



# KEYSTONE

VALVES & CONTROLS

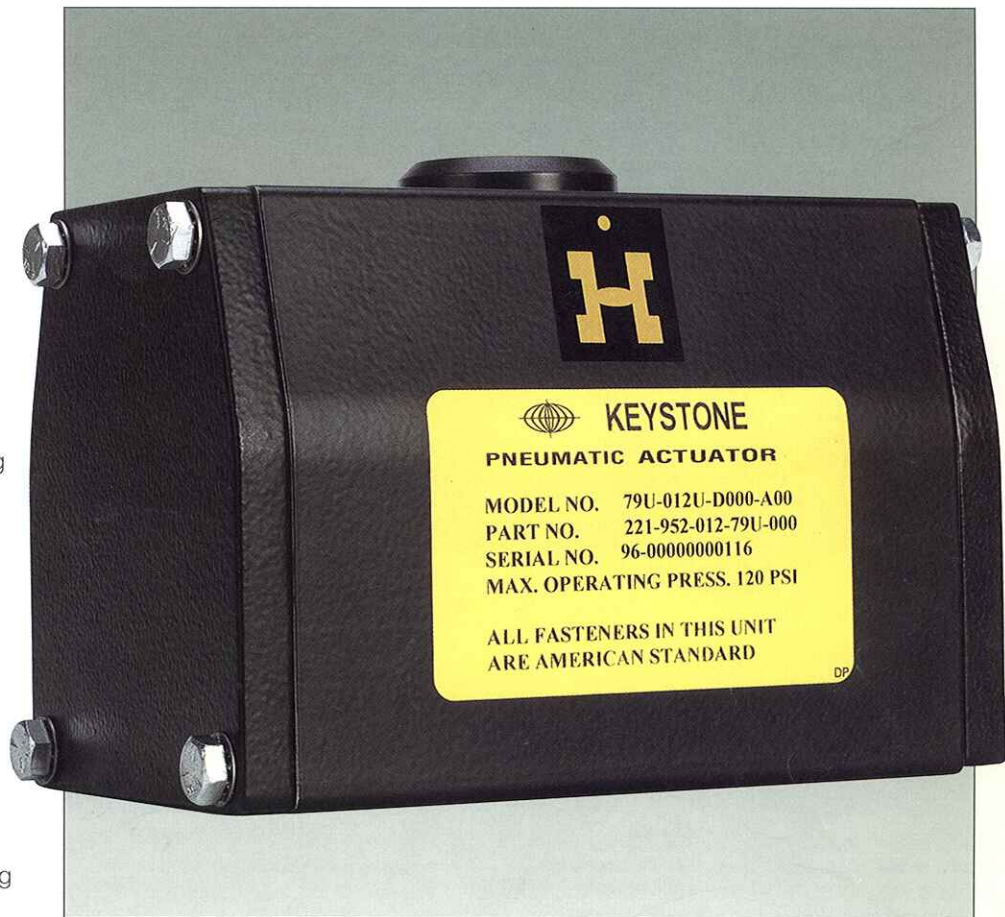
A Keystone Company

## Features and Benefits

- Compact rack and pinion design utilizes the whole piston area to develop output torque.
- Pistons with integral rack drive reduce the number of dynamic seals, minimizing air leakage.
- Double pistons nullify sideloads on the pinion shaft, minimizing bearing wear and extending life.
- Internal air porting eliminates external tubing.
- Hard anodized aluminum body with external electrostatic powder coating (ESPC) finish protects against corrosive environments.
- Female output drive enables direct mounting of most Keystone valves, eliminating special adaptation connections and assuring correct alignment.
- Bottom entry pinion shaft simplifies assembly and provides anti-blowout feature.
- Anti-friction piston pads ensure no metal-to-metal contact, providing smooth operation. Ideal for modulating or on/off control applications.
- Adjustable travel stops standard in both directions on models 065 and 090.



## Double Acting Pneumatic Quarter-turn Actuators (Keystone Standard or ISO 5211) For Output Torques to 13,444 lb.in.



- An extensive range of standard accessories are available for direct mounting.
  - Solenoid valves
  - Limit switchboxes
  - Positioners
  - Declutchable manual override gearbox
  - High visibility indicator

## General Application

For remote control of any quarter-turn application; for example, ball, butterfly or rotary plug valves, dampers, etc.

## Technical Data

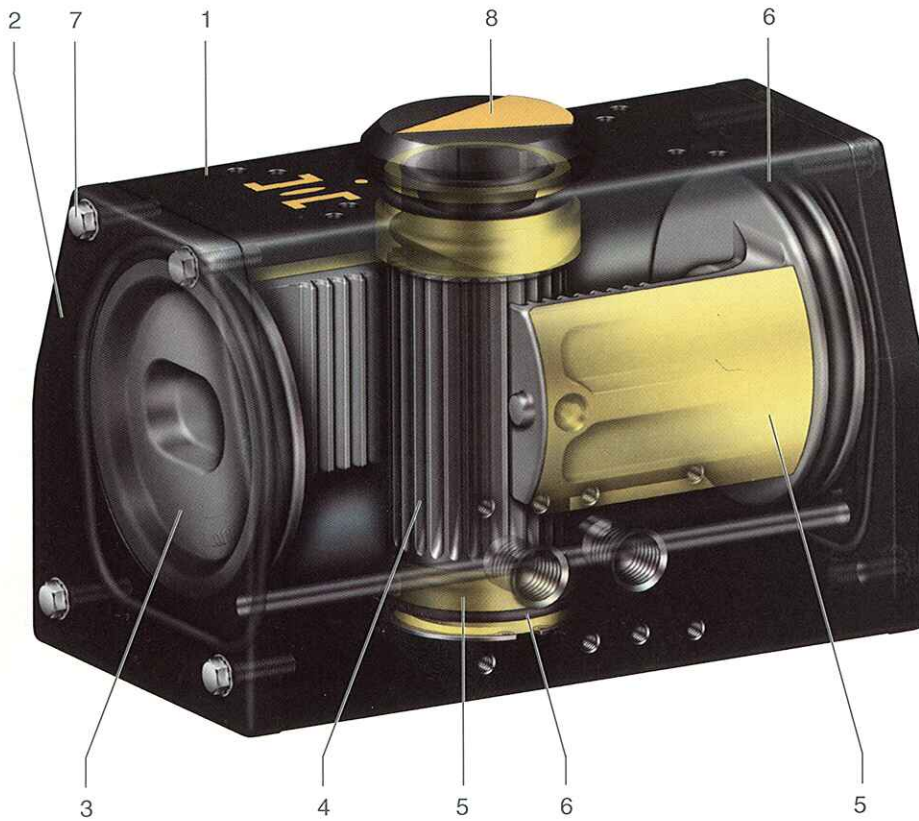
Maximum supply pressure: 150 psig  
 Rated supply pressure: 120 psig  
 Output torque: 13,444 lb.in. @ 120 psig  
 Temperature range: -20°F to 210°F  
 (-30°C to 100°C)

Optional temperature ranges available:  
 -15°F to 300°F  
 (-26°C to 150°C)  
 -40°F to 160°F  
 (-40°C to 71°C)

**Making Flow Control Easier**

# Keystone Figure 79U/79E Pneumatic Actuator

Models 003 to 091



## Materials of Construction

Part	Material	US Material Standard	UK Material Standard	DIN Material Standard
1 Body	Extruded aluminum (hard anodized & ESPC*)	ASTM B221	BS1474 6063	DIN 3.33206.51
2 End cap	Die-cast aluminum LM6 or LM24 (ESPC*)	ASTM B85	BS1490	DIN 1725 - 230 or 226
3 Piston (003 only) Piston (006-090)	Glass filled nylon 66 Die-cast aluminum (anodized) LM6 or LM24	ASTM B85	BS1490	DIN 1725 - 230 or 226
4 Pinion shaft	Carbon steel (sealbond - N coated)	ASTM A108	BS970 080M40	C40
5 Bearings	Engineered polymer			
6 O-rings	Nitrile			
7 Fasteners	304 stainless steel	ASTM A193	BS970 Part 3 - 304/305	DIN 267 Part 3
8 Indicator	ABS			

\* electrostatic powder coating

**Notes**

1. Operating times under no load for air pressures from 40 psig to 100 psig. (Times based on actual measurements.)
2. All times using a standard Keystone 5/2 solenoid valve with nominal .7C<sub>v</sub>.
3. Total time is defined as time required from switching solenoid valve to completion of 90 degree stroke.
4. Stroke times can be increased or decreased dramatically by using speed controls, oversized pilot valves or quick-exhaust valves.
5. Air Consumption:  
Cubic inches shown in chart represent actual free air volume in either open or close direction. Air consumption will vary depending on supply pressure. To determine standard cubic feet per minute use the following formula:

$$\text{SCFM} = \frac{\text{Vol. in}^3}{1728} \left( \frac{\text{Supply Air psig} + 14.7}{14.7} \right) (\text{Cycles/Minute})$$

Example: Calculate SCFM for Model 036 double acting using 80 psig air supply and 5 cycles/minute.

$$\text{SCFM} = \frac{(119 + 83)}{1728} \left( \frac{80 + 14.7}{14.7} \right) (5) \quad \text{SCFM} = 3.77$$

**Actuator Operating Times (seconds)**

Actuator Model	Stroke Time	Total Time
003	.16	.24
006	.26	.37
012	.45	.64
024	.90	1.22
036	1.32	1.76
065/066	3.60	5.10
090/091	4.50	6.30

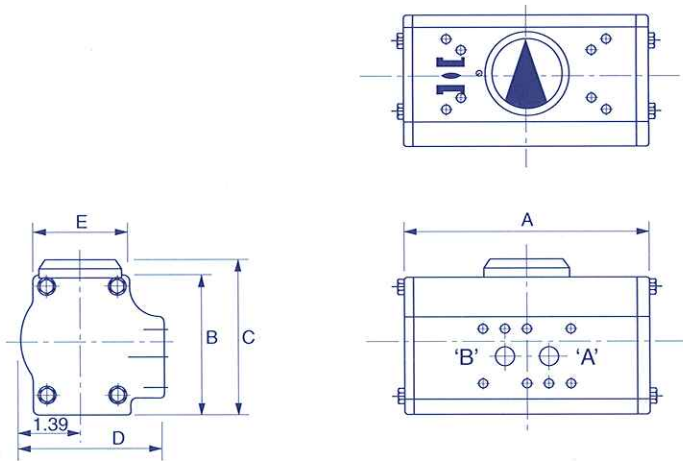
**Actuator Piston Displacement (in<sup>3</sup>)**

Actuator Model	Open	Close
003	11	8
006	21	14
012	38	28
024	79	56
036	119	83
065/066	215	161
090/091	292	204

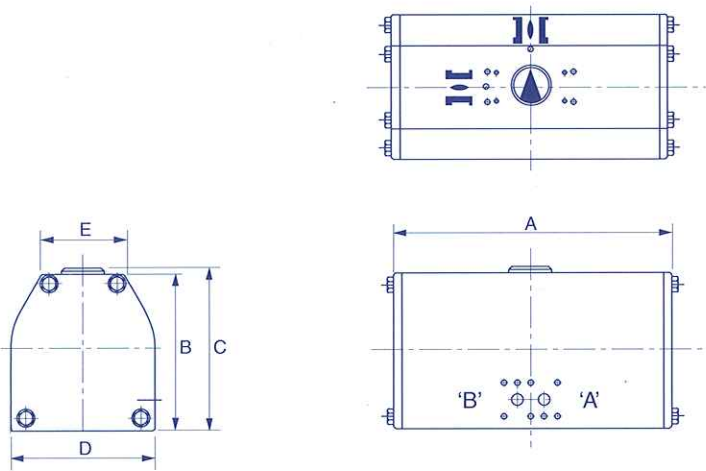
# Keystone Figure 79U/79E Pneumatic Actuator

Models 003 to 091

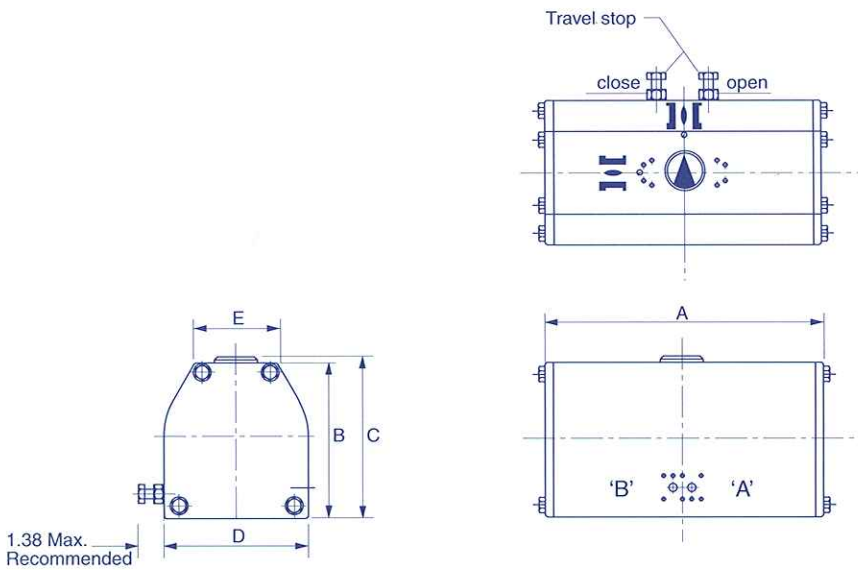
## Model 003



## Models 006-036



## Models 065/090

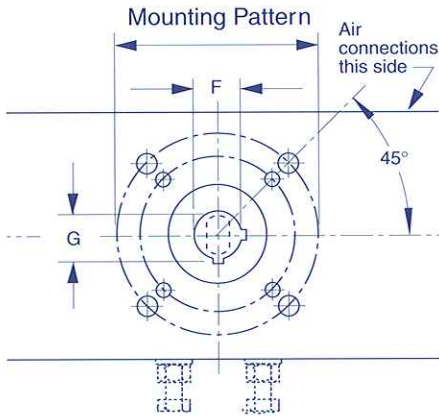


## General Information

1. The total travel of 100 degrees allows for end-of-travel adjustment of 5 degrees over and 7 degrees under at both open and close positions on models 065 and 090.
2. Travel stop bolts (when present) must not be used for manual override.

## General Information

- A. A comprehensive range of adaptors are available to suit all Keystone valve stems.
- B. Actuators can be mounted parallel or perpendicular to valve flow.



## Actuator Dimensions (inches)

Actuator Model	A	B	C	D	E	Weight (lbs)
003	5.57	3.19	3.54	3.27	2.20	2.7
006	6.55	4.08	4.41	3.66	2.26	5.7
012	7.13	5.00	5.35	4.38	3.25	7.7
024	9.17	5.90	6.26	5.35	3.35	16.7
036	10.72	6.87	7.24	6.00	3.50	27.0
065/066	12.78	8.55	8.90	8.00	4.50	41.9
090/091	16.08	8.55	8.90	8.00	4.50	63.9

## Mounting Dimensions (inches) - 79U

Actuator Model	Shaft Bore F	Keyway Size G	Key Width	Key Size	Mounting Patterns PCD	Mounting Holes
79U-003	0.814 Dia.	0.855	0.189	3/16 Sq.	1.75	4 x 1/4-20UNC x .38 Dp.
79U-006/012	1.004 Dia.	1.060	0.252	1/4 Sq.	3.25	4 x 3/8-16UNC x .56 Dp.
79U-024/036	1.128 Dia.	1.250	0.252	1/4 Sq.	3.25	4 x 3/8-16UNC x .56 Dp. 5.00 4 x 1/2-13UNC x .63 Dp.
79U-065	1.128 Dia.	1.250	0.252	1/4 Sq.	5.00	4 x 1/2-13UNC x .63 Dp.
79U-066	1.380 Dia.	1.523	0.315	5/16 Sq.	5.00	4 x 1/2-13UNC x .63 Dp.
79U-090	1.628 Dia.	1.808	0.378	3/8 Sq.	5.00	4 x 1/2-13UNC x .63 Dp.
79U-091	1.882 Dia.	2.058	0.504	1/2 x 3/8	6.25	4 x 3/4-10UNC x 1.00 Dp. 5.00 4 x 1/2-13UNC x .63 Dp. 6.25 4 x 3/4-10UNC x 1.00 Dp.

## 79U Actuator to Valve Adaptability

Actuator Model	Compatible with Valve Adaptability Code
79U-003	AAA, BAB <sup>(1)</sup> , BAC <sup>(1)</sup>
79U-006/012	AAA <sup>(1)</sup> , BAB, BAC, BAD, BBG
79U-024/036	BAB <sup>(1)</sup> , BAC <sup>(1)</sup> , BAD <sup>(1)</sup> , CAD, CAE, CAF
79U-065	BAB <sup>(1)</sup> , BAC <sup>(1)</sup> , BAD <sup>(1)</sup> , CAD, CAE, CAF
79U-066	CAG
79U-090	CAH, DAH
79U-091	CAD, CAE, CAF, CAG, DAJ, DBC

## Note

1. These adaptability or ISO codes require use of a transition plate included in mounting kit.

## Shaft Detail and Mounting Pattern Code (inches) - 79E

Actuator Model	F	Shaft Bore Dia. x	G	Keyway	Mounting Flange Type
79E-003	.630	Dia. x	.433 A/F	.189	F05
79E-006	.630	Dia. x	.433 A/F	.252	F05 & F07
79E-012	.787	Dia. x	.551 A/F	.252	F07
79E-024	.984	Dia. x	.709 A/F	—	F07 & F12
79E-036	1.181	Dia. x	.866 A/F	—	F12
79E-065	1.378	Dia. x	1.516	.394	F12
79E-090	1.969	Dia. x	2.126	.551	F12 & F16

## Mounting Pattern Dimensions and Valve Adaptability (inches) - 79E

79E ISO Mounting Type	PCD	Mounting Holes	Compatible with Valve Mounting Flange Type
F05	1.97	4 x 1/4-20UNC x .38 Dp.	F05 & F07 (1)
F07	2.76	4 x 5/16-18UNC x .50 Dp.	F07
F12	4.92	4 x 1/2-13UNC x .63 Dp.	F07(1) & F12
F16	6.50	4 x 3/4-10UNC x 1.00 Dp.	F16

**Output Torques (lb.in.) for Double Acting (air-to-air) Actuators**

Actuator Model	Air Supply in psig					
	40	50	60	80	100	120
003	156	198	240	325	409	493
006	298	379	459	621	782	943
012	580	737	893	1207	1520	1834
024	1159	1472	1785	2411	3038	3664
036	1732	2200	2668	3604	4540	5476
065/066	3347	4252	5157	6966	8775	10585
090/091	4252	5401	6550	8848	11146	13444

**Notes**

1. To convert bar to Kpa multiply bar by 100.
2. To convert bar to Mpa multiply bar by 0.1.

**Output Torques (Nm) for Double Acting (air-to-air) Actuators**

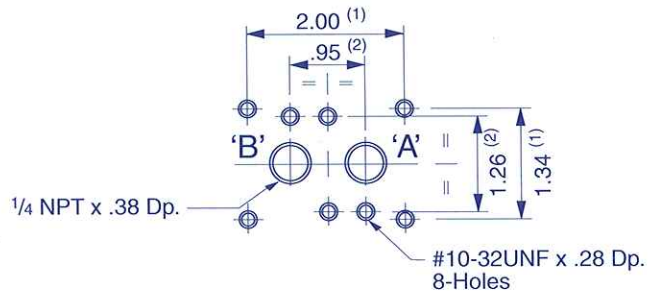
Actuator Model	Air Supply in barg					
	3	4	5	6	7	8
003	20	27	33	40	48	55
006	37	52	64	77	91	105
012	73	101	124	151	177	204
024	145	202	248	301	354	407
036	217	301	370	450	529	608
065/066	419	583	716	869	1022	1176
090/091	532	740	909	1104	1298	1493

**Notes**

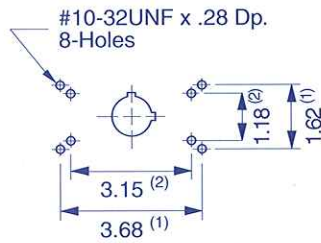
Each body has both types of accessory mounting pads.

1. Keystone standard mounting pad
2. NAMUR mounting pad

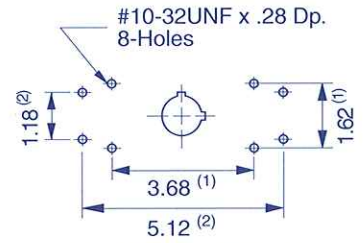
**Accessory Drillings to Actuator Body (inches)**



Note: air port 'B' - CLOSED  
air port 'A' - OPEN  
Port Hole Drillings



Top Mounting Drilling  
Models 003 to 036



Top Mounting Drilling  
Models 065/091

**Actuator Shaft Top Detail (inches)**

Model(s) 79U/79E	Shaft Bore
003	.814 Dia. x .855 x .189 Keyway ( <sup>3</sup> / <sub>16</sub> Sq. Key)
006/012	1.004 Dia. x 1.060 x .252 Keyway ( <sup>1</sup> / <sub>4</sub> Sq. Key)
024/036/065/066/090/091	1.128 Dia. x 1.250 x .252 Keyway ( <sup>1</sup> / <sub>4</sub> Sq. Key)

## Standard Keystone Accessories - Available for All Models

### LP-Switch

Figure 792L

2-SPDT mechanical switches with top adjustable cams prewired to a terminal strip. Low profile, anodized aluminum housing with polyester coating. Enclosure rating: NEMA 4 & 4X.



LP-Switch



K-Switch

### K-Switch

Figure 792K

Adjustable K-Cam tripping system and BZ switch elements with self-rising terminal clamps or V3 switch elements with terminal strip. Threaded cover and housing of anodized aluminum with polyester coating. Reflective indicator for visual position indication up to 100 feet. Enclosure rating: UL Listed NEMA 4, 4X, 7 & 9 for Class I, Div. 1, Groups C & D and Class II, Div. 1, Groups E, F & G.



A-Switch



K-Block

### A-Switch

Figure 792A

Spacious enclosure readily accepts various switch types prewired to a terminal strip. Multi-purpose, anodized aluminum housing with polyester coating. Potentiometer, retransmission module or pneumatic valves are also available. Enclosure rating: FM Approved NEMA 4, 4X for use in Class I, Div. 1, Groups C & D hazardous locations.

### K-Block

Figure 792B

Magnetically operated, 2-SPST hermetically sealed contacts with LED indication is available with fixed or adjustable activating pucks. Compact enclosure of engineered resin and polyurethane potting for durability and corrosion resistance. Enclosure rating: NEMA 4, 4X & 6.



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