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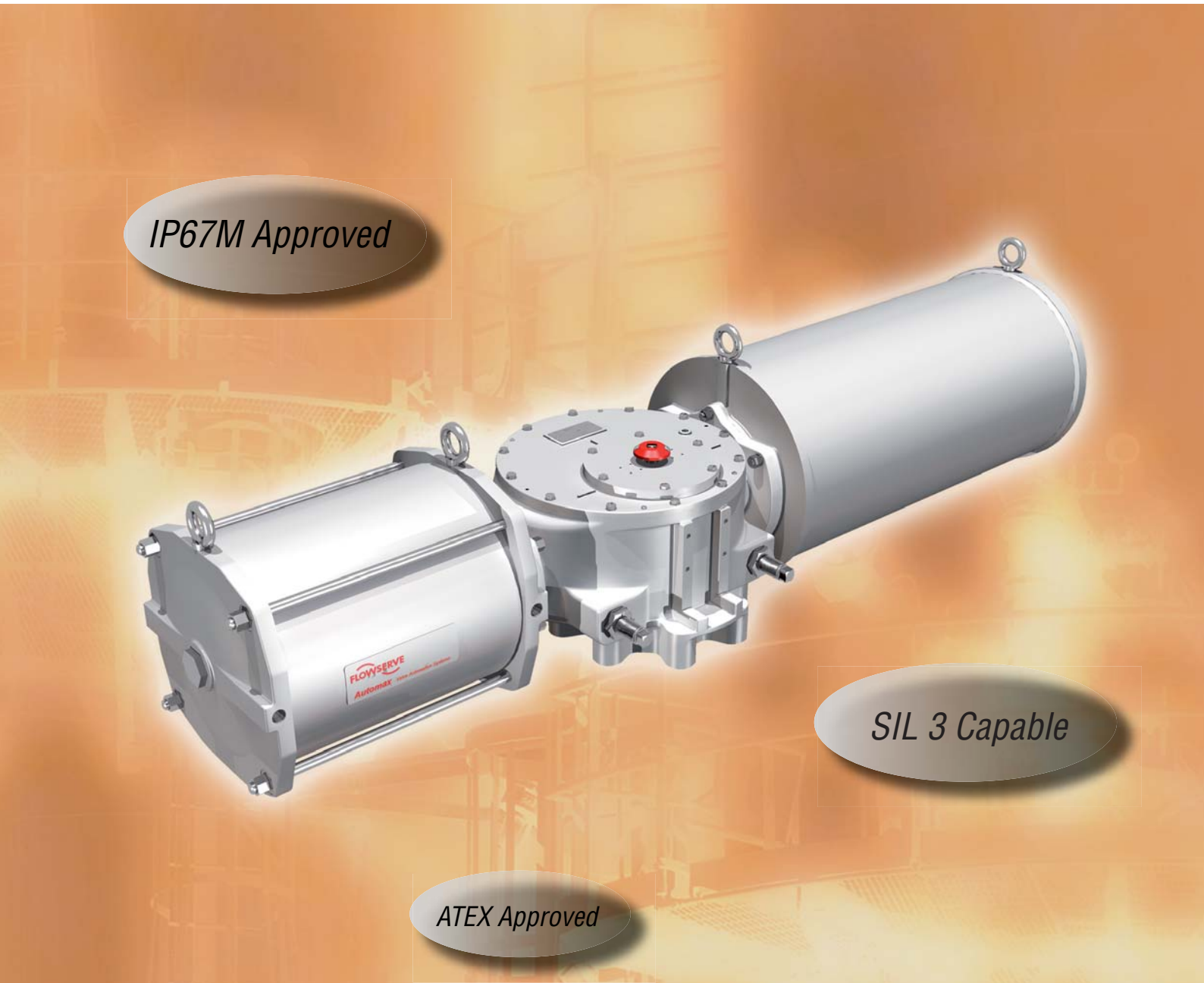
Automax
RG Series Heavy Duty Actuator
Double Acting or Spring Return Scotch Yoke Actuator



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 2.8 - 248600Nm (25 to 2.2 million in-lbs). 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 Mounting hardware.

Automax

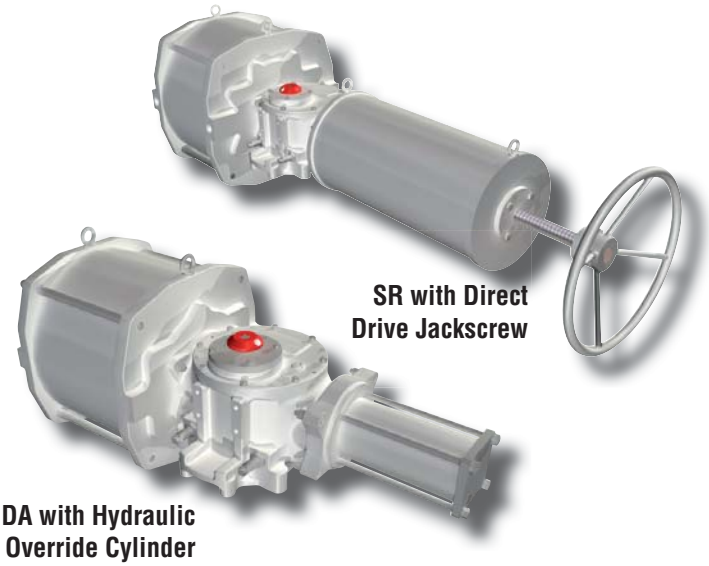
RG Series

Heavy-Duty Scotch Yoke Actuator

Accessories

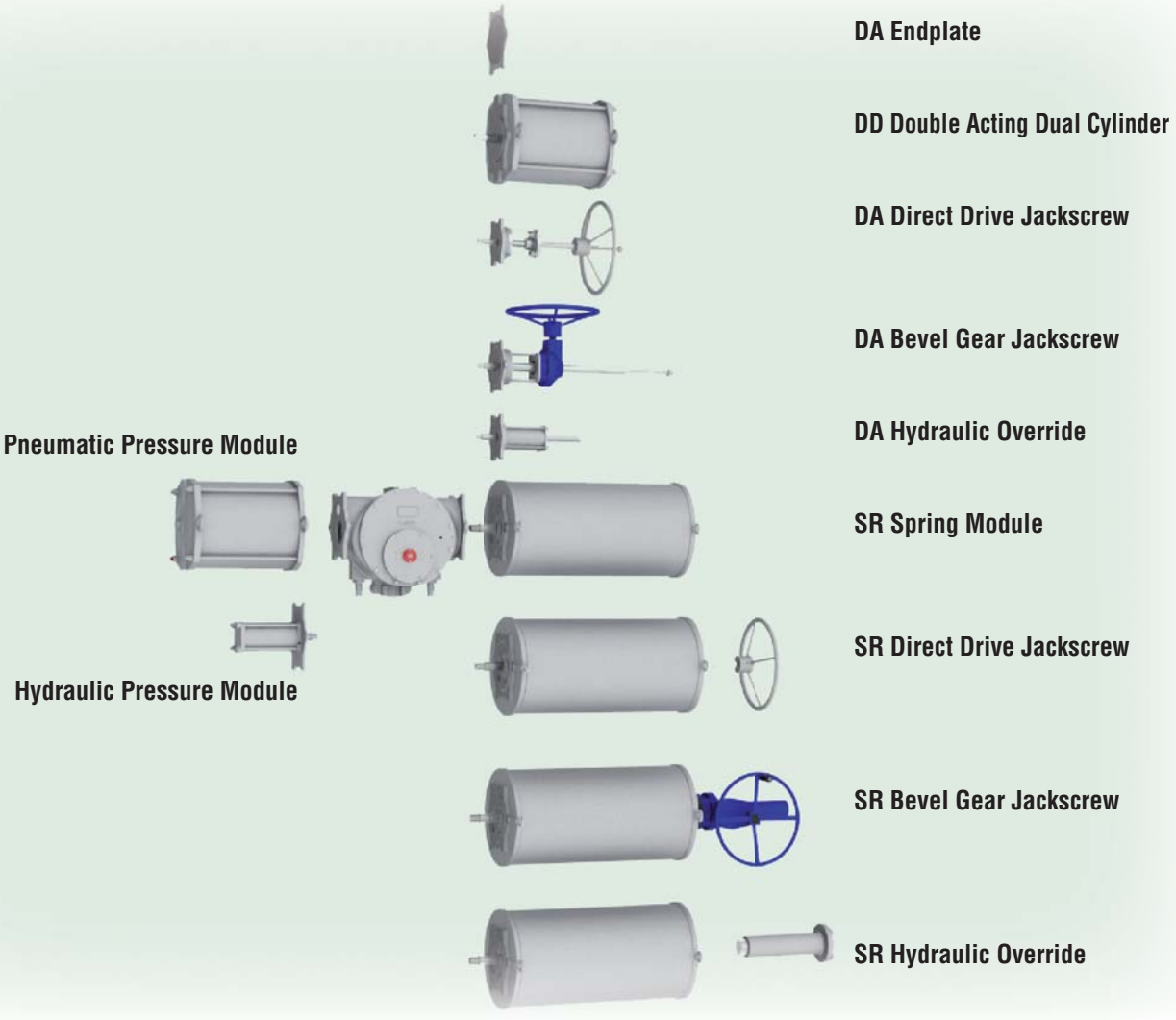
Modular Construction

- *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



RG Series

Heavy-Duty Scotch Yoke Actuator

The Automax RG Series provides up to 248,000 Nm of heavy-duty Scotch yoke torque. Enhanced performance is achieved by using a superior yoke support system that significantly reduces transverse loads.

Features

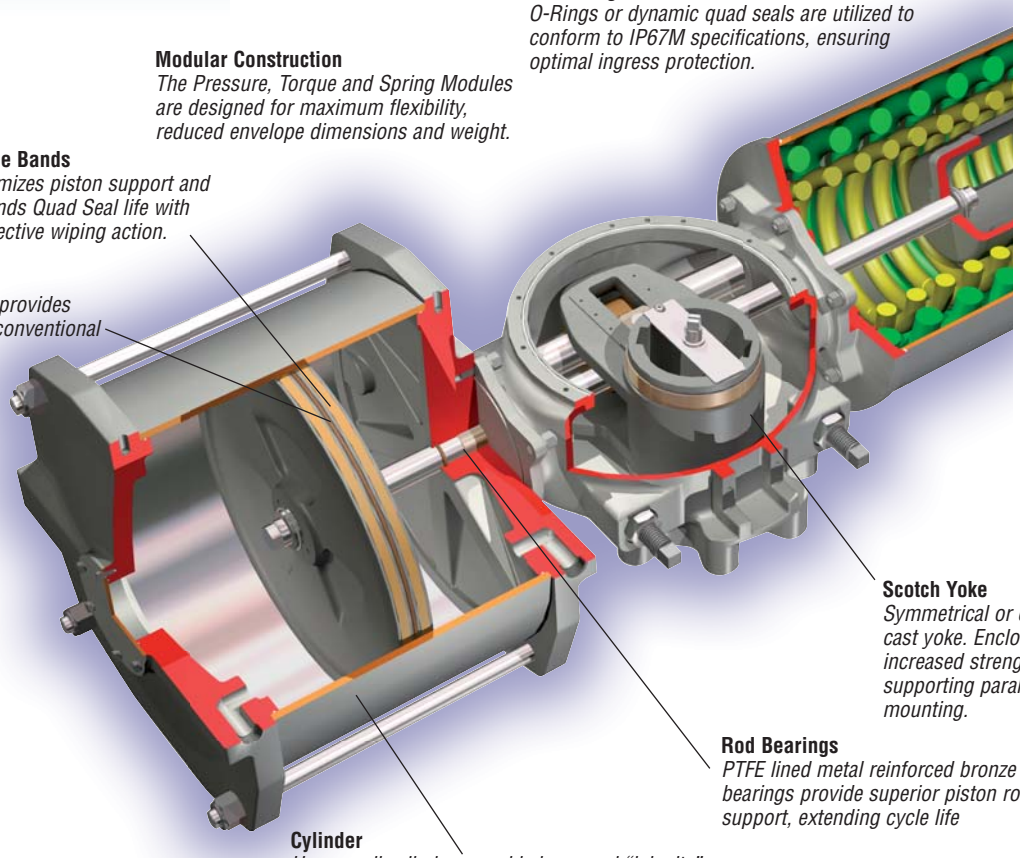
- True Modular Design
- On-Off, Multi-Position and Throttling
- Pneumatic, Gas and Hydraulic Models
- Spring Return "Fail Safe" and Double Acting
- Torque Outputs:
  - DA – 248000 Nm (2.2M in-lbs)
  - SR – 124000 Nm (1.2M in-lbs)
- Operating Pressures:
  - Pneumatic: 2.8-10 bar
  - Hydraulic: 34-207 bar

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.



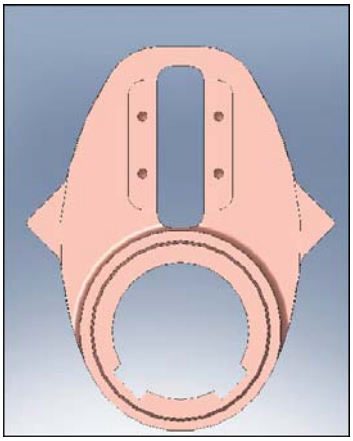
Scotch Yoke
Symmetrical or canted ductile iron cast yoke. Enclosed yoke slot for increased strength with 2 keyways supporting parallel or perpendicular mounting.

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

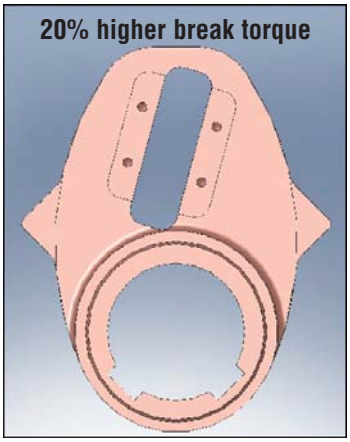
Cylinder
Heavy wall cylinders provide increased "job site" durability. Interior surface is honed and hard chrome plated to provide superior corrosion and wear resistance.

RG Series

Heavy-Duty Scotch Yoke Actuator



Symmetrical Yoke



Canted Yoke

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*

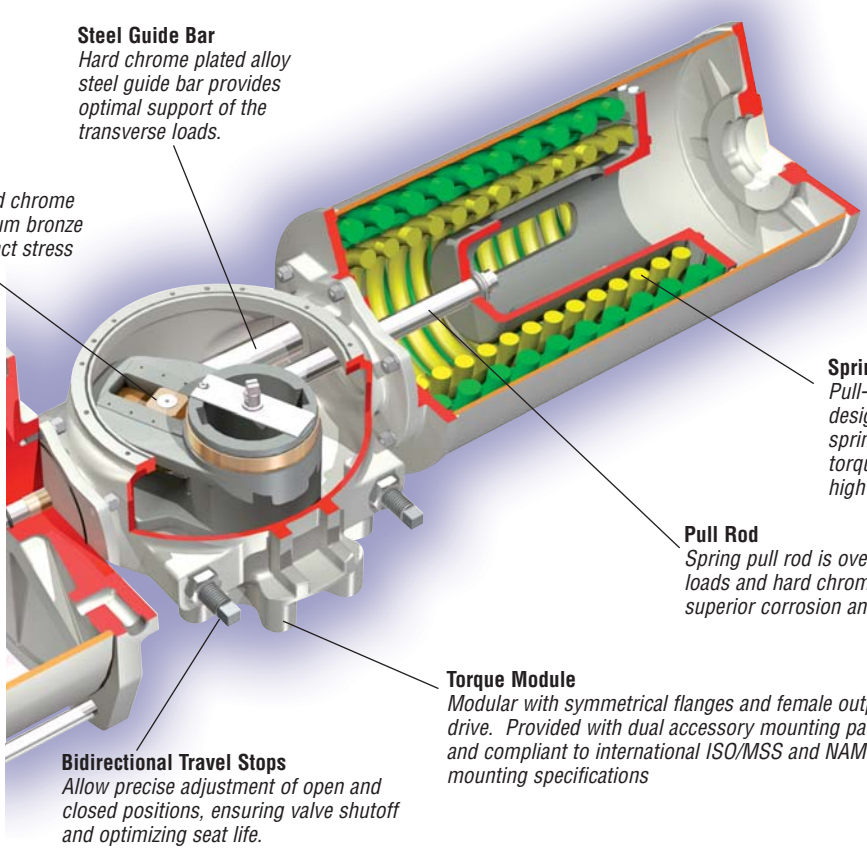
Features

- 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

Override Options
Spring Module design facilitates field retro-fitting 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.



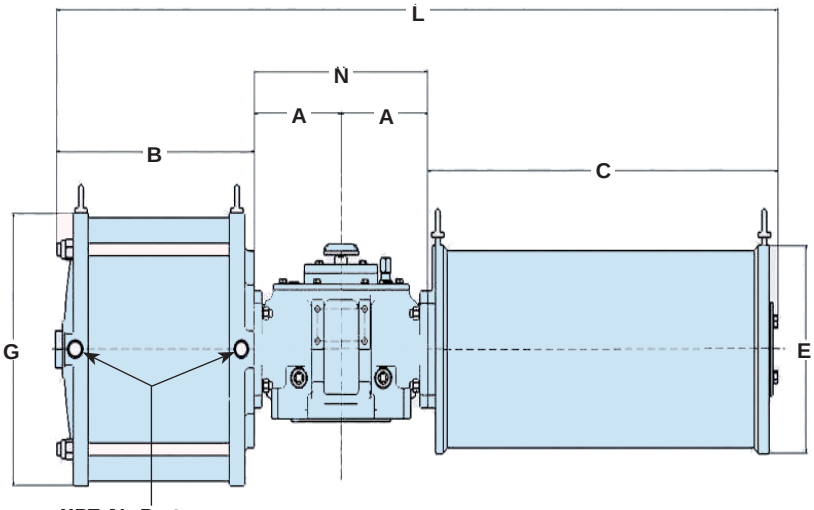
Spring Module
Pull-to-compress, concentric-nested design utilizes high strength alloy spring steel to maintain consistent torque output (over time) and promote high cycle life performance.

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

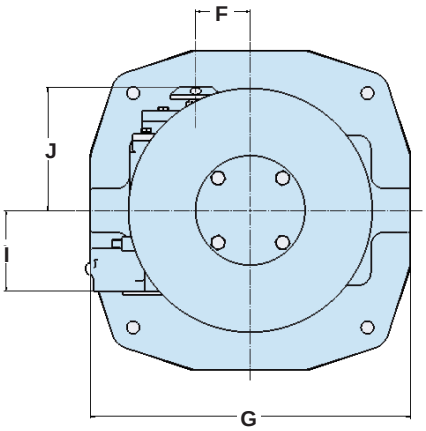
Bidirectional Travel Stops
Allow precise adjustment of open and closed positions, ensuring valve shutoff and optimizing seat life.

Dimensions

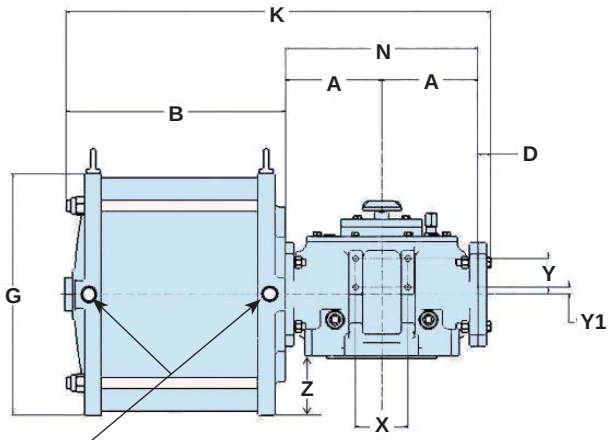


NPT Air Ports

Spring Return

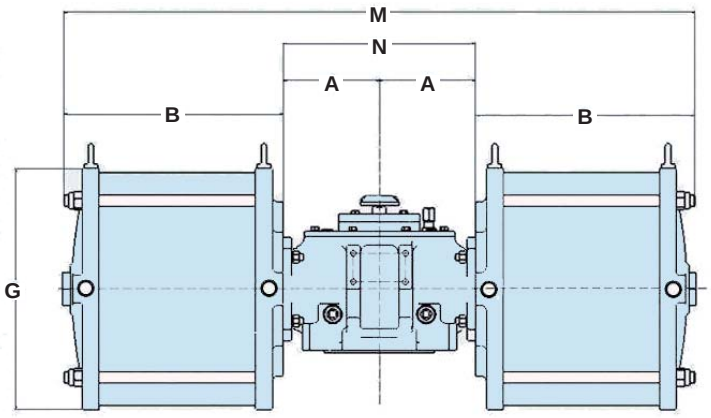


Side View



NPT Air Ports

Double Acting Single Cylinder

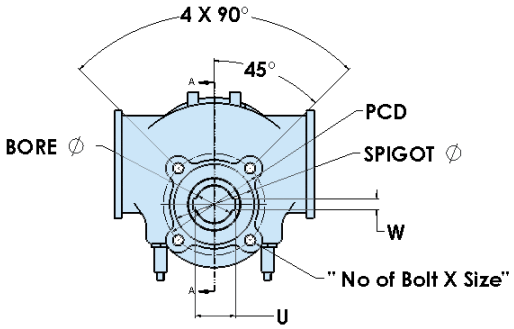


Double Acting Dual Cylinder

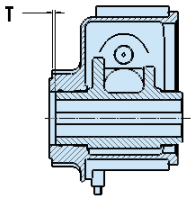
Actuator Dimensions, mm (inch)															
SERIES	A	B	C	D	E	F	I	J	K	L	M	N	X	Y	Y1
RG1	141 (5.55)	310 (12.20)	498 (19.61)	18,5 (0.73)	264 (10.39)	55 (2.17)	99 (3.90)	129 (5.08)	610,5 (24.04)	1090 (42.91)	902 (35.51)	282 (11.10)	68 (2.68)	60 (3.36)	30 (1.18)
RG2	162 (6.38)	368 (14.49)	586 (23.07)	20 (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″

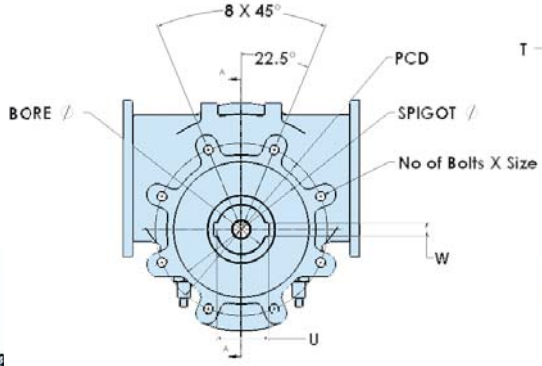
Dimensions



ISO BASE DETAILS
(RG1, RG2)

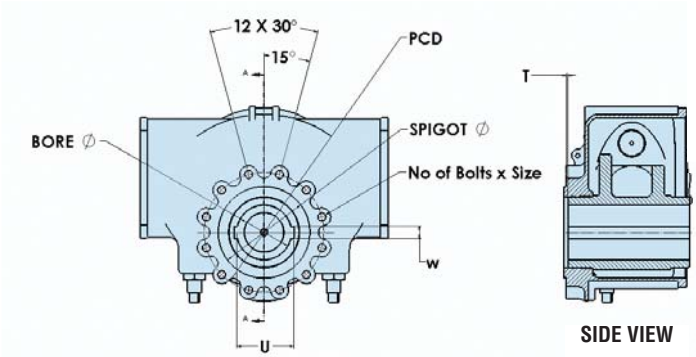


SIDE VIEW



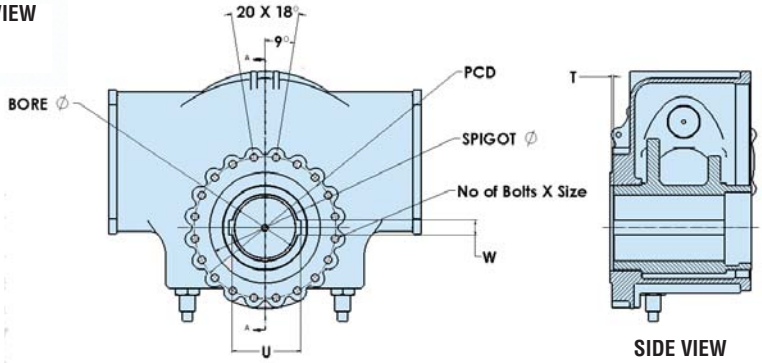
ISO BASE DETAILS
(RG3 TO RG6)

SIDE VIEW



ISO BASE DETAILS
(RG7)

SIDE VIEW

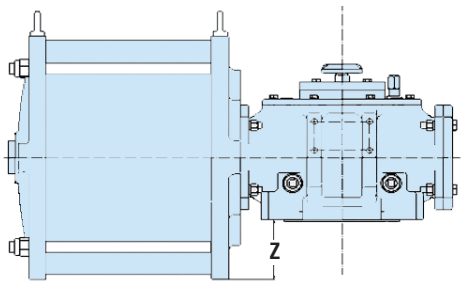


ISO BASE DETAILS
(RG8)

SIDE VIEW

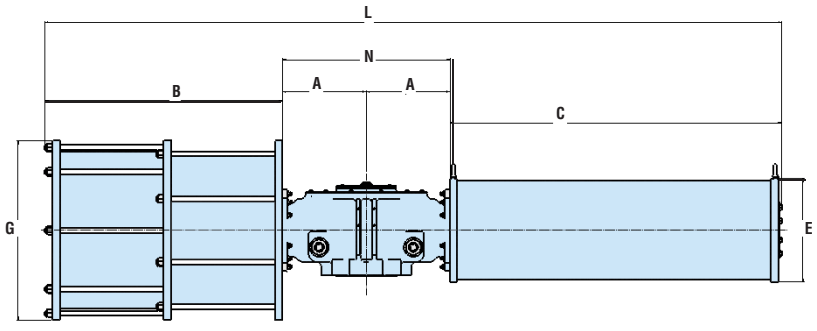
Mounting Base Details & Dimensions, mm (inch)											
SERIES	ISO BASE	SPIGOT Ø	PCD	BORE Ø	BORE Tol	W	W Tol	No of Bolt X Size	T	U	U Tol
RG1	F14	100 (3.94)	140 (5.51)	48 (1.89)	H9	14 (0.55)	+0.12/+0.05	4 X M16	5 (0.20)	51,8 (2.04)	+0.2/+0.0
RG2	F16	130 (5.12)	165 (6.50)	60 (2.36)	H9	18 (0.71)	+0.15/+0.07	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)



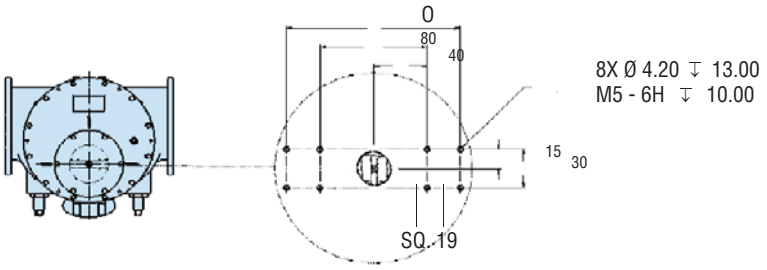
Double Acting Tandem Cylinder

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)

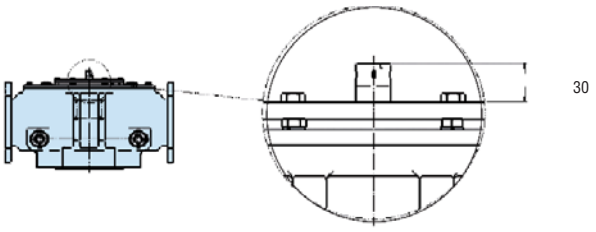
Module Weights

Model	Torque Module	Module Weights, kg (Lbs)																							
		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	31 (68)	14 (31)	16 (35)	22 (47)	24 (53)	30 (66)	43 (94)	63 (139)	–	–	–	–	–	–	–	–	–	–	40 (88)	44 (97)	46 (101)	47 (103)	48 (106)	52 (114)	54 (119)	54 (119)
RG2	45 (99)	–	–	–	25 (56)	32 (69)	45 (99)	65 (143)	95 (209)	145 (320)	–	–	–	–	–	–	–	–	58 (128)	66 (145)	70 (154)	72 (158)	72 (158)	78 (172)	82 (180)	85 (186)
RG3	65 (143)	–	–	–	–	–	45 (100)	64 (142)	91 (200)	145 (318)	185 (406)	255 (561)	–	–	–	–	–	–	103 (226)	118 (260)	121 (267)	122 (269)	125 (276)	150 (330)	146 (321)	–
RG4	134 (295)	–	–	–	–	–	–	–	99 (217)	154 (339)	194 (427)	266 (586)	337 (741)	428 (942)	–	–	–	–	183 (402)	201 (442)	210 (462)	217 (477)	232 (510)	248 (545)	257 (565)	254 (581)
RG5	231 (510)	–	–	–	–	–	–	–	–	162 (356)	207 (455)	277 (610)	388 (853)	452 (994)	743 (1634)	–	–	–	290 (639)	335 (737)	350 (770)	356 (783)	410 (901)	434 (955)	–	–
RG6	423 (933)	–	–	–	–	–	–	–	–	–	224 (493)	280 (616)	391 (861)	478 (1051)	787 (1732)	1055 (2321)	1384 (3044)	–	583 (1283)	790 (1738)	760 (1671)	787 (1730)	937 (2061)	907 (1995)	–	–
RG7	853 (1881)	–	–	–	–	–	–	–	–	–	–	–	–	–	829 (1824)	1096 (2411)	1435 (3156)	1779 (3913)	1038 (2283)	1339 (2946)	1383 (3043)	1444 (3177)	1650 (3630)	1686 (3709)	–	–
RG8	1686 (3718)	–	–	–	–	–	–	–	–	–	–	–	–	–	984 (2165)	1282 (2819)	1533 (3372)	1891 (4159)	2103 (4627)	2367 (5800)	2779 (6113)	2830 (6227)	3232 (7111)	3374 (7423)	–	–

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

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

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.

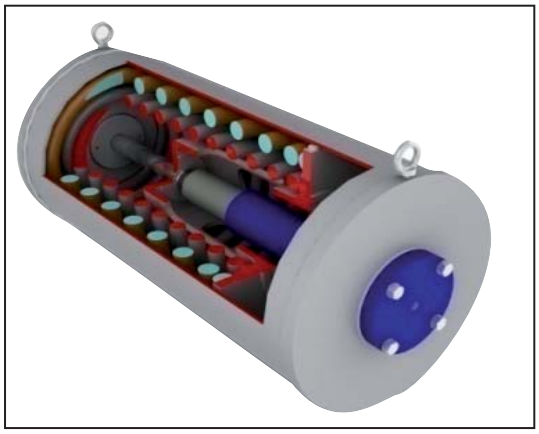
Actuator Model Designation

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

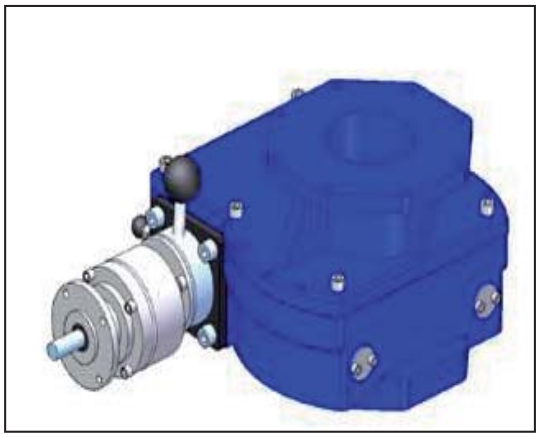
Manual Override Options

Jackscrew

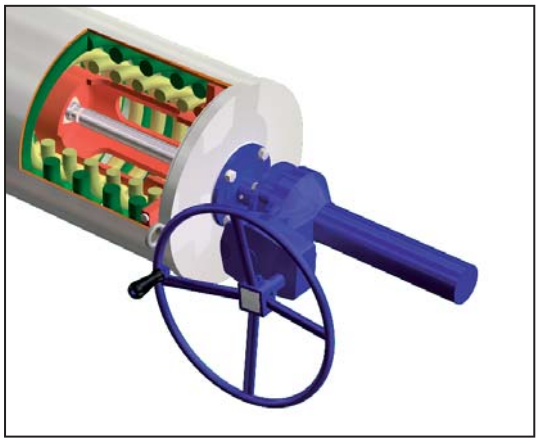
Hydraulic



Sandwich Gear



Bevel Gear



Model	ISO Mounting	Torque		DA				SR			
		N-m	in-lb	Jackscrew		Sandwich Declutchable Gear	Hydraulic	Jackscrew		Sandwich Declutchable Gear	Hydraulic
				Direct Operation	Bevel Gear			Direct Operator	Bevel Gear		
RG1	F14	2000	17702	✓	–	✓	–	✓	–	✓	–
RG2	F16	4000	35404	✓	–	✓	–	✓	–	✓	–
RG3	F25	8001	70808	✓	✓	✓	✓	✓	✓	✓	✓
RG4	F30	16002	141616	–	✓	✓	✓	–	✓	✓	✓
RG5	F35	32005	283232	–	✓	✓	✓	–	✓	✓	✓
RG6	F40	63010	557613	–	–	–	✓	–	–	–	✓
RG7	F48	125020	1106375	–	–	–	✓	–	–	–	✓
RG8	F60	248600	2212750	–	–	–	✓	–	–	–	✓

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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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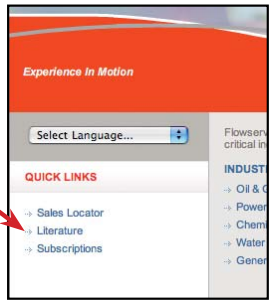

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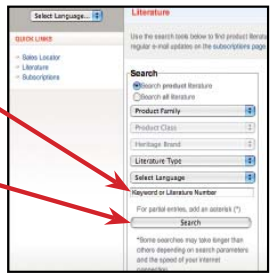

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