Control Valve Maintenance Support System Valstaff Application for FOUNDATION fieldbus System

Model VMS103

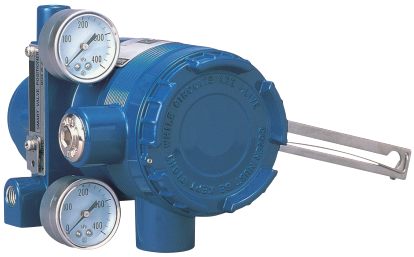
OVERVIEW

The control valve maintenance support system, Valstaff, is a system that supports decision-making necessary for control valve maintenance and promotes the efficiency of maintenance operation. Communicating with the control valve, on which the smart valve positioner is mounted, the system realizes the following functions.

- Information on the operating status of the control valve is collected during the plant operation, and this data is processed, saved and managed by the Valstaff application to predict progress of the control valve deterioration and to judge for abnormalities.
- A request for performance test is transmitted from the Valstaff application, and the responses are then recorded to quantify performances of the control valve.
- The smart valve positioner is easily adjusted and set from the Valstaff application and this information is maintained by the application.
- Information on the control valve maintenance is electronically and centrally managed.

The Valstaff FOUNDATION fieldbus system adopts the FOUNDATION fieldbus for its communication technology. The system is comprised of a smart valve positioner, host applications and FOUNDATION fieldbus related equipment that support the protocol.

Valstaff application



SVP3000 Alphaplus
Smart Valve Positioner Model AVP303/304

SVP3000 Alphaplus
Smart Valve Positioner (Remote type)
Model AVP203/204

FEATURES

Structured as sub-system of DCS

Model VMS103 realizes maintenance support functions for control valves with smart valve positioners model AVP303/203 that complies with H1 Fieldbus. This system is structured using Smart Linking Device that also complies with H1 Fieldbus (Refer to Figure 1).
This system structure realizes flexible installation of the Valstaff Fieldbus system regardless of DCS or upper information network.

Fieldbus / Analog Hybrid System

Valstaff Fieldbus system can be structured using hybrid type smart valve positioners model AVP304/204 that receives 4-20 mA analog signal and transmit diagnostics and performance information of control valve on Fieldbus. With this system architecture, maintenance support function of Valstaff can be obtained using Fieldbus that is superior to real-time performance of data acquisition.

System configuration

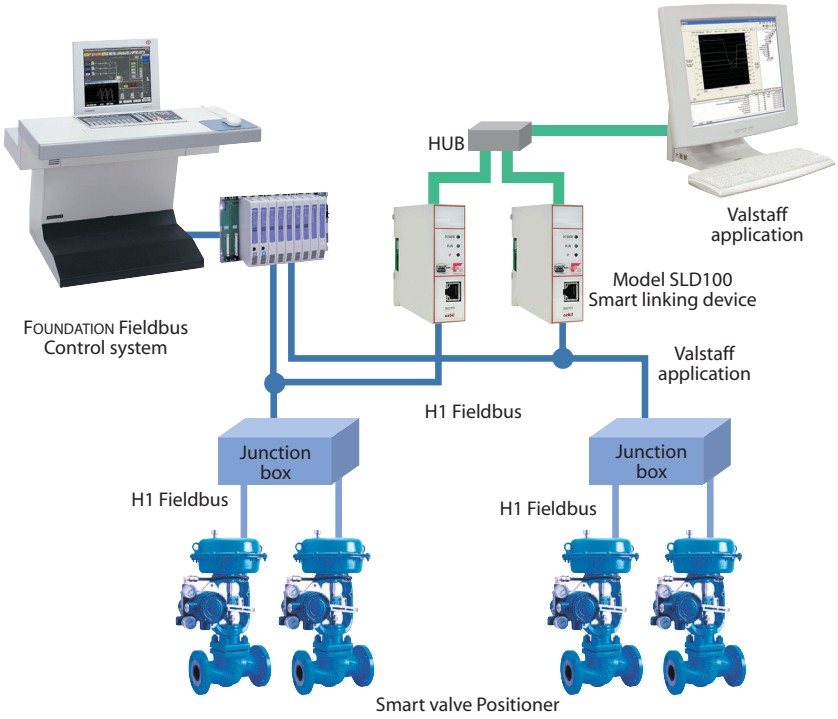


Figure 1 FOUNDATION fieldbus system

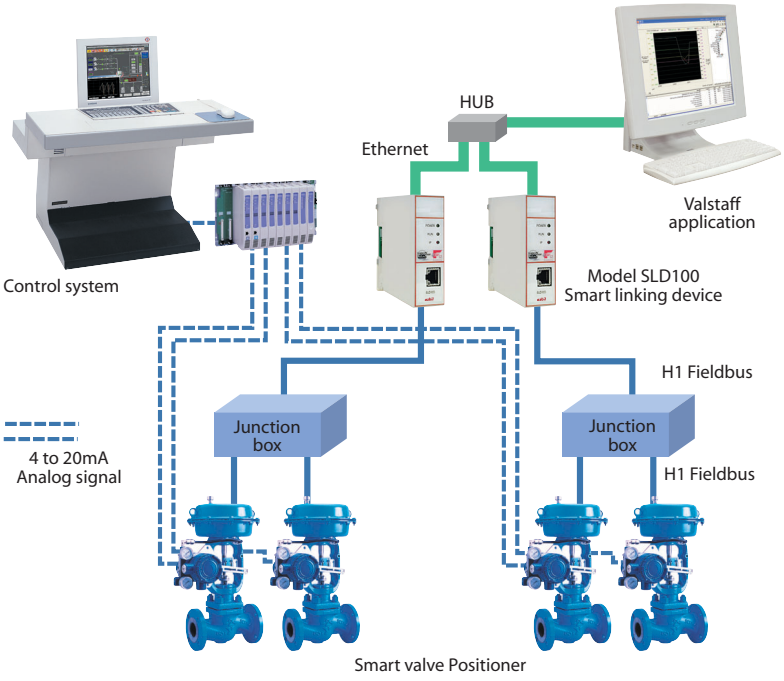


Figure 2 FOUNDATION fieldbus / Analog hybrid system

Soft ware mode

Operation Setup mode

In Operation Setup mode, various types of information necessary for maintenance operation are registered and organized.

Monitoring mode

In Monitoring mode, transition of diagnostic parameters is checked by periodically communicating with smart valve positioners during plant operation.

Test mode

In Test mode, performance test commands are transmitted to smart valve positioners and their responses are received during plant shutdown.

SVP configuration / Calibration mode

In SVP configuration / Calibration mode, smart valve positioners are configured and calibrated during plant shutdown.

FUNCTIONS

The following functions are available for each software mode.

Functions of Operation Setup Mode

■ Password setting

Taking into account how the plant operation is affected by a certain Valstaff operation, the user levels are preset on the Valstaff system. The user levels can be controlled with passwords to maintain security of the system operation.

■ PD tag commissioning

Before starting the operation of Valstaff, this function checks whether tag numbers registered for the smart valve positioner and for Valstaff match. System setting errors can be eliminated by this function.

■ Control valve specification management

Control valve specifications managed by Valstaff are saved in the database using this function. The saved specification data can be referenced, if necessary, during the monitoring mode or the test mode.

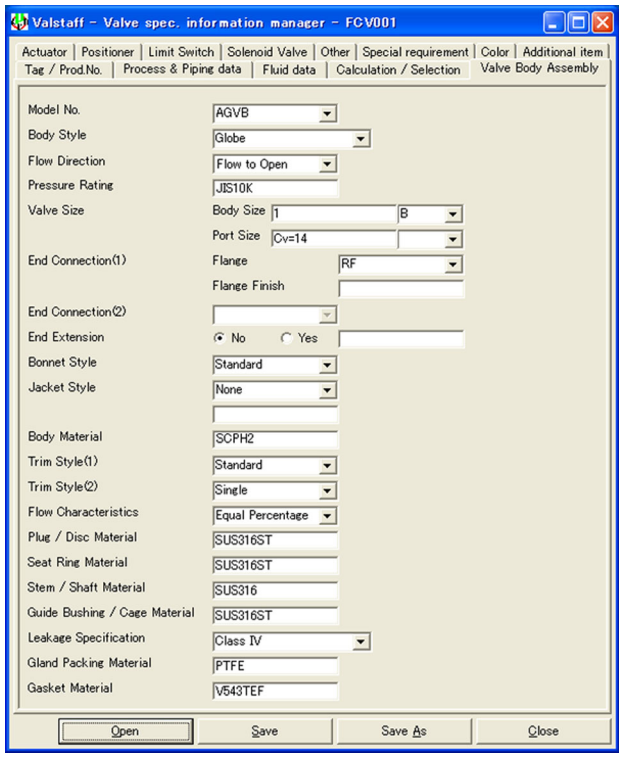


Figure 3 Control valve specification management window

■ Alarm setting

This function is used to set whether or not alarms are needed upon detection of certain data in the monitoring mode, and to set their threshold values.

■ Maintenance importance level registration

The maintenance importance levels set for individual control valves can be reflected onto Valstaff, taking into account process severities, degree of impact on plant operation, etc. These levels can be referenced during operation in the monitoring mode or when alarms are set up, thus providing support when responding to progressing errors or generated alarms in accordance with the importance levels.

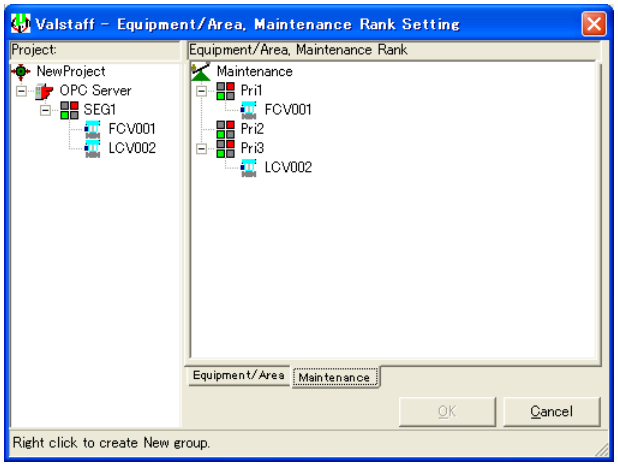


Figure 4 Importance level registration window

■ Equipment/area information registration

Geographical information covering equipment installed and area information inside the equipment can be reflected onto Valstaff. Such information can be referenced during operation in the monitoring mode or when alarms are set up, thus providing support when responding to progressing errors or generated alarms by referring to geographical conditions.

Functions of Monitoring Mode

■ Displaying diagnostic parameters

Diagnostic parametric data held by smart valve positioners can be loaded to Valstaff applications during plant operation, and then graphically displayed using this function. Deterioration progress and occurrence of errors can be predicted during plant operation by the Valstaff application.

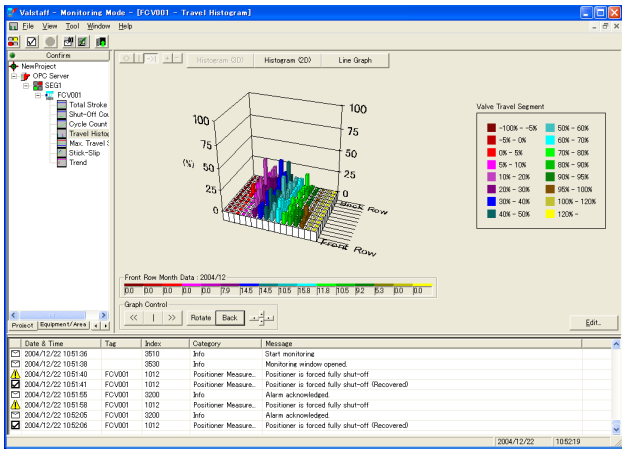


Figure 5 Displaying diagnostic parameters

■ Setting alarm for diagnostic parameters

An alarm can be generated on Valstaff when data is detected that exceeds the preset threshold value of a diagnostic parameter using this function.
This data is used as reference data for daily maintenance. In addition, the system can call and refer to the control valve specification information and importance level information registered in the operation setup mode described in [1], and parameter information of smart valve positioners, as needed, during operation in the monitoring mode.

Functions of Test Mode

■ Step response test

This function is used to perform step response test from Valstaff applications when the plant is shut down. The results are graphically displayed, so that deterioration and defects that are occurring in the control valve can be detected based on changes in response waveforms between the same test patterns.
In addition, quantitative dynamic characteristic data, including time constant, delay time, and stabilization time, can be obtained from the inspection results, and are available for the evaluation of control valve performances.

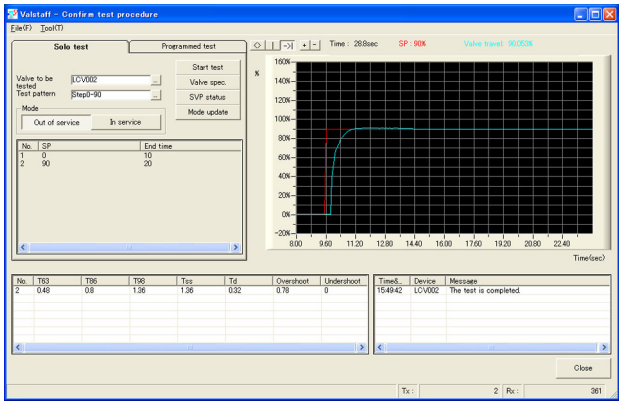


Figure 6 Step response check window

Functions of SVP Configuration / Calibration Mode

■ Executing Auto setup

The Auto setup, a positioner automatic adjustment function, is executed from Valstaff applications using this function. Because behaviors of the control valve during Auto setup can be monitored, the Auto setup can be run, checking whether there is any error in the automatic adjustment process.
The stroke time measured during Auto setup and hysteresis data can also be referenced. This enables easy estimation of deterioration and errors that may be occurring in the control valve.

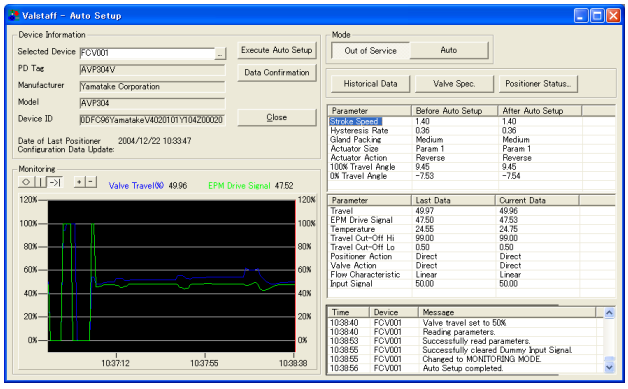


Figure 7 Executing auto setup window

■ Parameter control

Parameters of the smart valve positioner can be operated from Valstaff applications to change the configuration and calibration. In addition, the results can be saved and called later. For a single smart valve positioner, different configuration and calibration can easily be set using this function.

SPECIFICATIONS

Application specifications

Maximum number of H1 fieldbus segments (Maximum number of Smart Linking Device connections)	32 pcs.	
Maximum number of Smart Valve Positioner connections	64 units / 1 system (max 8 units / 1 segment) (If your system requires more than 64 units, please consult us.)	
Update cycles of diagnostic parameters	Stick slip diagnostic algorithm	: 400 sec.
	Total Stroke % parameter	: 1 day
	Max. Travel Speed parameter	: 1 day
	Shut Off Count parameter	: 1 day
	Cycle Count parameter	: 1 day
	Travel Histogram	: 1 month
	SP, valve travel, EPM drive signal, SVP internal temperature trend: 1 second	
Performance test data sampling cycle	83.3 msec.	
Communication	Ethernet (10BASE-T)	
Data storage format	CSV file	
Data backup	Possible in offline status	
Data load	Possible in offline status	
Information system networks	Not supported.	
Copy protect	USB port insertion type hardware license key system	
Related software	FOUNDATION fieldbus OPC server (attached to Valstaff application) License key driver (attached to Valstaff application)	

Applicable smart valve positioners

Model No.	Remarks
AVP303	Software Ver.2.1 or later
AVP203	
AVP304	Software Ver.1.1 or later
AVP204	

For detailed specifications of smart valve positioner, refer to the specification sheets No. SS2-AVP303-0100.

Note

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