FLOWSERVE

Automax Valve Automation Systems

Pneumatic Actuators And Accessories

Experience In Motion

Automax Valve Automation Systems

Pneumatic Actuators And Accessories

Flowserve is the World's Premier Provider of flow management services. Flowserve manufactures Automax Valve Automation Systems to provide full service valve and damper automation to the worldwide oil and gas, pulp and paper, chemical, processing and energy related industries. We provide maximum value to the end user through a broad offering of products, services, application engineering and our systematic approach to automation.

Sales and service facilities are strategically located in industrial centers throughout the world.

Quality, Dependability, and Productivity.

Recognized as the leader in valve automation systems, Automax's pneumatic actuators can automate valves with torque values from 25 to 500,000 in-lb. Actuators are available in a wide range of materials suitable for use in the most demanding applications. Flowserve also offers a comprehensive range of NAMUR Controls and accessories such as lockout modules and gear overrides. To complete the package Flowserve can provide engineering design services for AutoBrakit Mounting hardware. We currently have more than 10,000 AutoBrakits designed and documented for traceability and repeatability on a global basis.

SuperNova B-Series

SuperNova B series Rack and Pinion actuators are designed for butterfly, plug or ball valves, and offer one compact design for double acting and spring return. Precision die-cast pistons with large cylinder bearings increase efficiency and cycle life. Available in torque ranges from 25 in-lb to 58,000 in-lb, for optimum actuator sizing.

Controls & Accessories

The actuator is the heart of an automation system, but control accessories are important in creating a complete system to meet increasingly sophisticated customer requirements. Solenoid valves and related accessories with NAMUR interfaces provide direct, modular mounting on actuator. Switches, Positioners, Gear Overrides and Lockout Modules can also be integrated into the assembly. AutoBrakits are engineered to assure consistency and proper alignment.

Stainless Steel SXL-Series

The SXL® series utilizes a 316 series stainless steel housing and is ideal for use in corrosive environments. It is available in both double acting and spring return and can be supplied with internal components identical to the SNA Series or with optional stainless steel internals. For sanitary applications the housing can be polished. Available in torque ranges from 78 in-lb to 7279 in-lb.

EFC Epoxy-Filled Composite Series

The EFC series actuator is manufactured from a combination of tough corrosion resistant epoxy and composite materials. The simple design of the EFC series ensures the minimum number of moving parts and seals. Double acting and spring return versions utilize a shuttle piston with a full diameter acetal bearing.

Heavy Duty R2, R3, R4 & R5 Series

A complete line of Scotch Yoke heavy-duty actuators provides torques from 3,000 to 500,000 in-lb. The combination of Scotch Yoke actuators plus Rack and Pinion actuators offers the opportunity to standardize on one source for your complete quarter-turn automation needs. Scotch Yoke Actuators can also be configured with high pressure hydraulic cylinders. Contact Flowserve for complete details.

SuperNova B-Series

Spring Return

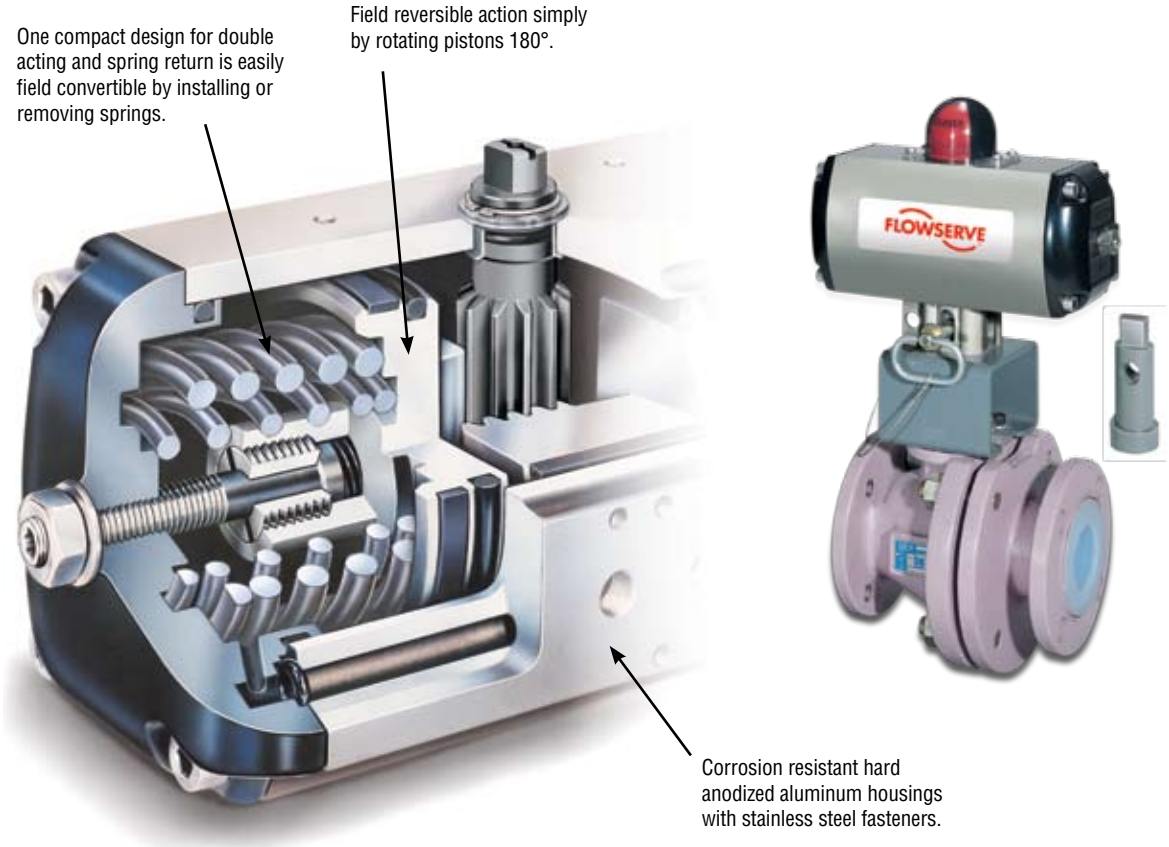
Rack & Pinion Actuators are designed for automating butterfly, plug or ball valves and dampers. The actuators incorporate a precision-extruded hard anodized aluminum body and a one-piece nitride-coated pinion gear, factory lubricated for a long trouble-free life. Actuators are designed for 100-degree travel with clockwise and counter-clockwise travel adjustment for open and closed positions. Actuators are convertible to a double acting or a spring return simply by removing or adding springs, while utilizing the same body and end caps. Available in torque ranges from 25 in-lbs. to 58,000 in-lbs., for optimum actuator sizing for each valve requirement.

Automax Aluminum Alloy

Hard anodic oxidation is an electrolytic conversion process which results in the formation of an oxide film. Continuation of the process produces the “hard” anodic coating to two mils. The chemical composition provides the optimum alloy for strength, abrasion resistance, cold working and chemical resistance.

The most useful properties of the oxide coating are:

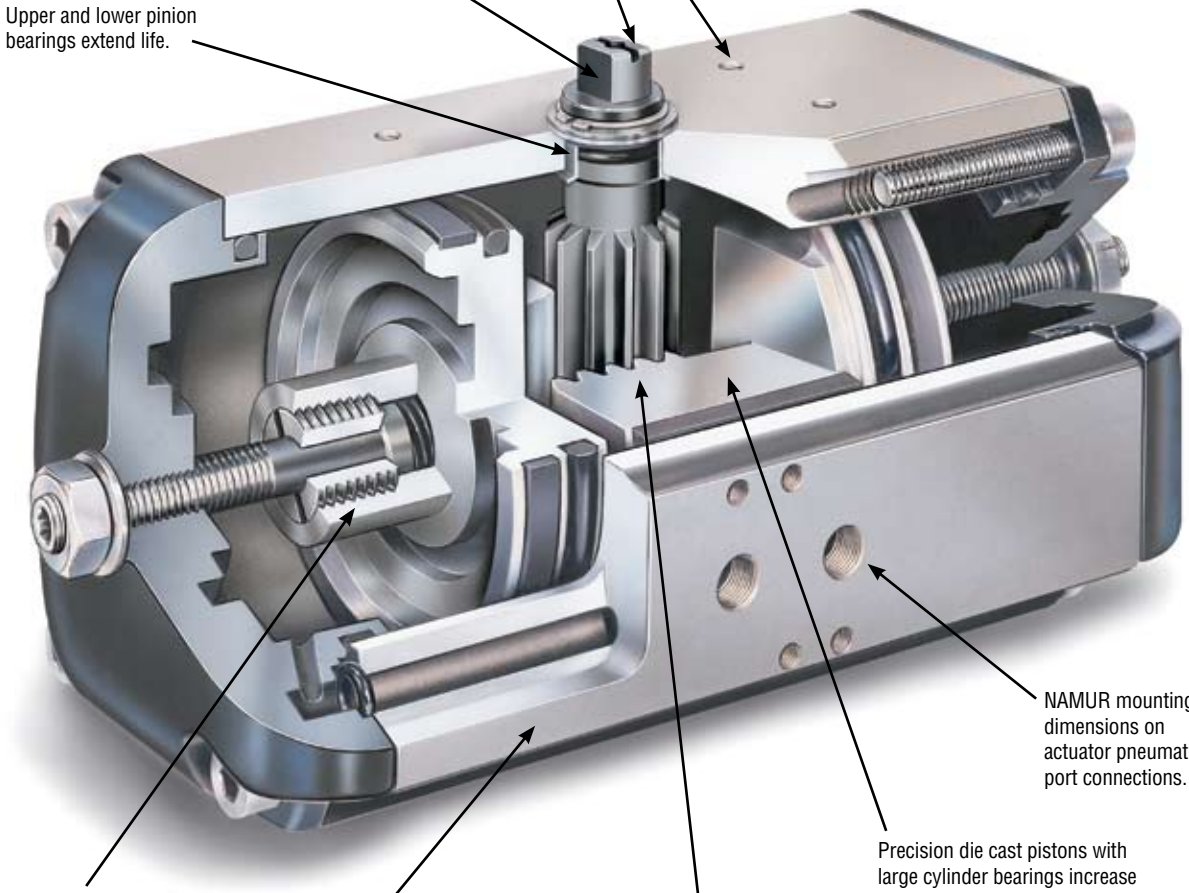
1. The oxide coating is integral with the base substrate and will not spall off by impacting thermal shock nor to temperatures to aluminum’s melting point. The oxide has negligible effect on the other properties of aluminum.
2. Aluminum oxide is one of the hardest materials known with a hardness of corundum (45 to 65 Rockwell C). Further, abrasion tests show only half as much wear as hardened steel.
3. Aluminum oxide is relatively stable and chemically inert. The oxide is usually stable over a pH range of 4.5 to 8.5, but can be dissolved by strong acids and alkalis, where as it normally resists concentrated nitric acid at pH 1 and ammonium hydroxide at pH 13.



SuperNova B-Series

Double Acting

Broad size range offers optimum actuator sizing for each valve requirement.



**Outward piston adjustment only on models SNA250 & SNA300*

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SuperNova B-Series

Torque Outputs

Model	Spring			Air Supply					
				60 Psi		80 Psi		100 Psi	
	No	End	Break	End	Break	End	Break	End	Break
B050	5	36	55	56	76				
	6	43	64	46	69				
	7	49	73	35	63	74	102		
	8	61	92	15	49	54	88	93	127
	9	73	110			34	74	73	113
B063	6	68	102	103	141				
	7	79	119	85	128				
	8	90	136	66	116				
	9	102	153			119	175		
	10	113	170			100	163		
	11	124	186			82	150	153	222
	12	135	203					135	210
B085	6	141	211	215	293				
	7	164	246	177	267				
	8	188	282	138	241				
	9	211	317			248	365		
	10	235	352			209	339		
	11	258	387			171	313	320	463
	12	282	422					281	437
B100	6	260	390	397	541				
	7	303	455	325	493				
	8	347	520	253	445				
	9	390	585			457	673		
	10	433	651			385	625		
	11	477	716			313	577	589	853
	12	520	781					518	805
B115	6	430	645	656	894				
	7	502	753	537	814				
	8	573	860	418	735				
	9	645	968			756	1112		
	10	717	1075			637	1033		
	11	789	1183			518	954	975	1410
	12	860	1290					856	1331
B125	6	610	915	930	1267				
	7	712	1067	761	1155				
	8	813	1220	593	1042				
	9	915	1372			1071	1577		
	10	1017	1525			903	1464		
	11	1118	1677			734	1352	1381	1999
	12	1220	1830					1213	1887

Note: For additional air supply pressures, consult factory or your AutoSize software program.

DA Torque

Actuator	Air Supply				
	40	60	80	100	150
A32	25	37	50	62	93
B050	78	116	155	194	291
B063	144	216	288	360	539
B085	299	449	598	748	1122
B100	552	828	1104	1380	2071
B115	913	1369	1826	2282	3423
B125	1294	1941	2588	3236	4853
B150	2329	3494	4658	5823	8734
B175	3487	5230	6974	8717	13076
B200	4970	7455	9940	12424	18637
SNA250	10354	15531	20707	25884	38826
SNA300	15529	23293	31057	38822	58232

Model	Spring			Air Supply					
				60 Psi		80 Psi		100 Psi	
	No	End	Break	End	Break	End	Break	End	Break
B150	6	1098	1648	1673	2280				
	7	1281	1922	1369	2078				
	8	1465	2197	1066	1875				
	9	1648	2471			1927	2837		
	10	1831	2746			1624	2635		
	11	2014	3020			1320	2432	2485	3597
	12	2198	3295					2182	3394
B175	6	1606	2527	2438	3457				
	7	1899	2907	2079	3133				
	8	2153	3349	1530	2851				
	9	2427	3759			2820	4292		
	10	2701	4170			2366	3989		
	11	2975	4581			1912	3686	3656	5430
	12	3249	4992					3201	5127
B200	6	2343	3516	3568	4864				
	7	2734	4107	2914	4432				
	8	3125	4691	2269	4000				
	9	3515	5277			4106	6053		
	10	3906	5865			3456	5622		
	11	4296	6451			2808	5190	5293	7674
	12	4687	7037					4645	7243
SNA250*	6	2854	6591	7421	12025				
	7	3393	7690	6448	11441				
	8	3945	8788	5428	10857				
	9	4519	9887	4373	10273	9780	15450		
	10	5106	10985	3274	9689	8566	14866		
	11	5715	12084			7352	14281	12529	19458
	12	6343	13182			6138	13697	11314	18874
SNA300*	6	4744	11096	9931	17473				
	7	5640	12945	8245	16501				
	8	6558	14795	6482	15530				
	9	7512	16644	4658	14559	12669	22326		
	10	8487	18493	2762	13588	10625	21355		
	11	9500	20343			8581	20384	16348	28150
	12	10543	22192			6537	19412	14304	27179

**Note: SNA250-SNA300 Spring Combinations. Spring number is total number of springs in endcaps. There should never be a difference in springs per endcap greater than one. Example: SNA250S09 would have four springs in one endcap and five in the other.*

Spring Chart B050 ②

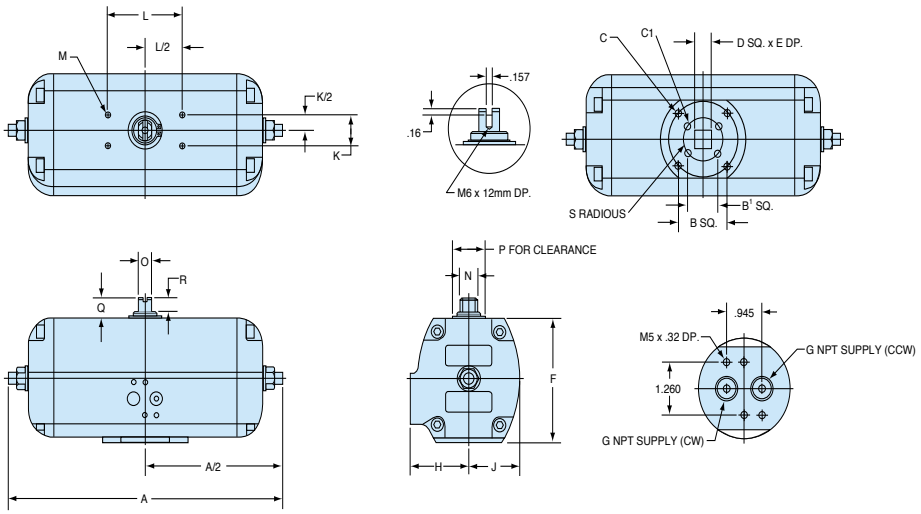
Spring Group	Spring Combination①		
	#1 Spring (inner)	#2 Spring (low rate outer)	#3 Spring (high rate outer)
4	1③	1③	
5		2	
6	2	1	
7	1	2	
8	2	2	
9	2		2

Note: ①#1 Spring has one color code dot. #2 Spring has two color code dots. #3 Spring has three color code dots ②B050 has maximum of 2 springs per endcap. ③Install springs on opposite sides.

Spring Chart B063-B200

Spring Group	Spring Combination①		
	#1 Spring (inner)	#2 Spring (middle)	#3 Spring (outer)
4		2	
5		1③	1③
6			2
7	1		2
8	2		2
9	1③	1③	2
10		2	2
11	1	2	2
12	2	2	2

Dimensions



① Actuator shown in the full clockwise (CW) position as viewed from top.

② Accessory mounting holes not for gear override or stop block.

③ Cycle times under no load conditions. Air line size, air capacity, and valve torque characteristics affect these cycle times. Faster or slower cycle times can be accomplished using special control components.

Model	ISO	A		B	B¹	C	C¹	D	E	F	G	H	J	K	L	M②③	N	O	P	Q	R
		DA&SR	180	SQ.	SQ.						NPT										
B050	F04S11E	6.69	8.70	1.169	N/A	#10-24x.31	N/A	.433	.47	2.56	⅛	1.58	1.14	1.181	3.150	#10-24	.47	.394	.75	.79	.39
B063	F03/F05S14E	7.95	9.92	1.392	1.002	¼ 20x.31	#10-24x.31	.551	.63	3.19	⅛	1.77	1.40	1.181	3.150	#10-24	.47	.394	.88	.79	.39
B085	F05/F07S17E	9.84	12.13	1.949	1.392	5/16-18x.31	¼ 20x.31	.669	.75	4.15	⅛	2.24	1.87	1.181	3.150	#10-24	.77	.551	1.00	.79	.55
B100	F05/F07S17E	11.65	14.80	1.949	1.392	5/16-18x.31	¼ 20x.31	.669	.75	4.80	¼	2.48	2.17	1.181	3.150	#10-24	.77	.551	1.38	.79	.55
B115	F07/F10S22E	13.47	17.60	2.840	1.949	⅜-16x.39	5/16-18x.31	.866	.98	5.30	¼	2.91	2.46	1.181	5.118	#10-24	1.10	.787	1.63	1.18	.79
B125	F07/F10S22E	15.83	20.35	2.840	1.949	⅜-16x.39	5/16-18x.31	.866	.98	5.79	¼	3.07	2.68	1.181	5.118	#10-24	1.10	.787	2.00	1.18	.79
B150	F10/F12S27E	19.13	25.20	3.480	2.840	½-13x.45	⅜-16x.39	1.063	1.18	6.85	¼	3.47	3.19	1.181	5.118	#10-24	1.87	1.417	2.38	1.18	.89
B175	F10/F14S36E	21.34	28.58	3.897	2.840	⅝-11x.63	⅜-16x.39	1.417	1.57	8.21	¼	4.17	3.74	1.181	5.118	#10-24	1.87	1.417	2.75	1.18	.89
B200	F10/F14S36E	24.41	31.69	3.897	2.840	⅝-11x.63	⅜-16x.39	1.417	1.57	9.39	¼	4.72	4.25	1.181	5.118	#10-24	1.97	1.417	2.94	1.18	.89

Note: Double Acting

Pressure at port "CW" will result in clockwise rotation. Pressure at port "CCW" will result in counter-clockwise rotation.

Note: Spring Return

Pressure at port "CCW" will result in counter-clockwise rotation. Springs provide clockwise rotation upon loss of pressure.

Model	Weights(lbs)		Volume(in)		CycleTime	
	DA	SR	CW	CCW	CW	CCW
B050	2.7	3.1	8.2	5.4	.5	.5
B063	3.8	4.4	16	10	.5	.5
B085	7.5	9.3	34	20	.5	.5
B100	11.5	14.6	56	38	1	.5
B115	17.7	22.5	94	65	1	1
B125	23.8	30.2	128	90	1	1
B150	40.8	51.2	224	159	2.0	1.5
B175	63.7	77.2	351	232	3.0	2.0
B200	91.5	118	507	332	4.5	3.0

Note: Double Acting

Pressure at port "CW" will result in clockwise rotation. Pressure at port "CCW" will result in counter-clockwise rotation.

Note: Spring Return

Pressure at port "CCW" will result in counter-clockwise rotation. Springs provide clockwise rotation upon loss of pressure.

How To Order *(Select **Bold Type Code** from each column that applies)*

MODEL	TYPE	Springs (Select One)①			
		050 Thru 300	Seals	Materials	Options
B050	**D** Double Acting **S** Spring Return (FCW) **C** Spring Return (FCCW) **M** 180° Double Acting	04 05 06 07 08 09 10 11 12	**Blank** - Buna (Std.) **L** Low Temp. **H** Viton (High Temp.)	**Blank** - Std. Hard Anodized Aluminum **K** K-Mass Coated **W** White Epoxy Coated **G** Gray Epoxy Coated **X** BlackMax Coating	**R** Extra Long Travel Stop **C** Stainless Steel Pinion/Snap Ring
B063					
B085					
B100					
B115					
B125					
B150					
B175					
B200					
SNA250					
SNA300					

① Consult torque charts or AutoSize for applicable spring combinations. Example: A model B100 spring return (FCW) spring set 10, would be coded as **B100S10**

SuperNova SNA250 & SNA300 90° Units and 180° Actuators

180° Rack & Pinion Actuators

Automax 180 Degree Actuators are available in the same models and with the same torque outputs as the standard SuperNova Double Acting actuators.The integral mechanical, end-of-stroke travel adjustment is for one direction only. As options, travel stops can be furnished for less than 180° travel and an additional travel stop for the other direction can be provided in the valve actuator adaption.

Automax has developed economical control circuits and devices to actuate multiport valves both

2 position (0°,180°) and

3 position (0°, 90°,180°)

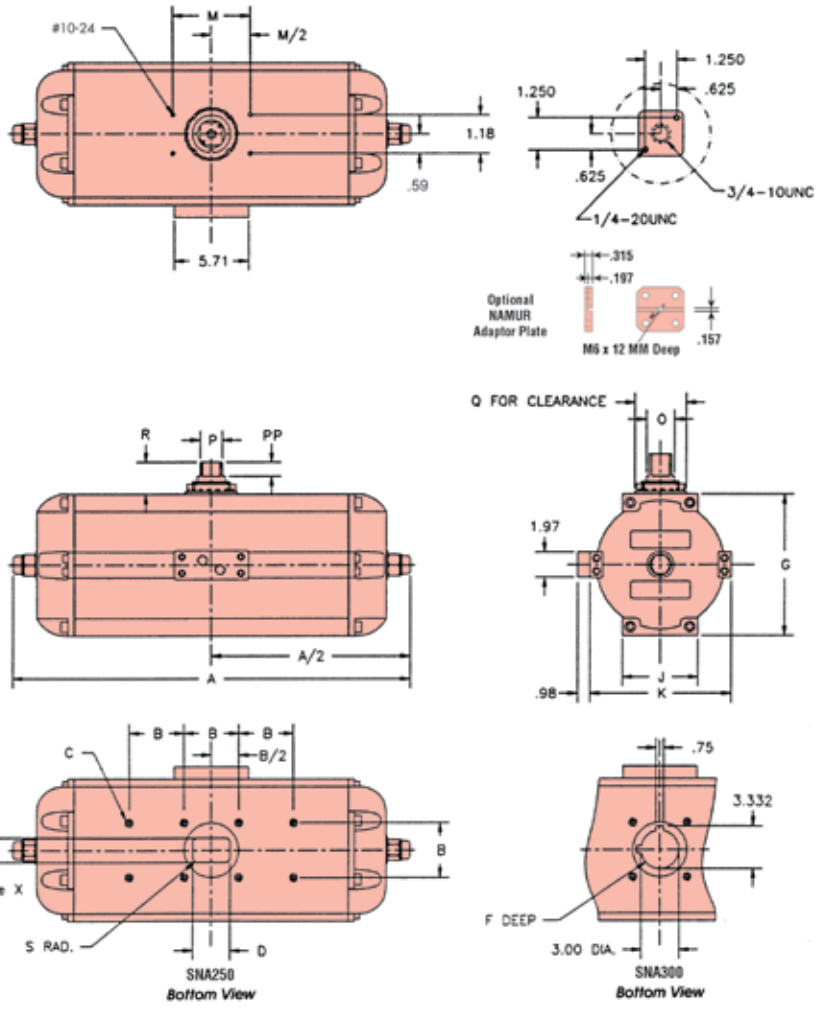
utilizing the UltraSwitch. Consult your Automax Representative for assistance in selecting the best control package.

Dimensions for 50-200 size 180° actuators on previous page.

SNA250

Typical 180° Rotary Actuator

Dimensions



① Actuator shown in the full clockwise (CW) position as viewed from top. ② Accessory mounting holes not for gear override or stop block. ③ Use studs only to mount. Bolts not recommended. ✓ Cycle times under no load conditions. Air line size, air capacity, and valve torque characteristics affect these cycle times. Faster or slower cycle times can be accomplished using special control components.

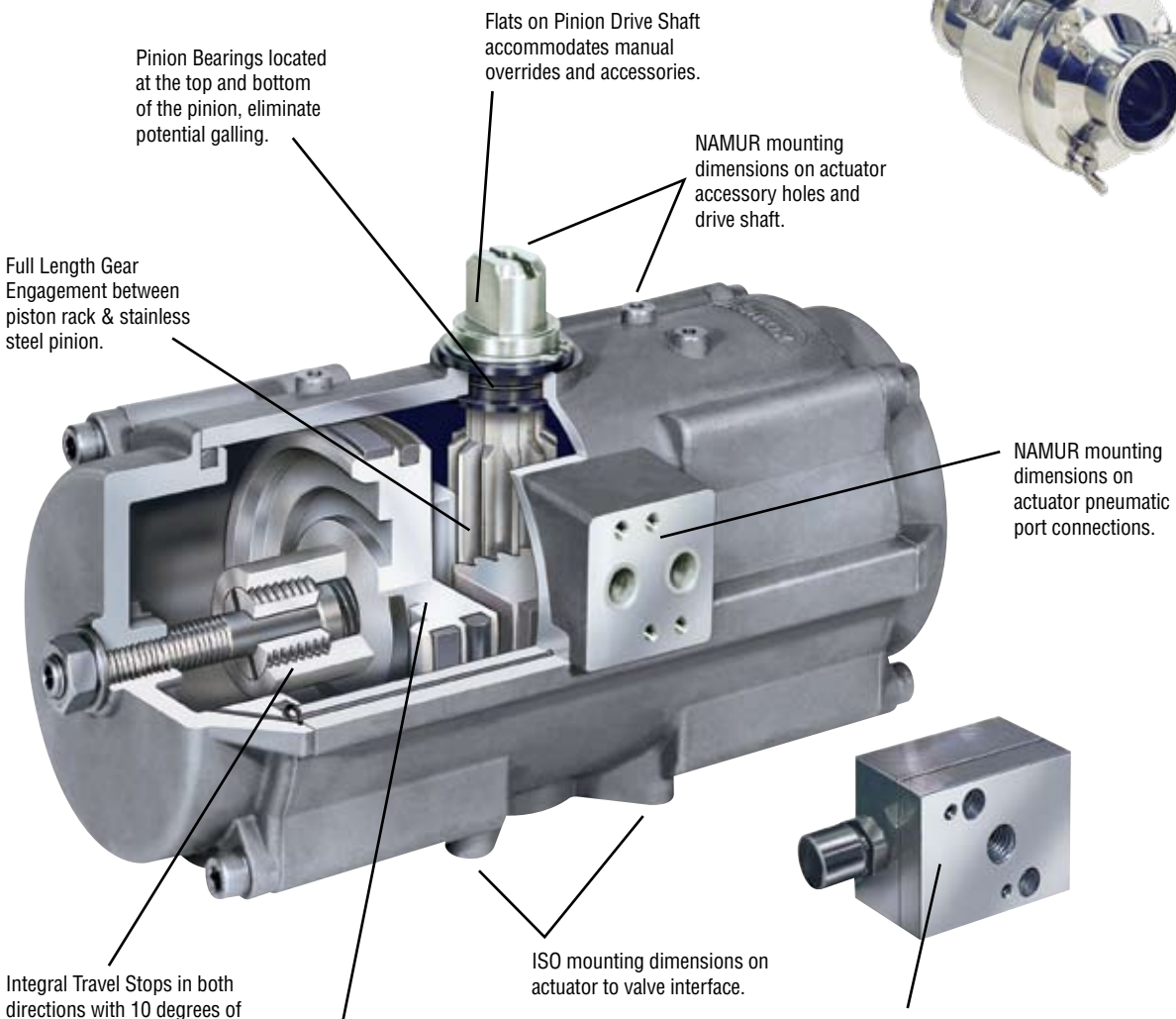
MODEL	A		B	C	D	E	F	G	H	J	K	M	O	P	PP	Q	R	S	WEIGHTS		VOLUME		CYCLE TIME	
	DA&SR	180							NPT										DA	SR	CW	CCW	CW	CCW
SNA250	27.32	39.14	4.250	⅝-11X.63	2.87	1.850	1.81	11.02	½	5.91	11.02	5.118	2.20	1.969	0.98	3.75	1.65	.24	137	172	757	720	5-7	5-7
SNA300	32.60	44.00	5.000	⅝-11X.94	N/A	N/A	2.50	13.39	½	6.30	13.39	5.118	2.44	1.969	0.98	3.75	1.65	N/A	217	288	1403	1019	6-9	6-9

Controls		Accessories	
A25N Directional Valve* The Automax Directional Valve mounts directly to SuperNova series actuators which eliminates the cost of tubing and fittings. The valves are available for double acting and spring return actuators with NEMA 4X, 7 & 9, or intrinsi-cally-safe and low power solenoid operators. These valves have been tested and proven reliable for over 1 million cycles.		**"Pharos" NAMUR Indicator *** Provides an economical solution for positive visual indication of the actuator position. Constructed of tough industrial engineered resin, the UltraIndicator can be used on actuators that utilize a NAMUR mounting interface.	
		UltraSwitch GL/XL/PL Series Rotary Position Indicators* The UltraSwitch series of position indicators provides a compact and economical package for both visual and remote electrical indication of valve position. Models are available in both die cast aluminum and non-metallic versions. Suitable for non-hazardous, hazardous and intrinsically-safe applications.	
APS1 Module* The Automax APS1 module works with the Automax A25N solenoid valve and diverts exhaust air from between the pistons into the spring chamber. This prevents corrosive atmospheres from being pulled into the spring chamber.		**Aviator and BUSwitch Rotary Position Indicator with Internal Pilot Solenoid*** The Aviator rotary position indicator enclosure with internal pilot solenoid coil provides a truly integrated package. It can easily be converted to a BUSwitch by simply adding a Fieldbus communication printed circuit board.	
APS2 Module* The Automax APS2 module works with remote/line mounted solenoid valves and diverts exhaust air from between the pistons into the spring chamber. This prevents corrosive atmospheres from being pulled into the spring chamber.		**APEX Modular Positioner*** Available in both aluminum and non-metallic versions, the Apex positioner combines precise valve positioning with advanced features. A modular manifold base allows 3-15 psi pneumatic control signals, or 4-20mA signals with the addition of the I/P module. Models are available for corrosion resistant applications and hazardous locations as defined by UL, C-UL, CENELEC, and SAA.	
LV1 Lockout & Vent Valve* The LV1 Lockout and Vent Valve module provides two primary functions. The LV1 may be used with a manual override to shut off supply air and vent actuator ports. The LV1 may also be used as a pneumatic lockout valve which, when properly implemented, will satisfy OSHA Standard 1910.47. The LV1 may be sandwich mounted with other Automax NAMUR acces-sories or may be used with the NPT1 adaptor.		**Lockouts*** The lockout option permits easy lockout of automated valves. Lockouts are designed to withstand the rated output torque of the actuator, with the intent to meet the requirements of OSHA Standard 1910.47 "The Control of Hazardous Energy" (Lockout/Tagout).	
		Gear Overrides* Declutchable gear overrides are options which allow local manual control of actuated valves and dampers. The gear overrides are sized for easy operation and can be combined with other control accessories.	
FC1, FCDA & FCSR* The 'FC' Series Flow Control modules provide compact flow controls for precise adjustment of SuperNova actuator speeds. The Flow Control Modules may be sandwich mounted with other Automax accessories or may be used with the NPT1 adaptor.		**AutoBrakits*** Automax heavy-duty mounting kits are designed to close tolerances to assure consistency and proper alignment, which are essential to ensure maximum actuator and valve cycle life.	

**Consult Individual Catalogs and IOM's For Additional Information*

SXL Series Stainless Steel

The SXL Series utilizes a 316 series stainless steel body and is ideal for use in corrosive environments. It is available in both Double Acting and Spring Return versions with a maximum double acting torque output of 7,279 in-lbs. The SXL Series can be supplied with stainless steel or aluminum pistons and springs per customer requirements and is also available with optional polished finishes for sanitary applications.



Pinion Bearings located at the top and bottom of the pinion, eliminate potential galling.

Flats on Pinion Drive Shaft accommodates manual overrides and accessories.

NAMUR mounting dimensions on actuator accessory holes and drive shaft.

Full Length Gear Engagement between piston rack & stainless steel pinion.

NAMUR mounting dimensions on actuator pneumatic port connections.

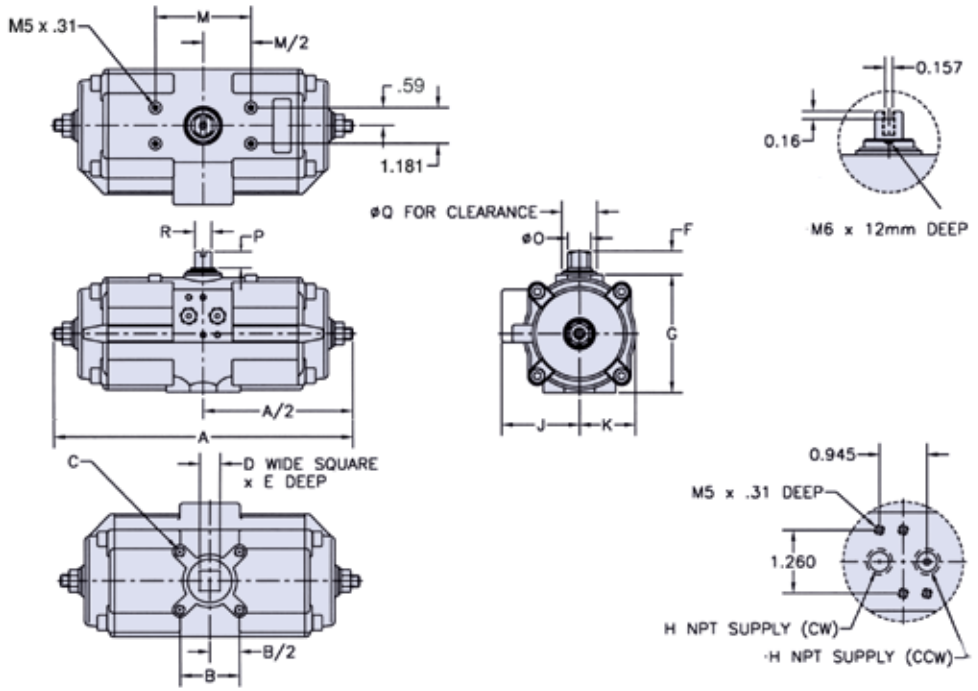
ISO mounting dimensions on actuator to valve interface.

Integral Travel Stops in both directions with 10 degrees of overtravel to assure precise adjustment of both open and closed positions.

Precision Die Cast Pistons with large cylinder bearings increases efficiency and cycle life. Field reversible action simply by rotating pistons 180°. (Optional stainless steel pistons also available.)

Air Purge Modules are available in stainless steel to isolate the internal components of spring return actuators from the atmosphere. Stainless steel breather vent optional.

SXL Series Dimensions



① *Actuator shown in the full clockwise (CW) position as viewed from top.*

② *Accessory mounting holes not for gear override or stop block.*

③ *Use studs only to mount. Bolts not recommended.*

✓ *Cycle times under no load conditions. Air line size, air capacity, and valve torque characteristics affect these cycle times. Faster or slower cycle times can be accomplished using special control components.*

Model	ISO	A	B	C	D	E	F	G	H	J	K	M	O	P	Q	R	Weights(lbs)		Volume(in)		CycleTime	
			SQUARE							NPT							DA	SR	CW	CCW	CW	CCW
SXL050	F04S11M	6.69	1.169	M5 x .31	.433	.47	.79	2.56	1/8	1.85	1.18	3.150	.56	.39	.83	.39	4.85	5.15	8.2	5.4	.5	.5
SXL063	F05S14M	7.95	1.392	M6 x .31	.551	.63	.79	2.56	1/8	2.11	1.44	3.150	.56	.39	.91	.39	7.05	7.80	16	10	.5	.5
SXL085	F07S17M	9.84	1.949	M8 x .31	.669	.79	.79	3.94	1/8	2.60	1.87	3.150	.77	.55	1.18	.55	11.24	13.18	34	20	.5	.5
SXL100	F07S17M	11.65	1.949	M8 x .31	.669	.79	.79	4.57	1/4	2.95	2.00	3.150	.77	.55	1.46	.55	16.09	19.02	56	38	1	.5
SXL115	F10S22M	13.46	2.840	M10 x .31	.866	.98	1.18	5.16	1/4	3.23	2.46	5.118	1.38	.79	1.77	.79	23.14	27.55	94	65	1	1
SXL125	F10S22M	15.83	2.840	M10 x .31	.866	.98	1.18	6.61	1/4	3.43	2.70	5.118	1.38	.79	2.17	.79	38.14	45.12	128	90	1	1
SXL150	F12S27M	19.13	3.480	M12 x .47	1.063	1.14	1.18	6.61	1/4	3.94	3.19	5.118	1.97	.89	2.64	1.42	51.14	61.50	224	159	2	1.5

How To Order *(Select **Bold Type Code** from each column that applies)*

MODEL	TYPE	Springs (Select One)	Seals	Materials	Options
SXL050	**D** Double Acting	04	**Blank** - Viton (Std.)	**Blank**	**R** Extra Long Travel Stop
SXL063	**S** Spring Return (FCW)	05	**L** Low Temp.	**K** K-Mass Coated	**M** Stainless Steel Springs
SXL085	**C** Spring Return (FCCW)	06		**F** Polished	**P** Stainless Steel Pistons
SXL100		07			
SXL115		08			
SXL125		09			
SXL150		10			
		11			
		12			

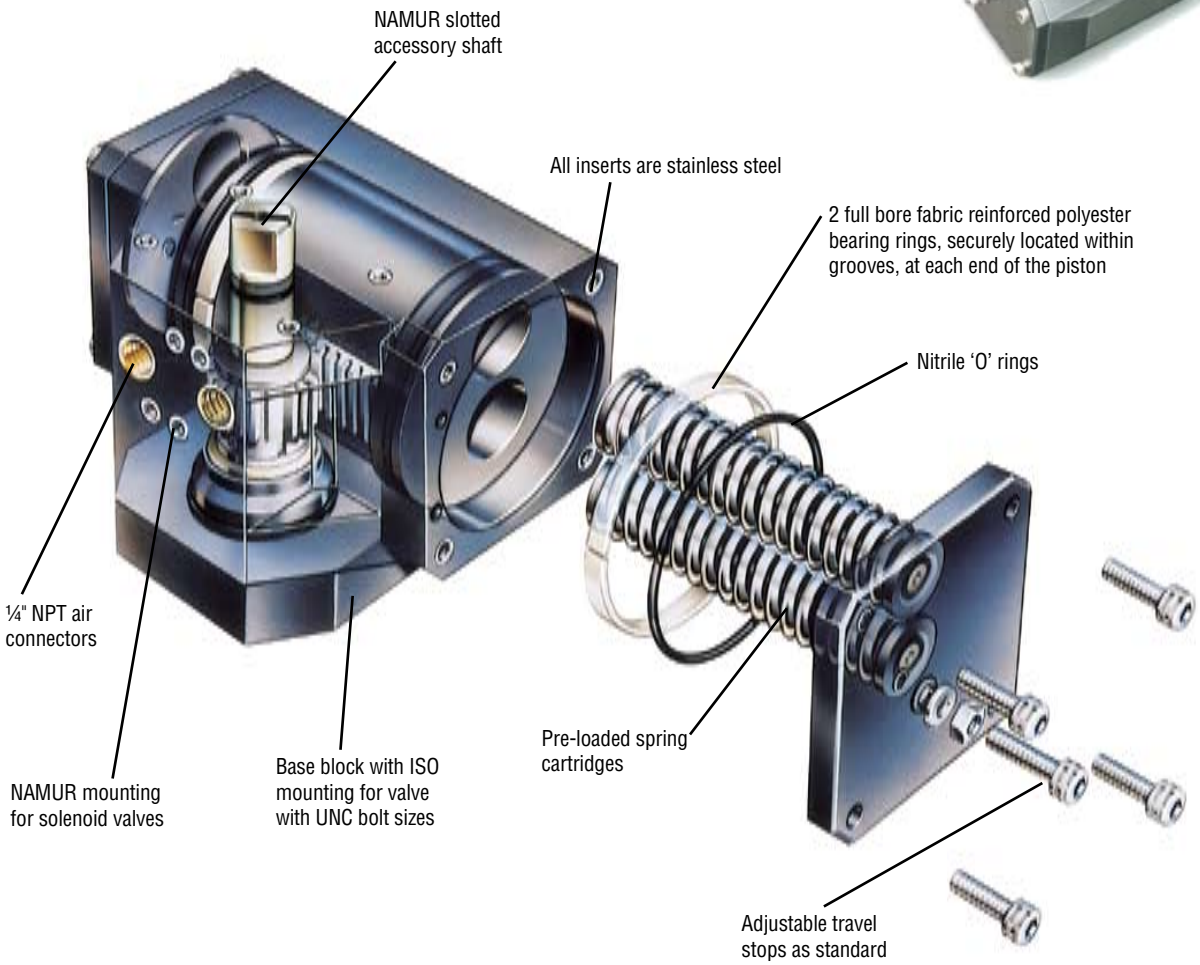
Example: A model SXL100 spring return (FCW) spring set 10, would be coded as **SXL100S10**

EFC Series Actuators

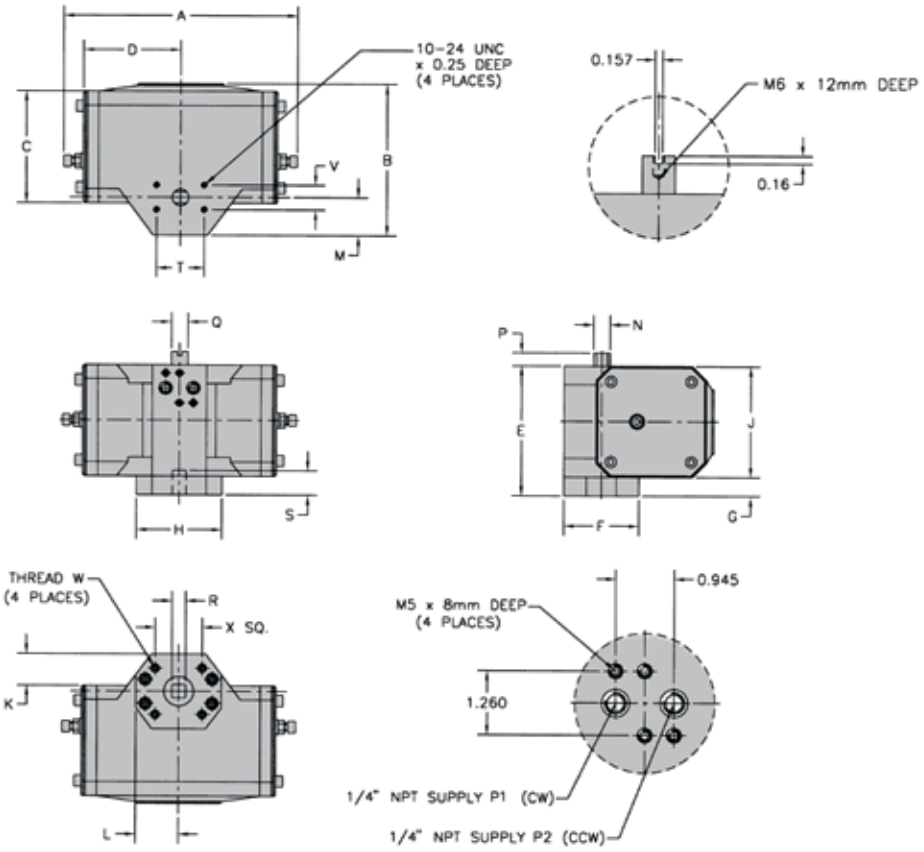
The EFC Series Actuator is manufactured from a tough corrosion-resistant epoxy and glass composite (EFC) which does not require surface protection. EFC is a tough material, which is consistent throughout, therefore any surface damage will not affect its resistance to corrosion.

The EFC Series shuttle piston design allows ample space for two low- fatigue spring cartridge packs, located within the full length of the piston. For a double-acting actuator, the spring cartridge packs are removed, thus avoiding a dimensional difference between spring return and double-acting version.

The simple design of the EFC Series Actuator ensures the least number of moving parts and air seals. The shuttle piston has full diameter acetal bearing rings and nitrile 'O' rings located at each end of the piston. Both bearing rings and 'O' rings can be changed simply by removing the end caps. Total disassembly of the actuator is not necessary and, therefore, maintenance costs are reduced.



EFC Series Dimesions



Double Acting (as viewed from top) Pressure at port "P1" will result in clockwise rotation. Pressure at port "P2" will result in counter-clockwise rotation.

Spring Return (SR Unit) (as viewed from top) Pressure at port "P2" will result in counter-clockwise rotation. Springs provide clockwise rotation upon loss of supply pressure.

① Actuator shown in the full clockwise (CW) position as viewed from top.

② Accessory mounting holes not for gear override or stop block.

③ Mounting is per ISO 5211 with UNC bolt sizes. Cycle times under no load conditions.

✓ Air line size, air capacity, and valve torque characteristics affect these cycle time. Faster or slower cycle times can be accomplished using special control components.

Model	ISO③	A	B	C	D	E	F	G	H	J	K	L	M	N DIA.	P	Q	R	S	T②	V	W	X	WEIGHT (lbs)	
																							DA	SR
A20	F04S11E	6.82	4.41	3.15	2.76	3.70	2.68	0.71	2.99	2.95	1.06	1.50	1.34	0.69	0.79	0.472	0.433	0.47	1.969	1.024	¼-20X.40	1.169	4.6	5.3
A40	F04S11E	8.36	5.24	3.70	3.31	4.49	2.99	0.79	3.54	3.74	1.34	1.77	1.50	0.69	0.79	0.472	0.433	0.51	1.969	1.024	¼-20X.40	1.169	7.9	9.0
A80	F05S14E	9.76	6.30	4.65	4.02	5.47	3.15	0.79	3.54	4.69	1.42	1.77	1.58	0.69	0.79	0.472	0.551	1.02	1.969	1.024	¼-20X.40	1.392	13	15
A160	F07S17E	12.57	7.60	5.63	5.16	6.65	3.78	0.98	4.72	5.67	1.65	2.36	1.89	1.06	1.18	0.709	0.669	0.95	3.150	1.181	5/16-18X.50	1.948	22	26
A270	F10S22E	14.73	8.98	6.65	5.95	7.80	4.41	1.10	5.51	6.65	1.97	2.76	2.21	1.25	1.18	0.866	0.866	1.14	3.150	1.181	⅜-16X.63	2.839	37	44
A500	F12S27E	17.76	11.02	8.27	7.52	9.33	5.51	1.10	6.23	8.27	2.44	3.15	2.76	1.50	1.18	1.063	1.063	1.34	3.150	1.181	½-13X.78	3.479	62	70

MODEL	CYCLE TIME (seconds per 90°)	
	Air	Springs
A20	.5	.6
A40	.6	.6
A80	.9	.6
A160	1.8	1.2
A270	3.2	2.0
A500	4.9	3.3

How To Order *(Select **Bold Type Code** from each column that applies)*

MODEL	TYPE	Springs (Select One)	Seals
A20	**DA** Double Acting	30	**Blank**-Std Buna
A40	**SR** Spring Return (FCW)	40	
A80	**SO** Spring Return (FCCW)	50	
A160		60	
A270		70	
A500		80	

*Example: A model A80SR spring return (FCW) spring set 60, would be coded as **A80SR60***

Heavy Duty R-2, R-3 and R-4 Series

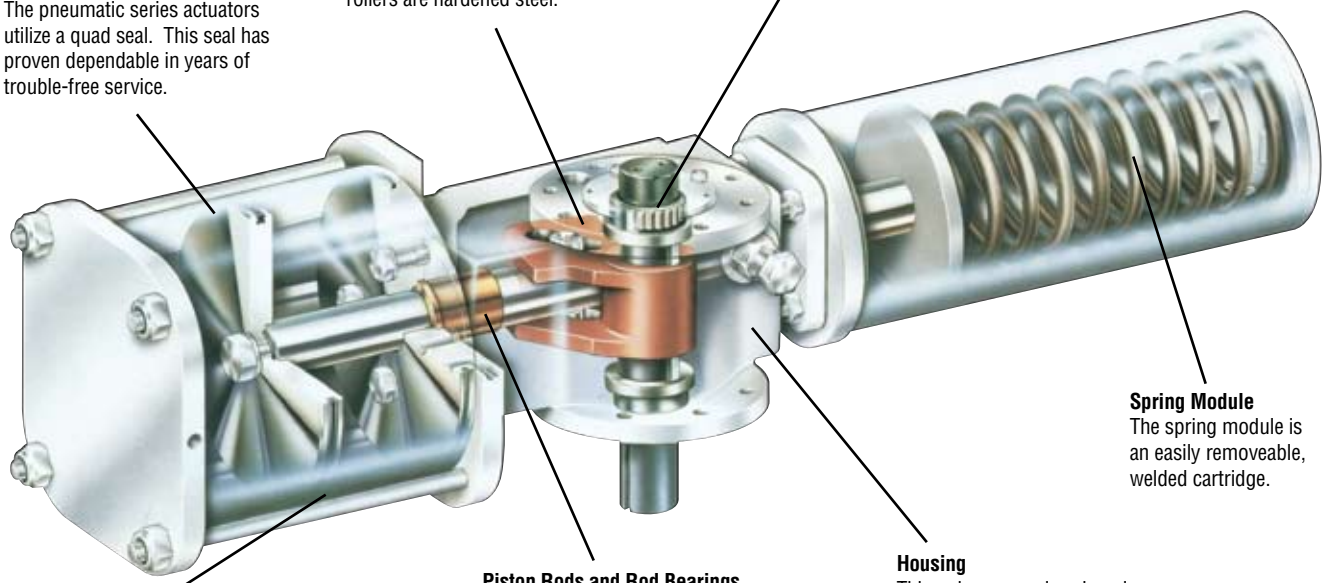
Automax has a complete line of scotch yoke, heavy duty rotary actuators, which has a unique bearing design to provide higher efficiencies and longer life.

- Pneumatic, Gas and Hydraulic Models
- Double Acting, Spring Return and “Fail-Safe”
- On-Off, Multi-position and Throttling
- Pressure Ranges from 40 psi to 2500 psi
- Torque Outputs: Standard Design from 1000 to 170,000 in-lbs
- Overrides, Special Controls, Line Break Controls, etc.

Needle Bearings and Seals
Automax is the only actuator with precision drawn cup needle bearings at the torque shaft journals. The bearings significantly increase torque output and cycle life, while providing near frictionless rotary movement. The seals protect the needle bearings from external dirt and corrosion, while the bearing’s rigid design prolongs seal life.

Scotch Yoke
The slot in the scotch yoke mechanism is precision machined. The yoke pin is induction hardened and chrome plated. The yoke pin rollers are hardened steel.

Piston Seals
The pneumatic series actuators utilize a quad seal. This seal has proven dependable in years of trouble-free service.



Spring Module
The spring module is an easily removeable, welded cartridge.

Housing
This unique one-piece housing assures accurate alignment of both the torque shaft and the piston rod.

Piston Rods and Rod Bearings
Large diameter piston rods are guided and supported by extra long bronze bearings. The rods are ground, high strength steel with a hard chrome plating polished to a mirror finish of 4 to 8 microns.

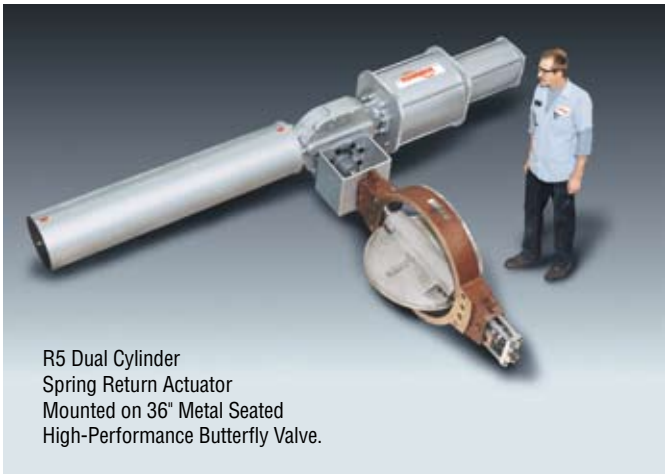
Cylinders
The cylinders are honed to a micro finish with a hard chrome plating.

Heavy Duty R-5 Series

The RS Series Heavy Duty Scotch Yoke Actuator provides torque output as high as 500,000 in-lb.

- Pneumatic, Gas and Hydraulic Models
- Double Acting, Spring Return and “Fail-Safe”
- On-Off, Multi-position and Throttling
- Pressure Ranges from 40 psi to 2500 psi

The R5 series when combined with Automax’s extensive range of automation products offers the opportunity to standardize on a single source for your complete quarter-turn automation needs.



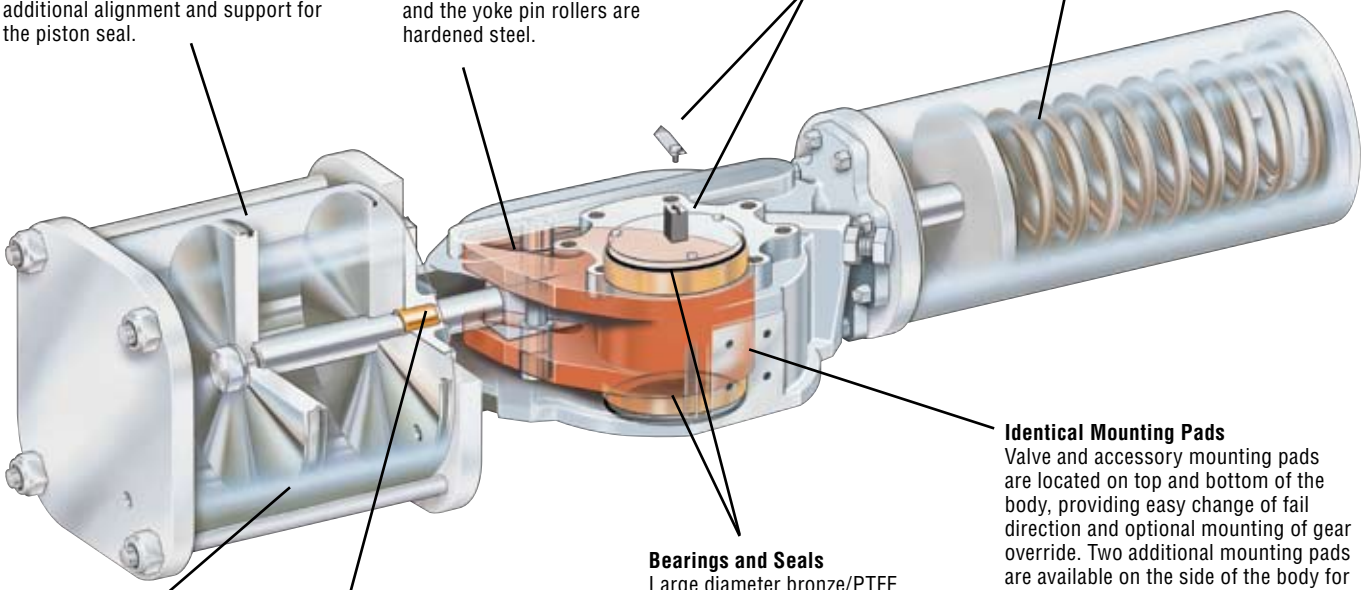
R5 Dual Cylinder
Spring Return Actuator
Mounted on 36" Metal Seated
High-Performance Butterfly Valve.

Piston Seal and Wearband
The pneumatic series actuators utilize a quad seal in conjunction with a piston wearband. The quad seal provides a low friction, long lasting seal, proven dependable for years of trouble free service. The wearband provides additional alignment and support for the piston seal.

Scotch Yoke
The slot in the scotch yoke mechanism is precision machined. The yoke pin is induction hardened and chrome plated. It is supported at the top and bottom by a guide slot in the housing and the yoke pin rollers are hardened steel.

Indicator/Output shaft
Top accessory shaft has NAMUR slot, and optional position indicator.

Spring Module
The spring module is an easily removable, welded cartridge.



Identical Mounting Pads
Valve and accessory mounting pads are located on top and bottom of the body, providing easy change of fail direction and optional mounting of gear override. Two additional mounting pads are available on the side of the body for mounting accessories.

Bearings and Seals
Large diameter bronze/PTFE bearings provide a smooth, low friction surface for the yoke journal. The seals protect the bearings from external dirt and corrosion, while the bearing’s rigid design prolongs seal life.

Piston Rods and Rod Bearings
Piston rods are guided and supported by self lubricating bronze bearings. The rods are ground, high strength steel with a hard chrome plating, polished to a mirror finish.

Cylinder
The cylinders are honed to a micro finish with a hard chrome plating.

Heavy Duty Torque Charts

Double Acting

Model	Torque	40	60	80	100
R205	Break Run	3302 1865	4953 2798	6604 3731	8255 4663
R206	Break Run	4899 2767	7348 4151	9797 5535	12246 6918
R207	Break Run	6785 3833	10178 5750	13571 7667	16963 9583
R208	Break Run	8962 5063	13444 7595	17925 10126	NA
R310	Break Run	13607 7687	20411 11531	27214 15374	34018 19218
R312	Break Run	19993 11295	29990 16940	39990 22590	49985 28240
R314	Break Run	27541 15560	41310 23340	55080 31120	NA
R316	Break Run	36250 20480	54375 30720	NA	NA
R414	Break Run	40005 22600	60010 33900	80010 45200	100010 56500
R416	Break Run	53070 29980	79600 44970	106135 59960	132670 74950
R418	Break Run	67870 38343	101810 57515	135745 76685	169680 95860
R420	Break Run	84420 47690	126630 71540	168835 95380	NA
R422	Break Run	102706 58022	154059 87033	NA	NA

Model	Torque	40	60	80	100
R205SR	Pneumatic Break Pneumatic End Spring Break Spring End	2297 1244 2291 1237	3447 1922 3379 1854	4594 2474 4595 2475	5668 2954 5882 3168
R206SR	Pneumatic Break Pneumatic End Spring Break Spring End	3235 1710 3379 1854	4961 2842 4793 2673	6543 3829 6349 3636	8268 4197 8527 4455
R207SR	Pneumatic Break Pneumatic End Spring Break Spring End	4452 2333 4595 2475	6755 4041 6349 3636	9003 4932 8923 4851	10987 5560 11759 6331
R208SR	Pneumatic Break Pneumatic End Spring Break Spring End	5880 3166 5882 3168	8721 4649 8923 4851	11764 6337 11759 6331	14704 7927 14692 7915
R310SR	Pneumatic Break Pneumatic End Spring Break Spring End	9187 4958 9189 4950	13785 7683 13522 7420	18379 9226 19049 9895	22824 10350 24993 12519
R312SR	Pneumatic Break Pneumatic End Spring Break Spring End	12937 6835 13522 7420	19849 10696 19841 10687	26167 13693 27022 14548	33083 16451 34443 17811
R314SR	Pneumatic Break Pneumatic End Spring Break Spring End	17813 8660 19049 9895	27015 14541 27022 14548	36023 19391 36027 19395	43937 22229 47043 25335
R316SR	Pneumatic Break Pneumatic End Spring Break Spring End	23672 11198 24993 12519	34892 18260 36027 19395	47047 25339 47043 25335	NA
R414SR	Pneumatic Break Pneumatic End Spring Break Spring End	27017 14563 27000 14546	40522 21811 40534 21823	54034 29613 53514 29092	65906 34984 68924 38002
R416SR	Pneumatic Break Pneumatic End Spring Break Spring End	35285 16574 37712 19001	52338 27916 53514 29092	70571 39649 68924 38002	87623 46374 89343 48094
R418SR	Pneumatic Break Pneumatic End Spring Break Spring End	44656 20235 48472 24050	65057 34036 68924 38002	89320 48070 89343 488094	111651 60743 111024 60115
R420SR	Pneumatic Break Pneumatic End Spring Break Spring End	55731 31309 53514 29092	82705 41456 85779 44530	109531 58622 111024 60115	137834 74229 137828 74223
R422SR	Pneumatic Break Pneumatic End Spring Break Spring End	64633 33712 68924 38002	101472 50564 103390 52481	131049 67443 137828 74223	NA

Heavy Duty Torque Charts

R5 Pneumatic Double Acting Torques

Model	Torque	40	60	80	100
R514DA	Break Run	73978 44083	110967 66124	147956 88166	184945 110207
R516DA	Break Run	97370 58022	146056 87033	194741 116044	243426 145055
R518DA	Break Run	123882 73820	185822 110730	247763 147640	309704 184550
R51414DA	Break Run	150393 89618	225589 134426	300786 179235	375982 224044
R520DA	Break Run	153512 91476	230268 137214	307024 182952	383780 228691
R51614DA	Break Run	173785 103557	260678 155335	347570 207114	434463 258892
R522DA	Break Run	186261 110991	279392 166487	372522 221982	465653 277478
R51616DA	Break Run	197177 117496	295766 176244	394355 234992	492944 293740
R524DA	Break Run	222129 132365	333194 198547	444258 264729	NA
R51816DA	Break Run	223689 133294	335533 199941	447377 266588	NA
R51818DA	Break Run	250200 149092	375300 223638	500400 298183	NA
R52020DA	Break Run	309460 184404	464191 276607	NA	NA

R5 Pneumatic Spring Return Torques

Model	Torque	40	60	80	100
R516SR	Pneumatic Break Pneumatic End Spring Break Spring End	NA	NA	NA	156005 85871 148061 88837
R518SR	Pneumatic Break Pneumatic End Spring Break Spring End	82154 39519 78533 41956	119224 66535 111234 66740	159124 88990 148061 88837	200290 113660 182885 109731
R520SR	Pneumatic Break Pneumatic End Spring Break Spring End	98195 54881 91442 54865	149578 79902 139352 80127	196391 109761 182885 109731	250315 145647 220965 132579
R522SR	Pneumatic Break Pneumatic End Spring Break Spring End	118445 65755 111234 66740	189534 119400 148061 88837	237839 133171 220965 132579	304023 178232 265558 159335
R524SR	Pneumatic Break Pneumatic End Spring Break Spring End	140221 70545 139352 80127	221343 134713 182885 109731	281411 155620 265558 159335	364896 217507 311154 186693
R52214SR	Pneumatic Break Pneumatic End Spring Break Spring End	171600 101466 148061 88837	258112 153445 220965 132579	333706 186318 311154 186693	438098 269586 355748 213449
R52416SR	Pneumatic Break Pneumatic Break Spring Break Spring End	208867 122237 182885 109731	318838 193047 265558 159335	424063 255551 355748 213449	NA

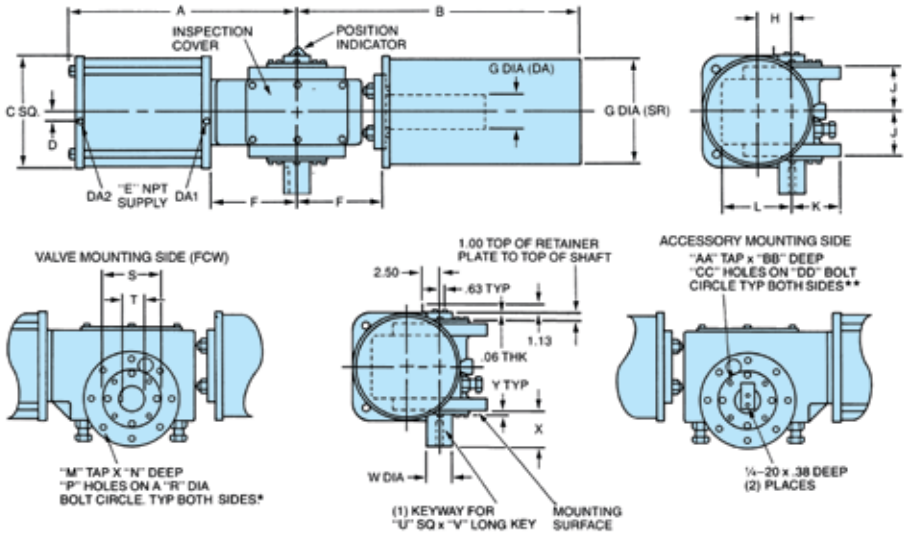
How To Order *(Select **Bold Type Code** from each column that applies)*

Model	Cylinder Size	Type	Spring Size	Override	Temperature	Material/Coating
R2	**05**-5" dia. **06**-6" dia. **07**-7" dia. **08**-8" dia.	**DA**-Double Acting **SR**-Spring Return (FCW) **SO**-Spring Return (FCCW)	**Blank**- DA **40**-40 psi air supply **60**-60 psi air supply **80**-80 psi air supply **100**-100 psi air supply	**Blank**- None **G**-Declutch Gear **H**- Hydraulic **J**- Jackscrew **S**- Hydraulic Snubber **B**- Delutch Gear w/ Hydraulic Snubber	**Blank**- Standard 20° to 180° F (nitrile seals). **V**- High Temp. 0° to 300° F (viton seals). **L**- Low Temp. -55° to 180°F (nitrile seals, heat treated body).	**Blank**- Standard; Epoxy under-coat with Polyurethane top coat **F**-AWWA, specifications intent **E**- Epoxy paint (white) **M**- Marine Trim
R3	**10**-10" dia. **12**-12" dia. **14**-14" dia. **16**-16" dia.					
R4	**14**-14" dia. **16**-16" dia. **18**-18" dia. **20**-20" dia. **22**-22" dia.					
R5	**14**-14" dia. **16**-16" dia. **18**-18" dia. **20**-20" dia. **22**-22" dia. **24**-24" dia.					

*Example: A model R310 spring return (FCW) with 60 psi air supply and viton seals would be: **R310SR60V**. For hydraulic or electro-hydraulic actuators, consult factory.*

Note: In some instances for the R5 actuator, a second cylinder size is required to complete the model number. Consult torque charts.

Dimensions



Volumes & Weights

Double Acting & Spring Returns

Model Number	Volumes In³	Estimated Weights (lbs.)				
		DA	SR40	SR60	SR80	SR100
R205	137	124	186	189	193	198
R206	198	133	198	202	205	222
R207	269	144	213	218	233	238
R208	352	155	227	244	248	256
R310	550	290	423	435	448	465
R312	792	339	484	496	514	531
R314	1078	401	560	576	593	665
R316	1407	486	661	678	749	NA
R414	1539	665	904	941	968	1127
R416	2010	765	1039	1067	1226	1169
R418	2544	901	1203	1362	1305	1423
R420	3141	1038	1507	1443	1559	1578
R422	3801	1347	1816	1869	1887	NA

Notes:

1. All dimensions are in inches.

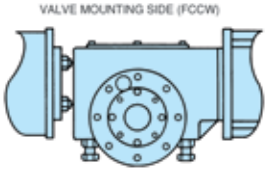
2. Pressure at port side DA1 will result in clockwise rotation, pressure at port DA2 will result in counterclockwise rotation.

3. Orientation of accessory output may be indexed 90˚.

** R2 Has only 4 holes at 45°*

***R4 8 each ⅜ - l6 x ¾" deep holes on center line of "DD" diameter bolt circle are available for accessory mounting. The ⅜ -16 x 1" long hex head cap screws must be replaced by a longer bolt equal to the thickness of the mounting bracket. The retainer plate is ½" thick.*

***R2-R3 A clearance hole for a 5/16" hex cap screw and lock-washer may be required to clear the retainer plate bolts on the center line of "DD" diameter bolt circle.*

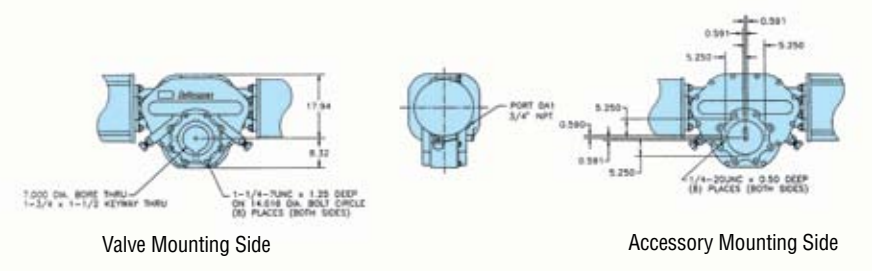


Model	A	B					C	D	E	F	G					H	J	K	L
		DA	SR40	SR60	SR80	SR100					DA	SR40	SR60	SR80	SR100				
R205	19.82	17.01	29.00	30.00	32.00	33.00	5.75	1.19	¼	7.19	2.00	9.13	9.13	9.13	9.13	3.00	3.25	2.78	5.75
R206	19.82	17.01	30.00	30.00	32.00	38.00	6.75	1.19	¼	7.19	2.00	9.13	9.13	9.13	9.13	3.00	3.25	2.78	5.75
R207	19.82	17.01	30.00	32.00	38.00	40.00	7.75	1.19	¼	7.19	2.00	9.13	9.13	9.13	9.13	3.00	3.25	2.78	5.75
R208	19.82	17.01	33.00	38.00	40.00	41.00	8.75	1.19	¼	7.19	2.00	9.13	9.13	9.13	9.13	3.00	3.25	2.78	5.75
R310	23.00	18.13	34.00	36.00	39.00	42.00	10.75	0.00	⅜	8.19	3.50	13.25	13.25	13.25	13.25	3.00	4.13	4.44	6.81
R312	23.00	18.13	36.00	38.00	41.00	43.00	12.75	0.00	⅜	8.19	3.50	13.25	13.25	13.25	13.25	3.00	4.13	4.44	6.81
R314	23.50	18.13	39.00	41.00	44.00	45.00	14.75	0.00	½	8.19	3.50	13.25	13.25	13.25	14.63	3.00	4.13	4.44	6.81
R316	23.75	18.13	42.00	44.00	45.00	N/A	16.88	0.00	½	8.19	3.50	13.25	13.25	14.63	N/A	3.00	4.13	4.44	6.81
R414	30.87	25.37	50.00	56.00	59.00	55.00	14.75	0.00	½	11.56	4.50	14.63	14.63	14.63	16.63	4.50	5.82	6.50	9.75
R416	31.12	25.37	57.00	59.00	55.00	56.00	16.88	0.00	½	11.56	4.50	14.63	14.63	16.63	16.63	4.50	5.82	6.50	9.75
R418	31.69	25.37	59.00	56.00	57.00	59.00	20.88	0.00	¾	11.56	4.50	16.63	16.63	16.63	16.63	4.50	5.82	6.50	9.75
R420	31.94	25.37	59.00	56.00	57.00	59.00	20.88	0.00	¾	11.56	4.50	16.63	16.63	16.63	16.63	4.50	5.82	6.50	9.75
R422	32.12	25.37	55.00	58.00	59.00	N/A	23.75	0.00	¾	11.56	4.50	16.63	16.63	16.63	N/A	4.50	5.82	6.50	9.75

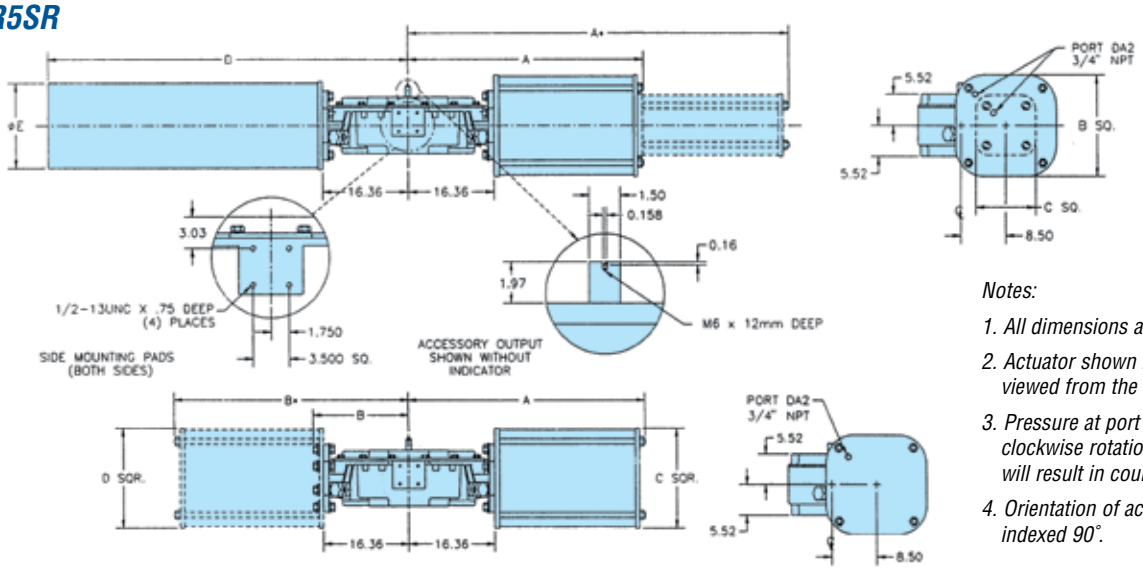
Model	M	N	P	R	S	T	U	V	W	X	Y	AA	BB	CC	DD
R2	⅝-11	1.00	4	5.750	4.25	1.718	.500	1.59	2.000	2.25	.31	¼-20	.31	4	3.562
R3	⅝-11	1.13	8	7.500	5.00	2.148	.625	3.50	2.500	4.25	.31	¼-20	.31	4	4.375
R4	⅞-9	1.13	8	11.000	8.00	3.261	.875	4.06	3.750	5.00	.50	⅜-16	**	8	7.187

Dimensions

R5DA



R5SR



Notes:

1. *All dimensions are in Inches.*
2. *Actuator shown in full CW position, as viewed from the accessory side.*
3. *Pressure at port side DA1 will result in clockwise rotation, pressure at port DA2 will result in counterclockwise rotation.*
4. *Orientation of accessory output may be indexed 90˚.*

Actuator	A	B	B*	C	D
R514DA	44.17	17.46	N/A	14.75	N/A
R51414DA	44.17	N/A	44.17	14.75	14.75
R516DA	44.67	17.46	N/A	16.88	N/A
R51614DA	44.67	N/A	44.17	16.88	14.75
R51616DA	44.67	N/A	44.67	16.88	16.88
R518DA	45.00	17.46	N/A	18.88	N/A
R51816DA	45.00	N/A	44.67	18.88	16.88
R51818DA	45.00	N/A	40.00	18.88	18.88
R520DA	45.13	17.46	N/A	20.88	N/A
R52020DA	45.13	N/A	45.13	20.88	20.88
R522DA	45.50	17.46	N/A	23.13	N/A
R524DA	46.00	17.46	N/A	25.50	N/A

Actuator Model	Volume (in³)	Weights (lb.)				
		DA	SR40	SR60	SR80	SR100
R514	3233	932	N/A	N/A	N/A	N/A
R51414	6466	1199	N/A	N/A	N/A	N/A
R516	4222	1066	N/A	N/A	N/A	2040
R51614	7455	1333	N/A	N/A	N/A	N/A
R51616	8444	1467	N/A	N/A	N/A	N/A
R518	5344	1180	1938	1992	2153	2260
R51816	9566	1581	N/A	N/A	N/A	N/A
R51818	10688	1695	N/A	N/A	N/A	N/A
R520	6597	1297	2035	2253	2378	2559
R52020	13194	1929	N/A	N/A	N/A	N/A
R522	7983	1463	2276	2437	2725	2888
R52214	11216	N/A	2704	2992	3274	3437
R524	9500	1730	2686	2811	3155	3274
R52416	13722	N/A	3212	3556	3838	N/A

Actuator	A	A*	B	C	40	60	80	100	125	150	175	200	E
R516SR	44.75	N/A	16.88	N/A	N/A	N/A	N/A	79.00	84.00	96.49	96.49	96.49	16.00
R518SR	45.00	N/A	18.88	N/A	76.00	71.50	79.00	84.00	96.49	96.49	96.49	96.49	16.00
R520SR	45.13	N/A	20.88	N/A	70.00	81.50	84.00	96.49	96.49	96.49	96.49	N/A	16.00
R522SR	45.50	N/A	23.13	N/A	71.50	79.00	96.49	96.49	96.49	96.49	N/A	N/A	16.00
R524SR	46.00	N/A	25.50	N/A	81.50	84.00	96.49	96.49	96.49	N/A	N/A	N/A	16.00
R52214SR	45.50	71.88	23.13	14.75	79.00	96.49	96.49	96.9	N/A	N/A	N/A	N/A	16.00
R52416SR	46.00	72.88	25.50	16.88	84.00	96.49	96.49	N/A	N/A	N/A	N/A	N/A	16.0

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