

Control Valve Maintenance Support System PLUG-IN Valstaff

R60

Introduction

PLUG-IN Valstaff is a valve management system that detects problems with control valves and positioners at the earliest possible stage by monitoring diagnostic parameters and other information from the Smart Valve Positioner, thereby assisting to avoid accident/failure and helping to streamline maintenance tasks by clearly presenting the information required for decision-making on control valve maintenance. The PLUG-IN Valstaff monitors diagnostic information 24 hours a day, 365 days a year by communicating with Azbil Corporation's Smart Valve Positioner, which supports FOUN-DATION[™] fieldbus and HART[®] communication. Based on this diagnostic information, at the first sign of an abnormality, the system sends an alert in order to prompt action before the control valve can cause a problem, allowing continuously safe and secure plant operation. The PLUG-IN Valstaff also supports quick and accurate startup by automating positioner settings that adjust the control valve status, as well as automating step response tests. It also utilizes diagnostic information for routine maintenance, supporting the creation of an appropriate maintenance plan based on the degree of deterioration of control valves.

Function Overview

The PLUG-IN Valstaff, in combination with Azbil Corporation's Smart Valve Positioner, achieves its functions of CV diagnostics parameter monitoring, step response test, and auto-setup by means of integration with a device management system.

Online diagnosis & monitoring while the plant is operating

By collecting diagnostic parameter data from the Smart Valve Positioner and displaying it in a graph during plant operation, the progress of control valve deterioration and the occurrence of abnormalities can be estimated while the plant is operating. The PLUG-IN Valstaff collects data from the positioner and displays the following diagnostics graphs.

1. Total stroke

Displays a chronological graph of the total distance the valve stem has moved as a result of control of the valve travel.

2. Shut-off count

Counts the number of times the valve is completely closed and displays the total close counts in chronological order in a graph.

3. Cycle count

Counts the number of times the control valve motion was reversed and displays it in chronological order in a graph.

4. Travel histogram

Indicates the amount of time the control valve is in that position and the changes that occurred though time in a histogram.

5. Maximum travel speed

Constantly measures the operating speed of the control valve in both the opening and closing directions, calculates the maximum speed for each day, and then displays the maximum values for opening and closing directions over time.

6. Stick-slip diagnostics

Analyzes stick-slip occurrence trends.



Figure 1. Stick-Slip Diagnostics Screen

7. Trend data

Displays the travel setting of any selected positioner, the actual travel of the control valve, deviation between travel the setting and actual valve travel, the EPM drive signal, and circuit board temperature. Data for up to one week can be displayed in graph form.

8. Po Validity/Max. Friction diagnostics

Displays the current relationship between output air pressure and valve travel in a graph together with the values obtained during auto-setup, which serve as a standard. Each day's output air pressure validity and maximum friction are indicated chronologically in the graph. (Only Smart Valve Positioner 700 series)

9. Air circuit diagnostics

Each day, the amount of shift from the normal values for the EPM drive signal and nozzle back pressure is calculated and displayed chronologically in a graph. (Only Smart Valve Positioner 700 series)

10. Supply Pressure

Displays the maximum value and minimum value of supply pressure per day in chronological order in a graph. (Only Smart Valve Positioner 700 series)

11. Zero Point Travel

Periodically updates the values for maximum and minimum travel when the valve is fully closed, and displays the maximums and minimums of each day in a chronological graph. (Only Smart Valve Positioner 700 series)

No. SS2-PVS600-0001

12. Temperature

Periodically updates the temperature measured by the temperature sensor on the electronics board of the positioner, and displays the maximum and minimum temperature of each day in chronological order in a graph. (Only Smart Valve Positioner 700 series)

13. A set of online diagnostic windows

Frequently used online diagnostic windows can be grouped to display a set of windows for individual control valves.



Figure 2. A set of control valve online diagnostic windows

14. Valve Condition Viewer

Displays accumulated online diagnostic parameters in a table. The results can be sorted and filtered by diagnostic items to show organized information about the current condition control valve motion.

Start 11/2017	Period		× 10	>	No.	Y Nak	Y	Group Name Basic	v								
End 16/2018	0 12 - Dack	Month(s) Us	idate Back I	Forward Hist	orical Compariso	× Pasel	All Filter	Group Se Calum S	rtine	CSVOU	ADUR 12						
		Total	Christen .	9.4	Court	Ovela	Court	Max Tone	al Crued				964.9				Trend
Device Teg	Target for Comparison	Difference	End Value	Difference	End Value	Difference	End Value	Nax.+	Nat	YX	High Alarm Count	High Alerm End Court	Medium Alerm Court	Nedium Alerm End Count	Low Alerm Court	Low Alarm End Count	Set Point Max
		5	2	Size(s)	Size(s)	firm(s)	firme(s)	204	2.6		firme(s)	Size(s)	time(s)	firm(s)	time(s)	timels) +	2
1.80		5 380 657.0	19 615 938 9	3	18	5	34	101.35	-64.79	9.33	0	3					141 93
2 FC	Ő	1,537,425,4	1,572,409.3	499	525	153	199	178.70	-338.98	48.79	385	19					129.85
3 FC	Ő	1,506,465,2	1,718,538,2	158,145	185,168	6	99	201.38	-193.06	43.94	378	43					99.99
4 LC	Ő	1,470,810,5	3,297,081,5	11,288	11,344	88	153	46.86	-39.52	13.74	55	6					105.05
5 PC	Ő	1,440,063.3	2,360,282,0	2	78	7	117	70.86	-47.48	13.65	31,490	15					105.08
6 FC		1,434,868.1	2,264,852,7	5,463	10.024	1,994	2,144	211.44	-192.69	64.65	97,427	171					105.03
7 LC		1,373,683,1	2,687,900.0	1,105	3,273	2,496	4,157	184.58	-39.97	14,71	12	2					104.99
8 FC		1,266,863.3	3,716,318,4	4,911	23,232	5,122	9,295	88.15	-189.95	26.52	153	14					145.21
9 TC		1,146,584,8	2,032,636,4	76,903	122,505	4	27	42.57	-40.70	14.72	168	9					100.02
ID FC		866.413.5	1,758,436.3	79	143	0	34	259.65	-990.73	23.88	500	15					105.01
11 TC		661,777,5	1.053,469,1	4,743	7,968	4	39	43.55	-41.99	12.74	152	11					100.01
12 FC		645,079.0	726,951,1	78,579	86,578	4	36	213.07	-172.56	29.69	1,536	66					100.01
13 FC		568.196.3	736.061.5	47	204	58	154	220.56	-200.59	48.45	2,904	102					105.85
14 PC		360,625,3	1.917.386.5	80	209	14	127	60.38	-39.65	13.85	24	7					104.9
15 FC		291,494,1	\$64,905.7	38	105	4	45	204.12	-172.55	31.62	1,630	74					99.99
IE FC	Ū.	261,706.6	379,875,2	24	129	14	81	209.45	-192.01	31.84	1,442	50					105.07
17 TC		252,298.7	451,362.5	2,738	4,913	39	95	129.99	-186.50	12.00	86	10					105.05
IB FC		226.181.5	267,509.5	104,997	108,271	8	65	213.47	-188.57	34.06	1,343	12					104.9
19 FC		225,723.6	275,254.3	41	92	32	120	210.96	-201.50	40.39	2,405	82					105.01
E FC		219,403.6	427,577.9	1,171	2,009	11	117	195.98	-331.81	49.20	48,415	113					125.00
ET FC		168.042.8	636,116,7	33,615	78,878	8	65	212.51	-185.00	29.08	1,207	40					100.0
2 FC		163,850.8	350,606.6	1,123	1,212	8	34	201.89	-176.74	30.47	559	32					104.9
E FC		162,631.3	200,421.0	39	93	4	39	203.22	-171,71	24.94	2,835	93					99.90
R FC		160,476.1	272,231.8	26	56	4	34	120.99	-215.75	5.70	0	3					99.97
IS FC		128.085.9	216,796,7	57	127	10	37	85.31	-65.96	9.26	0	2					105.04
IS FC		123,783,2	203,907.0	36	89	4	41	204.95	-172.55	31.04	1,862	61					100.00
7 FC		123.001.3	295,258.3	847	912	6	32	203.88	-182.88	36.27	895	43					105.07
a no		1.00.434.5	111 180 1	17				104.01	333.03								100.01

Figure 3. Valve Condition Viewer

By drawing monthly trend with accumulated online diagnostic result for multiple Control Valves, a CV which is different behavior compared to the other Valves can be visualized.



Figure 4. Monthly trend of Valve Condition Viewer

15. Trend Monitor Dashboard

Trend Monitor Dashboard monitors whether the daily average of each online diagnostic parameter indicate the trend to keep increasing or decreasing. It enables to grasp the overall of condition for all Valves and the detail trend condition for each valve.

riod 1 • months End date 7/4/2 alysis period 6/4/2019 - 7/4/2019	019 🔢	Moving Average Sampling No	im 5 • Trend Jud	gement Sampling M	4um 10 👻		UPDATE
shboard FV702-02 × 302F	V0802 ×	302FV0704 ×					
7% -	NO	TAG NAME	DEVICE TYPE	TOTAL STROKE	SHUT OFF COUNT	CYCLE COUNT	MAX TRAVE SPEED +
13%~2	1	FV3301	AVP30x	No change	No change	No change	No change
	2	FV3302	AVP30x	No change	No change	No change	No change
Tags:15	3	FV3303	AVP30x	No change	No change	No change	No change
	4	302FV0702	AVP7xx	No change	No change	No change	No change
12	5	302FV0703	AVP7xx	No change	No change	No change	No change
- 80 %	6	302FV0704	AVP7xx	No change	No change	No change	No change
No change	7	302FV0705	AVP7xx	No change	No change	No change	No change
Trend change	8	302FV0706	AVP7xx	No change	No change	No change	No change
Misong	9	302FV0707	AVP7xx	No change	No change	No change	No change
	10	FV702-02	AVP7xx	Missing	Missing	Missing	Missing
	11	302FV0801	AVP7xx	No change	No change	No change	No change
	12	302FV0802	AVP7xx	No change	Change	No change	No change
	13	302FV0803	AVP7xx	No change	No change	No change	No change

Figure 5. Trend Monitor Dashboard



Figure 6. Trend Monitor Dashboard (Detailed picture)

Offline Valve Test

A step response test or a valve signature test can be used to diagnose the condition of control valves when the plant is not operating.

1. Step Response Test

When the plant is not operating, the user can check the response of the control valve to changes by making step changes in the travel setting. The result is displayed in a graph that indicates slight changes that cannot be found by a visual check. The result is overlapped with past results for comparison, which is useful to find control valve deterioration and other problems.

This CV step response test function supports the following input characteristics set with Azbil Smart Valve Positioner.

- Linear
- Quick Open
- Equal percent
- Custom



Figure 7. Step Response test Screen

Azbil Corporation

Tests can be executed concurrently as well as consecutively for multiple valves, making use of a limited amount of time (Figure 8).

Control valve performance can be evaluated with quantitative dynamic characteristics data obtained from the test, such as time constants, delay time, and settling time, and by comparing the data with past results. The evaluation can be output as a report (Figure 9).



Figure 8. Diagram of step response testing



Figure 9. Step Response Test Result Comparison Report

2. Valve Signature Test

When the plant is not operating, a valve signature test can be executed. This test ramps the control valve at low speed in both directions to the fully closed and fully open positions in order to diagnose the condition of each part of the valve, utilizing the characteristics data obtained from the output air pressure of the actuator and from valve travel.

The result, which are displayed in the graph, can be used to detect deterioration or other problems in the control valve. This test can be executed for several control valves consecutively.

(Only Smart Valve Positioner 700 series)



Figure 10. Valve Signature Screen

AO loop check

A loop check function that uses 4–20 mA DC analog output is available. A loop check can be executed manually with the output changed by the operator or can be executed automatically with the output of regulatory control blocks or manual loader blocks changed automatically using OPC communication. Whether to run it manually or automatically can be selected.

The user can select 3 or 5 points, one way or round trip, and whether to include checks of 0.1 % and 99.9 % MV. In addition, in an environment where multiple loops can be checked simultaneously, you can specify the number of loops to check.

The loop check function supports the following types of flow characteristics set for Azbil Smart Valve Positioners.

- Linear
- Quick Open
- Equal percent
- Custom
- Note: For automatic execution, an OPC server that can change the values output from the DCS is required.

In an InnovativeField Organizer environment, automatic execution is available with the following types of DCS.

- Azbil Advanced-PS
- Azbil Harmonas-DEO
- Yokogawa CENTUM CS1000/CS3000
- Yokogawa CENTUM VP

When used in a PRM environment, note the following.

Configuration for allowing data to be written to CENTUM regulatory control blocks or manual loader blocks via Exaopc is required. For automatic execution, the mode of regulatory control blocks must be changed to ROUT or MAN via Exaopc. With manual loader blocks, the mode must be changed to MAN via Exaopc. If the mode cannot be changed, the AO loop cannot be checked automatically.

If there is a calculation block that converts output characteristics between regulatory blocks and manual loader blocks, use the manual loader blocks for loop checks. If manual loader blocks are split-configured at a level below a regulatory control block, use manual loader blocks for loop checks.

Testing of emergency shutoff valves

A partial stroke test (PST) or full stroke test (FST) can be used to diagnose the condition of emergency shutoff valves.

1. Partial Stroke Test (PST)*

When the plant is operating, PLUG-IN Valstaff executes a partial-stroke low-speed ramp operation for emergency shutoff valves. Equipment failure can be detected from the results.

The test results are indicated in a graph. By comparing the results with past results, the user can find deterioration and other problems with emergency shutoff valves. This test can be executed for several emergency shutoff valves consecutively.

2. Full Stroke Test (FST)*

When the plant is not operating, PLUG-IN Valstaff opens and closes emergency shutoff valves to their full extent to check if they operate properly.

The test results are indicated in a graph. By comparing the results with past results, the user can find deterioration and other problems with emergency shutoff valves.

This test can be executed for several emergency shutoff valves consecutively.

- These tests are available when PLUG-IN Valstaff is used with the following 700 Series Smart ESD Devices provided by Azbil Corporation:
 - Model AVP77_(analog signal 4-20 mAdc)
 - Model AVP78_ (analog signal 0-20 mAdc)
 - Model AVP79_ (discrete signal 0/24 Vdc)
 - Model AVP703

Auto-setup

The PLUG-IN Valstaff's auto-setup function automatically adjusts the positioner.

The user can monitor the behavior of control valves during auto-setup, checking if there is abnormality in the auto adjustment process.

Also, the stroke time and hysteresis data collected during auto-setup can be compared with the past test data. This comparison provides an easy way to judge deterioration and the occurrence of abnormalities in the control valve.

PLUG-IN Vals	taff - AutoSetup							-	
Device Information					Mode			1	
Device Path	HL111>NWG/205>XPC/32>IDM19	-	Execute AutoSer	tup	Out	of service	In Service		
Device Tag	SVP21912		Check Data		_				
Manufacturer	Yamatake		CHECK Data			int Outro	Decking Chatra		
Madel	SVP		Close		Pisto	rical bata	Positioner Status		
Device ID	1193076				Paramete	er .	Before AutoSetup	After AutoSetup	
					Stroke T	ine	456	454	
Last Settings Up	odate: 01723/2012 08/37/59				Hysteres	is Rate	0.02	0.02	
nitoring					Gland Pa	soking Type	Light	Light	
peration Mode	Restore Move Hairline	Name	Data Time	(All	Actuator	Size	Param 3	Param 3	
		Trend	40.07 09.975		Actuator	Action	Direct	Direct	
	Q 7 0 < >	EDM	+7.87 08375		0% Trave	I Angle	-17.48	-17.65	
		Drive Sig	nal 4551 08375	1 0 🖪	100% Tra	mel Angle	20.86	20.74	
120% -				r 120%	Paramete	H.	Previous Data	Current Data	
					Travel		No Record	49.97	
110%-				-110%	Drive Sig	nal	No Record	44.95	
100%				-100%	Temperat	ture	No Record	24.31	
90% -				-90%	Travel Cu	utoff High	No Record	100.00	
000				00%	Travel Cu	utoff Low	No Record	0.00	
00%				00.74	Positione	r Action	No Record	Direct	
70%-				-70%	Valve Ac	tion	No Record	Direct	
60%-				60%	Flow Typ	e	No Record	Linear	
50%				50%	Input (%)		No Record	50.00	
40%				40%	Time	Device	Message		
			V		08:35:45	SVP21912	Reading of parameter	s is complete.	
30%-				-30%	08:35:46	SVP21912	Auto setup is being o	arried out.	
20%-				-20%	08:35:46	SVP21912	Please wait a momen		
10%				10%	08:37:33	SVP21912	Auto setup was succ	eastul.	
					08:37:34	SVP21912	Positioner operation of	heck has begun.	
0%-				-0%	08:37:51	SVP21912	Operation check is co	implete.	
-10%-				10%	08:37:52	SVP21912	Reading of parameter	s has begun.	
	rao craicao onaici	7.00	08/37/30		08:37:59	SVP21912	Reading of parameter	s is complete.	
	00.30.30 00.3		Tor		08:38:01	SVP21912	Reading positioner m	ode	
			114		08:38:02	SVP21912	Reading of positioner	mode is complete.	
	G (3				083802	SVP21912	AutoSetup is complet	e.	

Figure 11. Auto-setup Screen

Device Memo

A memo can be created for individual control valves with a simple operation and can be opened from the device tree for easy reference. The user can use device memos for purposes such as recording the installation date, adjustment history, or abnormal conditions, in order to manage control valves.

System Configuration

The PLUG-IN Valstaff works in conjunction with the InnovativeField Organizer[™] device management system made by Azbil Corporation or with the PRM^{*} (Plant Resource Manager) made by Yokogawa Electric Corporation.

With Advanced-PS (TDCS3000)

By operating the PLUG-IN Valstaff on InnovativeField Organizer, it is possible to manage control valves with a HART communication-compatible Smart Valve Positioner model AVP202/AVP302/SVX102/AVP307/AVP701/AVP702/ AVP77_/AVP78_/AVP79_.

For details on system configuration, refer to the specification sheet for InnovativeField Organizer (SS2-IFO600-0001).



Figure 12. PLUG-IN Valstaff Configuration for Advanced-PS/TDCS3000

With Harmonas-DEO

By operating the PLUG-IN Valstaff on InnovativeField Organizer, it is possible to manage control valves with a Smart Valve Positioner by using HART communication. For details on system configuration, refer to the specification sheet for InnovativeField Organizer (SS2-IFO600-0001).





InnovativeField Organizer system configuration, which is

independent of DCS model

The PLUG-IN Valstaff can be used in conjunction with InnovativeField Organizer independent from DCS by using HNU (HART Network Unit). In this case, the PLUG-IN Valstaff can manage control valves with HART communication-compatible Smart Valve Positioner model AVP202/ AVP302/SVX102/AVP307/AVP701/AVP702/AVP77_/ AVP78_/AVP79_.

A HART modem can be used as an interface unit instead of HNU.

For details on system configuration, refer to the specification sheet for InnovativeField Organizer (SS2-IFO600-0001).



Figure 14. InnovativeField Organizer system configuration, which is independent of DCS vendor and model

When Combined with Yokogawa Electric Corporation's PRM

The PLUG-IN Valstaff control valve maintenance support system can be used in conjunction with Yokogawa Electric Corporation's Plant Resource Manager (PRM).



Figure 15.PLUG-IN Valstaff configuration on PRM Server

Maximum Number of Connected Smart Valve Positioners

The maximum number of positioners that can be managed by the PLUG-IN Valstaff is shown below. It is dependent on the communication protocol.

System	Communication protocol	Maximum number of managed units		
Azbil Corporation's InnovativeField Organizer	HART	1000		
Yokogawa Electric Corporation's PRM	HART FOUNDATION fieldbus	500 *1		

*1: The sum of FOUNDATION fieldbus devices and HART devices.

Data collection Specifications

Table 1. With InnovativeField Organizer

		1				
		Stick-slip diagnostics:	400 s			
		Total stroke:	1 day			
		Maximum travel speed:	1 day			
		Total shut-off count:	1 day			
		Cycle count:	1 day			
		Po Validity/Max. Friction diagnostics:	1 day *4			
Diagnostic p	arameter	Air circuit diagnostics:	1 day *4			
update inter	val	Supply Pressure:	1 day *4			
		Zero Point Travel:	1 day *4			
		Travel histogram:	1 day			
		Set Point (from DCS OP) and Valve opening:	Fastest 1 s *2			
		Output Air Pressure:	Fastest 1 s *2 *4			
		Deviation:	Fastest 1 s *2			
		Temperature:	Fastest 1 s *2			
Valve test*5	HART	Model AVP701/702/ AVP77_/78_/79_	Fastest 50 ms			
data sampling	communica-	Model AVP302/202	85 ms			
cycle		Model AVP307	85 ms			
Device condition monitor- ing interval		Fastest 1 s *2				

Table 2. With PRM

		Stick-slip diagnostics:	400 s *1 *2	
		Total stroke:	1 day	
		Maximum travel speed:	1 day	
		Total shut-off count:	1 day	
		Cycle count:	1 day	
		Po Validity/Max. Friction diagnostics:	1 day *4	
		Air circuit diagnostics:	1 day *4	
Diagnostic p	arameter	Supply Pressure:	1 day *4	
update inter	val	Zero Point Travel:	1 day *4	
		Travel histogram:	1 day	
		Set Point (from DCS OP) and Valve opening:	Fastest 1 s *1 *2	
		Output Air Pressure:	Fastest 1 s *1 *2 *4	
		Deviation:	Fastest 1 s *1 *2	
		Temperature:	Fastest 1 s *1 *2	
		Model AVP703	Fastest 50 ms	
Valve test*5	communication	Model AVP303	85 ms	
data sampling		Model AVP701/702/ AVP77_/78_/79_	Fastest 50 ms	
cycle	communication	Model AVP302/202	Fastest 5 s *3	
		Model AVP307	85 ms	
Device cond interval	ition monitoring	300 s *2		

- *1: In case of Valstaff running on PRM, the functions may not be available or specifications may be different depending on the performance of PRM Field Communication Server, HART communication performance every IO of CENTUM, and how to assign HART dynamic parameters by IOM Builder.
- *2: Interval may require adjustment depending on the number of valve positioners connected.
- *3: Depending on the communication performance, a simple test may be required instead of a step response test.
- *4: Only Smart Valve Positioner 700 series
- *5: Valve test refers to the step response test, valve signature test, partial stroke test, and full stroke test.

Table 3. Application Specifications

		PLUG-IN Valstaff for InnovativeField Organizer					PLUG-IN Valstaff for PRM				
	ltem	Founi field	dation Ibus	HART			FOUNDATION fieldbus		HART		
		Model AVP303	Model AVP703	Model AVP302 AVP202	Model AVP701 AVP702	Model AVP307 AVP207 *2	Model AVP303	Model AVP703	Model AVP302 AVP202	Model AVP701 AVP702	Model AVP307 AVP207 *2
Positioner setup	Auto Setup		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
AO loop che	ck			\checkmark	\checkmark	\checkmark	√*6	√*6	√*6	√*6	√*6
	Step Response Test	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark
Offline Disgnostics	Simultaneous execution of Step Response Test to multiple CSv	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		√ *5		√*5	√*5
in plant	Valve Signature *1		\checkmark		\checkmark			\checkmark		\checkmark	
shutdown	Simultaneous execution Valve Signature Test to multiple CVs		\checkmark		\checkmark			√*5		√*5	
	Total Stroke	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
· · · · · · · · · · · · · · · · · · ·	Total shut-off count	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	Cycle Count	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	Travel histogram	\checkmark	\checkmark	 ✓ 	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	Max Travel Speed	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	Stick-slip diagnostics	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
	Zero point (Shut off) diagnostic	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Online Diagnostics	Deviation diagnostics between Input and Travel	√ *3	√ *3	√ *3	√ *3	√ *3	√ *8	√ *8	✓ *4	✓ *4	✓ *4
in plant	Output air pressure validity *1		\checkmark		\checkmark			\checkmark		\checkmark	
operation	Max frictional force *1		\checkmark		\checkmark			\checkmark		\checkmark	
	Supply air pressure *1		\checkmark		\checkmark			\checkmark		\checkmark	
	Positioner air circuit abnormality *1		\checkmark		\checkmark			\checkmark		\checkmark	
	Trend data such as Input, Travel, Deviation, EPM drive signal	√ *3	√ *3	√ *3	√ *3	√ *3	√ *8	√*8	✓ *4 *7	✓ *4 *7	✓ *4 *7
	Summary Report generation for Online Diagnostics parameters	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Positioner	Parameter Backup for multiple AVPs	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Backup	Simultaneous Parameter Backup for multiple AVPs	\checkmark	\checkmark	~	\checkmark	\checkmark					

*1: available for the model AVP701/AVP702/AVP703 only

*2: Require PLUG-IN Valstaff R43 or later in case of use in combination with the model AVP307/AVP207.

*3: Data collection on best effort with fastest 1 second scan.

*4: In case that IO of CENTUM FCS is N-IO, data collection with fastest 1 second scan on best effort by using Exaopc communication. In case that IO of CENTUM FCS is F-IO, by using Exaopc communication, data sampling interval is depend on the number of HART communication devices connected to one AI/O card. (With communication via PRM Field Communication Server, data sampling interval is 1 hour because of performance constraint)

Note: Require PLUG-IN Valstaff R43 or later to execute this function.

*5: Require PLUG-IN Valstaff R50 or later to execute this function. The test for multiple valves can be executed simultaneously. Time that is required to collect the result data for all test, is depend on the throuput of PRM Field Communication Server, CENTUM FCS, and IO.

*6: To automatically execute AO loop checks in a PRM environment, configuration for allowing data to be written to CENTUM regulatory control blocks via an OPC server (Exaopc/HIS) is required. Also note that whether or not multiple loops can be checked simultaneously depends on the I/O system environment of CENTUM.

*7: When trend data is collected via an OPC server (Exaopc or HIS), specify the settings so that the number of data accesses does not exceed the throughput of the OPC server. If throughput is excessive, an error may occur. It is your responsibility to make sure that the maximum throughput is not exceeded. Note that the number of data accesses is the sum of the accesses by all client applications, including the OPC trend data collection function.

When collecting data via an OPC server, CENTUM settings must be changed using the IOM builder, control drawing builder, etc. This change may affect existing applications. It is your responsibility to take into consideration the impact on existing applications when changing the CENTUM settings.

*8: In the case of FOUNDATION fieldbus, data is collected only via the field communication server of the PRM. Due to performance restrictions, data collection is executed on a 1-hour cycle.

Target Smart Valve Positioner

Table 4. Smart Valve Positioner 300/200 series

Model number	Internal software version			
Model AVP302	V 2D L			
Model AVP202	ver. 3.D or later			
Model AVP303	V 21 14			
Model AVP203	ver. 2.1 or later			
Model AVP307	Mar 7.0 an later			
Model AVP207	ver. /.0 or later			

Table 5. Smart Valve Positioner 700 series

Model number	Internal software version
Model AVP701/702/ AVP77_/78_/79_	Ver. 2.1 or later
Model AVP703	Ver. 2.5 or later

For detailed Smart Valve Positioner specifications, refer to the specification sheet for each product shown below.

Model AVP302:	SS2-AVP300-0100
Model AVP202:	SS2-AVP200-0100
Model SVX102:	SS2-SVX100-0100
Model AVP307:	SS2-AVP307-0100
Model AVP303/203:	SS2-AVP303-0100
Model AVP701/702:	SS2-AVP702-0100
Model AVP77_/78_/79_:	SS2-AVP772-0100
Model AVP703:	SS2-AVP703-0100

Operating Environment

The PLUG-IN Valstaff works on Azbil Corporation's InnovativeField Organizer or Yokogawa Electric Corporation's PRM R3.30 or later.

Table 6. Computer platform

System/soft- ware package	Operating System
InnovativeField Organizer R50	Windows 10 Pro (64-bit) *
RPM R3.30/ R3.31/ R4.01/R4.02/ R4.03	Windows Server 2008 Standard Edition R2 Service Pack 1 (64-bit)
	Windows 10 Enterprise 2016 LTSB (64bit) Windows 10 IoT Enterprise Edition 2016 (64bit) ** Windows Server 2016 Standard Edition (64bit)

* For details, refer to the specification sheet (SS2-IFO600-0001) for InnovativeField Organizer (R60).

** To no use Lockdown function

License System

Table 7. PLUG-IN Valstaff base license

	Model number	Description			
	AZ-2AMV6XE01	PLUG-IN Valstaff R6x License 16 TAG entry edition			
	AZ-2AMV6XE02	PLUG-IN Valstaff R6x License 25 TAG			
	AZ-2AMV6XE05	PLUG-IN Valstaff R6x License 50 TAG			
License for	AZ-2AMV6XE10	PLUG-IN Valstaff R6x License 100 TAG			
number of device	AZ-2AMV6XE20	PLUG-IN Valstaff R6x License 200 TAG			
connection	AZ-2AMV6XE30	PLUG-IN Valstaff R6x License 300 TAG			
	AZ-2AMV6XE50	PLUG-IN Valstaff R6x License 500 TAG			
	AZ-2AMV6XE75	PLUG-IN Valstaff R6x License 750 TAG			
	AZ-2AMV6XEA0	PLUG-IN Valstaff R6x License 1000 TAG			

Table 8. PLUG-IN Valstaff DMS (Device Management System) connection license

	Model number	Description
License for DMS connection	AZ-2AMV6XE-A	PLUG-IN Valstaff R6x DMS connect License for Innovative- Field Organizer
	AZ-2AMV6XE-B	PLUG-IN Valstaff R6x DMS connect License for PRM

No. SS2-PVS600-0001

Table 9. PLUG-IN Valstaff TAG extension licenseAfter PLUG-IN Valstaff is installed, this license is used toincrease the number of connected devices.

	Model number	Description
License for number of device extension	AZ-2AMV6XEP1	PLUG-IN Valstaff R6x TAG extension license 16to25
	AZ-2AMV6XEP2	PLUG-IN Valstaff R6x TAG extension license 25to50
	AZ-2AMV6XEP3	PLUG-IN Valstaff R6x TAG extension license 50to100
	AZ-2AMV6XEP4	PLUG-IN Valstaff R6x TAG extension license 100to200
	AZ-2AMV6XEP5	PLUG-IN Valstaff R6x TAG extension license 200to300
	AZ-2AMV6XEP6	PLUG-IN Valstaff R6x TAG extension license 300to500
	AZ-2AMV6XEP7	PLUG-IN Valstaff R6x TAG extension license 500to750
	AZ-2AMV6XEP8	PLUG-IN Valstaff R6x TAG extension license 750to1000

External Storage

The diagnostic data on control valves collected by PLUG-IN Valstaff running in InnovativeField Organizer can be automatically backed up to an external storage device. To prevent loss of diagnostic data, be sure to install an external storage device when introducing the system. For automatic backup, the following external storage devices whose compatibility has been verified by Azbil can be used.

- Tandberg Data Inc. RDX QuikStor External USB Docking Station Model: 8782
- Tandberg Data Inc. RDX QuikStor Cartridge (Memory: 1 TB) Model: 8586

Tandberg Data Inc. web site:

http://www.tandbergdata.com/us/

Notes

When automatic backup to an external storage device is used, it is necessary to keep the PC safe. However, do not install anti-virus software on the PC used for InnovativeField Organizer. (The installation of anti-virus software specified by Azbil on standard PCs sold by Azbil is excluded.) Check for viruses remotely from another PC.

Also, if an external storage device whose operation we have not checked is used, Azbil Corporation cannot guarantee its operation or the integrity of the data. If the lack of a guarantee is acceptable and an external storage device which we have not checked is used, please use a device that meets the following conditions at a minimum.

- No special software is required to operate the device (do not install any software other than what is specified by Azbil Corporation on the PC used for InnovativeField Organizer).
- This device does not incorporate a security function.

About icons for safety precautions

The safety precautions described in this document are indicated by the following icons.

indicated by the following icons.	Before executing offline test, inform workers in the
Warnings are indicated when mishandling this product might result in death or serious injury.	 valves open and close. Unexpected valve opening or closing might injure workers.
Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to the product.	 Before executing full stroke tests, inform workers in the vicinity of control valves that the tests will make the valves open and close regardless of signals from the controller. Unexpected valve opening or closing can injure workers
The indicated action is prohibited	workers.
 Be sure to follow the indicated instructions. 	 changing settings, or performing other related operations, check that the intended operation will not affect the operation of the plant and change
Safety precautions	the mode to out of service.
CAUTION Before wiring, be sure to shut off the power to all devices that require power shutoff during wiring. Failure to do so may cause device failure. If an explosion-proof field device is used, never	 Before executing AutoSetup, inform workers in the vicinity of control valves that AutoSetup will open the valves from the fully closed position to the fully open position. Unexpected valve opening or closing can injure workers.
open its cover while it is running (while power is supplied). Doing so may result in an electric shock. For handling of this type of device, see the user's	 When connecting the hard disk drive to another PC, perform a virus check before reconnecting it to the device management system.
manual for the device. Do not touch electrically charged parts such as the	are operating, please make sure that HART commu- nication will not affect the host control system.
Doing so may result in an electric shock.	Before executing AO loop check, inform workers
Back up data and check for viruses regularly. Failure to do so may result in corrupted data or program malfunction.	 In the vicinity of control valves that the loop check will make the valves open and close. Unexpected valve opening or closing might injure workers.
Do not install any anti-virus software into this PC. Check for viruses remotely from another PC.	
Do not connect the PC upon which the PLUG-IN Valstaff application software is to be installed to an external network such as the Internet or a corpo- rate intranet. If the PC is infected by a virus, the collected data may be corrupted or a program may malfunction.	
 Do not install any applications except those listed below on the PC upon which the PLUG-IN Valstaff application software is to be installed. Device management system and associated software PLUG-IN Valstaff application software Driver for the USB hard disk drive used for data backup and loading (if necessary) Please keep in mind that Azbil Corporation's warranty does not cover any failures resulting from installation of any other applications. 	
operators in the control room that devices will be operate. Unexpected device behavior can injure workers.	

-Memo-

• Valstaff and InnovativeField Organizer are trademarks of Azbil Corporation.

- CENTUM, PRM, Exaopc is a trademark of Yokogawa Electric Corporation in the USA and other countries.
- ETHERNET is a registered trademark of FUJIFILM Business Innovation Co., Ltd.
- FOUNDATION is a trademark of FieldComm Group.
- HART[®] is a registered trademark of FieldComm Group.
- Windows 10 Pro, Windows Server 2008, and Windows Server 2016 are registered trademark or trademark of Microsoft Corporation in the USA and other countries.

Please read "Terms and Conditions" from the following URL before ordering and use. https://www.azbil.com/products/factory/order.html

Specifications are subject to change without notice.

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