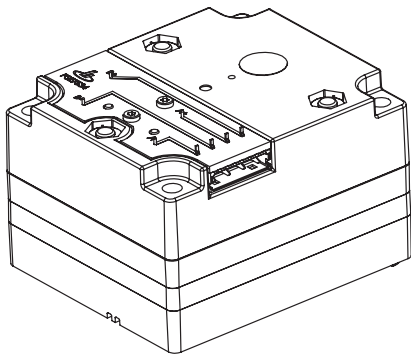


SMART POSITIONER MODUL

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)	0.32 lb	0.375 lb
Installation	in any position	
Medium	Compressed air acc. ISO8573-1	
Filtration	Class 4 (filtered 15 µm)	
Lubrication	Class 4 permanently (25 mg/m ³ occurred for max. 24 h)	
Pressure dew point	Class 4 (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	-13... +176 °F (-40°F option available)	
Ambient temperature	-13... +176 °F (-40°F option available)	
Medium temperature	-13... +176 °F (-40°F 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

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PNEUMATIC CHARACTERISTICS

		SINGLE ACTING	DOUBLE ACTING
Nominal pressure	p_1	87 psig	
Working pressure inlet	$p_{1\min}$	22 psig	
	$p_{1\max}$	116 psig	
Output pressure range	P_2	3 psig ... p_1	
Ambient pressure	p_{amb}	1.45 psig rel.	
Nominal flow rate $p_1 \rightarrow \text{out}$	QN	≥ 4.6 SCFM (@ 77°F) 87 \rightarrow 72.5 psig	
Nominal flow rate out \rightarrow Exh	QN	≥ 4.6 SCFM (@ 77°F) 87 \rightarrow 72.5 psig	≥ 8.5 SCFM (@ 77°F) 87 \rightarrow 72.5 psig
Own air consumption	QLS	≤ 0.01 SCFM (@ 77°F)	
Chamber leakage	QLC	≤ 0.0018 SCFM (@ 77°F) 87 \rightarrow 0 psig	

ELECTRIC CHARACTERISTICS

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

*see control recommendation page 10

ELECTRIC INTERFACE

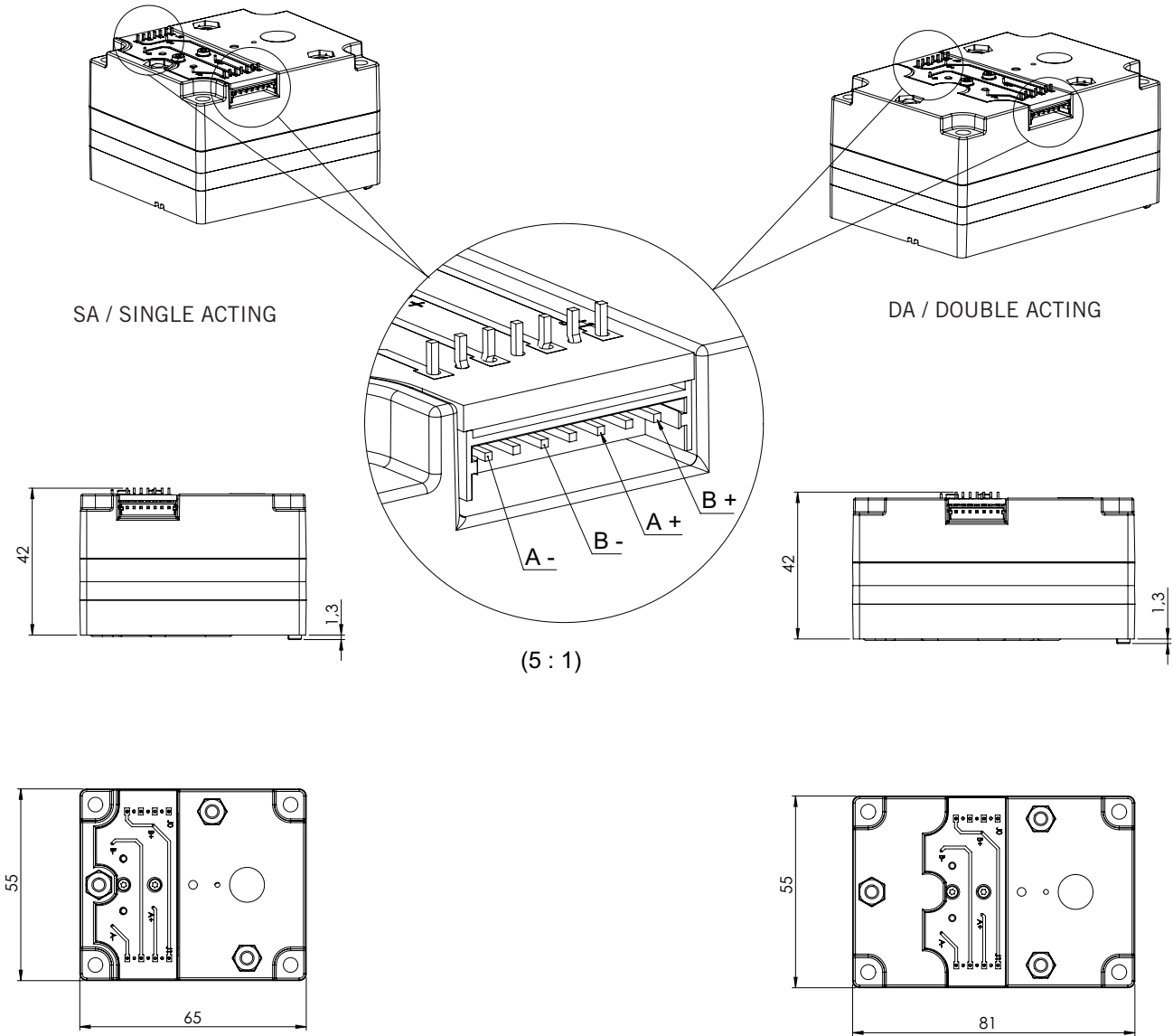
	SINGLE ACTING	DOUBLE ACTING
Type of connector	Molex Micro Blade 532540770	
Pinout	Pin1: A-	Pin1: A-
A: Piezo element A	Pin2: n.c.	Pin2: n.c.
B: Piezo element B	Pin3: B-	Pin3: B-
NC: not connected	Pin4: n.c.	Pin4: n.c.
	Pin5: A+	Pin5: A+
	Pin6: n.c.	Pin6: n.c.
	Pin7: B+	Pin7: B+

DYNAMICAL CHARACTERISTICS

		SINGLE ACTING	DOUBLE ACTING
Switching time filling	$t_{1/10\%}$	< 25 ms (@ 77°F and $p_1 = 87$ psig)	< 35 ms (@25°C and $p_1 = 6$ bar)
	$t_{2/90\%}$	< 60 ms (@ 77°F and $p_1 = 87$ psig)	< 80 ms (@25°C and $p_1 = 6$ bar)
Switching time exhausting	$t_{3/90\%}$	< 25 ms (@ 77°F and $p_1 = 87$ psig)	< 35 ms (@25°C and out1/2=6bar)
	$t_{4/10\%}$	< 70 ms (@ 77°F and $p_1 = 87$ psig)	< 90 ms (@25°C and out1/2=6bar)
Definition	Switching time measurement is a system step reponse with nominal pressure supply and a chamber-volume of app. 0.8 cubic inch		

DIMENSIONAL DRAWING

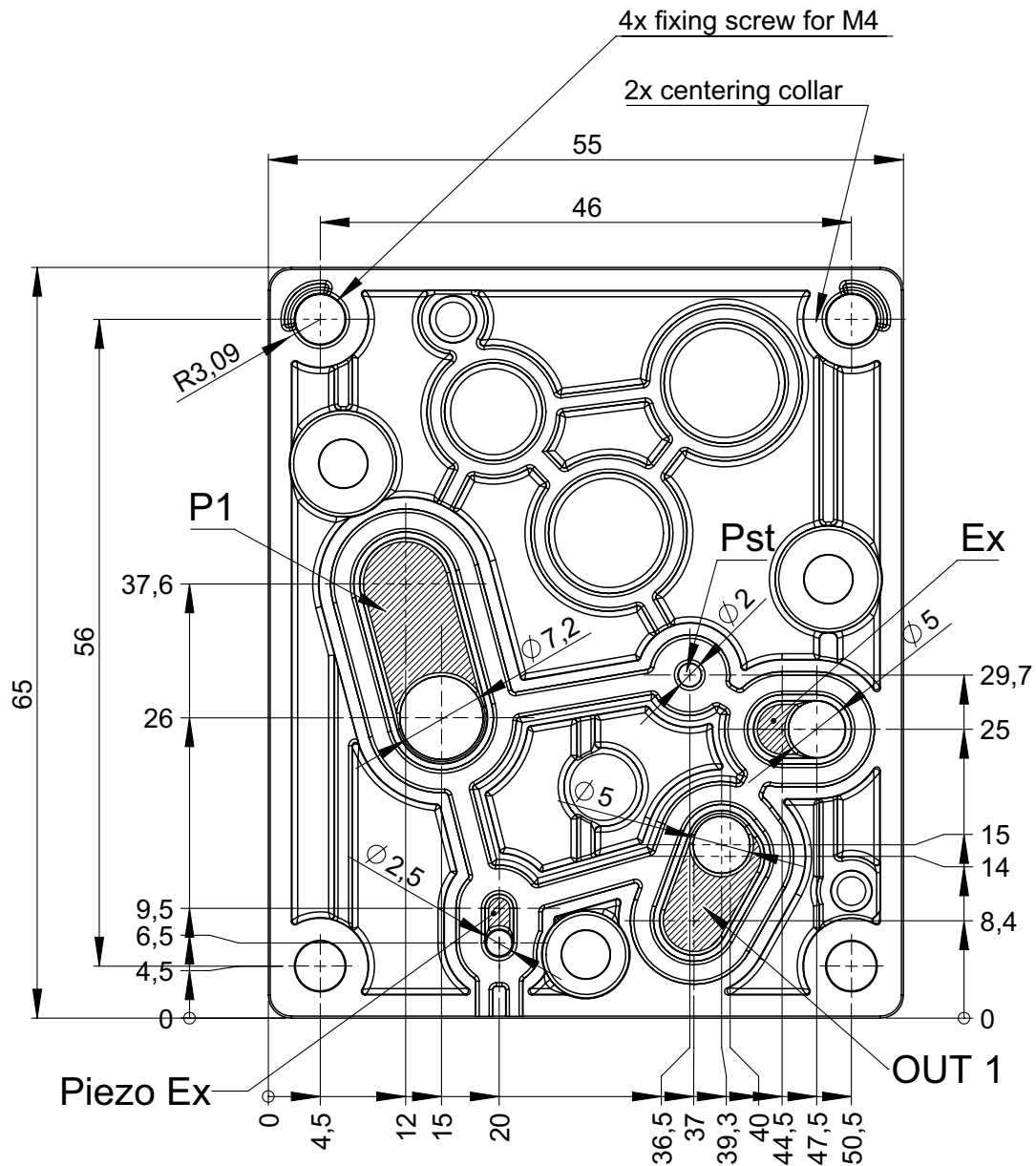
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all dimensions in mm
convert to inch:
dimension divided by 25.4

PNEUMATIC PORTS

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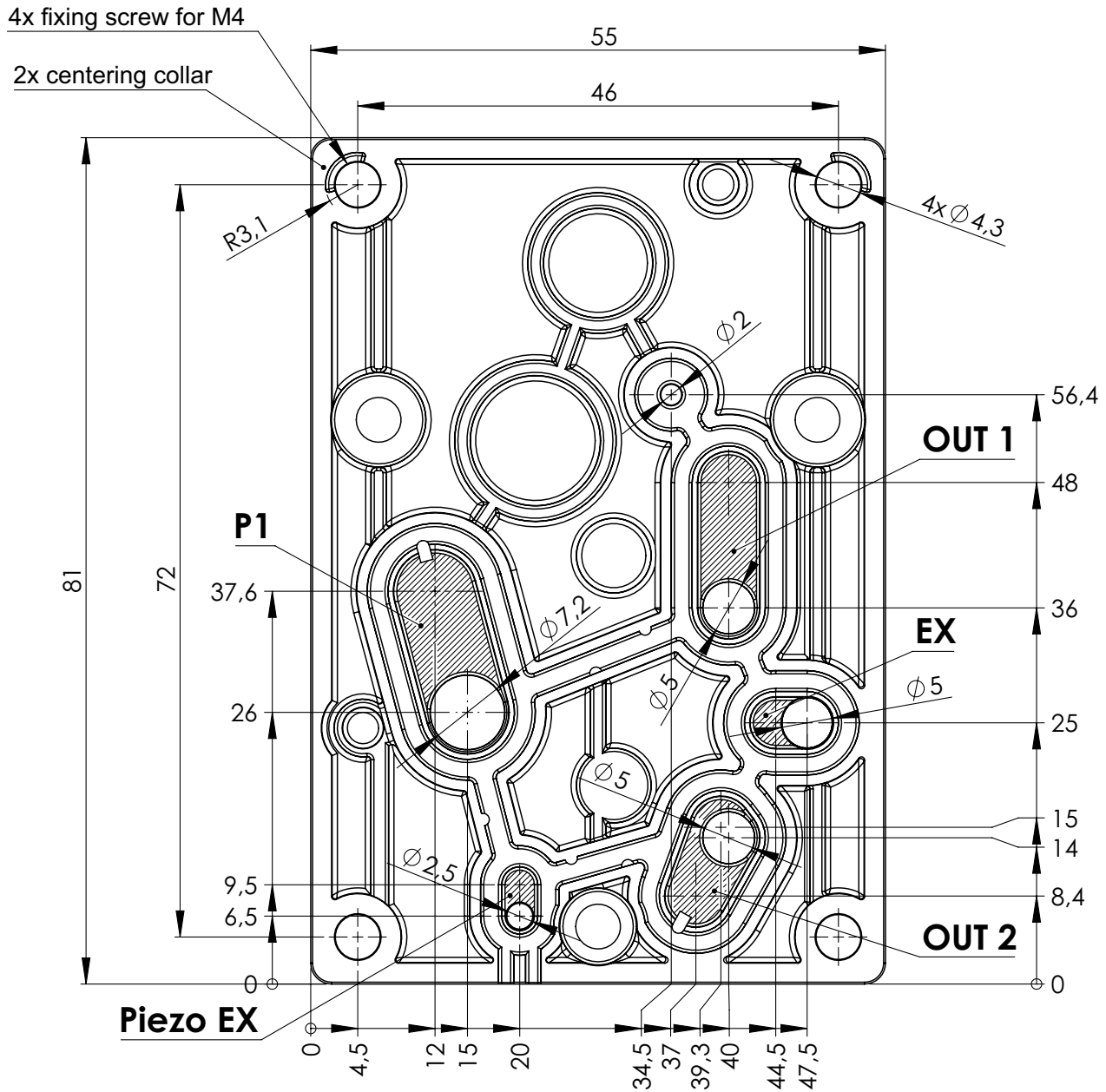


all dimensions in mm
 convert to inch:
 dimension divided by 25.4

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!



all dimensions in mm
 convert to inch:
 dimension divided by 25.4

PNEUMATIC PORTS DOUBLE ACTING

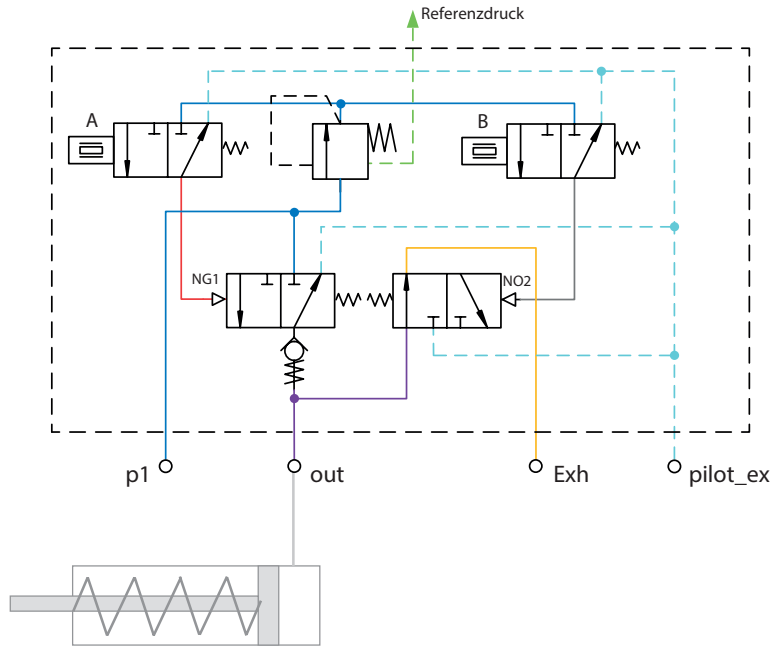
Piezo Ex	collected air from piezo valve
P1	inlet pressure
OUT 1	outlet chamber
OUT 2	outlet chamber
EX	exhaust
Pst*	pilot pressure

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

PNEUMATIC DIAGRAMS

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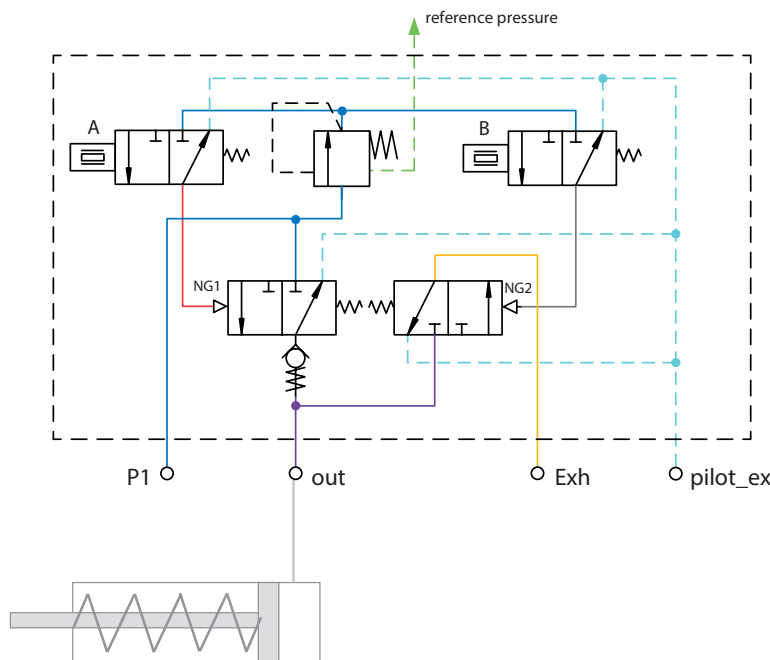
SINGLE ACTING POLYMER / FAIL SAFE EXHAUST



Fail Safe	Funktion	A	B
X	→	0	0
	←	1	1
	Stop	0	1
	nicht erlaubt	1	0

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

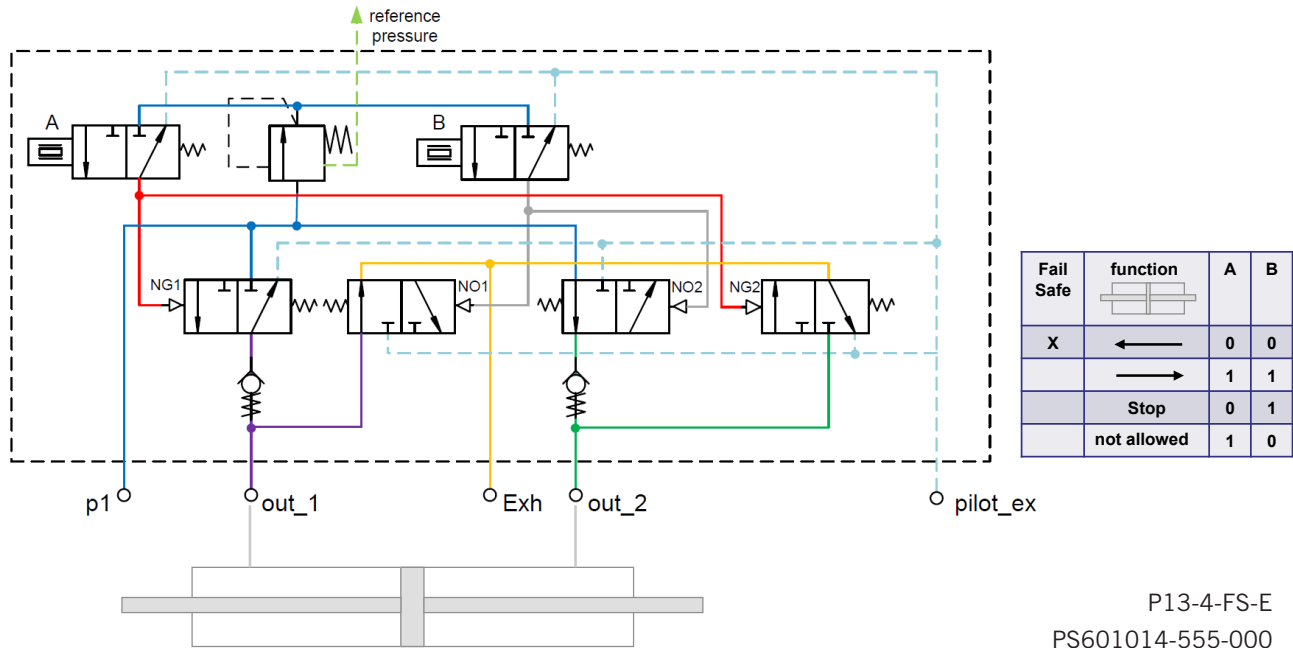
SINGLE ACTING POLYMER / FAIL SAFE HOLD



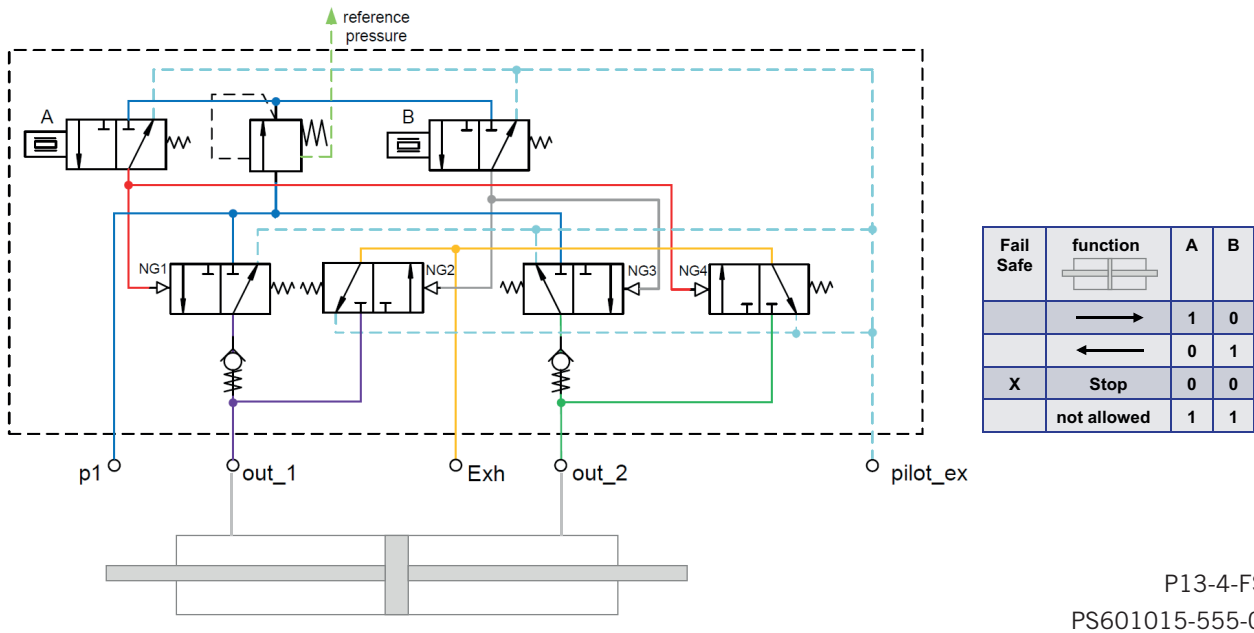
Fail Safe	function	A	B
	→	0	1
	←	1	0
X	Stop	0	0
	not allowed	1	1

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

DOUBLE ACTING POLYMER / FAIL SAFE EXHAUST



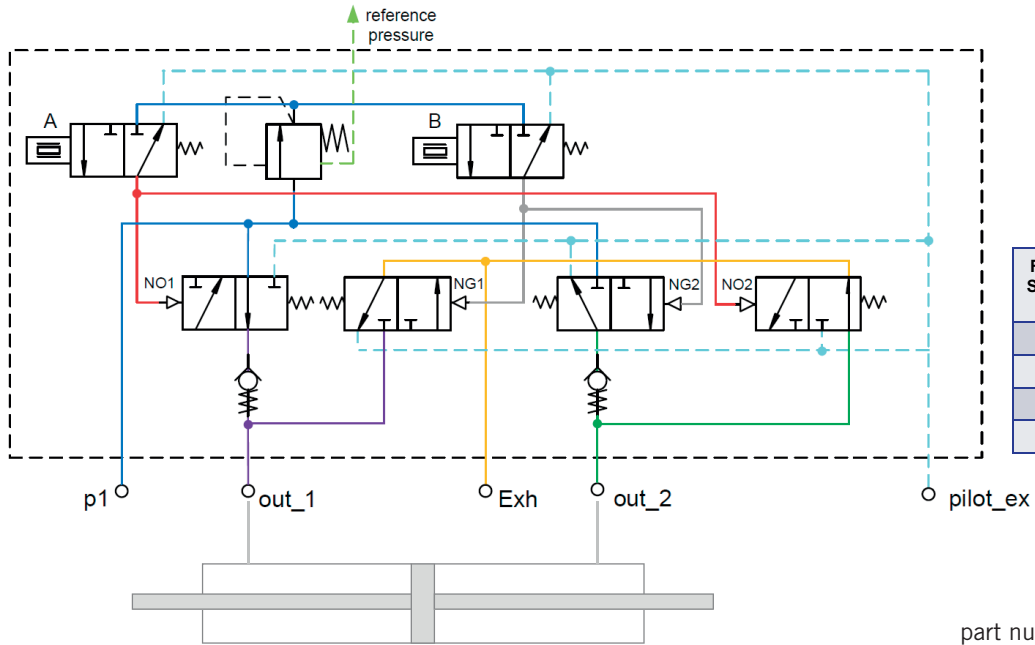
DOUBLE ACTING POLYMER / FAIL SAFE HOLD



PNEUMATIC DIAGRAMS

Smart Positioner Modul

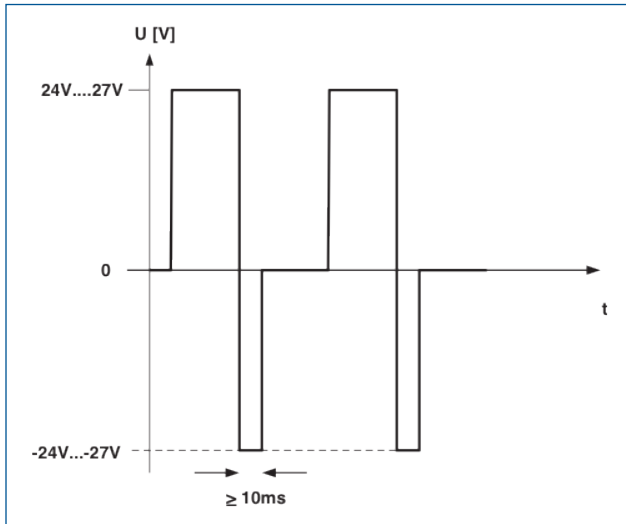
DOUBLE ACTING / FAIL SAFE FILLING



Type P13-4-FS-B
part number PS601013-555-000

CONTROL ADVICE

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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

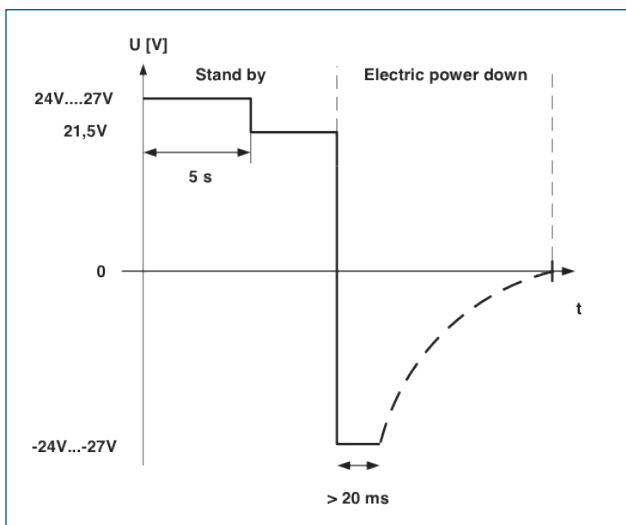


Fig. 2

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).

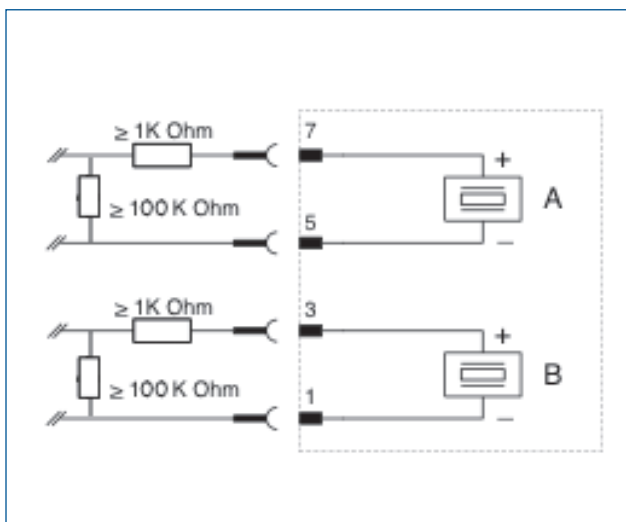


Fig. 3:

For current limiting a serial resistor $\geq 1 \text{ K Ohm}$ must be provided.

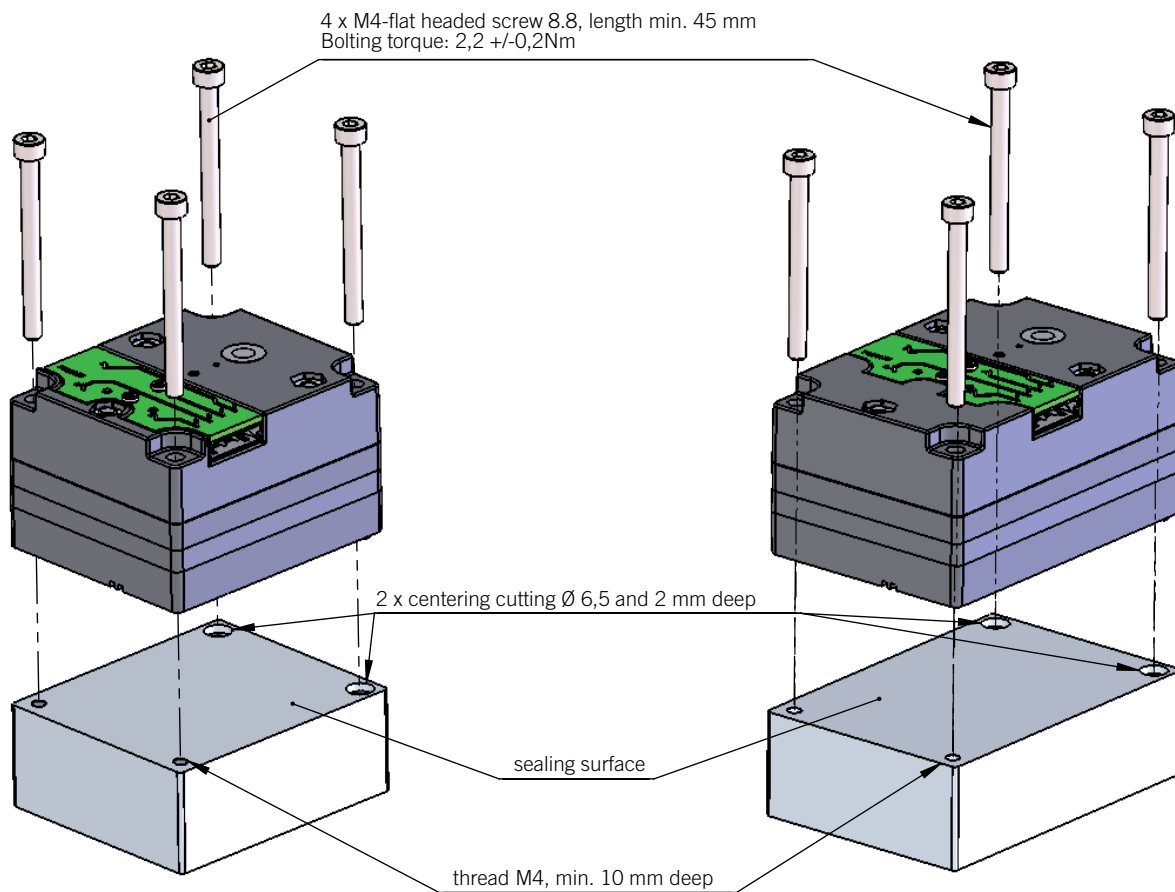
For discharge a parallel Resistor (100K) shall be provided.

INSTRUCTIONS FOR INSTALLATION

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Single acting

Double acting

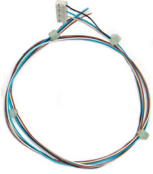




Specifications to sealing surface: \square 0,05 ∇ Ra 1,6

all dimensions in mm
convert to inch:
dimension divided by 25.4

ACCESSORY

Smart Positioner Modul

	DESCRIPTION	ORDER NUMBER
	PLUG CONNECTOR WITH WIRES 0,5 M cross section: 0,14 mm ² / AWG 26	PS60086C
CONNECTION AND MOUNTING SET (NECESSARY ONLY IN TEST PHASE)		
	Universal connection set for single and double acting modules, Connection G1/8	PS60266B
	Plug connector with wires 0,5m cross section: 0,14 mm ² / AWG 26	

NOTES

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NOTES

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