

Weco® butterfly valve operators and actuators

All models and sizes of Weco® butterfly valves can be equipped with Weco® operators or actuators as well as other brands of actuators. Typical options include standard and throttling handles, gear operators, chain-wheel operators, vane actuators, pneumatic actuators, special controllers, and positioners.

Standard handle

2 through 12-inch valve sizes



Recommended service

Manual on/off service

- ▶ Positive-stop gripper with integral locking lug ensures full open/full closed operation
- ▶ Model 12 and 12N valves have a detent plate which bolts on the valve body in each of four quadrants
- ▶ Model 22 and 22L valve have a pre-notched top flange with on/off detent positions

Throttling handle

2 through 12-inch valve sizes



Recommended service

Manual throttling service

- ▶ Notched detent plate and positive-stop gripper with integral locking lug ensures positive locking in any of 10 positions from full open or full closed operation
- ▶ Detent plate bolts on the valve body in each of the four quadrants

Pneumatic actuators

Quarter-turn, double acting actuator;
2 through 6-inch valve sizes



Recommended service

Compact, pneumatic actuator for on/off valve operation

- ▶ The only moving part, the vane, is cast integral to the shaft for sturdiness; does not require field lubrication
- ▶ Fully repairable in-line
- ▶ Mounts directly to valve in any quadrant

Gear operators

Weatherproof, worm gear operator;
2 through 24-inch valve sizes



Recommended service

Manual on/off or throttling services

- ▶ Operator has 90° travel arc with internal travel stop screws for a plus or minus 20° adjustment at either end of the travel
- ▶ Mounts on the valve in any quadrant
- ▶ Chain wheel attachment available
- ▶ Hand-wheel shaft extensions available

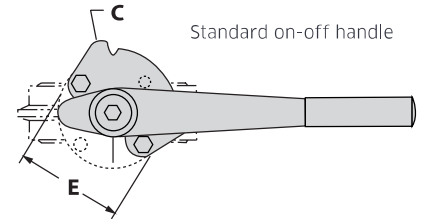
Stem extension



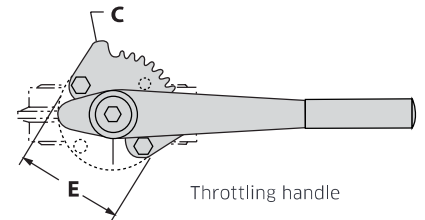
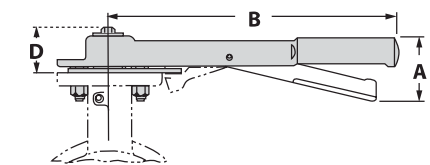
Weco® butterfly valve specifications

Standard and throttle handles

		Valve size, in.			
		2 - 3	4 and 6	8 and 10	12
Standard for models 12, 12N		3234078	3231336	3227946	3227947
Standard for models 22, 22L		3234092	3231337	3216208	3216224
Throttling for all models		3235577	3235578	3228018	3228019
Dimensions, in., mm	A	2 $\frac{3}{4}$ 60.3	2 $\frac{1}{2}$ 63.5	3 76.2	2 $\frac{3}{4}$ 69.9
	B	9 $\frac{1}{2}$ 241	10 $\frac{3}{4}$ 276	15 381	19 483
	C	2 $\frac{3}{4}$ 69.9	2 $\frac{3}{4}$ 69.9	4 102	4 102
	D	1 $\frac{1}{16}$ 36.5	1 $\frac{1}{16}$ 42.9	1 $\frac{1}{16}$ 42.9	1 $\frac{1}{16}$ 42.9
	E	4 102	4 102	6 152	6 152



Standard on-off handle

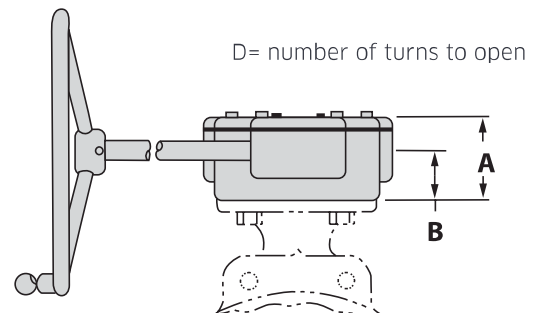
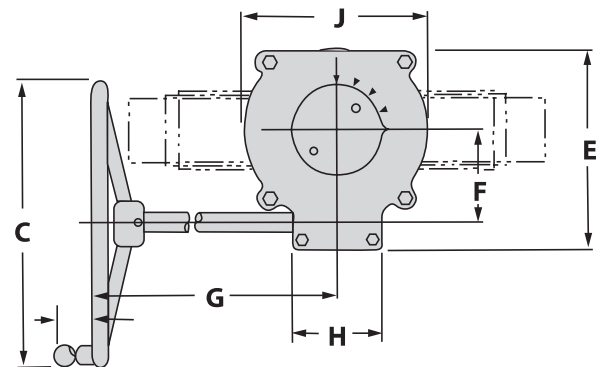


Throttling handle

Note: – Butterfly valve assemblies include a standard detent plate for on-off operations. Handle assemblies for throttling service include a throttling detent plate to replace the standard detent plate on the valve.

Gear operators

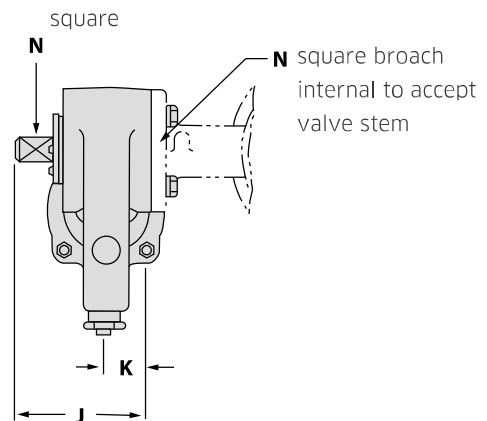
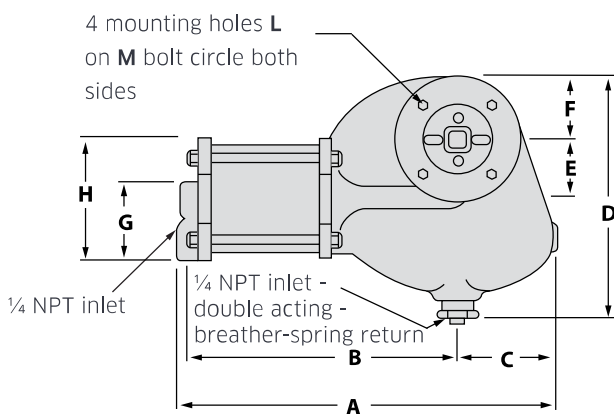
		Valve size, in.		
		2 - 6	8 and 10	12
Standard handwheel		P561734	P561735	P561736
Dimensions, in., mm	A	2.13 54	4.07 104	4.07 104
	B	1.13 28.6	1.59 40.5	1.59 40.5
	C	6.00 152.4	9.84 249.9	9.84 249.9
	D	9.25	8.5	8.5
	E	5.53 141	7.91 201	7.91 201
	F	2.05 52	2.8 71	2.8 71
	G	8.54 216.9	10.04 255	10.91 277
	H	4.02 102	5.12 130	5.12 130
	I	–	–	–
	J	4.02 102	5.43 138	5.43 138



Weco® butterfly valve specifications

Pneumatic actuators - double acting

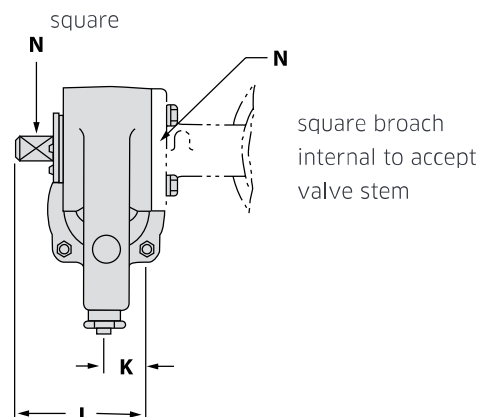
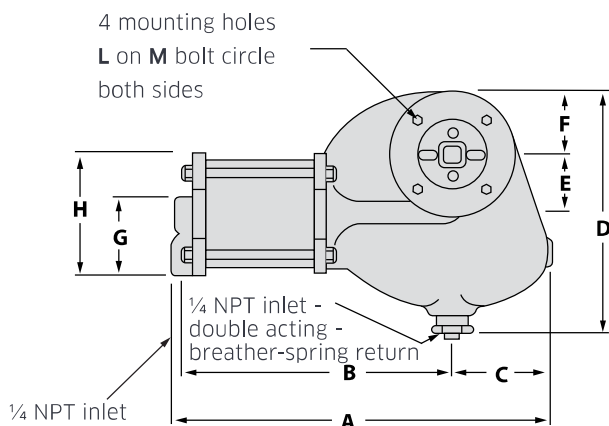
Model		330	350	550	550A	590	590A
Sizes, in.		2 - 6	5 - 6	8 - 10	12	10	12
Part #		3235438	3237369	3236771	3237183	3237886	3237887
Weight	lb	12	20	38	38	67	67
	kg	5.1	9	18	18	31	31
A	in.	12 ⁵ / ₁₆	16 ⁵ / ₁₆	19 ³ / ₁₆	19 ³ / ₁₆	22	22
	mm	319	511	492	492	559	559
B	in.	8 ³ / ₄	12 ⁵ / ₁₆	13 ¹ / ₁₆	13 ¹ / ₁₆	15 ⁵ / ₁₆	15 ⁵ / ₁₆
	mm	222	313	348	348	403	403
C	in.	3 ⁵ / ₁₆	3 ⁵ / ₁₆	5 ⁵ / ₁₆	5 ⁵ / ₁₆	5 ⁵ / ₁₆	5 ⁵ / ₁₆
	mm	84.1	84.1	133	132	132	139
D	in.	7 ⁹ / ₁₆	7 ⁹ / ₁₆	12 ¹ / ₁₆	12 ¹ / ₁₆	12 ¹ / ₁₆	12 ¹ / ₁₆
	mm	198	198	308	308	308	308
E	in.	1 ⁵ / ₁₆	1 ⁵ / ₁₆	3 ⁵ / ₁₆	3 ⁵ / ₁₆	3 ⁵ / ₁₆	3 ⁵ / ₁₆
	mm	49.2	49.2	90.5	90.5	81	81
F	in.	2 ¹ / ₁₆	2 ¹ / ₁₆	3 ⁵ / ₁₆	3 ⁵ / ₁₆	3 ⁵ / ₁₆	3 ⁵ / ₁₆
	mm	52.4	52.4	77.8	77.8	77.8	77.8
G	in.	2	3 ⁵ / ₁₆	3 ⁵ / ₁₆	3 ⁵ / ₁₆	5 ⁵ / ₁₆	5 ⁵ / ₁₆
	mm	50.8	84.1	84.1	84.1	135	135
H	in.	3 ⁵ / ₁₆	6 ¹ / ₂	6 ¹ / ₂	6 ¹ / ₂	10 ⁹ / ₁₆	10 ⁹ / ₁₆
	mm	98.4	165.1	165	165	268	268
J	in.	4 ⁵ / ₁₆	4 ⁵ / ₁₆	5 ⁵ / ₁₆	5 ⁵ / ₁₆	5 ⁵ / ₁₆	5 ⁵ / ₁₆
	mm	110	110	135	135	135	135
K	in.	1 ¹ / ₁₆	1 ¹ / ₁₆	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈
	mm	36.5	36.5	47.6	47.6	47.6	47.6
L	in.	³ / ₈	³ / ₈	¹ / ₂	¹ / ₂	¹ / ₂	¹ / ₂
		16 UNC	16 UNC	13 UNC	13 UNC	13 UNC	13 UNC
M	in.	3 ³ / ₄	3 ³ / ₄	5	5	5	5
	mm	82.6	82.6	127	127	127	127
N	in.	⁵ / ₈	⁵ / ₈	⁷ / ₈	1 ¹ / ₈	⁷ / ₈	1 ¹ / ₈
	mm	15.9	15.9	22.2	28.6	22.2	28.6



Weco® butterfly valve specifications

Pneumatic actuators - spring acting

Model	332	333	354	355	596	597A	
Sizes, in.	2 - 3	3 - 4	4	5 - 6	8 - 10	12	
Part #	3237525	3237368	3237373	3237515	3237865	3237866	
Weight	lb	17	19	29	35	112	125
	kg	7.5	8.5	13	16	51	57
A	in.	19 ⁹ / ₁₆	19 ⁹ / ₁₆	20 ¹ / ₄	20 ¹ / ₄	30 ³ / ₈	30 ³ / ₈
	mm	497	497	514	514	765	765.2
B	in.	15 ³ / ₈	15 ³ / ₈	16 ⁷ / ₁₆	16 ⁷ / ₁₆	24	24
	mm	400	400	418	418	610	610
C	in.	3 ³ / ₁₆	3 ³ / ₁₆	3 ³ / ₁₆	3 ³ / ₁₆	5 ³ / ₁₆	5 ³ / ₁₆
	mm	84.1	84.1	84.1	84.1	129	132
D	in.	8 ⁵ / ₈	8 ⁵ / ₈	8 ⁵ / ₈	8 ⁵ / ₈	13 ³ / ₈	13 ³ / ₈
	mm	219	219	219	219	333	333
E	in.	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	3 ³ / ₈	3 ³ / ₈
	mm	49.2	49.2	49.2	49.2	81	81
F	in.	2 ¹ / ₈	2 ¹ / ₈	2 ¹ / ₈	2 ¹ / ₈	3 ³ / ₈	3 ³ / ₈
	mm	52.4	52.4	52.4	52.4	77.8	77.8
G	in.	2	2	3 ³ / ₈	3 ³ / ₈	5 ³ / ₈	5 ³ / ₈
	mm	50.8	50.8	84.1	84.1	135	135
H	in.	3 ³ / ₈	3 ³ / ₈	6 ¹ / ₂	6 ¹ / ₂	10 ⁹ / ₁₆	10 ⁹ / ₁₆
	mm	98.4	98.4	165	165	268	268
J	in.	4 ⁵ / ₁₆	4 ⁵ / ₁₆	4 ⁵ / ₁₆	4 ⁵ / ₁₆	5 ³ / ₈	5 ³ / ₈
	mm	110	110	110	110	135	135
K	in.	1 ⁷ / ₁₆	1 ⁷ / ₁₆	1 ⁷ / ₁₆	1 ⁷ / ₁₆	1 ⁷ / ₈	1 ⁷ / ₈
	mm	36.5	36.5	36.5	36.5	47.6	47.6
L	in.	3 ⁸ / ₁₆	3 ⁸ / ₁₆	3 ⁸ / ₁₆	3 ⁸ / ₁₆	1 ¹ / ₂	1 ¹ / ₂
		16 UNC	16 UNC	16 UNC	16 UNC	13 UNC	13 UNC
M	in.	3 ¹ / ₄	3 ¹ / ₄	3 ¹ / ₄	3 ¹ / ₄	5	5
	mm	82.6	82.6	82.6	82.6	127	127
N	in.	5 ⁸ / ₁₆	5 ⁸ / ₁₆	5 ⁸ / ₁₆	5 ⁸ / ₁₆	7 ⁸ / ₁₆	1 ¹ / ₈
	mm	15.9	15.9	15.9	15.9	22.2	28.6



Weco® butterfly valve specifications

Weco® actuator sizing specifications

Required operating torques:

There are three torques to be considered when selecting the proper actuator for a butterfly valve:

- ▶ **Seating torque** - The torque required to displace a resilient seat and effect shutoff
- ▶ **Bearing torque** - The torque required to overcome friction forces on the valve shaft bearing surfaces
- ▶ **Dynamic torque** - Torque due to fluid forces which tend to close the valve

in most general butterfly valve applications. Where unusual service conditions exist (such as likelihood of seat swelling, or low and high temperature seat hardening), an additional safety factor may be applicable.

Dynamic torque

Dynamic torque is torque on the valve shaft due to the fluid forces on the valve disc.

This torque is a function of valve diameter, pressure drop, and a torque coefficient (**C_t**) which varies with angle opening. Torque is calculated by the equation:

The torques for resilient seated valves tabulated in this section are the sum of **(1)** and **(2)** above for various shutoff pressures. These tabulated values include a safety factor large enough to insure proper valve operation

T = C_tD³ ΔP	Where:	T = Dynamic torque (in-lb)
		D = Valve Dia (in.)
		C _t = Dynamic torque coefficient (see table below)

C _t vs. Angle open										
Angle open	0	10	20	30	40	50	60	70	80	90
C _t	0	.007	.014	.022	.033	.050	.087	.143	.215	0

Valve Part	Standard Material	Optional Materials (see note)
Seat & O-ring	Nitrile (Buna N) (-20°F to 200°F)	Hypalon®, Polytetrafluoroethylene (PTFE), Viton®, EPDM, Red Natural Rubber
Body	Ductile Iron	Aluminum, Steel, Stainless Steel
Stem (upper & lower)	410 Stainless Steel	316 Stainless Steel
Disc	Ductile Iron	Aluminum, Bronze, 316 Stainless Steel, Ryton®, Kynar®, Halar, Polytetrafluoroethylene (PTFE) Coated, Nickel Plated, Hastelloy®
Spirol/Retainer Pins	302 Stainless Steel	

Weco® butterfly valve specifications

Weco® actuator sizing information

Dynamic torque is not usually of major concern in resilient seated butterfly valves unless the line velocity exceeds 20 fps. If line velocity exceeds this, a check should be made to insure that actuator output exceeds the calculated dynamic torque. Dynamic torque should be checked at 80° open for on-off applications.

Dynamic torque is of prime consideration in situations where line velocity is not recovered downstream of the valve. This situation exists on installations where there is an unlimited source and less than 6 diameters of pipe downstream of the valve. If a valve discharges to the atmosphere, the pressure drop across the valve will be equal to the height of water above the valve for all angles of valve opening. This pressure drop must not exceed the pressure drop tabulated in Maximum ΔP vs. Angle Opening Tables for any angle. If it does, provisions must be made for velocity recovery by adding downstream piping.

Actuator sizing for tee linkages:

For standard tee linkage applications where one actuator operates two butterfly valves of the same size with one valve opening as the other valve closes, the actuator sizing will be the same as for a single butterfly valve application. For the actuator sizing for other tandem linkage applications, consult the factory.

Low-torque valves:

Undercut discs are available for butterfly valve applications that require lower seating torques. For complete information, consult factory.

Actuators sizing torque for Weco® butterfly valves

Valve size, in.	Seating torque in Inch-lb (N*m), @ various line pressures						
	0 psi	50 psi	75 psi	100 psi	125 psi	150 psi	175 psi
	0 kPa	345 kPa	517 kPa	690 kPa	862 kPa	1034 kPa	1207 kPa
2	90 10	90 10	92 10	94 11	96 11	98 11	100 11
2½	130 15	130 15	134 15	138 15	142 16	146 17	150 17
3	200 23	200 23	206 23	212 24	218 25	224 25	230 26
4	350 23	350 40	366 41	382 43	398 45	414 47	430 49
5	535 60	535 60	566 64	597 67	628 71	659 74	690 78
6	770 87	770 87	823 93	876 99	929 105	982 111	1,035 117
8	1,350 153	1,350 153	1,475 167	1,600 181	1,725 195	1,850 209	1,975 223
10	2,100 237	2,100 237	2,340 264	2,580 292	2,820 319	3,060 346	3,300 373
12	3,000 339	3,000 339	3,400 384	3,800 429	4,200 475	4,600 520	5,000 565
14	3,680 416	4,240 479	4,790 541	5,350 605	5,900 667	6,480 732	–
16	4,880 551	5,730 647	6,580 744	7,430 840	8,280 936	9,140 1030	–
18	6,230 704	7,460 843	8,690 982	9,920 1121	11,150 1260	12,390 1400	–
20	7,770 878	9,380 1060	11,000 1243	12,610 1425	14,230 1610	15,840 1790	–
24	11,100 1250	14,010 1580	16,920 1910	19,830 2240	22,740 2570	25,650 2900	–

Note:

- For valves using Polytetrafluoroethylene (PTFE) seats, use torque value at highest standard value rating even for lower pressure applications.
- Above figures are for values used in wet service, for dry service valves contact factory.

Weco® butterfly valve specifications

Weco® actuator sizing specifications

Minimum air pressure for Weco® pneumatic actuators operating Weco® valves at 175 psi rated pressure

Double acting models	Actuator air pressure: psi (kPa)		
	30	50	75
	207	345	517
Valve sizes			
330	2" - 4"	2" - 5"	2" - 6"
350	2" - 6"	2" - 6"	2" - 6"
550	8"	8" - 10"	8" - 10"
550A	–	–	12"
590	8" - 10"	8" - 10"	8" - 10"
590A	12"	12"	12"

Spring return models	Actuator air pressure: psi (kPa) *Note			
	30 (207)	40 (276)	60 (414)	70 (483)
	40 (276)	50 (345)	70 (483)	80 (552)
Valve sizes				
332	2" - 2½"	2 - 2½"	2 - 2½"	2 - 2½"
333	–	–	–	2" - 4"
354	2" - 4"	2" - 4"	2" - 4"	2" - 4"
355	–	–	2" - 6"	2" - 6"
596	–	8" - 10"	8" - 10"	8" - 10"
597A	–	–	12"	12"

- Note:**
- Pressure above line for air to open, spring to close. Below line for air to close, spring to open.
 - All of the above ratings are conservative for normal installations. Abnormally high torquet conditions may necessitate increased actuator capability.
 - Maximum actuator air pressure 120 psi, except 80 psi maximum pressure on Models 350, 590 and 590A.

Weco® pneumatic actuator torque ratings (note the air pressure)

Double acting models	Displacement cu. in. cu. cm	Rated torque in. lb N*m	Pressure to achieve rated torque psi kPa
330	25	1,150	80
	410	130	552
350	72	1,150	30
	1180	130	207
550	120	5,500	80
	1970	622	552
550A	120	5,500	80
	1970	622	552
590	355	5,500	30
	5820	622	207
590A	355	5,500	30
	5820	622	207

Spring return models	Displacement cu. in. cu. cm	Spring closing torque in. lb N*m	Spring opening torque in. lb N*m	Air opening torque @ 80 psi in. lb N*m	Air closing torque @ 80 psi in. lb N*m
332	25	150	300	1,000	850
	410	17	34	113	96
354	25	425	850	725	300
	40	48	96	82	34
596	72	425	850	2,641	2,216
	1180	48	96	298	250
550A	72	1,050	2,100	2,016	966
	1180	119	237	228	109
590	355	3,300	6,600	11,366	8,066
	5820	373	746	1280	911
590A	355	5,000	10,000	9,666	4,666
	5820	565	1130	1100	527

- Note:**
- All of the above ratings are for normal installations.
 - Abnormally high torque conditions may necessitate increased actuator air pressure.

Torque data

Pressure	psi	40	60	80	100	120
	kPa	276	414	552	690	827
Torque output	in. lb	800	1,200	1,600	2,000	2,400
	mm kg	90	136	181	226	271

Minimum actuator pressure for Weco valves at 175 psi line pressure

Valve size		2" - 4"	5"	6"
Pressure	psi	30	45	60
	kPa	207	310	414