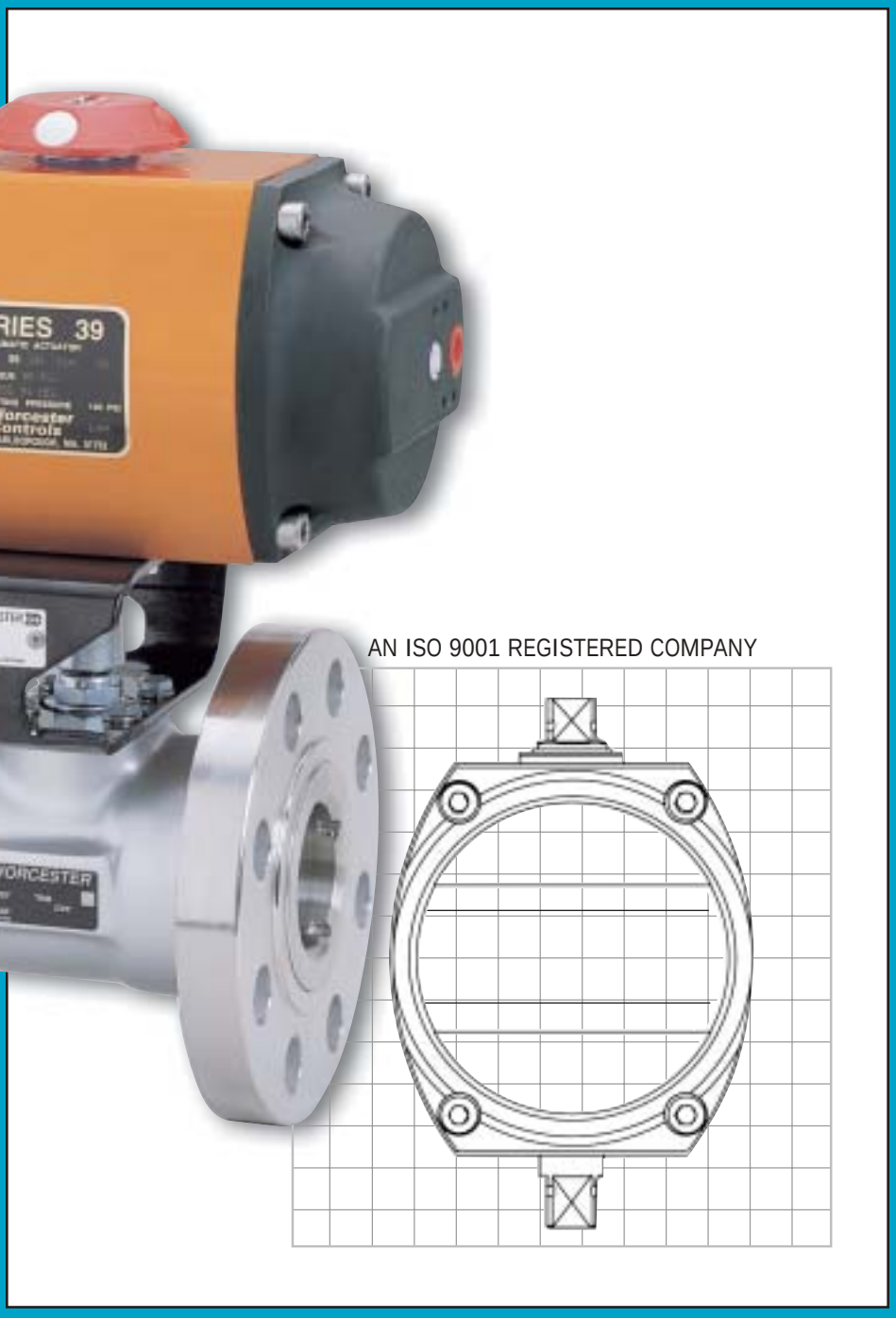
FLOWSERVE

Worcester Controls

PB 302-34



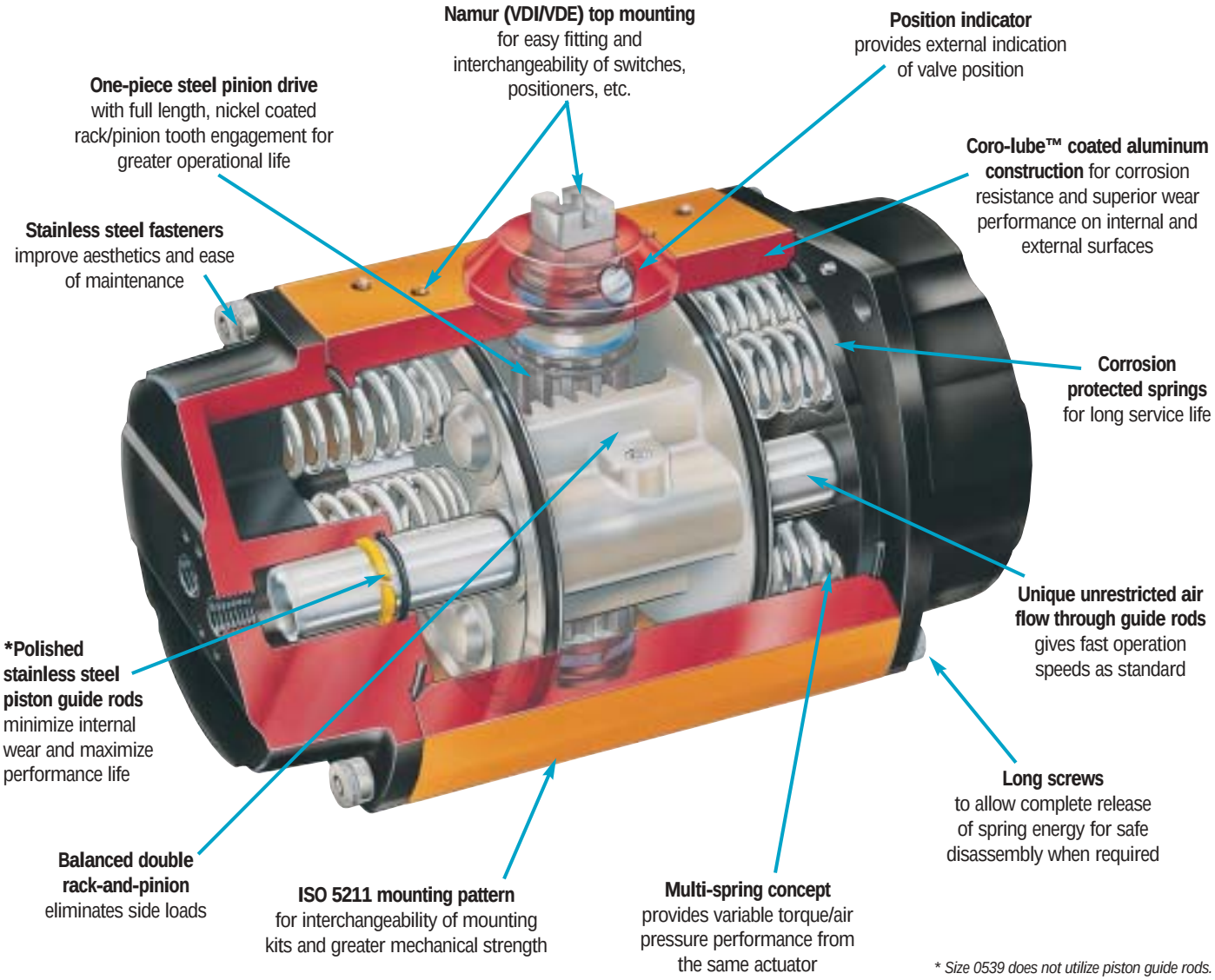
AN ISO 9001 REGISTERED COMPANY

Series 39 Pneumatic Actuator

Twin piston double rack-and-pinion pneumatic actuator offers long cycle life for rotary applications

Series 39 Pneumatic Actuators

High cycle pneumatic power for on-off or throttling control of rotary valves and dampers



** Size 0539 does not utilize piston guide rods.*

Features and Benefits

- Available as spring return or double acting
- Large range of sizes for efficient torque matching
- All parts sealed and greased for life, no maintenance required
- Safe disassembly, no special tools required
- Can be mounted for fail-open or fail-closed operation
- Backed by our exclusive two-year warranty

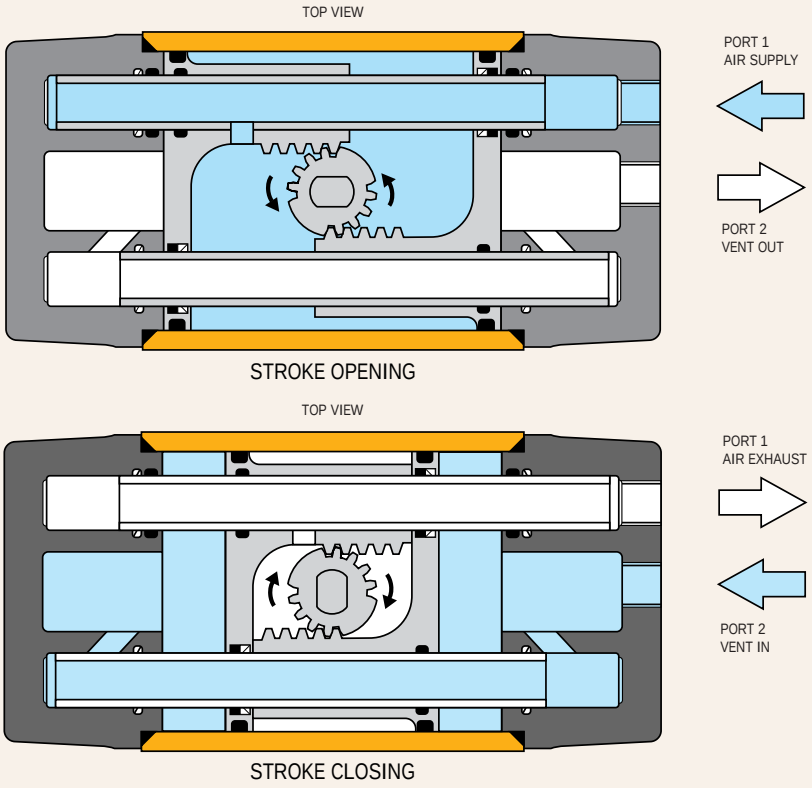
Operating Principle

The Series 39 Pneumatic Actuator design is based on the opposed rack-and-pinion principle utilizing piston guide rods to guarantee part alignment. The fully supported guide rods minimize friction and wear between the pistons and the body bore.

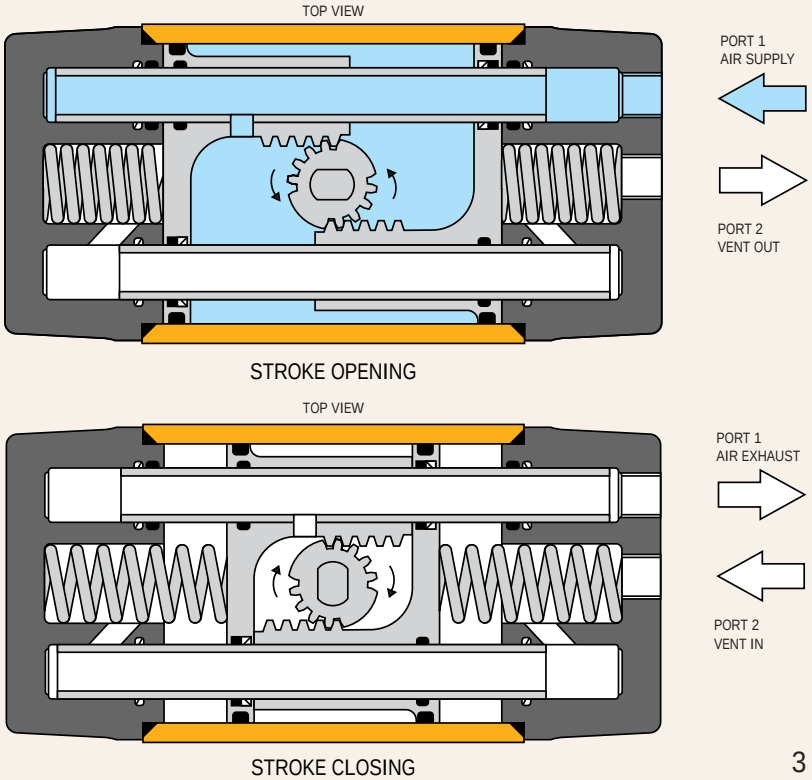
In the double acting actuator, compressed air is applied to Port 1. The air flows through the rear guide rod, enters the center chamber to push the pistons apart, turning the shaft counter-clockwise (as seen from above) to open the valve. During this action, air in the end caps is vented through Port 2 via the front guide rod. Action is reversed, i.e. the valve is closed, by applying air to Port 2 and venting air through Port 1.

In a fail-safe spring return actuator, springs are nested in the end caps. The number of springs in each cap depends on the available supply air pressure and required torque output. Air is supplied through Port 1 to the center chamber to push the pistons apart which compresses the springs. During this action, air in the end caps is vented through Port 2 via the front guide rod. When air is vented out through Port 1 (via a three-way solenoid valve) the springs push the pistons back together thus closing the valve. Port 2 is continuously vented. The springs provide a dependable, safe closure in the event of electrical or air supply failure.

DOUBLE ACTING ACTUATOR 39



SPRING RETURN ACTUATOR 39S

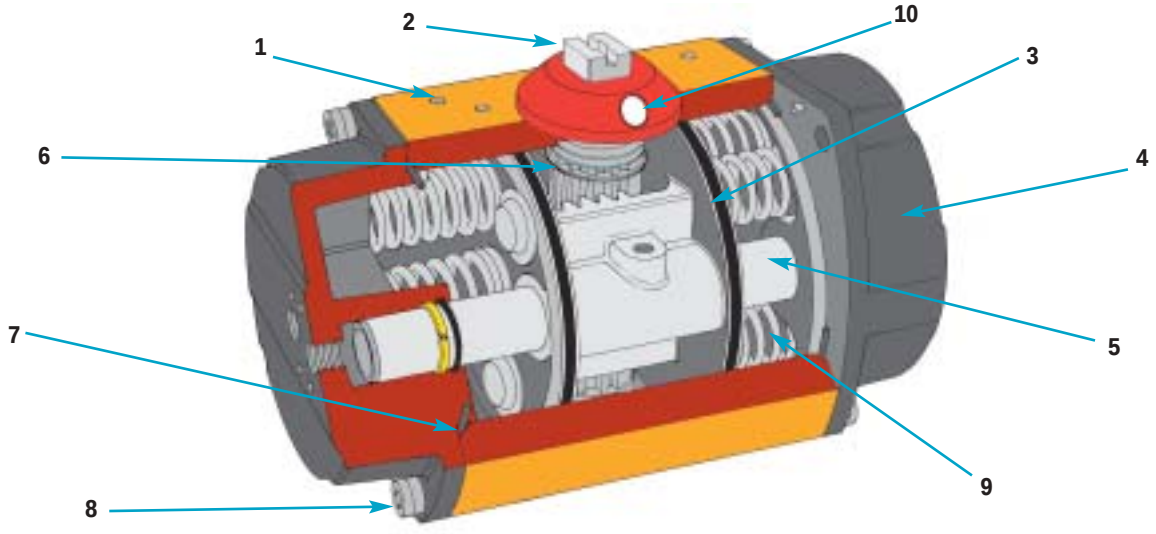


Product Specifications

- Pneumatic Actuators shall be of a dual-piston design for compactness, highest torque output, minimal air consumption and even weight distribution (balanced) on the valve stem.
- Actuators shall be equipped with two piston guide rods to bear the lateral rack-and-pinion thrust forces, increasing piston seal life and eliminating the possibility of cylinder scratching by the pistons. Elastomeric seals shall not be loaded as bearings.
- The torque shall be generated through a double rack-and-pinion gearing mechanism with full-length, uninterrupted engagement of the rack-and-pinion teeth.
- The rack shall be machined as part of the piston in order to extend the actuator life and eliminate hysteresis.
- Actuator housings shall be protected both internally and externally with a nickel acetate filled coating for corrosion resistance.
- Single acting actuators shall use multi-springs at each end to eliminate uneven forces on the pistons and shall be field adaptable to reduced pressure air supplies.
- Actuators shall have external extended shafts for position indication and manual override capability.
- Actuators shall have optional integral end-mounted limit switches, reducing overall height and allowing the use of extended actuator shafts as manual override.
- Actuators shall have optional integral solenoid valving without the use of transfer tubes. Valving shall incorporate fail-safe action upon interruption of electrical signal.
- Actuator manufacturer shall offer the minimum of a two-year warranty.

As manufactured and offered by Flowserve.

Parts List/Material Specifications



ITEM NO.	DESCRIPTION	MATERIAL/FINISH
1	Body	Aluminum (Extrusion) Anodized
2	Pinion	Carbon Steel (Corrosion Resistant Coated)
3	Pistons	Aluminum
4	End Caps	Aluminum Anodized
5	Guide Rods	Stainless Steel
6	Bearings	Acetal
7	“O” Rings	Nitrile Rubber
8	End Cap Screws	Stainless Steel
9	Springs	Chrome Silicon (Corrosion Resistant Coated)
10	Position Indicator	Polyethylene

Solenoid Mounting

SOLENOID BLOCK - DIRECT MOUNTED

The solenoid end cap of each actuator is pre-drilled to allow rapid attachment of either a double acting or spring return solenoid control block.

The double acting solenoid control block provides extremely fine and independent adjustments for speed control on the opening and closing strokes of a double acting actuator (20:1 ratio). The double acting solenoid control block can be overridden by manual operation of the control block spool.

The spring return solenoid control block provides an optional adjustment for speed control on the spring stroke of a spring return actuator.

Both double acting and spring return styles will return to the actuator "closed" position (pistons together) upon electrical failure.

General Purpose TYPE1 Solenoid Coil Data

(Class A Coil)

VOLTAGE	INRUSH AMPS	HOLDING AMPS
24 VAC 50/60 Hz	1.20	.80
120 VAC 50/60 Hz	.30	.15
240 VAC 50/60 Hz	.12	.08
12 VDC	—	.70
24 VDC	—	.35

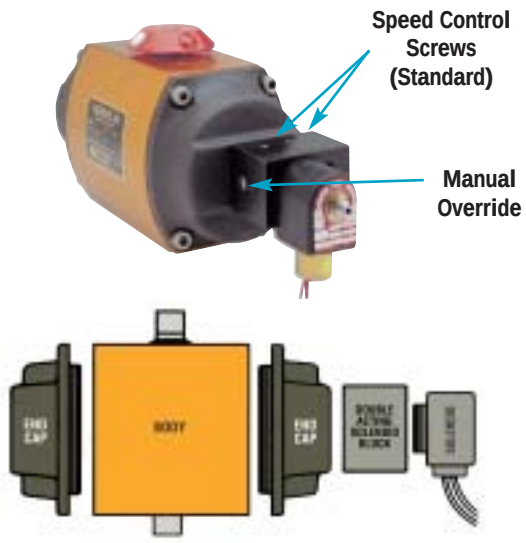
Watertight/Hazardous Locations TYPE 4, 4x, 7 & 9 Solenoid Coil Data

(Class F Coil)

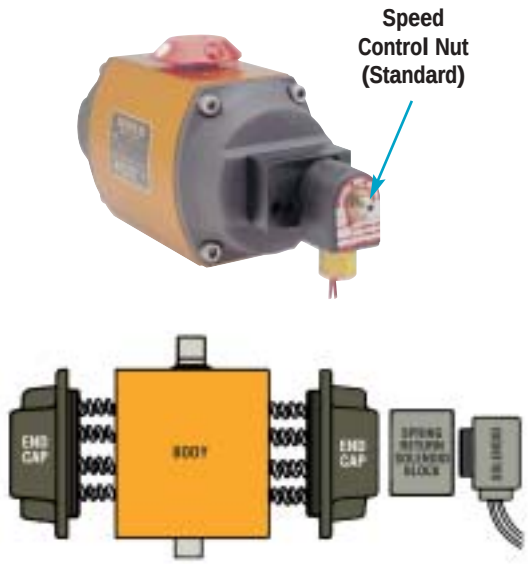
VOLTAGE	INRUSH AMPS	HOLDING AMPS
24 VAC 50/60 Hz	1.13	.71
120 VAC 50/60 Hz	.23	.14
240 VAC 50/60 Hz	.11	.07
12 VDC	—	.81
24 VDC	—	.41

Solenoids are available in the following types: General Purpose TYPE 1; Watertight TYPE 4, 4x; Hazardous Locations TYPE 7 (UL & CSA listed for Class I, Division I, Groups A, B, C & D) and TYPE 9 (UL & CSA listed for Class II, Groups E, F & G). The Type 7 solenoid is also rated Type 4, 4x.

Four-Way Double Acting Solenoid



Three-Way Spring Return Solenoid



Namur Solenoid Interface

Optional Namur VDI/VDE 3845 interface end caps and direct mount Namur solenoids are available making the Series 39 a truly international actuator. All ports are G 1/4 except size 05 and 10, which are G 1/8. Consult table on back cover for ordering details.

Three-way Namur solenoids include a standard rebreather feature.

Namur End Cap (designated V64)

Namur Mounted Solenoid

Torque Output

Sizing

Determine appropriate valve torque requirements from valve literature. For double acting actuators, select the actuator whose torque output at available air supply exceeds breakaway torque requirements of the valve. For detailed instructions, consult Worcester Controls' Ball Valve Actuator Selection Manual, brochure V400.

For fail-closed, spring return actuators, select the appropriate size actuator whose torque output at end of the spring stroke (at available air supply) is sufficient to close the valve.

For fail-open spring return actuators, select appropriate actuator whose torque output at the end of the air stroke is sufficient to close the valve. For fail-open actuators, it is also necessary to determine that the torque output at the start of the spring stroke exceeds breakaway requirements of the valve.

Spring Return Actuator

		Operating Pressure												
		30 (2.0)		40 (2.7)		50 (3.4)		60 (4.1)		70 (4.8)		80 (5.4)		psi (Bar)
No. of Springs		2		4		6		8		8		10		
Model No.	Stroke	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	
1039	Air	70 7.9	40 4.5	85 9.6	60 6.8	105 11.9	60 6.8	125 14.1	70 7.9	170 19.2	120 13.6	175 19.8	95 10.7	in-lb N m
	Spring	58 6.6	35 4.0	60 6.8	35 4.0	95 10.7	55 6.2	125 14.1	75 8.5	125 14.1	75 8.5	160 18.1	95 10.7	in-lb N m
1539	Air	140 15.8	60 6.8	130 14.7	85 9.6	200 22.6	125 14.1	240 27.1	150 16.9	260 24.9	155 16.4	325 31.6	190 20.9	in-lb N m
	Spring	100 11.3	60 6.8	105 11.9	74 7.3	165 18.6	105 11.9	220 24.9	145 16.4	220 24.9	145 16.4	280 31.6	185 20.9	in-lb N m
2039	Air	220 24.9	150 17.0	300 33.9	240 27.1	340 38.4	235 26.6	415 46.9	280 31.6	575 65	440 49.7	600 67.8	360 40.7	in-lb N m
	Spring	140 15.8	95 10.7	190 21.5	125 14.1	300 33.9	195 22.0	400 45.2	265 29.9	400 45.2	265 29.9	505 57.0	335 37.9	in-lb N m
2539	Air	220 24.9	110 12.4	560 63.3	400 45.2	600 67.8	350 39.5	730 82.5	420 47.5	925 105	655 74	980 111	550 62.1	in-lb N m
	Spring	240 27.1	170 19.2	345 39.0	210 23.7	540 61.0	330 37.3	720 81.4	450 50.8	720 81.4	450 50.8	915 103	575 65.0	in-lb N m
3039	Air	324 36.6	180 20.3	840 94.9	610 68.9	965 108	600 67.8	1130 128	690 78.0	1575 178	1145 129	1650 186	920 104	in-lb N m
	Spring	456 51.5	264 29.8	560 63.3	340 38.4	870 98.3	535 60.5	1160 131	730 82.5	1160 131	730 82.5	1470 166	920 104	in-lb N m
3339	Air			1550 175	1160 131	1810 205	1200 136	2060 233	1220 138	2700 305	1860 210	2950 333	1900 215	in-lb N m
	Spring			1070 121	680 77	1680 190	1070 121	2300 260	1460 165	2300 260	1460 165	2900 328	1850 209	in-lb N m
3539	Air	1560 176.3	1260 142.4	2100 237	1470 166	2360 267	1450 164	2850 322	1730 195	3570 428	2615 295	3850 435	2210 250	in-lb N m
	Spring	900 101.7	720 81.4	1330 150	850 96.0	2070 234	1330 150	2770 313	1815 205	2770 313	1815 205	3500 395	2300 260	in-lb N m
4039	Air			3410 385	2300 260	3980 450	2350 266	4470 505	2390 270	5620 635	3450 390	6150 695	3500 396	in-lb N m
	Spring			2490 435	1500 170	3730 422	2240 253	4970 562	2980 337	4970 562	2980 337	6210 702	3740 423	in-lb N m
4239	Air			6550 740	4520 511	7280 822	4140 468	7960 899	3390 383	10510 1187	6190 699	10920 1233	5590 632	in-lb N m
	Spring			4560 515	2390 270	6900 780	3800 430	9290 1049	4890 550	9290 1049	4890 550	11720 1324	6370 720	in-lb N m
No. of Springs				12		16		18		22		24		
4539	Air			8700 983	4000 452	10600 1200	4300 485	13200 1490	5900 667	14900 1680	6100 689	17600 1990	8000 904	in-lb N m
	Spring			8300 938	4000 452	11800 1330	5500 622	15600 1760	6300 712	16600 1880	7800 881	18000 2030	8400 949	in-lb N m
5039	Air			12500 1410	6000 678	15500 1750	6000 678	19500 3250	8500 960	21800 2460	8000 904	26500 2990	11500 1330	in-lb N m
	Spring			13000 1470	6500 7340	18000 2030	8500 960	20500 2320	9500 1070	26000 2940	12200 1380	28500 3220	13500 1520	in-lb N m

N m = Newton meter, the standard metric measure of torque.

Double Acting Actuator

	Operating Pressure										
Model No.	30 (2.0)	40 (2.7)	50 (3.4)	60 (4.1)	70 (4.8)	80 (5.4)	90 (6.1)	100 (6.8)	110 (7.5)	120 (8.2)	psi (Bar)
05	33.6	48.6	59.7	73.5	86.3	97.4	106	126	137	148	
1039	80 9.3	125 14.1	160 18.1	200 22.5	245 27.7	270 30.5	310 35.0	350 39.6	385 43.5	425 48.0	in-lb N m
1539	155 17.6	240 27.1	300 33.9	370 41.8	460 52.0	510 57.6	580 65.5	650 73.4	725 81.9	790 89.3	in-lb N m
2039	285 32	435 49.1	545 61.6	680 76.8	840 94.9	935 106	1070 121	1200 136	1330 150	1460 165	in-lb N m
2539	590 66.6	785 88.4	980 111	1180 133	1375 155	1570 177	1770 200	1965 222	2160 244	2355 266	in-lb N m
3039	790 89	1200 136	1500 169	1860 210	2305 260	2580 292	2935 332	3290 372	3645 412	4000 452	in-lb N m
3339	1600 181	2230 252	2280 325	3520 398	4160 470	4800 542	5430 614	6070 686	6720 760	7330 828	in-lb N m
3539	2220 250	2975 336	3900 441	4800 542	5600 633	6400 723	7200 814	8000 904	8800 994	9600 1080	in-lb N m
4039	3510 397	4710 532	6170 697	7390 835	8710 984	10040 1135	11400 1288	12700 1435	13970 1579	15270 1726	in-lb N m
4239	6500 734	8700 983	10900 1232	13090 1479	15330 1732	17530 1981	19720 2228	21920 2477	24120 2725	26310 2973	in-lb N m
4539	9000 1016	12700 1430	16100 1820	19500 2200	22700 2560	26000 2940	29400 3320	32600 3680	36000 4070	39500 4460	in-lb N m
5039	13145 1485	19000 2150	24000 2710	29000 3280	34000 3840	40000 4520	45000 5080	50000 5650	55000 6210	60000 6780	in-lb N m

Torque Output Series 0539
Two-Spring Return Actuator

	Operating Pressure						
	50 (3.4)		60 (4.1)		70 (4.8)		psi (Bar)
	Start	End	Start	End	Start	End	
Air	28 (3.2)	16 (1.9)	35 (4.3)	30 (3.4)	50 (5.7)	41 (4.5)	in-lb N m
Spring	42 (4.7)	32 (3.6)	42 (4.7)	32 (3.8)	42 (4.7)	32 (3.6)	in-lb N m

Torque Output Series 0539
Four-Spring Return Actuator

	Operating Pressure		
	80 (5.4)		psi (Bar)
	Start	End	
Air	45 (5.1)	30 (3.4)	in-lb N m
Spring	53 (6.0)	41 (4.6)	in-lb N m

Torque Output Series 0539
Double Acting Actuator

Operating Pressure										
30 (2.0)	40 (2.7)	50 (3.4)	60 (4.1)	70 (4.8)	80 (5.4)	90 (6.1)	100 (6.8)	120 (8.2)	psi (Bar)
33.6 (3.8)	48.6 (5.5)	59.7 (6.8)	73.5 (8.3)	86.3 (9.8)	97.4 (11.0)	106 (12.0)	126 (14.2)	148 (16.7)	in-lb N m

Engineering Data

Air Flow Requirements

Actuator Size	Under 4 ft. Run	Over 4 ft. Run
0539, 1039, 1539 2039, 2539	1/8" Tubing	1/4" Tubing
3039, 3339, 3539, 4039, 4239, 4539, 5039	1/4" Tubing	1/2" Tubing

Actuator Weights*

Actuator Model	Double Acting	Spring Return
	lb. (kg)	lb. (kg)
0539	1.7 (.77)	2.0 (.90)
1039	3 (1.3)	3.5 (1.6)
1539	6 (2.7)	7 (3.1)
2039	10 (4.5)	12 (5.5)
2539	16.25 (4.5)	18.5 (8.4)
3039	24.6 (11)	27 (12)
3339	50.6 (23)	54.5 (24.7)
3539	58 (26)	65 (30)
4039	70 (32)	80 (36)
4239	158 (68)	192 (83)
4539	213 (97)	253 (115)
5039	304 (138)	355 (161)

*without solenoid

Stroke Time (seconds)

Minimum (Unloaded)			
Model No.	D/A Actuator	SR Actuator	With Max.* Speed Control
0539	Less than 1	Less than 1	10
1039	Less than 1	Less than 1	10
1539	Less than 1	1	15
2039	1	1-2	15
2539	2-3	2-3	18
3039	3-4	3-4	20
3339	4-5	7-8	25
3539	4-5	8-9	25
4039	5-6	9-10	30
4239	10-11	11-12	36
4539	10-12	11-13	40
5039	12-14	13-15	60

*Average times under 50% load conditions, 80 psi (with standard solenoid).

NOTE:
These figures are meant as an indication of obtainable speeds only. For more precise figures for any particular application, contact your Worcester representative. Faster speeds are obtainable, if required, by using additional control equipment.

Speed control with spring return actuators only available on exhaust air (spring stroke).

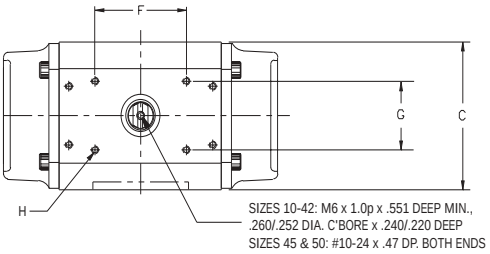
Operating Conditions

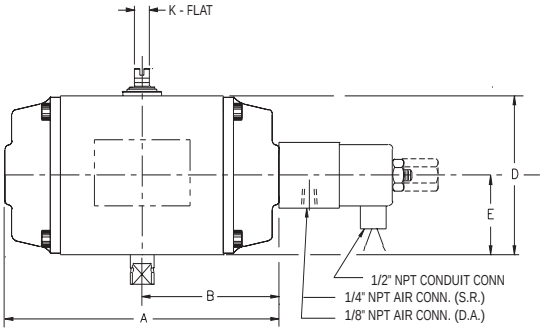
Pressure Range:	30-120 psi Double Acting 40-120 psi All Spring Return Versions* *Standard spring return units require 80 psi minimum. Reduced pressure versions are available.
Media:	Air or non-corrosive gas.
Temperature Range:	0° to 212°F (-18° to 100°C) Actuator Only To 100°F (38°C) continuous, actuator with G.P. solenoid To 175°F (79°C) continuous, actuator with Watertight Type 4, 4x or Hazardous Locations Type 4, 4x, 7 & 9 solenoid High temperature option to 250°F continuous, to 300°F intermittent (without solenoid) Low temperature option to -40°F (without solenoid)
Rotation:	Actuators rotate in counter-clockwise direction when the outer air connection is pressurized.
Movement: Sizes 10-35: Sizes 40-50:	90° with up to 2° each direction 90° with up to 2° overrun each end
Supply Air:	The Series 39 Actuator is factory lubricated. For optimum performance, standard filtered and lubricated air is recommended.

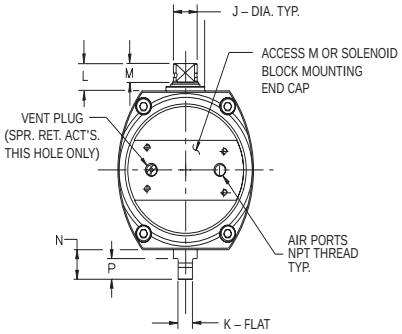
Air Consumption per Stroke (actual) at 80 psi

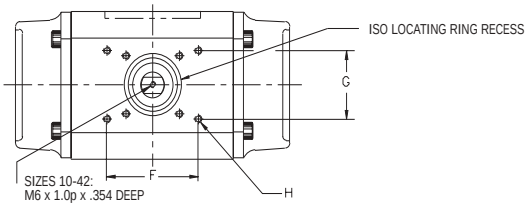
	0539	1039	1539	2039	2539	3039	3339	3539	4039	4239	4539	5039
To Open	0.01 0.3	0.04 1.1	0.08 2.3	0.16 4.5	0.28 7.9	0.43 12.1	.65 18.3	0.9 25.5	1.26 35.6	1.73 49	3.1 87.7	5.5 155
To Close (DA only)	0.01 0.3	0.05 1.4	0.09 2.5	0.17 4.8	0.3 8.5	0.47 13.3	1.1 31.0	1.27 36	1.43 40.5	3.25 92	4.6 130.2	7.0 198

Dimensions Inches (mm)

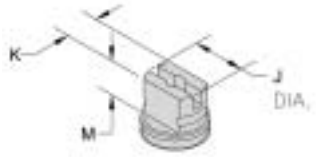




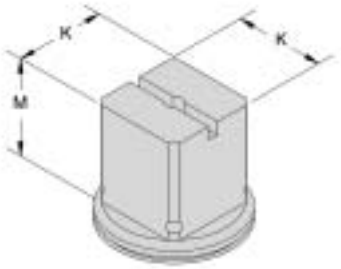




Shaft Dimensions
(Top shaft shown)



Sizes 10-20



Sizes 25-50

* Tapped mounting hole dimensions are those of Flowserve design and are designed for Worcester's valve mounting kits and accessories. Series 39 actuators are also tapped for ISO and Namur mounting. See opposite page.

Series 39 Actuator Dimensions* - Inches (mm)

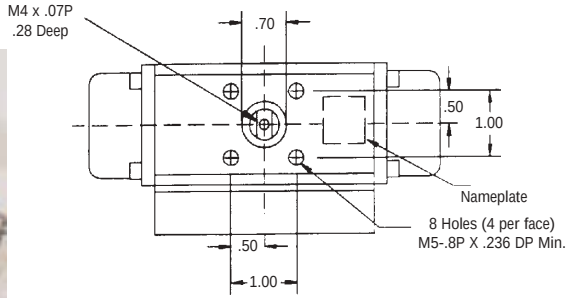
ACTUATOR	A	B	C	D	E	F	G	H	AIR PORTS
1039	6.10 (155)	3.05 (77.5)	3.02 (76.7)	3.37 (85.6)	1.69 (42.9)	2.00 (50.8)	1.38 (35.1)	10-32 UNF-2B .30 DP	1/8" NPT
1539	7.66 (195)	3.83 (97.3)	3.70 (94.0)	4.09 (104)	2.05 (52.1)	2.00 (50.8)	1.38 (35.1)	10-32 UNF-2B .31 DP	1/8" NPT
2039	9.24 (235)	4.62 (117)	4.57 (116)	4.92 (125)	2.46 (62.5)	2.00 (50.8)	1.38 (35.1)	10-32 UNF-2B .32 DP	1/8" NPT
2539	10.62 (270)	5.31 (135)	5.34 (136)	5.78 (147)	2.89 (73.4)	4.22 (107)	1.94 (49.3)	1/4-28 UNF-2B .42 DP	1/4" NPT
3039	12.77 (324)	6.39 (162)	6.10 (155)	6.60 (168)	3.30 (83.8)	6.34 (161)	2.87 (72.9)	1/4-28 UNF-2B .64 DP	1/4" NPT
3339	15.64 (397)	7.82 (199)	8.11 (206)	8.44 (214)	4.22 (107)	6.34 (161)	3.39 (86.1)	1/4-28 UNF-2B .72 DP	1/4" NPT
3539	16.62 (422)	8.31 (211)	8.34 (212)	8.54 (217)	4.27 (109)	8.38 (213)	4.00 (102)	1/4-28 UNF-2B .77 DP	1/4" NPT
4039	20.02 (509)	10.01 (254)	9.64 (245)	10.87 (276)	5.87 (149)	9.59 (244)	4.63 (118)	1/16-20 UNF-2B .91 DP	1/4" NPT
4239	24.24 (616)	12.12 (308)	11.14 (283)	12.44 (170)	6.69 (149)	9.59 (244)	4.63 (118)	1/16-20 UNF-2B .81 DP	1/4" NPT
4539	22.87 (581)	11.43 (290)	13.19 (335)	13.49 (343)	6.74 (171)	13.00 (330)	6.25 (159)	5/8-18 UNF .98 DP	1/4" NPT
5039	24.94 (633)	12.47 (317)	15.39 (391)	15.52 (394)	7.76 (197)	15.50 (394)	7.50 (191)	5/8-18 UNF .98 DP	1/4" NPT

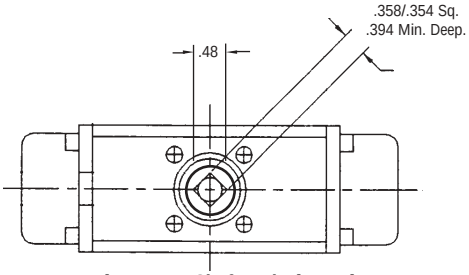
Shaft Dimensions

J	K	L	M	N	P
.59 (15.0)	.358 (9.1)	.79 (20.1)	.63 (16.0)	.72 (18.3)	.59 (15.0)
.63 (16.0)	.498 (12.7)	.79 (20.1)	.53 (13.5)	.87 (22.1)	.65 (16.5)
.80 (20.3)	.498 (12.7)	.79 (20.1)	.53 (13.5)	.85 (21.6)	.65 (16.5)
.99 (25.2)	.748 (19.0)	1.18 (30.0)	.88 (22.4)	1.14 (29.0)	.85 (21.6)
1.13 (28.7)	.875 (22.2)	1.18 (30.0)	.87 (22.1)	1.19 (30.2)	.92 (23.4)
1.44 (36.6)	1.125 (28.6)	1.18 (30.0)	.84 (21.3)	1.60 (40.6)	1.25 (31.8)
1.44 (36.6)	1.125 (28.6)	1.18 (30.0)	.83 (21.1)	1.52 (38.6)	1.21 (30.7)
1.80 (45.7)	1.375 (34.9)	1.97 (50.0)	1.46 (37.1)	1.96 (49.8)	1.93 (49.0)
2.63 (66.8)	2.000 (50.8)	1.97 (50.0)	1.54 (39.1)	1.96 (49.8)	1.93 (49.0)
—	2.000 (50.8)	2.30 (58.4)	1.50 (38.1)	2.30 (58.4)	1.50 (38.1)
—	2.250 (57.2)	2.71 (68.8)	1.75 (44.5)	2.71 (68.8)	1.75 (44.5)

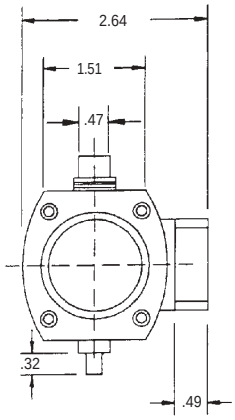
The Series 0539 Pneumatic Actuator

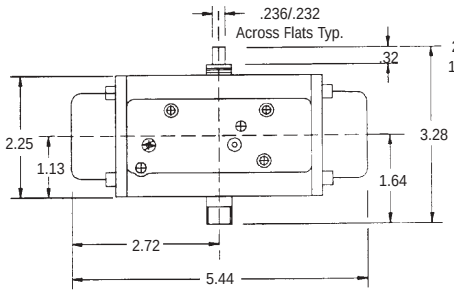
Dimensions (inches)



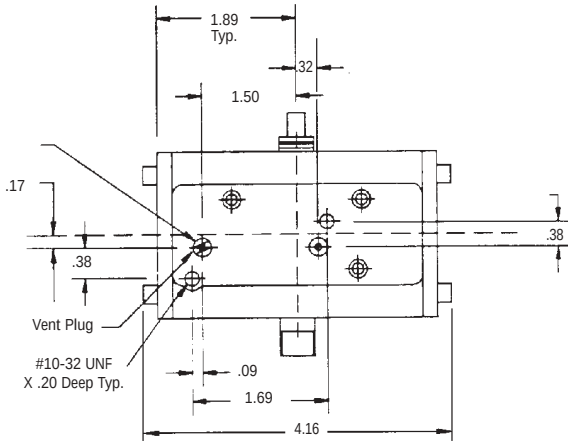


Female Bottom Shaft End Dimensions





NOTE: *Mounting pattern identical top and bottom.*



Double Acting Actuator End Cap Detail

Mounting Configurations

Namur - inches (mm)

Actuator Size	Mounting Pattern	Shaft Height
0539	WCC	WCC
1039	3.15 x 1.18 x M5 (80.0 x 30.0)	.79 (20.0)
1539	3.15 x 1.18 x M5 (80.0 x 30.0)	.79 (20.0)
2039	3.15 x 1.18 x M5 (80.0 x 30.0)	.79 (20.0)
2539	3.15 x 1.18 x M5 (80.0 x 30.0)	1.18 (30.0)
3039	3.15 x 1.18 x M5 (80.0 x 30.0)	1.18 (30.0)
3339	3.15 x 1.18 x M5 (80.0 x 30.0)	1.18 (30.0)
3539	3.15 x 1.18 x M5 (80.0 x 30.0)	1.18 (30.0)
4039	5.12 x 1.18 x M5 (130.0 x 30.0)	1.97 (50.0)
4239	5.12 x 1.18 x M5 (130.0 x 30.0)	1.97 (50.0)
4539	—	—
5039	—	—

*Top-Mount Namur VDI/VDE 3845 Mounting Configuration**

*ISO Mounting Configuration**

**See boxed note on opposite page (8)*

ISO - inches (mm)

Actuator Size	ISO 5211	Mounting Pattern
0539	F03	1.00 sq. (25.4)
1039	F04	1.17 sq. (29.7)
1539	F05	1.39 sq. (35.3)
2039	F07	1.95 sq. (49.5)
2539	F07	1.95 sq. (49.5)
3039	F10	2.84 (72.1)
3339	F12	3.48 (88.4)
3539	F12	3.48 (88.4)
4039	F14	3.90 (99.1)
4239	F16	4.59 (117)
4539	—	—
5039	—	—

ACCESS™ — For Integral Control with Optional Digital Protocol Compatibility

There's never been this much performance in such a small package — until now. ACCESS is an industry innovation which integrates the pneumatic actuator, limit switches, solenoid and diagnostics into a single package!

The ACCESS is available for either conventional wiring applications or for simple communications with the most common digital protocols.

The ACCESS is significantly more compact than conventional actuators with accessories and eliminates unnecessary brackets, couplings and additional enclosures. Advanced digital technology provides instant valve/actuator status. A simple cable connection — for both power supply and communications — reduces engineering time, wiring and installation costs. For further details, refer to Brochure PB 940.

Member of ASI Trade Organization and the Open DeviceNet Vendor Association

Pulsair® Zero Air Bleed Positioner; MAStermind® Switches/Dribble Feed

For pneumatically actuated control valves such as the characterized seat control valve shown here, Flowserve offers the Pulsair loop powered positioner with auto calibration and zero air bleed. Operated by a 4-20 mA analog signal, Pulsair's microprocessor and three-button keypad provide on-site automatic calibration, split-range, speed adjustment, fault-delay, etc. Available with Hart Protocol®. For further details, refer to Brochure PB 90P.

Also available, in a multi-NEMA rated enclosure similar to that of Pulsair, is the MAStermind Modular Accessory System. This is a highly versatile actuator accessory package containing any of the following options: limit switches, solenoids, 4-20 mA position feedback, all in an explosion-proof housing. It also includes an optional dribble feed arrangement for filling, batching and blending processes.

PULSAIR

Member of the HART Communication Foundation

HART®

Accessories & Options

End-Mounted Limit Switches

(CSA and FM Approved)

Where compact installation is required, an end-mounted limit switch module is available. This module comes as a combined Watertight TYPE 4 and Hazardous Location version TYPE 7 (Class I, Division 1, 2, Group C, D; and Class II, Division 1, 2, Group E, F, G) and TYPE 9, and comes with two SPDT or two DPDT mechanical switches. It is also available with SPST AC or DC proximity switches. Refer to Brochure PB EMS.

Top-Mounted Limit Switches

One or two switches can be furnished as required. The switch has a cast aluminum housing, SPDT switch, and a one-way roller lever. General Purpose (TYPE 1), Watertight (TYPE 1, 3, 3 R, and 4), and Hazardous Location (TYPE 7, Class I, Groups C and D; and TYPE 9, Class II, Groups E, F and G) housings are available.

Position Indicator

Polyester Coating

Bidirectional Travel Stops

Declutchable Geared Override

Also Available

- Top-Mounted Stainless Steel Rotary Switches
- Stainless Steel Springs
- Rebreather Gasket

How to Order

10	E	39	S	W	Z	120A	

Actuator Sizes	Special Services	Series	Operating Mode	Solenoid	Limit Switches	Solenoid Voltage	‡Options
05 **10** **15** **20** **25** **30** **33** **35** **40** **42** **45** **50**	**Blank** - None - (Male Shaft End) **F** - Female Shaft End (0539 Only) **9** - Fail Open Mount **H** - High Temperature (N and SN models only) **E** - End-Mounted Limit Switch Module **R** - Rotary Switch† **T** - Travel Stops† (Sizes 10-30 only)	**39**	**Blank** - Double Acting **S** - Spring Return*	**Blank** - General Purpose Solenoid (TYPE 1) **W** - Watertight Solenoid (TYPE 4) **X** - Hazardous Locations Solenoid (TYPE 4, 4x, 7 & 9) **N** - No Solenoid (No Block)	**Top Mounted** **M1** - General Purpose Switch **M2** - Two General Purpose Switches **W1** - Watertight Switch **W2** - Two Watertight Switches **X1** - Hazardous Locations Switch **X2** - Two Hazardous Location Switches **Rotary - (must specify "R" in Special Services Column)†** **M1** - 1 SPDT **M2** - 2 SPDT **D1** - 1 DPDT **D2** - 2 DPDT **End-Mounted - (must specify "E" in Special Service Column)†** **Z** - Watertight/Hazardous Locations, SPDT Switches **ZD** - Watertight/Hazardous Locations, DPDT Switches **Z1** - Watertight/Hazardous Locations, 2 wire AC Proximity Switches **Z3** - Watertight/Hazardous Locations, 3 wire DC Proximity Switches	**12 D** - 12 DC **24 D** - 24 DC **24 A** - 24/60 AC **120 A** - 120/60 AC **240 A** - 240 60 AC	**V-54** - S.S. Springs (Sizes 10-30 only) **V-55** - Rebreather Gasket **V-64** - Namur Solenoid End Cap

Code depicts Series 39 Spring Return Actuator with watertight solenoid and watertight/hazardous locations end mounted limit switches.
† Not available on Series 0539.
Due to continuous development of our product range, we reserve the right to alter the product specifications contained in this brochure as required.

***NOTE:** Specify air supply for spring return actuators. Place appropriate code from below after Solenoid voltage when ordering.

4 - Prepared for 40 psi air supply
5 - " 50 "
6 - " 60 "
7 - " 70 "
Blank " 80 "

To Order ACCESS combined pneumatic actuator, limit switches and solenoid, refer to the ACCESS Brochure.

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can (and often does) provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Operation Maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding any matter with respect to this product. Because Flowserve is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice. Should any question arise concerning these provisions, the purchaser/user should contact Flowserve Corporation at any one of its worldwide operations or offices.

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