

## Pneumatic actuator mechanism for Wafer and Lug Butterfly Valves



The fluid used in pneumatic position indicators can be water, air or any other non-corrosive fluid. Compressed air is generally used at a maximum supply pressure of 8 bar and a temperature ranging from -32°C to +90°C. The air acts on a piston. The movement of this piston causes a threaded rod to move longitudinally.

There are two models : the « PA » type and the « P » type.

"PA" type actuator mechanisms are composed of pre-compressed springs with a single spring safety system. The number of springs on each side can vary from 2 to 6 springs depending on the operating torque requirements. Easy to assemble and replace.

"P" type actuator mechanisms are composed of two concentric springs on each side. The safety system is optional. There is no initial pre-compression, which makes assembling and replacing the springs less straightforward.

There are two possible operating modes for a pneumatic actuator mechanism: single effect (spring return) and double effect, with torques ranging from 15 Nm to 5,000 Nm.

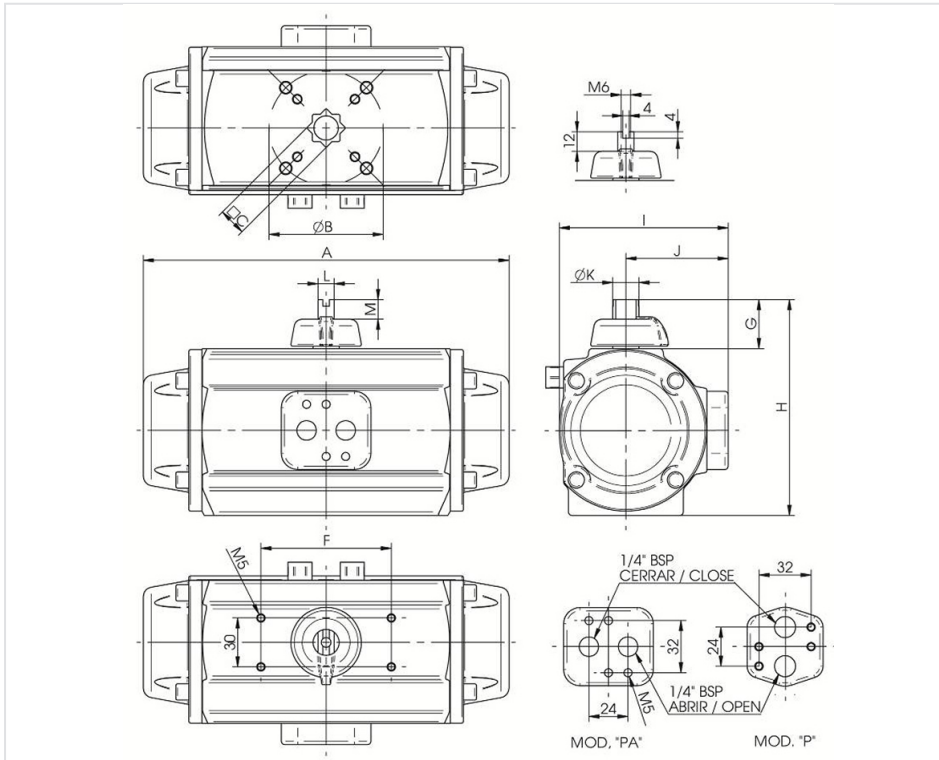
Single effect consists of a single chamber with a piston plus a mechanical spring. Air pressure moves the piston and compresses the spring. In the event of air failure, the spring returns the piston to its original position.

Double effect consists of two chambers. In the event of air failure, the piston remains in its final position.

### General dimensions

DE Type	SE Type	A for DE mm	A for SE mm	B mm	C mm	F mm	G mm	H mm	I mm	J mm	K mm	L mm	M mm	Mass DE kg	Mass SE kg
PA00	PA00S	152.3	152.3	F05	14	80	30	111.3	84.1	52.2	13.8	10	12.5	1.4	1.62
PA05	PA05S	200.8	200.8	F05-F07	17	80	30	128.3	101.6	61.7	13.8	10	12.5	2.57	2.94
PA10	PA10S	224.4	224.4	F05-F07	17	80	30	132.3	103.6	62.7	13.8	10	12.5	3.08	3.48
PA15	PA15S	264.2	264.2	F05-F07	17	80	30	147.8	119.4	70.5	13.8	10	12.5	4.20	5.04
PA20	PA20S	310	310	F05-F07	17	80	30	156.3	127.5	75.1	21.9	16	12.5	5.61	6.63
PA25	PA25S	356.2	356.2	F07-F10	27	80	30	184.3	153.5	89.2	21.9	16	12.5	9.30	11.3
P30	P30S	349	479	F07-F10	27	80	30	211	177	94	21.8	16	11	9.10	15.9
P40	P40S	444	598.4	F10-F12	36	130	50	272	226	120	41.9	32	20	17.6	36.4
P50	P50S	524	694	F14	36	130	50	313	257.5	135	41.9	32	20	30.7	58.4
PA60	PA60S	672.5	672.5	F16	46	130	50	368	330.5	172	41.9	32	13.5	48.3	63.2
PA70	PA70S	742.5	742.5	F16	46	130	50	428	403	217	41.9	32	10.5	77.9	118.2

DE = double effect - SE = simple effect



## Selecting the type of pneumatic actuator

The selection of the mechanism type is based on the DN of the butterfly valve, the network pressure, and the type of actuator (single or double effect).

There are two types of actuator mechanisms: "PA" and "P". The difference lies in the type of springs used:

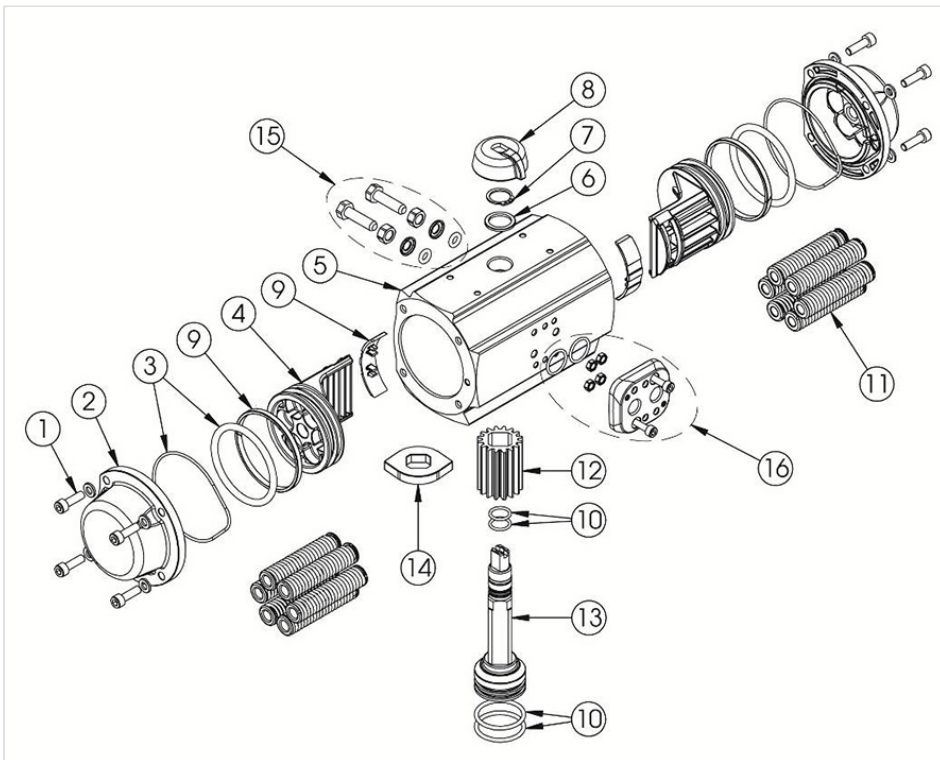
- "PA" type: 2 to 6 pre-compressed springs with expansion limiter (new version)
- "P" type: 1 or 2 concentric springs (old version)

DN	Double effect			Simple effect		
	PN6	PN10	PN16	PN6	PN10	PN16
32	PA00	PA00	PA00	PA00S	PA00S	PA05S
50	PA00	PA00	PA00	PA00S	PA00S	PA05S
65	PA00	PA05	PA05	PA05S	PA05S	PA10S
80	PA05	PA05	PA05	PA10S	PA10S	PA15S
100	PA05	PA05	PA10		PA15S	PA20S
125	PA10	PA10	PA15	PA20S	PA20S	PA25S
150	PA15	PA15	PA20	PA25S	PA25S	P30S
200	PA20	PA20	PA25	P30S	P30S	P30S

DN	Double effect			Simple effect		
	PN6	PN10	PN16	PN6	PN10	PN16
250	PA25	PA25	P30	P40S	P40S	P40S
300	P30	P30	P30	P40S	P40S	P40S
350	P30	P40	P40	P40S	P40S	P50S (*)
400	P40	P40	P50 (DN400*)	P50S (*)	P50S (*)	PA60S (*)
450	P50 (DN600*)	P50 (DN500*)		PA60S (*)	PA60S (*)	PA70S (*)
500		PA60 (*)	PA70 (*)	PA70S (*)	PA70S (*)	
600						
700	PA60 (*)	PA70 (*)				
800	PA70 (*)					

(\*) Special assembly - Consult us

## PA Type Materials

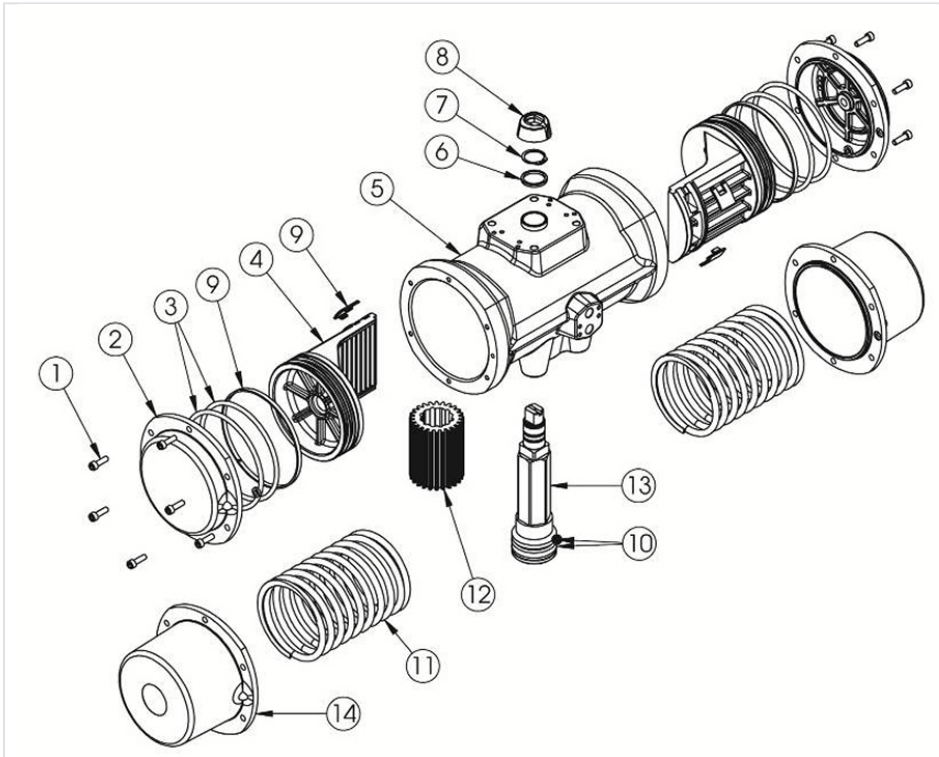


Item	Description	Material	Quantity
1	Allen screws + cover washers	Stainless steel AISI-304	8
2	Side covers	Aluminium Alloy + Cataphoresis + Polyurethane	2

Item	Description	Material	Quantity
3	Cover and piston O-rings	NBR	4
4	Piston	Aluminium Alloy + Cataphoresis	2
5	Extruded cylinder	Aluminium Alloy + Cataphoresis + Rilsan 250 µm	1
6	Washer	Polyamide 6	1
7	Safety clip spring	Nickel-coated steel + PTFE	1
8	Position indicator	Polyamide	1
9	Piston guide	POM (1) / PTFE + Bronze (2) / Nylon (3)	4
10	Shaft O-ring	NBR	4
11	Springs assembly	Steel DIN 17-223-C passivated Trivalent Cr	2 to 12
12	Gear	Aluminium + Cataphoresis	1
13	Shaft	Steel + Cataphoresis	1
14	Lever	Steel + Cataphoresis	1
15	End-of-travel adjustment hardware	Inox A2 (5) and AISI-304 / ACERPL (6)	1
16	Connection plate	Polyamide + FV / CF8M	2

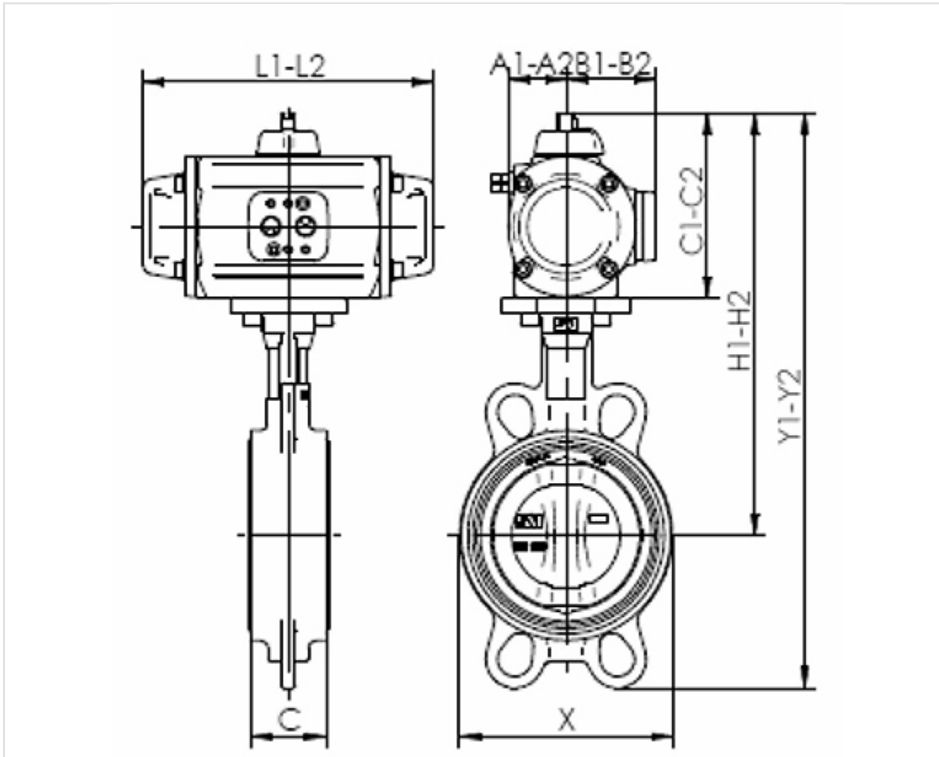
1) PA and P40 series (excluding PAW) - (2) P series - (3) P50 and PA70

## P Type Materials



Item	Description	Matériel	Quantité
1	Allen screws + cover washers	Stainless steel AISI-304	
2	Side covers	Aluminium Alloy + Cataphoresis + Polyurethane	2
3	Cover and piston O-rings	NBR	4
4	Piston	Aluminium Alloy + Cataphoresis	2
5	Extruded cylinder	Aluminium Alloy + Cataphoresis + Rilsan 250 µm	1
6	Washer	Polyamide 6	1
7	Safety Circlips	Nickel-coated Steel + PTFE	1
8	Position Indicator	Polyamide	1
9	Piston guide	PFTE + Bronze	4
10	Shaft O-ring	NBR	4
11	Springs assembly	Steel DIN 17-223-C passivated Trivalent Cr	2-4
12	Gear	Aluminium + Cataphoresis	1
13	Shaft	Acier + Cataphoresis	1
14	External side covers	Aluminium Alloy + Cataphoresis + Polyurethane	2

Simple effect and double effect dimensions



Double effect

DN mm	Plug inch	C mm	X mm	Reference	A1 mm	B1 mm	C1 mm	H1 mm	Y1 mm	L1 mm	Mass kg
25	1"	33	68	PA00	31.9	52.2	129.8	232.5	292.5	152.3	2.9
32	1¼"	33	68	PA00	31.9	52.2	129.8	232.5	292.5	152.3	2.9
40	1½"	33	76	PA00	31.9	52.2	129.8	239.8	295.8	152.3	3.1
50	2"	43	100	PA00	31.9	52.2	129.8	249.8	311.3	152.3	3.8
65	2½"	46	108	PA05	39.9	61.7	128.3	263.3	332.3	200.8	5.2
80	3"	46	124	PA05	39.9	61.7	128.3	269.3	363.3	200.8	5.7
100	4"	52	147	PA05	39.9	61.7	128.3	293.3	399.3	200.8	6.5
125	5"	56	180	PA10	40.9	62.7	132.3	312.3	438.8	224.4	9.2
150	6"	56	206	PA15	48.9	70.5	147.8	340.8	473.8	264.2	11.4
200	8"	60	257	PA20	52.4	75.1	156.3	381.3	551.3	310	16.6
250	10"	68	324	PA25	64.3	89.2	184.3	466.8	676.8	356.3	29.8
300	12"	78	376	P30	83	94	211	519	759	349	38.6

DN mm	Plug inch	C mm	X mm	Reference	A1 mm	B1 mm	C1 mm	H1 mm	Y1 mm	L1 mm	Mass kg
350	14"	78	430	P40	106	120	272	610.5	873.5	444	53
400	16"	102	485	P40	106	120	272	652	960	444	73.5
450	18"	114	536	P50	122.5	135	313	693.5	1033	524	112
500	20"	127	593	P50	122.5	135	313	745.5	1125	524	144
600	24"	154	690	PA60	158.5	172	368	862	1302	672.5	254
700	28"	165	830	PA70	186	217	453	1043	1533	742.5	330

## Simple effect

DN mm	Plug inch	C mm	X mm	Reference	A2 mm	B2 mm	C2 mm	H2 mm	Y2 mm	L2 mm	Mass kg
25	1"	33	68	PA00S	31.9	52.2	129.8	232.5	292.5	152.3	3.1
32	1¼"	33	68	PA00S	31.9	52.2	129.8	232.5	292.5	152.3	3.1
40	1½"	33	76	PA00S	31.9	52.2	129.8	239.8	295.8	152.3	3.3
50	2"	43	100	PA00S	31.9	52.2	129.8	249.8	311.3	152.3	4
65	2½"	46	108	PA05S	39.9	61.7	128.3	263.3	332.3	200.8	5.5
80	3"	46	124	PA10S	40.9	62.7	132.3	273.3	367.3	224.4	6.6
100	4"	52	147	PA15S	48.9	70.5	147.8	312.8	418.8	264.2	9
125	5"	56	180	PA20S	52.4	75.1	156.3	336.3	462.8	310	12.7
150	6"	56	206	PA25S	64.3	89.2	184.3	377.3	510.3	356.2	18.5
200	8"	60	257	P30S	83	94	211	436	606	479	27
250	10"	68	324	P40S	106	120	272	554.5	764.5	598.4	57
300	12"	78	376	P40S	106	120	272	580	820	598.4	66
350	14"	78	430	P40S	106	120	272	610.5	873.5	598.4	72
400	16"	102	485	P50S	122.5	135	383	763	1071	694	114
450	18"	114	536	PA60S	158.5	172	438	818.5	1158	672.5	164
500	20"	127	593	PA70S	186	217	498	930.5	1310	742.5	232

## Mechanical Performances

### Operating torque

DE - Double Effect		SE - Simple Effect					
Type	Air 6 bar Nm	Type	Number of springs	Initial springs Nm	Final springs Nm	Air 6 bar initial Nm	Air 6 bar final Nm
PA00	25	PA00S	6	16.5	11.1	13.9	8.5

DE - Double Effect		SE - Simple Effect					
Type	Air 6 bar Nm	Type	Number of springs	Initial springs Nm	Final springs Nm	Air 6 bar initial Nm	Air 6 bar final Nm
PA05	49.7	PA05S	6	31.4	20.9	28.8	18.3
PA10	71	PA10S	6	45.6	30.8	40.2	25.4
PA15	116.5	PA15S	6	71.5	49	67.5	45
PA20	165.5	PA20S	6	104.7	65.8	99.7	60.8
PA25	290	PA25S	6	181.8	119.4	170.6	108.2
P30	469.2	P30S	4	273.7	179.9	289.3	195.5
P40	1180	P40S	4	766.9	491.6	688.3	413
P50	2067	P50S	4	1206	723.6	1344	861.4
PA60	3458	PA60S	6	2075	1383	2075	1383
PA70	5043	PA70S	6	3539	1769	3273	1504

## Operating time

Type DE	Type SE	Mass DE kg	Mass SE kg	Operating time in seconds			
				Double effect opening	Double effect closing	Simple effect opening	Simple effect closing
PA00	PA00S	1.40	1.62	0.15	0.15	0.2	0.2
PA05	PA05S	2.57	2.94	0.2	0.2	0.25	0.25
PA10	PA10S	3.08	3.48	0.25	0.25	0.3	0.3
PA15	PA15S	4.20	5.04	0.3	0.3	0.4	0.4
PA20	PA20S	5.61	6.63	0.4	0.4	0.5	0.5
PA25	PA25S	9.30	11.3	0.5	0.5	0.8	0.8
P30	P30S	9.10	15.9	0.6	0.6	1.2	1.2
P40	P40S	17.6	36.4	1.2	1.2	2	2
P50	P50S	30.7	58.4	2	2	6	6
PA60	PA60S	48.3	83.2	3	3	6	5
PA70	PA70S	77.9	118.2	4	4	8	6

## Volume capacity in liters at atmospheric pressure

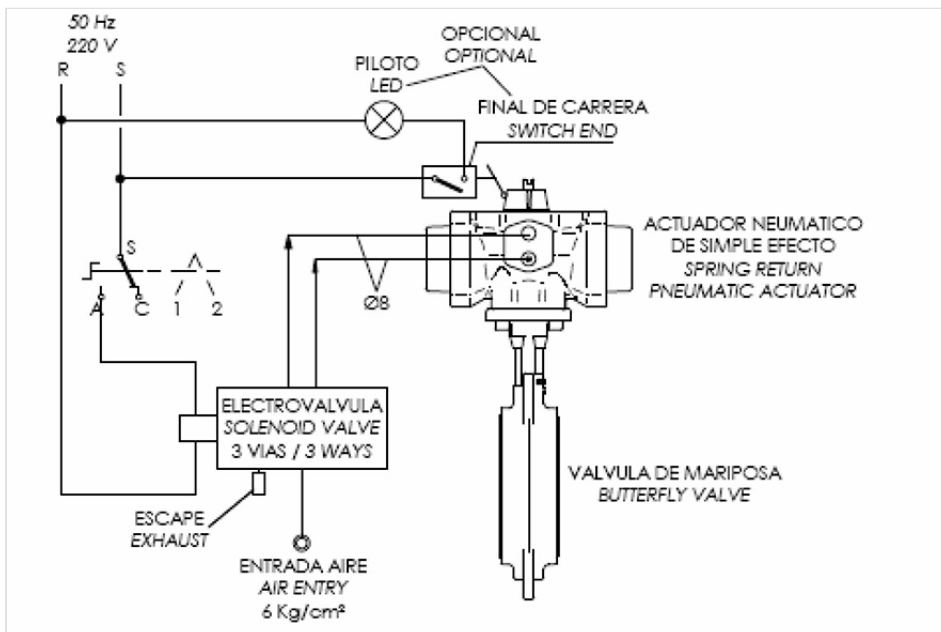
### Liters at atmospheric pressure

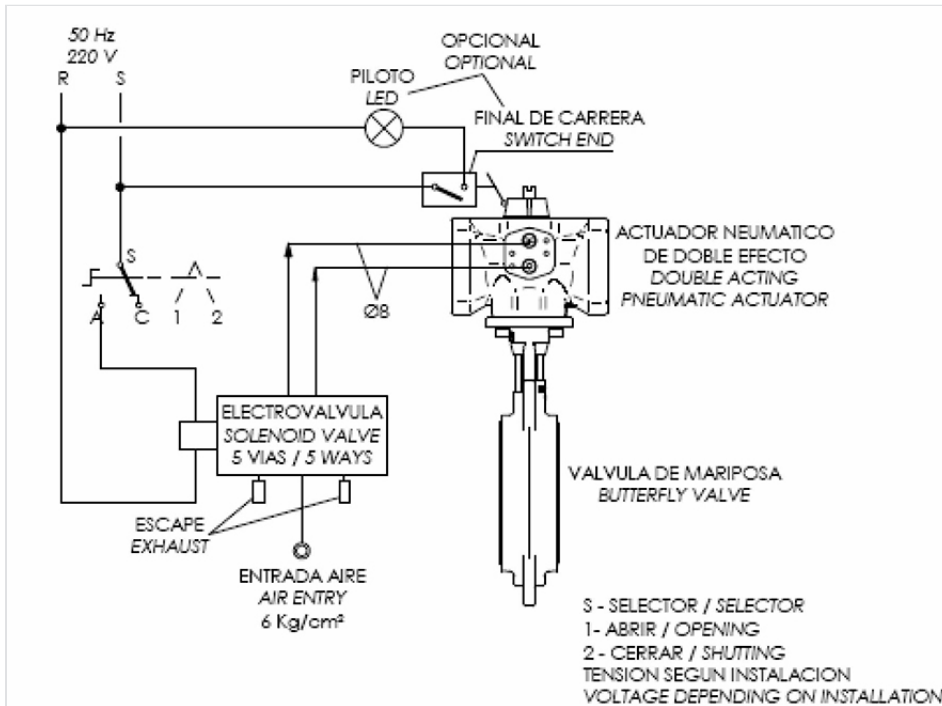
SE - Simple effect		DE - Double effect		
Type	Opening	Type	Opening	Closing
PA00S	0.15	PA00	0.15	0.18
PA05S	0.28	PA05	0.28	0.37
PA10S	0.35	PA10	0.35	0.45

SE - Simple effect		DE - Double effect		
Type	Opening	Type	Opening	Closing
PA15S	0.65	PA15	0.65	0.82
PA20S	0.8	PA20	0.8	1.15
PA25S	1.5	PA25	1.5	2.02
P30S	2.05	P30	2.05	1.9
P40S	5.3	P40	5.3	5.3
P50S	10.5	P50	10.5	7
PA60S	19.5	PA60	19.5	20.7
PA70S	31	PA70	31	30

To calculate the air consumption, multiply the figure given in the table by the working pressure of the compressed air in bar.

### Installation diagram





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