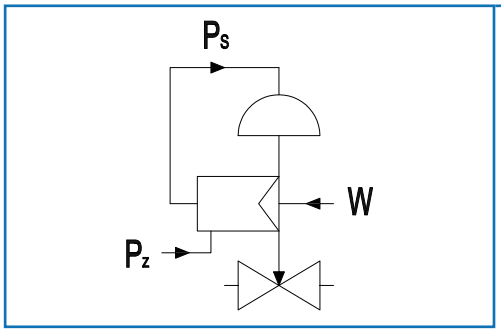
von Rohr
Armaturen AG

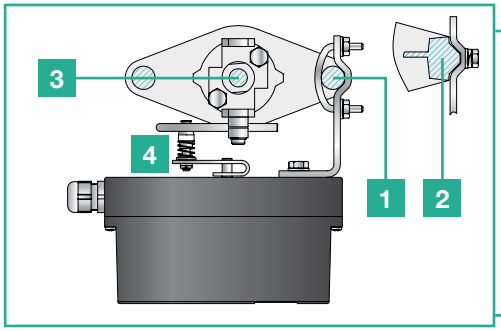
Series 827A ARCAPRO®

Positioner customized for specific control tasks



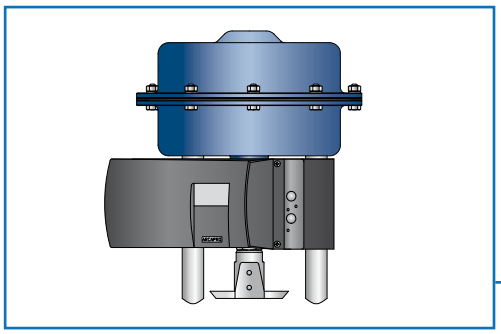
Functioning

A linear function between the input signal and stroke is the best way to ensure maximum control precision. Control valves with pneumatic actuators, however, are subject to friction, media pressure, and high flow forces, which means that this linearity is not intrinsic in the system. Only a positioner can eliminate positioning errors. To do so, it compares the input signal (reference variable w) with the actual stroke (control variable x). Depending on the control deviation (x_w), the positioner uses the intake air pressure (p_z) to yield the actuating pressure (p_s) for the actuator (actuating variable y). Either 4...20 mA or digital signals can be used as input signals.



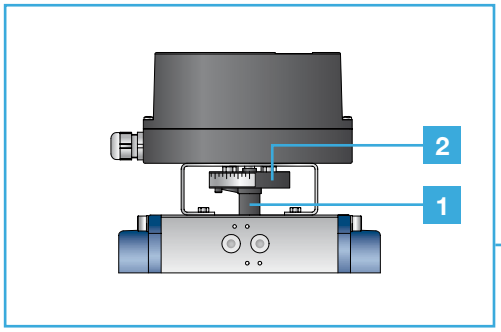
Positioner mounting to IEC 534 (NAMUR)

The standard mounting method to IEC 534 is based on manufacturer-independant mechanical interface between the pillars (1), yoke (2) and actuator spindle (3). An angle bracket is normally used to secure the positioner, while the position feedback (4) comprises a lever with a spring element. The air supply is connected to the positioner, while the pneumatic connection to the actuator is realized by means of a pipe or hose.



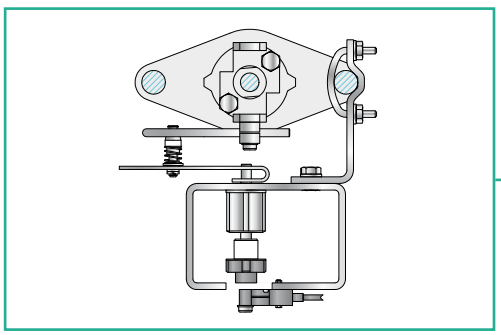
ARCAPLUG®-position feedback

The patented ARCAPLUG® position feedback (4) connects the valve stem and the stroke scanning lever. The tapered roller, which is made of wear-resistant plastic, engages the bail on the actuator coupling. The spring mechanism for the tapered roller is self-adjusting, which means that the stroke is always detected without backlash and without hysteresis. Even strong vibrations or heavy shocks do not cause any wear and tear, and the spacing tolerances of the bail are optimal equalized.



Direct, integrated mounting S100

Simpler, robust and vibration-proof is the direct integrated positioner mounting, which is attached with two screws to the actuator pillars. As with the NAMUR mounting, standardized mechanical interfaces are provided at pillars and spindle. The actuating pressure is led from the positioner through the pillars into the actuator without any additional piping. This avoids leakage. The supply air is connected directly to the positioner.



Mounting for rotary and swivel actuators according to VDI/VDE 3845

The mounting for rotary and swivel actuators is according to VDI/VDE 3845. Thereby the catch (1) is attached to the end of the shaft of the actuator and engages the coupling wheel (2) which is mounted on the positioner. The correct distance between the catch (1) and coupling (2) is achieved with the matching VDI/VDE 3845 mounting bracket.

Contactless feedback (NCS module)

If the environmental conditions at the valve such as vibration, temperature, or nuclear radiation exceed the specified values of the positioner, then a separate installation of the positioner is useful.

The intelligent design: ARCAPRO® digital positioner type 827A

Functional principle

ARCAPRO® is an intelligent, second generation positioner. It not only offers a wider range of functions and higher level of reliability, but also features an advanced online diagnostics system and optional maintenance display. The position of the stem is sent to a potentiometer whose output signal is compared with the setpoint by the microprocessor. Using a special control algorithm, the controller activates the two piezo valves, which connect the actuator to the air supply or atmosphere. The ARCAPRO® positioner can be operated locally or from the control room.

Optimized operating modes

The ARCAPRO® position features the following Modes of operation:

- Automatic or manual operation
- Initialization
- Parameterization
- Diagnostic

Modular design

The ARCAPRO® positioner is compact and modular. Additional modules increase your range of options:

- **Analog module**
  Position indicator to report the actual position as a signal 4...20 mA
- **Binary module**
  Two adjustable software limit switches, fault signal switch, binary input
- **Slot initiator module**
  Two adjustable inductive limit switches, alarm switches
- **Contact module**
  Two adjustable mechanical limit switches

Automatic commissioning

The automatic initialization function allows you to commission the positioner quickly and easily. The parameters can be set on the device or by means of HART, PROFIBUS or Foundation Fieldbus communication. The following parameters can be set:

- Setpoint direction, characteristic
- Split-range operation
- Tight closing function
- Function for position and fault signalling outputs and the binary inputs

Communication

Depending on the version, the ARCAPRO® positioner enables communication with other field devices or process control systems via:

- HART
- Profibus PA
- Foundation Fieldbus

Advanced online diagnostics according to NE 91

The advanced online diagnostics allows to evaluate the state of the entire regulating unit. The diagnostic values can be displayed on site or can be queried via the communication line. An even more precise analysis is possible by various additional functions, such as:

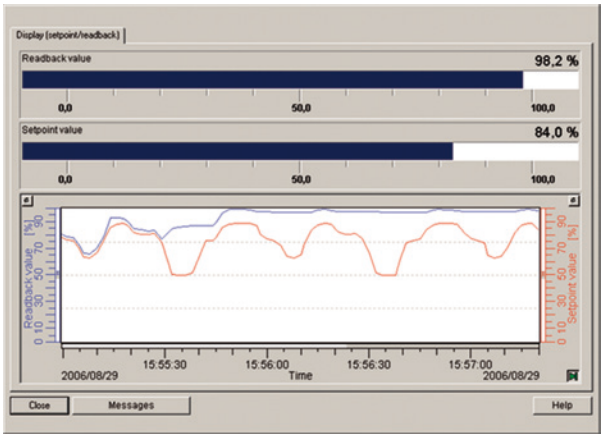
- Partial stroke test
- Leakage measurement
- Monitoring of the temperature limits
- Position value calculation

Maintenance information according to NE 107

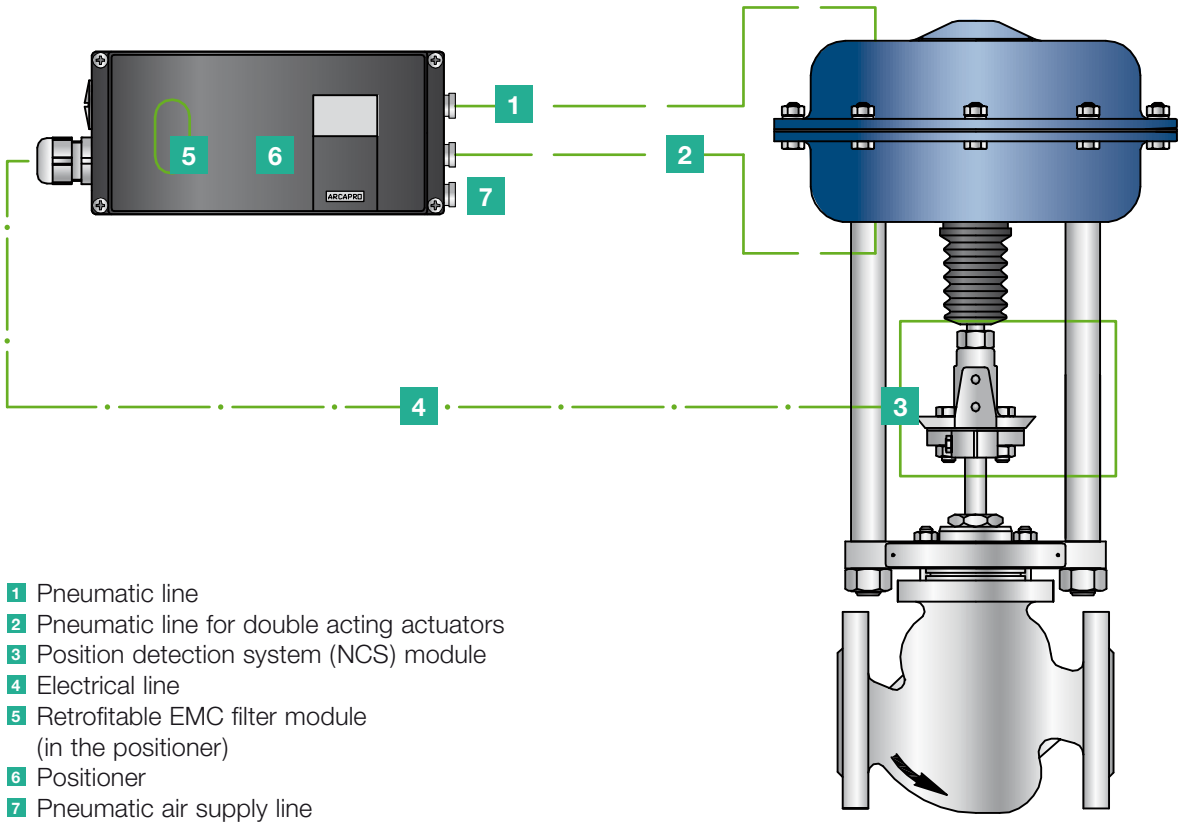
For the parameters obtained by the extended online diagnostics, the three level alarm function according to NE 107 is possible. To enable this, the relevant limit values that trigger the signals must be defined for the following statuses:

- Medium-term need for maintenance
- Urgent need for maintenance
- Failure…

The data is displayed on the device and can be sent to higher-level systems via the binary outputs or via HART or bus communication. The evaluation usually takes place in the process control system.

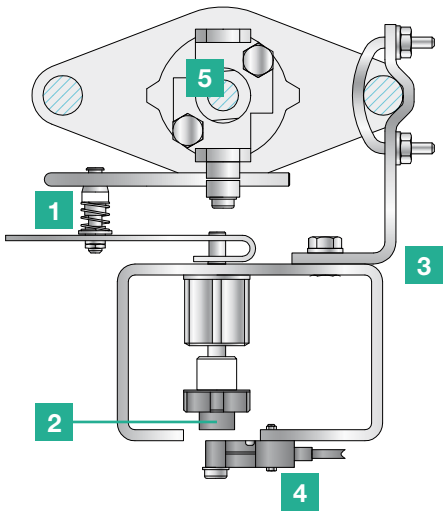


Contactless feedback (NCS) module
Functional principle



1 Pneumatic line
2 Pneumatic line for double acting actuators
3 Position detection system (NCS) module
4 Electrical line
5 Retrofitable EMC filter module (in the positioner)
6 Positioner
7 Pneumatic air supply line

NCS module with pillar mounting on linear actuators



1 Stroke feedback
2 Magnet
3 NAMUR mounting angle
4 Non Contacting sensor (NCS module)
5 Actuator stem

Contactless feedback (NCS) module

The positioner allows a separate attachment of the position sensing system. Stroke or rotation angle are recognized by a non-contact position sensor (Non Contacting Sensor) directly on the actuator. Thus, it is possible to install the control unit at a distance. The positioner is connected via an electric line to the detection system. One or two pneumatic lines connect the positioner to the actuator.

If the environmental conditions at the valve such as vibration, temperature, or nuclear radiation exceed the specified values of the positioner, then a separate installation of the positioner is useful.

The NCS consists of a cast in sensor which is to be mounted fixed, and a magnet. With linear actuators the magnet is mounted on the spindle and with rotary actuators the magnet is mounted on the end of the shaft. The sensor housing, for rotary actuators, is mounted on the console and for linear actuators on an angle mounting kit. The angle can be a NAMUR mounting angle or any other angle bracket.

By an EMC filter module the NCS is supplied with power while ensuring the electromagnetic compatibility.
An EMC filter module is possible to:

- Order already installed in the positioner
- Be installed in the positioner subsequently

Series 827A ARCAPRO®

Basic version with gauge group

Features	Advantages
Over many years proven smart digital positioner	● Long service life ● Low life cycle costs
Modular retrofittable accessories and optional modules	● Optimum adaptation to the respective application and the control system used
Integrated pipeless mounting	● Compact design ● High mechanical strength ● No sensitive piping
Patented ARCAPLUG® stroke feedback	● Self-adjusting ● No hysteresis ● Minimal wear
Minimal air consumption	● Low operating expenses
Universal communication	● Easy adaptation to existing plant communication
Enhanced online diagnostics	● All diagnostic data readable on the device or in ● Self-monitoring of the complete valve ● Precise planning of maintenance
Contactless feedback	● Can be used at high vibration, high temperature and nuclear radiation

von Rohr Armaturen AG

Series 827A ARCAPRO®

General data	
Housing material	anodized aluminum, stainless steel, polycarbonate
Temperature range	–30…+80° C (–40…+100° C with potentiometer)
Permanent control deviation	typically < 0.3%
Linearity error	typically < 0.5%
Deadband	self-adapting (typically < 0.3%) or adjustable (0.1% to 10%)

Protection classes	
	without / intrinsically safe / non sparking / explosion proof

Communication / input	
Standard / HART	2wire connector 4–20 mA, 3/4Leiter connector 0/4–20 mA
Profibus PA	Profibus PA, profile B, version 3.0
Foundation Fieldbus	H1 communication

Binary inputs	
	Switching or voltage inputs, parameterizable (e.g. “Move valve to CLOSED”)

Option modules	
Analog module	signal 4–20 mA, passive
Binary module	2 NAMUR limit switches, 1 NAMUR alarm switches, 1 binary input
Slot initiator module	2 inductive limit switches NAMUR,1 NAMUR alarm switches
Contact module	2 mechanical limit switches

Pneumatic data	
Air supply pressure	1.4–7 bar
Constant air consumption	< 36 Ndm^3/h

Mounting	
Linear actuators	integrated according to IEC 534, stroke 3–130 mm
Rotary actuators	according to VDI/VDE 3845, angle 30–100°

von Rohr Armaturen AG • Member of the ARCA FLOW Group
Fichtenhagstrasse 4 • CH-4132 Muttenz • Tel. +41 (0)61 467 91 20 • Fax +41 (0)61 467 91 21 • info@von-rohr.ch • www.von-rohr.ch