

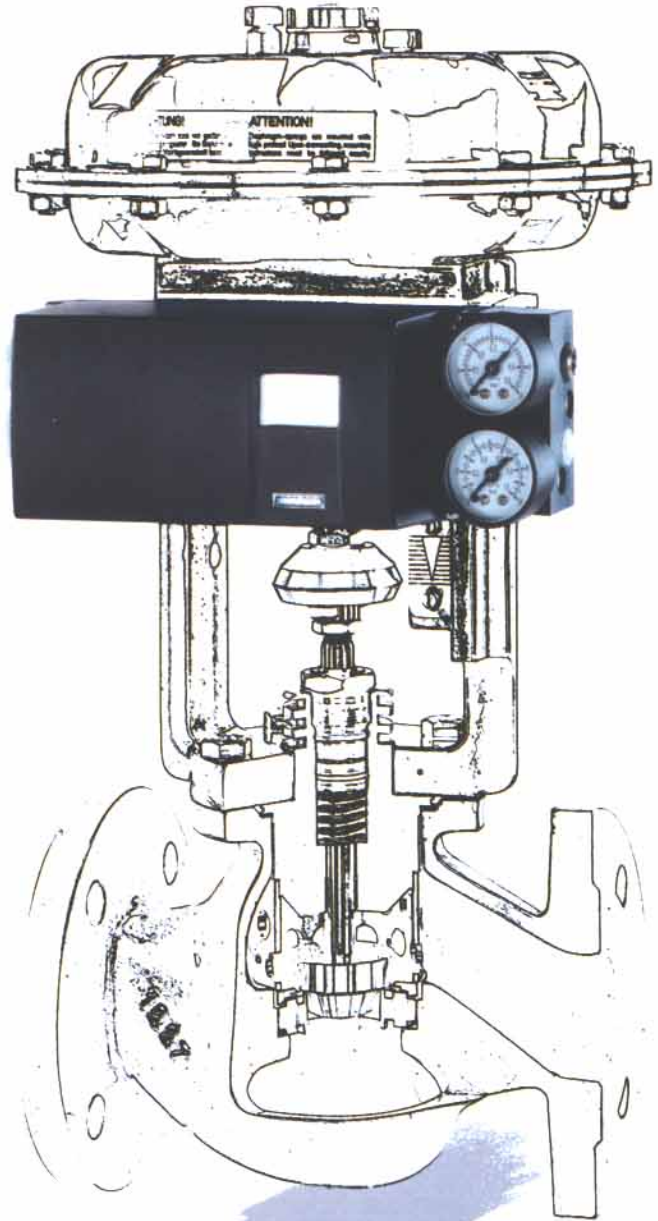
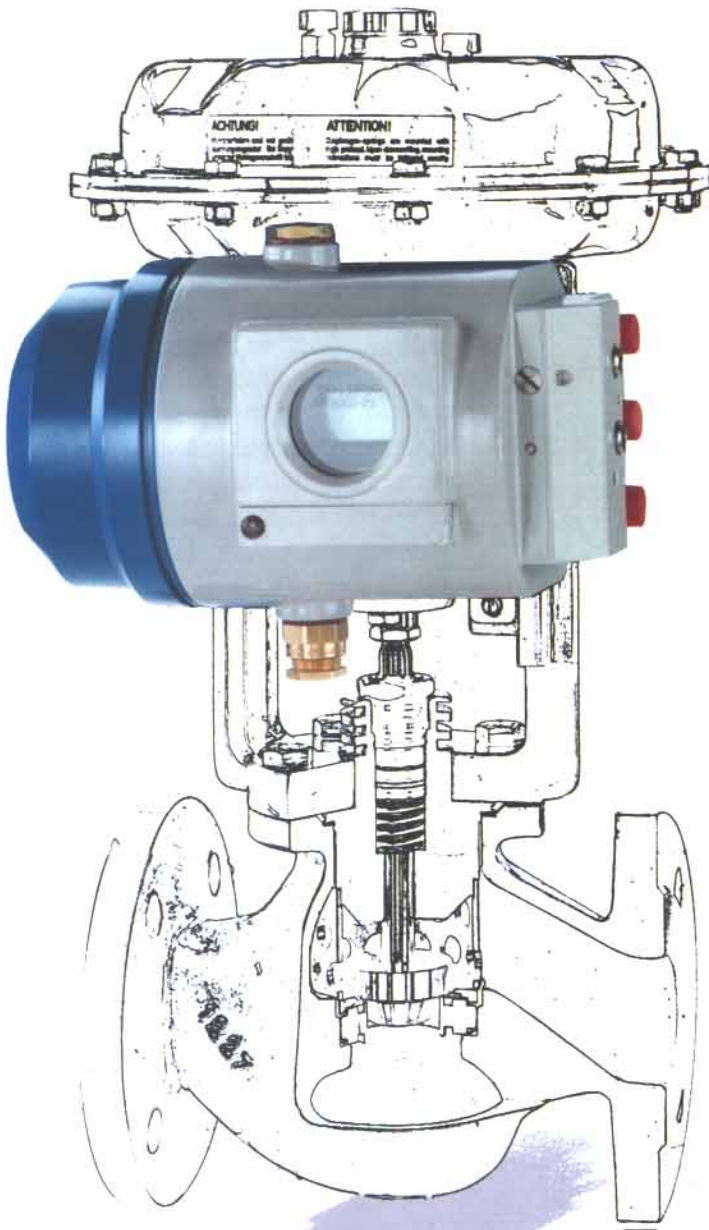
HART-protocol

PROFIBUS

Smart

ARCAPRO[®]

Typ 827A



Intelligent Positioner

Armaturen AG

von Rohr

ARCA
VALVES
*quality engineered
control valves*

DS 827A E

Positioner Type 827A

Features

The ARCAPRO Type 827A positioner is a valve positioner of the second generation which is characterised by substantially increased functions, higher reliability, and extended diagnosis. It has been designed as a compact instrument with a modern and practical design, providing for a reliable operation even under very rough ambient conditions. The display is also visible during operation, so that the operating data can be checked with a quick glance at the instrument

The ARCAPRO positioner allows the following modes of operation:

- Automatic operation
- Manual operation
- Initialisation
- Parameterisation
- Diagnosis

When the instrument cover is taken off, the parameterisation of the ARCAPRO positioner can be carried out by means of push-keys. The following values are adjustable:

- Direction of set-point
- Characteristic curve
- Split-range operation
- Limitation of output signal
- Tight shut-off function
- Function of the error report signal
- Ram function

Alternatively, the parameterisation can also be carried out via the HART interface or the PROFIBUS-connection. By using the corresponding operating software all relevant values of the control valve may be indicated, e.g. number of valve, type of actuator, mode of operation, process- and diagnostic data:

- Zero point and range
- Setting speed
- Setting increments
- Dead band
- Number of working hours
- Number of error reports
- Number of directional changes
- Stroke integral value

On the users shell the current diagnostic data can be compared online with former maintenance data. In addition it is possible to define limit values, e.g. for the stroke integral value, and in case that these values are exceeded to produce messages. Actuator problems may be discovered at an early stage, so that repairs can be planned ahead. The preventive maintenance may thus be planned more efficiently and production-stops will be reduced to a minimum.

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Device status

	Current 04.08.2001	Before 06.01.2001	Changes
Zero P0	26,6 %	31,8 %	-5,2 %
End stop P100	71,9 %	77,2 %	-5,3 %
Actuating time tup	2,9 s	3,0 s	-0,1 s
Actuating time tdown	1,6 s	1,6 s	0,0 s
	12,0 ms	10,0 ms	2,0 ms
	14,0 ms	14,0 ms	0,0 ms
	0,3 %	0,3 %	0,0 %
	-0,3 %	-0,3 %	0,0 %
	3,7 %	3,6 %	0,1 %
	-6,4 %	-6,5 %	0,1 %
	0,0 mm	30,3 mm	-30,3 mm
	0,0 %/min	0,0 %/min	0,0 %/min

as "last service" on closing
"last service" on closing

37
126 Number of strokes 36

on closing

Display positioner values

Valve position
0% 50% 100%
31,0 %
31,0 %
31,4 %
6,5 mA

Setpoint
Source 0/4...20 mA HART

Manual P Config. Binary inputs 1 2 Fault

Alarm A1 OFF — % Alarm A2 OFF — %
Limitation YA 0,0 % Limitation YE 100,0 %
System deviation xd 0,4 % Standardization MPOS

04.08.2001 14:46:31 OK, positioner is in error-free automatic mode

Archive gventz, file ...\EVENTS\PS004203.EVT

Shells for process-control and diagnostics

Design and Function

The energy supply to the positioner ARCAPRO is achieved with the analogue twin-core system by the input current I_w . In case of three- and four-core systems the auxiliary voltage E_H is used. With a Bus-connection, the instrument is supplied with a constant current by the Bus.

The position of the actuator is transmitted to the potentiometer by a shaft and a gear with sliding clutch. The gear allows the adaption to small or large positioning angles, so that strokes of 3 mm can be measured with the same accuracy as setting angles of 100° . The slide-clutch is used for the adjustment of the potentiometer when taking the instrument into operation.

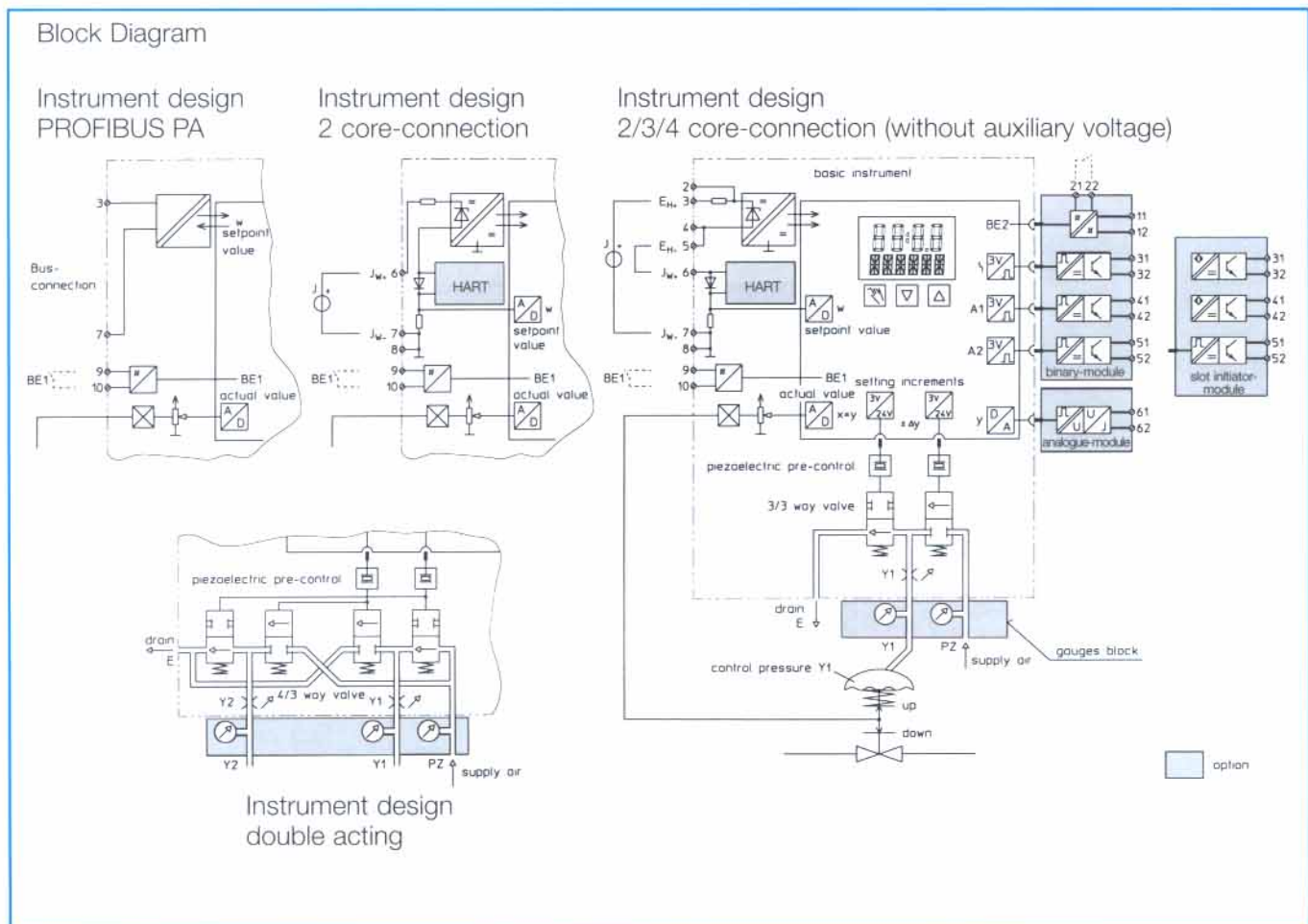
The main part of the positioner ARCAPRO is the electronic board with the microprocessor and the indicating and operating elements. Here the analogue or - in case of a Bus connection - the digital setpoint signal X_S is compared with the current value signal of the potentiometer. Based on a special control algorithm the controller forms signals which actuate the two piezo elements and thus create the pneumatic positioning signal. Restrictor-valves allow the adaption to the volume of the actuator.

The LCD display indicates the operating conditions and the adjusted parameters or - in case of automatic operation - the current stroke or angular value with 4 digits. Through the screen

window the display is constantly visible also in the automatic operating mode.

The positioner ARCAPRO has a modular design. The optional components can be installed in a simple plug-in mode, after taking off the components-cover.

The optional analogue, binary or slot initiator modules are used for the transmission of the hardware-conforming 4-20 mA signal of the actuator position, or of two position switches, to the control system. Alternatively, the position signal can also be sent via HART or PROFIBUS. The fault-signal output allows the additional control of the valve, giving a signal in case of power failure or a deviation from the setpoint value.

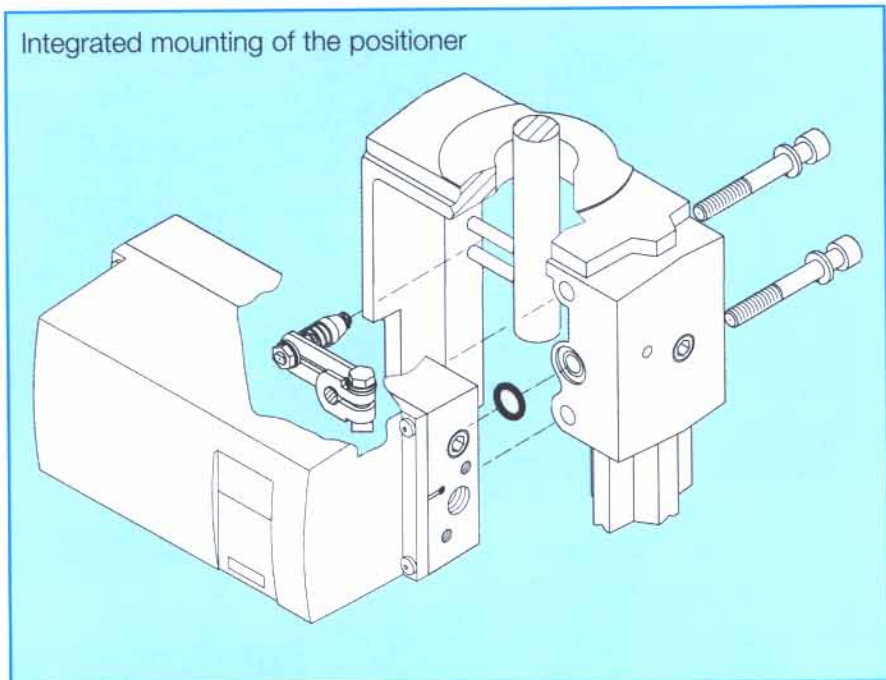
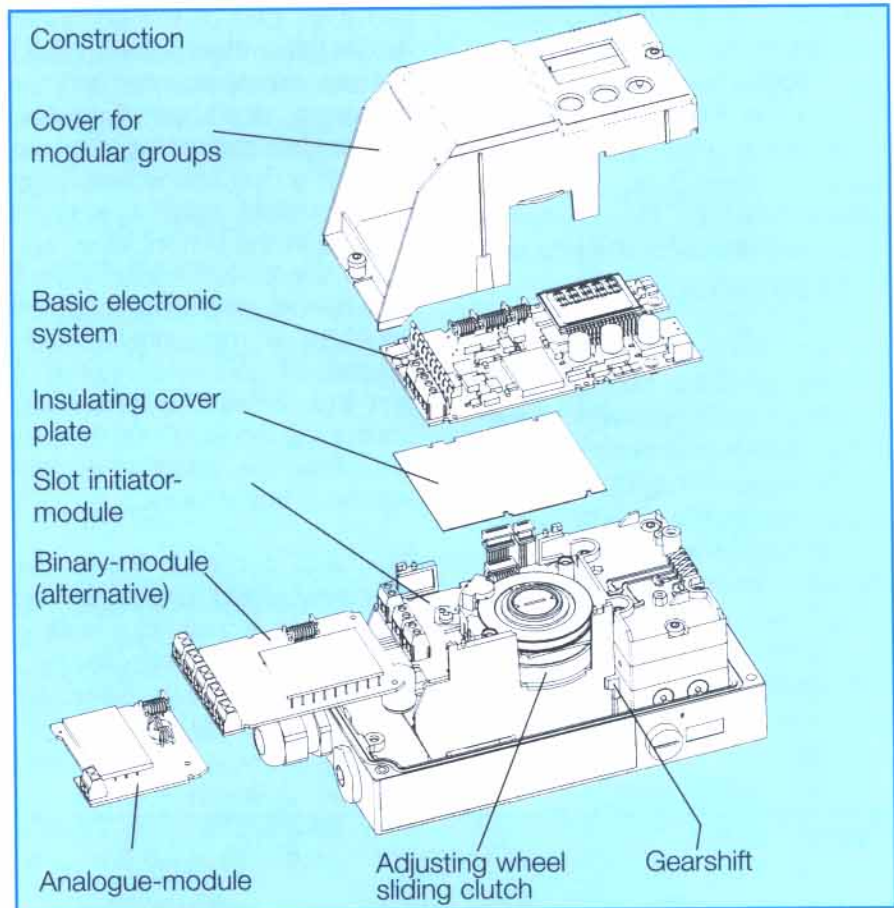


Design and Function

With the binary input signals BE1 and BE2 it is possible to realise certain additional functions, e.g. the movement into an end position or the locking of the valve position, independently from the setpoint. A logical link of these input signals with the fault signal output is also possible, so that an error signal can be sent if a pressure sensor for stuffing-box leakages is installed.

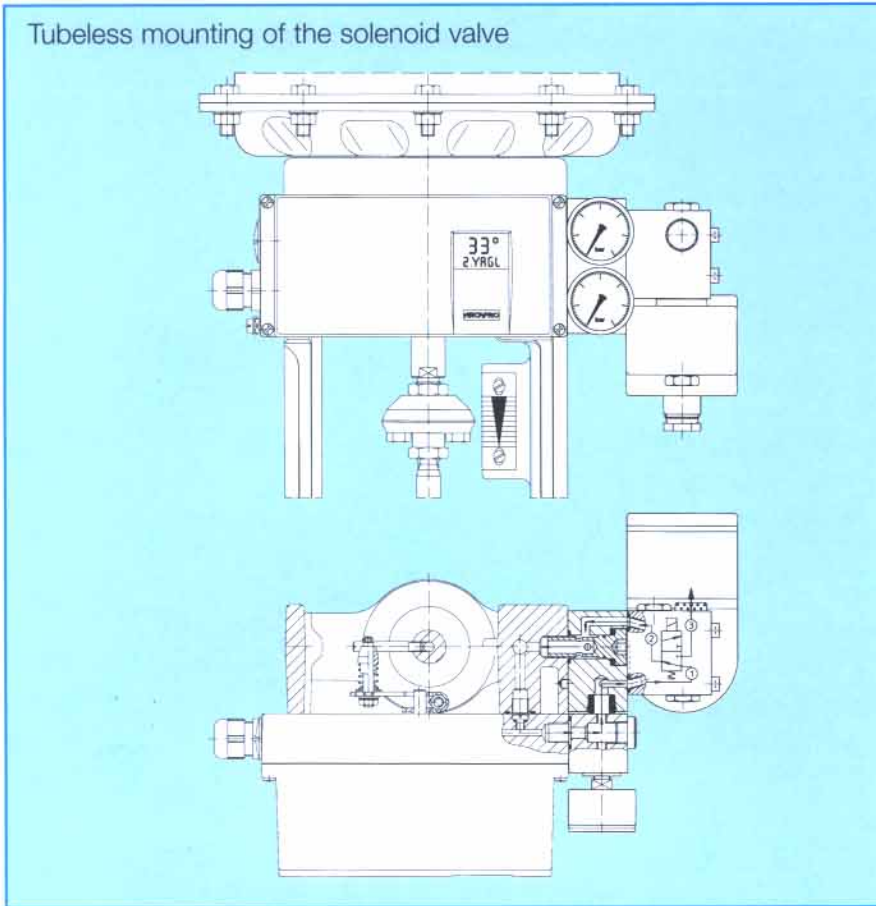
The mechanical construction of the ARCAPRO positioner has been designed to meet the rough conditions in industrial plants. The robust metal casing is made of seawater-resistant and surface-treated cast aluminium and guarantees for a maximum service life even under impact and shock conditions or in a corrosive atmosphere. The mounting parts and connecting elements are made of stainless steel or provided with a passivated surface, so that the function as well as the outer appearance are maintained for a long time, even under unfavourable ambient conditions.

With a few flicks of the wrist the positioner can be mounted to the actuator types 812 or 813 in a simple plug-in mode, by which the connections for air supply and reset are realised without any additional parts. This solid and vibration-free mounting with a short lever immediately at the yoke, together with the high accuracy of the positioner, guarantee for the best control quality. The stroke-tapping elements are securely mounted inside the yoke which not only provides for a reliable function but also conforms to the rules for the prevention of accidents.



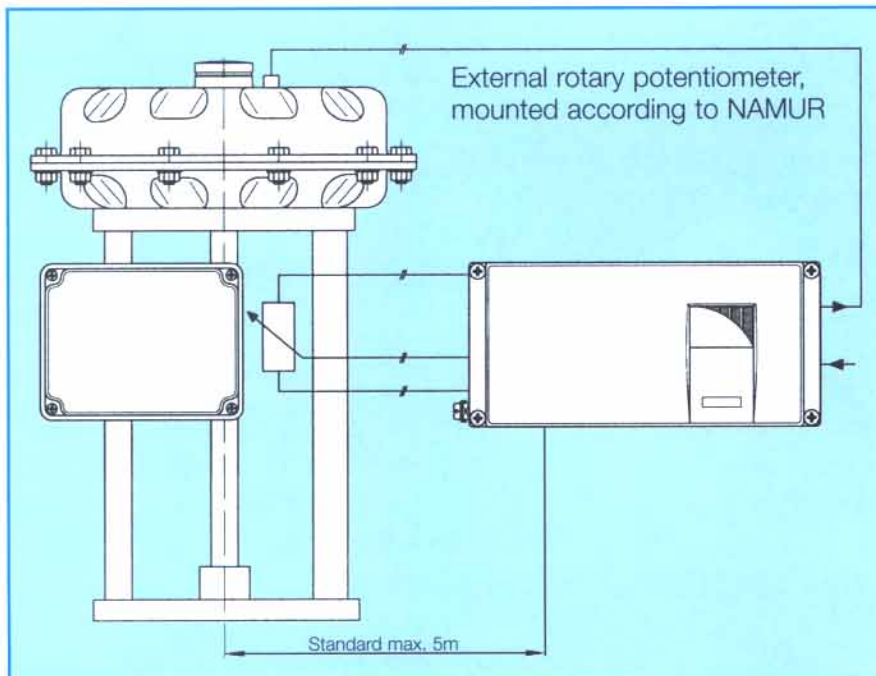
Design and Function

Tubeless mounting of the solenoid valve



For plants with increased safety requirements additional security circuits can be installed by the integrated mounting of a solenoid valve between positioner-output and actuator-input. The output signal y of the positioner is thereby led through the gauges block into the solenoid valves block, which has an enlarged NAMUR connecting face for a 2/3-way solenoid valve. If the solenoid valve is actuated by a safety signal, the positioning signal is switched to the actuator through the channels ① and ②, through solenoid valves block and yoke. If there is no safety signal, the actuator is deaerated through channels ② and ③ and the valve moves into its safe end position, independently of the control signal of the positioner. This design has the essential advantage that there is no piping required between positioner and solenoid valve. This allows the fast and easy exchange of positioner and solenoid valve, and a large mounting volume is avoided.

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In cases where environmental conditions do not allow mounting of positioner directly to actuator (lack of space, too high temperatures, too high vibrations), the positioner is provided with a connection for a external potentiometer. Instead of the integrated rotary potentiometer a circuit plate is integrated so that the positioner can be installed in some distance from the actuator. The external potentiometer can be mounted to any actuator in the same way as positioner mounting itself.

Technical Data

	827A.E	827A.D	827A.X
All Units			
Controller data			
Repetitive control deviation	typical < 0,3 %		
Linearity deviation	typical < 0,5 %		
Dead band	self-adapting (typical 0,3 %) or adjustable fixed value (0,1 % to 10 %)		
Units without Profibus			
Input signal	2-core connection: 4 - 20 mA, 3/4 -core connection: 0 to 20 mA		
Load voltage 2-core connection 2-core connection with HART 3/4-core connection	≥ 6,4 V (320 Ω) ≥ 6,5 V (325 Ω) ≥ 1 V (50 Ω)		≥ 8,0 V (400 Ω) ≥ 8,8 V (440 Ω) ≥ 1 V (50 Ω)
Connection to intrinsical safe circuits with	-		$U_0 \leq 30 \text{ V}$, $I_K \leq 100 \text{ mA}$, $P \leq 1 \text{ W}$
Auxiliary voltage 3/4-core connection	18 - 35 V		18 - 30 V
Units with Profibus			
Bus-voltage	9 - 32 V		9 - 24 V
Current consumption	≤ 10 mA		
Supply unit	$U_s = 24 \text{ V}$, $I_s = 128 \text{ mA}$		
De-coupling	galvanically insulated		
Connection	-		intrinsical safe circuit
Unit profile	PROFIBUS PA, profile B, Version 3.0		
All Units			
Binary inputs			
Binary input BE1	terminal clamps 9/10: $I \leq 5 \mu\text{A}$, $U \leq 3 \text{ V}$, galvanically not insulated		
Binary input BE2	terminal clamps 11/12: „0“ at $U \leq 4,5 \text{ V}$, „1“ at $U \geq 13 \text{ V}$, $R_i \geq 25 \text{ k}\Omega$, galvanically insulated		connection to intrinsical safe voltage supply with $U_i \leq 30 \text{ V}$
	terminal clamps 21/22: $I \leq 5 \mu\text{A}$, $U \leq 3 \text{ V}$, $R_i \geq 25 \text{ k}\Omega$, galvanically not insulated		
Binary outputs			
Binary-module	„0“: $I < 60 \mu\text{A}$, „1“ : $R = 1 \text{ k}\Omega$ inherent galvanic insulation		for the connection to intrinsically safe switch amplifiers DIN 19234, inherent galvanic insulation
Slot initiator-module	Slot initiator-outputs for the connection to intrinsically safe switch amplifiers DIN 19234, inherent galvanic insulation trouble-output as binary-module		

Technical Data

	827A.E	827A.D	827A.X
Analogue output	4 - 20 mA, 2 core connection, galvanically insulated		
Auxiliary voltage	12 - 35 V		12 - 30 V
Connection to intrinsical safe circuits with	-		$U_0 \leq 30 \text{ V}$, $I_K \leq 100 \text{ mA}$, $P \leq 1 \text{ W}$
Pneumatic energy supply			
Supply air pressure	1,4 - 7 bar		
Air quality	instrument-air according to DIN ISO 8573-1 class 2		
Standby air consumption	< 36 dm ³ /h i.N.		
Ambient conditions			
Temperature during operation	-30 to + 80 °C	T4 -30 to +80°C T5 -30 to +65°C T6 -30 to +50°C	T4 -30 to +80°C T5 -30 to +65°C ¹⁾ T6 -30 to +50°C ¹⁾
Temperature for transport and storage	-40 to +80°C		
Mounting position	any position, in wet environment with exhaust air port and shaft pointing upwards		
Type of protection	-	II2G EEx d IIC T4/T5/T6	II2G EEx ia/ib IIC T4/T5/T6 ²⁾
Protection class	IP 65		
Vibration resistance	10 g (to 100 Hz)		
CE-sign	conformity according to EMV-Rule 89/336 EWG, corresponding to the following standards: interference emission: EN 50081-1 interference resistance: EN 50082-2		
Weight			
Metal casing ³⁾	approx. 1,3 kg	approx. 4 kg	approx. 1,3 kg
Plastic casing	approx. 0,9 kg	-	approx. 0,9 kg
Connections			
Electric	screwed terminals 2,5 AWG28-12, cable union size M 20 x 1,5 ⁴⁾		
Pneumatic	pipe thread G 1/4 ⁵⁾		
Mounting			
Stroke actuators	integrated or according to IEC 534, stroke range 3 - 130 mm		
Rotating actuators	according to VDI/VDE 3845, rotating angle: 30 - 100 °		

¹⁾ Without analogue-module

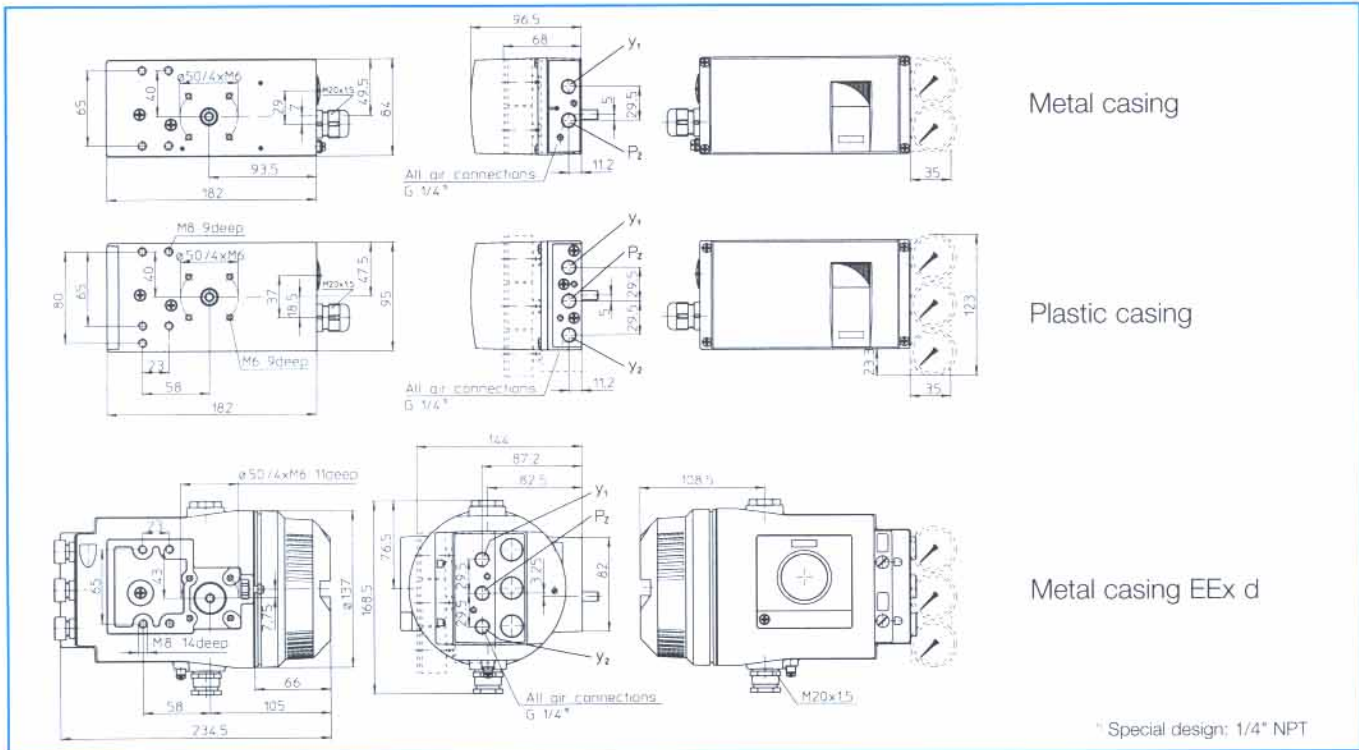
²⁾ With analogue-module II2G EEx ia/ib IIC T4

³⁾ Aluminium, special design stainless steel

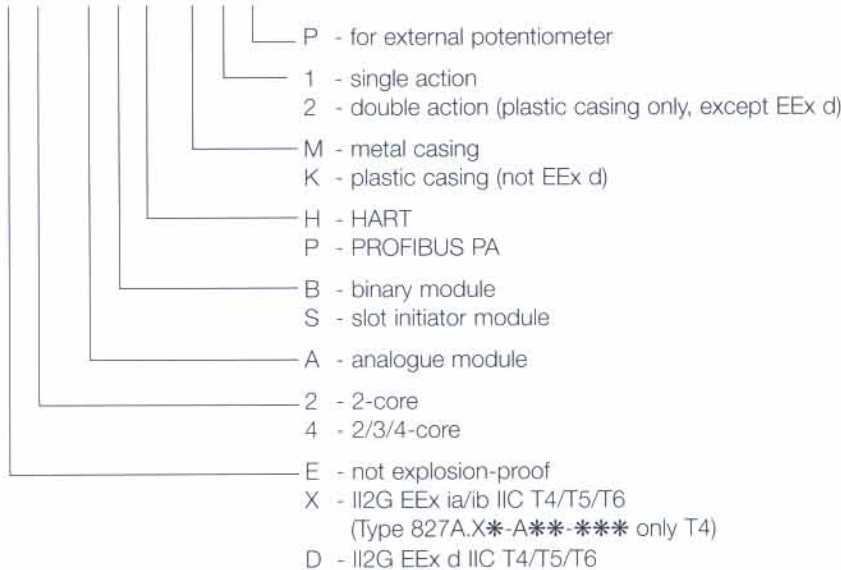
⁴⁾ Special design: 1/2" NPT

⁵⁾ Special design: 1/4" NPT

Dimensions and Type Code



Type 827A. * * - * * * - * * *



Accessorie

- Mounting kit for integrated mounting to ARCA stroke actuators Type 812
- Mounting kit for integrated mounting to ARCA stroke actuators Type 813
- Mounting kit for mounting to stroke actuators according to IEC 534 (NAMUR)
- Mounting kit for integrated mounting to ARCA rotating actuators Type 840
- Mounting kit for mounting to rotating actuators according to VDI/VDE 3845
- Mounting kit for integrated mounting to Samson actuators Type 3277
- External linear potentiometer with mounting kit for mounting according to IEC 534 (NAMUR), for valve strokes 3 - 8 mm / 8 - 20 mm / 20 - 45 mm
- External rotary potentiometer
- Gauges block for single- and double action
- Mounting kit for the tubeless, integrated mounting of solenoid valves to ARCA- and Samson- stroke actuators
- Mounting kit for the tubeless, mounting of solenoid valves to stroke actuators according to IEC 534 (NAMUR)