



PN9000 Series Pneumatic Actuators for Spira-trol™ K and L Series Control Valves

Description

The PN9000 series actuators are a compact range of linear actuators that are available in 3 diaphragm sizes for matching the requirements of valves at various differential pressures.

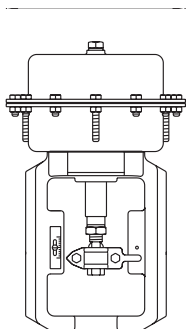
Each actuator is fitted with a mechanical travel indicator and incorporates a fully-rolling diaphragm, which provides good linearity over the operating stroke.

Available types	PN = Standard	Suffix E = Spring-extend
	PNP = Electroless nickel plated	Suffix R = Spring-retract
Optional extra	Manual handwheel	Suffix H
	Stainless steel bolting	Suffix S

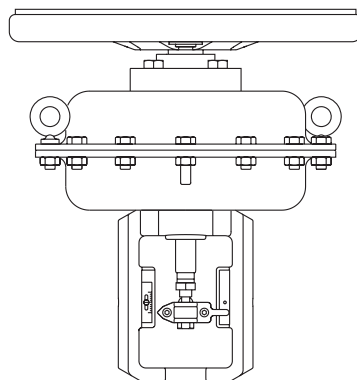
Important note: Throughout this document, reference has been made to the PN actuator.

Technical data

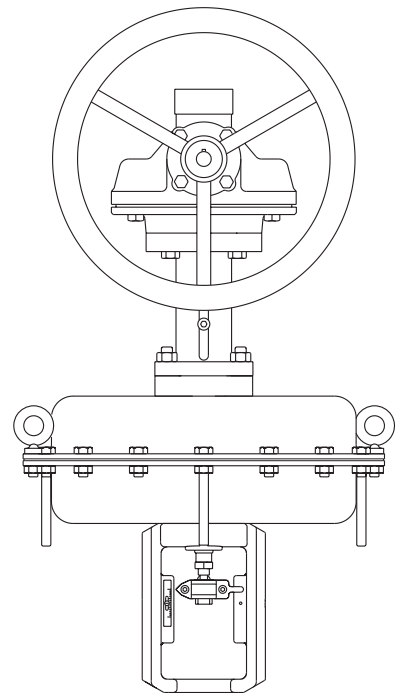
Temperature range	- 4 °F to 230 °F (- 20 °C to +110 °C)	
Maximum operating inlet pressure	PN9100	87 psi g (6 bar g)
	PN9200	87 psi g (6 bar g)
	PN9300	58 psi g (4 bar g)
Air supply connection	¼" NPT	
Actuator travel	PN9100	20 mm
	PN922_ and PN932_	20 mm
	PN923_ and PN933_	30 mm



PN9100

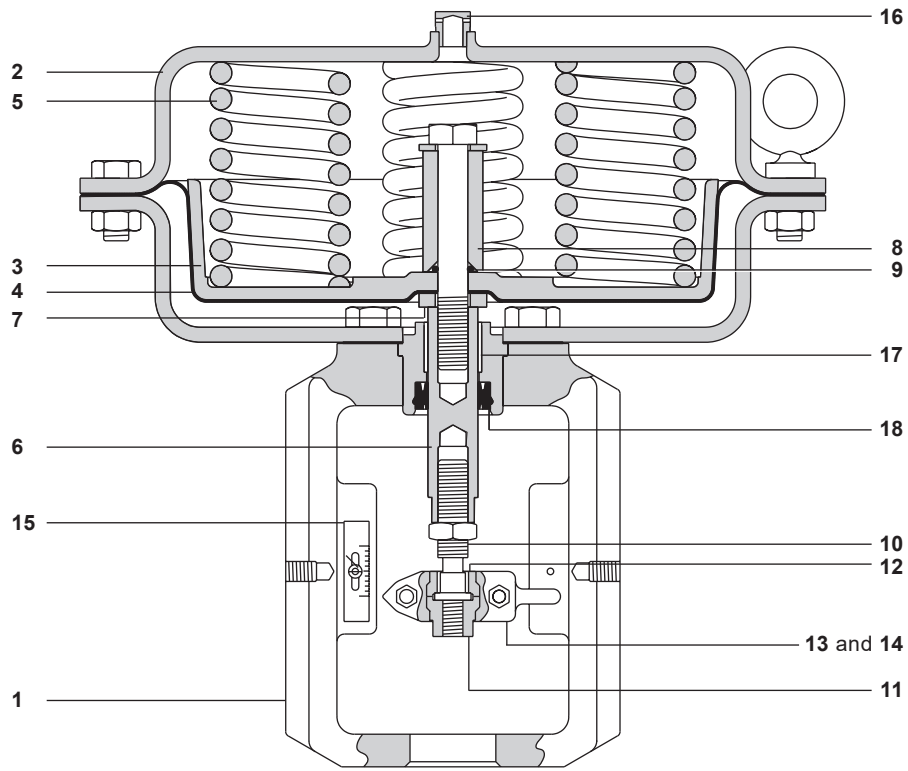


PN9200EH



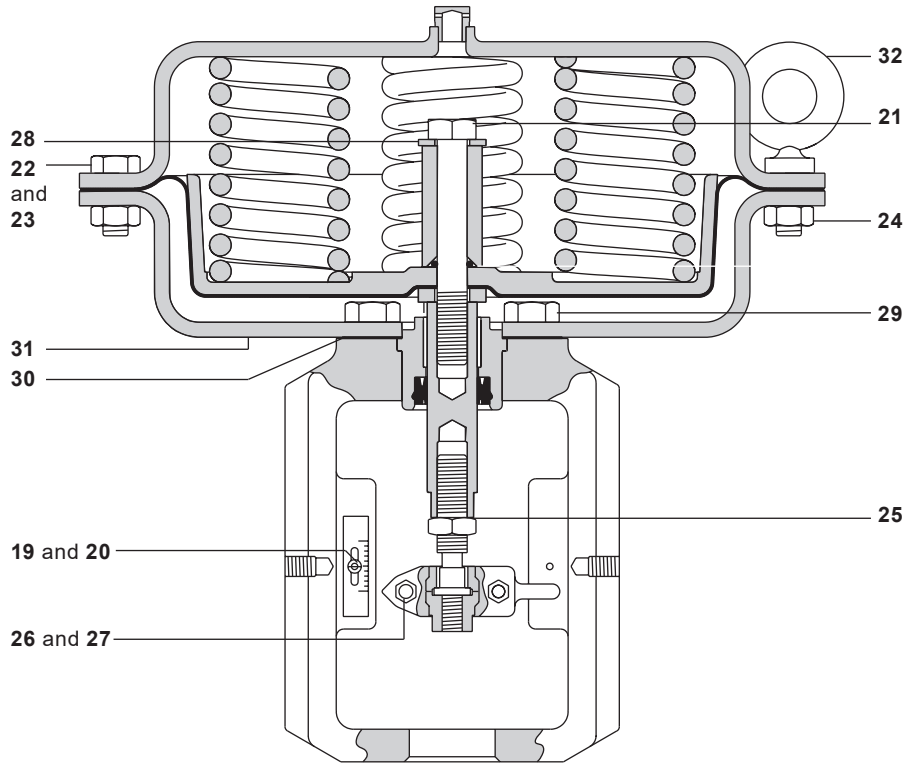
PN9337RH

Materials



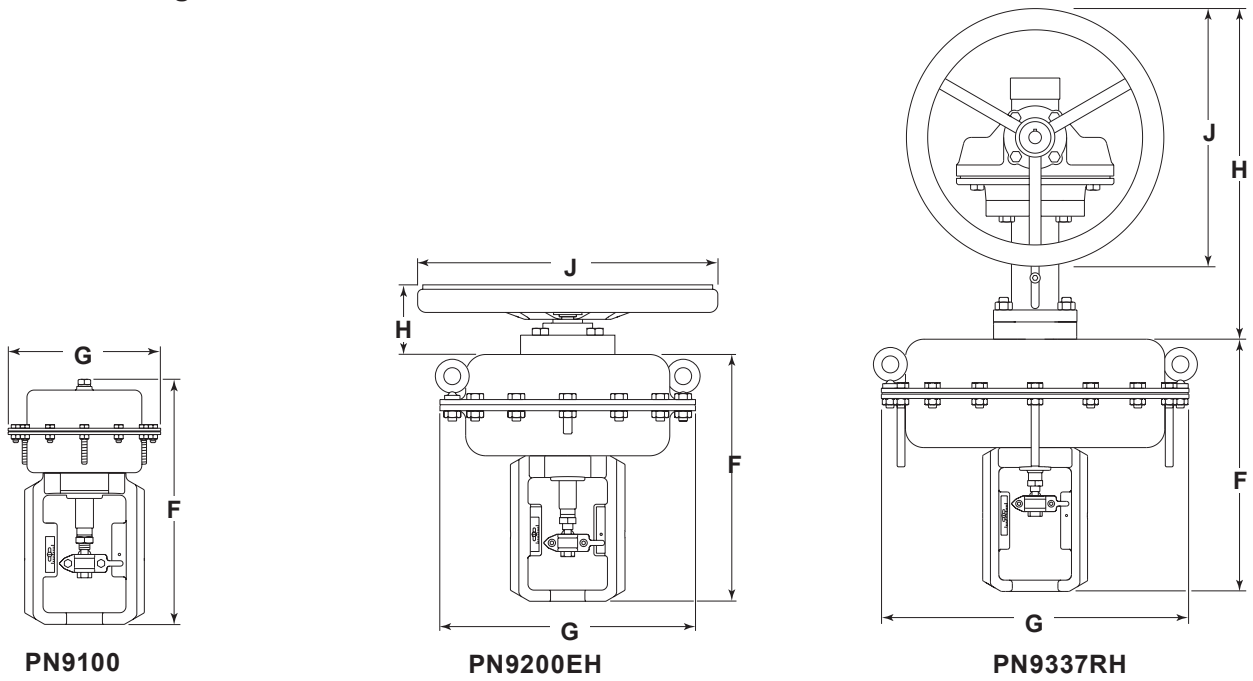
No.	Part	Material	
1	Yoke	SG iron	
2	Upper diaphragm housing	Carbon steel (plated)	
3	Diaphragm plate	Aluminium	
4	Diaphragm	Reinforced NBR	
5	Spring	Spring steel	
6	Spindle	Stainless steel	
7	Washer	Carbon steel (plated)	
8	Spacer	Carbon steel (plated)	
9	'O' ring	Viton	
10	Connector	Stainless steel	BS 970 431 S29
11	Adaptor	Stainless steel	BS 970 431 S29
12	Collar	PN9000	Carbon steel
		PNP9000	Stainless steel
		PN9000S	Stainless steel 316L
13	Clamp front	Stainless steel	
14	Clamp rear	Stainless steel	
15	Scale	Stainless steel	
16	Vent plug	Brass	
17	Bearing	PTFE/steel composite	
18	Seal	Polyurethane	

Materials (continued)



No.	Part		Material	
		PN9000	Carbon steel (plated)	
19	Pan head screw			
20	Nyloc nut	PNP9000	Stainless steel	A2 - 70
		PN9000S	Stainless steel	A2 - 70
21	Bolt		Carbon steel (plated)	Gr. 8.8
22	Hex. head screw (short)	PN9000	Carbon steel (plated)	Gr. 8.8
23	Hex. head screw (long)	PNP9000	Stainless steel	A2 - 70
24	Nut	PN9000S	Stainless steel	A2 - 70
		PN9000	Carbon steel (plated)	
25	Lock-nut	PNP9000	Stainless steel	A2 - 70
		PN9000S	Stainless steel	A2 - 70
		PN9000	Carbon steel (plated)	Gr. 8.8
26	Socket head screw	PNP9000	Stainless steel	A2 - 70
27	Nut	PN9000S	Stainless steel	A2 - 70
28	Washer		Carbon steel (plated)	
29	Screw		Carbon steel (plated)	Gr. 8.8
30	Gasket		Reinforced graphite	
31	Lower diaphragm housing		Carbon steel (plated)	
		PN9000	Cast steel	
32	Lifting eye	PNP9000	Cast steel	
		PN9000S	Stainless steel 316L	

Dimensions and weights (approximate) in mm (in) and kg (lbs)



Actuator Range	Dimensions								Weights			
	F		G		H		J		Actuator		Handwheel	
	mm	in	mm	in	mm	in	mm	in	Kg	lb	Kg	lb
PN9100E and variants	275	10.8	170	6.7	55	2.2	225	8.9	6	13.2	5.86	12.9
PN9100R and variants	275	10.8	170	6.7	140	5.5	225	8.9	6	13.2	2.5	5.5
PN9200E and variants	300	11.8	300	11.8	68	2.7	350	13.8	17	37.4	7.2	15.8
PN9200R and variants	300	11.8	300	11.8	152	6.0	350	13.8	17	37.4	3.77	8.3
PN9230E and variants	360	14.2	300	11.8	65	2.6	350	13.8	17	37.4	3.77	8.3
PN9230R and variants	360	14.2	300	11.8	152	6.0	350	13.8	17	37.4	3.77	8.3
PN9320E and variants	325	12.8	390	15.4	65	2.6	350	13.8	27	59.4	7.2	15.8
PN9320R and variants	325	12.8	390	15.4	152	6.0	350	13.8	27	59.4	3.77	8.3
PN9330E and variants	335	13.2	390	15.4	65	2.6	350	13.8	27	59.4	7.2	15.8
PN9330R and variants	335	13.2	390	15.4	152	6.0	350	13.8	27	59.4	3.77	8.3
PN9336E and variants	335	13.2	390	15.4	65	2.6	350	13.8	27	59.4	7.2	15.8
PN9336R and variants	335	13.2	390	15.4	152	6.0	350	13.8	27	59.4	3.77	8.3
PN9337E and variants	335	13.2	390	15.4	410	16.1	350	13.8	27	59.4	21	46.2
PN9337R and variants	335	13.2	390	15.4	410	16.1	350	13.8	27	59.4	21	46.2

Spare parts

The only spares available are clearly indicated below and are common for both spring-extend and spring-retract versions.

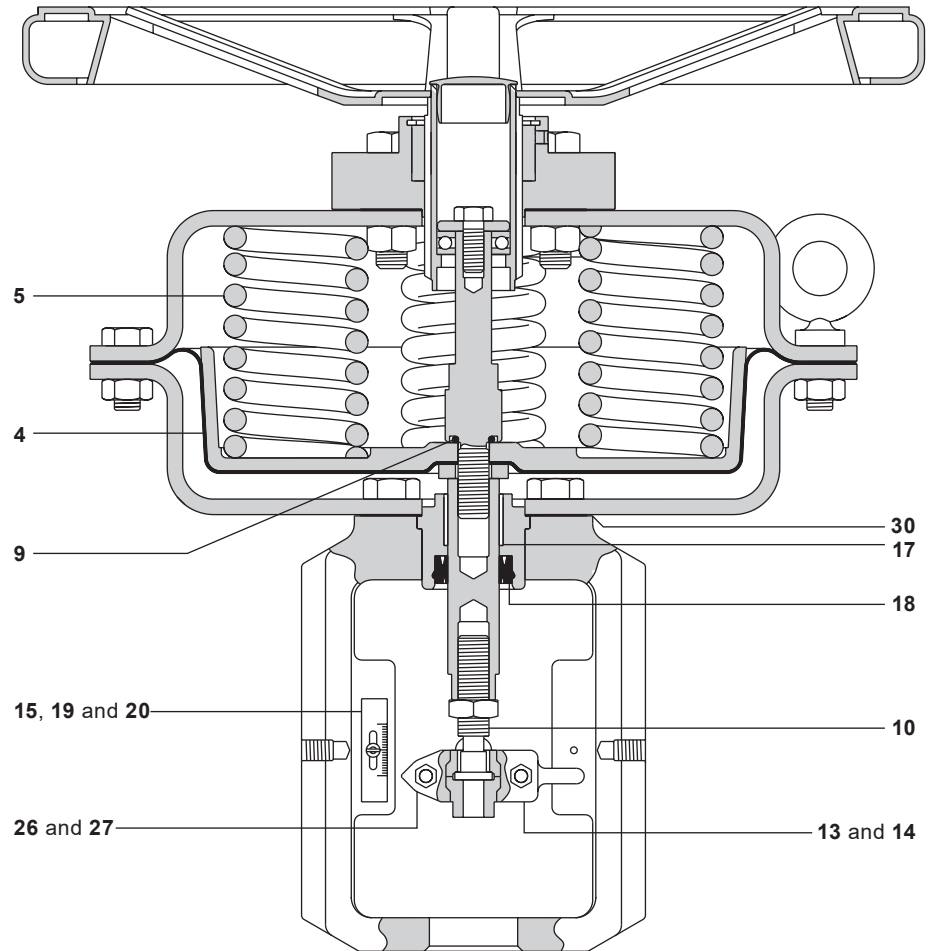
Available spares

Stem seal kit	17, 18, 30
Diaphragm kit	4, 9
Travel indicator kit	15, 19, 20
Spring kit	5
Linkage kit (suitable for Mk1 and Spira-trol™ valves)	10, 13, 14, 26, 27

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the actuator model.

Example: 1 - Stem seal kit for a PN9120 pneumatic actuator.



How to use the sizing data (on pages 6 to 11)

The following tables supply guidance as to the sizing of the PN9000 when it is used on the Spira-trol™ K and L series valves.

Two conditions are illustrated in tabular form:

Class IV shut-off - Providing shut-off of the valve to the requirements of BS 5793-4 (IEC 60534-4) class IV.

Class VI shut-off - Providing shut-off of the valve to the requirements of BS 5793-4 (IEC 60534-4) class VI.

To select a suitable actuator:

- Identify the column containing the valve and gland material selected.
- Identify the maximum operating pressure condition, including any transient pressures likely to occur, within the selected column.
- Read back to the left hand side of the table to identify the suitable actuator for the application.

For conditions outside of those illustrated please contact Spirax Sarco.

Maximum differential pressures for Class IV shut-off - PN9000E

PTFE or Graphite stem seal

Actuator	Spring Range	Maximum Differential Pressures (psi)																	
		½"		¾"		1"		1 ¼"		1 ½"		2"		2 ½"		3"		4"	
		PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
PN9126E	15 - 30	403	186	297	126	170	55	138	49	34		14							
PN9122E	9 - 15	140		89		31		30											
PN9123E	30 - 60	740	740	740	673	536	422	422	333	156	118	101	74						
PN9220E	3 - 15	201		137		63		55											
PN9220E	6 - 18	691	475	525	354	322	208	256	168	85	46	50	23	14					
PN9230E	6 - 18													14					
PN9226E	15 - 30	740	740	740	740	740	740	740	740	346	307	236	209						
PN9236E	16 - 30													118	92	68	51	36	26
PN9222E	9 - 15	740	740	740	740	608	493	477	389	180	142	119	91						
PN9223E	30 - 60	740	740	740	740	740	740	740	740	740	740	546	519						
PN9233E	31 - 60													293	267	180	163	106	95
PN9320E	3 - 15	677	460	513	342	315	200	250	162	82	44	49	21						
PN9320E	6 - 18	740	740	740	740	740	712	646	557	254	215	171	143						
PN9330E	6 - 18													81	55	44	28	21	11
PN9322E	9 - 15	740	740	740	740	740	740	740	740	442	404	305	278						
PN9336E	15 - 30													288	261	176	160	103	93
PN9332E	9 - 15													157	131	93	76	51	41
PN9337E	36 - 51													740	740	506	489	309	299

Bellows and PTFE or Graphite stem seal

Actuator	Spring Range	Maximum Differential Pressure (psi)																	
		½"		¾"		1"		1 ¼"		1 ½"		2"		2 ½"		3"		4"	
		PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
PN9226E	15 - 30	360	360	360	360	360	360	360	327	154	115	100	72						
PN9236E	16-30	360	360	360	360	360	360	360	327	154	115	100	72						
PN9222E	9 - 15	149		96		36		34											
PN9223E	30 - 60	360	360	360	360	360	360	360	360	360	360	360	360						
PN9233E	31 - 60													185	159	111	94	63	52
PN9320E	6 - 18	360	345	360	251	254	139	203	114	62	23	34							
PN9322E	9 - 15	360	360	360	360	360	360	360	360	250	212	168	141						
PN9336E	15 - 30													180	154	107	91	61	50
PN9332E	9 - 15													49	23	24			
PN9337E	36 - 51													360	360	360	360	266	256

Maximum differential pressures for Class VI shut-off - PN9000E

PTFE or Graphite stem seal

Actuator	Spring Range	Maximum Differential Pressure (psi)																	
		1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"	
		PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
PN9120E	3 - 15	61		48		31		24											
PN9120E	6 - 18	199		157		104		80		34		24							
PN9125E	6-30	199		157		104		80		34		24							
PN9122E	9 - 15	352	135	277	106	185	71	143	54	61	23	43	16						
PN9126E	15 - 30	615	398	485	314	324	210	251	162	108	69	76	49						
PN9123E	30 - 60	740	740	740	740	690	576	534	446	230	192	164	137						
PN9220E	3 - 15	413	196	326	155	217	103	168	79	72	34	51	24						
PN9220E	6 - 18	740	687	713	542	477	362	369	280	159	120	113	86						
PN9230E	3 - 15													61	34	39	22	24	13
PN9222E	9 - 15	740	740	740	740	740	648	590	501	254	216	181	154						
PN9226E	15 - 30	740	740	740	740	740	740	740	740	420	381	299	272						
PN9236E	16 - 30													165	139	106	89	66	55
PN9223E	30 - 60	740	740	740	740	740	740	740	740	740	740	609	582						
PN9233E	30 - 60													340	313	217	200	135	125
PN9320E	3 - 15	740	672	702	531	469	355	363	274	156	118	111	84						
PN9320E	6 - 18	740	740	740	740	740	740	740	670	328	289	233	206						
PN9322E	9 - 15	740	740	740	740	740	740	740	740	516	478	368	340						
PN9330E	6 - 18													128	102	82	65	51	40
PN9336E	15 - 30													334	308	214	197	133	123
PN9332E	9 - 15													204	178	130	114	81	71
PN9337E	36 - 51													740	740	544	527	339	328

Bellows and PTFE or Graphite stem seal

Actuator designation	Spring Range	Maximum Differential Pressure (psi)																	
		1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"	
		PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
PN9123E	30 - 60	225		178		118		91		39		27							
PN9222E	9 - 15	360	145	285	114	190	75	147	58	63	24	44	17						
PN9226E	15 - 30	360	360	360	360	360	360	360	360	228	189	162	135						
PN9236E	16 - 30													58	31	37	20	23	12
PN9223E	30 - 60	360	360	360	360	360	360	360	360	360	360	360	360						
PN9233E	30 - 60													232	206	148	131	92	82
PN9320E	6 - 18	360	360	360	360	360	294	316	227	136	97	97	69						
PN9322E	9 - 15	360	360	360	360	360	360	360	360	324	286	231	204						
PN9330E	6 - 18													21		13			
PN9332E	9 - 15													96	70	61	45	38	28
PN9336E	15 - 30													227	201	145	128	90	80
PN9337E	36 - 51													360	360	360	360	296	285

Maximum differential pressures for Class IV shut-off - PN9000R

PTFE or Graphite stem seal

Actuator	Spring Range	Air Pressure	Maximum Differential Pressure (psi)																	
			½"		¾"		1"		1 ¼"		1 ½"		2"		2 ½"		3"		4"	
			PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
PN9120R	3 - 15	30	450	234	334	163	195	81	158	69	42		20							
		40	740	712	712	541	448	333	353	265	127	88	80	53						
		50	740	740	740	740	700	586	549	460	211	173	141	113						
		60	740	740	740	740	740	740	740	740	656	296	258	201	174					
		70	740	740	740	740	740	740	740	740	740	381	342	261	234					
		90	740	740	740	740	740	740	740	740	740	550	512	382	355					
PN9220R	3 - 15	20	640	424	485	314	296	181	235	147	76	37	44	17						
		30	740	740	740	740	740	740	740	740	376	337	258	230						
		40	740	740	740	740	740	740	740	740	675	637	472	444						
		50	740	740	740	740	740	740	740	740	740	740	685	658						
		60	740	740	740	740	740	740	740	740	740	740	740	740						
		70	740	740	740	740	740	740	740	740	740	740	740	740						
PN9230R	3 - 15	30													130	104	76	59	41	30
		40													251	224	153	136	89	78
		50													371	345	230	213	137	126
		60													491	465	307	290	185	174
		70													611	585	384	367	233	222
		90													740	740	537	521	329	318
PN9320R	3 - 15	20	740	740	740	740	740	659	605	517	236	197	158	131						
		30	740	740	740	740	740	740	740	740	740	740	579	552						
		40	740	740	740	740	740	740	740	740	740	740	740	740						
		50	740	740	740	740	740	740	740	740	740	740	740	740						
		60	740	740	740	740	740	740	740	740	740	740	740	740						
PN9330R	6 - 18	20																		
		30													243	216	147	131	86	75
		40													480	453	299	282	180	170
		50													716	690	451	434	275	264
		60													740	740	602	586	369	359

Maximum differential pressures for Class IV shut-off - PN9000R (continued)

Bellows and PTFE or Graphite stem seal

Actuator	Spring Range	Air Pressure	Maximum Differential Pressure (psi)																	
			½"		¾"		1"		1 ¼"		1 ½"		2"		2 ½"		3"		4"	
			PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
PN9120R	3 - 15	50	324	107	234	63	128	14	106	17	20									
		60	360	360	360	360	360	266	301	213	104	66	64	37						
		70	360	360	360	360	360	360	360	360	189	151	125	97						
		90	360	360	360	360	360	360	360	360	358	320	245	218						
PN9220R	3 - 15	30	360	360	360	360	360	360	360	360	184	145	121	94						
		40	360	360	360	360	360	360	360	360	360	360	335	307						
		50	360	360	360	360	360	360	360	360	360	360	360	360						
		60	360	360	360	360	360	360	360	360	360	360	360	360						
		70	360	360	360	360	360	360	360	360	360	360	360	360						
		90	360	360	360	360	360	360	360	360	360	360	360	360						
PN9230R	3 - 15	30													23					
		40													143	117	84	67	46	35
		50													263	237	161	144	94	83
		60													360	357	238	221	142	131
		70													360	360	315	298	190	179
		90													360	360	360	360	286	275
PN9320R	3 - 15	20	360	245	343	172	201	86	162	73	44		21							
		30	360	360	360	360	360	360	360	360	360	360	360	360						
		40	360	360	360	360	360	360	360	360	360	360	360	360						
		50	360	360	360	360	360	360	360	360	360	360	360	360						
		60	360	360	360	360	360	360	360	360	360	360	360	360						
PN9330R	6 - 18	30													135	109	79	62	43	32
		40													360	346	230	213	137	127
		50													360	360	360	360	232	221
		60													360	360	360	360	326	316

Maximum differential pressures for Class VI shut-off - PN9000R

PTFE or Graphite stem seal

Actuator	Spring Range	Air Pressure	Maximum Differential Pressure (psi)																	
			½"		¾"		1"		1 ¼"		1 ½"		2"		2 ½"		3"		4"	
			PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
PN9120R	3 - 15	20	185		146		97		75		31		22							
		30	663	446	523	352	349	235	270	181	116	78	83	55						
		40	740	740	740	729	602	487	466	377	201	162	143	116						
		50	740	740	740	740	740	740	740	661	573	285	247	203	176					
		60	740	740	740	740	740	740	740	740	740	370	332	264	236					
		70	740	740	740	740	740	740	740	740	740	455	416	324	297					
		90	740	740	740	740	740	740	740	740	740	624	586	445	417					
PN9220R	3 - 15	20	740	636	673	502	450	335	348	259	150	111	107	79						
		30	740	740	740	740	740	740	740	740	450	411	320	293						
		40	740	740	740	740	740	740	740	740	740	711	534	507						
		50	740	740	740	740	740	740	740	740	740	740	740	721						
		60	740	740	740	740	740	740	740	740	740	740	740	740						
		70	740	740	740	740	740	740	740	740	740	740	740	740						
		90	740	740	740	740	740	740	740	740	740	740	740	740						
PN9230R	3 - 15	20													57	31	36	20	22	12
		30													177	151	113	96	70	60
		40													297	271	190	173	118	108
		50													418	392	267	250	166	156
		60													538	512	344	327	214	204
		70													658	632	421	404	262	252
		90													740	740	575	558	358	348
PN9320R	3 - 15	20	740	740	740	740	740	740	718	629	310	271	221	193						
		30	740	740	740	740	740	740	740	740	740	740	642	615						
		40	740	740	740	740	740	740	740	740	740	740	740	740						
		50	740	740	740	740	740	740	740	740	740	740	740	740						
		60	740	740	740	740	740	740	740	740	740	740	740	740						
PN9330R	6 - 18	20													52	26	33	17	21	10
		30													289	263	185	168	115	105
		40													526	500	337	320	210	199
		50													740	737	488	472	304	294
		60													740	740	640	623	399	388

Maximum differential pressures for Class VI shut-off - PN9000R

Bellows and PTFE or Graphite stem seal

Actuator	Spring Range	Air Pressure	Maximum Differential Pressure (psi)																	
			½"		¾"		1"		1 ¼"		1 ½"		2"		2 ½"		3"		4"	
			PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
PN9120R	3 - 15	40	58		45		30		23											
		50	360	319	360	252	282	168	218	130	94	55	66	39						
		60	360	360	360	360	360	360	360	360	325	178	140	127	99					
		70	360	360	360	360	360	360	360	360	360	263	225	187	160					
		90	360	360	360	360	360	360	360	360	360	360	360	308	281					
PN9220R	3 - 15	30	360	360	360	360	360	360	360	360	258	219	184	156						
		40	360	360	360	360	360	360	360	360	360	360	360	360						
		50	360	360	360	360	360	360	360	360	360	360	360	360						
		60	360	360	360	360	360	360	360	360	360	360	360	360						
		70	360	360	360	360	360	360	360	360	360	360	360	360						
		90	360	360	360	360	360	360	360	360	360	360	360	360						
PN9230R	3 - 15	30													70	43	44	28	27	17
		40													190	164	121	105	75	65
		50													310	284	198	181	123	113
		60													360	360	275	258	171	161
		70													360	360	352	335	219	209
		90													360	360	360	360	315	305
PN9320R	3 - 15	20	360	360	360	360	355	241	275	186	118	80	84	57						
		30	360	360	360	360	360	360	360	360	360	360	360	360						
		40	360	360	360	360	360	360	360	360	360	360	360	360						
		50	360	360	360	360	360	360	360	360	360	360	360	360						
		60	360	360	360	360	360	360	360	360	360	360	360	360						
PN9330R	6 - 18	30													182	156	116	99	72	62
		40													360	360	268	251	167	156
		50													360	360	360	360	261	251
		60													360	360	360	360	356	345

PN9000 series selection guide:

Type	PN = Polyester powder coated (standard)	PNP
	PNP = Electroless nickle plated	
Series	9 = 9000 series	9
Actuator size	1 = 100 cm ²	3
	2 = 340 cm ²	
	3 = 670 cm ²	
Valve travel	2 = 20 mm	3
	3 = 30 mm	
Spring rating	0 = 2.9 - 14.5 psi (0.2 - 0.6 bar) (option for 0.4 to 1.2 bar)	7
	2 = 9 - 15 psi (0.6 - 1.0 bar)	
	3 = 29 - 58 (2.0 - 4.0 bar)	
	5 = 5.8 - 29 psi (0.4 - 2.0 bar) (PN9100 series only)	
	6 = 14.5 - 29 psi (1.0 - 2.0 bar)	
Spring action	7 = 36.3 - 50.8 psi (2.5 - 3.5 bar) (PN933_ series only)	E
	E = Spring-extend	
Manual override	R = Spring-retract	
	H = Handwheel (optional)	
Stainless steel bolting	S = Stainless steel bolting (optional)	

How to order/selection example:

1 off Spirax Sarco PNP9337E pneumatic actuator.