



Worcestor Controls Series F39 Pneumatic Actuator

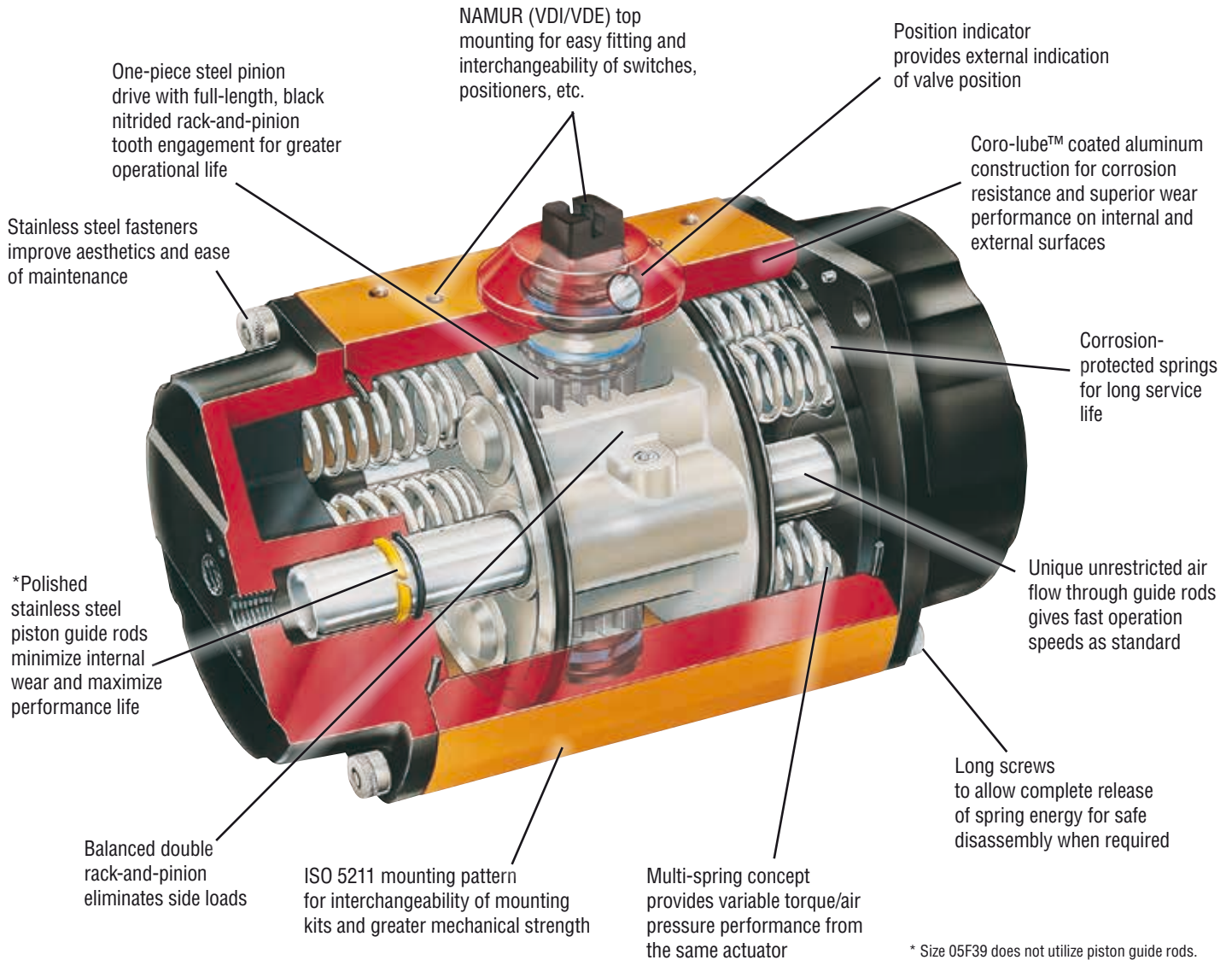
Twin-piston, double rack-and-pinion



Experience In Motion

Series F39 Pneumatic Actuators

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



Features and Benefits

- Available as spring-return or double-acting
- Large range of sizes for efficient torque matching
- Internal parts are factory lubricated for maximum service life
- Safe disassembly, no special tools required
- Can be mounted for fail-open or fail-closed operation
- Limit stop for accurate rotational positioning
- Standard NAMUR ancillary attachment
- International ISO5211 actuator mounting pattern

Operating Principle

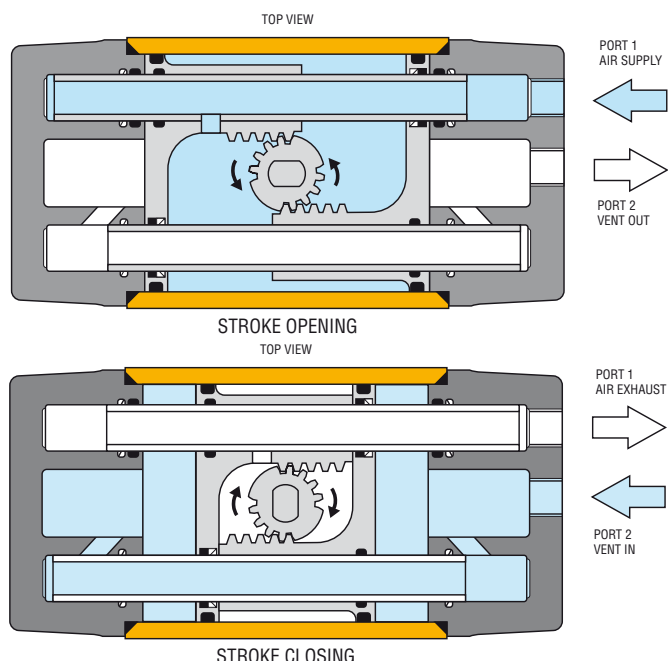


The Series F39 Pneumatic Actuator design is based on the opposed rack-and-pinion principle utilizing piston guide rods to guarantee part alignment. The fully supported guide rods minimize friction and wear between the pistons and the body bore.

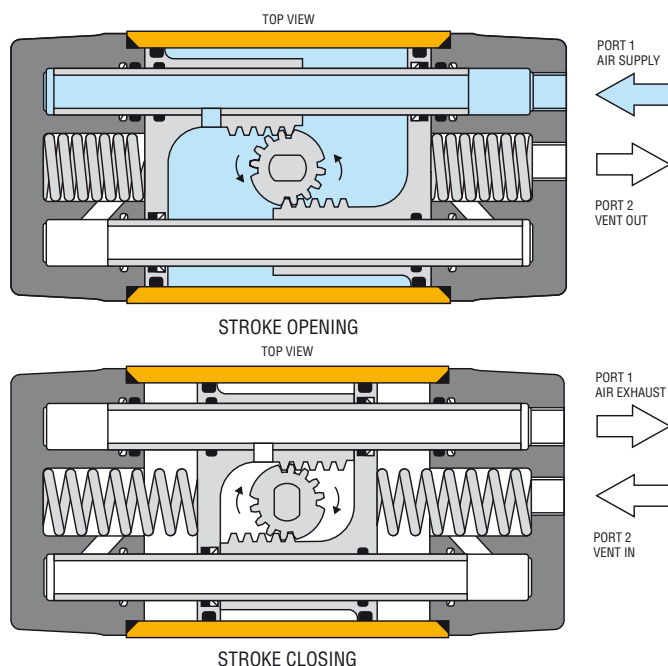
In the double-acting actuator, compressed air is applied to Port 1. The air flows through the rear guide rod and enters the center chamber to push the pistons apart, turning the shaft counterclockwise (as seen from above) to open the valve. During this action, air in the end caps is vented through Port 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 located 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 F39



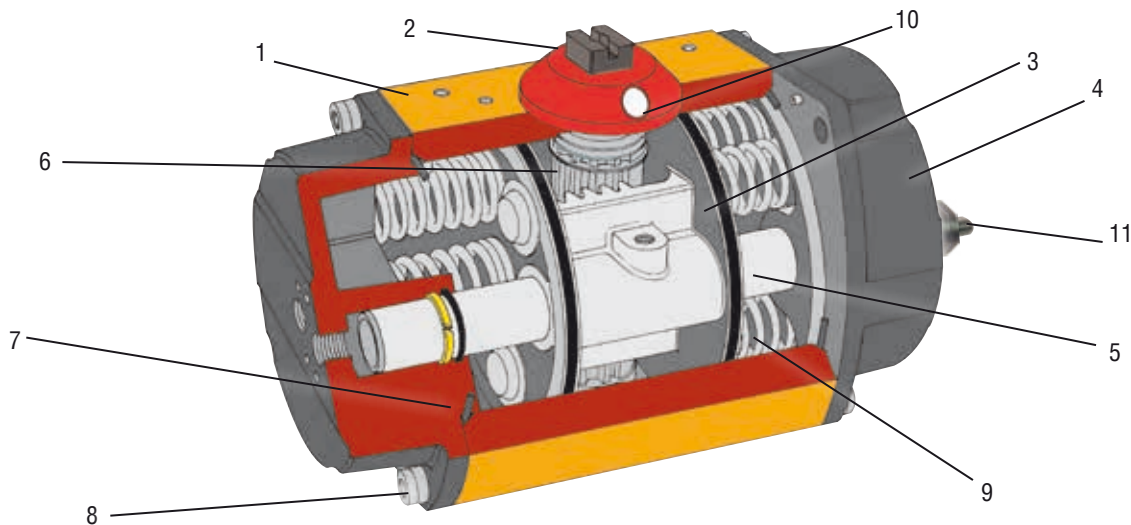
SPRING-RETURN ACTUATOR F39S



Product Specifications

- Pneumatic Actuators are of a dual-piston design for compactness, highest torque output, minimal air consumption and even weight distribution (balanced) on the valve stem.
- Actuators are 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 are not loaded as bearings.
- The torque is generated through a double rack-and-pinion gearing mechanism with full-length, uninterrupted engagement of the rack-and-pinion teeth.
- The rack is machined as part of the piston in order to extend the actuator life and eliminate hysteresis.
- Actuator housings are protected both internally and externally from corrosion using an anodizing process.
- Single-acting actuators use multi-springs at each end to eliminate uneven forces on the pistons and are field adaptable to balance reduced pressure air supplies.
- Actuators are supplied with end mounted limit stops for accurate position control
- Actuators can have optional integral end-mounted limit switches, reducing overall height and allowing the use of the actuator pinion for manual override (cannot be combined with limit stops).
- Actuators can be supplied with integral solenoid valving without the use of transfer tubes. Valving incorporates fail-safe action upon interruption of electrical signal.

Parts List/Material Specifications

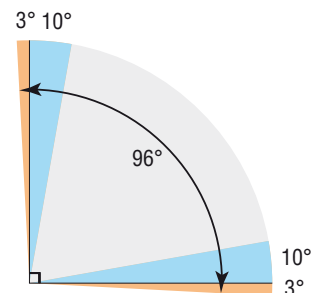


Item No.	Description	Material/Finish
1	Body	Aluminum (Extrusion) Anodized
2	Pinion	Carbon Steel (Corrosion-Resistant Nitride Treatment)
3	Pistons	Aluminum
4	End Caps	Aluminum Anodized
5	Guide Rods	Stainless Steel
6	Bearings	Acetal
7	"O" Rings	Nitrile Rubber
8	End Cap Screws	Stainless Steel
9	Springs	Chrome Silicon (Corrosion-Resistant Coated)
10	Position Indicator	Polyethylene
11	Limit Stops	Stainless Steel

End Mounted Limit Stops



Recognizing the increasing need for accurate rotation adjustment on many applications within the process industry, Worcester Controls has developed a unique method of providing this feature which is now standard on the actuator. The design takes advantage of the moving guide rods within the actuator and uses two stops in the end cap to limit their



travel and therefore adjust the rotation of the actuator in both directions.

The design allows for a nominal rotation of 90° providing 3° of adjustable over travel at each end of the actuator stroke. The limit stop screws can also be used to adjust the under travel of the actuator by 10° at each end of the actuator stroke.

End Mounted Solenoid Block

The solenoid end cap of each actuator is pre-drilled to VDE/VDI NAMUR 3845 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. The advanced design prohibits environmental ingress to spring chamber during piston stroke extending actuator life.

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

An extensive range of Weatherproof and Explosionproof coil options is available, along with a wide voltage selection including low-power and intrinsically safe.

W25NFA 2-position, 3-Way, Single Operator and W25NAA 2-position, 4-way, Single Operator

- NAMUR mounting
- Weatherproof and Hazardous Area
- Speed control – Standard
- Momentary override – Standard
- Interchangeable coils – Standard
- -40F to 180F - Standard
- Rebreather design - Standard

Watertight Class F Coil (Type 4, 4x)

Voltage	Inrush amps	Holding Amps
24/60. 22/50 VAC	0.36	0.24
120/60. 110/50 VAC	0.08	0.05
240/60. 220/50 VAC	0.04	0.03
12 VDC	0.38	0.38
24 VDC	0.20	0.20
120 VDC	0.04	0.04

Hazardous Class H Coil (Type 4, 4x, 7, 9)

Voltage	Inrush amps	Holding Amps
24/60. 22/50 VAC	Consult Factory	
120/60. 110/50 VAC	0.10	0.05
240/60. 220/50 VAC	0.05	0.03
12 VDC	0.38	0.38
24 VDC	0.19	0.19
120 VDC	Consult Factory	

Type 7 (UL & CSA listed for Class I, Division I, groups A, B, C & D) and Type 9 (UL & CSA listed for class II E, F & G) The type 7 solenoid is also rated 4, 4x



W25NFA Three-Way
Spring-Return Solenoid



W25NAA Four-Way
Double-Acting 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.

For fail-closed, spring-return actuators, select the appropriate size actuator whose torque output at the 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 Torque Output Series 05F39 (in-lb/Nm)

Model No.	Stroke	Operating Pressure psi (Bar)							
		50 (3.4) 2 Springs		60 (4.1) 2 Springs		70 (4.8) 2 Springs		80 (5.5) 4 Springs	
05F39	Air	Start	End	Start	End	Start	End	Start	End
		27	16	35	24	49	38	53	37
	Spring	3.1	1.8	4.0	2.7	5.5	4.3	6.0	4.2
		42	32	42	32	42	32	53	41
		4.7	3.6	4.7	3.6	4.7	3.6	6.0	4.6

Spring-Return Actuator Torque Output (in-lb/Nm)

Model No.	Stroke	Operating Pressure psi (Bar)													
		30 (2.0) 4 Springs		40 (2.7) 4 Springs		50 (3.4) 6 Springs		60 (4.1) 8 Springs		70 (4.8) 8 Springs		80 (5.5) 10 Springs		90 (6.2) 10 Springs	
10F39	Air	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
	Spring	57	27	89	60	105	60	118	60	152	91	168	89	201	114
15F39	Air	6.4	3.0	10.0	6.8	11.9	6.8	13.3	6.8	17.2	10.3	19.0	10.0	22.7	12.9
	Spring	70	42	70	42	105	63	140	84	140	84	175	104	175	104
20F39	Air	7.9	4.7	7.9	4.7	11.9	7.1	15.8	9.5	15.8	9.5	19.8	11.8	19.8	11.8
	Spring	115	70	181	133	193	140	239	145	284	193	335	219	399	282
25F39	Air	13.0	7.9	20.5	15.0	21.8	15.8	27.0	16.4	32.1	21.8	37.8	24.8	45.1	31.9
	Spring	115	74	115	74	173	112	231	149	231	149	289	186	289	186
30F39	Air	13.0	8.4	13.0	8.4	19.5	12.6	26.1	16.8	26.1	16.8	32.6	21.0	32.6	21.0
	Spring	210	128	332	243	389	257	443	274	558	389	612	404	735	513
35F39	Air	23.7	14.5	37.5	27.5	44.0	29.0	50.0	31.0	63.0	44.0	69.2	45.6	83.0	58.0
	Spring	210	135	210	135	315	212	419	272	419	272	525	339	525	339
40F39	Air	23.7	15.3	23.7	15.3	35.6	23.9	47.4	30.7	47.4	30.7	59.3	38.3	59.3	38.3
	Spring	345	188	549	381	637	398	730	398	925	549	1009	611	1212	797
45F39	Air	39.0	21.2	62.0	43.0	72.0	45.0	82.5	45.0	104.5	62.0	114.0	69.0	137.0	90.0
	Spring	379	232	379	232	568	348	758	465	758	465	947	581	947	581
50F39	Air	42.8	26.2	42.8	26.2	64.2	39.3	85.6	52.5	85.6	52.5	107.0	65.6	107.0	65.6
	Spring	577	320	912	628	1044	646	1204	690	1531	991	1682	1027	2009	1345
55F39	Air	65.2	36.2	103.0	71.0	118.0	73.0	136.0	78.0	173.0	112.0	190.0	116.0	227.0	152.0
	Spring	609	372	609	372	912	558	1221	744	1221	744	1522	929	1522	929
60F39	Air	68.8	42.0	68.8	42.0	103.0	63.1	138.0	84.1	138.0	84.1	172.0	105.0	172.0	105.0
	Spring	1053	564	1682	1177	1947	1221	2213	1221	2832	1859	3098	1850	3735	2460
65F39	Air	119	64	190	133	220	138	250	138	320	210	350	209	422	278
	Spring	1257	804	1257	804	1885	1204	2513	1611	2513	1611	3151	2009	3151	2009
70F39	Air	142	91	142	91	213	136	284	182	284	182	356	227	356	227
	Spring	1345	780	2133	1522	2478	1593	2814	1682	3717	2434	3938	2487	4752	3230
75F39	Air	152	88	241	172	280	180	318	190	420	275	445	281	537	365
	Spring	1451	929	1451	929	2177	1398	2903	1859	2903	1859	3629	2328	3629	2328
80F39	Air	164	105	164	105	246	158	328	210	328	210	410	263	410	263
	Spring	2142	1080	3407	2301	3983	2354	4469	2390	5620	3452	6257	3567	7523	4779
85F39	Air	242	122	385	260	450	266	505	270	635	390	707	403	850	540
	Spring	2487	1496	2487	1496	3726	2239	4974	2982	4974	29798	6213	3735	6213	3735
90F39	Air	281	169	281	169	421	253	562	337	562	337	702	422	702	422
	Spring	3717	1797	5974	3983	6859	3938	7744	3894	9912	6018	10859	6000	13054	8142
95F39	Air	420	203	675	450	775	445	875	440	1120	680	1227	678	1475	920
	Spring	4390	2593	4390	2593	6584	3885	8779	5177	8779	5177	10974	6469	10974	6469
100F39	Air	496	293	496	293	744	439	992	585	992	585	1240	731	1240	731
	Spring	6275	3142	7965	3452	9735	3717	11505	3894	14868	6992	16470	7204	19736	10399
105F39	Air	709	355	900	390	1100	420	1300	440	1680	790	1861	814	2230	1175
	Spring	6107	3159	9160	4735	12213	6319	15266	7894	15266	7894	18320	9478	18320	9478
110F39	Air	690	357	1035	535	1380	714	1725	892	1725	892	2070	1071	2070	1071
	Spring	9717	4876	12169	5310	15045	5664	17700	5753	20355	10399	24877	10585	30533	15488
115F39	Air	1098	551	1375	600	1700	640	2000	650	2300	1175	2811	1196	3450	1750
	Spring	9647	4885	14470	7319	19293	9762	24116	12204	24116	12204	28940	14638	28940	14638
120F39	Air	1090	552	1635	827	2180	1103	2725	1379	2725	1379	3270	1654	3270	1654
	Spring														

Double-Acting Actuator Torque Output (in-lb/Nm)

Model No.	Operating Pressure psi (Bar)									
	30 (2.0)	40 (2.7)	50 (3.4)	60 (4.1)	70 (4.8)	80 (5.5)	90 (6.2)	100 (6.9)	110 (7.6)	120 (8.3)
05F39	34	49	60	73	87	97	106	126	137	148
	3.8	5.5	6.8	8.3	9.8	11.0	12.0	14.2	15.5	16.7
10F39	89	130	173	202	239	274	310	350	385	425
	10.0	14.7	19.5	22.8	27.0	31.0	35.0	39.6	43.5	48.0
15F39	177	248	319	389	460	531	602	673	743	814
	20.0	28.0	36.0	44.0	52.0	60.0	68.0	76.0	84.0	92.0
20F39	327	451	584	708	841	965	1097	1221	1354	1478
	37.0	51.0	66.0	80.0	95.0	109	124	138	153	167
25F39	540	752	965	1177	1389	1620	1841	2062	2283	2505
	61.0	85.0	109	133	157	183	208	233	258	283
30F39	885	1239	1593	1947	2301	2655	3009	3363	3717	4071
	100	140	180	220	260	300	340	380	420	460
33F39	1735	2390	3053	3717	4514	5195	5885	6638	7346	8054
	196	270	345	420	510	587	665	750	830	910
35F39	2124	2974	3806	4691	5531	6372	7213	8098	8983	9824
	240	336	430	530	625	720	815	915	1015	1110
40F39	3390	4717	6062	7390	8717	10169	11505	12921	14337	15753
	383	533	685	835	985	1149	1300	1460	1620	1780
42F39	5885	8319	10620	12833	15222	17638	20134	22568	25001	27435
	665	940	1200	1450	1720	1993	2275	2550	2825	3100
45F39	8806	12213	15753	19293	22833	26408	29913	33630	37170	40710
	995	1380	1780	2180	2580	2984	3380	3800	4200	4600
50F39	13620	19028	24338	29913	35400	40860	46374	51861	57348	62835
	1539	2150	2750	3380	4000	4617	5240	5860	6480	7100

Engineering Data

Stroke Time (seconds)*

Actuator Free Internal Volume

Tubing Requirements

Weights lb. (kg)

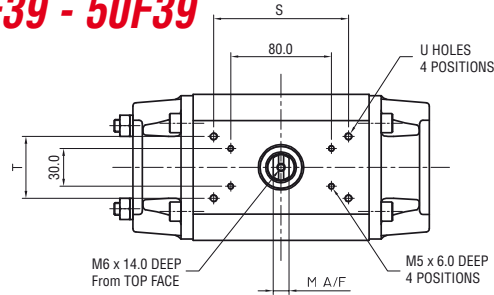
Model No.	Double Acting	Spring Return	With Max.* Speed Control	Open		Close DA Only		Under 4 ft. Run	Over 4 ft. Run	Double Acting	Spring Return
				Cubic Inches (in³)	Litres	Cubic Inches (in³)	Litres				
05F39	Less than 1	Less than 1	10	3	0.05	3	0.05	1/8"	1/4"	1.6 (0.7)	1.8 (0.8)
10F39	Less than 1	Less than 1	10	10	0.17	13	0.22	1/8"	1/4"	3 (1.3)	3.5(1.6)
15F39	Less than 1	1	15	21	0.35	24	0.39	1/8"	1/4"	6 (2.7)	7 (3.1)
20F39	1	1-2	15	42	0.69	45	0.74	1/8"	1/4"	10 (4.5)	12 (5.5)
25F39	2-3	2-3	18	74	1.22	80	1.31	1/8"	1/4"	16 (7.4)	18.5 (8.4)
30F39	3-4	3-4	20	114	1.86	125	2.05	1/4"	1/2"	24 (11)	27 (12)
33F39	4-5	7-8	25	207	3.39	292	4.79	1/4"	1/2"	50 (22.5)	57 (26)
35F39	4-5	8-9	25	240	3.93	338	5.54	1/4"	1/2"	57 (26)	66 (30)
40F39	5-6	9-10	30	411	6.73	500	8.19	1/4"	1/2"	96 (43.6)	107 (48.6)
42F39	10-11	11-12	36	732	12.00	848	13.89	1/4"	1/2"	158 (71.8)	177 (80.6)
45F39	10-12	11-13	40	824	13.51	1220	20.00	1/4"	1/2"	213 (97)	253 (115)
50F39	12-14	13-15	60	1457	23.87	1861	30.50	1/4"	1/2"	304 (138)	354 (161)

* NOTE: These figures are meant as an indication of obtainable speeds only. For more precise figures for any particular application, contact your Flowserve rep. Faster speeds are obtainable, if required, by using additional control equipment. Speed control with spring-return actuators only available on exhaust air (spring stroke).

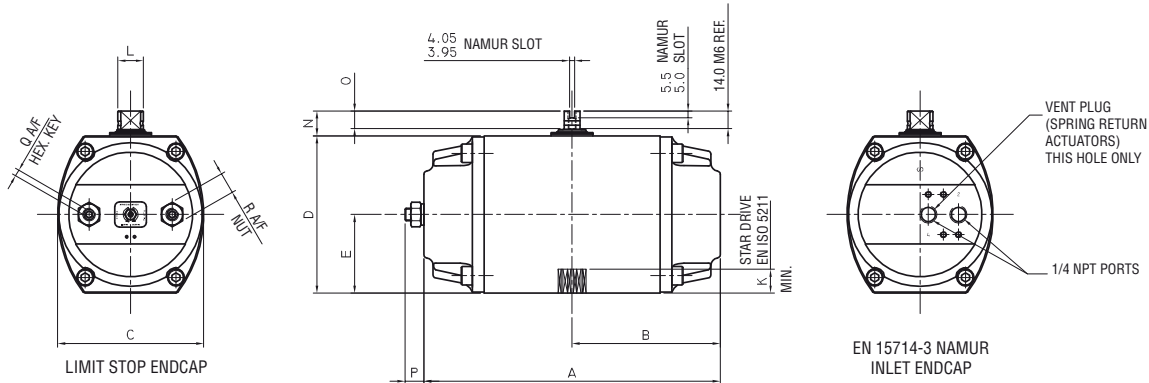
Operating Conditions

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	Standard temperature option: Actuator only 0° to 212°F (-18° to 100°C) Actuator with Watertight Type 4, 4x or Hazardous Locations Type 4, 4x, 7 & 9 solenoid to 180°F (82°C) continuous 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 counterclockwise direction when the outer air connection is pressurized.
Movement	90° with 3° over travel and 10° under travel controllable
Supply Air	The Series F39 Actuator is factory lubricated. For optimum performance, standard filtered and lubricated air is recommended.

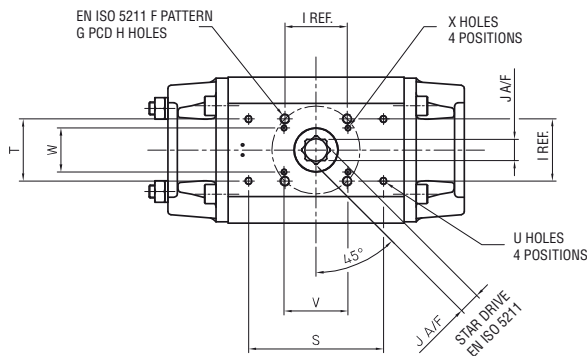
Dimensions Sizes 10F39 - 50F39 Inches (mm)



EN 15714-3 NAMUR TOP ACCESSORY MOUNTING



EN 15714-3 NAMUR INLET ENDCAP



ACTUATOR MOUNTING ATTACHMENT EN ISO 5211

Model	Legacy Mount Dimensions		
	V	W	X
10F39	2.00	1.37	10-32 UNF x
	50.8	34.9	0.3 (7.7) DP
15F39	2.00	1.37	10-32 UNF x
	50.8	34.9	0.31 (8.0) DP
20F39	2.00	1.37	10-32 UNF x
	50.8	34.9	0.31 (8.0) DP

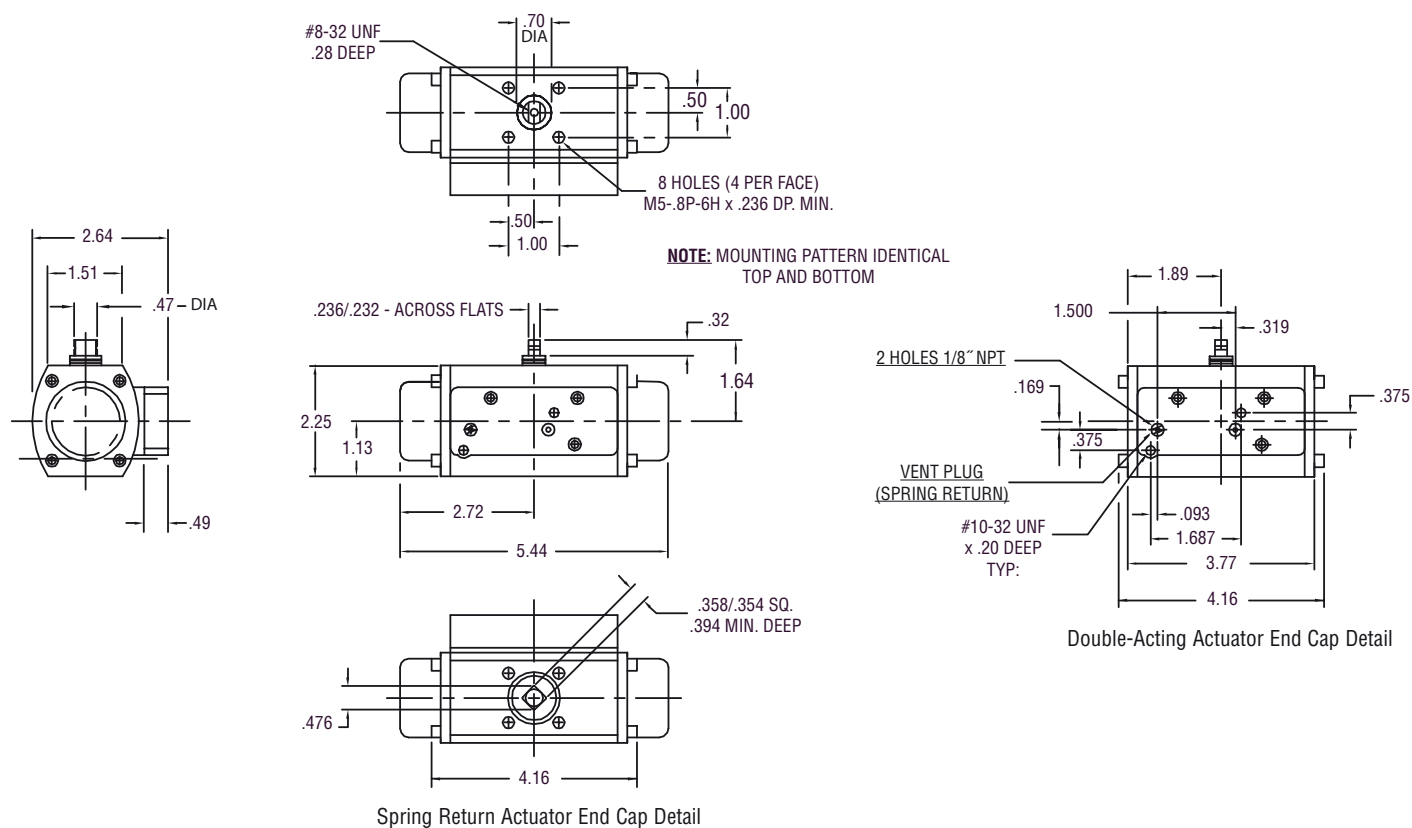
Model	Basic Dimensions					Bottom ISO Mounting Dimensions							Top Pinion Dimensions					Limit Stop Dimensions			Ancillary Hole Dimensions (Note 2)			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U			
10F39	6.11	3.06	3.02	3.37	1.69	F04	1.65	M5 x 0.25 6.25 DP	1.17	0.43	0.47	0.59	0.35	0.79	0.63	0.39	0.16	0.51	2.87	1.25	M5 x 0.25 6.3 DP			
	155.3	77.7	76.8	85.5	42.8				42.0		29.7	11.0	12.0	15.0	9.0	20.0	16.0	10.0	4.0	13.0		73.0	31.8	
15F39	7.69	3.84	3.70	4.09	2.05	F05	1.97	M6 x 0.30 7.5 DP	1.39	0.55	0.63	0.63	0.50	0.79	0.55	0.43	0.16	0.51	2.87	1.25	M5 x 0.24 6.0 DP			
	195.3	97.7	94.0	104.0	52.0				50.0		35.4	14.0	16.0	16.0	12.6	20.0	13.9	11.0	4.0	13.0		73.0	31.8	
20F39	9.27	4.63	4.57	4.92	2.46	F07	2.76	M8 x 0.40 10.0 DP	1.95	0.67	0.75	0.80	0.50	0.79	0.54	0.59	0.20	0.67	4.22	1.94	M6 x 0.27 7.0 DP			
	235.4	117.7	116.0	125.0	62.5				70.0		49.5	17.0	19.0	20.3	12.6	20.0	13.8	15.0	5.0	17.0		107.2	49.2	
25F39	10.67	5.33	5.33	5.77	2.89	F07	2.76	M8 x 0.40 10.0 DP	1.95	0.67	0.75	0.75	0.75	1.18	0.87	0.83	0.24	0.75	4.22	1.94	M6 x 0.4 10.0 DP			
	271.0	135.5	135.5	146.6	73.5				70.0		49.5	17.0	19.0	19.0	19.0	30.0	22.2	21.0	6.0	19.0		107.2	49.2	
30F39	12.80	6.40	6.10	6.59	3.30	F10	4.02	M10 x 0.50 12.5 DP	2.84	0.87	0.94	0.87	0.87	1.18	0.86	0.91	0.24	0.75	6.34	2.87	M6 x 0.4 10.0 DP			
	325.1	162.6	155.0	167.5	83.8				102.0		72.1	22.0	24.0	22.1	22.1	30.0	21.9	23.0	6.0	19.0		161.1	73.0	
33F39	15.70	7.85	8.11	8.43	4.21	F12	4.92	M12 x 0.70 18.0 DP	3.48	1.06	1.14	1.12	1.12	1.18	0.83	0.91	0.31	0.94	6.34	3.39	M8 x 0.5 13.0 DP			
	398.7	199.4	206.0	214.0	107.0				125.0		88.4	27.0	29.0	28.5	28.5	30.0	21.2	23.0	8.0	24.0		161.1	86.0	
35F39	16.69	8.34	8.39	8.54	4.27	F12	4.92	M12 x 0.63 16.0 DP	3.48	1.06	1.14	1.12	1.12	1.18	0.82	1.18	0.31	0.94	8.37	4.00	M8 x 0.6 14.0 DP			
	423.9	212.0	213.0	217.0	108.5				125.0		88.4	27.0	29.0	28.5	28.5	30.0	20.9	30.0	8.0	24.0		212.7	101.6	
40F39	20.15	10.07	9.64	10.87	5.87	F14	5.51	M16 x 0.95 24.0 DP	3.90	1.42	1.57	1.37	1.37	1.97	1.46	1.06	0.39	1.18	9.59	4.63	M10 x 0.6 15.0 DP			
	511.8	255.9	244.9	276.0	149.0				140.0		99.0	36.0	40.0	34.9	34.9	50.0	37.0	27.0	10.0	30.0		243.6	117.5	
42F39	24.40	12.20	11.14	12.44	6.69	F16	6.50	M20 x 1.20 30.0 DP	4.59	1.81	1.97	2.00	2.00	1.97	1.36	1.18	0.39	1.18	5.25	4.00	M8 x 0.5 13.0 DP			
	619.7	309.9	283.0	316.0	170.0				165.0		116.7	46.0	50.0	50.8	50.8	50.0	34.5	30.0	10.0	30.0		133.4	101.6	
45F39	22.67	11.34	13.19	14.70	7.99	F16	6.50	M20 x 1.20 30.0 DP	4.59	1.81	1.89	2.00	2.00	1.97	1.36	1.10	0.39	1.18	13.00	6.25	M16 x 0.95 24.0 DP			
	575.9	288.0	334.9	373.5	203.0				165.0		116.7	46.0	48.0	50.8	50.8	50.0	34.5	28.0	10.0	30.0		330.2	158.7	
50F39	24.65	12.32	15.26	16.70	8.95	F25	10.00	M16 x 0.95 24.0 DP	2.17	2.24		2.24	2.24	1.97	1.29	1.38	0.39	1.18	9.59	4.63	M10 x 0.6 15.0 DP			
	626.0	313.0	387.5	424.2	227.4				254.0		55.0	57.0		57.0	57.0	50.0	32.8	35.0	10.0	30.0		243.7	117.5	

1. The model 50F39 uses 8 mounting holes on a 10.0 inch (254mm) PCD distributed evenly about the center lines of the actuator.

2. On models 42F39, 45F39 and 50F39 ancillary mounting holes are only on the top of the actuator, on 40F39, only on the base. These sizes also have a location spigot on the base of the actuator in accordance with ISO 5211

Dimensions Size 05F39

Inches



How to Order

10	E	F39	S	W	Z	120A	-----	----
Actuator Sizes	Special Services	Series	Operating Mode	Solenoid	End Mount Limit Switches	Solenoid Voltage	Spring Return Supply Pressure	Options †
05	Blank - None	F39	Blank - Double Acting	W - Watertight Solenoid (Type 4, 4x)	(must specify "E" in Special Service Column)†	12D - 12 DC	Blank - 80 psig	V54 - SST Springs (Sizes 10-30 only)
10	9 - Fail-Open Mount		S - Spring Return	X - Hazardous Locations Solenoid (Type 4, 4x, 7 & 9)	Z - Watertight/Hazardous Locations, SPDT Switches	24D - 24 DC	7 - 70 psig	V90 - Reverse Rotation (FCCW)
15	H - High Temperature** (N & SN Models Only)			N - No Solenoid	ZD - Watertight/Hazardous Locations, DPDT Switches	24A - 24/60 AC	6 - 60 psig	V95 - NorGuard Severe Service Actuator***
20	E - End mounted Limit Switch Module*				Z1 - Watertight/Hazardous Locations, 2-Wire AC/DC Proximity Sensors	120A - 120/60 AC	5 - 50 psig	V96 - CE Marking***
25						240A - 240/60 AC	4 - 40 psig	
30								
33								
35								
40								
42								
45								
50								

† Not available on Series 05F39.

* NOTE: Not available with end mounted travel stops. Top-mounted travel stops available on 10-30 Sizes only - consult factory.

End-mounted travel stops standard on all size 10-42 actuators, excluding end mount switches.

** NOTE: Consult Factory for high and low temperature solenoid variations.

*** NOTE: Applies to actuator only.

Positioners and limit switches

Pulsair® Zero Air Bleed Positioner

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®, FOUNDATION Fieldbus and Profibus.



Position Indication Switches

The UltraSwitch series of position indicators provides a compact and economical package for both visual and remote electrical indication of valve position. Hazardous location approvals and corrosion resistant materials make the Worcester Controls rotary position indicators ideal for even the most hostile environments.



End-mounted Limit Switches (CSA and FM approved)

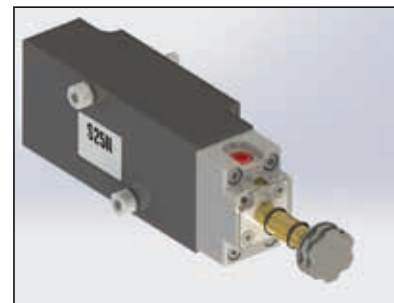
Where compact installation is required, an end-mounted limit switch module is available. This module comes as a combined Watertight TYPE 4 and Hazardous Location (Class I, Division 1,2, Group C, D; and Class II, Division 1, 2, Group E, F, G) and comes with two SPDT or two DPDT mechanical switches. It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

Solenoid Accessories

S25N NAMUR / In-Line solenoid

- Standard NAMUR or In-Line options
- 3-way or 4-way convertible
- Interchangeable coils

NAMUR accessories include speed control, actuator ingress protection and lockout and vent module



Accessories and Options

NorGuard surface treatment can be supplied for severe service protection.

NorGuard coating complies with:

- MIL-A-63576A-Type 1-Aluminium Oxide Coating - Lubrication
- MIL-A-8625 (Anodic Coatings)
- ASTM B 117 (Salt Spray Testing)



Also Available:

- Top-Mounted, Stainless Steel Rotary Switches
- Stainless Steel Springs
- Fast Acting



Declutchable Gear Override

ACCESS™

Limit switches, solenoid and diagnostics integrated with the actuator

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.



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