



ACTUATOR SELECTION GUIDE FOR FLOW-TEK BALL VALVES

Proper actuator selection is needed to ensure consistent operation of the automated valve. Selecting the proper actuator begins with establishing valve operating torque. Valve operating torque is determined by seating material, operation frequency, media type and line pressure. This guide provides a means of determining the valve operating torque based on these variables.

The following steps are used to select the proper actuator:

1. After selecting the desired seating material, refer to the charts on the following pages to determine the basic torque requirement for the valve.
2. Using the design or maximum operating line pressure and the valve size chose the Valve Torque Requirement from the tables. If line pressure is not listed the next highest pressure nearest the actual pressure should be selected.
3. Determine the Application Factor from the chart below. Select the largest factor if the service application matches more than one of the listed factors.
4. Determine the Frequency of Operation Factor from the chart below.
5. Add the Application Factor and the Frequency of Operation Factor to determine the Total Torque Factor.
6. Multiply the torque from the tables per item 2 by the Total Torque Factor per item 5 to determine the Total Valve Torque Requirement. This will be the torque needed to size the actuator.
7. From the actuator output torque tables select an actuator with an output torque greater than the Valve Torque Requirement.

Pneumatic Actuators

- Double Acting (Air-to-Air): Determine the air supply pressure available to the actuator and select the Actuator Size that exceeds the Valve Torque Requirement.
- Single Acting (Spring Return for fail safe operation, either Fail-Open or Fail-Close): Determine the air supply available to the actuator and select the Actuator Size that exceeds the Valve Torque Requirement for the END of stroke for BOTH the Air Stroke and the Spring Stroke. The actuator selection is optimized when the end of stroke torques are nearly equal.

Electric Actuators

- Select the Actuator Size that exceeds the Valve Torque Requirement.
8. From the EZ Ordering Code Matrix select the mounting kit required to connect the valve and actuator. EZ Ordering Codes are listed by valve series.

Note: Safety factors are not built into the Valve Torque Requirements.

Examples of how to size an actuator can be found on page 6 of this Technical Bulletin.

APPLICATION FACTORS			
Media	Factor	Media	Factor
Clean Particle-Free, Non-Lubricating (water)	1.0	Saturated Steam	1.3
Lubricating Fluid (clean oil)	1.0	Superheated Steam	1.5
Fluids with Solid Particles	1.4	Clean Natural and Other Gasses	1.3
Chilled Water	1.3	Slurries	1.8
Condensed Water	1.4	Dry Powders	1.8
River Water	1.4	Modulating with Positioners	1.3
Low Temperature 0°F to -150°F	1.3	Series 70 Electric On / Off	1.2
Cryogenic Service from -150°F to -425°F	2.0	Cavity Filler Added	1.3
Chlorine Service	1.5	Triad Series 3 Piece	1.15
Lubricant Free or Oxygen Cleaned	1.5	Multiport Valves - See Multiport Torque Tables	

Factors listed above are to be used as a guide only. Actual conditions may vary causing an increase or decrease in the Application Factor.

FREQUENCY OF OPERATION FACTORS	
Frequency	Factor
One or More Cycles Per Day	0.0
Less Than One Cycle Per Week	0.3
Less Than One Cycle Per Month	0.4
Less Than One Cycle Per Six Months	0.5

Total Torque Factor = Application Factor + Frequency of Operation Factor

Total Valve Torque Requirement = Valve Torque Requirement x Total Torque Factor

If a Media Containment Unit is added between the valve and the actuator additional torque must be added to the valve operating torque as follows:

MCU 120 lb-ins
 MCU 3T ...50 lb-ins

MCU 230 lb-ins
 MCU 460 lb-ins

MCU 340 lb-ins
 MCU 570 lb-ins



VALVE TORQUE REQUIREMENTS 2 WAY VALVES

RPTFE SEATS - FULL PORT VALVES

VALVE SIZE	TORQUE, LB-IN - FULL PORT - RPTFE SEATS														
	0	100	200	300	400	500	600	700	800	900	1000	1200	1400	1600	1800
1/4															
1/2	50	50	50	50	52	55	55	55	58	60	60	60	60	60	65
3/4	85	85	87	87	87	90	90	90	90	92	95	95	95	98	100
1	120	120	130	130	130	135	135	135	135	140	140	145	150	150	160
1 1/4	155	160	165	165	180	180	180	185	185	190	195	200	205	215	235
1 1/2	250	250	265	270	275	280	290	295	300	310	315	325	340	350	365
2	360	370	390	400	420	435	450	465	480	495	510	530	540	550	635
2 1/2	450	480	520	560	585	625	660	700	730	765	800	872	942	1013	1083
3	550	610	665	720	770	820	875	930	990	1045	1100	1206	1315	1424	1533
4	1050	1300	1550	1800	2100	2300	2600	2850	3100	3350	3600	4122	4635	5147	5660
6	2400	2850	3300	3700	4150	4550	5000	5400	5700						
8	4600	5000	5400	5800	6200	6650	7100	7400	7800						
10	12500	12800	13200	13500	14700	16900	18100	19000	19400						
12	18500	19000	19500	20000	22000	24000	26000	28000	28400						

TEK-FIL, TFM OR PTFE SEATS - FULL PORT VALVES

VALVE SIZE	TORQUE, LB-IN - FULL PORT - TEK-FIL, PTFE OR TFM SEATS														
	0	100	200	300	400	500	600	700	800	900	1000	1200	1400	1600	1800
1/4															
1/2	35	35	35	36	40	40	40	40	40	42	42	45	47	47	49
3/4	65	65	65	65	65	68	69	70	70	70	70	70	70	70	72
1	85	90	90	95	100	100	105	108	110	112	115	120	125	130	140
1 1/4	140	145	150	155	160	165	170	172	175	180	185	195	205	215	225
1 1/2	210	215	225	230	240	250	255	265	270	280	285	305	320	330	350
2	355	370	380	390	400	410	425	435	445	455	465	490	510	530	550
2 1/2	375	400	450	500	500	505	505	590	600	610	650	698	750	802	854
3	500	500	600	650	680	700	750	810	850	900	950	1035	1125	1216	1307
4	900	1100	1350	1505	1750	1950	2200	2400	2600	2800	3000	3442	3865	4289	4712
6	2000	2400	2850	3250	3625	4000	4450	4825	5300						
8	3000	3600	4200	4750	5325	5850	6450	7000	7600						
10	11300	12200	13000	13700	14800	15400	16200	1700	17800						
12	16600	17600	18700	19700	20600	21400	22500	23400	24500						

2-PC METAL SEATS - FULL PORT VALVES

VALVE SIZE	TORQUE, LB-IN - FULL PORT - MULTI-COMPONENT METAL SEATS								
	LINE PRESSURE, PSI								
	0	100	200	300	400	500	600	700	740
1/2	130	150	160	180	200	220	230	250	260
3/4	210	240	260	280	310	330	350	370	380
1	280	320	360	400	440	480	520	560	570
1 1/5	390	440	500	550	610	660	710	770	790
2	510	590	660	740	810	890	960	1040	1060

- Notes: 1. For Standard Port valves use torque for the next smaller size valve.
Example: 1" Standard Port = 3/4" Full Port,
1" Full Port = 1-1/4" Standard Port
2. For Triad Series Valves multiply listed torque by 1.15.



VALVE TORQUE REQUIREMENTS 2 WAY VALVES

UHMWPE OR 50/50 SEATS - FULL PORT VALVES

VALVE SIZE		TORQUE, LB-IN - FULL PORT - UHMWPE OR 50/50 SEATS																
		LINE PRESSURE, PSI																
		0	100	200	300	400	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200
1/4																		
1/2	50	50	51	55	56	57	58	60	60	60	60	61	62	65	70	71	75	76
3/4	100	105	107	110	112	115	118	120	125	125	130	135	140	142	150	155	160	165
1	150	155	160	165	170	172	178	180	185	185	190	195	200	205	225	230	240	250
1 1/4	225	232	240	250	260	265	270	280	290	290	295	305	320	340	355	370	380	400
1 1/2	350	360	370	385	395	410	420	430	440	450	450	465	485	510	530	555	580	600
2	500	550	650	700	750	780	850	950	1000	1000	1100	1200	1300	1400	1500	1700	1750	1850
2 1/2	750	850	1000	1100	1200	1300	1450	1500	1600	1600	1700	1800						
3	1250	1350	1500	1650	1750	1850	2000	2200	2300	2300	2350	2500						
4	1800	2000	2300	2600	2900	3200	3400	3750	3950	3950	4250	4500						
6	3000	3500	4000	4500	4900	5450	5900	6400										
8	6000	6500	7000	7400	7900	8400	8800	9250										
10																		
12																		

PEEK OR DELRIN SEATS - FULL PORT VALVES

VALVE SIZE		TORQUE, LB-IN - FULL PORT - PEEK OR DELRIN SEATS																	
		LINE PRESSURE, PSI																	
		0	100	200	300	400	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	
1/4																			
1/2		82	85	85	90	90	95	95	100	100	100	105	110	115	120	120	130	140	145
3/4		140	145	145	150	150	160	160	165	165	170	175	180	185	190	190	195	200	210
1		180	185	190	195	200	200	210	212	215	220	225	230	235	240	240	255	260	270
1 1/4		220	225	230	240	245	250	260	265	270	280	285	290	310	330	340	350	365	
1 1/2		335	345	360	375	385	400	410	425	435	450	460	490	515	540	565	590	615	
2		350	450	550	650	700	850	900	1000	1100	1200	1300	1500	1650	1850	2000	2200	2400	
2 1/2		800	950	1000	1150	1250	1400	1500	1600	1700									
3		1350	1500	1700	1850	2000	2200	2300	2500	2600									
4		2100	2400	2650	2900	3200	3500	3800	4000	4200									
6		4600	5000	5400	5900	6300	6750	7200	7600	7800									
8		8260	8980	9690	10410	11130	11940	12750	13290	13700									
10		22440	22980	23700	24240	26390	30340	32500	34110	35600									
12		33210	34110	35010	35910	39500	43090	46680	50270	53700									

Notes: 1. For Standard Port valves use torque for the next smaller size valve.

Example: 1" Standard Port = 3/4" Full Port,
1" Full Port = 1-1/4" Standard Port

2. For Triad Series Valves multiply listed torque by 1.15.



VALVE TORQUE REQUIREMENTS MULTIPORT VALVES

FULL PORT VALVES - PTFE OR TFM 1600 SEATS

VALVE SIZE	MULTIPORT VALVE TORQUE, IN-LB - FULL PORT - PTFE SEATS									
	LINE PRESSURE, PSI									
	0	100	200	300	400	500	600	700	800	1000
1/4 & 3/8	71	75	80	84	89	93	97	102	106	115
1/2	106	108	111	113	115	117	120	122	124	128
3/4	133	136	140	143	146	149	153	156	159	166
1	221	231	241	251	261	271	281	291	301	321
1 1/4	248	265	281	298	315	331	348	364	381	
1 1/2	372	390	407	425	443	460	478	495	513	
2	496	545	593	642	691	739	788	836	885	
2 1/2	938	976	1013	1051	1089	1126	1164	1201	1239	
3	1062	1206	1350	1494	1638	1781	1925	2069	2213	
4	2301	2367	2434	2500	2567	2633	2699	2766	2832	
6	3480	3800	4100	4450	4700	5050	5370	5700	6000	
8	5265	5600	5950	6300	6600	6950	7300	7600	8000	

STANDARD PORT VALVES - PTFE OR TFM 1600 SEATS

VALVE SIZE	MULTIPORT VALVE TORQUE, IN-LB - STANDARD PORT - PTFE SEATS									
	LINE PRESSURE, PSI									
	0	100	200	300	400	500	600	700	800	1000
1/4 & 3/8	71	75	80	84	89	93	97	102	106	115
3/4	106	108	111	113	115	117	120	122	124	128
1	133	136	140	143	146	149	153	156	159	166
1 1/4	221	231	241	251	261	271	281	291	301	321
1 1/2	248	265	281	298	315	331	348	364	381	
2	372	390	407	425	443	460	478	495	513	

Notes: Above torque values are based on PTFE or TFM 1600 seats in clear, non-viscous fluid.

For RPTFE Seats multiply listed torque by 1.15.

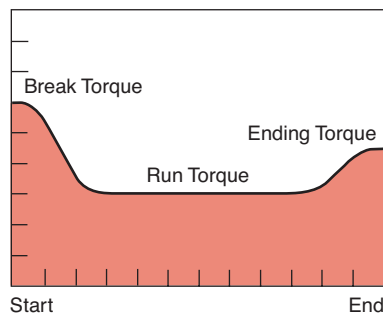
For Tek-Fil Seats multiply listed torque by 1.00.

For 50/50 Seats multiply listed torque by 1.50.

For UHMWPE Seats multiply listed torque by 1.62.

When using the torque table for sizing actuators use the Application Factors listed on page 1.

TYPICAL VALVE TORQUE CURVE

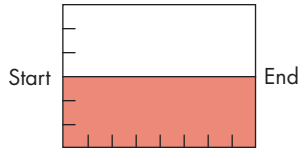


Note: Ball valve torque is high at the beginning of each stroke, called Break Torque. This high initial torque is the result of the ball and seats taking a set after sitting in a static position for a period of time. As the ball is turned the torque decreases. This is known as the Run Torque. The torque will again increase at the end of the stroke as the ball and seats are returned to full contact. This torque is known as Ending Torque and it will be approximately 80% of the Break Torque. This typical curve occurs in both directions when operating a ball valve open to closed or closed to open.



AUTOMATOR SERIES

DOUBLE ACTING TORQUE CURVE

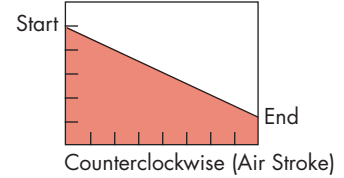


The Double Acting Actuator has a constant output torque throughout travel from start to end, clockwise or counterclockwise rotation.

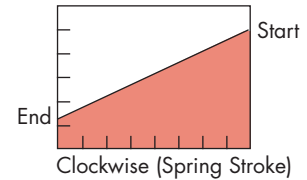
DOUBLE ACTING PNEUMATIC OPERATED TORQUE OUTPUT (LB.-INS.)

Actuator Size	Air Supply Pressure (PSIG)				
	40	60	80	100	120
48	75	113	150	188	225
63	145	221	297	373	449
83	351	536	721	906	1091
93	493	753	1013	1272	1532
119	1058	1615	2171	2728	3285
128	1410	2152	2894	3636	4378
160	2797	4270	5742	7214	8687
210	5783	8826	11870	14914	17957
255	14211	21691	29171	36650	44130

SINGLE ACTING TORQUE CURVES



Counterclockwise (Air Stroke)



Clockwise (Spring Stroke)

SPRING RETURN PNEUMATIC OPERATED TORQUE OUTPUT (LB.-INS.)

Actuator Size	No. Springs Per Piston	Air Supply Pressure (PSIG)											
		40		60		80		100		120		Spring Stroke	
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
48	1	51	32	89	70	126	107	164	145	201	182	43	24
	2/1	39	10	77	48	114	85	152	123	189	160	65	36
	2			64	27	101	64	139	102	176	139	86	49
	3/2			52	5	89	42	127	80	164	117	108	61
	3					77	21	115	59	152	96	129	73
63	2	91	65	167	141	243	217	319	293	395	369	80	54
	3	64	27	140	103	216	179	292	255	368	331	118	81
	4			113	65	189	141	265	217	341	293	156	108
	5			86	27	162	103	238	179	314	255	194	135
	6					135	65	211	141	287	217	232	162
83	2	210	167	395	352	580	537	765	722	950	907	184	141
	3	156	76	341	261	526	446	711	631	896	816	275	195
	4			281	176	466	361	651	546	836	731	360	255
	5			220	97	405	282	590	467	775	652	439	316
	6					369	185	554	370	739	555	536	352
93	2	310	232	570	492	830	752	1089	1011	1349	1271	261	183
	3	218	101	478	361	738	621	997	880	1257	1140	392	275
	4			386	231	646	491	905	750	1165	1010	522	367
	5			294	94	554	354	813	613	1073	873	659	459
	6					462	229	721	488	981	748	784	551
119	2	692	469	1249	1026	1805	1582	2362	2139	2919	2696	589	366
	3	509	174	1066	731	1622	1287	2179	1844	2736	2401	884	549
	4			883	437	1439	993	1996	1550	2553	2107	1178	732
	5			700	142	1256	698	1813	1255	2370	1812	1473	915
	6					1073	404	1630	961	2187	1518	1767	1098
128	2	880	465	1622	1207	2364	1949	3106	2691	3848	3433	945	530
	3			1357	733	2099	1475	2841	2217	3583	2959	1419	795
	4			1094	261	1836	1003	2578	1745	3320	2487	1891	1058
	5					1568	529	2310	1271	3052	2013	2365	1326
	6					1302	57	2044	799	2786	1541	2837	1592
160	2	1819	1118	3292	2591	4764	4063	6236	5535	7709	7008	1679	978
	3	1399	349	2872	1822	4344	3294	5816	4766	7289	6239	2448	1398
	4			2452	1123	3924	2595	5396	4067	6869	5540	3147	1818
	5			2030	353	3502	1825	4974	3297	6447	4770	3917	2240
	6					3154	1196	4626	2668	6099	4141	4546	2588
210	2	3833	2508	6876	5551	9920	8595	12964	11639	16007	14682	3275	1950
	3	2859	868	5902	3911	8946	6955	11990	9999	15033	13042	4915	2924
	4			4930	2275	7974	5319	11018	8363	14061	11406	6551	3896
	5			3949	638	6993	3682	10037	6726	13080	9769	8188	4877
	6					6022	2031	9066	5075	12109	8118	9839	5848
255	2	9487	6747	16967	14227	24447	21707	31926	29186	39406	36666	7464	4724
	3	7125	3015	14605	10495	22085	17975	29564	25454	37044	32934	11196	7086
	4			12243	6762	19723	14242	27202	21721	34682	29201	14929	9448
	5			9880	3030	17360	10510	24839	17989	32319	25469	18661	11811
	6					14998	6778	22477	14257	29957	21737	22393	14173

For Spring Return Actuators select the size where End of Air and End of Spring both exceed the Valve Torque Requirement



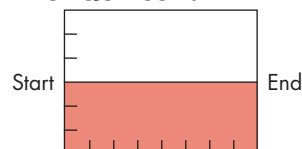
SERIES 73 ELECTRIC ACTUATOR TORQUES

Actuator Size	Torque Output lb.-ins.
S73-1	100
S73-3	300
S73-6	600

SERIES 70 PREMIER ELECTRIC ACTUATOR TORQUES

Actuator Size	Torque Output lb.-ins.
S70-003	300
S70-005	500
S70-008	800
S70-012	1200
S70-020	2000
S70-030	3000
S70-050	5000
S70-065	6500

ELECTRIC ACTUATOR TORQUE CURVE



Electric Actuators have a constant output torque throughout travel from start to end, clock-wise or counter-clock-wise rotation.

EXAMPLES OF HOW TO SIZE AN ACTUATOR

Select Flow-Tek Double Acting (Air-to-Air) pneumatic actuator, Single Acting (Spring Return) pneumatic actuator and a Flow-Tek Electric Actuator for the following application:

Valve: 2" F15, Full Port – Line Pressure: 200 psi – Line Media: Saturated Steam – Seat Material: Tek-Fil® –
 Actuator Air Supply Pressure: 80 psig — Frequency of operation: 4 times per day.

Step 1 Determine The Torque Requirement

Refer to the Valve Torque Requirements chart for a Tek-Fil seat. A 2" valve with line pressure of 200 psi has a torque requirement of 380 lb.-ins. The application is for Saturated Steam so use an Application Factor of 1.3. The frequency of operation is 4 times per day so use a factor of 0.0. The total torque factor is 1.3 (1.3 + 0.0 = 1.3).

Valve Torque Requirement: $380 \times 1.3 = 494$ lb.-ins.

Step 2 Select the Correct Actuator Size

Double Acting Pneumatic Actuator, with Air Supply pressure of 80 psig

From the Double Acting Pneumatic Operated Output chart select the size actuator that exceeds 494 lb.-ins. with an 80 psig air supply. The size 83 actuator has a torque output of 721 lb.-ins. The next size smaller actuator (size 63) only has a torque output of 297.

Correct Actuator: Size 83

Spring Return Pneumatic Actuator, with Air Supply pressure of 80 psig - Same valve as above.

From the Spring Return Pneumatic Operated Output chart select the size actuator that exceeds 494 lb.-ins. with an 80 psig air supply. FOR SPRING RETURN THE ENDING OF THE AIR STROKE AND THE SPRING STROKE MUST EXCEED THE VALVE TORQUE REQUIREMENT OF 494 LB.-INS. The first actuator to accomplish this is the size 119 with 3 springs (air end 1287, spring stroke 549). The next size actuator is a 119 with 4 springs (air end 993, spring end 732). The end stroke of torque on a 119-4 is more balanced and it allows for changes in service conditions.

Correct Actuator: Size 119-4

Electric Actuator

The Application Factors for Series 70 ON/OFF is 1.2. Valve Torque Requirement: $494 \times 1.2 = 592.8$ lb.-ins.

From the Electric Actuator Torque Output charts select the size actuator that exceeds 592.8 lb.-ins.

Correct Actuator: Size S73-6 (torque output of 600 lb.-ins.)

or

Correct Actuator: Size S70-008 (torque output of 800 lb.-ins.)

Step 3 Select the Mounting Kit to Connect the Valve and Actuator

Refer to the EZ Ordering Code Matrix for 2" F15, Full Port valve.

Pneumatic Double Acting: 2" F15 valve with size 083 actuator requires EZ-005S.

Pneumatic Spring Return: 2" F15 valve with size 119-4 actuator requires EZ-010S.

Electric: 2" F15 valve with size S73-6 actuator requires EZ-004S.

2" F15 valve with size S70-008 actuator requires EZ-005S.



ISO MOUNTING KIT - EZ CODE MATRIX "S" DRIVE

TRIAD SERIES VALVES

		Type	ACTUATOR SIZE / MODEL							
S.P.	F.P.	Electric	S70-003 S70-005 S73-1, S73-3, S73-6		S70-008 S70-012 S70-020		S70-030 S70-050 S70-065			
		Pneumatic	B048	B063	B083	B093	B119	B128	B160	B210 B255B
-	1/4"		EZ-002S		EZ-003S					
-	3/8"									
3/4"	1/2"									
1"	3/4"		EZ-004S		EZ-005S					
1 1/4"	1"									
1 1/2"	1 1/4"									
2"	1 1/2"		EZ-050S (73 Series Only)		EZ-006S		EZ-007S		EZ-056S	
2 1/2"	2"						EZ-012S			
	3"						Contact Factory			
	4"									EZ-013S EZ-015S EZ-074S

7000/8000 SERIES VALVES

	Type	ACTUATOR SIZE / MODEL								
F.P.	Electric	S70-003 S70-005 S73-1, S73-3, S73-6		S70-008 S70-012 S70-020		S70-030 S70-050 S70-065				
	Pneumatic	B048	B063	B083	B093	B119	B128	B160	B210	B255B
¼"		EZ-002S		EZ-003S						
3/8"										
½"										
¾"		EZ-008S		EZ-009S						
1 "										
1-¼"										
1-½"		EZ-004S		EZ-005S		EZ-010S				
2 "										
2½"										
3"				EZ-018S EZ-011S		EZ-019S EZ-012S			EZ-013S	
4"										
6"										
8"								EZ-014S	EZ-015S	

Note: EZ CODE is not an actuator sizing guide. Size the actuator for the proper torque of the valve.



ISO MOUNTING KIT - EZ CODE MATRIX "S" DRIVE

F15/30 SERIES VALVES

	Type	ACTUATOR SIZE / MODEL							
F.P.	Electric	S70-003 S70-005 S73-1, S73-3, S73-6		S70-008 S70-012 S70-020		S70-030 S70-050 S70-065			
	Pneumatic	B048	B063	B083	B093	B119	B128	B160	B210 B255B
1/2"		EZ-002S		EZ-003S					
3/4"									
1"		EZ-008S		EZ-009S		EZ-021S		EZ-060S	
1 1/2"									
2"		EZ-004S		EZ-005S		EZ-010S		EZ-059S	
2 1/2"				EZ-011S					
3"						EZ-012S			
4"								EZ-013S	
6"								EZ-014S	
8"								EZ-015S	
10"								EZ-040S	
12"								EZ-030S	

RF15 SERIES VALVES

	Type	ACTUATOR SIZE / MODEL							
F.P.	Electric	S70-003 S70-005 S73-1, S73-3, S73-6		S70-008 S70-012 S70-020		S70-030 S70-050 S70-065			
	Pneumatic	B048	B063	B083	B093	B119	B128	B160	B210 B255B
1"		EZ-002S		EZ-003S					
1 1/2"		EZ-003S		EZ-009S					
2"		EZ-004S		EZ-005S					
3"									
4"				EZ-024S		EZ-025S		EZ-026S	
6"								EZ-015S	
8"						EZ-014S		EZ-074S	
10"								EZ-040S	
12"								EZ-030S	

Note: EZ CODE is not an actuator sizing guide. Size the actuator for the proper torque of the valve.



ISO MOUNTING KIT - EZ CODE MATRIX "S" DRIVE

S7000 (S7500/S7700) SERIES VALVES

	Type	ACTUATOR SIZE / MODEL						
OD Tube Port	Electric	S70-003, S70-005 S73-1, S73-3, S73-6		S70-008, S70-012 S70-020		S70-030, S70-050 S70-065		
	Pneumatic	B048	B063	B083	B093	B119	B128	B160
1/2"		EZ-002S		EZ-003S				
3/4"								
1"								
1 1/2"		EZ-008S		EZ-009S		EZ-021S		
2"		EZ-004S		EZ-005S		EZ-010S		

S70 / S90 SERIES VALVES

	Type	ACTUATOR SIZE / MODEL			
S.P.	Electric	S70-003, S70-005 S73-1, S73-3, S73-6		S70-008, S70-012, S70-020	
	Pneumatic	B048	B063	B083	B093
3/4"		EZ-002S		EZ-003S	
1"					
1 1/2"		EZ-031S		EZ-032S	
2"		EZ-004S		EZ-005S	

S85 SERIES VALVES

	Type	ACTUATOR SIZE / MODEL						
F.P.	Electric	S70-003, S70-005 S73-1, S73-3, S73-6		S70-008, S70-012 S70-020		S70-030, S70-050 S70-065		
	Pneumatic	B048	B063	B083	B093	B119	B128	B160
½"		EZ-002S						
¾"								
1"		EZ-008S		EZ-009S				
1¼"								
1½"		EZ-004S		EZ-005S		EZ-010S		
2"								
2½"				EZ-006S		EZ-007S		
3"				EZ-018S		EZ-019S		

MPT130 / MPC 130 SERIES VALVES

		Type	ACTUATOR SIZE / MODEL						
MPT Size	MPC Size	Electric	S70-003, S70-005 S73-1, S73-3, S73-6		S70-008, S70-012 S70-020		S70-030, S70-050 S70-065		
		Pneumatic	B048	B063	B083	B093	B119	B128	B160
¼" - ½"	½"		EZ-034S		EZ-035S				
¾"	¾"								
1"	1"		EZ-036S		EZ-037S				
1¼"	-								
1½"	1½"		EZ-048S		EZ-038S		EZ-039S		
2"	2"								

Note: EZ CODE is not an actuator sizing guide. Size the actuator for the proper torque of the valve.



ISO MOUNTING KIT - EZ CODE MATRIX "S" DRIVE

MPT230 / MPC 230 SERIES VALVES

		Type	ACTUATOR SIZE / MODEL							
MPT 230 Size	MPC 230 Size	Electric	S70-003 S70-005 S73-1, S73-3, S73-6		S70-008 S70-012 S70-020		S70-030 S70-050 S70-065			
		Pneumatic	B048	B063	B083	B093	B119	B128	B160	B210 B255B
1/4" - 1/2"	1/2"		EZ-034S							
3/4"	3/4"		EZ-036S		EZ-037S					
1"	1"									
1 1/4"	-		EZ-048S		EZ-041S					
1 1/2"	1 1/2"				EZ-038S		EZ-039S			
2"	2"				EZ-042S		EZ-043S			
2 1/2"	2 1/2"				EZ-044S		EZ-045S			
3"	3"									
4"	4"								EZ-046S	

MPF150/300 SERIES VALVES

	Type	ACTUATOR SIZE / MODEL							
F.P.	Electric	S70-003 S70-005 S73-1, S73-3, S73-6		S70-008 S70-012 S70-020		S70-030 S70-050 S70-065			
	Pneumatic	B048	B063	B083	B093	B119	B128	B160	B210 B255B
1/2"		EZ-034S							
3/4"		EZ-036S		EZ-037S					
1"									
1 1/2"		EZ-048S		EZ-038S		EZ-039S			
2"				EZ-042S		EZ-043S			
2 1/2"				EZ-044S		EZ-045S			
3"									
4"								EZ-046S	
6"								EZ-073S	
8"						EZ-047S		EZ-075S	

*8" Available in MPF 150 only.

Note: EZ CODE is not an actuator sizing guide. Size the actuator for the proper torque of the valve.



ISO MOUNTING KIT - EZ GEAR CODE MATRIX "S" DRIVE

TRIAD SERIES VALVES

		GEAR SIZE / MODEL			
S.P.	F.P.	FTG22	FTG30	FTG50	FTG80
-	1/4"	EZ-003S			
-	3/8"				
3/4"	1/2"				
1"	3/4"				
1 1/4"	1"	EZ-005S	EZ-007S		
1 1/2"	1 1/4"				
2"	1 1/2"	EZ-006S			
2 1/2"	2"				
-	3"	EZ-020S	EZ-012S	EZ-015S	
-	4"		EZ-014S		

7000/8000 SERIES VALVES

	GEAR SIZE / MODEL			
F.P.	FTG22	FTG30	FTG50	FTG80
¼", 3/8", ½"	EZ-003S			
¾"				
1"	EZ-009S			
1-¼"				
1-½"	EZ-005S			
2"				
2½"	EZ-006S			
3"	EZ-020S	EZ-012S		
4"				
6"		EZ-014S	EZ-015S	
8"				

Note: EZ CODE is not an gear sizing guide. Size the gear for the proper torque of the valve.



ISO MOUNTING KIT - EZ GEAR CODE MATRIX "S" DRIVE

F15/30 SERIES VALVES

	GEAR SIZE / MODEL				
F.P.	FTG22	FTG30	FTG50	FTG80	
½"	EZ-003S				
¾"					
1"					
1¼"					
1½"	EZ-009S				
2"					
2½"	EZ-005S	EZ-010S			
3"					
4"	EZ-011S	EZ-012S	EZ-013S		
6"					
8"		EZ-014S	EZ-015S		
10"					
12"				EZ-030S	

RF15 SERIES VALVES

	GEAR SIZE / MODEL			
S.P.	FTG22	FTG30	FTG50	FTG80
¾"	EZ-003S			
1"				
1-½"	EZ-009S			
2"	EZ-003S			
3"	EZ-026S			
4"				
6"				
8"	EZ-014S	EZ-015S		
10"				
12"			EZ-030S	

Note: EZ CODE is not an gear sizing guide. Size the gear for the proper torque of the valve.



ISO MOUNTING KIT - EZ GEAR CODE MATRIX "S" DRIVE

S7000 (S7500/S7700) SERIES VALVES

	GEAR SIZE / MODEL			
OD Tube Port	FTG22	FTG30	FTG50	FTG80
1/2"	EZ-003S			
3/4"				
1"				
1 1/2"				
2"	EZ-005S			

S70 / S90 SERIES VALVES

	GEAR SIZE / MODEL			
S.P.	FTG22	FTG30	FTG50	FTG80
¾"	EZ-003S			
1"	EZ-009S			
1-½"	EZ-005S			
2"				
2½"				
3"				

S85 SERIES VALVES

	GEAR SIZE / MODEL			
F.P.	FTG22	FTG30	FTG50	FTG80
1/2"	EZ-003S			
3/4"				
1"				
1-1/4"				
1-1/2"	EZ-005S			
2"				
2 1/2"				
3"				
	EZ-018S	EZ-019S		

MPT130 / MPC 130 SERIES VALVES

		GEAR SIZE / MODEL			
MPT Size	MPC Size	FTG22	FTG30	FTG50	FTG80
1/4-1/2"	1/2"	EZ-035S			
3/4"	3/4"				
1"	1"				
1 1/4"	-				
1 1/2"	1 1/2"	EZ-038S	EZ-039S		
2"	2"				

Note: EZ CODE is not an gear sizing guide. Size the gear for the proper torque of the valve.



ISO MOUNTING KIT - EZ GEAR CODE MATRIX "S" DRIVE

MPT230 / MPC230 SERIES VALVES

		GEAR SIZE / MODEL			
MPT230 Size	MPC230 Size	FTG22	FTG30	FTG50	FTG80
1/4" - 1/2"	1/2"	EZ-035S			
3/4"	3/4"	EZ-037S			
1"	1"				
1 1/4"	-	EZ-038S			
1 1/2"	1 1/2"		EZ-043S		
2"	2"	EZ-042S			
2 1/2"	2 1/2"		EZ-045S	EZ-046S	
3"	3"	EZ-044S			
4"	4"				

MPF150/300 SERIES VALVES

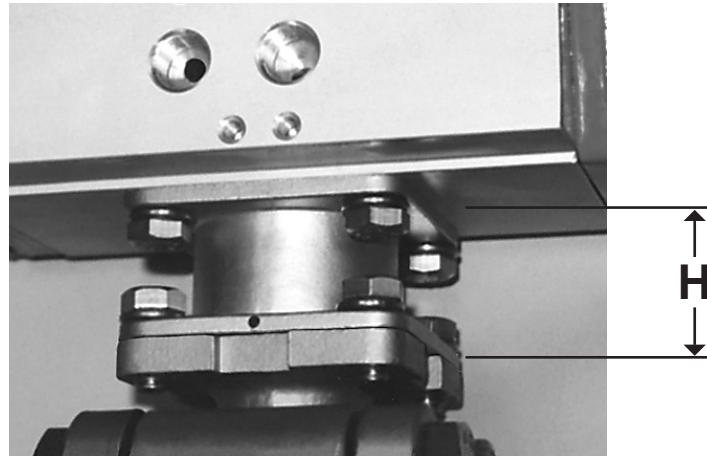
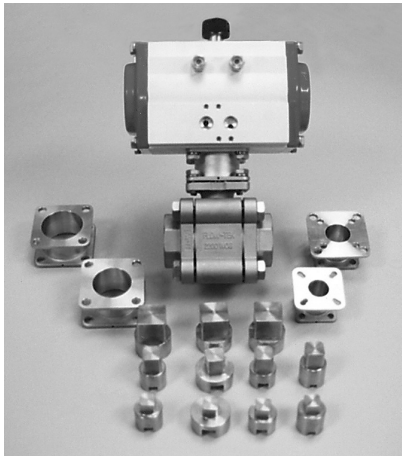
	GEAR SIZE / MODEL			
F.P.	FTG22	FTG30	FTG50	FTG80
1/2"	EZ-035S			
3/4"				
1"	EZ-037S			
1-1/2"	EZ-038S			
2"	EZ-042S	EZ-043S		
2 1/2"				
3"	EZ-044S	EZ-045S	EZ-046S	
4"				
6"				
8"			EZ-051S	

Note: EZ CODE is not an gear sizing guide. Size the gear for the proper torque of the valve.



FLUSH MOUNTING KITS

Flow-Tek's Flush Mounting Kits are available on valves sizes 1/4" to 2-1/2" and they provide a very attractive method of connecting Flow-Tek valves and actuators. At 1.30" in height, these kits offer a low profile connection between the actuator and valve and reduce the overall space requirements of the assembly. The kits come complete with an investment cast (CF8M) Flush Mount Housing, 304 Stainless Steel coupler and Stainless Steel hardware. In addition to the reduced space requirements, these kits offer some additional advantages over standard mounting kits. They will protect the packing area of the valve during caustic washdowns and the design offers full access to the mounting bolts for fast and easy actuator mounting. These kits can be mounted in any direction and feature a weep hole to eliminate the possibility of an internal buildup of media. The kits also allow the user to field mount different size actuators to a single valve. All couplers are machined to close tolerances. Flow-Tek is offering these low profile kits in addition to our standard mounting kits.



FLUSH MOUNTING KIT SELECTION CHART

Valve Series and Size					Pneumatic Actuator	Electric Actuator	FM Kit Number	H In (mm)
Triad		7000/8000 S85*	F15/F30	S7000				
SP	FP							
3/4" 1"	1/4" 3/8" 1/2" 3/4"	1/4" 3/8" 1/2" 3/4"	1/2" 3/4"	1/2" 3/4" 1"	B048 B063	S73-1 S73-2 S73-3	FM-001	1.30 (33)
					B083 B093		FM-002	
		1" 1 1/4"	1"	1 1/2"	B048 B063	S73-1 S73-2 S73-3 S70-003 S70-005	FM-003	
					B083 B093	S70-008 S70-012	FM-004	
					B119 B128		FM-005	
1 1/4" 1 1/2"	1" 1 1/4"	1 1/2" 2"	1 1/2" 2"	2"	B063	S73-6 S70-003 S70-005	FM-006	
					B083 B093	S70-008 S70-012 S70-020	FM-007	
					B119 B128		FM-008	
2" 2 1/2"	1 1/2" 2"	2 1/2"			B063	S73-6 S70-003 S70-005	FM-009	
					B083 B093	S70-008 S70-012 S70-020	FM-010	
					B119 B128		FM-011	

*S85 is not available in 1/4" and 3/8" sizes.



CONVERSIONS

Length Equivalents						
To Obtain by Multiply Number of	Meters	Inches	Feet	Millimeters	Miles	Kilometers
Meters	1	39.37	3.2808	1000	0.0006214	0.001
Inches	0.0254	1	0.0833	25.4	0.0001578	0.0000254
Feet	0.3048	12	1	304.8	0.0001894	0.0003048
Millimeters	0.001	0.03937	0.0032808	1	0.0000006214	0.000001
Miles	1609.35	63,360	5,280	1,609,350	1	1.60935
Kilometers	1,000	39,370	3280.83	1,000,000	0.62137	1

1 meter = 100 centimeters = 1000 millimeters = 0.001 kilometers = 1,000,000 micrometers
To convert metric units, adjust the decimal point.
1 millimeter = 1000 microns = 0.03937 inches = 39.37 mils.

Pressure Equivalents								
To Obtain by Multiply Number of	Kg. Per Sq. Cm.	Lb. Per Sq. In.	Atmosphere	Bar	In. of Hg.	Kilopascals	In. of Water	Ft. of Water
Kg. Per Sq. Cm.	1	14.22	0.9678	0.98067	28.96	98.067	394.05	32.84
Lb. Per Sq. In.	0.07031	1	0.06804	0.06895	2.036	6.895	27.7	2.309
Atmosphere	1.0332	14.696	1	1.01325	29.92	101.325	407.14	33.93
Bar	1.01972	14.5038	0.98692	1	29.53	100	402.156	33.513
In. of Hg.	0.03453	0.4912	0.03342	0.033864	1	3.3864	13.61	1.134
Kilopascals	0.0101972	0.145038	0.0098696	0.01	0.2953	1	4.02156	0.33513
In. of Water	0.002538	0.0361	0.002456	0.00249	0.07349	0.249	1	0.0833
Ft. of Water	0.03045	0.4332	0.02947	0.029839	0.8819	2.9839	12	1

1 ounce/sq. inch = 0.0625 lbs./sq. inch

Volume Equivalents							
To Obtain by Multiply Number of	Liters	Cubic Inches	Cubic Feet	U.S. Quart	U.S. Gallon	Imperial Gallon	U.S. Barrel (Petroleum)
Liters	1	61.0234	0.03531	1.05668	0.264178	0.220083	0.00629
Cubic Inches	0.01639	1	5.787 x 10 ⁻⁴	0.01732	0.004329	0.003606	0.000103
Cubic Feet	28.317	1728	1	29.9221	7.48055	6.22888	0.1781
U.S. Quart	0.94636	57.75	0.03342	1	0.25	0.2082	0.00595
U.S. Gallon	3.78543	231	0.13368	4	1	0.833	0.02381
Imperial Gallon	4.54374	277.274	0.16054	4.80128	1.20032	1	0.02877
U.S. Barrel (Petroleum)	158.98	9702	5.6146	168	42	34.973	1

1 cubic meter = 1,000,000 cubic centimeters
1 liter = 1000 milliliters

Volume Rate Equivalents						
To Obtain by Multiply Number of	Liters per Minute	Cubic Meters per Hour	Cubic Feet per Hour	Liters per Hour	U.S. Gallon per Minute	U.S. Barrel per Day
Liters per Minute	1	0.06	2.1189	60	0.264178	9.057
Cubic Meters per Hour	16.667	1	35.314	1000	4.403	151
Cubic Feet per Hour	0.4719	0.028317	1	28.317	0.1247	4.2746
Liters per Hour	0.016667	0.001	0.035314	1	0.004403	0.151
U.S. Gallon per Minute	3.785	0.2273	8.0208	227.3	1	34.28
U.S. Barrel per Day	0.1104	0.006624	0.23394	6.624	0.02917	1

Torque Conversion Factors								
To Obtain by Multiply Number of	Lb. Inches	Lb. Ft.	g - cm	kg - cm	kg - m	mN - m	cN - m	N - m
Lb. - Ins.	1	0.083	11.52.1	1.152	0.0115	113	11.3	0.113
Lb. - Ft.	12	1	13826	13.83	0.138	1356	135.6	1.356
g - cm	0.0009	0.00007	1	0.001	0.00001	0.098	0.01	0.0001
kg - cm	0.868	0.072	1000	1	0.01	98.07	9.807	0.098
kg - m	86.8	7.233	100000	100	1	9807	980.7	98.7
mN - m	0.009	0.0007	10.2	0.01	0.0001	1	0.1	0.001
cN - m	0.088	0.007	102	0.102	0.001	10	1	0.01
N - m	8.851	0.738	10197	10.2	0.102	1000	100	1

American Standard Metric Standard International System - S.I.

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