valve/actuator by adjusting:

- "Tag Information" on page 100
- "Characterization" on page 102
- "Bumpless Transfer" on page 107
- "Button Lock" on page 107
 - "Near Closed" on page 107

- □ "Air-to-Open / Air-to-Close" on page 108
- "Position Limit Stops" on page 108 🛛

- "Burst Settings" on page 112
- "Configure I/O" on page 109
- "Position Fault Limits" on page 108 "Language" on page 108

🚰 ValVue SVI II AP - Offline NEW		
Tools Help Monitor Tag Informations Diagnostics Status Check Ch	naracterization Button	Lock
Tag Name NEW Descriptor Message Date 15 JUL 2005 Final Assy Number 0 Polling Address 0 Long Tag N/A Language Position Fault Limits 1. English 5 Pressure Units Time 1 (s) Enable Burst Settings Configure I/O Burst Settings Configure I/O	Characterization Characterization Characterization Capital % (30) Capital % (50) C Quick Open C Custom C Custom C Camflex % Air Action Air Action C Air-to-Close Single/Double C Single Acting C Double Acting	Buttons cal Cal-Config cal Manual Buttons
Change Mode 🔷 Mode: Setup	Exit	elp

Figure 71 Configure Screen - Setup Mode



ValVue must be in Setup mode to make any configuration changes on this screen.

Tag Information

The *Tag* information contains an extra field, *Polling Address*. To change *Tag* information:

- 1. Enter data.
- 2. Click Apply.

Polling Address

The Polling Address doesn't appear in the Tag information on the Monitor screen.

HART can communicate with up to 64 devices on a single pair of wires. These devices are distinguished by their polling address which number from 0 to 63. If there is a device at polling address 0, it must be the only device on the loop. There can be up to 63 devices with non-zero polling addresses on the loop (subject to power and intrinsic safety constraints). For an SVI II AP HART 6 device, polling address can be up to 63. Devices which operate 4-20 mA are generally required to have polling address 0, however with split range valve positioners, several 4-20 mA devices can be wired in series. Set these devices up with non-zero polling addresses.

Positioner Application	Polling Address	Comment
Normal default on current loop	0	Use this for all single loop control.
Split range on a single current loop	1 to 63	Give each device on the current loop a unique address. 0 can cause errors. Use the <i>Options</i> dialog to specify particular addresses or an address range to save scanning time.
Split range with each positioner on a current loop powered by iso- lator	1 to 63	Give each device operated by a single controller a unique address. 0 can cause errors. Use the <i>Options</i> dialog to specify particular addresses or an address range to save scanning time.
Multidrop in voltage mode	1 to 63	Used with HART multiplexor. Follow instructions of Mux manufacturer.

Table 6	Polling	Address	Application	าร
---------	---------	---------	-------------	----

Positioner Application	Polling Address	Comment
Use with Mux	1 to 31	Used with voltage mode devices only. Give each device on a circuit a unique address. 0 can cause errors. Use the <i>Options</i> dialog to specify particular addresses or an address range to save scanning time.

Table 6 Polling Address Applications (Continued)

Characterization

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

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

Figure 72 shows the characterization curves in a graphical format.



Figure 72 Characterization Curves

Custom Characterization

When you select **Custom** under *Characterization*, ValVue launches a characterization graph (Figure 73). 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. It is required that the first position is 0, 0 and the last position is 100,100 (both first and last positions indicate 0 and 100 percent and are not counted as any of the nine points allowed).



Figure 73 Custom Characterization Curve - No Data Points

Adding Data Points

- Custom Characterization x Position (%) Input Signal (%) Input Signal (%) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 90.2 100 Position (%) 0.0 100 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 90.2 Capture to Clipboard ΟK Cancel
- 1. Adding data points by placing the cursor on the curve and left-clicking (Figure 74).

Figure 74 Adding the First Data Point

2. Continue until you have added all data points to the curve. The values for the data points fill the editable boxes below the graph. Data points are added from the highest to lowest values.



Figure 75 Data Points Added

Deleting Data Points

1. Delete data points by selecting the data point and right clicking (Figure 76).



Figure 76 Deleting a Data Point

2. Continue selecting data points until you have deleted all data points. The values for the data points empty from the editable boxes below the graph.



Figure 77 Data Points Deleted

Dragging Data Points

Move points by *dragging* them to their new position (Figure 78). The characterization curve must be non-decreasing and the program does not allow a point to be added or moved to a position that would create a decreasing segment. To drag a data point:

- 1. Select a data point by dragging and holding with a left click.
- 2. Drag the data point to the new location.



Figure 78 Changing Curve by Dragging

Saving Custom Characterization Curves

To save the custom curve:

1. Click OK.

Figure 79 appears.

ValVue_SVI2AP		×	
Save the custom characterization data?			
ОКЪ	Cancel]	

Figure 79 Save Custom Characterization

- 2. Click **OK** to save the custom characterization data.
- 3. Return to the *Calibration* screen and click **Apply** to save the changes.

Button Lock

The SVI II AP comes with an optional local display and buttons for data entry. These buttons can be used to perform basic SVI II AP setup without the need for ValVue or a handheld. It may, however, be desirable after initial setup to *lock* the buttons so that the parameters cannot be inadvertently changed from the buttons. Several levels of locks are provided:

- □ Allow Local Buttons (level 3): Buttons on the SVI II AP are enabled.
- □ Lock Out Local Cal. Config. (level 2): You can use the buttons to perform operations in normal operating mode and manual mode, however you cannot go to configure or calibrate mode.
- □ Lock Out Local Manual (level 1): You can examine variables in normal operating mode but may not put the valve in manual mode (and therefore cannot get to calibrate or configure modes).
- □ Lock Out All Buttons (level 0): The buttons are disabled.

Bumpless Transfer

This option provides a means to maintain smooth valve control positioning when changing to Normal mode from Manual or Setup. Without Bumpless Transfer, when changing to Normal mode, the setpoint could vary in a manner that causes a significant process disturbance. Bumpless Transfer moves the controller signal to match the valve position so that smooth resumption of control with little disturbance results.

When *Bumpless Transfer* is selected, returning to Normal mode from Manual or Setup mode is deferred until the input signal matches the current valve position. Either the input signal or the valve position can be changed to match. If nothing is done, the system slowly changes the position until it matches the signal setpoint. The time taken to move to the position is determined by the Transfer Time which is a number between 0 and 255 and is approximately the number of seconds required to move the valve 100% toward the signal position.

Near Closed

The near closed value determines the value of position below which the valve is considered *near closed* by the continuous diagnostic calculations.

Position Limit Stops

Use the SVI II AP to establish software limit stops. If enabled, during correct operation of the SVI II AP, the control functions of the SVI II AP do 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.

The full open and full closed buttons similarly ignores the settings of the software limit stops.

Some of the diagnostic tests cannot be performed with position limit stops set.

Single/Double Acting

This is factory set.

Air-to-Open / Air-to-Close

You must select whether the valve is an air to open valve or an air to close valve. This selection is used to determine whether an increasing signal opens or closes the valve.

Position Fault Limits

You can configure how position errors are handled. A position error occurs when the valve position differs from the requested position (from the input signal in Normal mode or the manual setpoint in Manual mode) by more than the *Position Error Band* for more than the *Position Error Time 1*. When this occurs, a status flag is set which is reported during the next HART message (only that a flag is set is reported. You must send a *Read Status* message to find out the cause of the status flag). If the error persists for *Position Error Time 2*, the valve is put in failsafe position. This latter action can be disabled by unchecking the enable box next to the *Time 2 entry*.

For practical considerations, *Time 2* (if enabled) must be larger than *Time 1* by at least two seconds. *Time 1* must be at least as long as the time required to open the valve fully or unnecessary position errors are reported. The maximum time is 327 seconds.

Language

The SVI II AP can display its menu in *English* or *French*. The ValVue program is not affected.
Pressure Units

You can select the units in which the actuator pressure is reported: *psi, bar,* or *kPa*.

Configure I/O

Use the Configure screen to set up the Inputs and Outputs.

Accessing Configure I/O

When the user clicks on the Configure I/O button on the Configure screen ValVue launches the I/O configure window shown below. In the Configure I/O window you can change the following configuration parameters:

- □ "Output Switches (DO)" on page 110
- □ "Digital Input (DI)" on page 111
- □ "Input Signal Range (AI)" on page 111
- □ "Position Retransmit (AO)" on page 111

To configure the inputs and outputs:

1. Click Configure I/O.

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	
Monitor Trend Configure Calibrate Diagnostics Status Check	1
Tag Name NEW Descriptor	Characterization Button Lock © Linear © Allow Local Buttons © Equal % (30) © Lock out Local Cal-Config © Quick Open © Lock out Local Manual © Custom © Lock out all Buttons © Camflex % Bumpless Transfer Air Action E Bumpless Transfer © Air-to-Open E Bumpless Transfer
1. English 5 Position Error Band (%) Pressure Units Time 1 (s) Enable	Single/Double Near Closed Value (%) 1 © Single Acting Position Limits
psi Burst Settings Configure I/D	C Double Acting Image: Allow diag/tune to override limits Image: Tight Shutoff Below (%) 0 Image: Tight Shutoff Below (%) 0 Image: Position Lower Limit (%) 0 Apply Image: Position Upper Limit (%)
Change Mode 🗢 Mode: Setup	ExitHelp

Figure 80 Launching Configure I/O

The I/O Configure window appears (Figure 81).

2. Adjust the parameters and click **OK** to save changes and return to the *Configure* screen.

DO (Output Switches)	DI (Digit Input)
Switch 1	🔽 Digit Input Enab
0. Always Normal Position 🗾	SP (Input Signal Range)
0	Low Input Signal 4 (mA)
Normally 💿 Closed 🔿 Open	High Input Signal 20 (mA)
Switch 2	
0. Always Normal Position 💌	AD (Valve Position Retransmit)
	Lower Range Value 0 (%) at 4 mA
Normally 💿 Closed 🔿 Open	Upper Range Value 100 (%) at 20 mA

Figure 81 I/O Configure Window

Output Switches (DO)

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

0.	Always Normal	The switch is not controlled by the SVI II AP and remains in it's default
Positio	n	position. The two digital output switches can be opened or closed in response to detected conditions. The default configuration setting is <i>Always Normal Position</i> , 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 <i>Position Low Limit</i> or <i>Position High Limit</i> .
1.	Failsafe	The switch is activated when the SVI II AP is in failsafe mode.
2.	Reset	The switch is activated whenever a reset has occurred and the switch remains activated until the SVI II AP status is cleared.
3.	Position Error	The switch is activated whenever a position error has occurred and is deactivated when the position recovers to the correct position.
4.	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).
5.	Position Low Limit	The switch is activated whenever the valve position is less than the position setting of this switch control.



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

6. *Position Upper Limit* The switch is activated whenever the valve position is greater than the position setting of this switch control.



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

7. Manual Mode

The switch is activated whenever the SVI II AP is in manual mode, configure mode, calibrate mode, or diagnostic mode.

The switch can be configured to default as normally open or normally closed.



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

Digital Input (DI)

The SVI II AP can receive a digital signal that is used by the positioner software. You can enable the digital input by clicking in the checkbox.

Input Signal Range (AI)

Use this parameter to adjust the current range Input Signal 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.

Position Retransmit (AO)

The SVI II AP has the ability to retransmit the position signal as an output to another device with 4 - 20 mA current output proportional to position. The 4-20 retransmit is galvanically isolated from the 4-20 input on the main board.

Burst Settings

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. Turning on Burst mode in cases where it is not required affects the communication bandwidth.

To configure Burst Settings:

- 1. Place the unit into Setup mode.
- 2. Click **Burst Settings** and Figure 82 appears.

Burst Settings	
Burst Mode Burst Command	Off Cmd1: PV
Burst Variables Burst Variable 1 Burst Variable 2	Position
Burst Variable 3 Burst Variable 4	Position
ОК	Cancel

Figure 82 Burst Settings

- 3. Use the *Burst Mode* pulldown to select **On**.
- 4. Use the Burst Command pulldown to select the required command:
 - Cmd1: PV
 - □ Cmd2: %range/current
 - □ Cmd3: Dyn vars/current
 - □ Cmd9: Device vars w/status (only applies to SVI II AP HART 6 (firmware 411))
 - □ Cmd33: Device variables (only applies to SVI II AP HART 6 (firmware 411))
- 5. If using:
 - □ *Cmd9* or *Cmd33*: Choose the variables for the burst command and the order for command variables to be returned using the four Burst Variable pulldowns. There are 15 variables:

\square	Position	P2
		1 4

- Supply Pressure
- 🗆 Signal
- DO1
- □ Temperature □ DI
 - VoltsInput
- □ Num Strokes □ Num Cycles
- Pos Retransmit

Raw Position

□ P1-P2

DO2

Setpoint

Then click **OK**.

□ Any other command click **OK**.

A dialog appears.

6. Click **OK** and then **Apply**.

Configure Context Menu

Right-click on the Configure screen, a context menu shown in Figure 83 appears.

🍻 ValVue SVI II AP - Of	fline NEW			
Tools Help				
Monitor Trend Configure	e Calibrate Diagnostics Status Check	1		
Tag Name Descriptor Message Date Final Assu Number	NEW Custom Linearization 15 JUL 2005 Detach Trend Help	Characterization C Linear C Equal % (30) C Equal % (50) C Quick Open C Custom C Canflex %	Button Lock Allow Local Buttons Lock out Local Cal-Config Lock out Local Manual Lock out all Buttons	

Figure 83 Configure Screen Context Menu

The following items are on the *Configure* context menu.

- Custom Linearization Recomputes the position scale so that when the open stop adjustment is edited, and is only a percent of the full stops, ValVue reads and display the edited open stop adjustment as 100%
- □ Detach Trend Removes the Trend display from the anchored screen format and creates a separate trend display
- □ *Help* Displays the help file at the *Configure* screen instructions

Custom Linearization

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

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

Simple Lever Type	Compound Lever Type
Stoke	L1 L3 Stole
Stroke length (S)	Lever arm 2 length (L2)
Lever arm length (L1) 0	Offset length (L3) 0
Valve position at 0 horizontal (T) %	 L2 above L1 (as shown) C L2 below L1
* Enter all the lengths in the same unit (either inch or m	m)
Simple Ca	ncel Compound

1. Right-click and select **Custom Linearization** and Figure 84 appears.

Figure 84 Custom Linearization Dialog

Levers	You can customize both simple and compound lever.
Simple Lever	The simple lever has the pivot point (the potentiometer in the SVI II AP) mounted a fixed distance (L1) from the valve stem pickup point. In order to compute the proper correction curve, the stroke length, the distance from the pivot to the valve stem pickup point and the valve position at horizontal must be entered. Click Simple to com- pute the correction and displays the curve.

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

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

2. Enter all lever parameters, click on the lever type (Compound lever in Figure 85).

Dialog	×
Simple Lever Type	Compound Lever Type
Generation Stroke	L2 L2 L1 L1 L3
Stroke length (S) 2	Lever arm 2 length (L2) 5
Lever arm length (L1) 2.5	Offset length (L3) 2.5
Valve position at 50	L2 above L1 (as shown)
horizontal (T) %	C L2 below L1
* Enter all the lengths in the same unit (either inch or mm)	
Simple Cancel	Compound

Figure 85 Selecting Lever Type

ValVue displays the rotation angle for the custom linearization.

3. Click **OK** to continue.

ValVue_SVI2AP 🔀
Rotation Angle is 47.2.
ок

Figure 86 Rotation Angle Dialog



The custom linearization in a custom characterization graph appears (Figure 87).

Figure 87 Custom Linearization Graph

4. Click **OK** to save and return to the *Configure* screen.

Figure 88 appears.

ValVue_SVI2AP		×
Save the custom ch	aracterization dat	a?
ок 💦	Cancel	

Figure 88 Saving Custom Linear Characterization

5. Click **OK** to save the custom characterization data.

Applying Configuration Changes

After you have made all the necessary configuration changes you must apply the changes at the top level of the *Configure* screen.

To apply all configuration changes:

□ Click **Apply** and any changes made in the *Configure* or *Calibrate* screens are written immediately to the SVI II AP.

Trend Screen

4

What you can do on the Trend Screen

Use the *Trend* screen (Figure 89) to observe the valve real time performance. The process trend graph is useful for troubleshooting a control valve and for tuning the PID positioning parameters. As the X axis is defined in seconds, the process trend graphs are zoomed only on the Y axis.

The process trend graph can be detached as a separate window from the tabbed dialog for viewing while performing calibration and diagnostic tasks. To detach the trend:

□ Right-click in any screen and select **Detach Trend**.

In manual mode, drag the position indicator to change the valve position.



Figure 89 Trend Screen

Trend Graph Features

Turn the display of any of the curves on the *Trend* graph by checking or unchecking these boxes:

- Desition blue
- □ Manual Setpoint black
- □ Signal Setpoint red
- Deressure green (SVI, SVI II, SVI II AP with Advanced Diagnostics

Trend - Y Low/High

Set the Y axis (position) of the *Trend* graph by entering the values in these edit boxes and hit tab to set the scale. Change the axis with the mouse by zooming and return to the original scale by right-clicking in the graph.



Figure 90 Selecting Area of Trend to Zoom



Figure 91 Area of Trend with Zoom View

Position	Shows the position of the valve is in percentage of valve opening. 0% is always closed and 100% is open. Because the travel of a valve can exceed its nominal travel, positions greater than 100% are possible (see "Open Stop Adjustment" on page 61).
Signal	Indicates the input analog signal expressed in percentage of the configured signal range.

Trend Context Menu

When the user right clicks on the grey area of the Trend screen (but not in the graph area), a context menu shown in Figure 92 appears:

- □ *Refresh Graph* Restarts the sampling of the trend graph.
- □ Stop Graph Stops the sampling of the trend graph. It can be restarted by selecting **Refresh Graph**.
- Detach Trend Removes the Trend display from the tabbed dialog and creates a separate display.



□ Help - Displays the help file at the Trend screen instructions

Figure 92 Trend Context Menu

Calibrate Screen

What you can do on the Calibrate Screen

From the *Calibrate* screen (Figure 93) you can calibrate:

- 🗆 Signal
- Pressure
- □ Advanced Parameters (PID Position tuning parameters)
- Valve Travel

🚰 ValVue SVI II AP - (Offline NEW		
Tools Help			
Monitor Trend Config	ure Calibrate Diagnostics Status Check	k]	
Tag Descriptor Message Date	NEW 	PID Parameters 100 P (%) 160 I (1/10 s) Advanced Parameters 20 D (ms)	
Assembly Number Long Tag Calibration	0 N/A	30 Padj (%)	
Current Input Signal	12.00 mA Calib. Signal	Open Stop Adjustment	
Current Pressure	13.54 psi Calib, Pressure	100.0 (%) Set Open Stop Adj.	
		Apply	
Change Mode	🔿 Mode: Manual	Exit Help	

Figure 93 Calibrate Screen

Signal Calibration Procedure

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



The Reset to Factory selection in the Calibrate right click menu returns the calibrations to those that were set at the factory.

The currently measured value of the primary input is displayed and can be compared to reference signals to see if recalibration is necessary. Calibrating the primary signal can be done most easily with a variable current source.

ValVue allows you to perform a low signal and high signal calibration.

Low Signal Value Calibration

1. Click Calib. Signal (Figure 94).

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	
Monitor Trend Configure Calibrate Diagnostics Status Check	
Tag NEW Descriptor	PID Parameters 100 P (%) 160 I (1/10 s) Advanced Parameters 20 D (ms) 30 Padj (%)
Calib. Signal 12.00 mA Calib. Signal	Open Stop Adjustment 100.0 (%) Set Open Stop Adj.
	Apply
Change Mode 🔷 Mode: Setup	Exit Help

Figure 94 Starting Signal Calibration

Figure 95 appears indicating that the calibration will be changed.



Figure 95 Starting Signal Calibration

2. Click **OK** and Figure 96 appears with a field to enter the low or high signal value.

Sensor Calibration	×
Signal Value	
mA	Set as Low Value
or	Set as High Value
Cano	el

Figure 96 Signal Calibration Dialog

3. Enter a low value *Signal Value* (from 3.5 and 8.0 mA) and click **Set as Low Value**.

Sensor Calibration	×
Signal Value 6.5 mA	Set as Low Value
or	Set as High Value
Canc	el

Figure 97 Setting Signal Low Value



Enter a low signal value outside the 3.5 to 8.0 range and Figure 98 appears. Click **OK** and re-enter the value.

ValVue SVI II AP 🛛 🛛 🛛
Signal must be a value in milliamps and be between 3.5 and 8.0
ОК

Figure 98 Low Signal Calibration Warning

High signal Value Calibration

1. Click Calib. Signal (Figure 94).

A dialog appears indicating that the calibration will be changed (Figure 95).

2. Click **OK** to continue.

A dialog appears with a blank field for entering the low or high signal value, in mA (Figure 96).

3. Enter the high value (between 16.0 and 21.0 mA) in the Signal Value field. Click **Set as High Value**.



Figure 99 Setting Signal High Value



If you enter a low signal value outside the range of 16.0 to 21.0 mA, ValVue issues a warning (Figure 98). Click **OK** to continue and re-enter a value.

ValVue S	VI II AP	×
Signal m and be b	ust be a value in etween 16.0 an	milliamps d 21.0
	ОК	

Figure 100 High Signal Calibration Warning

Pressure Calibration Procedure



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

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

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

To recalibrate the pressure sensor:

1. Click Calib. Pressure (Figure 101).

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	,
Monitor Trend Configure Calibrate Diagnostics Status Check	
Tag NEW	PID Parameters
Descriptor	100 P (%)
Message	160 I (1/10 s)
Date 15 JUL 2005	Advanced Parameters
Assembly Number 0	
Long Tag N/A	30 Padj (%)
Calibration	
Current Input Signal 12.00 mA Calib. Signal	Open Stop Adjustment
Current Pressure 13.54 psi Calib. Pressure	100.0 (%) Set Open Stop Adj.
	Apply
Change Mode 🔷 Mode: Setup	Exit Help

Figure 101 Starting Pressure Calibration

A dialog appears (Figure 102).



Figure 102 Calibrate Pressure Dialog

2. Click Yes to continue.

After calibrating the pressure sensors Figure 103 appears.

ValVue SVI II AP 🛛 🔀
Calibration has been changed
OK.

Figure 103 Pressure Calibration Changed Dialog

3. Click **OK** to close the dialog and return to the Calibrate screen.



If ValVue detects an error when performing pressure calibration, the calibration aborts and the dialog displayed in Figure 104. Click **OK** to close the dialog and return to the Calibrate screen. Troubleshoot the problem prior to performing pressure calibration a second time.

¥al¥ue_9	5412A	x
\triangle	Calibration failed. A pressure sensor may not be in proper range (-3 psi t	:o +3 psi).

Figure 104 Calibration Failure Dialog

Advanced Parameters

You can fine tune the SVI II AP using the Advanced Parameters dialog to adjust:

- Dead Zone
- 🗆 Beta
- □ Position Compensation Coefficient
- Boost
- □ Stroke Time

To adjust the advanced parameters:

1. Click Advanced Parameters (Figure 105).

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	
Monitor Trend Configure Calibrate Diagnostics Status Check	1
Tag NEW Descriptor	PID Parameters 100 P (%) 160 I (1/10 s) 20 D (ms) 30 Padj (%)
Calibration	
Current Input Signal 12.00 mA Calib. Signal	Open Stop Adjustment
Current Pressure 13.54 psi Calib. Pressure	100.0 (%) Set Open Stop Adj.
	Арріу
Change Mode 🔷 Mode: Setup	Exit Help

Figure 105 Starting Advanced Parameters

Stroke Time

The *Advanced Tuning Parameters* dialog appears (Figure 106). Refer to Table 7 for parameter descriptions.

Advanced Tuning) Parameters		×
0.00	Dead Zone (%)		
-2	Beta		
13	Position Compens	ation Coefficient	
4	Boost	Both Directions	
0	Stroke Time (s)	O Open	
		C Closed	
	ок	Cancel	

Figure 106 Advanced Parameters Dialog

Tuning Parameter	Description
Dead Zone	When the valve position is within the setpoint +/- the dead zone, no additional posi- tion 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 and 5%.
Beta	Beta is nonlinear gain factor, ranging from -9 to 9. When beta is 0, the position con- troller gain is linear. Otherwise the gain is function of error. The larger the <i>Beta</i> , the smaller the gain for small error. Typical values for a valve position controller is 7 or 8.
Position Compensation Coefficient	The response of a valve is different when it is nearly closed than when it is nearly open. The position compensation coefficient, a number between 2 and 20, allows you to make adjustments to try to equalize the valve response. The normal value is 6.
Boost	The boost field in the PID adjustments controls a supplemental pressure or boost to speed up initial valve response. Valve response is the amount of time it takes for the valve to go from setpoint to 100%

Table 7 Advanced Tuning Parameters

Amount of time in seconds required for the valve to be completely stroked.

Calibrate Context Menu

Right-click on the Calibrate screen and a context menu appears (Figure 107).



Most functions available in the Calibrate context menu are used for advanced setup and are only accessible when ValVue is in the setup mode. Refer to "Advanced Setup with ValVue" on page 57 of this manual for further instructions.

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	
Monitor Trend Configure Calibrate Diagnostics Status Check	1
Tag NEW Descriptor 100 Message 0 Date 15 JUL 2005 Assembly Number 0 Long Tag N/A Calibration Reset to F Current Input Signal 12.00 mA Current Pressure 13.54 psi Calib. Pressure 13.54 psi	P (%) Stops ad Stops b Adjustment Tune d Position Factory Cal g Setup end Set Open Stop Adj.
Change Mode 🔷 Mode: Setup	Exit Help

Figure 107 Calibrate Screen Context Menu

The following items are on the *Calibrate* context menu.

- □ *Run Find Stops* Runs the automatic position calibration process.
- Manual Find Stops Sets the position calibration by moving the valve full closed and full open. On very large valves, the automatic find stops routine may timeout before the valve has reached the end of travel. Manual find stops allows calibration of these valves.
- □ *Open Stop Adjustment* Recomputes the position scale so that at the value entered in the open stop adjustment edit box as a percent of full stops, the position reads 100%
- □ *Run Auto Tune* Automatically finds appropriate PID parameters for the valve.
- □ *Full Open* Moves the valve to full open. This command works by taking the valve out of closed loop control and sends a high or low signal to the I/P.

- □ *Full Closed* Moves the valve to full closed. This command works by taking the valve out of closed loop control and sends a high or low signal to the I/P.
- Set Valve Position Sets the valve to a specific position (this is accomplished by momentarily returning to manual mode, repositioning the valve, and returning to setup mode).
- □ *Reset to Factory Cal* Resets the signal and pressure calibration to their factory settings.
- □ *Live Tuning* Enables/disables live tuning and sets the *Max Live* % of the original value.
- □ *Detach Trend* Removes the Trend display from the tabbed dialog and creates a separate display.
- □ *Help* Displays the help file at the Calibrate screen instructions.

Reset to Factory Cal

Resetting Factory Calibration restores the calibration data for all sensors.

To reset calibration parameters:

1. Select **Reset to Factory Cal** from the *Calibrate* context menu and Figure 108 appears.



Figure 108 Reset to Factory Cal Dialog

2. Click **OK** and Figure 109 appears.



Figure 109 Reset to Factory Cal Confirmation Dialog

Live Tuning

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

To do this:

1. Click Live Tuning and Figure 110 appears.

Live Tuning Wizard	×
PID Parameters	
171	P (%)
99	l (1/10 s)
17	D (ms)
97	Padj (%)
Apply	Cancel

Figure 110 Live Tuning Wizard

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

Applying Calibration Screen Changes

After making all necessary calibration changes, you must apply the changes at the top level of the *Calibrate* screen. To apply all calibration changes:

□ Click **Apply** to save any changes made immediately to the SVI II AP.

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Diagnostics Screen

What you can do on the Diagnostics Screen

The *Diagnostics* screen (Figure 111) displays positioner *Tag* information and the current continuous diagnostics information (updated every time the *Diagnostics* screen is selected). It provides access to the diagnostic tests, and displays test results in the *Results* area.

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

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	
Monitor Trend Configure Calibrate Diagnostics Status Check	Diagnostic Tests
Tag NEW Descriptor	Diagnostic Tests Diagnostic Type C Std. Actuator Sig. C Step Test C Ramp Test C Extended Act. Sig. Perform Diag
Continuous Diagnostics	L View Saved Diag.
Strokes 1 Cycles 2 Time Open (hr) 0 Time Closed (hr) 0 Time Near Closed (hr) 0	Results I I I
Change Mode 🔷 Mode: Setup	Exit Help

Figure 111 Diagnostics Screen

Tag Information

The *Diagnostics* screen displays the *Tag* information for the active SVI II AP. The *Tag* information is display only on the *Diagnostics* screen. Change *Tag* info on the *Monitor* or *Configure* screens.

Continuous Diagnostics

The Continuous Diagnostics window displays the continuous diagnostic data including:

- □ *Strokes*: Number of full strokes the valve has made
- □ *Cycles*: Number of cycles (direction changes)
- □ *Time Open*: Time the valve has spent open
- □ *Time Closed:* Time the valve has been closed
- □ *Time Near Closed:* Time the valve has spent throttling near the seat

Diagnostic Tests

The SVI II AP allows four diagnostic tests to be performed:

- □ Standard Actuator Signature (/AD)
- □ Step Test (ISD, /AD)
- □ Ramp Test (ISD, /AD)
- □ Extended Actuator Signature (/AD)

Performing Diagnostic Tests

To perform a diagnostic test:

- 1. Select the test to perform.
- 2. Adjust the test parameters, if necessary.
- 3. Click Perform Diag.

After you first run a diagnostic test, the *Diagnostic Graph* appears (Figure 112) and three buttons appear on the main *Diagnostics* screen:

- □ View Current Diag ("View Current Diag" on page 135)
- □ Save Diag ("Save Diag" on page 135)
- □ View Saved Diag ("View Saved Diag" on page 136)



Figure 112 Diagnostic Graph

View Current Diag

After performing a diagnostic test and returning to the *Diagnostics* screen, you can view the current diagnostic graph again:

□ Click **View Current Diag** and the *Diagnostic Graph* appears.

Save Diag

After performing a diagnostic test and returning to the *Diagnostics* screen, you can save the diagnostic graph and data:

- 1. Click Save Current Diag and a Windows browser appears.
- 2. Locate the folder in which to save the diagnostic graph and data (.dgn format).

View Saved Diag

You can view previously saved diagnostic graphs and data. To view saved diagnostics:

- 1. Click View Saved Diag and an empty Diagnostic Graph appears.
- 2. Click **Select Curve** and a dialog containing a list of signature locations appears (Figure 113).



Figure 113 Choose Signature Curve

- 3. Choose the type of saved signature curve for viewing, click **OK** and, if appropriate, a Windows browser to locate the file appears.
- 4. Select a curve is selected, the graph appears in the *Diagnostic Graph* window.

Standard Actuator Signature (Std. Actuator Sig.)

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

To run the diagnostic:

- 1. Select Std. Actuator Sig.
- 2. Enter a *Speed Level*, if required. The speed level is the rate of speed at which the test is performed, with 1 being the slowest and 10 being the fastest. The default speed level is 4.
- 3. Click Perform Diag.

🚰 ValVue SVI II AP - Offline NEW Tools Help	
Monitor Trend Configure Calibrate Diagnostics Status Check Tag NEW Descriptor Message Date 15 JUL 2005 Assembly Number 0 Long Tag N/A	Diagnostic Tests Diagnostic Type (• <u>Std. Actuator Sig</u> (• Step Test (• Ramp Test (• Extended Act. Sig. Perform Diag
Strokes 1 Cycles 2 Time Open (hr) 0 Time Closed (hr) 0 Time Near Closed (hr) 0	View Current Diag. Save Diag. View Saved Diag. Results
Change Mode 🔷 Mode: Setup	Exit Help

Figure 114 Performing Standard Actuator Signature Test

4. During the *Standard Actuator Signature* test, a dialog Figure 115 appears indicating running time.

Diagnostics	
Standard Actuator Signature	O Running
Elapsed Time (Task): 00:00:45 Elapsed Time (Total): 00:00:45	Cancel Current Task Cancel All Continue

Figure 115 Standard Actuator Signature Test Progress

When the *Standard Actuator Signature* diagnostics complete Figure 116 appears with the elapsed time shown.

Diagnostics			SWRBCD
Standard Actuator Signature	O Finished		
	Std. Signa	ture Complete	
			2.2
			-
Elapsed Time (Task): 00:19:51			
Elapsed Time (Total): 00:19:51	Cancel Current Task	Cancel All	Continue

Figure 116 Standard Actuator Signature Test Complete

5. Click **Continue** and Figure 117 appears.

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



Figure 117 Standard Actuator Signature Diagnostics Graph

Diagnostic Graph Features

There are several features on the *Diagnostic Graphs* that allow you to view and save diagnostic data:

- □ "Show Data Points"
- \square "Export to Excel" on page 140
- □ "Capture to Clipboard" on page 140
- □ "Print Report" on page 140
- □ "Select Curves" on page 140
- □ "Show Diagnostic Info" on page 141

Show Data Points

Select **Show Data Points** and the Diagnostic Graph displays a tick mark on the graph for all available data points as shown in Figure 117.

Export to Excel

Select **Export to Excel** and Excel opens with the *Diagnostic Graph* data exported into an Excel spreadsheet. You must then save the data as an Excel file.



If there is no curve displayed in the graph ValVue displays an error message No curves to export.

Capture to Clipboard

Select **Capture to Clipboard** and ValVue captures the diagnostic graph to the Windows clipboard. Open any Windows program that can process images, such as Microsoft Word or WordPad, and paste the image of the diagnostic graph.

Print Report

Select **Print Report** and ValVue captures a report and opens it in your *Report Setup* selection, which you can then print or save.

Select Curves

You can view two positioner signatures in addition to the current signature. The two other signatures, represented by blue and black curves, can be displayed in the *Diagnostic Graph*.

To select a curve:

1. Click Select Curve (Figure 117 on page 139).

Figure 118 appears.



Figure 118 Select Curve Dialog

2. Select the signature type and click **OK**. If the signature curve is from a file ValVue launches a Windows browser to locate the file. The signature curve appears in the *Diagnostic Graph* window.

Cho	ose Signature Curve	×
C	none	
ō	Current Signature	
C	Saved Signature	
C	Baseline Signature	
C	Current Signature from dp2 File	
C	Saved Signature from dp2 File	
•	Baseline Signature from dp2 File	
C	Signature from dgn File	
_		
	OK Cancel	

Figure 119 Select Baseline Signature from Dump File

Show Diagnostic Info

Diagnostic Info accesses a dialog that displays the diagnostic information gathered for the selected signatures.

To show diagnostic info:

1. Click **Show Diagnostic Info** (Figure 120). The Diagnostic Graph shows the current curve and a selected saved curve, Signature 1, in blue.



Figure 120 Show Diagnostic Info

The *Diagnostic Information* dialog appears displaying the data for the curves in the *Diagnostic Graph* (Figure 121).

Diagnostic Informatio	in		State of State of State	x
	Durrient Signali	ure	Signature 1	Signature 2
Speed	4		5	
Response Open	17.7	2		
Response Closed	5.7	\$		
Friction	0.29	p≋i	0.22	
Lower Spring Range	6.06	pei	6.37	
Upper Spring Range	14.94	psi	15.55	
				Οκ

Figure 121 Diagnostic Information

2. Click **OK** to close the dialog.

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 size specified in *step* until the ending position is reached. For each step, the SVI II AP measures the position at even time intervals for the amount of time specified in *time*. If 2-way is specified, when the end position is reached, the procedure is repeated from the end position to the start position.

To run the Step Test:

- 1. Click **Step Test**. The test parameters become active to the right of *Diagnostic Tests*.
- 2. If necessary, adjust the following parameters:

- □ Start Position (%) □ Stop Position (%)
 - 🗆 Time (s)

- Sample Rate
- Step Size (%)
- $\hfill\square$ One Way or Two Way

(samples/s)

142

3. Click Perform Diag.

While the test is running, a progress dialog appears (Figure 122).

Diagnostics Step Response Test	O Running
Elapsed Time (Task): 00:03:13 Elapsed Time (Total): 00:03:13	Cancel Current Task Cancel All Continue

Figure 122 Step Test Running

On completion of the test a Signature Complete message appears.

4. Click **Continue** to close the dialog. The Step Test Diagnostic Graph appears (Figure 123).



Figure 123 Diagnostics Graph for Step Test

5. View/save the graph (refer to "Diagnostic Graph Features" on page 139) and click on **Close** to return to the *Diagnostics* screen.

Diagnostic Info for Step Test

Click Show Diagnostic Info displays the analysis for each step (Figure 123).

		Current Curve	Selected Curve1	Selected Curv
	Start(%)		40.000	40.000
Ch 1	End(%)		45.000	45.000
stepi	T86(%)		0.600	0.600
	Overshoot(%)		-0.200	-0.200
	Start(%)		45.000	45.000
~ ~	End(%)		50.000	50.000
Step 2	T86(%)		0.600	0.600
	Overshoot(%)		4.400	4.400
	Start(%)		50.000	50.000
~ ~	End(%)		55.000	55.000
Step 3	T86(%)		0.600	0.600
	Overshoot(%)		0.800	0.800
Step 4	Start(%)		55.000	55.000

Figure 124 Step Test Diagnostic Information (Diag Info)

Ramp Test

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

- 1. Select **Ramp Test** and *Ramp Test* parameters become active to the right of the *Diagnostic Tests*.
- 2. If necessary, adjust the following parameters:
 - □ Start Signal (mA)
 - □ Stop Signal (mA)
 - □ Number of Samples
- 3. Click Perform Diag. Figure 125 appears.

Diagnostics		_		
Ramp Test		Running -	0% complete	
Elapsed Time (Task): Elapsed Time (Total):	00:00:08 00:00:08	Cancel Current Task	Cancel All	Continue

Figure 125 Ramp Test Running
On completion Figure 126 appears.

Diagnostics Ramp Test		 Finished Signature Complete
Elapsed Time (Task): Elapsed Time (Total):	00:09:08 00:09:08	Cancel Current Task Cancel All Continue

Figure 126 Ramp Test Complete

4. Click **Continue** to close the dialog.

The Ramp Test Diagnostic Graph appears (Figure 127).



Figure 127 Ramp Test Diagnostic Graph

5. View/save the graph and click **Close** to return to the *Diagnostics* screen.

Extended Actuator Signature (Extended Act. Sig.)

The extended actuator signature slowly ramps the pressure to the actuator up and down over a user-selected position range and measures the position vs. pressure. The signature is useful for determining valve friction and for identifying performance problems at specific valve positions. To perform this test:

- 1. Select Extended Act. Sig.
- 2. Adjust the Start Position, Stop Position and Speed Level parameters, if necessary.
- 3. Click Perform Diag.

🚰 ValVue SVI II AP - Offline NEW	
Tools Help	
Monitor Trend Configure Calibrate Diagnos	tics Status Check
Tag NEW Descriptor	Diagnostic Tests Diagnostic Type 40 Stat Position (%) Std Actuator Sig. Step Test Ramp Test Extended Act. Sig. Perform Pag. View Current Diag. Save Diag. View Saved Diag. Results Hystersis & Deadband: Max = 1.77 % Max = 0.35 % Min = 0.46 %
Change Mode 🔷 Mode:	Setup Exit Help

Figure 128 Performing Extended Actuator Signature Diagnostic Test

Figure 129 appears.

Diagnostics	_
Extended Actuator	
Extended Actuator Signature	 Finished Extended Signature Complete
Elapsed Time (Task): 00:01:20 Elapsed Time (Total): 00:01:20	Cancel Current Task Cancel All Continue

Figure 129 Extended Actuator Signature Test Complete

When the test is complete, the dialog indicates completion.

4. Click **Continue** to close the dialog.



The Extended Actuator Diagnostic Graph appears (Figure 130).

Figure 130 Extended Actuator Signature Test Diagnostic Graph

5. View/edit/save the graph and click **Close** to return to the *Diagnostics* screen.

Diagnostics Context Menu

The Diagnostics context, right click menu is displayed below and contains the following selections:

- □ *View Diagnostic Graph* Displays the diagnostic graph from the most recent diagnostic test.
- □ Save Diagnostic Data to File Launches Windows browser to select or create data file, for saving diagnostic data.
- □ Save Signature in SVI II AP Saves the current signature in SVI II AP, that can be recalled from Select Curve in the Diagnostic Graph.
- □ *Reset Continuous Diagnostics* Resets the continuous diagnostics.
- Detach Trend Removes the Trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the on-line help at the *Diagnostics* screen instructions.

🚰 ValVue SVI II AP - (Offline NEW	
Tools Help		
Monitor Trend Config	ure Calibrate Diagnostics Status Chec	k]
Tag Descriptor	NEW	Diagnostic Type Diagnostic Type 40 Start Position (%) C Std. Actuator Sig. Stop Position (%)
Message Date Assembly Number	 15 JUL 2005	C Step Test C Ramp Test • Extended Act. Sig
Long Tag	View Diagnostic Graph Sava Diagnostic Data to File Diagnostic Report	Perform Diag.
	Save Signature in SVI2AP Save Signature as Baseline in SVI2AP	View Saved Diag.
Strokes	Reset Continuous Diagnostics	- Results
Cycles Time Open (hr) Time Closed (hr) Time Near Closed (hr)	Extended Signature Preference Detach Trend Help 0	
Change Mode	🔿 Mode: Setup	Exit Help

Figure 131 Diagnostics Context Menu

Reset Continuous Diagnostics

This function sets the historical counters to 0.

To reset continuous diagnostics:

- 1. Select **Reset Continuous Diagnostics** from the *Diagnostics* context menu and Figure 132 appears.
- 2. Click **OK**.



Figure 132 Diagnostics Reset Continuous Diagnostics Dialog

Status Screen

7

What you can do on the SVI II AP Status Screen

Use the *Status* screen to see the operating and internal status of the SVI II AP and reset the *Current Fault* or *All Faults* (Current and Historical). The screen is divided into three separate sections for *Operation, Firmware*, and *Circuit* where:

- □ Green indicates no faults
- □ Yellow indicates error conditions that can occur in normal operation (not faults) that may presently exist or have historically existed

🚰 ValVue SVI II AP - Offline NEW										
Tools Help										
Monitor Trend Configure Calibrate Diagnostics Status Check										
Operation	Firmware Circuit									
C H	C H C H									
A Reset	Self Check Error Position Sensor Fault									
Position Error	Software Error Current Sensor Fault									
Aarginal Power	Reserved									
\ominus 🥥 Bias Out of Range	NVM Checksum Actuator Pressure Fault									
🥝 🙆 Auto Tune Failed	RAM Checksum Error Reserved									
🥝 🥥 Find Stops Failed	Flash Lhecksum Error Supply Pressure Sensor Fault									
🙆 🥥 Calibrate Failed	Factory Mode Fault									
🧿 🕘 Std Diagnostic Failed	Atmospheric Pressure Fault									
🧿 🙆 Ext Diagnostic Failed	Keypad Fault									
🥝 🙆 Air Supply Low	C Current H History									
🔿 🔵 Actuator Error	Clear Current Faults Clear All Faults									
Change Mode 🔷 🔍	Mode: SetupHelp									

 \Box Red indicates a fault.

Figure 133 SVI II AP Status Screen

Clear Current Faults

Click **Clear Current Faults** to reset the status in the SVI II AP for all current faults only. The buttons on the *Status* screen indicating the current faults revert to green, if the condition is no longer valid.

Clear All Faults

Click **Clear All Faults** to reset the status bit in the SVI II AP for all faults, both historical and current. The buttons on the *Status* screen indicating the current and historical faults revert to green.

Status Code List

Fault Definitions

Table 8 lists a definition for each indicated device fault and recommended actions.

FAULT Name	TEXT For DD & ValVue	HELP For DD & ValVue	Critic ality	Probable Cause	Recommended Action
RESET	Reset	Device reset indicator	3	Device reboot. The power recovered. Incoming signal was below 2.9 mA.	Reset the flag using ValVue or HART Host.
LOW_ POWER	Low Power	Input current < 3.2 mA	3	Device power is below 3.2 mA.	Increase mA only if calibra- tion or diagnostics are to be performed.
ACTUATOR	Actuator Error	Unable to posi- tion the valve normally.	2	 Air supply is insufficient. Handwheel or mechanical stop present. Valve stuck of sticking excessively. Unbalance forces on valve trim exceeds actuator capability. 	 Increase air supply above spring final value + 10 psig. Verify if mechanical stop is present. Perform valve signature using ValVue. If possible, perform valve signature under process conditions. Validate sizing of actuator against pro- cess condition using Val- SpeQ.
AIR_SUPPLY_L OW	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.

Table 8 Fault Matrix

FAULT Name	TEXT For DD & ValVue	HELP For DD & ValVue	Critic ality	Probable Cause	Recommended Action
POSITION_ ERROR	Position Error	If T1 error is configured AND the posi- tion error out- side the error band for time T1.	2	 Controller is slow to fol- low command signal due to physical valve wear, such as tight packing, stem build up, throttling surface friction or actuator friction. Valve is slow to follow command signal due to large volume actuator. Valve will not follow com- mand signal due to insuffi- cient or no air supply. Valve does not move because the device's mode is not set to Normal. Valve will not follow com- mand signal due to poor controller tuning for current valve status. Valve will not follow com- mand signal due to control- ler malfunction such as I/P or Relay. Valve will not follow com- mand signal due to inline obstruction. 	 Perform valve signature using ValVue. Perform step test signa- ture using ValVue. Verify that air supply droop dur- ing filling is less than 15 % or the set pressure. Validate that the air sup- ply set to the instrument is greater that the spring final + 10 psig. Set the mode to Normal using ValVue or HART Host. Perform Autotune or Manual tuning using Val- Vue or HART Host. Verify if Bias Out Range or I/P Out of Range events are active. Perform valve signature using ValVue.
I2CBUS					
KEYPAD	Keypad Fault	Possible mois- ture inside or connector or mechanical failure.	2	The local user interface and display is defective.	Replace the local user interface and display assembly.
MARGINAL_PO WER	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 per- formed.
CALIBRATION_ FAILED	Calibration Failed	Calibration of AO or pressure failed.	3	Calibration of the input sen- sors was outside the acceptable range when attempting to calibrate.	Using precision measuring equipment, perform cali- bration according to boundary limits of input sensors.

	Table 8	Fault Matrix (Continued)
--	---------	--------------------------

FAULT Name	TEXT For DD & ValVue	HELP For DD & ValVue	Critic ality	Probable Cause	Recommended Action
FIND_STOPS_F AILED	Find Stops Failed	Find Stops pro- cess failed.	3	 When calibrating stops (Zero / Span) the travel sen- sor moved outside the acceptable limits. A procedure timeout occurred due to an extremely large volume of actuator to displace. Valve position could not stabilize when deenergiz- ing or when energizing the actuator. 	 Using ValVue or HART Host, verify that travel sen- sor counts is 0 +/- 1000 with the valve closed. For a 90° valve, measured sen- sor count is done at 50% travel. Using ValVue or HART Host, performs a Manual Stop calibration. Verify that air supply is adequate. Verify that accessories (boosters, quick exhausts, etc.) are not creating instability.
AUTOTUNE_FAI LED	Autotune Failed	Self tuning failed to con- verge on acceptable parameters.	3	 When performing an Autotune, procedure failed to complete due valve hys- teresis beyond 50 %. Air supply is insufficient. Air supply droops signifi- cantly during actuator fill- ing. 	 Using ValVue or HART Host, perform an Auto- tune with an aggressive- ness level between 2 and 4. Or manual tune the parameters according to the instruction manual. Increase air supply above spring final value + 10 psig. Perform 5 to 10 % steps and observe air supply gauge on the controller.
STD_ DIAGNOSTICS_ FAILED	Std Diagnos- tics Failed		3	When running a Standard Actuator Signature, the device failed to move the valve between 10 % to 90 %.	 Selected speed is too slow. Increase speed for the test by increments of 1. Insufficient Air supply.
EXT_ DIAGNOSTICS_ FAILED	Ext Diagnos- tics Failed.		3	When running a Extended Actuator Signature, device failed to move the valve between the configured travel.	 Selected speed is too slow. Increase the speed for the test by increments of 1. Insufficient air supply.

FAULT Name	TEXT For DD & ValVue	HELP For DD & ValVue	Critic ality	Probable Cause	Recommended Action
RTOS_ SCHEDULING	Operating Sys- tem Fault.	An internal error from which the device recov- ered automati- cally	2		
SUPPLY_ HIGH	High Air Supply Warning	Supply Pres- sure above upper limit.	1	 1:A failure in the air filter regulator occurred. 2: A nearby equipment drawing a high volume, suddenly quit using air and created a spike in air supply. 3: The air set is adjusted greater than configured threshold. 	 Replace air filter regula- tor. Resize air manifold. Adjust threshold to be 3 to 5 psig greater than set air supply.
BIAS_OUT_ OF_RANGE	Bias Out Of Range	An important internal parameter is out of range.	1	The servo signal to the cur- rent to pressure converter is outside of normal throttling range.	
IP_OUT_OF_RA NGE	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 nor- mal range.	
TEMPR_OUT_O F_RANGE	Temp. Out Of Range	Temperature outside oper- ating range.	2	The board temperature is below –40 °C or above 85 °C.	NOT IMPLEMENTED
DI_ ABNORMAL			3		
LATCH_ FSAFE					
TIGHT_SHUTO FF					
NVM_CHECKS UM0	NVM Check- sum Error	The device failed to read critical data from non vola- tile memory.	1	A permanent corruption of the content in non volatile memory occurred.	 Remove power to the device for 2 minutes and restart the device. If the failure persist, replace the device.

FAULT Name	TEXT For DD & ValVue	HELP For DD & ValVue	Critic ality	Probable Cause	Recommended Action
RAM_CHECKS UM	RAM Check- sum Error	An internal error from which the device recov- ered automati- cally.	2	A corruption of the content in volatile memory occurred.	Notify the factory at svi- support@GE.com.
FW_ CHECKSUM	Flash Check- sum Error	A critical inter- nal fault.	1	Invalid firmware checksum due to data corruption.	 Remove power to the device for 2 minutes and restart it. If the failure persists, Replace device.
STACK	Stack Error	An internal error from which the device recov- ered automati- cally.	2	A problem with the memory stack occurred.	Clear the condition using ValVue or HART Host.
FACTORY- WRITE	Factory Write Indicator	Indicator of writes to non volatile mem- ory allowed only for firm- ware upgrade.	1		
NVM_TEST	NVM Test Error	An error in non volatile mem- ory could not be repaired.	2	A problem occurred when testing non volatile mem- ory.	Clear the condition using ValVue or HART Host.
0	ESD Trip occurred and requires user intervention to be released.				
FACTORYMODE	Factory Mode Indicator	Device per- forms factory authorized operations.	1	Device is in the factory mode.	Replace device and report the problem at svisup- port@GE.com.
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 svisup- port@GE.com.

FAULT Name	TEXT For DD & ValVue	HELP For DD & ValVue	Critic ality	Probable Cause	Recommended Action
POSITION_ SENSOR	Position Sensor Fault		1	Electronic Hall sensor com- ponent and related compo- nents failed.	Replace device and report the problem at svisup- port@GE.com.
CURRENT_ SENSOR	Current Sen- sor Fault		1	Electronic input loop current sensor is damaged.	Replace device and report the problem at svisup- port@GE.com.
TEMPERATURE _SENSOR	Temperature Sensor Fault		1	Electronic temperature sen- sor is damaged.	Replace device and report the problem at svisup- port@GE.com.
CURRENT_ SENSOR_ 2ND			2	Secondary input current sensor is damaged.	Replace device and report the problem at svisup- port@GE.com.
PRESSURE1	Pressure 1 Fault	Output Pres- sure Sensor Fault (Single acting) or Out- put 2 Pressure Sensor Fault (double acting).	1	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.
PRESSURE2	Pressure 2 Fault	Supply Pres- sure Sensor Fault (Single acting) or Out- put 1 Pressure Sensor Fault (double acting)	1	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.
PRESSURE3	Pressure 3 Fault	Supply Pres- sure Sensor Fault (double acting only)	1	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.
PRESSURE4	I/P Pressure Sensor Fault		1	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.

FAULT Name	TEXT For DD & ValVue	HELP For DD & ValVue	Critic ality	Probable Cause	Recommended Action
PRESSURE5	Atmospheric Pressure Sen- sor Fault		2	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.
WATCHDOG_TI MEOUT	Watchdog timeout	An internal error from which the device recov- ered automati- cally.	2	n/a	NOT IMPLEMENTED
NVM_WRITE NVM	NVM Write Fault	A write to non volatile mem- ory failed; data may be lost on reset.	2	An error occurred when attempting to write to non volatile memory.	1: Clear the condition using ValVue or HART Host. 2: If condition persists, replace device and report problem at svisup- port@GE.com.
IRQ_FAULT	IRQ Fault	An internal error from which the device recov- ered automati- cally.	2	The circuit board interrupt request failed.	1: Clear the condition using ValVue or HART Host. 2: If condition persists, replace device and report problem at svisup- port@GE.com.
TMOUT_ FLASH_TEST	Flash ROM Test timeout	The test didn't complete in time.	2		
SELF_ CHECK	MCU Internal Malfunction	A critical inter- nal fault.	1	A general self check failed.	 Clear the condition using ValVue or HART Host. If condition persists, replace device and report problem at svisup- port@GE.com.
SOFTWARE	Software Error	An internal error from which the device recov- ered automati- cally.	2	Operating system failed in conducting a task.	1: Clear the condition using ValVue or HART Host. 2: If condition persists, replace device and report problem at svisup- port@GE.com.

FAULT Name	TEXT For DD & ValVue	HELP For DD & ValVue	Critic ality	Probable Cause	Recommended Action
ESD_TRIP	ESD Valve Tripped	An ESD trip event is pres- ent.	1		
AI_PV_LOW	AI_PV_LOW	An ESD trajec- tory signature is available for retrieving.	2	n/a	Not Implemented
AI_PV_HIGH	AI_PV_HIGH	An error saving ESD signature, not necessar- ily the latest.	2	n/a	Not Implemented
IP_SERVO_ LOW	IP_SERVO_ LOW	Last com- pleted PST failed.	1	 The required I/P current is too low to ensure venting of the relay. The I/P flexure is pushed against the nozzle. Faulty I/P flow regulator 	1,2,3: Service required. Contact the factory.
IP_SERVO_ HIGH	IP_SERVO_ HIGH	A new PST tra- jectory signa- ture and data are available for retrieving.	2	 The required I/P current is too high to maintain output pressure to actuator. The I/P flexure is pushed away from the nozzle 	1, 2: Service required. Con- tact the factory.
0		An error saving PST signature, not necessar- ily the latest.	2		
DIAGPROC1	Diag Proc1	Last com- pleted Pneu- matic Test failed.	2		
RANGE1	Range 1	The I/P cut off switch is not functional.	2		
RANGE2	Range 2		2		

FAULT Name	TEXT For DD & ValVue	HELP For DD & ValVue	Critic ality	Probable Cause	Recommended Action
LINKAGE_DRIF T	Linkage Drift		2	1:In the fully open or fully closed position a raw travel sensor count deviation of x% exists against the cali- brated stop value.	 Verify that linkage is well fastened. Re run the Find Stops method. When device goes in Failsafe when running the Find Stop method, clear alarm and rerun the stops.
VALVE_ STUCK_ CLOSED	Valve Stuck Closed	Measured fric- tion is below customer specified range.	2	 1: A handwheel is left engaged. 2: Valve is seized in place. 3: Insufficient actuator thrust. 	 Verify presence of a mechanical stops such as a handwheel. Repair valve. Run a PST or Extended signature. If friction is abnormal then overhaul valve.
VALVE_ STUCK_ OPENED	Valve Stuck Opened	Measured fric- tion is above customer specified range.	2	 1: A handwheel is left engaged. 2: Valve is seized in place. 3: Exhaust port is clogged up (no venting). 4: An accessory prevents the air from the actuator to be vented. 	 Verify presence of a mechanical stops such as a hand wheel. Repair valve. Verify that exhaust port is not restricted. Run a TBT test from Val- Vue. A failure of the TBT test would indicate a prob- lem in venting.
UI_OFF	UI_OFF	Pressure to move valve is greater than customer specified range.	2		
RANGE3	Range 3	Supply pres- sure drop exceeds a cus- tomer speci- fied value.	2		
RANGE4	Range 4	PST canceled before com- pletion.	2		

HART Device Status Command Bytes

Table 9 lists all Bytes and their correlating fault bits in the HART Device Status Command.

LCD	Description	Action	Cause
RESET	Reset occurred due to command or power up. Always present after power up.	Warning	Normal operation on power up always sets RESET. RESET is sent by HART communica- tions. Use CLEAR ERR to remove warning
LOW POWER	Input current < 3.6 mA	Takes the device to low power	
ACT ERR	Positioner unable to position a valve normally	Warning	
AIR LOW	IR LOW Supply pressure is < 10 psi (.69 bar, 69 kPa). Otherwise I/P pressure is below 0.8 psi (.05 bar, 5.5 kPa)		Mechanical or pneumatic problem
POS ERR	The position error exceeds configured limit for more than configured time	Warning after T1 and Failsafe	Pneumatic/ mechanical, configuration, loose magnet
KEYBOARD	LCD/Button Failure	Warning	Damaged buttons or LCD electronics
MARGN PWR	Input signal is insufficient to proceed		
CALIB ERR	Calibrate failed	Warning	Invalid values for current calibration and input range by HART commands
STOP ERR	Calibration error. Find STOPS was unsuccess- ful.	Warning	Configuration, calibration
TUNE ERR	Auto tune failed	Warning	Mechanical or pneumatic problem causes tuning failure
STD DIAG	A standard diagnostic procedure failed to complete	Warning	Pneumatic / mechanical, configuration
EXT DIAG	An extended diagnostic procedure failed to complete	Warning	Pneumatic / mechanical, configuration
CMD STOP	HART command aborted	Warning	Bad data range or data limi- tation
BIAS ERR	Position algorithm error in output bias	Warning	Pneumatic/ mechanical

Table 9	LCD I	Error	Messages
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LCD	Description	Action	Cause
I/P LIMIT	I/P current too high or too low	Warning	Electronic hardware
TEMP ERR	Internal circuit temperature high (>80 °C, 176 °F) or low (<-40 °C, -40 °F)	Warning	Environment
NVM ERR_R	An FRAM record and its copy both have CRC errors	Failsafe	
RAM ERR	RAM data item had a bad checksum	Warning	
FLASH ERR	Flash memory failed checksum test	Failsafe	Flash memory failed check- sum test
STACK ERR A valid hidden record (in RAM) existing upon reset indicating that a stack overflow had occurred		Warning	
FCTRYMODE	Factory mode failure	Failsafe	
NVM ERR-T	An FRAM record and its copy both have CRC errors	Warning	
REF VOLT	Temperature compensated I/P current is out of range	Failsafe	
POS SENSR	Internal error in Hall Effect sensor	Warning	Electronic hardware
SIG SENSR	Internal error in sensing of 4 - 20 mA	Warning	Electronic hardware
PRES1 ER	Temperature compensated pressure sensor 1 reading is outside the range	Warning	
PRES2 ER	Temperature compensated pressure sensor 2 reading is outside the range	Warning	
PRES3 ER	Temperature compensated pressure sensor 3 reading is outside the range or supply pres- sure recorded is >120 psi (8.28 bar, 828 kPa)	Warning	
PRES4 ER	Temperature compensated pressure sensor 4 reading is outside the range or pilot pressure recorded is >120 psi (8.28 bar, 828 kPa)	Warning	
PRES5 ER	Temperature compensated pressure sensor 5 reading is outside the range	Warning	
NVM ERR-W	Writer to FRAM fails or data repairing in FRAM fails	Warning	

Table 9 LCD Error Messages (Continued)

LCD	Description	Action	Cause
IRQ FAULT	Valid hidden record (in RAM) existing upon reset that indicates that an illegal interrupt occurred	Warning	
DATA ERR	Internal software error data overrun	Failsafe	CPU/firmware
MCU ERR 1 Micro-Controller Self Check failed		Failsafe	
SW ERR	Software self check error	Failsafe	CPU/firmware

Tuble 5 Leb Error riessages (continued
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Status Context Menu

When you right click on the *Status* screen, a context menu appears as shown in Figure 134. The context menu contains only a link to *Status* on-line help.



Figure 134 SVI II AP Status Screen Context Menu

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Check Screen- Advanced Troubleshooting

8

What you can do on the Check Screen

Use the *Check* screen (Figure 135) to monitor and set some basic parameters: *Set I/P, Unset I/P, Full Open, Full Closed* and *Detach Trend*. The *Check* screen is used primarily for troubleshooting. Setting parameters on this screen requires the use of the right click menu or the *Tools* menu and that you are in Setup mode.

🚰 ValVue SVI II AP - (Offline NEW	
Tools Help	- (
Monitor Trend Config	ure Calibrate Diagnostics Status Check	1
Tag	NEW	
Descriptor		
Message		
Date	15 JUL 2005	
Assembly Number		
Long Tag	N/A	
Position (%) Lowe	er Stop Raw Position Upper Stop -142 -1671 -3201	
Current (mA) Raw	Signal Pressure psi 12003 13.544	
Board Temp (C) Min 1 22.47	Femp (C) Max Temp (C) -60 100	
I/P Set I.	/P	
Change Mode	O Mode: Manual Exit Help	

Figure 135 Check Screen

Information Displayed

GE Oil & Gas

The *Check* screen is used for troubleshooting and displays the operating parameters of the SVI II AP including:

Tag Information	Position	Lower Stop
Raw Position	Upper Stop	Current
Raw Signal	Pressure reading	Board Temperature reading
Minimum Temperature	Maximum Temperature	I/P reading
Set I/P field		

Check Context Menu

The Check context, right click menu is displayed Figure 136 on page 165 and described below:

- □ Set I/P Removes the valve from normal control and applies a constant signal (using the value in the Set I/P edit box) to the I/P.
- □ UnSet I/P Turns off Set I/P and returns the valve to normal control.
- □ *Full Open* Moves the valve to full open. This command work by taking the valve out of closed loop control and sends a high or low signal to the I/P.
- □ *Full Closed* Moves the valve to full closed. This command works by taking the valve out of closed loop control and sends a high or low signal to the I/P.
- Detach Trend Removes the trend display from the tabbed dialog and creates a separate display.
- □ *Help* Displays the on-line help at the *Check* screen instructions

Set I/P

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

To set the I/P:

- 1. Enter a number between 1 and 55000 in the Set I/P edit box (Figure 136).
- 2. Right-click and select **Set I/P** (or use the *Tools* menu). The indicator appears red.

To resume normal control:

□ Right-click and select **UnSet I/P**. Returning to Manual or Normal mode also returns the valve to control.

ValVue SVI II AP - (Offline NEW				
Monitor Trend Config	ure Calibrate Diagnostics Status Check				
Tag Descriptor Message	NEW ESTER				
Date	15 JUL 2005				
Assembly Number	IU N/A				
Position (%) Lowe 50.0244 Current (mA) Raw 12 Board Temp (C) Min 1 22.47	er Stop Raw Position Upper Stop -142 -1671 - Set I/P UnSet I/P Signal Pressi Full Open 12003 - I Femp (C) Max Temp (C) -60 100				
Change Mode	Mode: Setup Exit Help				

Set I/P Edit Box

Figure 136 Check Screen Context Menu

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Changing HART Versions

Changing SVI II AP to HART 6

Starting with firmware version 4.1.1, ValVue SVI II AP software supports HART 6. When you logon to a HART 5 version of the software and either look at the *Tools* menu or *Tools* right-click menu a menu item appears to convert to HART 6.

🚰 ValVue SVI II AP - NEW		
Tpols Help		
Wull Open Full Closed Set to Fail Position	Calibrate Diagnostics Status Check	
Cancel Transfer Reset		Signal (%) 162.5 Signal (mA) 30.00 Position (%) 153.5 Saturation (%) 153.5
Report Setup Report		Pressure (psi) 26.2
Save SVI Data Restore SVI Data	w	
Backup NVM		
Change HART Rev to 6	JUL 2005	153.5 Position (%)
Update Configured Data		Setpoint (%)
Detach Trend Help		Send Cmd
Status Setup Wizard	Additional Status Available Device Malfunction Configuration Changed	A
Change Mode	👲 Mode: FailSafe	Exit Help

Figure 137 Select Tools

To change a HART 5 unit to HART 6:

1. Select Tools > Change HART Rev to 6 and a Figure 138 appears.



Figure 138 HART Change DCS Warning



- 2. Click **OK** and a second dialog appears.
- 3. Click **Yes** and a third dialog appears.



Figure 139 Application Warning

4. Press **OK** and the ValVue SVI II AP application closes. Once you reopen HART 6 is functional.

References

10

Overview

This section provides the compatible HART modems and technical release notes.

Supported HART Modems

Listed below are the HART modems supported by ValVue.

- □ Supports MacTek Viator RS232 HART modem model 010001
- □ Supports MacTek Viator USB HART modem model 010031.
- □ Supports Micriolink RS232 HART modem model 101-0005
- □ Supports Microlink USB HART modem model 101-0007.
- □ Supports E & H USB HART modem model FXA-191-S1
- □ Supports MTL Multiplexor model 4841
- □ P&F HART Multiplexers and wireless gateway

Technical Release Notes

ValVue HART 2.80.0 Family Software Technical Release Notes

(GE Energy	T:41-	ValVue HART 2.80.0 Family Software	N-		Revision	А
Ge Energy		Title	Technical Release Notes.doc	INO.		Date	6/14/2012
Author	Sean Kong	Check	Luke Tao/Terry Zuo	Approv	Henry Du	Page	1 of 13

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Revision History

	The table below	describes th	ne revision	history o	f this	document.
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Rev.	Date	Revised By	Checked By	Approved By	Brief Description
А	06/14/2011	Sean Kong	Luke Tao/Terry Zuo	Du Henry	Release as 2.80.0 family software mainly to support Wireless Adapter VECTOR, and WirelessHART Gateway Connection

(BR GE FROM	TT: 1	ValVue HART 2.80.0 Family Software			Revision	А
GE Energy		Intie	Technical Release Notes.doc	INO.		Date	6/14/2012
Author	Sean Kong	Check	Luke Tao/Terry Zuo	Approv	Henry Du	Page	2 of 13

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TOPICS

- I. Family Software Overview
- II. Software Registration Requirement
- III. Supported Device
- IV. New Features
- V. Improvements
- VI. Bug Fixes
- VII. Known Issues
- VIII. Supported Operating Environment
- IX. Software Backward Compatibility
- X. Supported Standalone Communication Medium

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I. Family Software Overview

The ValVue® HART 2.80.0 Family software package provides a powerful interface to Masoneilan's Smart Valve Interfaces, the Model 12300 and 12400 Digital Level Transmitter (HDLT12300 and 12400), and other HART® instruments. This package supports SVI[®] models SVI[®] II AP, SVI[®] II, SVI[®] and SVi1000, Level transmitter HDLT12300 and 12400, and WirelessHart[®] Adapter VECTOR

ValVue 2.80.0 Family Software supports a variety of computer environments. The family consists of the following deployable software products, each with its own installer. Different products are allowed to coexist on the same machine.

The following describes the nature of each product.

1. ValVue 2.80.0 Full Edition

This edition of the software runs in a standalone environment. This edition of the software requires Software Registration to activate the license. It may be used as trial for up to 60-day prior to the registration.

2. ValVue 2.80.0 Lite Edition

This edition of the software runs in a standalone environment with limited features. This edition of the software does not require Software Registration.

3. PRM PLUG-IN ValVue 2.80.0

This software operates with Yokogawa PRM (Plant Resource Management). This software requires Software Registration to activate the license. This software supports SVI II AP, SVI II, SVI1000 and 12400 only.

4. ValVue 2.80.0 AMS SNAP-ON

This software operates with Emerson AMS (Asset Management System). This software requires software license through Emerson AMS Help Desk.

5. ValVue 2.80.0 For Honeywell FDM

This software, the same binary as that of Standalone Full Edition, operates with Honeywell FDM (Field Device Manager). This software requires Software Registration to activate the license with the same licensing mechanism. It may be used as trial for up to 60-day prior to the registration.

6. Smarts Assistant 2.10.0 Standard Edition

This edition of the software, as a companion tool for HART devices, is a utility used for operation such as device option upgrade or firmware upgrade. This tool supports SVI II AP, SVI II , SVI II ESD, SVi1000 and 12400. The software does not require Software Registration.

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II. Software Registration Requirement

The following applies to software registration for all ValVue Family software except ValVue AMS SNAP-ON and ValVue Lite Edition. Please refer to SNAP-ON Marketing release for the SNAP-ON software registration.

The key for software registration and the licensing is the possession of a valid software serial number issued as part of the software purchase. To register the software, the user has to launch the ValVue application.

Follow the instructions provided in the application to complete the registration. Upon the successful completion of registration, a software key will be issued by Software Registration Desk. The registration is a one-time process with perpetual licensing on the installed computer therefore no new registration is required if the software has been registered previously on the same computer.

Software Registration is only available via email.

Software Registration Desk Email Address: <u>software.reg@ge.com</u>

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III. Supported Devices

The following lists all supported devices with associated firmware version.

Device Type	VECTOR	SVi1000	124	100		s	VI II AP					SVI II				SVI			HDLT	12300	
Firmware Ver.	3.195	1.1.1	1.1. 2	1.1. 1	4.1.1	3.2.3	3.2.1	3.1.3	3.1.1	1.2.5	1.2.4	1.2.3	1.2.2	1.2.1	1.08	1.07	1.06	7.11	6.11	5.11	4.12
ValVue 2.80.0 Full Edition	\checkmark	\checkmark	V	V	\checkmark	V	V	\checkmark	V	V	V	V	V	V	V						
ValVue 2.80.0 Lite Edition	\checkmark	\checkmark	\checkmark	V	\checkmark	V	V	\checkmark	V	V	\checkmark	\checkmark	V	V	V						
ValVue 2.80.0 AMS SNAP-ON		\checkmark	V	V	V	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	V	V	\checkmark	V	V	V	V	V	V	V
PRM PLUG-IN ValVue 2.80.0		V	\checkmark	\checkmark	V	V	V	\checkmark	V	\checkmark	V	V	V	V							
ValVue 2.80.0 for FDM		\checkmark	V	V	\checkmark	V	V	V	V	\checkmark	\checkmark	\checkmark									

ValVue Family Application Supported Device List

6	GE Energy	Title	ValVue HART 2.80.0 Family Software	No		Revision	А				
	G de energy	The	Technical Release Notes.doc	140.		Date	6/14/2012	1			
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IV. New Features

1. All ValVue 2.80.0 Family

- Support WirelessHART Adapter, VECTOR, device type 0x65CD
- Support WirelessHART Adapter, VECTOR bullet of MACTek, device type 0xE0AC
- Support P+F WirelessHART Gateway communication, based upon UDP protocol

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V. Improvements

- ValVue 12400 trending was updated to have the same style as ValVue SVI2AP module
- Enumerate available com port
- Allow searching devices from given range of polling addresses or specific addresses
- Added "Report and Backup" to Setup Wizard
- Complete solution of Windows 7/server 2008 compatibility.
- Dresser logo, images and copyright information were replaced with GE Energy.

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VI. Bug Fixes

- Fixed issue that restoring 12400 data always popup error said that "An unsupported operation was attempted."
- Allow use to change option settings even when ValVue is offline connection.
- The Availability of SVi1000 DO configuration in ValVue SVi1000 is based upon the present of physical DO card.
- The appending spaces in the Long Tag string will be trimmed when it is written to device.
- The error messages of burst setting for AP HART6 is more user-friendly and instructive.
- Allow users to change mode from failsafe to setup and normal for SVi1000.
- Fixed issue about trend information display in offline mode of double acting AP.

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VII. Known Issues

- If you load a DGN file that was created with ValVue2.50 or before, you have to make sure the current ValVue has the same the pressure unit same as it in DGN file, an then you will get the same diagnostic result as before.
- After having done a standard actuator signature, you can't change the pressure unit before you save it with DGN format file (if you want to save it). It is because that the pressure unit change can't influence the result from COMMAND191 and COMMAND192 at the same time.
- For ValVue SVI2AP with FDM connection, the hart command "038 Reset Configuration Changed" does not work.
- FDM build network can't find 12400 devices with burst mode is on
- When ValVue connects to device through P+F WirelessHART Gateway communication, system performance may be slow.
- Sometimes ValVue SVi1000 or ValVue SVI2AP processes may still remain after application is terminated. Task Manager is needed to kill it manually.

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VIII. Supported Operating Environment

The following lists the supported Operating System for Standalone application and the Host System for integrated application.

O.S. / Host	Windows for Standalone					Emerson AMS				Yokogawa PRM		Honeywell FDM		
Version	Windows Server 2008	Windows 7 32 and 64 bit	XP SP3	Vista SP1	2000 SP4	Server 2003	11.x	10.x	9.x	8.x	6.x	3.x	2.x	310/410
ValVue 2.80.0 Full Edition	V	V	V	\checkmark	\checkmark	\checkmark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ValVue 2.80.0 Lite Edition	\checkmark	\checkmark	V	\checkmark	V	\checkmark	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ValVue 2.80.0 AMS SNAP- ON	N/A	N/A	N/A	N/A	N/A	N/A	\checkmark	\checkmark	V	V	\checkmark	N/A	N/A	N/A
PRM PLUG- IN ValVue 2.80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	V	\checkmark	N/A
ValVue 2.80.0 for FDM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	V

ValVue Family Application OS/Host Compatibility

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IX. Software Backward Compatibility

All Products

- Support earlier version of configuration data file.
- Support earlier version of Trend and Signature data file.
- Support interchange of configuration data saved among different supported device types and revisions.

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X. Supported Standalone Communication Medium

The following lists the supported communication medium.

Standalone ValVue Communication Medium Support

	MACKTEK (RS232; USB, Bluetooth Wireless)
HART Modem	MICROLINK (RS232; USB)
	E + H FXA-191-S1 (USB)
	ProComSol (Bluetooth Wireless)
	MTL 4841 (Cornerstone Protocol; AMS Protocol)
HART MUX	P+F (2700F, 2700G)
	FDM HART Multiplexer (SoftMux)
HART OPC Server	HART Server 3.x
WirelessHART	P+F WirlessHART Gateway

(End of Document)

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Notes

The space provided below is for entering notes on ValVue and its operation.



SVi1000 Software Manual



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Introduction

1

About This Manual

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 Masoneilan or your local Masoneilan representative.

Conventions Used in This Manual

Conventions used in this manual are as follows:

- □ Italicized letters are used when referencing a term used in the program display window.
- □ Italics is used for emphasis on important items.
- □ Fields where data is entered or user entered data is *italicized*.
- □ Actions performed on buttons, checkboxes, etc. appear bolded. For example: Click **Done**.



Indicates important facts and conditions.



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

WARNING



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

ValVue Overview

Masoneilan's ValVue software is a Human Machine Interface (HMI) software tool that provides a powerful interface to Masoneilan's SVi1000 and other HART instruments. ValVue is used to configure and calibrate the SVi1000 utilizing HART communications protocol.

Using ValVue you can:

- Monitor SVi1000 Operation and Quickly set up the SVi1000 (See "What You Can Do on the Monitor Tab" on page 199)
- □ Observe real time valve performance (See "What you can do on the Trend Tab" on page 225)
- □ Advanced SVi1000 Set Up (See "What You Can Do on the Configure Tab" on page 229)
- □ Calibrate the SVi1000 (See "What you can do on the Calibrate Tab" on page 241)
- □ Check the SVi1000 Status (See "What you can do on the Status Tab" on page 253)
- Monitor and adjust some of the basic parameter (See "What you can do on the Check Tab" on page 273)

System Requirements

Listed below are the hardware and software requirements for the computer used with ValVue:

Hardware

Processor:	PC with minimum 1 GHz Intel Pentium or compatible
RAM:	Minimum 1 Gig
Disk:	Application Component: 15 M
	Database Component: 30 M minimum

Software

OS:

Windows XP SP2, Window Server 2003 SP1 or Window Server 2003 R2, or Windows Server 2008

ValVue SVi1000 Work Environment

Overview

After you have selected the connected device ValVue launches and the device appears in the first *Monitor* tab (Figure 1).



ValVue is the main interface for connected devices. Once a connected device is selected the SVi1000 software launches.

🚰 ValVue SVi1000 - Offline SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
SVi1000	Signal (%) 0.5 Signal (mA) 4.19 Position (%) 10.5 Setpoint (%) -0.2
Tag SINGLE	
Descriptor	Signal (%)
Message	10.5 Position (%)
Date 01 MAY 2010	Setpoint (%)
Assembly Number 10222787	
	Send Cmd
Status Setup Wizard	
Change Mode 🔷 Mode: Manual	Exit Help

Figure 1 SVi1000 Environment

Working in SVi1000

SVi1000 is set up as a typical Windows program, with tabs, menus, dialogs, windows and toolbars. After logging into ValVue the currently selected device appears in *SVi1000's Monitor* tab. You can either perform operations on the *Monitor* tab or select another tab.

Toolbar

The toolbar at the top of every SVi1000 tab has two menu items: Tools and Help. The Tools menu depends on the tab and is explained with that tab.

Modes of Operation

The SVi1000 has three modes of operation:

- □ *Normal*: In this mode the SVi1000 responds to the input signal and positions the valve accordingly (indicator green).
- Manual: In this mode the valve does not respond to the input signal. Instead it remains stable in one position, which is the position that the valve was in when manual mode was entered or a new position selected by you (by changing the setpoint in the *Monitor* tab).
- □ *Setup*: In this mode you can set calibration and configuration parameters. Whenever you leave the Normal mode, a warning appears (Figure 2).

Change Mode

Use the *Change Mode* button on all *SVi1000* tabs to change the operating *SVi1000* mode. When selected, you can change the *SVi1000* mode to any of three operating modes:

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



Figure 2 Leaving Normal Mode Warning

Whenever you leave Normal mode, a warning appears.

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

Exit

Clicking **Exit** quits the program.

SVi1000 Help

Help is readily available from anywhere within SVi1000, including:

- □ Main Help menu: Available by clicking **Help**, located at the bottom, right corner of every tab.
- □ Context Sensitive Help: Available by right clicking within the tab area.
- □ Toolbar Help: Located in the toolbar at the top of every tab, available by clicking **Help** at the top of the tab.

Help Menu

The Help menu is the same on every tab and contains:

- □ *Help*: Launches the help file table of contents.
- □ *Firmware Info*: Displays information about the firmware loaded into the SVi1000.
- □ *About*: Displays information about ValVue SVi1000.

SVi1000 Tabs

Monitor Tab

From the *Monitor* tab, you can view the basic functions of the SVi1000 including tag and identification, input signal, setpoint, position, and status. You can also change the SVi1000 mode of operation and perform setup and command functions.

🚰 ValVue SVi1000 - Offline SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
SVi1000	Signal (%) 0.5 Signal (mA) 4.19 Position (%) 10.5 Setpoint (%) -0.2
Tag SINGLE	
Descriptor	Signal (%)
Message	10.5 Position (%)
Date 01 MAY 2010	Setpoint (%)
Assembly Number 10222787	
	Send Cmd
Status	
Change Mode 🔷 Mode: Manual	Exit Help

Figure 3 Monitor Tab

Trend Tab

From the *Trend* tab you can observe real time valve performance. These process trend graphs are useful for troubleshooting a control valve and for tuning the PID positioning parameters.



Figure 4 Trend Tab

Configure Tab

The *Configure* tab displays the current configuration parameters and provides the ability to change them.

💑 ValVue SVi1000 - SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
	Characterization
Tag Name SINGLE	C Linear C Uuick Upen
Descriptor	C Equal % (30) C Custom
Message	C Equal % (50) Camflex %
Date 01 MAY 2010	Air Action Bumpless Transfer
Final Assy Number 10222787	C Air-to-Open Bumpless Transfer Enable
Polling Address 0	C Air-to-Close
Position Fault Limits	Position Limits
U.5 Position Error Band (%)	Allow tune to override limits
Time 1 (s) 🧮 Enable	I Tight Shutoff Below (%) 0
D0 (Output Switches) Switch 1 Switch 2	Position Lower Limit (%)
7. Manual Mode 💽 7. Manual Mode 💌	F Position Upper Limit (%)
0	Position Rate Limits
Normally C Closed 🖲 Open Normally C Closed 🖲 Open	
SP (Input Signal Range)	
Low Input Signal 4 (mA) CLOSED High Input Signal	20 (mA) OPEN UnLock Local UI Apply
Change Mode 🔷 Mode: Setup	Exit Help

Figure 5 Configure Tab

Calibrate Tab

The *Calibrate* tab displays the current controller calibration parameters and provides the ability to adjust them in the *Setup* mode.

🖬 ValVue SVi1000 - SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
TagSINGLEDescriptorMessageDate01 MAY 2010Assembly Number10222787	PID Parameters 272 P (%) 134 I (1/10 s) Advanced Parameters 12 D (ms) -200 Padj (%)
Calibration Current Input Signal 4.19 mA Calib. Signal	Open Stop Adjustment 100.0 (%) Set Open Stop Adj.
	Apply
Change Mode 🔷 Mode: Setup	ExitHelp

Figure 6 Calibrate Tab

Status Tab

Use the *Status* tabs to see the operating and internal status of the SVi1000. There are seven tabs, which include:

- □ Active Faults: Displays all current faults and provides current and historical information on each fault. These also appear on the individual tabs.
- □ *General:* Displays faults that cannot be attributed to SVi1000 components; e.g. instrumentation, actuator, pneumatics, electronics. General faults are often testing and data faults.
- □ *Instrumentation:* Displays all faults related to instrumentation other than the actuator, pneumatics or electronics.
- □ Actuator: Displays all faults related to the actuator on which the SVi1000 is mounted.
- Dependence of the Pneumatics: Displays all faults related to the SVi1000 pneumatics.
- □ *Critical*: Displays all faults critical to SVi1000 operations.
- □ *Electronics*: Displays all electronics faults.

🚜 ValVue SVi1000 - SINGLE	
Tools Help	1
Monitor Trend Configure Calibrate Status Check	
Active Faults General Instrumentation Actuator Pneumatics Critical Electronics	
No Error	
Clear <u>Current Faults</u> Clear <u>A</u> ll Faults	
Change Mode 🔷 Mode: Setup Exit Help	

Figure 7 Status Tab: Active Faults

Check

Use the *Check* tab to set some of the basic parameters. This tab is used primarily for troubleshooting.

🚰 ValVue SVi1000 - Offline SINGLE					
Tools Help					
Monitor Trend Configure Calibrate Status Check					
Tag SINGLE					
Descriptor					
Message					
Date 01 MAY 2010					
Assembly Number 10222787					
Position (%) Lower Stop Raw Position Upper Stop 10.5 -632 -634 5265 Current (mô) Baw Signal					
4.192 4223					
Board Temp (C) Min Temp (C) 27.43 -60 100					
PWM Set I/P					
Change Mode 🔷 Mode: Manual Exit Help					

Figure 8 Check Tab

This page intentionally left blank.

Monitor

3

What You Can Do on the Monitor Tab

The *Monitor* tab is the first window displayed on starting SVi1000. You can:

- □ Monitor the current operation of the SVi1000 and adjust the controller (graphical representation) to change operation parameters. See "Adjust Operations" on page 200.
- □ Generate reports on SVi1000 operation. See "Reports" on page 207.
- □ Access the Setup Wizard. See "Setup Wizard" on page 213.

Adjust Operations

🚰 ValVue SVi1000 - Offline SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
Tag SINGLE Descriptor	Signal (%) 0.5 Signal (mA) 4.19 Position (%) 10.5 Setpoint (%) -0.2 2 Signal (%) Position (%) Signal (%) Position (%) Setpoint (%)
Assembly Number 10222787	Send Cmd
Change Mode 🔷 Mode: Manual	Exit Help

Figure 9 Monitor Tab

1. Tag Information

The Tag Information on the Monitor tab displays the following items:

- 🗆 Tag
- □ Descriptor
- Message
- □ Date
- □ Assembly Number

This data appears at the same location on the *Monitor*, *Configure* and *Calibrate* tabs but can only be changed on the *Configure* tab (See "Tag Information" on page 230).

2. Signal/Position Data

Signal	Indicates the input analog signal expressed in % of the configured signal range.
Position %	Indicates the actual valve position in % of valve opening. 0% is always closed and 100% is open for ATO and reversed for ATC. Because the travel of a valve may exceed its nominal travel, posi- tions greater than 100% are possible.
Setpoint %	In NORMAL mode, the setpoint is the target position based on the characterized input. In MANUAL mode, it is the target position to which the SVi1000 is controlling the valve. Drag the lower arrow to change the manual setpoint.
Position Indicator	Shows the valve position graphically. The indicator consists of three parts:
	 The upper part contains an indicator showing the value of the input signal. In Normal mode this is the position setpoint.
	If operating in manual mode, this is the position that the valve moves to if returning operation to normal mode.

- The center green bar shows the valve position where % = valve open. The numerical valve position is shown in the center.
- The lower part contains an indicator showing the valve setpoint. In operating mode, this is the same as the signal.
 In Manual mode it is the valve setpoint. You can drag the arrow to change the valve setpoint. While dragging, the number in the center bar shows the manual setpoint for use when you release the arrow.

Changing the Setpoint

Change to Manual mode prior to changing the position indicator; click on **Change Mode** and select **Manual**. There are three ways to change the position indicator:

- □ Entering the setpoint value in the *Setpoint* dialog.
- □ Dragging the position indicator.
- □ Left clicking on either side of the position indicator modifies the setpoint by 5%.

To enter a value for the position indicator setpoint:

1. Right click inside the position indicator area.

The Setpoint dialog appears.

Setpoint	
Enter a Setpoin	nt (%)
OK)	Cancel

Figure 10 Setpoint

2. Enter the setpoint percentage and click **OK**.

3. Status on the Monitor Tab

The SVi1000 tracks operation and provides several health indicators. When there is a fault code available in the SVi1000, this box contains (Figure 11) *Additional Status Available*. The LED is green for OK or red when a flag is set. The fault codes can be retrieved by:

- 1. Select Read Status from the Send Command drop down list.
- 2. Click Send Cmd.

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

	Status Additional Status Available Configuration Changed Setup Wizard	•	Mfg ID=101 Mfg Device Type=202 Number Preambles=5 Universal Command Revision=5 Hardware Revision=3 Transmit Command Revision=2 Software Revision=1 Device Function Flag=0 Device ID=8190480		
--	---	---	---	--	--

Figure 11 Monitor Tab: Additional Status Available

The following commands can be sent to the SVi1000:

000 Read Identifier: Returns the unique identifier from the device including the device ID, device type, and the manufacturers ID.

001 Read Primary Variable: Returns the position in percent open.

002 Read Current: Returns the input signal in mA and the signal in percent.

003 Read All Variables: Returns the input signal and the position in percent open

011 Read ID from Tag: Prompts you for a tag name. The tag name is sent in a HART command and if received by a device with a matching tag name, the ID of the device is returned. The format of the ID is the same as command 001 Read Identifier.

012 Read Message: Reads the message that was stored in the device when it was configured

013 Read Tag & Descriptor: Reads the tag name, date, and the descriptor that was stored in the device when it was configured.

016 Read Assembly Number: Reads the final assembly number that was stored in the device when it was assembled at the factory

017 Write Message: Enter a message (up to 32 characters) for storage in the SVi1000.

018 Write Tag & Descriptor: Enter a tag name (up to 8 characters) and a description (up to 16 characters) that are stored in the SVi1000.

019 Write Final Assembly: Enter an identifying number (0 to 16 million) that is stored in the SVi1000.

038 Reset Configuration Changed Flag: Sets the HART configuration changed bit back to 0. The bit is set whenever a value in the device has changed.

211 Read Custom Characterization: Reads and displays the custom characterization configuration.

212 Read Error Limits: Reads and displays the position range and time outs associated with position errors.

213 Read Calibration Data: Reads and displays the low and high signal calibration in mA.

216 Read PID: Reads and displays the valve positioning tuning parameters.

136 Read Status: Reads and displays the status flags. These flags describe error conditions that have occurred since the last time they were cleared.

138 Clear Status: Clears the status flags.

142 Read Switches: Reads and displays the state (open/closed) of the switches, if applicable.

Monitor

154 Read Setpoint: Reads the manual setpoint of the controller.

141 Read Raw Data: Returns information from the SVi1000 that is useful to Masoneilan engineers for diagnostic purposes. The information includes values from the position measurements, and the internal SVi1000 temperature.

143 Read Temperatures: Reads the historical low and high range to which the controller was exposed and reads the actual circuit board temperature.

249 Read Operating Mode: Reads and displays the controller operating mode.

4. Information Pane

Use the *Send Cmd* button to make a request for the display of various system data in this pane. For example, device identifier settings see Figure 9 on page 200.

To retrieve information:

- 1. Select a command from the **Send Command** drop down list.
- 2. Click Send Cmd.

Monitor Context Menu

🚰 ValVue SVi1000 - Offline SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
Full Open Full Closed Set to Fail Position Cancel Transfer Reset	Signal (%) 0.5 Signal (mA) 4.19 Position (%) 10.5 Setpoint (%) -0.2
Tag SIN Report Setup Report Descriptor Save SVI Data Message Restore SVI Data Date 01 t Assembly Number 102zzror	Signal (%) 10.5 Position (%) Setpoint (%)
Status Setup Wizard	© Send Cmd
Change Mode Mode: Setup	Exit Help

When you right click a context menu appears (Figure 12).

Figure 12 Monitor Tab Context Sensitive Menu

The following items appear and are greyed out based on the actual SVi1000 mode:

Full Open	Moves the valve to full 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 Closed	Moves the valve to full closed. This takes the valve out of closed loop control and sends a high or low signal to the I/P. This is avail- able only in manual or setup mode.
Set to Fail Position	Sets the <i>Output Pressure</i> (P1) to 0 psi. Moves the valve full open or full closed, whichever is the fail position of the actuator.
Cancel Transfer	Returns the SVi1000 to manual mode from the bumpless transfer mode (available during a bumpless transfer).
Reset	Issues a master reset to the device, causing it to go through its startup routine and reinitializing all of its operating parameters from nonvolatile memory.

	The valve moves during the reset operation.
Report Setup	Allows you to set up a report template and printing program. See "How to Create Reports" on page 207.
Report	Generates a report of the SVi1000 parameters. "Generate Report" on page 212.
Save SVI Data	Saves the SVi1000 internal parameters in a file that can be read and restored.
Restore SVI Data	Restores the contents of a dump file to a Masoneilan device. This can be used to <i>clone</i> an SVi1000 into a new SVi1000.
NOTE	Items like tag, which should be unique, and position calibrations which differ on each controller, are not cloned. This command is available only in manual mode.
Detach Trend	Removes the <i>Trend</i> display from the anchored tab format and cre- ates a separate trend display.
Help	Displays the help file at the Monitor tab instructions.

Reports

One of the functions available on the *Monitor* tab is the ability to generate reports. SVi1000 provides the ability to extract information about the SVi1000 operation and dump the information into a report format. When SVi1000 extracts the information from a device it requires a template file into which to dump the data. To generate a report with SVi1000 you must first create a report template file that includes the parameters you would like to include in the report as well as personalization.

How to Create Reports

There are three basic steps to create reports:

- 1. Set up the report: Create a report template file.
- 2. Select the report setup (report template file): Using the *Report Setup* command from the *Monitor* context menu.
- 3. Generate the report: Using the Report command from the Monitor context menu.

Creating Report Template Files

You can create a custom SVi1000 report by creating a rich text format (RTF) file which is laid out in the format of the desired report. The default template is located in:

- □ Win7 and 2008 Server: C:\Program Data\Dresser\ValVue\SVi1000\Data.
- □ WinXP and 2003 Server: C:\Documents and Settings\All Users\Application Data\Dresser\ValVue\SVi1000\Data.

Prior to selecting the set up of the report (*Monitor Context* menu) you must create the report template file in an rtf format. The report template includes the operation parameters that you would like populated in the report.

SVi1000 substitutes the values of SVi1000 parameters into the text file where ever it finds a parameter name that matches an SVi1000 parameter. For each parameter you would like included in the report place \$\$ in front of the parameter name.

For example:

Tag = \$\$Tag

SVi1000 substitutes the actual tag name from the SVi1000 in place of the *\$Tag* in the report.

When creating the report template file, use an application that can save the report template file to an rtf or text file such as WordPad, Microsoft Word, or Notepad.



rtf files are preferred as you can apply special formatting to the file that can contain fonts, sizes, tabs, etc. and bitmaps. Some .rtf formatting is accepted in Word which is not available in WordPad.

The allowed SVi1000 Parameters are listed in Table 1. Use the report file (*report.rtf*) shipped with the application for examples.

Report Parameter	Information Provided in Report
\$\$Tag	Tag Name
\$\$Descriptor	Descriptor
\$\$Date	Date
\$\$Message	Message
\$\$AssemblyNumber	Final Assembly Number
\$\$MfgID	Manufacturer's ID (101 for Masoneilan)
\$\$DeviceType	Device Type (200 for the SVi1000)
\$\$DeviceID	Hart DeviceID
\$\$HWRev	Hardware Revision
\$\$SWRev	Software Revision
\$\$CmdRev	Firmware Command Revision
\$\$PollingAddress	PollingAddress
\$\$Position	Position
\$\$Signal	Input Signal
\$\$Pressure	Actuator Pressure
\$\$IPOutput	Signal to the I/P in Counts (0 to 65000)
\$\$Temperature	Circuit Board Temperature
\$\$LowTemperature	Historical Low Temperature
\$\$HighTemperature	Historical High Temperature
\$\$Output	Output from the process controller
\$\$Mode	SVi1000 Mode
\$\$SignalPercent	Input Signal as Percent
\$\$AirAction	Air to Open/Air to Close

Table 1 Report Setup Parameters

Report Parameter	Information Provided in Report
\$\$ActuatorType	Single/Double Acting Actuator
\$\$PosErrorBand	Position Error Band
\$\$PosErrorTime	Position Deviation Time
\$\$Charact	Characterization (Linear, Equal Percentage, etc.)
\$\$CustomCharact	Displays the Custom Characterization constants Individual items of the characterization curve may be selected by enter- ing: \$\$CustomCharact[n] where n is a number between 0 and 17
\$\$ButtonLock	Button Lock Level
\$\$Bumpless	Bumpless Transfer On/Off
\$\$BumplessSpeed	Time to move from Manual to Normal (operating) mode
\$\$TightShutoff	Tight Shutoff On/Off
\$\$TSValue	Tight Shutoff Value
\$\$ULimitStop	Upper Position Limit On/Off
\$\$ULSValue	Upper Position Limit
\$\$LLimitStop	Lower Position Limit On/Off
\$\$LLSValue	Lower Position Limit
\$\$NearClosed	Value below which is considered Near Closed
\$\$PosUnits	Position Units of Measure (always %)
\$\$PresUnits	Pressure Units (psi, bar, or kpa)
\$\$SignalUnits	Signal Units (always mA)
\$\$Language	SVi1000 Display Language
\$\$LowSignal	Low Calibration Value
\$\$HighSignal	High Calibration Value
\$\$P	Proportional Gain In controller
\$\$Padjust	Adjustment to P when valve is exhausting
\$\$1	Integral action of controller
\$\$Beta	Step size adjustment in controller
\$\$D	Derivative action of controller
\$\$PosComp	Position range compensation of controller
\$\$DeadZone	Dead zone of controller

TUDIE I REPORTSELUD FURUITIELEIS (CONTINUEU

Report Parameter	Information Provided in Report
\$\$Damping	Damping coefficient of controller
\$\$Travel	Total strokes of the valve
\$\$Cycles	Total cycles of the valve
\$\$TimeOpen	Total time open of the valve
\$\$TimeClosed	Total time closed of the valve
\$\$TimeNearClosed	Amount of time valve was nearly closed
\$\$ResponseOpen	Time require to open valve
\$\$ResponseClosed	Time required to close valve
\$\$Switch1Type	Condition under which Switch 1 will operate
\$\$Switch1Value	Value at which Switch 1 will activate
\$\$Switch1Action	Switch is Normally Closed or Normally Open
\$\$RawSignal	Signal Value in A/D Counts
\$\$RawPosition	Position Value in A/D Counts
\$\$PositionStopLow	Position A/D Counts at the Lower Stop
\$\$PositionStopHigh	Position A/D Counts at the Upper Stop
<pre>\$\$OptionConfig \$\$OptionConfigEx0 \$\$OptionConfigEx1 \$\$OptionConfigEx2 \$\$OptionConfigEx3</pre>	Data describing the hardware installed on the controller
\$\$Friction	Friction Measured from a Standard Actuator Signature
\$\$FLowerSpringRange	Lower Spring Range measured from a standard actuator signature
\$\$FupperSpringRange	Upper Spring Range measured from a standard actuator signature
\$\$LowPressureActual	Pressure when the actuator is exhausted
\$\$HighPressureActual	Supply Pressure
\$\$Speed	Speed at which the last diagnostic test was run
\$\$SpeedSaved	Speed at which the saved standard signature was run
\$\$SpeedBaseline	Speed at which the baseline standard signature was run
\$\$LowerSpringRange \$\$LowerSpringRangeSaved \$\$LowerSpringRangeBaseline	Lower Spring Range calculated from the current, saved, or baseline stan- dard signature

Table 1 Report Setup Parameters (Continued)

Report Parameter	Information Provided in Report
\$\$UpperSpringRange \$\$UpperSpringRangeSaved \$\$UpperSpringRangeBaseline	Upper Spring Range calculated from the current, saved, or baseline stan- dard signature
\$\$Signature	Position/Pressure Pairs Gathered during the Standard Signature Test
\$\$SignatureSaved	Position/Pressure Pairs Saved in the Saved Standard Signature
\$\$SignatureBaseline	Position/Pressure Pairs Saved in the Baseline Standard Signature

Table 1 Report Setup Parameters (Continued)

Report Setup

To set up the report:

1. Right click on the ${\bf Monitor}$ tab and select ${\bf Report\ Setup}.$

The *Report Setup* dialog appears.

- 2. Click **Browse** and navigate to the desired folder for both:
 - □ Report Template File Name
 - □ Report Program to use

	Report Setup	—
	Report Template File Name C:\ProgramData\Dresser\ValVue\SVi1000\Report\SVI1000	Browse
Click to automatically _	Report Program to use C:\Program Files\Microsoft Office\Office14\WINWORD.EXE Click to Auto Find MS Word Word Pad use Wordpad	Browse
use Word for reports.	for reports. OK Cancel	

Figure 13 Report Setup

Generate Report

To generate a report:

- 1. On the *Monitor* tab right click and select **Report**.
- 2. Click **OK**.

SVi1000 populates the report template. An example of a report is shown in Figure 14.



Smart Valve Interface - Configuration Data Sheet

General Information

Tag Name	
Descriptor	PLANT
Date	15 JUL 2005
Message	MASONEILAN
Assembly Number	O
Manufacturer's ID	101
Device Type	204
Device ID	5420073
Hardware Revision	3
Transmitter Revision	1
Software Revision	2
Polling Address	Ο

Operating Data

Position	0.0 %
Signal	19.77 mA
Switch 1	Closed

Configuration Information

Air Action	ATO
Actuator Type	Single
Position Error Band	50%

Figure 14 Report Sample Using SVi1000 Template

Setup Wizard

Running the *Setup Wizard* is one of two ways to set up the SVi1000. When you decide to run the setup you can either run the entire setup wizard or pick and choose which components of the setup wizard to run.

From the *Setup Wizard* tab you can rapidly setup the SVi1000 by configuring some basic parameters. By selecting the appropriate check boxes you can set the device identification, reset the configuration to factory defaults, perform a travel calibration, create a report and backup and autotune the positioning parameters. When the selected tasks are started a progress dialog appears.

The Setup Wizard can dramatically reduce commissioning time in the field.

To run the *Setup Wizard* you must first be in *Setup* mode. See "Change Mode" on page 190 for information on changing modes.

🚰 ValVue SVi1000 - Offline SINGLE		
Tools Help		
Monitor Trend Configure Calibrate Status Check		
SVi1000	Signal (%) 0.5 Signal (mA) 4.19 Position (%) 10.5 Setpoint (%) -0.2	
Tag SINGLE		
Descriptor	Signal (%)	
Message	10.5 Position (%)	
Date 01 MAY 2010	Setpoint (%)	
Assembly Number 10222787		
	Send Cmd	
Status O Setup Wizard		
Change Mode Mode: Setup	ExitHelp	

□ Select **Setup Wizard** and *Starting the Setup Wizard* appears.

Figure 15 Starting the Setup Wizard

Setup Wizard Selections

After you start the *Setup Wizard* SVi1000 launches the *Setup Wizard* window where you can select the setup features to perform:

- □ "Step 1: Setting the Tag and Descriptor" on page 215
- □ "Step 2: Set Air Action" on page 216
- □ "Step 3: Calibrate Travel" on page 217
- □ "Step 4: Autotune" on page 218
- □ "Step 5: Report & Backup" on page 219
- □ "Step 6: Setup Selections Made" on page 220
- □ "Step 7: New Parameters" on page 222
- □ "Step 8: Setup Wizard Complete" on page 224

Setup Wizard		
Step 1:		
Tag SING Descriptor IAM	ILE SVI1000	
Message		
Step 2: Air-to-Open Air-to-Close	Reset Configuration to factory defaults	
Step 3:		
Step 4: Autotune Su	ipply Pressure 0.0	
Step 5:		
	Apply Cancel	

Figure 16 Setup Wizard

Step 1: Setting the Tag and Descriptor

To change the *Tag and Descriptor* information:

- 1. Select Set Tag and Descriptor (See Figure 17).
- 2. Edit the *Tag* field.

S	etup Wizard	×
	Step 1:	
	Set Tag and Descriptor	
	Tag SINGLE	
	Descriptor I AM SVI1000	
	Message	
	Step 2:	
	Air-to-Open Reset Configuration to factory defaults	
	C Air-to-Close	
	Step 3:	
	Calibrate Travel	
	Step 4:	
	C Autotune Supply Pressure 0.0	
	Step 5:	
	🔲 Report & Backup	
	Apply Canc	el

Figure 17 Setup Wizard: Setting Tag and Descriptor

3. Enter text in the Descriptor and Message fields, if necessary.



Changes made to Tag and Descriptor will not take place until you click **Apply**. Don't click **Apply** until after you have made all your Setup Wizard selections.

Step 2: Set Air Action

Use this to set the reset to factory defaults.

Reset Configuration to Resets the configuration to factory defaults. *factory defaults*

To do this:

□ Click **Reset configuration to factory defaults**.

s	Setup Wizard		
	Step 1:		
	✓ Set Tag and Descriptor		
	Tag SINGLE		
	Descriptor I AM SVI1	000	
	Message		
	Step 2:		
	C Air-to-Close		
	Step 3:		
	🗖 Calibrate Travel		
	Step 4: Autotune Supply	Pressure 0.0	
	Step 5:		
		Apply Cancel	

Figure 18 Reset to Factory Defaults



Changes made to Tag and Descriptor will not take place until you click **Apply**. Don't click **Apply** until after you have made all your Setup Wizard selections.
Step 3: Calibrate Travel

To determine valve position, the controller must measure 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.

To calibrate controller travel:

□ Click the **Calibrate Travel** checkbox.

Se	tup Wizard	x	
	Step 1:		
	Set Tag and Descriptor		
	Tag SINGLE		
	Descriptor I AM SVI1000		
	Message		
	Step 2: Beset Configuration		
	Air-to-Open Heset Configuration to factory defaults		
	C Air-to-Close		
	Step 3:		
	Calibrate Travel		
	Step 4:		
	Autotune Supply Pressure 0.0		
	Step 5:		
	Apply Can	cel	

Figure 19 Enabling Calibrate Travel



Changes made to Tag and Descriptor will not take place until you click **Apply**. Don't click **Apply** until after you have made all your Setup Wizard selections.

Step 4: Autotune

The SVi1000 has a built in positioning Autotune feature. When setting up the valve controller, this feature automatically computes the optimal parameters for the positioning algorithm. This feature does not require valve specific parameters in order to complete successfully.

The Autotune feature can be launched using the local user interface, a handheld communicator loaded with the device driver (DD), a control system loaded with the DD or SVi1000 software. However, it cannot be fully done remotely, as you must use the local user interface *Configuration Selection Switch*.

To autotune the SVi1000 with the Setup Wizard:

- 1. Move the Configuration Selection Switch on the unit to:
 - \Box 0 for and ATO value.
 - \Box 8 for an ATC value.
- 2. Click the Autotune checkbox.
- 3. Enter a Supply Pressure.

Setu	ıp Wizaro	1		×
s	Step 1:			
	~	Set Tag and D	escriptor	
		Tag	SINGLE	
		Descriptor	I AM SVI1000	
		Message		
s	Step 2:		Devel Configuration	
		€ Air-to-Ope	to factory defaults	
	C Air-to-Close			
s	Step 3:			
	~	Calibrate Trave	el	
s	Step 4:			
		Autotune	Supply Pressure 30.0	
s	Step 5:	Benort & Back	מו	
			~P	
			Apply Cano	el

Figure 20 Enabling Autotune



Changes made to Tag and Descriptor will not take place until you click **Apply**. Don't click **Apply** until after you have made all your Setup Wizard selections.

Step 5: Report & Backup

Use this step to create a report and backup.

To do this:

□ Click **Report & Backup**.

Setup Wizard	—	
Step 1:		
🔽 Set Tag and D	Descriptor	
Tag	SINGLE	
Descriptor	I AM SVI1000	
Message		
Step 2:	en Reset Configuration to factory defaults	
C Air-to-Close		
Step 3: Calibrate Trav	el	
Step 4: Autotune	Supply Pressure 30.0	
Step 5:	(up	
	Apply Cancel	

Figure 21 Creating Report & Backup

Step 6: Setup Selections Made

1. Click **Apply**.

SVi1000 applies Step 1 and Step 2 (if selected) and executes Step 3 and Step 4 (if selected).

Setup Wizard	×		
Step 1:			
Tag	SINGLE		
Descriptor	I AM SVI1000		
Message			
Step 2:	Ipen Reset Configuration to factory defaults		
C Air-to-Close			
Step 3:			
Calibrate Travel			
Step 4: I Autotune	Supply Pressure 30.0		
Step 5:	ackup		

Figure 22 Applying Setup Wizard Changes

The Setup Dialog: Confirm Actions dialog indicating the actions setup selected appears.

ValVue SVi1000	—
Setup will perform: - Set Tag and Descriptor - Reset Config to Default - Run Find Stops - Run Autotune - Create report & backup	
ОК	Cancel

Figure 23 Setup Dialog: Confirm Actions

2. Click OK.

If you are calibrating travel and autotuning, the *Stroke the Valve Warning* dialog appears.



Figure 24 Stroke the Valve Warning

3. Click **OK** to continue.

Setup Wizard Progress

During the course of running the *Setup Wizard*, SVi1000 displays progress dialogs. The *Setup Wizard Progress Dialog* indicates that *Step 1 – Set Tag and Descriptor* is finished. These dialogs progress as the various selections are run.

Setup Wizard		
Setup Wizard Progress		
Set Tag and Descriptor	🥚 Finished	
Reset Configuration to Defaults	🥝 Finished	
Find Stops	0	
AutoTune	0	
Create Report_Backup	0	
Elapsed Time (Task): 00:00:01 Elapsed Time (Total): 00:00:02	Cancel Current Task	Cancel All Continue

Figure 25 Setup Wizard Progress Dialog

Step 7: New Parameters

After you close the *Setup Wizard Diagnostic Graph*, the *PID Values* window appears (See Figure 26).

The *PID Values* window shows the previous and the newly calculated (as a result of auto tune) PID values. To complete the auto tune process:

□ Close the window by clicking **Exit**.

PID Values		D	<
Previous		New	
272	Р	272	
134	1	134	
12	D	12	
-200	Padj	-200	
5	Pos Comp	5	
-2	Beta	-2	
0.00	Dead Zone	0.00	
0	Boost	1	
[Exit		

Figure 26 New PID Values After Setup Wizard Calibration

Parameter Definitions

Ρ	Proportional gain in %. Common values for the controller are 50 for small valves up to 4000 for large valves.
1	Integral time or reset time in 1/10th sec, is the time constant of inte- gral control. Higher values of I cause less integral action, however a value of 0 gives no integral action. Common values are 10 to 200.
D	Derivative time or rate time (msec) is the time constant of derivative control. Common values are 10 to 100.
PAdjust	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.

Pos Comp (Position Com- pensation Coefficient)	The response of the valve is different when the valve is nearly closed than when the valve is nearly open. The position compensa- tion coefficient, which is a number between 0 and 20, makes adjustments to try to equalize the valve response. The normal value is 6. For springless actuators the value is 15.
Beta	<i>Beta</i> 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 a small error (<i>Beta Response</i>).

Positive Beta





Figure 27 Beta Response

Dead Zone When the valve position is within the setpoint +/- the dead zone, no additional position control is performed. This value is normally 0%, however for high friction valves (e.g. valves with graphite packing) a higher dead zone (%) helps avoid limit cycling due to the stick/slip action of the valve. In these cases the dead zone chosen might be 0.5% to 1%.

BoostThis field controls a supplemental pressure or boost to speed up
initial valve response from setpoint from 0 to 100%.

The values determined above provide sufficient response for most applications. However these values are determined by a target set of performance criteria built into the SVi1000. You may want performance different than this set and may therefore want to set the PID values differently than determined by Autotune. You can individually set tuning values from the *Calibrate* tab.

Step 8: Setup Wizard Complete

After the *Setup Wizard* completes all setup tasks, and you have closed the *PID Values* window (if you ran Auto Tune) SVi1000 the *Setup Wizard* dialog appears, indicating *Setup Wizard Complete*.

□ Click **Continue** to complete the process.

Setup Wizard		
Setup Wizard Progress		
Set Tag and Descriptor	0	Finished
Reset Configuration to D)efaults 🧿	Finished
Find Stops	0	Finished
AutoTune	0	Finished
Create Report _Backup	0	Finished
		Setup Wizard Complete
Elapsed Time (Task): 00:0 Elapsed Time (Total): 00:0	00:13 00:20 Cancel Curr	rent Task Cancel All Continue

Figure 28 Setup Wizard Complete

Trend

4

What you can do on the Trend Tab

Use the *Trend* tab (see Figure 29) to observe real time valve performance. These process trend graphs are useful for troubleshooting a control valve and for tuning the PID positioning parameters. The graphs can be manipulated only on the Y axis.

You can detach the trend as a separate window for viewing while performing calibration and diagnostic tasks. To detach the trend:

□ Right click in any tab select **Detach Trend**.

In Manual or Setup mode, drag the position indicator to change the valve position.



Figure 29 Trend Tab Displaying All Parameters

Trend Graph Features

The display of any of the four curves on the *Trend* graph may be turned on or off by checking or unchecking these boxes:

- □ Position: blue
- □ Manual Setpoint: black
- □ Signal Setpoint: red

Trend: Y Low/High	The Y axis (position) of the trend graph can be set by entering the values in these edit boxes. Enter a number and hit Tab or Enter key to set the scale.
Position	Indicates the actual valve position in % of valve opening. 0% is always closed and 100% is open. Because the travel of a valve may exceed its nominal travel, positions greater than 100% are possible.

Changing the Graph View

Any portion of a diagnostic graph may be examined more closely by entering the new Y scale in the proper scale edit box or by dragging a box across an area of the graph. If the mouse is dragged across an area, that area fills the graphic window. Right clicking or double clicking on the graph restores the default scales. The X scale cannot be resized.

Capture to Clipboard

Clicking this button saves an image of the graph on the clipboard. The image (a bitmap) may be pasted into another document (e.g. into a Microsoft Word document).

Trend Context Menu

When you right click on the grey area of the *Trend* tab (but not in the graph area), the *Trend Context Menu* appears. The following items appear:

Refresh Graph	Restarts the sampling of the trend graph
Stop Graph	Stops the sampling of the trend graph. It can be restarted by selecting Refresh Graph .
Open	Opens an <i>Open Trend Data File</i> dialog to select a <i>.tre</i> file for viewing.
Save	Opens an Save Trend Data File dialog to save a file (.re).
Detach Trend	Removes the display from the tabbed dialog and creates a separate trend display
Help	Displays the help file at the Trend tab instructions



Figure 30 Trend Context Menu

This page intentionally left blank.

Configure

5

What You Can Do on the Configure Tab

In the *Setup* mode, from the *Configure* tab (see Figure 31), you can set the information that tells the SVi1000 how the valve/actuator is configured by adjusting the following parameters:

- □ "Tag Information" on page 230
- Characterization" on page 232
- "Bumpless Transfer" on page 236
- "DO Output Switches" on page 237
- \square "Position Fault Limits" on page 231
- □ "Air Action" on page 235
- □ "Position Limits" on page 236
- Configure Context Menu" on page 239



Before making any configuration changes on the Configuration tab SVi1000 must be in Setup mode. If you need to change modes refer to "Change Mode" on page 190.

ValVue SVi1000 SINGLE Tools Help Monitor Trend Configure Calibrate Status Check		
Monitor Trend Consigure Calibrate Status Check Tag Name SINGLE Descriptor	Characterization C Linear C Equal % (30) C Equal % (50) C Equal % (50)	
Date 01 MAY 2010 Final Assy Number 10222787 Polling Address 0	Air Action Bumpless Transfer Image: Air-to-Close Image: Bumpless Transfer Enable	
Position Fault Limits 0.5 Position Error Band (%) 327 Time 1 (s) ▼ Enable	Position Limits ✓ Allow tune to override limits ✓ Tight Shutoff Below (%) 0.5	
D0 (Output Switches) Switch 1 Switch 2 0. Always Normal Position 0. Always Normal Position	Position Lower Limit (%) Position Upper Limit (%) Position Rate Limits UP DOWN	
Normally Closed Open Normally Closed Open SP (Input Signal Range)		
Change Mode 🔷 Mode: Setup	Exit Help	

Figure 31 Configure Tab: Setup Mode

Tag Information

To change *Tag* information on the *Configure* tab:

- 1. In the Setup mode place the cursor in the Tag field for change.
- 2. Delete and type as necessary.
- 3. Click Apply.

You can also change the tag information through the Setup Wizard.



Position Fault Limits

You can configure how position errors are handled. A position error occurs when the valve position differs from the requested position (from the input signal in normal operating mode or the manual setpoint in manual mode) by more than the parameters. When this occurs, a status flag is set which is reported during the next HART message only that a flag is set is reported.

On the Configure tab you can set:

Position Error BandUse this to define the error band, or the percentage of valve travel,
that the requested position is allowed to vary from the actual posi-
tion. The Position Error Band must be between 0.5% and 200%. If
you set a value for Position Error Band outside the range an error
message appears.

ValVue SVi1000	
Position Error Band must be no less than 0.50% and no larger than 200.00%.	
ОК	

Figure 32 Position Error Band Error Message

Time 1 s Enable

Use check box to enable a field to enter the amount of time a position error is allowed to exist before the valve is put in failsafe position. This time must be between 1 and 327 seconds. If you set a value for *Position Error Time* outside the range an error message appears.

ValVue SVi1000 🛛 🔀	
Position Error Time 1 must be between 0 and 327 s.	
ОК	

Figure 33 Position Error Time Error Message

Characterization

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

- □ *Linear*: Causes the valve to open proportionally with the input signal. Select this option if non linear trim is used in the valve.
- \Box Equal % (50) and Equal % (30): Two equal percentage characterizations are available, one with R=50 and the other with R=30.
- □ *Quick Open*: The quick opening characterization is the inverse to the *Equal Percentage* 50% characterization curve.
- □ *Custom*: Selecting this option displays the *Custom Characterization* dialog to format a custom curve. The curve can have up to nine points and points in between are linearly interpolated. See "Custom Characterization" on page 233.
- □ *Camflex* %: This characterizes the valve as a Masoneilan Camflex valve with settings of *Linear* and *Equal 50*%.



Figure 34 shows the characterization curves in a graphical format.

Figure 34 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. Custom characterization must be the selected configuration option to use the generated curve. Custom characterization is accomplished using the Figure 35 dialog.



Figure 35 Custom Characterization

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.

To create a custom characterization:

- 1. Click **Custom** and the *Custom Characterization* dialog appears.
- 2. Enter values in the *Input Signal (%)/Position (%)* fields from lowest to highest. If there is too drastic a slope change the *Invalid Segment* dialog appears. Adjust values accordingly.

ValVue SVi1000	
Invalid Segment at X= 1.9 Slope too high.	
OK Cancel	

Figure 36 Invalid Segment

Input Signal (%)/Position (%) fields activate and appears.

- 3. Click **Close** and a dialog appears prompting you to save.
- 4. Click OK.

Custom Linearization

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

Simple Lever Type	The simple lever has the pivot point (the potentiometer in the SVi1000) mounted a fixed distance (L1) from the valve stem pickup point. In order to compute the proper correction curve, the stroke length, the distance from the pivot to the valve stem pickup point and the valve position at horizontal must be entered. Clicking Simple , entering a value and clicking OK computes the correction and displays the curve.
Compound Lever Type	The compound lever linkage has two lever segments attached at one end to the pivot and the other end to the valve stem pickup point. In order to compute the proper correction curve, the user must enter the stroke length, first lever segment length (L1), second lever seg- ment length (L2), the distance from the pivot to the valve stem pickup (L3), the valve position at horizontal. Clicking Compound , entering a value and clicking OK computes the correction and displays the curve.

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

To create a custom linearization:

1. Select **Custom Linearization** from the *Custom Characterization* dialog and the *Custom Linearization* dialog appears.

Custom Linearization Dialog	
Simple Lever Type	Compound Lever Type
G L1 Stole	Lever Type Select
	Parameters
Stroke length (S)	Lever arm 2 length (L2)
Lever arm length (L1)	Offset length (L3)
Valve position at horizontal (T) %	C L2 above L1 (as shown)
	C L2 below L1
	OK Cancel

Figure 37 Custom Linearization

- 2. Enter values in the fields associated with either lever type and click the associated button.
- 3. Use the Length Unit Select pulldown to select either:
 - □ inch
 - 🗆 mm
- 4. Click OK.

Air Action

Use this reset to factory defaults. Air Action is factory set.

Bumpless Transfer

Use the checkbox to select/deselect this option.

This option provides a means to maintain smooth valve control positioning when changing to Normal mode from Manual or Setup. Without *Bumpless Transfer*, when changing to Normal mode, the setpoint could vary in a manner that causes a significant process disturbance. *Bumpless Transfer* moves the controller signal to match the valve position so that smooth resumption of control with little disturbance results.

When *Bumpless Transfer* is selected, returning to Normal mode from Manual or Setup mode is deferred until the input signal matches the current valve position. Either the input signal or the valve position can be changed to match. If nothing is done, the system slowly changes the position until it matches the signal setpoint. The time taken to move to the position is determined by the *Transfer Time* which is a number between 0 and 255 and is approximately the number of seconds required to move the valve 100%.

Position Limits

Allow Diagnostics to Over- ride Limits	A checkbox for enabling/disabling autotuning and diagnostics to override limits.
Tight Shutoff Below (%)	Use this checkbox to enable/disable the use of <i>Tight Shutoff</i> 's value. Activates a tight shutoff below the value in the field. If the input sig- nal would position the valve below the <i>Tight Shutoff</i> value, then air is supplied to fully seat the valve. Range: –1 and 20%.
Position Lower Limit	Use this checkbox to enable/disable the use of the value in the field. Activates a software limit stop. No valve position lower than this occurs when enabled. This is software only. During electrical/air fail- ure, the valve moves to failsafe position. This stop is ignored during manual full open or close operations.
Position Upper Limit	Use this checkbox to enable/disable the use of the value in the field. Activates a software limit stop. No valve position higher than this occurs when enabled. This is software only. During electrical/air fail- ure, the valve moves to failsafe position. This stop is ignored during manual full open or close operations.
Position Rate Limits	Click either/both boxes to activate a field to the right. Enter a value in %/second which is the time used for travelling full span.
NOTE	If you configure both Bumpless Transfer and Position Rate Limits and the Bumpless Transfer settings is significantly greater than the Position Rate Limits, a dialog appears. You can click OK and continue, but in effect, the Bumpless Transfer is ignored in favor of Position Rate Limits.

DO Output Switches

Use this to define characteristics of the inputs and output switches and position retransmit.

Configuring Output Switches

You can change the following configuration parameters:

- □ DO (Output Switches)
- □ SP (Input Signal Range)

To configure the inputs and outputs:

- 1. Change the following configuration parameters:
 - □ *Output Switches*: See "Output Switches" for descriptions of all the I/O settings.
 - □ *Input Signal Range* : See "Input Signal Range" on page 238 for descriptions of all the I/O settings.

D0 (Output Switches) Switch 1	Switch 2	
7. Manual Mode 💌	7. Manual Mode 📃 💌	
0	0	
Normally C Closed Open Normally C Closed Open		
SP (Input Signal Range) Low Input Signal 4 (mA) CLOSED High Input Signal 20 (mA) OPEN		

Figure 38 Configure Output Switches

2. Click Apply.

Output Switches

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. These conditions are:

- 0. Always Normal Position The switch is not controlled by the SVi1000 and remains in it's default position. The two digital output switches can be opened or closed in response to detected conditions. The default configuration setting is Always Normal Position, where normal is closed, which means that the switch will not switch for any valve travel. To activate the switch at a given valve position, configure the switch Position Low Limit or Position High Limit.
- 1. Failsafe The switch is activated when the SVi1000 is in failsafe mode.
- 2. *Reset* The switch is activated whenever a reset has occurred and the switch remains activated until the SVi1000 status is cleared.

3. Position Error	The switch is activated whenever a position error has occurred and is deactivated when the position recovers to the correct position.
4. 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).
5. Position Low Limit	The switch is activated whenever the valve position is less than the position setting of this switch control.
	If both Position Low Limit and Tight Shut Off are used, the Position Low Limit must be above the Tight Shut Off.
6. Position Upper Limit	The switch is activated whenever the valve position is greater than the position setting of this switch control.
	If both Position High Limit and Full Open Above are used, the Position High Limit must be below the Full Open Above.
7. Manual Mode	The switch is activated whenever the SVi1000 is in manual mode.
Use the radio buttons to	configure to default the switch as normally open or normally closed.



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

Input Signal Range

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

Configure Context Menu

When you right click on the *Configure* tab the *Configure Tab*: *Context Menu* appears containing:

- Detach Trend: Removes the Trend display from the anchored tab format and creates a separate trend display
- □ *Help*: Displays the help file at the *Configure* tab instructions.

🚰 ValVue SVi1000 - Offline SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
Tag Name SINGLE	Characterization C Linear C Quick Open
Descriptor	C Equal % (30) Custom
Message	C Equal % (50) C Camflex %
Date 01 MAY 2010 Final Assy Number 10222787	Air Action Bumpless Transfer
Polling Address 0 Detach Trend	C Airto-Close
Position Fault Limits 0.5 90:00000000000000000000000000000000000	Position Limits ✓ Allow tune to override limits ✓ Tight Shutoff Below (%)
DD (Output Switches) Switch 1 Switch 2 7. Manual Mode O. Always Normal Position	 ✓ Position Lower Limit (%) ✓ Position Upper Limit (%) 100
Normally C Closed © Open Normally C Closed © Open	Position Rate Limits
SP (Input Signal Range) Low Input Signal 4 (mA) CLOSED High Input Signal	20 (mA) OPEN Apply
Change Mode 🔷 Mode: Setup	Exit Help

Figure 39 Configure Tab: Context Menu

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Calibrate

6

What you can do on the Calibrate Tab

Use the SVi1000 *Calibrate Tab* calibrate:

- □ *Calibration*: Signal calibration. See "Calibration" on page 243.
- □ *Parameters*: PID parameters and advanced parameters. See "PID and Advanced Parameters" on page 244.
- □ Open Stop Adjustment. See "Open Stop Adjustment" on page 246.
- $\hfill\square$ Use the right click menu to:
- □ "Run Find Stops" on page 248
- "Manual Find Stops" on page 250
 "Open Stop Adjustment" on page 246
- "Auto Tune" on page 251
- Full Open
- □ Set Valve Position
- Detach Trend

Reset to Factory Cal

□ Full Closed

🐼 ValVue SVi1000 - SINGLE	
Monitor Trend Configure Calulate Status Check Tag SINGLE Descriptor Message Date 01 MAY 2010 Assembly Number 10222787	PID Parameters 272 P (%) 134 I (1/10 s) Advanced Parameters 12 D (ms)
Calibration Current Input Signal 4.19 mA Calib. Signal	-200 Padj (%) Open Stop Adjustment 100.0 (%) Set Open Stop Adj.
	Apply
Change Mode 🔷 Mode: Setup	Exit Help

Figure 40 Calibrate Tab

Calibration

The sensor is calibrated at the factory and does not usually require recalibration, but if needed, this dialog provides a convenient method.

To start this function:

1. Click Calib. Signal. and the *This Will Change Calibration* dialog appears.

ValVue SVi1000	
This will change the signal calibration. Continue?	
ОК	Cancel

Figure 41 This Will Change Calibration

2. Click **OK** and the Sensor Calibration dialog appears.

Sensor Calibration	
Signal Value	
12 mA	Set as Low Value
or	Set as High Value
Cancel	

Figure 42 Sensor Calibration

3. Enter a value for either high or low and click the associated button and the *Calibration Has Been Changed* dialog appears.

ValVue SVi1000 🛛 🔀
Calibration has been changed
ОК

Figure 43 Calibration Has Been Changed

4. Click OK.

PID and Advanced Parameters

You can fine tune the SVi1000 using regular parameters or advanced parameters. On this tab you can adjust:

 $\square P$

 \Box I

 \square D

🗆 Padj

See "Step 7: New Parameters" on page 222 for an explanation of these parameters.



You can only edit the PID parameters when the slot is 0. In the local UI the slots run from 0 to F. In ValVue they run from 0 to 7.

To adjust these parameters:

1. Enter values in the required fields in *PID Parameters*.

- PID Parameter	s	
222	P (%)	
134	l (1/10 s)	Adument Parameters
12	D (ms)	
2	Padj (%)	

Figure 44 PID Parameters

2. Click Apply.

Advanced Parameters

Use this dialog to adjust:

Р	I
D	Padj
Dead Zone	Beta
Position Compensation Coef- ficient	Boost

See "Step 7: New Parameters" on page 222 for an explanation of these parameters.

To adjust the advanced parameters:

1. Click Advanced Parameters and the Advanced Parameters dialog appears.

Advanced Tun	ing Parameters	×
Slot: 0	•	
272	P (%)	
134	l (1/10 s)	
12	D (ms)	
-200	Padj (%)	
0.00	Dead Zone (%)	
-2	Beta	
5	Position Compensation Coefficient	
0	Boost	
	OK Cancel	

Figure 45 Advanced Parameters

- 2. Use the pulldown to select slot 0.
- Adjust the parameters, then click OK.
 A dialog appears.
- 4. Click OK.
- 5. Click Apply.

Open Stop Adjustment

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

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

Figure 46 shows how this works. This calibrates the position with the full travel of the valve.



Figure 46 Open Stop Adjustment Diagram

To start this function:

- 1. Enter an open stop value in the edit field.
- 2. Click Set Open Stop Adj. and the Open Stop Adjustment Successful dialog appears.



Figure 47 Open Stop Adjustment Successful

- 3. Click OK.
- 4. Click Apply.

Calibrate Context Menu

When you right click on the Calibrate tab the Calibrate Tab Context Menu appears.



Only Detach Trend and Help are available in the Calibrate context menu for Normal and Manual modes.

🚰 ValVue SVi100) - Offline SINGLE		
Tools Help			
Monitor Trend Co	nfigure Calibrate Status Check		
		PID Parameters	
Tag	SINGLE	272 P (%)	
Descriptor		134 I (1/10 s)	
Message		Advanced Parameters	
Date	01 MAY 2010	12 D (ms)	
Assembly Number	10222787	-200 Padi (%)	
Calibration Current Input Sig	Run Find Stops Manual Find Stops Open Stop Adjustment	nal Open Stop Adjustment	
	Run Auto Tune		
	Full Open Full Closed Set Valve Position	100.0 (%)	
	Reset to Factory Cal		
	Detach Trend Help	Apply	
Change Mode	O Mode: Setup	Exit Help	

Figure 48 Calibrate Tab Context Menu

The following items are on the *Calibrate* context menu.

- □ *Run Find Stops*: Runs the automatic position calibration process ("Run Find Stops" on page 248).
- Manual Find Stops: Set the position calibration by moving the valve full closed and full open. On very large valves, the automatic find stops routine may timeout before the valve has reached the end of travel. Manual find stops allows calibration of these valves ("Manual Find Stops" on page 250).
- □ Open Stop Adjustment: See "Open Stop Adjustment" on page 246.

- □ *Run Auto Tune*: Automatically finds appropriate PID parameters for the valve ("Auto Tune" on page 251).
- □ *Full Open*: Moves the valve to full open. This command works by taking the valve out of closed loop control and sends a high or low signal to the I/P.
- □ *Full Closed*: Moves the valve to full closed. This command works by taking the valve out of closed loop control and sends a high or low signal to the I/P.
- Set Valve Position: Allows you to set the valve to a specific position (this is accomplished by momentarily returning to manual mode, repositioning the valve, and returning to setup mode).
- □ *Reset to Factory Cal*: Resets the signal calibration to factory settings.
- Detach Trend: Removes the Trend display from the anchored tab format and creates a separate trend display.
- □ Help: Displays the help file at the Calibrate tab instructions.

Run Find Stops

To determine valve position, the controller must measure and save the closed and open positions of the valve. This can be done automatically by running the *Run Find Stops* procedure from the *Calibrate* tab context menu.

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. A progress tab appears while the find stops process is running.

To run Find Stops:

1. Right click in the tab and select **Run Find Stops**.

The Starting Run Find Stops dialog appears.



Figure 49 Starting Run Find Stops

2. Click OK.

When Find Stops is running, the Find Stops dialog appears.

Position Calibration	
Position Calibration	
Find Stops	O Running
Elapsed Time (Task): 00:00:10 Elapsed Time (Total): 00:00:10	Cancel Current Task Cancel All Continue

Figure 50 Find Stops

When Find Stops completes, the progress dialog appears as in Find Stops Complete.

Position Calibration	
Position Calibration	
Find Stops	Finished Find Stops Complete
Elapsed Time (Task): 00:00:30	
Elapsed Time (Total): 00:00:30	

Figure 51 Find Stops Complete

3. Click **Continue** to close the dialog and return to the *Calibrate* tab.

Manual Find Stops

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

When *Manual Find Stops* is selected, the valve is moved to full closed and you are asked to respond when the valve has reached the full closed position. The valve is then moved to full open and you are asked to respond when the valve has reached the full open position.

To run Manual Find Stops:

1. Right click in the *Calibrate* tab and select Manual Find Stops.



The Stroke Valve dialog appears.

Figure 52 Stroke Valve

2. Click **OK** to continue.

SVi1000 moves the valve to the fully closed position and launches the Valve Closed dialog.

Manual Find Stops	×
When the valve is fully closed click OK	
OK Cancel	

Figure 53 Valve Closed

3. When the valve is fully closed click **OK**.

SVi1000 moves the value to the fully open position and the *Value Open Dialog* dialog appears.



Figure 54 Valve Open Dialog

4. When the valve is fully open click **OK**.

Auto Tune

To start the Auto Tune function:

1. Right click in the *Calibrate* tab and select **Run Auto Tune**.

The Start Running Autotune Warning dialog appears.



Figure 55 Start Running Autotune Warning

2. Click **OK** and the *Enter Supply Pressure* dialog appears.

Input Value	
Enter the supply pressure (psi)	
OK Cancel	

Figure 56 Enter Supply Pressure

3. Enter a pressure. click **OK** and the *Aggressiveness* dialog appears.

Input Value 🛛 🔀
Aggressiveness(-9 to +9, 0: Natural):
0
OK Cancel

Figure 57 Aggressiveness



Aggressiveness: Enter a value that tends the value to either fast response or overshoot. It is advised to increment the value one digit at a time to see the operational results.

- 4. Enter a value, click **OK** and the *PID Tuning* begins followed in sequence until complete.
- 5. Click **Continue** to return to the *Calibrate* tab.
Status

7

What you can do on the Status Tab

Use the *Status* tab to see at a glance 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:

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

On the Status tab you can reset the Current Faults or All Faults (Current and Historical).

The window has selectable tabs that display the associated parameters for each tab.

When you are on the *Active Faults* tab the current active faults appears (Figure 58). The status codes are then partitioned into their respective SVi1000 functional areas.

Active Faults

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

A ValVue SVi1000 - SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
Active Faults General Instrumentation Actuator Pneumatics Critical Electronics	
No Error	
Clear Current Faults	
Change Mode O Mode: Setup Exit Help	

Figure 58 Status Tab: Active Faults

General

The *General* status tab displays faults that cannot be attributed to SVi1000 components; e.g. actuator, pneumatics, electronics. General faults are often testing and data faults.

🚰 ValVue SVi1000 - SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	1
Active Faults General Instrumentation Actuator Pneumatics Critical Electronics	
C H	
🙆 🥥 Low Air Supply Warning	
🙆 🥥 Keypad Fault	
🔿 🥥 Calibration Failed	
🥥 🥝 Find Stops Failed	
🥥 🥝 Autotune Failed	
🔗 🥝 Bias Out Of Range	
Factory Write Indicator	
🥥 🥥 Factory Mode Indicator	
Clear <u>Ourrent Faults</u> Clear <u>A</u> ll Faults	
Change Mode 🔷 Mode: Setup Exit Help	

Figure 59 Status Tab: General

Instrumentation

The *Instrumentation* status tab displays all faults related to instrumentation other than the actuator, pneumatics or electronics.

🚰 ValVue SVi1000 - SINGLE	_ 🗆 🛛
Tools Help	
Monitor Trend Configure Calibrate Status Check	
Active Faults General Instrumentation Actuator Pneumatics Critical Electronics	
СН	
Comparison of the second se	
🖉 🥥 Marginal Power	
🔿 🥥 Operating System Fault	
🔿 🥥 NVM Test Error	
🔴 🥥 NVM Write Fault	
🕘 🥥 IRQ Fault	
😑 🥥 MCU Internal Malfunction	
😑 🥥 Software Error	
Clear Current Faults Clear All Faults	
Change Mode 🔷 Mode: Setup Exit Help	

Figure 60 Status Tab: Instrumentation

Actuator

The *Actuator* status tab displays all faults related to the actuator on which the SVi1000 is mounted.

🚰 ValVue SVi1000 - SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
Active Faults General Instrumentation Actuator Pneumatics Critical Electronics	
СН	
Actuator Error	
Position Error	
Clear <u>Current Faults</u>	
Change Mode 🔷 Mode: Setup Exit Help	

Figure 61 Status Tab: Actuator

Pneumatics

The *Pneumatics* status tab displays all faults related to the SVi1000 pneumatics.

🚰 ValVue SVi1000 - SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
Active Faults General Instrumentation Actuator Pneumatics Critical Electronics	
СН	
I/P Out Of Range	
Clear Current Faults	
Change Mode 🔷 Mode: Setup Exit Help	

Figure 62 Status Tab: Pneumatics

Critical

The Critical status tab displays all faults critical to SVi1000 operations.

🚰 ValVue SVi1000 - Offline TEST	
Tools Help	
Monitor Configure Calibrate Status Check Trend	
Active Faults General Instrumentation Actuator Critical Pneumatics Electronics	
СН	
Internal Error	
🕘 🥥 NVM Checksum Error	
O RAM Checksum Error	
Flash Checksum Error	
🥥 🥥 Stack Error	
Clear <u>C</u> urrent Faults Clear <u>A</u> ll Faults	
Change Mode O Mode: Setup Exit Help	

Figure 63 Status Tab: Critical

Electronics

The *Electronics* status tab displays all electronics faults.

🖾 ValVue SVi1000 - SINGLE
Tools Help
Monitor Trend Configure Calibrate Status Check
Active Faults General Instrumentation Actuator Pneumatics Critical Electronics
СН
🔴 🥥 Ref Voltage Fault
🕘 🕘 Position Sensor Fault
🙆 🥥 Current Sensor Fault
O Temperature Sensor Fault
🔴 🥥 I/P Pressure Sensor Fault
Atmospheric Pressure Sensor
Clear <u>Current Faults</u> Clear <u>A</u> ll Faults
Change Mode O Mode: Setup Exit Help

Figure 64 Status Tab: Electronics

When you click **Clear Current Faults**, SVi1000 resets the status in the SVi1000 for all current faults *only*. The buttons on the *Status* tab indicating the current faults revert to green, if the condition is no longer valid.

To clear current faults:

□ Click Clear Current Faults.

There should be no faults listed in Figure 65 as current on any tab or in the *Active Faults* column.

AlVue SVi1000 - SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
Active Faults General Instrumentation Actuator Pneumatics Critical Electronics	
No Error	
Clear <u>Ourrent Faults</u> Clear <u>A</u> II Faults	
Change Mode 🔷 Mode: Setup Exit Help	

Figure 65 Current Faults Cleared

Status

Clear All Faults

When you click **Clear All Faults** SVi1000 resets the status bit in the SVi1000 for all faults, both historical and current. The buttons on the *Status* tab indicating the current and historical faults revert to green.

To clear all faults:

□ Click Clear All Faults.

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

Fault Matrix

Table 2 describes SVi1000 faults and helps determine the cause and corrective action.

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
RESET	Reset	Device reset indicator	3	Device reboot. The power recovered. Incoming signal was below 2.9 mA.	Reset the flag using ValVue or HART Host.
LOW_POWER	Low Power	Input current < 3.2 mA	3	Device power is below 3.2mA.	Increase mA only if calibra- tion or diagnostics are to be performed.
ACTUATOR	Actuator Error	Unable to posi- tion the valve normally.	2	 Air supply is insufficient. Handwheel or mechanical stop present. Valve stuck of sticking excessively. Unbalance forces on valve trim exceeds actuator capability. 	 Increase air supply above spring final value + 10 psig. Verify if mechanical stop is present. Perform valve signature using ValVue. If possible, perform valve signature under process conditions. Validate sizing of actuator against pro- cess condition using Val- SpeQ.
AIR_SUPPLY_L OW	Low Air Supply Warning	Supply Pres- sure below low limit	2	Air supply is not turned on or is set below 10psig.	Increase air supply above spring final value + 10 psig.

|--|

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
POSITION_ ERROR	Position Error	If T1 error is configured AND the posi- tion error out- side the error band for time T1.	2	 Controller is slow to fol- low command signal due to physical valve wear, such as tight packing, stem build up, throttling surface friction or actuator friction. Valve is slow to follow command signal due to large volume actuator. Valve will not follow com- mand signal due to insuffi- cient or no air supply. Valve does not move because the device's mode is not set to Normal. Valve will not follow com- mand signal due to poor controller tuning for current valve status. Valve will not follow com- mand signal due to control- ler malfunction such as I/P or Relay. Valve will not follow com- mand signal due to inline obstruction. 	 Perform valve signature using ValVue. Perform step test signa- ture using ValVue. Verify that air supply droop dur- ing filling is less than 15% or the set pressure. Validate that the air sup- ply set to the instrument is greater that the spring final + 10 psig. Set the mode to Normal using ValVue or HART Host. Perform Autotune or Manual tuning using Val- Vue or HART Host. Verify if Bias Out Range or I/P Out of Range events are active. Perform valve signature using ValVue.
I2CBUS					
KEYPAD	Keypad Fault	Possible mois- ture inside or connector or mechanical failure.	2	The local user interface and display is defective.	Replace the local user interface and display assembly.
MARGINAL_ POWER	Marginal Power		2	The input current is less than 3.85mA.	Increase loop current to 4mA only if calibration and diagnostics are to be per- formed.

Table 2 Fault Matrix (Continued)

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
CALIBRATION_ FAILED	Calibration Failed	Calibration of AO or pressure failed.	3	Calibration of the input sen- sors was outside the acceptable range when attempting to calibrate.	Using precision measuring equipment, perform cali- bration according to boundary limits of input sensors.
FIND_STOPS_ FAILED	Find Stops Failed	Find Stops pro- cess failed,	3	 When calibrating stops (Zero / Span) the travel sen- sor moved outside the acceptable limits. A procedure timeout occurred due to an extremely large volume of actuator to displace. Valve position could not stabilize when deenergiz- ing or when energizing the actuator. 	 Using ValVue or HART Host, verify that travel sen- sor counts is 0 +/- 1000 with the valve closed. For a 90° valve, measured sen- sor count is done at 50% travel. Using ValVue or HART Host, performs a Manual Stop calibration. Verify that air supply is adequate. Verify that accessories (boosters, quick exhausts, etc.) are not creating instability.
AUTOTUNE_ FAILED	Autotune Failed	Self tuning failed to con- verge on acceptable parameters.	3	 When performing an Autotune, procedure failed to complete due valve hys- teresis beyond 50%. Air supply is insufficient. Air supply droops signifi- cantly during actuator fill- ing. 	1: Using ValVue or HART Host, perform an Auto- tune with an aggressive- ness level between 2 and 4. Or manual tune the parameters according to the instruction manual. 2: Increase air supply above spring final value + 10 psig. 3: Perform 5 to 10% steps and observe air supply gauge on the controller.
STD_ DIAGNOSTICS_ FAILED	Std Diagnos- tics Failed		3	When running a Standard Actuator Signature, the device failed to move the valve between 10% to 90%.	 Selected speed is too slow. Increase speed for the test by increments of 1. Insufficient Air supply.

Table 2 F	ault Matrix	(Continued)
-----------	-------------	-------------

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
EXT_ DIAGNOSTICS_ FAILED	Ext Diagnos- tics Failed.		3	When running a Extended Actuator Signature, device failed to move the valve between the configured travel.	 Selected speed is too slow. Increase the speed for the test by increments of 1. Insufficient Air supply.
RTOS_ SCHEDULING	Operating Sys- tem Fault.	An internal error from which the device recov- ered automati- cally	2		
SUPPLY_HIGH	High Air Supply Warning	Supply Pres- sure above upper limit.	1	 1:A failure in the air filter regulator occurred. 2: A nearby equipment drawing a high volume, suddenly quit using air and created a spike in air supply. 3: The air set is adjusted greater than configured threshold. 	 Replace air filter regula- tor. Resize air manifold. Adjust threshold to be 3 to 5 psig greater than set air supply.
BIAS_OUT_OF_ RANGE	Bias Out Of Range	An important internal parameter is out of range.	1	The servo signal to the cur- rent to pressure converter is outside of normal throttling range.	
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 nor- mal range.	
TEMPR_OUT_ OF_RANGE	Temp. Out Of Range	Temperature outside oper- ating range.	2	The board temperature is below –40 °C or above 85 °C.	NOT IMPLEMENTED
DI_ABNORMAL			3		
LATCH_FSAFE					
TIGHT_ SHUTOFF					

Table 2 Fault Matrix (Continued)

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
NVM_ CHECKSUM0	NVM Check- sum Error	The device failed to read critical data from non vola- tile memory.	1	A permanent corruption of the content in non volatile memory occurred.	 Remove power to the device for 2 minutes and restart the device. If the failure persist, replace the device.
RAM_ CHECKSUM	RAM Check- sum Error	An internal error from which the device recov- ered automati- cally.	2	A corruption of the content in volatile memory occurred.	Notify GE at svisup- port@GE.com.
FW_ CHECKSUM	Flash Check- sum Error	A critical inter- nal fault.	1	Invalid firmware checksum due to data corruption.	 Remove power to the device for 2 minutes and restart it. If the failure persists, Replace device.
STACK	Stack Error	An internal error from which the device recov- ered automati- cally.	2	A problem with the memory stack occurred.	Clear the condition using ValVue or HART Host.
FACTORY- WRITE	Factory Write Indicator	Indicator of writes to non volatile mem- ory allowed only for firm- ware upgrade.	1		
NVM_TEST	NVM Test Error	An error in non volatile mem- ory could not be repaired.	2	A problem occurred when testing non volatile mem- ory.	Clear the condition using ValVue or HART Host.
0	ESD Trip occurred and requires user intervention to be released.				

Table 2 Fault Matrix (Continued)

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
FACTORYMODE	Factory Mode Indicator	Device per- forms factory authorized operations.	1	Device is in the factory mode.	Replace device and report the problem at svisup- port@GE.com.
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 svisup- port@GE.com.
POSITION_ SENSOR	Position Sensor Fault		1	Electronic Hall sensor com- ponent and related compo- nents failed.	Replace device and report the problem at svisup- port@GE.com.
CURRENT_ SENSOR	Current Sen- sor Fault		1	Electronic input loop current sensor is damaged.	Replace device and report the problem at svisup- port@GE.com.
TEMPERATURE _SENSOR	Temperature Sensor Fault		1	Electronic temperature sen- sor is damaged.	Replace device and report the problem at svisup- port@GE.com.
CURRENT_ SENSOR_2ND			2	Secondary input current sensor is damaged.	Replace device and report the problem at svisup- port@GE.com.
PRESSURE1	Pressure 1 Fault	Output Pres- sure Sensor Fault (Single acting) or Out- put 2 Pressure Sensor Fault (double acting).	1	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.
PRESSURE2	Pressure 2 Fault	Supply Pres- sure Sensor Fault (Single acting) or Out- put 1 Pressure Sensor Fault (double acting)	1	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.
PRESSURE3	Pressure 3 Fault	Supply Pres- sure Sensor Fault (double acting only)	1	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.

Table 2 Fault Matrix (Continued)

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
PRESSURE4	I/P Pressure Sensor Fault		1	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.
PRESSURE5	Atmospheric Pressure Sen- sor Fault		2	 Pressure sensor has been overpressurized and dam- aged. Pressure sensor has failed due to some malfunc- tion. 	Replace device and report the problem at svisup- port@GE.com.
WATCHDOG_ TIMEOUT	Watchdog timeout	An internal error from which the device recov- ered automati- cally.	2	n/a	NOT IMPLEMENTED
NVM_WRITE NVM	NVM Write Fault	A write to non volatile mem- ory failed; data may be lost on reset.	2	An error occurred when attempting to write to non volatile memory.	1: Clear the condition using ValVue or HART Host. 2: If condition persists, replace device and report problem at svisup- port@GE.com.
IRQ_FAULT	IRQ Fault	An internal error from which the device recov- ered automati- cally.	2	The circuit board interrupt request failed.	1: Clear the condition using ValVue or HART Host. 2: If condition persists, replace device and report problem at svisup- port@GE.com.
TMOUT_FLASH _TEST	Flash ROM Test timeout	The test didn't complete in time.	2		
SELF_CHECK	MCU Internal Malfunction	A critical inter- nal fault.	1	A general self check failed.	1: Clear the condition using ValVue or HART Host. 2: If condition persists, replace device and report problem at svisup- port@GE.com.

Table 2 Fault Matrix (Continued)

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
SOFTWARE	Software Error	An internal error from which the device recov- ered automati- cally.	2	Operating system failed in conducting a task.	1: Clear the condition using ValVue or HART Host. 2: If condition persists, replace device and report problem at svisup- port@GE.com.
ESD_TRIP	ESD Valve Tripped	An ESD trip event is pres- ent.	1		
AI_PV_LOW	AI_PV_LOW	An ESD trajec- tory signature is available for retrieving.	2	n/a	Not Implemented
AI_PV_HIGH	AI_PV_HIGH	An error saving ESD signature, not necessar- ily the latest.	2	n/a	Not Implemented
IP_SERVO_ LOW	IP_SERVO_ LOW	Last com- pleted PST failed.	1	 The required I/P current is too low to ensure venting of the relay. The I/P flexure is pushed against the nozzle. Faulty I/P flow regulator 	1,2,3: Service required. Contact GE.
IP_SERVO_ HIGH	IP_SERVO_ HIGH	A new PST tra- jectory signa- ture and data are available for retrieving.	2	 1: The required I/P current is too high to maintain output pressure to actuator. 2: The I/P flexure is pushed away from the nozzle 	1, 2: Service required. Con- tact GE.
0		An error saving PST signature, not necessar- ily the latest.	2		
DIAGPROC1	Diag Proc1	Last com- pleted Pneu- matic Test failed.	2		

Table 2Fault Matrix (Continued)

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
RANGE1	Range 1	The I/P cut off switch is not functional.	2		
RANGE2	Range 2		2		
LINKAGE_ DRIFT	Linkage Drift		2	1:In the fully open or fully closed position a raw travel sensor count deviation of x% exists against the cali- brated stop value.	 Verify that linkage is well fastened. Re run the Find Stops method. When device goes in Failsafe when running the Find Stop method, clear alarm and rerun the stops.
VALVE_STUCK_ CLOSED	Valve Stuck Closed	Measured fric- tion is below customer specified range.	2	 1: A handwheel is left engaged. 2: Valve is seized in place. 3: Insufficient actuator thrust. 	 Verify presence of a mechanical stops such as a handwheel. Repair valve. Run a PST or Extended signature. If friction is abnormal then overhaul valve.
VALVE_STUCK_ OPENED	Valve Stuck Opened	Measured fric- tion is above customer specified range.	2	 1: A handwheel is left engaged. 2: Valve is seized in place. 3: Exhaust port is clogged up (no venting). 4: An accessory prevents the air from the actuator to be vented. 	 Verify presence of a mechanical stops such as a hand wheel. Repair valve. Verify that exhaust port is not restricted. Run a TBT test from Val- Vue. A failure of the TBT test would indicate a prob- lem in venting.
UI_OFF	UI_OFF	Pressure to move valve is greater than customer specified range.	2		

Table 2 Fault Matrix (Continued)

FAULT Name (Anchor)	TEXT For DD & Valvue2 English	HELP For DD & Valvue2 English	Critic ality	Probable Cause	Recommended Action
RANGE3	Range 3	Supply pres- sure drop exceeds a cus- tomer speci- fied value.	2		
RANGE4	Range 4	PST canceled before com- pletion.	2		

Table 2Fault Matrix (Continued)

Status Context Menu

The Status tab context menu contains only a link to Status online help.

Check

8

What you can do on the Check Tab

Check tab provides a method for monitoring and adjusting some of the basic parameters. This tab is used primarily for troubleshooting.

You can use the right click menu or the *Tools* menu to *Set IP, Unset IP, Full Open, Full Closed* and *Detach Trend*. To perform any action from the *Check* tab Context Menu, SVi1000 must be in the *Setup* mode. (See "Change Mode" on page 190 for further information.)

ValVue SVi1000 - Offline SINGLE	
Monitor Trend Configure Calibrate Status Check	
	-
Tag SINGLE	
Descriptor	
Message	
Date 01 MAY 2010	
Assembly Number 10222787	
Position (%) Lower Stop Raw Position Upper Stop 10.5 -632 -634 5265	
Current (mA) Raw Signal 4.192 4223	
Board Temp (C) Min Temp (C) Max Temp (C) 27.43 -60 100	
Pw/M Set I/P	
Change Mode 🔷 Mode: Manual	Exit Help

Figure 66 Check Tab

Information Displayed on the Check Tab

The *Check* tab is used for troubleshooting and displays the operating parameters of the SVi1000 including:

Position	Indicates the actual valve position in % of valve opening. 0% is always closed and 100% is open. Because the travel of a valve may exceed its nominal travel, positions greater than 100% are possible.
Lower Stop/Upper Stop	The <i>Lower</i> and <i>Upper Stop</i> values are the A/D values measured from the position sensor at the full travel of the valve. The <i>Lower Stop</i> designates the lower end of the valve travel. The raw position measurement must always be between these two numbers.
Raw Position	The A/D value measured from the position sensor.
Current (mA)	The value of the input signal in miliamps.
Raw Signal	The A/D value measured from the signal sensor.
Board Temp (C)	The internal SVi1000 temperature measured in degrees Celsius. The SVi1000 also reports the lowest temperature and highest temperature in which it has been operating.
Min Temp (C)	This is the minimum temperature in degrees Celsius at which the SVi1000 reports it has been operating.
Max Temp (C)	This is the maximum temperature in degrees Celsius at which the SVi1000 reports it has been operating.
PWM	The current D/A value being sent to the I/P that controls the valve position.
Set PWM	Use this field in conjunction with the right click menu Set I/P com- mand to set the IP for troubleshooting.

Check Context Menu

The Check tab context menu contains (Figure 67) the following items:

- □ Set I/P: Uses the value in this field as a test. The LED is red while set.
- □ Unset I/P: Unsets the I/P value.
- □ *Full Open*: Moves the valve to full open. This command works by taking the valve out of closed loop control and sends a high or low signal to the I/P.
- □ *Full Closed*: Moves the valve to full closed. This command works by taking the valve out of closed loop control and sends a high or low signal to the I/P.
- □ *Detach Trend*: Removes the trend display from the tabbed dialog and creates a separate trend display.
- □ *Help*: Displays the online help at the *Check* tab instructions.



To execute any Context menu task, SVi1000 must be in the Setup mode. (See "Change Mode" on page 190.)

🚰 ValVue SVi1000 - Offline SINGLE	
Tools Help	
Monitor Trend Configure Calibrate Status Check	
TagSINGLEDescriptorMessageDate01 MAY 2010Assembly Number10222787	
Position (%) Lower Stop Raw Position Upper Stop 10.5 -632 -634 5265 Current (mA) Raw Signal 4.192 4223 Board Temp (C) Min Temp (C) Max Temp (C) 27.43 -60 100	Set I/P UnSet I/P Full Open Full Closed Detach Trend Help
PWM Set I/P	Exit Help

Figure 67 Check Context Menu

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Optional Switch Load Limits

9

Output Switches

Introduction

The SVIi1000 supports two identical contact outputs, SW #1 and SW #2 (Digital Output switches), that can be logically linked to status bits. The Digital Output switch terminals are solid state contacts. Each switch requires its own power source and must be connected to the appropriate connector on the Electronics Module Terminal Board.

The switches are polarity sensitive and must be connected only to a DC circuit. The switch (+) terminal must be electrically positive with respect to the (–) terminal. If the (+) terminal is electrically negative with respect to the (–) terminal, then the switch will conduct.

There must be a series load in the circuit to prevent damage to the switch. **If the switch is** connected directly across the power source the current will be limited only by the capacity of the power source and the switch can be damaged.

	Switch OFF	Switch ON
V _{SWITCH}	30 VDC max.	\leq 1 V (Switch saturation voltage)
I _{SWITCH}	\leq 0.200 mA (Switch leakage current)	1 A max.

This section discusses the necessary precautions when configuring a system.

CAUTION

Consult with qualified personnel to ensure that electrical requirements for the switch are met.

Incorrect polarity connection results in an effectively closed connection.

The maximum voltage that can be applied to the digital switch outputs is 30 VDC. This is an open circuit parameter (the digital switch is in the open state). Under open circuit conditions, the switch current will be less than 0.200 mA.

The switch maximum current rating is 1 A. When the switch is ON, the typical voltage drop across the switch is ≤ 1 V. It is essential that the external circuit controls voltage such that the switch saturation voltage is maintained.

When the switch is on (closed) the external voltage must be dropped across the load (Figure 68).



The load must be designed such that the current in the circuit is ≤ 1 A at all times. Some 3rd party devices, such as incandescent lamps or solenoids, require surge and back EMI protection to limit current to ≤ 1 A.

Load is designed to ensure that voltage across t	he switch is < 1 V.
LOAD]
SVi1000 Switch Output: $\leq 1 \text{ V}$ with switch ON	External Voltage Source

Figure 68 Simplified Switch Installation Drawing: Correct Configuration

Without a load, when the switch is on (closed) the external voltage would be dropped across the switch. **This damages the switch** (Figure 69).



Figure 69 Simplified Switch Installation Drawing: Configuration Not Allowed

Checking Switch Operation

ValVue Commands

This procedure gives an example, using the settings in Figure 70, to see if a switch is operating:

1. Click the **Configure** tab, click and Figure 70 appears.

I/O Configure	2	×
D02 (Output Switches)	AD (Valve Position Transmitter)	
Switch 2	Lower Range Value	
0. Always Normal Position 💌	0 (%) at 4 mA	
0	Upper Range Value	
Normally 💿 Closed 🔿 Open	100 (%) at 20 mA	
OK	Cancel	

Figure 70 I/O Configure

- 2. Switch from *Normally Opened* to *Normally Closed* or vice versa, click **OK** and **Apply Changes**.
- 3. Click the **Check** tab.
- Select Command 142 Read Switches from the pulldown list and click Send Cmd.
 The information field below populates with the configured switch states.

Ensure that the switch just reconfigured has changed state.

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ValVue 12400 Software

Advanced Level Measurement

- SIL2-capable liquid level
 instrument
- Low- and high- level switch integrated functions
- Easy installation and simple operation
- Three built-in pushbuttons
- Seamless system integration



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ValVue 12400 Work Environment

What is ValVue 12400?

Welcome to ValVue 12400

Masoneilan's ValVue 12400 software is a Human-Machine Interface (HMI) software tool that provides a powerful interface to Masoneilan's Digital Level Transmitter, Model 12400 that uses HART[®] communication protocol.

ValVue 12400 is used to configure, calibrate and perform transmitter diagnostics with the Model 12400 (Digital Level Transmitter) utilizing HART communications protocol.

What would you like to do with ValVue 12400?

- □ Monitor operations: See "What you can do on the 12400 Monitor Screen" on page 323.
- □ Quickly set up the 12400: "What you can do on the Basic Setup Screen" on page 349.
- □ Advanced 12400 set up: See "What you can do on the Advanced Setup Screen" on page 367.
- □ Calibrate the 12400: "Calibration Tools" on page 403.
- Perform diagnostics on the 12400: See "What you can do on the Transmitter Diagnostics Screen" on page 417.
- □ "Status" on page 427 the 12400 status: "What you can do on the Status Screen" on page 427.
- □ Initiate a trend of the 12400 variables: See "What you can do on the Trend Screen" on page 341.

ValVue 12400's Work Environment

After you have selected the connected device ValVue 12400 launches and displays the device in the first *ValVue 12400* screen, *12400 Monitor* (Figure 71). ValVue 12400 is a series of tabs, with each tab representing one of ValVue 12400's screens. Tabs and screens are named according to their function.

🚈 ValVue 12400 - O	ffline NEW			
Tools Help				
12400 Monitor Basic S	etup Advanced Setup Transmitter Diagn	ostics Status Check Trend		
)	[%] 100		12400
			Level (%)	50.0
Tag Name Descriptor	NEW	80 -	Signal (mA)	12.00
Message	TESTING	_		
Date (dd/mm/yyyy)	26 AUG 2009	60 -		
Final Assy Number	0			
ļ		40 -	000 Road Identifier	Send Cmd
Status No sta	atus set O	20 -	Mtg ID=Dresser Device Type=12400 Number Preambles=5 Universal Command Revision=5 Transmit Command Revision=1	
		0	Software Revision=2 Hardware Revision=1 Device Function Flag=0	
Change Mode	Mode: Normal	•	Exit Help	

Figure 71 First ValVue 12400 Screen - after Connected Device Selected

Context Menu

Each ValVue 12400 screen has an associated context menu, accessed by right-clicking on the screen. The context menu changes from screen to screen. Figure 72 shows the *12400 Monitor* context menu.



Figure 72 12400 Monitor Screen - Context Menu

Working in ValVue 12400

ValVue 12400 is a typical Windows program, with tabs, menus, dialogs, windows and toolbars. After you have successfully logged into ValVue 12400 the currently selected device appears in ValVue 12400's *Monitor* screen.

Toolbar

The toolbar at the top of every ValVue 12400 screen has two menu items; Tools and Help.

Tools Menu

The *Tools* menu changes according to the selected screen and is most often the same menu as when right-clicking on the active screen.

For example, when on the *12400 Monitor* screen the *Tools* menu contains the items shown in Figure 73.

🚰 ValVue 12400 - Offline	NEW			
Tools Help				
12400 Monitor Basic Setup A	dvanced Setup Transmitter Diagno	ostics Status Check Trend		
	Reset Save 12400 Data Restore 12400 Data Report Setup	[%] 100	Level (%)	12400 50.0 12.00
Tag Name NEW	Report	80 -		
Descriptor Message TES1 Date (dd/mm/yyyy) 26 Al Final Assy Number 0	Update Configured Data Detach Trend Help	60 -		Send Cmd
		40 -	000 Read Identifier	-
Status No status set	0	20 - 0 -	Mfg ID=Dresser Device Type=12400 Number Preambles=5 Universal Command Revision=5 Transmit Command Revision=1 Software Revision=2 Hardware Revision=1 Device Function Flag=0	 • •
Change Mode	Mode: Normal	•	Exit Help]

Figure 73 Tools Menu when on 12400 Monitor Screen

When you are on the *Transmitter Diagnostics* screen the *Tools* menu contains the items shown in Figure 74.



Figure 74 Tools Menu when on Transmitter Diagnostics Screen

Modes of Operation

There are three modes of operation available for ValVue 12400: *Normal, Setup* and *Manual* (Controller Activation only).

Normal Operation

In the Normal mode the 12400 measures the Process Variable (*PV*) and transmits the *PV* as a 4 to 20 mA signal.

Setup

In the Setup mode you can set configuration and calibration parameters.

Manual

In the Manual mode you can set configuration and PID calibration parameters.

Change Mode

The *Change Mode* button located at the bottom left of all ValVue 12400 screens allows you to change the operating 12400 mode. When selected, you can change the 12400 mode to either of two operating modes:

- Normal In this mode the ValVue 12400 measures the Process Variable (PV) and transmits the PV as a 4 to 20 mA signal. The monitor displays level detection accordingly (indicator green).
- □ Setup In this mode you can set calibration and configuration parameters.

In addition to the two user-selectable modes, there is an additional mode that is the result of internal diagnostics:

□ *Failsafe* - When the 12400 cannot operate correctly the device goes into failsafe mode and remains in the failsafe mode until you intervene. In failsafe mode, the output signal is either below 3.6 mA or above 20.5 mA, as configured in "Advanced Setup" on page 367.

To change 12400 mode:

1. Click Change Mode as (Figure 75).

Tag Name	LT 102				1240
Descriptor	CONDENSATE LEVEL		Level transmitter		
Message			Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009			Durand CC	1
Final Assy Number	U-			Decoro po	
Polling Address				ZERU	1
				SPAN	
Transmitter			Signal Range		
Transmitter Mode	Level	· ·	LRV	4.000	mA
Transmitter Mounting	Left Mounted	-	URV	20.000	mA
			SG Service		
Transmitter Action	Direct	~			
Local UI Language	English	-	Level SG Service	1.000	

Figure 75 Selecting Change Mode
The *Change Mode* dialog appears. The active mode is indicated by the radio button.

Change Mode	×
Choose Mode	
Normal	
C Setup	
OK	Cancel

Figure 76 Change Mode Dialog

2. Choose the appropriate mode and click **OK**.

Choose Mode	•
ି Normal ୧ Setup	
ОК	Cancel

Figure 77 Choosing Setup Mode

Tag Name	LT 102				12400
Descriptor	CONDENSATE LEVEL		Level transmitter		
Message			Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009			,	
Final Assy Number	0			<u>R</u> ecord SG	
Polling Address	0			ZERO	
				<u>s</u> pan	
Transmitter			- Signal Range		
Transmitter Mode	Level	_	LRV	4.000	mA
Tennenitter Mounting	L all blaustad		URV	20.000	mA
Transmiller Mounting		<u> </u>	- SG Service		
Transmitter Action	Direct	•			
	le co		Level SG Service	1.000	

Setup mode is activated and all setup parameters are enabled.

Figure 78 Setup Mode Activated



Whenever you change modes in ValVue 12400, the screens toggle between 12400 Monitor and Setup screens (Basic Setup and Advanced Setup). If changing mode from Normal to Setup, ValVue 12400 displays the Basic Setup screen (except when on the Advanced Setup screen). If changing mode from Setup to Normal, ValVue 12400 displays the 12400 Monitor screen.

Exiting in Setup Mode

If when exiting ValVue 12400, you are in the Setup mode, an error message appears.

ValVue 12400		
Click OK to change to Nom	nal mode and ex	it ValVue 12400.
Click Exit in Setup mode to	remain in Setup	mode (not recommended).
Click Cancel to return to Va	Nue 12400.	
ОК	Exit	Cancel

Figure 79 Exiting in Setup Mode Error Message

□ Click **OK** to change to Normal mode and exit ValVue 12400.

If changes have been made before exiting, an error message appears.

ValVue 12400			
Changes have been ma	ade, do you w	ant to apply then	n now?
<u>Y</u> es	No	Cancel	Í

Figure 80 Error Message of changes made when exiting in Setup mode

□ Click **Yes** to save changes.

Exit

Clicking **Exit** quits the program.

Help

There are several methods of accessing Help. The most obvious method and the one present on each screen is the Help button located at the bottom, right side. Clicking the Help button displays the help file table of contents. See "Types of Help Available" on page 291 for more information.

ValVue 12400 Help

Types of Help Available

Help is readily available from anywhere within ValVue 12400. Help exists in help menus, and in the toolbar available on every screen, and specific context sensitive help on most screens.

- □ *Main Help Menu* available by clicking on the help button, located at the bottom, right corner of every screen.
- □ *Context Sensitive Help* available by right-clicking within the screen area.
- □ *Toolbar Help* located in the toolbar at the top of every screen, available by clicking on **Help** at the top of the screen.
- □ *F*1 the first function key opens the help page that describes the current screen.

Toolbar Help

ValVue 12400's toolbar contains a Help menu that provides access to the help file contents (under the Help selection) and under the Tools menu provides access to the context sensitive help for the selected screen.

Help Menu

The Help menu is the same on every screen and contains:

- □ *Help* launches the help file table of contents
- □ *Firmware Info* displays information about the firmware loaded into the 12400
- □ *About* displays information about ValVue 12400

Context Sensitive Help

Context sensitive help is available on every ValVue 12400 screen by right-clicking in the screen area.

ValVue 12400 Screens

12400 Monitor

The 12400 Monitor screen provides at a glance access to 12400 operation.

See "What you can do on the 12400 Monitor Screen" on page 323.

🚰 ValVue 12400 - Offline NEW				
Tools Help				
12400 Monitor Trend Basic Setup Adv	anced Setup Transmitter Diag	nostics Status Check		
		[%]		12400
			Level (%)	50.0
Tag Name NEW Descriptor		80 -	Signal (mA)	12.00
Message Date (dd/mm/yyyy) 26 AUG 2009		60 -		
Final Assy Number 0		40 -		Send Cmd
		40		
Status No status set	0	20 -		V
Change Mode Mode:	Normal	•	Exit Help	

Figure 81 12400 Monitor Screen

Trend

From the *Trend* screen you can observe the performance of the 12400 in real time.



See "What you can do on the Trend Screen" on page 341.

Figure 82 Trend Screen without Controller Activation



Figure 83 Trend Screen with Controller Activation

Basic Setup

The *Basic Setup* screen provides access to all basic setup features. Changes to this screen require ValVue 12400 to be in *Setup* mode.

See also:

- □ "Change Mode" on page 288
- □ "What you can do on the Basic Setup Screen" on page 349

Tag Name	LT 102				12400
Descriptor	CONDENSATE LEVEL		Level transmitter		
Message			Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009			,	
Final Assy Number	0			Becord SG]
Polling Address	0			ZERO	
				SPAN	1
Transmitter			- Signal Range		
Transmitter Mode	Level	*	LRV	4.000	mA
Transmitter Mounting	Left Mounted	-	URV	20.000	mA
	1		SG Service		
Transmitter Action	Direct	*			
Local III Language	English	*	Level SG Service	1.000	

Figure 84 Basic Setup Screen

Advanced Setup

The Advanced Setup screen provides access to all advanced setup and calibration features. Changes on the Advanced Setup screen require ValVue 12400 to be in Setup mode (see "Change Mode" on page 288).

Activate the 12400 PID features by clicking **Controller Activation**, which enables the *Controller Monitor* and the *Controller Setup* screens.



The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

See:

- □ "Change Mode" on page 288
- □ "What you can do on the Advanced Setup Screen" on page 367

ValVue 12400 - Offline NEW Tools Help Controller Monitor Trand Controller Setur Basic Setur	Advanced Setup Transmitter Diagnostics S	tatus Chark
Controller Monitor Irend Controller Setup basic Setup Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 SIL2 Fault Timeout(x10 sec) SIL2 Configuration Non-SIL Device	SG Meter Calibration ZER0 SG Calibration 1.000
Database Filters and Tuning Calibration Alarms Threshold (mm) Time (sec) Alarm Low 1 ✓ 40.00 15.00 Alarm Low 2 □ 10.00 15.00 Alarm High 1 ✓ 60.00 15.00 Alarm High 2 □ 80.00 15.00	C Configure Enabled C Configure Disabled DO Switches Switch #1 Normally © Closed © Open always in normal position Switch #2 Normally © Closed © Open	Range Level LRV Level URV 10.000 Revel Units Terror Shift % Reduced Span %
Name Hysteresis 0.49 % Torque Tube Compensation TT Activation Image Process Temperature 20.0 Change Mode Mode:	always in normal position	D.00 D.00 Apply

Figure 85 Advanced Setup Screen

Transmitter Diagnostics

The Transmitter Diagnostics screen provides access to all diagnostics.

See "What you can do on the Transmitter Diagnostics Screen" on page 417.

alVue 1	2400 - L	T 102					
; Help							
400 Monite	or Trend	Basic Setu	p Advanced	Setup Transmith	er Diagnostics Status	Check	
Tag Nam	ne	LT 102			7		12400
Descripto	or	CONDEN	SATE LEVEL		-		
Message					-	– Continuous I	Diagnostic Data
Date (dd,	/mm/uuuu)	25 NOV :	2009		-		
Final Ass	u Number	0			-	Time Full=	lling=15/4 257 hrs
T II GI AGO	y manufact	1.				Time Empl Time Work	ty=240 hrs king=1853 hrs
Service T	ime						
Time Sir	nce Service	=80 days					
Service	Interval=U d	lays				<u>B</u> eset D)ata <u>D</u> etail
ļ							
Rese	t <u>T</u> ime	Set Inte	rval				
AUTAUL	D/Signal Irin Device	n in Haw Co Range	unt Usi	er Range	Calibl RV	CalibURV	Specific Gravity Meter
A01 4	4000	20000	4000	20000	-1844751	1205594	
A00 4	4000	20000	4000	20000	SGmeterLRV	SGmeterURV	
	4000	20000	4000	20000	977199	1091573	Meter On/Off
Signal 4	4000	120000				1000 1000 1000 1000 1000 1000 1000 100	

Figure 86 Transmitter Diagnostics Screen

Status

The Status screen provides 12400 operational status information.

See "What you can do on the Status Screen" on page 427



Figure 87 Status Screen

Check

The Check screen provides 12400 operational data.

See "What you can do on the Check Screen" on page 441

Help						
00 Monitor Tren	nd Basic Setup	Advanced Setu	up Transmitter Diagno:	stics Status Check		
ſag Name	NEW					1240
)escriptor						
vlessage	TESTING					
) ate (dd/mm/yyy	y) 26 AUG 2	009				
Final Assy Numbe	r O					
Femperature-Corre	ected Values —					
Temperature-Corre Main Temperatu	ected Values — ure	Sensor Tem	perature			
Temperature-Corre Main Temperatu 7232	ected Values — ure 28 DegC	Sensor Tem	perature 27 DegC			
Temperature-Corre Main Temperatu 7232 Primary Signal C	ected Values — ure 28 DegC Current	Sensor Tem 6928 Level	perature 27 DegC			
Temperature-Corre Main Temperatu 7232 Primary Signal C 12026	ected Values	Sensor Tem 6928 Level -690269	perature 27 DegC 50 %	- Range of Calibration	n	1
Temperature-Corre Main Temperatu 7232 Primary Signal C 12026 Terminal Voltag	ected Values ure 28 DegC Current 12 mA e	Sensor Tem 6928 Level -690269	perature 27 DegC 50 %	Range of Calibration CalibLRV	n CalibURV]
Temperature-Corru Main Temperatu 7232 Primary Signal C 12026 Terminal Voltag 1799	ected Values	Sensor Tem 6928 Level -690269	perature 27 DegC 50 %	Range of Calibration CalibLRV -2464683	n	
Temperature-Corre Main Temperatu 7232 Primary Signal C 12026 Terminal Voltage 1799 Primary Signal C	ected Values	Sensor Tem 6928 Level -690269 Secondary S	perature 27 DegC 50 %	Range of Calibration CalibLRV -2464683 SGmeterLRV	n CalibURV 1076867 SGmeterURV	
Temperature-Corre Main Temperatu 7232 Primary Signal C 12026 Terminal Voltage 1799 Primary Signal C 12014	ected Values	Sensor Tem 6928 Level -690269 Secondary S 12013	perature 27 DegC 50 %	Range of Calibration CalibLRV -2464683 SGmeterLRV -2472286	n CalibURV 1076867 SGmeterURV 1068148	

Figure 88 Check Screen

Controller Monitor

The *12400 Controller Monitor* screen provides *at a glance* access to 12400 PID operation. This screen only appears if *Controller Activation* is selected on the *Advanced Setup* screen.

See "What you can do with the 12400 Controller Monitor Screen" on page 303

🙀 ValVue 12400 - Offline NEW			
Tools Help			
Controller Monitor Trend Controller Setup	Basic Setup Advanced S	etup Transmitter Diagnostics	s Status Check
Tag NEW Controller Mode AUTO MANUAL	Controller Bargraghs Controller Output 18.44 (mA) 103.120 (%) mA 20 18.00	Level Measurement 50.00 Setpoint (mm) 25.1 Level (mm) mm 80 	12400 PID Parameters Settings P 50.00 I (s) 100.0 D (ms) 5000 Kd 100 Beta 9 Alams Low Controller Alam - Absolute (mm) High Controller Alam - Absolute (mm)
Device No status set		28 	Send Cmd
Change Mode Mode:	Normal	٠	Exit Help

Figure 89 12400 Controller Monitor Screen

What you can do on the 12400 Controller Setup Screen

Controller Setup screen functionality includes:

- □ "PID Controller Setpoint Range" on page 339
- □ "PID Controller Configuration" on page 338
- □ "PID Parameters Settings" on page 337
- □ "PID Controller Alarms" on page 336

For context menu items (right click menus) see 12400 Controller Monitor Context Menu.

ntroller Monitor Tre	nd Controller Set	up Basic Setup Advar	nced Setup	Transmitter Diagnosti	cs Status Check	:]	
Controller Setpoint F Low Setpoint Valu High Setpoint Val Initial Setpoint Val Setpoint Unit Setpoint Trac Ver Ratio Control Ratio Gain 1.00	tange e 20.00 ue 80.00 cm cing Activation	Low Setpoint Limit High Setpoint Limit	15.00 95.00	Controll Contro Deriva Contro Outpu Manu Contro	er Configuration — oller Action ative Source oller Dead Zone (%) it Rate Limit (%/s) al Reset Bias (%) oller Rate (s)	C Direct C PV 0.99 199.79 50 0.06	C Reverse
PID Parameters Set P 1.00 I (s) 0.0 D (ms) 0 Kd 0 Beta 0	ings			Controll Aa V Lov V Hig	er Alams m Type v Controller Alarm (h Controller Alarm (Absolute Absolute 10.00 90.00	C Deviation

Figure 90 12400 Controller Setup Screen

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Controller Monitor

What you can do with the 12400 Controller Monitor Screen

The 12400 Controller Monitor screen provides at a glance access to 12400 PID operation. This screen only appears if *Controller Activation* is selected on the *Advanced Setup* screen. *Controller Monitor* screen functionality includes:

- © "Controller Monitor Controller Bargraphs" on page 304
- □ "Status on the 12400 Monitor Screen" on page 324
- □ Changing Tag Name: See "Tag" on page 304
- □ "Send Command" on page 307
- □ "PID Controller Mode" on page 309

For context menu items (right click menus) see "12400 Monitor Context Menu" on page 310.



Figure 91 12400 Controller Monitor Screen

Tag

Enter a unique name.

Controller Monitor Controller Bargraphs

Use this section of the *Controller Monitor* screen to manipulate the *Controller Output* or *Level Measurement*.

The blue pointers on the *Level Measurement* bargraph are the *Controller Alarms* set on the *Controller Setup* screen.

The red pointers on the *Level Measurement* bargraph are determined by the *Range Level LRV* and *URV* fields on the *Advanced Setup* screen. These values must be within 10% of the *Alarms* fields threshold levels on the same screen.

The units for the fields are set on the Controller Setup screen.



Figure 92 12400 Controller Monitor Screen Controller Bargraphs

Controller Output

The Controller Output fields are display only.

To set the output:

1. C	lick	MANUAL	and a dialog appears.
------	------	--------	-----------------------

Do you really want to change controller mode to MANUAL	ontroller mode to MANUAL?
· · · · · · · · · · · · · · · · · · ·	
· · ·	

Figure 93 Change to Manual Mode Dialog

2. Click **Yes**, the **MANUAL** button goes red and the *Controller Output* slider and the entry field to the left activate.

3. Use the slider or the field to change to the required value. The change is reflected in the fields above.

4. Click	AUTO	to return to Auto mode and a dialog appears.
----------	------	--

Do you really wa	ant to change controller mode t	to AUTO?
A) (5.)		



5. Click **Yes** and the AUTO button goes green.

Level Measurement

The Level Measurement Level (%) field is display only.

To set the level measurement:

1. Click **AUTO**, if not in Auto mode, and a dialog appears.

ValVue 12400		8
Do you really want	to change controller mode	to AUTO?
	Yes	No

Figure 95 Change to Auto Mode Dialog

- 2. Click **Yes**, the **AUTO** button goes green and the *Level Measurement* slider, the entry field to the right and the *Level Measurement Setpoint (cm)* field activates.
- 3. Use the slider or the fields to change to the required value. The change is reflected in all the fields.

Send Command

ValVue 12400 provides the ability to easily send HART commands to the 12400, reads the results, and displays them in the result box below. This function works the same from this screen as well as from the *Controller Monitor* screen.

To send a command:

1. Select the command from the drop down list on the *Monitor* screen (Figure 96).

🚰 ValVue 12400 - Offline NEW			
Tools Help			
12400 Monitor Basic Setup Advanced Setup Transmitter Diagnostic	s Status Check Trend	1	1
			12400
	[%]		
		Level (%)	50.0
Tag Name NEW		Signal (mA)	12.00
Descriptor		,	
Message TESTING			
Date (dd/mm/yyyy) 26 AUG 2009	60 -		
Final Assy Number 0			Send Crod
	40 -		
		000 Read Identifier	
Status No status set	20 -	Tag=NEW 001 Read Primary Variable Descriptor 002 Read Current	~ =
	20	Date=26 A UU3 Read All Variables	~
			~
Change Mode Mode: Normal	•	Exit Help	

Figure 96 Monitor Screen without Controller Activation



Figure 97 Monitor Screen with Controller Activation

2. Click Send Cmd. Read the results in the in the Result display.







Figure 99 Monitor Screen with Controller Activation: Results Displayed

PID Controller Mode

Use this area to change the PID block from Auto to Manual and back during configuration and operation. To change to Normal or Setup mode use the ______ button ("Change Mode" on page 288).



Figure 100 PID Controller Change Mode

12400 Monitor Context Menu

12400 Monitor Context Menu

This functions the same for the Controller Monitor screen.

The 12400 Monitor Context menu (Figure 101) provides access to the following features:

- □ "Reset" on page 311
- □ "Restore 12400 Data" on page 312
- □ "Save 12400 Data" on page 313
- □ "Reports" on page 314
- □ "Update Configured Data" on page 334
- □ "Detach Trend" on page 347

For further information see:

- □ "Creating Report Files" on page 315
- □ "Report Setup" on page 320
- □ "Generate Report" on page 321

ols Help 2400 Monitor Basic Setup Ad	vanced Setup Transmitter Diagnos	stics Status Check Trend	1	
Tag Name NEw Descriptor Image: Second Secon	Reset Save 12400 Data Restore 12400 Data Report Setup Report Update Configured Data Detach Trend Help	(%) 100 80 - 60 -	Level (%) Signal (mA)	12400 50.0 12.00
Status No status set	Mode: Normal	40 -	000 Read Identifier Mfg ID=Dresser Device Type=12400 Number Preambles=5 Universal Command Revision=1 Software Revision=1 Device Function Flag=0 Evit Help	



Reset

Reset issues a master reset to the device, causing it to go through its startup routine and re-initializing all of its operating parameters from non-volatile memory.

To reset an 12400 :

1. Right-click on the 12400 Monitor screen to pop up the context menu and select **Reset** (Figure 102).

🝻 ValVue 12400 - C	Offline NEW		
Tools Help			
12400 Monitor Basic 9	Setup Advanced Setup Transmitter Diagno	istics Status Check Trend	
	Reset Save 12400 Data Restore 12400 Data Report Setup	[%] 100 Let	12400
Tag Name Descriptor	Report Update Configured Data	- 80 - Sig	nal (mA) 12.00
Message Date (dd/mm/yyyy) Final Assy Number	Detach Trend Help 26 AUI3 2009 0	60 -	Send Cmd
Status No s	tatus set	40 – 20 – Tag= Descr Date=	018 Write Tag & Descriptor
Change Mode	Mode: Normal	•	Exit Help

Figure 102 Selecting Reset

ValVue 12400 displays a warning message (Figure 103).

ValVue	12400	
	Reset ma Reset an	ay upset the signal. yway?
[[OK 1	Cancel



2. Click **OK** to continue the reset.

Restore 12400 Data

ValVue 12400 provides an ability to download saved parameters from a saved file to the device.

To restore 12400 data:

1. Right-click on the 12400 Monitor screen to pop up the context menu and select **Restore** 12400 Data ().

🐼 ValVue 12400 - Offline NEW		
Tools Help		
12400 Monitor Basic Setup Advanced Setup Transmitter Diagnos	stics Status Check Trend	1
		12400
Reset		
Save 12400 Data		Level (%) 50.0
Tag Name		Signal (mA) 12.00
Report Setup	80 -	
Message Undate Configured Data		
Date (dd/mm/yyy Detach Trend	60 -	
Final Assy Numbe Help		
		Send Cmd
	40 -	018 Write Tag & Descriptor 📃 💌
		Tag=NEW
Status No status set	20 -	Descriptor= Date=26 AUG 2009
· · · · · · · · · · · · · · · · · · ·		
Change Mode Mode: Normal	•	Exit Help

Figure 104 Selecting Restore Data

A message appears.

ValVue	12400
<u>.</u>	Restoring 12400 memory will take about 20 seconds and will replace your current configuration
	Cancel

Figure 105 Restore 12400 Memory Dialog

2. Click **OK** to continue and a dialog appears (Figure 106).

Open		? 🛛
Look in: 🗲) Data	• 🖬 🏕 🔳 •
12400 040 12400.dp	02.dp1 1	
		Ş
File name:		Open
Files of type:	12400 Dump Files	Cancel

Figure 106 Opening Restore Data File

- 3. Choose a saved file.
- 4. Click **Open**.

Save 12400 Data

ValVue 12400 provides an ability to save parameters to a device and save it as a file.

To save 12400 data:

1. Right-click on the *12400 Monitor* screen to pop up the context menu and select **Save 12400 Data** (Figure 107).

🚰 ValVue 12400 - Offline NEW	
Tools Help	
12400 Monitor Basic Setup Advanced Setup Transmitter Diagnostics St.	atus Check Trend
	12400
Reset	
Save 12400 Data	Level (%) 50.0
Restore 12400 Data K	Signal (mA) 12.00
Report Setup	80 -
Update Configured Data G	
Detach Trend 2009	60 -
Help	
	40
	018 Write Tag & Descriptor
	Tag=NEW
Status No status set	20 - Descriptor= Date=26 AUG 2009
Change Mode Mode: Normal 🔷	Exit Help

Figure 107 Selecting Saved Data

A message appears.



Figure 108 Saving 12400 Memory Data

- 2. Click **OK** to continue.
- 3. Specify the file name and click **Save** to store the parameters as a file (Figure 109).

Save As		?	×
Save in: 🗲) Data		
🖬 12400.dp	1		
File name:	12400.dp2	Save A]
Save as type	12400 Dump Files	✓ Cancel	

Figure 109 Store 12400 File

Reports

Reports

You can generate reports that extract information about the 12400 operation. To create a report you must first create the setup for the report select the parameters you would

There are basically two steps to create reports:

- 1. Set up the report
- 2. Generate the report

Prior to defining the set up of the report you must have a template that is an txt, rtf or html file. The report template should include the fields that you would like generated in the report.

Creating Report Files

You can create a custom 12400 report by creating a text or rich text format file which is laid out in the format of the desired report. The default template is located in:

- □ Win7 and 2008 Server: C:\Program Data\Dresser\ValVue\12400\Report.
- □ WinXP and 2003 Server: C:\Documents and Settings\All Users\Application Data\Dresser\ValVue\12400\Report.

ValVue 12400 substitutes the values of 12400 parameters into the text file where ever it finds a parameter name that matches an 12400 parameter. For example:

Tag = \$\$Tag

ValVue 12400 substitutes the actual tag name from the 12400 in place of the \$\$Tag in the report.

Any text can be used in a .txt file and printed with NotePad. With WordPad or Microsoft Word, the user can use an .rtf format file which can contain special formatting (fonts, sizes, tabs, etc.) and can contain bitmaps. Some .rtf formatting is accepted in Word which is not available in WordPad - you should check the documentation of these program to determine what options are available (e.g. right align tabs is allowed in Word but not in WordPad). HTML files are also allowed and can be displayed with a browser.

The allowed 12400 parameters are listed below. You are encouraged to list the report file (report.rtf) shipped with the application for examples.

General Information

\$\$Tag - Tag Name

\$\$Descriptor - Descriptor

\$\$Date - Date

\$\$Message - Message

Device Specific Information

\$\$AssemblyNumber - Assembly Number

\$\$MfgID - Manufacturers ID

\$\$DeviceType - Device Type

\$\$DeviceID - Device ID

\$\$HWRev - Hardware Revision

\$\$TRSRev - Transmitter Revision

\$\$SWRev - Software Revision

\$\$CmdRev - Firmware command revision

\$\$PollingAddress - PollingAddress

Dynamic Information

\$\$Level \$\$LevelUnits - Level in selected units

\$\$Signal mA - Loop Signal

\$\$SignalPercent % - Signal Percent

\$\$CircuitTemp \$\$TempUnits - Temperature in selected degrees

\$\$Mode - Mode

\$\$LowLevCal pts - Low Level Cal

\$\$HighLevCal pts - High Level Cal

Configuration Information

\$\$TransType - Transmitter Type
\$\$Mounting - Mounting
\$\$Action - Action
\$\$ButtonLock - Buttons (Locked or Unlocked)
\$\$Password - Buttons Password
\$\$Controller - Controller Mode
\$\$Language - Language

DO_1 \$\$DO0Normal - Normal Position \$\$DO0ModeMap - Modes Map \$\$DO0AttribMap - Attributes Map \$\$DO0FaultMap - Faults Map

DO_2 \$\$DO1Normal - Normal Position \$\$DO1ModeMap - Modes Map \$\$DO1AttribMap - Attributes Map

\$\$D01FaultMap - Faults Map

Additional Factory Configuration

\$\$FactoryOptions - Options

Calibration Information

Level Service: \$\$SGCal - SG Cal \$\$SGLevelSer - SG Ser

Interface Service:

\$\$LSGCal - SG Cal Low

\$\$USGCal - SG Cal Upper

\$\$SGLowInfSer - SG Ser Low

\$\$SGHighInfSer - SG Ser Upper

SG Meter Service: \$\$SGMeterCalib - SG Meter Cal \$\$SGMeterCal - SG Cal

Transmitter Ranges: \$\$LLevel \$\$LevelUnits - Low Level \$\$ULevel \$\$LevelUnits - High Level \$\$ZeroShift % - Zero Shift \$\$ReducedSpan % - Reduce Span

Loop Current Range: \$\$LowCur mA - Low Current \$\$HighCur mA - High Current

Alarms Information

Position Error: \$\$Alarm0Activation - Activation \$\$Alarm0LowAlarm - Low Alarm \$\$Alarm0HighAlarm - High Alarm \$\$Alarm0Time1 - Time1 (warning)

Position Error Fail:

\$\$Alarm1Activation - Activation
\$\$Alarm1Low Alarm - Low Alarm
\$\$Alarm1HighAlarm - High Alarm
\$\$Alarm1Time1 - Time1 (warning)

Range 1:

\$\$Alarm2Activation - Activation
\$\$Alarm2LowAlarm - Low Alarm
\$\$Alarm2HighAlarm - High Alarm
\$\$Alarm2Time1 - Time 1 (warning)

Range 2:

\$\$Alarm3Activation - Activation
\$\$Alarm3LowAlarm - Low Alarm
\$\$Alarm3HighAlarm - High Alarm
\$\$Alarm3Time1 - Time 1 (warning)

Continuous Diagnostic: \$\$Fills - Number of Fills \$\$TimeFull hrs - Time Full \$\$TimeEmpty hrs - Time Empty

\$\$TimeWorking hrs - Time Working

Details:

\$\$dgTime0to9Percent - Time 0-9%

\$\$dgTime10to19Percent - Time 10-19%

\$\$dgTime20to29Percent - Time 20-29%

\$\$dgTime30to39Percent - Time 30-39%

\$\$dgTime40to49Percent - Time 40-49%

\$\$dgTime50to59Percent - Time 50-59%

\$\$dgTime60to69Percent - Time 60-69%

\$\$dgTime70to79Percent - Time 70-79%

\$\$dgTime80to89Percent - Time 80-89%

\$\$dgTime90to99Percent - Time 90-99%

Smart and Analog Filters

Input Smart Filtering Parameters: \$\$WIntg s - W INTG \$\$DZIntg % - DZ INTG \$\$WVal s - W VAL

First Order Output Filter: \$\$Damping s - Damping

Database

Displacer Information:

\$\$Displacer - Type

\$\$DisplVolume \$\$DisplVUnits - Volume in selected volume units \$\$DisplWeight \$\$DisplWUnits - Weight in selected weight units \$\$DisplHeight \$\$DisplHUnits - Height in selected height units

\$\$DisplDiam \$\$DisplHUnits - Diameter in selected units

Chamber Information:

\$\$ChamberType - Type

\$\$ChamberOptions - Options

Torque Tube Information:

\$\$TorqueTMatl - Material

\$\$TorqueTForce - Force

\$\$ArmLength - Arm Length

\$\$Options - Options

Report Setup

You must select the report template file which is either a text (.txt) or rich text (.rtf). A standard report comes installed with ValVue 12400 but you can create new reports in other formats (see Creating Report Files).

The program that generates the reports can be WordPad, or Microsoft Word for text files. Rich text format (.rtf) files can be used with WordPad or Word to give better formatting.

1. Select the report file by clicking the browse button next to the report file edit box and then select the proper report file.

The Report Template is located in:

- □ Win7 and 2008 Server: C:\Program Data\Dresser\ValVue\12400\Report.
- □ WinXP and 2003 Server: C:\Documents and Settings\All Users\Application Data\Dresser\ValVue\12400\Report.

A version of the report exists for:

- English
 French
- 🗆 Italian 🗆 German
- □ Spanish □ Spanish
- □ Japanese □ Portuguese

 Select the program by clicking the button associated with the program for use. The software attempts to autofind the .exe. If the .exe is not found you can use the *Browse* button to manually find the .exe. WordPad is often installed in the directory *C:\Program Files\Accessories* or in *C:\windows*. The actual location of these files or Microsoft Word varies from computer to computer.

Generate Report

To generate a report:

□ On the 12400 *Monitor* screen select **Report** from the right click, context sensitive menu. ValVue 12400 launches the report in the report template and application.

There is a text box at the top of the report where you can enter customer related information.

1 yes		GE Energ	GE Energy	
00		Masonoil	an and Consolidated	
		Wasonein	Masonelian and consolidated	
Customer Data:		= (CATTER Deal	
		_		
			and the second s	
			TRANK OF	
11				
14	DEPODT			
	REPORT	DATA SHEET		
	REPORT	DATA SHEET		
	REPORT	DATA SHEET		
General Informatic	REPORI	Configuration Info	rmation	
General Informatic	NEW REPORT	Configuration Info	<mark>rmation</mark> Level Transmitter	
General Informatic Tag Name Descriptor	NEW REPORT	Configuration Info Transmitter Type Mounting	<mark>rmation</mark> Level Transmitter Mounting Left	
General Informatic Tag Name Descriptor Date	NEW 26 AUG 2009	Configuration Info Transmitter Type Mounting Action	rmation Level Transmitter Mounting Left Direct Acting	
General Informatic Tag Name Descriptor Date Message	NEW 26 AUG 2009	Configuration Info Transmitter Type Mounting Action SIL Configuration	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device	
General Informatic Tag Name Descriptor Date Message	NEW 26 AUG 2009	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper	
General Informatic Tag Name Descriptor Date Message Device Specific Inf	NEW 26 AUG 2009	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled	
General Informatic Tag Name Descriptor Date Message Device Specific Inf	NEW 26 AUG 2009	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English	
General Informatic Tag Name Descriptor Date Message Device Specific Info Assembly Number	NEW 26 AUG 2009 formation	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2	
General Informatic Tag Name Descriptor Date Message Device Specific Info Assembly Number Manufacturer ID	NEW 26 AUG 2009 formation	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device Type	NEW 26 AUG 2009 formation 0 Dresser 12400	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO 1	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device Type Device ID	NEW 26 AUG 2009 formation 0 Dresser 12400 9092088	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO_1 Normal State	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2 Closed	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device Type Device ID Device Rev	NEW 26 AUG 2009 formation Dresser 12400 0902088	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO_1 Normal State Function	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2 Closed Disable	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device ID Hardware Rev Transmitter Par	NEW 26 AUG 2009 formation 0 Dresser 12400 0902088 1	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO_1 Normal State Function	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2 Closed Disable	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device Type Device ID Hardware Rev Transmitter Rev Schtware Devi	NEW 26 AUG 2009 formation 0 Dresser 12400 0902088 1 1	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO_1 Normal State Function	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2 Closed Disable	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device Type Device ID Hardware Rev Transmitter Rev Software Rev	NEW 26 AUG 2009 formation 0 Dresser 12400 0902088 1 1 2	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO_1 Normal State Function DO_2 Normal State	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2 Closed Disable	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device Type Device ID Hardware Rev Transmitter Rev Software Rev Polling Address	NEW 26 AUG 2009 formation 0 Dresser 12400 0902088 1 1 2 0	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO_1 Normal State Function	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2 Closed Disable	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device Type Device ID Hardware Rev Transmitter Rev Software Rev Polling Address	NEW 26 AUG 2009 formation 0 Dresser 12400 0902088 1 1 2 0	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO_1 Normal State Function DO_2 Normal State Function	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2 Closed Disable	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device Type Device ID Hardware Rev Transmitter Rev Software Rev Polling Address	REPORI NEW 26 AUG 2009 formation 0 Dresser 12400 0902088 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO_1 Normal State Function DO_2 Normal State Function	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2 Closed Disable Closed Disable	
General Informatic Tag Name Descriptor Date Message Device Specific Inf Assembly Number Manufacturer ID Device Type Device ID Hardware Rev Transmitter Rev Software Rev Polling Address Dynamic Informati	REPORI NEW 26 AUG 2009 formation 0 Dresser 12400 0902088 1 1 2 2 0	Configuration Info Transmitter Type Mounting Action SIL Configuration Jumper setting Buttons Lock Language Fault Timeout DO_1 Normal State Function DO_2 Normal State Function	rmation Level Transmitter Mounting Left Direct Acting SIL 2 Device No write protect jumper Configure Enabled English 2 Closed Disable Closed Disable	

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12400 Monitor

3

What you can do on the 12400 Monitor Screen

On the *Monitor* screen you can:

- □ "Level Indicator" on page 324
- □ "Status on the 12400 Monitor Screen" on page 324
- Changing Tag and Descriptor Information on the 12400 Monitor Screen" on page 325
- □ "Changing Message on 12400 Monitor Screen" on page 328
- □ "Send Command" on page 330
- □ "Update Configured Data" on page 334

From the *12400 Monitor* screen, you can view the basic functions of the 12400 including; tag and descriptor, input signal, level and status. For context menu items see "12400 Monitor Context Menu" on page 310.

🐼 ValVue 12400 - Offline NEW		
Tools Help		
12400 Monitor Trend Basic Setup Advanced Setup Transmitte	r Diagnostics Status Check	1
	[26]	12400
	100 Level (%)	50.0
Tag Name NEW Descriptor	80 -	12.00
Message Date (dd/mm/yyyy) 26 AUG 2009	60 -	
Final Assy Number	40 -	Send Cmd
Status No status set	20 -	4
Change Mode Mode: Normal	• Exit	Help

Figure 111 12400 Monitor Screen

Level Indicator

This indicator shows the level position graphically. The indicator consists of two parts:

- □ The upper part contains an indicator showing the value of the input signal. In Normal mode this is the position setpoint.
- \Box The center green bar shows the transmitter level where % = level detected. The numerical valve position is shown in the center.

Status on the 12400 Monitor Screen

The 12400 tracks many errors and fault conditions. Standard HART device status information is displayed in the *Status* box (bottom left on the *Monitor* screen). When there is additional information on internal fault codes, the *Status* box contains *Additional Status Available*. To see the additional status click the **Status** tab. The fault codes appear on the *Status* screen. The Status screen has multiple tabs and screens arranged according to their function.

This functions the same on the 12400 Controller Monitor screen, but is labeled *Device Status* instead.



Figure 112 12400 Monitor Screen
Changing Tag and Descriptor Information on the 12400 Monitor Screen

There are two ways to change Tag and Descriptor information using ValVue 12400:

- □ Using Send Command on the 12400 Monitor screen
- □ In *Tag* and *Descriptor* fields on the *Basic* Setup screen

To change Tag information on the 12400 Monitor screen:

1. Select Write Tag & Descriptor from the drop down list of commands (Figure 113).



Figure 113 Selecting Write Tag & Descriptor Command

2. Click Send Command (Figure 114)

🖉 ValVue 12400 - Of	fline NEW		
Tools Help			
12400 Monitor Trend	Basic Setup Advanced Setup Transmitte	er Diagnostics Status Check	
		[%] 100	12400
Tag Name Descriptor	NEW	80 -	Level (%) 50.0 Signal (mA) 12.00
Message Date (dd/mm/uuuu)	TESTING 26 AUG 2009	60 -	
Final Assy Number	0		Send Cmd
		40 -	018 Write Tag & Descriptor
Status No sta	tus set	20 -	Message=TESTING
Change Mode	Mode: Normal	•	Exit Help

Figure 114 Executing Send Cmd

ValVue 12400 launches a dialog (Figure 115) for entering the new tag and descriptor data.

Tag	LT 102
Descriptor	CONDENSATE LEVEL
Date (DD/MM/YY)	25 NOV 2009

Figure 115 Input Tag Data Dialog

The format for *Tag* allows eight characters that include letters, numerals, and punctuation. The lower case letters are converted to UPPER CASE. The following are invalid characters:

`{|}~

The format for Descriptor allows 16 valid characters.

The format for Date input must be DD/MM/YY, for example 25/11/09 shown as 25 NOV 2009.

3. Enter all *Tag* data and click **OK** (Figure 116).

Tag	LT 102
Descriptor	DESC
Date (DD/MM/YY)	25 NOV 2009
ΟΚ	Cancel

Figure 116 Saving Input Tag Data

ValVue 12400 saves the tag data and display it in the Tag and Descriptor fields (Figure 117).

🖉 ValVue 12400 - Of	fline NEW		
rools Help			
12400 Monitor Trend	Basic Setup Advanced Setup Transmit	ter Diagnostics Status Check	12400
Tag Name Descriptor Message Date (dd/mm/yyyy)	NEW TESTING 26 AUG 2009	- 80 - 60 -	Signal (mA) 12.00
Final Assy Number	0	40 -	Send Cmd
Status No stat	us set	20 -	Descriptor= Date=26 AUG 2009
Change Mode	Mode: Normal	•	Exit Help

Figure 117 Tag Information Changed on 12400 Monitor Screen

Changing Message on 12400 Monitor Screen

There are two ways to change *Message* information using ValVue 12400:

- □ Using Send Command on the 12400 Monitor screen.
- □ In *Message* field on the *Basic Setup* screen.

To change Message information on the 12400 Monitor screen:

1. Select Write Message from the drop down list of commands (Figure 118).

ValVue 12400 - Offline NEW Tools Help 12400 Monitor Trend Basic Setur Advanced Setur Transmit	tter Diagnostics Status Check	
		12400
Tag Name NEW	80 -	Signal (mA) 12.00
Message Date (dd/mm/yyyy) 26 AUG 2009 Final Assy Number 0	60 -	
	40 -	017 Write Message
Status No status set	20 -	018 Write Tag & Descriptor 019 Write Assembly Number 038 Reset Configuration Changed Fl 042 Reset
Change ModeMode: Normal	•	ExitHelp

Figure 118 Selecting Write Message Command

ValVue 12400 launches a dialog (Figure 119) for entering the new message data.

Input Value		×
Message		
×		
OK	Cancel	

Figure 119 Input Value Message Dialog

2. Enter all *Message* data and click **OK** (Figure 120).

Input Value
Message
USED FOR TESTING
OK Cancel

Figure 120 Saving Input Message Data

ValVue 12400 saves the message data and display it in the Message field (Figure 121).

ValVue 12400 - Of pols Help	ffline NEW	-	1	
Carlos Monitor Trend	Basic Setup Advanced Setup Transmitter	Diagnostics Status Check		12400
Tag Name Descriptor	NEW	80 -	Signal (mA)	12.00
Message Date (dd/mm/yyyy) Final Assy Number	26 AUG 2009 0	60 -		Send Omd
		40 -	017 Write Messag	e 💽
Status No sta	itus set	20 -		<u>~</u>
Change Mode	Mode: Normal	•	Exit Help	

Figure 121 Message Information Changed on 12400 Monitor Screen

Send Command

Send Command

ValVue 12400 provides the ability to easily send HART commands to the 12400, reads the results, and displays them in the result box below. This function works the same from this screen as well as from the *Controller Monitor* screen.

To send a command:

1. Select the command from the drop down list on the *Monitor* screen (Figure 122).

🚰 ValVue 12400 - Off	fline NEW		
Tools Help			
12400 Monitor Basic Se	tup Advanced Setup Transmitter Dia	ignostics Status Check Trend	1
		[%] 100	12400
Tag Name Descriptor	NEW	80 -	Level (%) 50.0 Signal (mA) 12.00
Message Date (dd/mm/yyyy) Final Assy Number	TESTING 26 AUG 2009 0	60 -	
		40 -	000 Read Identifier 000 Read Identifier 000 Read Identifier
Status No stat	us set O	20 -	Description 102 Read Current Date=26 4 003 Read All Variables
Change Mode	Mode: Normal	•	ExitHelp

Figure 122 Monitor Screen without Controller Activation



Figure 123 Monitor Screen with Controller Activation

2. Click **Send Cmd**. Read the results in the in the *Result* display.



Figure 124 Monitor Screen without Controller Activation: Results Displayed

ontroller Monitor Trend Controller Setu	p Basic Setup Advanced Setup Transmitter Dia	agnostics Status Check
Tag NEW Controller Mode AUTO MANUAL	Controller Bargraghs Controller Output 17.49 (mA) 67.70 Setpoin 84.317 (%) 50.0 Level (mA % 17.49 16 77 72 Setpoin 100 17 72 100 100 100 100 100 100 100 100 100 10	PID Parameters Settings P 0.00 I (s) 0.0 D (ms) 0 Kd 0 Beta 0 Alarms Low Controller Alarm - Absolute (%) Low Controller Alarm - Absolute (%)
Device No status set		Send Cmd 000 Read Identifier 000 Read Identifier Device Type=12400 Number Preambles=5 Universal Command Revision=5 Transmit Command Revision=1 Software Revision=1 Device Function Flag=0 Device ID=0020288

Figure 125 Monitor Screen with Controller Activation: Results Displayed

Command Selection

The HART commands available for selection are listed below:

000 Read Identifier

- 001 Read Primary Variable
- 002 Read Current
- 003 Read All Variables
- 011 Read ID from Tag
- 012 Read Message
- 013 Read Tag & Descriptor
- 014 Read Sensor Info
- 015 Read Device Info
- 016 Read Assembly Number
- 017 Write Message

018 Write Tag & Descriptor

- 019 Write Assembly Number
- 038 Reset Configuration Changed Flag

042 Reset

142 Read DO Switches

143 Read Temperatures

148 Read Filter Information

151 Read Specific Gravities

152 Read Raw Level Range Values

157 Read Data Base

160 Read Diagnostic Information

170 Read Configurations

199 Read Coupling Value

- 202 Read Zero Shift And Reduced Span
- 220 Read Raw Values
- 221 Read TCorrected Values
- 249 Read Device Mode

Command Result Display

The command results appear in the command results window area, located immediately below the HART command drop-down list. Each time you send a HART command the old results are cleared and the new command results appear. If the command results are longer than the display are, a scroll bar appears.

Update Configured Data

ValVue 12400 provides an ability to upload parameters from the device.

To update configured data:

- 1. Right-click on the 12400 Monitor screen to pop up the context menu.
- 2. Select Update Configured Data (Figure 126).



Figure 126 Update Configured Data Menu

Controller Setup

What you can do on the 12400 Controller Setup Screen

Controller Setup screen functionality includes:

- □ "PID Controller Alarms" on page 336
- □ "PID Controller Configuration" on page 338
- □ "PID Parameters Settings" on page 337
- □ "PID Controller Setpoint Range" on page 339

For context menu items (right click menus) see "12400 Monitor Context Menu" on page 310.

ValVue 12400 - Offlin	e NEW	
ols Help		
ontroller Monitor Trend	Controller Setup Basic Setup Advanced Setup	p Transmitter Diagnostics Status Check
		12400
Controller Setpoint Rai	nge	Controller Configuration
Low Setpoint Value	20.00 Low Setpoint Limit 15.00	Controller Action C Direct C Reverse
High Setpoint Value	80.00 High Setpoint Limit 95.00	Derivative Source © PV C Error
Initial Setpoint Value	e 25.00	Controller Dead Zone (%) 0.99
Setpoint Unit	cm 💌	Output Rate Limit (%/s) 199.79
🗖 Setpoint Trackin	ng	Manual Reset Bias (%) 50
Ratio Control Ac	Tivation	
Ratio Gain 1.00	Ratio Bias (%) 0.00	
PID Parameters Settin	ngs	Controller Alarms
P 1.00		Alarm Type © Absolute C Deviation
1 (s) 0.0		E
D (ms)		IV Low Controller Alarm (▲)
Kd D		F High Controller Alarm (%) 90.00
0		
Beta U		
		Apply
	Mode: Normal 4	
change Mode		

Figure 127 12400 Controller Setup Screen

PID Controller Alarms

Use this section to configure the type of controller alarm and the low and high limit values while in Setup mode.

Controller Alarms	
Alarm Type	Absolute C Deviation
Low Controller Alarm	(%) 10.00
High Controller Alarm	(%) 90.00

Figure 128 Controller Alarms

Alarm Type	Click either:
	□ Absolute: Determines that alarming is performed when the differ- ence between the Low Setpoint Value and the Low Controller Alarm value is exceeded or the High Setpoint Value and the High Controller Alarm value is exceeded.
	Deviation: Determines that alarming is performed when the dif- ference between the Low Setpoint Value and the Low Controller Alarm is exceeded or the High Setpoint Value and the High Con- troller Alarm value is exceeded using a deviation calculation.
Low Controller Alarm (&)/ High Controller Alarm (&)	Click the checkbox and enter a value for the appropriate level (s). These limits must be within 10% of the <i>High Setpoint</i> value <i>and High Setpoint</i> value, respectively. See PID Controller Setpoint Range.

PID Parameters Settings

Use this set of fields to set the PID parameters.

- PID Par	ameters Setting	IS
Р	0.00	
l (s)	0.0	Apply PID
D (ms)	0	
Kd	0	Cancel
Beta	0	

Figure 129 PID Parameters Settings

Ρ	<i>P</i> is a dimensionless gain factor related to the pro- portioning action of the algorithm. It ranges from 0 to 50.	
I (s)	Integral time or reset time, is the time constant of integral control. Higher values of I cause slower inte- gral action. Common values are 0 to 100 (10 sec- onds). A value of zero disables integral action.	
D (ms)	Derivative time or rate time is the time constant of derivative control expressed in milliseconds. It ranges from 0 to 5000 msec. A value of zero disables derivative action.	
Кd	Differential gain used in PID controller for position. It ranges from 0 to 100.	
Beta	<i>Beta</i> is a nonlinear dimensionless gain factor, rang- ing 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.	
Apply PID	Saves the configuration to the device.	

PID Controller Configuration

Use this section to configure controller limit values while in setup mode.

Controller Configuration		
Controller Action	C Direct	Reverse
Derivative Source	PV	C Error
Controller Dead Zone (%)	0.99	
Output Rate Limit (%/s)	199.79	
Manual Reset Bias (%)	50	
Controller Rate (s)	0.06	



Controller Action	Click either: Direct or Reverse.
Derivative Source	Click either: PV or Error . This determines whether calculations are based on process variable or error.
Controller Dead Zone (%)	Enter the percentage for the control dead zone.
Output Rate Limit (%/s)	Enter a value to limit the controller output rate.
Manual Reset Bias (%)	Enter the percentage for the controller bias during a reset.
Controller Rate (s)	Enter the value for the time before running the process controller

PID Controller Setpoint Range

Use this section to configure setpoint values while in setup mode.

-Controller Setpoint Rang	je		
Low Setpoint Value	20.00	Low Setpoint Limit	15.00
High Setpoint Value	80.00	High Setpoint Limit	95.00
Initial Setpoint Value	25.00		
Setpoint Unit	cm 💌		
Setpoint Tracking			
Ratio Control Activ	ration		
Ratio Gain 1.00		Ratio Bias (%)	0.00



Low Setpoint Value	Enter the desired lowest controller setpoint value. The value can fall below this as in <i>Low Setpoint Limit</i> . This limit must be within 10% of the <i>Lower Controller Alarm</i> value.
High Setpoint Value	Enter the desired highest controller setpoint value. The value can go above this as in <i>High Setpoint Limit</i> . This limit must be within 10% of the <i>Higher Controller Alarm</i> value.
Initial Setpoint Value	Enter the value for the power up controller setpoint.
Low Setpoint Limit	Enter the lowest allowable controller setpoint value.
High Setpoint Limit	Enter the highest allowable controller setpoint value.

Setpoint Unit	Use the pulldown to select the unit for use in the program:		
	□ mm		
	□ cm		
	\square m		
	□ liter		
	\square m3		
	If the setpoint units do not match the level units the Ratio Control Activation automati-		
	cally activates.		
Setpoint Tracking	Click to enable setpoint tracking. When enabled, if the controller is changed from man- ual mode to normal mode, the setpoint is set equal to the current process variable.		
Ratio Control Activation	Self-enables when setpoint and level engineering units do not match to have the pro- gram perform calculations to compensate.		
Ratio Gain	Enter the gain coefficient to convert controller setpoint process variable units.		
Ratio Bias (%)	Enter the bias coefficient to convert controller setpoint process variable units.		

Trend

5

What you can do on the Trend Screen

From the *Trend* screen you can observe the performance of the 12400 in real time.

These graphs are useful for tuning the 12400 parameters and monitoring performance by showing current and level detection. The process trend graphs may be zoomed only on the Y axis.

The process trend can be detached from the tabbed dialog so that it can be viewed while performing calibration and diagnostic tasks. To detach the trend, right-click in any screen.

For more information on specific items on the screen, click on them below. For context menu items (right click menus) see "Trend Context Menu" on page 346.



Figure 132 Trend Screen without Controller Activation

Trend Screen with Controller Activation

Use this screen to view trends that include Controller Setpoint trace.





Level (&)	Toggles the blue trace for this value on/off.	
Signal Output (mA)	Toggles the red trace for this value on/off.	
Controller Setpoint (%)	Toggles the green trace for this value on/off.	

Controller Setpoint Setting	Opens the <i>Controller Setpoint Setting</i> dialog where you can change the controller setpoint and level configuration while in Normal mode.		
	Image: Controller Setpoint Setting Image: Controller Setpoint Setpoint % Setpoint (%) 50.29 % Setpoint (%) 50.29 % Setpoint (%) 50.00 % Setpoint (%) 50.00 % Setpoint (%) 50.00 % Setpoint (%) Solo % Setpoint (%) Setpoint (%) % Setpoint (%)		
	further information.		
PID Parameters Setting	Opens the <i>PID Parameters Setting</i> dialog where you can change the controller PID configuration while in Setup or Normal mode.		
	PID Parameters Setting P 1.00 I (s) 0.0 D (ms) 0 Kd 0 Beta 0 OK Cancel		
	further information.		
Controller Output Setting	Opens the <i>Controller Output Setting</i> dialog where you can change the controller output while in Setup mode. Controller Output Setting Controller Output (%) 70.43 Controller Output (%) 15.27 Controller Output (%) 12 15 Controller Output (%) 15.27 Controller Output (%) 15.27 Controller Output (%) 15.27 Controller Output (%) Controller Output (%) 15.27 Controller Output (%) Controller Output (%) 15.27 Controller Output (%) Con		
Y LOW/ Y High	Use these fields to zoom the traces along the Y axis.		
Capture to Clipboard	Captures the entire plot to the clipboard for use in another program. See "Capture to Clipboard" on page 347.		

Graph Display

The display of any of the curves on the *Trend* graph can be turned on or off by checking or unchecking these boxes:

- □ Level blue
- □ Signal Output red
- □ Controller Setpoint green (for Controller Activation only)



Figure 134 Trend Screen without Controller Activation



Figure 135 Trend Screen with Controller Activation

Changing the Graph View

Any portion of a diagnostic graph may be examined more closely by entering the new X and Y scales in the proper scale edit boxes or by dragging a box across an area of the graph. If the mouse is dragged across an area, that area will fill the graphic window. Right button clicking on the graph restores the default scales.

Trend Context Menu

This functions identically both with and without Controller Activation.

Functions include:

- □ *Refresh Graph*: Refreshes the view by stopping the recording presentation and then restarting.
- □ Stop Graph: Stops the presentation of traces.
- □ "Report Setup" on page 320
- □ "Report Setup" on page 320
- □ "Detach Trend" on page 347
- □ *Help* launches context sensitive help



Figure 136 Trend Context Menu

Detach Trend

The *Detach Trend* feature, when selected removes the display from the tabbed dialog and creates a separate trend display. You can move the detached trend anywhere on your computer desktop. When you close the detached Trend, the screen returns to the ValVue 12400 tabbed dialog.



Figure 137 Detached Trend Screen

Capture to Clipboard

Clicking this button saves an image of the graph on the clipboard. The image (a bitmap) may be pasted into another document (e.g. into a Microsoft Word document).

This page intentionally left blank.

Basic Setup

6

What you can do on the Basic Setup Screen

On the Basic Setup screen you can:

- □ Configure the "Transmitter" on page 353
- $\hfill\square$ Calibrate the Level Transmitter SG: See "Level Transmitter" on page 357
- □ "Signal Range" on page 365
- $\hfill\square$ Set the "SG Service" on page 363

To make any changes on the *Basic Setup* screen the operating mode of ValVue 12400 must be in Setup mode.

Tag Name	LT 102			1240
Descriptor	CONDENSATE LEVEL	Level transmitter		
Message		Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009			
Final Assy Number	0		Becord SG	
Polling Address	0		ZERO	
			SPAN	
Transmitter		Signal Range		
Transmitter Mode	Level	LRV	4.000	mA
Transmitter Mounting	Left Mounted	URV	20.000	mA
	1	SG Service		
Transmitter Action	Direct	<u>_</u>	L. con	
Local UI Language	English	Level SG Service	1.000	



Apply

After you have completed basic setup you must click on Apply to save all changes made.

Exiting in Setup Mode

If, when exiting ValVue 12400, you are in the Setup mode, an error message appears.

ValVue 12400		
Click OK to change to Norr	mal mode and ex	iit ValVue 12400.
Click Exit in Setup mode to	remain in Setup	mode (not recommended).
Click Cancel to return to Va	aVue 12400.	
OK]	Exit	Cancel

Figure 139 Exiting in Setup Mode Error Message

1. Click **OK** to change to Normal mode and exit ValVue 12400.

If changes have been made before exiting, an error message appears.

an de 12400			Ľ
and the second second second second		and the second of the sec	
Changes have been ma	ade, do you wa	апсто арру спен	HOW
Changes have been ma	ade, do you wa	апсто арріу спені	HUW

Figure 140 Error Message of changes made when exiting in Setup mode

2. Click **Yes** to save changes.

Changing Tag Information on the Basic Setup Screen

Once in the Setup mode, you can change the *Tag Information* on the *Basic Setup* screen. All information fields become active (Figure 141).

00 Monitor Trend	Basic Setup Advanced Setup	Transmitter Diag	nostics Status Check		
Tag Name	LT 102				12400
Descriptor	CONDENSATE LEVEL		Level transmitter		
Message			Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009				
Final Assy Number	0			<u>R</u> ecord SG	
Polling Address	0			ZERO	1
				<u>S</u> PAN	
Transmitter			Signal Range		
Transmitter Mode	Level	•	LRV	4.000	mA
Transmitter Mounting	Loft Mounted	_	URV	20.000	mA
r ransmider mounting	L'en mountes	<u> </u>	SG Service		
Transmitter Action	Direct	•			
Local UI Language	English	•	Level SG Service	1.000	

Figure 141 Tag Information Fields Active

To change a field:

1. Enter new text in all required fields.

Tag Name	12406 CONDENSATE LEVEL	Level transmitter		1240
Message			1 000	
Date (dd/mm/yyyy)	25 NOV 2009		11.000	
Final Assy Number	0	-	Record SG	
Polling Address	0		ZERO	
			<u>s</u> pan	
Transmitter		Signal Range		
Transmitter Mode	Level	▪ LRV	4.000	mA
Transmitter Mounting	Loft Mounted	URV	20.000	mA
Transmiker Mounting		SG Service		
Transmitter Action	Direct			
Local UI Language	English	Level SG Service	1.000	

Figure 142 Tag Information Fields Changed

2. Click **Apply** (Figure 143) to save the changes.

Tag Name	12406			1240
Descriptor	CONDENSATE LEVEL	Level transmitter		
Message		Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009	_	Decent CC	
Final Assy Number			Hecord Su	
Polling Address	ļu.		ZERO	
			<u>s</u> pan	
Transmitter		Signal Range		
Transmitter Mode	Level	- LRV	4.000	mA
Transmitter Mounting	Left Mounted	URV	20.000	mA
		SG Service		
Transmitter Action	Direct		-	
	English	Level SG Service	1.000	
	Endish	Level SG Service	1.000	

Figure 143 Saving Tag Information Changes

Transmitter

The Basic Setup screen allows you to configure the following parameters for the 12400:

- □ "Transmitter Mode" on page 353
- □ "Transmitter Mounting" on page 354
- □ "Transmitter Action" on page 355
- □ "Display Language" on page 356

Transmitter Mode

The 12400 can be set for the transmitter to work strictly as a level transmitter to interface with a computer remotely.

To change the *Transmitter Mode*:

□ Click on the arrow of the drop down list, located at the right of the *Transmitter Mode* field and select either **Level** or **Interface.**

The Transmitter Mode field is changed.

Tag Name	LT 102			1240
Descriptor	CONDENSATE LEVEL	Level transmitter		
Message		Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009			
Final Assy Number	0		<u>R</u> ecord SG	
Polling Address	0		ZERO	
			<u>S</u> PAN	
Transmitter		Signal Range		
Transmitter Mode	Level	▪ LRV	4.000	mA
Transmitter Mounting	Level Interface	URV	20.000	mA
		SG Service		
Transmitter Action	Direct	-		
	1	Level SG Service	1.000	

Figure 144 Selecting Transmitter Mode

Transmitter Mounting

The 12400 can be mounted on either the left or the right side of the torque tube.

To change the *Transmitter Mounting*:

□ Click on the arrow of the drop down list, located at the right of the *Transmitter Mounting* field and select either **Left Mounted** or **Right Mounted**.

The Transmitter Mounting field is changed.

Tag Name	LT 102			1240
Descriptor	CONDENSATE LEVEL	Level transmitter		
Message		Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009			
Final Assy Number	0		<u>R</u> ecord SG	
Polling Address	0		ZERO	
			<u>s</u> pan	
Transmitter		Signal Range		
Transmitter Mode	Level	▪ LRV	4.000	mA
Transmitter Mounting	Left Mounted	URV	20.000	mA
Transmiker mounting	Left Mounted	SG Service		
Transmitter Action	Right Mounted	T		
	T	Level SG Service	1.000	

Figure 145 Selecting Transmitter Mounting

Transmitter Action

The 12400 can be operated to transmit either direct (current increases when level increases) or reversed (current decreases when level increases).

To change the *Transmitter Action*:

□ Click on the arrow of the drop down list, located at the right of the *Transmitter Action* field and select either **Direct** or **Reversed**.

The Transmitter Action field is changed.

Tag Name	LT 102			1240
Descriptor	CONDENSATE LEVEL	Level transmitte	er	
Message Dista (dd/mm/uuuu)	25 NDV 2009	Level SG Cal	libration 1.000	
Final Assy Number	0		<u>R</u> ecord SG	1
Polling Address	0	_	ZERO	1
			<u>S</u> PAN	
Transmitter		- Signal Range -		
Transmitter Mode	Level	▼ LRV	4.000	mA
Transmitter Mounting	Loft Mounted	URV	20.000	mA
Transmitter mounting	Treit Mounted	SG Service		
Transmitter Action	Direct			
Local ULL anguage	Direct	Level SG Ser	vice 1.000	

Figure 146 Selecting Transmitter Action

Display Language

The language displayed in 12400 LCD can be changed.

To change the Display Language:

□ Click on the arrow of the drop down list, located at the right of the *Display Language* field and select one of **English**, **French**, **Spanish**, **Portuguese**, **Japanese**, **Italian** and **German**.

The Display Language field is changed.

400 Monitor Trend	Basic Setup Advanced Setup Trans	smitter Diagnostics Status Check		
Tag Name	LT 102			1240
Descriptor	CONDENSATE LEVEL	Level transmitter		
Message		Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009		1	
Final Assy Number	0		<u>R</u> ecord SG	
Polling Address	0		ZERO	
			<u>S</u> PAN	
Transmitter		Signal Range		
Transmitter Mode	Level	LRV	4.000	mA
T	1.0.0	URV	20.000	mA
Transmiller Mounting	Leit Mounted	SG Service		
Transmitter Action	Direct	•		
		Level SG Service	1.000	
Local UI Language	English			
	French Spanish			
	Destruction			APPIY

Figure 147 Selecting Display Language

Level Transmitter

Level Transmitter

If the Specific Gravity (SG) of the service liquid used for 12400 calibration is known, and is different than the factory calibrated SG, the Level transmitter features allow you to configure the 12400 with a new Calibration SG. The Level transmitter features are:

- \square "Record SG" enter a specific SG and save as Calibration SG
- \square "Zero" on page 358 set the zero value for the new Calibration SG
- \square "Span" on page 359 set the span for the new Calibration SG

Record SG

ValVue 12400 allows you to enter a new Specific Gravity (SG) value for the service liquid used with the 12400 and save the new SG as the SG used for calibration.

To enter the new SG value:

- 1. Enter the new SG value in the field.
- 2. Click Record SG (Figure 148).

	U.T. 400				12400
Tag Name					12400
Descriptor	CONDENSATE LEVEL		Level transmitter		
Message			Level SG Calibration	2.000	
Date (dd/mm/yyyy)	25 NOV 2009				
Final Assy Number	0			<u>R</u> ecord SG	
Polling Address	0			ZERO	
				SPAN	
_					1
l ransmitter			Signal Hange	-	
Transmitter Mode	Level	•	LRV	4.000	mA
▼ `\\ L A	1 au 1		URV	20.000	mA
I ransmitter Mounting	Left Mounted		SG Service		
Transmitter Action	Direct	•			
			Level SG Service	1.000	
Local UI Language	English	•			

Figure 148 Saving New SG Calibration

Figure 151 appears indicating that the new SG was successfully recorded.

3. Click **OK** to close the message box and return to ValVue 12400.



Figure 149 New SG Saved Message

Zero

ValVue 12400 allows you to also record the zero value for the newly saved calibration liquid Specific Gravity (SG).

To obtain a new zero SG value:

1. Click **ZERO** (Figure 150).

Tag Nama	LT 102				1240
Descriptor			- Level transmitter		
Descriptor					8
Message			Level SG Calibration	2.000	
Date (dd/mm/yyyy)	25 NUV 2009				
Final Assy Number	0			Record SG	
Polling Address	0			ZERO	
				<u>S</u> PAN	
Transmitter			Signal Bange		-
	-		LBV	4.000	
Transmitter Mode	Level	-		14.000	ma
Transmitter Mounting	Left Mounted	•	URV	20.000	mA
		Lane -	- SG Service		
Transmitter Action	Direct	•			
	[Level SG Service	1.000	
Local UI Language	English	_			

Figure 150 Selecting SG ZERO

ValVue 12400 displays a message dialog (Figure 151).

- 2. Put the displacer, connected to the 12400, completely in the air.
- 3. Press OK.

Figure 151 SG ZERO Message

If ValVue 12400 successfully obtains the Zero value, a dialog appears (Figure 152).

4. Click OK.

ValVue	12400 🛛 🛛
(į)	Completed Successfully
	OK

Figure 152 Zero Value Recorded Message

Span

ValVue 12400 allows you to also record the span value for the newly saved calibration liquid Specific Gravity (SG). To obtain a new SG span value:

1. Click SPAN (Figure 153).

Tag Name	LT 102				12400
Descriptor	CONDENSATE LEVEL		Level transmitter		
Message	[Level SG Calibration	2.000	
Date (dd/mm/yyyy)	25 NOV 2009				
Final Assy Number	0			Record SG	
Polling Address	0			ZERO	
				<u>s</u> pan	
Transmitter			Signal Range		
Transmitter Mode	Level	-	LRV	4.000	mA
Transmitter Mounting	Left Mounted	-	URV	20.000	mA
	,		SG Service		
Transmitter Action	Direct	-			
	English	-	Level SG Service	1.000	

Figure 153 Selecting SG Span

ValVue 12400 displays a dialog (Figure 154).

- 2. Immerse the displacer, connected to the 12400, completely into the new liquid.
- 3. Press **OK** to continue.

ValVue	12400		×
1	Fill the tar	ik and then c	lick OK
[OK]	Cancel	

Figure 154 SG SPAN Message Box

If ValVue 12400 successfully obtains the Span value, Figure 155 appears.

4. Click **OK** to close the message box and return to ValVue 12400.

ValVue	12400 🛛 🛛
(į)	Completed Successfully
	OK

Figure 155 Span Value Recorded Message
Applying Basic Setup Changes

When you make any changes on the *Basic Setup* screen, the changed field appears and the *Apply* button is enabled.

To save changes, click **Apply.**

Tag Name	LT 102				1240
Descriptor	CONDENSATE LEVEL		Level transmitter		
Message			Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009				
Final Assy Number	0			<u>R</u> ecord SG	
Polling Address	0			ZERO	
				<u>s</u> pan	
Transmitter			- Signal Range		
Transmitter Mode	Level	•	LRV	4.000	mA
T	I so Manual		URV	20.000	mA
r ransmiller mounting	Len Mounted		SG Service		
Transmitter Action	Direct	<u> </u>			
	The state		Level SG Service	1.000	

Figure 156 Applying Changes Made

Basic Setup Context Menu

The Basic Setup Context menu (Figure 157) contains the following selections:

- □ "Report Setup" on page 320
- □ "Reports" on page 314
- □ "Detach Trend" on page 347
- □ *Help* launches context sensitive help

Tag Name	LT 102				1240
Descriptor	CONDENSATE LEV	EL	_ Level transmitter		
Message			Level SG Calibration	1.000	
Date (dd/mm/yyyy) Final Assy Number	25 NUV 2009			<u>R</u> ecord SG	1
Polling Address	0	Report Setup		ZERO]
		Report		<u>s</u> pan	
Transmitter		Detach Trend	- Signal Range		·
Transmitter Mode	Level		LRV	4.000	mA
Transmitter Mounting	Left Mounted	-	URV	20.000	mA
Transmitter Action	Direct	-	SG Service		
Local UI Language	English	•	Level SG Service	1.000	

Figure 157 Basic Setup Context Menu

SG Service

If the Specific Gravity (SG) of the process liquid is different than the Calibration SG, you can set a specific SG Service. To set the SG Service:

1. Enter a new SG value.

Tag Name	ILT 309			12400
Descriptor	OIL/WATER SEP	Interface transmitter	0.750	
Message Date (dd/mm/www)	25 NOV 2009	High SG Calibration	1.000	
Final Assy Number	0	B	ecord Low/High SG	
Polling Address	0		ZERO	
			<u>S</u> PAN	
Transmitter		Signal Range		i
Transmitter Mode	Interface	LRV	4.000	mA
Transmitter Mounting	Left Mounted	URV	20.000	mA
	-	SG Service		
Transmitter Action	Direct	Low SG Service	0.750	
Local UI Language	English	High SG Service	1.000	

Figure 158 Selecting SG Service

2. Click Apply (Figure 159).

Tag Name	ILT 309			12400
Descriptor	OIL/WATER SEP	Interface transmitter		
Message		Low SG Calibration	0.750	
Date (dd/mm/yyyy)	25 NOV 2009	High SG Calibration	1.000	
Final Assy Number	0	<u></u>	ecord Low/High SG	
Polling Address	0		ZERO	
			<u>S</u> PAN	
Transmitter		- Signal Range		
Transmitter Mode	Interface	- LRV	4.000	mA
Transmitter Mounting	Left Mounted	URV	20.000	mA
		SG Service		P
Transmitter Action	Direct	Low SG Service	0.750	
Local UI Language	English	High SG Service	1.000	

Figure 159 Saving SG Service

If the Service SG is not between 0.001 and 20.000 you receive the error message (Figure 160).



Figure 160 Service SG Error Message

Signal Range

The *Signal Range* feature on the 12400 *Basic Setup* screen allows you to set low (*LRV*) and upper (*URV*) current values for the 12400 signal range, within an allowed range of the default 4 - 20 mA.

To set the *LRV* or *URV* for the signal range:

1. Enter a value in the *LRV* or *URV* field (Figure 161).

Tag Name	LT 102			12400
Descriptor	CONDENSATE LEVEL	Level transmitter		
Message		Level SG Calibratio	n 1.000	
Date (dd/mm/yyyy)	25 NOV 2009	_	1	
Final Assy Number	0		<u>R</u> ecord SG	
Polling Address	0		ZERO	
			<u>s</u> pan	
Transmitter		Signal Range		
Transmitter Mode	Level	▼ LRV	4.000	mA
Transmitter Mounting	Laft Manustad	URV	20.000	mA
Transmitter mounting		SG Service		
Transmitter Action	Direct			
	F	Level SG Service	1.000	

Figure 161 Selecting LRV

2. Click **Apply** (Figure 162) to save the new range.

Tag Name	LT 102				1240
Descriptor	CONDENSATE LEVEL		Level transmitter		
Message			Level SG Calibration	1.000	
Date (dd/mm/yyyy)	25 NOV 2009				
Final Assy Number	0			Record SG	
Polling Address	0			ZERO	
				<u>S</u> PAN	
Transmitter			Signal Range		
Transmitter Mode	Level	•	LRV	5	mA
Transmitter Mounting	Left Mounted	•	URV	18	mA
			SG Service		
Transmitter Action	Direct	-			
Local UI Language	English	•	Level SG Service	11.000	

Figure 162 Saving New Signal Range

If the *LRV* is less than 3.8 mA or if the *URV* is greater than 20.5 mA, you receive an error message:

ValVue	12400
!	The constraints for signal range are: High Signal - Low Signal >= 5mA . 3.8 mA <= Low Signal < High Signal <= 20.5 mA

Figure 163 Signal Range Error Message

Advanced Setup

7

What you can do on the Advanced Setup Screen

On the Advanced Setup screen you can:

- □ Configure the "Local User Interface" on page 368
- □ "SG Meter Calibration" on page 370
- □ Set Alarm parameters ("Alarm" on page 374)
- □ Set "DO Switches" on page 379
- □ Set the Reduced Signal "Range" on page 376
- Access Database function to save Displacer/Torque parameters ("Database" on page 382)
- □ Access Filters and Tuning function to set Filter and Damping Time parameters ("Filters and Tuning" on page 395)
- Access Calibration Tools to calibrate Primary and secondary Signal output currents ("Calibration Tools" on page 403)
- □ "Set SIL2 Settings" on page 373
- Activate the 12400 PID features by clicking Controller Activation, which enables the "Controller Monitor" on page 303 and the "Controller Setup" on page 335 screens. To make any changes on the Advanced Setup screen, ValVue 12400 must be in Setup mode.
- □ Activate the *Torque Tube Compensation* features by clicking **TT Activation**. Click **Process Temperature** and enter a temperature at which you are targeting the process to operate.

ValVue 12400 - Offline NEW Tools Help		
Controller Monitor Trend Controller Setup Basic Setup A	dvanced Setup Transmitter Diagnostics S	Status Check
Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 Fault Timeout(x10 sec) 2 SIL2 Configuration Non-SIL Device	SG Meter Calibration ZER0 SG Calibration 1.000
Database Filters and Tuning Calibration Alarms Tunch club(cm) Tunck carp)	C Configure Enabled C Configure Disabled C DO Switches	Reset to Factory
Alarm Low 1 Image 40.00 15.00 Alarm Low 2 10.00 15.00 Alarm High 1 60.00 15.00 Alarm High 2 80.00 15.00	Switch #1 Normally © Closed © Open always in normal position Switch #2 Normally © Closed © Open always in normal position	Level LRV Level URV 10.000 80.000 Level Units
Nam Hysteresis U.49 % Torque Tube Compensation Tractivation Process Temperature Process Temperature 20.0 degC	Controller Activation	Apply
Change Mode Mode: Normal	٠	Exit Help

Figure 164 Advanced Setup Screen



Note: The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

Local User Interface

ValVue 12400 allows you to set access control to the 12400 through the *Local User Interface* feature.



Note: The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

Available locks selections are:

- □ *Configure Enabled* allows 12400 control through LDC display and local buttons
- □ *Configure Disabled* prevents local user from writing any changes made through ValVue 12400.

Changing Configuration

The process to change configuration is simple:

1. Click the required radio button, as shown in Figure 165.

Tag Name NEW Image: Sill of the state in the sta	ValVue 12400 - Offline NEW Tools Help Controller Monitor Trend Controller Setup Basic Setup Ac	dvanced Setup Transmitter Diagnostics St	atus Check
Alarm Low 2 10.00 15.00 Alarm High 1 Image: 60.00 15.00 Alarm High 2 80.00 15.00 Alarm High 2 80.00 15.00 Alarm Hysteresis 0.49 % Torque Tube Compensation Image: Controller Activation Image: Controller Activation Tractivation Image: Controller Activation Image: Controller Activation Image: Process Temperature Image: Controller Activation Image: Controller Activation	Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 Fault Timeout (x 10 sec) [2 SIL2 Configuration Non-SIL Device Local User Interface C Configure Enabled C Configure Disabled Tools DO Switches Switch #1 Normally © Closed © Open	12400 SG Meter Calibration ZERO SG Calibration SG Calibration SPAN Reset to Factory Range Level LRV Level URV [10.000 80.000
	Alarm Low 2 10.00 15.00 Alarm High 1 IF 60.00 15.00 Alarm High 2 Image: State Sta	always in normal position Switch #2 Normally Closed always in normal position always in normal position Controller Activation Controller Activation	Level Units mm Zero Shift % Reduced Span % 0.00 Apply

Figure 165 Selecting Button Locks - Configure Disabled

2. If password protect is enable, a password input dialog appears after the configuration change to make the user input a password.

Input Password (-32767, 3276)	7) 🔀
UI lock Password:	
-32767	-
OK Cancel	1

Figure 166 Input Password

The password is used to unlock the protection of local buttons.



The password enable/disable is set via third party tools. ValVue 12400 does not support this feature.

SG Meter Calibration

Use the *Specific Gravity (SG Meter) Calibration* function on the *Advanced Setup* screen to directly read the specific gravity of the process liquid from the 12400. *SG Meter* is used to perform on site new calibration or simulation, with or without liquid.

To complete the SG Meter Calibration function you must first Zero the SG and then perform a Span reading to arrive at the new SG Calibration.

SG Meter Calibration Zero

To Zero the SG Meter Calibration:

1. Click ZERO.

ValVue 12400 issues the dialog shown in Figure 167.

- 2. Empty the displacer chamber.
- 3. Click OK.



Figure 167 Zero SG Meter Dialog

After the Zero reading is complete, a dialog appears (Figure 168).

4. Click **OK** to close the dialog and return to ValVue 12400.



Figure 168 Zero Completed Message

Span

To complete the SG Meter Calibration execute SPAN for the new SG:

- 1. Click **SPAN**.
- 2. Fill the displacer chamber.
- 3. Click **OK** (Figure 169).

ValVue '	12400		×
	Fill the tar	nk and then c	ick OK
	OK]	Cancel	

Figure 169 Span SG Meter Dialog

After completing the *Zero* and *Span* operations the new *SG Calibration* appears in the *SG Calibration* field as shown in Figure 170.

🚰 ValVue 12400 - Offline NEW		
Tools Help		
Controller Monitor Trend Controller Setup Basic Setup	dvanced Setup Transmitter Diagnostics Sta	atus Check
Tag Name NEW	SIL2 Fault Timeout(x10 sec)	12400
Descriptor OIL/WATER SEP	2	SG Meter Calibration
Message	SIL2 Configuration	ZERO
Date (dd/mm/yyyy) 26 AUG 2009		SG Calibration 1.358
Final Assy Number	C Configure Enabled	SPAN
Database Filters and Tuning Calibration	Tools © Configure Disabled	Reset to Factory
- Alams	DO Switches	Range
Alam Law 1 1 40.00	Switch #1	Level LRV Level URV
Alam Low 1 1 40.00 [15.00	Normally (Closed C Open	10.000 80.000
Alam Low 2 1 10.00 15.00	always in normal position	Level Units
Alam High 1 J 60.00 15.00	Switch #2	mm
Alam High 2] [80.00 [15.00	Normally C Closed Open	ZeroShift % ReducedSpan %
Alarm Hysteresis 0.49 %	always in normal position	0.00
Torque Tube Compensation	Controller Activation	
TT Activation Process Temperature ☐ 20.0 degC	Controller Activation	Apply
Change Mode Mode: Setup	•	Exit Help

Figure 170 SG Meter Calibration Changed

Reset to Factory

If you would like to restore the SG Calibration to the factory default:

- 1. Click Reset to Factory. ValVue 12400 displays a dialog (Figure 171).
- 2. Click **Yes** if you want to reset the calibration to the factory.

2	Are you sure you	u want to rese	t the calibration to	the factory calibration
		Sec. 337.74		

Figure 171 Reset Factory Calibration Dialog

ValVue 12400 displays a dialog (Figure 172).

3. Click **OK** to close the dialog and return to ValVue 12400.

ValVue	12400
į	Calibration has been reset to the factory calibration
	ОК

Figure 172 Calibration Reset Dialog

The SG Calibration Factory Default displays in the SG Calibration field (Figure 173).

ValVue 12400 - Offline NEW Tools Help Controller Monitor Trend Controller Setup Basic Setup A	dvanced Setup Transmitter Diagnostics St	atus Check
Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 Fault Timeout(x10 sec) 2 SIL2 Configuration Non-SIL Device Local User Interface C Configure Enabled C Configure Disabled DO Switches Switch #1 Nomally C Closed C Open always in nomal position Switch #2 Nomally C Closed C Open always in nomal position Switch #2 Nomally C Closed C Open always in nomal position V	12400 SG Meter Calibration ZERO SG Calibration I.000 SPAN Reset to Factory Range Level LRV Level URV 10.000 80.000 Level Units mm Zero Shift % Reduced Span % [0.00
Torque Tube Compensation TT Activation Process Temperature 20.0 degC	Controller Activation	Apply
Change Mode Mode: Setup	•	Exit Help

Figure 173 SG Calibration Reset to Factory Defaults

Set SIL2 Settings

Use this screen to set SIL2 settings, which include:

- □ *SIL2 Configuration* Use the pulldown to select whether the device is a SIL2 device or not.
- □ Fault Timeout There are three SIL2-related faults:
 - □ *Output is out of range* output exceeds -200% to 105%.
 - Desition out of Range level sensor fault.
 - □ *Loop Current Error* mismatch between commanded and read loop output. Diagnosed only in Normal mode.

Each of these are a failsafe producing fault. To avoid a false failsafe, you can use the *Fault Timeout* field to enter a time (in 10 second increments) during which a fault is not reported. For example, a setting of two sets a timeout of 20 seconds.



The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

ValVue 12400 - Offline NEW				
Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 Fault Timeout(x10 sec) 2 SIL2 Configuration Non-SIL Device Local User Interface C Configure Enabled © Configure Disabled	12400 SG Meter Calibration ZERO SG Calibration 1.000 SPAN Reset to Factory		
Alams Threshold (mm) Time (sec) Alam Low 1 ✓ 40.00 15.00 Alam Low 2 10.00 15.00 Alam High 1 ✓ 60.00 15.00 Alam High 2 80.00 15.00 Alam Hysteresis 0.49 %	DO Switches Switch #1 Normally Closed C Open always in normal position Switch #2 Normally C Closed Open always in normal position	Range Level LRV Level URV 10.000 80.000 Level Units mm ZeroShift % ReducedSpan % 0.00 0.00		
Torque Tube Compensation TT Activation Process Temperature Change Mode Mode: Setup	Controller Activation Controller Activation	Apply		

Figure 174 SIL2 Settings

Alarm

ValVue 12400 allows you to define conditions for when an alarm is triggered.



The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

There are two alarms available, with a high low value setting for each alarm and a hysteresis value.

To change *Alarms* settings:

- 1. Enable an alarm by clicking the checkbox, located to the right of the Alarm name.
- 2. Set the alarm *Threshold* and *Time* values.

ValVue 12400 - Offline NEW Tools Help Controller Monitor Trend Controller Setup Basic Setup Advanced Setup Transmitter Diagnostics Status Check			
Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 Fault Timeout(x10 sec) [2 SIL2 Configuration Non-SIL Device Local User Interface C Configure Enabled © Configure Enabled	12400 SG Meter Calibration ZERO SG Calibration I.000 SPAN Report to Enders	
Database Filters and Tuning Calibration Alarms Threshold (mm) Time (sec) Alarm Low 1 I 40.00 15.00 Alarm Low 2 I 10.00 15.00 Alarm High 1 I 60.00 15.00 Alarm High 2 I 80.00 15.00 Alarm Hysteresis 0.49 %	Tools DO Switches Switch #1 Normally always in normal position Switch #2 Normally Closed Open always in normal position	Instant to Factory Range Level LRV 10.000 80.000 Level URV 10.000 80.000 Level Units mm Zero Shift % Reduced Span % 0.00	
Torque Tube Compensation TT Activation Process Temperature 20.0 degC Change Mode Mode: Setup	Controller Activation	Apply Exit Help	

Figure 175 Setting Alarm Parameters

3. Click Apply.

If the *Alarm Low* time is less than one second, or greater than 600 seconds, an error message appears (Figure 176).



Figure 176 Alarm Low Time Error Message

If the *Alarm High* time is less than one second, or greater than 600 seconds, an error message appears (Figure 176).

ValVue	12400
<u>.</u>	Alarm High 1 time must be between 1 second and 600 seconds
	(CK)

Figure 177 Alarm High Time Error Message

If the Alarm Low Threshold + Hysteresis is greater than Alarm High Threshold, an error message appears (Figure 178).



Figure 178 Alarm Low/High Threshold Error Message

Alarm Hysteresis

ValVue 12400 also allows you to adjust the hysteresis value for alarms.

To change the Alarm Hysteresis:

□ Enter the new Alarm *Hysteresis* value.

If you enter an Alarm Hysteresis value less than 0.49% or greater than 50%, an you error message appears (Figure 179).



Figure 179 Alarm Hysteresis Error Message

Range

For an application where the level change is smaller than the displacer height, it is possible to obtain the full signal range by adjusting the range parameters: *Level LRV* (Low Range Value) and *Level URV* (Upper Range Value).



The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

Change Level LRV or URV Setting

To change the setting:

- 1. Enter a new value in the Level LRV or Level URV field.
- 2. Click Apply.

ValVue 12400 - Offline NEW Tools Help Controller Monitor Trend Controller Setup Basic Setup A	Ndvanced Setup Transmitter Diagnostics Sta	atus Check
Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 Fault Timeout(x10 sec) 2 SIL2 Configuration Non-SIL Device Local User Interface Configure Enabled Configure Disabled DO Switches Switch #1 Normally Colosed Copen always in normal position Switch #2 Normally Colosed Copen always in normal position Controller Activation	12400 SG Meter Calibration ZERO SG Calibration SPAN Reset to Factory Range Level LRV Level URV 10.000 80.000 Level Units mm Zero Shift % Reduced Span % 0.00
TT Activation 🔽 Process Temperature 🗌 20.0 degC	Controller Activation	Apply
Change Mode Node: Setup	•	Exit Help

Figure 180 Changing LRV



Figure 181 LRV Error Message



Figure 182 Upper Level Error Message

Changing Level Units

To change the *Level Units*:

Click on the arrow of the drop down list, located at the right of the *Level Units* field and select: %, cm, Cubic Inches, CuFt, CuMtr, ft, grams, in, kg, lb, liter, meter or mm.

field changes.
field changes

ValVue 12400 - Offline NEW ools Help Controller Monitor Trend Controller Setup Basic Setup	Advanced Setup Transmitter Diagnostics St.	atus Check
Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 Fault Timeout(x10 sec) 2 SIL2 Configuration Non-SIL Device Local User Interface C. Configure Enabled	SG Meter Calibration ZER0 SG Calibration 1.000 SPAN
Database Filters and Tuning Calibration Alams Threshold (mm) Time (sec) Alams 40.00 15.00	DO Switches Switch #1 Normally © Closed © Open	Reset to Factory Range Level LRV Level URV 10.000
Alarm Low 2 I 10.00 15.00 Alarm High 1 I 60.00 15.00 Alarm High 2 I 80.00 15.00 Alarm High 4 I 80.00 15.00	always in normal position	Level Units mm % mm % ReducedSpan % 0.00
Torque Tube Compensation TT Activation Process Temperature 20.0 degC	Controller Activation	m3 inch feet Cu_ln Cu_R kg

Figure 183 Changing Level Units

Zero Shift

To change the Zero Shift % setting:

- 1. Enter a new Zero Shift value in the field.
- 2. Click Apply.



Figure 184 Zero Shift Error Message

Reduced Span

To change the *Reduced Span* setting:

- 1. Enter a new value in the *Reduced Span* field.
- 2. Click Apply.



Figure 185 Reduced Span Error Message

DO Switches

DO Switches

The 12400 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 12400 detects. These conditions are:

Always In Normal Position - the switch is not controlled by the 12400 and remains in it's default position.

Failsafe - the switch is activated when the 12400 is in failsafe mode.

Reset - the switch is activated whenever a reset has occurred and the switch remains activated until the 12400 status is cleared.

Not Normal Mode- the switch is activated whenever operating mode is anything but Normal.

Time Working - the switch is activated only for 12400 working time.

*Low Level_*1 - the switch is activated whenever the 12400 detects the low level of this switch control.

Low Level_2 - the switch is activated whenever the 12400 detects the low level of this switch control.

High Level_1 - the switch is activated whenever the 12400 detects the high level of this switch control.

High Level_2 - the switch is activated whenever the 12400 detects the high level of this switch control.

Fault Detected - the switch is activated whenever a fault is detected.

Local UI Off - the switch is activated whenever the local UI is Off.

The switch can be configured to default as normally open or normally closed.

Configuring DO Switches



The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

To configure the DO Switches:

1. Select if the switch is normally closed or open by clicking the associated radio button.

ValVue 12400 - Offline NEW			
Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 Fault Timeout(x10 sec) 2 SIL2 Configuration Non-SIL Device Local User Interface C Configure Enabled C Configure Disabled DO Switches Switch #1 Nomally Closed Open always in normal position Switch #2 Normally Open Consect Copen Configure Disabled	SG Meter Calibration ZERO SG Calibration SG Calibration SG Calibration SG Calibration SG Calibration Reset to Factory Range Level LRV Level URV 10.000 [0.00] Question ZeroShift % ReducedSpan % [0.00]	
Torque Tube Compensation TT Activation Process Temperature 20.0 degC	Controller Activation	Apply	
Change Mode Mode: Setup	•	Exit Help	

Figure 186 Selecting Switch Closed or Open

- 🚰 ValVue 12400 - Offline NEW Tools Help Controller Monitor Trend Controller Setup Basic Setup Advanced Setup Transmitter Diagnostics Status Check SIL2 NEW 12400 Tag Name Fault Timeout(x10 sec) OIL/WATER SEP 2 Descriptor SG Meter Calibration SIL2 Configuration Message ZERO Non-SIL Device 💌 26 AUG 2009 Date (dd/mm/yyyy) SG Calibration 1.000 0 Local User Interface Final Assy Number SPAN C Configure Enabled Configure Disabled Reset to Factory Database Filters and Tuning Calibration Tools DO Switches Alarms Range Threshold (mm) Time (sec) Level URV Switch #1 Level LRV 40.00 15.00 Alarm Low 1 🔽 Normally Closed
 Open 10.000 80.000 Alarm Low 2 🔽 10.00 15.00 always in normal position Level Units Alarm High 1 🔽 60.00 15.00 Fail Safe mm -Alarm High 2 🔽 80.00 15.00 Reset Not Normal Mode ZeroShift % ReducedSpan % Not Normal Moc Time Working Low Level_1 Low Level_2 C High Level_1 High Level_2 C Fault Detected Local LIL Off 0.00 0.00 Alarm Hysteresis 0.49 % Torque Tube Compensation $\overline{\mathbf{v}}$ TT Activation Process Temperature 🔲 20.0 degC Local UI Off Apply Change Mode Mode: Setup 0 Help Exit
- 2. Use the drop down list to select the function.

Figure 187 Selecting Switch Function

The newly selected switch function appears in the switch field.

Database

Database

The ValVue 12400 *Database* feature allows you to save to a database, and all the *Displacer* and *Torque Tube* specifications associated with the 12400.

To start the *Database* feature:

Click **Database**.

ValVue 12400 launches the Database window (Figure 188).

Database		X
Displacer		Displacer Type
20.000 Displacer Volume 1219	 Displacer Height 	✓ With Displacer
liter 💌 Volume Units		Non Standard
100.00 Displacer Weight mm	- Height Units	🗖 Stainless
g 🗾 Veight Units		Extension Rod
Torque Tube and Chamber	Chamber Options	Options
No Chamber 💌 Chamber Type	None	Extension HT/LT
No Torque Tube 💌 Torque Tube Matl.	C Special Steel	
Non Standard 🗨 Torque Tube Force	C Carbon Steel	
Non Standard 🗨 Arm Length	C Stainless Steel	
	<u> </u>	
Apply	<u>C</u> ance	el

Figure 188 Database Window

Displacer

The Database window allows you to specify the following Displacer parameters:

- Displacer Volume
- □ Volume Units
- Displacer Weight
- □ Weight Units
- Displacer Height
- Displacer Diameter

Displacer Volume

To change the Displacer Volume:

□ Enter a new *Displacer Volume*.

If you enter a *Displacer Volume* less than zero liter (zero Culn) and greater than 40 liter (2441 Culn), you receive the error message (Figure 189).



Figure 189 Displacer Volume Error Message

Volume Units

To change the Volume Units:

□ Use the drop down list to select: **Culn** or **liter**.

The Volume Units field are changed.

Database	100	x
Displacer		Displacer Type
20.000 Displacer Volume 1219	 Displacer Height 	✓ With Displacer
liter 💌 Volume Units		Non Standard
Cu_In liter Displacer Weight mm	🚽 Height Units	✓ Stainless
g veight Units		🗖 Extension Rod
Torque Tube and Chamber	Chamber Options	Options
No Chamber 🗨 Chamber Type	None	Extension HT/LT
No Torque Tube 💌 Torque Tube Matl.	C Special Steel	
Non Standard 🗨 Torque Tube Force	C Carbon Steel	
Non Standard 🗨 Arm Length	O Stainless Steel	
	<u>C</u> ancel	

Figure 190 Selecting Volume Units

Displacer Weight

To change the Displacer Weight:

□ Enter a new Displacer Weight.

If you enter a weight less than zero kg (zero gram, Olb) or greater than 100 kg (100000 gram, 220.46 lb) you receive the error message (Figure 191).



Figure 191 Displacer Weight Error Message

Displacer Weight Units

To change the Displacer Weight Units:

□ Use the drop down list to select: **gram**, **kg**, or **lb**.

The Displacer Weight Units field is changed.

Database	199	X
Displacer		Displacer Type
20.000 Displacer Volume 1219	 Displacer Height 	✓ With Displacer
liter Volume Units		Non Standard
100.00 Displacer Weight mm	- Height Units	✓ Stainless
g veight Units		Extension Rod
kg poundnd Chamber	Chamber Options	Options
No Chamber 💌 Chamber Type	C None	Extension HT/LT
No Torque Tube 💌 Torque Tube Matl.	C Special Steel	
Non Standard 🗨 Torque Tube Force	Carbon Steel	
Non Standard 🗨 Arm Length	C Stainless Steel	
	<u>C</u> ancel	

Figure 192 Selecting Weight Units

Displacer Height

To change the Displacer Height:

□ Use the drop down list to select: **14", 32"**, **48"**, **60"**, **72**", **84"**, **96"**, **120"**, or **Custom (in inch)**. If selecting *Custom (in inch)* you must type in the value in the *Displacer Height* field.

The Displacer Height field is changed.

- Displacer		Displacer Type
20.000 Displacer Volume 1219		✓ With Displacer
Cu_In Volume Units 356 813 100 00 Displacer Weight 1219	inches)	□ Non Standard
g ▼ Weight Units 204 Units 204 01254 1829 2134 204 204 204 204 204 204 204 20		Extension Rod
- Torque Tube and Chamber	Chamber Options	- Options
No Chamber 🚽 Chamber Type	C None	Extension HT/LT
No Torque Tube 💌 Torque Tube Matl.	C Special Steel	
Non Standard 🔹 Torque Tube Force	Carbon Steel	
Non Standard 🗾 Arm Length	O Stainless Steel	
	Cancel	

Figure 193 Selecting Displacer Height

If you entered a *Displacer Height* less than 0.0 in. or greater than 3937.0 in., an error message appears (Figure 194).



Figure 194 Displacer Height Error Message

Displacer Diameter

To change the Displacer Diameter:

□ Enter a new Displacer Diameter.

If you enter a value less than 0 in. or greater than 19.6850 in., an error message appears.

ValVue	12400
	Displacer diameter must be between 0 inch and 19.68 inch.
	OK

Figure 195 Displacer Diameter Error Message

Displacer Type

The *Database* window allows you to select the following *Displacer Type* parameters (Figure 196):

- □ With Displacer
- Non Standard
- □ Stainless
- □ Extension Rod

Database	1000-	×
Displacer		Displacer Type
20.000 Displacer Volume 1219	➡ Displacer Height	Vith Displacer
Cu_In 💌 Volume Units		🗖 Non Standard
100.00 Displacer Weight mm	- Height Units	✓ Stainless
g 💽 Weight Units		Extension Rod
Torque Tube and Chamber	Chamber Options	Options
No Chamber 💌 Chamber Type	C None	Extension HT/LT
No Torque Tube 💌 Torque Tube Matl.	C Special Steel	
Non Standard 💌 Torque Tube Force	Carbon Steel	
Non Standard 🗨 Arm Length	C Stainless Steel	
	<u>C</u> ance	4

Figure 196 Displacer Type Parameters

To change any of the *Displacer Type* parameters:

□ Select or de-select the appropriate checkboxes (Figure 197).

	Displacer Type	
Displacer Height	I With Displacer	
	Non Standard	
🚽 Height Units	Stainless	
kg ▼ Weight Units		
Chamber Options	Options	
None	Extension HT/LT	
C Special Steel		
C Carbon Steel		
C Stainless Steel		
	 Displacer Height Height Units Chamber Options None Special Steel Carbon Steel Stainless Steel 	

Figure 197 De-selecting Displacer Type Checkbox

Torque Tube and Chamber

The *Database* window allows you to specify the following *Torque Tube* and *Chamber* parameters:

- □ Chamber Type
- □ Torque Tube Matl.
- □ Torque Tube Force
- □ Arm Length

Chamber Type

To change the *Chamber Type*:

 Click on the arrow of the drop down list, located at the right of the *Chamber Type* field and select: No Chamber, 12400, 12401, 12402, 12403, 12404, 12405, 12406, 12407,12408 or 12409.

The *Chamber Type* field is changed.

			Displacer Type
).91	Displacer Volume 356	 Displacer Height 	🔽 With Displacer
iter 💌	Volume Units		🔲 Non Standard
.36	Displacer Weight	🚽 Height Units	✓ Stainless
ka 🗸 Weight Units			Extension Rod
	Contraction of the second s	E 1977 Strategy and the strategy of the	
orque Tube an 12402 10 Chamber 2400 2401 2402	Id Chamber Chamber Type Torque Tube Matl. Torque Tube Force	Chamber Options None Special Steel Carbon Steel	Extension HT/LT

Figure 198 Selecting Chamber Type

Torque Tube Matl.

To change the *Torque Tube Material*:

Click on the arrow of the drop down list, located at the right of the Chamber Type field as and select: No Torque Tube, Inconel/Carbon, Inconel/Stainless, Inconel/Special, Stainless/Carbon, Stainless/Stainless, Stainless/Special, Monel/Carbon, Monel/Stainless, Monel/Special, Special/Carbon, Special/Stainless, or Special/Special.

The Torque Tube Matl. field is changed.

		Displacer Type
0.91 Displacer Volume 356	Displacer Height	🔽 With Displacer
iter 💽 Volume Units		Non Standard
1.36 Displacer Weight mm	🚽 Height Units	🔽 Stainless
kg 🔄 Weight Units	Extension Rod	
orque Tube and Chamber	Chamber Options	C Options
12402 Chamber Type	None	Extension HT/LT
nconel/Carbon 👻 Torque Tube Matl.	C Special Steel	
Monel/Stainless Torque Tube Force Carbon Steel		
Monel/Stainless Annual Torque Tube Force		

Figure 199 Selecting Torque Tube Material

Torque Tube Force

To change the *Torque Tube Force*:

□ Click on the arrow of the drop down list, located at the right of the *Torque Tube Force* field and select: **Non Standard, 1, 2**, or **4**.

The Torque Tube Force field is changed.

			Displacer Type
0.91	Displacer Volume 356	 Displacer Height 	🔽 With Displacer
liter 🔄	 Volume Units 		I Non Standard
1.36 Displacer Weight mm 🚽 Height Units		🔽 Stainless	
kg 👻 Weight Units			Extension Rod
forque Tube	and Chamber	Chamber Options	Options
Inconel/Carl	oon 🔻 Torque Tube Matl.	C Special Steel	
1	Torque Tube Force	C Carbon Steel	
Non Standa	d Arm Length	C Stainless Steel	

Figure 200 Selecting Torque Tube Force

Arm Length

To change the *Arm Length*:

□ Click on the arrow of the drop down list, located at the right of the *Arm Length* field and select: Non Standard, 4", 8", or 16".

The Arm Length field is changed.

		Displacer Type
0.91 Displacer Volume 356	 Displacer Height 	✓ With Displacer
liter 💽 Volume Units		Non Standard
1.36 Displacer Weight mm	🚽 Height Units	✓ Stainless
kg 🔻 Weight Units		Extension Rod
Forque Tube and Chamber	Chamber Options	Options
12402 Chamber Type	C None	Extension HT/LT
12402 Chamber Type Inconel/Carbon Torque Tube Matl.	C None C Special Steel	Extension HT/LT
12402 Chamber Type Inconel/Carbon Torque Tube Matl. 1 Torque Tube Force	C None C Special Steel C Carbon Steel	Extension HT/LT
12402 Chamber Type Inconel/Carbon Torque Tube Matl. 1 Torque Tube Force 4" Arm Length	 None Special Steel Carbon Steel Stainless Steel 	Extension HT/LT

Figure 201 Selecting Arm Length

Chamber Options

The Database window allows you to select the following Chamber Options:

- □ Special Steel
- □ Carbon Steel
- Stainless Steel

To change the Chamber Options:

□ Select the required radio button, located to the left of the appropriate chamber option material.

ispiacei			Displacer Type
D.91	Displacer Volume 356	 Displacer Height 	🔽 With Displacer
iter 💌	Volume Units		🗖 Non Standard
1.36	Displacer Weight mm	🚽 Height Units	🔽 Stainless
kg 👻 Weight Units		Extension Rod	
orque Tube a 12402 Inconel/Carbo 1	nd Chamber Chamber Type Torque Tube Matl. Torque Tube Force Arr Length	Chamber Options None Special Steel Carbon Steel	Options Extension HT/LT

Figure 202 Changing Chamber Options

Figure 203 shows the newly selected Chamber Option.

Jisplacer			Displacer Type
0.91 Displace	Volume 356	 Displacer Height 	✓ With Displacer
liter 💽 Volume L	Jnits		I Non Standard
1.36 Displacer Weight mm 💽 Height Units		🔽 Stainless	
kg 💌 Weight Units			Extension Rod
forque Tube and Chambe	er	Chamber Options	Options
12402 💌 0	Chamber Type	None	Extension HT/LT
Inconel/Carbon 💌 1	Forque Tube Matl.	C Special Steel	
1 💌 1	Forque Tube Force	C Carbon Steel	
16" • 4	Arm Length	C Stainless Steel	

Figure 203 Chamber Option Changed

Options

The Database Options include:

- □ *Extension HT/LT*: Activates or deactivates the extension.
- □ *Process Temperature*: Activates and deactivates the temperature field used to take into account the composition of the torque tube.

To change the options:

1. Select or de-select the checkbox located to the left of the Extension HT/LT parameter.

s lopidooi		Displacer Type
0.91 Displacer Volume 356	💌 Displacer Height	🔽 With Displacer
liter 🛛 👻 Volume Units		Non Standard
1.36 Displacer Weight mm	🚽 Height Units	🔽 Stainless
kg 👻 Weight Units		Extension Rod
		l
Forque Tube and Chamber	Chamber Options	Options
12402 Chamber Type	C None	Extension HT/LT
Inconel/Carbon 💌 Torque Tube Matl.	C Special Steel	
1 Torque Tube Force	Carbon Steel	
	C al la al l	

Figure 204 Extension HT/LT Selected

2. Select or de-select the checkbox located to the left of the *Process Temperature* parameter, enter a temperature in °C and click **Set**.

Applying Database Changes

After you have made displacer, torque tube, and chamber changes in the *Database* window they must be saved to the database.

To save changes:

Click **Apply**.

To cancel any changes made, click **Cancel.** All parameters in the revert to previous values.

Displacer		Displacer Type
0.91 Displacer Volume 356	✓ Displacer Height	✓ With Displacer
liter 💽 Volume Units		Non Standard
1.36 Displacer Weight mm	🚽 Height Units	🔽 Stainless
ka 🔹 👻 Weight Units		Extension Rod
orque Tube and Chamber	Chamber Options	Options
orque Tube and Chamber 12402 Chamber Type Inconel/Carbon	Chamber Options	Options
orque Tube and Chamber 12402 Chamber Type Inconel/Carbon Torque Tube Matl. 1	Chamber Options C None C Special Steel C Carbon Steel	Options

Figure 205 Saving Database Changes

Filters and Tuning

Filters and Tuning

ValVue 12400 allows you to filter the output of the Hall effect sensor before the signal is digitally processed. Filter parameters are accessed on the *Filters and Tuning* window.



The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

To start the Filters and Tuning feature:

- - X 🕼 ValVue 12400 - Offline NEW Tools Help Controller Monitor Trend Controller Setup Basic Setup Advanced Setup Transmitter Diagnostics Status Check SIL2 NEW 12400 Tag Name Fault Timeout(x10 sec) OIL/WATER SEP 2 Descriptor SG Meter Calibration SIL2 Configuration ZERO Message Non-SIL Device 💌 Date (dd/mm/yyyy) 26 AUG 2009 SG Calibration 1.000 Local User Interface 0 Final Assy Number SPAN C Configure Enabled Configure Disabled Filters and Tuning Calibration Tools Reset to Factory Database Alarms DO Switches Range Threshold (mm) Time (sec) Switch #1 Level LRV Level URV 15.00 Alarm Low 1 🔽 40.00 Normally . Closed C Open 10.000 80.000 15.00 Alarm Low 2 🔽 10.00 always in normal position -Level Units 60.00 15.00 Alarm High 1 🔽 mm • Switch #2 Alarm High 2 🔽 80.00 15.00 Normally
 Closed
 Open ZeroShift % ReducedSpan % 0.00 0.00 always in normal position • Alarm Hysteresis 0.49 % Torque Tube Compensation Controller Activation \checkmark TT Activation Controller Activation Process Temperature 🔽 20.0 degC Apply Mode: Setup Change Mode $^{\circ}$ Help Exit
- □ Click **Filters and Tuning** (Figure 206).

Figure 206 Starting Filters and Tuning

Smart Filter Enable	Autotune	
Filter Time Constant	0.10	sec
Deadzone	0.99	*
Validate Window	0.12	sec
Calibration Filter		
Filter Time Constant	1.00	sec
Damping Time		
Damping Time Enable	2.00	sec

ValVue 12400 launches the Filters and Tuning window (Figure 207).

Figure 207 Filters and Tuning Window

Smart Filter Enable

The Smart Filter eliminates noise from the Hall effect sensor output.

To enable the Smart Filter:

□ Click on the checkbox, located to the left of *Smart Filter Enable*.

Smart Filter and Tuning		
$\mathbb{K}^{\underline{S}}$ mart Filter Enable	Autotune	
Filter Time Constant	0.10	sec
Deadzone	0.99	%
Validate Window	0.12	sec
Calibration Filter		
Filter Time Constant	1.00	sec
Damping Time		
Damping Time Enable	2.00	sec
	Canc	el

Figure 208 Activating Smart Filter Parameters
Filter Parameters

The filter parameters are always available to edit: *Filter Time Constant*, *Deadzone*, and *Validate* window. Once *Smart Filter* has been enabled, the smart filter parameters are ready for use.

Filter Time Constant

To change the Filter Time Constant:

- 1. Click Smart Filter Enable.
- 2. Enter a new value in *Filter Time Constant*.
- 3. Click Apply.

Smart Filter Enable	Autotune	1
	-	
Filter Time Constant		sec
Deadzone	0.99	%
Validate Window	0.12	sec
Calibration Filter		
Filter Time Constant	1.00	sec
Damping Time		
Damping Time Enable	2.00	sec

Figure 209 Changing Filter Time Constant

If you enter a *Time Constant* less 0.1 sec and greater than 60 sec., an error message appears (Figure 210):



Figure 210 Filter Time Constant Error Message

Deadzone

To change the *Deadzone*:

- 1. Click Smart Filter Enable.
- 2. Enter a new value in *Deadzone*.
- 3. Click Apply.

Smart Filter Enable	Autotune	1
	0.10	_
Filter Time Constant	Ju.10,	sec
Deadzone		%
Validate Window	0.12	sec
Calibration Filter		
Filter Time Constant	1.00	sec
Damping Time		
Damping Time Enable	2.00	sec

Figure 211 Changing Deadzone Variable

If you enter a *Deadzone* variable less 0.01 % and greater than 100.00%., an error message appears (Figure 212):



Figure 212 Deadzone Error Message

Validate Window

To change the Validate Window:

- 1. Click Smart Filter Enable.
- 2. Enter a value in Validate Window.
- 3. Click Apply.

ilters and Tuning		
Smart Filter and Tuning		
Smart Filter Enable	Autotune	
Filter Time Constant	0.10	sec
Deadzone	0.99	%
Validate Window		sec
Calibration Filter		
Filter Time Constant	1.00	sec
Damping Time		
Damping Time Enable	2.00	sec
Apply	<u>C</u> ancel	1
		_

Figure 213 Changing Validate Window

If you enter a *Validate Window* time less 0.06 sec and greater than 60.00 sec., an error message appears (Figure 214):



Figure 214 Validate Window Error Message

Autotune

ValVue 12400 provides an Autotune feature on the Filters and Tuning window.

To start Autotune:

□ Click **Autotune** (Figure 215).

Smart Filter and Tuning		l
☑ <u>S</u> mart Filter Enable	Autotune	
Filter Time Constant	0.10	sec
Deadzone	0.99	~ %
Validate Window	0.12	sec
Calibration Filter		
Filter Time Constant	1.00	sec
Damping Time		
🔽 Damping Time Enablei	2.00	sec
	<u>C</u> ancel	1

Figure 215 Starting Autotune

The Autotune process begins and a progress dialog appears (Figure 216):

Runnin	Procedure	
	Auto Tune in Progress	
	Cancel	

Figure 216 Running Procedure Dialog

Damping

The *Damping Time* is always available to edit. Once *Damping Time* has been enabled, the *Filter Time Constant* is really practice into use.

Damping Time

To change the Damping Time:

1. Click Damping Time Enable (Figure 217).

Filters and Tuning		X
Smart Filter and Tuning		
☑ <u>S</u> mart Filter Enable	Autotune	
Filter Time Constant	0.50	sec
Deadzone	1.00	%
Validate Window	0.10	sec
Calibration Filter		- A
Filter Time Constant	1.00	sec
Damping Time		
Damping Time Enable	0.10	sec
	<u>C</u> ancel	

Figure 217 Click Damping Time Enable

2. Enter a new Damping Time and click Apply.

If you enter a *Damping Time* variable less 0.10 sec and greater than 60.00 sec, an error message appears (Figure 218).



Figure 218 Damping Time Error Message

Applying Filters and Tuning Changes

When you make any changes in the *Filters and Tuning* window, click **Apply** to save.

Calibration Filter

It is ratio filter and always available to edit when OOS mode.

Filter Parameter

To change the Damping Time :

□ Enter a new value in *Filter Time Constant*.

officiario running		
Smart Filter Enable	Autotune	
Filter Time Constant		sec
Deadzone	0.99	%
Validate Window	0.12	sec
Calibration Filter		
Filter Time Constant	1.00	sec
Damping Time		
Damping Time Enable	2.00	sec
Apolu [Cancel	1

Figure 219 Entering a Filter Constant

If you enter a *Filter Time Constant* variable less 0.10 sec and greater than 60.00 sec, an error message appears (Figure 220).

ValVue	12400
	The value for variable Filter Time Constant must be between 0.10 and 60.00.
	(OK)

Figure 220 Filter Error Message

Calibration Tools

Calibration Tools

ValVue 12400 allows you to calibrate each of the Analog Output (AO) signal. Calibration tools are accessed on the *Calibration Tools* window.



The milliammeter must have an accuracy rating better than that of the Model 12400 Level transmitter (0.5% of span). The meter accuracy rating must be better than 8 microamperes.

Connect the transmitter Primary Signal (or Secondary Signal) with a milliammeter in series with a 12 to 30 VDC supply. When the circuit is interrupted to insert the milliammeter, the power is interrupted and the transmitter starts up in Normal mode; it must be changed to Setup mode before opening the *Calibration Tools*.

To start the Calibration Tools:

□ Click **Calibration Tools** (Figure 221).



The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

🕼 ValVue 12400 - Offline NEW		
Controller Monitor Trend Controller Setup Basic Setup AG	dvanced Setup	tue Check
Tag Name NEW Descriptor OIL/WATER SEP Message	SIL2 - Fault Timeout (x10 sec) 2 SIL2 Configuration Non-SIL Device	SG Meter Calibration SG Calibration SG Calibration 1.000 SPAN
Database Filters and Tuning Calibration Alams Threshold (mm) Time (sec) Alarm Low 1 Imode 40.00 15.00 Alarm Low 2 Imode 10.00 15.00	Tools Configure Diabled Configure Diabled DO Switches Switch #1 Normally Closed C Open always in normal position	Reset to Factory Range Level LRV Level URV 10.000 80.000 Level URV
Alarm High 1 I I 60.00 15.00 Alarm High 2 I 80.00 15.00 Alarm Hysteresis 0.49 %	Switch #2 Normally Closed C Open always in normal position	Zero Shift % Reduced Span %
Torque Tube Compensation TT Activation Process Temperature Change Mode Mode: Setup	Controller Activation	Apply

Figure 221 Starting Calibration Tools

WARNING



This procedure causes the output current of the transmitter to change. Always put the control system in Manual before performing this operation. The 12400 Level transmitter must be in Setup mode to proceed.

Calibration Tools Signal Selection Coupling Coupling method Primary Signal C Secondary Signal % 4-20mA Calibration Reset Set 4 mA 🔲 Reset All 20 mA F Primary Signal Current Generator 🔲 Secondary Signal Set Current 0 mΑ <u>C</u>lose

ValVue 12400 launches the Calibration Tools window (Figure 222).

Figure 222 Calibration Tools Window

Signal Selection

ValVue 12400 allows you to calibrate either Primary Signal or Secondary Signal.

To select the signal:

 \Box Click on the radio button, located to the left of the signal name (Figure 223).

Signal Selection <u>Primary Signal</u>		ondary Signal	Coupling Coupling method
4 mA	0	Set	Reset
20 mA	Ũ	Set	F Primary Signal
Current Generator			🔲 Secondary Signal
Set Current	0	mA	Eleset to Factory

Figure 223 Selecting Signal

4 - 20 mA Calibration

The *Calibration Tools* window provides the ability to calibrate the 4 - 20 mA source for the AO signal.

4 mA Calibration

To calibrate Zero at 4 mA:

1. Click on 4 mA as (Figure 224).

Signal Selection Frimary Signal C Secondary Signal 4-20mA Calibration	Coupling Coupling method
4 mA 5et 5et 5et	Reset Reset All Primary Signal
Current Generator Set Current 0 mA	Secondary Signal



Once 4 mA calibration is started, the 4 mA button grays out.

Calibration Tools		
Signal Selection © Primary Signal – 4-20mA Calibration	້ <u>S</u> econdary Signal	Coupling Coupling method
4 mA 0	Set Set	Reset
Current Generator	mA	Secondary Signal



2. Read the value from the precision milliammeter.

3. Enter the reading from the milliammeter into the field and click **Set** (Figure 226).

Calibration Tools		
Signal Selection	C Secondary Signal	Coupling Coupling method
4 mA	4 Set	Reset
Current Generator	0 mA	Secondary Signal

Figure 226 Setting 4 mA Calibration

ValVue 12400 displays the dialog (Figure 227).

4. Click **Yes** to confirm setting the 4 mA calibration.



Figure 227 Saving 4 mA Calibration

If the range is outside that shown in Figure 228, an error message appears.



Figure 228 4 mA Calibration Error Message

20 mA Calibration

To calibrate Span at 20 mA:

1. Click on **20mA** (Figure 229).



Figure 229 Starting 20 mA Calibration

Once 20 mA calibration is started, the 20 mA button is greyed out.

Signal Selection C Secondary Signal 4-20mA Calibration	Coupling Coupling method
4 mA 4 Set	Reset
Set Current 0 mA	Secondary Signal

Figure 230 20 mA Calibration Active

2. Read the value from the precision milliammeter.

3. Enter the reading from the milliammeter into the field and click **Set** (Figure 231).

Signal Selection © Erimary Signal 4-20mA Calibration	C Second	ary Signal	Coupling Coupling method
4 mA	4	Set St	Reset Reset All Primary Signal
Current Generator	0	mA	Secondary Signal

Figure 231 Setting 20 mA Calibration

ValVue 12400 displays the dialog (Figure 232).

4. Click **Yes** to confirm setting the 20 mA calibration.



Figure 232 Saving 20 mA Calibration

If the range is outside that shown in Figure 233, an error message appears.



Figure 233 20 mA Calibration Error Message

Correct Calibration Error

If you receive an error message (Transmitter specific error or Parameter value too large) (Figure 234), it means that AO is calibrated incorrectly, and the read-back signal is out of range. And the calibration process is aborted.



Figure 234 HART Error Message For Improper Calibration

The solution is:

- 1. Click Reset to factory.
- 2. Redo calibration.

Set Current Generating

The *Calibration Tools* window also allows you to generate an output current for checking the current loop and to check 12400 calibration.

To generate output the desired current:

- 1. Enter the current output value in the Set Current field.
- 2. Click on **Set Current**.

ignal Selection	Coupling Coupling method
-20mA Calibration	×
4 mA Set	Reset
20 mA 0 Set	F Primary Signal
Current Generator	E Secondary Signal
Set Current 4 mA	Beset to Factory

Figure 235 Setting Current Output

A dialog appears (Figure 236).

3. Verify that the current output is correct with a precision milliammeter in series with the AO output.

4. Click **OK** to return to Calibration Tools.



Figure 236 Current Output Verification Dialog

If the range is outside that shown in Figure 237, an error message appears.



Figure 237 Current Output Error Message

Coupling

The *Calibration Tools* window allows you to check and adjust the coupling of the instrument to the torque tube. See the instruction EU 12400 for details of the mechanical method that must be performed. Coupling adjustment is normally performed in the workshop when the instrument is assembled to the torque tube.

The adjustment may be inspected using ValVue and a special weight. The displacer must be removed and the instrument removed from service to perform the check.

To start the coupling calibration:

- 1. Change the mode to Setup.
- 2. Tighten the adjustment screw. (For a standard displacer (907 cm3, 1362 gr), hang 727.1 gr on the torque arm. See the instruction for a special displacer.).

3. Click Coupling method (Figure 238).

Signal Selection Primary Signal 	C Secondary Signal	Coupling method
4-20mA Calibration		*
4 mA0	Set	Reset
20 mA	Set	F Reset All
Current Generator		🔲 Secondary Signal
Set Current	mA	Beset to Factory

Figure 238 Starting Coupling

4. Pull the indexing flexure until it is centered by the pin.

ValVue 12400 displays the coupling value. The reading must be between -5% and +5%.

If the reading is beyond the limits, an adjustment is required. (Refer to the instruction for the workshop method.)

5. Click **Stop Coupling** to complete.

Signal Selection	C <u>S</u> e	econdary Signal	Coupling Stop Coupling
4-20mA Calibration			3.90 %
4 mA	0	Set	Reset
20 mA	0	Set	Primary Signal
Current Generator			🔽 Secondary Signal
Set Current	0	mA	Beset to Factory

Figure 239 Stop Coupling

Calibration Reset

The *Calibration Tools* window provides the ability to reset the AO Main and AO Optional to the factory defaults.

Resetting All

To reset both AO Main and AO Optional:

1. Select the checkbox, located to the left of Reset All (Figure 240).

Signal Selection • <u>Primary Signal</u>	Coupling
4-20mA Calibration	*
4 mA Set	Reset
20 mA 0 Set	Primary Signal
Current Generator	- 🔽 Secondary Signal
Set Current 0 mA	<u>R</u> eset to Factory

Figure 240 Selecting Reset All

2. Click **Reset to Factory** (Figure 241).

Calibration Tools	
Signal Selection Erimary Signal <u>Secondary Signal</u> 4-20mA Calibration	Coupling Coupling method
4 mA 0 Set	Reset
Current Generator	Reset to Factory

Figure 241 Resetting to Factory

ValVue 12400 displays the dialog (Figure 242).

3. Click **Yes** to reset to the factory default.

ValVue 12400		
Please con	firm to do selected	resetting
Ves	No	1

Figure 242 Confirming Reset

If Reset has been executed, a dialog appears (Figure 243).



Figure 243 Reset Succeeded

Resetting AO Main

To reset AO Main:

- 1. Select the checkbox, located to the left of AO Main.
- 2. Click **Reset to Factory** (Figure 244).

Signal Selection	C Secondary Signal	Coupling Coupling method
4-20mA Calibration		*
4 mA	0 Set	Reset
20 mA	0 Set	Primary Signal
Current Generator		🔲 Secondary Signal
Set Current) mA	Reset to Factory

Figure 244 Selecting Reset AO Main

A dialog appears (Figure 245).

3. Click **Yes** to reset to the factory default.



Figure 245 Confirming Reset

If Reset has been executed, ValVue 12400 displays a dialog shown (Figure 246).

~		
1	Primary Signal	Succeeded
-	Secondary Signal	Succeeded

Figure 246 Reset Succeeded

Resetting AO Optional

To reset AO Optional:

- 1. Select the checkbox, located to the left of AO Optional (Figure 247).
- 2. Click **Reset to Factory** (Figure 247).

Calibration Tools	
Signal Selection © Primary Signal – 4-20mA Calibration	Coupling Coupling method
4 mA 0 Set	Reset Reset All Primary Signal
Current Generator Set Current D mA	Secondary Signal
Close	

Figure 247 Selecting Reset AO Optional

A dialog appears (Figure 248).

3. Click **Yes** to reset to the factory default.

ValVue 12400	×
Please confirm	to do selected resetting
<u>Y</u> es	No

Figure 248 Confirming Reset

If Reset has been executed, ValVue 12400 displays a dialog (Figure 249).



Figure 249 Reset Succeeded

Advanced Setup Context Menu

The Advanced Setup context menu (Figure 250) contains the following selections:

- □ Report Setup
- 🗆 Report
- Detach Trend
- □ *Help* launches context sensitive help



The SIL2 feature (see fields in red box) is available using firmware 1.1.2 or later.

ValVue 12400 - Offline NEW Tools Help Controller Monitor Trend Controller Setup Basic Se	tup Advanced Setup Transmitter Diagnostics St	tatus Check
Tag Name NEW Descriptor OIL/WATER SEP Message	Sill 2 Fault Timeout(x10 sec) Z Sill 2 Configuration Non-Sill Device C Configure Enabled C Configure Disabled wtches wtches mend wtches Switch #2 Normally ⓒ Closed ⓒ Open	SG Meter Calibration ZERO SG Calibration SG Calibration SG Calibration Reset to Factory Range Level LRV Level URV 10.000 §80.000 Level Units mm ZeroShift % ReducedSpan %
Alam Hysteresis 0.49 % Torque Tube Compensation T TT Activation Image: Compensation for the second se	Controller Activation Controller Activation	Apply

Figure 250 Advanced Setup Context Menu

Applying Advanced Setup Changes

When you make any changes on the *Advanced Setup* screen, the changed field appears and the *Apply* and *Cancel* buttons activate.

- □ To save changes, click **Apply.**
- □ To cancel any changes made, click **Cancel.** All parameters on the screen revert to previous settings.

Transmitter Diagnostics

What you can do on the Transmitter Diagnostics Screen

The Transmitter Diagnostics screen provides diagnostic data at a glance and allows you to:

- □ View continuous diagnostic data ("Continuous Diagnostic Data" on page 418)
- □ Reset continuous diagnostic data ("Continuous Diagnostic Data" on page 418)
- □ View Diagnostic Data in a graphical format ("Detail" on page 419)
- □ Reset Service Time ("Service Time" on page 420)
- □ Set Service Time Interval ("Service Time" on page 420)
- □ "A01/A00/Signal Trim in Raw Count" on page 422
- □ "Calibration Raw Range" on page 423
- □ Test Specific Gravity Meter ("Specific Gravity Meter" on page 424)

		-					
Tag Nam	ie	LT 102					1240
Descripto	и	CONDEN	ISATE LEVEL	-			
Message						Continuous I	Diagnostic Data
Date (dd.	/mm/yyyy)	25 NOV	2009			Number Fil	lling=1574
Final Ass	y Number	0				Time Full=: Time Empt	257 hrs ty=240 hrs
Time Sir Service	nce Service Interval=0	days days				<u>R</u> eset D	Data Detail
Time Sir Service Rese	nce Service Interval=0 t⊥ime 1/Signal Tri Device		rval unt	er Range	Range of Calibra	Eeset C	Data Detail
Time Sir Service Rese A01/A00	t <u>Time</u> 1/Signal Tri Device	Set Inte	rval unt 4000	er Range	Range of Calibra CalibLRV -1844751	ation CalibURV 1205594	Data Detail
Time Sir Service Rese A01/A00 A01 A01	time 1/Signal Tri Device 4000	Set Inte min Raw Co a Range 20000 20000	rval unt 4000	er Range 20000 20000	Range of Calibre CalibLRV -1844751 SGmeterLRV	Eeset C CalbURV 1205594 SGmeterURV	Specific Gravity Meter

Figure 251 Transmitter Diagnostics Screen

Continuous Diagnostic Data

The *Continuous Diagnostic Data* area of the *Transmitter Diagnostics* screen provides a live view of transmitter diagnostics that you can reset and view in a graphical format.

Reset Data

ValVue 12400 allows you to reset continuous diagnostic data collection.

To reset data:

1. Click Reset Data (Figure 252).

100 Mon	itor Trend	Basic Setu	ıp Advanced	Setup Transmit	ter Diagnostics Status	Check	
Tag Na	me	LT 102			-		1240
Descript	or	CONDEN	ISATE LEVEL		—		
Messag	e					– Continuous D	Jiagnostic Data
Date (de	d/mm/yyyy)	25 NOV	2009		-	Number Fill	ing=1574
Final As	sy Number	0			7	Time Full=2	257 hrs
Res	et <u>T</u> ime	Set inte	rval				
Res A01/AC	et <u>T</u> ime	Set Inte	rval unt	er Bange	Range of Calibra	tion	Specific Gravity Meter
	et <u>T</u> ime 10/Signal Trii Device 4000	Set Inte n in Raw Co Range	rval unt - 4000	er Range	Range of Calibra CalibLRV -1844751	tion CalibURV 1205594	Specific Gravity Meter
Res A01/AC A01 A00	et <u>T</u> ime 10/Signal Trii Device 4000 4000	Set Inte n in Raw Co Range 20000	rval Us unt Us 4000	er Range 20000 20000	Range of Calibra CalibLRV -1844751 SGmeterLRV	tion CalibURV 1205594 SGmeterURV	Specific Gravity Meter

Figure 252 Selecting Reset Data

A warning dialog appears (Figure 253).

2. Click **OK** to continue the reset.

ValVue 12400	X
After resetting,	the values will be lost
-	1

Figure 253 Reset Diagnostic Data Dialog

Detail

ValVue 12400 provides a detailed graphical format of the diagnostic data.

To view the diagnostic data detail:

Click **Detail**.

100 Moi	nitor Trend	Basic Setu	up Advanced	ISetup Transmi	tter Diagnostics 9	Status	Check	
Tag Na	ame	LT 102			7			12400
Descrip	ptor	CONDE	NSATE LEVEL		—			
Messaj	ge			1			Continuous	Diagnostic Data
Date (c	dd/mm/yyyy)	25 NOV	2009		_		Number F	illing=1574
Final A	ssy Number	0					Time Emp	=257 nrs oty=240 hrs
Servic	ce Interval=0 c	=ou days Jays					<u>R</u> eset I	Data Detail
Re	set <u>Time</u>	Set Inte	rval		-		<u>R</u> eset I	Data Detail
Re A01/A	set <u>T</u> ime 00/Signal Trir Device	=ou days Jays Set <u>I</u> nte n in Raw Co s Range	erval	er Range	Range of 0	Calibratic	n CalibuleV	Data Detail
Re 401/A	set <u>I</u> ime 00/Signal Trir Device	Set Inte n in Raw Co Range	erval punt 4000	er Range	Range of C CalibLRV -1844751	Calibratic	Deset	Data Detail
Re A01/A A01	set <u>Time</u> 00/Signal Trir Device 4000	Set Inte	erval Us ount Us 4000	er Range 20000 20000	Range of 0 CalibLRV -1844751 SGmeterL	Calibratic	CalibURV 1205594 SGmeterURV	Data Detail

Figure 254 Selecting Diagnostic Data Detail

Detail Diagnostics Data × [Unit: Hours] 9 15 0 0-9% 10-19% 20-29% 30-39% 40-49% 50-59% 60-69% 70-79% 80-89% 90-99%

ValVue 12400 displays the data in a graphical format (Figure 255).

Figure 255 Diagnostic Data Detail

Service Time

The *Service Time* area of the *Transmitter Diagnostics* screen allows you to reset the service time and change the service interval.

Reset

To reset the Service Time:

1. Click **Reset** (Figure 256).

100 Moniti	or Trend	Basic Setu	ip Advanced	Setup Transmit	ter Diagnostics Status	Check	
Tag Nam	ne	LT 102			7		1240
Descripto	n	CONDEN	SATE LEVEL		-		
Message					-	C	Disease to Date
nessage		25 NOV 1	2009		_		Diagnostic Data
Date (dd/	mm/ yyyy)	251107 2	2000		_	Number Fil Time Full=	lling=1574 257 brs
Final Ass	y Number	lo				Time Empt	ly=240 hrs king=1952 hrs
Time Sir Service	nce Service Interval=0 d	=80 days lays				l <u>R</u> eset D)ata Detail
Time Sir Service Rese	nce Service Interval=0 c t <u>Time</u>	=80 days lays Set <u>I</u> nter	rval			<u>B</u> eset D	Data Detail
Time Sir Service Rese	nce Service Interval=0 c t <u>Time</u>	=80 days lays Set Inter n in Raw Cor	rval	or Parroy	Range of Calibra	Reset D	Data Detail
Time Sir Service Rese A01/A00	nce Service Interval=0 c t <u>Time</u> t/Signal Trin Device \$000	=80 days lays Set Inter n in Raw Cor Range [20000	rval unt 4000	er Range	Range of Calibra CalibLRV -1844751	ation CalibURV [1205594	Data Detail
Time Sir Service Rese A01/A00 A01	nce Service Interval=0 c t Iime	=80 days lays Set Inter Range 20000 20000	rval unt 4000 4000	er Range 20000 20000	Range of Calibra CalibLRV -1844751 SGmeterLRV	ation CalibURV [1205594 SGmeterURV	Data Detail

Figure 256 Selecting Reset

A warning dialog appears (Figure 257).

2. Click **OK**.

ValVue 12400		
After resetting, t	he values will be lost	
ОК	Cancel	

Figure 257 Reset Service Time Dialog

Set Interval

To set the *Service Time* interval:

1. Click **Set Interval** (Figure 258).

. 11-l-							Contrast Contrast
нер							
400 Mo	nitor Trend	Basic Setu	ıp Advanced	Setup Transmit	ter Diagnostics Status	Check	
Tag Na	ame	LT 102			7		12400
Descrip	otor	CONDEN	NSATE LEVEL		-		
Messa	ne				-	Cantinuaus D	inamantia Dista
Dista (r	s- Id/mm/uuuu)	25 NOV	2009		-	Continuous D	
	idzininiz yyyy)	0			_	Number Filli Time Full=2	ng=1574 57 hrs
Final A	ssy Number	lo			-	Time Empty	=240 hrs ng=1853 hrs
Service	e Time						
Time	Since Service:	=80 davs					
Servio	ce Interval=0 d	ays				<u>R</u> eset Da	ata <u>D</u> etail
Re	set <u>T</u> ime	Set Inte	rva				
Re	set <u>T</u> ime	Set Inte	nval2				
Re 	set <u>T</u> ime 00/Signal Trin	Set Inte	irva		Range of Calibra	tion	Specific Gravity Meter
Re 	set <u>T</u> ime 00/Signal Trin Device	Set Inte n in Raw Co Range	unt	er Range	Range of Calibra	tion CalibURV	Specific Gravity Meter
A01/A	set <u>T</u> ime 00/Signal Trin Device 4000	Set Inten nin Raw Co Range 20000	rva	er Range	Range of Calibra CalibLRV -1844751	tion CalibURV 1205594	Specific Gravity Meter
A01/A A01/A A01 A00	set <u>I</u> ime 00/Signal Trin Device 4000 4000	Set Intenin Raw Co Range 20000	rva	er Range 20000 20000	Range of Calibra CalibLRV -1844751 SGmeterLRV	tion CalibURV 1205594 SGmeterURV	Specific Gravity Meter
 Re A01/A A01 A00 Signal	set <u>Time</u> 00/Signal Trin Device 4000 4000 4000	Set Intention Raw Co Range 20000 20000 20000	rva 2	er Range 20000 20000 20000 20000	Range of Calibra CalibLRV -1844751 SGmeterLRV 977193	tion CalibURV 1205594 SGmeterURV 1091573	Specific Gravity Meter

Figure 258 Selecting Set Interval

ValVue 12400 launches a data input dialog (Figure 259).

Input New Service Interval	
Service Time Interval	
0	
OK Cancel	

Figure 259 Service Time Interval Dialog

2. Enter the new Service Time interval, in seconds and click **OK** to save.

Input New Service Interval	
Service Time Interval	
144	
OK Cancel	

Figure 260 Service Time Interval Set

AO1/AO0/Signal Trim in Raw Count

Transmitter Diagnostics screen provides a live view of AO1/AO0/Signal trim in raw count.

	nenu I	Basic Setu	p Advancec			Check	
Tag Name		LT 102			=		1240
Descriptor		CONDEN	ISATE LEVEL		-		
Message					-	– Continuous D	iagnostic Data
Date (dd/m	n/yyyy)	25 NOV 3	2009		-	Number Filli	
Final Assy N	lumber	0			-	Time Full=2	57 hrs = 240 hrs
1351 135							
Reset I	ime	Set <u>I</u> nte	rval				
Reset I 	ime	Set <u>I</u> nte in Raw Co	rval	ar Range	Range of Calibra	ition	Specific Gravity Meter
Reset I A01/A00/9	ime	Set Inte in Raw Co Range 20000	unt Us	er Range	Range of Calibra CalibLRV -1844751	tion CalibURV 1205594	Specific Gravity Meter
Reset I A01/A00/S A01 400 A00 400	ime	Set <u>I</u> nte in Raw Co Range 20000 20000	unt Us 4000	er Range 20000 20000	Range of Calibra CalibLRV -1844751 SGmeterLRV	tion CalibURV 1205594 SGmeterURV	Specific Gravity Meter

Figure 261 AO1/AO0/Signal Trim in Raw Count

Calibration Raw Range

ValVue 12400 provides a live view of calibration raw range.

- □ CalibLRV
- □ CalibURV
- □ SGMeterLRV
- □ SGMeterURV

400 Monite	or Trend	Basic Setu	ıp Advanced	Setup Transmit	tter Diagnostics Status	Check		
Tag Nam	e	LT 102			=		12400	
Descripto	đ	CONDEN	SATE LEVEL		-			
Message					-	- Continuous Diagnostic Data		
Date (dd/	Date (dd/mm/yyyy) 25 NOV 2009		-	Number Fil	illing=1574			
Final Assy	Assy Number 0		-	Time Full=	257 hrs			
Beca	t <u>Time</u>	Set Inte			Banne of Calibra	Beset D	Specific Gravitu Meter	
401/400	a orginal i m	e Bange	Us	er Range	CalibLRV	CalibURV		
A01/A00	Device		The second se		1044751	1205594		
A01/A00	Device 1000	20000	4000	20000	1-10447.51	1.200001	100770	
A01/A00 A01 400 A00 400	Device 1000 1000	20000	4000	20000	SGmeterLRV	SGmeterURV	u	

Figure 262 Raw Range of Calibration

Specific Gravity Meter

ValVue 12400 allows you to start the *Specific Gravity Meter* from the *Transmitter Diagnostics* screen to assist in diagnosing transmitter problems.

When the meter is not running the button, located to the right of the meter field, will be grey.

To start the Specific Gravity Meter:

□ Click Meter On/Off (Figure 263).

400 Moni	tor Trend	Basic Setu	ıp Advanced	d Setup Transmit	ter Diagnostics Status	Check	
Tag Nar	ne	LT 102			-		1240
Descript	or	CONDEN	NSATE LEVEL	-	-		
Message	e				-	- Continuous D	iagnostic Data
Date (do	l/mm/yyyy)	25 NOV	2009		-	Number Filli	ng-1574
Final Assy Number 0		-	Time Full=2				
Rese	et <u>T</u> ime	Set Inte	rval				
Reso	et <u>T</u> ime 0/Signal Tri Devic	Set Inte m in Raw Co e Range	unt Us	er Range	Range of Calibra	tion	Specific Gravity Meter
Rese A01/A0	et <u>T</u> ime 0/Signal Tri Devic 4000	Set Inte m in Raw Co e Range 20000	unt 4000	er Range	Range of Calibra CalibLRV -1844751	tion CalibURV 1205594	Specific Gravity Meter
Reso A01/A0 A01	et <u>T</u> ime 0/Signal Tri Devic 4000 4000	Set Inte m in Raw Co e Range 20000 20000	unt Us 4000	er Range 20000 20000	Range of Calibra CalibLRV -1844751 SGmeterLRV	tion CalibURV 1205594 SGmeterURV	Specific Gravity Meter

Figure 263 Starting Specific Gravity Meter

400 Monitor	Trend	Basic Setu	p Advanced	Setup Transmi	tter Diagnostics Status	Check	
Tag Name		LT 102			=		12400
Descriptor		CONDEN	ISATE LEVEL				
Message		25 NOV	2009		_	- Continuous E	Diagnostic Data
Final Assy Number 0			Number Fill Time Full=2 Time Empty	ling=1574 257 hrs y=240 hrs			
						<u>H</u> eset D	ata <u>D</u> etait
Reset	<u>T</u> ime	Set Inte	rval				
Reset	<u>T</u> ime Signal Trir	Set Inte	unt	er Bange	Range of Calibr	ation	Specific Gravity Meter
Reset]	Iime Signal Trir Device	Set Inte n in Raw Co Range 20000	unt Usi 4000	er Range	Range of Calibr CalibLRV -1844751	ation CalibURV 1205594	Specific Gravity Meter
Reset	<u>I</u> ime 'Signal Trir Device 000	Set Inte n in Raw Co Range 20000 20000	rval unt 4000 4000	er Range 20000 20000	Range of Calibr. CalibLRV -1844751 SGmeterLRV	CalibURV 1205594 SGmeterURV	Specific Gravity Meter

The Specific Gravity Meter is now working, indicated by the green button (Figure 264).

Figure 264 Specific Gravity Meter On

Transmitter Diagnostics Context Menu

The Transmitter Diagnostics context menu (Figure 265) contains the following selections:

- □ "Report Setup" on page 320
- □ "Reports" on page 314
- □ "Detach Trend" on page 347
- □ *Help* launches context sensitive help

Tag Na	ame	LT 102			=		1240
Descrip	otor	CONDEN	ISATE LEVEL		-		
Message					Continuous Diagnostic Data		
Date (dd/mm/yyyy) 25 NOV 2009			-	Number	Fillina=1574		
Final A	ssy Number	er 0		_	Time Ful Time Em	=257 hrs pty=240 hrs	
Service Time : Servic	e Time Since Service	=80 days Haus		Report Setu Report	p		
- SCIVIC	,e milerval-o i	Juyo		Detach Tren Help	d	<u>R</u> eset	Data <u>D</u> etail
Re	set <u>T</u> ime	Set Inte	rval				
A01/A	00/Signal Tri Device	m in Raw Co e Range	unt Us	er Range	Range of Calibra	ition CalibURV	Specific Gravity Meter
A01	4000	20000	4000	20000	-1844751	1205594	
A00	4000	20000	4000	20000	SGmeterLRV	SGmeterURV	
a: 1	4000	20000	4000	20000	977199	1091573	Meter Un/Uff

Figure 265 Transmitter Diagnostics Context Menu

Status

9

What you can do on the Status Screen

The *Status* screen allows you to see at a glance the operating and internal status of the 12400. The screen is divided into a series of tabs that provides active faults, log only, annunciate, and fail safe.

On the *Status* screen you can reset the *Current Faults* or *All Faults* (Current and Historical). You can also select and clear an individual fault.

The window has selectable tabs that display the associated parameters for each tab when selected; e.g. when you select **Log Only** tab the Log only status and fault codes appear.

□ When you are on the *Active Faults* tab the current active faults appear (Figure 266). The status codes are then partitioned into their respective 12400 functional areas.



Figure 266 Status Screen

Active Faults

The Active Faults status tab (Figure 267) displays all current faults.



Figure 267 Status Screen Active Faults Tab

Log Only

The Log Only status tab (Figure 268) displays all faults that have been logged.

🐼 ValVue 12400 - LT 102	
Tools Help	
12400 Monitor Trend Basic Setup Advanced Setup Transmitter Diagnostics Status Check	
Active Faults Log Only Annunciate User Faults 2 Failsafe User Faults 1	12400
CUR HIS	
🔴 🔴 Reset	
🕘 🔴 Level Sensor Near Dut Of Range	
Factory Mode Indicator	
Operating System Fault	
IRQ Fault	
Calibration Failed	
Autotune Failed	
OUI Off (Low Temp.)	
🕘 🥚 Loop Output Saturated	
Elear Quirrent Faults Clear All Faults	
Change Mode Mode: Normal Exit Help]

Figure 268 Status Screen Log Only Tab

Annunciate

The Annunciate status tab (Figure 269) displays all faults that have been annunciated.

Active Fa	aults Log Only Annunciate Use	r Faults 2 Fail	safe User Faults 1		1240
CUR H	lis	CUR HIS		CUR H	IIS
0	Level Sensor Out Of Range	0 0	RAM Checksum Error	0 0	Diagnostic Voltage Low
	Low Alarm #1	i i	Stack Overflow	0	Diagnostic Voltage High
	Low Alarm #2	00	Watchdog Timeout	0	HART Voltage Low
0	High Alarm #1	0 0	Flash Test Timeout	0 0	HART Voltage High
0	High Alarm #2	0 0	Software Fault	00	Core Voltage Low
0	Keypad Fault	0 0	Invalid Displacer Length	0	Core Voltage High
0 (Main Temp. Out Of Range	0 0	Incorrect Mounting Config.	0 0	Calculated RV Out Of Range
0 (Sensor Temp. Out Of Range	0 0	Working Time Exceeded	0	Level Display Saturated
0 (Main NVM Write Error	0 0	Loop Output Warning	0 0	Insufficient Calculated Range
0 (Sensor NVM Write Error	0 0	Loop Output Fault	0 0	Level Sensor Off
0 (Main NVM Test Failed	0 0	Terminal Voltage Low		
0	Sensor NVM Test Failed		Terminal Voltage High		

Figure 269 Status Screen Annunciate Tab

User Faults 2

The User Faults 2 status tab (Figure 270) displays user related, position sensor and temperature read/sensor faults. The Fail High and Fail Low fields are not active for a SIL2 device.

🗹 ValVue 12400 - LT 102	
Tools Help	
12400 Monitor Trend Basic Setup Advanced Setup Transmitter Diagnostics Status Check	
Active Faults Log Only Annunciate User Faults 2 Failsafe User Faults 1	12400
CUR HIS	
😑 🥥 Level Sensor Disconnected	
😑 🥥 Level Sensor Fault	
🕒 🕒 Read Main Temp. Failed	
🔵 🔵 Read Sensor Temp. Failed	
🔘 🔴 Main Temp. Fault	
🔘 🔘 Sensor Temp. Fault	
(* ⊪ai High C Fail Low	Set
Liear Lurrent Faults Clear All Faults	
Change Mode: Setup 🥥 Exit Help	

Figure 270 Status Screen User Faults 2 Tab

Failsafe

The *Failsafe* status tab (Figure 271) displays failsafe faults. If configured as a SIL2 device the three faults in the red box appear.

Nonitor Trand Pasia Satura Aduances	Status Transmitter Disamosting Status Chook	
		1240
Active Faults Log Only Annunciate Use		
CUR HIS	CUR HIS	
Contraction Contracted	Contraction Contractico Con	
Contraction Contractica Con	Output is out of range	
😑 🥥 Read Main Temp. Failed	Position out of Range	
🔘 🥥 Read Sensor Temp. Failed	Loop Current Error	
🔵 🧿 Main Temp. Fault		
🔘 🔘 Sensor Temp. Fault		
🔘 🥥 Main NVM Checksum Error		
🔵 🧿 Sensor NVM Checksum Error		
📀 🔘 Flash Checksum Error		
😑 😑 Factory Write Indicator		
😑 🙁 MCU Fault		
🔘 🔘 Current Sensor Fault		
	ar <u>Current Faults</u>	

Figure 271 Status Screen Failsafe Tab
User Faults 1

The User Faults 1 status tab (Figure 272) displays user related, current sensor and loop output faults. The Fail High and Fail Low fields are not active for a SIL2 device



Figure 272 Status Screen User Faults 1 Tab

Clearing Faults

ValVue 12400 has three types of fault clearing available:

- □ Clear Fault clears an individual, entered fault
- □ Clear Current Faults clears only current faults
- □ Clear All Faults clears all faults

Clearing Individual Fault

The *Status* screen allows you to select and clear an individual fault in the *Active Faults* tab that has a HART fault code, digits enclosed in parentheses, located to the right of the text describing the fault (Figure 273).

To clear an individual fault:

1. Enter the HART number for the fault in the text box located to the right of *Clear Fault*.

🚰 ValVue 12400 - LT 102	
Tools Help	
12400 Monitor Trend Basic Setup Advanced Setup Transmitter Diagnostics Status Check	
Active Faults Log Only Annunciate User Faults 2 Failsafe User Faults 1	400
CUR HIS	
🔴 🕚 Low Alarm #1 (7)	
🔴 🕘 Low Alam #2 (8)	
1/ LearEau	
Clear <u>C</u> urrent Faults Clear <u>A</u> ll Faults	
Change Mode: Normal 💿 Exit Help	

Figure 273 Entering Fault HART Number

2. Click Clear Fault (Figure 274).

The selected fault is cleared from the *Active Faults* list and the *Clear Fault* button returns to an inactive state.

🚰 ValVue 12400 - LT 102	×
Tools Help	
12400 Monitor Trend Basic Setup Advanced Setup Transmitter Diagnostics Status Check	
Active Faults Log Only Annunciate User Faults 2 Failsafe User Faults 1	
CUR HIS	
🔴 🔴 Low Alarm #1 (7)	
🔴 🔴 Low Alarm #2 (8)	
Dear Fquit	
Clear <u>C</u> urrent Faults Clear <u>A</u> ll Faults	
Change Mode: Normal 🔷 Exit Help	

Figure 274 Clearing Fault

Clear Current Faults

Use *Clear Current Faults* to reset the status in the 12400 for all current faults only. The buttons on the *Status* screen indicating the current faults revert to green, if the condition is no longer valid.

To clear current faults:

□ Click **Clear Current Faults** (Figure 275).

🐼 ValVue 12400 - LT 102	
Tools Help	
12400 Monitor Trend Basic Setup Advanced Setup Transmitter Diagnostics Status Check	- 10
Active Faults Log Only Annunciate User Faults 2 Failsafe User Faults 1	12400
CUR HIS	
🔴 🔴 Reset	
🥥 🧶 Level Sensor Near Out Of Range	
Factory Mode Indicator	
😑 🕒 Operating System Fault	
🔵 🔘 IRQ Fault	
🔵 🥥 Calibration Failed	
🔘 🔘 Autotune Failed	
🕘 🔘 UI Off (Low Temp.)	
🥥 🥚 Loop Output Saturated	
Liear <u>All</u> Faults	
Change Mode Mode: Normal Change Mode Exit Help	

Figure 275 Clearing Current Faults

Clear All Faults

Use the *Clear All Faults* button to reset the status bit in the 12400 for all faults, both historical and current. The buttons on the *Status* screen indicating the current and historical faults revert to green.

To clear all faults:

□ Click Clear All Faults (Figure 276).

🐼 ValVue 12400 - LT 102	
Tools Help	
12400 Monitor Trend Basic Setup Advanced Setup Transmitter Diagnostics Status Check	
Active Faults Log Only Annunciate I ser Faults 2 Failsafe I ser Faults 1	12400
CUR HIS	
🔴 🔴 Reset	
🔵 🥚 Level Sensor Near Out Of Range	
😑 🥥 Factory Mode Indicator	
🔵 🔘 Operating System Fault	
😑 😑 IRQ Fault	
🔵 🥥 Calibration Failed	
Autotune Failed	
O UI Off (Low Temp.)	
Coop Output Saturated	
Clear Quirrent Faults Clear All Farits	
Change Mode Mode: Normal State Help	5

Figure 276 Clearing All Faults

Set Fail High/Fail Low

On the User Faults 2 and User Faults 1 tab on the Status screen you can set whether position sensor, temperature readings, temperature sensor, current sensor, or loop output testing fail at the predefined high or low level. The Fail High and Fail Low fields are not active for a SIL2 device.

To change this setting:

- 1. Enter Setup mode.
- 2. Click on the correct radio button; **Fail High** or **Fail Low.** In Figure 277, *Fail Low* has been selected.

s Help	un le ve	Challen	de ut		
2400 Monitor Trend Basic Setup Adva		Jiagnostics Status	Check		12400
Active Faults Log Unly Annunciate CUR HIS Level Sensor Disconnected Level Sensor Fault Read Main Temp. Failed Main Temp. Fault Sensor Temp. Fault	User Faults 2 Failsale	User Faults 1			
				⊂ Fail High • Fail Low	Set
	Clear <u>C</u> urrent Faults	ſ	Clear <u>A</u> ll Faults		

Figure 277 Fail Low Selected

3. Click **Set** to save *Fail Low*.

🚰 ValVue 12400 - LT 102	
Tools Help	
12400 Monitor Trend Basic Setup Advanced Setup Transmitter Diagnostics Status Check	
Active Faults Log Only Annunciate User Faults 2 Failsafe User Faults 1	12400
CUR HIS	
🔘 🥚 Level Sensor Disconnected	
Level Sensor Fault	
🕘 🕒 Read Main Temp. Failed	
Read Sensor Temp. Failed	
🥥 🕘 Main Temp. Fault	
⊂ Fail High ☞ Fail Low	Spt
Clear <u>C</u> urrent Faults	
Change Mode Mode: Setup 🔿 Exit He	alp

Figure 278 Fail High/Low Changed

Status Context Menu

The Status context menu (Figure 279) contains the following selections:

- □ "Report Setup" on page 320
- □ "Reports" on page 314
- □ "Detach Trend" on page 347
- □ *Help* launches context sensitive help

ols Help				
2400 Monitor Trend Basic Setup Ad	vanced Setup Transmitter D	iagnostics Status	Check	
Active Faults Log Only Annunciate) User Faults 2 Failsafe L	Jser Faults 1		12400
CUR HIS				
🥚 🥚 Low Alarm #1 (7)				
🥝 🥚 Low Alarm #2 (8)				
	Reset			
	Report Setup Report			
	Detach Trend Help			
				Clear Fault
2	Clear Current Faults		Clear All Faults	
Charace Made Mode:	Normal		Evit	Help

Figure 279 Status Context Menu

Check

10

What you can do on the Check Screen

The *Check* screen provides the user a method for monitoring some of the basic parameters. This screen is used primarily for troubleshooting.

The Check screen (Figure 280) has two areas of data:

- □ Temperature-Corrected Values
- □ Calibration Raw Range

The only active area of the *Check* screen is the *Context* menu.

alVue 12400 - (Offline NE	N				
s Help						
400 Monitor Trend	Basic Setur	Advanced Setu	D Transmitter Diagnos	tics Status Check		
		1				
Tag Name	NEW					12400
Descriptor						
Message	TESTING					
Date (dd/mm/uuuu)	26 AUG 2	009	`			
Einel Acou Number	0					
Final Assy Number	10					
Temperature-Correc	ted Values —					
Main Tananahan		C T				
7232	8 DeaC	5ensor rem,	27 DegC			
larre la		10020	le, e ege			
Primary Signal Cu	rent	Level	-			
12026 1	2 mA	1-690569	50 %	Range of Calibration		1
Terminal Voltage				CalibLRV	CalibURV	
1799	7 V			-2464683	1076867	
Primary Signal Ou	iput	Secondary S	ignal Output	SGmeterLRV	SGmeterURV	
12014	2 mA	12013	12 mA	-2472286	1068148	
		1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -				
Change Mode	1 1	dode: Norma	I 0		Exit Help	

Figure 280 Check Screen

Check Context Menu

The Check Context menu (Figure 281) contains the following selections:

- □ "Report Setup" on page 320
- □ "Reports" on page 314
- □ "Detach Trend" on page 347
- □ *Help* launches context sensitive help

	-		1	-			40.40
Tag Name	NEW				~		1240
Descriptor							
Message	TESTING			21			
Date (dd/mm/yyyy)	26 AUG 20	009		Report Setup			
Final Assy Number	0			Report	0		
	1			Detech Trend			
			-	Detaun menu			
				Help			
Temperature-Correct	ed Values —			Help			
Temperature-Correct Main Temperature	ed Values —	Sensor Temp	perature	Help			
Temperature-Correct Main Temperature 7232 2	ed Values	Sensor Temp 6928	perature	Help			
Temperature-Correct Main Temperature 77232 2 Primary Signal Curr	ed Values	Sensor Temp 6928 Level	perature	Help			
Temperature-Correct Main Temperature 7232 2 Primary Signal Curr 12026 1	ed Values	Sensor Temp 6928 Level -690269	perature 27 DegC	Help	Bange of Calibration		-
Temperature-Correct Main Temperature 7232 2 Primary Signal Curr 12026 1 Terminal Voltage	ed Values	Sensor Temp 6928 Level -690269	perature 27 DegC 50 %	Help	Range of Calibration	Calibul RV]
Temperature-Correct Main Temperature 7232 2 Primary Signal Curr 12026 1 Terminal Voltage 1799 1	ed Values	Sensor Tem 6928 Level -690269	perature 27 DegC 50 %	Help	Range of Calibration CalibLRV -2464683	CalibURV]
Temperature-Correct Main Temperature 7232 2 Primary Signal Curr 12026 1 Terminal Voltage 1799 1	ed Values	Sensor Tem 6928 Level -690269	perature 27 DegC 50 %	Help	Range of Calibration CalibLRV -2464683	CalibURV 1076867]

Figure 281 Check Context Menu

ValVue VECTOR Software

Product description

- WirelessHART technology
- Provides 24/7 monitoring
- One Port wireless adapter
- Local/Direct power option

VECTOR[™] SERIES V1100 Masoneilan ^{WirelessHART®}Adapter This page intentionally left blank.

Introduction

1

Introduction

The *ValVue VECTOR* is a user friendly interface that facilitates ValVue wireless setup and diagnostics.

🐼 ValVue VECTOR - Offline VECTOR01	
Tools Help	
Overview Trend Configure Maintenance Status Communication A	Alerts Battery
VECTOR	PV Loop Current (mA) 11.14 PV (mA) 11.14 Direct Power Voltage (V) 1.00
Tag VECTOR01	Electronics Temperature (Kelvin) 25.00
Long Tag WIRELESS ADAPTER 01 Descriptor vector Message IT'S A WIRELESS ADAPTER Date 19 JUN 2009 Assembly Number 2009	Good Idle Good Idle Send Cmd
Setup Wizard Sub devices	Exit Help

Figure 282 ValVue VECTOR

ValVue VECTOR Software

ValVue VECTOR provides the ability to:

- □ Quickly and easily perform initial set up of the VECTOR on the network. See "Setup Wizard Screen" on page 465.
- □ Configure VECTOR operations. See "Configure Power Tab" on page 474.
- □ Monitor VECTOR operation. See "Status Screen: General" on page 505.
- Diagnose some problems using the ValVue VECTOR's event configuration, monitoring capabilities and maintenance. See "Status Screen: General" on page 505 and "Maintenance Tab" on page 501.

About This Manual

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

Conventions Used in This Manual

Conventions used in this Manual are as follows:

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

Indicates important facts and conditions.



CAUTION

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

WARNING



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

Installation

2

Installation

Requirements

The ValVue installation procedures require basic knowledge of Microsoft Windows operating systems and the VECTOR (V1100). For additional information describing the VECTOR, consult the V1100 Instruction Manual.

Hardware and Operating System Requirements

Listed below are the hardware and software requirements for the computer used with ValVue:

Hardware

Processor:	PC with minimum 1 GHz Intel Pentium or compatible
RAM:	Minimum 1 Gig
Disk:	Application Component: 15 M
	Database Component: 30 M minimum

Software

OS:

Windows XP SP2, Window Server 2003 SP1 or Window Server 2003 R2, or Windows Server 2008

HART Related Issues

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

HART Compliance

The VECTOR 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.

WARNING



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

Communicate Failure

If the PC (using a modem) fails to communicate with the HART or ValVue the message *No Devices Found* appears in the *Overview* screen. If the device communications fails during the session, the message *HART I/O Failed* appears. Communication failure prevents the PC from establishing a link. Possible causes of communications failure related to installation include:

- □ Insufficient Loop Current and Voltage
- □ Poor wiring contacts
- □ Improper connection of the HART modem to the computer
- □ Incorrect serial port
- □ Using the VECTOR with another HART master terminal in service
- □ Insufficient loop impedance (a minimum of 250 Ohms is required)
- □ Field device has a nonzero polling address (Set the VECTOR 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.

ValVue VECTOR Operational Overview

Operational Overview

After you have selected the connected device ValVue launches and the device appears in the first *Overview* tab (Figure 283).

Ga ValVue VECTOR - Offline VECTOR01	
Tools Help	
Overview Trend Configure Maintenance Status Communication Aler	ts Battery
VECTOR	PV Loop Current (mA) 11.14 PV (mA) 2 Direct Power Voltage (V) 1.00
Tag VECTOR01 Long Tag WIRELESS ADAPTER 01 Descriptor vector Message IT'S A WIRELESS ADAPTER	Electronics Temperature (Kelvin) 25.00 Device Status Good Idle
Date 19 JUN 2009 Assembly Number 2009	Send Cmd
Status (4)	3
Setup Wizard Sub devices	
 Active search 	Exit Help

Figure 283 VECTOR Work Environment



ValVue is the main interface for connected devices. Once a connected device is selected the VECTOR software launches.

Buttons and Fields

1 Tag fields

(2) Adapter Status

- 🗆 Tag
- Long Tag
- Descriptor
- Message
- Date
- □ Assembly Number

This data can be changed on the "Setup Wizard Screen" on page 465 and in "Configure Adapter Info Tab" on page 495.

- □ PV Loop Current: Displays the detected loop current.
- □ *PV*: Displays the process variable.
- Direct Power Voltage: Displays the voltage if the device is configured for direct voltage.
- □ *Electronics Temperature*: Displays the board temperature detected by the device.
- Device Status: Displays the device status as text and in a colored status bar, where:
 - \Box Green means the connection is good.
 - $\hfill\square$ Red means the connection is bad.
- Wireless Status: Displays the status of the wireless connection, some of which include Idle, Searching, Joining, Operational and Join Failed. LED color indicates:
 - \Box Green means the join succeeded.
 - \Box Red means the join failed.
 - □ Beige means the process is idle or in the process of searching or joining.

(3) Send Cmd button Click to make a request for the display of various system data in the box below.

(4) Status The VECTOR tracks operation and provides several health indicators. When there is a fault code available in the VECTOR, this box contains Additional Status Available. The LED is gray for OK or red when a flag is set. Setup Wizard button

Sub devices ... button

Setup Wizard Click to open the "Setup Wizard Screen" on page 465.

Sub devices ... Click to scan for network sub devices and have them listed in 299 "Scan Result" on page 468. See "Scan for Devices" on page 468.

Overview Tab Tools Menu and Context Menu

The Overview tab Tools menu consists of:

- □ "Reset" on page 451 □ "Report Setup" on page 452
- □ "Report" on page 454 □ "Save SVI Data" on page 454
- "Restore SVI Data" on page 455
- □ "Detach Trend" on page 455

Reset

Use this feature to perform a master reset of the VECTOR to default values.

Remove the loop from automatic control before proceeding.

□ "Update Configured Data" on

page 455

□ Help



WARNING

To do this:

1. Select **Tools > Reset** and *Perform Master Reset* appears.

erform Master Reset		
WARN-Loop should be removed from automatic control	l	

Figure 284 Perform Master Reset

2.	Click	Continue	and a second dialog appears.
----	-------	----------	------------------------------

- 3. Click **Continue** again and a dialog that says *Device reset OK* appears.
- 4. Click **Continue** again and a dialog that says NOTE Loop may be returned to automatic control appears.
- 5. Click Continue .

Report Setup

One of the functions available on the *Overview* tab is the ability to generate reports. ValVue VECTOR provides the ability to extract information about the VECTOR operation and dump the information into a report format. When extracted the information from a device requires a template file into which to dump the data. To generate a report with ValVue VECTOR you must first create a report template file that includes the parameters you would like to include in the report as well as personalization.

How to Create Reports

There are three basic steps to create reports:

- 1. Set up the report: Create a report template file.
- 2. Select the report setup (report template file): Using the *Report Setup* command from the *Monitor* context menu.
- 3. Generate the report: Using the Report command from the Tools or context menu.

Creating Report Template Files

You can create a custom report by creating a rich text format (RTF) file which is laid out in the format of the desired report. The default template is located in:

- □ Win7 and 2008 Server: C:\Program Data\Dresser\ValVue\VECTOR\Report.
- □ WinXP and 2003 Server: C:\Documents and Settings\All Users\Application Data\Dresser\ValVue\VECTOR\Report.

Prior to selecting the set up of the report you must create the report template file in an rtf format. The report template includes the operation parameters that you would like populated in the report.

ValVue VECTOR substitutes the values of parameters into the text file where ever it finds a parameter name that matches a VECTOR parameter. For each parameter you would like included in the report place \$\$ in front of the parameter name.

For example:

Tag = \$\$Tag

VECTOR substitutes the actual tag name from the unit in place of the \$\$Tag in the report.

When creating the report template file, use an application that can save the report template file to an rtf or text file such as WordPad, Microsoft Word, or Notepad.



rtf files are preferred as you can apply special formatting to the file that can contain fonts, sizes, tabs, etc. and bitmaps. Some .rtf formatting is accepted in Word which is not available in WordPad.

To set up the report:

1. Right click on the **Overview** tab and select **Report Setup** or select it from the **Tools** menu.

The Report Setup dialog appears.

- 2. Click **Browse** and navigate to the desired folder for *Report Template File Name*.
- 3. Click **Browse** and navigate to the desired folder for *Report Program to use* or click the desired button and the *Auto Find* feature will find the program for you.

Click to automatically use Word for — reports.	Report Setup Report Template File Name C:\ProgramData\Dresser\ValVue\VECTOR\Report\VectorFi Browse Report Program to use C:\Program Files\Microsoft Office\Office14\WINWORD.EXE Auto Find MS Word	Click to automatically use Wordpad for reports.
use Word for — reports.	Cancel	for reports.

Figure 285 Report Setup

Report

To generate a report:

- 1. On the Overview tab right click and select **Report**.
- 2. Click **OK**.

ValVue populates the report template. An example of a report is shown in Figure 286.



VECTOR - Configuration Data Sheet

General Information

Tag Name	VECTOR01
Long Tag Name	WIRELESS ADAPTER 01
Descriptor	vector
Date	19 JUN 2009
Message	IT'S A WIRELESS ADAPTER
Assembly Number	2009
Manufacturer's ID	101
Device Type	205
Device ID	9042009
Hardware Revision	1
Transmitter Revision	1
Software Revision	1
Polling Address	0
Operating Data	

PV Loop Current	11.14 mA
PV	11.14 mA
Direct Power Voltage	1.00 V
Wireless Mode	Idle

Figure 286 Report Sample Using Template

Save SVI Data

Saves the VECTOR internal parameters in a file that can be read and restored.

Restore SVI Data

Restores the contents of a dump file to a Masoneilan device. This can be used to clone a VECTOR into a new VECTOR.



Items like tag should be unique.

Update Configured Data

Use this command to upload device data to ValVue VECTOR to synchronize the two.

To do this:

1. Use the right click or tools menu and select **Update Configured Data** and appears.

ValVue VECTOR			83
This operation will load config synchronize ValVue and devic Do you want to continue?	guration data fron e.	n device to	
[Yes	No	

Figure 287 Update Configured Data

2. Click Yes.

Detach Trend

Removes the *Trend* display from the anchored tab format and creates a separate trend display.

Working in ValVue VECTOR

ValVue VECTOR is set up as a typical Windows program, with tabs, menus, dialogs, windows and toolbars. After logging into ValVue the currently selected device appears in *Overview* tab. You can either perform operations on the *Overview* tab or select another tab.

Toolbar

The toolbar at the top of every tab has two menu items: *Tools* and *Help*. The *Tools* menu depends on the tab and is explained with that tab.

Modes of Operation

The VECTOR has two modes of operation:

- □ Active Search: In this mode the software is searching for networked devices.
- □ *Join Network*: In this mode the VECTOR is joined to the network.

Exit

Clicking **Exit** quits the program.

ValVue VECTOR Help

Help is readily available from anywhere within the program, including:

- □ Main Help menu: Available by clicking **Help**, located at the bottom, right corner of every tab.
- □ Context Sensitive Help: Available by right clicking within the tab area.
- □ Toolbar Help: Located in the toolbar at the top of every tab, available by clicking **Help** at the top of the tab.

Help Menu

The Help menu is the same on every tab and contains:

- □ *Help*: Launches the help file table of contents.
- □ *Firmware Info*: Displays information about the firmware loaded into the VECTOR.
- □ *About*: Displays information about ValVue VECTOR.

ValVue VECTOR Tabs

Overview Tab

From the *Overview* tab, you can view the basic functions of the VECTOR including tag and identification, input signal, setpoint, operational voltages, and device status. You can also run the Setup Wizard, scan for subdevices and send HART commands and view results.

🕼 ValVue VECTOR - Offline VECTOR01 👘 🖃						
Tools Help						
Overview Trend Con	figure Maintenance Status Communication	on Alert	s Battery	1		
HERE'S ALL	VECTOR		PV Loop Current (mA) PV (mA)	11.14		
T			Direct Power Voltage (V)	1.00		
Тад	VECTOR01		Electronics Temperature (Kelvin)	25.00		
Long Tag	WIRELESS ADAPTER 01		- Davice Status	-Wireless Status		
Descriptor	vector					
Message	IT'S A WIRELESS ADAPTER		Good	Idle		
Date	19 JUN 2009					
Assembly Number	2009			Send Cmd		
Status						
Setup Wizard Sub devices						
Active search Exit Help						

Figure 288 Overview

Trend Tab

From the *Trend* tab you can observe real time valve performance. These process trend graphs are useful for monitoring loop current and direct power voltage.



Figure 289 Trend

Configure Tab

Use the *Configure* tab to configure all aspects of VECTOR operations.

🚰 ValVue VECTOR - Offline VECTOR0	L						
Tools Help							
Overview Trend Configure Maintenance Status Communication Alerts Battery							
Power Wireless Wired 4-20mA Burst Settings Event Notification Adapter Information Time							
Adapter Power	● Loop Powered 1 0V						
	C Loop Powered - 1.5V						
	C Loop Powered - 2.0V	Set the Adapter Power Mode:					
	C Loop Powered 2.5V	Loop Power: Choose the highest voltage step possible					
	O Direct Powered - High Power	Direct Power: Choose the setting based on available power					
	O Direct Powered - Power Saving						
	O Direct Powered - External Battery						
Field Device Power Control							
Field Device Power Control	Off 🗾	Set the Field Device Power Control Setting					
Field Device Turn On Time	10 s	Set the Field Device turn on time					
Field Device Idle Time	60 s	Set the time the Field Device remains powered when an external HART master is detected					
Field Device On Estimated Percent	0 %						
Field Device Cutoff Enable	Disabled 💌	Enable the Field Device Cutoff					
Field Device Cutoff Voltage	18 V	Set the Field Device Cutoff Voltage					
NOTE: These settings are only used when the device is wired in the Field Device Power Control Configuration							
Read Apply All							
Active search Exit Help							

Figure 290 Configure

Maintenance Tab

Use the *Maintenance* tab to perform maintenance-related resets, self tests and network scans for subdevices and network device disconnect.

🐼 ValVue VECTOR - Offline VECTOR01	- • •
Tools Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	1
┌ Master Reset	
Master Reset Resets the Adapter	
⊢ Self Test	
Self Test Perform a self test on the Adapter	
Factory Reset	
Factory Reset Resets the Adapter back to the factory default configuration	
Disconnect device from network	
Disconnect device from network Disconnect a wirelessHART device from this network	
Advertise to new device	
Advertise to new device Advertise to new wirelessHART device trying to join this network	
 Active search Exit Help 	

Figure 291 Maintenance

Status Tab

Use the *Status Tab: Device_Status* tabs to see the VECTOR operating and internal status. There are eight tabs, which include:

- □ "Active Faults": Use this subtab to view a list of active faults, the Start Date, Start Time and Alert Description.
- □ "Device_Status": Use this subtab to view all current faults for overall device faults.
- □ *"IO_and_Subdevice_Status"*: Use this subtab to view all current faults for subdevices.
- □ *"Ext_Device_Status"*: Use this subtab to view all current faults for extended device status, when available.
- □ *"WirelessHART_Status":* Use this subtab to view all current faults for the WirelessHART connection.
- □ *"Device_Diagnostic_Status_0"*: Use this subtab to view all current faults for the device diagnostic tests.
- "Device_Specific_Status_0": Use this subtab to view all current faults for data that has field device status information relating to: failures / warnings / status of process's.
- □ *"Device_Specific_Status_1"*: Use this subtab to view all current faults for the wireless setup.

🐼 ValVue VECTOR - Offline VECTOR01	×
Tools Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	
Active Faults Device_Status IO_and_Subdevice_Status Ext_Device_Status WirelessHART_Status Device_Diagnostic_Status_0 Devi	
Primary Variable Out Of Limits	
On-Primary Variable Out Of Limits	
PV Analog Channel Saturated	
PV Analog Channel Fixed	
🕐 Additional Status Available	
Cold Start (Reset/Self test / power off-on)	
Configuration Changed	
O Device Malfunction	
Configure Change Count 0	
Active search Exit Help	

Figure 292 Status Tab: Device_Status

Communication Tab

Use the *Communication* tab offers tools to track and analyze wireless communications status and performance.

🚰 ValVue VECTOR - Offlin	e VECTOR01					- • X
Tools Help						
Overview Trend Configu Wireless Status Join Details Wireless Mode Join Mode Join Duty Cycle Join Time Advertisement Count Neighbor Count	Ire Maintenance Status Idle Join now 0.0 0 0 0	Communication Alerts Burst Service Status Burst Service Requeste Burst Service Granted	Battery ed 0.0 0.0		Status Wireless Signal Fo Wireless Time Syc WirelessHart Sign Network Admissio Join Failed Network Security Network Joined Network Bandwid	ound chronized al Identified n Clearance th
Join Attempts	0			X X	Join Complete	ui
Wireless Statistics Generated packets Terminated packets	0	Wired Statistics Wired Slave Statistic STX Count 0	ACK Count	0	BACK Count	0
CRC errors	0	STX Sent	0	Parity Errors	Received 0	
DLL failures NL(Session) failures Nouce Counter Values	0 0 0	ACK Received OSTX Received OACK Received		Framing Erro Received CheckByte Received	rs 0 Errors 0	
	Active search	BACK Received	0	Gap Errors F	Received 0 Help	

Figure 293 Communication

Alerts Tab

Use the *Alerts* tab to see a list of alerts, both pending and historical with related information.

	🐼 ValVue VECTOR - Offline VECTOR01 📃 📼 💌							
То	ols Help							
0	verview Trend Configure Alert Global Status Alert Occurred	Maintenance Status Communi	cation Alerts Battery					
Г	Alert Status							
	Start Date and Time	Alert Name	Stop	Date and Time	Alert Description	n		
		There a	are no alerts to show in this view.					
	•	III				•		
	Re Select All Clear Alerts							
	(> Active search		Exit	Help			

Figure 294 Alerts

Battery Tab

Use the *Battery* tab to configure battery settings and view battery data.

ValVue VECTOR - Offline	e VECTOR01				- • -		
Tools Help							
Battery Settings			Battery Status		1		
Battery Capacity	20	mAh	Power Status	Nominal			
Battery Low Voltage	20.00	v	Battery Life Remaining	0	Days		
Battery Critical Voltage	20.00	v	Battery Comsumption Rate	0.00	mAh		
Battery Changed Date			Battery Capacity Used	0.00	mAh		
			Battery Capacity Remaining	0.00	mAh		
			Last Battery Changed		-		
					Apply		
	 Active search 			Exit Help			

Figure 295 Battery

Setup Wizard

4

Setup Wizard Screen

From the Setup Wizard screen you can setup the VECTOR by configuring:

- □ Tag, Long Tag, Descriptor and Message.
- Power type and associated characteristics
- □ Wireless *Network ID* and *Join Key*
- □ Report & Backup

etup Wizard		×
Step 1:		
🔲 Set Tag and D	escriptor	
Tag	VECTOR01	
Long Tag	WIRELESS ADAPTER 01	
Descriptor	vector	
Message	IT'S A WIRELESS ADAPTER	_
Step 2: 🔲 Configure Po	ower Mode	
Power Mode	Loop Powered - Low(1v)	-
Step 3: 🗖 Join Device	to Network	
Network ID	2011	
Join Key 1	0	
Join Key 2	0 0	
Join Key 3	0 0	
Join Key 4	0	
Step 4: Report & Ba	ckup	

Figure 296 Setup Wizard

Buttons and Fields

Tag	Enter up to eight characters long and is used to identify the VECTOR in the system and appears throughout the program. This can reflect a label from a plant drawing or a control system.
Long Tag	Same as Tag, but you can enter up to 32 characters.
Descriptor	Enter up to 16 characters to describe the user of the valve.
Message	Enter with up to 32 characters for any information.
Configure Power Mode checkbox	Check this box to enable the <i>Power Mode</i> pulldown list.
Power Mode	Use this pulldown list to select the type of adapter power:
	Loop Powered - Low (1V)
	Loop Powered - Medium (1.5 V)
	Loop Powered - High (2.0 V)
	Loop Powered - Highest (2.5 V)
	Direct Powered - High Power
	Direct Powered - Power Saving
	Direct Powered - External Battery
Join Device to Network checkbox	Click to validate that the <i>Join Key</i> is correct and to add the device to the net- work by clicking Apply .
Network ID	Enter a unique ID using digits only from 0 to 36863.
Join Key	Enter four characters in both boxes for each of the eight fields.
Report & Backup	Click and when Setup Wizard completes a report of settings appears using the selection made in <i>Report Setup</i> .

Run Setup Wizard

To run the Setup Wizard:

- 1. Click Setup Wizard and Figure 296 appears.
- 2. Enter text into the Tag, Long Tag, Descriptor and Message field, as required.
- 3. Click **Configure Power Mode** and use the *Power Mode* pulldown to select a setting.
- 4. Click Join Device to Network and enter a Network ID and the four Join Keys
- 5. Click Apply and a dialog appears, Figure 297, listing the items for execution.

ValVue VECTOR	×
Setup will perform: - Set Tag and Descriptor - Configure Power Mode - Join Device to Network - Create report & backup	
ОК	Cancel

Figure 297 Setup Wizard Selected Items

6. Click **OK** and the tasks are completed and *Setup Wizard Complete* appears. If *Report* & *Backup* is selected a dialog appears; click **OK**.



Setup Wizard				
Setup Wizard Progress	\$			
Set Tag and Descripto	u 🥥	Finished		
Configure Power Mode	• 🥝	Finished		
Join Device to Network	k 🥝	Finished		
Create Report _Backup	› 🥥	Finished		
		Setup Wizard Complete		
Elapsed Time (Task): 00):00:01			
Elapsed Time (Total): 00):00:04 Cancel Cu	rrent Task Cancel All Continue		

Figure 298 Setup Wizard Complete

7. Click Continue.

Scan for Devices

To scan for network subdevices:

1. Click **Sub devices** and *Scan Result* appears listing the devices found.

Su	b devices								×
	Devic 1	Tag NEW	Long	Pollin 0	Mfg ID Dress	Devic 202	Devic 0	Univ 5	Ι
						OK		Cancel	

Figure 299 Scan Result

2. Click OK.
Trend

5

Trend Tab

Use the *Trend* tab (see Figure 300) to observe real time VECTOR performance. These trend graphs are useful for monitoring loop current and direct power voltage. The graphs can be manipulated only on the Y axis.

You can detach the trend as a separate window for viewing while changing power. To detach the trend:



□ Right click in any tab select **Detach Trend**.



Trend Graph Features

The display of any of the curves on the *Trend* graph may be turned on or off by checking or unchecking these boxes:

- □ Loop current: blue
- □ Direct Power Voltage: black
- *Trend: Y Low/High* The Y axis of the trend graph can be set by entering the values in these edit boxes. Enter a number and hit **Tab** or **Enter** key to set the scale.

Changing the Graph View

Any portion of a graph may be examined more closely by entering the new Y scale in the proper scale edit box or by dragging a box across an area of the graph. If the mouse is dragged across an area, that area fills the graphic window. Right clicking or double clicking on the graph restores the default scales. The X scale cannot be resized.

Capture to Clipboard

Clicking this button saves an image of the graph on the clipboard. The image (a bitmap) may be pasted into another document (e.g. into a Microsoft Word document).

Trend Right Click and Context Menu

When you right click on the grey area of the *Trend* tab (but not in the graph area), the *Trend Context Menu* appears. The following items appear:

Refresh Graph	Restarts the sampling of the trend graph.
Stop Graph	Stops the sampling of the trend graph. It can be restarted by selecting Refresh Graph .
Open	Opens an <i>Open Trend Data File</i> dialog to select a <i>.tre</i> file for view-ing.
Save	Opens an Save Trend Data File dialog to save a file (.tre).
Detach Trend	Removes the display from the tabbed dialog and creates a separate trend display.
Help	Displays the help file at the <i>Trend</i> tab instructions.





This page intentionally left blank.

Configure

6

Configure Screen: Overview

The *Configure* screen and its subtabs has an overall purpose of configuring all VECTOR settings. It is comprised of eight subtabs:

- □ "Configure Power Tab" on page 474
- □ "Configure Wired Tab" on page 479
- "Configure Burst Settings Tab" on page 484
- "Configure Adapter Info Tab" on page 495
- □ "Configure Wireless Tab" on page 477
- □ "Configure 4-20 mA Tab" on page 481
- "Configure Event Notification Tab" on page 490
- "Configure Adapter Info Tab" on page 495

Configure Power Tab

Use this screen to configure power type and associated characteristics.

ፉ ValVue VECTOR - Offline VECTOR01	L			
Tools Help				
Overview Trend Configure Maintena	ance Status Communication Alerts	Battery		
Power Wireless Wired 4-20mA	Burst Settings Event Notification Ada	apter Information Time		
Adapter Power Setting	G Loss Demond 10%			
	C Loop Powered 1 D/			
	C Loop Powered - 1.5v	Set the Adapter Rever Mode:		
	C Loop Powered - 2.5V	Loop Power: Choose the highest voltage step possible		
	C Direct Powered - High Power	Direct Power: Choose the setting based on available power		
	C Direct Powered - Power Saving			
	O Direct Powered - External Battery			
Field Device Power Control				
Field Device Power Control	Off	Set the Field Device Power Control Setting		
Field Device Turn On Time	10 s	Set the Field Device turn on time		
Field Device Idle Time	60 s	Set the time the Field Device remains powered when an external HART master is detected		
Field Device On Estimated Percent	0 %			
Field Device Cutoff Enable	Disabled 🔹	Enable the Field Device Cutoff		
Field Device Cutoff Voltage	18 V	Set the Field Device Cutoff Voltage		
NOTE: These settings are only used when the device is wired in the Field Device Power Control Configuration				
		Read Apply Apply All		
Active search Exit Help				

Figure 302 Configure Power



Once you configure any item, click:

Apply to apply changes from the selected tab only,

or

Apply All to apply changes made on all tabs.

Adapter Power	Use this pulldown list to select the type of adapter power:
Setting	Loop Powered - (1V)
	□ Loop Powered - (1.5 V)
	Loop Powered - (2.0 V)
	Loop Powered - (2.5 V)
	Direct Powered - High Power
	Direct Powered - Power Saving
	Direct Powered - External Battery
Field Device Power Control	When used in a direct power configuration, the VECTOR can activate a switchable terminating resistor between the HART and the RETURN signal wires. This eliminates the need for an external terminating resistor in some installations, allowing for a switchable field device power and controlled automatically by the VECTOR.
	□ Off: Sets so the field device power control switch is never connected.
	 On: Sets so the field device power control switch is always connected. You can then choose the enable the <i>Field Device Cutoff Enable</i> feature.
	 Switching: Sets the device to switching mode controlled by the VECTOR. The VECTOR powers on and off HART field devices as needed by the network operation for measurements. Use this when running off a limited power source, such as an external battery or solar cell. When used in combination with Burst mode, the VECTOR schedules measurements from the connected HART devices, and turns on the loop when a scheduled measurement is needed. For this mode to work properly, you must determine and configure <i>Field Device Turn On Time</i> parameter for the connected wired HART field devices. Switching mode has two possible configurations: With <i>Field Device Cutoff Enable</i> disabled. This requires setting <i>Field</i>
	Device Turn On Time.
	 With Field Device Cutoff Enable enabled. This requires setting Field Device Turn On Time and Field Device Cutoff Voltage.
Field Device Turn On Time	Enter the lag time between when a loop is turned on and when communica- tions with subdevices commences.

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Field Device Idle Time	Enter the time in seconds for the device to remain powered after an unscheduled event. This event could be a HART query over the <i>Wireless</i> HART handheld or detection of another HART master trying to communicate (such as a wired HART handheld). This prevents the VECTOR from powering off a field device when some other master is attempting communication with the field device. Generally best left at the default of 60 seconds.
Field Device On Esti- mated Percent	Enter the estimated time for the field device to be powered during normal operation. This is a calculation based upon the <i>Field Device Turn On Time</i> and the VECTOR burst mode ("Configure Burst Settings Tab" on page 484) settings. The lower this value is, the less power used. Display only.
Field Device Cutoff Enable	Use this pulldown to enable or disable whether a <i>Field Device Cutoff Voltage</i> is used.
Field Device Cutoff Voltage	Enter the voltage below which power to the field devices is cutoff.
Read button	Read Click this to read parameters into ValVue from the VECTOR. These can then be used as a basis for further configuration.

Configure Wireless Tab

Use the *Configure Wireless* to configure the wireless connection attributes, connect and disconnect from the network and enable or disable over-the-air radio upgrade function.

ValVue VECTOR - Offline VECTOR01		
Overview Irend Configure Maintenance Status Communication Alerts Battery		
Power Wireless Wired 4-20mA Burst Settings Event Notification Adapter Information Time		1
Network ID 2011		
Join Mode Join now		
Radio Output Power 0 dBm		
Radio Upgrade		
Over the Air Upgrade Enabled Enable the Adapter radio module to be upgraded using over the air prog	ramming	
Read Apply	Apply	All
Active search Exit Help]	

Figure 303 Configure Wireless



Once you configure any item, click:

Apply to apply changes from the selected tab only,

or

Apply All to apply changes made on all tabs.

Buttons and Fields

Wireless

Network ID

Enter a unique ID using digits only from 0 to 36863.

Join Mode	Use the pulldown list to select the join method:		
	Don't attempt to join: No attempt is made to join the network.		
	Join Now: Attempt to join as soon as you click Apply		
	 Attempt to join immediately on powerup or reset: Defers join until one of these conditions occurs. 		
Radio Power Output	Use the pulldown to select the VECTOR's radio transmit power:		
	□ 0 dBm		
	□ +10 dBm		
Radio Upgrade			
Over the Air Upgrade	Use the pulldown to select enabled or disabled to allow over the air programming.		

Configure Wired Tab

Use the *Configured Wired* to configure the HART connection characteristics and the subdevice scan characteristics.

G ValVue VECTOR - Offline VECTOR01	
Tools Help	
Overview Trend Configure Maintenance Status Con	mmunication Alerts Battery
Power Wireless Wired 4-20mA Burst Settings Ev HART Master	rent Notification Adapter Information Time
Master Mode Secondary -	Set the HART master mode for the Adapter when communicated with wired devices
Retry Count 3	Set the number of retries the Adapter will perform for wired communications
Device Scan Mode	
Sub-Device Scan On Disabled	Set the Adapter to scan for wired devices on power up or reset
Scan Start Address 0	
Scan End Address 0	
Sub-device Time Sync	
Sub-device Time Sync Disabled	Set to the allow the Adapter to synchronize wired devices to the WirelessHART time if the device supports a clock
Polling	
Poll Address 0	Set the HART address for the Adapter when using the wired-HART interface
	Read Apply All
🔿 Active search	Exit Help

Figure 304 Configured Wired



Once you configure any item, click:

Apply to apply changes from the selected tab only,

or

Apply All to apply changes made on all tabs.

Hart Master	
Master Mode	 Use the pulldown list to select the HART mode as either: <i>Primary</i>: This the default <i>Secondary</i> This is the HART Master mode used by the VECTOR when communicating as a HART master with wired-HART devices.
Retry Count	Enter the number of retries to establish communication before failure.
Device Scan Mode	
Sub-Device Scan On Power-up	Use the pulldown list to enable or disable scans automatically on powerup. When enabled, the VECTOR scans the 4-20 mA loop for attached HART devices on power-up or when the VECTOR is reset. These devices are added to the list of sup- ported sub-devices for the VECTOR and are communicated to the <i>Wireless</i> HART gateway. The VECTOR can support a maximum of eight sub-devices. If more than eight wired-HART devices are detected, only the first eight devices are used.
Scan Start Address	Enter the start address for the scan.
Scan Start Address	Enter the stop address for the scan.
Sub-Device Time Sync	Use the pulldown list to set so that when you scan you synchronize the subdevice times with the scanning device.
Polling Address	Enter the address. This is the HART polling address used to communicate to the VEC- TOR on the wired-HART interface using a HART capable host (such as a HART com- municator or PC with HART modem). By default, the VECTOR is at HART polling address 15. Range: <i>0</i> and <i>63</i> .

Configure 4-20 mA Tab

Use the Configure 4-20 mA to configure the parameters related to 4-20 mA current loop.

4 - 20 mA	2011A Burst Settings Event Notification Ada	pter Information Tin	ne tion Table		
		Index	mA Value	Eng Value	•
PV Units	IMA 💌	1	0.00	0.00	
	Lines	2	0.00	0.00	
PV Linearization Mode	Linear	3	0.00	0.00	
	0.00	4	0.00	0.00	
PV Damp	0.00	5	0.00	0.00	=
		6	0.00	0.00	-
PV Upper Range Value	0.000	7	0.00	0.00	
		8	0.00	0.00	
PV Lower Bange Value	0.000	9	0.00	0.00	
r v Lomer Hange valde	1	10	0.00	0.00	
Linner Fault Concent	0.00	11	0.00	0.00	
opper hauit current	0.00	12	0.00	0.00	
	0.00	13	0.00	0.00	
Lower Fault Current	0.00	14	0.00	0.00	
Hanna Linder (Dennark)		15	0.00	0.00	
Upper Limit of Proportional	0.00	16	0.00	0.00	
nange		17	0.00	0.00	
Lower Limit of Proportional	0.00	18	0.00	0.00	
Range	1	19	0.00	0.00	Ψ.
Lower Limit of Proportional Range	0.00	18	0.00 0.00 0.00	0.00 0.00 0.00	

Figure 305 Configure 4-20 mA



Once you configure any item, click:

Apply to apply changes from the selected tab only,

or

Apply All to apply changes made on all tabs.

PV Units	Use the pulldown to select the engineering units for use in representing PV-related values.
PV Linearization Mode	 Use the pulldown to select the transformation function applied to the field device output and percentage range: <i>Linear</i> <i>Special Curve</i> Use the <i>PV Linearization Table</i> to configure the curve characteristics. See "Create a PV Linearization Table".
PV Damp	Enter a damping constant in seconds.
PV Upper Range Value	Enter a value for the upper operational endpoint. This defines operational 100% mark.
PV Lower Range Value	Enter a value for the lower operational endpoint. This defines operational 0% mark.
Upper Fault Current	Enter a value to set the maximum current output of the loop when in a fault condition.
Lower Fault Current	Enter a value to set the minimum current output of the loop when in a fault condi- tion.
Upper Limit of Pro- portional Range	Enter a value for the proportional range upper limit.
Lower Limit of Pro- portional Range	Enter a value for the proportional range lower limit.
PV Linearization Table	Use the <i>PV Linearization Table</i> to set the linearization characteristics. This is settable at all times, but is only applied when <i>Special Curve</i> is selected.

Create a PV Linearization Table

Use the pulldown to select the transformation function applied to the field device output and percentage range. There are 32 points each comprised of:

- □ *Index*: Lists values of 1 to 32 that correlate to an *mA Value* and to the *Eng Value* for that number.
- □ *mA Value*: Enter a mA value for the curve.
- □ *Eng Value*: Enter a engineering value for the curve (input current).

To create a custom linearization:

Index	mA Value	Eng Value	^
1	0.00	0.00	
2	0.00	0.00	
3	0.00	0.00	
4	0.00	0.00	
5	0.00	0.00	
6	0.00	0.00	
7	0.00	0.00	
8	0.00	0.00	
9	0.00	0.00	
10	0.00	0.00	
11	0.00	0.00	
12	0.00	0.00	
13	0.00	0.00	
14	0.00	0.00	
15	0.00	0.00	
16	0.00	0.00	
17	0.00	0.00	
18	0.00	0.00	
19	0.00	0.00	×

Figure 306 PV Linearization Table

- 3. Enter values for the desired number of related *mA Indexs* and *Eng Indexs*.
- 4. Click Apply or Apply All.

Configure Burst Settings Tab

When you open this screen, the main screen appears (*Burst Settings: Automatic*). Use this tab to configure the *Automatic Update Rate*, the *Automatic Commands* and manual burst settings anytime a new device appears on the network it is sent the burst data.

ValVue VECTOR - Offline VECTOR01	
Overview Trend Configure Maintenance Status Communication Alerts Battery	
Power Wireless Wireless Wireless Eurst Auto Burst Automatic Update Rate Off Automatic Commands Sub-Device:Cmd3,Vector:Cmd9 & Cmd48 	
Read Apply Auto Burst Msg	Apply All
O Active search Exit Help	

Figure 307 Burst Settings: Automatic

ValVue VECTOR QWE	RT1				
Overview Trend Configur	re Maintenance 9	Status Communication	Alerts Battery		
Power Wireless Wired Auto Burst Automatic Update Rate	4-20mA Burst S	ettings Event Notificatio	on Adapter Information	Time Cmd48,Vector:Cmd3 & Cmd48	
Burst Message 0	e 20-20		- NL		
Message Number	0	Sub Device Tag	65CA	-	
Mode	Enabled 💌	Burst Command	Cmd 3:Dyn Vars/Curr	rent	
Trigger Option				Burst Data (from last burst message)	
Trigger Mode	Continuous 💌	Trigger Level	0	Burst Command:	
Update Period	300	s Max Update Period	300 s	Cmd 3:Dyn Vars/Current	
Device Variable (for co	mmand 9 and 33)			Value: 0.00 Units:	
Variable Code 0	250	Variable Code 4	250		
Variable Code 1	250	Variable Code 5	250	Burst Data Timestamp	
Variable Code 2	250	Variable Code 6	250	Date: 01 JAN 1970	
Variable Code 3	250	Variable Code 7	250	Time: 00:00:00	
Puret Massage 1	Puret Managan 1				
			Read	Apply Auto Burst Apply Burst Msg Apply All	
		 Active search 		Exit Help	





Once you configure any item, click:

Apply All to apply changes from the selected tab only,

Auto Burst	Use this area to set the burst settings automatically sent to new sub-devices when they join the network. You can:
	turn the update on,
	 set the automatic burst update rate
	and choose which preconfigured command sets for use.
Automatic Update Rate	Use the pull down to set automatic update off or to select and update time rate.

Use the pull down to select from the preconfigured commands for use. The commands include a command (s) sent to the sub-device and a set of two commands sent to the VECTOR:			
□ Sub-device: Cmd3, VECTOR Cmd3 & Cmd 48			
□ Sub-device: Cmd3, VECTOR Cmd9 & Cmd 48			
□ Sub-device: Cmd3 & Cmd 48, VECTOR Cmd3 & Cmd 48			
□ Sub-device: Cmd3 & Cmd 48, VECTOR Cmd9 & Cmd 48			
Use the pulldown to enable or disable manual burst mode.			
Use this pulldown to assign the long tag to the burst configuration or to leave it unassigned.			

Burst Command	Use the pulldown to select a burst command to manually send:
	□ <i>Cmd 1: PV</i> : Read the primary variable value and its units code.
	 Cmd 2: % range/current: Reads the loop current and its associated percent of range. The loop current always matches the current that can be measured by a milli-ammeter in series with the field device; this includes the loop current under alarm conditions. Percent of range always follows the loop current even if it is set to a value. The upper and lower range values map the loop current value to the percent of range. As a result the percent of range is not limited to values between 0% and 100%, but tracks the loop current to transducer limits when they are defined.
	Cmd 3: Dyn vars/current: Reads the loop current and up to four predefined dynamic variables. The loop current always matches the current measurable by a milli-ammeter in series with the field device; this includes alarm conditions and set values. The items configured are set in Device Variable field of the Burst Message Settings dialog ("Configure Manual Burst" on page 489) and include:
	245 Percent Range
	245 Loop Current
	246 Primary Variable
	247 Secondary Variable
	248 Tertiary Variable
	249 Quaternary Variable
	250 Not Used
	 Cmd 9: Device vars w/ Status: Requests the value and status of up to eight device or dynamic variables.
	 Cmd 33: Device variables: Requests the value of up to four device variables. Each slot accepts any device variable supported by the device.
	Cmd 48: Read Additional Device Status: Returns device status information not included in the response code or device status. This command also returns the results of Command 41, Perform Self Test. In addition, this command contains status information regarding analog channel 1 through analog channel 8. Bits in Analog Channel Saturated are set when the electrical limits established by the field device are exceeded for the corresponding Analog Channel. Bits in Analog Channel Fixed are set when the corresponding Analog Channel is directly (e.g., using Command 40 or 66) or indirectly (e.g., using Command 79) being manually controlled.

□ *Cmd* 778: *Read Battery Life*: Reads the current battery status.

Trigger Options	Use the pulldown list to select the trigger event for the manual burst:			
Trigger Mode	 Continuous: Publish the burst message continuously at least at the Update Period. 			
	 Window: Triggers the burst message when the source value deviates more than the specified <i>Trigger Level</i>. 			
	 <i>Rising</i>: Triggers the burst message when the source value rises above the specified <i>Trigger Value</i>. 			
	 Falling: Triggers the burst message when the source value falls below the specified Trigger Value. 			
	 On-change: Triggers the burst message when the source value falls below or rises above the specified <i>Trigger Value</i>. 			
Trigger Options Trigger Level	Enter a trigger level in mA.			
Trigger Options Update Period	Use the pulldown to select the period between automatic burst updates.			
Trigger Options Max Update Period	Use the pulldown to select the maximum time before an automatic burst updates. Burst messages are always be published at least as often as the <i>Maximum Update Period</i> .			
Burst Data Burst Command	Displays the last burst command sent.			
Burst Data Value	Displays the value from the last burst command sent, if applicable.			
Burst Data Units	Displays the engineering units of the value from the last burst command sent, if applicable.			
Burst Data Timestamp Date	Displays the date of the last received burst data.			
Burst Data Timestamp Time	Displays the time of the last received burst data.			
Device Variable Variable	Use these fields to supplement the device's array of device variables to allow access to the process measurements and loop current returned in Command 3.			
	245 Percent Range			
	245 Loop Current			
	246 Primary Variable			
	247 Secondary Variable			
	248 Tertiary Variable			
	249 Quaternary Variable			
	250 Not Used			

Read buttonClick this to read burst setting from the device.Apply Burst Message
buttonClick this to send a burst using the manual burst settings.Apply Auto Burst
buttonClick this to send a burst using the auto burst settings.

Configure Auto Burst

To configure a *Auto Burst*:

- 1. Use the *Automatic Update Rate* pulldown to select a rate and the *Automatic Commands* pulldown to select a command set.
- 2. Click Apply Auto Burst or Apply All.

Configure Manual Burst

To configure a *Manual Burst*:

- 1. Use the *Mode* pulldown to select **Enabled**.
- 2. Use the Subdevice Tag pulldown to select the longtag or leave unassigned.
- 3. Use the Burst Command pulldown to select a command.
- 4. Set the *Trigger Options*.
- 5. Click Apply Burst Msg.
- 6. Use the *Mode* pulldown to select **Off**. Use the *Automatic Update Rate* pulldown to reset for auto burst.

Configure Event Notification Tab

Use the *Configure Event Notification* to create an event message profile related to a series of user-configured parameters. This tab is comprised of four areas where you configure event notifications and access a subtab where you view and clear notifications ("Event Status Subtab" on page 494).

ValVue VECTOR - Offline VECTOR01	
lools Help	
Overview Trend Configure Maintenance Status Communication Ale	erts Battery
Power Wireless Wired 4-20mA Burst Settings Event Notification	Adapter Information Time
Event Message 0 V	Standard Event Mask
Subdevice Tag VECTOR01	PV Analog Channel Saturated PV Analog Channel Fixed
Retry Time (s)	Field device has more status available
Debounce Interval (s) 0	A modification has been made to the configuration of the field d Field device has malfunctioned due to a hardware error or failur
Max Update Time (s) 0	Maintenance required The second sec
Device-Specific Event Mask 1	Device-Specific Event Mask 2
Fid dev stat0-1	Fld dev stat17-1
Fld dev stat0-2	Eld dev stat17-2
Fld dev stat0-3	Fld dev stat17-3
Fld dev stat0-4	Fld dev stat17-4
Fid dev stat0-5	Fid dev stat17-5
	Eld dou stat17.7
	Eld dev stat17.8
	Read Apply All
 Active search 	Exit Help

Figure 309 Configure Event Notification



Event Message Number	Use the pulldown to select a number between 0 and 8 or 0 and 3 (depends on the number of event messages supported). This number can then optionally be linked to the <i>Subdevice Tag</i> and is linked to parameters configured on the remaining three tabs.
Status button	Status Click to open the <i>Event Status Subtab</i> dialog where you view and clear notifications.
Subdevice Tag	Use the pulldown list to select a tag to which you link the Event Message Number.
Mode	Use the pulldown to select either <i>Enabled</i> or <i>Off</i> for the configured <i>Event Message Number.</i>
Event Timing	
Retry Time	Enter the number of seconds to wait before a retry.
Debounce Interval	Enter a time in seconds for which a debounce interval is enforced before a second event for the message number is allowed. The debounce interval is the minimum time period over which the bit must remain changed (i.e., the time the event must persist) in a device before the event notification is sent. If the this interval does not conform to the allowed values the device adjusts them accordingly and returns the corrected values.
Max. Update Time	Enter a number of seconds, which is the maximum time beyond which the software must check to see if the configured parameters have been matched.

- Standard Event Mask Check all boxes for inclusion in the message event as viewed on the "Event Status Subtab" on page 494 as screen LEDs:
 - Process applied to the primary variable is outside the operating limits of the field device: Check to set an event when PV moves outside of field device limits. The PV limits are defined in the 4-20 mA tab (PV Upper Range Value/PV Lower Range Value). See "Configure 4-20 mA Tab" on page 481.
 - Process applied to the non-primary variable is outside the operating limits of the field device: Check to set an event when a variable moves outside of field device limits.
 - PV Analog Channel Saturated: Check to set an event when the electrical limits established by the field device are exceeded for the corresponding analog channel.
 - □ *PV Analog Channel Fixed*: Check to set an event when the corresponding analog channel is directly or indirectly in manual control.
 - □ *Field device has more status available*: Check to set an event when more status information is available via command 48.
 - □ A reset or self test of the field device has occurred, or power has been removed and reapplied: Check to set an event when any of these events occur.
 - □ A modification has been made to the configuration of the field device: Check to set an event when any change is made to the field device configuration.
 - □ Field device has malfunctioned due to a hardware error or failure: Check to set an event when a hardware failure occurs.
 - □ *Maintenance required*: Check to set an event when the device has not malfunctioned, but requires maintenance. This is set if any of the Alert messages is active or is in the history. You must clear all the alerts to reset.
 - Device variable alert: Check to set an event when the PV goes out of range.
 - Critical power failure: Check to set an event when a power failure causes a reboot.
 - Secondary Analog Channel Fixed: Check to set an event when the corresponding analog channel is directly or indirectly in manual control.
 - □ *Tertiary Analog Channel Fixed*: Check to set an event when the corresponding analog channel is directly or indirectly in manual control.
 - Quaternary Analog Channel Fixed: Check to set an event when the corresponding analog channel is directly or indirectly in manual control.
 - Quinary Analog Channel Fixed: Check to set an event when the corresponding analog channel is directly or indirectly in manual control.
 - □ Secondary Analog Channel Saturated: Check to set an event when the electrical limits established by the field device are exceeded for the corresponding analog channel.

		<i>Tertiary Analog Channel Saturated</i> : Check to set an event when the electrical limits established by the field device are exceeded for the corresponding analog channel.
		<i>Quaternary Analog Channel Saturated</i> : Check to set an event when the electrical limits established by the field device are exceeded for the corresponding analog channel.
		<i>Quinary Analog Channel Saturated</i> : Check to set an event when the electrical limits established by the field device are exceeded for the corresponding analog channel.
		Simulation Active: Check to set an event when a simulation runs.
		<i>Non-Volatile memory failure</i> : Check to set an event when there is a non-volatile memory failure.
		<i>Volatile memory failure</i> : Check to set an event when there is a volatile memory failure.
		Watchdog reset executed: Check to set an event when a watchdog timer resets.
		<i>Voltage conditions out of range</i> : Check to set an event when device voltage goes out of range. This is set when the device is in battery powered mode and the battery state reaches Critical.
		<i>Environmental conditions out of range</i> : Check to set an event when conditions go out of range. This is set when unit temperature is below -54 °C or above +89 °C.
		<i>Electronic failure</i> : Check to set an event when there is any electronics failure.
		Subdevice list changed: Check to set an event when any additions or deletions occur to the subdevice list.
		<i>Duplicate master detected</i> : Check to set an event when a second master is detected on the network.
		<i>Capacity Denied</i> : Check to set an event when a the device has been denied a request for network capacity (bandwidth) to perform a function. Check the burst mode settings ("Configure Wireless Tab").
		<i>Bandwidth allocation pending</i> : Check to set an event when a gateway requested bandwidth allocation is made but not yet completed.
		<i>Block transfer pending:</i> Check to set an event when a block transfer is in process. Block transfers are used for asset management or large data transfers.
Device-Specific Event Mask 1 and 2	Use The	e this tab to enable/disable various events so that they are active for alarming. e alarms are reflected on the "Event Status Subtab" as screen LEDs.
Fld dev stat	Che	eck to set an event when the device-specific item is out of range.

Event Status Subtab

Use this tab to view and to clear notifications.

Event Status	\mathbf{X}
Operation	C Standard Status
 Configuration changed event pending Device status event pending More status available event pending 	Process applied to the primary variable is outside the operating Process applied to the non-primary variable is outside the oper. PV Analog Channel Saturated PV Analog Channel Fixed Field device has more status available A reset or self test of the field device has occurred or power b
Date of First Unack Event Triggered 01 JAN 1970 Time of First Unack Event Triggered 00:00:00	A modification has been made to the configuration of the field Field device has malfunctioned due to a hardware error or failu Maintenance required Device variable alert
Device-Specific Status	Device-Specific Status 2
 ☐ Fld dev stat0-1 ☐ Fld dev stat0-2 ☐ Fld dev stat0-3 ☐ Fld dev stat0-4 ☐ Fld dev stat0-5 ☐ Fld dev stat0-6 ☐ Fld dev stat0-7 ☐ Fld dev stat0-8 	□Fld dev stat17.1 □Fld dev stat17.2 □Fld dev stat17.3 □Fld dev stat17.4 □Fld dev stat17.5 □Fld dev stat17.6 □Fld dev stat17.8
	Clear Cancel

Figure 310 Event Status Subtab

Configuration changed event pending	Illuminates to indicate that a configuration change is pending.
Device status event pending	Illuminates to indicate that a device status event is pending.
More status available event pending	Illuminates to indicate that an event containing status updates from command 48 is pending.
Date of First Unak Event Triggered	Displays the date the first unacknowledged event was triggered.
Time of First Unak Event Triggered	Displays the time the first unacknowledged event was triggered.
Clear button	Clear Click this button to clear all screen items. The screen remains clear until the next triggering event occurs.

Configure Adapter Info Tab

Use the *Configure Adapter Info* to configure adapter nameplate data, engineering units and write protect the VECTOR.

🐼 ValVue VECTOR - Offline VECTOR01 💼 📼					
Tools Help					
Overview Trend Configure Maintenance Status Communication Alerts Battery					
Power Wireless Wired 4-20mA Burst Settings Event Notification Adapter Information Time					
Tag	VECTOR01	Date	19 JUN 2009		
Long Tag	WIRELESS ADAPTER 01	Country	America 🔹		
Descriptor	VECTOR	SI Unit Control	None		
Message	IT'S A WIRELESS ADAPTER	Electronics Temperature	Kelvin 💌		
Assembly Number	2009	Univ Cmd Rev	7		
Manufacturer	Masoneilan-Dresser	Trans Cmd Rev	1		
Model	Vector	Hardware Rev	1		
Device ID	9042009	Software Rev	1		
Device Serial		MAC Address			
Write Protect Write Protect Disabled Image: only reading operations are allowed		e Wireless Module Manufacturer ID	0		
Software Revision	Software Revision		0		
Software Build	0	Device Revision	0		
Software Bootloader Re	evision 0	Software Revision	0		
Software Build Date		Hardware Revision	0		
	Read Apply All				
	Active search Exit Help				

Figure 311 Configure Adapter Info



Once you configure any item, click:

Apply to apply changes from the selected tab only,

or

Apply All

to apply changes made on all tabs.

Adapter Information			
Tag	Enter up to eight characters long and is used to identify the VECTOR in the system and appears throughout the program. This can reflect a label from a plant drawing or a control system.		
Long Tag	Same as Tag, but you can enter up to 32 characters.		
Descriptor	Enter up to 16 characters for VECTOR-related information.		
Message	Enter up to 32 characters as a device-related message.		
Assembly Number	Enter an overall field device identity number.		
Manufacturer	Enter the manufacturer.		
Model	Enter the model.		
Device ID	Enter the <i>Device ID</i> .		
Device Serial Num- ber	Enter the VECTOR serial number.		
Date	Enter a date in <i>dd/mm/yyyy</i> format.		
MAC Address	Enter the VECTOR MAC address.		
Univ Cmd Rev	Enter the HART Command revision.		
Hardware Rev	Enter the hardware revision.		
Trans Cmd Rev	Enter the transmitter revision.		
Software Rev	Enter the ValVue VECTOR software revision.		
Country	Use the pulldown to select the country where the VECTOR is installed: America Japan Germany France Spain Russian China		
SI Unit Control	Use the pulldown to select either: <i>None</i> : The application uses English units. <i>SI Only</i> : The application uses only SI units.		
Electronics Tempera- ture	Use the pulldown to select the temperature scale: degC degF Kelvin 		

Write Protected

<i>Write Protected</i> pull- down	Use the pulldown to select <i>Enabled</i> to write protest the VECTOR; only read opera- tions are allowed.
Software Revision	
Software Build	Displays the present build number Displays the revision as scanned using the <i>Read</i> button.
Software Bootloader Revision	Displays the present bootloader number Displays the revision as scanned using the <i>Read</i> button.
Software Build Date	Displays the software build date Displays the revision as scanned using the <i>Read</i> button.
Wireless Module	
Manufacturer ID	Displays the manufacturer's ID Displays the revision as scanned using the <i>Read</i> button.
Device Type	Displays the device type ID Displays the revision as scanned using the <i>Read</i> button.
Device Revision	Displays the device revision as scanned using the <i>Read</i> button.
Software Revision	Displays the revision as scanned using the <i>Read</i> button.
Hardware Revision	Displays the revision as scanned using the <i>Read</i> button.
Read button	Read Click this to read parameters into ValVue from the VECTOR. these can then be used as a basis for further configuration.

Configure Time Screen

Use the Configure Time to view time and date related values.

🚰 ValVue VECTOR - Offline	VECTOR01				- • •
Tools Help					
Overview Trend Configure	Maintenance Status	Communication Alerts Battery			
Power Wireless Wired	4-20mA Burst Settings	Event Notification Adapter Information	Time		1
Current Date		-			
]	_			
System Uptime	0	8			
		[Read	Apply	Apply All
	 Active search 		Exit	Help	

Figure 312 Configure Time



Time	
Current Date	Displays the current date from the field device.
Current Time	Displays the current time from the field device.

Uptime

System Uptime

Displays the running time since the last power on.

Read button Click this to read parameters into ValVue from the VECTOR. these can then be used as a basis for further configuration.

Configure Tab Tools and Context Menu

There is no context menu for this tab.

Update Configured Data

Use this command to upload device data to ValVue VECTOR to synchronize the two.

To do this:

1. Use the right click or tools menu and select **Update Configured Data** and appears.



Figure 313 Update Configured Data

2. Click Yes.

Detach Trend

Removes the *Trend* display from the anchored tab format and creates a separate trend display.

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Maintenance



Maintenance Tab

The *Maintenance Tab* tab offers tools to connect/disconnect the VECTOR from the network and perform simple maintenance.

🐼 ValVue VECTOR - Offline VECTOR01				
Tools Help				
Overview Trend Configure Maintenance Status Communication Alerts Battery	1			
Master Reset				
Master Reset Resets the Adapter				
┌ Self Test				
Self Test Perform a self test on the Adapter				
Factory Reset				
Factory Reset Resets the Adapter back to the factory default configuration				
Disconnect device from network				
Disconnect device from network Disconnect a wirelessHART device from this network				
Advertise to new device				
Advertise to new device Advertise to new wirelessHART device trying to join this network				
Active search Exit Help				

Figure 314 Maintenance Tab



Maintenance Tab Tools and Context Menu

Update Configured Data

Available on the Tools menu only.

Use this command to upload device data to ValVue VECTOR to synchronize the two.

To do this:

1. Use the right click or tools menu and select **Update Configured Data** and appears.



Figure 315 Update Configured Data

2. Click Yes.

Factory Reset

Use this command to reset the VECTOR to factory default values.

Detach Trend

Removes the *Trend* display from the anchored tab format and creates a separate trend display.

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Status

8

Status Screen: General

Use the *Device Status* screen to see the VECTOR 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:

- □ Red indicates an alarm (fault) has occurred
- □ Green indicates no faults

On each screen the *Configure Change Count* field indicates the number of times the device configuration or calibration has been changed by a host application or from a local operator interface.

The Status screen is split into eight subtabs:

"Active Faults" on page 506	"Device_Status" on page 507
"IO_and_Subdevice_Status" on page 508	"Ext_Device_Status" on page 509
"WirelessHART_Status" on page 510	"Device_Diagnostic_Status_0" on page 511
"Device_Specific_Status_0" on page 512	"Device_Specific_Status_1" on page 513

Active Faults

The Active Faults tab displays all current faults.

ValVue VECTOR - Offline VECTOR01	×
Tools Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	. 1
Active Faults Device_Status 10_and_Subdevice_Status Ext_Device_Status WirelessHART_Status Device_Diagnostic_Status_0 Devi	<u> </u>
No Error	
Configure Change Count 0	
 Active search Help 	

Figure 316 Active Faults

Device_Status

The Device_Status tab displays all current faults for overall device faults.

WalVue VECTOR - Offline VECTOR01	
Tools Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	
Active Faults Device_Status IO_and_Subdevice_Status Ext_Device_Status WirelessHART_Status Device_Diagnostic_Status_0	Devi ↓ ▶
Primary Variable Out Of Limits	
On-Primary Variable Out Of Limits	
PV Analog Channel Saturated	
PV Analog Channel Fixed	
Additional Status Available	
Cold Start (Reset/Self test / power off-on)	
Configuration Changed	
Oevice Malfunction	
Configure Change Count 0	
Active search Eat Help	

Figure 317 Device_Status

IO_and_Subdevice_Status

The *IO_and_Subdevice_Status* tab displays all current faults for subdevices.

Sa ValVue VECTOR - Offline VECTOR01	
Tools Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	
Active Faults Device_Status IO_and_Subdevice_Status Ext_Device_Status WirelessHART_Status Device_Diagnostic_Status	us_0 Devi ◀ ▶
Sub Device List Changed	
Ouplicate Master Detected	
Configure Change Count 0	
Active search Exit Help	

Figure 318 IO_and_Subdevice_Status

Ext_Device_Status

The *Ext_Device_Status* tab displays all current faults for extended device status, when available.

ValVue VECTOR - Offline VECTOR01	
Tools Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	1
Active Faults Device_Status IO_and_Subdevice_Status Ext_Device_Status WirelessHART_Status Device_Diagnostic_Status	us_0 Devi 🔸 🕨
Maintenance Required	
Oevice Variable Alert	
Critical Power Failure	
Configure Change Count 0	
Active search Edit	

Figure 319 Ext_Device_Status

WirelessHART_Status

The WirelessHART_Status tab displays all current faults for the WirelessHART connection.

🖗 ValVue VECTOR - Offline VECTOR01	
Tools Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	1
Active Faults Device_Status IO_and_Subdevice_Status Ext_Device_Status WirelessHART_Status Device_Diagnostic_Status	atus_0 Devi ∢ ▶
Capacity Denied	
Bandwidth allocation pending	
Block transfer pending	
Configure Change Count 0	
Active search	

Figure 320 WirelessHART_Status

Device_Diagnostic_Status_0

The *Device_Diagnostic_Status_0* tab displays all current faults for the device diagnostic tests.

ValVue VECTOR - Offline VECTOR01	- • •
Tools Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	
Active Faults Device_Status IO_and_Subdevice_Status Ext_Device_Status WirelessHART_Status Device_Diagnostic_Status	_0 Devi
Simulation Active	
Non-Volatile Memory Failure	
🕘 Volatile Memory Error	
Watchdog Reset Executed	
Voltage Conditions Out Of Range	
Environmental Conditions Out Of Range	
Electronic Failure	
Configure Change Count 0	
O Active search	

Figure 321 Device_Diagnostic_Status_0

Device_Specific_Status_0

The *Device_Specific_Status_0* tab displays all current faults for data that has field device status information relating to: failures / warnings / status of process's.

ValVue VECTOR - Offline VECTOR01	- • •
loois Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	1
IO_and_Subdevice_Status Ext_Device_Status WirelessHART_Status Device_Diagnostic_Status_0 Device_Specific_Status_0 [Device_
Stack Overflow	
Burst Messages Dropped	
Incorrect power mode	
Bad Loop Switch Parameters	
Bad Burst Configuration	
Subdevice Dropped	
Ouplicate Poll Addr Detected	
Wired Burst Mode Detected	
Configure Change Count 0	
Active search Exit Help	

Figure 322 Device_Specific_Status_0

Device_Specific_Status_1

The *Device_Specific_Status_1* tab displays all current faults for the wireless setup.

WalVue VECTOR - Offline VECTOR01	- • ×
Tools Help	
Overview Trend Configure Maintenance Status Communication Alerts Battery	1
Ext_Device_Status WirelessHART_Status Device_Diagnostic_Status_0 Device_Specific_Status_0 Device_Specific_Status_1	
Wireless Join Failed	
Loop Switch Cutoff Voltage Tripped	
Configure Change Count 0	
Active search	

Figure 323 Device_Specific_Status_1

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Communication

Communication Tab

The *Communication* tab offers tools to track and analyze wireless communications status and performance.

🖌 ValVue VECTOR - Offline VECTOR01			
Tools Help			
Overview Trend Configure I Wireless Status Join Details Idle Join Details Join Idle Join Mode Join Join Join Duty Cycle 0.0 Join Time 0 Advertisement Count 0 Neighbor Count 0 Join Attempts 0	Maintenance Status Communication Burst Service F Burst Service C Burst Service C	Alerts Battery Status lequested 0.0 iranted 0.0	Join Status Wireless Signal Found Wireless Time Sychronized WirelessHart Signal Identified Network Admission Join Retrying Join Failed Network Security Clearance Network Joined Network Bandwidth Join Complete
Wireless Statistics Generated packets 0 Terminated packets 0 CRC errors 0 DLL failures 0 NL(Session) failures 0 Nouce Counter Values 0	Wired Statistic Wired Slave STX Count Wired Maste STX Sent ACK Receive OSTX Recei BACK Receive	s Statistics ACK Count 0 r Statistics 0 r Statistics 0 r d 0	BACK Count 0 Party Errors Received 0 Framing Errors Received 0 CheckByte Errors Received 0 Gap Errors Received 0
C	> Active search		Exit Help

Figure 324 Communication

Buttons and Fields

Wireless Status	
Join Details	
Wireless Mode	Displays the wireless mode.
Join Mode	Displays the join mode.
Join Duty Cycle	This is a percentage measurement of progress in the join cycle.
Join Time	Time in seconds elapsed since the join request.
Advertisement Count	Number of advertisement packets received.
Neighbor Count	Number of available neighbors detected.
Join Attempts	Number of join attempts. After five attempts, the join is marked as failed and the Alert message is set. The radio module resets and tries again for five more times, this repeats indefinitely until a join is successful.
Burst Service Status	
Burst Service Requested	Lists the number of times a burst request occurs.
Burst Service Granted	Lists the number of times a burst request is granted.
Join Status	A series of LEDs that illuminate as each part of the join process is completed.
Wireless Statistics	
Generated Packets	Number of packets generated by this device.
Terminated Packets	Number of packets terminated by this device.
CRC Errors	Number of CRC errors detected.
DLL Failures	Number of data link layer MIC (Message Integrity Check) failures detected.
NL (sessions) Failures	Number of network layer data link layer MIC failures detected.
Nonce Count Value	Numbers of nonces used. Reset when a new wireless join occurs.
Wired Statistics	
Wired Slave Statistics	The adapter can perform as a wired slave, when being configured by a wired host (such as a handheld).
STX Count	Number of messages sent from the host to the adapter in this wired slave mode.
ACK Count	Number of messages sent from the adapter to the host in this wired slave mode.
BACK Count	Number of <i>Wired Burst</i> messages sent from the adapter to the host in wired slave mode. The adapter does not support wired Burst message, so this field is always zero, however, the HART spec requires this count value to be included in the device.
Wired Master Statistics	The adapter can perform as a wired master when communicating with sub-devices.

STX Sent	Number of messages initiated by the adapter to other wired slaves.
ACK Received	Number of message responses received by the adapter from the wired slave, from request messages originated from the adapter.
OSTX Received	Number of <i>STX</i> messages sent from the other master on the HART bus. The <i>O</i> stands for the <i>Other</i> Master.
OACK Received	Number of <i>ACK</i> messages sent from wired HART slaves to the other master on the HART bus.
BACK Received	Number of <i>BACK</i> messages heard on the bus. A wired HART slave device can support a <i>Burst</i> mode where it continuously sends data to masters on the bus.
Parity Errors Received	Count of parity error messages received by the I/O system on this channel.
Framing Errors Received	Count of framing error messages received by the I/O system on this channel.
Checkbyte Errors Received	Count of checkbyte error messages received by the I/O system on this channel.
Gap Errors Received	Count of gap error messages received by the I/O system on this channel.

Communication Tab Tools and Context Menu

There is no context menu for this tab.

Update Configured Data

Use this command to upload device data to ValVue VECTOR to synchronize the two.

To do this:

1. Use the right click or tools menu and select **Update Configured Data** and appears.



Figure 325 Update Configured Data

2. Click Yes.

Detach Trend

Removes the *Trend* display from the anchored tab format and creates a separate trend display.

Alerts

10

Alerts Tab

Use this tab to view a list of historical faults (non-active) and active alerts, the *Start Date*, *Start Time Stop Date*, *Stop Time* and *Alert Description*. Additionally, you can select an alert and click **Clear** to remove it from display.

rview Trend Configure Maintenance Status Communication Alerts Battery ert Global Status				
Alert Occurred	Active Alerts			
Start Date and Time	Alert Name	Stop Date and Time	Alert Description	
01 JAN 1970 00:00:00	Power Mode Misconfigured		The power mode detected on the	
01 JAN 1970 00:00:11	Duplicate HART Master Detected	01 JAN 1970 00:00:48	A HART Master has been detect	
•	m		•	

Figure 326 Alerts Status

Buttons and Fields

Alert Global Status	
Alert Occurred	Gray indicates no alert occurred; red indicates active alerts or alert history.
Active Alerts	Gray indicates no alert occurred; red indicates active alerts or alert history.
Alert Status	
Start Date and Time	Displays the start date and time for each alert.
Alert Name	Displays the alert name.
Stop Date and Time	Displays the stop date and time for each alert.
Alert Description	Displays a description associated withe the alert.
Re Select button	Remove all the checked items and provide reselect space.
Select All button	Selects all alerts which can be cleared.
Clear Alerts button	Clears selected alerts.

Alerts Tab Tools and Context Menu

There is no context menu for this tab.

Update Configured Data

Use this command to upload device data to ValVue VECTOR to synchronize the two.

To do this:

1. Use the right click or tools menu and select **Update Configured Data** and appears.



Figure 327 Update Configured Data

2. Click Yes.

Detach Trend

Removes the *Trend* display from the anchored tab format and creates a separate trend display.

Battery

11

Battery Info Screen

Use the *Battery Settings* to configure battery settings and view battery data.

.	alVue VECTOR - Offlin	e VECTOR01				
Too	ls Help					
Ov	erview Trend Configu	ure Maintenance Status Cor	mmunication A	Verts Battery		
Γ	Battery Settings			Battery Status		
	Battery Capacity	20	mAh	Power Status	Nominal	
	Battery Low Voltage	20.00	v	Battery Life Remaining	0	Days
	Battery Critical Voltage	20.00	v	Battery Comsumption Rate	0.00	mAh
	Battery Changed Date			Battery Capacity Used	0.00	mAh
				Battery Capacity Remaining	0.00	mAh
				Last Battery Changed		
						Apply
		 Active search 			Exit Help	

Figure 328 Battery Settings



Once you configure any item, click:

Apply

to apply changes.

Buttons and Fields

Enter the battery capacity in mAh.
Enter the voltage at which the battery voltage sets an alarm.
Enter the voltage at which the battery voltage sets a critical alarm.
Enter in <i>dd/mm/yyyy</i> format the date the battery was changed.
Displays whether the status is Nominal, Low, Critically Low, Recharging – Low, Recharging – High.
Displays the calculated battery life remaining.
Displays the calculated battery consumption rate.
Displays the amount of mAh used.
Displays the amount of mAh remaining.
Displays in <i>dd/mm/yyyy</i> format the date the battery was changed.

Battery Tab Tools and Context Menu

There is no context menu for this tab.

Update Configured Data

Use this command to upload device data to ValVue VECTOR to synchronize the two.

To do this:

1. Use the right click or tools menu and select **Update Configured Data** and appears.



Figure 329 Update Configured Data

2. Click Yes.

Detach Trend

Removes the *Trend* display from the anchored tab format and creates a separate trend display.

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ValVue HDLT Software

ValVue HDLT - Offlin Tools Help	e LEV1			
Transmitter Dia HDLT Monitor	gnostics Configuration	Data Base Calibration	Controller Calibration Parameters	Controller Parameters
		in	_	HDLT
		20	Level in	10.00
T ag Descriptor	LEV1 DESC	15 -	Signal (mA)	12.00
Message Date	MESSAGE 02 FEB 2000			
Assembly Number	1234	10 -		Send Lmd
Status	•	5 –		<u></u>
ļ,		0		×
Change Mode	Mode: Diagnostic	٥	Exit	Help

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Monitor Tab

The *Monitor* tab displays the level of liquid or the interface reported by the device, status information, and mode information. From this tab, you can send commands to read calibration and configuration information.

ValVue HDLT - Offlin	e LEV1		
Tools Help			
Transmitter Diag HDLT Monitor	gnostics Configuration Da	ata Base Controller Calibration Parameters	Controller Parameters
			HDLT
CCC .		in	
			10.00
-	LD/	Signal (mé)	12.00
lag			1
Descriptor	MESSAGE		
Date	02 FEB 2000	_	
	1234		Send Cmd
	1		
Status	0		<u></u>
		5 –	
			<u> </u>
Change Mode	Mode: Diagnostic	⊖ Exit	Help

Figure 1 Monitor Tab

Tag Information

Displays the tag information from the HDLT including the *Tag*, *Descriptor*, *Message*, *Date*, and *Assembly Number*.

Tag Name	This is a user-entered value. It may be up to eight characters long and is used to identify the HDLT within the plant. HART communi- cation can use the tag name to verify that it is communicating to the desired value.
Descriptor	This is a user-entered value. It may be up to 16 characters long and may contain any text.
Message	This is a user-entered value. It may be up to 32 characters long and may contain any text.

Date	This field contains a user entered date value. The value is stored inside the device. It can be used however you wish and is often used to track the date of the last maintenance.	
Assembly Number	This field contains a user-entered number. You can assign the assembly a unique number for their internal use.	
Other Fields		
Level	The value of the level of liquid measurement in its engineering units. The units can be selected by the user in the calibration-parameters tab. The signal is converted to engineering units based on the parameters entered on the calibration tab.	
Signal (mA)	The value of the output signal from the HDLT expressed in milli-ampere.	
Send CMD	Sends the command that is selected in the drop down box to the HDLT. The response from the HDLT is printed in the response box.	
Write Assembly Number	Selecting this command brings up a dialog which lets you enter an assembly number which are written to the HDLT.	
Write Message	Selecting this command brings up a dialog which lets the user enter a message of up to 32 characters which will be written to the HDLT.	
Write Tag and Descriptor	Selecting this command brings up a dialog which to enter a tag name, descriptor, date. This data is written to the HDLT.	
Device ID	Each HDLT manufactured by Masoneilan is assigned a unique identi- fication number. HART uses the manufacturer's ID, Manufacturer's Device Type, and the Device ID to uniquely identify a HART device. No two devices will have the same values for these three parameters.	
Manufacturer's ID	Masoneilan's manufacturers ID for HART devices is 101. This number is built into the device.	
Device Type	The HDLT device code is 100. This number is built into the device.	
Hardware Revision	This value indicates which revision of the hardware is used inside the HDLT. LevelVue and other software that must communicate with the HDLT uses the software revision number to know how to correctly communicate with the device.	

Status

The HDLT tracks internal errors and fault conditions. When there is information on fault codes available in the HDLT, this box will contain *Additional Status Available*. To retrieve fault codes:

- 1. Select **Read Status** from the drop down list.
- 2. Click **Send CMD**. The results appear in the lower left box. The status block also contains other status codes returned by HART. These include *Configuration Changed, Device malfunction,* and *Variable out of limits*.

Clear Status

Clears the status flags. See "Status Code List" on page 531.

Send Commands

Clicking on the arrow presents a list of HART commands that may be sent to the HDLT. To do this:

- 1. Click on a command to select it.
- 2. Click **Send Message** to send the message to the device.
- 3. The response appears in the *Response* box.

Commands:

000 Read Identifier	Returns the unique identifier from the device including the device ID, device type, and the manufacturers ID.	
001 Read Primary Variable	Returns the level of liquid or the level of interface.	
002 Read Current	Returns the current signal in mA.	
003 Read All Variables	Returns the current signal, the level position, the circuit tempera- ture and the local controller setpoint.	
011 Read ID from Tag	Prompts the user for a tag name. The tag name is sent in a HART command and if received by a device with a matching tag name, the ID of the device is returned. The format of the ID is the same as command 001 Read Identifier.	
012 Read Message	Reads the message that was stored in the device when it was con- figured.	
013 Read Tag and Descrip	Reads the tag name, date and the descriptor that was stored in the device when it was configured.	
016 Read Assembly Number	Reads the final assembly number that was stored in the device when it was configured.	
017 Write Message	Writes the Message.	
018 Write Tag and Descriptor	Writes the Tag and Descriptor.	
019 Write Assembly Number	Writes the Assembly Number.	
038 Reset Configuration Changed Flag	Clears the HART status bit <i>Configuration Changed</i> . The configura- tion changed bit is set each time the user changes any configu- rable parameter.	

148 Read Status	Reads and displays the status flags. These flags describe error condi- tions that have occurred since the last time they were cleared. See "Status Code List" on page 531 for a complete list of possible codes.	
149 Clear Status	Clears message status codes.	
150 Read Fault History	Displays the faults that have occurred since the last full power up or since the faults were cleared with a <i>Clear status</i> command. The faults recorded with a <i>Read status</i> are cleared on a reset but those recorded in fault history are not.	
138 Read Configuration	Displays the configuration of the HDLT including level or interface mode, direct or reverse action, button locks, alarm settings, fail current.	
140 Read Displacer Data	Displays the volume, weight, length and diameter of the displacer.	
142 Read Transmitter Data	Describes the material and options of the torque tube and chamber.	
150 Read Continuous Diag. Data	Displays the continuous diagnostic data including the number of fills, time empty, time full, and time working.	
014 Read PV Sensor Info	Displays the sensor data including the sensor serial number, sensor upper and lower limits, and span. Not used by the HDLT.	
015 Read PV Output Info	Displays the level output information including full and empty levels (engineering units) and the damping coefficient.	
132 Read Alarms	Displays the settings of the alarm limits.	
134 Read Level Specific Gravity	Displays the specific gravity used for calibration and in service for level measurement.	
136 Read Interface Specific Gravity	Displays the specific gravities used for calibration and in service for interface measurement.	
152 Read Specific Gravity Meter	Displays the specific gravity meter calibration values and the spe- cific gravity if the tank is full.	
200 Read Signal Calib	Displays the low and high current signal calibration values.	
202 Read Zero and Reduced Span	Displays the zero shift and the reduced span values.	
170 Read Raw Data	Returns information from the HDLT that is useful to Masoneilan tech- nicians for diagnostic purposes.	
Read Controller Configuration	Displays the controller configuration information including setpoint scales and controller rate. Available only in version 5.11 and higher.	
Read Controller Parameters 1	Displays the process controller operating parameters ("Calibration Parameters Tab" on page 542). Available only in version 5.11 and higher.	
Read Controller Parameters 2	Displays the process controller ratio control parameters. Available only in version 5.11 and higher.	

Read Controller PID	Displays the process controller PID parameters: <i>P, I, Kt, Kd</i> , and <i>Beta</i> . Available only in version 5.11 and higher.
Read Setpoint Scale	Displays the controller setpoint scale. Available only in version 5.11 and higher.

Response

The HART command response from the HDLT is displayed in the response box.

Status Code List

The following status messages report events since the last time the status codes were cleared.

- □ Startup The level was powered off and restarted or a reset occurred.
- □ Sensor Disconnected The sensor was disconnected.
- □ Sensor Fault An invalid sensor reading was detected.
- □ Torque Sensor Error An invalid sensor reading was detected.
- □ *TCIR Reference Error* An invalid internal reference voltage was detected.
- □ *Torque Sensor Range Error* The torque sensor measurement was out of range.
- □ *EEProm Write Error* An attempt to save data to the non-volatile memory failed.
- Data Overrun Error An internal software/hardware error occurred.
- □ *Timeout Error* An internal software/hardware error occurred.
- □ *Circuit Temperature Error* The circuit temperature was outside of the operating range.
- □ *Circuit Temperature Sensor Error* An invalid temperature sensor measurement was detected.
- □ Software Error An internal software/hardware error occurred.
- □ *No Refresh* An internal software/hardware error occurred.
- □ LOW ALARM The level is lower than the lower alarm setting.
- □ *HIGH ALARM* The level is higher than the upper alarm setting.
- Displacer Height Error The displacer position was out of range.
- □ *Mounting Error* The level head is mounted incorrectly (compared to calibration and configuration settings).
- □ Specific Gravity Out of Range The measured specific gravity is out of range.
- Displacer Error An invalid displacer measurement was detected.
- □ *Calibrate Failed* Calibration failed, probably due to an invalid data entry.
- □ *Low Alarm Occurred* The level was lower than the lower alarm setting (but may be above the limit currently).

- □ *High Alarm Occurred* The level was higher than the upper alarm setting (but may be below the limit currently).
- □ Specific Gravity Meter Error An invalid measurement was detected.
- □ Stack Reset An internal software error occurred and a stack overflow was detected.
- □ *RTD Standard Error* The RTD reference measurement was incorrect.
- □ Zero Standard Error The Zero reference measurement was incorrect.
- □ *RTD Sensor Error* The RTD sensor measurement was incorrect.
- □ Abort An internal software/hardware error occurred.
- □ *Factory Error* Invalid factory data was detected.

Read Additional Status

When displayed, there are status codes set in the HDLT that indicate events or faults that have occurred since the last time they were cleared. Send the HDLT a *Read Status* message and the status codes appear in the response box. Sending the HDLT a *Clear Status* message clears the status codes (if the problem no longer exists) and the *Read Additional Status* message disappears. See "Status Code List" on page 531 for a complete list of possible codes.

Change Mode

This allows you to change the mode of the HDLT.

Calibrate Mode

Allows calibration of the HDLT. The calibrate mode has three tabs to set up various aspects of the transmitter:

- □ "Calibration Tab" on page 540
- □ "Calibration Parameters Tab" on page 542
- □ "Calibration Tools Tab" on page 544

Normal Operating Mode

In the Normal operating mode and in level or interface transmitter, the HDLT measures the level of liquid or the interface and sets the output current to the appropriate value according to the parameters set in configuration and calibration. In Controller mode, the HDLT measures the level of liquid or the interface and sets the output current (controller output) accordingly to the controller parameters set in *Configuration* and in the *Controller* tab. The HDLT needs to be set in normal Operating mode before leaving this mode for Hart communication to work properly.

The Normal mode tab displays the current level of liquid or the interface, signal values and HDLT' status. In addition it allows you to send hart commands to the HDLT that displays the configuration and calibration data.

Manual Mode

The Manual mode is an intermediate mode used before going to *Configure Calibrate* or *Diagnostic* modes. This mode allows you to drive the controller output for a HDLT working in Controller mode.

Configure Mode

Allows you to configure the HDLT. The configure mode has two tabs to set up various aspects of the transmitter:

- □ "Configuration Tab" on page 536
- □ "Configuration DataBase Tab" on page 551

Report

Generates a report of the HDLT parameters using the template selected in *Report Setup*.

Report Setup

You must select the report template file which is either a text (.txt) or rich text (.rtf) or a browser (.htm) file. A standard report comes installed with ValVue but you can create new reports in other formats.

To select the report file:

- 1. Click the browse button next to the report file edit box.
- 2. Select the proper report file.

The program that generates the reports can be WordPad, or Microsoft Word for text files. Rich text format (.rtf) files can be used with WordPad or Word to give better formatting. HTML files can be used with Word or Internet explorer.

To select the program:

- 1. Click the browse button next to the program edit box.
- 2. Select the program to use.

NotePad and WordPad are often installed in the directory *c*:*Program Files**Accessories*\ *or in c*:*windows*\. The actual location of these files or Microsoft Word varies from computer to computer.

Alternately, you can click either the MS Word or Word Pad checkbox and the software finds the appropriate .exe for you.

Menu - Monitor

When you right-click on the *Monitor* tab, a context menu appears. The items that appear depend on the HDLT mode:

- Reset Selecting this issues a master reset to the device, causing it to go through its startup routine and re-initializing all of its operating parameters from non-volatile memory.
- □ *Report Setup* Allows you to select a report file and a report printing program ("Report Setup" on page 533).
- □ *Report* Generates a report of the HDLT parameters.
- □ Save HDLT Data Saves the HDLT internal parameters to a disk file that can be read by the ValVue.
- Restore HDLT Data Reads data that has been saved with a SaveHDLT Data command and sends HART commands to set the HDLT to match the data read. This is used to clone an HDLT into a new HDLT. Note: Items like tag, which should be unique, and calibrations which differ on each device are not cloned. This command is available only in Manual mode.
- □ *Detach Trend* Removes the *Trend* display from the tabbed dialog and creates a separate display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Trend Tab

See "Monitor Tab" on page 527 for nameplate data configuration.

You to turn on or off the graphical display of *Level*, *Level Setpoint*, and *signal Output*. The scale for the output signal is on the right hand side.



Figure 2 Trend Tab

Trend Graph

Displays the last 180 seconds of level, signal output and level setpoint if the HDLT is in controller mode.

Clicking **Refresh** clears the graph and starts recording again.

Clicking **Stop** freezes the graph.

The Y scale can be changed by entering new values or by dragging the mouse over the selected area. Right-click in the graph to return it to the default scale.

The scale can also be change by dragging over the range of scale that you want to display.

Capture to Clipboard copies a picture of the *Trend* tab to the clipboard. From the clipboard, it can be pasted into other applications (e.g. Microsoft Word).

Menu - Trend

When you right-click on the *Trend* tab (but not in the graph area - see zooming), a context menu appears:

- □ *Refresh Graph* Restarts the sampling of the *Trend* graph.
- □ Stop Graph Sops the sampling of the trend graph. It can be restarted by selecting *Refresh Graph*.
- Detach Trend Removes the Trend display from the tabbed dialog and creates a separate display.
- □ *Help* Displays the help file at the *Trend* tab instructions.

Configuration Tab

See "Monitor Tab" on page 527 for nameplate data configuration.

, ricip		
Transmitter Diagn	ostics Configuration Da	ta Base Controller Controller Parameters
HDLT Monitor	Trend Configuration] Calibration Calibration Parameters Calibration Tools
Tag Name	LEV1	HDLT
Descriptor	DESC	Controller
Message	MESSAGE	
Date (DD/MM/\^)	02 FEB 2000	Controller Enable
Assembly Number	1234	 Low Setpoint High Setpoint Initial Setpoint Setpoint Units
Polling Address	0	- 0 40 10 bbl •
Transmitter		1.70 seconds
Transmitter		
Transmitter Mode	1. Level	Alarms and Failsafe
Transmitter Mounting	1. Left 💌	Low Alarm (in) Time 1 (sec)
Transmitter Action	1. Direct	before setting alarm
Display Language	1. English 👻	Hink Alarm (in) Time 2 (sec)
E Lash Ord Domain		before setting
LOCK OUT BULLONS		raisafe
	And	Failsafe Current (mA)

Figure 3 Configure Tab

Fields	
Polling Address	HART can communicate with up to 15 devices on a single pair of wires. These devices are distinguished by their polling address, which is a number from 0 to 15. If there is a device at polling address 0, it must be the only device on the loop. There may be up to 15 devices with non-zero polling addresses on the loop (subject to power and intrinsic safety constraints). Devices which operate 4-20 mA are generally required to have polling address 0.
	Any transmitter with a polling address set between 1 and 15 have their the current output fixed to 4mA.Never set a polling address between 1 and 15 when the HDLT is working in controller mode.
Transmitter	
Transmitter Mode	Allows you to select either level or liquid interface measurement:
	In the level indicator mode, the signal indicates the level of the liquid in the tank of a known specific gravity fluid.
	In the interface indicator mode, the signal indicates the position of the interface between two liquids of different specific gravities.
Transmitter Mounting	Selects whether the HDLT head is mounted at the left or at the right position versus the displacer.
Transmitter Action	Selects direct or reverse acting transmitter:
	 In direct acting transmitter, the current increases when the level or the interface of the liquid increases.
	 In reverse acting, the current decreases when the level or the interface of the liquid decreases.
Display Language	Selects the display language of the HDLT as French or English. Only the LCD display on the HDLT is affected (not the PC software).
Lock Out Buttons	When selected this option prohibits access to manual, calibration and configuration modes. You need to enter a password (for HDLT revisions greater than 4.12) through the push buttons to access all modes.
	The password must be a number between 1 to 255.
	The HDLT is automatically locked when it comes back in normal operating mode.
Controller	
Controller Enable	Click the checkbox to enable/disable the fields below.

Low Setpoint/High Setpoint	Controller low/high setpoint values corresponding to the low/high level or interface values (set in calibration parameters). If the setpoint unit is:
	The same as the level or interface unit, the controller low/high setpoint values must be the same as the low/ high level or interface values.
	Not the same as the level or interface unit, the controller low/ high setpoint values can be different from the level or interface values. In this case you must activate a ratio control flag to force the controller to define the transformation function to level units.
Initial Setpoint	On startup, the controller setpoint is set with the initial setpoint value.
Setpoint Units	Engineering units of the controller setpoint. If the setpoint units are not the same as the level or interface unit, then the ratio control flag must be activated and the ratio gain/ratio bias value calculated properly using setpoint low/high values versus low/high level or interface values. The transformation function is: Setpoint in level/interface unit = ratio gain * Setpoint in its unit + ratio bias.
Controller Rate	Determines how often the controller calculates the output signal. The value must be set between 0.2s and 20s.
Alarms and Failsafe	
Low Alarm (in)/High Alarm (in)	If the <i>Low Alarm</i> box is selected and the level or the interface of liq- uid is lower than the low alarm value for more than the <i>Time 1</i> value in seconds, the low alarm is set. If <i>High Alarm</i> box is selected and the level or the interface of liquid is greater than the high alarm value for more than the <i>Time 1</i> value in seconds, the high alarm is set.
Time 1 (sec)/ Time 2 (sec)	If either <i>High</i> or <i>Low Alarm</i> box is selected and the level or the inter- face of liquid is outside of the alarms ranges for more than <i>Time 1</i> , then the alarm is set. If the level remains outside of the alarms ranges for more than <i>Time 2</i> , then the HDLT is set to failsafe mode.
	If either <i>Time 1</i> or <i>Time 2</i> are set to a negative number this is under- stood by the HDLT as not used.
	<i>Time 2</i> must be greater than <i>Time 1</i> . The maximum time value is 1000 seconds.

Failsafe Current	If <i>Failsafe Current</i> is not selected and the HDLT goes to failsafe mode, the current remains at the last current value sent before the failsafe mode activation. If <i>Failsafe Current</i> is selected and the HDLT goes to failsafe, the cur- rent is set to the value entered in the edit box.
	The Failsafe Current values must be between 3.6 to 23 mA.
Apply	Sends all of the changes made to entries on the tab immediately to the DLT.

Menu - Configure

When you right-click on any of the *Configuration* tabs, a context menu appears. The items that appear depend on the HDLT mode:

- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the HDLT parameters.
- Detach Trend Removes the Trend display from the tabbed dialog and creates a separate trend display.
- □ Help Displays the help file at the Monitor tab instructions.

Calibration Tab

HDLT Monitor	ics Configuration Data Trend Configuration	Base Controller Calibration	Controller Parameters Parameters Calibration Tools
Tag L	EV1		HDLT
Descriptor D	ESC		
Message 🛛 🕅	ESSAGE		
Date 0	2 FEB 2000		
Assembly Number 1	234		
	Low SG High SG		
5G Calibration	Calibration Calibration	SG Calibration	
Record SG	Record SG Low/High	SG Calibration 0.000 SPAN	

See "Monitor Tab" on page 527 for nameplate data configuration.

Figure 4 Calibration Tab
Level Transmitter Calibration

To calibrate the level transmitter:

- 1. Enter the specific gravity of calibration and press the **Record SG** button.
- 2. Empty the tank (or attach the proper weight for dry calibration) and click ZERO.
- 3. Fill the tank (or attach the proper weight for dry calibration) and click **SPAN**.

Interface Transmitter Calibration

To calibrate the level interface transmitter:

- 1. Enter the specific gravities of calibration for the two liquids (*Low SG Calibration* and *High SG Calibration*) and click **Record SG Low/High**.
- 2. Fill the tank with the low specific gravity liquid (or attach the proper weight for dry calibration) and click **ZERO**.
- 3. Fill the tank with the high specific gravity liquid (or attach the proper weight for dry calibration) and click **SPAN**.

Specific Gravity Meter Calibration

To calibrate the specific gravity meter:

- 1. Enter the specific gravity of the known liquid in SG Calibration.
- 2. Empty the tank (or attach the proper weight for dry calibration) and click ZERO.
- 3. Fill the tank with the known liquid (or attach the proper weight for dry calibration) and click **SPAN**.

Menu - Calibrate

When you right-click on any of the *Calibrate* tabs, a context menu appears. The items that appear depend on the HDLT mode:

- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the HDLT parameters.
- Detach Trend Removes the Trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Calibration Parameters Tab

LIDI T Manihas	nostics	Configuration Data Ba	Collection	Controller	Controller Parameters
HULI Monitor	Trena		Calibration	Calibration 1 arameters	
Tag	LEV1				HDLT
Descriptor	DESC				
Message	MESSAGE				
Date	02 FEB 2000				
Assembly Number	1234				
Ranges	w level	20 High level in	Level	units	mitter Low SG
Ranges	w level	20 High level jin 1 Reduce span (%)	v Level	units	mitter Low SG High SG
Ranges Lo	w level ero shift (%) Damping (seconds)	20 High level in 1 Reduce span (%)	Level 1	units	mitter Low SG High SG er

See "Monitor Tab" on page 527 for nameplate data configuration.

Figure 5 Calibration Parameters Tab

Fields

Ranges

Low level, High Level and Level units	The low and high values of liquid level and the engineering units that appear when the tank is respectively empty and full.
	The low and high values of the interface and the engineering units that appear when the tank is filled with the low specific gravity and filled with the high specific gravity.
Zero Shift (%)	The value in percentage of calibration scale to shift the zero.
Damping (seconds)	Output current filtering. The value is expressed in seconds and corresponds to T63% for a first order filter.
Low Current (mA) and High Current (mA)	The signal that is sent by the transmitter corresponding to the low and high level or interface level for direct transmitter action or the high and low level or interface level for reverse transmitter action.

Reduced Span	The value in percentage of calibration scale to reduce the span.
Interface Transmitter: Low SG/ High SG	For an interface transmitter: This specific gravity of service is nor- mally the same as the low-high specific gravity used during the calibration, but can be changed here if the specific gravity of the process has changed and is not equal to the low-high values of the calibration.
Level Transmitter: SG Service	For a level transmitter: The specific gravity of service is normally the same as the specific gravity of the calibration but can be changed here if the specific gravity of the process has changed and is not equal to the calibration values.
Apply	Sends all of the changes made to entries on the tab immediately to the DLT.

Menu - Calibrate

When you right-click on any of the *Calibrate* tabs, a context menu appears. The items that appear depend on the HDLT mode:

- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the HDLT parameters.
- Detach Trend Removes the Trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Calibration Tools Tab

<mark>Vue HDLT - Offlin</mark> Is Help	e LEV1				
Transmitter Dia; HDLT Monitor	gnostics Trend	Configuration Data Ba	se Calibration	Controller Calibration Parameters	Controller Parameters Calibration Tools
Tag Descriptor Message Date Assembly Number	LEV1 DESC MESSAGE 02 FEB 2000 1234				HDLT
4-20mA Calibration 4 mA 20 mA Set Current		Set Value from Current Set Value from Current mA		ling oupling Method 🖉 🖉	
Change Mode	Mode:	Calibrate	•	Exit	Help

See "Monitor Tab" on page 527 for nameplate data configuration.

Figure 6 Calibration Tools Tab

4-20 mA Calibration



The HDLT comes from factory calibrated and should normally not require signal calibration. This should be done only if absolutely necessary.

- 1. Click 4mA or 20mA to set the current output from the HDLT to 4 or 20 mA.
- Measure the actual value of the current in the loop, enter it in the appropriate box, and click Set. This recalibrates the signal to the entered value. Entering a value in the lower box and clicking Set Current causes the HDLT to output the entered current for testing purposes.

Coupling

Coupling is used when adjusting the coupling between the electronic head and the torque tube. To adjust:

- 1. Click **Coupling Method** and the coupling appears and is updated.
- 2. Adjust the physical coupling until this value is between +/-5%.
- 3. Click **Coupling Method** a second time to turn off the coupling measurement.

Menu - Calibrate

When you right-click on any of the *Calibrate* tabs, a context menu appears. The items that appear depend on the HDLT mode:

- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the HDLT parameters.
- Detach Trend Removes the Trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Controller Parameters Tab

IVue HDLT - Offling	e LEV1				
HDLT Monitor Transmitter Diag	Trend	Configuration Configuration Data Base	Calibration ; Co	Calibration Parameters	Calibration Tools
Tag Name Descriptor Message Date Assembly Number	LEV1 DESC MESSAGE 02 FEB 2000 1234		HDLT Apply PID	50.00 5.0 5 8 0	Proportional Gain (%) Integral Time (s) Derivative Time (ms) Derivative Gain Beta (non_linear)
 Ratio Control Setpoint Tracking 		[(.5 Ratio Gain	1	Low Alarm Limit in High Alarm Limit in
Derivative Source • PV • Error			0 Ratio Bias in	50.0	Manual Reset Bias (%)
Alarm Type	viation		0 Set Point Low Lim	it 1.0	Output Rate Limit (%/s)
Action C Direct I Re	verse		20 Set Point High Lin bbl	nit 1.00	Controller Dead Zone (%)
Change Mode	Mode: C	Configure	•	Exit	Help

See "Monitor Tab" on page 527 for nameplate data configuration.

Figure 7 Controller Parameters Tab

Fields

Ratio Control	Click to enable/disable ratio control for the system.
Setpoint Tracking	If setpoint tracking is selected, when the controller is changed from the manual mode to local mode, the setpoint is set to equal the cur- rent process variable. In that case, the process will not be upset by the change from manual to local mode (operating mode).
Derivative Source	Determines whether the derivation action is done on a change in process variable or a change in error (setpoint - process variable).
Alarm Type	Determines whether the alarms are absolute or deviation.
Controller Action	Determines whether the controller is direct or reverse acting.

Ratio Gain and Bias	In ratio control, the setpoint and process variable may be in differ- ent engineering units or on different scales. The relationship between the setpoint in process variable units and the raw set- point is given by:
	Setpoint (in process variable units) = Ratio Gain × Setpoint (in its units) + Ratio Bias
Setpoint Low and High Limit	The setpoint is constrained to be between the low and high limits. The limits are entered in the same engineering unit as the control- ler unit.
Proportional Gain	The ratio of controller output to the error. The relationship between the <i>Proportional Gain</i> and the <i>Proportional Band</i> is: PB in $\% = 100$ / PG. The range is 0 to 50. The <i>Proportional Gain</i> can be adjusted by the Beta coefficient.
Integral Time (s)	Or reset time, is the time constant of integral control. The range is 0 to 1000 second.
Derivative Time (ms)	Derivative time or rate time is the time constant of derivative con- trol. The range is 0 to 5000 millisecond.
Derivative Gain	This is a parameter to control the <i>Derivative Time</i> . The range is 0 to 100. This coefficient act as a first order filter on the <i>Derivative Time</i> .
Beta (non-linear)	This is non-linear gain factor, ranging from -9 to 9. When 0, the controller gain is linear. Otherwise the gain is the function of error.
Low Alarm Limit and High Alarm Limit	Define when the alarm lights on the controller view are lit. If abso- lute alarms are selected and the process variable is not between the low and high alarm limit, the alarm light is on. If deviation alarms are set and the difference between the setpoint and the process variable is not between the low and high alarm limit, the alarm light is on. The alarm limits are entered in the same units as the process variable.
Manual Reset Bias (%)	This mainly applies to P or PD control or unstable (integrator) pro- cess. It is the process controller output at a typical operating steady state. If the controller outputs range goes from 30 to 50% at normal operation, the <i>Manual Reset Bias</i> should be set at 40% in order to minimize steady state error.
Output Rate limit (%/s)	Limits how fast the controller output can change. It is expressed as the percent of full controller output range per second and can be set up to 500%/s.
Controller Dead Zone (%)	When the difference between the setpoint and the process vari- able is less than the dead zone, the controller takes no action to change this output. The range is 0% to 20%.

Apply PID	Sends the displayed PID information to the HDLT, changing the PID used for control. Unlike the <i>Apply</i> button, this button only sends the PID information but does not require that the HDLT change out of operating mode.
Apply	Sends all of the changes made to entries on the tab immediately to the DLT.

Menu - Controller

When you right-click on the *Controller* tab, a context menu appears. The items that appear depend on the HDLT mode:

- □ *Local Setpoint* Puts the controller in local setpoint mode. You can adjust the setpoint in this mode.
- □ Set Manual Mode Puts the controller in Manual mode.
- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the HDLT parameters.
- Detach Trend Removes the trend display from the tabbed dialog and creates a separate Trend display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Controller Tab

ValVue HDLT - Offlin	e LEV1				
Tools Help					
HDLT Monitor Transmitter Diag	Trend prostics	Configuration Configuration Da	Calibration	Calibration Parameters	Calibration Tools
Tag	LEV1		-	in 20	HDLT
Descriptor Message	MESSAGE			15 -	Module Status
Date Assembly Number	02 FEB 2000 1234		-	10 -	
,				5 - 🔾	
Mode INAC	TIVE	•		0_	j10.00 Setpoint bbl
				in 5.00 Setpoint (I	_evel Units)
				10.00 Level	in
Change Mode	Mode:	Configure	0	Exit	Help

See "Monitor Tab" on page 527 for nameplate data configuration.

Figure 8 Controller Tab

Allows you to directly set the value of the controller output in man- ual mode.
Allows you to enter a setpoint directly.
Displays the controller setpoint value in its setpoint unit.
Displays the controller setpoint value converted to level or inter- face unit.

Controller Alarms	This box displays the status of the process variable alarms. The alarms may be absolute or deviation alarms:
	 Absolute alarms: If the process variable is below the lower alarm limit or above the upper alarm limit, the alarm light turns on.
	 Deviation alarms: If the difference between the setpoint and the process variable is below the lower alarm limit or above the upper alarm limit, the alarm light turns on.
Controller Level/Setpoint Display	This graphical display shows the current value of the level or the interface as a green bar and the setpoint as a triangle. From this display, you can <i>drag</i> the triangle to change the setpoint when the controller is in normal operating mode (local mode).
Controller Local/Manual	If the controller is in Normal operation mode (local mode), you can change the setpoint from LevelVue by dragging the indicator on the <i>Level/Setpoint</i> display or by entering a setpoint directly. The control- ler adjusts the output signal to try to match the process variable with the new setpoint.
	In Manual mode, the controller output is locked to a constant value. You can change that value by dragging the indicator on the output display or by entering a value directly.
Controller On/Off	Turns the process controller on or off:
	$\ \square$ If not enabled (off), the HDLT operates as a normal transmitter.
	If enabled (on), the HDLT performs the function of a controller and the 4-20 output is a control signal to control a valve.
Controller Output	Displays the output of the controller in percent.

Menu - Controller

When you right-click on the *Controller* tab, a context menu appears. The items that appear depend on the HDLT mode:

- □ *Local Setpoint* Puts the controller in local setpoint mode. You can adjust the setpoint in this mode.
- □ Set Manual Mode Puts the controller in Manual mode.
- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the HDLT parameters.
- Detach Trend Removes the trend display from the tabbed dialog and creates a separate Trend display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Configuration DataBase Tab

	Trend	Configuration	Calibration	Calibration Parameters	Calibration Tools
Transmitter Dia	gnostics	Configuration Data I	Base	Controller	Controller Parameters
Tag	LEV1				HDLT
Descriptor	DESC			- Torque Tube and Charr	ber
Message	MESSAGE			12300 💌	Chamber Type
Date	02 FEB 2000			Inconel/Carbon	Torque Tube Matl.
Assembly Number	1234			1 💌	Torque Tube Force
	·			4" 💌	Arm Length
S				Displacer Type	
Jispiacei				With Displacer	T Stainless
100.00 Dis	placer Volume	50.00 Displace	er Height	1 Non Standard	L Extension Hod
	lume Units	2.00 Displace	er Diameter	- Options	Chamber Options
Culn 👻 Vo				Extension	Special Steel
Culn Vo	1				
Culn Vo	placer Weight	in 💽 Height U	Jnits	Intrinsically Safe Elametroof	C Carbon Steel
Culn Vo 10.00 Dis Ib Vo	placer Weight eight Units	in 💌 Height l	Jnits	Intrinsically Safe Fiameproof Weatherproof	C Carbon Steel C Stainless Steel C Drain

See "Monitor Tab" on page 527 for nameplate data configuration.

Figure 9 Configuration Database Tab

Fields

Displacer

Displacer Volume and Volume Units	Defines the displacer volume and its engineering units.
Displacer Height, Displacer Diameter, and Height Units	Defines the displacer height and diameter and their engineering units.
Displacer Weight and Weight Units	Defines the displacer weight and its engineering units.
Torque Tube and Chamber	Defines the HDLT Chamber Type, the Torque Tube Matl, the Torque Tube Force and the Arm Length.
Displacer Type	Defines options available for the displacer: With Displacer, Non Standard, Stainless, Extension Rod.
Chamber Options	Defines the options available on the chamber.

Options

Defines the options linked to the high temperature design and the dangerous areas.

Menu - Configure

When you right-click on any of the *Configuration* tabs, a context menu appears. The items that appear depend on the HDLT mode:

- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the HDLT parameters.
- Detach Trend Removes the Trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Transmitter Diagnostics Tab

ValVuo HDLT Offling	LEVA				
Tools Help					
		1	i i -		1
HDLI Monitor	Irend Lonfiguration	Lalil a Base	bration L	alibration Parameters	Controller Parameters
		-	1 000		
Tag	LEV1				HDLT
Descriptor	DESC				
Message	MESSAGE		Auto Tune		
Date	02 FEB 2000		Auto Funo		
Assembly Number	1234		0.5	W Integ. (sec.)	
			0.3	_ DZ Integ .(%)	
			0.1		
Continuous Diagnostic D	ata		1.00	··· · · · · · · · · · · · · · · · · ·	
Number of Fills = 20.0			Save Coet.		
Time Full = 100 days Time Empty = 50 days					
Time Working = 200 day	ys -		Sensor Test		
			- Specific Gravity M	/leter	
			Meter On/Off		
Reset Data					
Change Mode	Mode: Diagnostic	0		Exit	Help

See "Monitor Tab" on page 527 for nameplate data configuration.

Figure 10 Transmitter Diagnostics Tab

Smart Filtering Coefficients

These three parameters suppress the noise, the waves in the displacer chamber or the mechanical vibration to smooth the current output:

- □ *W Integ*: Integration window expressed in seconds. The value must be between 0.1 and 32.0 seconds.
- □ *DZ Integ*: Dead Zone Integration is expressed in percent of zero/span calibration. The value must be between 0.01% and 10.0 %.
- □ *W Val*: Validation window is expressed in seconds. The scale must be between 0.1 and 32.0 seconds.

Menu - Diagnostics

When you right-click on the *Transmitter Diagnostics* tab, a context menu appears. The items that appear depend on the HDLT mode:

- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the HDLT parameters.
- Detach Trend Removes the Trend display from the tabbed dialog and creates a separate display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Fields

Continuous Diagnostic Data	Displays data useful for prediction of life of the transmitter and other components of the process affected by the liquid flow. The HDLT tracks the amount of time the tank is empty, full, or working (pow- ered on). In addition the HDLT sums the increases in tank level. When used in a batch process where the tank is not filled and emptied at the same time, this measurement is a tank totalizer.
Reset Data	Causes the continuous diagnostic data to be set to 0. Any values stored before the reset are lost.
Auto Tune	Clicking Auto Tune runs a routine that determines the best parame- ters for smoothing the output signal from the HDLT.
Save Coef.	Clicking the Save Coefficients button saves the three Smart Filtering Coefficients above into the HDLT non-volatile memory.
Sensor Test	Performs a sensor self test. This procedure must be run ONLY IF THE LIQUID LEVEL IS STABLE to avoid going to failsafe mode. This test is performed when the level is out of service.
Specific Gravity Meter	When on, the meter displays the specific gravity continuously if the specific gravity meter has been calibrated.

Menu Bar and Footer Buttons

File Menu	Allows you to exit the level portion of the program to the device selection list.
Exit Button	Exits the program.
Help Button	Displays the online help table of contents. Right-clicking on any tab displays a menu that includes help – the menu help displays help for the particular tab.
Help Menu	Allows you to view online help for the LevelVue program or for the ValVue program (of which LevelVue is a part). <i>Software Revision</i> : This value indicates which revision of software is used inside the HDLT. As software is updated, this value changes. LevelVue and other software that must communicate with the HDLT use the soft- ware revision number to know how to correctly communicate with the device.
Mode	Displays the mode of the DLT – Operating, Manual, Configure, Cali- brate, Diagnostic, or Failsafe.
Online/Offline	In the offline mode, LevelVue reads values for all of the variables from a file (rather from a real HDLT device). The offline mode can be used to examine the variable values that have been saved with the Save DLT Data command and is useful as a demo/learning tool.

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ValVue SVI Software

ValVue SVI - Offline T	TAG		
Tools Help			
Monitor Trend Configu	ure Controller Config Calibrate	Diagnostics State	us Check
	SVI		Signal (%) 33.1 mA 9.30 Position (%) 70.2
Tag	TAG		Pressure (psi) -0.16
Descriptor	DESC		
Message	MESSAGE		70.2 Signal (%)
Date	23 JAN 2001		Setpoint (%)
Assembly Number	1026949		Send Cmd
Status		0	
Setup Wizard			
Change Mode	Mode Diagnostic	0	Exit Help

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Monitor Tab

From the *Monitor* tab, you can see the basic functioning of the SVI including the valve position, the input signal, actuator pressure, and the mode. This tab allows you to change the valve position (when in manual mode) by dragging the position indicator.

ValVue SVI - Offline TAG			
Tools Help			
Monitor Trend Configure	Controller Config Calibrate Diagnosti	cs Statu:	s Check
	SVI		Signal (%) 33.1 mA 9.30 Position (%) 70.2
Tag TA(G		Pressure (psi) -U.16
Descriptor DES	SC		Signal (%)
Message ME	SSAGE	4	70.2 Position (%)
Date 23.	JAN 2001		Setpoint [%]
Assembly Number 102	26949]	Send Pmd
Status Setup Wizard	•		
Change Mode	Mode Diagnostic	•	Exit Help

Figure 1 Monitor Tab

Fields	
Tag	A user-assigned name for the valve with maximum eight charac- ters. The value is displayed in many views but can only be changed from the "Configure Tab" on page 571 or with commands sent from the <i>Monitor</i> tab.
Descriptor	A user-defined field with up to 16 characters. This field is com- monly used to describe the user of the valve. The value appears in many views but can only be changed from the "Configure Tab" on page 571 or with commands sent from the <i>Monitor</i> tab.
Message	A user-defined field with up to 32 characters. This field may be used for any information the user wants. The value is displayed in many views but can only be changed from the "Configure Tab" on page 571 or with commands sent from the <i>Monitor</i> tab.

Date	A date that can be used however you want. The preferred format is dd MMM yyyy (e.g. 14 NOV 2001). The program also accepts dates formatted as dd/mm/yy (e.g. 14/11/01). Years greater than 70 are assumed to be in the 1900's with years 70 or less assumed to be in the 2000's. The day precedes the month. Dates as dd/mm/yyyy are also accepted. The value appears in many views but can only be changed from the "Configure Tab" on page 571 or with commands sent from the <i>Monitor</i> tab.
Assembly Number	A user assigned number value may be between 0 and 16,777,215. The value is displayed in many views but can only be changed from the "Configure Tab" on page 571 or with commands sent from the <i>Monitor</i> tab.
Status	The SVI tracks some errors and fault conditions. When there is infor- mation on fault codes available in the SVI, this box contains <i>Read</i> <i>Additional Status</i> .
Signal	The value of the input signal expressed as the position it indicates. It is scaled in percent and is characterized if necessary.
Position	The current position of the valve in percent open. 0% is always closed and 100% is open. Because the travel of a valve may exceed its nom- inal travel, positions greater than 100% are possible (see <i>Open Stop</i> <i>Adjustment</i> on the "Calibrate Tab" on page 581).
Setpoint	When in operating mode, the setpoint is the position indicated by the input signal (characterized if necessary).
	In manual mode, it is the position to which the SVI is controlling the valve. The manual setpoint may be changed by dragging the lower Thumb on the position indicator.
Position Indicator	This indicator shows the valve position graphically. The indicator consists of three parts:
	The upper part contains an indicator that shows the value of the signal. In Operating mode this is the position setpoint. In Manual mode. this is the position that the valve moves to if operating mode is selected.
	The center green bar shows the valve position with full left as closed and full right as open. The numerical valve position is shown in the center.
	The lower part contains an indicator (thumb)that shows the valve setpoint. In Operating mode this is the same as the signal. In Manual mode it is the valve setpoint. You can drag the thumb to change the valve setpoint. While dragging. the number in the center bar shows the manual setpoint that will be selected when you release the thumb.

You can also change the manual setpoint by right-clicking in the indicator. A dialog box appears where you enter the exact setpoint for use.

PressureThe actuator pressure, which can be reported in psi, bar, or kPa.You can select the units from the "Configure Tab" on page 571.

Send Command Sends the selected Hart command to the SVI, reads the results, and displays them in the result box to the left.

Setup Wizard From the Setup Wizard you can rapidly setup the SVI by configuring some basic parameters. By selecting the appropriate check boxes the you can set the device identification, select the air action, perform a travel calibration, and an autotune. Used primarily for rapid setup of standard application valving the Setup Wizard dramatically reduces commissioning time in the field.

The task list shows what processes will run. When started from the *Setup Wizard*, several tasks can be listed and are performed in order For processes started from the "Configure Tab" on page 571 or "Diagnostics Tab" on page 589, only one task is listed and started.

Se	tup Wizard
Γ	Char 1
	Set Tag and Descriptor
	Tag TAG
	Descriptor DESC
	Message MESSAGE
	Step 2:
	Set Air Action
	Air-to-Open
	C Air-to-Close
	Step 3:
	Calibrate Travel
	Step 4:
	C Autotune
	Step 5:
	Report & Backup
	Apply Cancel

Figure 2 Setup Wizard

Wizard Step 1

When selected, you can modify the device *Tag*, *Descriptor*, and *Message*.

Step 1:				
Set Tag and Descriptor				
Tag	TAG			
Descriptor	DESC			
Message	MESSAGE			

Wizard Step 2

When selected you can modify the air action or return the device to factory default settings.

Step 2:	
Set Air Action	Reset configuration to factory defaults
💿 Air-to-Open	
C Air-to-Close	

Wizard Step 3

When selected, you can perform a *Travel Calibration*. To determine valve position, the positioner must measure the closed and open positions of the valve. The SVI first exhausts the actuator and measures the position, then fills the actuators and measures the position. From these measurements the valve position is determined.

Step 3:		
🔲 Calibrate Travel		

Wizard Step 4

When selected, you can perform an Auto Tune. The SVI positioner is a PID servo control device with special parameters unique to valve positioners. Because the SVI can be put on a wide variety of valves, the values of the parameters must be changed to match each valve.

The SVI can determine a good set of parameters automatically. When the Auto Tune procedure is run, the SVI performs a series of open and closed loop tests to determine values for *P*, *I*, *D*, *Padj*, *Beta*, *Position Compensation*, and *DeadZone*.

The values determined should give good general operation of the valve, however these values are determined by a target set of performance criteria built into the SVI. You may want performance different than this set and may therefore want to set the PID values differently than determined by Auto Tune. This can be done on the "Calibrate Tab" on page 581.

Step 4:		
Autotune		

Wizard Step 5

Click and when Setup Wizard completes a report of settings appears using the selection made in *Report Setup*.

Step 5:	
🗖 Report & Backup	

Mode

The SVI can be in any of several operating modes:

Operating	In this mode the SVI responds to the input signal and positions the valve appropriately (indicator green).
Manual	In this mode the valve does not respond to the input signal. Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position selected by the user (see <i>Setpoint</i>) (indicator yellow).
Configure	In this mode you can set configuration parameters of the posi- tioner or controller (indicator yellow).
Calibrate	In this mode you can set calibration parameters of the positioner (indicator yellow).
Diagnostic	In this mode you can run response time tests, step response tests, and positioner signatures (indicator yellow).
Bumpless transfer	This is a transition mode when you select operating mode from manual mode (see <i>Bumpless Transfer</i>) (indicator red).

Failsafe

When the SVI cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until the user intervenes (indicator red).

Change Mode	
Choose Mode	
Operating	
Manual	l
C Configure	
C Calibrate	
O Diagnostic	
OK Cancel	

Figure 3 Change Mode

Command Result Display

This box displays the SVI's response to HART commands. The following commands may be sent to the SVI:

000 Read Identifier	Returns the unique identifier from the device including the <i>Device ID</i> , <i>Device type</i> , and the <i>Manufacturers ID</i> .
001 Read Primary Variable	Returns the position in percent open.
002 Read Current	Returns the input signal in mA.
003 Read All Variables	Returns the input signal and the position in percent open.
011 Read ID from Tag	Prompts you for a tag name. The tag name is sent in a HART com- mand and if received by a device with a matching tag name, the ID of the device is returned. The format of the ID is the same as com- mand 001 Read Identifier.
012 Read Message	Reads the message that was stored in the device when it was con- figured.
013 Read Tag & Descriptor	Reads the tag name, date, and the descriptor that was stored in the device when it was configured.
016 Read Assembly Number	Reads the final assembly number that was stored in the device when it was configured.
017 Write Message	This command allows you to enter a message (up to 32 characters) to store in the SVI.
018 Write Tag & Descriptor	This command allows you to enter a tag name (up to eight charac- ters) and a description (up to 16 characters) to store in the SVI.

019 Write Final Assembly	This command allows you to enter an identifying number (0 to 16 million) which is stored in the SVI.
038 Reset Configuration Changed Flag	Clears the HART configuration changed flag.
210 Read Configuration	Reads the configuration data from the device and displays it in the response box. The data includes all of the data describing the device set on the "Configure Tab" on page 571 including Air-To-Open/Air-To-Close, Tight Shutoff status, Software Position Limit Stops, etc.
212 Read Error Limits	Reads and displays the position range and time-outs associated with position and pressure errors.
213 Read Calibration Data	Reads and displays the input signal that corresponds to the open and closed position of the valve.
216 Read PID	Reads and displays the valve tuning parameters.
136 Read Status	Reads and displays the status flags. These flags describe error con- ditions that have occurred since the last time they were cleared. See Status Code List for a complete list of possible codes.
138 Clear Status	Clears the status flags. See also Status Code List.
137 Read Limit Switches	Reads the status of the contact switches.
139 Read Continuous Diagnostic Data	Reads and displays the continuous diagnostic data including num- ber of full strokes the valve has made, the number of cycles (direc- tion changes), the time the valve has spent open, the time the valve has been closed, and the time the valve has spent throttling near the seat.
191 Read Signature Results	Displays the results of the last run standard valve signature test. The results include friction, response time, supply pressure, and spring range. The last run data remains in the positioner until a power off and then it is lost.
	Therefore this data will not be meaningful if the diagnostics have not been run since the last power off.
221 Read Configuration 2	Displays the values of the parameters that define the configura- tion of the process controller.
217 Read Loop PID	Displays the values of the process controller's PID parameters.
218 Read Loop Parameters 1	Displays the values of the parameters used by the process control- ler.
219 Read Loop Parameters 2	Displays the values of the parameters used by the process control- ler for ratio control.

220 Read Loop Mode	Displays the process controller mode for the setpoint and process variable: either remote (measured from the primary and auxiliary input channels respectively) or local (set by HART command and remains constant until changed by another HART command).
141 Read Raw Data	Returns information from the SVI that is useful to Masoneilan techni- cians for diagnostic purposes. The information includes the input current on the auxiliary input channel, the A/D values from the pres- sure, signal, and position measurements, the D/A value of the signal to the I/P, and the internal SVI temperature.

Auto Tune

The SVI positioner is PID servo control device with special parameters unique to valve positioners. Because the SVI can be put on a wide variety of valves, the values of the parameters must be changed to match each valve.

The SVI can determine a good set of parameters automatically. When the Auto Tune procedure is run, the SVI performs a series of open and closed loop tests to determine values for P, I, D, Padj, Beta, Position Compensation, and Dead Zone. A progress dialog appears while the autotune process is running.

The values determined should give good general operation of the valve; however these values are determined by a target set of performance criteria built into the SVI. You may want performance different than this set and may therefore want to set the PID values differently than determined by Auto Tune. This can be done on the Calibrate tab.

Progress Dialog

Some processes that ValVue can start can be lengthy. These processes include find stops, autotune, diagnostics, and the setup wizard. While these processes run, a dialog is provided to show the progress and allow you to cancel the process early if necessary.

Setup Wizard	
Setup Wizard Progress	
Set Tag and Descriptor	🥚 Finished
Set Air Action	🥚 Finished
Find Stops	😑 Finished
AutoTune	Finished
Create Report Backup	Running
Elapsed Time (Task): 00:00:57 Elapsed Time (Total): 00:01:12	Cancel Current Task Cancel All Continue

Figure 4 Progress

Read Status

The SVI tracks some errors and fault conditions. When there is information on fault codes available in the SVI, this box contains *Read Additional Status*. To retrieve the fault codes

- 1. Select **Read Status** from the drop down list.
- 2. Click Send. The results appear in the lower left box.

Menu - Monitor

When you right-click on the *Monitor* tab, a context menu appears (the items that appear depend on the SVI mode):

- □ *Full Open* Moves the valve to full open. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P.
- □ *Full Closed* Moves the valve to full closed. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P.
- □ *Cancel Transfer* Stops the bumpless transfer and puts the device in Manual mode. Available only when bumpless transfer is on and the device has been instructed to go to Operate mode from Manual mode.
- Reset Clicking this button issues a master reset to the device, causing it to go through its startup routine and re-initializing all of its operating parameters from non-volatile memory.
- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the SVI parameters.
- □ Save SVI Data Saves the SVI internal parameters to a disk file that can be read by the ValVue.
- Restore SVI Data Reads the internal parameter values from a saved file and writes them to the SVI. This changes the configuration and calibration parameters. Only available in Manual mode.
- □ Detach Trend Removes the Trend display from the tabbed dialog and creates a separate display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Trend Tab

From the *Trend* tab you can watch the performance of the valve and the process controller as it operates.

These graphs are useful for tuning the PID parameters and monitoring valve performance. The process trend graphs may be zoomed only on the Y axis.

The process trend can be detached from the tabbed dialog so that it can be viewed while performing calibration and diagnostic tasks.



Figure 5 Trend Tab

Fields

Position, Manual Setpoint,
Signal Setpoint and
PressureThe display of any of the four curves on the Trend graph can be turned on
or off by checking or unchecking these boxes. The available curves are
position, position setpoint, and if the controller is on the process variable
and the process setpoint.Y Low/HighThe Y axis (position) of the trend graph can be set by entering the values in
these edit boxes. Enter a number and hit tab to set the scale. The axis can
be changed with the mouse by zooming and can be returned to the origi-
nal scale by right-clicking in the graph.

Position Indicator	This indicator shows the valve position graphically. The indicator consists of three parts:
	The upper part contains an indicator that shows the value of the signal. In Operating mode this is the position setpoint In Manual mode. this is the position that the valve moves to if operating mode is selected.
	The center green bar shows the valve position with full left as closed and full right as open. The numerical valve position is shown in the center.
	The lower part contains an indicator (thumb)that shows the valve setpoint. In Operating mode this is the same as the signal. In Manual mode it is the valve setpoint. You can drag the thumb to change the valve setpoint. While dragging. the number in the center bar shows the manual setpoint that will be selected when you release the thumb.
	You can also change the manual setpoint by right-clicking in the indicator. A dialog box appears where to type the exact setpoint for use.
Change Mode	The SVI can be in any of several operating modes:
	 Operating: In this mode the SVI responds to the input signal and positions the valve appropriately (indicator green).
	Manual: In this mode the valve does not respond to the input signal. Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position selected by the user (see Setpoint (indicator yellow).
	 Configure: In this mode you can set configuration parameters of the positioner or controller (indicator yellow)
	 Calibrate: In this mode you can set calibration parameters of the positioner (indicator yellow).
	 Diagnostic: In this mode you can run response time tests, step response tests, and positioner signatures (indicator yellow).
	 Bumpless transfer: This is a transition mode when you select operating mode from manual mode (see Bumpless Transfer) (indicator red).
	Failsafe: When the SVI cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until the user intervenes (indicator red).

Capture to Clipboard Clicking this button saves an image of the graph on the clipboard. The image (a bitmap) can be pasted into another document (e.g. into a Microsoft Word document).

Zooming

Any portion of a diagnostic graph can be examined more closely by entering the new X and Y scales in the proper scale edit boxes or by dragging the mouse across an area of the graph. lithe mouse is dragged across an area, that area fills the graphic window Right button clicking on the graph restores the default scales.

Menu-Trend

When you right-click on the *Trend* tab (but not in the graph area -see zooming), a context menu appears:

- □ *Refresh Graph* Restarts the sampling of the *Trend* graph.
- □ Stop Graph- Stops the sampling of the *Trend* graph. It can be restarted by selecting Refresh Graph.
- □ *Report Setup* -Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the SVI parameters.
- □ *Detach Trend* Removes the *Trend* display from the tabbed dialog and creates a separate display.
- □ *Help-* Displays the help file at the *Trend* tab instructions.

Configure Tab

From the *Configure* tab you can set the information that tells the SVI how the valve/actuator is configured.

Tasla Usla			
Monitor Trend Configure Contro	oller Config Calibrate Diagnostics S	itatus Check	
Tag Name TAG Descriptor DESC Message MESSAI Date 23 JAN Final Assy Number 1026949 Polling Address 0 Bumpless Transfer Enable	GE	Characterization C Linear G Equal % (50) C Equal % (30) C Quick Open C Custom Air Action G Air-to-Open C Air-to-Close	Button Lock C Allow Local Buttons C Lock out Local Cal-Config C Lock out Local Manual C Lock out all Buttons Single/Double Single Acting Pressure Units psi
1. English Direct/Reverse Direct Acting Instrument Hardware Reverse Software Reverse	Position Fault Limits Position Error Time 1 (sec) Time 2 (sec)	Band (%) Enable Enable	Position Limits Tight Shutoff Below (%) Position Lower Limit (%) Position Upper Limit (%) Near Closed Value 4 Apply

Figure 6 Configure Tab

Fields

Polling AddressHART can communicate with up to 15 devices on a single pair of
wires. These devices are distinguished by their polling address
which is a number from 0 to 15. If there is a device at polling
address 0, it must be the only device on the loop. There may be up
to 15 devices with non-zero polling addresses on the loop (subject
to power and intrinsic safety constraints). Devices which operate
4-20 mA are generally required to have polling address 0, however
with split range valve positioners, several4-20 mA devices may be
wired in series. These devices should be set up with non-zero poll-
ing addresses.SwitchesThe SVI can measure the status of too contact switches (open or
closed). See the operating manual for connection information.

Language	The SVI can display its menu in English or French. The AMS Snap-on program is not affected. Separate language versions of AMS Snap-on are available.	
Pressure Units	The pressure reported by the SVI can be in psi, bar, or kpa units. If the pressure units are changed after the unit has been fully set up, the SVI automatically converts all of its internal parameters to the appropriate units. Diagnostic and memory dump data saved to a file is not converted.	
Position Fault Limits	You can configure how position errors are handled. A position error occurs when the valve position differs from the requested position (from the input signal in Normal operating mode or the Manual set- point in manual mode) by more than the Position Error Band for more than the Position Error Time 1. When this occurs, a status flag is set is reported during the next HART message (Only that a flag is set is reported. You must send a Read Status message to find out the cause of the status flag). If the error persists for Position Error Time 2, the valve is put in failsafe position. This later action may be disabled by unchecking the Enable box next to the Time 2 entry.	
	For practical considerations, Time 2 (if enabled) must be larger than Time 1 by at least two seconds. Time 1 must be at least as long as the time required to open the valve fully or unnecessary position errors are reported. The maximum time is 327 seconds.	
Characterization	Control valves are often characterized to give a specific relationsh between flow capacity (Cv) and percent opening of the valve. The valve can be characterized with special purpose trim or with the S ⁴ positioner Several characterizations are available:	
	Linear: Causes the value to open proportionally with the input signal. This option should be selected if non-linear trim is used in the value.	
	 Equal Percentage (50) and Equal Percentage (30): Two equal percentage characterizations are available, one with R=50 and the other with R=30. 	
	 Quick Opening: The quick opening characterization is the inverse to the Equal Percentage (50) characterization curve. 	
	Custom Configuration: Selecting this option displays an additional dialog where to enter or draw a custom characterization curve. The curve can have up to nine points and points in between are linearly interpolated.	
Air-to-Open I Air-to-Close	You must select whether the valve is an air to open valve or an air to close valve. This selection determines whether an increasing signal opens or closes the valve.	

Single/Double Acting Actuator	Select whether the actuator is a single or double acting actuator.	
Button Lock	The SVI comes with an optional local display and buttons for data entry. These buttons can be used to perform basic SVI setup with- out the need for ValVue or a handheld. It may, however, be desir- able after initial setup to lock the buttons so that the SVI parameters cannot be inadvertently changed from the buttons. Several level of locks are provided:	
	□ Allow Local Buttons (level 3): Buttons on the SVI are enabled.	
	Lock Out Local Cal Config. (level 2): You can use the buttons to perform operations in normal operating mode and manual mode, however you cannot go to configure or calibrate mode.	
	Lock Out Local Manual (level 1): You can examine variables in normal operating mode but cannot put the valve in manual mode (and therefore cannot get to calibrate or configure modes).	
	Lock Out All Buttons (level 0): The buttons are disabled.	
Bumpless Transfer	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 sys- tem slowly changes the position until it matches the signal set- point. The time taken to move to the position is determined by the Transfer Time, which is a number between 0 and 255 and is approximately the number of seconds required to move the valve 100%.	
Near Closed	This value determines the value of position below which the valve is considered near closed by the continuous diagnostic calcula-tions.	
Tight Shutoff	When selected, if the input signal of the valve would position the valve below the tight shutoff value (entered in the edit box to the right), full supply pressure or atmosphere pressure is supplied to the actuator as needed to close the valve with full seating force.	

Position Limit Stops: Position Lower Limit / Position Upper Limit	The SVI allows you to establish software limit stops. If enabled, dur- ng correct operation of the SVI, the control functions of the SVI 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 valv goes to the fail safe position without regard to the software limit stops. The full open and full closed buttons similarly ignore the set- tings of the software limit stops.	- it ve
Apply	Clicking Apply saves to the SVI any changes that have been made t configuration or calibration parameters.	to
Change Mode	The SVI can be in any of several operating modes:	
	 Operating: In this mode the SVI responds to the input signal and positions the valve appropriately (indicator green). 	
	Manual: In this mode the valve does not respond to the inpusion signal. Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position selected by the user (see Setpoint) (indicate yellow).	ıt d or
	 Configure: In this mode you can set configuration parameter of the positioner or controller (indicator yellow). 	rs
	 Calibrate: In this mode you can set calibration parameters of the positioner (indicator yellow). 	of
	 Diagnostic: In this mode you can run response time tests, steresponse tests, and positioner signatures (indicator yellow). 	۶þ
	 Bumpless transfer: This is a transition mode when you select operating mode from manual mode (see Bumpless Transfer (indicator red). 	t)
	 Failsafe: When the SVI cannot operate correctly the device goes to the failsafe position and remains in the failsafe mod until the user intervenes (indicator red). 	le

Custom Characterization

A custom characterization defines the relationship between the input signal and the output position of the valve. It can contain up to nine.

XY pairs and the position is linearly interpolated between the pairs.

The first position must be 0,0 and the last position 100,100. Both are in percent and neither count toward the 9 points allowed.

Add points to the curve by clicking the mouse at the position where the point is to be added. Delete points by clicking on it with the right mouse button.

Move points by dragging them to their new position.

The characterization curve must be non-decreasing and the program will not allow a point to be added or moved to a position that would create a decreasing segment.

To enter exact positions:

- 1. Enter a value in the edit boxes at the bottom of the tab.
- 2. Hit **TAB**.
- 3. Click **OK** to save the changes and returns to the Configuration tab. Clicking **Cancel** returns to the *Configuration* tab without saving.



Figure 7 Custom Characterization

Custom Linearization

When mounted on a reciprocating valve, a small non-linearity in the reported valve position versus actual valve position can 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. This option is selected automatically when you click **OK** to accept the displayed curve.

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

Clicking **Cancel** on the *Custom Linearization* tab returns to the *Configuration* tab without changing the characterization.

Dialog				
Simple Lever Type	Compound Lever Type			
G Ll Ll	L1 L3 Stoke			
Stroke Length (S)	Lever arm 2 length (L2) 0			
Lever arm length (L1)	Offset length (L3)			
Valve position at 0 horizontal (T) %	C L2 below L1			
Simple	Cancel			

Figure 8 Custom Linearization

Linkage Parameters

- □ Stroke Length The distance of stem movement from 0% to 100% position.
- □ *Lever 1 Length* The length of the lever connected to the rotating element of the SVI2.
- □ *Position at horizontal* The valve position when Lever 1 is horizontal (for normally positioned valves).
- □ *Lever 2 Length* The length of the 2nd lever in a compound lever. This lever connects the 1st lever to the valve stem.
- □ *Offset* The horizontal distance from the connection between the two levers and the connection of the 2nd lever to the stem.
- □ *Lever 2 Above/Below* Select above if Lever 2 points toward the open position and below if it points toward the closed position.
Simple - Compound Linkage Configuration

SIMPLE LEVER

The simple lever has the pivot point (the potentiometer in the SVI) mounted a fixed distance (L1) from the valve stem pickup point. To compute the proper correction curve:

- 1. Enter the stroke length, the distance from the pivot to the valve stem pickup point and the valve position at horizontal.
- 2. Click Simple to compute the correction and display the curve.

COMPOUND LEVER

The compound linkage has two lever segments attached at one end to the pivot (the potentiometer in the SVI) and the other end to the valve stem pickup point. To compute the proper correction curve:

- 1. Enter the stroke length, first lever segment length (L1), second lever segment length (L2), the distance from the pivot to the valve stem pickup (L3), the valve position at horizontal.
- 2. Click **Compound** to compute the correction and display the curve.

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

Menu -Configure

When you right-click on the Configure tab, a context menu appears:

- □ *Custom Linearization* Displays the *Custom Linearization* tab to allow correction for linkage non-linearity. This tab creates a custom characterization that linearizes the valve movement with respect to the input signal.
- □ *Report Setup* -Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the SVI parameters.
- □ *Detach Trend* Removes the *Trend* display from the tabbed dialog and creates a separate display.
- □ *Help* Displays the help file at the *Configure* tab instructions.

Controller Configure Tab

From the *Controller Config* tab you can set the information that tells the SVI how the process controller is to be configured.

ValVue SVI - Offline TAG	i		
Tools Help			
Monitor Trend Config	ure Controller Config Calibrate	Diagnostics Status Check	
Tag Name	TAG		
Descriptor	DESC		
Message	MESSAGE		
Date	23 JAN 2001		
Final Assy Number	1026949		
		Process Controller On	
Startup Mode			
C Startup Local	 Direct Acting 	0.5 Initial Setpoint (PV Units)	
Startup Remote	Reverse Acting	0.75 Controller Period (sec)	
C Startup Last Mode			
C Local Only		Allo Control	
%	 PV Units Code 	% Remote SP	Units Code
			Apply
Change Mode	Mode Configure	•	Exit Help

Figure 9 Controller Config Tab

Fields

Controller Startup Mode This op

This option determines whether the setpoint is in local or remote mode on start up. As an option, it can startup in the mode that it was in before power was lost.

Some configurations allow the setpoint to be only local. This box allows that configuration to be set.

Direct/Reverse

You must select whether the SVI is a direct or reverse instrument. A positioner is direct if increasing the input signal increases the output pressure to the actuator and is reverse if increasing the input signal decreases the output pressure. Reverse mode operation may be accomplished by hardware or software means. Hardware reverse is an option that must be ordered from the factory (the device cannot be converted to hardware reverse in the field).

Reverse mode is a rarely used option and may cause unexpected results in the event of a power or air failure. Be sure you understand the operation of the SVI in reverse mode before selecting either hardware or software reverse. Call Masoneilan's technical support if you are unsure of the proper use of reverse modes.

Air-To-Open	Electrical Failure	Air Failure	Sensor Failure
Direct	Closed	Closed	Configurable
Hardware Reverse	Open	Closed	Configurable
Software Reverse	Closed	Closed	Configurable
Air-To-Close	Electrical Failure	Air Failure	Sensor Failure
Air-To-Close Direct	Electrical Failure Open	Air Failure Open	Sensor Failure Configurable
Air-To-Close Direct Hardware Reverse	Electrical Failure Open Closed	Air Failure Open Open	Sensor Failure Configurable Configurable

In the software reverse mode, care must be taken to insure that the controller does not output a signal less than 3.8 mA. As the input signal drops, the air pressure to the actuator increases. However, below 3.8 mA, the SVI would not have sufficient power to run. When power is insufficient to run, the output to the I/P would drop to 0 and the air pressure would go to atmosphere pressure. See also *Fail Low / Fail High*.

Fail Direction

This selection determines whether the SVI fails to low output signal or to high output signal. It is used almost exclusively in the hardware reverse mode. Fail low is the normal mode, but for hardware reverse instruments, fail high may be preferred. Where fail high results in a low actuator pressure. In an electrical failure, the SVI no longer operates and cannot fail high.

Process Controller On/Off This option allows operation of the process controller when checked. If selected, the process variable must be connected to the auxiliary input channel and some hardware connections must be changed (see operating manual). This option can only be selected if the device has been purchased with the process controller option.

If the device is not used as a process controller uncheck the box. When OFF, limit switches can be attached to the second input terminal (see operating manual for connection details). The SVI reports whether the limit switches are open or closed.

Initial Setpoint	When power is applied to the SVI after being off longer than three seconds the SVI performs a cold start where its memory is restored from parameters stored in non-volatile memory. This parameter determines the setpoint if the startup mode is local. Local setpoints are entered in process variable units. lithe SVI is in ratio control mode, these units may be different from the setpoint units.
Controller Period	The controller can process the setpoint and process variable data every 0.15 seconds (6.7 times per second) to 10 seconds. At 0.15 sec- onds the display and button response is degraded. For fast pro- cesses, a rate of 0.2 would be a reasonable value and for slow processes 2 seconds is common.
Ratio Control	This option turns ratio control on or off. In ratio control, the setpoint and process variable may be in different engineering units or on dif- ferent scales. The relationship between the setpoint in process vari- able units and the raw setpoint is given by:
	Setpoint (in process variable units)=Ratio Gain × Setpoint +Ratio Bias.
	The setpoint in process variable units is used in the PID calculation to compute error.
PV Units Code / Remote SP Units Code	You can select the units for the process variable and setpoint. HART defines units codes for many commonly used units. The AMS snap-on is programmed to recognize many of these and you can select them from the list box. If the units used is not in the list box, enter the HART units code in the list box. In which case the program only reports the code, not the text version of the units.

Menu -Controller Configuration

When the user right-clicks on the *Controller Configuration* tab, a context menu appears. The following items may be on the menu (the items that appear depend on the SVI mode).

- □ *Report Setup* -Allows the user to select a report file and a report printing program.
- □ *Report*-Generates a report of the SVI parameters.
- □ *Detach Trend* Removes the trend display from the tabbed dialog and creates a separate trend display.
- □ *Help*-Displays the help file at the *Controller Monitor* tab instructions.

Calibrate Tab

From the *Calibrate* tab you can calibrate the stop positions and the feedback control parameters.

ValVue SVI - Offline TAG				
Tools Help				
Monitor Trend Configu	ure Controller Config Calibrate Diagnostic	cs Status Check		
Ter	TAG	23	P (%)	
Tag		355	l (1/10 s)	
Descriptor	JDESC	107	D (ms)	
Message	MESSAGE	6	Padi (%)	
Date	23 JAN 2001	0.09	Dead Zone (%)	
Assembly Number	1026949	-4	Beta	
		6	Position Compensation Coefficient	
		0	Damping Coefficient	
4.00 Low Sign	nal (mA) CLOSED 25.00 High F	^p ressure psi		
20.00 High Sign				
20.00 High Signal (mA) OPEN				
Dpen Sto	op Adjustment			
15.47 Primary Ir	nput Signal 2nd Input Sigr	nal 8.38	Pressure psi	
Calib S	ignal Calib 2nd Sid	inal	Calib Pressure	
			Apply	
Change Mode	Mode Manual	0	Exit Help	

Figure 10 Calibrate Tab

Fields

Signal- Low/High The low and high signal defines at what input values the valve will be fully open or fully closed. The low signal value must always be lower than the high signal value. The AMS Snap-on software identifies which value represents closed and which represents open from the configuration data.

> The values are typically 4 and 20 mA but may be any values between 3.8 and 22 mA. lithe valve is split ranged, values of 4 and 12 or 12 and 20 may be entered for example. These entries are the proper method of split ranging the SVI (rather than with a custom characterization curve).

PProportional gain P(%) is the ratio of proportional action (part of
controller output) to error. Common values for the positioner are 50
for small values, up to 4000 for large values.

1	Integral time or reset time (0.1 sec), is the time constant of integral control. Higher values of I cause less integral action, however a value of 0 gives no integral action. Common values are 10 to 200.
D	Derivative time or rate time (msec) is the time constant of derivative control. Common values are 10 to 100.
PAdj	Valves often have significantly different response when filling verses exhausting. The proportional gain is adjusted by adding Pad}(%) to P when the valve is exhausting.
DeadZone	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%.
Beta	Beta is 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. Typical beta value for a valve position controller is 7 or 8.
Position Compensation Coefficient	The response of the valve is different when the valve is nearly closed than when the valve is nearly open. The position compensation coefficient, which is a number between 0 and 9, allows you to make adjustments to try to equalize the valve response. The normal value is 6.
Damping Coefficient	The valve response may be made slower for some applications. A value of zero gives no damping, and a value of nine gives maximum damping of valve motion.
Apply	Clicking Apply saves to the SVI any changes that have been made to configuration or calibration parameters.
High Pressure	Enter the air supply pressure in this edit box. This value is used only for scaling the input pressure signal to engineering units and need not be exact.
Low PV /High PV	If the process controller option is ON, you must enter the engineering units for the process variable that corresponds to 4.0 mA and 20.0 mA. The SVI uses these values to convert the auxiliary input signal to engineering units.
Low Remote SP /High Remote SP	If the process controller option is ON, you must enter the engineering units for the setpoint that corresponds to 4.0 mA and 20.0 mA. The SVI uses these values to convert the primary input signal to engi- neering units.
Change Mode	The SVI can be in any of several operating modes:

- □ *Operating:* In this mode the SVI responds to the input signal and positions the valve appropriately (indicator green).
- Manual: In this mode the valve does not respond to the input signal. Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position selected by the user (see Setpoint) (indicator yellow).
- □ *Configure*: In this mode you can set configuration parameters of the positioner or controller (indicator yellow).
- □ Calibrate: In this mode you can set calibration parameters of the positioner (indicator yellow).
- Diagnostic: In this mode you can run response time tests, step response tests, and positioner signatures (indicator yellow).
- Bumpless transfer: This is a transition mode when you select operating mode from manual mode (see Bumpless Transfer) (indicator red).
- □ *Failsafe*: When the SVI cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until the user intervenes (indicator red).

Calibration Value

This value is used when recalibrating the signal measurement. To do this:

- 1. Set the source current to a known value.
- 2. Enter that value in the Calibration Value edit box.
- 3. Select Set Low Signal Cal or Set High Signal Cal appropriately.

Calibration Value- 2nd input Signal

To calibrate the auxiliary signal input (used for the process variable when the controller is on):

- 1. Connect a 4ma or 20ma signal to the input.
- 2. Enter the value in this edit box.
- 3. Select Set Low Signal2 Cal or Set Low Signal1 Cal, respectively from the menu.

See the operating manual for instructions on connecting the auxiliary signal to the SVI.

Calibration Value- Pressure

The pressure sensor is calibrated at the factory. To recalibrate it in the field:

- 1. Set the pressure to a low value (less than nine psi).
- 2. Enter the value in this edit box.
- 3. Select Set Low Pressure Cal from the menu.
- 4. Calibrate the upper range of the sensor by setting the pressure to a high value (between 10 and 120 psi).
- 5. Enter the value in this edit box.
- 6. Select **Set High Pressure Cal** from the menu.

Open Stop Adjustment

In some valves the stem travel exceeds the nominal valve travel. The SVI allows you to compensate for this so that the valve position reads 100% at the nominal travel. To make this correction:

- 1. Enter 100 in the Open Stop Adjustment edit box.
- 2. Select **Run Find Stops** from the context menu. This calibrates the position with the full valve travel.
- 3. Return to the Manual mode and adjust the valve to its nominal travel and note the position reading.
- 4. Return to *Calibrate* mode.
- 5. Enter the position that was measured at nominal travel into the *Open Stop Adjustment* edit box.
- 6. Select **Run Find Stops** from the menu. This calibrates the value so that the nominal travel reads 100%.

Pressure Calibration Procedure

The *Calibrate* tab allows you to recalibrate the pressure sensor in the SVI. The sensor is calibrated at the factory and does not usually require recalibration, but if needed, this dialog provides a convenient method. The *Reset to Factory* button returns the calibrations to those that were set before delivery of the SVI.

The currently measured value of the pressure sensor is displayed and can be compared to reference measurements to see if recalibration is necessary.

The procedure for recalibration is:

Zero Calibration

- 1. Click the Calib. Pressure button. A dialog appears.
- 2. Enter 0 in the *Pressure Value* field.

3. Turn the air off and click **Set Low Pressure**.

Gain calibration

- 1. Right-click and from the popup menu select *Full Open* (on an ATO valve).
- 2. Click the Calib. Pressure button. A dialog appears.
- 3. Enter the supply pressure in the *Pressure Value* field.
- 4. Click Set High Pressure.

Signal Calibration Procedure

The *Calibrate* tab allows you to recalibrate the signal sensor in the SVI. The sensor is calibrated at the factory and does not usually require recalibration, but if needed, this dialog provides a convenient method. The *Reset to Factory* button returns the calibrations to those that were set before delivery of the SVI.

The currently measured value of the primary input is displayed and can be compared to reference signals to see if recalibration is necessary. Calibrating the primary signal can be done most easily with a variable current source.

The procedure for recalibration is:

Low Calibration

- 1. Click the **Calib. Signal** button. A dialog appears.
- 2. Enter 4 in the signal value field.
- 3. Set the current to 4.00 mA and click **Set Low Signal**.

High Calibration

- 1. Click the **Calib. Signal** button. A dialog appears.
- 2. Enter 20 in the signal value field.
- 3. Set the current to 20.00 mA and click Set High Signal.

Auxiliary Signal Calibration Procedure

The *Calibrate* tab allows you to recalibrate the auxiliary signal sensor in the SVI. This sensor is used as the process variable input when the SVI is used as a controller. The *Reset to Factory* button returns the calibrations to those that were set before delivery of the SVI.

The currently measured value of the auxiliary input appears and can be compared to reference signals to see if recalibration is necessary. Calibrating the auxiliary signal can be done most easily with a variable current source.

The procedure for recalibration is:

Low Calibration

- 1. Click the Calib. 2nd Signal button. A dialog appears.
- 2. Enter 4 in the signal value field.
- 3. Set the current to 4.00 mA and click **Set Low Signal**.

High Calibration

- 1. Click the **Calib. 2nd Signal** button. A dialog appears.
- 2. Enter 20 in the signal value field.
- 3. Set the current to 20.00 mA and click Set High Signal.

Find Stops

The *Find Stop* routine attempts to move the valve through out it's full range to measure the mechanical stroke of the valve. The calibration routine succeeds if the mechanical motion measured by the travel sensor rotates more than the minimum required span and if the value measured at both stops is within the limits of the travel sensor (18 deg. To 120 deg for standard SVI or 9 to 60 degrees for short stroke version of SVI). A progress dialog appears while the find stops process is running.

Correction can be made for nominal valve travel if it is less than full travel (see Open Stop adjustment).

The following affects the Find Stop routine from succeeding:

- □ Insufficient or inadequate air supply to the positioner
- □ Improper adjustment of the reversing relay (if present)
- □ Steady state cannot be achieved at one or both mechanical stops
- External accessories (such as solenoids, trip valve, lock up valve, etc) restricting the flow to the actuator
- □ Defective travel sensor
- □ Inadequate travel sensor rotation or rotation beyond the sensor's limits.

On a failure of the *Find Stop* routine, verify the following in this order:

- 1. Turn on the air supply and make sure that it is at least 5 psig more than the upper spring range value.
- 2. If any, adjust the reversing relay in accordance to the manufacturer's specifications of the reversing relay.
- 3. Secure all linkages connecting the travel sensor to the actuator motion.
- 4. Using the Status tab, verify that the alarm position sensor error isn't enabled. In the case that it is enabled, re-adjust the lever per the SVI's instruction manual to insure that the lever arm is rotating in the appropriate quadrant.
- 5. Verify that the minimum travel span is 4900 counts and that the sensor counts is less than 32000 counts and more than 1 (see procedure below).

Procedure for verifying the sensor counts using Valvue2:

- 1. Change the mode of the SVI to Calibrate.
- 2. Click on the **Calibrate** tab.
- 3. Right-click in the tab or click on the Tools menu, and select Full Close.
- 4. Select the **Check** tab and note the value of *RawPosition*.
- 5. Right-click in the tab or click on the **Tools** menu, and select **Full Open**.
- 6. Select the **Check** tab and note the value of *RawPosition*.



Figure 11 Find Stops Lever Orientation

Maximum lever arm swing for Standard SVI version (short stroke Version is +/- 30 deg from mid-point)

Manual Find Stops

On some very large valves or valves with non-Masoneilan 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.

To calibrate the position:

- 1. Select **Full Closed** from the menu to close the valve.
- 2. When the valve is fully closed, select Set as Closed Stop.
- 3. Select **Full Open** from the menu to open the valve.
- 4. When the valve is fully opened, select **Set As Open Stop**

For some values the open position stop exceeds the nominal travel of the value. By entering a value in the *Open Stop Adjustment* the position calibration can be adjusted to nominal travel.

Menu - Calibrate

When you right-click on the **Calibrate** tab, a context menu appears.

Run Find Stops	Runs the automatic position calibration process.
Manual Find Stops	Allows you to set full open and full closed and wait for the valve to complete these operations before the SVI accepts the stop position. This allows for setting the stops on very large valves which may not work properly with the automatic find stops routine.
Run Auto Tune	Automatically finds appropriate PID parameters for the valve.
Full Open	Moves the valve to full open. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P.
Full Closed	Moves the valve to full closed. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P.
Reset to Factory Cal	Resets the signal calibration to their factory setting. Report Setup – Allows you to select a report file and a report printing program.
Report	Generates a report of the SVI parameters.
Detach Trend	Removes the <i>Trend</i> display from the tabbed dialog and creates a separate display.
Help	Displays the help file at the Calibrate tab instructions.

Diagnostics Tab

From the *Diagnostic* tab you can run response time tests, step response tests, and positioner signatures.

ValVue SVI - Offline	TAG			
Tools Help				
Monitor Trend Config	ure Controller Config Calibrate	Diagnostics Statu	is Check	
Tag	TAG			
Descriptor	DESC			
Message	MESSAGE		Dismostias	
Date	23 JAN 2001		Test	
Assembly Number	1026949		C Std Actuator Sig.	40 Start Position (%)
-			C Step Response	10 Time (s)
	701		C Extended Act. Sig.	
Strokes	/01		Barform Ding	Menu Saund Ding
Cycles	29660		Feironn Diag	
Time Open (hr)	2007	Results		~
Time Closed (hr)	171			
Time Near Closed (hr)	21			
				×
Change Mode	Mode Diagnostic	0	E	kit Help

Figure 12 Diagnostics Tab

Fields

Continuous Diagnostic Values: Strokes, Cycles, Time Open, Time Closed, Time Near Closed	Displays the continuous diagnostic data including number of full strokes the valve has made, the number of cycles (direction changes), the time the valve has spent open, the time the valve has been closed, and the time the valve has spent throttling near the seat.
Diagnostic Tests	
Diagnostic Types: Response Test, Step Test, Positioner Signature	The SVI allows four diagnostic tests to be performed: <i>Standard actuator signature</i> , <i>Step Response</i> test, <i>Extended actuator signature</i> test, and <i>Positioner Signature</i> test. The test to be performed is selected in this selection box.
Diagnostic Parameters: Start Position, Stop Position, Time	The parameters needed by the diagnostic tests are dependent upon which test is selected:

Standard Actuator Signature: Measures the position vs. pressure response of the valve when increasing pressure and when decreasing pressure. The test is made from 10% position to 90% position with data points taken every 10%.

This test produces a pressure vs. position graph where the actuator pressure is first increased slowly then decreased slowly. The graph displays data from 10% to 90% in 10% increments, both increasing and decreasing.

Speed – A number from 1 (slowest) to 9 (fastest). The speed should generally be as slow as possible where the test finishes in a reasonable amount of time. As a rule of thumb, the speed can be the size of the valve in inches but not less than 2 or more than 9.



Figure 13 Standard Actuator Signature Test

- Positioner Signature: The valve signal is slowly changed from the starting current to the ending current and then back. The number of points indicated are sampled equally spaced in each direction). A Positioner Signature produces an input signal vs. position graph for both increasing and decreasing signal. The signal is a simulated signal so linearity cannot be checked. The positioner is slowly moved from the starting position to the ending position and back and the two curves (up and down) are measured and displayed.
 - □ Starting current (mA)
 - □ Ending current (mA)

- □ Number of points to sample
- Step Profile: Measures the position response over time of the valve to a request to change position. o Starting position (%). This test produces a time vs. position graph where the valve is requested to change position. The graph can contain data for 2 to 10 seconds of data with data every 0.1 seconds.
 - □ Ending position (%)
 - Sample time Number of seconds to sample at each step





Extended Actuator Signature: The same test as the standard actuator signature except that you can specify a position range for the test and that sample data is taken more frequently. (every 0.1 seconds). This provides a much more detailed signature. The ending position may be less than 0 (e.g. –5.0%) which allows a signature to examine the seating response of the valve.

An *Extended Actuator Signature* test produces a pressure vs. position graph where the actuator pressure is first increased slowly then decreased slowly. The graph displays data for the user selected position range both increasing and decreasing with data sampled every 0.1 seconds.

- □ Starting position (%)
- □ Ending position (%)

	Speed – A number from 1 (slowest) to 9 (fastest). The speed should generally be as slow as possible where the test finishes in a reasonable amount of time. As a rule of thumb, the speed can be the size of the valve in inches but not less than 2 or more than 9. When the test range (starting position minus ending position) is small, a slower speed may be used.
PerformDiag.	Clicking Perform Diag . causes the selected diagnostic procedure to start A progress dialog appears while the diagnostic process is running.
View Saved Diagnostic	Previously run and saved diagnostics are viewed by clicking View Saved Diagnostic . This option is available in all modes of operation.
	Choose Signature Curve
	This allows diagnostic graphs that have been saved previously to be displayed. Two graphs (plus the current graph if one has just been run) can be displayed at once in order to compare the results:
	None: Removes the curve.
	 Current Signature: Displays the last run standard actuator signature (note: the last run Standard Signature in the SVI is lost if power to the SVI is lost).
	 Saved Signature: Displays the standard actuator signature saved in the SVI (if any).
	 Baseline Signature: Displays the standard actuator signature saved as the baseline signature in the SVI (if any).
	Current Signature from dp1 File: Select a dp1 file for this or another SVI. The current standard actuator signature from that file is displayed.
	Saved Signature from dp1 File: Select a dp1 file for this or another SVI. The saved standard actuator signature from that file is displayed.
	 Baseline Signature from dp1 File: Select a dp1 file for this or another SVI. The baseline standard actuator signature from that file is displayed.
	Signature from dgn File: Select a file that contains saved diagnostic graphs from this or another SVI. You can then select any of the saved diagnostic graphs.



Figure 15 Choose Signature Curve

Clicking the **Export** button creates a comma separated value file (.csv) of the diagnostic data being shown on the graph. CSV files can be read directly into Excel where you can create graphs or perform other analysis.

Show Data Points

Selecting this option will show a+ at each data point on the graph.

Show Diagnostic Info

Clicking this button opens a window that shows the friction and spring range of each standard actuator signature on the diagnostic graph. No information is shown for diagnostic graphs that are not standard actuator signatures.

Results The results of the *Response Time* test are displayed in the results box.

Change Mode The SVI can be in any of several operating modes:

- □ *Operating:* In this mode the SVI responds to the input signal and positions the valve appropriately (indicator green).
- Manual: In this mode the valve does not respond to the input signal. Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position selected by the user (see Setpoint) (indicator yellow).
- □ *Configure*: In this mode you can set configuration parameters of the positioner or controller (indicator yellow).
- □ Calibrate: In this mode you can set calibration parameters of the positioner (indicator yellow).

- Diagnostic: In this mode you can run response time tests, step response tests, and positioner signatures (indicator yellow).
- Bumpless transfer: This is a transition mode when you select operating mode from manual mode (see Bumpless Transfer) (indicator red).
- □ *Failsafe*: When the SVI cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until the user intervenes (indicator red).

Diagnostic Reports

To create this report:

1. Right-click on the **Diagnostic** tab and select **Diagnostic Report** and a dialog appears:

Look in: 🚺 Data	
Name	Date modified T
SVIDemo.dgn	1/20/2002 10:15 PM C
٠ [!!)
-	
File name:	Open

Figure 16 Open

2. Select a .dgn file, click **Open** and the *Pick Diagnostic Data* dialog appears:

Pick Diagnostic Data		
SIG-C 1 4/ 8/1997 9:59 SIG-S 1 4/ 8/1997 9:59 SIG-F 2 4/ 8/1997 9:59 SIG-EXT 2 4/ 8/1997 10: 1 STEP 0 4/ 8/1997 10: 3 STEP 0 4/ 8/1997 10: 3 SIG-POS 0 4/ 8/1997 10: 8 SIG-POS 0 4/ 8/1997 10:19		
	ОК	Cancel

Figure 17 Pick Diagnostic Report

3. Select specific group data (up to three of the same type) for presentation on a report, click **OK** and the report appears:



Figure 18 Diagnostic Report

This report can be printed or saved under a user designated name for later use.

Report Preferences

You must select the report file which is either a text (.txt) or rich text (.rtf) file. A standard report template comes installed with ValVue but you can create new reports in other formats (see *Creating Report Files*).

To select the report file:

- 1. Click the browse button next to the report file edit box.
- 2. Select the proper report file.

The program that generates the reports can be NotePad, WordPad, or Microsoft Word. Rich text format (.rtf) files can be used with WordPad or Word to give better formatting.

To select the program:

- 1. Click the browse button next to the program edit box.
- 2. Select the program to use.

NotePad and WordPad are often installed in the directory c:\Program Files\Accessories\ or in c:\windows\. The actual location of these files or Microsoft Word varies from computer to computer.

Creating Report Files

You can create a custom SVI report by creating a text or rich text format file which is laid out in the format of the desired report. This snap-on substitutes the value of its parameter into the text file where ever it finds a parameter name that matches an SVI parameter. For example:

Tag=\$\$Tag

The snap-on substitutes the actual tag name from the SVI in place of the \$\$Tag in the report.

Any text can be used in a .txt file and printed with NotePad. With WordPad or Microsoft Word, you can use an .rtf format file which can contain special formatting (fonts, sizes, tabs, etc.) and can contain bitmaps. Some .rtf formatting is accepted in Word which is not available in WordPad – check the documentation of these program to determine what options are available (e.g. right align tabs is allowed in Word but not in WordPad).

The allowed SVI Parameters are listed below. List the report file (report.rtf) shipped with the application for examples.

\$\$Tag - Tag Name \$\$Descriptor - Descriptor \$\$Date - Date \$\$Message - Message \$\$AssemblyNumber - Final Assembly Number \$\$MfgID - Manufacturers ID (101 for Masoneilan) \$\$DeviceType - DeviceType (200 for the SVI) \$\$DeviceID - Hart DeviceID \$\$HWRev - Hardware Revision \$\$SWRev - Software Revision \$\$PollingAddress - PollingAddress **\$\$**Position - Position \$\$Pressure - Actuator Pressure \$\$Signal - Input signal \$\$Setpoint - Process Setpoint \$\$ProcessVar - Process variable \$\$Temperature - Circuit board temperature \$\$Bias - Internal I/P bias \$\$Output - Output from the process controller

\$\$Mode - SVI mode \$\$ControllerModeSP - Local/Remote \$\$ControllerModePV - Real/Simulated process variable \$\$SignalPercent - Input signal as percent \$\$AirAction - Air-to-open/Air-to-close \$\$ActuatorType - Single/double acting actuator \$\$ControllerSwitch - Controller on/off \$\$DirectReverse - Direct or reverse positioner \$\$ReverseType - Software or hardware reverse \$\$FailDirection - Fail to low/high I/P signal \$\$PosErrorBand - Position error band \$\$PosErrorTime - Time until position error \$\$PosErrorFailtime - Time until position error produces failsafe action \$\$Charact - Characterization (linear, equal percentage, etc.) \$\$CustomCharact - Displays the custom characterization constants \$\$ButtonLock - Button lock level \$\$Bumpless - Bumpless Transfer on/off \$\$TightShutoff - Tight shutoff on/off \$\$TSValue - Tight shutoff value \$\$ULimitStop - Upper position limit on/off \$\$ULSValue - Upper position limit \$\$LLimitStop - Lower position limit on/off \$\$LLSValue - Lower position limit \$\$NearClosed - Value below which is considered near closed \$\$PresUnits - Pressure units of measure \$\$PosUnits - Position units of measure (always %) \$\$Language - SVI display language \$\$LowSignal - Low calibration value \$\$HighSignal - High calibration value \$\$HighPres - Pressure calibration value \$\$P - Proportional gain in positioner \$\$Padjust - gain adjustment of positioner

\$\$I - Integral action of positioner \$\$Beta - Step size adjustment in positioner \$\$D - Derivative action of positioner \$\$PosComp - Position range compensation of positioner \$\$DeadZone - Dead zone of positioner \$\$Damping - Damping coefficient of positioner \$\$Travel - Total strokes of the valve \$\$Cycles - Total cycles of the valve \$\$TimeOpen - Total time open of the valve \$\$TimeClosed - Total time closed of the valve \$\$TimeNearClosed - Amount of time valve was nearly closed \$\$Friction - Friction computed by standard diagnostic \$\$ResponseOpen - Time require to open valve \$\$ResponseClosed - Time required to close valve \$\$LSpringRange - Lower spring range (measured) \$\$USpringRange - Upper spring range (measured) \$\$Signature - Displays the data from the valve signature \$\$SigSavedSpeed - The speed used to run the saved signature \$\$LSprRngSaved - The lower spring range of the saved signature \$\$USprRngSaved - The upper spring range of the saved signature \$\$SigSaved - Displays the data from the saved valve signature \$\$SigFactorySpeed - The speed used to run the factory signature \$\$LSprRngFac - The lower spring range of the factory signature \$\$USprRngFac - The upper spring range of the factory signature \$\$SigFactory - Displays the data from the factory valve signature \$\$PVUnits - Process variable units of measure \$\$SPUnits - Process setpoint units of measure \$\$StartupMode - Controller startup mode local/remote \$\$InitialSetpoint - Initial setpoint for local startup \$\$ControllerRate - Controller cycle time \$\$RatioControl - Ratio control on/off \$\$ContrDirRev - Controller action direct/reverse

\$\$LowPV - Low calibration for process variable

\$\$HighPV - High calibration for process variable

\$\$LowSP - Low calibration for setpoint

\$\$HighSP - High calibration for setpoint

\$\$ContP - Controller P

\$\$Contl - Controller I

\$\$ContTD - Controller D

\$\$ContKD - Controller D gain

\$\$ContBeta - Controller beta

\$\$LSPLimit - Lower setpoint limit

\$\$USPLimit - Upper setpoint limit

\$\$LowAlarm - Low alarm value

\$\$HighAlarm - High alarm value

\$\$ManResetBias - Manual reset bias

\$\$OutRateLim - Controller output rate limit

\$\$ContDZ - Controller dead zone

\$\$DevSource - Derivative source

\$\$AlarmType - Alarm type absolute/deviation

\$\$SPTracking - Setpoint tracking on/off

\$\$FreezeOnBad - Freeze on bad value on/off

Menu - Diagnostics

When you right-click on the *Diagnostics* tab, a context menu appears (the items depend upon what diagnostics have been run):

- □ *View Diagnostic Graph* Views the data from the last run diagnostic procedure.
- □ Save Diagnostic Data Saves the data from the last run diagnostic into a disk file. The disk file can be imported into spreadsheets or read with ValVue.
- □ *Diagnostic Report* Opens a dialog to select a .dgn file and specify specific group data (up to three of the same type) for presentation on a diagnostics report.
- □ Save Signature in SVI Saves the last run signature in the SVI.
- □ Save Signature as Baseline Saves the last run signature as the baseline signature in the SVI. You must have administrator level privilege to select this option.
- □ *Report Setup* Allows the user to select a report file and a report printing program
- □ *Report* Generates a report of the SVI parameters.

- □ *Reset Continuous Diagnostics* Resets the continuous diagnostic data (stroke count, cycle count, time open, time closed, and time near closed) to 0. When reset, the previous values are lost, thus the data should be recorded somewhere before being reset is used.
- □ *Detach Trend* Removes the *Trend* display from the tabbed dialog and creates a separate display.
- □ *Help* Displays the help file at the *Diagnostics* tab instructions.

Status Tab

From the *Status* tab you can see the internal status of the SVI. The tab is divided into four separate sections for *Operations, Communication, Firmware*, and *Circuitry*.



Figure 19 Status Tab

Fields	
Clear Faults	Clicking Clear Faults clears the status bits inside the SVI device. This button is only available when the SVI is in manual or operating mode.
Change Mode	The SVI can be in any of several operating modes:

- □ *Operating:* In this mode the SVI responds to the input signal and positions the valve appropriately (indicator green).
- Manual: In this mode the valve does not respond to the input signal. Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position selected by the user (see Setpoint) (indicator yellow).
- □ *Configure*: In this mode you can set configuration parameters of the positioner or controller (indicator yellow).
- □ Calibrate: In this mode you can set calibration parameters of the positioner (indicator yellow).
- Diagnostic: In this mode you can run response time tests, step response tests, and positioner signatures (indicator yellow).
- Bumpless transfer: This is a transition mode when you select operating mode from manual mode (see Bumpless Transfer) (indicator red).
- □ *Failsafe*: When the SVI cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until the user intervenes (indicator red).

Status Code List

POSITION_ERROR	The valve failed to go the requested position within the required time.
POSITION_SENSOR_ERROR	The position sensor has failed or its connection is open.
PRESSURE_SENSOR_ ERROR	The pressure sensor has failed.
SIGNAL_SENSOR_ERROR	The input signal measurement sensor has failed.
REFERENCE_VOLTAGE_ERR OR, IP VOLTAGE ERROR	The primary reference voltages inside the SVI is incorrect and all other measurements will likely be affected.
SYSTEM EEPROM FAULT	The SVI cannot write to EEPROM. This prevents the SVI from function- ing.
WATCHDOG TIMER TIME- OUT	The watchdog timer was not reset by the SVI. This indicates a serious failure in the SVI.
CIRCUIT TEMPERATURE FAULT	he circuit board reached a temperature outside of its rated temperature.
BIAS_OUT_OF_RANGE	The signal to the I/P which causes no valve movement (called the bias) has changed and is outside of the normal operating range.
SELF_CHECK_FAILURE	On startup, the SVI did not pass a self check.
HART_ERROR	An excessive number of HART transmission errors have occurred.

SOFTWARE_ERROR	An inconsistency has been detected within the SVI.
RESET_OCCURRED	A reset has occurred either because of a power interruption or because of an external request for reset.
DATA_OVERRUN	The SVI is not processing acquired data.
INTERNAL_TEMP_ERROR	Internal temperature of the SVI is above or below the rated temperature.
EEPROM_WRITE_FAILED	A write to the SVI's internal memory failed.
FIND_STOPS_FAILED	The calibration procedure for position failed to find reasonable values.
CALIBRATE FAILED	An attempt to run find stops or autotune failed.
STANDARD DIAGNOSTICS FAILED	Running the standard diagnostic failed to complete.

Menu -Status Tab

- □ *Report Setup* -Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the SVI parameters.
- Detach Trend- Removes the Trend display from the tabbed dialog and creates a separate display.
- □ *Help-* Displays the help file at the *Controller Monitor* tab instructions.

Check Tab

From the *Check* tab you can set and monitor some of basic parameters. This tab is used primarily for troubleshooting.

ValVue SVI - Offline	TAG				
Tools Help				1	
Monitor Trend Config	ure Controller Con	fig Calibrate Diag	gnostics Status	Check	1
-	TAC		_	_	
lag	ITAd				
Descriptor	DESC			TATA	
Message	MESSAGE				
Date	23 JAN 2001				
Assembly Number	1026949				
- A					
Position (%) Raw	Position	Pressure psi	Raw Pressure		
70.2	14184	-0.15	9611		
Current (mA) Raw	Signal	2nd Current (mA)	2nd Raw Signal	Controller Output	
9.3	9296	32.77	32767	0	
Board Temp (C)					
18.1					
	_				
I/P Set I.	/P				
1 3430	U				
Change Mode	Mode	Manual	0	Exit	Help

Figure 20 Check Tab

Fields	
Position	The current position of the valve in percent open. 0% is always closed and 100% is open. Because the travel of a valve may exceed its nom- inal travel, positions greater than 100% are possible (see <i>Open Stop</i> <i>Adjustment</i>).
Raw Position	The A/D value measured from the position sensor. This is used for troubleshooting purposes.
Pressure	The actuator pressure which can be reported in psi, bar, or kPa. You can select the units from the "Configure Tab" on page 571.
Raw Pressure	The A/D value from the pressure sensor. This is used for troubleshoot- ing purposes.
Current	The value of the input signal in milliamps.

Raw Signal	The A/D value measured from the signal sensor. This is used for troubleshooting purposes.
Current (2nd)	The value of the auxiliary input signal in mA. The auxiliary signal is used as the process variable input when the controller is on.
Raw Signal (2nd)	The A/D value from the auxiliary signal sensor. This is used for troubleshooting purposes.
Controller Output	When the controller is on, this value is the signal in percent sent to the positioner from the process controller.
Board Temperature	The internal SVI temperature measured in degrees Celsius.
I/P	The current D/A value being sent to the I/P that controls the valve position. This value is used for troubleshooting. The D/A value sent to the I/P can be set directly for testing by using the Set I/P edit box and menu command.

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.

To set the I/P:

- 1. Enter a number between 1 and 5500 in the Set I/P edit box.
- 2. Right-click to pop up the context menu and select *Set I/P*. The indictor should appear red.

To resume normal control, right-click to pop up the context menu and select UnSet I/P.

Menu-Check

When you right-click on the Check tab, a context menu appears.

- □ Set I/P- Removes the valve from normal control and sends a constant signal (using the value in the Set I/P edit box) to the SVI's I/P.
- □ UnSet I/P- Turns off Set I//P and returns the valve to normal control.
- □ *Report Setup* -Allows the user to select a report file and a report printing program.
- □ *Report* Generates a report of the SVI parameters.
- □ *Detach Trend* Removes the *Trend* display from the tabbed dialog and creates a separate display.
- □ *Help-* Displays the help file at the *Check* tab instructions.

Controller Tab

From the *Controller* tab, you can see the basic functioning of the SVI process controller including the process variable and the process setpoint. This tab allows you to change the valve position (when in manual mode) by dragging the controller output indicator or to change the process setpoint (in local mode) by dragging the process setpoint indicator.

ValVue SVI - Offline	TAG			
Tools Help				
Monitor Trend Config	gure Controller Config Calibrate I	Diagnostics Status	is Check Controller Controller Settings	
<u> </u>				
Tag	TAG		% 100	
Descriptor	DESC			
Message	MESSAGE		80 -	
Date	23 JAN 2001			
Assembly Number	1026949		71.7 Remote Setpoint	
<u>,</u>			40 - bar 🖊	
			20 - 71.7	
Mode	Manual Mode		%	
Controller Status		0		
			1 Setpoint	
			1 Process Variable	
			93 Output (%)	
			9.3	
		I mar I		
	Mode Manual			
Change Mode	mode Manual	0	ExitHelp	

Figure 21 Controller Tab

Fields

Local/Remote/Manual Mode Sets the mode of the controller.

- □ Local- The process setpoint is set to a constant value determined by the user It can be changed from the Setpoint Indicator.
- *Remote-* The setpoint is measured from the input signal on the primary SVI input
- Manual The positioner is put in Manual mode and is not controlled by the process controller. The valve position can be changed from the Output Indicator from the Monitor tab.

Controller Status	The alarm status indicates when the process variable is outside of the user specified range of upper alarm limit and lower alarm limit. The alarm can be specified as an absolute range or as a deviation from setpoint.	
Setpoint Indicator	The graphical display shows the process variable (bar) and the pro- cess setpoint (thumb). The process variable is measured from the 2nd input signal (auxiliary input signal) and scaled to engineering units.	
	 In remote mode, the process setpoint is measure from the primary input signal and scaled to engineering units. 	
	In local mode, the setpoint is set by the user and may be changed by dragging the thumb or by right-clicking on the thumb and typing a value.	
	In manual mode, the setpoint is ignored.	
Remote Setpoint	The process controller setpoint is measured at the primary input sensor and is scaled in engineering units according to the data entered on the calibration tab. If ratio control is selected, the set- point units may be different from the process variable. The remote setpoint field shows the remote setpoint even when the controller is in local mode or manual mode.	
Scaled Setpoint	When ratio control is selected, the remote setpoint is linearly scaled by user input parameters to calculate the scaled setpoint for use by the process controller. The scaling can be used to change to setpoint engineering units to match the process vari- able.	
Setpoint	The setpoint of the process controller. When ratio control is selected, this is the scaled value in the same units as the process variable. In local setpoint mode, the setpoint can be changed by dragging the thumb in the process setpoint indicator or by right-clicking on the indicator and typing a value.	
Process Variable	The process variable is the value in engineering units of the pro- cess being controlled and measured from the transmitter signal attached to the 2nd signal input (auxiliary signal).	
Controller Output	When the controller is on, this value is the signal in percent sent to the positioner from the process controller.	
Controller Output Indicator	The graphical display shows the output of the process controller from 0% to 100% and the valve position (uncharacterized to match the controller output). In manual mode, the thumb can be dragged to change the valve position.	

Change Mode	The SVI can be in any of several operating modes:
	 Operating: In this mode the SVI responds to the input signal and positions the valve appropriately (indicator green).
	Manual: In this mode the valve does not respond to the inpusion signal. Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position selected by the user (see Setpoint) (indicate yellow).
	 Configure: In this mode you can set configuration parameter of the positioner or controller (indicator yellow).
	 Calibrate: In this mode you can set calibration parameters of the positioner (indicator yellow).
	 Diagnostic: In this mode you can run response time tests, steresponse tests, and positioner signatures (indicator yellow).
	 Bumpless transfer: This is a transition mode when you select operating mode from manual mode (see Bumpless Transfer (indicator red).
	□ <i>Failsafe</i> : When the SVI cannot operate correctly the device goes to the failsafe position and remains in the failsafe mod until the user intervenes (indicator red).

Menu - Controller

When you right-click on the *Controller Monitor* tab, a context menu appears (the items that appear depend on the SVI mode):

- □ Set Manual Puts the valve in Manual mode.
- □ Set Local Puts the controller in Local mode with a constant, user defined setpoint.
- □ Set Remote Puts the controller in remote mode with the setpoint measured from the signal input.
- □ Set Output In Manual mode, allows you to set the valve position. The valve moves to where it would go if the controller output were set the entered value.
- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the SVI parameters.
- □ *Detach Trend* Removes the Trend display from the tabbed dialog and creates a separate display.
- □ *Help* Displays the help file at the *Controller Monitor* tab instructions.

Controller Settings Tab

From the *Controller Settings* tab you can change the parameters that control the process controller.

ValVue SVI - Offline	TAG		
Tools Help	1		
Monitor Trend Config	jure Controller Config Calibrate Di	agnostics Status Check Cor	ntroller Controller Settings
Tag	TAG	Derivative Source	3
Descriptor	DESC	C PV	Setpoint Tracking
Message	MESSAGE	C Error	Freeze on Bad Value
Date	23 JAN 2001	Alarm Type	
Assembly Number	1026949	C Absolute	
20 Proportion	nal Gain (%) 0	Set Point Low Limit	-100 Low Alarm Limit
3 Integral T	ime (s) 100	Set Point High Limit	100 High Alarm Limit
Derivative	e Time (ms)	Ratio Gain	50 Manual reset Bias (%)
B Derivative	e Gain 0	Ratio Bias	0utput Rate Limit (%/s)
7 Beta (nor	i-linear)		0.49 Controller Dead Zone (%)
			Apply Settings
Change Mode	Mode Calibrate	0	Exit Help

Figure 22 Controller Settings Tab

Fields	
Derivative Source	Determines whether a change in process variable or a change in error (setpoint- process variable) causes derivative action.
Setpoint Tracking	If setpoint tracking is selected, when the controller is changed from the Manual mode to Local mode, the setpoint is set to equal the current process variable. In that case the process is not upset by the change from manual to local.
Freeze on Bad Value	If selected and if the process variable read from the auxiliary input channel is not a valid reading, the controller output is not changed.
Alarm Status	The alarm status indicates when the process variable is outside of the user specified range of upper alarm limit and lower alarm limit.
	The alarm can be specified as an absolute range or as a deviation from setpoint.

Alarm Type	Determines whether the alarms will be absolute or deviation:	
	 An absolute alarm appears when the process variable is not between the low and high alarm values. 	
	 A deviation alarm appears when the process variable differs from the setpoint by more than the low and high alarm values. 	
Controller Parameter List		
The following paramete controller is operating:	rs for the process controller can be changed whenever the process	
Proportional Gain (%)	<i>P</i> is the ratio of proportional action (part of controller output) to error.	
Integral Time (sec)	Integral time or reset time, is the time constant of integral control.	
Derivative Time (msec)	Derivative time or rate time is the time constant of derivative control.	
Derivative Gain	Derivative gain is a parameter for derivative control. Typical range is 8 to 16.	
Beta	This is 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.	
Setpoint Low and High Limits	The setpoint is constrained to be between the low and high limits. Both local and remote setpoints are limited. The limits are entered in the same engineering units as the process variable.	
Ratio Gain and Bias	In ratio control, the setpoint and process variable can be in different engineering units or on different scales. The relationship between the setpoint in process variable units and the raw setpoint is given by:	
	Setpoint (in process variable units)=Ratio Gain × Setpoint + Ratio Bias.	
	The setpoint in process variable units is used in the PID calculation to compute error.	
Low and High Alarm Limits	Defines when the alarm lights on the controller view are lit. If abso- lute alarms are selected and the process variable is not between the low and high alarm limit, the alarm light is on. If deviation alarms are set and the difference between the setpoint and the process variable is not between the low and high alarm limit, the alarm light is on. The alarm limits are entered in the same units as the process variable.	
Manual Reset Bias	Only applies to P or PD control. It is the process controller output at a typical operating steady state. If the controller outputs range from 30 to 50% at normal operation, the <i>Manual Reset Bias</i> should be set at 40% in order to minimize steady state error.	
Output Rate Limit	Limits how fast the output can change. It is expressed as the percent of full output range per second and can be between 1 and 200 per- cent.	

Controller Dead Zone	When the difference between the setpoint and the process vari- able is less than the dead zone, the controller takes no action to change the output.	
Apply Settings	Sends the values on the tab to the SVI. Changes made on the set- tings tab are not made until the Apply Settings button is clicked.	
Change Mode	The SVI can be in any of several operating modes:	
	 Operating: In this mode the SVI responds to the input signal and positions the valve appropriately (indicator green). 	
	Manual: In this mode the valve does not respond to the input signal. Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position selected by the user (see Setpoint) (indicator yellow).	
	 Configure: In this mode you can set configuration parameters of the positioner or controller (indicator yellow). 	
	 Calibrate: In this mode you can set calibration parameters of the positioner (indicator yellow). 	
	 Diagnostic: In this mode you can run response time tests, step response tests, and positioner signatures (indicator yellow). 	
	 Bumpless transfer: This is a transition mode when you select operating mode from manual mode (see Bumpless Transfer) (indicator red). 	
	 Failsafe: When the SVI cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until the user intervenes (indicator red). 	

Menu Bar and Footer Buttons

File Menu	Allows you to exit the level portion of the program to the device selection list.
Exit Button	Exits the program.
Help Button	Displays the online help table of contents. Right-clicking on any tab displays a menu that includes help – the menu help displays help for the particular tab.
Help Menu	Allows you to view online help for the program or for the ValVue pro- gram. <i>Software Revision</i> : This value indicates which revision of soft- ware is used inside the unit. As software is updated, this value changes. SVI and other software that must communicate with the SVI use the software revision number to know how to correctly com- municate with the device.
Mode	Displays the mode of the SVI – Operating, Manual, Configure, Cali- brate, Diagnostic, or Failsafe.
Online/Offline	In the offline mode, SVI reads values for all of the variables from a file (rather from a real SVI device). The offline mode can be used to examine the variable values that have been saved with the Save SVI Data command and is useful as a demo/learning tool.
ValVue SVI Software

ValVue SVI - Offline T	TAG		
Tools Help			
Monitor Trend Configu	ure Controller Config Calibrate	Diagnostics State	us Check
	SVI		Signal (%) 33.1 mA 9.30 Position (%) 70.2
Tag	TAG		Pressure (psi) -0.16
Descriptor	DESC		
Message	MESSAGE		70.2 Signal (%)
Date	23 JAN 2001		Setpoint (%)
Assembly Number	1026949		Send Cmd
Status		0	
Setup Wizard			
Change Mode	Mode Diagnostic	0	Exit Help

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Monitor Tab

Use the *Monitor* tab to view the basic functions of the SVI2 including tag and identification, input signal, setpoint, position, and status. When in manual mode, you can use the bar indicator to change the valve position by dragging the position indicator.

The Setup Wizard provides for rapid setup of the positioner in four easy steps.

ValVue SVI2 - Offline TAG1	
Tools Help	
Monitor Trend Configure Calibrate Diagnostics Status Check	
SVI II	Signal (%) 33.5 9.35 mA Position (%) 33.5 Setpoint (%) 33.5
TagTAG1DescriptorDESC1MessageMESSAGE1Date01 JAN 2001Assembly Number1235	Send Cmd
Status Contraction Setup Wizard	
Change Mode Mode: Setup	Exit Help

Figure 1 Monitor Tab

Fields

Tag

A user-assigned name for the valve with a maximum of eight characters. The value appears in many views but can only be changed from the "Configure Tab" on page 626 tab or with commands sent from the Monitor tab.

Descriptor A user-defined field with up to 16 characters. Use this field to describe the user of the valve. The value appears in many views but can only be changed from the "Configure Tab" on page 626 tab or with commands sent from the Monitor tab.

Message	A user-defined field with up to 32 characters. Use this field for any information. The value appears in many views but can only be changed from the "Configure Tab" on page 626 tab or with commands sent from the <i>Monitor</i> tab.	
Date	Use the date field as needed. The preferred format is dd MMM yyyy (e.g. 14 NOV 2001). The program also accepts dates formatted as dd/mm/yy (e.g. 14/11/01). Years greater than 70 are assumed to be in the 1900's with years 70 or less assumed to be in the 2000's. The day precedes the month. Dates as dd/mm/yyyy are also accepted. The value appears in many views but can only be changed from the"Configure Tab" on page 626 tab or with commands sent from the <i>Monitor</i> tab.	
Assembly Number	A user-assigned number between 0 and 16,777,215. The value appears in many views, but can only be changed from the "Configure Tab" on page 626 or with commands sent from the <i>Monitor</i> tab.	
Status	The SVI2 tracks many errors and fault conditions. When there is information on fault codes available in the SVI, this box contains <i>Additional Status Available</i> .	
Signal	The value of the input signal expressed as the position it indicates. It is scaled in percent and is characterized if necessary.	
Position	The current position of the valve in percent open. 0% is always closed and 100% is open. Because the travel of a valve may exceed its nom- inal travel, positions greater than 100% are possible (see"Open Stop Adjustment" on page 637).	
Setpoint	When in operating mode, the setpoint is the position indicated by the input signal (characterized if necessary). In manual mode, it is the position to which the SVI2 is controlling the valve. Change the manual setpoint by dragging the lower thumb on the position indicator when the positioner is in Manual mode.	
Position Indicator	This indicator shows the valve position graphically. The indicator consists of three parts:	
	The upper part contains an indicator that shows the value of the signal. In Operating mode this is the position setpoint. In manual mode, this is the position that the valve moves to if operating mode is selected.	
	The center green bar shows the valve position with full left as closed and full right as open. The numerical valve position is shown in the center.	

	The lower part contains an indicator (thumb) that shows the valve setpoint. In operating mode this is the same as the signal. In manual mode it is the valve setpoint. Drag the thumb to change the valve setpoint. While dragging, the number in the center bar shows the manual setpoint selected when you release the thumb.	
	You can also change the manual setpoint by right-clicking in the indicator. A dialog box appears where to type the exact setpoint for use.	
Pressure	The SVI2 continuously monitors the actuator pressure. It is dis- played in the user selected units (psi, bar, or kpa).	
Send Command	Sends the selected HART command to the SVI, reads the results, and displays them in the result box below.	
Setup Wizard	From the Setup Wizard tab you can rapidly setup the SVI2 by con- figuring some basic parameters. By selecting the appropriate check boxes you can set the device identification, select the air action, perform a travel calibration, and an autotune. When the selected tasks are started, ValVue displays a progress dialog.	

Used primarily for rapid setup of standard valves, the *Setup Wizard* can dramatically reduce commissioning time in the field.

Step 1:		
	Set Tag and [Descriptor
	Tag	SVI II
	Descriptor	POSITIONER
	Message	RELEASE 123 SW + P
Step 2:		Denet Conferenciae to
•	Set Air Action	factory defaults
	 Air-to-Ope 	en
	C Air-to-Clos	se
Step 3:		
•	Calibrate Trav	el
Step 4:		
~	Autotune	Supply Pressure 30.0 psi
Step 5:		
	Report & Back	«up

Figure 2 Setup Wizard

Change Mode When selected, you can change the SVI2 mode. The SVI2 can be in any of three operating modes:

- □ *Operating* In this mode the SVI2 responds to the input signal and positions the valve appropriately (indicator green).
- □ *Manual-* In this mode the valve does not respond to the input signal Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position is selected (see *Setpoint*) (indicator yellow).
- Setup- In this mode you can set calibration and configuration parameters. Additionally you can run response time tests, step response tests, and positioner signatures. (indicator yellow).

Change Mode 🛛 🔀
Choose Mode
C Operating
🔘 Manual
Setup
OK Cancel

Mode

The SVI2 can be in any of several operating modes

- □ *Operating* in this mode the SVI2 responds to the input signal and positions the valve appropriately (indicator green).
- □ *Manual* in this mode the valve does not respond to the input signal. Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position selected by you (see *Setpoint*) (indicator yellow).
- Setup in this mode, the valve does not respond to the input signal and remains stable unless moved by a command selected by you. In this mode, you can set calibration and configuration parameters. Additionally, you can run response time tests, step response tests, and positioner signatures (indicator yellow).
- Bumpless transfer this is a transition mode when you select Operating mode from manual mode and the positioner has been configured for bumpless transfer. (indicator red).
- □ *Failsafe* when the SVI2 cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until you intervene (indicator red).

Command Result Display

This box displays the SVI's response to HART commands. The following commands may be sent to the SVI:

- □ 000 Read Identifier Returns the unique identifier from the device including the device ID, device type, and the manufacturers ID.
- □ 001 *Read Primary Variable* Returns the position in percent open.
- □ 002 Read Current Returns the input signal in mA.
- □ 003 *Read All Variables* Returns the input signal and the position in percent open.
- □ 011 Read ID from Tag Prompts you for a tag name. The tag name is sent in a HART command and if received by a device with a matching tag name, the ID of the device is returned. The format of the ID is the same as command 001 Read Identifier.
- □ 012 Read Message Reads the message that was stored in the device when it was configured.
- □ 013 Read Tag & Descriptor Reads the tag name, date, and the descriptor that was stored in the device when it was configured.
- □ 016 Read Assembly Number Reads the final assembly number that was stored in the device when it was configured.
- □ 017 Write Message This command allows you to enter a message (up to 32 characters) for storage in the SVI2.
- □ 018 Write Tag & Descriptor This command allows you to enter a tag name (up to 8 characters) and a descriptor (up to 16 characters) that are stored in the SVI2.
- □ 019 Write Final Assembly This command allows you to enter an identifying number (0 to 16 million) which is stored in the SVI2.
- □ 038 Reset Configuration Changed Flag This command sets the HART configuration changed bit back to 0. The bit is set whenever a value saved in the device is changed.
- 210 Read Configuration Reads the configuration data from the device and displays it in the response box. The data includes all of the data describing the device set on the Configure tab including Air-To-Open/Air-To-Close, Tight Shutoff status, Software Position Limit Stops, etc.
- □ 200 Read Option Config Reads basic (hardware) configuration information about the positioner.
- □ 212 Read Error Limits Reads and displays the position range and time-outs associated with position and pressure errors.
- □ 213 Read Calibration Data Reads and displays the input signal that corresponds to the open and closed position of the valve.
- □ 216 Read PID Reads and displays the valve tuning parameters.
- □ 136 Read Status Reads and displays the status flags. These flags describe error conditions that have occurred since the last time they were cleared. See "Status Code List" on page 653 for a complete list of possible codes.
- □ 138 Clear Status Clears the status flags. See "Status Code List" on page 653.
- □ 137 Read Switches Reads the status of the contact switches.

- □ 139 Read Continuous Diagnostic Data Reads and displays the continuous diagnostic data including number of full strokes the valve has made, the number of cycles (direction changes), the time the valve has spent open, the time the valve has been closed, and the time the valve has spent throttling near the seat.
- □ 191 Read Standard Diagnostic Data Displays the valve response time open and response time closed.
- □ 154 Read Setpoint reads the manual setpoint of the positioner.
- □ 1093 Read Firmware Checksum a non-standard HART command that returns the checksum of the firmware this identifies a specific build of the firmware.
- 141 Read Raw Data Returns information from the SVI that is useful to Masoneilan technicians for diagnostic purposes. The information includes the input current on the auxiliary input channel, the A/D values from the pressure, signal, and position measurements, the D/A value of the signal to the I/P, and the internal SVI temperature.
- □ 999 Hart Status this command interprets the 2nd HART status byte returned with the command set to read position and signal.

Setup Wizard

Wizard Step 1

When selected, you can modify the device Tag, Descriptor, and Message.

Step 1:		
🔽 Set Tag and D	escriptor	
Tag	SVEII	
Descriptor	POSITIONER	
Message	RELEASE 123 SW + P	

Wizard Step 2

When selected, you can modify the air action or return the device to factory default settings.

Sten 2:	
Set Air Action	Reset Configuration to factory defaults
Air-to-Open	
🔿 Air-to-Close	

Wizard Step 3

When selected, you can perform a *Travel Calibration*. To determine valve position, the positioner must measure the closed and open positions of the valve. The SVI2 first exhausts the actuator and measure the position, then fills the actuator and measure the position. From these measurements the valve position can be determined.

Step 3:	
🔲 Calibrate Travel	

Wizard Step 4

When selected, you can perform an Autotune. The SVI2 positioner is PID servo control device with special parameters unique to valve positioners. Because the SVI2 can be put on a wide variety of valves, the values of the parameters must be changed to match each valve.

The SVI2 can determine a good set of parameters automatically. When the Auto Tune procedure is run, the SVI2 performs a series of open and closed loop tests to determine values for *P*, *I*, *D*, *Padjust*, *Beta*, *Position Compensation*, and *DeadZone*.

The values determined should give good general operation of the valve; however these values are determined by a target set of performance criteria built into the SVI2. You may want performance different than this set and may therefore want to set the PID values differently than determined by Auto Tune. This can be done on the "Calibrate Tab" on page 634.

Additionally, you can enter the expected Supply Pressure.

Step 4:		
🗌 Autotune	Supply Pressure	30.0 psi

Wizard Step 5

Click and when *Setup Wizard* completes a report of settings appears using the selection made in *Report Setup*.

Step 5:		
~	Report & Backup	

Auto Tune

The SVI2 positioner is PID servo control device with special parameters unique to valve positioners. Because the SVI2 can be put on a wide variety of valves, the values of the parameters must be changed to match each valve.

The SVI2 can determine a good set of parameters automatically. When the Auto Tune procedure is run, the SVI2 performs a series of open and closed loop tests to determine values for P, I, D, Padjust, Beta, Position Compensation, and DeadZone. A progress dialog appears while the autotune process is running.

The values determined should give good general operation of the valve; however, these values are determined by a target set of performance criteria built into the SVI2. You may want performance different than this set and may therefore want to set the PID values differently than determined by Auto Tune. This is done on the "Calibrate Tab" on page 634.

Progress Dialog

Some processes that ValVue can start can be lengthy. These processes include find stops, autotune, diagnostics, and the setup wizard. While these processes run, a dialog is provided to show the progress and allow you to cancel the process early if necessary.

Setup Wizard		
Setup Wizard Progress		
Set Tag and Descriptor	🥚 Finished	
Set Air Action	🥝 Finished	
Find Stops	Running	
AutoTune	0	
Create Report_Backup	0	
Elapsed Time (Task): 00:00:01 Elapsed Time (Total): 00:00:05	Cancel Current Task	Cancel All Continue

Figure 3 Progress

Read Status

To retrieve the fault codes:

- 1. Select **Read Status** from the drop down list.
- 2. Click **Send**. The results appear in the lower left box. The fault codes also appear on the *Status* page.

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

Menu - Monitor

When you right-click on the *Monitor* tab, a context menu appears. The items that appear depend on the SVI2 mode:

- □ *Full Open* Moves the valve to full open. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P. This is available only in manual or setup mode.
- □ *Full Closed* Moves the valve to full closed. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P. This is available only in manual or setup mode.
- □ Set to Fail Position Moves the valve full open or full closed, whichever is the fail position of the actuator.
- □ *Cancel Transfer* Returns the SVI2 to manual mode from the bumpless transfer mode. Available during a bumpless transfer.
- Reset Selecting this issues a master reset to the device, causing it to go through its startup routine and re-initializing all of its operating parameters from non-volatile memory.
- □ *Report Setup* Allows you to select a report file and a report printing program.
- □ *Report* Generates a report of the SVI2 parameters.
- □ Save SVI Data Saves the SVI2 internal parameters to a disk file that can be read by the ValVue.
- Restore SVI Data Reads data that has been saved with a Save SVI Data command and sends HART commands to set the positioner to match the data that was read. This can be used to clone an SVI into a new SVI. Note: items like tag, which should be unique, and position calibrations which differ on each positioner are not cloned. This command is available only in manual mode.
- □ *Detach Trend* Removes the trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Monitor* tab instructions.

Trend Tab

Use the *Trend* tab to see the performance of the valve in real time as it operates.

These graphs are useful for tuning the PID parameters and monitoring valve performance by showing valve position and setpoint as they change over time. The process trend graphs may be zoomed only on the Y axis.

The process trend can be detached from the tabbed dialog so that it can be viewed while performing calibration and diagnostic tasks. To detach the trend, right-click in any tab.

When in manual mode, change the valve position by dragging the position indicator.



Figure 4 Trend Tab

Fields

Position, Manual Setpoint,
Signal Setpoint andThe display of any of the four curves on the Trend graph may be
turned on or off by checking or unchecking these boxes.PressureY Low/ Y HighThe Y axis (position) of the trend graph can be set by entering the values in these edit boxes. Enter a number and hit tab to set the scale.

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The axis can be changed with the mouse by zooming and can be

returned to the original scale by right-clicking in the graph.

Position Indicator	This indicator shows the valve position graphically. The indicator consists of three parts:
	 The upper part contains an indicator that shows the value of the signal. In Operating mode this is the position setpoint. In manual mode, this is the position that the valve moves to if operating mode is selected.
	The center green bar shows the valve position with full left as closed and full right as open. The numerical valve position is shown in the center.
	The lower part contains an indicator (thumb) that shows the valve setpoint. In operating mode this is the same as the signal. In manual mode it is the valve setpoint. Drag the thumb to change the valve setpoint. While dragging, the number in the center bar shows the manual setpoint selected when you release the thumb.
	You can also change the manual setpoint by right-clicking in the indicator. A dialog box appears where to type the exact setpoint for use.
Change Mode	When selected, you can change the SVI2 mode.The SVI2 can be in any of three operating modes:
	 Operating- In this mode the SVI2 responds to the input signal and positions the valve appropriately (indicator green).
	Manual- In this mode the valve does not respond to the input signal Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position is selected (see Setpoint) (indicator yellow).
	Setup- In this mode you can set calibration and configuration parameters. Additionally you can run response time tests, step response tests, and positioner signatures. (indicator yellow).
Capture to Clipboard	Clicking this button saves an image of the graph on the clipboard. The image (a bitmap) may be pasted into another document (e.g. into a Microsoft Word document).

Zooming

Any portion of a diagnostic graph may be examined more closely by entering the new X and Y scales in the proper scale edit boxes or by dragging the mouse across an area of the graph. If the mouse is dragged across an area, that area fills the graphic window. Right button clicking on the graph restores the default scales.

Menu - Trend

When you right-click on the Trend tab (but not in the graph area- see *Zooming*), a context menu appears:

- □ *Refresh Graph* Restarts the sampling of the *Trend* graph.
- Stop Graph Stops the sampling of the trend graph. It can be restarted by selecting **Refresh Graph**.
- □ Open Opens an Open Trend Data File dialog to open a previously saved trend (.tre file).
- □ Save Opens an Save Trend Data File dialog to save a trend (.tre file).
- □ *Detach Trend* Removes the trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Trend* tab instructions.

Configure Tab

In the Setup mode, from the *Configure* tab, you can set the information that tells the SVI2 how the valve/actuator is configured. Following configuration, you must send the configuration information to the SVI II by clicking on the **Apply** button or by returning to the Manual or Operating mode.

alVue SVI2 - Offline ools Help	TAG1		
Monitor Trend Config Tag Name Descriptor Message Date Final Assy Number Polling Address	TAG1 DESC1 MESSAGE1 01 JAN 2001 1235 0 Language 1. English	Characterization Chinear Equal % (30) Caula % (50) Quick Open Custom Camflex % Air Action Air-to-Open Air-to-Close Single/Double Single Acting	Button Lock Allow Local Buttons Lock out Local Cal-Config Lock out Local Manual Lock out all Buttons Bumpless Transfer Enable
	Position Fault Limits 0.5 Position Error Band (% Time 1 (s) Ena Time 2 (s) Ena	C Double Acting	Near Closed Value (%) 0.5 Position Limits Tight Shutoff Below (%) Position Lower Limit (%) Position Upper Limit (%)

Figure 5 Configure Tab

Fields

Polling Address	HART can communicate with up to 15 devices on a single pair of wires. These devices are distinguished by their polling address which is a number from 0 to 15. If there is a device at polling address 0, it must be the only device on the loop. There may be up to 15 devices with non-zero polling addresses on the loop (subject to power and intrinsic safety constraints). Devices which operate 4-20 mA are generally required to have polling address 0, however with split range valve positioners, several 4-20 mA devices may be wired in series. These devices should be set up with non-zero poll- ing addresses.
Switches	The SVI2 contains as an option, an output switch that can opened or closed in response to conditions that the SVI2 detects. These conditions are:
	 Disabled - The switch is not controlled by the SVI2 and remains in its default position.
	 Failsafe - The switch is activated when the SVI is in failsafe mode.
	 Reset - The switch is activated whenever a reset has occurred and the switch remains activated until the SVI2 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 activated - The switch is activated whenever the device is in tight shutoff. Tight shutoff is on and the valve position is less than the tight shutoff position.
	 Position low limit - The switch is activated whenever the valve position is less than the position setting of this switch control.
	Position upper limit - The switch is activated whenever the valve position is greater than the position setting of this switch control.
	 Manual mode - The switch is activated whenever the SVI2 is in manual mode, configure mode, calibrate mode, or diagnostic mode.
	The switch can be configured to default as normally open or normally closed.
Language	The SVI can display its menu in English or French. Use this list box to choose a language. The ValVue program is not affected.

Pressure Units	You can select the units in which the actuator pressure is reported. Selections are psi, bar, or kpa.		
Position Fault Limits	You can configure how position errors are handled. A position error occurs when the valve position differs from the requested position (from the input signal in normal operating mode or the manual set-point in manual mode) by more than the <i>Position Error Band</i> for more than the <i>Position Error Time 1</i> . When this occurs, a status flag is set which is reported during the next HART message (only that a flag is set is reported. You can send a <i>Read Status</i> message to find out the cause of the status flag). If the error persists for <i>Position Error Time 2</i> , the valve is put in failsafe position. <i>This latter action may be disabled by unchecking the Enable box next to the Time 2 entry.</i>		
	For practical considerations, Time 2 (if enabled) must be larger than Time 1 by at least 2 seconds. Time 1 should be at least as long as the time required to open the valve fully or unnecessary position errors are reported. The maximum time is 327 seconds.		
Characterization	Control valves are often characterized to give a specific relation- ship between flow capacity (Cv) and percent opening of the valve. The valve can be characterized with special purpose trim or with the SVI positioner. Several characterizations are available:		
	Linear: Causes the value to open proportionally with the input signal. This option should be selected if non-linear trim is used in the value.		
	 Equal Percentage (50) and Equal Percentage (30): Two equal percentage characterizations are available, one with R=50 and the other with R=30. 		
	 Quick Opening: The quick opening characterization is the inverse of the Equal Percentage (50) characterization curve. 		
	Custom Configuration: Selecting this option displays an additional dialog where you can enter or draw a custom characterization curve. The curve can have up to nine points and points in between are linearly interpolated.		
Air Action: Air-to-Open I Air-to-Close	You must select whether the valve is an air to open valve or an air to close valve. This selection determines whether an increasing signal opens or closes the valve.		
Actuator Type: Single/ Double	Selects the actuator type-single acting or double acting. This is available only on SVI2 Version 1.2.2 and later.		

Button Lock	The SVI comes with an optional local display and buttons for data entry. These buttons can be used to perform basic SVI setup with- out the need for ValVue or a handheld. It may, however, be desir- able after initial setup to lock the buttons so that the SVI parameters cannot be inadvertently changed from the buttons. Several levels of locks are provided:
	□ Allow Local Buttons (level 3): Buttons on the SVI are enabled.
	Lock Out Local Cal Config. (level 2): You can use the buttons to perform operations in normal operating mode and manual mode, however they may not go to configure or calibrate mode.
	Lock Out Local Manual (level 1): You can examine variables in normal operating mode but may not put the valve in manual mode (and therefore cannot get to calibrate or configure modes).
	□ Lock Out All Buttons (level 0): The buttons are disabled.
Bumpless Transfer	This option provides a means to maintain smooth valve control positioning when changing to Normal mode from Manual or Setup. Without <i>Bumpless Transfer</i> , when changing to Normal mode, the setpoint could vary in a manner that causes a significant process disturbance. <i>Bumpless Transfer</i> 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 sys- tem slowly changes the position until it matches the signal set- point. The time taken to move to the position is determined by the Transfer Time which is a number between 0 and 255 and is approximately the number of seconds required to move the valve 100%.
Near Closed	The <i>Near Closed</i> value determines the value of position below which the valve is considered near closed by the continuous diag- nostic calculations.
Tight Shutoff	When selected, if the input signal of the valve would position the valve below the tight shutoff value (entered in the edit box to the right), full supply pressure or atmosphere pressure is supplied to the actuator as needed to close the valve with full seating force.

Position Limit Stops: Position Lower Limit / Position Upper Limit	 The SVI2 allows you to establish software limit stops. If enabled, during correct operation of the SVI2, the control functions of the SVI will not allow the valve position to be lower than the lower position limit or above the upper position limit. Note, however, that 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. The full open and full closed buttons similarly ignores the settings of the software limit stops. Some of the diagnostic test cannot be performed with position limit stops set. 	
Apply	Clicking Apply causes any changes made in the <i>Configure</i> or <i>Cali-brate</i> tabs to be witten immediately to the SVI2.	
Change Mode	When selected, you can change the SVI2 mode. The SVI2 can be in any of three operating modes:	
	 Operating- In this mode the SVI2 responds to the input signal and positions the valve appropriately (indicator green). 	
	Manual- In this mode the valve does not respond to the input signal Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position is selected (see Setpoint) (indicator yellow).	
	 Setup- In this mode you can set calibration and configuration parameters. Additionally you can run response time tests, step response tests, and positioner signatures. (indicator vellow). 	

Custom Characterization

A custom characterization defines the relationship between the input signal and the output position of the valve. It 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 are in percent and neither count toward the nine points allowed.

Add points to the curve by clicking at the position where you want the point. Delete an existing point by clicking on it with the right mouse button.

Move points by dragging them to their new position.

The characterization curve must be non-decreasing. The program will not allow a point to be added or moved to a position that would create a decreasing segment.

To enter exact positions:

- 1. Enter a value in the edit boxes at the bottom of the tab.
- 2. Hit the **TAB** key. The point is entered and the graph updated.

3. Click **OK** saves the changes and returns to the *Configuration* tab. Clicking **Cancel** returns to the *Configuration* tab without saving.



Figure 6 Custom Characterization

Custom Linearization

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

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

Clicking **Cancel** on the *Custom Linearization* tab returns to the *Configuration* tab without changing the characterization.

Dialog	×
Simple Lever Type	Compound Lever Type
G Ll Ll	L1 L3 Stoke
Stroke Length (S)	Lever arm 2 length (L2) 0
Lever arm length (L1)	Offset length (L3)
Valve position at 0 horizontal (T) %	C L2 below L1
Simple	Cancel

Figure 7 Custom Linearization

Linkage Parameters

- □ Stroke Length The distance of stem movement from 0% to 100% position.
- □ *Lever 1 Length* The length of the lever connected to the rotating element of the SVI2.
- □ *Position at horizontal* The valve position when Lever 1 is horizontal (for normally positioned valves).
- □ *Lever 2 Length* The length of the 2nd lever in a compound lever. This lever connects the 1st lever to the valve stem.
- □ *Offset* The horizontal distance from the connection between the two levers and the connection of the 2nd lever to the stem.
- □ *Lever 2 Above/Below* Select above if Lever 2 points toward the open position and below if it points toward the closed position.

Simple - Compound Linkage Configuration

SIMPLE LEVER

The simple lever has the pivot point (the potentiometer in the SVI) mounted a fixed distance (L1) from the valve stem pickup point. To compute the proper correction curve:

- 1. Enter the stroke length, the distance from the pivot to the valve stem pickup point and the valve position at horizontal.
- 2. Click Simple to compute the correction and display the curve.

COMPOUND LEVER

The compound linkage has two lever segments attached at one end to the pivot (the potentiometer in the SVI) and the other end to the valve stem pickup point. To compute the proper correction curve:

- 1. Enter the stroke length, first lever segment length (L1), second lever segment length (L2), the distance from the pivot to the valve stem pickup (L3), the valve position at horizontal.
- 2. Click **Compound** to compute the correction and display the curve.

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

Menu - Configure

When you right-click on the Configure tab, a context menu appears:

- Custom Linearization Displays the Custom Linearization tab to allow correction for linkage non-linearity. The Custom Linearization tab creates a custom characterization that linearizes the valve movement with respect to the input signal.
- Detach Trend Removes the trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Configure* tab instructions

Calibrate Tab

Use the *Calibrate* tab to calibrate the stop positions and the feedback control parameters (PID tuning parameters).

ValVue SVI2 - Offline	TAG1		
Tools Help			
Monitor Trend Configu	ure Calibrate Diagnostics S	itatus Check	
		PID Paramete	15
Tag	TAG1	70	P (%)
Descriptor	DESC1	34	l (1/10 s)
Message	MESSAGE1	66	D (ms)
Date	01 JAN 2001	25	Padi (%)
Assembly Number	1235	0.00.	Dead Zone (%)
	1	-2	Beta
		5	Position Compensation Coefficient
		0	Damping Coefficient
Signal Range		- Colibration	
4 Low Si	gnal (mA) CLUSED	9.35 Current Input Sig	inal (mA)
20 High Si	ignal (mA) OPEN	Calib. Signal	1
	·	-	
j oto upen s	otop Adjustment (%)		
			Apply
Change Mode	Mode: Manual	•	Exit Help

Figure 8 Calibrate Tab

Fields

Signal - Low/High

The low and high signal defines at what input values the valve is fully open or fully closed. The low signal value must always be lower than the high signal value. The ValVue software identifies which value represents closed and which represents open from the configuration data.

The values will typically be 4 and 20 mA but may be any values between 3.8 and 22 mA. If the valve is to be split ranged, (low) values of 3.8 to 14 and (high) values of 10 to 20.2 may be entered. There must be at least 5 mA difference between the low and high values. These entries are the proper method of split ranging the SVI (rather than with a custom characterization curve).

Changing the signal low and high values is not allowed on an SVI2-1.

Ρ	Proportional gain P (%) is the ratio of proportional action (part of controller output) to error. Common values for the positioner are 50 for small valves up to 4000 for large valves.
I	Integral time or reset time (0.1 sec), is the time constant of integral control. Higher values of I cause less integral action, however a value of 0 gives no integral action. Common values are 10 to 200.
D	Derivative time or rate time (msec) is the time constant of deriva- tive control. Common values are 10 to 100.
P _{Adj}	Valves often have significantly different response when filling verses exhausting. The proportional gain is adjusted by adding Padj (%) to P when the valve is exhausting.
DeadZone	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%.
Beta	Beta is 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. Typical beta values fer a valve position controller is 7 or 8.
Position Compensation Coefficient	The response of the valve is different when the valve is nearly closed than when the valve is nearly open. The position compensa- tion coefficient, which is a number between 0 and 9, allows you to make adjustments to try to equalize the valve response. The nor- mal value is 6.
Damping Coefficient	The valve response may be made slower for some applications.
	In SVI2 version 1.1.4 and earlier, a value of 0 gives no damping, and a value of 9 gives maximum damping of valve motion.
	For SVI2 version 1.2.1 and later, the damping is specified as the maximum valve movement in %/second. A value of 0 indicates no damping. Allowed values are 1 to 200 %/s. The damping can be applied in both directions or only in one direction.
Apply	Clicking Apply causes any changes made in the "Configure Tab" on page 626 or "Calibrate Tab" on page 634 tabs to be witten immediately to the SVI2.
Change Mode	When selected, you can change the SVI2 mode.The SVI2 can be in any of three operating modes:
	 Operating- In this mode the SVI2 responds to the input signal and positions the valve appropriately (indicator green).

- Manual- In this mode the valve does not respond to the input signal Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position is selected (see Setpoint) (indicator yellow).
- Setup- In this mode you can set calibration and configuration parameters. Additionally you can run response time tests, step response tests, and positioner signatures. (indicator yellow).

Calibration Value

This value is used when recalibrating the signal or pressure measurement.

- 1. Set the source current or pressure to a known value.
- 2. Enter that value in the Calibration Value edit box.
- 3. Select Set Low Signal Cal, Set High Signal Cal, Set Low Pressure Cal, or Set High Pressure Cal appropriately.

Signal Calibration Procedure

The *Calibrate* tab allows you to recalibrate the signal sensor in the SVI. The sensor is calibrated at the factory and does not usually require recalibration, but if needed, this dialog provides a convenient method. The *Reset to Factory* button returns the calibrations to those that were set before delivery of the SVI.

The currently measured value of the primary input is displayed and can be compared to reference signals to see if recalibration is necessary. Calibrating the primary signal can be done most easily with a variable current source.

The procedure for recalibration is:

Low Calibration

- 1. Click the **Calib. Signal** button. A dialog appears.
- 2. Enter 4 in the signal value field.
- 3. Set the current to 4.00 mA and click **Set Low Signal**.

High Calibration

- 1. Click the **Calib. Signal** button. A dialog appears.
- 2. Enter 20 in the signal value field.
- 3. Set the current to 20.00 mA and click Set High Signal.

Open Stop Adjustment

In some valves the stem travel exceeds the nominal valve travel. The SVI2 allows you to compensate for this so that the valve position reads 100% at the nominal travel.

To make this correction:

- 1. Enter 100 in the Open Stop Adjustment edit box.
- 2. Select **Find Stops** from the context menu. This calibrates the position with the full travel of the valve.
- 3. Return to Manual mode and adjust the valve to its nominal travel and note the position reading.
- 4. Return to Calibrate mode, enter the position that was measured at nominal travel into the *Open Stop Adjustment* edit box and select **Open Stop Adjustment** from the menu.

The valve now reads 100% at the nominal travel of the valve.

Zero Calibration

- 1. Click the **Calib. Pressure** button. A dialog appears.
- 2. Enter 0 in the pressure value field.
- 3. Turn the air off and click **Set Low Pressure**.

Pressure Calibration Procedure

The Calibrate tab allows you to recalibrate the pressure sensor in the SVI2. The sensor is calibrated at the factory and does not usually require recalibration, but if needed, this dialog provides a convenient method. The *Reset to Factory* menu returns the calibrations to those that were set before delivery of the SVI2.

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

Gain calibration

- 1. Right-click and from the popup menu select **Full Open** (on an ATO valve).
- 2. Click the **Calib. Pressure** button. A dialog appears.
- 3. Enter the supply pressure in the pressure value field.
- 4. Click Set High Pressure.

Menu - Calibrate

When you right-click on the Calibrate tab, a context menu appears:

□ *Run Find Stops* - Runs the automatic position calibration process. To determine valve position, the positioner must measure and save the closed and open positions of the valve. This can be done automatically by running the Find Stops procedure from the Calibrate tab. The SVI2 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 (see *Open Stop Adjustment*). A progress dialog appears while the find stops process is running.

Manual Find Stops - Allows you to set the position calibration by moving the valve full closed and full open. On very large valves, the automatic find stops routine may timeout before the valve has reached the end of travel. Manual find stops allows calibration of these valves.

On some very large valves or valves with non-Masoneilan 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.

When *Manual Find Stops* is selected, the valve is moved to full closed and you are asked to respond when the valve has reached the closed position. The valve is moved to full open and you are asked to respond when the valve has reached the full open position.

For some values the open position stop exceeds the nominal travel of the value. See *Open Stop Adjustment* for details about how to make this adjustment.

- □ Open Stop Adjustment Recomputes the position scale so that at the value entered in the open stop adjustment edit box as a percent of full stops, the position reads 100%.
- □ *Run Auto Tune* Automatically finds appropriate PID parameters for the valve.
- □ *Full Open* Moves the valve to full open. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P.
- □ *Full Closed* Moves the valve to full closed. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P.
- Set Valve Position Allows you to set the valve to a specific position. This is accomplished by momentarily returning to manual mode, repositioning the valve, and returning to setup mode.
- □ *Reset to Factory Cal* Resets the signal calibration its their factory setting.
- Detach Trend Removes the trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Calibrate* tab instructions.

Diagnostics Tab

Use the *Diagnostic* tab to run response time tests, step response tests, actuator signatures, and positioner signatures. The continuous diagnostics appear each time the tab is opened.

ValVue SVI2 - Offline	a TAG1				
Tools Help					
Monitor Trend Confi	gure Calibrate Diagnostics	Status Check	Diamatia Task		
Tag Descriptor Message Date Assembly Number Strokes Cycles Time Open (hr) Time Closed (hr)	TAG1 DESC1 MESSAGE1 01 JAN 2001 1235 22 171 0 0 2232		Diagnostic Type C Response Test Step Test Positioner Sig. Perform Diag.	40 60 10 5 C One Way	Start Position (%) Stop Position (%) Time (s) Step Size (%) (* Two Way View Saved Diag.
Change Mode	n) 0 Mode: Setup			Exit H	elo

Figure 9 Diagnostics Tab

Continuous Diagnostic Values: Strokes, Cycles, Time Open, Time Closed, Time Near Closed

Displays the continuous diagnostic data including number of full strokes the valve has made, the number of cycles (direction changes), the time the valve has spent open, the time the valve has been closed, and the time the valve has spent throttling near the seat.

Diagnostic Tests

tion, Time, Step Size

Diagnostic Types: Response Test, Step Test, Positioner Sig.	The SVI2 allows four diagnostic tests to be performed: <i>Response</i> <i>Time Test</i> (with Actuator Signature), <i>Step Response Test</i> , <i>Positioner</i> <i>Signature Test</i> , and <i>Extended Actuator Signature</i> test. The test to be performed is selected in this selection box.
Diagnostic Parameters: Start Position, Stop Posi-	The parameters needed by the diagnostic tests are dependent upon which test is selected:

Response Time Test: If no pressure sensor is present, no parameter is required. If a pressure sensor is present, an actuator signature is measured and a speed must be entered.
 A Response Time Test measures the time for the valve to go from full closed to full open and the time for the valve to go from full open to full closed.



Figure 10 Response Test

- If the SVI2 contains a pressure sensor, an actuator signature is also measured and friction, spring range, and supply pressure are reported in the diagnostic results box.
 - Speed: A speed of four is typical for almost all valves. Very large valves may require a speed greater than 4 (up to 10) and very small valves may require a lower speed. The lower the speed value, the slower the test is run.
- Positioner Signature: The valve signal is slowly changed from the starting current to the ending current and then back. The number of points indicated are sampled equally spaced in each direction):
 - □ Starting current (mA)
 - Ending current (mA)
 - Number of points to sample. This number often needs to be 1 more than you might expect. e.g. to sample from 5 mA to 10 mA with a sample every 1 mA, you want samples at 5, 6, 7, 8, 9, and 10 or 6 (not 5) samples.



Figure 11 Positioner Signature

A *Positioner Signature* produces an input signal vs. position graph for both increasing and decreasing signal. The signal is a simulated signal so linearity cannot be checked.

To run a *Positioner Signature*: Enter a starting current, an ending current, and the number of samples that should be taken across the interval specified by the starting and ending current.

The positioner is slowly moved from the starting position to the ending position and back and the two curves (up and down) are measured and displayed.

- □ Step Profile: A series of step tests are performed starting from the start position and moving toward the end position. Each step test is a step whose length is specified in the step parameter. Step tests are performed one after another until the end position is reached. If two way is selected, step tests are performed in the reverse direction as well. The time parameter determines how long the valve position is sampled at each step test.)
 - □ Starting position
 - □ Ending position
 - Sample time Number of seconds to sample at each step
 - Step length The % position change at each step 0 means to step the full distance from starting position to ending position

 One/two way - If two way is selected, the step tests are performed both increasing position and decreasing position.



Figure 12 Step Response Test

 Extended Actuator Signature: An extended actuator signature is like a standard actuator signature (pressure vs position hysteresis curve) except that the starting and ending position can be specified.

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

- □ Starting Position
- □ Ending Position
- □ Speed (see description of speed in *Response Time Test*)



Figure 13 Extended Actuator Signature

Perform Diagnostics	Clicking Perform Diagnostics starts the selected diagnostic proce- dure. When finished, the results appear in a graph and/or the diag- nostics results box. A progress tab appears while the diagnostic process is running.
View Saved Diag.	Clicking View Saved Diag . allows you to view the results of a diag- nostic test that had been saved earlier in a file. Actuator signatures are saved when the SVI2 memory is saved (see the Monitor menu) and all types of signature can be saved in a diagnostic file from the <i>Diagnostics</i> menu.
	Choose Signature Curve
	Select Curve allows diagnostic graphs that have been saved previously to be displayed. Two graphs (plus the current graph if one has just been run) may be displayed at once in order to compare the results.
	None - Removes the curve.
	 Current Signature - Displays the last run standard actuator signature (note: the last run standard signature in the SVI is lost if power to the SVI is lost).
	 Saved Signature - Displays the standard actuator signature saved in the SVI (if any).
	 Baseline Signature - Displays the standard actuator signature saved as the baseline signature in the SVI (if any).
	Current Signature from dp1 File - Allows you to select a dp1 file for this or another SVI. The current standard actuator signature from that file is displayed.

- Saved Signature from dp1 File Allows you to select a dp1 file for this or another SVI. The saved standard actuator signature from that file is displayed.
- Baseline Signature from dp1 File Allows you to select a dp1 file for this or another SVI. The baseline standard actuator signature from that file is displayed.
- Signature from dgn File Allows you to select a file that contains saved diagnostic graphs from this or another SVI. You can select any of the saved diagnostic graphs.

Choose Signature Curve 🛛 🔀
none
C Current Signature
C Saved Signature
C Baseline Signature
C Current Signature from dp1 File
Saved Signature from dp1 File
C Baseline Signature from dp1 File
Signature from dgn File
OK Cancel

Figure 14 Choose Signature Curve

Clicking the **Export** button creates a comma separated value file (.csv) of the diagnostic data being shown on the graph. CSV files can be read directly into Excel where you can create graphs or perform other analysis.

Show Data Points

Selecting this option shows a + at each data point on the graph.

Show Diagnostic Info

Clicking this button opens a window that shows the friction and spring range of each standard actuator signature on the diagnostic graph.

Diagnostic Information					×
I	Current Signate	ure	Signature 1	Signature 2	
Speed	4		4		
Response Open	2.9	s			
Response Closed	2.2	\$			
Friction	0.91	psi	0.92		
Friction %	7.4	%	3.9		
Lower Spring Range	21.56	psi	14.24		
Upper Spring Range	33.99	psi	37.88		
				OK	

Figure 15 Show Diagnostic Information

Diagnostic Graph - XY Scale

You can change the X and/or Y scales by typing the desired scale into the edit boxes. The actual scale displayed may be different - it is adjusted to give reasonable values to the grid lines.

ResultsThe results of the Response Time Test are displayed in the results
box.

Change Mode When selected, you can change the SVI2 mode.The SVI2 can be in any of three operating modes:

- Operating- In this mode the SVI2 responds to the input signal and positions the valve appropriately (indicator green).
- Manual- In this mode the valve does not respond to the input signal Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position is selected (see Setpoint) (indicator yellow).
- Setup- In this mode you can set calibration and configuration parameters. Additionally you can run response time tests, step response tests, and positioner signatures. (indicator yellow).

Diagnostic Reports

To create this report:

1. Right-click on the **Diagnostic** tab and select **Diagnostic Report** and a dialog appears.



Figure 16 Diagnostic Report Open

2. Select a .dgn file, click **Open** and the *Pick Diagnostic Data* dialog appears.

Pick Diagnostic Data	
SIG-C 4 2/ 5/2003 15:39 STEP 0 2/ 5/2003 15:47 SIG-POS 0 2/ 5/2003 16:1 SIG-EXT 4 2/ 5/2003 16:13	
	OK Cancel

Figure 17 Pick Diagnostic Data

3. Select specific group data (up to three of the same type) for presentation on a report, click **OK** and the report appears.

File Edit View Insert Format Help Image: Sector Sec
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
PhilTimes New Roman 18 B U B E
Diagnostic Report 05/25/2011 12:21 Diagnostic Type Extended Act. Sig.
Diagnostic Report 05/25/2011 12:21 Diagnostic Type Extended Act. Sig.
Diagnostic Type Extended Act. Sig.
Extended Act. Sig.
Test Result
SVI II - 2/5/2003 16:13 Speed: 4 Response Open: 0.0 s Response Closed: 0.0 s Friction: 0.23 (2.0%) Lower Spring Range: 4.59 Upper Spring Range: 16.31
Diagnostic Graph
65 60 55
For Help, press F1

Figure 18 Diagnostic Report

This report can be printed or saved under a user designated name for later use.

Report Preferences

You must select the report template file which is either a text (.txt) or rich text (.rtf) or a browser (.htm) file. A standard report comes installed with ValVue but you can create new reports in other formats (see Creating Report Files).

To select the report file:

- 1. Click the browse button next to the report file edit box.
- 2. Select the proper report file.

The program that generates the reports can be NotePad, WordPad, or Microsoft Word for text files. Rich text format (.rtf) files can be used with WordPad or Word to give better formatting. HTML files can be used with Word or Internet explorer.

To select the program:

1. Click the browse button next to the program edit box.

2. Select the program to use.

NotePad and WordPad are often installed in the directory c:\Program Files\Accessories\ or in c:\windows\. The actual location of these files or Miorosoft Word varies from computer to computer.

Creating Report Files

You can create a custom SVI report by creating a text or rich text format file which is laid out in the format of the desired report.

ValVue substitutes the values of SVI2 parameters into the text file where ever it finds a parameter name that matches an SVI2 parameter. For example: *Tag*=\$\$*Tag*

ValVue substitutes the actual tag name from the SVI2 in place of the \$\$Tag in the report.

Any text can be used in a .txt file and printed with NotePad. With WordPad or Microsoft Word, you can use an .rtf format file which can contain special formatting (fonts, sizes, tabs, etc.) and can contain bitmaps. Some .rtf formatting is accepted in Word which is not available in WordPad – you should check the documentation of these program to determine what options are available (e.g. right align tabs is allowed in Word but not in WordPad). HTML files are also allowed and can be displayed with a browser.

The allowed SVI Parameters are listed below. You are encouraged to list the report file (report.rtf) shipped with the application for examples.

\$\$Tag - Tag Name \$\$Descriptor - Descriptor

\$\$Date - Date

\$\$Message - Message

\$\$AssemblyNumber - Final Assembly Number

\$\$MfgID - Manufacturers ID (101 for Masoneilan)

\$\$DeviceType -DeviceType (200 for the SVI)

\$\$DeviceID - Hart DeviceID

\$\$HWRev - Hardware Revision

\$\$SWRev - Software Revision

\$\$CmdRev - The firmware command revision

\$\$PollingAddress - PollingAddress

\$\$Position - Position

\$\$Signal - Input signal
\$\$Pressure - Actuator pressure \$\$IPOutput - The signal to the I/P in counts (0 - 65000) \$\$Temperature - Circuit board temperature \$\$LowTemperature - The lowest operating temperature that the device has encountered \$\$HighTemperature - The highest operating temperature that the device has encountered \$\$Output - Output - From the process controller \$\$Mode - SVI mode \$\$SignalPercent - Input signal as percent \$\$AirAction - Air-to-open/Air-to-close \$\$ActuatorType - Single/double acting actuator \$\$PosErrorBand - Position error band \$\$PosErrorTime - Time until position error \$\$ PosErrorFailTime - Time until position error produces failsafe action \$\$Charact - Characterization (linear, equal percentage, etc.) \$\$CustomCharact - Displays the custom characterization constants (individual items of the characterization curve may be selected by entering \$\$CustomCharact[n] where n is a number between 0 and 17 \$\$ButtonLock - Button lock level \$\$Bumpless - Bumpless Transfer on/off \$\$BumplessSpeed - The time to move from manual to operating mode \$\$TightShutoff - Tight shutoff on/off \$\$TSValue - Tight shutoff value \$\$ULimitStop - Upper position limit on/off \$\$ULSValue - Upper position limit \$\$LLimitStop - Lower position limit on/off \$\$LLSValue - Lower position limit \$\$NearClosed -Value below which is considered near closed \$\$PosUnits - Position units of measure (always %) \$\$PresUnits - the pressure units (psi, bar, or kpa)

\$\$SignalUnits - the signal units (always mA) \$\$Language - SVI display language \$\$LowSignal - Low calibration value \$\$HighSignal - High calibration value \$\$P - Proportional gain in positioner \$\$Padjust - Adjustment to P when valve is exhausting \$\$I - Integral action of positioner \$\$Beta - Step size adjustment in positioner \$\$D - Derivative action of positioner \$\$PosComp - Position range compensation of positioner \$\$DeadZone - Dead zone of positioner \$\$Damping - Damping coefficient of positioner \$\$Travel - Total strokes of the valve \$\$Cycles - Total cycles of the valve \$\$TimeOpen - Total time open of the valve \$\$TimeClosed -Total time closed of the valve \$\$TimeNearClosed - Amount of time valve was nearly closed \$\$ResponseOpen - Time require to open valve \$\$ResponseClosed - Time required to close valve \$\$Switch1Type - The condition under which switch 1 operates \$\$Switch1Value - The value at which switch 1 activates \$\$Switch1Action - Switch is normally closed or normally open \$\$RawSignal - The signal value in A/D counts \$\$RawPosition - The position value in A/D counts \$\$PositionStopLow - The position A/D counts at the lower stop \$\$PositionStopHigh - The position A/D counts at the upper stop \$\$OptionConfig - Data describing the hardware installed on the positioner

\$\$OptionConfigEx0, \$\$OptionConfigEx1, \$\$OptionConfigEx2, \$\$OptionConfigEx3 - Data describing the hardware installed on the positioner

\$\$Friction - The friction measured from a standard actuator signature

\$\$FLowerSpringRange - The lower spring range measured from a standard actuator signature

\$\$FupperSpringRange - The upper spring range measured from a standard actuator signature

\$\$LowPressureActual - The pressure when the actuator is exhausted

\$\$HighPressureActual - The supply pressure

\$\$Speed - The speed at which the last diagnostic test was run

\$\$SpeedSaved - The speed at which the saved standard signature was run

\$\$SpeedBaseline - The speed at which the baseline standard signature was run

\$\$LowerSpringRange, \$\$LowerSpringRangeSaved, \$\$LowerSpringRangeBaseline - The lower spring range calculated from the current, saved, or baseline standard signature

\$\$UpperSpringRange, \$\$UpperSpringRangeSaved, \$\$UpperSpringRangeBaseline - The upper spring range calculated from the current, saved, or baseline standard signature

\$\$Signature - The position/pressure pairs gathered during the standard signature test

\$\$SignatureSaved - The position/pressure pairs saved in the saved standard signature

\$\$SignatureBaseline - The position/pressure pairs saved in the baseline standard signature

Menu - Diagnostics

When you right-click on the *Diagnostics* tab, a context menu appears. The items depend upon what diagnostics have been run:

- □ *View Diagnostic Graph* Views the data from the last run diagnostic procedure.
- □ Save Diagnostic Data Saves the data from the last run diagnostic into a disk file. The disk file can be imported into spreadsheets or read with ValVue.
- □ *Diagnostic Report* Opens a dialog to select a .dgn file and specify specific group data (up to three of the same type) for presentation on a diagnostic report.
- □ Save Signature in SVI2 Saves the current signature in the SVI2.
- □ Save Signature as Baseline in SVI2 Saves the current signature as the baseline signature in the SVI.
- □ *Reset Continuous Diagnostics* Resets the continuous diagnostic data (stroke count, cycle count, time open, time closed, and time near closed) to 0. When reset, the previous values are lost, thus the data should be recorded somewhere before being reset if it is to be used.
- Detach Trend Removes the trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Diagnostics* tab instructions.

Status Tab

From the *Status* tab you can see at a glance the internal status of the SVI II. The tab is divided into four separate sections for *Operations, Communication, Firmware,* and *Circuitry.* Green indicates no faults, yellow indicate conditions that may exist or have existed that can occur in normal operations, and red indicate a fault. Most faults do not prevent correct operation of the device.



Figure 19 Status Tab

Fields

Clear Faults Change Mode Clicking Clear Faults resets the status bits in the SVI2.

When selected, you can change the SVI2 mode. The SVI2 can be in any of three operating modes:

- □ *Operating* In this mode the SVI2 responds to the input signal and positions the valve appropriately (indicator green).
- Manual- In this mode the valve does not respond to the input signal Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position is selected (see Setpoint) (indicator yellow).

 Setup- In this mode you can set calibration and configuration parameters. Additionally you can run response time tests, step response tests, and positioner signatures. (indicator yellow).

Status Code List

- □ LOW POWER: Indicates that the signal is below 3.8 mA.
- □ *RESET_OCCURRED*: A reset has occurred either because of a power interruption or because of an external request for reset.
- □ *POSITION_ERROR*: The valve failed to go the requested position within the required time.
- □ BIAS OUT OF RANGE: The integral term of the PID position control has reached its limits without the valve reaching the proper position.
- □ AUTOTUNE FAILED: The autotune process failed to find reasonable values for PID.
- □ *FIND_STOPS_FAILED*: The calibration procedure for position failed to find reasonable values.
- □ *CALIBRATE FAILED*: The pressure or signal calibration failed because the values were out of range.
- STANDARD DIAGNOSTIC FAILED: The standard actuator signature failed to complete.
- □ EXT DIAGNOSTIC FAILED: The extended actuator signature failed to complete.
- □ CONFIGURATION CHANGED: You have changed one or more of the configuration or calibration values since the last time this flag was cleared.
- □ ACTUATOR ERROR1: Air pressure has been lost or the calibration of the valve position endpoint has significantly changed.
- □ SELF_CHECK_FAILURE: On startup, the SVI did not pass a self check.
- □ SOFTWARE_ERROR: An inconsistency has been detected within the SVI.
- DATA_OVERRUN: The SVI is not processing acquired data.
- Description_SENSOR_ERROR: The position sensor has failed or its connection is open.
- □ CURRENT_SENSOR_ERROR: The input signal measurement sensor has failed.
- □ *REFERENCE_VOLTAGE_ERROR*: The primary reference voltage inside the SVI is incorrect and all other measurements are likely affected.
- □ *INTERNAL_TEMP_ERROR*: Internal temperature of the SVI is above or below the rated temperature.
- □ *EEPROM_WRITE_FAILED*: A write to the SVI's internal memory failed.

Menu-Status

□ *Help*- Displays the help file at the *Configure* tab instructions.

Check Tab

Use the *Check* tab to monitor some of the basic parameters. This tab is used primarily for troubleshooting.

ValVue SVI2 - Offline	TAG1			
Tools Help				
Monitor Trend Configure Calibrate Diagnostics Status Check				
Tag	TAG1			
Descriptor	DESC1			
Message	MESSAGE1			
Date	01 JAN 2001			
Assembly Number	1235			
Paulian (%)	er Chan - David David and Linear Chan			
33.4899	-529 3338 11146			
Current (mA) Baw	, Signal			
9.355	9355			
Board Temp (C) Min T				
16.82	12.75 26.07			
/P Sett	, ,			
26692	<u> </u>			
, , ,				
Change Mode Mode: Setup O Evit Help				
Change Mode	Mode: Setup 🔿ExitHelp			

Figure 20 Check Tab

Fields

Current	The value of the input signal in milliamps.
Board Temperature	The internal SVI2 temperature measured in degrees Celsius. The SVI2 also reports the lowest temperature and highest temperature in which it has been operating.
I/P	The current D/A values being sent to the I/P that controls the valve position. This value is used for troubleshooting. The D/A value sent to the I/P can be set directly fer testing by using the <i>Set I/P</i> edit box and menu command.
Raw Position	The A/D values measured from the position sensor. This is used for troubleshooting purposes.

Lower Stop/Upper Stop	A/D values measured from the position sensor at the full travel of the valve. The raw position measurement must always be between these two numbers. These numbers are useful for troubleshooting problems.
Raw Signal	The A/D value measured from the signal sensor. This is used for troubleshooting purposes.
Change Mode	When selected, you can change the SVI2 mode. The SVI2 can be in any of three operating modes:
	 Operating- In this mode the SVI2 responds to the input signal and positions the valve appropriately (indicator green).
	Manual- In this mode the valve does not respond to the input signal Instead it remains stable in one position which is the position that the valve was when manual mode was entered or a new position is selected (see Setpoint) (indicator yellow).
	Setup- In this mode you can set calibration and configuration parameters. Additionally you can run response time tests, step response tests, and positioner signatures. (indicator yellow.
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 trouble-shooting. This command is only available in Setup mode.

Set I/P

To set the I/P:

- 1. Enter a number between 1 and 55000 in the Set I/P edit box.
- 2. Right-click to pop up the context menu and select **Set I/P** (or use the Tools menu). The indictor should appear red.

To resume normal control, right-click to open the context menu and select **UnSet I/P**. Returning to Manual or Operating mode also returns the valve to control.

Menu - Check

When you right-click on the Check tab, a context menu appears:

- □ Set I/P Removes the valve from normal control and sends a constant signal (using the value in the Set I/P edit box) to the SVI2's I/P.
- □ UnSet I/P Turns off Set I/P and returns the valve to normal control.
- □ *Full Open* Moves the valve to full open. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P.
- □ *Full Closed* Moves the valve to full closed. This command work by taking the valve out of closed loop control and send a high or low signal to the I/P.
- Detach Trend Removes the trend display from the tabbed dialog and creates a separate trend display.
- □ *Help* Displays the help file at the *Check* tab instructions.

Menu Bar and Footer Buttons

File Menu	Allows you to exit the level portion of the program to the device selection list.
Exit Button	Exits the program.
Help Button	Displays the online help table of contents. Right-clicking on any tab displays a menu that includes help – the menu help displays help for the particular tab.
Help Menu	Allows you to view online help for the program or for the ValVue program. <i>Software Revision</i> : This value indicates which revision of software is used inside the unit. As software is updated, this value changes. SVI and other software that must communicate with the SVI use the software revision number to know how to correctly communicate with the device.
Mode	Displays the mode of the SVI – Operating, Manual, Configure, Cali- brate, Diagnostic, or Failsafe.
Online/Offline	In the offline mode, SVI reads values for all of the variables from a file (rather from a real SVI device). The offline mode can be used to examine the variable values that have been saved with the Save SVI Data command and is useful as a demo/learning tool.

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