



● CONSTRUCTION

1.- INDICATOR

NAMUR: Position indicator with NAMUR is convenient for mounting accessories such as Limit Switch box, Positioner and so on.

2.- PINION

The pinion is high-precision and integrative, made from nickelled alloy steel, full conform to the latest standards of ISO5211, DIN3337, NAMUR, the dimensions can be customized, and the stainless steel is available.

3.- ACTUATOR BODY

According to the different requirements the extruded aluminum alloy ASTM6005, Body can be treated with hard anodized, powder polyester painted, PTFE or Nickel plated.

4.- END CAPS

Die-casting aluminum powder polyester painted in different colors, PTFE or nickel plated.

5.- PISTONS

The twin rack pistons are made from Die- casting aluminum treated with Hard anodized or made from Cast steel with galvanization. Symmetric mounting position, long cycle life and fast operation, reversing rotation by simply inverting the pistons.

6.- TRAVEL ADJUSTMENT

The two independent external travel stop adjustment bolts can adjust $\pm 5^\circ$ at both open and close directions easily and precisely.

7.- HIGH PERFORMANCE SPRING

Preloaded coating springs are made from the high-quality material for resistant to corrosion and longer service life, which can be demounted safely and conveniently to satisfy different requirements of torque by changing quantity of springs.

8.- BEARING & GUIDES

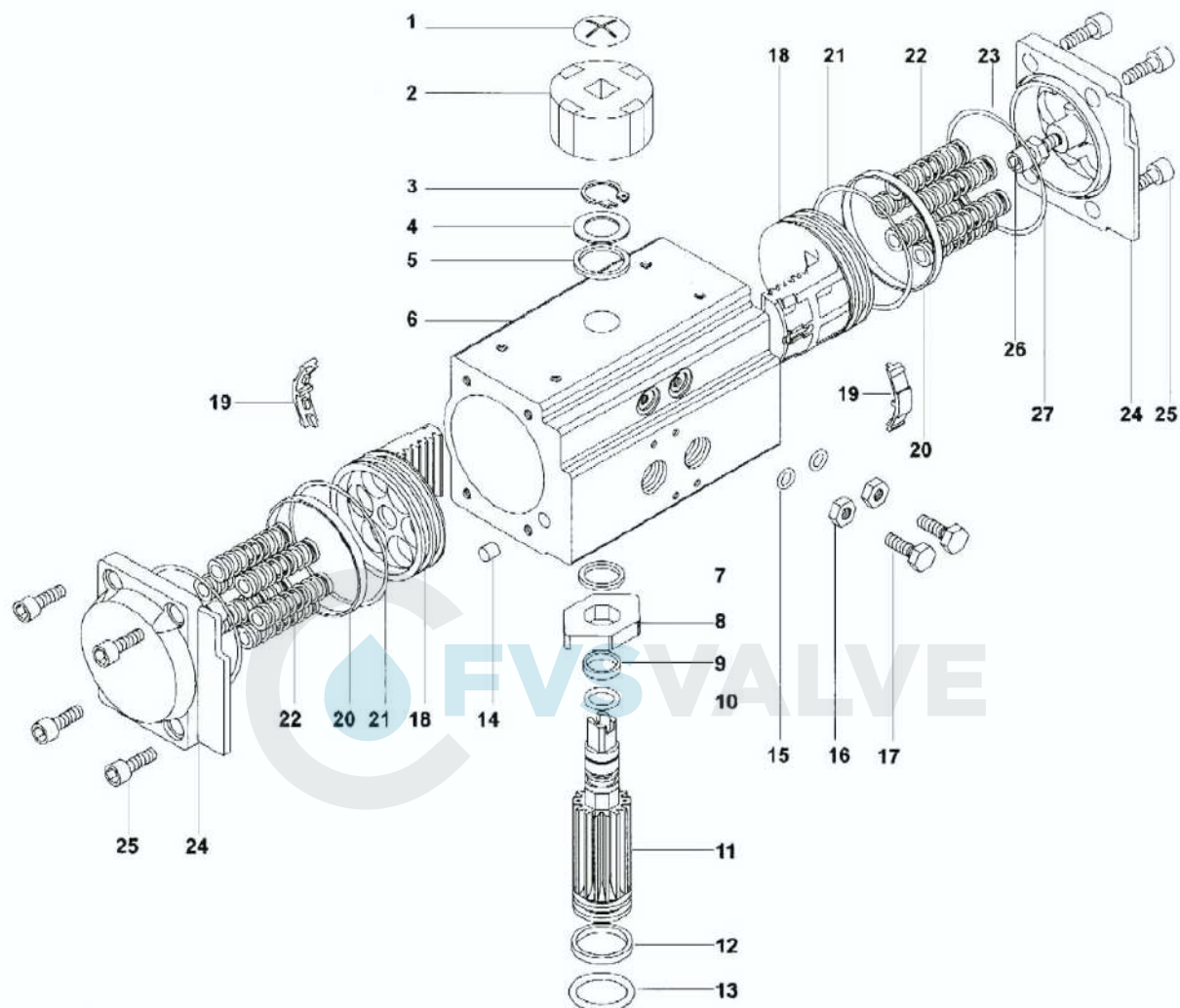
Made from low friction, long-life compound material, to avoid the direct contact between metals. the maintenance and replacement are easy and convenient.

9.- SEALING O-RINGS

NBR rubber O-rings provide trouble-free operation at standard temperature ranges. For high and low temperature applications Viton or Silicone.



● PARTS AND MATERIAL

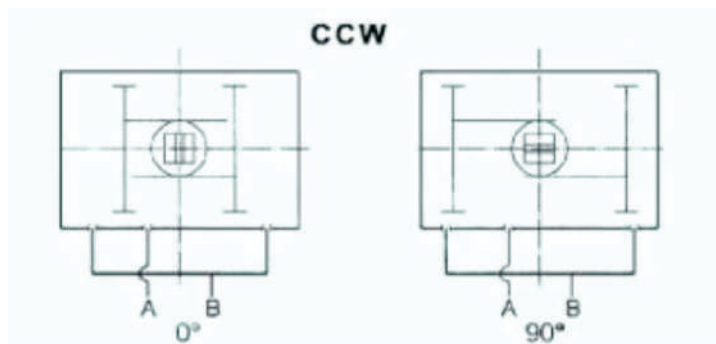




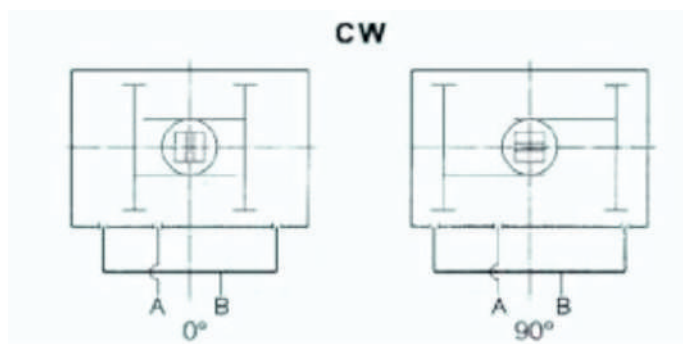
Nº	Description	Qty	Standard Material	Protection	Optional Material
1	Indicator screw	1	Plastic		
2	Indicator	1	Plastic		
3	Spring clip	1	Stainless Steel		
4	Thrust washer	1	Stainless Steel		
5	Outside washer	1	Engineering plastics		
6	Body	1	Extruded alluminum alloy	Hard anodized etc	
7	Inside washer	1	Engineering plastics		
8	Cam	1	Alloy steel		
9	O-ring (Pinion top)	1	NBR		Viton/Silicone
10	Bearing (pinion top)	1	Engineering plastics		
11	Pinion	1	Alloy steel	Nickel plated	Stainless steel
12	O-ring (Pinion top)	1	Engineering plastics		
13	Bearing (pinion top)	2	NBR		Stainless steel
14	Plug	2	NBR		Stainless steel
15	O-ring (Adjust screw)	2	NBR		Stainless steel
16	Nut (Adjust screw)	2	Stainless Steel		
17	Adjust screw	2	Stainless Steel		
18	Piston	2	Cast alluminum/casting	Anodizec/zinc galvanized	Stainless steel
19	Guide(Piston)	2	Engineering Plastics		
20	Bearing(Piston)	2	Engineering Plastics		
21	O-ring (pinion)	2	NBR		Viton/silicone
22	Spring	0-12	Spring Steel	Dip coating	
23	O-ring (End cap)	2	NBR		Viton/silicone
24	End cap	2	Cast alluminum	Powder polyster painted etc	
25	Cap screw	8	Stainless Steel		
26	Stop screw	2	Stainless Steel		
27	Nut (stop screw)	2	Stainless Steel		



• DOUBLE ACTING ACTUATORS



Air to port A forces the pistons outwards, causing the pinion to turn counter clockwise while the air is being exhausted from port B. Air to port B forces the inwards, causing the pinion to turn clockwise while the air is being exhausted port A.



Air to port A forces the pistons outwards, causing the pinion to turn clockwise while the air is being exhausted from port B. Air to port B forces the inwards, causing the pinion to turn counter clockwise while the air is being exhausted from port A.

Output torque of double acting actuators

Model	Air supply pressure (Unit Bar)									
	2	2.5	3	4	4.5	5	5.5	6	7	8
RD020	8.0	10.0	12.0	16.0	18.0	20.0	21.9	23.9	27.9	31.9
RD035	14.6	18.2	21.9	29.2	32.8	36.5	40.1	43.8	51.1	58.4
RD050	20.1	25.1	30.1	40.1	45.1	50.2	55.2	60.2	70.2	80.3
RD075	31.4	39.2	47.0	62.7	70.5	78.4	86.2	94.1	109.7	125.4
RD110	45.1	56.4	67.7	90.3	101.6	112.9	124.1	135.4	158.0	180.6
RD160	66.1	82.7	99.2	132.2	148.8	165.3	181.8	198.4	231.4	264.5
RD255	100.3	125.4	150.5	200.6	225.7	250.8	275.9	301.0	351.1	401.3
RD435	117.0	213.8	256.5	242.0	384.8	427.5	470.3	513.0	596.5	684.0
RD665	266.0	332.5	399.0	532.0	598.5	665.0	731.5	796.0	931.0	1064.0
RD1000	425.6	532.0	638.4	851.2	957.6	1064.0	1170.4	1276.8	1489.6	1702.4
RD1200	532.0	665.0	798.0	1064.0	1197.0	1330.0	1463.0	1596.0	1862.0	2128.0
RD1800	769.5	961.9	1154.3	1539.0	1731.4	1923.8	2116.1	2308.5	2693.3	3078.0
RD2700	1169.6	1462.1	1754.5	2339.3	2631.7	2924.1	3216.5	3508.9	4093.7	4678.6

Sizing: double acting actuator

The suggested safety factor for double acting actuators under normal working conditions is 20%-30%.

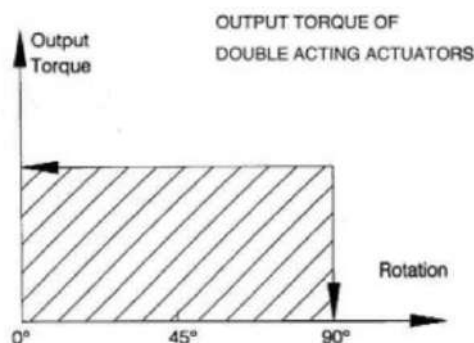
Example:

The torque needed by valve=100N.m

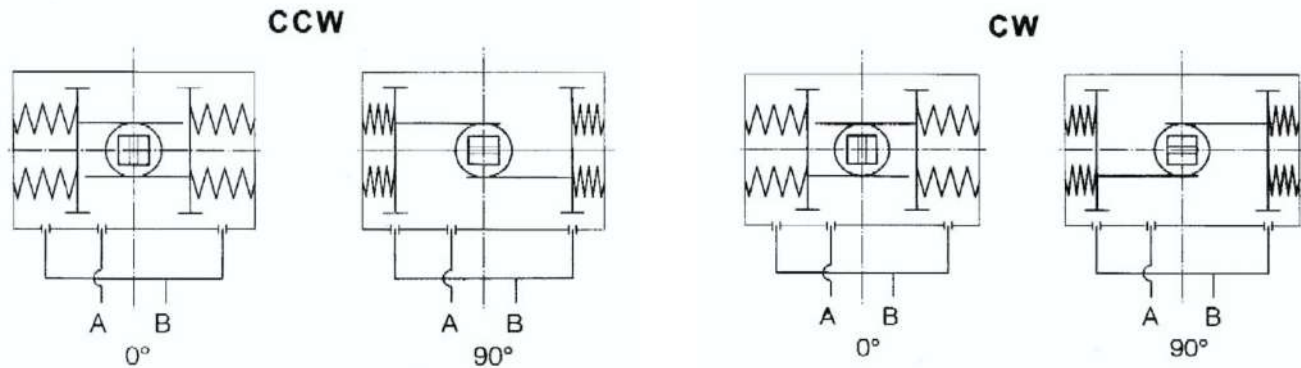
The torque considered safety factor
 $(1+30\%)=130\text{N.m}$

Air supply=5Bar

According to the above table, we can choose the minimum model is RD160.



• SPRING RETURN ACTUATORS



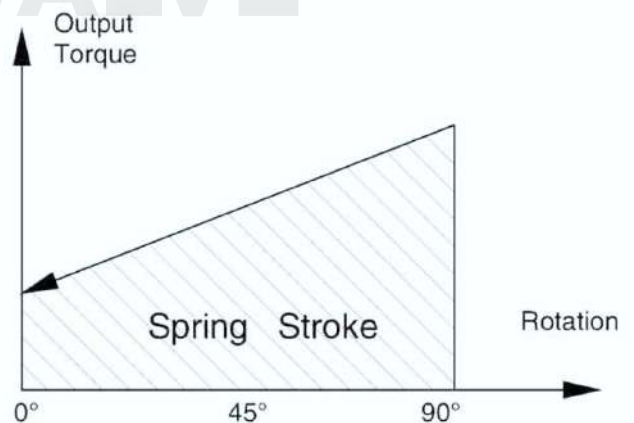
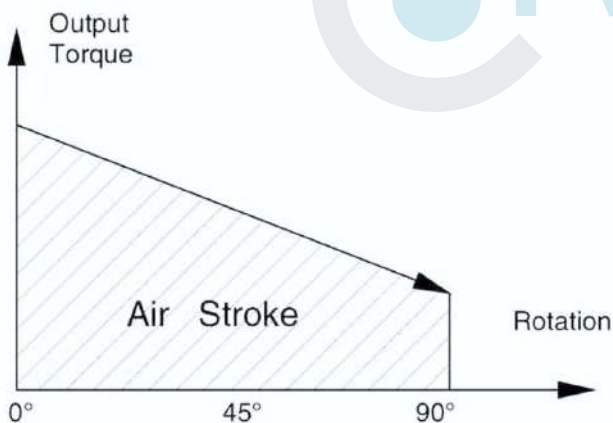
Air to port A forces the pistons outwards, causing the springs to compress. The pinion turns counterclockwise while air is being exhausted from port B.

Loss of air pressure on port A, the stored energy in the springs forces the pistons inwards. The pinion turns clockwise while air is being exhausted from port A.

Air to port B forces the pistons outwards, causing the springs to compress. The pinion turns clockwise while air is being exhausted from port B.

Loss of air pressure on port B, the stored energy in the springs forces the pistons inwards. The pinion turns counterclockwise while air is being exhausted from port A.

OUTPUT TORQUE OF SPRING RETURN ACTUATORS



NOTE

Make sure that the torque necessary to operate the valve is compatible with the actuator torque (it depends on both actuator type and its supply). Please note that the requested torque depends not only on the valve, but on the working conditions and the safety margins of the plant in question, too.



Output torque of spring return actuators (Unit: Nm)

Output torque of air to springs																	Spring's output	
Air pressure		2.5 Bar		3 Bar		4 Bar		5 Bar		6 Bar		7 Bar		8 Bar				
Model	Spring Qty	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°	
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	
RS020	5	5.7	3.8	7.6	5.7											6.2	4.3	
	6	4.9	2.5	6.9	4.5	10.9	8.5									7.4	5.0	
	7	4.0	1.3	6.0	3.3	9.8	7.3	14.0	10.4							8.6	5.9	
	8			5.2	2.0	9.2	6.2	13.2	9.1	17.2	14.1					9.9	6.7	
	9			4.3	0.8	8.3	4.8	12.3	7.9	16.3	12.8	20.3	16.8			11.1	7.6	
	10					7.4	3.6	11.5	6.7	15.5	11.6	19.5	15.6			12.4	8.5	
	11					6.6	2.3	10.6	5.4	14.6	10.4	18.6	14.3	22.6	18.3	13.6	9.3	
	12							9.7	4.2	13.8	9.1	17.8	12.2	21.8	17.1	14.8	10.2	
RS035	5	11.4	7.7	15.0	11.4	22.3	14.9									10.4	6.8	
	6	10.1	5.7	13.6	9.3	20.9	16.6	28.3	23.9							12.5	8.2	
	7	8.6	3.6	12.5	7.2	19.5	14.5	26.8	21.9							14.6	9.6	
	8			10.9	5.1	18.2	12.4	25.5	19.8	32.8	27.0	40.1	34.3			16.7	10.9	
	9					16.8	10.4	24.1	17.7	31.4	24.9	38.7	32.2			18.8	12.3	
	10					1.4	8.2	22.8	15.6	30.0	22.8	37.3	30.1	44.7	37.4	20.9	13.7	
	11							21.5	13.5	28.7	20.7	36.0	28.0	43.3	35.3	22.9	15.0	
	12							20.0	11.4	27.3	18.6	34.6	25.9	41.9	33.3	25.0	16.4	
RS050	5	14.5	10.6	19.4	15.5	29.5	25.7									14.5	10.5	
	6	12.4	7.6	17.3	12.6	27.4	22.7	37.5	32.8							17.4	12.7	
	7	10.4	4.8	15.2	9.7	25.3	19.9	35.4	29.9							20.3	14.8	
	8			13.1	6.8	23.1	16.9	33.3	27.0	43.2	37.0	53.3	47.0			23.2	16.9	
	9					21.0	14.1	31.2	24.1	41.1	34.1	51.2	44.2			26.1	19.0	
	10					19.0	11.1	28.8	21.2	39.0	31.2	49.1	41.2	58.1	51.2	29.0	21.1	
	11							27.0	18.3	37.0	28.3	47.0	38.4	57.0	48.4	31.9	23.2	
	12							24.9	15.4	34.9	25.4	44.9	35.4	54.9	45.4	34.7	25.3	
RS075	5	23.3	16.1	31.1	24.0	46.8	39.7									23.0	15.8	
	6	20.1	11.5	28.0	19.3	43.7	35.1	59.4	50.7							27.6	19.0	
	7	17.0	6.9	24.8	14.8	40.5	30.5	56.2	46.2							32.2	22.1	
	8			21.7	10.1	37.4	25.8	53.1	41.5	68.8	57.2	84.5	72.9			36.8	25.3	
	9					34.2	21.3	49.9	37.0	65.6	52.6	81.2	68.3			41.4	28.5	
	10					31.0	16.6	46.7	32.3	62.4	48.0	78.1	63.7	93.8	79.3	46.0	31.6	
	11							43.6	27.7	59.3	43.4	75.0	59.1	90.6	74.8	50.6	34.8	
	12							40.4	23.2	56.1	38.9	71.7	54.5	87.4	70.2	55.2	38.0	
RS110	5	33.1	22.0	44.2	33.2	66.8	55.9									34.4	23.3	
	6	28.4	15.2	39.6	26.4	62.2	49.0	84.8	71.6							41.2	28.0	
	7	23.8	8.2	34.9	19.4	57.5	42.1	80.2	64.7							48.1	32.7	
	8			31.3	12.6	52.9	35.2	75.5	57.9	98.1	80.5	120.7	103.0			55.0	37.3	
	9					48.2	28.4	70.9	51.0	93.5	73.6	116.0	96.1			61.9	42.0	
	10					43.6	21.5	66.2	44.1	88.8	66.7	111.3	89.2	134.0	111.8	68.7	46.7	
	11							61.5	37.2	84.1	59.9	106.6	82.4	129.2	105.0	75.6	51.4	
	12							56.8	30.4	79.4	53.0	101.9	75.5	124.5	98.1	82.5	56.0	
RS160	5	51.0	33.4	67.5	49.9	100.6	83.0									49.2	31.6	
	6	44.7	23.5	61.1	40.0	94.2	73.2	127.3	106.2							59.1	38.0	
	7	38.4	13.7	54.9	30.3	87.9	63.4	121.0	96.4							68.9	44.3	
	8			48.5	20.4	81.6	53.5	114.7	86.5	147.7	119.6	180.8	152.7			78.7	50.6	
	9					75.3	43.7	108.4	76.8	141.5	109.8	174.5	142.9			88.6	56.9	
	10					68.9	33.4	102.0	66.5	135.1	99.6	168.2	132.6	201.2	165.7	98.4	63.3	
	11							95.7	57.0	128.7	90.1	161.8	123.1	194.8	156.2	108.3	69.6	
	12							89.4	47.5	122.5	80.6	155.5	113.6	188.6	146.7	118.1	75.9	



Output torque of spring return actuators (Unit: Nm)

Output torque of air to springs																Spring's output	
Air pressure	2.5 Bar		3 Bar		4 Bar		5 Bar		6 Bar		7 Bar		8 Bar				
Model	Spring Qty	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
RS255	5	73	47	98	72	148	122									79	52
	6	63	31	88	56	138	107	188	157							94	63
	7	52	15	77	40	127	90	178	141							110	73
	8			67	25	117	75	167	125	217	176	268	226			125	84
	9					107	59	157	109	207	159	257	210			141	94
	10					96	44	146	94	196	144	247	194	297	245	157	105
	11							136	78	186	128	236	178	286	228	173	115
	12							125	63	176	113	226	163	276	213	188	125
RS435	5	128	85	171	127	256	213									129	86
	6	111	59	154	102	239	187	325	273							155	103
	7	94	33	137	76	222	162	308	247							181	120
	8			120	50	205	136	291	221	376	307	462	392			206	137
	9					187	110	273	196	358	281	444	367			232	155
	10					170	84	256	169	341	255	427	340	512	426	258	172
	11							238	143	324	229	409	314	495	400	284	189
	12							221	118	307	203	392	289	478	374	310	206
RS665	5	193	124	259	191	392	324									208	140
	6	165	83	232	149	365	282	498	415							250	168
	7	137	41	203	107	336	240	469	373							292	196
	8			176	66	309	199	442	237	575	465	708	598			333	223
	9					280	157	413	290	546	423	679	556			375	251
	10					253	115	386	248	519	381	652	514	758	647	417	279
	11							358	207	491	340	624	473	757	606	458	307
	12							330	165	463	298	596	431	729	564	500	335
RS1000	5	332	222	438	329	651	542									309	200
	6	292	161	398	267	611	480	824	693							371	240
	7	252	99	358	205	571	418	784	631							433	280
	8			318	143	531	356	744	569	957	782	1169	995			495	320
	9					491	295	704	507	917	720	1130	933			557	360
	10					451	233	664	446	877	658	1090	871	1302	1084	618	400
	11							624	384	837	597	1050	809	1263	1022	680	440
	12							584	322	797	535	1010	748	1223	960	742	480
RS1200	5	390	285	523	418	789	684									380	275
	6	335	209	468	342	734	608	1000	874							456	330
	7	280	133	413	266	679	532	945	798							532	385
	8			358	190	624	456	890	722	1156	988	1422	1254			608	440
	9					569	380	835	646	1101	912	1367	1178			684	495
	10					514	304	780	570	1046	836	1312	1102	1578	1368	760	550
	11							725	494	991	960	1257	1026	1523	1292	836	605
	12							670	418	936	684	1202	950	1468	1216	912	660
RS1800	5	552	409	744	600	1129	985									554	410
	6	470	297	662	489	1047	874	1432	1259							665	492
	7	388	187	580	379	964	764	1349	1149							775	575
	8			498	268	883	653	1267	1037	1652	1422	2037	1807			886	656
	9					800	542	1185	926	1569	1311	1954	1696			998	739
	10					718	431	1103	816	1488	1201	1872	1586	2257	1970	1108	821
	11							1021	705	1406	1090	1791	1474	2176	1859	1219	903
	12							939	594	1323	979	1708	1363	2093	1748	1330	985
RS2700	5	903	675	1195	968	1779	1552									787	560
	6	790	519	1083	811	1667	1396	2252	1981							943	672
	7	679	361	972	654	1556	1238	2141	1823							1101	783
	8			860	497	1444	1081	2029	1666	2614	2252	3199	2836			1258	895
	9					1332	923	1917	1509	2502	2094	3087	2678			1416	1007
	10					1220	767	1805	1352	2390	1937	2974	2521	3560	3107	1572	1119
	11							1693	1194	2278	1779	2862	2364	3448	2949	1730	1231
	12							1582	1037	2167	1623	2751	2207	3336	2792	1887	1342

Sizing: Spring Return Actuators

The suggested safety for spring return actuator under normal working conditions is 30-50%

Example:

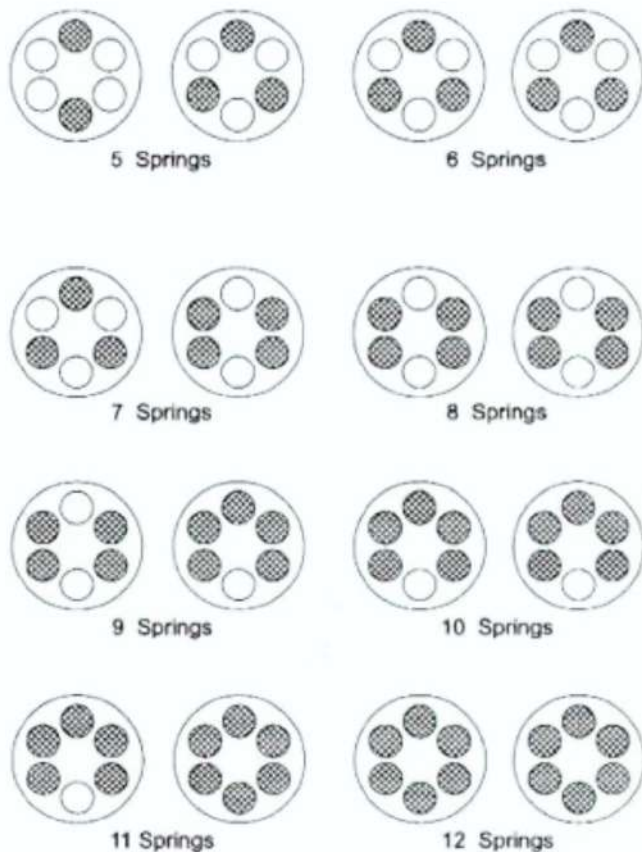
The torque needed by valve=80N.m The torque consider safety factor $(1+30\%) = 104 \text{ Nm}$. Air supply=5Bar. According to the table of spring return actuators' output, we find output torque of RT435SR K7 is: Air stroke $0^\circ = 308\text{N.m}$ Air stroke $90^\circ = 247\text{N.m}$ Spring stroke $90^\circ = 181\text{N.m}$ Spring stroke $0^\circ = 120\text{N.m}$

All the output is larger than we needed.

Attention:

During the restoration, the spring return actuators' output torque will not be affected by the inputting air from the port B. On the contrary, it will help the restoration of springs.

Attention mounting from for spring return actuators



During selecting the spring return actuators, we can choose the more reasonable and more economical actuators, if we know the different torque needed by the valve working at opening, operating and closing.

For example:

The original maximum torque of the butterfly valve = 104N.m

After opening, the torque is $104 \times 30\% = 32\text{N.m}$

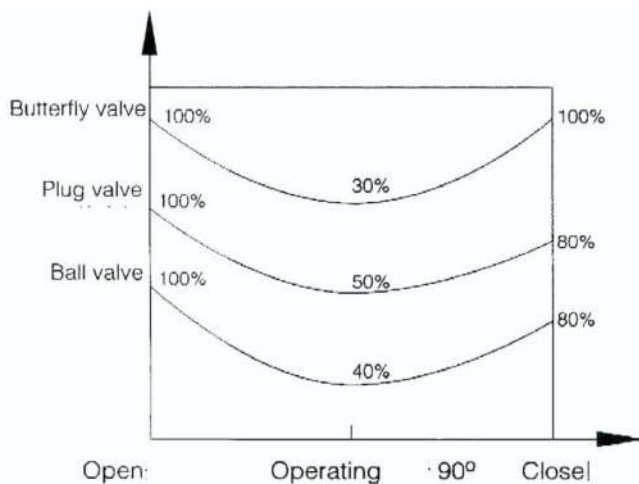
Gas source pressure = 5Bar

We can choose RT255SR K11

- Air stroke $0^\circ = 136\text{N.m} > 104\text{N.m}$
- Air stroke $90^\circ = 78\text{N.m} > 32\text{N.m}$
- Spring travel $90^\circ = 173\text{N.m} > 32\text{N.m}$
- Spring travel $0^\circ = 115\text{N.m} > 104\text{N.m}$

The above data show that the butterfly valve can meet the normal opening and closing requirements.





Example:

The max torque needed the butterfly valve=104N.m.
The torque after opened (operating) $104 \times 30\% = 32$ N.m.

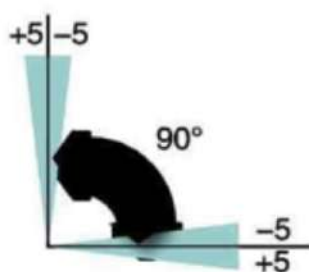
Air supply = 5Bar.

We can select the RT255SR K11.

Output torque is:

- Air stroke $0^\circ = 136\text{N.m} > 104\text{N.m}$
- Air stroke $90^\circ = 78\text{N.m} > 32\text{N.m}$
- Spring stroke $90^\circ = 173\text{N.m} > 32\text{N.m}$
- Spring stroke $0^\circ = 115\text{N.m} > 104\text{N.m}$

The above datas show the actuator's torque can satisfy the requirement of the butterfly valve.



Operating conditions:

1.- Operating media

Dry or lubricated air, or the non-corrosive gases. The maximum particle diameter must be less than μm .

2.- Air supply pressure

the minimum supply pressure is 2.5 Bar.

The maximum supply pressure is 8 Bar.

3.- Operating temperature

Standard: $-20^\circ\text{C} - +80^\circ\text{C}$

High temperature: $-15^\circ\text{C} - +150^\circ\text{C}$

4.- Travel adjustment

Have adjustment range of $\pm 5^\circ$ for the rotation at 0° and 90°

5.- Application

Either indoor or outdoor.

Operating type

Double acting and spring return



Air supply connection is designed in accordance with NAMUR Standard to install solenoid valves.

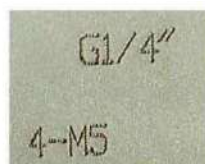
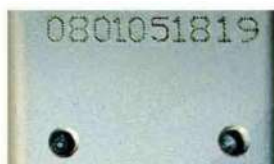


The Namur drive pinion and Namur top mounting connection permit direct installation of accessories such as limit switch box and positioner.

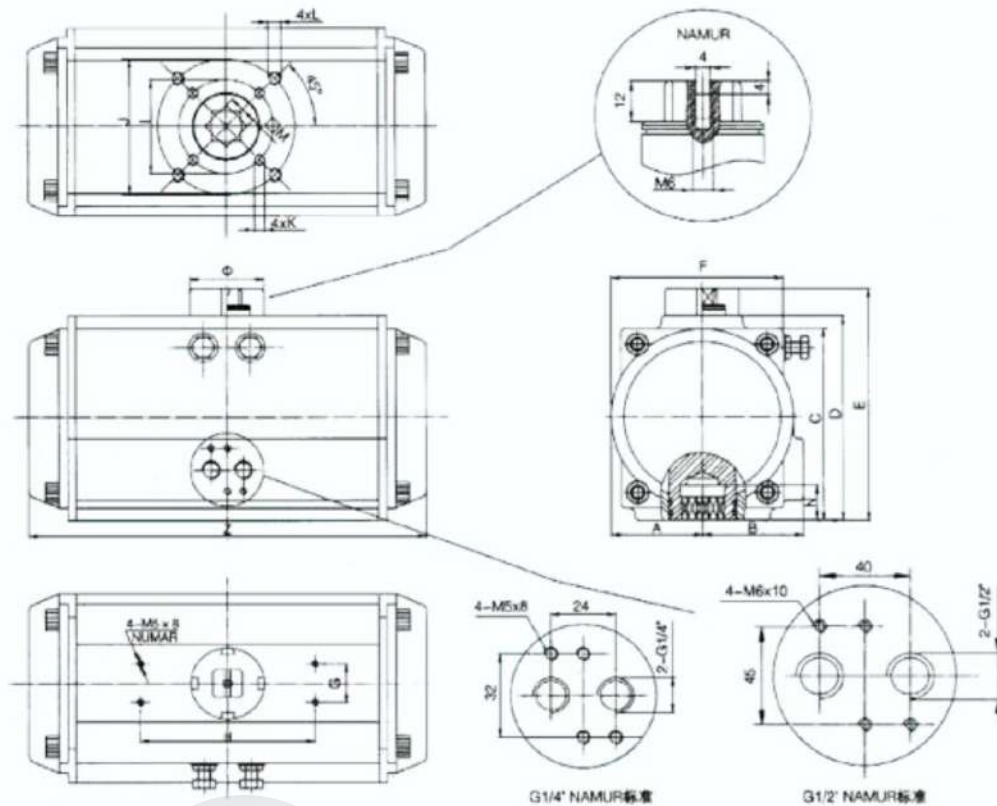


Bottom mounting connection is designed with ISO5211 and DIN3337 standards for direct mounting with valve gear boxes or mounting brackets.

Each actuator is marked with a serial number, air connection and bottom mounting holes are marked for easy track and distinction.







Dimension Table

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Z	Z	Air Connection
RD020	30	41.5	65.5	72	92	65	30	80	φ36	φ50	M5x8	M6x10	11	14	147	φ40	NAMUR G 1/4"
RD035	36	47	81	87.5	107.5	72	30	80	φ50	φ70	M6x10	M8x13	14	18	168	φ40	NAMUR G 1/4"
RD050	42	53	94	99.5	119.5	81	30	80	φ50	φ70	M6x10	M8x13	14	18	184	φ40	NAMUR G 1/4"
RD075	46	57	98.5	108.7	128.7	92	30	80	φ50	φ70	M6x10	M8x13	17	21	204	φ40	NAMUR G 1/4"
RD110	50	58.5	111	116.5	136.5	98	30	80	φ50	φ70	M6x10	M8x13	17	21	262	φ40	NAMUR G 1/4"
RD160	57.5	64	122.5	133	153	109.5	30	80	φ70	φ102	M8x13	M10x16	22	26	268	φ40	NAMUR G 1/4"
RD255	67.5	74.5	145.5	155	175	127.5	30	80	φ70	φ102	M8x13	M10x16	22	26	301	φ55	NAMUR G 1/4"
RD435	75	77	161	172	192	137.5	30	80	φ102	φ125	M10x16	M12x20	27	31	390	φ55	NAMUR G 1/4"
RD665	87	87	184	197	217	158	30	80	φ102	φ125	M10x16	M12x20	27	31	458	φ55	NAMUR G 1/4"
RD1000	103	103	216	230	260	189	30	130		φ140		M16x25	36	50	525	φ80	NAMUR G 1/4"
RD1200	113	113	235.5	255	285	210	30	130		φ140		M16x25	36	50	532	φ80	NAMUR G 1/4"
RD1800	130	130	264.5	289	319	245	30	130		φ165		M20x25	46	60	602	φ80	NAMUR G 1/4"
RD2700	147	147	299	326	356	273	30	130		φ165		M20x25	46	60	722	φ80	NAMUR G 1/2" (NAMUR G 1/4")



Air Consumption

Model	Air volume opening	Air volume closing	Model	Air volume opening	Air volume closing
RD020	0.12	0.16	RD435	2.5	2.2
RD035	0.21	0.23	RD665	3.7	3.2
RD050	0.3	0.34	RD1000	5.9	5.4
RD075	0.43	0.47	RD1200	7.5	7.5
RD110	0.64	0.73	RD1800	11	9
RD160	0.95	0.88	RD2700	17	14
RD255	1.6	1.4			

Air consumption rest with air supply, air volume and action cycle times, expressions:

$L/Min - \text{Air volume} (\text{Air volume Opening} + \text{Air volume Closing}) \times \text{Air supply (Kpa)} + 101.3 \times \text{Action cycle times} (/min) 101.3.$

Series	Model	Spring Qty	Spring Qty	Series	Model	Spring Qty	Spring Qty
RD□RD	020	K5	120°, 140°, 180°	RD□RD	435	K5	120°, 140°, 180°
	035	K6	for special		665	K6	for special
	050	K7	degree operation		1000	K7	degree operation
RD□RS□	075	K8		RD□RS□	1200	K8	
	110	K9	SS		1800	K9	SS
RD□□Ni	160	K10	Stainless	RD□□Ni	2700	K10	Stainless
	255	K11	Steel pinion			K11	Steel pinion
		K12				K12	

Weight Table

Model	RD020(φ52)	RD035(φ63)	RD050(φ75)	RD075(φ83)	RD110(φ92)	RD160(φ105)	RD255(φ125)
(RD)	1.38kg	2.03kg	2.7kg	3.13kg	4.6kg	6.77kg	8.9kg
(RS)	1.45kg	2.05kg	2.9kg	3.6kg	5.22kg	6.85kg	10.1kg

Model	RD435(φ140)	RD655(φ160)	RD1000(φ190)	RD1200(φ210)	RD1800(φ240)	RD2700(φ270)
(RD)	13.25kg	20.14kg	31.3kg	46.80kg	67.28kg	96.9kg
(RS)	15.55kg	24kg	35.25kg	54.8kg	80.2kg	118kg





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