Fisher[™] FIELDVUE[™] DVC6200 SIS Digital Valve Controller PST Calibration and Testing using ValveLink[™] Software

The test procedure contained in this Instruction Manual Supplement is to be considered as a guideline only and should be modified to address site-specific requirements. Use this procedure in conjunction with the DVC6200 Series quick start guide (D103556X012) and the DVC6200 SIS instruction manual (D103557X012). In addition, exercise good engineering practices and abide by specific plant safety guidelines for safe operation.

A WARNING

This document is not intended to be used as a stand-alone document. It *must* be used in conjunction with the following documents:

Safety Manual for FIELDVUE DVC6200 SIS Digital Valve Controller and Position Monitor (<u>D103601X012</u>) Fisher FIELDVUE DVC6200 SIS Instruction Manual (<u>D103557X012</u>)

Failure to use this instruction manual supplement in conjunction with the above referenced manuals could result in personal injury or property damage. If you have any questions regarding these instructions or need assistance in obtaining any of these documents, contact your <u>Emerson sales office</u>.

For additional information on Partial Stroke Testing and associated parameters refer to Partial Stroke Test Information on page 20.





PST Calibration

This document covers the basic PST calibration, as well as details for making adjustments to the normal end, using Advanced Settings (see figure 11).

Figure 1. Calibration > Partial Stroke

VL ValveLink Software - Partial Stroke Tes	st/Demand and Reset Data - 13XV102
Tag Network Instrument Setup Calibration	Diagnostics Spec Sheet Tools Customize ValveLink Help
Auto Trav	ave 2 4 Az 2 10 O
ValveLink Solo Version 13.3 Partial St	troke
Local Machine, COM1, HAF Solenoid	Valve Test Read Save
Taxvio2 Store Fiel	ed Settings ration Graph Data Points Analyzed Notes Valve Trim Actuator Accessories
Rescure F	пецоекиць
Hardware	
	Test Start Point: 100.0 %
	Teet Travel Target: 95.0 %
	Outgoing Ramp Rate: 0.25%/s
	Incoming Ramp Rate: 0.25%/s
	Test Pause Time: 30 seconds
	Partial Storke Pressure Limit: 27.44 pai
	Collection Interval: 150.0 maec.
	Max Allowable Travel: 30.0 %
	6 6 crest
	Confirm SIS Lier
	Run Diagnostic Style Dataset Under Dataset Under Under
I	
To run Partial Stroke calibration	🕮 🕼 💆 🕺 🔍 🕰 د 🖗 🐠

Figure 2. Set Instrument Out of Service and start Partial Stroke Test calibration

ValveLink Software	X		
Instrument is In Service. Instrument must be Out Of Ser Do you wish to change the Inst	vice to run Calibration. rument Mode now?		
	Yes No		
Partial Stroke Calibration		×	Refer to figure 11 for
STOP W/	ARNING		information on Advanced Settings
Calibration procedures may result in position, and loss of process contro	n a sudden change in the valve bl.		
DO NOT continue until the instrume isolated from the process.	ent and the associated valve are	•	
Advanced Settings			
< Back	Next > Cancel	Help	

	-							
Figure	ר	[nton	+ h ~	Decined	0+-	i nin a	Dama	Data
гаше	ъ.	гшег	ine.	Desired			Kallin	KALE
iguic	•••	Lincei		Desnied	outg	Joing	- Carrip	itace

Partial Stroke Calibration	Supports separate ramp rates for outing and incoming strokes
O 1.00 %/s	
O 0.50 %/s	
○ 0.25 %/s	
O 0.12 %/s	
○ 0.06 %/s	
< Back Next > Cancel Help	

Figure 4. Enter the Desired Incoming Ramp Rate

Partial Stroke Calibration	<u> </u>	Additional ramp rates for the incoming stroke
 ○ 4.00 %/s ○ 2.00 %/s ○ 1.00 %/s ○ 0.50 %/s ○ 0.25 %/s ○ 0.12 %/s ○ 0.06 %/s 		
< Back Next > Cancel Help		

Figure 5. Enter the Travel Target Movement

Partial Stroke Calibration	×
Please enter the Target Travel Movement:	
15 %	
< Back Next > Cancel	lelp

Target Travel Movement is the percentage of travel from the normal end

Figure 6. Partial Stroke Calibration progress

Partial Stroke Calibration Progress	
Moving to Partial Stroke Start Point	
Travel: 100.00 %	
20%	
	Cancel



Figure 7. Partial Stroke Calibration progress

Partial Stroke Calibration Progress	
Running Calibration Test. Incoming Ramp Rate: 0.25 %/s	Will calibrate to 30% from
Travel: 72.13 %	the normal end
55%	
Lancel	
Partial Stroke Calibration Progress	
Retrieving Test Data from Device	
65%	
Cancel	

Figure 8. Configuring SIS Triggers



Figure 9. Partial Stroke Calibration Progress



Figure 10. Calibration Procedure Complete

ValveLink Software The following values were written during PST Calibration: Outgoing Ramp Rate: 0.25 %/s Incoming Ramp Rate: 0.25 %/s Travel Low Low Alert Point: 4.00 % Travel High High Alert Point: 96.05 % Additional Partial Stroke Test Parameters and Acceptance Criteria have been written to the device.	List of parameter values being downloaded to the device
ОК	
ValveLink Software	
The calibration procedure is completed.	
ОК	

If you need to make adjustments to the normal end default settings, select Advanced Settings, as shown in figure 11, and make the necessary adjustments.

Partial Stroke Calibration	
WARNING Calibration procedures may result in a sudden change in the valve position, and loss of process control. DO NOT continue until the instrument and the associated valve are isolated from the process. Image: Advanced Settings < Back Next > Cancel Help	Select to define the normal end

Figure 11. Select Advanced Settings to Make Adjustments to the Normal End

Figure 12. Set Travel High End

Partial Stroke Calibration Travel High High Alert Point 96 % PST Pause Time	Defines the normal end of travel (where the valve is when the process is running normally) The point at which valve seating occurs will vary slightly every time. Do not set this higher than 99.5% or lower than 0.5%.
30 sec	
< Back Next > Cancel Help	

Figure 13. Enter Target Travel Movement

Partial Stroke Calibration	×
Please enter the Target Travel Movement:	
20 %	
	_
< Back Next > Cancel Help	

Figure 14. Partial Stroke Calibration Progress



Running a PST calibration will:

- Enable Short Duration PST. Refer to figure 25 for information on disabling Short Duration PST.
- Configure the PST Abort and PST Abnormal Notification parameters as shown in figure 15. The PST Abort and PST Abnormal Notification parameters are configurable in the PST Alert Behavior tab, shown in figure 17.

Figure 15. PST Abort and PST Abnormal Notification Parameters at End of PST Calibration

PST Abort			
Pressure Threshold	\leftarrow	\rightarrow	Enabled ~
High Friction Breakout	\leftarrow	\rightarrow	Enabled
Low Friction Breakout Press	\leftarrow	\rightarrow	Disabled
Maximum Travel Exceeded	+	\rightarrow	Enabled
Minimum Travel Not Achieved	\leftarrow	\rightarrow	Enabled ~
Not Seated	\leftarrow	\rightarrow	Enabled ~
Travel Deviation	\leftarrow	\rightarrow	Disabled
PST Abnormal Notification			
Pressure Threshold	\leftarrow	\rightarrow	Yellow
High Friction Breakout	+	\rightarrow	Yellow
Low Friction Breakout Press	\leftarrow	\rightarrow	Disabled
Maximum Travel Exceeded	\leftarrow	\rightarrow	Yellow
Minimum Travel Not Achieved	\leftarrow	\rightarrow	Yellow
Not Seated	\leftarrow	\rightarrow	Yellow
Solenoid Valve Test Abnormal	+	\rightarrow	Yellow ~
Travel Deviation	\leftarrow	\rightarrow	Disabled

Configuration

After successfully calibrating the valve for PST go to the Detailed Setup SIS/Partial Stroke tab and verify the values for the parameters in the Test Configuration group box are correct. Then go to the SIS Options group box and enable any of the behaviors required for the PST.

Figure 16. Verify Test Configuration and Test Acceptance Criteria

ValveLink Software - Detailed Setup - 13XV102							
Tag Network Instrument Setup Calibration Diagnostics Spec Sheet Tools Customize ValveLink Hep							
	~ /2 / / / /3 🗠						
ValveLink Solo Version 13.3	Datasets: 17 Apr 2018 14:51:52						
13XV102	Uni, Inki Modem 2 Page Group: Entire Configuration						
Local Control Panel Solenoid Valve Test Alert Record Burst Travel/Pressure Control Informational Status Electronic Alerts Sensor Alerts Institument Valve Initial Setup Outputs Travel History Alerts Pressure Alerts Device Identification Travel Alerts Input Characterization Tuning SIS / Partial Stroke							
	Parameter	Instrument	Download/Upload	Database Dataset:			
	Test Configuration						
	Enable	Enabled	\leftarrow	Enabled			
	Test Start Point	Valve Open					
	Target Travel Movement (%)	30	$\leftarrow \rightarrow$	10			
	Outgoing Ramp Rate	0.25%/s	\leftarrow	0.25%/s			
	Incoming Ramp Rate	0.25%/s	$\leftarrow \rightarrow$				
	Test Pause Time (sec)	30	$\leftarrow \rightarrow$	10			
	Short Duration PST	Enabled		Disabled			
	Max Allowed Travel Movement (%)	30		0			
	Minimum Travel Movement (%)	5	← →	0			
	Hetum Lead (%)	Jo	$\leftarrow \rightarrow$	0			
	Test Acceptance Untena						
	Outgoing Pressure Threshold	27.2 psi		29.5 psi			
	Deservent List (%)	bb.6 psi		U.0 psi			
	Dreakout Higri (%)	96.14		/			
	High Eristian Proskaut Prose	4					
	Low Friction Braskout Press	31.4 psi					
	Proplement Times (acc)	b8.2 psi		0.0 psi			
	SIS Ontions	J400					
	Auto Partial Stroke Test Interval	0 days 0 bays 0 minutes		O dava O have O minutes			
	Latch on Position Trip	Enabled		Disabled			
	Position Trip Point (%)						
	Manual Reset Required	U.o		Manual Reset			
	Action on Failed Test	Ramp Back		Step Back			
	Save Dataset Delete Da	taset Copy From Tag					
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				-			

Once the PST has been setup and calibrated go to the PST Alert Behavior tab; select the criteria to be used to evaluate PST after it runs by defining the severity level of each abnormality by categorizing them Red/Yellow/Green under PST Abnormal Notification. Then, select the criteria to be used to abort a PST after initiation, and the criteria to be used to prohibit a PST before initiation.

Figure 17. Select PST Criteria

V ValveLink Software - Detailed Setup - 13XV102							
Tag Network Instrument Setup Calibration Diagnostics Spec Sheet Tools Customize ValveLink Help							
ValveLink Solo Version 13.3	Datasets: 17 Apr 2018 14:51:	52	′				
E Wath Local Machine, COM1, HART Modem	Page Group: Entire Configuration		<u> </u>				
13XV102			ζ				
	Local Control Panel Solenoid Valv	e Test Alert Record	inic Alert	ts Sensor Alerts Instrument Valve Trim Actuator Accessories Notes			
		Thistory Alerts Pressure	LEI 128 UK				
			\rangle				
	Parameter PST Probibited	Instrument	A A	Database Dataset:			
	Flach Integrity Failure						
	Missel and Carses Failure	Disabled					
	Reference Veltage Esilure	Disabled					
	Drive Current Epilure	Disabled					
	Critical MVM Esilves	Disabled	\rightarrow				
	Temperature Senser Epikure	Disabled					
	Pressure Concern Failure	Disabled					
	Travel Sensor Failure	Disabled					
	Guardo Bransor Failure	Disabled		Disabled			
	Supply Pressure Low	Disabled		Disabled			
	Travel Deviation	Disabled	\angle	Disabled			
	Pressure Failback Active	Disabled	-	Disabled			
	PST Abort						
	Pressure Inreshold	Enabled		Disabled			
	High Friction Breakout	Enabled	<₽	Disabled			
	Low Friction Breakout Press	Disabled	7	Disabled			
	Maximum Travel Exceeded	Enabled	\angle	Disabled			
	Minimum Travel Not Achieved	Enabled		Disabled			
	Not Seated	Enabled		Disabled			
	Travel Deviation	Disabled		Disabled			
	PST Abnormal Notification						
	Pressure Threshold	Yellow	\leftarrow	Disabled			
	High Friction Breakout	Yellow		Disabled			
	Low Friction Breakout Press	Disabled		Disabled			
	Maximum Travel Exceeded	Yellow		Disabled			
	Minimum Travel Not Achieved	Yellow		Disabled			
	Not Seated	Yellow		Disabled			
	Solenoid Valve Test Abnormal	Yellow	' (<u> </u>	Disabled			
	Travel Deviation	Disabled	\nearrow	Disabled			
	Save Dataset Delete Dat	aset Copy From Tag		Close Tag Help			
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Enable/Disable the stroke alerts from the SIS/Partial Stroke Alerts tab.

Figure 18. Set SIS / Partial Stroke Alerts

ValveLink Software - Detailed Setup - 1	3XV102
Tag Network Instrument Setup Calibration	Diagnostics Spec Sheet Tools Customize ValveLink Help
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ValveLink Solo Version 13.3	Datasets: 17 Apr 2018 14:51:52
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	Instrument Valve Accessories Notes
	Initial Setup Outputs Travel History Alerts Pressure Alerts derCharacterization Tuning SIS / Partial Stroke Alerts
	Parameter Instrument ed Database Dataset:
	PST Pass
	PST Pass Alert Disabled
	PST Prohibited
	PST Prohibited Alert Disabled Disabled
	Program Row Failure
	Program Row Failure Shutdown Disabled Shutdown Disabled
	SIS Hardware Failure
	SIS Hardware Failure Shutdown Disabled Shutdown Disabled
	Tripped by LCP
	Tripped by LCP Alert Disabled
	Tripped by LCP Alert Latch (mm:ss) 15 minutes 0 seconds 15 minutes 0 seconds
	Manual Reset Required
	Manual Reset Required Alert Enabled Enabled
	Save Dataset Delete Dataset Copy From Tag Close Tag Help
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Initiating a PST Diagnostic

If an Auto PST is desired go to the SIS/Partial Stroke tab and set up the PST schedule in Auto Partial Stroke Test Interval. The instrument will run a PST at the interval defined.

Figure 19. Setting Auto PST

🕅 ValveLink Software - Detailed Setup - 13XV102							
Tag Network Instrument Setup Calibration Diagnostics Spec Sheet Tools Customize ValveLink Help							
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ValveLink Solo Version 13.3	Detasets: 17 Apr 2018 14:51:52						
Local Machine, COMI, HART Modem	Page Group: Entire Configuratio	ation					
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Local units and provide subclick and provide result and provide state result and provide subclick and							
	Parameter	Instrument	Download/Upload	Database Dataset:			
	Test Configuration						
	Enable	Enabled	\leftarrow \rightarrow	Enabled			
	Test Start Point	Valve Open					
	Target Travel Movement (%)	30	$\leftarrow \rightarrow$	10			
	Outgoing Ramp Rate	0.25%/s	$\leftarrow \rightarrow$	0.25%/s			
	Incoming Ramp Rate	0.25%/s					
	Test Pause Time (sec)	30	$\leftarrow \rightarrow$	10			
	Short Duration PST	Enabled		Disabled			
	Max Allowed Travel Movement (%)	30		0			
	Minimum Travel Movement (%)	5	$\leftarrow \rightarrow$	0			
	Return Lead (%)	Jo		10			
	Test Acceptance Untena						
	Outgoing Pressure Threshold	Ihreshold 27.2 psi		29.5 psi			
	Proping Pressure Threshold	b5.6 psi		U.U psi			
	Dreakout high (%)	96.14					
	High Eriction Breakout Press	4					
	Low Friction Breakout Press	31.4 psi		0.0 psi			
	Breakout Timeout (sec)	56.2 psi					
	SIS Options	400					
	Auto Partial Stroke Test Interval	0 days 0 hours 0 minutes	\leftarrow	O dave O bours O minutes			
	Latch on Position Trip	Enabled	← →	Disabled			
	Position Trip Point (%)	0.8					
	Manual Reset Required	Smart Auto Reset	← →	I* Manual Beset			
	Action on Failed Test	Ramp Back	← →	Step Back			
				Tereb ager			
l	Deve Dataset Delete Da	daserCopy from Tag		<			
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To run a manual PST select the Partial Stroke Test icon as shown in figure 20.

Figure 20. Initiating a Manual PST

i igure zor iniciacing a inc		PST Icon		
ValveLink Software - Partial Stroke Test Tag Network Instrument Setup Calibration	t/Demand and Reset Data - 13XV102 Diagnostics Spec Sheet Tools Customize	Virtunk Help	_D×	
UvlveLink Solo Version 13.3	Datasets: www.com Inputs Configuration Graph Data Poin	ts Analyzed Notes Valve Trim Actual	Sheet Accessories	
	Test Start Point: 100.0 Test Travel Target: 70.0 Outgoing Ramp Rate: 0.25%/s Incoming Ramp Rate: 0.25%/s	% %		
	Partial Stroke Pressure Limit: 8.55 Collection Interval: 150.0 Max Allowable Travel: 30.0	psi msec. %		, Before the manual PST initiates,
	Run Diagnostic Save Dataset Defet	e Dataset Upload	Close Tag H	instrument diagnostic data to ValveLink software. Select Upload to save the data. Deletion of the data from the instrument is not necessary as new data will overwrite the oldest dataset. Datasets that are not uploaded to ValveLink software will not be accessible in the instrument once they are overwritten by new data.
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Figure 21. Partial Stroke Test Progress



Figure 22. PST Analyzed Data

ValveLink Software - Partial Stroke Tes	t/Demand and Reset Data - 13XV	102		X
Tag Network Instrument Setup Calibration	Diagnostics Spec Sheet Tools Cu	istomize ValveLink Help		
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Valuet tale Cale Manuface 12.3				Spec Sheet
	Datasets: cnewo			
E COM Local Machine, COM 1, MART Modem				Head Save
13KV102	a de se de de	and the second sec		
🖻 😴 Database	Inputs Configuration Graph D	ata Points Phayond Notes Valve Trim Actuator Ac	consories	
(unassigned)	Zero Ranged Travel at:	919 mA		
E Dialer	Full Ranged Travel at:	19.75 mA		
The Castleting Caluma	Average Dynamic Error:	0.67 %		
CE Costavor Coorri	Maximum Dynamic Error:	0.86 %		
+ Mydrogen Compressor	Mnimum Dynamic Error:	0.47 %		
Move Tag Here	Dynamic Linearity (Ind):	4.95 %		
- 🔂 n	Average Torque:	20 lbf.in		
Reactor	Maximum Torque:	23 blin		
	Minimum Torque:	17 bl.n		
	Spring Hate:	116.55 Bt/m		
	bench Set:	20.17+46.06 pti		
			- PST Re	sult
			131.4	Juic
	PST/Demand/Reset inforted by	HART Command		
	PET Connerd Provide Included by	Forth Commany		
	PS1/Demand/Reset status:	Completed Successfully		
	Task Type:	Executed by PST/Demand/Reset Vew		
	Last Demand Stroke Time:	U.5 sec		
	Last Demand Stroke Date:	09 May, 2018 14:46:24		
	Max travel reached	15.04 %		
	Decaling a Decampose	AL 47 M		
	Greaters Pressure.			
	PST Read	Covers:		
			_	
			Tost avaluation per definition i	n tha
			 rescevaluation per deminition il 	nune
			DST Abnormal Notification area	un
			FST ADHOLINALIVULIICALIULI GLU	up
			how of the DST Alart Pahavior to	sh.
			DUX UI LITE FOT ATELL DEHAVIOL LA	10
	Run Diagnostic Save Dataset	Deliver Discusses Upload		Close Tag Help
	Run Diagnostic Save Dataset	Delete Discont Upland		Close Tag Help
,	Run Diagnostic Save Dataset	Defere Dataset Upload	an 🛛 🗤	Close Tag Help



Figure 23. Resulting Press/Tvl Graph Results with Short Duration PST Enabled

Figure 24. Resulting TvI/Time Graph Results with Short Duration PST Enabled



A PST Diagnostic can be run with Short Duration PST disabled, as shown in the figure below. When Short Duration PST is disabled the pause time will be in effect once the valve reaches the desired test point, resulting in a slower PST.

Figure 25. Disable Short Duration PST in SIS/Partial Stroke

W ValveLink Software - Detailed Setup - 13XV102								
Tag Network Instrument Setup Calibration	Diagnostics Spec Sheet Tools Cust	tomize ValveLink Help ∮ ₩ 65						
Image: State								
Local Machine, COM1, HART Modem	Page Group: Entire Configuration							
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	Initial Setup Outputs Trav	Initial Setup Outputs Travel History Alerts Pressure Alerts Device Identification Travel Alerts Input Characterization Tuning SIS / Partial Stroke						
	Parameter Test Configuration	Instrument	Download/Upload	Database Dataset:				
	Enable	Enabled	$\leftarrow \rightarrow $	Enabled				
	Test Start Point	Valve Open						
	Target Travel Movement (%)	30	$\leftarrow \rightarrow$	10				
	Outgoing Ramp Rate	0.25%/s	$\leftarrow \rightarrow$	0.25%/s				
Short Duration	Incoming Ramp Rate	0.25%/s	$\leftarrow \rightarrow$					
DST disabled	Test Pause Time (sec)	30		10				
FST disabled	Max Allowed Travel Movement (%)	Disabled		Disabled				
	Minimum Travel Movement (%)	5						
	Return Lead (%)	0	$\leftarrow \rightarrow$					
	Test Acceptance Criteria	,						
	Outgoing Pressure Threshold	27.2 psi	$\leftarrow \rightarrow$	29.5 psi				
	Incoming Pressure Threshold	55.6 psi	$\leftarrow \rightarrow$	0.0 psi				
	Breakout High (%)	96.14		/				
	Breakout Low (%)	4						
	High Friction Breakout Press	31.4 psi		0.0 psi				
	Breakout Timeout (sec)	58.2 psi						
	SIS Options	400						
	Auto Partial Stroke Test Interval	0 days 0 hours 0 minutes	$\leftarrow \rightarrow $	0 days 0 hours 0 minutes				
	Latch on Position Trip	Enabled	← →	Disabled				
	Position Trip Point (%)	0.8	$\leftarrow \rightarrow$	0				
	Manual Reset Required	Smart Auto Reset	$\leftarrow \rightarrow$	Manual Reset				
	Action on Failed Test	Ramp Back	← →	Step Back				
	Save Dataset Delete Da	taset Copy From Tag						
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Figure 26. Resulting Press/Tvl Graph Results with Short Duration PST Disabled

Figure 27. Resulting Tvl/Time Graph Results with Short Duration PST Disabled



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3XV102			
+- 🗐 Database	Inputs Configuration Graph Da	ta Points Analyzed Notes Valve Trim Actuator Accessories	
	Zero Ranged Travel at:	2.47 1	
	Full Banged Travel at:	3.47 mA 20.07 m∆	
	Average Dynamic Error:	1.40 %	
	Maximum Dynamic Error:	1.55 %	
	Minimum Dynamic Error:	1.21 %	
	Dynamic Linearity (Ind):	0.10 %	
	Average Torque:	NA	
	Maximum Torque:	NA	
	Minimum Torque:	NA	
	Spring Rate:	NA	
	Bench Set:	25.58 - 48.31 psi	
	PCT/Demand /Depart initiated hur	HART Command	
	POT/Demand/Reset initiated by.	HART Command	
	PS1/Demand/Reset status:	Lompleted Successfully	
	Task Type:	Executed by PST/Demand/Reset View	
	Last Demand Stroke Time:	U.5 SEC	
	Last Demand Stroke Date: Max Travel Reached:	05 May, 2018 14:46:24	
	Max maver neached.	23.20 %	
	Breakout Pressure:	44.53 psi	

Figure 28. PST Analyzed Data with Short Duration PST Disabled

PST Result

Run Diagnostic Save Dataset Delete Dataset

Select a PST style, either with or without Short Duration PST, and standardize on that style, as the data may be difficult to compare between the two styles. If the desire is to minimize the amount of time the valve is away from the normal end, then enabling Short Duration PST is recommended. If the amount of time away from the normal end is not a concern, then disabling Short Duration PST will cause the set point to pause at the end of the outgoing stroke for the travel to catchup to the set point. The results of the test with the Short Duration PST disabled will be similar to the PST as offered in earlier versions of SIS instruments.

Partial Stroke Test Information

A valve stroke test is the process of taking the valve from the normal end to another target position at a preconfigured ramp rate before returning to the normal end while gathering data. The data is analyzed to evaluate the condition of the valve assembly against a set of user defined thresholds. A valve stroke test is only run if everything is normal in the instrument. A safety demand signal will always take precedence over a valve stroke test.

Test Start Point defines the normal end of the valve. The valve needs to be at this end for a PST to be initiated. When a PST is initiated the valve will be move from this end to the target travel and then back. See figure 29.

Travel Target Movement is the percentage of the calibrated travel span that the valve moves away from its normal operating end of travel towards its tripped end of travel during the test. The default value is 10%. See figure 29.

Outgoing Ramp Rate is the rate at which the valve will move during the outgoing stroke of the Partial Stroke test. The default value is 0.25%/second. The outgoing stroke is from the normal end to the PST target. See figure 30.

Incoming Ramp Rate is the rate at which the valve will move during the incoming stroke of the Partial Stroke test. The default value is 0.25%/second. The incoming stroke is the return stroke to normal end. See figure 30.

Test Pause Time is the time between the outgoing and incoming strokes of the test. The default value is 5 seconds. Pause Time will not be used if Short Duration PST is enabled and the travel reaches the minimum travel movement and. See figure 30.

Short Duration PST, when enabled, the incoming stroke is initiated as soon as the travel reaches the minimum travel movement. Refer to figure 30 for a time series representation of this parameter.

Maximum Allowed Travel Movement defines the percentage of the calibrated travel span that the valve moves away from its normal operating end of travel towards its tripped end of travel during the test (see figure 30). When enabled as an abort criteria the test will terminate and the valve will return to the normal end following the configuration for a failed test behavior.

Minimum Travel Movement is the percentage of the calibrated travel span that the valve must move away from its normal operating end of travel towards its tripped end of travel during the test, for the test to be successful. The Incoming stroke will be initiated on reaching the minimum travel movement when short duration PST is enabled The default value is 10%.

Return Lead, defines the percent (%) change in setpoint to overcome the hysteresis in the valve assembly.

Test Acceptance Criteria

- Outgoing Pressure Threshold defines the actuator pressure at which a partial stroke test will detect a pressure threshold violation during the outgoing stroke (see figure 29). When enabled as an abort criteria it prevents the DVC6200 SIS from exhausting (or building) excessive pressure from/to the actuator to move a stuck valve. During PST Calibration, the Partial Stroke Outgoing Pressure Threshold will be set automatically.
- Incoming Pressure Threshold defines the actuator pressure at which a partial stroke test will detect a pressure threshold violation during the incoming stroke (see figure 29). During PST Calibration, the Partial Stroke Incoming Pressure Threshold will be set automatically.
- Breakout High, in percent (%) of calibrated travel, is the point above which the valve is considered to have reached the high end. This value is automatically set during the PST calibration and can be refined by the user using the Travel High High variable in the Travel Alerts tab.
- Breakout Low, in percent (%) of calibrated travel, is the point below which the valve is considered to have reached the low end. This value is automatically set during the PST calibration and can be refined by the user using the Travel Low Low variable in the Travel Alerts tab.
- High Friction Breakout Pressure indicates the force required to breakout of the normal end of travel is higher than the user configured threshold. The breakout is defined as the pressure at which the travel crosses the user configured breakout travel, either high or low depending on the configured normal end. PST Calibration sets this value automatically for most actuators. The user can refine this pressure threshold based on PST data. Refer to figure 29.
- Low Friction Breakout Pressure indicates the force required to breakout of the normal end of travel is lower than the user configured threshold. The breakout is defined as the pressure at which the travel crosses the user configured breakout travel, either high or low depending on the configured normal end. PST Calibration sets this value automatically for most actuators. The user can refine this pressure threshold based on PST data. Refer to figure 29.
- **Breakout Timeout** is the time in seconds before which the travel must have moved beyond the breakout high or breakout low travel thresholds, depending on the test start point.



SIS Options

- Auto Partial Stroke Test Interval is the interval of time (in days, hours, and minutes) between partial stroke tests that are automatically run by the digital valve controller, subject to the device being powered up. A value of 0 disables this feature.
- Start PST on Loop Current Trigger—When this feature is enabled, the digital valve controller will run a partial stroke test if the loop current is set to within +/-0.5% of the PST trip point. The loop current must remain at that point for the duration of the test. To abort the test, the loop current must be returned to the normal or tripped current. This feature is disabled by default. This feature is not available when a loop-powered local control panel is installed.

PST Trip Point (ETT) is the point at which the loop current must be set to run a partial stroke test for energize-to-trip applications. This value is not configurable and is preset at 8 mA.

PST Trip Point (DETT) is the point at which the loop current must be set to run a partial stroke test for de-energize-to-trip applications. This value is not configurable and is preset at 16 mA.

- Latch on Position Trip defines if the instrument latches on a position trip and waits for a manual reset or will reset when the supply pressure returns.
- Position trip Point If the travel goes below this point in calibrated travel when the set point is at the normal end the instrument will go to the no air position. This protect against conditions where the supply pressure has drooped causing the valve to be partially open and too close to the seat.
- Manual Reset Required defines the power up behavior of the DVC6200 SIS. Auto Reset allows the valve to track the command signal when power is applied to the device. Manual Reset will lock the device in its safety position until

the digital valve controller is reset. The digital valve controller when configured to Smart Auto will behave like a manual reset when a trip is initiated at the valve by the local control panel and like auto reset at all other times.

When the digital valve controller is waiting for a manual reset its state can be determined from the status monitor by monitoring the Locked In Safety Position alert.

When Auxiliary Terminal Action is set to SIS Local Control Panel.

The reset signal depends on how the AUX terminals are configured. If configured for SIS Local Control Panel, the digital valve controller can be reset by pressing the button next to the green light on the LCP100. If configured as Push Button Partial Stroke, the digital valve controller can be reset by shorting the AUX terminals for more than 3 seconds but less than 10 seconds. The device cannot be reset from the AUX terminals if they are configured otherwise.

• Action on Failed Test displays the action taken by the instrument if a communication timeout occurs. Values are Ramp Back or Step Back.

SIS/ Partial Stroke Alerts

- PST Pass Alert, when enabled a PST pass alert is set in command 48 Byte 5 bit 7 on a successful PST and stays active for a user configured period. The time is shared between the LCP Trip Alert time and can be refined by writing to the Tripped by LCP Alert Latch in ValveLink.
- PST Prohibited Alert, when enabled a PST deferred alert is set in command 48 Byte 5 bit 6. The faults that contribute to the PST Prohibited are user configurable and can be enabled in the PST Alert Behavior tab of ValveLink.
- SIS Program Flow Failure is active if the firmware is not performing the expected series of calculations.
- SIS Hardware Failure is active if a demand has occurred, but the electronics hardware failed to take control of the I/P drive.
- Tripped by the LCP—The DVC6200 SIS is in the tripped position as a result of the trip button being pressed on the local control panel. This alert will automatically clear only after the valve returns to the normal state.
- Tripped by LCP Alert Latch defines the duration for which the alert is active once the valve leaves the tripped end.
- Manual Reset Required Alert, when enabled will activate an alert when a manual reset is required. It can be monitored in status monitor or using command 48 data byte 3 bit 3.

PST Alert Behavior

PST Prohibited is a user configurable list of hardware failures that will prohibit a PST from initiating.

- Flash Integrity Failure is active if there is a failure associated with flash ROM (read only memory). If this alert is active, restart the instrument. If the alert persists, replace the printed wiring board assembly.
- Minor Loop Sensor Alert is active if the pneumatic relay position reading is outside the valid range. If the alert persists, replace the printed wiring board.
- **Reference Voltage Failure** is active if there is a failure associated with the internal voltage reference. If this alert is active, replace the printed wiring board assembly.
- Drive Current Failure is active when the drive current to the I/P converter is not flowing as expected. If this alert occurs, check the connection between the I/P converter and the printed wiring board assembly. Try removing

the I/P converter and installing it. If the alert does not clear, replace the I/P converter or the printed wiring board assembly.

- **Critical NVM Failure** is active if there is a failure associated with NVM that is critical for instrument operation. If this alert is active, restart the instrument. If the alert persists, replace the printed wiring board assembly.
- Temperature Sensor Failure is active when the instrument temperature sensor fails, or the sensor reading is outside of the range of -60 to 100°C (-76 to 212°F). The temperature reading is used internally for temperature compensation of inputs. If this alert is active, restart the instrument. If the alert persists, replace the printed wiring board assembly.
- **Pressure Sensor Failure** is active if any of the 3 pressure sensor readings are outside the range of -24.0 to 125.0% of the calibrated pressure for more than 60 seconds. If this alert is active, check the instrument supply pressure, ensure the printed wiring board assembly is properly mounted onto the module base assembly, and ensure the pressure sensor O-rings are properly installed. If the alert persists after restarting the instrument, replace the printed wiring board assembly.
- Travel Sensor Failure is active if the sensed travel is outside the range of -25.0 to 125.0% of calibrated travel. If this alert is active, check the instrument mounting. Also, check that the electrical connection from the travel sensor is properly plugged into the printed wiring board assembly. After restarting the instrument, if the alert persists, troubleshoot the printed wiring board assembly or travel sensor.
- Supply Pressure Alert is active if the supply pressure falls below the supply pressure alert point.
- Travel Deviation Alert—If the difference between the Travel Target and the Travel exceeds the Travel Deviation Alert Point for more than the Travel Deviation Time, the Travel Deviation Alert is active. It remains active until the difference between the travel target and the Travel is less than the Travel Deviation Alert Point minus the Travel Alert Deadband.
- **Pressure Fallback Active Alert** is active when the instrument has detected a problem with the travel feedback and is now controlling the output like an I/P transducer.

PST Abort is a user configurable list of alerts that will abort a PST when encountered during a PST.

- Pressure Threshold, either the outgoing pressure or incoming pressure threshold has been violated.
- High Friction Breakout Pressure, the force required to breakout of the normal end of travel is higher than the user configured threshold. The breakout is defined as the pressure at which the travel crosses the user configured breakout travel, either high or low depending on the configured normal end.
- Low Friction Breakout Pressure, the force required to breakout of the normal end of travel is lower than the user configured threshold. The breakout is defined as the pressure at which the travel crosses the user configured breakout travel, either high or low depending on the configured normal end.
- Max Travel Exceeded, the test actual travel has violated the user configured maximum travel.
- Minimum Travel not achieved, the actual travel during the test did not achieve the user configured minimum travel.
- Not Seated, the valve did not return to the normal end as defined by the breakout high or breakout low depending on the normal end of travel.
- Travel Deviation, the error between the actual valve travel and set point exceeded the user configured value for a user defined period.

PST Abnormal Notification is a user configurable list of alerts that will notify the user of an abnormal PST using command 48 Byte3 bit 6. The user can define if the occurrence of each alert will mark the test as Red or Yellow in the PST evaluation in addition to the ability to disable it.

- Pressure Threshold, either the outgoing pressure or incoming pressure threshold has been violated.
- High Friction Breakout Pressure, the force required to breakout of the normal end of travel is higher than the user configured threshold. The breakout is defined as the pressure at which the travel crosses the user configured breakout travel, either high or low depending on the configured normal end.
- Low Friction Breakout Pressure, the force required to breakout of the normal end of travel is lower than the user configured threshold. The breakout is defined as the pressure at which the travel crosses the user configured breakout travel, either high or low depending on the configured normal end.
- Max Travel Exceeded, the test actual travel has violated the user configured maximum travel.
- Minimum Travel not achieved, the actual travel during the test did not achieve the user configured minimum travel.
- Not Seated, the valve did not return to the normal end as defined by the breakout high or breakout low depending on the normal end of travel.
- Travel Deviation, the error between the actual valve travel and set point exceeded the user configured value for a user defined period.
- Solenoid Valve Test abnormal

Figure 30. Time Series Representation of Short Duration PST



DVC6200 SIS

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