

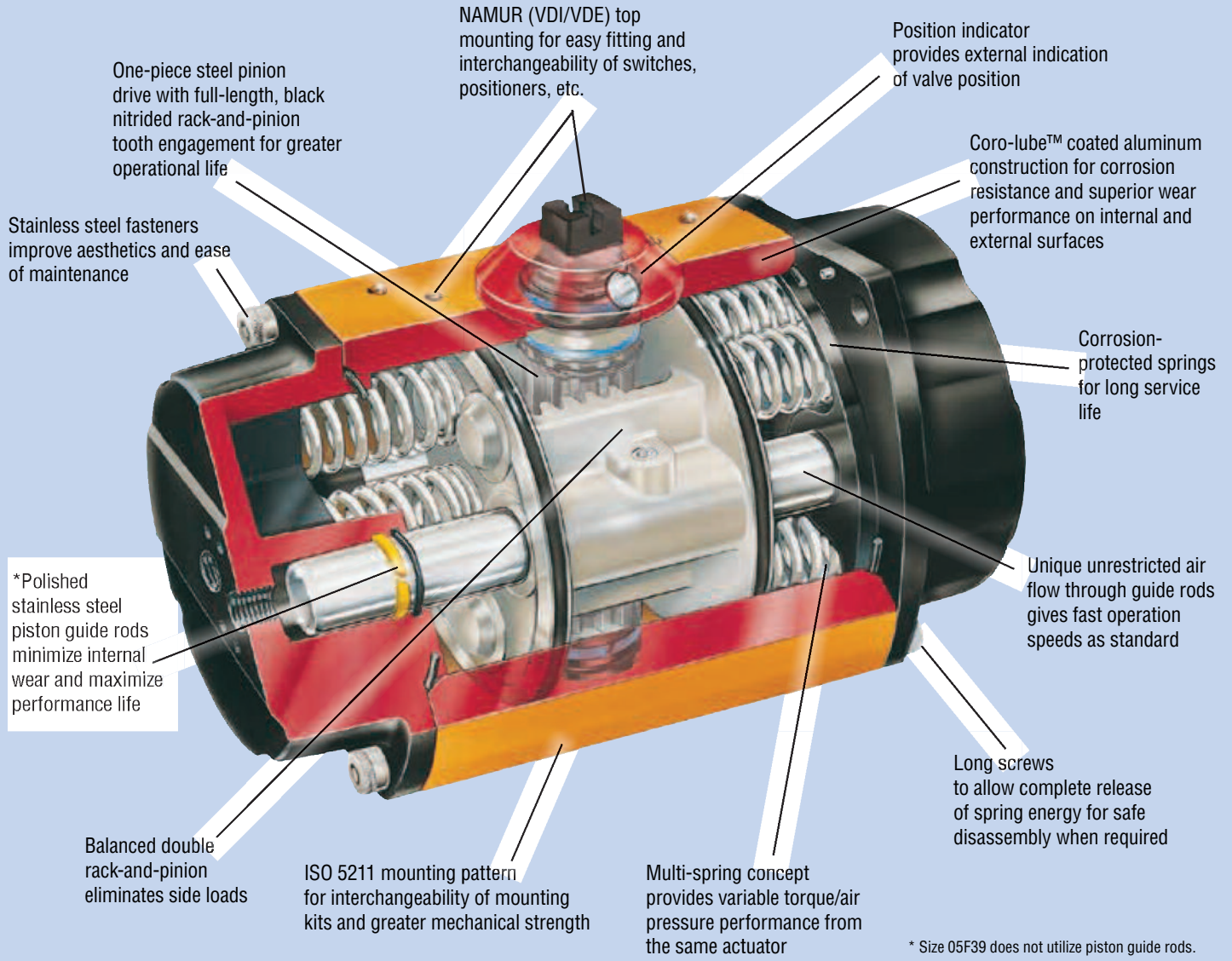


**Worcester Controls
Series F39
Pneumatic Actuator
Twin-piston, double rack-and-pinion**

Series F39 Pneumatic Actuators



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



* Size 05F39 does not utilize piston guide rods.

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

Series F39 Pneumatic Actuators



Operating Principle

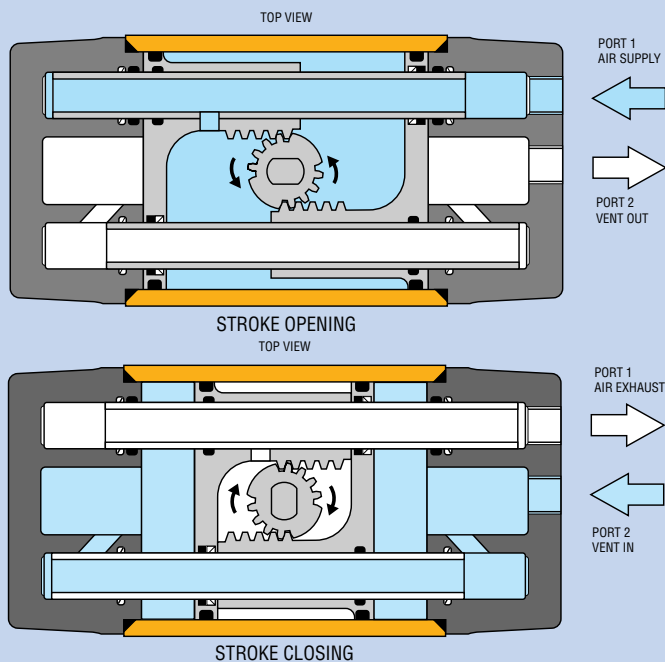


The Series F39 Pneumatic Actuator design is based on the opposed rack-and-pinion principle utilizing piston guide rods to guarantee part alignment. The fully supported guide rods minimize friction and wear between the pistons and the body bore.

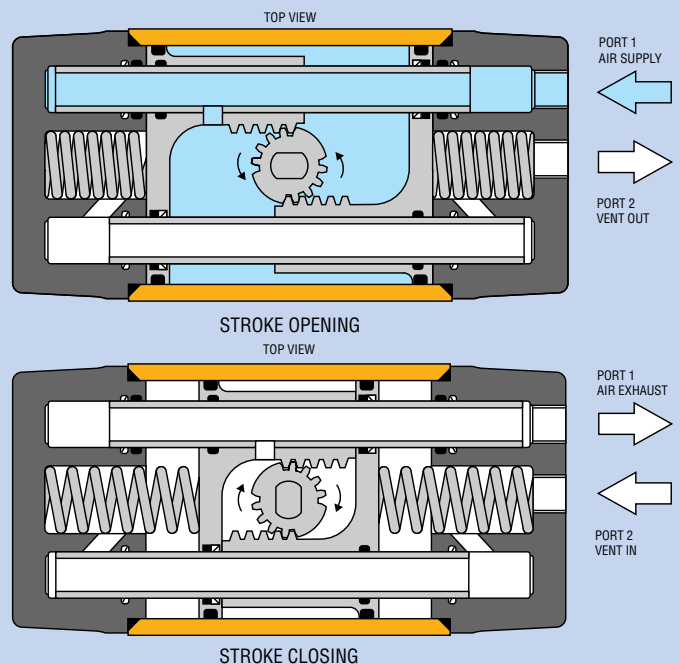
In the double-acting actuator, compressed air is applied to Port 1. The air flows through the rear guide rod and enters the center chamber to push the pistons apart, turning the shaft counterclockwise (as seen from above) to open the valve. During this action, air in the end caps is vented through Port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



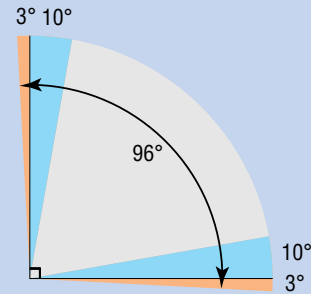
Series F39 Pneumatic Actuators



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

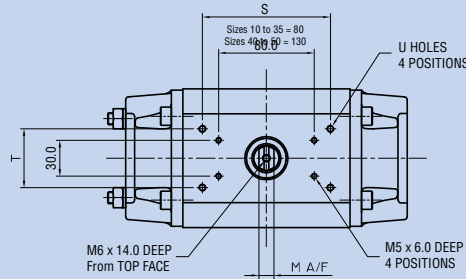


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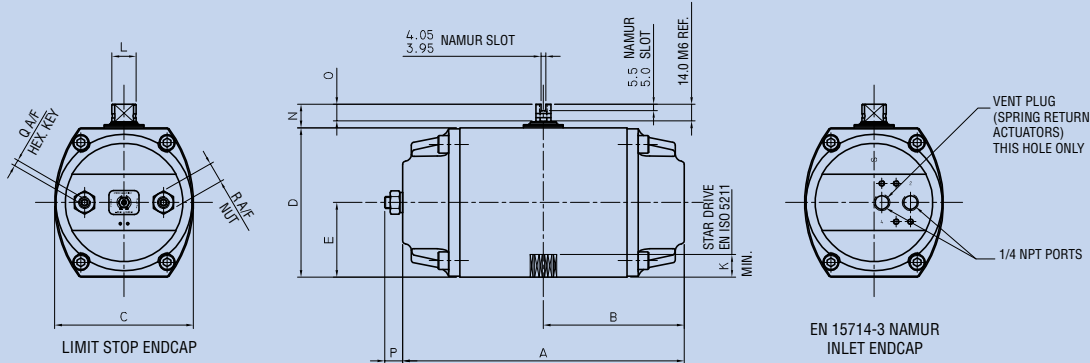
Series F39 Pneumatic Actuators

Dimensions Sizes 10F39 - 50F39

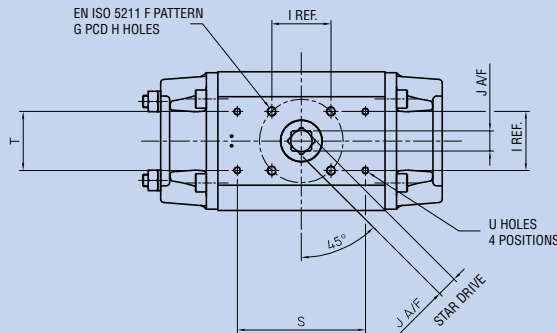
Inches (mm)



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	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	57.0	50.0	32.8	35.0	10.0	30.0	243.7	117.5	

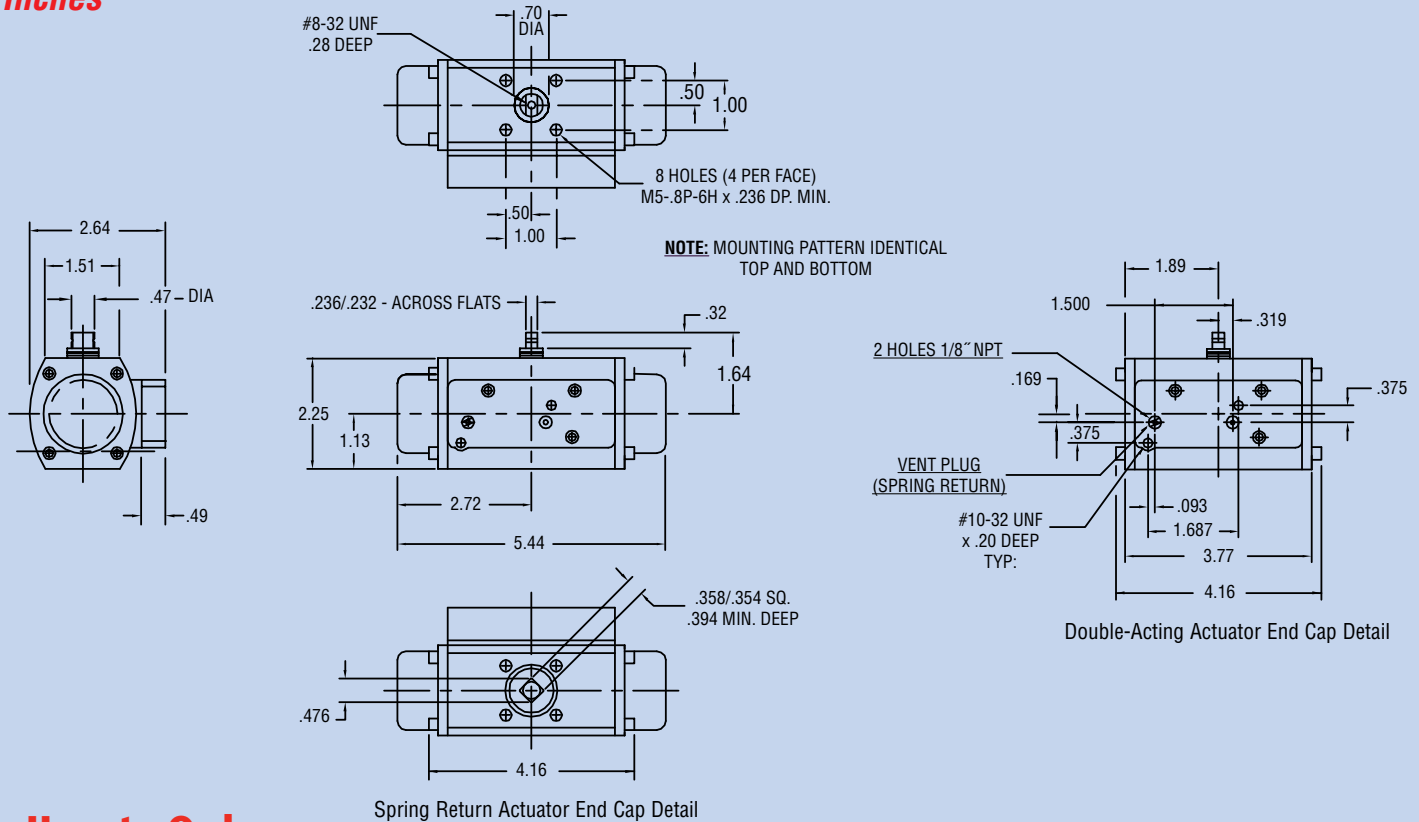
1. The model 50F39 uses 8 mounting holes on a 10.0 inch (254mm) PCD distributed evenly about the center lines of the actuator.
 2. On models 42F39, 45F39 and 50F39 ancillary mounting holes are only on the top of the actuator, on 40F39, only on the base.
 These sizes also have a location spigot on the base of the actuator in accordance with ISO 5211

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 For further information on Proposition 65, please go to www.oehha.ca.gov/proposition-65

Series F39 Pneumatic Actuators

Dimensions Size 05F39

Inches



How to Order

SERIES		ACTUATOR SIZES	SOLENOID	SPECIAL SERVICES	END MOUNT LIMIT SWITCHES	SOLENOID VOLTAGE	SPRING RETURN SUPPLY PRESSURE	OPTIONS
WCA-F39	Double Acting	- 05 33	W- Watertight Solenoid (type 4, 4x)	(blank)- None	Must specify "E" in under Special Services†	12D- 12 DC	8- 80 psig	V54- SST Springs (sizes 10-30 only)
WCA-F39S	Spring Return	10 35 15 40 20 42 25 45 30 50	X- Hazardous Location Solenoid (type 4, 4x, 7 & 9)	9- Fail Open Mount H- High Temperature** (N & SN models only) E- End Mounted Limited Switch Module* L- Low Temperature** (N, SN, W models only)	Z- Watertight/Hazardous Locations, SPDT Switches ZD- Watertight/Hazardous Locations, DPDT Switches Z1- Watertight/Hazardous Locations, 2-Wire AC/DC Proximity Sensors	24D- 24 DC 24A- 24/60 AC 120A- 120/60 AC 240A- 240/60 AC	7- 70 psig 6- 60 psig 5- 50 psig 4- 40 psig	V90- Reverse Rotation (FCCW) V95- NorGuard Servere Service Actuator*** V96- CE Marking***
			N- No Solenoid		n/a without Solenoid	n/a without Solenoid	WCA-F39S series only	

† 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.

Worcester Spring Return Pneumatic Actuators

Part #	Description
WC-F39S-10N-8	Worcester Spring Return Pneumatic Actuator, Size 10
WC-F39S-15N-8	Worcester Spring Return Pneumatic Actuator, Size 15
WC-F39S-20N-8	Worcester Spring Return Pneumatic Actuator, Size 20
WC-F39S-25N-8	Worcester Spring Return Pneumatic Actuator, Size 25

Stock actuators are based on 80 PSI Air Supply (Other pressures available)

MOST COMMON



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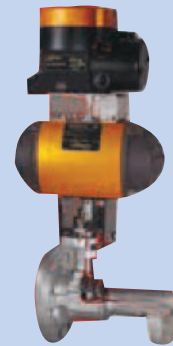
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Series F39 Pneumatic Actuators

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

