

M Series Manual Handwheel Gear Actuators for Type A11, A31A and A41 Butterfly Valves

M Series handwheel gear actuators (figure 1) are totally enclosed, weatherproof, worm gear actuators for reliable manual operation with Type A11, A31A and A41 High Performance Butterfly Valves. The M Series actuator consists of a body housing, cover, worm gear, input shaft, and handwheel. The housing is grease-packed.

Note

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Features

- **Long Service Life**—Rugged construction

provides stability and corrosion resistance. The unit is totally enclosed for weatherproof operation.

- **Accurate Valve Disc Positioning**—Two adjustable stops are located in the housing for correct adjustment of disc position. The actuator is inherently self-locking, unless subjected to high vibration.

- **Overtravel Capability**—Provides for five degrees of overtravel in both directions for precise positioning of the valve disc.

Installation

The M Series gear actuator is normally mounted on a valve at the factory. However, the actuator can be field-mounted; it can be mounted in any position on the Type A11 or A31A and it can be mounted in positions 1 and 3 on the Type A41, as shown in figure 2. Make clearance considerations before mounting the actuator to determine the most suitable mounting position. Dimensions are shown in figure 3.



W4715-1 / IL

Figure 1. M Series Handwheel Gear Actuator



Specifications

Actuator Sizes

See tables 1, 2, and 3

Valve Compatibility

■ Accepts Type A11 valve square-end shafts from 10.3 to 34.9 mm (0.405 to 1.375 inches), keyed shafts from 38.1 to 44.5 mm (1-1/2 to 1-3/4 inches)⁽¹⁾.

■ Accepts Type A31A valve keyed shafts from 44.5 to 57.2 mm (1-3/4 to 2-1/4 inches).

■ Accepts Type A41 valve Double D shafts from 12.7 to 44.5 mm (1/2 to 1-3/4 inches).

See tables 1, 2, and 3

Maximum Torque Output

See tables 1, 2, and 3

Handwheel Rotation

Clockwise handwheel rotation closes the valve (produces clockwise rotation of the valve shaft)

Construction Materials

Housing and Cover: Cast iron

Worm: Steel

Worm Gear: Manganese Bronze

Input Shaft: Steel (303 stainless steel on request)

Handwheel: Cast Iron

Mounting Positions

See figure 2

Approximate Weight without Handwheel

ACTUATOR	TYPE A11		TYPE A31A	
	WEIGHT			
	kg	Pounds	kg	Pounds
1KE	7.3	16	5.4	12
2KE	10	22	8.6	19
5KE	12.2	27	10	22
7KE	22.6	50	20.4	45
9KE	31.8	70	31.8	70
10KE	56.7	125	56.7	125

ACTUATOR	WEIGHT	
	kg	Pounds
0KE/D1, 0KE/D2, 0KE/D3	2.7	6
2KE/D4	8.2	18
6KE/D5, 6KE/D6	13.6	30
9KE/D7	29.5	65

Handwheel Weight

8-inch: 2.0 kg (4.50 lb)

12-inch: 4.0 kg (6.75 lb)

18-inch: 4.5 kg (10 lb)

24-inch: 5.4 kg (12 lb)

36-inch: 7.8 kg (17.25 lb)

Dimensions

See figures 3

Options

■ Locking plates with padlock for fixed positioning

■ Stops are typically set every 10 degrees, but can be special ordered with stops set up to 45 degrees from both ends.

■ Handwheel extensions

1. As an option, CL600 NPS 10 (with 1-1/2 inch keyed shaft) and NPS 12 (with 1-3/4 inch shaft) Type A11 valves require a keyed connection if being used with size 9KE or 10KE-6 actuators.

Table 1. M Series Gear Actuator for A11 (CL600)

VALVE SIZE, NPS	VALVE SHAFT SIZE, INCHES	MAXIMUM RECOMMENDED TORQUE ⁽¹⁾		ACTUATOR SIZE	HANDWHEEL DIAMETER, INCHES	RIM FORCE ⁽²⁾		NUMBER OF TURNS TO CLOSE ⁽³⁾	MAXIMUM TORQUE RATING OF ACTUATOR	
		n•m	lb•in			n	lb		N•m	Lbf•in
3	13/32	113	1,000 ⁽⁴⁾	1KE	12	80	18	9.5	452	4,000
4	5/8	303	2,690 ⁽⁴⁾	1KE	12	209	47	9.5	452	4,000
6	7/8	643	5,700	2KE	12	445	100	9.5	678	6,000
		765	6,780 ⁽⁴⁾	5KE		400	90	12.5	904	8,000
8	1	643	5,700	2KE	12	445	100	9.5	678	6,000
		846	7,500	5KE	12	445	100	12.5	904	8,000
		1349	11,960 ⁽⁴⁾	7KE	18	436	98	13.5	2,260	20,000
10	1-3/8	1354	12,000	7KE	18	440	99	13.5	2,260	20,000
	1-1/2	2144	19,000	9KE	24	440	99	16	3,390	30,000
	1-1/2	3520	31,160 ⁽⁴⁾	10KE-6	18	214	48	72	8,474	75,000
12	1-3/8	1354	12,000	7KE	18	440	99	13.5	2,260	20,000
	1-3/4	2144	19,000	9KE	24	440	99	16	3,390	30,000
	1-3/4	3520	31,160 ⁽⁴⁾	10KE-6	18	214	48	72	8,474	75,000

1. Maximum recommended torque for the valve/actuator combination is based on valve shaft rating, actuator rating and rim force.
 2. Rim force required to produce Maximum recommended torque.
 3. This column shows the number of times the handwheel must be turned to close the valve 90 degrees.
 4. Shaft rating of the A11 valve.

Ordering Information

Because the M Series actuators for the A11 and A31A valves are often available in more than one size for any given valve size, they should be chosen according to torque requirements of the valve.

Please specify actuator size when specifying valve size and class.

M Series actuators for the A41 valve have been matched to the requirements of each valve size and should be chosen according to the valve size requested.

M Series Actuators

Table 2. M Series Gear Actuator for A31A

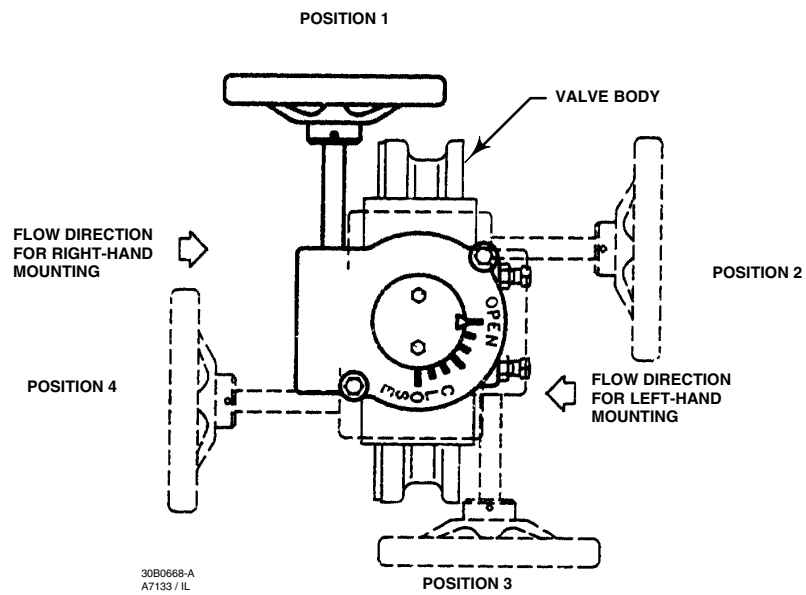
VALVE SIZE, NPS	VALVE SHAFT SIZE, INCHES	MAXIMUM RECOMMENDED TORQUE ⁽¹⁾		ACTUATOR SIZE	HANDWHEEL DIAMETER, INCHES	RIM FORCE ⁽²⁾		NUMBER OF TURNS TO CLOSE ⁽³⁾	MAXIMUM TORQUE RATING OF ACTUATOR	
		n•m	lb•in			n	lb		N•m	Lbf•in
CL150										
14	1-3/16	644	5,700	2KE	12	445	100	9.5	271	6,000
		847	7,500	5KE	12	445	100	12.5	904	8,000
		1287	11,390 ⁽⁴⁾	7KE	18	418	94	13.5	2,260	20,000
16	1-1/4	644	5,700	2KE	12	445	100	9.5	271	6,000
		847	7,500	5KE	12	445	100	12.5	904	8,000
		1,579	13,970 ⁽⁴⁾	7KE	18	512	115	13.5	2,260	20,000
18	1-1/2	1356	12,000	7KE	18	440	99	13.5	2,260	20,000
		2188	19,370 ⁽⁴⁾	9KE	24	449	101	16	3,390	30,000
		2188	19,370	10KE-6	18	133	30	72	8,474	75,000
20	1-3/4	1356	12,000	7KE	18	440	99	13.5	2,260	20,000
		2147	19,000	9KE	24	440	99	16	3,390	30,000
		2555	22,620 ⁽⁴⁾	10KE-6	18	156	35	72	8,474	75,000
24	2-1/4	2147	19,000	9KE	24	440	99	16	3,390	30,000
		8,474	75,000	10KE-6	18	516	116	72	8,474	75,000
CL300										
14	1-3/4	1356	12,000	7KE	18	440	99	13.5	2,260	20,000
		2555	22,620 ⁽⁴⁾	9KE	24	525	118	16	3,390	30,000
16	1-3/4	1356	12,000	7KE	18	440	99	13.5	2,260	20,000
		2555	22,620 ⁽⁴⁾	9KE	24	525	118	16	3,390	30,000
18	2-1/4	2147	19,000	9KE	24	440	99	16	3,390	30,000
		6,985	61,830 ⁽⁴⁾	10KE-6	18	423	95	72	8,474	75,000
20	2-3/4	2147	19,000	9KE	24	440	99	1672	3,390	30,000
		8474	75,000	10KE-6	18	516	116	72	8,474	75,000
24	2-3/4	8474	75,000	10KE-6	18	516	116	72	8,474	75,000

1. Maximum recommended torque for the valve/actuator combination is based on valve shaft rating, actuator rating and rim force.
2. Rim force required to produce Maximum recommended torque.
3. This column shows the number of times the handwheel must be turned to close the valve 90 degrees.
4. Shaft rating of the A31A valve.

Table 3. M Series Gear Actuator for A41

VALVE SHAFT SIZE, INCHES	ACTUATOR SIZE	SHAFT RATING		HANDWHEEL DIAMETER, INCHES	RIM FORCE ⁽¹⁾		NUMBER OF TURNS TO CLOSE ⁽²⁾	MAXIMUM TORQUE RATING OF ACTUATOR	
		n•m	lb•in		n	lb		N•m	Lbf•in
1/2	0KE/D1	58	515	8	441	21	6	271	2,400
5/8	0KE/D2	138	1,230	8	227	51			
3/4	0KE/D3	240	2,120	8	391	88			
1	2KE/D4	468	4,140	12	325	73	9.5	678	6,000
1-1/4	6KE/D5	1,110	9,820	24	365	82	10	1,356	12,000
1-1/2	6KE/D6	1,356	12,000	24	445	100			
1-3/4	9KE/D7	2,658	23,520	36	365	82			

1. Rim force required to produce shaft rating torque.
2. This column shows the number of times the handwheel must be turned to close the valve 90 degrees.



NOTE:
ONLY POSITIONS 1 AND 3 ARE APPLICABLE TO TYPE A41.

Figure 2. Available Mounting Positions

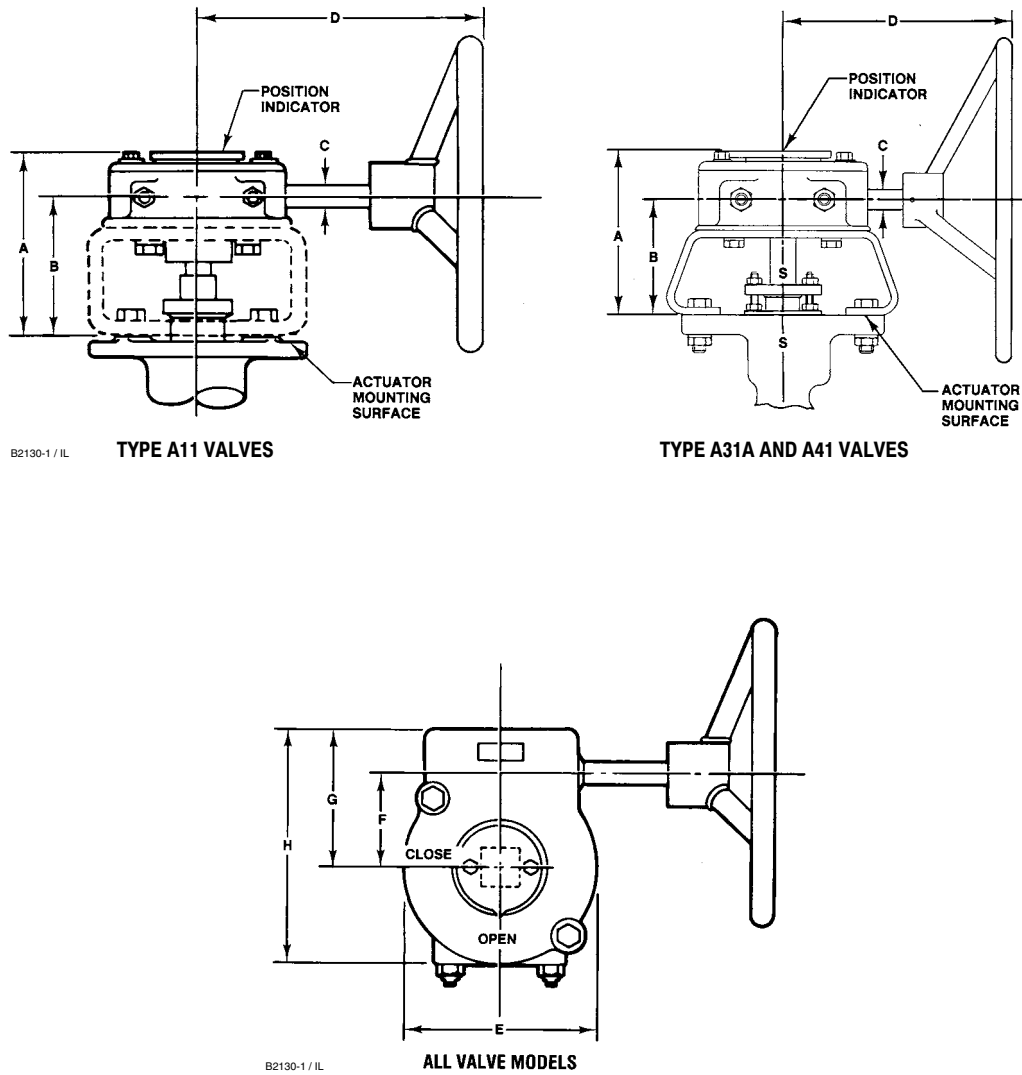


Figure 3. M Series Dimensions (also see tables 4 and 5)

Table 4. Dimensions for A11 and A31A Compatible Actuators

ACTUATOR SIZE	DIMENSIONS												
	A			B			C	D	E	F	G	H	Handwheel Diameter
	A11	A31A CL150	A31A CL300	A11	A31A CL150	A31A CL300							
mm													
1KE	146 ⁽¹⁾	---	---	105 ⁽¹⁾	---	---	15.7	168	127	64	92	156	203
2KE	171	155	---	130	114	---	19.1	206	165	79	117	191	305
5KE	189	173	---	140	124	---	19.1	206	165	79	114	197	305
7KE	203	206 ⁽²⁾	254	146	130 ⁽³⁾	197	25.4	314	203	106	140	241	457
9KE	298	298	298	219	219	219	25.4	375	235	119	156	273	610
10KE-6	298	298	298	219	219	219	19.1	394	235	127	156	273	457
Inches													
1KE	5.75 ⁽¹⁾	---	---	4.12 ⁽¹⁾	---	---	0.62	6.62	5.00	2.50	3.62	6.12	8
2KE	6.75	6.12	---	5.12	4.50	---	0.75	8.12	6.50	3.12	4.62	7.50	12
5KE	7.44	6.81	---	5.50	4.88	---	0.75	8.12	6.50	3.12	4.50	7.75	12
7KE	8.00	8.12 ⁽²⁾	10.00	5.75	5.12 ⁽³⁾	7.75	1.00	12.38	8.00	4.12	5.50	9.50	18
9KE	11.75	11.75	11.75	8.62	8.62	8.62	1.00	14.75	9.25	4.69	6.12	10.75	24
10KE-6	11.75	11.75	11.75	8.62	8.62	8.62	0.75	15.50	9.25	5.00	6.12	10.75	18

1. The 1KE uses the 2KE A and B dimensions when it is mounted on an NPS 4 valve.
 2. If the 7KE is used on an NPS 14 valve the A dimension is 206 mm (8.12 inches), on an NPS 16 valve it is 187 mm (7.38 inches), on an NPS 18 or 20 valve it is 254 mm (10.00 inches).
 3. If the 7KE is used on an NPS 14 or 16 valve, the B dimension is 130 mm (5.12 inches), on an NPS 18 or 20 valve it is 197 mm (7.75 inches).

Table 5. Dimensions for A41 Compatible Actuators

ACTUATOR SIZE	DIMENSIONS								
	A	B	C	D	E	F	G	H	Handwheel Diameter
mm									
0KE/D1 0KE/D2 0KE/D3	127	97	16	178	105	44	67	119	203
2KE/D4	137	102	19	203	165	79	117	191	305
6KE/D5 6KE/D6	159 210	111 162	25	376	168	83	119	200	762 914
9KE/D7	267	187	25	427	235	119	156	273	914
Inches									
0KE/D1 0KE/D2 0KE/D3	5.0	3.814	0.625	7	4.125	1.725	2.625	4.6875	8
2KE/D4	5.38	4.005	0.75	8	6.50	3.125	4.625	7.50	12
6KE/D5 6KE/D6	6.25 8.25	4.375 6.375	1.0	14.81	6.625	3.25	4.688	7.875	30 36
9KE/D7	10.5	7.375	1.0	16.81	9.25	4.6875	6.125	10.75	36

Note

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