FLOWSERVE

StarPac 3
Intelligent Control System

Experience In Motion

Take Complete Control of your Process with the StarPac 3

The StarPac 3 can improve plant operation at a lower cost than conventional systems. By having the StarPac 3 mounted directly on the valve, along with its associated pressure and temperature sensors, separate line taps are not required. In addition, long straight runs of piping are not required as in the case of conventional methods.

The Flowserve StarPac 3 is not just a valve; it is an entire process control system in a single package that includes:

- Built-in Process Sensors (P1, P2 and Temperature) substantially reduce process lag over control systems, resulting in enormous cost savings to the process.
- Microprocessor Based Controller.
- Control Valve with a High Accuracy Digital Positioner including a valve position sensor and actuator pressure sensors.

The StarPac 3 control system provides much better process control than traditional control loops:

- The built-in process sensors substantially reduce process lag.
- The sample rate for the StarPac 3 is sixteen times per second.
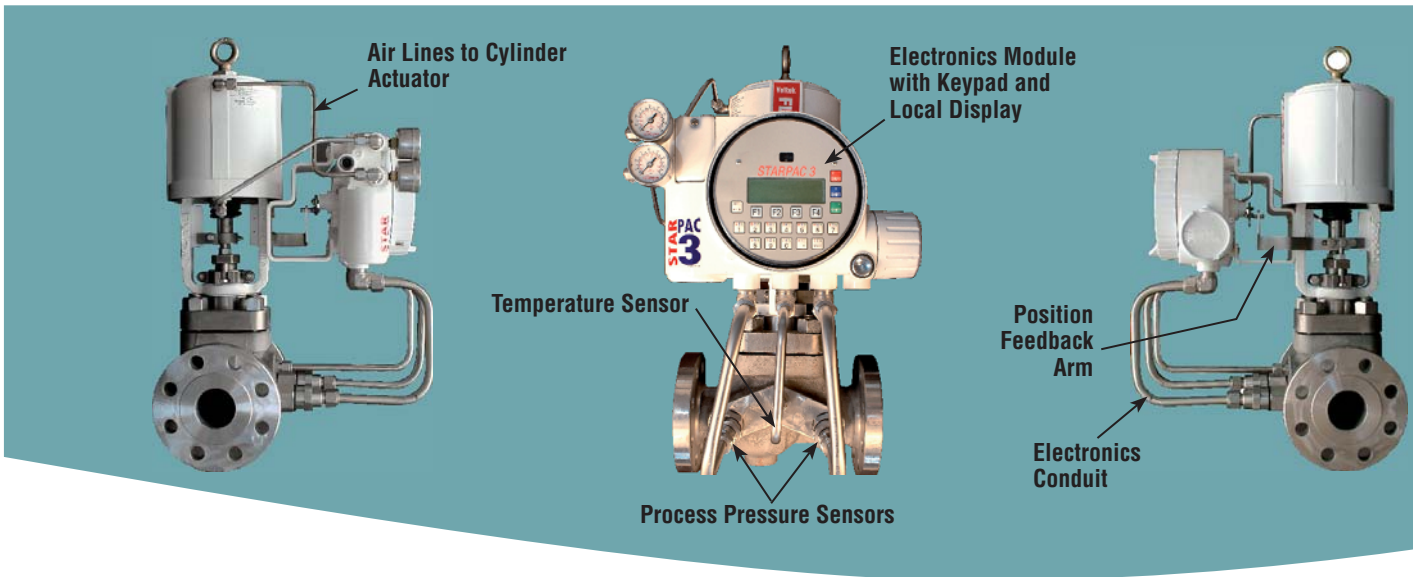- Typical loop time is 3 milliseconds.

The StarPac 3 self-contained PID controller controls the following process variables:

- Gas flow
- Liquid flow
- Upstream Pressure – P1,
- Downstream Pressure – P2
- Differential Pressure - ΔP
- Temperature
- Other process variables can be input from external transmitters.

The StarPac 3 can be configured to accept a setpoint in a number of different ways:

- Setpoint from a Digital signal through serial data ports from DCS or personal computer.
- Setpoint from a 4-20 mA analog control signal.
- Setpoint from the local keypad.
- Pre-programmed setpoint held with no external communication.

Air Lines to Cylinder Actuator

Electronics Module with Keypad and Local Display

Temperature Sensor

Position Feedback Arm

Electronics Conduit

Process Pressure Sensors

Enhance your Process Control Performance with the StarPac 3

The StarPac 3 control system is offered on a number of Flowserve valve bodies.

- Valtek Mark One - 1 inch to 24 inch (consult factory for larger sizes)
- Kammer Valves - 1/2 inch to 8 inch
- Valtek Mark 100
- Flowserve Multi-Z Trim
- Valtek ShearStream - 2 inch to 16 inch
- Valtek MaxFlo - 2 inch to 24 inch (consult factory for larger sizes)
- Kammer - SmallFlow and TotalFlow
- In addition, the StarPac 3 can be used on nearly any type of valve actuator (including electric and hydraulic).

The StarPac 3 is designed to improve process control for a diverse group of applications.

- Off-Shore Applications
- Food & Beverage Industry
- Chemical Applications
- Hypergolics
- Refineries: Fuel Oil, Natural Gas, Crude Oil, Steam, Condensate, Coker Bottoms, etc.
- Power Generation Applications: Steam, Feed Water, Ammonia, Condensate, Fuel Oil, Natural Gas, etc.
- Oil & Gas Exploration
- Continuous Gas Lift Automation
- Gas injection for the making of steel
- Cyrogenic
- Bellows Sealed
- Aerospace
- Pulp & Paper
- Research Laboratories
- Metals & Mining
- Air Separation
- Boiler Applications

Quickly Configure the StarPac 3 Locally or Remotely

Complete local configuration can be done using the on-board keypad. Configuration software not required. Additional keypad functionality includes:

- Local alarm and error messages
- Calibration
- System tuning

Complete configuration can be done using infrared communications with a PDA that contains the Flowserve keypad simulator software.

- Same functionality as the keypad.


The StarPac 3 can also be connected to a PC or laptop through a USB Port.

The StarPac 3 is provided with the powerful StarTalk XP software. The software is a powerful tool that performs the following functions:

- Configuration
- Calibration
- Alarm and error details
- System tuning with chart recorder
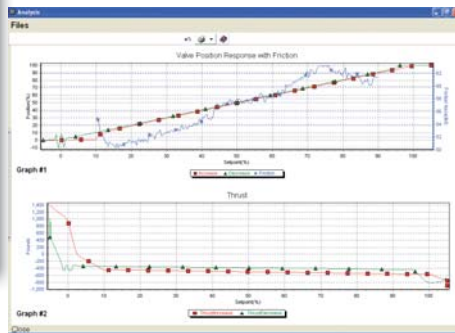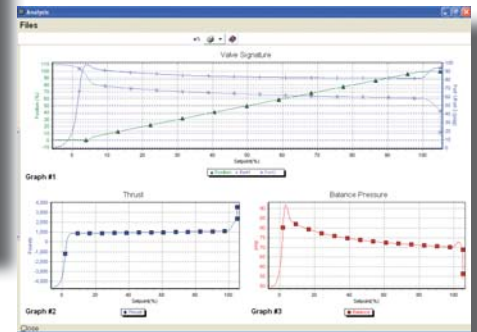- Real-time status screen
- Powerful diagnostic tools

Prevent Costly Downtime with StarPac 3's Diagnostic Capabilities
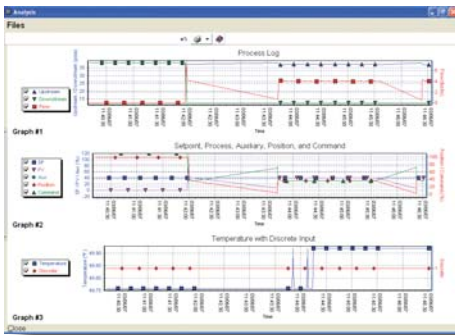
Data Log

**Friction**

Signature

The StarPac 3 notifies you when internal system problems and process problems through:

- Continuous Self Diagnostics – Notification of alarms and errors instantly.
- Discrete Output – Alarm Relay will activate when selected alarms occur.
- On board data logger – Captures 300 data points of process and valve information including flow rate, upstream pressure, downstream pressure, temperature, valve position, valve command, setpoint and process variable

The StarTalk XP software is a powerful tool that aids in diagnosing problems using:

- Process Signatures – Evaluate process conditions. Generate pump curves.
- Valve Signatures – Evaluate valve travel and actuator pressures. Thrust and actuator balance pressures are calculated.
- Signature Comparisons – Compare multiple signatures to determine changes in valve performance and changes in the process.
- Friction Analysis – Valve friction is calculated throughout valve stroke.
- Data Log Analysis – Analyse process and valve data. Determine why upsets in the process occurred.

StarPac 3 System Schematic

Loop Types
- ΔP
- P1
- P2
- Temp.
- Flow
- Position
- Auxiliary
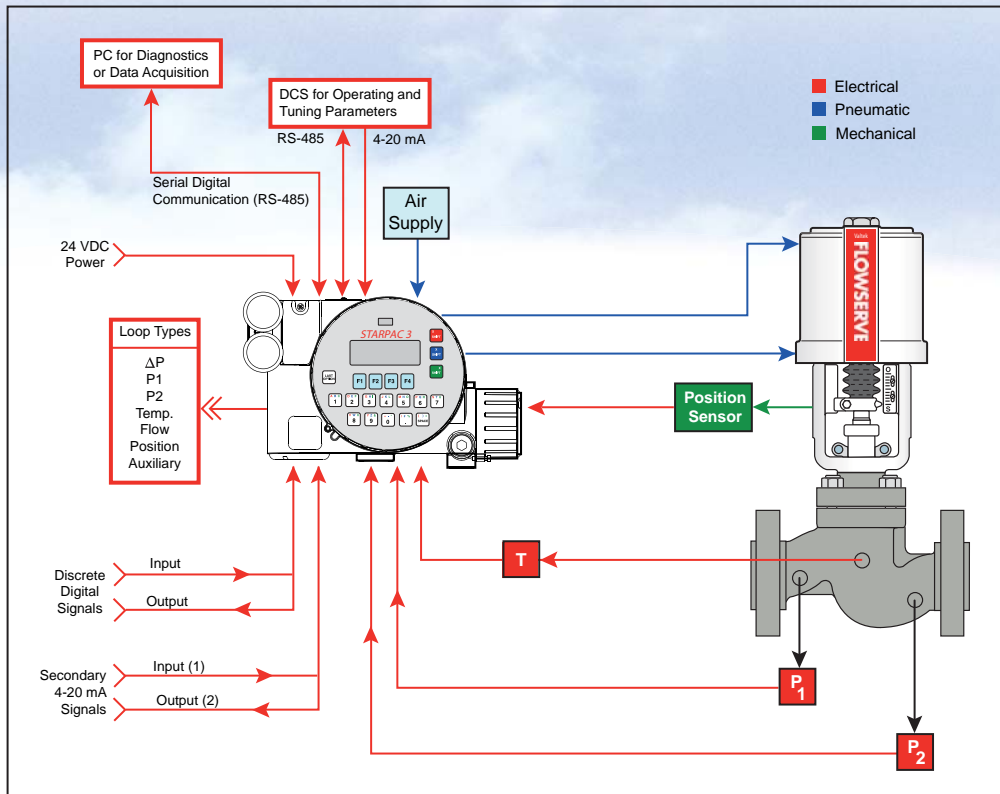
How to Order:

Selection		Code	Example
		SP	SP
Model	StarPac 3	3	3
Communication	Modbus	M	M
Housing Material	Aluminum, white paint	0	0
	Stainless, No paint	1	
Certifications	General Purpose	14	14
	Explosionproof FM, Class 1, Div 1, Groups B,C,D	30	
	cCSA_USA Class I, Div 2, Groups A,B,C,D	31	
Feedback Shaft	DD Shaft - 316 SS (Flowserve Standard)	D6	D6
	Namur Shaft - 316 SS (VDI/VDE 3845)	N6	
Conduit Connections	1/2 NPT	E	E
	M20	M	
Action	Four-way (Double-Acting)	04	04
	Three-way (Single-Acting)	03	
	Four-way Vented (Double-Acting)	4V	
	Three-way Vented (Single-Acting)	3V	
Gauges	Gauges (Flowserve Standard) psi (bar, kPa)	0G	0G
	Stainless Steel Gauges psi (bar, kPa)	0S	
	Stainless with Brass Internals psi (kg/cm^2)	KG	
	Stainless Steel with Stainless Internals psi (kg/cm^2)	KS	
	No Gauges	0U	
Special Options	No Specials	00	00
	Fail open, feedback spring bias	SF	
	No Sensors	NS	

StarPac 3 Specifications

Table I: Flow Accuracy

The accuracy of the standard StarPac 3 model is +/- 2 percent of full scale flow over the turndown of the control valve, normally 30:1 for a globe valve. This can be improved by using characterized trim or reducing the turndown of the high accuracy range.

Table II: Electrical Specifications

Power Supply	Nominal 24 VDC (18 to 64 VDC allowable) providing 150 mA (50 mA if only Modbus communications are being used)
Analog Inputs	Isolation protection to 1000 V
Analog Outputs	Two (2) 4-20 mA that each drive up to 750 Ω
Discrete Input	Jumper selectable input voltages of 120 and 24 V accept either AC or DC signals, pulse width >1/16 sec.
Discrete Output: Pulse Relay	24 VAC or VDC operation, max. output switching frequency of 256 Hz
Discrete Output: Alarm Relay	Jumper selectable NO or NC contacts; maximum relay contact rating: 24 VDC resistive. Hazardous Groups A & B - 230 mA, Group C - 590 mA, Group D - 800 mA
Overload protection	Minimum 500 volt isolation; 24 V power fuse protected
Serial Interface	Dual RS-485 ports; Modbus Protocol
USB Interface	2.0 mini-B; Modbus Protocol
Infrared	PDA Keypad Emulation

Table III: Software Specifications

Computer	Minimum Pentium processor running Windows XP, 32 MB total memory (64 MB recommended), 30 MB available hard disk space, CD-ROM drive
Ports	1 minimum available with 8 maximum possible. (Can also communicate via USB connection)
StarPacs per link	Up to 31

Table IV: Environmental Specifications

Ambient	-40° to 170° F (-40 to 76° C)
Process Media	-320° to 1500° F (-195 to 815° C)
Temperature Effect	-40° to -10° F (-40 to 23° C): (0.07% °F) -10° to 150° F (-23 to 66° C): (0.02% °F) 150° to 185° F (66 to 88° C): (0.07% °F)
Transport and Storage Temperature Range	-40° to 170° F (-40 to 76° C)
Operating Humidity	0 - 100% non-condensing

Note: The air supply must conform to ISA standard ISA 7.0.01 (a dew point at least 18 degrees Fahrenheit below ambient temperature, particle size below five microns - oil content not to exceed one part per million).

Table V: Measurement Repeatability

Flow	0.25% full scale
Pressure (max)	0.1% full scale
Temperature	1^0 C body temperature measured by Type K thermocouple
Drift	1% full scale/6 months
Calibration	Independent zero and span adjustment for all sensors

Table VI: Physical Specifications

Pressure	316L stainless steel, Viton O-ring seal (standard); Hastelloy C optional; other alloys on request
Housing	Cast, powder-coated aluminum; stainless steel available
Tubing	316 stainless steel with Swagelok fittings
Environmental Vibration	NEMA 3; Up to 2 G's - 30 to 500 Hz, measured at electronics
Pressure Sensor Over-range	Two times maximum operating pressure with negligible change in output

FLOWSERVE

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FCD VLENBR0066-01 – 09/10

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