FLOWSERVE

Automax Valve Automation Systems

Pneumatic Actuators and Accessories

Experience In Motion

Flow Control Division
Automax Valve Automation Systems

Flowserve Corporation's Automax Valve Automation Systems provides complete valve and damper automation to the worldwide processing industries. We provide maximum value to the end user through a broad offering of products, services, application engineering and our systematic approach to automation.

Quality, Dependability and Productivity

Recognized as the leader in valve automation systems, Automax pneumatic actuators can automate valves with torque values from 25 to 2.2 million in-lbs (2.8 - 248,566Nm). 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. To complete the package Flowserve can provide engineering design services for automation mounting brackets, "AutoBrakit" and mounting hardware.

SuperNova
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 to 58,000 in-lbs, for optimum actuator sizing.

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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. Automation mounting brackets, "AutoBrakit" with mounting hardware are engineered to assure consistency and proper alignment

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Stainless Steel
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 optional stainless steel internals. For sanitary applications the housing can be polished. Available in torque ranges from 78 to 7279 in-lbs.

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Heavy-Duty RG Series RG1 - RG8
A complete line of Scotch Yoke heavy-duty actuators provides torques from 950 to 2.2M in-lbs. 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.

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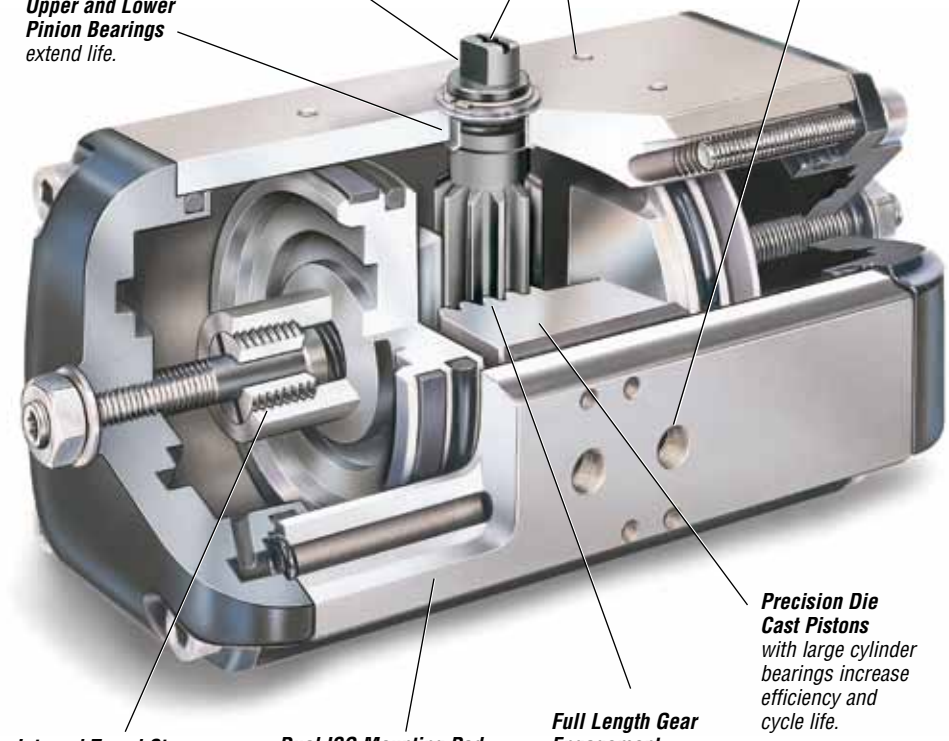
Sales and service facilities are strategically located in industrial centers throughout the world.

SuperNova B Series Double Acting

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 counterclockwise travel adjustment for open and closed positions.

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



Flats on Pinion Drive Shaft *accommodates wrench overrides and accessories.*

NAMUR Mounting Dimensions *on actuator accessory holes and drive shaft.*

NAMUR Mounting Dimensions *on actuator pneumatic port connections.*

Upper and Lower Pinion Bearings *extend life.*

Precision Die Cast Pistons *with large cylinder bearings increase efficiency and cycle life.*

Full Length Gear Engagement *between piston rack & nitride-coated pinion.*

Dual ISO Mounting Pad *provides ease and flexibility in direct valve installation.*

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

* Bidirectional travel stops are available via a bottom-mounted Travel Stop Module on models SNA250 & SNA 300.

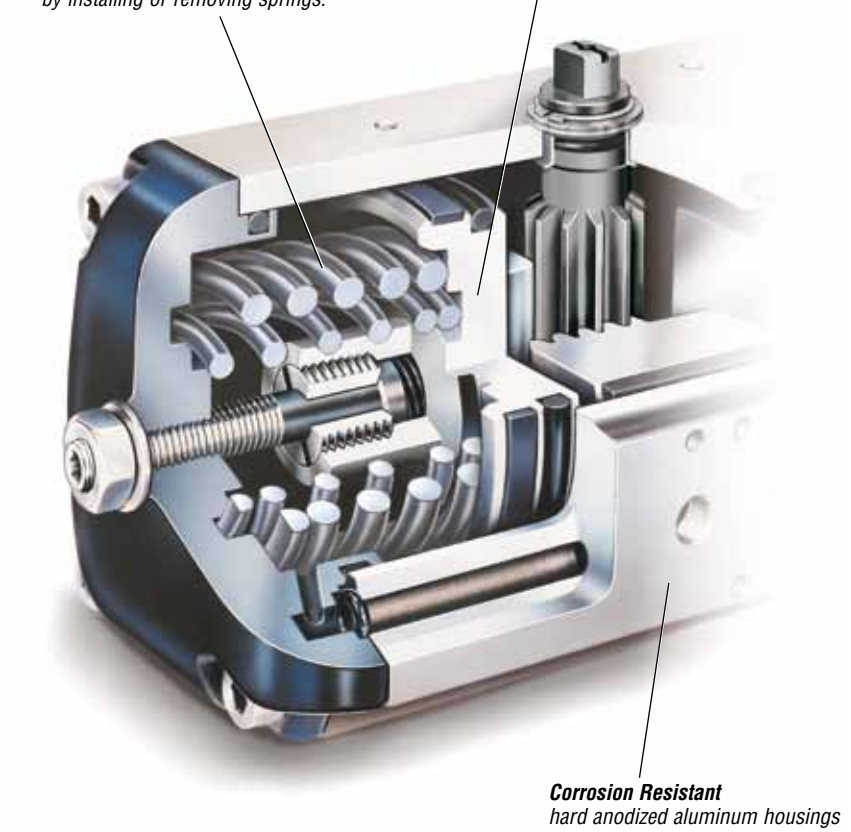
SuperNova B Series
Spring Return

The most useful properties of the oxide coating are:

- The oxide coating is integral with the base substrate and will prevent spalling from impact, thermal shock, or high temperatures up to aluminum's melting point. The oxide has negligible effect on the other properties of aluminum.
- 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.
- 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. It normally resists concentrated nitric acid at a pH 1 and ammonium hydroxide at pH 13, so consult factory for chemical compatibility.

One Compact Design
for double acting and spring return is easily field convertible by installing or removing springs.

Field Reversible
action simply by rotating pistons 180°.



Corrosion Resistant
hard anodized aluminum housings with stainless steel fasteners.

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 more than 50µm. The chemical composition provides the optimum alloy for strength, abrasion resistance, cold working and chemical resistance.

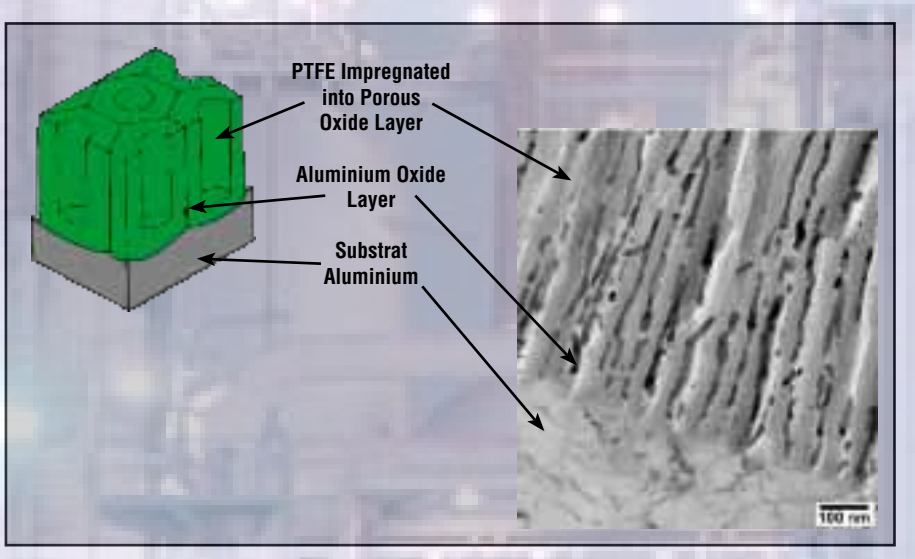
MaxGuard™ Severe Service Actuator

The MaxGuard™ process is designed to provide maximum protection against corrosive environments. The MaxGuard™ formula is a chemical conversion process specifically developed for anodized aluminum alloys. During the anodizing process PTFE is impregnated into the aluminum oxide layer. A 2MIL (50µm) protective layer imparted with PTFE is created.

- **Superior Chemical Resistance**
- **Increased Internal/External Wear Resistance**

This advanced process was originally developed by the U.S. Dept. of Defense and applied to aluminum material deployed for deep space exploration. The MaxGuard™ coating complies with the following specifications:

- MIL-A-63576A-Type1-Aluminum Oxide Coating - Lubrication
- MIL-A-8625 (Anodic Coatings)
- ASTM B 117 (Salt Spray Testing)



The MaxGuard™ process is applied to the actuator body and both end caps providing an armored layer of protection – both internal and external.

Recommended Applications:

Acids / Caustics

Chemical

Offshore

Wash down

Coastal (Desalination)

Specify MaxGuard™ for the following products:

- **SuperNova B050 – B200**
- **SuperNova SNA250 – SNA300**

FLOWSERVE

SuperNova B Series

Torque Outputs

Model	Spring			Air Supply (psi)					
				60		80		100	
	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 Pressure (psi)				
	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 (psi)					
				60		80		100	
	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

Spring Chart B050[2]

Spring Group	Spring Combination[1]		
	#1 Spring (inner)	#2 Spring (low rate outer)	#3 Spring (high rate outer)
4	1[3]	1[3]	
5		2	
6	2	1	
7	1	2	
8	2	2	
9	2		2

Spring Chart B063-B200

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

Notes:

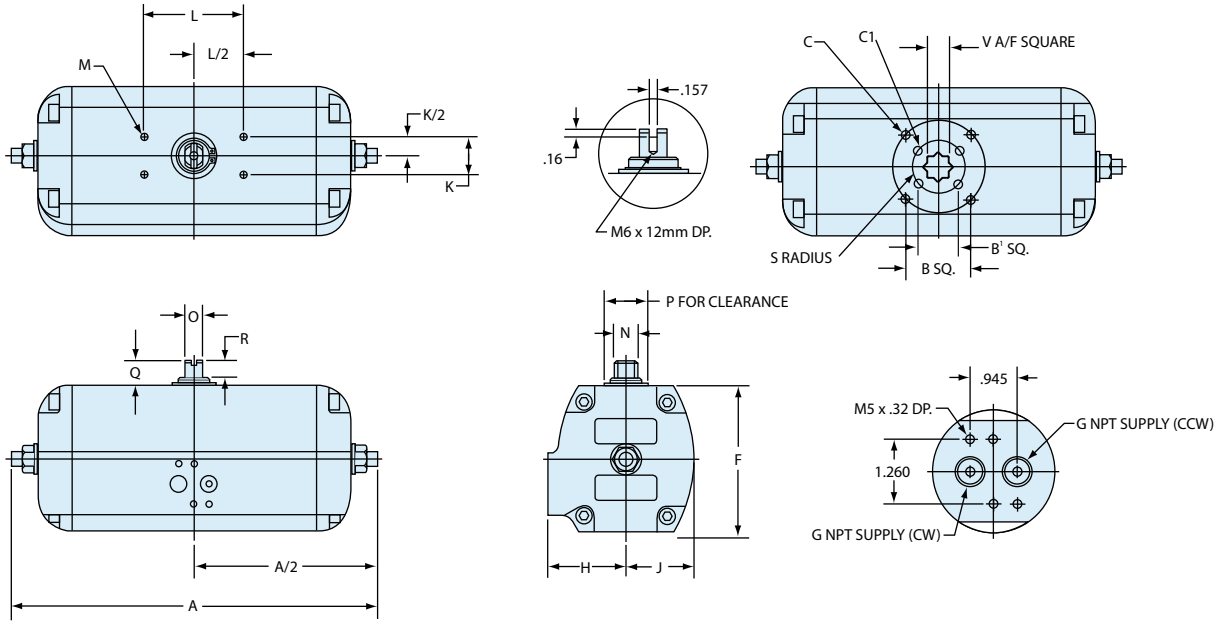
[1] #1 Spring has one color code dot
#2 Spring has two color code dots
#3 Spring has three color code dots

[2] B050 has maximum of 2 springs per endcap

[3] Install springs on opposite sides

- All dimensions are in inches.
- **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.

Dimensions



Model	ISO	A		B	B[1]	C	C_1	D	E	F	G	H	J	K	L	M[1, 2]	N	O	P	Q	R	Weights (lbs)		Volume (in)		Cycle Time[3]	
		DA&SR	180	SQ.	SQ.						NPT											DA	SR	CW	CCW	CW	CCW
B050	F04S11E	6.69	8.70	1.169	N/A	#10-24x.31	N/A	.433	.47	2.56	1/8	1.58	1.14	1.181	3.150	#10-24	.47	.394	.75	.79	.39	2.7	3.1	8.2	5.4	.5	.5
B063	F03/F05S14E	7.95	9.92	1.392	1.002	1/4-20x.31	#10-24x.31	.551	.63	3.19	1/8	1.77	1.40	1.181	3.150	#10-24	.47	.394	.88	.79	.39	3.8	4.4	16	10	.5	.5
B085	F05/F07S17E	9.84	12.13	1.949	1.392	5/16-18x.31	1/4-20x.31	.669	.75	4.15	1/8	2.24	1.87	1.181	3.150	#10-24	.77	.551	1.00	.79	.55	7.5	9.3	34	20	.5	.5
B100	F05/F07S17E	11.65	14.80	1.949	1.392	5/16-18x.31	1/4-20x.31	.669	.75	4.80	1/4	2.48	2.17	1.181	3.150	#10-24	.77	.551	1.38	.79	.55	11.5	14.6	56	38	1	.5
B115	F07/F10S22E	13.47	17.60	2.840	1.949	3/8-16x.39	5/16-18x.31	.866	.98	5.30	1/4	2.91	2.46	1.181	5.118	#10-24	1.10	.787	1.63	1.18	.79	17.7	22.5	94	65	1	1
B125	F07/F10S22E	15.83	20.35	2.840	1.949	3/8-16x.39	5/16-18x.31	.866	.98	5.79	1/4	3.07	2.68	1.181	5.118	#10-24	1.10	.787	2.00	1.18	.79	23.8	30.2	128	90	1	1
B150	F10/F12S27E	19.13	25.20	3.480	2.840	1/2-13x.45	3/8-16x.39	1.063	1.18	6.85	1/4	3.47	3.19	1.181	5.118	#10-24	1.87	1.417	2.38	1.18	.89	40.8	51.2	224	159	2.0	1.5
B175	F10/F14S36E	21.34	28.58	3.897	2.840	5/8-11x.63	3/8-16x.39	1.417	1.57	8.21	1/4	4.17	3.74	1.181	5.118	#10-24	1.87	1.417	2.75	1.18	.89	63.7	77.2	351	232	3.0	2.0
B200	F10/F14S36E	24.41	31.69	3.897	2.840	5/8-11x.63	3/8-16x.39	1.417	1.57	9.39	1/4	4.72	4.25	1.181	5.118	#10-24	1.97	1.417	2.94	1.18	.89	91.5	118	507	332	4.5	3.0

Note:

[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.

- All dimensions are in inches.
- **Double Acting** – Pressure at port "CW" will result in clockwise rotation. Pressure at port "CCW" will result in counter-clockwise rotation.
- **Spring Return** – Pressure at port "CCW" will result in counterclockwise 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)* 050 Thru 300	Seals	Materials	Options
B050 **B063** **B085** **B100** **B115** **B125** **B150** **B175** **B200** **SNA250** **SNA300**	**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 **M** - MaxGuard™ Severe Service Actuator	**R** - Extra Long Travel Stop **C** - Stainless Steel Pinion/ Snap Ring

* 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

Models SNA250 & SNA300 90° and 180° Actuators

SNA250

Typical 180° Rotary Actuator

180° Rack & Pinion Actuators

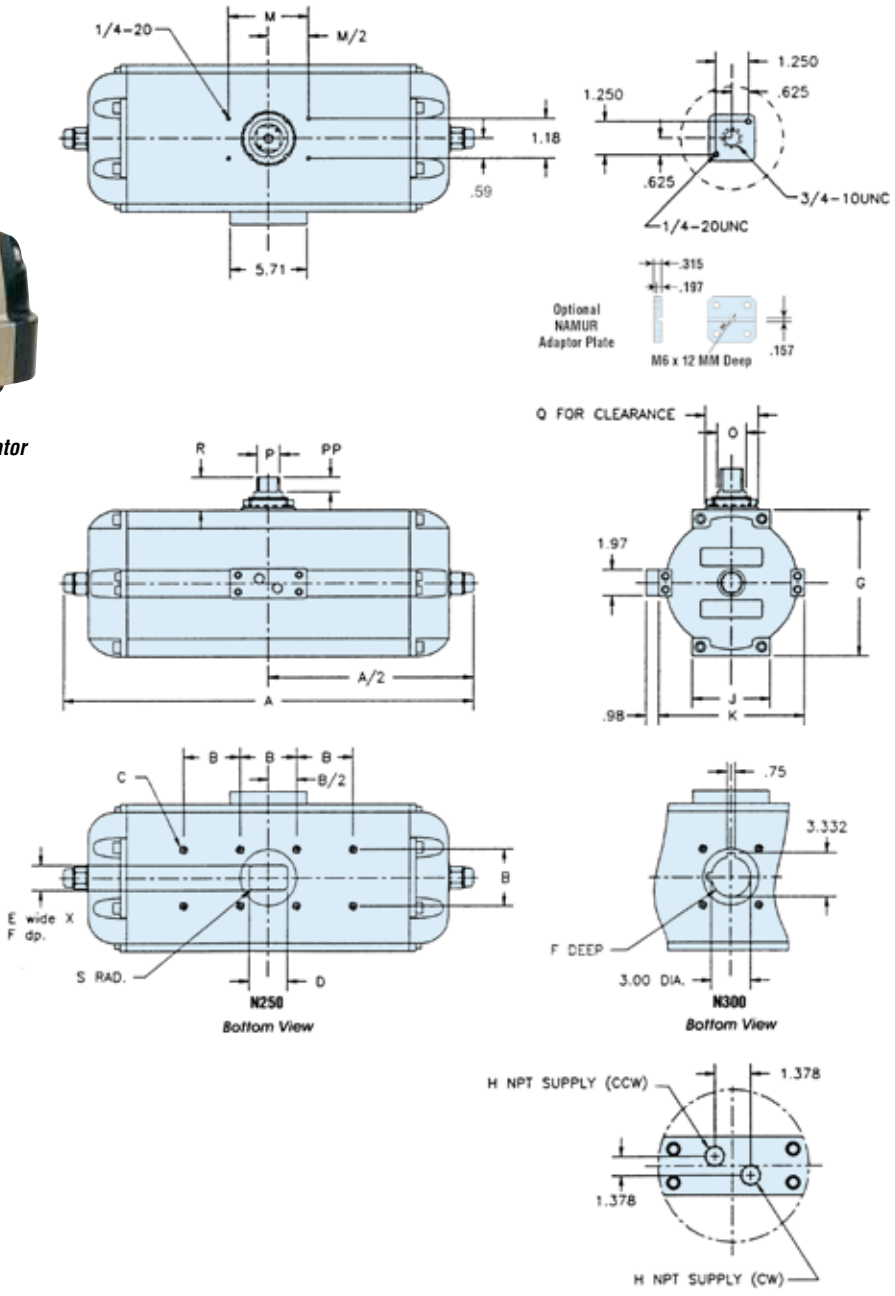
Automax 180 Degree Actuators are available in the same models and with the same torque outputs as the standard SuperNova Double Acting actuators. The integral mechanical, end-of-stroke travel adjustment is for one direction only. As options, travel stops can be furnished for less than 180° travel and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

Dimensions



Model	A		B[1]	C	D	E	F	G	H	J	K	M[2,3]	O	P	PP	Q	R	S	Weights (lbs)		Volume (in)		Cycle Time	
	DA&SR	180							NPT										DA	SR	CW	CCW	CW	CCW
SNA250	27.32	39.14	4.250	5/8-11X.63	2.87	1.850	1.81	11.02	1/2	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	5/8-11X.94	N/A	N/A	2.50	13.39	1/2	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

Notes:

[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.

- All dimensions are in inches.
- 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.

For *"How To Order"* *see page 13*

Controls & Accessories

Controls

S25N 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 intrinsically-safe and low power solenoid operators. These valves have been tested and proven reliable for over 1 million cycles.

APS1 Module*
The Automax APS1 module works with the Automax S25N 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.

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.

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 accessories or may be used with the NPT1 adaptor.

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.

Accessories

"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/XCL/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.

Aviator II 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.

APEX Modular Positioner*
Epoxy coated aluminium construction, the Apex positioner combines precise valve positioning with advanced features. A modular manifold base allows 3-15 psi pneumatic control signals, or 4-20 mA 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, ATEX, and SAA.

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.

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 IOMs 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.

SXL Series
The SXL Series is available in both Double Acting and Spring Return versions with a maximum double acting torque output of 7,279 in-lbs. It 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.

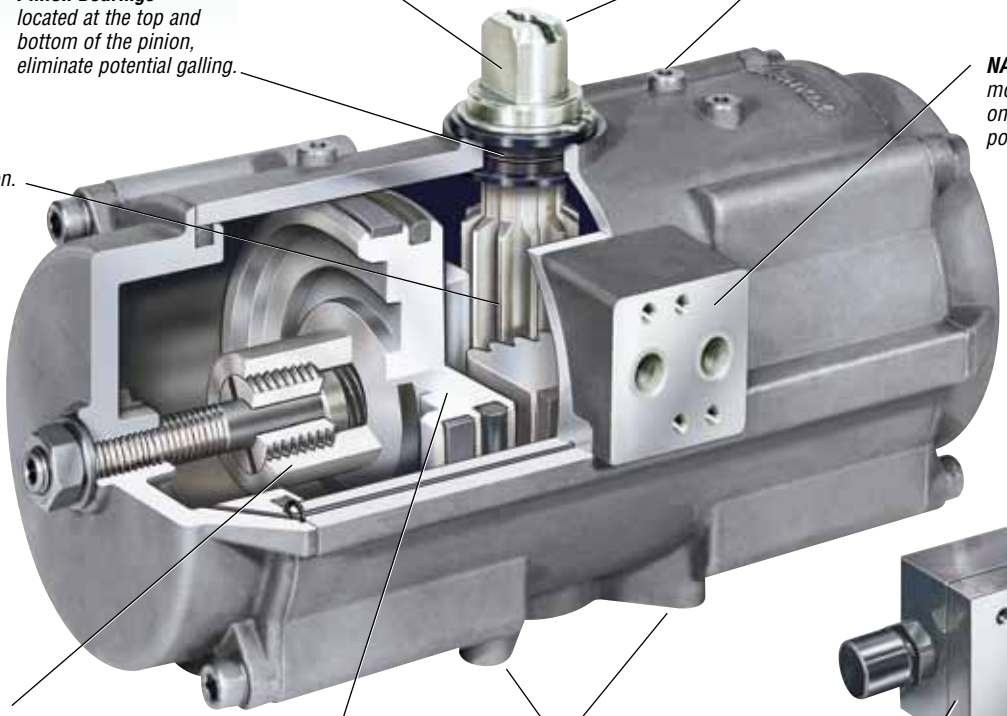
Flats on Pinion Drive Shaft
accommodates manual overrides and accessories.

NAMUR
mounting dimensions on actuator accessory holes and drive shaft.

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

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

NAMUR
mounting dimensions on actuator pneumatic port connections.



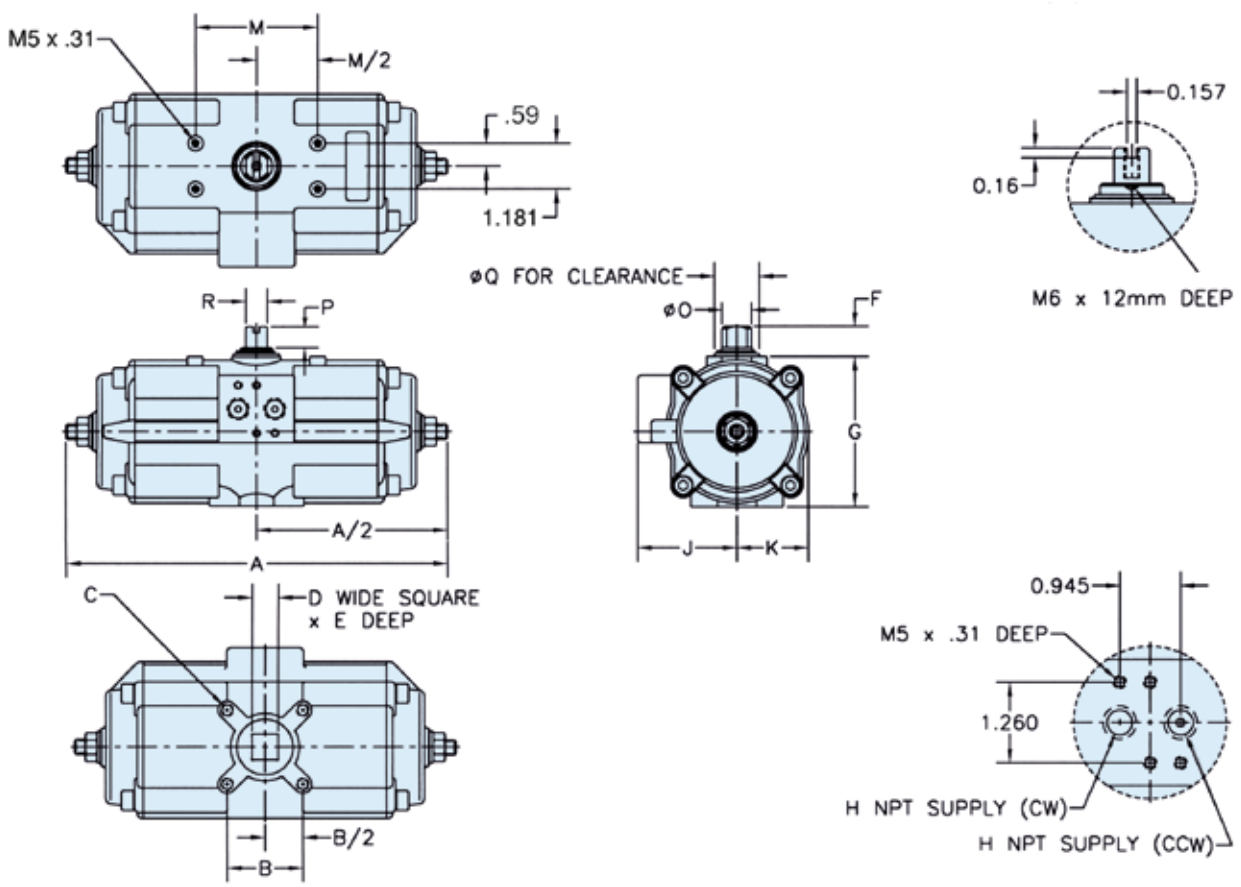
Integral Travel Stops
in both directions with 10 degrees of overtravel to assure precise adjustment of both open and closed positions.

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.)

ISO
mounting dimensions on actuator to valve interface.

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.

Dimensions



Model	ISO	A	B[1]	C	D	E	F	G	H	J	K	M[2, 3]	O	P	Q	R	Weights (lbs)		Volume (in)		Cycle Time	
		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.	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

Notes:

[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.

- All dimensions are in inches.
- 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.

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

Model	Type	Springs (Select One)* 050 Thru 300	Seals	Materials	Options
SXL050 **SXL063** **SXL085** **SXL100** **SXL115** **SXL125** **SXL150**	**D** - Double Acting **S** - Spring Return (FCW) **C** - Spring Return (FCCW)	**04** **05** **06** **07** **08** **09** **10** **11** **12**	**Blank** - Viton (Std.) **L** - Low Temp.	**Blank** - Std. Hard Anodized Aluminum **K** - K-Mass Coated **F** - Polished	**R** - Extra Long Travel Stop **M** - Stainless Steel Springs **P** - Stainless Steel Pistons

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

RG Series

Heavy-Duty Scotch Yoke Actuator

The Automax RG Series provides up to 2.2 million in-lbs of heavy-duty Scotch yoke torque. Enhanced performance is achieved by using a superior yoke support system that significantly reduces transverse loads.

Features

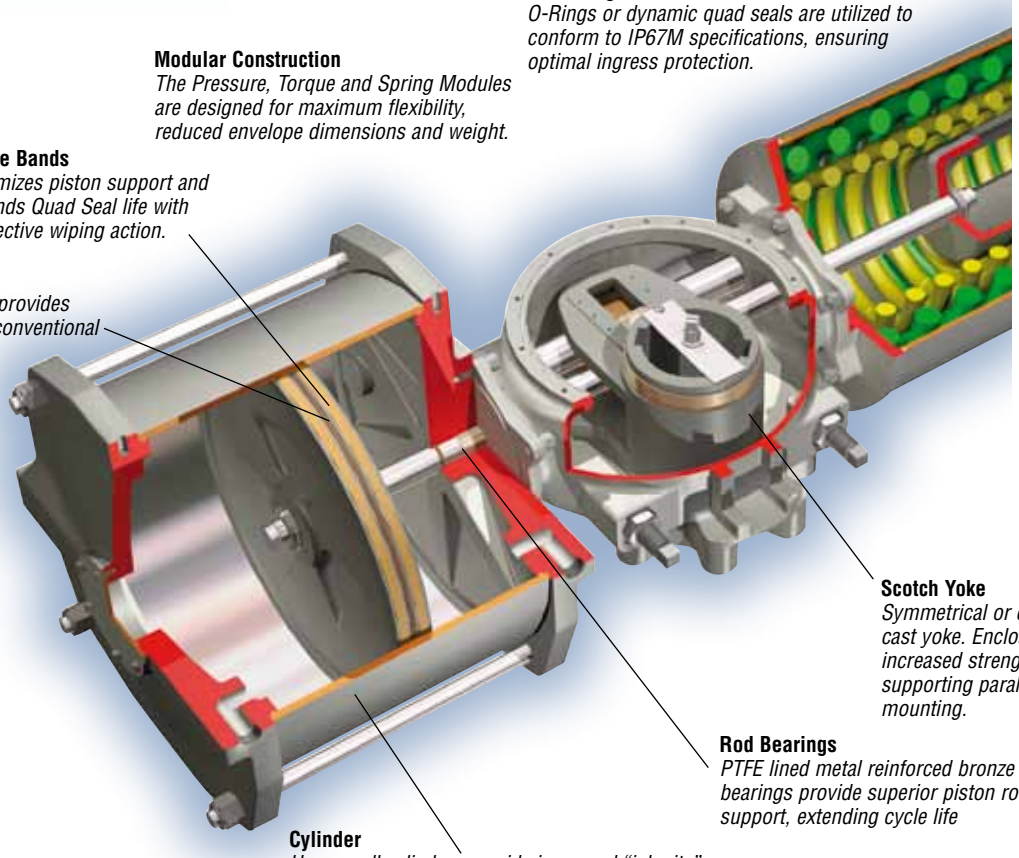
- True Modular Design
- On-Off, Multi-Position and Throttling
- Pneumatic, Gas and Hydraulic Models
- Spring Return "Fail Safe" and Double Acting
- Torque Outputs:
  - DA – 2.2M in-lbs (248K Nm)
  - SR – 1.2M in-lbs (124K Nm)
- Operating Pressures:
  - Pneumatic: 40-150psi
  - Hydraulic: 500-3000psi

IP67M Ingress Protection
O-Rings or dynamic quad seals are utilized to conform to IP67M specifications, ensuring optimal ingress protection.

Modular Construction
The Pressure, Torque and Spring Modules are designed for maximum flexibility, reduced envelope dimensions and weight.

Guide Bands
Optimizes piston support and extends Quad Seal life with protective wiping action.

Piston Seals
Dynamic Quad Seal design provides enhanced cycle life versus conventional O-Rings.



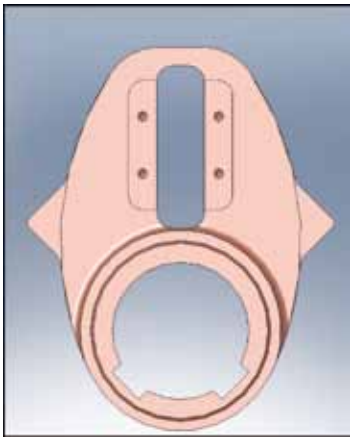
Scotch Yoke
Symmetrical or canted ductile iron cast yoke. Enclosed yoke slot for increased strength with 2 keyways supporting parallel or perpendicular mounting.

Rod Bearings
PTFE lined metal reinforced bronze bearings provide superior piston rod support, extending cycle life

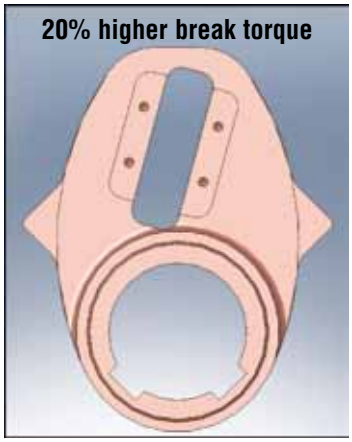
Cylinder
Heavy wall cylinders provide increased "job site" durability. Interior surface is honed and hard chrome plated to provide superior corrosion and wear resistance.

RG Series

Heavy-Duty Scotch Yoke Actuator



Symmetrical Yoke



Canted Yoke

Features

- Hard Chrome Plated Cylinder Walls
- Symmetrical and Canted Yoke
- Guide Bar Yoke Support
- Dual DD Cylinder Option
- Field Reversible Action
- Overrides, Line Break and Special Controls
- ESD Performance

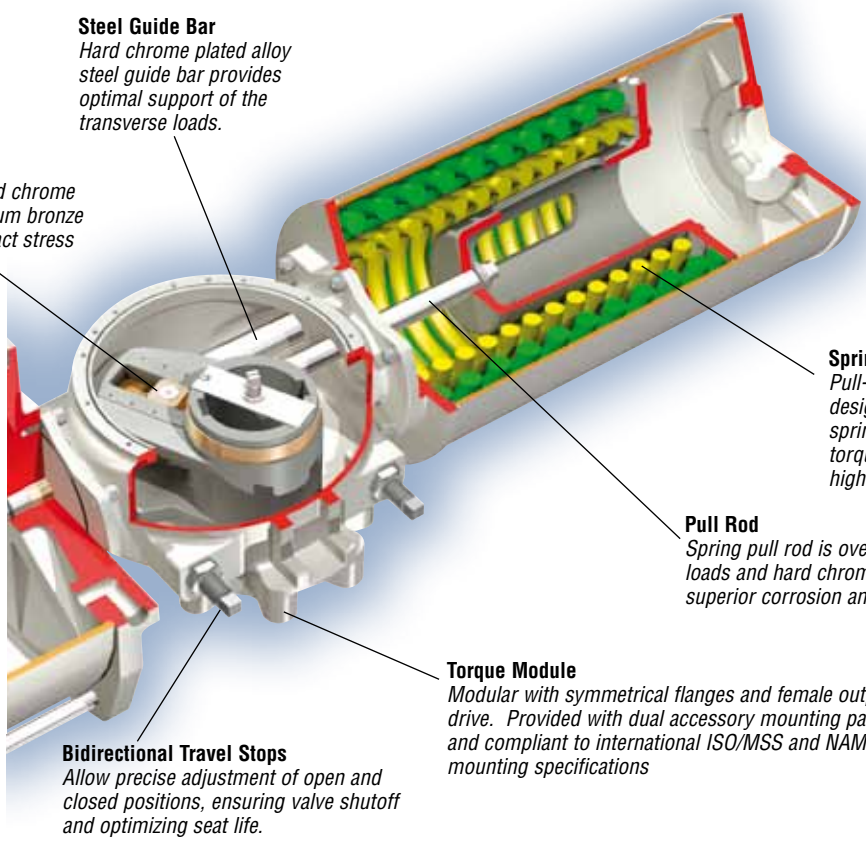
Interchangeable Yoke System

- *Ductile iron casting*
- *Totally enclosed yoke slot for increased strength and cycle life*
- *Canted yoke results in approx. 20% higher break torque*
- *2 keyway provision for flexibility of parallel or perpendicular mounting*

Override Options
Spring Module design facilitates field retrofitting of jackscrew or hydraulic overrides

Steel Guide Bar
Hard chrome plated alloy steel guide bar provides optimal support of the transverse loads.

Slider Block
Induction hardened and hard chrome plated yoke pin with aluminum bronze slider blocks minimize contact stress and ensure high cycle life.



Spring Module
Pull-to-compress, concentric-nested design utilizes high strength alloy spring steel to maintain consistent torque output (over time) and promote high cycle life performance.

Pull Rod
Spring pull rod is over-sized to resist impact loads and hard chrome plated to provide superior corrosion and wear resistance.

Torque Module
Modular with symmetrical flanges and female output drive. Provided with dual accessory mounting pads and compliant to international ISO/MSS and NAMUR mounting specifications

Bidirectional Travel Stops
Allow precise adjustment of open and closed positions, ensuring valve shutoff and optimizing seat life.

RG Series

Heavy-Duty Scotch Yoke Actuator

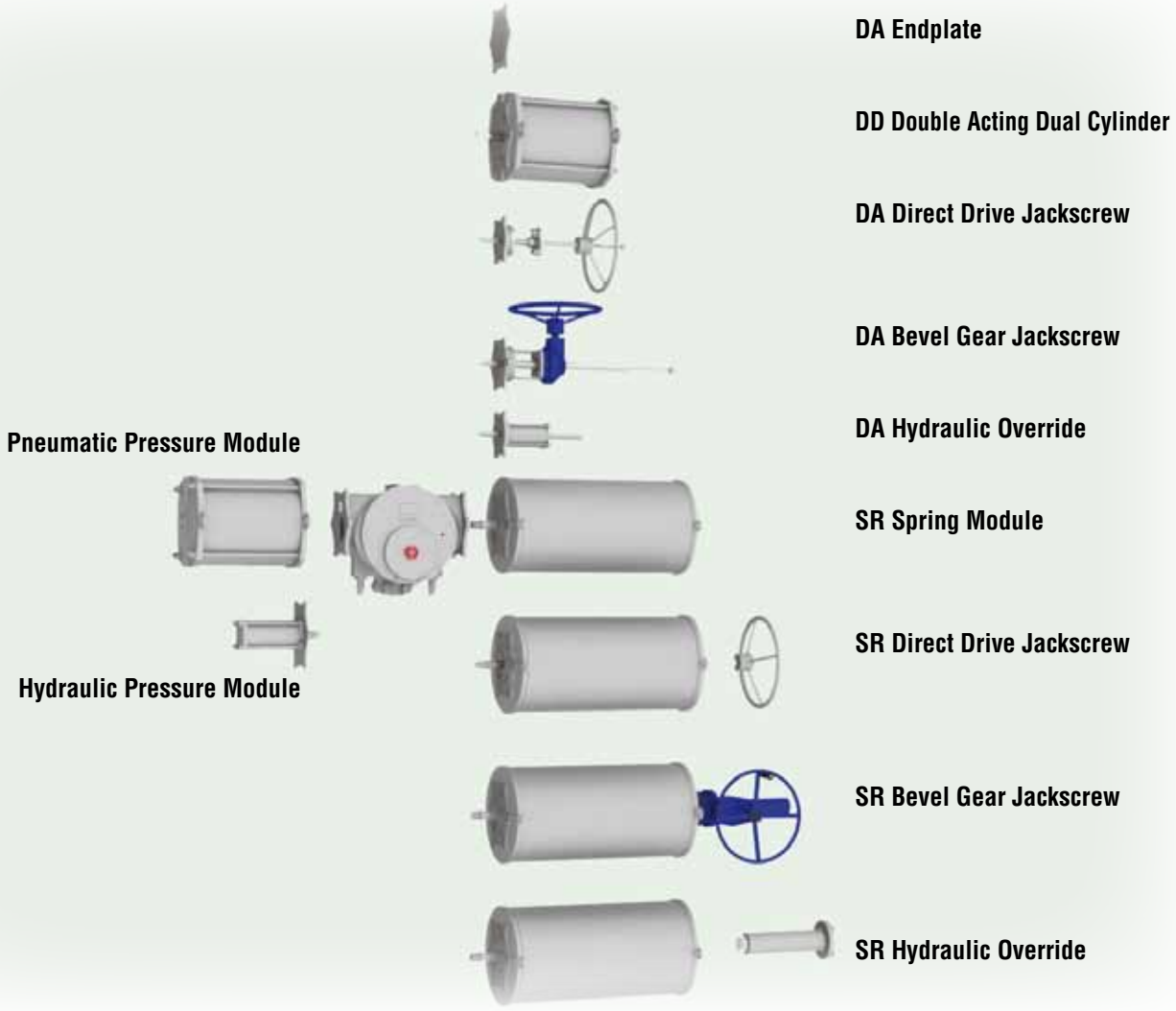
Accessories

Modular Construction

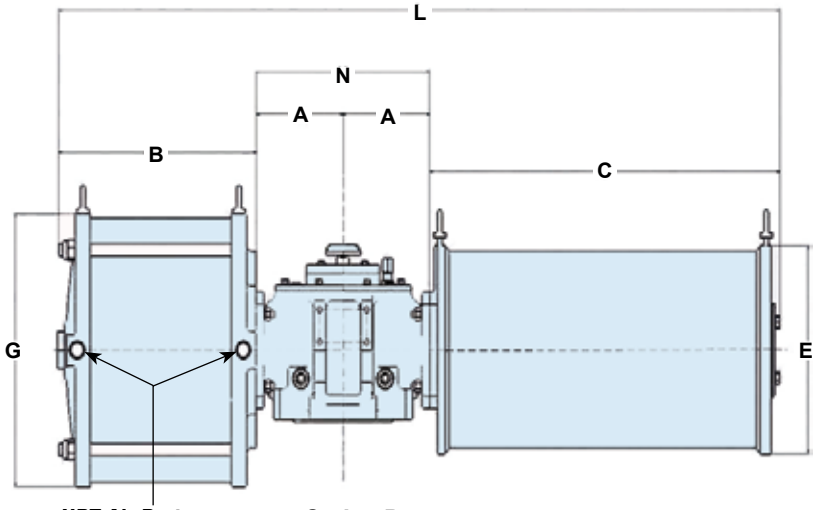
- *Double Acting or Spring Return (FCW or FCCW)*
- *Pneumatic or Hydraulic Pressure Modules*
- *Torque Module with symmetrical or canted yokes*
- *Override Options – Direct Drive Jackscrew, Bevel Gear Jackscrew or Hydraulic Override*

SR with Direct Drive Jackscrew

DA with Hydraulic Override Cylinder

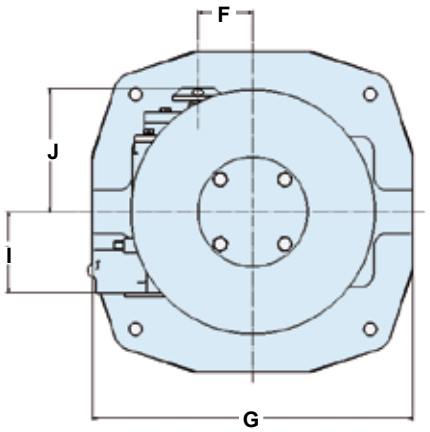


Dimensions

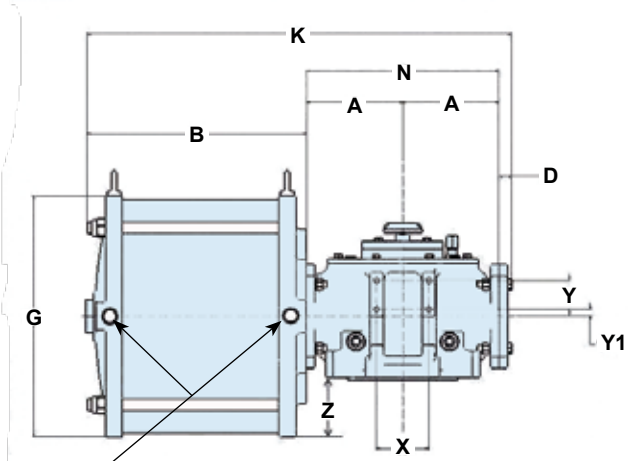


NPT Air Ports

Spring Return

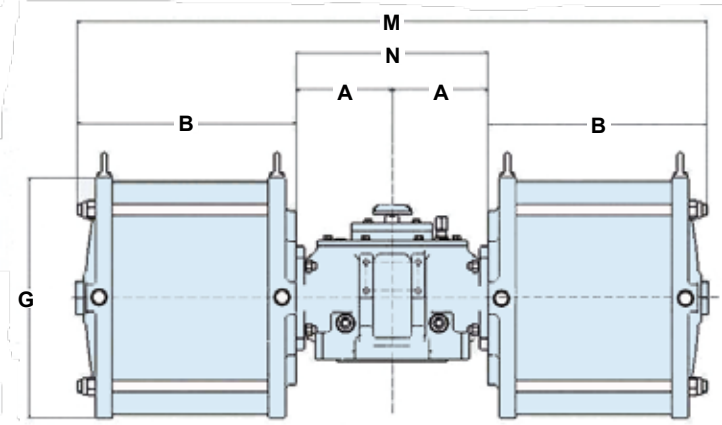


Side View



NPT Air Ports

Double Acting Single Cylinder

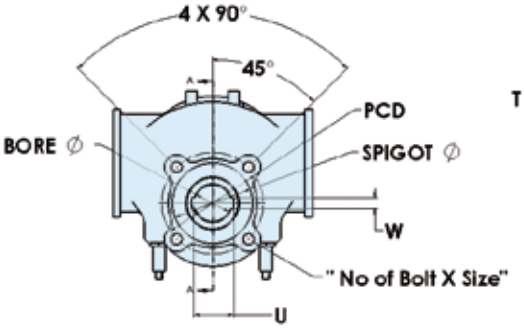


Double Acting Dual Cylinder

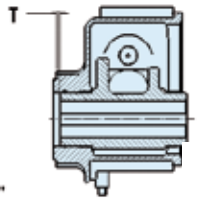
Actuator Dimensions, mm (inch)															
SERIES	A	B	C	D	E	F	I	J	K	L	M	N	X	Y	Y1
RG1	141 (5.55)	310 (12.20)	498 (19.61)	18,5 (0.73)	264 (10.39)	55 (2.17)	99 (3.90)	129 (5.08)	610,5 (24.04)	1090 (42.91)	902 (35.51)	282 (11.10)	68 (2.68)	60 (3.36)	30 (1.18)
RG2	162 (6.38)	368 (14.49)	586 (23.07)	20 (0.79)	322 (12.68)	65 (2.56)	116 (4.57)	144 (5.67)	712 (28.03)	1278 (50.31)	1060 (41.73)	324 (12.76)	68 (2.68)	60 (3.36)	30 (1.18)
RG3	175 (6.98)	444 (17.48)	706 (27.80)	23 (0.91)	380 (14.96)	75 (2.95)	111 (4.37)	151 (5.94)	817 (32.17)	1500 (59.06)	1238 (48.74)	350 (13.78)	95 (3.74)	52 (2.05)	13 (0.51)
RG4	243 (9.57)	565 (22.24)	868 (34.17)	23 (0.91)	467 (18.39)	91 (3.58)	145 (5.71)	175 (6.89)	1074 (42.28)	1919 (75.55)	1616 (63.62)	486 (19.13)	95 (3.74)	60 (3.36)	30 (1.18)
RG5	312 (12.28)	716 (28.19)	1008 (39.69)	26 (1.02)	568 (22.36)	145 (5.71)	175,5 (6.91)	189,5 (7.46)	1366 (53.78)	2348 (92.44)	2056 (80.94)	624 (24.57)	95 (3.74)	60 (3.36)	30 (1.18)
RG6	394 (15.51)	756 (29.76)	1640 (64.57)	28 (1.10)	600 (23.62)	185 (7.28)	208 (8.19)	218 (8.58)	1572 (61.89)	3184 (125.35)	2300 (90.55)	788 (31.02)	95 (3.74)	60 (3.36)	30 (1.18)
RG7	500 (19.69)	810 (31.89)	2030 (79.92)	50 (1.97)	615 (24.21)	220 (8.66)	265 (10.43)	310 (12.20)	1860 (73.23)	3840 (151.18)	2620 (103.18)	1000 (39.37)	95 (3.74)	100 (3.94)	30 (1.18)
RG8	665 (26.18)	860 (33.86)	2600 (102.36)	55 (2.17)	680 (26.77)	280 (11.02)	306 (12.05)	360 (14.17)	2245 (88.39)	4790 (188.58)	3050 (120.08)	1330 52.36)	95 (3.74)	100 (3.94)	30 (1.18)

Cylinder Size	5"	6"	7"	8"	9"	10"	12"	14"	16'	18"	20"	22"	24"	28"	32"	36"	40"
G	178 (7.01)	178 (7.01)	196 (7.72)	222 (8.74)	248 (9.76)	274 (10.79)	324 (12.76)	375 (14.76)	438 (17.24)	486 (19.13)	532 (20.94)	588 (23.15)	648 (25.51)	865 (34.06)	967 (38.07)	1069 (42.09)	1170 (46.06)
Port Size NPT	3/8″	3/8″	3/8″	3/8″	3/8″	1/2″	3/4″	3/4″	3/4″	1″	1″	1″	1″	1½″	1½″	1½″	2″

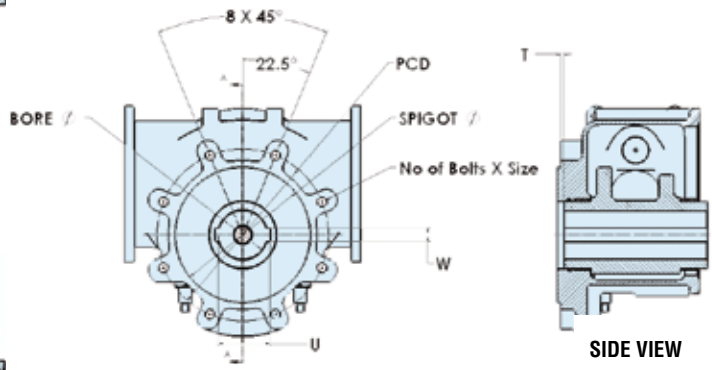
Dimensions



ISO BASE DETAILS
(RG1, RG2)

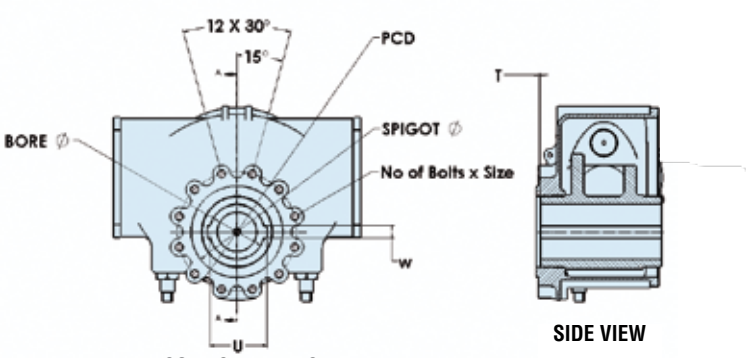


SIDE VIEW



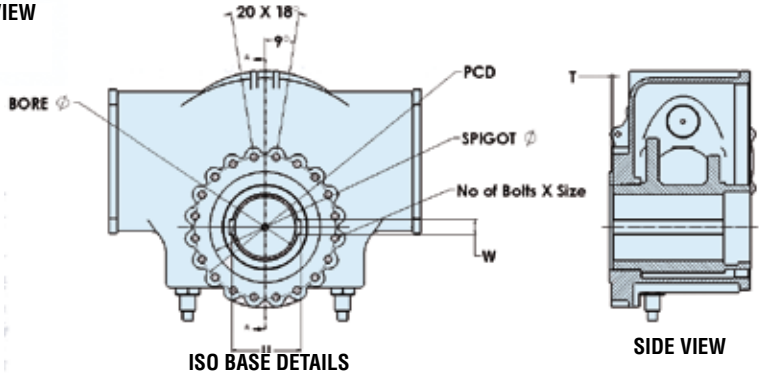
ISO BASE DETAILS
(RG3 TO RG6)

SIDE VIEW



ISO BASE DETAILS
(RG7)

SIDE VIEW

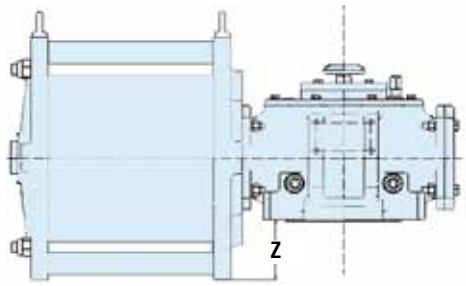


ISO BASE DETAILS
(RG8)

SIDE VIEW

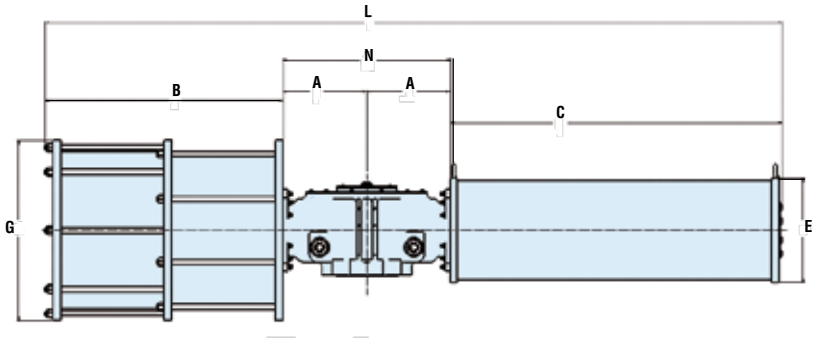
Mounting Base Details & Dimensions, mm (inch)											
SERIES	ISO BASE	SPIGOT Ø	PCD	BORE Ø	BORE Tol	W	W Tol	No of Bolt X Size	T	U	U Tol
RG1	F14	100 (3.94)	140 (5.51)	48 (1.89)	H9	14 (0.55)	+0.12/+0.05	4 X M16	5 (0.20)	51,8 (2.04)	+0.2/+0.0
RG2	F16	130 (5.12)	165 (6.50)	60 (2.36)	H9	18 (0.71)	+0.15/+0.07	4 X M20	5 (0.20)	64,4 (2.54)	+0.2/+0.0
RG3	F25	200 (7.87)	254 (10.0)	72 (2.83)	H9	20 (0.79)	+0.15/+0.07	8 X M16	5 (0.20)	76,9 (3.03)	+0.2/+0.0
RG4	F30	230 (9.06)	298 (11.73)	98 (3.86)	H9	28 (1.10)	+0.15/+0.07	8 X M20	5 (0.20)	104,4 (4.11)	+0.2/+0.0
RG5	F35	260 (10.24)	356 (14.02)	160 (6.30)	H9	40 (1.57)	+0.18/+0.08	8 X M30	5 (0.20)	169,4 (6.67)	+0.2/+0.0
RG6	F40	300 (11.81)	406 (15.98)	180 (7.09)	H9	45 (1.77)	+0.18/+0.08	8 X M36	8 (0.20)	190,4 (5.50)	+0.2/+0.0
RG7	F48	370 (14.57)	483 (19.02)	220 (8.66)	H9	50 (1.97)	+0.18/+0.08	12 X M36	8 (0.20)	231,4 (9.11)	+0.3/+0.0
RG8	F60	470 (18.5)	603 (23.74)	280 (11.02)	H9	63 (2.48)	+0.22/+0.10	20 X M36	8 (0.20)	292,4 (11.51)	+0.3/+0.0

Dimensions



Double Acting Single Cylinder

Dimension Z, mm (inch)																	
SERIES	**5"**	**6"**	**7"**	**8"**	**9"**	**10"**	**12"**	**14"**	**16'**	**18"**	**20'**	**22"**	**24"**	**28"**	**32"**	**36"**	**40"**
RG1	10 (0.39)	10 (0.39)	1 (0.04)	12 (0.47)	25 (0.98)	38 (1.50)	63 (2.48)	–	–	–	–	–	–	–	–	–	–
RG2	–	–	–	5 (0.20)	8 (0.31)	21 (0.83)	46 (1.81)	71,5 (2.81)	103 (4.06)	–	–	–	–	–	–	–	–
RG3	–	–	–	–	–	26 (1.02)	51 (2.01)	76,5 (3.01)	108 (4.25)	132 (5.20)	155 (6.10)	–	–	–	–	–	–
RG4	–	–	–	–	–	–	–	42,5 (1.67)	74 (2.91)	98 (3,86)	121 (4.76)	149 (5.87)	179 (7.05)	–	–	–	–
RG5	–	–	–	–	–	–	–	–	43,5 (1.71)	67,5 (2.66)	90,5 (3.56)	118,5 (4.67)	148,5 (5.85)	257 (10.12)	–	–	–
RG6	–	–	–	–	–	–	–	–	–	35 (1.38)	58 (2.28)	86 (3.39)	116 (4.57)	224,5 (8.84)	275,5 (10.85)	326,5 (12.85)	–
RG7	–	–	–	–	–	–	–	–	–	–	–	–	59 (2.32)	167,5 (6.59)	218,5 (8.6)	269,5 (10.61)	320 (12.60)
RG8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	177,5 (6.99)	228,5 (9.00)	279 (10.98)



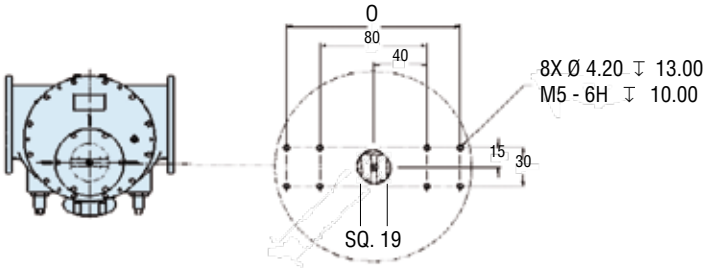
Double Acting Tandem Cylinder

Dimensions for Spring Return Tandem Cylinders, mm (inch)							
SERIES	**A**	**B**	**C**	**E**	**G**	**N**	**L**
RG8 32-32	665 (26.18)	1715 (67.52)	2600 (102.36)	680 (26.77)	1170 (46.06)	1330 52.36)	5645 (222.24)
RG836-36	665 (26.18)	1740 (68.50)	2600 102.36)	680 (26.77)	1170 (46.06)	1330 52.36)	5670 (223.23)

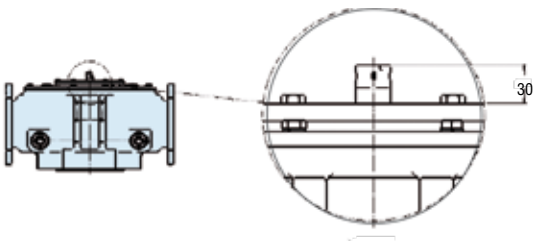
Module Weights

Module Weights, Lbs (kgs)																									
Model	Torque Module	Pressure Module																	Spring Module							
		5	6	7	8	9	10	12	14	16	18	20	22	24	28	32	36	40	1	2	3	4	5	6	7	8
RG1	68 (31)	31 (14)	35 (16)	47 (22)	53 (24)	66 (30)	94 (43)	139 (63)	–	–	–	–	–	–	–	–	–	–	88 (40)	97 (44)	101 (46)	103 (47)	106 (48)	114 (52)	119 (54)	119 (54)
RG2	99 (45)	–	–	–	56 (25)	69 (32)	99 (45)	143 (65)	209 (95)	320 (145)	–	–	–	–	–	–	–	–	128 (58)	145 (66)	154 (70)	158 (72)	158 (72)	172 (78)	180 (82)	186 (85)
RG3	143 (65)	–	–	–	–	–	100 (45)	142 (64)	200 (91)	318 (145)	406 (185)	561 (255)	–	–	–	–	–	–	226 (103)	260 (118)	267 (121)	269 (122)	276 (125)	330 (150)	321 (146)	–
RG4	295 (134)	–	–	–	–	–	–	–	217 (99)	339 (154)	427 (194)	586 (266)	741 (337)	942 (428)	–	–	–	–	402 (183)	442 (201)	462 (210)	477 (217)	510 (232)	545 (248)	565 (257)	581 (254)
RG5	510 (231)	–	–	–	–	–	–	–	–	356 (162)	455 (207)	610 (277)	853 (388)	994 (452)	1634 (743)	–	–	–	639 (290)	737 (335)	770 (350)	783 (356)	901 (410)	955 (434)	–	–
RG6	933 (423)	–	–	–	–	–	–	–	–	–	493 (224)	616 (280)	861 (391)	1051 (478)	1732 (787)	2321 (1055)	3044 (1384)	–	1283 (583)	1738 (790)	1671 (760)	1730 (787)	2061 (937)	1995 (907)	–	–
RG7	1881 (853)	–	–	–	–	–	–	–	–	–	–	–	–	–	1824 (829)	2411 (1096)	3156 (1435)	3913 (1779)	2283 (1038)	2946 (1339)	3043 (1383)	3177 (1444)	3630 (1650)	3709 (1686)	–	–
RG8	3718 (1686)	–	–	–	–	–	–	–	–	–	–	–	–	–	2165 (984)	2819 (1282)	3372 (1533)	4159 (1891	4627 (2103)	5800 (2637)	6113 (2779)	6227 (2830)	7111 (3232)	7423 (3374)	–	–

NAMUR shaft height and bracket mounting details



Detail B



Detail C

Series	O
RG1	-
RG2	-
RG3	-
RG4	130
RG5	130
RG6	130
RG7	130
RG8	130

Product Specification

- Actuator shall be designed in accordance with EN15714-3 to define minimum cycle life performance and designed for on-off and modulating service.
- Actuator output shall meet ISO rated torque compliance to provide safe mounting interface and comply with ISO 5211/MSS SP-101 mounting standards and NAMUR VDI/VDE standards for accessory mounting.
- Actuator shall have a symmetrical torque module to simplify field service and interchangeability of spring and air modules. Manual overrides and mounting is consistent for both spring and torque module to simplify mounting.
- The actuator torque module shall utilize an interchangeable yoke system to allow simple field conversion of symmetrical and canted yokes.
- The spring module shall use a pull-to-compress motion with single or concentric-nested springs that are internally supported and guided and weld secured for safety.
- The spring module shall be designed for minimum length and weight to improve the center of gravity, reduce material stress and assembly support requirements.
- The actuator shall have hard chrome plated cylinder walls to provide superior corrosion and wear resistance.
- The actuator piston sealing should use advanced Quad Seal technology to provide enhanced cycle life compared to conventional O-Rings.
- The internal support guide rods, spring rods and piston rods shall be hard chrome plated for superior corrosion and wear resistance.
- The pneumatic cylinder shall use external retention rods to provide visual confirmation and inspection of rod integrity for increased safety.

Agency & Environmental Approvals

- IP67M (1 meter depth for 30 minutes)
- IEC 61508 SIL 3 Suitable
- ATEX Certified

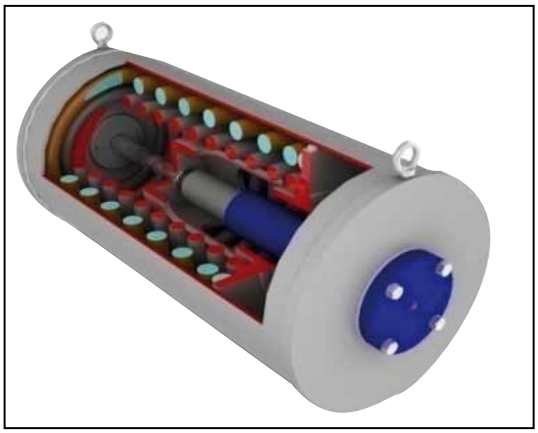
Standard Paint Specification
The standard external surface treatment consists of a 2 pack primer and 2 pack epoxy coating. This international marine coating is suitable for chemical, coastal and offshore environments providing superior corrosion resistance.

Primer Coat: Akzo Nobel Intergard 251, anticorrosive zinc phosphate epoxy primer, 75 microns DFT, color: KGA902-Red.
Top Coat: Akzo Nobel Intergard 740 epoxy finish, 2 mills DFT
Finished Color: ECK724 – Storm Grey, High Gloss

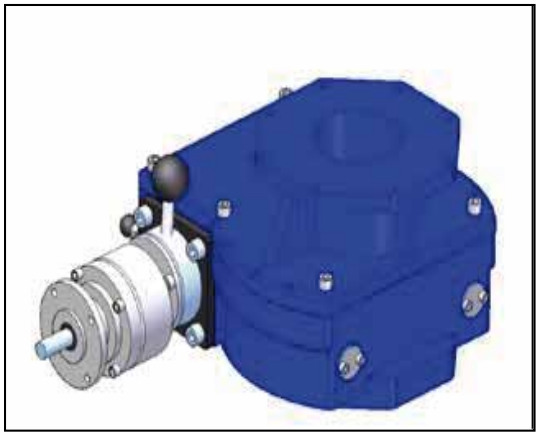
Manual Override Options

Jackscrew

Hydraulic



Sandwich Gear



Bevel Gear

Model	ISO Mounting	Torque		DA				SR			
				Jackscrew		Sandwich Declutchable Gear	Hydraulic	Jackscrew		Sandwich Declutchable Gear	Hydraulic
		N-m	in-lb	Direct Operation	Bevel Gear			Direct Operator	Bevel Gear		
RG1	F14	2000	17702	✓	–	✓	–	✓	–	✓	–
RG2	F16	4000	35404	✓	–	✓	–	✓	–	✓	–
RG3	F25	8000	70808	✓	✓	✓	✓	✓	✓	✓	✓
RG4	F30	16000	141616	–	✓	✓	✓	–	✓	✓	✓
RG5	F35	32000	283232	–	✓	✓	✓	–	✓	✓	✓
RG6	F40	63000	557613	–	–	–	✓	–	–	–	✓
RG7	F48	125000	1106375	–	–	–	✓	–	–	–	✓
RG8	F60	250000	2212750	–	–	–	✓	–	–	–	✓

Actuator Model Designation

How to Order							
Series	**Body Size**	**Cylinder Size**	**Action**	**Spring Module**	**Torque Pattern (Yoke)**	**Sealing/Temp**	**Manual Override**	**Material/ Coatings**	**Options**
RG	1	05 06 07 08 09 10 12	DA- Double Acting Single Cylinder	0	S- Symmetrical	N- Nitrile, -20˚F to 180˚F	0- None	GE- Grey Epoxy (std)	00- None
	2	08 09 10 12 14 16	DD- Double Acting Dual Cylinder	1	C- Canted		G- Sandwich Declutch Gbox	PO- Primer Only	TC- Ext. Stopper -CW
	3	10 12 14 16 18 20		2		H- High Temp (Viton), 0˚F to 300˚F	J- Jackscrew	WE- White Epoxy	TO- Ext. Stopper -CCW
	4	14 16 18 20 22 24		3			D- Bevel Gear Jackscrew	SP- Specials	TB- Ext. Stopper -Both Dir
	5	16 18 20 22 24 28		4		L- Low Temp, (material) -55˚F to 180˚F	H- Hydraulic		S xxx- Specials code
	6	18 20 22 24 28 32 36	SR- Spring Return Fail CW	5					
	7	24 28 32 36 40	SO- Spring Return Fail CCW	6					
	8	28 32 36 40		7					
				8					
Model Code Example:									
RG	5	22	SR	6	C	N	D	GE	TC

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