SIEMENS

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SIPART

Electropneumatic positioners SIPART PS2 with 4 to 20 mA/HART

Diagnostics Manual

6DR50.. 6DR51.. 6DR52.. 6DR53.. 6DR59..

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

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🛕 WARNING

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indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

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Introduction

1.1 Purpose of this documentation

This Diagnostics Manual contains information for performing diagnostics on the positioner and the valve.

The Diagnostics Manual is intended for service technicians authorized by Siemens and for personnel responsible for diagnostics.

Referenced document:

• Operating Instructions Electropneumatic Positioner SIPART PS2 with 4 to 20 mA/HART

The operating instructions contain information on the safe commissioning, use and maintenance of the positioner.

1.2 User documentation

The user documentation for this product consists of the following documents:

Document	Availability
Operating Instructions	Available for download on the Internet.
Compact Operating Instructions, Explosion Protec- tion	
Diagnostics Manual	
Getting Started (leaflet)	• Enclosed with the product.
	Available for download on the Internet.

See also

SIPART PS2 product information (<u>http://www.siemens.com/sipartps2</u>) Manuals (<u>http://www.siemens.com/processinstrumentation/documentation</u>)

1.3 Document history

Edition	Note
05/2024	New diagnostic manual created.

1.4 Product compatibility

1.4 Product compatibility

The table describes the compatibility between manual edition, firmware, device revision, Electronic Device Description (EDD) and SIEMENS Device Manager Software.

The diagnostic functions available in the positioner depend on the firmware version.

Manual edition, note	Firmware (FW)	Device revision	Electronic Device Description (EDD)	Device Manager software, compatible version
05/2024: 1st Edition	5.05.00	8	25.00.00	 SIEMENS SIMATIC PDM Version 9.0 or higher SIEMENS SITRANS DTM Version 4.x SIEMENS SITRANS Mobile IQ as of version 4.02 (Bluetooth)
	5.04.00	8	25.00.00	• SIEMENS SIMATIC PDM Version 9.0 or
	5.03.00	8	25.00.00	higher
	5.02.00	7	24.00.00	• SIEMENS SITRANS DTM Version 4.x
	5.02.01			
	5.01.00	6	23.00.00	
	5.00.00	5	22.00.00	

Safety notes

2.1 Warning symbols on the device



2.2 Unexpected movements when executing diagnostic functions

Unexpected movements of the positioner and the valve

Danger of injury. Danger of crushing.

When diagnostic functions are started, the positioner can move the actuator of the valve independently.

- Ensure that no body parts or objects are within the movement range of the positioner and the valve while the diagnostic function is running.
- Observe the separate operating instructions and all safety-relevant information when performing diagnostics on the positioner.
- Note that operation of the positioner is interrupted during certain diagnostic functions.

2.2 Unexpected movements when executing diagnostic functions

Diagnostics options

3.1 Overview of diagnostic functions

Different diagnostic functions are available for the various operating phases of the positioner.



	Product operating phases Installation and commissioning Check the positioner after commissioning and before production. Application examples • Actuator travel • Travel time - s- • Installation check • Function test		
	Installation and commission- ing	Production	Maintenance
	Check the positioner after com- missioning and before produc- tion.	The positioner is in the process and actively controls the flow rate at a process valve via an ac- tuator. Passive monitoring and diagnos- tics of the valve, optimization of the control behavior.	The positioner is not in the run- ning process: No active control of a flow rate. Active testing and diagnostics of the valve.
Diagnostic function	Application examples		
Diagnostic values (Page 17)	Actuator travelTravel time	 Device temperatures Current values of the process diagnostics 	 Stroke counter "Drag pointer" for maximum value
Process diagnostics (Page 93)	-	 Partial Stroke Test Alarms when upper limits are violated 	 Long-term trends in process diagnostics Adapt maintenance intervals
Maintenance diagnos- tics (Page 505)	Installation checkFunction test	-	 Determine the status of the process valve Compare with installation status

Diagnostics options

3.1 Overview of diagnostic functions

Diagnostic values

4.1 Definition of diagnostic values

The diagnostic values of the positioner are counters, maintenance information or values for process diagnostics with the following functions and properties:

- The diagnostic values monitor the valve.
- The diagnostic values can be read out in all operating states of the positioner.
- The positioner saves the diagnostic results every 15 minutes, so that the diagnostic values of the last 15 minutes are lost at most in the event of a power failure.

Saving diagnostic values	Description	Additional information
Counter	Display for cumulative values, e.g.	Counter (Page 33)
	Total strokes	
	Operating hours	
	Alarms	
Maintenance information	Shows current measured values, e.g.	Maintenance information (Page 50)
	Setpoint current	
	Current temperature	
Values for process diagnos- tics	Shows the current status and the values for process diagnostics, e.g.	Values for process diagnostics (Page 64)
	PST status	
	Pneumatic leakage	
	Stiction	
	End position offset	

• Some diagnostic values can be reset.

4.2 With local operation: Displaying diagnostic values

4.2 With local operation: Displaying diagnostic values

Open Diagnostics mode

Press the 3 buttons on the display \$\vee \sum \Lambda\$ simultaneously for at least 2 seconds.
 ⇒ "Diagnostics" mode is active.
 Diagnostic value shown in the display:



- The top line shows the value, e.g. "107".
 For values greater than 99 999, the display switches to exponential format. Example: The value "1 234 567" is shown as "1.23E6".
- The bottom line shows the number of the diagnostic value, e.g. "1", and the short name of the diagnostic value, e.g. "STRKS".

Displaying diagnostic values

The diagnostic values are shown on the display in ascending or descending order.

- In ascending order: Press the button.
 ⇒ The next highest diagnostic value is displayed.
- Descending order: Hold down the \bigcirc button and press the \bigtriangledown button at the same time. \Rightarrow The next lower diagnostic value is displayed.

Set diagnostic value to zero

Requirement

The diagnostic value can be reset.

Procedure

- 1. Select the desired diagnostic value.
- 2. Press the \underline{A} button for at least 5 seconds. \Rightarrow The "rESEt" display changes to "0". The value is set to zero.

Exit Diagnostics mode

• Press the 🖭 button for at least 2 seconds.

4.3 With SIMATIC PDM: Displaying diagnostic values

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Displaying diagnostic values

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	🔼 SIP	ART	PS2					-	-		(
	File	Dev	vice View Diagnostics	Maintena	ince	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
		+I	Download to device		?						
		t[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
	<u> </u>	Ţ.	Assign address and TAG				I SIPART PS2 DR8 HART	•			
		<u>61</u> 2	Value comparison				⊡ldentification				
			Object properties				TAG	DEMOKOFF		1	
			Calibration log				Long TAG	SIPART PS2		1	
			Change Log				Descriptor	-		1	
			Set device checked				Message	DIAGNOSIS		1	
I		-					Data	1/20/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

4.3 With SIMATIC PDM: Displaying diagnostic values

- 5. Close the dialog.
- 6. Select the directory "Maintenance & Diagnostics > Diagnostic values". \Rightarrow The counters for the diagnostic values are displayed.

SIPART PS2			- 0	×
File Device View Diagnostics Mainte	enance Help SIMATIC PDM V9.	2 SP2 Proce	ss Device N	Manager
🚐 +0 🛍 💁 📝 🔊 🖪 🔡 4	â ?			
SIPART PS2	Parameter	Value	Unit	Status
i≘‡ SIPART PS2 DR8 HART	Diagnostic values			
	Maintenance counters			
☐ ↓ Maintenance & Diagnostics	100% strokes (1.STRKS)	107		1
Partial Stroke Test	Direction changes (2.CHDIR)	562		1
	Fault messages (3.\CNT)	434		1
Aintenance counters Aintenance information Toyle actuator travel Travel time Leakage Aintpulated variable	Alarm 1 (4.A1CNT)	14		1
	Alarm 2 (5.A2CNT)	2		1
	Operating hours (6.HOURS)	891	h	1
	Operating hours (resettable) (7.HOURR)	642	h	1
	Operating hours since last initialization	1	h	1
…↓ Pulse length …↓ Deadband	Cycles pneumatic block 1 (42.VENT1)	101363		1
1 Slow step zone	Cycles pneumatic block 2 (43.VENT2)	82827		1
	Cycles pneumatic block (resettable) (44.VEN1R)	99318		1
□ □ □ Pressure	Cycles pneumatic block 2 (resettable) (45.VEN2R)	81136		1
Peak values	Maintenance information			_
Offline test reports	⊡ Temperature			
	Unit (H1/J1.TUNIT)	degC		1
	Current temperature (30.TEMP)	26.2	degC	1
	Minimum temperature (31.TMIN)	20.7	degC	1
	Maximum temperature (32.TMAX)	33.4	degC	1
	⊡Pressure			
	Pressure unit (U1.PUNIT)	bar		1
	Supply pressure PZ (60.PZ)	9999.000	bar	1
	Actuating pressure Y1 (61.P1)	9999.000	bar	1
	+/- Leakage at Y1 [*/min] (67.LMY1)	0.000	bar	1
	□ Peak values			_
	Maximum supply pressure PZ (resettable) (63.PZMAX)	5.230	bar	1
	Maximum positive leakage at Y1 [*/min] (resettable) (69.LMUY1)	0.000	bar	1
	Maximum negative leakage at Y1 [*/min] (resettable) (71.LMDY1)	0.000	bar	1
	Event counter			
>	<			>

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Open the menu in SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🛃 SI	PART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proce	ss Devic	e Manager	
	+1	Download to device	?						
	t]	Upload to PG/PC			Parameter	Value	Unit	Status	^
É	Ţ	Assign address and TAG			SIPART PS2 DR8 HART	-			
	<u>61</u> 2	Value comparison			□ Identification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡]	
		Change Log			Descriptor	-		1	
	1	Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		+	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

- 5. Close the dialog.
- 6. In the "Maintenance" dialog, select the command "Maintenance information".

SIPART PS2	- [) ×
File Device View Diagnostics Maintenance Help Image:	SIMATIC PDM V9.2 SP2 Process Device	Manager
	Parameter	Value ^
SIPART PS2 e Device View Diagnostics Maintenance Help Maintenance information SIPART PS2 SIPART PS2 DR8 HART C 1 Gentification C 2 Gommunication SIPART PS2 Communication Maintenance & Diagnostics C 2 Gommunication SIPART PS2 V Online a	Maintenance & Diagnostics	_
	Activation of extended diagnostics (52.XDIAG)	On 3 (th
	Pressure monitoring (U.\PRES)	On
	Partial Stroke Test (A.\PST)	On
	Monitoring of dynamic control valve behavior (b.\DEVI)	Off
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	Off
	Monitoring stiction (slipstick effect) (d.\STIC)	Off
	Deadband monitoring (E.\DEBA)	Off
	Monitoring of lower endstop (F.\ZERO)	Off
	Monitoring of upper endstop (G.\OPEN)	Off
	Monitoring of lower limit temperature (H.\TMIN)	Off
	Monitoring of upper limit temperature (J.\TMAX)	Off
	Monitoring number of total strokes (L.\STRK)	Off
	Monitoring number of direction changes (O.\DCHG)	Off
	Monitoring of average position value (P.\PAVG)	Off
	Pressure monitoring	
	Pressure unit (U1.PUNIT)	bar 🗸
	<	>
z004skzd SIPART PS2 🖌 🛛 Online acc	cess 🖌 🛛 Diagnosis Update 🖌 🛛 Identity Check 🖌	O:

 \Rightarrow The "Maintenance information" dialog opens.

Reset maintenance counter and device counter

Reset maintenance counter

- 1. Open the "Maintenance counters" tab.
- 2. Click the "Reset maintenance counters" button.

SIPART PS2 - Maintenan	ce information			?	3	×
Current Last maintenance	aintenance counters Temperature Pressure					í
SIEMENS				GOOD 🗸	-[]	ł
Date:	1/29/2024	<u> </u>	SIPART Maintenance date:	1/15/2024	- 18	
Number of						
100% strokes (1.STRKS);		134 1	Operating hours (6.HOURS):	1074	4 18 (
Direction changes (2.CHDIR):		816 🚺	Operating hours (resettable) (7.HOURR):	82	5 1 1	6
Fault messages (3.\CNT):	1	467 1	Operating hours since last initialization:		2 1 1	6
Alarm 1 (4.A1CNT):		14 1	Cycles pneumatic block 1 (42.VENT1):	11225	2 11	
Alam 2 (5.A2CNT):		2 1	Cycles pneumatic block 2 (43.VENT2):	9163	5 1	
			Cycles pneumatic block (resettable) (44.VEN1R):	11040	5 1	
			Cycles pneumatic block 2 (resettable) (45.VEN2R):	90314	4 1	
						1
	Reset maintenance counters			Reset device counters	1	
c						>
Transfer Messag	es Print				Jose	

 \Rightarrow The "Reset maintenance counters" dialog opens.

SIPART PS2 - Reset maintenance counters	\times
This job resets the following maintenance counters * Number of '100 percent strokes' (STRKS). * Number of direction changes (CHDIR). * Number of alarm messages (\CNT). * Number of alarms 1 and 2 (A1CNT/A2CNT).	
Do you really want to execute this job?	
 ○ No - No action ● Yes - Reset maintenance counter 	ð
ОК Сапсе	ł

3. Select the option button "Yes - Reset maintenance counter".

4. Click the "OK" button.

 \Rightarrow The maintenance counters are set to zero.

Number of		
100% strokes (1.STRKS):	0	10
Direction changes (2.CHDIR):	0	1
Fault messages (3.\CNT):	0	ŧ
Alarm 1 (4.A1CNT):	0	10
Alarm 2 (5.A2CNT):	0	ŧ

|--|

1.	Click	the	"Reset	device	counters"	button.

SIPART PS2 - Maintenance	information			?		×
SIEMENS				GOOD 🗸	-[!
Date:	1/29/2024]- 1]	SIPART Maintenance date:	3/15/2024	-	18
Number of						
100% strokes (1.STRKS):		134 1	Operating hours (6.HOURS):	107	4 1	l h
Direction changes (2.CHDIR):		816 1	Operating hours (resettable) (7.HOURR):	82	5 1	l h
Fault messages (3.\CNT):		467 1	Operating hours since last initialization:		2 1	l h
Alarm 1 (4.A1CNT):		14 1	Cycles pneumatic block 1 (42.VENT1):	11225	2 1	8
Alam 2 (5.A2CNT):		2 1	Cycles pneumatic block 2 (43.VENT2):	9163	6 1	1
			Cycles pneumatic block (resettable) (44.VEN1R):	11040	5 1	1
			Cycles pneumatic block 2 (resettable) (45.VEN2R):	9031	4 1	8
	Reset maintenance counters			Reset device counters)	
						>
Transfer Messages	Print				Close	

 \Rightarrow The "Reset device counters" dialog opens.

SIPART PS2 - Reset device counters	×
This job resets the following device counters: * Number of operating hours * Number of cycles valve 1 * Number of cycles valve 2 Do you really want to execute this job?	
 No - No action Yes - Number of operating hours Yes - Number of cycles valve 1 Yes - Number of cycles valve 2 Yes - Number of cycles valve 1 and 2 Yes - All device counters 	ø
OK Cancel	

2. Select the required option button, e.g. "Yes - All device counters".

- 3. Click "OK".
 - \Rightarrow The selected, resettable device counters are set to zero.

Operating hours (6.HOURS):	1076	1	h
Operating hours (resettable) (7.HOURR):	0	t.	h
Operating hours since last initialization:	3	1	h
Cycles pneumatic block 1 (42.VENT1):	112434	ţ.	
Cycles pneumatic block 2 (43.VENT2):	91736	ţ]	
Cycles pneumatic block (resettable) (44.VEN1R):	0	t.	٦
Cycles pneumatic block 2 (resettable) (45.VEN2R):	0	ţ.	

4. Close the "Maintenance information " dialog.

Reset maximum pressure values and pressure event counter

Reset maximum pressure values

- 1. In the "Maintenance" dialog, select the command "Maintenance information". \Rightarrow The "Maintenance information" dialog opens.
- 2. Open the "Pressure" tab.

MENS		GOOD 🗸
Pressure	+/- Leakage at Y1 ["/min] (67.LMY1):	0.000
8.4	Peak values	
6	Maximum supply pressure PZ (resettable) (63.PZMAX):	4.257
	Maximum positive leakage at Y1 [*/min] (resettable) (69.LMUY1):	0.036
4-	Maximum negative leakage at Y1 [*/min] (resettable) (71.LMDY1):	-0.036
2-		Reset peak values
	Event counter	
Saura Sau	Violations of lower limit PZ (resettable) (64.N_MIN):	22
a a	Violations of upper limit PZ (resettable) (65.N_MAX):	Q
	Violations of limit Y1 (resettable) (66.N1MAX):	0
		Reset event counter

Click the "Reset peak values" button.
 ⇒ The "Reset peak values" dialog opens.

SIPART PS2 - Reset peak values	×
Do you really want to do this?	
No - No action	ð
O Yes - Maximum supply pressure	
O Yes - Leakage [*/min]	
Yes - All peak values	
OK Cance	el

- 4. Select the required option button, e.g. "Yes All peak values".
- 5. Close the dialog with "OK". \Rightarrow The "Message Log" dialog opens.
- 6. Wait until the status "... successfully reset" is displayed.
- 7. Click the "Close" button.
 - \Rightarrow The selected maximum pressure values are set to zero.

Peak values				
Maximum supply pressure PZ (resettable) (63.PZMAX):	4.045	11	ba	r
Maximum positive leakage at Y1 [*/min] (resettable) (69.LMUY1):	0.000	1	ba	r
Maximum negative leakage at Y1 [*/min] (resettable) (71.LMDY1):	0.000	10	ba	r
	Reset peak values			

Reset pressure event counter

1. Click the "Reset event counter" button.

	6000	IJ
		11
+/- Leakage at Y1 (*/min) (67.LMY1):	0.00	1
Peak values		
Maximum supply pressure PZ (resettable) (63.PZMAX):	4.25	7 1
Maximum positive leakage at Y1 [*/min] (resettable) (69.LMUY1):	0.03	5 1
Maximum negative leakage at Y1 [*/min] (resettable) (71.LMDY1):	-0.03	5 1
	Reset peak values	1
Event counter		
Violations of lower limit PZ (resettable) (64.N_MIN):	3	22 1
Violations of upper limit PZ (resettable) (65.N_MAX):		0 1
Violations of limit Y1 (resettable) (66.N1MAX):		0 1
	Reset event counter	
	+/- Leakage at Y1 ['/min] (67.LMY1): Peak values Maximum supply pressure PZ (resettable) (63.PZMAX): Maximum positive leakage at Y1 ['/min] (resettable) (69.LMUY1): Maximum negative leakage at Y1 ['/min] (resettable) (71.LMDY1): Event counter Violations of lower limit PZ (resettable) (64.N_MIN): Violations of upper limit PZ (resettable) (65.N_MAX): Violations of limit Y1 (resettable) (65.N_MAX):	GOOD +/- Leakage at Y1 ['/min] (67.LMY1): 0.000 Peak values Maximum supply pressure PZ (resettable) (63.PZMAX): Maximum positive leakage at Y1 ['/min] (resettable) (69.LMUY1): Maximum negative leakage at Y1 ['/min] (resettable) (69.LMUY1): Maximum negative leakage at Y1 ['/min] (resettable) (71.LMDY1): Reset peak values Event counter Violations of lower limt PZ (resettable) (64.N_MIN): Violations of upper limt PZ (resettable) (65.N_MAX): Violations of limt Y1 (resettable) (66.N1MAX):

 \Rightarrow The "Reset event counter" dialog opens.

SIPART PS2 - Reset event co	ounter ×
Do you really want to do this? No - No action Yes - Supply pressure Yes - Actuating pressure Yes - All event counters	0
ОК	Cancel

- 2. Select the required option button, e.g. "Yes All event counters".
- 3. Close the dialog with "OK". \Rightarrow The "Message Log" dialog opens.
- 4. Wait until the status "... successfully reset".

- 5. Click the "Close" button.
 - \Rightarrow The selected event counters are set to zero.

Event counter	
Violations of lower limit PZ (resettable) (64.N_M	11N): [0] 1]
Violations of upper limit PZ (resettable) (65.N_M/	AX): 0 1
Violations of limit Y1 (resettable) (66.N1M/	AX): 0 t
	Reset event counter

6. Close the dialog.

4.5 Save maintenance data

4.5 Save maintenance data

Diagnostic value	Save maintenance information
	Short designation: 46.STORE
Function	This function saves the relevant diagnostic values as maintenance data.
Note	Comparing the stored diagnostic values with the current diagnostic values allows conclusions to be drawn about the mechanical wear of the valve.
	The values of the following 12 diagnostic values are saved:
	Determined actuator travel (8.WAY)
	Travel time UP (9.TUP)
	Travel time DOWN (10.TDOWN)
	Leakage test (11.LEAK)
	Endstop 0% position (21.P0)
	Endstop 100% position (22.P100)
	• Pulse length UP (23.IMPUP) - For additional information, see the operating instructions
	• Pulse length DOWN (24.IMPDN) - For additional information, see the operating instructions
	Deadband UP (26.DBUP)
	Deadband DOWN (27.DBDN)
	Slow speed zone UP (28.SSUP) - For additional information, see operating instructions
	Slow speed zone DOWN (29.SSDN) - For additional information, see operating instructions

Save current diagnostic values as maintenance data

The 12 diagnostic values mentioned above can be saved using the following 2 options.

Local operation

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display 🕾 ⊽▲ simultaneously for at least 2 seconds.
- 2. Select the diagnostic value "46.STORE". The number of maintenance data stores is displayed, e.g. "0".
- 3. Press the \underline{A} button for at least 5 seconds and the display will show "Strt" appears on the display.

 \Rightarrow After 5 seconds, the number of maintenance data memories is shown on the display, e.g. "1". The current diagnostic values were saved as maintenance data.

The saved maintenance data can be displayed with SIMATIC PDM can be displayed.

Remote operation with SIMATIC PDM

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

4.5 Save maintenance data

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC....." command.

🖊 SIF	PART	PS2				-	-		<
File	Dev	vice View Diagnostics I	Maintenance	e Help	SIMATIC PDM	V9.2 SP2 Proces	s Devic	e Manager	
	+I	Download to device	?						
	1	Upload to PG/PC			Parameter	Value	Unit	Status	^
	Π	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			⊡ldentification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor	-		‡]	
	1	Set device checked			Message	DIAGNOSIS		‡]	
	_				Data	1/29/2024		T.	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. In the "Maintenance" dialog, select the command "Maintenance information".

Diagnostic values

4.5 Save maintenance data

	· 1						
SIPART PS2 - Maintenance information					?	×	
Current Last maintenance Maintenance counters To	emperature Pressure						^
SIEMENS							
Date:	10/12/2023		1		SIPART Maintenance date:	[
Manipulated variable lower endstop, current (21.P0):		7.4	1	%	Deadband 'UP', current (26.DBUP):	[
Manipulated variable upper endstop, current (22.P100):		87.4	1	%	Deadband 'DOWN', current (27.DBDN):		
Travel time 'UP', current (9.TUP):		1.2	1	s	Slow step zone 'UP', current (28.SSUP):		
Travel time 'DOWN', current (10.TDOWN):		1.9	tii	s	Slow step zone 'DOWN', current (29.SSDN):		
Pulse length 'UP', current (23.IMPUP):		8.0	tII	ms	Determined actuator travel, current (8.WAY):		
Pulse length 'DOWN', current (24.IMPDN):		8.0	1 1	ms	Leakage, current (11.LEAK):		
						_	
	Save maintenance infor	mation (last maintenance))				~
<						>	
Transfer Messages Print]				Close		

7. In the "Current" tab, press the "Save maintenance information (last maintenance)" button.

- \Rightarrow The diagnostic values are saved as maintenance data with the extension "old".
- 8. To compare the saved maintenance data: In the "Maintenance & Diagnostics" directory >>, select "Diagnostic values".

4.6 Counter

SIPART PS2			_		×
File Device View Diagnostics Ma 🔜 🔳 💵 🛍 🕸 📝 🕼 🐘	intenance Help SIMATIC PDM	V9.2 SP2 Pro	cess Devic	æ Manag	er
SIPART PS2	Parameter	Value	Unit	Status	_^
	Determined actuator travel, current (8.WAY) Determined actuator travel, old (WAY)	90.8 90.8	•	11 1	
·····tu Pressure monitoring ····tu Triggered pressure monitoring ····tu Pratial Stroke Test tu Offline loak age test	Travel time Travel time 'UP', current (9.TUP) Travel time 'UP', eld (TUP)	1.2	s	1 1	
Cffline leakage test Diagnostic values Gfline test reports	Travel time 'DOWN', current (10.TDOWN) Travel time 'DOWN', old (TDOWN)	1.9	s s s	11 11 11	
	⊡ Leakage Leakage, current (11.LEAK)	0.0	%/min	t	
	Leakage, old (LEAK) Image: Manipulated variable	0.0	%/min	1	
	Manipulated variable lower endstop, current (21.P0) Manipulated variable lower endstop, old (P0)	7.4	%		
	Manipulated variable upper endstop, current (22.P100) Manipulated variable upper endstop, old (P100)	87.4 87.4	%		
	⊢⊔Pulse length 'UP', current (23.IMPUP) Pulse length 'UP', old (IMPUP)	8.0	ms	1 1	_
z004skzd SIPART PS2 🖌	Online access ✓ Diagnosis Update ✓ Ident	ity Check 🖌			× ○:

The current diagnostic value have the extension "current".

4.6 Counter

4.6.1 Counter overview

Diagnostic value counter	Short designation	Additional information
100% stroke	1.STRKS	100%- stroke (1.STRKS) (Page 35)
Direction reversal	2.CHDIR	Change of direction (2.CHDIR) (Page 35)
Fault messages	3.4CNT	Fault messages (3.\CNT) (Page 36)
Alarm 1	4.A1CNT	Alarm 1 (4.A1CNT) (Page 36)
Alarm 2	5.A2CNT	Alarm 2 (5.A2CNT) (Page 37)
Operating hours	6.HOURS	Operating hours (6.HOURS) (Page 38)
Operating hours, resettable	7.HOURR	Operating hours, resettable (7.HOURR) (Page 38)
Operating hours in temperature range 1 9	33.T1 41.T9	Operating hours in the temperature range 1 to 9 (33.T1 41.T9) (Page 39)

Diagnostic values

4.6 Counter

Diagnostic value counter	Short designation	Additional information
Switching cycles of pneumatic block, valve 1	42.VENT1	Switching cycles pneumatic block (42.VENT1 /
Switching cycles of pneumatic block, valve 2	43.VENT2	43.VENT2) (Page 43)
Number of switching cycles of pneumatic block, valve 1, resettable	44.VEN1R	Switching cycles pneumatic block, resettable (44.VEN1R / 45.VEN2R) (Page 44)
Number of switching cycles of pneumatic block, valve 2, resettable	45.VEN2R	
Operating hours in the travel range WT00 WT95	49.WT00 56.WT95	Operating hours in the travel range WT00 to WT95 (49.WT00 56.WT95) (Page 45)
Violations of lower limit PZ, (resettable)	64.N_MIN	Violations of lower limit PZ, resettable (64.N_MIN) (Page 49)
Violations of upper limit PZ, resettable	65.N_MAX	Violation of upper limit PZ, resettable (65.N_MAX) (Page 49)
Exceeded limit Y1, resettable	66.N1_MAX	Violation of limit Y1, resettable (66.N1MAX) (Page 50)

4.6 Counter

4.6.2 100%- stroke (1.STRKS)

Diagnostic value	100% strokes		
	Short designation: 1.STRKS		
Function	The counter adds up the movements of the actuator and shows the number of total strokes.		
	A total stroke is defined as the distance between the position 0% to 100% and back from 100% to 0%.		
	Partial strokes are totaled in the counter. The total 200% movement is counted as 1 stroke in the diagnostic value.		
Note	The diagnostic value can be reset.		
Display range	0 4.29E9		
Communication	•		
SIMATIC PDM Export	Name	ps2_lift_int	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Bytes: 16 19	
		Format: Unsigned-32	

4.6.3 Change of direction (2.CHDIR)

Diagnostic value	Direction changes Short designation: 2.CHDIR	
Function	During operation, the counter records and totals every change of direction with a movement greater than 0.25%.	
Note	The diagnostic value can be reset.	
Display range	0 4.29E9	
Communication		
SIMATIC PDM Export	Name	ps2_number_dirchange
	DisplayValue	≜ Value
HART communication (read)	Command	#169
	Response Data	Bytes: 12 15
		Format: Unsigned-32

4.6 Counter

4.6.4 Fault messages (3.\CNT)

Diagnostic value	Fault messages		
	Short designation: 3. [\] CNT		
Function	The counter records and totals all error messages that occur in the positioner.		
Note	The diagnostic value can be reset.		
Display range	0 4.29E9		
Communication			
SIMATIC PDM Export	Name	ps2_errors	
	DisplayValue	≜ Value	
HART-communicationread	Command	#169	
	Response Data	Bytes: 50 51	
		Format: Unsigned-16	

4.6.5 Alarm 1 (4.A1CNT)

Diagnostic value	Alarm 1		
	Short designation: 4.A1CNT		
Function	The counter records and totals all Alarm 1 error messages that have occurred in the positioner.		
Note	The diagnostic value can be reset.		
Requirement	The application parameter "44.AFCT - Alarmfunktion" is activated.		
Display range	0 4.29E9		
Communication			
SIMATIC PDM Export	Name	ps2_a1cnt	
	DisplayValue	≜ Value	
HART-communicationread	Command	#169	
	Response Data	Bytes: 52 55	
		Format: Unsigned-32	
4.6.6 Alarm 2 (5.A2CNT)

Diagnostic value	Alarm 2			
	Short designatio	n: 5.A2CNT		
Function	The counter recor	The counter records and totals all Alarm 2 error messages that have occurred in the positioner.		
Note	The diagnostic va	The diagnostic value can be reset.		
Requirement	The application pa	The application parameter "44.AFCT - Alarmfunktion" is activated.		
Display range	0 4.29E9	0 4.29E9		
Communication				
SIMATIC PDM Export	Name	ps2_a2cnt		
	DisplayValue	≜ Value		
HART-communicationread	ead Command #169			
	Response Data	Bytes: 59		
		Format: Unsigned-32		

4.6.7 Operating hours (6.HOURS)

Diagnostic value	Operating hours			
	Short designatio	Short designation: 6.HOURS		
Function	If the positioner is hours.	If the positioner is supplied with electrical auxiliary energy, the counter adds up the operating hours.		
Note	The diagnostic va	The diagnostic value cannot be reset.		
Display range	04.29E9			
Unit	h (hours)			
Communication				
SIMATIC PDM Export	Name ps2_hours			
	DisplayValue	≜ Value		
HART-communicationread	Command #169			
	Response Data	Bytes: 32 36		
		Format: Unsigned-32		

4.6.8 Operating hours, resettable (7.HOURR)

Diagnostic value	Operating hours,	, resettable		
	Short designation	n: 7.HOURR		
Function	If the positioner is hours since the la	If the positioner is supplied with electrical auxiliary energy, the counter adds up the operating hours since the last reset of the 7.HOURR diagnostic value.		
Note	The diagnostic val	lue can be reset.		
	Example application	Example application: Start a new counter after replacing the pneumatic block.		
Display range	0 4.29E9	0 4.29E9		
Unit	h (hours)			
Communication				
SIMATIC PDM Export	Name	var_hours_resettable		
	DisplayValue	≜ Value		
HART communication (read)	d) Command #193			
	Response Data	Bytes: 0 3		
		Format: Unsigned-32		

Diagnostic values	Operating hours in temperature range 1 9				
	Short designation: 33.T1 41.T9				
Function	The diagnostic value ranges.	es show how long the posit	ioner has been operate	ed in specific ten	nperature
Note	During operation, the measured temperature is averaged over one hour and assigned to the diagnostic value of the corresponding temperature range. This allows conclusions to be drawn about the operating conditions of the positioner and the valve.				
Display range	0 4.29E9				
Unit	h (hours)				
Communication					
SIMATIC PDM Export	Diagnostic values	Name	Label	DisplayValue	Unit
	33.T1	ps2_histogr_temp_0	• -40 °C30 °C	≜ Value	h
			• -49 °F22 °F		
	41.T9	ps2_histogr_temp_8	• 75 °C 90 °C	≜ Value	
			• 167 °F 194 °F		
				1	
	Temperature unit	Name	Label	DisplayValue	
		ps2_histogr_temp_unit	Unit	• °C	
				• °F	
HART communication (read)	Command	#176		1	
	Response Data	Bytes: 1 27	Histogram Value 1	9 (3 bytes each	ı) in units
		Format: Unsigned-24	of hours		
		Byte: 0	Histogram Value Unit	Code	
		Format: Enum	• 32: °C		
			• 33: °F		

4.6.9 Operating hours in the temperature range 1 to 9 (33.T1 ... 41.T9)

The diagnostic values 33.T1 to 41.T9 are assigned to the following temperature ranges:

Diagnostic	value "Operating hours in tempera-	Assigned temperature range	
ture range	Tx"	[°C]	[°F]
33.T1	Temperature range 1	< -30	< -22
34.T2	Temperature range 2	-3015.1	-2 5
35.T3	Temperature range 3	-150.1	5 32
36.T4	Temperature range 4	0 14.9	32 59
37.T5	Temperature range 5	15 29.9	59 86
38.T6	Temperature range 6	30 44.9	86 113
39.T7	Temperature range 7	45 59.9	113 140
40.T8	Temperature range 8	60 75	140 167
41.T9	Temperature range 9	> 75	> 167

Remote operation with SIMATIC PDM: Show histogram

Requirement

- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Diagnostics" menu, select the "Histograms > Temperature".

SIPART PS2		- D X	<
File Device View Dia Help	gnostics Maintenance Update diagnostics	SIMATIC PDM V9.2 SP2 Process Device Manager	
Image: signarrow of the signal signarrow of the signarrow of the signal sig	Status Trend charts Histograms KPI Valve charts Alarm logbook	ameter Position Control deviation Temperature Monitoring of dynamic control valve behavior (b.\DEVI) Monitoring of dynamic control valve behavior (b.\DEVI) Monitoring stiction (slipstick effect) (d.\STIC) Deadband monitoring (E.\DEBA) Monitoring of lower endstop (F.\ZERO) Monitoring of lower limit temperature (H.\TMIN) Monitoring of lower limit temperature (J.\TMAX) Monitoring number of total strokes (L.\STRK) Monitoring of average position value (P.\PAVG) Pressure monitoring	
z004skzd SIPART PS2 🖌	Online access 🖌 Dia	gnosis Update 🖌 Identity Check 🖌 📃 🔤)

 \Rightarrow The current data is loaded from the positioner. "Load in PG/PC..." is not required.

 \Rightarrow The "Temperature" dialog shows the operating hours in the temperature range, divided into 9 temperature ranges.

Diagnostic values

4.6 Counter



3. To display the number of operating hours in the temperature range numerically: Click the "List of histogram values" button.

SIPART PS2 - List of histog	jram values	?	×
List of histogram values:			
-40 degC30 degC	0	h	
-30 degC15 degC	0	h	
-15 degC 0 degC	0	h	
0 degC 15 degC	0	h	
15 degC 30 degC	968	h	
30 degC 45 degC	73	h	
45 degC 60 degC	0	h	
60 degC 75 degC	0	h	
75 degC 90 degC	0	h	
<			>
Print		Close	

4. Close the dialog.

4.6.10 Switching cycles pneumatic block (42.VENT1 / 43.VENT2)

Diagnostic values	Cycles pneumati	c block 1		
	Short designatio	n: 42.VENT1		
	Cycles pneumati	c block 2		
	Short designatio	n: 43.VENT2		
Function	The counters add the pneumatic blo	The counters add up the number of actuation processes and show the switching frequency of the pneumatic block.		
	The pneumatic block of the positioner pressurizes and depressurizes the actuator.			
	Single-acting a	actuators:		
	– The diagno	ostic value "42.VENT1" sums the pressurizing processes.		
	– The diagno	ostic value "43.VENT2" sums the depressurizing processes.		
	Double-acting	actuators:		
	– The diagno	ostic value "42.VENT1" sums the pressurizing (Y2) with depressurizing (Y1).		
	– The diagno	- The diagnostic value "43.VENT2" sums the pressurizing (Y1) with depressurizing (Y2).		
Display range	0 4.29E9			
Communication				
Cycles pneumatic block 1 (42	2.VENT1)			
SIMATIC PDM Export	Name	ps2_pill1		
	DisplayValue	≜ Value		
HART communication (read)	Command	#169		
	Response Data	Bytes: 20 23		
		Format: Unsigned-32		
Cycles pneumatic block 2 (43	3.VENT2)			
SIMATIC PDM Export	Name	ps2_pill2		
	DisplayValue	≜ Value		
HART communication (read)	Command	#169		
	Response Data	Bytes: 24 27		
		Format: Unsigned-32		

4.6.11 Switching cycles pneumatic block, resettable (44.VEN1R / 45.VEN2R)

Diagnostic values	Cycles pneumati	c block 1, resettable		
	Short designatio	n: 44.VEN1R		
	Cycles pneumati	c block 2, resettable		
	Short designatio	n: 45.VEN2R		
Function	The counters total pneumatic block s	the number of actuation processes and show the switching frequency of the since the last reset of the diagnostic values 44.VEN1R and 45.VEN2R.		
	The pneumatic bl	ock of the positioner pressurizes and depressurizes the actuator.		
	Single-acting	actuators:		
	– The diagno	ostic value "44.VEN1R" sums the pressurizing processes.		
	– The diagno	ostic value "45.VEN2R" sums the depressurizing processes.		
	Double-acting	actuators:		
	– The diagno	ostic value "44.VEN1R" sums the pressurizing (Y2) with depressurizing (Y1).		
	– The diagno	ostic value "45.VEN2R" sums the pressurizing (Y1) with depressurizing (Y2).		
Note	The diagnostic va	The diagnostic values can be reset.		
	Example applicati	Example application: Start a new counter after replacing the pneumatic block.		
Display range	0 4.29E9	0 4.29E9		
Communication				
Cycles pneumatic block 1, re	settable (44.VEN1	R)		
SIMATIC PDM Export	Name	var_pill1_resettable		
	DisplayValue	≜ Value		
HART communication (read)	Command	#193		
	Response Data	Bytes: 4 7		
		Format: Unsigned-32		
Cycles pneumatic block 2, re	settable (45.VEN2	R)		
SIMATIC PDM Export	Name	var_pill2_resettable		
	DisplayValue	≜ Value		
HART-communicationread	Command	#193		
	Response Data	Bytes: 8 11		
		Format: Unsigned-32		

4.6.12 Operating hours in the travel range WT00 to WT95 (49.WT00 ... 56.WT95)

Diagnostic values	Operating hours in	position WT00 WT95				
	Short designation:	49.WT00 56.WT95				
Function	The diagnostic value positioner in "Autom	The diagnostic values show how long a process valve was operated in which travel range by the positioner in "Automatic" mode.				
	The positioner continuously registers the current position and updates the operating hours counter for the corresponding travel range every hour. This allows conclusions to be drawn about the operating conditions and an assessment of the control characteristics of the control circuit and the entire valve.					
Note	The total travel range from 0 to 100% is divided into 8 or 20 travel ranges.					
	 With local operation and indication on the display: The diagnostic values "49.WT00" to "56.WT95" show the operating hours in the assigned 8 travel ranges. With Device Manager Software, e.g. SIMATIC PDM: The operating hours are displayed in 20 travel ranges. 				tic values "49.WT00" to anges.	
					layed in	
Display range) 4.29E9					
Unit	h (hours)					
Communication						
SIMATIC PDM Export	Control range in %	Name	Label	DisplayValue	Unit	
	05	ps2_histogr_readback_0	05%	≜ Value	h	
	95 100	ps2_histogr_readback_19	95 100 %	≜ Value		
HART communication (read)	Command	#174				
	Response Data	Bytes: 0 59	Histogram Value 1	20 (3 bytes e	each) in	
		Format: Unsigned-24	units of hours			

With local operation

The display shows the diagnostic values "49.WT00" to "56.WT95" show the operating hours in the assigned 8 travel ranges.

Diagnostic WTxx"	value "Operating hours in the travel range	Assigned travel range [%]
49.WT00	Travel range WT00	< 5
50.WT05	Travel range WT05	5 9.9
51.WT10	Travel range WT10	10 29.9
52.WT30	Travel range WT30	30 49.9
53.WT50	Travel range WT50	50 69.9
54.WT70	Travel range WT70	70 89.9
55.WT90	Travel range WT90	90 94.9
56.WT95	Travel range WT95	≥ 95

With SIMATIC PDM: Display histogram and set "Operating hours in the travel range" to zero

Requirement

- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Diagnostics" menu, select the "Histograms > Position".

SIPART PS2			- 0	×
File Device View 🚺	Diagnostics Maintenance Update diagnostics	SIMATIC PDM V9.2 SP2	Process Device Manag	jer
Image: Signature sinter signate signature signature sinter signature signature signat	Status Trend charts Histograms KPI Valve charts Alarm logbook	ameter Position Control deviation Temperature Descriptor Message Date Device Manufacturer Device Type Order number Serial number Final Assembly Number Hardware Revision Fimware revision EDD version		
z004skzd SIPART PS2 🖌	Online access 🖌 Diag	gnosis Update 🖌 🛛 Identity Check 🖌		O:

 \Rightarrow The current data is loaded from the positioner. "Load in PG/PC..." is not required.

 \Rightarrow The "Position" dialog shows the operating hours in the travel range divided into 20 travel ranges.

Diagnostic values

4.6 Counter



3. To display the number of operating hours in the travel range numerically: Click the "List of histogram values" button.

SIPART PS2 - List of histogram values	? ×
0 5 %: 6 1 h 50	55 %: 9 🚛 h
5 - 10 %: 14 🚺 h 55 -	60 %: 0 🚺 h
10 - 15 %: 6 🚺 h 60	65 %: 0 🚺 h
15 - 20 %: 194 🚺 h 65 -	70 %: 0 🚺 h
20 - 25 %: 92 🚺 h 70	75 %: 0 🚺 h
25 - 30 %: 30 🗱 h 75 -	80 %: 0 🚛 h
30 - 35 %: 2 🚺 h 80 -	85 %: 0 🚛 h
35 - 40 %: 0 🚺 h 85	90 %: 12 🚺 h
40 45 %: 0 🚺 h 90	95 %: 44 🚺 h
45 50 %: 3 🚺 h 95	100%: 183 🚺 h
Print	Close

- 4. If necessary, set the operating hours counter to zero: In the "Position" dialog, click the "Restart histogram" button.
 ⇒ The operating hours counters for the control ranges in the positioner and in SIMATIC PDM are set to zero.
- 5. Close the dialog.

Diagnostic value	Violations of lower limit PZ, resettable		
	Short designation: 64.N_MIN		
Function	If the supply pressure PZ exceeds the limit in the U5.PZMLL of the "Pressure monitoring" process diagnostics (U.\PRES) parameter, the event counter of the diagnostic value "64.N_MIN" is incremented.		
Note	The diagnostic value can be reset at the same time as the "65.N_MAX" diagnostic value.		
Requirement	The positioner has firmware version 5.02 or higher.		
Display range	0 99 999		
Communication			
SIMATIC PDM Export	Name	var_PZ_NoLimitUnderrunResettable	
	DisplayValue	≜ Value	
HART communication (read)	Command	#200	
	Response Data	Bytes: 18 19	
		Format: Unsigned-16	

4.6.13 Violations of lower limit PZ, resettable (64.N_MIN)

4.6.14 Violation of upper limit PZ, resettable (65.N_MAX)

Diagnostic value	Violations of upper limit PZ, resettable		
	Short designation: 65.N_MAX		
Function	If the supply pressure PZ exceeds the limit in the U6.PZMUL parameter of the "Pressure moni- toring" process diagnostics (U.\PRES), the event counter of the diagnostic value "65.N_MAX" is incremented.		
Note	The diagnostic value can be reset at the same time as the "64.N_MIN" diagnostic value.		
Requirement	The positioner has firmware version 5.02 or higher.		
Display range	0 99 999		
Communication			
SIMATIC PDM Export	Name	var_PZ_NoLimitOverrunResettable	
	DisplayValue	≜ Value	
HART communication (read)	Command	#200	
	Response Data	Bytes: 20 21	
		Format: Unsigned-16	

4.6.15 Violation of limit Y1, resettable (66.N1MAX)

Diagnostic value	Violations of limit Y1, resettable		
	Short designation: 66.N1MAX		
Function	If the actuating pressure Y1 exceeds the limit in the "U7.PCL" parameter of the "Pressure mon- itoring" (U.\PRES) process diagnostics, the event counter of the diagnostic value "66.N1MAX" is incremented.		
Note	The diagnostic value can be reset.		
Requirement	The positioner has firmware version 5.03 or higher.		
Display range	0 99 999		
Communication			
SIMATIC PDM Export	Name	var_P1_NoLimitReachedResettable	
	DisplayValue	≜ Value	
HART communication (read)	Command	#200	
	Response Data	Bytes: 22 23	
		Format: Unsigned-16	

4.7 Maintenance information

4.7.1 Overview of maintenance information

Diagnostic value maintenance informa- tion	Short designation	Additional information
Determined actuator travel	8.WAY	Determined actuator travel (8.WAY) (Page 51)
Travel time UP (direction 100% position)	9.TUP	Travel time UP (9.TUP) (Page 52)
Travel time DOWN (direction 0% position)	10.TDOWN	Travel time DOWN (10.TDOWN) (Page 52)
Leakage test	11.LEAK	Leakage test (11.LEAK) (Page 53)
Deadband UP (direction 100% position)	26.DBUP	Deadband UP (26.DBUP) / Deadband DOWN (27.DBDN)
Deadband DOWN (direction 0% position)	27.DBDN	(Page 54)
Current temperature	30.TEMP	Current temperature (30.TEMP) (Page 55)
Minimum temperature (min/max pointer)	31.TMIN	Minimum temperature (31.TMIN) / Maximum tempera-
Maximum temperature (min/max pointer)	32.TMAX	ture (32.TMAX) (Page 56)
Setpoint current	59.mA	Setpoint current (59.mA) (Page 57)
Supply pressure PZ	60.PZ	Supply pressure PZ (60.PZ) (Page 58)
Actuating pressure Y1	61.P1	Actuating pressure Y1 (61.P1) (Page 60)
Actuating pressure Y2	62.P2	Actuating pressure Y2 (62.P2) (Page 62)
Maximum supply pressure PZ, resettable	63.PZMAX	Maximum supply pressure PZ, resettable (63.PZMAX) (Page 64)

4.7.2 Determined actuator travel (8.WAY)

Diagnostic value	Determined actuator travel		
	Short designatio	n: 8.WAY	
Function	The diagnostic va	ue shows one of the following two values:	
	• For rotary actuators, the angle of rotation of the positioner axis that was determined during initialization.		
	For linear actu Requirements	ator, the stroke in mm.	
	- Use of the	SIEMENS Standard mounting kit "35 mm lever arm" or "130 mm lever arm".	
	 The setting in the "3.YWAY" application parameter corresponds to the mounti tion of the actuator pin on the lever arm. 		
Display range	0 130		
Factory setting	0		
Unit	• Angle in °		
	• Stroke in mm		
Communication	•		
SIMATIC PDM Export	Name	ps2_span_act	
	DisplayValue	≜ Value	
HART communication (read)	Command	#128	
	Response Data	Bytes: 38 41	
		Format: Float	

4.7.3 Travel time UP (9.TUP)

Diagnostic value	Travel time UP		
	Short designation: 9.TUP		
Function	The diagnostic value shows the travel time of the actuator in the direction of 100% position determined during initialization.		
Note	During initialization	on, the time between 17% and 83% travel is measured.	
	The result extrapolated for 0% to 100% travel is accepted as the diagnostic value "Travel time OPEN".		
Display range	0 1 000		
Unit	s (seconds)		
Communication			
SIMATIC PDM Export	Name	ps2_tup_act	
	DisplayValue	≜ Value	
HART communication (read)	Command	#128	
	Response Data	Bytes: 4 7	
		Format: Float	

4.7.4 Travel time DOWN (10.TDOWN)

Diagnostic value	Travel time DOWN		
	Short designation: 10.TDOWN		
Function	The diagnostic value shows the travel time of the actuator in the direction of the 0% position determined during initialization.		
Note	During initialization	on, the time between 83% and 17% travel is measured.	
	The result extrapolated for 100% to 0% travel is accepted as the diagnostic value "Travel time DOWN".		
Display range	01000		
Unit	s (seconds)		
Communication			
SIMATIC PDM Export	Name	ps2_tdown_act	
	DisplayValue	≜ Value	
HART communication (read)	Command	#128	
	Response Data	Bytes: 8 11	
		Format: Float	

4.7.5 Leakage test (11.LEAK)

Diagnosewert	Leakage test		
	Short designation: 11.LEAK		
Function	The diagnostic value shows the result of the last leakage test or starts the leakage test.		
	The leakage test o	letects pneumatic l	eaks in the actuator or in the piping.
Note	This diagnostic va → Manual leakage	lue can be used to e test (Page 508).	start the leakage test as a maintenance diagnostic
Display options	-	The display has or	ne of the following causes:
		No leakage tes	st has been performed to date.
		The positioner	is not initialized.
		• The factory se "50.PRST" was	tting was restored with the application parameter
	0.0 100.0	An existing test re	sult means one of the following possibilities:
		• The leakage te	est was performed manually.
		• The leakage te	est was performed during initialization.
Unit	%/minute		
	Note: The value shows the change in actuator position in % during the duration of the 1-minute leakage test.		
Communication			
SIMATIC PDM Export	Name	ps2_leakage_act	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Byte: 32	Leak Test state
		Format: Enum	
		Bytes: 29 31	Leak Test value
		Format: Float	

4.7.6 Deadband UP (26.DBUP) / Deadband DOWN (27.DBDN)

Diagnostic value	Deadband UP		
	Short designation: 26.DBUP		
	Deadband DOWN		
	Short designatio	n: 27.DBDN	
Function	The diagnostic va	lues show the deadband of the positioner as a percentage:	
	"Deadband UP	" (26.DBUP) in direction 100% position	
	"Deadband DC	WN" (27.DBDN) in direction 0% position	
Note	The values either correspond to the manually set value of the application parameter "34.DEBA" or, if "34.DEBA" is set to "Auto", the value automatically adapted by the positioner.		
Display range	0.1 10.0		
Unit	%		
Communication			
Deadband UP (26.DBUP)			
SIMATIC PDM Export	Name	ps2_dead_up_act	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Bytes: 0 3	
		Format: Float	
Deadband DOWN (27.DBDN)			
SIMATIC PDM Export	Name	ps2_dead_down_act	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Bytes: 4 7	
		Format: Float	

4.7.7 Current temperature (30.TEMP)

Diagnostic value	Current temperature		
	Short designation: 30.TEMP		
Function	The diagnostic value shows the current temperature in the positioner enclosure.		
Note	The temperat	ure sensor is located in the enclosure on the electronics board.	
	• In order to sw the display.	itch over the temperature display between °C and °F: Press the $\underline{\mathbb{A}}$ button on	
Display range	-50 100	°C	
	-58 212	°F	
Unit	• °C		
	• °F		
Communication			
Current temperature (30.TE	MP)		
SIMATIC PDM Export	Name	ps2_temp	
	DisplayValue	≜ Value	
	Unit	l ≙ Unit	
HART communication (read)	Command	#169	
	Response Data	Bytes: 38 41	
		Format: Float	
Temperature unit (H1/J1.TUN	Temperature unit (H1/J1.TUNIT)		
SIMATIC PDM Export	Name	ps2_unit_temp_code	
	DisplayValue	• °C	
		• °F	
HART communication (read)	Command	#169	
	Response Data	Byte: 37	
		Format: Enum	

4.7.8 Minimum temperature (31.TMIN) / Maximum temperature (32.TMAX)

Diagnostic value	Minimum temperature		
	Short designation: 31.TMIN		
	Maximum temperature		
	Short designation: 32.TMAX		
Function	The minimum tem ously determined	perature and the maximum temperature inside the enclosure are continu- and stored in the manner of a drag indicator.	
Note	• To change the display.	temperature display between °C and °F to switch: Press the <u>A</u> button on the	
	The determine	d values can only be reset in the factory.	
Display range	-50 100	°C	
	-58 212	°F	
Unit	• °C		
	• °F		
Communication			
Minimum temperature (31.T	MIN)		
SIMATIC PDM Export	Name	ps2_tmin	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Bytes: 42 45	
		Format: Float	
Maximum temperature (32.)	MAX)		
SIMATIC PDM Export	Name	ps2_tmax	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Bytes: 46 49	
		Format: Float	
Temperature unit (H1/J1.TUNIT)			
SIMATIC PDM Export	Name	ps2_unit_temp_code	
	DisplayValue	• °C	
		• °F	
HART communication (read)	Command	#169	
	Response Data	Byte: 37	
		Format: Enum	

4.7.9 Setpoint current (59.mA)

Diagnostic value	Setpoint current	
	Short designation: 59.mA	
Function	The diagnostic value shows the current setpoint current measured at the analog input in mA.	
Display range	0.0 22.0	
Unit	mA	
Communication		
The value is only shown on the display and cannot be exported.		

4.7.10 Supply pressure PZ (60.PZ)

Diagnostic value	Supply pressure PZ Short designation: 60.PZ		
Function	The diagnostic value shows the current supply pressure PZ.		
Note	The differential pr	essure between the ambient pressure and the input PZ is measured.	
	If there is no supp	ly pressure, the displayed value should be approximately "0".	
	Depending on the sensors may devia	positioner's operating altitude above sea level, the zero point of the pressure ate and must be calibrated.	
Requirement	The positioner	r has pressure sensors (-Z P01 or P02 option).	
	"Pressure mon	itoring" (U.\PRES) is activated.	
Display range	0 9.999	bar	
	0 0.999	MPa	
	0 145.00	psi	
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"	
	• MPa	(U.\PRES).	
	• psi		
Communication			
Supply pressure PZ (60.PZ)			
SIMATIC PDM Export	Name	var_PZ_value	
	DisplayValue	≜ Value	
HART communication (read)	Command	#200	
	Response Data	Bytes 2 5	
		Format: Float	
Pressure unit (U1.PUNIT)			
SIMATIC PDM Export	Name	var_pressureUnit	
	DisplayValue	• bar	
		• MPa	
		• psi	
HART communication (read)	Command	#200	
	Response Data	Byte: 1	
		Format: Enum	

Calibrate zero point

Requirement

- The positioner is depressurized.
- The displayed pressure deviation is in the following range:
 - -0.500 ... 0.500 bar
 - -0.050 ... 0.050 MPa
 - -72.51 ... 72.51 psi

Procedure

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display $\bigcirc \bigtriangleup$ simultaneously for at least 2 seconds.
- 2. Select the diagnostic value "60.PZ".
- 3. Press the \underline{A} button for at least 5 seconds and the display will show "rESEt". \Rightarrow If "0" is displayed, the calibration was successful.

 - \Rightarrow If "notoL" the calibration was not successful due to excessive pressure deviation.

4.7.11 Actuating pressure Y1 (61.P1)

Diagnostic value	Actuating pressure Y1 Short designation: 61.P1		
Function	Shows the current actuating pressure Y1.		
Note	The differential pr	essure between the ambient pressure and the output Y1 is measured.	
	If there is no actu	ating pressure, the displayed value should be approximately "0".	
	Depending on the positioner's operating altitude above sea level, the zero point of the press sensors may deviate and must be calibrated.		
Requirement	The positioner	r has pressure sensors (-Z PO2 option).	
	"Pressure mor	itoring" (U.\PRES) is activated.	
Display range	0 9.999	bar	
	0 0.999	MPa	
	0 145.00	psi	
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"	
	• MPa	(U.\PRES).	
	• psi		
Communication			
Actuating pressure Y1 (61.P1)		
SIMATIC PDM Export	Name	var_P1_value	
	DisplayValue	≜ Value	
HART communication (read)	Command	#200	
	Response Data	Bytes 6 9	
		Format: Float	
Pressure unit (U1.PUNIT)			
SIMATIC PDM Export	Name	var_pressureUnit	
	DisplayValue	• bar	
		• MPa	
		• psi	
HART communication (read)	Command	#200	
	Response Data	Byte: 1	
		Format: Enum	

Calibrate zero point

Requirement

- The positioner is depressurized.
- The displayed pressure deviation is in the following range:
 - -0.500 ... 0.500 bar
 - -0.050 ... 0.050 MPa
 - -72.51 ... 72.51 psi

Procedure

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display $\bigcirc \bigtriangleup$ simultaneously for at least 2 seconds.
- 2. Select the diagnostic value "61.P1".
- 3. Press the \underline{A} button for at least 5 seconds and the display will show "rESEt". \Rightarrow If "0" is displayed, the calibration was successful.

 \Rightarrow If "notoL" was displayed, the calibration was not successful due to excessive pressure deviation.

4.7.12 Actuating pressure Y2 (62.P2)

Diagnostic value	Actuating pressure Y2		
	Short designation: 62.P2		
Function	The diagnostic value shows the current actuating pressure Y2 value.		
Note	The differential pr	essure between the ambient pressure and the output Y2 is measured.	
	If there is no actu	ating pressure, the displayed value should be approximately "0".	
	Depending on the positioner's operating altitude above sea level, the zero point of the pressure sensors may deviate and must be calibrated.		
Requirement	The positioner	r is double-acting.	
	The positioner	r has pressure sensors (-Z PO2 option).	
	"Pressure mon	itoring" (U.\PRES) is activated.	
Display range	0 9.999	bar	
	0 0.999	MPa	
	0 145.00	psi	
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"	
	• MPa	(U.\PRES).	
	• psi		
Communication			
Actuating pressure Y2 (62.P2	2)		
SIMATIC PDM Export	Name	var_P2_value	
	DisplayValue	≜ Value	
HART communication (read)	Command	#200	
	Response Data	Bytes 10 13	
		Format: Float	
Pressure unit (U1.PUNIT)			
SIMATIC PDM Export	Name	var_pressureUnit	
	DisplayValue	• bar	
		• MPa	
		• psi	
HART communication (read)	Command	#200	
	Response Data	Byte: 1	
		Format: Enum	

Calibrate zero point

Requirement

- The positioner is depressurized.
- The displayed pressure deviation is in the following range:
 - -0,500 ... 0,500 bar
 - -0,050 ... 0,050 MPa
 - -72,51 ... 72,51 psi

Procedure

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display $\bigcirc \bigtriangleup$ simultaneously for at least 2 seconds.
- 2. Select the diagnostic value "62.P2".
- 3. Press the \underline{A} button for at least 5 seconds and the display will show "rESEt". \Rightarrow If "0" is displayed, the calibration was successful.

 \Rightarrow If "notoL" was displayed, the calibration was not successful due to excessive pressure deviation.

4.7.13 Maximum supply pressure PZ, resettable (63.PZMAX)

Diagnostic value	Maximum supply pressure PZ, resettable Short designation: 63.PZMAX		
Function	The supply pressure PZ is continuously monitored.		
	The highest measured value is displayed as the diagnostic value.		
Note	The diagnostic va	lue can be reset.	
Condition	The positioner ha	s pressure sensors (-Z PO1 or PO2 option).	
Display range	0 9.999	bar	
	0 0.999	MPa	
	0 145.00	psi	
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"	
	• MPa	(U.\PRES).	
	• psi		
Communication			
Maximum supply pressure P	Z, resettable (63.	PZMAX)	
SIMATIC PDM Export	Name	var_PZ_MaxPointerResettable	
	DisplayValue	≜ Value	
HART communication (read)	Command	#200	
	Response Data	Bytes: 14 17	
		Format: Float	
Pressure unit (U1.PUNIT)			
SIMATIC PDM Export	Name	var_pressureUnit	
	DisplayValue	• bar	
		• MPa	
		• psi	
HART communication (read)	Command	#200	
	Response Data	Byte: 1	
		Format: Enum	

4.8 Values for process diagnostics

4.8.1 Overview of values for process diagnostics

These diagnostic values show the status and the current measured values of the process diagnostics.

Process diagnostics for monitoring	Diagnostic value	Short desig- nation	Additional information
Partial Stroke Test for SIPART PS2	PST status / Measured time	12.PST	PST status / Measured time (12.PST) (Page 68)
without pressure sensors	Time since last Partial Stroke Test	13.PRPST	Time since last partial stroke test (13.PRPST) (Page 70)
• with Z P01 option	Time until next Partial Stroke Test	14.NXPST	Time until next Partial Stroke Test (14.NXPST) (Page 70)
Partial Stroke Test	PST status	12.PST	PST status (12.PST) (Page 69)
(pressure sensor-sup- ported)	Time since last Partial Stroke Test	13.PRPST	Time since last partial stroke test (13.PRPST) (Page 70)
for SIPART PS2 with op- tion -Z PO2	Time until next Partial Stroke Test	14.NXPST	Time until next Partial Stroke Test (14.NXPST) (Page 70)
Dynamic response	Dynamic control valve behavior	15.DEVI	Dynamic control valve behavior (15.DEVI) (Page 71)
Leakage and compen-	Pneumatic leakage	16.ONLK	Pneumatic leakage (16.ONLK) (Page 71)
sation (without pres- sure sensors)	Length of the leakage compensa- tion pulses	57.LCPUL	Length of the leakage compensation pulses (57.LCPUL) (Page 78)
	Period of the leakage compensation pulses	58.LCPER	Length of the leakage compensation pulses (58.LCPER) (Page 78)
Leakage	+/- Leakage at Y1	67.LMY1	+/- leakage at Y1 (67.LMY1) (Page 86)
(pressure sensor-sup- ported) for SIPART PS2with op- tion -7 P02)	+/- Leakage at Y2	68.LMY2	+/- leakage at Y2 (68.LMY2) (Page 87)
	Maximum positive leakage at Y1	69.LMUY1	Maximum positive leakage at Y1 (69.LMUY1) (Page 88)
	Maximum positive leakage at Y2	70.LMUY2	Maximum positive leakage at Y2 (70.LMUY2) (Page 89)
	Maximum negative leakage at Y1	71.LMDY1	Maximum negative leakage at Y1 (71.LMDY1) (Page 90)
	Maximum negative leakage at Y2	72.LMDY2	Maximum negative leakage at Y2 (72.LMDY2) (Page 91)
Stiction	Stiction (slipstick effect)	17.STIC	Stiction (slipstick effect) (17.STIC) (Page 72)
Deadband	Deadband UP	26.DBUP	Deadband UP (26.DBUP) / Deadband DOWN
	Deadband DOWN	27.DBDN	(27.DBDN) (Page 75)
0% endstop	Lower endstop (0% position)	18.ZERO	Endstop 0% position (18.ZERO) (Page 72)
100% endstop	Upper endstop (100% position)	19.OPEN	Endstop 100% position (19.OPEN) (Page 73)
Temperature	Current temperature	30.TEMP	Current temperature (30.TEMP) (Page 76)
	Minimum temperature	31.TMIN	Minimum temperature (31.TMIN) / Maximum
	Maximum temperature	32.TMAX	temperature (32.TMAX) (Page 77)
Total strokes	100% stroke	1.STRKS	100%- stroke (1.STRKS) (Page 66)
Direction reversal	Direction reversal	2.CHDIR	Change of direction (2.CHDIR) (Page 66)
Average value of posi- tion	Average value of position	20.PAVG	Average position value (20.PAVG) (Page 74)

Additional information on the process diagnostics \rightarrow Process diagnostics (Page 93).

Process diagnostics for monitoring	Diagnostic value	Short desig- nation	Additional information
Supply pressure PZ	Supply pressure PZ	60.PZ	Supply pressure PZ (60.PZ) (Page 79)
for SIPART PS2with op- tion -Z P01/P02)	Maximum supply pressure PZ, reset- table	63.PZMAX	Maximum supply pressure PZ, resettable (63.PZMAX) (Page 83)
	Violations of lower limit PZ, resetta- ble	64.N_MIN	Violations of lower limit PZ, resettable (64.N_MIN) (Page 84)
	Violation of upper limit PZ, resetta- ble	65.N_MAX	Violation of upper limit PZ, resettable (65.N_MAX) (Page 84)
Actuating pressure Y1	Actuating pressure Y1	61.P1	Actuating pressure Y1 (61.P1) (Page 81)
for SIPART PS2with op- tion -Z PO2)	Exceeded limit Y1, resettable	66.N1MAX	Violation of limit Y1, resettable (66.N1MAX) (Page 85)

4.8.2 100%- stroke (1.STRKS)

Diagnostic value	100% strokes			
	Short designation: 1.STRKS			
Function	The counter adds	up the movements of the actuator and shows the number of total strokes.		
	A total stroke is de to 0%.	A total stroke is defined as the distance between the position 0% to 100% and back from 100% to 0%.		
	Partial strokes are totaled in the counter. The total 200% movement is counted as 1 stroke in the diagnostic value.			
Note	The diagnostic value can be reset.			
Display range	0 4.29E9			
Communication				
SIMATIC PDM Export	Name	ps2_lift_int		
	DisplayValue	≜ Value		
HART communication (read)	Command #169			
	Response Data	Bytes: 16 19		
		Format: Unsigned-32		

4.8.3 Change of direction (2.CHDIR)

Diagnostic value	Direction changes		
	Short designatio	n: 2.CHDIR	
Function	During operation, the counter records and totals every change of direction with a movement greater than 0.25%.		
Note	The diagnostic value can be reset.		
Display range	0 4.29E9		
Communication			
SIMATIC PDM Export	Name ps2_number_dirchange		
	DisplayValue	≜ Value	

Diagnostic value	Direction changes	
	Short designatio	n: 2.CHDIR
HART communication (read)	Command	#169
	Response Data	Bytes: 12 15
		Format: Unsigned-32

4.8.4 PST status / Measured time (12.PST)

Diagnostic value	Status PST / Measured time		
	Short designation: 12.PST		
Function	The diagnostic value shows one of the following values:Status of the last Partial Stroke Tests (PST)If PST is successful: The measured time		
Note	The PST can be started manually with this diagnostic value \rightarrow With local operation: Run PST (Page 130).		
	Requirement for F	PST:	
	Successful PST ref (Page 125)	erence run \rightarrow With local operation: Configure PST and execute reference run	
Status messages at the start of the PST	notoL	No Tolerance: The actuator is outside the defined "Start position" (A1.STPOS) \pm "Start tolerance" (A2.STTOL). The PST does not start.	
	Strt	Start: After 5 seconds, manual PST is started.	
	WAIt	Wait: The PST is being executed.	
Status/display options	OFF	The PST function is deactivated.	
	C-ERR	Configuration error:	
		PST cannot be started.	
		• The settings in the parameters "Start position" (A1.STPOS), "Stroke height" (A3.STRKH) and "Stroke direction" (A4.STRKD) are not plausible.	
	FdIni	Failed PST Initialization: The PST reference run has failed.	
	norEF	The PST reference run has not yet been performed.	
	notSt	No Test: The PST has not yet been performed	
	###.#	Measured travel time (stroke time) of the PST in seconds.	
		The last PST was successfully executed.	
	SdtSt	Stopped Test: The last PST was interrupted.	
	FdtSt	Failed Test: The last PST failed.	
Factory setting	OFF		
Communication	T		
SIMATIC PDM Export	Name	ps2_pst_current_val	
	Label	Measured stroke time (12.PST)	
	DisplayValue	≜ Value, e.g. "0.69"	
HART communication (read)	Command	#171	
	Response Data	Bytes: 0 11	
		Format and meaning: \rightarrow Via HART communication: Read out diagnostic results (Page 135)	

4.8.5 PST status (12.PST)

Diagnostic value	Status PST		
	Short designation: 12.PST		
Function	The diagnostic value shows the status of the last Partial Stroke Test (PST).		
Note	The PST can be started manually with this diagnostic value → With local operation: Run F (Page 190).		
	Requirement for F	PST:	
	Successful PST ref (Page 186)	erence run \rightarrow With local operation: Configure PST and execute reference run	
Requirement	The positioner ha	s pressure sensors (-Z PO2 option).	
Status messages at the start of the PST	notoL	No Tolerance: The actuator is outside the defined "Start position" $(A1.STPOS) \pm$ "Start tolerance" (A2.STTOL). The PST does not start.	
	Strt	Start: After 5 seconds, manual PST is started.	
	WAIt	Wait: The PST is being executed.	
Status/display options	Off	The PST is deactivated.	
	C-ERR	Configuration error:	
		PST cannot be started.	
		• Settings in the "Start position" (A1.STPOS) and "End position" (Ad.EN-POS) parameters are not plausible.	
	FdIni	Failed PST Initialization: The PST reference run has failed.	
	norEF	The PST reference run has not yet been performed.	
	notSt	No Test: The PST has not yet been performed	
	oCAY	The last PST was successfully executed.	
	SdtSt	Stopped Test: The last PST was interrupted.	
	FdtSt	Failed Test: The last PST failed.	
Factory setting	Off		
Communication			
HART communication (read)	Command	#211	
	Response Data	Format and meaning: \rightarrow Via HART communication: Read out diagnostic results (Page 196)	

4.8.6 Time since last partial stroke test (13.PRPST)

Diagnostic value	Time since last Partial Stroke Test	
	Short designation: 13.PRPST	
Function	The diagnostic value shows the time since the last Partial Stroke Test (PST) in days or the status.	
Display options	###	Days since the last PST
	notSt	No Test: The PST has not yet been performed
	norEF	The PST reference run has not yet been performed.
	Sdtst	Stopped Test: The last PST was interrupted.
	FdtSt	Failed Test: The last PST failed
Unit	Days	
Communication		
SIMATIC PDM Export	Name	ps2_pst_prev_time
	DisplayValue	≜ Value
HART communication	Command	#171
	Response Data	Bytes: 12 15
		Format: Float

4.8.7 Time until next Partial Stroke Test (14.NXPST)

Diagnostic value	Time to next Partial Stroke Test	
	Short designation: 14.NXPST	
Function	The diagnostic value shows the time until the next Partial Stroke Test (PST) in days.	
Requirement	The PST is activated in "Configuration" mode.	
	• A test interval is set in the "A8.INTRV" parameter.	
Display options	Off	Factory setting or unfulfilled requirement
	###	Days until next PST
Unit	Days	
Communication		
SIMATIC PDM Export	Name	ps2_pst_next_time
	DisplayValue	≜ Value
HART communication	Command	#171
	Response Data	Bytes: 17 20
		Format: Float

Diagnostic value	Dynamic control valve behavior	
	Short designation: 15.DEVI	
Function	The diagnostic value shows the deviation between the currently determined control behavior and the expected control behavior.	
Requirement	• For firmware version 5.00 to 5.02: The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".	
	• The positioner is initialized.	
	 The process diagnostics "Monitoring of dynamic control valve behavior" (b.\DEVI) is activated. 	
Display range	0.0 100.0	
Unit	%	
Communication		
SIMATIC PDM Export	Name	ps2_devi_value
	DisplayValue	≜ Value
HART communication (read)	Command	#171
	Response Data	Bytes: 30 33
		Format: Float

4.8.8 Dynamic control valve behavior (15.DEVI)

4.8.9 Pneumatic leakage (16.ONLK)

Diagnostic value	Pneumatic leakage	
	Short designation: 16.ONLK	
Function	The diagnostic value shows the current additional compressed air consumption caused by leakage.	
Requirement	The process diagnostics "Monitoring of pneumatic leakage" (C.\LEAK) is activated.	
Display range	0 100	
Unit	%	
Communication		
SIMATIC PDM Export	Name	ps2_leak_online_val
	DisplayValue	≜ Value
HART communication (read)	Command	#171
	Response Data	Bytes: 34 37
		Format: Float

4.8.10 Stiction (slipstick effect) (17.STIC)

Diagnostic value	Stiction (slipstick)	
	Short designation: 17.STIC	
Function	The diagnostic value shows jerky changes in the process valve position, known as slip jumps, as a percentage of the travel distance.	
Note	Jerky changes in the process valve position indicate excessive stiction.	
Requirement	The process diagnostics "Monitoring of stiction (slipstick effect)" (d.\STIC) is activated.	
Display range	0100	
Unit	%	
Communication		
SIMATIC PDM Export	Name	ps2_slip_stick_value
	DisplayValue	≜ Value
HART communication (read)	Command	#171
	Response Data	Bytes: 38 41
		Format: Float

4.8.11 Endstop 0% position (18.ZERO)

Diagnostic value	Endstop 0-%-Position			
	Short designation: 18.ZERO			
Function	The diagnostic value shows the percentage by which the mechanical endstop at the 0% posi- tion has changed compared to the value at initialization.			
Requirement	• The application parameter "39.YCLS" is set to one of the following values: "do", "uP do", "Fd", "Fu Fd", "uP Fd", "Fu do".			
	• The "Monitorin	ng 0% stop" (F.\ZERO) process diagnostics is activated.		
Display range	0.0 100.0			
Unit	%			
Communication				
SIMATIC PDM Export	Name	ps2_zero_value		
	DisplayValue	_≙		
		Value		
HART communication (read)	Command	#171		
	Response Data	Bytes: 42 45		
		Format: Float		
4.8.12	Endstop	100%	position	(19.0PEN)
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				• •

Diagnostic value	Endstop 100-%-Pe	Endstop 100-%-Position	
	Short designation	n: 19.OPEN	
Function	The diagnostic value shows the percentage by which the mechanical endstop at the 100% position has changed compared to the value at initialization.		
Requirement	• The application parameter "39.YCLS" is set to one of the following values: "uP", "uP do", "Fu", "Fu Fd", "uP Fd", "Fu do".		
	• The "100% end	dstop monitoring" process diagnostics (G.\OPEN) is activated.	
Display range	0.0 100.0	0.0 100.0	
Unit	%		
Communication			
SIMATIC PDM Export	Name	ps2_open_value	
	DisplayValue	≜ Value	
HART communication (read)	Command	#171	
	Response Data	Bytes: 46 49	
		Format: Float	

4.8.13 Average position value (20.PAVG)

Diagnostic value	Average position value	
	Short designation: 20.PAVG	
Function	The diagnostic value shows the status of the process diagnostics "Monitoring of average po- sition value" (P.\PAVG) or the last calculated average position value of the valve position during the time base set in the process diagnostics.	
Display options	OFF	The process diagnostics "Monitoring of average position value" (P.\PAVG) is deactivated.
	IdLE	The process diagnostics "Monitoring of average position value" (P.\PAVG) is activated but not yet started.
	rEF	Process diagnostics "Monitoring of average position value" (P.\PAVG) has been started and the reference average value "P2.STATE" is currently being calculated.
	COMP	The current average position value of the valve is currently being calculated.
	0.0 100.0	Calculated average position value
Unit	%	
Communication		
SIMATIC PDM Export	Name	ps2_pos_avg_value
	DisplayValue	≜ Value
HART communication (read)	Command	#171
	Response Data	Bytes: 26 29
		Format: Float

See also

Monitoring the position average value (P.\PAVG) (Page 435)

4.8.14 Deadband UP (26.DBUP) / Deadband DOWN (27.DBDN)

Diagnostic value	Deadband UP		
	Short designation: 26.DBUP		
	Deadband DOWN		
	Short designatio	n: 27.DBDN	
Function	The diagnostic va	lues show the deadband of the positioner as a percentage:	
	"Deadband UP	" (26.DBUP) in direction 100% position	
	"Deadband DC	OWN" (27.DBDN) in direction 0% position	
Note	The values either of or, if "34.DEBA" is	correspond to the manually set value of the application parameter "34.DEBA" set to "Auto", the value automatically adapted by the positioner.	
Display range	0.1 10.0		
Unit	%		
Communication			
Deadband UP (26.DBUP)			
SIMATIC PDM Export	Name	ps2_dead_up_act	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Bytes: 0 3	
		Format: Float	
Deadband DOWN (27.DBDN)		-	
SIMATIC PDM Export	Name	ps2_dead_down_act	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Bytes: 4 7	
		Format: Float	

4.8.15 Current temperature (30.TEMP)

Diagnostic value	Current temperature	
	Short designatio	n: 30.TEMP
Function	The diagnostic va	lue shows the current temperature in the positioner enclosure.
Note	The temperate	ure sensor is located in the enclosure on the electronics board.
	• In order to sw the display.	itch over the temperature display between °C and °F: Press the $\underline{\mathbb{A}}$ button on
Display range	-50 100	°C
	-58 212	°F
Unit	• °C	
	• °F	
Communication		
Current temperature (30.TEM	ЛР)	
SIMATIC PDM Export	Name	ps2_temp
	DisplayValue	≜ Value
	Unit	≜ Unit
HART communication (read)	Command	#169
	Response Data	Bytes: 38 41
		Format: Float
Temperature unit (H1/J1.TUN	NIT)	
SIMATIC PDM Export	Name	ps2_unit_temp_code
	DisplayValue	• °C
		• °F
HART communication (read)	Command	#169
	Response Data	Byte: 37
		Format: Enum

4.8.16 Minimum temperature (31.TMIN) / Maximum temperature (32.TMAX)

Diagnostic value	Minimum temperature		
	Short designation: 31.TMIN		
	Maximum temperature		
	Short designation	n: 32.TMAX	
Function	The minimum tem ously determined	nperature and the maximum temperature inside the enclosure are continu- and stored in the manner of a drag indicator.	
Note	• To change the display.	temperature display between °C and °F to switch: Press the $\underline{\mathbb{A}}$ button on the	
	The determine	d values can only be reset in the factory.	
Display range	-50 100	°C	
	-58 212	°F	
Unit	• °C		
	• °F		
Communication			
Minimum temperature (31.T	MIN)		
SIMATIC PDM Export	Name	ps2_tmin	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Bytes: 42 45	
		Format: Float	
Maximum temperature (32.1	(MAX)		
SIMATIC PDM Export	Name	ps2_tmax	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Bytes: 46 49	
		Format: Float	
Temperature unit (H1/J1.TU	NIT)		
SIMATIC PDM Export	Name	ps2_unit_temp_code	
	DisplayValue	• °C	
		• °F	
HART communication (read)	Command	#169	
	Response Data	Byte: 37	
		Format: Enum	

4.8.17 Length of the leakage compensation pulses (57.LCPUL)

Diagnostic value	Length of the leakage compensation pulse		
	Short designatio	n: 57.LCPUL	
Function	The diagnostic va	The diagnostic value shows the length of the compensation pulses in milliseconds.	
	The sign indicates the control direction of the pulse.		
Requirement	The process diagn	ostics "Monitoring of pneumatic leakage" (C.\LEAK) is activated.	
Display range	-256 254		
Factory setting	0	0	
Unit	ms (millisecond)		
Communication			
SIMATIC PDM Export	Name	var_LeakagePulsLength	
	DisplayValue	≜ Value	
HART communication (read)	Command	#169	
	Response Data	Byte 60	
		Format: Signed-8	

4.8.18 Length of the leakage compensation pulses (58.LCPER)

Diagnostic value	Period of the leakage compensation pulse	
	Short designation	n: 58.LCPER
Function	The diagnostic val	lue shows the cycle duration of the leakage compensation pulses.
Requirement	The process diagn	ostics "Monitoring of pneumatic leakage" (C.\LEAK) is activated.
Display range	0.00 600.00	
Factory setting	0.00	
Unit	s (second)	
Communication	•	
SIMATIC PDM Export	Name	var_LeakagePeriod
	DisplayValue	≜ Value
HART communication (read)	Command	#169
	Response Data	Bytes 60 64
		Format: Float

4.8.19 Supply pressure PZ (60.PZ)

Diagnostic value	Supply pressure	PZ
	Short designatio	n: 60.PZ
Function	The diagnostic value shows the current supply pressure PZ.	
Note	The differential pr	essure between the ambient pressure and the input PZ is measured.
	If there is no supp	ly pressure, the displayed value should be approximately "0".
	Depending on the sensors may devia	positioner's operating altitude above sea level, the zero point of the pressure ate and must be calibrated.
Requirement	The positioner	r has pressure sensors (-Z P01 or P02 option).
	"Pressure mon	itoring" (U.\PRES) is activated.
Display range	0 9.999	bar
	0 0.999	MPa
	0 145.00	psi
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"
	• MPa	(U.\PRES).
	• psi	
Communication		
Supply pressure PZ (60.PZ)		
SIMATIC PDM Export	Name	var_PZ_value
	DisplayValue	≜ Value
HART communication (read)	Command	#200
	Response Data	Bytes 2 5
		Format: Float
Pressure unit (U1.PUNIT)		
SIMATIC PDM Export	Name	var_pressureUnit
	DisplayValue	• bar
		• MPa
		• psi
HART communication (read)	Command	#200
	Response Data	Byte: 1
		Format: Enum

Calibrate zero point

Requirement

- The positioner is depressurized.
- The displayed pressure deviation is in the following range:
 - -0.500 ... 0.500 bar
 - -0.050 ... 0.050 MPa
 - -72.51 ... 72.51 psi

Procedure

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display $rac{1}{r}$ simultaneously for at least 2 seconds.
- 2. Select the diagnostic value "60.PZ".
- 3. Press the \underline{A} button for at least 5 seconds and the display will show "rESEt". \Rightarrow If "0" is displayed, the calibration was successful.

 - \Rightarrow If "notoL" the calibration was not successful due to excessive pressure deviation.

4.8.20 Actuating pressure Y1 (61.P1)

Diagnostic value	Actuating pressu	ire Y1
	Short designatio	n: 61.P1
Function	Shows the current actuating pressure Y1.	
Note	The differential pressure between the ambient pressure and the output Y1 is measu	
	If there is no actu	ating pressure, the displayed value should be approximately "0".
	Depending on the sensors may devia	positioner's operating altitude above sea level, the zero point of the pressure ate and must be calibrated.
Requirement	The positioner	r has pressure sensors (-Z PO2 option).
	"Pressure mon	itoring" (U.\PRES) is activated.
Display range	0 9.999	bar
	0 0.999	MPa
	0 145.00	psi
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"
	• MPa	(U.\PRES).
	• psi	
Communication		
Actuating pressure Y1 (61.P1)	
SIMATIC PDM Export	Name	var_P1_value
	DisplayValue	≜ Value
HART communication (read)	Command	#200
	Response Data	Bytes 6 9
		Format: Float
Pressure unit (U1.PUNIT)		
SIMATIC PDM Export	Name	var_pressureUnit
	DisplayValue	• bar
		• MPa
		• psi
HART communication (read)	Command	#200
	Response Data	Byte: 1
		Format: Enum

Calibrate zero point

Requirement

- The positioner is depressurized.
- The displayed pressure deviation is in the following range:
 - -0.500 ... 0.500 bar
 - -0.050 ... 0.050 MPa
 - -72.51 ... 72.51 psi

Procedure

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display $rac{1}{rac{2}}$ simultaneously for at least 2 seconds.
- 2. Select the diagnostic value "61.P1".
- 3. Press the \underline{A} button for at least 5 seconds and the display will show "rESEt". \Rightarrow If "0" is displayed, the calibration was successful.

 \Rightarrow If "notoL" was displayed, the calibration was not successful due to excessive pressure deviation.

4.8.21 Maximum supply pressure PZ, resettable (63.PZMAX)

Diagnostic value	Maximum supply pressure PZ, resettable	
	Short designatio	n: 63.PZMAX
Function	The supply pressure PZ is continuously monitored.	
	The highest meas	ured value is displayed as the diagnostic value.
Note	The diagnostic va	lue can be reset.
Condition	The positioner has	s pressure sensors (-Z PO1 or PO2 option).
Display range	0 9.999	bar
	0 0.999	MPa
	0 145.00	psi
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"
	• MPa	(U.\PRES).
	• psi	
Communication		
Maximum supply pressure P	Z, resettable (63.	PZMAX)
SIMATIC PDM Export	Name	var_PZ_MaxPointerResettable
	DisplayValue	≜ Value
HART communication (read)	Command	#200
	Response Data	Bytes: 14 17
		Format: Float
Pressure unit (U1.PUNIT)		
SIMATIC PDM Export	Name	var_pressureUnit
	DisplayValue	• bar
		• MPa
		• psi
HART communication (read)	Command	#200
	Response Data	Byte: 1
		Format: Enum

4.8.22 Violations of lower limit PZ, resettable (64.N_MIN)

Diagnostic value	Violations of lower limit PZ, resettable	
	Short designation: 64.N_MIN	
Function	If the supply pressure PZ exceeds the limit in the U5.PZMLL of the "Pressure monitoring" process diagnostics (U.\PRES) parameter, the event counter of the diagnostic value "64.N_MIN" is incremented.	
Note	The diagnostic va	lue can be reset at the same time as the "65.N_MAX" diagnostic value.
Requirement	The positioner has	s firmware version 5.02 or higher.
Display range	0 99 999	
Communication		
SIMATIC PDM Export	Name	var_PZ_NoLimitUnderrunResettable
	DisplayValue	≜ Value
HART communication (read)	Command	#200
	Response Data	Bytes: 18 19
		Format: Unsigned-16

4.8.23 Violation of upper limit PZ, resettable (65.N_MAX)

Diagnostic value	Violations of upper limit PZ, resettable			
	Short designatio	n: 65.N_MAX		
Function	If the supply pressure PZ exceeds the limit in the U6.PZMUL parameter of the "Pressure moni- toring" process diagnostics (U.\PRES), the event counter of the diagnostic value "65.N_MAX" is incremented.			
Note	The diagnostic value can be reset at the same time as the "64.N_MIN" diagnostic value.			
Requirement	The positioner has firmware version 5.02 or higher.			
Display range	0 99 999			
Communication				
SIMATIC PDM Export	Name	var_PZ_NoLimitOverrunResettable		
	DisplayValue	≜ Value		
HART communication (read)	Command	#200		
	Response Data Bytes: 20 21			
		Format: Unsigned-16		

4.8.24 Violation of limit Y1, resettable (66.N1MAX)

Diagnostic value	Violations of limit Y1, resettable				
	Short designation: 66.N1MAX				
Function	If the actuating pressure Y1 exceeds the limit in the "U7.PCL" parameter of the "Pressure mon- itoring" (U.\PRES) process diagnostics, the event counter of the diagnostic value "66.N1MAX" is incremented.				
Note	The diagnostic va	The diagnostic value can be reset.			
Requirement	The positioner has firmware version 5.03 or higher.				
Display range	0 99 999				
Communication					
SIMATIC PDM Export	Name	var_P1_NoLimitReachedResettable			
	DisplayValue	≜ Value			
HART communication (read)	Command	#200			
	Response Data Bytes: 22 23				
		Format: Unsigned-16			

4.8.25 +/- leakage at Y1 (67.LMY1)

Diagnostic value	+/- Leakage at Y1			
	Short designation: 67.LMY1			
Function	The diagnostic value shows the pressure increase or decrease (leakage) per minute for the actuating pressure Y1.			
Note	The diagnostic	The diagnostic value is determined in the controlled state.		
	• Positive values indicate an increase in pressure, e.g. in the event of pneumatic leakage between supply pressure PZ and actuating pressure Y1.			
	• Negative values indicate a decrease in pressure, e.g. if the pneumatic system is leaking.			
Requirement	The positioner has	s pressure sensors (Z PO2 option).		
Display range	±0.000 9.999	bar/min		
	±0.000 0.999	MPa/min		
	±0.00 99.99	psi/min		
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"		
	• MPa/min	(U.\PRES).		
	• psi/min			
Communication				
+/- Leakage at Y1 (67.LMY1)				
SIMATIC PDM Export	Name	var_LM_LeakageRateChamber1		
	DisplayValue	≜ Value		
HART communication (read)	Command	#200		
	Response Data	Bytes: 24 27		
		Format: Float		
Pressure unit (U1.PUNIT)	-			
SIMATIC PDM Export	Name	var_pressureUnit		
	DisplayValue	• bar		
		• MPa		
		• psi		
HART communication (read)	Command	#200		
	Response Data	Byte: 1		
		Format: Enum		

4.8.26 +/- leakage at Y2 (68.LMY2)

Diagnostic value	+/- Leakage at Y2			
	Short designation: 68.LMY2			
Function	The diagnostic value shows the pressure increase or decrease (leakage) per minute for the actuating pressure Y2.			
Note	The diagnostic	value is determined in the controlled state.		
	• Positive values indicate an increase in pressure, e.g. in the event of pneumatic leakage between supply pressure PZ and actuating pressure Y2.			
	• Negative values indicate a decrease in pressure, e.g. if the pneumatic system is leaking.			
Requirement	The positioner	is double-acting.		
	The positioner	has pressure sensors (-Z PO2 option).		
Display range	±0.000 9.999	bar/min		
	±0.000 0.999	MPa/min		
	±0.00 99.99	psi/min		
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"		
	• MPa/min	(U.\PRES).		
	• psi/min			
Communication	•			
+/- Leakage at Y2 (68.LMY2)				
SIMATIC PDM Export	Name	var_LM_LeakageRateChamber2		
	DisplayValue	≜ Value		
HART communication (read)	Command	#200		
	Response Data	Bytes: 28 31		
		Format: Float		
Pressure unit (U1.PUNIT)	1			
SIMATIC PDM Export	Name	var_pressureUnit		
	DisplayValue	• bar		
		• MPa		
		• psi		
HART communication (read)	Command	#200		
	Response Data	Byte: 1		
		Format: Enum		

4.8.27 Maximum positive leakage at Y1 (69.LMUY1)

Diagnostic value	Maximum positive leakage at Y1			
	Short designation: 69.LMUY1			
Function	The pressure char	nge at Y1 is continuously monitored in the controlled state.		
	The maximum pressure increase is determined and stored in the manner of a drag pointer.			
Note	The diagnostic va	lue can be reset.		
Requirement	The positioner ha	s pressure sensors (-Z PO2 option).		
Display range	±0.000 9.999	bar/min		
	±0.000 0.999	MPa/min		
	±0.00 99.99	psi/min		
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"		
	• MPa/min	(U.\PRES).		
	• psi/min			
Communication				
Maximum positive leakage a	it Y1 (69.LMUY1)			
SIMATIC PDM Export	Name	var_LM_P1DeltaPresMaxPointerResettable		
	DisplayValue	≜ Value		
HART communication (read)	Command	#200		
	Response Data	Bytes: 32 35		
		Format: Float		
Pressure unit (U1.PUNIT)				
SIMATIC PDM Export	Name	var_pressureUnit		
	DisplayValue	• bar		
		• MPa		
		• psi		
HART communication (read)	Command	#200		
	Response Data	Byte: 1		
		Format: Enum		

4.8.28 Maximum positive leakage at Y2 (70.LMUY2)

Diagnostic value	Maximum positive leakage at Y2				
	Short designatio	n: 70.LMUY2			
Function	The pressure char	ge at Y2 is continuously monitored in the controlled state.			
	The maximum pressure increase is determined and stored in the manner of a drag pointer.				
Note	The diagnostic va	lue can be reset.			
Requirement	The positioner	is double-acting.			
	The positioner	has pressure sensors (-Z PO2 option).			
Display range	±0.000 9.999	bar/min			
	±0.000 0.999	MPa/min			
	±0.00 99.99	psi/min			
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"			
	• MPa/min	(U.\PRES).			
	• psi/min				
Communication	1				
Maximum positive leakage a	t Y2 (70.LMUY2)				
SIMATIC PDM Export	Name	var_LM_P2DeltaPresMaxPointerResettable			
	DisplayValue	≜ Value			
HART communication (read)	Command	#200			
	Response Data	Bytes: 36 39			
		Format: Float			
Pressure unit (U1.PUNIT)	1				
SIMATIC PDM Export	Name	var_pressureUnit			
	DisplayValue	• bar			
		• MPa			
		• psi			
HART communication (read)	Command	#200			
	Response Data	Byte: 1			
		Format: Enum			

4.8.29 Maximum negative leakage at Y1 (71.LMDY1)

Diagnostic value	Maximum negative leakage at Y1			
	Short designatio	n: 71.LMDY1		
Function	The pressure change at Y1 is continuously monitored in the controlled state.			
	The maximum pre	essure drop is determined and stored in the manner of a drag pointer.		
Note	The diagnostic va	ue can be reset.		
Requirement	The positioner has	s pressure sensors (-Z PO2 option).		
Display range	±0.000 9.999	bar/min		
	±0.000 0.999	MPa/min		
	±0.00 99.99	psi/min		
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"		
	• MPa/min	(U.\PRES).		
	• psi/min			
Communication				
Maximum negative leakage	at Y1 (71.LMDY1)			
SIMATIC PDM Export	Name	var_LM_P1DeltaPresMinPointerResettable		
	DisplayValue	≜ Value		
HART communication (read)	Command	#200		
	Response Data	Bytes: 40 43		
		Format: Float		
Pressure unit (U1.PUNIT)	-			
SIMATIC PDM Export	Name	var_pressureUnit		
	DisplayValue	• bar		
		• MPa		
		• psi		
HART communication (read)	Command	#200		
	Response Data	Byte: 1		
		Format: Enum		

4.8.30 Maximum negative leakage at Y2 (72.LMDY2)

Diagnostic value	Maximum negative leakage at Y2				
	Short designation: 72.LMDY2				
Function	The pressure change at Y2 is continuously monitored in the controlled state.				
	The maximum pre	essure drop is determined and stored in the manner of a drag pointer.			
Note	The diagnostic va	lue can be reset.			
Requirement	The positioner	is double-acting.			
	The positioner	has pressure sensors (-Z PO2 option).			
Display range	±0.000 9.999	bar/min			
	±0.000 0.999	MPa/min			
	±0.00 99.99	psi/min			
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"			
	• MPa/min	(U.\PRES).			
	• psi/min				
Communication					
Maximum negative leakage	at Y2 (72.LMDY2)				
SIMATIC PDM Export	Name	var_LM_P2DeltaPresMinPointerResettable			
	DisplayValue	≜ Value			
HART communication (read)	Command	#200			
	Response Data	Bytes: 44 47			
		Format: Float			
Pressure unit (U1.PUNIT)	1				
SIMATIC PDM Export	Name	var_pressureUnit			
	DisplayValue	• bar			
		• MPa			
		• psi			
HART communication (read)	Command	#200			
	Response Data	Byte: 1			
		Format: Enum			

5.1 Definition of process diagnostics

Process diagnostics monitor the valve, consisting of positioner, actuator and valve, during active operation.

Up to 3 thresholds for messages can be set for monitoring.

The results allow conclusions to be drawn about the condition and operating behavior of the valve.

Required maintenance work can be identified before the valve fails and maintenance cycles can be adapted to the condition of the valve.

The data and results of the process diagnostics are stored in the positioner for up to 30 months and can be read out via HART communication.

With Device Manager Software, e.g. SIMATIC PDM, the data can be displayed graphically and exported.

Note

Display of the process diagnostics

The display of the process diagnostics is deactivated in the factory setting: The application parameter "52.XDIAG" is set to "Off".

The process diagnostics are displayed if the setting "On1", "On2" or "On3" is activated in application parameter "52.XDIAG".

5.2 Activate extended diagnostics (52.XDIAG) and set the number of messages

Function of the application parameter "Extended diagnostics" (52.XDIAG)

The SIPART PS2 positioner has several process diagnostics. With the factory setting of the positioner, the "Extended diagnostics" (52.XDIAG) parameter is deactivated and the process diagnostics are not visible on the display.

After changing the parameter "52.XDIAG" from "Off" to "On1", "On2" or "On3", the process diagnostics are visible and can be activated individually. The setting applies to all process diagnostics.

After setting "52.XDIAG" to "On1", "On2" or "On3", up to 3 thresholds for messages can be set for the process diagnostics.

Note

When using the Digital I/O Module (DIO) for the alarm function "44.AFCT"

- With setting "52.XDIAG" = "On3": The "A1" and "A2" alarms are not output via the Digital I/-O Module (DIO) output.
- With setting "52.XDIAG" = "On2": Only the "A1" alarm is output the digital output "DO1".
- With setting "52.XDIAG" = "On1": The "A1" alarm is output at the digital output "DO1". The "A2" alarm is output at the digital output "DO2".

Regardless of the use of the Digital I/O Module (DIO), the alarms "A1" and "A2" are output via the communication interface.

Note

When using HART communication

If one of the thresholds is exceeded and the setting is changed from "52.XDIAG" to "On1", "On2" or "On3":

- A readable entry with a timestamp is created in the alarm logbook of the positioner.
- The "more status available" bit is set.
- Request the specific message for process diagnostics with the HART command "#48".

Table 5-1	Application parameter "52.XDIAG"

Setting	Description
Off	The display of the process diagnostics is deactivated.
	The messages are deactivated.
On1	The process diagnostics are displayed.
	• 1-stage message for all process diagnostics: The threshold 3 messages are activated.
	• If threshold 3 is exceeded:
	 A specific process diagnostics message is shown on the display.
	- With the optional Digital I/O Module (DIO): The "Fault signal output" is activated.

Setting	Description				
On2	•	The process diagnostics are displayed.			
	•	2-stage message for all process diagnostics: Threshold 2 messages and threshold 3 messages are activated.			
	•	If threshold 2 is exceeded:			
		 A specific process diagnostics message is shown on the display. 			
		- With the optional Digital I/O Module (DIO): The digital output "DO2" is activated.			
	•	If threshold 3 is exceeded:			
		 The threshold 2 message is not issued. 			
		 A specific process diagnostics message is shown on the display. 			
		 With the optional Digital I/O Module (DIO): The "Fault signal output" is activated. The digital output "DO2" is deactivated. 			
On3	•	The process diagnostics are displayed.			
	•	3-stage message for all process diagnostics: Threshold 1 messages, threshold 2 messages and threshold 3 messages are activated.			
	•	If threshold 1 is exceeded:			
		 A specific process diagnostics message is shown on the display. 			
		- With the optional Digital I/O Module (DIO): The digital output "DO1" is activated.			
	If threshold 2 is exceeded:				
	 The threshold 1 message is not issued. 				
		 A specific process diagnostics message is shown on the display. 			
		 With the optional Digital I/O Module (DIO): The digital output "DO2" is activated. The digital output "DO1" is deactivated. 			
	•	If threshold 3 is exceeded:			
		 The threshold 1 message and the threshold 2 message are not issued. 			
		 A specific process diagnostics message is shown on the display. 			
		 With the optional Digital I/O Module (DIO): The "Fault signal output" is activated. The digital outputs "DO1" and "DO2" are deactivated. 			

Activate the application parameter "Extended diagnostics" (52.XDIAG)

The parameter can be activated with the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the application parameter "52.XDIAG".
- 3. For "52.XDIAG", set the value to "On1", "On2" or "On3". \Rightarrow The process diagnostics "A.\PST" to "U.\PRES" appear on the display.

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. Select the directory "Device > Maintenance and Diagnostics > Extended diagnostics".

🖊 SIP	ART F	S2			- 0	×
File	Dev	ice View Diagnostics Ma	intenar	nce Help	SIMATIC PDM V9.2 SP2 Process Device Ma	nager
	40	Download to device		?		
	t]	Upload to PG/PC			Parameter Valu	e
÷.	'n	Assign address and TAG			Maintenance & Diagnostics	
	<u>۵۱۵</u>	Value comparison			Activation of extended diagnostics (52.XDIAG) Off	
		Object properties			Pressure monitoring (U.\PRES) On	
	8	Calibration log			Pressure monitoring	
		Change Log			Triggered pressure monitoring	
	1	Set device checked			⊕Offline leakage test	
	-	Check configuration			Diagnostic values	
	È	Templates			Offline test reports	
		Wizards				
		Operation	•			
		Setup	•			
		Maintenance and Diagnostics	•	Extended dia	agnostics	
		Communication		Pressure mo	nitoring	
				Triggered pr	essure monitoring	
				Offline leaka	age test	
				Diagnostic v	/alues	>
z004skz	d SI	PART PS2 🖌	(_	Online	e access $arphi$ Diagnosis Update $arphi$ Identity Check $arphi$	

 \Rightarrow The "Extended diagnostics" dialog is displayed.

3. For "Activation of extended diagnostics" (52.XDIAG), set the value to "On1", "On2" or "On3".



 \Rightarrow The messages are activated and the status of the process diagnostics "A.\PST" to "P.\PAVG" is displayed.

SIPART PS2 - Extended diagnostics						? ×
SIEMENS					E	GOOD 🔽 - 🚺 Î
Activation of extended diagnostics (52 XDIAG). On 3 three	e-stage alam)					~ <i>0</i>
Overview Partial Stroke Test (A.\PST):	Off	- 1I	Monitoring of upper endatop (G.\OPEN):	Off	v 11	
Monitoring of dynamic control valve behavior (b.\DEVI):	Off	- 11	Monitoring of lower limit temperature (H \TMIN):	Off	■ 11	
Monitoring/compensation of pneumatic leakage (C.\LEAK):	Off	v 11	Monitoring of upper limit temperature (J $\TMAX)$	Off	· 11	
Monitoring etiction (algotick effect) (d \STIC):	Off	· 11	Monitoring number of total strokes (L\STRK):	Of	V 11	
Deadband monitoring (E.\DEBA):	Off	1	Monitoring number of direction changes (D.\DCHG):	Off	v 11	
Monitoring of lower endstop (F.\ZERO):	Off	- 1 1	Monitoring of average position value (P.\PAVG):	Of	v 11	
Transfer Messages Print						Close

- 4. Save the change with the "Transfer" button.
- 5. Close the dialog.

5.3 Overview of process diagnostics

5.3 Overview of process diagnostics

The process diagnostics available in the positioner depend on the following general conditions:

- Firmware version of the positioner
- Features of the positioner: Without pressure sensor or with pressure sensors (-Z P01/P02 options)

Process diagnostics for Sho		Diagnostics a	pplicable for	Additional information			
monitoring	designa-	Positioner SIP	ART PS2				
	tion	Without pressure sensor	With pressure sensor (Z P01 option)	With pressure sensors (Z P02 option)			
Partial Stroke Test (without pressure sen- sors)	A.\PST	X	x	Only with U.\PRES = Off	Partial Stroke Test (without pressure sensors) (Page 99)		
Partial Stroke Test (pressure sensor-suppor- ted)	A.\PST	-	-	x	Partial Stroke Test (pressure sensor- supported) (Page 149)		
Dynamic response	b.\DEVI	x	X	x	Monitoring of dynamic control valve behavior (b.\DEVI) (Page 212)		
Leakage and compensa- tion	C.\LEAK	x	X	x	Monitoring/compensation of pneu- matic leakage (C.\LEAK) (Page 237)		
Leakage (pressure sensor-suppor- ted)	U.\PRES	-	-	x	Monitoring of pneumatic leakage (pressure sensor-supported) (Page 261)		
Stiction	d.\STIC	x	x	x	Monitoring of stiction (slipstick) (d.\STIC) (Page 293)		
Deadband	E.\DEBA	x	x	x	Monitoring of deadband "E.\DEBA" (Page 314)		
0% endstop	F.\ZERO	x	X	x	Monitoring 0% stop (F.\ZERO) (Page 335)		
100% endstop	G.\OPEN	X	X	x	Monitoring 100% endstop (G.\OPEN) (Page 357)		
Temperature	H.\TMIN, J.\TMAX	x	X	X	Monitoring of lower limit tempera- ture (H.\TMIN) and upper limit tem- perature (J.\TMAX) (Page 379)		
Total strokes	L.\STRK	x	X	x	Monitoring the number of total strokes (L.\STRK) (Page 405)		
Direction reversal	O.\DCHG	X	Х	x	Monitoring the number of changes in direction (O.\DCHG) (Page 421)		
Average value of posi- tion	P.\PAVG	X	X	x	Monitoring the position average val- ue (P.\PAVG) (Page 435)		
Supply pressure PZ (pressure sensor-suppor- ted)	U.\PRES	-	x	x	Monitoring of supply pressure PZ (pressure sensor-supported) (Page 451)		
Actuating pressure Y1 (pressure sensor-suppor- ted)	U.\PRES	-	-	x	Monitoring actuating pressure Y1 (pressure sensor-supported) (Page 481)		

5.4.1 Functional description

The Partial Stroke Test (PST) is used on valves with single-acting actuators on valves, e.g. on safety valves.

During a PST reference run, the time required for a defined reference distance is measured and a distance-time diagram is recorded.

In the following PSTs, the measured time is compared with the time of the reference run.

The determined time difference can be monitored with adjustable thresholds.

If these thresholds are exceeded, messages are output via the display and optionally via the digital contacts or HART communication.

The distance-time diagram of the last executed PST is saved in the positioner and can be read out.

If the PST is repeated regularly, characteristic curves can be compared with each other and changes over time can be determined.

Regular movement of the process valve can prevent the valve from getting stuck.

The PST is configured and executed with Device Manager Software, e.g. SIMATIC PDM. The software can be used to read PST data from the positioner and display it as charts.

Local configuration via the display and buttons is also possible.

Diagnostic values for PST:

- PST status / Measured time (12.PST)
- Time since last partial stroke test (13.PRPST)
- Time until next Partial Stroke Test (14.NXPST)

The PST can be started via:

- Local operation
- Remote operation with a Device Manager Software e.g. SIMATIC PDM
- Digital input "DI1" or "DI2"
- Remote operation via HART communication
- Cyclic test interval

5.4.2 Activate PST

Requirement

The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

"Partial Stroke Test (A.\PST)" parameter

Function	The param	parameter activates or deactivates the Partial Stroke Test (PST).			
Setting options	Off	Process diagnostics are deactivated.			
	On	Process diagnostics is activated.			
Factory setting Off					

Remote operation with SIMATIC PDM

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SIF	PART	952					-	-		×
File	Dev	ice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Device	e Manager	r
	+I	Download to device		?						
	t[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
<u> </u>	Ţ	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison				Identification				
		Object properties				TAG	DEMOKOFF		1	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
						Data	1/29/2024		†	

3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".

- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2			_		×
File Device View Diagnostics	Maintenance Help SIMATIC PDN	V9.2 SP2 Proc	ess Devid	ce Manage	er
🔜 昌 40 👊 🖻 🔛 💿 🖪 🗄					
⊡	Parameter	Value	Unit	Status	^
SIPART PS2 DR8 HART	Maintenance & Diagnostics	1		_	
	Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage		t	-
🗄 🖉 Maintenance & Diagnostics	Pressure monitoring (U.\PRES)	Off		1	
······‡ Communication	Partial Stroke Test (A.\PST)	On 🗸		1	
	Monitoring of dynamic control valve behavior (b.\DEVI)	Off		1	
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	On		‡	
	Monitoring stiction (slipstick effect) (d.\STIC)	Off		1	
	Deadband monitoring (E.\DEBA)	Off		‡	
	Monitoring of lower endstop (F.\ZERO)	Off		ţ.	
	Monitoring of upper endstop (G.\OPEN)	Off		1	
	Monitoring of lower limit temperature (H.\TMIN)	Off		‡]	
	Monitoring of upper limit temperature (J.\TMAX)	Off		1	
	Monitoring number of total strokes (L.\STRK)	Off		‡]	
	Monitoring number of direction changes (O.\DCHG)	Off		‡]	
	Monitoring of average position value (P.\PAVG)	Off		‡]	
	E Partial Stroke Test				
	Start position (A1.STPOS)	100.0	%	‡]	
	Start tolerance (A2.STTOL)	2.0	%	‡]	
	Stroke height (A3.STRKH)	10.0	%	‡]	
	Stroke direction (A4.STRKD)	DO (down only)		1	
	Ramp mode (A5.RPMD)	Off		1	
	Ramp rate (A6.RPRT)	1.0	%/s	1	
	Behavior after failed PST (A7.FLBH)	No reaction> 'A		1	
	Factor 1 (AA.FACT1)	1.5		1	
	Factor 2 (Ab.FACT2)	3.0		1	
	Factor 3 (AC.FACT3)	5.0		1	
	Test interval (A8.INTRV)	OFF	Days	1	
	□ □ Offline leakage test				\
z004skzd SIPART PS2 🖌	🛛 Online access 🖌 🛛 Diagnosis Update 🖌 🛛 Ide	ntity Check 🖌			0.,

6. Select the "Maintenance & Diagnostics" directory.

- For "Partial Stroke Test (A.\PST)", set the value to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 8. In the "Device" menu, select the command "Download to device...".
- 9. Select the check box "Load changed parameters only".
- 10. In the dialog, click the "Start" button.
 - \Rightarrow If the check box is selected, only the changed parameter values are loaded into the positioner.
- 11. Wait until the status "Load to Device: Action finished" is displayed.
- 12. Close the dialog.

With local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "A.\PST" parameter of the "Partial Stroke Test" process diagnostics.
- 3. Set the "" parameter to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. Switch the positioner to "Manual (MAN)" mode by pressing the button on the display 🕿 simultaneously for at least 5 seconds.

5.4.3 With SIMATIC PDM: Configure PST with wizard and execute reference run

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics "Partial Stroke Test" (A.\PST) is activated.
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.
- The positioner is in "Automatic (AUT)" mode.

Open Wizards menu

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC...".

	SIP.	ART F	952							_	-		×
	File	Dev	vice View Diagnostics	Mainter	ance	Help		SIMATIC PDM	V9.2 SP2	Proces	s Devic	e Manag	er
		+ []	Download to device		?								
G		†]	Upload to PG/PC				Parameter		Value		Unit	Status	^
	<u>i</u>	11	Assign address and TAG				SIPART PS2 [DR8 HART					
		<u>۵</u> ۵	Value comparison				Identification	n					
			Object properties				TAG		DEMOKOFF			1	
		R	Calibration log				Long TAG		SIPART PS2			1	
		D	Change Log				Descriptor		-			1	
			Set device checked				Message		DIAGNOSIS			1	
		_					Data		1/29/2024			†	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

- 5. Close the dialog.
- 6. In the "Device" menu, select the command "Wizards > Wizard Partial Stroke Test...".

🔼 SIP	ART	PS2				- 0	>	<
File	Dev +]	vice View Diagnostics Mai Download to device	ntenance	e Help SIMA	TIC PDM V9.2 SP	2 Process Device N	Manager	
	† ∎	Upload to PG/PC		Parameter		Value	Unit	^
	ŢŢ.	Assign address and TAG		Maintenance & Diagnostics				
	<u>61</u> 2	Value comparison		Activation of extended diagnostics (52.XD	AG)	On 3 (three-stage		
		Object properties		Pressure monitoring (U.\PRES)		On		
		Calibration log		Partial Stroke Test (A.\PST)		On		
		Change Log		Monitoring of dynamic control valve behav	ior (b.\DEVI)	Off		
		Set device checked		Monitoring/compensation of pneumatic lea	kage (C.\LEAK)	Off		
	-	Check configuration		Monitoring stiction (slipstick effect) (d.\STI	2)	Off		
		Templates		Deadband monitoring (E.\DEBA)		Off		
		icitipates		Monitoring of lower endstop (F.\ZERO)		Off		
		Identification		Monitoring of upper endstop (G.\OPEN)		Off		
		Wizards	•	Wizard - Quick Start	N)	Off		
		Operation	•	Wizard - Partial Stroke Test	X)	Off		
		Setup	•	Wizard - Full Stroke Tect		Off		
		Maintenance and Diagnostics		Wizard Stop Porpose Test	DCHG)	Off		
I		Maintenance and Diagnostics	-	Wizard - Step Response Test	(G)	Off		
I		Communication		Wizard - Multi Step Response lest				
I				Wizard - Valve Performance lest		bar		~
ļ	-	. 1		Wizard - Valve Signature			>	
z004skz	d S	IPART PS2 🖌		Online access 🖌 🛛 Diagnosis Upda	ate 🖌 🛛 Identity Check		🤆)

 \Rightarrow The "Step 1 of 7: Settings" dialog opens.

Step 1: Settings

	SIPART PS2 - Wizard - Partia	I Stroke Test					?	×
Step	1 of 7: Settings							Ŷ
		SIEMENS					_	1
	Settings		Configure the 'Partial Stroke Test'.					
	Poforonco	Start position (A1.STPOS):	100.0	1	%		F	
	Keleience	Start tolerance (A2.STTOL):	2.0	1	%	1		
	Reference diagram	Stroke height (A3.STRKH):	10.0	1	%	ST TOL	Ann	within
		Stroke direction (A4.STRKD):	DO (down only)	1		H		7
	Limits /	Ramp mode (A5.RPMD):	Off ~	1			V	4-
	Test	Ramp rate (A6.RPRT):	1.0	1	%/s			
		Behavior after failed PST (A7.FLBH):	No reaction> 'Automatic (Auto)' mode $~\sim$	1			cor	pyright :
	Trace diagram					Status for 'PST':	PST r	not yet
Ţ	Test interval		PST configuration error	1			PST i	ST nitializa
	-						PST i	nitializa stoppe
<								>
	Tanafa	Drint		-	2	Deals	Net	
	Iransfer Messages	Print	Ap	piy		< Back	Next	>

In this step, the parameters for the traversing range and the duration of the PST are configured.

The "Status for PST" dialog box shows the current status of the PST.

If the PST reference run has already been successfully executed, the "PST initialization OK" message is highlighted.

Table 5-2	Explanation	of the	buttons
-----------	-------------	--------	---------

Transfer	Transfers data to the positioner
Messages	Opens the message log
Print	Creates a PDF file
Apply	Saves the changed values of the dialog
< Back	Opens the dialog of the previous step
Next >	Opens the dialog for the next step

1. Enter the "Start position".

A1.STPOS	Start position
Function	The parameter defines the start position of the PST.
Setting range	0.0 100.0
Factory setting	100.0
Unit	%

2. Enter the "Start tolerance".

A2.STTOL	Start tolerance
Function	The parameter defines the start tolerance of the PST.
Note	Example: Start position "100.0", start tolerance "2.0".
	• During the PST reference run, the actuator moves from the current position to the start position. When the position 98% is exceeded, the start position is considered reached.
	• The PST only starts when the actuator is between the positions 98% and 102%.
Setting range	0.1 10.0
Factory setting	2.0
Unit	%

3. Enter the "Stroke height".

A3.STRKH	Stroke height
Function	The parameter defines the control range of the PST.
Setting range	0.1 100.0
Factory setting	10.0
Unit	%

4. Enter the "Stroke direction".

A4.STRKD	Stroke direction		
Function	The paramete	r defines the actuating direction of the PST.	
Setting options	uP	The actuator only moves towards the 100% position:	
		• The positioner moves the actuator from the start posi- tion to the upper target position and measures the time.	
		• After reaching the upper target position, the actuator moves back to the start position.	
		Upper target position = Start position (A1.STPOS) ± Start tolerance (A2.STTOL) + Stroke height (A3.STRKH)	
	do	The actuator only moves towards the 0% position:	
		• The positioner moves the actuator from the start posi- tion to the lower target position and measures the time.	
		 After reaching the lower target position, the actuator moves back to the start position. 	
		Low target position = Start position (A1.STPOS) ± Start tol- erance (A2.STTOL) - Stroke height (A3.STRKH)	
	uP do	The actuator moves in both directions:	
		• The positioner moves the actuator from the start posi- tion to the upper target position and measures the time.	
		• After reaching the upper target position, the positioner moves the actuator to the lower target position and measures the time.	
		• After reaching the lower target position, the actuator moves back to the start position.	
		Setpoint position = Start position (A1.STPOS) \pm Start toler- ance (A2.STTOL) \pm Stroke height (A3.STRKH)	
Factory setting	do		

5. If needed, activate the "Ramp mode".

A5.RPMD	Ramp mode		
Function	The parameter activates ramp mode.		
	The ramp mode can be used to influence the actuating speed and thus the duration of the PST. This can reduce the impact on the process.		
Setting options	Off	Ramp mode is deactivated.	
		The PST is without control.	
	On	Ramp mode is activated.	
		The PST is executed with the ramp rate according to "A6.RPRT" parameter.	
Factory setting	Off		

6. If Ramp mode is activated, enter the "Ramp rate".

A6.RPRT	Ramp rate	
Function	The ramp rate defines the duration of the PST:	
	Smaller values extend the duration.	
	Larger values shorten the duration.	
Note	The ramp rate refers to the total stroke of the valve.	
	Example: The setting "10.0" means that the PST is executed with a travel of 10% per second.	
Requirement	The "Ramp mode" (A5.RPMD) parameter is activated.	
Setting range	0.1 100.0	
Factory setting	1.0	
Unit	%/s	

7. Configure the "Behavior after failed PST".

A7.FLBH	Behavior after failed PST		
Function	The parameter defines the behavior of the positioner after a failed PST.		
Note	Example of failed PST: The threshold assigned with "Factor 3" (AC.FACT3) has been exceeded.		
Setting options	Auto	Switch to "Automatic (AUT)" mode. "AUT" is shown in the display.	
	HoLd	Hold current position.	
	AirIn	Aerate actuator with supply pressure PZ.	
	AirOu	Vent actuator.	
Factory setting	Auto		

- 8. Click the "Apply" button.
- 9. Click the "Next >" button.

 \Rightarrow The "Step 2 of 7: Reference" dialog opens.

Step 2: Perform PST reference run

In this step, the PST reference run is performed and the measured value is determined and displayed.

Perform the PST reference run in the following cases:

- After re-initializing the positioner
- After the commissioning the valve
- If there is a fundamental change in the operating conditions
- When changing the PST parameters
- Before the first PST

If a PST reference run has not yet been performed or the PST parameters have been changed, the expected reference stroke time is displayed, e.g. "1.51 s".
		SIEMENS			
Settings			Start measurement of the reference stroke tir	me for the valve.	
Referen	ICE	PST reference stroke time (A9.PSTIN):	1.51	~	1 s
		Status for reference stroke time:	Reference stroke time estimated	~	10
Referen	ice diagram		PST / Initialization still active		10
Limits /	_				

- 1. Click the "Start/Stop" button.
- 2. Confirm the start in the following dialog with "OK".
 - \Rightarrow The PST reference run is in progress.
 - \Rightarrow "INPST" is shown in the display.
 - \Rightarrow The dialog shows: "PST / Initialization still active".

After successful completion, the following information is displayed in the dialog:

- PST reference stroke time (A9.PSTIN), e.g. "0.64 s"
- Status ...: "Reference stroke time measured"

	SIEMENS		
Settings		Start measurement of the reference stroke time for	the va
Reference	PST reference stroke time (A9.PSTIN):	0.64	
	Status for reference stroke time:	Reference stroke time measured	
Reference diagram		PST / Initialization still active	
Limits /			

3. Click the "Next >" button.

 \Rightarrow The "Step 3 of 7: Reference diagram" dialog opens.

Step 3: Reference diagram

SIPA	RT PS2 - Wizard - Partial S	itroke Test					?)	×
Step 3 of	7: Reference diagram							^
		SIEMENS						
S	ettings							
R	eference	Time stamp: Day:	10/26/2023		Time stamp: Time:	15:	16:41.21)
O R	eference diagram		No 'trace data' are available or no '	trace data' were read.				
u	imits /							
T	est							
	race diagram							
J 🖪	est interval							~
<							3	•
Tran	Messages	Print		Read	Trace < Ba	ck	Next >	

If a PST reference run was performed immediately beforehand, the diagram of the previous PST reference run is displayed.

1. Read out and display the diagram of the current PST reference run: Click the "Read Trace" button.

 \Rightarrow The "Read Trace - Sample type" dialog opens.

- 2. Select the option button "Read in actual value only" or "Read in actual value and setpoint" dialog.
- 3. Click "OK".

 \Rightarrow The "Read Trace - Select skipped samples" dialog opens.

SIPART PS2 - Read Trace	×
Select skipped samples Every sample (very slow) Every 2nd sample (slow) Every 3rd sample (medium) Every 5th sample (fast) Every 10th sample (very fast) 	Ø
OK Cance	4

As the HART communication may be slow, it is possible to load the chart data from the positioner in different resolutions.

- 4. Select the option button for the required sample rate, e.g. "Every 3rd sample (medium)".
- 5. Close the dialog by clicking "OK". \Rightarrow The "Message Log" dialog opens.
- 6. Wait until the status "Finished" is displayed.
- 7. Close the "Message Log" dialog. \Rightarrow The chart of the current PST reference run is created and displayed.

	SIEMENS						
Settings							
Reference	Time stamp: Day:	3/18/2024		me stamp: Time	e:	17:24:52.29	10
Reference diagram	€ t , € t , €t e	t Export/Editing: Noth	ing selected · Reference	loput M	lonotone 🎽	📑 📑 Vier	w
Limits /	105	Actual value:					
Test	-	Setpoint:	\int				203
TEST	× 90-	# End position:	-				
Trace diagram	Strok						=
Test interval	80-		/				.
	- 70						
2							1

Note on the example shown:

- The diagram display was scaled by changing the input fields of the axes, e.g. "70".
- 8. Click the "Next >" button.
 - \Rightarrow The "Step 4 of 7: Limits" dialog opens.

Step 4: Limits

The dialog shows the reference stroke time "A9.PSTIN", the factors 1, 2, 3 and the resulting thresholds for messages when exceeded:

- Threshold 1, e.g. "1.15" s
- Threshold 2, e.g. "2.31" s
- Threshold 3, e.g. "3.85" s

Tha	moreagoe car		nut via th	na diaita		the dicales	1 or via UAD	Tcommunication
THE	illessaues cai	i be ou	נטענ עומ נו	ie ululta	i output,	ule ulsula	י טו יומ האח	

ep 4 of 7: L	Limits			
		SIEMENS		
Sett	ings	PST reference stroke time (A9.PSTIN): 0.64 V	ll s	
Refe	erence	- Specify the three maintenance demanded levels. (Multiples of the refe	erence stroke time!)	
11010		Factor 1 (AA.FACT1): 1.5	:0	1.15 1 s
Refe	erence diagram			
Limi	ts /	Factor 2 (Ab.FACT2): 3.0		2.31 🚺 s
Test	t in the second s		: <u>_</u>	
		Factor 3 (AC.FACT3): 5.0		3.85 🚺 s
Trac	e diagram		-	
Test	t interval			

1. To adjust the thresholds: Change the values of factors 1, 2 and 3.

AA.FACT1	Factor 1
Function	This factor multiplied by the reference stroke time "A9.PSTIN" results in threshold 1 of the process diagnostics.
Setting range	0.1 100.0
Factory setting	1.5

Ab.FACT2	Factor 2
Function	This factor multiplied by the reference stroke time "A9.PSTIN" results in threshold 2 of the process diagnostics.
Setting range	0.1 100.0
Factory setting	3.0

AC.FACT3	Factor 3
Function	This factor multiplied by the reference stroke time "A9.PSTIN" results in threshold 3 of the process diagnostics.
Setting range	0.1 100.0
Factory setting	5.0

- 2. Save the changes with the "Transfer" button.
- 3. Click the "Next >" button.
 - \Rightarrow The "Step 5 of 7: Test" dialog opens.

Step 5: Test

Requirement

- The PST reference run was performed successfully.
- The actuator of the positioner is at the defined start position "A1.STPOS" ± Start tolerance "A1.STTOL".

Procedure

SIPART PS2 - Wizard - F	Partial Stroke Test	?	×
Step 5 of 7: Test			^
Settings	SIEMENS		
Reference	Measured stroke time (12.PST): Invalid value 1 s Status for measured stroke time: No PST carried out yet 1 s		
Reference diagra	Am PST / Initialization still active		
Test	Start position out of start tolerance		
Test interval			v
Transfer Messa	ages Print Start/Stop < Back	Next	>

- 1. Click the "Start/Stop" button.
- 2. Confirm the start in the following dialog with "OK".
 - \Rightarrow The PST is running.
 - \Rightarrow The status "PST / Initialization still active" is highlighted.
 - \Rightarrow "EXPST" is shown in the display.

After a successful PST, the following is displayed:

- Diagnostic value "Measured stroke time" (12.PST), e.g. "0.69 s"
- Status "Measured stroke time is valid"
- "Deviation from from reference stroke time" in seconds, e.g. "0.05 s"
- With an additional PST: "Deviation from old PST" in seconds, e.g. "-0.02 s"
- If the PST fails, the reason is highlighted in the "Detailed PST-Error information" dialog box.

Partial Stroke Test	?	×
		^
SIEMENS		
Measured stroke time (12.PST): 0.69 1 s 1 s Status for measured stroke time: Measured stroke time is valid 1 s 1 Deviation from reference stroke time Detailed PST-Error information: Actuator stops at current position 1 s Deviation from old PS Status for measured stroke time: PST / Initialization still active 1 s Deviation from reference stroke time Detailed PST-Error information: Actuator stops at current position 1 s Deviation from old PS Stat position out of stat tolerance PST configuration error 1 s Deviation from old PS	e: 0.05 T: -0.02	s
		>
ages Print Start/Stop	< Back Nex	t >

3. Click the "Next >" button.

 \Rightarrow The "Step 6 of 7: Trace diagram" dialog opens.

Step 6 of 7: Trace diagram SIEMENS Settings Reference Time stamp: Day	y: 10/26/2023 💷 🖬 Time stamp: Time: 14	5:37:15.340
Settings Reference SIEMENS Time stamp: Day	y: 10/26/2023 🔲 🐨 🕄 Time stamp: Time: 10	3:37:15.340
Settings Time stamp: Day Reference	y: 10/26/2023 🔲 🗸 Time stamp: Time: 14	6:37:15.340
Time stamp: Day	y: 10/26/2023 🗐 🗸 Time stamp: Time: 14	6:37:15.340
Reference diagram	No trace data' are available or no trace data' were read.	
Limits /		
Test		
Trace diagram		
Test interval		
		>
Tractor Newson Dat	Ded Trees	Neda

Step 6: Trace chart

If an immediately preceding PST was executed, the diagram of the previous PST is displayed.

- 1. Click the "Read Trace" button.
 - \Rightarrow The "Read Trace Sample type" dialog opens.
- 2. Select the option button "Read in actual value only" or "Read in actual value and setpoint" dialog.
- 3. Click "OK".
 - \Rightarrow The "Read Trace Select skipped samples" dialog opens.

SIPART PS2 - Read Trace X
Select skipped samples Every sample (very slow) Every 2nd sample (slow) Every 3rd sample (medium) Every 5th sample (fast) Every 10th sample (very fast)
OK Cancel

- 4. Select the option button for the sample rate, e.g. "Every 3rd sample (medium)".
- 5. Close the dialog with "OK".
 - \Rightarrow The "Message Log" dialog opens.

- 6. Wait until the status "Finished" is displayed.
- 7. Close the "Message Log" dialog. \Rightarrow The chart for the current PST is created and displayed.



8. Click the "Next >" button.

 \Rightarrow The "Step 7 of 7: Test intervall" dialog opens.

Step 7: Test interval

The PST can be started by various actions.

This step describes the internal scheduler that automatically starts the PST.

7 of 7: Test interval					_
	SIEMENS				
Settings		Define the intervals in which the 'Partial Stroke Test' is executed automatically.			
Reference	Test interval (A8.INTRV):	OFF 🗸	1	Days	
Defense line	Time since last PST (13.PRPST):		1	Days	
Reference diagram	Time to next PST (14.NXPST):		1	Days	
Limits /	Status for 'Time to next PST':	The function is deactivated <	1		
Test					
Trace diagram					
A CONST APPERSPICATION .					
restinterval					

- 1. Activate the test interval for the regular PST.
 - For the "Test interval" (A8.INTRV), select "<-120 ... 365>".
 - Enter the interval time in days, e.g. "10".

A8.INTRV	Test interval						
Function	The paramete	he parameter defines the interval time for the cyclic PST.					
Setting options	Off	The test interval is deactivated.					
	1 365	The test interval is activated and the interval time is defined in days.					
Factory setting	Off						

2. Click the "Apply" button.

 \Rightarrow The test interval is activated and is executed automatically if the requirements are met. Additional displays in the dialog:

- Diagnostic value "Time since last PST" (13.PRPST), e.g. "O Days".
- Diagnostic value "Time to next PST" (14.NXPST), e.g. "10 days".

SIPART PS2 - Wizard - Partial Str	roke Test				?	×
Step 7 of 7: Test interval						^
	SIEMENS					
Settings		Define the intervals in which the 'Partial Stroke Test' is executed automatically.				
Reference	Test interval (A8.INTRV):	10 🗸 🗸	11	Days		
Defense disease	Time since last PST (13.PRPST):	0	10	Days		
Reference diagram	Time to next PST (14.NXPST):	10	11	Days		
Limits /	Status for 'Time to next PST':	Time (14.NXPST) is valid	10			
Test						
Trace diagram						
Test interval						
c						>
Transfer Messages	Print	Apply < Ba	ck		Finish	

3. Close the dialog with the "Finish" button.

 \Rightarrow The diagnostics results and the chart are saved.

5.4.4 With SIMATIC PDM: Run PST

Requirement

The PST reference run was performed successfully \rightarrow With SIMATIC PDM: Configure PST with wizard and execute reference run (Page 103)

Start SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.
- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".

Run PST

1. In the "Device" menu, select the command "Maintenance and Diagnostics > Partial Stroke Test > Partial Stroke Test".

🖊 SIF	PART	PS2						_		×
File	Dev	vice View Diagnostics Mai	inter	nanc	e Help SIMATIC PDN		9.2 SP2 Proce	ess Devid	ce Manage	er
	+I	Download to device		?						
<u> </u>	1	Upload to PG/PC		nete	er	١	/alue	Unit	Status	^
ė.	Π	Assign address and TAG		inte	nance & Diagnostics	_				-
	<u>6</u> 12	Value comparison		tiva	tion of extended diagnostics (52.XDIAG)	C	On 3 (three-stage		1	
		Object properties On 1								
		Calibration log		ırtial	Stroke Test (A.\PST)	C)n		1	
		Change Log		pnito	oring of dynamic control valve behavior (b.\DEVI)	C	Ж		t	
		Set device checked		pnito	oring/compensation of pneumatic leakage (C.\LEAK)	C	Ж		‡]	
	3	Check configuration		pnito	oring stiction (slipstick effect) (d.\STIC)	C	Жf		1	
		Translater			pand monitoring (E.\DEBA)	C	Жf		1	
		lemplates		pnito	oring of lower endstop (F.\ZERO)	C	Жf		1	
		Identification		pnito	oring of upper endstop (G.\OPEN)	C	Жf		1	
		Wizards	×	pnito	oring of lower limit temperature (H.\TMIN)	C	Жf		1	
		Operation	•	pnito	oring of upper limit temperature (J.\TMAX)	C	Жf		1	
		Catur		pnito	oring number of total strokes (L.\STRK)	C	Эff		1	
		Setup	•	pnito	pring number of direction changes (O \DCHG)		Эff		‡]	
		Maintenance and Diagnostics	•		Extended diagnostics	C	Ж		1	
		Communication			Pressure monitoring					
					Triggered pressure monitoring	b	ar		1	
	1				Partial Stroke Test	۲	Settings			×
z004skz	d S	IPART PS2 🖌			Monitoring of dynamic control valve behavior		Partial Strok	e Test		0.:
					Monitoring/compensation of pneumatic leakage	Ī				
					Monitoring stiction					

 \Rightarrow The "Partial Stroke Test" dialog opens.

SIPART PS2 - Partial Stro	ke Test		? ×
SIEMENS			GOOD 🗸
Partial Stroke Test (A.∖PST):	On V Texecute 'Partial Stroke Test'	1	Diagnostics deactivation Cancel 'Partial Stroke Test'
Measured stroke time (12.PST): Status for measured stroke time:	Invalid value V 1 No PST carried out yet V 1	s	
Detailed PST-Error information:	PST / Initialization still active Actuator stops at current position Actuator is vented Actuator is aerated with supply air (P Start position out of start tolerance PST configuration error		
	PST Trace diagram	Test interval Time since last PST (13.PRPST): Time to next PST (14.NXPST): Status for 'Time to next PST':	0 0 The function is deactivated
< Transfer Messag	es Print		Close

2. Ensure that the actuator is in the defined "Start position" (A1.STPOS) ± "Start tolerance" (A2.STTOL).

- 3. Start the PST with the "Execute Partial Stroke Test" button.
 - \Rightarrow The PST starts.
 - \Rightarrow "EXPST" is shown in the display.

After a successful PST is displayed:

- Diagnostic value "Measured stroke time" (12.PST), e.g. "1.08 s"
- Status "Measured stroke time is valid"
- "Deviation from from reference stroke time", e.g. "0.00 s"
- With an additional PST: "Deviation from old PST" in seconds, e.g. "0.00 s"

If the PST fails, the reason is highlighted in the "Detailed PST-Error information" dialog box. If error message "Start position out of start tolerance" occurs: Move the actuator to the defined start position and start the PST again.

SIPART PS2 - Partial Stro	ke Test				?	×
SIEMENS				G	OOD	 Image: second sec
Partial Stroke Test (A.\PST):	On Execute 'Partial Stroke Test'	‡II		Diagnostics deactiva Cancel 'Partial Stroke	ition Test'	
Measured stroke time (12.PST): Status for measured stroke time:	1.08 Measured stroke time is valid	11 s 11				
Detailed PST-Error information:	PST / Initialization still active Actuator stops at current position Actuator is vented Actuator is aerated with supply air (F	11 1	Deviation from reference stroke time: Deviation from old PST:			0.00
	PST configuration error PST Trace diagram		Test interval	[0
			Time since last PST (13.PRPST): Time to next PST (14.NXPST): Status for 'Time to next PST':	The function is deactivated		0
< Transfer Messag	es Print				Clos	> se

- 4. Click the "PST Trace diagram" button.
 - \Rightarrow The "PST Trace diagram" dialog is displayed.

SIPART PS2 -	PST Trace diagram	?	×
SIEMENS	No trace data' are available or no trace data'	were read.	
Transfer	Messages Print Read trace	Clos	e

- 5. To display the PST trace chart, click the "Read Trace" button. \Rightarrow The "Read Trace - Sample type" dialog opens.
- 6. Select the option button "Read in actual value only" or "Read in actual value and setpoint" dialog.
- 7. Click "OK".

 \Rightarrow The "Read Trace - Select skipped samples" dialog opens.

SIPART PS2 - Read Trace X
Select skipped samples
 Every sample (very slow) Every 2nd sample (slow) Every 3rd sample (medium) Every 5th sample (fast) Every 10th sample (very fast)
OK Cancel

As the HART communication may be slow, it is possible to load the chart data from the positioner in different resolutions.

- 8. Select the option button for the required sample rate, e.g. "Every 3rd sample (medium)".
- 9. Close the dialog with "OK". \Rightarrow The "Message Log" dialog opens.
- 10. Wait until the status "Finished" is displayed.

11. Click the "Close" button.

 \Rightarrow The trace chart for the current PST is created and displayed.



12. Close the dialog with the "Close" button.

 \Rightarrow The diagnostics results and the chart are saved.

5.4.5 With local operation: Configure PST and execute reference run

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics "Partial Stroke Test" (A.\PST) is activated.

Configuring parameters

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Configure the PST parameters.

A1.STPOS	Start position
Function	The parameter defines the start position of the PST.
Setting range	0.0 100.0
Factory setting	100.0
Unit	%

A2.STTOL	Start tolerance
Function	The parameter defines the start tolerance of the PST.
Note	Example: Start position "100.0", start tolerance "2.0".
	• During the PST reference run, the actuator moves from the current position to the start position. When the position 98% is exceeded, the start position is considered reached.
	• The PST only starts when the actuator is between the positions 98% and 102%.
Setting range	0.1 10.0
Factory setting	2.0
Unit	%

A3.STRKH	Stroke height
Function	The parameter defines the control range of the PST.
Setting range	0.1 100.0
Factory setting	10.0
Unit	%

A4.STRKD	Stroke direction		
Function	The parameter defines the actuating direction of the PST.		
Setting options	uP	The actuator only moves towards the 100% position:	
		• The positioner moves the actuator from the start posi- tion to the upper target position and measures the time.	
		• After reaching the upper target position, the actuator moves back to the start position.	
		Upper target position = Start position (A1.STPOS) ± Start tolerance (A2.STTOL) + Stroke height (A3.STRKH)	
	do	The actuator only moves towards the 0% position:	
		• The positioner moves the actuator from the start posi- tion to the lower target position and measures the time.	
		• After reaching the lower target position, the actuator moves back to the start position.	
		Low target position = Start position (A1.STPOS) ± Start tol- erance (A2.STTOL) - Stroke height (A3.STRKH)	
	uP do	The actuator moves in both directions:	
		• The positioner moves the actuator from the start posi- tion to the upper target position and measures the time.	
		• After reaching the upper target position, the positioner moves the actuator to the lower target position and measures the time.	
		• After reaching the lower target position, the actuator moves back to the start position.	
		Setpoint position = Start position (A1.STPOS) \pm Start toler- ance (A2.STTOL) \pm Stroke height (A3.STRKH)	
Factory setting	do		

A5.RPMD	Ramp mode	
Function	The parameter activates ramp mode. The ramp mode can be used to influence the actuating speed and thus the duration of the PST. This can reduce the impact on the process.	
Setting options	OFF	Ramp mode is deactivated.
		The PST is without control.
	On	Ramp mode is activated.
		The PST is executed with the ramp rate according to "A6.RPRT" parameter.
Factory setting	OFF	

A6.RPRT	Ramp rate	
Function	The ramp rate defines the duration of the PST:	
	Smaller values extend the duration.	
	Larger values shorten the duration.	
Note	The ramp rate refers to the total stroke of the valve.	
	Example: The setting "10.0" means that the PST is executed with a travel of 10% per second.	

Process diagnostics

5.4 Partial Stroke Test (without pressure sensors)

A6.RPRT	Ramp rate
Requirement	The "Ramp mode" (A5.RPMD) parameter is activated.
Setting range	0.1 100.0
Factory setting	1.0
Unit	%/s

A7.FLBH	Behavior after failed PST	
Function	The parameter defines the behavior of the positioner for a failed PST.	
Note	Example of failed PST: The threshold assigned with "Factor 3" (AC.FACT3) has been exceeded.	
Setting options	Auto	Switch to "Automatic (AUT)" mode. "AUT" is shown in the display.
	HoLd	Hold current position.
	AirIn	Aerate actuator with supply pressure PZ.
	AirOu	Vent actuator.
Factory setting	Auto	

A8.INTRV	Test interval	
Function	The parameter defines the interval time for the cyclic PST.	
Setting options	OFF	The test interval is deactivated.
	1 365	The test interval is activated and the interval time is defined in days.
Factory setting	OFF	

AA.FACT1	Factor 1
Function	This factor multiplied by the reference stroke time "A9.PSTIN" results in threshold 1 of the PST.
Setting range	0.1 100.0
Factory setting	1.5

tor 2
s factor multiplied by the reference stroke time "A9.PSTIN" results in the eshold 2 of the PST.
100.0

AC.FACT3	Factor 3
Function	This factor multiplied by the reference stroke time "A9.PSTIN" results in the threshold 3 of the PST.
Setting range	0.1 100.0
Factory setting	5.0

3. Switch the positioner to "Manual mode (MAN)" by pressing the 🕿 button for at least 5 seconds.

Perform PST reference run

1. Select the "A9.PSTIN" parameter.

When the following status is displayed in the top line of the display, the PST reference run can be started:

- "C #,##", e.g. "C 0.7".

If the status display is different, the PST reference run cannot be started.

A9.PSTIN	Start reference PST	
Function	The parameter shows the status of the PST reference run and the calculated or measured reference stroke time for the travel from the PST start position (A1.STPOS) to the PST setpoint position.	
Status displays	nolni	Positioner has not yet been initialized.
	C ##.#	• Calculated: If the positioner has already been initialized, the calculated average travel time of the control valve is displayed, e.g. "0.7".
		• The PST reference run has not yet been performed or the PST parameters have been changed.
	rEAL	The PST reference run is activated.
	INPST	The PST reference run is in progress.
	###.#	Reference stroke time in seconds: The PST reference run was completed successfully.
	C-Err	Configuration error
	FdIni	Failed PST initialization.
	SdrEF	The PST reference run was canceled.
Factory setting	nolni	

2. Press the $\underline{\mathbb{A}}$ button for at least 5 seconds and the display will show "rEAL".

 \Rightarrow The PST reference run starts.

- \Rightarrow "INPST" is shown in the display.
- Wait until the reference run is completed.
 ⇒ If the display shows a numerical value, e.g. "0.9", the PST reference run has been successfully completed.

5.4.6 With local operation: Run PST

Requirement

- The PST reference run was performed successfully → With local operation: Configure PST and execute reference run (Page 125).
- The positioner is in "Automatic (AUT)" mode.
- The actuator of the positioner is at the defined start position "A1.STPOS" ± Start tolerance "A2.STTOL".

Procedure

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display 🕾 ⊽▲ simultaneously for at least 2 seconds.
- 2. Select the diagnostic value "12.PST".
- 3. Press the ▲ button for at least 5 seconds and the display will show "Strt".
 ⇒ The PST starts. "WAIt" is shown in the display.
 ⇒ During PST execution, the display shows "EXPST".
 The PST can be interrupted by pressing the ▲ button again.
- 4. Wait until PST is finished \Rightarrow After the successful PST, the display shows the measured time in seconds.

5.4.7 Via digital contacts: Start PST

Requirement

The digital input DI2 is only available for positioners with Digital I/O Module (DIO).

Activate and start digital input PST

The PST can be started via the digital input DI1 or DI2.

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Select the application parameter "42.DI1 Digital input 1 function" or "43.DI2 Digital input 2 function".
- 3. Set the parameter to one of the following values according to the actuation:
 - When actuated with a NO contact ("Normally Open"): "PST"
 - When actuated with a NC contact ("Normally Closed"): "-PST"
 - \Rightarrow The digital input is activated for the PST activated.
- 4. Switch the positioner to "Manual (MAN)" mode by pressing the button on the display 🕿 simultaneously for at least 5 seconds.
- 5. Switch the positioner to "Automatic (AUT)" mode by pressing the R button. \Rightarrow Activating the connected NC contact or NO contact starts the PST.

5.4.8 Via HART communication: Start PST

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics "Partial Stroke Test" (A.\PST) is activated.
- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52..

Start PST

Send to the positioner via HART communication:

- "#172" command
- Byte 0, Bit 5 and Byte 1, Bit 0
- \Rightarrow The PST starts and the display shows "EXPST".



Cancel PST

Send to the positioner via HART communication:

- "#172" command
- Byte 0, Bit 5 and Byte 1, Bit 1

5.4.9 Diagnostic value "PST status / Measured time" (12.PST)

Diagnostic value	Status PST / Measured time		
	Short designation: 12.PST		
Function	The diagnostic value shows one of the following values:Status of the last Partial Stroke Tests (PST)		
	If PST is succes	ssful: The measured time	
Note	The PST can be started manually with this diagnostic value \rightarrow With local operation: Run PST (Page 130).		
	Requirement for P	'ST:	
	Successful PST refe (Page 125)	erence run \rightarrow With local operation: Configure PST and execute reference run	
Status messages at the start of the PST	notoL	No Tolerance: The actuator is outside the defined "Start position" (A1.STPOS) \pm "Start tolerance" (A2.STTOL). The PST does not start.	
	Strt	Start: After 5 seconds, manual PST is started.	
	WAIt	Wait: The PST is being executed.	
Status/display options	OFF	The PST function is deactivated.	
	C-ERR	Configuration error:	
		PST cannot be started.	
		• The settings in the parameters "Start position" (A1.STPOS), "Stroke height" (A3.STRKH) and "Stroke direction" (A4.STRKD) are not plausible.	
	FdIni	Failed PST Initialization: The PST reference run has failed.	
	norEF	The PST reference run has not yet been performed.	
	notSt	No Test: The PST has not yet been performed	
	###.#	Measured travel time (stroke time) of the PST in seconds.	
		The last PST was successfully executed.	
	SdtSt	Stopped Test: The last PST was interrupted.	
	FdtSt	Failed Test: The last PST failed.	
Factory setting	OFF		
Communication	1	1	
SIMATIC PDM Export	Name	ps2_pst_current_val	
	Label	Measured stroke time (12.PST)	
	DisplayValue	≜ Value, e.g. "0.69"	
HART communication (read)	Command	#171	
	Response Data	Bytes: 0 11	
		Format and meaning: \rightarrow Via HART communication: Read out diagnostic results (Page 135)	

5.4.10 Diagnostic value " - Time since last Partial Stroke Test" (13.PRPST)

Diagnostic value	Time since last P	Time since last Partial Stroke Test		
	Short designatio	Short designation: 13.PRPST		
Function	The diagnostic val	ue shows the time since the last Partial Stroke Test (PST) in days or the status.		
Display options	###	Days since the last PST		
	notSt	No Test: The PST has not yet been performed		
	norEF	The PST reference run has not yet been performed.		
	Sdtst	Stopped Test: The last PST was interrupted.		
	FdtSt Failed Test: The last PST failed			
Unit	Days			
Communication				
SIMATIC PDM Export	Name	ps2_pst_prev_time		
	DisplayValue	≜ Value		
HART communication	Command	#171		
	Response Data	Bytes: 12 15		
		Format: Float		

5.4.11 Diagnostic value "Time until next Partial Stroke Test" (14.NXPST)

Diagnostic value	Time to next Par	tial Stroke Test			
	Short designatio	Short designation: 14.NXPST			
Function	The diagnostic va	lue shows the time until the next Partial Stroke Test (PST) in days.			
Requirement	• The PST is acti	vated in "Configuration" mode.			
	A test interval	• A test interval is set in the "A8.INTRV" parameter.			
Display options	Off Factory setting or unfulfilled requirement				
	###	Days until next PST			
Unit	Days				
Communication					
SIMATIC PDM Export	Name	ps2_pst_next_time			
	DisplayValue	≜ Value			
HART communication	Command	#171			
	Response Data	Bytes: 17 20			
		Format: Float			

5.4.12 Via HART communication: Read out diagnostic results

Requirement

- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52..
- The PST was executed.

Procedure

Send to the positioner via HART communication:

• "#171" command

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Byte	Format	Description	1	
0 Bits		PST State		
		0x01	PST not yet initialized	
		0x02	PST initialization failed	
		0x04	PST initialization OK	
		0x08	No PST	
		0x10	PST stopped	
		0x20	PST fault	
		0x40	PST valid	
		0x80	PST / Initialization still active	
1	Unsigned-8	PST Error Byte		
		Bit O	Actuator is held on actual position	
		Bit 1	Actuator is deaerated	
		Bit 2	Actuator is vented with full system pressure (PZ)	
		Bit 3	Start position out of tolerance	
		Bit 4	Configuration error	
2 5	Float	PST Referen	ce Step Time	
6	Bits	PST Referen	ce Step Time State	
		0x00	Measurement of Reference stroke time failed	
		0x01	Device not initialized / Reference stroke time estimated	
		0x02	Reference stroke time measured	
7 10	Float	Partial Strok	re Test Time	

Table 5-3Response Data Bytes

Process diagnostics

5.4 Partial Stroke Test (without pressure sensors)

Byte	Format	Description			
11	Bits	Partial Stroke Test	Time State		
		0x00	No PST carried out yet		
		0x01	PST interrupted		
		0x01	PST failed		
		0x03	Measured stroke time is valid		
12 15	Float	Time since the las	Time since the last Partial Stroke Test		
16	Bits	State of Time sinc	e the last Partial Stroke Test		
		0x00	Function is deactivated		
		0x01	Time is valid		
17 20	Float	Time until the nex	kt Partial Stroke Test		

 Table 5-4
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5.4.13 With SIMATIC PDM: Export diagnostics results

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.
- The PST was executed and the trace charts were displayed → With SIMATIC PDM: Run PST (Page 119).

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SI	PART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenanc	e Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+I	Download to device	?						
	↑	Upload to PG/PC			Parameter	Value	Unit	Status	^
	Π	Assign address and TAG			SIPART PS2 DR8 HART	1			
	<u>6</u>]2	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
	1	Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🖊 s	SIPART PS2						_		×
File	Device	View	Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2	Process Devic	ce Manage	er
	Save	Ctrl+S	🖌 💿 🖪	器 🏦 ?					
₽	Export				Parameter	Value	Unit	Status	^
•	Import		HART		SIPART PS2 DR8 HART				
	Print	Ctrl+P			⊡ldentification				
	Chara		 Diagnostics 		TAG	DEMOKOFF		1	
	Close				Long TAG	SIPART PS2		1	
					Descriptor	-		1	
					Message	DIAGNOSIS		1	
					Date	8/15/2023		1	
					⊡ Device				
					Manufacturer	Siemens		1	
					Device Type	SIPART PS2		1	
					Order number	-		1	
					Serial number	N1KO037518210		1	
					Final Assembly Number	0		1	
					Hardware Revision	3		1	
					Firmware revision	5.03.00-28		1	
					EDD version	25.00.00			
					⊡ Setup				
			1		Dynamic variable mapp	ing			_ ×
z004s	kzd SIPA	RT PS2 🖌			Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌			O

6. In the "File" menu, select the "Export..." command.

 \Rightarrow The "Export - ..." dialog opens.

- 7. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

Export - SIPART PS2			?	\times
Export directory:				^
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export				
HTML transformation file:				
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_Exp	ort Transformation.xs	sl		
Which information should be exported?				
Device parameters				
Diagnostics				
Document Manager				
Selection				
Object				
SIPART PS2				-
Chabing				
Status.				_
				~
				>
Messages	Start	Stop	Close	

8. Start the export with the "Start" button.

- 9. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL stylesheet "PDM80_ExportTransformation.xsl"
- 10. Close the dialog.

11. Open the XML file with suitable software, e.g. editor.

Param\$SIPART PS2\$20230815_121412.xml -	Editor			-		×
<pre><?xml version="1.0" encoding="utf-8"?> <!-- Created by PDM 902.200.2901.5. Do no <?xml-stylesheet type='text/xsl' href='PDM <PDM XMLVersion="8.04"--> <object> <device> <id>2</id> <pltid>0</pltid> <type>EDD_OBJECT_OFFLINE</type> <class>EDD_OCLASS_NODE_HART_MODEMNetze/HART_MODEMsetze/HART_Modem-Netzwer <onlinevalues>False</onlinevalues>False</class></device></object></pre>	t edit this File!! B0_ExportTransformatic Bass> k/NODE_10/SIPART PS2 </th <td>-> on.xsl'?> /ObjectPa</td> <td>th></td> <td></td> <td></td> <td>,</td>	-> on.xsl'?> /ObjectPa	th>			,
<pre><conlinevalues> alse <catalogpath>/DEVICE/HART/ACTUATOR/E <objectname>SIPART P52</objectname> <section>DEVICE</section> <commandmode>ExportOffline</commandmode></catalogpath></conlinevalues></pre>	LECTRO_PNEUMATIC/SIEME	ENS/SIPAR	r_ps2/sipart_ps2_har	T_DR8 </td <td>'CatalogP</td> <td>ath</td>	'CatalogP	ath
<pre><deviceparameters></deviceparameters></pre>	g" Type="String" Label ="longTag" Type="Strin !ame="descriptor" Type= ="message" Type="Strin !ate" Type="DateTime" L >2023-08-15T00:00:6 :owseName="manufacturer	L="TAG" Pa ng" Label: "String" ng" Label: abel="Da @ <td>aramViewMember="True "Long TAG" ParamVie Label="Descriptor" "Message" ParamView te" ParamViewMember= pute> e="UInt16" Label="Ma</td> <td>" Displ wMember ParamVi Member= "True" nufactu</td> <td>ayValue= "="True" ewMember "True" D DisplayV urer" Par</td> <td>"DE Dis ="T isp alu</td>	aramViewMember="True "Long TAG" ParamVie Label="Descriptor" "Message" ParamView te" ParamViewMember= pute> e="UInt16" Label="Ma	" Displ wMember ParamVi Member= "True" nufactu	ayValue= "="True" ewMember "True" D DisplayV urer" Par	"DE Dis ="T isp alu
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-	8 mit BON	N

The XML file contains the following diagnostic data for the PST.

Parameter	Data description in the XML file					
	Name	Label	DisplayValue	Unit		
			e.g.			
A1.STPOS	ps2_pst_start_pos	Start position (A1.STPOS)	100.0	%		
A2.STTOL	ps2_pst_start_tol	Start tolerance (A2.STTOL)	2.0	%		
A3.STRKH	ps2_pst_step_val	Stroke height (A3.STRKH)	10.0	%		
A4.STRKD	ps2_pst_step_dir	Stroke direction (A4.STRKD)	DO (down only)	-		
A5.RPMD	var_pst_ramp_mode	Ramp mode (A5.RPMD)	Off	-		
A6.RPRT	var_pst_ramp_rate	Ramp rate (A6.RPRT)	1.0	%/s		
A7.FLBH	var_pst_failure_behavior	Behavior after failed PST (A7.FLBH)	No reaction> 'Automatic (Au- to)' mode	-		
AA.FACT1	ps2_pst_factor_1	Factor 1 (AA.FACT1)	1.5	-		
Ab.FACT2	ps2_pst_factor_2	Factor 2 (Ab.FACT2)	3.0	-		
AC.FACT3	ps2_pst_factor_3	Factor 3 (AC.FACT3)	5.0	-		

Table 5-5 Parameter

Parameter	Data description in the XML file					
	Name	Label		Unit		
			e.g.			
A8.INTRV	ps2_pst_inter_val	Test interval (A8.INTRV)	OFF	OFF		
				• Days		
A9.PSTIN	ps2_pst_step_time	PST reference stroke time (A9.PSTIN)	0.64	S		

Table 5-6Diagnostics results

Diagnostic value/	Data description in the XML file							
<parameter></parameter>	Name	Label	DisplayValue	Unit				
			e.g.					
12.PST <last pst=""></last>	ps2_pst_current_val	Measured stroke time (12.PST)	0.69	S				
13.PRPST	ps2_pst_prev_time	Time since last PST (13.PRPST)	0	Days				
14.NXPST	ps2_pst_next_time	Time to next PST (14.NXPST)	0	Days				
<pst reference="" run=""></pst>	var_PST_REF_TimeStamp_Date	Time stamp: Day	1/31/2024 <mm dd="" yyyy=""></mm>	-				
	var_PST_REF_TimeStamp_Time	Time stamp: Time	14:55:12.000	-				
	ps2_pst_step_time_status	Status for reference stroke time	Reference stroke time measured	-				
<last pst=""></last>	var_PST_TimeStamp_Date	Time stamp: Day	1/31/2024 <mm dd="" yyyy=""></mm>					
	var_PST_TimeStamp_Time	Time stamp: Time	15:10:02.000	-				
	ps2_pst_current_status	Status for measured stroke time	Measured stroke time is valid	-				
<pre><deviation "measured="" "pst="" (12.pst)"="" (a9.pstin)"="" and="" between="" reference="" stroke="" time=""></deviation></pre>	par_delta_pst_and_rfz_new	Deviation from reference stroke time	0.05	S				

5.4.14 Messages

5.4.14.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics "Partial Stroke Test" (A.\PST) is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.4.14.2 Messages in the display

Display		Possible cause
0-59 FUT35	① Error code 9	The actuator is outside the defined start position "A1.STPOS" ± start tolerance "A1.STPOS". The PST does not start.
1 2-59 AUT 35	1 bar 2 Error code 9	The PST measured stroke time exceeds the set threshold 1.
(2-59 RUT36	1 2 bars 2 Error code 9	The PST stroke time exceeds the set threshold 2.
1 2-59 AUT 35	1 3 bars 2 Error code 9	The PST measured stroke time exceeds the set threshold 3.
0-16 RUT35	① Error code 16	The combination of the parameter values "A1.STPOS", "A3.STRKH" and "A4.STRKD" is not plausible. The PST does not start.

If the set thresholds are exceeded, error code "9" is output.

If several messages are present at the same time, the display switches between the different error codes.

5.4.14.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.
I/Os

Digital I/O Module (DIO) 6DR4004-6A / -8A	Inductive Limit Switches (ILS) 6DR4004-6G / -8G	Mechanic Limit Switches (MLS) 6DR4004-6K		
	$3 \xrightarrow{+} 51 \xrightarrow{52}$	$3 \xrightarrow{+} 51 \xrightarrow{+} 52$		
(4) + <u>41</u>				
① Digital input DI2, galvanically isolated	1 Fault message output, has no func-	1 Fault message output, has no func-		
(2) Digital input DI2, dry contact	tion in combination with 6DR4004-3ES	tion in combination with 6DR4004-4ES		
(3) Fault message output	U Digital output 1	(2) Digital output 1		
④ Digital output DO1	(3) Digital output 2	(3) Digital output 2		
5 Digital output DO2				

5.4.14.4 With SIMATIC PDM: Display PST status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenanc	e Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
	+1	Download to device	?	9					
. ₽	t[Upload to PG/PC			Parameter	Value	Unit	Status	^
<u>.</u>	Π	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		‡]	
		Calibration log			Long TAG	SIPART PS2		‡]	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		‡]	
	_				Data	1/29/2024		†	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🔁 SIF	PART PS2								-	_		×
File	Device	View	Diag	postics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proces	ss Device	e Manage	r
	4 t	<u>a</u> 🖻	R	Update o	diagnostics							
	SIPART PS	2		Status			ameter	Value		Unit	Status	^
ė.	🖉 SIPART	FPS2 DI		Trend ch	arts	•	PART PS2 DR8 HART	l				
	i iden i iden i iden	uncation		Histogra	ms		Identification					
	🎚 🥠 🥢 Mai	ntenanc		KDI		Ĺ	TAG	DEMOKOFF			1	
	Cor	nmunicat		Value ch	arte	ĺ	Long TAG	SIPART PS2			1	
				Alarma la	ans		Descriptor	-			1	
		l		Alarmito	уроок	-	Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							⊡ Device	-				
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			‡]	
							Final Assembly Number	0			1	
							Hardware Revision	3			‡]	
							Firmware revision	5.03.00-28			‡]	
							EDD version	25.00.00				
							Setup					
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			‡]	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							 Basic settings 					
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuato	or spi		1	~
z004skz	d SIPART	PS2 🖌					Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌)

6. In the "Diagnostics" menu, select the command "Status".

- 7. Select the "Status" tab.
 - If a threshold is exceeded, the corresponding message is highlighted:
 - PST reference stroke time exceeded (limit x)
 - Start position out of tolerance

SIPART PS2 - Status	?	×	
s Status Messages			^
FAILURE X	Ł		
Agnostics 1: Dynamic control valve behavior (limit 1). Dynamic control valve behavior (limit 2). Dynamic control valve behavior (limit 3). Pneumatic leakage (limit 1). Pneumatic leakage (limit 2).	^ 1	1	
 Stiction (slipstick) (limit 3). Limit for lower endstop monitoring exceeded (limit 1). Limit for lower endstop monitoring exceeded (limit 2). Limit for lower endstop monitoring exceeded (limit 3). Limit for upper endstop monitoring exceeded (limit 1). Limit for upper endstop monitoring exceeded (limit 1). 	Į1	1	
 Limit for stroke integral (100% strokes) exceeded (limit 2. Limit for direction changes exceeded (limit 2). Limit for direction changes exceeded (limit 3). 	11 ^ 11 ~	1	<
<		>	
Transfer Messages Print	Close		

8. Close the dialog.

5.4.14.5 Via HART communication: Get messages

Requirement

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52..

Call up message for process diagnostics

If a process diagnostics threshold is violated, the "more status available" bit is set.

Send the "#48" command to the positioner via HART communication.

 \Rightarrow The 20 Bytes of are returned

When the thresholds for the "A.\PST" process diagnostics are exceeded, the messages are contained in the following bytes:

- Byte 17, Bit 7 corresponds to threshold 1 exceeded.
- Byte 17, Bit 6 corresponds to threshold 2 exceeded.
- Byte 17, Bit 5 corresponds to threshold 3 exceeded.

5.4.14.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.5 Partial Stroke Test (pressure sensor-supported)

5.5.1 Functional description

The Partial Stroke Test (PST) is used on valves with single-acting actuators, e.g. on safety valves.

During a PST reference run, pressure position data is recorded and the abort criteria for the subsequently executed PSTs are determined.

Abort criteria:

- The determined pressure value for the valve breakaway from the PST start position.
- The PST pressure value determined for the end position, which the PST should not fall below.

Process diagnostics

5.5 Partial Stroke Test (pressure sensor-supported)

When using Device Manager Software e.g. SIMATIC PDM, an expert mode is available with which these termination criteria can be changed manually.

At the PST, the following additional Key Performance Indicators (KPI) are determined:

- Standstill time before PST start
- Measured start position
- Pressure in chamber 1 at start position
- Breakout pressure in chamber 1
- Measured end position
- Pressure in chamber 1 at end position
- Breakout pressure in chamber 1 (return)
- Electronics temperature
- Operating hours

If the PST falls below the pressure limit, the PST stops.

A message is issued via the display, the digital contacts and the communication.

The KPIs and the pressure-position data of the last 10 PSTs are stored in the positioner and can be read out.

The PST data can also be used to determine friction coefficients, spring characteristics and hysteresis.

Regular movement of the process valve can prevent the valve from getting stuck.

The PST is configured and executed with Device Manager Software, e.g. SIMATIC PDM. The software can be used to read PST data from the positioner and display it as charts.

Local configuration via the display and buttons is possible to a limited extent.

Diagnostic values for PST:

- PST status (12.PST)
- Time since last partial stroke test (13.PRPST)
- Time until next Partial Stroke Test (14.NXPST)

The PST can be started via:

- Local operation
- Remote operation with Device Manager Software e.g. SIMATIC PDM
- Digital input
- Remote operation via HART communication
- Cyclic test interval

5.5.2 Activate PST

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- "Pressure monitoring" (U.\PRES) is activated.

"Partial Stroke Test" (A.\PST) parameter

Function	The parameter act	e parameter activates or deactivates the Partial Stroke Test (PST).						
Setting options	Off	Process diagnostics are deactivated.						
	On	Process diagnostics is activated.						
Factory setting	Off							

Remote operation with SIMATIC PDM

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SI	PARTI	PS2					-	-		<
File	Dev	vice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+I	Download to device		?						
	1	Upload to PG/PC				Parameter	Value	Unit	Status	^
E). 1	Assign address and TAG				SIPART PS2 DR8 HART	-			
	<u>۵۱۵</u>	Value comparison				⊡ldentification				
		Object properties				TAG	DEMOKOFF		‡ []	
		Calibration log				Long TAG	SIPART PS2		‡ []	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
	-					Data	1/29/2024		t I	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2			_		×					
File Device View Diagnostics	Maintenance Help SIMATIC F	PDM V9.2 SP2 Proc	ess Devid	e Manage	er					
🔒 昌 💵 🛍 🕸 🖻 🔛 🖎	器 為 ?									
SIPART PS2	Parameter	Value	Unit	Status	~					
ȇ SIPART PS2 DR8 HART	Maintenance & Diagnostics									
i⊞…‡ Identification	Activation of extended diagnostics (52 XDIAG)	On 1 (single-stage alarm)		t	-					
	Pressure monitoring (U.\PRES)	On		1						
Communication	Partial Stroke Test (A.\PST)	On 🗸	1	t						
	Monitoring of dynamic control valve behavior (b.\DEVI)	Off		t						
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	On	<u> </u>	ţ.						
	Monitoring stiction (slipstick effect) (d.\STIC)	Off		ţ.						
	Deadband monitoring (E.\DEBA)	Off		1						
	Monitoring of lower endstop (F.\ZERO)	Off		1						
	Monitoring of upper endstop (G.\OPEN)	Off		1						
	Monitoring of lower limit temperature (H.\TMIN)	Off		1						
	Monitoring of upper limit temperature (J.\TMAX)	Off		1						
	Monitoring number of total strokes (L.\STRK)	Off		1						
	Monitoring number of direction changes (0.\DCHG)	Off		1						
	Monitoring of average position value (P.\PAVG)	Off		1						
	Pressure monitoring									
	Triggered pressure monitoring									
	⊡ Partial Stroke Test									
	Start position (A1.STPOS)	100.0	%	1						
	Start tolerance (A2.STTOL)	2.0	%	1						
	End position (Ad.ENPOS)	90.0	%	1						
	End tolerance (AE.ENTOL)	5.0	%	1						
	Breakout pressure limit (AF.BOLIM)	7.000	bar	‡ [
	Breakout pressure tolerance (AG.BOTOL)	0.100	bar	1						
	Time to end position (AH.PSTDO)	80	s	1						
	Time back to start position (AJ.PSTUP)	0	s	1						
	Test repetitions (AL.PSTRP)	Off		1						
	Test interval (A8.INTRV)	OFF	Days	1						
z004skzd SIPART PS2 🖌	│ Online access <i>V</i> │ Diagnosis Update <i>V</i>	Identity Check 🖌)					

6. Select the "Maintenance & Diagnostics" directory.

- For "Partial Stroke Test (A.\PST)", set the value to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 8. In the "Device" menu, select the command "Download to device...".
- 9. Select the check box "Load changed parameters only".
- 10. In the dialog, click the "Start" button.
 ⇒ If the check box is selected, only the changed parameter values are loaded into the positioner.
- 11. Wait until the status "Load to Device: Action finished" is displayed.
- 12. Close the dialog.

With local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "A.\PST" parameter of the "Partial Stroke Test" process diagnostics.
- 3. Set the "" parameter to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. Switch the positioner to "Manual (MAN)" mode by pressing the button on the display 🔄 simultaneously for at least 5 seconds.

5.5.3 With SIMATIC PDM: Configure PST with wizard and execute reference run

Requirement

- The positioner has pressure sensors (Z PO2 option)
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- "Pressure monitoring" (U.\PRES) is activated.
- Process diagnostics "Partial Stroke Test" (A.\PST) is activated.
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.
- The positioner is in "Automatic (AUT)" mode.

Open Wizards menu

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC...".

🔼 SI	PART I	PS2							_	[-	×
File	Dev	vice View Diagnostics	Maintena	nce	Help		SIMATIC PDM	V9.2 SP2	Process [Device	Manager	r
	+I	Download to device		?								
	t[]	Upload to PG/PC				Parameter		Value	U	nit	Status	^
Ė	Ţ	Assign address and TAG				SIPART PS2 DR8 HAP	RT					
	<u>61</u> 2	Value comparison				Identification						
		Object properties				TAG		DEMOKOFF			‡ []	
		Calibration log				Long TAG		SIPART PS2			‡]	
		Change Log				Descriptor		-			‡]	
		Set device checked				Message		DIAGNOSIS			‡]	
	-					Data		1/20/2024			+	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

- 5. Close the dialog.
- 6. In the "Device" menu, select the command "Wizards > Wizard Partial Stroke Test...".

🔼 SIF	PART	PS2				- 0	>	<
File	Dev	rice View Diagnostics Mair	tenance	Help SIMA	TIC PDM V9.2 SP	2 Process Device	Manager	
	+	Download to device	?					
D	1	Upload to PG/PC		Parameter		Value	Unit	^
Ē.	ų.	Assign address and TAG		Maintenance & Diagnostics				
	<u>6</u> 10	Value comparison		Activation of extended diagnostics (52.XD	IAG)	On 3 (three-stage		
		Object properties		Pressure monitoring (U.\PRES)		On		
		Calibration log		Partial Stroke Test (A.\PST)		On		
		Change Log		Monitoring of dynamic control valve behav	ior (b.\DEVI)	Off		
		Set device checked		Monitoring/compensation of pneumatic lea	kage (C.\LEAK)	Off		
	-	Check configuration		Monitoring stiction (slipstick effect) (d.\STI	C)	Off		
		Templates		Deadband monitoring (E.\DEBA)		Off		
	-	lemplates	_	Monitoring of lower endstop (F.\ZERO)		Off		
		Identification		Monitoring of upper endstop (G.\OPEN)		Off		
		Wizards	•	Wizard - Quick Start	N)	Off		
		Operation	•	Wizard - Partial Stroke Test	X)	Off	<u> </u>	
		Setun		Wittard - Full Stroke Test		Off		_
		Maintenance and Diagnostics		Wizard - Full Stroke lest	DCHG)	Off	<u> </u>	
		Maintenance and Diagnostics	- I	Wizard - Step Response lest	(G)	Off		
		Communication		Wizard - Multi Step Response Test		_		
				Wizard - Valve Performance Test		bar		~
L	1	. 1	_	Wizard - Valve Signature			>	
z004skz	dS	IPART PS2 🖌		Online access 🖌 🛛 Diagnosis Upd	ate 🖌 🛛 Identity Check		🤆)

 \Rightarrow The "Step 1 of 7: Settings" dialog opens.

Step 1: Settings

1 0	of 7: Settings						
		SIEMENS				- 12	
í.	Settings		Configure the 'Partial Stroke Test'.				
	Deference	Start position (A1.STPOS):	100.0	1	%		
	Kelerence	Start tolerance (A2.STTOL):	2.0	1	%		L
	Reference diagram	End position (Ad.ENPOS):	90.0	tI	%	ST TOL MORE TO AND	
		End tolerance (AE.ENTOL):	5.0	1	%		
	Limits /	Time to end position (AH.PSTDO):	80	t	s	A A	
	Test	Time back to start position (AJ.PSTUP):	0	t	s		0
		Test repetitions (AL.PSTRP):	Off 🗸 🗸	1		Copyright to Si	en
	Trace diagram					Status for 'PST': Reference PST is	8 S
	Test interval		PST configuration error	1			au s v
						Reference PST h PST is still active	a
ì				-			

In this step, the parameters for the traversing range and the duration of the PST are configured.

The "Status for PST" dialog box shows the current status of the PST.

If the PST reference run has already been successfully executed, the "Reference PST is valid" message is highlighted.

able 5-7 Explanation of the buttons

Transfer	Transfers data to the positioner
Messages	Opens the message log
Print	Creates a PDF file
Apply	Saves the changed values of the dialog
< Back	Opens the dialog of the previous step
Next >	Opens the dialog for the next step

1. Enter the "Start position".

A1.STPOS	Start position
Function	The parameter defines the start position of the PST.
Note	The start position of the PST should correspond to the fully pressurized position of the actuator.
	This means that the start position should not correspond to the safety po- sition of the process valve.
Setting range	0.0 100.0
Factory setting	100.0
Unit	%

2. Enter the "Start tolerance".

A2.STTOL	Start tolerance					
Function	The parameter defines the start tolerance of the PST.					
Note	Example: Start position "100.0", start tolerance "2.0".					
	• During the PST reference run, the actuator travels from the current position to the start position. When the position 98% is exceeded, the start position is considered reached.					
	• The PST only starts when the actuator is between the positions 98% and 102%.					
Setting range	0.1 10.0					
Factory setting	2.0					
Unit	%					

3. Enter the "End position".

Ad.ENPOS	End position			
Function	The parameter defines the end position of the PST.			
	• During the PST reference run to determine the abort pressure, the ac- tuator moves from the start position to the end position, taking into account the end tolerance (AE.ENTOL).			
The actuator moves from the start position to the end po the PST. As the end position is approached based on press slightly undercut.				
Setting range	0.0 100.0			
Factory setting	90.0			
Unit	%			

4. Enter the "End tolerance".

AE.ENTOL	End tolerance
Function	The parameter defines the end tolerance of the PST relative to the end position.
Note	Example: End position "90.0", end tolerance "5.0".
	• During the PST reference run to determine the abort pressure, the ac- tuator moves to position "85.0".
	 With PST, the actuator moves to the end position "90.0". As the end position is approached based on pressure, it can be slightly undercut.
Setting range	1.0 20.0
Factory setting	5.0
Unit	%

5. Enter the "Time to end position".

AH.PSTDO	Time to end position
Function	The parameter defines the minimum duration that the PST uses for depressurizing to travel from the start position to the end position.
Note	Example: Value "1".
	Depending on the process actuator, the PST needs a minimum time to cover the distance. The actuator moves directly to the end position.
Setting range	1 300
Factory setting	80
Unit	s (second)

6. Enter the "Time back to start position".

AJ.PSTUP	Time back to start position							
Function	The parameter defines the minimum duration that the PST uses for pres- surizing to move from the end position back to the start position.							
Note	Example 1: You have left the value at the factory setting "0".							
	• The PST travels from the end position uncontrolled directly back to the start position.							
	Example 2: Value "1".							
	• Depending on the process actuator, the PST needs a minimum time cover the distance. The actuator gradually returns to the start position							
Setting range	0 300 • If "0": No data recording when returning to the start position.							
	 With ≥ "1": Recording of data when returning to the start position. 							
Factory setting	0							
Unit	s (second)							

7. If needed, activate "Test repetitions" and enter the number.

AL.PSTRP	Test repetitions						
Function	Test repetition	t repetitions in the event of a failed PST					
Setting options	Off	The test repetition function is deactivated.					
	1 3	The test repetition function is activated and the number defined.					
Factory setting	Off						

- 8. Click the "Apply" button.
- 9. Click the "Next >" button.
 - \Rightarrow The "Step 2 of 7: Reference" dialog opens.

Step 2: Perform PST reference run

In this step, the PST reference run is performed and various measured values are determined and displayed.

Perform the PST reference run in the following cases:

- After re-initializing the positioner
- After the commissioning the valve
- If there is a fundamental change in the operating conditions
- When changing the PST parameters
- Before the first PST

Displays in the dialog

The dialog contains the following information:

- The "Status for PST" shows the current PST status.
- The "Detailed PST-Error information" dialog box show the current error.
- If a PST reference run has already been performed, the results of the previous PST reference run are displayed.

🔼 s	SIPART PS2 - Wizard - Partia	al Stroke Test					_		?	×	
Step 2	of 7: Reference										^
		SIEMENS									
	Settings	1	Start the measurement of the referen	ce PS	т						
•	Reference	Status for 'PST':	Reference PST is valid	^ 1	ill.		Det	tailed PST-Error information:	onfiguration e	rror	
	Reference diagram		Reference PST is still active Reference PST fault Reference PST has been stopp	~				Start p	osition out of ected step he breakout pre	start tol eight of r	
	Limits /	Electronics temperature:	28.0	~	de	gC					
	Test	Measured start position:	99.9		~	1	%	Pressure in chamber 1 at start position:	3.035		
								Breakout pressure chamber 1:	2.147		
	Trace diagram	Measured end position:	88.6		~	18	%	Pressure in chamber 1 at end position:	2.012		
t	Test interval	C	Start in expert mode		b	>					
<										>	~
									1 1 1 1		
	Transfer Messages	Print						Start/Stop < Back	Ne	xt >	J

Perform PST reference run

- 1. Click the "Start/Stop" button.
- 2. Confirm the start in the following dialog with "OK".
 - \Rightarrow The PST reference run is in progress.
 - \Rightarrow In the "Status for PST" dialog box, "Reference PST is still active" is displayed.
 - \Rightarrow "INPST" is shown in the display.

After successful completion, the results and the status are displayed in the "Reference PST is valid" dialog.

- 3. Click the "Next >" button.
 - \Rightarrow The "Step 3 of 7: Reference diagram" dialog opens.

Perform PST reference run with expert mode

If the PST reference run fails, the abort criteria can be set manually.

- 1. Select the "Start in expert mode" check box.
- 2. Click the "Start/Stop" button.
 - \Rightarrow The "Expert mode" dialog opens \rightarrow With SIMATIC PDM: Run PST in expert mode (Page 173).

Step 3: Reference diagram

SIPART PS2 - Wizard - Partia	I Stroke Test		2		?	×
Step 3 of 7: Reference diagram						^
	SIEMENS					
Settings						
Reference	Time stamp: Day:	10/26/2023		Time stamp: Time:	15:16:41	210
Reference diagram		No 'trace data' are available or no	'trace data' were read.			
Limits /	l I					
Test	l i					
Trace diagram						
Test interval	l i					~
<						>
Transfer Messages	Print		Read	Trace < Bac	k Next	>

If a PST reference run was performed immediately beforehand, the diagram of the previous PST reference run is displayed.

- 1. Click the "Read Trace" button.
 - \Rightarrow The chart for the current PST reference run is created and displayed.



Notes on the example shown:

The diagram display is scaled by changing the input fields of the axes, e.g. "4".

- 2. Click the "Next >" button.
 - \Rightarrow The "Step 5 of 7: Test" dialog opens.

Step 5: Test

Requirement

- The PST reference run was performed successfully.
- The actuator is at the defined start position "A1.STPOS" ± Start tolerance "A1.STTOL".

SIPART PS2 - Wizard - Partial Stroke Test	?	×
Step 5 of 7: Test		^
SIEMENS		
Settings		
Reference		
Status for 'PST': Reference PST is valid A Detailed PST-Error information Reference diagram PST valid Reference PST is still active Reference PST fault	C PST cor Supply p Start po Unexpe	nfigurati pressure sition ou cted ste
Electronics temperature: 28.1 V t degC Standstill time before PST star	Limit of t	breakou
Measured start position: 99.8 V 1 % Pressure in chamber 1 at start positi	on: 3.007	
Trace diagram Breakout pressure chamber	r 1: 2.069	
Measured end position: 89.6 V 1 % Pressure in chamber 1 at end position	on: 1.974	
Start in expert mode		-1
		~
		>
Transfer Messages Print Start/Stop < Back	Nex	xt >

Run PST

- 1. Click the "Start/Stop" button.
- 2. Confirm the start in the following dialog with "OK".
 - \Rightarrow The PST is running.
 - \Rightarrow In the "Status for PST" dialog box, " PST is still active" is highlighted.

 \Rightarrow "EXPST" is shown in the display.

- After a successful PST, the results and the following states are displayed:
- "Reference PST is valid".
- "PST valid".

If the PST fails, the reason is highlighted in the "Status for PST" dialog box.

Click the "Next >" button.
 ⇒ The "Step 6 of 7: Trace diagram" dialog opens.

Run PST with expert mode

In the event of a failed PST, the abort criteria of the PST can be set manually.

- 1. Select the "Start in expert mode" check box.
- 2. Click the "Start/Stop" button.
 - \Rightarrow The "Expert mode" dialog opens \rightarrow With SIMATIC PDM: Run PST in expert mode (Page 173).

Step 6: Trace chart

SIPART PS2 - Wizard - Partial Stroke Test	?	×
Step 6 of 7: Trace diagram		^
SIEMENS		
Settings		
Reference Time stamp: Day: 10/26/2023	16:37:15.34	40
No 'trace data' are available or no 'trace data' were read.		
Limits /		
Test		
Trace diagram		
Test interval		
<		> [×]
Transfer Messages Print Read Trace < Bac	k Next >	

If an immediately preceding PST was executed, the diagram of the previous PST is displayed.

- 1. Click the "Read Trace" button.
 - \Rightarrow The chart for the current PST is created and displayed.



2. Click the "Next >" button.

 \Rightarrow The "Step 6 of 7: Test intervall" dialog opens.

	SIEMENS				
Settings		Define the intervals in which the 'Partial Stroke Test' is executed automatically.			
Reference	Test interval (A8.INTRV):	OFF	10	Days	
	Time since last PST (13.PRPST):		11	Days	
Reference diagram	Time to next PST (14.NXPST):	0	11	Days	
Limits /	Status for 'Time to next PST':	The function is deactivated	tll.		
Test					
-					
Trace diagram	•				
Test interval					

Step 7: Test interval

1. If needed, activate the "Test interval".

A8.INTRV	Test interval				
Function	The parameter activates and defines the interval time for the cyclical PST.				
Setting options	Off	The test interval is deactivated.			
	1 365	The test interval is activated and the interval time is defined in days.			
Factory setting	Off				

2. Click the "Apply" button.

 \Rightarrow The test interval is activated and is executed automatically if the requirements are met. Further displays:

- Diagnostic value "Time since last PST" (13.PRPST) in days, e.g. "0".
- Diagnostic value "Time to next PST" (14.NXPST) in days, e.g. "10".

SIPART PS2 - Wizard - Partial Stroke Test			?	×
Step 7 of 7: Test interval				^
SIEMENS				
Settings Define the intervals in which the 'Partial Stroke Test' is executed automatically.				
Reference Test interval (A8.INTRV): 10 ~	11	Days		
Time since last PST (13.PRPST): 0	1	Days		
Time to next PST (14.NXPST): 10	1	Days		
Limits / Status for 'Time to next PST': Time (14.NXPST) is valid	1			
Test				
Trace diagram				
Test interval				
				~
<				>
Transfer Messages Print Apply < Ba	ick		Finish	

3. Close the dialog with the "Finish" button.

 \Rightarrow The test results and the chart are saved.

5.5.4 With SIMATIC PDM: Run PST

Requirement

The PS reference run was performed successfully \rightarrow With SIMATIC PDM: Configure PST with wizard and execute reference run (Page 153).

Start SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.
- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".

Run PST

1. In the "Device" menu, select the command "Maintenance and Diagnostics > Partial Stroke Test > Partial Stroke Test".

🖊 SIP	PART F	PS2						_		×			
File	Dev	rice View Diagnostics Mai	nter	nance	Help SIMATIC PDN	۱v	9.2 SP2 Proce	ess Devid	e Manage	er			
	۰I	Download to device		?	?								
Upload to PG/PC				nete	r	Value	Unit	Status	^				
<u> </u>	Assign address and TAG			inten	ance & Diagnostics					-			
	Value comparison			tivat	ion of extended diagnostics (52.XDIAG)	(On 3 (three-stage		‡				
	Object properties			essu	re monitoring (U.\PRES)		On		1				
		Calibration log		irtial	Stroke Test (A.\PST)		On		1				
		Change Log		pnito	ring of dynamic control valve behavior (b.\DEVI)	(Off		1				
		Set device checked		pnito	ring/compensation of pneumatic leakage (C.\LEAK)		Off		1				
	Th.	Check configuration		pnito	ring stiction (slipstick effect) (d.\STIC)		Off		1				
	Templates			adb	and monitoring (E.\DEBA)		Off		1				
				pnito	ring of lower endstop (F.\ZERO)		Off		1				
		Identification		onito	ring of upper endstop (G.\OPEN)		Off		1				
		Wizards	•	pnito	ring of lower limit temperature (H.\TMIN)		Off		‡ []				
		Operation	•	pnito	ring of upper limit temperature (J.\TMAX)		Off		1				
				pnitoring number of total strokes (L.\STRK)			Off		‡ []				
		Setup	•	onito	ring number of direction changes (O \DCHG)		Off		1				
		Maintenance and Diagnostics	•		Extended diagnostics		Off		1				
		Communication			Pressure monitoring								
			Triggered pressure monitoring			bar		1					
	1				Partial Stroke Test	۲	Settings			×			
z004skz	d Sl	IPART PS2 🖌		-	Monitoring of dynamic control valve behavior		Partial Strok	e Test		<mark>)</mark>			
					Monitoring/compensation of pneumatic leakage								
					Monitoring stiction								

 \Rightarrow The "Partial Stroke Test" dialog opens.

SIPART PS2 - Partial Stroke Test		?	×
SIEMENS	OOD	<u>、</u>	
Partial Stroke Test (A.\PST): On Diagnostics deacting Execute 'Partial Stroke Test' Cancel 'Partial Stroke Test'	vation e Test'		
Status for 'PST': Reference PST is valid Reference PST is still active Reference PST fault PST configuration em Supply pressure too lo Statup pre	or w art tolerance ht of the ac sure reache	tuat d V	11
Electronics temperature: -128.0 	√ 1∥ ha	~	‡ ∐ h
Measured end position: -128.0 Image: A constrained of a call position: Ima	↓ ↓ ba	r r	
Expert mode - Partial Stroke Test Test interval Read trace Time since last PST (13.PRPST): Time to next PST (14.NXPST): Status for 'Time to next PST':		1 0 1 1 1 0 1 1	Days Days
< Transfer Messages Print		Clo	> ise

2. Ensure that the actuator is in the defined "Start position" (A1.STPOS) ± "Start tolerance" (A2.STTOL)

Run PST

 Start the PST with the "Execute Partial Stroke Test" button. After the successful PST, the results are displayed and the status "PST valid" is highlighted. If error message "Start position out of start tolerance" occurs: Move the actuator to the defined start position and start the PST again.

SIPART PS2 - Partial Stroke Test	? ×
SIEMENS	GOOD 🗸 👖
Partial Stroke Test (A.\PST): On Image: Construction of the structure of the stru	s deactivation ial Stroke Test'
Status for "PST": Reference PST is valid PST valid Reference PST is still active Reference PST fault Reference PST has been stoppe V	ation error re too low out of start tolerance step height of the actuat out pressure reached
Electronics temperature: 28.2 V 🕄 degC Standstill time before PST start: 0.04	∨ ‡ ∥ h
Measured start position: 99.1 V 1 % Pressure in chamber 1 at start position: 2.621	∨ ‡∐ bar
Breakout pressure chamber 1: 2.214	∨ ‡∐ bar
Measured end position: 89.9 V 1 % Pressure in chamber 1 at end position: 2.089	∨ ‡∐ bar
Expert mode - Partial Stroke Test Test interval	
Read trace Time since last PST (13.PRPST):	0 1 Days
Time to next PST (14.NXPST):	0 1 Days
Status for 'Time to next PST': The function is deact	ivated V 1
<	>
Transfer Messages Print	Close

Run PST in expert mode

If the PST fails, the PST termination criteria can be set manually.

SIPART PS2 - Partial Stroke Test		?	×
SIEMENS	GOOD 🧳	-	!
Partial Stroke Test (A.\PST): On V I Diagnostic Execute 'Partial Stroke Test' Cancel 'Partial Stroke Test'	es deactivation tial Stroke Test'		
Status for 'PST': Reference PST is valid Reference PST is still active Reference PST fault Reference PST has been stoppe PST is still active	ration error ure too low out of start tolerance step height of the actua cout pressure reached	^ : t v	11
Electronics temperature: -128.0	t hur	~	t‼ h
Measured start position: 122.0 • Pressure in chamber 1 at start position: 355.000 Breakout pressure chamber 1: 9999.000 Measured end position: -128.0 • Pressure in chamber 1 at end position: 9999.000	 ↓ ar ↓ bar ↓ bar 		
Expert mode - Partial Stroke Test Test interval Read trace Time since last PST (13.PRPST): Image: Test interval Time to next PST (14.NXPST): Image: Test interval Status for 'Time to next PST':	C C tivated	11 11 11	Days Days
< Transfer Messages Print		Clos	> * e

Start the PST with the "Expert mode - Partial Stroke Test" button.
 ⇒ The "Expert mode" dialog opens → With SIMATIC PDM: Run PST in expert mode (Page 173).

Determine PST results

- 1. To display the PST trace chart, click the "Read trace" button. \Rightarrow The "Read Trace - Sample type" dialog opens.
- 2. Select the option button "Read in actual value only" or "Read in actual value and setpoint" dialog.

- 3. Click "OK".
 - \Rightarrow The "Read Trace Select skipped samples" dialog opens.

SIPART PS2 - Read Trace X
Select skipped samples Every sample (very slow) Every 2nd sample (slow) Every 3rd sample (medium) Every 5th sample (fast) Every 10th sample (very fast)
OK Cancel

As HART communication can be slow, the diagram data can be loaded from the positioner in different resolutions.

- 4. Select the option button for the required sample rate, e.g. "Every 3rd sample (medium)".
- 5. Close the dialog with "OK". \Rightarrow The "Message Log" dialog opens.
- 6. Wait until the status "Finished" is displayed.



7. Click the "Close" button. \Rightarrow The trace chart for the current PST is created and displayed.

8. Close the dialog with the "Close" button. \Rightarrow The test results and the chart are saved.

5.5.5 With SIMATIC PDM: Run PST in expert mode

Requirement

The PST is configured with the SIMATIC PDM wizard \rightarrow With SIMATIC PDM: Configure PST with wizard and execute reference run (Page 153)

or with SIMATIC PDM executed \rightarrow With SIMATIC PDM: Run PST (Page 167).

Function of the PST expert mode

With the optional expert mode, the abort criteria of the PST reference run or the PST can be changed manually.

The limit of the breakout pressure and the abort pressure can be reduced temporarily or permanently.

Because more compressed air is released than is required to reach the PST end position, it can be easier for the process valve to break away.

NOTICE

Partial Stroke Test (PST) with modified abort criteria

By reducing the breakout or abort pressure, the process valve can move below the defined PST end position (Ad.ENPOS) .

Start expert mode

Start expert mode from "Wizard - Partial Stroke Test"	Start expert mode from "Maintenance and diag- nostics > Partial Stroke Test"				
1. Start in expert mode	Expert mode - Partial Stroke Test Test interval Read trace Time since last PST (13) Time to next PST (14) Status for 'Time to next PST (14)				
2. Start/Stop	Transfer Messages Print				
1. Select the "Start in expert mode" check box.	1. Click the "Expert mode - Partial Stroke Test" but-				
2. Click the "Start/Stop" button.					
\Rightarrow The "Expert mode" dialog opens.	\Rightarrow The "Expert mode" dialog also opens.				

Expert mode

In the "Expert mode" dialog, the status and error messages are displayed in the following dialog boxes:

- Status for PST
- Detailed PST-Error information

Temporary limit of breakout pressure:	1.966	11 bar							
Temporary limit of abort pressure:	1.966	1 bar							
Breakout pressure limit (AF.BOLIM): Abort pressure limit:	1.966	11 bar 11 bar	Status for 'PST':	Reference PST is valid PST valid Reference PST is still active Reference PST fault Reference PST has been stopp	1 Detailed PST-Erro	r information:	PST co Supply Start po Unexpe	nfigurat pressum sition o cted st breako	tion erro e too lo ut of st ep heig ut pres
			Electronics temperature:	28.1 🗸	1 degC Standstill time before	ne PST start:	5.75		
			Measured start position:	99.3 🗸 🖌 Pressu	re in chamber 1 at start position:	2.552	~	til bar	r,
					Breakout pressure chamber 1:	2.018	~	til bar	r
			Measured end position:	89.3 🗸 11 % Press.	re in chamber 1 at end position:	1.910		ti bar	t

Note

Partial Stroke Test (PST) in expert mode

The PST uses the pressure values of the following parameters as abort criteria:

- Temporary limit of breakout pressure
- Temporary limit of abort pressure

Definitions

Breakout pressure limit

The pressure at which the process valve must have moved after the PST start, otherwise the PST aborts with the "Limit of Breakout pressure reached" message.

- The pressure value is determined in the PST reference run. Or
- The pressure value was defined via "Temporary Breakout pressure limit".

Temporary Breakout pressure limit

The pressure at which the process valve must have moved in **expert mode** after PST start, the process valve must have moved, otherwise the PST aborts with the message "Limit of Breakout pressure reached".

- You can use the "Start/Stop" button to execute the PST with "Temporary Breakout pressure limit".
- You can use the "Apply" button to set the temporary pressure value as a permanent pressure value in "Breakout pressure limit".

Abort pressure limit

The pressure at which the PST end position (Ad.ENPOS) must be reached, otherwise the PST aborts with the message "Abort pressure limit reached".

- The pressure value results from the PST reference run determined at the PST end position (Ad.ENPOS) and the PST end tolerance (AE.ENTOL).
 or
- The pressure value was defined via "Temporary Abort pressure limit".

Temporary Abort pressure limit

The pressure at which the PST end position (Ad.ENPOS) must be reached in **Expert mode**, otherwise the PST aborts with the message "Abort pressure limit reached".

- You can use the "Start/Stop" button to execute the PST with "Temporary Abort pressure limit".
- You can use the "Apply" button to set the temporary pressure value as a permanent pressure value in "Abort pressure limit".

Run PST in expert mode

NOTICE

Partial Stroke Test (PST) with modified abort criteria

By reducing the breakout or abort pressure, the process valve can move below the defined PST end position (Ad.ENPOS) .

- 1. Change the values of the temporary PST termination criteria:
 - Temporary limit of breakout pressure
 - Temporary limit of abort pressure
- 2. To start the PST reference run or the PST: Click the "Start/Stop" button.
- 3. Confirm the start in the following dialog with "OK". \Rightarrow The PST reference run or the PST is started
 - \Rightarrow The PST reference run or the PST is started.

4. Wait until the PST is completed.

After successful completion, the results and the following status are displayed:

- Reference PST is valid or
- PST is valid

If the following error messages appear, adjust the temporary pressure values again if necessary and repeat the PST reference run or the PST:

- Reference PST fault
- PST fault
- Limit of Breakout pressure reached
- Abort pressure limit reached
- 5. Determine the termination criteria by which to decide how to run the following PSTs outside expert mode:

Note

Partial Stroke Test (PST) outside expert mode

The PST uses the pressure values of the following parameters as abort criteria:

- Breakout pressure limit
- Abort pressure limit
- If the temporary pressure values are **not** to apply: Click the "Close" button.
 ⇒ The "Expert mode" dialog closes. or
- If the temporary pressure values are to apply: Click the "Apply" button.
 ⇒ The temporary pressure values are **permanently** applied in the "Breakout pressure limit" and "Abort pressure limit" parameters. Click the "Close" button.
 ⇒ The "Expert mode" dialog closes.
- 6. Complete the configuration or execution of the PST.
 - Wizard Partial Stroke Test → With SIMATIC PDM: Configure PST with wizard and execute reference run (Page 153)
 - Maintenance and diagnostics > Partial Stroke Test → With SIMATIC PDM: Run PST (Page 167)

Note

Shorten the PST test interval (A8.INTRV) to maintain the smooth running of the process valve.

5.5.6 With SIMATIC PDM: Display PST results, KPIs and diagrams

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.
- The PST was executed.

Display PST results and KPI

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

C	SIP.	ART F	952					-	-		<
	File	Dev	ice View Diagnostics	Maintenan	ce H	Help	SIMATIC PDM	V9.2 SP2 Proces	s Devic	e Manager	
6		+[]	Download to device	- (?						
6	D	†[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
	ė	11	Assign address and TAG				SIPART PS2 DR8 HART				
		<u>6</u> 12	Value comparison				Identification				
			Object properties				TAG	DEMOKOFF		‡ []	
			Calibration log				Long TAG	SIPART PS2		‡]	
		D	Change Log				Descriptor	-		1	
			Set device checked				Message	DIAGNOSIS		1	
							Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

File Device View Diagnostics Maintenance Help SIMATIC PDM V9.2 SP2 Process Device Manager Image: Status Image: Status <th>SIPART PS2</th> <th></th> <th></th> <th>– 🗆 ×</th>	SIPART PS2			– 🗆 ×
SIPART PS2 Status ameter Value Image: Sipart PS2 Distriction Trend charts PART PS2 DR8 HART Image: Sipart PS2 Distriction PART PS2 DR8 HART DEMOKOFF Image: Sipart PS2 Partial Stroke Test DEMOKOFF Image: Sipart PS2 Valve charts Valve Signature Sipart PS2 Valve charts Valve Signature DIAGNOSIS Image: Valve Charts Date 10/12/2023 Image: Device Image: Valve Signature Signant Image: Valve Charts Signant Signant Image: Valve Charts Valve Signature DIAGNOSIS Image: Valve Charts Valve Charts Signant Image: Valve Charts Valve Charts Valve Signature Image: Valve Charts Valve Charts Valve Charts Image: Valve Charts Valve Charts Valve Charts Image: Valve Charts Valve Charts Valve Charts Im	File Device View Diag	gnostics Maintenance H Update diagnostics	Help SIMATIC PDM V9.2 SP2	Process Device Manager
EDD version 25.00.00 ESetup	Image: state	Update diagnostics Status Trend charts Histograms KPI Valve charts Alarm logbook	ameter PART PS2 DR8 HART Identification Partial Stroke Test Valve Signature Occumptor Message Date Date Device Manufacturer Device Valve Type Order number Serial number Final Assembly Number Hardware Revision Fimware revision	Value DEMOKOFF SIPART PS2 - DIAGNOSIS 10/12/2023 Siemens SIPART PS2 - NIK0037518210 0 3 5.03.00-28
		E	EDD version 3 Setup	25.00.00

6. In the "Diagnostics" menu, select the command "KPI > Partial Stroke Test".

 \Rightarrow The "Partial Stroke Test" dialog opens.

The results of the last 10 Partial Stroke Tests are displayed in the dialog.

SIEMENS			Number of data records (without reference):			10 48						
n.	(ñ.,	18 m	¥		11	1.	140	10	Q.,	1	12
haracteristic value	Reference	-9	-8	-7	-6	-5	-4	-3	-2	-1	-Latest	Unit
andstill time before PST start		0.05	5.75	0.66	0.03	0.00	0.03	0.08	0.14	0.10	0.03	h
easured start position	99.8	99.9	99.3	99.3	99.8	99.7	99.7	99.8	99.9	99.6	99.9	2
assure in chamber 1 at start position	2.965	2.912	2.552	2.610	3.007	2.958	3.020	3.373	3.498	2.748	3.209	bar
eakout pressure chamber 1	2.234	2.234 2.186		2.072	2.069	2.196	9999.000	9999.000	2.160	2.106	2.179	bar
easured end position	89.2	89.2 87.2		89.3	89.6	85.3	-128.0	-128.0	86.4	89.9	89.9	2
essure in chamber 1 at end position	2.107	2.016	1.910	1.936	1.974	1.881	9999.000	9999.000	1.902	2.056	2.086	bar
eakout pressure chamber 1 (return)	9999.000	9999.000	9999.000	9999.000	9999.000	9999.000	9999.000	9999.000	9999.000	9999.000	9999.000	bar
ectronics temperature	26.2	28.0	28.1	28.1	28.1	27.1	27.1	27.4	27.9	28.0	27,1	degC
perating hours	1130	130 957		968	968	976	976	976	976	1001	1130	h
			Valid	Valid	Valid	Valid	Invalid	Invalid	Valid	Valid	Valid	
atua	Valid	Valid	Valid	Valid	Valid	Valid	a reality	a La Garra	YORU	Valid	* Carlo	
atun mestamp:Day दि" स्दि* स्ट्रि स्ट्री Export/Editing	Vald 4/2/2024 g: Nothing selecte	Valid 2/5/2024	Vald 2/8/2024	Vald 2/8/2024	Vald 2/8/2024 sxes - Print	2/9/2024	2/9/2024	2/9/2024	2/9/2024	1/1/1900	4/2/2024	
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7. Close the dialog.

Display PST diagrams

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SI	PART F	PS2					-	-		<
File	Dev	vice View Diagnostics	Maintena	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Devic	e Manager	
	+1	Download to device		?						
	†]	Upload to PG/PC				Parameter	Value	Unit	Status	^
Ē	Ţ.	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison				⊡ldentification				
		Object properties				TAG	DEMOKOFF		‡ []	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
						Date	1/29/2024		+ D	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
| SIPART PS2 | | | - 🗆 X |
|---|---|--|---|
| File Device View Diag | gnostics Maintenance H
Update diagnostics | Help SIMATIC PDM V9.2 SP2 Proce | ss Device Manager |
| Image: Signature Image: Signature | Status Trend charts Histograms KPI Valve charts Alarm logbook | ameter IPART PS2 DR8 HART Identification TAG TAG Partial Stroke Test Valve Signature Date Device Manufacturer Device Manufacturer Device Type Order number Serial number Final Assembly Number Hardware Revision Fimware revision EDD version EDD version EDD version ESetup | Value ▲ DEMOKOFF SIPART PS2 JIAGNOSIS 10/12/2023 Siemens SIPART PS2 NIKO037518210 0 3 5.03.00-28 25.00.00 ✓ |
| z004skzd SIPART PS2 🖌 | < | Online access 🖌 Diagnosis Update 🖌 Identity Check 🖌 | > |

6. In the "Diagnostics" menu, select the "Valve charts > Partial Stroke Test" command.

 \Rightarrow The "Partial Stroke Test" dialog opens.

7. Click the "Read data from device" button.



 \Rightarrow The "Read data from device" dialog opens.

8. Activate the desired selection and amount of data.

SIPART PS2 - Read data from device	×
Are you sure you want the device to read the valve charts? This process can take several minutes per chart. No Yes - Reference chart only Yes - Reference chart and last chart Yes - Reference chart and last 2 charts Yes - Reference chart and last 3 charts Yes - Reference chart and last 4 charts Yes - Reference chart and last 5 charts Yes - Reference chart and last 5 charts Yes - Reference chart and last 6 charts Yes - Reference chart and last 7 charts Yes - Reference chart and last 8 charts Yes - Reference chart and last 8 charts Yes - Reference chart and last 9 charts	0
Yes - All available charts	
OK Cancel	

9. Close the dialog with "OK".⇒ The "Message Log" dialog opens.

10. Wait until the status "Finished" is displayed.

11. Close the "Message Log" dialog.



12. In the "Partial Stroke Test" dialog, click the "Response curve selection" button.

13. In the "Response curve selection" dialog, activate the required selection and confirm with "OK".

SIPART PS2 - Response curve selection	\times
Response curve Reference Last -1 -2	Ø
OK	cel

 \Rightarrow The dialog with the charts of the selected data is displayed.



14. Close the dialog.

5.5.7 With local operation: Configure PST and execute reference run

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- "Pressure monitoring" (U.\PRES) is activated.
- Process diagnostics "Partial Stroke Test" (A.\PST) is activated.

Configuring parameters

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Configure the PST parameters.

A1.STPOS	Start position
Function	The parameter defines the start position of the PST.
Note	The start position of the PST should correspond to the fully pressurized position of the actuator.
	This means that the start position should not correspond to the safety po- sition of the process valve.
Setting range	0.0 100.0
Factory setting	100.0
Unit	%

A2.STTOL	Start tolerance	
Function	The parameter defines the start tolerance of the PST.	
Note	Example: Start position "100.0", start tolerance "2.0".	
	• During the PST reference run, the actuator moves from the current position to the start position. When the position 98% is exceeded, the start position is considered reached.	
	• The PST only starts when the actuator is between the positions 98% and 102%.	
Setting range	0.1 10.0	
Factory setting	2.0	
Unit	%	

A8.INTRV	Test interval	
Function	The parameter defines the interval time for the cyclic PST.	
Setting options	OFF	The test interval is deactivated.
	1 365	The test interval is activated and the interval time is defined in days.
Factory setting	OFF	

Ad.ENPOS	End position	
Function	The parameter defines the end position of the PST.	
	• During the PST reference run to determine the abort pressure, the ac- tuator moves from the start position to the end position, taking into account the end tolerance (AE.ENTOL).	
	• The actuator moves from the start position to the end position during the PST. As the end position is approached based on pressure, it can be slightly undercut.	
Setting range	0.0 100.0	
Factory setting	90.0	
Unit	%	

Process diagnostics

AE.ENTOL	End tolerance
Function	The parameter defines the end tolerance of the PST relative to the end position.
Note	Example: End position "90.0", end tolerance "5.0".
	• During the PST reference run to determine the abort pressure, the ac- tuator moves to position "85.0".
	 With PST, the actuator moves to the end position "90.0". As the end position is approached based on pressure, it can be slightly undercut.
Setting range	1.0 20.0
Factory setting	5.0
Unit	%

AH.PSTDO	Time to end position	
Function	The parameter defines the minimum duration that the PST uses for de- pressurizing to travel from the start position to the end position.	
Note	Example: Value "1".	
	Depending on the process actuator, the PST needs a minimum time to cover the distance. The actuator moves directly to the end position.	
Setting range	1300	
Factory setting	80	
Unit	s (second)	

AJ.PSTUP	Time back to start position	
Function	The parameter defines the minimum duration that the PST uses for pres- surizing to move from the end position back to the start position.	
Note	Example 1: You have left the value at the factory setting "0".	
	• The PST travels from the end position uncontrolled directly back to the start position.	
	Example 2: Value "1".	
	• Depending on the process actuator, the PST needs a minimum time to cover the distance. The actuator moves gradually to the start position.	
Setting range	0 300 • If "0": No data recording when returning to the start position.	
	 With ≥ "1": Recording of data when returning to the start position. 	
Factory setting	0	
Unit	s (second)	

AL.PSTRP	Test repetitions	
Function	Test repetitions in the event of a failed PST	
Setting options	OFF	The test repetition function is deactivated.
	1 3	The test repetition function is activated and the number defined.
Factory setting	OFF	

Perform PST reference run

1. Select the "AY.PSTRF" parameter.

The PST reference run can be started with one of the following status displays in the top line of the display:

- "Empty"
- "oCAY"

If the status display is different, the PST reference run cannot be started.

AY.PSTRF	Start reference PST	
Function	The parameter shows the status of the PST reference run.	
Status displays	nolni	Positioner has not yet been initialized.
	"Empty"	The PST reference run has not yet been performed or the PST parameters have been changed.
	rEAL	The PST reference run is activated.
	INPST	The PST reference run is in progress.
	oCAY	The PST reference run was completed successfully.
	C-Err	Configuration error
	FdIni	Failed PST initialization: The PST reference run failed.
	SdrEF	The PST reference run was canceled.
Factory setting	nolni	

- 2. Press the <u>A</u> button for at least 5 seconds and the display will show "rEAL". \Rightarrow The PST reference run starts.

 - \Rightarrow "INPST" is shown in the display.
- 3. Wait until the PST reference run is completed.

 \Rightarrow If the display shows "oCAY", the PST reference run has been successfully completed.

5.5.8 With local operation: Run PST

Requirement

- The PST reference run was performed successfully → With local operation: Configure PST and execute reference run (Page 186).
- The positioner is in "Automatic (AUT)" mode.
- The actuator is at the defined PST start position (A1.STPOS) ± PST start tolerance (A2.STTOL).

Procedure

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display simultaneously for at least 2 seconds.
- Select the diagnostic value "12.PST". The PST can be started when one of the following status displays appears in the top line of the display:
 - "notSt": No Test The PST has not yet been performed.
 - "oCAY": The last PST was successfully executed.

With other status displays, the PST cannot be started \rightarrow Diagnostic value "PST status" (12.PST) (Page 194).

- 3. Start PST Press the ▲ button for at least 5 seconds and the display will show "Strt".
 ⇒ The PST starts. Indication on the display "WAIt".
 ⇒ Indication in the display during PST execution: "EXPST".
 The PST can be interrupted by pressing the ▲ button again.
- 4. Wait until PST is finished \Rightarrow After the successful PST, the display shows "oCAY".

5.5.9 Run PST in local expert mode

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- "Pressure monitoring" (U.\PRES) is activated.
- Process diagnostics "Partial Stroke Test" (A.\PST) is activated.
- The parameters of the PST process diagnostics are configured → With local operation: Configure PST and execute reference run (Page 186).

Note on the PST in local expert mode

The limit of the breakout pressure can be changed with the following 2 parameters, e.g. to enable breakout in the case of a stuck process valve.

AF.BOLIM	Breakout pressure limit
Function	The parameter defines the pressure at which the process valve must have moved after the PST start, otherwise the PST aborts.
	The pressure value is determined in the PST reference run or defined via the "Temporary Breakout pressure limit" parameter.
Note	Example: Limit for breakout pressure "1.5", tolerance for breakout pressure "0.2".
	The breakout must be detected before the pressure has reached 1.3 bar.
	For double-acting actuators, the value relates to the pressure difference P2 minus P1.
Setting range	0.1 7
Factory setting	7
	Automatic adjustment is made after the PST reference run.
Unit	bar

AG.BOTOL	Breakout pressure tolerance
Function	The parameter defines the tolerance for the breakout pressure of the PST.
Note	Example: Limit for breakout pressure "1.5", tolerance for breakout pressure "0.2".
	The breakout must be detected before the pressure has reached 1.3 bar.
	For double-acting actuators, the value relates to the pressure difference P2 minus P1.
Setting range	0.1 6
Factory setting	0.1
Unit	bar

The abort pressure cannot be changed locally, but only with SIMATIC PDM in expert mode.

Configure parameters and run PST

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Configure the PST parameters AF.BOLIM and AG.BOTOL.
- 3. Start the PST → With local operation: Run PST (Page 190). The PST can alternatively be used with SIMATIC PDM via digital contacts or via HART communication.

5.5.10 Via digital contacts: Start PST

Requirement

The digital input DI2 is only available for positioners with Digital I/O Module (DIO).

Activate and start digital input PST

The PST can be started via the digital input DI1 or DI2.

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Select the application parameter "42.DI1 Digital input 1 function" or "43.DI2 Digital input 2 function".
- 3. Set the parameter to one of the following values according to the actuation:
 - When actuated with a NO contact ("Normally Open"): "PST"
 - When actuated with a NC contact ("Normally Closed"): "-PST"
 - \Rightarrow The digital input is activated for the PST activated.
- 4. Switch the positioner to "Manual (MAN)" mode by pressing the button on the display 🔄 simultaneously for at least 5 seconds.
- 5. Switch the positioner to "Automatic (AUT)" mode by pressing the R button. \Rightarrow Activating the connected NC contact or NO contact starts the PST.

5.5.11 Via HART communication: Start PST

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- "Pressure monitoring" (U.\PRES) is activated.
- Process diagnostics "Partial Stroke Test" (A.\PST) is activated.

Start PST

Send to the positioner via HART communication:

- Command "#172"
- Byte 0, Bit 5 and Byte 1, Bit 0
- \Rightarrow The PST starts and the display shows "EXPST".

8.8	9,9,8
88	EXPST

Cancel PST

Send to the positioner via HART communication:

- Command "#172"
- Byte 0, Bit 5 and Byte 1, Bit 1

5.5.12 Diagnostic value "PST status" (12.PST)

Diagnostic value	Status PST			
	Short designation: 12.PST			
Function	The diagnostic va	The diagnostic value shows the status of the last Partial Stroke Test (PST).		
Note	The PST can be started manually with this diagnostic value \rightarrow With local operation: Run PST (Page 190).			
	Requirement for F	PST:		
	Successful PST ref (Page 186)	erence run \rightarrow With local operation: Configure PST and execute reference run		
Requirement	The positioner has	s pressure sensors (-Z PO2 option).		
Status messages at the start of the PST	notoL	No Tolerance: The actuator is outside the defined "Start position" $(A1.STPOS) \pm$ "Start tolerance" (A2.STTOL). The PST does not start.		
	Strt	Start: After 5 seconds, manual PST is started.		
	WAIt	Wait: The PST is being executed.		
Status/display options	Off	The PST is deactivated.		
	C-ERR	Configuration error:		
		• PST cannot be started.		
		• Settings in the "Start position" (A1.STPOS) and "End position" (Ad.EN-POS) parameters are not plausible.		
	FdIni	Failed PST Initialization: The PST reference run has failed.		
	norEF	The PST reference run has not yet been performed.		
	notSt	No Test: The PST has not yet been performed		
	oCAY	The last PST was successfully executed.		
	SdtSt	Stopped Test: The last PST was interrupted.		
	FdtSt	Failed Test: The last PST failed.		
Factory setting	Off			
Communication				
HART communication (read)	Command	#211		
	Response Data	Format and meaning: \rightarrow Via HART communication: Read out diagnostic results (Page 196)		

5.5.13	Diagnostic value	" - Time since	last Partial Stroke	Test" (13.PRPST)

Diagnostic value	Time since last Partial Stroke Test		
	Short designation: 13.PRPST		
Function	The diagnostic val	ue shows the time since the last Partial Stroke Test (PST) in days or the status.	
Display options	###	Days since the last PST	
	notSt	No Test: The PST has not yet been performed	
	norEF	The PST reference run has not yet been performed.	
	Sdtst	Stopped Test: The last PST was interrupted.	
	FdtSt	Failed Test: The last PST failed	
Unit	Days		
Communication			
SIMATIC PDM Export	Name	ps2_pst_prev_time	
	DisplayValue	≜ Value	
HART communication	Command	#171	
	Response Data	Bytes: 12 15	
		Format: Float	

5.5.14 Diagnostic value "Time until next Partial Stroke Test" (14.NXPST)

Diagnostic value	Time to next Partial Stroke Test		
	Short designation: 14.NXPST		
Function	The diagnostic va	lue shows the time until the next Partial Stroke Test (PST) in days.	
Requirement	• The PST is acti	vated in "Configuration" mode.	
	A test interval	is set in the "A8.INTRV" parameter.	
Display options	Off	Factory setting or unfulfilled requirement	
	###	Days until next PST	
Unit	Days		
Communication			
SIMATIC PDM Export	Name	ps2_pst_next_time	
	DisplayValue	≜ Value	
HART communication	Command	#171	
	Response Data	Bytes: 17 20	
		Format: Float	

5.5.15 Via HART communication: Read out diagnostic results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The PST was executed.

Display the diagnostics status

Send to the positioner via HART communication:

- Command "#209"
- Byte 0

The answer consists of the following data:

Table 5-8 Status byte for PST_ADV resp. PST_REFADV

Bit	Status
0	PST_ADVREF running
1	PST_ADVREF failed
2	PST_ADVREF valid
3	PST_ADVREF stopped
4	PST_ADV running
5	PST_ADV failed
6	PST_ADV valid
7	PST_ADV stopped

Read out PST results

Request

Send to the positioner via HART communication:

- Command "#211"
- Byte 0 with the index the PST: "0" or "1" to"9".

Byte	Format	Description	
0	Unsigned-8	Index of the data record to be read	
		0	Current or latest data record
		1 9	Previous data record

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Byte	Format	Description
0	Unsigned-8	Data record index of the read data
1	Unsigned-8	Advanced PST State
2 3	Unsigned-16	Advanced PST Error
4 7	Float	Advanced PST Idleness time
8 11	Float	Advanced PST: Start Position
12 15	Float	Advanced PST: End Position
16	Enum	Pressure Unit
17 20	Float	Advanced PST: Pressure P1 at Start Position
21 24	Float	Advanced PST: Pressure P2 at Start Position
25 28	Float	Advanced PST: Pressure P1 at Breakout Position Down
29 32	Float	Advanced PST: Pressure P2 at Breakout Position Down
33 36	Float	Advanced PST: Pressure P1 at End Position
37 40	Float	Advanced PST: Pressure P2 at End Position
41	Enum	Temperature Unit
42 45	Float	Advanced PST Electronic Temperature
46 48	Date	Advanced PST Timestamp: Date
49 52	Time	Advanced PST Timestamp: Time
53 56	Float	Advanced PST: Pressure P1 at Breakout Position Return
57 60	Float	Advanced PST: Pressure P2 at Breakout Position Return
61 64	Unsigned-32	Advanced PST Operating Hours Counter

 Table 5-10
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Device-Specific Command Error

5.5.16 With SIMATIC PDM: Export diagnostics results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.
- The PST was executed and the trace charts were displayed → With SIMATIC PDM: Configure PST with wizard and execute reference run (Page 153).

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART F	952				-	-		×
File	Dev	ice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	,
	+I	Download to device	?						
	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u>.</u>	😑 🕎 Assign address and TAG				E SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			□ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

	SIPART PS2						_		×
File	Device	View	Diagnostics	Maintenance	e Help	SIMATIC PDM V9.2 SP2 Pro	cess Devic	e Manager	r
	Save C	Ctrl+S	🖌 🔊 🖪	器 紹 🥐					
₽	Export				Parameter	Value	Unit	Status	^
•	Import ISIPART PS2 DR8 HART								
	□ Print Ctrl+P								
—	Class		 Diagnostics 		TAG	DEMOKOFF		1	
	Close				Long TAG	SIPART PS2		1	
					Descriptor	-		1	
					Message	DIAGNOSIS		1	
					Date	8/15/2023		1	
					⊡ Device				
					Manufacturer	Siemens		1	
					Device Type	SIPART PS2		‡]	
					Order number	-		1	
					Serial number	N1KO037518210		1	
					Final Assembly Number	0		‡ []	
					Hardware Revision	3		1	
					Firmware revision	5.03.00-28		‡	
					EDD version	25.00.00			
					⊡ Setup				
					 Dynamic variable mapp 	ing			\sim
z004s	kzd SIPART	r psz 🖌			Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌)

6. In the "File" menu, select the "Export..." command.

 \Rightarrow The "Export - ..." dialogopens.

- 7. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

	Export - SIPART PS2	?	×
E	Export directory:		_
C	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export		-
ł	ITML transformation file:		
C	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation.xsl		
-1	Which information should be exported?		
5	Device parameters		
5	Diagnostics		
5	Document Manager		
\$	Selection		
(Object		
\$	Status:		_
			~
< []			>
	Messages Start Stop	Close	

8. Start the export with the "Start" button.

- 9. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815 121412.xml"
 - XSL stylesheet "PDM80 ExportTransformation.xsl"

10. Close the dialog.

11. Open the XML file with suitable software, e.g. an editor.



The XML file contains the following data for process diagnostics.

able 5-11 Paramete	er					
Parameter	Data description in the XML file					
	Name	Label	DisplayValue			
			e.g.			
A1.STPOS	ps2_pst_start_pos	Start position (A1.STPOS)	100.0			
A2.STTOL	ps2_pst_start_tol	Start tolerance (A2.STTOL)	2.0			
Ad.ENPOS	var_PST_Adv_EndPos	End position (Ad.ENPOS)	90.0			
AE.ENTOL	var_PST_Adv_EndTol	End tolerance (AE.ENTOL)	5.0			
AF.BOLIM	var_PST_Adv_BreakoutPresLimit	Breakout pressure limit (AF.BOLIM)	2.022			
AG.BOTOL	var_PST_Adv_BreakoutPresTol	Breakout pressure tolerance (AG.BOTOL)	0.100			
AH.PSTDO	var_PST_Adv_TimeDown	Time to end position (AH.PSTDO)	80			
AJ.PSTUP	var_PST_Adv_TimeReturn	Time back to start position (AJ.PSTUP)	0			

neter

Unit

% % % %

. psi

S

s

bar MPa

Process diagnostics

5.5 Partial Stroke Test (pressure sensor-supported)

Parameter	Data description in the XML file					
	Name Label D		DisplayValue	Unit		
			e.g.			
AL.PSTRP	var_PST_Adv_Repeat	Test repetitions (AL.PSTRP)	OFF	-		
A8.INTRV	ps2_pst_inter_val	Test interval (A8.INTRV)	OFF	OFF		
				• Days		

Table 5-12Diagnostics results

Diagnostic value/	Data description in the XML file					
Parameter	Name	Label	DisplayValue	Unit		
			e.g.			
13.PRPST	ps2_pst_prev_time	Time since last PST (13.PRPST)	0	Days		
14.NXPST	ps2_pst_next_time	Time to next PST (14.NXPST)	0	Days		
Abort pressure limit	var_PST_Adv_AbortPresLimit	Abort pressure limit	0.333	• bar		
				• MPa		
				• psi		

Diagnostic value/	Data description in the XML file						
Parameter	Name	Label	DisplayValue	Unit			
			e.g.				
<pst reference="" run=""></pst>	var_KPI_PST_AdvRef_State_2_F8	Status for 'PST'	0	-			
	var_KPI_PST_AdvRef_State_2_Valid	Status for 'PST'	Valid	-			
	var_KPI_PST_AdvRef_State_2_03	Status for 'PST'	0	-			
	var_KPI_PST_AdvRef_Error_2	Detailed PST-Error informa- tion	0	-			
	var_KPI_PST_AdvRef_Time- Stamp_Date	Time stamp: Day	1/31/2024 <mm dd="" yyyy=""></mm>	-			
	var_KPI_PST_AdvRef_Time- Stamp_Time	Time stamp: Time	14:35:42.165	-			
	var_KPI_PST_AdvRef_Operating- Hours	Operating hours	946	h			
	var_KPI_PST_AdvRef_Electronic- sTemp	Electronics temperature	27.1	• °C • °F			
	var_KPI_PST_AdvRef_StartPos_Act- Value	Measured start position	99.8	%			
	var_KPI_PST_AdvRef_EndPos_Act- Value	Measured end position	89.4	%			
	var_KPI_PST_AdvRef_Breakout- Time_P1	Breakout pressure chamber 1	2.286	• bar • MPa			
	var_KPI_PST_AdvRef_StartPos_P1	Pressure in chamber 1 at start position	3.143	• psi			
	var_KPI_PST_AdvRef_Breakout- Time_P1	Breakout pressure chamber 1	2.286				
	var_KPI_PST_AdvRef_EndPos_P1	Pressure in chamber 1 at end position	2.128				
	var_KPI_PST_AdvRef_Breakout- Time_P1_Return	Breakout pressure chamber 1 (return)	9999.000				
	var_KPI_PST_AdvRef_Breakout- Time_P2	Breakout pressure chamber 2	9999.000				
	var_KPI_PST_AdvRef_StartPos_P2	Pressure in chamber 2 at start position	9999.000				
	var_KPI_PST_AdvRef_EndPos_P2	Pressure in chamber 2 at end position	9999.000				
	var_KPI_PST_AdvRef_Breakout- Time_P2_Return	Breakout pressure chamber 2 (return)	9999.000				

Diagnostic value/	Data description in the XML file						
Parameter	Name	Label	DisplayValue e.g.	Unit			
<last pst=""></last>	var_KPI_PST_AdvLatest_State_2_80	Status for 'PST'	0	-			
	var_KPI_PST_AdvLat- est_State_2_Valid	Status for 'PST'	Valid	-			
	var_KPI_PST_AdvLatest_State_2_3F	Status for 'PST'	Reference PST is valid	-			
	var_KPI_PST_AdvLatest_Idlenes- sTime	Standstill time before PST start	0.00	h			
	var_KPI_PST_AdvLatest_Error_2	Detailed PST-Error informa- tion	0	-			
	var_KPI_PST_AdvLatest_Time- Stamp_Date	Time stamp: Day	1/31/2024 <mm dd="" yyyy=""></mm>	-			
	var_KPI_PST_AdvLatest_Time- Stamp_Time	Time stamp: Time	14:40:58.715	-			
	var_KPI_PST_AdvLatest_Operating- Hours	Operating hours	947	h			
	var_KPI_PST_AdvLatest_Electronic- sTemp	Electronics temperature	27.1	• °C • °F			
	var_KPI_PST_AdvLatest_Start- Pos_ActValue	Measured start position	99.8	%			
	var_KPI_PST_AdvLatest_End- Pos_ActValue	Measured end position	89.9	%			
	var_KPI_PST_AdvLatest_StartPos_P1	Pressure in chamber 1 at start position	2.956	• bar • MPa			
	var_KPI_PST_AdvLatest_Breakout- Time_P1	Breakout pressure chamber 1	2.271	• psi			
	var_KPI_PST_AdvLatest_EndPos_P1	Pressure in chamber 1 at end position	2.080				
	var_KPI_PST_AdvLatest_Breakout- Time_P1_Return	Breakout pressure chamber 1 (return)	9999.000				
	var_KPI_PST_AdvLatest_StartPos_P2	Pressure in chamber 2 at start position	9999.000				
	var_KPI_PST_AdvLatest_Breakout- Time_P2	Breakout pressure chamber 2	9999.000				
	var_KPI_PST_AdvLatest_EndPos_P2	Pressure in chamber 2 at end position	9999.000				
	var_KPI_PST_AdvLatest_Breakout- Time_P2_Return	Breakout pressure chamber 2 (return)	9999.000				
	var_KPI_PST_Adv_NumberOfData- sets	Number of data records (with- out reference)	10	-			

Table 5-13	KPIs of the	maximum	of 9	predecessor PSTs
------------	-------------	---------	------	------------------

Data description in the XML file				
Name	Label	DisplayValue	Unit	
var_KPI_PST_AdvM 1 _State_2_80	Status for 'PST'		-	
var_KPI_PST_AdvM 9 _State_2_80				
var_KPI_PST_AdvM 1 _State_2_Valid	Status for 'PST'		-	
var_KPI_PST_AdvM 9 _State_2_Valid				
var_KPI_PST_AdvM 1 _State_2_3F	Status for 'PST'		-	
var_KPI_PST_AdvM 9 _State_2_3F				
var_KPI_PST_AdvM 1 _IdlenessTime	Standstill time before PST		h	
	start			
var_KPI_PST_AdvM 9 _IdlenessTime				
var_KPI_PST_AdvM1_Error_2	Detailed PST-Error informa-		-	
	tion			
var_KPI_PST_AdvM 9 _Error_2				
var_KPI_PST_AdvM 1 _TimeStamp_Date	Time stamp: Day		-	
var_KPI_PST_AdvM 9 _TimeStamp_Date				
var_KPI_PST_AdvM 1 _TimeStamp_Time	Time stamp: Time		-	
var_KPI_PST_AdvM 9 _TimeStamp_Time				
var_KPI_PST_AdvM1_OperatingHours	Operating hours		h	
var_KPI_PST_AdvM 9 _OperatingHours				
var_KPI_PST_AdvM1_ElectronicsTemp	Electronics temperature		• °C	
			• °F	
var_KPI_PST_AdvM 9 _ElectronicsTemp				
var_KPI_PST_AdvM1_StartPos_ActValue	Measured start position		%	
var_KPI_PST_AdvM 9 _StartPos_ActValue				
var_KPI_PST_AdvM1_EndPos_ActValue	Measured end position		%	
var_KPI_PST_AdvM 9 _EndPos_ActValue				

Data description in the XML file					
Name	Label	DisplayValue	Unit		
var_KPI_PST_AdvM 1 _StartPos_P1	Pressure in chamber 1 at start		• bar		
	position		• MPa		
var_KPI_PST_AdvM 9 _StartPos_P1			• psi		
var_KPI_PST_AdvM 1 _BreakoutTime_P1	Breakout pressure chamber 1				
var_KPI_PST_AdvM 9 _BreakoutTime_P1					
var_KPI_PST_AdvM 1 _EndPos_P1	Pressure in chamber 1 at end				
	position				
var_KPI_PST_AdvM 9 _EndPos_P1					
var_KPI_PST_AdvM 1 _BreakoutTime_P1_Return	Breakout pressure chamber 1				
	(return)				
var_KPI_PST_AdvM 9 _BreakoutTime_P1_Return					
var_KPI_PST_AdvM 1 _StartPos_P2	Pressure in chamber 2 at start				
	position				
var_KPI_PST_AdvM 9 _StartPos_P2					
var_KPI_PST_AdvM 1 _BreakoutTime_P2	Breakout pressure chamber 2				
var_KPI_PST_AdvM 9 _BreakoutTime_P2					
var_KPI_PST_AdvM 1 _EndPos_P2	Pressure in chamber 2 at end				
	position				
var_KPI_PST_AdvM 9 _EndPos_P2					
var_KPI_PST_AdvM 1 _BreakoutTime_P2_Return	Breakout pressure chamber 2				
	(return)				
var_KPI_PST_AdvM 9 _BreakoutTime_P2_Return					

5.5.17 Messages

5.5.17.1 General information

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The application parameter "52.XDIAG" is set to "On1", "On2" or "On3".
- Process diagnostics "Partial Stroke Test" (A.\PST) is activated.

Notes

- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - With the "#48" command, you can query the specific message for process diagnostics.

5.5.17.2 Messages in the display

Indication on the display

Display	Possible cause	Remedy
1 16 11 15 1 Error code 16	The parameter values of the PST are not configured correctly. If, on start of the PST, the plausibility check of the PST parameters fails, this fault mes- sage is displayed, but not reported via the fault message output.	 Execute stroke direction from high pressure level to low pressure level. For double-acting actuators, the pressure difference P2 minus P1 is relevant. Configure the parameters "A1.STPOS", "A2.STTOL", "Ad.ENPOS" so that the appropriate one of the following two conditions is fulfilled: At higher pressure levels at the 100% position: A1.STPOS - A2.STTOL > Ad.ENPOS + 5 % At higher pressure levels at the 0% position: A1.STPOS + A2.STTOL < Ad.ENPOS - 5 %

5.5.17.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Message for the Partial Stroke Test

The fault message output is activated in the following situations:

- PST with pressure sensors failed
- Start position out of tolerance

I/Os

Digital I/O Module (DIO) 6DR4004-6A / -8A	Inductive Limit Switches (ILS) 6DR4004-6G / -8G	Mechanic Limit Switches (MLS) 6DR40046K			
2	$2 \xrightarrow{1} \xrightarrow{+} 41 \xrightarrow{+} 42$	$2 \xrightarrow{1} \xrightarrow{+} 41$			
$3 \xrightarrow{+} 31 \xrightarrow{+} 32$	$3 \xrightarrow{+} 51 \xrightarrow{+} 52$	3 + 51 + 51 + 52			
4 + 41 42					
(5) + 51 ← 52					
① Digital input DI2, galvanically isolated	1 Fault message output, has no func-	1 Fault message output, has no func-			
2 Digital input DI2, dry contact	tion in combination with 6DR4004-3ES	tion in combination with 6DR4004-4ES			
③ Fault message output	2) Digital output 1	2 Digital output 1			
④ Digital output DO1	(3) Digital output 2	③ Digital output 2			
5 Digital output DO2					

5.5.17.4 With SIMATIC PDM: Display PST status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM , open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenan	ice Help	SIMATIC PDM	V9.2 SP2 Proces	ss Device	e Manager	
	+[]	Download to device		?					
	t[Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	Π	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>6</u>]2	Value comparison			□ Identification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		\$ []	
					Data	1/20/2024		+□	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🖊 SIP	ART PS2								_	[×								
File	Device	View	Diag	nostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2 P	rocess [Device	e Manage	er								
	40.10	<u>an</u> 🝺	R	Update o	diagnostics															
⊡⊡	SIPART PS	2		Status			ameter	Value	U	nit	Status	^								
<u> </u>	SIPART	PS2 DI		Trend ch	arts		IPART PS2 DR8 HART													
ie‡ Identification ie‡ Setup		Histograms		Identification																
	🗄 🤌 Mai	ntenanc		KDI		Ĺ	TAG	DEMOKOFF			1									
	Con	nmunicat		Valve ch	arte	ľ	Long TAG	SIPART PS2			1									
				Alarmalo	ans		Descriptor	-			1									
		l		Alarmito	JUDOK	_	Message	DIAGNOSIS			1									
							Date	8/15/2023			1									
							□ Device													
							Manufacturer	Siemens			1									
							Device Type	SIPART PS2			1									
							Order number	-			1									
							Serial number	N1KO037518210			‡									
							Final Assembly Number	0			1									
							Hardware Revision	3			1									
							Firmware revision	5.03.00-28			1									
												E			EDD version	25.00.00				
						Setup														
						Dynamic variable mapp	ing													
							PV is	Setpoint			1									
							SV is	Setpoint			‡]									
							TV is	Setpoint			1									
							QV is	Setpoint			1									
							Basic settings													
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator s	spi		1	¥								
z004skz	d SIPART	PS2 🖌					Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌				<mark>)</mark>								

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Status" tab.

In the event of an error, the corresponding message is highlighted:

- PST with pressure sensors failed
- Start position out of tolerance
- 8. Close the dialog.

5.5.17.5 Via HART communication: Get messages

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52..

Call up message for process diagnostics

Send the "#48" command to the positioner via HART communication.

 \Rightarrow 20 bytes are returned as data.

The message for the "A.\PST" process diagnostics is contained in the following Byte:

• Byte 17, Bit 4 corresponds to PST failed.

5.5.17.6 Reset messages

Messages are saved in the alarm logbook of the positioner.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.6 Monitoring of dynamic control valve behavior (b.\DEVI)

5.6.1 Functional description

Process diagnostics monitors the dynamic control valve behavior.

During diagnostics, the currently determined control behavior is compared with the expected control behavior and displayed as a percentage deviation.

When the positioner is in operation, the current value of the deviation is displayed in the diagnostic value "Dynamic control valve behavior" (15.DEVI).

Ring memory

If data storage is activated in the positioner, the deviation data determined is stored in the positioner's ring memories.

In each case, 20 data entries are stored in 5 ring memories for different lengths of time using the FIFO method (First In - First Out) .

Ring memory for time span	Amount of data	Time interval between the data
Last 30 minutes	20	1.5 minutes
Last 8 hours	20	24 minutes
Last 5 days	20	6 hours
Last 2 months	20	3 days
Last 30 months	20	45 days

The data can be stored in Device Manager Software, e.g. SIMATIC PDM, as a trend and exported for further processing.

The data can be read and processed using HART commands.

The process diagnostics are monitored with adjustable thresholds. If the limits are exceeded, messages are output via the display and optionally via the digital contacts or HART communication.

5.6.2 Activate and configure diagnostics

Requirement

The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics of "Monitoring of dynamic control valve behavior" (b.\DEVI)

Function	Process diagnostic	rocess diagnostics monitors the dynamic control valve behavior.			
Note	The current value of the deviation is shown in the display or in SIMATIC PDM in the "Dynamic control valve behavior" diagnostic value (15.DEVI) .				
Setting options	Off	Process diagnostics are deactivated.			
	On	Process diagnostics is activated.			
Factory setting	Off				

Process diagnostics parameters

If the process diagnostics are activated with "On", the following parameters can be seen.

b1.TIM	Time constant	Time constant			
Function	The parameter defines the damping effect.				
	The time constant is found during initialization from the determined travel times "uP" and "doWn" .				
Setting option/setting range	Auto	The time constant determined during initialization is effective.			
	1 400	If the determined time constant is not sufficient: Alternatively, enter a value between "1" and "400".			
		Examples:			
		The value "1" results in very weak damping.			
		• The value "400" causes strong damping.			
Factory setting	Auto				
Unit	Seconds				

b2.LIMIT	Limit
Function	The parameter defines the limit in percent for the permissible deviation from the expected position progression.
	The limit is a factor in the formation of thresholds.
Note	Recommendation: During operation of the positioner, observe the diagnostic value "Dynamic control valve behavior" (15.DEVI). Enter the resulting maximum value as the minimum limit "b2.LIMIT".
Setting range	0.1 100.0
Factory setting	1.0
Unit	%

b3.FACT1	Factor 1				
Function	This factor multipl	This factor multiplied by the value of "b2.LIMIT" results in threshold 1 of the process diagnostics			
Setting range	0.1 100.0	Condition: b3.FACT1 < b4.FACT2 < b5.FACT3			
Factory setting	5.0				

b4.FACT2	Factor 2				
Function	This factor multipl	This factor multiplied by the value of "b2.LIMIT" results in threshold 2 of the process diagnostic			
Setting range	0.1 100.0	Condition: b3.FACT1 < b4.FACT2 < b5.FACT3			
Factory setting	10.0				

b5.FACT3	Factor 3				
Function	This factor multipl	This factor multiplied by the value of "b2.LIMIT" results in threshold 3 of the process diagnostics.			
Setting range	0.1 100.0	Condition: b3.FACT1 < b4.FACT2 < b5.FACT3			
Factory setting	15.0				

Activate and configure "Monitoring of dynamic control valve behavior"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "b.\DEVI" of the process diagnostics "Monitoring of dynamic control valve behavior".
- 3. Set the "b.\DEVI" parameter to "On". ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the thresholds to the valve, change the parameter values:
 - b1.TIM
 - b2.LIMIT
 - b3.FACT1
 - b4.FACT2
 - b5.FACT3

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SI	PART	PS2					-	-		×
File	Dev	vice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Devic	e Manager	
	+I	Download to device		?						
	1	Upload to PG/PC				Parameter	Value	Unit	Status	^
É	1	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>6</u> 12	Value comparison				Identification				
		Object properties				TAG	DEMOKOFF		1	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
	1	Set device checked				Message	DIAGNOSIS		1	
	_					Data	1/29/2024		†	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
| SIPART PS2 | | - | _ | | × |
|--|--|--------------------|----------|-------------|----------|
| File Device View Diagnostics Maintenance | Help SIMATIC PDM | 9.2 SP2 Proces | ss Devic | e Manager | r |
| □□↓ 1 1 4 P ↓ 图 R 提 A ? | | | | - | |
| | Parameter | Value | Unit | Status | ~ |
| SIPART PS2 DR8 HART | Activation of extended diagnostics (52 XDIAG) | On 1 (single-stage | Unit | | - |
| ia‡ Identification | Pressure monitoring (IL\PRES) | On | | 1 | - |
| ⊞…↓ Setup Maintenance & Diagnostics | Partial Stroke Test (A \PST) | On | | 1 | - |
| | Monitoring of dynamic control valve behavior (b.\DEVI) | On 🗸 | | / · · · | - |
| | Monitoring/compensation of pneumatic leakage (C.\LEAK) | Off | | 1 | - |
| | Monitoring stiction (slipstick effect) (d.\STIC) | On | | t] | - |
| | Deadband monitoring (E.\DEBA) | Off | | t] | - |
| | Monitoring of lower endstop (F.\ZERO) | Off | | ‡ | |
| | Monitoring of upper endstop (G.\OPEN) | Off | | 1 | |
| | Monitoring of lower limit temperature (H.\TMIN) | Off | | 1 | 1 |
| | Monitoring of upper limit temperature (J.\TMAX) | Off | | 1 | 1 |
| | Monitoring number of total strokes (L.\STRK) | Off | | ‡ [] | |
| | Monitoring number of direction changes (O.\DCHG) | Off | | ‡ [] | |
| | Monitoring of average position value (P.\PAVG) | Off | | ‡] | |
| | Pressure monitoring | | | | 1 |
| | | | | | |
| | Partial Stroke Test | | | | |
| | Monitoring of dynamic control valve behavior | | | | |
| | Time constant (b1.TIM) | AUTO | s | ‡ [] | |
| | Limit (b2.LIMIT) | 1.0 | % | ‡] | |
| | Factor 1 (b3.FACT1) | 1.0 | | 1 | |
| | Factor 2 (b4.FACT2) | 2.0 | | 1 | |
| | Factor 3 (b5.FACT3) | 3.0 | | 1 | |
| | Monitoring/compensation of pneumatic leakage | | | | ~ |
| z004skzd SIPART PS2 🖌 | 🛛 🖌 Online access 🖌 🖉 Diagnosis Update 🖌 Identit | y Check 🖌 | | |) |

6. Select the "Maintenance & Diagnostics" directory.

- 7. For "Monitoring of dynamic control valve behavior" (b.\DEVI), set the value to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 8. To adapt the thresholds to the valve, change the parameter values:
 - b1.TIM
 - b2.LIMIT
 - b3.FACT1
 - b4.FACT2
 - b5.FACT3
- 9. In the "Device" menu, select the command "Download to device...".

10. Recommendation: Select the check box "Load changed parameters only".

11. In the dialog, click the "Start" button.

 \Rightarrow If the check box is selected, only the changed parameter values are loaded into the positioner.

12. Wait until the status "Load to Device: Action finished" is displayed.

13. Close the dialog.

5.6.3 With SIMATIC PDM: Show diagnostic results

Requirement

• The positioner has firmware version 5.02 or higher.

Note

For positioners with firmware version 5.00 or 5.01, no data for process diagnostics "b.\DEVI" are stored in the positioner.

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "b.\DEVI" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "b.\DEVI".

Note

If unwanted diagnostic messages appear on the display or via communication, increase the value of the diagnostic parameter "b2.LIMIT".

- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🛃 SI	PART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenance	e Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+I	Download to device	?						
	1	Upload to PG/PC			Parameter	Value	Unit	Status	^
	ņ	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			□ Identification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
	_				Data	1/29/2024		† 1	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. In the "Diagnostics" menu, select the "Trend charts > Deviation" command.

Note

The "b.\DEVI" process diagnostics does not have an independent trend display. The process diagnostics are displayed in the "Deviation" trend display.



 \Rightarrow The "Deviation" dialog is displayed.

The dialog contains tabs, each with a trend chart for the deviations determined:

- Trend over 30 minutes
- Trend over 8 hours
- Trend over 5 days shown as an example
- Trend over 2 months
- Trend over 30 months

The respective trend chart is based on the maximum of 20 data from the corresponding ring memory.

The lines of "Threshold 1, 2 and 3" are also shown.



Button	Description
Trend value list	Shows the 20 data for the displayed trend chart.
Restart trend	Caution: This function deletes the data stored in the po- sitioner in all 5 ring memories.
Trend help text	Explains how process diagnostics works.

7. Close the dialog.

5.6.4 Diagnostic value "Dynamic control valve behavior" (15.DEVI)

Diagnostic value	Dynamic control	valve behavior				
	Short designatio	n: 15.DEVI				
Function	The diagnostic val and the expected	The diagnostic value shows the deviation between the currently determined control behavior and the expected control behavior.				
Requirement	• For firmware v "On2" or "On3	 For firmware version 5.00 to 5.02: The "52.XDIAG" application parameter is set to "On1", "On2" or "On3". 				
	The positioner	is initialized.				
	• The process di vated.	• The process diagnostics "Monitoring of dynamic control valve behavior" (b.\DEVI) is activated.				
Display range	0.0 100.0					
Unit	%					
Communication						
SIMATIC PDM Export	Name	ps2_devi_value				
	DisplayValue	≜ Value				
HART communication (read)	Command	#171				
	Response Data	Bytes: 30 33				
		Format: Float				

5.6.5 Via HART communication: Read out diagnostic results

Requirement

• The positioner has firmware version 5.02 or higher.

Note

For positioners with firmware version 5.00 or 5.01, no data for process diagnostics "b.\DEVI" are stored in the positioner.

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "b.\DEVI" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "b.\DEVI".
- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52...

Request

Send to the positioner via HART communication:

- Command "#173"
- Ring memory index of the process diagnostics, e.g. "40". Send the request for each of the 5 ring memories separately.

Ring memory index	Ring memory for time span
40	Last 30 minutes
41	Last 8 hours
42	Last 5 days
43	Last 2 months
44	Last 30 months

Answer

The response consists of the following data on the requested ring memory:

- Response Data Bytes
- Command-Specific Response Code

Table 5-14Response Data Bytes

Byte	Format	Description
0	Enum	Ring memory index
1	Unsigned-8	Number of valid values in the ring memory
2	Enum	Unit of the ring memory values

Process diagnostics

5.6 Monitoring of dynamic control valve behavior (b.\DEVI)

Byte	Format	Description
3 42	Signed-16	Values 1 20 of the ring memory (2 bytes each)
		Scaling: 256/1.
		Examples:
		• 256 ≜ 1%
		• 25 600 ≜ 100%
43 46	Float	Value of threshold 1 (b2.LIMIT × b3.FACT1)
47 50	Float	Value of threshold 2 (b2.LIMIT × b4.FACT2)
51 54	Float	Value of threshold 3 (b2.LIMIT × b5.FACT3)
55 58	Float	-
59 62	Float	-
63 66	Float	-

 Table 5-15
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

5.6.6 With SIMATIC PDM: Export diagnostics results

Requirement

• The positioner has firmware version 5.02 or higher.

Note

For positioners with firmware version 5.00 or 5.01, no data for process diagnostics "b.\DEVI" are stored in the positioner.

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "b.\DEVI" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "b.\DEVI".
- The positioner has a HART communicator: SIPART PS2 6DR51...\6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	SIPART	PS2					-	- 1	_ >	<
File	Dev	vice View Diagnostics	Maintena	nce	Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
	- +1	Download to device		?						
	p 🔟	Upload to PG/PC				Parameter	Value	Unit	Status	^
	È. 😰	Assign address and TAG				E SIPART PS2 DR8 HART				
	<u>۵۵</u> ۵	Value comparison				⊡ldentification				
		Object properties				TAG	DEMOKOFF		‡]	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
						Data	1/29/2024		+ D	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. Open the trend chart in the "Diagnostics" menu with the command "Trend charts > Deviation" → With SIMATIC PDM: Show diagnostic results (Page 218).
 When the trend chart opens, the current data of this process diagnostics in the positioner are read out by SIMATIC PDM.

🖊 s	IPART PS2						_		\times
File	Device Save	View Ctrl+S	Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2 Pro	cess Devic	e Manag	er
₽	Export		HART		Parameter	Value	Unit	Status	^
	Import				SIPART PS2 DR8 HART				_
=	Print	Ctrl+P	Diagnostics		TAG	DEMOKOFF		1	
	Close				Long TAG	SIPART PS2		1	
					Descriptor	-		1	
					Message	DIAGNOSIS		1	
					Date	8/15/2023		1	
					⊡ Device				
					Manufacturer	Siemens		1	
					Device Type	SIPART PS2		1	
					Order number	-		1	
					Serial number	N1KO037518210		1	
					Final Assembly Number	0		1	
					Hardware Revision	3		1	
					Firmware revision	5.03.00-28		1	
					EDD version	25.00.00			
					⊡ Setup				
					Dynamic variable mapp	ing			×
z004sł	kzd SIPA	RT PS2 🖌			Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 📃			O

7. In the "File" menu, select the "Export..." command.

 \Rightarrow The "Export - ..." dialog opens.

- 8. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

	Export - SIPART PS2	?	\times	
	Evoat directory			^
	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export			
	HTML transformation file:		-	
	C. (rogrambata / Siemens (Automation / SimA TrC_FDM / Templates / PDM to_Export Transformation / Si			
	Which information should be exported?			
	Device parameters			
	Document Manager			
	Selection			
	Object			
	O SIPART PS2			
	Chature -			
			-	
				¥
<			>	
[Messages Start Stop	Close		

9. Start the export with the "Start" button.

- 10. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL stylesheet "PDM80_ExportTransformation.xsl"
- 11. Close the dialog.

12. Open the XML file with suitable software, e.g. an editor.

Param\$SIPART PS2\$20230815_121412.xml -	Editor			_		\times	
xml version="1.0" encoding="utf-8"?							~
Created by PDM 902.200.2901.5. Do no</td <th>ot edit this File!!></th> <td>•</td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	ot edit this File!!>	•				- 1	
xml-stylesheet type='text/xsl' href='PD</td <th>M80_ExportTransformatior</th> <td>1.xs1'?></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	M80_ExportTransformatior	1.xs1'?>				- 1	
<pdm xmlversion="8.04"></pdm>							
<object></object>							
<device></device>							
<id>2</id>							
<pltid>0</pltid>							
<type>EDD_OBJECT_OFFLINE</type>	-1						
<ciass>EDD_OCLASS_NODE_HAR1_MODEMK//</ciass>			h.				
ColineValues False (ColineValues)	TR/NUDE_10/SIPART PS2K/C	бјестрат	n>				
<pre><continevalues>Falsek/Onlinevalues> </continevalues></pre>			DC2/CTDADT DC2 HADT			-+h	
<pre><cdldlogfdlll>/DEVICE/HART/ACTUATOR/I <objectname>STDADT_DS3//ObjectName></objectname></cdldlogfdlll></pre>	ELECTRO_PNEOMATIC/SIEME	IS/ SIFARI	_F32/SIFARI_F32_HARI	_DRok/(ataiogr	acii	
<pre><section>DEV/ICE</section></pre>							
<commandmodesexportoffline< <="" command="" td=""><th>Modes</th><td></td><td></td><td></td><td></td><td></td><td></td></commandmodesexportoffline<>	Modes						
	loac,						
<pre><deviceparameters></deviceparameters></pre>							
<pre><attribute ")<="" <attribute="" browsename="" name="date" pre=""></attribute></pre>	ag" Type="String" Label: e="longTag" Type="String Name="descriptor" Type=' e="message" Type="String date" Type="DateTime" La	"TAG" Pa g" Label= 'String" g" Label= bbel="Dat	ramViewMember="True" "Long TAG" ParamView Label="Descriptor" F "Message" ParamViewMember="	' Displa Member= ParamVia Member=' True" (ayValue=" ="True" ewMember: "True" D: DisplavV	"DE Dis ="T isp alu	
Dates are in ISO 8601 format</td <th>!>2023-08-15T00:00:00</th> <td><td>ute></td><td></td><td></td><td></td><td></td></td>	!>2023-08-15T00:00:00	<td>ute></td> <td></td> <td></td> <td></td> <td></td>	ute>				
<pre><attribute b<="" name="manufacturer id" pre=""></attribute></pre>	rowseName="manufacturer	id" Type	="UInt16" Label="Mar	nufactur	ren" Pari	amV	۴
<						>	
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-8	mit BON	Λ	

The XML file contains 100 lines with the exported process diagnostics data.

There are 20 lines for each of the five 5 ring memories.

The data for process diagnostics is labeled with Name= "var_trend_dynamic_devi...". The 1st data line reads, for example:

```
<Attribute Name="var_trend_dynamic_devi_30min_0"
```

BrowseName="var trend dynamic devi 30min 0"

Type="Int16" Label="0.0 up to -1.5 minutes"

ParamViewMember="False" **DisplayValue="0.6"** Import="True" State="16" **Unit="%"**>143</ Attribute>

- The texts marked in bold are included and explained in the following table.
- The numerical value at "DisplayValue", e.g. "0.6", is the deviation that was determined with the process diagnostics in the period 0 to -1.5 minutes.
- The table shows a summary of the 100 data of the "b.\DEVI" process diagnostics exported with the XML file.

Ring memory	Amoun	Data description in the XML file						
for time span	t of da-	Name	Label	DisplayValue	Unit			
	τα		(Time span of data determi- nation)	e.g.				
Last 30 mi-	20	var_trend_dynamic_devi_30min_0	0.0 up to -1.5 minutes	0.6	%			
nutes								
		var_trend_dynamic_de- vi_30min_19	-28.5 up to -30.0 minutes	0.6				
Last 8 hours	20	var_trend_dynamic_devi_8h_0	0 up to -24 minutes					
		var_trend_dynamic_devi_8h_19	-456 up to -480 minutes					
Last 5 days	20	var_trend_dynamic_devi_5d_0	0 up to -6 hours					
		var_trend_dynamic_devi_5d_19	-114 up to -120 hours					
Last 2 months	20	var_trend_dynamic_devi_2m_0	0 up to -3 days					
		var_trend_dynamic_devi_2m_19	-57 up to -60 days					
Last	20	var_trend_dynamic_devi_30m_0	0 up to -45 days					
30 months								
		var_trend_dynamic_devi_30m_19	-855 up to -900 days					

5.6.7 Messages

5.6.7.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.6.7.2 Messages in the display

Indication on the display

If the set thresholds are exceeded, error code "10" is output.

If several messages are present at the same time, the display switches between the different error codes.

If threshold 1 is exceeded	If threshold 2 is exceeded	If threshold 3 is exceeded:
© 835,99 © 80 RUT35	(2 - 10 FUT 35	2 10 RUT 35
1 bar Error code 10	 2 bars Error code 10 	 3 bars Error code 10

5.6.7.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.

Digital I/O Module (DIO) 6DR4004-6A / -8A	Inductive Limit Switches (ILS) 6DR4004-6G / -8G	Mechanic Limit Switches (MLS) 6DR4004-6K	
	$3 \xrightarrow{t} \xrightarrow{+} 51 \xrightarrow{52}$	$3 \xrightarrow{+} 51 \xrightarrow{+} 52$	
(4) (4) (4) (4) (4)			
(5) (5)			
1 Digital input DI2, galvanically isolated	1) Fault message output, has no func-	1 Fault message output, has no func-	
(2) Digital input DI2, dry contact	tion in combination with 6DK4004-3ES	tion in combination with 6DR4004-4ES	
(3) Fault message output		(2) Digital output 1	
(4) Digital output DO1	(3) Digital output 2	(3) Digital output 2	
5 Digital output DO2			

5.6.7.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenanc	e Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
	+1	Download to device	?	9					
. ₽	t[Upload to PG/PC			Parameter	Value	Unit	Status	^
<u>.</u>	Π	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		‡]	
		Calibration log			Long TAG	SIPART PS2		‡]	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		‡]	
	_				Data	1/29/2024		†	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🔁 SI	PART PS2								-	-		×
File	Device	View	Diag	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proces	s Device	e Manage	r
	1 +1 t	1 🐴 🖻	R	Update o	diagnostics							
	SIPART P	S2		Status			ameter	Value		Unit	Status	^
Ė	- 🤌 SIPAF	RT PS2 DI		Trend ch	arts		PART PS2 DR8 HART	1				
		entification etup		Histogra	ame	Ĺ	Identification					
	🛓 🧷 M	aintenanc		KDI	1113	Ţ.	TAG	DEMOKOFF			1	
	1 Co	ommunicat		Value ch	arte	ſ	Long TAG	SIPART PS2			1	
				Alarma la	ans		Descriptor	-			1	
				Alarm Io	дроок		Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							Device					
							Manufacturer	Siemens			‡]	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			‡ []	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			‡ []	
							EDD version	25.00.00				
						E	Setup	-				
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			‡]	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							Basic settings					
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuato	or spi		1	~
z004ska	zd SIPAR	r psz 🖌					Online access 🖌 Di	iagnosis Update 🖌 🛛 Identity Check 🖌)

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Status" tab.

When a threshold is exceeded, the corresponding message "Dynamic control valve behavior (limit x)" is highlighted.



8. Close the dialog.

5.6.7.5 Via HART communication: Get messages

Requirement

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52..

Get message

If a process diagnostics threshold is violated, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. When the thresholds for the "b.\DEVI" process diagnostics are exceeded, the messages are contained in the following bytes:
 - Byte 14, bit 7 corresponds to threshold 1 exceeded.
 - Byte 14, bit 6 corresponds to threshold 2 exceeded.
 - Byte 14, bit 5 corresponds to threshold 3 exceeded.

5.6.7.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.7 Monitoring/compensation of pneumatic leakage (C.\LEAK)

5.7.1 Functional description

Process diagnostics activates leakage monitoring and leakage compensation.

The pneumatic leakages mainly occur in the actuator or in the pipe installation.

Leakage monitoring

- Leakage monitoring determines the current additional compressed air consumption of the valve caused by leakage while the actuator is moving.
- The diagnostics compare the expected air consumption with the actual air consumption when the actuator is moving.
- The current deviation is displayed as a percentage value in the diagnostic value "Pneumatic leakage" (16.ONLK) and stored in the ring memory.

Note

Accuracy of results

Note that this monitoring only provides results with single-acting, spring-loaded actuators and a setpoint from 5 to 95%.

Leakage compensation

- The leakage compensation compensates the leakage in control phases with constant setpoint.
- Leakage compensation increases the quality of control by reducing or preventing the typical periodic oscillation of leaky valves.
- The leakage compensation compensates leakages up to 2% of the positioner's air performance.
- The following diagnostic values show the length and period of the current leakage compensation pulses:
 - Length of the leakage compensation pulses (57.LCPUL)
 - Period of the leakage compensation pulses (58.LCPER)

The leakage compensation values are not saved in the ring memories.

Ring memory

If data storage is activated in the positioner, the deviation data determined is stored in the positioner's ring memories.

In each case, 20 data entries are stored in 5 ring memories for different lengths of time using the FIFO method (First In - First Out) .

Ring memory for time span	Amount of data	Time interval between the data
Last 30 minutes	20	1.5 minutes
Last 8 hours	20	24 minutes
Last 5 days	20	6 hours
Last 2 months	20	3 days
Last 30 months	20	45 days

The data can be stored in Device Manager Software, e.g. SIMATIC PDM, as a trend and exported for further processing.

The data can be read and processed using HART commands.

Process diagnostics can be monitored with adjustable thresholds. If these thresholds are violated, messages are output via the display and optionally via the digital contacts or the HART communication.

5.7.2 Activate and configure diagnostics

Requirement

The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics of "Monitoring/compensation of pneumatic leakage" (C.\LEAK)

Leakage monitoring					
Function	Leakage monitori valve caused by le	Leakage monitoring determines the current additional compressed air consumption of the valve caused by leakage while the actuator is moving.			
Note	The current deviation is displayed as a percentage value in the diagnostic value "Pneumatic leakage" (16.ONLK) .				
Leakage compensation					
Function	The leakage compensation compensates the leakage in control phases with constant setpoint.				
Note	The following diagnostic values show the length and period of the current leakage compen- sation pulses:				
	Length of the leakage compensation pulses (57.LCPUL)				
	eakage compensation pulses (58.LCPER)				
Leakage monitoring and leak	kage compensatio	n			
Setting options	Off	Process diagnostics are deactivated.			
	On	Process diagnostics is activated.			
Factory setting	Off				

Process diagnostics parameters

If the process diagnostics are activated with "On", the following parameters can be seen.

C1.LIMIT	Limit
Function	The parameter defines the limit of the increased compressed air in percent.
	The limit is a factor in the formation of thresholds.
Note	 During operation of the positioner, observe the "Pneumatic leakage" diagnostic value (16.ONLK) with regard to the maximum value occurring.
	 If no leakage exists, monitoring of the increased compressed air consumption is auto- matically calibrated in such a way during the initialization that the diagnostic value 16.ONLK remains below the value "30".
	 A value above "30" indicates a leak as the cause of the additional compressed air con- sumption.
	2. In the "C1.LIMIT" parameter, enter the maximum value that occurred in the diagnostic value as the limit.
Setting range	0.1 100.0
Factory setting	1.0
Unit	%

Process diagnostics

5.7 Monitoring/compensation of pneumatic leakage (C.\LEAK)

C2.FACT1	Factor 1	Factor 1			
Function	This factor multiplied by the value of "C1.LIMIT" results in threshold 1 of the process diagnost				
Setting range	0.1 100.0	Condition: C2.FACT1 < C3.FACT2 < C4.FACT3			
Factory setting	5.0				

C3.FACT2	Factor 2	
Function	This factor multipl	ied by the value of "C1.LIMIT" results in threshold 2 of the process diagnostics.
Setting range	0.1 100.0	Condition: C2.FACT1 < C3.FACT2 < C4.FACT3
Factory setting	10.0	

C4.FACT3	Factor 3			
Function	This factor multipl	ied by the value of "C1.LIMIT" results in threshold 3 of the process diagnostics.		
Setting range	0.1 100.0	Condition: C2.FACT1 < C3.FACT2 < C4.FACT3		
Factory setting	15.0			

Activate and configure "Monitoring/compensation of pneumatic leakage"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the parameter "C.\LEAK" of the process diagnostics "Monitoring/compensation of pneumatic leakage".
- 3. Set the "C.\LEAK" parameter to "On". ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the thresholds to the valve, change the parameter values:
 - C1.LIMIT
 - C2.FACT1
 - C3.FACT2
 - C4.FACT3

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PARTI	PS2					-	-		×
File	Dev	vice View Diagnostics	Mainter	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	r
	+I	Download to device		?						
.	t[Upload to PG/PC				Parameter	Value	Unit	Status	^
<u> </u>	Π	Assign address and TAG				I SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison				⊡ Identification				
		Object properties				TAG	DEMOKOFF		1	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
						Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. Select the "Maintenance & Diagnostics" directory.

SIPART PS2		-	_		×
File Device View Diagnostics Maintenand	e Help SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manage	r
🛃 🞩 🕂 🕂 🕸 🖻 🖌 🕥 🖪 🔡 🗚 😭					
⊡ III SIPART PS2	Parameter	Value	Unit	Status	^
⊡ Ø SIPART PS2 DR8 HART	Maintenance & Diagnostics				
	Activation of extended diagnostics (52.XDIAG)	On 1 (single-stage		1	
Haintenance & Diagnostics	Pressure monitoring (U.\PRES)	On		1	
	Partial Stroke Test (A.\PST)	On		1	
	Monitoring of dynamic control valve behavior (b.\DEVI)	Off		Ø	
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	On 🗸		1	
	Monitoring stiction (slipstick effect) (d.\STIC)	Off		1	
	Deadband monitoring (E.\DEBA)	On		1	
	Monitoring of lower endstop (F.\ZERO)	Off		1	
	Monitoring of upper endstop (G.\OPEN)	Off		1	
	Monitoring of lower limit temperature (H.\TMIN)	Off		1	
	Monitoring of upper limit temperature (J.\TMAX)	Off		1	
	Monitoring number of total strokes (L.\STRK)	Off		1	
	Monitoring number of direction changes (O.\DCHG)	Off		1	
	Monitoring of average position value (P.\PAVG)	Off		1	
	⊡ Pressure monitoring				
	Pressure unit (U1.PUNIT)	bar		1	
	Hysteresis for limits (U2.P_HYS)	0.200	bar	1	~
2004skzd SIPART PS2 🖌	🛛 Online access 🖌 🛛 Diagnosis Update 🖌 🖌 Identi	ity Check 🖌			٥.

7. For "Monitoring/compensation of pneumatic leckage" (C.\LEAK), set the value to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed

- 8. To adapt the thresholds to the valve, change the parameter values:
 - C1.LIMIT
 - C2.FACT1
 - C3.FACT2
 - C4.FACT3
- 9. In the "Device" menu, select the command "Download to device...".
- 10. Recommendation: Select the check box "Load changed parameters only".
- 11. In the dialog, click the "Start" button.
 ⇒ If the check box is selected, only the changed parameter values are loaded into the positioner.
- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.

5.7.3 With SIMATIC PDM: Display diagnostic results of the leakage monitoring

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "C.\LEAK" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "C.\LEAK".

Note

If unwanted diagnostic messages appear on the display or via communication, increase the value of the diagnostic parameter "C1.LIMIT".

- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🛃 SI	PART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenance	e Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+I	Download to device	?						
	1	Upload to PG/PC			Parameter	Value	Unit	Status	^
	ņ	Assign address and TAG			SIPART PS2 DR8 HART	-			
	<u>61</u> 2	Value comparison			□ Identification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
	_				Data	1/29/2024		† 1	

- 3. In the "Upload to PG/PC..." dialog click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. In the "Diagnostics" menu, select the "Trend charts > Leakage (percentage of stroke)" command.

🖊 si	PART PS2										_		×
File	Device	View	Dia R	gnostics Update	Maintenan diagnostics	ice I	lelp	SIM/	TIC PDM V	/9.2 SP2 Proce	ess Devic	e Manag	er
				Status			ameter	г	Value		Unit	Status	^
	ilde ⊡ til sa	ntification		Trend ch	narts	•		Actual value					
	⊞ J Set	up intenanc		Histogra KPI	ams	+		Deviation Leakage (percentage of strok	e)			1	
	ŧ□ Cor	nmunicat		Valve ch	arts	•		Leakage (pressure change pe	r minute)	J		11 1	_
				Alarm lo	ogbook			Stiction (slipstick)				t	
							-	Upper endstop				‡ []	_
								Temperature				1	
			-			-	Supply pressure PZ				10 1	_	
							Seri	ial number	N1KO0375182	10		t.	
							Fina	al Assembly Number	0			1	
							Har	dware Revision	3			1	
							Firm	ware revision	5.03.00-28			<u>‡</u>	
							EDI	D version	25.00.00				
							Setup						
			1				⊟ Dyn	amic variable mapping					×
z004skz	d SIPART	PS2 🖌					Onli	ine access 🖌 🛛 Diagnosis Upo	late 🖌 🛛 Identi	ty Check 🖌			O

The "Leakage (percentage of stroke)" dialog is displayed. The dialog contains tabs, each with a trend chart for the deviations determined:

- Trend over 30 minutes
- Trend over 8 hours
- Trend over 5 days
- Trend over 2 months
- Trend over 30 months

The respective trend chart is based on the maximum of 20 data from the corresponding ring memory.

The lines of thresholds 1, 2 and 3 are also shown.



Button	Notes
Trend value list	Shows the 20 data for the displayed trend chart.
Restart trend	Caution: This function deletes the data stored in the po- sitioner in all 5 ring memories.
Trend help text	Explains how process diagnostics works.

7. Close the dialog.

5.7.4 Diagnostic value "Pneumatic leakage" (16.ONLK)

Diagnostic value	Pneumatic leakage				
	Short designatio	n: 16.ONLK			
Function	The diagnostic va leakage.	The diagnostic value shows the current additional compressed air consumption caused by leakage.			
Requirement	The process diagr	nostics "Monitoring of pneumatic leakage" (C.\LEAK) is activated.			
Display range	0 100				
Unit	%				
Communication					
SIMATIC PDM Export	Name	ps2_leak_online_val			
	DisplayValue	≜ Value			
HART communication (read)	Command	#171			
	Response Data	Bytes: 34 37			
		Format: Float			

5.7.5 Diagnostic value "Length of the leakage compensation pulse" (57.LCPUL)

Diagnostic value	Length of the lea	kage compensation pulse				
	Short designation	Short designation: 57.LCPUL				
Function	The diagnostic value shows the length of the compensation pulses in milliseconds.					
	The sign indicates the control direction of the pulse.					
Requirement	The process diagn	The process diagnostics "Monitoring of pneumatic leakage" (C.\LEAK) is activated.				
Display range	-256 254					
Factory setting	0					
Unit	ms (millisecond)					
Communication						
SIMATIC PDM Export	Name	var_LeakagePulsLength				
	DisplayValue	≜ Value				
HART communication (read)	Command	#169				
	Response Data	Byte 60				
		Format: Signed-8				

5.7.6 Diagnostic value "Period of the leakage compensation pulse" (58.LCPER)

Diagnostic value	Period of the leakage compensation pulse			
	Short designation: 58.LCPER			
Function	The diagnostic value shows the cycle duration of the leakage compensation pulses.			
Requirement	The process diagnostics "Monitoring of pneumatic leakage" (C.\LEAK) is activated.			
Display range	0.00 600.00			

Diagnostic value	Period of the leakage compensation pulse					
	Short designatio	Short designation: 58.LCPER				
Factory setting	0.00	0.00				
Unit	s (second)	s (second)				
Communication						
SIMATIC PDM Export	Name	var_LeakagePeriod				
	DisplayValue	≜ Value				
HART communication (read)	Command	#169				
	Response Data	Bytes 60 64				
		Format: Float				

5.7.7 Via HART communication: Read out diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "C.\LEAK" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "C.\LEAK".

Note

If unwanted diagnostic messages appear on the display or via communication, increase the value of the diagnostic parameter "C1.LIMIT".

• The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Request

Send to the positioner via HART communication:

- Command "#173"
- Ring memory index of the process diagnostics, e.g. "10".

Send the request for each of the 5 ring memories separately.

Ring memory index	Ring memory for time span
10	Last 30 minutes
11	Last 8 hours
12	Last 5 days
13	Last 2 months
14	Last 30 months

Answer

The response consists of the following data on the requested ring memory:

- Response Data Bytes
- Command-Specific Response Code

Tablo 5-16	Rosnonso	Data	Rivtos
Table 5-10	Response	Dala	bytes

Byte	Format	Description
0	Enum	Ring memory index
1	Unsigned-8	Number of valid values in the ring memory
2	Enum	Unit of the ring memory values
3 42	Signed-16	Values 1 20 of the ring memory (2 bytes each)
		Scaling: 256/1
		Examples:
		• 256 ≜ 1%
		• 25 600 ≜ 100%
43 46	Float	Value of threshold 1 (C1.LIMIT × C2.FACT1)
47 50	Float	Value of threshold 2 (C1.LIMIT × C3.FACT2)
51 54	Float	Value of threshold 3 (C1.LIMIT × C4.FACT3)
55 58	Float	-
59 62	Float	-
63 66	Float	-

 Table 5-17
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

5.7.8 With SIMATIC PDM: Export diagnostics results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "C.\LEAK" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is activated regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "C.\LEAK".

Note

If unwanted diagnostic messages appear on the display or via communication, increase the value of the diagnostic parameter "C1.LIMIT".

- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	952							-		×
File	File Device View Diagnostics Maintenance			ce He	lp		SIMATIC PDM	V9.2 SP2 Pro	cess Devic	e Manage	r
	+I	Download to device ?		?							
	Upload to PG/PC				Parameter Value				Unit	Status	^
<u> </u>	Π	Assign address and TAG Value comparison			= 5	SIPART PS2 DR8 HART					
	<u>61</u> 2				E	□ Identification					
		Object properties				TAG		DEMOKOFF		1	
		Calibration log				Long TAG		SIPART PS2		1	
		Change Log				Descriptor		-		1	
	Set device checked					Message		DIAGNOSIS		1	
						Data		1/29/2024		+	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. Open the trend chart in the "Diagnostics" menu with the command "Trend charts > Leckage (percentage of stroke)" → With SIMATIC PDM: Display diagnostic results of the leakage monitoring (Page 242). When the trend chart opens, the current data of this process diagnostics in the positioner are read out by SIMATIC PDM.

						•								
	SI	PART PS2						—		×				
	File	Device	View	Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2	Process Devic	e Manag	er				
16		Save	Ctrl+S	V 1 🕥 🖪	器 (約 🥐									
ſĿ	→	Export				Parameter	Value	Unit	Status	^				
	+	Import		HART		SIPART PS2 DR8 HART								
		Print	Ctrl+P			⊡Identification								
				Diagnostics		TAG	DEMOKOFF		1					
		Close				Long TAG	SIPART PS2		1					
						Descriptor	-		1					
						Message	DIAGNOSIS		1					
						Date	8/15/2023		1					
						⊡Device								
						Manufacturer	Siemens		1					
						Device Type	SIPART PS2		1					
						Order number	-		1					
						Serial number	N1KO037518210		1					
						Final Assembly Number	0		1					
						Hardware Revision	3		1					
						Firmware revision	5.03.00-28		1					
						EDD version	25.00.00							
						⊡ Setup								
]	 Dynamic variable mapp 	ing			~				
z0	z004skzd 🛛 SIPART PS2 🖌 🛛 🕹 Online access 🖌 🖉 Diagnosis Update 🖌 🛛 Identity Check 🖌 📃 📀 🚲							O:						

7. In the "File" menu, select the "Export..." command.

The "Export - ..." dialog opens.

- 8. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

	Export - SIPART PS2	?	×
			^
	Export directory: C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export		-
			_
	C:\ProgramData \Siemens \Automation \SIMA IIC_PDM \Templates \PDM80_Export Transformation.xsl		-
	Which information should be exported?		
	Device parameters		
E	✓ Diagnostics		
6	Document Manager		
	Selection		
	0		-
	U SIPART PS2		
	Status:		_
<			>
	Messages Start Stop	Close	

9. Start the export with the "Start" button.

- 10. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file"Param\$xxx\$yyyymmdd_hhmmss.xml", z. B.
 "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 11. Close the dialog.

12. Open the XML file with suitable software, e.g. editor.

Param\$SIPART PS2\$20230815_121412.xml	- Editor			_		×	
xml version="1.0" encoding="utf-8"?							~
Created by PDM 902.200.2901.5. Do r</td <td>ot edit this File!!:</td> <td>•</td> <td></td> <td></td> <td></td> <td>- 17</td> <td></td>	ot edit this File!!:	•				- 17	
xml-stylesheet type='text/xsl' href='PD</td <td>M80_ExportTransformation</td> <td>1.xs1'?></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	M80_ExportTransformation	1.xs1'?>				- 1	
<pdm xmlversion="8.04"></pdm>							
<object></object>							
<device></device>							
<id>2</id>							
<pltid>0</pltid>							
<type>EDD_OBJECT_OFFLINE</type>							
<class>EDD_OCLASS_NODE_HART_MODEM<!--</td--><td>Class></td><td></td><td></td><td></td><td></td><td></td><td></td></class>	Class>						
<odjectpath>NetZe/HART Modem-NetZwe</odjectpath>	erk/NODE_10/SIPART PS2 0</td <td>DjectPat</td> <td>in></td> <td></td> <td></td> <td></td> <td></td>	DjectPat	in>				
<pre><onlinevalues>False</onlinevalues></pre>					C-+-1D	- 4 4	
<catalogpath>/DEVICE/HART/ACTUATOR/</catalogpath>	ELECTRO_PNEUMATIC/SIEME	IS/SIPARI	_PS2/SIPARI_PS2_HARI	_DR8 </td <td>CatalogP</td> <td>atn</td> <td></td>	CatalogP	atn	
<pre><odjectname>SIPART PS2</odjectname></pre>	•						
<section>Device</section>	Madax						
	modes						
<pre></pre>							
<pre></pre>	ag" Type="String" Label.	"тас" ра	ram/jeuMember_"True	Dicol	awalue_	"DE	
<pre></pre>	e_"longTag" Type_"String	" Lahel-	"Long TAG" ParamView	Member	-"True" (Die	
<pre></pre> cattribute Name="descriptor" Browse	Name-"descriptor" Type-	string"	Label-"Descriptor" F	Param\/i	ewMember	_"T	
<pre><attribute browsenam<="" name="message" pre=""></attribute></pre>	e="message" Type="String	" Label=	"Message" ParamView	4ember=	"True" D	isn	
<pre><attribute browsename="</pre></td><td>date" la<="" name="date" td="" type="DateTime"><td>bel="Dat</td><td>e" ParamViewMember="</td><td>'True"</td><td>Displavy</td><td>alu</td><td></td></attribute></pre>	bel="Dat	e" ParamViewMember="	'True"	Displavy	alu		
<l 8601="" are="" dates="" format<="" in="" iso="" td=""><td>>2023-08-15T00:00:00</td><td>K/Attrib</td><td>ute></td><td></td><td></td><td></td><td></td></l>	>2023-08-15T00:00:00	K/Attrib	ute>				
<attribute e<="" name="manufacturer id" td=""><td><pre>BrowseName="manufacturer</pre></td><td>id" Type</td><td>="UInt16" Label="Mar</td><td>ufactu</td><td>nen" Pan</td><td>amv</td><td>Y</td></attribute>	<pre>BrowseName="manufacturer</pre>	id" Type	="UInt16" Label="Mar	ufactu	nen" Pan	amv	Y
<						>	
	Zeile 21669 Sepalte 50	70%	Windows (CPLE)			4	
	Zene 51000, sparte 50	10/6	WINDOWS (CREF)	UIF-C	5 mile DOIN	/1	

The XML file contains 100 lines with the exported process diagnostics data.

Each of the 5 ring memories contains 20 data entries.

The data for process diagnostics is labeled with Name= "var_trend_leakage...".

The 1st data line reads, for example:

<Attribute Name="var_trend_leakage_30min_0"

BrowseName="var_trend_leakage_30min_0" Type="Int16" Label="0.0 up to -1.5 minutes" ParamViewMember="False" DisplayValue="0.0" Import="True" State="32" Unit="%">0</ Attribute>

- The texts marked in bold are included and explained in the following table.
- The numerical value at "DisplayValue", e.g. "0.0", is the deviation that was determined with the process diagnostics in the period 0 to -1.5 minutes.
- The table shows a summary of the 100 data of the "C.\LEAK" process diagnostics exported with the XML file.
| Ring memory | Amoun | oun Data description in the XML file | | | | | | |
|-----------------------------|-------------------------|--------------------------------------|---|---------------------------|------|--|--|--|
| for time span t of da
ta | | Name | Label
(≜ Time span of data deter-
mination) | DisplayVal-
ue
e.g. | Unit | | | |
| Last 30 mi- | 20 | var_trend_leakage_30min_0 | 0.0 up to -1.5 minutes | 0.0 | % | | | |
| nutes | | | | | | | | |
| | | var_trend_leakage_30min_19 | -28.5 up to -30.0 minutes | 0.0 | | | | |
| Last 8 hours | 20 | var_trend_leakage_8h_0 | 0 up to -24 minutes | | | | | |
| | | | | | | | | |
| | var_trend_leakage_8h_19 | | -456 up to -480 minutes | | | | | |
| Last 5 days | 20 | var_trend_leakage_5d_0 | 0 up to -6 hours | | | | | |
| | | | | | | | | |
| | | var_trend_leakage_5d_19 | -114 up to -120 hours | | | | | |
| Last 2 months | 20 | var_trend_leakage_2m_0 | 0 up to -3 days | | | | | |
| | | | | | | | | |
| | | var_trend_leakage_2m_19 | -57 up to -60 days | | | | | |
| Last | 20 | var_trend_leakage_30m_0 | 0 up to -45 days | | | | | |
| 30 months | | | | | | | | |
| | | var_trend_leakage_30m_19 | -855 up to -900 days | | | | | |

5.7.9 Messages

5.7.9.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.7.9.2 Messages in the display

Indication on the display

If the set thresholds are exceeded, error code "11" is output.

If several messages are present at the same time, the display switches between the different error codes.



Leakage compensation								
1 bar means: Small leakage detected.	2 bars means: Medium leakage detec- ted.	3 bars means: Large leakage detected.						
(2-11-11-15) (2-11-11-15)	2-11 RUT 35	() (2-11 PUT 35						
(1) 1 bar	① 2 bars	① 3 bars						
② Error code 11	② Error code 11	② Error code 11						
Result:	Result:	Result:						
• The leakage compensation compen- sates for the leakage.	• The leakage compensation limit has been reached.	The leakage compensation cannot completely compensate for the leak-						
• The quality of the control is main- tained by the leakage compensation.	• The quality of the control can be in- fluenced by the leakage.	age.The quality of the control is influenced by the leakage.						

5.7.9.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.



I/Os

5.7.9.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	PS2					-	- 1	□ >	×
File	Dev	vice View Diagnostics	Maintena	nce	Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
	+1	Download to device		?						
	† I	Upload to PG/PC				Parameter	Value	Unit	Status	^
<u>.</u>	Π	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison				Identification				
		Object properties				TAG	DEMOKOFF		‡ []	
		Calibration log				Long TAG	SIPART PS2		‡ []	
		Change Log				Descriptor	-		1	
	5	Set device checked				Message	DIAGNOSIS		‡ []	
	_					Date	1/29/2024		±	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

⊿ SIP	ART PS2								-	-		Х
File	Device	View	Diag	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proces	ss Devic	e Manag	er
	+ +	<u>40</u> 🖻	R	Update o	diagnostics							
	SIPART PS	52		Status			ameter	Value		Unit	Status	^
÷	SIPAR	T PS2 DI		Trend ch	arts		PART PS2 DR8 HART		_			
	i ⊞…‡_ Ide	ntification		Histogra		ĺ	Identification					
		intenanc		r iistogra	1115	ľ	TAG	DEMOKOFF			1	
	Cor	mmunicat		Value ch	arte		Long TAG	SIPART PS2			1	
				Alarma la	ans		Descriptor	-			1	
				Alarmito	дроок	-	Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							Device	-				
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			1	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			1	
							EDD version	25.00.00				
						E	Setup					
							Dynamic variable mapp	ing			_	
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							Basic settings					
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator	or spi		1	~
z004skz	d SIPART	PS2 🖌					Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌				<mark>0</mark>

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Status" tab.

When a threshold is exceeded, the message"Pneumatic leckage (limit x)" is highlighted.

SIPART PS2 - Status	? ×
Diagnostics Status Messages	^
SIEMENS	GOOD 🗸
Device diagnostics 1: Pneumatic leakage (limit 1). Dynamic control valve behavior (limit 1). Dynamic control valve behavior (limit 2). Pneumatic leakage (limit 2). Pneumatic leakage (limit 3).	roke integral exceeded umber of changes in direction excee eviation of lower endstop exceeded eviation of the upper endstop excee Iband adaptation exceeded
 Stiction (slipstick) (limit 3). Limit for lower endstop monitoring exceeded (limit 1). Limit for lower endstop monitoring exceeded (limit 2). Limit for lower endstop monitoring exceeded (limit 3). Limit for upper endstop monitoring exceeded (limit 1). 	ence stroke time exceeded (limit 1). ence stroke time exceeded (limit 2). ence stroke time exceeded (limit 3). pressure sensors failed
Limit for stroke integral (100% strokes) exceeded (limit 2 A Limit for stroke integral (100% strokes) exceeded (limit 2 A Limit for direction changes exceeded (limit 1). Limit for direction changes exceeded (limit 2). Limit for direction changes exceeded (limit 3).	device temperature exceeded (limit device temperature exceeded (limit device temperature exceeded (limit device temperature undershot (limit device temperature undershot (limit ~
<	>
Transfer Messages Print	Close

8. Close the dialog.

5.7.9.5 Via HART communication: Get messages

Requirement

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Get message

If a process diagnostics threshold is violated, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. When the thresholds for the "C.\LEAK" process diagnostics are exceeded, the messages are contained in the following bytes:
 - Byte 14, bit 4 corresponds to threshold 1 exceeded.
 - Byte 14, bit 3 corresponds to threshold 2 exceeded.
 - Byte 14, bit 2 corresponds to threshold 3 exceeded.

5.7.9.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.8 Monitoring of pneumatic leakage (pressure sensor-supported)

5.8.1 Functional description

Process diagnostics monitors the signal pressures Y1 and Y2.

The monitoring of the actuating pressure Y2 is only available for the double-acting positioner.

The result shows the pressure loss or the pressure increase as a pressure unit per minute.

If the falling or rising pressure values exceed the limit in the regulated state, a message is issued.

Process diagnostics parameters:

• Limit ±leakage (U8.LRL)

Process diagnostics parameters:

- +/- Leakage at Y1 (67.LMY1)
- +/- Leakage at Y2 (68.LMY2)
- Maximum positive leakage at Y1 (69.LMUY1)
- Maximum positive leakage at Y2 (70.LMUY2)
- Maximum negative leakage at Y1 (71.LMDY1)
- Maximum negative leakage at Y2 (72.LMDY2)

Ring memory

For the signal pressures Y1 and Y2, 20 data each are stored in 5 ring memories for different time periods using the FIFO method (First In - First Out) .

Ring memory for time span	Amount of data	Time interval between the data			
Last 30 minutes	20	1.5 minutes (90 seconds)			
Last 8 hours	20	24 minutes			
Last 5 days	20	6 hours			
Last 2 months	20	3 days			
Last 30 months	20	45 days			

The data can be stored in Device Manager Software, e.g. SIMATIC PDM, as a trend and exported for further processing.

The data can be read and processed using HART commands.

Process diagnostics can be monitored with adjustable thresholds. If these thresholds are violated, messages are output via the display and optionally via the digital contacts or the HART communication.

5.8.2 Activate and configure diagnostics

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- "Pressure monitoring" (U.\PRES) is activated.

General parameters

U1.PUNIT	Pressure unit
Function	The parameter defines the pressure unit for all pressure sensor-supported diagnostics.
Setting options	• bar
	• MPa
	• psi

Process diagnostics parameters

U8.LRL	Limit +/- leakage	Limit +/- leakage					
Function	The parameter de	fines the limit for pressure changes per minute in the regulated state.					
	Process diagnostic	es can be used to detect leaks.					
Note	If the factory s	etting is "0.000", process diagnostics are deactivated.					
	Recommendat "0.100 bar/mir	ion: When process diagnostics is activated, the set value should be at least n".					
	If the measured va operating modes,	alue exceeds the limit, the "Automatic (AUT)" and "Manual mode (MAN)" error code "22" appears on the display.					
	A message is ente	red in the alarm logbook. To reset the error code: Eliminate leakage.					
	If the leak cannot	be eliminated: Increase the limit or set the value to "0".					
Setting range	0.000 7.000	bar/min					
	0.000 0.700	MPa/min					
	0.00 101.53	psi/min					
Factory setting	0.000						

Activate and configure "Monitoring of pneumatic leakage (pressure sensor-supported)"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "U.\PRES" parameter of the "Pressure monitoring".

- 3. Set the "" parameter to "On".
 - \Rightarrow The associated parameters are displayed.
- 4. Change the "U8.LRL" parameter to a value not equal to "0.000". \Rightarrow Process diagnostics is activated.

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	SIPART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Devic	e Manager	
	= +1	Download to device	?						
	B	Upload to PG/PC			Parameter	Value	Unit	Status	^
	🖹 🙀 Assign address and TAG 🗆 SIPART PS2 DR8 HART								
	<u>۵۵</u> ۵	Value comparison			⊡ldentification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. In the "Device" menu, select the command "Maintenance and Diagnostics > Pressure Monitoring".

🔼 SIF	PART F	252				-	-		×
File	Dev	rice View Diagnostics Ma	intenand	e Help	SIMATIC PDM V	9.2 SP2 Proce	ss Devic	e Manage	r
	+I	Download to device	2	,					
- +	t[Upload to PG/PC		Parameter		Value	Unit	Status	^
÷.	Ţ	Assign address and TAG		Maintenance	& Diagnostics				
	<u>۵۵</u> ۵	Value comparison		Activation of	extended diagnostics (52.XDIAG)	On 3 (three-stage		1	
		Object properties		Pressure mor	nitoring (U.\PRES)	On		1	
		Calibration log		Partial Stroke	e Test (A.\PST)	Off		1	
		Change Log		Monitoring of	f dynamic control valve behavior (b.\DEVI)	Off		1	
		Set device checked		Monitoring/c	compensation of pneumatic leakage (C.\LEAK)	Off		1	
	1	Check configuration		Monitoring st	iction (slipstick effect) (d.\STIC)	Off		1	
		Templates		Deadband m	nonitoring (E.\DEBA)	Off		1	
		lemplates		Monitoring of	f lower endstop (F.\ZERO)	Off		1	
		Identification		Monitoring of	f upper endstop (G.\OPEN)	Off		1	
		Wizards	•	Monitoring of	f lower limit temperature (H.\TMIN)	Off		1	
		Operation	•	Extended diag	Inostics	Off		1	
		Setun		Pressure mon	itoring	Off		1	
		Maintenance and Diagnostics		Partial Stroke	Test	On		1	
		Maintenance and Diagnostics	_	Monitoring of	dynamic control valvo bobavior	On		1	
		Communication		Manitaria (aynamic control valve behavior				
				ivionitoring/c	ompensation of pheumatic leakage	bar		1	
	1			Monitoring st	iction	0.200	bar	1 1	1
z004skz	d Sl	IPART PS2 🖌		Deadband mo	onitoring	y Check 🖌 📔)

 \Rightarrow The "Pressure monitoring" dialog is displayed.

7. Activate "Pressure monitoring" (U.\PRES) with the value "On".

SIPART PS2 - Pressure monitoring	? ×
SIEMENS	GOOD 🗸 - 🚺 -
Diagnostics activation	
Pressure monitoring (U.\PRES): Off	
On	
Transfer Messages Print	Close

 \Rightarrow The dialog with the current parameters is displayed.

SIPART PS2 - Pressure monitori	ing				? ×
SIEMENS					GO
Diagnostics activation					
Pressure monitoring (U.\PRES):	On ~] 1			
Pressure unit (U1.PUNIT):	bar 🗸	11		Supply pressure PZ (60.PZ):	
Hysteresis for limits (U2.P_HYS):	0.200	11	bar	Actuating pressure Y1 (61.P1):	
Lower limit PZ (U5.PZMLL):	1.400	11	bar	+/- Leakage at Y1 [*/min] (67.LMY1):	
Behavior lower limit PZ (U3.PFRLL):	No reaction> 'Automatic (Auto)' mode ${\smallsetminus}$	1 1			
Upper limit PZ (U6.PZMUL):	7.000	1	bar		
Behavior upper limit PZ (U4.PFRUL):	No reaction> 'Automatic (Auto)' mode \sim	1			
Limit actuating pressure Y1 (U7.PCL):	7.000	11	bar		
Limit +/- Leakage [*/min] (U8.LRL):	0.250	ð	bar		
<					>
Transfer Messages	Print				Close

- 8. Change the "U8.LRL" parameter to a value not equal to "0.000", e.g. "0.250".
- 9. Transfer these changes to the positioner with the "Transfer" button.
- 10. Close the dialog.
- 11. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.
- 12. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".

5.8.3 With SIMATIC PDM: Show diagnostic results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.
- Monitoring of pressure sensor-based leakage is activated → Activate and configure diagnostics (Page 263).
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

Display parameters and diagnostic results

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	A SIPART PS2 X										
Fi	le [Devi	ice View Diagnostics	Maintena	nce	Help	SIMATIC PDM	V9.2 SP2 Proce	ss Devic	e Manager	
	-		Download to device		?						
	- -		Upload to PG/PC				Parameter	Value	Unit	Status	^
	ė. 1	11	Assign address and TAG				⊡ SIPART PS2 DR8 HART				
	6	Δ	Value comparison				□ Identification				
	[Object properties				TAG	DEMOKOFF		‡ []	
		8	Calibration log				Long TAG	SIPART PS2		1	
	5	2	Change Log				Descriptor	-		1	
	5	1	Set device checked				Message	DIAGNOSIS		1	
							Date	1/29/2024		+	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. In the "Device" menu, select the command "Maintenance and Diagnostics > Pressure Monitoring".

 \Rightarrow The "Pressure monitoring" dialog shows the parameters and current leakage at Y1, with double-acting positioners also at Y2.

Z SIPART PS2	2 - Pressure monitoring				?		\times
				GOOD	<u>✓</u>	-	
n ing (U.\PRES):	On 🗸	1					
unit (U1.PUNIT):	bar v 1	t	Supply pressure PZ (60.PZ):		4.000	11	bar
nits (U2.P_HYS):	0.200	ti ba	ar Actuating pressure Y1 (61.P1):		1.672	11	bar
PZ (U5.PZMLL):	1.400	t ba	ar +/- Leakage at Y1 [*/min] (67.LMY1):		0.000	11	bar
PZ (U3.PFRLL):	No reaction> 'Automatic (Auto)' mode 🗸						
PZ (U6.PZMUL):	7.000	ti ba	ar				
PZ (U4.PFRUL):	No reaction> 'Automatic (Auto)' mode 🗸						
ure Y1 (U7.PCL):	7.000	ti ba	ar				
[*/min] (U8.LRL):	0.250	ti ba	ar				
<							~
Transfer	Messages Print				Cle	ose	

- 7. Close the dialog.
- 8. Select the directory "Maintenance & Diagnostics > Diagnostic values > Pressure". ⇒ The diagnostic results are displayed:
 - Pressure unit (U1.PUNIT)
 - +/- Leakage at Y1 (67.LMY1)
 - +/- Leakage at Y2 (68.LMY2)
 - Maximum positive leakage at Y1 (69.LMUY1)
 - Maximum positive leakage at Y2 (70.LMUY2) only with double-acting positioner
 - Maximum negative leakage at Y1 (71.LMDY1)
 - Maximum negative leakage at Y2 (72.LMDY2) only with double-acting positioner

SIPART PS2		_		×			
File Device View Diagnostics Maintenance Help SIMATIC PDM V9.2 SP2 Process Device Manager I I I I I I I I I I I I I I I I I I I							
SIPART PS2 SIPART PS2 DR8 HART 	Parameter Pressure Pressure unit (U1.PUNIT) Supply pressure PZ (60.PZ) Actuating pressure Y1 (61.P1) +/- Leakage at Y1 [*/min] (67.LMY1) Peak values	Value bar 3.990 1.670 0.000	Unit bar bar bar	Status 1 1 1 1 1 1 1 1 1			
Maintenance counters Maintenance information Temperature Pressure Pressure Communication	Maximum supply pressure PZ (resettable) (63.PZMAX) Maximum positive leakage at Y1 [*/min] (resettable) (69.LMUY1) Maximum negative leakage at Y1 [*/min] (resettable) (69.LMUY1) Event counter Violations of lower limit PZ (resettable) (64.N_MIN) Violations of upper limit PZ (resettable) (65.N_MAX) Violations of limit Y1 (resettable) (66.N1MAX)	5.230 0.000 0.000 25 0 0	bar bar bar	1 1			
z004skzd SIPART PS2 🖌	Online access 🖌 Diagnosis Update 🖌 Identity	Check V					

Display trend data

1. In the "Diagnostics" menu, select the "Trend charts > Leakage (pressure change per minute)" command.

🖊 SIF	PART PS2									_		×
File	Device	View	Diag	gnostics Update o	Maintenand diagnostics	e l	Help	SIMATIC PDM	V9.2 SP2 Proce	ss Devic	e Manag	jer
		52 T PS2 DI		Status			amet	er		Value		^
	ii de	entification		Trend ch	arts	•		Actual value				_
	i Se	tup		Histogra	ms	•		Deviation		1		
	I Co	aintenanc mmunicat		KPI		►		Leakage (percentage of stroke)		DEMOR	COFF	_
	40 CO			Valve ch	arts	•		Leakage (pressure change per minute)		SIPAR	FPS2	_
				Alarm lo	gbook			Stiction (slipstick)		-		_
		L						Lower endstop		DIAGN	DSIS	_
								Upper endstop		10/12/	2023	_
							-	Temperature		-		
							-	Deadband		Siemen	s	
						Sup	Supply pressure D7		SIPAR	PS2		
									-			
							Se	erial number		N1KO0	3751821	0
							Fir	nal Assembly Number		0		
							Ha	ardware Revision		3		
							Fir	mware revision		5.03.00	-28	
							E	DD version		25.00.0	0	
						E	Setu	p				~
						<						>
z004skz	d SIPART	PS2 🖌					0	nline access 🖌 🛛 Diagnosis Update 🖌 🛛 Ident	ity Check 🖌			O

The "Leakage (pressure change per minute)" dialog is displayed. The dialog contains the tabs, each with a trend chart for the determined pressure values:

- Trend over 30 minutes
- Trend over 8 hours
- Trend over 5 days
- Trend over 2 months
- Trend over 30 months

The respective trend chart is based on the maximum 2 × 20 data of the corresponding 2 ring memories for the positive and negative leakage.

The 2 lines for the limit "+/- leakage" (U8.LRL) are displayed.



Button	Notes
Trend value list	Shows the 20 data for the displayed trend chart.
Restart trend	Caution: This function deletes the data stored in the po- sitioner in all 5 ring memories.
Trend help text	Explains how process diagnostics works.

2. Close the dialog.

5.8.4 Diagnostic value " +/-Leakage at Y1" (67.LMY1)

Diagnostic value	+/- Leakage at Y1					
	Short designation: 67.LMY1					
Function	The diagnostic value shows the pressure increase or decrease (leakage) per minute for the actuating pressure Y1.					
Note	The diagnostic	value is determined in the controlled state.				
	Positive values between supp	 Positive values indicate an increase in pressure, e.g. in the event of pneumatic leakage between supply pressure PZ and actuating pressure Y1. 				
	Negative value	es indicate a decrease in pressure, e.g. if the pneumatic system is leaking.				
Requirement	The positioner has	s pressure sensors (Z PO2 option).				
Display range	±0.000 9.999	bar/min				
	±0.000 0.999	MPa/min				
	±0.00 99.99	psi/min				
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"				
	• MPa/min	(U.\PRES).				
	• psi/min					
Communication						
+/- Leakage at Y1 (67.LMY1)						
SIMATIC PDM Export	Name	var_LM_LeakageRateChamber1				
	DisplayValue	≜ Value				
HART communication (read)	Command	#200				
	Response Data	Bytes: 24 27				
		Format: Float				
Pressure unit (U1.PUNIT)	-					
SIMATIC PDM Export	Name	var_pressureUnit				
	DisplayValue	• bar				
		• MPa				
		• psi				
HART communication (read)	Command	#200				
	Response Data	Byte: 1				
		Format: Enum				

5.8.5 Diagnostic value " +/-Leakage at Y2" (68.LMY2)

Diagnostic value	+/- Leakage at Y2						
	Short designatio	Short designation: 68.LMY2					
Function	The diagnostic va actuating pressure	ne diagnostic value shows the pressure increase or decrease (leakage) per minute for the ctuating pressure Y2.					
Note	The diagnostic	The diagnostic value is determined in the controlled state.					
	Positive values between supp	s indicate an increase in pressure, e.g. in the event of pneumatic leakage ly pressure PZ and actuating pressure Y2.					
	Negative value	es indicate a decrease in pressure, e.g. if the pneumatic system is leaking.					
Requirement	The positioner	is double-acting.					
	The positioner	r has pressure sensors (-Z PO2 option).					
Display range	±0.000 9.999	bar/min					
	±0.000 0.999	MPa/min					
	±0.00 99.99	psi/min					
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"					
	• MPa/min	(U.\PRES).					
	• psi/min						
Communication							
+/- Leakage at Y2 (68.LMY2)							
SIMATIC PDM Export	Name	var_LM_LeakageRateChamber2					
	DisplayValue	≜ Value					
HART communication (read)	Command	#200					
	Response Data	Bytes: 28 31					
		Format: Float					
Pressure unit (U1.PUNIT)	1						
SIMATIC PDM Export	Name	var_pressureUnit					
	DisplayValue	• bar					
		• MPa					
		• psi					
HART communication (read)	Command	#200					
	Response Data	Byte: 1					
		Format: Enum					

5.8.6 Diagnostic value "Maximum positive leakage at Y1" (69.LMUY1)

Diagnostic value	Maximum positive leakage at Y1					
	Short designatio	Short designation: 69.LMUY1				
Function	The pressure char	The pressure change at Y1 is continuously monitored in the controlled state.				
	The maximum pre	essure increase is determined and stored in the manner of a drag pointer.				
Note	The diagnostic va	lue can be reset.				
Requirement	The positioner has	s pressure sensors (-Z PO2 option).				
Display range	±0.000 9.999	bar/min				
	±0.000 0.999	MPa/min				
	±0.00 99.99	psi/min				
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"				
	• MPa/min	(U.\PRES).				
	• psi/min					
Communication						
Maximum positive leakage a	t Y1 (69.LMUY1)					
SIMATIC PDM Export	Name	var_LM_P1DeltaPresMaxPointerResettable				
	DisplayValue	≜ Value				
HART communication (read)	Command	#200				
	Response Data	Bytes: 32 35				
		Format: Float				
Pressure unit (U1.PUNIT)						
SIMATIC PDM Export	Name	var_pressureUnit				
	DisplayValue	• bar				
		• MPa				
		• psi				
HART communication (read)	Command	#200				
	Response Data	Byte: 1				
		Format: Enum				

5.8.7 Diagnostic value "Maximum positive leakage at Y2" (70.LMUY2)

Diagnostic value	Maximum positive leakage at Y2						
	Short designatio	n: 70.LMUY2					
Function	The pressure char	The pressure change at Y2 is continuously monitored in the controlled state.					
	The maximum pre	he maximum pressure increase is determined and stored in the manner of a drag pointer.					
Note	The diagnostic val	Гhe diagnostic value can be reset.					
Requirement	The positioner	The positioner is double-acting.					
	The positioner	The positioner has pressure sensors (-Z PO2 option).					
Display range	±0.000 9.999	bar/min					
	±0.000 0.999	MPa/min					
	±0.00 99.99	psi/min					
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"					
	• MPa/min	(U.\PRES).					
	• psi/min						
Communication	1						
Maximum positive leakage a	t Y2 (70.LMUY2)						
SIMATIC PDM Export	Name	var_LM_P2DeltaPresMaxPointerResettable					
	DisplayValue	≜ Value					
HART communication (read)	Command	#200					
	Response Data	Bytes: 36 39					
		Format: Float					
Pressure unit (U1.PUNIT)							
SIMATIC PDM Export	Name	var_pressureUnit					
	DisplayValue	• bar					
		• MPa					
		• psi					
HART communication (read)	Command	#200					
	Response Data	Byte: 1					
		Format: Enum					

5.8.8 Diagnostic value " Maximum negative leakage at Y1" (71.LMDY1)

Diagnostic value	Maximum negative leakage at Y1					
	Short designation: 71.LMDY1					
Function	The pressure char	The pressure change at Y1 is continuously monitored in the controlled state.				
	The maximum pre	essure drop is determined and stored in the manner of a drag pointer.				
Note	The diagnostic va	ue can be reset.				
Requirement	The positioner has	s pressure sensors (-Z PO2 option).				
Display range	±0.000 9.999	bar/min				
	±0.000 0.999	MPa/min				
	±0.00 99.99	psi/min				
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"				
	• MPa/min	(U.\PRES).				
	• psi/min					
Communication	1					
Maximum negative leakage	at Y1 (71.LMDY1)					
SIMATIC PDM Export	Name	var_LM_P1DeltaPresMinPointerResettable				
	DisplayValue	≜ Value				
HART communication (read)	Command	#200				
	Response Data	Bytes: 40 43				
		Format: Float				
Pressure unit (U1.PUNIT)	-					
SIMATIC PDM Export	Name	var_pressureUnit				
	DisplayValue	• bar				
		• MPa				
		• psi				
HART communication (read)	Command	#200				
	Response Data	Byte: 1				
		Format: Enum				

5.8.9 Diagnostic value " Maximum negative leakage at Y2" (72.LMDY2)

Diagnostic value	Maximum negative leakage at Y2						
	Short designatio	Short designation: 72.LMDY2					
Function	The pressure char	The pressure change at Y2 is continuously monitored in the controlled state.					
	The maximum pre	he maximum pressure drop is determined and stored in the manner of a drag pointer.					
Note	The diagnostic val	ue can be reset.					
Requirement	The positioner	is double-acting.					
	The positioner	The positioner has pressure sensors (-Z PO2 option).					
Display range	±0.000 9.999	bar/min					
	±0.000 0.999	MPa/min					
	±0.00 99.99	psi/min					
Unit	• bar/min	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"					
	• MPa/min	(U.\PRES).					
	• psi/min						
Communication	1						
Maximum negative leakage	at Y2 (72.LMDY2)						
SIMATIC PDM Export	Name	var_LM_P2DeltaPresMinPointerResettable					
	DisplayValue	≜ Value					
HART communication (read)	Command	#200					
	Response Data	Bytes: 44 47					
		Format: Float					
Pressure unit (U1.PUNIT)							
SIMATIC PDM Export	Name	var_pressureUnit					
	DisplayValue	• bar					
		• MPa					
		• psi					
HART communication (read)	Command	#200					
	Response Data	Byte: 1					
		Format: Enum					

5.8.10 Via HART communication: Read out diagnostic results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.
- Monitoring of pressure sensor-based leakage is activated → Activate and configure diagnostics (Page 263).

Read out trend data

Request

Send to the positioner via HART communication:

- Command "#173"
- Ring memory index of the process diagnostics, e.g. "50". Send the request separately for each of the 5 ring memories for the Y1 actuating pressure and for double-acting positioners for the actuating pressure Y2.

Ring memory index for Y1	Ring memory for time span
50	Last 30 minutes
51	Last 8 hours
52	Last 5 days
53	Last 2 months
54	Last 30 months

Ring memory index for Y2	Ring memory for time span		
55	Last 30 minutes		
56	Last 8 hours		
57	Last 5 days		
58	Last 2 months		
59	Last 30 months		

Answer

The response consists of the following data on the requested ring memory:

- Response Data Bytes
- Command-Specific Response Code

Table 5-18	Response	Data Bytes
------------	----------	------------

Byte	Format	Description
0	Enum	Ring memory index
1	Unsigned-8	Number of valid values in the ring memory

Byte	Format	Description
2	Enum	Unit of the ring memory values
3 42	Signed-16	Values 1 20 of the ring memory (2 bytes each)
43 46	Float	Limit positive leakage (U8.LRL)
47 50	Float	Limit negative leakage (U8.LRL)
51 54	Float	-
55 58	Float	-
59 62	Float	-
63 66	Float	-

 Table 5-19
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

Process diagnostics data

Request

Send to the positioner via HART communication:

• Command "#198"

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Table 5-20 Response Data Bytes

Byte	Format	Description
0	Enum	Pressure monitoring (U.\PRES)
1	Enum	Pressure unit (U1.PUNIT)
2 5	Float	Lower limit PZ (U5.PZMLL)
6 9	Float	Hysteresis for limits (U2.P_HYS)
10	Enum	Behavior lower limit PZ (U3.PFRLL)
11	Enum	Behavior upper limit PZ (U4.PFRUL)
12 15	Float	Upper limit PZ (U6.PZMUL)
16 19	Float	Limit actuating pressure Y1 (U7.PCL)
20 23	Float	Limit leakage (U8.LRL)
24 25	Unsigned-16	Time pressure measurement Y1 (U9.TPMT)

 Table 5-21
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

Diagnostic values

Data request

Send to the positioner via HART communication:

• Command "#200"

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Byte	Format	Description		
0	Unsigned-8	Number of available Pressure Sensors		
1	Enum	Pressure Unit (U1.PUNIT)		
2 5	Float	Supply Pressure Value (60.PZ)		
6 9	Float	Chamber 1 Pressure Value (61.P1)		
10 13	Float	Chamber 2 Pressure Value (62.P2)		
14 17	Float	Supply Pressure Maximum Pointer resettable (63.PZMAX)		
18 19	Unsigned-16	Number of Supply Pressure Limit Underruns resettable (64.N_MIN)		
20 21	Unsigned-16	Number of Supply Pressure Upper Limit Overruns resettable (65.N_MAX)		
22 23	Unsigned-16	Number of Chamber Pressure 1 Limit reached resettable (66.N1MAX)		
24 27	Float	elta Pressure Chamber 1 (67.LMY1)		
28 31	Float	Delta Pressure Chamber 2 (68.LMY2)		
32 35	Float	Chamber 1 positive Delta Pressure Maximum Pointer resettable (69.LMUY1)		
36 39	Float	Chamber 2 positive Delta Pressure Maximum Pointer resettable (70.LMUY2)		
40 43	Float	Chamber 1 negative Delta Pressure Maximum Pointer resettable (71.LMDY1)		
44 47	Float	Chamber 2 negative Delta Pressure Maximum Pointer resettable (72.LMDY2)		

Table 5-23Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

5.8.11 With SIMATIC PDM: Export diagnostics results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

1	🖊 SIP	ART	PS2					-		×
	File	Dev	vice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proce	ss Devic	e Manager	
6		Image: Second		?						
Г	⊡4 ₽•					Parameter	Value	Unit	Status	^
L	÷			ddress and TAG 🗆 SIPART PS2 DR8 HART	SIPART PS2 DR8 HART					
L						□ Identification				
L			Object properties			TAG	DEMOKOFF		1	
		🛐 Calibration log				Long TAG	SIPART PS2		1	
			Change Log			Descriptor	-		1	
			Set device checked			Message	DIAGNOSIS		1	
						Date	1/29/2024		±0	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. Open the trend chart in the "Diagnostics" menu with the command "Trend charts > Leakage (pressure change per minute)" Trend Charts > → With SIMATIC PDM: Show diagnostic results (Page 267).

When the trend chart opens, the current data of this process diagnostics in the positioner are read out by SIMATIC PDM.

1	SIPART PS2					_		×
File	Device Vi	ew Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2	Process Devic	e Manage	r
	Save Ctrl+	<u>></u> ⊻ ⊠ ℝ	器 的 ?					
⋺	Export			Parameter	Value	Unit	Status	^
•	Import	HART		SIPART PS2 DR8 HART				
	Print Ctrl+	P		Identification				
	Class	Diagnostics		TAG	DEMOKOFF		1	
	Close			Long TAG	SIPART PS2		1	
				Descriptor	-		1	
				Message	DIAGNOSIS		1	
				Date	8/15/2023		1	
				⊡ Device				
				Manufacturer	Siemens		1	
				Device Type	SIPART PS2		1	
		Order number	-		1			
		Serial number	N1KO037518210		1			
				Final Assembly Number	0		1	
				Hardware Revision	3		1	
			Firmware revision	5.03.00-28		1		
		EDD version	25.00.00					
				⊡ Setup				
				Dynamic variable mapping				×
z004s	kzd SIPART PS2	2 🖌		Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌)

7. In the "File" menu of SIMATIC PDM , select the command "Export..."..

The "Export - ..." dialog opens.

- 8. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

Export - SIPART PS2	?	\times
Export directory:		^
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export		
HTML transformation file:		
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation.xsl		
Which information should be exported?		
Device parameters		
Diagnostics		
Document Manager		
Scienting		
Object		
		_
SIPART PS2		
Status:		_
<		>
Messages Start Stop	Close	

9. Start the export with the "Start" button.

- 10. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 11. Close the dialog.

12. Open the XML file with suitable software, e.g. an editor.

Param\$SIPART PS2\$20230815_121412.xml -	Editor			-		×	
with supplier list of speeding lists allow							
<pre></pre>	at adit this file!!					1	^
<pre><!-- Created by PDM 902.200.2901.5. D0 no<br--><)vml stylesheet type !text/vsl! hpsf !DDM</pre>	ot edit this File!!	> 					
<pre></pre>	had_exportmansformatio	1.X51 (X				- 1	
(Objects							
Devices							
CP1+Td>8C/P1+Td>							
(TVDE)EDD_OBJECT_OFELTNE(/TVDE)							
Classiend OCLASS NODE HART MODEMA/	Classy						
<pre><objectpath>Netze/HART_Modem-Netzwei</objectpath></pre>	ck/NODE 10/STPART PS24/	ObjectPat	h>				
<onlinevalues>False</onlinevalues>							
<catalogpath>/DEVICE/HART/ACTUATOR/</catalogpath>	ELECTRO PNEUMATIC/SIEME	NS/SIPART	PS2/SIPART PS2 HART		CatalogP	ath	
<objectname>SIPART PS2</objectname>				_			
<section>DEVICE</section>							
<commandmode>ExportOffline<td>Mode></td><td></td><td></td><td></td><td></td><td></td><td></td></commandmode>	Mode>						
<deviceparameters></deviceparameters>							
<pre><attribute 8601="" <attribute="" browsename="dat</td><td>ag" format="" iso="" label<br="" name="manufacturer id" type="String">e="longTag" Type="Strin Name="descriptor" Type e="message" Type="Strin date" Type="DateTime" L !>2023-08-15T00:00:0 rowseName="manufacturer</attribute></pre>	="TAG" Pa g" Label= "String" g" Label= abel="Dat 0id" Tvpe	ramViewMember="True' "Long TAG" ParamView Label="Descriptor" f Message" ParamView e" ParamViewMember=' ute> ="UInt16" Label="Mar	' Displa Member: ParamVie Member=' 'True" [hufactur	ayValue= ="True" ewMember "True" D DisplayV rer" Par	"DE Dis ="T isp alu amV	~	
						-	
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-8	mit BON	Λ	

The XML file lists 100 lines for Y1 and Y2 with the exported trend data of the process diagnostics.

Each of the 2 × 5 ring memories contains 20 data. The data for Y1 are labeled with Name = "var_trend_leakage_rate_P1_...". The data for Y2 are labeled with Name = "var_trend_leakage_rate_P2_...". The 1st data line reads, for example: <Attribute Name="var_trend_leakage_rate_P1_30min_0" BrowseName="var_trend_leakage_rate_P1_30min_0" Type="Int16" Label="0,0 bis -1,5"

Minuten" ParamViewMember="False" DisplayValue="0,000" Import="True" State="16" Unit="bar/min">0</Attribute>

- The texts marked in bold are included and explained in the following table.
- The numerical value at "DisplayValue", e.g. "0.000", is the value that was determined with the process diagnostics in the period 0 to -1.5 minutes for the specified unit.
- The table shows a summary of the 100 data exported with the XML file for Y1 and Y2.

Ring memory	Amoun	Data description in the XML file			
for time span	t of da- ta	Name	Label (Time span of data deter-	DisplayVal- ue	Unit
			mination)	e.g.	
Last 30 mi-	20	• var_trend_leak-	0.0 up to -1.5 minutes	0.000	• bar/min
nutes		age_rate_P1_30min_0			• MPa/min
		• var_trend_leak-			• psi/min
		age_rate_P2_30min_0			-
					-
		 var_trend_leak- age_rate_P1_30min_19 	-28.5 up to -30.0 minutes		
		• var trend leak-			
		age_rate_P2_30min_19			
Last 8 hours	20	• var_trend_leakage_rate_P1_8h_0	0 up to -24 minutes		
		• var_trend_leakage_rate_P2_8h_0			
		• var_trend_leakage_rate_P1_8h_19	-456 up to -480 minutes		
		• var_trend_leakage_rate_P2_8h_19			
Last 5 days	20	• var_trend_leakage_rate_P1_5d_0	0 up to -6 hours		
		• var_trend_leakage_rate_P2_5d_0			
		• var_trend_leakage_rate_P1_5d_19	-114 up to -120 hours		
		• var_trend_leakage_rate_P2_5d_19			
Last 2 months	20	• var_trend_leakage_rate_P1_2m_0	0 up to -3 days		
		• var_trend_leakage_rate_P2_2m_0			_
					_
		 var_trend_leak- 	-57 up to -60 days		
		age_rate_P1_2m_19			
		• var_trend_leak-			
		age_rate_P2_2m_19			-
Last 30	20	• var_trend_leak-	0 up to -45 days		
monuns		age_rate_P1_30m_0			
		var_trend_leak-			
		age_rate_P2_30m_0			-
					-
		• var_trend_leak-	-855 up to -900 days		
		age_rate_r1_SUM_19			
		• var_trend_leak-			
		age_rate_r2_som_r9			

The XML file contains the following additional data for process diagnostics.

Table 5-24 P	arameter
--------------	----------

Parameter	Data description in the XML file				
	Name	Label	DisplayVal- ue	Unit	
			e.g.		
U1.PUNIT	var_pressureUnit	Druckeinheit (U1.PUNIT)	bar	• bar	
				• MPa	
				• psi	
U8.LRL	var_LM_LeakageRateLimit	Grenzwert +/- Leckage [*/	0.250	• bar/min	
		min] (U8.LRL)		• MPa/min	
				• psi/min	

Table 5-25 Diagnostic values

Diagnostic	Data description in the XML file				
value	Name	Label	DisplayVal- ue	Unit	
			e.g.		
67.LMY1	var_LM_LeakageRateChamber1	+/- Leakage at Y1 [*/min] (67.LMY1)	0.000	bar/minMPa/min	
68.LMY2	var_LM_LeakageRateChamber2	+/- Leakage at Y2 [*/min] (68.LMY2)	0.000	• psi/min	
69.LMUY1	var_LM_P1DeltaPresMaxPointerResettable	Maximum positive leakage at Y1 [*/min] (resettable) (69.LMUY1)	0.000		
70.LMUY2	var_LM_P2DeltaPresMaxPointerResettable	Maximum positive leakage at Y2 [*/min] (resettable) (70.LMUY2)	0.000		
71.LMDY1	var_LM_P1DeltaPresMinPointerResettable	Maximum negative leak- age at Y1 [*/min] (resetta- ble) (71.LMDY1)	0.000		
72.LMDY2	var_LM_P2DeltaPresMinPointerResettable	Maximum negative leak- age at Y2 [*/min] (resetta- ble) (72.LMDY2)	0.000		

5.8.12 Messages

5.8.12.1 General information

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- "Pressure monitoring" (U.\PRES) is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.8.12.2 Messages in the display

Indication on the display

If the set limit is exceeded, error code "22" is output.

If several messages are present at the same time, the display switches between the different error codes.

Display		Possible cause
1 - 22 RUT36) Error code 22	The increase or decrease in pressure (leakage) exceeds the limit "+/- leak- age" (U8.LRL).
5.8.12.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Message via the digital output

If one of the following values exceeds the limit (U8.LRL), the fault signal output is activated:

- Maximum pressure change / positive leakage at Y1 (69.LMUY1)
- Maximum pressure change / negative leakage at Y1 (71.LMDY1)
- Maximum pressure change / positive leakage at Y2 (70.LMUY2)
- Maximum pressure change / negative leakage at Y2 (72.LMDY2)

I/Os	
------	--

Digital I/O Module (DIO) 6DR4004-6A / -8A	Inductive Limit Switches (ILS) 6DR4004-6G / -8G	Mechanic Limit Switches (MLS) 6DR4004-6K
$3 \xrightarrow{+} 31 \xrightarrow{+} 32$	$3 \xrightarrow{t} 51 \xrightarrow{52} 52$	$3 \xrightarrow{+} 51 \xrightarrow{+} 52$
$(4) \qquad \qquad$		
(5) + 51 ← 52		
1 Digital input DI2, galvanically isolated	1 Fault signal output, in conjunction	1 Fault signal output, in conjunction
2 Digital input DI2, dry contact	with 6DR4004-3ES without function	with 6DR4004-4ES without function
3 Fault message output	2) Digital output 1	2) Digital output 1
④ Digital output DO1	(3) Digital output 2	(3) Digital output 2
5 Digital output DO2		

5.8.12.4 With SIMATIC PDM: Read diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created for the positioner.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.
- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🔁 SIF	PART PS2								-	-		Х
File	Device	View	Diag	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proces	ss Device	e Manage	er
	. + 1 10	<u>ad</u> 🖻	R	Update (diagnostics							
	SIPART P	S2		Status			ameter	Value		Unit	Status	^
÷.	🖉 SIPAR	T PS2 DI		Trend ch	narts	•	IPART PS2 DR8 HART	l				
	i ide	ntification tup		Histogra	ams	,	Identification					
	🗄 🛷 Ma	intenanc		KPI		,	TAG	DEMOKOFF			1	
	‡ _ Co	mmunicat		Valve ch	arts	Ĺ	Long TAG	SIPART PS2			1	
				Alarmic	abook		Descriptor	-			1	
				Alamino	JUDOK		Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							Device					
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			1	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			1	
							EDD version	25.00.00				
						E	Setup					
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							Basic settings					
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator	or spi		1	×
z004skz	d SIPART	PS2 🖌					Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌				<mark>)</mark>

6. In the "Diagnostics" menu, select the "Status" command.

- 7. Select the "Messages" tab.
 - If the limit is exceeded, the message is highlighted:
 - "Limit +/- Leakage exceeded"

SIPART PS2	Status		?	×
Diagnostics Sta	tus Messages			^
SIEMENS				>
Device status:	More status available Field device malfunctioned Primary variable outside the operating limits Non-primary variable outside the operating limit Current output outside the operating range lim	Device status 2:	 Tight closing DOWN Tight closing UP Fast closing DOWN Fast closing UP Digital input DI1 	1
Device status 1:	Device in 'Automatic (AUT)' mode Device in 'Configuring' mode Device in P manual operation Digital setpoint source Alam has responded	Operation warnings:	Limit +/- Leakage exceeded Control variable out of range Setpoint out of range Device is not ready for operation (not initialize Supply pressure falls below the lower limit	1
		Device errors:	EEPROM error Error measured value acquisition Pressure sensor module defective	1
		Device status:	Maintenance required Failure Functional check	1
		Current temperature (30.TEMP):	27.1	1
		Input current of device:	11.363	1 ! 🗸
<				>
Transfer	Messages Print		Close	

8. Close the dialog.

5.8.12.5 Via HART communication: Get messages

Requirement

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Get message

If the set limit for leakage monitoring is exceeded, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 Bytes is returned. The message for the process diagnostics is contained in the following Byte:
 - Byte 3, Bit 7 corresponds to leakage limit exceeded.

5.8.12.6 Reset messages

The error messages are saved in the alarm logbook of the positioner.

The error messages can be reset using the corrective measures.

Error message	Possible cause	Remedy					
Error code "22" The increase or decrease in pressure (leakage) exceeds or falls below the "limit +/- leakage" (U8.LRL).	The increase or decrease in pressure (leakage) exceeds or	• Find and rectify the cause of the pressure increase or decrease (leakage).					
	 Reset the diagnostic values via display, SIMATIC PDM or HART communication: 						
							 Maximum positive leakage at Y1 (69.LMUY1)
		 Maximum negative leakage at Y1 (71.LMDY1) 					
	 Maximum positive leakage at Y2 (70.LMUY2) 						
		 Maximum negative leakage at Y2 (72.LMDY2) 					
		 Reset the limit "U8.LRL" to "0.000". ⇒ Monitoring is activated. 					

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.9 Monitoring of stiction (slipstick) (d.\STIC)

5.9.1 Functional description

Process diagnostics continuously monitor the stiction of the valve.

In the event of setpoint changes, jerky changes in the process valve position, so-called slip jumps, indicate excessive stiction.

The size of the slip jumps is determined as a percentage of the travel distance and displayed as the diagnostic value "stiction" (17.STIC).

Ring memory

If data storage is activated in the positioner, the deviation data determined is stored in the positioner's ring memories.

In each case, 20 data entries are stored in 5 ring memories for different lengths of time using the FIFO method (First In - First Out).

Ring memory for time span	Amount of data Time interval between the	
Last 30 minutes	20	1.5 minutes
Last 8 hours	20	24 minutes

Process diagnostics

5.9 Monitoring of stiction (slipstick) (d.\STIC)

Ring memory for time span	Amount of data	Time interval between the data
Last 5 days	20	6 hours
Last 2 months	20	3 days
Last 30 months	20	45 days

The data can be stored in Device Manager Software, such as SIMATIC PDM, as a trend and exported for further processing.

The data can be read and processed using HART commands.

Process diagnostics can be monitored with adjustable thresholds. If these thresholds are violated, messages are output via the display and optionally via the digital contacts or the HART communication.

5.9.2 Activate and configure diagnostics

Requirement

The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics "Monitoring of stiction (slipstick effect)" (d.\STIC)

Function	Process diagnostic	Process diagnostics continuously monitor the stiction of the valve.		
Note	The size of the slip the diagnostic val	⁻ he size of the slip jumps is determined as a percentage of the travel distance and displayed as he diagnostic value "stiction" (17.STIC).		
Setting options	Off	Process diagnostics are deactivated.		
	On	Process diagnostics is activated.		
Factory setting	Off			

Note

Incorrect interpretation in case of travel times below one second

If the travel times are less than one second, the positioner does not accurately differentiate between a normal movement of the actuator and a sudden change.

• If necessary, increase the travel time by adjusting the pneumatic restrictor(s)

Process diagnostics parameters

If the process diagnostics are activated with "On", the following parameters can be seen.

d1.LIMIT	Limit		
Function	The parameter defines the basic limit for slipstick detection as a percentage.		
	The limit is a factor in the formation of thresholds.		
Note	ommendation:		
	• During operation of the positioner, observe the "stiction" (17.STIC) diagnostic value.		
	Enter the resulting maximum value as the limit.		
Setting range	0.1 100.0		
Factory setting	1.0		
Unit	%		

d2.FACT1	Factor 1		
Function	This factor multiplied by the value of "d1.LIMIT" results in threshold 1 of the process diagnostic		
Setting range	0.1 100.0	Condition: d2.FACT1 < d3.FACT2 < d4.FACT3	
Factory setting	5.0		

d3.FACT2	Factor 1	Factor 1		
Function	This factor multiplied by the value of "d1.LIMIT" results in threshold 2 of the process diagnos			
Setting range	0.1 100.0	Condition: d2.FACT1 < d3.FACT2 < d4.FACT3		
Factory setting	10.0			

d4.FACT3	Factor 1		
Function	This factor multiplied by the value of "d1.LIMIT" results in threshold 3 of the process diagnostics		
Setting range	0.1 100.0 Condition: d2.FACT1 < d3.FACT2 < d4.FACT3		
Factory setting	15.0		

Activate and configure "Monitoring of stiction"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "d.\STIC" of the "Stiction monitoring" process diagnostics.
- 3. Set the "d.\STIC" parameter to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the thresholds to the valve, change the parameter values:
 - d1.LIMIT
 - d2.FACT1
 - d3.FACT2
 - d4.FACT3

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	SIPART	PS2				-	-		ĸ
File	e De	evice View Diagnostics Mai	ntenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	= +1	Download to device	?						
	. ¹	Upload to PG/PC			Parameter	Value	Unit	Status	^
	÷ 🗊	Assign address and TAG			□ SIPART PS2 DR8 HART				1
	<u>6</u>]2	Value comparison			⊡ldentification				
		Object properties			TAG	DEMOKOFF		1	
	1	Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. Select the "Maintenance & Diagnostics" directory.

SIPART PS2		_	- 🗆	\times			
File Device View Diagnostics Maintenanc	Help SIMATIC PDM V	/9.2 SP2 Proces	s Device Ma	nager			
🔒 📕 मा 🏜 🖻 🛃 🛞 🤼 🔡 👫 ?							
□ IPART PS2	Parameter	Value	Unit Sta	tus ^			
□··· / SIPART PS2 DR8 HART	Maintenance & Diagnostics						
SIPART PS2 -							
🗄 🖉 Maintenance & Diagnostics	Pressure monitoring (U.\PRES)	On					
	Partial Stroke Test (A.\PST)	On					
	Monitoring of dynamic control valve behavior (b.\DEVI)	On		11			
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	On	;				
	Monitoring stiction (slipstick effect) (d.\STIC)	Off 🗸		A			
	Deadband monitoring (E.\DEBA)	Off					
	Monitoring of lower endstop (F.\ZERO)	Un	:	1			
	Monitoring of upper endstop (G.\OPEN)	Off		1			
	Monitoring of lower limit temperature (H.\TMIN)	Off		11			
	Monitoring of upper limit temperature (J.\TMAX)	Off		1			
	Monitoring number of total strokes (L.\STRK)	Off					
	Monitoring number of direction changes (O.\DCHG)	Off		11			
	Monitoring of average position value (P.\PAVG)	Off		11			
	Pressure monitoring						
	Pressure unit (U1.PUNIT)	bar					
	Hysteresis for limits (U2.P_HYS)	0.200	bar 🗧	× 11			
z004skzd SIPART PS2 🖌	Online access 🖌 🛛 Diagnosis Update 🖌 🛛 Identit	ty Check 🖌		I 🔾:			

- 7. For "Monitoring stiction (slipstick effect)" (d.\STIC), set the value to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 8. To adapt the thresholds to the valve, change the parameter values:
 - d1.LIMIT
 - d2.FACT1
 - d3.FACT2
 - d4.FACT3
- 9. In the "Device" menu, select the command "Download to device...".

10. Recommendation: Select the check box "Load changed parameters only".

- 11. In the dialog, click the "Start" button.
 - \Rightarrow If the check box is selected, only the changed parameter values are loaded into the positioner.
- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.

5.9.3 With SIMATIC PDM: Show diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "d.\STIC" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "d.\STIC".

Note

If unwanted diagnostic messages appear on the display or via communication, increase the value of the diagnostic parameter "d1.LIMIT".

- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART F	952				-	-		×
File	Dev	ice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Device	e Manager	, I
	+I	Download to device	?						
	t[Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	🗄 😈 Assign address and TAG			□ SIPART PS2 DR8 HART					
	<u>۵۵</u> ۵	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor			1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🔁 sii	PART PS2									_		×
File	Device Vi	ew Di	iagnostics Update	Maintenance diagnostics	ł	lelp		SIMATIC PDM	V9.2 SP2 Proce	ess Devic	e Manager	ſ
		S2 DI	Status			amet	ler	Value		Unit	Status	^
	identific	catior	Trend cl	narts	•		Actual value]			
	i ↓ Setup		Histogra	ams	►		Deviation			_	•	4
	Mainter Mainter Commu	nanc Inicat	KPI		►		Leakage (percenta	ge of stroke)			IL AL	-
	4		Valve ch	arts	►		Leakage (pressure	change per minute)			↓ ↓	-
			Alarm lo	ogbook			Stiction (slipstick)				+ <u></u>	-
						-	Lower endstop				+-	-
							Upper endstop				+-	
							Temperature			1	t	1
							Deadband				1	-
							Supply pressure P	Z			t	
						S	erial number	N1KO037518210			t	1
						Fi	inal Assembly Number	0			1	
						Н	ardware Revision	3			1	
						Fi	imware revision	5.03.00-28			1	1
						E	DD version	25.00.00				
					E	Setu	IP					
						ΞDy	ynamic variable mapp	ing				\sim
z004skz	d SIPART PS2	2 🖌				C	Online access <table-cell> 🖌 🛛 D</table-cell>	iagnosis Update 🖌 🛛 Ident	tity Check 🖌) .d

6. In the "Diagnostics" menu, select the "Trend charts > Stiction (slipstick)" command.

 \Rightarrow The "Stiction (slipstick)" dialog is displayed.

The dialog contains tabs, each with a trend chart for the deviations determined:

- Trend over 30 minutes
- Trend over 8 hours
- Trend over 5 days
- Trend over 2 months
- Trend over 30 months

The respective trend chart is based on the maximum of 20 data from the corresponding ring memory.

The lines of thresholds 1, 2 and 3 are also shown.

Process diagnostics

5.9 Monitoring of stiction (slipstick) (d.\STIC)



Button	Notes
Trend value list	Shows the 20 data for the displayed trend chart.
Restart trend	Caution: This function deletes the data stored in the po- sitioner in all 5 ring memories.
Trend help text	Explains how process diagnostics works.

7. Close the dialog.

Diagnostic value	Stiction (slipstick)					
	Short designatio	n: 17.STIC				
Function	The diagnostic va as a percentage o	The diagnostic value shows jerky changes in the process valve position, known as slip jumps, as a percentage of the travel distance.				
Note	Jerky changes in t	he process valve position indicate excessive stiction.				
Requirement	The process diagr	nostics "Monitoring of stiction (slipstick effect)" (d.\STIC) is activated.				
Display range	0 100					
Unit	%					
Communication						
SIMATIC PDM Export	Name	ps2_slip_stick_value				
	DisplayValue	≜ Value				
HART communication (read)	Command	#171				
	Response Data	Bytes: 38 41				
		Format: Float				

5.9.4 Diagnostic value "Stiction (slipstick)" (17.STIC)

5.9.5 Via HART communication: Read out diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "d.\STIC" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "d.\STIC".

Note

If unwanted diagnostic messages appear on the display or via communication, increase the value of the diagnostic parameter "d1.LIMIT".

• The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Request

Send to the positioner via HART communication:

- Command "#173"
- Ring memory index of the process diagnostics, e.g. "15".

Process diagnostics

5.9 Monitoring of stiction (slipstick) (d.\STIC)

Send the request for each of the 5 ring memories separately.

Ring memory index	Ring memory for time span
15	Last 30 minutes
16	Last 8 hours
17	Last 5 days
18	Last 2 months
19	Last 30 months

Answer

The response consists of the following data on the requested ring memory:

- Response Data Bytes
- Command-Specific Response Code

Tahle 5-26	Response Data By	tec
	Response Data by	les

Byte	Format	Description
0	Enum	Ring memory index
1	Unsigned-8	Number of valid values in the ring memory
2	Enum	Unit of the ring memory values
3 42	Signed-16	Values 1 20 of the ring memory (2 bytes each)
		Scaling: 256/1
		Examples:
		• 256 ≜ 1%
		 25 600 ≜ 100%
43 46	Float	Value of threshold 1 (d1.LIMIT × d2.FACT1)
47 50	Float	Value of threshold 2 (d1.LIMIT × d3.FACT2)
51 54	Float	Value of threshold 3 (d1.LIMIT × d4.FACT3)
55 58	Float	-
59 62	Float	-
63 66	Float	-

Table 5-27 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

5.9.6 With SIMATIC PDM: Export diagnostics results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "d.\STIC" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "d.\STIC".

Note

If unwanted diagnostic messages appear on the display or via communication, increase the value of the diagnostic parameter "d1.LIMIT".

- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SI	PART I	PS2				-	-		×
File	Dev	vice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	r
	+I	Download to device	?						
	†[Upload to PG/PC			Parameter	Value	Unit	Status	^
Ė	🖹 📅 Assign address and TAG				□ SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			□ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
	Change Log				Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		† 1	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. Open the trend chart in the "Diagnostics" menu with the command "Trend charts > Stiction (slipstick)" → With SIMATIC PDM: Show diagnostic results (Page 298).
 When the trend chart opens, the current data of this process diagnostics in the positioner are read out by SIMATIC PDM.

	SIPART PS2						_		×
File	e Device	View Ctrl+S	Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2	Process D	evice M	anager
	5070	carro	YUR	iii m 🕐	-				
	Export		HART		Parameter	Value	Ur	iit St	atus
	Import				SIPART PS2 DR8 HART				
	Print	Ctrl+P			Identification				
	Close		 Diagnostics 		TAG	DEMOKOFF			‡]
	Close				Long TAG	SIPART PS2			1
					Descriptor	-			1
					Message	DIAGNOSIS			1
					Date	8/15/2023			1
					Device				
					Manufacturer	Siemens			1
					Device Type	SIPART PS2			1
					Order number	-			1
					Serial number	N1KO037518210			1
					Final Assembly Number	0			1
					Hardware Revision	3			1
					Firmware revision	5.03.00-28			1
					EDD version	25.00.00			
					⊡ Setup				
					 Dynamic variable mapp 	ing			~
z004	skzd SIPA	RT PS2 🖌			Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌			

7. In the "File" menu, select the "Export..." command.

The "Export - ..." dialog opens.

- 8. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

Export - SIPART PS2	?	×
Export directory:		^
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export		
HTML transformation file:		
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation.xsl		-
Which information should be exported?		
Device parameters		
Diagnostics		
Document Manager		
Coloration .		
C Object		
SIPART PS2		
Status:		
		~
<		>
Messages Start Stop	Close	

9. Start the export with the "Start" button.

- 10. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 11. Close the dialog.

12. Open the XML file with suitable software, e.g. editor.

Param\$SIPART PS2\$20230815_121412.xml	- Editor			_		×	
xml version="1.0" encoding="utf-8"?						/	
Created by PDM 902.200.2901.5. Do n</td <td>ot edit this File!!:</td> <td>•</td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	ot edit this File!!:	•				- 1	
xml-stylesheet type='text/xsl' href='PD</td <td>M80_ExportTransformation</td> <td>1.xs1'?></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	M80_ExportTransformation	1.xs1'?>				- 1	
<pdm xmlversion="8.04"></pdm>							
<object></object>							
<device></device>							
<id>2</id>							
<pitio>0</pitio>							
Classiend OCLASS NODE HART MODEMA/	Class						
<pre>class/ebb_occAss_Nobe_NART_Nobent/ cObjectPathsNetze/HART_Modem_Netzwe</pre>	erk/NODE 10/STPART PS2//	biectPat	hs				
<pre><onlinevalues>Ealse</onlinevalues></pre> /OnlineValues>		, o jecci ac					
<catalogpath>/DEVICE/HART/ACTUATOR/</catalogpath>	ELECTRO PNEUMATIC/SIEMEN	S/SIPART	PS2/SIPART PS2 HART	DR8 </td <td>CatalogP</td> <td>ath</td> <td></td>	CatalogP	ath	
<objectname>SIPART PS2</objectname>					-		
<section>DEVICE</section>							
<commandmode>ExportOffline<td>Mode></td><td></td><td></td><td></td><td></td><td></td><td></td></commandmode>	Mode>						
<deviceparameters></deviceparameters>							
<pre><attribute browsenam<br="" browsename="t
<Attribute Name=" longtag"="" name="tag"><attribute browsenam<br="" name="descriptor"><attribute browsenam<br="" name="message"><attribute browsename="</td><td><pre>ag" label:<br="" name="date" type="String">he="longTag" Type="String Name="descriptor" Type=" e="message" Type="String date" Type="DateTime" La !!>2023-08-15T00:00:00 nowseName="manufactures</attribute></attribute></attribute></attribute></pre>	="TAG" Pa g" Label= 'String" g" Label= abel="Dat >id" Type	ramViewMember="True" "Long TAG" ParamView Label="Descriptor" F "Message" ParamViewMember= ute> "UTot16" Label="Mar	' Displ Member ParamVio Member= 'True" M	ayValue= ="True" ewMember: "True" D: DisplayVa rer" Par	"DE Dis ="T isp alu		
	o owservanie= manuraccurer	10 1000	= OINCIO LADCI= MAN	uractu		>	
						-	
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-8	3 mit BON	Λ	

The XML file contains 100 lines with the 100 exported process diagnostics data. Each of the 5 ring memories contains 20 data entries.

The data for process diagnostics is labeled with Name = "var_trend_slipstick...". Exemplary data line:

<Attribute Name="var_trend_slipstick_30min_0"

BrowseName="var_trend_slipstick_30min_0" Type="Int16" Label="0.0 up to -1.5 minutes" ParamViewMember="False" DisplayValue="0.0" Import="True" State="32" Unit="%">0</ Attribute>

- The texts marked in bold are included and explained in the following table.
- The numerical value at "DisplayValue", e.g. "0.0", is the value that was determined with the process diagnostics in the period 0 to -1.5 minutes.
- The table shows a summary of the 100 data of the "d.\STIC" process diagnostics exported with the XML file.

Ring memory	Amoun	Data description in the XML file								
for time span	t of da-	Name	Label	DisplayValue	Unit					
			(Time span of data deter- mination)	e.g.						
Last 30 mi-	20	var_trend_slipstick_30min_0	0.0 up to -1.5 minutes	0.0	%					
nutes										
		var_trend_slipstick_30min_19	-28.5 up to -30.0 minutes	0.0						
Last 8 hours	20	var_trend_slipstick_8h_0	0 up to -24 minutes							
		var_trend_slipstick_8h_19	-456 up to -480 minutes							
Last 5 days	20	var_trend_slipstick_5d_0	0 up to -6 hours							
		var_trend_slipstick_5d_19	-114 up to -120 hours							
Last 2 months	20	var_trend_slipstick_2m_0	0 up to -3 days							
		var_trend_slipstick_2m_19	-57 up to -60 days							
Last 30 months	20	var_trend_slipstick_30m_0	0 up to -45 days							
		var_trend_slipstick_30m_19	-855 up to -900 days		7					

5.9.7 Messages

5.9.7.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.9.7.2 Messages in the display

Indication on the display

If the set thresholds are exceeded, error code "12" is output.

If several messages are present at the same time, the display switches between the different error codes.

If threshold 1 is exceeded	If threshold 2 is exceeded	If threshold 3 is exceeded:		
© 12 FUT 35	(1) (2) 12 13 13 1	() (2-12-13-13-13-13-13-13-13-13-13-13-13-13-13-		
① 1 bar ② Error code 12	1 2 bars 2 Error code 12	 3 bars Error code 12 		

5.9.7.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.

Digital I/O Module (DIO) 6DR4004-6A / -8A	Inductive Limit Switches (ILS) 6DR4004-6G / -8G	Mechanic Limit Switches (MLS) 6DR4004-6K			
	1 + 31 + 31 + 32 + 541	1 + 31 + 31 + 32 + 14			
2 21 22					
	$3 \xrightarrow{1} \xrightarrow{+} 51$	$3 \xrightarrow{+} 51 \xrightarrow{+} 52$			
(4) (4) (4) (4)					
5 $+$ 51 52					
① Digital input DI2, galvanically isolated	1 Fault message output, has no func-	① Fault message output, has no func-			
2 Digital input DI2, dry contact	tion in combination with 6DR4004-3ES	tion in combination with 6DR4004-4ES			
③ Fault message output	2) Digital output 1	(2) Digital output 1			
④ Digital output DO1	(3) Digital output 2	(3) Digital output 2			
5 Digital output DO2					

l/Os

5.9.7.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	PS2				-	-		<
File	Dev	rice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+I	Download to device	?						
	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	ŢŢ.	Assign address and TAG			SIPART PS2 DR8 HART	•			
	<u>61</u> 2	Value comparison			⊡ldentification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		‡ []	
	D	Change Log			Descriptor	-		1	
	1	Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		T I	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🔼 SIF	PART PS2								_		2	×
File	Device	View	Diag	postics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	rocess De	evice N	lanage	r
	4	1 🗗 🖻	R	Update (diagnostics							
-------------	SIPART	PS2		Status			ameter	Value	Uni	it S	atus	^
÷.	🤌 SIPA	RT PS2 DI		Trend ch	arts		IPART PS2 DR8 HART			_		
		entification		Histogra	me	Ĺ	Identification					
	🗄 🌽 Ň	laintenanc		v Di	1113	ĺ	TAG	DEMOKOFF			1	
	‡ ∎ o	ommunicat		NPI Value ale	- 4-		Long TAG	SIPART PS2			1	
				vaive ch	arts	•	Descriptor	-			1	
				Alarm Io	дроок	_	Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							Device					
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			1	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			1	
							EDD version	25.00.00				
							Setup	1				
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							 Basic settings 	•				
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator s	spi		1	~
z004skz	d SIPAF	RT PS2 🖌					🛛 Online access 🖌 🖉 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌)

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Status" tab.

When a threshold is exceeded, the message "Stiction (slipstick) (limit x)" is highlighted.

SIPART PS2 - Status			? ×
Diagnostics Status Messages			^
SIEMENS			GOOD 🗸
Device diagnostics 1: Pneumatic leakage (limit 1). Pneumatic leakage (limit 2). Pneumatic leakage (limit 3). Stiction (slipstick) (limit 1).	^ ‡I	Limit warnings:	Limit for stroke integral exceeded Limit for number of changes in direction exceed Limit for deviation of lower endstop exceeded Limit for deviation of the upper endstop exceed Limit deadband adaptation exceeded
Stiction (slipstick) (limit 3). Limit for lower endstop monitoring Limit for lower endstop monitoring Limit for lower endstop monitoring Limit for upper endstop monitoring	exceeded (imit 1). exceeded (imit 2). exceeded (imit 3). g exceeded (imit 1).	Device diagnostics 2:	PST reference stroke time exceeded (limit 1). PST reference stroke time exceeded (limit 2). PST reference stroke time exceeded (limit 3). PST with pressure sensors failed
Limit for stroke integral (100% strol Limit for stroke integral (100% strol Limit for direction changes exceed Limit for direction changes exceed Limit for direction changes exceed	kes) exceeded (limit 2 A kes) exceeded (limit 2 A ded (limit 1). ded (limit 2). ded (limit 3).	Device diagnostics 3:	Permitted device temperature exceeded (limit 1 Permitted device temperature exceeded (limit 2 Permitted device temperature exceeded (limit 3 Permitted device temperature undershot (limit 1 Permitted device temperature undershot (limit 2
< Transfer Messages Print			Close

8. Close the dialog.

5.9.7.5 Via HART communication: Get messages

Requirement

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Get message

If a process diagnostics threshold is violated, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. When the thresholds for the "d.\STIC" process diagnostics are exceeded, the messages are contained in the following bytes:
 - Byte 14, bit 1 corresponds to threshold 1 exceeded.
 - Byte 14, bit 0 corresponds to threshold 2 exceeded.
 - Byte 15, bit 7 corresponds to threshold 3 exceeded.

5.9.7.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.10 Monitoring of deadband "E.\DEBA"

5.10.1 Functional description

Process diagnostics continuously monitor the automatic adjustment of the deadband.

If the application parameter "34.DEBA - Deadband of closed-loop controller" is set to "Auto", the size of the deadband is adapted as follows in automatic mode:

- When control oscillations are detected: The deadband is gradually increased.
- In the absence of control oscillations: The deadband is gradually reduced.

The current value of the deadband is displayed in these diagnostic values:

- Deadband UP (26.DBUP)
- Deadband DOWN (27.DBDN)

Ring memory

If data storage is activated in the positioner, the deviation data determined is stored in the positioner's ring memories.

In each case, 20 data entries are stored in 5 ring memories for different lengths of time using the FIFO method (First In - First Out) .

Ring memory for time span	Amount of data	Time interval between the data
Last 30 minutes	20	1.5 minutes
Last 8 hours	20	24 minutes
Last 5 days	20	6 hours
Last 2 months	20	3 days
Last 30 months	20	45 days

The data can be stored in Device Manager Software, such as SIMATIC PDM, as a trend and exported for further processing.

The data can be read and processed using HART commands.

Process diagnostics can be monitored with an adjustable threshold. If this threshold is exceeded, messages are output via the display and optionally via the digital contacts or the HART communication.

5.10.2 Activate and configure diagnostics

Requirement

- The application parameter "34.DEBA" is set to "Auto".
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics "Monitoring the deadband" (E.\DEBA)

Function	Process diagnostics continuously monitor the automatic adjustment of the deadband. If the application parameter "34.DEBA" is set to "Auto", the size of the deadband is adapted in automatic mode.				
	When control	oscillations are detected: The deadband is gradually increased.			
	of control oscillations: The deadband is gradually reduced.				
Note	If the deadband increases disproportionately during automatic adjustment of the deadband during operation, this indicates a fault in the system, e.g. greatly increased friction. The current value of the deadband is displayed in these diagnostic values: • Deadband UP (26.DBUP)				
	Deadband DOWN (27.DBDN)				
Setting options	Off	Process diagnostics are deactivated.			
	On	Process diagnostics is activated.			
Factory setting	Off				

Note

Fault message display

The 3-stage fault message display has not been implemented for monitoring the deadband.

The positioner only triggers threshold 3 messages.

Process diagnostics parameters

If process diagnostics is activated with "On", the following parameter is visible.

E1.LEVL3	Threshold				
Function	The parameter def	e parameter defines a limit in percent for the automatic adjustment of the deadband.			
Setting range	0.1 10.0	• With setting "0.1" to "2.9":			
		 The limit is monitored. 			
		 If exceeded in automatic mode: The threshold 3 message is activa- ted. 			
		• With setting "3.0" to "10.0":			
		 The limit is not monitored. 			
		 No message if exceeded. 			
Factory setting	1.0				
Unit	%				

Activate and configure "Monitoring of deadband"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "E.\DEBA" of the "Monitoring of deadband" process diagnostics.
- 3. Set the "E.\DEBA" parameter to "On".
 ⇒ Process diagnostics are activated and the associated parameter is displayed.
- 4. To adapt the threshold to the valve, change the limit in the "E1.LEVL3" parameter.

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	952				-	-		×
File	Dev	ice View Diagnostics	Maintenanc	e Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+I	Download to device	?						
.	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	P	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		T	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2		-	- C	x c	,
File Device View Diagnostics Maintenance	e Help SIMATIC PDM V	9.2 SP2 Proces	ss Device	Manager	
	Parameter	Value	Unit	Status	^
E SIPART PS2 DR8 HART	Maintenance & Diagnostics				
	Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage		1	
😥 🖉 Maintenance & Diagnostics	Pressure monitoring (U.\PRES)	On		1	
	Partial Stroke Test (A.\PST)	On		1	
	Monitoring of dynamic control valve behavior (b.\DEVI)	On		1	
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	On		1	
	Monitoring stiction (slipstick effect) (d.\STIC)	On		1	
	Deadband monitoring (E.\DEBA)	Off 🗸		1	
	Monitoring of lower endstop (F.\ZERO)	Off		1	
	Monitoring of upper endstop (G.\OPEN)			1	
	Monitoring of lower limit temperature (H.\TMIN)	Off		1	
	Monitoring of upper limit temperature (J.\TMAX)	Off		1	
	Monitoring number of total strokes (L.\STRK)	Off		1	
	Monitoring number of direction changes (0.\DCHG)	Off		1	
	Monitoring of average position value (P.\PAVG)	Off		1	
	Pressure monitoring				
	Pressure unit (U1.PUNIT)	bar		1	
	Hysteresis for limits (U2.P_HYS)	0.200	bar	1	¥
z004skzd SIPART PS2 🖌	Online access 🖌 Diagnosis Update 🖌 Identit	y Check 🖌			

6. Select the "Maintenance & Diagnostics" directory.

- For "Deadband monitoring (E.\DEBA)", E.\DEBA set the value to "On".
 ⇒ Process diagnostics are activated and the associated parameter is displayed.
- 8. To adapt the threshold to the valve: Change the limit in the "E1.LEVL3" parameter, change the limit.
- 9. In the "Device" menu, select the command "Download to device..."...
- 10. Recommendation: Select the check box "Load changed parameters only".
- 11. In the dialog, click the "Start" button.
 ⇒ If the check box is selected, only the changed parameter values are loaded into the positioner.
- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.

5.10.3 With SIMATIC PDM: Show diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "E.\DEBA" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "E.\DEBA".
- The application parameter "34.DEBA" is set to "Auto".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SI	PARTI	PS2					-	-		<
File	Dev	vice View Diagnostics	Maintena	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Device	e Manager	
	+L	Download to device		?						
	1	Upload to PG/PC				Parameter	Value	Unit	Status	^
É	😑 📅 Assign address and TAG				□ SIPART PS2 DR8 HART					
	<u>6</u> 10	Value comparison				Identification				
		Object properties				TAG	DEMOKOFF		‡ []	
		Calibration log				Long TAG	SIPART PS2		‡]	
		Change Log				Descriptor	-		‡ []	
		Set device checked				Message	DIAGNOSIS		1	
						Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2			-	- [<
File Device View Dia	gnostics Maintenance Update diagnostics	Help SIMATIC PDM	V9.2 SP2 Proces	ss Device	Manager	
	Status	ameter	Value	Unit	Status	^
tional and the second	Trend charts Histograms KPI Valve charts Alarm logbook	 Actual value Deviation Leakage (percentage of stroke) Leakage (pressure change per minute) Stiction (slipstick) Lower endstop Upper endstop Temperature Deadband Supply pressure PZ Monitoring of upper limit temperature (J.\TMAX) Monitoring number of total strokes (L.\STRK) Monitoring number of direction changes (O.\DCHG) 	On 3 (three-stage a On On On On On Off Off Off Off Off Off		1 1	
		Monitoring of average position value (P.\PAVG) Pressure monitoring Pressure unit (U1.PUNIT) Understand for line (U2.P. UVC)	Off bar			
z004skzd SIPART PS2 🖌]	Online access V Diagnosis Update V Ider	ntity Check 🖌	bar).

6. In the "Diagnostics" menu, select the "Trend charts > Deadband" command.

 \Rightarrow The "Deadband" dialog is displayed.

The dialog contains tabs, each with a trend chart for the deviations determined:

- Trend over 30 minutes
- Trend over 8 hours
- Trend over 5 days
- Trend over 2 months
- Trend over 30 months

The respective trend chart is based on the maximum of 20 data from the corresponding ring memory.

The line for "Threshold 3" is also displayed.

Process diagnostics

5.10 Monitoring of deadband "E.\DEBA"



Button	Description
Trend value list	Shows the 20 data for the displayed trend chart.
Restart trend	Caution: This function deletes the data stored in the po- sitioner in all 5 ring memories.
Trend help text	Explains how process diagnostics works.

7. Close the dialog.

5.10.4 Diagnostic values "Deadband UP" (26.DBUP) / "Deadband DOWN" (27.DBDN)

Diagnostic value	Deadband UP						
	Short designatio	n: 26.DBUP					
	Deadband DOWN	1					
	Short designatio	Short designation: 27.DBDN					
Function	The diagnostic va	lues show the deadband of the positioner as a percentage:					
	"Deadband UP	 "Deadband UP " (26.DBUP) in direction 100% position 					
	"Deadband DC	DWN" (27.DBDN) in direction 0% position					
Note	The values either of or, if "34.DEBA" is	The values either correspond to the manually set value of the application parameter "34.DEBA" or, if "34.DEBA" is set to "Auto", the value automatically adapted by the positioner.					
Display range	0.1 10.0	0.1 10.0					
Unit	%						
Communication	•						
Deadband UP (26.DBUP)							
SIMATIC PDM Export	Name	ps2_dead_up_act					
	DisplayValue	≜ Value					
HART communication (read)	Command	#169					
	Response Data	Bytes: 0 3					
		Format: Float					
Deadband DOWN (27.DBDN)							
SIMATIC PDM Export	Name	ps2_dead_down_act					
	DisplayValue	≜ Value					
HART communication (read)	Command	#169					
	Response Data	Bytes: 4 7					
		Format: Float					

5.10.5 Via HART communication: Read out diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "E.\DEBA" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "E.\DEBA".
- The application parameter "34.DEBA" is set to "Auto".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Process diagnostics

5.10 Monitoring of deadband "E.\DEBA"

Request

Send to the positioner via HART communication:

- Command "#173"
- Ring memory index of the process diagnostics, e.g. "35".

Send the request for each of the 5 ring memories separately.

Ring memory index	Ring memory for time span
35	Last 30 minutes
36	Last 8 hours
37	Last 5 days
38	Last 2 months
39	Last 30 months

Answer

The response consists of the following data on the requested ring memory:

- Response Data Bytes
- Command-Specific Response Code

Table 5-28	Response Data Bytes

Byte	Format	Description
0	Enum	Ring memory index
1	Unsigned-8	Number of valid values in the ring memory
2	Enum	Unit of the ring memory values
3 42	Signed-16	Values 1 20 of the ring memory (2 bytes each)
		Scaling: 256/1
		Examples:
		• 256 ≜ 1%
		• 25 600 ≜ 100%
43 46	Float	-
47 50	Float	-
51 54	Float	Value of threshold 3 (E1.LEVL3)
55 58	Float	-
59 62	Float	-
63 66	Float	-

 Table 5-29
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received

Code	Class	Description
6	Error	Device Specific Command Error
16	Error	Access Restricted

5.10.6 With SIMATIC PDM: Export diagnostics results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "E.\DEBA" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "E.\DEBA".
- The application parameter "34.DEBA" is set to "Auto".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 S	PART	PS2					-	-		<
File	Dev	vice View Diagnostics	Maintena	nce	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+L	Download to device		?						
	1	Upload to PG/PC				Parameter	Value	Unit	Status	^
É	🖹 📅 Assign address and TAG				□ SIPART PS2 DR8 HART					
	Value comparison				⊡ldentification					
		Object properties				TAG	DEMOKOFF		1	
		Calibration log				Long TAG	SIPART PS2		1	
	Change Log				Descriptor	-		1		
	2	Set device checked				Message	DIAGNOSIS		1	
						Data	1/29/2024		+	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. Open the trend chart in the "Diagnostics" menu with the command "Trend charts > Deadband" → With SIMATIC PDM: Show diagnostic results (Page 318).
 When the trend chart opens, the current data of this process diagnostics in the positioner are read out by SIMATIC PDM.

	SIPART PS2				_		\times
Fil	e Device View	Diagnostics Maintenance	Help	SIMATIC PDM V9.2 SP2 Proce	ess Devic	e Manage	er
	Save Ctrl+S	V I 🗞 🖪 I 🗚 🕐					
	Export		Parameter	Value	Unit	Status	^
H	Import	HART	SIPART PS2 DR8 HART				
	Print Ctrl+P		Identification				
1-	Class	Diagnostics	TAG	DEMOKOFF		1	
	Close		Long TAG	SIPART PS2		1	
			Descriptor	•		1	
			Message	DIAGNOSIS		1	
			Date	8/15/2023		1	
			Device				
			Manufacturer	Siemens		1	
			Device Type	SIPART PS2		1	
			Order number	-		1	
			Serial number	N1KO037518210		1	
			Final Assembly Number	0		1	
			Hardware Revision	3		1	
			Firmware revision	5.03.00-28		<u>‡</u>	
			EDD version	25.00.00			
			⊡ Setup				
			Dynamic variable mapp	ing			<u> </u>
z004	skzd SIPART PS2 🖌		Online access 🖌 🛛 Di	agnosis Update 🖌 Identity Check 🖌 📃			9

7. In the "File" menu, select the "Export..." command.

The "Export - ..." dialog opens.
- 8. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

Export - SIPART PS2	?	×
Export directory:		^
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export		
HTML transformation file:		
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation.xsl		-
Which information should be exported?		
Device parameters		
Diagnostics		
Document Manager		
Coloration .		
C Object		
SIPART PS2		
Status:		
		~
<		>
Messages Start Stop	Close	

9. Start the export with the "Start" button.

- 10. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 11. Close the dialog.

12. Open the XML file with suitable software, e.g. editor.

Param\$SIPART PS2\$20230815_121412.xml	- Editor			_		×	
xml version="1.0" encoding="utf-8"?							~
Created by PDM 902.200.2901.5. Do n</td <th>ot edit this File!!:</th> <td>></td> <td></td> <td></td> <td></td> <td></td> <td></td>	ot edit this File!!:	>					
xml-stylesheet type='text/xsl' href='PD</td <th>M80_ExportTransformation</th> <td>n.xsl'?></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	M80_ExportTransformation	n.xsl'?>				- 1	
<pdm xmlversion="8.04"></pdm>							
<object></object>							
<device></device>							
<id>2</id>							
<pltid>0</pltid>							
<type>EDD_OBJECT_OFFLINE</type>							
<class>EDD_OCLASS_NODE_HART_MODEM<!--</td--><th>Class></th><td></td><td></td><td></td><td></td><td></td><td></td></class>	Class>						
<objectpath>Netze/HART Modem-Netzwe</objectpath>	rk/NODE_10/SIPART PS2 0</th <td>ObjectPat</td> <td>:h></td> <td></td> <td></td> <td></td> <td></td>	ObjectPat	:h>				
<onlinevalues>False</onlinevalues>				,			
<catalogpath>/DEVICE/HART/ACTUATOR/</catalogpath>	ELECTRO_PNEUMATIC/SIEME	NS/SIPART	_PS2/SIPART_PS2_HAR	T_DR8 </td <td>CatalogP</td> <td>ath</td> <td></td>	CatalogP	ath	
<odjectname>SIPART PS2</odjectname>	•						
<section>DEVICE</section>	h. 1						
<commandmode>ExportOffline<th>Mode></th><td></td><td></td><td></td><td></td><td></td><td></td></commandmode>	Mode>						
<pre><deviceparameters></deviceparameters></pre>		ITACI DA	and the standard literation			lloc	
<pre><attribute browsenam<br="" browsename="t
<Attribute Name=" longtag"="" name="tag"><attribute browsenam<br="" name="descriptor"><attribute browsenam<br="" name="message"><attribute browsename="
<! Dates are in ISO 8601 format</pre></td><th><pre>" jype="string" labe1:<br="" name="date">he="longTag" Type="string" Name="descriptor" Type=" he="message" Type="string" date" Type="DateTime" Li !>2023-08-15T00:00:00</attribute></attribute></attribute></attribute></pre> <td>="TAG" Pa g" Label= "String" g" Label= abel="Dat 0<td>rramviewMember="True "Long TAG" Paramvie Label="Descriptor" "Message" Paramview :e" ParamviewMember= pute></td><td>" Dispi wMember ParamVi Member= "True"</td><td>ayvalue= ="True" ewMember "True" D DisplayV</td><td>"DE Dis ="T isp alu</td><td></td></td>	="TAG" Pa g" Label= "String" g" Label= abel="Dat 0 <td>rramviewMember="True "Long TAG" Paramvie Label="Descriptor" "Message" Paramview :e" ParamviewMember= pute></td> <td>" Dispi wMember ParamVi Member= "True"</td> <td>ayvalue= ="True" ewMember "True" D DisplayV</td> <td>"DE Dis ="T isp alu</td> <td></td>	rramviewMember="True "Long TAG" Paramvie Label="Descriptor" "Message" Paramview :e" ParamviewMember= pute>	" Dispi wMember ParamVi Member= "True"	ayvalue= ="True" ewMember "True" D DisplayV	"DE Dis ="T isp alu		
<attribute b<="" name="manufacturer id" td=""><th>rowseName="manufacturer</th><td>id" Tvpe</td><td>="UInt16" Label="Ma</td><td>nufactu</td><td>rer" Par</td><td>amV</td><td>Ψ.</td></attribute>	rowseName="manufacturer	id" Tvpe	="UInt16" Label="Ma	nufactu	rer" Par	amV	Ψ.
<						>	
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-8	B mit BON	N	

The XML file contains 100 lines with the 100 exported process diagnostics data. Each of the 5 ring memories contains 20 data entries.

The data for process diagnostics is labeled with Name = "var_trend_deba...". Exemplary data line:

<Attribute Name="var_trend_deba_30min_0" BrowseName="var_trend_deba_30min_0" Type="Int16" Label="0.0 up to -1.5 minutes"

ParamViewMember="False" **DisplayValue="0.0"** Import="True" State="32" **Unit="%"**>0</ Attribute>

- The texts marked in bold are included and explained in the following table.
- The numerical value at "DisplayValue", e.g. "0.0", is the value that was determined with the process diagnostics in the period 0 to -1.5 minutes.
- The table shows a summary of the 100 data of the "E.\DEBA" process diagnostics exported with the XML file.

Ring memory	Amoun	Data description in the XML file							
for time span	t of da- ta	Name	Label (Time span of data determina- tion)	DisplayVal- ue e.g.	Unit				
Last 30 mi-	20	var_trend_deba_30min_0	0.0 up to -1.5 minutes	0.0	%				
nutes									
		var_trend_deba_30min_19	-28.5 up to -30.0 minutes	0.0					
Last 8 hours	20	var_trend_deba_8h_0	0 up to -24 minutes						
		var_trend_deba_8h_19	-456 up to -480 minutes						
Last 5 days	20	var_trend_deba_5d_0	0 up to -6 hours						
		var_trend_deba_5d_19	-114 up to -120 hours						
Last 2 months	20	var_trend_deba_2m_0	0 up to -3 days						
		var_trend_deba_2m_19	-57 up to -60 days						
Last 30	20	var_trend_deba_30m_0	0 up to -45 days]				
months									
		var_trend_deba_30m_19	-855 up to -900 days						

5.10.7 Messages

5.10.7.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.10.7.2 Messages in the display

Requirement

The application parameter "34.DEBA" is set to "Auto".

Indication on the display

If the set threshold is exceeded, error code "8" is output.

If several messages are present at the same time, the display switches between the different error codes.



3 bars
 Error code 8

5.10.7.3 Messages via digital signals

Requirement

- The positioner has a fault signal output, which is located on one of the following modules:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- The application parameter "34.DEBA" is set to "Auto".

Message for deadband monitoring

Note

Fault message display

The 3-stage fault message display has not been implemented for monitoring the deadband.

The positioner only triggers threshold 3 messages.

Monitoring is activated when the threshold "E1.LEVL3" is set to a limit between "0.1" and "2.9".

If the limit is exceeded in automatic mode, the fault signal output is activated.

I/Os



5.10.7.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The application parameter "34.DEBA" is set to "Auto".
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SI	PART I	PS2						-		×
File	Dev	vice View Diagnostics	Mainten	ance	Help	SIMATIC	PDM V9.2 SP2 Proce	ss Devic	e Manager	r
	+1	Download to device		?						
	1	Upload to PG/PC				Parameter	Value	Unit	Status	^
Ė	· 😈	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>6</u>]2	Value comparison				⊡ldentification				
		Object properties				TAG	DEMOKOFF		1	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
	_					Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🔼 SI	PART PS2								-	_		X
File	Device	View	Diag	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proce	ss Devic	e Manage	er
	1 +0 10	極 🖻	R	Update (diagnostics							
	SIPART PS	2		Status			ameter	Value		Unit	Status	^
ė	SIPART	FPS2 DI		Trend ch	arts		IPART PS2 DR8 HART			_	-	
	i ider	ntification		Histogra		ĺ	Identification					
	🗄 🥠 Mai	ntenanc		v ni	1115		TAG	DEMOKOFF			1	
	Con	nmunicat		NPI Value ale	- 4-		Long TAG	SIPART PS2			1	
				valve ch	arts	•	Descriptor	-			1	
				Alarm Io	здроок	_	Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							⊡ Device					
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			1	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			1	
							EDD version	25.00.00				
						E	Setup					
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							■ Basic settings					
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator	or spi		1	¥
z004skz	d SIPART	PS2 🖌					Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌) :

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Status" tab.

When the threshold is exceeded, the message "Limit deadband adaptation exceeded" is highlighted.

SIPART PS2 - S	tatus			? ×
Diagnostics Status	Messages			^
SIEMENS				GOOD 🗾 -
Device diagnostics 1:	Dynamic control valve behavior (limit 1). Dynamic control valve behavior (limit 2). Dynamic control valve behavior (limit 3). Pneumatic leakage (limit 1). Pneumatic leakage (limit 2).	t	Limit warnings:	Limit for number of changes in direction exceede Limit for deviation of lower endstop exceede Limit for deviation of the upper endstop exceede Limit deadband adaptation exceeded
	 Stiction (slipstick) (limit 3). Limit for lower endstop monitoring exceeded (limit 1). Limit for lower endstop monitoring exceeded (limit 2). Limit for lower endstop monitoring exceeded (limit 3). Limit for upper endstop monitoring exceeded (limit 1). 	1	Device diagnostics 2:	PST reference stroke time exceeded (limit 1). PST reference stroke time exceeded (limit 2). PST reference stroke time exceeded (limit 3). PST with pressure sensors failed
	Limit for stroke integral (100% strokes) exceeded (limit Limit for stroke integral (100% strokes) exceeded (limit Limit for direction changes exceeded (limit 1). Limit for direction changes exceeded (limit 2). Limit for direction changes exceeded (limit 3).	1	Device diagnostics 3:	Permitted device temperature exceeded (limit 1). Permitted device temperature exceeded (limit 2). Permitted device temperature exceeded (limit 3). Permitted device temperature undershot (limit 1). Permitted device temperature undershot (limit 2).
<				>
Transfer	Messages Print			Close

8. Close the dialog.

5.10.7.5 Via HART communication: Get messages

Requirement

- The application parameter "34.DEBA" is set to "Auto".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Get message

If the process diagnostics threshold is exceeded, the "more status available" is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. The message when the threshold for the "E.\DEBA" process diagnostics is contained in the following byte:
 - Byte 2, bit 4 corresponds to threshold 3 exceeded.

5.10.7.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.11 Monitoring 0% stop (F.\ZERO)

5.11.1 Functional description

The process diagnostics continuously monitor the deviation of the endstop at the 0% position.

It checks whether the upper endstop has changed compared to its value during initialization.

The amount of deviation is determined as a percentage of the travel distance and displayed as the diagnostic value "Endstop 0% position" (18.ZERO).

Note

Fault detection

Monitoring of the endstop not only responds to faults in the valve.

A mechanical change in the position feedback can also result in violating a threshold.

Ring memory

If data storage is activated in the positioner, the deviation data determined is stored in the positioner's ring memories.

In each case, 20 data entries are stored in 5 ring memories for different lengths of time using the FIFO method (First In - First Out).

Ring memory for time span	Amount of data	Time interval between the data
Last 30 minutes	20	1.5 minutes
Last 8 hours	20	24 minutes
Last 5 days	20	6 hours
Last 2 months	20	3 days
Last 30 months	20	45 days

The data can be stored in Device Manager Software, such as SIMATIC PDM, as a trend and exported for further processing.

The data can be read and processed using HART commands.

Process diagnostics can be monitored with adjustable thresholds. If these thresholds are violated, messages are output via the display and optionally via the digital contacts or the HART communication.

5.11.2 Activate and configure diagnostics

Requirement

- The application parameter "39.YCLS" is set to one of the following values: "do", "uP do", "Fd", "Fu Fd", "uP Fd", "Fu do".
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics "Monitoring 0% endstop" (F.\ZERO)

Function	The process diagn	ne process diagnostics continuously monitor the deviation of the endstop at the 0% position.				
Note	The amount of dev the diagnostic val	amount of deviation is determined as a percentage of the travel distance and displayed as diagnostic value "Endstop 0% position" (18.ZERO).				
Setting options	Off	Process diagnostics are deactivated.				
	On	Process diagnostics is activated.				
Factory setting	Off					

Note

Fault detection

Monitoring of the endstop not only responds to faults in the valve.

A mechanical change in the position feedback can also result in violating a threshold.

Process diagnostics parameters

If the process diagnostics are activated with "On", the associated parameters are visible.

F1.LEVL1	Threshold 1	hreshold 1						
Function	The parameter def as a percentage o	parameter defines threshold 1 for the permissible deviation of the lower stop (position 0%) percentage of the travel distance.						
Setting range	0.1 10.0	Condition: F1.LEVL1 < F2.LEVL2 < F3.LEVL3						
Factory setting	1.0							
Unit	%							

F2.LEVL2	Threshold 2	hreshold 2						
Function	The parameter def as a percentage o	e parameter defines threshold 2 for the permissible deviation of the lower stop (position 0 a percentage of the travel distance.						
Setting range	0.1 10.0	Condition: F1.LEVL1 < F2.LEVL2 < F3.LEVL3						
Factory setting	2.0							
Unit	%							

F3.LEVL3	Threshold 3	hreshold 3						
Function	The parameter def as a percentage o	e parameter defines threshold 3 for the permissible deviation of the lower stop (position 0% a percentage of the travel distance.						
Setting range	0.1 10.0	Condition: F1.LEVL1 < F2.LEVL2 < F3.LEVL3						
Factory setting	4.0							
Unit	%							

Activate and configure "Monitoring 0% endstop"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "F.\ZERO" of the "Monitoring 0% stop" process diagnostics.
- 3. Set the "F.\ZERO" parameter to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the thresholds to the valve, change the parameter values:
 - F1.LEVL1
 - F2.LEVL2
 - F3.LEVL3

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART	PS2					-	-		×
File	Dev	vice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	r
	+I	Download to device		?						
	†[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
<u> </u>	Π	Assign address and TAG				I SIPART PS2 DR8 HART				
	<u>6</u>]2	Value comparison				⊡ldentification				
		Object properties				TAG	DEMOKOFF		1	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
						Data	1/29/2024		1	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2		-	- [
ile Device View Diagnostics Maintenance	Help SIMATIC PDM	/9.2 SP2 Proces	ss Device	e Manage
📕 +0 🕂 🕂 🖻 📝 🔊 🖪 🚟 🗚 💡				
	Parameter	Value	Unit	Status
	Maintenance & Diagnostics			
	Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage		1
🗄 🖉 Maintenance & Diagnostics	Pressure monitoring (U.\PRES)	On		‡
	Partial Stroke Test (A.\PST)	On		1
	Monitoring of dynamic control valve behavior (b.\DEVI)	On		1
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	On		‡
	Monitoring stiction (slipstick effect) (d.\STIC)	On		1
	Deadband monitoring (E.\DEBA)	Off		1
	Monitoring of lower endstop (F.\ZERO)	Off 🗸		‡]
	Monitoring of upper endstop (G.\OPEN)	Off		1
	Monitoring of lower limit temperature (H.\TMIN)			‡
	Monitoring of upper limit temperature (J.\TMAX)	On		‡ []
	Monitoring number of total strokes (L.\STRK)	Off		1
	Monitoring number of direction changes (O.\DCHG)	Off		1
	Monitoring of average position value (P.\PAVG)	Off		1
	Pressure monitoring			
	Pressure unit (U1.PUNIT)	bar		1
	Hysteresis for limits (U2.P_HYS)	0.200	bar	1

6. Select the "Maintenance & Diagnostics" directory.

- 7. For "Monitoring of lower endstop" (F.\ZERO), set the value to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 8. To adapt the thresholds to the valve, change the parameter values:
 - F1.LEVL1
 - F2.LEVL2
 - F3.LEVL3
- 9. In the "Device" menu, select the command "Download to device...".

10. Recommendation: Select the check box "Load changed parameters only".

- 11. In the dialog, click the "Start".
 - \Rightarrow If the check box is activated, only the changed parameters are loaded into the positioner.
- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.

5.11.3 With SIMATIC PDM: Show diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "F.\ZERO" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "F.\ZERO".
- The application parameter "39.YCLS" is set to one of the following values: "do", "uP do", "Fd", "Fu Fd", "uP Fd", "Fu do".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART F	952				-	- 1		<
File	Dev	ice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Device	e Manager	
	+I	Download to device	?						
	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	Ţ	Assign address and TAG			I SIPART PS2 DR8 HART				1
	<u>۵۵</u> ۵	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor			1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2			_	
e Device View Diagnostics Maintenar 📃 💵 📬 🗊 隆 Update diagnostics	nce Help	SIMATIC PDM V9.2 S	SP2 Process Devic	æ Manager
SIPART PS2 Status	ameter	Value	Unit	Status
	Actual value			
ia‡ Setup Histograms	 Deviation 			+
Communicat KPI	Leakage (percen	tage of stroke)		+0
Valve charts	Leakage (pressure)	e change per minute)		+1
Alarm logbook	Stiction (slipstic	;)		+= †[]
	Lower endstop			1
	Upper endstop			
	Temperature			1
	Deadband			1
	Supply pressure	PZ		1
	Serial number	N1KO037518210		1
	Final Assembly Numbe	0		1
	Hardware Revision	3		10
	Firmware revision	5.03.00-28		1
	EDD version	25.00.00		
	Setup			
	Dynamic variable map	ping		

6. In the "Diagnostics" menu, select the "Trend charts > Lower endstop" command.

 \Rightarrow The "Lower endstop" dialog is displayed.

The dialog contains tabs, each with a trend chart for the deviations determined:

- Trend over 30 minutes
- Trend over 8 hours
- Trend over 5 days
- Trend over 2 months
- Trend over 30 months

The respective trend chart is based on the maximum of 20 data from the corresponding ring memory.

The lines of "Threshold 1, 2 and 3" are also shown.

Process diagnostics

5.11 Monitoring 0% stop (F.\ZERO)



Button	Description
Trend value list	Shows the 20 data for the displayed trend chart.
Restart trend	Caution: This function deletes the data stored in the po- sitioner in all 5 ring memories.
Trend help text	Explains how process diagnostics works.

7. Close the dialog.

Diagnostic value	Endstop 0-%-Position					
	Short designation	Short designation: 18.ZERO				
Function	The diagnostic val tion has changed	The diagnostic value shows the percentage by which the mechanical endstop at the 0% posi- tion has changed compared to the value at initialization.				
Requirement	• The application parameter "39.YCLS" is set to one of the following values: "do", "uP do", "Fd", "Fu Fd", "uP Fd", "Fu do".					
	• The "Monitoring 0% stop" (F.\ZERO) process diagnostics is activated.					
Display range	0.0 100.0					
Unit	%					
Communication						
SIMATIC PDM Export	Name	ps2_zero_value				
	DisplayValue	≜				
		Value				
HART communication (read)	Command	#171				
	Response Data	Bytes: 42 45				
		Format: Float				

5.11.4 Diagnostic value "Endstop 0% position" (18.ZERO)

5.11.5 Via HART communication: Read out diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "F.\ZERO" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "F.\ZERO".
- The application parameter "39.YCLS" is set to one of the following values: "do", "uP do", "Fd", "Fu Fd", "uP Fd", "Fu do".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Request

Send to the positioner via HART communication:

- Command "#173"
- Ring memory index of the process diagnostics, e.g. "20".

Send the request for each of the 5 ring memories separately.

Ring memory index	Ring memory for time span
20	Last 30 minutes
21	Last 8 hours
22	Last 5 days
23	Last 2 months
24	Last 30 months

Answer

The response consists of the following data on the requested ring memory:

- Response Data Bytes
- Command-Specific Response Code

Table 5-30	Response	Data	Bytes
	Response	Dutu	Dytes

Byte	Format	Description
0	Enum	Ring memory index
1	Unsigned-8	Number of valid values in the ring memory
2	Enum	Unit of the ring memory values
3 42	Signed-16	Values 1 20 of the ring memory (2 bytes each)
		Scaling: 256/1
		Examples:
		• 256 ≜ 1%
		 25 600 ≜ 100%
43 46	Float	Value of threshold 1 (F1.LEVL1)
47 50	Float	Value of threshold 2 (F2.LEVL2)
51 54	Float	Value of threshold 3 (F3.LEVL3)
55 58	Float	-
59 62	Float	-
63 66	Float	-

Table 5-31 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

5.11.6 With SIMATIC PDM: Export diagnostics results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "F.\ZERO" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "F.\ZERO".
- The application parameter "39.YCLS" is set to one of the following values: "do", "uP do", "Fd", "Fu Fd", "uP Fd", "Fu do".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART	PS2				-	-		×
File	Dev	vice View Diagnostics	Maintenand	e Help	SIMATIC PD	M V9.2 SP2 Proce	ss Devic	e Manager	,
	+I	Download to device	?	•					
! }	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	Π	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			□ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor			1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. Open the trend chart in the "Diagnostics" menu with the command "Trend charts > Lower endstop" → With SIMATIC PDM: Show diagnostic results (Page 340).
 When the trend chart opens, the current data of this process diagnostics in the positioner are read out by SIMATIC PDM.

	SIPART PS2						_		×		
Fil	e Device	View [Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2 Pro	cess Devic	e Manag	er		
18	Save Ct	trl+S	🖌 🕥 🖪	盟 🏦 ?							
₽	Export				Parameter	Value	Unit	Status	^		
•	Import		HART		□ SIPART PS2 DR8 HART						
	Print Ct	trl+P			⊡ldentification						
	Close		Diagnostics		TAG	DEMOKOFF		1			
	Close				Long TAG	SIPART PS2		1			
					Descriptor	-		1			
					Message	DIAGNOSIS		1			
					Date	8/15/2023		1			
					⊡ Device						
					Manufacturer	Siemens		1			
					Device Type	SIPART PS2		1			
					Order number	-		1			
					Serial number	N1KO037518210		1			
					Final Assembly Number	0		1			
					Hardware Revision	3		1			
					Firmware revision	5.03.00-28		1			
					EDD version	25.00.00					
					⊡ Setup						
	1	. 1			Dynamic variable mapp	ing		1	×		
z004	skzd SIPART	PS2 🖌			Online access 🖌 Dia	agnosis Update 🖌 🛛 Identity Check 🖌 📃			<mark>0</mark>		

7. In the "File" menu, select the "Export..." command.

The "Export - ..." dialog opens.

- 8. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

	Export - SIPART PS2	?	\times	_
	Evont directory:			~
	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export			
	H I ML transformation file: C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation xsl		-	
	Which information should be expected?			
	Selection			
	Object			
	SIPART PS2			
	0			
	Status:			
<			>	ľ
	Messages Start Stop	Close		
l	otat otop	0,000		

9. Start the export with the "Start" button.

- 10. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 11. Close the dialog.

12. Open the XML file with suitable software, e.g. an editor.

Param\$SIPART PS2\$20230815_121412.xml	- Editor			_		×	
xml version="1.0" encoding="utf-8"?							~
Created by PDM 902.200.2901.5. Do r</td <th>ot edit this File!!:</th> <td>></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	ot edit this File!!:	>				- 1	
xml-stylesheet type='text/xsl' href='PD</td <th>M80_ExportTransformation</th> <td>n.xsl'?></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	M80_ExportTransformation	n.xsl'?>				- 1	
<pdm xmlversion="8.04"></pdm>							
<object></object>							
<device></device>							
<id>2</id>							
<pltid>0</pltid>							
<type>EDD_OBJECT_OFFLINE</type>							
<class>EDD_OCLASS_NODE_HART_MODEM<!--</td--><th>Class></th><td></td><td></td><td></td><td></td><td></td><td></td></class>	Class>						
<objectpath>Netze/HART Modem-Netzwe</objectpath>	erk/NODE_10/SIPART_PS2 0</th <td>ObjectPat</td> <td>:h></td> <td></td> <td></td> <td></td> <td></td>	ObjectPat	:h>				
<pre><onlinevalues>False</onlinevalues></pre>						- 4-1-	
<catalogpath>/DEVICE/HART/ACTUATOR/</catalogpath>	ELECTRO_PNEUMATIC/SIEME	NS/SIPARI	_PS2/SIPARI_PS2_HAR	I_DK8K/	CatalogP	atn	
<pre><codjectname>SIPART PS2</codjectname></pre>	•						
<settion>Device</settion>	Madax						
<pre></pre>	modes						
<pre></pre>							
<pre></pre>	ag" Type-"String" Label.	-"TAG" P:	nam/iewMember_"True	" Dicol	awalue_	"nc	
<pre><attribute browsename="</pre></td><th>e_" longtag"="" name="longTag" th="" type_"string<=""><td>σ" Lahel-</td><td>"Long TAG" ParamView</td><td>Member</td><td>-"True"</td><td>Dic</td><td></td></attribute></pre>	σ" Lahel-	"Long TAG" ParamView	Member	-"True"	Dic		
<pre><attribute browse<="" name="descriptor" pre=""></attribute></pre>	Name-"descriptor" Type-	string"	Label-"Descriptor" F	ParamVi	ewMember	_"T	
<pre><attribute browsenam<="" name="message" pre=""></attribute></pre>	e="message" Type="string	g" Label-	"Message" ParamView	Member=	"True" D	isn	
<pre><attribute browsename="</pre></td><th>date" l<="" name="date" th="" type="DateTime"><td>abel="Dat</td><td>e" ParamViewMember='</td><td>"True"</td><td>DisplavV</td><td>alu</td><td></td></attribute></pre>	abel="Dat	e" ParamViewMember='	"True"	DisplavV	alu		
Dates are in ISO 8601 format</td <th>!>2023-08-15T00:00:0</th> <td>0<td>oute></td><td></td><td></td><td></td><td></td></td>	!>2023-08-15T00:00:0	0 <td>oute></td> <td></td> <td></td> <td></td> <td></td>	oute>				
<attribute e<="" name="manufacturer id" td=""><th><pre>BrowseName="manufacturer</pre></th><td>id" Type</td><td>="UInt16" Label="Mar</td><td>nufactu</td><td>rer" Par</td><td>amv</td><td>Y</td></attribute>	<pre>BrowseName="manufacturer</pre>	id" Type	="UInt16" Label="Mar	nufactu	rer" Par	amv	Y
<						>	
	Zeile 31668 Spalte 50	70%	Windows (CRLE)	UTE-8	mit BON	л	
	active broody opence bu		(citer)				

The XML file contains 100 lines with the 100 exported process diagnostics data. Each of the 5 ring memories contains 20 data entries.

The data for process diagnostics is labeled with Name = "var_trend_zero...". Exemplary data line:

<Attribute Name="var_trend_zero_30min_0" BrowseName="var_trend_zero_30min_0" Type="Int16" Label="0.0 up to -1.5 minutes"

ParamViewMember="False" **DisplayValue="0.0"** Import="True" State="32" **Unit="%"**>0</ Attribute>

- The texts marked in bold are included and explained in the following table.
- The numerical value at "DisplayValue", e.g. "0.0", is the value that was determined with the process diagnostics in the period 0 to -1.5 minutes.
- The table shows a summary of the 100 data of the "F.\ZERO" process diagnostics exported with the XML file.

Ring memory	Amoun	Data description in the XML file									
for time span	t of da-	Name	Label	DisplayValue	Unit						
	τα		(Time span of data deter- mination)	e.g.							
Last 30 mi-	20	var_trend_zero_30min_0	0.0 up to -1.5 minutes	0.0	%						
nutes											
		var_trend_zero_30min_19	-28.5 up to -30.0 minutes	0.0							
Last 8 hours	20	var_trend_zero_8h_0	0 up to -24 minutes								
		var_trend_zero_8h_19	-456 up to -480 minutes								
Last 5 days	20	var_trend_zero_5d_0	0 up to -6 hours								
		var_trend_zero_5d_19	-114 up to -120 hours								
Last 2 months	20	var_trend_zero_2m_0	0 up to -3 days								
		var_trend_zero_2m_19	-57 up to -60 days								
Last 30 months	20	var_trend_zero_30m_0	0 up to -45 days								
Ring memory for time spanAm t of taLast 30 mi-]						
		var trend zero 30m 19	-855 up to -900 days		1						

5.11.7 Messages

5.11.7.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.11.7.2 Messages in the display

Requirement

The application parameter "39.YCLS" is set to one of the following values: "do", "uP do", "Fd", "Fu Fd", "uP Fd", "Fu do".

Indication on the display

If the set thresholds are exceeded, error code "6" is output.

If several messages are present at the same time, the display switches between the different error codes.

If threshold 1 is exceeded	If threshold 2 is exceeded	If threshold 3 is exceeded:
(2-56 FUT 3-	(1) (2) - 56 (1) (1) (2) - 56 (1) (1) (2) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	0 8 35,13 2-56 RUT 35
1 bar Error code 6	 2 bars 2 Error code 6 	 3 bars Error code 6

5.11.7.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.

I/Os



5.11.7.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SI	PART I	PS2					-	-	• >	<
File	Dev	vice View Diagnostics	Mainter	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+I	Download to device		?						
	1	Upload to PG/PC				Parameter	Value	Unit	Status	^
Ė	Ψ	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>۵۵</u>	Value comparison				ldentification				
		Object properties				TAG	DEMOKOFF		‡ []	
		Calibration log				Long TAG	SIPART PS2		‡ []	
		Change Log				Descriptor	-		1	
	1	Set device checked				Message	DIAGNOSIS		1	
	_					Data	1/29/2024		t I	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🔁 sii	PART PS2								-	-		×
File	Device	View	Diag	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proces	ss Devic	e Manag	er
	1 +0 t0	極 🖻	R	Update (diagnostics							
	SIPART PS	52		Status			ameter	Value		Unit	Status	^
	- 🤌 SIPART	T PS2 DI		Trend ch	arts		IPART PS2 DR8 HART		_			
		ntificatior up		Histogra	mc	Ĺ	Identification					
	🗄 🧷 Mai	intenanc		v Di	1113	ľ	TAG	DEMOKOFF			1	
	tor	nmunicat		Value ch	t.e		Long TAG	SIPART PS2			1	
				Alarma la	dits	•	Descriptor	-			1	
				Alarm Io	дроок	_	Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							Device					
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			1	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			1	
							EDD version	25.00.00				
						E	Setup					
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							■ Basic settings					
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuat	or spi		1	~
z004skz	zd SIPART	PS2 🖌					🛛 Online access 🖌 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌				<mark>0</mark>

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Status" tab.

When a threshold is exceeded, the message "Limit for lower endstop monitoring exceeded (limit x)" is highlighted.

SIPART PS2 - Status				? ×
Diagnostics Status Messages				^
SIEMENS				GOOD 🗸
Device diagnostics 1: Dynamic control valve behavior (imit 1). Dynamic control valve behavior (imit 2). Dynamic control valve behavior (imit 3). Pneumatic leakage (imit 1). Pneumatic leakage (imit 2).	^ ~	1	Limit warnings:	Limit for stroke integral exceeded Limit for number of changes in direction excee Limit for deviation of lower endstop exceeded Limit for deviation of the upper endstop excee Limit deadband adaptation exceeded
 Stiction (slipstick) (limit 3). Limit for lower endstop monitoring exceeded (limit 1). Limit for lower endstop monitoring exceeded (limit 2). Limit for lower endstop monitoring exceeded (limit 3). Limit for upper endstop monitoring exceeded (limit 1).) _	1	Device diagnostics 2:	PST reference stroke time exceeded (limit 1). PST reference stroke time exceeded (limit 2). PST reference stroke time exceeded (limit 3). PST with pressure sensors failed
Limit for stroke integral (100% strokes) exceeded (limi Limit for stroke integral (100% strokes) exceeded (limi Limit for direction changes exceeded (limit 1). Limit for direction changes exceeded (limit 2). Limit for direction changes exceeded (limit 3).	×	1	Device diagnostics 3:	Permitted device temperature exceeded (limit Permitted device temperature exceeded (limit Permitted device temperature exceeded (limit Permitted device temperature undershot (limit Permitted device temperature undershot (limit Permitted device temperature undershot (limit
< Transfer Messages Print				Close

8. Close the dialog.

5.11.7.5 Via HART communication: Get messages

Requirement

- The application parameter "39.YCLS" is set to one of the following values: "do", "uP do", "Fd", "Fu Fd", "uP Fd", "Fu do".
- The positioner has a HART interface: SIPART PS2 6DR51...\6DR52...

Get message

If a process diagnostics threshold is violated, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. When the thresholds for the "F.\ZERO" process diagnostics are exceeded, the messages are contained in the following bytes:
 - Byte 15, bit 6 corresponds to threshold 1 exceeded.
 - Byte 15, bit 5 corresponds to threshold 2 exceeded.
 - Byte 15, bit 4 corresponds to threshold 3 exceeded.

5.11.7.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.12 Monitoring 100% endstop (G.\OPEN)

5.12.1 Functional description

Process diagnostics continuously monitor the deviation of the endstop at the 100% position.

It checks whether the upper endstop has changed compared to its value during initialization.

The size of the deviation is determined as a percentage of the travel distance and displayed as the diagnostic value "Endstop 100% position" (19.0PEN).

Note

Fault detection

Monitoring of the endstop not only responds to faults in the valve.

A mechanical change in the position feedback can also result in violating a threshold.

Ring memory

If data storage is activated in the positioner, the deviation data determined is stored in the positioner's ring memories.

In each case, 20 data entries are stored in 5 ring memories for different lengths of time using the FIFO method (First In - First Out) .

Ring memory for time span	Amount of data	Time interval between the data
Last 30 minutes	20	1.5 minutes
Last 8 hours	20	24 minutes
Last 5 days	20	6 hours
Last 2 months	20	3 days
Last 30 months	20	45 days

The data can be stored in Device Manager Software, such as SIMATIC PDM, as a trend and exported for further processing.

5.12 Monitoring 100% endstop (G.\OPEN)

The data can be read and processed using HART commands.

Process diagnostics can be monitored with adjustable thresholds. If these thresholds are violated, messages are output via the display and optionally via the digital contacts or the HART communication.

5.12.2 Activate and configure diagnostics

Requirement

- The application parameter "39.YCLS" is set to one of the following values: "uP", "uP do", "Fu", "Fu Fd", "uP Fd", "Fu do".
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics "Monitoring 100% endstop" (G.\OPEN)

Function	Process diagnostic	rocess diagnostics continuously monitor the deviation of the endstop at the 100% position.				
Note	The size of the dev the diagnostic valu	e size of the deviation is determined as a percentage of the travel distance and displayed as e diagnostic value "Endstop 100% position" (19.OPEN).				
Setting options	Off	Process diagnostics are deactivated.				
	On	Process diagnostics is activated.				
Factory setting	Off					

Note

Fault detection

Monitoring of upper endstop not only responds to faults in the valve.

A mechanical change in the position feedback can also result in violating a threshold.

Process diagnostics parameters

If the process diagnostics are activated with "On", the following parameters can be seen.

G1.LEVL1	Threshold 1	hreshold 1						
Function	The parameter deposition as a perce	e parameter defines threshold 1 for the permissible deviation of the endstop at the 100% sition as a percentage of the travel distance.						
Setting range	0.1 10.0	Condition: G1.LEVL1 < G2.LEVL2 < G3.LEVL3						
Factory setting	1.0							
Unit	%							

G2.LEVL2	Threshold 2	hreshold 2						
Function	The parameter dependent position as a perce	e parameter defines threshold 2 for the permissible deviation of the endstop at the 100% position as a percentage of the travel distance.						
Setting range	0.1 10.0	Condition: G1.LEVL1 < G2.LEVL2 < G3.LEVL3						
Factory setting	2.0							
Unit	%							

5.12 Monitoring 100% endstop (G.\OPEN)

G3.LEVL3	Threshold 3	hreshold 3						
Function	The parameter de position as a perce	e parameter defines threshold 3 for the permissible deviation of the endstop at the 100% sition as a percentage of the travel distance.						
Setting range	0.1 10.0	Condition: G1.LEVL1 < G2.LEVL2 < G3.LEVL3						
Factory setting	4.0							
Unit	%							

Activate and configure "Monitoring 100% endstop"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "G.\OPEN" of the process diagnostics "Monitoring 100% endstop".
- 3. Set the "G.\OPEN" parameter to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the thresholds to the valve, change the parameter values:
 - G1.LEVL1
 - G2.LEVL2
 - G3.LEVL3

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART	PS2					-	-		×
File	Dev	vice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	r
	+I	Download to device		?						
	†[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
<u> </u>	Π	Assign address and TAG				I SIPART PS2 DR8 HART				
	<u>6</u>]2	Value comparison				⊡ldentification				
		Object properties				TAG	DEMOKOFF		1	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
						Data	1/29/2024		1	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
| SIPART PS2 | | - | _ | | × |
|--|--|-------------------|----------|------------|---|
| File Device View Diagnostics Maintenance | Help SIMATIC PDM | /9.2 SP2 Proce | ss Devic | e Manage | r |
| 🔒 📕 🕂 🛍 🕸 🖻 🖌 🚳 💽 🛤 ? | | | | | |
| SIPART PS2 | Parameter | Value | Unit | Status | 1 |
| | ⊡ Maintenance & Diagnostics | | | | |
| | Activation of extended diagnostics (52.XDIAG) | On 3 (three-stage | | 1 | |
| 🗈 🖉 Maintenance & Diagnostics | Pressure monitoring (U.\PRES) | On | | ‡] | |
| | Partial Stroke Test (A.\PST) | On | | ‡] | |
| | Monitoring of dynamic control valve behavior (b.\DEVI) | On | | 1 | |
| | Monitoring/compensation of pneumatic leakage (C.\LEAK) | On | | 1 | |
| | Monitoring stiction (slipstick effect) (d.\STIC) | On | | 1 | |
| | Deadband monitoring (E.\DEBA) | Off | | 1 | |
| | Monitoring of lower endstop (F.\ZERO) | Off | | 1 | |
| | Monitoring of upper endstop (G.\OPEN) | Off ~ | | 1 | |
| | Monitoring of lower limit temperature (H.\TMIN) | Off | | 1 | |
| | Monitoring of upper limit temperature (J.\TMAX) | Un | | ‡] | |
| | Monitoring number of total strokes (L.\STRK) | Off | | 1 | |
| | Monitoring number of direction changes (O.\DCHG) | Off | | ‡] | |
| | Monitoring of average position value (P.\PAVG) | Off | | 1 | |
| | Pressure monitoring | | | | |
| | Pressure unit (U1.PUNIT) | bar | | 1 | |
| | Hysteresis for limits (U2.P_HYS) | 0.200 | bar | 1 | • |

6. Select the "Maintenance & Diagnostics" directory.

- For "Monitoring of upper endstop" (G.\OPEN), set the value to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 8. To adapt the thresholds to the valve, change the parameter values:
 - G1.LEVL1
 - G2.LEVL2
 - G3.LEVL3
- 9. In the "Device" menu, select the command "Download to device..."...
- 10. Recommendation: Select the check box "Load changed parameters only".
- 11. In the dialog, click the "Start" button.
 - \Rightarrow If the check box is selected, only the changed parameter values are loaded into the positioner.
- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.

5.12.3 With SIMATIC PDM: Show diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "G.IOPEN" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "G.\OPEN".
- The application parameter "39.YCLS" is set to one of the following values: "uP", "uP do", "Fu", "Fu Fd", "uP Fd", "Fu do".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART F	952				-	- 1		<
File	Dev	ice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Device	e Manager	
	+I	Download to device	?						
	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	Ţ	Assign address and TAG			I SIPART PS2 DR8 HART				1
	<u>۵۵</u> ۵	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor			1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🖊 SIF	ART PS2											_	[×		
File	Device	View	Diag	gnostics Update	Maintenanco diagnostics	e I	Help			SIMATIC PDM	V9.2 SP2	Process D	evice	e Manag	jer		
⊡∎		2 T PS2 DI		Status			amet	er		Value		Ur	nit	Status	^		
ie 1 Identification ie 1 Setup		ntification		Trend ch	narts	•		Actual value									
			Histogra	ams	►		Deviation						•				
	1 Co	iintenanc mmunicat		KPI		►		Leakage (percer	nta	ge of stroke)				Į∐ ≜∏	_		
				Valve ch	arts	►		Leakage (pressu	ire	change per minute)				+1	_		
					Alarm Io	ogbook			Stiction (slipstick)				+1	_			
												Lower endstop					
		-					Upper endstop						*=				
							Temperature						t	-			
						Deadband						1					
								Supply pressure PZ			1						
							Se	rial number		N1KO037518210				1			
						Fir	nal Assembly Numbe	er	0				1				
							Ha	ardware Revision		3				t []			
							Fir	mware revision		5.03.00-28				‡ []			
							E	DD version		25.00.00							
						E	Setu	p									
L			1				ΞDy	namic variable ma	ppi	ng					×		
z004skz	d SIPART	PS2 🖌					0	nline access 🖌	Di	iagnosis Update 🖌 🛛 Iden	tity Check 🖌 📗				Ο.,		

6. In the "Diagnostics" menu, select the "Trend charts > Upper endstop" command.

 \Rightarrow The "Upper endstop" dialog is displayed.

The dialog contains tabs, each with a trend chart for the deviations determined:

- Trend over 30 minutes
- Trend over 8 hours
- Trend over 5 days
- Trend over 2 months
- Trend over 30 months

The respective trend chart is based on the maximum of 20 data from the corresponding ring memory.

The lines of "Threshold 1, 2 and 3" are also shown.

Process diagnostics

5.12 Monitoring 100% endstop (G.\OPEN)



Button	Description
Trend value list	Shows the 20 data for the displayed trend chart.
Restart trend	Caution: This function deletes the data stored in the po- sitioner in all 5 ring memories.
Trend help text	Explains how process diagnostics works.

7. Close the dialog.

Diagnostic value	Endstop 100-%-Position							
	Short designation: 19.OPEN							
Function	The diagnostic val position has chang	The diagnostic value shows the percentage by which the mechanical endstop at the 100% position has changed compared to the value at initialization.						
Requirement	• The application parameter "39.YCLS" is set to one of the following values: "uP", "uP do", "Fu", "Fu Fd", "uP Fd", "Fu do".							
	• The "100% endstop monitoring" process diagnostics (G.\OPEN) is activated.							
Display range	0.0 100.0							
Unit	%	%						
Communication								
SIMATIC PDM Export	Name	ps2_open_value						
	DisplayValue	≜ Value						
HART communication (read)	Command	#171						
	Response Data	Bytes: 46 49						
		Format: Float						

5.12.4 Diagnostic value "Endstop 100% position" (19.OPEN)

5.12.5 Via HART communication: Read out diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "G.\OPEN" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "G.\OPEN".
- The application parameter "39.YCLS" is set to one of the following values: "uP", "uP do", "Fu", "Fu Fd", "uP Fd", "Fu do".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Request

Send to the positioner via HART communication:

- Command "#173"
- Ring memory index of the process diagnostics, e.g. "25".

Process diagnostics

5.12 Monitoring 100% endstop (G.\OPEN)

Send the request for each of the 5 ring memories separately.

Ring memory index	Ring memory for time span
25	Last 30 minutes
26	Last 8 hours
27	Last 5 days
28	Last 2 months
29	Last 30 months

Answer

The response consists of the following data on the requested ring memory:

- Response Data Bytes
- Command-Specific Response Code

Table 5-32	Response Data B	vtes
		,

Byte	Format	Description
0	Enum	Ring memory index
1	Unsigned-8	Number of valid values in the ring memory
2	Enum	Unit of the ring memory values
3 42	Signed-16	Values 1 20 of the ring memory (2 bytes each)
		Scaling: 256/1
		Examples:
		• 256 ≜ 1%
		 25 600 ≜ 100%
43 46	Float	Value of threshold 1 (G1.LEVL1)
47 50	Float	Value of threshold 2 (G2.LEVL2)
51 54	Float	Value of threshold 3 (G3.LEVL3)
55 58	Float	-
59 62	Float	-
63 66	Float	-

Table 5-33 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

5.12.6 With SIMATIC PDM: Export diagnostics results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "G.IOPEN" is set to "On".
 - For positioners with firmware version as of 5.03, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "G.\OPEN".
- The application parameter "39.YCLS" is set to one of the following values: "uP", "uP do", "Fu", "Fu Fd", "uP Fd", "Fu do".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART F	PS2				-	-		<
File	Dev	ice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Devic	e Manager	
	+I	Download to device	?						
! }	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	Π	Assign address and TAG			I SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Date	1/29/2024		1	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. Open the trend chart in the "Diagnostics" menu with the command "Trend charts > Upper endstop" → With SIMATIC PDM: Show diagnostic results (Page 362).
 When the trend chart opens, the current data of this process diagnostics in the positioner are read out by SIMATIC PDM.

	SIPART PS2					_		×
File	Device Vie Save Ctrl+	ew Diagnostics S	Maintenance	e Help	SIMATIC PDM V9.2 SP2 Proc	ess Devic	e Manage	яr
₽	Export			Parameter	Value	Unit	Status	^
H	Import	HART		SIPART PS2 DR8 HART				
	Print Ctrl+I	>		Identification				
I –	Class	Diagnostics		TAG	DEMOKOFF		‡	
	Close			Long TAG	SIPART PS2		1	
				Descriptor	-		1	
				Message	DIAGNOSIS		1	
				Date	8/15/2023		1	
				⊡ Device				
				Manufacturer	Siemens		1	
				Device Type	SIPART PS2		1	
				Order number	-		1	
				Serial number	N1KO037518210		1	
				Final Assembly Number	0		1	
				Hardware Revision	3		1	
				Firmware revision	5.03.00-28		1	
				EDD version	25.00.00			
				⊡ Setup				
				 Dynamic variable mapp 	ing			×
z0049	kzd SIPART PS2			Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 📃			<mark>)</mark> ;

7. In the "File" menu, select the "Export..." command.

 \Rightarrow The "Export - ..." dialog opens.

- 8. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

	Export - SIPART PS2	?	\times	
				^
	Export directory:		-	
	C:\ProgramData \Siemens \Automation \SIMATIC_PDM \Export		_	
	HTML transformation file:			
	$\label{eq:c:ProgramDataSiemens} C: \end{tabular} C: \end{tabular} DM \en$			
	Which information should be exported?			
	Device parameters			
	Diagnostics			
	Document Manager			
	Selection			
	() Object			
	O SIFART F32			
L				
	Status:			
				J
<			>	
[Messages Start Stop	Close		

9. Start the export with the "Start" button.

- 10. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 11. Close the dialog.

12. Open the XML file with suitable software, e.g. an editor.

Param\$SIPART PS2\$20230815_121412.xml -	- Editor			_		×	
xml version="1.0" encoding="utf-8"?							~
Created by PDM 902.200.2901.5. Do n</td <th>ot edit this File!!:</th> <td>></td> <th></th> <td></td> <td></td> <td>- 1</td> <td></td>	ot edit this File!!:	>				- 1	
xml-stylesheet type='text/xsl' href='PD</td <th>M80_ExportTransformatio</th> <td>n.xs1'?></td> <th></th> <td></td> <td></td> <td>- 1</td> <td></td>	M80_ExportTransformatio	n.xs1'?>				- 1	
<pdm xmlversion="8.04"></pdm>							
<object></object>							
<device></device>							
<1D>2 1D							
<tudesedd (tudes<="" object="" offline="" td=""><th></th><td></td><th></th><td></td><td></td><td></td><td></td></tudesedd>							
Classiend OCLASS NODE HAPT MODEMA/	Class						
COnjectPathsNetze/HART_Modem_Netzwe	ork/NODE 10/STPART PS2//	hiectPat	that the second s				
<pre><onlinevalues>Ealse</onlinevalues></pre>		b)ccci ai					
<catalogpath>/DEVICE/HART/ACTUATOR/</catalogpath>	ELECTRO PNEUMATIC/SIEME	NS/SIPART	PS2/SIPART PS2 HAR	T DR8 </td <td>CatalogP</td> <td>ath</td> <td></td>	CatalogP	ath	
<objectname>SIPART PS2</objectname>							
<section>DEVICE</section>							
<commandmode>ExportOffline<th>Mode></th><td></td><th></th><td></td><td></td><td></td><td></td></commandmode>	Mode>						
<deviceparameters></deviceparameters>							
<pre><attribute <attribute="" b<="" browsenam="" browsename=" <! Dates are in ISO 8601 format <Attribute Name=" id"="" longtag"="" manufacturer="" name="mode" pre=""></attribute></pre>	ag" Type="String" Label: he="longTag" Type="String Name="descriptor" Type= he="message" Type="String date" Type="DateTime" Li !>2023-08-15700:00:0 prowseName="manufacturer	="TAG" Pa g" Label= "String" g" Label= abel="Dat 0id" Tvpe	<pre>uramViewMember="True "Long TAG" ParamVie Label="Descriptor" "Message" ParamView ee" ParamViewMember= ute> e="UInt16" Label="Ma</pre>	" Displ wMember ParamVi Member= "True" nufactu	ayValue= ="True" ewMember "True" D DisplayV rer" Par	"DE Dis ="T isp alu amV	~
<						>	
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-8	3 mit BON	Л	

The XML file contains 100 lines with the 100 exported process diagnostics data. Each of the 5 ring memories contains 20 data entries.

The data for process diagnostics is labeled with Name = "var_trend_open...". Exemplary data line:

<Attribute Name="var_trend_open_30min_0" BrowseName="var_trend_open_30min_0" Type="Int16" Label="0.0 up to -1.5 minutes"

ParamViewMember="False" **DisplayValue="0.0"** Import="True" State="32" **Unit="%"**>0</ Attribute>

- The texts marked in bold are included and explained in the following table.
- The numerical value at "DisplayValue", e.g. "0.0", is the value that was determined with the process diagnostics in the period 0 to -1.5 minutes.
- The table shows a summary of the 100 data of the "G.\OPEN" process diagnostics exported with the XML file.

Ring memory	Amoun	Data description in the XML file								
for time span	t of da-	Name	Label	DisplayValue	Unit					
	τα		(Time span of data deter- mination)	e.g.						
Last 30 mi-	20	var_trend_open_30min_0	0.0 up to -1.5 minutes	0.0	%					
nutes										
		var_trend_open_30min_19	-28.5 up to -30.0 minutes	0.0						
Last 8 hours	20	var_trend_open_8h_0	0 up to -24 minutes							
		var_trend_open_8h_19	-456 up to -480 minutes							
Last 5 days	20	var_trend_open_5d_0	0 up to -6 hours							
		var_trend_open_5d_19	-114 up to -120 hours							
Last 2 months	20	var_trend_open_2m_0	0 up to -3 days							
		var_trend_open_2m_19	-57 up to -60 days							
Last 30 months	20	var_trend_open_30m_0	0 up to -45 days							
		var_trend_open_30m_19	-855 up to -900 days							

5.12.7 Messages

5.12.7.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.12.7.2 Messages in the display

Requirement

The application parameter "39.YCLS" is set to one of the following values: "uP", "uP do", "Fu", "Fu Fd", "uP Fd", "Fu do".

Indication on the display

If the set thresholds are exceeded, error code "7" is output.

If several messages are present at the same time, the display switches between the different error codes.

If threshold 1 is exceeded	If threshold 2 is exceeded	If threshold 3 is exceeded:		
0 835.19 2-51 AUT35	() () () () () () () () () () () () () ((2-51 AUT 35		
1 bar Error code 7	 2 bars 2 Error code 7 	 3 bars Error code 7 		

5.12.7.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.

I/Os

Digital I/O Module (DIO) 6DR4004-6A / -8A	Inductive Limit Switches (ILS) 6DR4004-6G / -8G	Mechanic Limit Switches (MLS) 6DR4004-6K		
$1 + 11 \\ 12 \\ 2 + 31 \\ 3 + 31 \\ 4 + 41 \\ 42 \\ 5 + 51 \\ 5 + 51 \\ 5 + 52 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12 \\$	1 + 31 + 31 + 32 + 41 + 42 + 51 + 51 + 52 + 52 + 52 + 51 + 52 + 52	1 + 31 + 31 + 32 + 41 + 42 + 51 + 51 + 52 + 52 + 52 + 52 + 52 + 5		
 Digital input DI2, galvanically isolated Digital input DI2, dry contact Fault message output Digital output DO1 Digital output DO2 	 Fault message output, has no function in combination with 6DR4004-3ES Digital output 1 Digital output 2 	 Fault message output, has no function in combination with 6DR4004-4ES Digital output 1 Digital output 2 		

5.12.7.4 With SIMATIC PDM: Read status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	952					-	-		<
File	Dev	rice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
	+I	Download to device		?						
	t[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
<u>.</u>	Π	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>۵۵</u> ۵	Value comparison				⊡ldentification				
		Object properties				TAG	DEMOKOFF		1	
		Calibration log				Long TAG	SIPART PS2		‡]	
		Change Log				Descriptor	-		‡]	
		Set device checked				Message	DIAGNOSIS		‡]	
						Data	1/29/2024		t I	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🖊 SI	PART PS2								_	-		X
File	Device	View	Diag	nostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proces	s Devic	e Manage	er
	1 +0 +0	40 B	R	Update o	diagnostics							
	SIPART PS	2		Status			ameter	Value		Unit	Status	^
ė.	🤌 SIPART	FPS2 DI		Trend ch	arte		IPART PS2 DR8 HART		_		-	
		ntification		Histogra		Ľ	Identification				_	
	🗄 🥠 Mai	ntenanc		voi	1115	Ţ	TAG	DEMOKOFF			1	
	Con	nmunicat		NPI Value ch	t.		Long TAG	SIPART PS2			1	
				Alarma la	arts	•	Descriptor	-			1	
				Alarm Io	дроок	_	Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							⊡ Device					
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			1	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			1	
							EDD version	25.00.00				
						E	Setup					
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							Basic settings					
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuato	r spi		1	×
z004skz	zd SIPART	PS2 🖌					🛛 Online access 🖌 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌)

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Status" tab.

When a threshold is exceeded, the message "Limit for upper endstop monitoring exceeded (limit x)" is highlighted.

SIPART PS2 - Status			? ×
Diagnostics Status Messages			^
SIEMENS			GOOD 🗸
Device diagnostics 1: Dynamic control valve behavior (limit 1). Dynamic control valve behavior (limit 2). Dynamic control valve behavior (limit 3). Pneumatic leakage (limit 1). Pneumatic leakage (limit 2).	↓ ↓	Limit warnings:	Limit for stroke integral exceeded Limit for number of changes in direction excee Limit for deviation of lower endstop exceeded Limit for deviation of the upper endstop exceeded Limit deadband adaptation exceeded
Limit for lower endstop monitoring exceeded (limit 3). Limit for upper endstop monitoring exceeded (limit 1). Limit for upper endstop monitoring exceeded (limit 2). Limit for upper endstop monitoring exceeded (limit 3). Limit for stroke integral (100% strokes) exceeded (limit 1).		Device diagnostics 2:	PST reference stroke time exceeded (limit 1). PST reference stroke time exceeded (limit 2). PST reference stroke time exceeded (limit 3). PST with pressure sensors failed
Limit for stroke integral (100% strokes) exceeded (limit 1 Limit for stroke integral (100% strokes) exceeded (limit 2 Limit for direction changes exceeded (limit 1). Limit for direction changes exceeded (limit 2). Limit for direction changes exceeded (limit 3).	▲ 1 D	Device diagnostics 3:	Pemitted device temperature exceeded (limit Pemitted device temperature exceeded (limit Pemitted device temperature exceeded (limit Pemitted device temperature undershot (limit Pemitted device temperature undershot (limit
¢			>
Transfer Messages Print			Close

8. Close the dialog.

5.12.7.5 Via HART communication: Get messages

Requirement

- The application parameter "39.YCLS" is set to one of the following values: "uP", "uP do", "Fu", "Fu Fd", "uP Fd", "Fu do"
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Get message

If a process diagnostics threshold is violated, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. When the thresholds for the "G.\OPEN" process diagnostics are exceeded, the messages are contained in the following bytes:
 - Byte 15, bit 3 corresponds to threshold 1 exceeded.
 - Byte 15, bit 2 corresponds to threshold 2 exceeded.
 - Byte 15, bit 1 corresponds to threshold 3 exceeded.

5.12.7.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.13 Monitoring of lower limit temperature (H.\TMIN) and upper limit temperature (J.\TMAX)

5.13.1 Functional description

Process diagnostics continuously monitor the temperature of the positioner.

The temperature sensor is located in the enclosure on the electronics board.

The current temperature is displayed in the "Current temperature" (30.TMP) diagnostic value in "°C" or in "°F".

Ring memory

If data storage is activated in the positioner, the measured temperatures are stored in the positioner's ring memories.

In each case, 20 data entries are stored in 5 ring memories for different lengths of time using the FIFO method (First In - First Out) .

Ring memory for time span	Amount of data	Time interval between the data
Last 30 minutes	20	1.5 minutes
Last 8 hours	20	24 minutes
Last 5 days	20	6 hours
Last 2 months	20	3 days
Last 30 months	20	45 days

The data can be stored in Device Manager Software, such as SIMATIC PDM, as a trend and exported for further processing.

The data can be read and processed using HART commands.

Process diagnostics can be monitored with adjustable thresholds. If these thresholds are violated, messages are output via the display and optionally via the digital contacts or the HART communication.

5.13.2 Activate and configure diagnostics (H.\TMIN)

Requirement

The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

"Monitoring of lower limit temperature" process diagnostics (H.\TMIN)

Function	Process diagnostics continuously monitor the lower limit temperature of the positioner.			
Note	The current temperature is displayed in the "Current temperature" (30.TMP) diagnostic value in "°C" or in "°F".			
	The minimum occurring temperature is displayed in the diagnostic value "Minimum tempe ature" (31.TMIN).			
Setting options	Off	Process diagnostics are deactivated.		
	Process diagnostics is activated.			
Factory setting	Off			

Process diagnostics parameters

If the process diagnostics are activated with "On", the associated parameters are visible.

H1.TUNIT	Unit					
Function	he parameter defines the unit of the displayed temperature.					
	he unit also applies to all other temperature-related parameters.					
Setting options	• °C					
	• °F					
Factory setting	°C					

H2.LEVL1	Threshold 1					
Function	The parameter defi	The parameter defines threshold 1 for the lower limit temperature.				
Setting range	-40.0 90.0	°C	Condition: H2.LEVL1 < H3.LEVL2 < H4.LEVL3			
	-40.0 194.0	°F				
Factory setting	-25.0 °C					

H3.LEVL2	Threshold 2					
Function	The parameter def	he parameter defines threshold 2 for the lower limit temperature.				
Setting range	-40.0 90.0	°C	Condition: H2.LEVL1 < H3.LEVL2 < H4.LEVL3			
	-40.0 194.0	°F				
Factory setting	-30.0 °C					

H4.LEVL3	Threshold 3				
Function	The parameter defines threshold 3 for the lower limit temperature.				
Setting range	-40.0 90.0	°C	Condition: H2.LEVL1 < H3.LEVL2 < H4.LEVL3		
	-40.0 194.0	°F			
Factory setting	-40.0 °C				

Activate and configure "Monitoring of lower limit temperature"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "H.\TMIN" parameter of the "Monitoring of lower limit temperature" process diagnostics.
- 3. Set the "H.\TMIN" parameter to "On". ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the thresholds to the valve, change the parameter values:
 - H1.TUNIT
 - H2.LEVL1
 - H3.LEVL2
 - H4.LEVL3

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.
- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2		-	-	ц ;	×
File Device View Diagnostics Maintenance	Help SIMATIC PDM V	9.2 SP2 Proces	ss Devic	e Manager	r
🔒 📕 🕂 🍽 🕸 🖻 🖌 🛞 💽 👯 👫 💡					
⊡∎ SIPART PS2	Parameter	Value	Unit	Status	^
SIPART PS2 DR8 HART	Maintenance & Diagnostics				1
	Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage		1	1
😥 🖉 Maintenance & Diagnostics	Pressure monitoring (U.\PRES)	On		1	
	Partial Stroke Test (A.\PST)	On		1	
	Monitoring of dynamic control valve behavior (b.\DEVI)	On		1	
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	On		1	
	Monitoring stiction (slipstick effect) (d.\STIC)	On		‡ []	
	Deadband monitoring (E.\DEBA)	Off		1	
	Monitoring of lower endstop (F.\ZERO)	Off		‡ []	
	Monitoring of upper endstop (G.\OPEN)	Off		1	
	Monitoring of lower limit temperature (H.\TMIN)	On 🗸		1	
	Monitoring of upper limit temperature (J.\TMAX)	Off		1	
	Monitoring number of total strokes (L.\STRK)	Un	/	1	
	Monitoring number of direction changes (O.\DCHG)	Off		1	
	Monitoring of average position value (P.\PAVG)	On		1	
	Pressure monitoring				
	Pressure unit (U1.PUNIT)	bar		1	
	Hysteresis for limits (U2.P_HYS)	0.200	bar	1	1
2004skzd SIPART PS2 🖌	Online access 🖌 Diagnosis Update 🖌 Identit	y Check 🖌) .

6. Select the "Maintenance & Diagnostics" directory.

- 7. For "Monitoring of lower limit temperature" (H.\TMIN), set the value to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 8. To adapt the thresholds to the valve, change the parameter values:
 - H1.TUNIT
 - H2.LEVL1
 - H3.LEVL2
 - H4.LEVL3
- 9. In the "Device" menu, select the command "Download to device...".

10. Recommendation: Select the check box "Load changed parameters only".

11. In the dialog, click the "Start" button.

 \Rightarrow If the check box is selected, only the changed parameter values are loaded into the positioner.

- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.

5.13.3 Activate and configure diagnostics (J.\TMAX)

Requirement

The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics "Monitoring of upper limit temperature" (J.\TMAX)

Function	The process diagnostics continuously monitor the upper limit temperature of the positioner.		
Note	The current temperature is displayed in the "Current temperature" (30.TMP) diagnostic value in "°C" or in "°F".		
	The maximum occurring temperature is displayed in the diagnostic value "Maximum tem ature" (32.TMAX).		
Setting options	Off	Process diagnostics are deactivated.	
	On Process diagnostics is activated.		
Factory setting	Off		

Process diagnostics parameters

If the process diagnostics are activated with "On", the associated parameters are visible.

J1.TUNIT	Unit
Function	The parameter defines the unit of the displayed temperature.
	The unit also applies to all other temperature-related parameters.
Setting options	• °C
	• °F
Factory setting	°C

J2.LEVL1	Threshold 1			
Function	The parameter defines threshold 1 for the upper limit temperature.			
Setting range	-40.0 90.0	°C	Condition: J2.LEVL1 < J3.LEVL2 < J4.LEVL3	
	-40.0 194.0	°F		
Factory setting	75.0 °C			

J3.LEVL2	Threshold 2			
Function	The parameter defines threshold 2 for the upper limit temperature.			
Setting range	-40.0 90.0	°C	Condition: J2.LEVL1 < J3.LEVL2 < J4.LEVL3	
	-40.0 194.0	°F		
Factory setting	80.0 °C			

J4.LEVL3	Threshold 3				
Function	The parameter defines threshold 3 for the upper limit temperature.				
Setting range	-40.0 90.0	°C	Condition: J2.LEVL1 < J3.LEVL2 < J4.LEVL3		
	-40.0 194.0	°F			
Factory setting	90.0 °C				

Activate and configure "Monitoring of upper limit temperature"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "J.\TMAX" parameter of the process diagnostics "Monitoring of upper limit temperature".
- 3. Set the "J.\TMAX" parameter to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the thresholds to the valve, change the parameter values:
 - J1.TUNIT
 - J2.LEVL1
 - J3.LEVL2
 - J4.LEVL3

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🗾 SI	PART F	PS2				-	-		×
File	Dev	rice View Diagnostics N	laintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+1	Download to device	?						
	1	Upload to PG/PC			Parameter	Value	Unit	Status	^
Ė	· 📊	Assign address and TAG			I SIPART PS2 DR8 HART				
	<u>6</u>]6	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		T I	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2		-	- [] >	<
File Device View Diagnostics Maintenance	e Help SIMATIC PDM	/9.2 SP2 Proce	ss Device	Manager	
🔒 🞩 🕂 🏨 🖻 🔛 🕥 💽 🔡 🏔 🔅	2				
□ II SIPART PS2	Parameter	Value	Unit	Status	^
i≘ ∮ SIPART PS2 DR8 HART	Maintenance & Diagnostics				1
	Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage		1	
🕢 🖉 Maintenance & Diagnostics	Pressure monitoring (U.\PRES)	On		1	1
	Partial Stroke Test (A.\PST)	On		1	1
	Monitoring of dynamic control valve behavior (b.\DEVI)	On		1	1
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	On		‡]	1
	Monitoring stiction (slipstick effect) (d.\STIC)	On		1	
	Deadband monitoring (E.\DEBA)	Off		‡ []	
	Monitoring of lower endstop (F.\ZERO)	Off		‡]	
	Monitoring of upper endstop (G.\OPEN)	Off		‡ []	
	Monitoring of lower limit temperature (H.\TMIN)	On		1	1
	Monitoring of upper limit temperature (J.\TMAX)	Off 🗸		‡]	1
	Monitoring number of total strokes (L.\STRK)	Off		1	1
	Monitoring number of direction changes (O.\DCHG)	On		‡]	1
	Monitoring of average position value (P.\PAVG)	On		‡]	1
	Pressure monitoring	-			1
	Pressure unit (U1.PUNIT)	bar		‡]	1
	Hysteresis for limits (U2.P_HYS)	0.200	bar	1	1~
2004skzd SIPART PS2 🖌	Online access 🖌 Diagnosis Update 🖌 Identi	ty Check 🖌)

6. Select the "Maintenance & Diagnostics" directory.

- 7. For "Monitoring of upper limit temperature" (J.\TMAX), set the value to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 8. Change the values of the parameters to adapt the thresholds to the valve:
 - J1.TUNIT
 - J2.LEVL1
 - J3.LEVL2
 - J4.LEVL3
- 9. In the "Device" menu, select the command "Download to device...".

10. Recommendation: Select the check box "Load changed parameters only".

- 11. In the dialog, click the "Start" button.
 - \Rightarrow If the check box is selected, only the changed parameter values are loaded into the positioner.
- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.

5.13.4 With SIMATIC PDM: Show diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "H.\TMIN" or "J.\TMAX" is set to "On".
 - For positioners with firmware version 5.03 or higher, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "H.\TMIN" or "J.\TMAX".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SI	PART	PS2					-		<
File	Dev	vice View Diagnostics	Maintenanc	e Help	SIMATIC	PDM V9.2 SP2 Proce	ss Devic	e Manager	
	+I	Download to device	?	9					
	↑	Upload to PG/PC			Parameter	Value	Unit	Status	^
	1	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			⊡ldentification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡]	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2			-	- (⊐ ×
File Device View Dia	agnostics Maintenance H Update diagnostics	Help SIMATIC PDM	V9.2 SP2 Proces	ss Device	e Manager
SIPART PS2	Status	ameter	Value	Unit	Status /
	Trend charts Histograms KPI Valve charts Alarm logbook	Actual value Deviation Leakage (percentage of stroke) Leakage (pressure change per minute) Stiction (slipstick) Lower endstop Upper endstop Temperature Deadband Supply pressure PZ	On 3 (three-stage On On On On On Off Off Off Off On On On		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		Monitoring number of total strokes (L.\STRK) Monitoring number of direction changes (O.\DCHG) Monitoring of average position value (P.\PAVG) Pressure monitoring Pressure unit (U1.PUNIT) Hysteresis for limits (U2.P. HYS)	Off Off Off Dff bar 0,200	bar	till till till till till
z004skzd SIPART PS2 🖌	,	Online access 🖌 Diagnosis Update 🖌 Identi	ity Check 🖌		

6. In the "Diagnostics" menu, select the "Trend charts > Temperature" command.

 \Rightarrow The "Temperature" dialog is displayed.

The dialog contains tabs, each with a trend chart for the deviations determined:

- Trend over 30 minutes
- Trend over 8 hours
- Trend over 5 days
- Trend over 2 months
- Trend over 30 months

The respective trend chart is based on the maximum of 20 data from the corresponding ring memory.

The lines of "Threshold 1, 2 and 3" are also shown for the both the upper and lower limits.

Process diagnostics

5.13 Monitoring of lower limit temperature (H.\TMIN) and upper limit temperature (J.\TMAX)



Button	Description
Trend value list	Shows the 20 data for the displayed trend chart.
Restart trend	Caution: This function deletes the data stored in the po- sitioner in all 5 ring memories.
Trend help text	Explains how process diagnostics works.

7. Close the dialog.

5.13.5 Diagnostic value "Current temperature" (30.TEMP)

Diagnostic value	Current temperature					
	Short designatio	n: 30.TEMP				
Function	The diagnostic va	lue shows the current temperature in the positioner enclosure.				
Note	• The temperature sensor is located in the enclosure on the electronics board.					
	• In order to sw the display.	itch over the temperature display between °C and °F: Press the $\underline{\mathbb{A}}$ button on				
Display range	-50 100	°C				
	-58 212	°F				
Unit	• °C					
	• °F					
Communication	Communication					
Current temperature (30.TEM	MP)					
SIMATIC PDM Export	Name	ps2_temp				
	DisplayValue	≜ Value				
	Unit	≜ Unit				
HART communication (read)	Command	#169				
	Response Data	Bytes: 38 41				
		Format: Float				
Temperature unit (H1/J1.TUN	NIT)					
SIMATIC PDM Export	Name	ps2_unit_temp_code				
	DisplayValue	• °C				
		• °F				
HART communication (read)	Command	#169				
	Response Data	Byte: 37				
		Format: Enum				

5.13.6 Diagnostic values "Minimum temperature" (31.TMIN) / "Maximum temperature" (32.TMAX)

Diagnostic value	Minimum temperature					
	Short designation	n: 31.TMIN				
	Maximum tempe	rature				
	Short designation	n: 32.TMAX				
Function	The minimum tem ously determined	perature and the maximum temperature inside the enclosure are continu- and stored in the manner of a drag indicator.				
Note	• To change the temperature display between °C and °F to switch: Press the <u>A</u> button on the display.					
	The determine	d values can only be reset in the factory.				
Display range	-50 100	°C				
	-58 212	°F				
Unit	• °C					
	• °F					
Communication	l					
Minimum temperature (31.T	MIN)					
SIMATIC PDM Export	Name	ps2_tmin				
	DisplayValue	≜ Value				
HART communication (read)	Command	#169				
	Response Data	Bytes: 42 45				
		Format: Float				
Maximum temperature (32.1	MAX)					
SIMATIC PDM Export	Name	ps2_tmax				
	DisplayValue	≜ Value				
HART communication (read)	Command	#169				
	Response Data	Bytes: 46 49				
		Format: Float				
Temperature unit (H1/J1.TU	NIT)					
SIMATIC PDM Export	Name	ps2_unit_temp_code				
	DisplayValue	• °C				
		• °F				
HART communication (read)	Command	#169				
	Response Data	Byte: 37				
		Format: Enum				

5.13.7 Via HART communication: Read out diagnostic results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "H.\TMIN" or "J.\TMAX" is set to "On".
 - For positioners with firmware version 5.03 or higher, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "H.\TMIN" or "J.\TMAX".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Request

Send to the positioner via HART communication:

- Command "#173"
- Ring memory index of the process diagnostics, e.g. "30".

Send the request for each of the 5 ring memories separately.

Ring memory index	Ring memory for time span
30	Last 30 minutes
31	Last 8 hours
32	Last 5 days
33	Last 2 months
34	Last 30 months

Answer

The response consists of the following data on the requested ring memory:

- Response Data Bytes
- Command-Specific Response Code

Table 5-34 Response Data Bytes

Byte	Format	Description	
0	Enum	Ring memory index	
1	Unsigned-8	Number of valid values in the ring memor	у
2	Enum	Unit of the ring memory values in °C	
3 42	Signed-16	Values 1 20 of the ring memory (2 byte	s each)
		Scaling: 256 per °C in two's complement f	ormat
43 46	Float	Value of threshold 1 (H2.LEVL1)	For the lower limit tempera-
47 50	Float	Value of threshold 2 (H3.LEVL2)	ture
51 54	Float	Value of threshold 3 (H4.LEVL3)	

Process diagnostics

5.13 Monitoring of lower limit temperature (H.\TMIN) and upper limit temperature (J.\TMAX)

Byte	Format	Description	
55 58	Float	Value of threshold 1 (J2.LEVL1)	For the upper limit tempera-
59 62	Float	Value of threshold 2 (J3.LEVL2)	ture
63 66	Float	Value of threshold 1 (J4.LEVL3)	

Table 5-35Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

5.13.8 With SIMATIC PDM: Export diagnostics results

Requirement

- Data backup is activated. The data is saved in the positioner from the time of activation.
 - For positioners with firmware version 5.00, 5.01 or 5.02: The application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and the process diagnostics parameter "H.\TMIN" or "J.\TMAX" is set to "On".
 - For positioners with firmware version 5.03 or higher, data storage is always activated, regardless of the setting of the application parameter "52.XDIAG" and the process diagnostics parameter "H.\TMIN" or "J.\TMAX".
- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	952				-	-		<
File	Dev	ice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+I	Download to device	?						
	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	Ţ	Assign address and TAG			SIPART PS2 DR8 HART	-			
	<u>61</u> 2	Value comparison			Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		T I	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. Open the trend chart in the "Diagnostics" menu with the command "Trend charts > Temperature" → With SIMATIC PDM: Show diagnostic results (Page 386) When the trend chart opens, the current data of this process diagnostics in the positioner are read out by SIMATIC PDM.

🖊 s	SIPART PS2						_		×
File	Device	View	Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2	Process Devi	ce Manag	ger
	Save	Ctrl+S	🖌 💿 🖪	器 🖁 🤔					
₽	Export				Parameter	Value	Unit	Status	^
•	Import		HART		SIPART PS2 DR8 HART				
	Print	Ctrl+P			Identification				
	Class		 Diagnostics 		TAG	DEMOKOFF		1	
	Close				Long TAG	SIPART PS2		1	
					Descriptor	-		1	
					Message	DIAGNOSIS		1	
					Date	8/15/2023		1	
					Device				
					Manufacturer	Siemens		1	
					Device Type	SIPART PS2		1	
					Order number	-		1	
					Serial number	N1KO037518210		1	
					Final Assembly Number	0		1	
					Hardware Revision	3		1	
					Firmware revision	5.03.00-28		<u>‡</u>	
					EDD version	25.00.00			
		Setup							
			1		Dynamic variable mapp	ing		1	<u> </u>
z004s	kzd SIPAR	RT PS2 🖌			Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌			💛:

7. In the "File" menu, select the "Export..." command.

 \Rightarrow The "Export..." dialog opens.

- 8. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

	Export - SIPART PS2	?	\times	
	Export directory:			^
	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export			
	HTML transformation file:			
	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation.xsl		_	
	Which information should be exported?			
	Device parameters			
	✓ Diagnostics			
	Document Manager			
	Selection			
	SIPART PS2			
	Status:			
<			>	*
	Messages Start Stop	Close		

9. Start the export with the "Start" button.

- 10. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 11. Close the dialog.

12. Open the XML file with suitable software, e.g. editor.

Param\$SIPART PS2\$20230815_121412.xml	- Editor			_		×	
xml version="1.0" encoding="utf-8"?						1	~
Created by PDM 902.200.2901.5. Do r</td <td>ot edit this File!!:</td> <td>></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	ot edit this File!!:	>				- 1	
xml-stylesheet type='text/xsl' href='PD</td <td>M80_ExportTransformation</td> <td>1.XS1'?></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	M80_ExportTransformation	1.XS1'?>				- 1	
<pdm xmlversion="8.04"></pdm>							
<object></object>							
<device></device>							
<id>2</id>							
<pltid>0</pltid>							
<type>EDD_OBJECT_OFFLINE</type>							
<class>EDD_OCLASS_NODE_HART_MODEM<!--</td--><td>Class></td><td></td><td></td><td></td><td></td><td></td><td></td></class>	Class>						
<odjectpath>NetZe/HART Modem-NetZwe</odjectpath>	erk/NODE_10/SIPART PS2 0</td <td>DDJectPat</td> <td>in></td> <td></td> <td></td> <td></td> <td></td>	DDJectPat	in>				
<pre><onlinevalues>False</onlinevalues></pre>					C-+-1	- 4-1-	
<catalogpath>/DEVICE/HART/ACTUATOR/</catalogpath>	ELECTRO_PNEUMATIC/SIEME	IS/SIPARI	_PS2/SIPARI_PS2_HARI	_DR8 </td <td>CatalogP</td> <td>atn</td> <td></td>	CatalogP	atn	
<pre><odjectname>SIPART PS2</odjectname></pre>	•						
<section>Device</section>	Madax						
	modes						
<pre></pre>							
<pre></pre>	ag" Type-"String" Label.	"TAG" Pa	ram/jeuMember_"True	Dicol	awalue_	"DE	
<pre></pre>	e_"longTag" Type_"String	" Lahel-	"Long TAG" ParamView	Member	-"True" (Die	
<pre></pre> cattribute Name="descriptor" Browse	Name-"descriptor" Type-	string"	Label-"Descriptor" F	Param\/i	ewMember	_"T	
<pre><attribute browsenam<="" name="message" pre=""></attribute></pre>	e="message" Type="String	7" Label=	"Message" ParamView	4ember=	"True" D	isn	
<pre><attribute browsename="</pre></td><td>date" la<="" name="date" td="" type="DateTime"><td>abel="Dat</td><td>e" ParamViewMember="</td><td>'True"</td><td>Displavy</td><td>alu</td><td></td></attribute></pre>	abel="Dat	e" ParamViewMember="	'True"	Displavy	alu		
<l 8601="" are="" dates="" format<="" in="" iso="" td=""><td>>2023-08-15T00:00:00</td><td>K/Attrib</td><td>ute></td><td></td><td></td><td></td><td></td></l>	>2023-08-15T00:00:00	K/Attrib	ute>				
<attribute e<="" name="manufacturer id" td=""><td><pre>BrowseName="manufacturer</pre></td><td>id" Type</td><td>="UInt16" Label="Mar</td><td>ufactu</td><td>nen" Pan</td><td>amv `</td><td>Y</td></attribute>	<pre>BrowseName="manufacturer</pre>	id" Type	="UInt16" Label="Mar	ufactu	nen" Pan	amv `	Y
<						>	
	Zoilo 21669 Spolto 50	70%	Windows (CPLE)			4	
	Zene 51000, sparte 50	10/6	WINDOWS (CREF)	UIF-C	5 mill BOIN	/1	

The XML file contains 100 lines with the 100 exported process diagnostics data. Each of the 5 ring memories contains 20 data entries.

The data for process diagnostics is labeled with Name = "var_trend_temp...".

The 1st data line reads, for example:

<Attribute Name="var_trend_temp_30min_0" BrowseName="var_trend_temp_30min_0" Type="Int16" Label="0.0 up to -1.5 minutes"

ParamViewMember="False" **DisplayValue="0.0"** Import="True" State="32" **Unit="degC"**>0</ Attribute>

- The texts marked in bold are included and explained in the following table.
- The numerical value at "DisplayValue", e.g. "0.0", is the value that was determined with the process diagnostics in the period 0 to -1.5 minutes.
- The table shows a summary of the 100 data of the process diagnostics exported with the XML file.
| Ring memory | Amoun | Data description in the XML file | | | |
|----------------|----------------|---|--------------------------------------|-------------------|------|
| for time span | t of da-
ta | Data description in the XML file
Name
var_trend_temp_30min_0

var_trend_temp_30min_19
var_trend_temp_8h_0

var_trend_temp_8h_19
var_trend_temp_5d_0

var_trend_temp_5d_19
var_trend_temp_5d_19
var_trend_temp_2m_0

var_trend_temp_2m_0 | Label
(Time span of data determi- | DisplayVal-
ue | Unit |
| | | | nation) | e.g. | |
| Last 30 mi- | 20 | var_trend_temp_30min_0 | 0.0 up to -1.5 minutes | 0.0 | • °C |
| nutes | | | | | • °F |
| | | var_trend_temp_30min_19 | -28.5 up to -30.0 minutes | | |
| Last 8 hours | 20 | var_trend_temp_8h_0 | 0 up to -24 minutes | | |
| | | | | | |
| | | var_trend_temp_8h_19 | -456 up to -480 minutes | | |
| Last 5 days | 20 | var_trend_temp_5d_0 | 0 up to -6 hours | | |
| | | | | | |
| | | var_trend_temp_5d_19 | -114 up to -120 hours | | |
| Last 2 months | 20 | var_trend_temp_2m_0 | 0 up to -3 days | | |
| | | | | | |
| | | var_trend_temp_2m_19 | -57 up to -60 days | | |
| Last 30 months | 20 | var_trend_temp_30m_0 | 0 up to -45 days | | |
| | | | | | |
| | | var_trend_temp_30m_19 | -855 up to -900 days | |] |

5.13.9 Messages

5.13.9.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.13.9.2 Messages in the display

Monitoring of lower limit temperature (H.\TMIN)

Requirement

Process diagnostics "Monitoring lower limit temperature" (H.\TMIN) is activated.

Indication on the display

Error code "13" is output if the value falls below the set thresholds.

If several messages are present at the same time, the display switches between the different error codes.



Monitoring of upper limit temperature (J.\TMAX)

Requirement

The process diagnostics "Monitoring of upper limit temperature" (J.\TMAX) is activated.

Indication on the display

If the set thresholds are exceeded, error code "14" is output.

If several messages are present at the same time, the display switches between the different error codes.

If threshold 1 is exceeded	If threshold 2 is exceeded	If threshold 3 is exceeded:		
© 835,89 © 89,619	(2 14 FUT 35	(2 14 FUT 35		
1 bar Error code 14	 2 bars 2 Error code 14 	 3 bars Error code 14 		

5.13.9.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.

Digital I/O Module (DIO) 6DR4004-6A / -8A	Inductive Limit Switches (ILS) 6DR4004-6G / -8G	Mechanic Limit Switches (MLS) 6DR4004-6K		
$1 + 11 \\ 12 \\ 2 - 21 \\ 22 \\ 3 - + 31 \\ 32 \\ 4 - + 41 \\ 42 \\ 5 - + 51 \\ 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 5 - 52 \\ 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5$	$\begin{array}{c} 1 \\ 1 \\ \hline \\ 2 \\ \hline \\ 3 \\ \hline \\ 3 \\ \hline \\ \end{array}$	$\begin{array}{c} 1 \\ 1 \\ \hline \\ 2 \\ \hline \\ 3 \\ \hline \\ \hline \\ 3 \\ \hline \\ \hline \\ \hline \\ 5 \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline$		
 ① Digital input DI2, galvanically isolated ② Digital input DI2, dry contact ③ Fault message output ④ Digital output DO1 ⑤ Digital output DO2 	 Fault message output, has no function in combination with 6DR4004-3ES Digital output 1 Digital output 2 	 Fault message output, has no function in combination with 6DR4004-4ES Digital output 1 Digital output 2 		

l/Os

5.13.9.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Process diagnostics

5.13 Monitoring of lower limit temperature (H.\TMIN) and upper limit temperature (J.\TMAX)

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	PS2					-	- 1	□ >	×
File	Dev	vice View Diagnostics	Maintena	nce	Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
	+1	Download to device		?						
	† I	Upload to PG/PC				Parameter	Value	Unit	Status	^
<u>.</u>	Π	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison				Identification				
		Object properties				TAG	DEMOKOFF		‡ []	
		Calibration log				Long TAG	SIPART PS2		‡ []	
		Change Log				Descriptor	-		1	
	5	Set device checked				Message	DIAGNOSIS		‡ []	
	_					Date	1/29/2024		±	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🖊 s	IPART PS2	2							_		×
File	Device	e View	Dia	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2 Pro	cess Devi	ce Manag	er
	-	1 🗗 🚺	R	Update	diagnostics						
.	SIPART	FPS2		Status			ameter	Value	Unit	Status	^
		ART PS2 [DI	Trend ch	arts	•	IPART PS2 DR8 HART	l			
		Setup	or	Histogra	ms	Ĺ	Identification				
	÷	Maintenan	c	KDI		Ĺ	TAG	DEMOKOFF		1	
	‡	Communic	at	Valva ch	arte	ĺ	Long TAG	SIPART PS2		1	
				Alexee Le	arts		Descriptor	•		1	
				Alarmit	доок		Message	DIAGNOSIS		1	
							Date	8/15/2023		1	
							⊡ Device				
							Manufacturer	Siemens		‡ []	
							Device Type	SIPART PS2		1	
							Order number	-		1	
							Serial number	N1KO037518210		1	
							Final Assembly Number	0		1	
							Hardware Revision	3		1	
							Firmware revision	5.03.00-28		1	
							EDD version	25.00.00			
						Ξ	Setup				
							Dynamic variable mapp	ing			
							PV is	Setpoint		1	
							SV is	Setpoint		1	
							TV is	Setpoint		1	
							QV is	Setpoint		1	
							 Basic settings 				
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator sp	i	1	~
z004s	kzd SIPA	ART PS2 🕨					Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌			<mark>0</mark> :

6. In the "Diagnostics" menu, select the "Status" command.

- 7. Select the "Status" tab.
 - When a threshold is exceeded, the message "Permitted device temperature exceeded (limit x)" is highlighted.
 - If the value falls below the threshold, the message "Permitted device temperature undershot (limit x)" is highlighted.

SIPART PS2 - Status	? ×
Diagnostics Status Messages	^
SIEMENS	GOOD 🗾 -
Device diagnostics 1: Dynamic control valve behavior (limit 1). Dynamic control valve behavior (limit 2). Dynamic control valve behavior (limit 3). Pneumatic leakage (limit 1). Pneumatic leakage (limit 2).	imit warnings: Limit for number of changes in direction exceede Limit for deviation of lower endstop exceede Limit for deviation of the upper endstop exceede Limit deadband adaptation exceeded
Limit for upper endstop monitoring exceeded (limit 1). Limit for upper endstop monitoring exceeded (limit 2). Limit for upper endstop monitoring exceeded (limit 3). Limit for stroke integral (100% strokes) exceeded (limit *	diagnostics 2: PST reference stroke time exceeded (limit 1). PST reference stroke time exceeded (limit 2). PST reference stroke time exceeded (limit 3). PST with pressure sensors failed 0x0
Limit for direction changes exceeded (limit 3). Limit for position average exceeded (limit 1). Limit for position average exceeded (limit 2). Limit for position average exceeded (limit 3).	diagnostics 3: Permitted device temperature exceeded (limit 2). Permitted device temperature exceeded (limit 3). Permitted device temperature undershot (limit 1). Permitted device temperature undershot (limit 2). Permitted device temperature undershot (limit 2).
<	>
Transfer Messages Print	Close

8. Close the dialog.

5.13.9.5 Via HART communication: Get messages

Requirement

- When monitoring the lower limit temperature (H.\TMIN): The process diagnostics is activated with "On".
- With monitoring the upper limit temperature (J.\TMAX): The process diagnostics is activated with "On".
- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52...

Get message

If the value is above or below the threshold of the process diagnostics, the "more status available" bit is set.

• Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data.

Lower temperature limit monitoring (H.\TMIN)

The messages for falling below the thresholds are contained in the following bytes:

- Byte 18, bit 4 corresponds to violation of lower threshold 1.
- Byte 18, bit 3 corresponds to violation of lower threshold 2.
- Byte 18, bit 2 corresponds to violation of lower threshold 3.

Monitoring the upper limit temperature (J.\TMAX)

The messages when the thresholds are exceeded are contained in the following bytes:

- Byte 18, bit 7 corresponds to threshold 1 exceeded.
- Byte 18, bit 6 corresponds to threshold 2 exceeded.
- Byte 18, bit 5 corresponds to threshold 3 exceeded.

5.13.9.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the upper of lower thresholds are no longer violated during process diagnostics, the message on the display disappears, e.g. after successful maintenance or when the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.14 Monitoring the number of total strokes (L.\STRK)

5.14.1 Functional description

The process diagnostics continuously monitor the total number of strokes performed by the valve.

A total stroke is defined as the distance between the position 0% to 100% and back from 100% to 0%.

Partial strokes are totaled in the counter. The total 200% movement is counted as 1 stroke in the diagnostic value.

The current value is displayed in the diagnostic value "100% strokes" (1.STRKS).

The data can be read and processed using HART commands.

Process diagnostics can be monitored with adjustable thresholds. If these thresholds are violated, messages are output via the display and optionally via the digital contacts or the HART communication.

5.14.2 Activate and configure diagnostics

Requirement

The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics "Monitoring of number of total strokes" (L.\STRK)

Function	The process diagnostics continuously monitor the total number of strokes performed by the valve.		
Note	The current value is displayed in the diagnostic value "100% strokes" (1.STRKS).		
Setting options	Off	Process diagnostics are deactivated.	
	On	Process diagnostics is activated.	
Factory setting	Off		

Process diagnostics parameters

If the process diagnostics are activated with "On", the following parameters can be seen.

L1.LIMIT	Limit for number of strokes
Function	The parameter defines the basic limit for the number of total strokes.
Setting range	1 1.00E8
Factory setting	1.00E6

L2.FACT1	Factor 1			
Function	This factor multipl	This factor multiplied by the value of "L1.LIMIT" results in threshold 1 of the process diagnostics Γ		
Setting range	0.1 40.0	Condition: L2.FACT1 < L3.FACT2 < L4.FACT3		
Factory setting	1.0			

L3.FACT2	Factor 2			
Function	This factor multipl	This factor multiplied by the value of "L1.LIMIT" results in threshold 2 of the process diagnostic		
Setting range	0.1 40.0	Condition: L2.FACT1 < L3.FACT2 < L4.FACT3		
Factory setting	2.0			

L4.FACT3	Factor 3			
Function	This factor multiplied by the value of "L1.LIMIT" results in threshold 3 of the process diagnostics			
Setting range	0.1 40.0	Condition: L2.FACT1 < L3.FACT2 < L4.FACT3		
Factory setting	5.0			

Activate and configure "Monitoring of number of total strokes"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "L.\STRK" of the process diagnostics "Monitoring of number of total strokes".
- 3. Set the "L.\STRK" parameter to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the thresholds to the valve, change the parameter values:
 - L1.LIMIT
 - L2.FACT1
 - L3.FACT2
 - L4.FACT3

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenar	nce Help	SIMAT	IC PDM V9.2 SP2 Proce	ss Devic	e Manager	
	+I	Download to device		?					
	† <u>∎</u>	Upload to PG/PC			Parameter	Value	Unit	Status	^
ė.	Ţ	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			Identification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor			1	
	1	Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2		-	- (] ;	×
ile Device View Diagnostics Maintenance	Help SIMATIC PDM V	9.2 SP2 Proces	ss Device	e Manager	
📕 🕂 🕂 🕸 📝 🖌 🛞 💽 🛗 👫 ?					
SIPART PS2	Parameter	Value	Unit	Status	^
SIPART PS2 DR8 HART	Maintenance & Diagnostics				
	Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage		1	
Haintenance & Diagnostics	Pressure monitoring (U.\PRES)	On		1	
	Partial Stroke Test (A.\PST)	On		1	
	Monitoring of dynamic control valve behavior (b.\DEVI)	On		1	
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	On		1	
	Monitoring stiction (slipstick effect) (d.\STIC)	On		1	
	Deadband monitoring (E.\DEBA)	Off		1	
	Monitoring of lower endstop (F.\ZERO)	Off		1	
	Monitoring of upper endstop (G.\OPEN)	Off		1	
	Monitoring of lower limit temperature (H.\TMIN)	Off		1	
	Monitoring of upper limit temperature (J.\TMAX)	Off		1	
	Monitoring number of total strokes (L.\STRK)	Off 🗸		1	
	Monitoring number of direction changes (O.\DCHG)	Off		1	
	Monitoring of average position value (P.\PAVG)	On	1	1	
	Pressure monitoring				
	Pressure unit (U1.PUNIT)	bar		1	
	Hysteresis for limits (U2.P_HYS)	0.200	bar	1	~

6. Select the "Maintenance & Diagnostics" directory.

- 7. For "Monitoring number of total strokes" (L.\STRK), set the value to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 8. To adapt the thresholds to the valve, change the parameter values:
 - L1.LIMIT
 - L2.FACT1
 - L3.FACT2
 - L4.FACT3
- 9. In the "Device" menu, select the command "Download to device...".

10. Recommendation: Select the check box "Load changed parameters only".

- 11. In the dialog, click the "Start" button.
 - \Rightarrow If the check box is selected, only the changed parameter values are loaded into the positioner.
- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.

5.14.3 Diagnostic value "100% stroke" (1.STRKS)

Diagnostic value	100% strokes	100% strokes					
	Short designatio	Short designation: 1.STRKS					
Function	The counter adds	up the movements of the actuator and shows the number of total strokes.					
	A total stroke is de to 0%.	A total stroke is defined as the distance between the position 0% to 100% and back from 100% to 0%.					
	Partial strokes are the diagnostic val	totaled in the counter. The total 200% movement is counted as 1 stroke in ue.					
Note	The diagnostic va	The diagnostic value can be reset.					
Display range	0 4.29E9						
Communication							
SIMATIC PDM Export	Name	ps2_lift_int					
	DisplayValue	≜ Value					
HART communication (read)	Command	#169					
	Response Data	Bytes: 16 19					
		Format: Unsigned-32					

5.14.4 With SIMATIC PDM: Export diagnostics results

Requirement

- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SI	PART	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+I	Download to device	?						
	t]	Upload to PG/PC			Parameter	Value	Unit	Status	^
	Ţ.	Assign address and TAG			SIPART PS2 DR8 HART	•			
	<u>61</u> 2	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
	Set device checked			Message	DIAGNOSIS		1		
					Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. In the "File" menu, select the "Export..." command.

2 9	SIPART PS2						_		×
File	Device	View	Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2 Proc	ess Devic	e Manage	er
	Save	Ctrl+S	🖌 i 🕥 🖪	碧 船?					
₽	Export				Parameter	Value	Unit	Status	^
•	Import		HART		SIPART PS2 DR8 HART				
	Print	Ctrl+P	_		Identification				
—	Class		 Diagnostics 		TAG	DEMOKOFF		1	
	Close				Long TAG	SIPART PS2		1	
					Descriptor	-		1	
					Message	DIAGNOSIS		1	
					Date	8/15/2023		1	
					⊡ Device				
					Manufacturer	Siemens		1	
					Device Type	SIPART PS2		1	
					Order number	-		1	
					Serial number	N1KO037518210		1	
					Final Assembly Number	0		1	
					Hardware Revision	3		1	
					Firmware revision	5.03.00-28		1	
					EDD version	25.00.00			
					⊡ Setup				
			1		Dynamic variable mapp	ing			×
z004s	kzd SIPA	RT PS2 🖌			Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 📃			O

 \Rightarrow The "Export - ..." dialog opens.

- 7. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

	Export - SIPART PS2	?	×
E	Export directory:		_
C	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export		-
ł	ITML transformation file:		
C	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation.xsl		
-1	Which information should be exported?		
5	Device parameters		
5	Diagnostics		
5	Document Manager		
\$	Selection		
(Object		
\$	Status:		_
			~
< []			>
	Messages Start Stop	Close	

8. Start the export with the "Start" button.

- 9. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"

10. Close the dialog.

11. Open the XML file with suitable software, e.g. an editor.



The data for process diagnostics is labeled with Name = "ps2_lift_int". Exemplary data line: <Attribute Name="**ps2_lift_int**" BrowseName="ps2_lift_int" Type="UInt32" Label="100% strokes (1.STRKS)" ParamViewMember="True" **DisplayValue="78"** Import="True" State="16" Unit="">78</Attribute> ⇒ The numerical value at "DisplayValue", e.g. "78", is the number of total strokes completed.

5.14.5 Messages

5.14.5.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.14.5.2 Messages in the display

Indication on the display

If the set thresholds are exceeded, error code "4" is output.

If several messages are present at the same time, the display switches between the different error codes.

If threshold 1 is exceeded	If threshold 2 is exceeded	If threshold 3 is exceeded:		
©-59 FUT 35	2-54 FUT 3:	2-54 FUT 3:		
1 bar 2 Error code 4	 2 bars Error code 4 	 3 bars Error code 4 		

5.14.5.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.



5.14.5.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

I/Os

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SIF	ART	952					-	-		<
File	Dev	rice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
	+I	Download to device		?						
	t[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
<u> </u>	Ţ	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison				Identification				
		Object properties				TAG	DEMOKOFF		‡ []	
		Calibration log				Long TAG	SIPART PS2		‡ []	
		Change Log				Descriptor	-		1	
	Set device checked			Message	DIAGNOSIS		1			
						Data	1/29/2024		† 1	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

⊿ SIP	ART PS2								-	-		Х
File	Device	View	Diag	postics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proces	ss Device	e Manage	er
	+ +	<u>a</u> 🖻	R	Update o	diagnostics							
B-11	SIPART PS	2		Status			ameter	Value		Unit	Status	^
÷	🖉 SIPART	F PS2 DI		Trend ch	arte		IPART PS2 DR8 HART		_		-	
	iter iteriter	ntification		Listoara	10113	ĺ	Identification					
	🗄 🥠 Mai	aintenanc					TAG	DEMOKOFF			1	
	Con	nmunicat		KPI	- 4-	Ţ	Long TAG	SIPART PS2			1	_
				valve ch	arts	•	Descriptor	-			1	_
				Alarm Io	дроок	_	Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							⊡ Device					
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			1	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			1	
							EDD version	25.00.00				
						E	Setup					
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							 Basic settings 					
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuato	or spi		1	Y
z004skz	d SIPART	PS2 🖌					🛛 Online access 🖌 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌				<mark>)</mark>

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Status" tab.

When a threshold is exceeded, the message "Limit for stroke integral (100% strokes) exceeded (limit x)" is highlighted.

SIPART PS2 - Status			
Diagnostics Status Messages			
SIEMENS			GOOD 🗸
Device diagnostics 1: Dynamic control valve behavior (limit 1). Dynamic control valve behavior (limit 2). Dynamic control valve behavior (limit 3). Pneumatic leakage (limit 1). Pneumatic leakage (limit 2).	^ ‡	Limit warnings:	Limit for stroke integral exceeded Limit for number of changes in direction exceed Limit for deviation of lower endstop exceeded Limit for deviation of the upper endstop exceed Limit deadband adaptation exceeded
Limit for lower endstop monitoring exceeded (limit 3). Limit for upper endstop monitoring exceeded (limit 1). Limit for upper endstop monitoring exceeded (limit 2). Limit for upper endstop monitoring exceeded (limit 3). Limit for stroke integral (100% strokes) exceeded (limit 1).	^ 1	Device diagnostics 2:	PST reference stroke time exceeded (limit 1). PST reference stroke time exceeded (limit 2). PST reference stroke time exceeded (limit 3). PST with pressure sensors failed
Limit for stroke integral (100% strokes) exceeded (limit 2) Limit for stroke integral (100% strokes) exceeded (limit 3) Limit for direction changes exceeded (limit 1). Limit for direction changes exceeded (limit 2). Limit for direction changes exceeded (limit 3).). ^ 1	Device diagnostics 3:	Permitted device temperature exceeded (limit 1 Permitted device temperature exceeded (limit 2 Permitted device temperature exceeded (limit 3 Permitted device temperature undershot (limit 1 Permitted device temperature undershot (limit 2
Transfer Messages Print			

8. Close the dialog.

5.14.5.5 Via HART communication: Get messages

Requirement

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Get message

If a process diagnostics threshold is violated, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. When the thresholds for the "L.\STRK" process diagnostics are exceeded, the messages are contained in the following bytes:
 - Byte 15, bit 0 corresponds to threshold 1 exceeded.
 - Byte 16, bit 7 corresponds to threshold 2 exceeded.
 - Byte 16, bit 6 corresponds to threshold 3 exceeded.

5.14.5.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.15 Monitoring the number of changes in direction (O.\DCHG)

5.15.1 Functional description

The process diagnostics continuously monitor the number of changes in direction with a movement greater than 0.25%.

The current value is displayed in the diagnostic value "Number of changes in direction" (2.CHDIR).

The data can be read and processed using HART commands.

Process diagnostics can be monitored with adjustable thresholds. If these thresholds are violated, messages are output via the display and optionally via the digital contacts or the HART communication.

5.15.2 Activate and configure diagnostics

Requirement

The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics of "Monitoring of number of changes in direction" (O.\DCHG)

Function	The process diagn movement greate	The process diagnostics continuously monitor the number of changes in direction with a movement greater than 0.25%.				
Note	The current value (2.CHDIR).	The current value is displayed in the diagnostic value "Number of changes in direction" (2.CHDIR).				
Setting options	Off	Process diagnostics are deactivated.				
	On	Process diagnostics is activated.				
Factory setting	Off					

Process diagnostics parameters

If the process diagnostics are activated with "On", the following parameters can be seen.

O1.LIMIT	Limit of direction change
Function	The parameter defines the basic limit for the number of changes in direction.
Setting range	1 1.00E8
Factory setting	1.00E6

O2.FACT1	Factor 1	actor 1					
Function	This factor multiplied by the value of "O1.LIMIT" results in threshold 1 of the proce tics.						
Setting range	0.1 40.0	Condition: O2.FACT1 < O3.FACT2 < O4.FACT3					
Factory setting	1.0						

O3.FACT2	Factor 2				
Function	This factor multip tics.	lied by the value of "O1.LIMIT" results in threshold 2 of the process diagnos-			
Setting range	0.1 40.0	40.0 Condition: 02.FACT1 < 03.FACT2 < 04.FACT3			
Factory setting	2.0				

O4.FACT3	Factor 3				
Function	This factor multipl tics.	lied by the value of "O1.LIMIT" results in threshold 3 of the process diagnos-			
Setting range	0.1 40.0	Condition: O2.FACT1 < O3.FACT2 < O4.FACT3			
Factory setting	5.0				

Activate and configure "Monitoring of number of changes in direction"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "O.\DCHG" of the "Monitoring number of changes in direction" process diagnostics.
- 3. Set the "O.\DCHG" parameter to "On". ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the thresholds to the valve, change the parameter values:
 - O1.LIMIT
 - 02.FACT1
 - 03.FACT2
 - 04.FACT3

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	🔁 SIF	PART F	PS2				-	-		<
	File	Dev	rice View Diagnostics Mai	intenance	Help	SIMATIC PDN	V9.2 SP2 Proce	ss Devic	e Manager	
		+I	Download to device	?						
ľ		† ∏	Upload to PG/PC			Parameter	Value	Unit	Status	^
	÷.	Ţ	Assign address and TAG			I SIPART PS2 DR8 HART				
		<u>6</u>]2	Value comparison			⊡ Identification				
			Object properties			TAG	DEMOKOFF		1	
			Calibration log			Long TAG	SIPART PS2		1	
			Change Log			Descriptor			1	
			Set device checked			Message	DIAGNOSIS		1	
						Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2		-	- [<
File Device View Diagnostics Maintenance	e Help SIMATIC PDM V	/9.2 SP2 Proce	ss Device	Manager	
SIPART PS2	Parameter	Value	Unit	Status	^
ildentification il‡] Setup	Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage		‡ []	
Maintenance & Diagnostics	Pressure monitoring (U.\PRES) Partial Stroke Test (A.\PST)	On On		‡ <u>□</u> ‡□	
	Monitoring of dynamic control valve behavior (b.\DEVI) Monitoring/compensation of pneumatic leakage (C.\LEAK)	On On		10 10	
	Monitoring stiction (slipstick effect) (d.\STIC) Deadband monitoring (E.\DEBA)	On Off		1 1	-
	Monitoring of lower endstop (F.\ZERO)	Off		10 +	-
	Monitoring of lower limit temperature (H.\TMIN)	Off		+= ‡[]	
	Monitoring of upper limit temperature (J.\TMAX) Monitoring number of total strokes (L.\STRK)	Off Off		‡∐ 	
	Monitoring number of direction changes (0.\DCHG) Monitoring of average position value (P.\PAVG)	Off ~		10 10	-
	Pressure monitoring Pressure unit (U1.PUNIT)	bar		t	
z004skzd SIPART PS2 🖌	Hysteresis for limits (U2.P_HYS)	0.200	bar	‡]	· ·

6. Select the "Maintenance & Diagnostics" directory.

- 7. For "Monitoring number of direction changes" (O.\DCHG), set the value to "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 8. To adapt the thresholds to the valve, change the parameter values:
 - O1.LIMIT
 - 02.FACT1
 - 03.FACT2
 - 04.FACT3
- 9. In the "Device" menu, select the command "Download to device...".

10. Recommendation: Select the check box "Load changed parameters only".

11. In the dialog, click the "Start" button.

 \Rightarrow If the check box is selected, only the changed parameter values are loaded into the positioner.

- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.

5.15.3 Diagnostic value "Direction change" (2.CHDIR)

Diagnostic value	Direction change	25			
	Short designatio	n: 2.CHDIR			
Function	During operation, greater than 0.25	During operation, the counter records and totals every change of direction with a movement greater than 0.25%.			
Note	The diagnostic va	lue can be reset.			
Display range	0 4.29E9				
Communication					
SIMATIC PDM Export	Name	ps2_number_dirchange			
	DisplayValue	≜ Value			
HART communication (read)	Command	#169			
	Response Data	Bytes: 12 15			
		Format: Unsigned-32			

5.15.4 With SIMATIC PDM: Export diagnostics results

Requirement

- The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	🔼 SIF	PART	PS2				-	-		<
	File	Dev	vice View Diagnostics	Maintenand	e Help	SIMATIC PDN	V9.2 SP2 Proce	ss Devic	e Manager	
		+I	Download to device	(2)					
		t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
	Ē.	Ţ	Assign address and TAG			SIPART PS2 DR8 HART			·	
		<u>61</u> 2	Value comparison			Identification				
			Object properties			TAG	DEMOKOFF		‡ []	
			Calibration log			Long TAG	SIPART PS2		‡ []	
			Change Log			Descriptor			‡]	
			Set device checked			Message	DIAGNOSIS		1	
I						Data	1/20/2024		+	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

5. Close the dialog.

6.	In the "File"	menu, select the	"Export"	command.
----	---------------	------------------	----------	----------

🖊 s	IPART PS2	!					_		×
File	Device	e View	Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2 Proc	ess Devic	e Manager	r
	Save	Ctrl+S	🖌 🕥 🖪	器 絡 ?					
₽	Export				Parameter	Value	Unit	Status	^
•	Import		HART		SIPART PS2 DR8 HART				
	Print	Ctrl+P	_		Identification				
	Class		 Diagnostics 		TAG	DEMOKOFF		1	
	Close				Long TAG	SIPART PS2		1	
					Descriptor	-		1	
					Message	DIAGNOSIS		1	
					Date	8/15/2023		1	
					⊡ Device				
					Manufacturer	Siemens		1	
					Device Type	SIPART PS2		1	
					Order number	-		1	
					Serial number	N1KO037518210		1	
					Final Assembly Number	0		1	
					Hardware Revision	3		1	
					Firmware revision	5.03.00-28		1	
					EDD version	25.00.00			
					⊡ Setup				
L			1		 Dynamic variable mapp 	ing			14
z004s	kzd SIPA	RT PS2 🖌			Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 📃)

 \Rightarrow The "Export - ..." dialog opens.

- 7. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

Export - SIPART PS2	?	\times
Export directory:		^
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export		
HTML transformation file:		
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation.xsl		
Which information should be exported?		
Device parameters		
Diagnostics		
Document Manager		
Selection		
Object		
		_
SIPART PS2		
Status:		_
<		>
Messages Start Stop	Close	

8. Start the export with the "Start" button.

- 9. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 10. Close the dialog.

11. Open the XML file with suitable software, e.g. an editor.

Param\$SIPART PS2\$20230815_121412.xml -	Editor			-		×	
<pre><?xml version="1.0" encoding="utf-8"?></pre>							^
Created by PDM 902.200.2901.5. Do no</td <th>ot edit this File!!</th> <td>></td> <td></td> <td></td> <td></td> <td></td> <td></td>	ot edit this File!!	>					
xml-stylesheet type='text/xsl' href='PD</td <th>M80_ExportTransformatio</th> <td>n.xs1.3></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	M80_ExportTransformatio	n.xs1.3>				- 1	
<pdm xmlversion="8.04"></pdm>							
(ODJECT)							
<p1+td>82/P1+Td></p1+td>							
<tvde>EDD_OBJECT_OFFLINE</tvde>							
<pre><class>EDD_OCLASS_NODE_HART_MODEMc/(</class></pre>	Class						
<objectpath>Netze/HART_Modem-Netzwei</objectpath>	rk/NODE 10/SIPART PS2 </th <td>ObjectPat</td> <td>h></td> <td></td> <td></td> <td></td> <td></td>	ObjectPat	h>				
<onlinevalues>False</onlinevalues>	_						
<catalogpath>/DEVICE/HART/ACTUATOR/</catalogpath>	ELECTRO_PNEUMATIC/SIEME	NS/SIPART	_PS2/SIPART_PS2_HAR	T_DR8 </td <td>CatalogP</td> <td>ath</td> <td></td>	CatalogP	ath	
<objectname>SIPART PS2</objectname>	_			_	_		
<section>DEVICE</section>							
<commandmode>ExportOffline<th>Mode></th><td></td><td></td><td></td><td></td><td></td><td></td></commandmode>	Mode>						
<deviceparameters></deviceparameters>							
<pre><attribute <attribute="" attribute="" browsename="da</td><th>ag" label<br="" name="manufacturer id" type="String">e="longTag" Type="Strin Name="descriptor" Type e="message" Type="Strin date" Type="DateTime" L !>2023-08-15T00:00:0 rowseName="manufacturer<td>="TAG" Pa g" Label= "String" g" Label= abel="Dat 0id" Tvpe</td><td>ramViewMember="True "Long TAG" ParamVie Label="Descriptor" "Message" ParamView e" ParamViewMember= ute> ="UInt16" Label="Ma</td><td>" Displ wMember ParamVi Member= "True" nufactu</td><td>ayValue= ="True" ewMember "True" D DisplayV rer" Par</td><td>"DE Dis ="T isp alu amV</td><td>~</td></attribute></pre>	="TAG" Pa g" Label= "String" g" Label= abel="Dat 0id" Tvpe	ramViewMember="True "Long TAG" ParamVie Label="Descriptor" "Message" ParamView e" ParamViewMember= ute> ="UInt16" Label="Ma	" Displ wMember ParamVi Member= "True" nufactu	ayValue= ="True" ewMember "True" D DisplayV rer" Par	"DE Dis ="T isp alu amV	~	
<						2	
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-8	3 mit BON	N	

The data for process diagnostics is labeled with Name = "ps2_number_dirchange". Exemplary data line:

<Attribute Name="**ps2_number_dirchange**" BrowseName="ps2_number_dirchange" Type="UInt32" Label="Direction changes (2.CHDIR)"

ParamViewMember="True" **DisplayValue="337"** Import="True" State="16" Unit="">337</ Attribute>

 \Rightarrow The numerical value at "DisplayValue", e.g. "337", is the number of changes in direction with a movement greater than 0.25%.

5.15.5 Messages

5.15.5.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.15.5.2 Messages in the display

Indication on the display

If the set thresholds are exceeded, error code "5" is output.

If several messages are present at the same time, the display switches between the different error codes.

If threshold 1 is exceeded	If threshold 2 is exceeded	If threshold 3 is exceeded:		
1 835,19 2-45 AUT 35	2-5-11 1 1 1 1 1 1 1 1 1 1 1 1	1 2-5-715		
① 1 bar ② Error code 5	 2 bars Error code 5 	 3 bars Error code 5 		

5.15.5.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.



I/Os

5.15.5.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Device" menu of SIMATIC PDM, select the command "Upload to PG/PC...".

🖊 SI	PART F	PS2				-	-		<
File	Dev	vice View Diagnostics	Maintenance	e Help	SIMATIC PDM	V9.2 SP2 Proces	s Devic	e Manager	
	+I	Download to device	?						
	† <u>I</u>	Upload to PG/PC			Parameter	Value	Unit	Status	^
Ė	Ţ	Assign address and TAG			⊡ SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison			⊡ldentification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
	_				Data	1/29/2024		1	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
5.15 Monitoring the number of changes in direction (O.\DCHG)

🖊 s	IPART PS2	2							_		×		
File	Device	e View	Dia	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2 Pro	cess Devi	ce Manag	er		
	-	1 🗗 🚺	R	Update	diagnostics								
	SIPART	FPS2		Status			ameter	Value	Unit	Status	^		
		ART PS2 [DI	Trend ch	arts	•	IPART PS2 DR8 HART	l					
		Setup	or	Histogra	ms	Ĺ	Identification						
	÷	Maintenan	c	KDI		Ĺ	TAG	DEMOKOFF		1			
	‡	Communic	at	Valva ch	arte	ĺ	Long TAG	SIPART PS2		1			
				Alexee Le	arts		Descriptor	•		1			
				Alarmit	доок		Message	DIAGNOSIS		1			
							Date	8/15/2023		1			
							⊡ Device						
							Manufacturer	Siemens		‡ []			
							Device Type	SIPART PS2		1			
							Order number	-		1			
							Serial number	N1KO037518210		1			
							Final Assembly Number	0		1			
							Hardware Revision	3		1			
							Firmware revision	5.03.00-28		1			
							EDD version						
						Ξ	Setup						
							Dynamic variable mapp	ing					
							PV is	Setpoint		1			
							SV is	Setpoint		1			
							TV is	Setpoint		1			
							QV is	Setpoint		1			
							⊟ Basic settings						
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator sp	i	1	~		
z004s	kzd SIPA	ART PS2 🕨					Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌			<mark>0</mark> :		

6. In the "Diagnostics" menu, select the "Status" command.

5.15 Monitoring the number of changes in direction (O.\DCHG)

7. Select the "Status" tab.

When a threshold is exceeded, the message "Limit for direction changes exceeded (limit x)" is highlighted.

SIPART PS2 - State	us				?	×	
Diagnostics Status	Messages					^	
SIEMENS					GOOD 🗸] {	
Device diagnostics 1:	Dynamic control valve behavior (limit 1). Dynamic control valve behavior (limit 2). Dynamic control valve behavior (limit 3). Pneumatic leakage (limit 1). Pneumatic leakage (limit 2).	< ·	1	Limit warnings:	Limit for stroke integral exceeded Limit for number of changes in direction exceeded Limit for deviation of lower endstop exceeded Limit for deviation of the upper endstop exceeded Limit deadband adaptation exceeded	eede d eede	
	Stiction (slipstick) (limit 3). Limit for lower endstop monitoring exceeded (limit 1). Limit for lower endstop monitoring exceeded (limit 2). Limit for lower endstop monitoring exceeded (limit 3). Limit for upper endstop monitoring exceeded (limit 1).	*	1	Device diagnostics 2:	PST reference stroke time exceeded (limit 1 PST reference stroke time exceeded (limit 2 PST reference stroke time exceeded (limit 3 PST with pressure sensors failed).).).	
(Limit for stroke integral (100%, strokes) exceeded (limit 2 Limit for stroke integral (100%, strokes) exceeded (limit 3 Limit for direction changes exceeded (limit 1). Limit for direction changes exceeded (limit 2). Limit for direction changes exceeded (limit 3).	^ ~	‡II	Device diagnostics 3:	Permitted device temperature exceeded (im Permitted device temperature exceeded (im Permitted device temperature exceeded (im Permitted device temperature undershot (im Permitted device temperature undershot (im	it 1). it 2). it 3). it 1). it 2).	
< Transfer	Messages Print				Close	`	

8. Close the dialog.

5.15.5.5 Via HART communication: Get messages

Requirement

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Get message

If a process diagnostics threshold is violated, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. When the thresholds for the "O.\DCHG" process diagnostics are exceeded, the messages are contained in the following bytes:
 - Byte 16, bit 5 corresponds to threshold 1 exceeded.
 - Byte 16, bit 4 corresponds to threshold 2 exceeded.
 - Byte 16, bit 3 corresponds to threshold 3 exceeded.

5.15.5.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.16 Monitoring the position average value (P.\PAVG)

5.16.1 Functional description

Process diagnostics monitors the pipes for blockages or leaks during a continuous process.

For this, the positioner forms a reference average value for the valve position over an adjustable period of time.

During diagnostics, the current average position value of the valve is compared with the reference average value.

The current average position value is displayed in the "Average position value" diagnostic value (20.PAVG).

Process diagnostics can be monitored with adjustable thresholds. If these thresholds are violated, messages are output via the display and optionally via the digital contacts or the HART communication.

5.16.2 Activate and configure diagnostics

Requirement

The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

Process diagnostics "Monitoring of average position value" (P.\PAVG)

Function	Process diagnostics monitors the pipes for blockages or leaks during a continuous process.				
Note	The current average position value is displayed in the "Average position value" diagnostic value (20.PAVG).				
Setting options	Off	Process diagnostics are deactivated.			
	On	Process diagnostics is activated.			
Factory setting	Off				

Process diagnostics parameters

If process diagnostics is activated with "On", the following process diagnostics parameters are visible.

P1.TBASE	Time basis for average value generation					
Function	The parameter defines the time base for the time intervals for calculating the reference average value and the current average position value of the process valve.					
Note	The reference ave	rage value is calculated in the 1st time base.				
	In the following tin with the reference	me intervals, the current average position value is calculated and compared e average value.				
Setting options	0,5 h	30 minutes				
	8 h	8 hours				
	5 d	5 days				
	60 d	60 days				
	2,5 y	2.5 years				
Factory setting	0,5 h					

P2.STATE	Reference average value				
Function	The parameter sho	ows the status or the value of the determined reference average value.			
Note	With local operation, this parameter can be used to start the determination of the reference average value and the position average value.				
Display options	IdLE	The reference average value has not yet been established.			
	Strt	The creation of the reference average value was started.			
	rEF	The reference average value is currently being established.			
	###,#	Calculated reference average value in percent			
Factory setting	IdLE				

Note

Current average position value

The current average position value is displayed in the "Average position value" diagnostic value (20.PAVG).

If an average position value has not yet been determined, the value "COMP" is displayed.

P3.LEVL1	Threshold 1					
Function	The parameter defines threshold 1 for the maximum percentage deviation of the current position average value from the reference average value.					
Setting range	0.1 100.0 Condition: P3.LEVL1 < P4.LEVL2 < P5.LEVL3					
Factory setting	2.0					
Unit	%					

P4.LEVL2	Threshold 2				
Function	The parameter defines threshold 2 for the maximum percentage deviation of the current po- sition average value from the reference average value.				
Setting range	0.1 100.0 Condition: P3.LEVL1 < P4.LEVL2 < P5.LEVL3				
Factory setting	5.0				
Unit %					

P5.LEVL3	Threshold 3					
Function	The parameter defines threshold 3 for the maximum percentage deviation of the current po- sition average value from the reference average value.					
Setting range	0.1 100.0 Condition: P3.LEVL1 < P4.LEVL2 < P5.LEVL3					
Factory setting	10.0					
Unit %						

Activate and configure "Monitoring of average value of position"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "P.\PAVG" of the process diagnostics "Monitoring of average position value".
- 3. Set the "" parameter to "On".
 - \Rightarrow Process diagnostics is activated and the associated parameters are displayed.

- 4. To adapt the thresholds to the valve, change the parameter values:
 - P1.TBASE
 - P3.LEVL1
 - P4.LEVL2
 - P5.LEVL3
- Select the "P2.STATE" parameter. This parameter starts the calculation of the average position value. If an average reference value has never been determined, the parameter is set to "IdLE".
- 6. Press the \bigwedge button for at least 5 seconds.
 - \Rightarrow The indicator in the display changes from "IDLE" to "rEF".

 \Rightarrow The reference average value is determined in the time base set in the "P1.TBASE" parameter.

 \Rightarrow When the 1st time interval has elapsed, e.g. "0.5h", the determined reference average value is shown on the display, e.g. "50.2".

 \Rightarrow Once the 2nd time interval has elapsed, the current average position value is shown in the diagnostic value "Average position value" (20.PAVG).

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

L	SIP	ART	PS2						-	[<
	File	Dev	vice View Diagnostics	Maintenanc	e Help		SIMATIC PDM	V9.2 SP2	Process	Device	e Manager	
6		+	Download to device	?								
6		t[]	Upload to PG/PC			Parameter	N	Value	l	Jnit	Status	^
	<u> </u>	Π	Assign address and TAG			SIPART PS2 DR8 HA	ART					
		<u>6</u> 10	Value comparison			Identification						
			Object properties			TAG	[DEMOKOFF			‡]	
			Calibration log			Long TAG	5	SIPART PS2			‡]	
			Change Log			Descriptor	-				‡]	
			Set device checked			Message	[DIAGNOSIS			‡]	
		_				Data		1/20/2024			+ 1	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

SIPART PS2		-	-		×
File Device View Diagnostics Maintenance	Help SIMATIC PDM V	/9.2 SP2 Proces	ss Devic	e Manager	
SIPART PS2	Parameter	Value	Unit	Status	^
i⊟ 🖉 SIPART PS2 DR8 HART	Maintenance & Diagnostics	·			1
	Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage		1	
😥 🖉 Maintenance & Diagnostics	Pressure monitoring (U.\PRES)	Off		1	
	Partial Stroke Test (A.\PST)	Off		1	1
	Monitoring of dynamic control valve behavior (b.\DEVI)	Off		1	
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	Off		1	
	Monitoring stiction (slipstick effect) (d.\STIC)	Off		1	
	Deadband monitoring (E.\DEBA)	Off		1	
	Monitoring of lower endstop (F.\ZERO)	Off		1	
	Monitoring of upper endstop (G.\OPEN)	Off		1	
	Monitoring of lower limit temperature (H.\TMIN)	Off		1	
	Monitoring of upper limit temperature (J.\TMAX)	Off		1	
	Monitoring number of total strokes (L.\STRK)	Off		1	
	Monitoring number of direction changes (O.\DCHG)	Off		1	1
	Monitoring of average position value (P.\PAVG)	On 🗸		1	1
	Monitoring of average position value	Off			1
	Time basis for average value generation (P1.TBASE)	On		1	1
	Threshold 1 (P3.LEVL1)	2.0	%	1	1
	Threshold 2 (P4.LEVL2)	5.0	%	1	1
	Threshold 3 (P5.LEVL3)	10.0	%	t]	.
z004skzd SIPART PS2 🖌	Online access 🖌 Diagnosis Update 🖌 Identit	v Check 🖌			5.

6. Select the "Maintenance & Diagnostics" directory.

- 7. For "Monitoring of average position value" (P.\PAVG), set the value "On". \Rightarrow Process diagnostics is activated and the associated parameters are displayed.
- 8. To adapt the thresholds to the valve, change the parameter values:
 - P1.TBASE
 - P3.LEVL1
 - P4.LEVL2
 - P5.LEVL3
- 9. In the "Device" menu of SIMATIC PDM, select the command "Download to device...".

10. Recommendation: Select the check box "Load changed parameters only".

- 11. In the dialog, click the "Start" button.
 - \Rightarrow If the check box is selected, only the changed parameter values are loaded into the positioner.
- 12. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 13. Close the dialog.

14. In the "Device" menu, select the command "Maintenance and Diagnostics > Monitoring of average position value".

SIPART PS2 - Monitoring of average posi	ition value					?	×
MENS					GO	OD .	<mark>/</mark> ·
lostics activation	On v	Ø			Start average value gen	eration	
basis for average value generation (P1.TBASE):	Time basis: 0.5 hours 🗸 🗸	t II		Average position value (20.PAVG):			0.0
Reference average value (P2.STATE):	0.0	1	%	Status for average value generation:	Ready		
Threshold 1 (P3.LEVL1):	2.0	1	%				
Threshold 2 (P4.LEVL2):	5.0	1	%				
Threshold 3 (P5.LEVL3):	10.0	1	%				
:							>
Transfer Messages Prin	nt					Clos	se

 \Rightarrow The "Monitoring of average position value " dialog opens.

15. Note the status in the "Status for average value generation" dialog box. No diagnostics can be started with the "Ready" status. The following states are possible:

Status	Description
Off	The diagnostics is deactivated.
Ready	The diagnostics can be started.
Determining the average reference value	-
Determining the average value of position	-
Value is valid	-

16. Click the "Start average value generation" button.

 \Rightarrow The "Start average value generation" dialog opens.

- 17. Confirm the diagnostics and close the dialog.
 - \Rightarrow An additional dialog opens.

18. Confirm the start to determine the reference average value.

- \Rightarrow The reference average value is determined in the time base (time interval) set in the "P1.TBASE" parameter.
- \Rightarrow In the "Status for average value generation" dialog box, the status changes to "Determining the average reference value" .

SIPART PS2 - Monitoring of average position value				? ×
MENS				GOOD 🗸
iostics activation				
Ionitoring of average position value (P.\PAVG): On	~ t !			Start average value generation
pasis for average value generation (P1.TBASE): Time basis: 0.5 hours	~ 1		Average position value (20.PAVG):	0.0
Reference average value (P2.STATE):	0.0	%	Status for average value generation:	Determining the average reference value
Threshold 1 (P3.LEVL1):	2.0 1	%		
Threshold 2 (P4.LEVL2):	5.0 1	%		
Threshold 3 (P5.LEVL3): 10	0.0	%		
				>
Transfer Messages Print				Close

After the set 1st time interval has elapsed:

 \Rightarrow In the "Reference average value" (P2.STATE) dialog box, the determine value is displayed, e.g. "50.2".

 \Rightarrow The status changes to "Determining the average value of position".

	SIPART PS2 - Monitoring of average position value			? 2
1EN	S			GOOD 🖌
ostics	activation			
onitori	ing of average position value (P.\PAVG): On	✓ ‡II		Start average value generation
)asis f	for average value generation (P1.TBASE): Time basis: 0.5 ho	urs 🗸 🚛	Average position value (20.PAVG):	0.0
1	Reference average value (P2.STATE):	50.2 📜 🤉	Status for average value generation:	Determining the average value of position 🤍
	Threshold 1 (P3.LEVL1):	2.0 🚺 %		
	Threshold 2 (P4.LEVL2):	5.0 🚛 %		
	Threshold 3 (P5.LEVL3):	10.0 🚛 %		
<				:
	Transfer Messages Print			Close

After the 2nd time interval has elapsed:

 \Rightarrow The determined current diagnostic value "Average position value" 20.PAVG is displayed, e.g. "50.2".

 \Rightarrow The status changes to "Value is valid".

SIPART PS2 - Monitoring of average p	osition value						?	>
ENS						GOOD	<u>√</u>	-[
tics activation								_
nitoring of average position value (P.\PAVG):	On v	1			Sta	rt average value generation		
usis for average value generation (P1 TRASE):	Time basis: 0.5 hours	11	1	Average position value (20 PAVG):			50.2) 1
Reference average value (P2.STATE):	50.2	11	%	Status for average value generation:	Value is val	id	~	t
Threshold 1 (P3.LEVL1):	2.0	1 1	%					
Threshold 2 (P4.LEVL2):	5.0	11	%					
Threshold 3 (P5.LEVL3):	10.0	40	%					
<								>
Transfer Messages	Print						Close	

19. Close the dialog with the "Close" button.

5.16.3 Diagnostic value "Average value of position" (20.PAVG)

Diagnostic value	Average position value							
	Short designatio	Short designation: 20.PAVG						
Function	The diagnostic va sition value" (P.\PA the time base set	The diagnostic value shows the status of the process diagnostics "Monitoring of average po- sition value" (P.\PAVG) or the last calculated average position value of the valve position during the time base set in the process diagnostics.						
Display options	OFF	The process diagnostics "Monitoring of average position value" (P.\PAVG) is deactivated.						
	IdLE	The process diagnostics "Monitoring of average position value" (P.\PAVG) is activated but not yet started.						
	rEF	Process diagnostics "Monitoring of average position value" (P.\PAVG) has been started and the reference average value "P2.STATE" is currently being calculated.						
	COMP	The current average position value of the valve is currently being calculated.						
	0.0 100.0	Calculated average position value						
Unit	%							
Communication								
SIMATIC PDM Export	Name	ps2_pos_avg_value						
	DisplayValue	≜ Value						
HART communication (read)	Command	#171						
	Response Data	Bytes: 26 29						
		Format: Float						

5.16.4 Messages

5.16.4.1 General information

Requirement

- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- Process diagnostics is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.16.4.2 Messages in the display

Indication on the display

If the set thresholds are exceeded, error code "15" is output.

If several messages are present at the same time, the display switches between the different error codes.

If threshold 1 is exceeded	If threshold 2 is exceeded	If threshold 3 is exceeded:
(1) (2) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	(2-15 FUT 3-	(2-15 FUT 3-
1 bar 2 Error code 15	 2 bars Error code 15 	 3 bars Error code 15

5.16.4.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Digital I/O Module (DIO)

If the application parameter "52.XDIAG" is set to "On3" and threshold 1 is exceeded

• The digital output "DO1" is activated.

If the application parameter "52.XDIAG" is set to "On2" or "On3" and threshold 2 is exceeded

- The digital output "DO2" is activated.
- The digital output "DO1" is deactivated (with "52.XDIAG" = "On3").

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

- The digital output "Fault signal output" is activated.
- The digital output "DO2" is deactivated (with "52.XDIAG" = "On2").
- The digital outputs "DO1" and "DO2" are deactivated (for "52.XDIAG" = "On3").

Inductive Limit Switches (ILS) or Mechanic Limit Switches (MLS)

On the ILS and MLS modules, only the "Fault message output" is available as a digital output. Only exceeding threshold 3 is output.

If the application parameter "52.XDIAG" is set to "On1", "On2" or "On3" and threshold 3 is exceeded

• The digital output "Fault signal output" is activated.



5.16.4.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

I/Os

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	PS2					-	- 1	□ >	×
File	Dev	vice View Diagnostics	Maintena	nce	Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
	+1	Download to device		?						
	† I	Upload to PG/PC				Parameter	Value	Unit	Status	^
<u>.</u>	Π	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>61</u> 2	Value comparison				Identification				
		Object properties				TAG	DEMOKOFF		‡ []	
		Calibration log				Long TAG	SIPART PS2		‡ []	
		Change Log				Descriptor	-		1	
	5	Set device checked				Message	DIAGNOSIS		‡ []	
	_					Date	1/29/2024		±	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🔼 SI	PART PS2								-	-		Х
File	Device	View	Diag	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proces	ss Devic	e Manage	er
	1 + 1 † 1	61A 🗊	R	Update o	diagnostics							
	SIPART PS	2		Status			ameter	Value		Unit	Status	^
Ė	🤌 SIPAR	T PS2 DI		Trond ch	arte		IPART PS2 DR8 HART		_	_		
		ntificatior					Identification					
	🗄 🥠 Mai	up intenanc		Histogra	ims		TAG	DEMOKOFF			1	
	Cor	nmunicat					Long TAG	SIPART PS2			ţ.	
				Valve ch	arts	•	Descriptor	-			t.	
				Alarm Io	gbook		Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							⊡ Device	-				
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			t []	
							Final Assembly Number	0			1	
							Hardware Revision	3			t []	
							Firmware revision	5.03.00-28			1	
							EDD version	25.00.00				
						E	Setup					
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
							Basic settings					
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuato	or spi		1	×
z004ska	zd SIPART	PS2 🖌					Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌)

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Status" tab.

When a threshold is exceeded, the message "Limit for position average exceeded (limit x)" is highlighted.

SIPART PS2 - Status			? ×
Diagnostics Status Messages			^
SIEMENS			GOOD 🔽 -
Device diagnostics 1: Dynamic control valve behavior (limit 1). Dynamic control valve behavior (limit 2). Dynamic control valve behavior (limit 3). Pneumatic leakage (limit 1). Pneumatic leakage (limit 2).	^ ‡	Limit warnings:	Limit for stroke integral exceeded Limit for number of changes in direction exceede Limit for deviation of lower endstop exceeded Limit for deviation of the upper endstop exceede Limit deadband adaptation exceeded
Stiction (slipstick) (limit 3). Limit for lower endstop monitoring exceeded (limit 1). Limit for lower endstop monitoring exceeded (limit 2). Limit for lower endstop monitoring exceeded (limit 3). Limit for upper endstop monitoring exceeded (limit 1).		Device diagnostics 2:	PST reference stroke time exceeded (limit 1). PST reference stroke time exceeded (limit 2). PST reference stroke time exceeded (limit 3). PST with pressure sensors failed
Limit for direction changes exceeded (limit 3). Limit for position average exceeded (limit 1). Limit for position average exceeded (limit 2). Limit for position average exceeded (limit 3).	î,	Device diagnostics 3:	Permitted device temperature exceeded (limit 1). Permitted device temperature exceeded (limit 2). Permitted device temperature exceeded (limit 3). Permitted device temperature undershot (limit 1). Permitted device temperature undershot (limit 2).
< Transfer Messages Print			Close

8. Close the dialog.

5.16.4.5 Via HART communication: Get messages

Requirement

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Get message

If a process diagnostics threshold is violated, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. When the thresholds for the "P.\PAVG" process diagnostics are exceeded, the messages are contained in the following bytes:
 - Byte 16, bit 2 corresponds to threshold 1 exceeded.
 - Byte 16, bit 1 corresponds to threshold 2 exceeded.
 - Byte 16, bit 0 corresponds to threshold 3 exceeded.

5.16.4.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

If the threshold is no longer exceeded during process diagnostics, the message on the display disappears, e.g. after successful maintenance or if the process conditions change.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.17 Monitoring of supply pressure PZ (pressure sensor-supported)

5.17.1 Functional description

The process diagnostics monitors the supply pressure PZ.

Process diagnostics parameters:

- Hysteresis for limits (U2.P_HYS)
- Lower limit PZ (U5.PZMLL)
- Upper limit PZ (U6.PZMUL)
- Behavior of the positioner when the value violates the lower limit PZ (U3.PFRL)
- Behavior of the positioner when the upper limit PZ (U4.PFRUL) is violated

Process diagnostics parameters:

- Current supply pressure PZ (60.PZ)
- Maximum supply pressure PZ (63.PZMAX)
- Event counter violations of lower limit PZ (64.N_MIN)
- Event counter violations of upper limit PZ (65.N_MAX)

Ring memory

The process diagnostics data obtained is stored in the ring memory of the positioner.

In each case, 20 data entries are stored in 5 ring memories for different lengths of time using the FIFO method (First In - First Out) .

Ring memory for time span	Amount of data	Time interval between the data
Last 30 minutes	20	1.5 minutes (90 seconds)
Last 8 hours	20	24 minutes
Last 5 days	20	6 hours

Process diagnostics

5.17 Monitoring of supply pressure PZ (pressure sensor-supported)

Ring memory for time span	Amount of data	Time interval between the data
Last 2 months	20	3 days
Last 30 months	20	45 days

The data can be stored in Device Manager Software, such as SIMATIC PDM, as a trend and exported for further processing.

The data can be read and further processed using HART commands.

The process diagnostics are monitored with adjustable thresholds. If the upper or lower limits are violated, messages are output via the display and optionally via the digital contacts or HART communication.

5.17.2 Activate and configure diagnostics

Requirement

- The positioner has pressure sensors (Z P01 or -Z P02 option)
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

General parameters for pressure sensor-based diagnostics

U1.PUNIT	Pressure unit
Function	The parameter defines the pressure unit.
Setting options	• bar
	• MPa
	• psi
Factory setting	bar

U2.P_HYS	Hysteresis for lim	Hysteresis for limits				
Function	The parameter de	fines the hysteresis for the following parameters:				
	Lower limit of	the supply pressure (U5.PZMLL)				
	Upper limit of	supply pressure (U6.PZMUL)				
	• Limit of the actuating pressure at the Y1 connection (U7.PCL)					
Setting range	0.200 1.000	bar				
	0.020 0.100	MPa				
	2.900 14.50	psi				
Factory setting	0.200	bar				
	0.020	MPa				
	2.900	psi				

Process diagnostics parameters

U3.PFRLL	Behavior lower limit PZ					
Function	The parameter defines the behavior of the positioner as soon as the lower limit of the supply pressure PZ is violated.					
Note	f the supply pressure fails or if the supply pressure is less than 1.4 bar:					
	 Observe the note in the section " energy and/or the supply pressur 	 Observe the note in the section "Behavior in the event of failure of the electrical auxiliary energy and/or the supply pressure PZ" in the operating instructions. 				
Setting options	Cont ≜ No reaction -> Automatic (Auto) mode>	The positioner continues to follow the setpoint.				
	HoLd	The current position is held.				
	≜ Hold current position (HOLd)	The positioner follows the setpoint again only when the supply pressure PZ has exceeded the lower limit again.				
Factory setting	Cont					

Process diagnostics

5.17 Monitoring of supply pressure PZ (pressure sensor-supported)

U4.PFRUL	Behavior upper limit PZ	3ehavior upper limit PZ				
Function	The parameter defines the behavior pressure PZ is violated.	he parameter defines the behavior of the positioner as soon as the upper limit of the supply ressure PZ is violated.				
Setting options	Cont ≜ No reaction -> Automatic (Auto) mode>	The positioner continues to follow the setpoint.				
	HoLd	The current position is held.				
	≜ Hold current position (HOLd)	The positioner follows the setpoint again, only when the supply pressure PZ has fallen below the upper limit again.				
Factory setting	Cont	•				

U5.PZMLL	Lower limit PZ						
Function	The parameter de	fines the minimum required supply pressure PZ.					
Note	If the supply pressure fails or if the supply pressure is less than 1.4 bar:						
	• Observe the note in the section "Behavior in the event of failure of the electrical energy and/or the supply pressure PZ" in the operating instructions.						
	Diagnostic values:						
	Current supply pressure PZ (60.PZ)						
	Event counter	violations of lower limit PZ (64.N_MIN)					
Setting range	1.400 7.000	bar					
	0.140 0.700	MPa					
	20.31 101.53	psi					
Factory setting	1.400	bar					
	0.140	MPa					
	20.31	psi					

U6.PZMUL	Upper limit PZ	Jpper limit PZ				
Function	The parameter de	fines the maximum allowable supply pressure PZ.				
Note	• If the value is exceeded: In the "Automatic (AUT)" mode and "Manual (MAN)" mode, the display shows error code "20".					
 If the supply pressure PZ after exceeding the limit "U6.PZMUL" has fallen minus the hysteresis"U2.P_HYS", the error code is no longer displayed. If the parameter "U4.PFRUL" is set to "HoLd", the control is active again. 						
	Diagnostic values:					
	Current supply pressure PZ (60.PZ)					
	Maximum supply pressure PZ (63.PZMAX)					
	Event counter violations of upper limit PZ (65.N_MAX)					
Setting range	1.400 7.000	bar				
	0.140 0.700	MPa				
	20.31 101.53	psi				

U6.PZMUL	Upper limit PZ	
Factory setting	7.000	bar
	0.700	MPa
	101.53	psi

Activate and configure "Monitoring of supply pressure PZ"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "U.\PRES" parameter of the "Pressure monitoring".
- 3. Set the "U.\PRES" parameter to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the limits at the valve, change the parameters:
 - U1.PUNIT
 - U2.P_HYS
 - U3.PFRLL
 - U4.PFRUL
 - U5.PZMLL
 - U6.PZMUL

Remote operation with SIMATC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SIF	PART	952				-	-		<
File	Dev	ice View Diagnostics Mainter	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Devic	e Manager	
	+I	Download to device	?						
- .	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	Π	Assign address and TAG			I SIPART PS2 DR8 HART				
	<u>6</u> 10	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
			-		Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. In the "Device" menu, select the command "Maintenance and Diagnostics > Pressure Monitoring".

⊿ SIP	ART	PS2				-	_		X
File	Dev	vice View Diagnostics M	aintena	ince	Help SIMATIC PDM	V9.2 SP2 Proce	ss Devic	e Manage	er -
	+I	Download to device		?					
Bargh	†[Upload to PG/PC	F		Parameter	Value	Unit	Status	^
÷	Ŧ	Assign address and TAG			⊡ Maintenance & Diagnostics	-			
	<u>61</u> 2	Value comparison			Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage		1	
		Object properties			Pressure monitoring (U.\PRES)	On		‡]	
		Calibration log			Partial Stroke Test (A.\PST)	Off		‡]	
		Change Log			Monitoring of dynamic control valve behavior (b.\DEVI)	Off		1	
		Set device checked			Monitoring/compensation of pneumatic leakage (C.\LEA	() Off		1	
	Sin.	Check configuration			Monitoring stiction (slipstick effect) (d.\STIC)	Off		1	
		Tamplatas			Deadband monitoring (E.\DEBA)	Off		1	
		lemplates			Monitoring of lower endstop (F.\ZERO)	Off		1	
		Identification			Monitoring of upper endstop (G.\OPEN)	Off		‡]	
		Wizards	•		Monitoring of lower limit temperature (H.\TMIN)	Off		1	
		Operation	•		Extended diagnostics	Off		1	
		Setun	•		Pressure monitoring	Off		1	
		Maintenance and Diagnostics			Partial Stroke Test	On		1	_
					Monitoring of dynamic control valve behavior	On		ţ⊔	
		Communication			Monitoring/compensation of pneumatic leakage		_		_
					Monitoring stiction	bar		↓ ↓	
-004-1	a Le				Deadhand monitoring	0.200	bar		
zuu4skz	als	IPAKI PSZ 💌			Deadband monitoring	у Спеск 🔽 📋 🔛			2

 \Rightarrow The "Pressure monitoring" dialog is displayed.

7. Select the "Pressure monitoring" (U.\PRES) with the value "On".

SIPART PS2 - Pressure monitoring	? ×
SIEMENS	GOOD 🗸 -
Diagnostics activation	
Pressure monitoring (U.\PRES): Off VI	
Off	
On	
Transfer Messages Print	Close

 \Rightarrow The dialog is displayed with the current parameters.

SIPART PS2 - Pressure monitori	ng			? ×
SIEMENS				GOC
Diagnostics activation				
Pressure monitoring (U.\PRES):	On v	Ø		
Pressure unit (U1.PUNIT):	bar 🗸	1	Supply pressure PZ (60.PZ):	
Hysteresis for limits (U2.P_HYS):	0.200	🕄 bar	Actuating pressure Y1 (61.P1):	
Lower limit PZ (U5.PZMLL):	1.400	🕄 bar	+/- Leakage at Y1 [*/min] (67.LMY1):	
Behavior lower limit PZ (U3.PFRLL):	No reaction> 'Automatic (Auto)' mode ${\smallsetminus}$] \$1		
Upper limit PZ (U6.PZMUL):	7.000] 🚺 bar		
Behavior upper limit PZ (U4.PFRUL):	No reaction> 'Automatic (Auto)' mode $$] 1		
Limit actuating pressure Y1 (U7.PCL):	7.000	📜 bar		
Limit +/- Leakage [*/min] (U8.LRL):	0.000	📜 bar		
C				×
Transfer Messages	Print			Close

- 8. To adapt the limits at the valve, change the parameters:
 - U1.PUNIT
 - U2.P_HYS
 - U3.PFRLL
 - U4.PFRUL
 - U5.PZMLL
 - U6.PZMUL

- 9. Transfer these changes to the positioner with the "Transfer" button.
- 10. Close the dialog.
- 11. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.
- 12.In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters are loaded and displayed in the "Process Device Manager".

5.17.3 With SIMATIC PDM: Show diagnostic results

Requirement

- The positioner has pressure sensors (Z PO1 or -Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 S	PART I	PS2				-	-		×
File	Dev	vice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	r
	+1	Download to device	?						
-	1	Upload to PG/PC			Parameter	Value	Unit	Status	^
Ė	· 😈	Assign address and TAG			I SIPART PS2 DR8 HART				
	<u>6</u>]2	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
	1	Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/20/2024		+ T	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. In the "Device" menu, select the command "Maintenance and Diagnostics > Pressure Monitoring".

SIPART PS2 - Pressure monitor	ring				?	×
SIEMENS					GO	C
Diagnostics activation SIE	MENS AG					
Pressure monitoring (U.\PRES):	On v	1				
Pressure unit (U1.PUNIT):	bar 🗸	11	Supply pressure PZ (60.PZ):			
Hysteresis for limits (U2.P_HYS):	0.200	tl bar	Actuating pressure Y1 (61.P1):			
Lower limit PZ (U5.PZMLL):	1.400	🚛 bar	+/- Leakage at Y1 [*/min] (67.LMY1):			
Behavior lower limit PZ (U3.PFRLL):	No reaction> 'Automatic (Auto)' mode 🗸 🗸	10				
Upper limit PZ (U6.PZMUL):	7.000	🚛 bar				
Behavior upper limit PZ (U4.PFRUL):	No reaction> 'Automatic (Auto)' mode 🗸 🗸	1				
Limit actuating pressure Y1 (U7.PCL):	7.000	🚛 bar				
Limit +/- Leakage [*/min] (U8.LRL):	0.000	🚛 bar				
<						> ``
Transfer Messages	Print				Close	

 \Rightarrow The "Pressure monitoring" dialog shows the current settings.

SIPART PS2				_		×
File Device View Diagnostics N	Maintenance He gnostics	P SIMATIC PDM	V9.2 SP2 Proce	ess Device	e Manager	
SIPART PS2 Status			Value	Unit	Status	^
im ↓ Identification Trend chart	ts ►	Actual value				
••••‡ Setup Histograms	s 🕨	Deviation	On 3 (three-stage		1	
Maintenanc KPI	•	Leakage (percentage of stroke)	On		‡ [
Valve chart	s 🕨	Leakage (pressure change per minute)	Off		1	
Alarm logb	ook	Stiction (slinstick)	Off		1	
	moniconingree		Off		1	
	Monitoring sti	Lower endstop	Off		1	
	Deadband m	Upper endstop	Off		1	
	Monitoring of	Temperature	Off		1	
	Monitoring of	Deadband	Off		1	
	Monitoring of	Supply pressure PZ	Off		1	
	Monitoring of up	oper limit temperature (J.\TMAX)	Off		1	
	Monitoring num	ber of total strokes (L.\STRK)	Off		1	
	Monitoring num	ber of direction changes (O.\DCHG)	Off		1	
	Monitoring of a	verage position value (P.\PAVG)	Off		1	
	Pressure mor	iitoring				1
	Pressure unit	(U1.PUNIT)	bar		1	1
	Hysteresis for	limits (U2.P_HYS)	0.200	bar	1	
z004skzd SIPART PS2 🖌		Online access 🖌 🛛 Diagnosis Update 🖌 🗌 Identi	ity Check 🖌			

7. In the "Diagnostics" menu, select the "Trend charts > Supply pressure PZ" command.

- 8. The "Supply pressure PZ" dialog is displayed. The dialog contains the tabs, each with a trend chart for the determined pressure values:
 - Trend over 30 minutes
 - Trend over 8 hours
 - Trend over 5 days
 - Trend over 2 months
 - Trend over 30 months

The respective trend chart is based on the maximum of 20 data from the corresponding ring memory.

The lines for "Upper limit PZ" and "Lower limit PZ" are also shown.



Button	Description
Trend value list	Shows the 20 data for the displayed trend chart.
Restart trend	Caution: This function deletes the data stored in the po- sitioner in all 5 ring memories.
Trend help text	Explains how process diagnostics works.

9. Close the dialog.

5.17.4 Diagnostic value " Supply pressure PZ" (60.PZ)

Diagnostic value	Supply pressure PZ		
	Short designation: 60.PZ		
Function	The diagnostic value shows the current supply pressure PZ.		
Note	The differential pressure between the ambient pressure and the input PZ is measured.		
	If there is no supp	bly pressure, the displayed value should be approximately "0".	
	Depending on the sensors may devia	positioner's operating altitude above sea level, the zero point of the pressure ate and must be calibrated.	
Requirement	The positioner	r has pressure sensors (-Z PO1 or PO2 option).	
	"Pressure mor	itoring" (U.\PRES) is activated.	
Display range	0 9.999	bar	
	0 0.999	MPa	
	0 145.00	psi	
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"	
	• MPa	(U.\PRES).	
	• psi		
Communication			
Supply pressure PZ (60.PZ)			
SIMATIC PDM Export	Name	var_PZ_value	
	DisplayValue	≜ Value	
HART communication (read)	Command	#200	
	Response Data	Bytes 2 5	
		Format: Float	
Pressure unit (U1.PUNIT)			
SIMATIC PDM Export	Name	var_pressureUnit	
	DisplayValue	• bar	
		• MPa	
		• psi	
HART communication (read)	Command	#200	
	Response Data	Byte: 1	
		Format: Enum	

Calibrate zero point

Requirement

- The positioner is depressurized.
- The displayed pressure deviation is in the following range:
 - -0.500 ... 0.500 bar
 - -0.050 ... 0.050 MPa
 - -72.51 ... 72.51 psi

Procedure

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display 🕾 🕁 🗛 simultaneously for at least 2 seconds.
- 2. Select the diagnostic value "60.PZ".
- 3. Press the \underline{A} button for at least 5 seconds and the display will show "rESEt". \Rightarrow If "0" is displayed, the calibration was successful.

 - \Rightarrow If "notoL" the calibration was not successful due to excessive pressure deviation.

5.17.5 Diagnostic value "Maximum supply pressure PZ" (63.PZMAX)

Diagnostic value	Maximum supply pressure PZ, resettable	
	Short designation: 63.PZMAX	
Function	The supply pressure PZ is continuously monitored.	
	The highest meas	ured value is displayed as the diagnostic value.
Note	The diagnostic va	lue can be reset.
Condition	The positioner has	s pressure sensors (-Z PO1 or PO2 option).
Display range	0 9.999	bar
	0 0.999	MPa
	0 145.00	psi
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"
	• MPa	(U.\PRES).
	• psi	
Communication		
Maximum supply pressure P	Z, resettable (63.	PZMAX)
SIMATIC PDM Export	Name	var_PZ_MaxPointerResettable
	DisplayValue	≜ Value
HART communication (read)	Command	#200
	Response Data	Bytes: 14 17
		Format: Float
Pressure unit (U1.PUNIT)		
SIMATIC PDM Export	Name	var_pressureUnit
	DisplayValue	• bar
		• MPa
		• psi
HART communication (read)	Command	#200
	Response Data	Byte: 1
		Format: Enum

5.17.6 Diagnostic value "Violations of lower limit PZ, resettable" (64.N_MIN)

Diagnostic value	Violations of lower limit PZ, resettable		
	Short designation: 64.N_MIN		
Function	If the supply pressure PZ exceeds the limit in the U5.PZMLL of the "Pressure monitoring" process diagnostics (U.\PRES) parameter, the event counter of the diagnostic value "64.N_MIN" is incremented.		
Note	The diagnostic va	The diagnostic value can be reset at the same time as the "65.N_MAX" diagnostic value.	
Requirement	The positioner has firmware version 5.02 or higher.		
Display range	0 99 999		
Communication			
SIMATIC PDM Export	Name	var_PZ_NoLimitUnderrunResettable	
	DisplayValue	≜ Value	
HART communication (read)	Command	#200	
	Response Data	Bytes: 18 19	
		Format: Unsigned-16	

5.17.7 Diagnostic value "Violation of upper limit PZ, resettable" (65.N_MAX)

Diagnostic value	Violations of upper limit PZ, resettable		
	Short designatio	n: 65.N_MAX	
Function	If the supply pressure PZ exceeds the limit in the U6.PZMUL parameter of the "Pressure moni- toring" process diagnostics (U.\PRES), the event counter of the diagnostic value "65.N_MAX" is incremented.		
Note	The diagnostic value can be reset at the same time as the "64.N_MIN" diagnostic value.		
Requirement	The positioner has firmware version 5.02 or higher.		
Display range	0 99 999		
Communication			
SIMATIC PDM Export	Name	var_PZ_NoLimitOverrunResettable	
	DisplayValue	≜ Value	
HART communication (read) Command #200		#200	
	Response Data	Bytes: 20 21	
		Format: Unsigned-16	

5.17.8 Via HART communication: Read out diagnostic results

Requirement

- The positioner has pressure sensors (-Z PO1 or -Z PO2 option)
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Ring memory of the "Monitoring of supply pressure PZ"

Request

Send to the positioner via HART communication:

- Command "#173"
- Ring memory index of the process diagnostics, e.g. "45". Send the request for each of the 5 ring memories separately.

Ring memory index	Ring memory for time span
45	Last 30 minutes
46	Last 8 hours
47	Last 5 days
48	Last 2 months
49	Last 30 months

Answer

The response consists of the following data on the requested ring memory:

- Response Data Bytes
- Command-Specific Response Code

	_	_	_
Table 5-36	Response	Data	Bytes

Byte	Format	Description
0	Enum	Ring memory index
1	Unsigned-8	Number of valid values in the ring memory
2	Enum	Unit of the ring memory values
3 42	Signed-16	Values 1 20 of the ring memory (2 bytes each) in "mbar".
		Example:
		• 1 ≜ 0.001 bar
		• 1000 ≜ 1 bar
43 46	Float	Lower limit PZ (U5.PZMLL)
47 50	Float	Upper limit PZ (U6.PZMUL)
51 54	Float	-
55 58	Float	-
59 62	Float	-
63 66	Float	-

 Table 5-37
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

Additional pressure sensor-based data

Request

Send to the positioner via HART communication:

• Command "#198"

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Process diagnostics

5.17 Monitoring of supply pressure PZ (pressure sensor-supported)

Byte	Format	Description
0	Enum	Pressure monitoring (U.\PRES)
1	Enum	Pressure unit (U1.PUNIT)
2 5	Float	Lower limit PZ (U5.PZMLL)
6 9	Float	Hysteresis for limits (U2.P_HYS)
10	Enum	Behavior lower limit PZ (U3.PFRLL)
11	Enum	Behavior upper limit PZ (U4.PFRUL)
12 15	Float	Upper limit PZ (U6.PZMUL)
16 19	Float	Limit actuating pressure Y1 (U7.PCL)
20 23	Float	Limit leakage (U8.LRL)
24 25	Unsigned-16	Time pressure measurement Y1 (U9.TPMT)

Table 5-38Response Data Bytes

 Table 5-39
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

5.17.9 With SIMATIC PDM: Export diagnostics results

Requirement

- The positioner has pressure sensors (-Z PO1 or -Z PO2 option)
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.
Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SI	PART	952					-	-		<	
File	Dev	vice View Diagnostics	Maintenar	nce l	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager		
	+I	Download to device		?							
	ti Upload to PG/PC Parameter		Upload to PG/PC		Parameter	Value	Unit	Status	^		
<u> </u>	Ţ.	Assign address and TAG				I SIPART PS2 DR8 HART					
	<u>61</u> 2	Value comparison				⊡ldentification					
		Object properties				TAG	DEMOKOFF		‡ []		
		Calibration log				Long TAG	SIPART PS2		1		
		Change Log				Descriptor	-		1		
	1	Set device checked				Message	DIAGNOSIS		1		
						Data	1/29/2024		↑		

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. Open the trend chart in the "Diagnostics" menu with the command "Trend charts > Supply pressure PZ" → With SIMATIC PDM: Show diagnostic results (Page 458). When the trend chart opens, the current data of this process diagnostics in the positioner are read out by SIMATIC PDM.

	SIPART PS2					_		×	
Fil	e Device V	iew Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2 Pro	cess Devid	e Manag	er	
18	Save Ctrl+	-s 🚽 🔊 🖪	器 🏦 🕐						
₽	Export			Parameter	Value	Unit	Status	^	
•	Import	HART		SIPART PS2 DR8 HART					
	Print Ctrl+	.p		Identification					
	Class	Diagnostics		TAG	DEMOKOFF		1		
	Close			Long TAG	SIPART PS2		1		
				Descriptor	-		1		
			Message DIAGNOSIS			1			
				Date		1			
				Device					
				Manufacturer	Siemens		1		
				Device Type	SIPART PS2		1		
				Order number	•		1		
				Serial number	N1KO037518210		1		
				Final Assembly Number	0		1		
				Hardware Revision	3		1		
				Firmware revision	5.03.00-28		1		
				EDD version	25.00.00				
				⊡Setup					
L	1	. 1		Dynamic variable mapping					
z004	skzd SIPART PS	2 🖌		Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 📃			💛:	

7. In the "File" menu of SIMATIC PDM , select the command "Export..."..

The "Export - ..." dialog opens.

- 8. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

	Export - SIPART PS2	?	×
			^
	Export directory:		-
	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export		-
	HTML transformation file:		
	C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation.xsl		
	Which information should be exported?		
	Device parameters		
	Diagnostics		
	Document Manager		
	Selection		
	Object		
	SIPART PS2		-
	Status:		_
			~
<			>
	Messages Start Stop	Close	

9. Start the export with the "Start" button.

- 10. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 11. Close the dialog.

12. Open the XML file with suitable software, e.g. an editor.

Param\$SIPART PS2\$20230815_121412.xml	- Editor			_		×	
xml version="1.0" encoding="utf-8"?							~
Created by PDM 902.200.2901.5. Do n</td <td>ot edit this File!!</td> <td>></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	ot edit this File!!	>				- 1	
xml-stylesheet type='text/xsl' href='PD</td <td>M80_ExportTransformatic</td> <td>n.xsl'?></td> <td></td> <td></td> <td></td> <td>- 1</td> <td></td>	M80_ExportTransformatic	n.xsl'?>				- 1	
<pdm xmlversion="8.04"></pdm>							
<object></object>							
<device></device>							
<id>2</id>							
<pltid>0</pltid>							
<type>EDD_OBJECT_OFFLINE</type>							
<class>EDD_OCLASS_NODE_HART_MODEM<!--</td--><td>Class></td><td></td><td></td><td></td><td></td><td></td><td></td></class>	Class>						
<objectpath>Netze/HART Modem-Netzwe</objectpath>	rk/NODE_10/SIPART PS2 </td <td>ObjectPat</td> <td>th></td> <td></td> <td></td> <td></td> <td></td>	ObjectPat	th>				
<onlinevalues>False</onlinevalues>							
<catalogpath>/DEVICE/HART/ACTUATOR/</catalogpath>	'ELECTRO_PNEUMATIC/SIEME	NS/SIPAR	<pre>T_PS2/SIPART_PS2_HAR</pre>	r_dr8 </td <td>CatalogR</td> <td>ath</td> <td></td>	CatalogR	ath	
<objectname>SIPART PS2</objectname>	•						
<section>DEVICE</section>							
<commandmode>ExportOffline<td>Mode></td><td></td><td></td><td></td><td></td><td></td><td></td></commandmode>	Mode>						
<deviceparameters></deviceparameters>							
<attribute browsename="t</td><td>ag" label<="" name="tag" td="" type="String"><td>.="TAG" Pi</td><td>aramViewMember="True</td><td>" Displ</td><td>ayvalue</td><td>"DE</td><td></td></attribute>	.="TAG" Pi	aramViewMember="True	" Displ	ayvalue	"DE		
<pre><attribute browsenam<="" name="longlag" pre=""></attribute></pre>	le="longlag" lype="Strir	g" Label:	="Long TAG" Paramvie	Member	="Inue"	DIS	
<pre>KAttribute Name="descriptor" Browse</pre>	Name="descriptor" Type=	"String"	Label="Descriptor"	Paramvi	ewnember	="1	
<pre><attribute <="" browsenam="" name="message" pre=""></attribute></pre>	le="message" Type="Strir	ig" Label:	="Message" Paramview	Member=	finuer L	isp	
<pre><attribute browsename=" </pre></td><td>date Type=" date11me"="" l<="" name="date" td=""><td>abe1="Dat</td><td>te" ParamviewMember≕</td><td>True</td><td>Display</td><td>atu</td><td></td></attribute></pre>	abe1="Dat	te" ParamviewMember≕	True	Display	atu		
Dates are in ISU 8601 Tormat<br <attaibute id"="" name_"manufacturen="" p="" r<=""></attaibute>	.:>2023-08-15100:00:0	id" Type	Dute>	ou£actu	non" Par	1.000	¥
KALLFIDULE Name= manufacturer iu B	rowsename= manutaccurer	10 100	e= UINCI6 Label= Ma	питасси	rer Par	VIIID	
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-8	8 mit BOI	M	

The XML file contains 100 lines with the exported process diagnostics data.

Each of the 5 ring memories contains 20 data entries.

The data for process diagnostics is labeled with Name = "var_trend_PZ...".

Exemplary data line:

<Attribute Name="var_trend_PZ_30min_0" BrowseName="var_trend_PZ_30min_0" Type="Int16" Label="0,0 bis -1,5 Minuten" ParamViewMember="False" DisplayValue="4,001" Import="True" State="16" Unit="bar">4001</Attribute>

- The texts marked in bold are included and explained in the following table.
- The numerical value at "DisplayValue", e.g. "4.001", is the value that was determined with the process diagnostics in the period 0 to -1.5 minutes for the specified unit.
- The table shows a summary of the 100 data for the supply pressure PZ exported with the XML file.

Ring memory	Amoun	Data description in the XML file	Data description in the XML file							
for time span	t of da- ta	Name	Label (≜ Time span of data determi- nation)	DisplayVal- ue e.g.	Unit					
Last 30 mi-	20	var_trend_PZ_30min_0	0.0 up to -1.5 minutes	4.001	• bar					
nutes					• MPa					
		var_trend_PZ_30min_19	-28.5 up to -30.0 minutes		• psi					
Last 8 hours	20	var_trend_PZ_8h_0	0 up to -24 minutes							
		var_trend_PZ_8h_19	-456 up to -480 minutes							
Last 5 days	20	var_trend_PZ_5d_0	0 up to -6 hours							
		var_trend_PZ_5d_19	-114 up to -120 hours							
Last 2 months	20	var_trend_PZ_2m_0	0 up to -3 days							
		var_trend_PZ_2m_19	-57 up to -60 days							
Last 30	20	var_trend_PZ_30m_0	0 up to -45 days							
months										
		var_trend_PZ_30m_19	-855 up to -900 days							

The XML file contains the following additional data for process diagnostics.

Table 5-40 Parameter

Parameter	Data description in the XML file						
	Name	Label	DisplayVal- ue	Unit			
			e.g.				
U1.PUNIT	var_pressureUnit	Pressure unit (U1.PUNIT)	bar	• bar			
U2.P_HYS	var_PZ_Hysteresis	Hysteresis for limits	0.200	• MPa			
		(U2.P_HYS)		• psi			
U3.PFRLL	var_PZ_FailureReaction	Behavior lower limit PZ (U3.PFRLL)	No reaction - Automatic operating mode (Auto)	-			
U4.PFRUL	var_PZ_FailureReactionUL	Behavior upper limit PZ (U4.PFRUL)	No reaction - Automatic operating mode (Auto)	-			
U5.PZMLL	var_PZ_LowerLimit	Lower limit PZ (U5.PZMLL)	1.400	• bar			
U6.PZMUL	var_PZ_UpperLimit	Upper limit PZ (U6.PZMUL)	7.000	• MPa			
				• psi			

Process diagnostics

5.17 Monitoring of supply pressure PZ (pressure sensor-supported)

Diagnostic value	Data description in the XML file								
	Name	Label	DisplayVal- ue	Unit					
			e.g.						
60.PZ	var_PZ_value	Supply pressure PZ (60.PZ)	3.981	• bar					
63.PZMAX	var_PZ_MaxPointerResettable	Maximum supply pressure PZ (resettable) (63.PZMAX)	5.230	• MPa • psi					
64.N_MIN	var_PZ_NoLimitUnderrunResettable	Violations of lower limit PZ (resettable) (64.N_MIN)	9	-					
65.N_MAX	var_PZ_NoLimitOverrunResettable	Violations of upper limit PZ (resettable) (65.N_MAX)	0	-					

Table 5-41 Diagnostic values

5.17.10 Messages

5.17.10.1 General information

Requirement

- The positioner has pressure sensors (-Z PO1 or -Z PO2 option)
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- "Pressure monitoring" (U.\PRES) is activated.

Notes

If the upper or lower limits are violated:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.17.10.2 Messages in the display

Indication on the display

If the upper or lower limits are violated, the respective error code is displayed.

If several messages are present at the same time, the display switches between the different error codes.

Display		Possible cause
18 36, 18 1- 18 RUT 35	① Error code 18	The supply pressure PZ violates the lower limit (U5.PZMLL).
1- 19 RUT 35	1 Error code 19	The supply pressure PZ is outside the specification.
0-20 RUT35	1 Error code 20	The supply pressure PZ violates the upper limit "U6.PZMUL".
Error code 18, 19 or 20 with e	rror message HoLd	See error code 18, 19 or 20.
		The positioner is set to "Hold position" if the "U3.PFRLL" or "U4.PFRUL" parameter is set to "HoLd" is set.

5.17.10.3 Messages via digital signals

Requirement

- The positioner has a fault signal output, which is located on one of the following modules:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)

Message via the digital output

If at least one of the following states is present, the fault signal output is activated:

- Supply pressure PZ lower than 1.4 bar (device specification)
- Supply pressure PZ higher than 7.0 bar (device specification)
- Supply pressure PZ less than "Lower limit PZ" (U5.PZMLL)
- Supply pressure PZ higher than "Upper limit PZ" (U6.PZMUL)

l/Os

Digital I/O Module (DIO) 6DR4004-6A / -8A	Inductive Limit Switches (ILS) 6DR4004-6G / -8G	Mechanic Limit Switches (MLS) 6DR4004-6K		
$1 + 11 \\ 12 \\ 2 - 21 \\ 22 \\ 3 + 31 \\ 4 - 42 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 52 \\ 5 - 5 - 52 \\ 5 - 5 - 5 \\ 5 - 5 - 5 \\ 5 - 5 - 5 \\ 5 - 5 -$	1 + 31 + 31 + 32 + 41 + 41 + 42 + 51 + 51 + 52 + 51 + 52 + 51 + 52 + 52	1 + 31 + 31 + 32 + 41 + 41 + 42 + 51 + 51 + 52 + 51 + 52 + 51 + 52 + 51 + 52 + 52		
 Digital input DI2, galvanically isolated Digital input DI2, dry contact Fault message output Digital output DO1 Digital output DO2 	 Fault signal output, in conjunction with 6DR4004-3ES without function Digital output 1 Digital output 2 	 Fault signal output, in conjunction with 6DR4004-4ES without function Digital output 1 Digital output 2 		

5.17.10.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- In SIMATIC PDM, an object is created with the firmware version of the positioner.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	🖊 SIP	ART	952				-	-		<
	File	Dev	ice View Diagnostics	Maintenanc	e Help	SIMATIC PDM	V9.2 SP2 Proce	ss Devic	e Manager	
		Download to device		?						
		TI Upload to PG/PC		1 Upload to PG/PC Par		Parameter	Value	Unit	Status	^
	<u> </u>	🖓 🐺 Assign address and TAG		Assign address and TAG		SIPART PS2 DR8 HART	•			
		<u>61</u> 2	Value comparison			□ Identification				
			Object properties			TAG	DEMOKOFF		‡ []	
		ß	Calibration log			Long TAG	SIPART PS2		1	
		1	Change Log			Descriptor	-		1	
			Set device checked			Message	DIAGNOSIS		1	
1						Data	1/20/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🔼 si	PART PS2								_		×
File	Device	View	Diag	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2 Pr	ocess De	vice Mana	iger
	1 + 1 +	<u>a</u> 🗗	R	Update	diagnostics						
	SIPART	°S2		Status			ameter	Value	Unit	t Statu	s ^
Ė	SIPAF	RT PS2 D		Trend ch	arts	•	IPART PS2 DR8 HART				
		entification etup		Histogra	ams	,	Identification				
	🗄 🌽 M	aintenanc	KPI			,	TAG	DEMOKOFF		1	
	‡ ∐ C	Communical Valve charts		Long TAG	SIPART PS2		1	1			
				·	Descriptor	-		1			
				Alamin	JUDOK		Message	DIAGNOSIS		1	
							Date	8/15/2023		1	ļ
							⊡ Device				
							Manufacturer		\$		
							Device Type	SIPART PS2		1	
							Order number	-		1	
							Serial number	N1KO037518210		1	
							Final Assembly Number	0		1	
							Hardware Revision	3		1	
							Firmware revision	5.03.00-28		1	
							EDD version	25.00.00			
						E	Setup				
							Dynamic variable mapp	ing			
							PV is	Setpoint		1	
							SV is	Setpoint		1	
							TV is	Setpoint		1	
						QV is	Setpoint		1		
							 Basic settings 		_		
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator s	pi	1	×
z004sk	zd SIPAR	T PS2 🖌					Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌			0.5

6. In the "Diagnostics" menu, select the "Status" command.

7. Select the "Messages" tab.

If a upper or lower limit is violated, the corresponding message is highlighted:

- Supply pressure falls below the lower limit
- Supply pressure out of specification
- Supply pressure exceeds the upper limit

SIPART PS2 - Status		? ×
nostics Status Messages		^
EMENS	GOOD 🗸	- <u></u> .
evice status: More status available Configuration changed Field device malfunctioned Primary variable outside the operating limits Non-primary variable outside the operating limit	Tight closing DOWN Tight closing UP Fast closing DOWN Fast closing UP Digital input DI1	1
vice status 1: Device in 'Automatic (AUT)' mode Device in 'Configuring' mode Device in P manual operation Digital setpoint source Alam has responded	Supply pressure falls below the lower limit Supply pressure out of specification Supply pressure exceeds the upper limit Device is not ready for operation (not initialize Supply pressure out of specification	1
Device errors	: EEPROM error Error measured value acquisition Pressure sensor module defective	1
Device status	:: Maintenance required Failure Functional check	t II
Current temperature (30.TEMP)	: 27.1	t degC
Input current of device	: 12.802] ‡ ∐ mA _
<		>
Transfer Messages Print		Close

8. Close the dialog.

5.17.10.5 Via HART communication: Get messages

Requirement

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52...

Get message

If the set upper or lower limits for "Monitoring of supply pressure PZ" are violated, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. The messages for the "Monitoring of supply pressure" process diagnostics are contained in the following bytes:
 - Byte 3, Bit 3: Supply pressure PZ falls below the "Lower limit" (U5.PZMLL).
 - Byte 3, Bit 4: The supply pressure PZ is off-specification.
 - Byte 3, Bit 5: The supply pressure PZ violates the "Upper limit" (U6.PZMUL).

5.17.10.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

The error messages can be reset using the corrective measures.

Error code/error message	Possible cause	Remedy			
18	Supply pressure PZ falls below the lower limit "U5.PZMLL".	 Increase supply pressure PZ until the upper lim- it (U5.PZMLL) plus hysteresis "U2.P_HYS" is violated. 			
		 Limit "U5.PZMLL" is set lower than the current supply pressure PZ. 			
19	The supply pressure PZ is off- specification.	 Adjust supply pressure PZ until the device-specific limits of 1.4 to 7 bar ± hysteresis "U2.P_HYS" are adhered to. 			
20	The supply pressure PZ viola- tes the upper limit	• Reduce supply pressure PZ until the limit (U6.PZMUL) mi- nus hysteresis (U2.P_HYS) is fallen below.			
	"U6.PZMUL".	 Limit "U6.PZMUL" is set higher than the current supply pressure PZ. 			
18, 19 or 20	The positioner is set to "Hold	• Adjust the supply pressure PZ according to the help for			
HoLd	position" if the "U3.PFRLL" or "U4.PFRUL" parameter is set to "HoLd" is set.	error codes "18", "19" or "20".			

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off". ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.

5.18.1 Functional description

Process diagnostics monitors actuating pressure Y1.

- If the value is exceeded: In the "Automatic (AUT)" mode and "Manual (MAN)" mode, error code "21" is shown on the display. The positioner holds the position. The positioner holds the position.
- If, after exceeding the limit "U7.PCL", the actuating pressure Y1 falls below the limit minus the hysteresis "U2.P_HYS", the error code is no longer displayed. Control is active once again.

Process diagnostics parameters:

- Hysteresis for limits (U2.P HYS)
- Limit actuating pressure Y1 (U7.PCL)

Process diagnostics parameters:

- Current actuating pressure Y1 (61.P1)
- Event counter violations of upper limit for actuating pressure Y1 (66.N1MAX)

The data can be displayed in SIMATIC PDM and exported for further processing.

The data can be read and processed using HART commands.

The process diagnostics are monitored with adjustable thresholds. If the limit is exceeded, messages are output via the display and optionally via the digital contacts or the HART communication.

5.18.2 Activate and configure diagnostics

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".

General parameters for pressure sensor-based diagnostics

U1.PUNIT	Pressure unit
Function	The parameter defines the pressure unit.
Setting options	• bar
	• MPa
	• psi
Factory setting	bar

U2.P_HYS	Hysteresis for limits						
Function	The parameter defi	The parameter defines the hysteresis for the following parameters:					
	Lower limit of the supply pressure (U5.PZMLL)						
	Upper limit of supply pressure (U6.PZMUL)						
	• Limit of the act	Limit of the actuating pressure at the Y1 connection (U7.PCL)					
Setting range	0.200 1.000	bar					
	0.020 0.100	MPa					
	2.900 14.50	psi					
Factory setting	0.200	bar					
	0.020	MPa					
	2.900	psi					

Process diagnostics parameters

U7.PCL	Limit actuating pressure Y1
Function	The parameter defines the maximum allowable actuating pressure Y1.
Note	• If the value is exceeded: In the "Automatic (AUT)" mode and "Manual (MAN)" mode, error code "21" is shown on the display. The positioner holds the position.
	• If, after exceeding the limit "U7.PCL", the actuating pressure Y1 falls below the limit minus the hysteresis "U2.P_HYS", the error code is no longer displayed. Control is active once again.
	Diagnostic values:
	Current actuating pressure Y1 (61.P1)
	• Event counter violations of upper limit for actuating pressure Y1 (66.N1MAX)

U7.PCL	Limit actuating pr	essure Y1
Setting range	1.400 7.000	bar
	0.140 0.700	MPa
	20.31 101.53	psi
Factory setting	7.000	bar
	0.700	MPa
	101.53	psi

Activate and configure "Monitoring of actuating pressure Y1"

Process diagnostics can be activated and configured using the following 2 options.

Local operation

- 1. Switch the positioner to "Configure" mode by pressing the button on the display 🕿 for at least 5 seconds.
- 2. Use the buttons on the display to select the "U.\PRES" parameter of the "Pressure monitoring".
- 3. Set the "U.\PRES" parameter to "On".
 ⇒ Process diagnostics is activated and the associated parameters are displayed.
- 4. To adapt the limits at the valve, change the parameters:
 - U1.PUNIT
 - U2.P_HYS
 - U7.PCL

Remote operation with SIMATIC PDM

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔁 SIP	PART	952					_		×
File	Dev	rice View Diagnostics Mai	ntenance	Help	SIMATIC PD	M V9.2 SP2 Proce	ss Devic	e Manage	er
	+I	Download to device	?						
	† ∐	Upload to PG/PC			Parameter	Value	Unit	Status	^
ė.	Ţ	Assign address and TAG			SIPART PS2 DR8 HART		_		
	<u>61</u> 2	Value comparison			□ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		‡	
	D	Change Log			Descriptor			1	
	1	Set device checked			Message	DIAGNOSIS		1	
					Data	1/20/2024		+	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. In the "Device" menu, select the command "Maintenance and Diagnostics > Pressure Monitoring".

🔼 SIF	PART	952				-	-		×
File	Dev	rice View Diagnostics Ma	intenan	ce Help	SIMATIC PDM V	9.2 SP2 Proces	ss Devic	e Manage	er
	+1	Download to device	0	?					
- A	t.	Upload to PG/PC		Parameter		Value	Unit	Status	^
÷.	ŢŢ	Assign address and TAG		Maintenance	& Diagnostics				
	<u>61</u> 2	Value comparison		Activation of	extended diagnostics (52.XDIAG)	On 3 (three-stage		1	
		Object properties		Pressure mor	nitoring (U.\PRES)	On		t []	
		Calibration log		Partial Stroke	e Test (A.\PST)	Off		1	
		Change Log		Monitoring of	dynamic control valve behavior (b.\DEVI)	Off		1	
		Set device checked		Monitoring/c	Monitoring/compensation of pneumatic leakage (C.\LEAK)			1	
	Check configuration Templates			Monitoring stiction (slipstick effect) (d.\STIC) Deadband monitoring (E.\DEBA)		Off		1	
						Off		1	
				Monitoring of	lower endstop (F.\ZERO)	Off		‡ []	
		Identification		Monitoring of	upper endstop (G.\OPEN)	Off		1	
		Wizards	•	Monitoring of	lower limit temperature (H.\TMIN)	Off		1	
		Operation	•	Extended diag	nostics	Off		1	
		Setup	•	Pressure mon	itoring	Off		1	_
	Maintenance and Diagnostics		•	Partial Stroke	Test •	On		↓ I	_
Communication			Monitoring of	dynamic control valve behavior	On		↓↓⊔		
		communication		Monitoring/co	- ompensation of pneumatic leakage	har		T.	_
				Monitoring st	iction	0 200	har	+- †	-~
z004skz	d S	IPART PS2 🖌		Deadband mo	nitoring	y Check 🖌			۰

 \Rightarrow The "Pressure monitoring" dialog is displayed.

7. Activate "Pressure monitoring" (U.\PRES) with the value "On".

SIPART PS2 - Pressure monitoring	? ×
SIEMENS	GOOD 🗸 -
Diagnostics activation	
Pressure monitoring (U.\PRES): Off VI	
Off	
On	
Transfer Messages Print	Close

 \Rightarrow The dialog is displayed with the current parameters.

SIPART PS2 - Pressure monitori	ng			? ×
SIEMENS				Goc
Diagnostics activation				
Pressure monitoring (U.\PRES):	On 🗸	· 🧷		
Pressure unit (U1.PUNIT):	bar 🗸	1	Supply pressure PZ (60.PZ):	
Hysteresis for limits (U2.P_HYS):	0.200	1 bar	Actuating pressure Y1 (61.P1):	
Lower limit PZ (U5.PZMLL):	1.400	🚺 bar	+/- Leakage at Y1 [*/min] (67.LMY1):	
Behavior lower limit PZ (U3.PFRLL):	No reaction> 'Automatic (Auto)' mode] 1		
Upper limit PZ (U6.PZMUL):	7.000	🚺 bar		
Behavior upper limit PZ (U4.PFRUL):	No reaction> 'Automatic (Auto)' mode]‡∥		
Limit actuating pressure Y1 (U7.PCL):	7.000	1 bar		
Limit +/- Leakage [*/min] (U8.LRL):	0.000	🚛 bar		
C				×
Transfer Messages	Print			Close

- 8. To adapt the limits at the valve, change the parameters:
 - U1.PUNIT
 - U2.P HYS
 - U7.PCL
- 9. Transfer these changes to the positioner with the "Transfer" button.
- 10. Close the dialog.

- 11. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.
- 12. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".

5.18.3 With SIMATIC PDM: Show diagnostic results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Device" menu, select the command "Maintenance and Diagnostics > Pressure Monitoring".

	🖊 SIP	ART	PS2					-	- 1		<
	File	Dev	vice View Diagnostics	Maintena	nce	Help	SIMATIC PDM	V9.2 SP2 Proce	ss Device	e Manager	
		+I	Download to device		?						
	.	t[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
	<u> </u>	Ţ.	Assign address and TAG				SIPART PS2 DR8 HART				
		<u>61</u> 2	Value comparison				□ Identification				
			Object properties				TAG	DEMOKOFF		‡ []	
			Calibration log				Long TAG	SIPART PS2		‡ []	
			Change Log				Descriptor	-		‡ []	
			Set device checked				Message	DIAGNOSIS		1	
1		_					Dut	1 (20 (2024		+ 1	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. In the "Device" menu, select the command "Maintenance and Diagnostics > Pressure monitoring".

 \Rightarrow The "Pressure monitoring" dialog shows the parameters and current "Actuating pressure Y1" (61.P1).

SIPART PS2 - Pressure monitoring					?	×	(
				GOOD 🗸	-[2	^
g (U.\PRES): On	1]					
t (U1.PUNIT): bar 🗸	1		Supply pressure PZ (60.PZ):	3.991	11	bar	
s (U2.P_HYS): 0.200	1	bar	Actuating pressure Y1 (61.P1):	1.667	1	bar	
2 (U5.PZMLL): 1.400	1	bar	+/- Leakage at Y1 [*/min] (67.LMY1):	0.000	1	bar	
Z (U3.PFRLL): No reaction> 'Automatic (Auto)' mode	1						
: (U6.PZMUL): 7.000	1	bar					
2 (U4.PFRUL): No reaction> 'Automatic (Auto)' mode	1						
Y1 (U7.PCL): 7.000	1	bar					
min] (U8.LRL): 0.000	1	bar					
<						>	~
Transfer Messages Print					Clo	se]

- 7. Close the dialog.
- 8. Select the directory "Maintenance & Diagnostics > Diagnostic values > Pressure".
 ⇒ The following diagnostic results are displayed:
 - Pressure unit (U1.PUNIT)
 - Actuating pressure Y1 (61.P1)
 - Violations of limit Y1, resettable (66.N1MAX)

SIPART PS2		_	
File Device View Diagnostics Mainte	nance Help SIMATIC PDM V9	.2 SP2 Process D	evice Manager
🔒 📳 🕫 🤷 🖻 🕼 😫 🕯	2		
SIPART PS2	Parameter	Value	Unit Status
□ ··· I SIPARI PS2 DR8 HARI	⊡ Pressure		
	Pressure unit (U1.PUNIT)	bar	‡]
□‡_ Maintenance & Diagnostics	Supply pressure PZ (60.PZ)	3.990	bar 🚺
Pressure monitoring Triggered process monitoring	Actuating pressure Y1 (61.P1)	1.670	bar 🗘
Inggered pressure monitoring Offline leakage test	+/- Leakage at Y1 [*/min] (67.LMY1)	0.000	bar 🚺
⊡‡∐ Diagnostic values	⊡ Peak values		
Maintenance counters	Maximum supply pressure PZ (resettable) (63.PZMAX)	5.230	bar 🚺
	Maximum positive leakage at Y1 [*/min] (resettable) (69.LMUY1)	0.000	bar 🚺
E-1 Pressure	Maximum negative leakage at Y1 [*/min] (resettable) (71.LMDY1)	0.000	bar 🚺
Peak values	Event counter		
Event counter Offline test reports	Violations of lower limit PZ (resettable) (64.N_MIN)	25	ţ.
Communication	Violations of upper limit PZ (resettable) (65.N_MAX)	0	ţ.
	Violations of limit Y1 (resettable) (66.N1MAX)	0	1
-			
z004skzd SIPART PS2 🖌	Online access 🖌 🛛 Diagnosis Update 🖌 🛛 Identity	Check 🖌	

5.18.4 Diagnostic value "Actuating pressure Y1" (61.P1)

Diagnostic value	Actuating pressure Y1					
	Short designatio	n: 61.P1				
Function	Shows the curren	Shows the current actuating pressure Y1.				
Note	The differential pr	essure between the ambient pressure and the output Y1 is measured.				
	If there is no actu	ating pressure, the displayed value should be approximately "0".				
	Depending on the sensors may devia	positioner's operating altitude above sea level, the zero point of the pressure ate and must be calibrated.				
Requirement	The positioner	r has pressure sensors (-Z PO2 option).				
	"Pressure mon	itoring" (U.\PRES) is activated.				
Display range	0 9.999	bar				
	0 0.999	MPa				
	0 145.00	psi				
Unit	• bar	The unit is defined in the "U1.PUNIT" parameter of "Pressure monitoring"				
	• MPa	(U.\PRES).				
	• psi					
Communication						
Actuating pressure Y1 (61.P1)					
SIMATIC PDM Export	Name	var_P1_value				
	DisplayValue	≜ Value				
HART communication (read)	Command	#200				
	Response Data	Bytes 6 9				
		Format: Float				
Pressure unit (U1.PUNIT)						
SIMATIC PDM Export	Name	var_pressureUnit				
	DisplayValue	• bar				
		• MPa				
		• psi				
HART communication (read)	Command	#200				
	Response Data	Byte: 1				
		Format: Enum				

Calibrate zero point

Requirement

- The positioner is depressurized.
- The displayed pressure deviation is in the following range:
 - -0.500 ... 0.500 bar
 - -0.050 ... 0.050 MPa
 - -72.51 ... 72.51 psi

Procedure

- 1. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display 🕾 🤝 🛧 simultaneously for at least 2 seconds.
- 2. Select the diagnostic value "61.P1".
- 3. Press the \underline{A} button for at least 5 seconds and the display will show "rESEt". \Rightarrow If "0" is displayed, the calibration was successful.

 \Rightarrow If "notoL" was displayed, the calibration was not successful due to excessive pressure deviation.

5.18.5 Diagnostic value "Violation of limit Y1, resettable" (66.N1MAX)

Diagnostic value	Violations of limit Y1, resettable					
	Short designatio	n: 66.N1MAX				
Function	If the actuating pressure Y1 exceeds the limit in the "U7.PCL" parameter of the "Pressure mon- itoring" (U.\PRES) process diagnostics, the event counter of the diagnostic value "66.N1MAX" is incremented.					
Note	The diagnostic va	The diagnostic value can be reset.				
Requirement	The positioner has firmware version 5.03 or higher.					
Display range	0 99 999					
Communication						
SIMATIC PDM Export	Name	var_P1_NoLimitReachedResettable				
	DisplayValue	≜ Value				
HART communication (read)	Command	#200				
	Response Data Bytes: 22 23					
		Format: Unsigned-16				

5.18.6 Via HART communication: Read out diagnostic results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Read out process diagnostics parameters

Request

Send to the positioner via HART communication:

• Command "#198"

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Table 5-42Response Data Bytes

Byte	Format	Description
0	Enum	Pressure monitoring (U.\PRES)
1	Enum	Pressure unit (U1.PUNIT)
2 5	Float	Lower limit PZ (U5.PZMLL)

Process diagnostics

5.18 Monitoring actuating pressure Y1 (pressure sensor-supported)

Byte	Format	Description
6 9	Float	Hysteresis for limits (U2.P_HYS)
10	Enum	Behavior lower limit PZ (U3.PFRLL)
11	Enum	Behavior upper limit PZ (U4.PFRUL)
12 15	Float	Upper limit PZ (U6.PZMUL)
16 19	Float	Limit actuating pressure Y1 (U7.PCL)
20 23	Float	Limit leakage (U8.LRL)
24 25	Unsigned-16	Time pressure measurement Y1 (U9.TPMT)

 Table 5-43
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

Read out the results of the process diagnostics

Request

Send to the positioner via HART communication:

• Command "#200"

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Table 5-44 Response data bytes

Byte	Format	Description (parameter)
0	Unsigned-8	Number of available Pressure Sensors
1	Enum	Pressure Unit (U1.PUNIT)
2 5	Float	Supply Pressure Value (60.PZ)
6 9	Float	Chamber 1 Pressure Value (61.P1)
10 13	Float	Chamber 2 Pressure Value (62.P2)
14 17	Float	Supply Pressure Maximum Pointer resettable (63.PZMAX)
18 19	Unsigned-16	Number of Supply Pressure Limit Underruns resettable (64.N_MIN)
20 21	Unsigned-16	Number of Supply Pressure Upper Limit Overruns resettable (65.N_MAX)
22 23	Unsigned-16	Number of Chamber Pressure 1 Limit reached resettable (66.N1MAX)
24 27	Float	Delta Pressure Chamber 1 (67.LMY1)

Byte	Format	Description (parameter)
28 31	Float	Delta Pressure Chamber 2 (68.LMY2)
32 35	Float	Chamber 1 positive Delta Pressure Maximum Pointer resettable (69.LMUY1)
36 39	Float	Chamber 2 positive Delta Pressure Maximum Pointer resettable (70.LMUY2)
40 43	Float	Chamber 1 negative Delta Pressure Maximum Pointer resettable (71.LMDY1)
44 47	Float	Chamber 2 negative Delta Pressure Maximum Pointer resettable (71.LMDY2)

 Table 5-45
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
5	Error	Too Few Data Bytes Received
6	Error	Device Specific Command Error
16	Error	Access Restricted

5.18.7 With SIMATIC PDM: Export diagnostics results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🔼 SI	PART F	PS2					-	-		×
File	Dev	vice View Diagnostics	Maintena	ince	Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	r
	+I	Download to device		?						
	†]	Upload to PG/PC				Parameter	Value	Unit	Status	^
	Assign address and TAG Image: Sign address and TAG Image: Sign address and TAG									
	<u>61</u> 2	Value comparison				ldentification				
		Object properties				TAG	DEMOKOFF		1	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
	_					Data	1/20/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.
- 6. In the "File" menu of SIMATIC PDM , select the command "Export...".

🖊 s	IPART PS2						_		×
File	Device	View	Diagnostics	Maintenance	Help	SIMATIC PDM V9.2 SP2	Process De	vice Manag	ger
	Save (Ctrl+S	🖌 i 🕥 🖪	器 🏦 🕐					
₽	Export				Parameter	Value	Uni	t Status	^
•	Import		HART		SIPART PS2 DR8 HART				
	Print (Ctrl+P	_		Identification				
-	Class		 Diagnostics 		TAG	DEMOKOFF		1	
	Close				Long TAG	SIPART PS2		1	
					Descriptor	-		1	
					Message	DIAGNOSIS		1	
					Date	8/15/2023		1	
					□ Device				
					Manufacturer	Siemens		1	
					Device Type	SIPART PS2		‡	
					Order number	-		1	
					Serial number	N1KO037518210		‡	
					Final Assembly Number	0		‡	
					Hardware Revision	3		1	
					Firmware revision	5.03.00-28		‡	
					EDD version	25.00.00			
					□ Setup				
L	1		1		 Dynamic variable mapp 	ing	1		×
z004sł	czd SIPAR	T PS2 🖌			Online access 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌			O.,;

The "Export - ..." dialog opens.

- 7. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

Export - SIPART PS2			?	\times
Export directory:				^
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export				
HTML transformation file:				
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_Exp	ort Transformation.xs	sl		
Which information should be exported?				
Device parameters				
Diagnostics				
Document Manager				
Selection				
Object				
SIPART PS2				-
Chabing				
Status.				_
				~
				>
Messages	Start	Stop	Close	

8. Start the export with the "Start" button.

- 9. Wait until the status "Export: Action finished" is displayed. The following 2 files are stored in the export path:
 - XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g.
 "Param\$SIPART PS2\$20230815_121412.xml"
 - XSL-Stylesheet "PDM80_ExportTransformation.xsl"
- 10. Close the dialog.

11. Open the XML file with suitable software, e.g. an editor.

Param\$SIPART PS2\$20230815_121412.xml -	Editor			_		×	
<pre><?xml version="1.0" encoding="utf-8"?> <!-- Created by POM 902.200.2901.5. Do no <?xml-stylesheet type='text/xsl' href='PDM <PDM XMLVersion="8.04"--> <object> <device> <id>2</id> <pltid>00/PltId> <type>ED_08JECT_OFFLINE</type> <class>EDD_OCLASS_NODE_HART_MODEMNetze/HART_MODEM-Netzwer <onlinevalues>False</onlinevalues> <catalogpath>/DEVICE/HART/ACTUATOR/E <objectname>SIPART_PS2</objectname></catalogpath></class></pltid></device></object></pre>	<pre>>t edit this File!! 180_ExportTransformatio 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3</pre>	> n.xsl'?> ObjectPat NS/SIPART	:h> '_PS2/SIPART_PS2_HAR	T_DR8 </th <th>CatalogP</th> <th>Path</th> <th>^</th>	CatalogP	Path	^
<pre></pre> <commandwode>ExportOffline DeviceParameters> <attribute <pre="" browsename="tag" name="tag"> <pre></pre> <pre></pre> <pre></pre> <pre>Cattribute Name="descriptor" BrowseName <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre>Cattribute Name="descriptor" BrowseName <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre>Cattribute Name="descriptor" BrowseName <pre></pre> <pre><</pre></pre></pre></pre></attribute></commandwode>	Node> hg" Type="String" Label he"longTag" Type="Strin hame="descriptor" Type= he"message" Type="Strin hate" Type="DateTime" L he" ->2023-08-15T00:00:0 howseName="manufacturer	="TAG" Pa g" Label= "String" g" Label= abel="Dat 0id" Tvpe	nramViewMember="True "Long TAG" ParamVie Label="Descriptor" "Message" ParamView e" ParamViewMember= pute> :="UInt16" Label="Ma	" Displ wMember ParamVi Member= "True" nufactu	.ayValue= '="True" .ewMember ."True" D DisplayV urer" Par	"DE Dis `="T Disp alu `amV >	~
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-	8 mit BON	N	

The XML file contains the following data for process diagnostics.

Table 5-46	Parameter
------------	-----------

Parameter	r Data description in the XML file								
	Name	Label	DisplayValue	Unit					
			e.g.						
U1.PUNIT	var_pressureUnit	Druckeinheit (U1.PUNIT)	bar	• bar					
U2.P_HYS	var_PZ_Hysteresis	Hysterese für Grenzwerte (U2.P_HYS)	0.200	MPansi					
U7.PCL	var_pressureChamberLimit	Grenzwert Stelldruck Y1 (U7.PCL)	7.000	P-1					

Diagnostic val-	Data description in the XML file									
ue	Name	Label	DisplayValue	Unit						
			e.g.							
61.Y1	var_P1_value	Stelldruck Y1 (61.P1)	1.670	barMPapsi						
66.N1MAX	var_P1_NoLimitReachedResettable	Überschreitungen Grenzwert Y1 (rücksetzbar) (66.N1MAX)	0	(Quantity)						

Table 5-47 Diagnostic values

See also

Activate and configure diagnostics (Page 482)

5.18.8 Messages

5.18.8.1 General information

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- "Pressure monitoring" (U.\PRES) is activated.

Notes

If the limits are exceeded:

- A message appears on the display.
- The fault message output is activated when one of the following modules is used:
 - Digital I/O Module (DIO)
 - Inductive Limit Switches (ILS)
 - Mechanic Limit Switches (MLS)
- When using HART communication:
 - The "more status available" bit is set.
 - You can use the "#48" command to query the specific message for process diagnostics.

5.18.8.2 Messages in the display

Indication on the display

If the set limit is exceeded, the respective error code is output.

If several messages are present at the same time, the display switches between the different error codes.

Display		Possible cause
	① Error code 21	The actuating pressure at Y1 exceeds the limit "U7.PCL"
836,18 21 Hold	1 Error code 21 with error message HoLd	The actuating pressure at Y1 exceeds the limit "U7.PCL" The positioner is set to "Hold position" if the "U3.PFRLL" or "U4.PFRUL" parameter is set to "HoLd" is set.

5.18.8.3 Messages via digital signals

Requirement

The positioner has a fault signal output, which is located on one of the following modules:

- Digital I/O Module (DIO)
- Inductive Limit Switches (ILS)
- Mechanic Limit Switches (MLS)

Message via the digital output

If the actuating pressure Y1 is higher than the limit "U7.PCL", the fault message output is activated.



I/Os

5.18.8.4 With SIMATIC PDM: Display diagnostics status

Requirement

- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created for the positioner.

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SIF	PART	952					-	-		<
File	Dev	rice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
	+I	Download to device		?						
	t[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
<u>.</u>	Π	Assign address and TAG		SIPART PS2 DR8 HART						
	<u>6</u> 10	Value comparison 🗆 Identification								
		Object properties				TAG	DEMOKOFF		‡]	
		Calibration log				Long TAG	SIPART PS2		1	
		Change Log				Descriptor	-		1	
		Set device checked				Message	DIAGNOSIS		1	
						Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🖊 si	PART PS2								_	[×
File	Device	View	Diag	gnostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2 P	rocess [)evice	e Manage	er
	 40 1	M 🗗 🖻	R	Update (diagnostics							
	SIPART	PS2		Status			ameter	Value	U	nit	Status	^
Ė) 🤌 SIPA	RT PS2 DI		Trend ch	arts	•	IPART PS2 DR8 HART					
	. ≝… ∔ . !	dentificatior Setup	ſ	Histogra	ms	Ĺ	Identification					
	i 🥠 🖓	Maintenanc		v Di	1113	ľ	TAG	DEMOKOFF			1	
	‡ [] (Communicat		Value ch	t.e	Ţ	Long TAG	SIPART PS2			1	
				Aleres le	arts	•	Descriptor	•			1	
				Alarm Io	дроок		Message	DIAGNOSIS			1	
							Date	8/15/2023			1	
							Device					
							Manufacturer	Siemens			1	
							Device Type	SIPART PS2			1	
							Order number	-			1	
							Serial number	N1KO037518210			1	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			1	
							EDD version	25.00.00				
						E	Setup					
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
				□ Basic settings								
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator s	pi		1	¥
z004sk	zd SIPA	RT PS2 🖌					🛛 Online access 🖌 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌 🗌				<mark>)</mark>

6. In the "Diagnostics" menu, select the "Status" command.

- 7. Select the "Messages tab.
 - If "Limit actuating pressure Y1" (U7.PCL) is exceeded, the message is highlighted:
 - Actuating pressure exceeds the upper limit

SIPART PS2 - Status	? ×
Diagnostics Status Messages	· · · · · · · · · · · · · · · · · · ·
SIEMENS	
Device status: More status available Field device malfunctioned Finary variable outside the operating limits Non-primary variable outside the operating lim Current output outside the operating range lim	Device status 2: Tight closing DOWN Tight closing UP Fast closing UP Digital input DI1
Device status 1: Device in 'Automatic (AUT)' mode Device in 'Configuring' mode Device in P manual operation Digital setpoint source Alam has responded	Operation warnings: Actuating pressure exceeds the upper limit Control variable out of range Setpoint out of range Device is not ready for operation (not initialize Supply pressure falls below the lower limit
	Device errors: EEPROM error Error measured value acquisition Pressure sensor module defective
	Device status: Maintenance required Failure Functional check
Curr	ent temperature (30.TEMP): 27.1
	Input current of device: 10.399
<	>
Transfer Messages Print	Close

8. Close the dialog.

5.18.8.5 Via HART communication: Get messages

Condition

The positioner has a HART communicator: SIPART PS2 6DR51.../6DR52..

Get message

If the limit for actuating pressure Y1 is exceeded, the "more status available" bit is set.

- Use the "#48" command to call up the specific message for process diagnostics. The command returns 20 bytes of data. The message for the process diagnostics "Monitoring of actuating pressure Y1" is contained in the following Byte:
 - Byte 3, Bit 6: The actuating pressure at Y1 exceeds the limit "U7.PCL".

5.18.8.6 Reset messages

The messages are saved in the alarm logbook of the positioner.

The error messages can be reset using the corrective measures.

Error code/error message	Possible cause	Remedy
21	The actuating pressure Y1 exceeds the limit "U7.PCL".	• Check to determine why the actuating pressure was exceeded.
21 HoLd	The positioner is set to "Hold position" if the "U3.PFRLL" or "U4.PFRUL" parameter is set to "HoLd" is set.	 Reduce the actuating pressure Y1 by moving the positioner in the opposite direction. Limit "U7.PCL" is set higher than the current actuating pressure Y1.

The message on the display disappears immediately if one of the following measures is taken:

- After another process diagnostics are successfully executed.
- Set application parameter "52.XDIAG" to "Off".
 ⇒ Process diagnostics are deactivated.
- Set the process diagnostics parameter to "Off".
 ⇒ Process diagnostics are deactivated.
Maintenance diagnostics

6.1 Definition of maintenance diagnostics

During a maintenance phase, e.g. while the flow rate is not being actively controlled, active tests and diagnostics can be performed using the maintenance diagnostics on the valve.

This determines the condition of the valve.

The current diagnostic results can be compared and evaluated with previous results.

6.2 Overview of maintenance diagnostics

6.2 Overview of maintenance diagnostics

The maintenance diagnostics available in the positioner depend on the firmware version.

Maintenance di- agnostic	Function	Diagnost SIPART P	ics applicable S2 position	e for er	Additional infor- mation
		With- out pres- sure sensor	With pres- sure sen- sor (-Z P01 op- tion)	With pres- sure sen- sors (-Z P02 option)	
Leakage test	The test uses position measurement to de- tect pneumatic leaks in the actuator or in the piping.	x	x	x	Leakage test (Page 507)
Full Stroke Test	The test analyzes the valve based on a complete stroke in both directions.	x	X	x	Full Stroke Test (FST) (Page 509)
Step Response Test	The test analyzes the valve based on a par- tial stroke in one direction.	x	X	X	Step Response Test (SRT) (Page 519)
Multi Step Re- sponse Test	The test analyzes the valve based on several partial strokes.	x	x	x	Multi Step Re- sponse Test (Page 528)
Valve Performance Test	 The test determines the following valve characteristics: Hysteresis Non-linearity Non-repeatability Measurement deviation Average measurement deviation of all cycles Maximum measurement deviation Total mean measurement deviation Uncertainty 	-	-	X	Valve Performance Test (VPT) (Page 540)
Valve Signature (drucksensorges- tützt)	The diagnostics create the characteristics of the valve using the pressure sensors integra- ted in the positioner. The dependency between pressure and po- sition of the valve is shown.	-	-	x	Valve Signature (VS) (Page 548)
Triggered pressure monitoring (druck- sensorgestützt)	The diagnostics determine the pressure dif- ference between 2 measurements and thus test the function of external attachments, e.g. the solenoid valve.	-	-	X	Triggered pressure monitoring (TPM) (Page 574)

6.3 Leakage test

6.3.1 Functional description

The leakage test detects pneumatic leaks in the actuator or in the piping.

The test blocks the pneumatic outputs Y1 and Y2 for 1 minute.

The position of the valve is monitored: In the event of a pneumatic leak, the position of the valve changes.

As a result, the change in position per minute is shown on the display and saved in the diagnostic value "Leakage test" (11.LEAK) .

The leakage test can be started during initialization or as a manual test at a later time.

- During initialization: The positioner automatically moves the valve to a center position and performs the test.
 Additional information → Operating instructions
- Manual test in the "Manual mode (MAN)" \rightarrow Manual leakage test (Page 508)

Note

During the 1-minute test, the positioner is not in "Automatic (AUT)" mode and has the following behavior:

- Any system deviations that occur are not corrected.
- The positioner does not follow the setpoint.

6.3 Leakage test

6.3.2 Manual leakage test

Requirement

- The positioner is in a maintenance phase, e.g. while the flow rate is not being actively controlled.
- The positioner is attached to the valve and connected to the power supply and the compressed air supply.
- The positioner is in "Manual (MAN)" mode.

Procedure

- Set the actuator to the desired start position. The position of the actuator must not be at one of the two end positions, "Endstop 0% position" or "Endstop 100% position".
 - Recommended for actuators with spring: Set a position with high chamber pressure, e.g. 90 to 95%.
 - Recommendation for drives without spring: Set a medium position, e.g. 40 to 60%.
- 2. Switch the positioner to "Diagnostics" mode by pressing the 3 buttons on the display $\bigcirc \bigtriangleup$ simultaneously for at least 2 seconds.
- 3. Select the diagnostic value "Leakage test" (11.LEAK).
- 4. Press the \triangle button for at least 5 seconds.
 - => "Strt" is shown in the display.
 - => The leakage test starts after 5 seconds.
 - => The display alternates between "tESt" and the current position of the actuator for 1 minute.

After 1 minute, the display shows the difference between the actuator position before and after the test.

6.3.3	Diagnostic value	"Leakage test"	(11.LEAK)
	5		• •

Diagnosewert	Leakage test				
	Short designatio	n: 11.LEAK			
Function	The diagnostic va	lue shows the resul	t of the last leakage test or starts the leakage test.		
	The leakage test o	letects pneumatic l	eaks in the actuator or in the piping.		
Note	This diagnostic va → Leakage test (P	lue can be used to age 507).	start the leakage test as a maintenance diagnostic		
Display options	-	The display has or	ne of the following causes:		
		No leakage tes	st has been performed to date.		
		The positioner	r is not initialized.		
		The factory setting was restored with the application parameter "50.PRST" was.			
	0.0 100.0	.0 An existing test result means one of the following possibilities:			
		• The leakage test was performed manually.			
		• The leakage te	est was performed during initialization.		
Unit	%/minute				
	Note: The value sh leakage test.	lows the change in a	actuator position in % during the duration of the 1-minute		
Communication					
SIMATIC PDM Export	Name	ps2_leakage_act			
	DisplayValue	≙ Value			
HART communication (read)	Command	#169			
	Response Data	Byte: 32	Leak Test state		
		Format: Enum			
		Bytes: 29 31	Leak Test value		
		Format: Float			

6.4.1 Functional description

The Full Stroke Test (FST) analyzes the valve based on a complete stroke in both directions.

The test moves the actuator of the valve from the start position (0%) to the end position (100%) and back to the start position.

The actual value curve is analyzed in accordance with the IEC 61514-2 standard.

The FST can be configured and executed during a maintenance phase of the valve with a Device Manager Software, e.g. SIMATIC PDM.

Local operation via the display and buttons is not possible.

The result of the test is saved in the positioner and can be compared with previous recordings to detect changes in the valve.

With SIMATIC PDM, the diagnostics results can be read from the positioner and displayed as charts.

Note

During the test, the positioner is not in "Automatic (AUT)" mode and has the following behavior:

- Any system deviations that occur are not corrected.
- The positioner does not follow the setpoint.
- The positioner moves the valve.

6.4.2 Start full stroke test.

Requirement

- The positioner is in a maintenance phase, e.g. while the flow rate is not being actively controlled.
- The positioner is attached to the valve and connected to the power supply and the compressed air supply.
- The positioner is in "Automatic (AUT)" mode.
- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Start FST

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

•	🖊 SIP	ART F	PS2						-		×
	File	Dev	vice View Diagnostics	Maintena	ance	Help	SIMATIC PDM	V9.2 SP2 P	rocess Devic	e Manager	,
E		+1	Download to device		?						
Г	<u> </u>	t[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
L	÷.	P	Assign address and TAG				I SIPART PS2 DR8 HART				
		<u>61</u> 2	Value comparison				⊡ Identification				
L			Object properties				TAG	DEMOKOFF		1	
L			Calibration log				Long TAG	SIPART PS2		‡ []	
L			Change Log				Descriptor	-		‡ []	
			Set device checked				Message	DIAGNOSIS		1	
		_					Data	1/20/2024		+	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

- 5. Close the dialog.
- 6. In the "Device > Wizards"menu, select the command "Wizard Full Stroke Test...".

🖊 SIP	ART	S2					_		×	
File	Dev	ice View Diagnostics Ma	intenance	Help	SIMAT	IC PDM V9.2 SP2	rocess Devic	e Manage	er:	
	+I	Download to device	?	_						
	1	Upload to PG/PC		arameter	Value		Unit	Status	^	
<u>.</u>	🗄 😈 Assign address and TAG		ind	SIPART PS2 DR8 HART						
	Value comparison			∃Identification						
		Object properties		TAG	DEMOKOFF			1		
		Calibration log		Long TAG	SIPART PS2			1		
		Change Log	n, die	Descriptor	-			1		
		Set device checked	Jeben	Message	DIAGNOSIS			1		
	Jan .	Check configuration		Date	8/15/2023			1		
		Templater	ngen,	Device	Device					
		Templates		Manufacturer	Siemens			1		
		Identification		Device Type	SIPART PS2			1		
		Wizards	•	Wizard - Quick Start	Wizard - Quick Start Wizard - Partial Stroke Test I0			1		
		Operation	•	Wizard - Partial Stroke Test.				1		
		Setup		Wizard - Full Stroke Test		_		1		
		Maintenance and Diagnostics		Wizard - Full Stroke lest	•			‡∐	_	
		Maintenance and Diagnostics	-	Wizard - Step Response Test				ţ.	_	
		Communication		Wizard - Wulti Step Respon	Wizard - Multi Step Response lest					
				wizard - valve Performance	e lest					
				Wizard - Valve Signature					<u> </u>	
z004skz	d Sl	PART PS2 🖌		Online access 🖌 D	iagnosis Updat	te 🖌 Identity Check 🖌			<mark>)</mark>	

 \Rightarrow The dialog with "Step 1 of 3: Settings" opens.

Step 1: Settings

SIPART PS2 - Wizard - Full Stroke	: Test		?	×
Settings Test Trace Diagram	SIEMENS Start position: Stroke height of step response time (Txx):	0.0% v 10 90.0 10 %		
Transfer		Analy David	Mandas	~

Transfer	Transfers data to the positioner
Messages	Opens the message log
Print	Creates a PDF file
Apply	Saves the changed values of the dialog
< Back	Opens the dialog of the previous step
Next >	Opens the dialog for the next step

Table 6-1Explanation of the buttons

1. Select the "Start position".

Start position	
Function	The parameter defines the start position of the FST in percent.
Setting options	• 0.0
	• 100.0
Factory setting	0.0
Unit	%

2. Enter the "Stroke height of step response time (Txx)".

Stroke height of step response time (Txx)				
Function	The parameter defines the stroke height in percent for determining the step response times Txx.			
Setting range	5.0 95.0			
Factory setting	90.0			
Unit	%			

- 3. Click the "Apply" button.
- 4. Click the "Next >" button.
 ⇒ The "Step 2 of 3: Test" dialog opens.

Step 2: Test

SIPART PS2 - Wizard - Full Stroke Test	?	×
Step 2 of 3: Test Settings Test Trace Diagram	T: Vo FST FST stopped FST fault FST valid FST valid FST still active	~
Transfer Messages Print	Start/Stop < Back Next >	•

If an immediately preceding FST was executed, the diagram of the previous FST is displayed. In the "Global status for FST" dialog box, the current status for the FST is displayed.

The following states are possible:

- No FST
- FST stopped
- FST fault
- FST valid
- FST still active

Procedure

- 1. Click the "Start/Stop" button. \Rightarrow A dialog opens.
- 2. Confirm the start with "OK". \Rightarrow A dialog opens with a note on possible damage.
- 3. Follow the instructions in the dialog.
- 4. To start the test, select the "Yes" option button and click "OK".
 - \Rightarrow The "FST" starts.
 - \Rightarrow "FST" is shown in the display.
 - \Rightarrow A dialog opens.

5. Close the dialog with "OK".

The positioner moves the actuator as follows:

- From the start position to the start position.
- From the start position to the center position.
- From the center position to the end position \triangleq start position.
- From the start position back to the start position.

Faults or errors are displayed in the "Detailed information" dialog box:

- Start position not reached
- Mid position not reached
- End position not reached

The "FST valid" status is highlighted after successful diagnostics. The results are presented in "Test results" dialog box:

Characteristic value	Description
Breakout time 1	Time between activation of the positioner and the beginning of the movement of the valve from the start position to the center position.
Breakout time 2	Time between activation of the positioner and the beginning of the movement of the valve from the center position to the start position.
Step response time 1	Time between activation of the positioner in the start position and reaching center position.
Step response time 2	Time between activation of the positioner in the center position and reaching the start position.
Step response time 1 (T63)	Time between activation of the positioner in the start position and reaching 63.2% of the distance to the center position.
Step response time 2 (T63)	Time between activation of the positioner in the center position and reaching 63.2% of the distance to the start position.
Step response time 1 (T86)	Time between activation of the positioner in the start position and reaching 86.5% of the distance to the center position.
Step response time 2 (T86)	Time between activation of the positioner in the center position and reaching 86.5% distance to the start position.
Step response time 1 (Txx)	Time between activation of the positioner in the start position and reaching Txx% of the distance to the center position.
	Txx corresponds to the "Stroke height of the step response time" set in step 1.
Step response time 2 (Txx)	Time between activation of the positioner in the center position and reaching Txx% distance to the start position.
	Txx corresponds to the "Stroke height of the step response time" set in step 1.

SIPART PS2 - Wizard - Full Stroke	e Test					?		×
Step 2 of 3: Test								^
	SIEMENS							
Settings Test	Global status for FST:	 No FST FST stopped FST fault ✓ FST valid FST still activ 	11					
Trace Diagram	Test results							
	Breakout time 1:	0.74 ~	t s	Breakout time 2:	0.29	↓ ↓	s	
	Step response time 1:	3.30 🗸 🗧	t s	Step response time 2:	1.86	↓ ↓	s	
	Step response time 1 (T63):	2.30 🗸 🗧	t s	Step response time 2 (T63):	0.98	~ 1	s	
	Step response time 1 (T86):	2.68 🗸	t s	Step response time 2 (T86):	1.35	~ 1	s	
	Step response time 1 (Txx):	2.72 🗸 🗸	t. s	Step response time 2 (Txx):	1.40	~ 1	s	
								~
Transfer Messages	Print			Start/Stop	< Back	N	ext >	

6. Click the "Next >" button.

 \Rightarrow The "Step 3 of 3: Trace Diagram" dialog opens.

Step 4: Create trace chart

	SIPART PS2 - Wizard - Full St	oke Test		?	×	
Ste	ep 3 of 3: Trace Diagram	SIEMENS				^
	Settings	Time stamp: Day: 1/ 1/1900	stamp: Time:	00:	00:00	
	Test	No trace data' are available or no trace data' were read.				
<					>	~
	Transfer Messages	Print Read Trace	< Back	Finisł	i ,	101 - 101 -

If an immediately preceding FST was executed, the diagram of the previous FST is displayed.

- Click the "Read Trace" button.
 ⇒ The "Read Trace Sample type" dialog opens.
- 2. Select the option button "Read in actual value only" or "Read in actual value and setpoint" dialog.
- 3. Click "OK".

 \Rightarrow The "Read Trace - Select skipped samples" dialog opens.

SIPART PS2 - Read Trace X
Select skipped samples Every sample (very slow) Every 2nd sample (slow) Every 3rd sample (medium) Every 5th sample (fast) Every 10th sample (very fast)
OK Cancel

As the HART communication may be slow, it is possible to load the chart data from the positioner in different resolutions.

- 4. Select the option button for the required sample rate, e.g. "Every 3rd sample (medium)".
- 5. Close the dialog by clicking "OK". \Rightarrow The "Message Log" dialog opens.
- 6. Wait until the status "Finished" is displayed.

- 7. Click the "Close" button.
 - \Rightarrow The trace chart of the current FST is displayed.



The diagram below shows an example of the setpoint values and the actual values.

- 8. Close the dialog with the "Finish" button.
 - \Rightarrow The test results and the chart are saved.

Displaying test results

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. Select the "Maintenance & Diagnostics" directory.
- 3. Select "Offline test reports" .
- 4. Click the "Show offline test reports" button.
- 5. Select "Full Stroke Test". \Rightarrow The test results are displayed.

6.5.1 Functional description

The Step Response Test (SRT) analyzes the valve based on a partial stroke in one direction.

The test moves the actuator of the valve from a freely configurable start position to a freely configurable end position.

The actual value curve is analyzed in accordance with the IEC 61514-2 standard.

The SRT can be configured and executed during a maintenance phase of the valve with a Device Manager Software, e.g. SIMATIC PDM.

Local operation via the display and buttons is not possible.

The result of the test is saved in the positioner and can be compared with previous recordings to detect changes in the valve.

With SIMATIC PDM, the diagnostics results can be read from the positioner and displayed as charts.

Note

During the test, the positioner is not in "Automatic (AUT)" mode and has the following behavior:

- Any system deviations that occur are not corrected.
- The positioner does not follow the setpoint.
- The positioner moves the valve.

6.5.2 Start Step Response Test

Requirement

- The positioner is in a maintenance phase, e.g. while the flow rate is not being actively controlled.
- The positioner is attached to the valve and connected to the power supply and the compressed air supply.
- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Start SRT

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART F	952				-	-		ĸ
File	Dev	ice View Diagnostics I	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	↓	Download to device	?						
	t[Upload to PG/PC			Parameter	Value	Unit	Status	^
<u> </u>	Ţ	Assign address and TAG			I SIPART PS2 DR8 HART				1
<u> </u>			⊡ldentification						
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

- 5. Close the dialog.
- 6. In the "Device > Wizards" menu, select the command "Wizard Step Response Test...".

File	Dev	ice View Diagnostics Main	ntenance	e Help	SIMA	TIC PDM V9.2 SP2 Proce	ess Devic	e Manag	er
	+	Download to device Upload to PG/PC							
	†			Parameter	Value			Status	1
<u> </u>	Assign address and TAG Assign address and TAG			SIPART PS2 DR8 HART					
				Identification	□ Identification				
		Object properties		TAG	DEMOKOFF			1	
	ß	Calibration log		Long TAG	SIPART PS2			1	
	2	Change Log		Descriptor	•			1	
	<u>.</u>	Set device checked		Message	DIAGNOSIS			1	
	- 1	Check configuration		Date	8/15/2023			1	
	Templates			Device					
				Manufacturer	Siemens			1	
		Identification		Device Type	SIPART PS2				
		Wizards		Wizard - Quick Start				1	
				Wizard - Partial Stroke Test	t	10		Ĵ.	_
		Setup	•	Wizard - Full Stroke Test	_		I.		
		Maintenance and Diagnostics		Wizard - Sten Response Te	ct			I.	_
				Wizard - Multi Step Respo	nse Test			11	_
		Communication	_	Wizard - Valve Performance	re Test				4
				Wizard - Valve Signature	ie iestiii				٩.
:004skz	d SI	PART PS2 🖌		Online access	Diagnosis Upda	ate 🖌 Identity Check 🖌			ĺ

 \Rightarrow The dialog with "Step 1 of 3: Settings" opens.

Step 1: Set the parameters

ep 1 of 3: Settings				
	SIEMENS			
Settings	Start position:	0.0	t‼ %	
Test	End position:	100.0	1 %	1
1001	Stroke height of step response time (Txx):	90.0	t‼ %	
Trace Diagram				
				,

Transfer	Transfers data to the positioner				
Messages	Opens the message log				
Print	Creates a PDF file				
Apply	Saves the changed values of the dialog				
< Back	Opens the dialog of the previous step				
Next >	Opens the dialog for the next step				

Table 6-2Explanation of the buttons

1. Enter the "Start position".

Start position					
Function	The parameter defines the start position of the SRT in percent.				
Setting range	0.0 100.0				
Factory setting	0.0				
Unit	%				
Communication					

2. Enter the "End position".

End position			
Function	The parameter defines the end position of the SRT in percent.		
Setting range	0.0 100.0		
Factory setting	100.0		
Unit	%		

3. Enter the "Stroke height of step response time (Txx)".

Stroke height of step response time (Txx)					
Function	The parameter defines the stroke height in percent for determining the step response times Txx.				
Setting range	5.0 95.0				
Factory setting	90.0				
Unit	%				

- 4. Click the "Apply" button.
- 5. Click the "Next >" button.
 - \Rightarrow The "Step 2 of 3: Test" dialog opens.

Step 2: Test

SIPART PS2 - Wizard - Step Response Test	?	×
Step 2 of 3: Test Settings Test Trace Diagram SRT still active SRT still active		~
Transfer Messages Print Start/Stop < Back	Next	>

If an immediately preceding SRT was executed, the diagram of the previous SRT is displayed. In the "Global status for SRT" dialog box, the current status for the SRT is displayed The following states are possible:

- No SRT
- SRT stopped
- SRT fault
- SRT valid
- SRT still active

Procedure

- 1. Click the "Start/Stop" button.
 - \Rightarrow A dialog opens.
- 2. Confirm the start with "OK". \Rightarrow A dialog opens with a note on possible damage.
- 3. Follow the instructions in the dialog. To start the test, select the "Yes" option button and click "OK".
 - \Rightarrow The "SRT" starts.
 - \Rightarrow "SRT" is shown in the display.
 - \Rightarrow A dialog opens.

- 4. Close the dialog with "OK". The positioner moves the actuator as follows:
 - From the start position to the start position.
 - From the start position to the end position.
 - From the start position back to the start position.

Faults or errors are displayed in the "Detailed information" dialog box:

- Start position not reached
- Mid position not reached
- End position not reached

The following status is highlighted after successful diagnostics: "SRT valid". The results are presented in "Test results" dialog box:

- Breakout time
- Overshoot
- Settling time 1
- Settling time 2
- Step response time
- Step response time (T63)
- Step response time (T86)

Step response time(Txx)

Corresponds to the set "Stroke height of step response time T" from step 1.

	SIEMENS								
Settings	Global status for SRT:	No SRT SRT stopped SRT fault SRT valid SRT valid SRT still activ	re v	10					
Trace Diagram	Test results								
	Breakout time:	0.25	~	10 :	Step response time:	7.19	~	1 s	1
	Overshoot:	0.0	~	t il (% Step response time (T63):	1.69	~	1 s	;
	Settling time 1:	3.55	~	18 :	Step response time (T86):	2.08	×	1 s	;
	Settling time 2:	Invalid value	~	1 8 :	Step response time (Txx):	2.12	~	1 . s	1

- 5. Click the "Next >" button.
 - \Rightarrow The "Step 3 of 3: Trace Diagram" dialog opens.

Step 3: Trace chart

SIPART PS2 - Wizard - Step Response Ter	st	?	×	
Step 3 of 3: Trace Diagram				^
SIE	MENS			
Settings				
Time : Test	stamp: Day: 1/ 1/1900	00:	00:(
Trace Diagram	No 'trace data' are available or no 'trace data' were read.			
<			>	~
Transfer Messages Pri	nt Read Trace < Back	Finish		

If an immediately preceding SRT was executed, the diagram of the previous SRT is displayed.

- Click the "Read Trace" button.
 ⇒ The "Read Trace Sample type" dialog opens.
- 2. Select the option button "Read in actual value only" or "Read in actual value and setpoint" dialog.
- 3. Click "OK".
 - \Rightarrow The "Read Trace Select skipped samples" dialog opens.



As the HART communication may be slow, it is possible to load the chart data from the positioner in different resolutions.

- 4. Select the corresponding option button for the required sample rate, e.g. "Every 3rd sample (medium)".
- 5. Close the dialog by clicking "OK". \Rightarrow The "Message Log" dialog opens.

- 6. Wait until the status "Finished" is displayed.
- 7. Click the "Close" button.
 - \Rightarrow The trace chart of the current SRT is displayed.

SIPART PS2 - Wizard - Step Respons	se Test		?	×
Step 3 of 3: Trace Diagram				^
Settings	SIEMENS			
Test	Time stamp: Day:	9/ 7/2023 Time stamp: Time: 12:02:38.560	1	
Trace Diagram	@* @* @‡ ∈	🕻 Export/Editing: Nothing selected 🗸 📄 Input Monotone 🛐 🔿 🗲 View SRT Trace diagram	Ŧ	
	80	Actual value: Actual value: Breakout times:		
	~ 60 ×	Start position: Reached end position:	=	
	20-			
	-5			
		-3 -2 -1 0 1 2 3 4 5 6 7 -3.9 Blapsed time s 7.18		*
Transfer Messages	Print	Read Trace < Back	Finish	

The diagram below shows an example of the result of the SRT with the following settings:

- Start position "0.0"
- End position "100.0"
- 8. Close the dialog with the "Finish" button.
 - \Rightarrow The test results and the chart are saved.

Displaying test results

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. Select the "Maintenance & Diagnostics" directory.
- 3. Select "Offline test reports" .
- 4. Click the "Show offline test reports" button.
- 5. Select "Step Response Test" \Rightarrow The test results are displayed.

6.6 Multi Step Response Test

6.6.1 Functional description

The Multi Step Response Test (MSRT) analyzes the valve based on several partial strokes.

The test moves the actuator of the valve to up to 20 freely configurable start and end positions.

The actual value curve is analyzed in accordance with the IEC 61514-2 standard.

The MSRT can be configured and executed during a maintenance phase of the valve with a Device Manager Software, e.g. SIMATIC PDM.

Local operation via the display and buttons is not possible.

The result of the test is saved in the positioner and can be compared with previous recordings to detect changes in the valve.

With SIMATIC PDM, the diagnostics results can be read from the positioner and displayed as charts.

Note

During the test, the positioner is not in "Automatic (AUT)" mode and has the following behavior:

- Any system deviations that occur are not corrected.
- The positioner does not follow the setpoint.
- The positioner moves the valve.

6.6.2 Start Multi Step Response Test

Requirement

- The positioner is in a maintenance phase, e.g. while the flow rate is not being actively controlled.
- The positioner is attached to the valve and connected to the power supply and the compressed air supply.
- The positioner is in "Automatic (AUT)" mode.
- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Start MSRT

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	🖊 SIP	ART	PS2					-	-		<
	File	Dev	vice View Diagnostics	Maintena	nce H	lelp	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
		+[]	Download to device		?						
	- .	t[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
	<u>.</u>	Π	Assign address and TAG				SIPART PS2 DR8 HART				
		<u>6</u> 10	Value comparison				⊡ Identification				
			Object properties				TAG	DEMOKOFF		1	
			Calibration log				Long TAG	SIPART PS2		1	
			Change Log				Descriptor	-		1	
			Set device checked				Message	DIAGNOSIS		1	
1		_					Data	1/20/2024		+	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

- 5. Close the dialog.
- 6. In the "Device > Wizards" menu, select the command "Wizard Multi Step Response Test...".

🔼 SIP	ART F	952				_		Х
File	Dev	ice View Diagnostics Mainter	nance	e Help	SIMATIC PDM V9.2 SP2 Proce	ss Devic	e Manager	r
	+1	Download to device	?					
- .	† I	Upload to PG/PC		Parameter	Value	Unit	Status	^
<u> </u>	ŢŢ.	Assign address and TAG		SIPART PS2 DR8 HART	•			
	<u>61</u> 0	Value comparison		Identification				
		Object properties		TAG	DEMOKOFF		1	
		Calibration log		Long TAG	SIPART PS2		1	
		Change Log		Descriptor			1	_
	4	Set device checked		Message	DIAGNOSIS		1	_
	-	Check configuration		Date	8/15/2023		↓ II	
		Templates		Device	1-			_
	_		-	Manufacturer	Siemens		II.	_
		Identification		Device Type	SIPART PS2		II.	_
		Wizards •		Wizard - Quick Start			II.	_
		Operation •		Wizard - Partial Stroke Test.			+	_
		Setup •		Wizard - Full Stroke Test			+1	_
		Maintenance and Diagnostics		Wizard - Step Response Tes	t		+-	-
		Communication		Wizard - Multi Step Respon	se Test		*=	-
				Wizard - Valve Performance	Test		1	
				Wizard - Valve Signature				~
z004skz	d S	PART PS2 🖌		Online access 🖌 🛛	Diagnosis Update 🖌 🛛 Identity Check 🖌)

 \Rightarrow The dialog with "Step 1 of 4: Settings" opens.

p 1 of 4	4: Settings						
		SIEME	NS				
0	Settings		Numbe	r of steps:	5	11	
			Step	duration:	4.0	1 s	l
	Test	Stroke heig	ht of step response t	ime (Txx):	90.0	1] %	6
	Results		Start position	End position			
		1	0.0	0.0			
	Trace Diagram	2	0.0	0.0			
		3	0.0	0.0			
		4	0.0	0.0			
		5	0.0	0.0			
		6	0.0	0.0			
		7	0.0	0.0			
		8	0.0	0.0			
		9	0.0	0.0			
		10	0.0	0.0			

Step 1: Set the parameters

Table 6-3Explanation of the buttons

Transfer	Transfers data to the positioner
Messages	Opens the message log
Print	Creates a PDF file
Apply	Saves the changed values of the dialog
< Back	Opens the dialog of the previous step
Next >	Opens the dialog for the next step

1. Enter the "Number of steps".

Number of steps	
Function	The parameter defines the number of individual jumps in the MSRT.
Setting range	2 20
Factory setting	5

2. Enter the "Step duration".

Step duration				
Function	The parameter defines the duration of each individual jump.			
Setting range	0.1 100.0			
Factory setting	4.0			
Unit	s (second)			

3. Enter the "Stroke height of step response time (Txx)".

Stroke height of step response time (Txx)				
Function	The parameter defines the stroke height in percent for determining the step response times Txx.			
Setting range	5.0 95.0			
Factory setting	90.0			
Unit	%			

4. Enter a value for "Start position" in the colored lines.

The number of lines highlighted in color corresponds to the value entered for "Number of steps".

Start position	
Function	The parameters define the start position of the respective test step as a percentage.
Setting range	0.0 100.0
Factory setting	0.0
Unit	%

 Enter a value for "End position" in the colored lines. The number of lines highlighted in color corresponds to the value entered for "Number of steps".

End position	
Function	The parameters define the end position of the respective test step as a percentage.
Setting range	0.0 100.0
Factory setting	100.0
Unit	%

Exemplary parameter values

	SIEM	ENS				
Settings		Numbe	r of steps:	5	11	
		Step	duration:	4.0	1	S
Test	Stroke he	eight of step response t	ime (Txx):	90.0	11	%
Results		Start position	End position			
	1	10.0	25.0			
Trace Diag	gram 2	25.0	50.0			
	3	50.0	75.0			
	4	75.0	100.0			
	5	100.0	10.0			
	6	0.0	0.0			
	7	0.0	0.0			
	8	0.0	0.0			
	9	0.0	0.0			

6. Click the "Apply" button.

7. Click the "Next >" button.

 \Rightarrow The "Step 2 of 4: Test" dialog opens.

Step 2: Test

SIPART PS2 - Wizard - Multi Step Response Test	t	?	×
Step 2 of 4: Test			^
SI	EMENS		
Settings Glob	al status for MSRT: No MSRT		
Contract Test	☐ MSRT fault ☐ MSRT valid ☐ MSRT still active ✓		
Results			
Trace Diagram			
Transfer Messages Print	Start/Stop < Back	Next >	

In the "Global status for MSRT" dialog box, the current status for the MSRT is displayed.

The following states are possible:

- No MSRT
- MSRT stopped
- MSRT fault
- MSRT valid
- MSRT still active

Procedure

- 1. Click the "Start/Stop" button. \Rightarrow A dialog opens.
- 2. Confirm the start with "OK". \Rightarrow A dialog opens with a note on possible damage.
- 3. Follow the instructions in the dialog.
- 4. To start the test, select the "Yes" option button and click "OK".
 - \Rightarrow The "MSRT" starts.
 - \Rightarrow "MSRT" is shown in the display.
 - \Rightarrow A dialog opens.

5. Close the dialog with "OK".

The positioner moves the actuator as follows:

- From the current starting position to the 1st starting position.
- From the 1st start position to the set positions one after the other.
- After reaching the last end position, return to the start position.

During the test, the number of jumps performed is displayed in the "Running status (Step)" dialog box.

Faults or errors are displayed in the "Detailed information" dialog box:

- Start position of first step not reached
- End position of last step not reached

Remedy:

- In step 1, set a longer duration or another end positions in the "Step duration" parameter.
- Start the test again in step 2.

Once the diagnostics has been successfully completed, the results are displayed in the dialog as average values:

- Average breakout time
- Average step response time
- Average step response time (T63)
- Average step response time (T86)
- Average step response time (Txx)
 Txx corresponds to the "Stroke height of the step response time" set in step 1.

- Average overshoot

	SIEMENS		Test results				
Sottings			Average breakout time:	0.12	\sim	10	S
Settings	Global status for MSRT:		Average step response time:	Invalid value	~	‡ ∥	s
Test		☐ MSRT fault ✓ MSRT valid	Average step response time (T63):	0.50	\sim	10	S
		MSRT still acti 🗸	Average step response time (T86):	1.25	~	t ll	S
Results			Average step response time (Txx):	1.54	\sim	10	S
Trace Diagram			Average overshoot:	0.1	~	til	%

- 6. Click the "Next >" button.
 - \Rightarrow The "Step 3 of 4: Results" dialog opens.

Step 3: Results

		SIEMENS								
S	ettings									
Te	est	Time stamp	: Day: 4/10/2024			Time stamp: Time:		14:41:10.61	1	
		Global status for	MSRT: No MSRT	∧ 1 ≣	Test results					
R	esults		MSRT stopped MSRT fault		Ave	erage breakout time:	0.08	~	1	l
Т	race Diagram		MSRT valid MSRT still active	e 🗸	Average	step response time:	3.50	~	11	
			Contract of the second s							
					Average step	response time (T63):	0.43	~	1	l
					Average step Average step	response time (T63): response time (T86):	0.43	~ ~	11	
					Average step Average step Average step	response time (T63): response time (T86): response time (Txx):	0.43 1.21 1.55	~	18 18	
					Average step i Average step i Average step	response time (T63): response time (T86): response time (Txx): Average overshoot:	0.43 1.21 1.55 0.4		10 10 10	
results: Step	Breakout time	Step response time	Step response time	Step resp	Average step i Average step i Average step	response time (T63): response time (T86): response time (Txx): Average overshoot:	0.43 1.21 1.55 0.4	Overshoot	10 10 10 10	
results: Step	Breakout time [s]	Step response time [s]	Step response time (T63) [s]	Step resp (T86) [s]	Average step i Average step i Average step	Step response time (T63): response time (T86): response time (Txx): Average overshoot:	0.43 1.21 1.55 0.4	Overshoot	10 10 10	
results: Step 1	Breakout time [s] 0.09 0.05	Step response time [s] 2.32 2.45	Step response time (T63) [s] 0.19 0.18	Step resp (T86) [s] 0.72 0.56	Average step i Average step i Average step	Step response time (T63): response time (T86): response time (Txx): Average overshoot: Step response ti (Txx) [s] 0.98 0.86	0.43 1.21 1.55 0.4 me	Overshoot [%] 0.4 0.5	10 10 10 10	
results: Step 1 2 3	Breakout time [s] 0.09 0.05 0.09	Step response time [s] 2.32 2.45 3.95	Step response time (T63) [s] 0.19 0.18 0.23	Step resp (T86) [s] 0.72 0.56 0.85	Average step i Average step i Average step	response time (T63): response time (T86): response time (Txx): Average overshoot: Step response ti (Txx) [s] 0.98 0.86 1.10	0.43 1.21 1.55 0.4	Overshoot [½] 0.4 0.5 0.4	10 10 10 10	
results: Step 1 2 3 4	Breakout time [s] 0.09 0.05 0.09 0.09	Step response time [s] 2.32 2.45 3.95 4.30	Step response time (T63) [s] 0.19 0.18 0.23 0.22	Step resp (T86) [s] 0.72 0.56 0.85 1.09	Average step i Average step i Average step	response time (T63): response time (T86): response time (Txx): Average overshoot: Step response time (Txx) [s] 0.98 0.86 1.10 1.58	0.43 1.21 1.55 0.4	Overshoot [%] 0.4 0.5 0.4 0.3	10 10 10 10	

The test results for each step of the MSRT are displayed.

1. Click the "Next >" button.

 \Rightarrow The "Step 4 of 4: Trace Diagram" dialog opens.

Step 4: Create trace chart

📕 SIPART PS2 - Wizard - Multi Step R	esponse Test	?	×
Step 4 of 4: Trace Diagram			^
	SIEMENS		
Settings			
Test	Time stamp: Day: 1/ 1/1900 Time stamp: Time:	00	:00:0
Results	No trace data' are available or no trace data' were read.		
Tuburu			
Trace Diagram			
¢			>
Transfer Messages	Print Read Trace < Back	Finish	

If an immediately preceding MRST was executed, the diagram of the previous MRST is displayed.

- 1. Click the "Read Trace" button.
 - \Rightarrow The "Read Trace Sample type" dialog opens.
- 2. Select the option button "Read in actual value only" or "Read in actual value and setpoint" dialog.
- 3. Click "OK".

 \Rightarrow The "Read Trace - Select skipped samples" dialog opens.

SIPART PS2 - Read Trace X
Select skipped samples Every sample (very slow) Every 2nd sample (slow) Every 3rd sample (medium) Every 5th sample (fast) Every 10th sample (very fast)
OK Cancel

As the HART communication may be slow, it is possible to load the chart data from the positioner in different resolutions.

- 4. Select the option button for the required sample rate, e.g. "Every 3rd sample (medium)".
- 5. Close the dialog by clicking "OK". \Rightarrow The "Message Log" dialog opens.
- 6. Wait until the status "Finished" is displayed.
- 7. Close the dialog.
 - \Rightarrow The chart of the current MSRT is displayed.

Cattinger	SIEMENS	
Test	Time stamp: Day: 9/ 7/2023 Time stamp: Time:	16:52:50.755
Results	@ ⊖ ⊖ @ ‡ @ ‡ Export/Editing: Nothing selected - ☐ Input Monotone MSRT Trace chart	View
Carl Trace Diagram	Actual value:	
	8 60 8 8	
		20 22 24 26 28

The diagram below shows an example of the setpoint values and the actual values, each with 5 start and end positions.

8. Close the dialog with the "Finish" button. \Rightarrow The test results and the chart are saved.

Displaying test results

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. Select the "Maintenance & Diagnostics" directory.
- 3. Select "Offline test reports" .

6.7 Valve Performance Test (VPT)

- 4. Click the "Show offline test reports" button.
- 5. Select "Multi Step Response Test". \Rightarrow The test results are displayed.

6.7 Valve Performance Test (VPT)

6.7.1 Functional description

The Valve Performance Test (VPT) determines the following valve characteristics in accordance with IEC 61298-2:

- Hysteresis
- Non-linearity
- Non-repeatability
- Measurement deviation
- Average measurement deviation of all cycles
- Maximum measurement deviation
- Total mean measurement deviation
- Uncertainty

During the test, 3 cycles are run through.

1 cycle corresponds to one full stroke: From the start position "0.0%" to the center position "100.0%" and to the end position "0.0%".

1 cycle contains 20 measuring steps:

- 10 measuring steps between "0.0%" and "100.0%"
- 10 measuring steps between "100.0%" and "0.0%"

The VPT can be configured and executed during a maintenance phase of the valve with a Device Manager Software, e.g. SIMATIC PDM.

Local operation via the display and buttons is not possible.

The result of the test is saved in the positioner and can be compared with previous recordings to detect changes in the valve.

With SIMATIC PDM, the diagnostics results can be read from the positioner and displayed as charts.

Note

During the test, the positioner is not in "Automatic (AUT)" mode and has the following behavior:

- Any system deviations that occur are not corrected.
- The positioner does not follow the setpoint.
- The positioner moves the valve.
6.7.2 Start Valve Performance Test

Requirement

- The positioner is in a maintenance phase, e.g. while the flow rate is not being actively controlled.
- The positioner is attached to the valve and connected to the power supply and the compressed air supply.
- The positioner is in "Automatic (AUT)" mode.
- The positioner has a HART interface: SIPART PS2 6DR51...\6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Start VPT

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

	SIP/	ART F	PS2						_		×
F	File	Dev	ice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Proc	ess Devic	e Manager	,
		ŧ.	Download to device		?						
]	t[]	Upload to PG/PC				Parameter	Value	Unit	Status	^
	ė.	n,	Assign address and TAG				I SIPART PS2 DR8 HART				
		<u>61</u> 2	Value comparison				⊡ Identification				
			Object properties				TAG	DEMOKOFF		1	
		R	Calibration log				Long TAG	SIPART PS2		1	
		D	Change Log				Descriptor	-		1	
			Set device checked				Message	DIAGNOSIS		1	
							Data	1/20/2024		+ 1	

- In the "Upload to PG/PC..." dialog, click the "Start" button.
 ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

- 5. Close the dialog.
- 6. In the "Device > Wizards" menu, select the command "Wizard Valve Performance Test...".

🔼 SIF	PART F	S2					_		×
File	Dev	ice View Diagnostics Mainter	ance	Help	SIMATI	C PDM V9.2 SP2 Proc	ess Devic	e Manage	er
	+1	Download to device	?						
D	t[Upload to PG/PC		Parameter	Value		Unit	Status	^
÷.	Π	Assign address and TAG		SIPART PS2 DR8 HART					
	<u>61</u> 2	Value comparison		Identification					
		Object properties		TAG	DEMOKOFF			1	
		Calibration log		Long TAG	SIPART PS2			1	
	D	Change Log		Descriptor	-			1	
	4	Set device checked		Message	DIAGNOSIS			1	_
	-	Check configuration		Date	8/15/2023			↓ I	
		Templates		Device				•	_
		Identification		Manufacturer	Siemens			+L +D	_
		Identification		Device Type	SIPART PS2			+0	_
		Wizards •		Wizard - Quick Start	10	.		+1	_
		Operation •		Wizard - Partial Stroke Test		,		+1	-
		Setup +		Wizard - Full Stroke Test				+= †[]	-
		Maintenance and Diagnostics		Wizard - Step Response Test	t			1	-
		Communication		Wizard - Multi Step Respons	se Test			-	-
				Wizard - Valve Performance	Test			1	
				Wizard - Valve Signature					~
z004skz	d S	PART PS2 🖌		Online access 🖌 D	iagnosis Update	🖌 Identity Check 🖌)

 \Rightarrow The dialog with "Step 1 of 3: Settings" opens.

Step 1: Description

	SIEMENS	
Oescription	The Valve Performance Test (VPT) determines the following valve	
Test	characteristic values according to IEC 61298-2: - Hysteresis - Non-linearity	
-	- Non-repeatability - Measurement error	
Results	Average measurement error of all cycles Maximum measurement error Total average measurement error	
	- Uncertainty	

Table 6-4Explanation of the buttons

Transfer	Transfers data to the positioner
Messages	Opens the message log
Print	Creates a PDF file
< Back	Opens the dialog of the previous step
Next >	Opens the dialog for the next step

1. Click the "Next >" button.

 \Rightarrow The "Step 2 of 3: Test" dialog opens.

Step 2: Test

If a successful VPT has already been performed, the results of the previous VPT are displayed.

SIPART PS2 - Wizard - Valve Performance Test	?	×
Step 2 of 3: Test Description Test Results Results		<
Transfer Messages Print Start/Stop < Back	Next	>

If an immediately preceding VPT was executed, the diagram of the previous VPT is displayed. In the "Global status for VPT" dialog box, the current status for the VPT is displayed

The following states are possible:

- No VPT
- VPT stopped
- VPT fault
- VPT valid
- VPT still active

Procedure

- 1. Click the "Start/Stop" button. \Rightarrow A dialog opens.
- 2. Confirm the start with "OK". \Rightarrow A dialog opens with a note on possible damage.
- 3. Follow the instructions in the dialog.
- 4. To start the test, select the "Yes" option button and click "OK". \Rightarrow The "VPT" starts.
 - \Rightarrow "VPT" is shown in the display.
 - \Rightarrow A dialog opens.

5. Close the dialog with "OK".

The positioner moves the actuator from the current starting position to the start position "0.0%" and runs through 3 cycles:

- From the start position "0.0%" with 10% increments to the center position "100.0%".
 The measured values are determined for each of the 10 measuring steps.
- From the center position "100.0%" with 10% steps to the end position "0.0%" (\triangleq start position).

The measured values are determined for each of the 10 measuring steps.

After completion of the 3rd cycle, the positioner moves the actuator back to the start position. The following information is displayed in the dialog during the test:

- Running status (cycle): Shows the number of the currently executed cycle.
- Running status (step): Shows the number of the step executed in this cycle.

Faults or errors are displayed in the "Detailed information" dialog box:

- Start position not reached
- End position not reached

The following status is highlighted after successful completion of the diagnostics: "VPT valid". The results are presented in "Test results" dialog box:

Characteristic value	Description
Hysteresis	The difference between consecutive output values at measured and unmeasured measuring points for each individual test cycle at the same test point in percent [%].
	Measured up and measured down means: Each measuring point is approached from 2 sides.
	The largest value from all test cycles is recorded as "hysteresis" and expressed as a percentage [%].
Non-linearity	The largest positive or negative deviation in percent [%] between the curve of the average values and the selected straight line.
	The non-linearity is independent of the deadband and hysteresis.
Non-repeatability	The difference between the measured or calibrated measured values at the same input value as a percentage [%] of the span (setpoint).
	The largest difference between all measured values recorded or measured at the same input value as a percentage [%] of the span (setpoint) is recorded as "Non-repeatability".
Maximum measurement error	The largest positive or negative measured value from the average values of all cycles.
Inaccuracy Up	The largest positive deviation of all measured values up or down from the ideal input value as a percentage [%] of the span (setpoint).
Inaccuracy Down	The largest negative deviation of all measured values up or down from the ideal input value as a percentage [%] of the span (setpoint).

SIPAR	T PS2 - Wizard - Valve Pe	erformance Test		_			1	
Step 2 o	of 3: Test							
		SIEMENS						
	Description	Global status for VPT:	No VPT					
	Test		/PT fault /PT valid /PT still active					
	Results	Test results						
		Hysteresis:	-1.13 🚺	%	Maximum measurement error:	-0.73	1	%
		Non-linearity:	-0.47 1	%	Inaccuracy Up:	0.50	1	%
		Non-repeatability:	0.72	%	Inaccuracy Down:	-0.99	1	%

6. Click the "Next >" button.

 \Rightarrow The "Step 3 of 3: Results" dialog opens.

Step 3: Results

SIPART PS2 - Wizard - Valve Performance Test				? ×
Step 3 of 3: Results				^
SIEMENS				
Test	ay: 9/ 8/2023	\$ Time s	tamp: Time:	10:09:34.090
Results Hystere:	iis: -1.13	1 % Maximum measur	ement error:	-0.73 🚛 %
Non-linear	ty: -0.47	til % Ina	ccuracy Up:	0.50 ‡ %
Non-repeatabil	ty: 0.72	JU % Inaccu	iracy Down:	-0.99 I %
Test results:	1st cycle - Up actual	1st cycle - Down actual	2nd cycle - Un actual	2nd cycle - Down actual
0		0.46	2nd cycle op detaal	0.50
10	-0.02	-0.32	0.10	-0.61
20	-0.07	-0.29	-0.05	-0.11
30	-0.04	-0.14	-0.03	-0.11
40	-0.06	-0.38	-0.02	-0.17
50	-0.08	0.00	-0.06	-0.46
60	-0.05	-0.44	-0.07	0.01
70	-0.02	-0.52	0.03	-0.33
80	0.05	-0.33	-0.00	-0.51
90	0.21	-0.92	0.06	-0.99
100	-0.54		-0.54	,
<				>
Transfer Messages Print			<	Back Finish

The following test results are displayed in the dialog:

- The 6 valve characteristic values are the average values of all measurement steps of the 3 cycles as a percentage.
- The measured values of all measuring steps of the 3 cycles are each displayed as a percentage deviation of the actual position from the setpoint position.
- 1. Close the dialog with the "Finish" button. \Rightarrow The test results are saved.

Displaying test results

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. Select the "Maintenance & Diagnostics" directory.
- 3. Select "Offline test reports" .

- 4. Click the "Show offline test reports" button.
- 5. Select "Valve Performance Test" \Rightarrow The test results are displayed.

6.8 Valve Signature (VS)

6.8.1 Functional description

The Valve Signature (VS) determines the characteristics of the valve over the entire operating range.

With the Valve Signature, the pressure position data are recorded and the following Key Performance Indicators (KPI) determined:

- Breakout pressure
- Breakout position
- Breakout pressure (return)
- Breakout position(return)
- Operating hours

For single-acting actuators, the actuating pressure is displayed above the position.

For double-acting actuators with spring return, the difference between the actuating pressures is shown above the position.

VS-reference

During initialization of the positioner, a Valve Signature is performed in RUN 6 and the KPIs are saved as a reference.

The previous reference is replaced with each subsequent initialization.

Additional properties

- The KPIs of the last 10 Valve Signatures are stored in a ring memory in the positioner. With more Valve Signatures, the KPIs are replaced in the ring memory using the FIFO method (First In - First Out).
- The Valve Signature is configured and executed with Device Manager Software, e.g. SIMATIC PDM.
- The KPIs can be read, displayed and compared with SIMATIC PDM.
- The data can also be used to determine friction coefficients, spring characteristics and hysteresis.

6.8.2 With SIMATIC PDM: Start valve signature

Requirement

- The positioner has pressure sensors (Z PO2 option).
- Process diagnostics "Pressure monitoring" (U.\PRES) is activated.
- The positioner is in a maintenance phase, e.g. while the flow rate is not being actively controlled.
- The positioner is attached to the valve and connected to the power supply and the compressed air supply.
- The positioner is in "Automatic (AUT)" mode.
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Start VS

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SI	PART	PS2						_		×
File	Dev	vice View Diagnostics	Mainten	ance	Help	SIMATIC PDM	V9.2 SP2 Pro	cess Devic	e Manager	r
	+1	Download to device		?						
	1	Upload to PG/PC				Parameter	Value	Unit	Status	^
Ė	^{].} 😈	Assign address and TAG				SIPART PS2 DR8 HART				
	<u>۵۱۵</u>	Value comparison				⊡ Identification				
		Object properties				TAG	DEMOKOFF		‡ []	
		Calibration log				Long TAG	SIPART PS2		‡	
		Change Log				Descriptor	-		‡ [
		Set device checked				Message	DIAGNOSIS		‡	
	-					Date	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

- 5. Close the dialog.
- 6. In the "Device > Wizards" menu, select the command "Wizard Valve Signature...".

SIP.	ART F	S2						-		×
File	Dev	ice View Diagnostics Ma	intena	nce	Help	SIMA	TIC PDM V9.2 SP2 Proc	ess Devid	e Manag	jer
	+0	Download to device		?						
.!	т	Upload to PG/PC			Parameter	Value		Unit	Status	^
	ņ	Assign address and TAG			SIPART PS2 DR8 HART					
	<u>6</u> 12	Value comparison			⊡ldentification					
		Object properties			TAG	DEMOKOFF			1	
	ß	Calibration log			Long TAG	SIPART PS2			1	
		Change Log			Descriptor				1	
	2	Set device checked			Message	DIAGNOSIS			1	
	-	Check configuration			Date	8/15/2023			1	
	ň.	Templates			Device					
					Manufacturer	Siemens			1	
		Identification			Device Type	SIPART PS2			1	
		Wizards	•		Wizard - Quick Start				1	
		Operation	•		Wizard - Partial Stroke Test.		10		I.	
		Setup	•		Wizard - Full Stroke Test		-		I.	_
		Maintenance and Diagnostics			Wizard - Sten Response Tes	t			II.	_
					Wizard - Multi Step Respon	se Test			↓L	_
		Communication			Wizard - Valve Performance	Test				
				_	Wizard - Valve Signature					
7004ckz	4 9			_)iagnosis Unda	te V Identity Check V			

 \Rightarrow The "Step 1 of 3: Description" dialog opens.

Step 1: Description

SIPART PS2 - Wizard - Valve Signature	?	×
Step 1 of 3: Description Image: Description Test Test Results For single-acting actuators, the actuating pressure is disposition. For duble-acting actuators with spring-return mechanists between the actuating pressures and the position is disposition.	en pressure and played above the m, the difference played.	
Transfer Messages Print	< Back N	ext >

· ·	
Transfer	Transfers data to the positioner
Messages	Opens the message log
Print	Creates a PDF file
< Back	Opens the dialog of the previous step
Next >	Opens the dialog for the next step

Table 6-5Explanation of the buttons

1. Click the "Next >" button.

 \Rightarrow The "Step 2 of 3: Test" dialog opens.

Step 2: Test

If a successful Valve Signature has already been performed, the results of the previous Valve Signature are displayed.

SIPART PS2 - Wizard - Valve Sig	gnature					?	×	
Step 2 of 3: Test							2	^
	SIEMENS							
Test Results	Overall status for VS:	 VS has been stopped VS fault VS is valid VS is still active 	10	Detailed information:	Start position not real End position not real Return position not Pressure sensor mo	ached ached reached dule defecti	ive	
	Breakout pressure:	2.231	1 bar	Breakout pressure (return):		1.5	247	
	Breakout position:	98.6	1 %	Breakout position (return):			0.4	
<							>	~
Transfer Messages	Print			Start/Stop	< Back	Next >		Ì

In the "Overall status for VS" dialog box, the current status for the Valve Signature is displayed.

The following states are possible:

- VS stopped
- VS fault
- VS valid
- VS still active

Procedure

- 1. Click the "Start/Stop" button. \Rightarrow A dialog opens.
- 2. Confirm the start with "OK". \Rightarrow A dialog opens with a note on possible damage.
- 3. Follow the instructions in the dialog.
- 4. To start the test, select the "Yes" option button and click "OK".
 ⇒ The maintenance diagnostics Valve Signature starts.
 ⇒ "VS" is shown in the display.
 ⇒ A dialog opens.
- 5. Close the dialog with "OK". The positioner moves the actuator as follows:
 - From the current starting position to the starting position "100.0%".
 - From the start position step by step to the "0.0%" position.
 - From the position "0.0%" gradually to the position "100.0%".
 - From the "100.0%" position back to the starting position.

Faults or errors are displayed in the "Detailed information" dialog box:

- Start position not reached
- End position not reached
- Return position not reached
- Pressure sensor module defective

- 6. Wait until the diagnostics is completed.
 - One of the following states is selected in the dialog: VS stopped, VS fault or VS valid.
 - "AUT" is shown in the display.

The following status is highlighted after successful diagnostics: "VS valid". The following KPIs are displayed as results in the dialog:

- Breakout pressure in bar
- Breakout position in %
- Breakout pressure (return) in bar
- Breakout position (return) in %

SIPART PS2 - Wizard - Valve Signature			? >	×
Step 2 of 3: Test				^
Description Overall status Description	or VS: VS has been stopped VS fault VS is valid VS is still active	t Detailed information:	Start position not reached End position not reached Retum position not reached Pressure sensor module defective	
Results Breakout pre Breakout pre	ssure: 2.274 sition: 1.5	1 bar Breakout pressure (return): 1 % Breakout position (return):	1.28	2
<				~
Transfer Messages Print]	Start/Stop	< Back Next >	

- 7. Click the "Next >" button.
 - \Rightarrow The "Step 3 of 3: Results" dialog opens.

Step 3: Results

In this step, the diagram of the Valve Signature can be displayed.

The result of the current and the previous Valve Signatures can be displayed with the following menu: "Diagnostics > KPI > Valve Signature" Valve Signature] \rightarrow With SIMATIC PDM: Display VS results, KPIs and diagrams (Page 556).

Maintenance diagnostics

6.8 Valve Signature (VS)

ep 3 of 3: Results	JIE	ł
Description	SIEMENS	
Test	Time stamp: Day: 9/ 8/2023 IV Time stamp: 1	ime: 12:26:53.445
Results		

- 1. Click the "Read Trace" button.
- 2. Wait until the diagram is displayed in the dialog.



3. Close the dialog with the "Finish" button. \Rightarrow The test results and the chart are saved.

6.8.3 With SIMATIC PDM: Display VS results, KPIs and diagrams

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.
- The Valve Signature was executed \rightarrow With SIMATIC PDM: Start valve signature (Page 549).

Display VS results and KPI

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART F	952				-	-		×
File	Dev	ice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	,
	+I	Download to device	?						
	t[]	Upload to PG/PC			Parameter	Value	Unit	Status	^
<u>.</u>	Π	Assign address and TAG			SIPART PS2 DR8 HART				
	<u>۵۵</u> ۵	Value comparison			□ Identification			_	
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		1	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Date	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

File Device View Diagnostics	Maintenance Help : iagnostics	SIMATIC PDM V9.2 SP2 Process De	vice Manager
SIPART PS2 Status		Value Unit	Status
ie‡ SIPART PS2 DI ie‡ Identification Trend ch ie‡ Setup Histogra	arts DR8 HART		
	Partial Stroke Test	DEMOKOFF	1
Valve ch	rts	SIPART PS2	1
Alarmio	abook	-	1
,	measuge	DIAGNOSIS	‡ []
	Date	1/29/2024	‡ []
	Device		
	Manufacturer	Siemens	1
	Device Type	SIPART PS2	1
	Order number	-	1
	Serial number	N1KO037518210	1
	Final Assembly Number	0	1
	Hardware Revision	3	1
	Firmware revision	5.03.00-28	1
	EDD version	25.00.00	
	□ Setup	· · ·	
	Dynamic variable mapping		

6. In the "Diagnostics"menu, select the command"KPI > Valve Signature".

 \Rightarrow The "Valve Signature" dialog opens.

In the dialog, the results of the last 10 Valve Signature are displayed as values and diagrams.

IEMENS				Number of data	records (without refer	rence):			10 1	1		
l: aracteristic value	Reference			1.7		Ls.	La.	La.	1.2	1.1	Last	
akout costion	99.1	58.6	98.6	98.3	98.5	98.7	98.7	98.9	98.5	98.5	99.1	
akout pressure	2 282	2.067	2.102	2.063	2.156	2.147	2.141	2,219	2 202	2.201	2 231	
kout position (return)	18	0.8	41	1.7	27	27	1.1	17	20	2.7	3.0	
kout pressure (return)	1.277	1,232	1.322	1.267	1,290	1.289	1.235	1.261	1,290	1.292	1,277	
rating hours	924	1007	1017	1021	1021	1022	1023	1023	1025	1026	1026	
	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid	
stamp: Day	10/27/2023	2/19/2024	2/21/2024	2/21/2024	2/21/2024	2/21/2024	2/21/2024	2/21/2024	2/21/2024	2/21/2024	2/22/2024	
e stamp: Time	00:10:14.550	12:09:07:200	09:05:02:160	13:23:01:490	13:26:53.210	14:16:44.365	15:53:06:455	16:23:59:545	17:35:56.900	19:02:28:315	09:48:07:570	
25	80-	Breakout position (Breakout position () Breakout pressure ()	Curve): Keypoints): (Curve):						-			
25 g	80 × ×	Breakout position (/ Breakout position (/ Breakout pressure (Breakout pressure) Breakout position (r Breakout position (r Breakout pressure)	Curve): Keypoints): (Curve): (Keypoints): return) (Curve): (return) (Keypoints): (return) (Curve):						-		•	
25 0 2- 15- xt 95 05-	80 × × × × × × × × × × × × × × × × × × ×	Breakout position (/ Breakout position (h Breakout pressure Breakout pressure Breakout pressure Breakout pressure Breakout pressure	Curve): Keypoints): (Curve): (Keypoints): return) (Curve): return) (Keypoints): (return) (Keypoints):						-	· · ·	••••••••••••••••••••••••••••••••••••••	

Notes on the example shown:

- The diagram display was scaled by changing the input fields of the axes, e.g. with "922" as the start value for the "Operating hours (h)".
- The reference data of the Valve Signature from the last initialization are marked in green.
- The data of the last executed Valve Signature are marked in blue.
- 7. Close the dialog with the "Close" button.

Show VS diagrams

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🖊 SI	PART I	PS2				-	-		<
File	Dev	vice View Diagnostics N	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	ss Devic	e Manager	
	+1	Download to device	?						
.	1	Upload to PG/PC			Parameter	Value	Unit	Status	^
Ė	· 🛱	Assign address and TAG			I SIPART PS2 DR8 HART				
	<u>6</u> 12	Value comparison			⊡ Identification				
		Object properties			TAG	DEMOKOFF		1	
		Calibration log			Long TAG	SIPART PS2		‡ []	
		Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
	-				Data	1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

6. In the "Diagnostics" menu, select the "Valve Charts > Valve Signature" > Valve Signature command.

File Device View	Diagnostics	Maintenance	Help SIMATIC PDM	9.2 SP2 Process Device Manager
🛃 📕 📲 🚺 💁 🔂	R Update	diagnostics		
SIPART PS2	PS2 DI			Value _^
SIPART PS2 DI			2 DR8 HART	
• 1 Setup	Histoar	ams 🕨	ion	
	KPI	•		DEMO
Communicat	Valve cl	arts •	Dartial Stroke Tert	SIPAR
	Alarm Joshook		Value Signature	-
Alanningbook		measury		DIAGN
		Date		1/29/2
		Device	8	
		Manuf	facturer	Siemen
		Devic	е Туре	SIPAR
		Order	number	-
		Serial	number	N1KOC
		Final /	Assembly Number	0
		Hardw	vare Revision	3
		Firmw	are revision	5.03.00
		EDD	version	25.00.0
		⊟ Setup		v

 \Rightarrow The "Valve Signature" dialog opens.

If a Valve Signature has already been performed and displayed, the diagram of the previous Valve Signature is displayed.

7. Click the "Read data from device" button.

SIPART PS2 - Valve Signature	?	×				
Read data from device		^				
et et et export/Editing: Nothing selected → _ Input Monotone >	View Link axes	Print				
Valve charts						
Reference:						

 \Rightarrow The "Read data from device" dialog opens.

8. Select the option button for the desired data.



9. Close the dialog with "OK". \Rightarrow The "Message Log" dialog opens.

10. Wait until the status "Finished" is displayed.

11. Click the "Close" button.

 \Rightarrow In the upper area of the "Valve Signature" dialog, the diagram is updated with the selected data.



12. To display the data and diagram of a specific Valve Signature: Click the "Response curve selection" button.

SIPART PS2 - Response curve selection	<
Response curve Reference Isst -1 -2	
OK Cancel	

 \Rightarrow "Response curve selection".

13. Select the option button for the required data, e.g. "Last".

14. Close the dialog with "OK".

 \Rightarrow In the lower section of the "Valve Signature" dialog, the diagram and the data for the selected Valve Signature are displayed, e.g. "Last".



15. Close the dialog.

6.8.4 Via HART communication: Start valve signature

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.
- The positioner is in a maintenance phase, e.g. while the flow rate is not being actively controlled.
- The positioner is attached to the valve and connected to the power supply and the compressed air supply.
- The positioner is in "Automatic (AUT)" mode.

Start VS

Send to the positioner via HART communication:

- "#172" command
- Byte 0 = 7 and Byte 1 = 5
- \Rightarrow Diagnostics starts and the "VS" is shown on the display.



Cancel VS

Send to the positioner via HART communication:

- "#172" command
- Byte 0 = 7 and Byte 1 = 255

6.8.5 Via HART communication: Read out diagnostic results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.
- The "Valve Signature" (VS) has been executed.

Display diagnostics status

Request

Send to the positioner via HART communication:

- Command "#210"
- Byte 1

Answer

The answer consists of the following data.

Table 6-6	Global	status	for	VS
-----------	--------	--------	-----	----

Bit	Status
4	VS stopped
5	VS fault
6	VS valid
7	VS still active

Read out diagnostic results

Request

Send to the positioner via HART communication:

- "#210" command
- Byte 0 with the index of the VS "0" or "1" to "9"

Byte	Format	Description				
0	Unsigned-8	Index of the d	Index of the data record to be read			
		0	Current or latest data record			
		1 9	Previous data record			

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Byte	Format	Description
0	Unsigned-8	Data record index of the read data
1	Unsigned-8	Valve Signature State
2	Unsigned-8	Valve Signature Error
3	Enum	Pressure Unit
4 7	Float	Valve Signature Breakout Pressure Up
8 11	Float	Valve Signature Breakout Position Up
12 15	Float	Valve Signature Breakout Pressure Return
16 19	Float	Valve Signature Breakout Position Return
20 22	Date	Valve Signature Timestamp: Date
23 26	Time	Valve Signature Timestamp: Time
27 30	Unsigned-32	Valve Signature Operating Hours Counter

Table 6-7	Response Data Bytes
	Response Duta Dytes

 Table 6-8
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Device Specific Command Error

Results of the VS reference

Request

Send to the positioner via HART communication:

• Command "#215"

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Table 6-9 R	esponse Data By	/tes

Byte	Format	Description	Description				
0	Unsigned-8	Valve Signatur	e State				
1	Unsigned-8	Valve Signatur	e Error				
2	Enum	Pressure Unit	Pressure Unit				
3 6	Float	Valve Signatur	Valve Signature Upper Pressure Value				
7 10	Float	Valve Signatur	Valve Signature Lower Pressure Value				
11	Enum	Valve Signatur	e Spring Detection				
		0	Valve without spring				
		1	1 Valve with spring				
12 15	Float	Valve Reference	e Signature Breakout Pressure Up				

Byte	Format	Description
16 19	Float	Valve Reference Signature Breakout Position Up
20 23	Float	Valve Reference Signature Breakout Pressure Return
24 27	Float	Valve Reference Signature Breakout Position Return
28 30	Date	Valve Reference Signature Timestamp: Date
31 34	Time	Valve Reference Signature Timestamp: Time
35 38	Unsigned-32	Valve Reference Signature Operating Hours Counter ###±

 Table 6-10
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Device Specific Command Error

6.8.6 With SIMATIC PDM: Export diagnostics results

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.
- The "Valve Signature" (VS) was executed and the diagrams were displayed → With SIMATIC PDM: Start valve signature (Page 549).

Procedure

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SIF	PART	PS2							-		×
File	Dev	vice View Diagnostics	Mainten	ance	Help	:	SIMATIC PDM	V9.2 SP2 Pr	ocess Devic	e Manager	r
	+I	Download to device		?							
	t[Upload to PG/PC				Parameter		Value	Unit	Status	^
<u>.</u>	Π	Assign address and TAG				SIPART PS2 DR8 HART					
	<u>6</u> 12	Value comparison				Identification					
		Object properties				TAG		DEMOKOFF		1	
		Calibration log				Long TAG		SIPART PS2		1	
		Change Log				Descriptor		-		1	
		Set device checked				Message		DIAGNOSIS		1	
	_					Data		1/29/2024		† ∏	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 5. Close the dialog.

🖊 s	IPART PS2						_	
File	Device	View Dia	agnostics	Maintenance	e Help	SIMATIC PDM V9.2 SP2	Process Devic	e Manager
	Save Ctr	I+S	/ 🕥 🖪	器 約 🥐				
₽	Export				Parameter	Value	Unit	Status
•	Import	н	ART		SIPART PS2 DR8 HART			
	Print Ctr	I+P			Identification			
	Class	D)iagnostics		TAG	DEMOKOFF		1
	Close				Long TAG	SIPART PS2		1
					Descriptor			1
					Message	DIAGNOSIS		1
					Date	8/15/2023		1
					⊡ Device			
					Manufacturer	Siemens		1
					Device Type	SIPART PS2		1
					Order number	-		1
					Serial number	N1KO037518210		1
					Final Assembly Number	0		1
					Hardware Revision	3		1
					Firmware revision	5.03.00-28		1
					EDD version	25.00.00		
					⊡ Setup			
					Dynamic variable mapping	ing		
z004sl	kzd SIPART P	S2 🖌			Online access 🖌 D	agnosis Update 🖌 🛛 Identity Check 🖌 🗌		

6. In the "File" menu, select the "Export..." command.

The "Export - ..." dialog opens.

- 7. Select the check boxes:
 - Device parameters required
 - Diagnostics required
 - Document Manager optional

Kxport - SIPART PS2	? ×
Event directory	^
C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Export	
HTML transformation file: C:\ProgramData\Siemens\Automation\SIMATIC_PDM\Templates\PDM80_ExportTransformation	n xsl
Which information about the expected?	
✓ Document Manager	
Selection	
Object	
Status:	
<	>
Messages Start	Stop Close

- 8. Start the export with the "Start" button.
- 9. Wait until the status "Export: Action finished" is displayed.

10. The following 2 files are stored in the export path:

- XML file "Param\$xxx\$yyyymmdd_hhmmss.xml", e.g. "Param\$SIPART PS2\$20230815_121412.xml"
- XSL stylesheet "PDM80_ExportTransformation.xsl"

11. Close the dialog.

12. Open the XML file with suitable software, e.g. an editor.

Param\$SIPART PS2\$20230815_121412.xn	nl - Editor			-		×
<pre><?xml version="1.0" encoding="utf-8"?> <!-- Created by PDM 902.200.2901.5. DC <?xml-stylesheet type='text/xsl' href=' <PDM XMLVersion="8.04"--> <object> <device> <id>2</id> <pltid>00/PltId> <type>EDD_0BJECT_OFFLINE</type> <class>EDD_OCLASS_NODE_HART_MODEM <objectpath>Netze/HART_MODEM <objectpath>Netze/HART_MODEM <colise>FalseFalse <catalogpath>/DEVICE/HART/ACTUATC <objectname>SIPART PS2</objectname>ExportOffline </catalogpath></colise></objectpath></objectpath></class></pltid></device></object></pre>	<pre>> not edit this File!! 'PDM80_ExportTransformatic 'PDM80_ExportTran</pre>	> m.xsl'?> 'ObjectPa NS/SIPAR	th> T_PS2/SIPART_PS2_HAR	T_DR8<	/CatalogF	^ 'ath
<pre><deviceparameters> <attribute browsename="<br" name="tag"><attribute browsen<br="" name="longTag"><attribute brow<br="" name="descriptor"><attribute browsename<br="" name="descriptor"><attribute browsename<br="" name="date"><!-- Dates are in ISO 8601 form<br--><attribute <="" name="manufacturer id" pre=""></attribute></attribute></attribute></attribute></attribute></attribute></deviceparameters></pre>	"tag" Type="String" Label lame="longTag" Type="Strin vseName="descriptor" Type= lame="message" Type="Strin =="date" Type="DateTime" L nat!>2023-08-15T00:00:0 ' BrowseName="manufacturer	="TAG" P Ig" Label "String" Ig" Label abel="Da Wid" Tvp	aramViewMember="True ="Long TAG" ParamVie Label="Descriptor" ="Message" ParamView te" ParamViewMember= bute> e="UInt16" Label="Ma	" Disp wMembe ParamV Member "True" nufact	layValue= r="True" iewMember ="True" D DisplayV urer" Par	"DE Dis '="T)isp /alu `amV ♥
	Zeile 31668, Spalte 50	70%	Windows (CRLF)	UTF-	-8 mit BOI	м.,

The XML file contains the following diagnostic results for the VS.

Table 6-11 Parameter

Parameter	Data description in the XML file								
	Name	Label	DisplayValue	Unit					
			e.g.						
VS Reference	var_KPI_VS_Ref_CurState_80	Overall status for VS	0	-					
	var_KPI_VS_Ref_CurState_Valid	Overall status for VS	Valid	-					
	var_KPI_VS_Ref_CurState_3F	Overall status for VS	0	-					
	var_KPI_VS_Ref_ErrorByte	Detailed information	0	-					
	var_KPI_VS_Ref_BreakoutPressure-	Breakout pressure	2.282	• bar					
	Up			• MPa					
				• psi					
	var_KPI_VS_Ref_BreakoutPositionUp	Breakout position	99.1	%					
	var_KPI_VS_Ref_BreakoutPressure-	Breakout pressure (return)	1.277	• bar					
	Down			• MPa					
				• psi					
	var_KPI_VS_Ref_BreakoutPosition- Down	Breakout position (return)	1.8	%					
	var_KPI_VS_Ref_TimeStamp_Date	Time stamp: Day	8/21/2023	-					
			<mm dd="" yyyy=""></mm>						
	var_KPI_VS_Ref_TimeStamp_Time	Time stamp: Time	14:35:56.980	-					
	var_KPI_VS_Ref_OperatingHours	Operating hours	924	h					
Latest VS	var_KPI_VS_Latest_CurState_80	Overall status for VS	0	-					
	var_KPI_VS_Latest_CurState_Valid	Overall status for VS	Valid	-					
	var_KPI_VS_Latest_CurState_3F	Overall status for VS	0	-					
	var_KPI_VS_Latest_ErrorByte	Detailed information	0	-					
	var_KPI_VS_Latest_BreakoutPres-	Breakout pressure	2.202	• bar					
	sureUp			• MPa					
				• psi					
	var_KPI_VS_Latest_BreakoutPosi- tionUp	Breakout position	98.5	%					
	var_KPI_VS_Latest_BreakoutPres-	Breakout pressure (return)	1.280	• bar					
	sureDown			• MPa					
				• psi					
	var_KPI_VS_Latest_BreakoutPosi- tionDown	Breakout position (return)	2.0	%					
	var_KPI_VS_Latest_Time-	Time stamp: Day	2/21/2024	-					
	Stamp_Date		<mm dd="" yyyy=""></mm>						
	var_KPI_VS_Latest_Time- Stamp_Time	Time stamp: Time	17:35:56.980	-					
	var_KPI_VS_Latest_OperatingHours	Operating hours	1025	-					
Number of VS Data- sets	var_KPI_VS_NumberOfDatasets	Number of data records (with- out reference)	10	-					

Table 6-12 KPIs of the maximum of 9 predecessor VS

Data description in the XML file							
Name	Label	DisplayValue	Unit				
var_KPI_VS_M1_CurState_80	Overall status for VS		-				
var_KPI_VS_M9_CurState_80							
var_KPI_VS_M1_CurState_Valid	Overall status for VS		-				
var_KPI_VS_M9_CurState_Valid							
var_KPI_VS_M1_CurState_3F	Overall status for VS		-				
var_KPI_VS_M9_CurState_3F							
var_KPI_VS_M1_ErrorByte	Detailed information		-				
var_KPI_VS_M9_ErrorByte							
var_KPI_VS_M1_BreakoutPressureUp	Breakout pressure		• bar				
			• MPa				
var_KPI_VS_M9_BreakoutPressureUp			• psi				
var_KPI_VS_M1_BreakoutPositionUp	Breakout position		%				
var_KPI_VS_M9_BreakoutPositionUp							
var_KPI_VS_M1_BreakoutPressureDown	Breakout pressure (return)		• bar				
			• MPa				
var_KPI_VS_M9_BreakoutPressureDown			• psi				
var_KPI_VS_M1_BreakoutPositionDown	Breakout position (return)		%				
var_KPI_VS_M9_BreakoutPositionDown							
var_KPI_VS_M1_TimeStamp_Date	Time stamp: Day		-				
var_KPI_VS_M9_TimeStamp_Date							
var_KPI_VS_M1_TimeStamp_Time	Time stamp: Time		-				
var_KPI_VS_M9_TimeStamp_Time							
var_KPI_VS_M1_OperatingHours	Operating hours		-				
var_KPI_VS_M9_OperatingHours							

6.9 Triggered pressure monitoring (TPM)

6.9 Triggered pressure monitoring (TPM)

6.9.1 Functional description

At the Triggered pressure monitoring (TPM), 2 time-shifted pressure measurements are performed at the Y1 connection:

- 1. Measurement at the start of diagnostics
- 2. Measurement at the end of the set duration (≜ Parameter "Time pressure measurement Y1" (U9.TPMT))

Once the test has been completed, the pressure difference between the 2 measurements is determined and displayed.

This test can be used to check the function of external attachments between the 2 measurements, e.g. a temporary air release.

Parameters of the TPM diagnostics:

• Time pressure measurement Y1 (U9.TPMT)

The diagnostics is made with Device Manager Software or, for example SIMATIC PDM of via HART communication, executed and read out.

Local operation is not possible.

Note

During the test, the positioner is not in "Automatic (AUT)" mode and has the following behavior:

- Any system deviations that occur are not corrected.
- The positioner does not follow the setpoint.
- The positioner moves the valve.

6.9 Triggered pressure monitoring (TPM)

6.9.2 With SIMATIC PDM: Configuring and starting TPM

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.
- The positioner is in a maintenance phase, e.g. while the flow rate is not being actively controlled.
- The positioner is attached to the valve and connected to the power supply and the compressed air supply.
- The "52.XDIAG" application parameter is set to "On1", "On2" or "On3".
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Diagnostics parameters

U9.TPMT	Time pressure measurement Y1			
Function	The parameter defines the time interval between the 1st pressure measurement and the 2nd pressure measurement at the Y1 connection.			
Setting range	1 1000			
Factory setting	1			
Unit	s (second)			
Communication				
SIMATIC PDM Export	Name	var_TPM_Time		
	DisplayValue	≜ Value		

Configuring and starting diagnostics

- 1. Switch the positioner to "Automatic (AUT)" mode.
- 2. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 3. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

SIPART PS2 – 🗆 🗙					<				
File	Dev	vice View Diagnostics	Maintenance	Help	SIMATIC PDM	V9.2 SP2 Proces	s Devic	e Manager	
	+1	Download to device	?						
	t 1	Upload to PG/PC			Parameter	Value	Unit	Status	^
😑 🗊 Assign address and TAG			SIPART PS2 DR8 HART						
	Value comparison			⊡ldentification					
		Object properties			TAG	DEMOKOFF		‡ []	
		Calibration log			Long TAG	SIPART PS2		‡]	
	1	Change Log			Descriptor	-		1	
		Set device checked			Message	DIAGNOSIS		1	
					Data	1/29/2024		+	

6.9 Triggered pressure monitoring (TPM)

- 4. In the "Upload to PG/PC..." dialog, click the "Start" button. ⇒ The current parameters of the positioner are loaded into the "Process Device Manager".
- 5. Wait until the status "Load to PG/PC: Action finished" is displayed.
- 6. Close the dialog.
- 7. Select the "Maintenance & Diagnostics" directory.

SIPART PS2			_		×				
File Device View Diagnostics	Maintenance Help SIMATIC PDN	V9.2 SP2 Proce	ss Devic	e Manage	er				
🔒 📑 🕂 🕂 🙅 🖻 🖡 🚳 🥄				_					
□ III SIPART PS2	Parameter	Value	Unit	Status	^				
⊡…II SIPART PS2 DR8 HART	Maintenance & Diagnostics								
	Activation of extended diagnostics (52.XDIAG)	On 3 (three-stage al		‡ []					
	Pressure monitoring (U.\PRES)	Off 🗸		‡ []					
	Partial Stroke Test (A.\PST)	Off		‡ []					
	Monitoring of dynamic control valve behavior (b.\DEVI)	Un		‡ []					
	Monitoring/compensation of pneumatic leakage (C.\LEAK)	Off		‡ []					
	Monitoring stiction (slipstick effect) (d.\STIC)	Off		‡ []					
	Deadband monitoring (E.\DEBA)	Off		1					
	Monitoring of lower endstop (F.\ZERO)	Off		‡					
	Monitoring of upper endstop (G.\OPEN)	Off		‡ []					
	Monitoring of lower limit temperature (H.\TMIN)	Off		1					
	Monitoring of upper limit temperature (J.\TMAX)	Off		1					
	Monitoring number of total strokes (L.\STRK)	Off		1					
	Monitoring number of direction changes (O.\DCHG)	Off		1					
	Monitoring of average position value (P.\PAVG)	Off		1					
1	⊡ Offline leakage test								
	Test range	100.0	%	1					
J	Diagnostic values				×				
z004skzd SIPART PS2 🖌	🛛 Online access 🖌 🛛 Diagnosis Update 🖌 🛛 Ide	ntity Check 🖌 📃			<mark>)</mark> :				

- 8. For "Pressure monitoring" (U.\PRES), set the value to "On".
- 9. In the "Device" menu, select the command "Download to device...".

10. Recommendation: Select the check box "Load changed parameters only".

- 11. In the dialog, click the "Start" button.
 ⇒ If the check box is selected, only the changed parameter values are loaded into the positioner.
- 12. Wait until the status "Load to Device: Action finished" is displayed.
- 13. Close the dialog.
14. In the "Device" menu, select the command "Maintenance and Diagnostics > Triggered pressure monitoring".

SIPART PS2 - Triggered pressure	monitoring		?	×
pressure measurement Y1 (U9.TPMT):	20 🖉 s) (Start test
	Measures the pressure drop of the actuating pressure at Y1 during the specified time period.	ļ	'Triggered pr	Stop test essure monit
		Operating hours:		
		Actuating pressure:		
		Actuating pressure drop:		
<				>
Transfer Messages	Print			Jose

 \Rightarrow The "Triggered pressure monitoring dialog is displayed.

15. Set the "U9.TPMT" parameter to a sufficient value, e.g. "20" seconds. During the set duration of the test, the positioner behaves as follows

- The positioner is not in "Automatic (AUT)" mode.
- Any system deviations that occur are not corrected.
- The positioner does not follow the setpoint.

16. Transfer the change to the positioner with the "Transfer" button.

17. Start with the "Start test" button.

18. Note the information in the following dialog.

19. To start the diagnostics, select the "Yes" option button and click "OK".

- \Rightarrow Diagnostics starts with the 1st pressure measurement at the Y1 connection.
- \Rightarrow The "Triggered Pressure monitoring is running" status is highlighted in the dialog.
- \Rightarrow "TPM" is shown in the display.



20. Confirm the start in the following dialog with "OK".

 \Rightarrow The function of external attachments can be tested, e.g. a temporary air release.

- 21. Wait for the end of the set duration and the 2nd pressure measurement at the Y1 connection. The diagnostic results are displayed in the dialog:
 - Operating hours
 - Actuating pressure : Shows the result of the 1st measurement.
 - Actuating pressure drop: Shows the pressure drop of the signal pressure during the set duration "U9.TPMT".

Z SIPAR	रT PS2 - Triggered pressure monitoring		?	×	(
(U9.TPMT):	20 1 s		Start test			
	Measures the pressure drop of the actuating pressure at Y1 during the Stop test					
	specified time period.		'Triggered pressure monitoring' is running	1		
	Operati	ing hours:	812	1 1	h	
	Actuating	pressure:	4.045	1	bar	
	Actuating press	sure drop:	0.869	1 1	bar	
<				ī	>	
Transf	sfer Messages Print		Close	•		

22. Close the dialog with the "Close" button.

Read diagnostics status

🔼 SIP	PART PS2								_	-		×
File	Device	View	Diag	nostics	Maintenance	H	lelp	SIMATIC PDM V9.2 SP2	Proces	s Devic	e Manage	er
	L L T	1 412 🕞	R	Update d	diagnostics							
	SIPART P	S2		Status			ameter	Value		Unit	Status	~
<u> </u>	🖉 SIPAR	RT PS2 DI					IPART PS2 DR8 HART	Value		onic	010100	-
	ie ‡ Ide	entificatior		Irend ch	arts	•	Identification					-
	i⊞↓∐ Se	aintenanc		Histogra	ims	•	TAG	DEMOKOFE	_		t	-
	1 Co	ommunicat		KPI		•	Long TAG	SIPART PS2			† 1	-
				Valve cha	arts	•	Descriptor				1	
				Alarm lo	gbook		Message	DIAGNOSIS			*- 1	-
						\vdash	Date	8/15/2023			+= †[]	-
							Device	0,10,2020			•=	
							Manufacturer	Siemens			t	
							Device Type	SIPART PS2			t	
							Order number	-			t	
							Serial number	N1KO037518210			1	
							Final Assembly Number	0			1	
							Hardware Revision	3			1	
							Firmware revision	5.03.00-28			1	
						EDD version	25.00.00					
		⊟ Setup				Setup						
							Dynamic variable mapp	ing				
							PV is	Setpoint			1	
							SV is	Setpoint			1	
							TV is	Setpoint			1	
							QV is	Setpoint			1	
					Basic settings							
							Type of actuator (1.Y	FWAY (linear actuator - carrier pin on actuator	r spi		1	~
z004skz	d SIPART	r psz 🖌					🛛 Online access 🖌 🖌 Di	agnosis Update 🖌 🛛 Identity Check 🖌)

1. In the "Diagnostics" menu, select the "Status" command.

2. Select the "Messages" tab.

The following message is highlighted while the test is running:

- Triggered pressure monitoring is running

SIPART PS2 - Status		?	×
Diagnostics Status Messages			^
SIEMENS		GOOD 🗸	ŀ
Device status: Primary variable outside the operating limits Non-primary variable outside the operating limit Current output outside the operating range limit Current output in fixed mode	Device status 2:	 Triggered pressure monitoring' is running Tight closing UOWN Tight closing UP Fast closing DOWN Fast closing UP 	1
Device status 1: Device in 'Automatic (AUT)' mode Device in 'Configuring' mode Device in P manual operation Digital setpoint source Alam has responded	Operation warnings:	 Control variable out of range Setpoint out of range Device is not ready for operation (not initialize Supply pressure falls below the lower limit Supply pressure out of specification 	1
	Device errors:	EEPROM error Error measured value acquisition Pressure sensor module defective	1
	Device status:	│ Maintenance required │ Failure │ Functional check	1
	Current temperature (30.TEMP):	27.2	1
	Input current of device:	10.399	1 .
<			>
Transfer Messages Print		Close	

3. Close the dialog.

6.9.3 Via HART communication: Configuring and starting TPM

Requirement

- The positioner has pressure sensors (-Z PO2 option).
- "Pressure monitoring" (U.\PRES) is activated.

Diagnostics parameters

U9.TPMT	Time pressure measurement Y1				
Function	The parameter defines the time interval between the 1st pressure measurement and the 2nd pressure measurement at the Y1 connection.				
Setting range	1 1000				
Factory setting	1				
Unit					
Communication	-				
HART communication	Command	#198			
(read)	Response Data	Bytes: 24 25			
		Format: Unsigned-16			
HART communication	Command	#199			
(write)	Request Data	Bytes: 24 25			
		Format: Unsigned-16			

Request diagnostic parameters

Request

Send to the positioner via HART communication:

• "#198" command

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Table 6-13 Response Data Bytes

Byte Format		Description
1	Enum	Pressure unit (U1.PUNIT)
24 25	Unsigned-16	Time pressure measurement Y1 (U9.TPMT)

Table 6-14	Command-Specifi	c Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors

Change diagnostic parameters (optional)

Request

Send to the positioner via HART communication:

- "#199" command
- Bytes 24 ... 25 for the set value of the parameter "U9.TPMT"

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Byte	Format	Description
1	Enum	Pressure unit (U1.PUNIT)
24 25	Unsigned-16	Time pressure measurement Y1 (U9.TPMT)

 Table 6-16
 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
2	Error	Invalid Selection
3		Passed Parameter Too Large
4		Passed Parameter Too Small
5		Too Few Data Bytes Received
6		Device-Specific Command Error
7		In Write Protect Mode
16		Access Restricted
32		Busy

Start diagnostics

Send to the positioner via HART communication:

- "#172" command
- Byte 0, Bit 5 and Byte 1, Bit 6
- \Rightarrow "TPM" is shown in the display.



Cancel diagnostics

- "#172" command
- Byte 0, Bit 5 and Byte 1, Bit 7

Display the diagnostics status

- "#48" command
- Byte 1, Bit 7

Read out diagnostic results

Request

Send to the positioner via HART communication:

• "#212" command

Answer

The answer consists of the following data:

- Response Data Bytes
- Command-Specific Response Code

Table 6-17 Response Data Bytes

Byte	Format	Description
1	Enum	Pressure Unit (U1.PUNIT)
1 4	Unsigned-32	Triggered Pressure Monitoring: Operating Hours Counter
5 8	Float	Triggered Pressure Monitoring: Chamber Pressure
9 12	Float	Triggered Pressure Monitoring: Chamber Pressure Drop

Table 6-18 Command-Specific Response Codes

Code	Class	Description
0	Success	No Command-Specific Errors
6	Error	Device Specific Command Error

Alarm logbook

7.1 Functionality and capacity

The positioner has an alarm logbook that is designed as a ring memory.

The alarm logbook saves all messages and alarms that occur during operation, e.g. when a threshold is exceeded, using the FIFO method (First In - First Out)

If the capacity is exceeded, previous messages are replaced by current messages.

Firmware	e (FW) of the positioner	Capacity
5.00		30 entries
5.01		
5.02		
5.03	Note: For SIPART PS2 with pressure sensors -Z P01/P02	400 entries
5.04		30 entries
5.05		

7.2 Open alarm logbook

Requirement

- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

7.2 Open alarm logbook

Display and update messages in the alarm logbook

- 1. In SIMATIC PDM, open the object of the positioner, e.g. "SIPART PS2".
- 2. In the "Process Device Manager" editor in the "Device" menu, select the "Upload to PG/PC..." command.

🚺 SI	PART F	PS2							_		×
File	Dev	vice View Diagnostics	Maintena	nce	Help		SIMATIC PDM	V9.2 SP2 Proc	ess Devic	e Manager	r
	+I	Download to device		?							
	†[]	Upload to PG/PC				Parameter		Value	Unit	Status	^
Ė	🗄 😈 Assign address and TAG					SIPART PS2 DR8 HAI	RT				
	<u>61</u> 2	Value comparison				Identification					
		Object properties				TAG		DEMOKOFF		1	
		Calibration log				Long TAG		SIPART PS2		‡ [
		Change Log				Descriptor		-		1	
		Set device checked				Message		DIAGNOSIS		1	
						Data		1/29/2024		†	

- 3. In the "Upload to PG/PC..." dialog, click the "Start" button.
 - \Rightarrow The current parameters of the positioner are loaded into the "Process Device Manager".
- 4. Wait until the status "Load to PG/PC: Action finished" is displayed.

SIPART PS2									-	- 1		×
File Device	View	Diagnostics	Maintenance diagnostics	Help	0		SIMATIC PDM	V9.2 SP2	Proces	s Device	e Manage	r
	°S2	Status			Para	meter		Value		Unit	Status	^
I ⊡… 🖉 SIPAR	RT PS2 DI	Trend ch	arts	•	⊡ SIF	PART PS2 DR8 HART	-					
	etup	Histogra	ims	•	Ξk	dentification						
🗄 🤌 M	aintenanc	KPI		•		TAG		DEMOKOFF			‡ []	
1	ommunicat	Valve ch	arts			Long TAG		SIPART PS2			1	
	ſ	Alarm Io	ahook			Descriptor		-			1	
	L	Alamino	guook			Message		DIAGNOSIS			1	

5. In the "Diagnostics" menu, select the "Alarm logbook" command.

 \Rightarrow The "Alarm logbook" dialog opens.

The procedure is shown as an example with FW 5.03.

For FW 5.00 to 5.02, the "Update" and "Reset" buttons are located at the bottom of the dialog.

	- Alarm	logbook				2)	×
SILVER I SE	Alum	logbook						~
SIEMENS			Date: 3/25/202	24 📃 🗸	Time:	12:22:23.675	1	
l ladata alam laabaak					Denst alarm la alar	-1.	_	
	U	poate alarm logbook			Reset alarm logbo	ок		
Alarm logbook:								
Time stamp		Operating hours	Alarm type		Status		^	
25.03.2024 12	:18:20	1099	Permitted device temp	perature exceeded.	Alarm not active			
25.03.2024 12	:13:49	1099	Permitted device temp	perature exceeded.	Alarm active (limit 2)			
25.03.2024 12	:12:55	1099	Permitted device temp	perature exceeded.	Alarm not active			
25.03.2024 12	:07:27	1099	Permitted device temp	perature exceeded.	Alarm active (limit 2)		
25.03.2024 12	:02:36	1099	Actuator runtime error	:	Alarm not active			
25.03.2024 12	:02:34	1099	Supply pressure out o	f specification	Alarm not active			
25.03.2024 12	:02:34	1099	Supply pressure falls b	below the lower limit	Alarm not active			
25.03.2024 12	:02:24	1099	Actuator runtime error		Alarm active			
25.03.2024 12	:02:23	1099	Supply pressure out o	f specification	Alarm active			
25.03.2024 12	:02:23	1099	Supply pressure falls b	below the lower limit	Alarm active			
Print	1)K Car		

The dialog shows the messages since the alarm log was last updated.

7.3 Reset messages in the alarm logbook

6. Click the "Update alarm logbook" button.



 \Rightarrow The "Update Alarm logbook" dialog opens.

SIPART PS2 - Update alarm logbook	×
Should the alarm logbook really be read by the device?	
O Yes - 20	ð
Yes - 100	
O Yes - All	
Yes - User-defined	
⊖ No	
OK Cancel	

- 7. Select the required option button, e.g. "Yes 100" dialog.
- 8. Close the dialog with "OK". \Rightarrow The "Message Log" dialog opens.
- 9. Wait until the status "Finished" is displayed.
- 10. Click the "Close" button. \Rightarrow When present, they are displayed in the "Alarm logbook" dialog.
- 11. Close the dialog with "OK".

7.3 Reset messages in the alarm logbook

Requirement

- The positioner has a HART interface: SIPART PS2 6DR51.../6DR52...
- The installation of SIMATIC PDM as of version 9.0 is available.
- An object with the firmware version of the positioner is created in SIMATIC PDM.

Reset messages in the alarm logbook

1. In the "Diagnostics" menu, select the "Alarm logbook" command.

SIPART PS2				-	- (_ >	<
File Device View Dia	gnostics Maintenance H	elp	SIMATIC PDM	V9.2 SP2 Proces	s Device	e Manager	
🔒 昌 💵 粒 🙆 🖻	Update diagnostics						
SIPART PS2	Status		Parameter	Value	Unit	Status	^
⊡	Trend charts		SIPART PS2 DR8 HART				
	Histograms •		□ Identification				
	KPI 🕨		TAG	DEMOKOFF		1	
	Valve charts		Long TAG	SIPART PS2		‡ []	
	Alarm logbook		Descriptor	-		‡ []	
	Alamitogbook		Message	DIAGNOSIS		1	

 \Rightarrow The "Alarm logbook" dialog opens.

The procedure is shown as an example with FW 5.03.

For FW 5.00 to 5.02, the "Update" and "Reset" buttons are located at the bottom of the dialog.

1	🖊 SIPART PS2 - Alarm	logbook		?	>	×
	SIEMENS		Date: 3/25/2024	Time: 12:22:23.675	11	^
	U	pdate alarm logbook		Reset alarm logbook		
	Alarm logbook:		La	1-	Ι.	
	Time stamp	Operating hours	Alarm type	Status		
	25.03.2024 12:18:20	1099	Permitted device temperature exceeded.	Alarm not active		
	25.03.2024 12:13:49	1099	Permitted device temperature exceeded.	Alarm active (limit 2)		
	25.03.2024 12:12:55	1099	Permitted device temperature exceeded.	Alarm not active]	
	25.03.2024 12:07:27	1099	Permitted device temperature exceeded.	Alarm active (limit 2)]	
	25.03.2024 12:02:36	1099	Actuator runtime error.	Alarm not active	1	
	25.03.2024 12:02:34	1099	Supply pressure out of specification	Alarm not active	1	
	25.03.2024 12:02:34	1099	Supply pressure falls below the lower limit	Alarm not active	1	
	25.03.2024 12:02:24	1099	Actuator runtime error.	Alarm active	1	
	25.03.2024 12:02:23	1099	Supply pressure out of specification	Alarm active	1	
	25.03.2024 12:02:23	1099	Supply pressure falls below the lower limit	Alarm active		
	Print	1		OK Can	cel	

The dialog shows the messages since the alarm log was last updated.

2. Click the "Reset alarm logbook" button.

SIPART PS2 - Alarm logbook				?	×	
SIEMENS	Date: 3/25/2024	[] t	Time:	12:22:23.675	ij	^
Update alarm logbook			Reset alarm logbook		ן כ	
Alarm logbook:						

7.3 Reset messages in the alarm logbook

 \Rightarrow The "Reset Alarm logbook" dialog opens.

SIPART PS2 - Reset alarm logbook
Do you really want to reset the alarm logbook in the device? Yes No
OK Cancel

- 3. Select the option button "Yes" dialog.
- 4. Close the dialog with "OK". \Rightarrow The messages in the alarm logbook of the positioner are deleted.
- 5. Click the "Update alarm logbook" button.
 ⇒ The dialog is updated: The messages have been removed.

SIPART PS2 - Ala	arm logbook					?	>	<
SIEMENS		Date: 4/12	2/2024		Time:	12:32:07.345	11	^
	Update alarm logbo	ok			Reset alarm logbook			
Alarm logbook:								
Time stamp	Operating hours	Alarm type	Status				^	
								~
Print	1	1	1		ОК	Can	icel	

6. Close the dialog with "OK".

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