

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	Aluminum cast AISi 12 or austenitic stainless steel 1.4581
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 (Standard and FIP) -40...+80 °C (LT) (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 PED 2014/68/EU		For fluid group 1 gases; fulfils requirements in article 4, 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	≤ 0.05 %
	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 drawing 1 and 2
Weight	Metal enclosure, aluminum	Approx. 1.3 kg
	Metal enclosure, stainless steel	Approx. 3.9 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

Operation	Standard	At failure of electrical or pneumatic energy exhausting
Option	Fail In Place	At failure of electrical or pneumatic energy blocking
Inlet air pressure		1.4 ... 7 bar (Standard) / 3...7 bar (FIP)
Air quality	Solids	ISO 8573-1 Class 3
	Dew point	ISO 8573-1 Class 3 (-40 °C, min. 20 K below ambient temperature)
	Oil content	ISO 8573-1 Class 3
Air consumption		< 0,01 Nm³/h during stationary operation
Flow rate (unthrottled)	Air supply valve at Δp	2 bar - 4,1 m³/h i.N., 4 bar - 7,1 m³/h i.N., 6 bar - 9,8 m³/h i.N.
	Air exhaust valve at Δp	2 bar – 8,2 Nm³/h, 4 bar – 13,7 Nm³/h, 6 bar – 19,2 Nm³/h (Standard) 2 bar – 4,3 Nm³/h, 4 bar – 7,3 Nm³/h, 6 bar – 9,8 Nm³/h (FIP)
Valve leakage		< 0,6 x 10 ⁻³ Nm³/h
Throttle ratio		Up to ∞ : 1 adjustable

Electrical data for basic device

Explosion protection	Intrinsic safety "ia"	II2G Ex ia IIC T6/T4 Gb, Zone 1
Permissible ambient temperature	"ia" with/without HART	T4 / T6 - 30 ... + 80 °C / - 30 ... + 60 °C (Standard and FIP) T4 / T6 - 40 ... + 60 °C / - 40 ... + 60 °C (LT)
	"ia" with PROFIBUS PA / Foundation Fieldbus	T4 / T6 - 30 ... + 80 °C / - 30 ... + 50 °C (Standard and FIP) T4 / T6 - 40 ... + 60 °C / - 40 ... + 50 °C (LT)

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

Explosion protection	without	„ia“
Electrical connection	See Figures 3	See Figures 3
Communication	HART version 7	
Input signal Iw	4 ... 20 mA	4 ... 20 mA
Current to maintain the power supply	≥ 3.8 mA	≥ 3.8 mA
Required load voltage without HART 2 wire device	6.53 V	8.3 V
Required load voltage without HART 2/3/4 wire device	8.4 V	-
Required load voltage with HART 2 wire device	6.79 V	-
Required load voltage with HART 2/3/4 wire device	-	9 V
Static destruction limit	± 40 mA	-
For connection to	-	certified intrinsically safe circuits with max. U _i = 30 V I _i = 100 mA P _i = 1 W
Internal capacitance	-	11 nF
Internal inductance	-	209 µH without HART 209 µH with HART
Digital input BE1	Suitable for dry contact, max. contact load ≤ 5 µA at 3 V	
Electrical isolation	Iw and BE1 electrically connected	Iw and BE1 electrically connected

Electrical data for basic device PROFIBUS PA

Electrical connection	See Figure 4
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 3.02, over 150 objects
Response time for a master telegram	typically 10 ms
Device address	126 in the as-delivered condition

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Electrical data for basic device Foundation Fieldbus

Electrical connection	See Figure 5
Communication	H1 communication to specification of the Fieldbus Foundation, group 3, class 31 PS (Publisher/Subscriber) V 2.4 1 resource block (RB2), 1 analogue output function block (AO), 1 PID function block (PID), 1 transducer block (standard advanced positioner valve)
Physical layer profile	123, 511
Block execution times	Analogue output function block 60 ms; PID function block 80 ms

Electrical data for basic device PROFIBUS PA / Foundation Fieldbus

Explosion protection	without	„ia“
Power supply	Bus-powered	Bus-powered
Bus voltage	DC 9 ... 32 V	DC 9 ... 24 V
Current consumption	10.5 mA ± 10 %	10.5 mA ± 10 %
Fault current	0	0
For connection to	-	circuits with certified FISCO power supply with max. $U_i = 17,5 \text{ V}$ $I_i = 380 \text{ mA}$ $P_i = 5,32 \text{ W}$
	-	circuits with certified barrier with max. $U_i = 24 \text{ V}$ $I_i = 250 \text{ mA}$ $P_i = 1,2 \text{ W}$
Internal capacitance	-	Negligible small
Internal inductance	-	8 µH
Safety shutdown		
Input resistance	> 20 kΩ	> 20 kΩ
Signal status 0: active	DC 0 ... 4.5 V	DC 0 ... 4.5 V
Signal status 1: inactive	DC 13 ... 30 V	DC 13 ... 30 V
For connection to	-	certified intrinsically safe circuits with max. $U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1 \text{ W}$
Internal capacitance	-	Negligible small
Internal inductance	-	Negligible small
Digital 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, Bus connection and BE1 electrically connected

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Electrical data for optional modules – Analog Output Module

Explosion protection	without	„ia“
Electrical connection	See Figure 6	See Figure 6
Nominal signal range	4...20 mA, short circuit resistant	4...20 mA, short circuit resistant
Dynamic range	3.6...20.5 mA	3.6...20.5 mA
Auxiliary voltage U_H	+12...+35 V	+12...+30 V
External load R_B [kΩ]	$(U_H [V] - 12)/I [mA]$	$(U_H [V] - 12)/I [mA]$
For connection to	-	certified intrinsically safe circuits with max. $U_i = 30 V$ $I_i = 100 mA$ $P_i = 1 W$
Internal capacitance	-	2 nF
Internal inductance	-	Negligible small
Electrical isolation	Disconnected from basic device	Disconnected from basic device

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Electrical data for option modules – binary module

Explosion protection	without	„ia“
Electrical connection	See Figure 7	See Figure 7
Digital outputs A1, A2, fault		
Signal status “High” (not responded)	Conductive, $R = 1 \text{ k}\Omega$	$\geq 2.1 \text{ mA}^1$
Signal status “Low” (responded)	Blocked, $I_R < 60 \mu\text{A}$	$\leq 1.2 \text{ mA}^1$
For connection to	-	certified intrinsically safe circuits with max. $U_i = 15 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$
Internal capacitance	-	5,2 nF
Internal inductance	-	Negligible small
Digital input BE2 Terminals 11/12		
Auxiliary voltage U_H	$\leq \text{DC } 35 \text{ V} \leq 20 \text{ mA}$	-
Signal status 0:	$\leq \text{DC } 4.5 \text{ V}$ or open	$\leq \text{DC } 4.5 \text{ V}$ or open
Signal status 1:	$\geq \text{DC } 13 \text{ V}$	$\geq \text{DC } 13 \text{ V}$
Input resistance	$> 25 \text{ k}\Omega$	$> 25 \text{ k}\Omega$
Static destruction limit	$\pm 35 \text{ V}$	-
For connection to	-	certified intrinsically safe circuits with max. $U_i = 25,2 \text{ V}$
Internal capacitance	-	Negligible small
Internal inductance	-	Negligible small
Digital input BE2 Terminals 21/22		
Signal state 0:	Dry contact, open	Dry contact, open
Signal state 1:	Dry contact, closed	Dry contact, closed
Contact load	3 V, 5 μA	3 V, 5 μA
Electrical isolation	Digital outputs A1, A2, fault, Digital input BE2 terminals 11/12 disconnected from basic device, Digital input BE2 terminals 21/22 connected to basic device	Digital outputs A1, A2, fault, Digital input BE2 terminals 11/12 disconnected from basic device, Digital input BE2 terminals 21/22 connected to 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 – Digital I/O Module

Explosion protection	without	„ia“
Electrical connection	See Figure 7	See Figure 7
Digital outputs A1, A2, fault		
Signal status “High” (not responded)	Conductive, $R = 1 \text{ k}\Omega$	$\geq 2.1 \text{ mA}^{1)}$
Signal status “Low” (responded)	Blocked, $I_R < 60 \text{ }\mu\text{A}$	$\leq 1.2 \text{ mA}^{1)}$
For connection to	-	certified intrinsically safe circuits with max. $U_i = 17,5 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 250 \text{ mW}$
Internal capacitance	-	5,2 nF
Internal inductance	-	Negligible small
Digital input BE2 Terminals 11/12		
Auxiliary voltage U_H	$\leq \text{DC } 35 \text{ V} \leq 20 \text{ mA}$	-
Signal status 0:	$\leq \text{DC } 4.5 \text{ V}$ or open	$\leq \text{DC } 4.5 \text{ V}$ or open
Signal status 1:	$\geq \text{DC } 13 \text{ V}$	$\geq \text{DC } 13 \text{ V}$
Input resistance	$> 25 \text{ k}\Omega$	$> 25 \text{ k}\Omega$
Static destruction limit	$\pm 35 \text{ V}$	-
For connection to	-	certified intrinsically safe circuits with max. $U_i = 32 \text{ V}$
Internal capacitance	-	Negligible small
Internal inductance	-	Negligible small
Digital input BE2 Terminals 21/22		
Signal state 0:	Dry contact, open	Dry contact, open
Signal state 1:	Dry contact, closed	Dry contact, closed
Contact load	3 V, 5 μA	3 V, 5 μA
Electrical isolation	Digital outputs A1, A2, fault, Digital input BE2 terminals 11/12 disconnected from basic device, Digital input BE2 terminals 21/22 connected to basic device	Digital outputs A1, A2, fault, Digital input BE2 terminals 11/12 disconnected from basic device, Digital input BE2 terminals 21/22 connected to 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 – slot initiator module

Explosion protection	without	„ia“
Electrical connection	See Figure 8	See Figure 8
Digital outputs A1, A2	Slotted initiators SJ2-SN or N7S20A to EN 60947-5-6 (NAMUR) for connecting to switching amplifier, NC (normally closed) function	
Signal state “High” (not responded)	$\geq 3 \text{ mA at } U_{\text{nom}} = 8 \text{ V}$	$\geq 2.1 \text{ mA } ^1)$
Signal state “Low” (responded)	$\leq 1 \text{ mA at } U_{\text{nom}} = 8 \text{ V}$	$\leq 1.2 \text{ mA } ^1)$
For connection to	$U_{\text{nom}} = 8 \text{ V}$	certified intrinsically safe circuits with max. $U_i = 15 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$
Internal capacitance	-	36 nF
Internal inductance	-	100 μH
Digital output fault		
Signal status “High” (not addressed)	$R = 1,1 \text{ k}\Omega$	$\geq 2.1 \text{ mA } ^1)$
Signal status “Low” (addressed)	$R = 10 \text{ k}\Omega$	$\leq 1.2 \text{ mA } ^1)$
For connection to	$U_H \leq 35 \text{ V}$ $I \leq 20 \text{ mA}$	certified intrinsically safe circuits with max. $U_i = 15 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$
Internal capacitance	-	5.2 nF
Internal inductance	-	Negligible small
Electrical isolation	Digital outputs A1, A2, fault disconnected from basic device	Digital 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 – Inductive Limit Switches

Explosion protection	without	„ia“
Electrical connection	See Figure 8	See Figure 8
Digital outputs A1, A2	Slotted initiators SJ2-SN or N7S20A 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 $U_{\text{nom}} = 8 \text{ V}$	$\geq 2.1 \text{ mA}^1)$
Signal state “Low” (responded)	$\leq 1 \text{ mA}$ at $U_{\text{nom}} = 8 \text{ V}$	$\leq 1.2 \text{ mA}^1)$
For connection to	$U_{\text{nom}} = 8 \text{ V}$	certified intrinsically safe circuits with max. $U_i = 16 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$
Internal capacitance	-	36 nF
Internal inductance	-	100 μH
Digital output fault		
Signal status “High” (not addressed)	$R = 1,1 \text{ k}\Omega$	$\geq 2.1 \text{ mA}^1)$
Signal status “Low” (addressed)	$R = 10 \text{ k}\Omega$	$\leq 1.2 \text{ mA}^1)$
For connection to	$U_H \leq 35 \text{ V}$ $I \leq 20 \text{ mA}$	certified intrinsically safe circuits with max. $U_i = 17,5 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 250 \text{ mW}$
Internal capacitance	-	5.2 nF
Internal inductance	-	Negligible small
Electrical isolation	Digital outputs A1, A2, fault disconnected from basic device	Digital 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“
Electrical connection	See Figure 9	See Figure 9
Digital outputs A1, A2	dry contacts	
Max. switching current	100 mA	-
Max. switching voltage	30 V DC	30 V DC
For connection to	-	certified intrinsically safe circuits with max. $U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 750 \text{ mW}$
Internal capacitance	-	Negligible small
Internal inductance	-	Negligible small
Digital output fault		
Signal status “High” (not responded)	$R = 1,1 \text{ k}\Omega$	$\geq 2.1 \text{ mA}^1)$
Signal status “Low” (responded)	$R = 10 \text{ k}\Omega$	$\leq 1.2 \text{ mA}^1)$
For connection to	$U_H \leq 35 \text{ V}$ $I \leq 20 \text{ mA}$	certified intrinsically safe circuits with max. $U_i = 15 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$
Internal capacitance	-	5.2 nF
Internal inductance	-	Negligible small
Electrical isolation	Digital outputs A1, A2, fault disconnected from basic device	Digital 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 – Mechanic Limit Switches

Explosion protection	without	„ia“
Electrical connection	See Figure 9	See Figure 9
Digital outputs A1, A2	dry contacts	
Max. switching current	100 mA	-
Max. switching voltage	30 V DC	30 V DC
For connection to	-	certified intrinsically safe circuits with max. $U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 750 \text{ mW}$
Internal capacitance	-	Negligible small
Internal inductance	-	Negligible small
Digital output fault		
Signal status “High” (not responded)	$R = 1,1 \text{ k}\Omega$	$\geq 2.1 \text{ mA}^1)$
Signal status “Low” (responded)	$R = 10 \text{ k}\Omega$	$\leq 1.2 \text{ mA}^1)$
For connection to	$U_H \leq 35 \text{ V}$ $I \leq 20 \text{ mA}$	certified intrinsically safe circuits with max. $U_i = 17,5 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 250 \text{ mW}$
Internal capacitance	-	5.2 nF
Internal inductance	-	Negligible small
Electrical isolation	Digital outputs A1, A2, fault disconnected from basic device	Digital 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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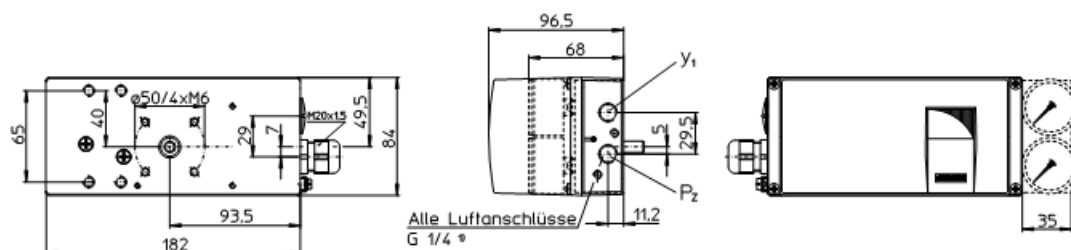


Figure 1 Metal enclosure, standard

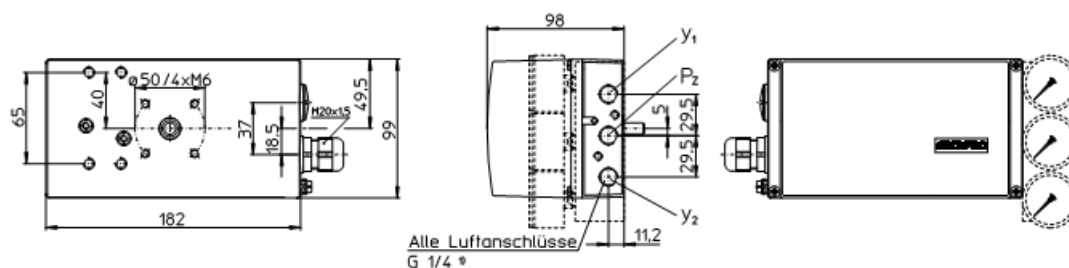


Figure 2 Metal enclosure, stainless steel

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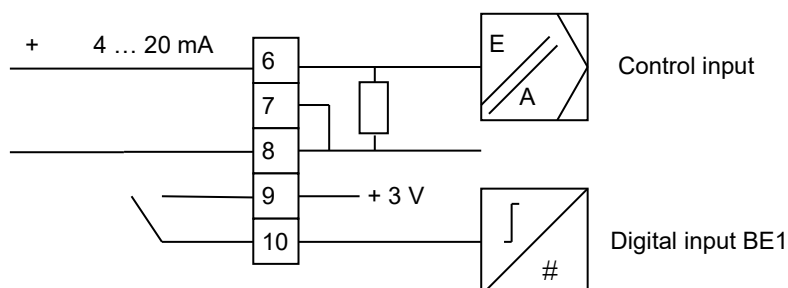


Figure 3 Electrical connection of 2 wire basic device

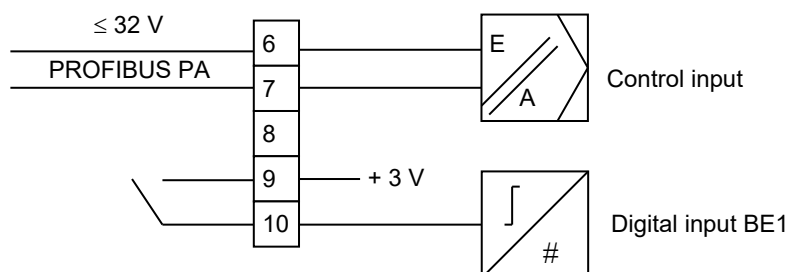
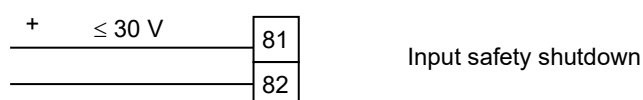


Figure 4 Electrical connection of base device, PROFIBUS PA

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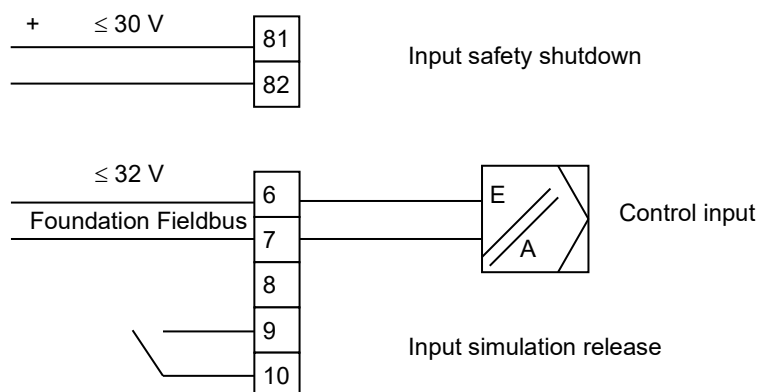


Figure 5 Electrical connection of base device, Fieldbus Foundation

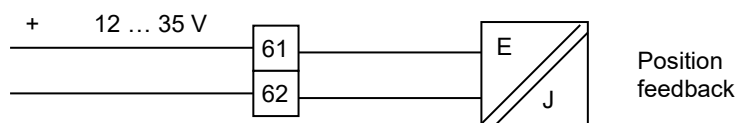


Figure 6 Electrical connection of Analog Output module

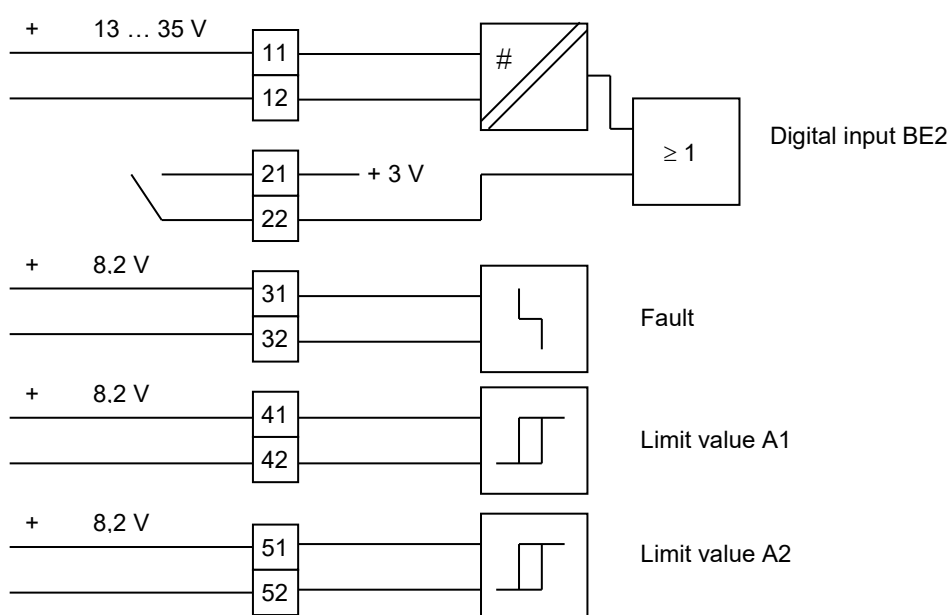


Figure 7 Electrical connection of Digital module / Digital I/O Module

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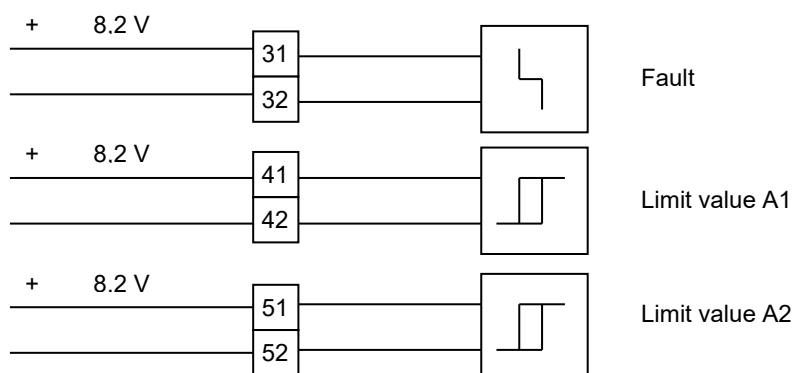


Figure 8 Electrical connection of slot initiator module / Inductive Limit Switches

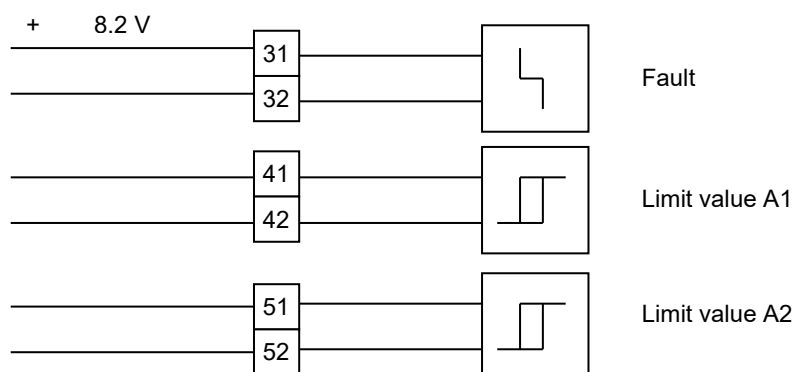


Figure 9 Electrical connection of contact module / Mechanic Limit Switches

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Order keys for ARCAPRO type 827A

1. Series		7. Enclosure material	
827A		M	Aluminum (single acting only)
2. Explosion protection ¹⁾		E	Stainless steel
E	Without		
X	Explosion-proof „ia“		
3. Connection of base device		8. Pneumatics	
2	2 - wire	1	Single-acting
		2	Double-acting (aluminum housing excluded)
4. Optional Module		9. Mechanical actuation	
0	Without	0	Standard
A	Analog Output Module	1	With internal non contacting sensor ³⁾
		2	Without (with Analog Input Module)
5. Limit monitor		10. Connection thread, electric / pneumatic	
0	Without	G	M20x1,5 / G 1/4
D	Digital I/O Module	N	1/2" NPT / 1/4" NPT
I	Inductive Limit Switches	M	M20x1,5 / 1/4" NPT
M	Mechanic Limit Switches	P	1/2" NPT / G 1/4
B	Binary module	R	Connector M12 Input signal / G 1/4
S	Slot initiator module	S	Connector M12 Input signal / 1/4" NPT
K	Contact module		
6. Communication		11. Options	
0	Without communication	FIP	Fail In Place ²⁾
H	HART	LT	- 40 °C ⁵⁾
P	PROFIBUS PA	SA	Connector M12 Analog Output Module
F	Foundation Fieldbus	SB	Connector M12 Binary-Modul / Digital I/O Module
		SS	Connector M12 Slot initiator module / Inductive Limit Switches
		SW	Connector M12 Analog Input Module
		NG	Operation with natural gas

¹⁾ ATEX and IECEx approval

²⁾ only for stainless steel housing

³⁾ On request

Example:

827A.E2-A0H-	<i>Positions 1 - 6</i>
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Positioner 827A – no explosion-proof – 2-wire connection – Analog Output Module – without – HART communication

M10-G-LT	<i>Positions 7 - 11</i>
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Aluminum enclosure – single-acting – mechanical actuation (standard) – connection thread electric M20x1.5 / pneumatic G 1/4 / - 40 °C

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
	For mounting on quarter turn actuators acc. to VDI/VDE 3845
Pressure gauge blocks	Pressure gauge block for single-acting or double-acting positioner
Extern. position detection	External rotary potentiometer for strokes to 130 mm or external linear potentiometer

