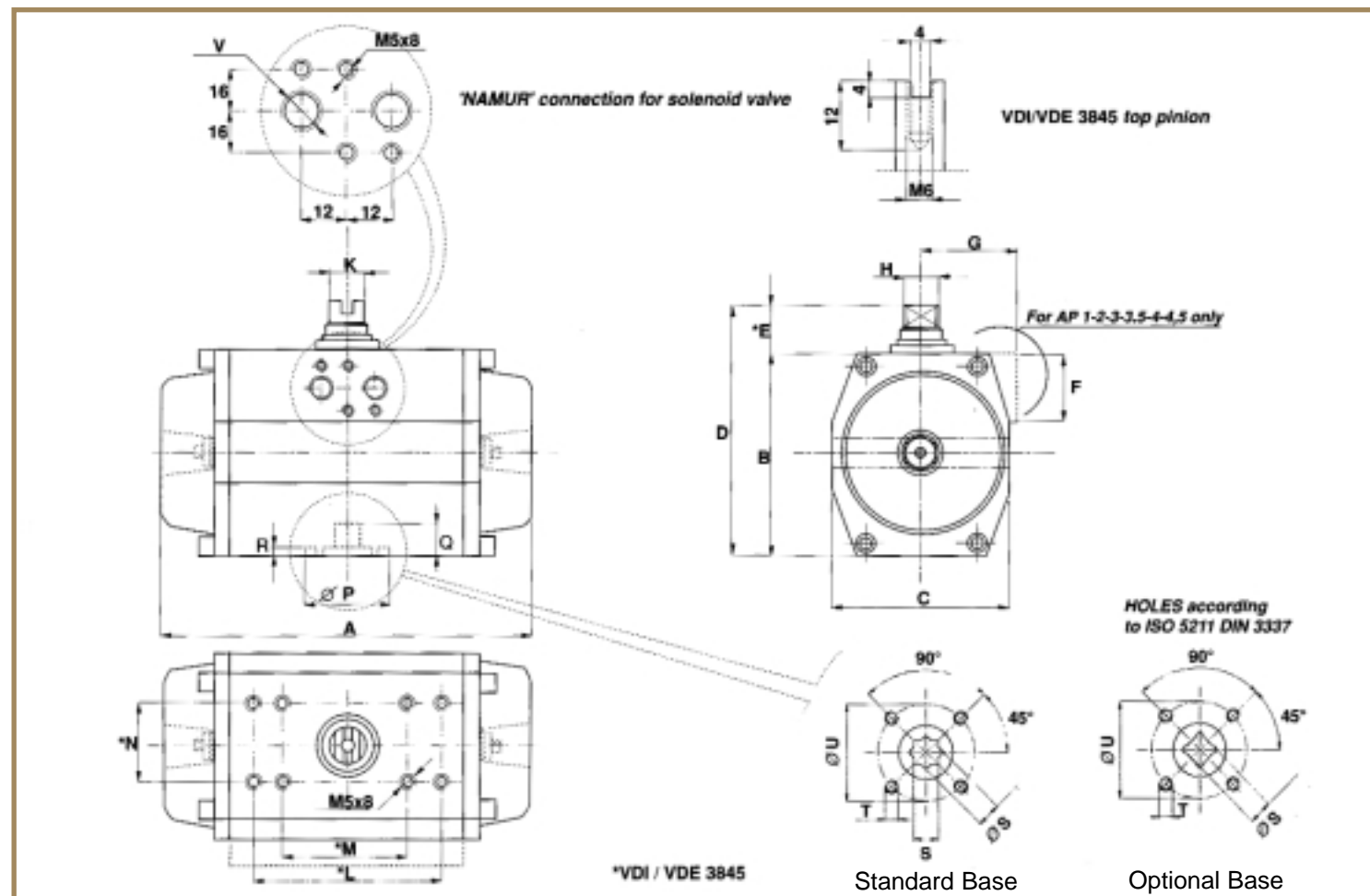


# AccuTorq<sub>®</sub> pneumatic actuator



## Dimensions (inches)

MODEL	A	B	C	D	E	F	G	H	K	L	M	N	P	Q	R	S	T	U	V	ISO 5211
AP1 DA/SR	5.39	2.64	2.36	3.43	0.79	1.65	1.61	0.47	0.31	-	3.15	1.18	0.98	0.39	0.08	0.35	M5/M6	1.42/1.97	1/8	F03/F05
AP2 DA/SR	5.91	3.27	2.87	4.06	0.79	1.65	1.75	0.47	0.31	-	3.15	1.18	1.18/1.38	0.47	0.08	0.43	M5/M6	1.65/1.97	1/4	F04/F05
AP3 DA/SR	8.03	3.94	3.35	4.72	0.79	1.97	1.95	0.55	0.39	-	3.15	1.18	1.38	0.63	0.12	0.55	M6/M8	1.97/2.76	1/4	F05/F07
AP3.5 DA/SR	9.06	4.33	3.86	5.12	0.79	1.97	2.09	0.75	0.55	-	3.15	1.18	2.17	0.79	0.14	0.67	M8	2.76	1/4	F07
AP4 DA/SR	10.67	4.92	4.33	5.71	0.79	1.97	2.28	0.75	0.55	-	3.15	1.18	2.17	0.79	0.14	0.67	M8/M10	2.76/4.02	1/4	F07/F10
AP4.5 DA/SR	12.01	5.59	5.04	6.77	1.18	2.28	2.72	1.10	0.79	5.12	3.15	1.18	2.76	0.94	0.14	0.87	M10	4.02	1/4	F10
AP5 DA/SR	14.17	6.10	5.51	7.28	1.18	-	-	1.10	0.79	5.12	3.15	1.18	2.76	0.94	0.14	0.87	M10	4.02	1/4	F10
AP5.5 DA/SR	14.96	6.93	6.30	8.11	1.18	-	-	1.42	1.10	5.12	3.15	1.18	3.35	1.14	0.14	1.06	M12	4.92	1/4	F12
AP6 DA/SR	18.19	7.87	6.89	9.06	1.18	-	-	1.42	1.10	5.12	3.15	1.18	3.35	1.14	0.14	1.06	M12	4.92	1/4	F12
AP8 DA/SR	21.85	9.84	8.46	11.81	1.97	-	-	1.89	1.26	5.12	-	1.18	3.94	1.50	0.20	1.42	M16	5.51	1/4	F14

## Weights (Lbs)

Model	AP1	AP2	AP3	AP3.5	AP4	AP4.5	AP5	AP5.5	AP6	AP8
Double Acting	1.87	3.57	6.43	9.215	12.91	18.95	24.64	33.50	46.73	94.79
Spring Return	2.38	3.83	6.96	10.270	13.97	21.60	28.98	41.44	54.23	120.10



# AccuTorq<sub>®</sub>

## ACTUATORS AND CONTROLS

### Series AP Pneumatic Actuator Rack and Pinion Design



## Inland Valve Corporation Ltd.

### Calgary

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Calgary, Alberta  
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E-mail: valve.inland@telusplanet.net

**AccuTorq®  
Pneumatic Rotary Actuators**

- HISTORY** - Series "AP" AccuTorq pneumatic actuators have been manufactured in accordance with documented quality procedures since 1979.
- QUALITY** - Every actuator is pressure tested and cycle tested prior to shipment. When actuators are specified for natural gas supply an additional Nitrogen test is performed. Customers are assured of reliable performance in high cycle or emergency shutdown (fail-safe) applications.
- DESIGN** - AccuTorq actuators are rack & pinion type. Linear kinetic energy is directly transformed into a "quarter turn" operation with reliable output torques. Both double acting and spring return actuators have twin cylinders horizontally opposed. Piston guides are incorporated to ensure correct contact between the rack and pinion, regardless of operating pressure. High quality materials are employed throughout the construction, and the compact design is readily fitted to ball, butterfly or plug valves.

**Standard Features and Benefits**

**FEATURE**

**BENEFIT**

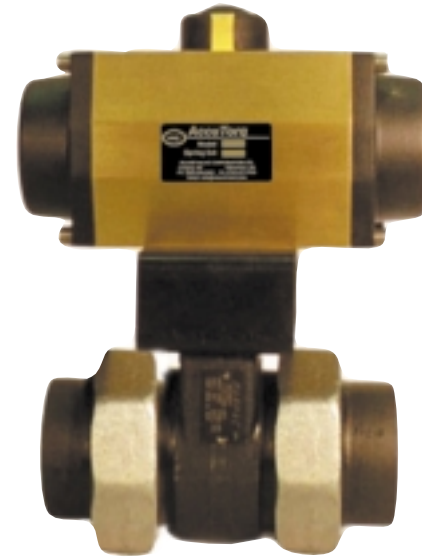
- Aluminum body is gold anodized
- Epoxy coated aluminum end caps
- Acetal resin piston guide rings and piston skate pads
- Electroless nickel plated carbon steel pinion
- Encapsulated multiple springs
- Specially designed preloaded self-contained spring cartridges
- "Namur" accessory mounting surfaces
- Compact rack & pinion design
- Broad range of sizes
- Improved corrosion protection from environmental factors
- Corrosion protection and trouble free disassembly
- Consistent/reliable torque outputs and extended cycle life
- Reliable torque transfer and corrosion protection from instrument supply source
- Allows simple field adjustments to suit changes in application or torque needs.
- Provides safe disassembly as springs are completely relaxed before end capscrews are removed
- Direct top mounting of accessory devices eg: limit switch/positioners.
- Saves space and eliminates the need for special supports
- Allows the closest possible match to valve torque requirements for reliable and cost effective valve automation.

Torque Output, Spring Return Actuator, In. Lbs.

Model	N of Spring For Each Side of Piston	Operating Pressure psi													
		30		40		60		70		80		100		Spring Stroke	
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
AP1 SR	2	31	21	49	39	86	76	104	94	120	110	157	148	31	21
	3	--	--	38	24	75	61	93	79	109	95	147	132	46	32
	4	--	--	27	8	65	45	83	63	99	79	136	116	62	42
	5	--	--	--	--	54	30	72	48	88	64	125	101	77	53
	6	--	--	--	--	--	--	61	32	77	48	115	85	93	64
AP2 SR	2	50	33	79	63	138	122	167	151	192	176	251	235	50	33
	3	--	--	62	38	121	97	150	126	175	151	234	210	74	50
	4	--	--	45	13	104	72	133	101	158	126	217	185	99	67
	5	--	--	--	--	87	47	116	76	141	101	200	160	124	84
	6	--	--	--	--	--	--	99	51	124	76	183	135	149	101
AP3 SR	2	107	71	169	133	294	258	356	321	410	374	535	499	107	71
	3	71	17	133	80	258	205	321	267	374	321	499	446	160	107
	4	--	--	98	26	223	151	285	214	339	267	463	392	214	142
	5	--	--	--	--	187	89	249	160	303	214	428	339	267	178
	6	--	--	--	--	--	--	214	107	267	160	392	285	321	214
AP3.5 SR	2	218	116	324	222	537	434	643	540	734	631	946	843	187	84
	3	133	26	239	132	452	345	558	451	649	542	861	754	276	169
	4	--	--	--	--	398	193	504	299	595	390	808	603	428	223
	5	--	--	--	--	336	157	442	264	533	355	745	567	463	285
	6	--	--	--	--	282	59	388	165	479	256	692	469	562	339
AP4 SR	2	264	173	414	322	714	622	864	772	992	900	1292	1200	255	163
	3	178	44	328	194	628	494	777	644	906	772	1206	1072	383	249
	4	--	--	248	69	547	369	697	519	826	647	1125	947	508	330
	5	--	--	--	--	467	235	617	385	745	513	1045	813	642	410
	6	--	--	--	--	387	110	537	260	665	388	965	688	767	490
AP4.5 SR	2	447	246	746	575	1290	1118	1562	1390	1796	1624	2340	2168	475	303
	3	267	147	534	303	1024	792	1268	1037	1478	1247	1968	1736	712	454
	4	--	--	443	99	987	643	1259	915	1493	1148	2037	1693	950	606
	5	--	--	--	--	835	405	1107	677	1341	910	1885	1454	1189	758
	6	--	--	--	--	--	--	956	438	1189	672	1734	1216	1427	909
AP5 SR	2	603	387	950	733	1643	1426	1990	1773	2286	2069	2979	2762	603	386
	3	419	89	765	435	1458	1128	1805	1475	2101	1771	2794	2464	900	570
	4	--	--	569	132	1262	825	1609	1177	1905	1468	2598	2161	1204	767
	5	--	--	--	--	1065	521	1412	860	1709	1165	2402	1858	1507	963
	6	--	--	--	--	869	218	1216	565	1512	861	2205	1554	1810	1159
AP5.5 SR	2	879	492	1363	976	2332	1945	2816	2429	3232	2845	4201	3814	892	504
	3	627	344	1111	530	2080	1499	2564	1983	2980	2399	3948	3368	1338	757
	4	--	--	858	--	1826	1053	2311	1537	2726	1953	3695	2922	1784	1010
	5	--	--	--	--	1574	607	2058	1091	2474	1507	3443	2476	2230	1263
	6	--	--	--	--	1321	396	1805	645	2221	1061	3189	2030	2676	1516
AP6 SR	2	1284	776	1992	1484	3410	2901	4118	3609	4725	4217	6143	5634	1248	740
	3	909	151	1618	859	3035	2277	3743	2985	4351	3593	5768	5010	1873	1115
	4	--	--	1243	235	2660	1652	3369	2361	3976	2968	5393	4386	2497	1488
	5	--	--	--	--	2286	1028	2994	1736	3601	2344	5019	3761	3122	1864
	6	--	--	--	--	1911	404	2619	1112	3227	1719	4644	3137	3746	2238
AP8 SR	2	2372	1552	3702	2882	6362	5542	7692	6872	8832	8011	11400	10670	2247	1427
	3	1659	428	2989	1758	5649	4418	6979	5748	8119	6888	10776	9546	3371	2140
	4	--	--	2275	634	4935	3294	6265	4624	7405	5764	10065	8424	4495	2854
	5	--	--	--	--	4221	2170	5551	3500	6691	4640	9351	7300	5619	3568
	6	--	--	--	--	3508	1064	4838	2376	5978	3516	8638	6176	6743	4288

Torque Output, Double Acting Actuator, In. Lbs.

Model	Operating Pressure psi								
	30	40	50	60	70	80	90	100	120
AP1 DA	52	70	89	107	126	141	157	179	210
AP2 DA	83	113	141	172	201	230	251	285	339
AP3 DA	178	240	303	365	428	481	535	606	713
AP3.5 DA	303	409	515	621	727	818	909	1031	1213
AP4 DA	428	578	727	877	1027	1156	1284	1455	1712
AP4.5 DA	777	1049	1321	1594	1866	2099	2333	2643	3149
AP5 DA	990	1336	1683	2029	2375	2672	2969	3365	4009
AP5.5 DA	1384	1868	2353	2837	3321	3737	4153	4706	5606
AP6 DA	2024	2733	3442	4150	4858	5466	6073	6883	8200
AP8 DA	3800	5129	6459	7789	9119	10259	11399	12919	15389



Air Consumption Cu. Ft.

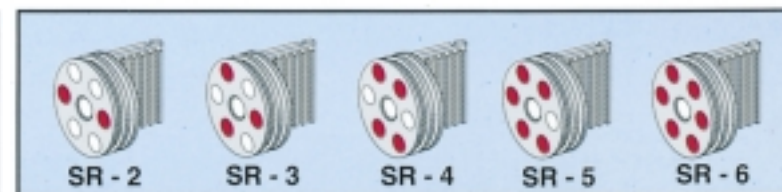
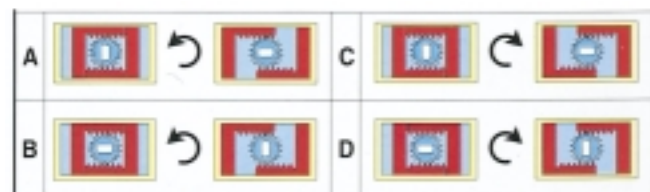
Model	AP1 DA/SR	AP2 DA/SR	AP3 DA/SR	AP3.5 DA/SR	AP4 DA/SR	AP4.5 DA/SR	AP5 DA/SR	AP5.5 DA/SR	AP6 DA/SR	AP8 DA/SR
Counter Clockwise	0.08	0.12	0.24	0.48	0.68	1.00	1.40	1.60	3.20	5.30
Clockwise (DA Only)	0.10	0.16	0.44	0.56	0.96	1.60	2.16	2.56	4.00	8.60

Opening / Closing Time (Sec.) 80 psi

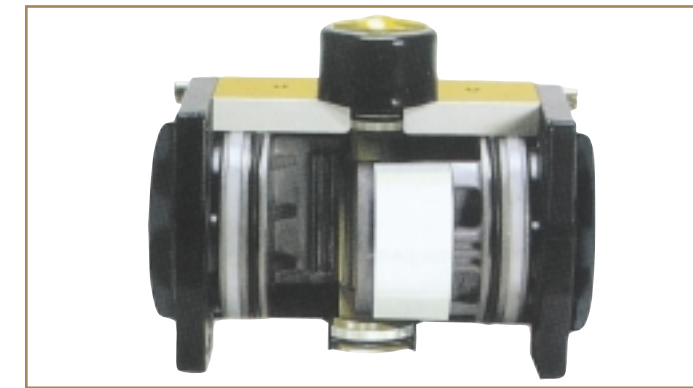
Model	AP1	AP2	AP3	AP3.5	AP4	AP4.5	AP5	AP5.5	AP6	AP8
Double Acting	Less Than 0.5 Sec	Less Than 1 Sec	Less Than 1 Sec	Less Than 1 Sec	Less Than 1 Sec	Less Than 1 Sec	Less Than 1.25 Sec	Less Than 1.5 Sec	1.5 - 2 Sec	3 - 4 Sec
Spring Return	Less Than 0.5 Sec	Less Than 1 Sec	Less Than 1 Sec	Less Than 1 Sec	Less Than 1 Sec	Less Than 1 Sec	1.5 - 2 Sec	Less Than 2 Sec	2 - 3 Sec	4 - 6 Sec

Mounting Variations

Proper Arrangement of Springs



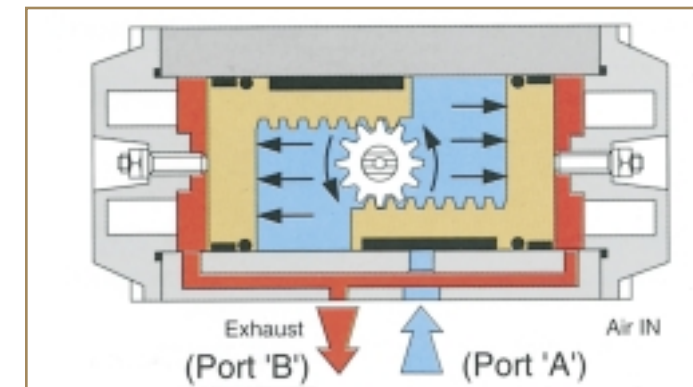
### Double Acting Actuator



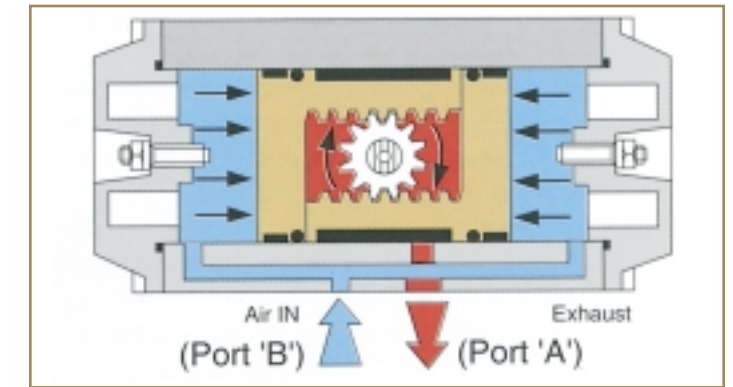
#### Principle of Operation

Counter clockwise output operation is achieved by inserting pressure into **Port 'A'**, to force the pistons apart thus rotating the actuator pinion counter clock-wise. During this operation, air from the outer chambers is exhausted through **Port 'B'**. Clockwise output operation is achieved by reverse of the above and inserting pressure into **Port 'B'**.

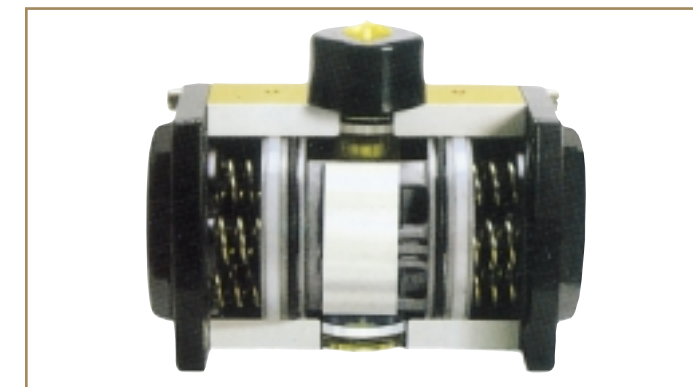
Counter Clockwise Output Rotation



Clockwise Output Rotation



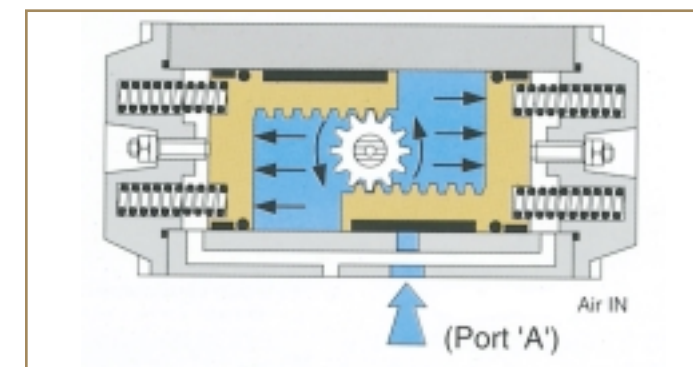
### Spring Return Actuator



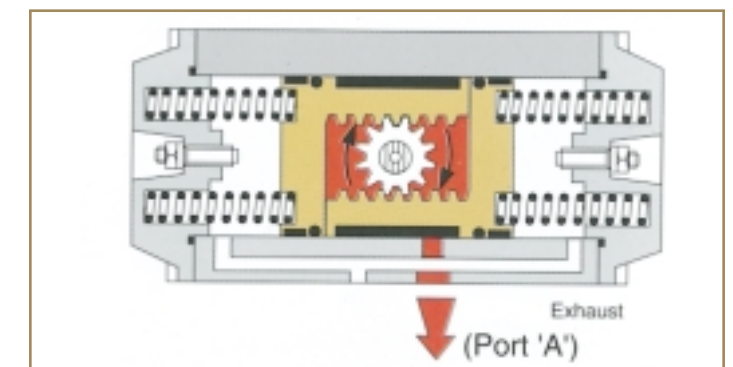
#### Principle of Operation

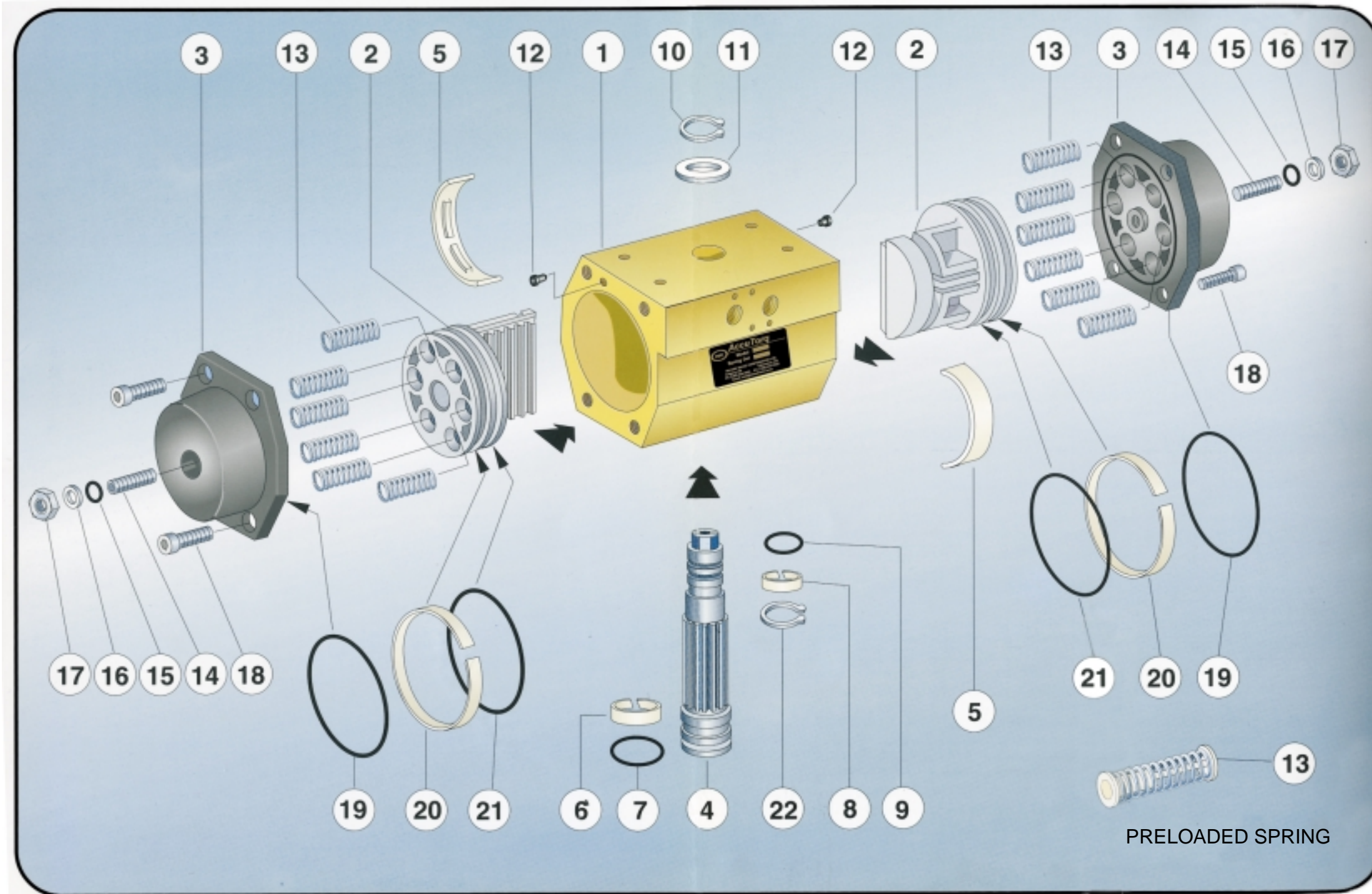
Pressure applied to **Port 'A'** will cause the inner chambers to be pressurized, forcing the pistons outward to compress the springs. The pinion is rotated counter clockwise. Upon release of pressure through **Port 'A'** the springs will exert pressure to close the pistons and rotate the pinion clockwise rapidly. This action will often be used to close a 90° turn valve in shut-down mode.

Clockwise Output Rotation



Counter Clockwise Output Rotation





Item	DESCRIPTION	Qty
1	Actuator body	1
2	Piston	2
3	End-cap	2
4	Pinion	1
* 5	Piston guide	2
* 6	Pinion guide ring	1
* 7	"O" ring	1
* 8	Pinion guide ring	1
* 9	"O" ring	1
10	Circlip	1
11	Thrust washer	1
* 12	Plug	2
13	Pre-Loaded springs	4/12
14	External stroke screw	2
15	"O" ring	2
16	Plain washer	2
17	Stop nut	2
18	End cap bolts	8
* 19	"O" ring	2
* 20	Piston guide ring	2
* 21	"O" ring	2
22	Circlip anti-blow out	1

\* Suggested spare parts list for maintenance.

## SPECIFICATIONS



**Pressure Range:** 30 PSI to 120 PSI (145 PSI Max.)  
**Temp Range:** Standard: -20° F to + 175° F  
 Low Temp: -40° F to + 212° F  
**Media:** Dry or lubricated air, non corrosive gas, water or light hydraulic oil  
**Stroke:** 90° with standard adjustable +3° to -3°  
**Lubrication:** all moving parts are factory lubricated for cycle life of actuator

**Construction:** Suitable for indoor or outdoor applications  
**Connections:** Bottom drilling to assemble valve is in accordance with I.S.O.5211 / DIN 3337. Interface for solenoid valve, top, shaft and top drilling to assemble accessories are in accordance with VDI/VDE 3845 NAMUR  
**Dimensions:** For valve mounting in accordance with ISO 5211 top-works and pinion to NAMUR

