

Technical Data Sheet

ARCAPRO® Positioner Type 827A



TD_827A

General data

Mounting	On linear actuators	ARCA-integrated or to VDI/VDE 3847-1 or IEC 534-6 (NAMUR) Range of stroke: 3 ... 130 mm
	On quarter turn actuators	Integrated to VDI/VDE 3847-2 or VDI/VDE 3845 Angle of rotation: 30 ... 100°
Enclosure material	Metal	Aluminium cast AISi 12 or austenitic stainless steel 1.4581
	Plastic	Glass-fibre-reinforced polycarbonate
Degree of protection		IP 66 to EN 60529
Installation position		Any installation position possible; pneumatic connections and exhaust opening must not point upwards for wet applications
Climate class	Operation	4K3, but -30 ... +80 °C (see electrical data for explosion-protected devices)
	Storage	1K5, but -40 ... +80 °C
	Transport	2K4, but -40 ... +80 °C
Vibration resistance		98 m/s ² , 27 ... 300 Hz Recommended continuous range for complete fitting ≤ 30 m/s ²
Classification according PED97/23/EC		For fluid group 1 gases; fulfils requirements in article 3, paragraph 3 (good engineering practice)
CE marking		Applicable directives and standards see declaration of conformity
Controller unit	Five-point switch	Adaptive
	Dead zone	Adaptive or fixed from 0.1 ... 10 %
	Actuating times	≥1.5 s adjustable
A/D converter	Resolution	≤ 0.5 %
	Sampling time	10 ms
Cycle time	With/without HART communication	20 ms
	With PROFIBUS PA communication	60 ms
	With Fieldbus Foundation communication	60 ms
Dimensions		See dimension drawings 1 to 4
Weight	Metal enclosure, aluminium	Approx. 1.3 kg
	Metal enclosure, stainless steel	Approx. 3.9 kg
	Metal enclosure, flame-proof	Approx. 5.2 kg
	Plastic enclosure	Approx. 0.9 kg
Connections	Electric	Screw terminals 2.5 AWG28-12; cable inlet see order key
	Pneumatic	G 1/4 DIN 45141 or 1/4-18NPT, see order key

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Pneumatic data

Inlet air pressure		1.4 ... 7 bar
Air quality	Solids	ISO 8573-1 Class 2 (particle size ≤ 1 µm, particle density ≤ 1 mg/Nm ³)
	Dew point	ISO 8573-1 Class 2 (-40 °C, min. 20 K below ambient temperature)
	Oil content	ISO 8573-1 Class 2 (≤ 0.1 mg/Nm ³)
Air consumption		< 36 Ndm ³ /h during stationary operation
Flow rate (unthrottled)	Air supply valve at Δp	2 bar - 4.1 Nm ³ /h, 4 bar - 7.1 Nm ³ /h, 6 bar - 9.8 Nm ³ /h
	Air exhaust valve at Δp	2 bar - 8.2 Nm ³ /h, 4 bar - 13.7 Nm ³ /h, 6 bar - 19.2 Nm ³ /h
Valve leakage		< 0.6 Ndm ³ /h
Throttle ratio		Up to ∞ : 1 adjustable

Electrical data for basic device

Explosion protection	Intrinsic safety "ia"	II 2 G Ex ia IIC T6/T4 Gb ¹⁾ , Zone 1
	Intrinsic safety "ic"	II 3 G Ex ic IIC T6/T4 Gc ¹⁾ , Zone 2
	Energy-limited "nL"	II 3 G Ex nL IIC T6/T4 Gc ¹⁾ , Zone 2
	Non-sparking, energy-limited "nA nL"	II 3 G Ex nA nL IIC T6/T4 Gc ¹⁾ , Zone 2
	Dust, protection by enclosure "tD"	II 3 D Ex tD A22 IP66 T100 Dc, Zone 22
	Flameproof "d"	II 2 G EEx d IIC T4...T6, Zone 1
Permissible ambient temperature	"ia", "ic", "nL", "nA nL", "tD" with / without HART	T4 / T6 - 30 ... + 80 °C / - 30 ... + 50 °C
	"ia" with PROFIBUS PA and Found.Fieldbus	T4 / T6 - 30 ... + 80 °C / - 30 ... + 50 °C
	"ic", "nL", "nA nL", "tD" with PROFIBUS PA and Found.Fieldbus	T4 / T6 - 20 ... + 75 °C / - 20 ... + 50 °C
	"d"	T4 / T5 / T6 - 30 ... + 80 °C / - 30 ... + 65 °C / - 30 ... + 50 °C

¹⁾ With analog module T4 only

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Electrical data for basic device with/without HART 2 wire connection

Explosion protection	without	„ia“	„ic“, „nL“, nA nL“, „tD“	„d“
Electrical connection	See Figures 5 and 6	See Figures 5 and 6	See Figures 5 and 6	See Figures 5 and 6
Input signal I_W	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA
Current to maintain the power supply	≥ 3.6 mA	≥ 3.6 mA	≥ 3.6 mA	≥ 3.6 mA
Required load voltage without HART 2 wire device	6.5 V	8.3 V	8.3 V	6.5 V
Required load voltage without HART 2/3/4 wire device	8.4 V	8.3 V	8.3 V	6.5 V
Required load voltage with HART 2 wire device	6.7 V	-	-	6.7 V
Required load voltage with HART 2/3/4 wire device	-	8.8 V	8.8 V	8.8 V
Static destruction limit	± 40 mA	-	-	± 40 mA
Internal capacitance	-	22 nF without HART 7 nF with HART	“ic“, “nL” 22 nF without HART 7 nF with HART	-
Internal inductance	-	0.12 mH without HART 0.24 mF with HART	“ic“, “nL” 0.12 mH without HART 0.24 mF with HART	-
For connection to circuits with the following peak values	-	$U_i = DC 30$ V $I_i = 100$ mA $P_i = 1$ W	„ic“, „nL“ $U_i = DC 30$ V $I_i = 100$ mA „nA nL“, „tD“ $U_n \leq DC 30$ V $I_i \leq 100$ mA	-
Binary input BE1	Suitable for dry contact, max. contact load ≤ 5 μ A at 3 V			
Electrical isolation	I_W and BE1 electrically connected	I_W and BE1 electrically connected	I_W and BE1 electrically connected	I_W and BE1 electrically connected

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Electrical data for basic device with / without HART 3/4 wire connection

Explosion protection	without	„ia“	„ic“, „nL“, nA nL“, „tD“	„d“
Electrical connection	See Figure 7	See Figure 7	See Figure 7	See Figure 7
Input signal I_W	0/4 ... 20 mA	0/4 ... 20 mA	0/4 ... 20 mA	0/4 ... 20 mA
Required load voltage	0.2 V	1.0 V	1.0 V	0.2 V
Power supply U_H	DC 18 ... 35 V	DC 18 ... 30 V	DC 18 .. 30 V	DC 18 ... 35 V
Internal capacitance	-	22 nF	„ic“, „nL“ 22 nF	-
Internal inductance	-	0.12 mH	„ic“, „nL“ 0.12 mH	-
For connection to circuits with the following peak values	-	$U_i = DC 30 V$ $I_i = 100 mA$ $P_i = 1 W$	„ic“, „nL“ $U_i = DC 30 V$ $I_i = 100 mA$ „nA nL“, „tD“ $U_n \leq DC 30 V$ $I_i \leq 100 mA$	-
Binary input BE1	Suitable for dry contact, max. contact load $\leq 5 \mu A$ at 3 V			
Electrical isolation	U_H and I_W electrically isolated, I_W and BE1 electrically connected	U_H and I_W electrically isolated (intrinsically safe circuits), I_W and BE1 electrically connected	U_H and I_W electrically isolated, I_W and BE1 electrically connected	U_H and I_W electrically isolated, I_W and BE1 electrically connected

Electrical data for basic device PROFIBUS PA

Electrical connection	See Figure 8
Communication	Layers 1 + 2 to PROFIBUS PA, transmission technique to IEC 1158-2, slave function layer 7 to PROFIBUS DP to EN 50170 with extended PROFIBUS functionality
Device profile	PROFIBUS PA profile B, version 3.0, over 150 objects
Response time for a master telegram	typically 10 ms
Device address	126 in the as-delivered condition

Electrical data for basic device Foundation Fieldbus

Electrical connection	See Figure 9
Communication	H1 communication to specification of the Fieldbus Foundation, group 3, class 31 PS (Publisher/Subscriber) 1 resource block (RB2), 1 analog output function block (AO), 1 PID function block (PID), 1 transducer block (standard advanced positioner valve)
Physical layer profile	123, 511
Block execution times	Analog output function block 60 ms; PID function block 80 ms

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Electrical data for basic device PROFIBUS PA / Foundation Fieldbus

Explosion protection	without	„ia“	„ic“, „nL“, „nA nL“, „tD“	„d“
Power supply	Bus-powered	Bus-powered	Bus-powered	Bus-powered
Bus voltage	DC 9 ... 32 V	DC 9 ... 24 V	DC 9 ... 32 V	DC 9 ... 32 V
Current consumption	10.5 mA ± 10 %	10.5 mA ± 10 %	10.5 mA ± 10 %	10.5 mA ± 10 %
Fault current	0	0	0	0
Internal capacitance	-	Negligible small	Negligible small	-
Internal inductance	-	8 µH	„ic“, „nL“ 8 µH	-
For connection to circuits with the following peak values				-
Bus connection with FISCO supply unit	-	U _i = DC 17.5 V I _i = 380 mA P _i = 5.32 W	„ic“, „nL“ U _i = DC 17.5 V I _i = 570 mA „nA nL“, „tD“ U _n ≤ DC 32 V	-
Bus connection with barrier	-	U _i = DC 24 V I _i = 250 mA P _i = 1,2 W	„ic“, „nL“ U _i = DC 32 V „nA nL“, „tD“ U _n ≤ DC 32 V	-
Safety shutdown				
Input resistance	> 20 kΩ	> 20 kΩ	> 20 kΩ	> 20 kΩ
Signal status 0: active	DC 0 ... 4.5 V	DC 0 ... 4.5 V	DC 0 ... 4.5 V	DC 0 ... 4.5 V
Signal status 1: inactive	DC 13 ... 30 V	DC 13 ... 30 V	DC 13 ... 30 V	DC 13 ... 30 V
Internal capacitance	-	Negligible small	Negligible small	-
Internal inductance	-	Negligible small	Negligible small	-
For connection to circuits with the following peak values	-	U _i = DC 30 V I _i = 100 mA P _i = 1 W	„ic“, „nL“ U _i = DC 30 V I _i = 100 mA „nA nL“, „tD“ U _n ≤ DC 30 V I _n ≤ 100 mA	-
Binary input BE1	Suitable for dry contact, max. contact load ≤ 5 µA at 3 V			
Electrical isolation	Bus connection and safety shutdown electrically isolated, Bus connection and BE1 electrically connected	Bus connection and safety shutdown electrically isolated (intrinsically safe circuits), Bus connection and BE1 electrically connected	Bus connection and safety shutdown electrically isolated, Bus connection and BE1 electrically connected	Bus connection and safety shutdown electrically isolated, Bus connection and BE1 electrically connected

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Electrical data for option modules – analog module

Explosion protection	without	„ia“	„ic“, „nL“, nA nL“, „tD“
Electrical connection	See Figure 10	See Figure 10	See Figure 10
Nominal signal range	4...20 mA, short circuit resistant	4...20 mA, short circuit resistant	4...20 mA, short circuit resistant
Dynamic range	3.6...20.5 mA	3.6...20.5 mA	3.6...20.5 mA
Auxiliary voltage U _H	+12...+35 V	+12...+30 V	+12...+30 V
External load R _B [kΩ]	(U _H [V] – 12)/I [mA]	(U _H [V] – 12)/I [mA]	(U _H [V] – 12)/I [mA]
Internal capacitance	-	11 nF	11 nF
Internal inductance	-	Negligible small	Negligible small
For connection to circuits with the following peak values	-	U _i = DC 30 V I _i = 100 mA P _i = 1 W	„ic“, „nL“ U _i = DC 30 V I _i = 100 mA „nA nL“, „tD“ U _n ≤ DC 30 V I _n ≤ 100 mA P _n ≤ 1 W
Electrical isolation	Disconnected from basic device	Disconnected from basic device (intrinsically safe circuits)	Disconnected from basic device

Electrical data for option modules – binary module

Explosion protection	without, „d“	„ia“	„ic“, „nL“, nA nL“, „tD“
Electrical connection	See Figure 11	See Figure 11	See Figure 11
Binary outputs A1, A2, fault			
Signal status “High” (not responded)	Conductive, R = 1 kΩ ¹⁾	≥ 2.1 mA ²⁾	≥ 2.1 mA ²⁾
Signal status “Low” (responded)	Blocked, I _R < 60 μA	≤ 1.2 mA ²⁾	≤ 1.2 mA ²⁾
Internal capacitance	-	5.2 nF	5.2 nF
Internal inductance	-	Negligible small	Negligible small
For connection to circuits with the following peak values	-	U _i = DC 15,5 V I _i = 25 mA P _i = 64 mW	„ic“, „nL“ U _i = DC 15,5 V „nA nL“, „tD“ U _n ≤ DC 15,5 V
Binary input BE2 Terminals 11/12			-
Auxiliary voltage U _H	≤ DC 35 V ≤ 20 mA	-	-
Signal status 0:	≤ DC 4.5 V or open	≤ DC 4.5 V or open	≤ DC 4.5 V or open
Signal status 1:	≥ DC 13 V	≥ DC 13 V	≥ DC 13 V
Input resistance	> 25 kΩ	> 25 kΩ	> 25 kΩ
Static destruction limit	± 35 V	-	-

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Electrical data for option modules – binary module (continuation)

Explosion protection	without, „d“	„ia“	„ic“, „nL“, nA nL“, „tD“
Binary input BE2 Terminals 11/12			-
Internal capacitance	-	Negligible small	Negligible small
Internal inductance	-	Negligible small	Negligible small
For connection to circuits with the following peak values	-	$U_i = DC\ 25,2\ V$	„ic“, „nL“ $U_i = DC\ 25,2\ V$ „nA nL“, „tD“ $U_n \leq DC\ 25,2\ V$
Binary input BE2 Terminals 21/22			
Signal state 0:	Dry contact, open	Dry contact, open	Dry contact, open
Signal state 1:	Dry contact, closed	Dry contact, closed	Dry contact, closed
Contact load	3 V, 5 μA	3 V, 5 μA	3 V, 5 μA
Electrical isolation	Binary outputs A1, A2, fault, binary input BE2 terminals 11/12 disconnected from basic device; binary input BE2 terminals 21/22 connected to basic device	Binary outputs A1, A2, fault, binary input BE2 terminals 11/12 disconnected from basic device (intrinsically safe circuits); binary input BE2 terminals 21/22 connected to basic device	Binary outputs A1, A2, fault, binary input BE2 terminals 11/12 disconnected from basic device; binary input BE2 terminals 21/22 connected to basic device

¹⁾ – Current must be restricted to 10 mA per output if operated in flame-proof housing.

²⁾ – Switching thresholds for supply to EN 60947-5-6: $U_H = 8.2\ V$, $R_i = 1\ k\Omega$

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Electrical data for option modules – slot initiator module

Explosion protection	without	„ia“	„ic“, „nL“, nA nL“, „tD“
Electrical connection	See Figure 12	See Figure 12	See Figure 12
Binary outputs A1, A2	Slotted initiators SJ2-SN to EN 60947-5-6 (NAMUR) for connecting to switching amplifier, NC (normally closed) function		
Signal state “High” (not responded)	$\geq 3 \text{ mA}$ at $U_{nom} = 8 \text{ V}$	$\geq 2.1 \text{ mA}^1)$	$\geq 2.1 \text{ mA}^1)$
Signal state “Low” (responded)	$\leq 1 \text{ mA}$ at $U_{nom} = 8 \text{ V}$	$\leq 1.2 \text{ mA}^1)$	$\leq 1.2 \text{ mA}^1)$
Internal capacitance	-	41 nF	41 nF
Internal inductance	-	100 mH	100 mH
For connection to circuits with the following peak values	$U_{nom} = 8 \text{ V}$	$U_i = \text{DC } 15,5 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$	„ic“, „nL“ „nA nL“, „tD“ $U_i = \text{DC } 15,5 \text{ V}$ $I_i = 25 \text{ mA}$ $U_n \leq \text{DC } 15,5 \text{ V}$ $P_n \leq 64 \text{ mW}$
Binary output fault	Connection to switching amplifier to EN 60947-5-6 (NAMUR)		
Signal status “High” (not responded)	$R = 1,1 \text{ k}\Omega$	$\geq 2.1 \text{ mA}^1)$	$\geq 2.1 \text{ mA}^1)$
Signal status “Low” (responded)	$R = 10 \text{ k}\Omega$	$\leq 1.2 \text{ mA}^1)$	$\leq 1.2 \text{ mA}^1)$
Internal capacitance	-	5.2 nF	5.2 nF
Internal inductance	-	Negligible small	Negligible small
For connection to circuits with the following peak values	$U_H \leq 35 \text{ V}$	$U_i = \text{DC } 15,5 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$	„ic“, „nL“ „nA nL“, „tD“ $U_i = \text{DC } 15,5 \text{ V}$ $I_i = 25 \text{ mA}$ $U_n \leq \text{DC } 15,5 \text{ V}$ $P_n \leq 64 \text{ mW}$
Electrical isolation	Binary outputs A1, A2, fault disconnected from basic device	Binary outputs A1, A2, fault disconnected from basic device (intrinsically safe circuits)	Binary outputs A1, A2, fault disconnected from basic device

¹⁾ – Switching thresholds for supply to EN 60947-5-6: $U_H = 8.2 \text{ V}$, $R_i = 1 \text{ k}\Omega$

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Electrical data for option modules – contact module

Explosion protection	without	„ia“	„ic“, „nL“, nA nL“, „tD“
Electrical connection	See Figure 13	See Figure 13	See Figure 13
Binary outputs A1, A2	dry contacts		
Max. switching current	4 A AC / DC	-	-
Max. switching voltage	AC 250 V, DC 24 V	-	-
Internal capacitance	-	Negligible small	Negligible small
Internal inductance	-	Negligible small	Negligible small
For connection to circuits with the following peak values	-	U _i = DC 30 V I _i = 100 mA P _i = 750 mW	„ic“, „nL“ U _i = DC 30 V I _i = 100 mA „nA nL“, „tD“ U _n ≤ DC 15,5 V
Binary output fault	Connection to switching amplifier to EN 60947-5-6 (NAMUR)		
Signal status “High” (not responded)	R = 1,1 kΩ	≥ 2.1 mA ¹⁾	≥ 2.1 mA ¹⁾
Signal status “Low” (responded)	R = 10 kΩ	≤ 1.2 mA ¹⁾	≤ 1.2 mA ¹⁾
Internal capacitance	-	5.2 nF	5.2 nF
Internal inductance	-	Negligible small	Negligible small
For connection to circuits with the following peak values	U _H ≤ 35 V	U _i = DC 15,5 V I _i = 25 mA P _i = 64 mW	“ic”, “nL” U _i = DC 15,5 V I _i = 25 mA „nA nL“, „tD“ U _n ≤ DC 15,5 V
Electrical isolation	Binary outputs A1, A2, fault disconnected from basic device	Binary outputs A1, A2, fault disconnected from basic device (intrinsically safe circuits)	Binary outputs A1, A2, fault disconnected from basic device

¹⁾ – Switching thresholds for supply to EN 60947-5-6: U_H = 8.2 V, R_i = 1 kΩ

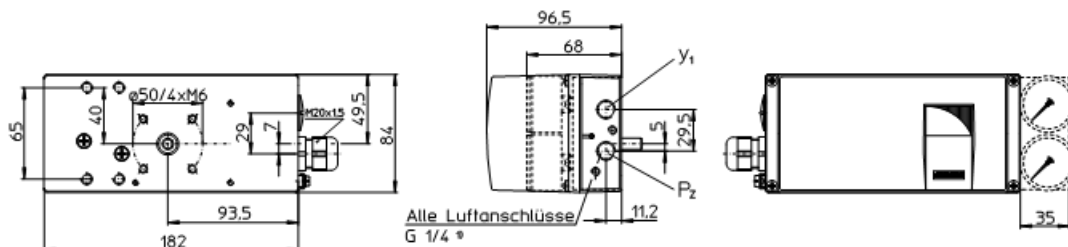


Figure 1 Metal enclosure, standard

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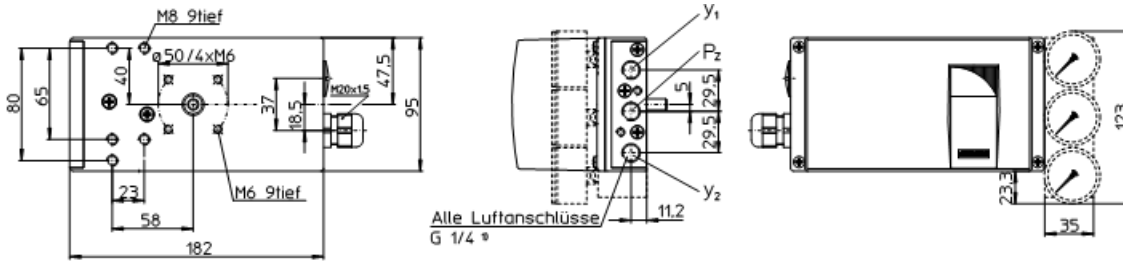


Figure 2 Plastic enclosure

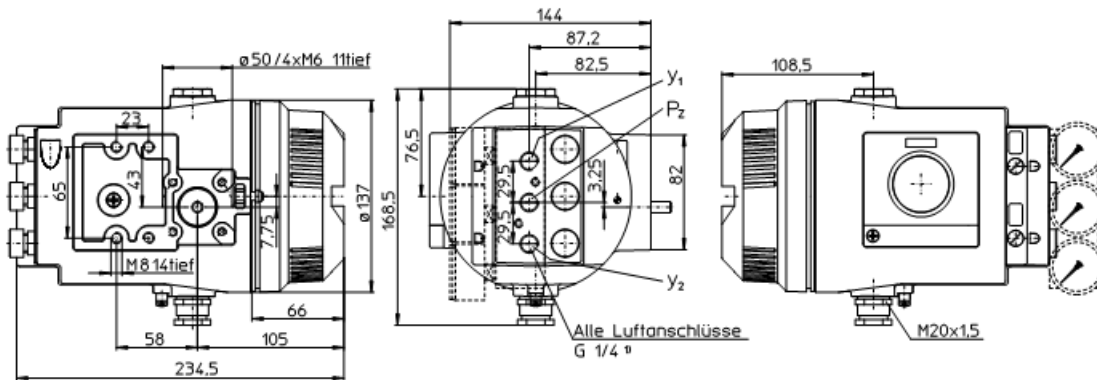


Figure 3 Metal enclosure, flame-proof

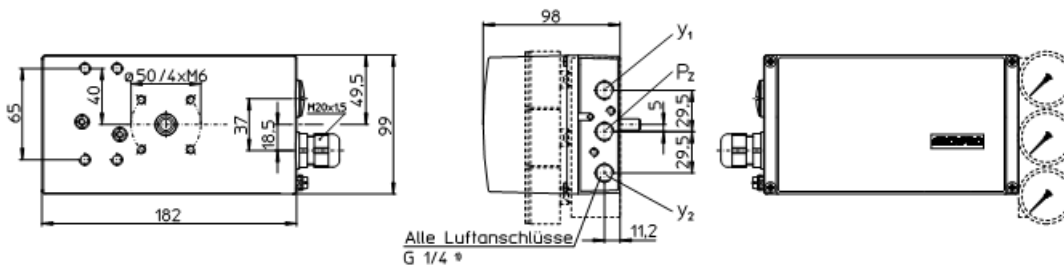


Figure 4 Metal enclosure, stainless steel

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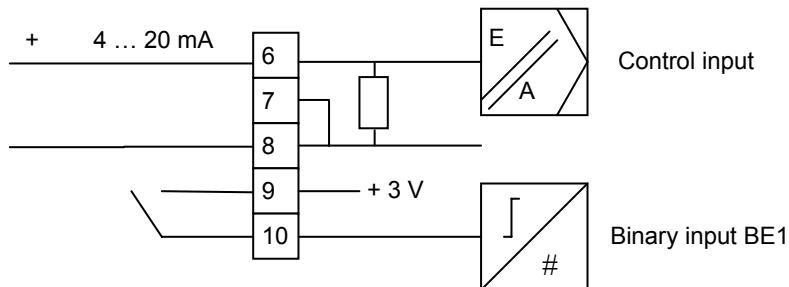


Figure 5 Electrical connection of 2 wire basic device

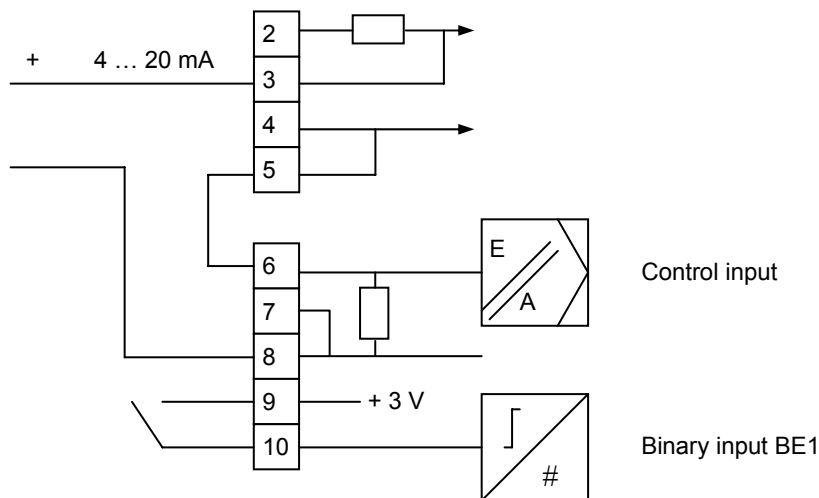


Figure 6 Electrical connection of 2/3/4 wire base device, 2 wire connection

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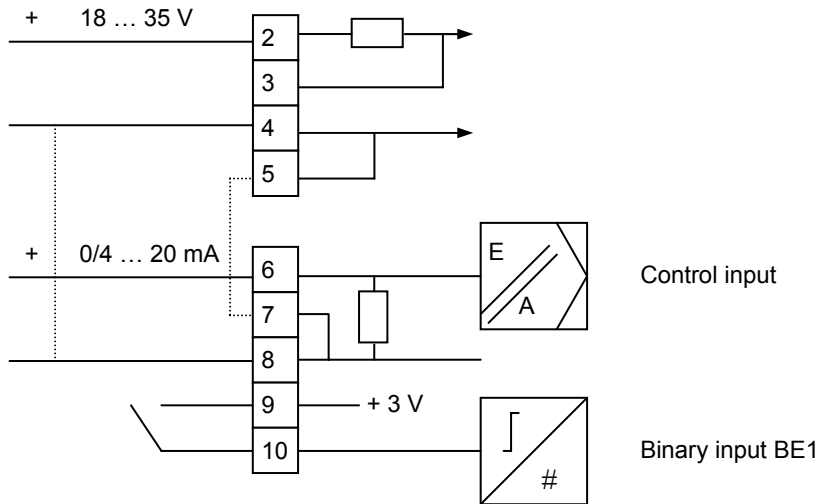


Figure 7 Electrical connection of 2/3/4 wire base device, 3/4 wire connection

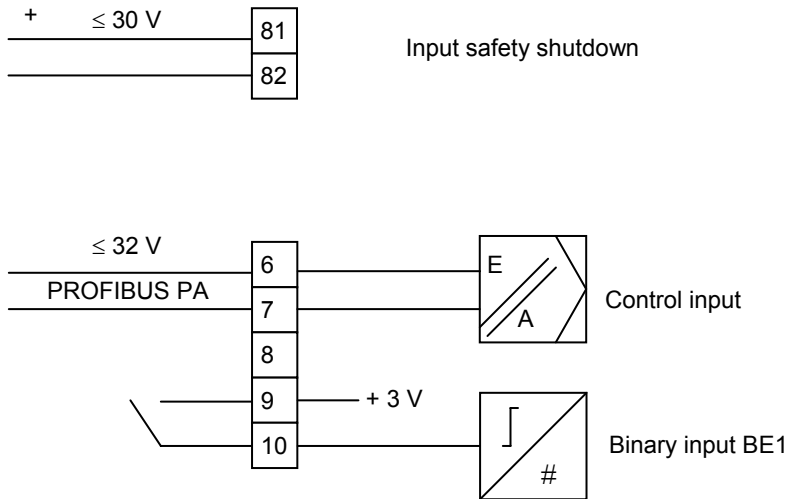


Figure 8 Electrical connection of base device, PROFIBUS PA

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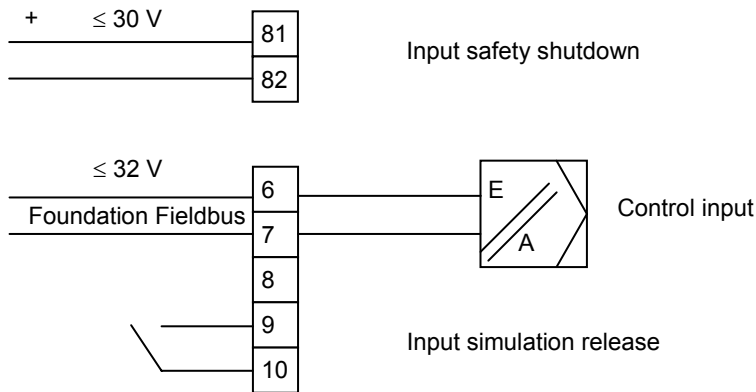


Figure 9 Electrical connection of base device, Fieldbus Foundation

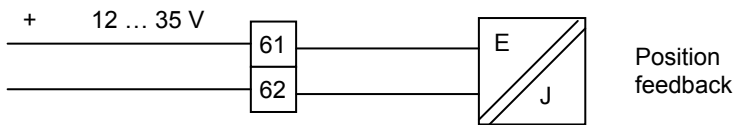


Figure 10 Electrical connection of analog module

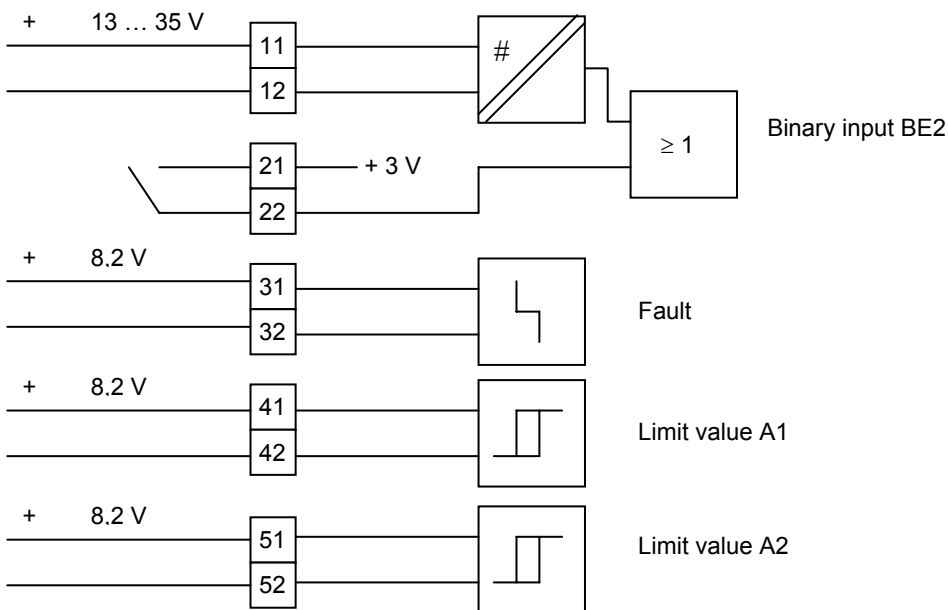


Figure 11 Electrical connection of binary module

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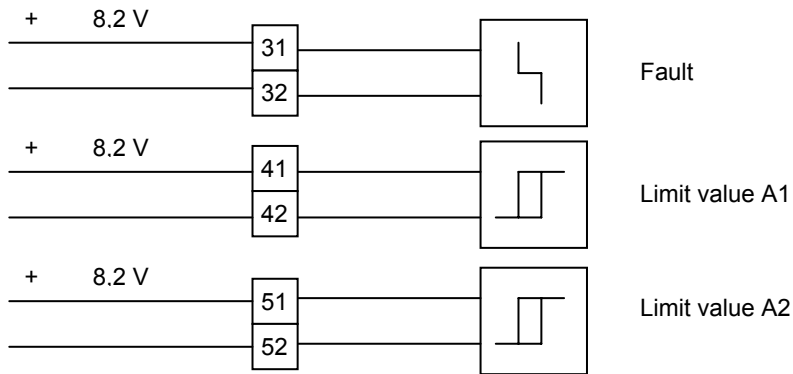


Figure 12 Electrical connection of slot initiator module

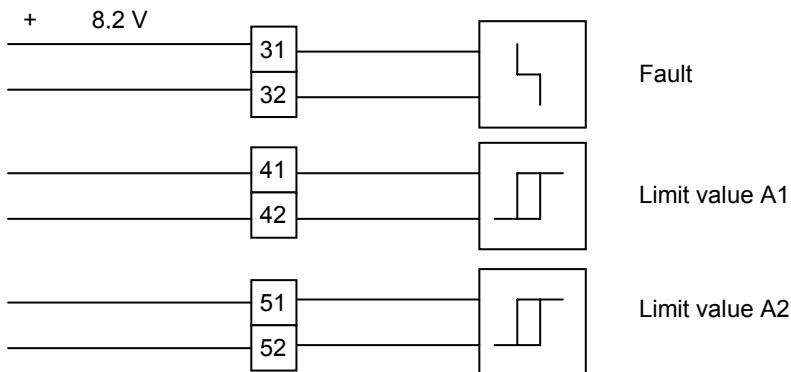


Figure 13 Electrical connection of contact module

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Order keys for ARCAPRO[®] type 827A

1. Series		7. Enclosure material	
827A		M	Aluminium (single-acting only)
2. Explosion protection ¹⁾		K	Plastic ⁶⁾
E	Without	E	Stainless steel ⁶⁾
X	Explosion-proof "ia" ²⁾	8. Pneumatics	
N	Explosion-proof "ic", "nL", "nA nL" ^{2), 3)}	1	Single-acting
S	Explosion-proof "ic", "nL", "nA nL", "tD" ^{2), 4)}	2	Double-acting (aluminium housing excluded)
D	Explosion-proof "d"		
3. Connection of base device		9. Mechanical actuation	
2	2 wire	0	Standard
4	2/3/4 wire ⁵⁾	2	None (for external potentiometer)
4. Analog output		10. Connection thread, electric / pneumatic	
0	Without analog output	G	M20x1.5 / G 1/4
A	Analog module	N	1/2" NPT / 1/4" NPT
5. Binary output		M	M20x1.5 / 1/4" NPT
0	Without binary output	P	1/2" NPT / G 1/4
B	Binary module	Q	M25x1.5 / 1/4" NPT (EEx d only)
S	Slot initiator module ⁶⁾	R	PROFIBUS connector M12 / G 1/4
K	Contact module ⁶⁾	S	PROFIBUS connector M12 / 1/4" NPT
6. Communication			
0	Without communication		
H	HART		
P	PROFIBUS PA		
F	Fieldbus Foundation		

¹⁾ ATEX approval, other approvals on request

²⁾ With HART communication 2/3/4 wire only

³⁾ Stainless steel housing excluded

⁴⁾ Without inspection window

⁵⁾ PROFIBUS PA and Foundation Fieldbus excluded

⁶⁾ Not for flameproof devices

Example:

827A.E2-A0H-	<i>Positions 1 - 6</i>
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Positioner 827A – not explosion-proof – 2 wire connection – analog module – without binary output – HART communication

M10-G	<i>Positions 7 - 10</i>
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Aluminium enclosure – single-acting – mechanical actuation (standard) – connection thread electric M20x1.5 / pneumatic G 1/4

Accessories

Mounting kits	For integrated mounting ARCA linear actuators type 812
	For integrated mounting ARCA linear actuators type 813
	For integrated mounting on linear actuators acc. to VDI/VDE 3847-1
	For mounting on linear actuators acc. to IEC 534 (NAMUR)
	For integrated mounting ARCA quarter turn actuators type 840
Pressure gauge blocks	For mounting on quarter turn actuators acc. to VDI/VDE 3845
	Pressure gauge block for single-acting or double-acting positioner
External position detection	External rotary potentiometer for strokes to 130 mm
	External linear potentiometer