



Valve Positioner

Product Guide

Field Devices for Measurement & Instrumentation

www.fielddevices.foxboro.com

Life Is On

Foxboro
by Schneider Electric



Valve Positioners

“Get the most of your valve”

Foxboro® Field Devices are in operation at more than a million different facilities throughout the world. We are producing control valve positioners of the highest quality since 1961 and offer the widest range of valve positioners to complement any application in any industry.

Our quality and performance solutions for valves are made to optimize your CapEx and OpEx.

To enable you to drive your process at its best, we manufacture with these values in mind:

- Highest performance
- Easy to use
- Reliability and robustness
- Premium technologies:
- Partial Stroke Test (PST)
- Fugitive Emission Monitoring
- FDT-DTM
- Control in the Field

Overview Selection Guide

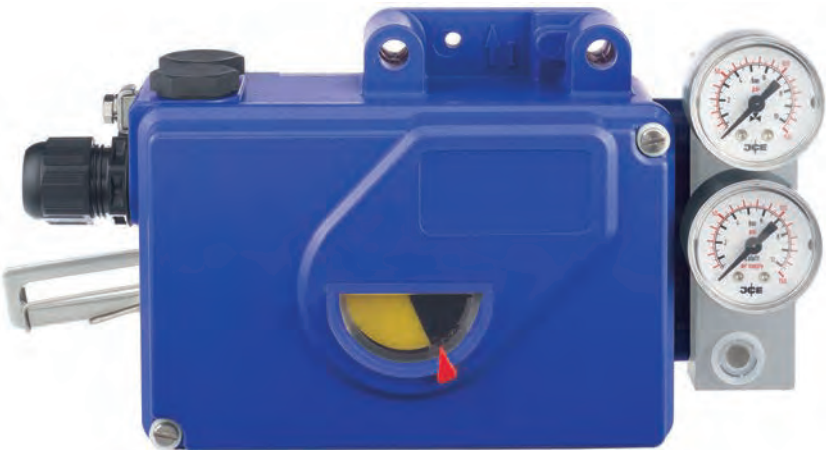
Smart Positioner		Ex		Housing		Options		Diagnostics		Device	Page
		Electrical Certification	Aluminum	Stainless Steel	Feedback 4-20 mA	Limit Switches	Advanced Diagnostics	Premium Diagnostics	Partial Stroke Test		
HART	IS	✓	✓	✓	✓	✓	✓	✓		SRD991	8
	XP	✓		✓	✓	✓	✓	✓		SRD960	6
Foundation Fieldbus H1 or Profibus PA	IS	✓	✓	✓	✓	✓	✓	✓		SRD991	8
	XP	✓		✓	✓	✓	✓	✓		SRD960	6

Electro-Pneumatic Positioner		Ex		Housing		Options		Device	Page
		Electrical Certification	Aluminum	Stainless Steel	Feedback 4-20 mA	Limit Switches			
Setpoint 4-20 mA	IS	✓	✓	✓	✓			SRI990	4
	IS	✓		✓	✓			SRI986	20
	IS,XP	✓						SRI983	18

Pneumatic Positioner		Ex		Housing		Options		Device	Page
		Electrical Certification	Aluminum	Stainless Steel	Feedback 4-20 mA	Limit Switches			
Setpoint 0.2 to 1 bar	IS	✓	✓	✓	✓			SRP981	22

Accessories		Ex		Housing		Accessory	Page
		Electrical Certification	Aluminum	Stainless Steel			
IP Converter	IS,XP	✓				IP26	28
Limit Switches	IS	✓				SGE985	27
	XP	✓				SRD960-TxT	27
Positon Feedback 4-20 mA	XP	✓				MLS01 /02	27
	IS	✓				SMI983	26
	XP	✓				SRD960-TxQ	26
0.2-1 bar		✓				SMP981	26
Filter Regulators		✓				FRS02 /04 /923	24
			✓			FRS03 /05	24
Volume Booster		✓	✓			VBS100 /300	25
Attachment Kits		✓	✓			EBZG	29

Analog Valve Positioner SRI990



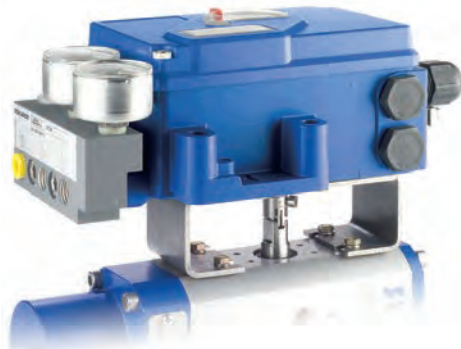
SRI990 – easy operation and compact design

- Analog valve control with fast control behavior
- Easy local operation and adjustments
- Valve action and rotation configurable by DIP switches
- Electrical adaptation of Zero and Span by potentiometers
- Gain and Damping adjustable independently
- Switch for pneumatic-test
- Load 300 Ohm
- Easy mounting to all linear and rotary actuators
- Optional Features:
 - Housing in Stainless Steel
 - Limit Switches (inductive or Micro Switches)
 - Position feedback 4-20 mA
 - Manifolds for gauges and boosters

Optional Stainless Steel housing



Example for mounting on rotary actuator



Technical Data

The analog Positioner SRI990 with analog input 4-20 mA is designed to operate pneumatic valve actuators. It offers an easy adjustment by means of switches and potentiometers.

The modular structure of this positioner series enables conversion from an analog to an “intel-ligent” positioner by exchanging the electronic.

Analogue		Setpoint 4-20 mA Load 300 Ohm
Characteristic of setpoint		linear
Adjustments by dip switches		for Direction of rotation, Signal range, Split range, direct or reverse action
Adjustments by potentiometers		for Zero and Span, Gain and Damping by DIP switch
Pneumatic test		
Display		Mechanical Indicator (Standard)
Air Supply		1.4 to 6 bar (20 to 90 psig), or 1.4 to 7 bar (20 to 105 psig) with “spool valve”
Stroke Range		8 to 260 mm (0.3 to 10.2 in)
Angle of Rotation		up to 95 degree angle
Protection Class		IP 66 or NEMA 4X
Electrical Classification	ATEX	intrinsic safety II 2 G Ex ib/ia IIB/IIC T4-T6 intrinsic safety for dust II 1 D Ex ia D 20 T 100°C
Electrical Connection		M20 x 1.5 or 1/2-14 NPT (others with Adapter AD...)
Pneumatic Connection		G1/4 or 1/4-18 NPT
Ambient Temperature		–40 to 80°C (–40 to 176°F)
Weight		1.7 kg / 3.7 lbs (double acting: 2 kg / 4.4 lbs)
Options		Inductive Limit Switches (2- or 3-wire) or Mechanical switches (Micro switches) Position Transmitter (4-20 mA) Gauge Manifold, Volume Booster
Attachment to linear actuators		acc. IEC 534 part 6 (NAMUR) and VDI/VDE 3847
to rotary actuators		acc. VDI/VDE 3845 and VDI/VDE 3847
to any other linear or rotary actuator by means of extensive attachment kit offering		



Universal Positioner SRD960



Operation

87.5 %
Valve position

Configuration

SRD Main Menu
1 Mounting
2 Autostart
3 Valve Action

Diagnosis report

84.6 %
Valve position
Maintenance

Positioner Report created with VALcare DTM

DTM VALcare

Enhanced EDD

Example for mounting on rotary actuators



SRD960 – Intelligent Valve Control – Explosion Proof (Ex d)

- Easy to operate, menu-driven with graphical backlit LCD
- Multilingual full text display, backlit for easy reading
- All parameters can be configured locally by push buttons
- Advanced Diagnostics for valve Predictive Maintenance
- Premium Diagnostics for valve footprint, on-line friction
- Certified for safety applications up to SIL 3
- Partial Stroke Test (PST) for emergency shutdown applications
- ATEX, FM and CSA approval for Ex d - “flameproof” / “explosion proof”
- HART Protocol
- PROFIBUS-PA
- FOUNDATION™ Fieldbus H1 with PID, AO, 4xDI, DO, IS, OS,AI, MAI function blocks and LAS functionality
- Easy mounting to all linear and rotary actuators
- Options:
 - Limit switches or position transmitter
 - Integrated gauges and volume boosters
 - Pressure sensors for supply air and outputs
 - WirelessHART module, explosion proof

The SRD960 provides start-up in two steps only and a multilingual full text graphical backlit LCD for configuration and operation.

The SRD960 provides enhanced applications and methods to analyze recorded stroke data.

All the diagnostic features can be easily configured and displayed by the Positioner DTM (VALcare™). The Positioner Device Type Manager (DTM) enables the operator to edit a complete ‘health’ report of the valve with all data for configuration and diagnostics.

The SRD960 also has the capability to control a Partial Stroke Test (PST) which gives operators a tool to identify the trouble-proof function of ESD (Emergency Shut Down) valves.

Technical Data

Advanced Diagnostics	• Autostart • Autodiagnostic • Alarm Output for Switching (with Optionboard) • Status List acc. NE107 • Response History	• Custom Characterization • Alarm Management • Position History
Premium Diagnostics	• On Line Friction • Ramping Signature • Valve Footprint • PST Predictive Maintenance	• Stepping Signature • Sensitivity Signature • PST
SRD960 with Communication	HART Setpoint 4-20 mA Load 420 Ohm PROFIBUS PA and FOUNDATION Fieldbus H1 Base current 10.5 mA ± 0.5 mA + FISCO FDE (Fault Disconnection Electronic) Certified DTMs for HART, Profibus PA and FF H1	
Display	Multilingual Graphical LCD with full text display	
Air Supply	1.4 to 6 bar (20 to 90 psig), or 1.4 to 7 bar (20 to 105 psig) with “spool valve”	
Stroke Range	8 to 260 mm (0.3 to 10.2 in)	
Angle of Rotation	Up to 95 degree angle	
Protection Class	IP 66 or NEMA 4X	
Electrical Classification	ATEX flameproof II 2 G Ex d T4 / T6 FM and CSA explosion proof Cl. I, Div. 1, Groups A, B, C, D	
Electrical Connection	M20 x 1.5 or 1/2-14 NPT (others with Adapter AD...)	
Pneumatic Connection	G1/4 or 1/4-18 NPT	
Ambient Temperature	-40 to 80°C (-40 to 176°F)	
Weight	2.7 kg / 5.9 lbs (double acting: 3 kg / 6.6 lbs)	
Options	Inductive Limit Switches (2- or 3-wire) Mechanical Switches (Micro Switches) Position Transmitter (4-20 mA) Binary Inputs or Binary Outputs or Binary Inputs/Outputs dedicated to SIS logic solvers* External potentiometer (*e.g. Triconex®)	
Attachment to linear actuators	acc. IEC 534 part 6 (NAMUR) and VDI/VDE 3847	
to rotary actuators	acc. VDI/VDE 3845 and VDI/VDE 3847	
to any other linear or rotary actuator by means of extensive attachment kit offering		



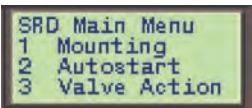
Intelligent Valve Positioner SRD991



Operation



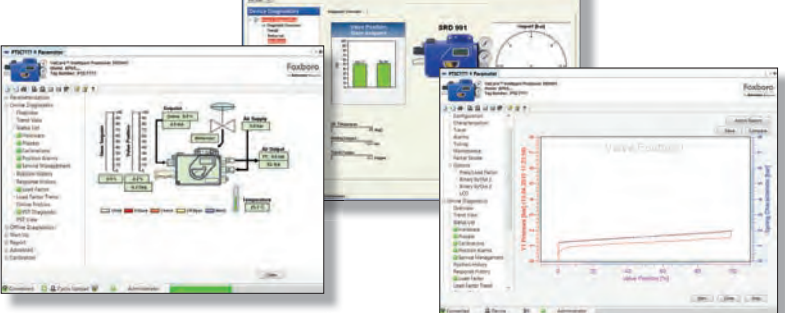
Configuration



Diagnosis report



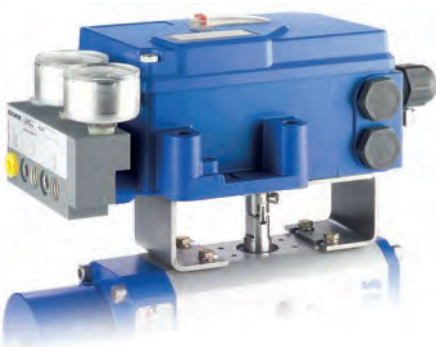
Enhanced EDD



DTM VALcare

Positioner Report created with VALcare DTM

Example for mounting on rotary actuator



SRD991 – Intelligent Valve Control – Intrinsically Safe (Ex ia)

- Easy to operate, menu-driven graphical LCD
- Multilingual full text display, visible also with cover closed
- All parameters can be configured locally by push buttons
- Advanced Diagnostics for valve Predictive Maintenance
- Premium Diagnostics for valve footprint, on-line friction
- Suitable for safety applications up to SIL 3
- Partial Stroke Test for emergency shutdown applications
- HART-Protocol
- PROFIBUS-PA
- FOUNDATION Fieldbus H1 with PID, AO, 4xDI, DO, IS, OS, AI, MAI function blocks and LAS functionality
- Easy mounting to all linear and rotary actuators
- Options:
 - Housing in stainless steel
 - Limit switches and position transmitter
 - Gauge manifolds and volume boosters
 - Pressure sensors for supply air and outputs
 - WirelessHART module

The SRD991 provides a start-up in two steps only and a multilingual full-text graphic LCD for configuration and operation.

The SRD991 provides enhanced applications and methods to analyze recorded stroke data.

All the diagnostic features can be easily configured and displayed by the Positioner DTM (VALcare).

Moreover, the Positioner DTM enables the operator to edit a complete “health” report of the valve with all data for configuration and diagnostics.

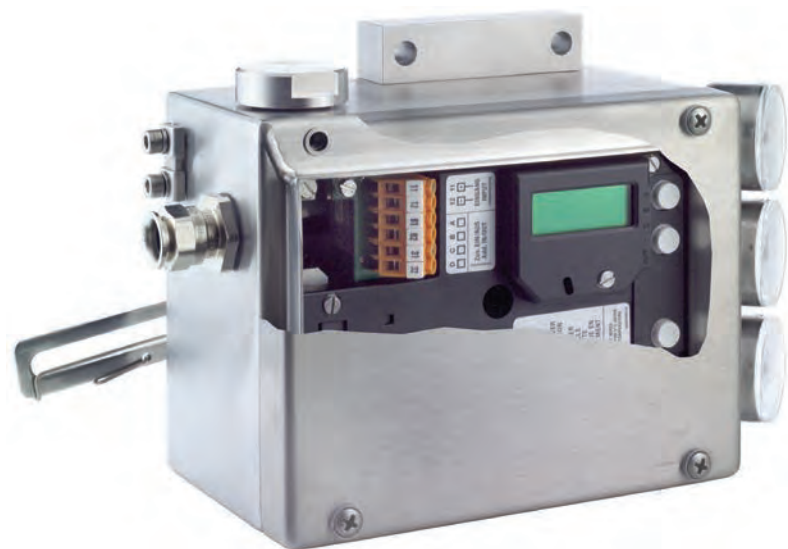
The SRD991 also has the capability to control a Partial Stroke Test that offers operators a tool to identify the trouble-proof function of ESD (Emergency Shut Down) valves.

Technical Data

Advanced Diagnostics		• Autostart	• Custom Characterization
		• Autodiagnostic	• Alarm Management
		• Alarm Output for Switching (with Optionboard)	
		• Status List acc. NE107	• Position History
		• Response History	
Premium Diagnostics		• On Line Friction	• Stepping Signature
		• Ramping Signature	• Sensitivity Signature
		• Valve Footprint	• PST
		• PST Predictive Maintenance	
SRD991 without Communication		Setpoint 4-20 mA	
		Load 300 Ohm	
SRD991 with Communication		HART	Setpoint 4-20 mA
			Load 420 Ohm
		PROFIBUS PA and FOUNDATION Fieldbus H1	
		Base current 10.5 mA ± 0.5 mA + FISCO	
		FDE (Fault Disconnection Electronic)	
		Certified DTMs for HART, Profibus PA and FF H1	
Display		Multilingual Graphical LCD with full text display	
		Mechanical Indicator (Standard)	
Air Supply		1.4 to 6 bar (20 to 90 psig), or	
		1.4 to 7 bar (20 to 105 psig) with “spool valve”	
Stroke Range		8 to 260 mm (0.3 to 10.2 in) with standard lever	
Angle of Rotation		Up to 95 degree angle	
Protection Class		IP 66 or NEMA 4X	
Electrical Classification		ATEX	
		Intrinsic safety II 2 G Ex ia IIC T4 / T6	
		intrinsic safety for dust II 1 D Ex ia D 20	
		FM and CSA	
		Intrinsic safety Class I, Div. 1, Groups A, B, C, D	
Electrical Connection		M20 x 1.5 or 1/2-14 NPT (others with Adapter AD...)	
Pneumatic Connection		G1/4 or 1/4-18 NPT	
Ambient Temperature		-40 to 80°C (-40 to 176°F)	
Weight		1.7 kg / 3.7 lbs (double acting: 2 kg / 4.4 lbs)	
Options (plug & play)		Inductive Limit Switches (2- or 3-wire)	
		Mechanical Switches (Micro Switches)	
		Position Transmitter (4-20 mA)	
		Binary Inputs or Binary Outputs or	
		Binary Inputs/Outputs dedicated to SIS logic solvers*	
		External potentiometer (*e.g. Triconex®)	
Attachment to linear actuators		acc. IEC 534 part 6 (NAMUR) and VDI/VDE 3847	
to rotary actuators		acc. VDI/VDE 3845 and VDI/VDE 3847	
to any other linear or rotary actuator by means of extensive attachment kit offering			



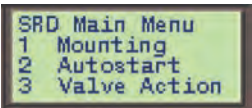
Stainless Steel Housing for Positioner SRD991 and SRI990



Operation



Configuration



Diagnosis report



Rugged and Compact Design – Intrinsically Safe (Ex ia)

The positioner comes in a rugged stainless steel housing with an extensive choice of electronic boards. With the SRD991:

- Easy to operate, menu-driven graphical LCD
- Multilingual full text display
- HART Protocol
- PROFIBUS-PA
- FOUNDATION Fieldbus H1 with PID, AO, 4xDI, DO, IS, OS, AI, MAI function blocks and LAS functionality

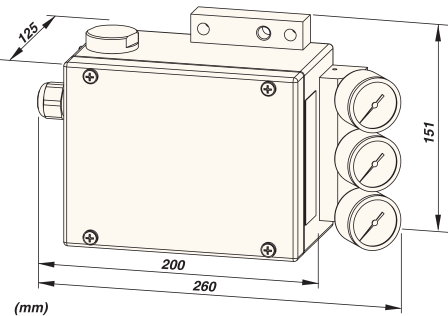
The modular concept of the positioner SRD991:

- Easy mounting to all linear and rotary actuators
- Options:
 - Position transmitter
 - Gauge manifolds
 - Pressure sensors for outputs

Special corrosion resistant design for offshore applications and for food and beverage industries.

This extremely rugged solution made of 316L Stainless Steel can be offered with SRI990 or SRD991 electronic, and all their features and diagnostics.

Example for mounting on rotary actuator

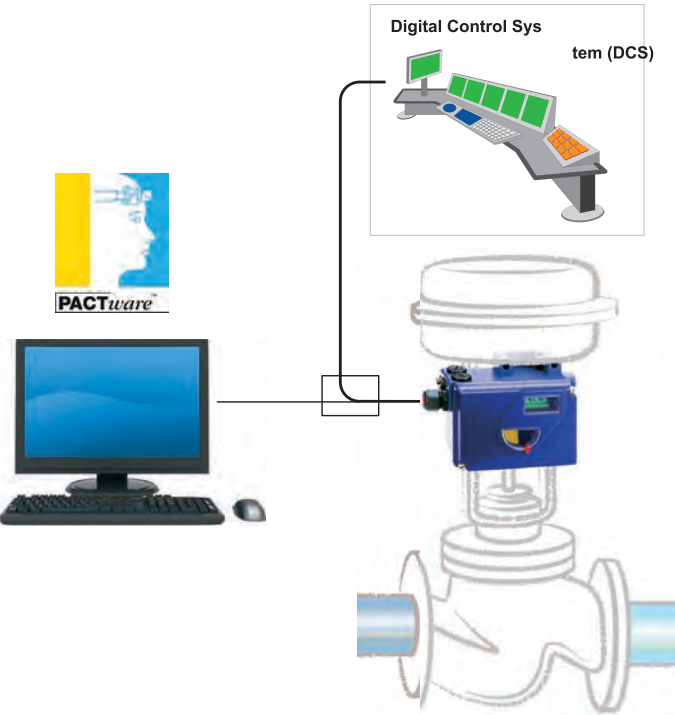


Technical Data

Stainless Steel Housing	
Material	Stainless Steel 316L, 1.25 mm thick
Protection class	IP 66 acc. to EN 60529
Electrical Classification ATEX	Intrinsic safety II 2 G Ex ia IIC T4 / T6
Impact resistance	7 Joule acc. to EN 50014
Seals	VMQ (Silicone)
Ambient Temperature	−40 to 80°C (−40 to 176°F)
Weight (complete positioner)	3.5 kg (7.7 lbs)
Pneumatic connection	1/4-18 NPT on manifold, prepared for gauges (option)
Electrical Connection	M20 x 1.5 or 1/2-14 NPT (others with Adapter AD...)
with SRD991 electronic	
Intelligent	Autostart with self calibration Advanced diagnostics for valve predictive maintenance Multilingual Graphical LCD with full text display Configuration of characteristic curves
without Communication	Setpoint 4-20 mA Load 300 Ohm
with Communication	HART Setpoint 4-20 mA Load 420 Ohm PROFIBUS PA and FOUNDATION Fieldbus H1 Fieldbus Protocol acc. to IEC 1158-2 (FISCO) Base current 10.5 mA ± 0.5 mA FDE (Fault Disconnection Electronic)
Options (plug & play)	Position Transmitter (4-20 mA) Binary Inputs or Binary Outputs or External potentiometer
General technical data	
Air Supply	1.4 to 7 bar (20 to 100 psig), For high pressure, option K: 4 to 10 bar (60 to 145 psig):
Stroke Range	8 to 260 mm (0.3 to 10.2 in) with standard lever
Angle of Rotation	Up to 95 degree angle
Options (plug & play)	Inductive Limit Switches (2- or 3-wire) Mechanical Switches (Micro Switches) Position Transmitter (4-20 mA) Binary Inputs or Binary Outputs or Binary Inputs/Outputs dedicated to SIS logic solvers* External potentiometer (*e.g. Triconex®)
Attachment to linear actuators to rotary actuators to any other linear or rotary actuator by means of extensive attachment kit offering	acc. IEC 534 part 6 (NAMUR) and VDI/VDE 3847 acc. VDI/VDE 3845 and VDI/VDE 3847



Advanced Diagnostics / Premium Diagnostics for Positioners SRD960 / SRD991



Operation

87.5 %
Valve position

Configuration

SRD Main Menu
1 Mounting
2 Autostart
3 Valve Action

Diagnosis report

84.6 %
Valve position
Maintenance

Intelligent Valve Diagnostics for Predictive Maintenance

The valve diagnostic software is available as Device Type Manager (DTM) for integration into control systems based on the Field Device Tool (FDT) technology such as the Foxboro I/A Series System. It is designed to support methods for evaluation of valve health, operation and configuration. The DTM's support the communication protocols HART, Profibus PA and FOUNDATION Fieldbus H1.

- Predictive Maintenance capabilities
- Intelligent Alarm management
- Self-Surveillance in accordance with NE107
- Service Management
- Histograms for valve position and response history
- Data collected up to 60 months
- Data stored inside positioner memory
- Determination of Stem Friction to prevent leakage and stuck stem
- Histogram for friction-history
- Partial Stroke Test (PST) function for ESD applications



Easy to Use • Easy to Understand • One Glance

Ease of use and easy to understand are the principal characteristic of the DTM interface.

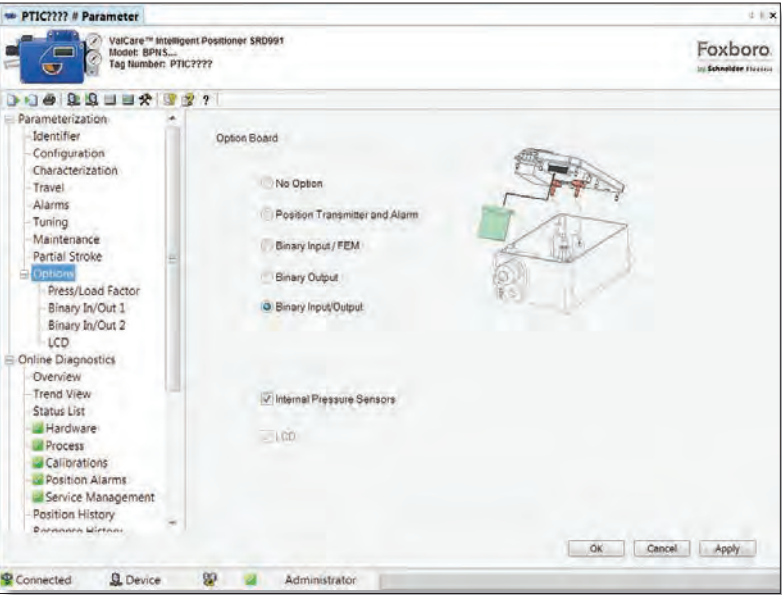
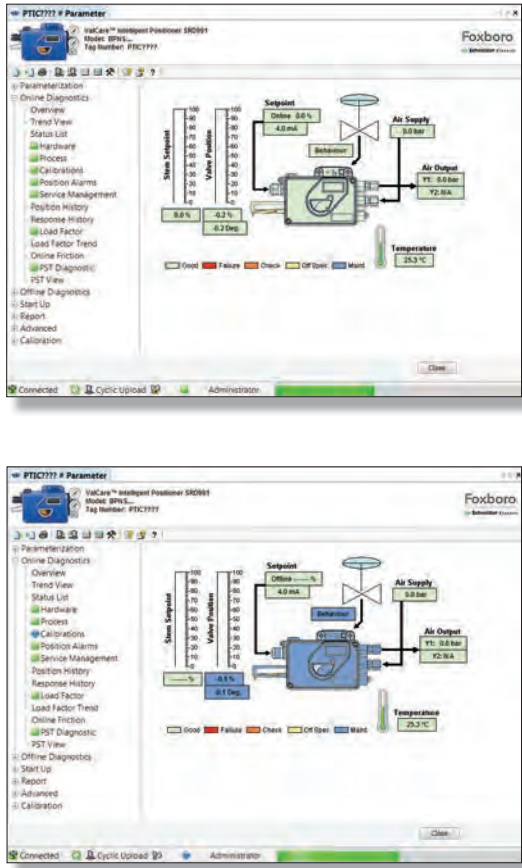
With one glance, users can identify if the equipment is running well (in green), needs maintenance (in blue), or indicates a measured value out of specification (in yellow) and any failure (in red). The color code complies with NAMUR NE107 standard:

Good

Alarm

Out of Spec.

Maintenance



Simple Configuration

This is the easiest way to configure a valve positioner. All configuration screens have been optimized with intuitive input and graphical elements that make it easy for anyone to configure a valve positioner while minimizing configuration errors.

Predictive Maintenance • Valve Friction • Valve Signatures

Predictive Maintenance

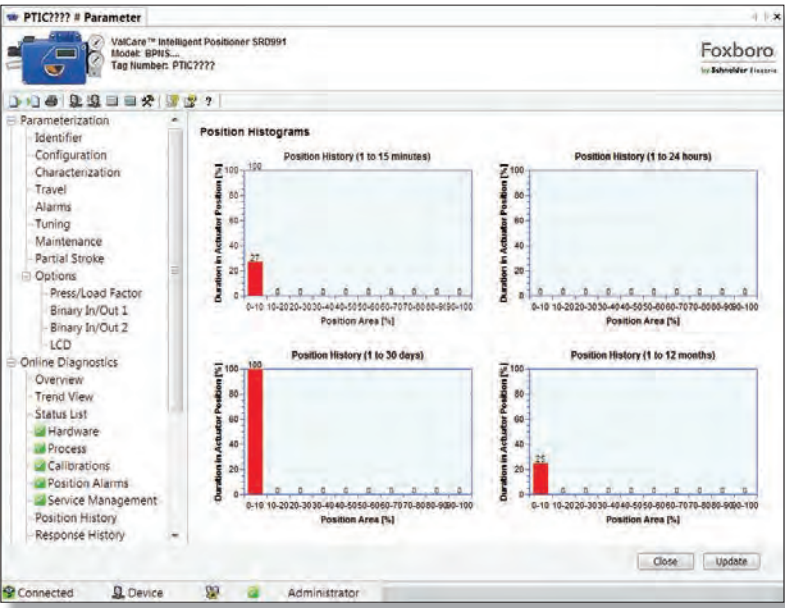
The DTM goes beyond the typical function of displaying a setpoint and measured values as it offers enhanced internal applications and methods to analyze valve data. The onboard functionality automatically retrieves and stores all important valve performance data collected by the positioner during operation.

Diagnostic valve data is refreshed every 200 ms which enables software to run on demand. As a result it is not required to run continuously on the control system and therefore can reduce unnecessary traffic on the communication signal.

The internal diagnostic routines continuously evaluate the state of the valve and inform an operator of any irregularities by executing a status alarm or diagnostic message. The self-surveillance mechanism complies with the NAMUR – NE107 standard.

Valve Friction

Stem Friction greatly impacts valve performance. As such, tracking valve friction has become indispensable information in order to accurately develop predictive maintenance schemes for any control valve. Tracing valve friction allows identification of possible pneumatic leakages or stuck valves while preventing dangerous spills, injuries to personnel, or damage to plant equipment. Internal pressure sensors measure the output pressure for each setpoint change. In milliseconds, the microprocessor of the positioner calculates the friction of the stem against the packing. The actual friction value is then displayed as 'Measured' and 'Average-Value' with additional drag-pointers for the 'Maximum' and 'Minimum Value'.



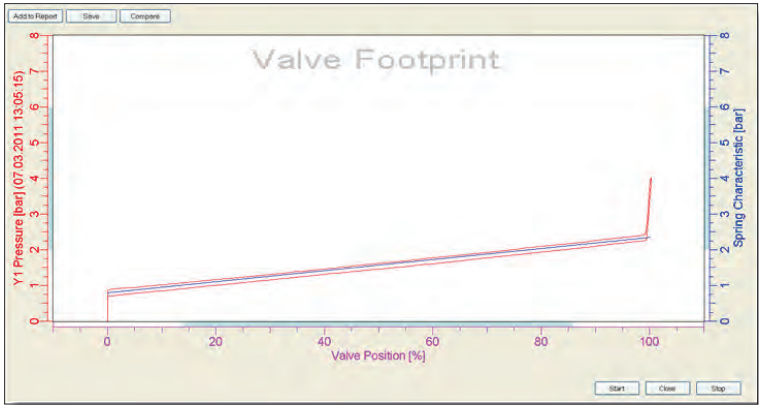
Total hours of operation of the device can be displayed, and service intervals can be timed accordingly using the Service Management screen.

A set of histograms show Valve Position History and Valve Response History which can depict a valve performance over time. The Stem Friction histogram is an additional tool that can be used to identify valve stickiness which is a common valve problem.

Valve Signature

Valve Footprint is an off-line function that defines the reference behaviour of the valve / actuator / positioner entity. Several types of signatures are available to define precisely the overall characteristic of the final control element such as:

- Stepping signature
- Ramping signature
- Sensivity signature
- Valve Footprint

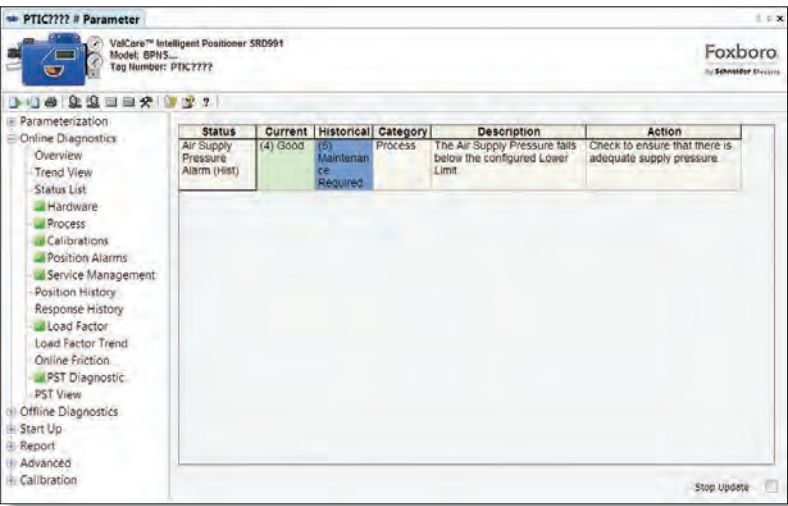


Unified Self-Surveillance • Positioner Report

Unified Self-Surveillance (NE107)

The Status List screen is a conglomeration of all status messages of the field device. All messages comply with the NAMUR – NE107 standard which helps users adhere to a consistent visual format and allows integration with external alarm systems.

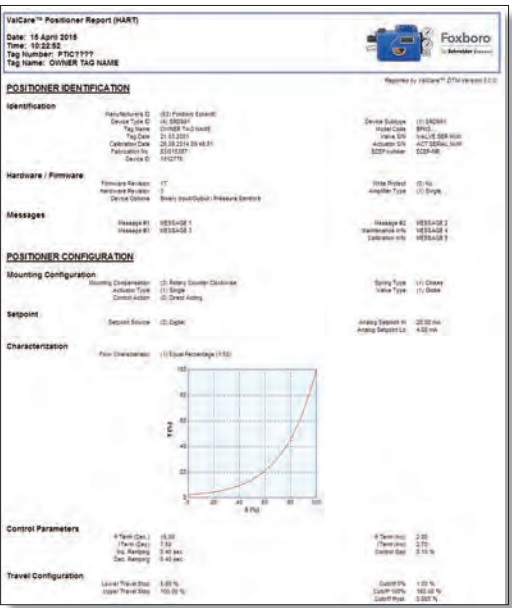
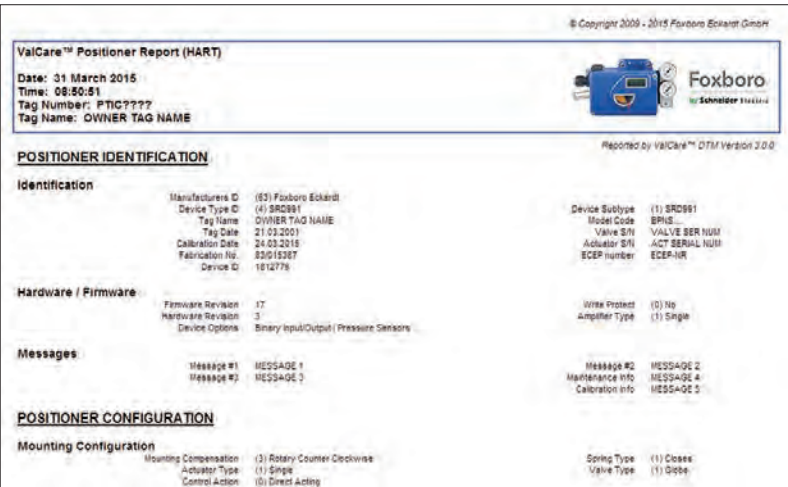
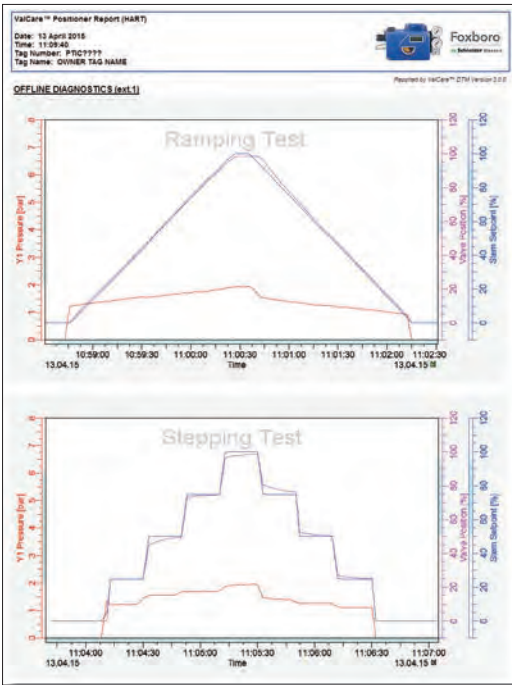
The available information provides a clear indication of activated alarms, possible root cause, and corrective actions to restore normal operating state. All alarms are generated in the positioner and can be uploaded at any time.



Positioner Report

With two simple clicks, you can generate a comprehensive and functional valve/positioner report.

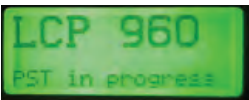
The 8-page report covers all information regarding the identification, configuration, status, and diagnostic state of the positioner/valve combination. For ease of portability and archiving, this report can be printed or stored in PDF format for future reference.



Partial Stroke Testing Solutions with SRD991 and SRD960 Positioners



PST running



PST good



PST failed or stuck valve



Intelligent Valve Solutions for Safety Systems and Emergency Shutdown (ESD) Applications

- SRD991 and SRD960 positioners are SIL 3 certified for Shutdown
- Partial Stroke Test Activation:
 - Automatically
 - Manually
 - By means of LCP960 Local Control Panel
 - By means of a separate Binary Input for Safety Instrumented System (SIS) Logic Solver
- PST Status through communication, LCD display and Binary Output
- Extended diagnostic through certified DTM in HART/PROFIBUS PA/FF
- Break Pressure and re-inflate time trends for Predictive Maintenance
 - LCP960 Local Control Panel for monitoring of PST
 - LCP960 with Ex d (Explosion Proof) certification
 - One push button to launch PST
 - Backlighted LCD with clear messages
 - Timer for last PST done
- SOV monitoring with pressure dip detection
- Full Stroke Test monitoring with trigger capabilities



Partial Stroke Testing Solution

Final control elements in Emergency Shutdown applications such as ON-OFF, Blow Down and Venting Valves remain in one position over a long time without any mechanical movement.

These valves have a tendency to get stuck and as a result may not operate on demand. This can have a severe impact on the functionality of a Safety System and could result in adverse conditions to operating personnel, plant equipment and the environment. Partial Stroke Test offers operators a tool to identify the troubleshooting function of ESD valves. The test can be easily executed via

the FDT-DTM based configuration and diagnostic tools VALcare and Valve Monitor.

The test can also be requested by an SIS Logic Solver and the result of the test can be read by the Logic Solver. This architecture has been developed in conjunction with Triconex® and eliminates the possibility of human error while reaching a high level of safety as described by IEC 61508 and IEC 61511.



Sequence of events inside the Triconex memory, for a safe traceability of all completed tests.

Triconex Sequence of Events Recorder - [SOE Retrieve: PST.SED]					
Date	Time	Alias	TagName	Variable State	Node
12/07/2015	11:58:13.805	10003	PST_LAUNCH	TRUE	01 - trinode01
12/07/2015	11:58:26.456	10003	PST_LAUNCH	FALSE	01 - trinode01
12/07/2015	11:58:26.856	10001	PST_STATUS	TRUE	01 - trinode01
12/07/2015	11:58:26.856	15001	PST_COMPLETED	TRUE	01 - trinode01
12/07/2015	11:58:33.906	15001	PST_COMPLETED	FALSE	01 - trinode01

Partial Stroke Testing with SOV Monitoring

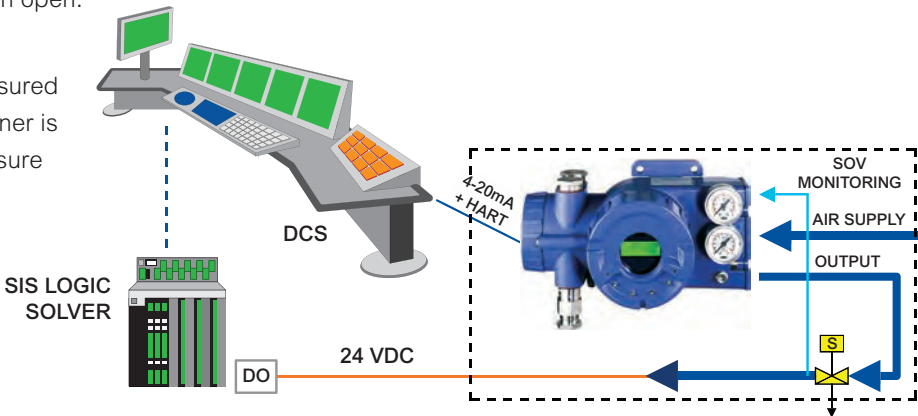
Foxboro provides the most complete and the most secure PST solution made with positioners thanks to the Partial Stroke Test with SOV monitoring.

The positioner has been pneumatically modified to become Fail Open. Even in a case of electronic damage, the valve will remain open.

In addition, the pressure between the solenoid valve and the actuator is measured by the positioner. Therefore, the positioner is able to detect the perturbation of pressure

due to a quick test of the SOV. The dip detection gives confirmation that the solenoid valve is working, keeping the valve in its original position (process not disturbed).

In case of emergency shutdown, a Full Stroke can be detected and a timer has been developed to measure the time to close.



Electro-Pneumatic Positioner SRI983



SRI983 - The Classic Explosion Proof Solution

- Analog valve control with fast control behaviour
- Input 4-20 mA
- Load only 260 Ohm - ideal for split range
- Easy local mechanical configuration
- Mechanical adaptations by setting-screws
- Zero and Span adjustable independently
- Gain and Damping adjustable independently
- Electrical I/P converter separate from pneumatic unit
- Mounting to all linear and rotary actuators
- Dual electrical certification Intrinsically Safe and Explosion proof according ATEX, FM and CSA
- Options:
 - Integrated gauges
 - Volume boosters (independent from positioner)

Example for mounting on linear actuator, version with integrated gauges



Example for mounting on rotary actuator



Technical Data

Analogue		Setpoint 4-20 mA
		Load 260 Ohm
Characteristic of setpoint		Linear, equal-percentage or invers-equal-percentage (by cams)
Split Range		Up to 3-fold
Valve Action		Direct or reverse adjustable
Zero and Span		Adjustable independently
Gain and Damping		Adjustable independently
Air Supply		1.4 to 6 bar (20 to 90 psig)
Stroke Range		8 to 200 mm (0.3 to 8.0 in)
Angle of Rotation		30 to 180 degree angle
Protection Class		IP 54, optional IP 65 / NEMA 4X
Certifications	ATEX	Intrinsically Safe (Ex ia) and Explosion Proof (Ex d)
	FM and CSA	Intrinsically Safe and Explosion Proof
Electrical Connection		M20 x 1.5 or 1/2-14 NPT
Pneumactical Connection		1/4-18 NPT
Ambient Temperature		-40 to 80°C (-40 to 176°F)
Humidity		Up to 100 %
Weight		1.5 kg / 3.3 lbs (double acting: 1.7 kg / 3.7 lbs)
Options		Manifold with staggered connection
		Integrated gauges
		Volume boosters (remote mounted)
		Fail Freeze block relay
Attachment to linear actuators		acc. IEC 534 part 6 (NAMUR) and VDI/VDE 3847
to rotary actuators		acc. VDI/VDE 3845 and VDI/VDE 3847
to any other linear or rotary actuator by means of extensive attachment kit offering		



Electro-Pneumatic Positioner SRI986



SRI986 - More than 1 Million applications worldwide

- Analog valve control with fast control behaviour
- Input 4-20 mA / 0-20 mA or 0-10 V
- Load only 200 Ohm - ideal for split range
- Easy local mechanical configuration
- Mechanical adaptations by setting-screws
- Zero and Span adjustable independently
- Gain and Damping adjustable independently
- Mounting to all linear and rotary actuators
- Options:
 - Position Transmitter 4-20 mA
 - Limit switches (inductive or Micro switches)
 - Gauge Manifold
 - Volume boosters

Example for mounting on linear actuator



Example for mounting on rotary actuator



Technical Data

The SRI986 Positioner is designed for operation of pneumatic valve actuators from control systems and electrical controllers with electric control signals.

It is used to reduce the adverse effects of valve friction, for higher thrust and shorter positioning time.

Analogue	Setpoint 4-20 mA / 0-20 mA / 0-10 V
	Load 200 Ohm
Characteristic of setpoint	Linear, equal-percentage or invers-equal-percentage (by cams)
Split Range	Up to 3-fold
Valve Action	Direct or reverse adjustable
Zero and Span	Adjustable independently
Gain and Damping	Adjustable independently
Air Supply	1.4 to 6 bar (20 to 90 psig)
Stroke Range	8 to 200 mm (0.3 to 8 in)
Angle of Rotation	30 to 180 degree angle
Protection Class	IP 54, optional IP 65
Electrical Classification	ATEX Intrinsic safety II 2 G Ex ia IIC T6
FM and CSA	Intrinsic safety Class I, Div. 1, Groups A, B, C, D
Electrical Connection	M20 x 1.5 or 1/2-14 NPT (others with Adapter AD..)
Pneumatical Connection	G 1/8; G 1/4 or 1/4 NPT by means of a manifold
Ambient Temperature	-40 to 80°C (-40 to 176°F)
Humidity	Up to 100 %
Weight	1.5 kg / 3.3 lbs (double acting: 1.8 kg / 4 lbs)
Options	Inductive Limit Switches (2- or 3-wire)
	Micro switches
	Position Transmitter (4-20 mA)
	Manifold with staggered connection
	Manifold with gauges
	Volume boosters (remote mounted)
Attachment to linear actuators	acc. IEC 534 part 6 (NAMUR) and VDI/VDE 3847
to rotary actuators	acc. VDI/VDE 3845 and VDI/VDE 3847
to any other linear or rotary actuator by means of extensive attachment kit offering	



Pneumatic Positioner SRP981



SRP981 - The result of 50 years experience with pneumatic positioners

- Pure pneumatic valve control, input 0.2 to 1 bar (3 to 15 psig)
- Low air consumption
- Split range up to 4-fold possible
- Basic device without electrical parts
- Valve control with fast control behaviour
- Easy local mechanical configuration
- Mechanical adaptations by setting-screws
- Zero and Span adjustable independently
- Gain and Damping adjustable independently
- Easy mounting to all linear and rotary actuators
- ATEX approved
- Options:
 - Electrical Position Transmitter 4-20 mA
 - Limit switches (inductive or Micro switches)
 - Manifold with gauges
 - Pneumatic Volume boosters

Example for mounting on linear actuator, version with integrated gauges



Example for mounting on rotary actuator



Technical Data

Control Signal			Setpoint 0.2 to 1 bar (3 to 15 psig)
Characteristic of setpoint			Linear, equal-percentage or invers-equal-percentage (by cams)
Split range			Up to 4-fold possible (up to dw=0.2 bar / 3 psig)
Valve Action			Direct or reverse adjustable
Zero and Span			Adjustable independently
Gain and Damping			Adjustable independently
Bypass switch			Connects input w directly with output y
Air Supply			1.4 to 6 bar (20 to 90 psig)
Stroke Range			8 to 200 mm (0.3 to 8 in)
Angle of Rotation			30 to 120 degree angle
Protection Class			IP 54, optional IP 65
Electrical Classification			
Base Unit		ATEX	Constructive safety II 2 G Ex c IIC T6
Accessories		ATEX	Intrinsic safety II 2 G Ex ia IIC T6
		FM and CSA	Intrinsic safety Class I, Div. 1, Groups A, B, C, D
Pneumatic Connection			G 1/8; G 1/4 or 1/4 NPT by means of a manifold
Electrical Connection (f. Accessories)			M20 x 1.5 or 1/2-14 NPT (others with Adapter AD..)
Ambient Temperature			−40 to 80°C (−40 to 176°F)
Humidity			Up to 100 %
Weight			0.7 kg / 1.5 lbs (double acting: 0.9 kg / 2 lbs)
Options			Inductive Limit Switches (2- or 3-wire)
			Micro Switches
			Electrical Position Transmitter (4-20 mA)
			Manifold with staggered connection
			Gauges
			Pneumatic Volume Boosters (remote mounted)
			Stainless Steel Housing (with linear mounting)
Attachment to linear actuators			acc. IEC 534 part 6 (NAMUR) and VDI/VDE 3847
to rotary actuators			acc. VDI/VDE 3845 and VDI/VDE 3847
to any other linear or rotary actuator by means of			extensive attachment kit offering

The SRP981 Positioner is designed for operation of pneumatic valve actuators with pneumatic control signals.

It is available in the version ATEX-Constructive Safety and in connection with the options in Ex ia/intrinsic safety.

It is used to reduce the adverse effects of valve friction, for higher thrust and shorter positioning time.

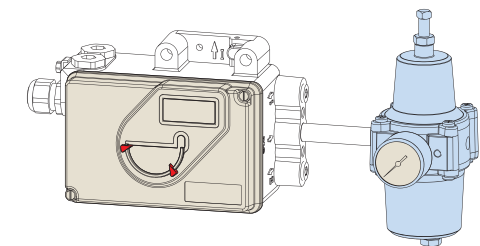
Extraordinary reliability and economy is reached with our durable pneumatic components, even under difficult climatic conditions.



Filter Regulator Series FRS FRS02, FRS03, FRS04, FRS05, FRS923



FRS02, FRS03, FRS04, FRS05, FRS923 – Filter Regulators for any application



- Aluminium and Stainless Steel (316) housing
- Easy mounting to SRD positioner series by means of supply tube
- Special versions for pure Oxygen or Natural Gas applications

FRS02, FRS03 Filter Regulator designed for SRD positioner series

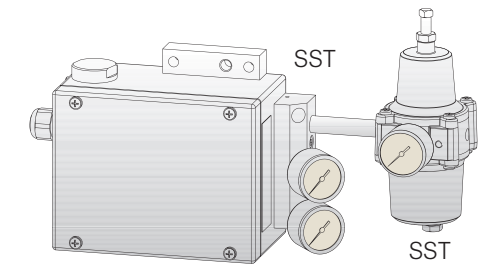
Input pressure	Max. 10 bar / 150 psi
Output pressure	0 to 8 bar (0 to 115 psi)
Air flow	Cv 0.5
Operating temperature	–30 to 70°C (–20 to 160°F)
Pneumatic connection	1/4 NPT
Filter	Filter grade 30 µm, Sintered bronze / Sintered SST
Materials	Aluminium (FRS02), Stainless Steel 316 (FRS03)

FRS923 Expert solution

Input pressure	Max. 15 br / 220 psi
Output pressure	0 to 2.5 bar or 0 to 6 bar (0 to 35 psi or 0 to 90 psi)
Air flow	Cv 0.4
Operating temperature	–40 to 80°C (–40 to 176°F)
Pneumatic connection	1/4 NPT
Filter	Sintered bronze, filter grade 30 µm
Materials	Aluminium (low copper content)
Special Versions	<ul style="list-style-type: none"> • free of grease for oxygen application • free of non-ferrous alloy and venting collection for Natural Gas application

FRS04, FRS05 High airflow capacity Filter Regulator

Input pressure	Max. 17 bar / 250 psi
Output pressure	0 to 8 bar (0 to 115 psi)
Air flow	Cv 2.5
Operating temperature	–50 to 90°C (–58 to 194°F)
Pneumatic connection	1/2 NPT
Filter	Filter grade 5 µm
Materials	Aluminium (FRS04), Stainless Steel 316 (FRS05)

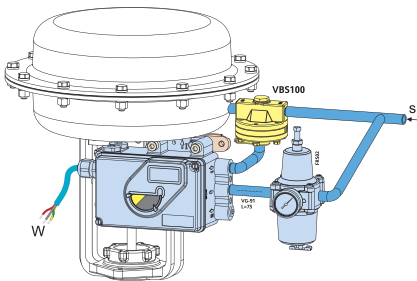


Volume Booster Series VBS and Pneumatic Relays



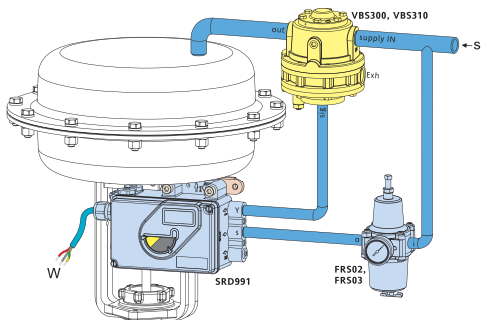
VBS100 and VBS300 – Rugged Volume Boosters

- 2 boosting tier Cv 1 and Cv 7
- Aluminium and Stainless Steel (316) housing



VBS100 / VBS110 Price convenient Solution

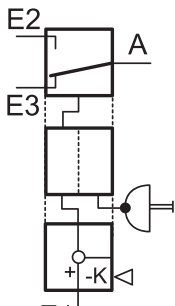
Input pressure	Max. 10 bar / 150 psi
Output pressure	0 to 10 bar, 1:1 Signal/Output Ratio
Air flow	Cv 1
Setting	Adjustable Bypass Valve
Operating temperature	–40 to 80°C (–40 to 176°F)
Mounting	Remote mounting
Pneumatic connection	1/4 NPT
Materials	Aluminium (VBS100), SST 316 (VBS110)



VBS300 / VBS310 High Performance booster

Input pressure	Max. 17 bar / 250 psi (SST: 10 bar / 150 psi)
Output pressure	0 to 10 bar, 1:1 Signal/Output Ratio
Air flow	Cv 7
Setting	Adjustable Bypass Valve
Operating temperature	–40 to 93°C (–40 to 200°F)
Mounting	Remote mounting
Pneumatic connection	1" NPT; Air venting collection
Materials	Aluminium (VBS300), SST 316 (VBS310)

PS953 & PC191 - Complete Range of Pneumatic Relays



- Relays for valve's pneumatic control panel
- Lock in Position relays (single and double acting)
- Selection relays (minimum or maximum signal selection)
- Change Over relays with accurate setpoint setting
- Self Latch version for Change Over relays with push button release

Position Feedback



SMI983, SRD960-TXQ, SMP981 – Position Feedback Units –

- Feedback 4-20 mA of the valve position
- Pneumatic feedback 0.2 to 1 bar (3 to 15 psi) of the valve position (SMP981)
- Easy adjustment of zero and span with local settings
- Stainless Steel housing as option for pneumatic solution
- Feedback Units with Intrinsically Safe (Ex ia) or Explosion Proof (Ex d) certification

The Position Feedback Units convert the linear or rotary movement of valve actuators into a pneumatic signal for the SMP981 or into a standard electrical feedback for the SMI983 (Intrinsically Safe) and the SRD960-TXQ (Ex Proof certification).



SMI983 4-20 mA Position Feedback, Intrinsically Safe

Input	Stroke	8 to 250 mm with standard lever
	Angle	30 to 180°
Output		4-20 mA
Settings		Adjustment of zero and span by two push-buttons and LEDs
Operating temperature		–40 to 80°C (–40 to 176°F)
Protection Class		IP 65
Certification		II 2 G Ex ia IIC acc. to ATEX



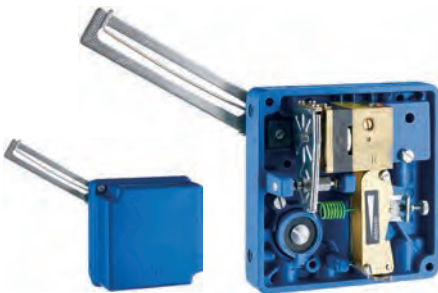
SRD960-TxQ 4-20 mA Position Feedback, Explosion Proof

Input	Stroke	up to 260 mm with standard lever
	Angle	up to 180°
Output		4-20 mA
Settings		Adjustment of zero and span by two push-buttons and LEDs
Operating temperature		–40 to 80°C (–40 to 176°F)
Protection Class		IP 66
Certification		II 2 G Ex d IIC acc. to ATEX



SMP981 Pneumatic 0.2-1 bar Position Feedback

Input	Stroke	8 to 250 mm with standard lever
	Angle	30 to 120°
Output		0.2 to 1 bar (3 to 15 psi)
Settings		Adjustment of zero and span by means of spring and screw
Operating temperature		–40 to 80°C (–40 to 176°F)
Protection Class		IP 54 or IP 65
Certification		II 2 G Ex c acc. to ATEX (constructive safety)



Limit Switches

SGE985, SRD960-TXT, MLS Series – Limit Switch Units –

- Inductive Namur limit switch, Inductive NAMUR increased safety (SIL 3),
- 3 wires type PNP and micro switches
- Precise switching points with adjustable transmission
- Limit Switches Units with Intrinsically Safe (Ex ia) or Explosion Proof (Ex d) cert.
- Application withstands extreme temperatures –50°C to 100°C (–58°F to 212°C)

SGE985 – Limit Switch Unit Intrinsically Safe

Input	Stroke	up to 260 mm
	Rotary Angle	no limitation
Switches		Inductive – Standard version Inductive – Security version Inductive – Three-Wire version Micro switches
Settings		Adjustable cams fixed with screws
Operating temperature		–40 to 80°C (–40 to 176°F) or –50 to 100°C
Protection Class		IP 65
Certification		II 2 G Ex ia acc. to ATEX

SRD960-TxT/U/R/V – Limit Switch Unit Explosion Proof

Input	Stroke	up to 260 mm
	Rotary Angle	no limitation
Switches		Inductive – Standard version Inductive – Security version Inductive – Three-Wire version Micro switches
Settings		Adjustable cams fixed with screws
Operating temperature		–40 to 80°C (–40 to 176°F) or –50 to 100°C
Protection Class		IP 66
Certification		II 2 G Ex d IIC acc. to ATEX

MLS Sensor – Miniature Mechanical Limit switches

Switches	Micro switches
Electrical durability	5,000,000 cycles under 48 VDC
Mounting	Mounting kits for linear actuators
Operating temperature	–25 to 70°C (–15 to 160°F)
Protection Class	IP 65
Certification	II 2 G/D Ex d e IIC acc. to ATEX



Current to Pneumatic converter IP26

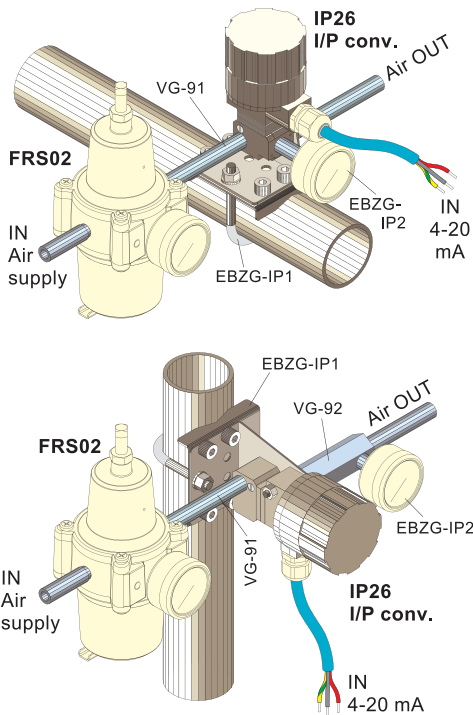


IP26 - Compact Field Rugged Current to Pneumatic Converter

- Accurate and Reliable
- Reduced inventory thanks to the dual certification IS / XP (ATEX, FM, CSA)
- Easy fit for universal replacement
- Achieve operational saving
- Extreme low temperature version -55°C (-67°F) available

The IP26 (current to pressure) transducer converts a 4–20 mA electrical current signal to a proportionally linear pneumatic output. The unique conversion technology provides a high

level of accuracy and repeatability for the operation of actuated valves. A low mass control circuit provides consistent output in high vibration applications. This compact unit is housed in an explosion proof enclosure that is designed for pipe, bracket or direct manifold mounting.



Input	4-20 mA
Outputs (to be selected in Model Code)	0.2 to 1 bar (3 to 15 psig) 0.2 to 1.7 bar (3 to 25 psig) 0.4 to 2 bar (6 to 30 psig)
Air Consumption	2.83 l/min (0.1 scfm)
Flow Capacity	4.1 m³/h (2.4 scfm) max.
Impedance	260 Ohms @ 21°C (70°F)
Loop Load	5.2 Volts @ 21°C (70°F)
Temperature Limits	-40 to 85°C (-40 to 185°F) -55°C with option -T
Certifications	ATEX Intrinsically Safe (Ex ia) and Explosion Proof (Ex d) FM and CSA Intrinsically Safe and Explosion Proof
Protection Class	IP 65 (NEMA 4X)
Port Sizes	Pneumatic In/Out: 1/4" NPT Electric: M20 x 1.5 (ATEX)
Mounting	Wall or 2" pipe (optional)
Weight	0.64 kg (1.4 lb)

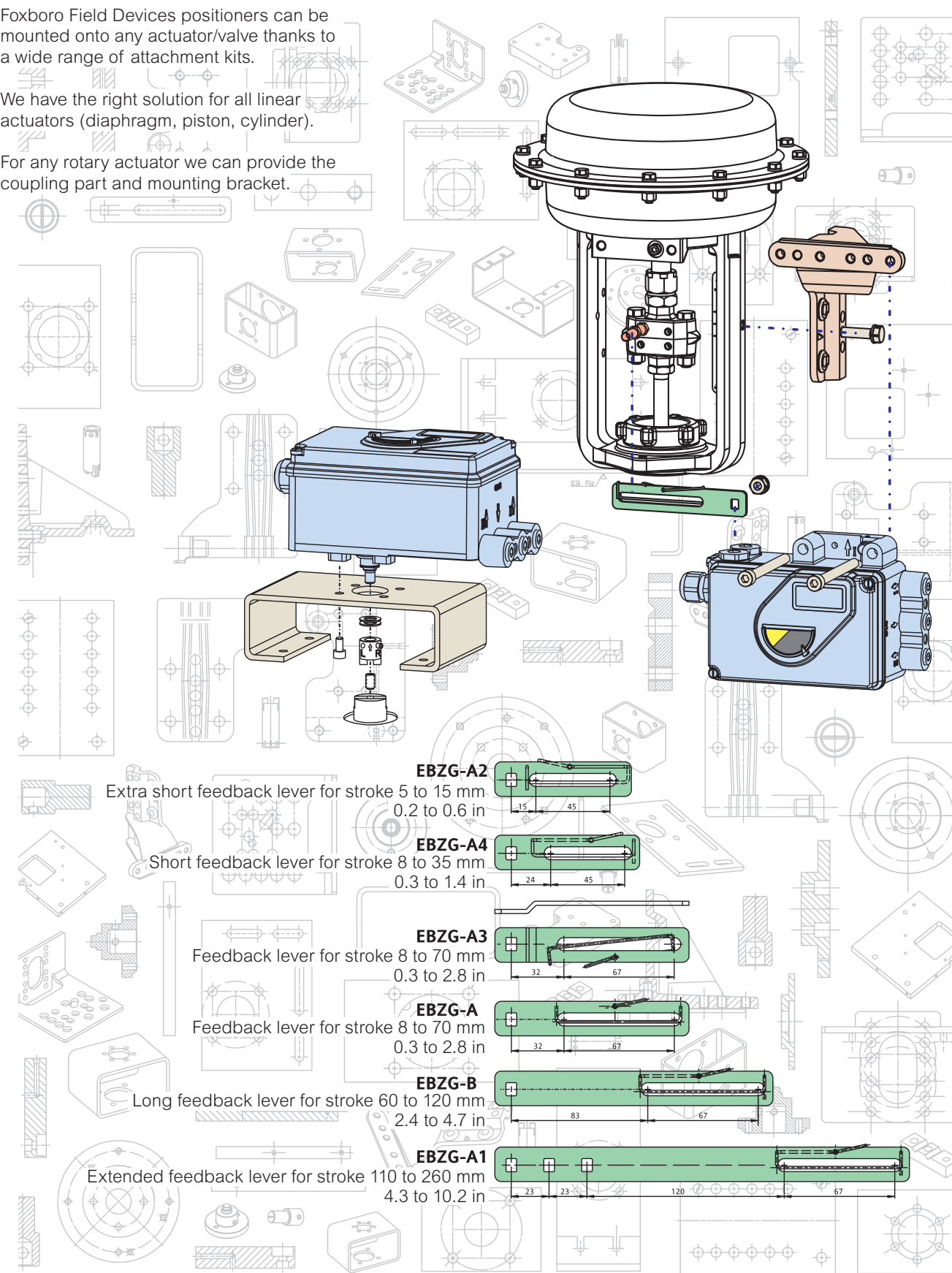


Attachment kits

Foxboro Field Devices positioners can be mounted onto any actuator/valve thanks to a wide range of attachment kits.

We have the right solution for all linear actuators (diaphragm, piston, cylinder).

For any rotary actuator we can provide the coupling part and mounting bracket.



Special versions



Fugitive Emission Monitoring

- Pressure switch connected to the optionboard B (Binary inputs)
- Available for SRD991 or SRD960 with optionboard B
- No need for additional external power supply
- ATEX certified Solution patented by Foxboro US 6,112,638

Fugitive Emission Monitoring is the solution to avoid any serious emission from the packing. In conjunction with a pressure switch gauge, the positioner is able to detect any dangerous leakage. The diagnostic is provided with a clear overview in the DTM.

Remote mounting

- Intrinsic Safety (SRD991) or Explosion proof (SRD960)
- Analog or Smart
- Communication protocols HART, Profibus PA or Foundation Fieldbus H1
- Possibility to connect Linear Potentiometer in case of cylinder application

This remote application is used in applications with high temperatures, high magnetic fields or vibrations. The Positioner (remote unit) is mounted far away from the valve or cylinder in a safe environment. The Potentiometer unit is mounted on the actuator.



Top mounting

- Communication protocols HART, Profibus PA or Foundation Fieldbus H1
- Quick and Compact Mounting
- Intrinsically Safe
- High level of safety: No external moving parts

The Top Mounting positioner is dedicated to diaphragm valves and angle seat valves. SRD991 positioners with top mounting design, feedback to the valve's position by means of a linear potentiometer instead of the standard rotary potentiometer. The positioner body comprises a flange, in order to enable a direct connection onto the actuator body. Therefore, the mounting kit has been reduced to the minimum.



Special versions



PST WirelessHART - Monitoring Safety Valves

- Easy implementation on existing valves
- Reduced installation cost (no additional cable, no battery)
- Online testing and predictive maintenance with high transfer data rate

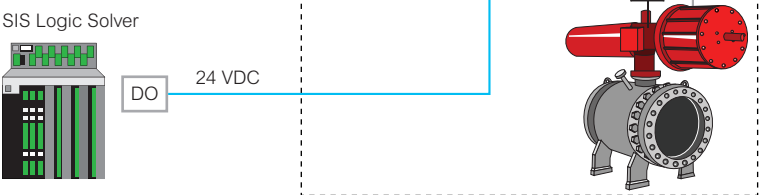
Partial Stroke Testing WirelessHART monitoring of safety valves is ideal for existing valves that are difficult to access or where wiring installation costs are prohibitive.

Foxboro Field Devices provides a complete, flexible and tested solution for PST monitoring with WirelessHART. This solution is based on Valve positioner (SRD991 or SRD960) with a WirelessHART adapter. The PST valve positioner and WirelessHART adapter are powered by a 24 VDC power supply. The PST WirelessHART positioner solution is available in either 'Intrinsically Safe' or 'Explosion proof' types.

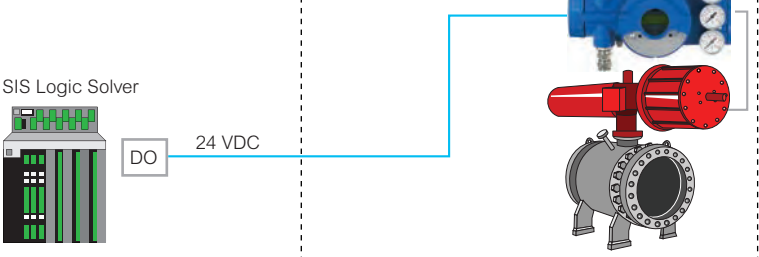
The Valve positioner is dedicated only to the monitoring of PST and wirelessly sends a diagnostics and signature to the DCS.

PST WirelessHART can also be installed with a parallel Solenoid Valve for Emergency Shutdown.

BEFORE



AFTER



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