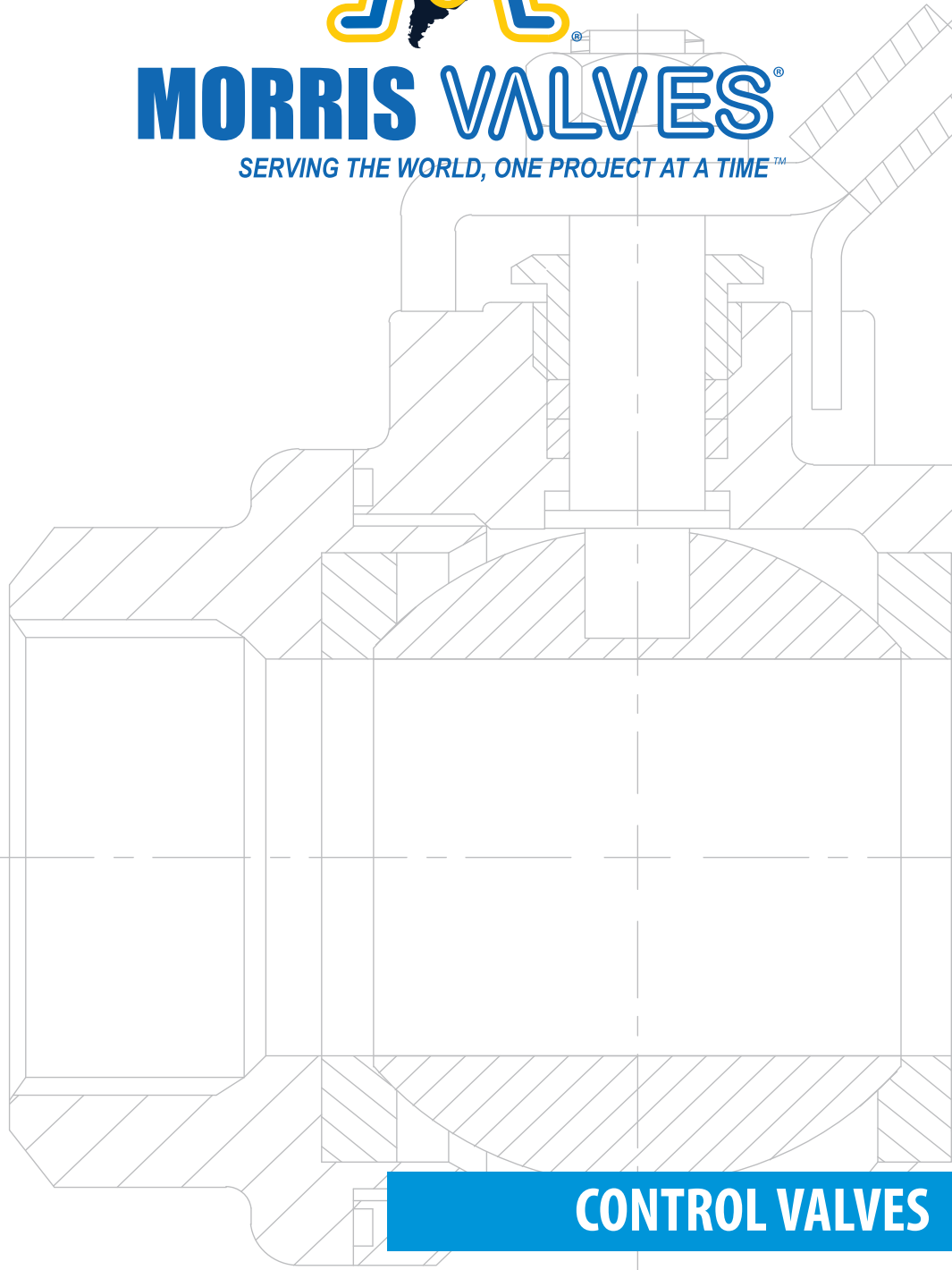




**MORRIS VALVES®**

SERVING THE WORLD, ONE PROJECT AT A TIME™



**CONTROL VALVES**

[www.morrisvalve.com](http://www.morrisvalve.com)



In 1984, our journey into the business of repairing valves and industrial instrumentation began. That journey has led us to represent and service well known American brands and companies. In early 2000, our experience and growing passion for the valve industry encouraged our decision to launch our own brand, Morris Valves. Starting with the highly requested Ball Valves, the brand has been based on the principal of quality and performance to match our customers' needs. Our high standards of production later lead us to incorporate other models such as Gate Valve and Check Valves to our production. These additions were carefully selected to match our Standard of Quality. Our success has been driven by our belief of "Tradition with Quality" in everything we do. Our products are developed with that belief which drives our growth and guides the service we provide to our customers.

Our vision is to be amongst the leading corporations in the supply of goods and services related to valves, their components and industrial equipment in general. We want to conquer new markets in conformity with international standards and remain committed to customer satisfaction, the welfare of our company and the sustainability of our planet.

## Mision

Our mission is to use our highly trained, highly focused, and extremely motivated staff to work with manufacturers who value quality and have the vision for new development and product applications to ensure the timely provision of goods and services related to valves, their components and industrial equipment in general. We maintain a rigorous standard of customer satisfaction, which will provide for the welfare of the company, the welfare of the countries we serve, and most importantly the sustainability of the planet.

## Contacts

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## Vision

*"Serving the world, one project at a time"*

PNEUMATIC ACTUATORS  
Twin piston rack & pinion  
Extruded aluminum alloy body

# MRP TYPE



SIZE: (50 - 400)mm

## FEATURES:

- \* Double acting actuators available in output torques up to 358756 inch pounds.
- \* Spring return actuators available with spring break torque up to 79409 inch pounds.
- \* A wider product range permitting a more economical sizing selection.
- \* Design suitable for both indoor & outdoor installation. Supplied with corrosion protections for normal environments. For severe duties a wide selection of highest levels of corrosion protection are available.
- \* Operating media: Dry or lubricated Air, inert / non-corrosive gases on condition that they are compatible with internal actuator parts and lubricants.
- \* Lubricated for the life under normal operation conditions from -20 ° C to +80 ° C. Special lubricants for Low (LT) and High (HT) temperature service are available.
- Standard product from - 20°C( -4 °F) to +80 °C(+176°F)
- (LT) actuator with VMQ O-rings from -40°C(-40°F) to +80°C(+176°F)
- (HT) actuator with FPM O-rings from -15°C(+5°F) to +150°C(+302°F)
- Caution.
- For LT & HT services, special lubricant is required.
- H & L Temperature will vary change the output torque of the actuator.

## HOW TO ORDER

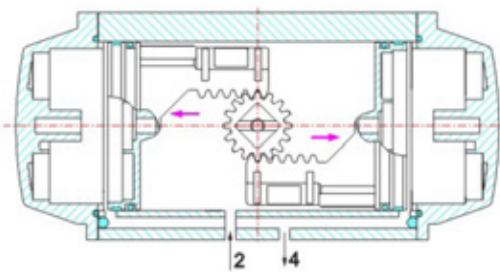
MRP  CYLINDER BORE -  ACTION (DA / SR) -  OP. TEMPERATURE (NT,LT,HT)

- \* Maximum working pressure up to 116 psi (8 bar)
- \* Stroke: There is  $\pm 5^\circ$  adjustable angle at the position of open and end of close.
- \* Top mounting and side connection in accordance with VDI/VDE 3845 Namur specification for simple and easy positioners and solenoid valves installation.
- \* Bottom connection according ISO 5211 & DIN 3337 standards and can be installed on the valve directly.

# 1. Operating Principle Double Acting (Air to Open / Air to close)

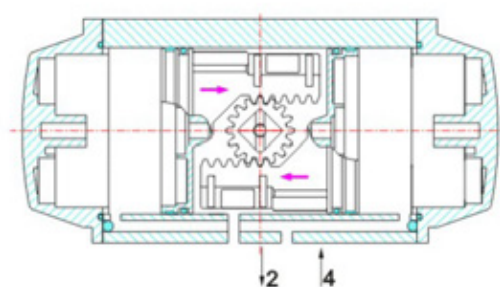
### CCW

Air to port 2, forces the pistons outwards, causing the pinion to turn COUNTERCLOCKWISE, while the air is being exhausted from port 4.



### CW

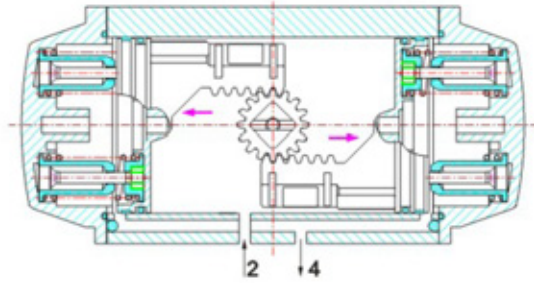
Air to port 4, forces the pistons inwards, causing the pinion to turn CLOCKWISE while the air is being exhausted from port 2.



# 1. Operating Principle Single Acting ( Spring Return)

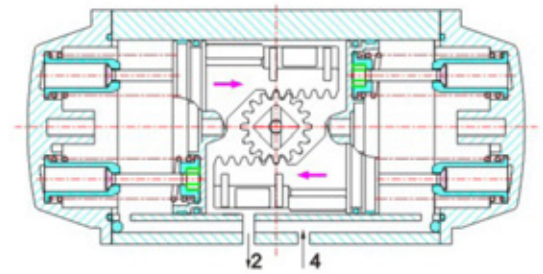
## CCW

Air to port 2, forces the pistons outwards, causing the springs to compress, the pinion turns COUNTERCLOCKWISE, while the air is being exhausted from port 4



## CW

Loss the air pressure, the stored energy in the springs forces the pistons inwards, the pinion turns CLOCKWISE while the air is being exhausted from port 2



### Direct action

So called, when the air pressure forces the valve to close and the springs return opens.

### Reverse action

So called, when the air pressure forces the valve to open and the spring return closes.

## 2. Actuator selection

\* Determine the maximum valve torque from the valve Torque Chart for the SEAT Material used. This is normally the breakaway torque after the valve has been stationary for the longest period of time.

\* Apply an appropriate service factor to the valve torque to determine the required torque.

- a. 20% for normal operation.
- b. 50% for Dry, Dirty or infrequent operation.
- c. 100% or 2X for Emergency shutoff or throttling control valves.

### I. Double Acting

The double acting actuator has a constant output Torque travel from start to end, counter-clockwise or clockwise.

Refer to the DA Output Torque Ratings (in-Lb). Read down the applicable Air Column to the first Torque that exceeds the required Torque, then left the actuator size.

Type MRP(bore)DA	Air Supply Pressure (Bar)										
	2.5	3	3.5	4	4.2	4.5	5	5.5	6	7	8
	Output Torque Ratings (in-lb)										
50	73.5	88.5	102.7	117.7	123.9	132.8	146.9	162.0	176.1	206.2	235.4
63	130.1	155.8	181.4	208.0	217.7	233.7	259.3	285.0	311.5	362.9	415.1
75	256.6	309.8	362.9	411.6	433.7	460.2	513.3	566.4	619.6	716.9	824.0
88	405.4	485.9	567.3	647.9	680.6	729.3	809.8	893.9	973.6	1132.9	1292.2
100	588.6	706.3	824.0	938.2	991.6	1062.1	1177.1	1292.2	1416.1	1646.2	1885.2
125	1920.6	1469.2	1717.0	1964.9	2062.2	2203.8	2451.6	2699.5	2938.4	3434.1	3920.9
145	2513.6	2310.0	2690.6	3080.1	3230.5	3460.6	3850.1	4230.6	4620.1	5390.1	6160.1
160	3389.8	3009.2	3513.7	4018.2	4221.8	4522.7	5018.40	5522.8	6027.3	7027.5	8036.5
180	4708.6	4062.5	4743.9	5425.5	5691.0	6098.1	6779.7	7452.3	8133.8	9487.9	10842.1
200	7903.7	5646.8	6593.8	7531.9	7903.7	8470.1	9417.20	10355.3	11293.5	13178.7	15063.9
240	11479.4	9487.9	11072.3	15656.5	13284.9	14231.9	15816.2	17347.4	18975.9	22144.5	25304.2
265	19931.8	13771.7	16064.1	18365.2	19285.7	20657.6	22958.8	25251.1	27543.4	32136.9	36730.5
300	22991.5	23923.5	27906.3	31898.0	33491.1	35880.8	39863.6	43855.3	47838.1	55812.6	63062.3
350	33366.3	27589.5	32188.3	36786.2	38625.4	41385.1	45983.0	50580.9	55179.8	64376.6	73573.4
400	77855.4	40039.8	46713.2	53386.7	56056.0	60059.2	66732.6	73406.1	80079.5	93426.4	106772.4



## II. (Single Acting) Spring Return

The Torque of the spring return actuator is not constant, but decreasing. It is divided in two Torques: One (Air Torque) due to the Air Pressure causing the spring compression during the Air Cycle and another (Spring Torque) due to the springs uncoiling during Spring cycle of actuation.

Refer to the SR Torque Chart (bellow), read down the Spring Torque "End column" to the first Torque that exceeds the required Torque, then right to the applicable Air Torque "End Column". If the Air End Torque also exceeds the required Torque, read left to the Actuator Size & Spring Set. If not, move down the chart one actuator size at a time and repeat, until both torques exceeds the required Torque.

Type MRP (bore) SR	Spring SET	Spring Torque		Air Supply Pressure (Bar)																
				2.5		3.5		4.5		5		5.5		6		7		8		
				Air Torque (in-lb)																
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	
Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	
50	05	43.4	30.1	43.4	30.1	73.5	60.2	102.7	89.4	117	103.6									
	06	51.3	35.4	38.1	22.1	67.3	51.3	97.4	81.4	112	95.6	127	103.6							
	07	60.2	41.6			61.1	42.5	91.2	81.4	105	87.6	120	101.8	135	115.9					
	08	69.0	47.8			54.9	33.6	69.9	48.7	99.1	77.9	114	92.9	128	101.8	158	137			
	09	77.9	54.0					78.8	54.9	92.9	69	108	84.1	122	98.2	152	128.3	181	157.5	
	10	85.9	59.3					73.5	46.9	87.6	61.1	103	76.1	117	90.3	147	120.4	176	149.6	
	11	94.7	65.5							81.4	52.2			94.5	67.3	111	81.4	141	111.5	170
	12	103.6	71.7										90.3	58.4	104	72.6	135	102.7	164	131.9
63	05	73.4	48.7	81.4	55.8	133	107.1	185	159.3	211	185									
	06	89.4	59.3	70.8	39.8	123	92	174.4	144.3	200	170	226	195.6							
	07	104.4	69			112	77	165	129.2	190	154.9	216	180.6	242.5	207.1					
	08	119.5	78.8			102.7	61.9	155	114.2	181	139.8	206	165.5	233	192.1	284	243.4			
	09	134.5	88.5					145	99.1	170.8	125	196	150.5	223	177	274	228.3	327	280.6	
	10	149.6	98.2					135	84.1	161	109.7	187	135.4	213	162	265	213.3	316.9	265.5	
	11	164.6	108							151	94.7	177	120.4	204.5	158.4	254.9	198.3	307.1	250.5	
	12	178.8	117.7									167	106.2	193.8	132.8	245	184.1	297	236.3	
75	05	153.1	98.2	159.3	104.4	261.9	207.1	365	310.7	417	362									
	06	184.1	117.7	139.8	73.5	242.5	176.1	346	279.7	397	331	449	382.3							
	07	214.2	137.2			223	146	326.6	249.6	338	300.9	429	352.3	480	403.4					
	08	245.2	156.7			203.5	115.1	307	218.6	358	270	410	321.3	461	372.6	563.8	475.3			
	09	276.1	174.4					289	187.6	340.8	239	392	290.3	443	341.6	546	444.3	649.6	547.9	
	10	306.2	195.6					268	157.5	319	208.9	371	260.2	422	311.5	524.8	414.2	628.4	517.7	
	11	337.2	215.1							300	177.9	351.4	229.2	402.7	280.6	505.4	383	609	486.8	
	12	367.3	216.8								331	199.1	382	250.7	485	353.1	588.6	456.7		
88	05	263.8	162	242.5	149.6	405	311.5	570.9	473.8	647.9	554									
	06	218.6	194.7	210.6	98.2	372.6	260.2	534.6	422.2	615	530.6	696.6	584.1							
	07	357.6	227.5			340	290.8	501	370.8	582	452.3	663.8	532.8	746	616					
	08	409	259.3			308	158.4	469	320.4	550	400.9	631.1	482.4	712.5	562.9	874.5	724.9			
	09	460.2	292					437	269	518	349.6	599.2	431	679.7	511.6	841.7	672.7	1000	836.4	
	10	511.6	324.8					404.5	217.7	485	298.3	566.4	379.7	647	464.1	808	623	973.6	785.1	
	11	562	356.7							453	247.8	533.7	328.4	615.1	409.8	777.1	570.9	935.5	730.2	
	12	613.4	389.4								501.8	277.9	582.4	358.5	743.5	519.5	902.8	682.4		

Type MRP (bore) SR	Spring SET	Spring Torque		Air Supply Pressure (Bar)																		
				2.5		3.5		4.5		5		5.5		6		7		8				
				0° 90°		0° 90°		0° 90°		0° 90°		0° 90°		0° 90°		0° 90°		0° 90°				
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End			
100	05	348.7	223.9	364	239.9	599.2	475.3	834	710.7	956	828.4											
	06	418.6	269	319.5	170	555	405.3	790.4	640.8	911	758.5	1026	876.2									
	07	487.7	314.2			509.8	335.4	745	570.9	863	688.6	978	804.5	1097	920.5							
	08	557.6	358.5			464.7	265.5	700.1	501	817.8	618.7	934	734.6	1053	854.1	1292	1088					
	09	627.5	403.6					655	431.9	773.6	550	883.9	666.5	1009	784.2	1248	1018	1478	1257			
	10	697.4	448.7					610.7	362	728	479.7	846.1	597.4	965	715.1	1195	947	1434	1186			
	11	767.4	492							683.3	409.8			801	527.5	920.5	645.2	1151	876	1389	1115	
	12	836.4	537										756	457.6	873.6	575.3	1106	814.3	1345	1044		
125	05	725.8	464.7	757	495.6	1252	991	1740	1558	1987	1726	2143	1823									
	06	876.2	557.6	664	345.2	1159	840.8	1646	1328	1894	1575	2049	1682	2288	1921							
	07	1017.8	650.5			1066	699.2	1553	1186	1801	1434	1956	1531	2195	1770	2690	256					
	08	1168.3	743.5			974	548.7	1460	1036	1708	1283	1859	1390	2102	1629	1713	239	3084	2611			
	09	1310	836.4					1367	894	1615	1142	1770	1239	2009	1478	2505	223	2991	2461			
	10	1460.4	929.3					1274	743	1522	991	1678	1097	1912	1336	2407	206	2894	2319			
	11	1602	1026.7							1425	850	1584	947	1823	1186	2319	190	2805	2168			
	12	1752.4	1115.2																			
145	05	1133	725.8	1195	788	1965	1558	2735	2328	3124	2717											
	06	1371.9	876.2	1044	549	1814	1319	2584	2089	2974	2478	3354	2859									
	07	1593	1017.8			1673	1097	2443	1867	2832	2257	3213	2637	3602	3027							
	08	1823	1168.2			1522	867	2292	1637	2682	2027	3062	2407	3451	2797	4222	3567					
	09	2053	1310					2151	1407	2540	1797	2921	2177	3310	2567	4080	3337	4850	4107			
	10	2275	1460					2000	1177	2390	1036	2770	1947	3160	2337	3930	3107	4699	3877			
	11	2505	1602							2248	1345	2629	1726	3018	2115	3788	2885	4558	3655			
	12	2735	1752									2478	1496	2867	1885	3638	3655	4408	3425			
160	05	1487	991.3	1522	1027	2522	2027	3514	3036	4027	3549											
	06	1761	1195	1319	752	2319	1752	3328	2761	2823	3257	4328	3762									
	07	2062	1389			2124	1434	3133	2443	3629	2938	4133	3443	4638	3947							
	08	2354	1593			1921	1159	2930	2168	3425	2664	3930	3169	4434	3673	5434	4673					
	09	2646	1788					2734	1876	3231	2380	3735	2876	4239	3381	5239	4381	6249	5390			
	10	2938	1983					2540	1584	3036	2080	3540	2584	4045	3089	5045	4089	6054	5098			
	11	3231	2186							2832	1788	3336	2292	3841	2797	4841	3797	5850	4806			
	12	3527	2381									3412	2000	3646	2505	4671	3523	5656	4514			
180	05	2098	1398	1991	1092	3346	2646	4700	4001	5381	4682											
	06	2514	1682	1780	874.5	3062	2260	4425	3585	5098	4266	5780	4939									
	07	2938	1956			2788	1814	4142	3169	4815	3841	5496	4523	6187	5116							
	08	3354	3113			2505	1390	3859	2744	4540	3425	5213	4107	5895	4779	7249	6134					
	09	3770	2522					3576	2328	4257	3009	4930	3682	5611	4363	6966	5717	8320	7072			
	10	4195	2797					3301	1912	3983	2584	4655	3257	5337	3939	6691	5302	8045	6656			
	11	4611	3084							3700	2168	4381	2841	5054	3523	6408	4877	7762	6230			
	12	5027	3354									4098	2455	4779	3107	6134	4461	7488	5815			
200	05	2788	1885	2823	1921	4708	3806	6594	5682	7532	6629											
	06	3346	2257	2451	1363	4328	3248	6213	5124	7134	6071	8098	7010									
	07	3903	2683			3956	2691	5841	4567	6780	5514	7718	6452	8665	7390							
	08	4461	3009			3576	2133	5461	4009	6399	4956	7346	5894	8284	6833	10169	8718					
	09	5018	3390					5089	3452	6027	4399	6966	5337	7913	6275	9789	8160	11674	10046			
	10	5576	3762					4523	2894	5647	3841	6594	4779	7532	5718	9417	7603	11302	9488			
	11	6134	4142							5275	3284	6213	4160	7160	5160	9037	7045	10922	8930			
	12	6691	4514									5841	3664	6780	4602	8664	6488	10550	8373			
240	05	4511	3186	4717	3292	7877	6461	11046	9621	12621	11205											
	06	5532	3806	4080	2372	7240	5532	10408	8700	11984	10285	13568	11860									
	07	6461	4470			6602	4611	9771	7780	11347	9355	12931	10939	14515	12524							
	08	7381	5107					9134	6850	10709	8435	12294	10019	13878	11594	17038	14763					
	09	8302	5744					8488	5930	10072	7514	11603	9045	13241	10674	16400	13842	19560	17002			
	10	9222	6381					7851	5009	9435	6594	10966	8125	12595	9753	15763	12913	18923	16082			
	11	10143	7019							8798	5673	10329	7204	11957	8833	15126	11993	18256	15161			
	12	11072	7656									9691	6275	11320	7913	14489	11072	17648	14232			



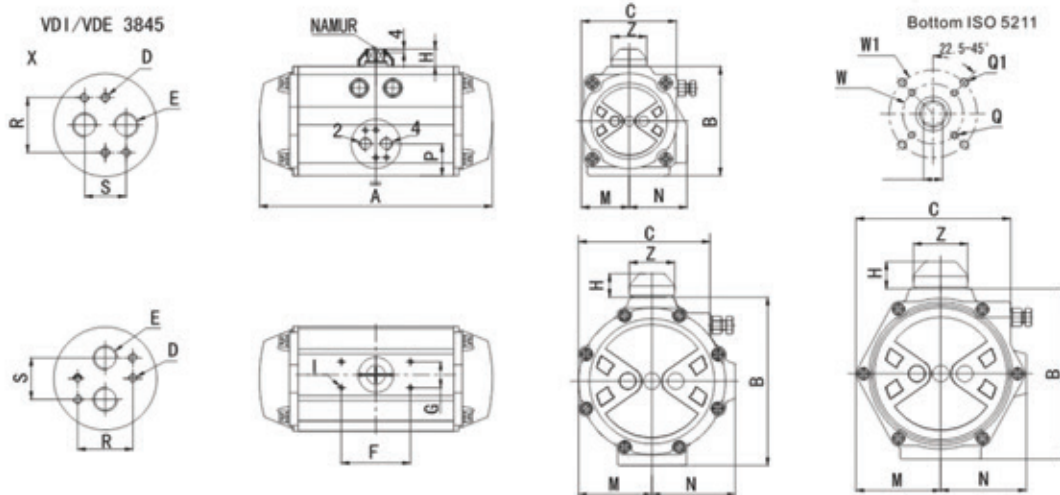
Type MRP (bore) SR	Spring SET	Spring Torque		Air Supply Pressure (Bar)															
				2.5		3.5		4.5		5		5.5		6		7		8	
				Air Torque (in-lb)															
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
265	05	7089	4832	6647	4389	11240	8983	15834	13568	18126	15869								
	06	8506	5797	5682	2947	10275	7559	14869	12152	17161	14444	19453	16745						
	07	9922	6762			9311	6142	13895	10735	16197	13028	18489	15329	20781	17622				
	08	11338	7727			8346	4726	12931	9320	15232	11612	17542	13904	19817	15781				
	09	12763	8691					11966	7904	14267	10196	16559	12488	18852	14790	23445	19374	28039	23968
	10	14179	9656					11001	6479	13303	8780	15595	11072	17887	13365	22481	17958	27074	22552
	11	15595	10621							12329	7364	14630	9656	16922	11948	21516	16542	26109	21136
12	17011	11586									13665	8240	15958	10532	20551	15126	25136	19719	
300	05	17533	13028	11789	8975	19675	16957	27738	24941	31703	28906								
	06	19728	14657	10169	6788	18135	14754	26110	22729	30101	26720	34084	30703						
	07	21914	16276			16507	12568	24481	20543	28473	24525	32456	28517	36447	32499				
	08	24109	17905			14887	10373	22853	18348	26844	22339	30827	26322	34818	30305	42810	35341		
	09	26295	19533					21224	16153	25216	20144	29199	24197	33190	28119	41138	32730	50391	45325
	10	21914	16276					19604	13966	23587	17949	27570	21941	31562	25924	39457	30119	48484	42961
	11	24109	17905							21958	15763	25941	19745	29933	23738	37784	27499	46758	40607
12	26295	19533									24321	17551	28305	21543	36102	24888	44962	38244	
350	05	20268	12842	10152	2717	19348	11913	28543	21109	31730	28906								
	06	24331	15409			16772	7859	25977	17055	30101	26720	35173	26251						
	07	28384	17985			14205	3806	23401	13002	28473	24525	32597	22198	37199	26971				
	08	32438	20551					20835	8948	26844	22339	30030	18144	34633	22737	43829	31933		
	09	36492	23118					18268	4894	22861	9488	27464	14090	32057	18684	41262	27879	50458	37076
	10	40554	25685									24897	10028	29491	14630	38686	23826	47882	33022
	11	44608	28260													36120	19773	45316	28968
12	48661	30827															42749	24915	
400	05	33084	21065	12303	283	25649	13630	38996	26977	45669	33650	52343	40324						
	06	39704	25278			21436	7010	34774	20357	41448	27030	48121	33704	54795	40377				
	07	46325	29491					30561	13736	37235	20410	43908	27083	50581	33757	63929	47104		
	08	52936	33704							33022	13798	39659	20472	46369	27145	59715	40492	73063	53830
	09	59556	37925									35483	13851	42156	20525	55503	33892	68850	47216
	10	66177	42138											37943	13904	51290	27251	64637	40598
	11	72788	46351													47076	20631	60424	33987
12	79409	50564															56211	27366	

### 3. Air consumption & Operating Time

Model	Ø BORE (mm)	Revolution of travel adjusted 1°	Air consumption of open (L)	Air consumption of close (L)	Open time (Sec)		Close time (Sec)		Weight (Kg)	
					DA	SR	DA	SR	DA	SR
MRP50	50	1/6 turn	0.09	0.15	0.20	0.25	0.25	0.3	0.96	1.06
MRP63	63	1/6 turn	0.16	0.26	0.25	0.30	0.30	0.35	1.58	1.70
MRP75	75	1/6 turn	0.31	0.49	0.30	0.35	0.40	0.50	2.7	3.15
MRP88	88	1/5 turn	0.51	0.78	0.40	0.50	0.50	0.60	3.8	4.40
MRP100	100	1/5 turn	0.71	1.11	0.50	0.60	0.70	0.90	5.4	6.51
MRP125	125	1/5 turn	1.54	2.34	0.9	1.10	1.20	1.40	10.2	12.6
MRP145	145	1/5 turn	2.41	3.78	1.20	1.40	1.50	1.80	14.5	18.1
MRP160	160	¼ turn	3.14	4.92	1.50	1.70	1.80	2.10	19.8	24
MRP180	180	¼ turn	4.26	6.89	2.00	2.20	2.40	2.80	25	31.6
MRP200	200	¼ turn	5.94	9.46	2.70	3.20	3.50	4.00	35.5	45.1
MRP240	240	¼ turn	10.0	15.2	3.50	4.00	4.10	4.60	53	64
MRP265	265	¼ turn	14.5	21.38	4.00	4.50	4.50	5.00	83	102



# 4. Dimensions



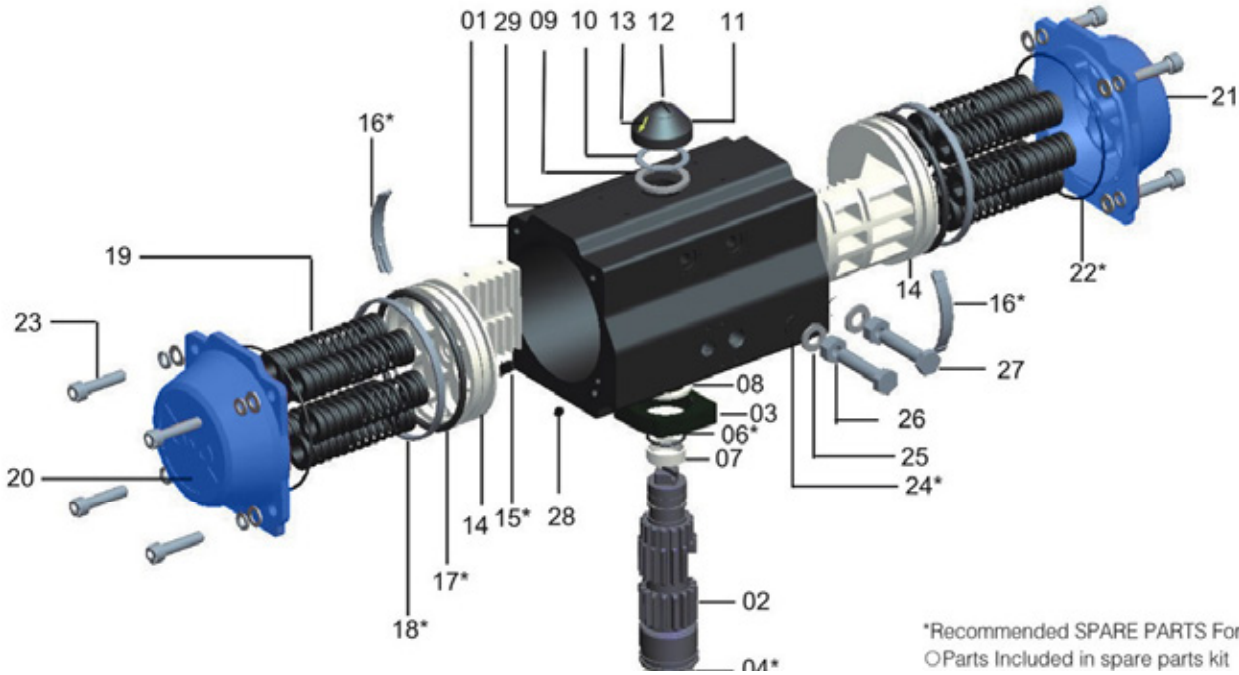
Dimensions (mm) & Technical data  
MRP ( DA / SR)

BORE ->	50	63	75	88	100	125	145	160	180	200	200	240	265	300	350	400
ISO5211->	F04	F05	F05/07	F05/07	F07/10	F07/10	F10/12	F10/12	F10/14	F10/14	F10/14	F12/16	F16	F16	F16	F25
A	142	163	215	253	270	345	409	439	488	543	543	629	740	885	944	1062
B	69	85	102	115	127	157	176	196.5	220	244	244	300	330	390	440	464
C	58	72	86.5	97	110	135.3	156	168.5	191	210.5	210.5	250.5	298.5	305	360	385
D	M5x10	M5x10	M5x10	M5x10	M5x10	M5x10	M5x10	M5x10	M5x10	M5x10	M5x10	M5x10	M6	M6	M6	M6
E(NPT)	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/2"	1/2"
F	80	80	80	80	80	80	80	80	130	130	130	130	130	130	130	150
G	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
H	20	20	20	20	20	30	30	30	50	50	50	50	50	50	50	50
I	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8
M	29	36	43.5	49.2	55.3	69.5	79	88	98	108	108	130.5	163.5	170	200	217.5
N	41	47	53	56.3	67	82	91	98.5	107	112.5	112.5	130.5	166	193	222	246
O	11	14	17	17	22	27	27	27	36	36	36	46	46	55	55	60
P	27	29	29	32	37	45.5	52.5	52	58	62.5	62.5	78	165.5	195	200	212
Q	42	50	50	50	70	70	102	102	102	102	102	125	165	165	165	254
Q1	-	-	70	70	102	102	125	125	140	140	140	165	-	-	-	-
R	32	32	32	32	32	32	32	32	32	32	32	45	45	45	45	45
S	24	24	24	24	24	24	24	24	24	24	24	40	40	40	40	40
T	12	16	18	18	22	27	32	32	39	39	39	49	69	69	69	65
W	M5	M6	M6	M6	M8	M8	M10	M10	M10	M10	M10	M12	M20	M20	M20	M20
W1	-	-	M8	M8	M10	M10	M12	M12	M14	M14	M14	M16	-	-	-	-
ØZ	41	41	41	41	41	56	65	65	80	80	80	115	115	115	115	115





# 5. Parts List



\*Recommended SPARE PARTS For maintenance  
 OParts Included in spare parts kit

PART No.	SPARE PARTS	QTY	DESCRIPTION	MATERIAL	CORROSION PROTECTION "A" (A)	OPTIONAL MATERIAL
1		1	BODY	Extruded Aluminum Alloy	Anodized	FPM/VMQ
2		1	DRIVE SHAFT	Steel Alloy	Oxidation	FPM/VMQ
3		1	ADJUST CAM	45#	--	
4		1	BOTTOM BEARING	POM	--	
5		1	O-RING ( Pinion Bottom)	NBR		
6		1	O-RING (Pinion top)	NBR		
7		1	TOP BEARING	POM		
8		2	TRHUSH BEARING	POM		
9		1	WASHER	SST	Nickel Plated	
10		1	CIR CLIP	SST		
11		1	INDICATOR	Nylon PA		
12		1	SCREW	Nylon PA		
13		2	INDICATOR FLAKE	Nylon PA		FPM/VMQ
14		2	PISTON	Die Cast Aluminum Alloy	Anodized	
15		2	PLUG	POM		
16		2	BEARING (Back Piston)	POM		
17		2	BEARING	POM		
18		2	O-RING (Piston)	NBR		FPM/VMQ
19		5-12	SPRING	Alloy Steel		
20		1	LEFT END CAP	Die Cast Aluminum Alloy	Anodized	FPM/VMQ
21		1	RIGHT END CAP	Die Cast Aluminum Alloy	Anodized	
22		2	O-RING END CAP	NBR		
23		8C	SCREW	SST		
24		2	O-RING (Stop screw)	NBR		FPM/VMQ
25		2	WASHER	SST		
26		2	NUT	SST		
27		2	ADJUSTMENT SCREW	SST		
28		2	PLUG	NBR		
29		1	LABEL	Polyester - Aluminum		

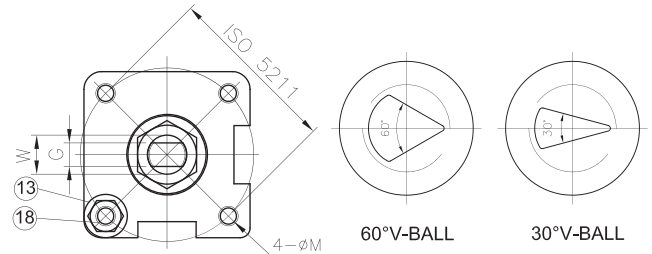
# FBV-C TYPE

**FEATURES:**

- \*MODULATING,SOLID SS V-BALL, 60° , 45° , 30° V- BALL, NOT SEAT INSERT
- \*NON-CLOGGING, FOR GENERAL & SLURRY APPLICATIONS
- \*SHUT-OFF ANSI CLASS VI.
- \*HIGHT TEMPERATURE SEATS
- \*COMPACT&EASY MAINTENANCE, AS CHANGE A STANDARD SEAT
- \*PNEUMATIC / ELECTRIC ACTUATOR, 3-15 PSI, 4-20 mA, HART Protocol,Profibus PA/Foundation Field Bus.
- \*DIRECT / REVERSE & DOUBLE ATION
- \*FLANGED IN ACCORDANCE WITH:
  - ANSI B16.5 / B16.10
  - DIN 3202-F4
  - PN10/16(DIN 2633); PN25/40(2635)
- \*HIGH PRESSURE DROP CAPABILITY
- \*ECONOMICAL WITH LOW OPERATING COST
- \*TEST:
  - API 598
  - \*HIGH PRESSURE DROP CAPABILITY
  - \*ECONOMICAL WITH LOW OPERATING COST
  - \*MATERIAL TRACEABILITY



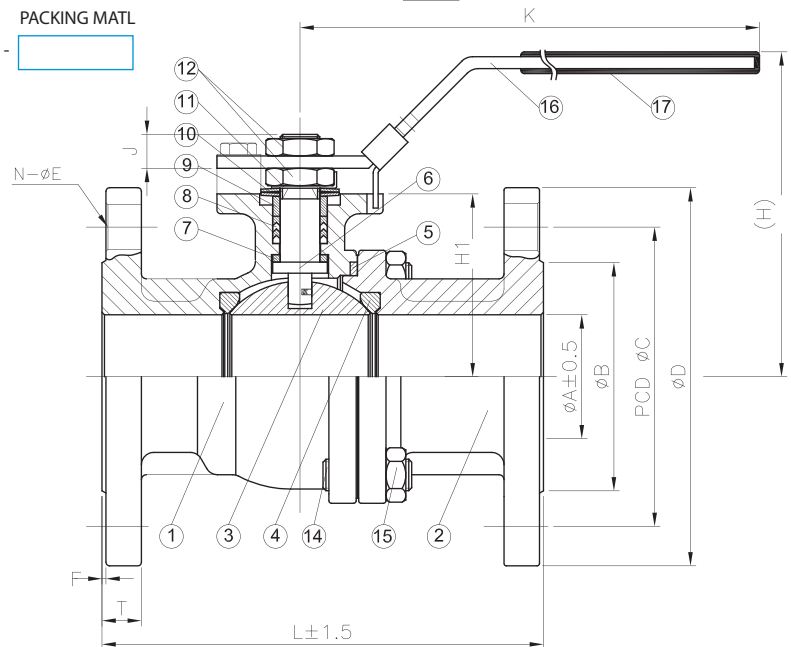
SIZE: **1/2" – 4"** **CE** APPROVED  
 \* ANSI CLASS 150#/300#/DIN, FLANGED END  
 \*2 PIECES



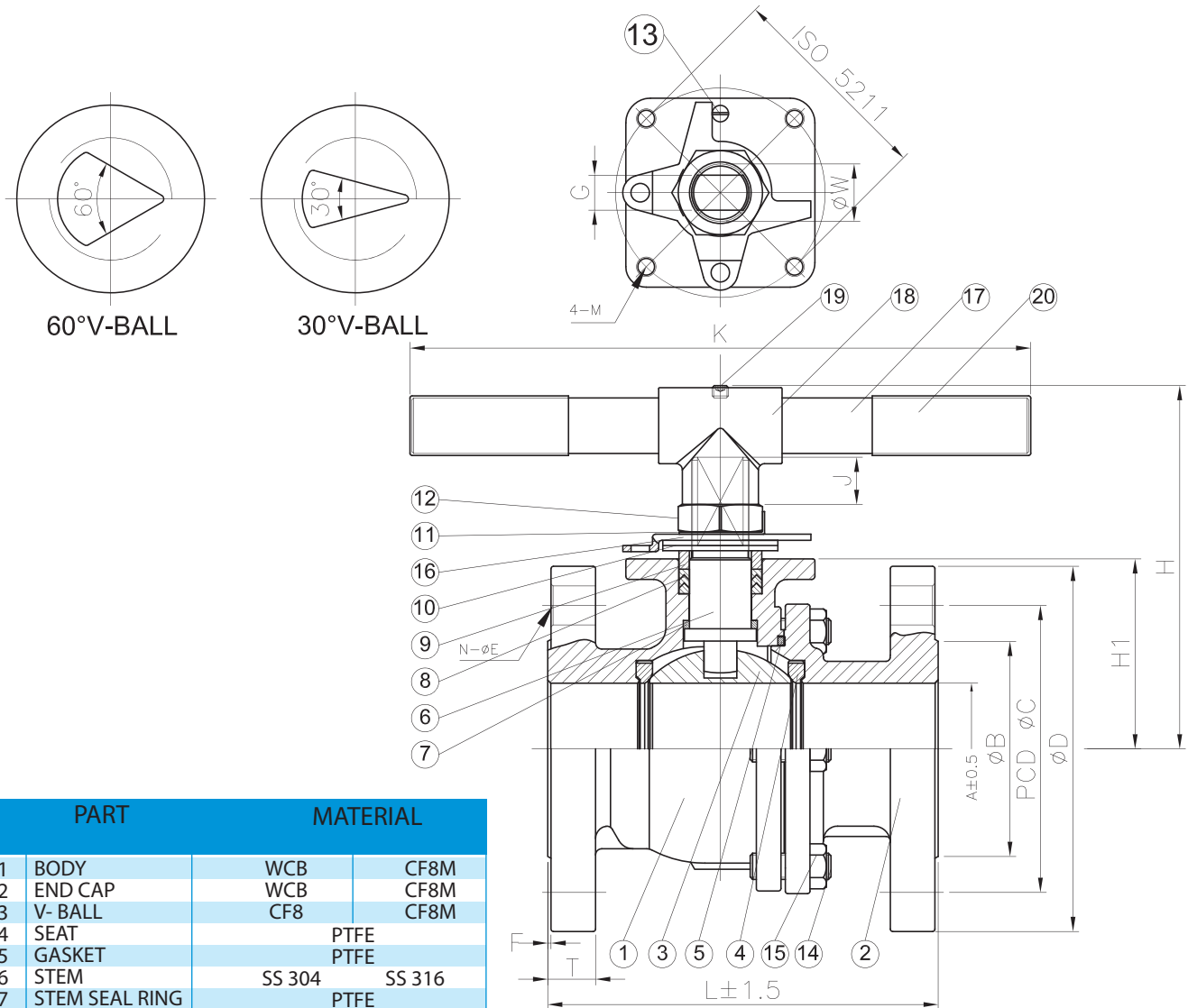
**HOW TO ORDER**

FBV-C  BODY MATL  -  SIZE  -  V-PORT (°)  -  SEAT MATL  -  PACKING MATL

PART		MATERIAL	
1	BODY	WCB	CF8M
2	END CAP	WCB	CF8M
3	V- BALL	CF8	CF8M
4	SEAT		PTFE
5	GASKET		PTFE
6	STEM	SS 304	SS 316
7	THRUST WASHER		PTFE
8	STEM PACKING		PTFE
9	STEM RING	SS 304	
10	BELLEVILLE WASHER	SS 301	
11	STOP WASHER	SS 304	
12	STEM NUT	SS 304	
14	BOLTS	ASTM Gr B7	ASTM A193 Gr B8
15	BOLTS NUT	ASTM A194 Gr 2HM	ASTM A193 Gr8

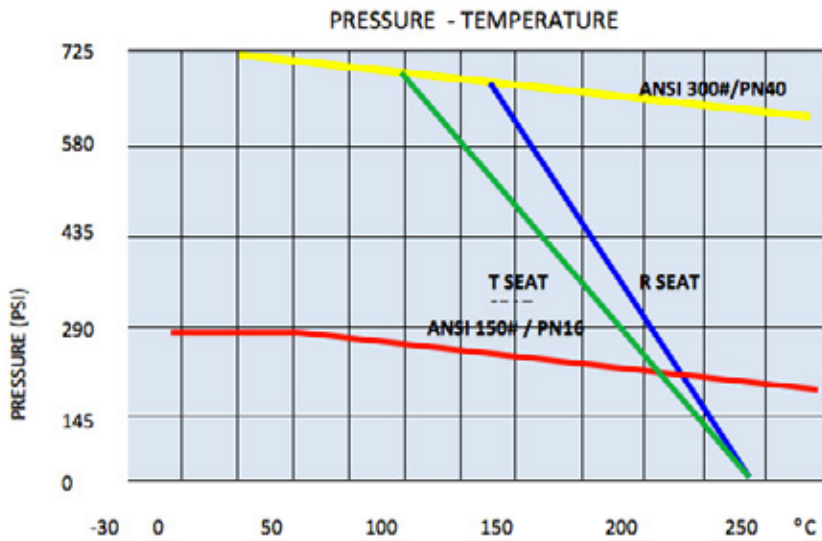


SIZE	A	B	C	D	T	F	N	E	H		K	L	ISO5211	M	G	W	Torque	SIZE	
½"	15	35	60.5	89	11.2	1.6	4	16	80	38.5	8.5	162	108	F04	M5 * 0.8P	10 - 24UNC	6.35	12	61.95
¾"	20	43	70.0	98.6	12.7	1.6	4	16	84.5	42.5	8.5	162	117	F04	M5 * 0.8P	10 - 24 UNC	6.35	12	88.50
1"	25	51	79.2	108	14.3	1.6	4	16	102	52	12	196	127	F05	M6 * 1.0P	¼ - 20 UNC	8.0	14	123.89
1¼"	32	63.5	88.9	117.5	15.9	1.6	4	16	102	56	12	196	140	F05	M6 * 1.0P	¼ - 20 UNC	8.0	14	159.29
1½"	38	73.2	98.6	127	17.5	1.6	4	16	125	65.25	12	226	165	F07	M8 * 1.25P	5/16 - 18 UNC	9.5	16	212.39
2"	50	92	120.7	152.5	19.1	1.6	4	19	132	73.75	12	226	178	F07	M8 * 1.25P	5/16 - 18UNC	9.5	16	336.28
2½"	64	104.7	139.7	177.8	23.3	1.6	4	19	176.8	92.5	23	300	190	F10	M10 * 1.5P	3/8 - 16 UNC	17	17	530.97
3"	76	127	152.4	190.5	23.9	1.6	4	19	185.5	101.7	23	300	203	F10	M10 * 1.5P	3/8 - 16 UNC	17	17	654.87
4"	100	157.2	190.5	228.6	23.9	1.6	8	19	200	119	23	380	229	F10	M10 * 1.5P	3/8 - 16UNC	17	17	1150.44



PART	MATERIAL
1 BODY	WCB CF8M
2 END CAP	WCB CF8M
3 V- BALL	CF8 CF8M
4 SEAT	PTFE
5 GASKET	PTFE
6 STEM	SS 304 SS 316
7 STEM SEAL RING	PTFE
8 V-RING STEM PACKING	PTFE
9 SLEEVE	SS 304
10 BELLEVILLE WASHER	SS 301
11 STOP	SS 304
12 STEM NUT	SS 304
13	
14 BOLTS	ASTM Gr B7 ASTM A193 Gr B8
15 BOLTS NUT	ASTM A194 Gr 2HM ASTM A193 Gr 8

VLV Size	Actuator Size MRP(XX)DA MRP(XX)SR		V-Port Angle (°)	Opening (%) and Angle of ball rotation											
				0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
				0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	
1/4"	50	63(7)	Slot 3	0	0	0.14	0.40	0.66	0.92	1.20	1.46	1.72	1.98	2.2	
			30°	0	0	0.11	0.22	0.37	0.58	0.85	1.15	1.62	2.10	2.55	
			60°	0	0	0.15	0.35	0.50	0.82	1.30	1.90	3.05	4.35	5.90	
3/8"	50	63(7)	Slot 3	0	0	0.14	0.40	0.66	0.92	1.20	1.46	1.72	1.98	2.2	
			30°	0	0	0.12	0.22	0.34	0.57	0.85	1.14	1.60	2.10	2.55	
			60°	0	0	0.14	0.35	0.50	0.85	1.36	1.96	3.11	4.38	5.93	
1/2"	50	63(7)	Slot 3	0	0	0.14	0.40	0.66	0.92	1.20	1.46	1.72	1.98	2.2	
			30°	0	0.04	0.23	0.47	0.77	1.19	1.83	2.47	3.43	4.65	5.58	
			60°	0	0.05	0.28	0.73	1.11	1.83	2.92	4.29	7.00	9.43	12.78	
3/4"	50	75(7)	Slot 3	0	0	0.14	0.40	0.66	0.92	1.20	1.46	1.72	1.98	2.2	
			30°	0	0.07	0.30	0.61	0.99	1.57	2.42	3.25	4.52	6.12	7.34	
			60°	0	0.08	0.35	0.93	1.46	2.42	3.85	5.64	9.21	12.41	16.28	
1"	63	75(10)	30°	0	0.08	0.45	1.25	2.06	3.54	5.30	7.70	10.49	12.84	15.48	
			60°	0	0.09	0.68	1.74	2.78	5.13	8.00	11.88	18.71	23.22	32.84	
			30°	0	0.08	0.48	1.37	2.47	4.12	6.08	8.82	11.76	14.87	17.39	
1-1/4"	75	88(9)	60°	0	0.09	0.67	2.04	3.41	6.47	10.80	15.39	22.35	33.37	44.20	
			30°	0	0.08	0.65	1.88	3.39	5.66	8.36	12.12	16.17	20.44	23.90	
			60°	0	0.09	0.92	2.81	4.69	8.89	14.85	21.16	30.73	45.88	59.74	
2"	88	125(7)	30°	0	0.09	1.18	3.79	7.53	12.26	17.83	26.44	36.45	48.09	55.92	
			60°	0	0.11	1.51	5.80	10.39	20.60	33.98	48.75	69.04	104.23	136.50	
			30°	0	0.10	1.15	4.42	7.91	13.39	20.05	30.43	41.92	69.75	77.20	
2-1/2"	88	125(9)	60°	0	0.11	1.46	5.91	11.90	23.24	37.92	59.31	83.29	113.65	162.50	
			30°	0	0.13	1.20	4.15	9.49	15.96	26.78	38.91	53.31	69.77	85.91	
			60°	0	0.16	2.89	6.70	15.82	29.36	46.32	73.60	106.74	149.88	193.20	
3"	100	145(8)	30°	0	0.18	1.75	7.84	18.59	35.21	58.60	87.89	124.41	158.53	197.10	
			60°	0	0.27	2.20	12.44	33.67	62.98	106.26	160.49	233.96	329.50	437.29	





CE APPROVED

SIZE: 1/4" - 4" NPT/SW  
3-Pieces

INVESTMENT CASTING BODY & CAPS  
ASTM A 351 - CF8M / ASTM A 351 - CF8 (DIN 1.4301), ASTM A 216 - WCB

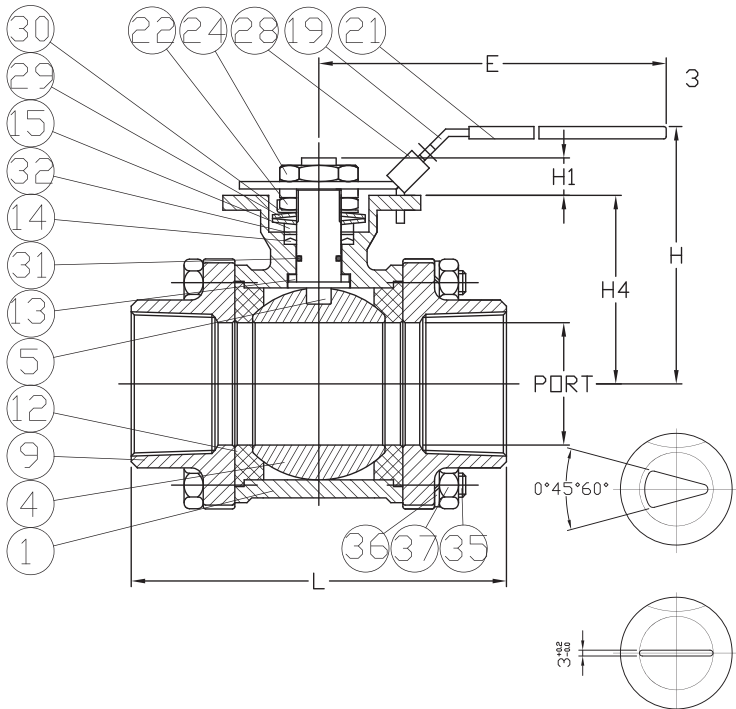
# 31KM-C TYPE

## FEATURES:

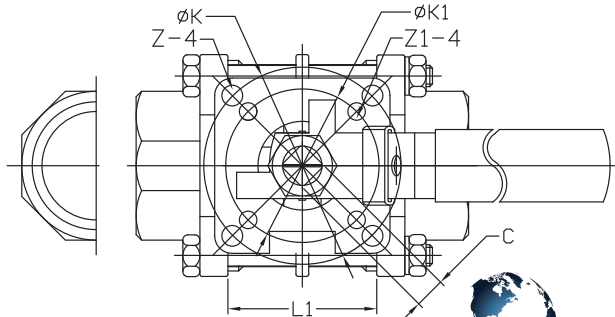
- \*MODULATING, SOLID SS V-BALL, 60°, 45°, 30° V- BALL, NOT SEAT INSERT
- \*NON-CLOGGING, FOR GENERAL & SLURRY APPLICATIONS
- \*SHUT-OFF ANSI CLASS VI.
- \*HIGH TEMPERATURE SEATS
- \*COMPACT & EASY MAINTENANCE, AS CHANGE A STANDARD SEAT
- \*MOUNTING PAD ISO 5211 STD
- \*PNEUMATIC / ELECTRIC ACTUATOR, 3-15 PSI, 4-20 mA, HART Protocol, Profibus PA/Foundation Field Bus.
- \*DIRECT / REVERSE & DOUBLE ACTION
- \*PIPE THREAD IN ACCORDANCE WITH:
  - ANSI B2.1 (BASIC STD FOR STEEL PIPE THREADS)
  - ANSI B1.20 (NPTF), BS21:1973, DIN259/2999, ISO228
- \*1000 PSI W.O.G /BLOW-OUT PROOF STEM
- \*HIGH PRESSURE DROP CAPABILITY
- \*ECONOMICAL WITH LOW OPERATING COST

## HOW TO ORDER

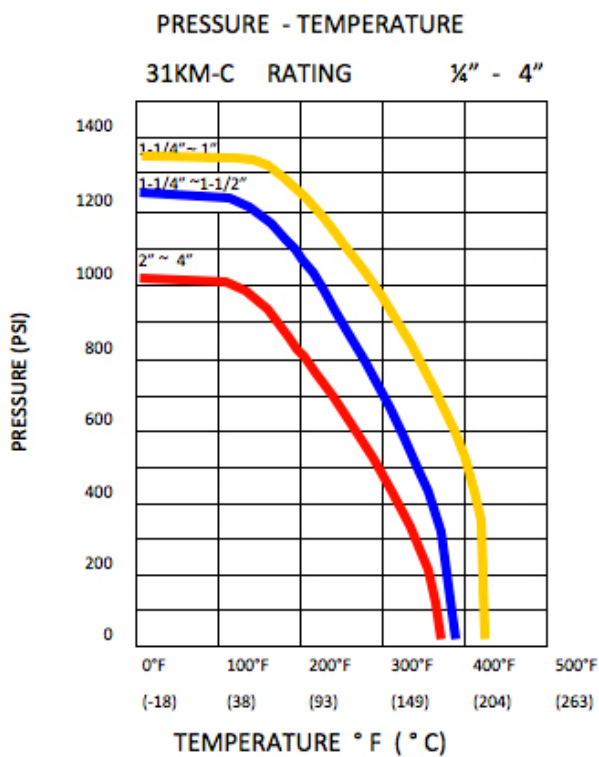
31KM-C  BODY MATL -  SIZE -  V-PORT (°) -  SEAT MATL -  PACKING MATL



PART		MATERIAL
1	BODY	ASTM-A351-CF8M ASTM-A216-WCB
4	BALL	ASTM-A351-CF8M
5	STEM	ASTM-A351-CF8M
9	END CAP	ASTM-A351-CF8M
12	BALL SEAT	RPTFE
13	THRUST WASHER	RPTFE
14	STEM PACKING	RPTFE
15	GLAND BUSH	ASTM-A351-CF8
19	HANDLE	ASTM-A351-CF8
21	HANDLE SLEEVE	VINYL GRIP
22	STEM NUT	ASTM-A351-CF8
24	HANDLE NUT	ASTM-A351-CF8
28	LOCKING PAD	ASTM-A351-CF8
29	BELLEVILLE WASHER	ASTM-A351-CF8
30	TAB WASHER	ASTM-A351-CF8
31	O - RING	VITON
32	PACKING FOLLOWER	25% - PTFE
35	BODY BOLT	ASTM-A351-CF8
36	BOLT WASHER	ASTM-A351-CF8
37	BOLT NUT	ASTM-A351-CF8



VLV Size	Actuator Size MRP(XX)DA MRP(XX)SR		V-Port Angle (°)	Opening (%) and Angle of ball rotation										
				0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
				0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°
¼"	50	63(7)	Slot 3	0	0	0.14	0.40	0.66	0.92	1.20	1.46	1.72	1.98	2.2
			30°	0	0	0.11	0.22	0.37	0.58	0.85	1.15	1.62	2.10	2.55
			60°	0	0	0.15	0.35	0.50	0.82	1.30	1.90	3.05	4.35	5.90
3/8"	50	63(7)	Slot 3	0	0	0.14	0.40	0.66	0.92	1.20	1.46	1.72	1.98	2.2
			30°	0	0	0.12	0.22	0.34	0.57	0.85	1.14	1.60	2.10	2.55
			60°	0	0	0.14	0.35	0.50	0.85	1.36	1.96	3.11	4.38	5.93
1/2"	50	63(7)	Slot 3	0	0	0.14	0.40	0.66	0.92	1.20	1.46	1.72	1.98	2.2
			30°	0	0.04	0.23	0.47	0.77	1.19	1.83	2.47	3.43	4.65	5.58
			60°	0	0.05	0.28	0.73	1.11	1.83	2.92	4.29	7.00	9.43	12.78
3/4"	50	75(7)	Slot 3	0	0	0.14	0.40	0.66	0.92	1.20	1.46	1.72	1.98	2.2
			30°	0	0.07	0.30	0.61	0.99	1.57	2.42	3.25	4.52	6.12	7.34
			60°	0	0.08	0.35	0.93	1.46	2.42	3.85	5.64	9.21	12.41	16.28
1"	63	75(10)	30°	0	0.08	0.45	1.25	2.06	3.54	5.30	7.70	10.49	12.84	15.48
			60°	0	0.09	0.68	1.74	2.78	5.13	8.00	11.88	18.71	23.22	32.84
1-1/4"	75	88(9)	30°	0	0.08	0.48	1.37	2.47	4.12	6.08	8.82	11.76	14.87	17.39
			60°	0	0.09	0.67	2.04	3.41	6.47	10.80	15.39	22.35	33.37	44.20
1-1/2"	75	100(8)	30°	0	0.08	0.65	1.88	3.39	5.66	8.36	12.12	16.17	20.44	23.90
			60°	0	0.09	0.92	2.81	4.69	8.89	14.85	21.16	30.73	45.88	59.74
2"	88	125(7)	30°	0	0.09	1.18	3.79	7.53	12.26	17.83	26.44	36.45	48.09	55.92
			60°	0	0.11	1.51	5.80	10.39	20.60	33.98	48.75	69.04	104.23	136.50
2-1/2"	88	125(9)	30°	0	0.10	1.15	4.42	7.91	13.39	20.05	30.43	41.92	69.75	77.20
			60°	0	0.11	1.46	5.91	11.90	23.24	37.92	59.31	83.29	113.65	162.50
3"	100	145(8)	30°	0	0.13	1.20	4.15	9.49	15.96	26.78	38.91	53.31	69.77	85.91
			60°	0	0.16	2.89	6.70	15.82	29.36	46.32	73.60	106.74	149.88	193.20
4"	45	180(8)	30°	0	0.18	1.75	7.84	18.59	35.21	58.60	87.89	124.41	158.53	197.10
			60°	0	0.27	2.20	12.44	33.67	62.98	106.26	160.49	233.96	329.50	437.29





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