

Pneumatic Actuator

Type LP0

The multi-spring membrane pneumatic actuators of LP0 type are applied for control operation of control valves and other positioning elements in industrial automatic systems.



TECHNICAL PARAMETERS

Actuator Function	<ul style="list-style-type: none"> • direct – the spring opens without air pressure • indirect – the spring closes without air pressure 	Potential Force [kn]	1 – 90 (air) 0.5 – 54 (spring)
Actuator Type	single-acting pneumatic diaphragm actuator	Maximum Supply Pressure [kpa]	450
Actuator Stroke [mm]	20, 38, 50, 60, 80, 100	Working Temperature Range	<ul style="list-style-type: none"> • -40 °C to +80 °C – standard • -60 °C to +80 °C – low-temperature design
Diaphragm Working Area [cm ²]	250, 400, 630, 2x630, 1000, 1500, 2x 1500	Hand Control	top handwheel
Spring Deflection Range [kpa]	<ul style="list-style-type: none"> • 20 – 100, 40 – 120, 60 – 140 (3 springs) • 40 – 200, 80 – 240, 120 – 280 (6 springs) • 180 – 380 (12 springs) 	Optional Accessories	pneumatic positioner electropneumatic positioner position transmitter, limit switches 3/2 – way control valve supply pressure reducing unit filter lock-up valve, pneumatic booster

PNEUMATIC ACTUATOR

OVERVIEW

There are three following design options of the acuator:

- direct action (air - ejects the stem)-type P,
- reverse action (air – retracts the stem)- type R,
- direct action, handwheel-type PN,
- reverse action, handwheel-type RN

FEATURES

- completely reversible action, option to change spring range w/o extraparts,
- actuator mounted on the columns,
- wide range of the available forces,
- linear relationship between rod displacement and control pressure as a result of using membranes with constant active area,
- various ranges of spring pressures due to changeability of spring number and /or dislocation of distance fencers,
- capability of the actuator o incorporate side-mounted handwheel, pneumatic or electro-pneumatic positioners, limit switches, air sets, three-way pneumatic solenoid valves, lockup valves, position transducers,
- possibility to equip with accessories allowing to decrease or increase distortion time,
- high strength of diaphragms, springs and packings,
- small size and weight

TECHNICAL SPECIFICATION

Input signal range	Spring range marking
20...100 kPa;	1
40...200 kPa;	2
40...120 kPa;	3
80...240 kPa;	4
60...140 kPa;	5
120...280 kPa;	6
180...380 kPa;	7

NUMBER OF SPRINGS	
range	springs
Standard version	
1,3,5	3
2,4,6	6
7	12
TANDEM version	
1,3,5	6
2,4,6	12
7	24

Working temperature:	- 40 +80°C
Relative humidity:	max. 98%

TABLE 1. TECHNICAL PARAMETERS

Size	Diaphragm effective area [cm²]	Stroke [mm]	Spring range marking	Max. supply pressure [kPa]
250	250	20	1...6	600
400	400			
630	630			
R-630T	2x630	20; 38	1...7	500
1000	1000	38; 50; 63		
1500	1500	38; 50; 63; 80; 100		
1500T	2x1500	50; 63; 80; 100		

FIGURE 1 - DIMENSIONS AND WEIGHT

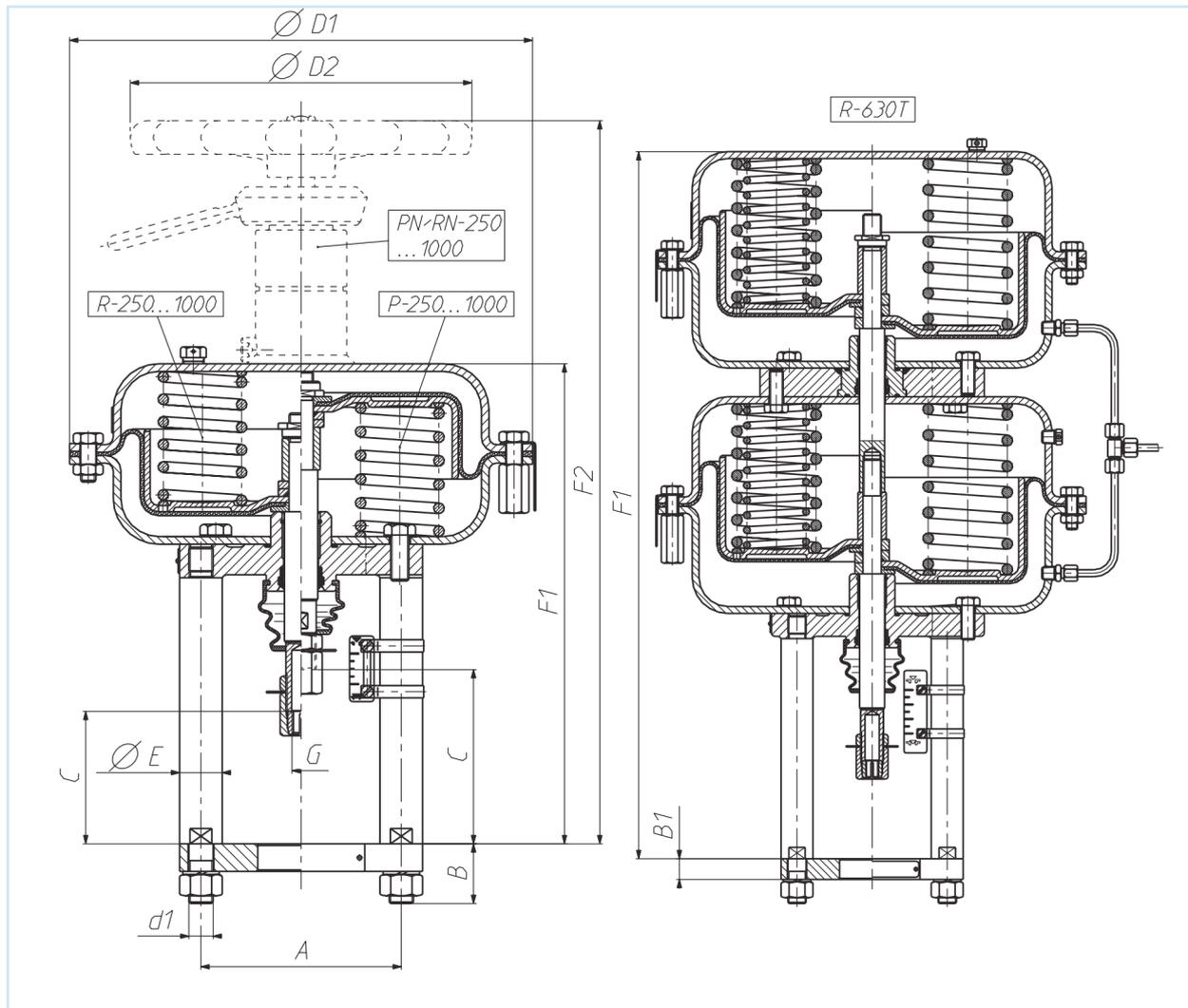


TABLE 2. DIMENSIONS AND WEIGHT OF THE ACTUATORS P/R-250...1000

Actuator size	A	B	B ₁	C		D ₁	D ₂	d ₁	E	F ₁	F ₂	G	Weight	
				P, PN	R, RN								P, R	PN, RN
250	110	31	18	112	86	240	225	M12	22	306	468	M12x1,25	10	14,5
400	132	39		116		305				312	474		16	20,5
630				134		305	402	564	30	37				
R-630T	-	-	20	375		-	616	-	45	52				
1000	216	50	20	210	127	477	450	M24	42	585	825	M16x1,5	74	100

FIGURE 2 - DIMENSIONS AND WEIGHT

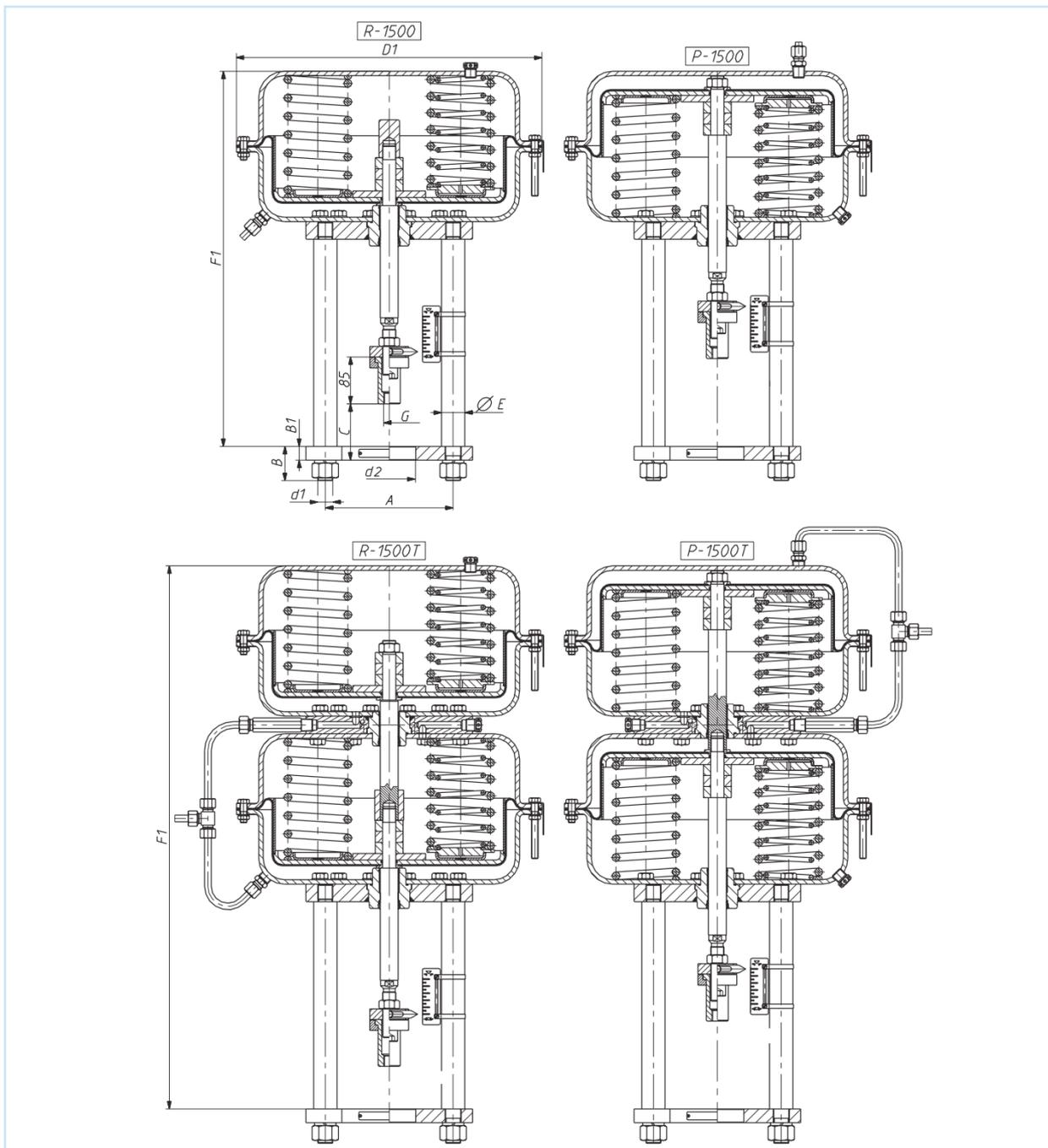


TABLE 2. DIMENSIONS AND WEIGHT OF THE ACTUATORS P/R-250...1000

Actuator size	A	B	B ₁	d ₂	D ₁	d ₁	E	F ₁	G	Weight	Actuator size	Stroke	C	
										P/R			P	R
[mm]											[mm]			
1500	230	62	18	57,15	550	M27	42	679	M16x1,5 M20x1,5 M24x1,5	95	1500	38	142	102
			22	84,15								50	154	
			25	70								63	167	
25			95,25	80								184		
1500T			18	57,15								100	204	
			22	84,15								50	154	
	25	70	63	167										
			25	95,25						200	1500T	100	2041	

DISPOSITION FORCES

Disposition actuator forces F_s [kN]:

Pneumatic actuator type P: $F_s = 10^{-4} \cdot A \cdot (p_z - p_2)$,

Pneumatic actuator type R: $F_s = 10^{-4} \cdot A \cdot p_1$

where:

A - Diaphragm effective area [cm²] - acc. table 1,

p_z - supply pressure [kPa] - acc. table 4

p_1 ; p_2 - Opening and closing spring range [kPa] - acc. table 4

TABLE 4. DISPOSITION FORCES FOR ACTUATORS F_s [kN]

Size	Actuator P			Actuator R					
	Supply pressure			Spring range					
	[kPa]			[kPa]					
	140	250	400	20...100	40...120 40...200	60...140	80...240	120...280	180...380
250	1,0	3,8	7,5	0,5	1,0	1,5	2,0	3,0	-
400	1,6	6,0	12,0	0,8	1,6	2,4	3,2	4,8	-
630	2,5	9,5	18,9	1,3	2,5	3,8	5,5	7,6	11,3
R630T	-	-	-	2,6	5,0	7,6	10,0	15,2	22,6
1000	4,0	15,0	30,0	2,0	4,0	6,0	8,0	12,0	18,0
1500	6,0	22,5	45,0	3,0	6,0	9,0	12,0	18,0	27,0
1500T	12,0	45,0	90,0	6,0	12,0	18,0	24,0	36,0	54,0

Note:

1. For actuators "P" assumed spring range 20...100 kPa and standard supply pressure.
2. Disposition forces calculated with the use of formulas or given in the table do not take into consideration friction for manufacture tolerances so the forces should be assumed as 15...20% lower than those values.
3. Actuator 630T occurs only in type „R“.

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