

M&J VALVE

AN SPX BRAND

Technical Specifications Ball-Trol™ Rotary Control Valve



SPX®

Ball-Trol™ Rotary Control Valve

The Ball-Trol rotary control valve is an unique ball valve design that exhibits full open¹, no pressure drop and excellent control through tapered slots at the low end. This control valve operates with 90 degrees rotation and has up to a 350:1 control range. Low noise and anti-cavitation trims are available.

Features

- **Oversized Ball** – The large ball size enables the full open through port to be designed with a V-Slot taper, which offers good control while rotating 90 degrees.
- **Unobstructed Line Size¹** – When open, the Ball-Trol offers unobstructed line size through bore which relates to high flow capacity (Cv) with minimum pressure drop across the valve.
- **Multi-Stage, Multi-Port Deflector Plates²** – These parallel plates are specifically designed to absorb pressure drop across the valve in stages; flow velocities are held within reasonable limits as opposed to the large, single drop associated with most other designs. Plates make use of resonant dampening to limit velocities and reduce both noise and cavitation. These plates are located in the bore of the ball and will affect the full open Cv.
- **Stem Sealing** – The Ball-Trol is designed with a positively retained stem to allow removal of topworks with valve under pressure. The design utilizes three seals to insure the integrity of the stem seal. The primary seal is a backseated design using reinforced TFE, combined with a secondary inner seal and an externally replaceable outer seal. Between the inner and outer seal, a port with a check fitting is provided for integrity testing and venting prior to outer seal removal. (See Figure 2)
- **Double-Seated Trunnion Mounted Ball Valve**– This offers the advantages of a ball valve without the disadvantages. The pressure-energized upstream seat is used as the sealing seat, and the downstream seat is used to guide the flow.
- **Bi-Directional** – Ball-Trol valves may be installed for flow in either direction.

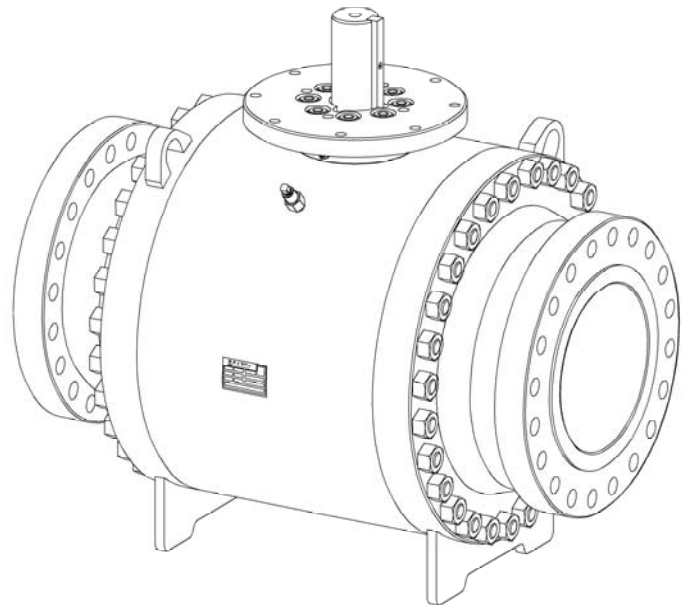


Figure 1. Ball-Trol Rotary Control Valve

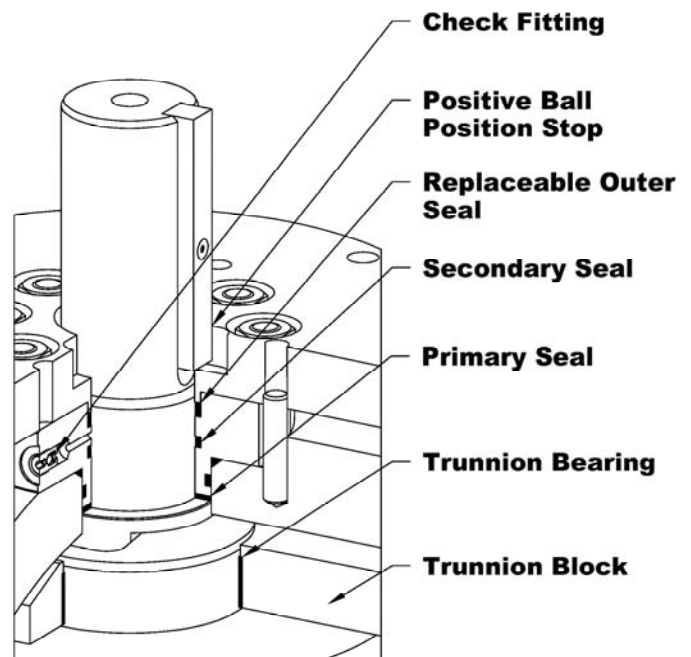


Figure 2

1 The V-Slot without trim, the V-Slot with trim (in slot), and the full bore ball (no V-Slots) allows unobstructed flow in the full open position. The Parallel plate trim does obstruct the flow in the full open position.

2 Patented

Specifications

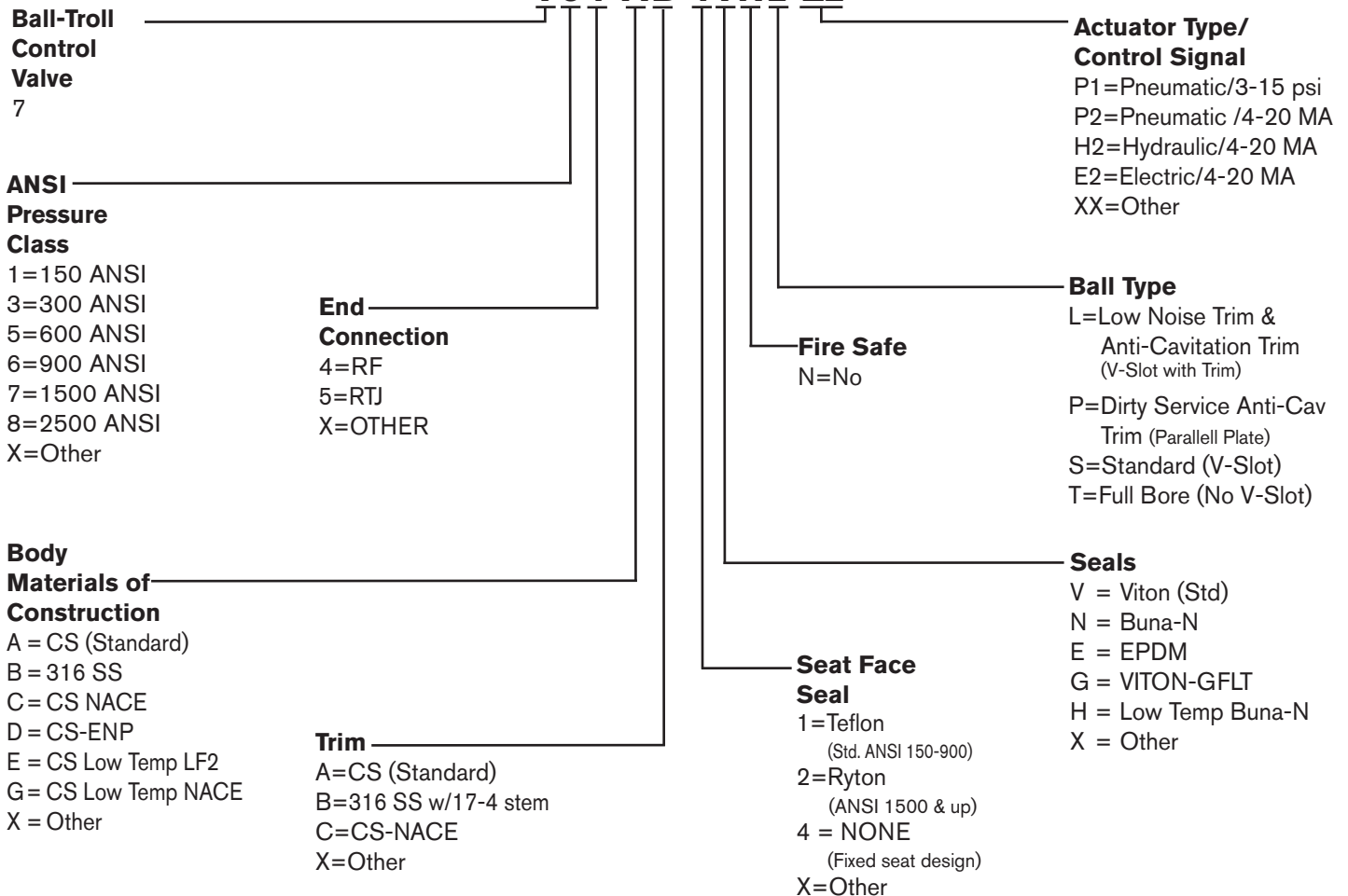
The M&J Ball-Trol is produced in an environment conforming to API-Q1 and ISO-9001 and designed, manufactured, tested and certified to one or more of the following: API-6D, ANSI B16.5, ANSI B16.10, ANSI B16.34, ANSI B2.1, API-598, API-1104, BS 2080, BS 5416, BS 6755.

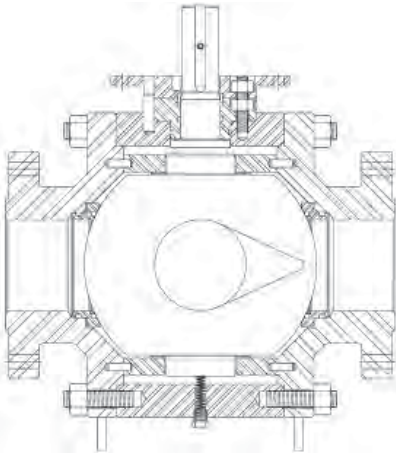
AVAILABLE BODY AND TRIM MATERIALS		
Description	Standard	Optional
Body, Tailpiece Assembly	ASTM A105 (Forging)	ASTM A105 ⁽¹⁾ ASTM A350 LF2 ASTM A182 F316 ASTM A105/003 ENP ASTM A350 LF2/003 ENP
Stem	AISI 4140/ENP	AISI 4140/ENP ⁽¹⁾ ASTM A564 Gr. 530 H1150 (17-4PH)
Ball	ASTM A105/EHC	ASTM A105/EHC ⁽¹⁾ ASTM A182 F316 HCP
Seat Ring	ASTM A105/ENP	ASTM A105/ENP ⁽¹⁾ ASTM A182 F316
Body Seal Seat Skirt Seal Stem Housing Inner Seal Stem Housing Outer Seal	VITON	BUNA-N EPDM, VITON-GFLT LOW TEMP BUNA-N
Seat Face Seal	GLASS FILLED TFE	RYTON ⁽²⁾
Stem Gasket, Gland Ring	GLASS FILLED TFE	

1. Material in accordance with NACE MR0175-2002
2. Registered trademark of Phillips Petroleum

BALL-TROL MODEL NUMBER

754-AB-1VNL-E2





Ball-Trol V-Slot with no Trim

Inherent Flow Characteristics

“Inherent flow characteristics” of a valve describes the relationship between flow capacity of the valve and percent opening of the valve while a constant pressure drop is maintained across the valve. Plotted in the figure below are three standard flow characteristics (Linear, Equal Percentage, and Hyperbolic). The Ball-Trol valve with the tapered V-slot exhibits an Equal Percentage type curve. When trim is added in the V-slot, the Ball-Trol valve flow characteristic becomes Hyperbolic. The Parallel Plate trim is Modified Equal Percent.

Sizing

Introduction

Sizing equations presented here are based on ANSI/ISA Standard S75.02, Control Valve Sizing Equations. The empirical data was derived using test procedures outlined in the ANSI/ISA Standard S75.02, Control Valve Capacity Test Procedure and the ISA Handbook of Control Valves, second edition.

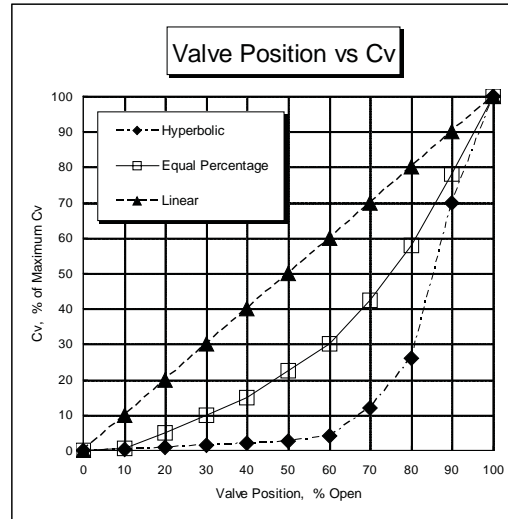
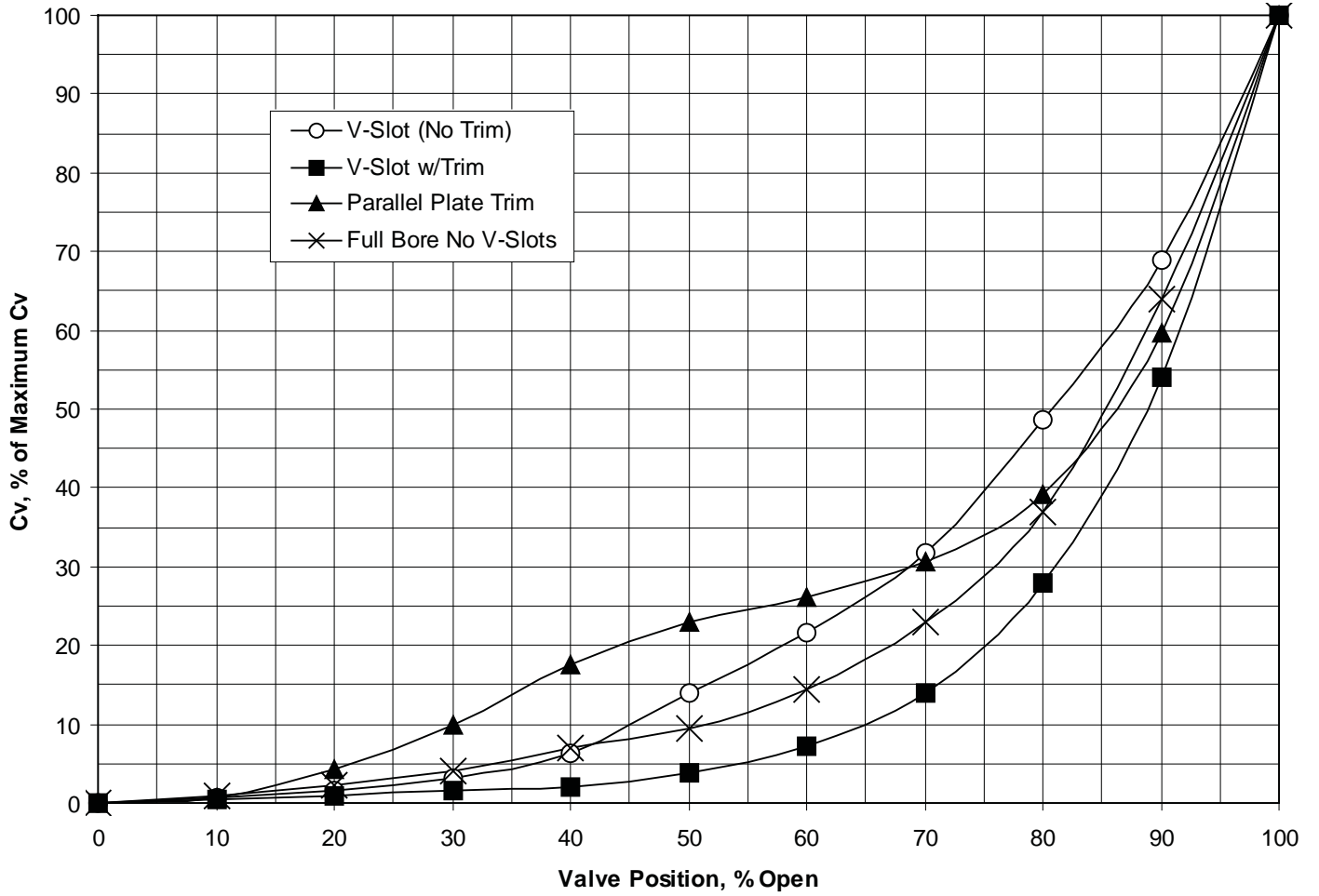


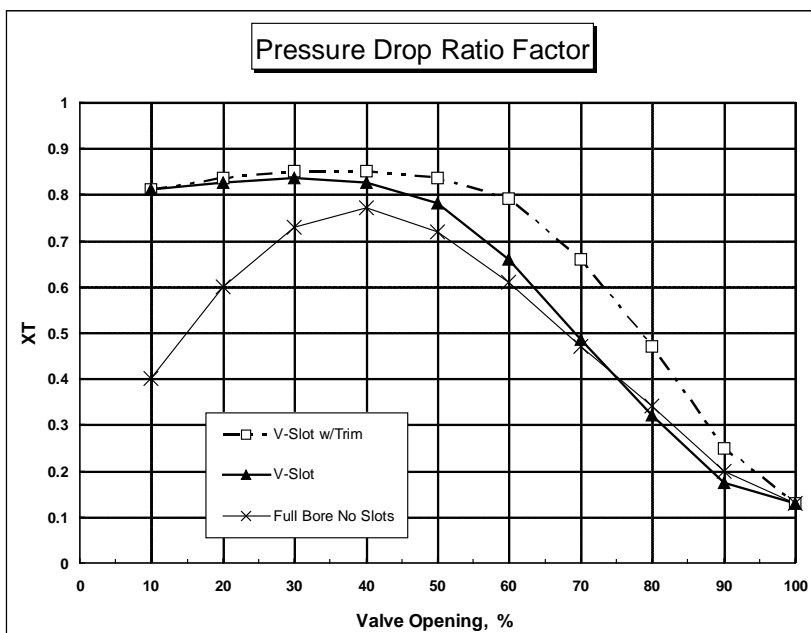
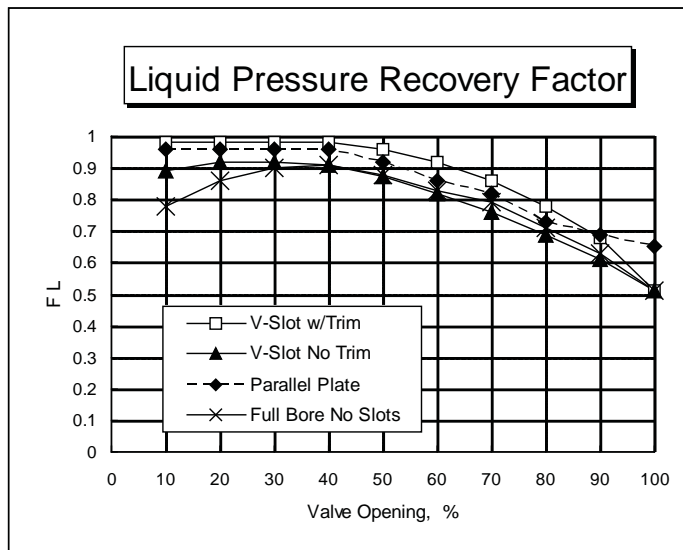
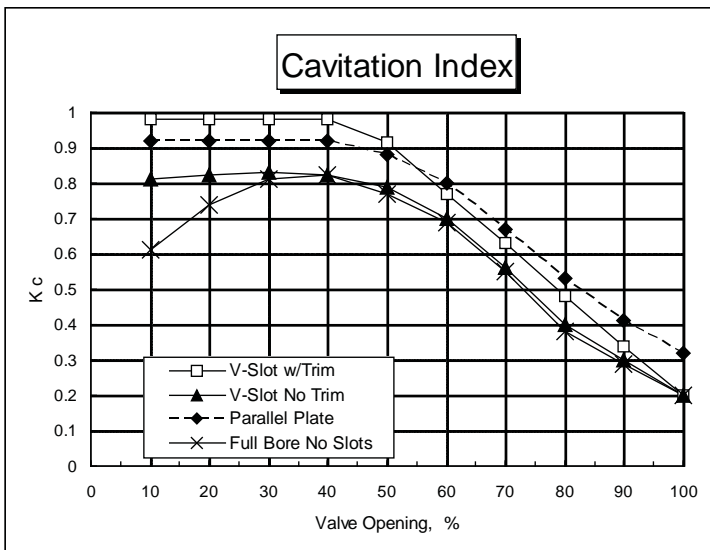
Table 1. Maximum Flow Coefficient (Cv)

VALVE SIZE		BALL SIZE						MAXIMUM VALVE Cv		
		V-Slot & Parallel Plate	V-Slot w/ trim	Full Bore Ball (No V-Slots)	V-Slot & Parallel Plate	V-Slot w/ trim	Full Bore Ball (No V-Slots)	Full Bore (No V-Slots)	V-Slot & V-Slot w/trim	Parallel Plate
Inch	DN	mm			INCH					
2	50	76	76	51	3	4	2	305	299	N/A
3	75	102	152	76	4	6	3	695	672	N/A
4	100	152	203	102	6	8	4	1201	1195	N/A
6	150	203	254	152	8	10	6	2700	2689	971
8	200	254	305	203	10	12	8	5120	3903	1409
10	250	356	457	254	14	18	10	8010	6098	2201
12	300	406	508	305	16	20	12	11550	8781	2750
16	400	508	610	406	20	24	16	20500	15811	4566
20	500	610	762	508	24	30	20	31900	24392	7014
24	600	762	914	610	30	36	24	44100	35124	10143
30	750	914	1067	762	36	42	30	68000	54881	15780

Ball-Trol Position vs Cv



SIZING FACTORS



Cv TABLES

Table 2. Cv for Ball-Trol with V-Slot

VALVE SIZE, INCHES	VALVE ROTATION, PERCENT										
	0	10	20	30	40	50	60	70	80	90	100
2	0	2	5	10	19	42	65	98	147	208	299
3	0	5	10	22	44	94	147	217	332	469	672
4	0	9	18	39	78	168	282	385	589	834	1195
6	0	20	40	87	175	378	589	866	1236	1876	2689
8	0	29	60	126	253	548	855	1257	1925	2722	3903
10	0	46	94	197	396	857	1336	1965	3008	4253	6098
12	0	66	135	284	570	1233	1924	2829	4331	6125	8781
16	0	117	240	504	1013	2193	3420	5030	7700	10888	15811
20	0	183	375	788	1583	3426	5344	7859	12031	17013	24392
24	0	283	540	1135	2280	4934	7696	11317	17324	24499	35124
30	0	413	844	1775	3563	7706	12025	17681	27069	38281	54881

Table 3. Cv for Ball-Trol with Full Bore Ball (No V-Slots)

VALVE SIZE, INCHES	VALVE ROTATION, PERCENT										
	0	10	20	30	40	50	60	70	80	90	100
2	0	2.2	6	11	18	25	38	60	96	179	305
3	0	5	13	25	41	56	86	136	218	408	695
4	0	8	22	41	68	93	142	225	363	689	1201
6	0	22	58	108	180	247	377	598	962	1664	2700
8	0	44	144	213	355	486	742	1178	1894	3277	5120
10	0	68	178	333	555	761	1161	1842	2964	5126	8010
12	0	99	257	480	800	1097	1675	2657	4274	7392	11550
16	0	175	456	853	1421	1948	2973	4715	7585	13120	20500
20	0	273	710	1327	2211	3031	4626	7337	11803	20416	31900
24	0	377	981	1835	3056	4190	6395	10143	16317	28224	44100
30	0	581	1513	2829	4712	6460	9860	15640	25160	43520	68000

Note: Do not size valve with control point below 14% open

Table 4.

Cv for Ball-Trol with V-Slot with Trim

VALVE SIZE, INCHES	VALVE ROTATION, PERCENT											Cv of Trim
	0	10	20	30	40	50	60	70	80	90	100	
2	0	1	3	5	7	12	22	39	83	163	299	24
3	0	3	7	11	15	27	49	88	188	367	672	42
4	0	4	13	20	26	48	87	156	333	653	1195	83
6	0	10	29	44	59	107	195	351	750	1469	2689	107
8	0	20	37	62	83	151	288	551	1106	2132	3903	105 or 144*
10	0	30	58	97	129	236	450	861	1728	3331	6098	257
12	0	44	84	139	186	340	648	1240	2488	4798	8781	294
16	0	78	149	247	331	604	1152	2204	4423	8527	15811	360
20	0	122	233	386	517	945	1799	3445	6910	13323	24392	670
24	0	176	336	556	744	1380	2592	4960	9952	19185	35124	926
30	0	275	525	869	1163	2125	4050	7750	15550	29988	54881	1356

* = Extra-X ball option.

Table 5.

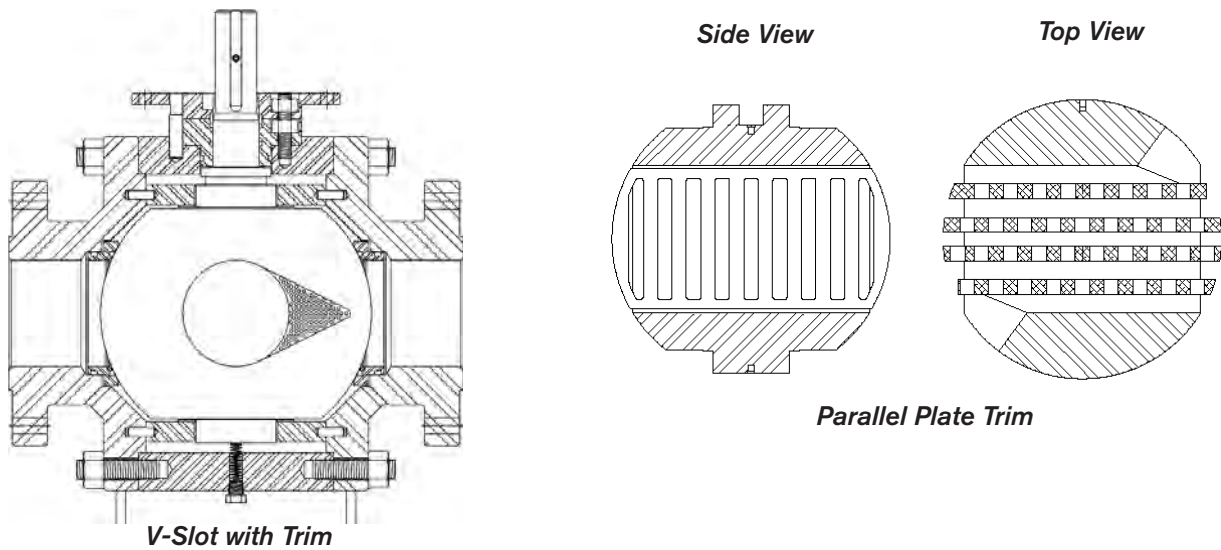
Cv for Ball-Trol with Parallel Plate Trim

VALVE SIZE, INCHES	NUMBER OF PLATES	VALVE ROTATION, PERCENT										
		0	10	20	30	40	50	60	70	80	90	100
6	3	0	7	39	85	168	257	295	344	412	676	971
8	3	0	11	58	123	242	373	428	499	641	980	1409
10	3	0	17	91	193	380	583	668	780	1002	1531	2201
12	4	0	18	117	271	483	632	718	844	1082	1642	2750
16	4	122	126	287	542	727	862	1077	1245	1623	2584	4566
20	4	0	50	325	749	1341	1758	1993	2342	3008	4561	7014
24	4	0	77	468	1078	1931	2531	2871	3372	4331	6568	10143
30	4	0	112	732	1686	3018	3953	4485	5269	6767	10263	15780

(Note: 16" Valve above was Cv tested with Fixed Seat construction (1/16" gap between seat & ball))

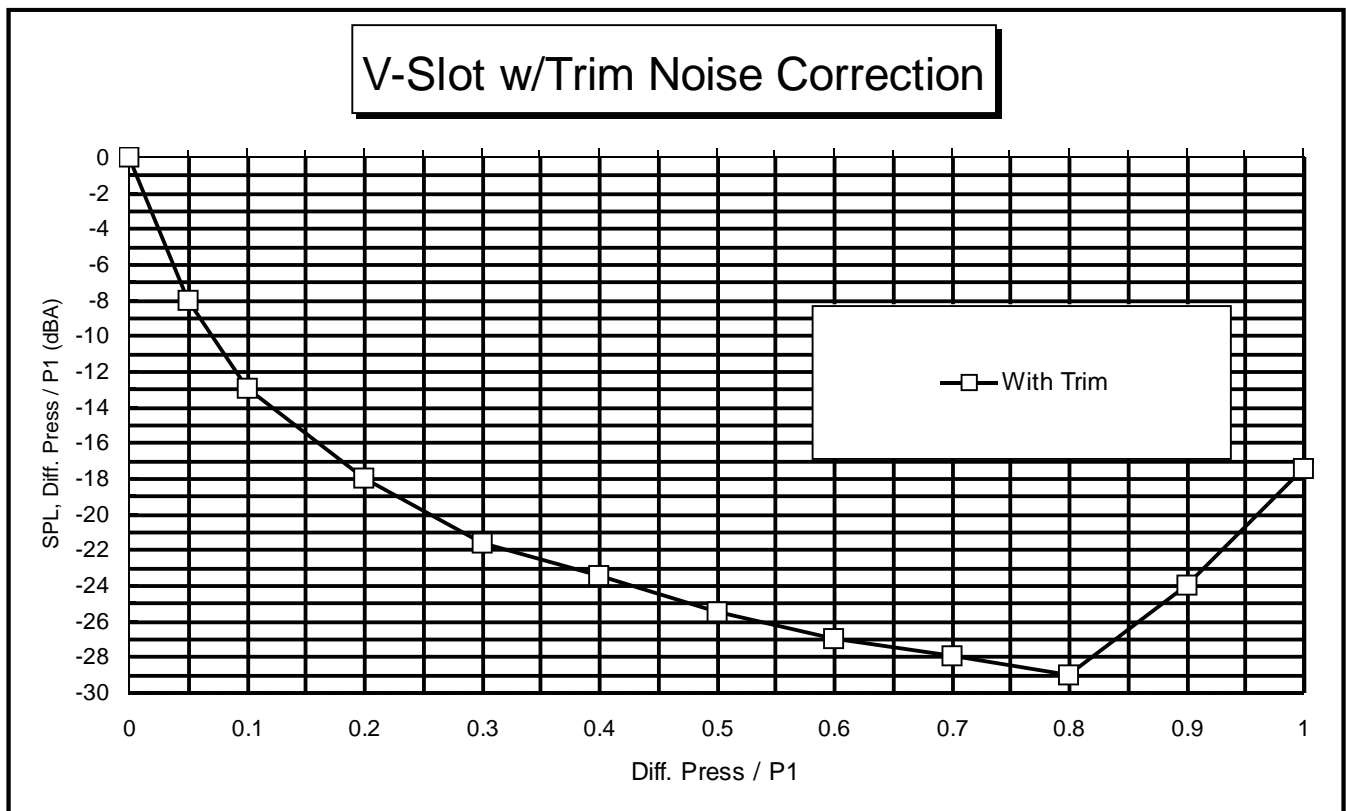
NOISE PREDICTION

The calculation procedure for both hydrodynamic noise in liquids and aerodynamic noise in compressible media follows the graphical method shown in the *ISA Handbook of Control Valves, second edition*. All noise level measurements were made according to ISA RP59.L.



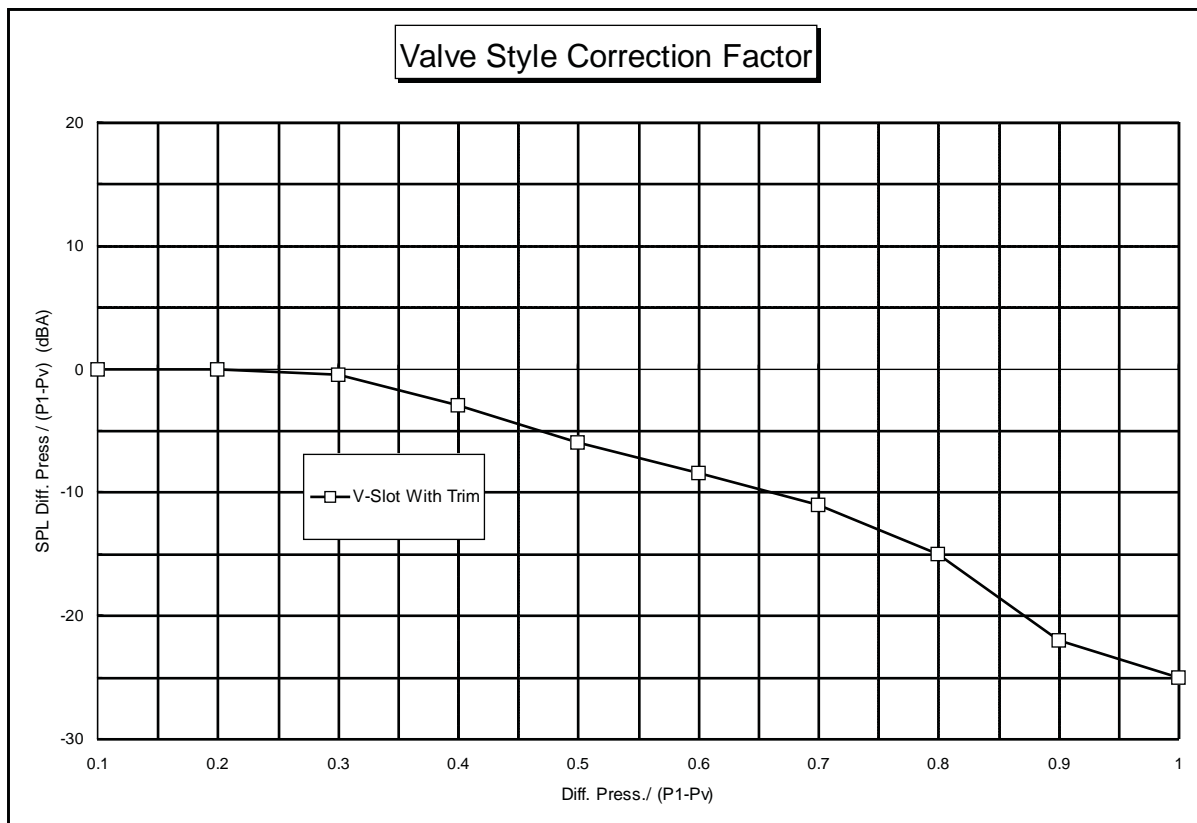
The figures above show the two types of optional trim that are available.

AERODYNAMIC NOISE DEDUCTION



Note: Only use this correction for calculated Cv's within the Cv of the Trim (see Table 4)

HYDRODYNAMIC NOISE DEDUCTION



Note: Only use this correction for calculated Cv's within the Cv of the Trim (see Table 4)

ACTUATORS

The Ball-Trol Control Valve requires 90° of stem rotation to position the slotted ports in the ball from full open to full closed.

Available actuator options are:

- Pneumatic
- Hydraulic
- Electric

Pneumatic

Either spring return or double acting piston type rack and pinion or scotch yoke actuators are used where clean, regulated, dry natural gas or air is available. Supply pressures of between 80 and 200 psig are most commonly used. The actuator is equipped with a high capacity, low consumption positioner that applies the full force of the supply pressure to accurately position the valve in response to a 3 – 15 psi or 4 – 20 mA input control signal. Action can be direct acting or reverse acting to provide “fail-close” or “fail-open” position on loss of control signal.

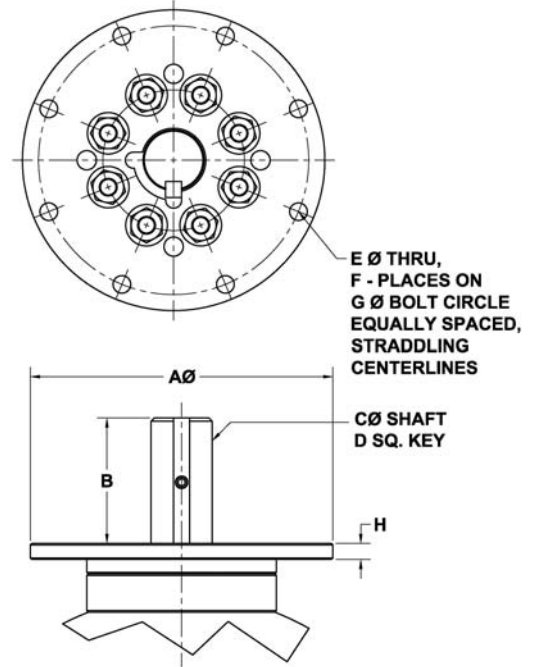
Hydraulic

In applications requiring hydraulic actuation, a double rack and pinion piston actuator is used. The actuator can be adapted to an existing hydraulic supply or to a self contained or separate electric motor driven hydraulic power unit. Electric or pneumatic control signals can be used to position the valve.

Electric

Electric actuators consist of an AC or DC motorized gear train that position the valve stem. Should manual control of the valve be desired, a handwheel is engaged by a lever-operated clutch that overrides the power operation. Control is provided from a 4 – 20 mA input signal. Fail open, closed, or in last position options are available.

Ball-Trol Top Works
2-Through 24-Inch
Class 150-900



Note: Ball rotation is counter-clockwise to open clockwise to close. Key is in-line with the bore of the ball

V-SLOT & PARALLEL PLATE

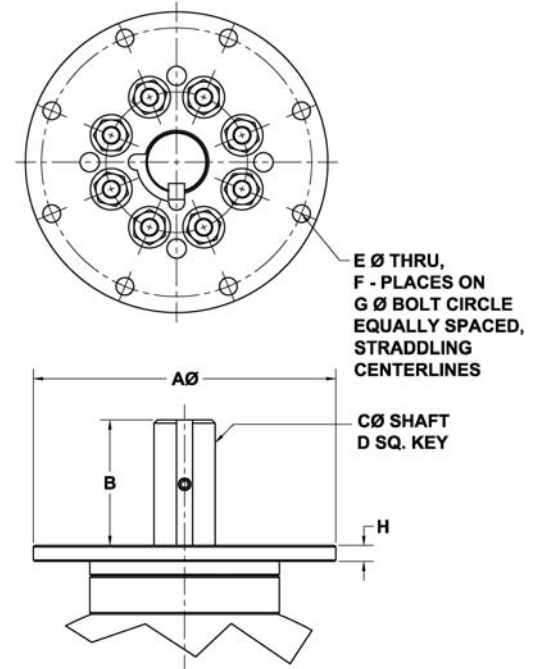
Valve Size Inches	A		B		C		D		E		F	G		H	
	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	Number of Holes	mm	Inches	mm	Inches
2	207	8.13	34	1.34	27	1.057	6	0.250	21	0.81	4	171	6.75	11	0.44
3	207	8.13	34	1.34	32	1.245	6	0.250	21	0.81	4	171	6.75	11	0.44
4	207	8.13	76	3.00	38	1.495	10	0.375	21	0.81	4	171	6.75	13	0.50
6	229	9.00	76	3.00	51	1.995	13	0.500	21	0.81	4	191	7.50	13	0.50
8	298	11.75	127	5.00	60	2.370	16	0.625	18	0.69	8	260	10.25	16	0.63
10	295	11.63	127	5.00	89	3.495	22	0.875	18	0.69	8	254	10.00	16	0.63
12	295	11.63	127	5.00	89	3.495	22	0.875	18	0.69	8	254	10.00	16	0.63
16	349	13.75	131	5.14	89	3.495	22	0.875	21	0.81	8	298	11.73	19	0.75
20	413	16.25	130	5.13	121	4.745	32	1.250	27	1.06	8	356	14.02	25	1.00
24	553	21.75	194	7.63	152	5.995	38	1.50	35	1.38	12	483	19.02	32	1.25

FULL BORE - NO V-SLOTS

Valve Size Inches	A		B		C		D		E		F	G		H	
	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	Number of Holes	mm	Inches	mm	Inches
2	146	5.75	34	1.34	21	0.813	5	0.188	10	0.41	4	127	5.00	10	0.38
3	165	6.50	34	1.34	27	1.062	6	0.250	13	0.53	4	140	5.50	10	0.38
4	207	8.13	35	1.38	32	1.245	6	0.250	21	0.81	4	171	6.75	11	0.44
6	207	8.13	76	3.00	38	1.495	10	0.375	21	0.81	4	171	6.75	13	0.50
8	229	9.00	76	3.00	51	1.995	13	0.500	21	0.81	4	191	7.50	13	0.50
10	298	11.75	127	5.00	60	2.370	16	0.625	18	0.69	8	267	10.50	16	0.63
12	298	11.75	127	5.00	60	2.370	16	0.625	18	0.69	8	267	10.50	16	0.63
16	295	11.63	127	5.00	89	3.495	22	0.875	18	0.69	8	254	10.00	16	0.63
20	349	13.75	131	5.14	89	3.495	22	0.875	21	0.81	8	298	11.73	19	0.75
24	413	16.25	130	5.13	121	4.745	32	1.250	27	1.06	8	356	14.02	25	1.00

Ball-Trol Top Works
2-Through 24-Inch
Class 150-900

Note: Ball rotation is counter-clockwise to open clockwise to close. Key is in-line with the bore of the ball



V-SLOT WITH TRIM

Valve Size Inches	A		B		C		D		E		F	G		H	
	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	Number of Holes	mm	Inches	mm	Inches
2	207	8.13	37	1.438	32	1.245	6.4	0.25	21	0.81	4	171	6.75	11	0.44
3	207	8.13	76	3.00	38	1.495	10	0.375	21	0.81	4	171	6.75	13	0.50
4	229	9.00	76	3.00	51	1.995	13	0.500	21	0.81	8	191	7.50	13	0.50
6	298	11.75	127	5.00	60	2.370	16	0.625	17	0.68	8	260	10.25	16	0.63
8	298	11.75	127	5.00	60	2.370	16	0.625	17	0.68	8	260	10.25	16	0.63
10	349	13.75	131	5.14	89	3.495	22	0.875	21	0.81	8	298	11.73	19	0.75
12	349	13.75	131	5.14	89	3.495	22	0.875	21	0.81	8	298	11.73	19	0.75
16	413	16.25	130	5.13	121	4.745	32	1.250	27	1.06	8	356	14.02	25	1.00
20	553	21.75	194	7.63	152	5.995	38	1.50	35	1.38	12	483	19.02	32	1.25
24	553	21.75	194	7.62	152	5.995	38	1.50	35	1.38	12	483	19.02	32	1.25

Ball-Trol V-Slot (No trim) Torques

BREAK TORQUE REQUIREMENTS V-SLOT (NO TRIM)

Valve Size Inches	DIFFERENTIAL PRESSURE (Psid)															
	0		500		1000		1500		2000		2500		3000		3500	
	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb
2	24	212	47	414	70	615	92	817	115	1019	138	1221	161	1422	184	1624
3	54	477	97	861	141	1246	184	1630	228	2014	271	2399	315	2783	358	3167
4	96	848	184	1632	273	2416	362	3201	450	3985	538	4759	628	5553	716	6338
6	216	1908	421	3727	627	5545	832	7364	1038	9183	1243	11002	1449	12820	1654	14639
8	383	3392	735	6503	1086	9614	1438	12725	1790	15836	2141	18947	2493	22058	2844	25170
10	599	5300	1183	10468	1767	15636	2351	20804	2935	25972	3519	31140	4103	36308	4687	41477
12	862	7632	1692	14974	2522	22317	3352	29659	4181	37002	5011	44344	5841	51687	6670	59029
16	1533	13568	3011	26648	4489	39728	5967	52809	7446	65889	8924	78969	10402	92049	11880	105129
20	2396	21200	5459	48306	8522	75412	11585	102518	14648	129624	17711	156730	20774	183836	23837	210942
24	3450	30528	8328	73700	13207	116872	18085	160044	22963	203216	27842	246388	32720	289560	37599	332732

Dynamic Torque (in-lbs) = dP X C

dP = flowing drop at calculated Cv (psid)

DYNAMIC TORQUE C FACTORS V-SLOT NO TRIM

Valve Size Inches	PERCENT OPEN										
	10	20	30	40	50	60	70	80	90	100	
2	0.1	0.4	0.8	1.4	1.9	3.3	5	4	5.2	0.1	
3	0.3	1.2	2.6	4.6	6.4	11	16.2	13	17	0.3	
4	0.7	2.6	6	10.5	14.4	24	37	29	39	0.7	
6	2.2	9	20	36	49	83	125	98	132	2.2	
8	5.1	20.3	46	81	112	188	285	224	300	5.1	
10	10	40	91	161	221	372	563	443	594	10	
12	17	69	156	277	380	639	968	760	1020	17	
16	36	142	319	568	780	1312	1986	1561	2093	36	
20	71	285	642	1141	1569	2639	3995	3139	4209	71	
24	126	503	1131	2011	2765	4650	7038	5530	7415	126	

Ball-Trol Full Bore (No V-Slots) Torques

BREAK TORQUE REQUIREMENTS FULL BORE (NO V-SLOTS)

Valve Size Inches	DIFFERENTIAL PRESSURE (Psid)															
	0		500		1000		1500		2000		2500		3000		3500	
	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb
2	24	212	47	414	70	615	92	817	115	1019	138	1221	161	1422	184	1624
3	54	477	97	861	141	1246	184	1630	228	2014	271	2399	315	2783	358	3167
4	96	848	184	1632	273	2416	362	3201	450	3985	538	4759	628	5553	716	6338
6	216	1908	421	3727	627	5545	832	7364	1038	9183	1243	11002	1449	12820	1654	14639
8	383	3392	735	6503	1086	9614	1438	12725	1790	15836	2141	18947	2493	22058	2844	25170
10	599	5300	1183	10468	1767	15636	2351	20804	2935	25972	3519	31140	4103	36308	4687	41477
12	862	7632	1692	14974	2522	22317	3352	29659	4181	37002	5011	44344	5841	51687	6670	59029
16	1533	13568	3011	26648	4489	39728	5967	52809	7446	65889	8924	78969	10402	92049	11880	105129
20	2396	21200	5459	48306	8522	75412	11585	102518	14648	129624	17711	156730	20774	183836	23837	210942
24	3450	30528	8328	73700	13207	116872	18085	160044	22963	203216	27842	246388	32720	289560	37599	332732

Dynamic Torque (in-lbs) = dP X C

dP = flowing drop at calculated Cv (psid)

DYNAMIC TORQUE C FACTORS FULL BORE (NO V-SLOTS)

Valve Size Inches	PERCENT OPEN										
	10	20	30	40	50	60	70	80	90	100	
2	0.36	0.44	0.44	0.5	0.7	1	2	4.2	7	7	
3	1.2	1.5	1.5	1.7	2.2	3.3	7	14	22	22	
4	2.6	3.2	3.3	3.7	5	8	15	31	48	48	
6	9	11	12	13	17	26	51	106	164	164	
8	21	24	26	29	38	58	115	240	373	373	
10	41	46	49	55	75	112	228	475	737	737	
12	70	80	83	94	128	192	382	799	1241	1241	
16	149	192	203	231	306	465	930	1944	3033	3033	
20	300	371	393	450	588	899	1798	3760	5851	5851	
24	528	654	672	754	1006	1546	3080	6435	10005	10005	

Ball-Trol V-Slot with Trim Torques

BREAK TORQUE REQUIREMENTS V-SLOT WITH TRIM

Valve Size Inches	DIFFERENTIAL PRESSURE (Psid)															
	0		500		1000		1500		2000		2500		3000		3500	
	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb
2	24	212	47	414	70	615	92	817	115	1019	138	1221	172	1522	184	1624
3	54	477	118	1045	182	1613	247	2181	311	2750	375	3318	439	3886	503	4454
4	96	848	214	1894	332	2940	450	3986	569	5032	687	6078	805	7124	923	8169
6	216	1908	463	4098	710	6287	958	8477	1205	10667	1453	12857	1700	15046	1948	17236
8	383	3392	835	7391	1287	11391	1739	15390	2191	19390	2643	23389	3095	27389	3541	31338
10	599	5300	1259	11145	1920	16990	2580	22835	3241	28680	3901	34525	4562	40370	5222	46215
12	862	7632	1787	15814	2712	23996	3636	32178	4561	40360	5485	48542	6410	56724	7334	64906
16	1533	13568	3267	28910	5001	44252	6734	59594	8468	74935	10201	90277	11935	105619	13669	120961
20	2396	21200	6180	54694	9965	88187	13750	121681	17535	155174	21320	188668	25104	222162	28889	255655
24	3450	30528	9416	83327	15382	136126	21349	188925	27315	241724	33281	294523	39247	347322	45214	400121

Dynamic Torque (in-lbs) = dP X C

dP = flowing drop at calculated Cv (psid)

DYNAMIC TORQUE C FACTORS (V-SLOT WITH TRIM)

Valve Size Inches	PERCENT OPEN									
	10	20	30	40	50	60	70	80	90	100
2	0.1	0.4	0.5	0.8	0.8	1.0	1.4	2.1	3.3	0.1
3	0.3	1.2	1.7	2.6	2.6	3.2	4.6	7.0	11	0.3
4	0.7	2.6	3.9	6.0	6.0	7.2	10.5	16	24	0.7
6	2.2	9	13.4	20.1	20.1	25	36	54	83	2.2
8	5.1	20	31	46	46	56	81	122	188	5.1
10	10	40	60	91	91	111	161	241	372	10
12	17	69	104	156	156	190	277	415	639	17
16	36	142	213	319	319	390	568	851	1312	36
20	71	285	428	642	642	785	1141	1712	2639	71
24	126	503	754	1131	1131	1383	2011	3016	4650	126

Ball-Trol Parallel Plate Torques

BREAK TORQUE REQUIREMENTS PARALLEL PLATE TRIM

Valve Size Inches	DIFFERENTIAL PRESSURE (Psid)															
	0		500		1000		1500		2000		2500		3000		3500	
	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb	Nm	In-Lb
6	216	1908	421	3727	627	5545	832	7364	1038	9183	1243	11002	1449	12820	1654	14639
8	383	3392	735	6503	1086	9614	1438	12725	1790	15836	2141	18947	2493	22058	2844	25170
10	599	5300	1183	10468	1767	15636	2351	20804	2935	25972	3519	31140	4103	36308	4687	41477
12	862	7632	1692	14974	2522	22317	3352	29659	4181	37002	5011	44344	5841	51687	6670	59029
16	1533	13568	3011	26648	4489	39728	5967	52809	7446	65889	8924	78969	10402	92049	11880	105129
20	2396	21200	5459	48306	8522	75412	11585	102518	14648	129624	17711	156730	20774	183836	23837	210942
24	3450	30528	8328	73700	13207	116872	18085	160044	22963	203216	27842	246388	32720	289560	37599	332732

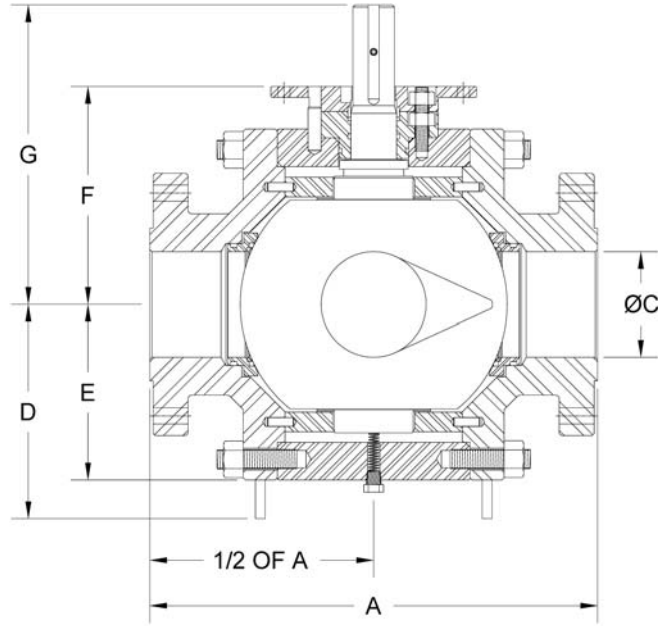
Dynamic Torque (in-lbs) = dP X C

dP = flowing drop at calculated Cv (psid)

DYNAMIC TORQUE C FACTORS (PARALLEL PLATE TRIM)

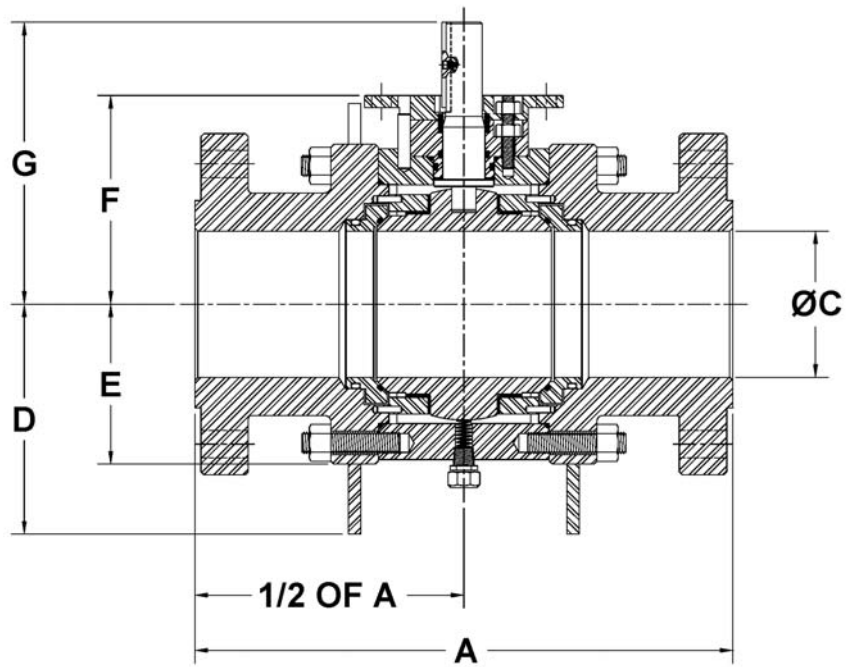
Valve Size Inches	PERCENT OPEN										
	10	20	30	40	50	60	70	80	90	100	
6	4.5	12.8	23.8	24.5	29.5	24.4	19.9	25	13.7	45.5	
8	10.2	29.2	54.2	55.9	67.1	55.6	45.5	56.9	31.2	104	
10	20.1	57.8	107	111	133	110	89.9	113	61.7	205	
12	34.6	99.4	184	190	228	189	155	194	106	353	
16	74.2	204	378	390	470	388	317	398	218	725	
20	143	410	761	784	942	780	638	799	437	1455	
24	252	723	1340	1381	1659	1375	1124	1408	770	2564	

Dimensions for V-Slot (without Trim) and Parallel Plate Ball-Trols



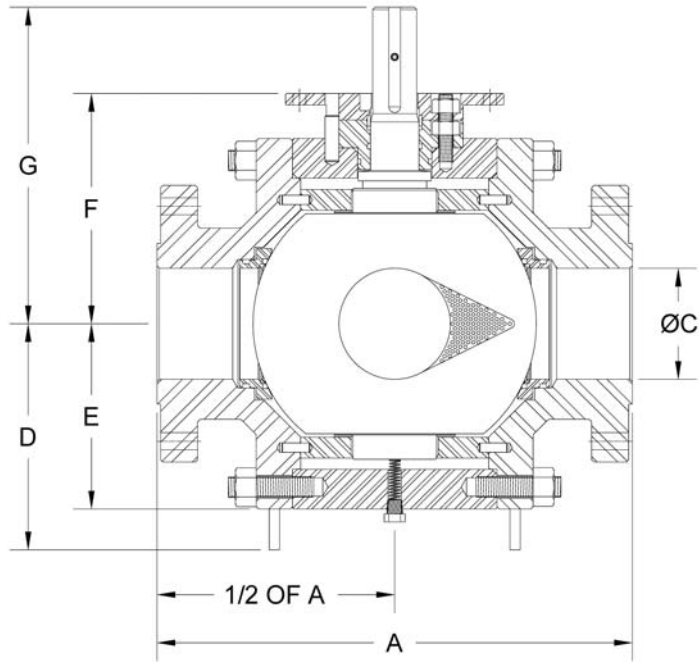
SIZE		A					C	D		E	F	G	WEIGHT
		Class						Class					Class
		150-600RF	900RF	900RJ	1500RF	1500RJ		150-900	1500				150-600
Inch	DN	mm										kg	
2	50	292	318	321	368	372	51	N/A	N/A	105	176	210	60
3	75	356	381	384	470	473	76	N/A	N/A	137	192	225	120
4	100	432	457	461	546	549	102	240	---	165	217	294	227
6	150	559	610	613	705	711	152	285	---	210	260	336	438
8	200	660	737	740	832	842	203	334	---	254	316	440	748
10	250	787	838	842	991	1000	254	386	---	311	379	506	1041
12	300	889	1118	1121	1295	1311	305	427	---	346	416	543	1757
16	400	1067	1321	1330	1524	1546	387	518	---	437	537	664	3358
20	500	1270	1473	1486	---	---	489	599	---	514	612	739	5259
24	600	1829	2286	2305	---	---	591	916	---	843	946	1137	9018
Inch	DN	Inches										Pounds	
2	50	11.50	12.50	12.63	14.50	14.63	2.00	N/A	N/A	4.13	6.94	8.25	130
3	75	14.00	15.00	15.13	18.50	18.63	3.00	N/A	N/A	5.38	7.56	8.87	265
4	100	17.00	18.00	18.13	21.50	21.63	4.00	9.44	---	6.50	8.56	11.56	500
6	150	22.00	24.00	24.13	27.75	28.00	6.00	11.22	---	8.25	10.23	13.23	965
8	200	26.00	29.00	29.13	32.75	33.13	8.00	13.14	---	10.00	12.44	17.32	1650
10	250	31.00	33.00	33.13	39.00	39.38	10.00	15.18	---	12.25	14.93	19.93	2295
12	300	35.00	44.00	44.13	51.00	51.63	12.00	16.83	---	13.63	16.38	21.38	3875
16	400	42.00	52.00	52.38	60.00	60.88	15.25	20.41	---	17.19	21.13	26.13	7405
20	500	50.00	58.00	58.50	---	---	19.25	23.59	---	20.25	24.09	29.09	11595
24	600	72.00	90.00	90.75	---	---	23.25	36.06	---	33.19	37.25	44.75	19884

DIMENSIONS FOR FULL BORE (NO V-SLOTS)



SIZE		A				C	D		E	F	G	WEIGHT	
		Class					Class					Class	
		300RF	600RF	900RF	900RJ		300-600	900				600	900
Inch	DN	mm										kg	
2	50	216	292	368	372	51	---	---	76	---	---	36	52
3	75	283	356	381	384	76	---	---	122	---	---	73	98
4	100	305	432	457	460	102	---	---	152	---	---	129	177
6	150	403	559	610	613	152	251	251	165	217	294	225	347
8	200	502	660	737	740	203	284	303	210	260	336	449	610
10	250	568	787	838	842	254	330	330	254	316	440	751	914
12	300	648	838	965	969	305	371	387	289	353	477	1152	1302
16	400	838	991	1130	1140	387	427	452	346	416	543	1721	2087
20	500	991	1194	1321	1334	489	519	537	437	537	664	2781	4361
24	600	1143	1397	1549	1568	591	600	634	514	612	739	5502	7035
Inch	DN	Inches										Pounds	
2	50	8.50	11.50	14.50	14.63	2.00	---	---	3.00	---	---	80	115
3	75	11.13	14.00	15.00	15.13	3.00	---	---	4.81	---	---	160	215
4	100	12.00	17.00	18.00	18.13	4.00	---	---	6.00	---	---	285	390
6	150	15.88	22.00	24.00	24.13	6.00	9.87	9.87	6.50	8.56	11.56	497	765
8	200	19.75	26.00	29.00	29.13	8.00	11.19	11.91	8.25	10.23	13.23	990	1345
10	250	22.38	31.00	33.00	33.13	10.00	13.00	13.00	10.00	12.44	17.32	1655	2015
12	300	25.50	33.00	38.00	38.13	12.00	14.62	15.25	11.38	13.88	18.76	2540	2870
16	400	33.00	39.00	44.50	44.88	15.25	16.82	17.81	13.63	16.39	21.38	3795	4600
20	500	39.00	47.00	52.00	52.50	19.25	20.43	21.16	17.19	21.13	26.13	6130	9615
24	600	45.00	55.00	61.00	61.75	23.25	23.62	24.97	20.25	24.11	29.09	12130	15510

DIMENSIONS FOR V-SLOT WITH TRIM



SIZE		A					C	D		E	F	G	WEIGHT
		Class						Class					Class
		150 - 600RF	900RF	900RJ	1500RF	1500RJ		150-900	1500				150 - 600
Inch	DN	mm										kg	
2	50	292	318	321	368	372	51	N/A	N/A	137	192	229	60
3	75	406	457	461	470	473	76	240	---	165	217	294	227
4	100	533	740	743	838	842	102	282	---	210	260	336	428
6	150	673	838	842	991	997	152	330	---	254	316	443	748
8	200	787	965	969	1143	1153	203	371	---	289	425	552	1041
10	250	1041	1232	1235	1448	1457	254	478	---	399	499	629	1975
12	300	1118	1334	1337	---	---	305	519	---	437	537	667	3358
16	400	1270	1575	1584	---	---	387	---	---	---	---	---	5259
20	500	1524	1905	1918	---	---	489	721	---	629	755	966	8790
24	600	1981	2324	2343	---	---	591	791	---	746	867	1055	14950
Inch	DN	Inches										Pounds	
2	50	11.50	12.50	12.63	14.50	14.63	2.00	N/A	N/A	5.38	7.57	9.00	130
3	75	16.00	18.00	18.13	18.50	18.62	3.00	9.44	---	6.50	8.56	11.56	500
4	100	21.00	29.12	29.25	33.00	33.13	4.00	11.09	---	8.25	10.23	13.23	965
6	150	26.50	33.00	33.13	39.00	39.25	6.00	13.01	---	10.00	12.44	17.44	1650
8	200	31.00	38.00	38.13	45.00	45.38	8.00	14.62	---	11.38	16.73	21.73	2295
10	250	41.00	48.50	48.63	57.00	57.38	10.00	18.82	---	15.69	19.64	24.78	4295
12	300	44.00	52.50	52.63	---	---	12.00	20.43	---	17.19	21.13	26.27	7405
16	400	50.00	62.00	62.38	---	---	15.25	---	---	---	---	---	11595
20	500	60.00	75.00	75.50	---	---	19.25	28.38	---	24.75	29.71	38.05	19106
24	600	78.00	91.50	92.25	---	---	23.25	31.13	---	29.38	34.13	41.54	32493

M&J Valve Ball-Trol Control Valve Specification Data Sheet

General:

Reference Number: _____ Project Number: _____
Service Application: _____
Tag Number: _____ Quantity: _____
Flowing Media: _____ Line Size/Pipe Schedule: _____
Per NACE: Yes No

Operating Conditions:

Flow Rate Units: GPM BPH BPD SCFH SCFD Lbs/Hr M3/Hr Kg/Hr
Pressure Units: PSIG Bar Kpa Kg/Cm2
Temperature Units °F °C
Flow Rate: Max: _____ Normal: _____ Min: _____
Inlet Pressure: Max: _____ Normal: _____ Min: _____
Pressure Drop: Max: _____ Normal: _____ Min: _____
Operating Temperature: Max: _____ Normal: _____ Min: _____
Specific Gravity: _____ Viscosity: _____ Specific Heat Ratio: _____
Vapor Pressure Pv: _____ Critical Pressure Pc: _____ Allowable Noise, dBA: _____

Valve:

Type: **Ball**
Flange Pressure Rating / End Conn. _____ RF RTJ
Max. Pressure / Temp. _____ / _____
Body Material: _____ Ball Material: _____
Seat Material: _____ Seal Material: _____

Actuator Type:

Pneumatic Electric Electro-Hydraulic Supplied by others
Operation: **Modulating**
Spring Action: Fail Open Fail Close Not applicable
Available Air / Gas Supply Pressure: _____
Manual Handwheel: Yes No
Electric Power Supply: 110 VAC 220 VAC 360 VAC 480 VAC
 Single Phase 3-Phase 60 Hz 50 Hz
Electrical Classification: Class I, Div 1 or 2, Gr. B, C & D EExd IIC T4 & T6
Stroke Speed Full Travel, Seconds: _____

Positioner:

Input Signal: 3 – 15 psi 4 – 20 mA
Gauges Required: Yes No Bypass Required: Yes No
Air Set Filter Required: Yes No

Test:

Hydro Pressure: Yes No
ANSI / FCI Leakage Class Required: N/A -Fixed Seat Design Class V Class VI

Notes

Notes

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Website: www.spxfc.com

SPX – M&J Valve Facility, Houston, TX, is in conformance to ISO 9001:2000 for the design and manufacture of valves and related accessories under IAF scope Category 18. APIQR registration number 0093.

Warranty

SPX goods, auxiliaries and parts thereof are warranted to the original purchaser against defective workmanship and material for a period of twelve (12) months from date of shipment from factory or (18) months from date of manufacture, whichever expires first. If the goods or services do not conform to the warranty stated above, then as Buyer's sole remedy, SPX shall, at SPX's option, either repair or replace the defective goods or reperform defective services. Third party goods furnished by SPX will be repaired or replaced as Buyer's sole remedy, but only to the extent provided in and honored by the original manufacturer's warranty. Unless otherwise agreed to in writing, SPX shall not be liable for breach of warranty or otherwise in any manner whatsoever for: (i) normal wear and tear; (ii) corrosion, abrasion or erosion; (iii) any good or services which, following delivery or performance by SPX, has been subjected to accident, abuse, misapplication, improper repair, alteration, improper installation or maintenance, neglect, or excessive operating conditions; (iv) defects resulting from Buyer's specifications or designs or those of Buyer's contractors or subcontractors other than SPX; or (v) defects resulting from the manufacture, distribution, promotion or sale of Buyer's products.

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Please note that this product is covered by patent numbers 5,524,863 and 7,234,488.

SPX Flow Control reserves the right to incorporate our latest design and material changes without notice or obligation. Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing. Certified drawings are available upon request.



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For more information about our worldwide locations, approvals, certifications, and local representatives, please visit www.spxfc.com.

SPX Corporation reserves the right to incorporate our latest design and material changes without notice or obligation.

Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing.