

A single KTM 3-Way ball valve replaces several 2-Way saving valuable space and simplifying piping

Features

- Positive alignment of body
- Blow out-proof stem
- More than 50% of stem length is supported by bushing and valve body. This allows packing to act as a stem seal only and not part of stem support, thus minimizing stem leaks
- Stainless steel anti-static device
- Sphericity tolerance of the ball is unsurpassed
- Reinforced PTFE bearing and packing rings reduce friction
- Automatic cavity pressure relief
- Positive position indication
- Meet NACE MR-01-75 for sulfide cracking resistance
- Locking device capable
- Heavy duty body construction

2-Seats Features

- ZERO leakage with standard T or E-Seat
- Pure white T or E-Seat seal relieves concern over product contamination
- Suitable for high temperature applications when equipped with exclusive Gratite seat
- Lower operating torque, easing operation and reducing actuator cost

4-Seats Features

- Equipped with 4-Seats so that port can be used as an inlet without leakage. They are available with either a 3 Way L-port or 3 Way T-port.
- A greater Cv value is achieved in most sizes

Standards

Design : ASME B16.34
End connection : ASME B16.5



General applications
Diverting or mixing fluids

Special tests

- Liquid penetrant
- Magnetic-particle
- PMI
- X-ray

Special options

- Extension bonnet
- Gratite seat (2 seats only)

Technical data

2-Seats (L-Port)
E3500 Full bore (40-200mm)
E3600 Reduced bore (150-250mm)
ASME Class 150, 300
-29°C to 500°C

4-Seats (L&T Port)
E3900 Full bore (15-200mm)
E3800 Reduced bore (150-200mm)
ASME Class 150
-29°C to 150°C

KTM Three-Way Floating Ball Valves

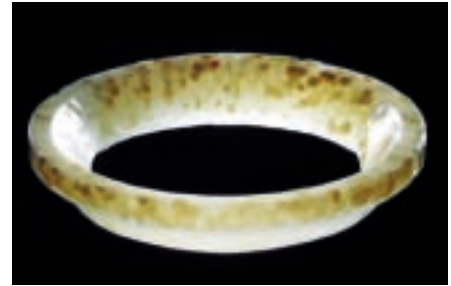
2-Seats (L-Port) and 4-Seats (L & T Port)

E-Seat Design and Features

The E-Seat offers process purity, strength, integrity, low permeability and high resiliency. It is composed of a unique molecularly enhanced copolymer of PTFE and PFA. It offers a full range of properties formerly requiring two separate materials. The E-seat provides pressure and temperature capabilities previously available only with glass or carbon fiber-reinforced PTFE. In high-temperature operations, the seat remains white, eliminating the risk of color contamination associated with seats made from darker reinforced materials. The E-seat is excellent on a wide variety of applications but is particularly recommended for use on styrene and butadiene, where low permeability is a performance factor; and on low-pressure steam, where flaking of virgin PTFE is a problem. It is also recommended for use on food and beverage, pharmaceutical and biotech, paper, clean gas and any other applications where product purity and the lack of foreign fillers are critical to the success.

The Popcorn Factor: The photograph to the right (A) shows a virgin PTFE seat after attack by a reactive monomers (in this case, styrene). The material's molecular matrix has been penetrated due to vapor pressure by uninhibited monomer, allowing a polymeric reaction to take place. Commonly called "popcorn polymerization," this reaction can totally destroy seat material.

In the second photograph (B), you can see the results of a test of the E-seat copolymer by KTM. Using butadiene, generally considered the worst-case scenario due to its small molecular size, the test ran for two years at 0.84Mpa and 82°C. The seats experienced minimum distortion and, after the two-year period, did not leak in service. Pressure tests after removal, at 1.1 times design, also showed no leakage. The photo shows two of the seats tested and for comparison, a new seat is shown in the foreground.



(A)



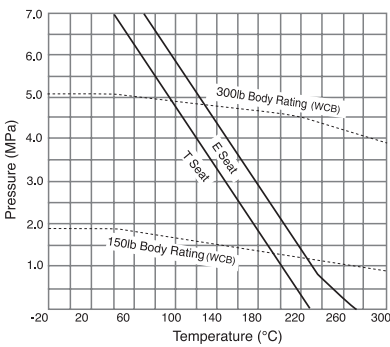
(B)

Pressure - Temperature Rating

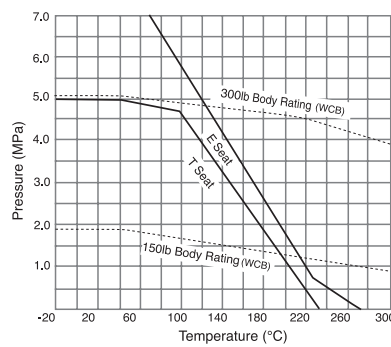
KTM Seat Ratings. The pressure and temperature limits of various KTM seat materials are shown below for valve sizes form 15mm to 220mm. Seat ratings for High-Temperature valves with 'Granite' seats are identical to ASME body ratings.

The body rating is shown by dotted lines.

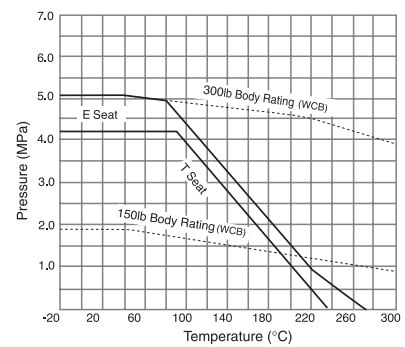
Full Bore 15mm to 20mm



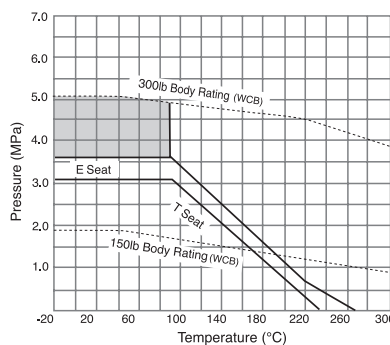
Full Bore 25mm to 65mm Reduced Bore 80mm



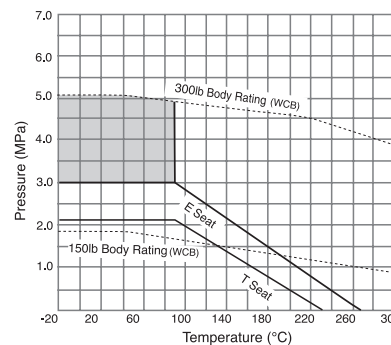
Full Bore 80mm to 100mm Reduced Bore 100mm to 125mm



Full Bore 125mm to 150mm Reduced Bore 150mm to 200mm



Full Bore 200mm Reduced Bore 250mm



E Seat : PTFE/PFA Copolymer
T Seat : PTFE

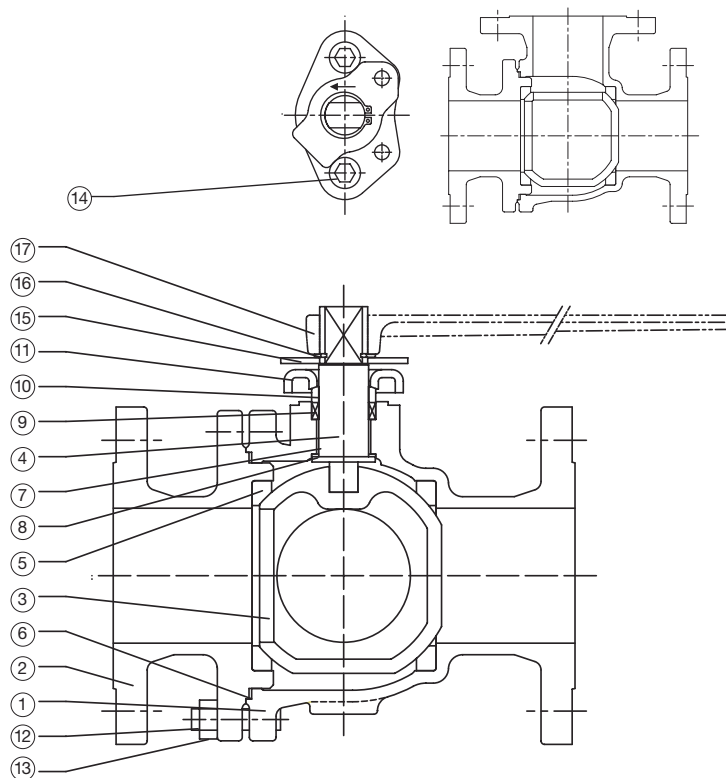
- Note: 1. If continuous service condition is in shaded area for 150mm and 200mm, trunnion type KTM Ball Valve is recommended
2. Body ratings shown in the charts conform to carbon steel (ASME B16.5 group 1.1 materials).

KTM Three-Way Floating Ball Valve

Full bore and reduced bore

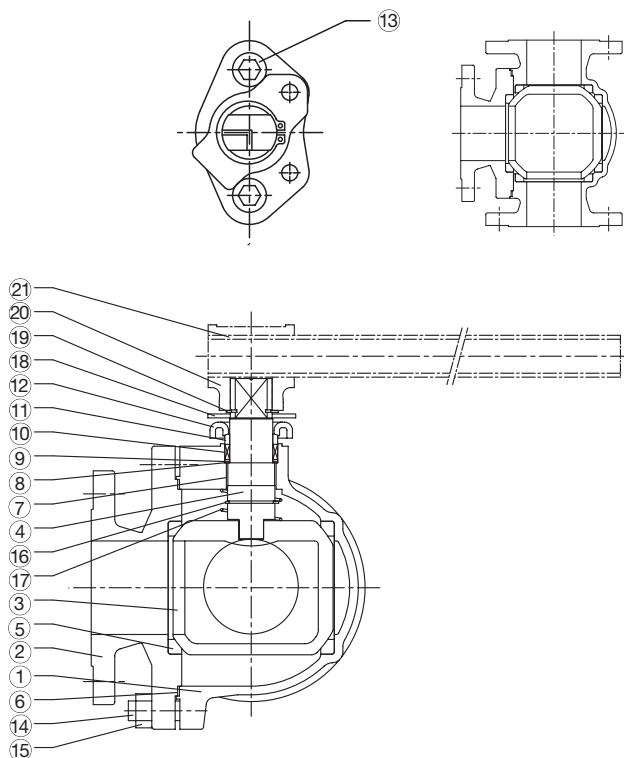
2- Seats (L-Port) E3500 Full bore. E3600 Reduced bore

Parts List					
No.	Parts Name	Material			Qty
1	Body	CF8	CF8M	WCB	1
2	Body Cap	CF8	CF8M	WCB	1
3	Ball	CF8	CF8M	CF8	1
4	Stem	304SS	316SS	304SS	1
5	Seat	PTFE (T), PTFE/PFA (E)			2
6	Gasket	PTFE (Class 150) Reinforced PTFE (Class 300)			1
7	Stem Bearing	Reinforced PTFE			1
8	Thrust Bearing	PTFE			1
9	Gland Packing	PTFE			1 set
10	Gland	316L SS			1
11	Gland Flange	304SS		C.Steel	1
12	Stud	304SS		C.Steel	4-8
13	Nut	304SS		C.Steel	4-8
14	GlandBolt	304SS		C.Steel	2
15	Stopper	304SS		C.Steel	1
16	Snap Ring	304SS		C.Steel	1
17	Handle	Ductile Iron			1



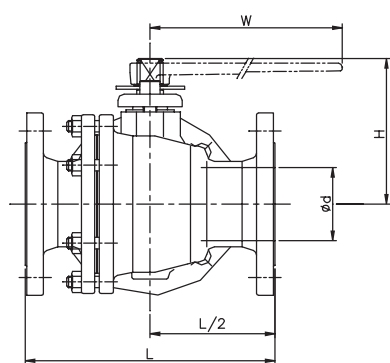
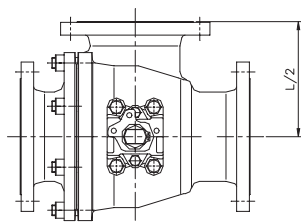
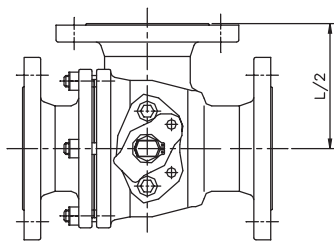
4- Seats (L-Port) E3900 Full bore. E3800 Reduced bore

Parts List					
No.	Parts Name	Material			Qty
1	Body	CF8	CF8M	WCB	1
2	Body Cap	CF8	CF8M	WCB	1
3	Ball	CF8	CF8M	CF8	1
4	Stem	304SS	316SS	304SS	1
5	Seat	PTFE (T), PTFE/PFA (E)			4
6	Gasket	PTFE (up to 80mm) Reinforced PTFE (100mm & larger)			1
7	Stem Bearing	Reinforced PTFE			1
8	Thrust Bearing	PTFE			1
9	Thrust Washer	316SS			1
10	Gland Packing	PTFE			1 set
11	Gland	316L SS			1
12	Gland Flange	304SS		C.Steel	1
13	Gland Bolt	304SS		C.Steel	2
14	Stud	304SS		C.Steel	6
15	Nut	304SS		C.Steel	6
16	Snap Ring	304SS	316SS	C.Steel	1
17	Spring	316SS			1
18	Stopper	304SS		C.Steel	1
19	Snap Ring	304SS		C.Steel	1
20	Handle Head	Ductile Iron			1
21	Pipe	C.Steel			1

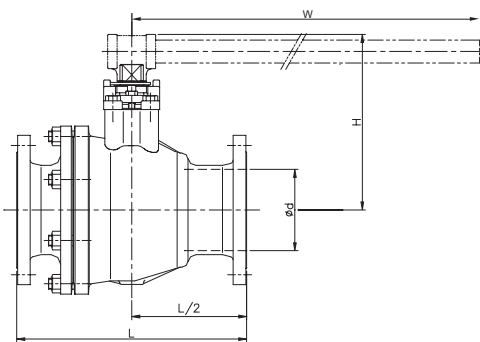


KTM Three-Way Floating Ball Valves

2-Seats (L-Port) E3500 Full bore, E3600 Reduced bore



Sizes 40mm to 100mm



Sizes 150mm to 200mm

ASME Class 150 Dimensions (mm)

Valve size (mm)	E3501 Full bore					E3601 Reduced Bore				
	d	L	H	W	Weight (kg)	d	L	H	W	Weight (kg)
40	38	210	97	230	11	-	-	-	-	-
50	51	220	107	230	14	-	-	-	-	-
65	64	250	142	400	21	-	-	-	-	-
80	76	260	152	400	27	-	-	-	-	-
100	102	330	178	650	46	-	-	-	-	-
150	152	430	328	1050	85	152	430	296	1,050	70
200	203	540	395	1410	120	203	540	316	1,050	96
250	-	-	-	-	-	254	670	386	1,410	110

Standard Materials

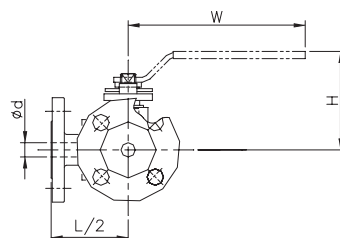
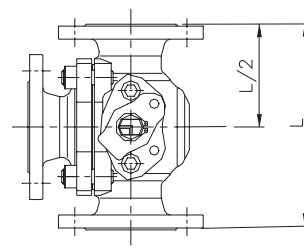
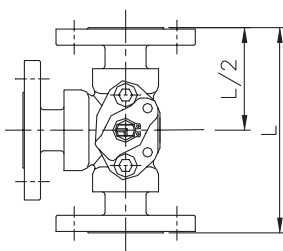
Body	: Carbon Steel (WCB), : 304SS (CF8), 316SS (CF8M)
Ball	: 304SS (CF8), 316SS (CF8M)
Stem	: 304SS, 316SS
Seat	: Select from these seat materials: PTFE/PFA Copolymer (E-Seat) -70 to 200°C Gratite -46 to 500°C Peek -29 to 300°C PTFE (T-Seat) -29 to 204°C

ASME Class 300 Dimensions (mm)

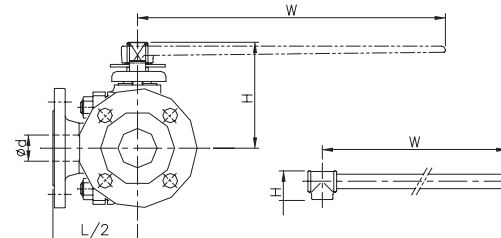
Valve size (mm)	E3502 Full bore					E3602 Reduced Bore				
	d	L	H	W	Weight (kg)	d	L	H	W	Weight (kg)
40	38	220	97	230	13	-	-	-	-	-
50	51	240	107	230	17	-	-	-	-	-
65	64	270	142	400	25	-	-	-	-	-
80	76	290	152	400	32	-	-	-	-	-
100	102	350	178	650	55	-	-	-	-	-
150	152	460	328	1050	102	152	460	296	1,050	82
200	203	570	395	1410	140	203	570	316	1,050	115
250	-	-	-	-	-	254	720	386	1,410	125

KTM Three-Way Floating Ball Valves

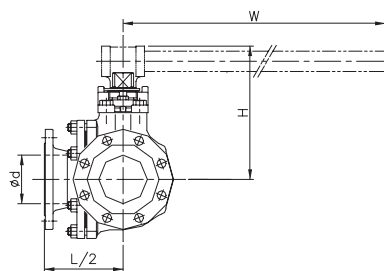
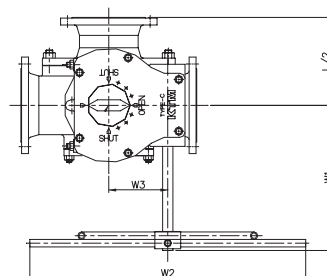
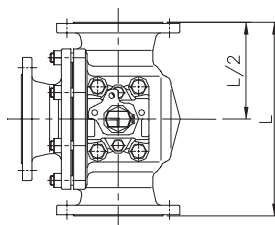
4-Seats (L & T Port) E3900 Full bore, E3800 Reduced bore



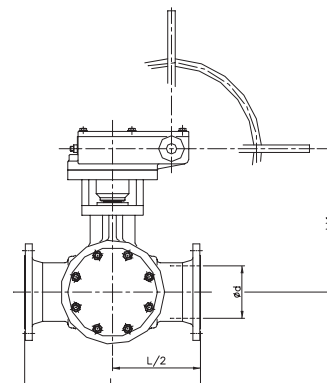
Sizes 15mm to 25mm



Sizes 40mm to 80mm



Sizes 100mm



Sizes 150mm to 200mm

Standard Materials

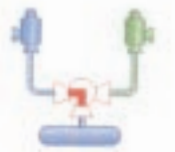
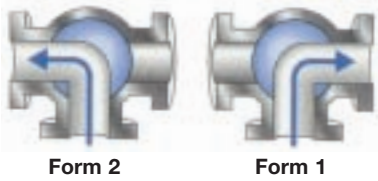
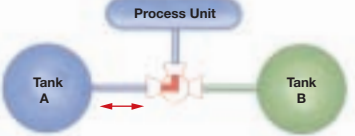
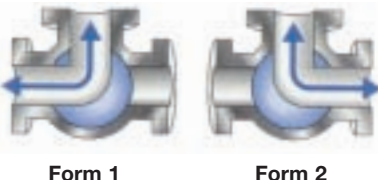
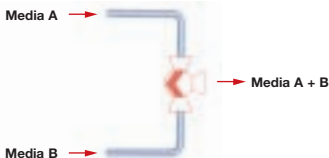

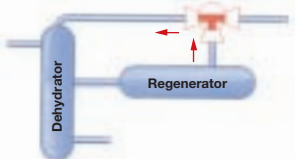
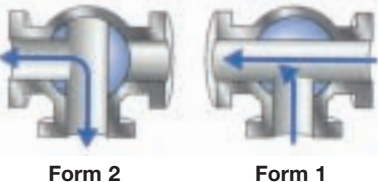
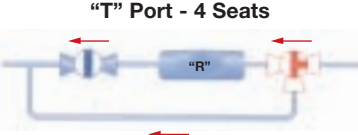
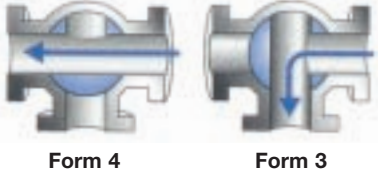
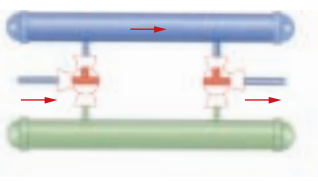
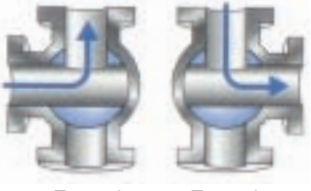
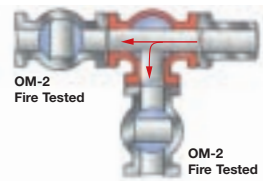
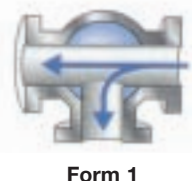
- Body : Carbon Steel (WCB),
: 304SS (CF8), 316SS (CF8M)
- Ball : 304SS (CF8), 316SS (CF8M)
- Stem : 304SS, 316SS
- Seat : Select from these seat materials:
PTFE/PFA Copolymer (E-Seat) -70°C to 200°C
PTFE (T-Seat) -29°C to 204°C

ASME Class 150 Dimensions (mm)

Valve Size (mm)	E3901 Full Bore									E3801 Reduced Bore									
	d	L	H	W	H ₁	W ₁	W ₂	W ₃	weight (kg)	d	L	H	W	H ₁	W ₁	W ₂	W ₃	weight (kg)	
15	13	140	89	160	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
20	19	150	105	230	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-
25	25	160	108	230	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-
40	38	210	132	400	-	-	-	-	14	-	-	-	-	-	-	-	-	-	-
50	51	220	137	400	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-
65	64	250	205	650	-	-	-	-	25	-	-	-	-	-	-	-	-	-	-
80	76	260	214	650	-	-	-	-	34	-	-	-	-	-	-	-	-	-	-
100	102	330	280	1,050	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-
150	152	510	-	-	416	421	800	171	191	152	430	-	-	330	349	600	116	152	-
200	203	580	-	-	474	421	800	171	244	203	500	-	-	416	421	800	171	195	-

KTM Three-Way Floating Ball Valves

Full bore and reduced bore

Applications	Description	Flow Forms	Function
<p>"L" Port - 2 Seats</p> 	<p>Transflow</p>	 <p>Form 2 Form 1</p>	<p>Transflow valves allow the operator to channel the pressure from the failed safety valve to the standby valve without shutting down the system. The faulty valve can then be replaced.</p>
<p>"L" Port - 2 or 4 Seats</p> 	<p>Diversion</p>	 <p>Form 1 Form 2</p>	<p>Change flow from one process to another. Delivery of media from multiple storage areas. Delivery of multiple feedstocks to storage.</p>
<p>"L" Port - 2 Seats</p> 	<p>Balancing, Bleeding or Proportioning</p>		<p>For temperature control, blending of media or balancing of flow rates.</p>
<p>"T" Port - 4 Seats</p> 	<p>Recirculation or Recycling</p>	 <p>Form 2 Form 1</p>	<p>Addition or removal of media from a system.</p>
<p>"T" Port - 4 Seats</p> 	<p>By-Pass</p>	 <p>Form 4 Form 3</p>	<p>Allows maintenance or calibration without system shutdown. "R" represents any meter, pump, transducer, instrumentation, etc.</p>
<p>"T" Port - 4 Seats</p> 	<p>Tandem Selector Shut-Off</p>	 <p>Form 2 Form 3</p>	<p>Allows maintenance on equipment that must remain in the system. Allows two pieces of equipment to be used simultaneously.</p>
<p>"T" Port - 4 Seats</p> 	<p>Fire-Safe And Fire-Tested Systems</p>	 <p>Form 1</p>	<p>Inherently 3-Way valves alone cannot be fire-safe because their multiport design does not allow them to shut off. 3-Way valves are available with fire-safe gaskets and gland packing. A fire-tested system can be achieved by applying the 3-Way with OM-2 fire-tested (API 607 Rev.4 and EXES 3-14-1-21) on two ports. An "L" port or a "T" port 3-Way could be applied.</p>

KTM Three-Way Floating Ball Valve

2-Seats (L-Port) and 4-Seats (L & T Port)

2-Seats Port Arrangements

2-Seat Design E3500 / E3600



E3500 / E3600 "L" Port



$P_B > P_C$
Form 1

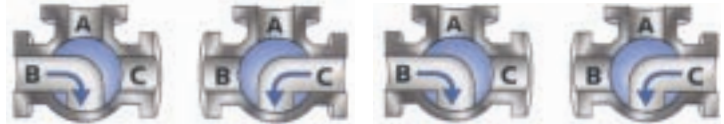
$P_B < P_C$
Form 2

4-Seats Port Arrangements

4-Seat Design E3900 / E3800



E3900 / E3800 "L" Port



$P_B > P_C$
Form 1

$P_B < P_C$
Form 2

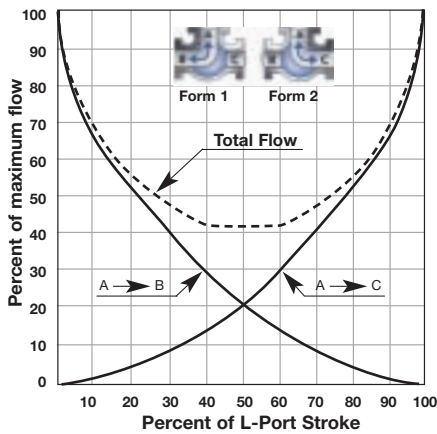
$P_B > P_C$
Form 3

$P_B < P_C$
Form 4

In the "L" port configuration, the four (4) seat design has the capacity to function either as a diverter valve or a block valve

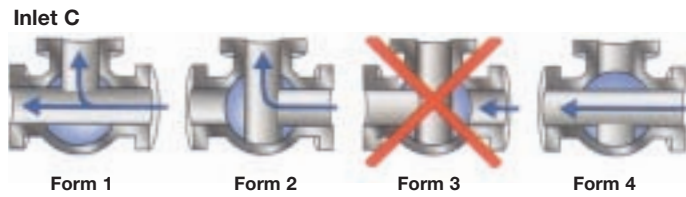
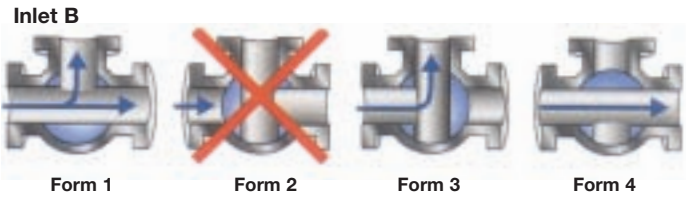
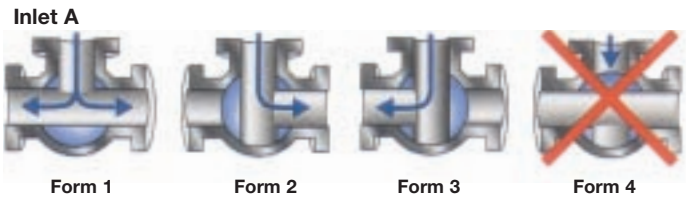
As with all floating 3-Way ball valve designs, flow path pressure must be slightly higher than the shutoff pressure. For example on Form 2 & 4: $P_B < P_C$ where P_B = Pressure in line "B" and P_C = Pressure in line "C".

Flow characteristics for "L" port when dividing flow.



The above shows the calculated flow to each run port when splitting flow from inlet port. Always specify operating forms desired with either "L" or "T" port type ball

E3900 / E3800 "T" Port



Cv Values, 2-Seats (L-Port)

Size (mm)	E3500 Full bore	E3600 Reduced bore
	"L" Port Form 1, 2	"L" Port Form 1, 2
40	53	-
50	102	-
65	144	-
80	247	-
100	425	-
150	970	670
200	1,700	996

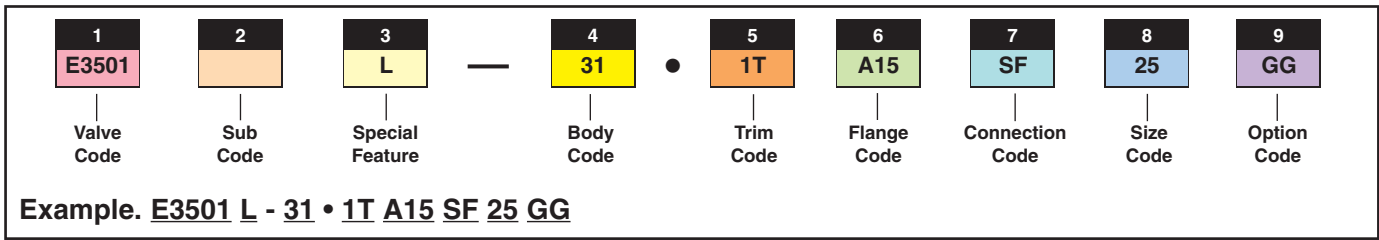
Cv Values, 4 Seats (L & T Port)

Size (mm)	E3900 Full bore			E3800 Reduced bore		
	"L" Port Form 1, 2	"T" Port Form 2, 3	"T" Port Form 4	"L" Port Form 1, 2	"T" Port Form 2, 3	"T" Port Form 4
15	8	6	23	-	-	-
20	14	13	45	-	-	-
25	22	20	84	-	-	-
40	57	50	230	-	-	-
50	110	100	430	-	-	-
65	160	150	670	-	-	-
80	260	240	1,170	-	-	-
100	446	400	2,070	-	-	-
150	1,600	1,400	5,000	738	660	1,700
200	2,800	2,000	9,000	1,096	990	2,250

KTM Three-Way Floating Ball Valve

Full bore and reduced bore

KTM Model Coding System



1			
Valve Code	Class		Description
	ASME	JIS	
E3501	150	10K	2 Seat Full bore 40mm to 200mm
E3502	300	20K	2 Seat Full bore 40mm to 200mm
E3601	150	10K	2 Seat Reduced Bore 80mm to 250mm
E3602	300	20K	2 Seat Reduced Bore 80mm to 250mm
E3901	150	10K	4 Seat Full bore 15mm to 200mm

6	
Flange Code	Description
JIS	
J10	JIS 10K
J20	JIS 20K
ASME	
A15	ASME Class 150
A30	ASME Class 300

2	
Sub Code	Description
Blank	Soft Seat

7	
Connection Code	Description
Blank	Raised Face
SF	Smooth Finish 125 to 250 AARH

3	
Special Features	Description
L	L-port
T	T-port

8			
Size Code	mm	inch	
15	15	1/2	
20	20	3/4	
25	25	1	
40	40	1 1/2	
50	50	2	
65	65	2 1/2	
80	80	3	
100	100	4	
125	125	5	
150	150	6	
200	200	8	
250	250	10	For Reduced Bore only

4			
Body Code	Material		
	JIS	ASTM	
31	SCS13A (304)	CF8 (304)	
32	SCS14A (316)	CF8M (316)	
62	SCPH2	WCB	

9	
Option Code	Description
Blank	No additional option
GG	Packing/Gasket-Graphite

5					
Trim Code	Ball	Seat		Packing Stem	
	JIS	ASTM			
1E	SCS13A ¹ or SCS14A ²	CF8 ¹ or CF8M ²	PTFE/PFA Copolymer	PTFE	304 ¹ or 316 ²
1T	SCS13A ¹ or SCS14A ²	CF8 ¹ or CF8M ²	PTFE	PTFE	304 ¹ or 316 ²
5E	SCS14A	CF8M	PTFE/PFA Copolymer	PTFE	316
5T	SCS14A	CF8M	R-PTFE	PTFE	316

¹ For Body Code 31 and 62 only
² For Body Code 32 only