



KEYSTONE

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 sizes 065 through 091.

Spring Return and Double Acting Pneumatic Quarter-Turn Actuators 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 applications

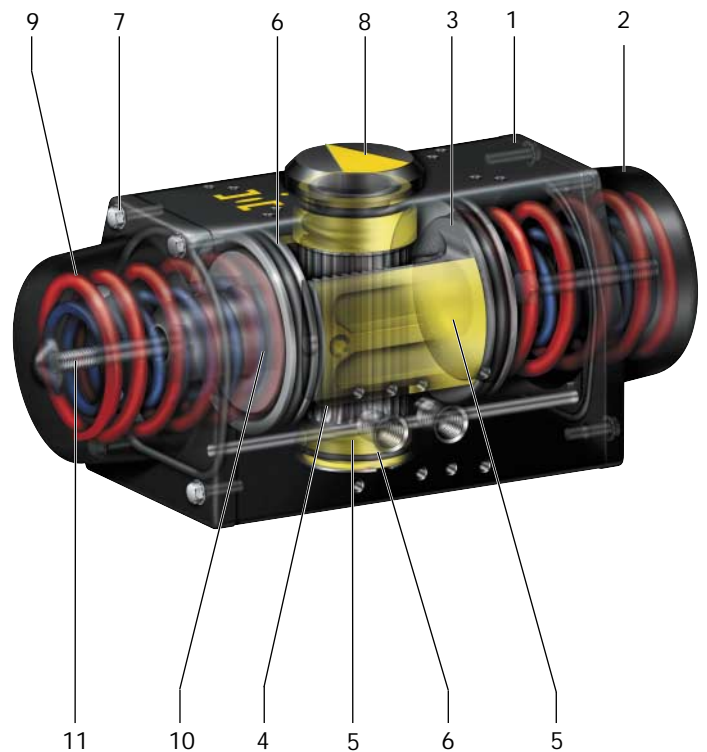
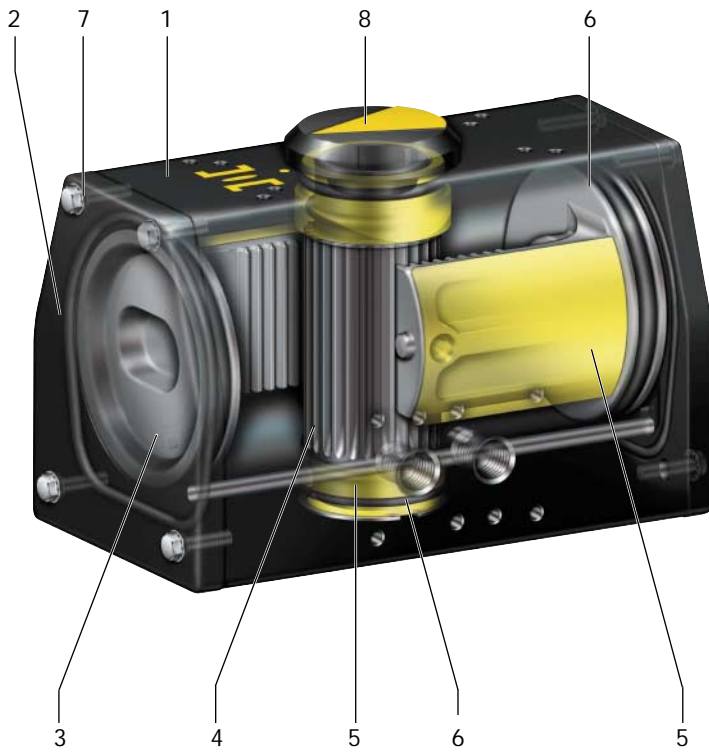
For remote control of any quarter-turn application; for example, ball, butterfly or rotary plug valves, dampers, etc.

Technical data

Max. Supply Pressure	: 150 psig
Rated Supply Pressure	: 120 psig
Double Acting Torque	: 13,444 lb.in. @ 120 psig
Spring End Torque	: 4,943 lb.in. @ 100 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)

Double Acting Pneumatic Quarter-Turn Actuators

Spring Return Pneumatic Quarter-Turn Actuator



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			
9 Spring	Spring steel (ESPC*)	ASTM A401	BS5216 HS3	DIN 17223 PtI
10 Spring Cone	Die-cast aluminum LM6	ASTM B85	BS1490	DIN 1725
11 Spring retaining bolt	Steel (plated)			

* electrostatic powder coating

Notes

- Operating times under no load for air pressures from 40 psig to 100 psig. (Times based on actual measurements.)
- Total time is defined as time required from switching solenoid valve to completion of 90 degree stroke.
- Stroke times can be increased or decreased dramatically by using speed controls, oversized pilot valves or quick-exhaust valves.
- 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:

Double Acting SCFM =

$$\left(\frac{\text{Open} + \text{Close Vol. in}^3}{1728} \right) \left(\frac{\text{Supply Air psig} + 14.7}{14.7} \right) (\text{Cycles/Min})$$

Spring Return SCFM =

$$\left(\text{Air Stroke Vol. in}^3 \right) \left(\frac{\text{Supply Air psig} + 14.7}{14.7} \right) (\text{Cycles/Min})$$

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

Double Acting SCFM =

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

- All Double Acting Actuator operating times are based on using a standard Tyco 5/2 solenoid valve with nominal .7Cv.
- All Spring Return Actuator operating times are based on using a standard Tyco 3/2 solenoid valve with nominal .4Cv.

Double Acting Actuator Operating Times (seconds)

Actuator Size	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

Spring Return Actuator Operating Times (seconds)

Actuator Size	Stroke Time		Total Time	
	Air	Spring	Air	Spring
003S	0.30	0.35	0.40	0.42
006S	0.50	0.50	0.52	0.54
012S	0.63	0.68	1.00	1.10
024S	1.40	1.60	2.10	2.30
036S	2.10	2.20	2.60	2.90
065S/066S	3.60	4.50	4.80	5.80
090S/091S	8.70	5.20	9.50	6.30

Actuator Piston Displacement (in3)

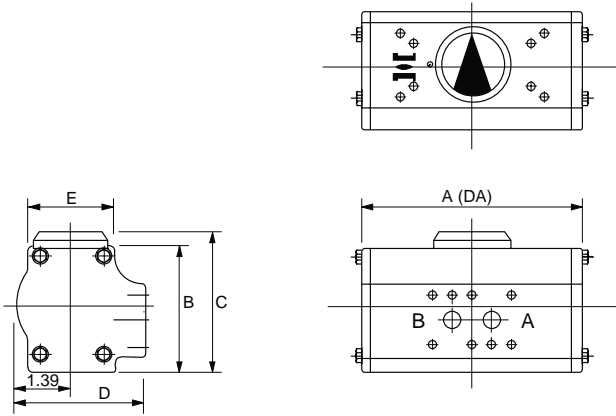
Actuator Size	Open-Double Acting	Close - Double Acting
	Air Stroke - Spring Return	
003	11	8
006	21	14
012	38	28
024	79	56
036	119	83
065/066	215	161
090/091	292	204

Actuator Weight (lb.)

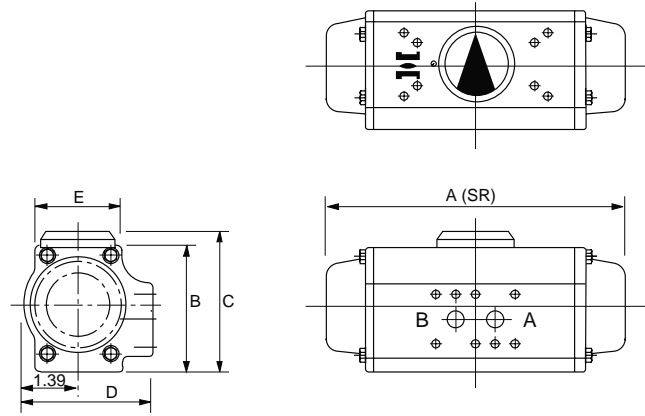
Actuator Size	Double Acting	Spring Return
003	2.7	3.3
006	5.7	7.9
012	7.7	12.5
024	16.7	26.0
036	27.0	38.0
065/066	41.9	75.0
090/091	63.9	99.2

Figure 79U Pneumatic Actuator

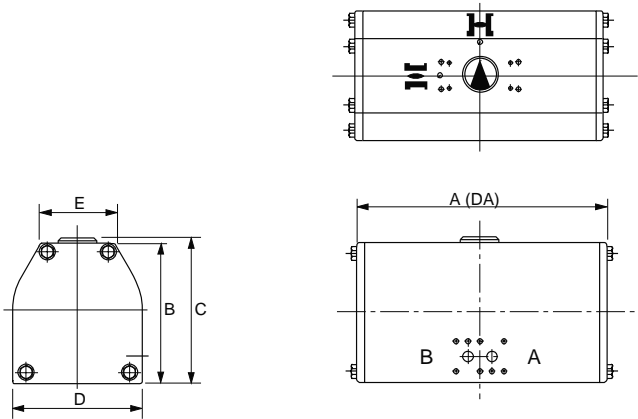
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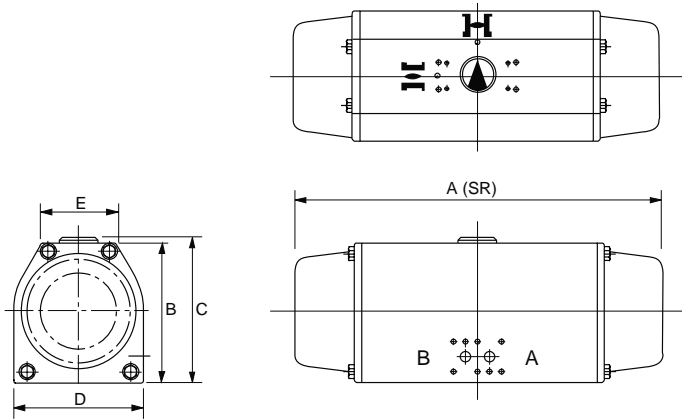
Size 003S



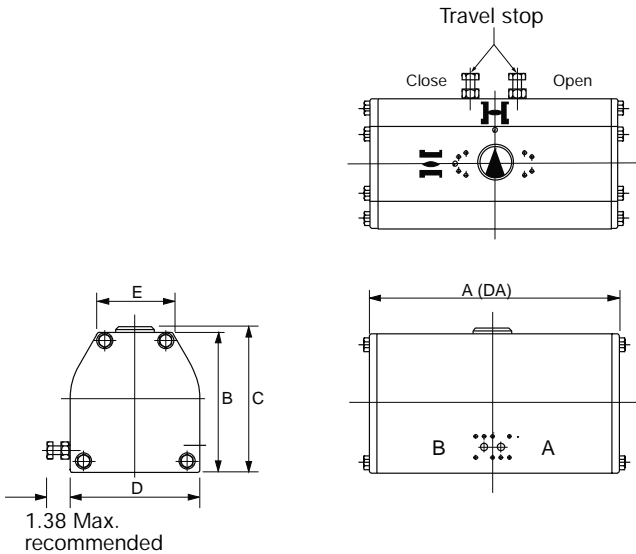
Sizes 006-036



Sizes 006S-036S



Sizes 065-091



Sizes 065S-091S

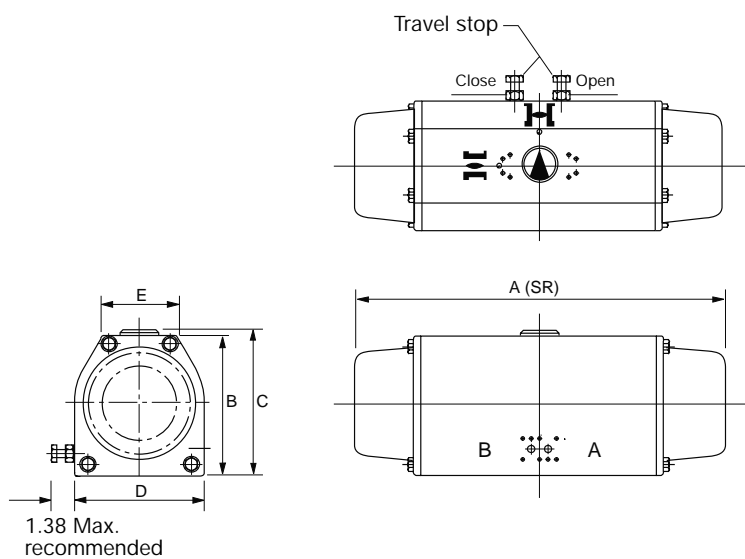
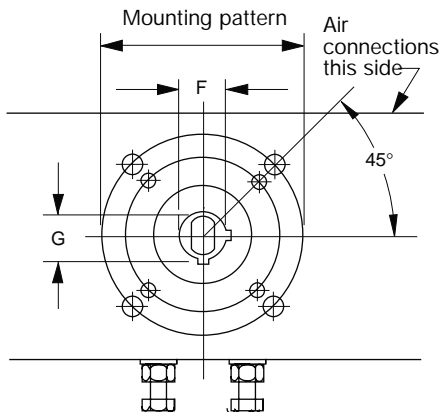


Figure 79U Pneumatic Actuator

General Information

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



Actuator Dimensions (inches)

Actuator Size	A(SR)	A(DA)	B	C	D	E
003	8.23	5.57	3.19	3.54	3.27	2.20
006	10.10	6.55	4.08	4.41	3.66	2.26
012	11.10	7.13	5.00	5.35	4.38	3.25
024	13.82	9.17	5.90	6.26	5.35	3.35
036	16.69	10.72	6.87	7.24	6.00	3.50
065/066	19.69	12.78	8.55	8.90	8.00	4.50
090/091	23.00	16.08	8.55	8.90	8.00	4.50

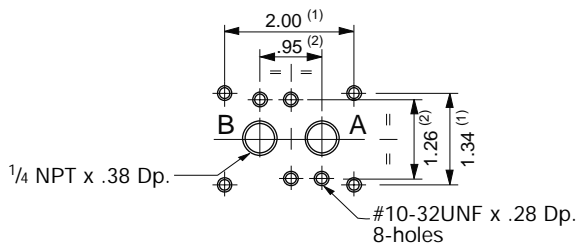
Mounting Dimensions (inches) - 79U

Actuator Size	Shaft Bore F	Keyway Size		Key Size	Mounting Patterns	
		G	Width		PCD	Mounting Holes
003	0.814 Dia.	0.855	0.189	3/16 Sq.	1.75	4 x 1/4-20UNC x .38 Dp.
006/012	1.004 Dia.	1.060	0.252	1/4 x 3/16	3.25	4 x 3/8-16UNC x .56 Dp.
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.
065	1.128 Dia.	1.250	0.252	1/4 Sq.	5.00	4 x 1/2-13UNC x .63 Dp.
066	1.380 Dia.	1.523	0.315	5/16 Sq.	5.00	4 x 1/2-13UNC x .63 Dp.
090	1.628 Dia.	1.808	0.378	3/8 Sq.	5.00	4 x 1/2-13UNC x .63 Dp.
					6.50	4 x 3/4-10UNC x 1.00 Dp.
091	1.882 Dia.	2.058	0.504	1/2 x 3/8	5.00	4 x 1/2-13UNC x .63 Dp.
					6.50	4 x 3/4-10UNC x 1.00 Dp.

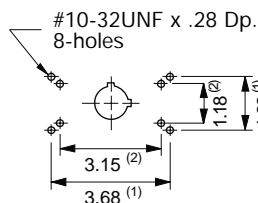
Accessory Drillings to Actuator Body (inches)

Notes

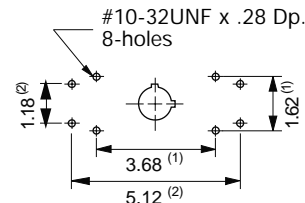
- Each body has both types of accessory mounting pads.
1. Tyco standard mounting pad
 2. NAMUR mounting pad



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



Top mounting drilling
 sizes 003 to 036



Top mounting drilling
 sizes 065 to 091

Sizes 065 to 091

1. On sizes 065 to 091, 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.
2. Travel stop bolts (when present) must not be used for manual override.

Actuator Shaft Top Detail (inches)

Size	Shaft Bore
003	.814 Dia. x .855 x .189 Keyway (3/16 Sq. Key)
006/012	1.004 Dia. x 1.060 x .252 Keyway (1/4 x 3/16 Key)
024/036/065/066/090/091	1.128 Dia. x 1.250 x .252 Keyway (1/4 Sq. Key)

Figure 79U Pneumatic Actuator

Output Torques (lb.in.) for Single Acting (spring return) Actuators

Actuator Size	Spring Rating (psig)	Spring End	Spring Start	Air Torque	Air Supply in psig					
					40	50	60	80	100	120
003S	40	62	Start	81	123	165	250	334	418	
			End	39	81	123	208	292	376	
	60	100	Start			127	212	296	380	
			End			65	150	234	318	
	80	137	Start				175	259	343	
			End				91	175	259	
100	174	Start					222	306		
		End					117	201		
006S	40	123	Start	151	232	312	474	635	796	
			End	74	155	235	397	558	719	
	60	197	Start			238	400	561	722	
			End			123	285	446	607	
	80	272	Start				325	486	647	
			End				172	333	494	
100	346	Start					412	573		
		End					220	381		
012S	40	245	Start	288	445	601	915	1228	1542	
			End	138	295	451	765	1078	1392	
	60	391	Start			455	769	1082	1396	
			End			230	544	857	1171	
	80	536	Start				624	937	1251	
			End				324	637	951	
100	709	Start					764	1078		
		End					415	729		
024S	40	482	Start	583	896	1209	1835	2462	3088	
			End	282	595	908	1534	2161	2787	
	60	771	Start			920	1546	2173	2799	
			End			470	1096	1723	2349	
	80	1059	Start				1258	1885	2511	
			End				657	1284	1910	
100	1347	Start					1597	2223		
		End					846	1472		
036S	40	718	Start	874	1342	1810	2746	3882	4618	
			End	443	911	1379	2315	3251	4187	
	60	1149	Start			1379	2315	3251	4187	
			End			734	1670	2606	3542	
	80	1579	Start				1885	2821	3757	
			End				1026	1962	2898	
100	2006	Start					2392	3328		
		End					1317	2253		
065S/066S	40	1395	Start	1681	2586	3491	5300	7109	8919	
			End	813	1718	2623	4432	6241	8051	
	60	2226	Start			2660	4469	6278	8088	
			End			1356	3165	4974	6784	
	80	3059	Start				3636	5445	7255	
			End				2117	3926	5736	
100	3892	Start					4612	6422		
		End					2440	4250		
090S/091S	40	1772	Start	2135	3284	4433	6731	9029	—	
			End	1033	2182	3331	5629	7927	—	
	60	2827	Start			3378	5676	7974	—	
			End			1721	4019	6317	8615	
	80	3885	Start				4618	6916	9214	
			End				2410	4708	7006	
100	4943	Start					5858	8156		
		End					3098	5396		

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

Actuator Size	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

LP-Switch

Model 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

Model 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.



K-Switch

A-Switch

Model 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.



A-Switch

K-Block™

Model 792E

Compact enclosure of engineered resin and potting for durability and corrosion resistance. Two inductive switches in a sealed enclosure provide an end-of-travel sensor impervious to moisture, with LED indication. NEMA 3, 4, 4X, 6, 12, 13 & IP67 protection rating.



K-Block

Also available

777 EPI-Torc Electric Actuator



- Permanently lubricated, completely self-locking, epicyclic gear train with minimum running gear components eliminates the need for motor brakes, declutch levers or latches to switch modes from manual to electric operation.
- Enclosures available with F.M. or C.S.A. approval.
- Thermal overload switch protects the motor.
- Automatically engageable/disengageable handwheel permits manual operation with motor in fused condition and also allows simultaneous manual/electrical operation without adverse effect to actuator.
- Hard anodized aluminum, epoxy-coated base and cover provides maximum corrosion protection.

Technical Data

Torque Range : From 300 lb. in. to 15,100 lb. in.
Available Voltages : 120, 240 VAC, 1Ø, 50/60 Hz
208, 230, 460 VAC, 3Ø, 60 Hz
575 VAC, 3Ø, 60 Hz
380 VAC, 3Ø, 50 Hz
12 VDC, 24 VDC

Request Publication Number: KVUDD-0001

ValvBus™Plus

Pneumatic and Electric
Actuator Controls



DeviceNet™ Networked
Actuator Controller



LonWORKS™ Networked
Actuator Controller



Actuator Sensor Interface (AS-i)

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