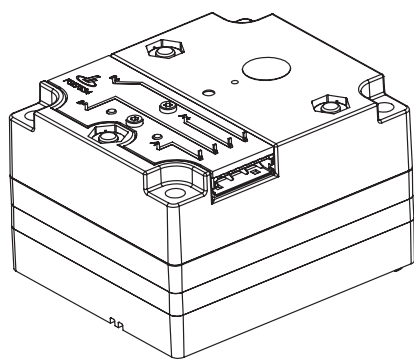


# SMART POSITIONER MODUL

Standardized Switching Piezo-Pneumatic System  
for Smart Valve Positioners

Technical Data



„OUR NEW SMART, PIEZO-PNEUMATIC POSITIONER MODULES CONSUME APPROXIMATELY 1 % OF THE AIR OF A TRADITIONAL ELECTROPNEUMATIC POSITIONER AND HAVE CLASS-LEADING LOW POWER CONSUMPTION HELPING TO SAVE ON CONTROLLER POWER.“

MICHAEL MACK, GLOBAL PRODUCT MANAGER PIEZO TECHNOLOGY

## SMART POSITIONER MODUL

### Standardized Switching Piezo-Pneumatic system for Smart Valve Positioners

Ready-to-install pneumatic modules for simple use in pneumatic smart valve positioners. HOERBIGER Piezo technology allows most energy efficient and lowest air consumption to realize any electric and pneumatic fail safe functions. Over the past 20 years more than 1.5 Mio. piezo modules have been installed successfully.

#### Customer benefits:

- Cost reduction across the complete product life cycle: R&D, Purchasing, OC, After Sales
- Possibility for differentiation by implementing additional diagnostic- and smart functions
- Cost reduction potential at end-users through reduction of air- and energy consumption

#### Features:

- Available as single- and double acting pneumatic module using piezo technology
- Universal pneumatic interface
- Ready-to-install system for direct use in smart positioners
- All-in-one unit with typical fail safe functions: Hold, Close, Open, both electric and pneumatic
- Minimum energy consumption: 90 % reduction for the pneumatic actor by using piezo technology
- Minimum air consumption: 90 % reduction for the pneumatic actor by using piezo technology

## GENERAL CHARACTERISTICS

	SINGLE ACTING	DOUBLE ACTING
Mounting	Flange	
Size	55 x 65 x 42 mm	55 x 81 x 42 mm
Weight (mass)	0,145 kg	0,170 kg
Installation	in any position	
Medium	Compressed air acc. ISO8573-1	
Filtration	Class 4	
Lubrication	Class 4 permanently	
Pressure dew point	Class 4 (min. 10K under ambient temperature)	
Flow direction	filling: from p1 → out exhausting: from out → Exh	filling: from p1 → out1/out2 exhausting: from out1/out2 → Exh
Storage temperature	-25... +80 °C (-40 °C option available)	
Ambient temperature	-25... +80 °C (-40 °C option available)	
Medium temperature	-25... +80 °C (-40 °C option available)	
Ambient humidity	95 %, without condensation	
Protection class	IP 00, DIN EN 60529/A1:2000	
Approval	suitable for intrinsically safe applications according IECEx	

## MATERIAL

Housing	Grivory PA 6.6
Control diaphragm	ECO
Sealings	VMQ, NBR
RoHS	conform

## CHARACTERISTICS AND INTERFACE

### Single and Double Acting Smart Positioner Modul

#### PNEUMATIC CHARACTERISTICS

Nominal pressure	$p_1$	6 bar
Working pressure inlet	$p_{1\min}$ $p_{1\max}$	1,5 bar 8 bar
Ambient pressure	$p_{\text{amb}}$	< 0.1 bar rel.
Nominal flow rate $p_1 \rightarrow \text{out}$	QN	$\geq 130 \text{ l/min (@25}^\circ\text{) } 6 \rightarrow 5 \text{ bar}$
Nominal flow rate out $\rightarrow \text{Exh}$	QN	$\geq 240 \text{ l/min (@25}^\circ\text{) } 6 \rightarrow 5 \text{ bar}$
Own air consumption	QLS	$\leq 0.4 \text{ l/min (@ } 25^\circ\text{C)}$
Chamber leakage	QLC	$\leq 0.05 \text{ (@ } 25^\circ\text{C) } 6 \rightarrow 0 \text{ bar}$

#### ELECTRIC CHARACTERISTICS

Switching voltage	U	<b>Minimum</b>	<b>Maximum</b>
On	$U_{\text{on}}$	+24 V DC	+27 V DC*
Off	$U_{\text{off}}$	-24 V DC	-27 V DC*
Holding (steady state)	$U_{\text{hold}}$	+21 V DC	+21,5 V DC
Capacity	C	$\leq 2 \times 100 \text{ nF (}\leq 100 \text{ nF for each piezopilot)}$	

\*see control recommendation page 10

#### ELECTRIC INTERFACE

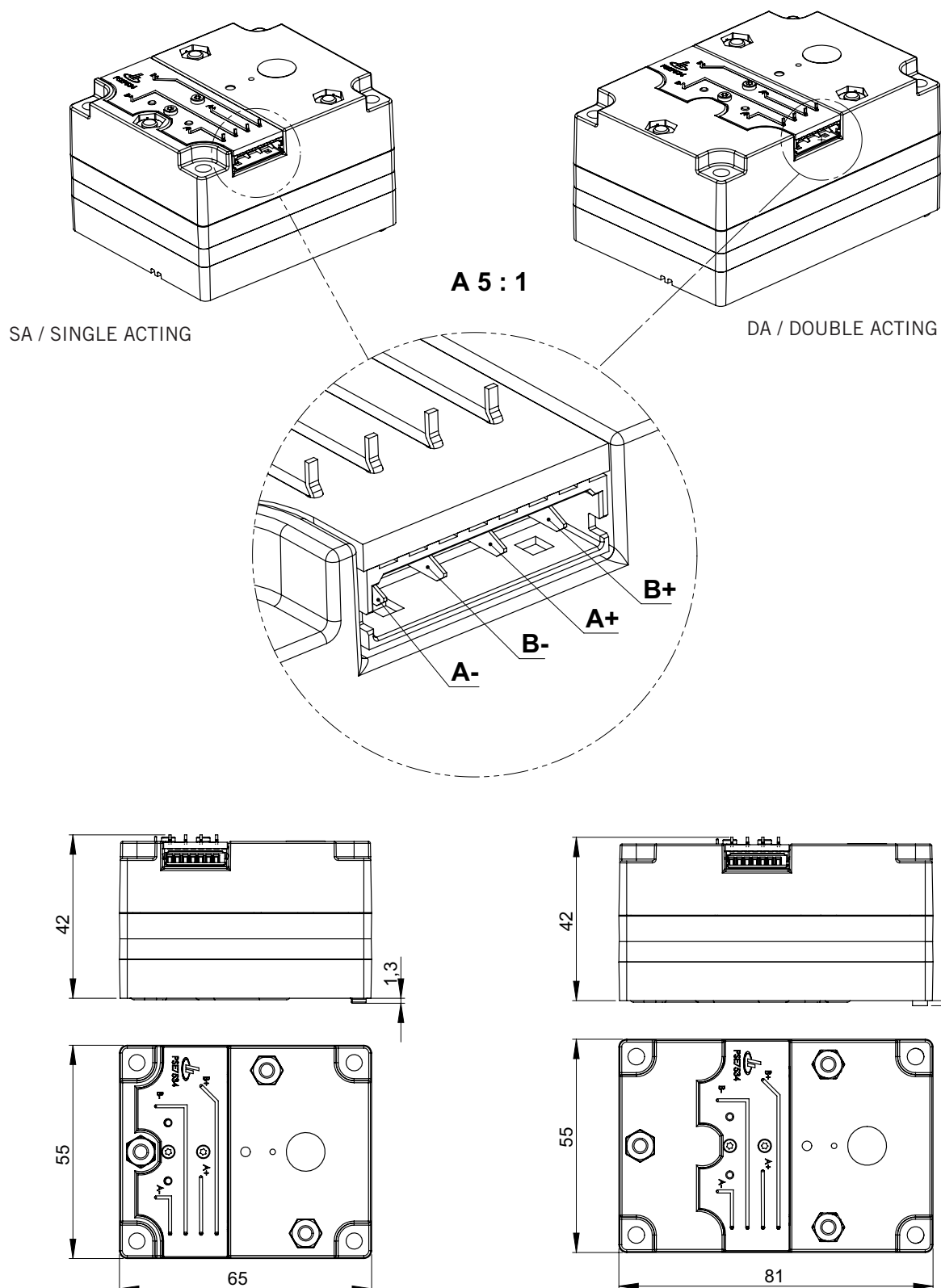
Type of connector	Molex Micro Blade 53015-0710
Pinout	Pin1: B+
A: Piezo element A	Pin2: n.c.
B: Piezo element B	Pin3: A+
NC: not connected	Pin4: n.c.
	Pin5: B-
	Pin6: n.c
	Pin7: A-

#### DYNAMIC CHARACTERISTICS

		SINGLE ACTING	DOUBLE ACTING
Switching time filling	$t_{1/10\%}$	< 25 ms (@25°C and $p_1=6\text{bar}$ )	< 35 ms (@25°C and $p_1=6\text{bar}$ )
	$t_{2/90\%}$	< 60 ms (@25°C and $p_1=6\text{bar}$ )	< 80 ms (@25°C and $p_1=6\text{bar}$ )
Switching time exhausting	$t_{3/90\%}$	< 25 ms (@25°C and $\text{out}=6\text{bar}$ )	< 35 ms (@25°C and $\text{out}_{1/2}=6\text{bar}$ )
	$t_{4/10\%}$	< 70 ms (@25°C and $\text{out}=6\text{bar}$ )	< 90 ms (@25°C and $\text{out}_{1/2}=6\text{bar}$ )
Definition	Switching time measurement is a system step reponse with nominal pressure supply and a chamber-volume of app. $13 \text{ cm}^3$		

## DIMENSIONAL DRAWING

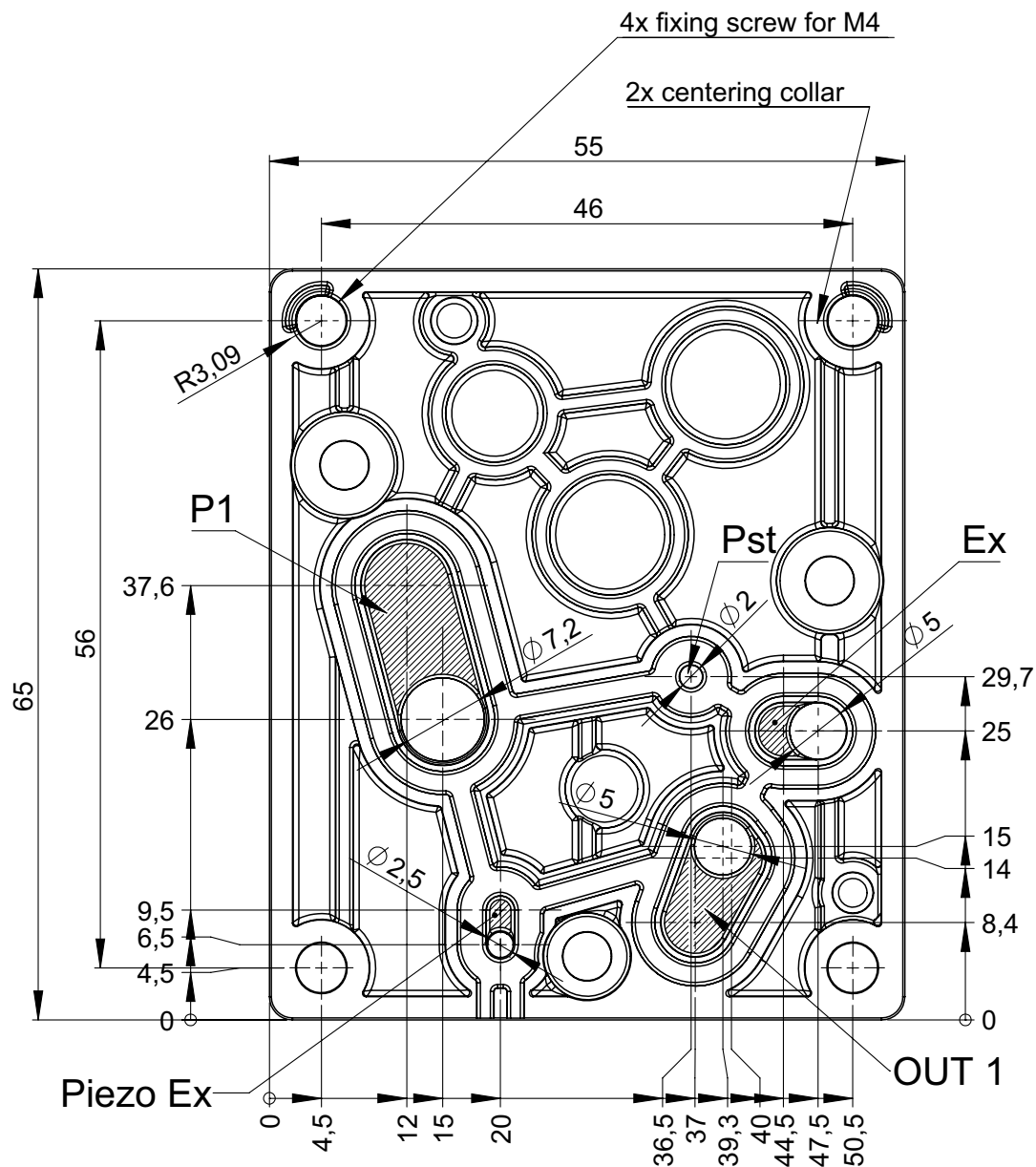
Single and Double Acting  
Smart Positioner Modul



## PNEUMATIC PORTS

Single Acting

Smart Positioner Modul



### PNEUMATIC PORTS SINGLE ACTING

Piezo Ex	collected air from piezo valve
P1	inlet pressure
OUT 1	outlet chamber
EX	exhaust
Pst*	pilot pressure

\*Only for internal use. Need to be closed in operation!

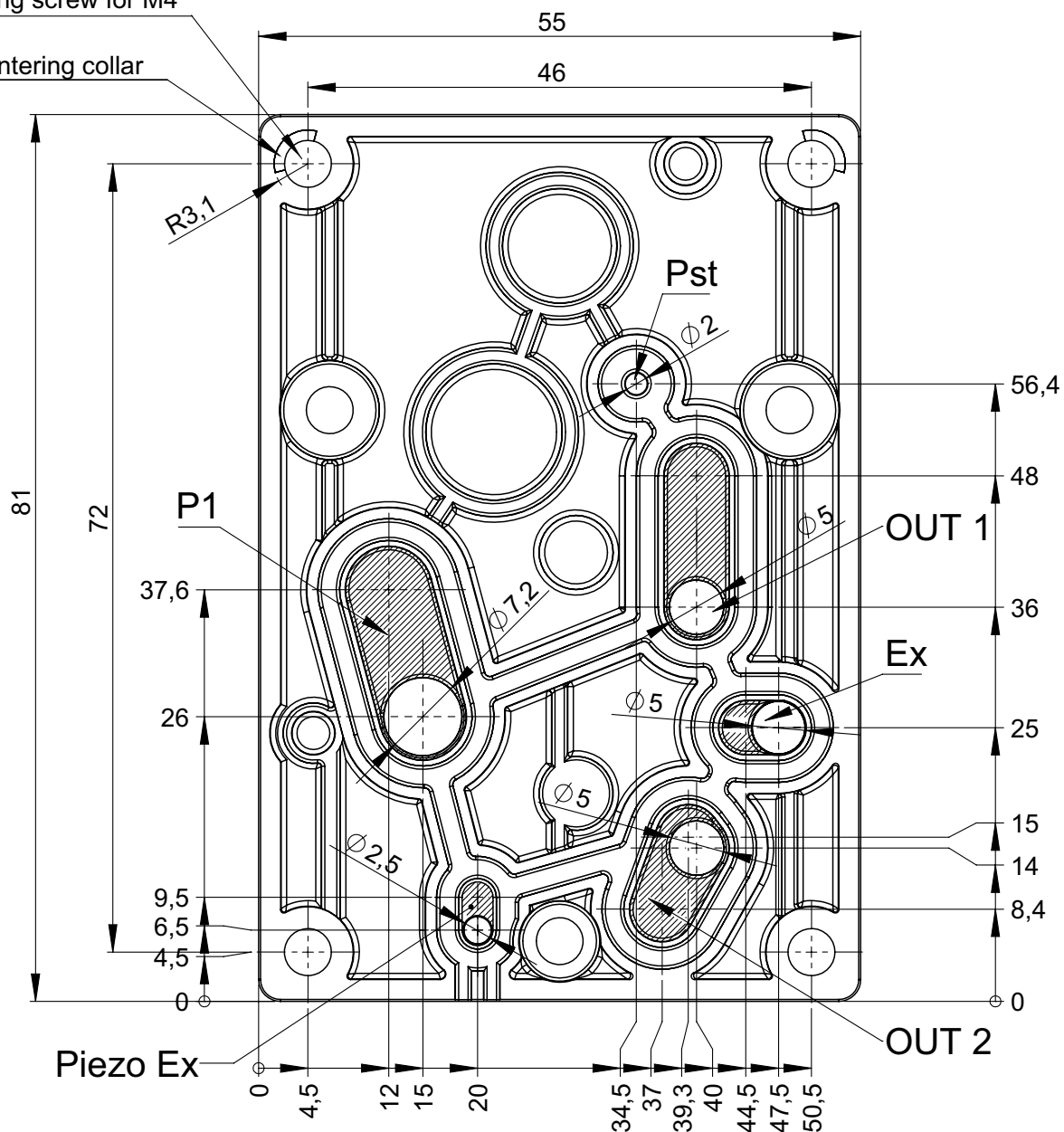
## PNEUMATIC PORTS

Double Acting

Smart Positioner Modul

4x fixing screw for M4

2x centering collar



### PNEUMATIC PORTS DOUBLE ACTING

Piezo Ex	collected air from piezo valve
P1	inlet pressure
OUT 1	outlet chamber
OUT 2	outlet chamber
EX	exhaust
Pst*	pilot pressure

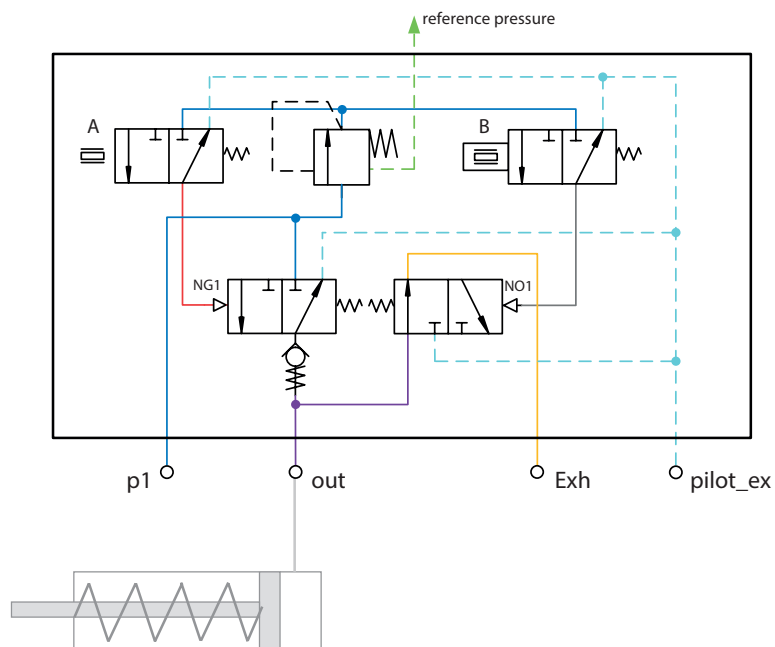
\*Only for internal use. Need to be closed in operation!

## PNEUMATIC DIAGRAMS

Single Acting

Smart Positioner Modul

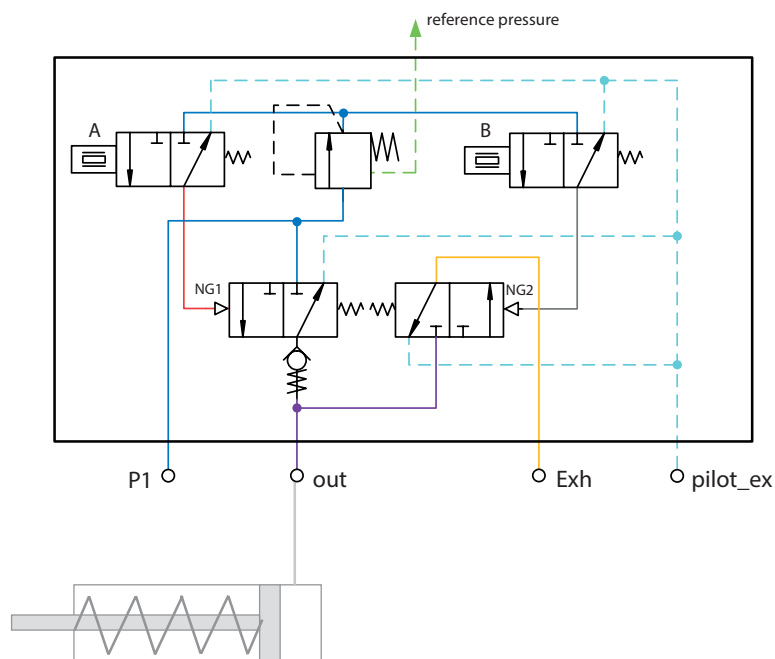
### SINGLE ACTING POLYMER / FAIL SAFE EXHAUST



Fail Safe	function	A	B
X	→	0	0
	←	1	1
	Stop	0	1
	not allowed	1	0

Type P13-3-FS-E  
part number PS601010-555-000

### SINGLE ACTING POLYMER / FAIL SAFE HOLD



Fail Safe	function	A	B
	→	0	1
	←	1	0
X	Stop	0	0
	not allowed	1	1

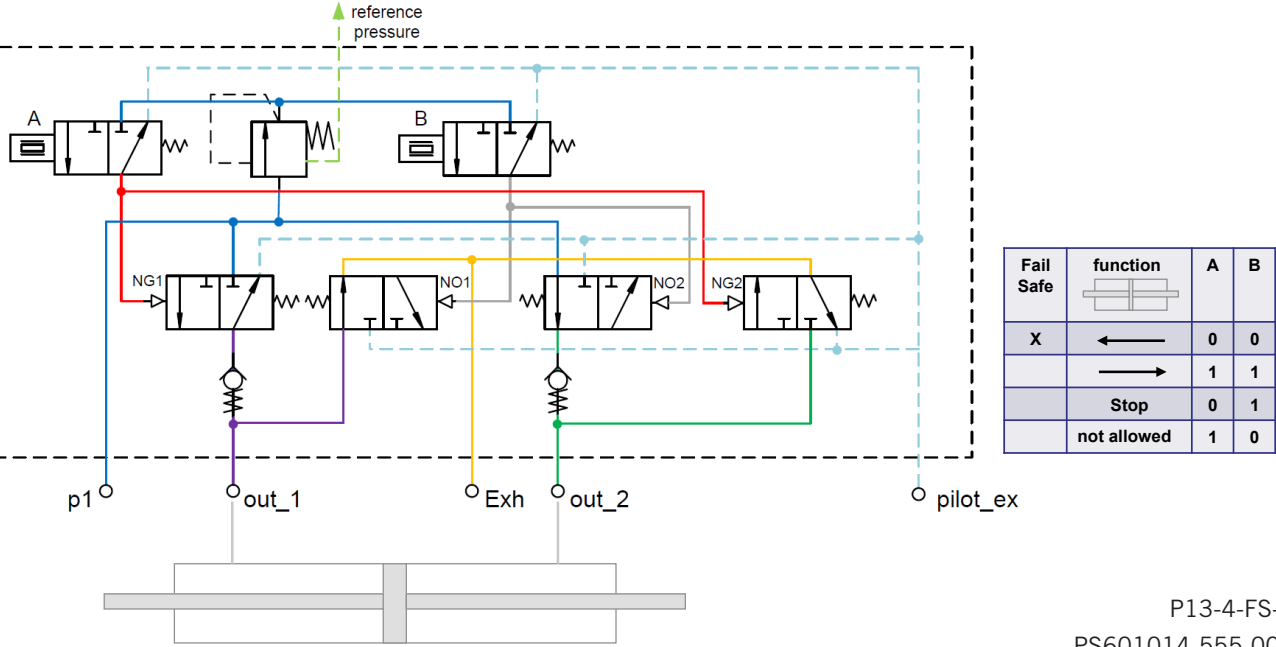
Type P13-3-FS-H  
part number PS601012-555-000



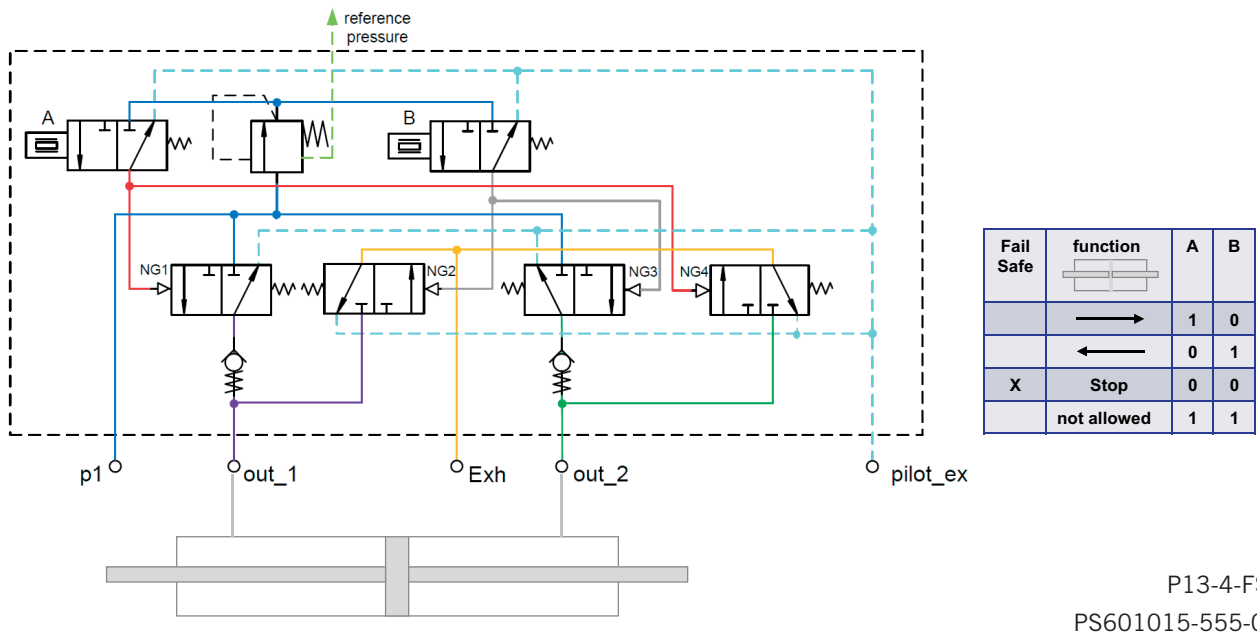
# PNEUMATIC DIAGRAMS

Double Acting  
Smart Positioner Modul

## DOUBLE ACTING POLYMER / FAIL SAFE EXHAUST



## DOUBLE ACTING POLYMER / FAIL SAFE HOLD

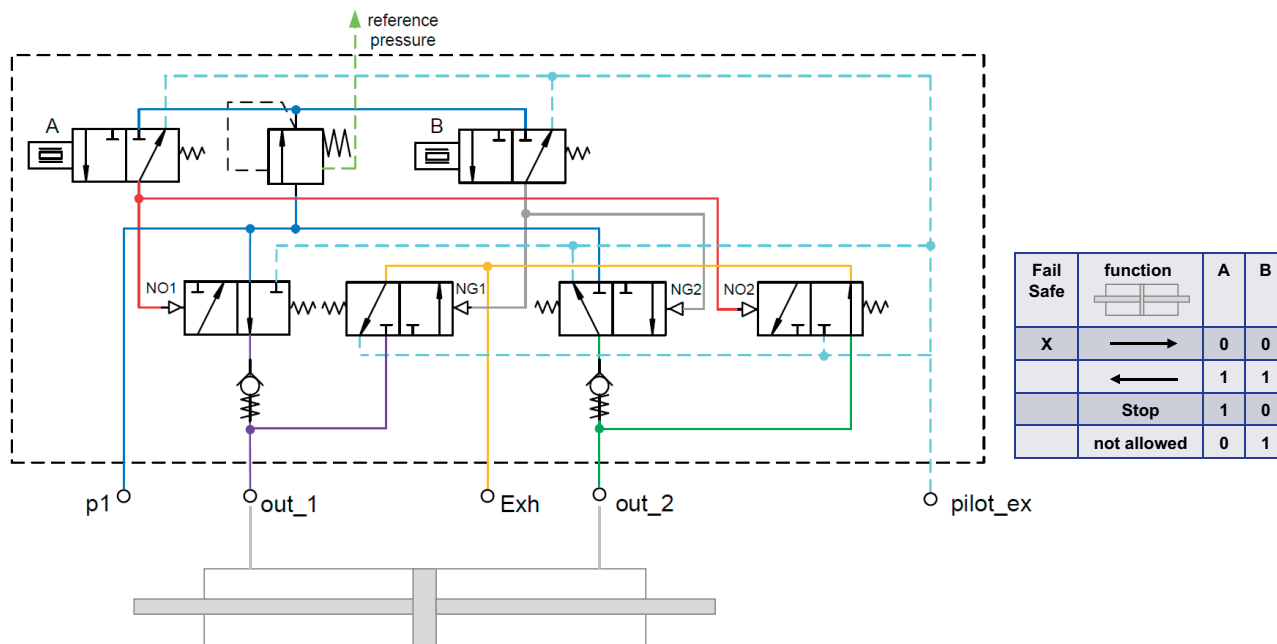


## PNEUMATIC DIAGRAMS

Double Acting

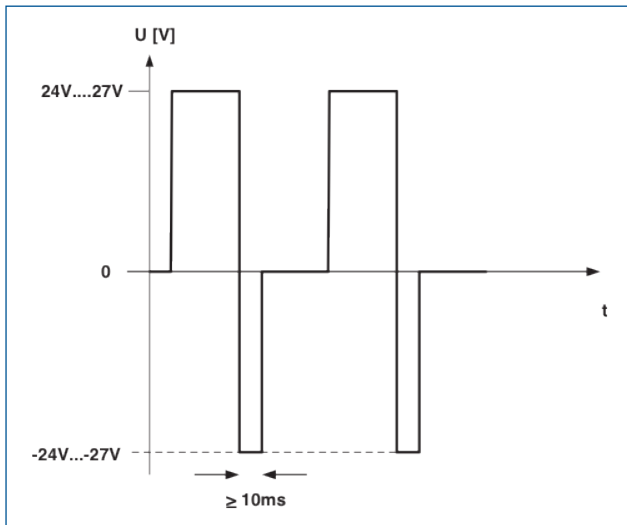
Smart Positioner Modul

### DOUBLE ACTING / FAIL SAFE FILLING



## CONTROL ADVICE

### Single and Double Acting Smart Positioner Modul



The physical characteristics of piezo ceramics under electrical voltage or temperature will cause a drift (relaxation) of the factory set switch on/off voltage. To avoid negative influence on the smart positioner function we strongly recommend to use the following piezo specific electrical control.

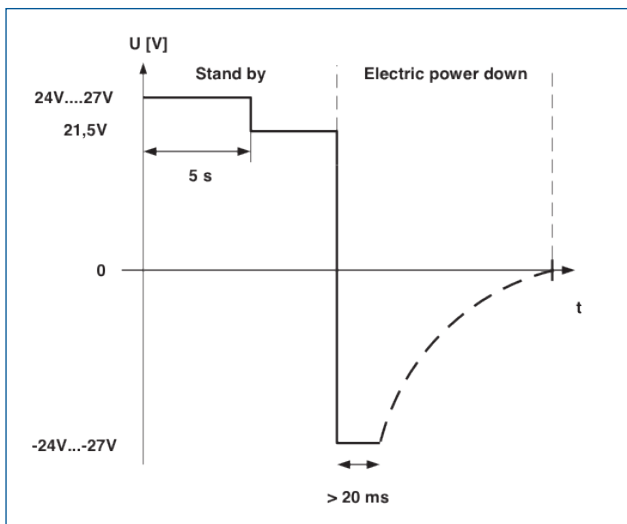
**Fig. 1**

#### Pulse modulation (PWM)

Control voltage ON: +24...+27 VDC

Control voltage OFF: -24...-27 VDC → 0V

The time a negative switch off voltage applied (-24 VDC) shall be min. 10 ms



**Fig. 2**

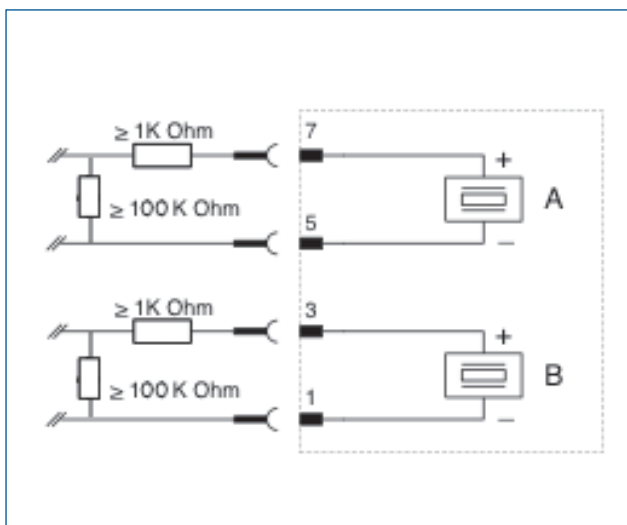
#### Normal operation

Stand by (Pressure hold): +24...+27 VDC → 21,5 V after ca. 5 seconds "ON" (power hold), lower down control voltage to +21,5 V

#### Electrical power down (Fail save):

-24...-27 VDC → 0V

After electrical power down, a negative switch off voltage shall be longer than 20 ms at the valve. A switch off impulse must be spent also in case of power loss (make appropriate switch off energy available; eg. capacitor).






**Fig. 3:**

For current limiting a serial resistor  
≥ 1 K Ohm must be provided.

For discharge a parallel Resistor (100K) shall be provided.

## ACCESSORY

### Single and Double Acting Smart Positioner Modul

DESCRIPTION		ORDER NUMBER
PLUG CONNECTOR WITH WIRES 0,5 M		
	cross section: 0,14 mm <sup>2</sup> / AWG 26	PS60086
CONNECTION AND MOUNTING SET (NECESSARY ONLY IN TEST PHASE)		
	Universal connection set for single and double acting modules, Connection G1/8	PS60266A
	Plug connector with wires 0,5m cross section: 0,14 mm <sup>2</sup> / AWG 26	

## NOTES

Smart Positioner Modul

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