

Valve Positioner Product Guide



About our Company

The names Foxboro and Eckardt stand for two world technology leaders in the field of process automation.

Foxboro and Eckardt, founded in 1908 and 1873 respectively, have made substantial contributions towards a safer and more economical operation in numerous plants around the world with state-of-the-art automation systems. Our success is based on a relationship of mutual trust with our customers.

Our company is part of Invensys and is located in Germany (Stuttgart) and France (Soultz near Basel). Engineering and Development is researched in Stuttgart, while production is completed in France where we manufacture more than 60,000 control valve positioners per year.

Foxboro Eckardt™ Control Valve Positioners, Gauge, Absolute and Differential Pressure Transmitters, Level Transmitters, Flow Transmitters, and Analytical Devices are in operation at more than a million different facilities throughout the world.

Foxboro Eckardt is well known as a high quality instrumentation manufacturer. We are certified in accordance with DIN EN ISO 9001. In production we focus on high quality and reliable products that will exceed our quality control testing before leaving the factory.

Certified to manufacture control valve positioners with ATEX, FM, CSA, INMETRO, GOST or NEPSI certification, Foxboro Eckardt provide solutions for HART®, FF H1, Profibus PA communication and SIL3 certified positioners for safety applications with Emergency Shut Down Valves.

We have been 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.

For more information on our products, please visit our website www.foxboro-eckardt.com

Valve Positioners

Modularity

PST

High Efficiency

User Friendly

Profibus PA

HART

High Reliability

FDT-DTM

FF H1

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Universal Positioner SRD960



EDD

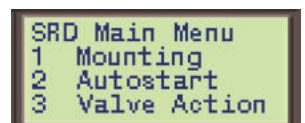


SRD960 - Intelligent Valve Control - Ex d

- Easy to operate, menu-driven with graphical 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 and FM approval for Ex d - "flameproof"/"explosionproof"
- 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



Operation

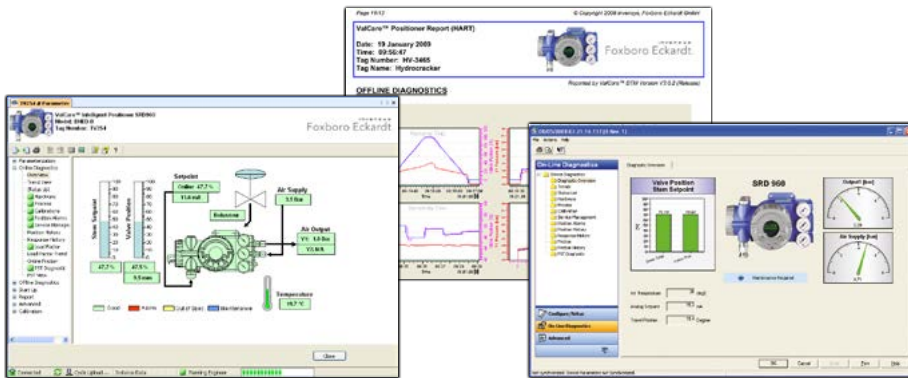


Configuration



Diagnosis report

Positioner Report created with VALcare™ DTM



DTM VALcare™

Enhanced EDD



Example for mounting on rotary actuators.

The SRD960 offers the most advanced technology available on the market today. This includes a start-up in two steps only and a multilingual full-text graphic LCD for configuration and operation, all available within the various process automation applied communication protocols.

The SRD960 offers 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 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	<ul style="list-style-type: none"> Autostart Autodiagnostic Alarm Output for Switching (with Optionboard) Status List acc. NE107 Response History 	<ul style="list-style-type: none"> Custom Characterization Alarm Management Position History
Premium Diagnostics	<ul style="list-style-type: none"> On Line Friction Ramping Signature Valve Footprint PST Predictive Maintenance 	<ul style="list-style-type: none"> Stepping Signature Sensitivity Signature PST
SRD960 with Communication	HART	Setpoint 4 to 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, optional up to 300 degree	
Protection Class	IP 66 or NEMA 4X	
Electrical Classification	ATEX	II 2 G Ex d T4 / T6 (flameproof)
	FM	Cl. I, Div. 1, Groups A, B, C, D (explosionproof)
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 / 3.7 lbs (double acting: 3 kg / 4.4 lbs)	
Optional Features	<ul style="list-style-type: none"> Inductive Limit Switches (2- or 3-wire) Mechanical Switches (Micro Switches) Position Transmitter (4 to 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. to IEC 534 part 6 (NAMUR) and VDI/VDE 3847	
rotary actuators	Acc. to VDI/VDE 3845 and VDI/VDE 3847	
any other linear or rotary actuator by means of extensive attachment kit offering		

Intelligent Valve Positioner SRD991



EDD

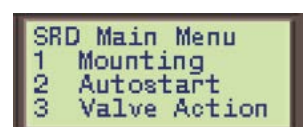


SRD991 – Intelligent Valve Control

- 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 (PST) 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



Operation

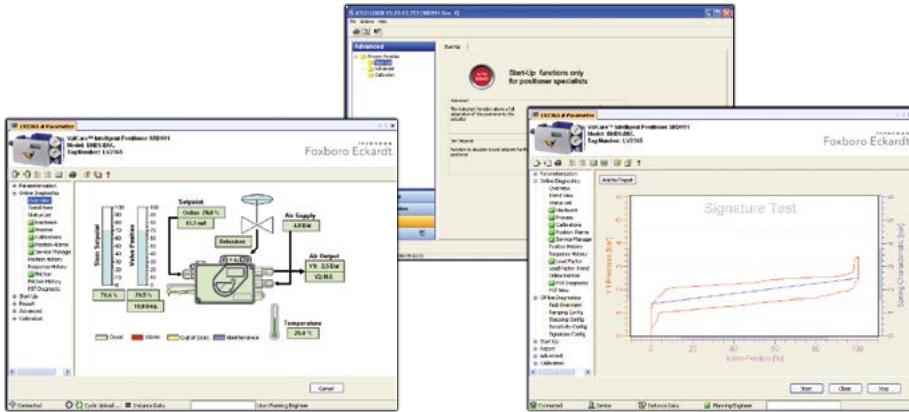


Configuration



Diagnosis report

Enhanced EDD



DTM VALcare™

Positioner Report created with VALcare™ DTM



Example for mounting on rotary actuators.

The SRD991 offers the most advanced technology available on the market today.

This includes a start-up in two steps only and a multilingual full-text graphic LCD for configuration and operation, all available within the various process automation applied communication protocols.

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

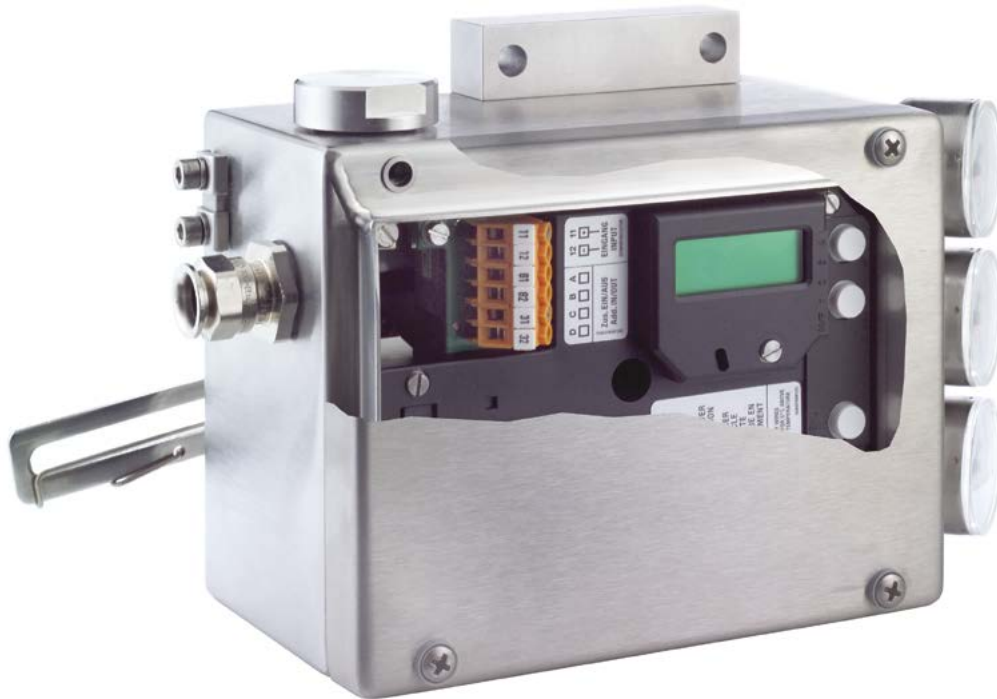
All the diagnostic features can be easily configured and displayed by the Positioner DTM (VALcare). Moreover, the Positioner DTM enables the operator to edit a complete "health" report of the valve with all data for configuration and diagnostics.

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

Technical Data

Advanced Diagnostics	<ul style="list-style-type: none"> Autostart Autodiagnostic Alarm Output for Switching (with Optionboard) Status List acc. NE107 Response History 	<ul style="list-style-type: none"> Custom Characterization Alarm Management Position History
Premium Diagnostics	<ul style="list-style-type: none"> On Line Friction Ramping Signature Valve Footprint PST Predictive Maintenance 	<ul style="list-style-type: none"> Stepping Signature Sensitivity Signature PST
SRD991	without Communication	Setpoint 4 to 20 mA Load 300 Ohm
	with Communication	HART Setpoint 4 to 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) high air capacity version
Stroke Range		8 to 260 mm (0.3 to 10.2 in) with standard lever
Angle of Rotation		up to 95 degree angle (optional up to 300 degree)
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 iaD 20
	FM / 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)
Optional Features (plug & play)		Inductive Limit Switches (2 or 3-wire) Mechanical Switches (Micro Switches) Position Transmitter (4 to 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. to IEC 534 part 6 (NAMUR) and VDI/VDE 3847
rotary actuators		Acc. to VDI/VDE 3845 and VDI/VDE 3847
any other linear or rotary actuator by means of extensive attachment kit offering		

Stainless Steel Housing for Positioners SRD991-SRI990



EDD



Rugged and Compact Design

Both positioners come in a rugged stainless steel housing and an extensive choice of electronic boards for SRI990 or SRD991.

Electronic board for the SRD991 digital valve positioner:

- 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

Electronic board for the SRI990 analog valve positioner:

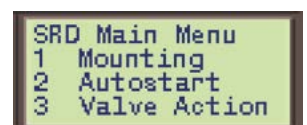
- Analog valve control with fast control behavior
- Electrical adaption of zero and span by potentiometers

The modular concept of the positioners SRI990 - SRD991:

- Easy mounting to all linear and rotary actuators
- Options:
 - Position transmitter
 - Gauge manifolds
 - Pressure sensors for outputs (SRD991)



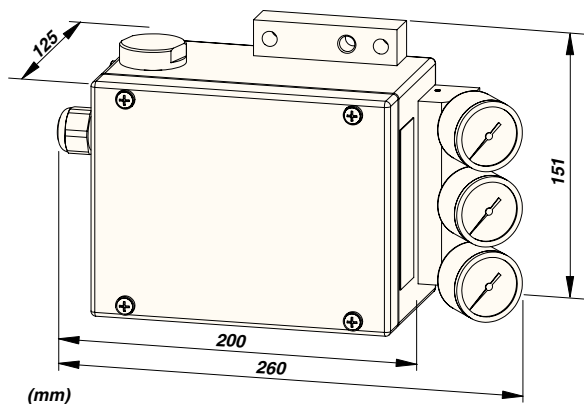
Operation



Configuration



Diagnosis report



Example for mounting on rotary actuators.

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

How to order -
Select "option -Z" in SRI990 or SRD991 model code.

The SRD991 offers the most advanced technology available on the market today.

This includes a multi-lingual full-text graphic LCD all available within the various process automation applied communication protocols.

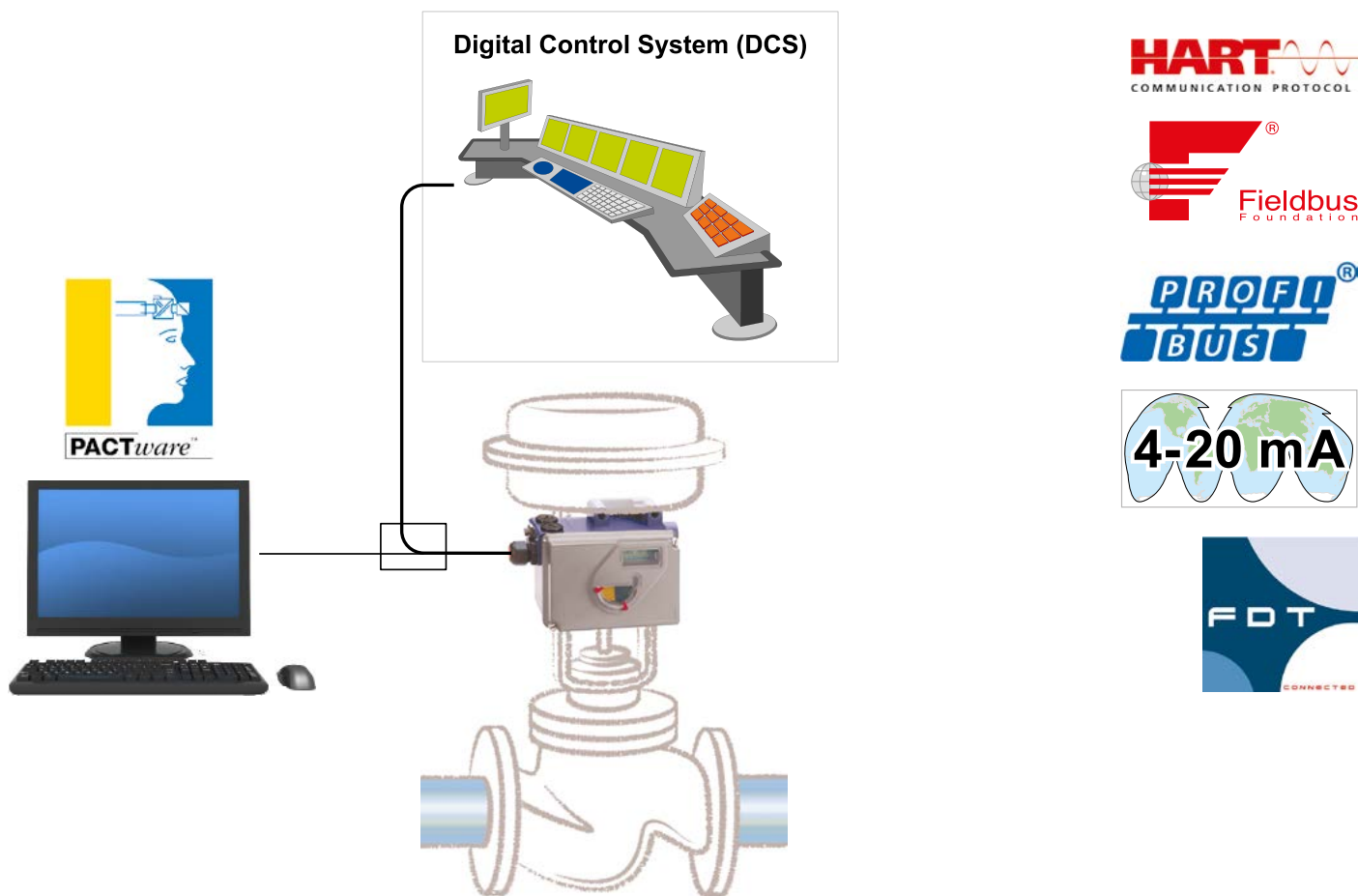
The SRD991 offers enhanced applications and methods to analyze recorded stroke data.

The advanced diagnostic can be partially shown on the local LCD of the positioner or fully on a PC or a DCS workstation such as the I/A Series® System thanks to DTM based software VALcare.

Technical Data

- Stainless Steel Housing	
Material	Stainless Steel 1.4404 / 316, 1.25 mm
Protection class	IP 66 acc. to EN 60529
Impact resistance	7 Joule acc. to EN 50014
Seals	VMQ (Silicone)
Weight (complete positioner)	3.5 kg
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 to 20 mA Load 300 Ohm
with Communication	HART Setpoint 4 to 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)
Optional Features (plug & play)	Position Transmitter (4 to 20 mA) Binary Inputs or Binary Outputs or External potentiometer
- with SRI990 electronic Analog	
	Setpoint 4 to 20 mA Load 300 Ohm
Characteristic of setpoint	Linear
DIP switches for	Direction of rotation, Signal range, Split range ...
- General technical data	
Air Supply	1.4 to 7 bar (20 to 105 psig), For high pressure, option K: 4 to 10 bar (60 to 150 psig):
Stroke Range	8 to 260 mm (0.3 to 10.2 in) with standard lever
Angle of Rotation	Up to 95 degree angle (optional up to 300 degree)
Electrical Classification	ATEX "Intrinsic safety" II 2 G Ex ia IIC T4 / T6
Ambient Temperature	-40 to +80 °C (-40 to +176 °F)
Attachment to linear actuators	Acc. to IEC 534 part 6 (NAMUR) and VDI/VDE 3847
rotary actuators	Acc. to VDI/VDE 3845 and VDI/VDE 3847
any other linear or rotary actuator by means of extensive attachment kit offering	

Advanced Diagnostics / Premium Diagnostics for Positioners **SRD960 / SRD991**



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 DTMs 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 function for ESD applications



Operation



Configuration



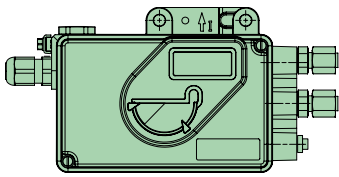
Diagnosis report

Easy to Use Easy to Understand One Glance

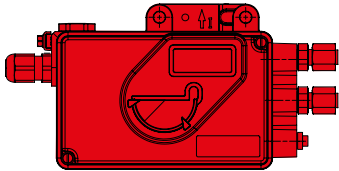
Ease of use and easy to understand are the principal characteristic of the DTM interface.

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

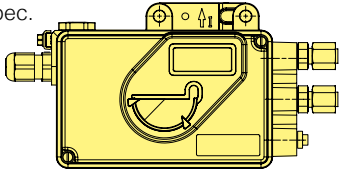
Good



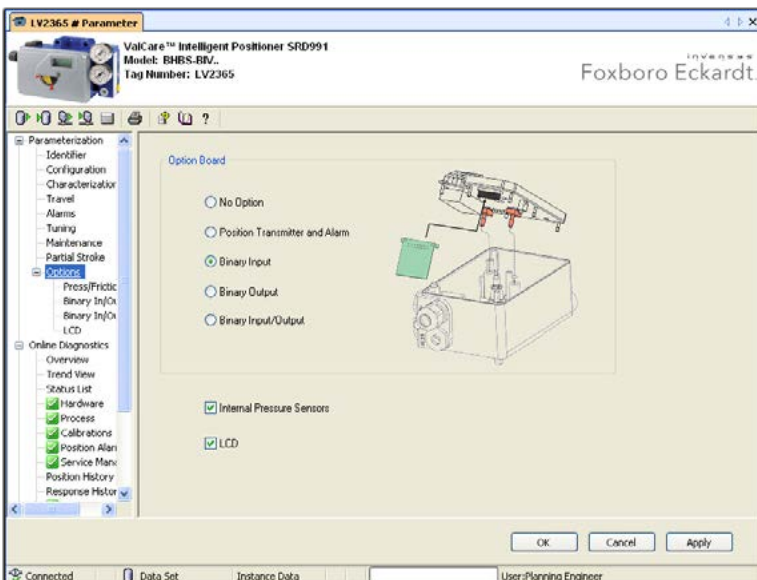
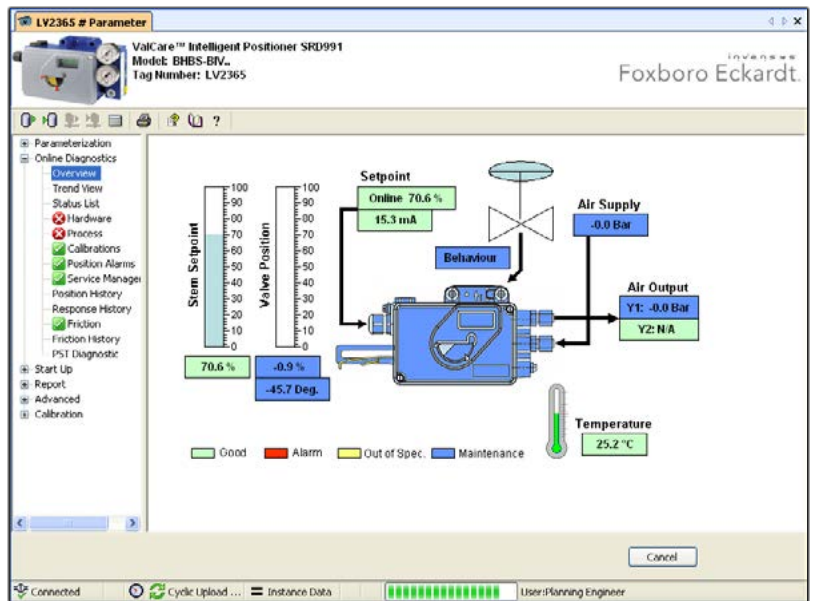
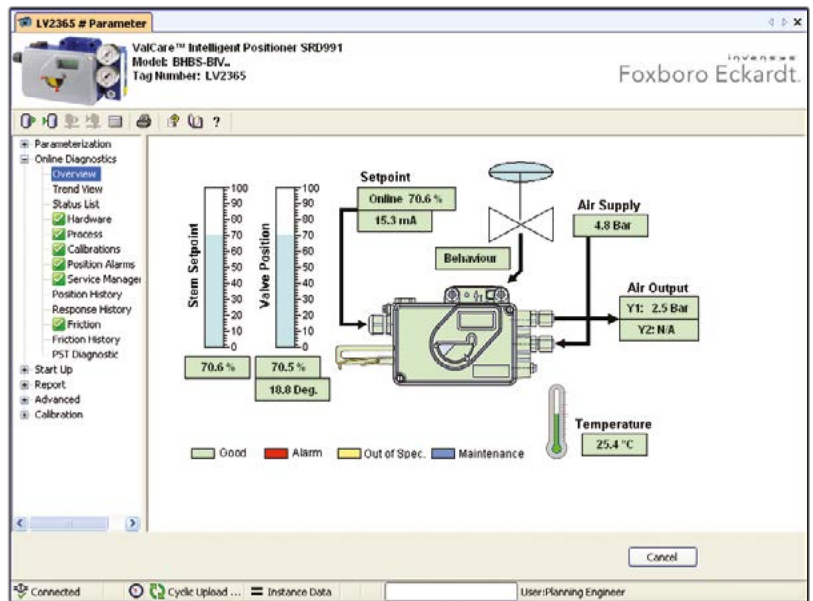
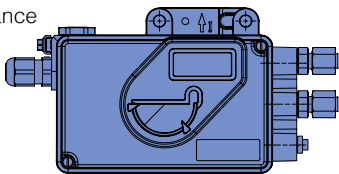
Alarm



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.

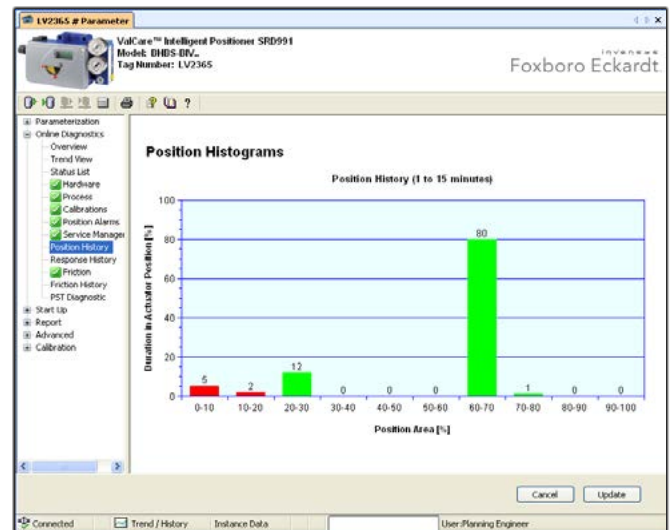
Predictive Maintenance

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 NAMUR – NE107 standard.

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 Friction

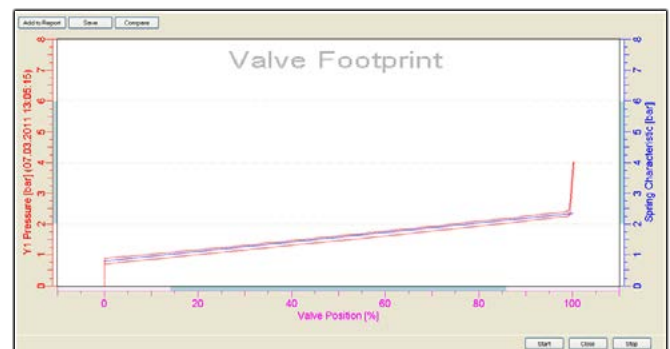
Stem Friction greatly impacts valve performance. As such, tracking valve friction has become indispensable information in order to accurately develop predictive maintenance schemes for any control valve. Tracing valve friction allows identification of possible pneumatic leakages or stuck valves while 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'.

Valve Signatures

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 (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 activate 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.

Status	Current	Historical	Category	Description	Action
Control Diff OOL (Hist)	(0) OK	(1) Inconsistent	Mechanics	Difference between applied digital or analog setpoint and actuator/valve-position exceeds allowed limit for a user specified time	Check to ensure that there is adequate supply pressure. Verify tuning parameters. Check mechanics of actuator and valve. Refer to troubleshooting section of M/EVE D105 A.
Air Supply Pressure Alarm (Hist)	(0) OK	(1) Inconsistent	Process	The Air Supply Pressure falls below the configured Lower Limit	Check to ensure that there is adequate supply pressure. Check pneumatic.
Output 1 Pressure Alarm (Hist)	(0) OK	(1) Inconsistent	Process	The positioner can not regulate the Output Pressure.	Check pneumatic.
Power Supply High (Hist)	(0) OK	(3) Out of Specification	Process	Power Supply above allowed limit 4-20 mA / HART: Operation above 22 mA, Fieldbus / FoxCom: Operation above 12 mA.	Operation outside power supply limit (see FOS for details) may damage positioner components and violate electrical safety certification requirements. Stop operating positioner. Ensure that the maximum power allowed supply is supplied to the unit.

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.

ValCare™ Positioner Report (HART)
 Date: 15 September 2008
 Time: 08:15:23
 Tag Number: LV4673
 Tag Name: Steam Cracker LV

POSITIONER IDENTIFICATION

Manufacturers ID	(3) Foxboro Eckardt	Device Type	SRD991
Tag Name	Steam Cracker LV	Model Code	BHNS
Manufacturing Date	21.03.2008	Valve S/N	3 WAYS
Calibration Date	12.07.1998	Actuator S/N	PETRAS
Fabrication No.	06090000	ECER number	NO ECER
		Amplifier Type	(1) Single

Hardware / Firmware

Firmware Revision	16	Write Protect	(0) No
Hardware Revision	2		
Device Options	Position Transmitter and Alarm Pressure Sensors		

Messages

Message #1: BIEL Message #2: STEP/ANE

OFFLINE DIAGNOSTICS (ext.1)

Ramping Test

Stepping Test

ValCare™ Positioner Report (HART)
 Date: 08 August 2008
 Time: 09:55:26
 Tag Number: PST 1
 Tag Name: TEST STUTTGART

POSITIONER CONFIGURATION

Mounting Configuration

Mounting Configuration	(2) Linear/Left Mounted	Spring Type	(1) Closes
Actuator Action	(1) Single	Valve Type	(1) Globe
Control Action	(8) Direct Acting		

Setpoint

Setpoint Source	(3) Analog	Analog Setpoint Lo	20.00 mA
		Analog Setpoint Hi	4.00 mA

Characterization

Flow Characteristic (1) Equal Percentage (1.50)

Control Parameters

P Term (Dec.)	25.00	P Term (Inch)	43.77
I Term (Dec)	25.00	I Term (Inch)	4.78
Int. Ramping	1.00 sec	Control Gap	0.15 %
Dec. Ramping	200.00 sec		

Travel Configuration

Lower Travel Stop	0.00 %	Cutoff 0%	1.00 %
Upper Travel Stop	100.00 %	Cutoff 100%	100.00 %
		Cutoff Hyst.	0.005 %

Input/Output Configuration

Binary Input 1	Namur (1-15A / +12.25A) PST1
Binary Output 2	Namur (<1mA / +12.25mA) Output active-HIGH Current PST1

Partial Stroke Test

PST Configuration	Manual	Maximum PST Duration time	200.00 sec
PST Time Interval	24 hours	Minimum Output 1 Pressure for PST	0.50 bar
PST setpoint change	60.00 %	Output 1 Pressure Units	(7) bar
Dec. Ramping	200.00 sec		

Partial Stroke Testing Solutions with SRD991 and SRD960 Positioners



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

- SRD991 and SRD960 positioners SIL 3 certified for Shutdown
- PST Activation:
 - Automatically
 - Manually
 - By means of LCP960 Local Control Panel
 - By means of a separate Binary Input for 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
 - Backlit LCD with clear messages
 - Timer for last PST done
- SOV monitoring with pressure dip detection
- FST (Full Stroke Test) monitoring with trigger capabilities



PST running



PST good



PST failed or stuck valve

i n v e n s y s i n v e n s y s

Foxboro Eckardt Triconex Partial Stroke Testing Solution

Final control elements in Emergency Shutdown (ESD) 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 (PST) 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	
12/07/2006	11:58:13.805	10003	PST_LAUNCH	TRUE	01 - trinode01	
12/07/2006	11:58:26.456	10003	PST_LAUNCH	FALSE	01 - trinode01	
12/07/2006	11:58:26.856	10001	PST_STATUS	TRUE	01 - trinode01	
12/07/2006	11:58:26.856	15001	PST_COMPLETED	TRUE	01 - trinode01	
12/07/2006	11:58:33.906	15001	PST_COMPLETED	FALSE	01 - trinode01	

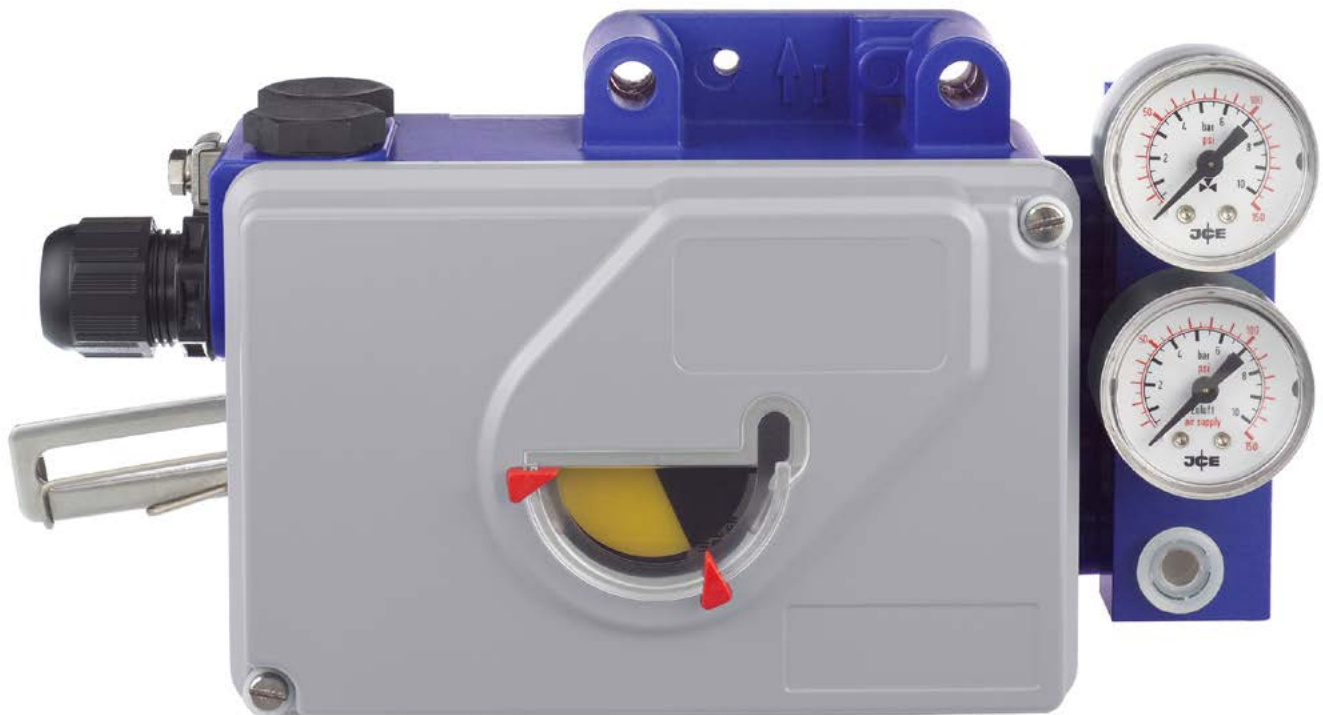


LCP960 Local Control Panel for PST

Features of Partial Stroke Test

PST Activation	Manually Automatically By means of separate Binary Input for SIS Logic Solver
Configuration	Test Interval Setpoint Change Maximum Wait Time Minimum Pressure Soft PST PST Setpoint Change • Fixed • Random
Action	PST for single or double acting actuator
Audit trail	In DCS by means of communication In SOE of Triconex by means of a digital output
Alarms	Minimum Pressure Time to perform PST
Trends	Break Pressure Time to re-inflate
Local Control Panel LCP960	With push button to launch PST LCD with PST Status Timer for last PST done

Analog Positioner SRI990



SRI990 - Easy Operation and Compact Design



- Analog valve control with fast control behaviour
- Easy local operation and adjustments
- Valve action and rotation configurable by DIP switches
- Electrical adaptation of zero and span by potentiometers
- Gain and Damping independently adjustable
- 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 to 20 mA
 - Manifolds for gauges and boosters



Optional Stainless Steel housing.



Example for mounting on rotary actuators.

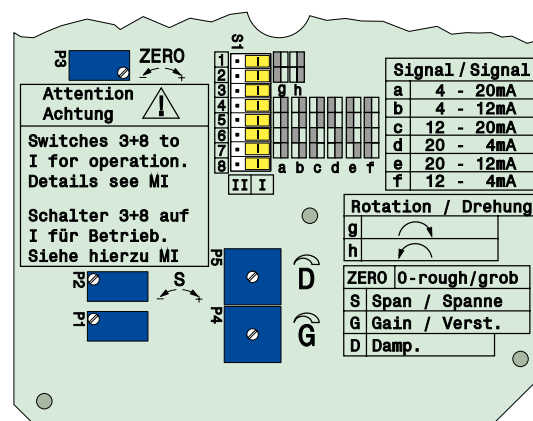
The analog Positioner SRI990 with analog input 4 to 20 mA is designed to operate pneumatic valve actuators.

It offers easy adjustment by means of switches and potentiometers.

The modular structure of this positioner series enables conversion from an analog to an "intelligent" positioner by exchanging the electronics.

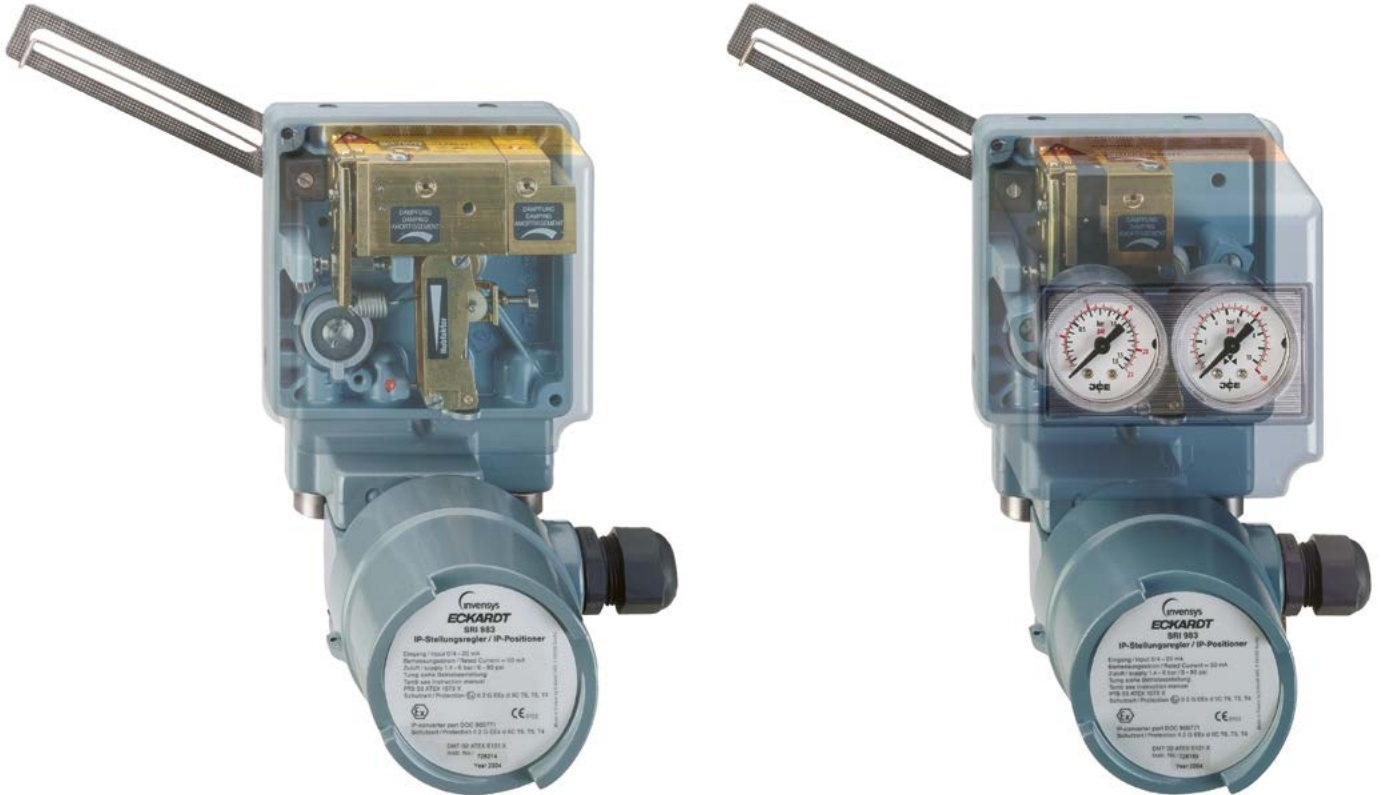
Technical Data

Analog	Setpoint 4 to 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
Pneumatic test	By DIP switch
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 (optional up to 300 degree)
Protection Class	IP 66 or NEMA 4X
Electrical Classification ATEX	"Intrinsic safety" II 2 G Ex ia IIC T6 "Intrinsic safety for dust" II 1 D Ex iaD 20
FM	"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	Inductive Limit Switches (2- or 3-wire) Or Mechanical switches (Micro switches) Position Transmitter (4 to 20 mA) Gauge Manifold, Volume Booster
Attachment to linear actuators	Acc. IEC 534 Teil 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	



Local operation and configuration.

Electro-Pneumatic Positioner SRI983



SRI983 - The Classic Explosion Proof Application



- Analog valve control with fast control behaviour
- Input 4 to 20 mA
- Load only 260 Ohm - ideal for split range
- Easy local mechanical configuration
- Mechanical adaptations by setting-screws
- Independent adjustment of zero and span
- Gain and Damping independently adjustable
- Electrical I/P converter separate from pneumatic unit
- Mounting to all linear and rotary actuators
- Options:
 - Integrated gauges
 - Volume boosters (independent from positioner)
 - Fail Freeze block relay



Example for mounting on linear valves, version with integrated gauges.



Example for mounting on rotary valves.

The SRI983 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.

Technical Data

Analog		Setpoint: 4 to 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		Independently adjustable
Gain and Damping		Independently adjustable
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 65 (ATEX) / NEMA 4X (FM and CSA)
Electrical Classification	ATEX	"Flameproof" II 2 G Ex d IIC T6
	FM and CSA	"Explosionproof" Class I, Div. 1, Groups B, C, D "Dust-ignition proof" Class II, Div. 1, Groups E, F, G
Electrical Connection		M20 x 1.5 or 1/2-14 NPT
Pneumatical 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 (external mounted) Fail Freeze block relay
Attachment	to linear actuators	Acc. to IEC 534 Part 6 (NAMUR)
	to rotary actuators	Acc. to VDI/VDE 3845
		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 to 20 mA / 0 to 20 mA or 0 to 10 V
- Load only 200 Ohm - ideal for split range
- Easy local mechanical configuration
- Mechanical adaptations by setting-screws
- Independent adjustment of zero and span
- Gain and Damping independently adjustable
- Mounting to all linear and rotary actuators
- Options:
 - Position Transmitter 4 to 20 mA
 - Limit switches (inductive or Micro switches)
 - Gauge Manifold
 - Volume boosters





Example for mounting on linear valves.



Example for mounting on rotary valves.

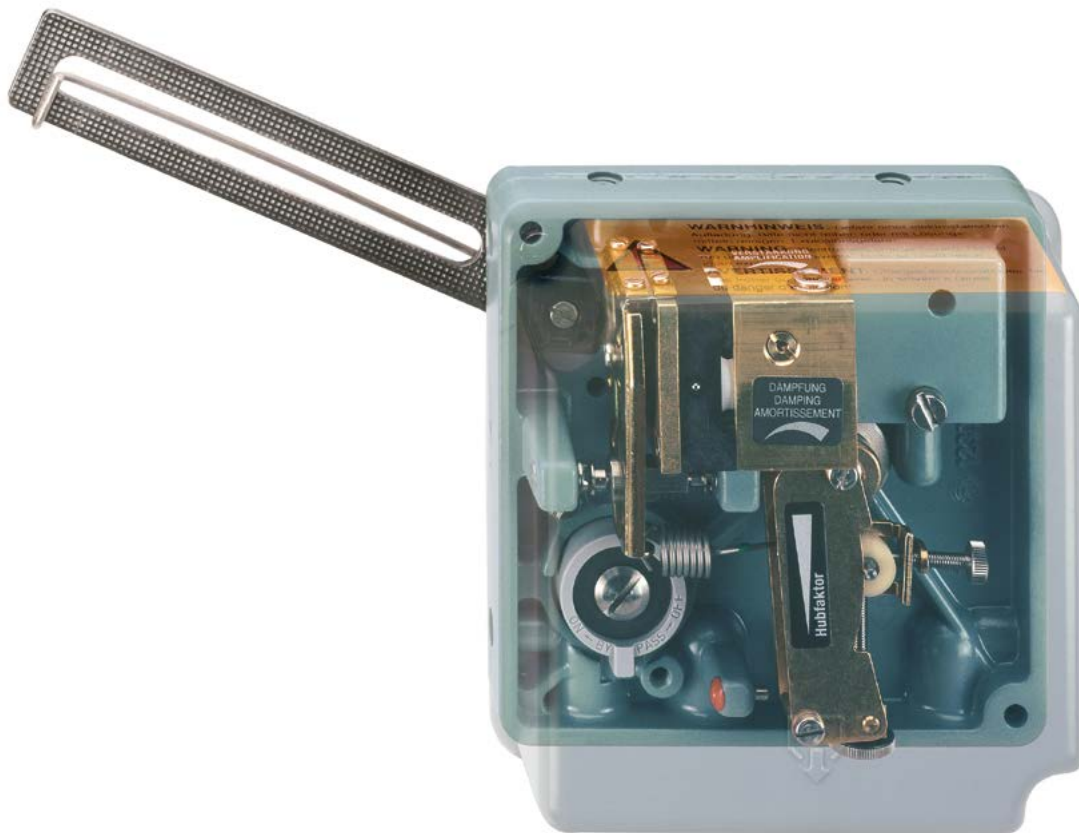
The SRI986 Positioner is designed for operation of pneumatic valve actuators from control systems and electrical controllers with electric control signals.

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

Technical Data

Analog	Setpoint: 4 to 20 mA / 0 to 20 mA / 0 to 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	Independently adjustable
Gain and Damping	Independently adjustable
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	IP54, 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
For use on ships or vessels	Lloyd's registered
Electrical Connection	M20 x 1.5 or 1/2-14 NPT (others with Adapter AD...)
Pneumatical Connection	G1/8
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 / 3.9 lbs)
Options	Inductive Limit Switches (2- or 3-wire) Micro switches Position Transmitter (4 to 20 mA) Manifold with staggered connection Manifold with gauges Volume boosters
Attachment to linear actuators	Acc. to IEC 534 Part 6 (NAMUR)
to rotary actuators	Acc. to VDI/VDE 3845
any other linear or rotary actuator	by means of extensive attachment kit offering

Pneumatic Positioner SRP981



SRP981 - The result of 40 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
- Independent adjustment of zero and span
- Gain and Damping independently adjustable
- Easy mounting to all linear and rotary actuators
- ATEX approved
- Options:
 - Electrical Position Transmitter 4 to 20 mA
 - Limit switches (inductive or Micro switches)
 - Manifold with gauges
 - Pneumatic Volume boosters



Example for mounting on linear valves, version with integrated gauges.



Example for mounting on rotary valves.

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.

Technical Data

Control Signal Characteristics		Setpoint: 0.2 to 1 bar (3 to 15 psig) Linear, equal-percentage or invers-equal percentage (with cams)
Split range		Up to 4-fold possible (up to $dw=0.2$ bar / 3 psig)
Zero and Span		Independently adjustable
Gain and Damping		Independently adjustable
Valve Action		Direct or reverse adjustable
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 8.0 in)
Angle of Rotation		30 to 180 degree angle
Protection Class		IP54, 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		G1/8
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 / 2.0 lbs)
Optional Features		Inductive Limit Switches (2- or 3-wire) Micro Switches Electrical Position Transmitter (4 to 20 mA) Manifold with staggered connection Gauges Pneumatic Volume Boosters Stainless Steel housing (with linear mounting)
Attachment to linear actuators		Acc. to IEC 534 part 6 (NAMUR)
rotary actuators		Acc. to VDI/VDE 3845
any other linear or rotary actuator		by means of extensive attachment kit offering

Position Transmitters

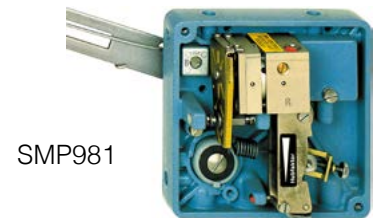
Limit switch unit

Intrinsically Safe Certification SGE985
Explosion Proof Certification SRD960-TxT/U/R/V
Inductive NAMUR
Inductive NAMUR increased safety (SIL3)
3 wires type PNP
Micro switches
For rotary actuator up to 180° rotation
For linear actuator up to 260 mm stroke with standard lever



Pneumatic 3-15 psi (0.2-1 bar) position feedback

SMP981
Output 3-15 psi / 0.2-1 bar
For rotary actuator up to 120° rotation
For linear actuator up to 250 mm stroke with standard lever
Optional stainless steel housing (with linear actuator)



4 to 20 mA position feedback

Intrinsically Safe Certification SMI983 and SRI990-TxQ
Explosion Proof Certification SRD960-TxQ
Output 4 to 20 mA
For rotary actuator up to 180° rotation
For linear actuator up to 260 mm stroke with standard lever



SRD960-TxQ



Additional equipment



I/P converter

With Intrinsically Safe Certification IP24
Input 4 to 20 mA
Output 3-15 psi / 0.2-1 bar
'In Field' housing up to IP65
Optional stainless steel housing



Filter regulators

FRS02, FRS03 and FRS923
Input up to 15 bar
Output 0-6 bar
Special application for pure oxygen possible (FRS923)
Stainless steel version available (FRS03)



Lightning protection, manifolds, Volume booster

High Flow Volume booster
LEXG-F / G / X / Y
Available with SIL 3 certification



Lock-in/Fail Freeze unit

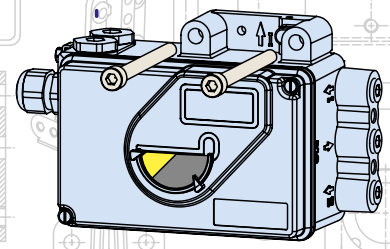
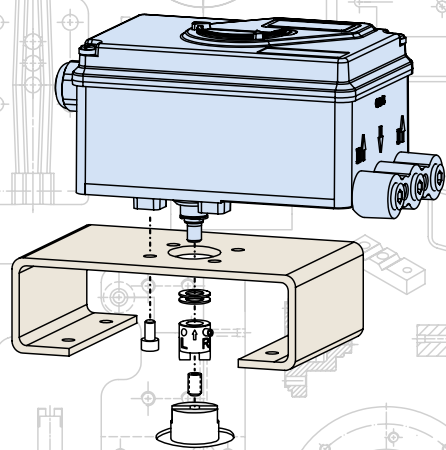
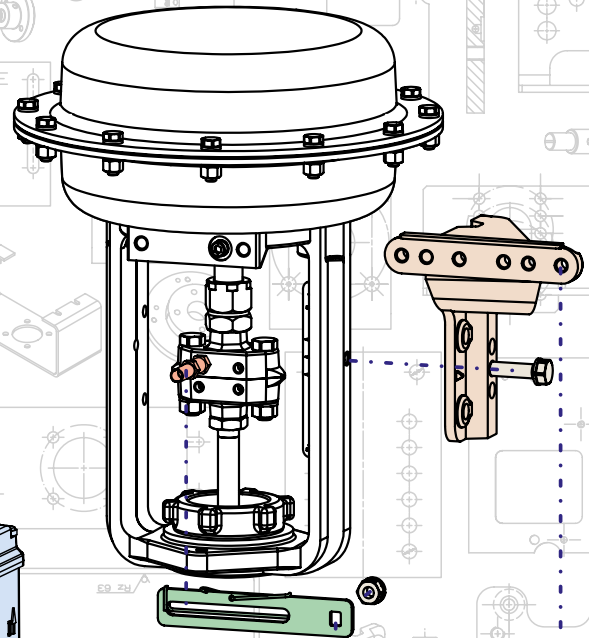
LEXG-VRx
Fail in place unit in case of lost air supply (Lock-in)
Fail in place unit in case of lost of air supply and electrical signal (Fail Freeze)
Certified Intrinsically Safe/to be used with an analog positioner

Attachment kits

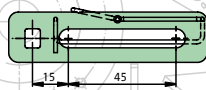
Foxboro Eckardt positioners can be mounted onto any actuator/valve thanks to a wide range of attachment kits.

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

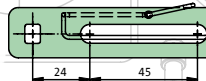
For any rotary actuator we can provide the coupling part and mounting bracket.



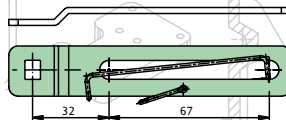
EBZG-A2
Extra short feedback lever for stroke 5 to 15 mm



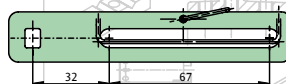
EBZG-A4
Short feedback lever for stroke 8 to 35 mm



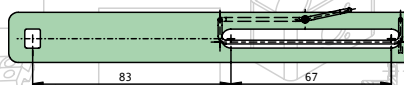
EBZG-A3
Feedback lever for stroke 8 to 70 mm



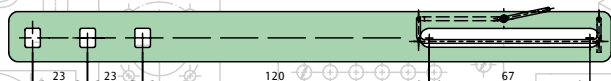
EBZG-A
Feedback lever for stroke 8 to 70 mm



EBZG-B
Long feedback lever for stroke 60 to 120 mm



EBZG-A1
Extended feedback lever for stroke 110 to 260 mm



Special versions

WirelessHART module for PST monitoring

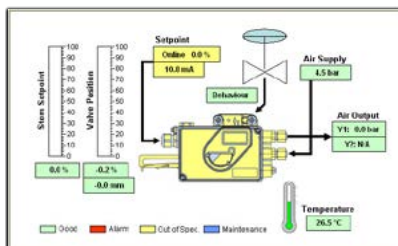


Features

- WirelessHART with Intrinsically Safe or Explosionproof Certification (ATEX and FM)
- Fastpipe function
- 24 V DC loop power - no battery

Fugitive Emission Monitoring

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 damaging leakage. The diagnostic is provided with a clear overview in the DTM.

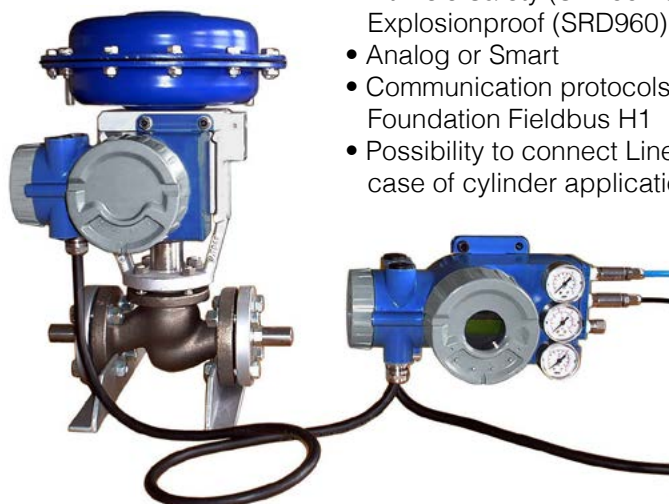


Features

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

Remote mounting

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 valve.



Features

- Intrinsic Safety (SRD991 or SRI990) or Explosionproof (SRD960)
- Analog or Smart
- Communication protocols Hart, Profibus PA or Foundation Fieldbus H1
- Possibility to connect Linear Potentiometer in case of cylinder application

Your Foxboro Eckardt representative:

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i n v e n s y s[™]

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