Masoneilan

a Baker Hughes business

ValVue™ ESD

Digital communications software designed exclusively for Masoneilan SVI™ II ESD positioner

Instruction Manual (Rev M)

Baker Hughes Data Classification : Public

About this Guide

This instruction manual applies to the following instruments and approved software:

SVI II ESD

- with Firmware version 3.1.2 or greater
- with **ValVue™** ESD version 1.0 or greater
- with a handheld communicator with DD published for SVI II ESD

The information contained in this manual, in whole or part, shall not be transcribed or copied without Baker Hughes written permission.

In no case does this manual guarantee the merchantability of the positioner or the software or its adaptability to a specific client needs.

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

Copyright

All information contained herein is believed to be accurate at the time of publication and is subject to change without notice.

Copyright 2024 by Baker Hughes Company. All rights reserved.

PN 720002-392 Rev. M

Document Changes

Revision/ Date	Changes
C / 02-2011	Added to section on DO switches configuration.
	Updated Registration section updated to GE logo software
D / 03-2013	Removed references to double-acting
	Fixed issues from S. Leledy.
E / 09-2013	the Simplified Switch diagram in Configure I/O section.
	Added Cautions about Position Low and Upper Limits.
	Added text about the 4-20 retransmit galvanic isolation.
F / 02-2014	Updated the Simplified Switch diagram in Configure I/O section and updated the text.
G / 08-2014	Updated Configure tab to add Air Loss Latch and Trip Level fields.
	Update software install section to reflect 1.10.0 version.
H / 10-2014	Add position retransmit updates to Configure I/O. Added new HART® commands for firmware 3.1.6.
J / 01-2015	Add Recovery Time features.
	Added changes to Monitor screen.
	Add note on Aggressiveness setting.
	Added changes to PST screen changing TBT test to Pneumatic Test.
K / 08-2018	Added Related Documents section.
	Added Failure to Communicate section.
	Added How Do I section.
	Updated Simplified Switch Installation Drawing: Correct Configura-tion and Simplified Switch Installation Drawing: Configuration Not Allowed drawings.
	Updated Launching Configure I/O figure.
	Updated maskable faults section.
	Added Notes on Aggressiveness.
	Added contact information.
L / 05-2019	Removed references to CD being shipped containing software.
	Added software download information.
	Updated Simplified Switch Installation Drawing: Correct Configura-tion and Simplified Switch Installation Drawing: Configuration Not Allowed drawings for DCS/PLS notes.
	Updated PST graphics to be realistic.
M / 03-2024	Rebranded to Baker Hughes format.

Contents

1. Introduction 19
    - About This Manual 19
    - Documentation Conventions 20
    - Masoneilan Help Contacts 20
    - ValVue ESD Overview 21
    - System Requirements 21
        - Hardware 21
        - Software 22
    - Related Documents 22
    - Failure to Communicate 22
    - Install ValVue ESD and PRM Plug-In 23
        - Downloading the programs 23
        - Installing ValVue ESD Software 24
        - Installing the Yokogawa PRM Plug-In 26
    - Registering ValVue ESD 34
        - Entering Software Keys 38
    - Licensing 40
        - Activating the License 42
2. Getting Started 43
    - Main Window 43
    - Connected Devices Icons 44
    - Plant Schedule 45
    - Editing Plant Schedule 46
        - Editing Plant Schedule for a Selected Device 49
        - Export to Excel 50
    - Connected Devices Help 50
    - Connected Devices Tools Menu 51
    - Configuring ValVue ESD Options 52
        - Launching Set Options 52
        - Set Options Screen 52
    - Multiplexor Setup and Operation 56
        - Selecting Mux Setup 56
        - Configuring the Multiplexor 59
        - Mux Reset 61
        - Scan Option 61
        - Troubleshooting ValVue ESD Used with Mux 62
        - Configuring Burst Mode 63
    - Launching a Device 64
        - Offline Mode 65
        - Selecting an Offline Device 66
        - Selecting a Connected Device 69
        - Device Information 70
        - Find by Tag 70
    - Re-Scan 71

© 2024 Baker Hughes Company. All rights reserved.

Right Clicking on Device Name 72
Launching ValVue ESD 72
Launching Historical View 73
View latest PST 75
3. How Do I? 77
Getting Started Tasks 77
How Do I? 77
4. ESDVue's Work Environment 79
Overview 79
Working in ESDVue 80
Toolbar 80
Modes of Operation 80
Device Trip 81
Change Mode 81
Exit 82
ESDVue Help 82
Help Menu 82
ESDVue Screens 83
Monitor Screen 83
Trend Screen 84
Configure Screen 85
Calibrate Screen 86
Diagnostics Screen 87
PST 88
Status Screen 89
Check 90
5. Monitor 91
What You Can Do on the Monitor Screen 91
PST Controller Characteristics 92
Pressure, Pressure1 and Pressure 2 92
Position Indicator 92
Signal 92
Position 93
Setpoint 93
Changing the Setpoint 94
Entering Setpoint Value 95
Status on the Monitor Screen 96
Tag Information 97
PST/ESD Information 97
ESD Types 98
Monitor Context Menu 99
Reports 101
How to Create Reports 101
Creating Report Template Files 101
Report Setup 106
(Generate) Report 106

© 2024 Baker Hughes Company. All rights reserved.

View All Parameters 108
Device 109
All 110
PST Config 111
PST DATA 112
Calibrate 113
Config 114
Dynamic 115
6. Trend 117
What you can do on the Trend Screen 117
Trend Graph Features 118
Changing the Graph View 118
Capture to Clipboard 118
Trend Context Menu 119
7. Configure 121
What You Can Do on the Configure Screen 121
Changing Tag Information 122
Button Lock 123
Fault Settings 123
Fault Settings Options 123
PST Allow Options 126
PST Faults and Related User Fields 127
Language 128
Pressure Units 128
Air Action 129
Configure I/O 129
Accessing Configure I/O 129
Setup Wizard 138
Setup Wizard Selections 139
8. Calibrate 156
What you can do on the Calibrate Screen 155
Find Stops 156
Advanced Parameters 159
Auto Tune 161
Auto Tune Diagnostic Graph 167
Diagnostic Graph Color Legend 168
Set Graph Scale 168
Select Additional Calibration Curve 170
Show Computed Calibration Results 175
Save to File 176
Export to Excel 178
Calibrate Context Menu 180
Run Find Stops 181
Manual Find Stops 184
Applying Calibration Changes 187
9. Diagnostics 189
What you can do on the Diagnostics Screen 189

© 2024 Baker Hughes Company. All rights reserved.

Step Diagnostics 190
Running a Step Test 190
Step Diagnostics Graph 195
Show Computed Step Results 203
Save to File 205
Export to Excel 207
Extended Signature Diagnostics 209
Extended Signature Diagnostics Graph Features 213
Show Computed Extended Signature Results 221
Save to File 223
Export to Excel 225
Load Data 227
Loading Data from a Database 227
Load Data from a File on Diagnostics Screen 230
10. PST 235
What you can do on the PST Screen 235
PST Setup Guidelines 236
1. Set PST Start Trigger 237
2. Run Extended Signature 238
3. Determine Friction, Breakout, PST Minimum Pressure From Extended Signature 239
4. Set PST Parameters 241
PST Schedule 242
Changing Interval of Days 242
Changing New PST Schedule 243
PST Configuration 246
Partial Stroke Test Settings 246
PST Travel 247
Minimum Pressure 248
Maximum Time 248
PST Speed 248
Dwell Time 249
Friction Low Limit 249
Friction High Limit 249
Breakout Limit 250
Droop Limit 250
Freeze DO 250
Freeze AO 250
Enable Schedule 250
Set 251
PST Diagnostics 251
Diagnostics Area 251
Perform PST 253
PST Diagnostic Graph 256
Perform Pneumatic Self Test 267
Load Diagnostic Data 269
Load Data from Database 270
Load from File 276

© 2024 Baker Hughes Company. All rights reserved.

Historical View 279
Changing the Historical View Start and End Dates 280
Displaying Historical View Diagnostic Graphs 284
Diagnostic Graph Color Legend 285
PST Context Menu 286
11. Status 287
What you can do on the Status Screen 287
Active Faults 289
General 290
Critical 291
Instrumentation 292
Actuator 293
Pneumatics 294
Electronics 295
Clear Current Faults 296
Clear All Faults 298
Clear Individual Fault 300
Set Fail High/Low 302
Status Fault Code List 302
Fault Matrix 303
Status Context Menu 329
12. Check 331
What you can do on the Check Screen 331
Information Displayed on the Check Screen 332
Send Command 333
List of Available HART® Commands 335
Check Context Menu 338
13. Advanced Setup with ESDVue 339
Overview 339
Methods to Set Up the SVI II ESD 339
Steps to Set Up SVI II ESD 339
Configuration Parameters 340
Calibration Steps 340
Run Find Stops 340
Manual Find Stops 343
Run Auto Tune 345

© 2024 Baker Hughes Company. All rights reserved.

List of Figures

1. Download Search for ESD 23
2. Download ESD Installer 23
3. Download Search for PRM 24
4. Welcome Screen 24
5. Licensing Agreement 25
6. Destination Folder 25
7. Install Shield Central Server 26
8. PRM Central Server License Agreement 27
9. PRM Central Server Destination Folder 27
10. PRM Central Server Database Directory Destination Folder 28
11. Ready to Install 29
12. Launch Service Dialog 29
13. Install Shield PRM Plug-In 30
14. PRM Plug-In License Agreement 30
15. PRM Plug-In Destination Folder 31
16. Choose Folder 31
17. PRM Plug-In Client Database Location Destination Folder 32
18. Choose Folder 32
19. Ready to Install 33
20. Owner and Product Key Registration Window 34
21. Applying Owner and Product Key Information 35
22. Software and Mux Key Window 35
23. Launching Registration Window 36
24. Registration Window 36
25. Save Registration Information 37
26. Registration File Saved Dialog 37
27. Registration Email Sent Dialog 38
28. Entering Software Key 38
29. Entering Mux Unlock Key 39
30. Successful Registration Message 39
31. Generating License File 40
32. Saving ESD Licensing Information File 41
33. ESD Licensing Information Email Dialog 41
34. Licensing File 42
35. Load Licensing File 42
36. ValVue ESD Main Window - Connected Devices 43
37. ValVue ESD Main Window with Disconnected Device Icon 44
38. Plant Schedule Screen 45
39. Accessing Edit Function 46
40. Editing Plant Cycle PST 47
41. Applying Edits to the Plant Schedule 48
42. Changing Plant Schedule Warning 48
43. Setting PST Schedule for Individual Device 49

© 2024 Baker Hughes Company. All rights reserved.

44. Plant Schedule Set for Individual Device 49
45. Selecting Export to Excel 50
46. Accessing Connected Devices Tools Menu 51
47. Launching Set Options 52
48. ValVue ESD Set Options Screen 53
49. Context Menu with Mux Functions 57
50. Device Address 57
51. Multiplexor Setup 58
52. Connected Devices 64
53. Selecting an Offline Device 66
54. Right Clicking Offline Device 67
55. File Open Window Launched at ValVue ESD 67
56. Offline dp3 Data File Default Location 68
57. Offline Device Displayed at Monitor Screen 68
58. Selecting a Connected Device 69
59. Device Information Displayed 70
60. Right Clicking on Connected Device 72
61. Selecting the Historical View Start Date 74
62. PST Historical View - Friction Displayed 75
63. ESDVue Environment 79
64. Leaving Normal Mode Warning 81
65. Entering Normal Mode Warning 82
66. Monitor Screen 83
67. Trend Screen 84
68. Configure Screen 85
69. Calibrate Screen 86
70. Diagnostics Screen 87
71. PST Screen 88
72. Status Screen 89
73. Check Screen 90
74. Monitor Screen 91
75. Position Indicator Active 94
76. Setpoint Dialog 95
77. Monitor Screen - Additional Status Available 96
78. Monitor Screen Context Sensitive Menu 99
79. Report Setup Dialog 106
80. Generate Report Dialog 106
81. Report Sample Using ESDVue Template 107
82. View All Parameters Window 108
83. View All Parameters - Device Tab 109
84. View All Parameters - All Tab 110
85. View All Parameters - PST Config Tab 111
86. View All Parameters - PST DATA Tab 112
87. View All Parameters - CAL Tab 113
88. View All Parameters - Config Tab 114
89. View All Parameters - DYNAMIC Tab 115

© 2024 Baker Hughes Company. All rights reserved.

90. Trend Screen Displaying All Parameters 117
91. Trend Context Menu 119
92. Configure Screen - Setup Mode 122
93. Position Error Band Error Message 123
94. Position Error Time Error Message 124
95. Stuck Limit Error Message 124
96. Linkage Limit Error Message 124
97. Near Closed Error Message 125
98. Supply Limit Low Error Message 125
99. Supply Limit High Error Message 125
100. Recovery Time Diagram 127
101. Launching Configure I/O 129
102. Switch Installation Drawing without Load: Configuration Not Allowed 131
103. Switch Installation Drawing: Correct Configuration with Load 133
104. DCS Switches Wiring Options 134
105. Launching Configure I/O 135
106. Starting the Setup Wizard 138
107. Setup Wizard Selections Window 139
108. Setup Wizard - Setting Tag and Descriptor 140
109. Tag and Descriptor Entered 141
110. Enabling Set Air Action 142
111. Air Action Set 143
112. Enabling Calibrate Travel 144
113. Enabling Autotune 145
114. Applying Setup Wizard Changes 146
115. Setup Dialog 146
116. Running Setup Wizard Dialog 147
117. Setup Wizard Progress Dialog 147
118. Setup Wizard Progress Dialog - Running Find Stops 148
119. Setup Wizard Progress Dialog - Running Autotune 148
120. Setup Wizard Autotune Diagnostic Graph 149
121. New PID Values After Setup Wizard Calibration 150
122. Setup Wizard Complete 152
123. Applying Configuration Changes 153
124. Configure Screen Context Menu 154
125. Calibrate Screen 155
126. Starting Find Stops 156
127. Starting Find Stops Dialog 157
128. Find Stops Dialog 157
129. Find Stops Complete 158
130. Starting Advanced Parameters 159
131. Advanced Parameters Dialog 160
132. Launching Auto Tune 161
133. Auto Tune Dialog 162
134. Auto Tune Input Value Dialog 162
135. Auto Tune Progress Dialog 164

© 2024 Baker Hughes Company. All rights reserved.

136. Auto Tune Finished Dialog 164
137. Auto Tune Diagnostic Graph 165
138. PID Values - Previous and New 166
139. Auto Tune Complete Dialog 166
140. Auto Tune Diagnostic Graph 167
141. Selecting Set Graph Scale 168
142. Set Graph Scale Window 169
143. Saving Scale Adjustments 169
144. Starting Select Additional Curve 170
145. Select Additional Step Curve Dialog 170
146. Selecting Load Data from Database 171
147. Selecting Database File 172
148. Selecting Load Data from File 172
149. File Browser 173
150. Opening File for Additional Curve 173
151. Selecting Calibration Record 174
152. Additional Calibration Curve Displayed 174
153. Selecting Show Computed Result 175
154. Auto Tune Calibration Computed Result 175
155. Selecting Save to File 176
156. File Browser 177
157. Selecting a Folder for Saving File 177
158. Selecting Export to Excel 178
159. Diagnostic Graph Data - in Excel 179
160. Calibrate Screen Context Menu 180
161. Selecting Run Find Stops 181
162. Starting Run Find Stops Dialog 182
163. Find Stops Dialog 182
164. Find Stops Complete 183
165. Selecting Manual Find Stops 184
166. Stroke Valve Dialog 185
167. Valve Closed Dialog 185
168. Valve Open Dialog 186
169. Applying Calibration Changes 187
170. Diagnostics Screen 189
171. Start/Stop Error Message 190
172. Time/Sample Rate Error Message 191
173. Step Size Error Message 191
174. Executing Perform Step Diagnostics 192
175. Step Diagnostics Warning Dialog 192
176. Running a Step 193
177. Loading Data for a Step 193
178. Step Diagnostics Complete - Continue 194
179. Step Diagnostics Graph 194
180. Selecting Set Graph Scale 196
181. Set Graph Scale Window 196

© 2024 Baker Hughes Company. All rights reserved.

182. Saving Scale Adjustments 197
183. Starting Select Additional Curve 198
184. Select Additional Step Curve Dialog 199
185. Selecting Load Data from Database 199
186. Step Diagnostics Database Browser 200
187. Selecting Load Data from File 200
188. File Browser 201
189. Opening File for Additional Curve 201
190. Selecting Step Test Record 202
191. Additional Curve Displayed 202
192. Selecting Show Computed Result 203
193. Step Diagnostics Computed Result 204
194. Selecting Save To File 205
195. File Browser 206
196. Selecting a Folder for Saving File 206
197. Selecting Export to Excel 207
198. Diagnostic Graph Data - in Excel 208
199. Adjusting Extended Diagnostics Parameters 209
200. Start and End Positions Error Message 210
201. Speed Level Error Message 210
202. Executing Perform Ext Sig 211
203. EXT Warning 211
204. Extended Signature Progress Dialog 212
205. Completing EXT 213
206. Extended Signature Diagnostics Graph 214
207. Selecting Set Graph Scale 215
208. Set Graph Scale Window 215
209. Saving Scale Adjustments 216
210. Starting Select Additional Curve 216
211. Select Additional Extended Signature Curve Dialog 217
212. Selecting Load Data from Database 217
213. Database Browser Displaying Extended Signature Data 218
214. Loading Extended Signature Data 218
215. Selecting Load Data from File 219
216. File Browser 219
217. Opening File for Additional Curve 220
218. Selecting Signature Data Record 220
219. Additional Curve Displayed 221
220. Selecting Show Computed Result 222
221. Extended Signature Diagnostics Computed Result 222
222. Selecting Save To File 223
223. File Browser 224
224. Selecting a Folder for Saving File 224
225. Selecting Export to Excel 225
226. Diagnostic Graph Data - in Excel 226
227. Selecting Load From DB 227

© 2024 Baker Hughes Company. All rights reserved.

228. Device and Data Type Displayed 228
229. Load Data from DB Tool Tip 229
230. Diagnostic Graph Displayed 229
231. Selecting Load From File 230
232. File Browser 231
233. Opening File for Diagnostic Data 231
234. Selecting Step Test Record 232
235. Diagnostic Graph Displayed 232
236. PST Screen 235
237. PST Test Settings Graph 236
238. Allow PST Trigger 237
239. Diagnostics Tab 238
240. Load from DB 239
241. Diagnostic Graph 239
242. Extended Signature Result Window - Computed Values 240
243. Changing Interval of Days 242
244. Calendar Feature 244
245. Saving Schedule Changes 245
246. PST Settings 246
247. PST Travel Error Message 247
248. PST Pressure Change Error Message 248
249. Max Time Error Message 248
250. PST Speed Error Message 248
251. Dwell Time Error Message 249
252. Friction Low Limit Error Message 249
253. Friction High Limit Error Message 249
254. Breakout Limit Error Message 250
255. Droop Limit Error Message 250
256. PST Configuration Dialog 251
257. PST Diagnostics 252
258. Starting PST 253
259. Partial Stroke Test Progress Dialog 254
260. Partial Stroke Test Complete 254
261. Launching View Graph 255
262. PST Results Displayed on PST Screen 255
263. PST Diagnostic Graph 256
264. Selecting Set Graph Scale 257
265. Set Graph Scale Window 257
266. Saving Scale Adjustments 258
267. Starting Select Additional Curve 258
268. Selecting Data Source 259
269. Additional PST Curve Displayed 259
270. Selecting Show Computed Result 260
271. PST Diagnostics Computed Result 261
272. Position and Pressure vs. Time View 262
273. Selecting Save to File 263

© 2024 Baker Hughes Company. All rights reserved.

274 File Browser 264
275 Selecting a Folder for Saving File 264
276 Selecting Export to Excel 265
277 Diagnostic Graph Data - in Excel 266
278 Executing Pneumatic Self Test 267
279 Terminal Board and Pneumatic Test Progress Dialog 268
280 Terminal Board and Pneumatic Test Complete 268
281 Load Data Selections 269
282 Selecting Data to Load 270
283 Selecting Load From Database 271
284 Launching Load Data from Database 272
285 Device and Data Type Displayed 273
286 Loading Selected Data 273
287 Load Data from DB Tool Tip 274
288 Diagnostic Graph Displayed 275
289 Selecting Load From File 276
290 File Browser 277
291 Opening File for Diagnostic Data 277
292 Selecting Diagnostic Record 278
293 Diagnostic Graph Displayed 278
294 Selecting Historical View 279
295 Selecting Start Date for Historical View 281
296 Selecting the Historical View End Date 282
297 PST Historical View - Friction Displayed 283
298 Selecting a Historical View Data Point 284
299 Historical View Diagnostic Graph 285
300 PST Screen Context Menu 286
301 Status Screen 288
302 Status Screen Active Faults Tab 289
303 Status Screen General Tab 290
304 Status Screen Critical Tab 291
305 Status Screen Instrumentation Tab 292
306 Status Screen Actuator Tab 293
307 Status Screen Pneumatics Tab 294
308 Status Screen Electronics Tab 295
309 Executing Clear Current Faults 296
310 Current Faults Cleared 297
311 Executing Clearing All Faults 298
312 All Faults Cleared 299
313 Entering an Individual Fault 300
314 Clearing an Individual Fault 301
315 Individual Fault Cleared 302
316 Status Screen Context Menu 329
317 Check Screen 331
318 Accessing HART Commands 333
319 Executing Send Command 334

© 2024 Baker Hughes Company. All rights reserved.

320. Send Command Results Displayed 335
321. DI Power Mode 337
322. Check Context Menu..... 338
323. Selecting Run Find Stops..... 340
324. Starting Run Find Stops Dialog..... 341
325. Find Stops Dialog..... 341
326. Find Stops Complete 342
327. Selecting Manual Find Stops 343
328. Stroke Valve Dialog..... 344
329. Valve Closed Dialog 344
330. Valve Open Dialog..... 345

© 2024 Baker Hughes Company. All rights reserved.

List of Tables

1. ValVue Software Installation Sizes 21
2. Software Requirements 22
3. Troubleshooting ValVue ESD Used with Mux 62
4. Burst Mode Data Return 63
5. Report Setup Parameters 102
6. Benign Faults and Related User Fields 127
7. PST_Failed Fault and Related User Fields 128
8. Faults Selectable for DO1 136
9. Advanced Tuning Parameters 160
10. PST Settings 241
11. SVI II ESD Fault Matrix 303

© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

© 2024 Baker Hughes Company. All rights reserved.

1. Introduction

About This Manual

The ValVue ESD Instruction Manual is intended to help a Field Engineer install ValVue ESD, and setup, calibrate, and test an SVI II ESD using ValVue ESD. If you experience problems that are not documented in this guide, contact the factory or your local representative. Sales offices are listed on the back cover of this manual.

© 2024 Baker Hughes Company. All rights reserved.

Documentation Conventions

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**.

Note: Indicates important facts and conditions.

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

⚠WARNING *Indicates a potentially hazardous situation, which if not avoided may result in death or serious injury.*

Masoneilan Help Contacts

Email: svisupport@bakerhughes.com

Phone: 888-SVI-LINE (888-784-5463)

© 2024 Baker Hughes Company. All rights reserved.

ValVue ESD Overview

Masoneilan's ValVue ESD software is a Human-Machine Interface (HMI) software tool that provides a powerful interface to Masoneilan's SVI II ESD, the Model 12300 and 12400 Digital Level Transmitter (DLT), and other HART® instruments used in a Safety Instrumented System (SIS).

ValVue ESD is used to configure, calibrate and perform partial stroke testing and valve diagnostics with the SVI II ESD utilizing HART® communications protocol.

- Using ValVue ESD you can:
- Monitor SVI II ESD Operation
- Quickly Set Up the SVI II ESD
- Advanced SVI II ESD Set Up
- Calibrate the SVI II ESD
- Configure or Run Partial Stroke Test (PST)
- Check the SVI II ESD Status
- Perform Diagnostics on SVI II ESD

System Requirements

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

Hardware

Processor: PC with minimum 1 GHz Intel Pentium or compatible

RAM: Minimum 1 gigabyte

Disk: Depends on product

Table 1 - ValVue Software Installation Sizes

Product	Application Component	Database Component	Total Installation Size
ValVue ESD	150M	100M	250M
PRM Central ValVue ESD	150M	100M	250M
PRM PLUG-IN ValVue ESD	150M	N/A	150M

* Assuming 100 devices, 1 PST/month for 5 years

© 2024 Baker Hughes Company. All rights reserved.

Software

Table 2 - Software Requirements

OS:	Windows® Server 2003, Windows Server 2008, XP, or 7
PRM:	PRM R3.x

Note: PRM is NOT required for Standalone installations.

Related Documents

This manual is based on the help file available from the SVI II ESDVue software.

- *Masoneilan SVI II ESD SIL3 Emergency Shutdown Device & PST Controller Quick Start Guide* (SVI II ESD SVI-ESD_QSG-GEA19520). Available at the Baker Hughes download site: *https://valves.bakerhughes.com/resource-center*.
- Release Notes, which are in the software installation directory.

Failure to Communicate

If the PC (using a modem) fails to communicate with the HART® or a COM port communication error occurs, or the message *HART I/O Failed* appears if the device communications fails during the session. Communication failure prevents the PC from establishing a link. Possible causes of communications failure related to installation include:

- Insufficient loop current and voltage
- Poor wiring contacts
- Improper connection of the HART® modem to the computer or a busy port (wait for COM port to clear or use another port)
- Incorrect serial port
- Using the software with another HART® master terminal in service
- Insufficient loop impedance (a minimum of 250 Ohms is required)
- Field device has a non-zero polling address (Set to multidrop)
- If HART® compliance problems are suspect prepar e 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.

© 2024 Baker Hughes Company. All rights reserved.

Install ValVue ESD and PRM Plug-In

Downloading the programs

ValVue ESD software is downloaded at https://valves.bakerhughes.com/resource-center

1. Download the ESD program by:
   a. Entering *ESD* as the search term at the search screen (*Figure 1*), and clicking the magnifying glass search icon.

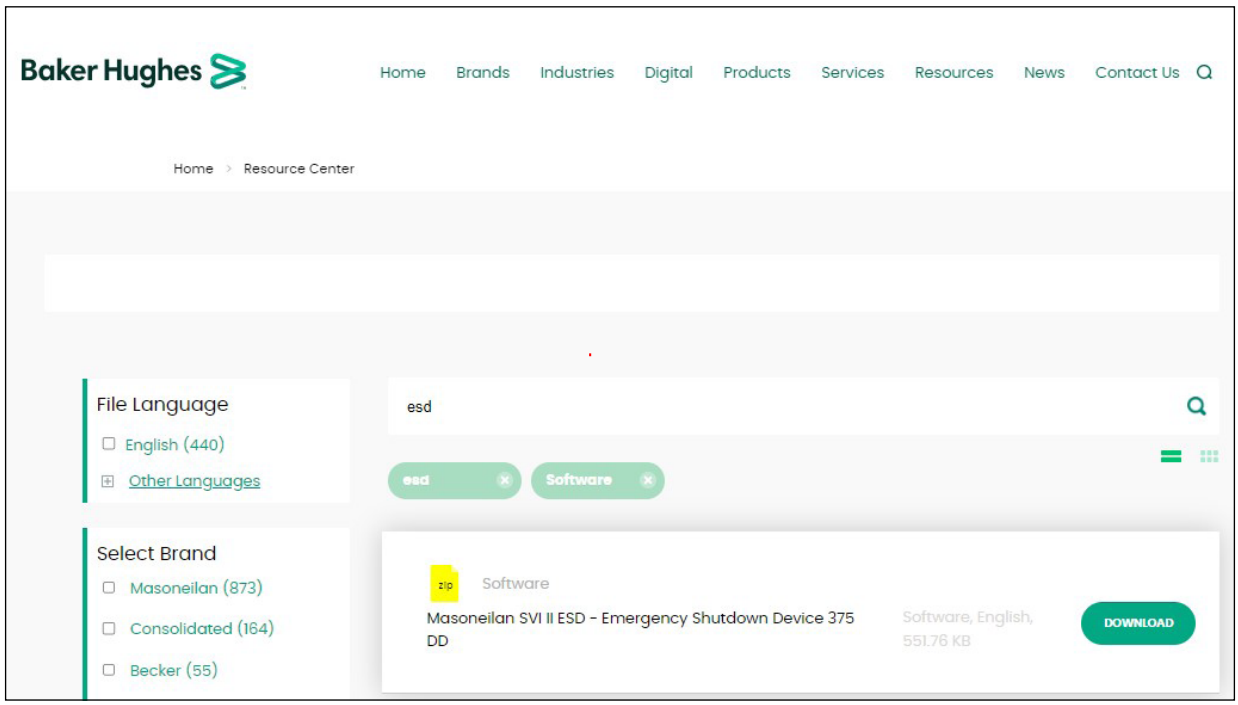


Figure 1 - Download Search for ESD

   b. Scrolling down and find the installer (*Figure 2*) and clicking **Download**. The file downloads to your Windows *Download* folder.

Figure 2 - Download ESD Installer

© 2024 Baker Hughes Company. All rights reserved.

2. Download the PRM program by:

   a. Entering *PRM* as the search term at the search screen (*Figure 3*), and clicking the magnifying glass search icon.

Figure 3 - Download Search for PRM

   b. Scrolling down and find the installer (red arrow in *Figure 3*) and clicking **Download**. The file downloads to your Windows *Download* folder.

There are two components to install:

- *"Installing ValVue ESD Software"*
- *"Installing the Yokogawa PRM Plug-In"* on page 26

Installing ValVue ESD Software

To install the software:

1. Right-click on the downloaded .exe and select **Run as Administrator**. *Figure 4* appears.

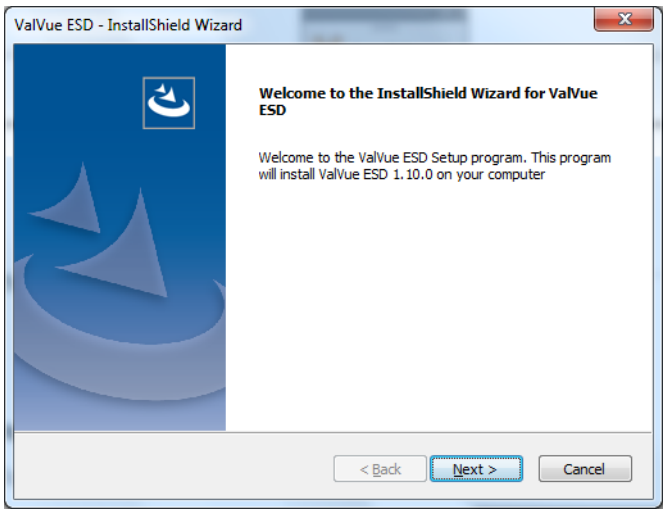


Figure 4 - Welcome Screen

© 2024 Baker Hughes Company. All rights reserved.

2. Click **Next** and *Figure 5* appears.

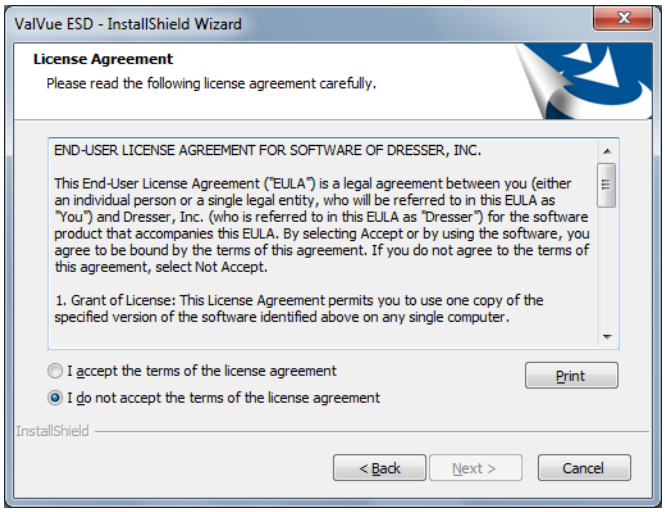


Figure 5 - Licensing Agreement

3. Click **I accept the terms of the license agreement,** click **Next** and *Figure 6* appears.

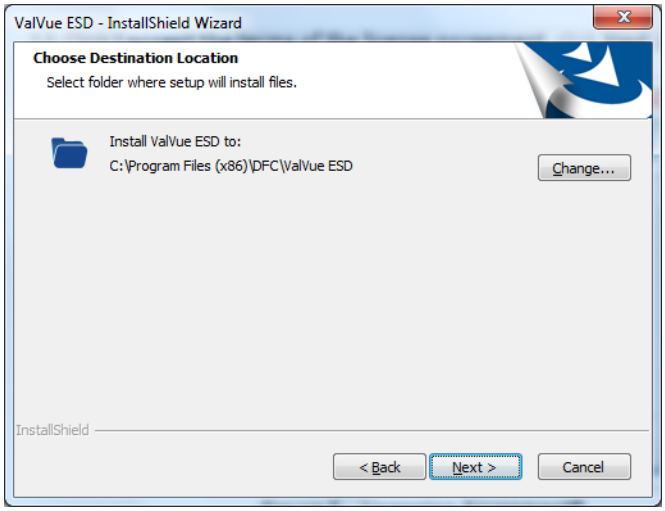


Figure 6 - Destination Folder

Note: Click Change to open the Choose Folder screen to navigate to and designate a non-default folder.

4. Click **Next** and then **Install.** The install proceeds.
5. Click **Finish**.

© 2024 Baker Hughes Company. All rights reserved.

Installing the Yokogawa PRM Plug-In

This process consists of:

- *"Installing Central Server"*

or

- *"Installing Plug-In Client"* on page 30

Installing Central Server

This installs both the plug-in and the central database. To install the software:

1. Unzip the file downloaded from the site into a folder on your system (not the desktop).
2. Right-click on the downloaded *central_valvue_ESD.exe* and select **Run as Administrator** and *Figure 7* appears.

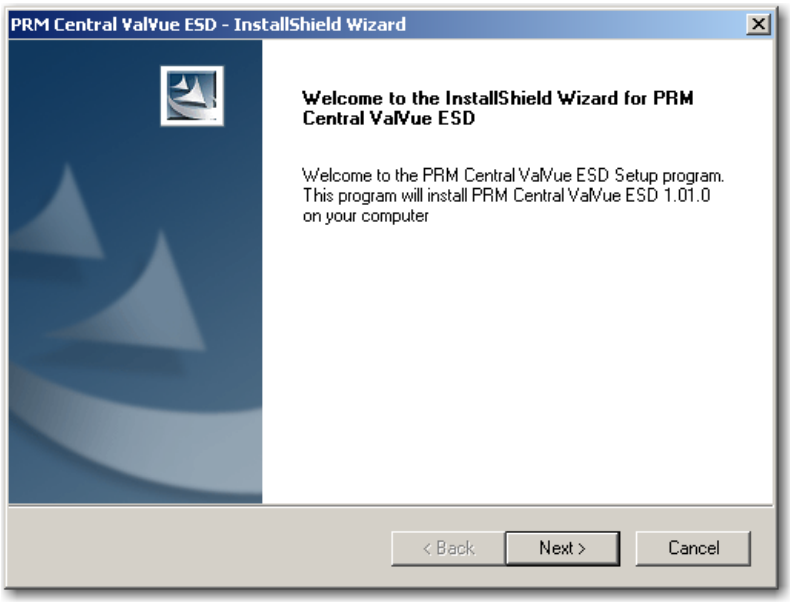


Figure 7 - Install Shield Central Server

© 2024 Baker Hughes Company. All rights reserved.

3. Click **Next** and the *License Agreement* screen appears (*Figure 8*).

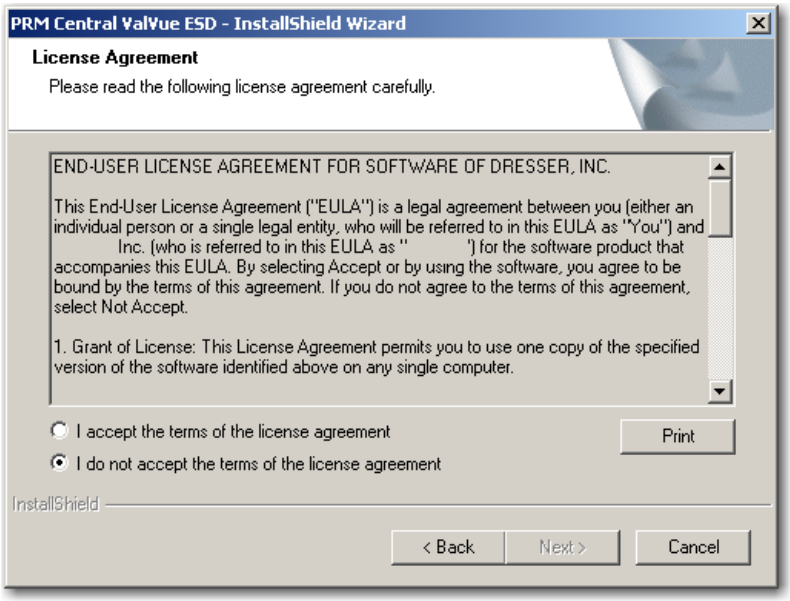


Figure 8 - PRM Central Server License Agreement

4. Click the accept radio button, click **Next** and the *Choose Destination Location* screen appears (*Figure 9*).

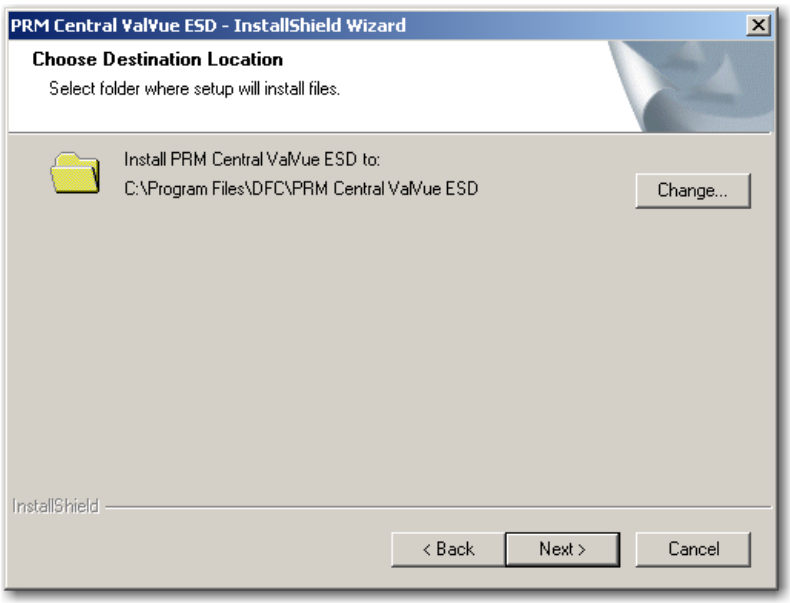


Figure 9 - PRM Central Server Destination Folder

© 2024 Baker Hughes Company. All rights reserved.

Note: Click Change to open the Choose Folder screen to navigate to and designate a non-default folder.

5. Click **Next** and the screen appears (*Figure 10*).

CAUTION

*Click **Change** to open the Choose Folder screen to navigate to and designate a non-default folder. Make a note of this machine and folder share name, ValVue ESD DATABASE as it is required when installing the PRM PLUG-IN ValVue.The installer also creates a data source for the database. If the database already exists, the installer updates the tables as necessary. No existing data is lost.*

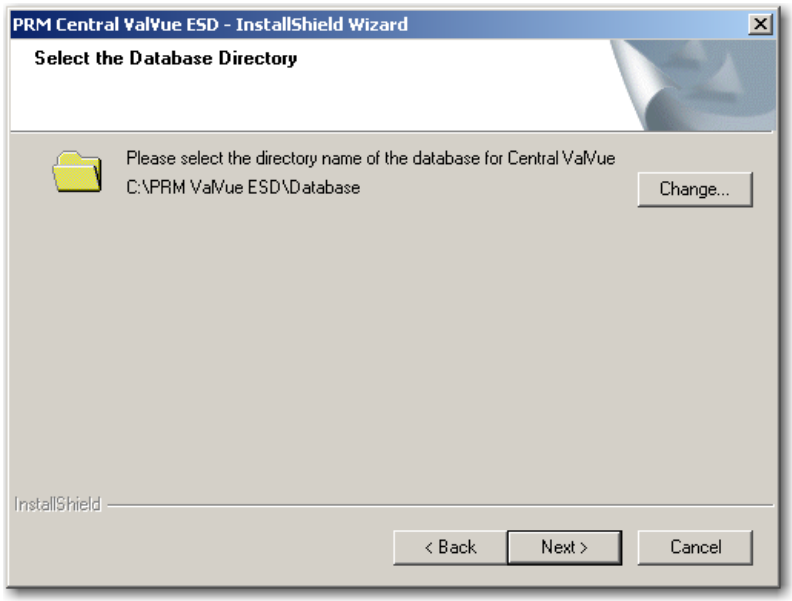


Figure 10 - PRM Central Server Database Directory Destination Folder

© 2024 Baker Hughes Company. All rights reserved.

6. Click **Next** and a screen appears (*Figure 11*).

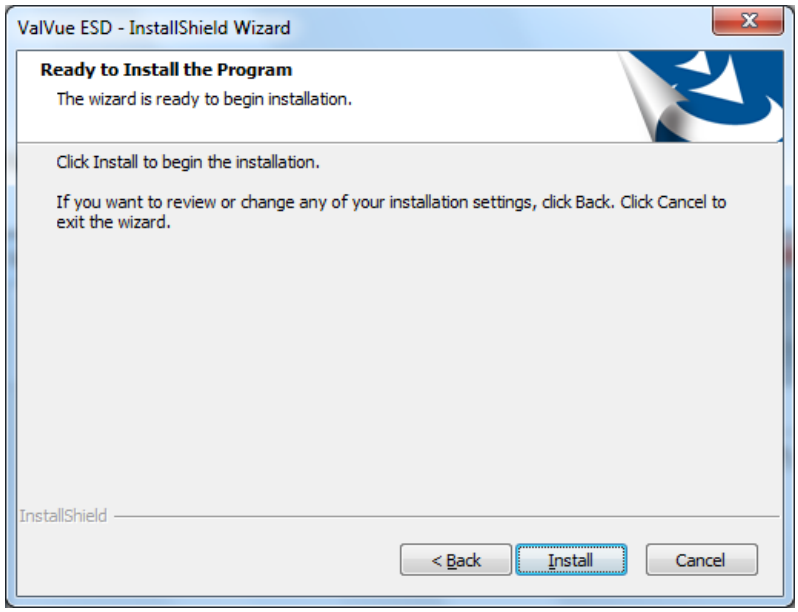


Figure 11- Ready to Install

7. Click **Install** and the *Setup Status* screen appears followed by *Launch Service dialog*.

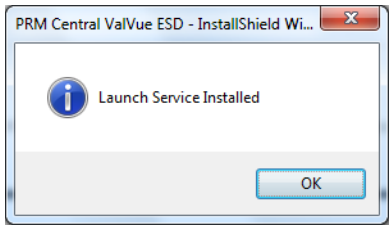


Figure 12 - Launch Service Dialog.

8. Click **OK** and follow the prompts to complete the installation.

© 2024 Baker Hughes Company. All rights reserved.

Installing Plug-In Client

This installs the plug-in and the client software and a database. Install this application on every computer on which PRM Client is installed after PRM Central is installed for the particular PRM server. This application does not require registration.

To install the software:

1. Unzip the file downloaded from the site into a folder on your system (not the desktop).
2. Right-click on the downloaded *plug_in_valvue_ESD.exe* and select **Run as Administrator** and *Figure 13* appears.

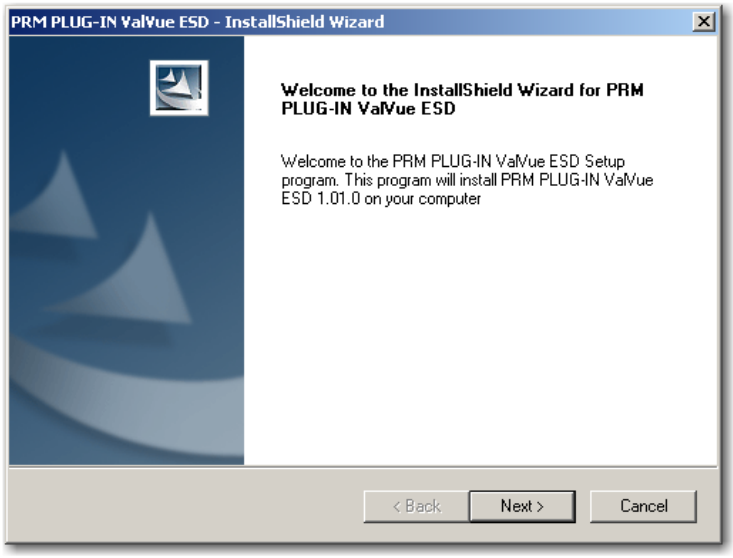


Figure 13 - Install Shield PRM Plug-In

3. Click **Next** and the *License Agreement* screen appears (*Figure 14*).

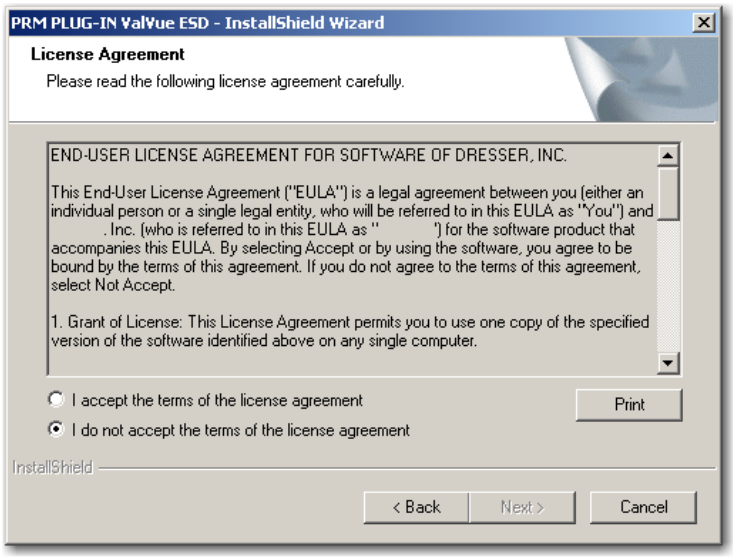


Figure 14 - PRM Plug-In License Agreement

© 2024 Baker Hughes Company. All rights reserved.

4. Click the accept radio button, click **Next** and the *Choose Destination Location* screen appears (*Figure 15*).

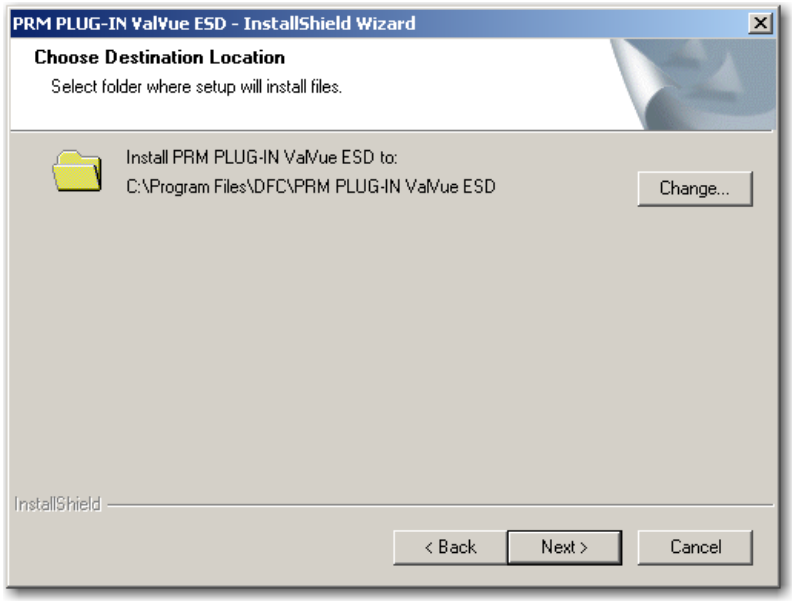


Figure 15 - PRM Plug-In Destination Folder

5. Click **Change** and the *Choose Folder* dialog appears (*Figure 16*).

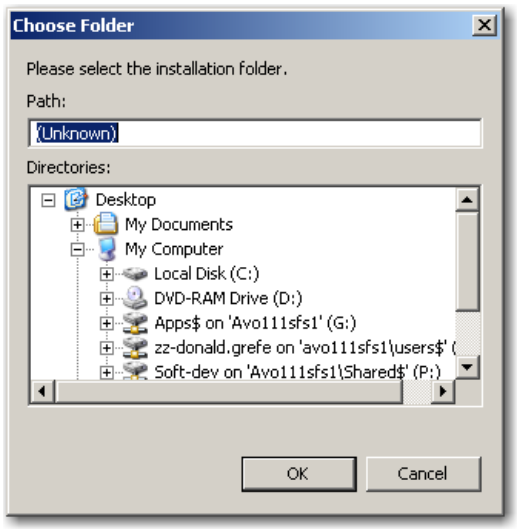


Figure 16 - Choose Folder

© 2024 Baker Hughes Company. All rights reserved.

6. Navigate to the desired folder, click **OK** and **Next** and the screen appears (*Figure 17*).

CAUTION

Use the same folder as with the ValVue ESD DATABASE.The installer also creates a data source for the database. If the database already exists, the installer updates the tables as necessary. No existing data is lost.

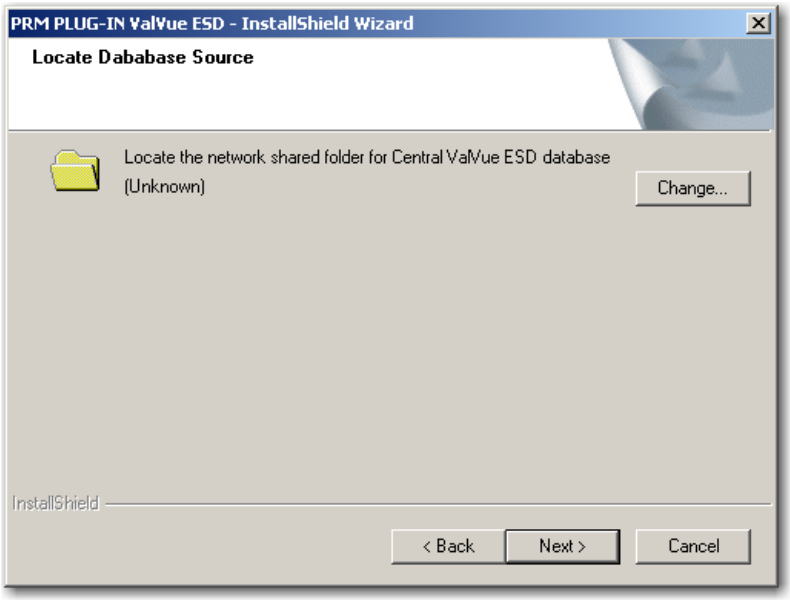


Figure 17 - PRM Plug-In Client Database Location Destination Folder

7. Click **Change** and the *Choose Folder* dialog appears (*Figure 18*).

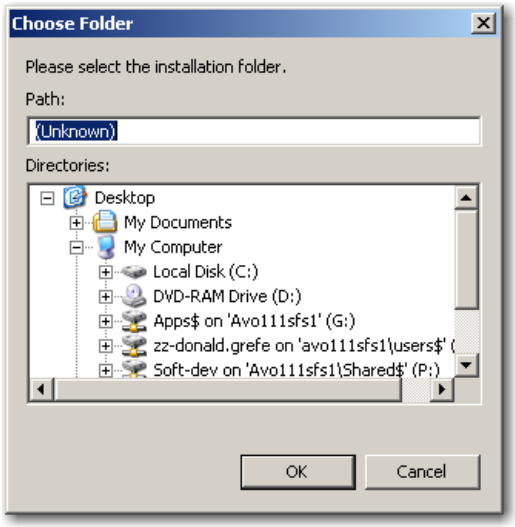


Figure 18 - Choose Folder

© 2024 Baker Hughes Company. All rights reserved.

8. Navigate to the desired folder, click **OK** and **Next** and the screen appears (*Figure 19*).

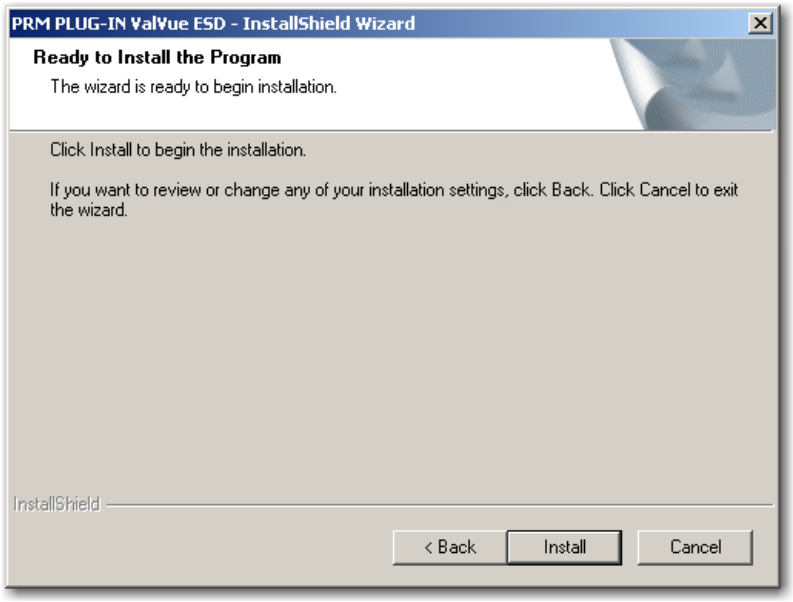


Figure 19 - Ready to Install

9. Click **Install** and the *Setup Status* screen appears followed by *InstallShield Wizard* Complete.
10. Click **Finish.**

PRM PLUG-IN ValVue ESD Warning

Listed below are warnings pertaining to the installation of the PRM PLUG-IN ValVue ESD.

PRM Multi-Server

Because of the connection with the database and Central ValVue ESD, the Multi-Server switching feature, available on the PRM client, is not allowed.

PRM PLUG-IN ValVue ESD Installation Folder

As mentioned in installation instructions, the PlugInValVue ESD application must be installed to the same drive and folder on every machine

© 2024 Baker Hughes Company. All rights reserved.

Registering ValVue ESD

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

To register your software, you must launch the 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 serial number, and the installation ID number from the ValVue ESD login display. You need the serial number to move ValVue ESD to a different computer.

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

To register ValVue ESD:

1. Start ValVue ESD either by clicking on the desktop icon or using the *Start* programs selection. When you start ValVue ESD, the registration window appears (*Figure 20*).

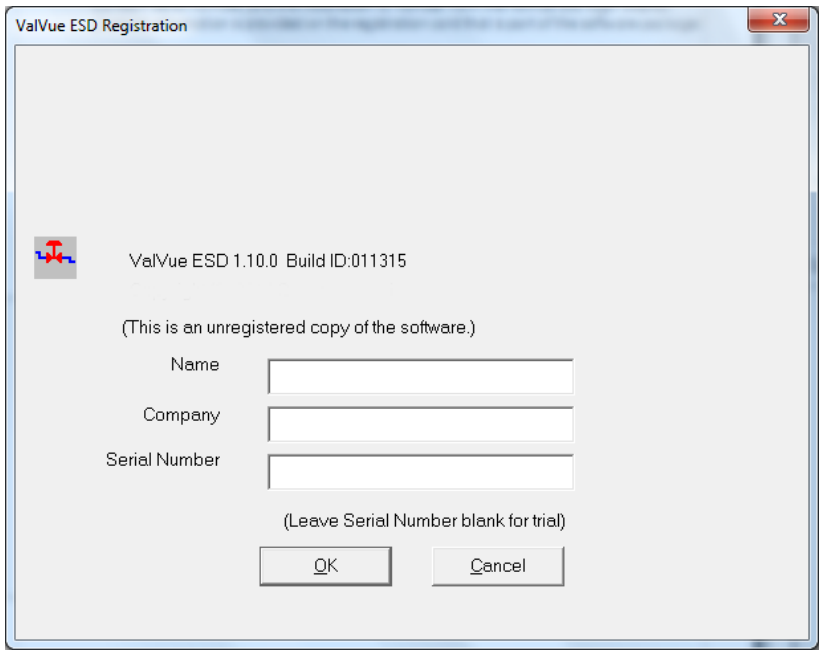


Figure 20 - Owner and Product Key Registration Window

© 2024 Baker Hughes Company. All rights reserved.

2. Enter *Name*, *Company* and *Serial Number* in the registration and click **OK**.

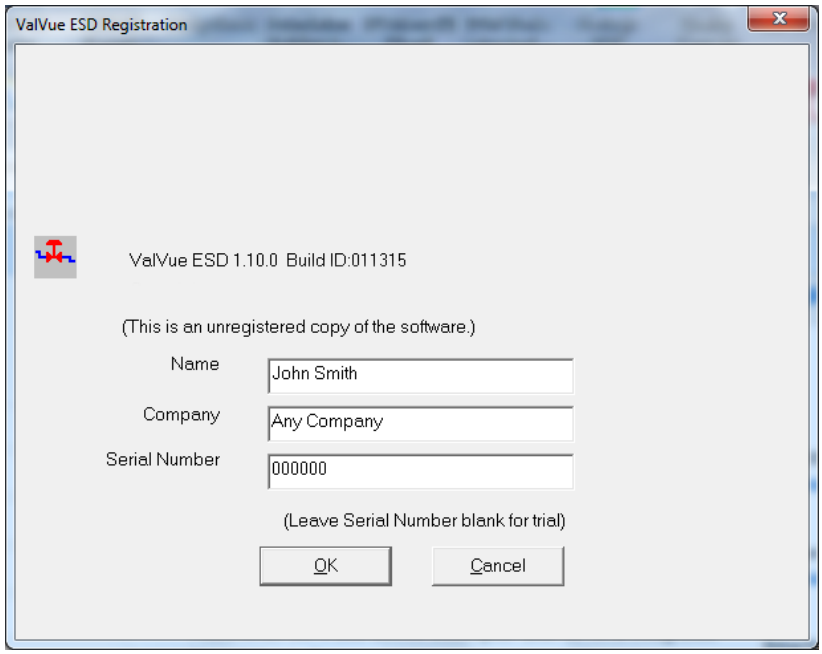


Figure 21 - Applying Owner and Product Key Information

The software key registration window appears (*Figure 22*).

3. Click **Mux** and enter a software key for the Mux option, if applicable.

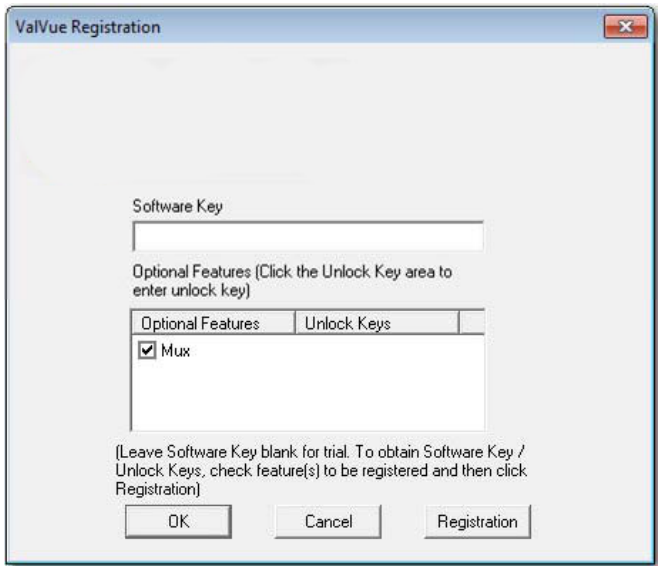


Figure 22 - Software and Mux Key Window

© 2024 Baker Hughes Company. All rights reserved.

4. Click **Registration** (*Figure 23*).

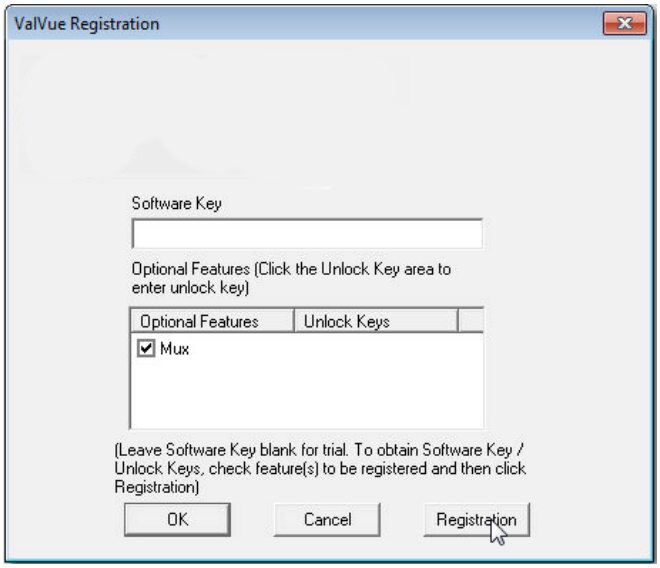


Figure 23 - Launching Registration Window

5. Enter your name and the name of your company. You are now ready to contact the factory with this information, to obtain your software keys. There are four methods shown on the Registration Instruction Card:

- *Mail*
- *Phone*
- *Fax*
- *Email*

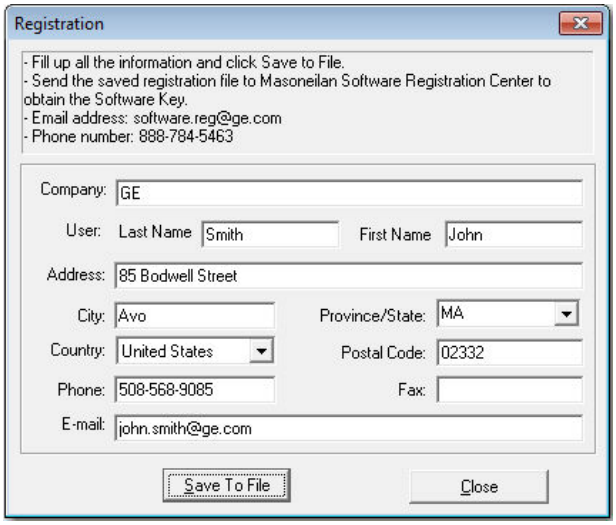


Figure 24 - Registration Window

© 2024 Baker Hughes Company. All rights reserved.

6. Click **Save to File** to save your registration file. A Windows browser appears (*Figure 25*).
7. Navigate to the desired folder, name the registration information (.txt) file and click **Save**.

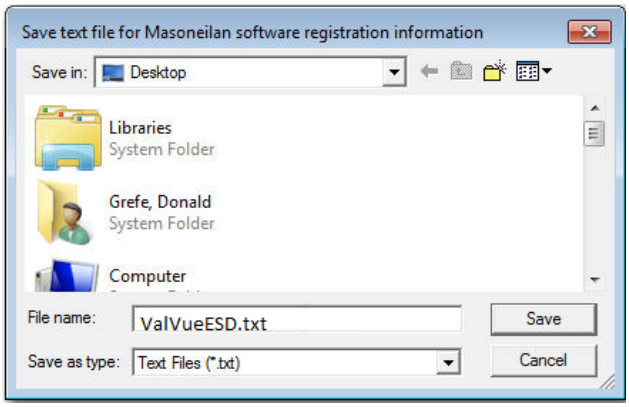


Figure 25 - Save Registration Information

A dialog appears (*Figure 26*).

8. Email the registration information by clicking **Yes**.

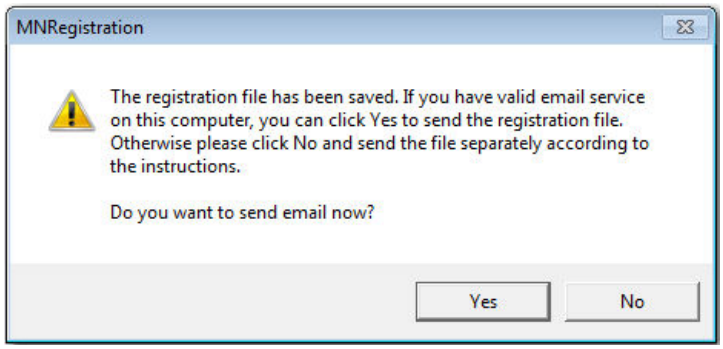


Figure 26 - Registration File Saved Dialog

ValVue ESD launches your email service and automatically attaches the registration and Masoneilan's Software Registration Center.

9. Click **Send** to email the registration.

   If your email program fails to start, contact the software registration center using the email address, phone number, address, or fax number given in this manual).

   A dialog indicating the email has been sent appears (*Figure 27*).

© 2024 Baker Hughes Company. All rights reserved.

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

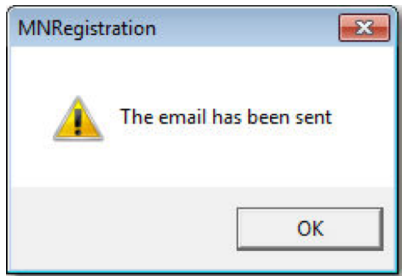


Figure 27 - Registration Email Sent Dialog

Entering Software Keys

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

Once you have your key, to enable the program:

1. Start ValVue ESD.
2. Choose **Help** > **View Registration**.
3. Enter the *Product Key* (if not already entered).
4. Click **OK**. On the 2nd registration screen, enter the software key returned by the factory (*Figure 28*).

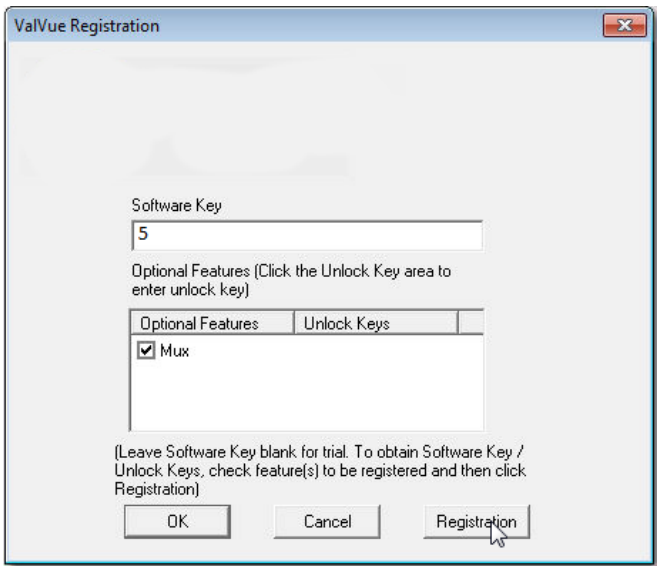


Figure 28 - Entering Software Key

5. Enter the software key, if applicable, by clicking on the screen under the *Unlock Keys* field and the field becomes active. Enter the *Mux software* key.
6. Click **OK**.

© 2024 Baker Hughes Company. All rights reserved.

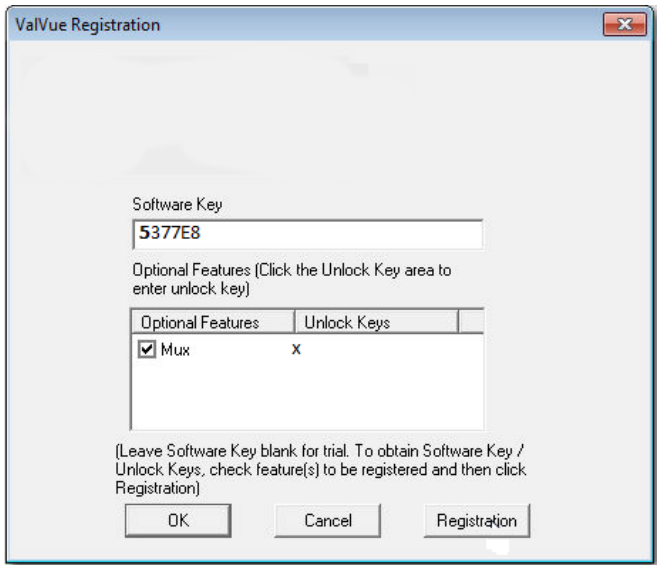


Figure 29 - Entering Mux Unlock Key

When the registration is complete and successful the message shown in *Figure 30* appears.

7. Click **OK**.

Figure 30 - Successful Registration Message

© 2024 Baker Hughes Company. All rights reserved.

Licensing

In addition to registration, a license is required to test more than five devices. To acquire a license for additional devices:

1. Select **Help** > **Software License**. The *Software License* menu item is enabled when the application is registered.
2. Select the number of tags (devices) for which you would like licenses from the *Number of Tags* drop down list.
3. Click **Generate File**.

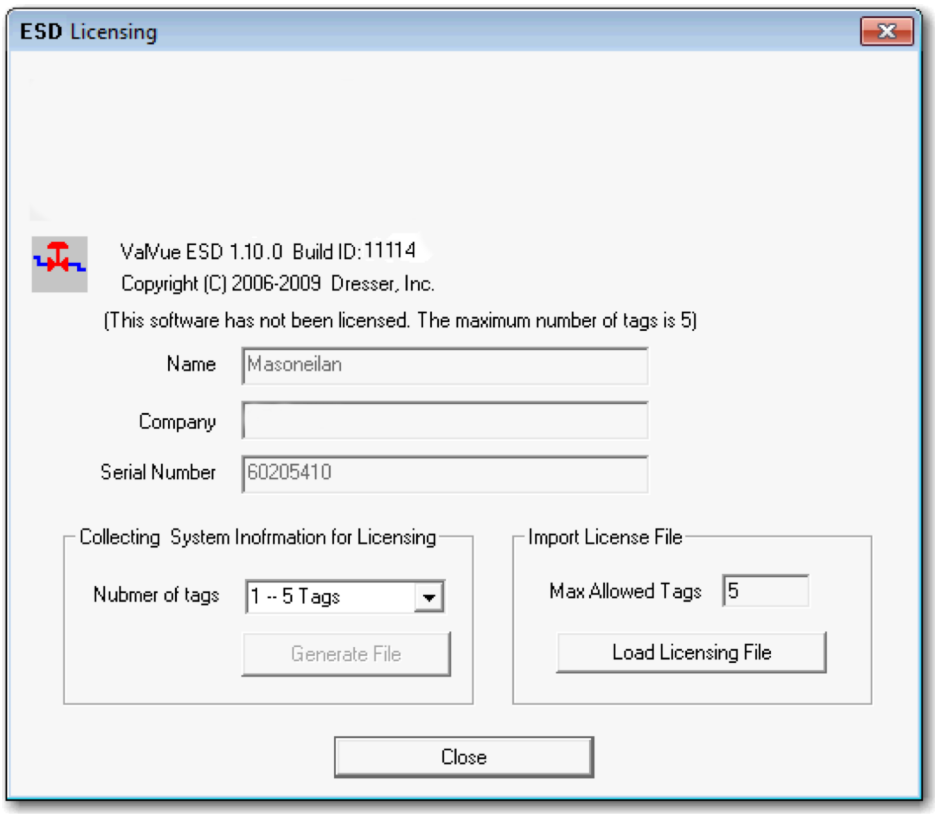


Figure 31 - Generating License File

© 2024 Baker Hughes Company. All rights reserved.

The *ESD Licensing* tool generates the licensing information file and opens a Windows browser with the file name.

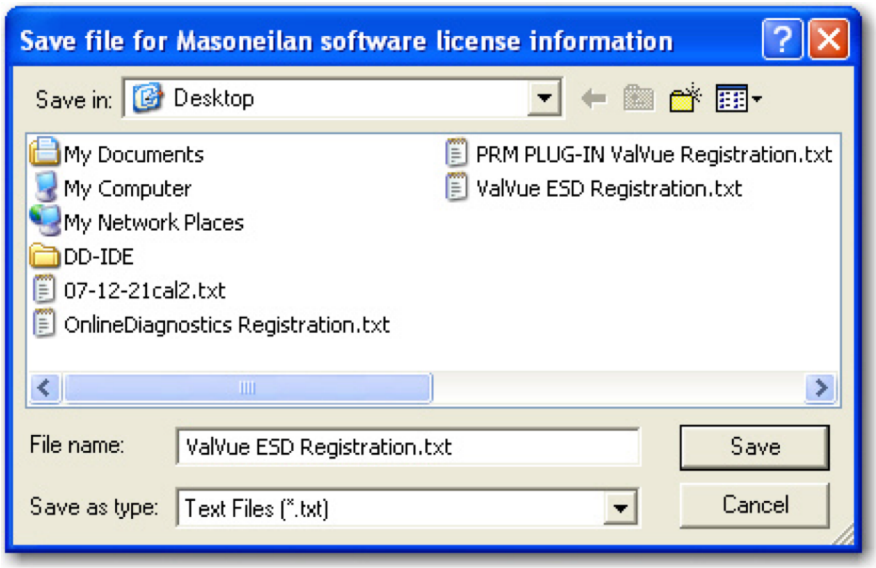


Figure 32 - Saving ESD Licensing Information File

4. Click **Save**.

   A dialog appears (*Figure 33*) indicating the licensing file has been saved. If you have a valid email service you can email the file.

5. Click **Yes** to email the file.

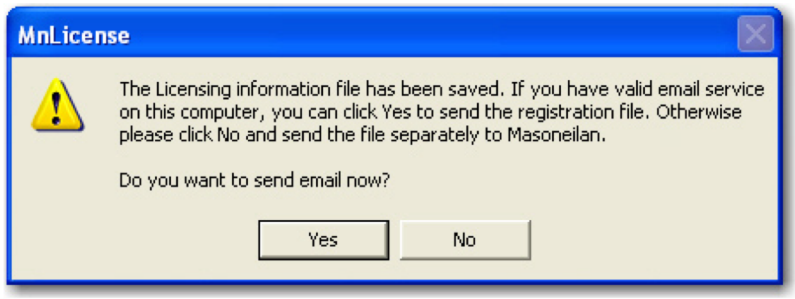


Figure 33 - ESD Licensing Information Email Dialog

© 2024 Baker Hughes Company. All rights reserved.

You receive a licensing file in response from the factory (*Figure 34*).

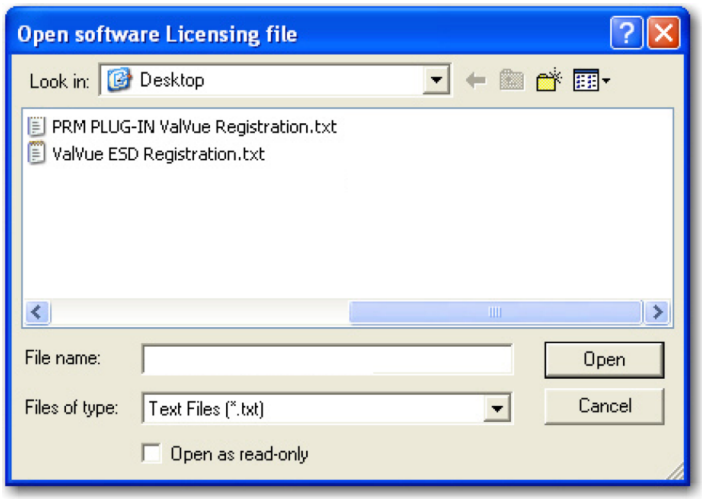


Figure 34 - Licensing File

Activating the License

To activate the license:

1. Select **Help** > **Software License** and *Figure 35* appears.

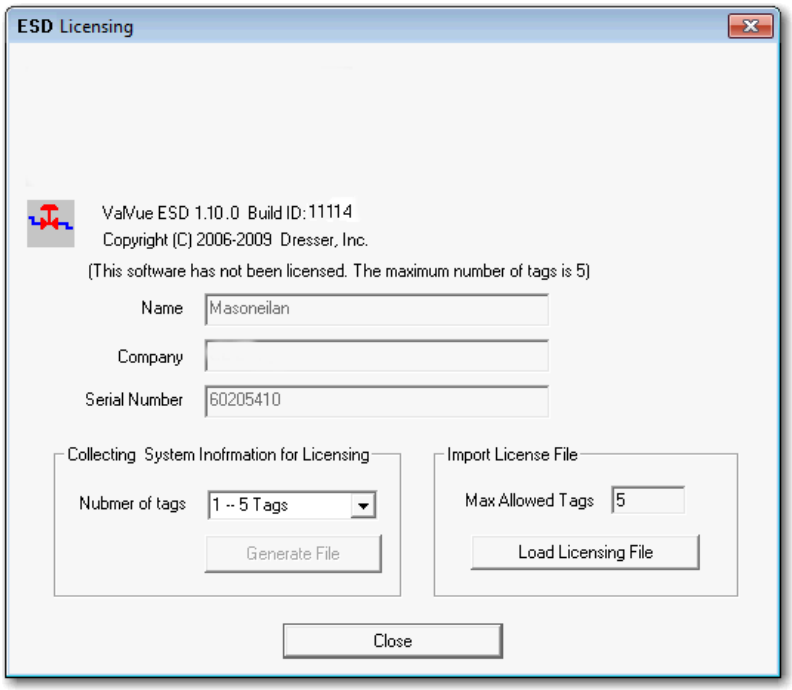


Figure 35 - Load Licensing File

2. Click **Load Licensing File**. The software is licensed and the licensed number of tags appear at the top of the *ESD Licensing* tool and the number is greyed out in the *Number of Tags* drop down list.

© 2024 Baker Hughes Company. All rights reserved.

2. Getting Started

Main Window

After you have successfully started ValVue ESD the main window appears (*Figure 36*), divided into two tabs:

- *Connected Devices* - Lists all connected devices in the SIS found during initial scan or re-scan.
- *Plant Schedule* - Provides access to view the next scheduled PST, edit schedule and synchronize devices

Each tab has an associated screen and functions. The *Connected Devices* screen appears on startup and lists all scanned, available devices on the selected COM port. When *Load Device List from Database on Startup* option is enabled (see *"Using a Device List File"* on page 54) ValVue ESD does not re-scan the port.

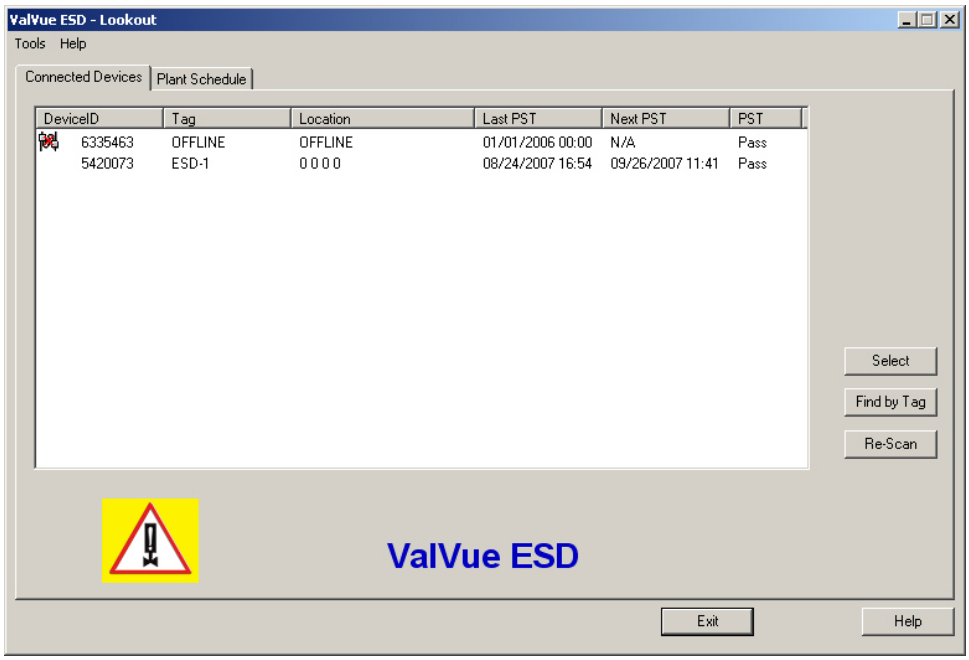


Figure 36 - ValVue ESD Main Window - Connected Devices

© 2024 Baker Hughes Company. All rights reserved.

Connected Devices Icons

When you start ValVue ESD the main window displays the scanned, connected devices and may also display an icon (*Figure 37*), located to the left of the device name.

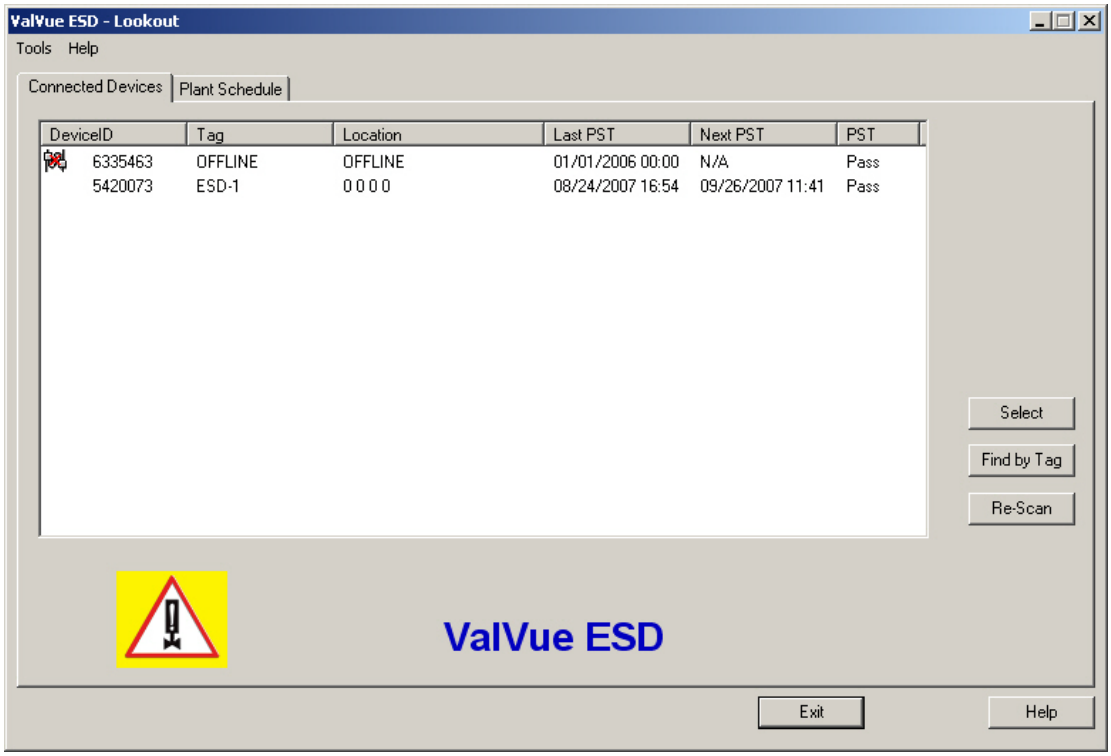


Figure 37 - ValVue ESD Main Window with Disconnected Device Icon

There are four possible icons:

Connected - indicates that the device is connected to the SIS and is available for running ValVue ESD.

Disconnected - indicates that the device is disconnected from the SIS and is only available offline.

Status - indicates that there is more device status information avail-able on the Status screen.

Unlicensed - indicates that there is no ValVue ESD license available. In this case you are not able to launch ValVue ESD for the selected device.

© 2024 Baker Hughes Company. All rights reserved.

Plant Schedule

When you select the Plant Schedule tab the Plant Schedule screen appears (*Figure 38*). The Plant Schedule tab indicates when the last PST (Partial Stroke Test) was executed and when the next PST is scheduled to occur. You can also edit the plant PST schedule, synchronize the current device, synchronize all devices in the SIS (Safety Integrated System) and export all schedule data to an Excel file.

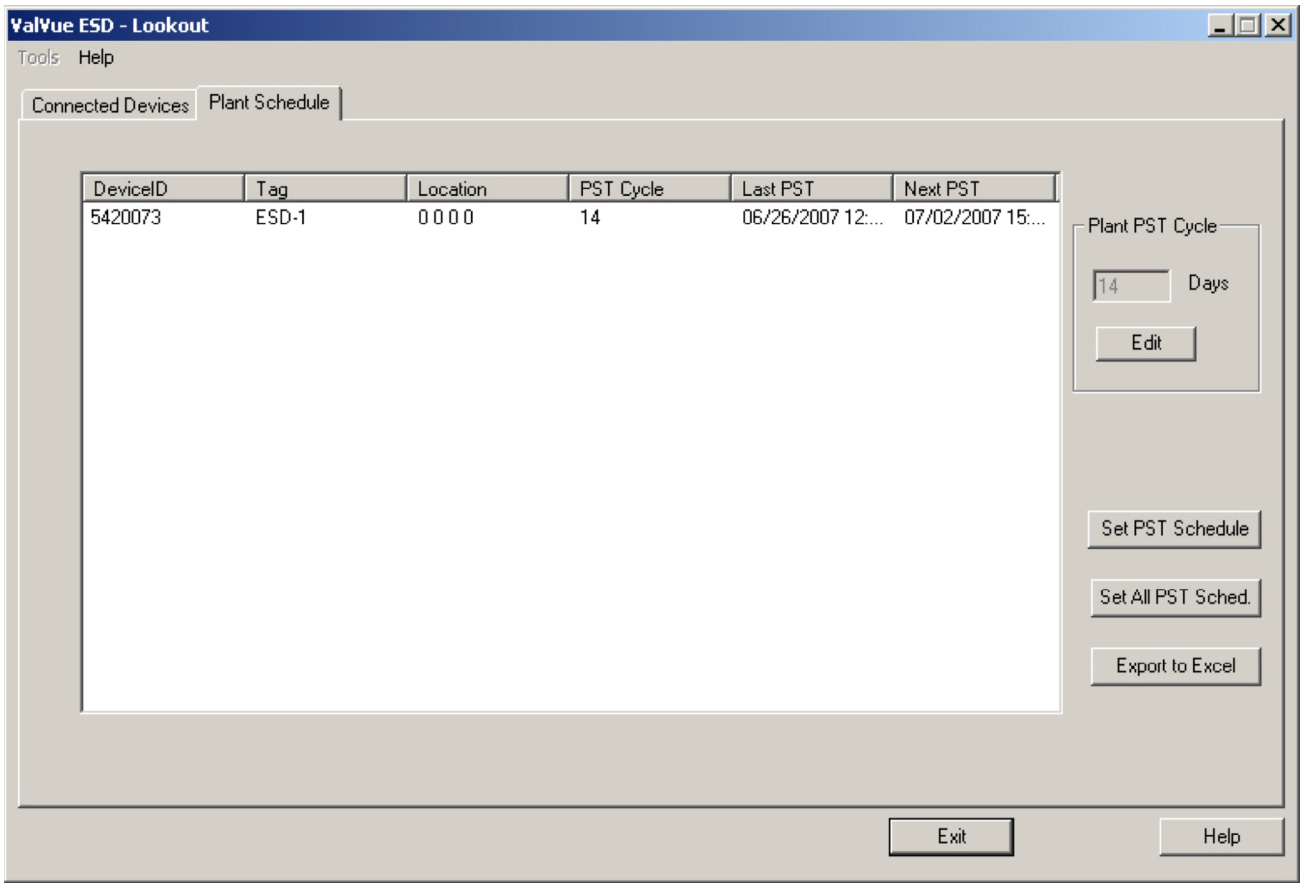


Figure 38 - Plant Schedule Screen

© 2024 Baker Hughes Company. All rights reserved.

Editing Plant Schedule

Use the *Plant Schedule* tab to edit the schedule for when PST (Partial Stroke Test) is executed for the SIS (Safety Integrated System). You can edit the schedule for an individually selected device or you can edit the PST schedule for all devices connected to the plant.

To edit the plant schedule for the entire plant:

1. Click **Edit** (*Figure 39*).

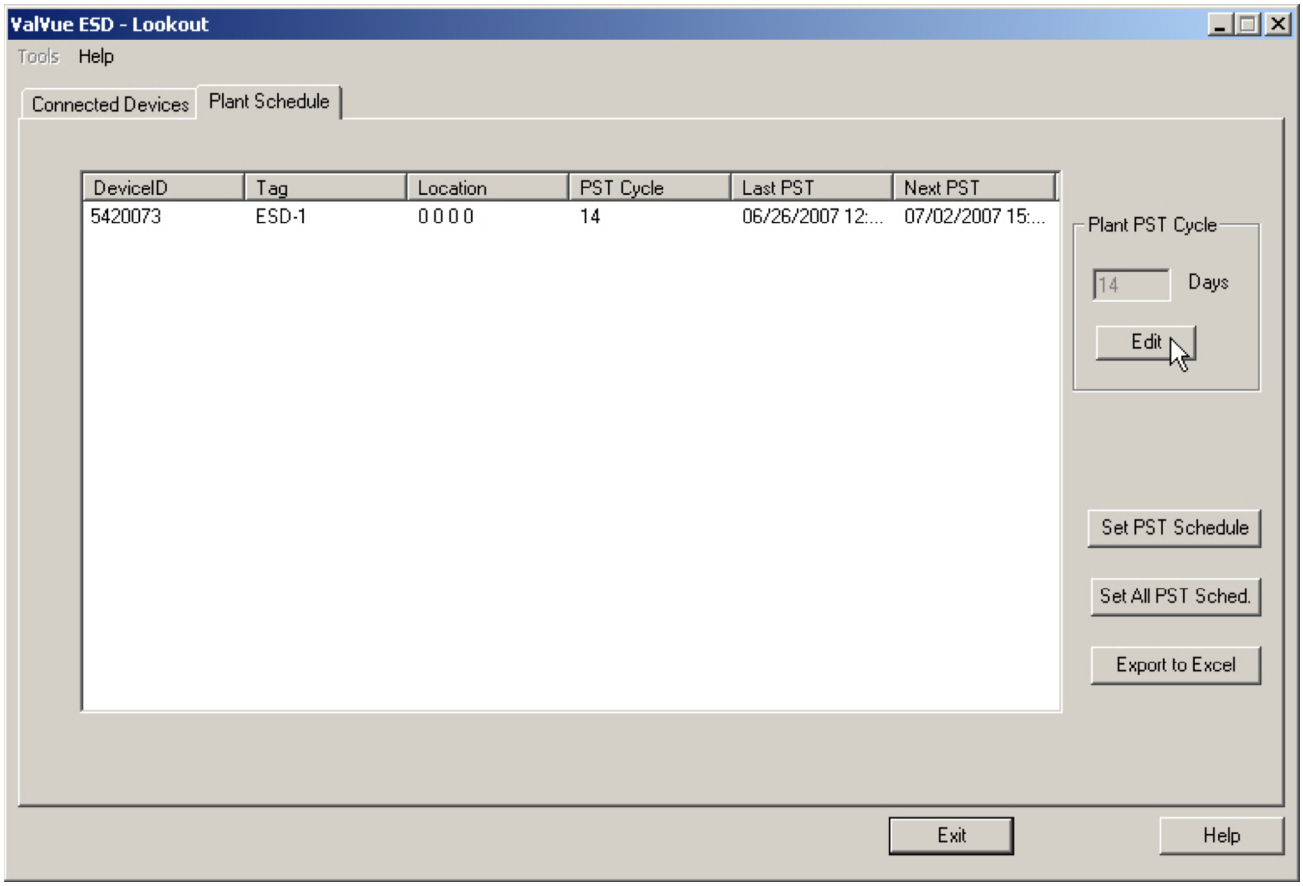


Figure 39 - Accessing Edit Function

© 2024 Baker Hughes Company. All rights reserved.

2. Click **Edit** and enter the number in the *Days* field for the *Plant Cycle* (*Figure 40*).

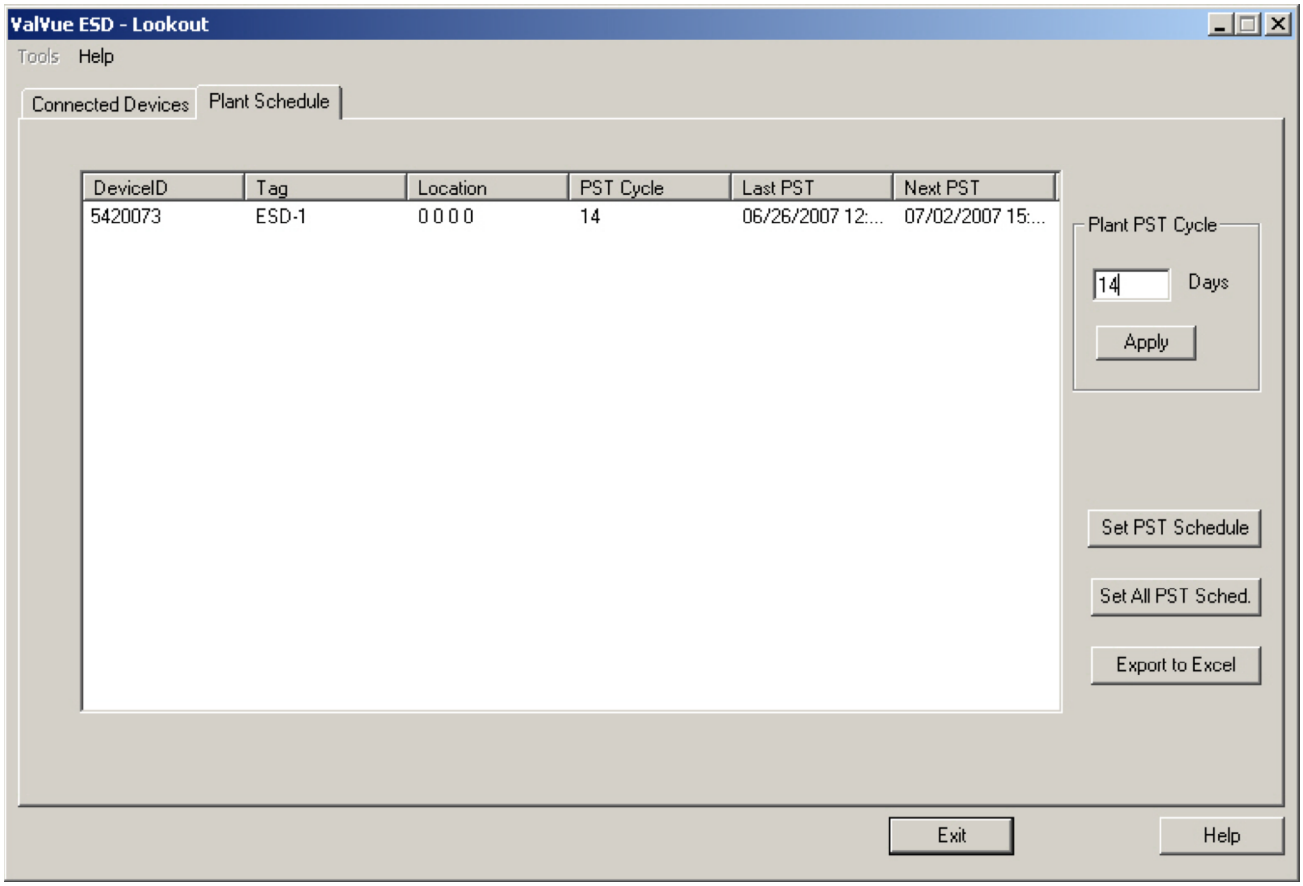


Figure 40 - Editing Plant Cycle PST

© 2024 Baker Hughes Company. All rights reserved.

3. Click **Apply** to save and apply changes (*Figure 41*).

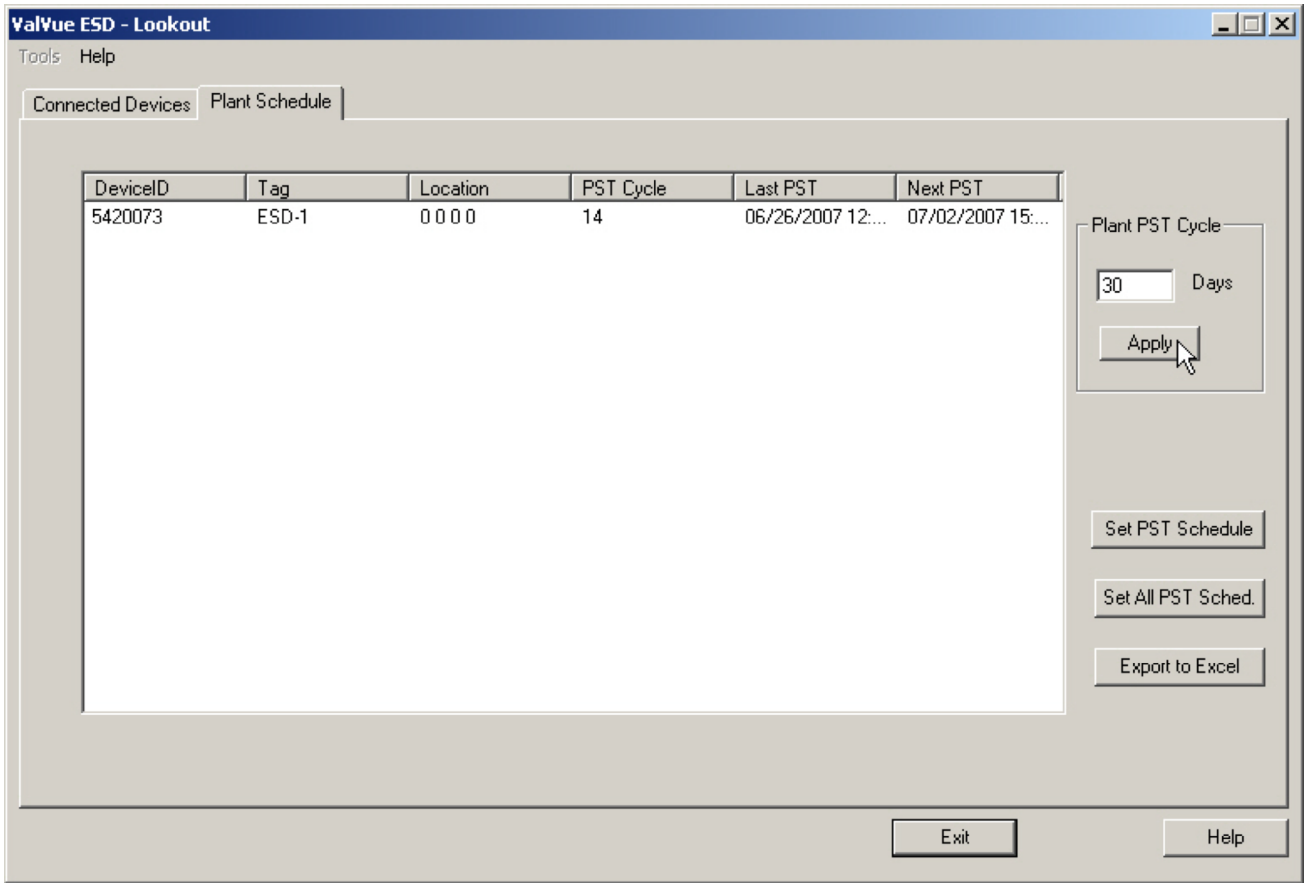


Figure 41 - Applying Edits to the Plant Schedule

A warning (*Figure 42*) asking you to confirm changes appears.

4. Click **OK** to save the schedule changes for all plant devices.

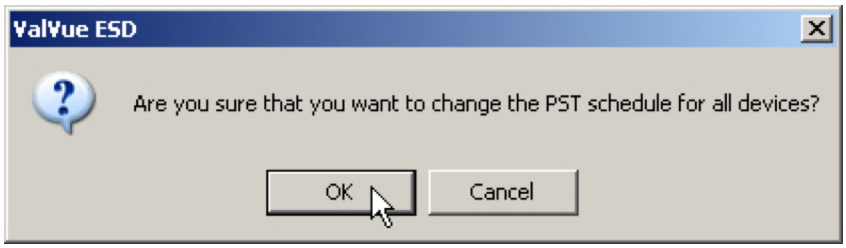


Figure 42 - Changing Plant Schedule Warning

© 2024 Baker Hughes Company. All rights reserved.

Editing Plant Schedule for a Selected Device

You can also edit the PST schedule for an individual, selected plant device:

1. Click **Edit** (*Figure 39*).
2. Click **Edit** and change the number in the *Days* field for the *Plant Cycle* (*Figure 40*).
3. Select the device for schedule update by clicking on the device name.
4. Click **Set PST Schedule** (*Figure 43*).

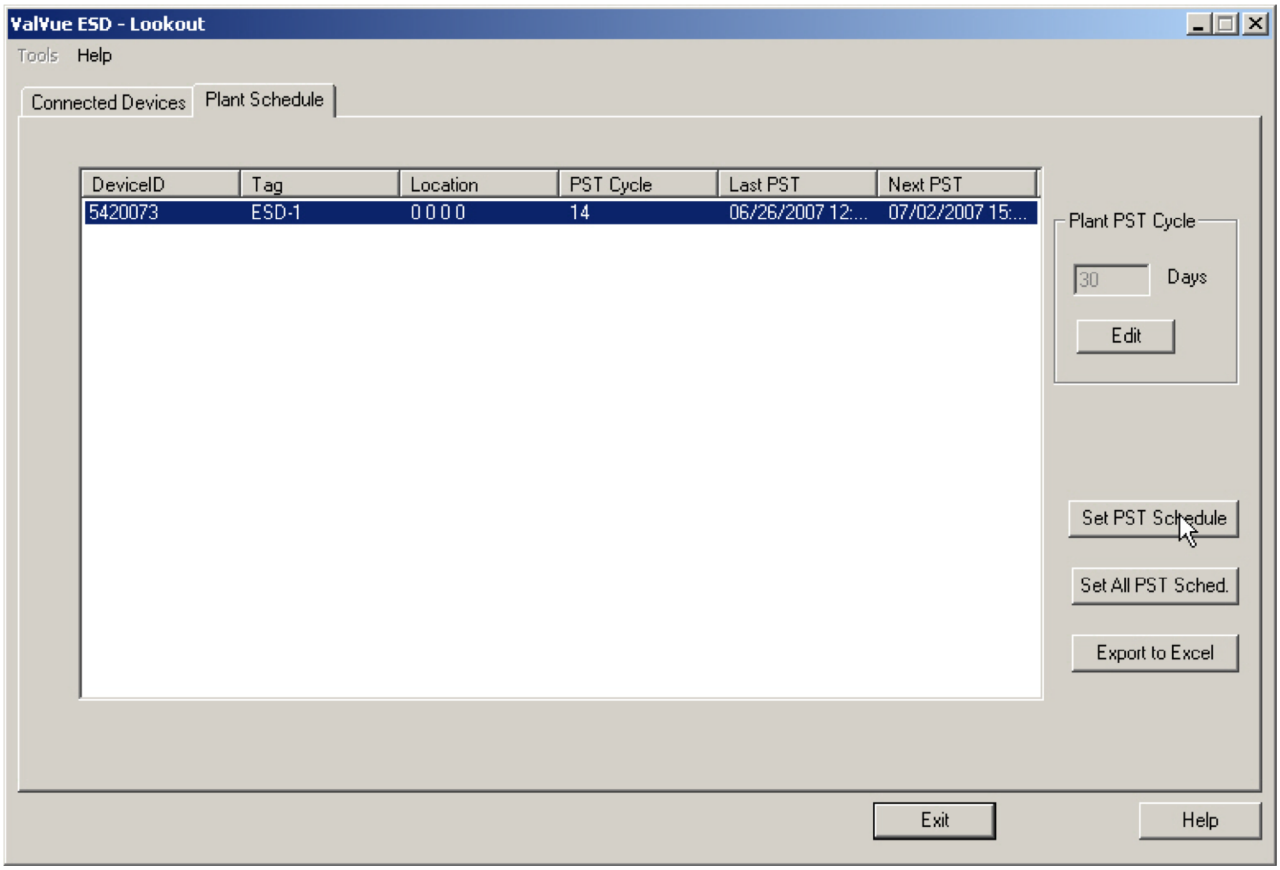


Figure 43 - Setting PST Schedule for Individual Device

A warning (*Figure 44*) appears.

5. Click **OK** to close the dialog and return to the *Plant Schedule* screen.

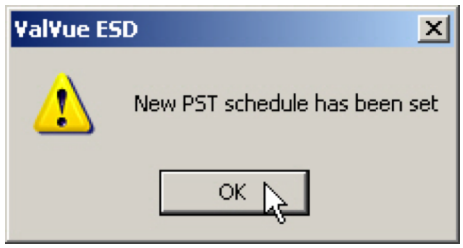


Figure 44 - Plant Schedule Set for Individual Device

© 2024 Baker Hughes Company. All rights reserved.

Export to Excel

You can save or create a comma separated value file (.csv) of the Plant Schedule data and export the file to Excel. With the Excel file you can perform schedule analysis and export the data to other formats. To export a plant schedule to Excel:

- Click **Export to Excel** (*Figure 45*).
  ESDVue launches Microsoft® Excel and displays the plant schedule data, as Excel values.

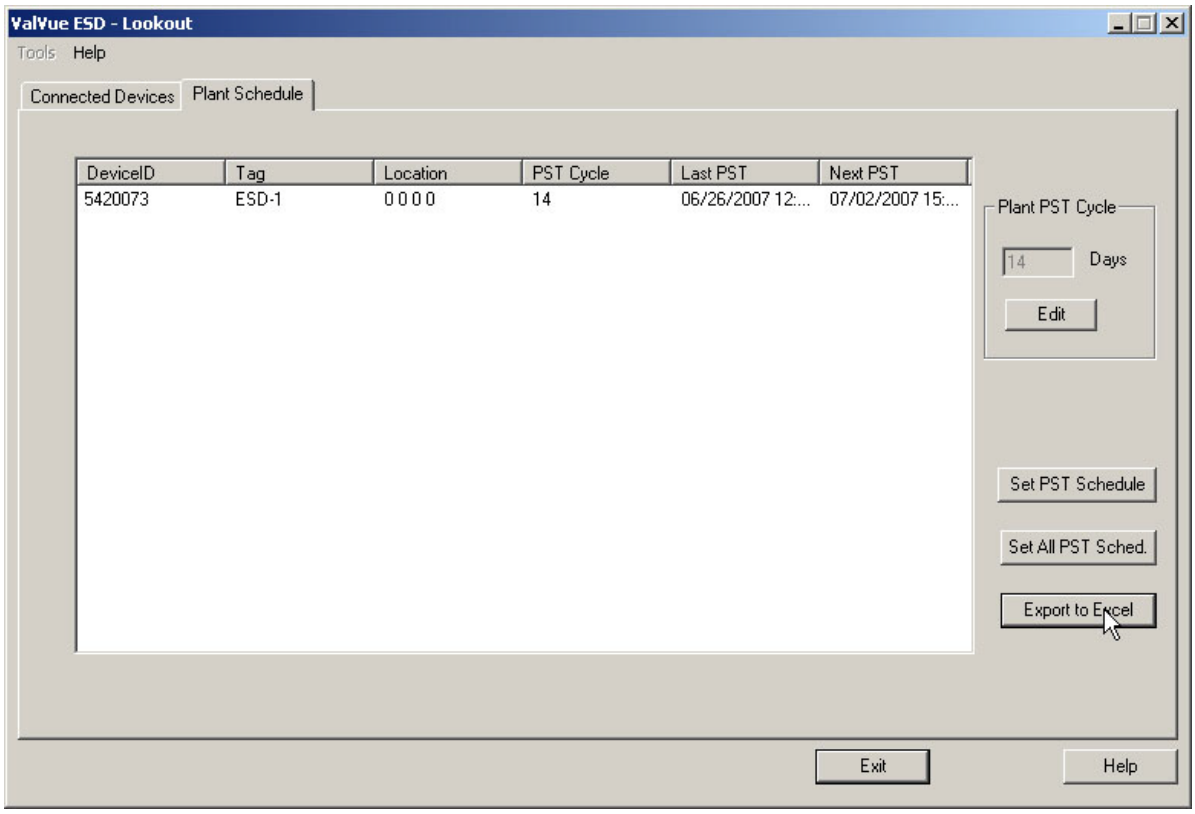


Figure 45 - Selecting Export to Excel

Connected Devices Help

Launch Help from the *Connected Devices* screen, either by clicking **Help** at the bottom right corner of the screen, or by selecting **Help** from the *Help* menu and help appears starting at the *Connected Devices* content.

© 2024 Baker Hughes Company. All rights reserved.

Connected Devices Tools Menu

Use the *Tools* menu (*Figure 46*) to access the tools to set up the selected device for operation.

See also *"Configuring ValVue ESD Options"* on page 52 and *"Multiplexor Setup and Operation"* on page 56.

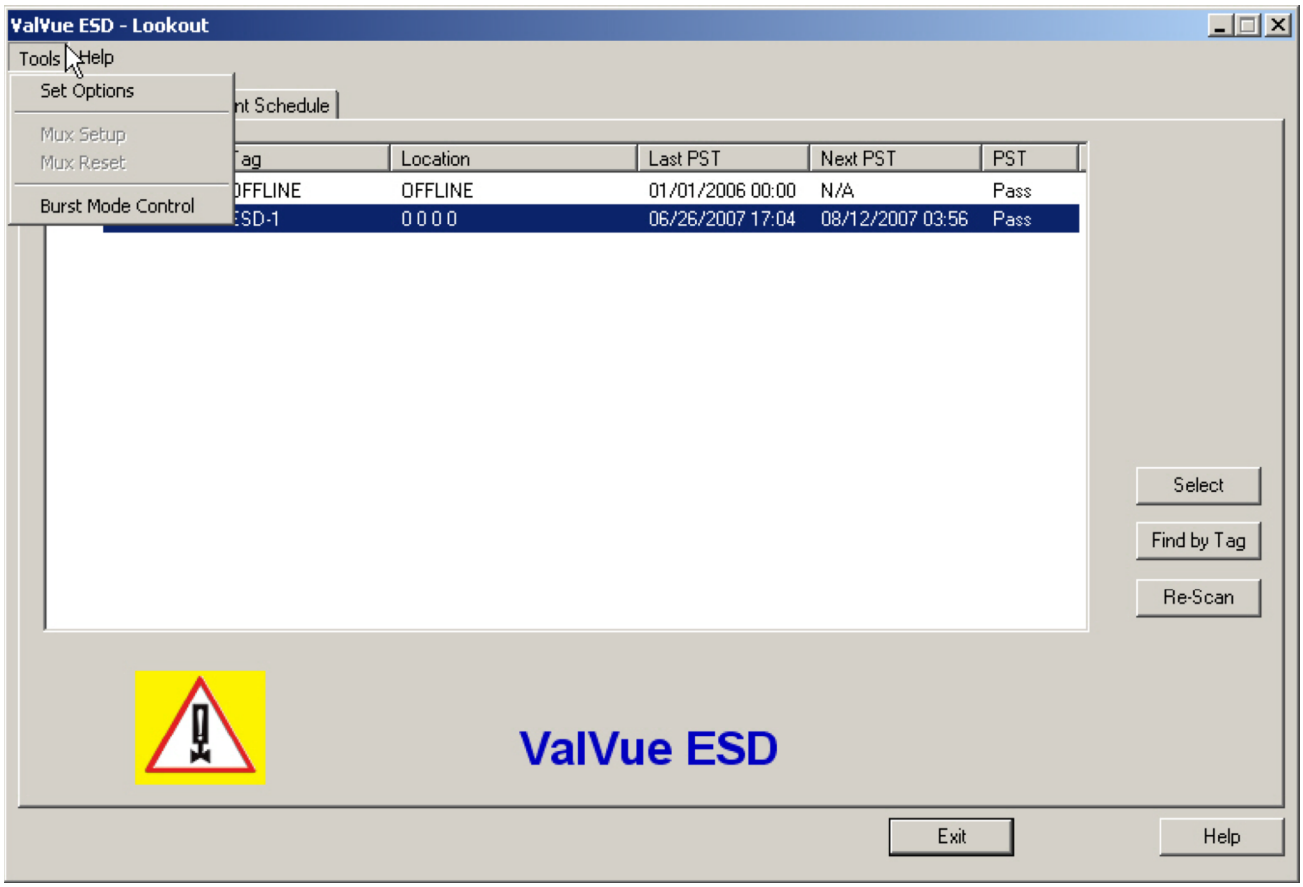


Figure 46 - Accessing Connected Devices Tools Menu

© 2024 Baker Hughes Company. All rights reserved.

Configuring ValVue ESD Options

Launching Set Options

1. Right-click to open the context menu (*Figure 47*) and select **Set Options** to open the *Options* dialog.

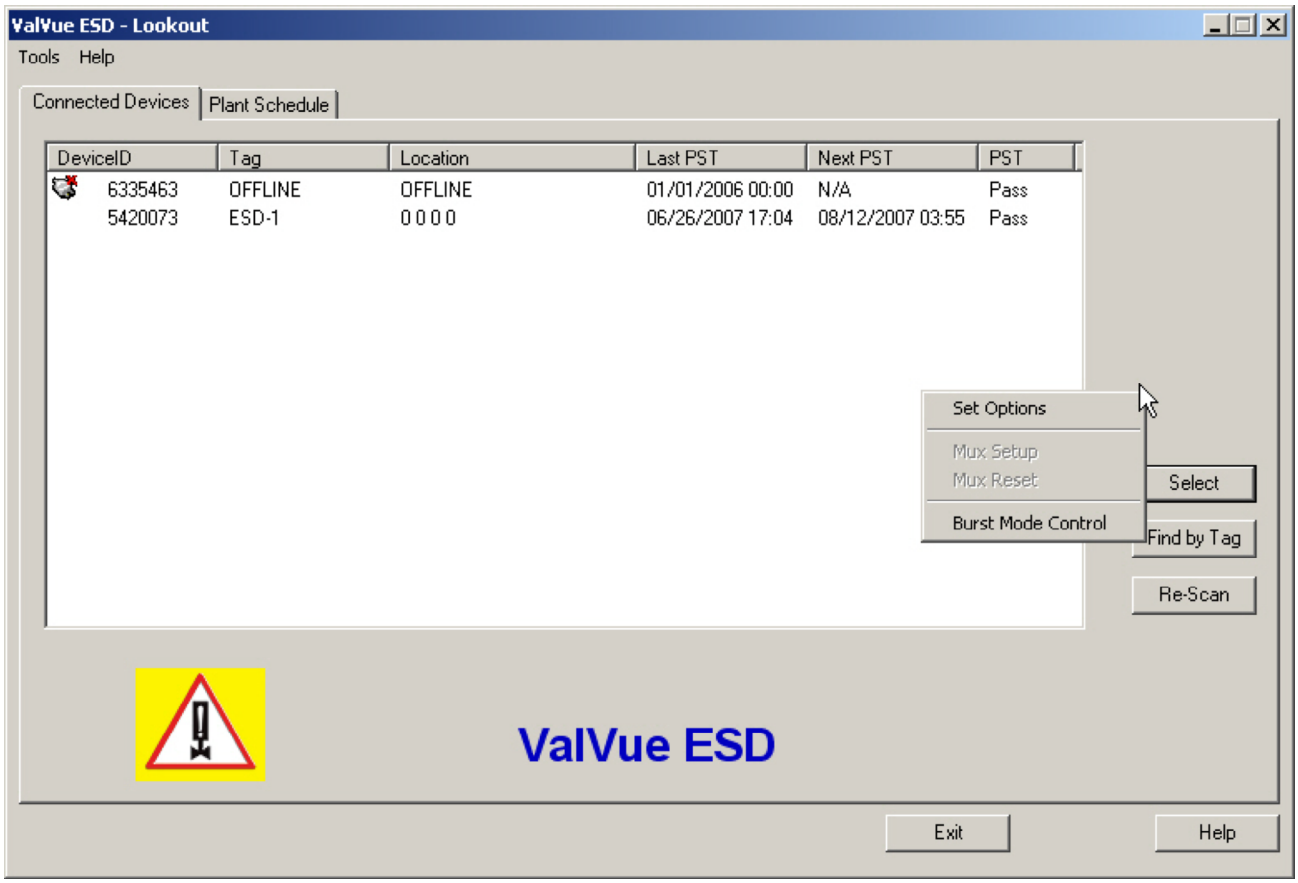


Figure 47 - Launching Set Options

Set Options Screen

Use the Set Options screen (*Figure 48*) to set communication parameters for the SVI II ESD.

The following options are available:

- *Interval Between Cycles* - time between patrolling cycles
- *Interval Between Devices* - time between each device within a cycle
- *Load Device List from Database on Startup* - allows loading of saved device addresses and information
- *Com Port* - select Communications Port
- *Hart Option* - enable/disable Multidrop feature

© 2024 Baker Hughes Company. All rights reserved.

- *Master Mode* - select Primary or Secondary Master
- *Use Multiplexor* - enable/disable Multiplexor feature
- *OK* - saves changes and opens the *Connected Devices* screen
- *Cancel* - cancels any changes you have made to the *Options* parameters and opens the *Connected Devices* screen

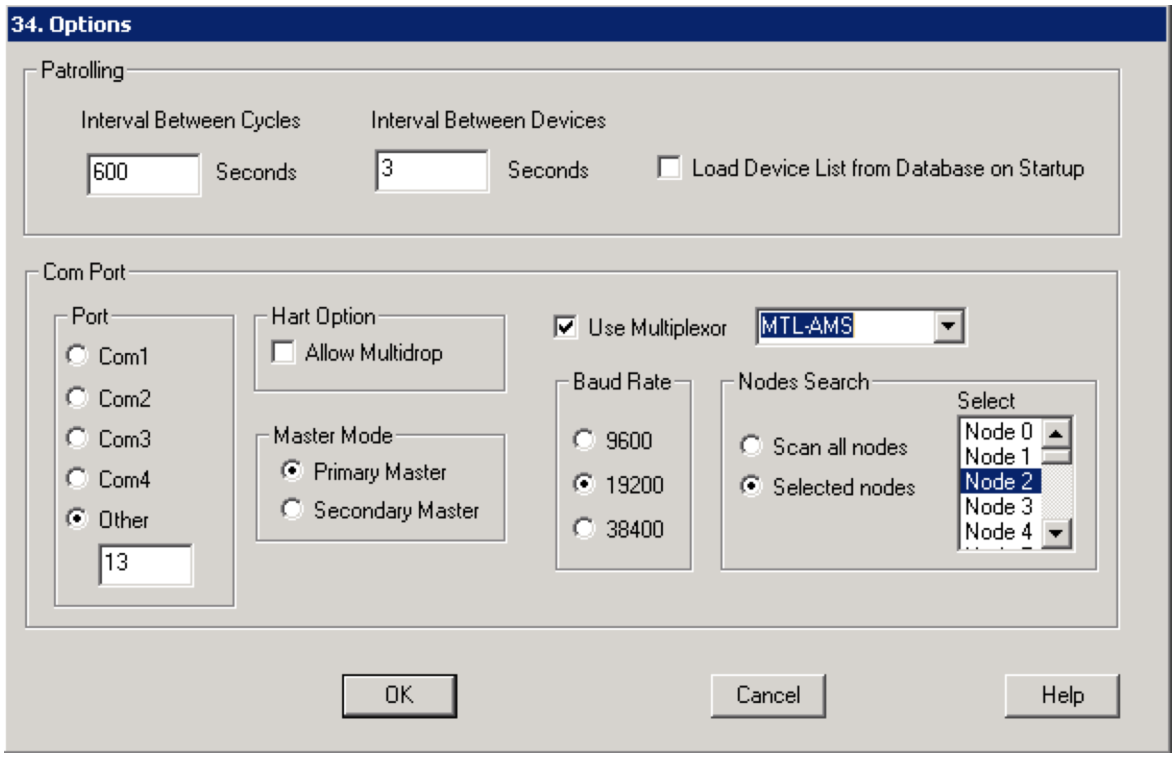


Figure 48 - ValVue ESD Set Options Screen

Interval Between Cycles

Patrolling is the time at which ValVue ESD searches for connected devices. ValVue ESD searches through all connected devices. Each time a search through all connected devices is executed is consid-ered a cycle. You can set the interval time between cycles; i.e. when one patrolling cycle has been completed how long ValVue ESD waits to start another patrolling cycle. To change the interval between patrolling cycles click in the field and change the number (in sec-onds).

Interval Between Devices

Patrolling is the time at which ValVue ESD searches for connected devices. ValVue ESD searches through all connected devices. Each time a search through all connected devices is executed is consid-ered a cycle. You can set the patrolling interval time between devices within a cycle; i.e. when one device has been recognized how long ValVue ESD waits to patrol for the next device. To change the patrollinga interval between devices click in the field and change the number (in seconds).

© 2024 Baker Hughes Company. All rights reserved.

Using a Device List File

The device list can be saved in a file to eliminate rescanning each time Connect is selected. This is useful only with multiplexors. Unless *Load Device List from Database on Startup* is selected as an option, the device addresses file used is temporary and is rescanned each time the program is restarted. If selected, you can select a file to save the device list. This file is read when the program is started and the list displayed. Select **New File** to change the file or create a new one.

Com Port Selection

Select the COM Port on your PC that is connected to the HART® modem. If you're not sure about the COM port the modem is con-nected to, go to the Windows Device Manager to locate the Com Port number assigned to the PC.

Multidrop

When more than one device is connected to a loop or if polling addresses other than *0* have been assigned to devices, select **Allow Multidrop**. ValVue ESD supports HART® devices, including SVI and SVI II, SVI II ESDs, and HDLTs with non-zero polling addresses and supports multiple SVI and SVI II and SVI II ESDs on the same loop for split ranging, for example. If the box is unchecked, ValVue ESD looks for devices only at polling address *0*. When in multidrop mode, even if a device is found at polling address *0*, ValVue ESD polls addresses up to 15.

Master Mode

ValVue ESD can send commands to a HART® device as a primary master or as a secondary master. HART® is a Master-Slave communication protocol, where the slave (field device) replies to commands sent by the master. The HART® protocol allows for a device to communicate simultaneously 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 inter-face) which is connected permanently with a slave, such as a control system. A Secondary Master is a host (or interface) connected temporarily to the slave (like 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 ESD program must be configured to match the configuration of the multiplexor. If the multiplexor is a primary master, ValVue ESD must also be configured to be a primary master.

© 2024 Baker Hughes Company. All rights reserved.

Mux Option

Use this option to set ESD for multiplexor operation. When checked then the *MUX Setup*, and *MUX Reset* controls appear on the *Con-nected Devices* page context (right click) menu. This checkbox also activates the multiplexor pulldown list, *Baud Rate* and *Nodes Search*. Multiplexor (by vendor) choices include:

- *MTL-AMS*
- *MTL-Cornerstone*
- *PF-2700F*
- *PF-2700G*

Note: Settings in the Options page for ValVue ESD must agree with the MUX configuration settings that are also shown. The Mux configuration can have originated in other applications.

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

- The MTL multiplexor supports baud rates of 9600, 19200, and 38400. You must set a baud rate that matches the configuration of the hardware.
- After the options are selected, select **OK** to accept the changes and exit to Connected Devices page or select **Cancel** to discard the changes.

© 2024 Baker Hughes Company. All rights reserved.

Multiplexor Setup and Operation

ValVue ESD supports the MTL HART® multiplexor allows you to monitor and operate many SVI II ESD PST controllers 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 an 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 manufacturer's documents.

Using the multiplexor capability of ValVue ESD and the MTL multiplexor, monitoring and communicating with many SVI's and other HART® devices is possible. After start-up and login to the ValVue ESD program, the *Connected Devices* screen appears and provides options to setup the multiplexor.

Use of the optional multiplexor ValVue ESD software requires an additional license and registration. Contact your local representative for licensing assistance. A 60 day trial of the multiplexor option is provided without licensing.

Selecting Mux Setup

To select the Mux Setup function:

1. Check **Use Multiplexor** and select the baud rate and node in the ValVue ESD Set Options (see *"Mux Option"* on page 55) return to the *Connected Devices* page.
2. Right-click on the **Connected Devices** page and select **Mux Setup** (*Figure 49*).

© 2024 Baker Hughes Company. All rights reserved.

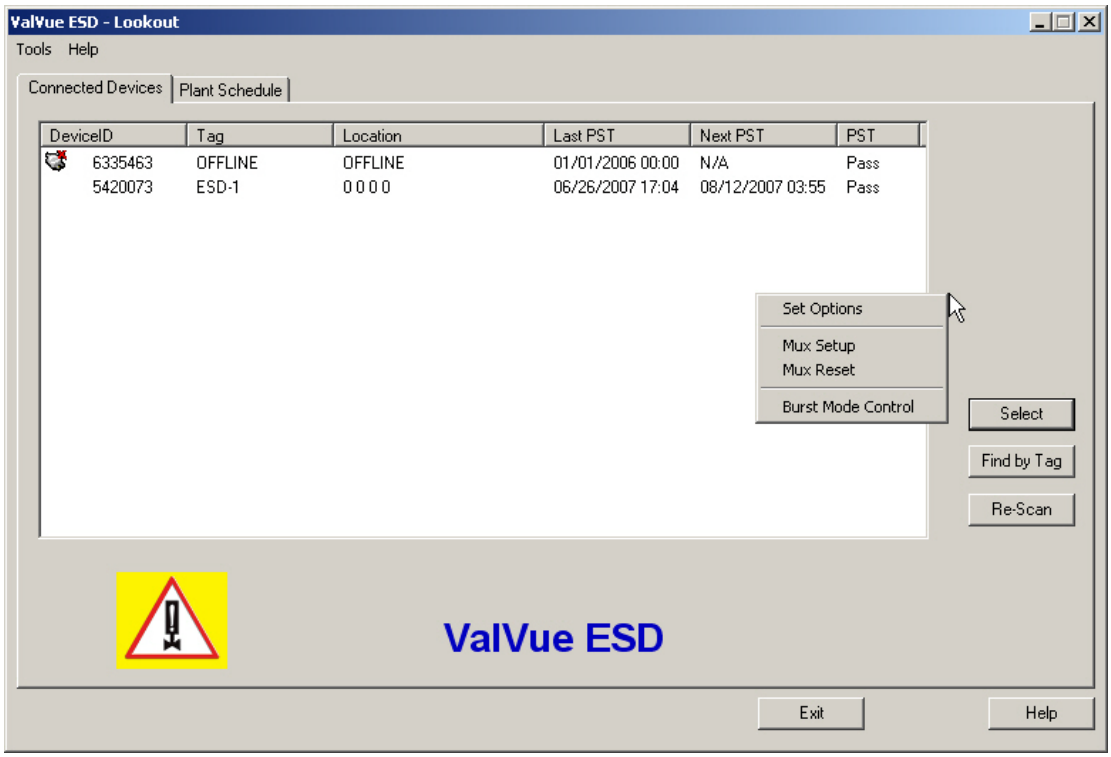


Figure 49 - Context Menu with Mux Functions

Figure 50 appears and prompts for the nodes to be configured.

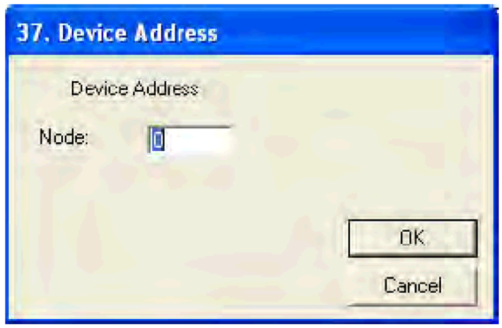


Figure 50 - Device Address

© 2024 Baker Hughes Company. All rights reserved.

3. Enter the *Node*, click **OK** and *Multiplexor Setup* window appears.

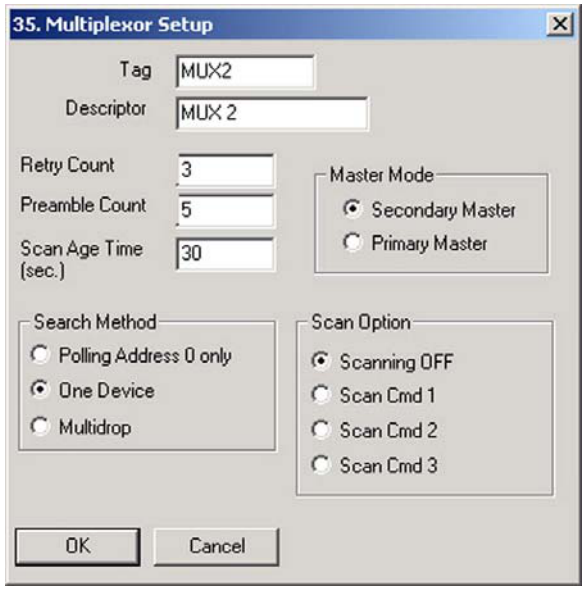


Figure 51 - Multiplexor Setup

© 2024 Baker Hughes Company. All rights reserved.

Configuring the Multiplexor

1. Select **MUX Setup** from the context menu to setup the nodes used on the MTL multiplexor. The *Connected Devices* page appears and prompts for the nodes to be configured.
2. Type a number between 1 and 31 for the desired node, e.g. 1 for node 1 and select **OK**. The node address must match the DIP switch setting on the MUX hardware. The *Multiplexor Setup* dialog appears (*Figure 51*).
3. Set the *Master Mode*: *Primary* or *Secondary Master*.

   Note: ValVue ESD must be configured to be the same type of master as the multiplexor. Use both the Options setup and Mux setup screens to check and compare the selection. Both can be primary or both can be secondary.

   The multidrop option substantially increases the time required to scan each node of the Mux.

Multiplexor Options Setup Dialog

Use this procedure to setup Multiplexor options.

1. Right-click in the *Connected Devices* page and select **Set Options**.
2. Check the **Use Multiplexor** box on the *Options* page.
3. Select which communication serial port the computer uses for the HART® communication channel. Once selected in the *Options* dialog, this selection overrides any selection on the command line that starts the program.
4. Select the baud rate to match that set with dip switches on the multiplexor hardware.

The device list is automatically saved to the device database. This file is read whenever the program is started and the saved device list appears. This is particularly useful for a multiplexor connected to many devices and saves the time required to re-scan.

Tag	This is a user-entered value of up to 7 characters, used to identify the MTL multiplexor node in the system. The tag appears in *Device List* box in *Connected Devices* page.
Descriptor	A description with up to 15 characters for the MTL multiplexor node.
Retry Count	The number of times the multiplexor retries sending a command to a HART® device before returning with an error. The valid range for this number is 0 to 5. The recommended number is ‘3’.

© 2024 Baker Hughes Company. All rights reserved.

Preamble Count	A device using the HART® protocol sends a short string of characters at the beginning of each communication to *wake up* the other device. This string is called a *preamble*. The number of preambles prefixed to each HART® command sent to a device varies from device to device. The valid range is 2 to 20. Recommended values for this parameter are 3 to 5 when using the Mux. ValVue ESD allows for a user-configured Mux preamble count.
Scan Age Time	The length of time in seconds that scan data remains valid. An error is returned when the scan data requested is older than the time when the data was last updated. This parameter set s this time for other applications that use the multiplexor. ValVue ESD does not sup-port the scanning feature.
Multiplexor Master Mode	ValVue ESD Options must be set to use the same mode as the multiplexor. Other applications that use the multiplexor or other HART® masters can require a special selection. See the multiplexor documentation for further information.
Search Method	When building a device list, the multiplexor can use one of three methods: • *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* - For each loop, polling address 0 is checked. If a device is found, no further search is performed on that loop. If no device is found at polling address 0, polling addresses 1 - 15 are searched and any devices found are added to the device list.

© 2024 Baker Hughes Company. All rights reserved.

Mux Reset

Select Mux Reset to issue a reset command to a node of the multiplexor. This function is enabled and used only in the multiplexor configuration of the program. 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 on the multiplexor 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 ESD 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 ESD to map devices.

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

Scan Option

The MTL multiplexor has the capability to continually scan the connected HART® devices to report the results. ValVue ESD does not use this feature, but the option is provided to configure the multiplexor as needed by other applications.

The multiplexor can be used to request information about HART® devices. 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. When it is reset, the multiplexor node re-scans all of the devices connected to the node (this hardware rescan is different from the re-scan done by ValVue ESD from the Re-scan popup menu function). 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. After the reset is finished, select Re-scan popup menu function to build a device list.

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. To find a device by its tag, select the Find by Tag button to open a text entry dialog. Enter a tag name to allow ValVue ESD 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.

Selecting the Re-scan popup menu function causes ValVue ESD to build a new device list. All nodes are checked. 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, you can optionally save the device list to a file so that rescanning is not necessary every time ValVue ESD is started.

© 2024 Baker Hughes Company. All rights reserved.

Troubleshooting ValVue ESD Used with Mux

Table 3 lists some of the problems, causes, and corrective actions you may encounter when setting up ValVue ESD used with a multiplexor (Mux).

Table 3 - Troubleshooting ValVue ESD Used with Mux

Problem	Cause	Corrective Action
No devices found	Both ValVue ESD and AMS are connected to the Mux	Connect ValVue ESD to the device with a modem. If the installation is fundamentally safe connect the input to the MTL 4046P Isolator. In a general purpose system, connect directly to the device wires.
	The Mux is configured for AMS communication	Reconfigure the Mux for Cornerstone communi-cations mode with MTL provided software.
Baud rate setting does not match setting	Mux	Use Set Options in ValVue ESD to match the set-ting in 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 converter 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 performed its last scan	Click the Reset Mux button to update or power off/on the Mux.
Devices all have the same tag name in Connected Devices	ValVue ESD and Mux are not configured as the same type of master	Set Mux and ValVue ESD so both are Primary Master or both are Secondary Master.

© 2024 Baker Hughes Company. All rights reserved.

Configuring Burst Mode

The Burst Mode is a mode where the HART® device continuously sends out data without being polled for such data, 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 will affect the communication bandwidth.

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

Table 4 - Burst Mode Data Return

Variable	Description	Units/Range
SVI II ESD (firmware 312)		
PV (Primary Variable)	Valve position	0-100%
SV (Secondary Variable)	Actuator Net Pressure	0-150 psig
TV (Tertiary Variable)	Not used (Future)	
QV (Quaternary Variable)	Not used (Future)	

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 to pop up a context menu.
3. Select the *Burst Mode Control* dialog.
4. Select the desired command.
5. Select **OK**.

Note: When burst mode is enabled, ValVue ESD DOES NOT allow the detailed device view to open communications to the device.

© 2024 Baker Hughes Company. All rights reserved.

Launching a Device

ValVue ESD opens the *Connected Devices* connection window (*Figure 52*), searches for connected devices and lists those devices. To stop the searching process, select **Stop**. 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.

The *Connected Devices* window is the interface tool for ValVue ESD and devices operating ESDVue. Once a connected device has been selected and launched, ESDVue initiates the selected device.

Note: ValVue ESD is the main interface for connected devices. Once a connected device is selected and launched the software tool for a device is called ESDVue.

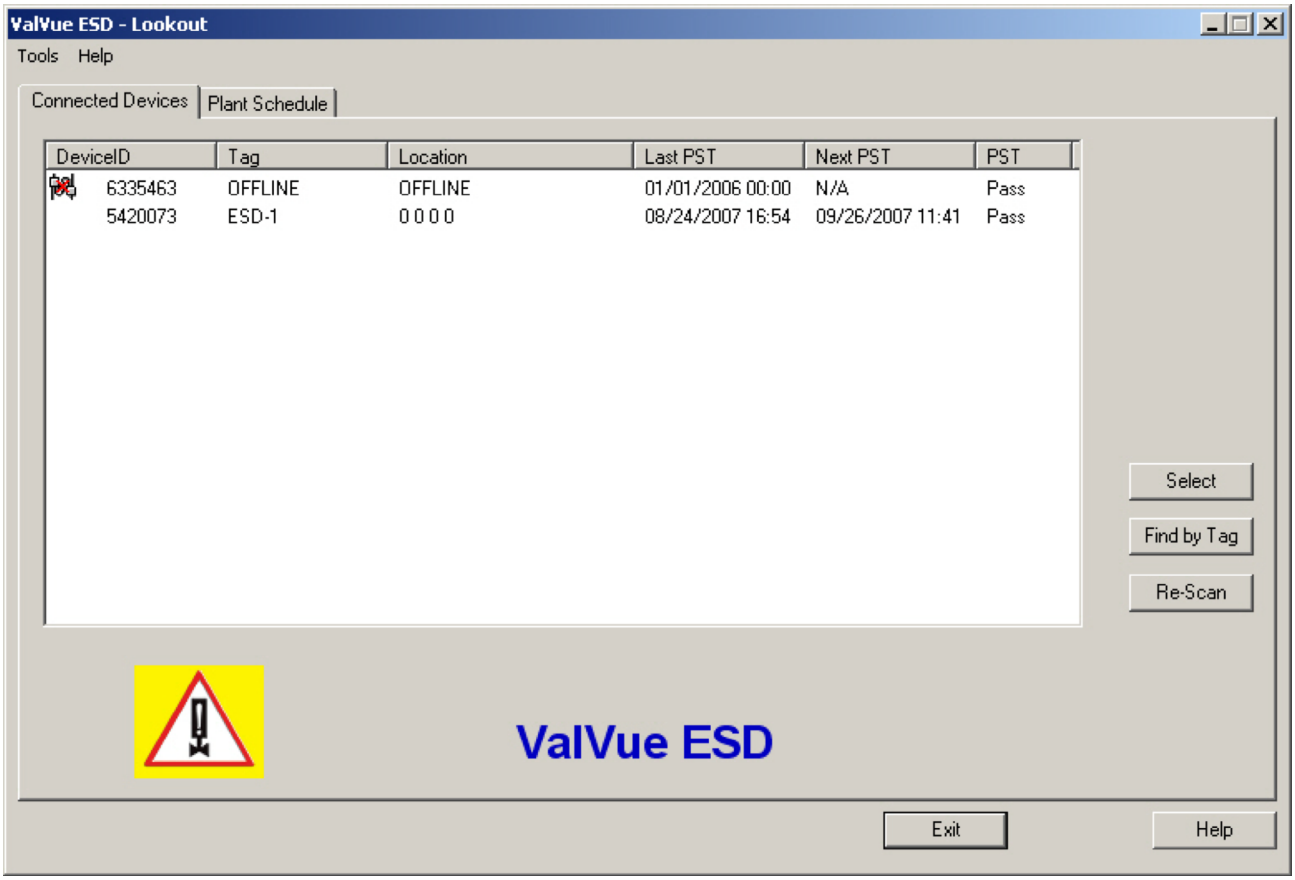


Figure 52 - Connected Devices

© 2024 Baker Hughes Company. All rights reserved.

Offline Mode

There is on offline mode available in ValVue ESD to work with a disconnected Masoneilan HART® devices.

The offline options serve two purposes:

- Viewing configuration, calibration and diagnostic data, for SVI II ESD using a dump file (.dp3).
- Learning the features and functions of both SVI II ESD and ValVue ESD when they are not connected to an actual device.

When *SVI II ESD Offline* is selected, you are prompted to select a dump file with a dp3 extension that contains configuration and calibration data used for running the SVI II ESD.

© 2024 Baker Hughes Company. All rights reserved.

Selecting an Offline Device

After the initial device scan executed when you launch ValVue ESD, the *Connected Devices* screen automatically appears and shows any devices found connected during the scan. Notice in *Figure 53* that the offline device was found.

To select and activate the device:

1. Either:

   • Click on the device name to highlight and then click on **Select** (*Figure 53*).

   or

   • Double-click on the device name

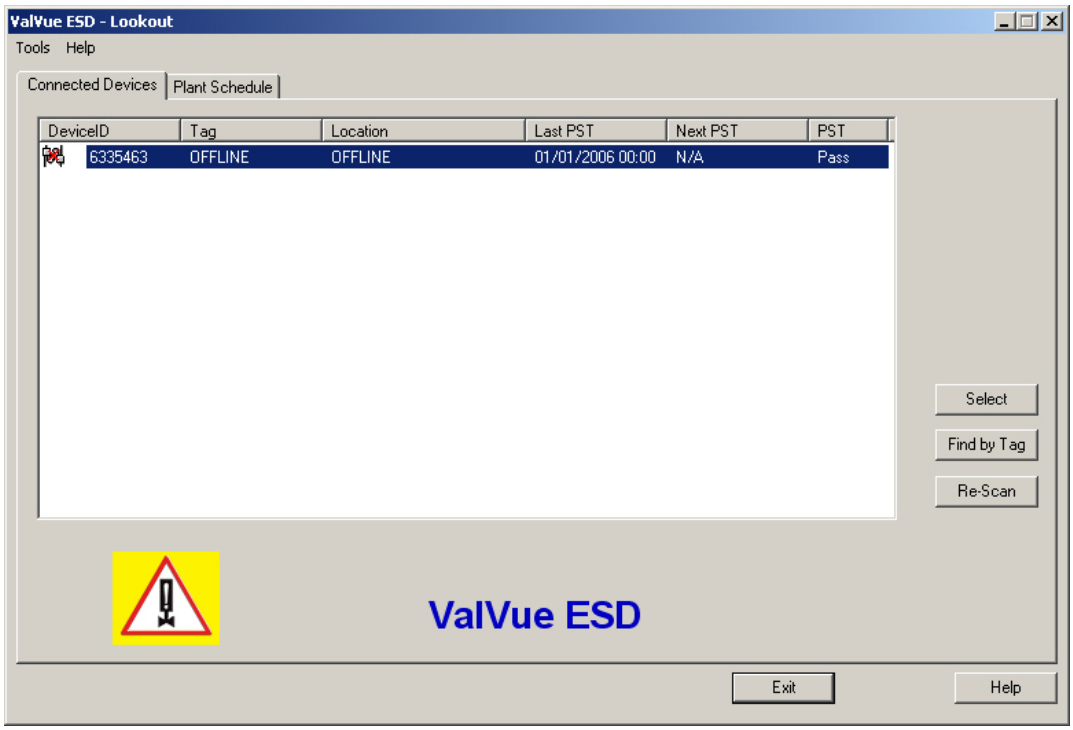


Figure 53 - Selecting an Offline Device

OR

• Right-click on the device name and select **Launching ESDVue** (*Figure 54*).

© 2024 Baker Hughes Company. All rights reserved.

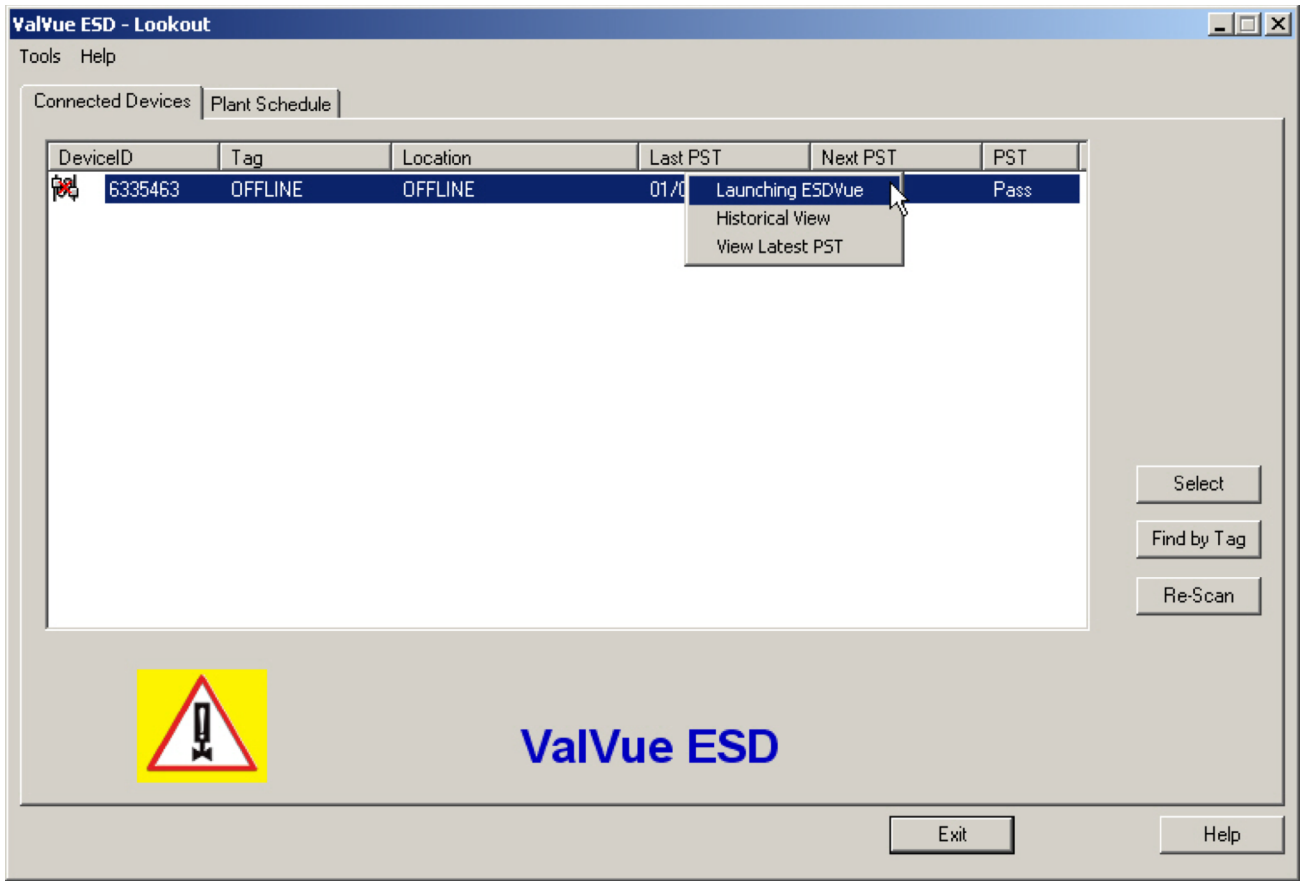


Figure 54 - Right Clicking Offline Device

A file *Open* window appears (*Figure 55*).

2. Select a dump file as a simulated device. The dump files are installed with ValVue ESD in the same location as the program file: e.g. *C:\Program Files\DFC\ValVue ESD/Data*. The default location for SVI II ESD file *Open* window is shown in *Figure 55*.

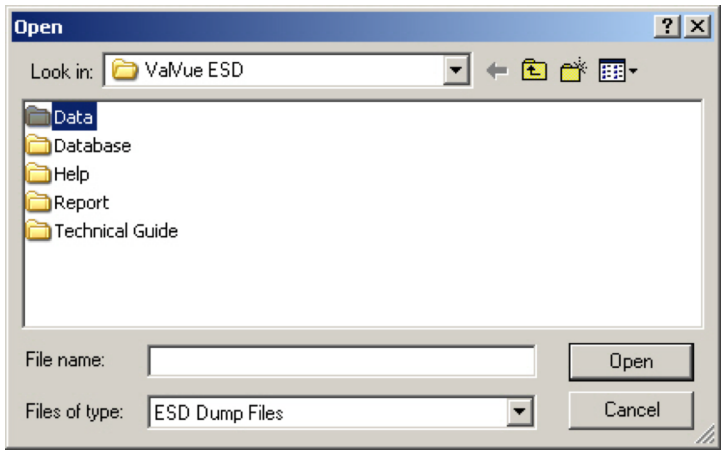


Figure 55 - File Open Window Launched at ValVue ESD

© 2024 Baker Hughes Company. All rights reserved.

3. Locate the *Data* folder in the *ValVue ESD* folder.
4. Locate the .dp3 in the *Data* folder (*Figure 56*) and click **Open**.

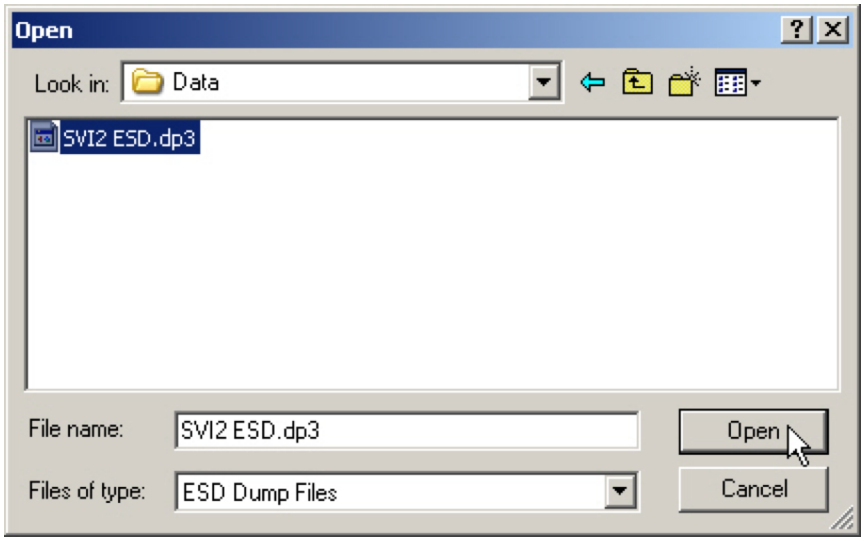


Figure 56 - Offline dp3 Data File Default Location

The *Monitor* screen of the offline device appears (*Figure 57*).

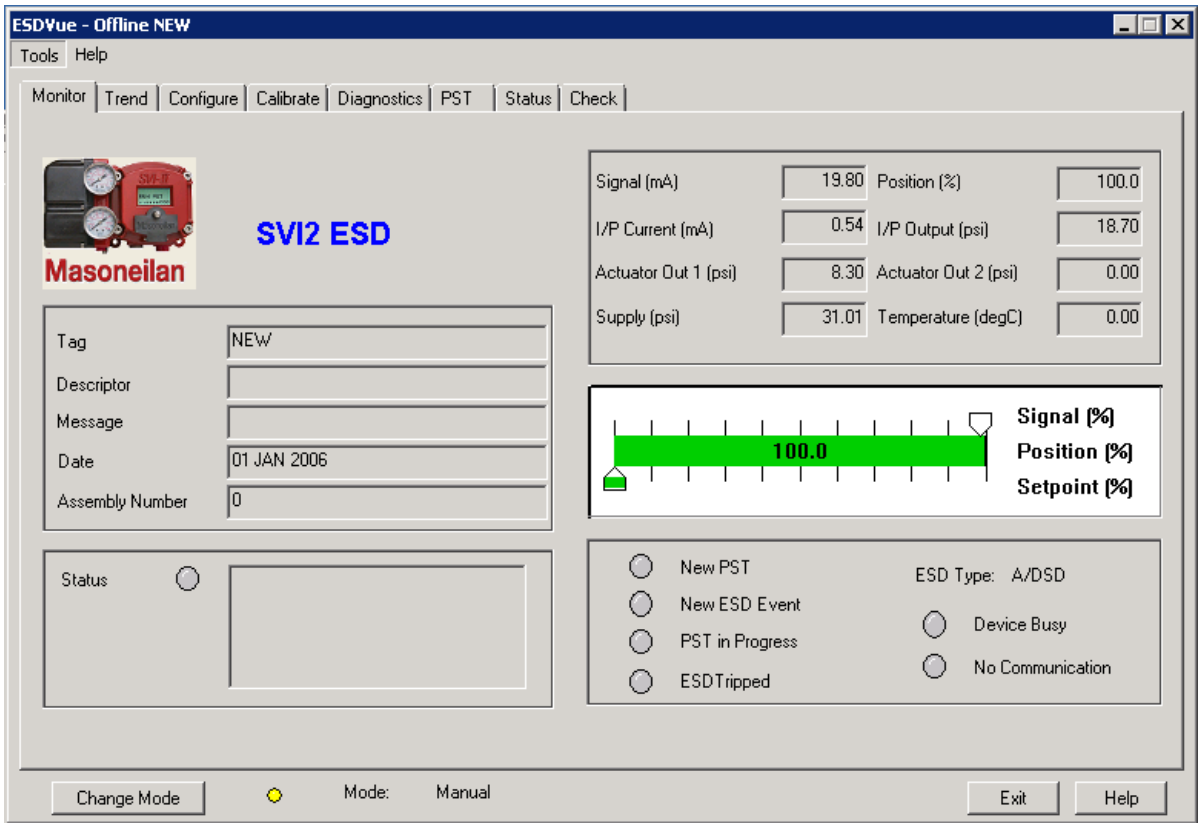


Figure 57 - Offline Device Displayed at Monitor Screen

© 2024 Baker Hughes Company. All rights reserved.

Selecting a Connected Device

After you have successfully logged into ValVue ESD the software automatically scans the SIS (Safety Integrated System) for any devices that are connected to the system. The connected devices that are found during the scan appear as shown in *Figure 58*.

To activate a connected device:

1. Click on the name of the device for activation (*Figure 58*).
2. Click **Select**.
   ValVue ESD launches the selected device and the *Monitor* screen appears.

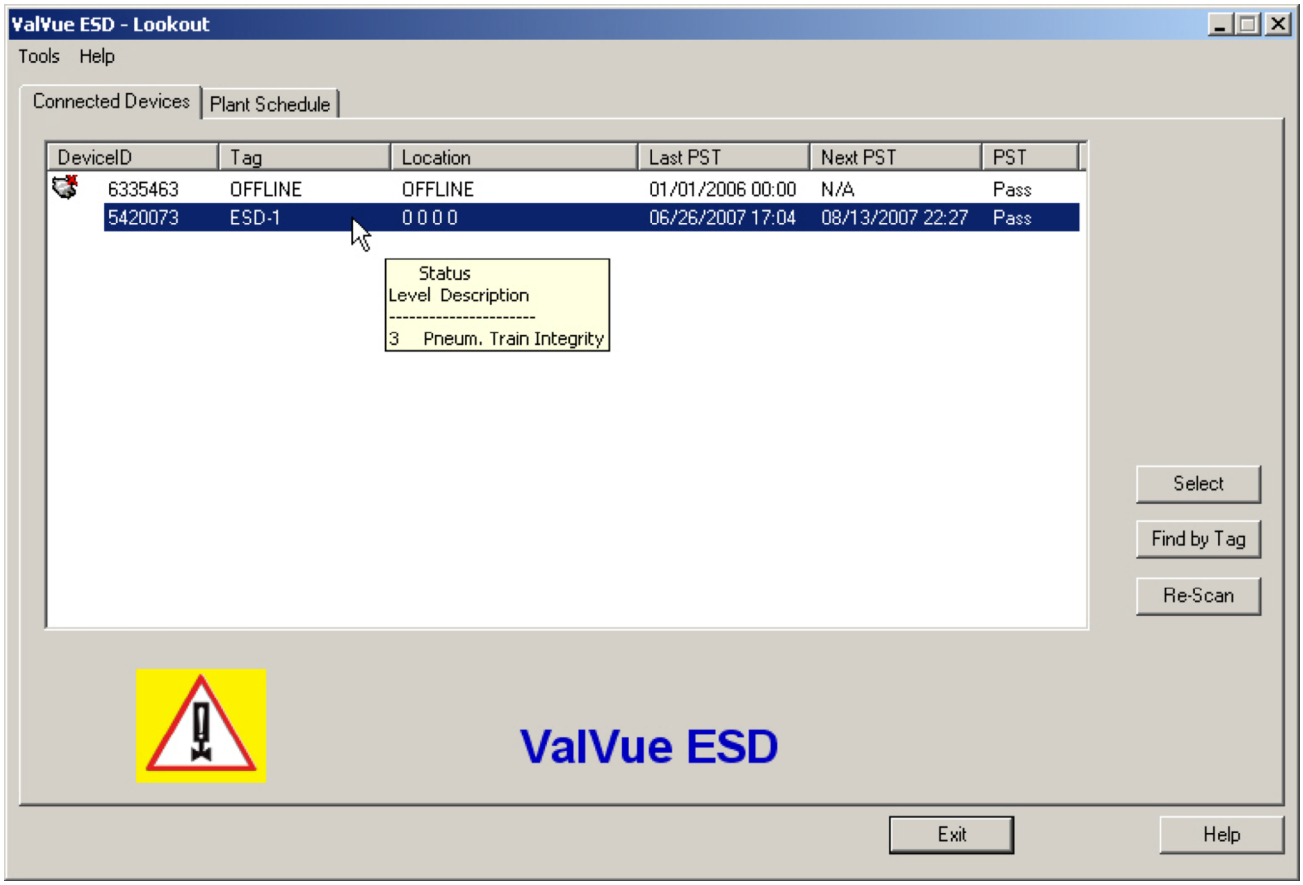


Figure 58 - Selecting a Connected Device

© 2024 Baker Hughes Company. All rights reserved.

Device Information

When you start ValVue ESD the software scans all the devices connected to the controlling computer. As ValVue ESD executes scanning the software also checks the status of each connected device. The status information is shown when you click on the name of a device and appears in a tool tip format (*Figure 59*).

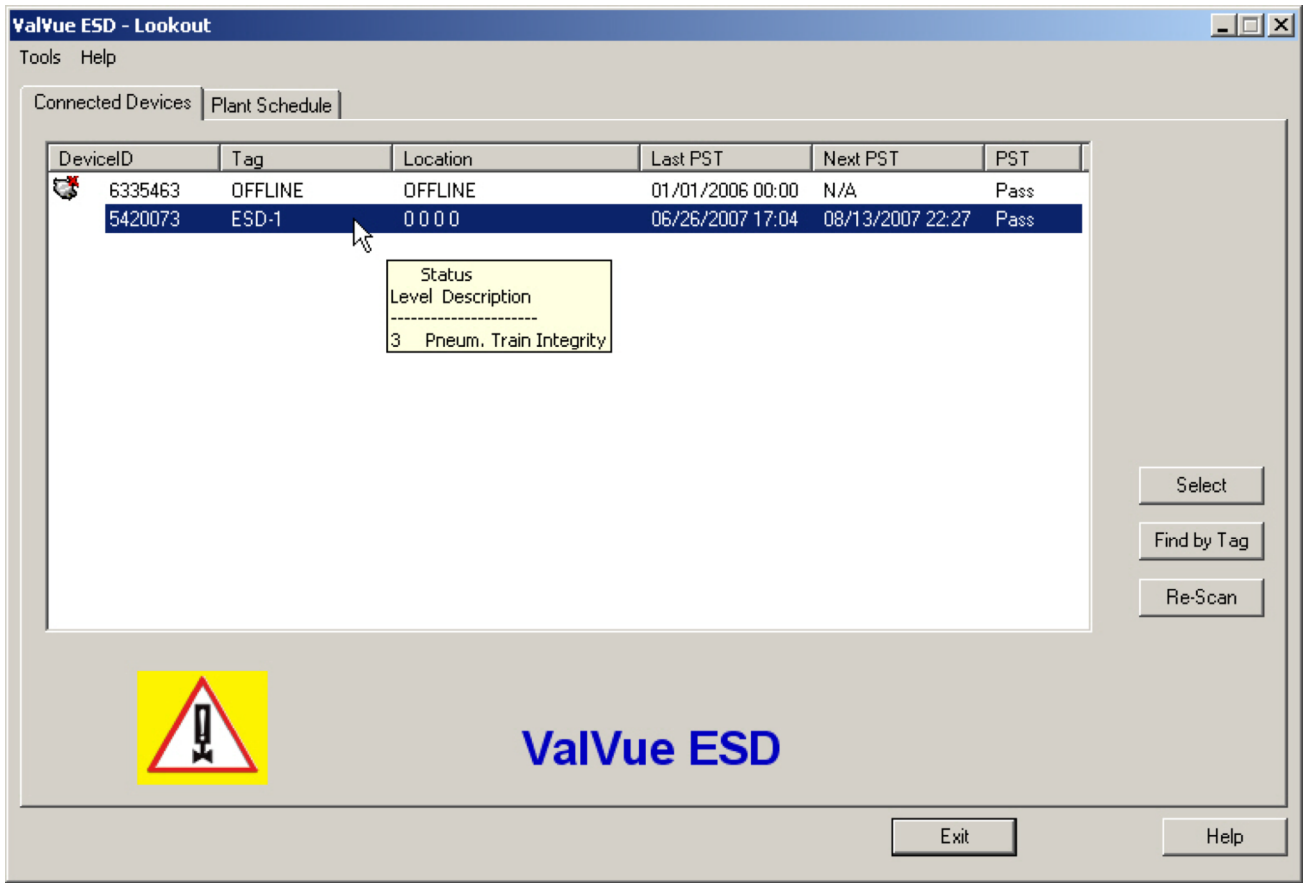


Figure 59 - Device Information Displayed

Find by Tag

To find a device by its tag name:

1. Select **Find by Tag** to open a text box.
2. Enter a tag name.
3. Select **OK**.

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

© 2024 Baker Hughes Company. All rights reserved.

Re-Scan

To build a new device list:

1. Select **Re-Scan** on the *Connected Devices* screen. In the:
   - Direct-connect configuration of ValVue ESD all polling addresses are checked if the options allow multidrop.
   - Multiplexor configuration, all nodes are checked. If there are a large number of devices connected to the multiplexor, this function takes time to complete.

   The rescan is completes.
2. Save the device list to a file so that rescanning is not necessary every time ValVue ESD is started. If there is only one device on the loop, select **Stop** when it has been found to save scan time.

© 2024 Baker Hughes Company. All rights reserved.

Right Clicking on Device Name

When you right-click on a connected device name on the main *ValVue ESD* screen (*Figure 60*), you can perform several functions particular to the selected device:

- *Launching ESDVue* - launches ValVue ESD
- *Historical View* - launches a historical performance view of the selected device
- *View Latest PST* - launches the graph representing the most recent PST (Partial Stroke Testing) of the selected device

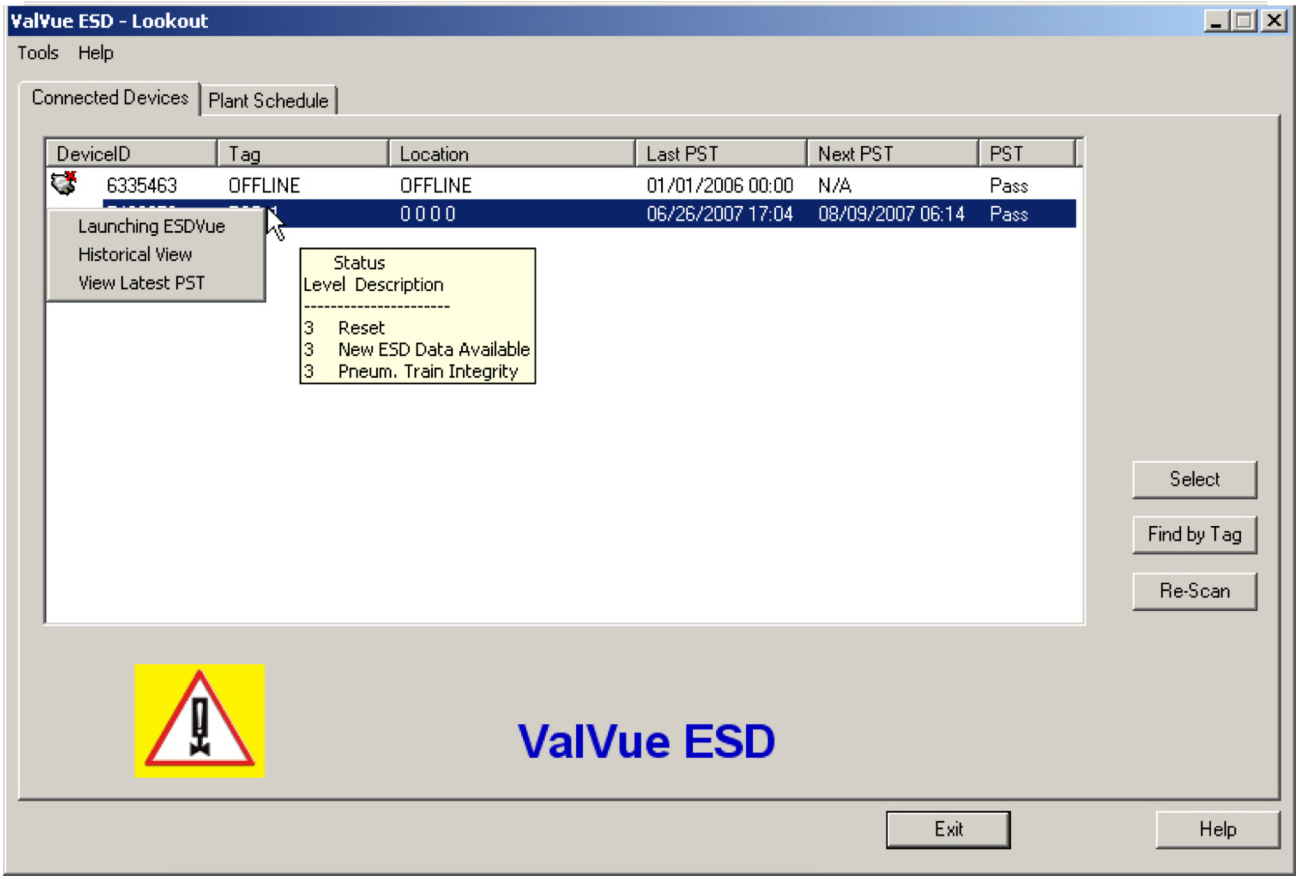


Figure 60 - Right Clicking on Connected Device

Launching ValVue ESD

There are three ways to launch ValVue ESD:

- Right-click on the device name (in the list of connected devices) from the main *ValVue ESD* screen.
- Select the device on the *ValVue ESD* main screen and then click **Select** at the bottom right of the screen.
- Double-click the device name on the main screen.

© 2024 Baker Hughes Company. All rights reserved.

Launching Historical View

To launch this:

1. Right-click the device name in the *Connected Devices* tab.
2. Select **Historical View** and the *PST Historical View* window appears (*Figure 61*).
3. Select the **Device ID** from the drop down list.
4. Select the **Start** and **End Dates** for the PST data to view.

Changing the Historical View Start and End Dates

The *Historical View* start and end date field is set up as mm/dd/yyyy. There are two methods for changing the PST schedule date field. You can click on each parameter of the date field; i.e. mm, or dd, or yyyy, and change each individual parameter or you access the calendar in the drop down of the date field.

To change the start date schedule for the next PST:

1. Click in each parameter (mm-dd-yy-hh-mm) of the date field and highlight the text.
2. Either:
   - Type over the old value with the new value for each parameter.

OR

   a. Click in the drop down, located at the right of PST schedule date field and access the date calendar (*Figure 61*).
   b. Using the arrow key on the calendar, change the month, if necessary and drag the mouse and select the correct date within the month by clicking on it.

© 2024 Baker Hughes Company. All rights reserved.

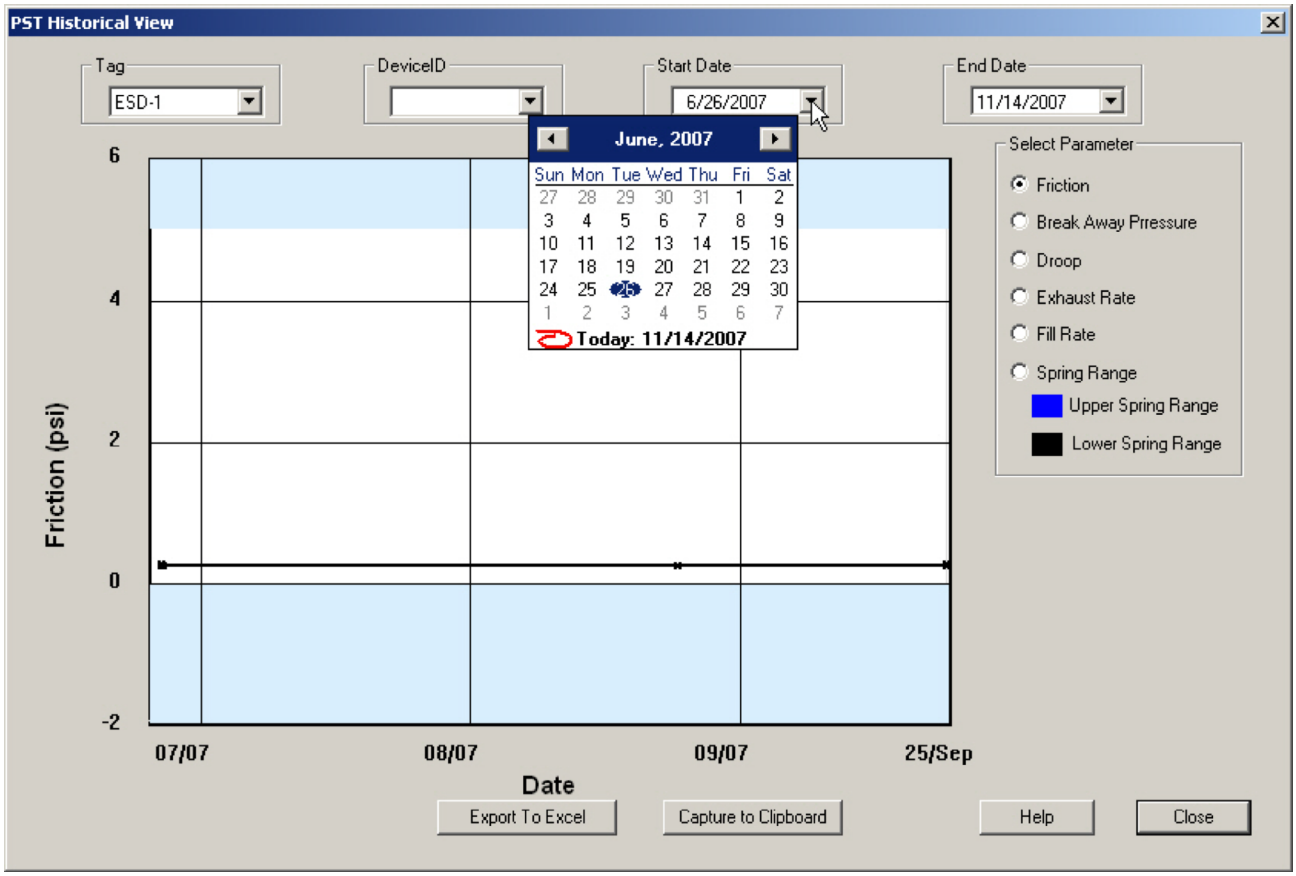


Figure 61 - Selecting the Historical View Start Date

3. Select the **End Date** in the same manner as the **Start Date**.
   ValVue ESD displays the historical PST data for the selected date range.
4. Select the parameter to view by clicking on the radio button to the left of the parameter name.

© 2024 Baker Hughes Company. All rights reserved.

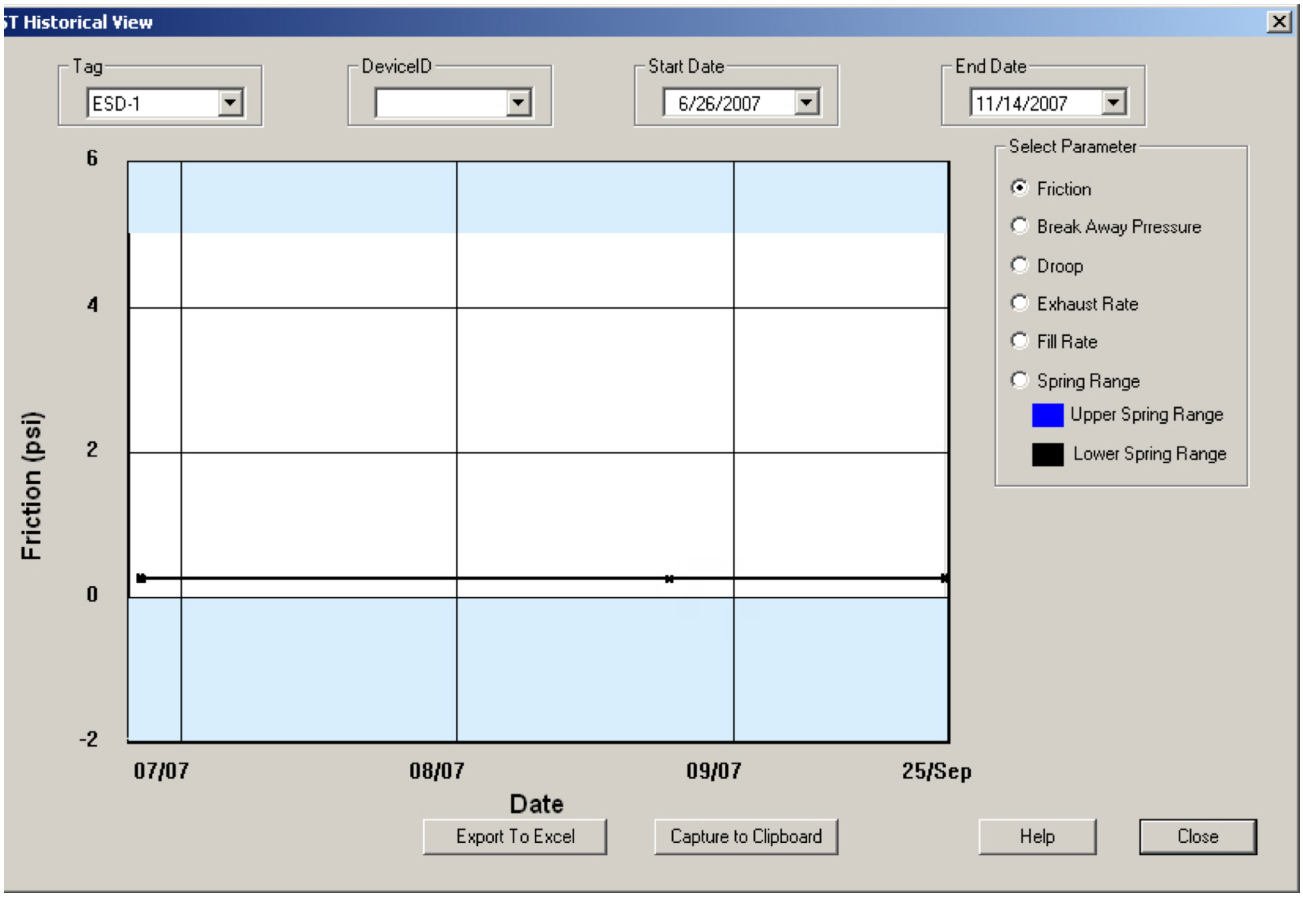


Figure 62 - PST Historical View - Friction Displayed

View latest PST

To view the latest PST:

1. Right-click the device name in the *Connected Devices* tab
2. Select **View Latest PST**. ValVue ESD launches the latest *PST Diagnostic* graph. For information on the Diagnostic Graph features, see **PST Diagnostic Graph**.

   Click **Close** and the latest *PST Diagnostic Graph* closes and the *Connected Devices* tab appears.

© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

© 2024 Baker Hughes Company. All rights reserved.

3. How Do I?

Getting Started Tasks

- *"Editing Plant Schedule"* on page 46
- *"Multiplexor Setup and Operation"* on page 56
- *"Launching a Device"* on page 64
- *"Configuring ValVue ESD Options"* on page 52
- *"Selecting a Connected Device"* on page 69
- *"Setup Wizard"* on page 138

How Do I?

- *"Change Mode"* on page 81
- *"Status on the Monitor Screen"* on page 96
- *"View All Parameters"* on page 108
- *"Fault Settings"* on page 123
- *"Configure I/O"* on page 129
- *"Find Stops"* on page 156
- *"Auto Tune"* on page 161
- *"Step Diagnostics"* on page 190
- *"Load Data"* on page 227
- *"PST Configuration"* on page 246 "
- *"Perform Pneumatic Self Test"* on page 267
- *"Clear All Faults"* on page 298
- *"Send Command"* on page 333
- *"Changing the Setpoint"* on page 94
- *"Reports"* on page 101
- *"Trend Graph Features"* on page 118
- *"PST Allow Options"* on page 126
- *"Setup Wizard"* on page 138
- *"Advanced Parameters"* on page 159
- *"Manual Find Stops"* on page 184
- *"Extended Signature Diagnostics"* on page 209
- *"PST Schedule"* on page 242
- *"PST Diagnostics"* on page 251
- *"Clear Current Faults"* on page 296
- *"Set Fail High/Low"* on page 302

© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

© 2024 Baker Hughes Company. All rights reserved.

4. ESDVue's Work Environment

Overview

After you have selected the connected device ValVue ESD launches and the device appears in the first *ESDVue Monitor* screen (*Figure 63*). ESDVue is a series of tabs, with each tab named according to their function.

Note: ValVue ESD is the main interface for connected devices. Once a connected device is selected and launched the software tool for a device is called ESDVue.

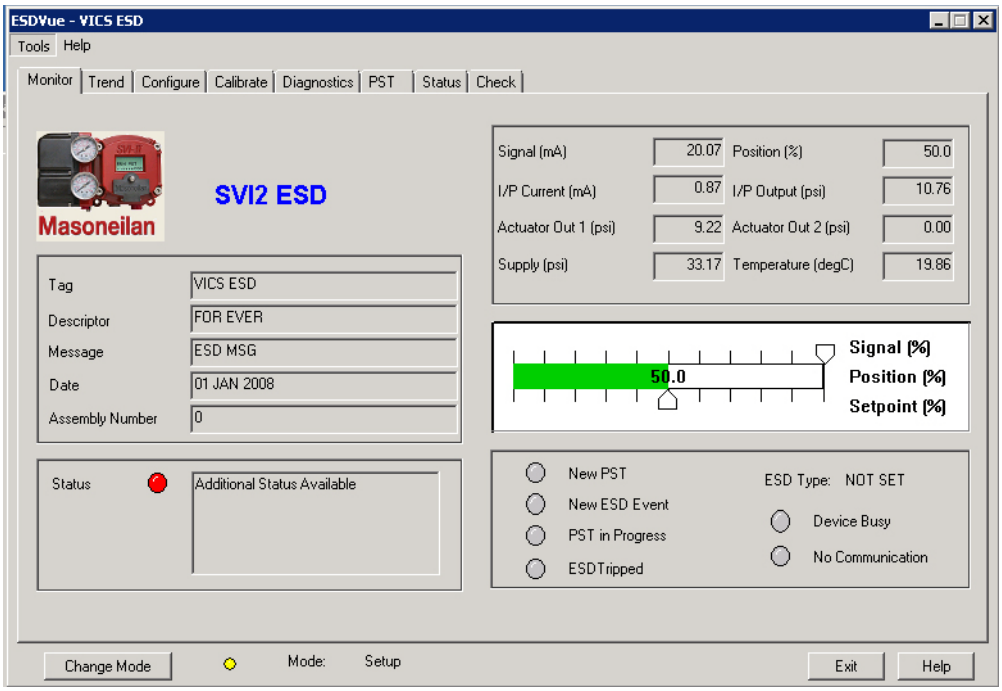


Figure 63 - ESDVue Environment

© 2024 Baker Hughes Company. All rights reserved.

Working in ESDVue

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

Toolbar

The toolbar at the top of every *ESDVue* screen has two menu items: *Tools* and *Help*.

Modes of Operation

The SVI II ESD has three modes of operation:

- *"Normal Operation"*
- *"Manual Operation"*
- *"Setup"*

Normal Operation

In Normal mode, the SVI II ESD responds to the input signal and positions the ESD valve accordingly.

In configurations where the safety function is triggered by current, when the input signal current:

- Falls below 5.6mA, the SVI II ESD de-energizes the ESD valve.
- Rises above 14mA, the SVI II ESD energizes the ESD valve.

In configurations where the safety function is triggered by a discrete 0 - 24 VDC signal, when the input signal voltage falls:

- Falls below 3V, the SVI II ESD de-energizes the ESD valve.
- Rises above 18V, the SVI II ESD energizes the ESD valve.

Manual Operation

In Manual 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 using the HART® or pushbutton interface. However, the Shutdown function is activated if the signal is less than 5.6 mA (ASD) or 3 VDC (A/DSD and DSD).

Setup

In the Setup mode, you can set calibration and configuration parameters. Additionally, you can run response time tests, step response tests, and valve signatures.

© 2024 Baker Hughes Company. All rights reserved.

Device Trip

Note: If the device is tripped, in Normal, Manual and Setup modes the setpoint and the control mode are not affected by a device trip, and as soon as the trip condition is removed (which includes Latch if configured) the valve goes back to the state prior to the trip.

However, if a process was running at the onset of the trip condition, the valve may also go to where it was before the process started, or stay at the de-energized stop. This is not true for Normal mode.

In failsafe and low power the valve must stay at the de-energized stop.

Note The positioner LCD may indicate Failsafe when an alarm condition exists. Use the pushbuttons to view and clear alarms. See "Accessing Diagnostic Information" in the Masoneilan SVI II ESD Smart Valve Interface with SIL3 Emergency Shutdown PST Controller Installation and Maintenance Manual.

Change Mode

Use the *Change Mode* button on all *ESDVue* screens to change the operating SVI II ESD mode.

When selected, you can change the SVI II ESD mode to any of three operating modes:

- *Normal* - In this mode the SVI II ESD 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* screen).
- *Setup* - In this mode you can set calibration and configuration parameters. Additionally, you can run response time tests, step response tests, and PST controller signatures (indicator yellow).

Whenever you leave the Normal mode, a warning appears (*Figure 64*).

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

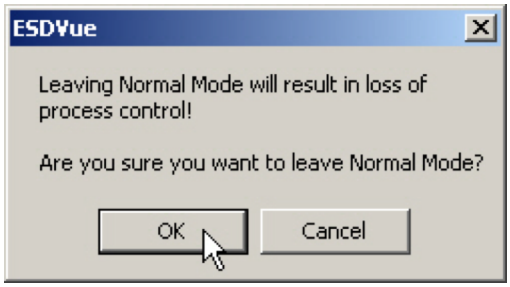


Figure 64 - Leaving Normal Mode Warning

© 2024 Baker Hughes Company. All rights reserved.

Whenever you return to Normal mode, a warning appears (*Figure 65*).

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

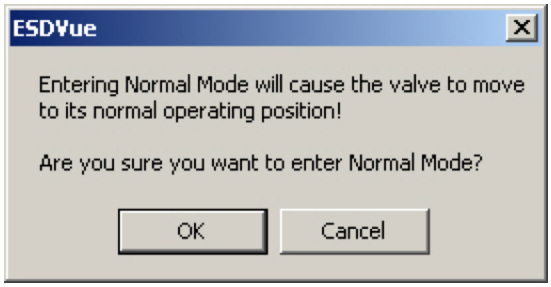


Figure 65 - Entering Normal Mode Warning

Exit

Clicking **Exit** quits the program.

ESDVue Help

Help is readily available from anywhere within ESDVue, including:

- Main Help menu – available by clicking **Help**, 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 **Help** at the top of the 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 ESD
- *About* – displays information about ESDVue

© 2024 Baker Hughes Company. All rights reserved.

ESDVue Screens

Monitor Screen

From the *Monitor* screen (*Figure 66*), you can view the basic functions of the SVI II ESD including tag and identification, input signal, setpoint, position, and status. You can also change the SVI II ESD mode of operation and perform setup and command functions.

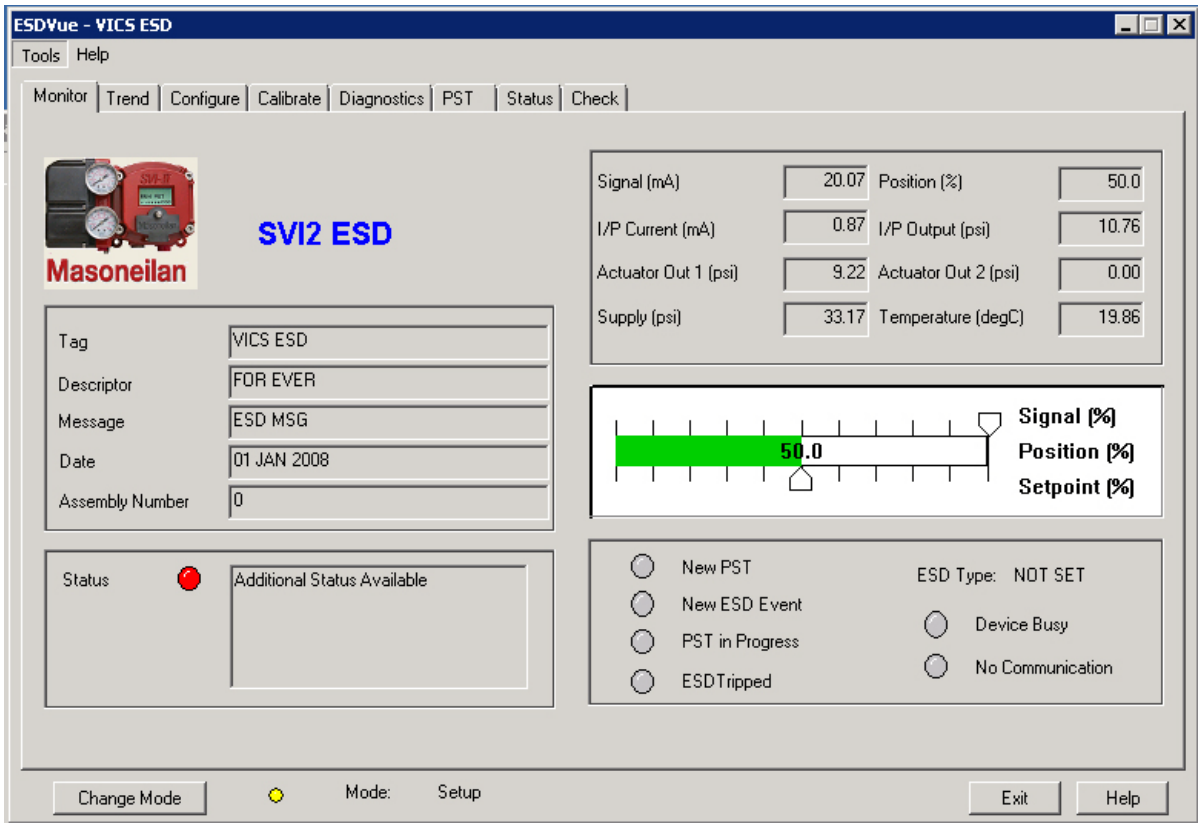


Figure 66 - Monitor Screen

© 2024 Baker Hughes Company. All rights reserved.

Trend Screen

From the *Trend* screen (*Figure 67*) you can observe the performance of the valve in real time

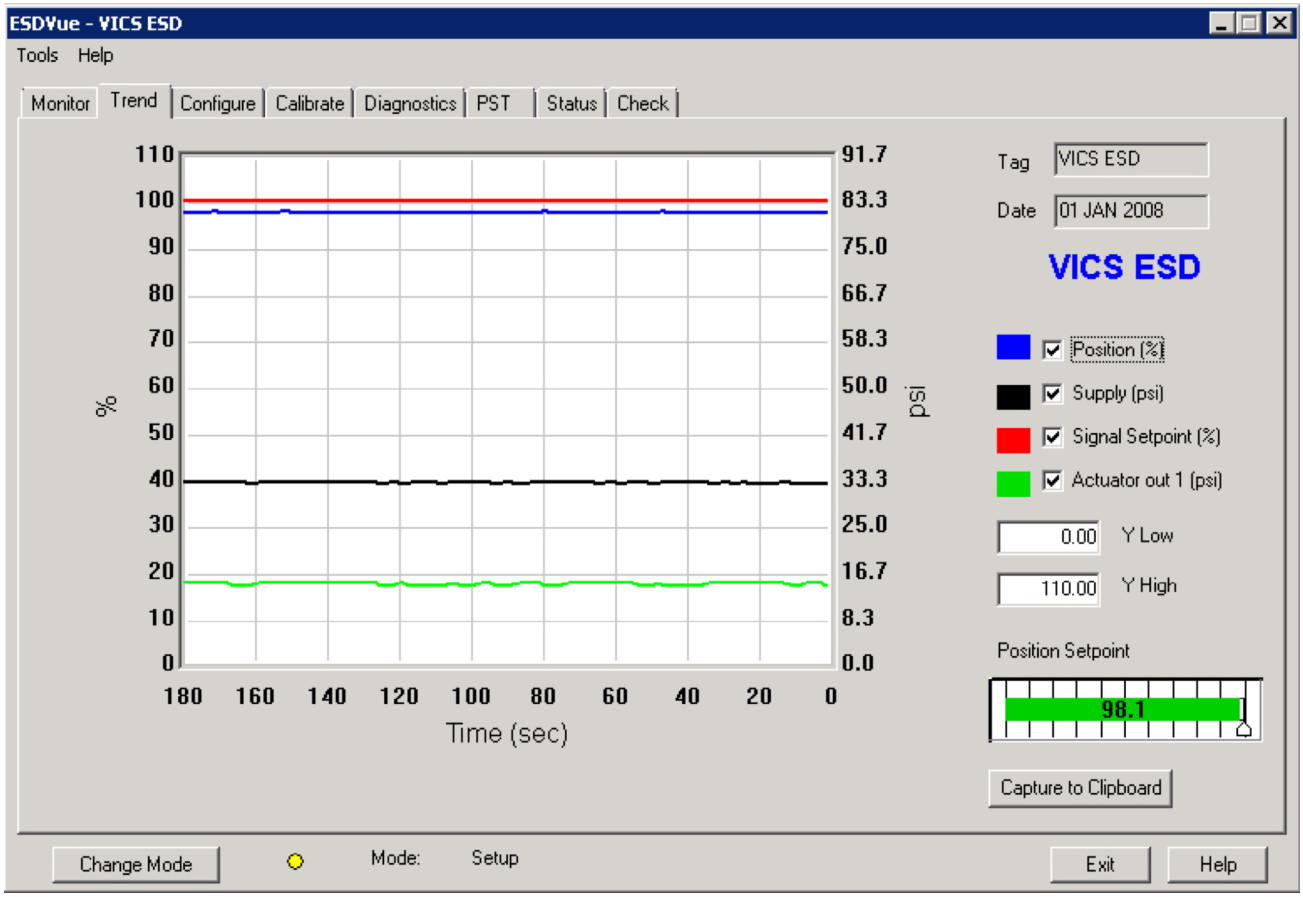


Figure 67 - Trend Screen

© 2024 Baker Hughes Company. All rights reserved.

Configure Screen

The *Configure* screen (*Figure 68*) displays the current configuration parameters and provides the ability to change them.

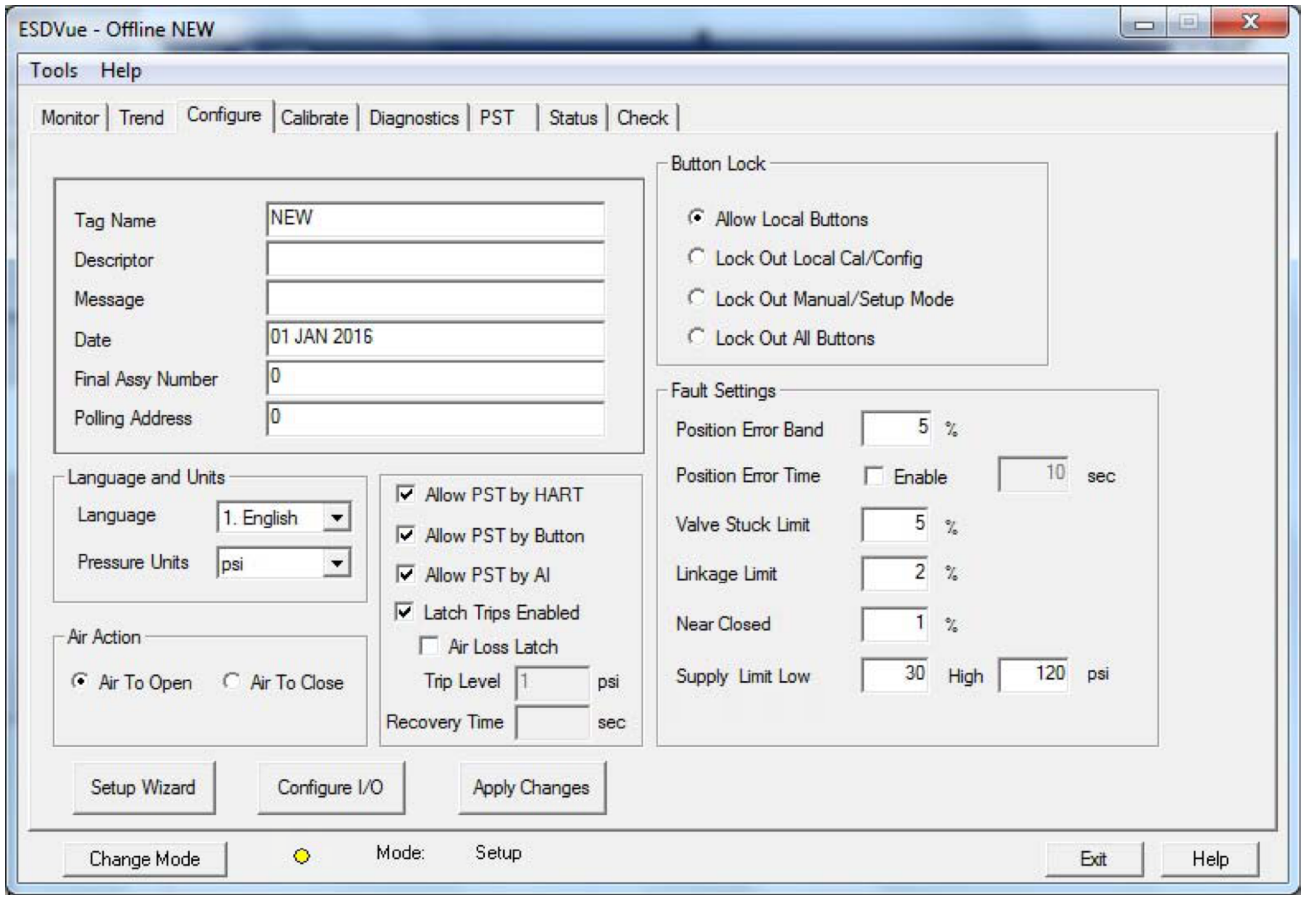


Figure 68 - Configure Screen

© 2024 Baker Hughes Company. All rights reserved.

Calibrate Screen

The *Calibrate* screen (*Figure 69*) displays the current PST controller's calibration parameters and provides the ability to adjust them in the *Setup* mode.

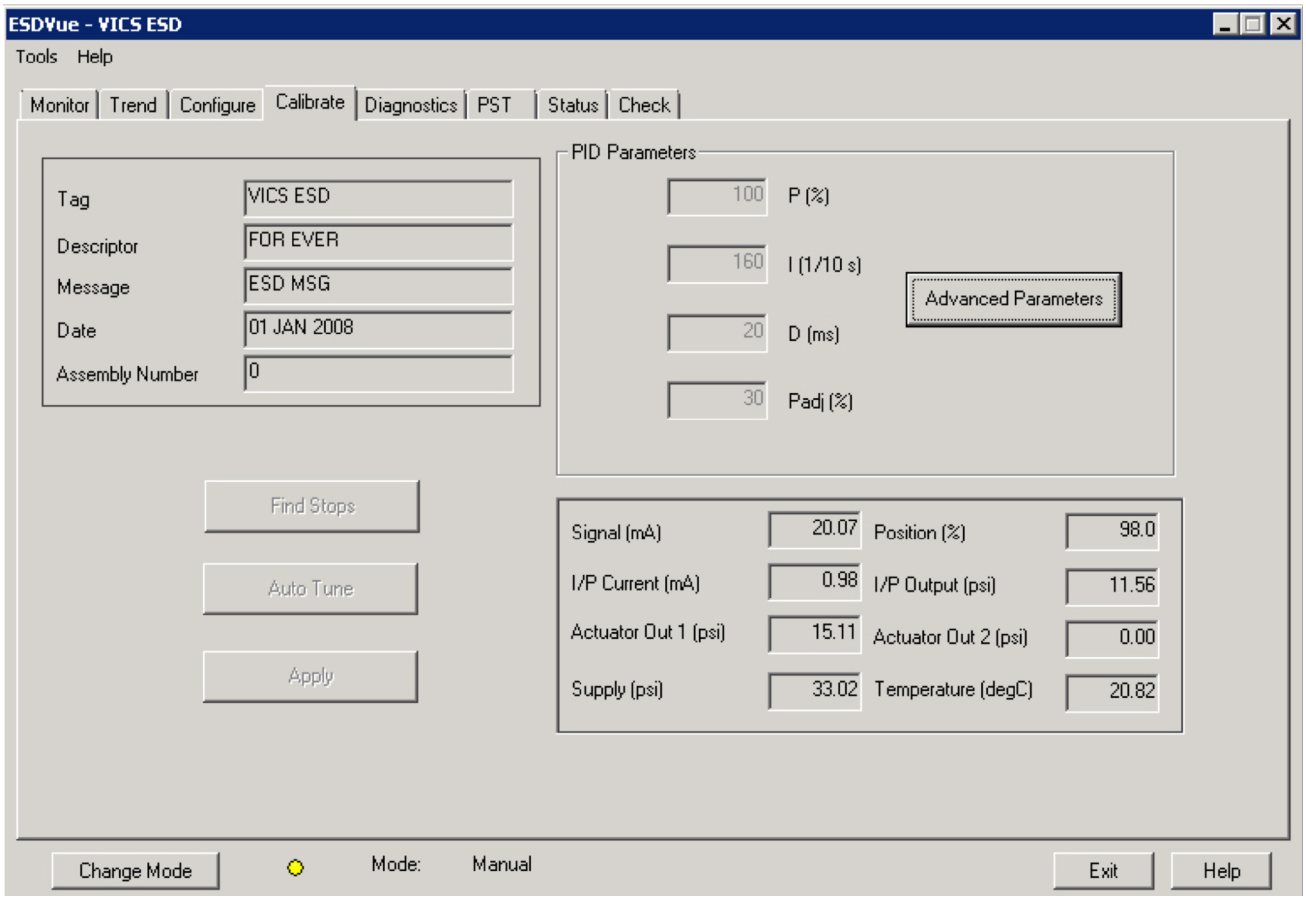


Figure 69 - Calibrate Screen

© 2024 Baker Hughes Company. All rights reserved.

Diagnostics Screen

The *Diagnostics* screen (*Figure 70*) provides the ability to functionally test operation of SVI II ESD.

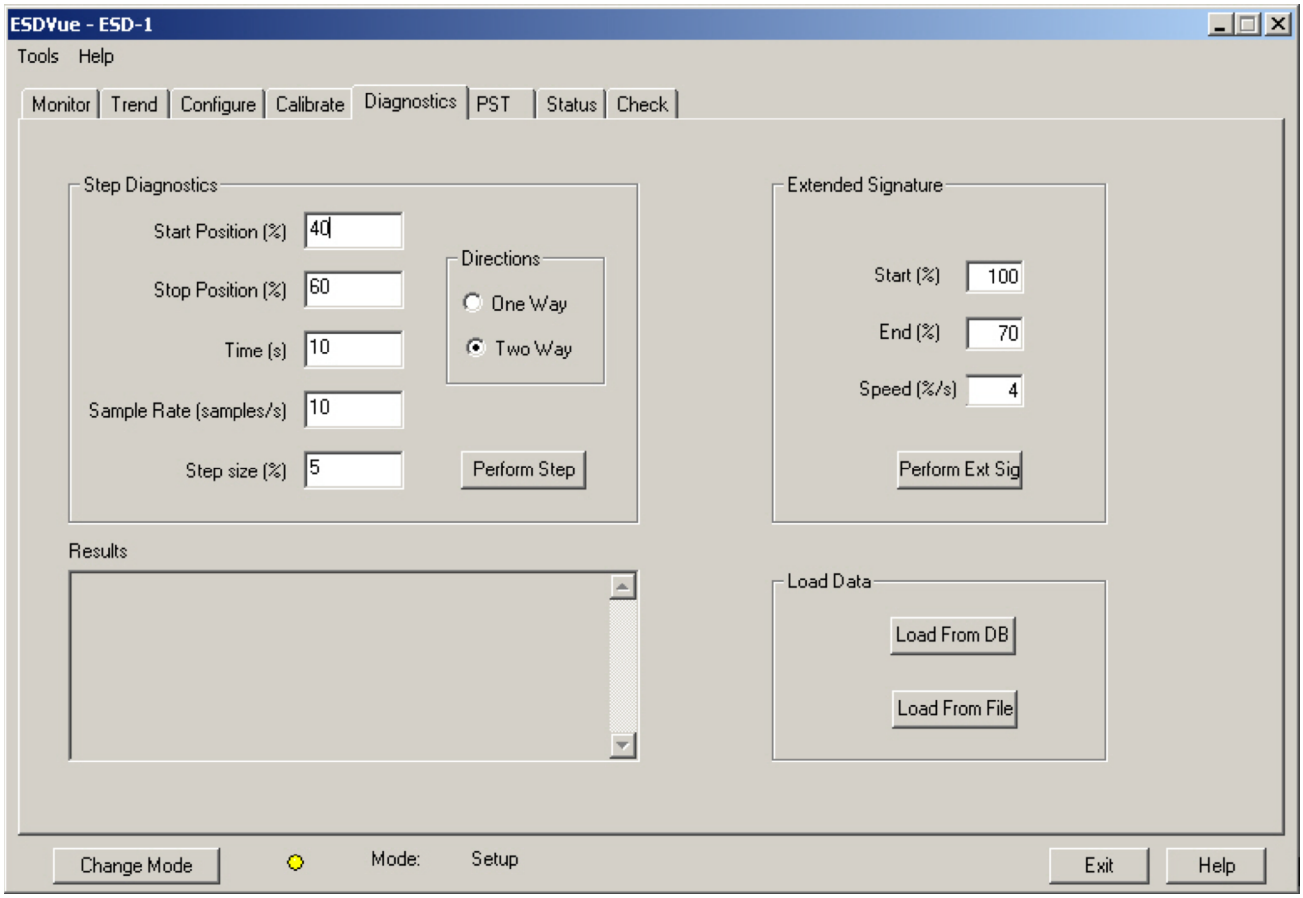


Figure 70 - Diagnostics Screen

© 2024 Baker Hughes Company. All rights reserved.

PST

The *PST* (Partial Stroke Test) screen (*Figure 71*) provides access to Partial Stroke Testing.

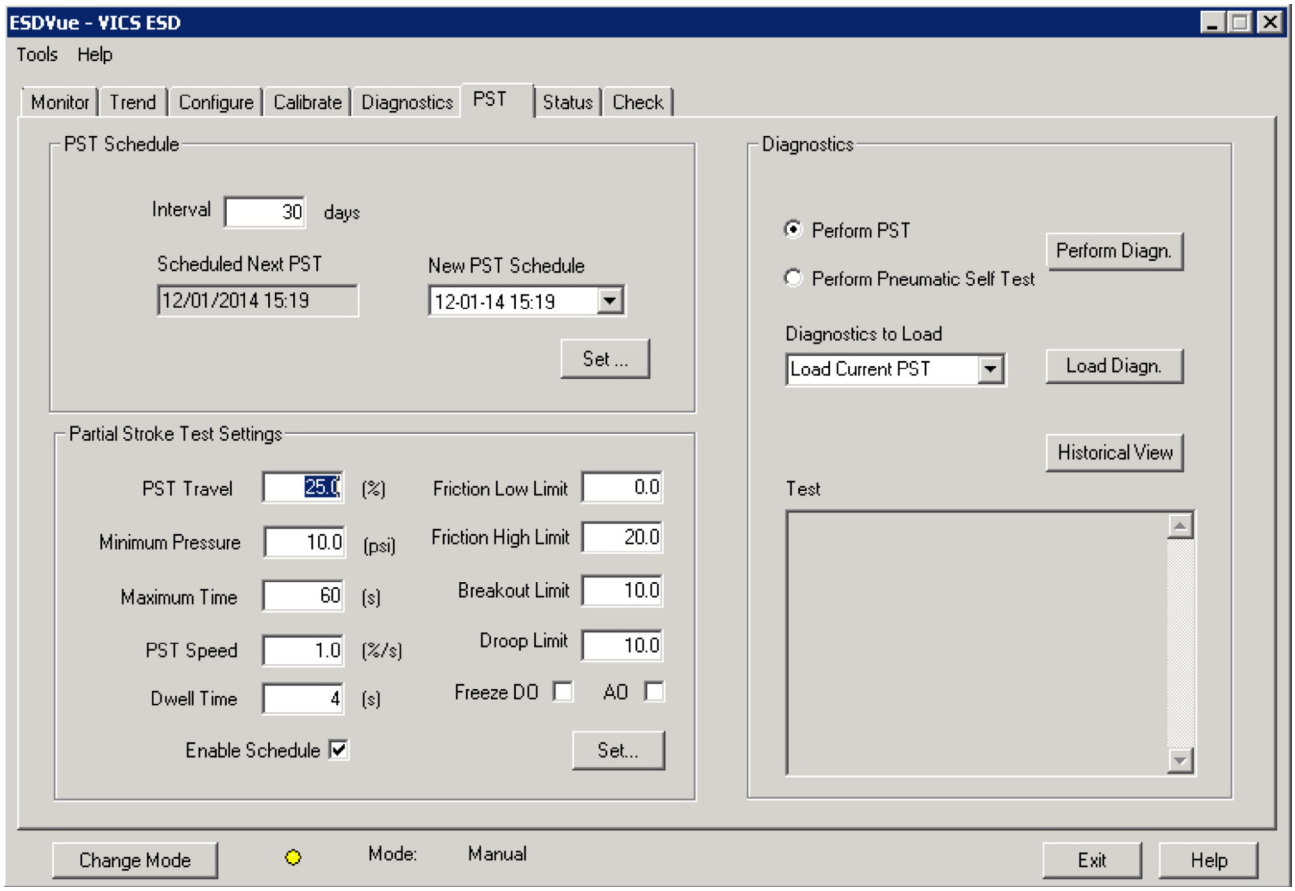


Figure 71 - PST Screen

© 2024 Baker Hughes Company. All rights reserved.

Status Screen

Use the *Status* screen (*Figure 72*) to see the operating and internal status of the SVI II ESD.

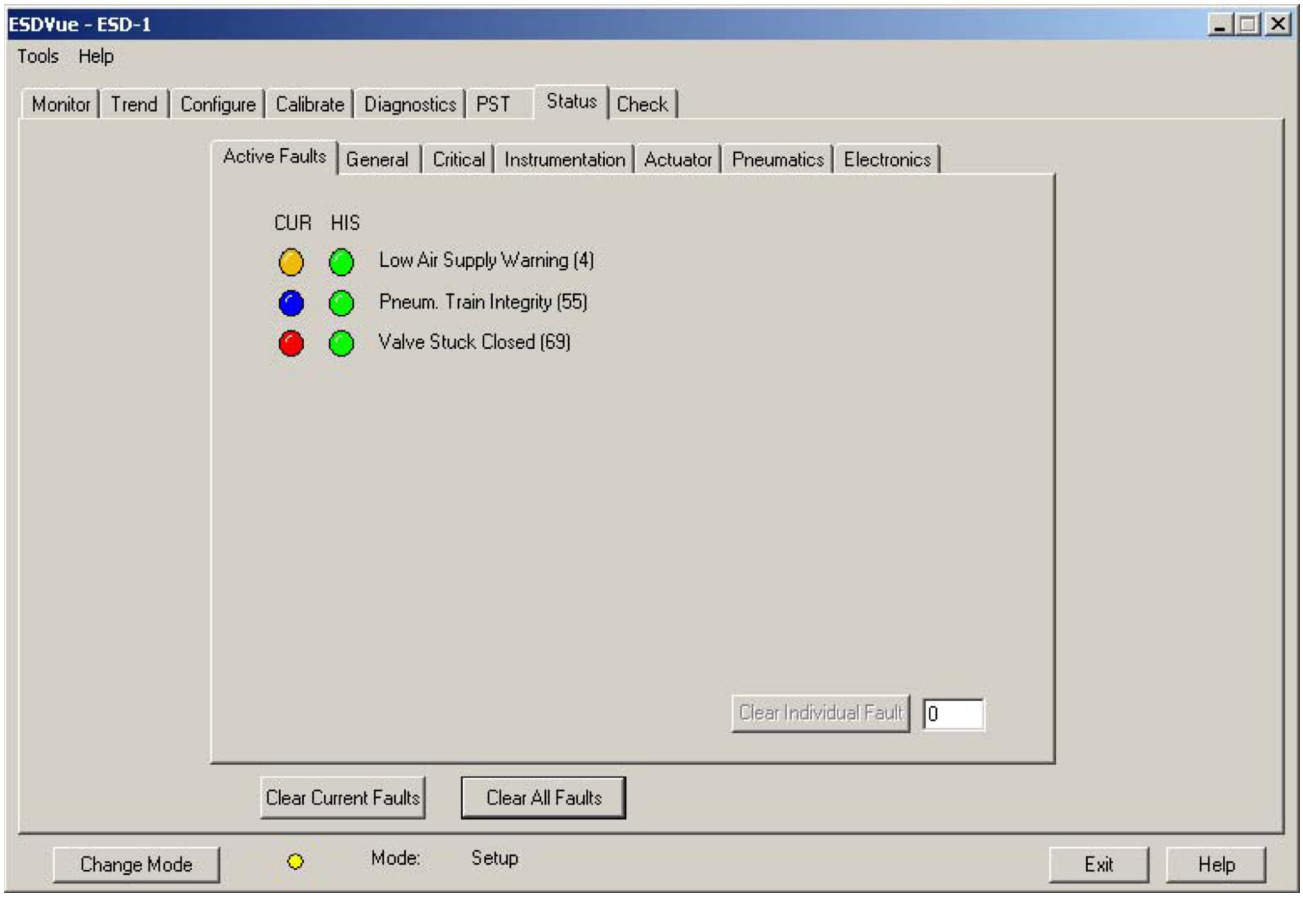


Figure 72 - Status Screen

© 2024 Baker Hughes Company. All rights reserved.

Check

Use the *Check* screen (*Figure 73*) to set some of the basic parameters. This screen is used primarily for troubleshooting.

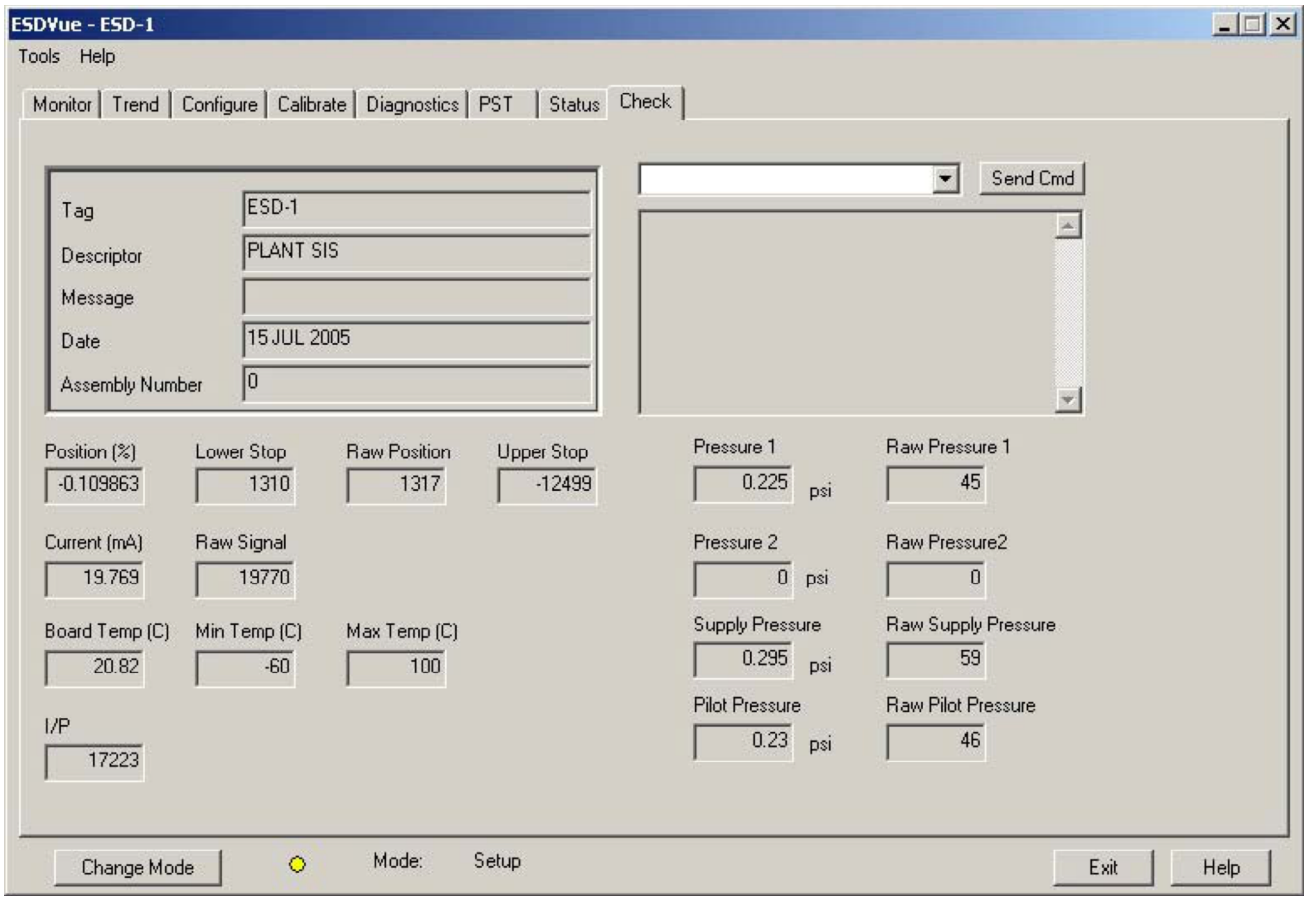


Figure 73 - Check Screen

© 2024 Baker Hughes Company. All rights reserved.

5. Monitor

What You Can Do on the Monitor Screen

The *Monitor* screen (*Figure 74*) is the first window displayed on starting ESDVue. You can:

- Monitor the current operation of the SVI II ESD
- Change operation parameters
- Monitor the current PST controller Characteristics
- Adjust the PST controller Indicator (graphical representation)
- Generate reports on SVI II ESD operation

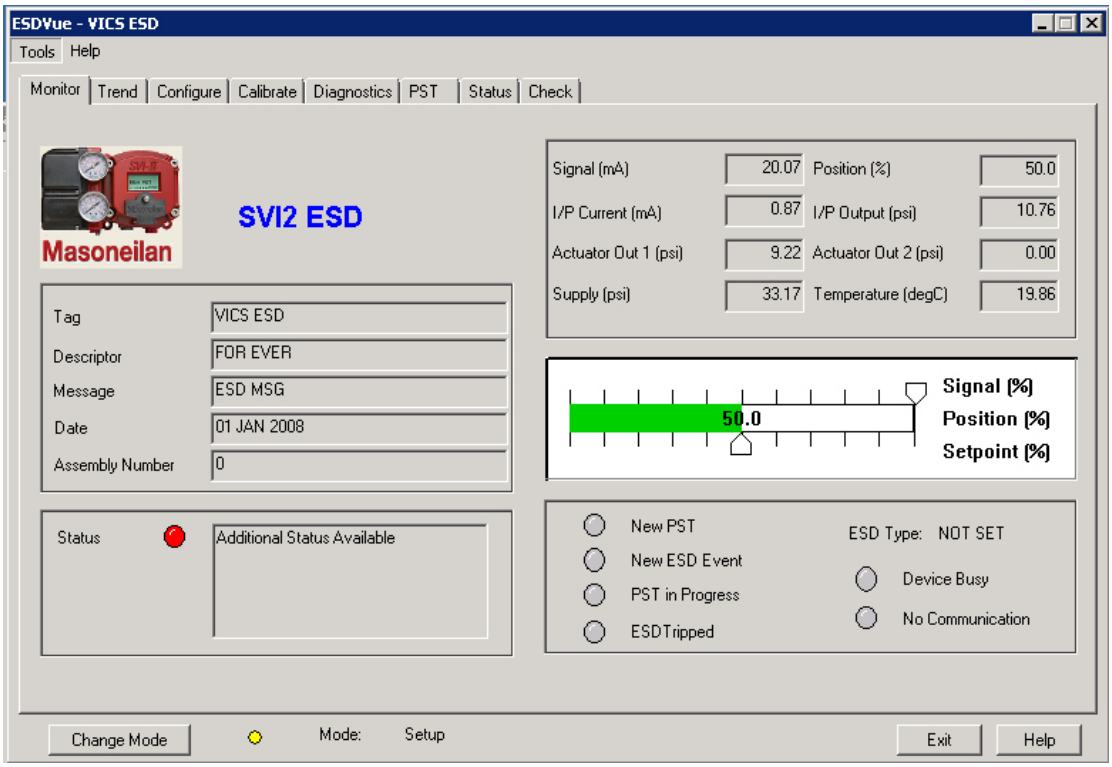


Figure 74 - Monitor Screen

© 2024 Baker Hughes Company. All rights reserved.

PST Controller Characteristics

The *PST controller Characteristics* displayed on the *Monitor* screen consist of:

- *Signal (mA)* - Indicates the input analog signal expressed in mA.
- *Position (%)* - Indicates the actual valve position in % of valve opening. 0% is always closed and 100% is open.
- *I/P Current (mA)* - the current in mA generated by the I/P.
- *I/P Output (psi)* - the output in psi generated by the I/P.
- *Actuator Out 1* (pressure units) - Actuator pressure when Single Acting. The SVI II ESD continuously monitors the actuator pressure. It is displayed according to the configured units (psi, bar, or kpa).
- *Actuator Out 2* (pressure units) - Has no value when Single Acting.
- *Supply* (pressure units) - Pressure generated by the air supply.
- *Temperature* (temperature units) - temperature read from the sensor.

Pressure, Pressure1 and Pressure2

If your unit is single acting, *Pressure* and *Pressure1* both have the same value, the actuator pressure.

Position Indicator

The *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 (thumb) 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 thumb to change the valve setpoint. While dragging, the number in the center bar shows the manual setpoint for use when you release the thumb.

Signal

Indicates the input analog signal expressed in % of the configured signal range.

© 2024 Baker Hughes Company. All rights reserved.

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.

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 ESD is controlling the valve. Change the manual setpoint by dragging the *lower thumb* on the position indicator.

© 2024 Baker Hughes Company. All rights reserved.

Changing the Setpoint

Prior to changing the position indicator ESDVue must be in Manual mode; 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%.

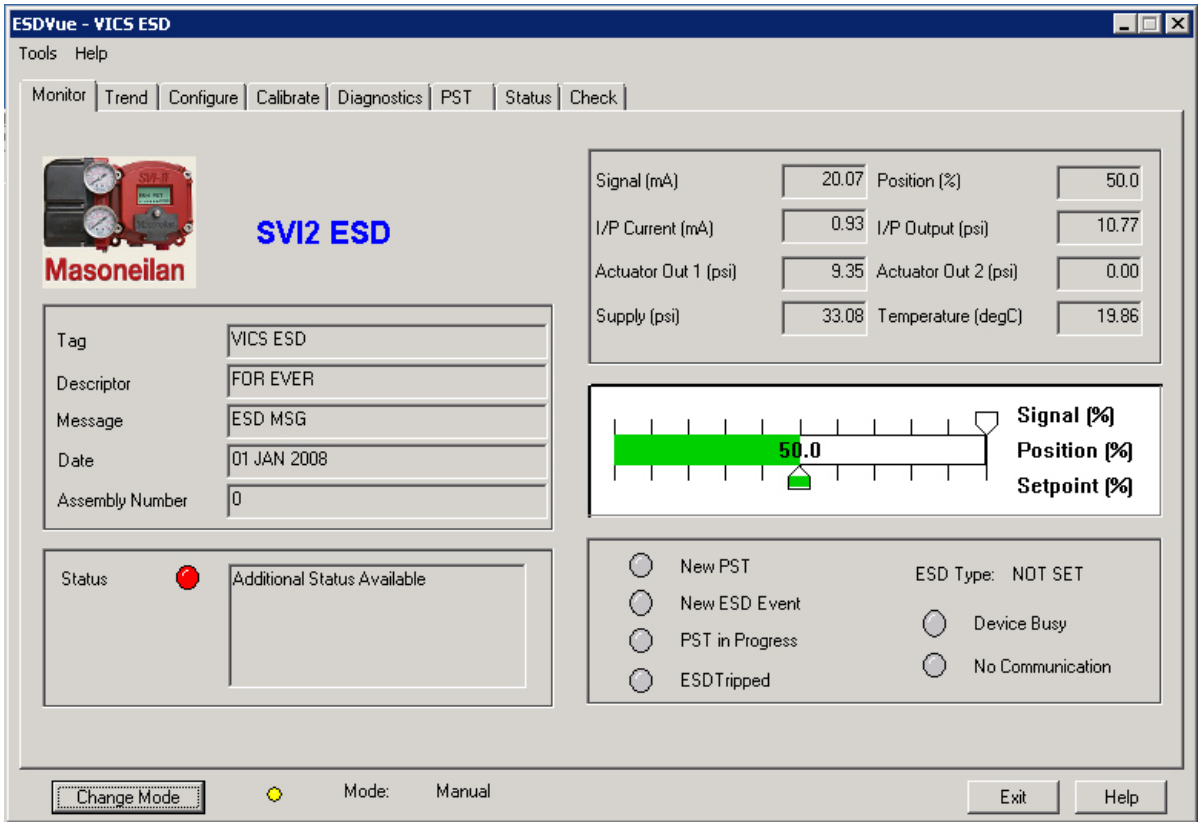


Figure 75 - Position Indicator Active

© 2024 Baker Hughes Company. All rights reserved.

Entering Setpoint Value

To enter a value for the position indicator setpoint:

1. Right-click inside the position indicator area.

   A dialog appears (*Figure 76*).

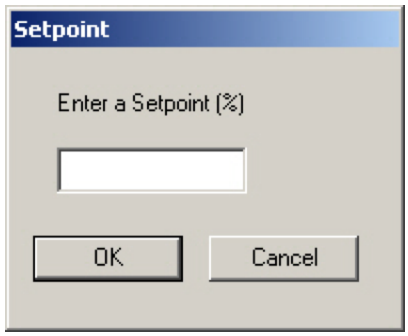


Figure 76 - Setpoint Dialog

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

© 2024 Baker Hughes Company. All rights reserved.

Status on the Monitor Screen

The SVI II ESD tracks operation and provides several health indicators. When there is a fault code available in the SVI II ESD, this box contains (*Figure 77*) *Additional Status Available*. The fault codes can be retrieved by:

1. Clicking the **Check** tab.
2. Selecting **Read Status** from the **Send Command** drop down list.
3. Clicking **Send**.

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

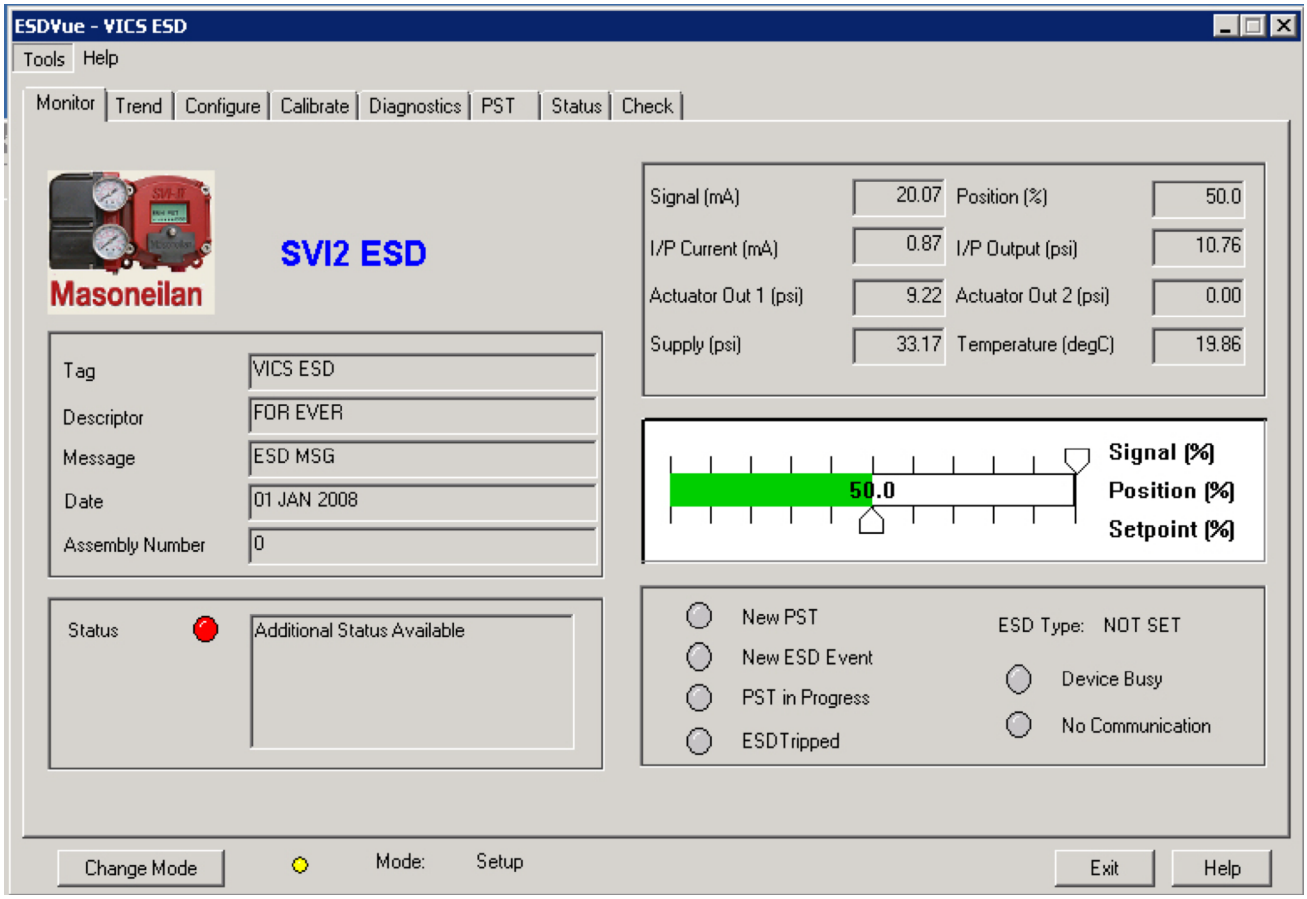


Figure 77 - Monitor Screen - Additional Status Available

© 2024 Baker Hughes Company. All rights reserved.

Tag Information

The *Tag Information* on the *Monitor* screen displays the following items:

- *Tag*
- *Descriptor*
- *Message*
- *Date*
- *Assembly Number*

This data appears at the same location on the *Monitor*, *Configure* and *Calibrate* screens but can only be changed on the *Configure* screen (See *"Changing Tag Information"* on page 122).

PST/ESD Information

The *Monitor* screen contains status information on SVI II ESD's Partial Stroke Testing (PST) and on the Emergency Shutdown Device (ESD) function. The PST/ ESD status fields are:

- *New PST* - indicates when a new PST has been executed
- *New ESD Event* - indicates whether there is a new ESD status event
- *PST in Progress* - indicates whether a PST is in progress or not
- *ESD Tripped* - indicates whether the Safety function has been tripped or not
- *ESD Type* - indicates the type of SVI II ESD device: ASD, DSD, A/DSD - See *"ESD Types"* on page 98.
- *Device Busy*
- *Communication/No Communication* - indicates if the SVI II ESD is in communication with the Safety System

If the *Status* field is colored red, that status field is current.

© 2024 Baker Hughes Company. All rights reserved.

ESD Types

There are three configurations of the SVI II ESD available:

ASD	2-wire Analog Trip - Single pair of 4-20 mA twisted pair signal cable installation, with superimposed HART® communication. Connected to Safety System AO card.
DSD	2-wire Discrete Trip - Single pair of 0/24 VDC cable installation, with superimposed HART® communication. Connected to Safety System DO card.
A/DSD	4-wire Discrete Trip - Single pair of 4-20 mA twisted pair signal cable installation, with superimposed HART® communication. Connected to Safety or Control System AO card. *AND* Single pair of 0/24 VDC cable installation. Connected to Safety Sys-tem DO card.

© 2024 Baker Hughes Company. All rights reserved.

Monitor Context Menu

When you right-click a context menu appears (*Figure 78*).

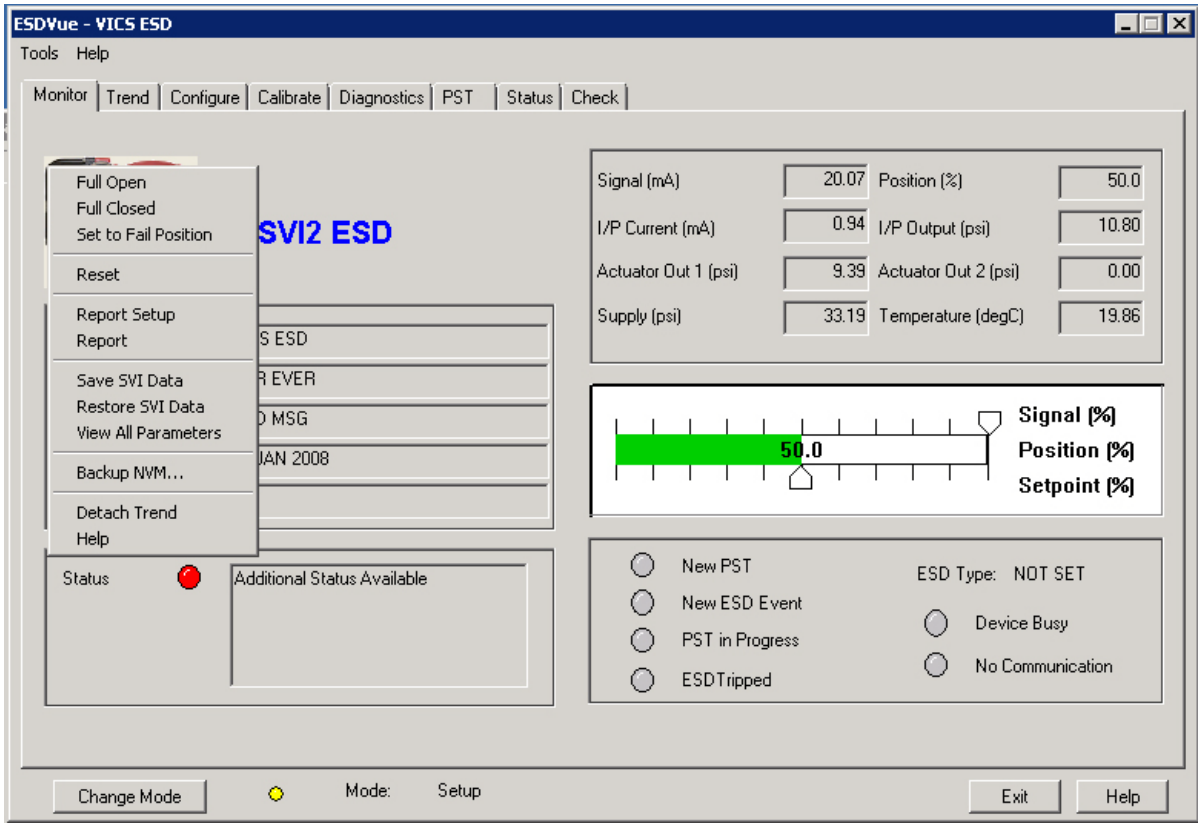


Figure 78 - Monitor Screen Context Sensitive Menu

The following items appear and are grayed out based on the actual SVI II ESD 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 psi. Moves the valve full open or full closed, whichever is the fail position of the actuator.
Cancel Transfer	Returns the SVI II ESD 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.

© 2024 Baker Hughes Company. All rights reserved.

WARNING *The valve moves during the reset operation.*

Report Setup (See Report Setup)	Allows you to set up a report template and printing program.
Report (See Generate Report)	Generates a report of the SVI II ESD parameters.
Save SVI	*Data* Saves the SVI II ESD internal parameters in a file that can be read and restored by ESDVue.
Restore SVI Data	Restores the contents of a dump file to a Masoneilan device.This can be used to *clone* an SVI II ESD into a new SVI II ESD.

Note: Items like tag, which should be unique, and position calibrations which differ on each PST controller, are not cloned. This command is available only in manual mode.

Backup NVM	Allows you to backup the Non Volatile Memory (NVM). This is useful for a factory engineer to help troubleshoot an SVI II ESD.
Detach Trend	Removes the Trend display from the anchored tab format and creates a separate trend display.
Help	Displays the help file at the Monitor screen instructions.
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.
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.*

© 2024 Baker Hughes Company. All rights reserved.

Reports

One of the functions available on the Monitor screen is the ability to generate reports. ESDVue provides the ability to extract information about the SVI II ESD operation and dump the information into a report format. When ESDVue extracts the information from a device it requires a template file into which to dump the data. To generate a report with ESDVue 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 SVI II ESD 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:

- *C:\Program Files\DFC\ESDVue\Report* for Win XP and Server
- *C:\Program Files\DFC\ValVue ESD\Data* for Win 7

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 should include the operation parameters that you would like populated in the report.

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

For example:

Tag = $$Tag

ESDVue substitutes the actual tag name from the SVI II ESD 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®.

Note: 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.

© 2024 Baker Hughes Company. All rights reserved.

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

Table 5 - Report Setup Parameters

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)
$$DeviceType	Device Type (200 for the SVI II ESD)
$$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 - 65000)
$$Temperature	Circuit Board Temperature
$$LowTemperature	Historical Low Temperature
$$HighTemperature	Historical High Temperature
$$Output	Output from the process controller
$$Mode	SVI II ESD Mode
$$SignalPercent	Input Signal as Percent
$$AirAction	Air-to-Open/Air-to-Close
$$ActuatorType	Single Acting Actuator only
$$PosErrorBand	Position Error Band
$$PosErrorTime	Position Deviation Time
$$Charact	Characterization (Linear, Equal Percentage, etc.)

© 2024 Baker Hughes Company. All rights reserved.

Table 5 - Report Setup Parameters (Continued)

Report Parameter	Information Provided in Report
$$CustomCharact	Displays the Custom Characterization constants Individual items of the characterization curve may be selected by entering: $$CustomCharact[n] - where n is a number between 0 and 17
$$ButtonLock	Button Lock Level
$$Bumpless	Bumpless Transfer On/Off
$$BumplessSpeed	Time to move from Manual to Normal (operating) mode
$$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	SVI II ESD Display Language
$$LowSignal	Low Calibration Value
$$HighSignal	High Calibration Value
$$P	Proportional Gain In PST controller
$$Padjust	Adjustment to P when valve is exhausting
$$I	Integral action of PST controller
$$Beta	Step size adjustment in PST controller
$$D	Derivative action of PST controller
$$PosComp	Position range compensation of PST controller
$$DeadZone	Dead zone of PST controller
$$Damping	Damping coefficient of PST controller
$$Travel	Total strokes of the valve (An accumulated value of 100% travel = 1 stroke. The travel does not need to occur in one movement.)

© 2024 Baker Hughes Company. All rights reserved.

Table 5 - Report Setup Parameters (Continued)

Report Parameter	Information Provided in Report
$$Cycles	Total cycles of the valve
$$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
$$PositionStopHigh	Position A/D Counts at the Upper Stop
$$OptionConfig $$OptionConfigEx0 $$OptionConfigEx1 $$OptionConfigEx2 $$OptionConfigEx3	Data describing the hardware installed on the PST 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 standard signature

© 2024 Baker Hughes Company. All rights reserved.

Table 5 - Report Setup Parameters (Continued)

Report Parameter	Information Provided in Report
$$UpperSpringRange $$UpperSpringRangeSaved $$UpperSpringRangeBaseline	Upper Spring Range calculated from the current, saved, or baseline standard signature
$$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

© 2024 Baker Hughes Company. All rights reserved.

Report Setup

To set up the report:

1. Right-click on the **Monitor** screen and select **Report Setup**.
   A dialog appears (*Figure 79*).
2. Click **Browse** and navigate to the desired folder for both:
   - *Report Template File Name*
   - *Report Program to use*

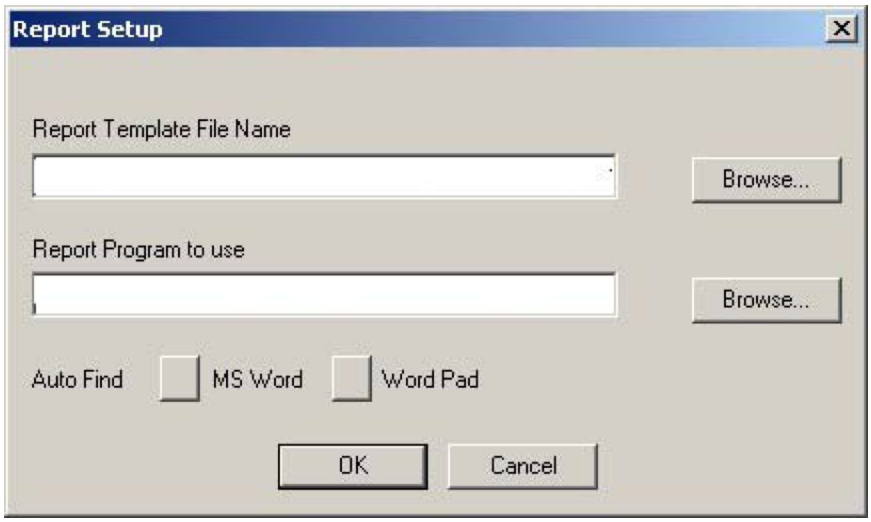


Figure 79 - Report Setup Dialog

(Generate) Report

To generate a report:

1. On the *Monitor* screen right-click and select **Report**.
   A dialog box appears (*Figure 80*).
2. Click **OK**.

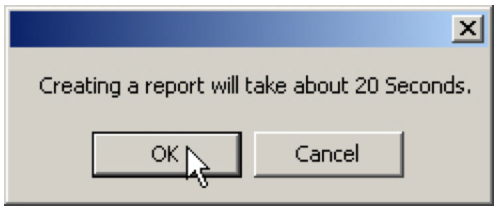


Figure 80 - Generate Report Dialog

ESDVue populates the report template. An example of a report is shown in *Figure 81*.

© 2024 Baker Hughes Company. All rights reserved.

Smart Valve Interface ESD - Configuration Data Sheet

General Information

Tag Name	ESD-1
Descriptor	PLANT SIS
Date	15 JUL 2005
Message	
Assembly Number	0
Manufacturer's ID	101
Device Type	203
Device ID	5420073
Hardware Revision	3
Transmitter Revision	1
Software Revision	2
Polling Address	0

Operating Data

Position	0.0 %
Signal	19.77 mA
Pressure	-0.01 psi
Switch 1	Closed

Configuration Information

Air Action	ATO
Actuator Type	Single
Position Error Band	5.0 %
Position Error Time	Off
Supply Low Limit	30.000

Figure 81 - Report Sample Using ESDVue Template

© 2024 Baker Hughes Company. All rights reserved.

View All Parameters

When you select **View All Parameters** from the *Monitor* context menu, the *Device Configure* window appears (*Figure 82*).

Note: The** **appearing in the Device Configure window, or on any screen in ESDVue indicates that there is status information available on the active item; e.g. there may have been a failure, current or historical for the parameter. Refer to "Status" on page 287 for further information.

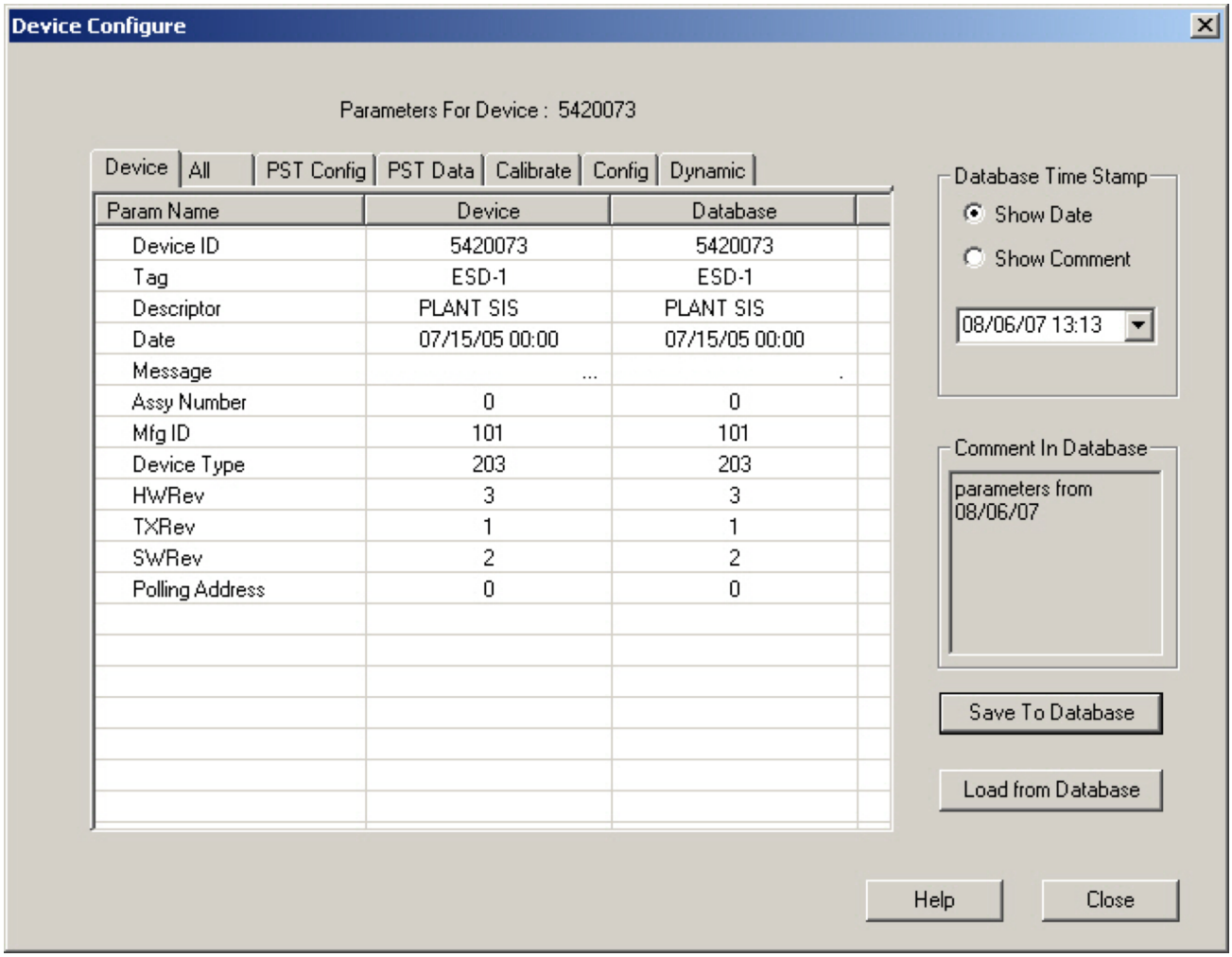


Figure 82 - View All Parameters Window

© 2024 Baker Hughes Company. All rights reserved.

Device

The *Device* tab displays all device specific parameters; e.g *Device I.D.*, *Tag*, *Device Type* (*Figure 83*).

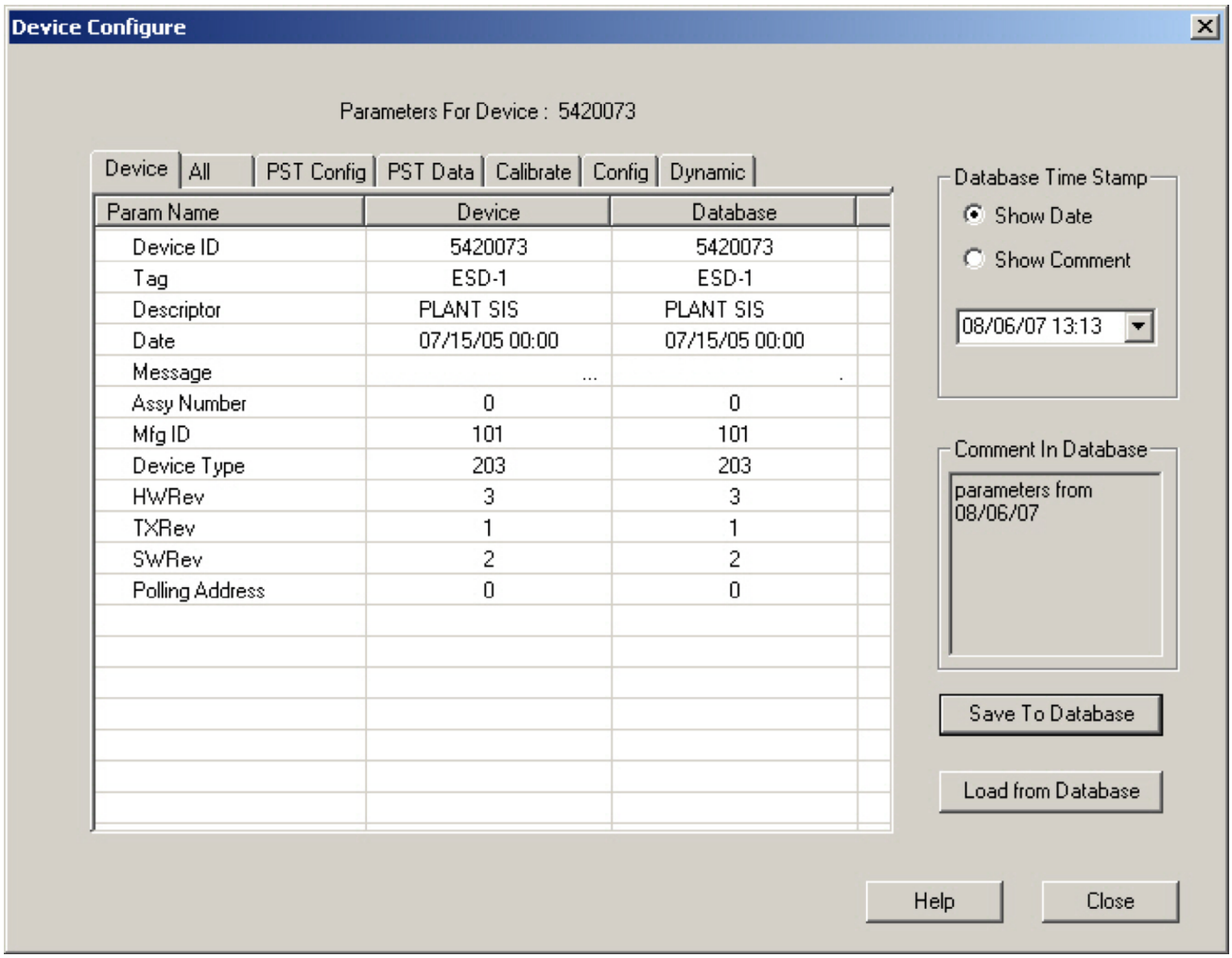


Figure 83 - View All Parameters - Device Tab

© 2024 Baker Hughes Company. All rights reserved.

All

The *All* tab displays all parameters collected from operation (*Figure 84*).

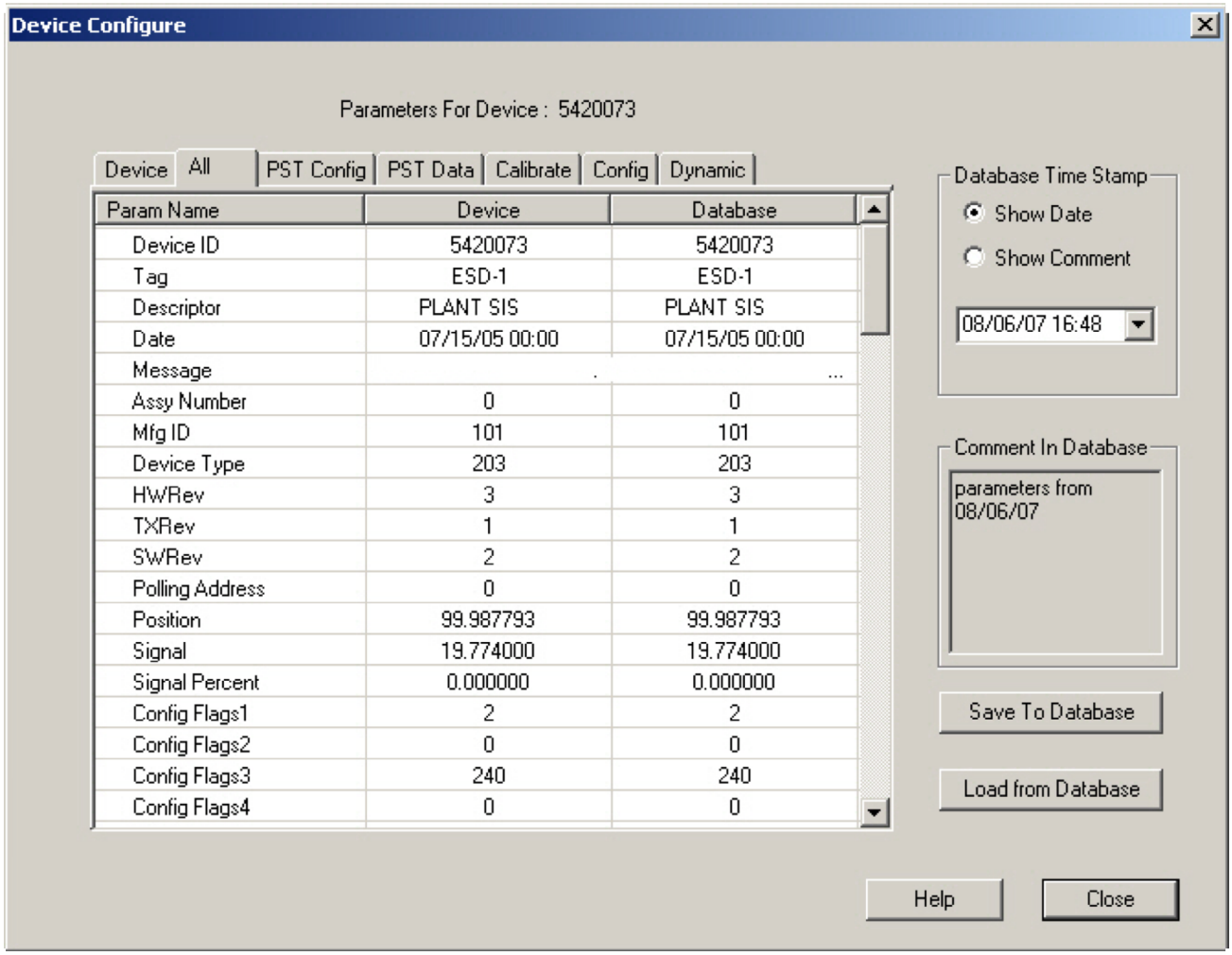


Figure 84 - View All Parameters - All Tab

© 2024 Baker Hughes Company. All rights reserved.

PST Config

The *PST Config* tab displays all device parameters for configuration of PST scheduling and operation (*Figure 85*).

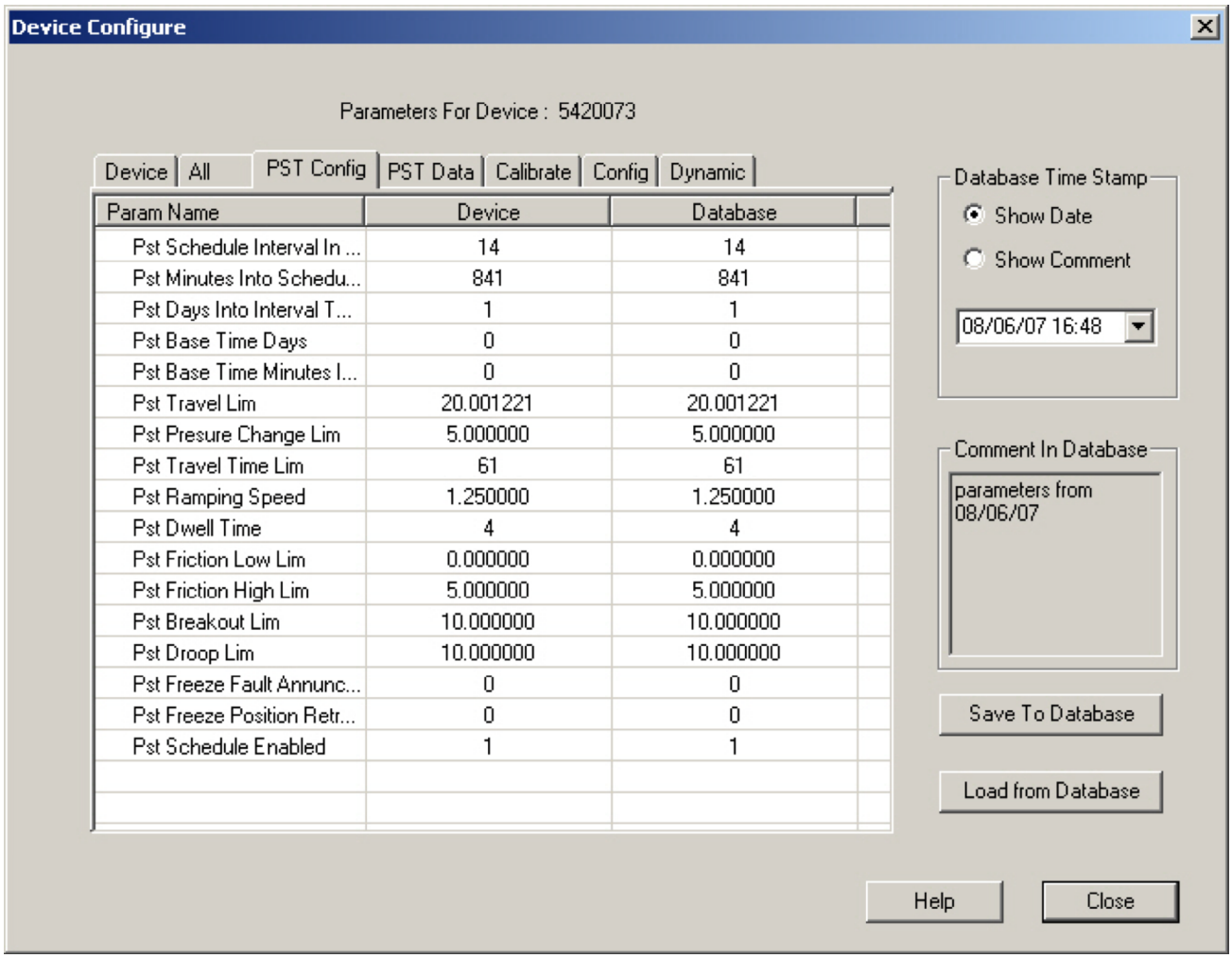


Figure 85 - View All Parameters - PST Config Tab

© 2024 Baker Hughes Company. All rights reserved.

PST DATA

The *PST Data* tab displays data parameters collected from PST operation (*Figure 86*).

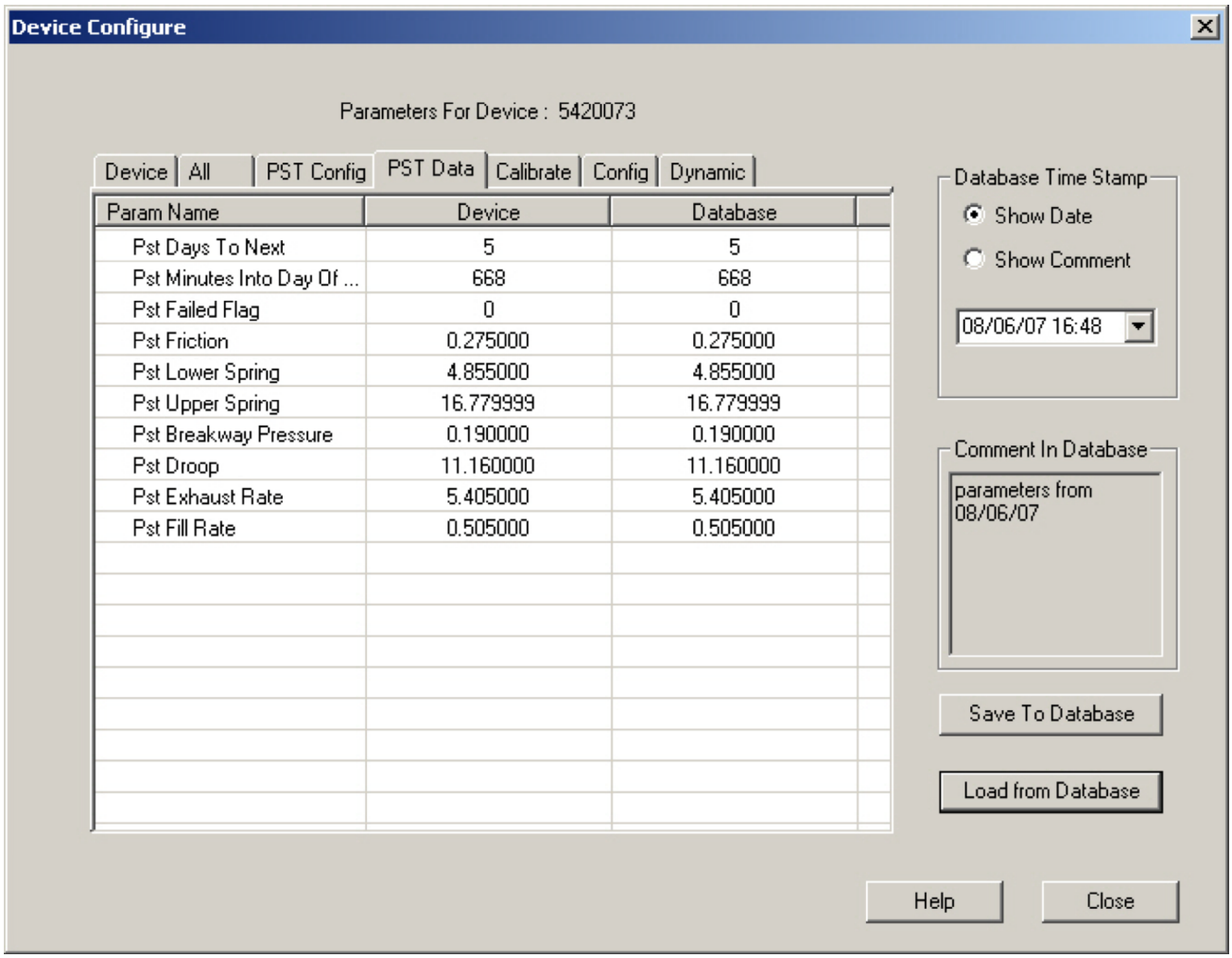


Figure 86 - View All Parameters - PST DATA Tab

© 2024 Baker Hughes Company. All rights reserved.

Calibrate

The *Calibrate* tab displays the device calibration parameters (*Figure 87*).

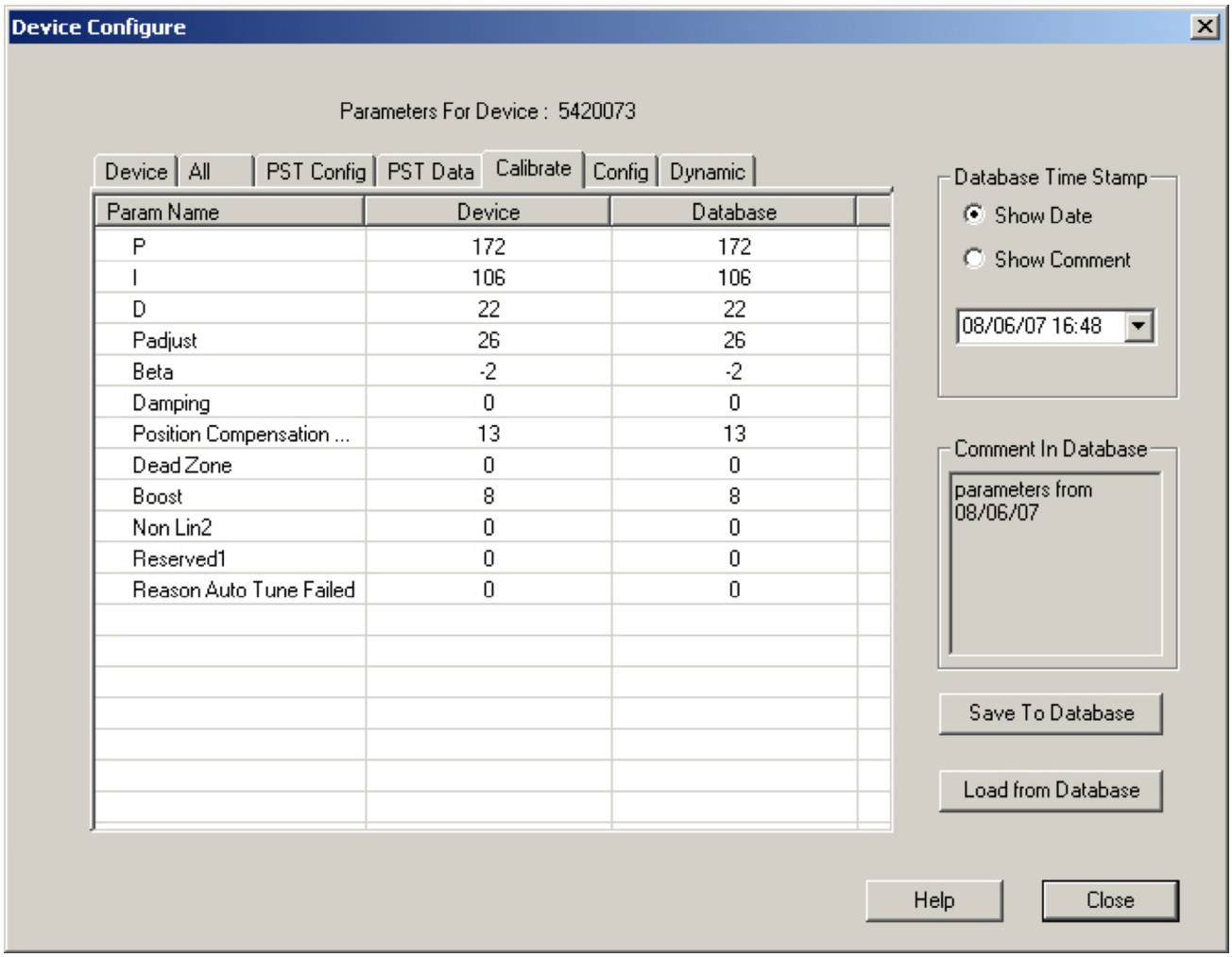


Figure 87 - View All Parameters - CAL Tab

© 2024 Baker Hughes Company. All rights reserved.

Config

The *Config* tab displays all SVI II ESD configuration parameters (*Figure 88*).

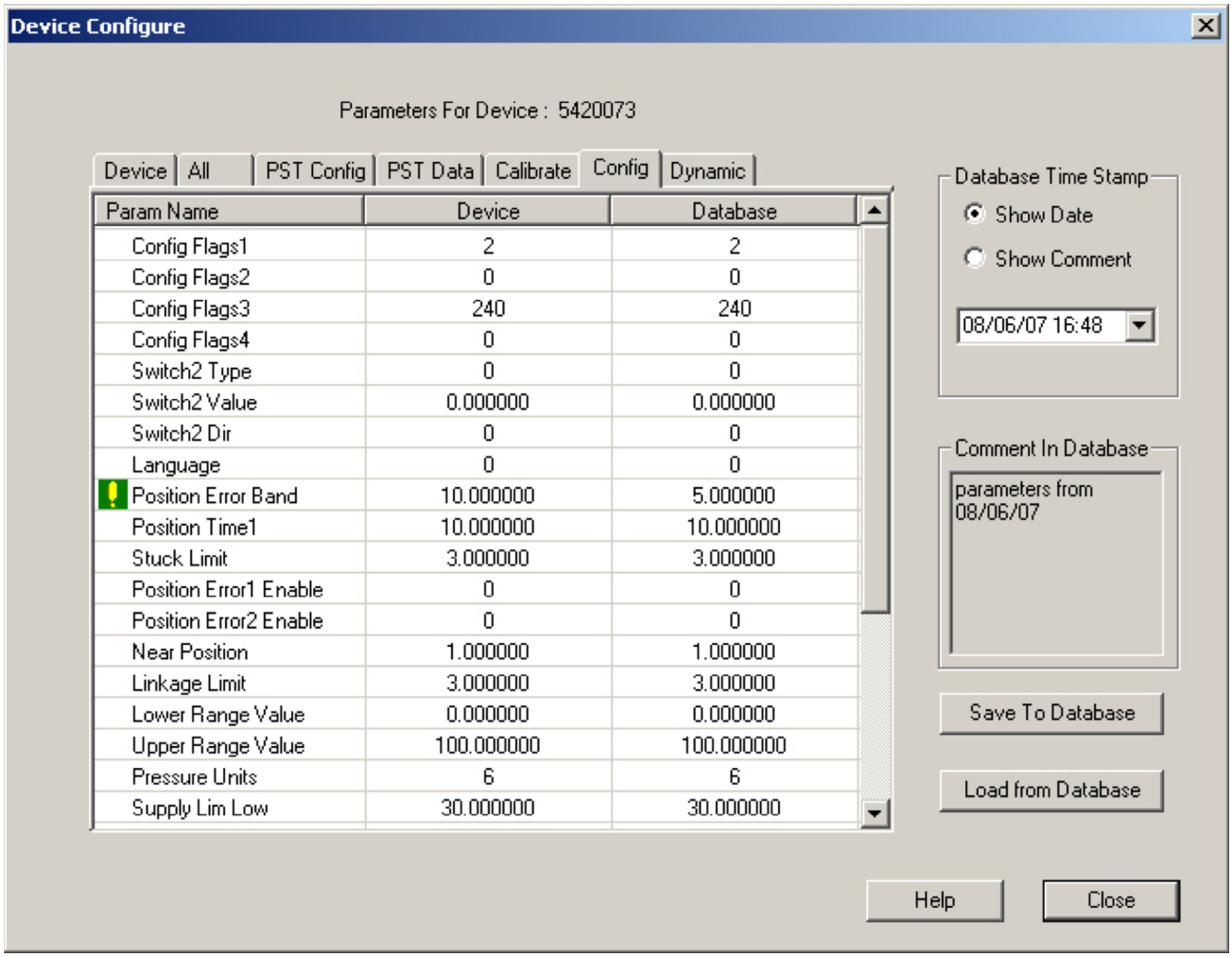


Figure 88 - View All Parameters - Config Tab

© 2024 Baker Hughes Company. All rights reserved.

Dynamic

The *Dynamic* tab displays all current position, signal, switch and pressure parameters (*Figure 89*).

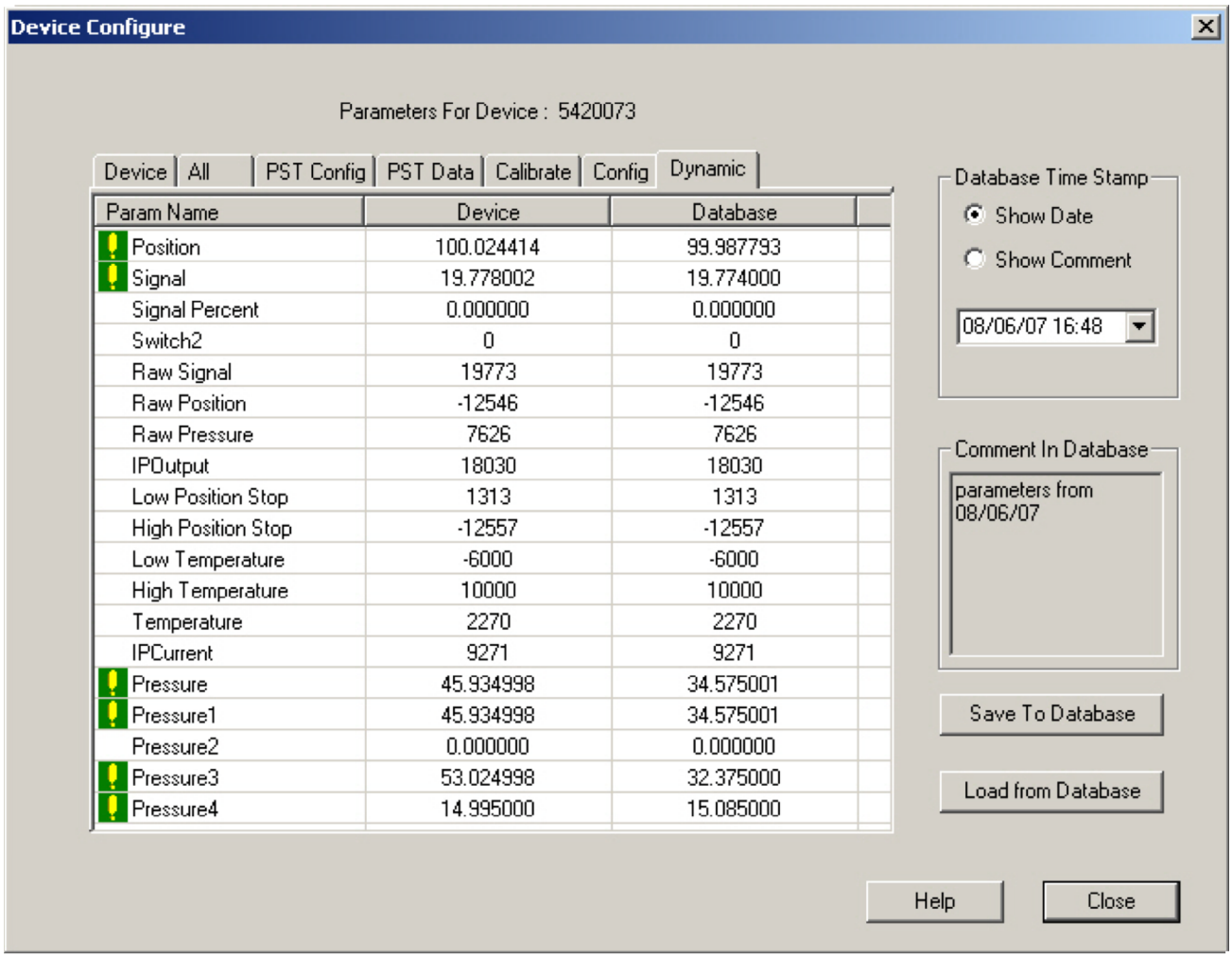


Figure 89 - View All Parameters - DYNAMIC Tab

© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

© 2024 Baker Hughes Company. All rights reserved.

6. Trend

What you can do on the Trend Screen

From the *Trend* screen (*Figure 90*) you can observe the performance of the valve in real time. These process trend graphs are useful for troubleshooting a control valve and for tuning the PID positioning parameters. The process trend graphs may be only on the Y axis.

The process trend graph can be detached as a separate window 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 select **Detach Trend**.

When in manual mode, the bar indicator allows you to change the valve position by dragging the position indicator.

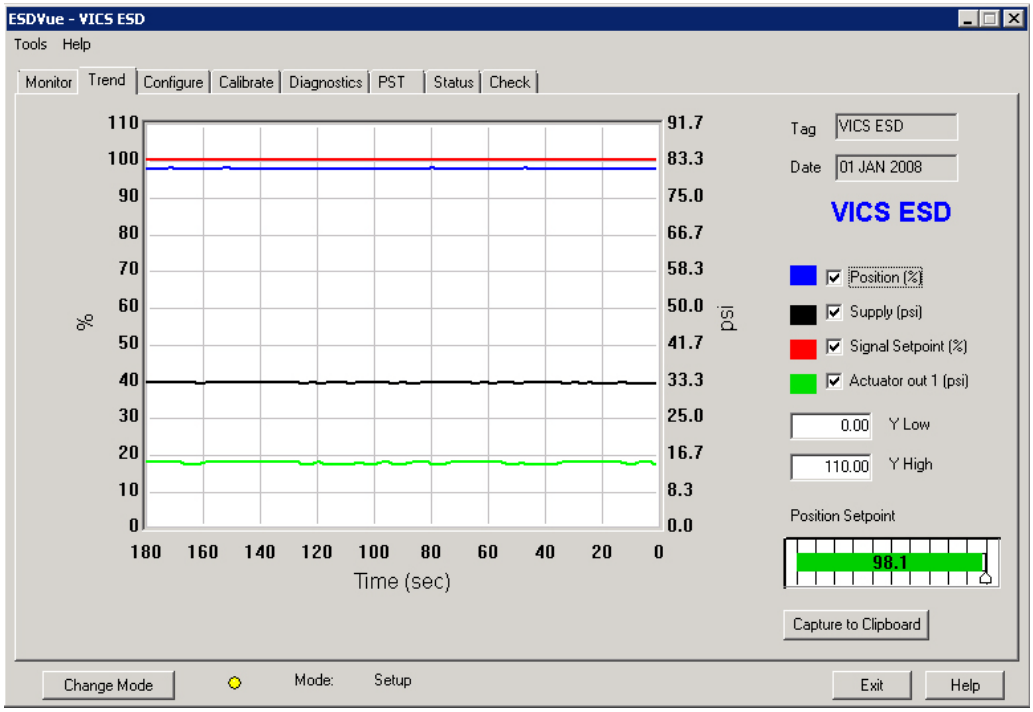


Figure 90 - Trend Screen Displaying All Parameters

© 2024 Baker Hughes Company. All rights reserved.

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
- *Supply* - black
- *Signal Setpoint* - red
- *Actuator out 1* - green

Tag	Displays the name configured on the *Configure* screen.
Date	Displays the date entered on the Configure screen. Usually the date placed in service.
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. The axis can be changed by dragging inside the graph and can be returned to the original scale by right clicking in the graph.
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.
Signal	Indicates the input analog signal expressed in % of the configured signal range.

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 fills the graphic window. Right 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).

© 2024 Baker Hughes Company. All rights reserved.

Trend Context Menu

When you right click on the grey area of the *Trend* screen (but not in the graph area), a context menu appears (*Figure 91*). 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**
Detach Trend	Removes the display from the tabbed dialog and creates a separate trend display
Help	Displays the help file at the *Trend* screen instructions

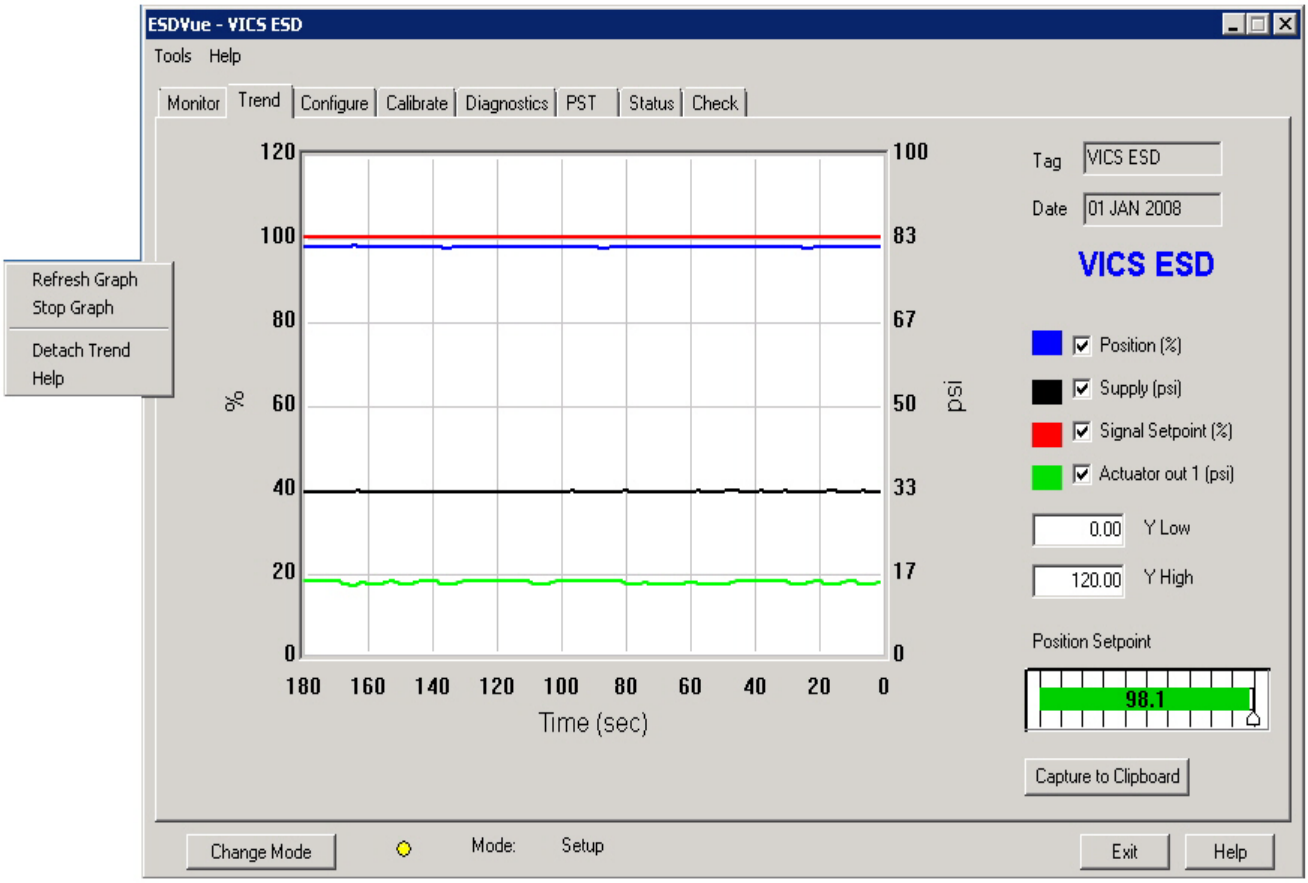


Figure 91 - Trend Context Menu

© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

© 2024 Baker Hughes Company. All rights reserved.

7. Configure

What You Can Do on the Configure Screen

In the *Setup* mode, from the *Configure* screen (*Figure 92* on page 122), you can set the information that tells the SVI II ESD how the valve/actuator is configured by adjusting the following parameters:

- *Tag Information*
- *Button Lock*
- *Fault Settings*
- *PST Allow Options*
- *Language*
- *Pressure Units*
- *Air Action*

On the *Configure* screen you can also set up the *Inputs* and *Outputs* with *Configure I/O* (refer to *"Configure I/O"* on page 129) and quickly commission the SVI II ESD by launching *Setup Wizard* (refer to *"Setup Wizard"* on page 138).

Note: Before making any configuration changes on the Configuration screen ESDVue must be in Setup mode. If you need to change modes refer to "Change Mode" on page 81.

© 2024 Baker Hughes Company. All rights reserved.

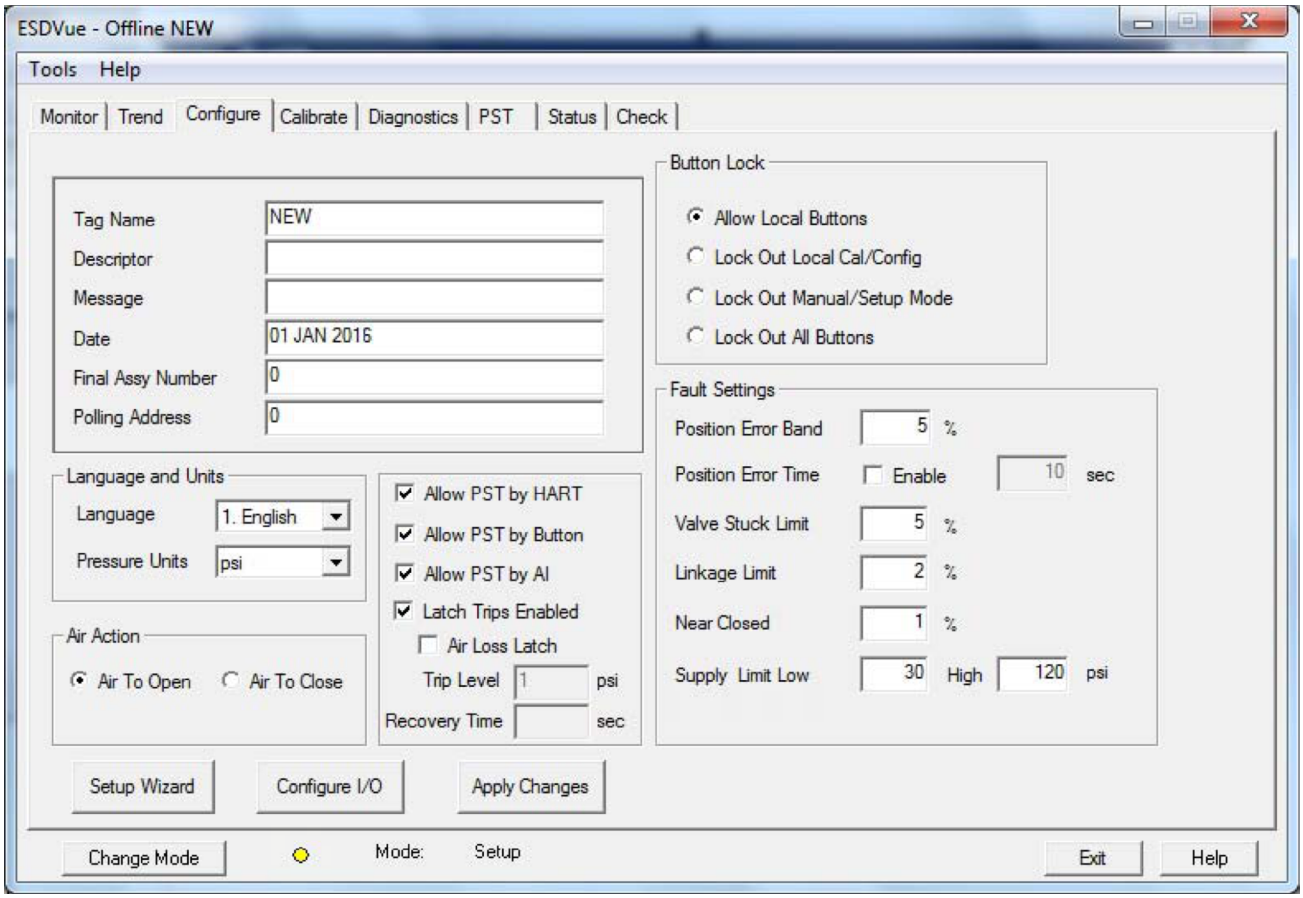


Figure 92 - Configure Screen - Setup Mode

Changing Tag Information

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

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

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

© 2024 Baker Hughes Company. All rights reserved.

Button Lock

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

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

Fault Settings

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.

After you have adjusted all the *Fault Settings* parameters click in the checkbox, beside **Enable** to activate.

Fault Settings Options

On the *Configure* screen you can set:

Position Error Band Use this to define the error band, or the percentage of valve travel, that the requested position is allowed to vary from the actual position. The *Position Error Band* must be between 0.5% and 199%. If you set a value for *Position Error Band* outside the range an error mes-sage appears (*Figure 93*).

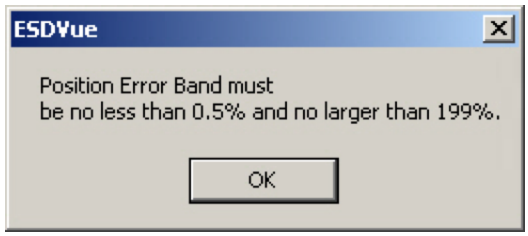


Figure 93 - Position Error Band Error Message

© 2024 Baker Hughes Company. All rights reserved.

Position Error Time

Use this to define the amount of time a position error is allowed to exist before the valve is put in failsafe position. The *Position Error* Time must be between 1 and 328 seconds. If you set a value for *Position Error Time* outside the range an error message appears (*Figure 94*).

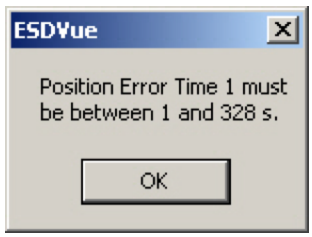


Figure 94 - Position Error Time Error Message

Valve Stuck Limit

The SVI II ESD issues an alert if a valve is stuck. When the SVI II ESD begins PST, it continually checks the valve travel to see if the valve is responding properly. If the valve is not traveling properly and appears to be stuck, the SVI II ESD aborts the test and report that the valve is stuck. Use the Stuck Limit fault setting to define the percent-age of partial stroke that the valve is allowed to be stuck before a status flag is issued. The *Stuck Limit* must be between 3% and 20% of the total PST. If you set a value for *Stuck Limit* outside the range an error message appears (*Figure 95*).

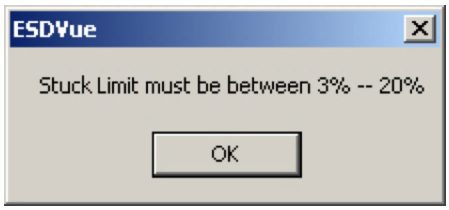


Figure 95 - Stuck Limit Error Message

Linkage Limit

Use this to define the amount the measured position is allowed to deviate from the expected position during an energized stop. The *Linkage Limit* setting is the percentage of deviation allowed between the measured and expected positions. The *Linkage Limit* must be between 1% and 20%. If you set a value for *Linkage Limit* outside the range an error message appears (*Figure 96*).

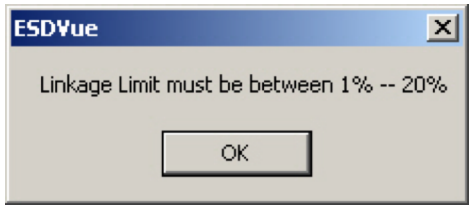


Figure 96 - Linkage Limit Error Message

© 2024 Baker Hughes Company. All rights reserved.

Near Closed

Use this to determine the value of position below which the valve is considered *near closed* by the continuous diagnostic calculations. The *Near Closed* value is defined as a percentage of the total partial stroke. The *Near Closed* value must be between 0% and 20%. If you set a value for *Near Closed* outside the range an error message appears (*Figure 97*).

Figure 97 - Near Closed Error Message

Supply Limit Low

Use this to define the supply pressure value that when sensed by the SVI II ESD is considered too low. The *Supply Limit Low* value must be between 30 and 110 psi. If you set a value for *Supply Limit Low* out-side the range an error message appears (*Figure 98*).

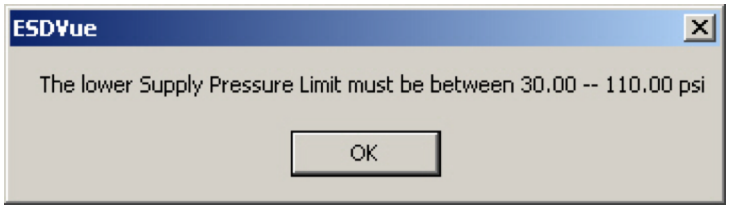


Figure 98 - Supply Limit Low Error Message

Supply Limit High

Use this to define the supply pressure value that when sensed by the SVI II ESD is considered too high. The *Supply Limit High* value must be between 30 and 120 psi. If you set a value for *Supply Limit High* out-side the range an error message appears (*Figure 99)*.

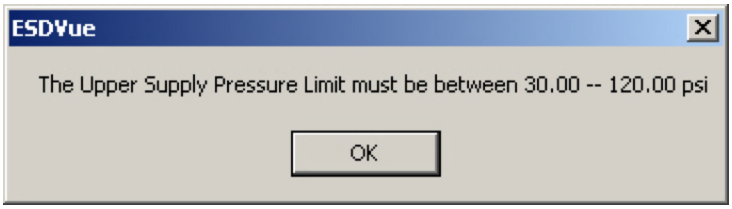


Figure 99 - Supply Limit High Error Message

© 2024 Baker Hughes Company. All rights reserved.

PST Allow Options

The *PST Allow* options provide the following configuration options:

- *Allow PST by HART* - When enabled, PST is executed by HART® command from a HART® device.
- *Allow PST by Button* - When enabled, PST is executed by the display button.
- *Allow PST by AI* - When enabled, PST is executed by Analog Input.
- *Latch Trips Enabled* - When disabled, the SVI II ESD takes no action when the SVI II ESD is tripped. You can enable this checkbox to enable latch trips. Further, enabling this checkbox activates the *Air Loss Latch* checkbox below.
  - *Air Loss Latch* and *Trip Level:* Enter a value into the *Trip Level* field and when *Latch Trips Enabled* is enabled and the air pressure goes below that level, the trip occurs.
  - Units used are set using the *Pressure Units* pulldown.

    Recovery Time: Enter a value in this field that represents a pause time during which low supply pressure is ignored so repetitive latching will not occur. See *Use of the field* below.

    Background: When a Find Stops is run, as part of it function, it calculates a *Recovery Time* to eliminate the effect of pressure droop when the actuator begins to refill after a close (see *Figure 100*). This time is set to three times the *Travel Time* from open to 95% closed.

    In certain cases this calculated value may be insufficient to avoid relatching from occurring. An example would be for a larger volume or slower actuator. In this case you need discover the correct *Recovery Time* via experiment. Configure a *Recovery Time*, run a test giving full supply pressure see if the valve relatches. Then increase the to assure that recovery reliably occurs.

    Use of the field: An algorithm generated *0* in this field means that the Find Stops was not able to automatically determine the value and latching is disabled and a fault is set. A user entered *0* (or negative value) in this field automatically enables the most recent Find Stops calculated time. If the Find Stops generated value is non-zero, then no fault is set.

© 2024 Baker Hughes Company. All rights reserved.

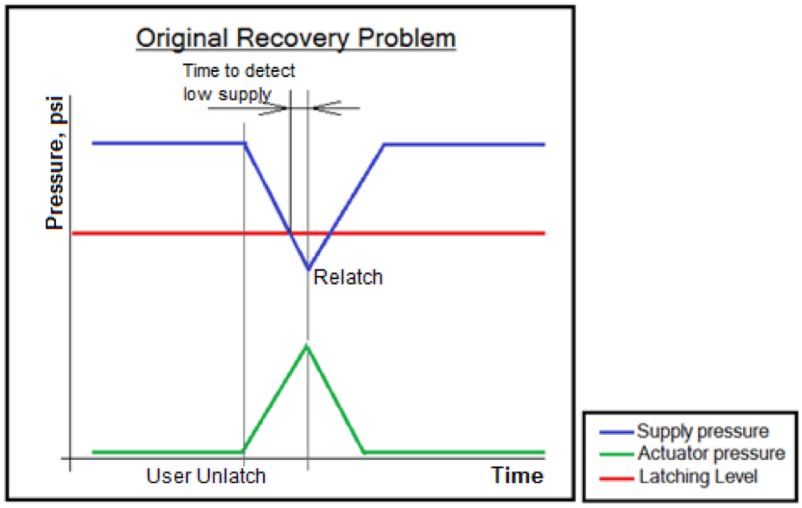


Figure 100 - Recovery Time Diagram

PST Faults and Related User Fields

There are two areas addressed in this discussion: benign faults and faults associated with PST terminating before test conclusion.

Benign faults occur after the PST concludes successfully and detects that one of the user-entered parameters are out of range. Table 6 lists the fault and the related user field.

Table 6 - Benign Faults and Related User Fields

Fault	User Field
FRICTION_LOW	*PST* tab *Partial Stroke Test Settings Friction Low Limit* field: decrease the limit.
FRICTION_HIGH	*PST* tab *Partial Stroke Test Settings Friction High Limit* field: Increase the limit.
BREAKOUT	*PST* tab *Partial Stroke Test Settings Breakout Limit* field: Change the limit.
SUPPLY_DROOP	*PST* tab *Partial Stroke Test Settings Droop Limit* field: Adjust the pressure down.

© 2024 Baker Hughes Company. All rights reserved.

Table 7 - PST_Failed Fault and Related User Fields

Cause	User Field
PST program changes actuator pressure to initial point (SP = 100%). Valve does not stabilize within allotted time.	*PST* tab *Partial Stroke Test Set-tings Maximum Time* field: Increase the time.
PST program changes actuator pressure to initial point (SP = 100%). While it waits to stabilize the user cancels it.	*PST* tab *Partial Stroke Test Set-tings Maximum Time* field: Increase the time.
PST attempts to move the valve to (100% - PST Travel) point. Fails to do so in *Maximum Time* - PST fails.	*PST* tab *Partial Stroke Test Set-tings Maximum Time* field: Increase the time.
PST successfully moves the valve to (100% - PST Travel) point but the resulting actuator pressure is below Minimum Pressure - PST fails.	*PST* tab *Partial Stroke Test Set-tings Minimum Pressure* field: Adjust the pressure.
PST attempts to move the valve to 100%. Fails to do so in Maximum Time - PST fails.	*PST* tab *Partial Stroke Test Set-tings Maximum Time* field: Increase the time.
PST attempts to write data it collected to NVMEM and fails - PST fails.	If repeated, contact support.

Language

The SVI II ESD can display its menu in:

- *English*
- *French*
- *Spanish*
- *Portuguese*
- *Japanese*
- *Italian*
- *German*

This list box allows you to choose which to use. The ESDVue program is not affected.

Pressure Units

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

© 2024 Baker Hughes Company. All rights reserved.

Air Action

Use this option to set the action of air on the valve; *Air To Open* causes air to open the valve and *Air To Close* causes air to close the valve.

Configure I/O

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

Accessing Configure I/O

Click **Configure I/O** on the *Configure* screen and ESDVue launches the *I/O Configure* window (*Figure 101*). You can change the following configuration parameters:

- *Output Switches*
- *Position Retransmit*

To configure the inputs and outputs:

1. Click **Configure I/O** on the *Configure* screen and the *I/O Configure* window appears (*Figure 101*).
2. Change the following configuration parameters:
   - *Output Switches* - See *"Output Switches (DO2)"* on page 131 for descriptions of all the I/O settings.
   - *Position Retransmit* - See *"Position Transmitter (AO)"* on page 134 for descriptions of all the I/O settings.
   - *Switch #1 Annunciate Fault Mask* - See *"Switch #1 Annunciate Fault Mask"* on page 135 for a description.

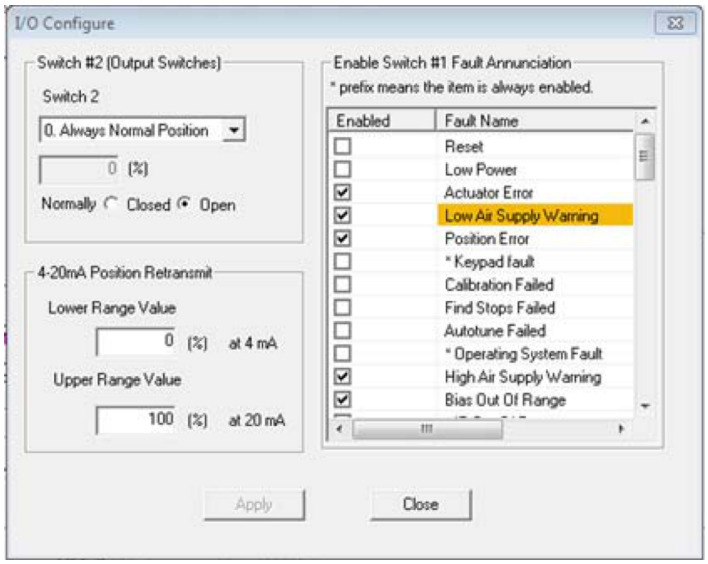


Figure 101 - Launching Configure I/O

© 2024 Baker Hughes Company. All rights reserved.

3. Click **OK**.

Note: If a fault is active, the level is indicated by a band appearing on the I/O Configure dialog. The colors correspond to level as on the Status tab:

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

© 2024 Baker Hughes Company. All rights reserved.

Output Switches (DO2)

The SVII ESD supports a contact output SW #2 (Digital Output switch), that can be logically linked to status bits.

The switch is 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, regardless of switch state.

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.

Without a load, when the switch is on (closed) the external voltage would be dropped across the switch. **This damages the switch** (*Figure 102*).

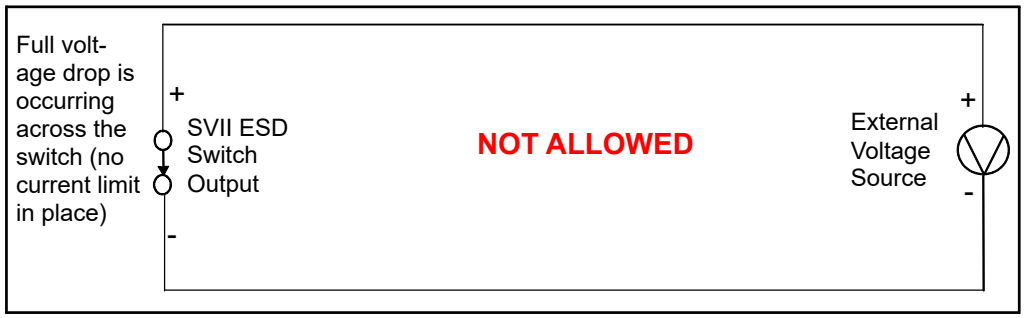


Figure 102 - Installation Drawing without Load: Configuration Not Allowed

These conditions are:

0. Always Normal Position	The switch is not controlled by the SVI II ESD and remains in it's default position. The discrete output switch 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*. If the switch is set to Always normal position, then the switch always remains in the selected state.
1. Failsafe	The switch is activated when the SVI II ESD is in failsafe mode.
2. Reset	The switch is activated whenever a reset has occurred and the switch remains activated until the SVI II ESD 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).

© 2024 Baker Hughes Company. All rights reserved.

5. Position Low Limit The switch is activated whenever the valve position is less than the position setting of this switch control.

CAUTION

*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.

CAUTION

*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 ESD is in manual mode.

8.Annunciate The switch is activated whenever the SVI II ESD makes an annunciation; e.g. diagnostics are running, SVI II ESD status has changed.

9. ESD Triggered The switch is activated whenever an Emergency Shutdown event is triggered.

10. Manual or OOS The switch is activated whenever the SVI II ESD is in either *Manual* mode or *Out Of Service (OOS)*.

11. PST is running The switch is activated whenever *PST* (Partial Stroke Testing) is running.

General Configuration Notes

This section discusses the necessary precautions when configuring a system.

	Switch OFF	**Switch ON**
V_{SWITCH}	30 VDC max.	≤ 1 V (Switch saturation voltage)
I_{SWITCH}	≤ 0.200 mA (Switch leakage current)	1 A max.

CAUTION

Incorrect polarity connection results in an effectively closed connection.

© 2024 Baker Hughes Company. All rights reserved.

CAUTION

Consult with qualified personnel to ensure that electrical requirements for the switch are met.

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 switch voltage is ≤ 1V.

When the switch is on (closed) the external voltage must be dropped across the load (*Figure 103*).

CAUTION

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 EMF protection to prevent voltage spikes.

Inductive Load, Solenoid, Incandescent Lamp Configuration

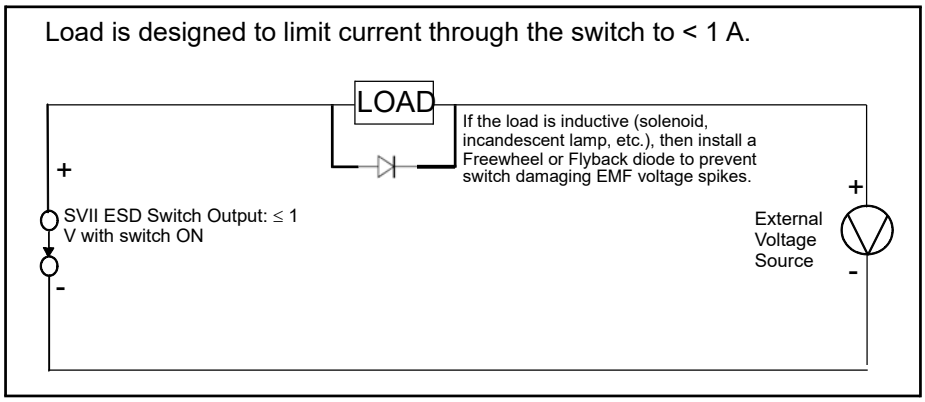


Figure 103 - Switch Installation Drawing: Correct Configuration with Load

© 2024 Baker Hughes Company. All rights reserved.

Distributed Control Systems Configurations

This section gives guidance for configuration in a DCS application. *Figure 104* gives two generalized drawings that cover DCS applications to ensure switch safety.

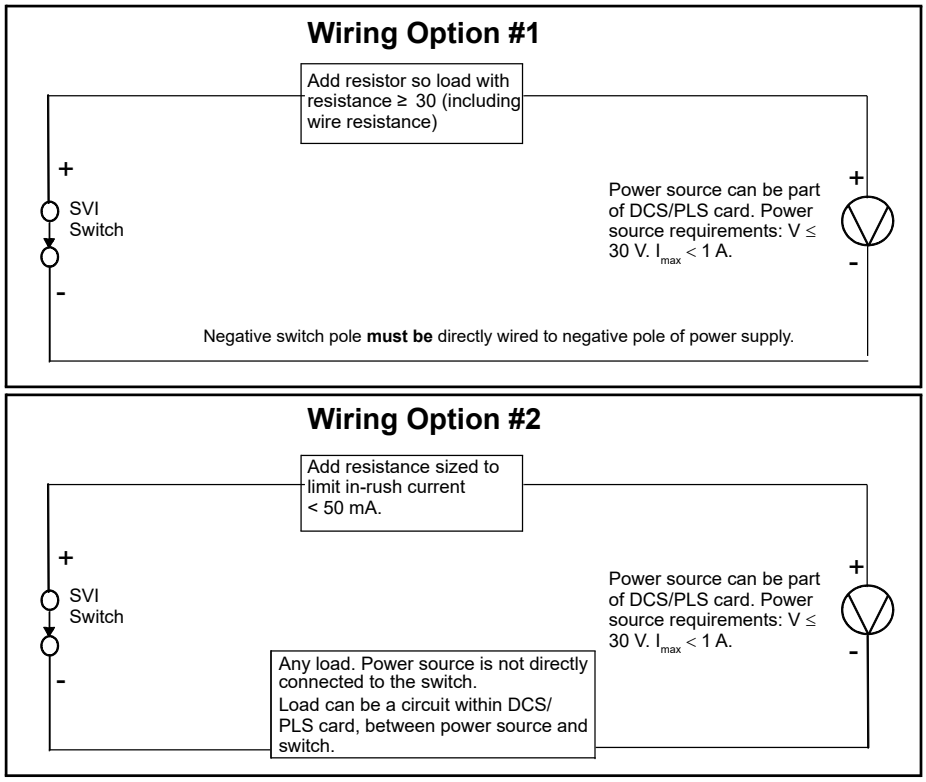


Figure 104 - DCS Switches Wiring Options

Configuration Considerations

- A typical value for 24 AWG cable about 0.025 Ohm/ft (see Wiring Option #1).
- If IS barrier is a combination of fuse, resistor and Zener diode then the connection is shown in Option #2. The barrier must have adequate resistance to limit inrush current, as the fuse cannot limit inrush current (see Wiring Option #2).

Position Transmitter (AO)

The SVI II ESD has the ability to retransmit the position signal as an output to another device with 4 - 20 mA current output proportional to position. Enter a lower range value and an upper range value.

© 2024 Baker Hughes Company. All rights reserved.

Switch #1 Annunciate Fault Mask

This feature is available for firmware versions 3.1.6 or later.

The default configuration of the ESD #1 switch is to open/close (depending on its normally open or closed configuration) if any of the conditions shown in *Figure 105* occurs. You can use this list of faults to configure which faults cause the switch to change state and which faults are ignored. Faults where the associated checkbox is checked cause the switch to change state on detection.

User interaction with some faults (HART® commands), by default, is disabled. These faults are indicated on the *I/O Configure* dialog with an asterisk (*) beside them. The faults falling into this category can be reconfigured by Masoneilan, but not by using ESDVue. Contact Masoneilan for assistance.

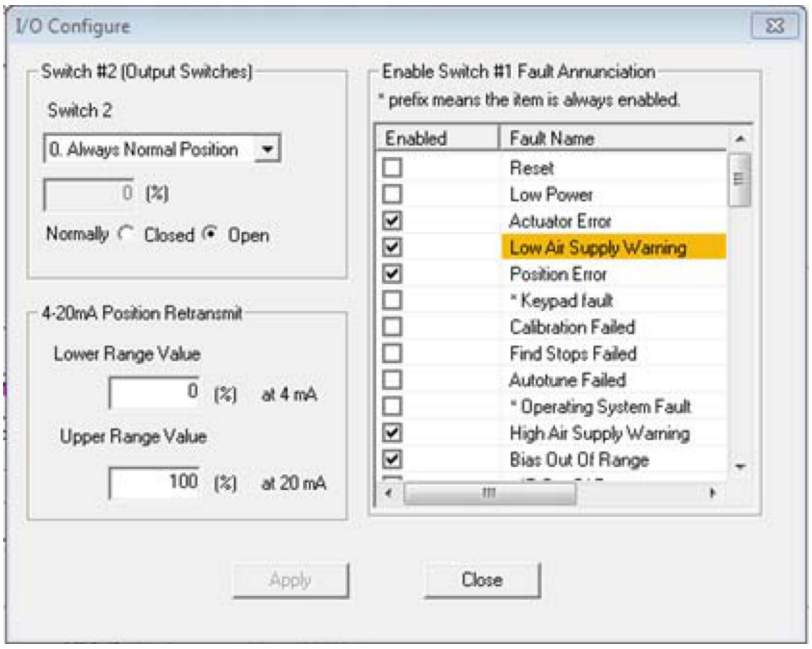


Figure 105 - Launching Configure I/O

The color coding for the severity of the fault matches those on the *Status* screen. See *"What you can do on the Status Screen"* on page 287.

Note: If you send HART® command 230 using a handheld and the DD, you will see Fault Mask information that is intended for Masoneilan technical personal for debugging purposes (starts with firmware 3.1.6).

To configure the switch:

1. Select the checkbox (es) associated with the fault you want to cause the switch to change state.
2. Click **Apply**.

© 2024 Baker Hughes Company. All rights reserved.

Table 8 lists all the faults that are selectable on the *I/O Configure* dialog to affect the DO1 switch. Selecting them activates them. Items marked on screen and in the table with an asterisk are non-maskable and always annunciate.

Table 8 - Faults Selectable for DO1

Fault (Fault name (screen text, if different))	Fault #	Fault	Fault #
RESET	1	WATCHDOG_TIMEOUT*	43
LOW_POWER	2	NVM_WRITE* (NVM Write Fault)	44
ACTUATOR	3	IRQ_FAULT*	45
AIR_SUPPLY_LOW (Low Air Supply Warning)	4	TMOUT_FLASH_TEST* (Flash ROM Test Timeout)	46
POSITION_ERROR	5	SELF_CHECK*(MCU Internal Malfunction)	47
KEYPAD* (Keypad fault)	7	SOFTWARE*	48
CALIBRATION_FAILED	9	ESD_TRIP (ESD Valve Tripped)	49
FIND_STOPS_FAILED	10	ESD_NEW_DATA (New ESD Data Available)	50
AUTOTUNE_FAILED	11	ESD_DATA_ERROR (Saving ESD Data Error)	51
RTOS_SCHEDULING* (Operating System Fault)	14	PST_FAILED*	52
SUPPLY_HIGH (High Air Supply Warning)	15	PST_NEW_DATA (New PST Data Available)	53
BIAS_OUT_OF_RANGE	17	PST_DATA_ERROR (Saving PST Data Error)	54
IP_OUT_OF_RANGE*	18	PNEUMATIC_TRAIN* (Pneum Train Integrity)	55
TEMPR_OUT_OF_RANGE	19	TERMINAL_BOARD* (ESD Circuitry Integrity)	56
CONF_1 (Err_Air_Cfg (Inadequate Low Threshold)	21	FRICTION_LOW (Friction Below Normal)	59
NVM_CHECKSUM* (NVM Checksum Error)	25	FRICTION_HIGH (Friction Above Normal	60
RAM_CHECKSUM* (Ram Checksum Error)	26	BREAKOUT (Breakout Force Exceeded)	61
FW_CHECKSUM* (Flash Checksum Error)	27	SUPPLY_DROOP (Air Supply Droop Abnormal)	62
STACK* (Stack Error)	28	PST_TEST_CANCELED	63

© 2024 Baker Hughes Company. All rights reserved.

Table 8 - Faults Selectable for DO1 (Continued)

Fault (Fault name (screen text, if different))	Fault #	Fault	Fault #
FACTORYWRITE* (Flash Indicator)	29	PNEUMATIC_TEST_CANCELED	64
NVM_TEST* (NVM Test Error)	30	IP_CAL_DRIFT (I/P Calibration Drift Warning)	65
LATCH_FSAFE (Latched Event)	31	IP_SERVO_LOW (Low I/P Output Pressure)	66
FACTORYMODE* (Factory Mode Indicator)	32	IP_SERVO_HIGH (High I/P Output Pressure)	67
REF_VOLTAGE* (Ref Voltage Fault)	33	LINKAGE_DRIFT* (Feedback Linkage Drift)	68
POSITION_SENSOR* (Position Sensor Fault)	34	VALVE_STUCK_CLOSED	69
CURRENT_SENSOR* (Current Sensor Fault)	35	VALVE_STUCK_OPENED	70
TEMPERATURE_SENSOR* (Temp. Sensor Fault)	36	TMOUT_PST_TEST* (PST Out of Schedule)	71
PRESSURE1* (Pressure 1 Fault)	38	TMOUT_PNEU_TEST* (Pneumatic Test Out of Schedule)	72
PRESSURE2* (Pressure 2 Fault)	39	LATCH_AIR_LOSS	73
PRESSURE3* (Pressure 3Fault)	40	AIR_LATCH_DISABLED	74
PRESSURE4* (Pressure 4 Fault)	41	AIR_LATCH_DELAY (Invalid Recovery Time)	75
PRESSURE5* (Pressure 5 Fault)	42		

© 2024 Baker Hughes Company. All rights reserved.

Setup Wizard

Running the *Setup Wizard* is one of two ways to set up the SVI II ESD. 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* screen you can rapidly setup the SVI II ESD 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 a progress screen appears.

The *Setup Wizard* can dramatically reduce commissioning time in the field. To customize the valve setup refer to *"Advanced Setup with ESDVue"* on page 339.

To run the *Setup Wizard* you must first be in *Setup* mode. See *"Change Mode"* on page 81 for information on changing modes.

- Select **Setup Wizard** (*Figure 106*).

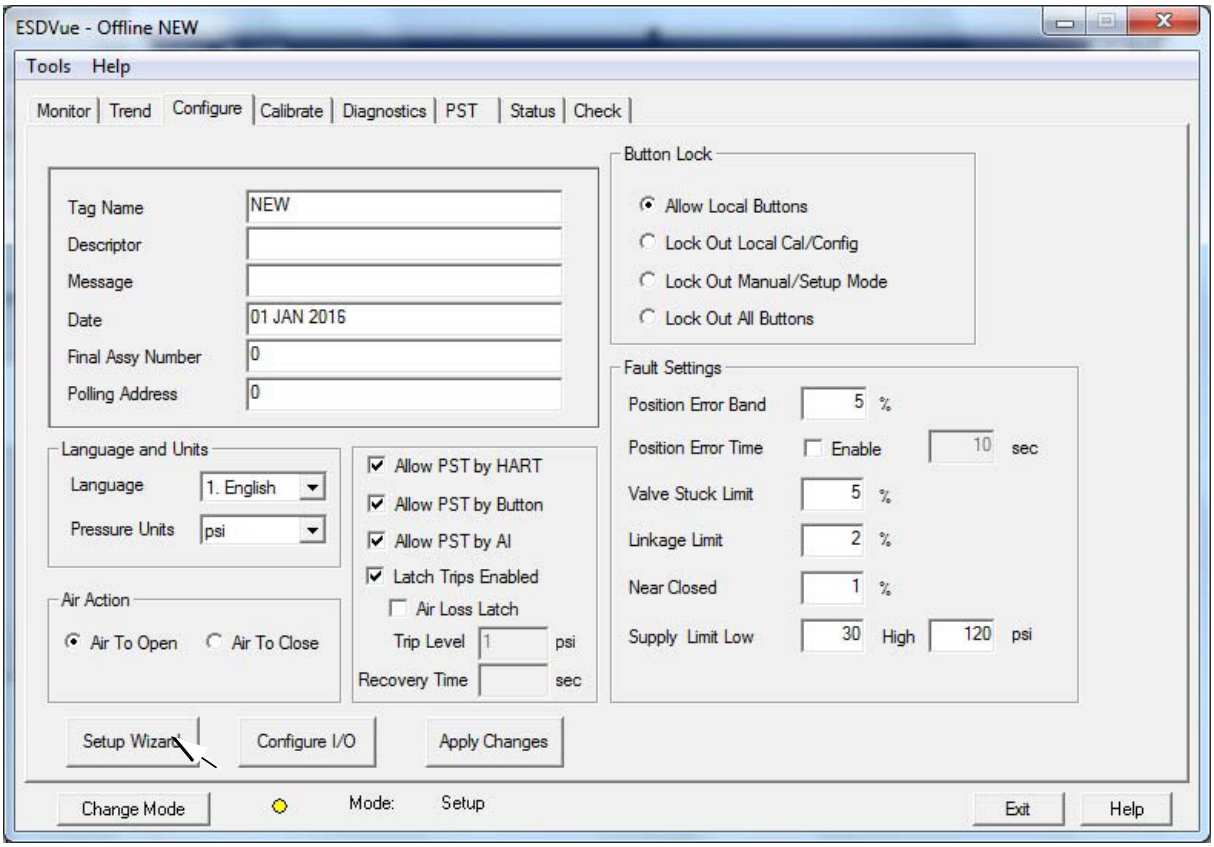


Figure 106 - Starting the Setup Wizard

© 2024 Baker Hughes Company. All rights reserved.

Setup Wizard Selections

After you start the *Setup Wizard* ESDVue launches the *Setup Wizard* window (*Figure 107*) where you can select the setup features to perform:

- *"Step 1 - Setting the Tag and Descriptor"* on page 140
- *"Step 2 - Set Air Action"* on page 142
- *"Step 3 - Calibrate Travel"* on page 144
- *"Step 4 - Autotune"* on page 145
- *"Step 5 - Setup Selections Made"* on page 146
- *"Step 6 - Setup Wizard Diagnostic Graph"* on page 149
- *"Step 7 - New Parameters"* on page 150
- *"Step 8 - Setup Wizard Complete"* on page 152
- *"Step 9 - Applying Configuration Changes"* on page 153

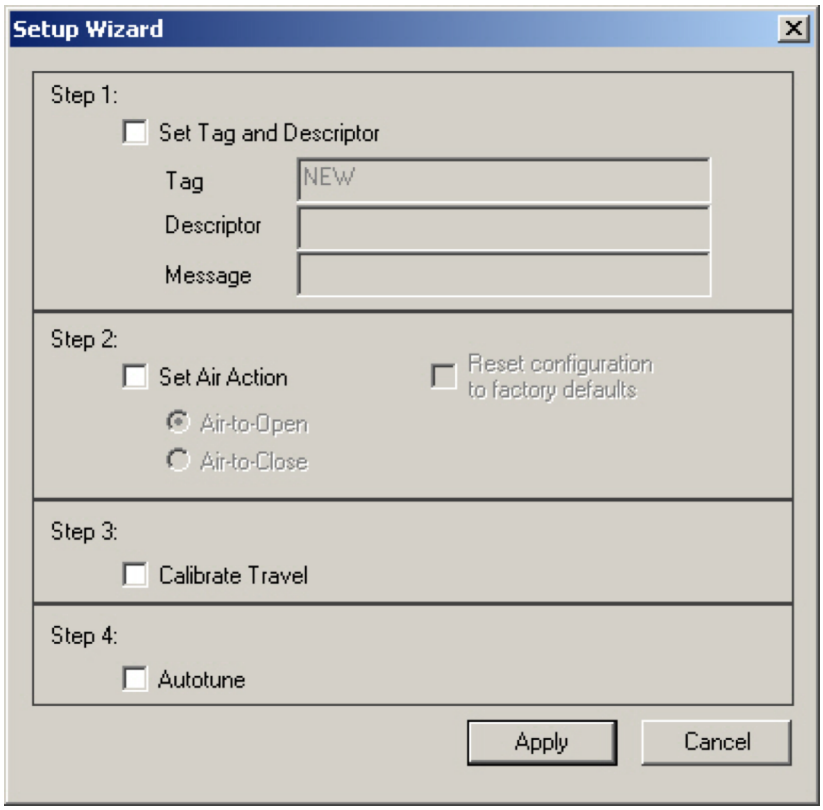


Figure 107 - Setup Wizard Selections Window

© 2024 Baker Hughes Company. All rights reserved.

Step 1 - Setting the Tag and Descriptor

If you are changing *Tag and Descriptor* information, make the changes prior to executing (*Apply*) the remaining Setup Wizard steps. If you are using the *Setup Wizard* for calibrating travel and auto tuning, ESDVue runs through the calibrate and auto tune procedures and *does not* return to the *Setup Wizard* window.

1. Select **Set Tag and Descriptor** (*Figure 108*).
2. Click in and edit the *Tag* field.

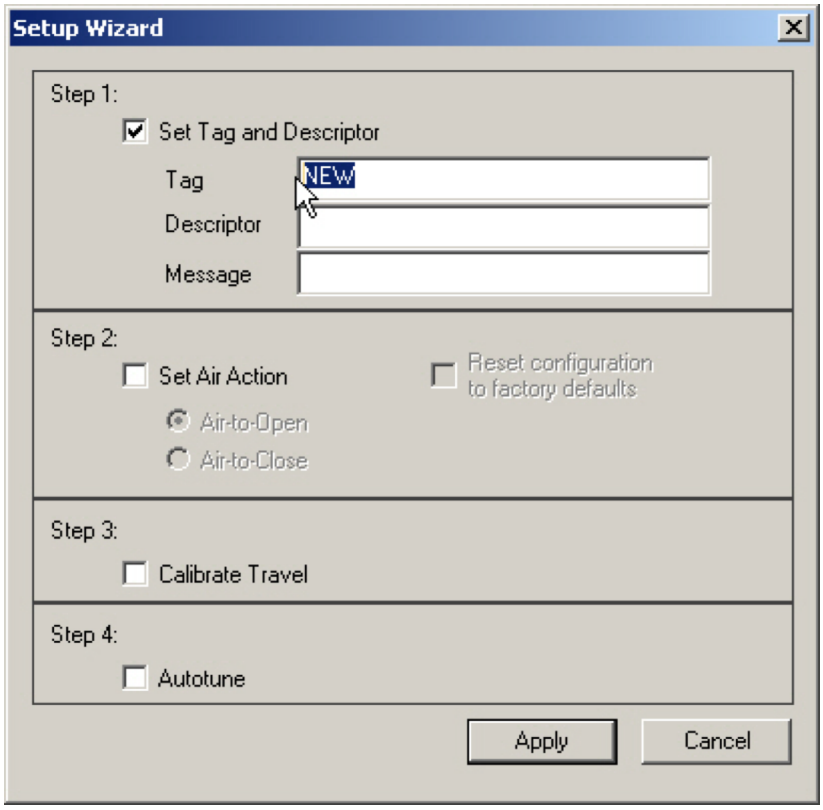


Figure 108 - Setup Wizard - Setting Tag and Descriptor

© 2024 Baker Hughes Company. All rights reserved.

3. Enter text in the *Descriptor* and *Message* fields, if necessary (*Figure 109*).

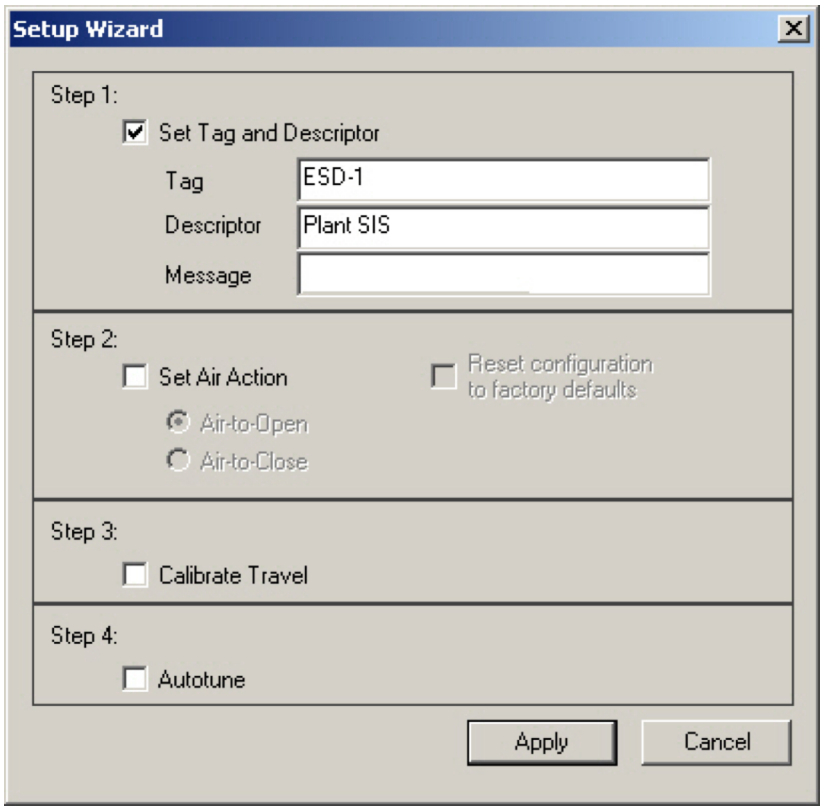


Figure 109 - Tag and Descriptor Entered

Note: The 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.

© 2024 Baker Hughes Company. All rights reserved.

Step 2 - Set Air Action

Use this 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 ESD to open the valve
- Air to Close - air pressure is used through the SVI II ESD to open the valve
- Reset configuration to factory defaults - resets the air action to the factory default

To set the air action:

1. Click **Set Air Action** (*Figure 110*).

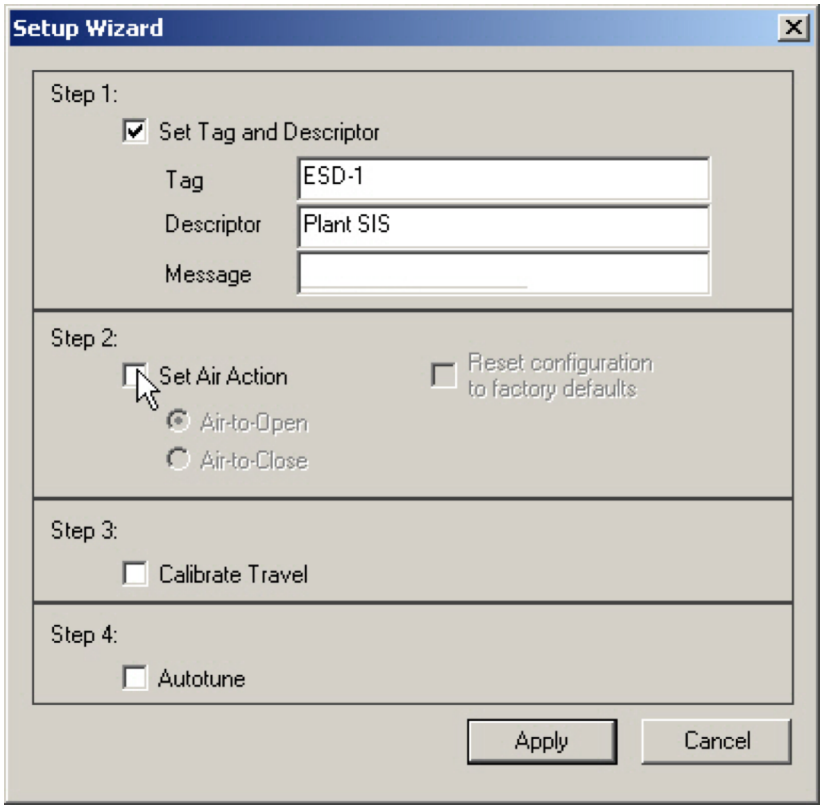


Figure 110 - Enabling Set Air Action

2. Click either the radio button for **Air-to-Open** or **Air-to-Close**.

© 2024 Baker Hughes Company. All rights reserved.

3. Click **Reset configuration to factory defaults** to reset the air action configuration to the factory defaults (*Figure 111*).

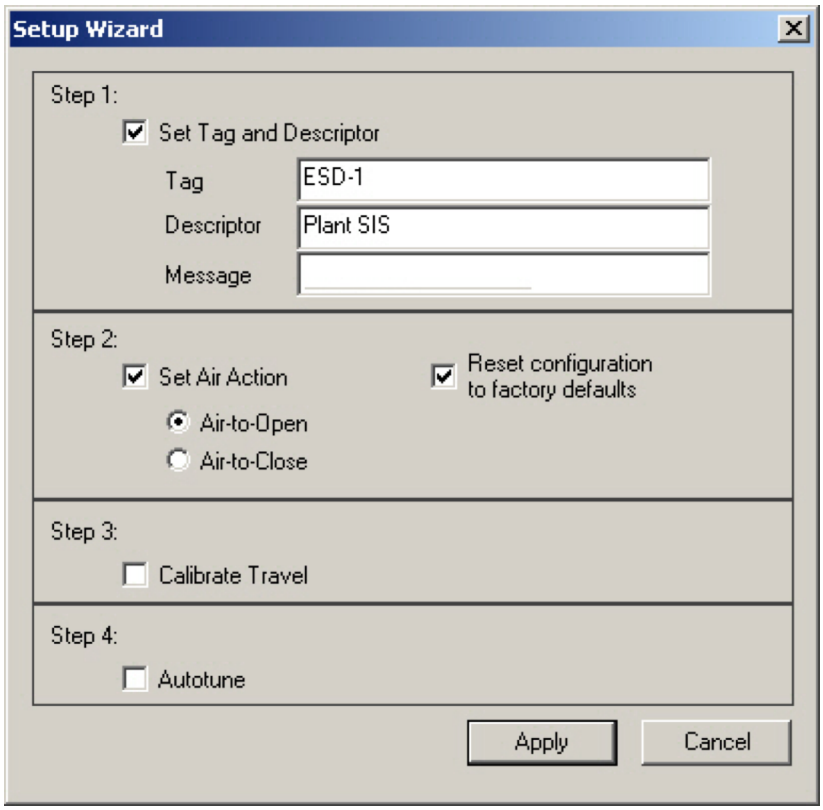


Figure 111 - Air Action Set

Note: The changes made 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.

© 2024 Baker Hughes Company. All rights reserved.

Step 3 - Calibrate Travel

To determine valve position, the PST controller must measure the closed and open positions of the valve. The SVI II ESD 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 PST controller travel:

- Click the **Calibrate Travel** checkbox (*Figure 112*).

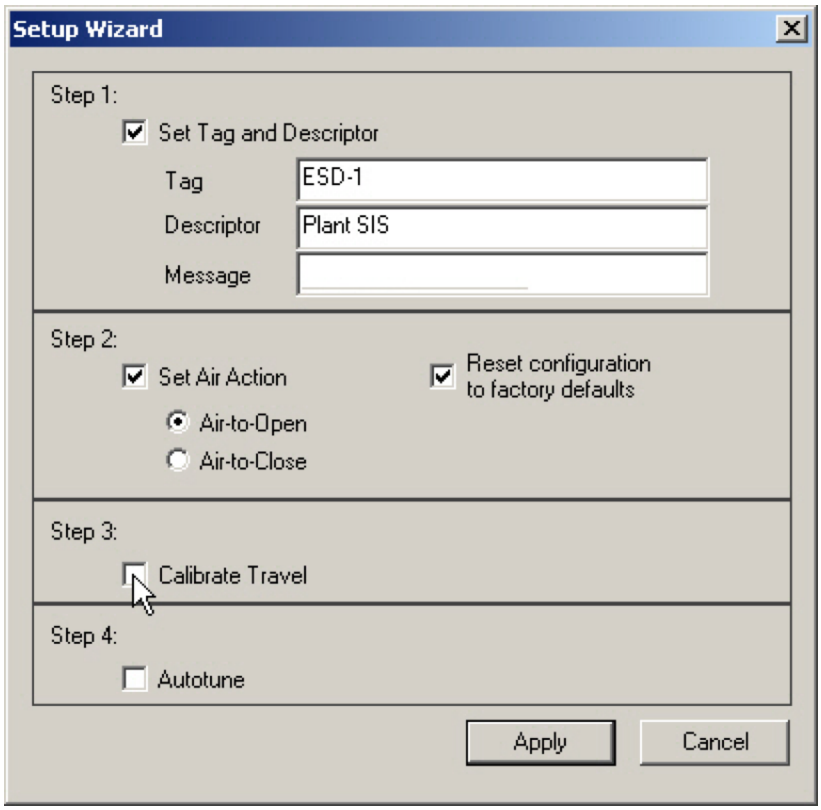


Figure 112 - Enabling Calibrate Travel

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

© 2024 Baker Hughes Company. All rights reserved.

Step 4 - Autotune

The SVI II ESD has a built-in positioning Autotune feature. When setting up the PST controller on a valve, this feature automatically computes the optimal parameters for the positioning algorithm. This features 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 optimal for tight and accurate position control.

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

To autotune the SVI II ESD with the *Setup Wizard*:

- Click the **Autotune** checkbox (*Figure 113*).

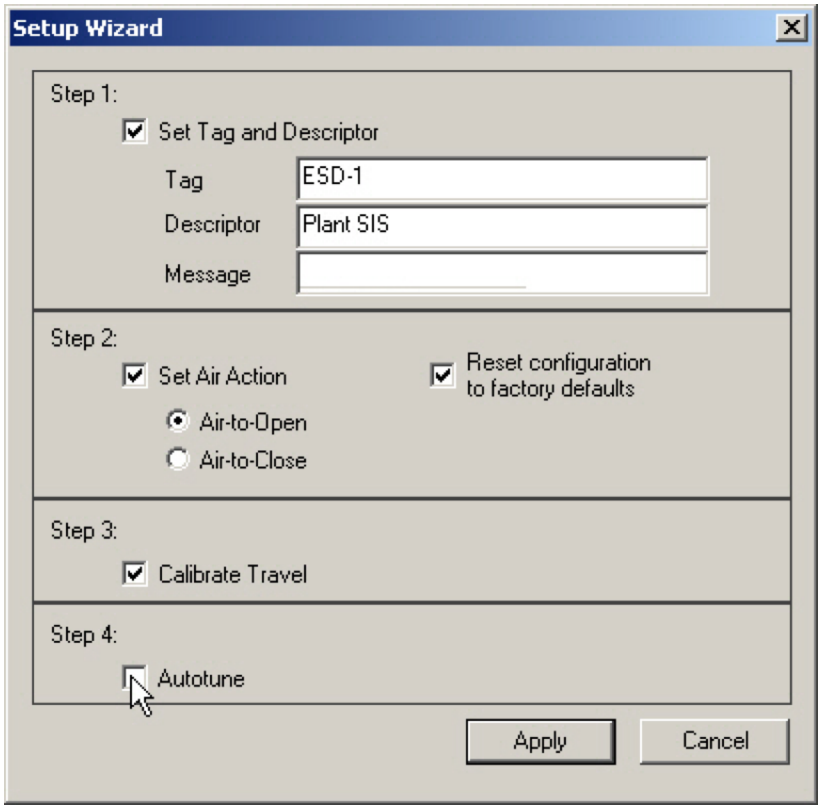


Figure 113 - Enabling Autotune

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

© 2024 Baker Hughes Company. All rights reserved.

Step 5 - Setup Selections Made

1. Click **Apply** (*Figure 114*).

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

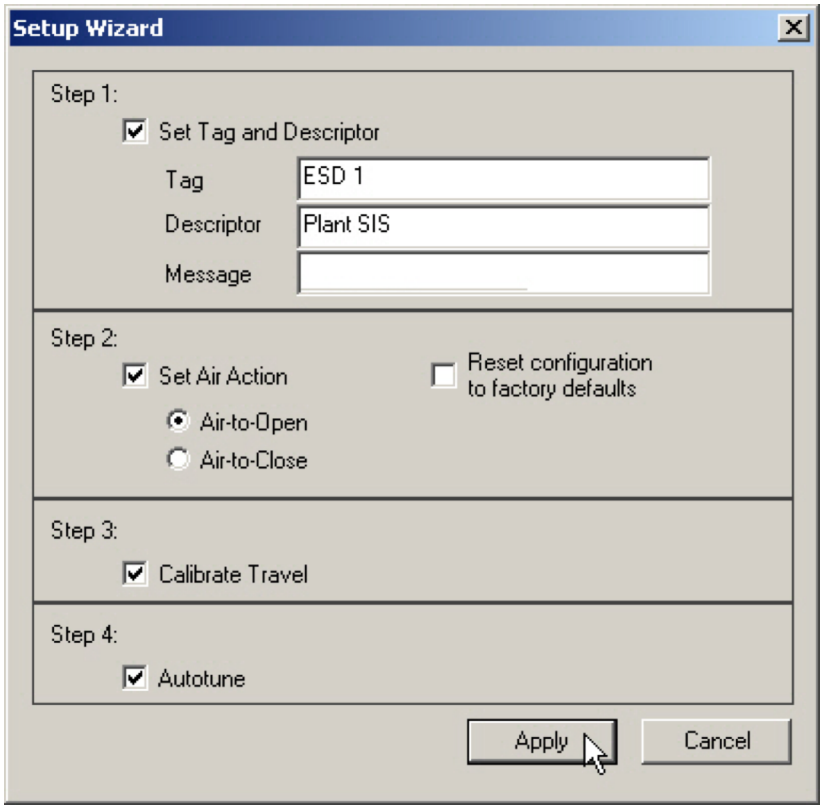


Figure 114 - Applying Setup Wizard Changes

A dialog indicating the actions setup selected appears (*Figure 115*).

2. Click **OK**.

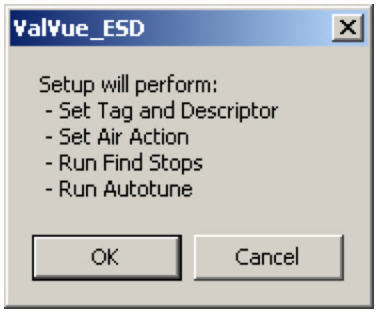


Figure 115 - Setup Dialog

If you are calibrating travel and autotuning, a dialog appears (*Figure 116*).

© 2024 Baker Hughes Company. All rights reserved.

3. Click **OK** to continue.

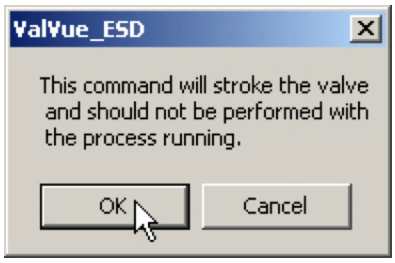


Figure 116 - Running Setup Wizard Dialog

Setup Wizard Progress

During the course of running the *Setup Wizard*, ESDVue displays progress dialogs. The progress dialog (*Figure 117*) indicates that Step 1 - Set Tag and Descriptor, and Step 2 - Set Air Action, are finished.

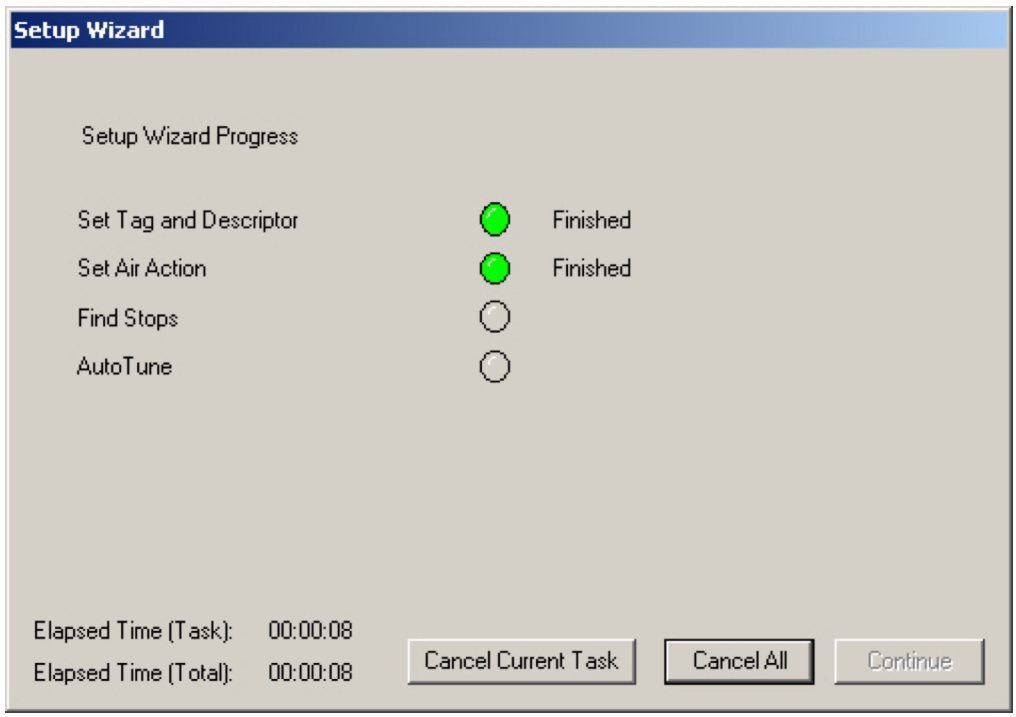


Figure 117 - Setup Wizard Progress Dialog

© 2024 Baker Hughes Company. All rights reserved.

ESDVue continues to issue progress messages, and failures, if they happen. *Figure 118* indicates that Step 3 - Calibrate Travel (Find Stops) is running.

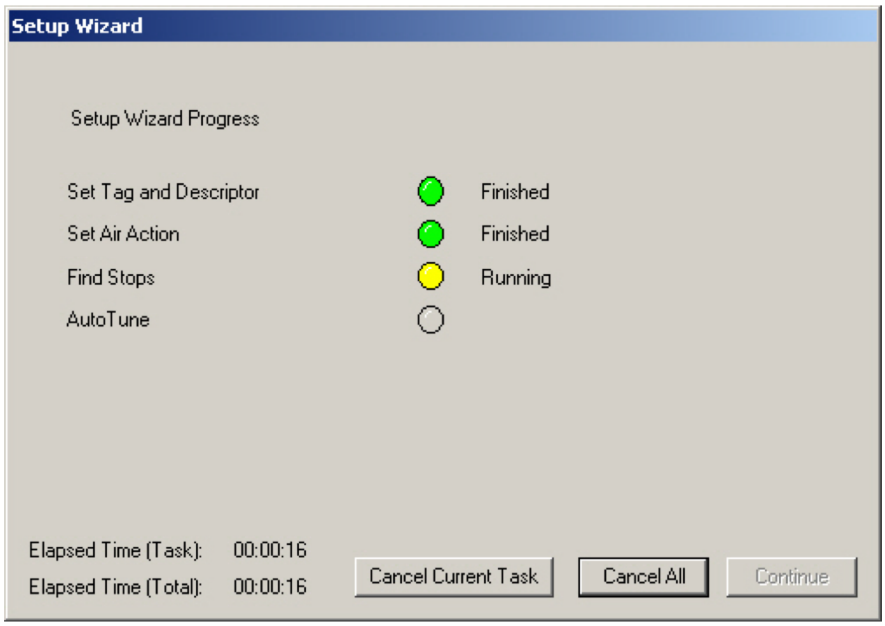


Figure 118 - Setup Wizard Progress Dialog - Running Find Stops

When the *Setup Wizard* has completed running Step 3 - Find Stops, progress continues with Step 4 - Autotune (*Figure 119*).

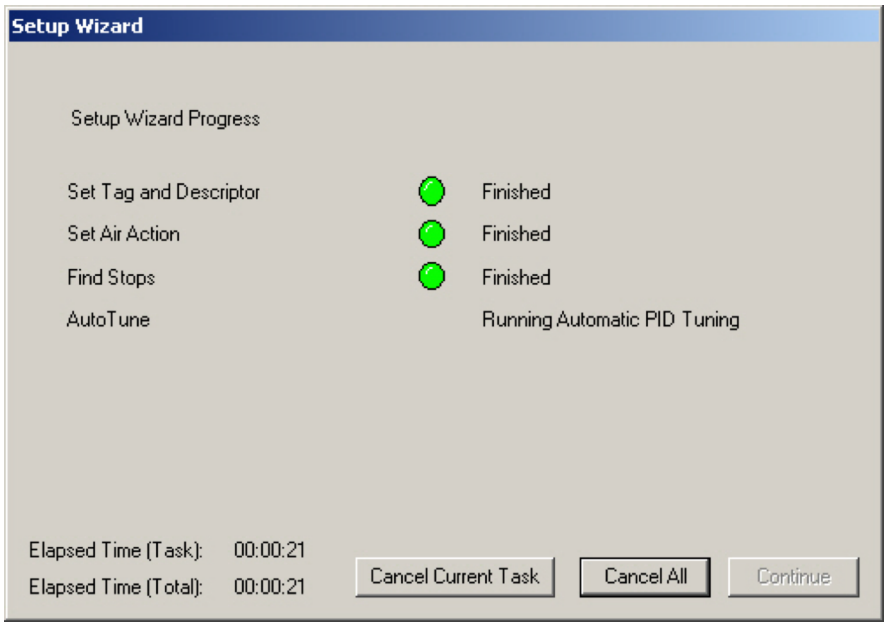


Figure 119 - Setup Wizard Progress Dialog - Running Autotune

© 2024 Baker Hughes Company. All rights reserved.

Step 6 - Setup Wizard Diagnostic Graph

After you have successfully completed Autotune, ESDVue launches the diagnostic graph (*Figure 120*) for the SVI II ESD that displays the tuning parameters in a graphical format.

There are several features available on the diagnostic graph that can enhance the data collected in the graph:

- Set Graph Scale - allows you to change the graph scale on diagnostic graphs so that you can narrow in on one area of the graph, or expand the viewing area.
- Select Additional Curve - allows you to view more than one diagnostic curve at a time; being able to compare two curves may facilitate diagnostics.
- Show Computed Result - allows you to view the data in a numerical value format.
- Show Data Points - when selected, by clicking the checkbox, shows the data points on the graph.
- Save To File - allows you to save the graph to a file.
- Export to Excel - exports the data as a CSV Excel file.
- Capture to Clipboard - captures a bitmap image of the graph.
- Close - closes the graph and returns the ESDVue screen.

View the graph and make any adjustments if necessary. and click **Close**.

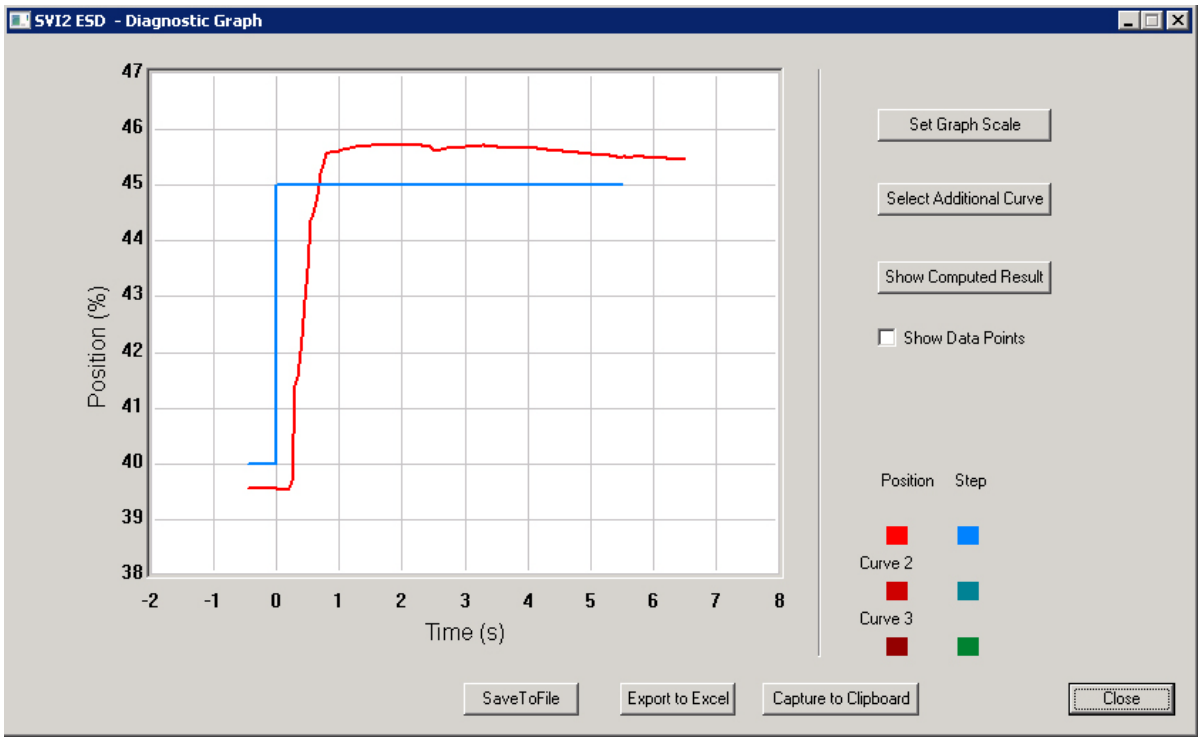


Figure 120 - Setup Wizard Autotune Diagnostic Graph

© 2024 Baker Hughes Company. All rights reserved.

Diagnostic Graph Color Legend

At the bottom of each SVI II ESD diagnostic graph is a color legend. The legend identifies by color each curve and step on the currently active graph and any additionally selected (using the *Select Additional Curves* function).

Step 7 - New Parameters

After you close the *Setup Wizard Diagnostic Graph*, the *PID Values* window appears (*Figure 121*).

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** (*Figure 121*).

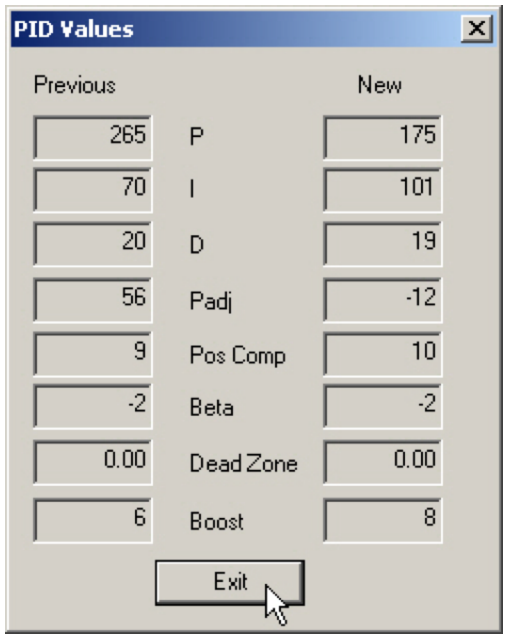


Figure 121 - New PID Values After Setup Wizard Calibration

Parameter Definitions

P	Proportional gain in %. Common values for the PST controller 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 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 *Padj (%)* to *P* when the valve is exhausting.

© 2024 Baker Hughes Company. All rights reserved.

Position Compensation Coefficient (Pos Comp)	The response of the valve is different when the valve is nearly closed than when the valve is nearly open. The position compensation coef-ficient, which is a number between 0 and 20, make adjustments to try to equalize the valve response. The normal value is 6. For spring-less actuators the value is 15.
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.
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%.

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 ESD. 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.

© 2024 Baker Hughes Company. All rights reserved.

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) ESDVue the *Setup Wizard* dialog appears., indicating *Setup Wizard Complete*.

- Click **Continue** and the Configure screen appears (*Figure 122*).

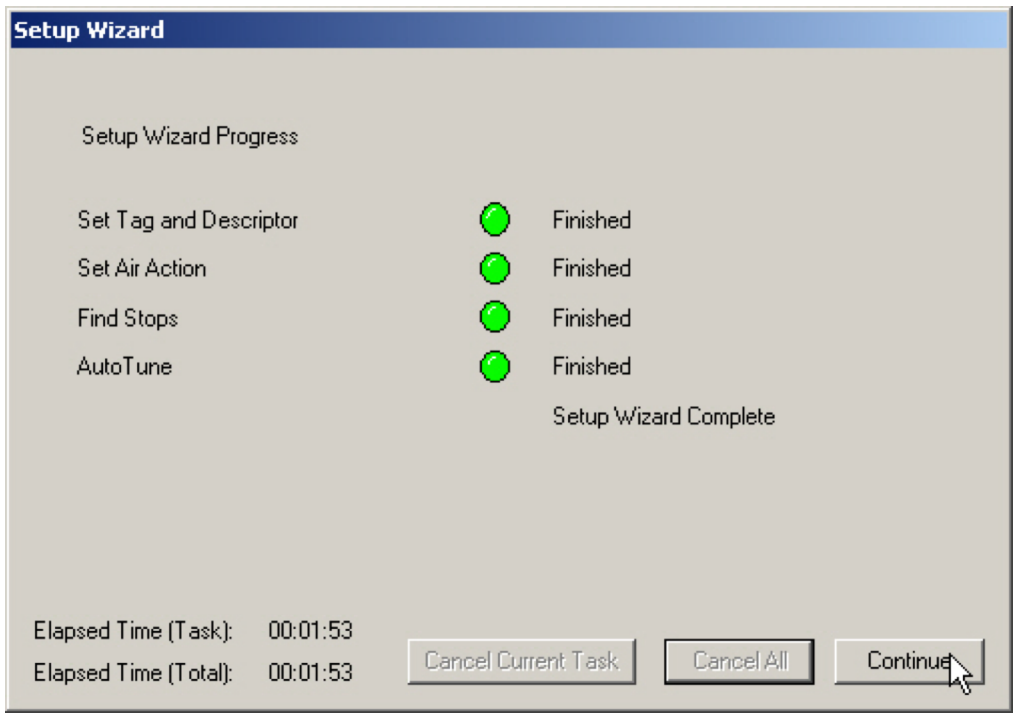


Figure 122 - Setup Wizard Complete

© 2024 Baker Hughes Company. All rights reserved.

Step 9 - 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** (*Figure 123*) and any changes made in the Configure screen are written to the SVI II ESD.

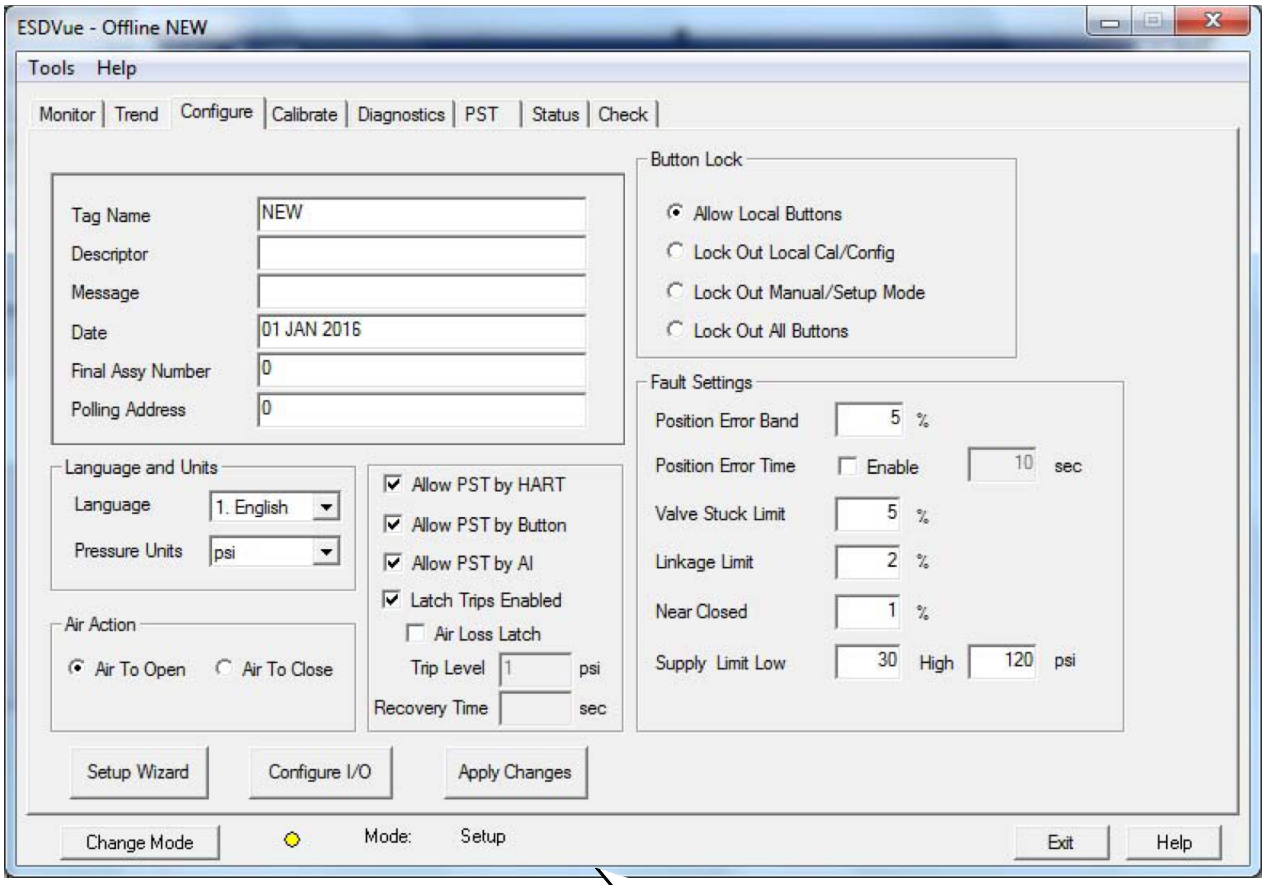


Figure 123 - Applying Configuration Changes

© 2024 Baker Hughes Company. All rights reserved.

Configure Context Menu

When you right-click on the *Configure* screen, a context menu appears (*Figure 124*) 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 screen instructions.

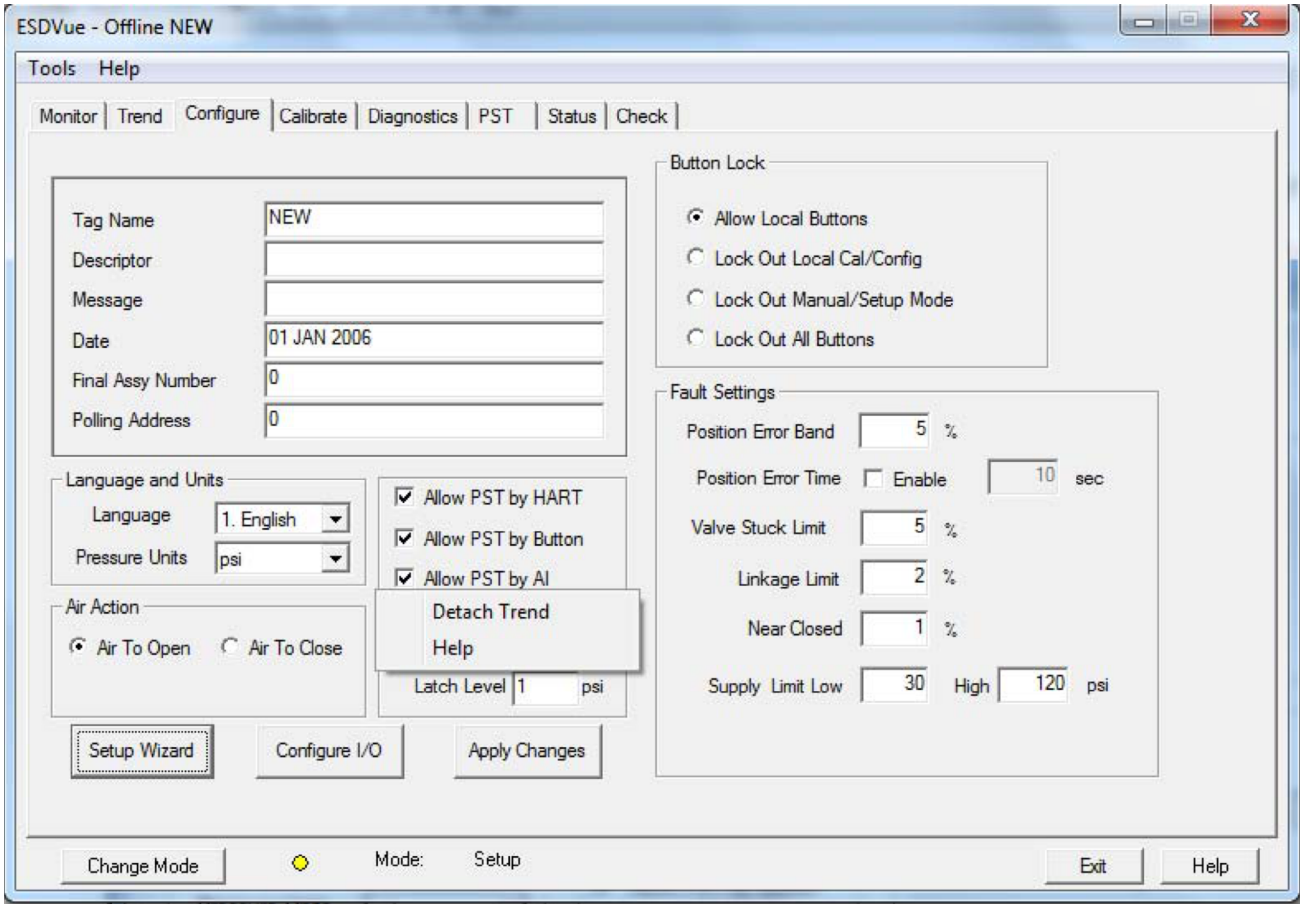


Figure 124 - Configure Screen Context Menu

© 2024 Baker Hughes Company. All rights reserved.

8. Calibrate

What you can do on the Calibrate Screen

Use the ESDVue *Calibrate* screen (*Figure 125*) to calibrate:

- *Stop Positions*
- *Signal*
- *Advanced Parameters* (PID - Position tuning parameters)

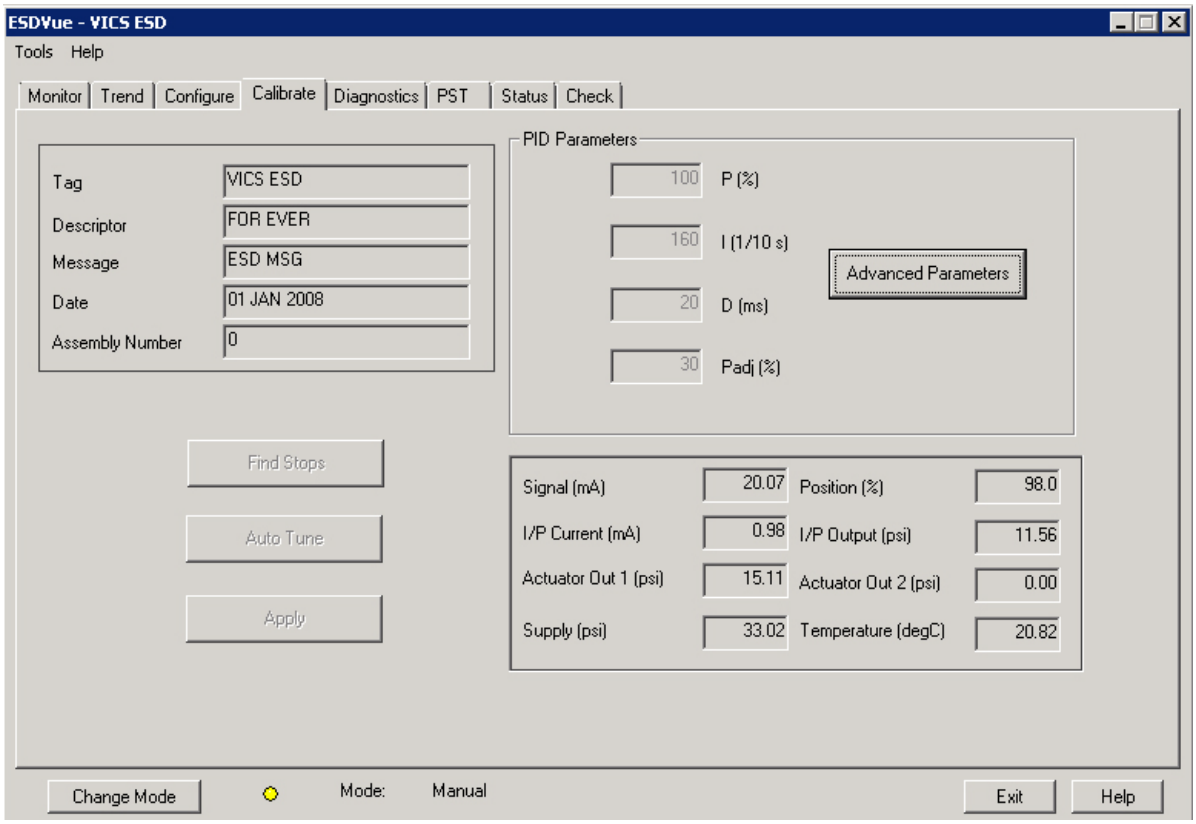


Figure 125 - Calibrate Screen

© 2024 Baker Hughes Company. All rights reserved.

Find Stops

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

The SVI II ESD moves the valve from its normal open position (recorded as the upper stop) to its lower stop position and records it, then moves it to its upper stop position again. 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 screen appears while the find stops process is running.

To start the *Find Stops* function:

1. Click **Find Stops** (*Figure 126*).

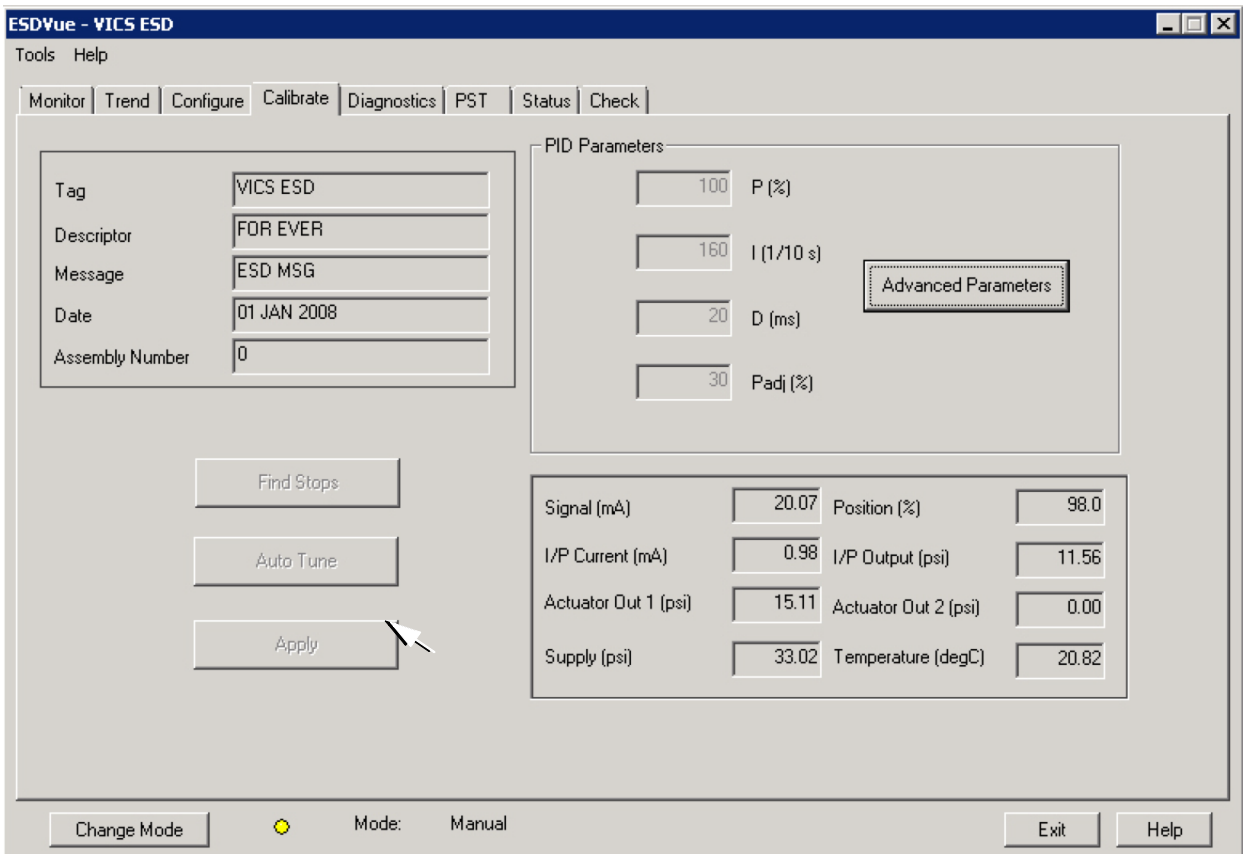


Figure 126 - Starting Find Stops

© 2024 Baker Hughes Company. All rights reserved.

A dialog appears (*Figure 127*).

2. Click **OK** to continue.

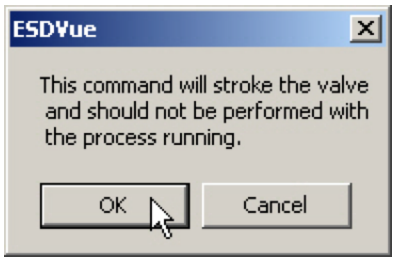


Figure 127 - Starting Find Stops Dialog

When *Find Stops* is running a progress dialog appears (*Figure 128*).

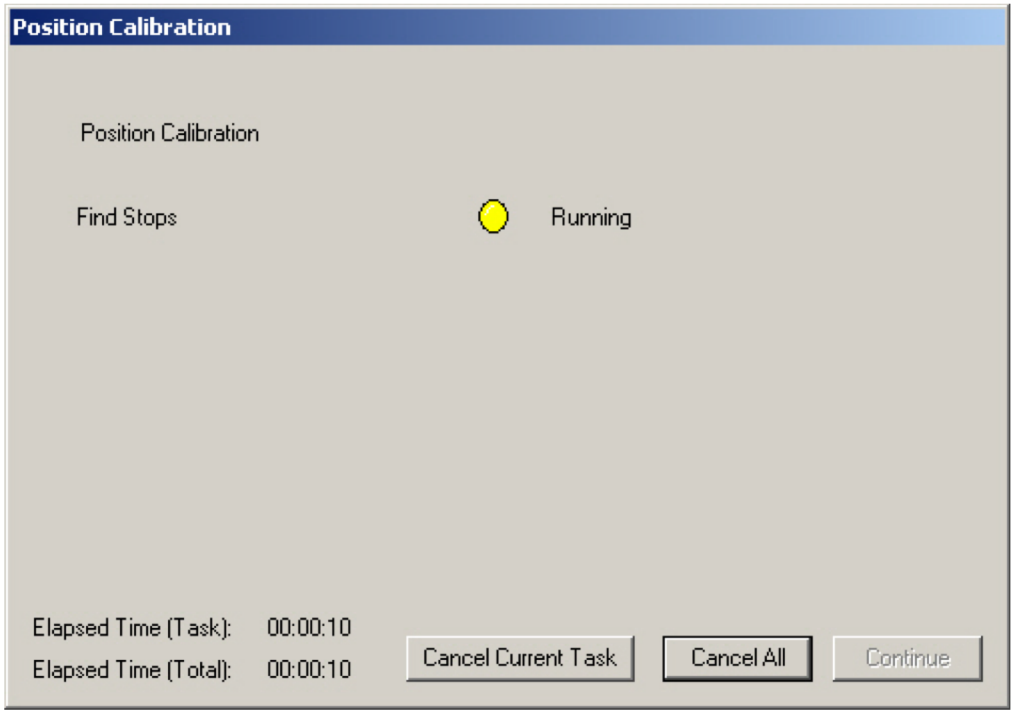


Figure 128 - Find Stops Dialog

When *Find Stops* has completed a dialog appears (*Figure 129*).

© 2024 Baker Hughes Company. All rights reserved.

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

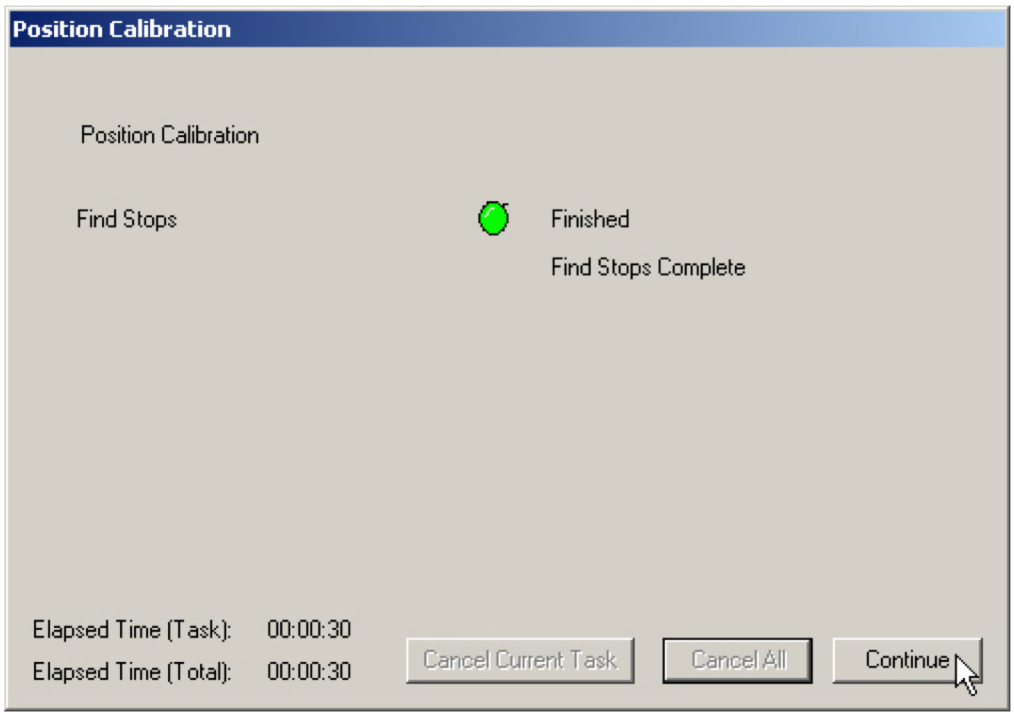


Figure 129 - Find Stops Complete

© 2024 Baker Hughes Company. All rights reserved.

Advanced Parameters

You can finely tune the SVI II ESD with the addition of advanced calibration parameters. On this screen you can adjust:

- *Dead Zone*
- *Beta*
- *Position Compensation Coefficient*
- *Boost*
- *Stroke Time*

To adjust the advanced parameters:

1. Click **Advanced Parameters** (*Figure 130*).

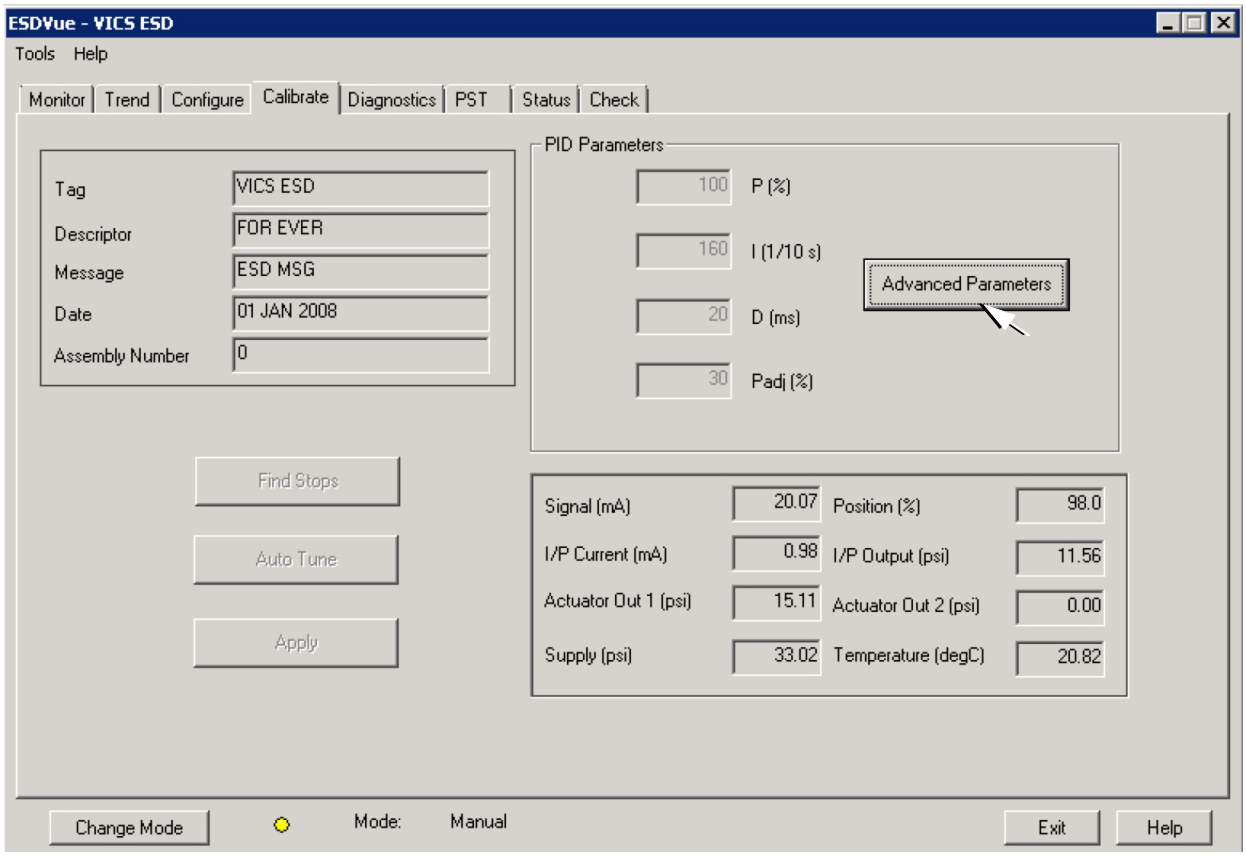


Figure 130 - Starting Advanced Parameters

© 2024 Baker Hughes Company. All rights reserved.

ESDVue launches the *Advanced Tuning Parameters* dialog (*Figure 131*).

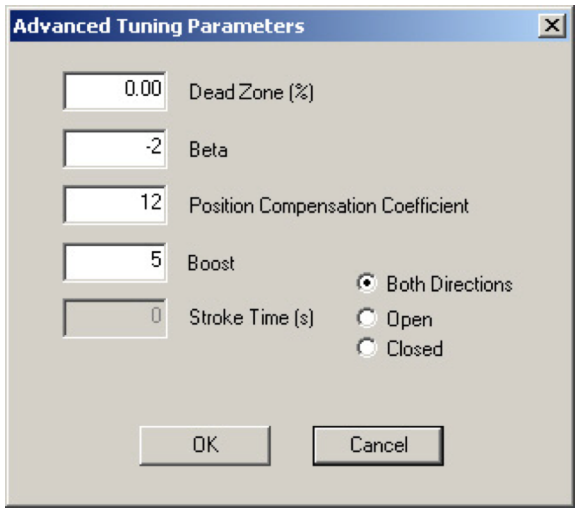


Figure 131 Advanced Parameters Dialog

2. Adjust the parameters, referring to Table 9 for parameter descriptions, then click **OK**.

Table 9 - Tuning Parameters

Tuning Parameter	Description
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%.
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.
Boost	The boost field in the PID adjustments controls a supplemental pressure or boost to speed up initial valve response from setpoint from 0 to 100%
Stroke Time	Amount of time in seconds that the valve is stroked.

© 2024 Baker Hughes Company. All rights reserved.

Auto Tune

The SVI II ESD has a built-in positioning Autotune feature. When setting up the PST controller 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 Autotune feature can be launched using the local pushbuttons, a handheld communicator loaded with the device driver (DD), a control system loaded with the DD or ESDVue software. ESDVue must be in Setup mode to perform Auto Tune. (See *"Change Mode"* on page 81)

To start the Auto Tune function:

1. Click **Auto Tune** (*Figure 132*).

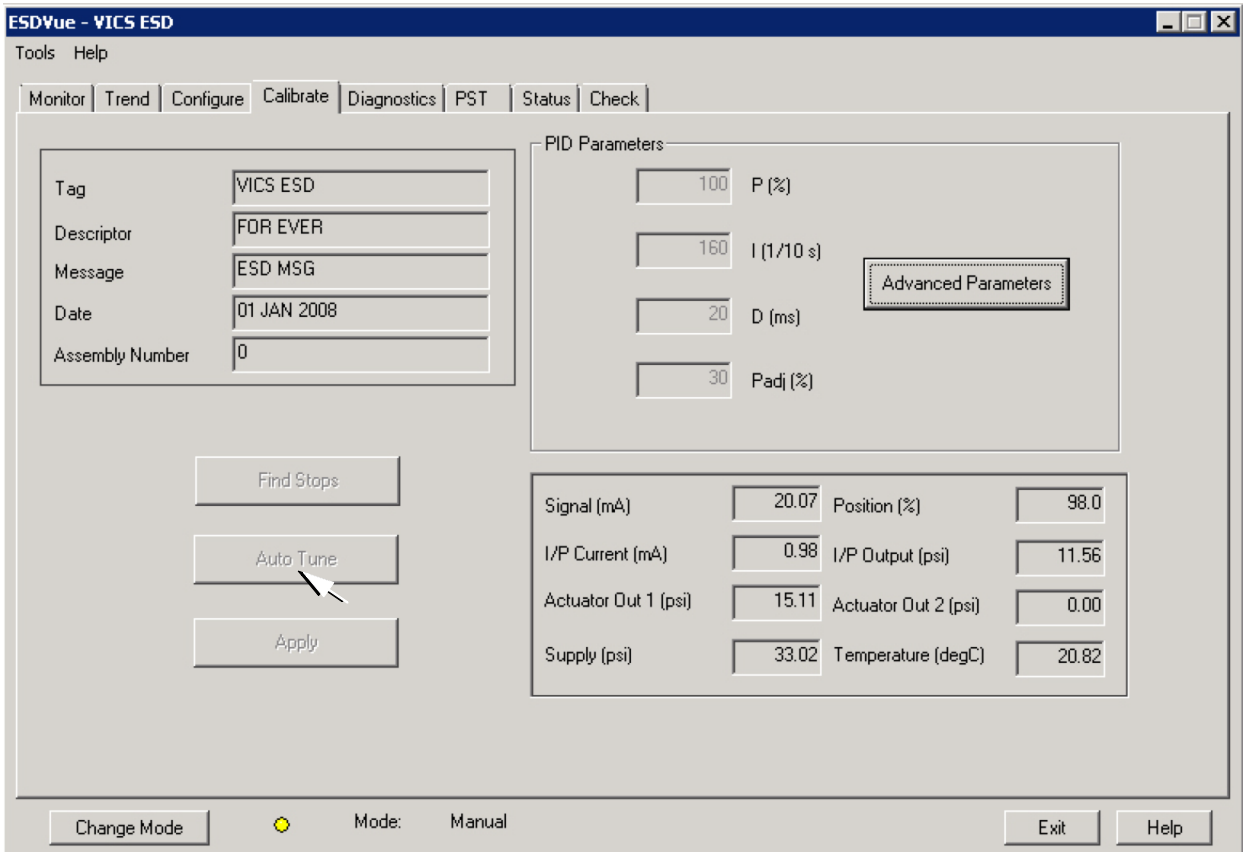


Figure 132 - Launching Auto Tune

© 2024 Baker Hughes Company. All rights reserved.

A dialog appears (*Figure 133*).

2. Click **OK** to continue the process.

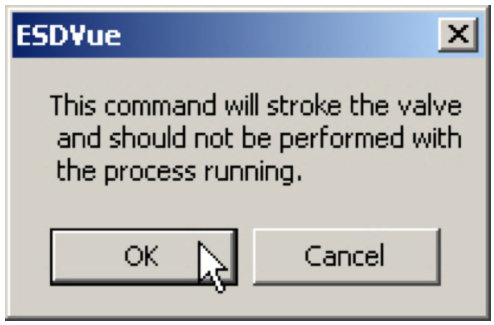


Figure 133 - Auto Tune Dialog

The *Input Value* dialog appears (*Figure 134*). The value refers to the aggressiveness at which the valve is stroked. *0* is the default.

3. Change the value if necessary and click **OK**.

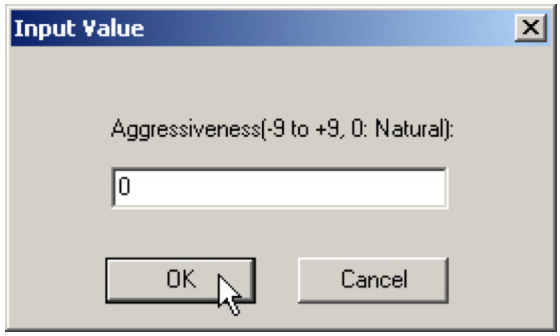


Figure 134 - Auto Tune Input Value Dialog

© 2024 Baker Hughes Company. All rights reserved.

Notes on Aggressiveness

Setting Aggressiveness	While the SVI II ESD software and the DD allow you to set *Aggressiveness*, the pushbuttons do not. In all three methods, however, the Aggressiveness value is inherited from any previously per-formed tuning (Autotune or manual). Once *Aggressiveness*, and other tuning values are determined, they are stored in NVRAM. The SVI II ESD software provides a user define *Aggressiveness Level* for auto-tuning, the allowable range varies from -9 to +9 where 0 (Zero) is consider normal tuning. The *Aggressiveness Level* influences stroking speed and over-shoot. A negative value will SLOW stroking speed and help minimized over-shoot. A positive value will INCREASE stroking speed and may add some over-shoot. The recommended values for *Aggressiveness* is 0 for control valves with-out volume boosters. In applications with volume boosters and/or quick exhaust valves are used the *Aggressiveness Level* is not as influential. For Auto-tuning it is usually between 0 and 3. Reduce the volume boosters sensitivity by opening the integral bypass needle valve about 1 to 2 turns. Use caution when adjusting the needle valve so as to not to damage the seat, close gently to seat and then open 1 or 2 turns.
Aggressiveness Dynamic	Lower values of aggressiveness lead to lower PID values and slower response and less overshoot. Higher values lead to higher PID values and quicker response and more overshoot. Once you have a preferred aggressiveness and you tune once, all future autotunes automatically use that same value, until user-changed.

© 2024 Baker Hughes Company. All rights reserved.

ESDVue starts the *Auto Tune* process and a progress dialog appears (*Figure 135*).

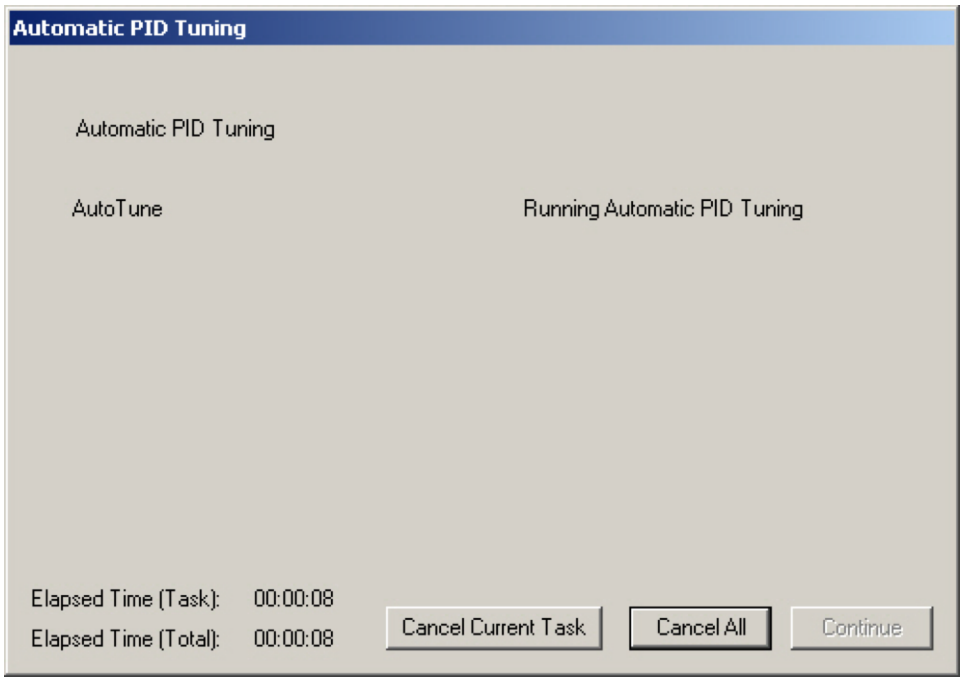


Figure 135 - Auto Tune Progress Dialog

When the Auto Tune process is complete, an *Auto Tune Finished* dialog appears (*Figure 136*). *Continue* is grayed out, or disabled.

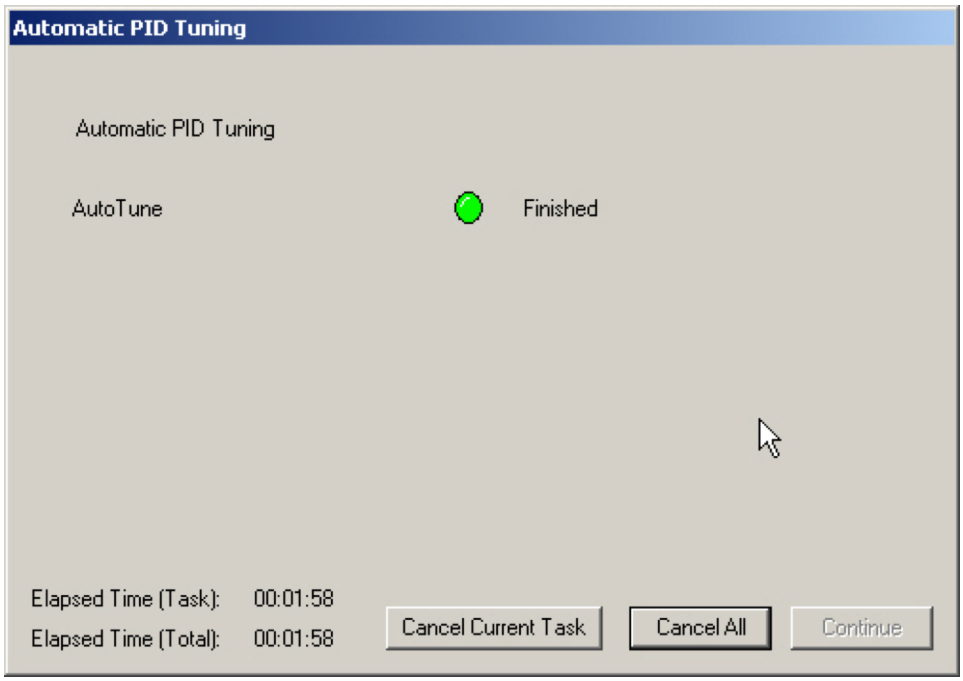


Figure 136 - Auto Tune Finished Dialog

© 2024 Baker Hughes Company. All rights reserved.

On completion of *Auto Tune* the *Diagnostic Graph* appears *Figure 137*. There are many features on the *Diagnostic Graph* to change the graph scale, select additional curves and show computed results.

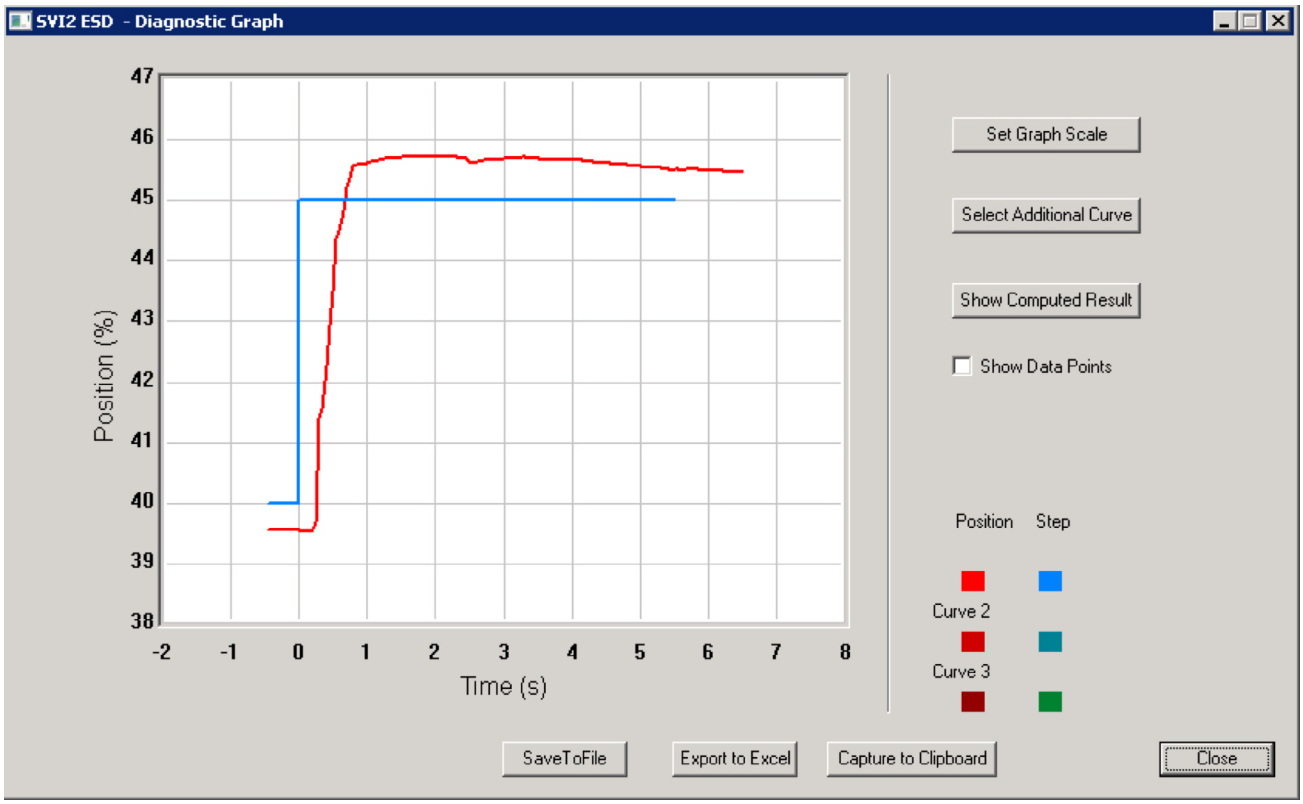


Figure 137 - Auto Tune Diagnostic Graph

4. Click **Close**.

   A window displaying the previous PID values and the new PID values after auto tune appears (*Figure 138*).

© 2024 Baker Hughes Company. All rights reserved.

5. Click **Exit** to close the window (*Figure 138*).

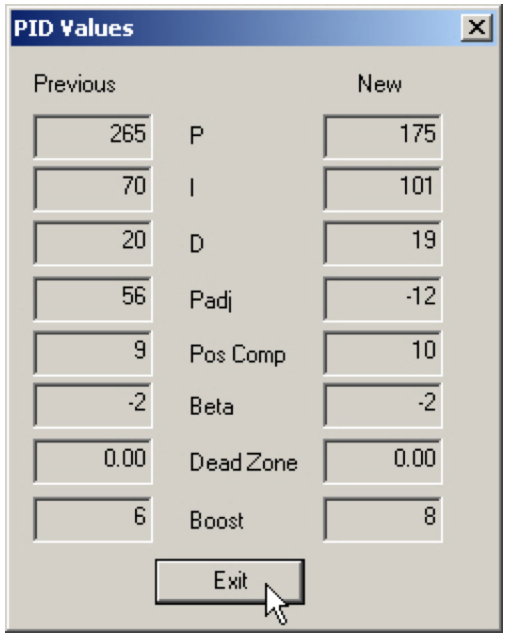


Figure 138 - PID Values - Previous and New

The *Automatic PID Tuning* dialog reappears (*Figure 139*).

6. Click **Continue** to exit *Auto Tune* and return to the *Calibrate* screen.

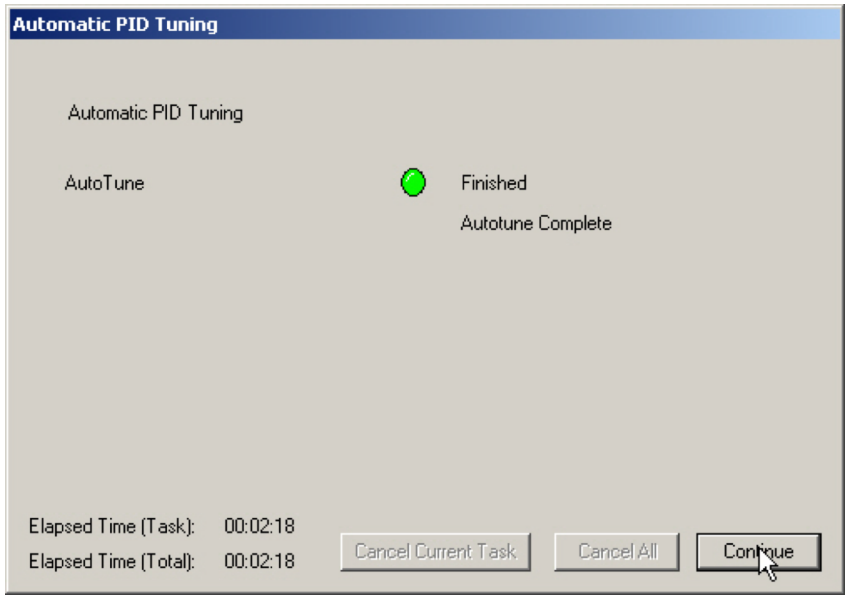


Figure 139 - Auto Tune Complete Dialog

© 2024 Baker Hughes Company. All rights reserved.

Auto Tune Diagnostic Graph

The *Auto Tune Diagnostic Graph* (*Figure 140*) displays the results of *Auto Tune* in a graphical format. The X axis shows Time and the Y axis shows Position over Time. The graph has several features that provide even further diagnostic capabilities.

- *Set Graph Scale* - changes the coordinates of the Time Position axes
- *Select Additional Curve* - displays an additional, selected, curve on the graph
- *Show Computed Result* - view the data in a numerical value format
- *Show Data Points* - when selected shows data points collected during testing
- *Save to File* - saves the graph to a file
- *Export to Excel* - exports the data as a CSV Excel file
- *Capture to Clipboard* - captures a bitmap image of the graph
- *Close* - closes the graph and returns the ESDVue screen

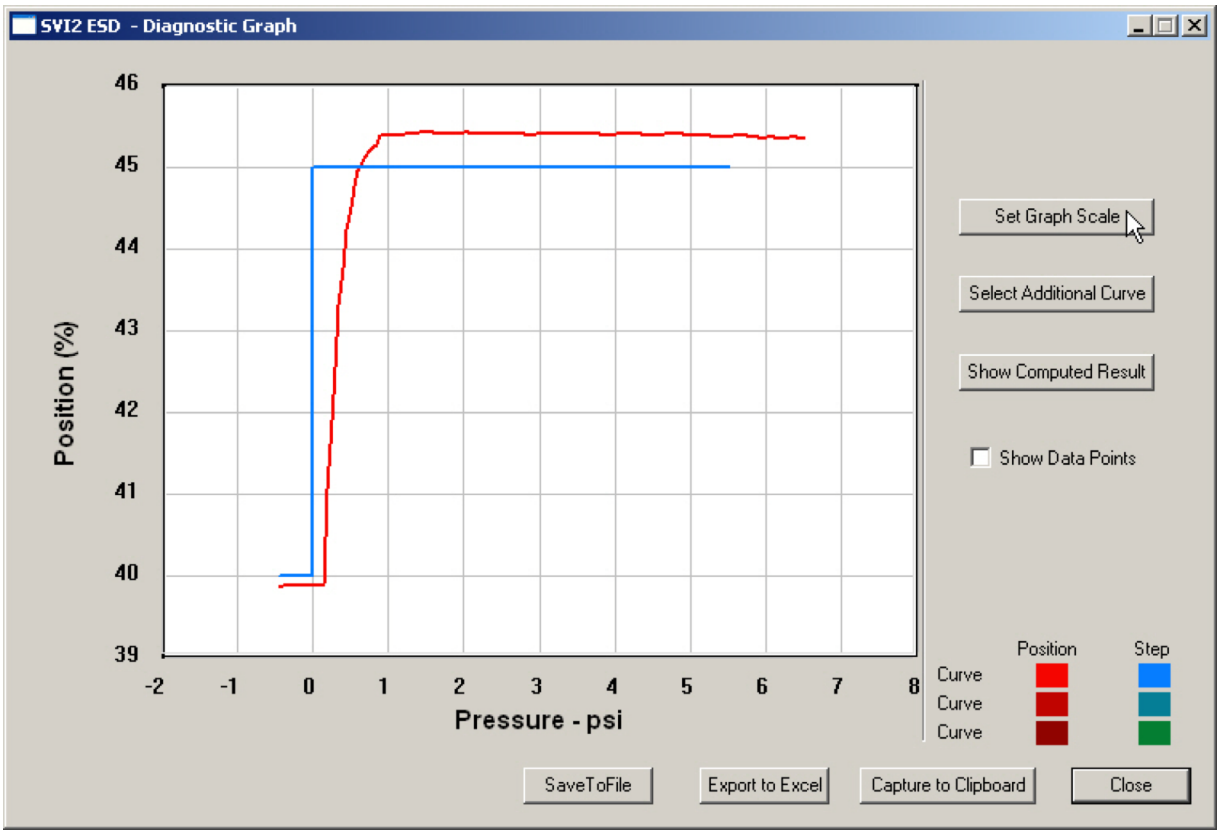


Figure 140 - Auto Tune Diagnostic Graph

© 2024 Baker Hughes Company. All rights reserved.

Diagnostic Graph Color Legend

Located at the bottom of each SVI II ESD diagnostic graph is a color legend. The legend identifies by color each curve and step on the graph, currently displayed, and any additionally selected (using the *Select Additional Curves* function).

Set Graph Scale

You can change the graph scale on diagnostic graphs to narrow in on one area of the graph, or expand the viewing area.

To change the graph scale:

1. Select **Set Graph Scale** (*Figure 141*).

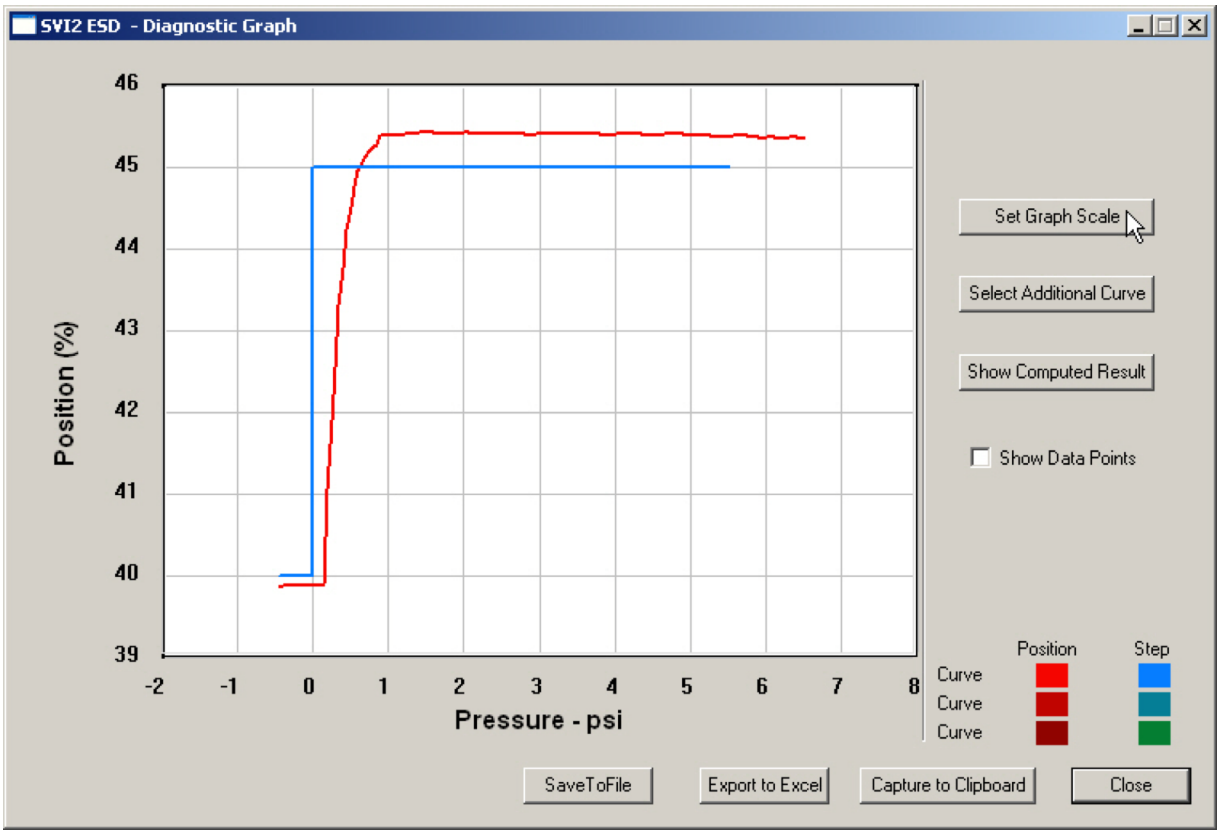


Figure 141 - Selecting Set Graph Scale

© 2024 Baker Hughes Company. All rights reserved.

The *Set Graph Scale* window appears (*Figure 142*).

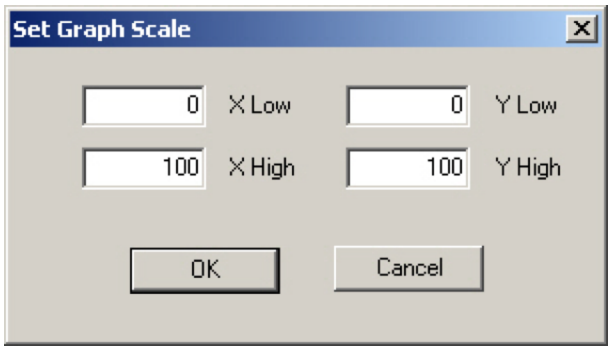


Figure 142 - Set Graph Scale Window

2. Adjust the X axis and Y axis coordinates as necessary and click **OK** (*Figure 143*).

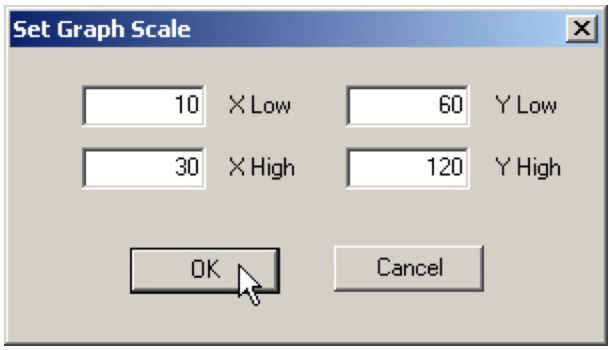


Figure 143 - Saving Scale Adjustments

The *Diagnostic Graph* reflects the changes made to the axes.

© 2024 Baker Hughes Company. All rights reserved.

Select Additional Calibration Curve

Use this to view more than one diagnostic curve at a time; comparing two curves may facilitate diagnostics. To display an additional curve on the diagnostic graph:

1. Click **Select Additional Curve** (*Figure 144*).

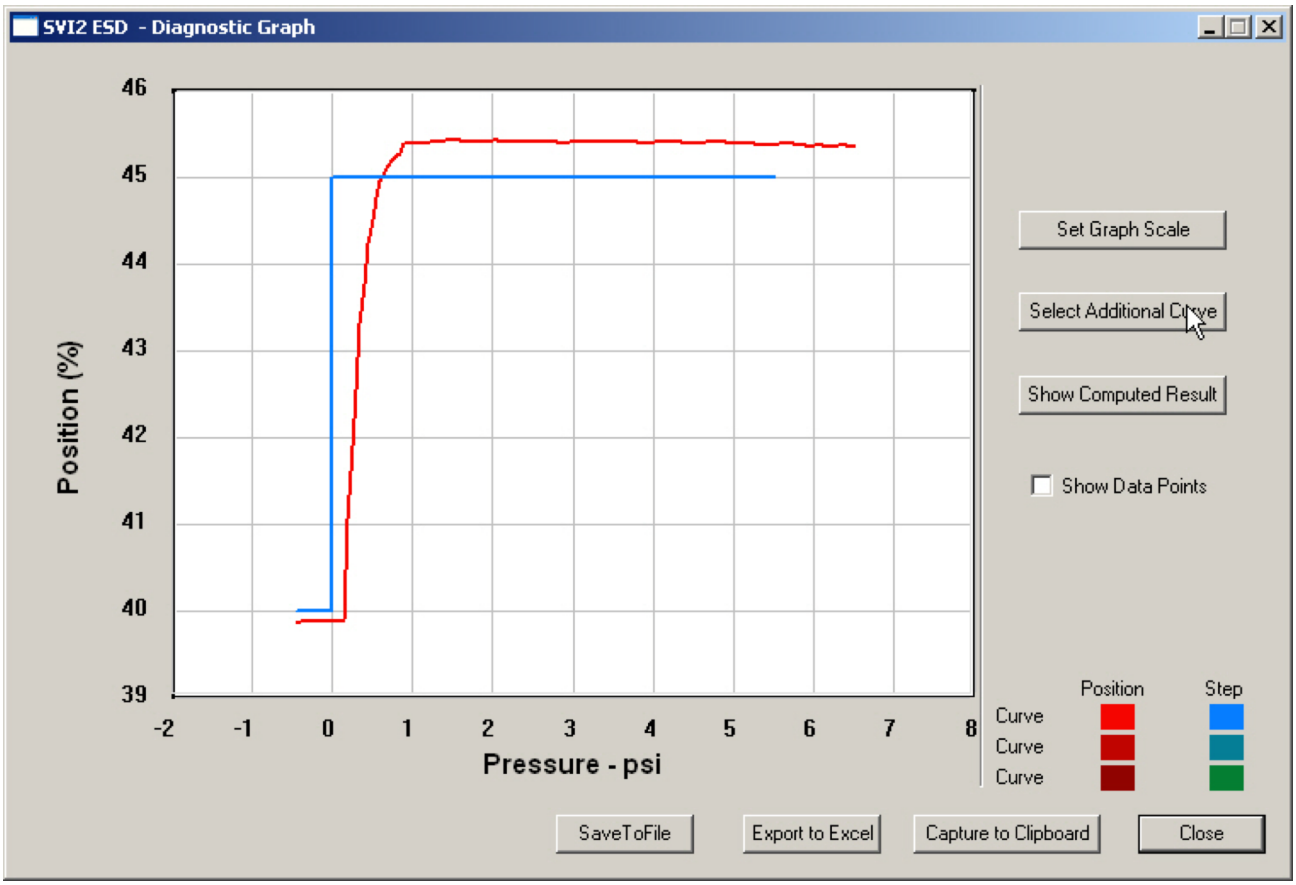


Figure 144 - Starting Select Additional Curve

A dialog appears (*Figure 145*). *Load Data from Database* and *Load Data from File* are the only active choices for *Step Diagnostics*.

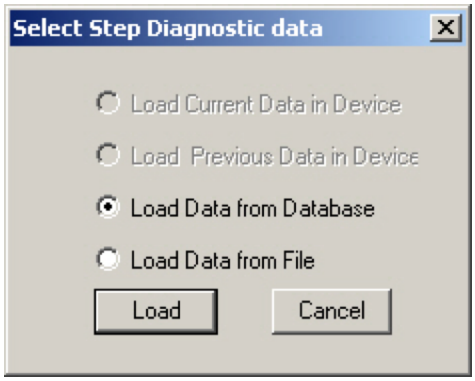


Figure 145 - Select Additional Step Curve Dialog

© 2024 Baker Hughes Company. All rights reserved.

2. Select the source of the additional curve:
   • *Load from Database* - launches window to select data from database
   • *Load Data from File* - launches to browser to select file to load.
3. Move to:
   • *“Selecting a Curve from a Database”*
   or
   • *“Selecting a Curve from a File”* on page 172

Selecting a Curve from a Database

To select a curve from a database:

1. Click the **Load Data from Database** radio button, if not already selected.
2. Click **Load** (*Figure 146*).

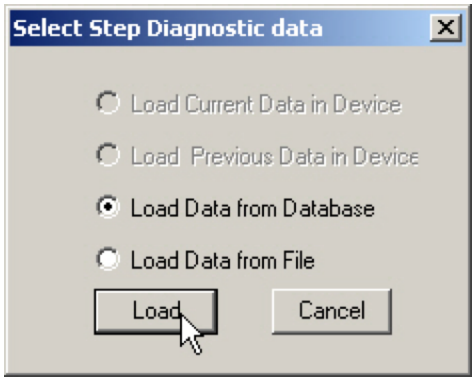


Figure 146 - Selecting Load Data from Database

The database browser appears (*Figure 147*).

The browser displays all types of data files and when executed from the *Calibration* graph defaults to *Step* (the calibration test being a single step).

© 2024 Baker Hughes Company. All rights reserved.

3. Select the data file with the appropriate time stamp and click **OK**.

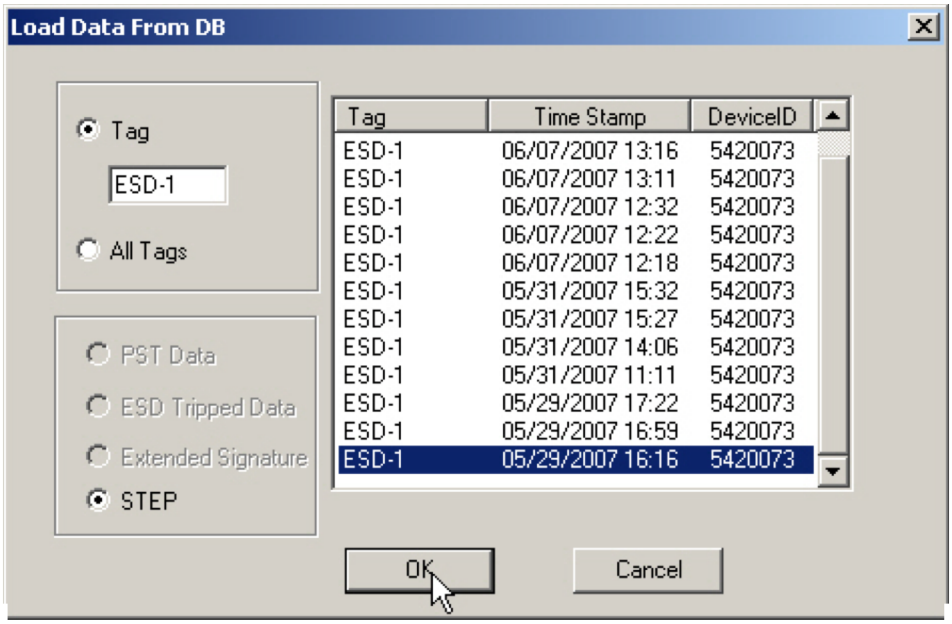


Figure 147 - Selecting Database File

Selecting a Curve from a File

You can also load an additional *Calibration Curve* from a saved file. To select a curve from a file:

1. Select **Load Data from File** and click **Load** (*Figure 148*).

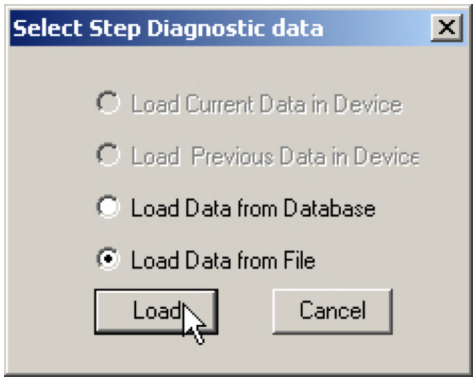


Figure 148 - Selecting Load Data from File

© 2024 Baker Hughes Company. All rights reserved.

A file browser window appears (*Figure 149*).

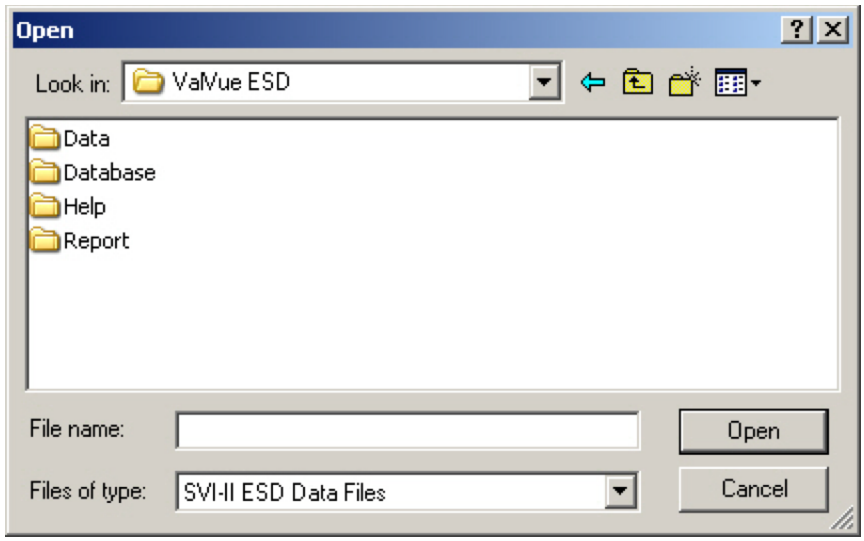


Figure 149 - File Browser

2. Locate and select the file name and click **Open** (*Figure 150*).

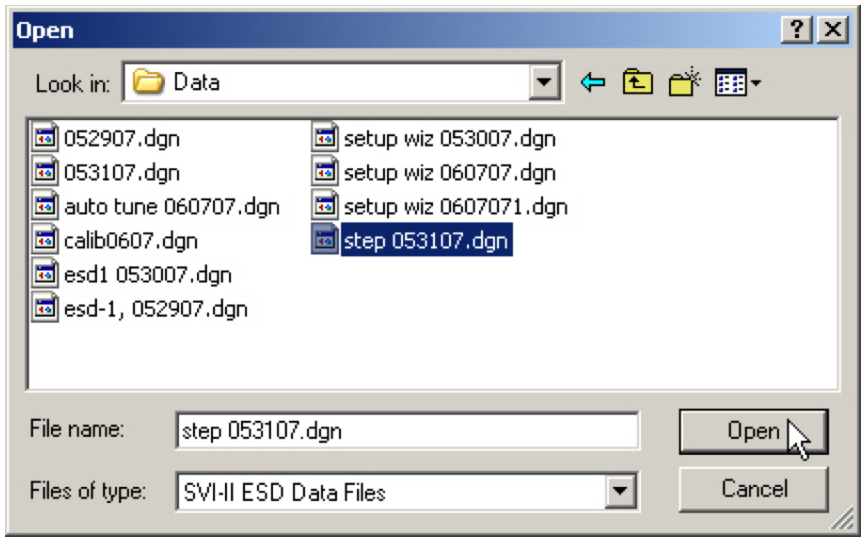


Figure 150 - Opening File for Additional Curve

© 2024 Baker Hughes Company. All rights reserved.

A dialog appears (*Figure 151*).

3. Select the record with the appropriate time stamp and click **OK** (*Figure 151*).

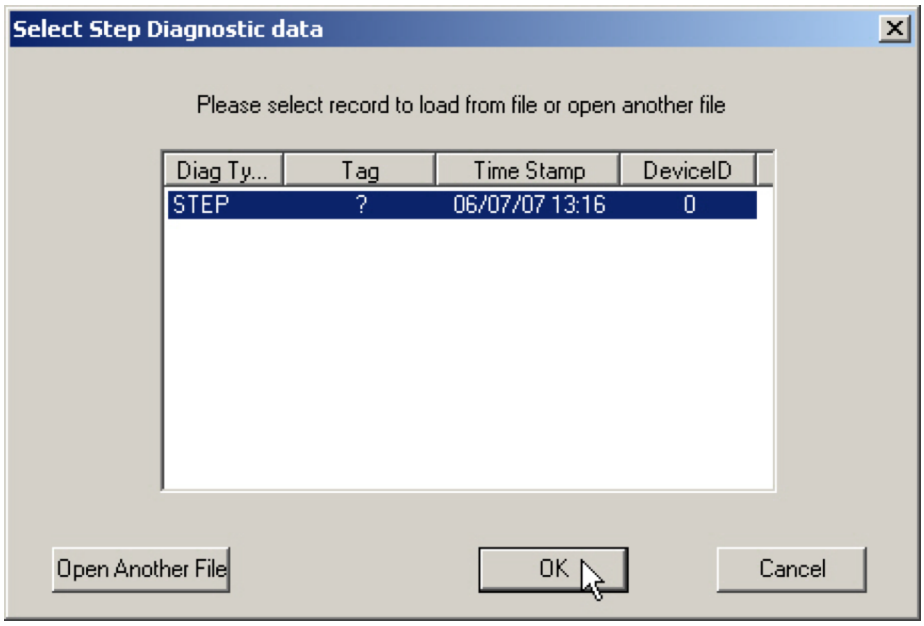


Figure 151 - Selecting Calibration Record

After selecting additional curve data from either the database or a file, the additional curve appears on the graph with the original curve (*Figure 152*).

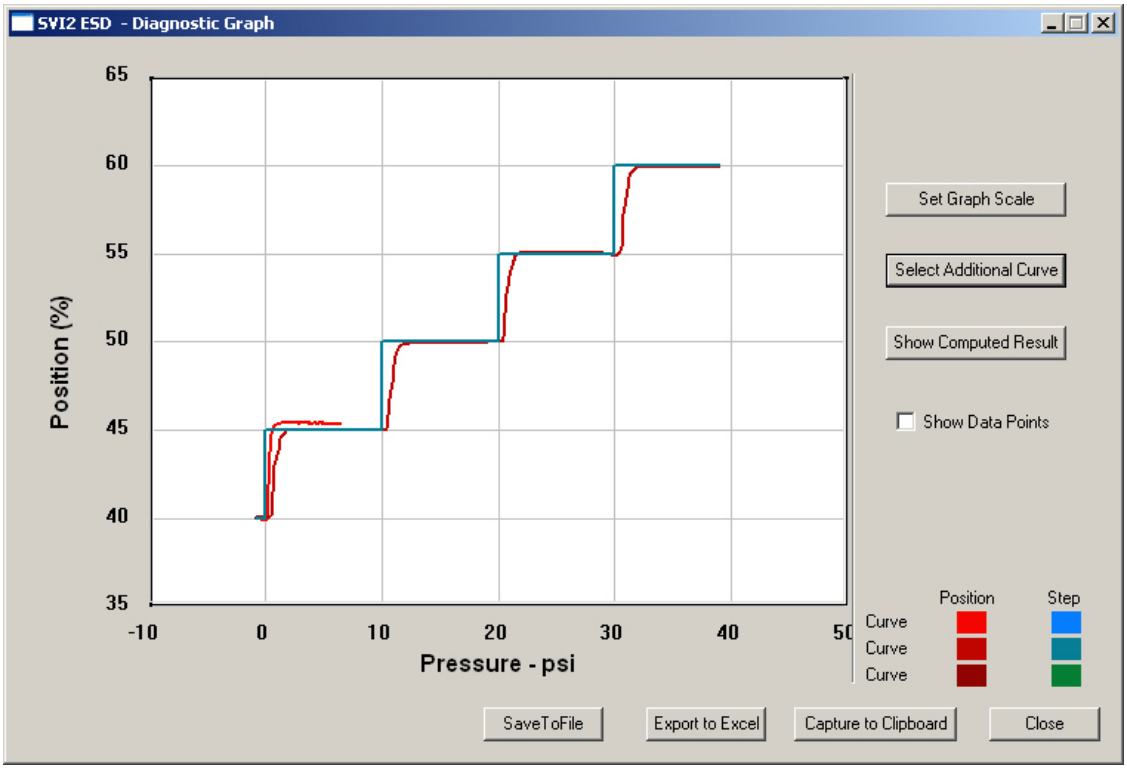


Figure 152 - Additional Calibration Curve Displayed

© 2024 Baker Hughes Company. All rights reserved.

Show Computed Calibration Results

To view the results of the *Auto Tune* test as a table of numerical values:

1. Click **Show Computed Result** (*Figure 153*).

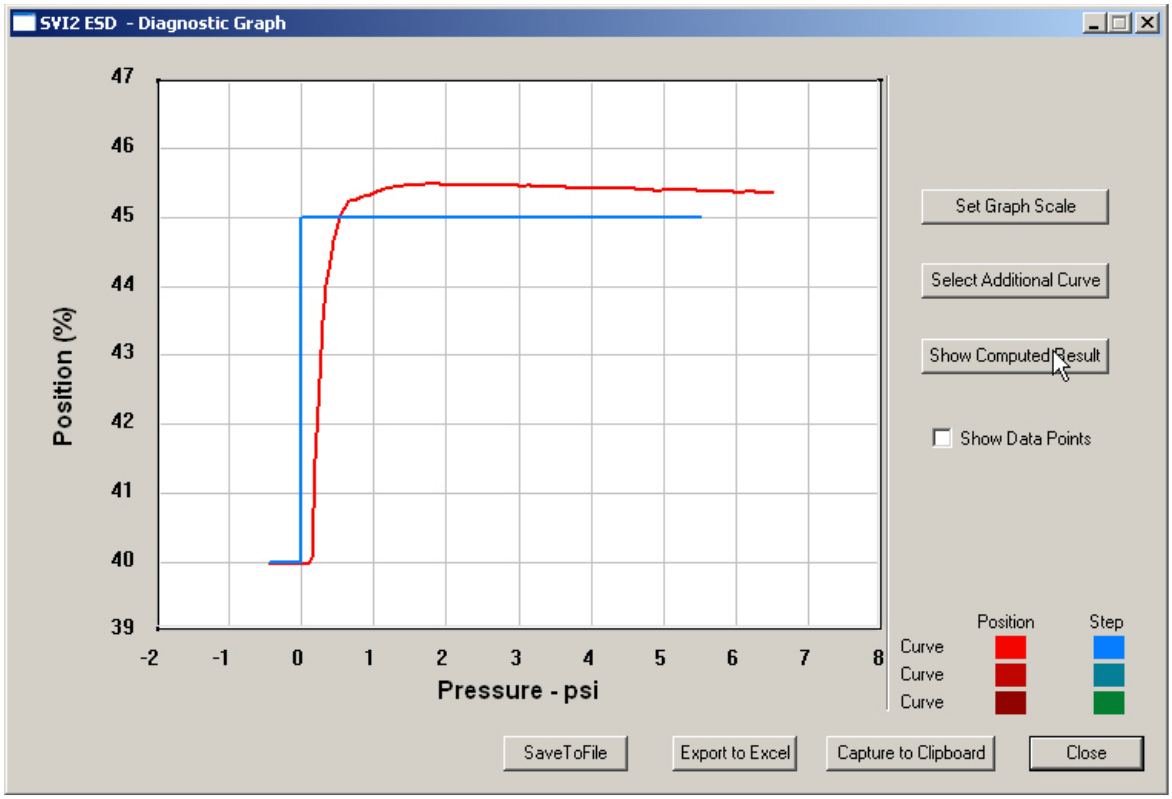


Figure 153 - Selecting Show Computed Result

The Step *Response Test Result* window appears (*Figure 154*). All step diagnostic results are displayed in a numerical format.

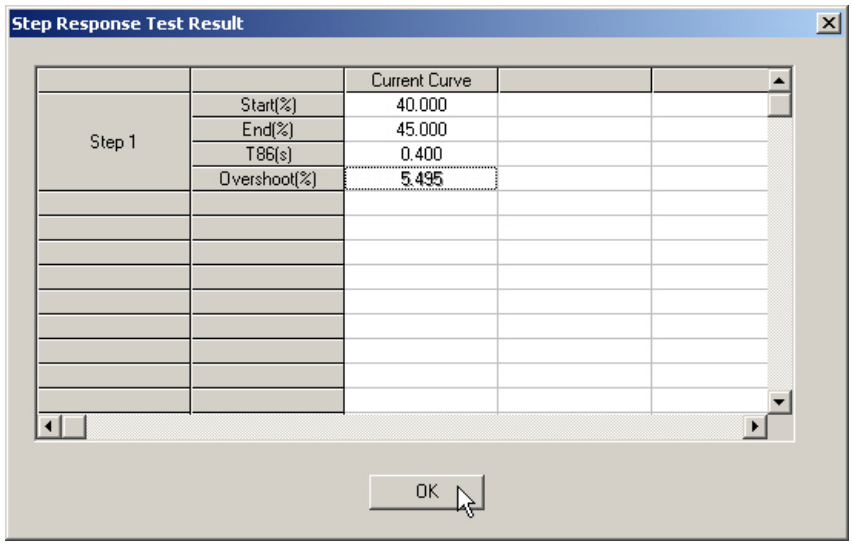


Figure 154 - Auto Tune Calibration Computed Result

© 2024 Baker Hughes Company. All rights reserved.

Save to File

To save diagnostic graphs in a graphical format as .dgn files to any specified location:

1. Select **Save To File** (*Figure 155*).

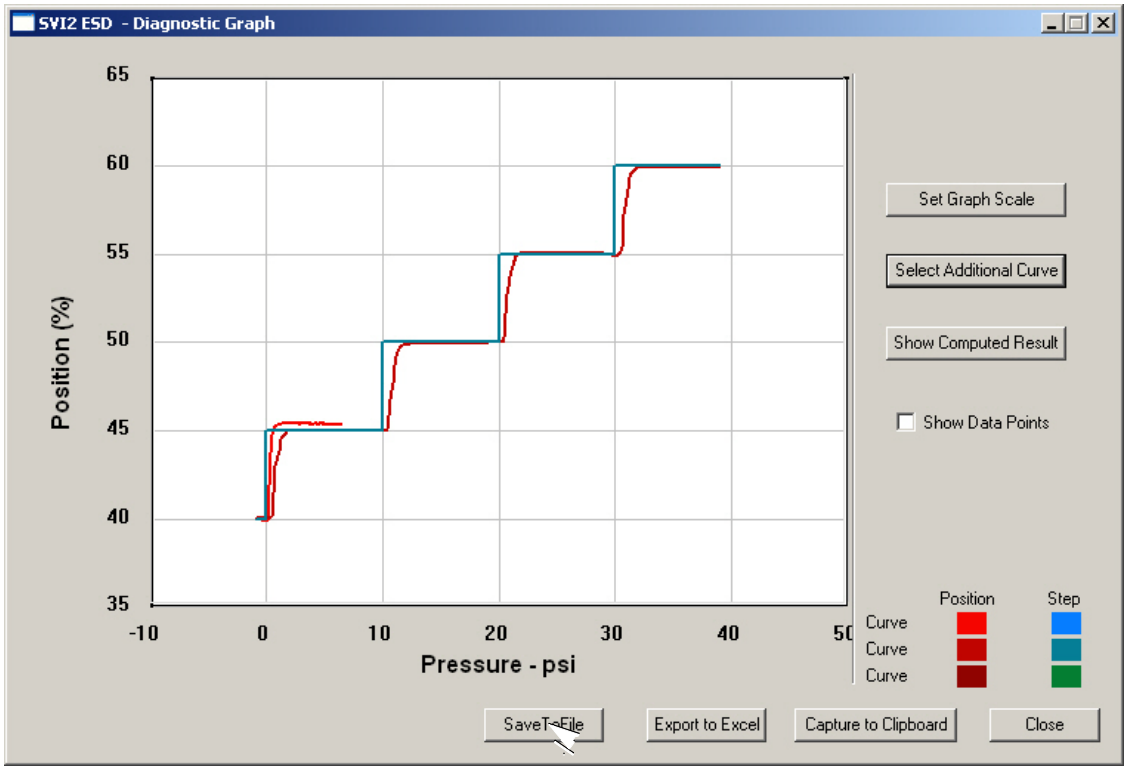


Figure 155 - Selecting Save to File

© 2024 Baker Hughes Company. All rights reserved.

A file browser appears (*Figure 156*).

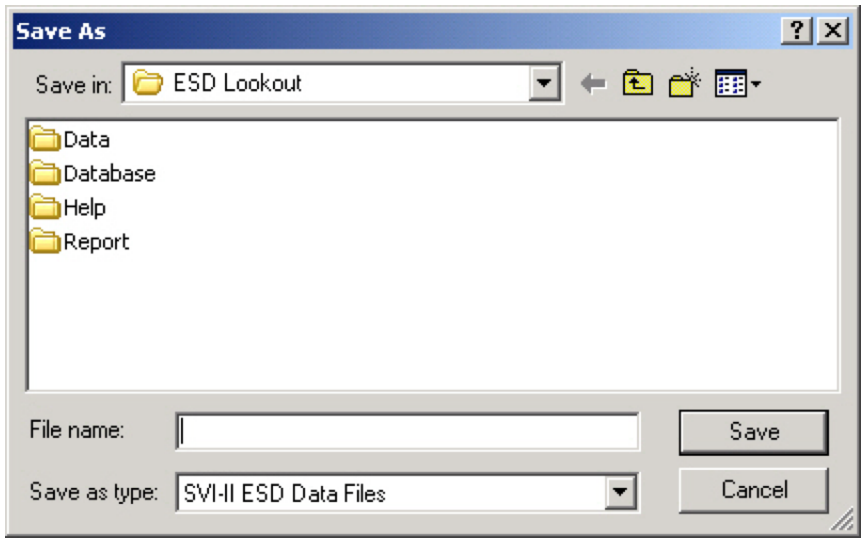


Figure 156 - File Browser

2. Locate the folder in which to save the file.

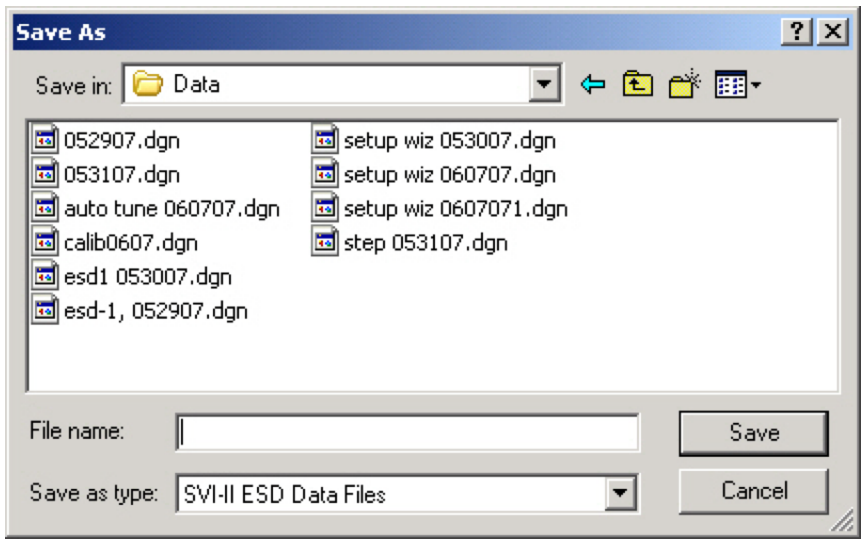


Figure 157 - Selecting a Folder for Saving File

3. Enter a file name and click **Save**. The diagnostic graph reappears

© 2024 Baker Hughes Company. All rights reserved.

Export to Excel

You can save or create a comma separated value file (.csv) of the diagnostic data from a graph and export the file to Excel. With the Excel file you can create graphs or perform other analysis.

To export a graph to Excel:

- Click **Export to Excel** (*Figure 158*).

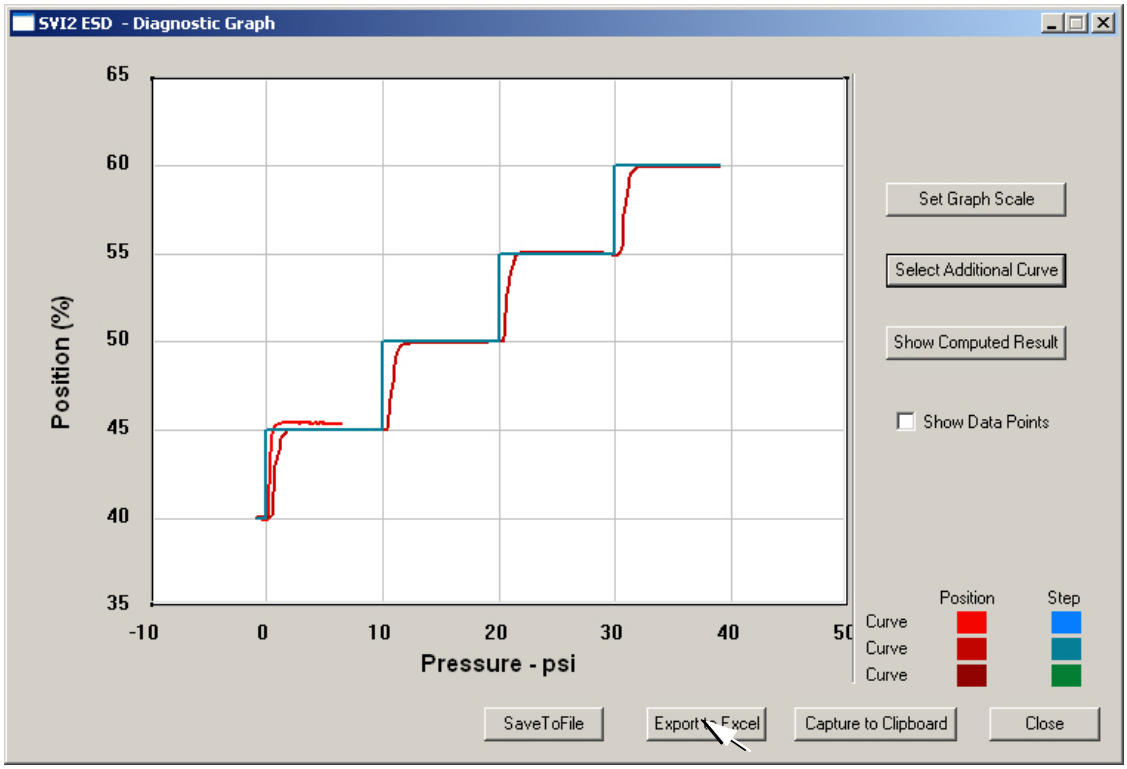
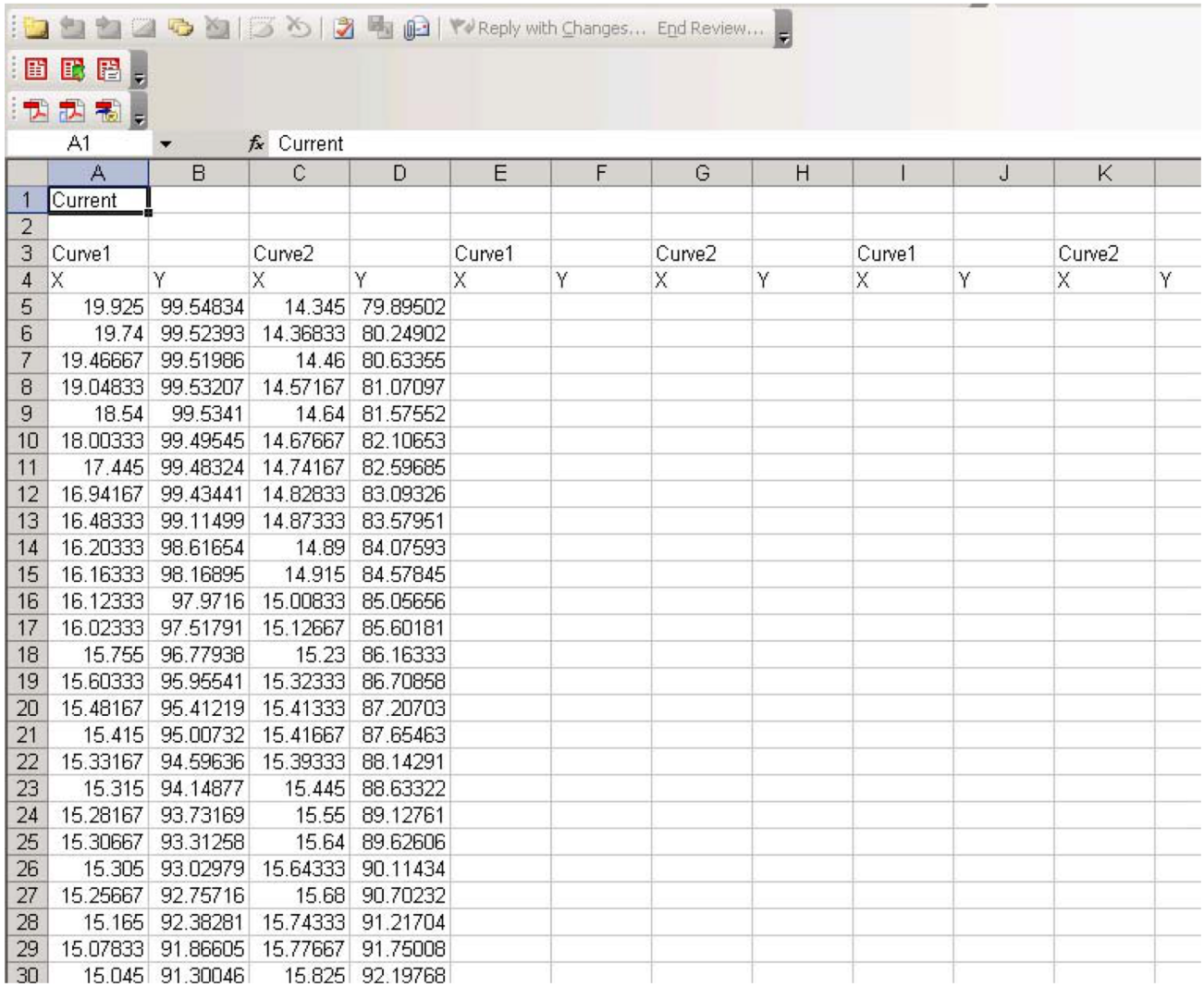


Figure 158 - Selecting Export to Excel

© 2024 Baker Hughes Company. All rights reserved.

Microsoft Excel opens with the X axis and Y axis values, taken from the diagnostic graph, as Excel values (*Figure 159*).



	A	B	C	D	E	F	G	H	I	J	K	
1	Current											
2												
3	Curve1		Curve2		Curve1		Curve2		Curve1		Curve2	
4	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
5	19.925	99.54834	14.345	79.89502								
6	19.74	99.52393	14.36833	80.24902								
7	19.46667	99.51986	14.46	80.63355								
8	19.04833	99.53207	14.57167	81.07097								
9	18.54	99.5341	14.64	81.57552								
10	18.00333	99.49545	14.67667	82.10653								
11	17.445	99.48324	14.74167	82.59685								
12	16.94167	99.43441	14.82833	83.09326								
13	16.48333	99.11499	14.87333	83.57951								
14	16.20333	98.61654	14.89	84.07593								
15	16.16333	98.16895	14.915	84.57845								
16	16.12333	97.9716	15.00833	85.05656								
17	16.02333	97.51791	15.12667	85.60181								
18	15.755	96.77938	15.23	86.16333								
19	15.60333	95.95541	15.32333	86.70858								
20	15.48167	95.41219	15.41333	87.20703								
21	15.415	95.00732	15.41667	87.65463								
22	15.33167	94.59636	15.39333	88.14291								
23	15.315	94.14877	15.445	88.63322								
24	15.28167	93.73169	15.55	89.12761								
25	15.30667	93.31258	15.64	89.62606								
26	15.305	93.02979	15.64333	90.11434								
27	15.25667	92.75716	15.68	90.70232								
28	15.165	92.38281	15.74333	91.21704								
29	15.07833	91.86605	15.77667	91.75008								
30	15.045	91.30046	15.825	92.19768								

Figure 159 - Diagnostic Graph Data - in Excel

© 2024 Baker Hughes Company. All rights reserved.

Calibrate Context Menu

When you right-click on the *Calibrate* screen, a context menu appears (*Figure 160*).

Note: Most functions available in the Calibrate context menu are used for advanced SVI II ESD setup and are only accessible when ESDVue is in the setup mode. Refer to "Advanced Setup with ESDVue" on page 339 for further instructions.

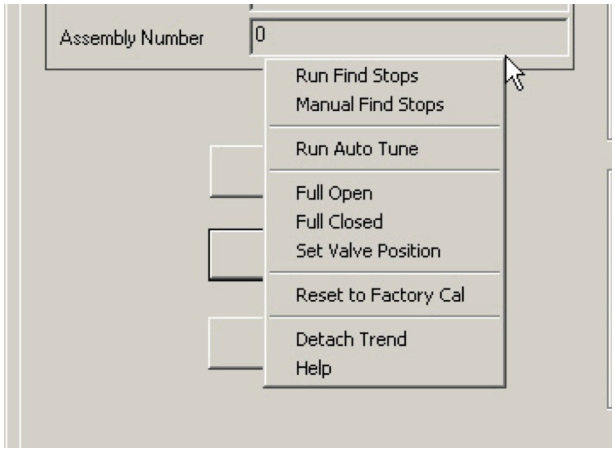


Figure 160 Calibrate Screen Context Menu

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

- *Run Find Stops* - runs the automatic position calibration process.
- *Manual Find Stops* - 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.
- *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* - 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 and pressure calibration to their factory settings.
- *Detach Trend* - Removes the trend display from the tabbed dialog and creates a separate trend display.
- *Help* - Displays the help file at the Calibrate screen instructions.

© 2024 Baker Hughes Company. All rights reserved.

Run Find Stops

To determine valve position, the PST 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* screen context menu.

The SVI II ESD 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 screen appears while the find stops process is running.

Steps to Run find Stops

To run *Find Stops*:

1. Right-click in the screen and select **Run Find Stop** (*Figure 161*).

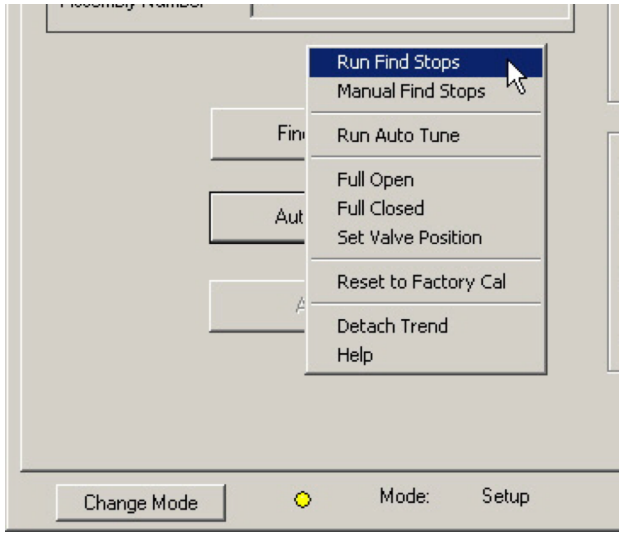


Figure 161 - Selecting Run Find Stops

© 2024 Baker Hughes Company. All rights reserved.

A dialog appears (*Figure 162*).

2. Click **OK**.

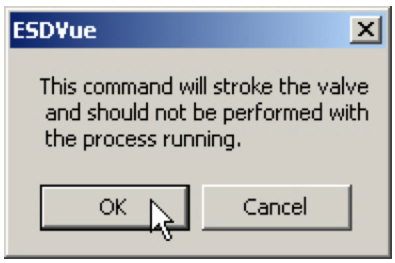


Figure 162 - Starting Run Find Stops Dialog

When *Find Stops* is running, a progress dialog appears (*Figure 163*).

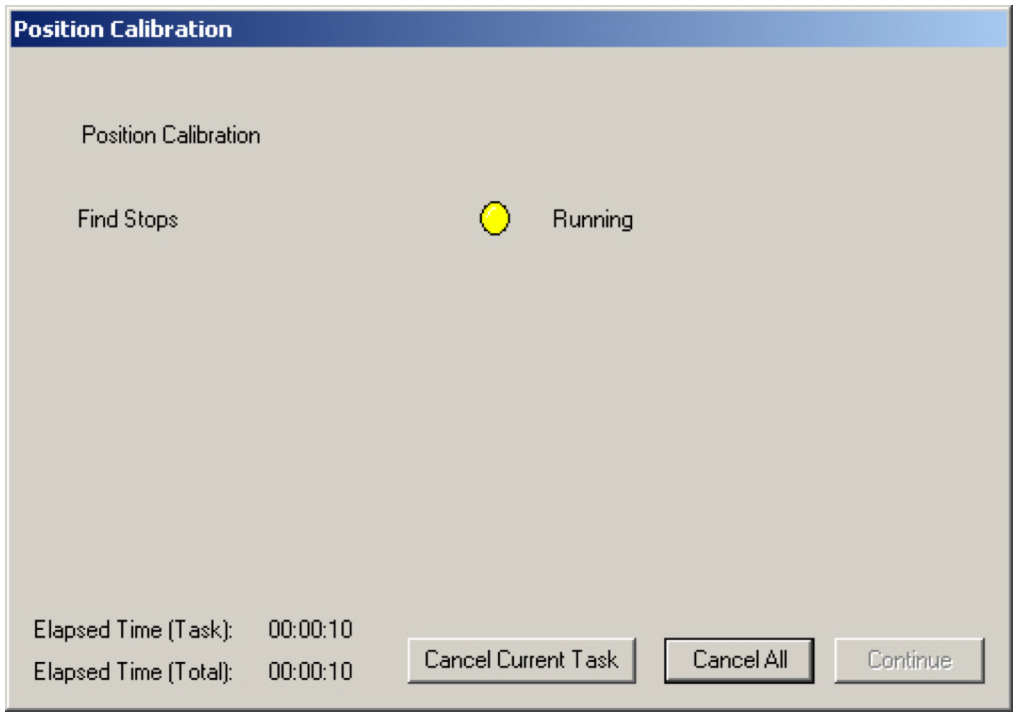


Figure 163 - Find Stops Dialog

© 2024 Baker Hughes Company. All rights reserved.

When *Find Stops* completes, the progress dialog appears as in *Figure 164*.

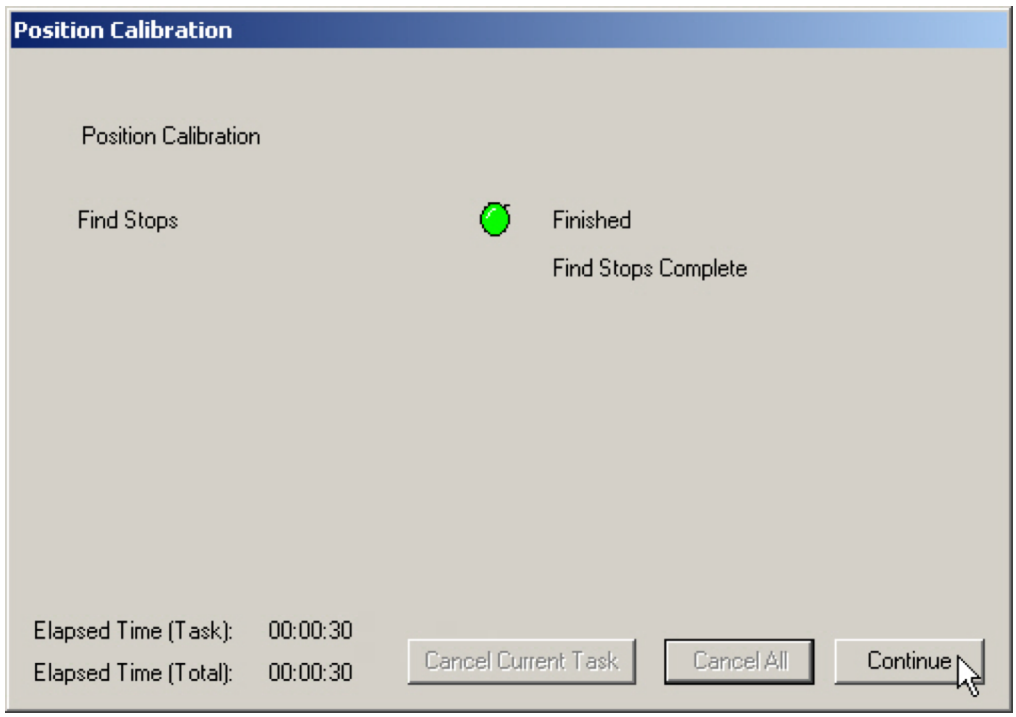


Figure 164 - Find Stops Complete

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

© 2024 Baker Hughes Company. All rights reserved.

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* screen and select **Manual Find Stops** (*Figure 165*).

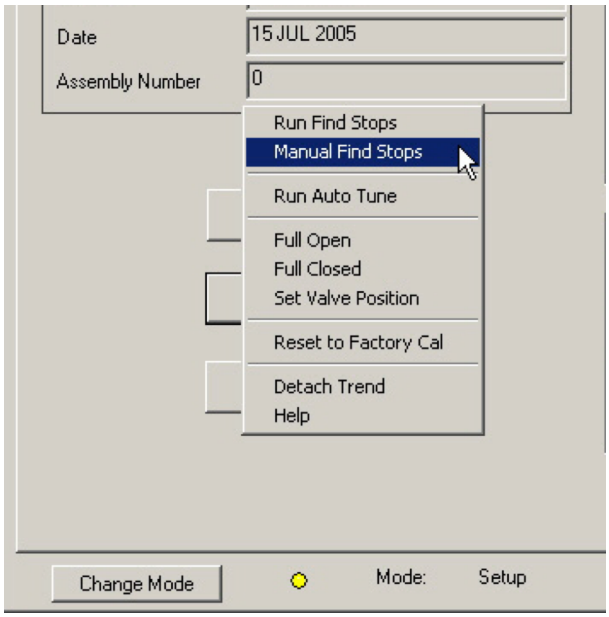


Figure 165 - Selecting Manual Find Stops

© 2024 Baker Hughes Company. All rights reserved.

A dialog appears (*Figure 166*).

2. Click **OK** to continue.

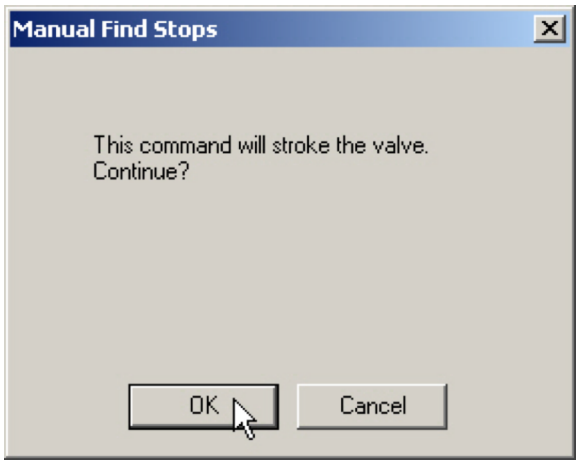


Figure 166 - Stroke Valve Dialog

ESDVue moves the valve to the fully closed position and launches a dialog (*Figure 167*).

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

Figure 167 - Valve Closed Dialog

© 2024 Baker Hughes Company. All rights reserved.

ESDVue moves the valve to the fully open position and a dialog appears (*Figure 168*).

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

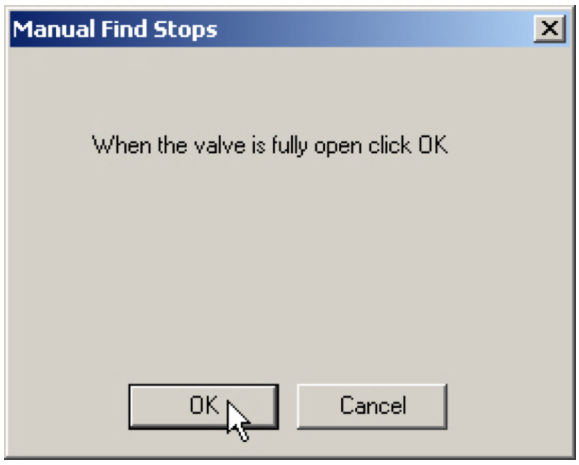


Figure 168 - Valve Open Dialog

© 2024 Baker Hughes Company. All rights reserved.

Applying Calibration Changes

When you make any changes on the *Calibrate* screen, a dialog appears (*Figure 169*).

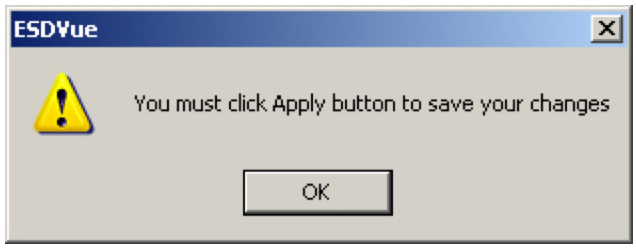


Figure 169 - Applying Calibration Changes

• Click **Apply** to save any changes and to write them immediately to the SVI II ESD.

© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

© 2024 Baker Hughes Company. All rights reserved.

9. Diagnostics

What you can do on the Diagnostics Screen

On the *Diagnostics* screen (*Figure 170*) you can:

- Perform *"Step Diagnostics"* on page 190
- Perform *"Extended Signature Diagnostics"* on page 209
- *"Load Data"* on page 227

Note: To perform any of the diagnostic tests on the Diagnostics screen ESDVue must be in Setup mode. See "Change Mode" on page 81 for more information.

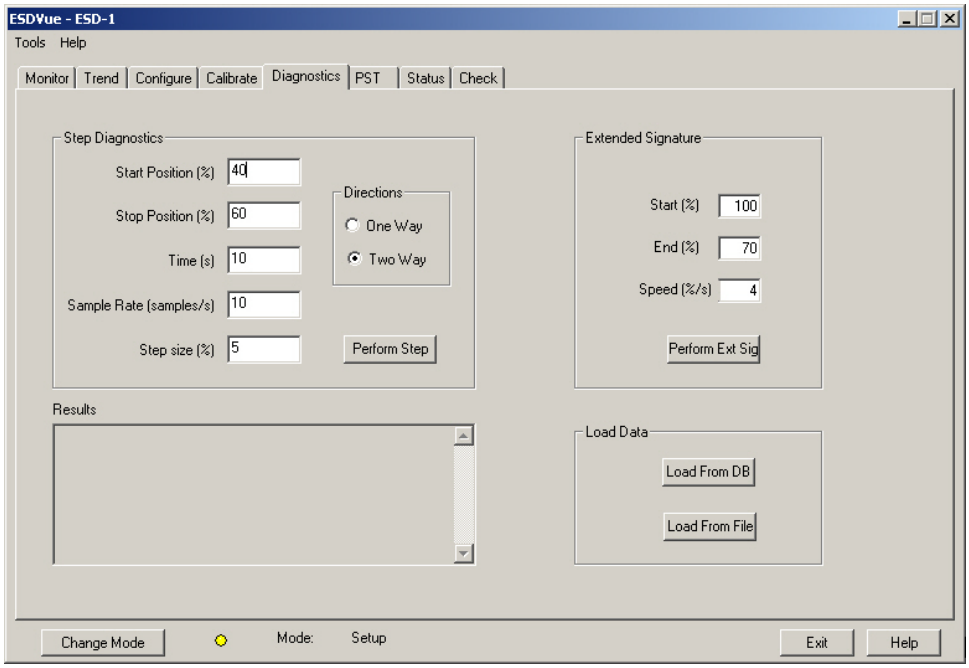


Figure 170 - Diagnostics Screen

© 2024 Baker Hughes Company. All rights reserved.

Step Diagnostics

Note: To perform any of the diagnostic tests on the Diagnostics screen ESDVue must be in Setup mode. See "Change Mode" on page 81 for more information.

The *Step Test* produces a position vs. pressure graph where the valve is submitted to a stepped input. 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 (one way or two way).

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 ESD 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. Adjust the following parameters, If necessary:
   - *Start Position (%)*
   - *Stop Position (%)*
   - *Time (s)*
   - *Sample Rate (samples/s)*
   - *Step Size (%)*
   - *One Way or Two Way*
2. Click **Perform Step**.

Running a Step Test

1. Enter the *Start* and *Stop* positions. The values must be between -5% and 105%. If you try to enter other values an error message appears (*Figure 171*).

Figure 171 - Start/Stop Error Message

2. Enter the *Time/Sample Rate*.

© 2024 Baker Hughes Company. All rights reserved.

The *Time* (total amount of time sampling allowed for each step) multiplied by the *Sample Rate* (number of samples per second) is the total number of samples and *cannot* exceed 400 or an error message appears (*Figure 172*).

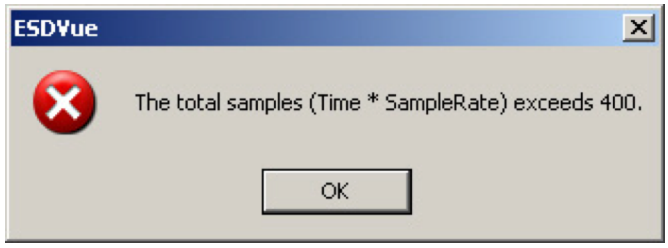


Figure 172 - Time/Sample Rate Error Message

3. Enter the *Step Size*.

   The *Step Size* (total distance of each step) must be less than the difference between the *Start* and *End* positions and also greater than 0.

   If you enter an incorrect *Step Size* an error message appears (*Figure 173*).

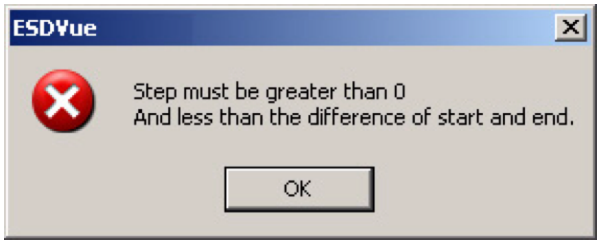


Figure 173 - Step Size Error Message

4. Select the test direction: **One Way** or **Two Way**. One way runs the step test ramping up, only. Two Way runs the step test ramping up and ramping down.

© 2024 Baker Hughes Company. All rights reserved.

5. Click **Perform Step** (*Figure 174*).

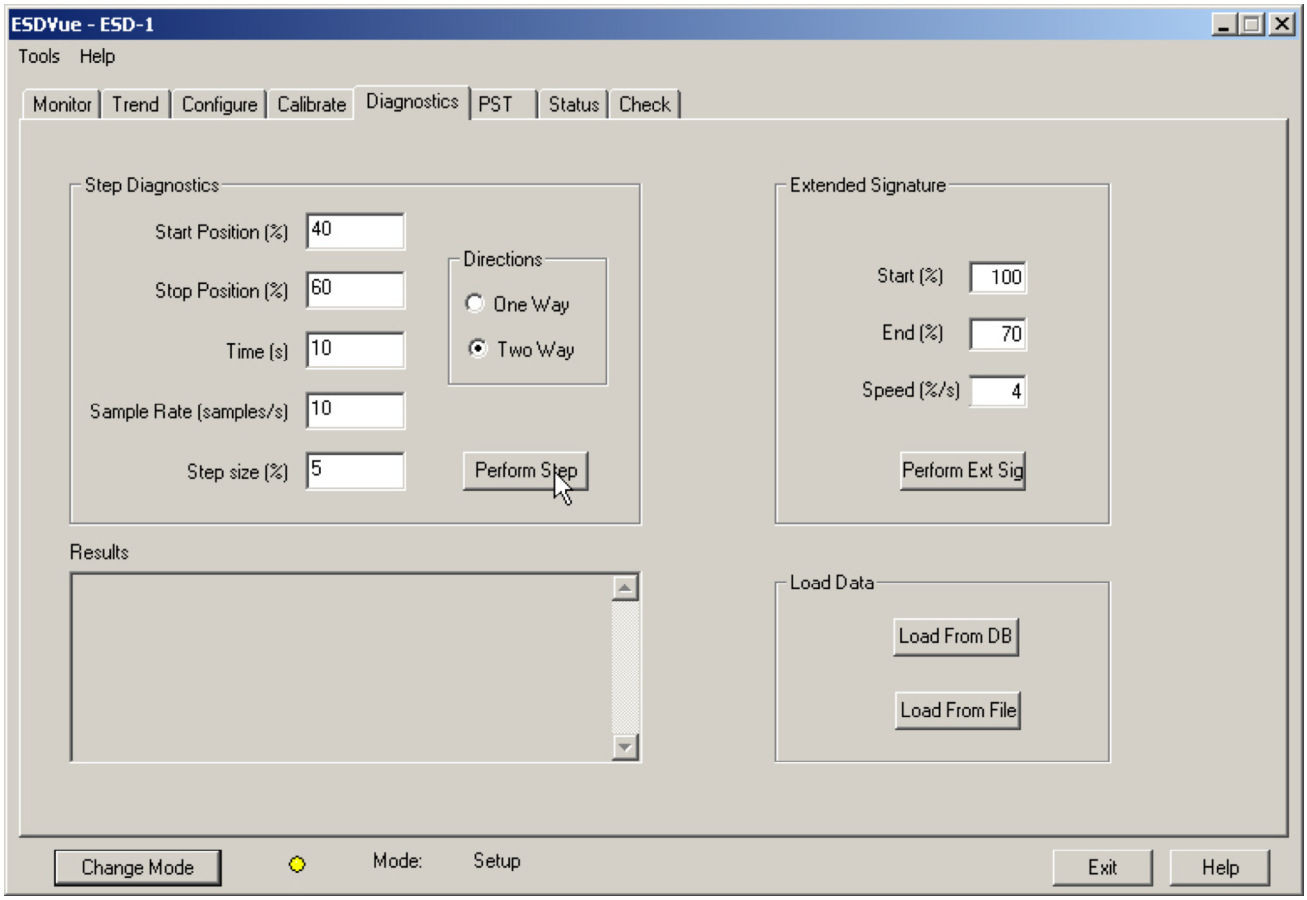


Figure 174 - Executing Perform Step Diagnostics

A warning message appears (*Figure 175*).

6. Click **OK**.

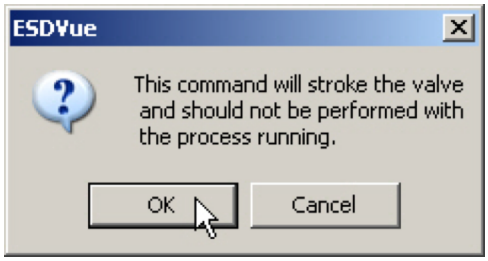


Figure 175 - Step Diagnostics Warning Dialog

© 2024 Baker Hughes Company. All rights reserved.

For each step ESDVue display a progress dialog indicating the step being run appears (*Figure 176*).

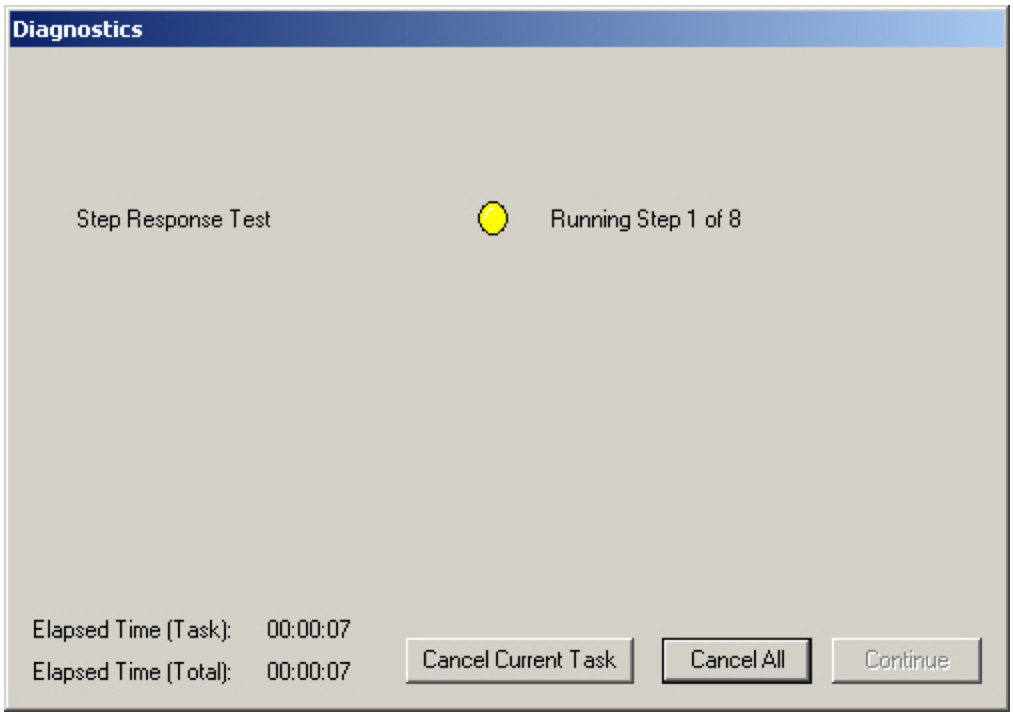


Figure 176 - Running a Step

After each step has completed running, ESDVue loads the data for the step run as indicated in *Figure 177*.

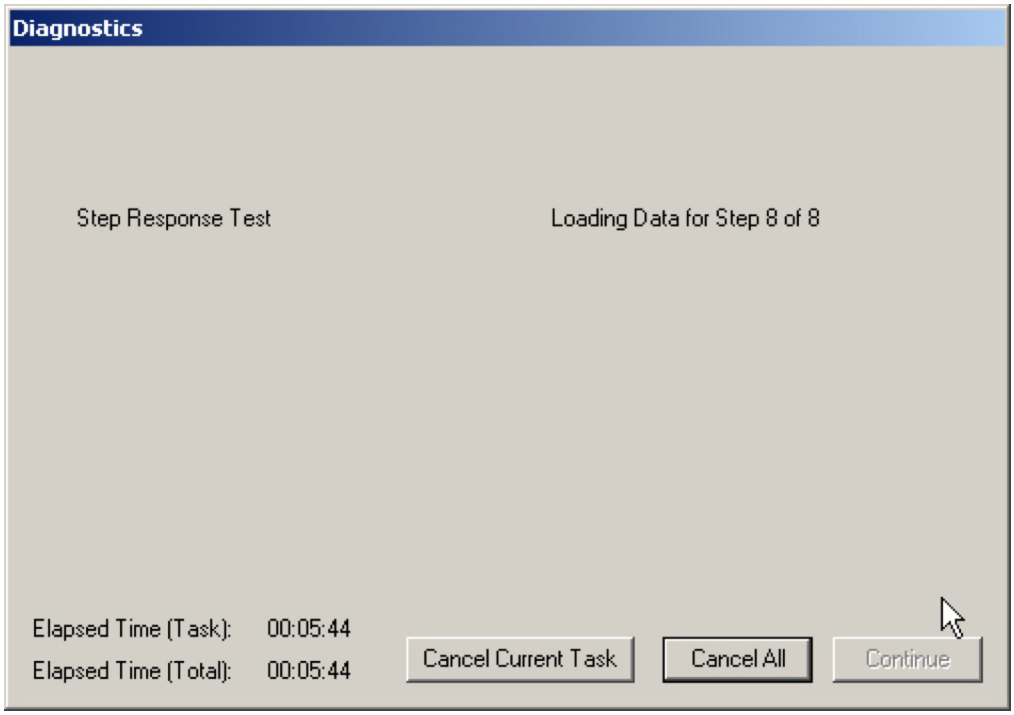


Figure 177 - Loading Data for a Step

© 2024 Baker Hughes Company. All rights reserved.

After *Step Diagnostics* has completed, ESDVue displays the message in *Figure 178*.

7. Click **Continue**.

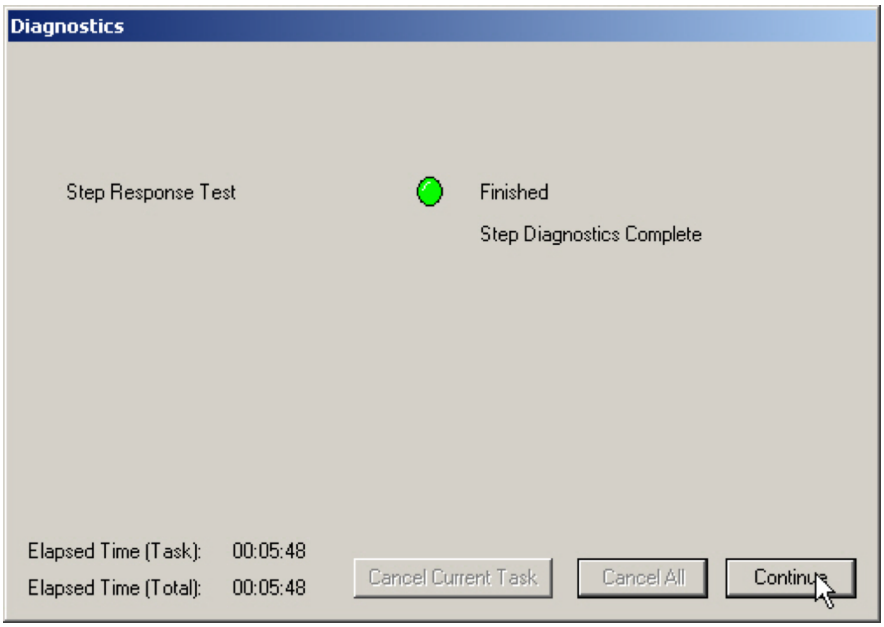


Figure 178 - Step Diagnostics Complete - Continue

The Step Diagnostics graph appears (*Figure 179*).

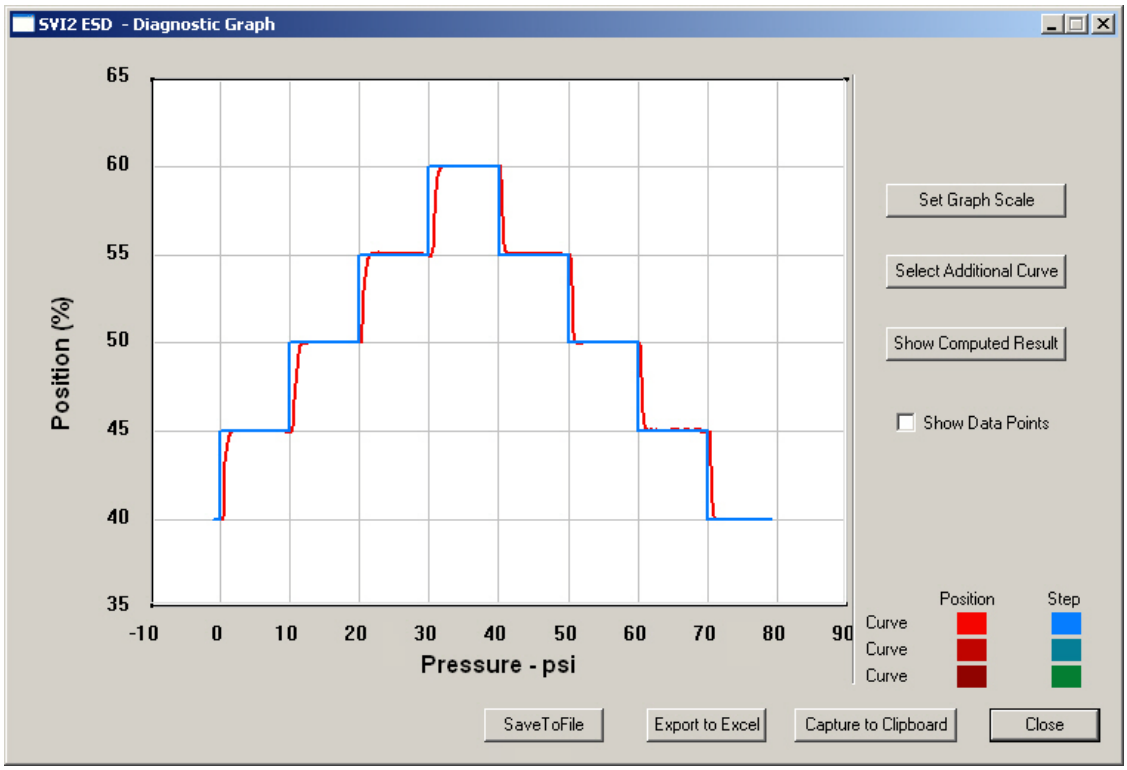


Figure 179 - Step Diagnostics Graph

© 2024 Baker Hughes Company. All rights reserved.

Step Diagnostics Graph

The *Step Diagnostics Graph* has the same features as all other diagnostic graphs:

- *Set Graph Scale* - changes the coordinates of the *Time Position* axes.
- *Select Additional Curve* - displays an additional, selected, curve on the graph.
- *Show Computed Result* - view the data in a numerical value format.
- *Show Data Points* - shows data points collected during testing.
- *Save to File* - save the graph to a file.
- *Export to Excel* - exports the data as a CSV Excel file.
- *Capture to Clipboard* - captures a bitmap image of the graph.
- *Close* - closes the graph and returns the *ESDVue* screen.

Diagnostic Graph Color Legend

Located at the bottom of each SVI II ESD diagnostic graph is a color legend. The legend identifies by color each curve and step on the graph, currently displayed, and any additionally selected (using the *Select Additional Curves* function).

© 2024 Baker Hughes Company. All rights reserved.

Set Graph Scale

You can change the graph scale on diagnostic graphs to narrow in on one area of the graph, or expand the viewing area.

To change the graph scale:

1. Select **Set Graph Scale** (*Figure 180*).

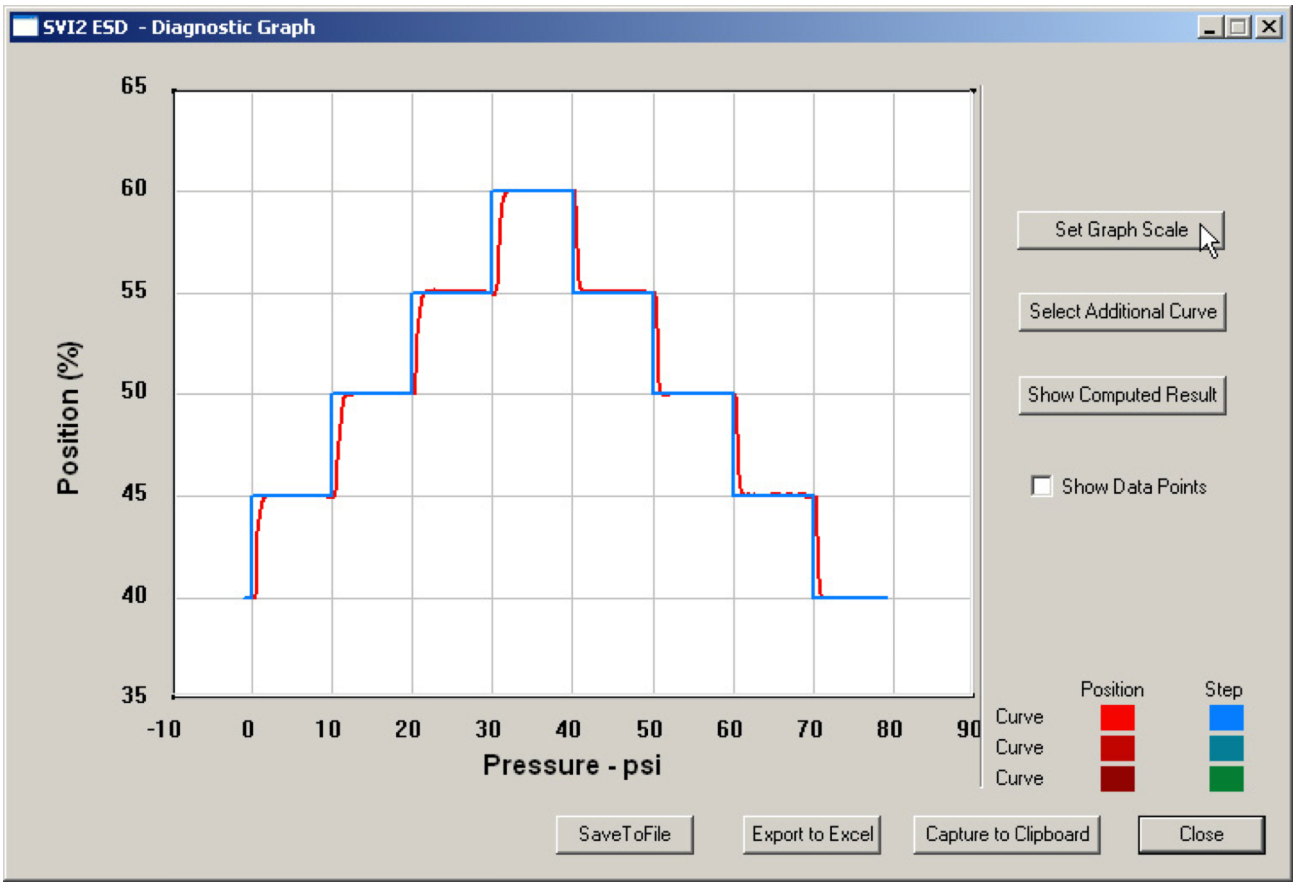


Figure 180 - Selecting Set Graph Scale

The *Set Graph Scale* window appears (*Figure 181*).

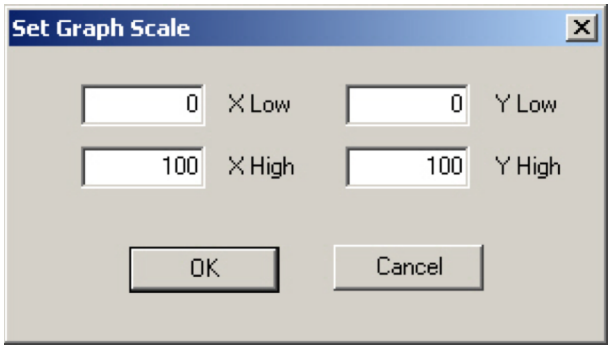


Figure 181 - Set Graph Scale Window

© 2024 Baker Hughes Company. All rights reserved.

2. Adjust the X axis and Y axis coordinates as necessary and click **OK** (*Figure 182*).

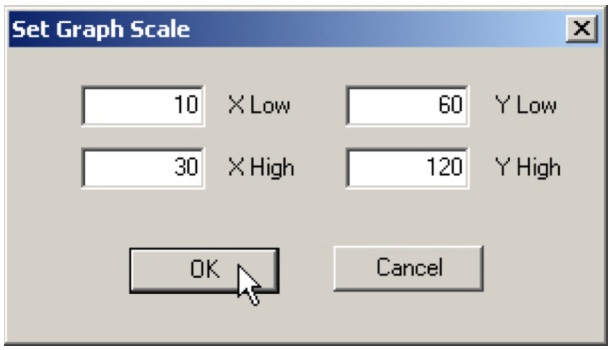


Figure 182 - Saving Scale Adjustments

The *Diagnostic Graph* reflects the changes made to the axes.

© 2024 Baker Hughes Company. All rights reserved.

Select Additional Step Curve

You can view more than one diagnostic curve at a time; being able to compare two curves may facilitate diagnostics.

To display an additional step curve on the diagnostic graph:

1. Click **Select Additional Curve** (*Figure 183*).

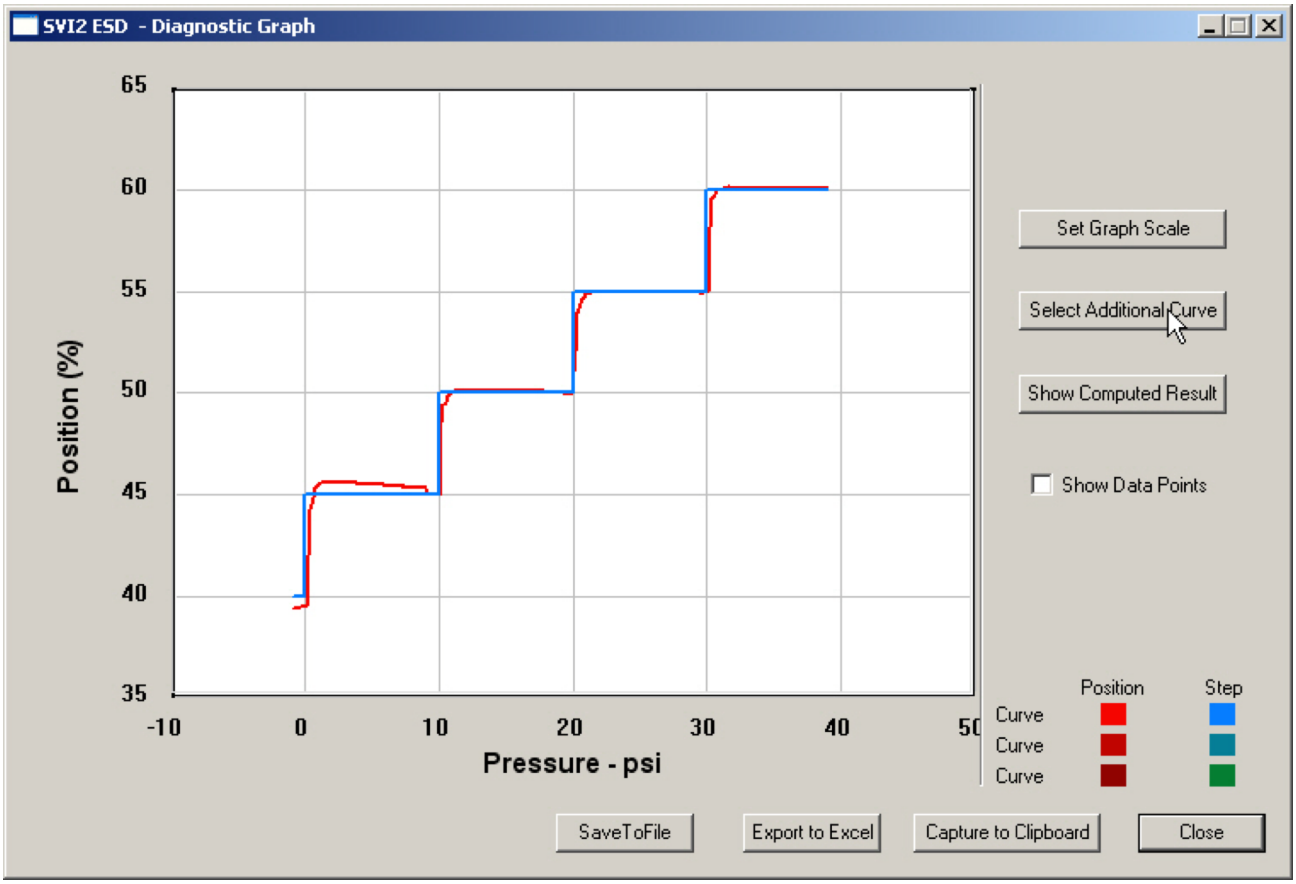


Figure 183 - Starting Select Additional Curve

A dialog appears (*Figure 184*).

2. Select the source of the additional curve:
   - **Load from Database** - launches window to select data from database
   - **Load Data from File** - launches to browser to select file to load

© 2024 Baker Hughes Company. All rights reserved.

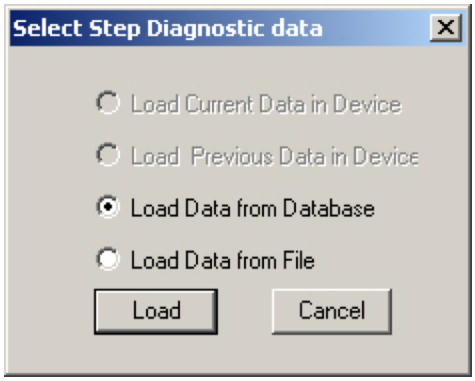


Figure 184 - Select Additional Step Curve Dialog

3. Either move to:
   - *"Selecting a Curve from a Database"*

   or
   - *"Selecting a Curve from a File"* on page 200

Selecting a Curve from a Database

To select a curve from a database:

1. Click the **Load Data from Database** radio button (*Figure 185*), if not already selected.
2. Click on **Load**.

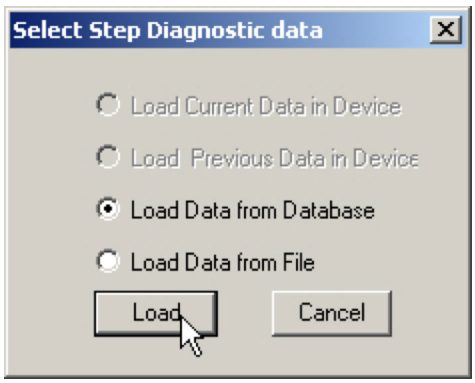


Figure 185 - Selecting Load Data from Database

The database browser appears (*Figure 186*). The browser displays only Step diagnostic data.

3. Scroll through the list of files and select the time stamp of the file to open and click **OK**.

© 2024 Baker Hughes Company. All rights reserved.

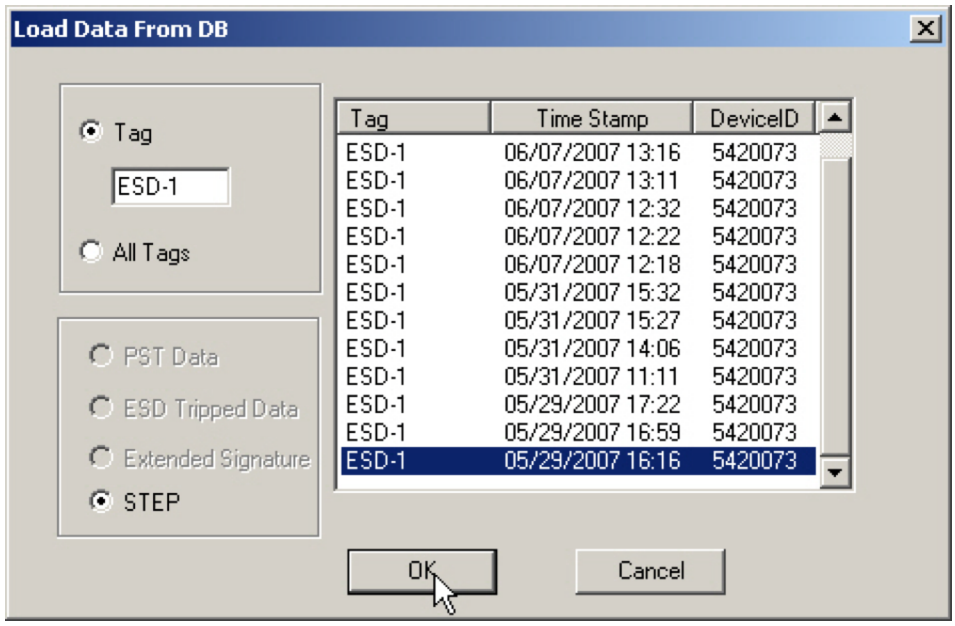


Figure 186 - Step Diagnostics Database Browser

Selecting a Curve from a File

You can also load an additional Step Curve from a saved file. To select a curve from a file:

1. Select **Select Additional Curve** from the Step Diagnostic Graph and a dialog appears (*Figure 187*).
2. Select **Load Data from File**.
3. Click **Load**.

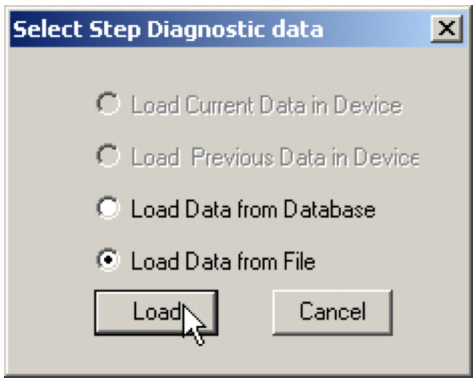


Figure 187 - Selecting Load Data from File

© 2024 Baker Hughes Company. All rights reserved.

A file browser window appears (*Figure 188*).

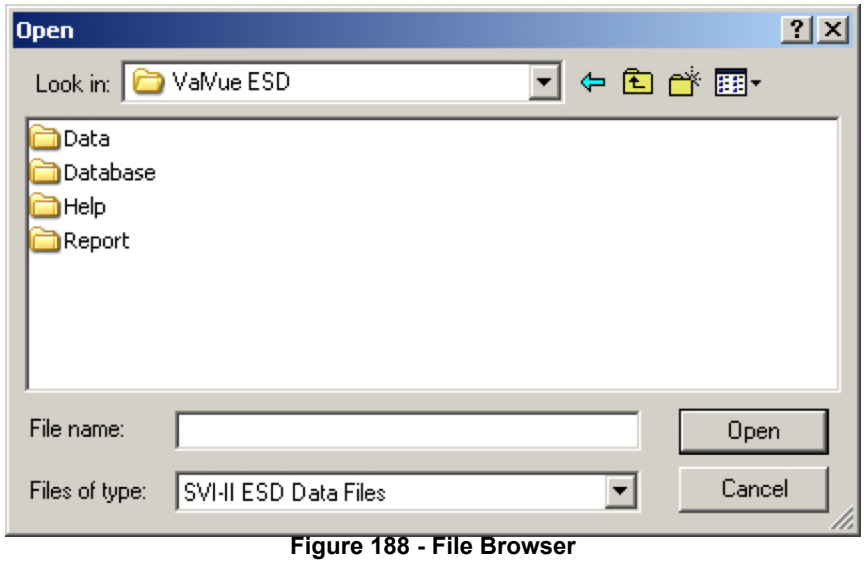


Figure 188 - File Browser

4. Using the browser, locate the file to load and click **Open** (*Figure 189*).

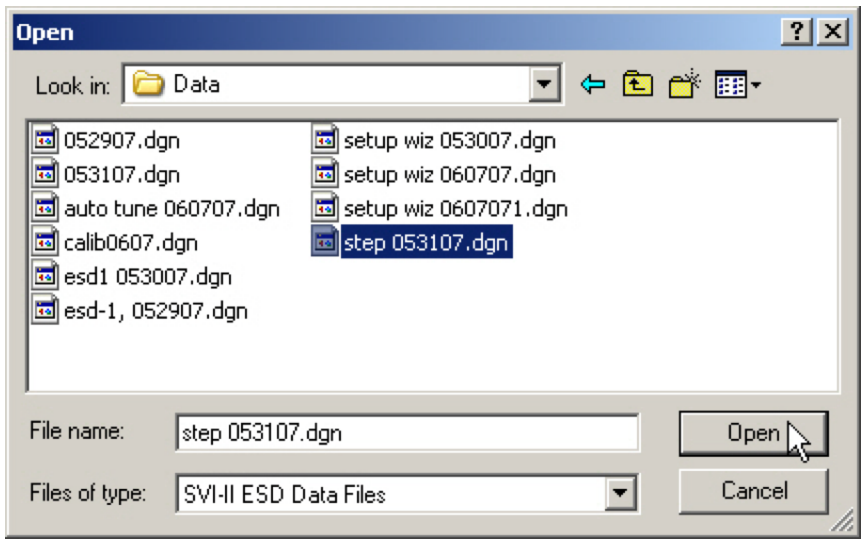


Figure 189 - Opening File for Additional Curve

A dialog appears (*Figure 190*).

5. Select the record with the appropriate time stamp and click **OK**.

© 2024 Baker Hughes Company. All rights reserved.

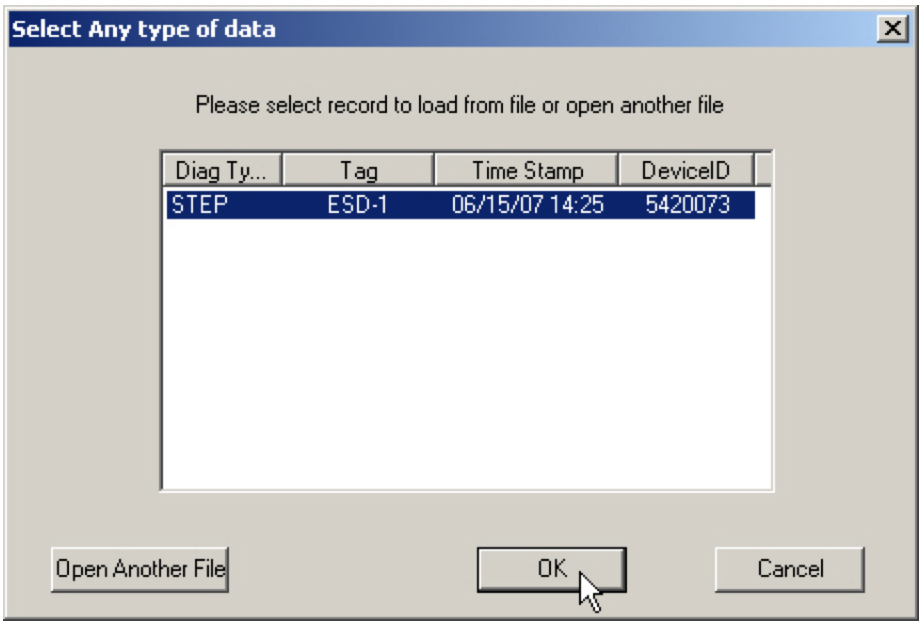


Figure 190 - Selecting Step Test Record

After selecting additional curve data from either the database or a file, the additional curve appears on the graph with the original curve (*Figure 191*).

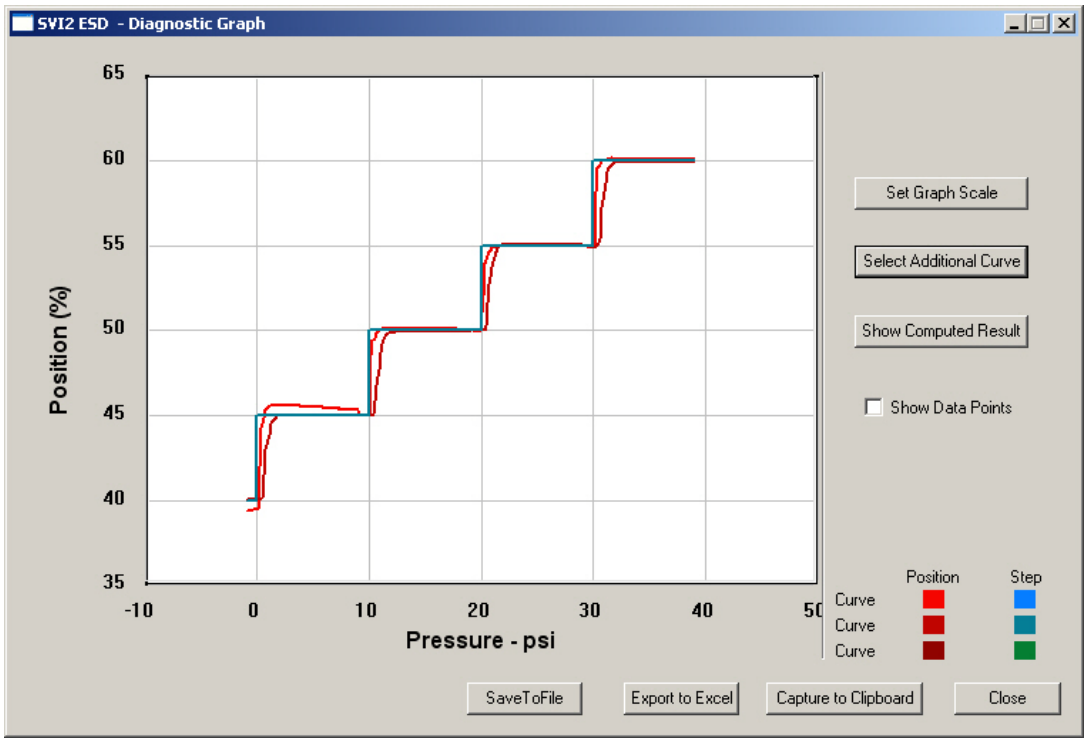


Figure 191 - Additional Curve Displayed

© 2024 Baker Hughes Company. All rights reserved.

Show Computed Step Results

To view the results of the *Step Test* as a table of numerical values:

- Click **Show Computed Result** (*Figure 192*).

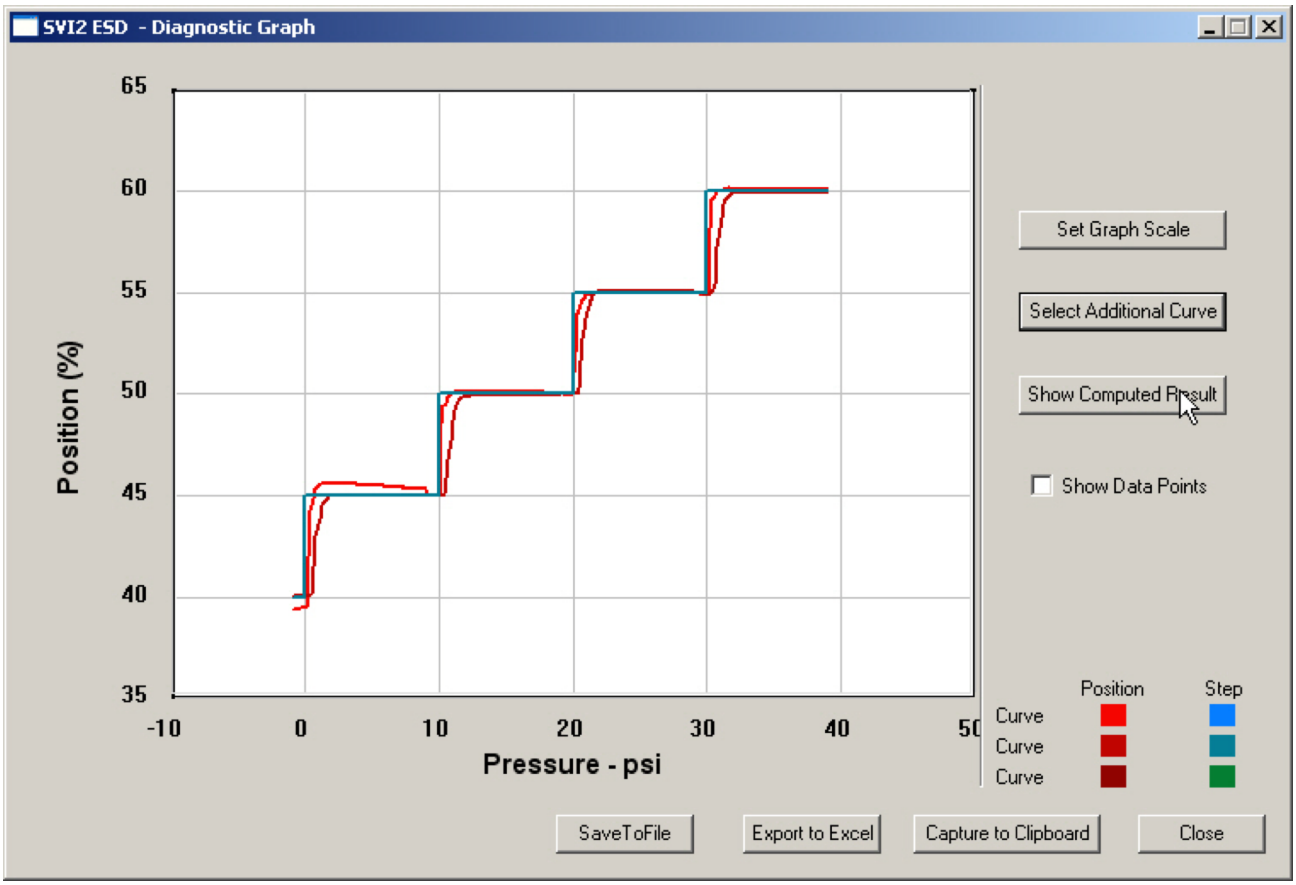


Figure 192 - Selecting Show Computed Result

© 2024 Baker Hughes Company. All rights reserved.

The *Step Response Test Result* window appears (*Figure 193*). All step diagnostic results appear in a numerical format.

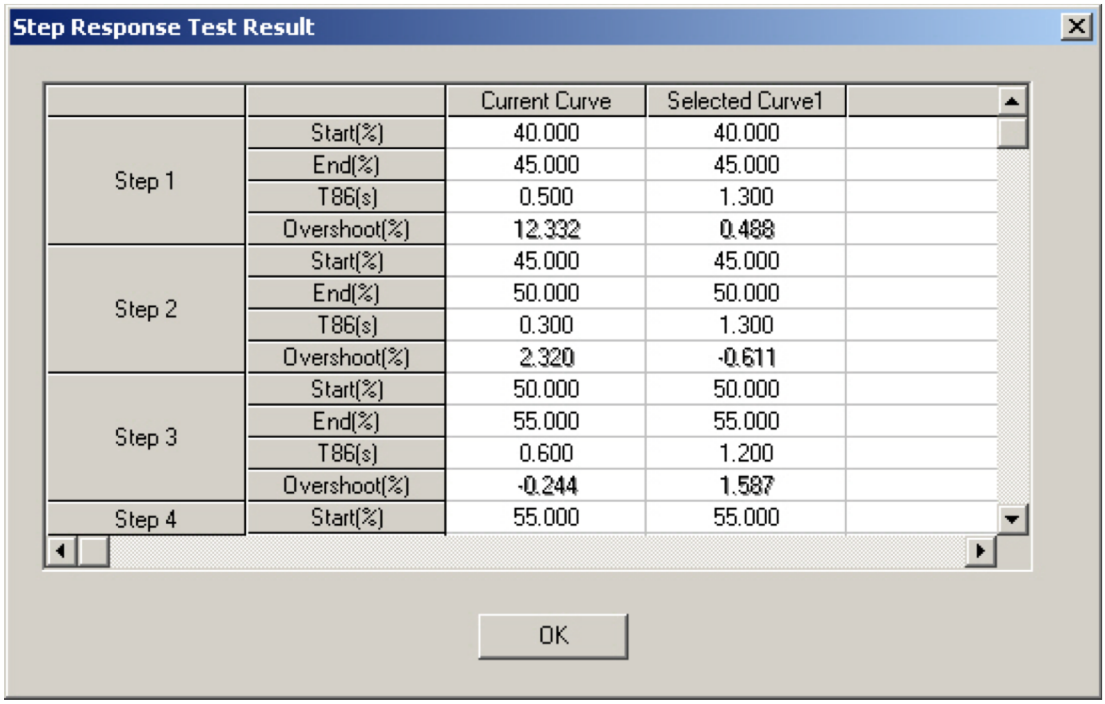


Figure 193 - Step Diagnostics Computed Result

© 2024 Baker Hughes Company. All rights reserved.

Save to File

To save diagnostic graphs in a graphical format as .dgn files to any specified location:

1. Select **Save To File** (*Figure 194*).

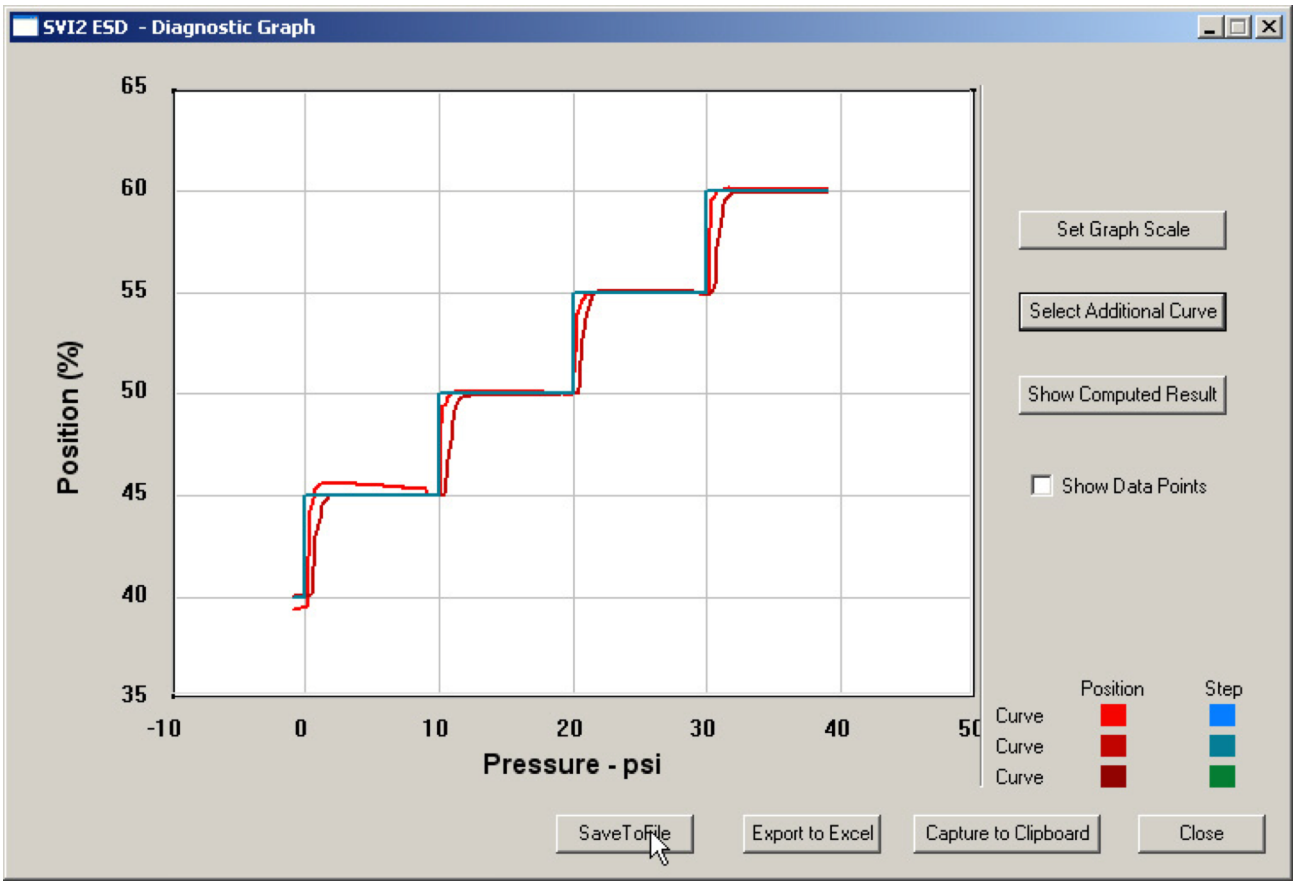


Figure 194 - Selecting Save To File

© 2024 Baker Hughes Company. All rights reserved.

A Windows file browser appears (*Figure 196*).

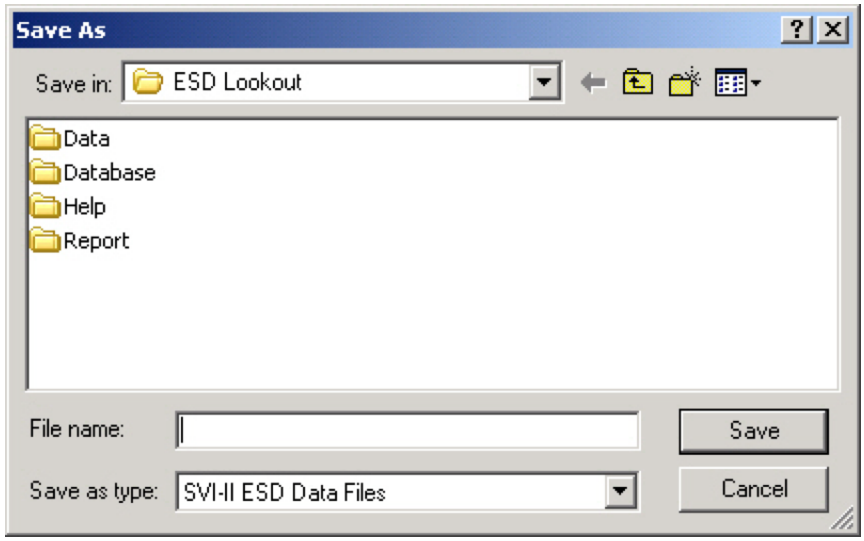


Figure 195 - File Browser

2. Locate the folder in which to save the file, enter a file name and click **Save**.

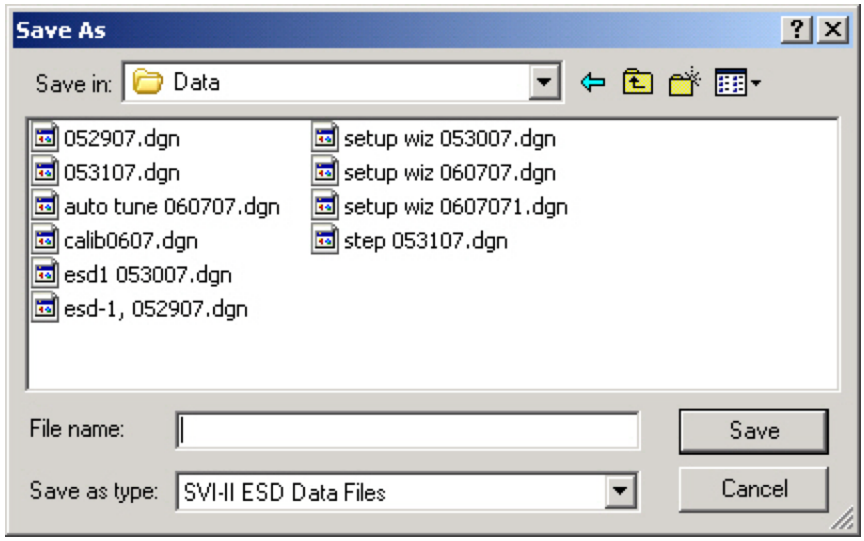


Figure 196 - Selecting a Folder for Saving File

The diagnostic graph returns.

© 2024 Baker Hughes Company. All rights reserved.

Export to Excel

You can save or create a comma separated value file (.csv) of the diagnostic data from a graph and export the file to Excel. With the Excel file you can create graphs or perform other analysis.

To export a graph to Excel:

- Click **Export to Excel** (*Figure 197*).

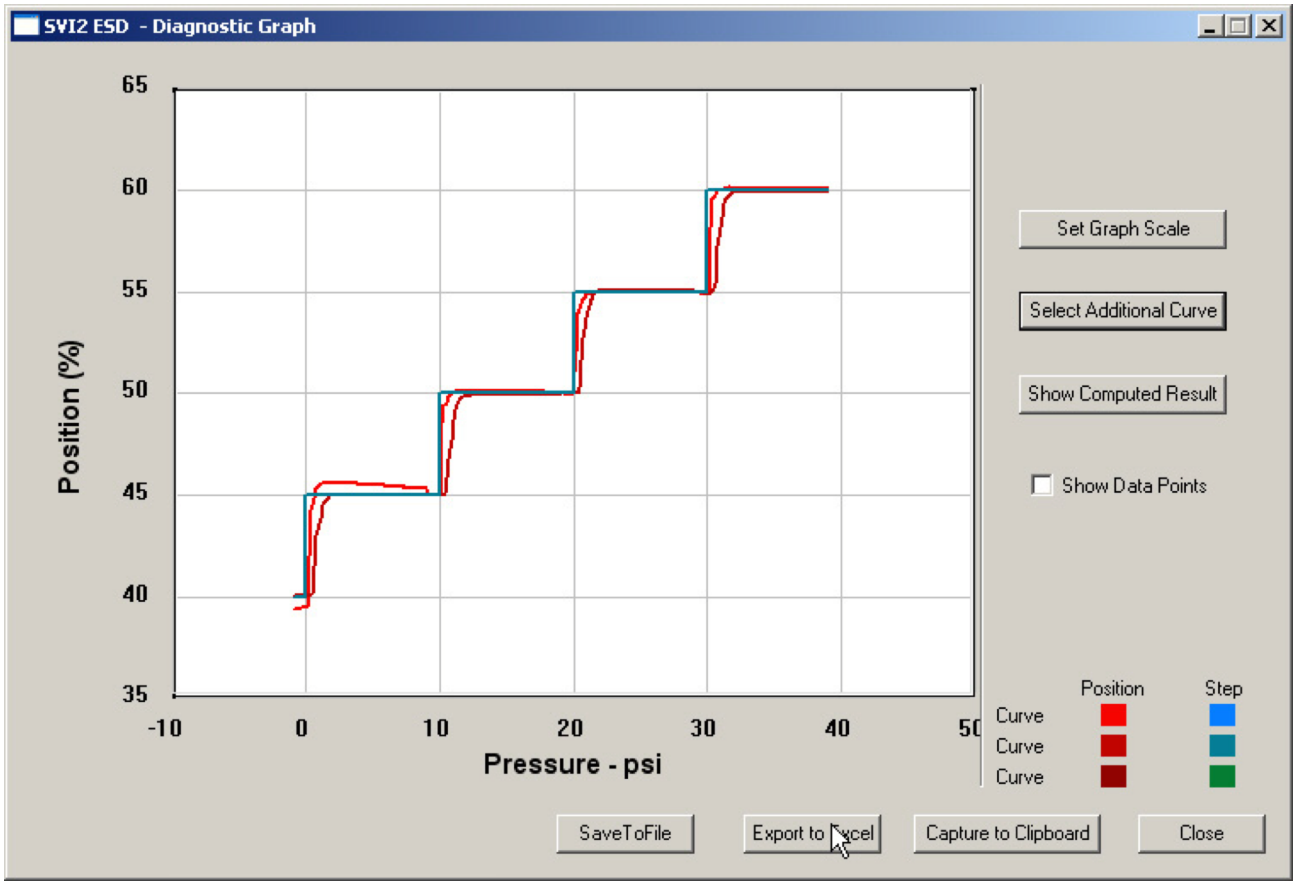
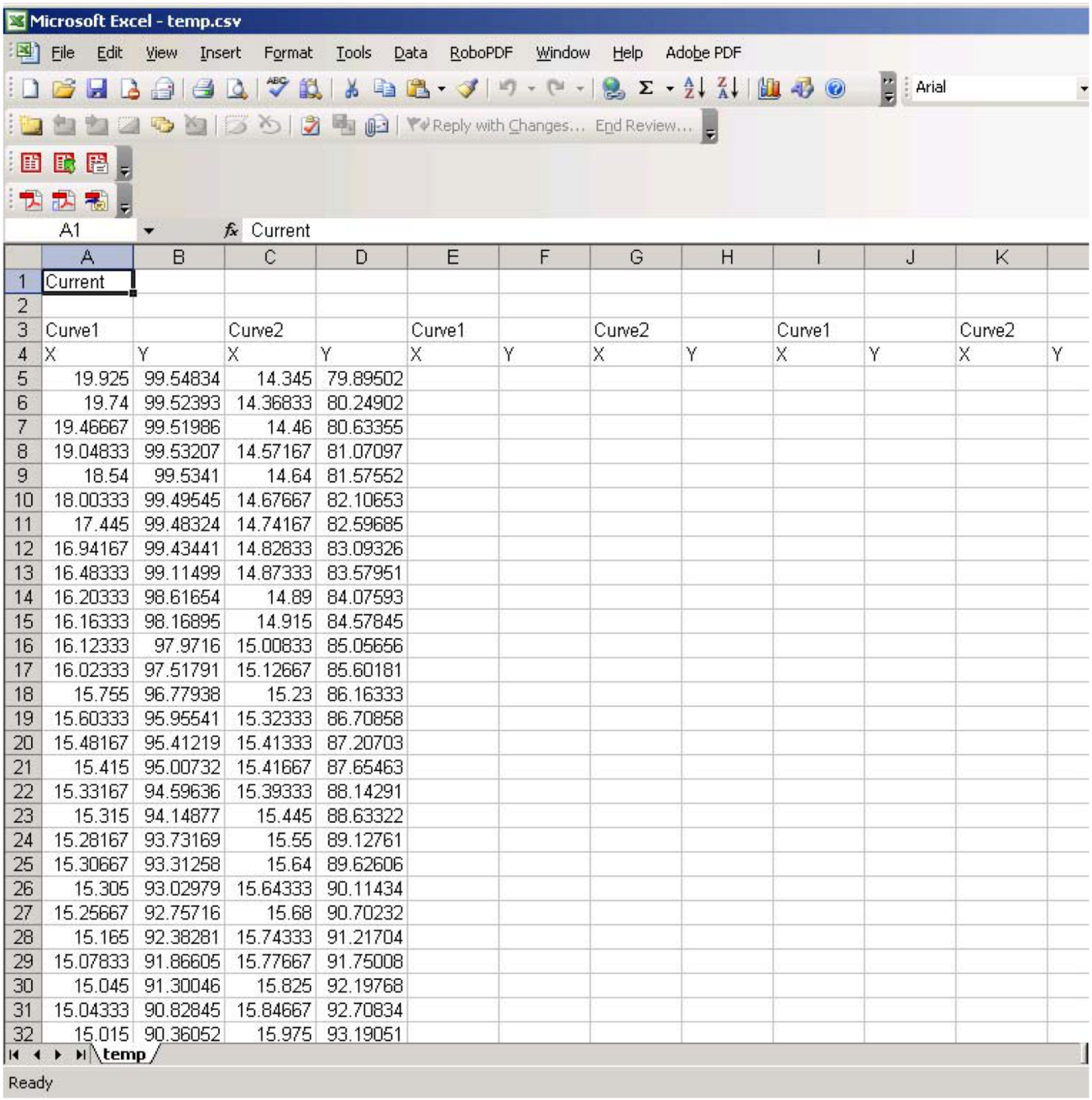


Figure 197 - Selecting Export to Excel

© 2024 Baker Hughes Company. All rights reserved.

Microsoft Excel opens and displays the X axis and Y axis values, taken from the diagnostic graph, as Excel values (*Figure 198*).



Microsoft Excel - temp.csv

File Edit View Insert Format Tools Data RoboPDF Window Help Adobe PDF

Arial

Reply with Changes... End Review...

A1 Current

	A	B	C	D	E	F	G	H	I	J	K	
1	Current											
2												
3	Curve1		Curve2		Curve1		Curve2		Curve1		Curve2	
4	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
5	19.925	99.54834	14.345	79.89502								
6	19.74	99.52393	14.36833	80.24902								
7	19.46667	99.51986	14.46	80.63355								
8	19.04833	99.53207	14.57167	81.07097								
9	18.54	99.5341	14.64	81.57552								
10	18.00333	99.49545	14.67667	82.10653								
11	17.445	99.48324	14.74167	82.59685								
12	16.94167	99.43441	14.82833	83.09326								
13	16.48333	99.11499	14.87333	83.57951								
14	16.20333	98.61654	14.89	84.07593								
15	16.16333	98.16895	14.915	84.57845								
16	16.12333	97.9716	15.00833	85.05656								
17	16.02333	97.51791	15.12667	85.60181								
18	15.755	96.77938	15.23	86.16333								
19	15.60333	95.95541	15.32333	86.70858								
20	15.48167	95.41219	15.41333	87.20703								
21	15.415	95.00732	15.41667	87.65463								
22	15.33167	94.59636	15.39333	88.14291								
23	15.315	94.14877	15.445	88.63322								
24	15.28167	93.73169	15.55	89.12761								
25	15.30667	93.31258	15.64	89.62606								
26	15.305	93.02979	15.64333	90.11434								
27	15.25667	92.75716	15.68	90.70232								
28	15.165	92.38281	15.74333	91.21704								
29	15.07833	91.86605	15.77667	91.75008								
30	15.045	91.30046	15.825	92.19768								
31	15.04333	90.82845	15.84667	92.70834								
32	15.015	90.36052	15.975	93.19051								

temp

Ready

Figure 198 - Diagnostic Graph Data - in Excel

© 2024 Baker Hughes Company. All rights reserved.

Extended Signature Diagnostics

Note: To perform any of the diagnostic tests on the Diagnostics screen ESDVue must be in Setup mode. See "Change Mode" on page 81 for more information.

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 the *Extended Actuator Signature Diagnostic* test:

1. Adjust the *Start (%)*, *End (%)* and *Speed (%/s)* parameters, if necessary (*Figure 199*).

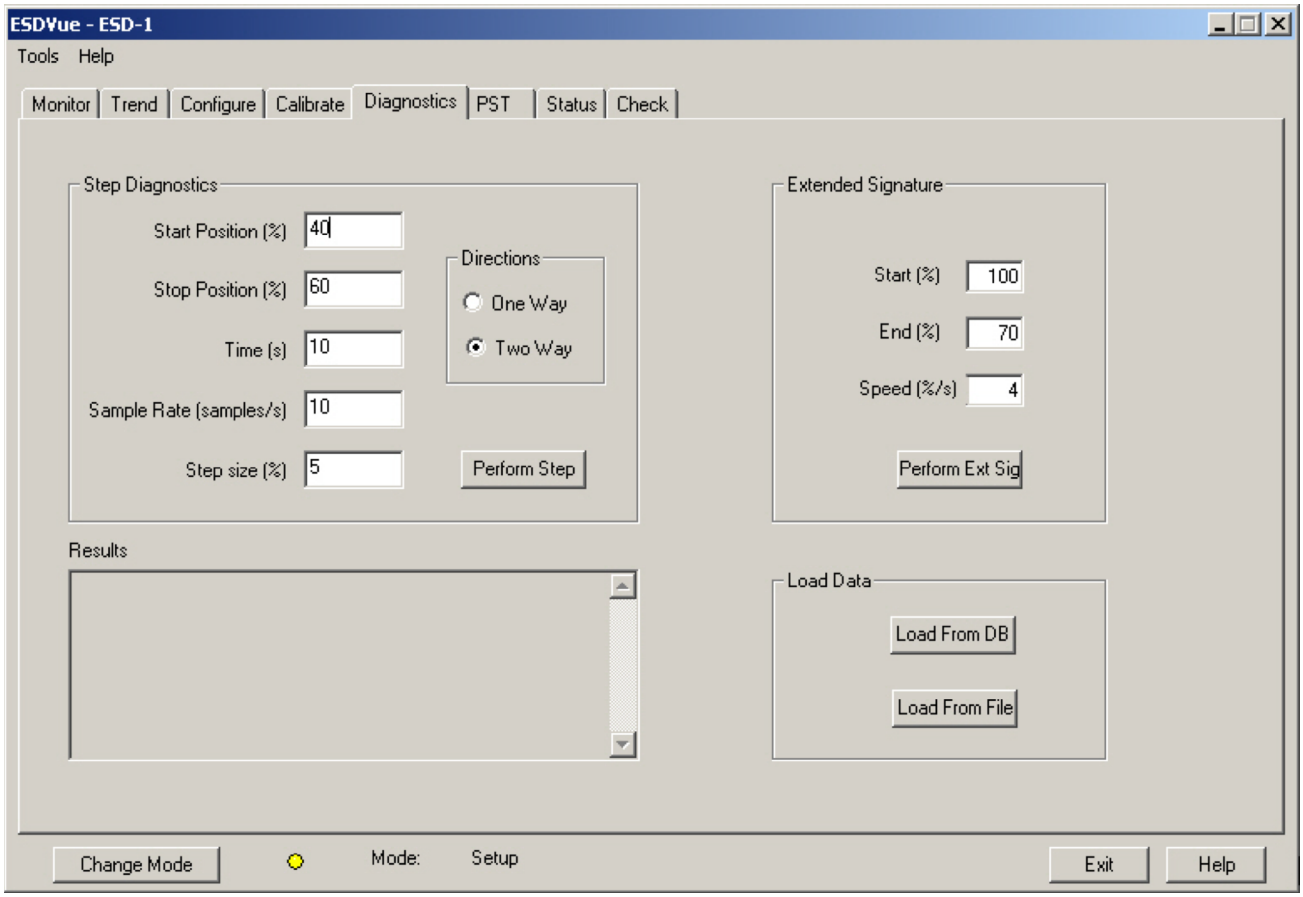


Figure 199 - Adjusting Extended Diagnostics Parameters

The *Start/End* position parameters are the start and end ramp up/ramp down positions expressed as a percentage of the total travel.

2. Enter the *Start* and *End Positions* for the SVI II ESD for running Extended Diagnostics.

© 2024 Baker Hughes Company. All rights reserved.

When entering the *Start/End Position*, the values must be between -5% and 110%. If you try to enter other values an error message appears (*Figure 200*).

Figure 200 - Start and End Positions Error Message

3. Enter the *Speed Level* for running Extended Diagnostics.

   When entering the *Speed Level*, the values must be between *1* and *10*. If you try to enter other values an error message appears (*Figure 201*). The speed level is the rate of speed at which the valve is moved as the test is performed, 1 is the slowest and 10 the fastest. The default speed level is 4. This field can be adjusted to account for larger (larger volume involved) or smaller valves (smaller volume involved).

Figure 201 - Speed Level Error Message

© 2024 Baker Hughes Company. All rights reserved.

4. Click **Perform Ext Sig** (*Figure 202*).

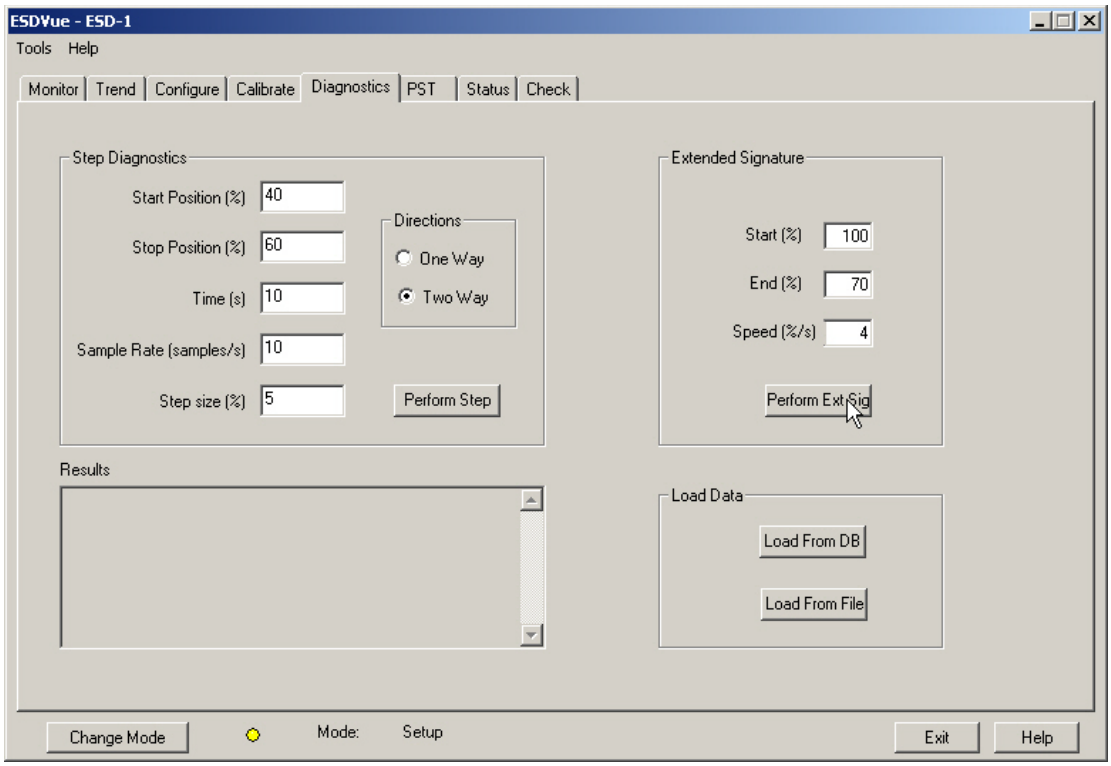


Figure 202 - Executing Perform Ext Sig

A warning dialog appears (*Figure 203*).

5. Make sure that the SVI II ESD is out of the process control loop and click **OK**.

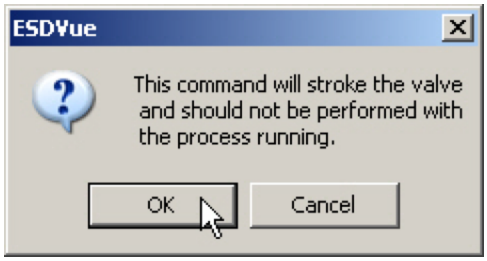


Figure 203 - EXT Warning

© 2024 Baker Hughes Company. All rights reserved.

The *Extended Actuator Signature* starts and the progress dialog appears (*Figure 204*).

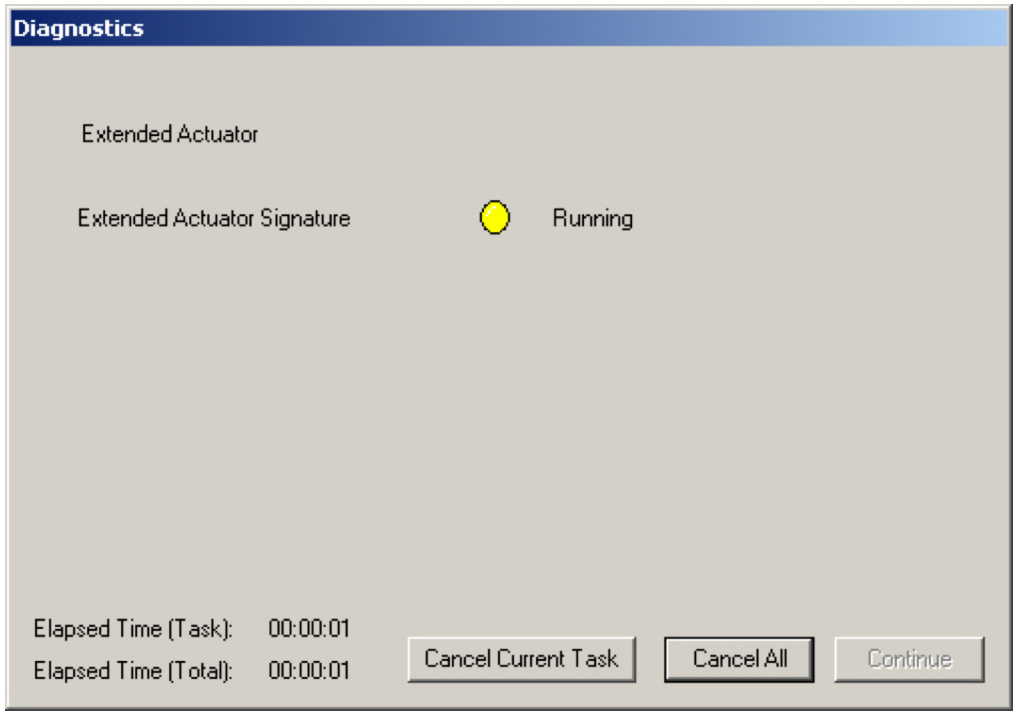


Figure 204 - Extended Signature Progress Dialog

When the test is completed the progress dialog changes to *Figure 205*.

© 2024 Baker Hughes Company. All rights reserved.

6. Click **Continue** to close the dialog and view the *Diagnostic Graph (Figure 206)*.

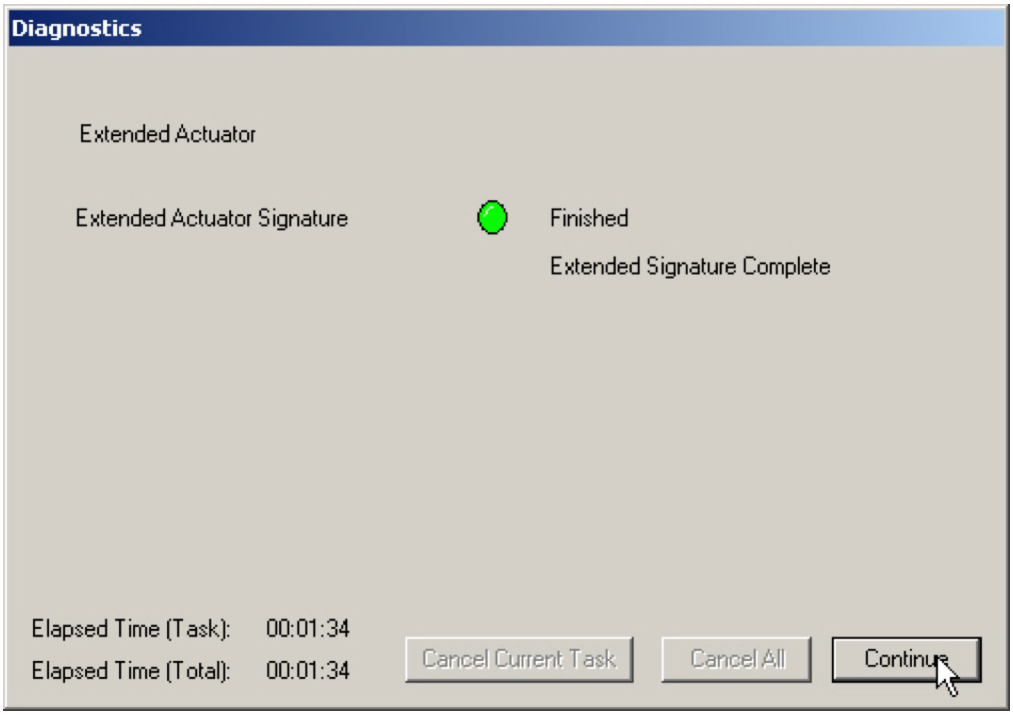


Figure 205 - Completing EXT

Extended Signature Diagnostics Graph Features

The *Extended Signature Diagnostics Graph* (*Figure 206*) has the same features as all other diagnostic graphs:

- *Set Graph Scale* - changes the coordinates of the *Pressure Position* axes.
- *Select Additional Curve* - displays an additional, selected, curve on the graph.
- *Show Computed Result* - view the data in a numerical value format.
- *Show Data Points* - shows data points collected during testing.
- *Save to File* - save the graph to a file.
- *Export to Excel* - exports the data as a CSV Excel file.
- *Capture to Clipboard* - captures a bitmap image of the graph.
- *Close* - closes the graph and returns the *ESDVue* screen.

© 2024 Baker Hughes Company. All rights reserved.

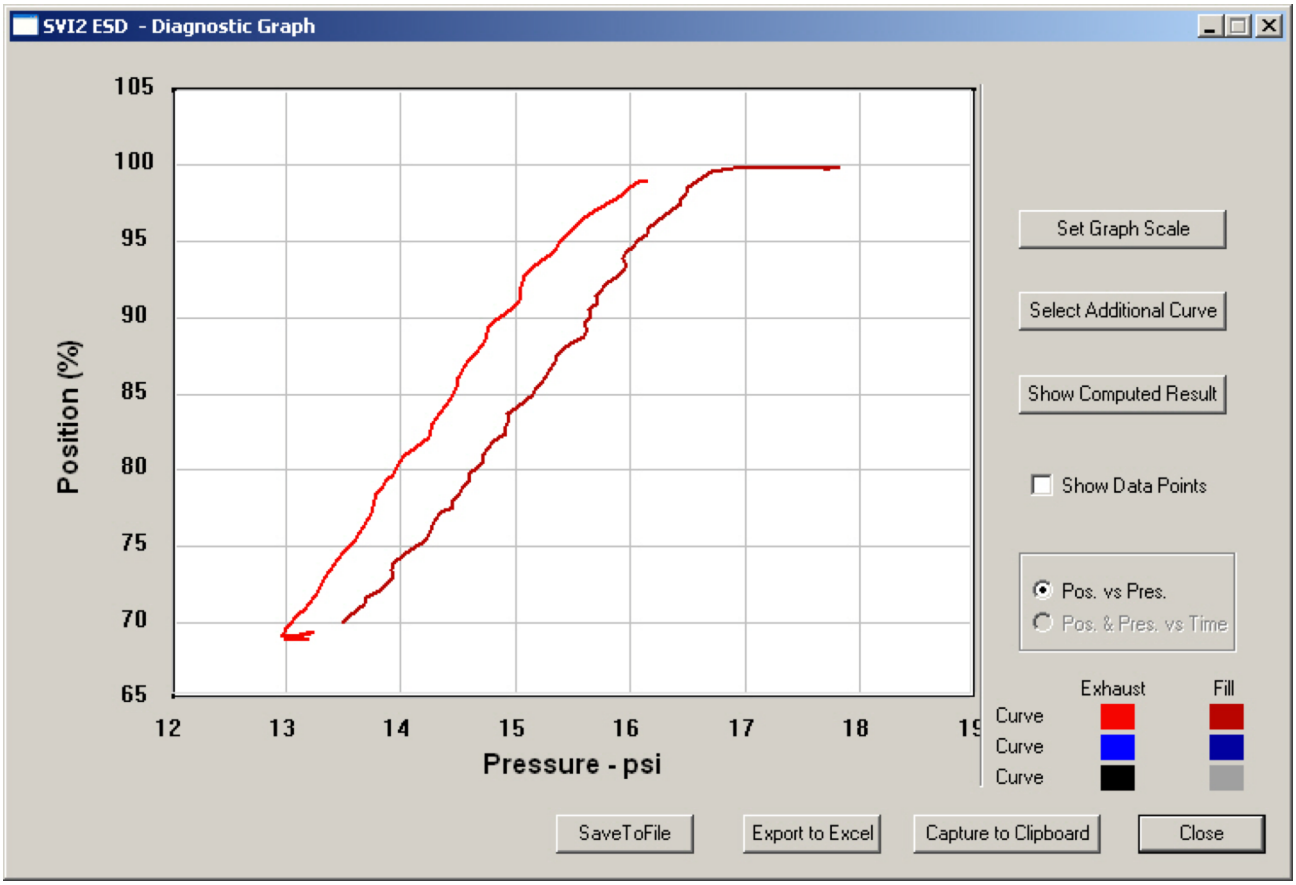


Figure 206 - Extended Signature Diagnostics Graph

© 2024 Baker Hughes Company. All rights reserved.

Set Graph Scale

You can change the graph scale on diagnostic graphs to narrow in on one area of the graph, or expand the viewing area.

To change the graph scale:

1. Select **Set Graph Scale** (*Figure 207*).

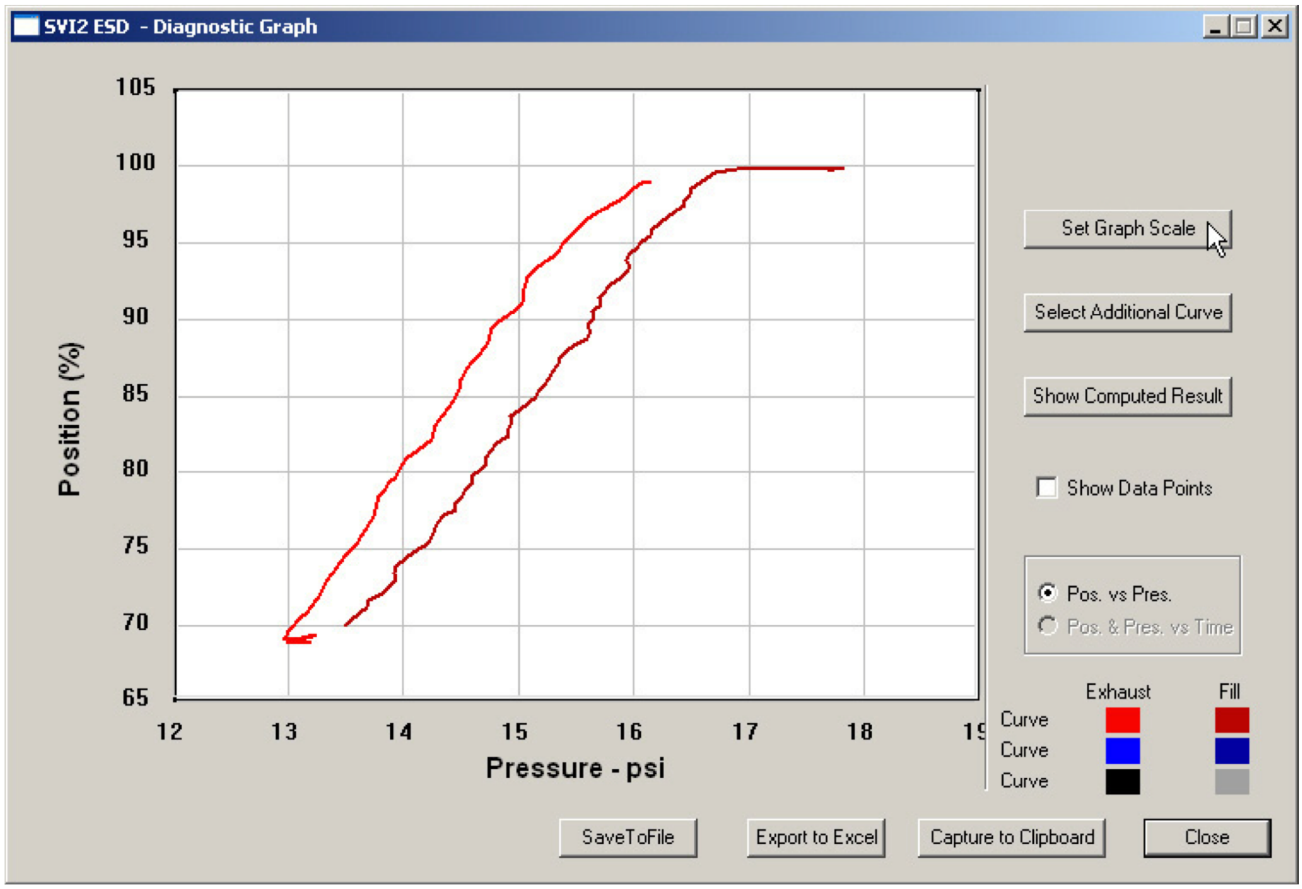


Figure 207 - Selecting Set Graph Scale

The *Set Graph Scale* window appears (*Figure 208*).

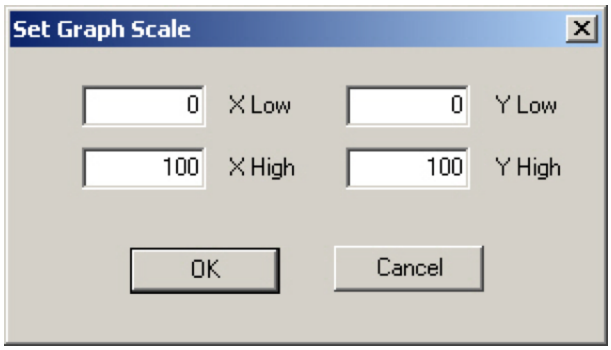


Figure 208 - Set Graph Scale Window

© 2024 Baker Hughes Company. All rights reserved.

2. Adjust the X axis and Y axis coordinates as necessary and click **OK** (*Figure 209*).

   The *Diagnostic Graph* reflects the changes made to the axes.

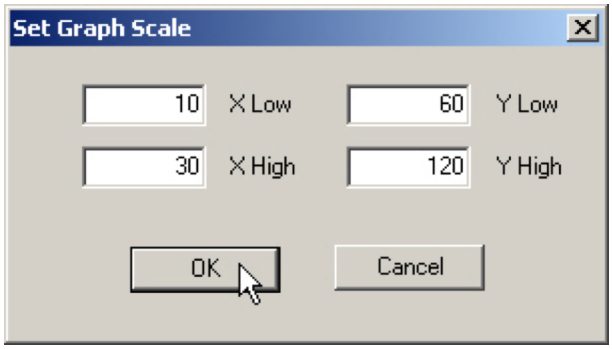


Figure 209 - Saving Scale Adjustments

Select Additional Extended Signature Curve

You can view more than one diagnostic curve at a time; being able to compare two curves may facilitate diagnostics.

To display an additional extended signature curve on the diagnostic graph:

1. Click **Select Additional Curve** (*Figure 210*).

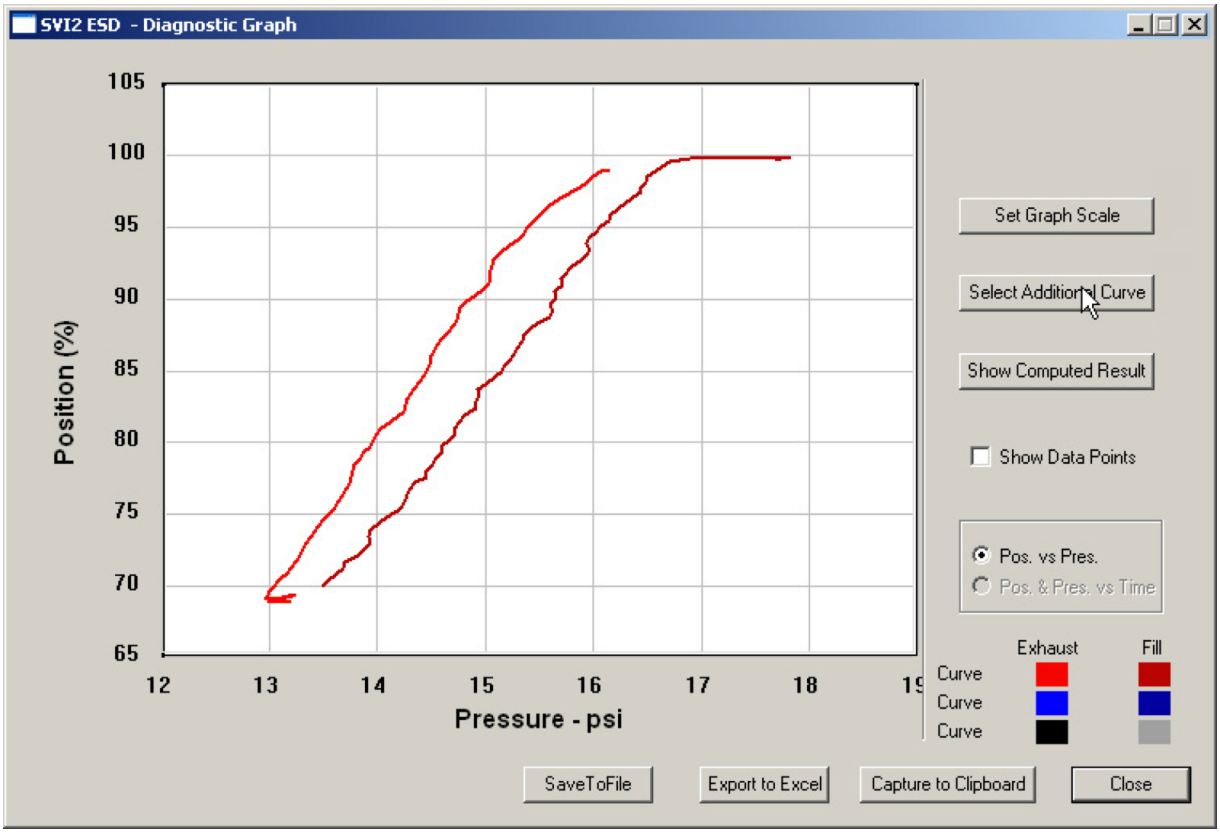


Figure 210 - Starting Select Additional Curve

© 2024 Baker Hughes Company. All rights reserved.

A dialog appears (*Figure 211*).

2. Select the source of the additional curve:
   - **Load from Database** - launches window to select data from database. Move to *"Selecting a Curve from a Database"*.
   - **Load Data from File** - launches to browser to select file to load. Move to *"Selecting a Curve from a File"* on page 219.

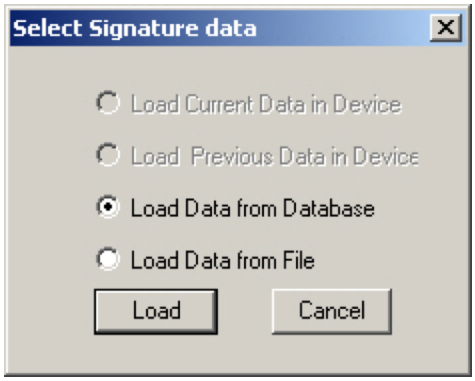


Figure 211 - Select Additional Extended Signature Curve Dialog

Selecting a Curve from a Database

To select a curve from a database:

1. Click the **Load Data from Database** radio button, if not already selected.
2. Click **Load** (*Figure 212*).

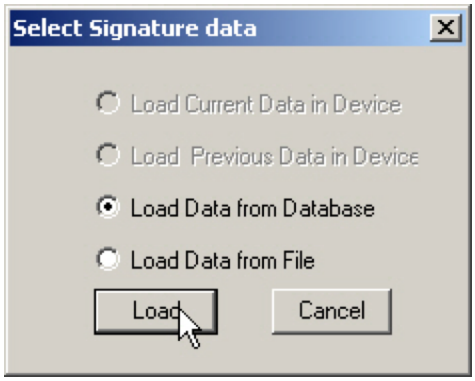


Figure 212 - Selecting Load Data from Database

© 2024 Baker Hughes Company. All rights reserved.

A database browser appears (*Figure 213*). The browser displays only Extended Signature diagnostic data.

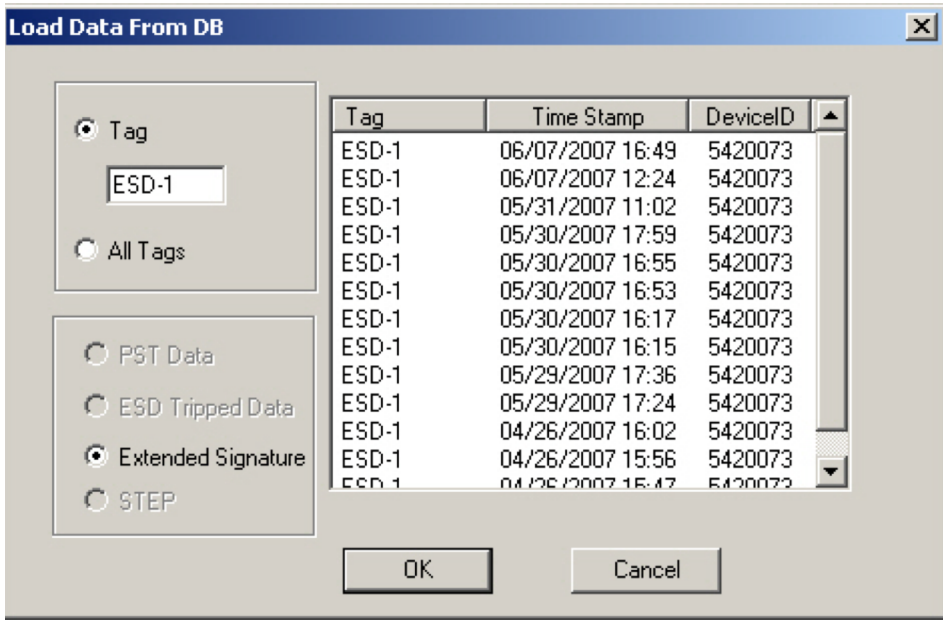


Figure 213 - Database Browser Displaying Extended Signature Data

3. Scroll through the list of data files until you locate the file with the appropriate time stamp and click **OK** (*Figure 214*).

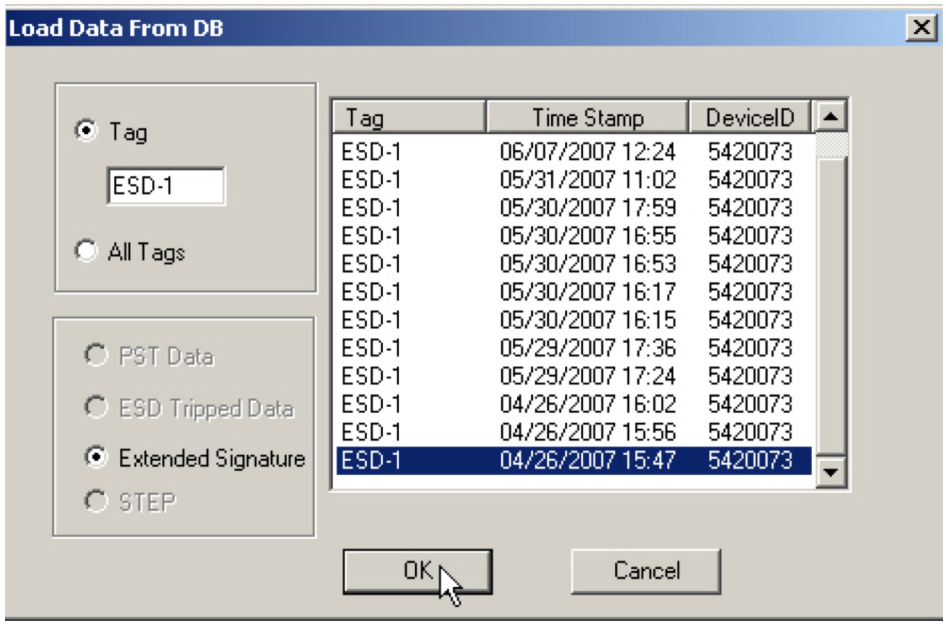


Figure 214 - Loading Extended Signature Data

© 2024 Baker Hughes Company. All rights reserved.

Selecting a Curve from a File

You can also load an additional *Extended Signature Curve* from a saved file. To select a curve from a file:

1. Select **Select Additional Curve** from the *Extended Signature Diagnostics Graph* and a dialog appears (*Figure 192*).
2. Select **Load Data from File** and click **Load**.

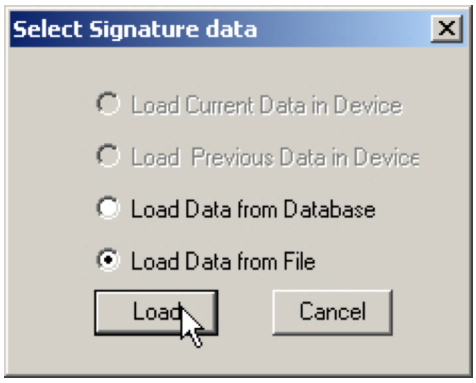


Figure 215 - Selecting Load Data from File

A file browser window appears (*Figure 216*).

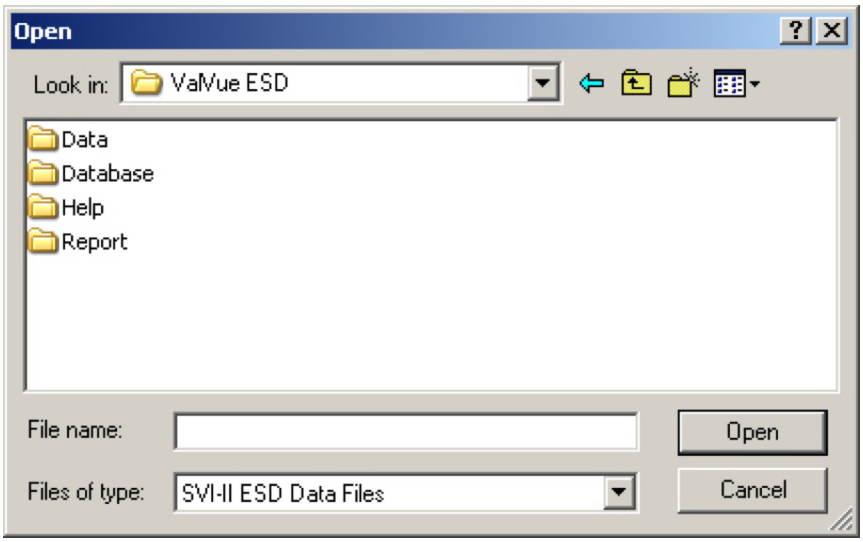


Figure 216 - File Browser

© 2024 Baker Hughes Company. All rights reserved.

3. Using the browser, locate the file to load and click **Open** (*Figure 217*).

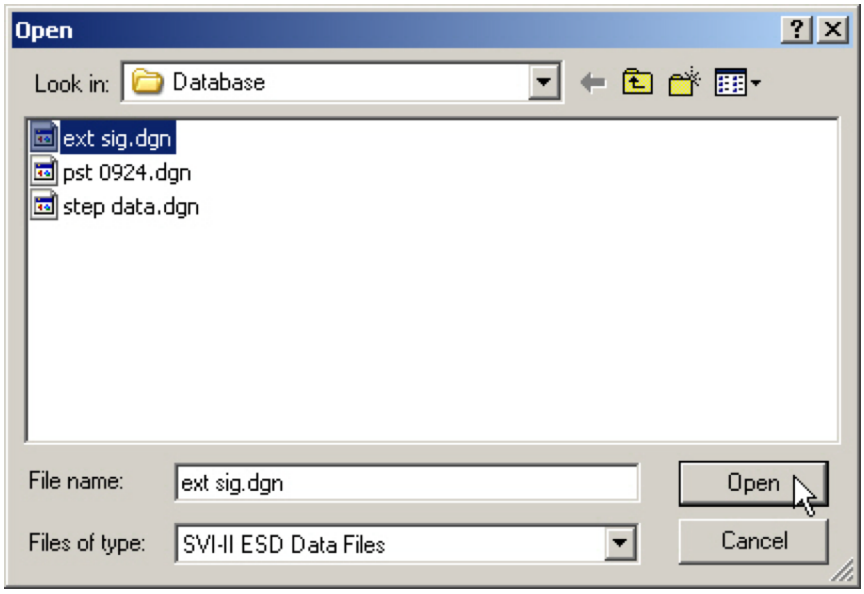


Figure 217 - Opening File for Additional Curve

A dialog appears (*Figure 218*).

4. Select the record with the appropriate time stamp and click **OK**.

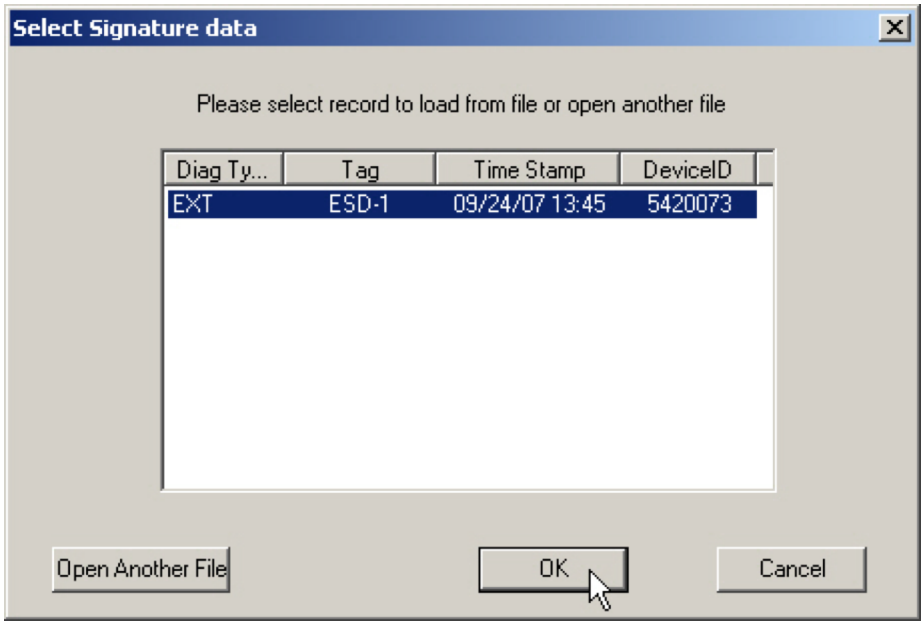


Figure 218 - Selecting Signature Data Record

© 2024 Baker Hughes Company. All rights reserved.

After selecting additional curve data from either the database or a file, the additional curve appears on the graph with the original curve (*Figure 219*).

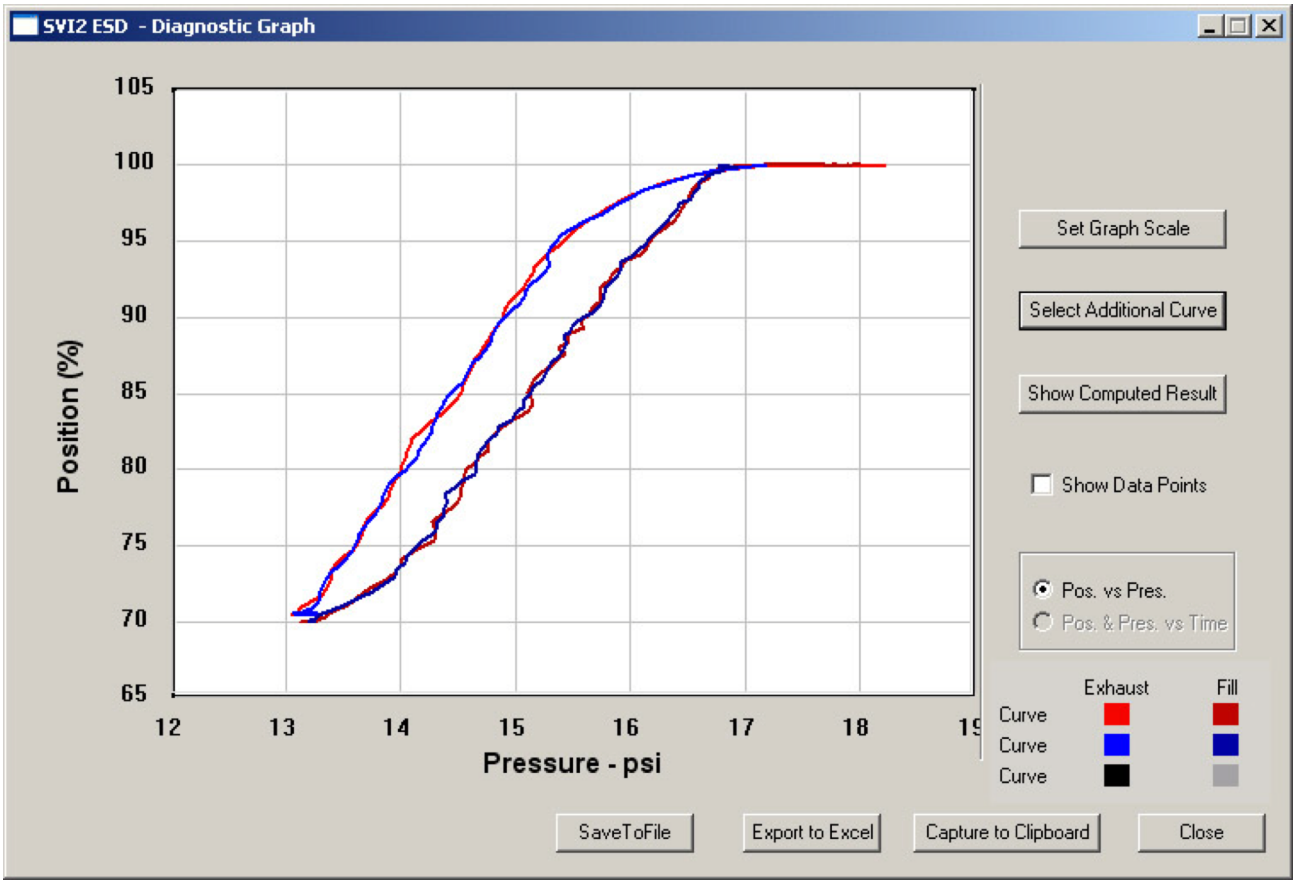


Figure 219 - Additional Curve Displayed

Show Computed Extended Signature Results

You can view the results of the test as a table of numerical values.

To display the computed result for the active *Extended Signature Test*:

- Click **Show Computed Result** (*Figure 220*).

© 2024 Baker Hughes Company. All rights reserved.

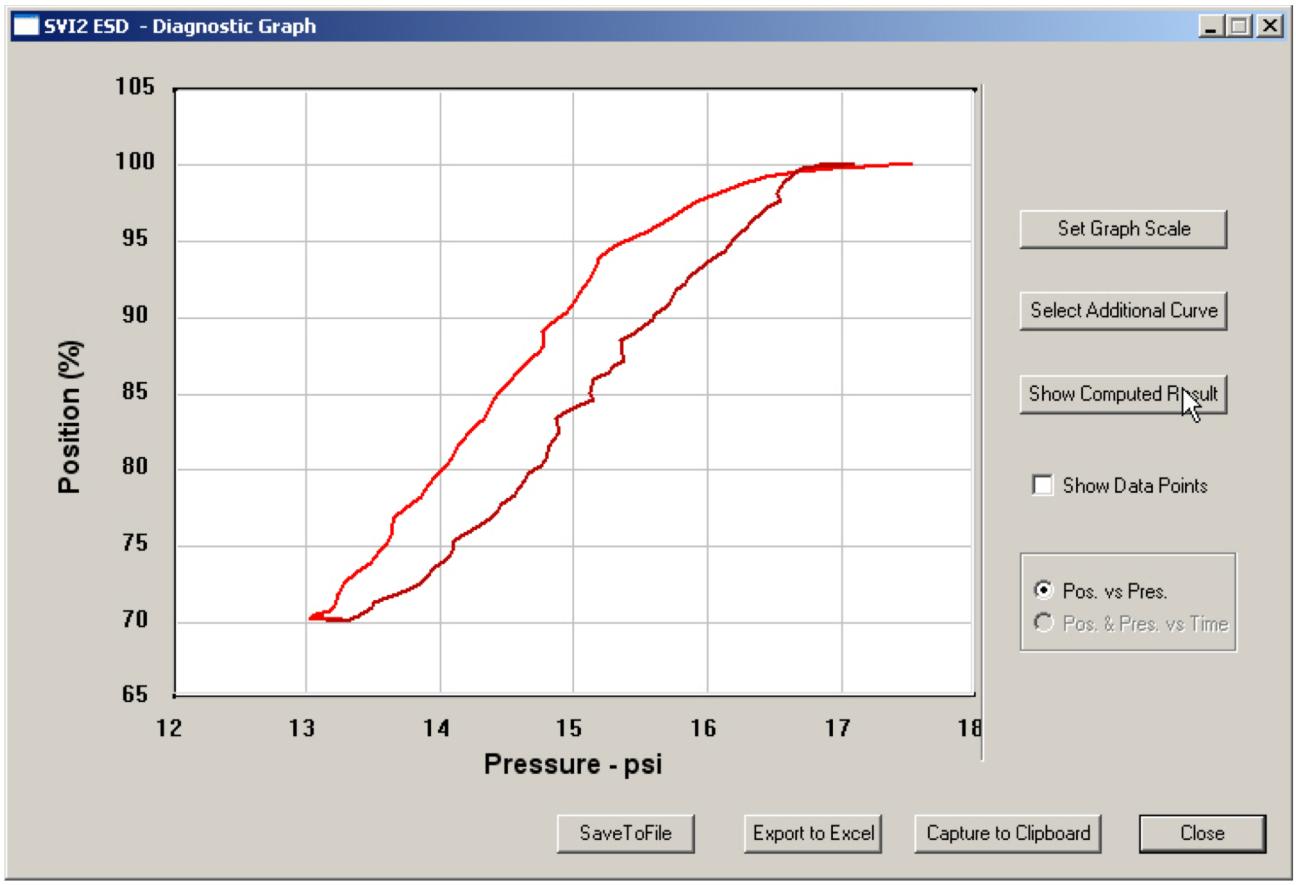


Figure 220 - Selecting Show Computed Result

The *Extended Signature Test Result* window appears (*Figure 221*). All extended signature diagnostic results are displayed in a numerical format.

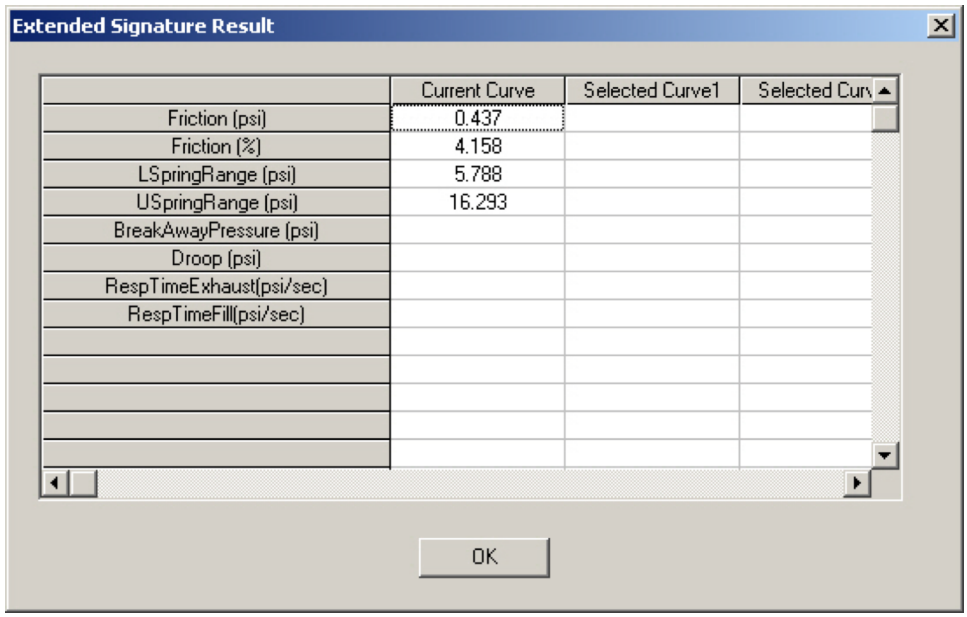


Figure 221 - Extended Signature Diagnostics Computed Result

© 2024 Baker Hughes Company. All rights reserved.

Save to File

You can save diagnostic graphs in a graphical format as .dgn files to any specified location.

To save a diagnostic graph to a file:

1. Select **Save To File** (*Figure 222*).

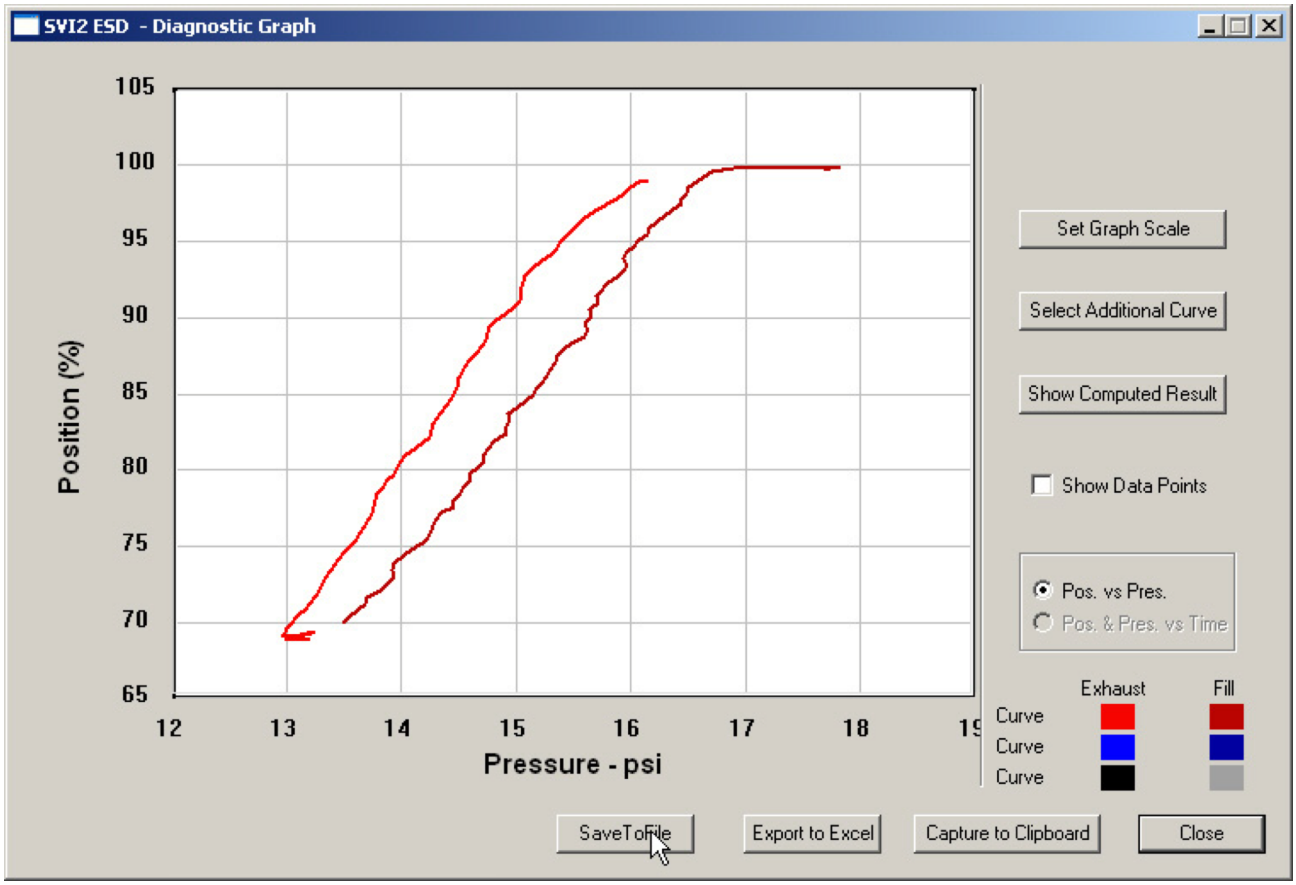


Figure 222 - Selecting Save To File

© 2024 Baker Hughes Company. All rights reserved.

A Windows file browser appears (*Figure 223*).

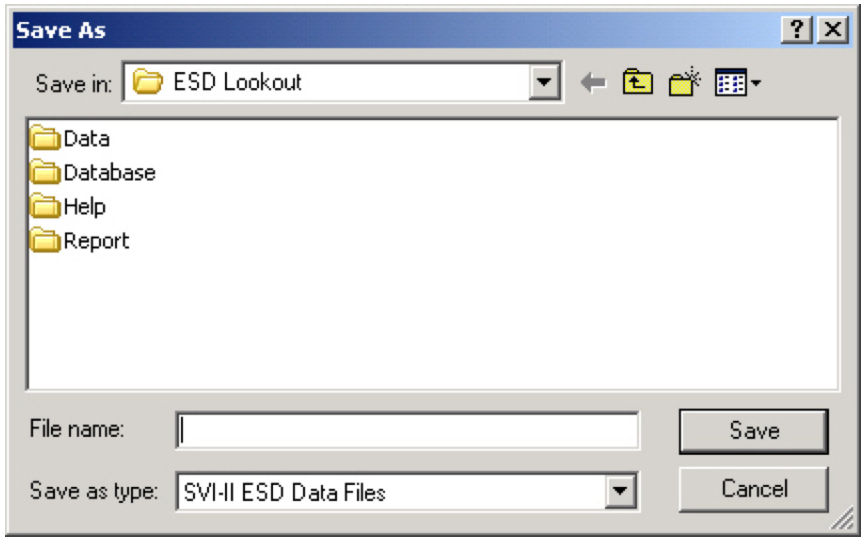


Figure 223 - File Browser

2. Locate the folder in which to save the file, enter a name and click **Save** (*Figure 224*).

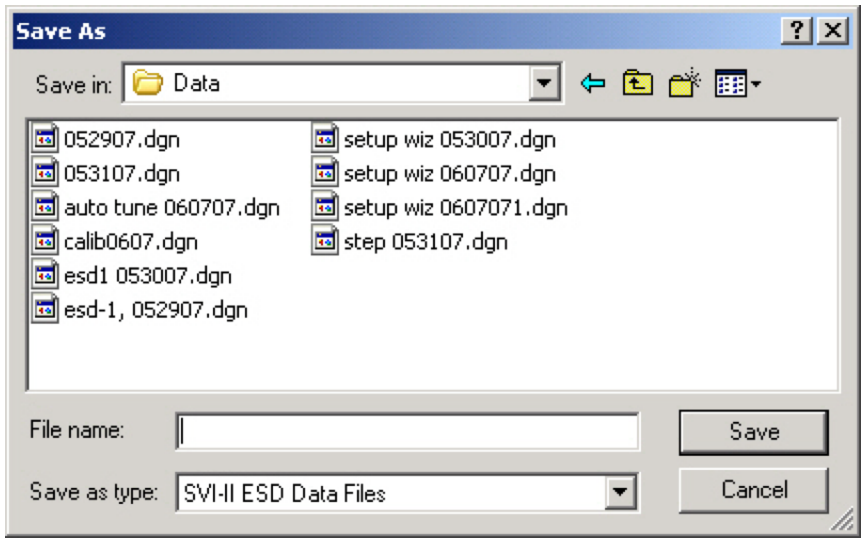


Figure 224 - Selecting a Folder for Saving File

ESDVue closes the browser window and returns the diagnostic graph.

© 2024 Baker Hughes Company. All rights reserved.

Export to Excel

You can save or create a comma separated value file (.csv) of the diagnostic data from a graph and export the file to Excel. With the Excel file you can create graphs or perform other analysis.

To export a graph to Excel:

- Click **Export to Excel** (*Figure 225*).

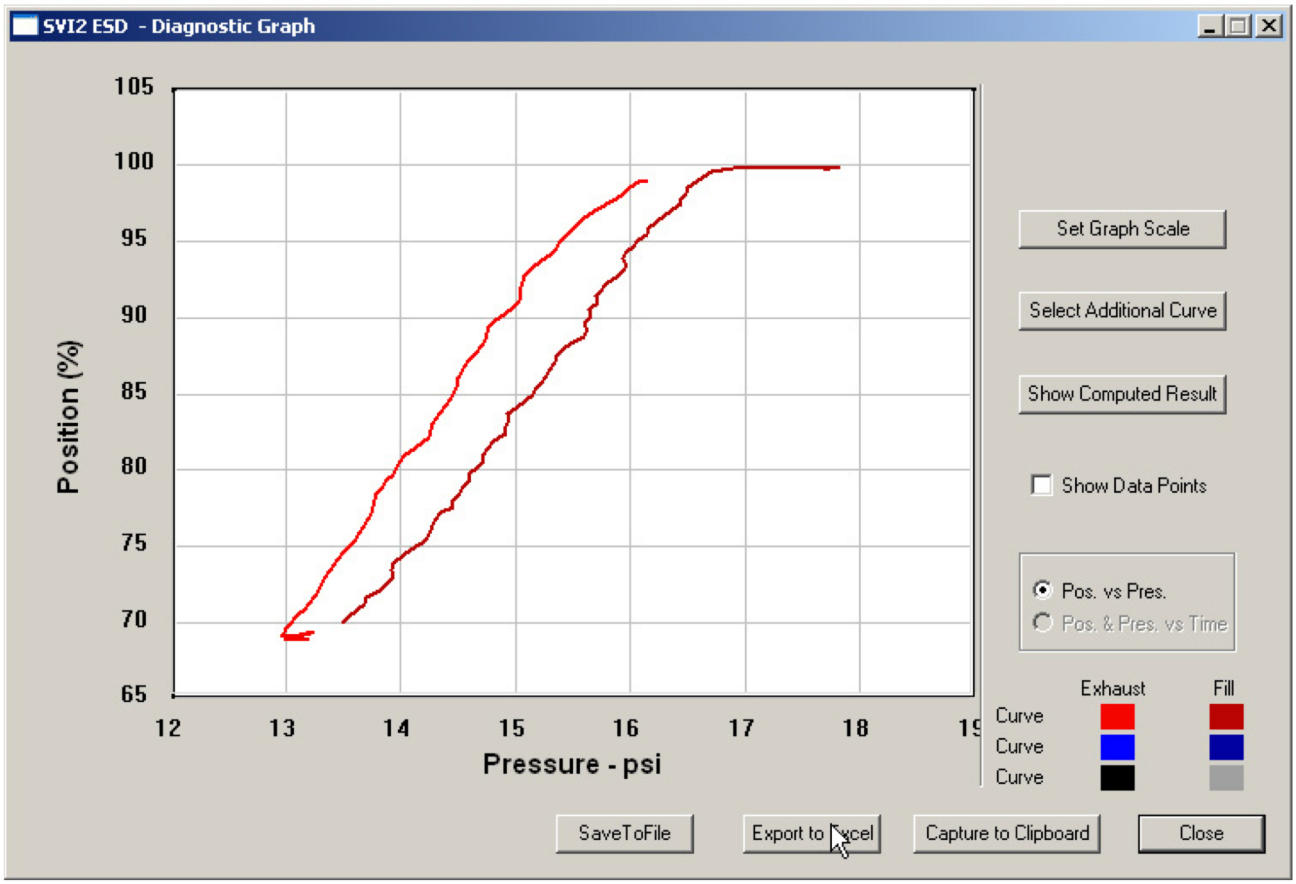
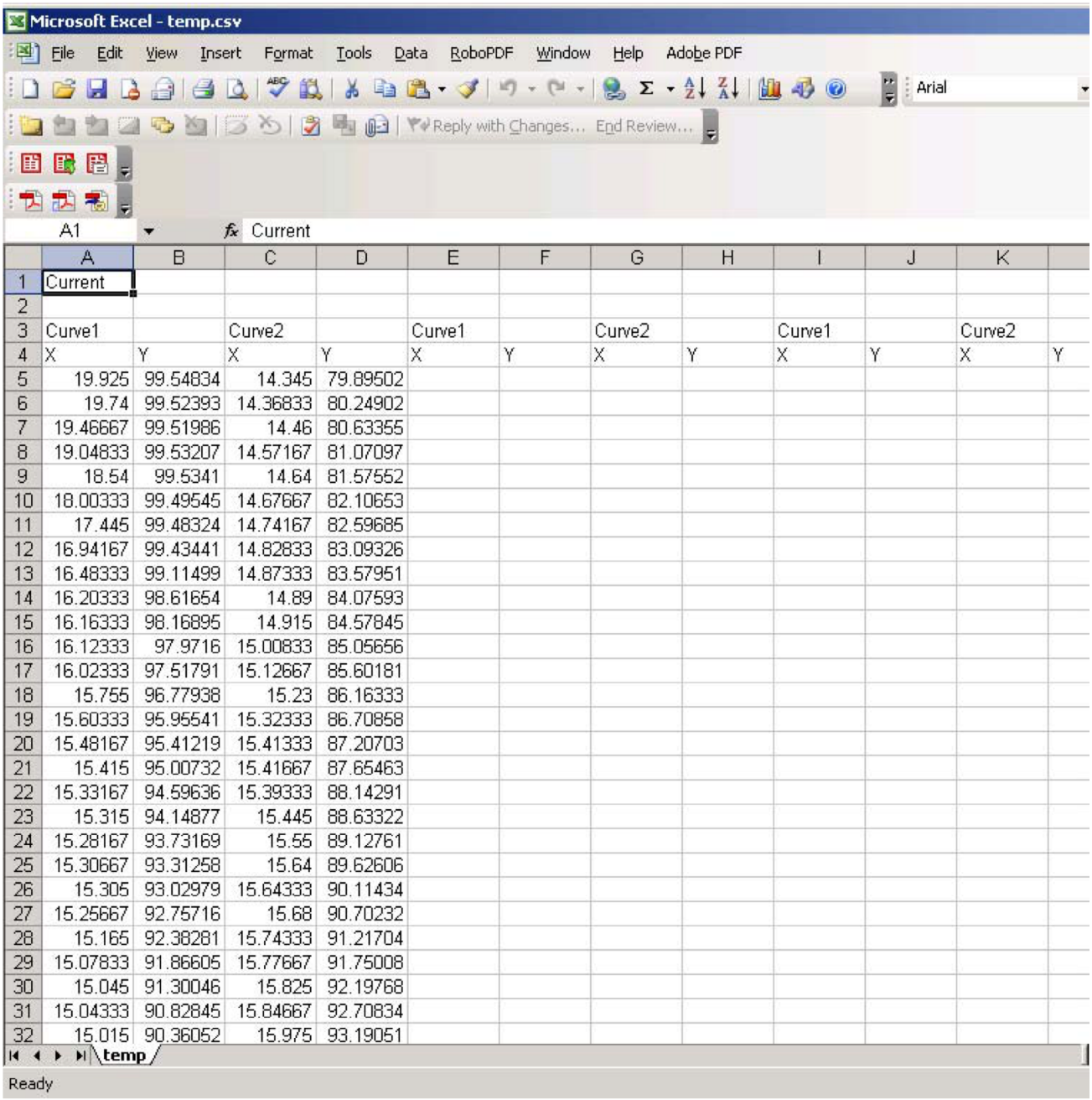


Figure 225 - Selecting Export to Excel

© 2024 Baker Hughes Company. All rights reserved.

Microsoft Excel opens and display the X axis and Y axis values, taken from the diagnostic graph, as Excel values (*Figure 226*).



	A	B	C	D	E	F	G	H	I	J	K	
1	Current											
2												
3	Curve1		Curve2		Curve1		Curve2		Curve1		Curve2	
4	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
5	19.925	99.54834	14.345	79.89502								
6	19.74	99.52393	14.36833	80.24902								
7	19.46667	99.51986	14.46	80.63355								
8	19.04833	99.53207	14.57167	81.07097								
9	18.54	99.5341	14.64	81.57552								
10	18.00333	99.49545	14.67667	82.10653								
11	17.445	99.48324	14.74167	82.59685								
12	16.94167	99.43441	14.82833	83.09326								
13	16.48333	99.11499	14.87333	83.57951								
14	16.20333	98.61654	14.89	84.07593								
15	16.16333	98.16895	14.915	84.57845								
16	16.12333	97.9716	15.00833	85.05656								
17	16.02333	97.51791	15.12667	85.60181								
18	15.755	96.77938	15.23	86.16333								
19	15.60333	95.95541	15.32333	86.70858								
20	15.48167	95.41219	15.41333	87.20703								
21	15.415	95.00732	15.41667	87.65463								
22	15.33167	94.59636	15.39333	88.14291								
23	15.315	94.14877	15.445	88.63322								
24	15.28167	93.73169	15.55	89.12761								
25	15.30667	93.31258	15.64	89.62606								
26	15.305	93.02979	15.64333	90.11434								
27	15.25667	92.75716	15.68	90.70232								
28	15.165	92.38281	15.74333	91.21704								
29	15.07833	91.86605	15.77667	91.75008								
30	15.045	91.30046	15.825	92.19768								
31	15.04333	90.82845	15.84667	92.70834								
32	15.015	90.36052	15.975	93.19051								

Figure 226 - Diagnostic Graph Data - in Excel

© 2024 Baker Hughes Company. All rights reserved.

Load Data

You can load saved data from a database or from a file.

Loading Data from a Database

Every time you successfully run a diagnostics test, ESDVue saves the diagnostic data to a database. On the *Diagnostics* screen you can load any diagnostic data from the database.

To load diagnostic data from the database:

1. Click **Load From DB** (*Figure 227*).

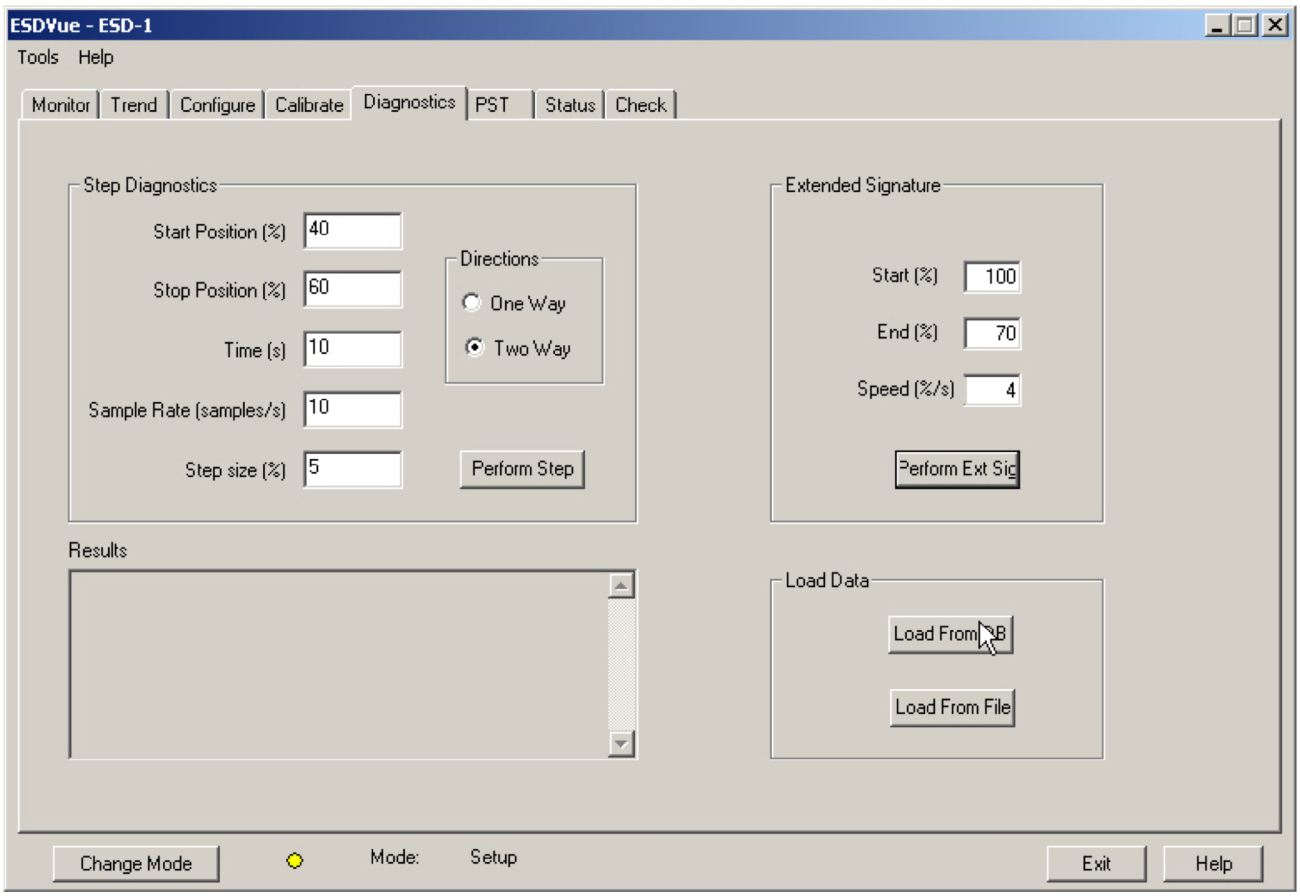


Figure 227 - Selecting Load From DB

The *Load Data From DB* window appears (*Figure 228*) where you select the data to load on the diagnostic graph.

2. Choose either a particular Device ID or choose All Tags (all devices) for the data to load.

© 2024 Baker Hughes Company. All rights reserved.

3. Use the radio buttons to select the data type you to load:
   - **PST Data**
   - **ESD Tripped Data**
   - **Extended Signature**
   - **STEP**
4. Scroll through the list and select the required time stamp.

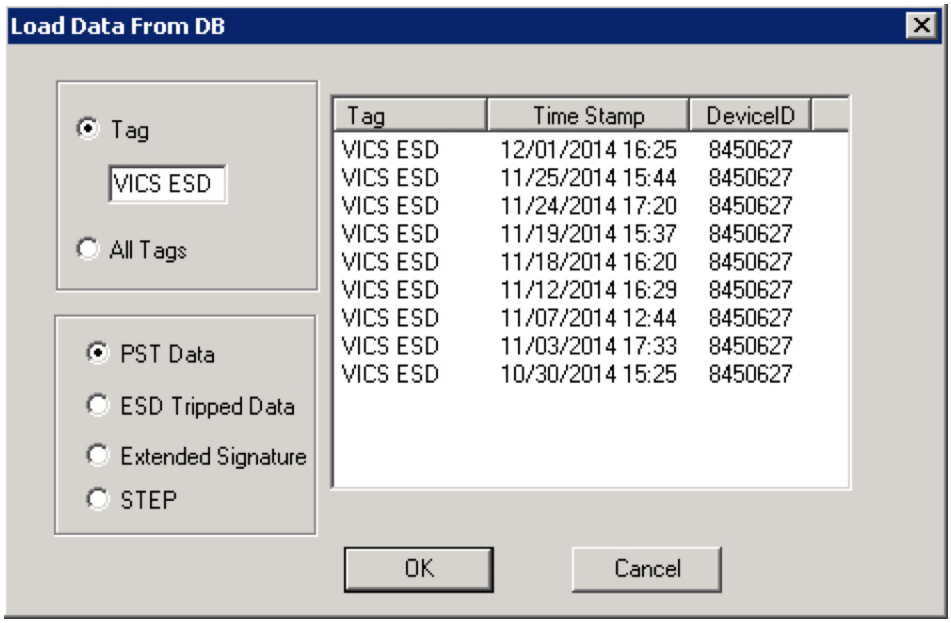


Figure 228 - Device and Data Type Displayed

Note: Load from Database Tool Tips; When you hover over a data record name that ESDVue displays all the data for the record (Figure 229).

© 2024 Baker Hughes Company. All rights reserved.

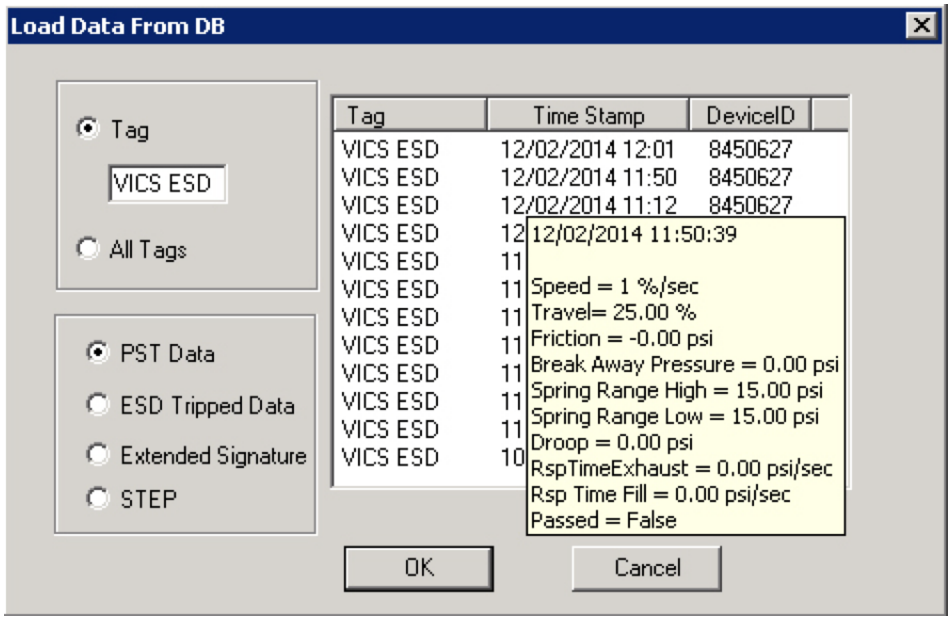


Figure 229 - Load Data from DB Tool Tip

5. Click **OK**.

   The *Diagnostic Graph* displays the loaded data (*Figure 230*).

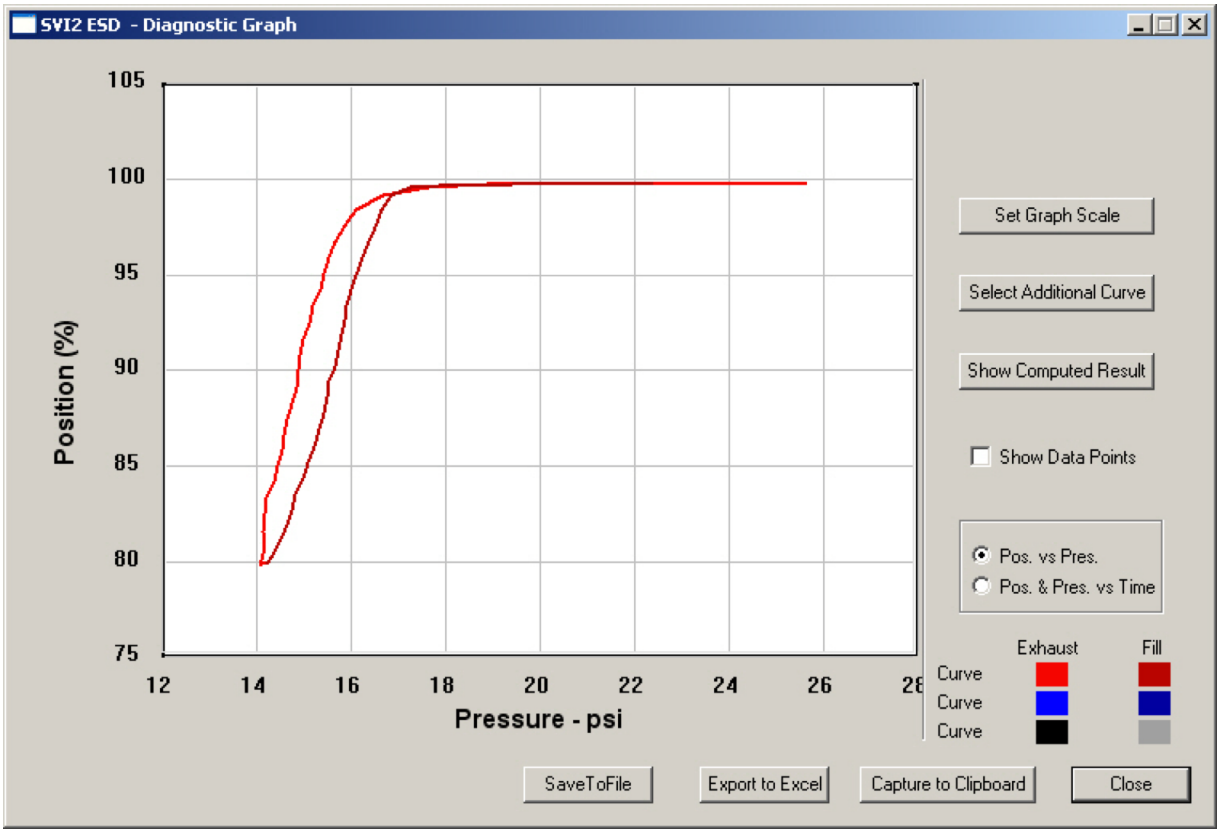


Figure 230 - Diagnostic Graph Displayed

© 2024 Baker Hughes Company. All rights reserved.

Diagnostic Graph Color Legend

Located at the bottom of each SVI II ESD diagnostic graph is a color legend. The legend identifies by color each curve and step on the graph; currently displayed and any additionally selected (using the *Select Additional Curve* function).

Load Data from a File on Diagnostics Screen

You can load a diagnostic file from the *Diagnostics* screen.

To load a file:

1. Click **Load From File** (*Figure 231*).

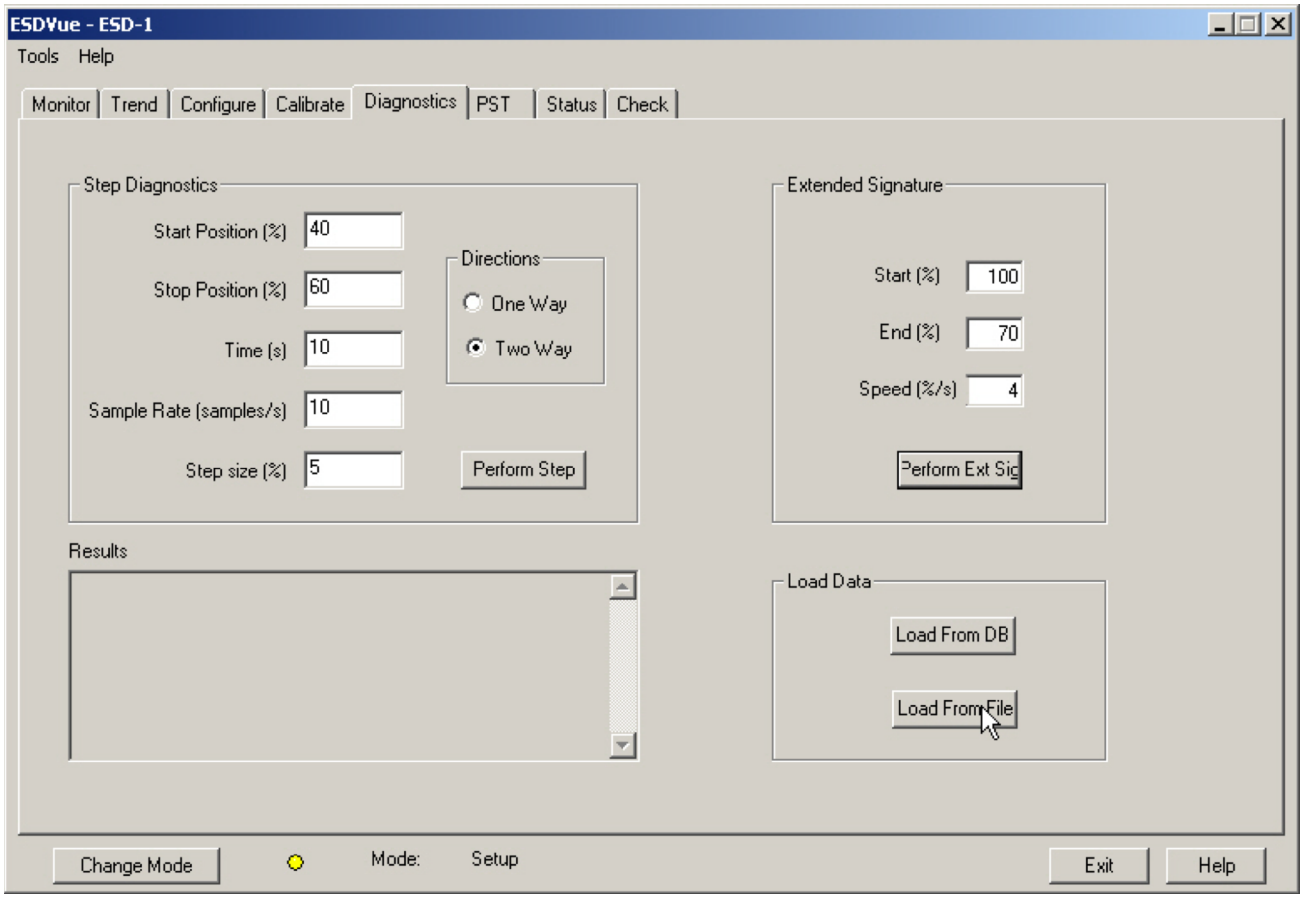


Figure 231 - Selecting Load From File

© 2024 Baker Hughes Company. All rights reserved.

A file browser window appears (*Figure 232*).

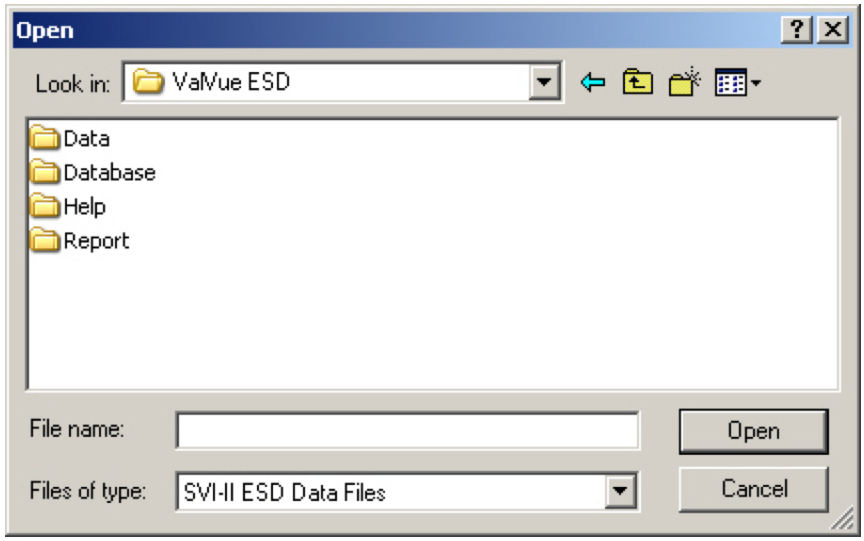


Figure 232 - File Browser

2. Locate the file to load and click **Open** (*Figure 233*).

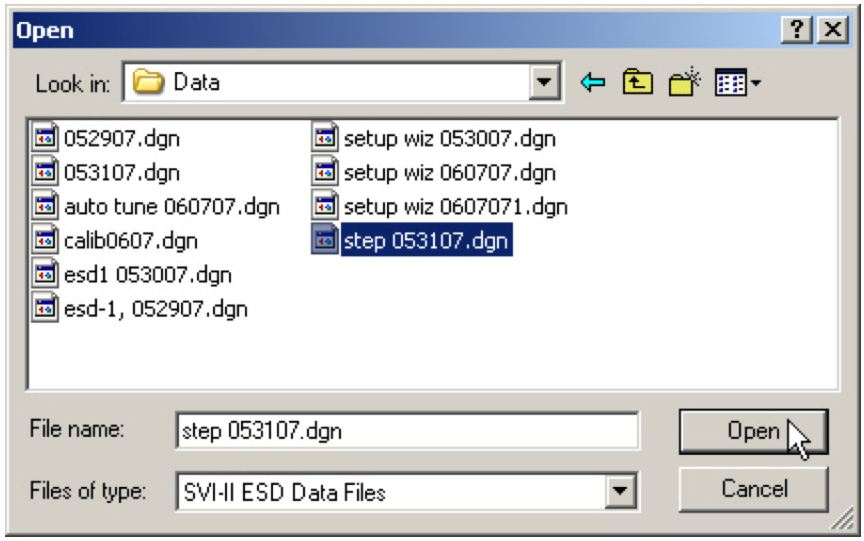


Figure 233 - Opening File for Diagnostic Data

A dialog appears (*Figure 234*).

3. Select the record with the appropriate time stamp and click **OK**.

© 2024 Baker Hughes Company. All rights reserved.

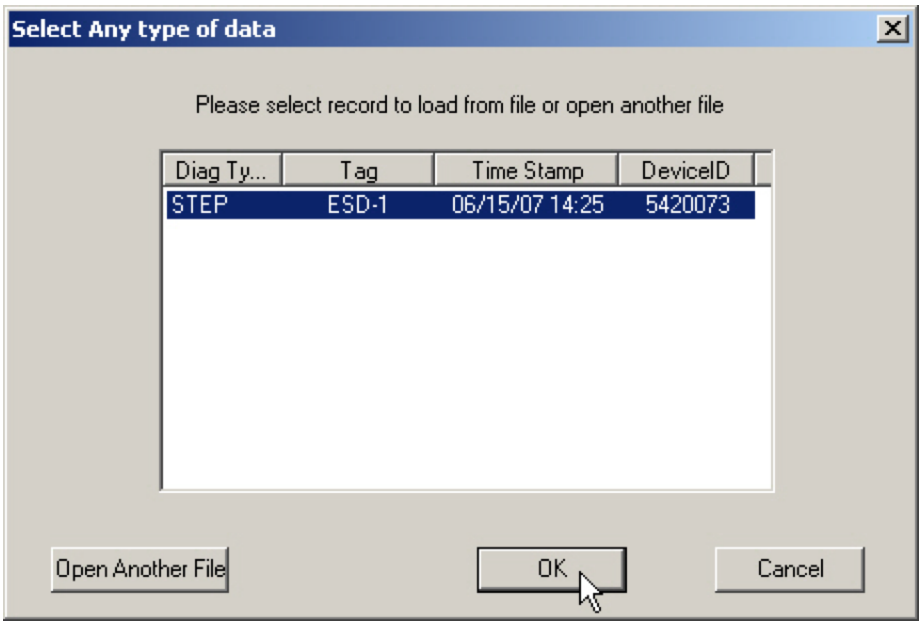


Figure 234 - Selecting Step Test Record

The diagnostic graph appears (*Figure 235*).

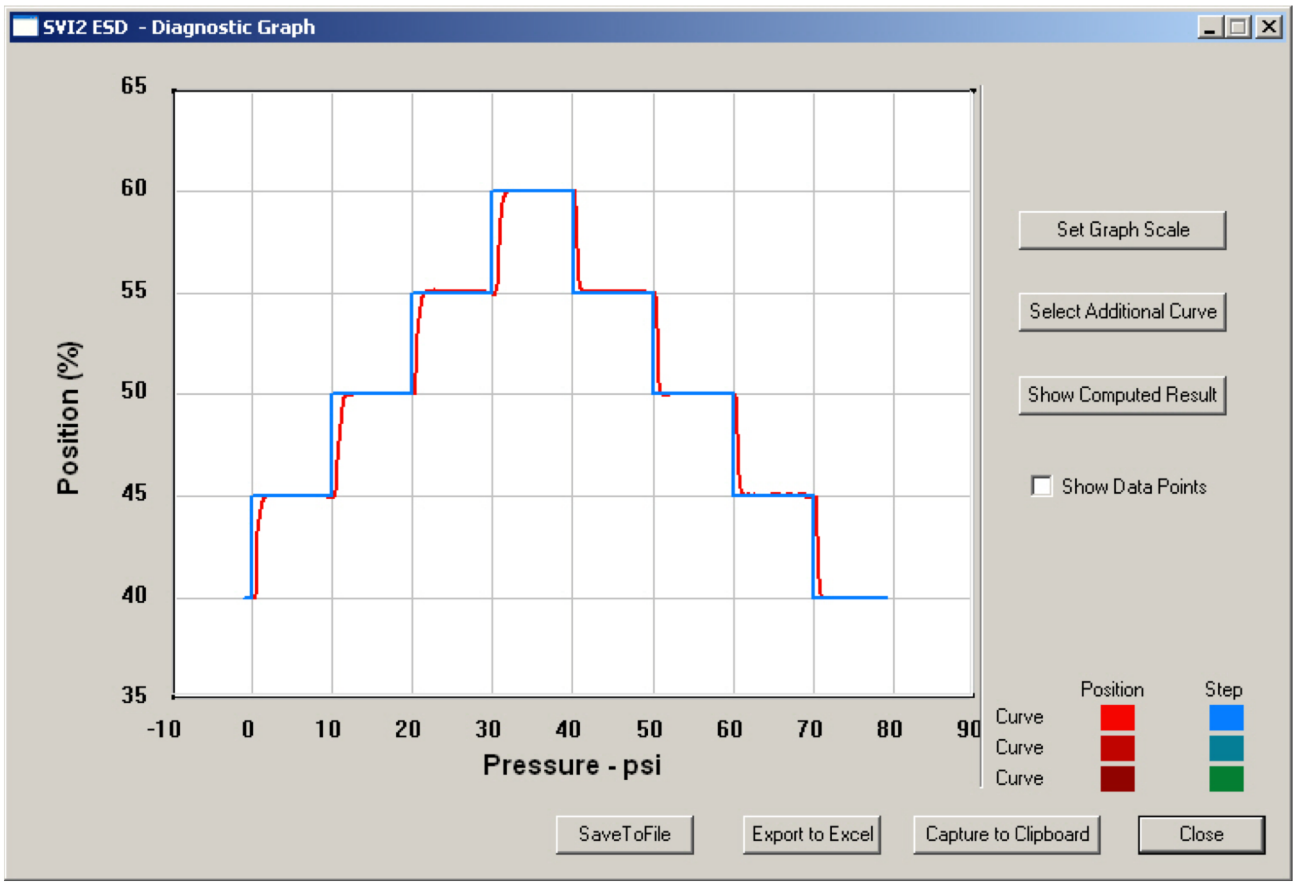


Figure 235 - Diagnostic Graph Displayed

© 2024 Baker Hughes Company. All rights reserved.

Diagnostic Graph Color Legend

Located at the bottom of each SVI II ESD diagnostic graph is a color legend. The legend identifies by color each curve and step on the graph, currently displayed, and any additionally selected (using the *Select Additional Curve* function).

© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

© 2024 Baker Hughes Company. All rights reserved.

10. PST

What you can do on the PST Screen

The *PST* screen is crucial to the ESD operation and is the location where you can:

- *Schedule Partial Stroke Testing (PST)*
- *Configure PST Settings*
- *Run Diagnostics and View Results*

Note: Operations on the PST screen can be performed in any mode.

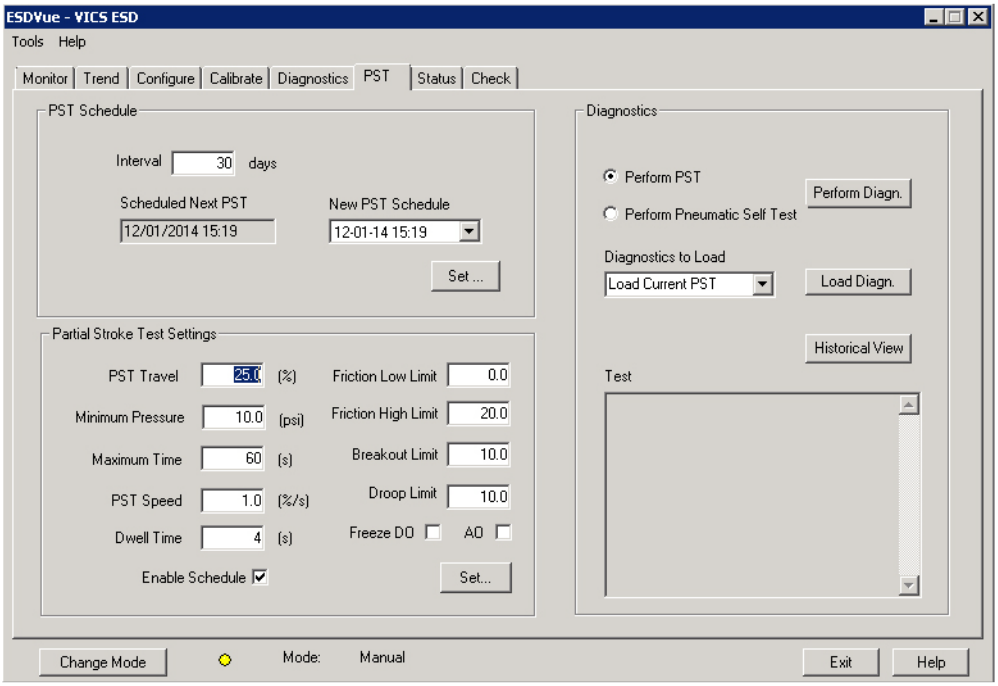


Figure 236 - PST Screen

© 2024 Baker Hughes Company. All rights reserved.

PST Setup Guidelines

This section outlines a general set of guidelines you can use to configure PST. These are:

- *"1. Set PST Start Trigger"* on page 237
- *"2. Run Extended Signature"* on page 238
- *"3. Determine Friction, Breakout, PST Minimum Pressure From Extended Signature"* on page 239
- *"4. Set PST Parameters"* on page 241

Figure 237 shows the parameters used o configure a PST.

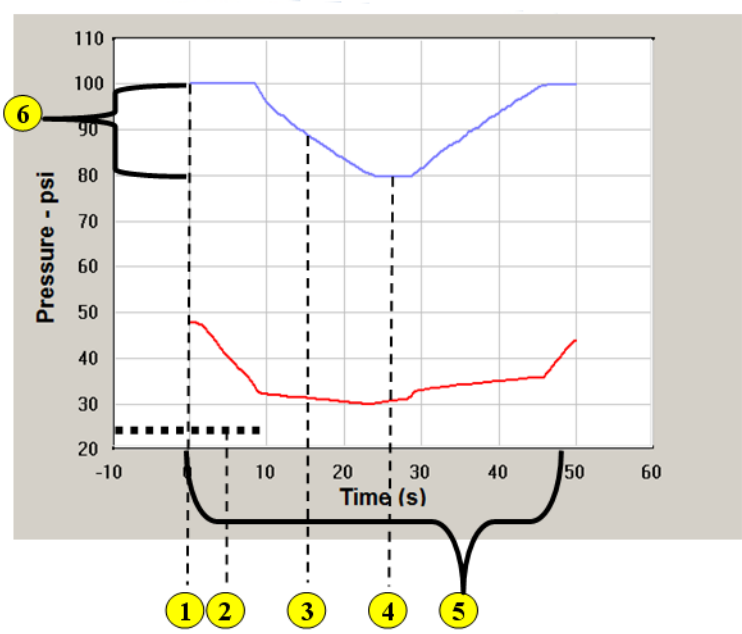


Figure 237 - PST Test Settings Graph

where:

- *1* = PST trigger (HART®, Analog, local Scheduler)
- *2*- PST Minimum Pressure
- *3*- PST Speed
- *4*- Dwell Time
- *5*- PST Time
- *6*- PST Travel

© 2024 Baker Hughes Company. All rights reserved.

1. Set PST Start Trigger

To do this:

1. Enter *Setup* mode.
2. Click the **Configure** tab and select the PST trigger type (s) (*Figure 238*).

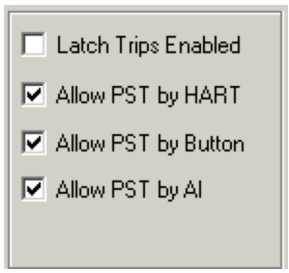


Figure 238 - Allow PST Trigger

These fields configure for the following:

- *Allow PST by HART* - use for ValVue ESD, HH375, DTM and HART® Host with DD
- *Allow PST by Button* - use for LCD pushbutton control
- *Allow PST by AI* - use for ASD A/DSD

3. Click **Apply Changes**.

© 2024 Baker Hughes Company. All rights reserved.

2. Run Extended Signature

To do this:

1. Click the **Diagnostics** tab (*Figure 239*).

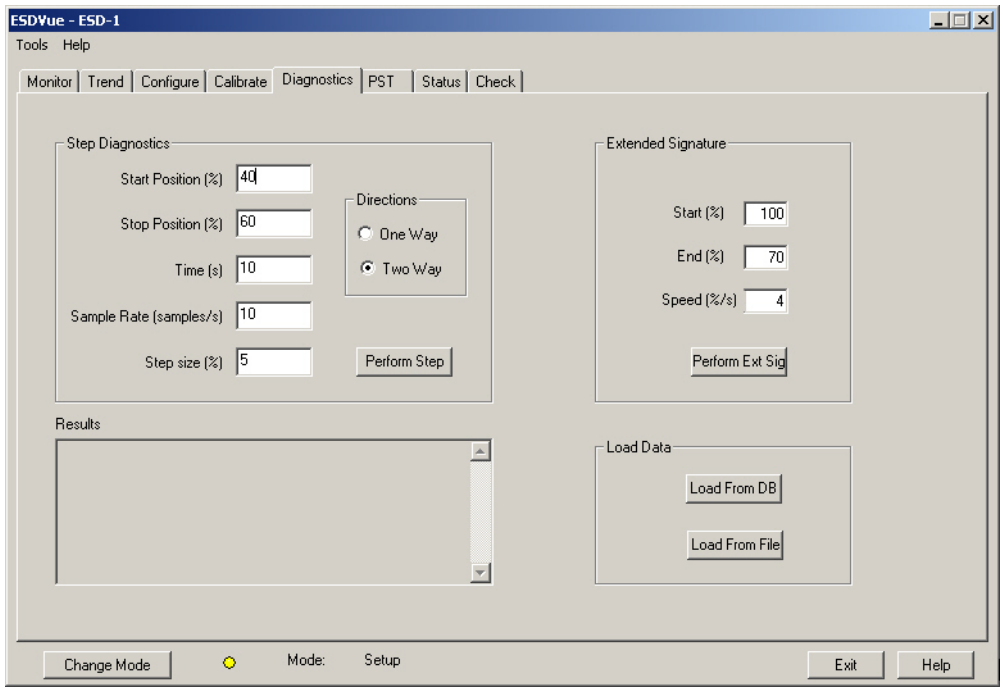


Figure 239 - Diagnostics Tab

2. Configure:
   - *Start (%)* to 105%
   - *End (%)* to -5%
   - *Speed (%/s)* to 2
3. Click **Perform Ext. Diag**.

   Once the test completes.
4. Click **Load from DB** and the dialog appears (*Figure 240*).
5. Click the **Extended Signature** radio button.
6. Select a **Time Stamp** and click **OK**.

© 2024 Baker Hughes Company. All rights reserved.

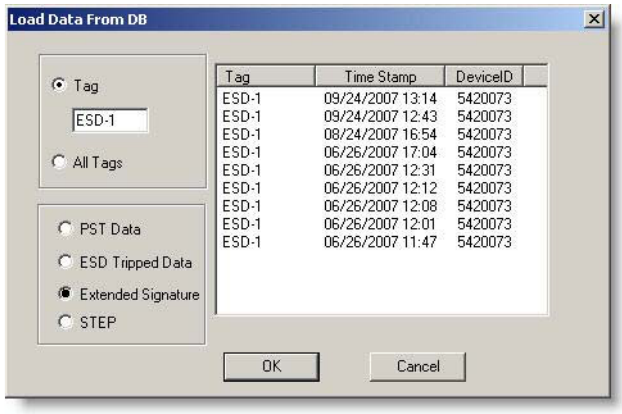


Figure 240 - Load from DB

The *Diagnostic Graph* appears (*Figure 241* on page 239).

3. Determine Friction, Breakout, PST Minimum Pressure From Extended Signature

To do this:

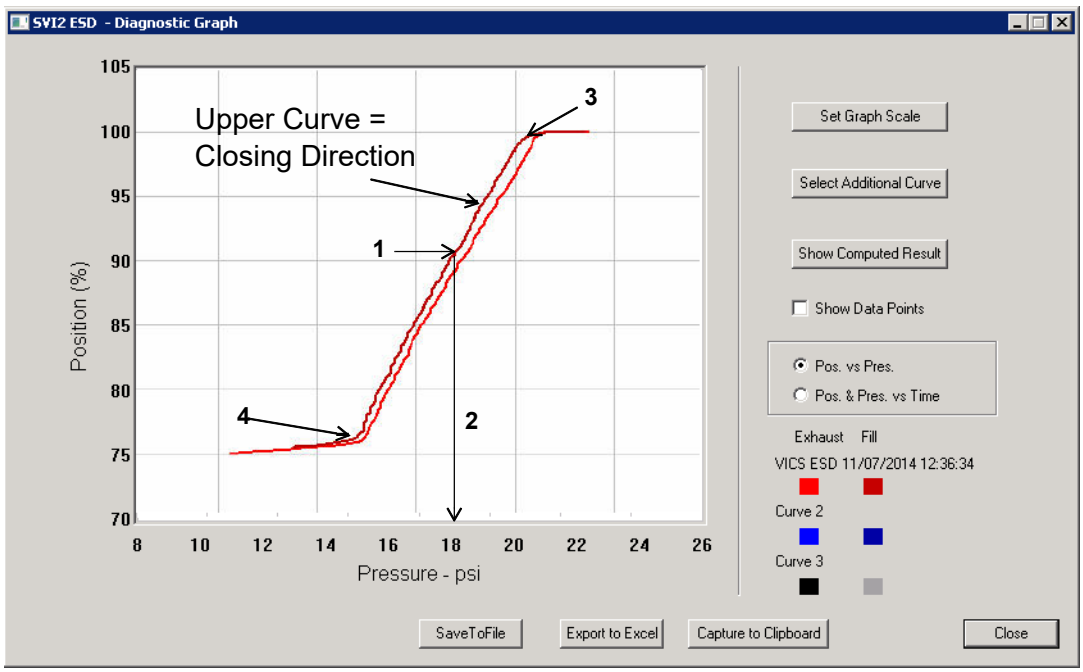


Figure 241 - Diagnostic Graph

7. Determine the PST minimum pressure by:

   This value depends on the spring range and the valve/actuator hysteresis.

   a. Determining where the PST Max travel crosses the closing curve (upper curve) - this is **1**. Locate the X-Axis pressure on the signature Y-Axis for the desired Travel target. For

© 2024 Baker Hughes Company. All rights reserved.

example, if the PST Travel is 30%, what is the pressure value to reach 70% travel. The Y-value selected must be on the upper curve of the graph. Finding the corresponding actuator pressure (**2**) on the Y-axis.

b. Calculating the PST Min Pressure, which must be less than **2**. PST Min Pressure = Spring Init. (**5**) pressure + (Spring Final (4) pressure – Spring Init (5) pressure) x 0.4.

8. Determine the friction minimum, friction maximum and breakout value by:

a. Clicking **Show Computed Result** and the *Extended Signature Result* window appears (*Figure 242*).

b. Calculating the minimum friction = *Friction * 0.40*.

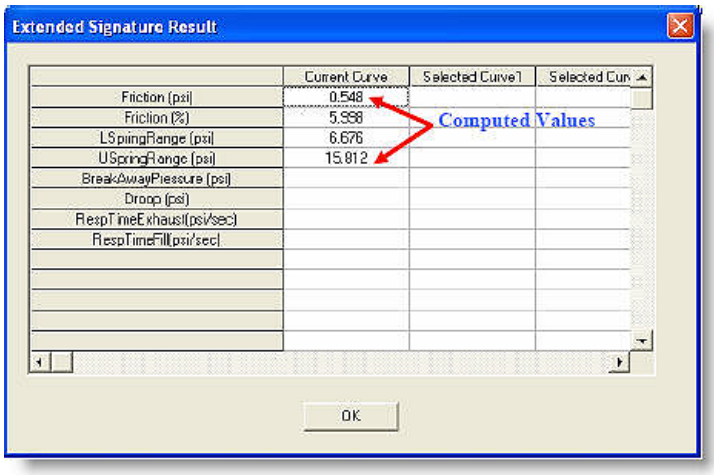


Figure 242 - Extended Signature Result Window - Computed Values

c. Calculating the maximum friction = *Friction * 2.*

d. Calculating the breakout = *LSpringRange -USpringRange/Friction(%)*.

© 2024 Baker Hughes Company. All rights reserved.

4. Set PST Parameters

Table 10 gives a summary of PST settings.

Table 10 - PST Settings

Setting	Definition
PST Travel	20%-30%. The greater the travel range, the more accurate the results from the PST test.
PST Min. Pressure	Spr.Init+ ((Spr.Final-Spr. Init) * 0.4)
PST Maximum Time	(PST Travel *2) / PST Speed + 20 seconds
PST Speed	2%
Dwell Time	5 seconds
Friction Low Limit	40% of static
Friction High Limit	200% of static
Breakout Limit	Friction * (Spr.Init-Spr.Final) / Friction%
Droop Limit	15% of air supply
Freeze AO	Disable
Freeze DO	Disable

© 2024 Baker Hughes Company. All rights reserved.

PST Schedule

The PST scheduling area allows you to set up the schedule at which Partial Stroke Test is executed. There are two parameters you can set for the PST schedule:

- *Interval of days* - time between PSTs (see *"Changing Interval of Days"* on page 242)
- *New PST Schedule* - a new starting date for executing PST (see *"Changing New PST Schedule"* on page 243)

Changing Interval of Days

To set the Interval of days:

1. Click in the **Interval days** field and enter a new value for interval of days (*Figure 243*).

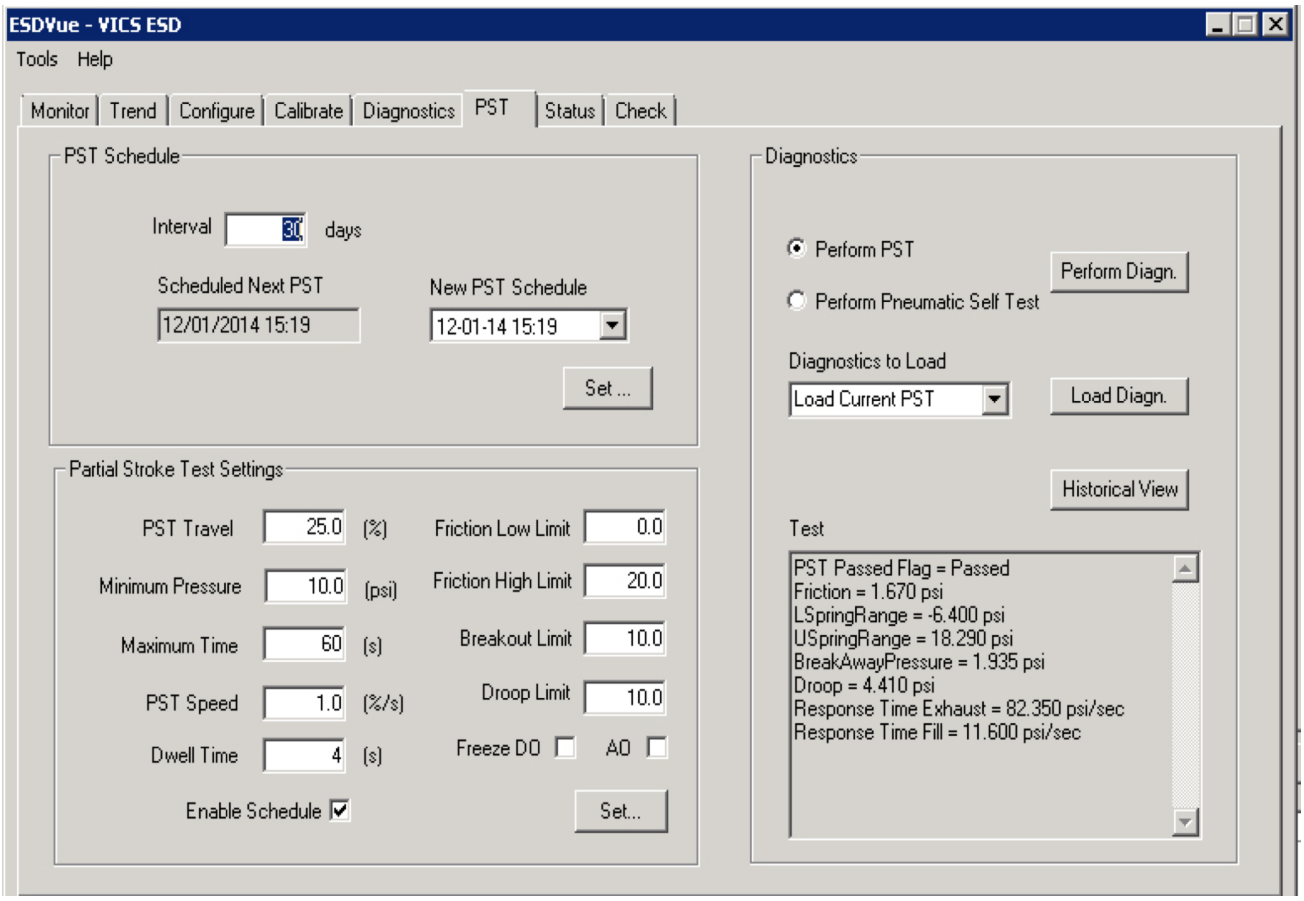


Figure 243 - Changing Interval of Days

2. Click **Set**.

© 2024 Baker Hughes Company. All rights reserved.

Changing New PST Schedule

The *New PST Schedule* date field is set up as mm-dd-yy-hh-mm. The hour field is set for 24 hours; there is no selection for AM or PM. There are two methods for changing the PST schedule date field, you can:

- Click on each parameter of the date field; i.e. mm, or dd, or yy etc., and change each individual parameter.

or

- Access the calendar in the date field drop down. To change the start date schedule for the next PST:

Either:

1. Click in each parameter (mm-dd-yy-hh-mm) of the date field and highlight the text.
   a. Type over the old value with the new value for each parameter

   OR

   b. Click in the drop down, located at the right of PST schedule date field and access the date calendar (*Figure 244*).
   c. Using the arrow key on the calendar, change the month, if necessary.
   d. When in the correct month on the calendar, drag the mouse and select the correct date within the month by clicking on it.

© 2024 Baker Hughes Company. All rights reserved.

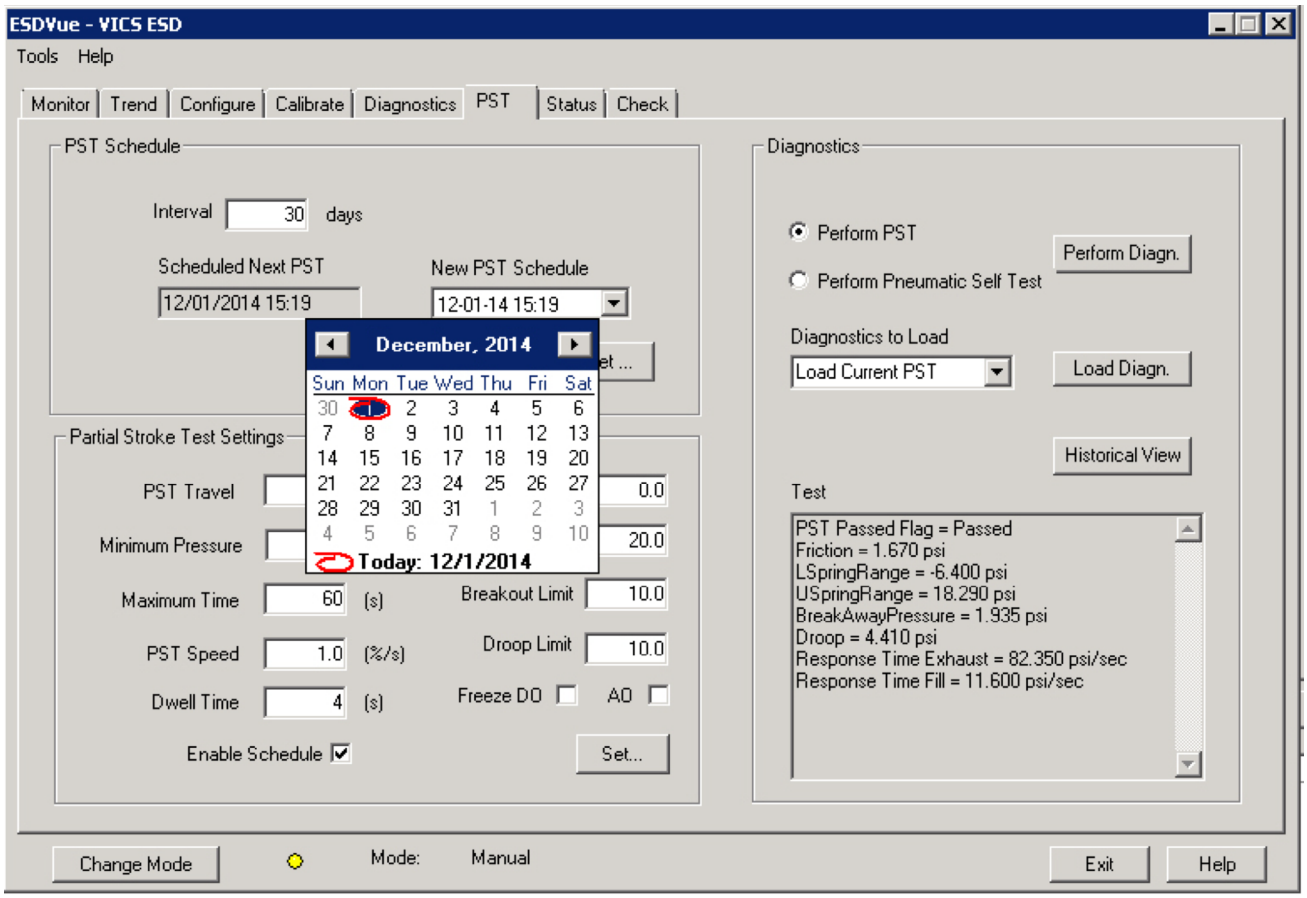


Figure 244 - Selecting Calendar Feature

© 2024 Baker Hughes Company. All rights reserved.

2. Click **Set** to save the changes (*Figure 245*).

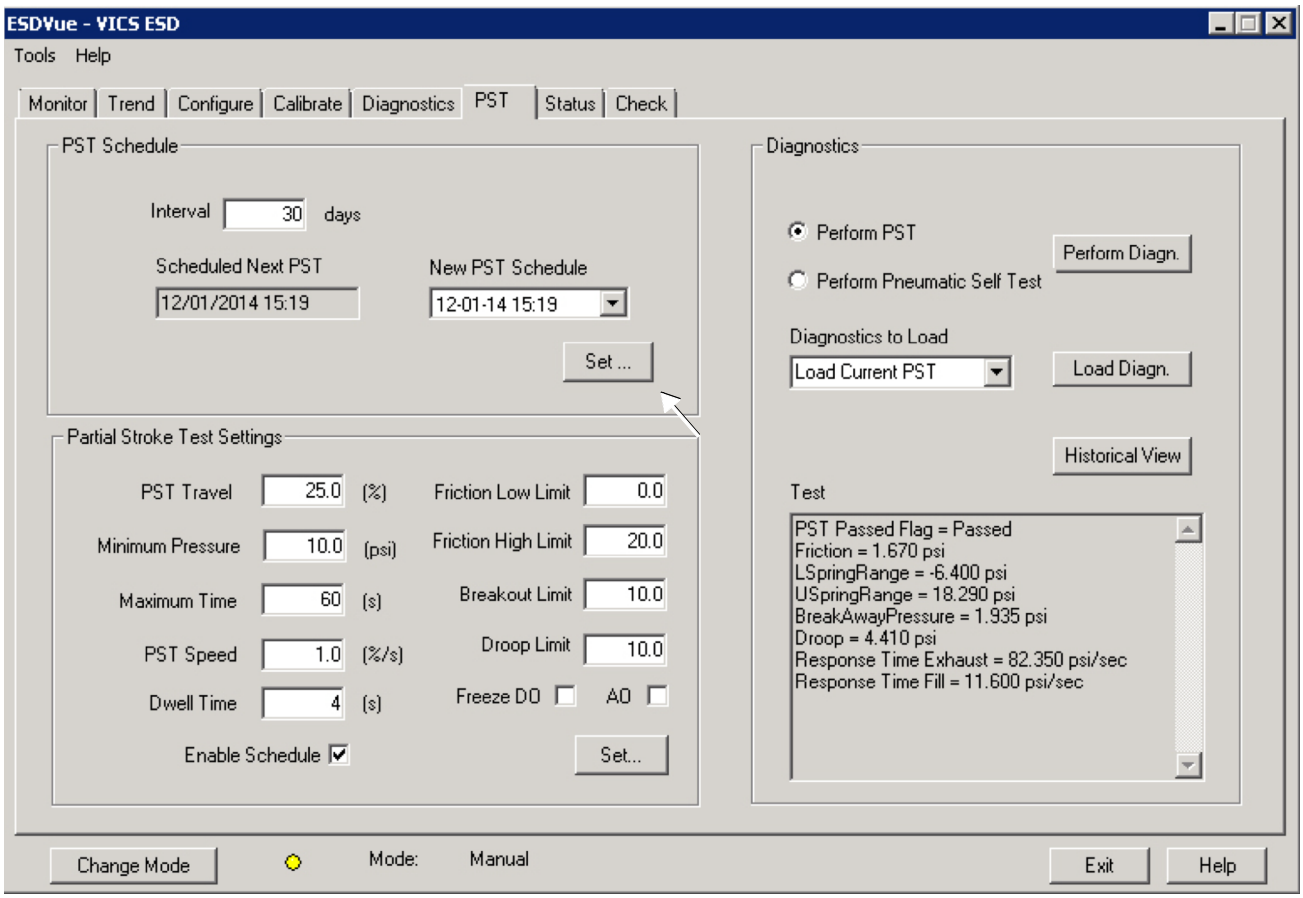


Figure 245 - Saving Schedule Changes

© 2024 Baker Hughes Company. All rights reserved.

PST Configuration

Use this to configure PST, or partial stroke testing, operation.

Partial Stroke Test Settings

The configurable PST parameters are as follows (*Figure 246*):

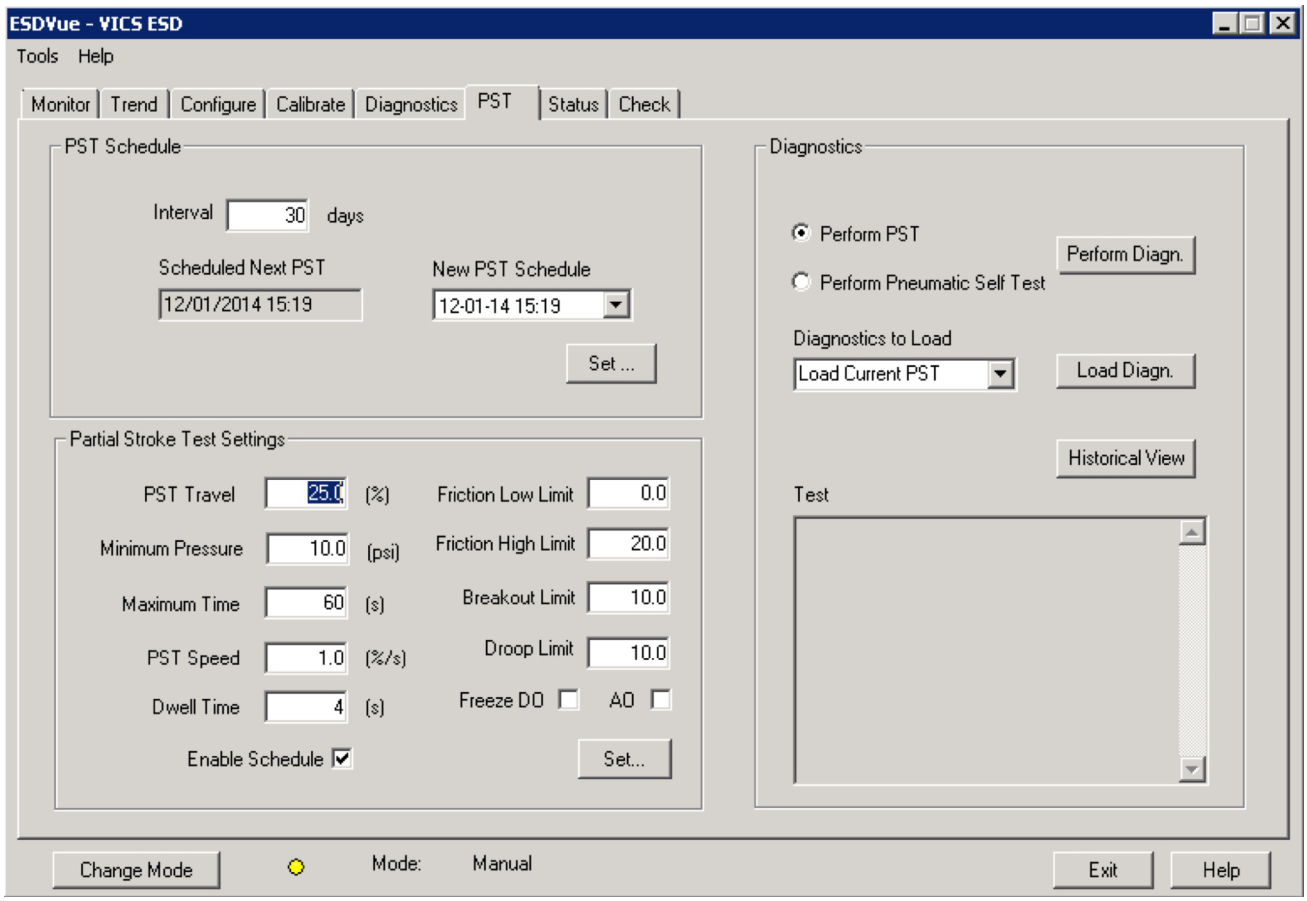


Figure 246 - PST Settings

- *PST Travel* - The allowed valve movement from full Open position in percentage of travel. A typical value is 20%. Maximum allowed is 30%. The greater the travel range, the more accurate the results from the PST test.
- *Minimum Pressure* – The allowed reduction in pressure in the actuator to achieve the desired PST Travel. This value depends on the spring range and the valve/actuator hysteresis. To set this value, first, run an Extended Actuator signature from the *Diagnostics* screen. Then, locate on the Y-Axis of the signature, the X-Axis pressure value for the desired Travel target. For example, if the PST Travel is 30%, what is the pressure value to reach 70% travel. The Y-value selected must be on the upper curve of the graph.

© 2024 Baker Hughes Company. All rights reserved.

- *Maximum Time* – The allowed amount of time in seconds before the PST test aborts. This value can be determine as follows: Maximum Time = (Travel Range * 2/ PST Speed) + Dwell Time +5 seconds.
- *PST Speed* - The valve travel speed in % Travel per second.
- *Dwell Time* - The amount of time in seconds between the down ramp and the up ramp of valve stroke.
- *Friction Low Limit* - The alarm threshold for low friction. This alarm is set if the analyzed friction from the PST test is less than this value. Engineering units of pressure (PSI, kPa or BAR).
- *Friction High Limit* - The alarm threshold for high friction. This alarm is set if the analyzed friction from the PST test is more than this value. Engineering units of pressure (PSI, kPa or BAR).
- *Breakout Limit* - The alarm threshold for valve breakout force (force to initiate valve movement). This alarm is set if the analyzed friction from the PST test is more than this value. Engineering units of pressure (PSI, kPa or BAR).
- *Droop Limit* - The alarm threshold for air supply inlet droop. This alarm is set if the analyzed Air Supply Droop from the PST test is more than this value, indicating a possible clogged up air filter in the air set or lack of volume feeding the SVI II ESD. Engineering units of pressure (PSI, kPa or BAR).
- *Freeze DO* (Digital Output) – Enable for the DO2 (SW#2) to not change state during a PST.
- *Freeze AO* (Analog Output) - Enable for the built-in PST controller transmitter to not update its output value during a PST.
- *Enable Schedule* - Enable to allow execution of the Automated PST Schedule.
- *Set* - Click to save PST configuration.

PST Travel

When configuring the *PST Travel*, since this is a Partial Stroke Test, you set the parameter as a percentage of the total valve travel. The range for *PST Travel* is between 5% and 30%. If you set a value outside the 5 - 30% range an error message appears (*Figure 247*).

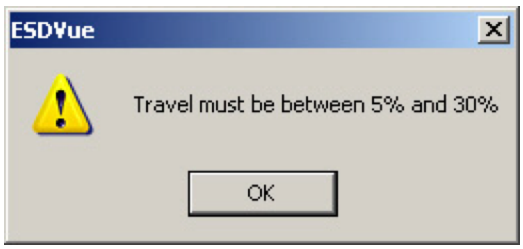


Figure 247 - PST Travel Error Message

© 2024 Baker Hughes Company. All rights reserved.

Minimum Pressure

When configuring the *Minimum Pressure* for the PST you are configuring the minimum amount of pressure required for the Partial Stroke Test. The pressure change value is in the configured pressure units. The PST *Pressure Change* must be between -120.0 and 120.0 psi (-828 and 828 kPa, -8.28 and 8.28 bar). If you set a value outside the range an error message appears (*Figure 248*).

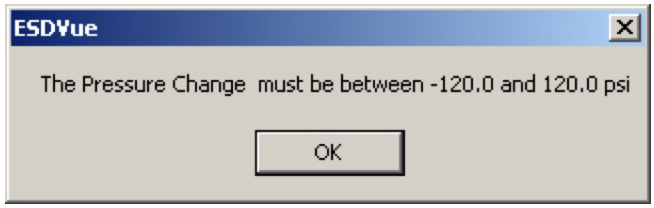


Figure 248 - PST Pressure Change Error Message

Maximum Time

The *Max Time* parameter is the maximum amount of time allowed for the PST. The value must be between 5 and 300 seconds. If you set the Max Time for a value outside the range an error message appears (*Figure 249*).

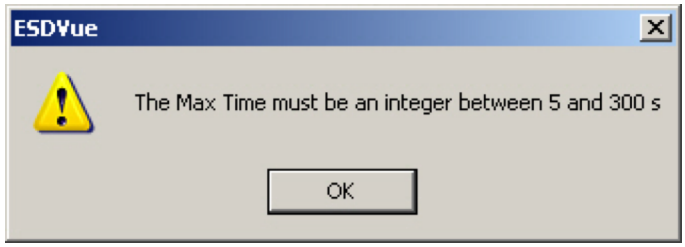


Figure 249 - Max Time Error Message

PST Speed

The *PST Speed* is defined in terms of % of the total PST travel per second. The range for PST speed is 0.25% and 10% in units of % per second. If you set the value outside the range an error message appears (*Figure 250*).

Figure 250 - PST Speed Error Message

© 2024 Baker Hughes Company. All rights reserved.

Dwell Time

The *Dwell Time* is the amount of time in seconds between ramp down and ramp up of valve stroke; similar to a threshold state. When performing a PST you want the dwell time range to be between 2 and 60 seconds. If you configure the Dwell Time parameter outside this range an error message appears (*Figure 251*).

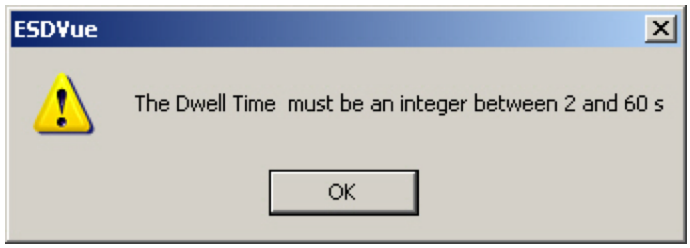


Figure 251 - Dwell Time Error Message

Friction Low Limit

Friction Low Limit is the minimum amount of pressure provided during the PST to overcome valve packing friction. Configure this parameter in pressure units in a range between 0.0 to 30.0 psi (0.0 to 207 kPa, 0.000 to 2.069 bar). If you configure a value outside the specified range an error message appears (*Figure 252*).

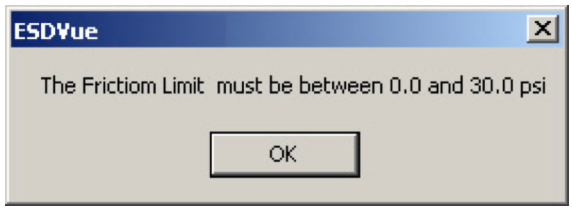


Figure 252 - Friction Low Limit Error Message

Friction High Limit

Friction High Limit is the maximum amount of pressure provided during the PST to overcome valve packing friction. Configure this parameter in pressure units in a range between 0.0 to 30.0 psi (0.0 to 207 kPa, 0.000 to 2.069 bar). If you configure a value outside the specified range an error message appears (*Figure 253*).

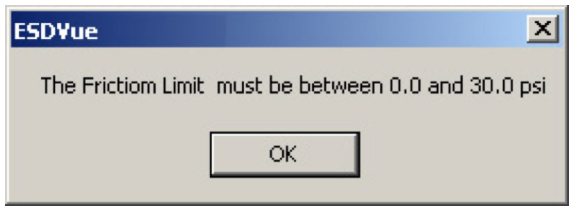


Figure 253 - Friction High Limit Error Message

© 2024 Baker Hughes Company. All rights reserved.

Breakout Limit

The *Breakout Limit* is the maximum amount of pressure applied to cause valve to break loose and move. Configure this parameter in pressure units in a range between 0.0 to 30.0 psi (0.0 to 207 kPa, 0.000 to 2.069 bar). If you configure a value outside the specified range an error message appears (*Figure 254*).

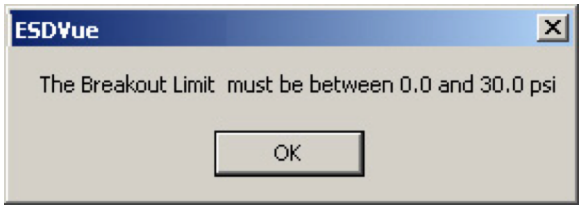


Figure 254 - Breakout Limit Error Message

Droop Limit

The *Droop Limit* is the amount of pressure drop allowed between ramp down and ramp up of valve stroke in pressure units. Configure this parameter in pressure units in a range between 0.0 to 30.0 psi (0.0 to 207 kPa, 0.000 to 2.069 bar). If you configure a value outside the specified range an error message appears (*Figure 255*).

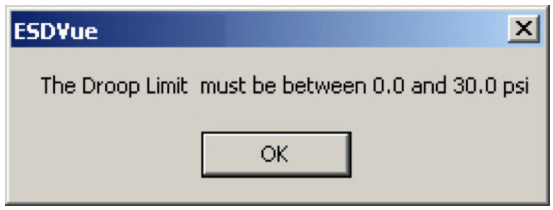


Figure 255 - Droop Limit Error Message

Freeze DO

The *Freeze DO* parameter freezes the digital output during PST.

Freeze AO

The *Freeze AO* parameter freezes the analog output during PST. To enable/disable Freeze AO check/uncheck the checkbox located to the right of AO.

Enable Schedule

The *Enable Schedule* parameter enables the PST schedule defined in the PST Schedule function (see *"PST Schedule"* on page 242).

© 2024 Baker Hughes Company. All rights reserved.

Set

To save changes:

1. Click **Set**.

   If the PST configuration is successfully saved ESDVue a dialog appears (*Figure 256*).

2. Click **OK** to close the dialog and return to the *PST* screen.

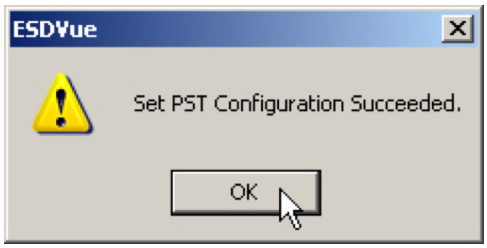


Figure 256 - PST Configuration Dialog

PST Diagnostics

One of the important safety features of the SVI II ESD is the ability to test functionality of the instrument. In addition to running a Partial Stroke Test (PST), the ESDVue provides advanced diagnostic capabilities and allows you to test the SVI II ESD terminal board and pneumatics and to run extended testing on the actuator. The diagnostics area of the *PST* screen provides access to all the diagnostic testing, shows the results from current testing and allows you to load and view historical data.

Diagnostics Area

The diagnostics area of the PST screen (*Figure 257*) has the following features:

- Two diagnostic tests to choose:
  - *Perform PST* - performs Partial Stroke Test
  - *Perform Pneumatic Self Test* - performs a Terminal Board Test and pneumatic test
- *Perform Diagn*. - button that executes selected diagnostic test
- *Diagnostics to Load* - drop down list from which to select diagnostic data to load onto *diagnostic graph*
- *Load* Diagn. - loads selected diagnostic data onto diagnostic graph
- *Historical View* - provides a graphical, historical view of Partial Stroke Testing for a selected device and selected star/end dates
- *Test* - panel that displays results from executed PST and EXT

© 2024 Baker Hughes Company. All rights reserved.

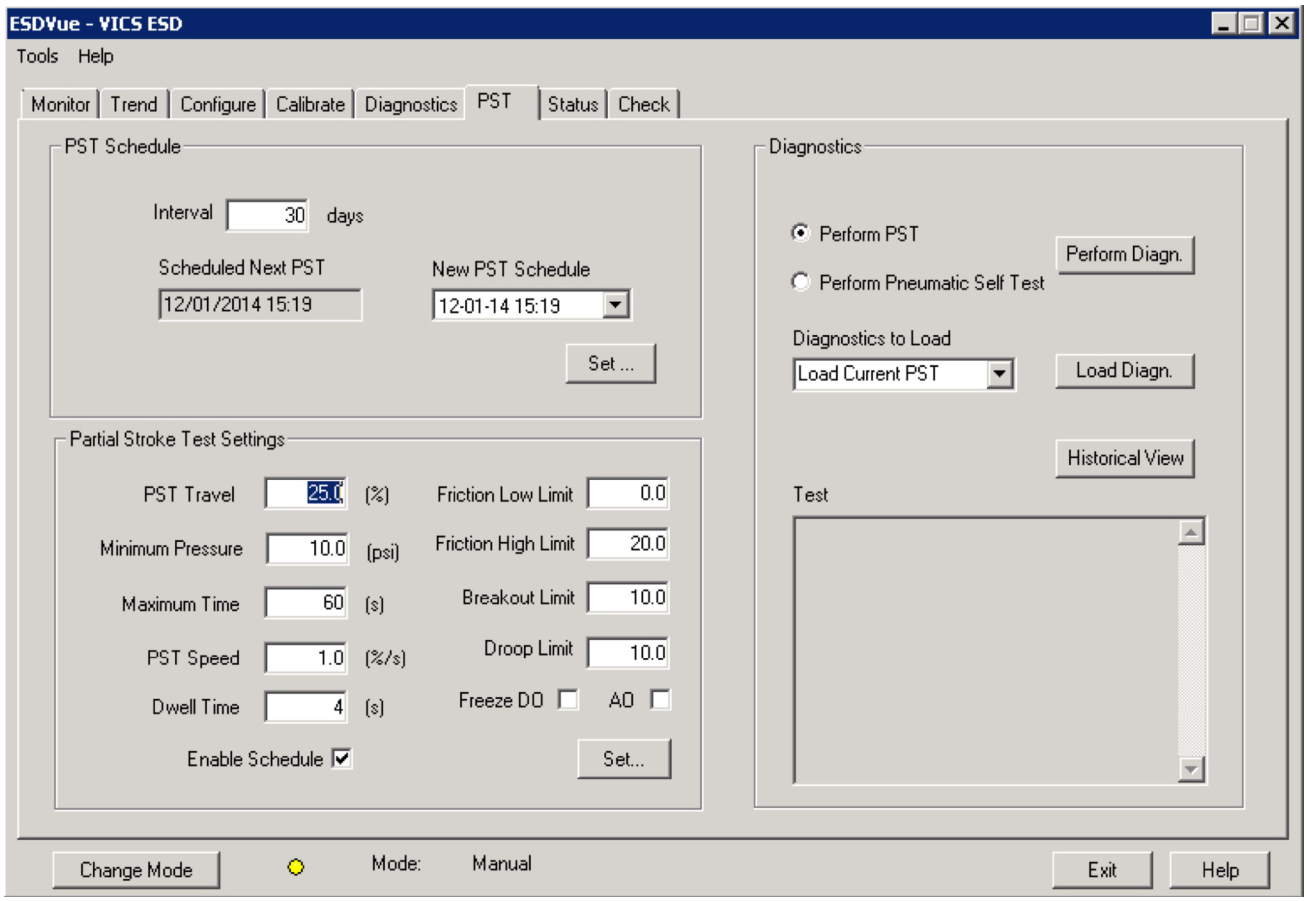


Figure 257 - PST Diagnostics

© 2024 Baker Hughes Company. All rights reserved.

Perform PST

The *Perform PST* diagnostic test runs the basic Partial Stroke Test (PST) on demand. The test also provides diagnostic results in a textual and a graphical format. PST can be performed in *Normal* or *Setup* mode.

To perform PST:

1. Click the **Perform PST** radio button.
2. Click **Perform Diagn**.

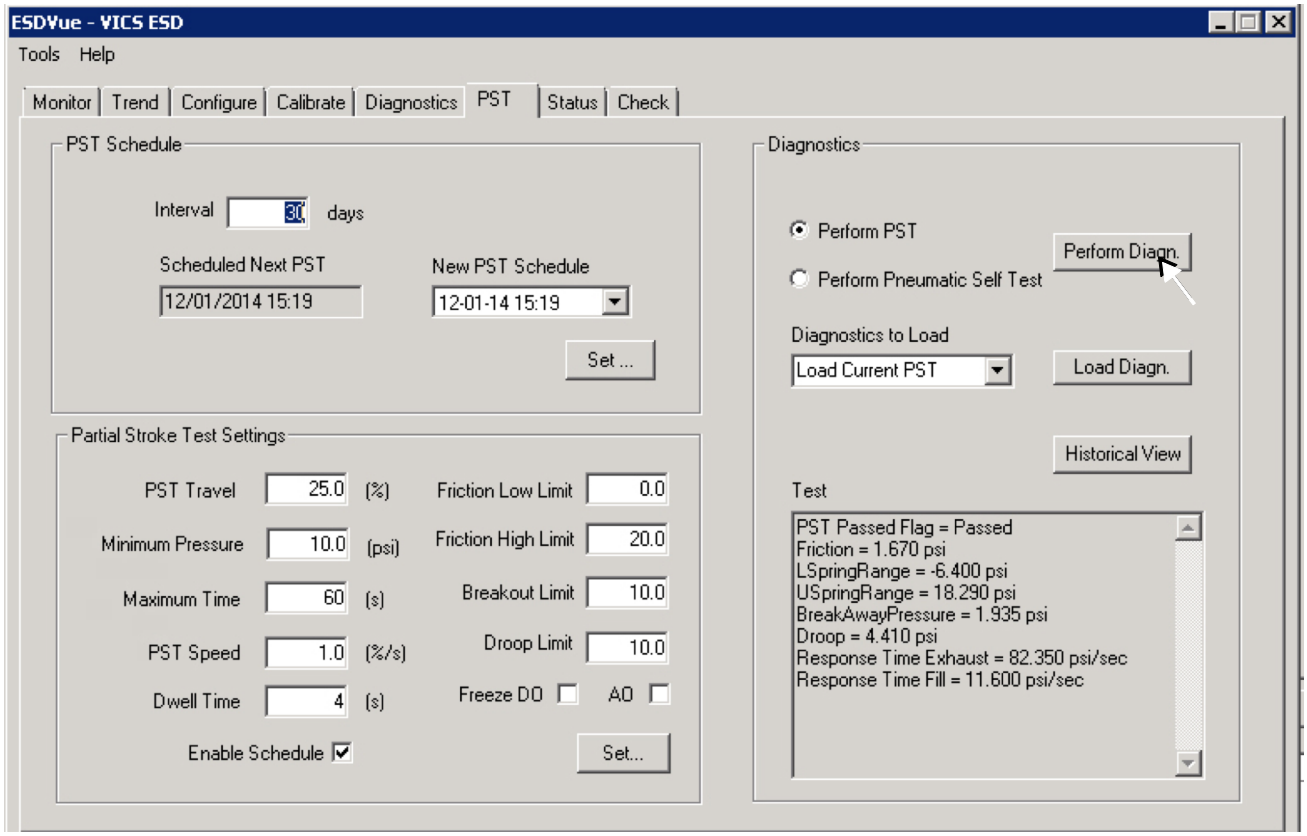


Figure 258 - Starting PST

© 2024 Baker Hughes Company. All rights reserved.

The test starts and a progress dialog appears (*Figure 259*).

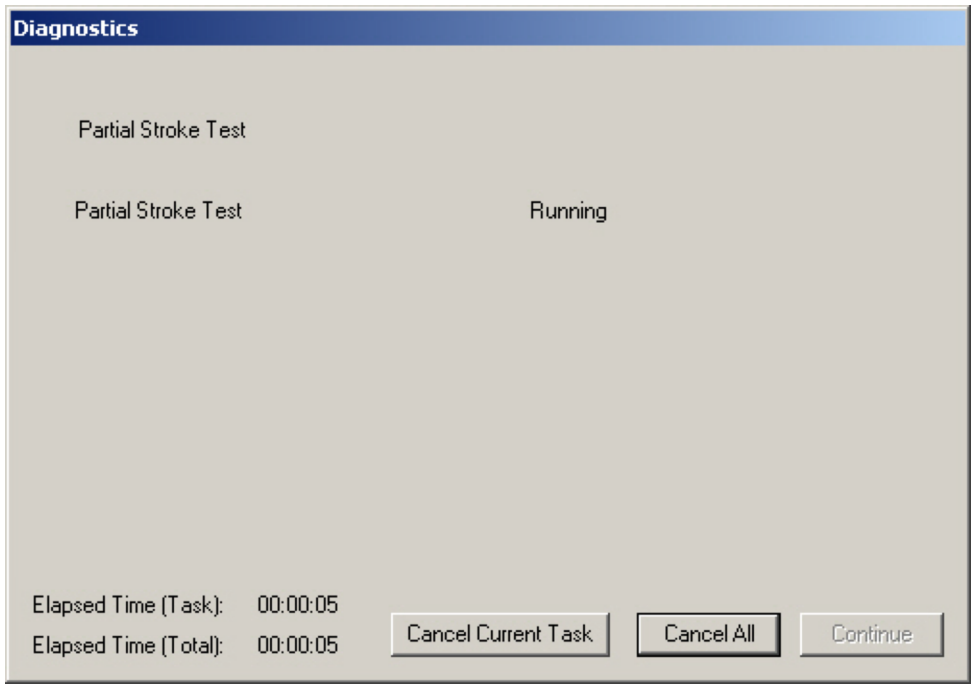


Figure 259 - Partial Stroke Test Progress Dialog

When the Partial Stroke Test is complete *Partial Stroke Test Complete* appears (*Figure 260*).

3. Click **Continue** to close the *Diagnostics* progress dialog.

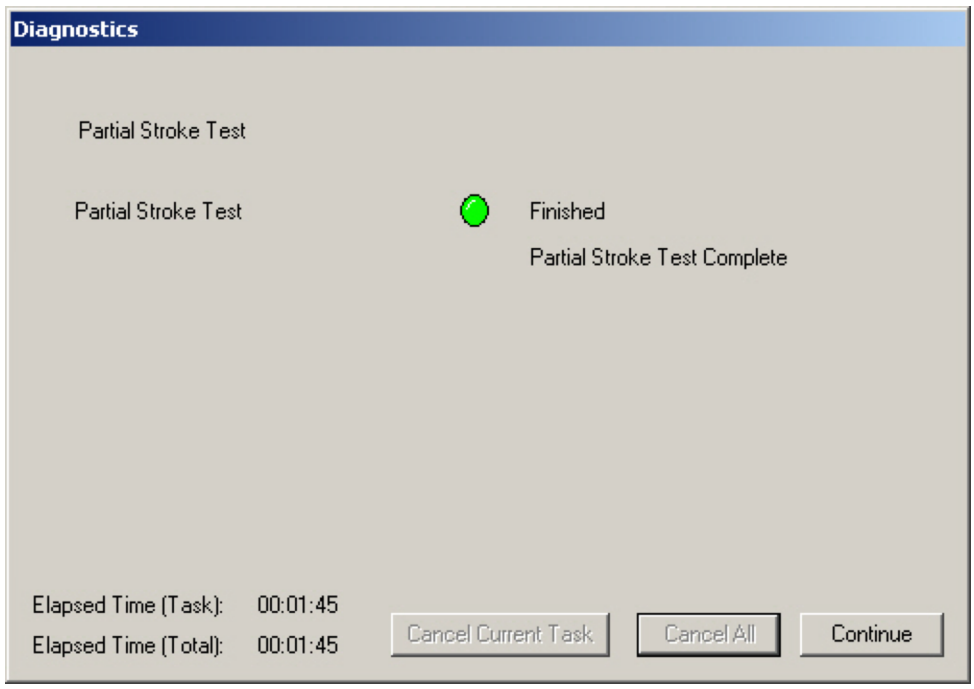


Figure 260 - Partial Stroke Test Complete

© 2024 Baker Hughes Company. All rights reserved.

The *PST Summary* dialog summarizes all PST results as values for each parameter and as pass/fail. From this dialog you can either view the *PST Diagnostics Graph* or click **Finish** to complete the PST and return to the *PST* screen.

4. Click **View Graph** to view the *PST Diagnostics Graph* (*Figure 261*). See "*PST Diagnostic Graph"* on page 256 for graph details.

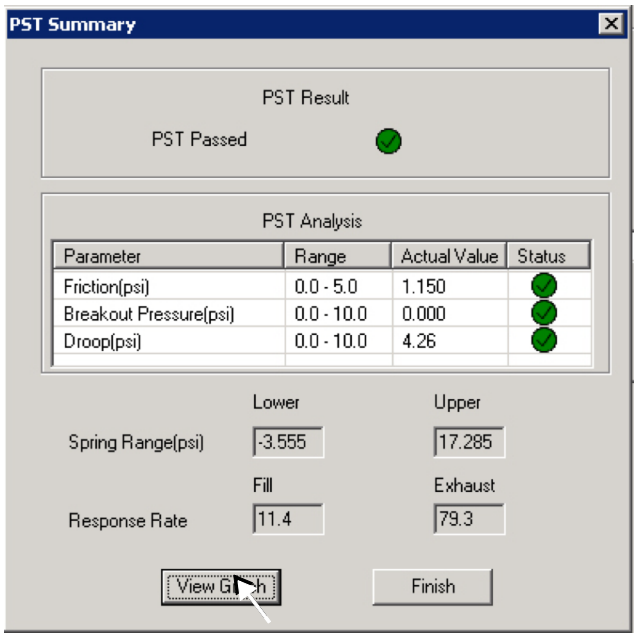


Figure 261 - Launching View Graph

5. Click **Close** on the graph screen and the *PST Summary* dialog reappears.
6. Click **Finish** and the *PST screen* reappears. The *Partial Stroke Test* results appear in the *Test* pane (*Figure 262*).

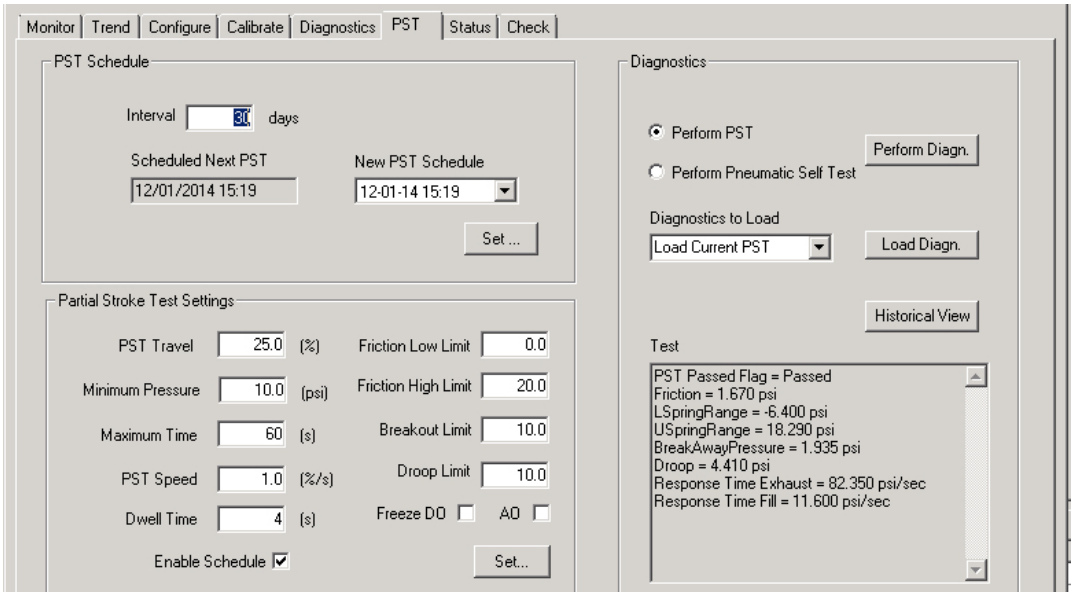


Figure 262 - PST Results Displayed on PST Screen

© 2024 Baker Hughes Company. All rights reserved.

PST Diagnostic Graph

After you complete the PST and select **View Graph** the results appear on the *Diagnostic Graph* (*Figure 263*). The *Diagnostic Graph* has several features that provide even further diagnostic capabilities:

- *Set Graph Scale* - change the coordinates of the Pressure, Position axes.
- *Select Additional Curve* - display an additional, selected, curve on the graph
- *Show Computed Result* - view the data in a numerical value format
- *Pos. & Pres. vs Time* - view PST result in a position and pressure vs. time format

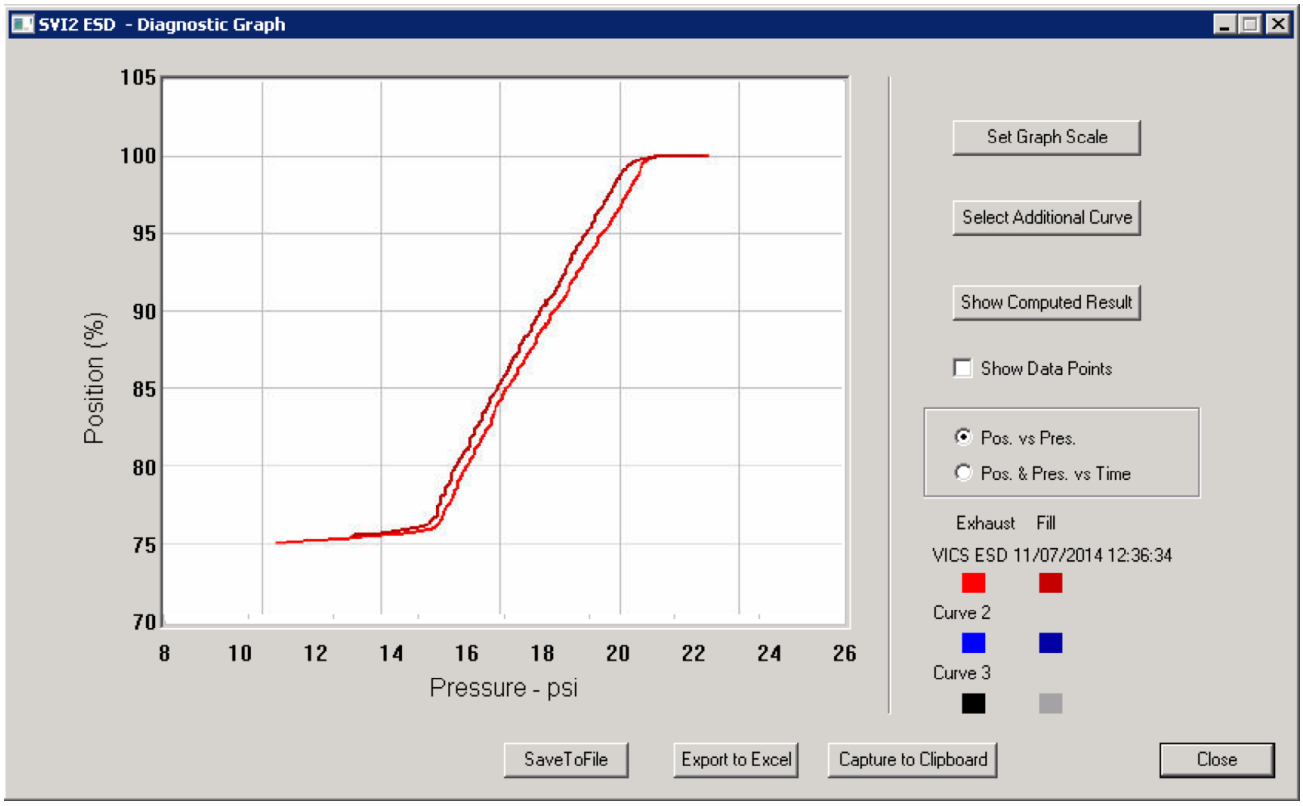


Figure 263 - PST Diagnostic Graph

Diagnostic Graph Color Legend

Located at the bottom of each SVI II ESD diagnostic graph is a color legend. The legend identifies by color each curve and step on the graph, currently displayed, and any additionally selected (using the *Select Additional Curve* function).

© 2024 Baker Hughes Company. All rights reserved.

Set Graph Scale

You can change the graph scale on diagnostic graphs to narrow in on one area of the graph, or expand the viewing area.

To change the graph scale:

1. Select **Set Graph Scale** (*Figure 264*).

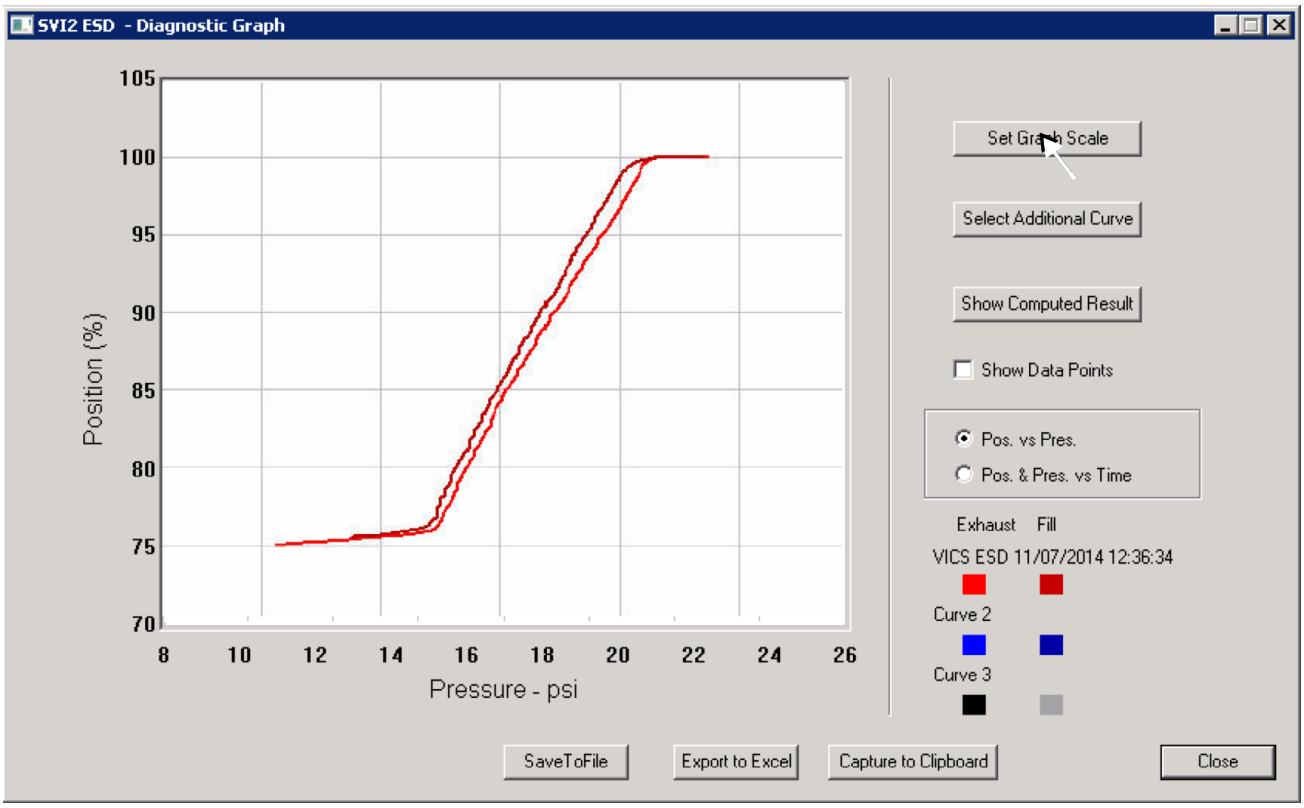


Figure 264 - Selecting Set Graph Scale

The *Set Graph Scale* window appears (*Figure 265*).

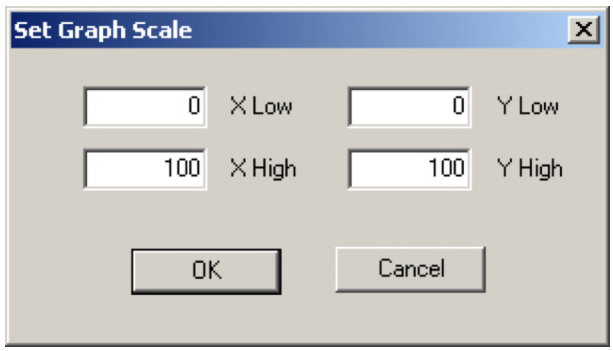


Figure 265 - Set Graph Scale Window

© 2024 Baker Hughes Company. All rights reserved.

2. Adjust the X axis and Y axis coordinates as necessary and click **OK** (*Figure 266*).

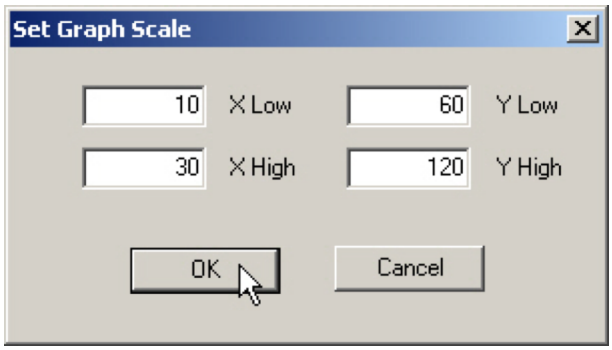


Figure 266 - Saving Scale Adjustments

The *Diagnostic Graph* reflects the changes made to the axes.

Select Additional PST Curve

You can view more than one diagnostic curve at a time; being able to compare two curves may facilitate diagnostics.

To display an additional curve on the diagnostic graph:

1. Click **Select Additional Curve** (*Figure 267*).

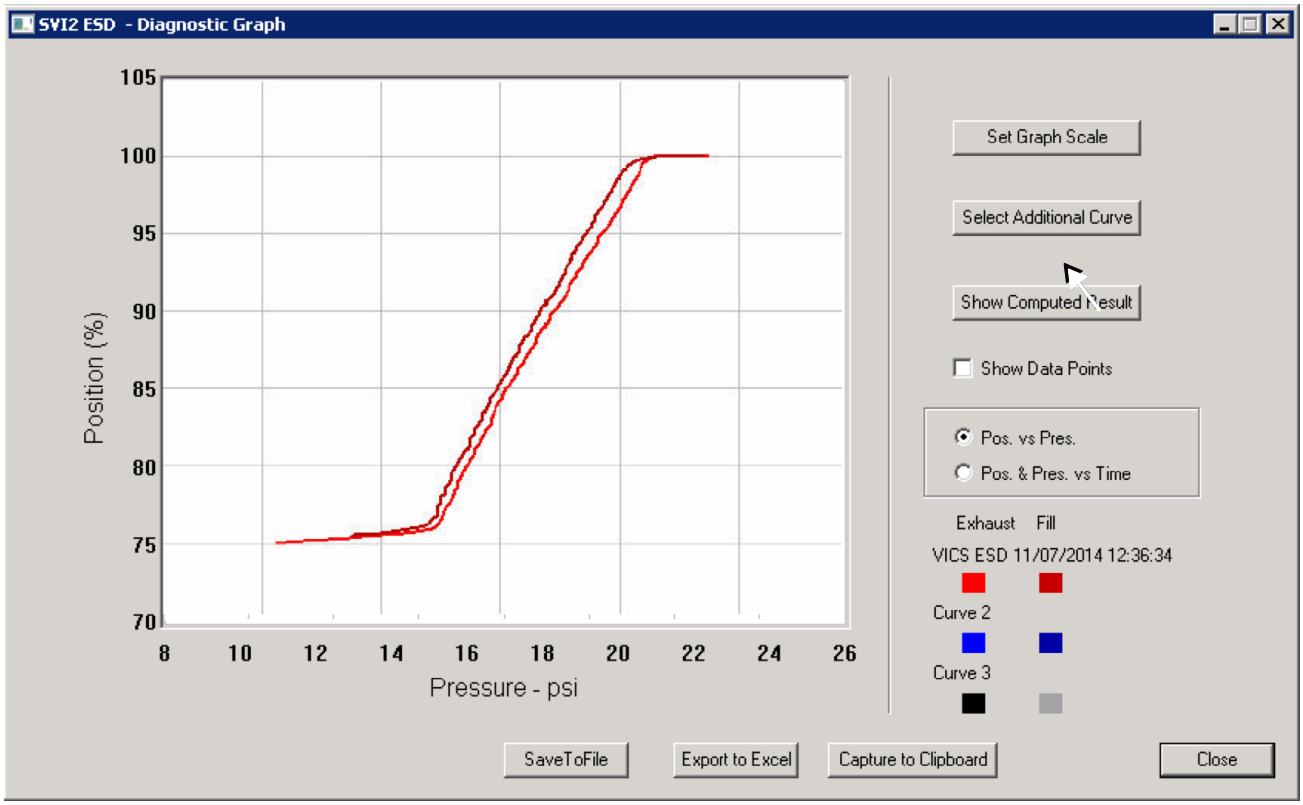


Figure 267 - Starting Select Additional Curve

© 2024 Baker Hughes Company. All rights reserved.

A dialog appears (*Figure 268*).

2. Select the source of the additional curve:
   - **Load Current Data in Device** - loads current curve
   - **Load Previous Data in Device** - loads last saved curve
   - **Load Data from Database** - launches window to select data from database
   - **Load Data from File** - launches to browser to select file to load

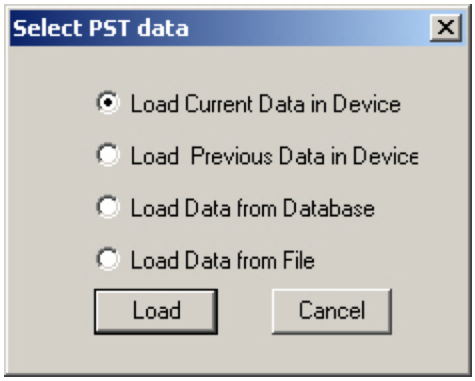


Figure 268 - Selecting Data Source

After you have selected the additional curve it appears as an overlay on the diagnostic graph (*Figure 269*).

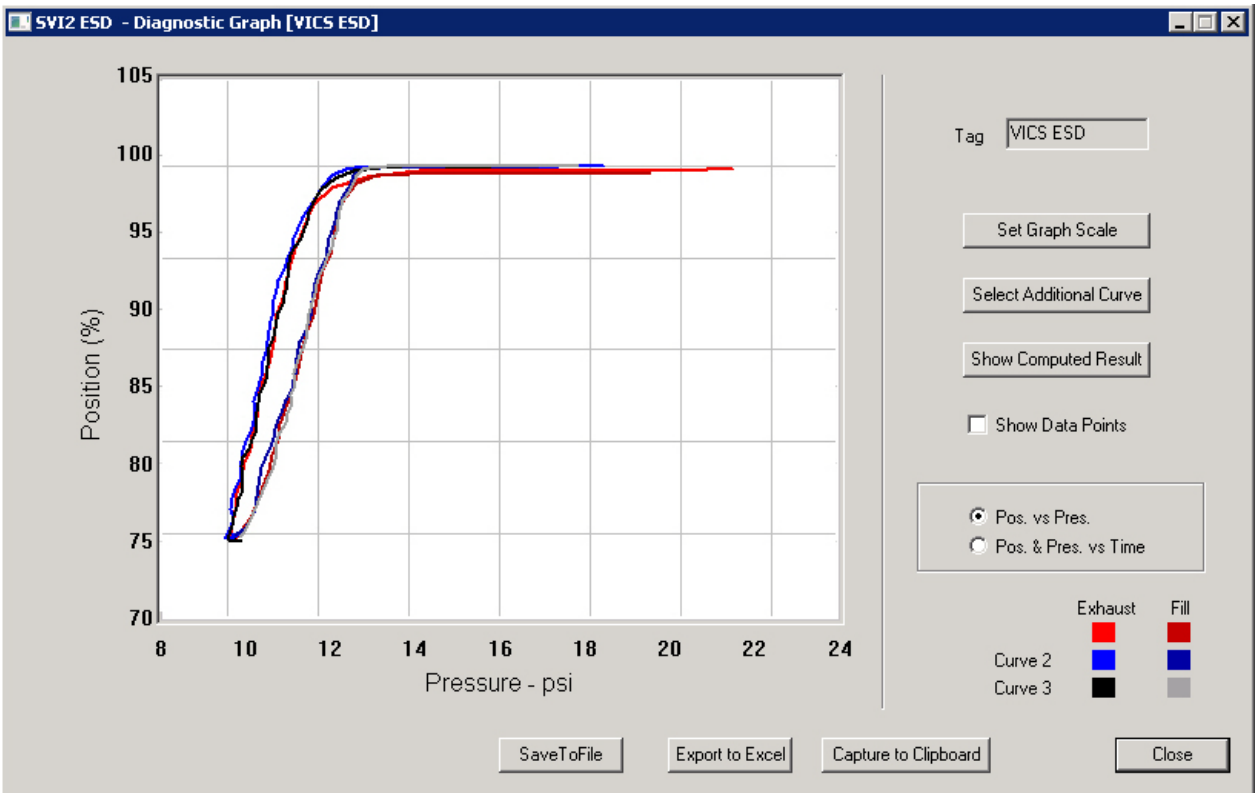


Figure 269 - Additional PST Curve Displayed

© 2024 Baker Hughes Company. All rights reserved.

Show Computed PST Result

You can view the results of the Partial Stroke Test and any other diagnostic test as a table of numerical values.

To launch the computed result for the active PST:

- Click **Show Computed Result**.

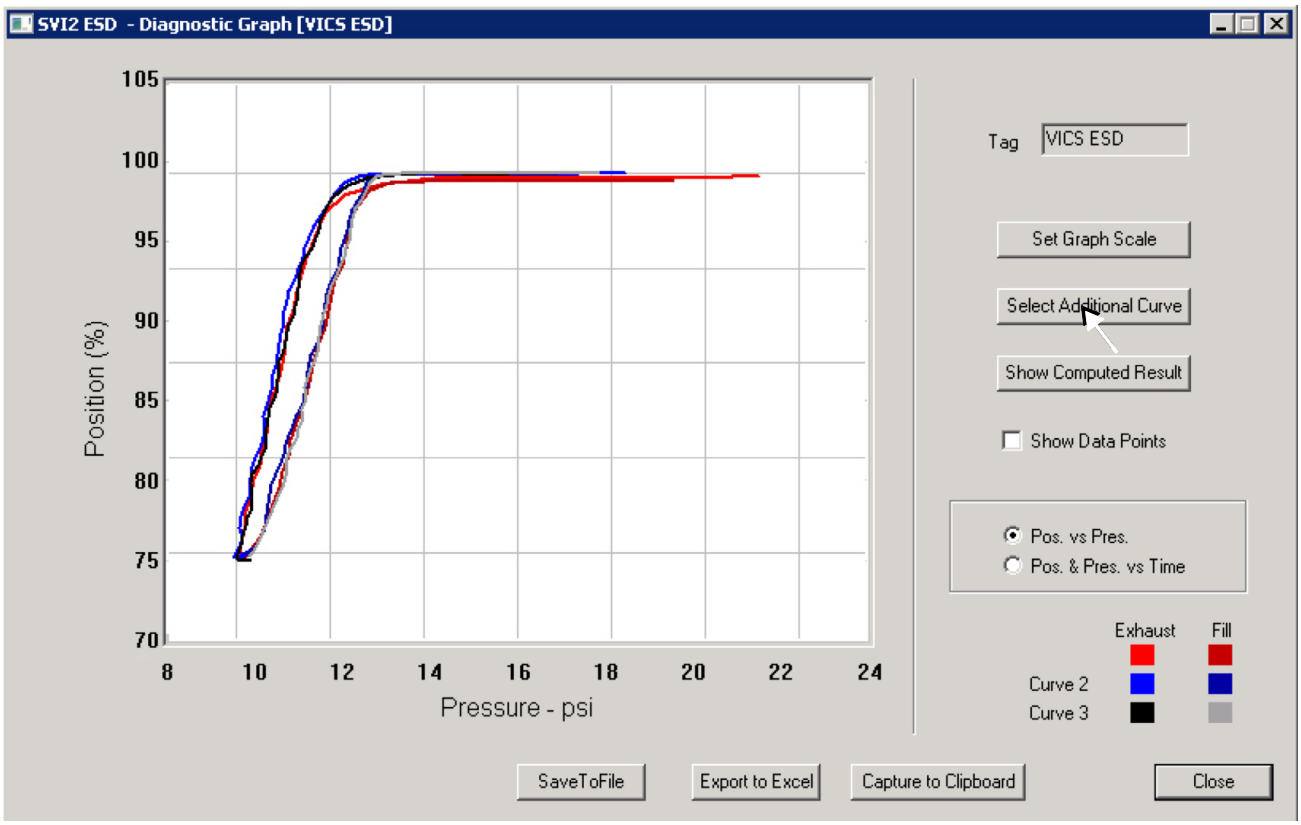


Figure 270 - Selecting Show Computed Result

© 2024 Baker Hughes Company. All rights reserved.

The Partial Stroke Test Result in the window appears (*Figure 271*). All diagnostic results are displayed in a numerical format.

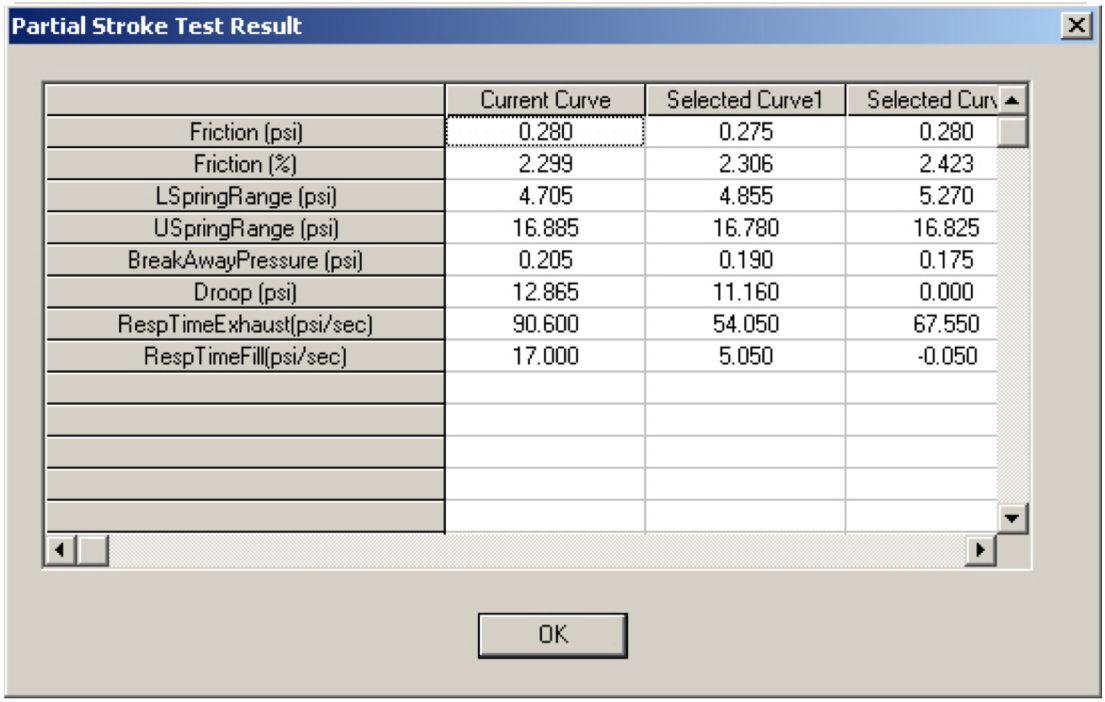


Figure 271 - PST Diagnostics Computed Result

Pos. & Pres. vs Time

You can view the PST results on the Diagnostic Graph in two views:

- *Pos. vs Pres. - Position vs Pressure*, the default view when the diagnostic graph is launched and is represented by the red curve (*Figure 263* on page 256).
- *Pos. & Pres. vs Time - Position and Pressure vs. Time*, an additional view displayed above the *Position vs Pressure* view, that displays the ramp down and up of the PST, and is represented by the blue curve as shown in *Figure 272*.

© 2024 Baker Hughes Company. All rights reserved.

To display the *Position and Pressure vs. Time* view:

- Click the **Pos. & Pres. vs Time** radio button beside (*Figure 272*).

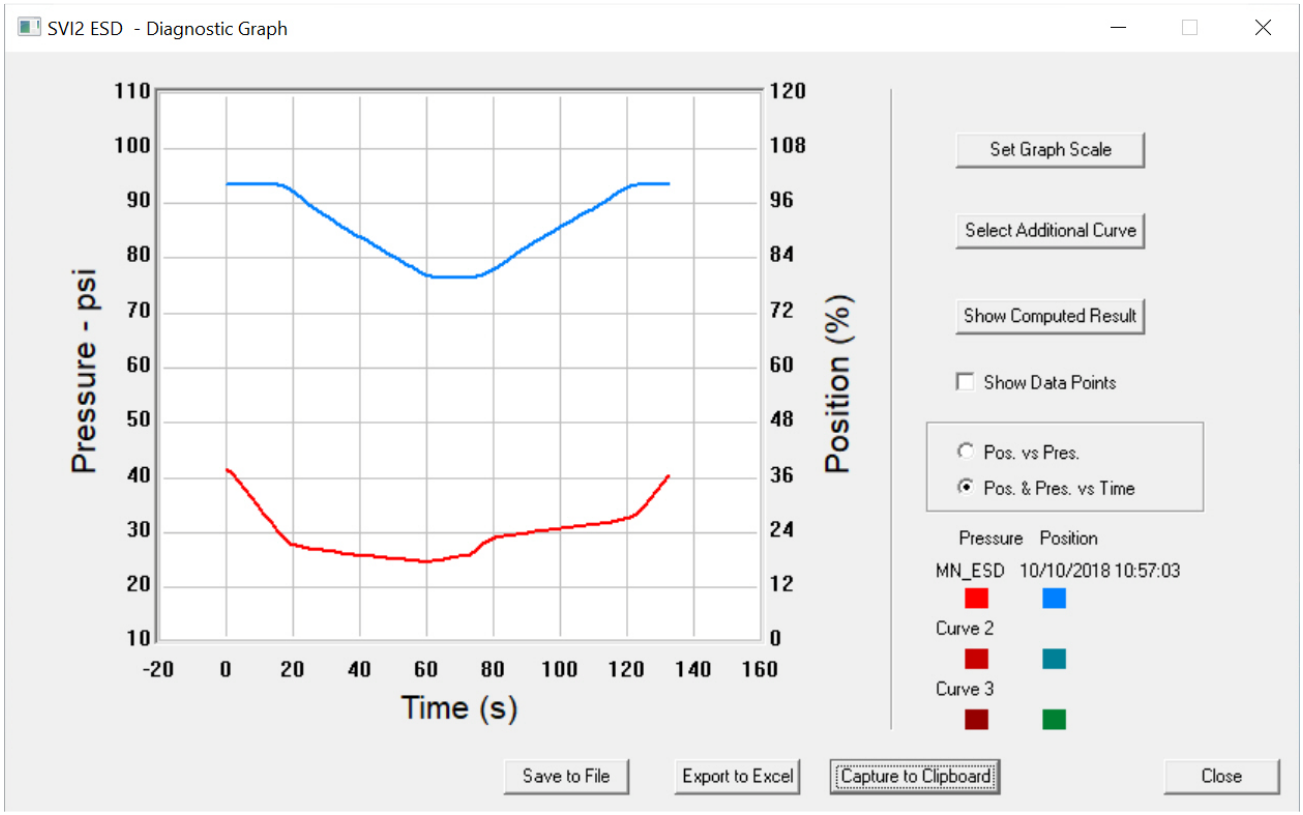


Figure 272 - Position and Pressure vs. Time View

© 2024 Baker Hughes Company. All rights reserved.

Save to File

You can save diagnostic graphs in a graphical format as .dgn files to any specified location.

To save a diagnostic graph to a file:

1. Select **Save To File** (*Figure 273*).

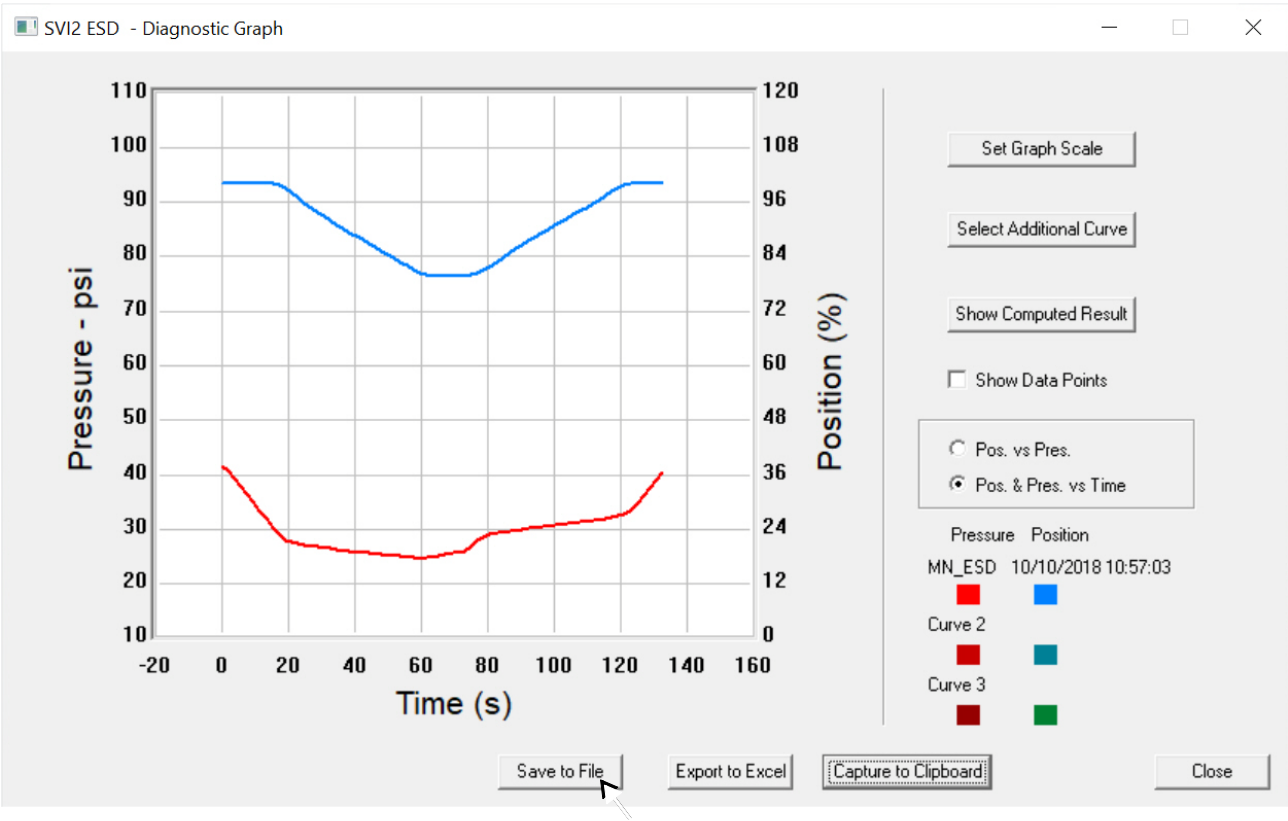


Figure 273 - Selecting Save to File

© 2024 Baker Hughes Company. All rights reserved.

A Windows file browser appears (*Figure 274*).

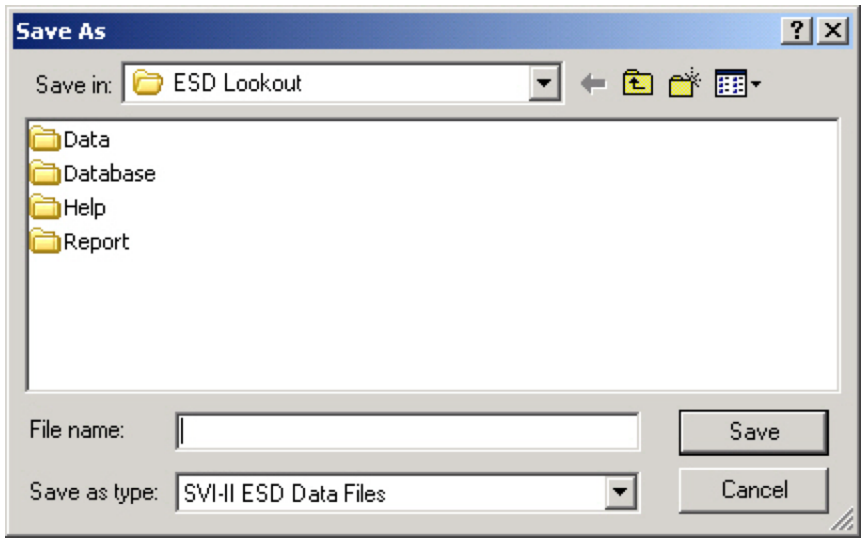


Figure 274 - File Browser

2. Locate the folder in which to save the file, enter a file name and click **Save**.
   The browser window closes and the diagnostic graph reappears.

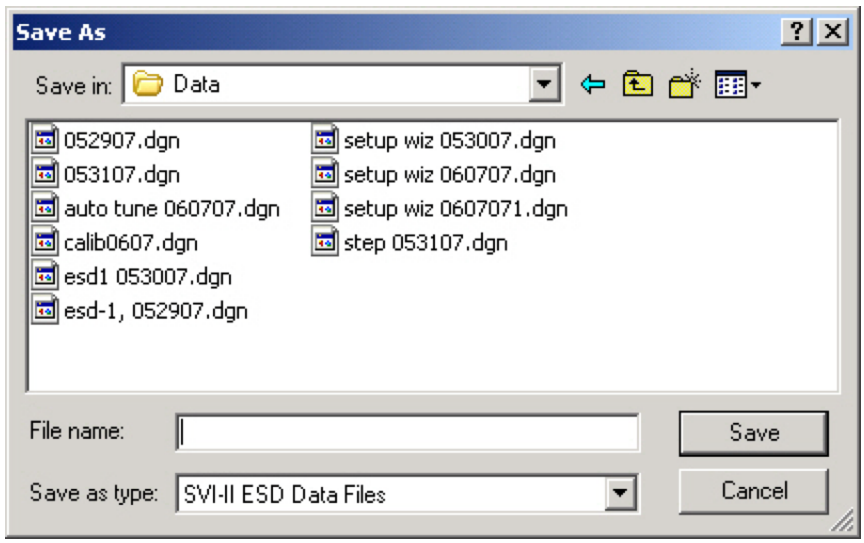


Figure 275 - Selecting a Folder for Saving File

© 2024 Baker Hughes Company. All rights reserved.

Export to Excel

You can save or create a comma separated value file (.csv) of the diagnostic data from a graph and export the file to Excel. With the Excel file you can create graphs or perform other analysis.

To export a graph to Excel:

- **Export to Excel** (*Figure 276*).

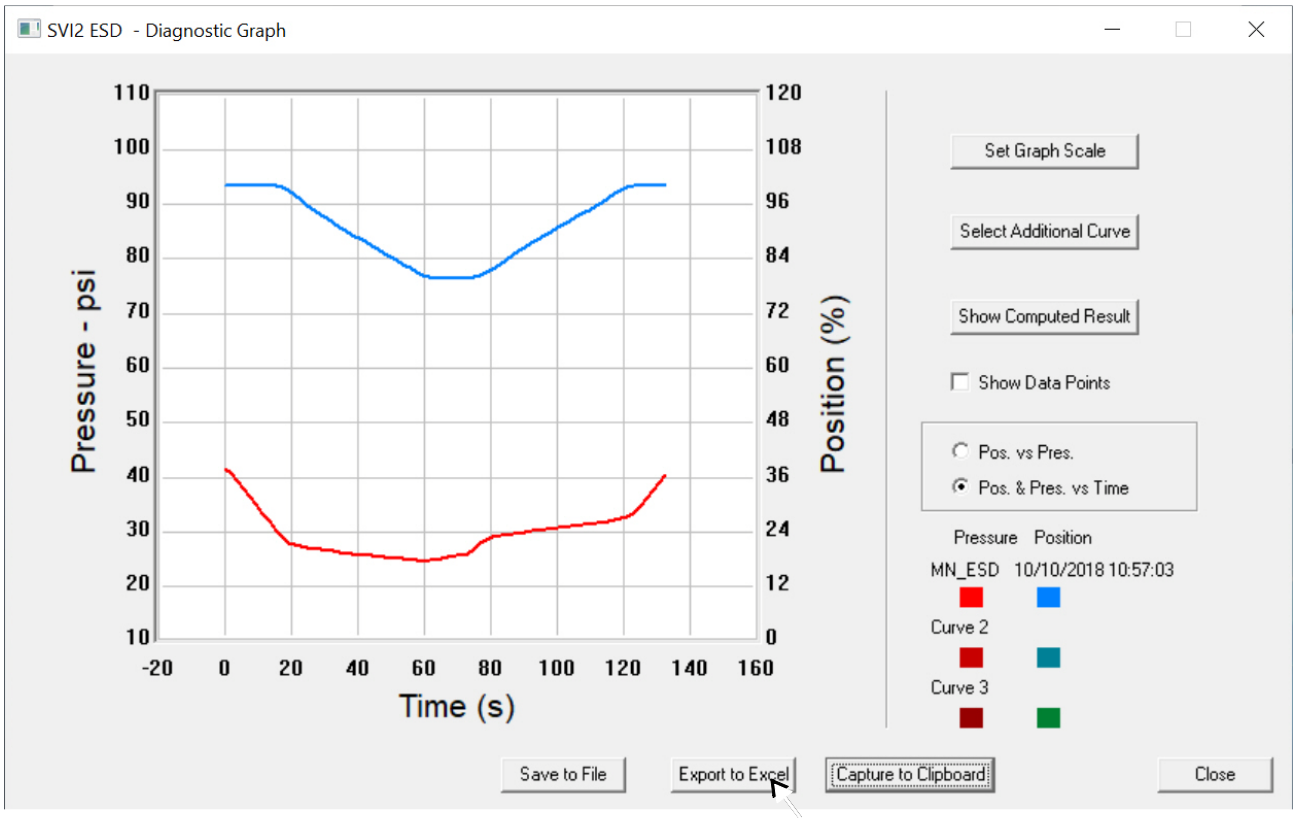
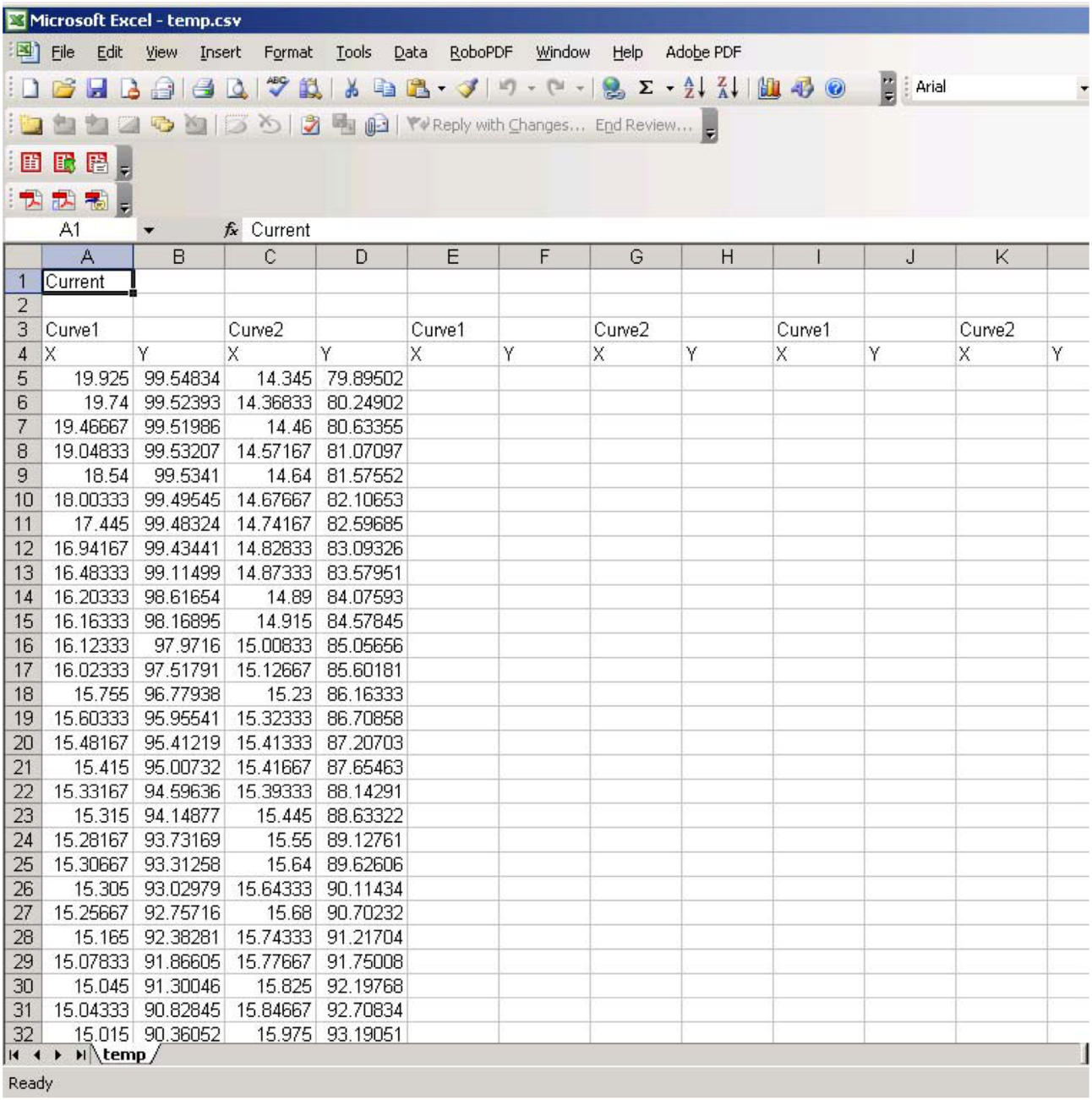


Figure 276 - Selecting Export to Excel

© 2024 Baker Hughes Company. All rights reserved.

Microsoft Excel appears and displays the X axis and Y axis values, taken from the diagnostic graph, as Excel values (*Figure 277*).



	A	B	C	D	E	F	G	H	I	J	K	
1	Current											
2												
3	Curve1		Curve2		Curve1		Curve2		Curve1		Curve2	
4	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
5	19.925	99.54834	14.345	79.89502								
6	19.74	99.52393	14.36833	80.24902								
7	19.46667	99.51986	14.46	80.63355								
8	19.04833	99.53207	14.57167	81.07097								
9	18.54	99.5341	14.64	81.57552								
10	18.00333	99.49545	14.67667	82.10653								
11	17.445	99.48324	14.74167	82.59685								
12	16.94167	99.43441	14.82833	83.09326								
13	16.48333	99.11499	14.87333	83.57951								
14	16.20333	98.61654	14.89	84.07593								
15	16.16333	98.16895	14.915	84.57845								
16	16.12333	97.9716	15.00833	85.05656								
17	16.02333	97.51791	15.12667	85.60181								
18	15.755	96.77938	15.23	86.16333								
19	15.60333	95.95541	15.32333	86.70858								
20	15.48167	95.41219	15.41333	87.20703								
21	15.415	95.00732	15.41667	87.65463								
22	15.33167	94.59636	15.39333	88.14291								
23	15.315	94.14877	15.445	88.63322								
24	15.28167	93.73169	15.55	89.12761								
25	15.30667	93.31258	15.64	89.62606								
26	15.305	93.02979	15.64333	90.11434								
27	15.25667	92.75716	15.68	90.70232								
28	15.165	92.38281	15.74333	91.21704								
29	15.07833	91.86605	15.77667	91.75008								
30	15.045	91.30046	15.825	92.19768								
31	15.04333	90.82845	15.84667	92.70834								
32	15.015	90.36052	15.975	93.19051								

Figure 277 - Diagnostic Graph Data - in Excel

© 2024 Baker Hughes Company. All rights reserved.

Perform Pneumatic Self Test

One of the diagnostic tests the ESDVue provides is the *Terminal Board and Pneumatics* test. You can run this test with ESDVue in any mode.

To perform this test:

1. Select the **Perform Pneumatic Self Test** radio button.
2. Click **Perform Diagn.**

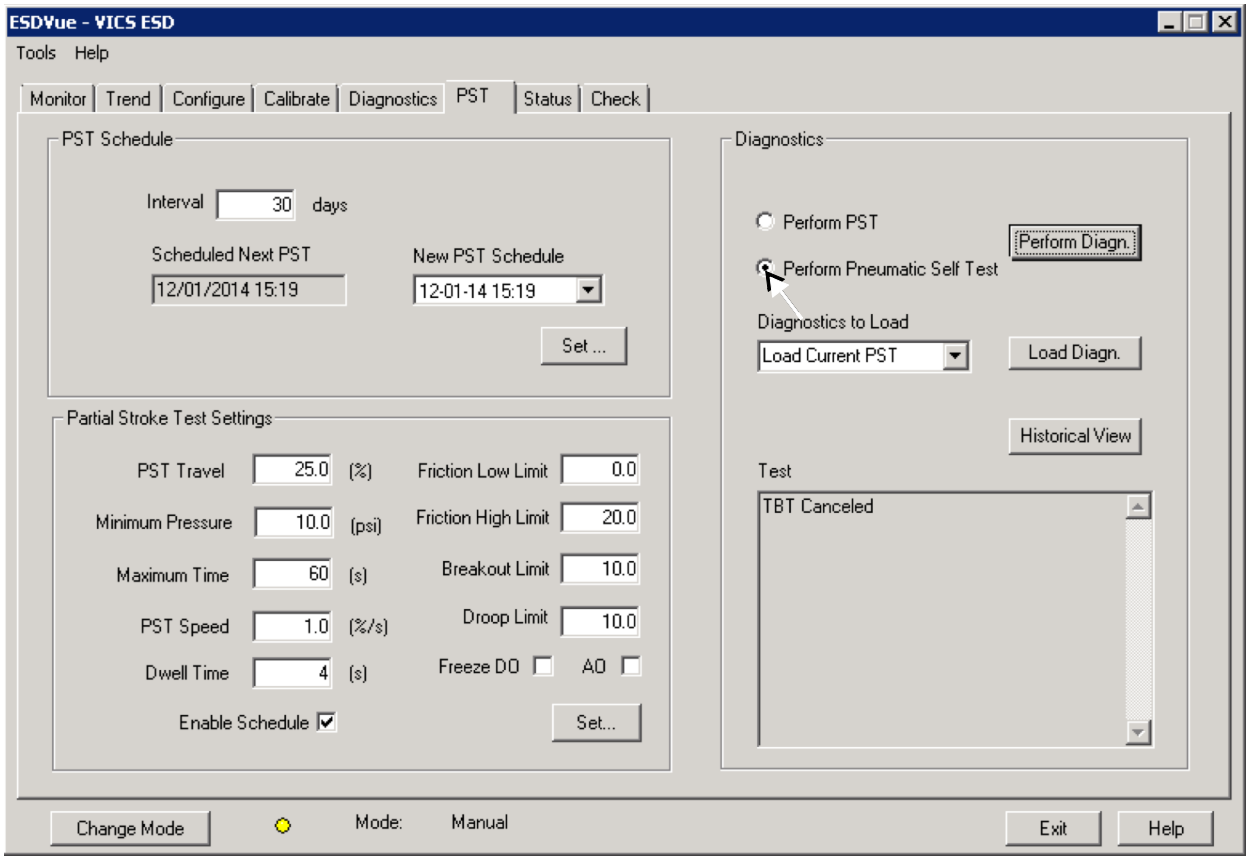


Figure 278 - Executing Pneumatic Self Test

© 2024 Baker Hughes Company. All rights reserved.

The *Partial Stroke Test* starts and a progress dialog appears (*Figure 279*).

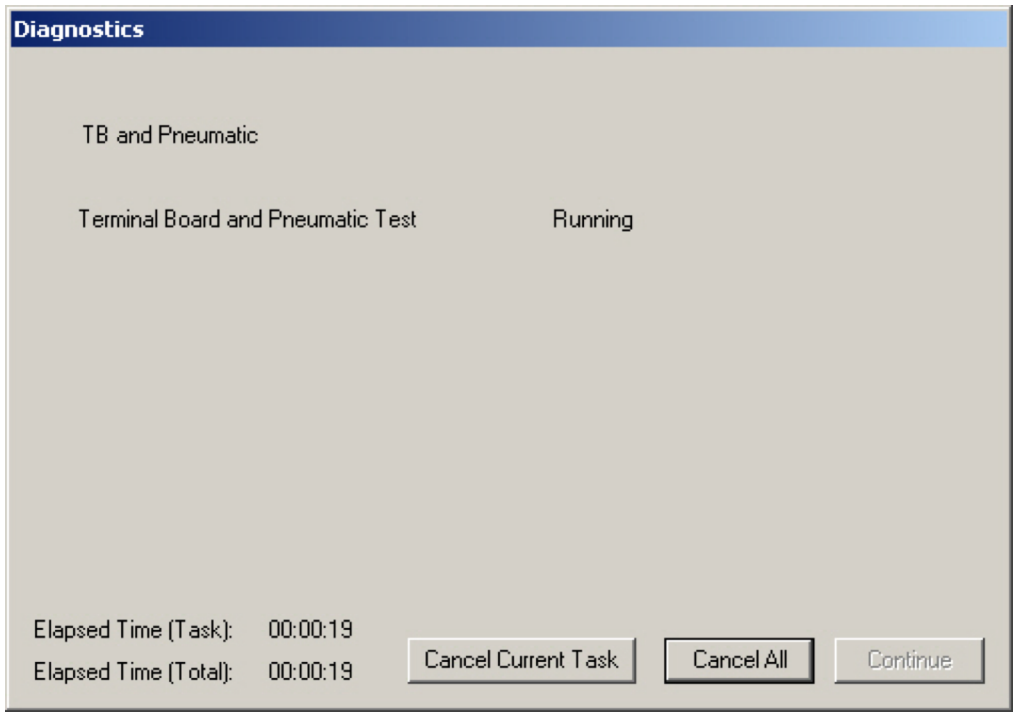


Figure 279 - Terminal Board and Pneumatic Test Progress Dialog

When the test completes the *Diagnostics* progress dialog appears as in (*Figure 280*).

3. Click **Continue** to return to the PST screen.

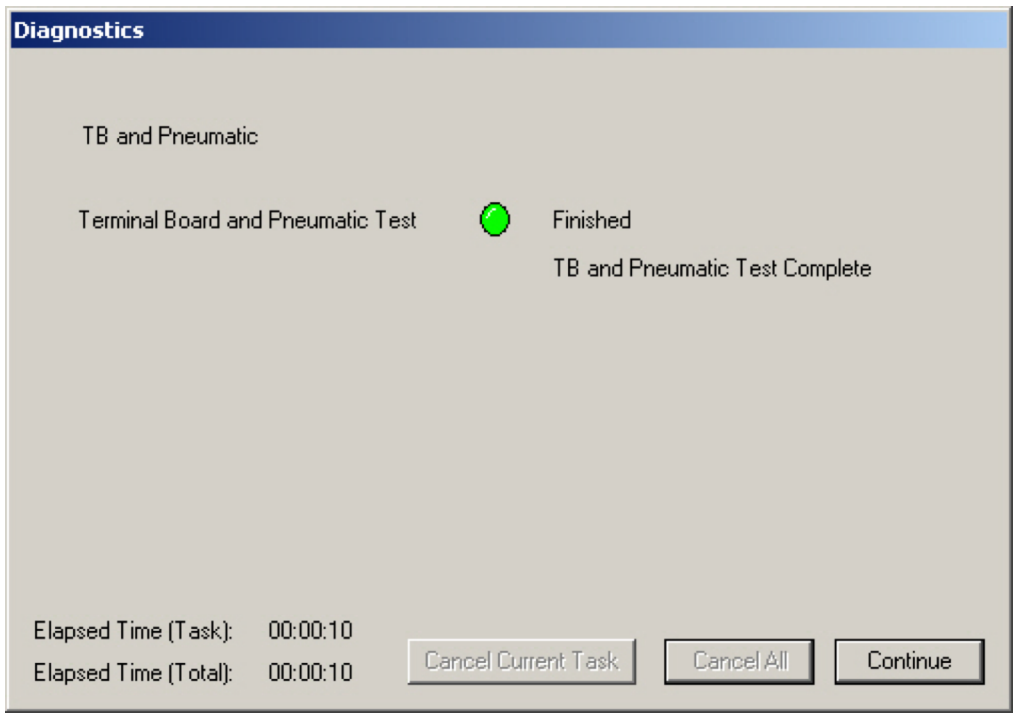


Figure 280 - Terminal Board and Pneumatic Test Complete

© 2024 Baker Hughes Company. All rights reserved.

Load Diagnostic Data

Use this feature to load previously saved data onto the Diagnostic Graph.

To load data:

- Select the data source from the *Diagnostics to Load* drop down list., which includes:
  - *Load Current PST* - loads the most recent PST results for the current device
  - *Load Saved PST* - loads the last saved PST results for the current device
  - *Load Tripped Data* - loads the tripped data for the current device
  - *Load From Database* - select a device and data type from the ESDVue database and view the diagnostics file.
  - *Load From File* - select a saved diagnostics file and view it.

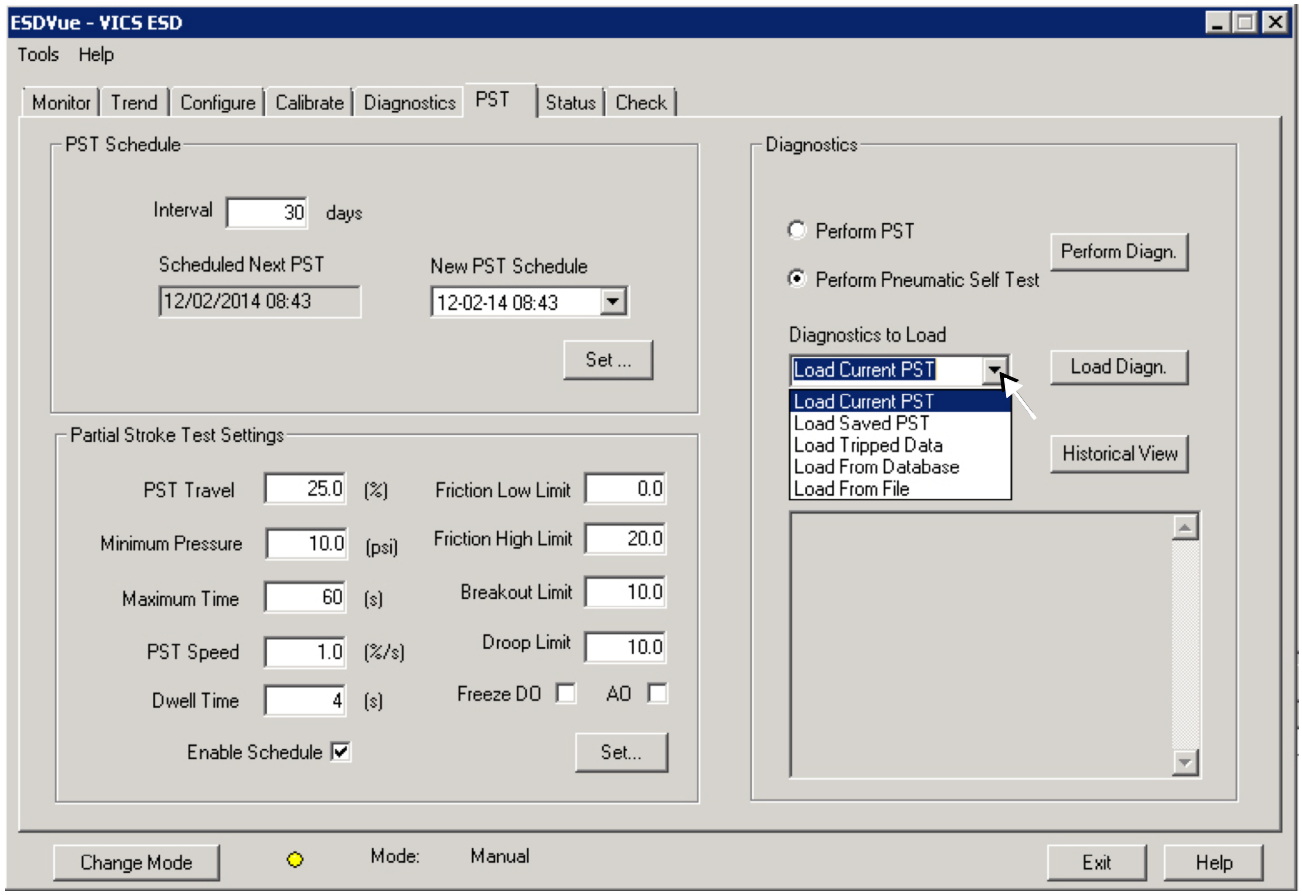


Figure 281 - Load Data Selections

© 2024 Baker Hughes Company. All rights reserved.

Load Data from Database

Every time you execute a diagnostic test ESDVue saves the data from the test to a database. On the *PST* screen you can select and load diagnostic data from the database.

To load diagnostics from the database:

1. Scroll through the *Diagnostics to Load* drop down list and click **Load From Database** (*Figure 282*).

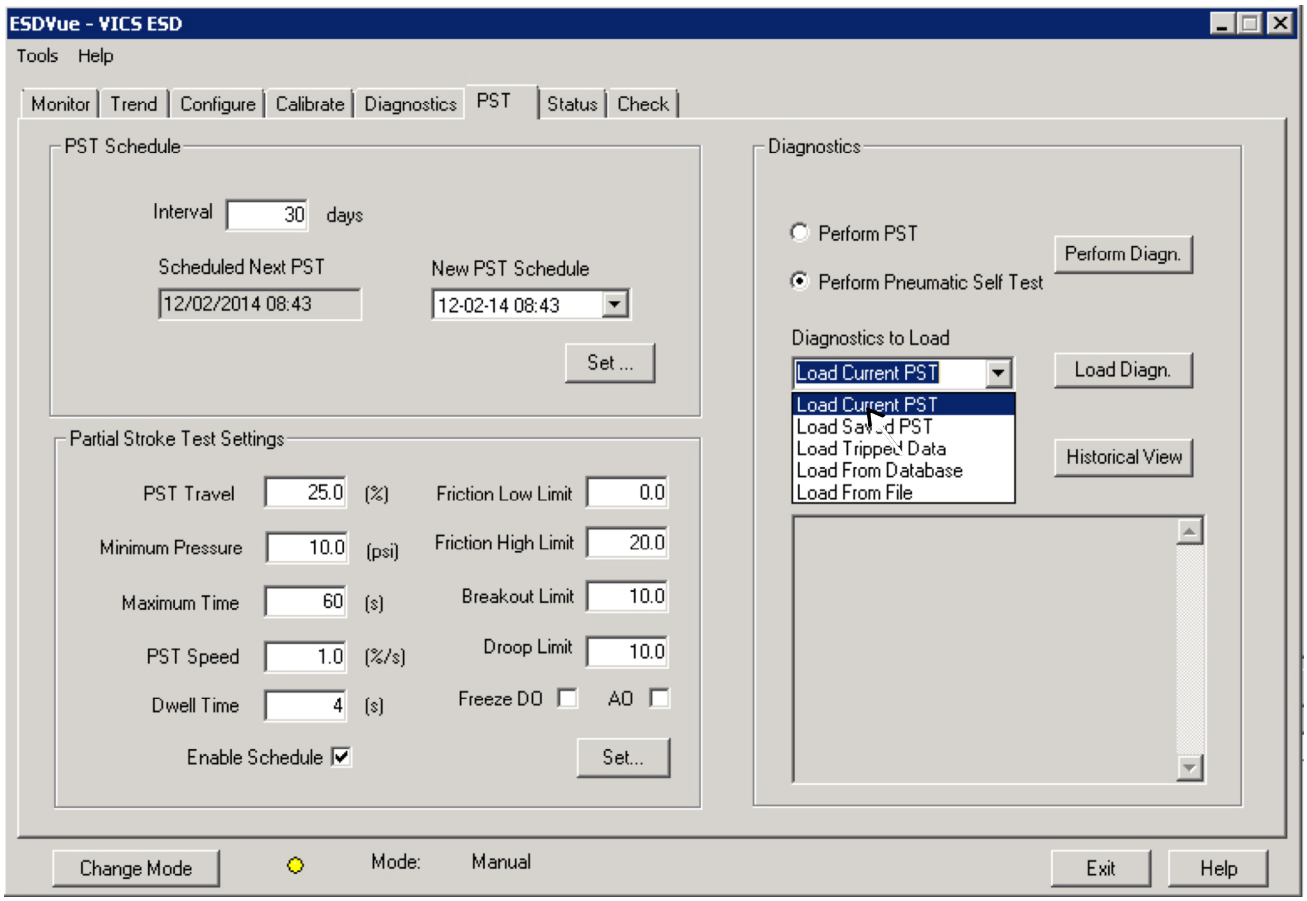


Figure 282 - Selecting Data to Load

© 2024 Baker Hughes Company. All rights reserved.

The *Diagnostics to Load* field fills with *Load From Database* (*Figure 283*).

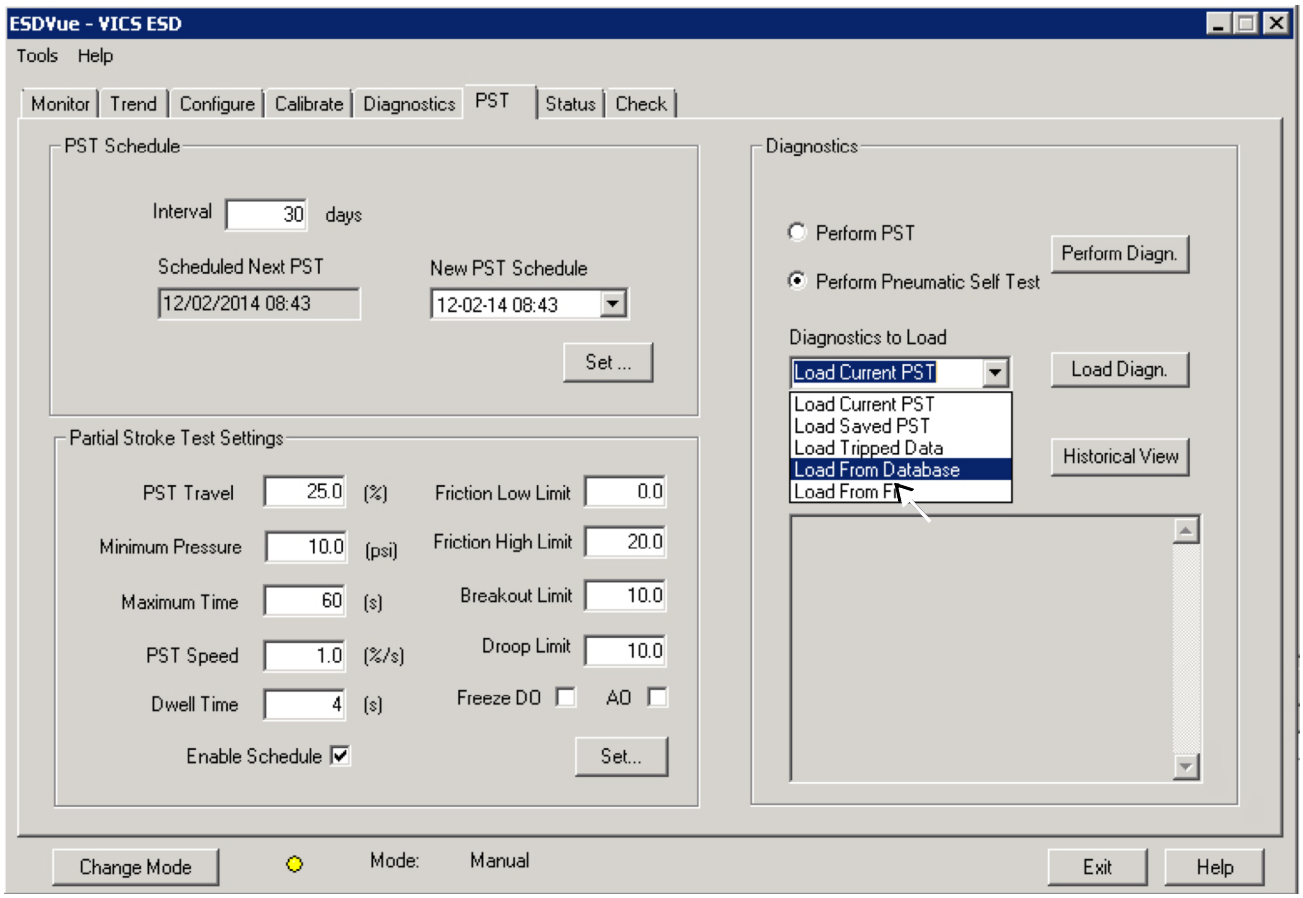


Figure 283 - Selecting Load From Database

© 2024 Baker Hughes Company. All rights reserved.

2. Click **Load Diagn** (*Figure 284*).

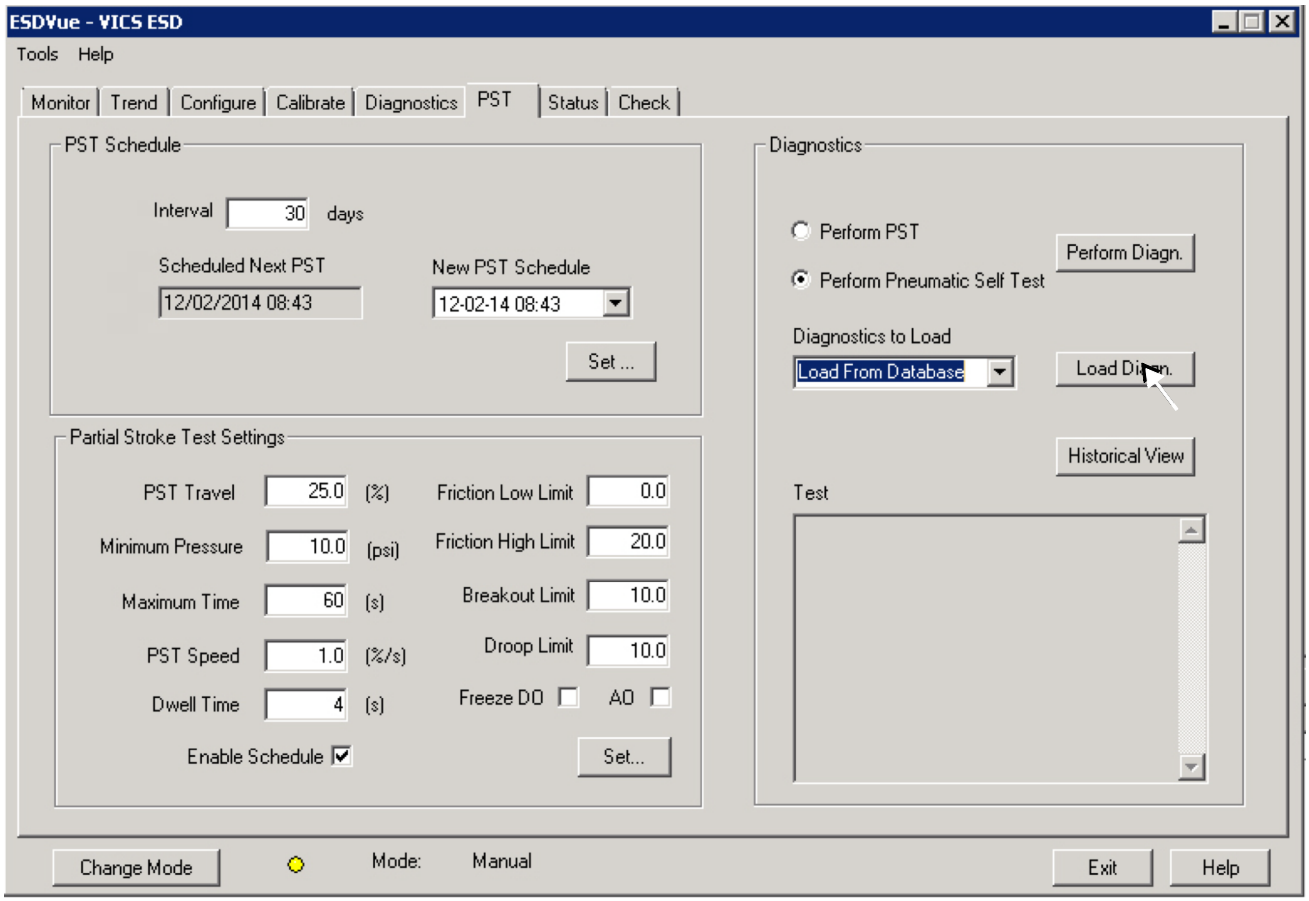


Figure 284 - Launching Load Data from Database

The *Load Data From DB* window appears where you select the data to load on the diagnostic graph.

3. Choose either a particular **Device ID** or choose **All Tags** (all devices).
4. Select the data type you to load (*Figure 285*):
   - **PST Data**
   - **ESD Tripped Data**
   - **Extended Signature**
   - **STEP**

© 2024 Baker Hughes Company. All rights reserved.

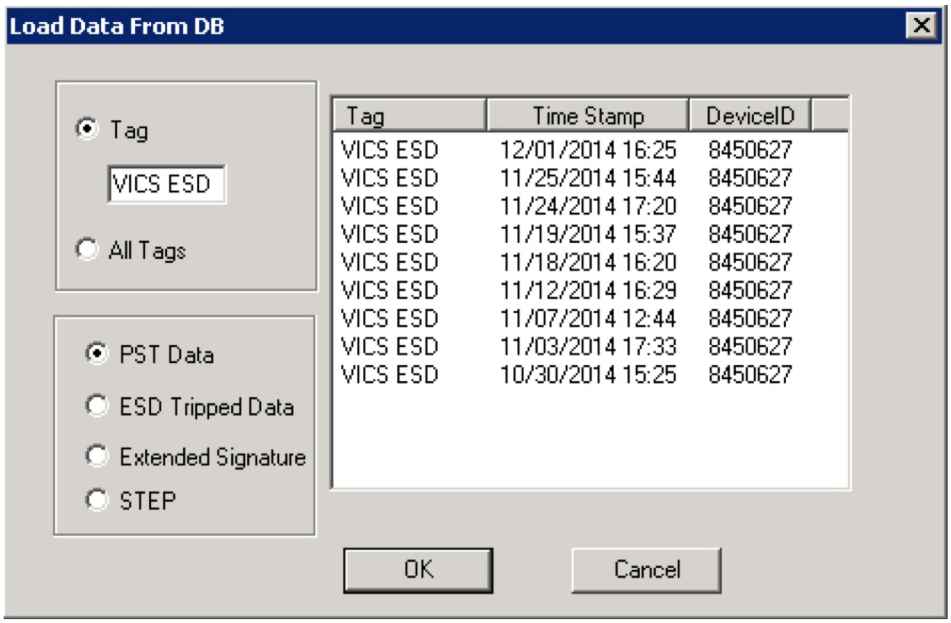


Figure 285 - Device and Data Type Displayed

5. Scroll through the list and find the *Time Stamp* to load and click **OK** (*Figure 286*).

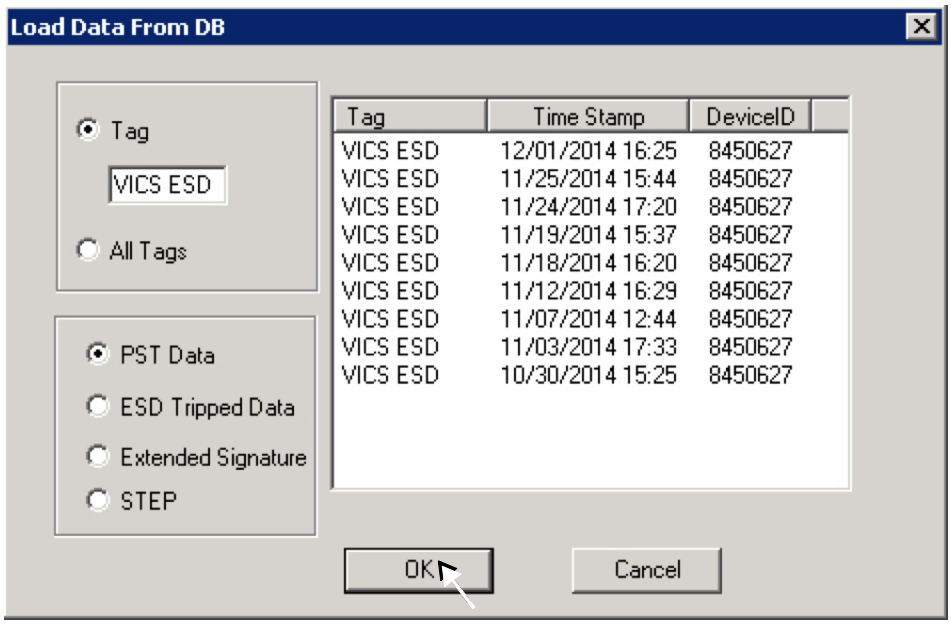


Figure 286 - Loading Selected Data

The *Diagnostic Graph* displays the loaded data.

© 2024 Baker Hughes Company. All rights reserved.

Load from Database Tool Tips

When you hover over a data record name all the data for the record appears (*Figure 287*).

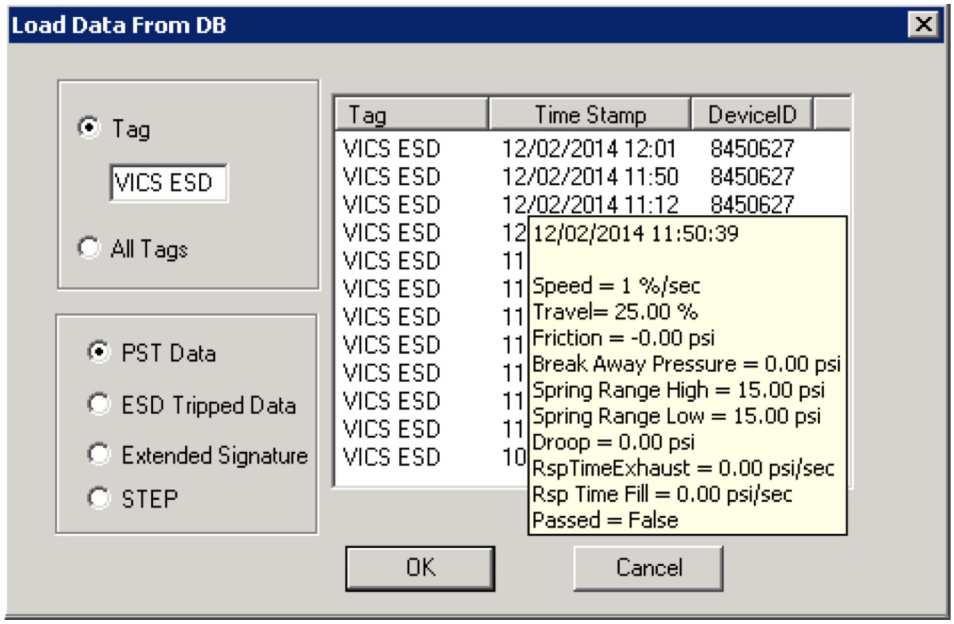


Figure 287 - Load Data from DB Tool Tip

© 2024 Baker Hughes Company. All rights reserved.

Data File Displayed

After selecting the data record, the diagnostic graph appears (*Figure 288*).

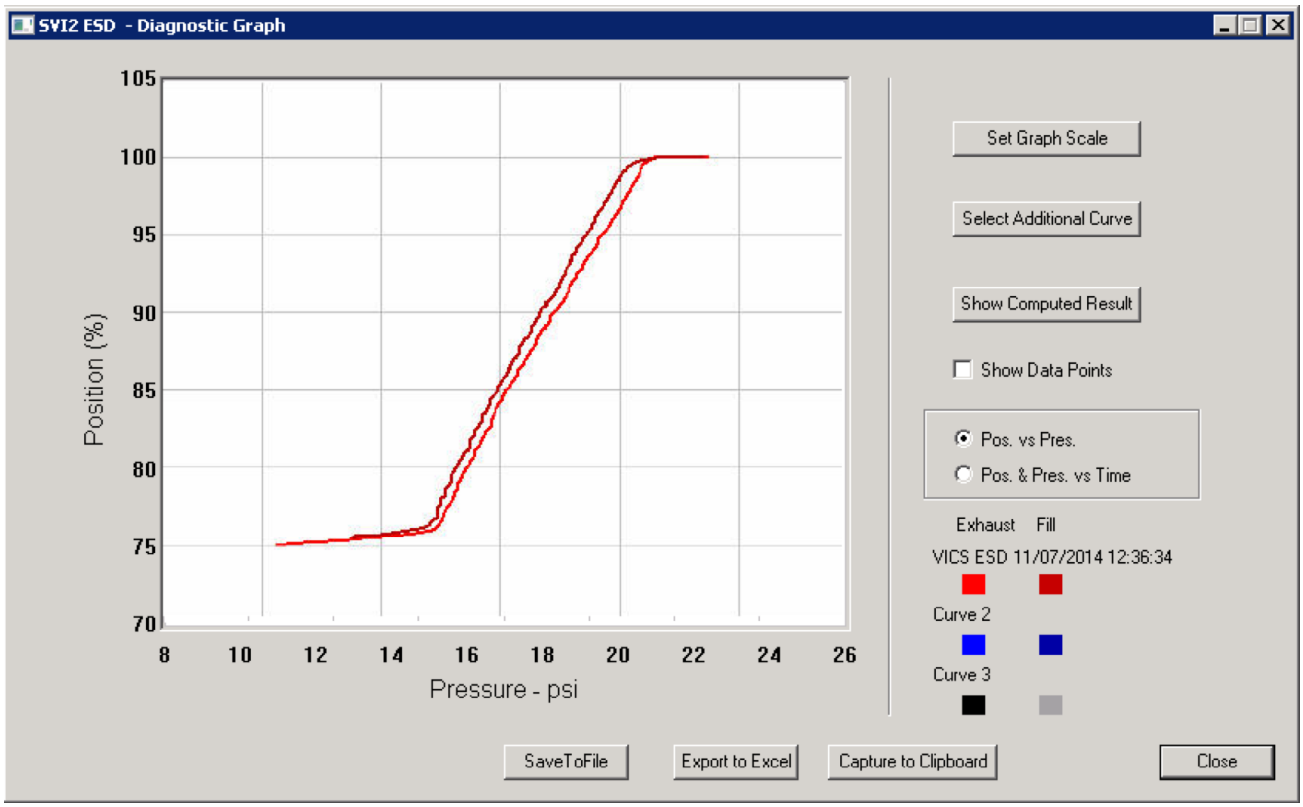


Figure 288 - Diagnostic Graph Displayed

Diagnostic Graph Color Legend

Located at the bottom of each SVI II ESD diagnostic graph is a color legend. The legend identifies by color each curve and step on the graph, currently displayed, and any additionally selected (using the *Select Additional Curve* function).

© 2024 Baker Hughes Company. All rights reserved.

Load from File

You can load a *PST* or *Pneumatic Self Test* diagnostic file from the *PST* screen.

To load a file:

1. Select **Load from File** from the *Diagnostics to Load* drop down list.
2. Click **Load Diagn** as shown in *Figure 289*.

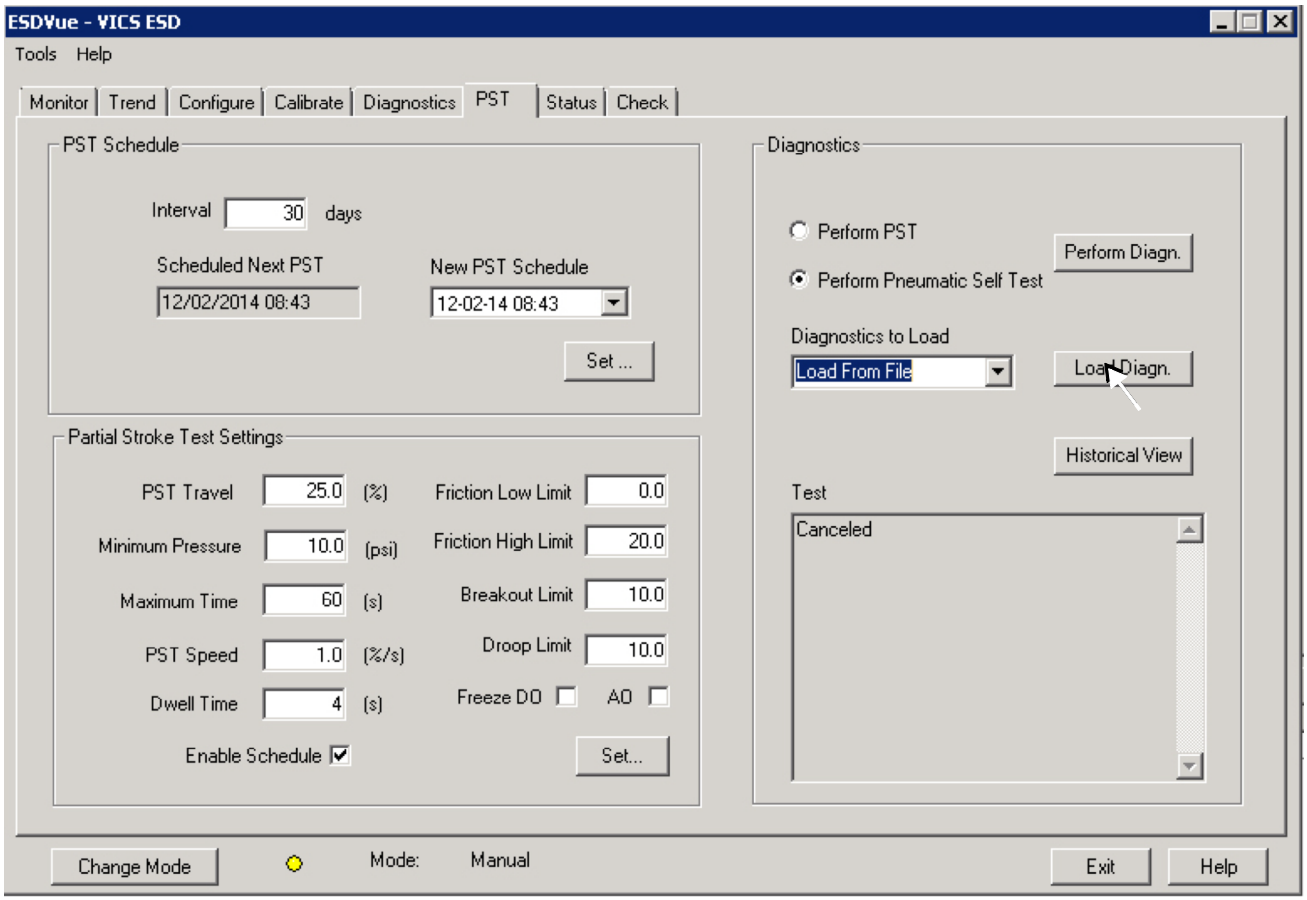


Figure 289 - Selecting Load From File

© 2024 Baker Hughes Company. All rights reserved.

A file browser window appears (*Figure 290*).

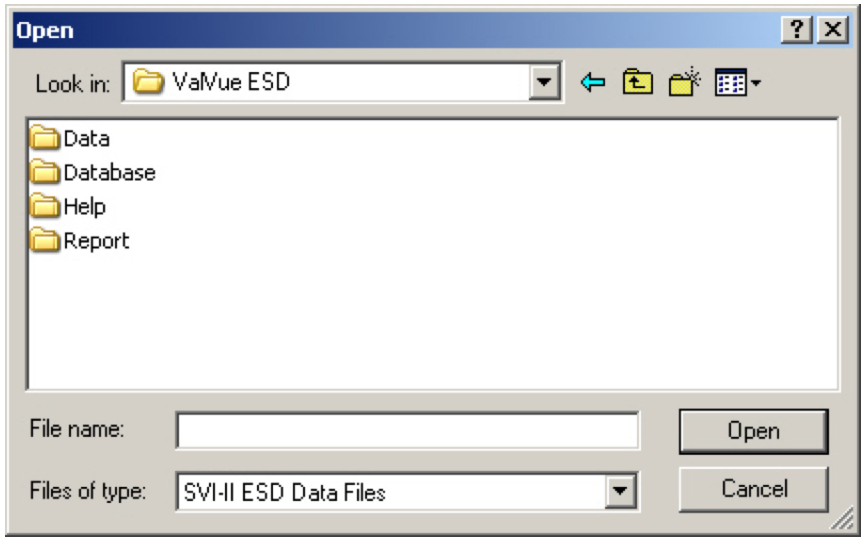


Figure 290 - File Browser

3. Using the browser, locate the file to load.
4. Select the file name and click **Open**.

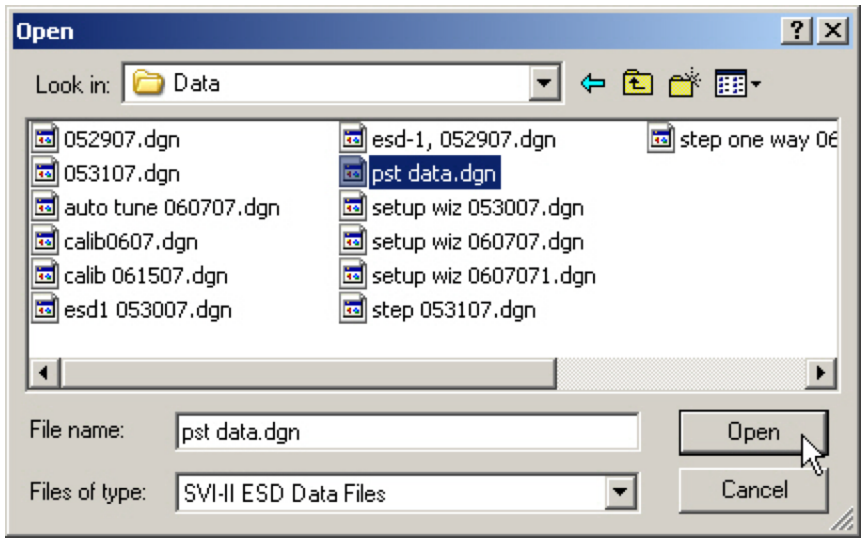


Figure 291 - Opening File for Diagnostic Data

A dialog appears (*Figure 292*).

5. Select the record with the appropriate time stamp and click **OK**.

© 2024 Baker Hughes Company. All rights reserved.

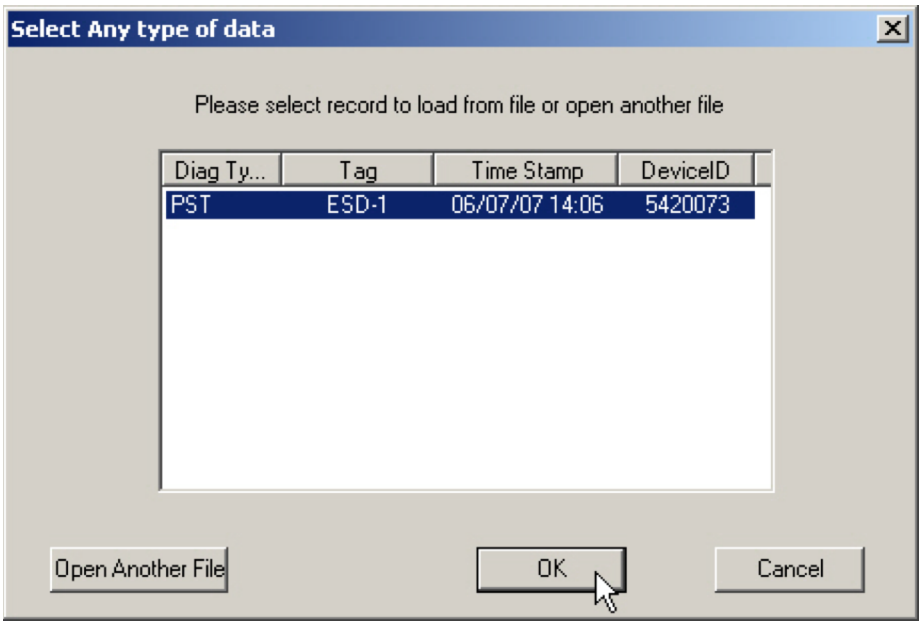


Figure 292 - Selecting Diagnostic Record

The diagnostic graph appears (*Figure 293*).

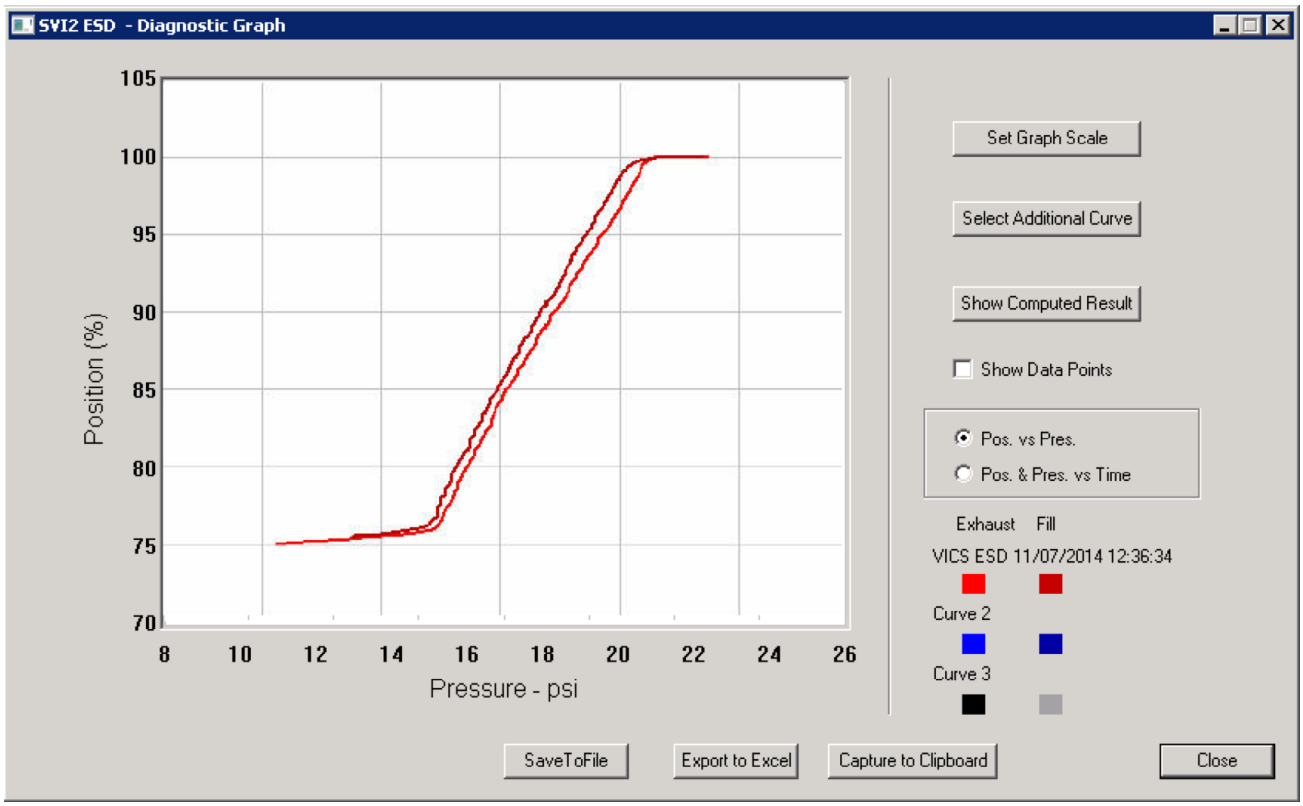


Figure 293 - Diagnostic Graph Displayed

© 2024 Baker Hughes Company. All rights reserved.

Diagnostic Graph Color Legend

Located at the bottom of each SVI II ESD diagnostic graph is a color legend. The legend identifies by color each curve and step on the graph; currently displayed and any additionally selected (using the *Select Additional Curve* function).

Historical View

The historical view provides a graphic representation of all historical data collected on the selected ESD.

To start *Historical View*:

1. Click **Historical View** (*Figure 294*).

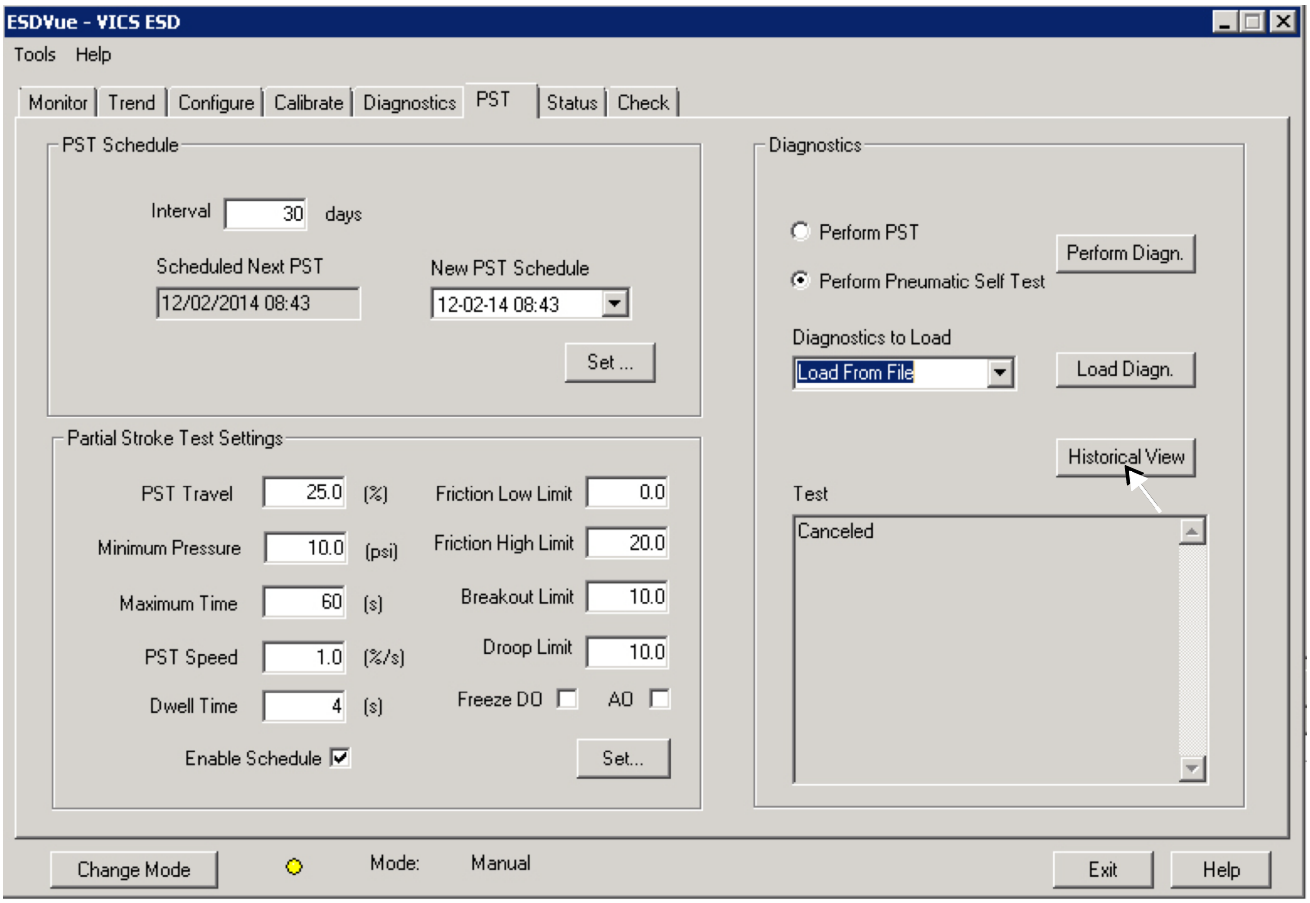


Figure 294 - Selecting Historical View

The *PST Historical View* window appears as shown in *Figure 295* on page 281.

2. Select the *Device ID* from the drop down list.
3. Change the **Start** and **End Dates** for the PST data as required.

© 2024 Baker Hughes Company. All rights reserved.

Changing the Historical View Start and End Dates

The *Historical View* start and end date field is set up as mm/dd/yyyy. There are two methods for changing the *PST Start* and *End Date* fields. You can:

- Click on each parameter of the date field; i.e. mm, or dd, or yyyy, and change each individual parameter.

or

- Access the calendar in the drop down of the date field.

To change the start date schedule for the next PST:

1. Either:
   a. Click in each parameter (mm-dd-yy-hh-mm) of the date field and highlight the text.
   b. Type over the old value with the new value for each parameter

   or

   a. Click in the drop down, located at the right of PST schedule date field and access the date calendar (*Figure 295*).
   b. Using the arrow key on the calendar, change the month, if necessary.
   c. When in the correct month on the calendar, drag the mouse and click on the correct date within the month.

© 2024 Baker Hughes Company. All rights reserved.

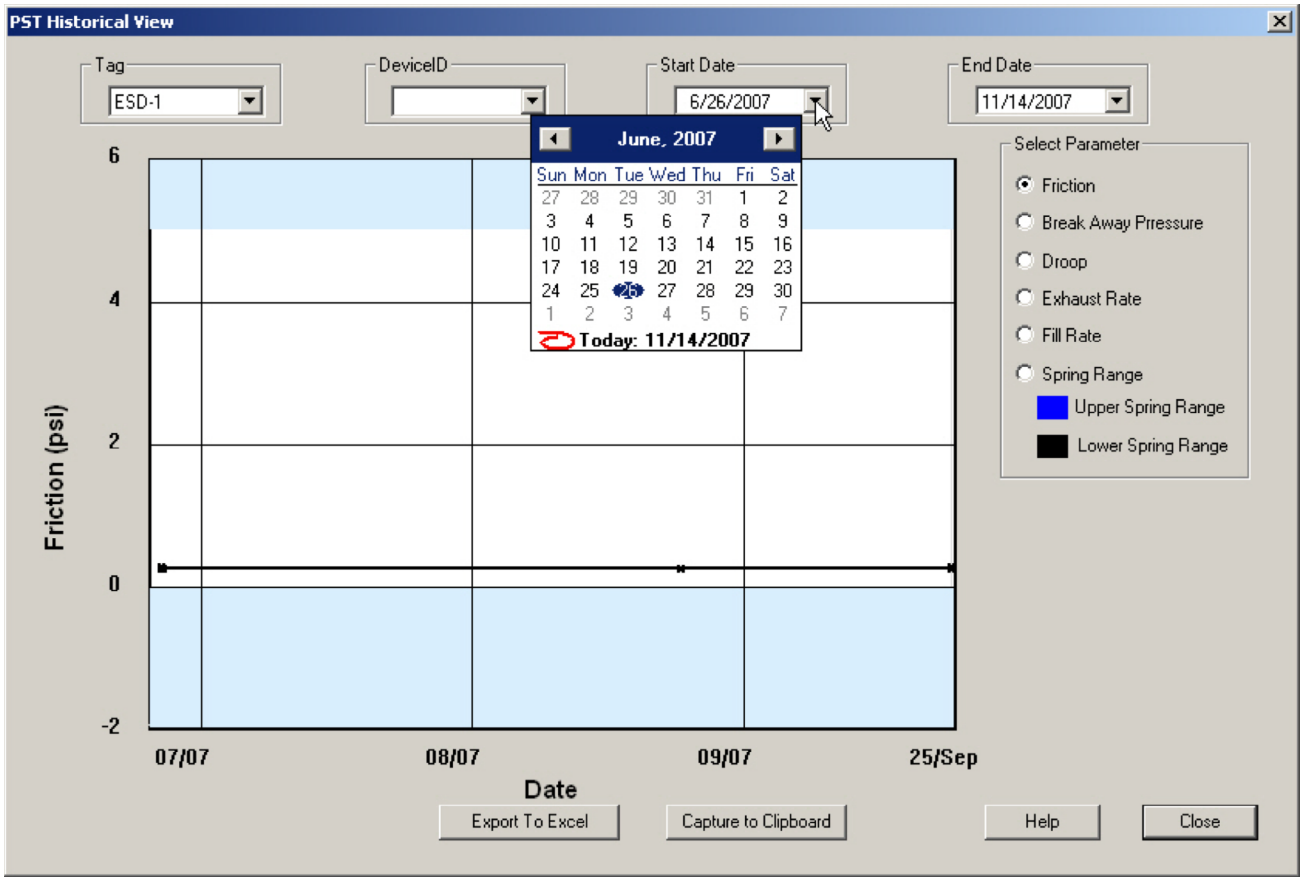


Figure 295 - Selecting Start Date for Historical View

2. Select the **End Date** in the same manner as the *Start Date*.

© 2024 Baker Hughes Company. All rights reserved.

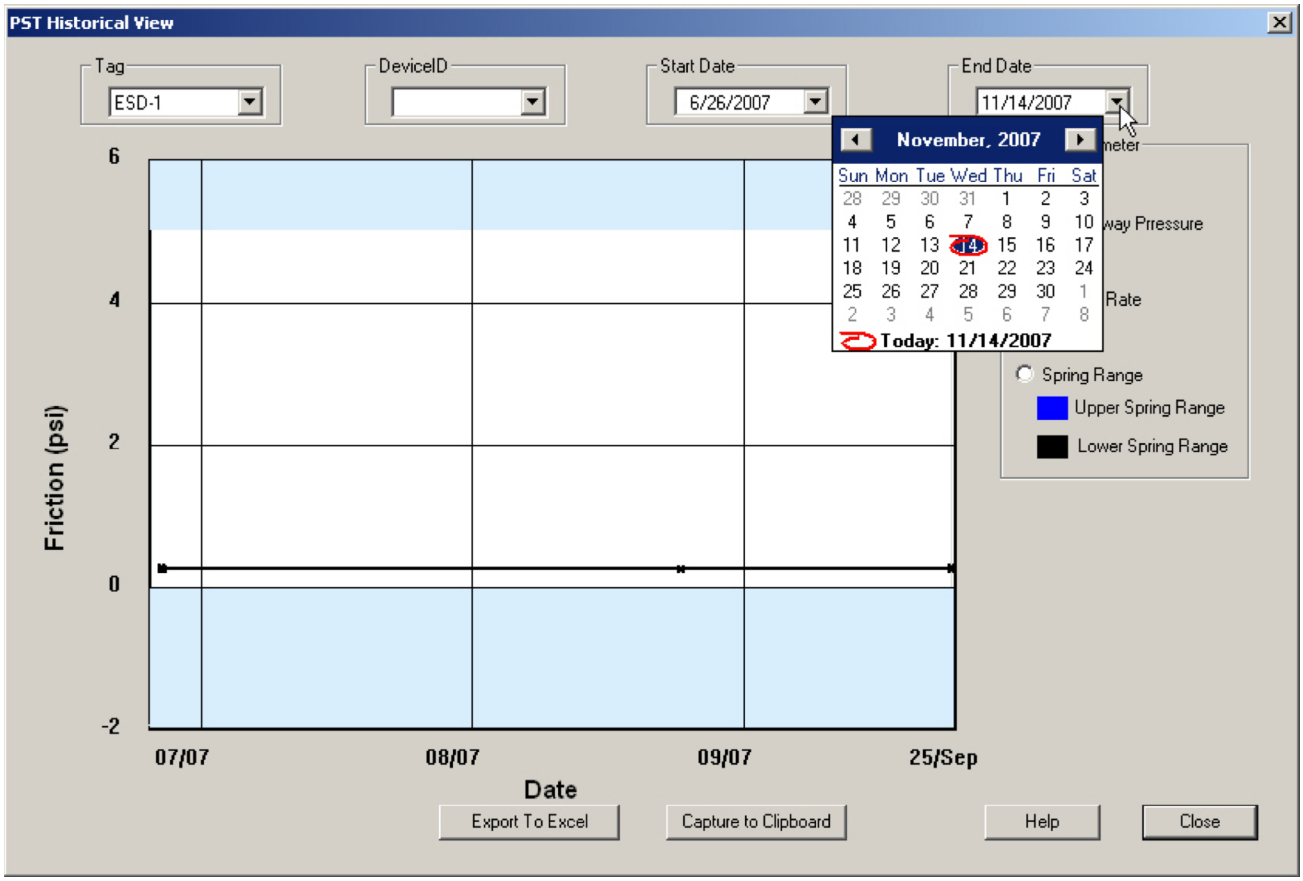


Figure 296 - Selecting the Historical View End Date

The historical PST data for the selected date range appears.

3. Select the parameter to view by clicking on its radio button.

© 2024 Baker Hughes Company. All rights reserved.

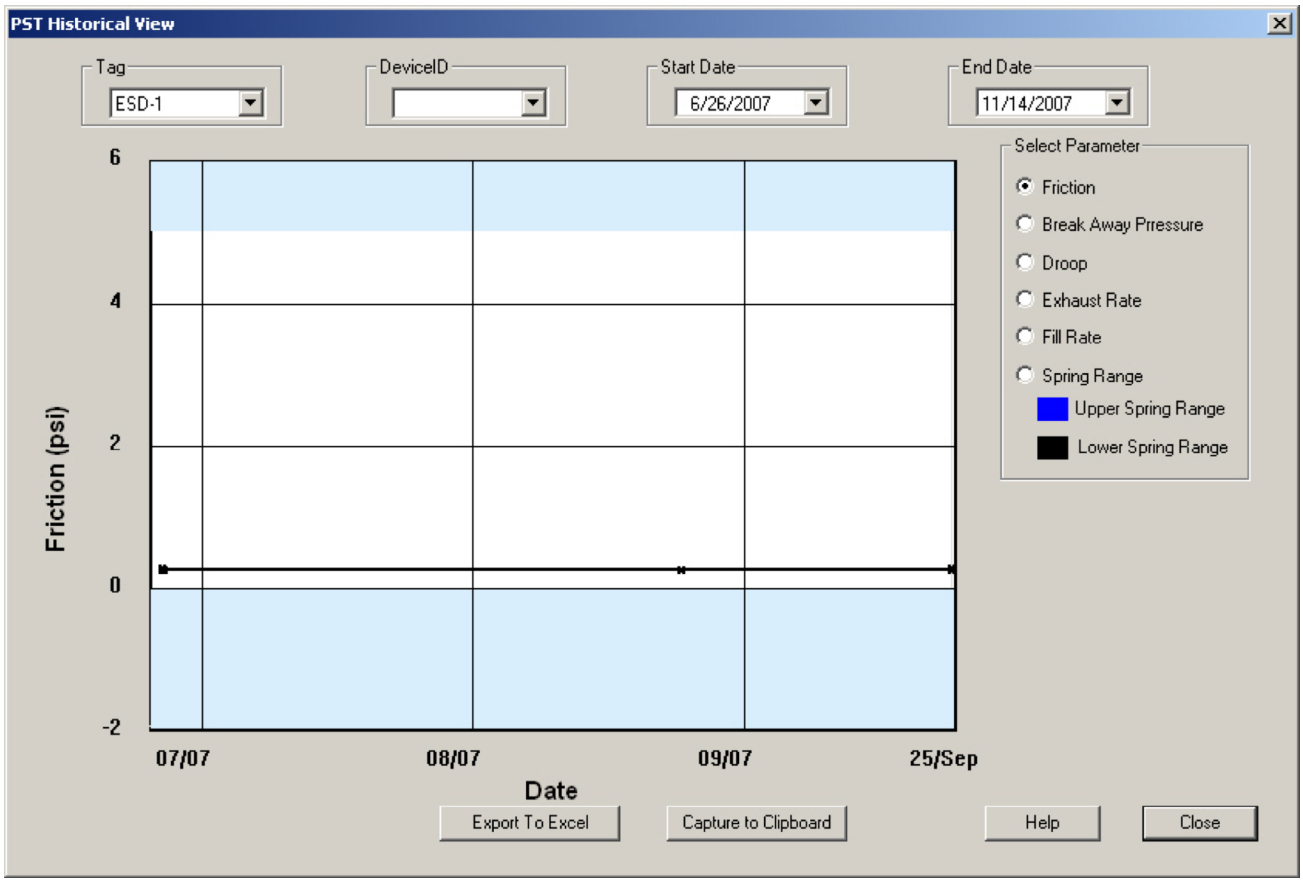


Figure 297 - PST Historical View - Friction Displayed

© 2024 Baker Hughes Company. All rights reserved.

Displaying Historical View Diagnostic Graphs

When the *Historical View* is active, and you have a selected a date range of data points, you can view the diagnostic graph associated with each of the data points.

To view a diagnostic graph associated with a historical data point:

1. Locate the correct date on the historical view timeline.
2. Double-click on the date's data point (*Figure 298*).

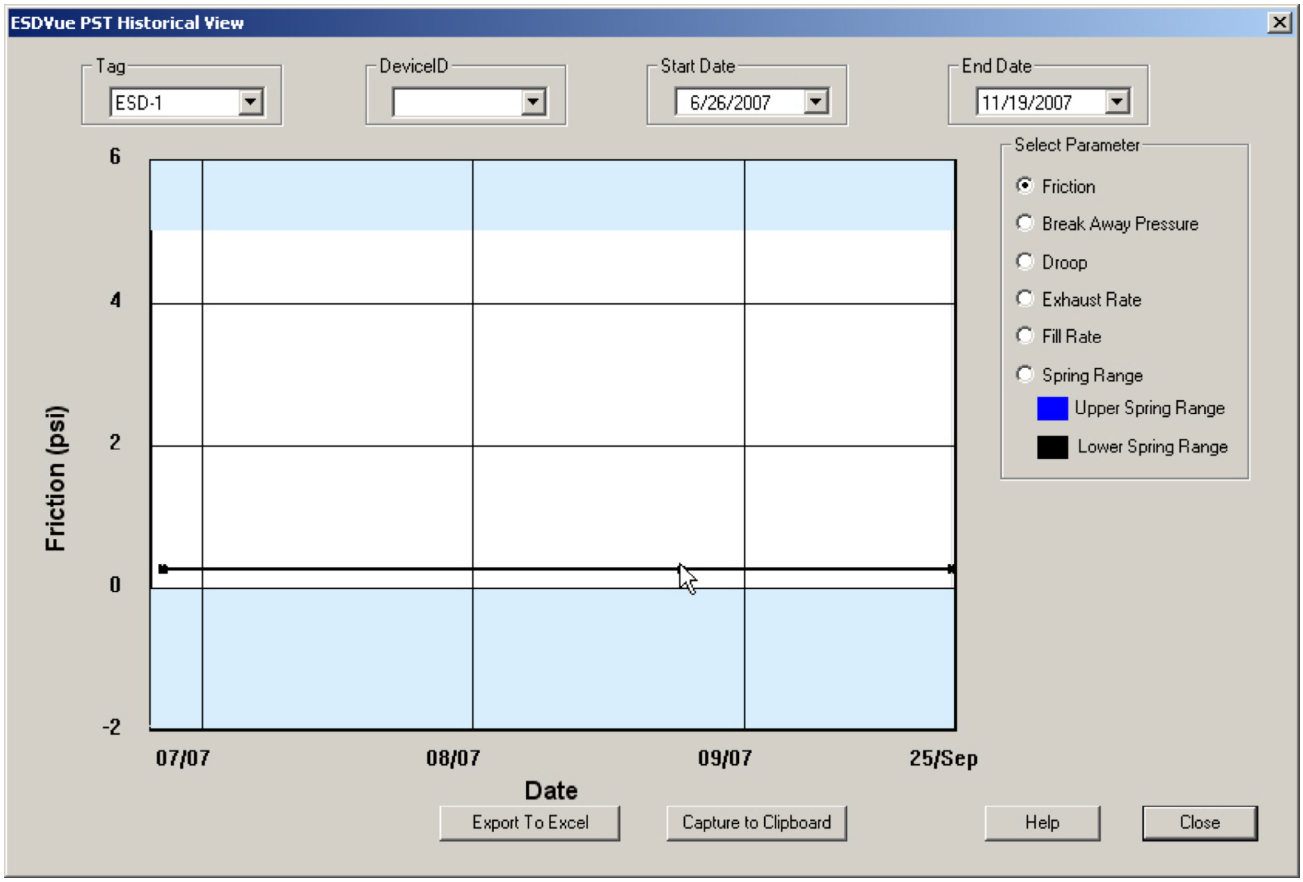


Figure 298 - Selecting a Historical View Data Point

© 2024 Baker Hughes Company. All rights reserved.

The diagnostic graph for the selected data point appears (*Figure 299*).

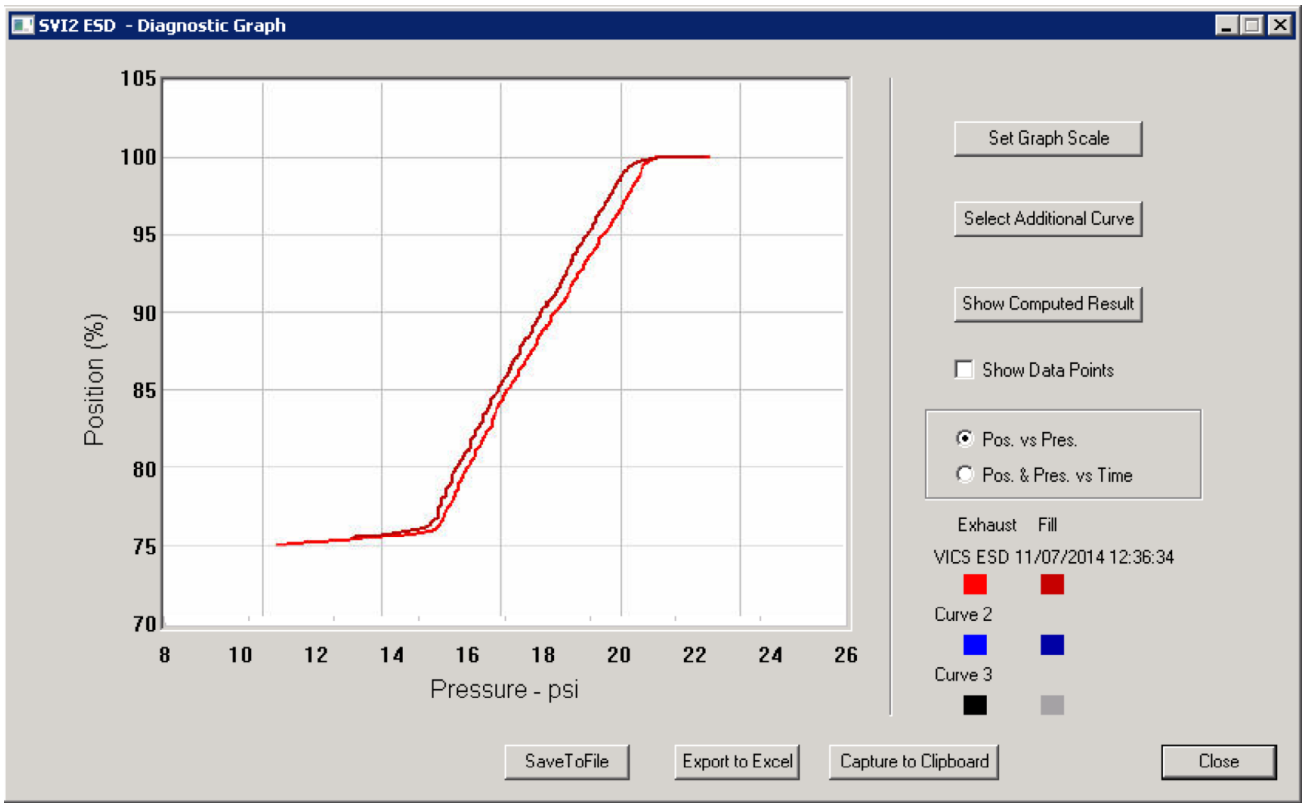


Figure 299 - Historical View Diagnostic Graph

Diagnostic Graph Color Legend

Located at the bottom of each SVI II ESD diagnostic graph is a color legend. The legend identifies by color each curve and step on the graph, currently displayed, and any additionally selected (using the *Select Additional Curve* function).

© 2024 Baker Hughes Company. All rights reserved.

PST Context Menu

The *PST* screen context menu (*Figure 300*) has the following items:

- *Detach Trend* - Removes the display from the tabbed dialog and creates a separate trend display
- *Help* - Displays the help file at the *PST* screen instructions

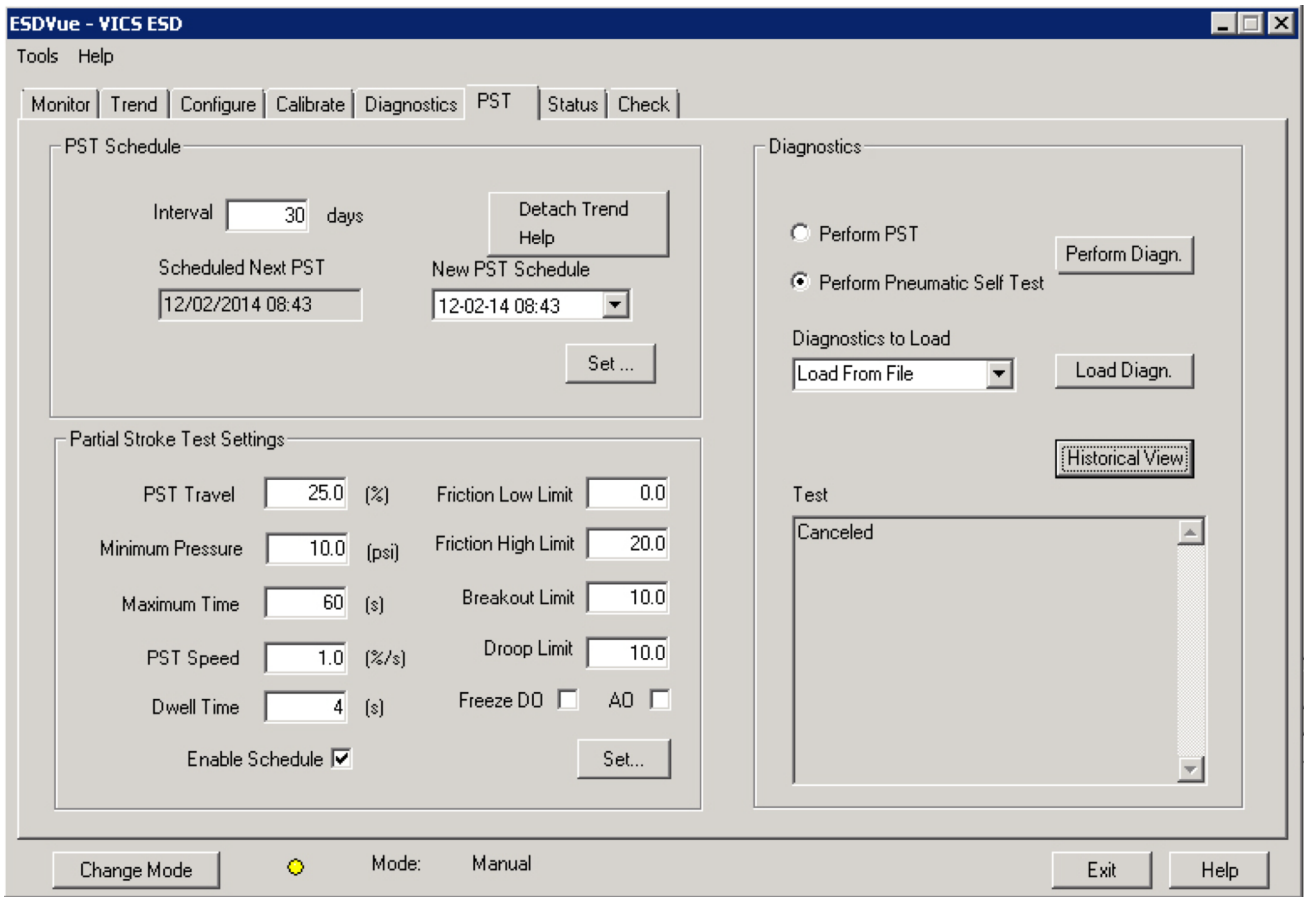


Figure 300 - PST Screen Context Menu

© 2024 Baker Hughes Company. All rights reserved.

11. Status

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 SVI II ESD. The screen is divided into a series of tabs that provide status, alarm, and fault information in a graphical form for all aspects of the SIS (Safety Instrumented System).

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

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

On the *Status* 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.

When you are on the *Active Faults* tab the current active faults appears (*Figure 301*). The status codes are then partitioned into their respective SVI II ESD functional areas.

© 2024 Baker Hughes Company. All rights reserved.

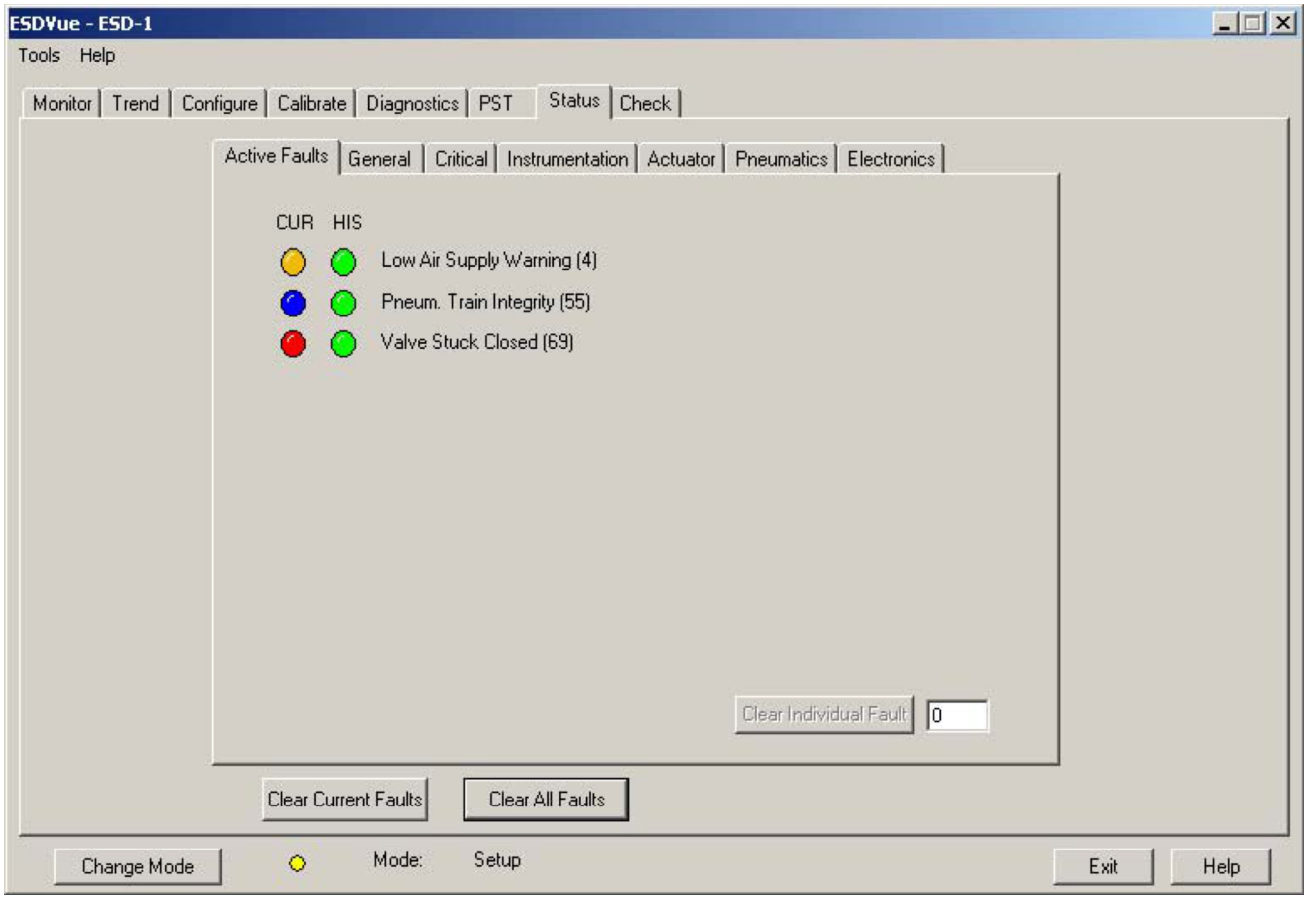


Figure 301 - Status Screen

© 2024 Baker Hughes Company. All rights reserved.

Active Faults

The *Active Faults* status tab (*Figure 302*) displays all current faults and provides current and historical information on each fault. There is also a box on the tab, located at the bottom right corner, that provides the ability to clear an individual fault. The individual fault lists active faults by Hex value.

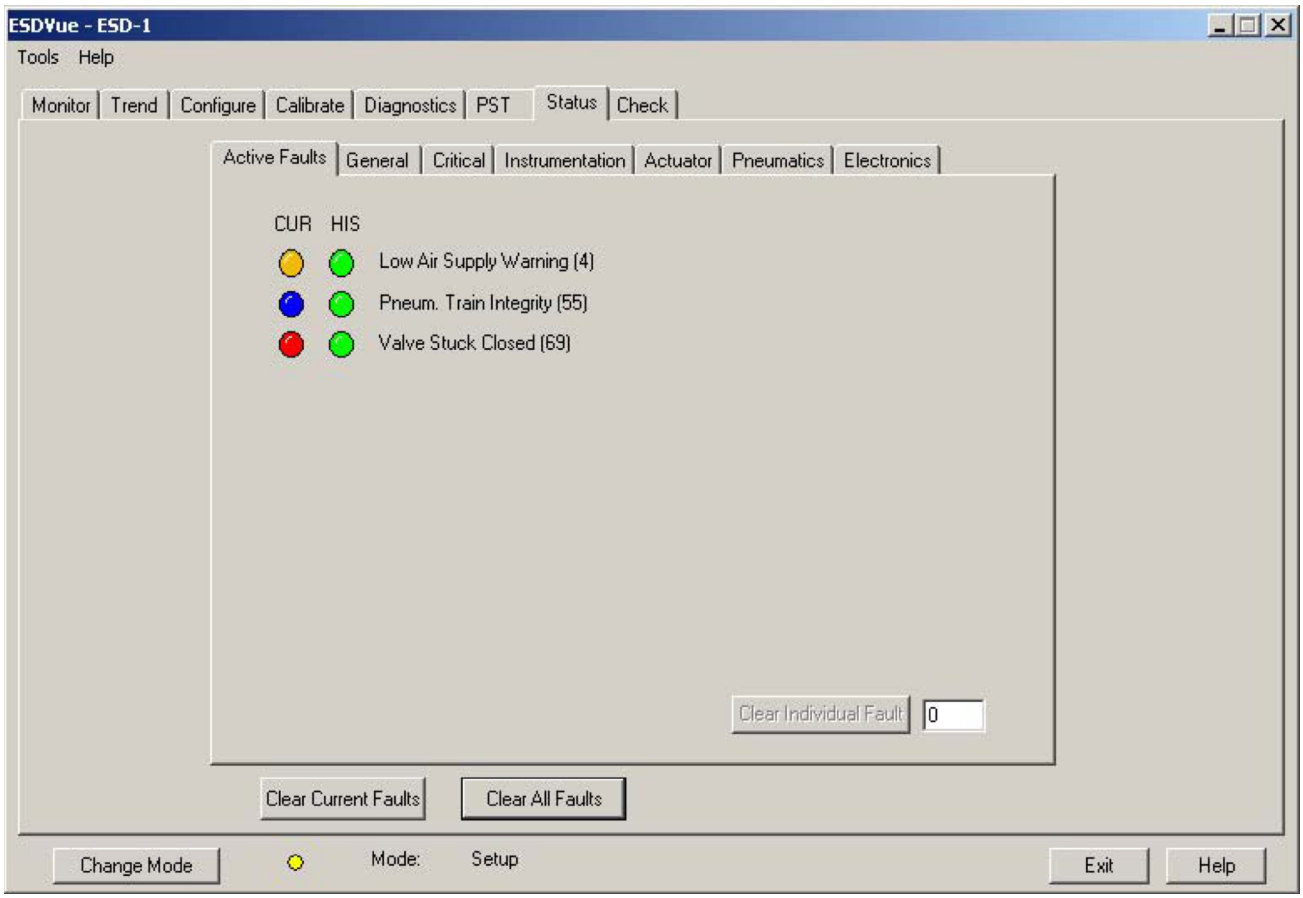


Figure 302 - Status Screen Active Faults Tab

© 2024 Baker Hughes Company. All rights reserved.

General

The *General* status tab (*Figure 303*) displays general faults that cannot be attributed to SVI II ESD components; e.g. electronics, actuator, pneumatics, electronics. General faults are often testing and data faults.

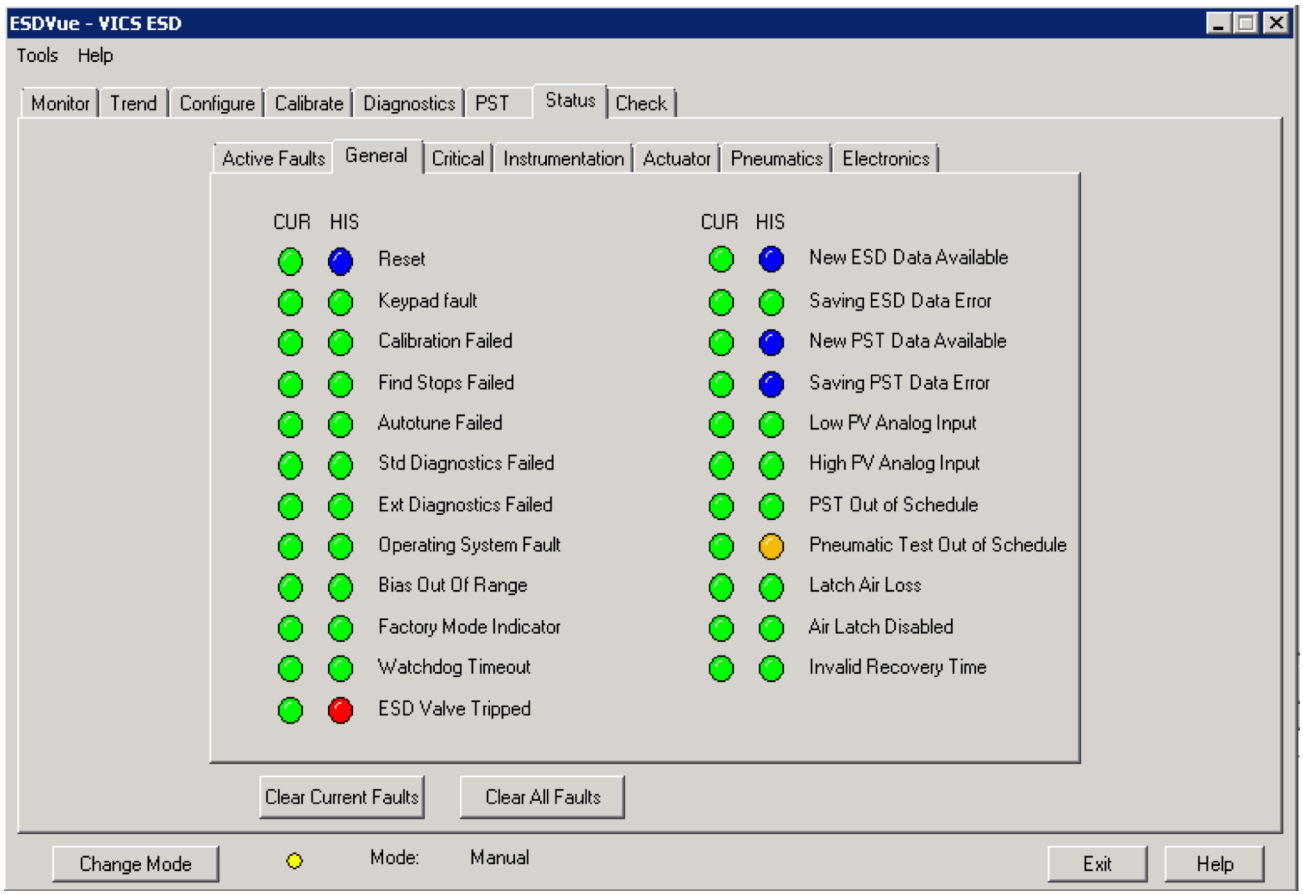


Figure 303 - Status Screen General Tab

© 2024 Baker Hughes Company. All rights reserved.

Critical

The *Critical* status tab (*Figure 304*) displays all faults that are critical to SVI II ESD operation.

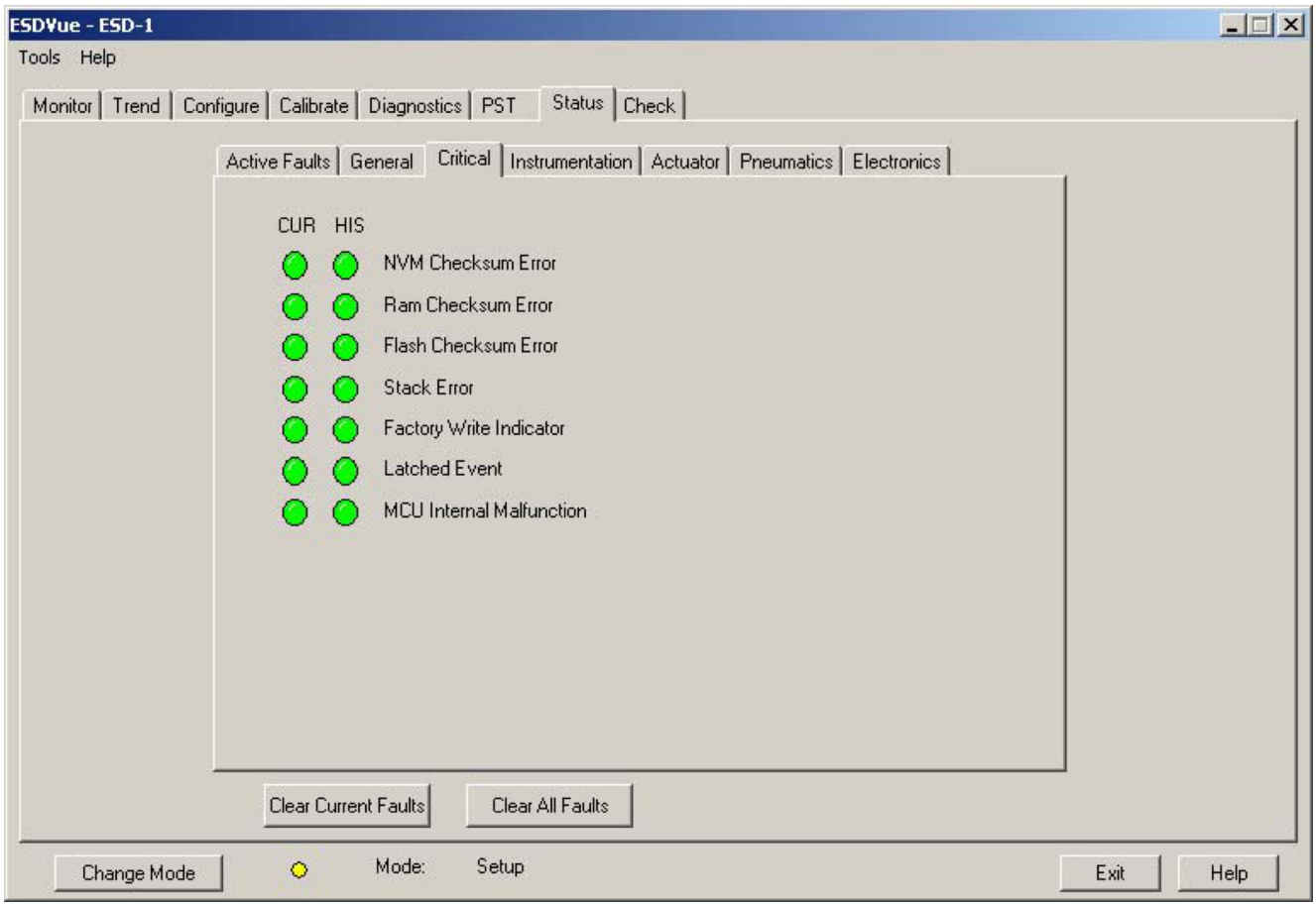


Figure 304 - Status Screen Critical Tab

© 2024 Baker Hughes Company. All rights reserved.

Instrumentation

The *Instrumentation* status tab (*Figure 305*) displays all faults related to instrumentation other than the actuator, pneumatics or electronics.

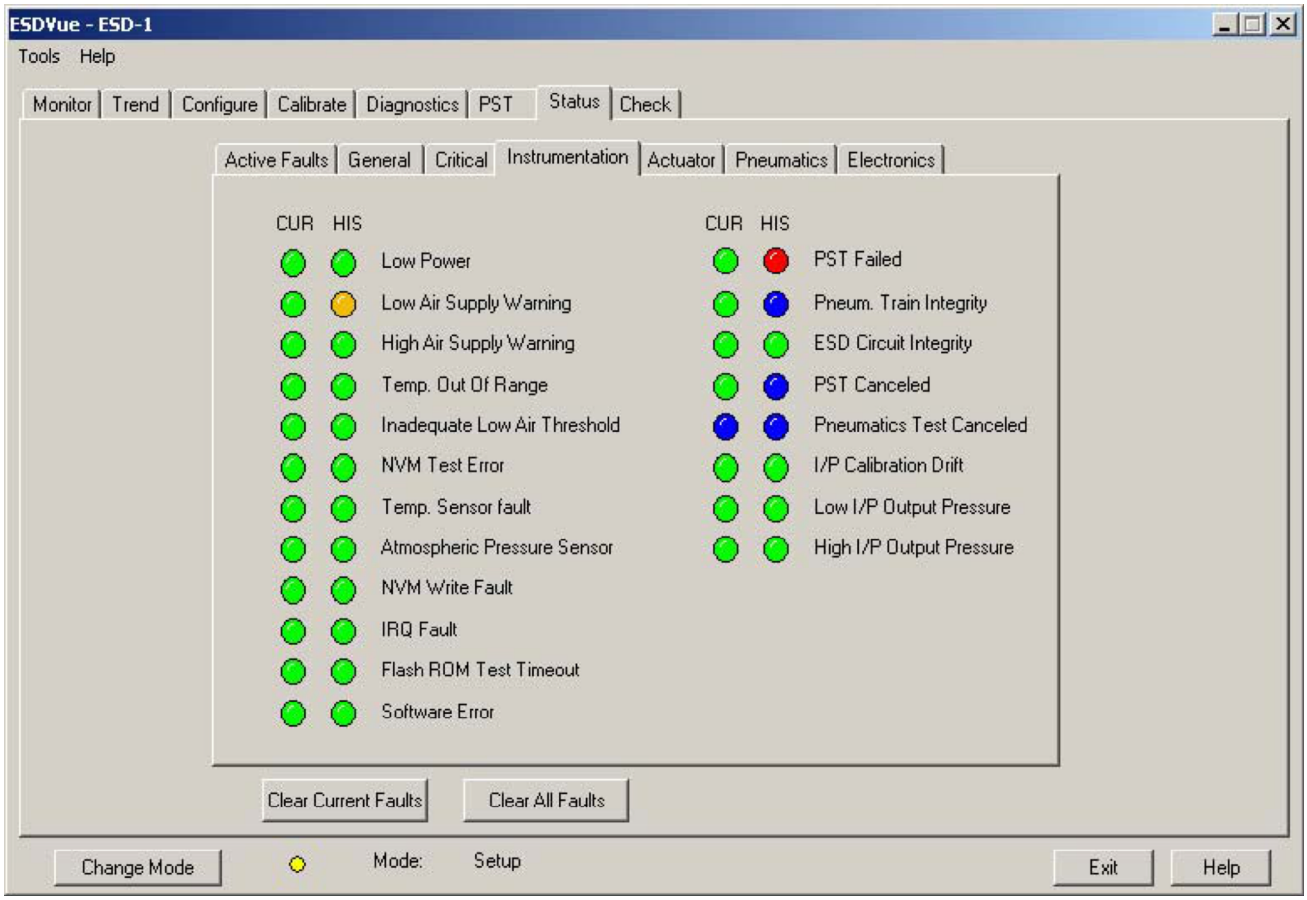


Figure 305 - Status Screen Instrumentation Tab

© 2024 Baker Hughes Company. All rights reserved.

Actuator

The *Actuator* status tab (*Figure 306*) displays all faults related to the actuator on which the SVI II ESD is mounted.

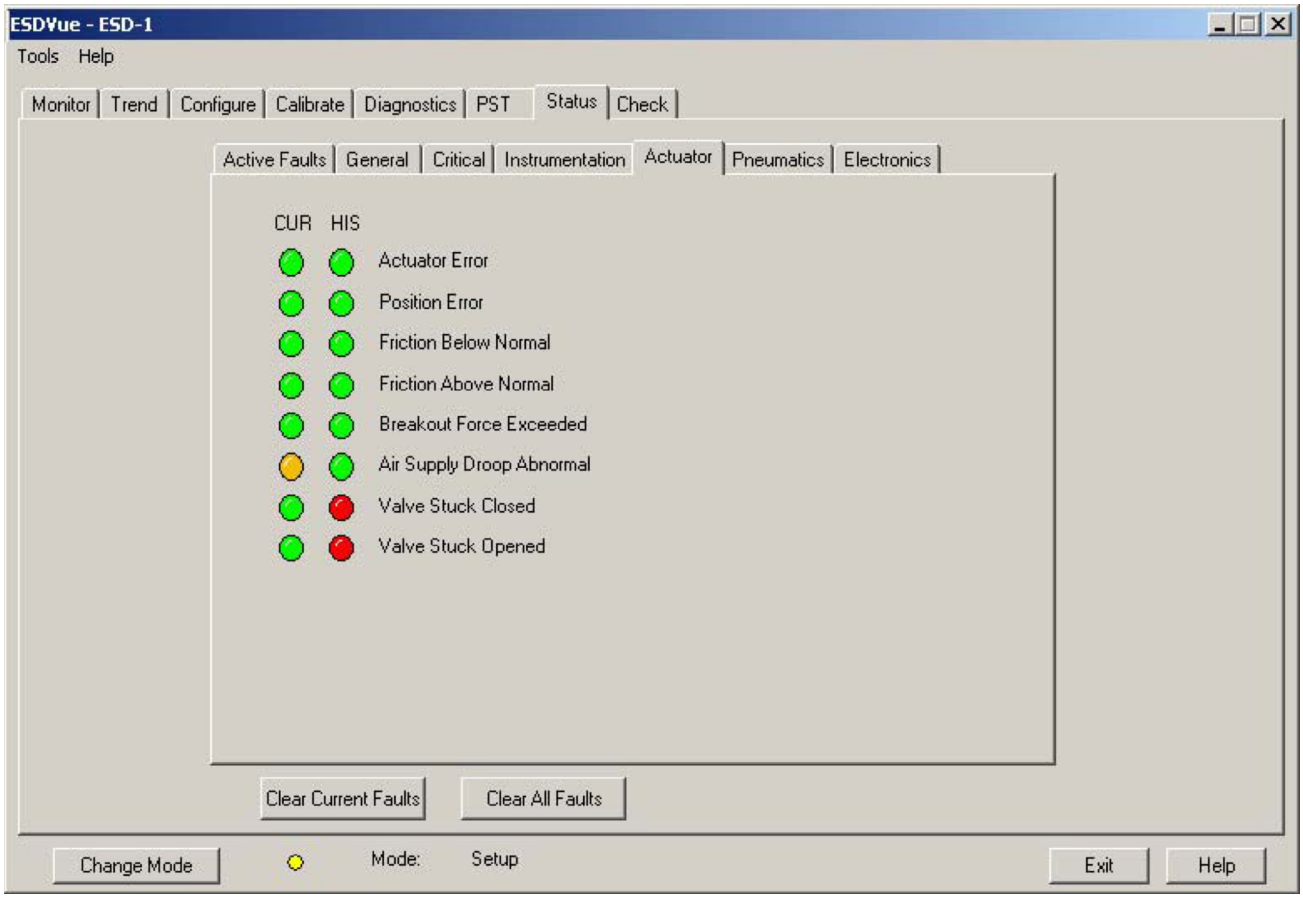


Figure 306 - Status Screen Actuator Tab

© 2024 Baker Hughes Company. All rights reserved.

Pneumatics

The *Pneumatics* status tab (*Figure 307*) displays all faults related to SVI II ESD pneumatics.

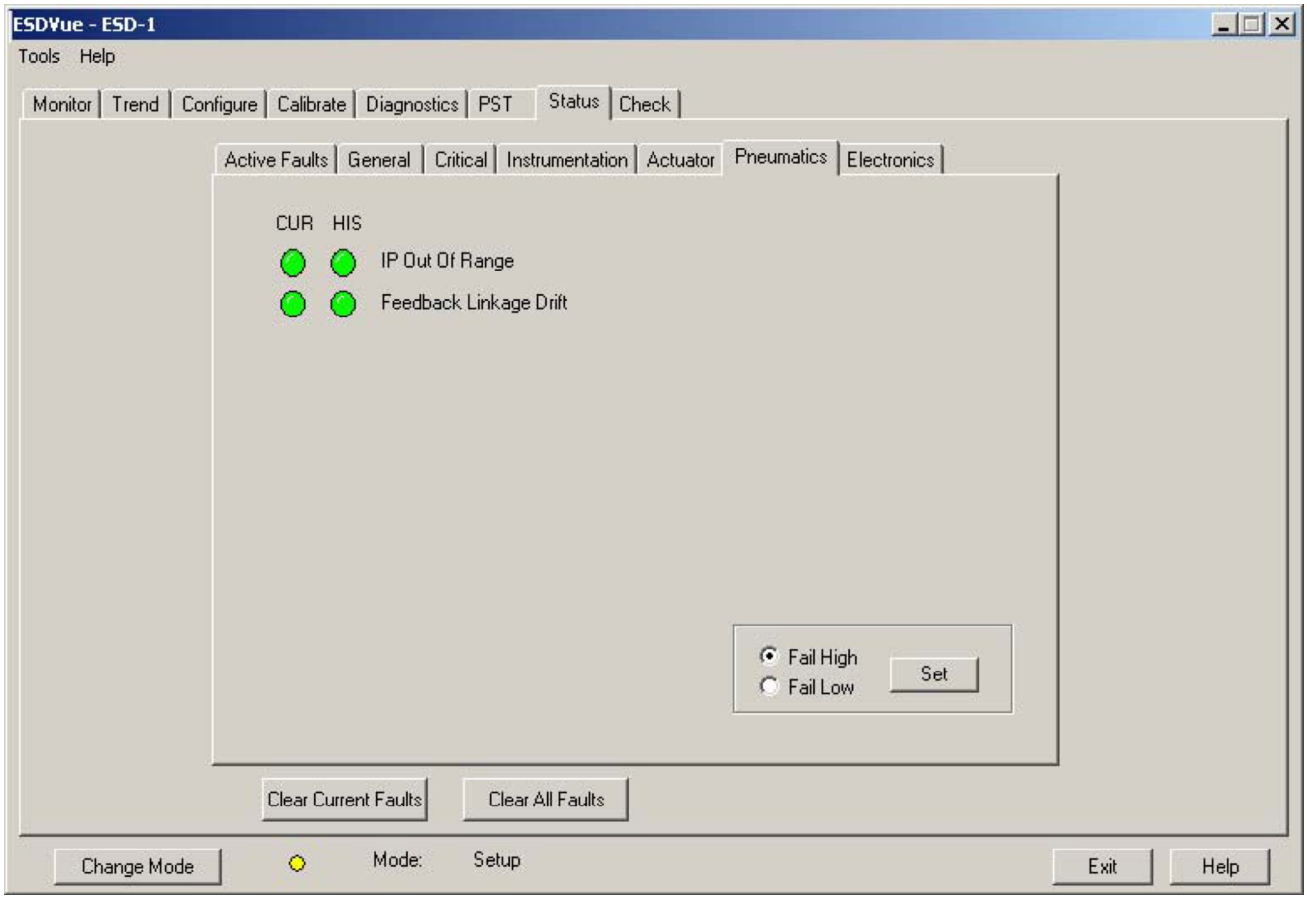


Figure 307 - Status Screen Pneumatics Tab

© 2024 Baker Hughes Company. All rights reserved.

Electronics

The *Electronics* status tab (*Figure 308*) displays all faults related to the SVI II ESD electronics.

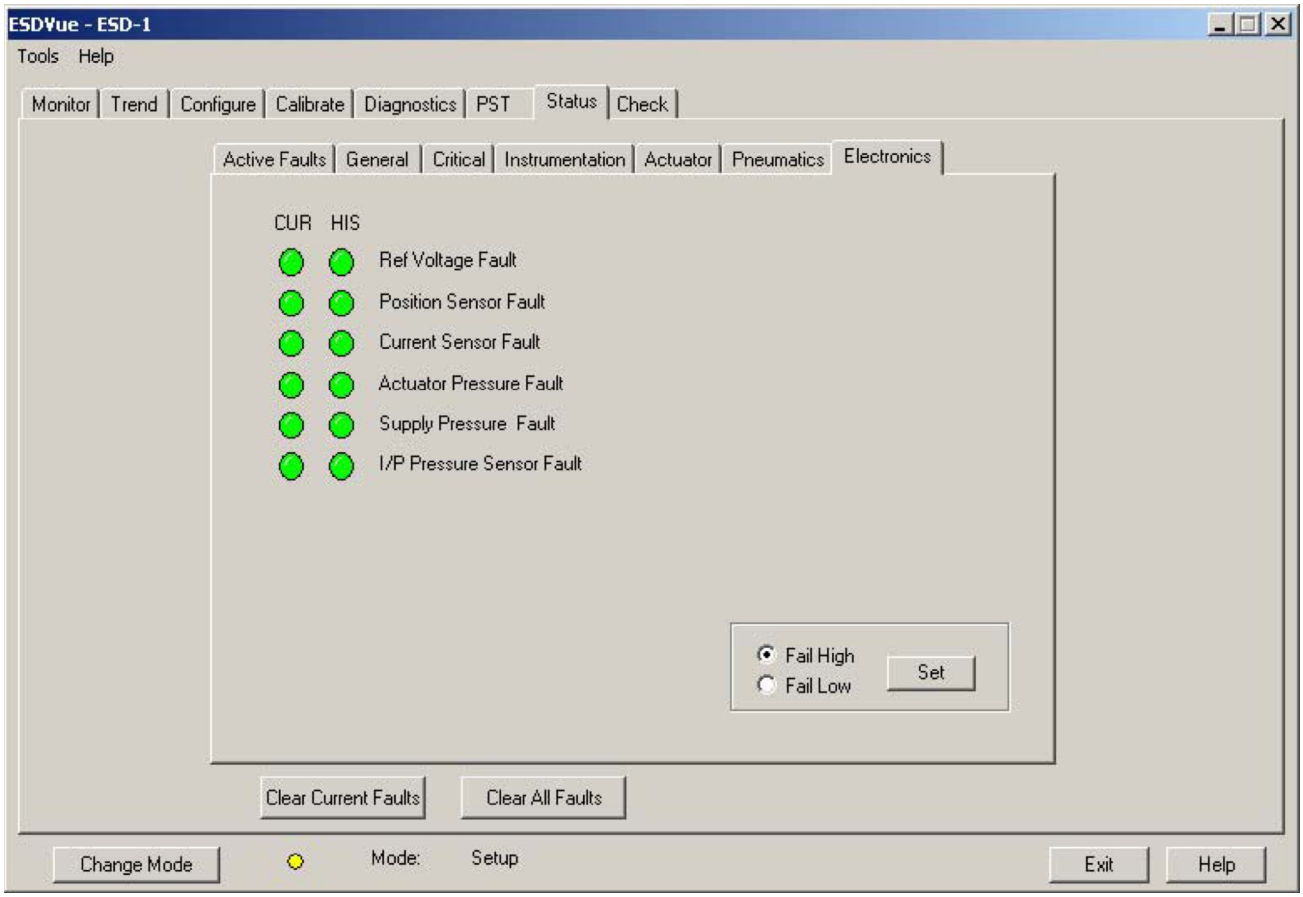


Figure 308 - Status Screen Electronics Tab

© 2024 Baker Hughes Company. All rights reserved.

Clear Current Faults

When you click **Clear Current Faults** ESDVue resets the status in the SVI II ESD 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 309*).

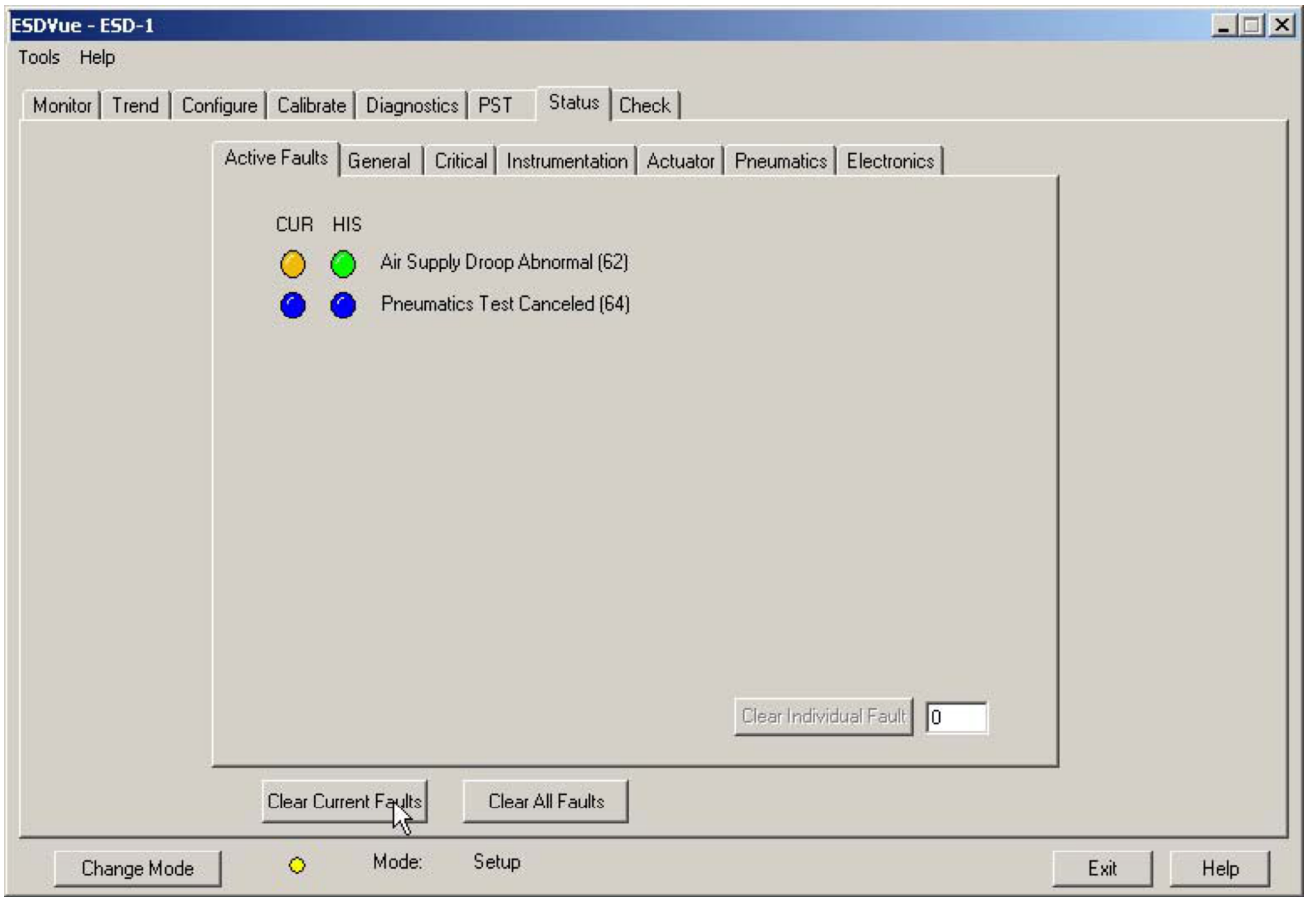


Figure 309 - Executing Clear Current Faults

There should be no faults listed (*Figure 310*) as current on any tab or in the *Active Faults* column of *FaultCodes (Hex)*.

© 2024 Baker Hughes Company. All rights reserved.

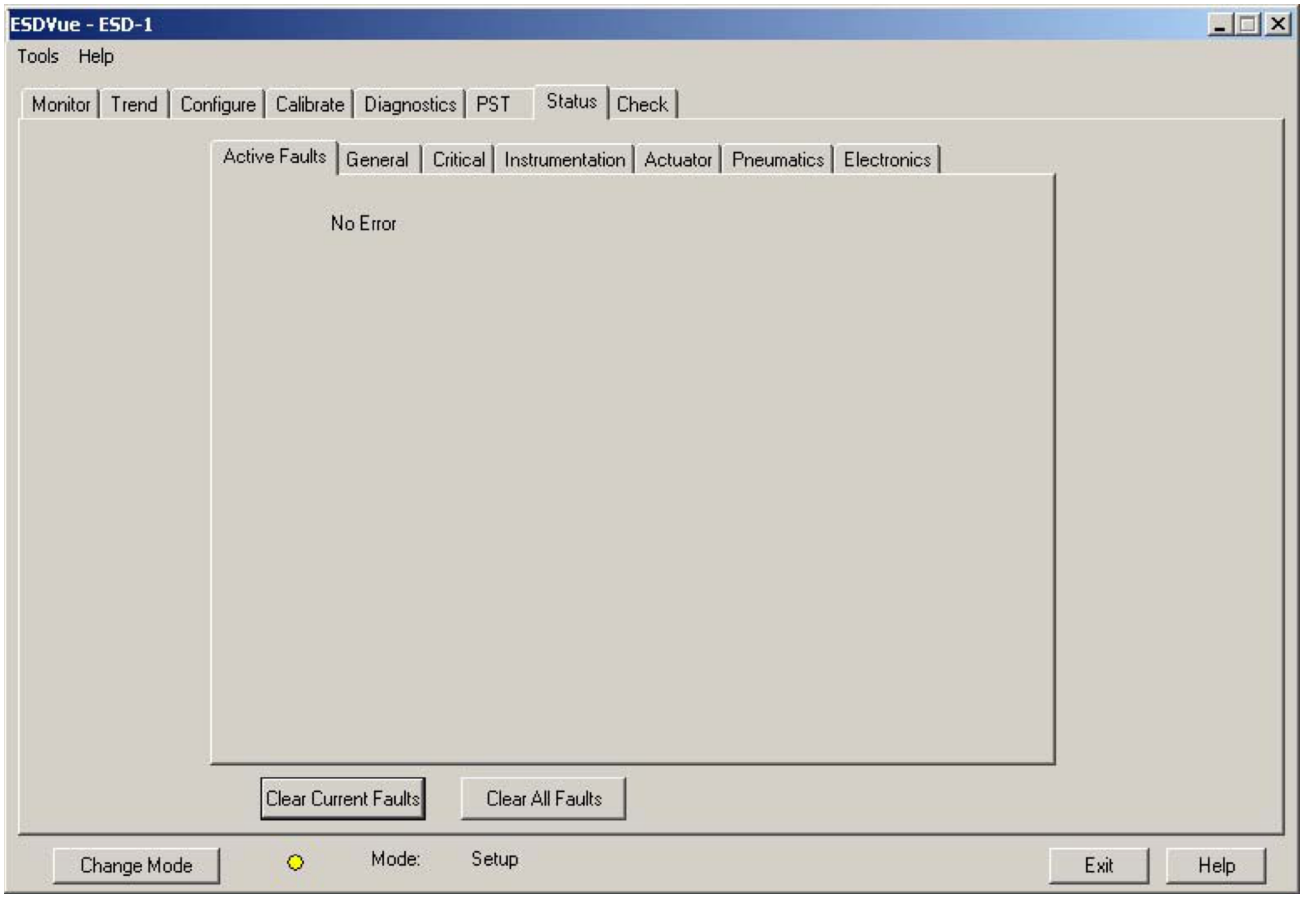


Figure 310 - Current Faults Cleared

© 2024 Baker Hughes Company. All rights reserved.

Clear All Faults

When you click **Clear All Faults** ESDVue resets the status bit in the SVI II ESD 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 311*).

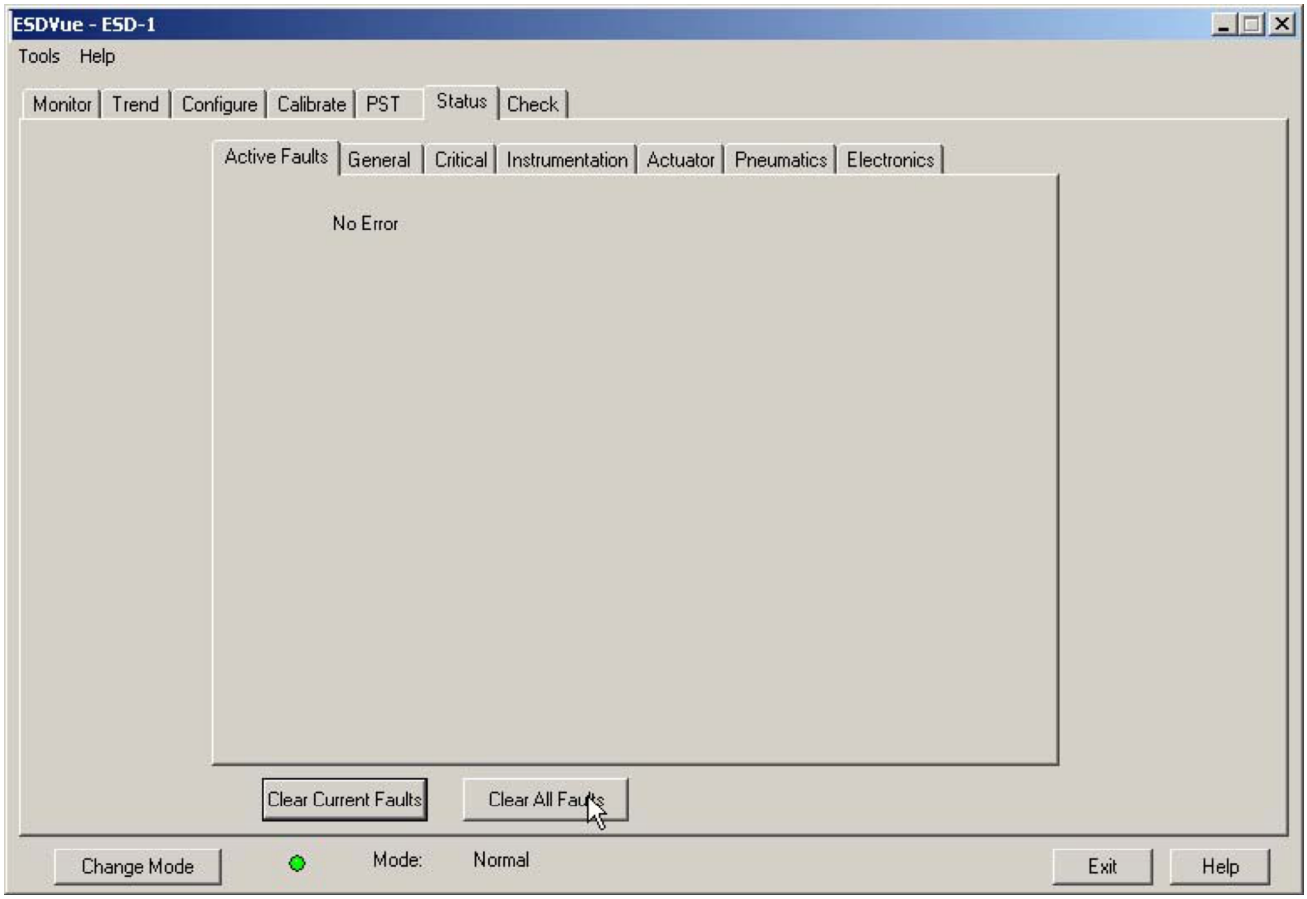


Figure 311 - Executing Clearing All Faults

© 2024 Baker Hughes Company. All rights reserved.

There should be no faults listed as current on any tab (*Figure 312*).

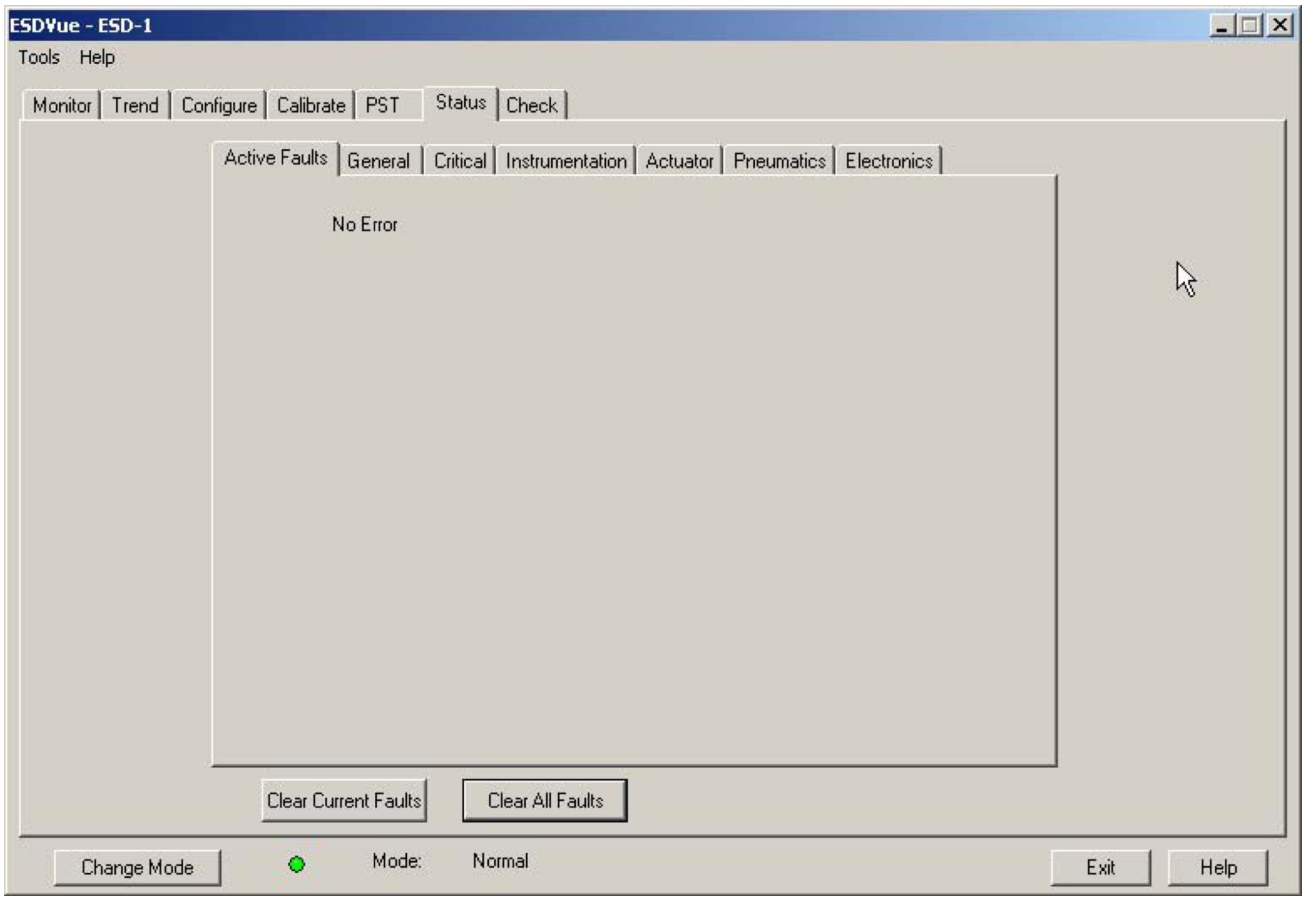


Figure 312 - All Faults Cleared

© 2024 Baker Hughes Company. All rights reserved.

Clear Individual Fault

Use the *Status* screen 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 313*).

To clear an individual fault:

1. Edit the *Clear Individual Fault*.field HART® fault number (*Figure 313*).

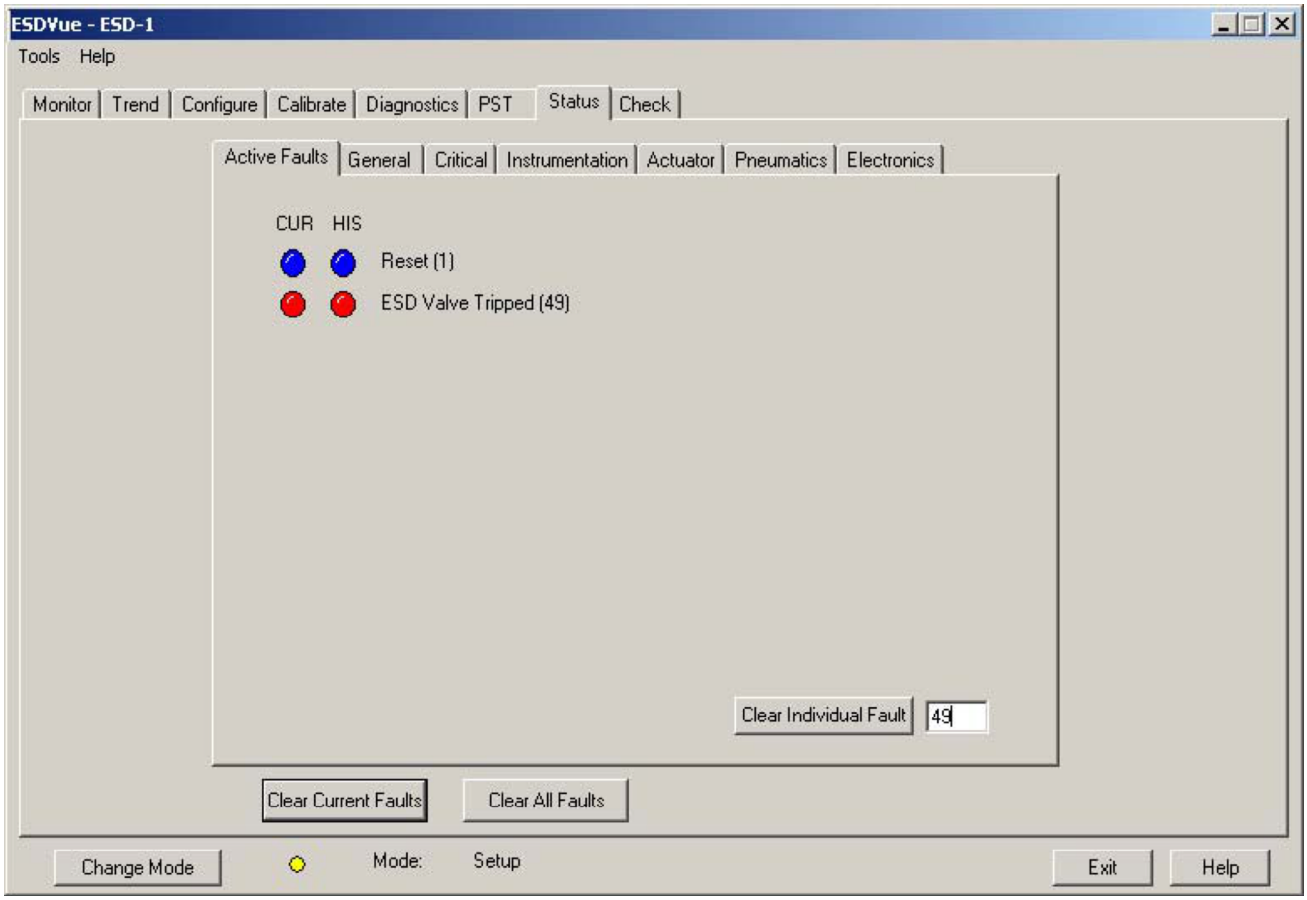


Figure 313 - Entering an Individual Fault

© 2024 Baker Hughes Company. All rights reserved.

2. Click **Clear Individual Fault** (*Figure 314*).

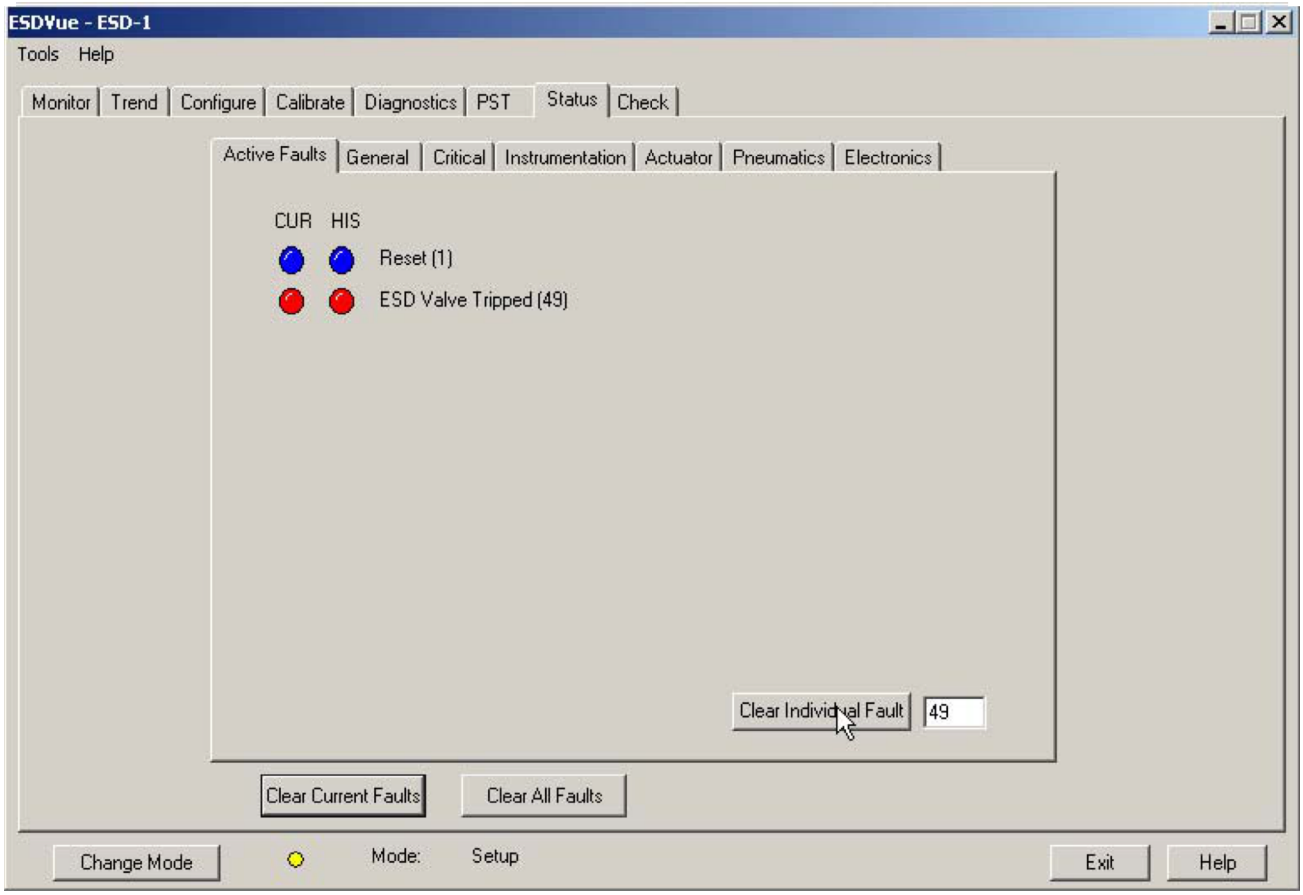


Figure 314 - Clearing an Individual Fault

© 2024 Baker Hughes Company. All rights reserved.

The selected fault is cleared from the *Active Faults* list and the *Clear Individual Fault* button returns to an inactive state (Figure 315).

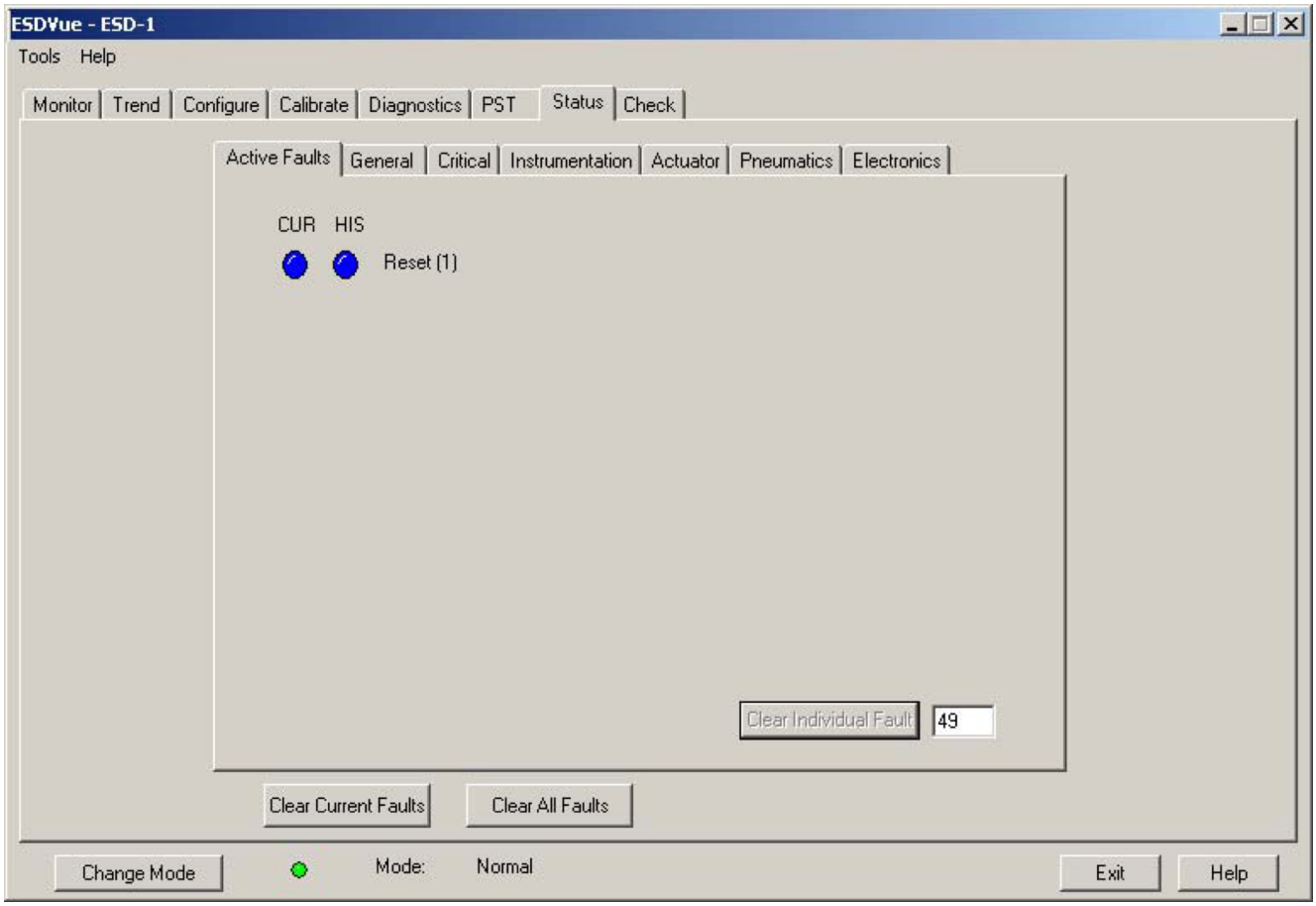


Figure 315 - Individual Fault Cleared

Set Fail High/Low

On the *Pneumatics and Electronics* tab on the *Status* screen you can set whether pneumatics, actuator, or electronics testing fail at a predefined high or low level. To change this setting you must be in *Setup* mode (*"Change Mode"* on page 81) and click on the correct radio button: **Fail High** or **Fail Low**.

Status Fault Code List

The *Status* screen displays all faults as bytes in the HART® Device Status Command. *Table 11* lists all Bytes and their correlating fault bits in the HART® Device Status Command.

© 2024 Baker Hughes Company. All rights reserved.

Fault Matrix

Table 11 lists and describes faults detected by SVI II ESD and provides information to help determine the fault cause and corrective action.

Table 11 - SVI II ESD Fault Matrix

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
1	0	0	RESET	3	No	Yes	No	Reset	Device reboot. The power recovered. Incoming signal was below 2.9mA.	Reset the flag using ValVue ESD or HART® Host
2	0	1	LOW_ POWER	3	Yes, when Input current > 3.25 mA	No	No	Low Power	Device power is below 3.2mA.	Increase mA only if calibration or diagnostics are to be performed.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
3	0	2	ACTUATOR	2	Yes if the condition is resolved	Yes	No	Actuator Error	1. Air supply is insufficient. 2. Handwheel or mechanical stop present. 3. Valve stuck of sticking excessively. 4. Unbalance forces on valve trim exceeds actuator capability.	1. Increase air supply above spring final value + 10 psig. 2. Verify if mechanical stop is present. 3. Perform valve signature using ValVue ESD. 4. If possible, perform valve signature under process conditions. Validate sizing of actuator against pro-cess condition using ValSpeQ.
4	0	3	AIR_ SUPPLY_ LOW	2	Yes if the condition is resolved	Yes	No	Air Supply Low	1- Air supply is not turned on or is set below 10psig.	1. Increase air supply above spring final value + 10 psig.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
5	0	4	POSITION_ ERROR	2	Yes if the condition is resolved	Yes	No	Position Error	1. Pst Controller is slow to follow command signal due to physical valve wear, such as tight packing, stem build-up, throttling surface friction or actuator friction. 2. Valve is slow to follow command signal due to large volume actuator. 3. Valve will not follow command signal due to insufficient or no air supply. 4. Valve does not move because the device's mode is not set to Normal. 5. Valve will not follow command signal due to poor PST controller tuning for current valve status.	1. Perform valve signature using ValVue ESD. 2. Perform step test signature using ValVue ESD. Verify that air supply droop during filling is less than 15% or the set pressure. 3. Validate that the air supply set to the instrument is greater that the spring final + 10 psig. 4. Set the mode to Nor-mal using ValVue ESD or HART® Host. 5. Perform Autotune or Manual tuning using ValVue ESD or HART® Host.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
									6. Valve will not follow command signal due to PST controller malfunction such as I/P or Relay. 7. Valve will not follow command signal due to in-line obstruction.	6. Verify if Bias Out Range or I/P Out of Range events are active. 7. Perform valve signature using ValVue ESD.
6	0	5	Undefined (reserved)	2	N/A	N/A	No	Reserved (0-5)		
7	0	6	KEYPAD FAILED	2			No	Keypad Fault	1. The local pushbutton and display is defective.	1. Replace the pushbutton and display assembly.
8	0	7	MARGIN-AL_ POWER	2			No	Marginal Power	1. The input current is less than 3.85mA.	1. Increase loop current to 4mA only if calibration and diagnostics are to be performed.
9	1	0	CALIBRA-TION_ FAILED	3	No	Yes	No	Calibration Failed	1. Calibration of the input sensors was outside the acceptable range when attempting to calibrate.	1. Using precision measuring equipment, perform calibration according to boundary limits of input sensors.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
10	1	1	FIND_ STOPS_ FAILED	3	Yes, If the “find stops” process completes success-fully	Yes	No	Find Stops Failed	1. When calibrating stops (Zero / Span) the travel sen-sor moved outside the acceptable limits 2. A procedure timeout occurred due to an extremely large volume of actuator to displace. 3. Valve position could not stabilize when de-energizing or when energizing the actuator.	1. Using ValVue ESD or HART® Host, verify that travel sensor counts is 0 +/- 1000 with the valve closed. For a 90° valve, measured sensor count is done at 50% travel. 2. Using ValVue ESD or HART® Host, perform a Manual Stop calibration. 3. Verify that air supply is adequate. Verify that accessories (boosters, quick-exhausts, etc.) are not creating instability.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
11	1	2	AUTO-TUNE_ FAILED	3	Yes, If the “autotune” completes success-fully	Yes	No	Autotune Failed	1. When performing an Autotune, procedure failed to complete due valve hysteresis beyond 50%. 2. Air supply is insufficient. 3. Air supply droops significantly during actuator filling.	1. Using ValVue ESD or HART® Host, perform an Autotune with an aggressiveness 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 5-10% steps and observe air supply gauge on the PST controller.
12	1	3	STD_DIAG-NOSTICS_ FAILED	3	Yes, If the diagnotics completes success-fully	Yes	No	Std Diagnostics Failed	1. When running a Standard Actuator Signature, the device failed to move the valve between 10% - 90%.	1. Selected speed is too slow. Increase speed for the test by increments of 1. 2. Insufficient Air supply.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
13	1	4	EXT_DIAG-NOSTICS_ FAILED	3	Yes, If the diagnotics completes success-fully	Yes	No	Ext Diagnostics Failed	1. When running a Extended Actuator Sig-nature, device failed to move the valve between the configured travel.	1. Selected speed is too slow. Increase the speed for the test by increments of 1. 2. Insufficient Air supply.
14	1	5	OS_ ERROR	2	No	Yes	No	Operating System Fault	1. The micro-controller failed an operation.	1. Notify factory at svisupport@ bakerhughes.com
15	1	6	Undefined (reserved)	1	Yes	Yes	No	Reserved (1-6)	n/a	NOT IMPLEMENTED
16	1	7	Undefined (reserved)	2				Reserved (1-7)	n/a	NOT IMPLEMENTED
17	2	0	BIAS_ OUT_OF_ RANGE	1	No	Yes	No	Bias Out Of Range	1. The servo signal to the current-to-pres-sure converter is outside of normal throttling range.	
18	2	1	IP_OUT_ OF_RANGE	1	No	Yes	No	I/P Out Of Range	1. The loop current to the internal cur-rent-to-pres-sure converter is outside of normal range.	

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
19	2	2	TEMPR_ OUT_OF_ RANGE	2	Yes	Yes	No	Temp. Out Of Range	The board temperature is below -40 °C or above 85 °C.	NOT IMPLEMENTED
20	2	3	Undefined (reserved)	3	n/a	n/a		Reserved (2-3)	n/a	NOT IMPLEMENTED
21	2	4	Undefined (reserved)	3	N/A	N/A	N/A	Reserved (2-4)	n/a	NOT IMPLEMENTED
22	2	5	Undefined (reserved)	3	N/A	N/A	N/A	Reserved (2-5)	n/a	NOT IMPLEMENTED
23	2	6	Undefined (reserved)	3	N/A	N/A	N/A	Reserved (2-6)	n/a	NOT IMPLEMENTED
24	2	7	Undefined (reserved)	3	N/A	N/A	N/A	Reserved (2-7)	n/a	NOT IMPLEMENTED
25	3	0	NVM_ CHECK-SUM	1	No	No	No	NVM Check-sum Error	1. A permanent corruption of the content in non-volatile memory occurred.	1. Remove power to the device for 2 minutes and restart the device. 2. If the failure persist, replace the device.
26	3	1	RAM_ CHECK-SUM	2	No	Yes	No	RAM Check-sum Error	1. A corruption of the content in volatile memory occurred.	1. Notify factory at svisupport@ bakerhughes. com.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
27	3	2	FW_ CHECK-SUM	1	No	No	No	Flash Check-sum Error	1. Invalid firmware checksum due to data corruption.	1. Remove power to the device for 2 minutes and restart it. 2. If the failure persists, Replace device.
28	3	3	STACK	2	No	Yes	No	Stack Error	1. A problem with the memory stack occurred.	1. Clear the condition using ValVue ESD or HART®Host.
29	3	4	FACTORY-MODE	1	No	Yes	No	Factory Mode Fault	1. Device is in the factory mode. This fault is not normally seen by end users. Investigate as to how Factory Mode was engaged.	1. Clear the condition using HART®Host. Cannot be cleared using ValVue ESD.
30	3	5	NVM_TEST	2	No	Yes	No	NVM Test Error	1. A problem occurred when testing non-volatile memory.	1. Clear the condition using ValVue ESD or HART® Host.
31	3	6	Undefined (reserved)	1	n/a	Yes	Yes	Reserved (3-6)	n/a	n/a
32	3	7	Undefined (reserved)	3	n/a			Reserved (3-7)	n/a	n/a

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
33	4	0	REF_ VOLTAGE	1	No	Yes	No	Ref Voltage Fault	1. A component problem is affecting the circuit board's reference voltage.	1. Replace the device and report problem at svisupport@ bakerhughes. com.
34	4	1	POSITION_ SENSOR	1	No	Yes	No	Position Sensor Fault	1. Electronic hall sensor component and related components failed.	1. Replace device and report problem at svisupport@ bakerhughes. com.
35	4	2	CURRENT_ SENSOR	1	No	Yes	No	Current Sensor Fault	1. Electronic input loop current sensor is damaged.	1. Replace device and report problem at svisupport@ bakerhughes. com.
36	4	3	TEMPERA-TURE_ SENSOR	1	No	Yes	No	Temperature Sensor Fault	1- Electronic tem-perature sensor is damaged.	1. Replace device and report problem at svisupport@ bakerhughes. com.
37	4	4	2ND_ CURRENT_ SENSOR	2	No	Yes	No	Current Sensor Fault Reserved	1- Secondary input current sensor is damaged.	1. Replace device and report problem at svisupport@ bakerhughes. com.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
38	4	5	PRES-SURE1	1	No	Yes	No	Actuator Pressure 1 Fault	1. Pressure sensor #1 has been over-pressurized and damaged. 2. Pressure sensor #1 has failed due to some malfunction.	1. Replace device and report problem at svisupport@bakerhughes.com.
39	4	6	PRES-SURE2	1	No	Yes	No	Actuator Pressure 2 Fault	1. Pressure sensor #2 has been over-pressurized and damaged. 2. Pressure sensor #2 has failed due to some malfunction.	1. Replace device and report problem at svisupport@bakerhughes.com.
40	4	7	PRES-SURE3	1	No	Yes	No	Supply Pressure Sensor Fault	1. Pressure sensor #3 has been over-pressurized and damaged. 2. Pressure sensor #3 has failed due to some malfunction.	1. Replace device and report problem at svisupport@bakerhughes.com.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
41	5	0	PRES-SURE4	1	No	Yes	No	I/P Pressure Sensor Fault	1. Pressure sensor #4 has been over-pressurized and damaged. 2. Pressure sensor #4 has failed due to some malfunction.	1. Replace device and report problem at svisupport@bakerhughes.com.
42	5	1	PRES-SURE5	2	No	Yes	No	Atmospheric Pressure Sensor Fault	1. A component problem is affecting circuit board's reference voltage.	1. Replace device and report problem at svisupport@bakerhughes.com.
43	5	2	WATCH-DOG_-TIMEOUT	2			No	Reserved (5-2)	n/a	NOT IMPLEMENTED
44	5	3	NVM_ WRITE	2	No	Yes	No	NVM Write Fault	1. An error occurred when attempting to write to non-volatile memory.	1. Clear the condition using ValVue ESD or HART® Host. 2. If condition persists, replace device and report problem at svisupport@bakerhughes.com.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
45	5	4	IRQ_FAULT	2	No	Yes	No	IRQ Fault	1. The circuit board interrupt request failed.	1. Clear the condition using ValVue ESD or HART® Host. 2. If condition persists, replace device and report the problem at svisupport@bakerhughes.com.
46	5	5	Undefined (reserved)	2	n/a	n/a	n/a	n/a	n/a	NOT IMPLEMENTED
47	5	6	SELF_CHECK	1	No	Yes	No	Self Check Error	1. A general self check failed.	1. Clear the condition using ValVue ESD or HART® Host. 2. If condition persists, replace device and report problem at svisupport@bakerhughes.com.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
48	5	7	SOFT-WARE	2	No	Yes	No	Software Error	Operating system failed in conducting a task.	1. Clear the condition using ValVue ESD or HART® Host. 2. If condition persists, replace device and report problem at svisupport@bakerhughes.com.
49	6	0	ESD_TRIP (_ACTIVE)	1	Yes	No	No	ESD Valve Tripped	SVI II ESD successfully de-energized its pneumatic output.	None. This is a status to confirm that SVI II ESD successfully de-energized its output.
50	6	1	ESD_NEW_ DATA	3	No	No	Yes	New ESD Data available	A shutdown event is stored in memory and has not yet been archived by ValVue ESD.	Connect Val-Vue ESD and wait for flag to self-clear. This will indicate that ValVue ESD successfully archived signature in its database.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
51	6	2	ESD_ DATA_ ERROR	3	Yes	Yes	No	Saving ESD data error	Upon a safety trip (shut-down), a problem occurred when storing event in memory.	1. Clear the condition using ValVue ESD or HART® Host. 2. If condition persists, replace device and report problem at svisupport@bakerhughes.com.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
52	6	3	PST_ FAILED	1	Yes	Yes	Yes	PST Failed	PST could not complete successfully because of: 1. Problem venting 2. PST pres-sure value was reached before target travel 3. PST Time value was reached before target travel 4. An ESD event happened during PST.	1. Verify that vent is not clogged up. Verify that there are no Pneumatic Train Integrity Alarm present. 2. Confirm that PST pres-sure setting is not too high. Run an extended signature to confirm proper PST Pressure for desired travel target. 3. Verify that vent is not partially clogged or that an accessory is not restricting air exhaust. Increase setting based on PST Travel Rate and PST travel. 4. None

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
53	6	4	PST_NEW_DATA	3	No	No	Yes	PST New Data	A PST Test is stored in memory and has not yet been archived by ValVue ESD.	Connect ValVue ESD and wait for the flag to self-clear. This will indicate that ValVue ESD successfully archived signature in its database.
54	6	5	PST_DATA_ERROR	3	Yes	Yes	No	Saving PST Error	Upon completion of a PST, a problem occurred when storing event in memory.	1. Clear the condition using ValVue ESD or HART® Host. 2. If condition persists, replace device and report problem at svisupport@bakerhughes.com.
55	6	6	PNEUMA-IC_TRAIN	1	Yes	No	Yes	Pneum. Train Integrity	1. The hourly test detected an unhealthy I/P. 2. The hourly test detected an unhealthy pneumatic relay. 3. The hourly test detected a prob-lem in venting.	1,2. Re-run the test from ValVue ESD (Pneu-matic Self Test button). If alarm persists contact the factory. 3. Verify vent condition.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
56	6	7	TERMI-NAL_ BOARD_ DIAG	2	Yes	No	Yes	ESD Circuit Integrity	The hourly diag-nostic detected a possible problem with the internal shut-down circuit.	Rerun Pneumatic Self Test test. If situation persists, the unit must be replaced.
57	7	0	AI_PV_ LOW	2	Yes	Yes	No	Low PV Analog Input	n/a	Not Implemented
58	7	1	AI_PV_ HIGH	2	Yes	Yes	No	High PV Analog Input	n/a	Not Implemented
59	7	2	FRICTION_ LOW	1	Yes	Yes	Yes	Friction Below Normal	The friction measured from the PST test is below the configured thresh-old.	1. Verify proper set-ting of threshold. 2. Valve shaft maybe broken and not engaging the ball / plug.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
60	7	3	FRICTION_ HIGH	1	Yes	Yes	Yes	Friction Above Normal	1. The friction measured from the PST test is above the configured threshold. 2. The packing can be overtightened. 3. Possible galling on guiding surfaces.	1. Verify proper set-ting of threshold. 2. Loosen up packing gland depending on packing type / style and application. Overhaul packing box. 3. Run Extended signature and overhaul valve if condition is validated.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
61	7	4	BREAKOUT	1	Yes	Yes	Yes	Breakout Force Exceeded	1. The break-out force measured from a PST test is above configured threshold. 2. The packing gland can be overtightened. 3. Possible galling on guiding surfaces. 4. Possible weakened springs (or broken). 5. Excessive friction between ball and seat.	1. Verify proper setting of threshold. 2. Loosen up packing gland depending on packing type / style and application. Overhaul packing box. 3,4,5- Run Extended signature and overhaul valve if condition is validated.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
62	7	5	SUPPLY_ DROOP (Supply deviation)	2	Yes	Yes	Yes	Air Supply Droop Abnormal	1. The air sup-ply droop measured during a PST is above the configured threshold. 2. The filter in air filter/regulator is clogged up. 3. Air supply tubing is too small. 4. Insufficient volume of air supply manifold.	1. Verify proper setting of threshold. 2. Replace filter in the air set. 3. Increase tubing size between air set and SVI II ESD. 4. Re-size manifold.
63	7	6	SUPPLY_ LOW	3	Yes	No	Yes	Low Air Supply Warning	1. An air sup-ply loss occurred. 2. Nearby equipment draws a high volume of air. 3. The air set is adjusted less than the configured threshold.	1. Confirm that operations may be returned to normal, then turn on air supply. 2. Resize air manifold. 3. Increase air pressure to 10psig more than upper spring range and more than 30psig.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
64	7	7	SUPPLY_ HIGH	3	Yes	No	Yes	High Air Supply Warning	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.	1. Replace air filter regulator. 2. Resize air manifold. 3. Adjust threshold to be 3-5 psig greater than set air supply.
65	8	0	IP_CAL_ DRIFT	2	No	Yes	No	I/P Calibration Drift Warning	1. The current to pressure converter's flexure has been tampered with or mis-adjusted. 2. An impending failure is present in the flow regulator of the I/P.	1,2. Service required. Contact the factory.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
66	8	1	IP_SER-VO_ LOW	1	No	Yes	No	Low I/P Out-put Pressure	1. The required I/P current is too low to ensure venting of the relay. 2. The I/P flexure is pushed against the nozzle. 3. Faulty I/P flow regulator.	1,2,3. Service required. Contact the factory.
67	8	2	IP_SER-VO_ HIGH	2	No	Yes	No	High I/P Output Pressure	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. Contact the factory.
68	8	3	LINKAGE_ DRIFT	1	Yes	Yes	No	Feedback Linkage Drift	1. In the fully open or fully closed position a raw travel sensor count deviation of x% exists against the calibrated stop value.	1. Verify that linkage is well fastened. 2. Re-run the Find Stops method. When device goes in Failsafe when running the Find Stop method, clear alarm and rerun the stops.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
69	8	4	VALVE_ STUCK_ CLOSED	1	Yes	Yes	No	Valve Stuck Closed	1. A hand-wheel is left engaged. 2. Valve is seized in place. 3. Insufficient actuator thrust.	1. Verify presence of a mechanical stops such as a handwheel. 2. Repair valve. 3. Run a PST or Extended signature. If friction is abnormal then overhaul valve.
70	8	5	VALVE_ STUCK_ OPENED	1	Yes	Yes	No	Valve Stuck Opened	1. A hand-wheel 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.	1. Verify presence of a mechanical stops such as a handwheel. 2. Repair valve. 3. Verify that exhaust port is not restricted. 4. Run a Pneumatic Self Test test from ValVue ESD. A failure of the Pneumatic Self Test test would indicate a problem in venting.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
71	8	6	TMOUT_ PST_ TEST	1	Yes	Yes	No	PST Out of schedule	PST hasn't been performed within time limit.	If persists con-tact Masoneilan. Implemented for firmware 3.1.6.
72	8	7	TMOUT_ PNEU_ TEST	2	Yes	Yes	No	Pneumatic test out of schedule	Pneumatic test hasn't been performed within time limit.	If persists con-tact Masoneilan. Implemented for firmware 3.1.6.
73	9	0	LATCH_ AIR_ LOSS	2	No	No	Yes	Low Supply Pressure Latch	Latched due to Low Supply Pressure.Supply pressure below configured threshold.	Fix supply pressure. Implemented for firmware 3.1.6.

© 2024 Baker Hughes Company. All rights reserved.

Table 11 - SVI II ESD Fault Matrix (Continued)

Sequence	Byte #	Bit #	FAULT Name	Criticality of Alarm	Auto-matically cleared	Can be cleared	Persists across resets	TEXT For DD & ValVue ESD2 English	Probable Cause English	Recommended Action
74	9	1	AIR_ LATCH_ DISABLED	3	No	Yes	No	Air Latch HW Malfunction	Cannot latch due to Low Supply Pressure due to one or more of the position or pressure sensors faults. Airloss Latching disabled due to faulty sensor(s)	If persists contact Masoneilan. Implemented for firmware 3.1.6.
75	9	2	AIR_ LATCH_ DELAY	3	Yes	No	Yes	No Rec. Delay Specified	Cannot latch because Air Latch Delay was not set -- would have never recovered if latched. Airloss Latching delay is not entered. Cannot recover.	If persists contact Masoneilan. Implemented for firmware 3.1.6.

© 2024 Baker Hughes Company. All rights reserved.

Status Context Menu

The *Status* screen context menu (*Figure 316*) contains only a link to *Status* on-line help.

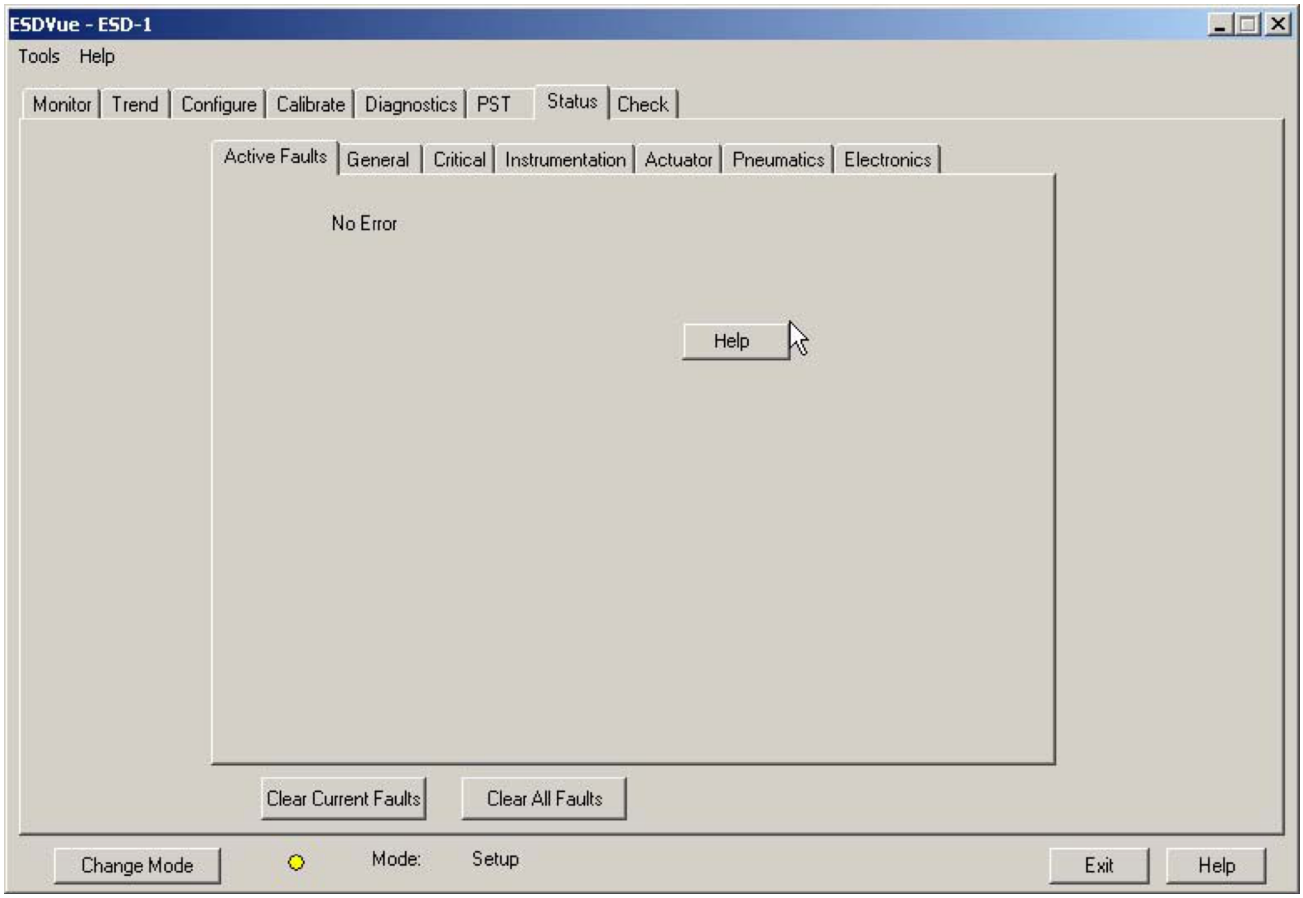


Figure 316 - Status Screen Context Menu

© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

© 2024 Baker Hughes Company. All rights reserved.

12. Check

What you can do on the Check Screen

Check screen provides a method for monitoring and adjusting some of the basic parameters. This screen is used primarily for troubleshooting.

You can:

- Send a HART® command and view the result.
- Use the *Check* screen right click menu or the *Tools* menu to set the SVI II ESD to *Full Open, Full Closed* and *Detach Trend*.To perform any action from the *Check* screen Context Menu, ESDVue must be in the *Setup* mode. (See *"Change Mode"* on page 81 for further information.)

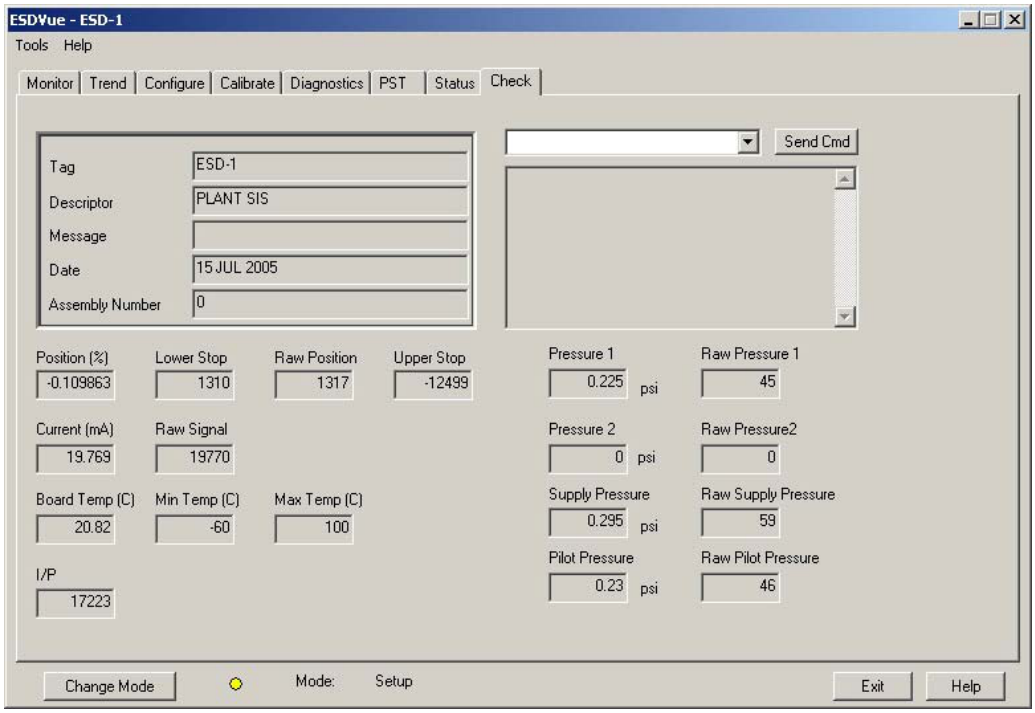


Figure 317 - Check Screen

© 2024 Baker Hughes Company. All rights reserved.

Information Displayed on the Check Screen

The *Check* screen is used for troubleshooting and displays the operating parameters of the SVI II ESD 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	The *Lower* and *Upper Stop* values are the A/D values measured from the position sensor at the full travel of the valve. The *Lower Stop* designates the lower end of the valve travel. The raw position measurement must always be between these two numbers. These numbers are useful for troubleshooting problems.
Raw Position	The A/D value measured from the pressure sensor 1. This is used for troubleshooting purposes.
Upper Stop	The *Lower* and *Upper Stop* values are the A/D values measured from the position sensor at the full travel of the valve. The *Upper Stop* designates the upper end of the valve travel. The raw position measure-ment must always be between these two numbers. These numbers are useful for troubleshooting problems.
Current (mA)	The value of the input signal in miliamps.
Raw Signal	The A/D value measured from the signal sensor. This is used for troubleshooting purposes.
Board Temp (C)	The internal SVI II ESD temperature measured in degrees Celsius. The SVI II ESD 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 SVI II ESD reports it has been operating.
Max Temp (C)	This is the maximum temperature in degrees Celsius at which the SVI II ESD reports it has been operating.
I/P	The current D/A value being sent to the I/P that controls the valve position. This value is used for troubleshooting.
Pressure 1	The SVI II ESD continuously monitors the actuator pressure. It is dis-played in the user-selected units (psi, bar, or kpa). Pressure 1 is the actuator pressure for a single acting SVI II ESD.
Raw Pressure 1	The A/D value measured from the pressure sensor 1. This is used for troubleshooting purposes.
Pressure 2	The SVI II ESD continuously monitors the actuator pressure. It is dis- played in the user-selected units (psi, bar, or kpa).
Raw Pressure 2	The A/D value measured from the pressure sensor 2. This is used for troubleshooting purposes.

© 2024 Baker Hughes Company. All rights reserved.

Supply Pressure	This is the pressure generated by the air supply.
Raw Supply Pressure	The A/D value measured from the air supply. This is used for trouble-shooting purposes.
Pilot Pressure	Pilot Pres (pressure units) is pressure generated by the I/P.
Raw Pilot Pressure	The A/D value measured from the I/P pressure sensor. This is used for troubleshooting purposes.

Send Command

One of many features available within ESDVue is the ability to easily send HART® commands to the SVI II ESD and receive visible results on the *Check* screen, in the result box below the command drop down list. For a complete list of the HART® commands see *"List of Available HART® Commands"* on page 335.

To send a HART® command:

1. Access the command drop down list by clicking on the arrow located at the right of the field (*Figure 318*).

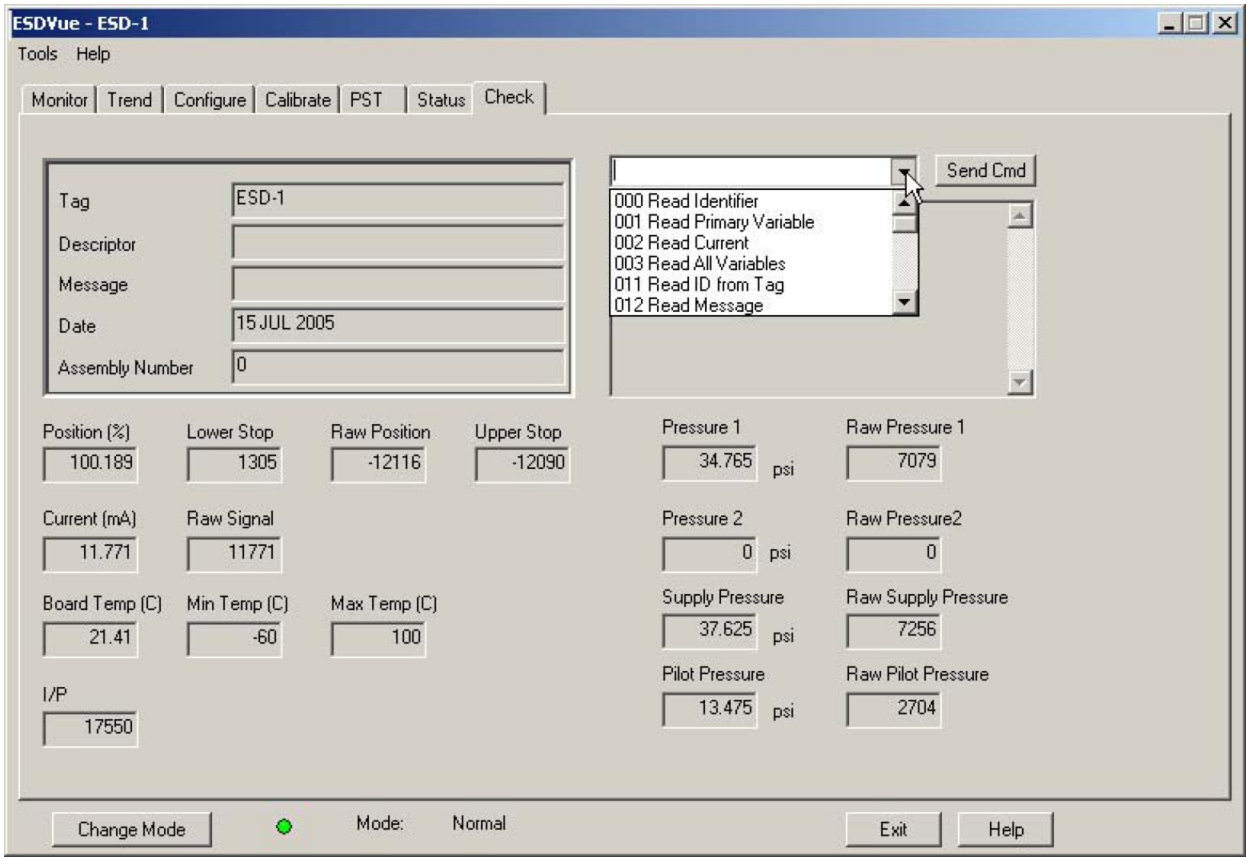


Figure 318 - Accessing HART Commands

© 2024 Baker Hughes Company. All rights reserved.

2. Scroll through and select the command for execution and click **Send Cmd** (*Figure 319*).

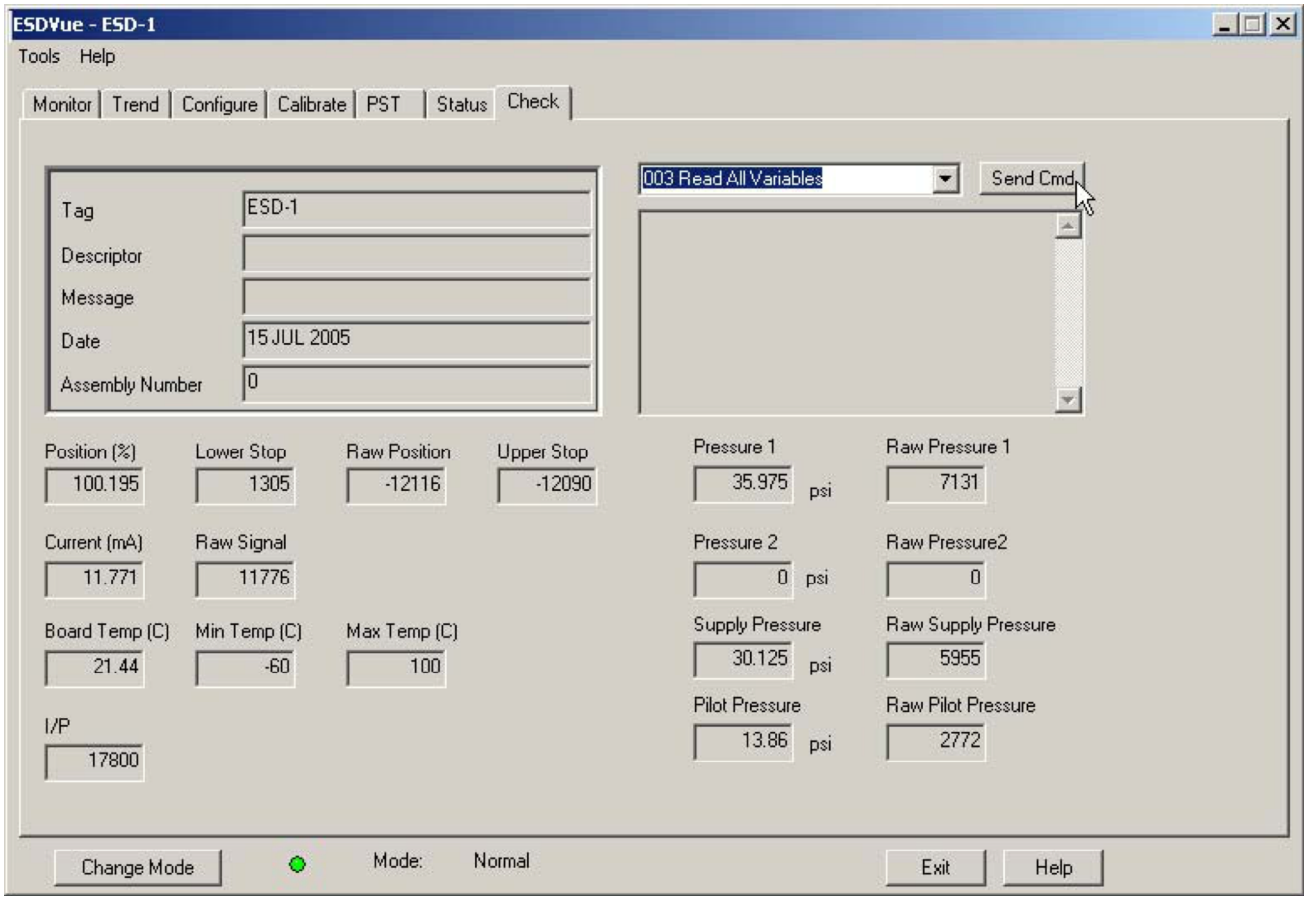


Figure 319 - Executing Send Command

© 2024 Baker Hughes Company. All rights reserved.

3. Read the results in the *Result Display* (*Figure 320*).

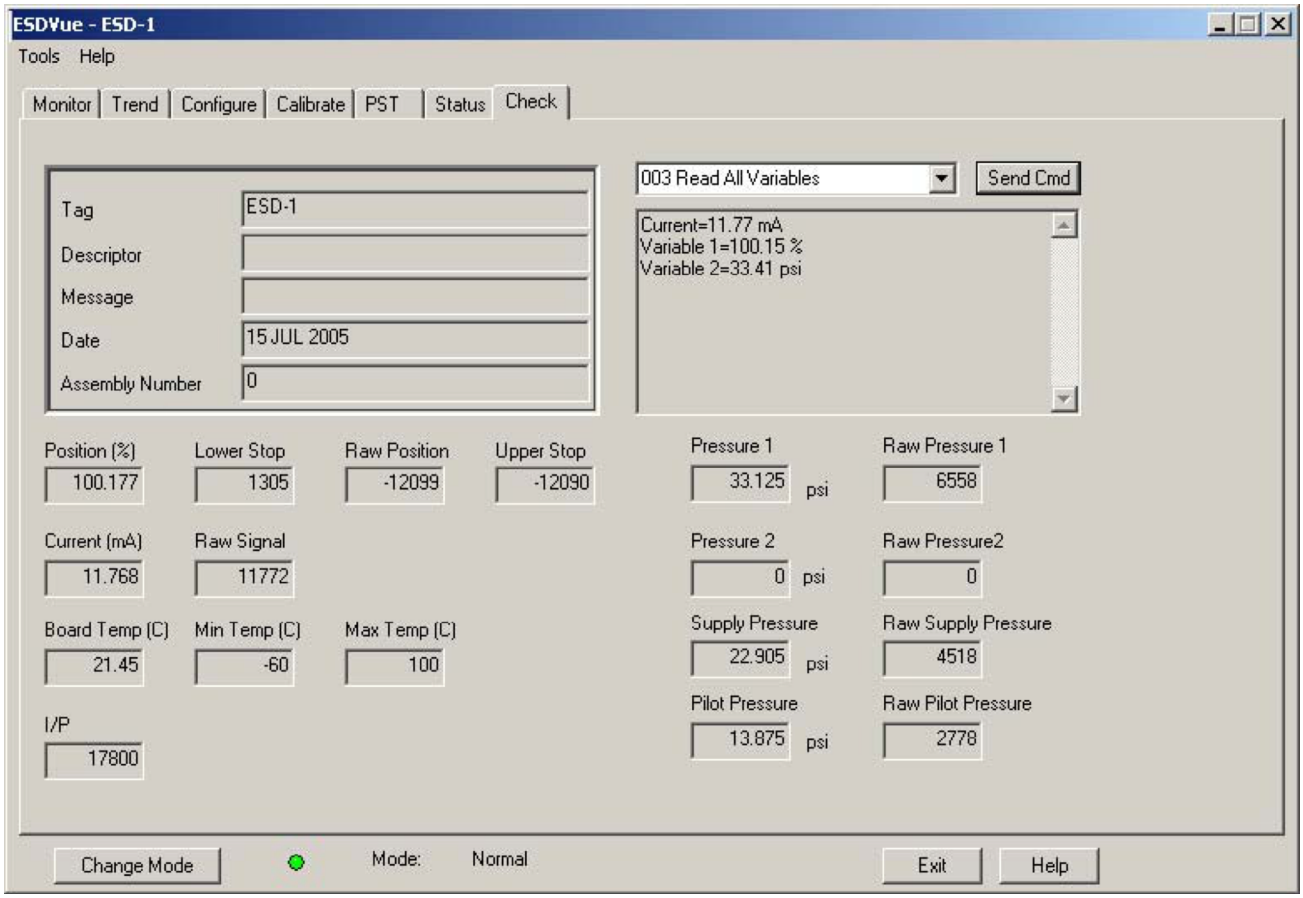


Figure 320 - Send Command Results Displayed

List of Available HART® Commands

The following commands can be sent to the SVI II ESD:

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.

© 2024 Baker Hughes Company. All rights reserved.

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 SVI II ESD.

018 Write Tag & Descriptor - enter a tag name (up to 8 characters) and a description (up to 16 characters) that are stored in the SVI II ESD.

019 Write Final Assembly - enter an identifying number (0 to 16 million) that is stored in the SVI II ESD.

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.

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 the options that are installed on the unit and their configuration.

212 Read Error Limits - reads and displays the position range and time-outs associated with position and pressure errors.

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 for a complete list of possible codes.

138 Clear Status - clears the status flags. See also Status Code List.

142 Read Switches - reads the state of the input switch, output switch (es) and the IP switch (factory set).

154 Read Setpoint - reads the manual setpoint of the PST controller.

141 Read Raw Data - returns information from the SVI II ESD that is useful to Masoneilan 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 ESD temperature.

143 Read Temperatures – reads the historical low and high range to which the PST controller was 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 PST controller operating mode.

227 Write DO and DI Switches Ext - writes the changes to the DO and DI switches. When this command is sent DI Power Mode appears. This command expands command 134 with the additional pulsing parameter and was added for firmware 3.1.6.

© 2024 Baker Hughes Company. All rights reserved.

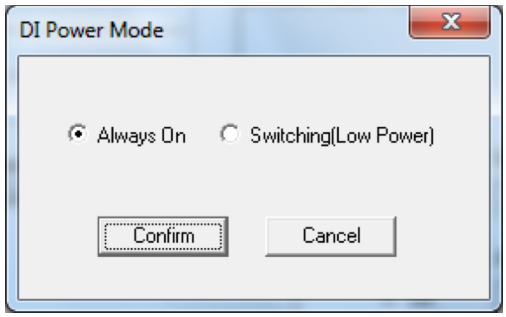


Figure 321 - DI Power Mode

Use this dialog to set whether the switch is:

- *Always On*: The output of the DI switch is continuously on at 3.3 V. This is necessary to prevent false activation of the DI with an open switch connected to the DI terminals by a long wire with capacitance greater than 0.04 uF. (In this mode, with a closed DI, the ESD device consumes approximately 0.1 mA extra current from the control loop).

or

- *Switching (Lower Power)*: The output of the DI is configured to a pulsing state - emitting short pulses with 3.3 V amplitude every 15 milliseconds. This configuration is acceptable if the wire between the DI terminals and the switch has capacitance less than 0.03 uF. At the capacitance greater than 0.04 uF the device sees the switch as closed, even when it is opened. As a general guideline:
  - A 1000’ wire will in most cases close the circuitry and thus clear the latch if the DI is configured as *Switching*.
  - A wire shorter than 100’ will never produce a false activation of the DI switch.

    In all other cases for the *Switching* configuration, you need to measure or calculate the actual capacitance of the wire used with the switch (*Always On* configuration is always safe.).This command, when it writes, does not change the following three parameters for the DO1 switch even if you change these values (not changeable in ValVue):
- *Direction*: always is 0.
- *Type*: always is 8.
- *Value*: always is 0.

The fact that the values are not changed is reflected in what is read back when command 228 is sent.

228 Read DO and DI Switches Ext - reads the type and action for the switches. This command expands command 137 with the additional pulsing parameter and was added for firmware 3.1.6.

© 2024 Baker Hughes Company. All rights reserved.

Check Context Menu

The *Check* screen context menu contains (*Figure 322*) the following items:

- *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 on-line help at the *Check* screen instructions.

Note: To execute any Context menu task, ESDVue must be in the Setup mode. (See "Change Mode" on page 81.)

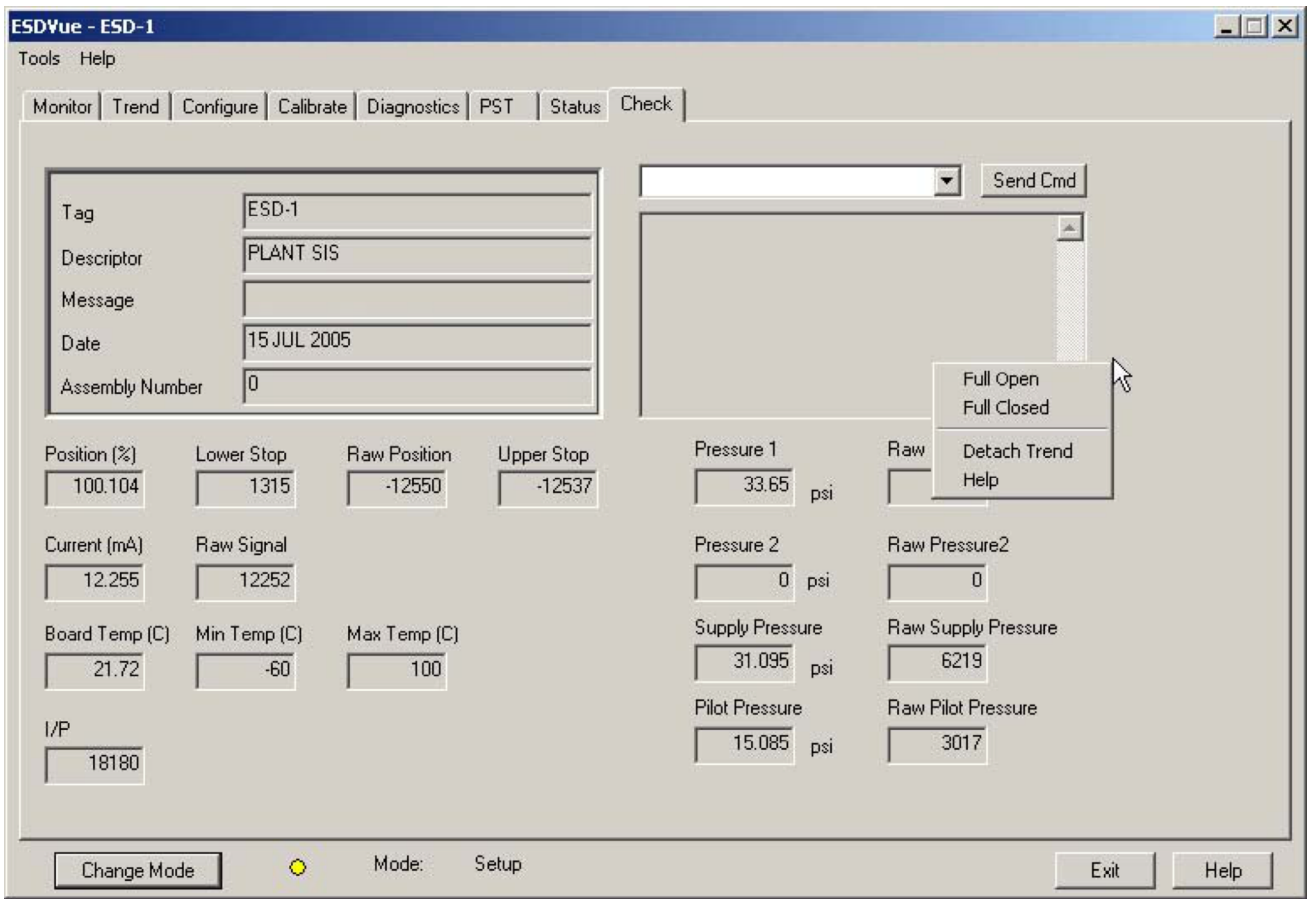


Figure 322 - Check Context Menu

© 2024 Baker Hughes Company. All rights reserved.

13. Advanced Setup with ESDVue

Overview

This section provides instructions for a custom, or advanced setup of the SVI II ESD with ESDVue.

Methods to Set Up the SVI II ESD

There are two methods of setting up the SVI II ESD with ESDVue:

- Run *Setup Wizard* from the *Configure* screen.
- *Advanced Setup* of the SVI II ESD by an advanced user

The *Setup Wizard* automatically runs through the specified setup routines and is the recommended method for initializing an SVI II ESD.

Steps to Set Up SVI II ESD

To set up the SVI II ESD:

1. Configure the SVI II ESD.
2. Read and set configuration parameters
3. Calibrate the SVI II ESD.
4. Run *Find Stops*.

or

1. Run *Manual Find Stops*.
2. Run *Auto Tune*.
3. View calibration parameters.

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

© 2024 Baker Hughes Company. All rights reserved.

Configuration Parameters

Refer to *"What You Can Do on the Configure Screen"* on page 121 for configuration instructions.

Calibration Steps

The calibration steps in an advanced setup are:

- Run Find Stops

or

1. Run *Manual Find Stops*.
2. Run *Auto Tune*.
3. View calibration parameters.

Run Find Stops

To determine valve position, the PST controller must measure and save the closed and open positions of the valve. Do this automatically by running the *Run Find Stops* procedure.

The SVI II ESD moves the valve from its normal open position (recorded as the upper stop) to its lower stop position and records it, then moves it to its upper stop position again. 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 screen appears while the find stops process is running. To run *Find Stops*:

1. Right-click and select **Run Find Stops** (*Figure 323*).

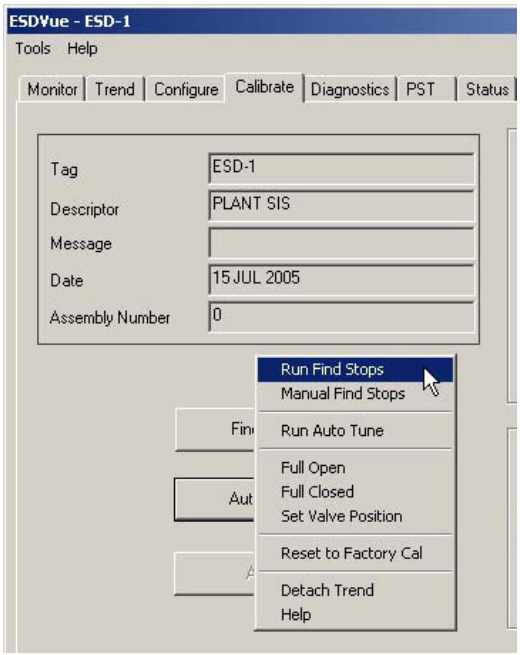


Figure 323 - Selecting Run Find Stops

© 2024 Baker Hughes Company. All rights reserved.

A dialog appears (*Figure 324*).

2. Click **OK**.

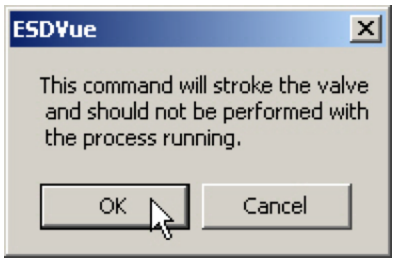


Figure 324 - Starting Run Find Stops Dialog

A progress dialog appears (*Figure 325*).

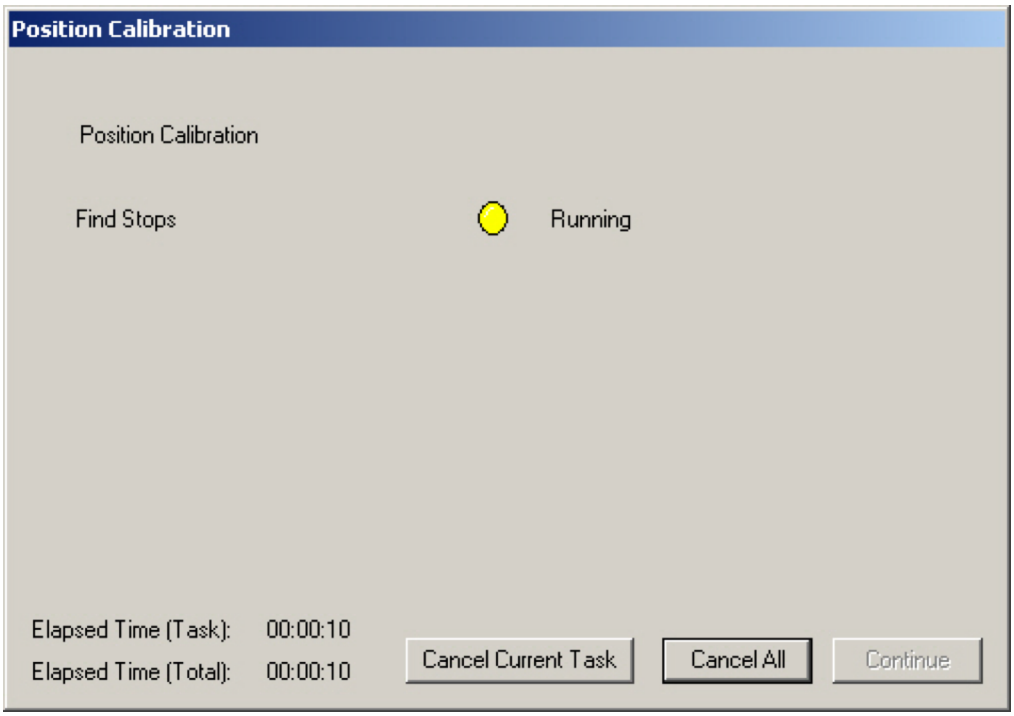


Figure 325 - Find Stops Dialog

© 2024 Baker Hughes Company. All rights reserved.

The progress dialog displays a message (*Figure 326*).

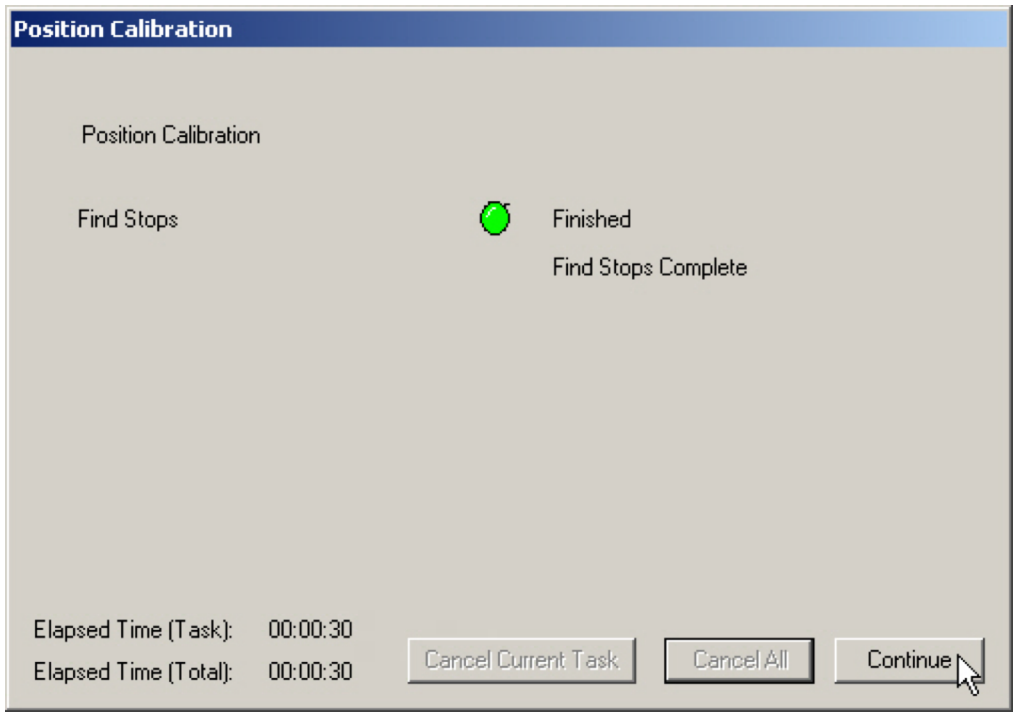


Figure 326 - Find Stops Complete

3. Click **Continue** to return to the *Calibrate* screen.

© 2024 Baker Hughes Company. All rights reserved.

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 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. Select **Manual Find Stops** (*Figure 327*).

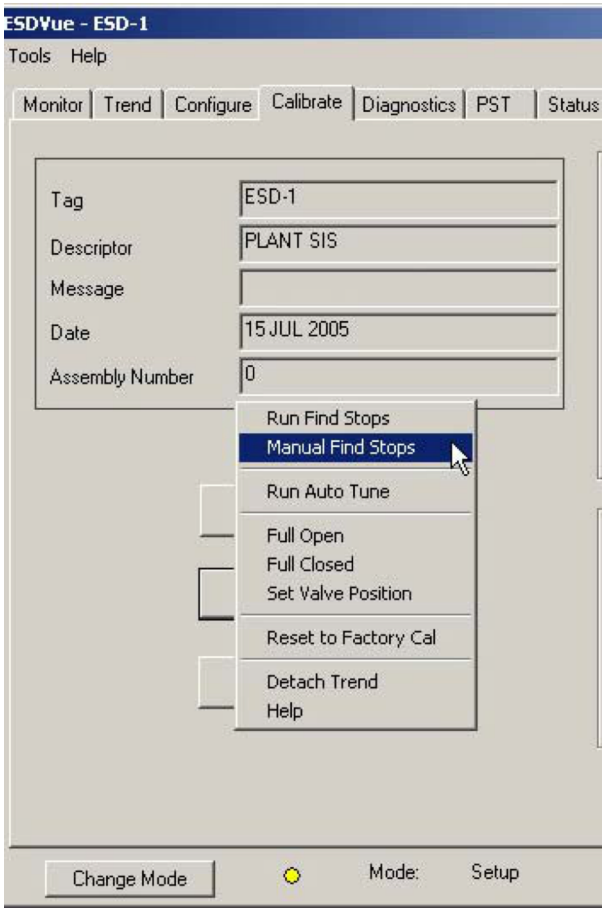


Figure 327 - Selecting Manual Find Stops

© 2024 Baker Hughes Company. All rights reserved.

A dialog appears (*Figure 328*).

2. Click **OK**.

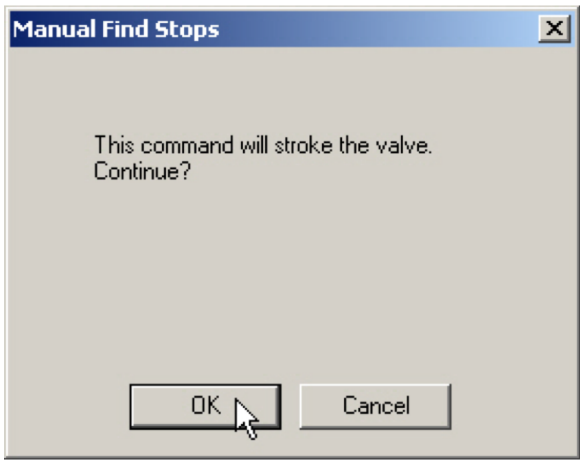


Figure 328 - Stroke Valve Dialog

ESDVue moves the valve to the fully closed position and a dialog appears (*Figure 329*).

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

Figure 329 - Valve Closed Dialog

© 2024 Baker Hughes Company. All rights reserved.

ESDVue moves the valve to the fully open position and a dialog appears (*Figure 330*).

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

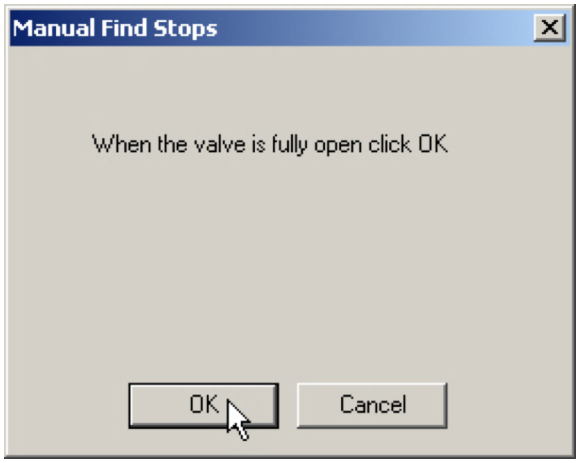


Figure 330 - Valve Open Dialog

Run Auto Tune

There are three ways to run *Auto Tune*:

- From the *Calibrate* screen - top level (refer to *"Auto Tune"* on page 161).
- From the *Calibrate* screen - context menu (refer to *"Calibrate Context Menu"* on page 180).
- From the *Configure* screen - *Setup Wizard* (refer to *"Step 4 - Autotune"* on page 145).

All methods operate exactly the same.

© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

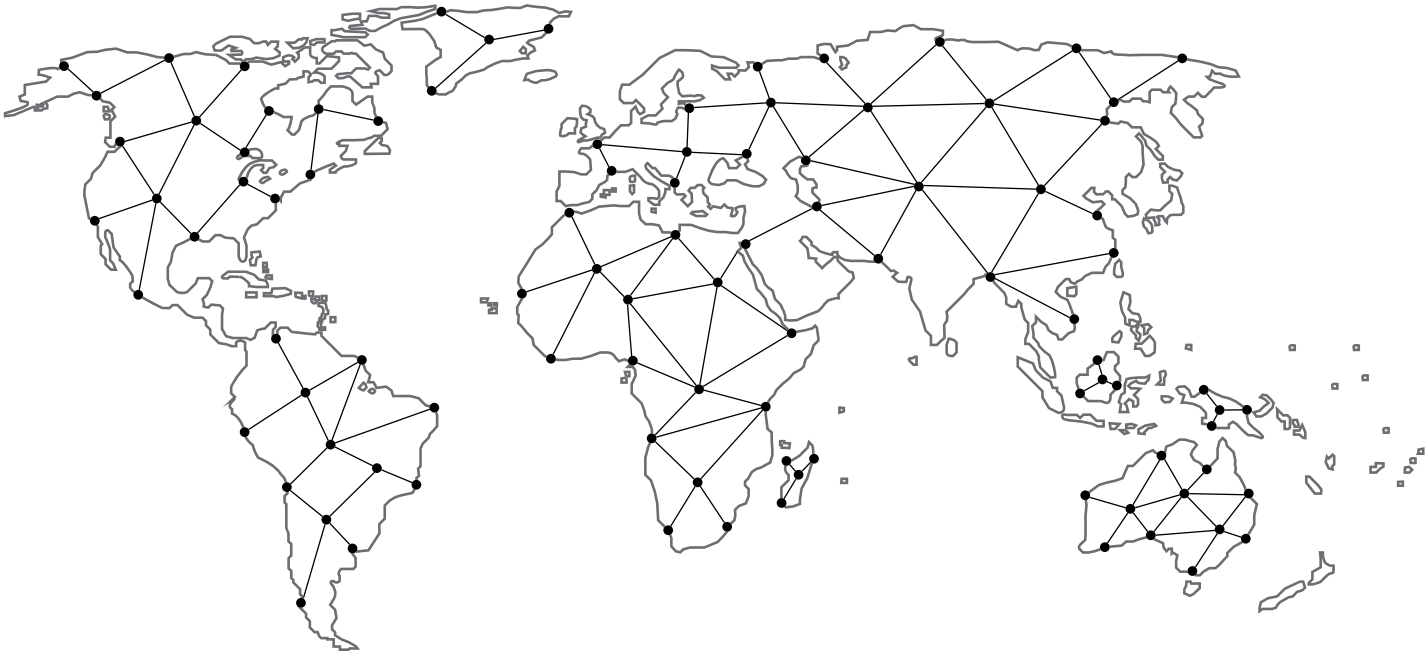
© 2024 Baker Hughes Company. All rights reserved.

This page intentionally left blank.

© 2024 Baker Hughes Company. All rights reserved.

Find the nearest local Channel Partner in your area:

valves.bakerhughes.com/contact-us



Tech Field Support & Warranty:

Phone: +1-866-827-5378

valvesupport@bakerhughes.com

valves.bakerhughes.com

Copyright 2024 Baker Hughes Company. All rights reserved. Baker Hughes provides this information on an “as is” basis for general information purposes. Baker Hughes does not make any representation as to the accuracy or completeness of the information and makes no warranties of any kind, specific, implied or oral, to the fullest extent permissible by law, including those of merchantability and fitness for a particular purpose or use. Baker Hughes hereby disclaims any and all liability for any direct, indirect, consequential or special damages, claims for lost profits, or third party claims arising from the use of the information, whether a claim is asserted in contract, tort, or otherwise. Baker Hughes reserves the right to make changes in specifications and features shown herein, or discontinue the product described at any time without notice or obligation. Contact your Baker Hughes representative for the most current information. The Baker Hughes logo, Masoneilan, ValVue, SVI, Varimax, LincolnLog, VRT and Camflex are trademarks of the Baker Hughes Company. Other company names and product names used in this document are the registered trademarks or trademarks of their respective owners.

Baker Hughes

BHMN-ValVue-ESD-IOM-19519M-0324 03/2024

bakerhughes.com