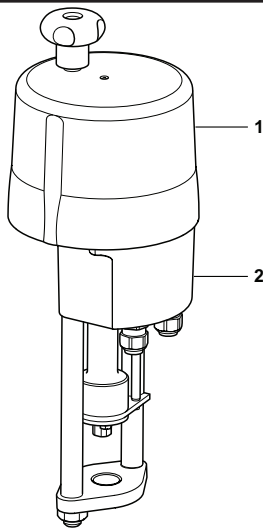


spirax sarco

AEL6 Series Smart Electric Actuators for ½" to 4" Control Valves



Materials

No.	Part		Material
1	Case	517 lbf to 1798 lbf	Polycarbonate
		3147 lbf to 5620 lbf	Die-cast aluminium
2	Housing		Die-cast aluminium
3	Guidance		Red brass

Description

The AEL6 series electric actuators are reversible having linear output.

Available types

The actuators are available with 4 supply variants: 230 Vac (2-wire, single phase), 115 Vac, 24 Vac and 24 Vdc. The standard version is available for VMD

(Valve Motor Drive), 0 / 4 - 20 mA or 0 / 2 - 10 Vdc input control signals. These actuators can be used with the following valves, in conjunction with an appropriate valve adaptor and mounting flange:

Control valves	2-port SPIRA-TROL
	3-port QL43 and QL73 mixing and diverting valves

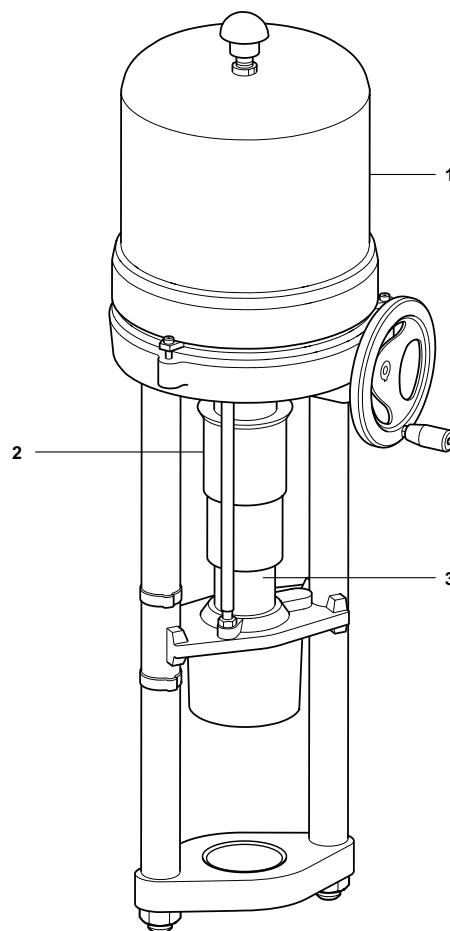
Note: A mounting flange and valve adaptor is required to mount the actuator to a valve. See the associated tables below:

Mounting flange selection

Valve type and size		Actuator	
		AEL62_, AEL63_, AEL64_, AEL65_	AEL66_
L, K, and Q Series	½" to 2"	EL5970	
L Series	2 ½" to 4"	EL5971	
K Series	2 ½" to 4"	EL5971	EL5972

Valve adaptor selection

Valve type and size		Valve stem	AEL62_	AEL63_	AEL64_	AEL65_	AEL66_
L, K, and Q Series	½" to 2"	M8 thread	AEL6911	AEL6911	AEL6911	AEL6911	
	2 ½" to 4"	M12 thread	Integrated	Integrated	Integrated	Integrated	EL5945



AEL6 Series

Smart Electric Actuators

for ½" to 4" Control Valves

Technical data

Actuator type	AEL6221_	AEL6321_	AEL6323_	AEL6421_	AEL6422_	AEL6532_	AEL6631_
Supply voltage	230 Vac (2-wire, single phase), 115 Vac, 24 Vac, 24 Vdc						
Supply frequency	50 Hz / 60 Hz / continuous						
Maximal power consumption VA Note: power consumption is relative to 50 / 60 Hz / continuous respectively	13	19	57	25	72	65	88
Stroke (mm) inches	2 (50)	2 (50)	2 (50)	2 (50)	2 (50)	2½ (65)	2⅓ (60 *)
Actuator speed mm/s Note: Speed is relative to 50 / 60 Hz / continuous respectively	0.9	0.9	4.5	0.7	1.7	1.3	0.4
Enclosure rating	IP65 (for outdoor installations, provide adequate shelter)						
Actuator thrust (kN) lbf	517 (2.3)	1,012 (4.5)	1,012 (4.5)	1,798 (8)	1,798 (8)	3,147 (14)	5,620 (25)
Ambient limits	-4°F to 140°F (-20°C to 60°C)						
Analog position set valve input	Adjustable: 0 / 4 - 20 mA or 0 / 2 - 10 Vdc						
Positioner function	Dead-band adjustable between 0.5 - 5% of set value range, maximum resolution 0.1 mA or 0.05 V at 2" (50 mm) stroke						
Active valve position feedback	Adjustable: 0 / 4 - 20 mA or 0 / 2 - 10 Vdc						
Automatic commissioning	Drives to torque dependant stop(s) and moves through the whole valve travel. Autoscale of set value and feedback in accordance to valve travel						
Characteristic curve correction	Up to 16 interpolation points, input inaccuracy 1%						
Torque increase	Adjustable up to 150% torque for up to 2.5s to break away a valve in the end position						
Status indication	2 LEDs under actuator cover						
Internal fault monitoring	Torque, position set value, active value, position, temperature of electronic board						
Diagnostics function	Stores cumulated operation data (motor and total running time, number of motor starts) and data sets of current values (set value, feedback value, torque, temperature)						

*Notes:

- 115 Vac and 230 Vac models of the AEL6631_ have a stroke limited to 2⅓ (60 mm).
- 24 Vac and 24 Vdc models of the AEL6631_ are capable of up to 4" (100 mm) stroke.

Optional extras:

- Additional position switches - AEL6951 (NC) and AEL6952 (NO)
- Local control - (non retrofittable for the AEL66_) - AEL6955 (2.3 to 14 kN) and AEL6956 (25 kN)
- Fault indicator relay - AEL6973
- Communication software including data cable - AEL6957
- Space heater - AEL6953 (24 Vac) and AEL6954 (115 Vac and 230 Vac)

Approvals

This equipment is CE marked and conforms to the following:

- EEC regulation 89 / 336 - EEC for Electromagnetical compatibility and 72 / 23 - EEC for low voltage directive.
- EN 61000 - 2 -2 / 2001 and EN 61000 - 6 - 4 for EMC, and 61010 - 1 / 1995 for safety.

How to use the sizing data:

The following tables supply guidance as to the sizing of the AEL6 series actuator when it is used on the SPIRA-TROL K and L series valves.

Three conditions are illustrated in tabular form:

L and K Series - 2-port valve: Class IV shut-off - Providing shut-off of the valve to the requirements of ANSI/FCI 70-2 class IV.

L and K Series - 2-port valve: Class VI shut-off - Providing shut-off of the valve to the requirements of ANSI/FCI 70-2 class VI.

QL - 3-port valve: Class IV shut-off - Providing shut-off of the valve to the requirements of ANSI/FCI 70-2 class IV.

To select a suitable actuator:

- Identify the column containing the valve size and gland material selected.
- Identify the maximum operating pressure condition, including any transient pressures likely to occur, within the selected column.
- Read back to the left hand side of the table to identify the suitable actuator for the application.

For conditions outside of those illustrated please contact Spirax Sarco.

AEL6 Series

Smart Electric Actuators

for 1/2" to 4" Control Valves

Maximum differential pressures for Class IV shut-off

Valve size	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"	
	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
Travel (mm)	20	20	20	20	20	20	20	20	20	20	20	20	30	30	30	30	30	30
Seat dia (mm)	16	16	18	18	22	22	25	25	38	38	45	45	60	60	75	75	95	95
Seat area (mm ²)	201	201	254	254	380	380	491	491	1134	1134	1590	1590	2827	2827	4418	4418	7088	7088
Seat circumference (mm)	50	50	57	57	69	69	79	79	119	119	141	141	188	188	236	236	298	298
Stem diameter (mm)																		
Stem pressure area (mm ²)																		
Recommended pinch for Class IV shut-off (N/m)	6000	6000	6000	6000	6000	6000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Required seating thrust (N)	302	302	339	339	415	415	393	393	597	597	707	707	942	942	1178	1178	1492	1492
Static gland packing friction	100	400	100	400	100	400	100	400	100	400	100	400	150	660	150	660	150	660
Bellows Seal (N)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2100	2100	2100	2100	2100	2100
Total thrust needed to close valve (N)	402	702	439	739	515	815	493	793	697	997	807	1107	1092	1602	1328	1838	1642	2152

PTFE or Graphite stem seal

Actuator	Min thrust (N)	Maximum Differential Pressures (psi)																	
		1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"	
		PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
AEL6221	2300	740	740	740	740	681	567	534	445	205	167	136	109	62	36	32	15	13	
AEL6321	4500			740	740	740	740	740	740	486	448	337	309	175	149	104	87	58	48
AEL6323	4500			740	740	740	740	740	740	486	448	337	309	175	149	104	87	58	48
AEL6421	8000							740	740	740	740	656	628	354	328	219	202	130	120
AEL6422	8000							740	740	740	740	656	628	354	328	219	202	130	120
AEL6532	14000									740	740	740	740	662	636	416	399	253	242
AEL6631	25000													740	740	740	740	478	467

Bellows and PTFE or Graphite steam seal

Actuator	Min thrust (N)	Maximum Differential Pressure (psi)																	
		1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"	
		PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
AEL6221	2300	287	71	206	35	109		91		13									
AEL6321	4500	360	360	360	360	360	360	360	360	294	256	200	173	67	41	35	18	16	
AEL6323	4500	360	360	360	360	360	360	360	360	294	256	200	173	67	41	35	18	16	
AEL6421	8000							360	360	360	360	360	360	247	220	150	133	87	77
AEL6422	8000							360	360	360	360	360	360	247	220	150	133	87	77
AEL6532	14000									360	360	360	360	360	360	347	330	210	199
AEL6631	25000													360	360	360	360	360	360

AEL6 Series

Smart Electric Actuators

for 1/2" to 4" Control Valves

Maximum differential pressures for Class VI shut-off (soft seal)

Valve size	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"	
	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
Travel (mm)	20	20	20	20	20	20	20	20	20	20	20	20	30	30	30	30	30	30
Seat dia (mm)	16	16	18	18	22	22	25	25	38	38	45	45	60	60	75	75	95	95
Seat area (mm ²)	201	201	254	254	380	380	491	491	1134	1134	1590	1590	2827	2827	4418	4418	7088	7088
Seat circumference (mm)	50	50	57	57	69	69	79	79	119	119	141	141	188	188	236	236	298	298
Stem diameter (mm)																		
Stem pressure area (mm ²)																		
Recommended pinch for Class IV shut-off (N/m)	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Required seating thrust (N)	8	8	8	8	10	10	12	12	18	18	21	21	28	28	35	35	45	45
Static gland packing friction	100	400	100	400	100	400	100	400	100	400	100	400	150	660	150	660	150	660
Bellows Seal (N)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2100	2100	2100	2100	2100	2100
Total thrust needed to close valve (N)	108	408	108	408	110	410	112	412	118	418	121	421	178	688	185	695	195	705

PTFE or Graphite stem seal

Actuator	Min thrust (N)	Maximum Differential Pressure (psi)																	
		1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"	
		PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
AEL6221	2300	740	740	740	740	740	721	646	558	279	241	199	171	109	83	69	53	43	33
AEL6321	4500					740	740	740	740	560	522	399	372	222	195	142	125	88	78
AEL6323	4500					740	740	740	740	560	522	399	372	222	195	142	125	88	78
AEL6421	8000							740	740	740	740	718	691	401	375	256	240	160	149
AEL6422	8000							740	740	740	740	718	691	401	375	256	240	160	149
AEL6532	14000							740	740	740	740	740	740	709	683	453	437	282	272
AEL6631	25000											740	740	740	740	740	740	507	497
AEL6221	25000													740	740	740	740	507	497

Bellows and PTFE or Graphite stem seal

Actuator	Min thrust (N)	Maximum Differential Pressure (psi)																	
		1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"	
		PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph	PTFE	Graph
AEL6221	2300	360	283	360	223	263	149	203	115	87	49	62	35	1	-25	0	-16	0	-10
AEL6321	4500	360	360	360	360	360	360	360	360	360	330	262	235	114	88	73	56	45	35
AEL6323	4500	360	360	360	360	360	360	360	360	360	330	262	235	114	88	73	56	45	35
AEL6421	8000							360	360	360	360	360	360	293	267	188	171	117	106
AEL6422	8000							360	360	360	360	360	360	293	267	188	171	117	106
AEL6532	14000											360	360	360	360	360	360	239	229
AEL6631	25000													360	360	360	360	360	360

AEL6 Series

Smart Electric Actuators

for 1/2" to 4" Control Valves

Dimensions / weights (approximately) in inches and pounds

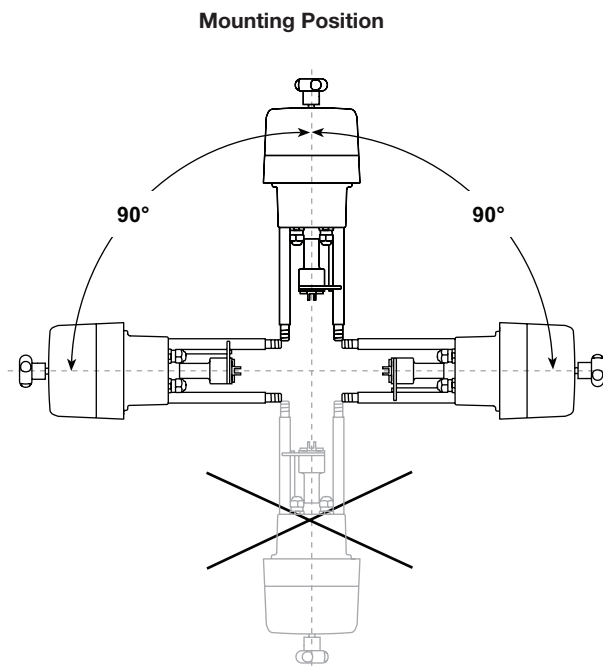
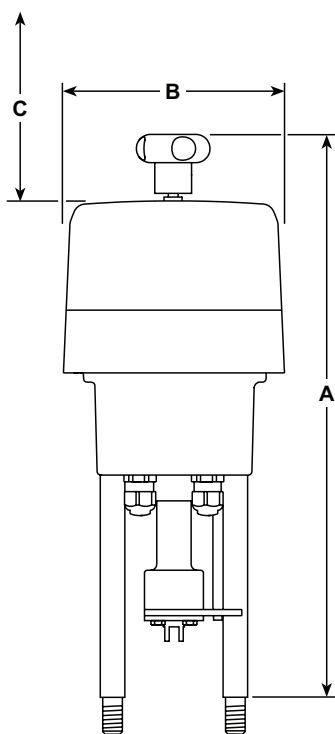
Model	A	B	C	Weight
AEL6221-	18	7	5.9	15.4
AEL6231-	18	7	5.9	15.4
AEL6323-	18	7	5.9	15.4
AEL6421-	19.3	7	5.9	22.0
AEL6422-	19.3	7	5.9	22.0
AEL6532-	21.9	7.1	6.8	26.4
AEL6631-	29.9	8.9	10.9	44.0

Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions that are supplied with the product.

Installation and wiring note:

The valve should be installed in a horizontal pipeline. The position of the actuator will depend on the type of valve to which it is fitted and the temperature of the media. However, it is not recommended that the actuators be fitted at more than 90° from the vertical position or in a wet environment.



AEL6 Series Smart Electric Actuators for 1/2" to 4" Control Valves

AEL6 series actuators - Product nomenclature and selection example:

Product	A = Actuator	A
Type	E = Electric	E
Movement	L = Linear	L
Series	6	6
Thrust lbf (kN)	2 = 517 (2.3) 3 = 1,102 (4.5) 4 = 1,798 (8) 5 = 3,147 (14) 6 = 5,620 (25)	2
Stroke in (mm)	2 = 2 (50) 3 = 2 ¹ / ₃ - 2 ³ / ₄ (60 - 70) (AEL65_ and AEL66_ series only)	2
Maximum speed (mm / s)	1 = 0 - 1.0 (AEL62_, AEL63_, AEL64 and AEL66_ series only) 2 = 1.1 - 2.0 (AEL64_ and AEL65_ series only) 3 = 2.1 - 4.5 (AEL63_ series only)	1
Supply voltage	1 = 230 Vac (2-wire, single phase) 2 = 115 Vac 3 = 24 Vac and 24 Vdc	1
Control signal	F = 24 V VMD, 0 / 2 - 10 Vdc and 0 / 4 - 20 mA (supply voltage 3 only) G = 115 V VMD, 0 / 2 - 10 Vdc and 0 / 4 - 20 mA (supply voltage 2 only) H = 24 V VMD, 0 / 2 - 10 Vdc and 0 / 4 - 20 mA (supply voltage 2 only) J = 230 V VMD, 0 / 2 - 10 Vdc and 0 / 4 - 20 mA (supply voltage 1 only) K = 24 V VMD, 0 / 2 - 10 Vdc and 0 / 4 - 20 mA (supply voltage 1 only)	J
Failure mode	X = No mechanical / electrical fail safe device S = Super capacitor fail safe (Standard, SSI Offering)	S

How to order / selection example:

Example : A 115 Vac fail safe electric actuator to suit a 1" control valve with PTFE stem seals, to have class IV shut-off against a 150 psi differential pressure. There is no requirement for high actuating speed, the control signal is 4-20mA.

Selection:

1 off Spirax Sarco AEL6221-2PS electric actuator.