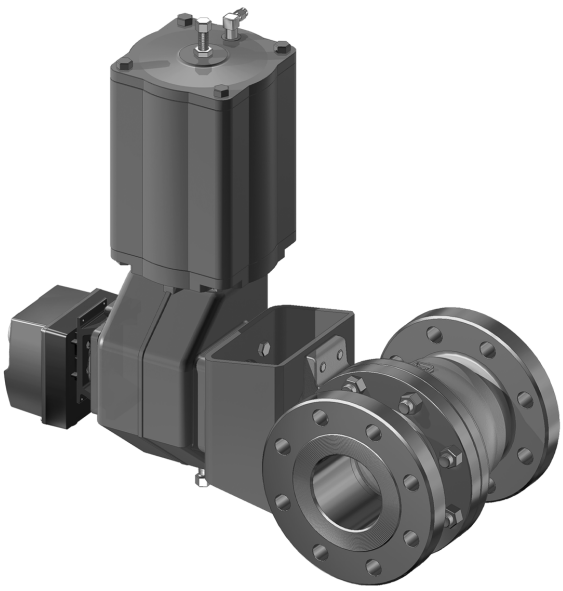
FLANGED FULL BORE MBV BALL VALVE, SERIES M2 FOR ASME RATINGS

Metso Automation has extended the scope of the flanged ball valve series of MBV. The latest addition M2, is designed particularly for the ASME pressure ratings. The construction uses same valve internals as earlier developed MBV series. The proven special shaft/ball joint enables M2 to be used in the most demanding applications and also assures tight shut-off even with the lowest pressure differentials.
The material and seat selection of M2 makes it possible to choose the most suitable M2 combination according to customers' specification.



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1 M2 20EN · Issue 9/2001

Applications

- Pulp mill applications:
  - Digesters and fiberlines
  - Liquor service
  - Chemical recovery
  - Sludge treatment
- TMP-plants.
- Deinking and recycling plants.
- Paper mill applications.
- Other process industry applications.

DESIGN FEATURES

Size range

- 1" ... 16".

Pressure classes

- ASME 150 and 300.

Tightness

- Separate ball and shaft assure good tightness even with metal seats and low shut-off pressures.
- Bubble tight shut-off with soft seats.

Versions, details

- V-ring gland packing ensures long maintenance-free operation.
- Spiral wound body joint gasket.
- Live loaded packing option.
- Q-trim option for noise and abatement cavitation.
- Scraping seat as standard, can be locked.
- Splined ball/shaft connection for good torque transmission.
- Trunnion design in 10" - 16".

Full bore

- High C_V per nominal size.
- Straight ball opening means low flow resistance.
- True full bore ball (cylindrical flow path).

Minimized emissions

- Uninterrupted circular spiral wound body gasket.
- No bending forces to gland packing.
- Live loaded gland packing available.

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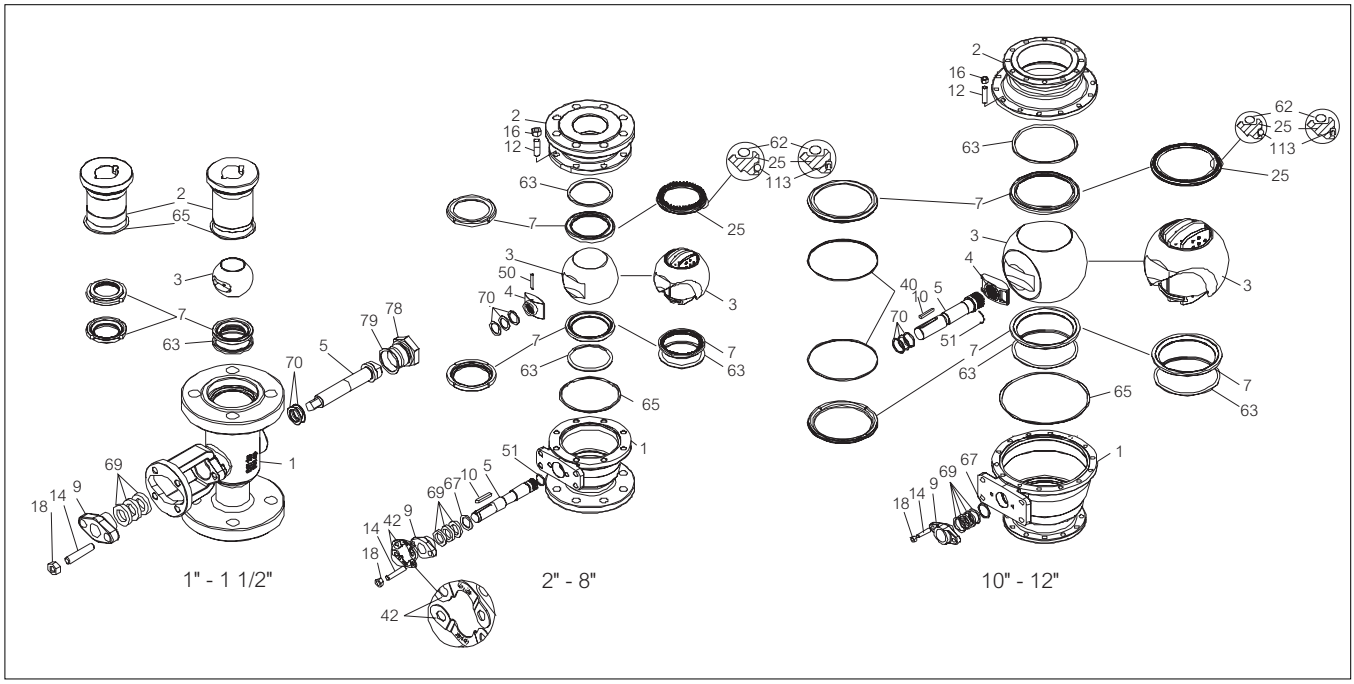
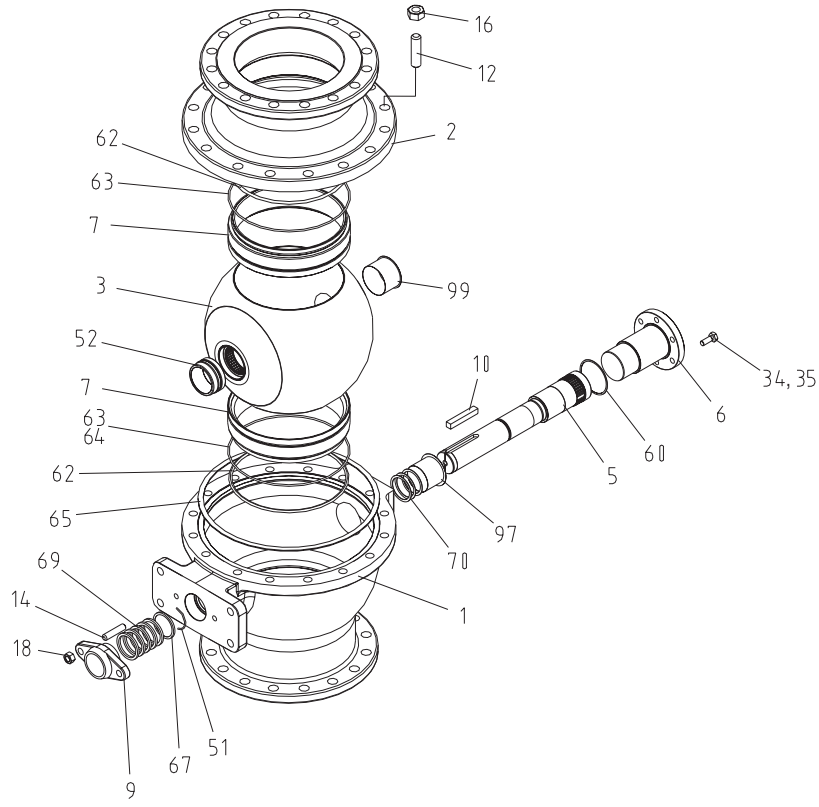
EXPLODED VIEW



PARTS LIST

Item	Part description	Material
1	Body	Stainless steel CF8M / CG8M
2	Body cap 2" - 12"	Stainless steel CF8M / CG8M
	Body insert 1" - 11/2"	Stainless steel
3	Ball / Q-Trim ball	Stainless steel AISI 316/CF8M / CG8M
4	Spline driver 2" - 12"	Stainless steel CF8M
5	Stem	Stainless steel XM-19 / AISI 329 (10" - 12")
7	Seat	Stainless steel + cobalt based alloy / PTFE or filled PTFE
9	Gland	Stainless steel CF8M
10	Key	Stainless steel AISI 329
12	Stud	Stainless steel ASTM A 193 gr. B8M
14	Stud	Stainless steel ASTM A 193 gr. B8M
16	Hexagon nut	Stainless steel ASTM A 194 gr. 8M
18	Hexagon nut	Stainless steel ASTM A 194 gr. 8M
25	Seat (E)	Stainless steel + cobalt based alloy
40	Locking ring 10" - 12"	Stainless steel AISI 316
42	Retainer plate	Stainless steel AISI 316
50	Cylindrical pin	Stainless steel AISI 316
51	Retaining ring	UNS N06625
62	Spring	UNS N06625
63	Back seal	PTFE
65	Body gasket	Stainless steel AISI 316 + PTFE or graphite filled spiral wound
67	Thrust ring	Stainless steel AISI 316
69	Packing	PTFE or graphite
70	Thrust bearing	PTFE + graphite
78	Hexagon bolt	Stainless steel AISI 316
79	Gasket	PTFE or graphite
113	Back seal	FPM (O-ring) as standard, PTFE + polyester (lip seal) optional

EXPLODED VIEW, TRUNNION DESIGN



PARTS LIST

Item	Description	Material
1	Body	Stainless steel CF8M / CG8M
2	Body cap	Stainless steel CF8M / CG8M
3	Ball/Q-Trim Ball	Stainless steel
5	Stem	Type AISI 329
7	Seat (S or T)	Stainless steel + cobalt based alloy / PTFE or filled PTFE
9	Gland	Stainless steel CF8M
10	Key	Stainless steel AISI 329
12	Stud	Stainless steel ASTM A 193 gr. B8M
14	Stud	Stainless steel ASTM A 193 gr. B8M
16	Hexagon nut	Stainless steel ASTM A 194 gr. 8M
18	Hexagon nut	Stainless steel ASTM A 194 gr. 8M
34	Hexagon screw	Stainless steel ASTM A 194 gr. 8M/A2-70
35	Lockwasher	Stainless steel AISI 316
51	Locking wire	UNS N06625
52	Bushing	Stainless steel AISI 316
60	Gasket	PTFE
62	Spring	UNS N06625
63	O-ring	Viton GF
64	Strip	PTFE
65	Body gasket	Stainless steel AISI 316 + PTFE or graphite filled spiral wound
67	Thrust ring	Stainless steel AISI 316
69	Packing	PTFE or graphite
70	Thrust bearing	PTFE + graphite
97	Trunnion bearing	PTFE + Stainless steel net
99	Trunnion bearing	PTFE + Stainless steel net

TECHNICAL SPECIFICATION

Product type

Flanged full bore, ball valve.
Single piece body 1", 1 1/2".
Split body design in 2" - 16".
Seat supported design 1"-12".
Trunnion design 10" - 16".

Pressure ratings

ASME 150 & 300.

Size range

1" - 16".

Temperature range

-50 °C … +250 °C. Depending on the seat material.
-60 °F … +480 °F.

Design standards

Valve body	ASME B16.34
Valve flanges	ASME B16.5
Face-to-face	1" - 6" ASME 150 / 300 and 8" - 12" ASME 150: ASME B16.10 long 8" - 12" ASME 300: ASME B16.10 short Trunnion 10" - 16": ASME B16.10 long

Standard materials

Body	CF8M.
Ball	CF8M + hard chrome.
Bearings	PTFE + graphite.
Seats	stainless steel + cobalt based alloy, PTFE or filled PTFE.
Seals/gaskets	PTFE, graphite, FPM.
Body gasket	Spiral wound with PTFE or graphite filler.
Gland packing	PTFE (V-rings), graphite.

Bolting

ASTM A 193 gr. B8M / A194 gr. 8M.

Certification

Tightness test certificate on request.

Standard options

Live loaded packing construction.
Degreasing.
Anti-static.
Q-Trim.

Valve testing

Each valve is tested for body integrity and seat tightness. The body test pressure is 1.5 x PN. The standard seat test pressure for metal seated valves is 1.0 x PN or 7 bar / 100 psi. The seat test pressure for soft seats is 6 bar / 90 psi. The test medium is inhibited water. Air test upon request.

Valve tightness

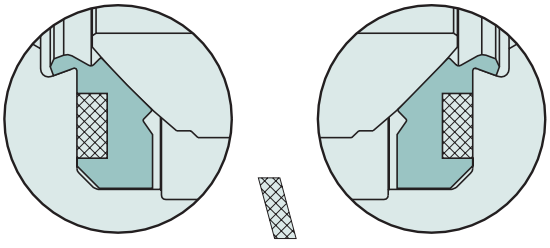
ASME / FCI 70-2 class V for metal seats as standard.
Soft seated seat supported valves are bubble tight.
Other tightness rates upon request.

C_V (K_V) -values and resistance coefficients

Valve size NPS	M2			M2 with Q-Trim	
	C_V 90°	K_V 90°	ξ 90°	C_V 90°	K_V 90°
1"	105	91	0.05	-	-
1 1/2"	250	220	0.07	-	-
2"	490	425	0.06	84	73
3"	1160	1000	0.05	245	210
4"	2200	1900	0.05	530	460
6"	5100	4400	0.04	1360	1180
8"	9300	8000	0.04	2330	2020
10"	15200	13200	0.04	3920	3400
12"	22400	19400	0.03	5600	4850
14"	28300	24500	0.03	6860	5930
16"	37700	32700	0.03	9190	7950

STANDARD SEAT OPTIONS

Locked scraping seat P

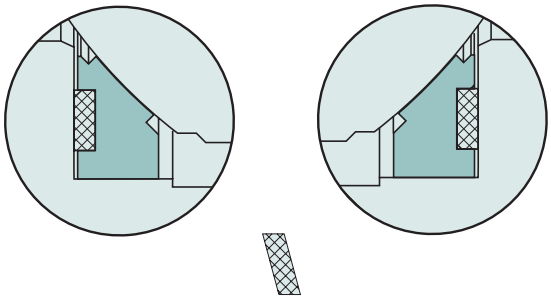


Non-compressed form of the PTFE back seal.

Materials:

Seats	Stainless steel + cobalt based alloy
Seals	PTFE
Temperature range	-50 °C ...+250 °C -60 °F … +445 °F
Size range	1" - 12"

General scraping seat S



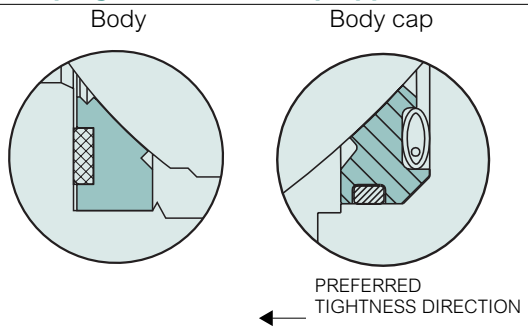
Non-compressed form of the PTFE back seal.

Materials:

Seats	Stainless steel + cobalt based alloy
Seals	PTFE
Temperature range	-50 °C … +230 °C -60 °F … +445 °F
Size range	1" - 12"
Note	1" and 1 1/2": Seat in other side integral with body insert

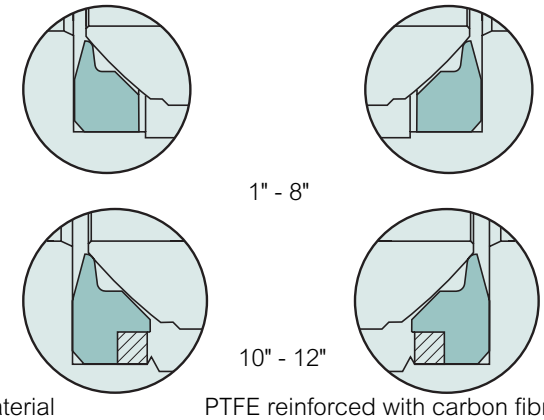
STANDARD SEAT OPTIONS

Scraping seat E for low Δp-applications



Material:	
Seats	Stainless steel + cobalt based alloy
Locked seals	PTFE
Spring assisted seals	FPM
Springs	UNS N06625
Temperature range	-50 °C … +200 °C -60 °F … +390 °F
Maximum Δp	16 bar / 230 psi.
Size range	1" - 12"

Soft seat M, for general use



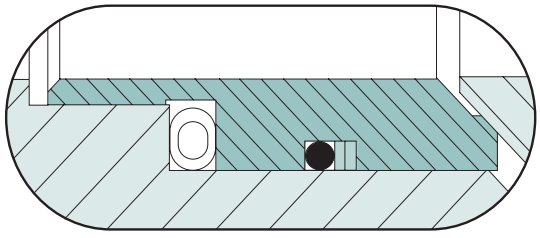
Material	PTFE reinforced with carbon fibres
Temperature range	-50 °C ...+250 °C, 1" - 4" -60 °F … +480 °F -50 °C ...+230 °C, 6" - 12" -60 °F … +445 °F

Soft seat T, for oxygen, peroxide etc applications

Material	PTFE
Temperature range	-50 °C ...+200 °C / -60 °F … +390 °F

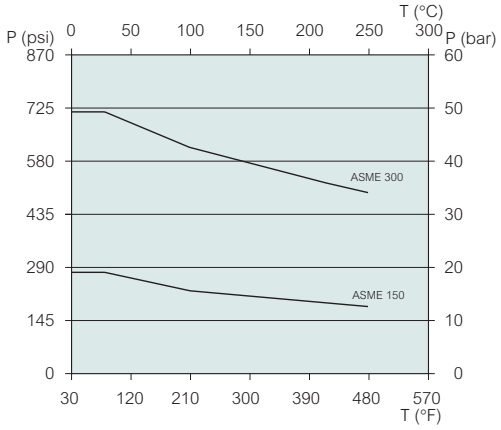
STANDARD SEAT of Trunnion mounted M2-series

Metal seat



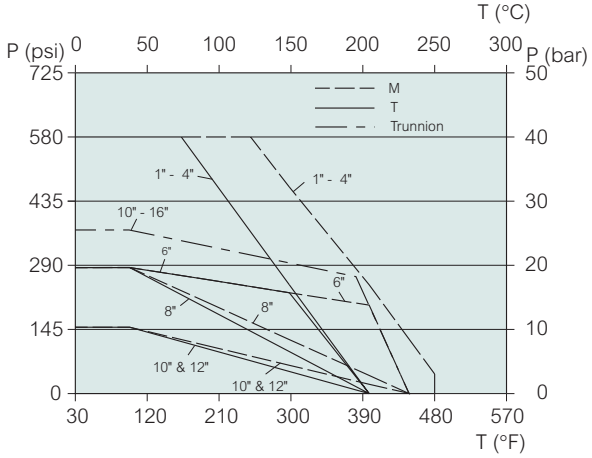
Materials:	
Ball seats	SS steel + cobalt based alloy
Seat seals	Viton GF O-ring
Spring:	INCONEL 625
Temperature range	-40 °C ...+200 °C

VALVE BODY RATINGS CF8M and CG8M
Pressure/temperature curves of valve body
ASME 150 & 300

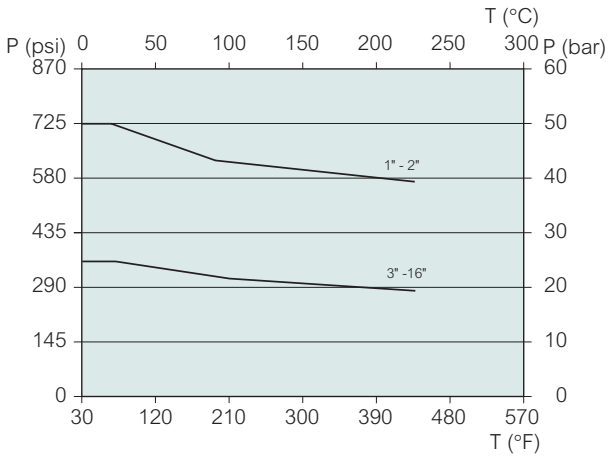


STANDARD SEAT OPTIONS

Maximum operating pressure for soft seats



Maximum operating pressure for metal seats



Soft seat ratings are based on differential pressure with the valve ball in the fully closed position and refers only the seats.

ACTUATOR SELECTION

M2-valve can be equipped with the following Metso Automation actuator types:

B1C/B1J Pneumatic double acting or spring return actuator. Actuators available for size range 1" - 16".
EC/EJ Pneumatic double diaphragm, double acting or spring return actuator. Actuators are available for size range 1" - 6".
M M-series manual gear operator for valve sizes 1" - 12".
LK Hand lever for valve sizes 1" - 4".
When selecting other than Metso Automation actuators please contact your local Metso Automation representative.

For the correct actuator selection you need to know the following process data:
- valve size and seat type
- supply pressure for the actuator
- maximum operating differential pressure over the valve in closed position

Actuators are selected from the tables the following way
- left hand column shows the valve size
- on the top line the possible actuator alternatives are shown
- the instrument air supply pressure is in the left column

Note: there are four possibilities; 3, 4, 5 and 6 bar / 45, 60, 75 and 90 psi in double-acting actuators.
- in the area marked with darker color the maximum possible operating pressure differential values are given. Actuators shall be chosen so that the operating pressure differential in pipeline does not exceed the values given in the tables.

Note! Extremely difficult mediums (MC-pulp, black, green and white liquor) must be taken in account separately.

Metal seated valve with double acting actuator, type B1C and EC
Maximum differential operating pressure [bar].

NPS	Shaft [mm]	Supply [bar]	EC [SIZE / BORE]							B1C [SIZE / BORE]											
			07 / 14	07 / 25	10 / 25	12 / 25	12 / 35	14 / 35	14 / 45	6 / 25	9 / 25	11 / 25	11 / 35	13 / 35	17 / 45	20 / 70	20 / 55	25 / 95	32 / 95	32 / 105	40 / 105
1	□ 11	3	50							50											
		4	50							50											
		5	50							50											
		6	50							50											
1.5	□ 14	3	23							34											
		4	31							50											
		5	41							50											
		6	49							50											
2	Ø 25	3		8 (-)	27 (16)					14 (6)	32 (16)										
		4		12 (7)	37 (16)					21 (10)	47 (16)										
		5		17 (10)	47 (16)					27 (14)	50 (16)										
		6		21 (12)	50 (16)					34 (16)	50 (16)										
3	Ø 25	3			8 (-)	21 (14)					10	19 (10)									
		4			11 (7)	25 (16)					14 (6)	25 (16)									
		5			14 (9)	25 (16)					17 (8)	25 (16)									
		6			17 (11)	25 (16)					21 (12)	25 (16)									
4	Ø 35	3					8 (-)	21 (14)					7	16 (8)							
		4					11 (7)	25 (16)					10 (5)	23 (12)							
		5					14 (9)	25 (16)					13 (6)	25 (16)							
		6					17 (11)	25 (16)					16 (9)	25 (16)							
6	Ø 45	3							6 (-)						9 (7)	11 (8)					
		4							8 (-)						13 (10)	16 (12)					
		5							11 (7)						16 (13)	20 (15)					
		6							13 (8)						20 (15)	24 (16)					
8	Ø 55	3															5	10 (8)			
		4															7 (5)	14 (11)			
		5															9 (7)	18 (14)			
		6															11 (9)	22 (16)			
10	Ø 65	3																5	11 (8)		
		4																7 (5)	15 (11)		
		5																9 (7)	19 (14)		
		6																11 (8)	23 (16)		
12	Ø 75	3																		6	14 (11)
		4																		9 (7)	19 (14)
		5																		11 (9)	24 (16)
		6																		14 (11)	25 (16)
TRUNNION																					
10	Ø 55	3																11	25		
		4																19	25		
		5																25			
		6																25			
12	Ø 65	3																7	22		
		4																12	25		
		5																16	25		
		6																21	25		
14	Ø 75	3																		14	25
		4																7		20	25
		5																10		25	
		6																13		25	
16	Ø 75	3																		8	22
		4																		13	25
		5																		19	25
		6																		25	

Note: Values in parenthesis for E-type seat, max. differential pressure 16 bar

Metal seated valve with double acting actuator, type B1C and EC
Maximum differential operating pressure [psi].

NPS	Shaft [inch]	Supply [psi]	EC [SIZE / BORE]							B1C [SIZE / BORE]											
			07/14	07/25	10 / 25	12 / 25	12/35	14 / 35	14/45	6 / 25	9 / 25	11 / 25	11 / 35	13 / 35	17 / 45	20 / 70	20 / 55	25 / 95	32 / 95	32 / 105	40 / 105
1	□ 0.43	45	725							725											
		60	725							725											
		75	725							725											
		90	725							725											
1.5	□ 0.55	45	334							493											
		60	450							725											
		75	592							725											
		90	710							725											
2	Ø 0.98	45		116 (-)	391 (232)					203 (87)	464 (232)										
		60		174 (100)	536 (232)					305 (145)	682 (232)										
		75		246 (145)	681 (232)					392 (203)	725 (232)										
		90		304 (174)	725 (232)					493 (232)	725 (232)										
3	Ø 0.98	45			116 (-)	304 (203)					145	276 (145)									
		60			159 (100)	363 (232)					203 (87)	363 (232)									
		75			203 (130)	363 (232)					247 (116)	363 (232)									
		90			246 (160)	363 (232)					305 (174)	363 (232)									
4	Ø 1.38	45					116 (-)	304 (203)					102	232 (116)							
		60					159 (100)	363 (232)					145 (73)	334 (174)							
		75					203 (130)	363 (232)					189 (87)	363 (232)							
		90					246 (160)	363 (232)					232 (131)	363 (232)							
6	Ø 1.77	45							87 (-)						131 (102)	160 (116)					
		60							116 (-)						159 (145)	232 (174)					
		75							159 (100)						232 (189)	290 (218)					
		90							188 (116)						290 (218)	348 (232)					
8	Ø 2.16	45															73	145 (116)			
		60															102 (73)	203 (160)			
		75															131 (102)	261 (203)			
		90															160 (131)	319 (232)			
10	Ø 2.56	45																73	160 (116)		
		60																102 (73)	218 (160)		
		75																131 (102)	276 (203)		
		90																160 (116)	334 (232)		
12	Ø 2.95	45																		87	203 (160)
		60																		131 (102)	276 (203)
		75																		160 (131)	348 (232)
		90																		203 (160)	363 (232)
TRUNNION																					
10	Ø 2.16	3																160	363		
		4																276	363		
		5																363			
		6																363			
12	Ø 2.56	3																102	319		
		4																174	363		
		5																232	363		
		6																305	363		
14	Ø 2.95	3																		203	363
		4																102		290	363
		5																145		363	
		6																189		363	
16	Ø 2.95	3																		116	319
		4																		189	363
		5																		276	363
		6																		363	

Note: Values in parenthesis for E-type seat, max. differential pressure 232 psi

Metal seated valve with spring return actuator, type B1J, B1JA, EJ and EJ_A
Maximum differential operating pressure [bar].

- B1J spring to close, minimum supply pressure 4 bar / 60 psi
- B1JA spring to open, minimum supply pressure 5 bar / 75 psi
- EJ spring to close, minimum supply pressure 4 bar / 60 psi
- EJA spring to open, minimum supply pressure 5.2 bar / 77 psi

NPS	Shaft [mm]	Type	EJ / EJ_A [SIZE / BORE]							B1J / B1JA [SIZE / BORE]											
			07 / 14	07/25	10 / 25	12 / 25	12/35	14 / 35	14/45	8 / 25	10 / 25	12 / 25	12 / 35	16 / 35	16 / 45	20 / 55	20 / 70	25 / 70	25 / 95	32 / 95	32/105
1	□ 11	EJ / EJ_A	50																		
		B1J								50											
		B1JA								50											
1.5	□ 14	EJ / EJ_A	29																		
		B1J								50											
		B1JA								50											
2	Ø 25	EJ / EJ_A		11 (-)	35 (16)																
		B1J								22 (12)	49 (16)										
		B1JA								33 (16)	50 (16)										
3	Ø 25	EJ / EJ_A			10 (-)	25 (16)															
		B1J									16 (10)	25 (12)									
		B1JA									22 (14)	25 (12)									
4	Ø 35	B1J					10 (-)	25 (16)					13 (8)	25 (16)							
		B1JA											18 (11)	25 (16)							
6	Ø 45	B1J							8 (-)						8 (7)		16 (15)	25 (16)			
		B1JA													11 (10)		23 (16)	25 (16)			
8	Ø 55	B1J														7 (5)			15 (10)		
		B1JA														10 (7)			21 (15)		
10	Ø 65	B1J																	8 (5)	16 (11)	
		B1JA																	11 (7)	22 (15)	
12	Ø 75	B1J																			10 (7)
		B1JA																			14 (9)
TRUNNION																					
10	Ø 55	B1J														6			25		
		B1JA														12			25		
12	Ø 65	B1J																	14	25	
		B1JA																	25		
14	Ø 75	B1J																	8		25
		B1JA																	14		25
16	Ø 75	B1J																			16
		B1JA																			25

Note: Values in parenthesis for E-type seat, max. differential pressure 16 bar

Maximum differential operating pressure [psi].

NPS	Shaft [inch]	Type	EJ / EJ_A [SIZE / BORE]							B1J / B1JA [SIZE / BORE]											
			07 / 14	07 / 25	10 / 25	12 / 25	12 / 35	14 / 35	14/45	8 / 25	10 / 25	12 / 25	12 / 35	16 / 35	16 / 45	20 / 55	20 / 70	25 / 70	25 / 95	32 / 95	32 / 105
1	□ 0.43	EJ / EJ_A	725																		
		B1J								725											
		B1JA								725											
1.5	□ 0.56	EJ / EJ_A	420																		
		B1J								725											
		B1JA								725											
2	Ø 0.98	EJ / EJ_A		159 (-)	507 (232)																
		B1J								319 (174)	711 (232)										
		B1JA								479 (232)	725 (232)										
3	Ø 0.98	EJ / EJ_A			145 (-)	363 (232)															
		B1J									232 (145)	363 (232)									
		B1JA									319 (203)	363 (232)									
4	Ø 1.38	B1J					145 (-)	363 (232)					189 (116)	363 (174)							
		B1JA											261 (160)	363 (174)							
6	Ø 1.77	B1J							87 (-)						116 (102)		232 (218)	363 (232)			
		B1JA													160 (145)		334 (232)	363 (232)			
8	Ø 2.16	B1J														102 (73)			218 (145)		
		B1JA														145 (102)			305 (218)		
10	Ø 2.56	B1J																	116 (73)	232 (160)	
		B1JA																	160 (102)	319 (218)	
12	Ø 2.95	B1J																			145 (102)
		B1JA																			203 (131)
TRUNNION																					
10	Ø 2.16	B1J														87			363		
		B1JA														174			363		
12	Ø 2.56	B1J																	203	363	
		B1JA																	363		
14	Ø 2.95	B1J																	116		363
		B1JA																	203		363
16	Ø 2.95	B1J																			232
		B1JA																			363

Note: Values in parenthesis for E-type seat, max. differential pressure 232 psi

Soft seated valve with double acting actuator, type B1C and EC
Maximum differential operating pressure [bar].

NPS	Shaft [mm]	Supply [barl]	EC [SIZE / BORE]							B1C [SIZE / BORE]						
			07 / 14	07 / 25	10 / 25	12 / 25	12 / 35	14 / 35	14 / 45	9 / 25	11 / 35	13 / 35	17 / 45	20 / 55	25 / 95	32 / 105
1	□ 11	3	50 (50)													
		4	50 (50)													
		5	50 (50)													
		6	50 (50)													
1.5	□ 14	3	45													
		4	50 (40)													
		5	50 (50)													
		6	50 (50)													
2	Ø 25	3		-	50 (50)											
		4		50 (40)	50 (50)											
		5		50 (50)	50 (50)											
		6		50 (50)	50 (50)											
3	Ø 25	3			26 (20)	50 (50)				33 (29)						
		4			38 (35)	50 (50)				50 (45)						
		5			50 (45)	50 (50)				50 (50)						
		6			50 (50)	50 (50)				50 (50)						
4	Ø 35	3					17	50 (50)			17	50 (50)				
		4					40 (25)	50 (50)			35 (22)	50 (50)				
		5					50 (35)	50 (50)			50 (35)	50 (50)				
		6					50 (50)	50 (50)			50 (50)	50 (50)				
6	Ø 45	3							20 (20)				20* (20)*			
		4							20 (20)				20* (20)*			
		5							20 (20)				20* (20)*			
		6							20 (20)				20* (20)*			
8	Ø 55	3												11	20* (20)*	
		4												15	20* (20)*	
		5												20* (6)	20* (20)*	
		6												20* (20)*	20* (20)*	
10	Ø 65	3													10*	
		4													10* (10)*	
		5													10* (10)*	
		6													10* (10)*	
12	Ø 75	3														10* (10)*
		4														10* (10)*
		5														10* (10)*
		6														10* (10)*
TRUNNION																
10	Ø 55	3													25	
		4													25	
		5													25	
		6													25	
12	Ø 65	3													25	
		4													25	
		5													25	
		6													25	
14	Ø 75	3													18	25
		4													25	
		5													25	
		6													25	
16	Ø 75	3													14	25
		4													21	25
		5													25	
		6													25	

Note: Values in parenthesis for M-type seat
*Max. differential pressure with soft seats

Soft seated valve with double acting actuator, type B1C and EC.
Maximum differential operating pressure [psi].

NPS	Shaft [inch]	Supply [psi]	EC [SIZE / BORE]							B1C [SIZE / BORE]						
			07 / 14	07 / 25	10 / 25	12 / 25	12 / 35	14 / 35	14 / 45	9 / 25	11 / 35	13 / 35	17 / 45	20 / 55	25 / 95	32 / 105
1	□ 0.43	45	725 (725)													
		60	725 (725)													
		75	725 (725)													
		90	725 (725)													
1.5	□ 0.55	45	652													
		60	725 (580)													
		75	725 (725)													
		90	725 (725)													
2	Ø 0.98	45		–	725 (725)											
		60		725 (435)	725 (725)											
		75		725 (725)	725 (725)											
		90		725 (725)	725 (725)											
3	Ø 0.98	45			377 (290)	725 (725)				479 (421)						
		60			551 (507)	725 (725)				725 (653)						
		75			725 (652)	725 (725)				725 (725)						
		90			725 (725)	725 (725)				725 (725)						
4	Ø 1.38	45					246 (-)	725 (725)			247	725 (725)				
		60					580 (362)	725 (725)			508 (319)	725 (725)				
		75					725 (507)	725 (725)			725 (508)	725 (725)				
		90					725 (725)	725 (725)			725 (725)	725 (725)				
6	Ø 1.77	45							290 (290)				290* (290)*			
		60							290 (290)				290* (290)*			
		75							290 (290)				290* (290)*			
		90							290 (290)				290* (290)*			
8	Ø 2.16	45												160	290* (290)*	
		60												218	290* (290)*	
		75												290* (87)	290* (290)*	
		90												290* (290)*	290* (290)*	
10	Ø 2.56	45													145*	
		60													145* (145)*	
		75													145* (145)*	
		90													145* (145)*	
12	Ø 2.95	45														145* (145)*
		60														145* (145)*
		75														145* (145)*
		90														145* (145)*
TRUNNION																
10	Ø 2.16	3													363	
		4													363	
		5													363	
		6													363	
12	Ø 2.56	3													363	
		4													363	
		5													363	
		6													363	
14	Ø 2.95	3													261	363
		4													363	
		5													363	
		6													363	
16	Ø 2.95	3													203	363
		4													305	363
		5													363	
		6													363	

Note: Values in parenthesis for M-type seat

Soft seated valve with spring return actuator, type B1J, B1JA, EJ and EJ_A
Maximum differential operating pressure [bar].

- B1J spring to close, minimum supply pressure 4 bar / 60 psi
- B1JA spring to open, minimum supply pressure 5 bar / 75 psi
- EJ spring to close, minimum supply pressure 4 bar / 60 psi
- EJ_A spring to open, minimum supply pressure 5.2 bar / 77 psi

NPS	Shaft [mm]	Type	EJ / EJ_A [SIZE / BORE]							B1J / B1JA [SIZE / BORE]									
			07 / 14	07 / 25	10 / 25	12 / 25	12 / 35	14 / 35	14 / 45	8 / 25	10 / 25	10 / 35	12 / 35	16 / 45	16 / 55	20 / 55	25 / 95	32 / 95	32 / 105
1	□ 11	EJ/EJ_A	50 (50)																
		B1J								50 (50)									
		B1JA								50 (50)									
1.5	□ 14	EJ/EJ_A	50 (38)																
		B1J								50 (50)									
		B1JA								50 (50)									
2	Ø 25	EJ/EJ_A		45 (30)	50 (50)														
		B1J								50 (50)									
		B1JA								50 (50)									
3	Ø 25	EJ/EJ_A			35 (32)	50 (50)													
		B1J								23 (20)	50 (50)								
		B1JA								37 (36)	50 (50)								
4	Ø 35	B1J					32 (24)	50 (50)				20 (14)	50 (36)						
		B1JA										23 (16)	50 (50)						
6	Ø 45	B1J							20 (20)					20* (20)*					
		B1JA												20* (20)*					
8	Ø 55	B1J														20* (20)*	20* (20)*		
		B1JA														20* (20)*	20* (20)*		
10	Ø 65	B1J															10* (6)	10* (10)*	
		B1JA															10* (7)	10* (10)*	
12	Ø 75	B1J																	10* (10)*
		B1JA																	10* (10)*
TRUNNION																			
10	Ø 55	B1J													6	25			
		B1JA													16	25			
12	Ø 65	B1J															25		
		B1JA															25		
14	Ø 75	B1J															25		
		B1JA															25		
16	Ø 75	B1J															19		25
		B1JA															25		

Note: Values in parenthesis for M-type seat

Maximum differential operating pressure [psi].

NPS	Shaft [inch]	Type	EJ / EJ_A [SIZE / BORE]							B1J / B1JA [SIZE / BORE]									
			07 / 14	07 / 25	10 / 25	12 / 25	12 / 35	14 / 35	14 / 45	8 / 25	10 / 25	10 / 35	12 / 35	16 / 45	16 / 55	20 / 55	25 / 95	32 / 95	32 / 105
1	□ 0.43	EJ/EJ_A	725 (725)																
		B1J								725 (725)									
		B1JA								725 (725)									
1.5	□ 0.55	EJ/EJ_A	725 (551)																
		B1J								725 (725)									
		B1JA								725 (725)									
2	Ø 0.98	EJ/EJ_A		662 (435)	725 (725)														
		B1J								725 (725)									
		B1JA								725 (725)									
3	Ø 0.98	EJ/EJ_A			507 (464)	725 (725)													
		B1J								334 (290)	725 (725)								
		B1JA								537 (522)	725 (725)								
4	Ø 1.38	B1J					464 (348)	725 (725)				290 (203)	725 (522)						
		B1JA										334 (232)	725 (725)						
6	Ø 1.77	B1J							290 (290)					290* (290)*					
		B1JA												290* (290)*					
8	Ø 2.16	B1J														290* (290)*	290* (290)*		
		B1JA														290* (290)*	290* (290)*		
10	Ø 2.56	B1J															145* (87)	145* (145)*	
		B1JA															145* (102)	145* (145)*	
12	Ø 2.95	B1J																	145* (145)*
		B1JA																	145* (145)*
TRUNNION																			
10	Ø 2.16	B1J													87	363			
		B1JA													232	363			
12	Ø 2.56	B1J															363		
		B1JA															363		
14	Ø 2.95	B1J															363		
		B1JA															363		
16	Ø 2.95	B1J															276		363
		B1JA															363		

Note: Values in parenthesis for M-type seat

Metal seated valve with manual gear operator.

Maximum differential operating pressure [bar].

NPS	Shaft [mm]	M7	M10	M14	M15	M16	WTRC60
1	□ 11	50 (16)					
1.5	□ 14	50 (16)					
2	Ø 25	50 (16)					
3	Ø 25	18 (13)	25 (16)				
4	Ø 35			25 (16)			
6	Ø 45			15 (13)	18 (16)		
8	Ø 55				8 (6)	15 (10)	
10	Ø 65					8 (5)	
12	Ø 75						16 (10)
TRUNNION							
10	Ø 55				25		
12	Ø 65					25	
14	Ø 75						25
16	Ø 75						25

Note: Values in parenthesis for E-type seat, max Δp 16 bar.
Drive bush is always used to fit valve shaft and gear operator bore

Maximum differential operating pressure [psi].

NPS	Shaft [inch]	M7	M10	M14	M15	M16	WTRC60
1	□ 0.43	725 (232)					
1.5	□ 0.55	725 (232)					
2	Ø 0.98	725 (232)					
3	Ø 0.98	261 (189)	363 (232)				
4	Ø 1.38			363 (232)			
6	Ø 1.77			218 (189)	261 (232)		
8	Ø 2.16				116 (87)	218 (145)	
10	Ø 2.56					116 (73)	
12	Ø 2.95						232 (145)
TRUNNION							
10	Ø 55				25		
12	Ø 65					25	
14	Ø 75						25
16	Ø 75						25

Note: Values in parenthesis for E-type seat, max Δp 232 psi.

Soft seated valve with manual gear operator

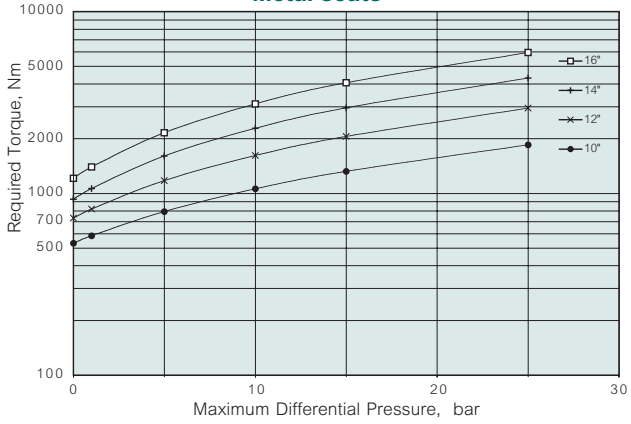
Maximum differential operating pressure [bar].

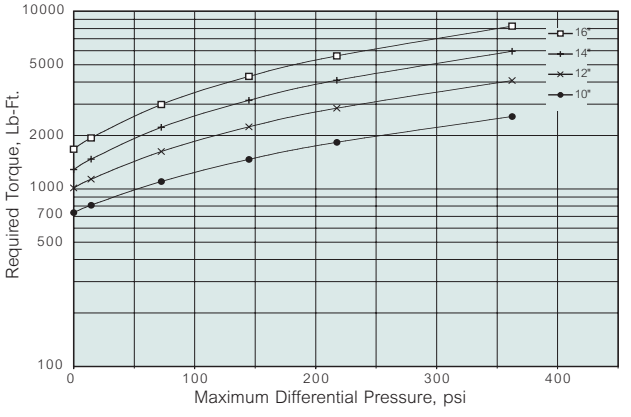
NPS	Shaft [mm]	M7	M14	M15	M16	WTRC60
1	□ 0.43	50				
1.5	□ 0.55	50				
2	Ø 25	50				
3	Ø 25	50				
4	Ø 35		50			
6	Ø 45		20*			
8	Ø 55			20*		
10	Ø 65				10*	
12	Ø 75					10*
TRUNNION						
10	Ø 2.16			363		
12	Ø 2.56				363	
14	Ø 2.95					363
16	Ø 2.95					363

Maximum differential operating pressure [psi].

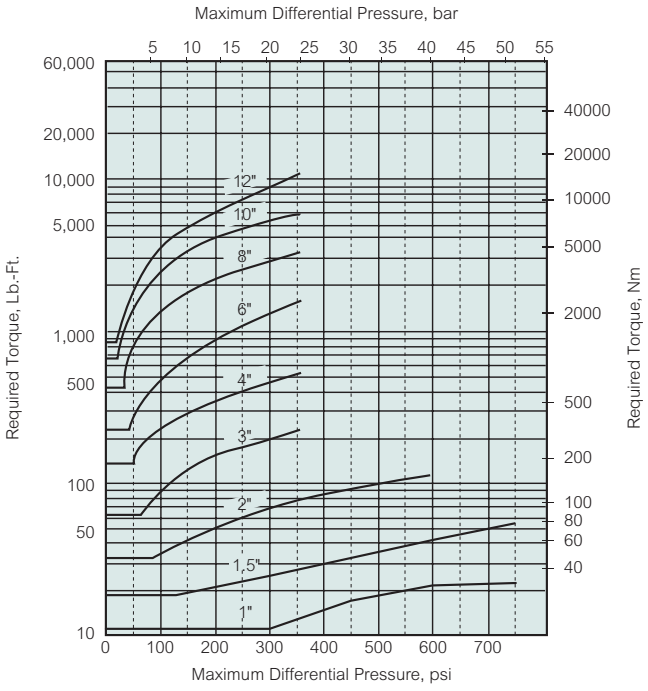
NPS	Shaft [inch]	M7	M14	M15	M16	WTRC60
1	□ 0.43	725				
1.5	□ 0.55	725				
2	Ø 0.98	725				
3	Ø 0.98	725				
4	Ø 1.38		725			
6	Ø 1.77		290*			
8	Ø 2.16			290*		
10	Ø 2.56				145*	
12	Ø 2.95					145*
TRUNNION						
10	Ø 2.16			363		
12	Ø 2.56				363	
14	Ø 2.95					363
16	Ø 2.95					363

M2-trunnion design. Torque vs. Differential Pressure Metal seats

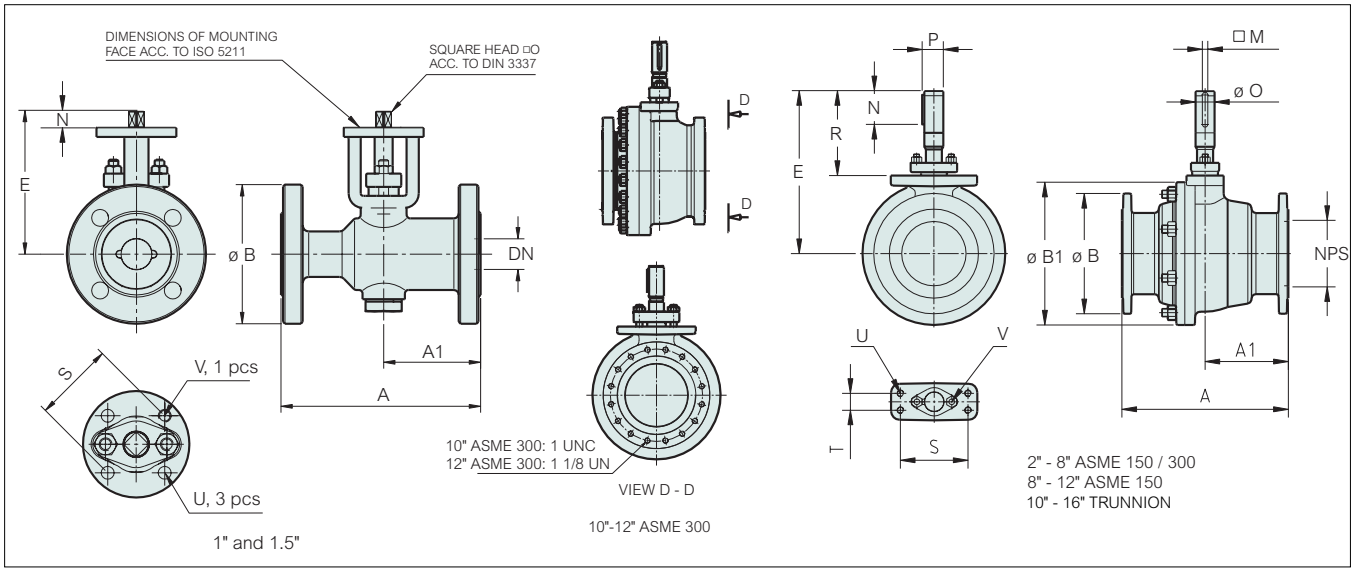




Torque vs. Differential Pressure M2-series S, P-seats



DIMENSIONS



SEAT SUPPORTED VALVES

NPS	TYPE	DIMENSIONS [mm]														WEIGHT [kg]	
		A	A1	ØB	ØB1	E	M	N	O	P	R	S	T	U	V	M2	Q-M2
1	M2C	160	80	108	-	119	-	14	□ 11	-	-	50, 70	F05, F07	Ø7	M8	5	-
1.5		165	87	127	-	142	-	17	□ 14	-	-	70	F07	Ø9	M10	9	-
2		178	79.0	152.4	146	215	6.35	46	Ø 25	27.8	137	110	32	1/2	3/8	11	12
3		203	101.5	190.5	190	237	6.35	46	Ø 25	27.8	137	110	32	1/2	3/8	25	27
4		229	110.5	228.6	241	309	9.52	58	Ø 35	39.1	169	130	32	1/2	3/8	40	43
6		394	197.0	279.5	342	386	12.70	80	Ø 45	50.4	201	160	40	5/8	1/2	100	110
8		457	228.5	342.9	430	476	12.70	90	Ø 55	60.6	231	160	55	3/4	1/2	175	195
10		533	266.5	406.4	512	555	15.87	112	Ø 65	71.9	263	230	90	1	3/4	290	330
12		610	305.0	482.6	592	660	19.05	134	Ø 75	83.1	325	307	120	1 1/4	3/4	460	515
1	M2D	165	80.0	124.0	-	119	-	14	□ 11	-	-	50, 70	F05, F07	Ø7	M8	8	-
1.5		191	87.0	155.0	-	142	-	17	□ 14	-	-	70	F07	Ø9	M10	12	-
2		216	89.0	165.1	146	215	6.35	46	Ø 25	27.8	137	110	32	1/2	3/8	15	17
3		282	141.0	209.6	200	237	6.35	46	Ø 25	27.8	137	110	32	1/2	3/8	35	37
4		305	152.5	254.0	254	309	9.52	58	Ø 35	39.1	169	130	32	1/2	3/8	60	63
6		403	201.5	317.5	353	386	12.70	80	Ø 45	50.4	201	160	40	5/8	1/2	135	145
8		419	209.5	381.0	462	476	12.70	90	Ø 55	60.6	231	160	55	3/4	1/2	240	260
10		457	208.0	445.5	552	555	15.87	112	Ø 65	71.9	263	230	90	1	3/4	365	405
12		502	223.0	520.7	626	660	19.05	134	Ø 75	83.1	325	307	120	1 1/4	3/4	545	600

TRUNNION TYPE VALVES

NPS	Type	DIMENSIONS IN mm														WEIGHT [kg]	
		A	A1	ØB	ØB1	E	M	N	ØO	P	R	S	T	U	V	M2	Q-M2
10	M2CB/ M2CE	533	267	406	514	543	12.7	90.25	55	60.4	230	160	55	3/4	1/2	300	340
12		610	305	483	592	623	15.9	112.4	65	71.6	262	230	90	1	3/4	450	505
14		686	343	533	665	764	19.1	134.4	75	82.9	354	307	120	1 1/4	3/4	640	715
16		762	381	597	750	789	19.1	134.4	75	82.9	353.5	307	120	1 1/4	3/4	850	950
10	M2DB/ M2DE	568	284	445	552	543	12.7	90.25	55	60.4	230	160	55	3/4	1/2	390	430
12		648	324	521	626	623	15.9	112.4	65	71.6	262	230	90	1	3/4	600	655
14		762	381	584	700	764	19.1	134.4	75	82.9	354	307	120	1 1/4	3/4	820	895
16		838	419	660	800	789	19.1	134.4	75	82.9	353.5	307	120	1 1/4	3/4	1150	1250

SEAT SUPPORTED VALVES

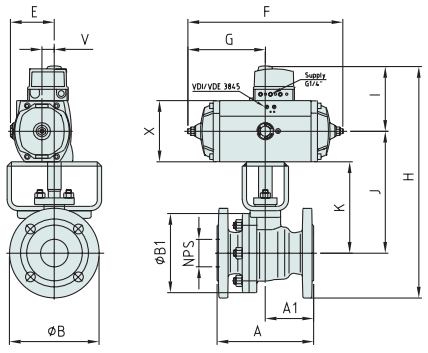
NPS	TYPE	DIMENSIONS [inch]														WEIGHT [lbs]	
		A	A1	ØB	ØB1	E	M	N	O	P	R	S	T	U	V	M2	Q-M2
1	M2C	6.30	3.15	4.25	-	4.69	-	0.55	□ 11	-	-	1.97, 2.76	F05, F07	Ø7	M8	11	-
1.5		6.50	3.43	5.00	-	5.59	-	0.67	□ 14	-	-	2.76	F07	Ø9	M10	20	-
2		7.01	3.11	6.00	5.75	8.46	0.25	1.81	Ø 0.98	1.09	5.39	4.33	1.26	1/2	3/8	25	26
3		7.99	4.00	7.50	7.48	9.33	0.25	1.81	Ø 0.98	1.09	5.39	4.33	1.26	1/2	3/8	56	60
4		9.02	4.35	9.00	9.49	12.17	0.37	2.28	Ø 1.38	1.54	6.65	5.12	1.26	1/2	3/8	87	95
6		15.51	7.76	11.00	13.46	15.20	0.50	3.15	Ø 1.77	1.98	7.91	6.30	1.57	5/8	1/2	225	243
8		17.99	9.00	13.50	16.93	18.74	0.50	3.54	Ø 2.16	2.39	9.09	6.30	2.17	3/4	1/2	390	430
10		20.98	10.49	16.00	20.16	21.85	0.62	4.41	Ø 2.56	2.83	10.35	9.06	3.54	1	3/4	645	728
12		24.02	12.01	19.00	23.31	25.98	0.75	5.28	Ø 2.95	3.27	12.80	12.10	4.72	1 1/4	3/4	1010	1136
1	M2D	6.50	3.15	4.88	-	4.69	-	0.55	□ 11	-	-	1.97, 2.76	F05, F07	Ø7	M8	18	-
1.5		7.52	3.43	6.10	-	5.59	-	0.67	□ 14	-	-	2.76	F07	Ø9	M10	26	-
2		8.50	3.50	6.50	5.75	8.46	0.25	1.81	Ø 0.98	1.09	5.39	4.33	1.26	1/2	3/8	33	37
3		11.10	5.55	8.25	7.87	9.33	0.25	1.81	Ø 0.98	1.09	5.39	4.33	1.26	1/2	3/8	75	82
4		12.01	6.00	10.00	10.00	12.17	0.37	2.28	Ø 1.38	1.54	6.65	5.12	1.26	1/2	3/8	131	139
6		15.87	7.93	12.50	13.90	15.20	0.50	3.15	Ø 1.77	1.98	7.91	6.30	1.57	5/8	1/2	295	320
8		16.50	8.25	15.00	18.19	18.74	0.50	3.54	Ø 2.16	2.39	9.09	6.30	2.17	3/4	1/2	535	573
10		17.99	8.19	17.50	21.73	21.85	0.62	4.41	Ø 2.56	2.83	10.35	9.06	3.54	1	3/4	800	893
12		19.76	8.78	20.50	24.65	25.98	0.75	5.28	Ø 2.95	3.27	12.80	12.10	4.72	1 1/4	3/4	1200	1323

TRUNNION TYPE VALVES

NPS	Type	DIMENSIONS IN inch.														WEIGHT [lbs]	
		A	A1	ØB	ØB1	E	M	N	ØO	P	R	S	T	U	V	M2	Q-M2
10	M2CB/ M2CE	20.98	10.49	16.00	20.24	21.38	0.50	3.55	2.17	2.38	9.06	6.30	2.17	3/4	1/2	662	750
12		24.02	12.01	19.00	23.31	24.53	0.63	4.43	2.56	2.82	10.31	9.06	3.54	1	3/4	992	1114
14		27.01	13.50	21.00	26.18	30.08	0.75	5.29	2.95	3.26	13.94	12.09	4.72	1 1/4	3/4	1411	1577
16		30.00	15.00	23.50	29.53	31.06	0.75	5.29	2.95	3.26	13.92	12.09	4.72	1 1/4	3/4	1874	2095
10	M2DB/ M2DE	22.36	11.18	17.50	21.73	21.38	0.50	3.55	2.17	2.38	9.06	6.30	2.17	3/4	1/2	860	5566
12		25.51	12.76	20.50	24.65	24.53	0.63	4.43	2.56	2.82	10.31	9.06	3.54	1	3/4	1323	1444
14		30.00	15.00	23.00	27.56	30.08	0.75	5.29	2.95	3.26	13.94	12.09	4.72	1 1/4	3/4	1808	1974
16		32.99	16.50	25.98	31.50	31.06	0.75	5.29	2.95	3.26	13.92	12.09	4.72	1 1/4	3/4	2536	2756

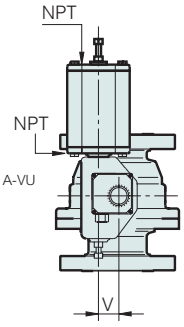
DIMENSIONS

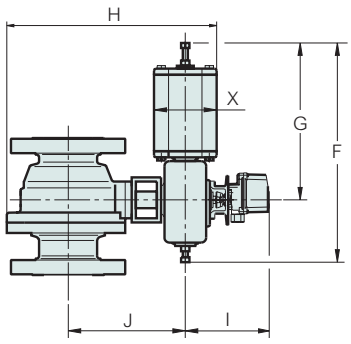
MOUNTING POSITION: A-VU (STANDARD)



1" - 6" WITH E- ACTUATOR

MOUNTING POSITION A-VU SHOWN.





2" - 16" WITH B1- ACTUATOR

SEAT SUPPORTED VALVE + DOUBLE ACTING ACTUATOR, TYPE B1C AND EC

NPS	TYPE	ACTUATOR / MOUNTING	DIMENSIONS [mm]							NPT/ISO	WEIGHT [kg]
			F	G	H	I	J	V	X		
1	M2C	EC07 / F07	300	150	440	207	165	24	117	1/4	13
1.5		EC07 / F07	300	150	470	207	185	24	117	1/4	17
2		EC07 / F07	300	150	520	207	229	24	117	1/4	20
2		EC10 / F10	405	203	565	226	250	32	155	1/4	29
2		B1C6 / F07	400	260	380	224	226	36	90	1/4	20
3		EC10 / F10	405	203	565	226	270	32	155	1/4	43
3		EC12 / F12	495	248	650	248	294	42	100	1/4	60
3		B1C9 / F07	455	315	420	225	249	43	110	1/4	35
4		EC12 / F12	495	248	735	248	354	42	200	1/4	75
4		EC14 / F14	675	338	795	278	384	56	259	1/4	117
4		B1C11 / F10	540	375	515	233	315	51	135	3/8	60
6		EC14 / F14	675	338	900	278	439	56	259	1/4	176
6		B1C17 / F14	770	545	680	270	401	78	215	1/2	160
8		B1C20 / F14	840	575	840	291	500	97	215	1/2	250
8		B1C25 / F16	1040	710	900	310	523	121	265	1/2	310
10		B1C25 / F16	1040	710	995	310	580	121	265	1/2	435
10		B1C32 / F25	1330	910	1075	348	617	153	395	3/4	560
12		B1C32 / F25	1330	910	1225	348	730	153	395	3/4	740
12		B1C40 / F30	1660	1150	1330	368	780	194	505	3/4	940
1	M2D	EC07 / F07	300	150	460	207	165	24	117	1/4	16
1		B1C6 / F07	400	260	305	224	163	36	90	1/4	15
1.5		EC07 / F07	300	150	475	207	185	24	117	1/4	20
1.5		B1C6 / F07	400	260	345	224	183	36	90	1/4	20
2		EC07 / F07	300	150	520	207	229	24	117	1/4	24
2		EC10 / F10	405	203	560	226	250	32	155	1/4	33
2		B1C9 / F07	455	315	385	225	227	43	110	1/4	30
3		EC10 / F10	405	203	570	226	250	32	155	1/4	53
3		EC12 / F12	495	248	650	248	354	42	200	1/4	70
3		B1C9 / F07	455	315	430	225	249	43	110	1/4	45
3		B1C11 / F10	540	375	440	233	255	51	135	3/8	55
4		EC12 / F12	495	248	700	248	354	42	200	1/4	95
4		EC14 / F14	675	338	760	278	384	56	259	1/4	137
4		B1C13 / F12	635	445	555	253	331	65	175	3/8	95
6		EC14 / F14	675	338	865	278	439	56	259	1/4	210
6		B1C20 / F14	840	575	720	291	420	97	215	1/2	215
8		B1C25 / F16	1040	710	915	310	523	121	265	1/2	375
10		B1C32 / F25	1330	910	1095	348	617	153	395	3/4	640
12		B1C40 / F30	1660	1150	1345	368	780	194	505	3/4	1025

TRUNNION TYPE VALVE + DOUBLE ACTING ACTUATOR B1C

NPS	TYPE	ACTUATOR/ MOUNTING	DIMENSIONS IN mm							NPT/ ISO	WEIGHT [kg]
			F	G	H	I max	J	V	X		
10	M2CB/ M2CE	B1C25 / F16	1040	710	1000	310	593	121	265	1/2	430
12		B1C25 / F16	1040	710	1095	310	649	121	265	1/2	580
12		B1C32 / F25	1330	910	1200	348	686	153	395	3/4	700
14		B1C32 / F25	1330	910	1380	348	805	153	395	3/4	890
14		B1C40 / F30	1660	1150	1485	368	855	194	505	3/4	1090
16		B1C32 / F25	1330	910	1430	348	830	153	395	3/4	1100
16		B1C40 / F30	1660	1150	1535	368	880	194	505	3/4	1300
10	M2DB/ M2DE	B1C25 / F16	1040	710	1000	310	593	121	265	1/2	600
12		B1C25 / F16	1040	710	1095	310	649	121	265	1/2	730
12		B1C32 / F25	1330	910	1200	348	686	153	395	3/4	850
14		B1C32 / F25	1330	910	1380	348	805	153	395	3/4	1070
14		B1C40 / F30	1660	1150	1485	368	855	194	505	3/4	1270
16		B1C32 / F25	1330	910	1430	348	830	153	395	3/4	1400
16		B1C40 / F30	1660	1150	1535	368	880	194	505	3/4	1600

SEAT SUPPORTED VALVE + DOUBLE ACTING ACTUATOR, TYPE B1C AND EC

NPS	TYPE	ACTUATOR / MOUNTING	DIMENSIONS [inch]								WEIGHT [lbs]
			F	G	H	I	J	V	X	NPT/ISO	
1	M2C	EC07 / F07	11.81	5.91	17.32	8.15	6.50	0.94	4.61	1/4	28.6
1.5		EC07 / F07	11.81	5.91	18.50	8.15	7.28	0.94	4.61	1/4	37.4
2		EC07 / F07	11.81	5.91	20.47	8.15	9.02	0.94	4.61	1/4	44.0
2		EC10 / F10	15.94	7.99	22.24	8.90	9.84	1.26	6.10	1/4	63.8
2		B1C6 / F07	15.75	10.24	14.96	8.82	8.90	1.42	3.54	1/4	44
3		EC10 / F10	15.94	7.99	22.24	8.90	10.63	1.26	6.10	1/4	94.6
3		EC12 / F12	19.49	9.76	25.59	9.76	11.57	1.65	3.94	1/4	132.0
3		B1C9 / F07	17.91	12.40	16.54	8.86	9.80	1.69	4.33	1/4	77
4		EC12 / F12	19.49	9.76	28.94	9.76	13.94	1.65	7.87	1/4	165.0
4		EC14 / F14	26.57	13.31	31.30	10.94	15.12	2.20	10.20	1/4	257.4
4		B1C11 / F10	21.26	14.76	20.28	9.17	12.40	2.01	5.31	3/8	132
6		EC14 / F14	26.57	13.31	35.43	10.94	17.28	2.20	10.20	1/4	387.2
6		B1C17 / F14	30.31	21.46	26.77	10.63	15.79	3.07	8.46	1/2	353
8		B1C20 / F14	33.07	22.64	33.07	11.46	19.69	3.82	8.46	1/2	551
8		B1C25 / F16	40.94	27.95	35.43	12.20	20.59	4.76	10.43	1/2	684
10		B1C25 / F16	40.94	27.95	39.17	12.20	22.83	4.76	10.43	1/2	959
10		B1C32 / F25	52.36	35.83	42.32	13.70	24.29	6.02	15.55	3/4	1235
12		B1C32 / F25	52.36	35.83	48.23	13.70	28.74	6.02	15.55	3/4	1632
12		B1C40 / F30	65.35	45.28	52.36	14.49	30.71	7.64	19.88	3/4	2073
1	M2D	EC07 / F07	11.81	5.91	18.11	8.15	6.50	0.94	4.61	1/4	35.2
1		B1C6 / F07	15.75	10.24	12.01	8.82	6.42	1.42	3.54	1/4	33
1.5		EC07 / F07	11.81	5.91	18.70	8.15	7.28	0.94	4.61	1/4	44.0
1.5		B1C6 / F07	15.75	10.24	13.58	8.82	7.20	1.42	3.54	1/4	44
2		EC07 / F07	11.81	5.91	20.47	8.15	9.02	0.94	4.61	1/4	52.8
2		EC10 / F10	15.94	7.99	22.05	8.90	9.84	1.26	6.10	1/4	72.6
2		B1C9 / F07	17.91	12.40	15.16	8.86	8.94	1.69	4.33	1/4	66
3		EC10 / F10	15.94	7.99	22.44	8.90	9.84	1.26	6.10	1/4	116.6
3		EC12 / F12	19.49	9.76	25.59	9.76	13.94	1.65	7.87	1/4	154.0
3		B1C9 / F07	17.91	12.40	16.93	8.86	9.80	1.69	4.33	1/4	99
3		B1C11 / F10	21.26	14.76	17.32	9.17	10.04	2.01	5.31	3/8	121
4		EC12 / F12	19.49	9.76	27.56	9.76	13.94	1.65	7.87	1/4	209.0
4		EC14 / F14	26.57	13.31	29.92	10.94	15.12	2.20	10.20	1/4	301.4
4		B1C13 / F12	25.00	17.52	21.85	9.96	13.03	2.56	6.89	3/8	209
6		EC14 / F14	26.57	13.31	34.06	10.94	17.28	2.20	10.20	1/4	462.0
6		B1C20 / F14	33.07	22.64	28.35	11.46	16.54	3.82	8.46	1/2	474
8		B1C25 / F16	40.94	27.95	36.02	12.20	20.59	4.76	10.43	1/2	827
10		B1C32 / F25	52.36	35.83	43.11	13.70	24.29	6.02	15.55	3/4	1411
12		B1C40 / F30	65.35	45.28	52.95	14.49	30.71	7.64	19.88	3/4	2260

TRUNNION TYPE VALVE + DOUBLE ACTING ACTUATOR B1C

NPS	TYPE	ACTUATOR/ MOUNTING	DIMENSIONS IN inch.							NPT/ ISO	WEIGHT [lbs]
			F	G	H	I max	J	V	X		
10	M2CB/ M2CE	B1C25 / F16	40.94	27.95	39.37	12.20	23.35	4.76	10.43	1/2	948
12		B1C25 / F16	40.94	27.95	43.11	12.20	25.55	4.76	10.43	1/2	1279
12		B1C32 / F25	52.36	35.83	47.24	13.70	27.01	6.02	15.55	3/4	1544
14		B1C32 / F25	52.36	35.83	54.33	13.70	31.69	6.02	15.55	3/4	1963
14		B1C40 / F30	65.35	45.28	58.46	14.49	33.66	7.64	19.88	3/4	2404
16		B1C32 / F25	52.36	35.83	56.30	13.70	32.68	6.02	15.55	3/4	2426
16		B1C40 / F30	65.35	45.28	60.43	14.49	34.65	7.64	19.88	3/4	2867
10	M2DB/ M2DE	B1C25 / F16	40.94	27.95	39.37	12.20	23.35	4.76	10.43	1/2	1323
12		B1C25 / F16	40.94	27.95	43.11	12.20	25.55	4.76	10.43	1/2	1610
12		B1C32 / F25	52.36	35.83	47.24	13.70	27.01	6.02	15.55	3/4	1874
14		B1C32 / F25	52.36	35.83	54.33	13.70	31.69	6.02	15.55	3/4	2359
14		B1C40 / F30	65.35	45.28	58.46	14.49	33.66	7.64	19.88	3/4	2800
16		B1C32 / F25	52.36	35.83	56.30	13.70	32.68	6.02	15.55	3/4	3087
16		B1C40 / F30	65.35	45.28	60.43	14.49	34.65	7.64	19.88	3/4	3528

SEAT SUPPORTED VALVE + SPRING RETURN ACTUATOR, TYPE B1J AND EJ / EJ_A

NPS	TYPE	ACTUATOR / MOUNTING	DIMENSIONS [mm]								WEIGHT [kg]
			F	G	H	I	J	V	X	NPT/ISO	
1	M2C	EJ/EJ_A07 / F07	443	293	445	207	165	24	117	1/4	16
1.5		EJ/EJ_A07 / F07	443	293	470	207	185	24	117	1/4	20
2		EJ/EJ_A07 / F07	443	293	525	207	230	24	117	1/4	24
2		EJ/EJ_A10 / F10	606	403	560	226	250	32	155	1/4	36
2		B1J/B1JA8 / F07	560	420	380	225	227	43	135	3/8	30
3		EJ/EJ_A10 / F10	606	403	605	226	270	32	155	1/4	50
3		EJ/EJ_A12 / F12	770	522	650	248	295	42	200	1/4	80
3		B1J/B1JA8 / F07	560	420	420	225	249	43	135	3/8	45
3		B1J/B1JA10 / F10	650	490	440	233	255	51	175	3/8	60
4		EJ/EJ_A12 / F12	770	522	740	248	295	42	200	1/4	95
4		EJ/EJ_A14 / F14	1030	692	795	278	384	56	259	1/4	155
4		B1J/B1JA10 / F10	650	490	525	233	315	51	175	3/8	75
4		B1J/B1JA12 / F12	800	620	560	253	331	65	215	1/2	100
6		EJ/EJ_A14 / F14	1030	692	900	278	439	56	259	1/4	215
6		B1J/B1JA16 / F14	990	760	705	270	401	78	265	1/2	205
6		B1J/B1JA20 / F14	1200	935	790	291	420	97	395	3/4	280
8		B1J/B1JA20 / F14	1200	935	915	291	500	97	395	3/4	355
8		B1J/B1JA25 / F16	1530	1200	990	310	523	121	505	3/4	530
10		B1J/B1JA25 / F16	1530	1200	1090	310	580	121	505	3/4	660
10		B1J/B1JA32 / F25	1830	1410	1145	348	617	153	540	1	980
12		B1J/B1JA32 / F25	1830	1410	1295	348	730	153	540	1	1160
1	M2D	EJ/EJ_A07 / F05	443	293	445	207	165	24	117	1/4	19
1		B1J/B1JA8 / F07	560	560	300	225	164	43	135	3/8	25
1.5		EJ/EJ_A07 / F07	443	293	445	207	185	24	117	1/4	23
2		EJ/EJ_A07 / F07	443	293	530	207	229	24	117	1/4	23
2		EJ/EJ_A10 / F10	606	403	570	226	250	32	155	1/4	40
2		B1J/B1JA10 / F10	650	490	405	233	233	51	175	3/8	45
3		EJ/EJ_A10 / F12	606	403	615	226	271	32	155	1/4	60
3		EJ/EJ_A12 / F10	770	522	660	248	294	42	200	1/4	90
3		B1J/B1JA10 / F10	650	490	445	233	255	51	175	3/8	70
3		B1J/B1JA12 / F12	800	620	480	253	271	65	215	1/2	95
4		EJ/EJ_A12 / F12	770	522	740	248	354	42	200	1/4	114
4		EJ/EJ_A14 / F14	1030	692	800	278	384	56	259	1/4	174
4		B1J/B1JA12 / F12	800	620	565	253	331	65	215	1/2	120
4		B1J/B1JA16 / F14	990	760	605	270	346	78	265	1/2	165
6		EJ/EJ_A14 / F14	1030	692	905	278	439	56	259	1/4	250
6		B1J/B1JA20 / F14	1200	935	795	291	420	97	395	3/4	315
6		B1J/B1JA25 / F16	1530	1200	870	310	443	121	505	3/4	490
8		B1J/B1JA25 / F16	1530	1200	1005	310	523	121	505	3/4	595
10		B1J/B1JA32 / F25	1830	1410	1165	348	617	153	540	1	1050
12		B1J/B1JA32 / F25	1830	1410	1315	348	730	153	540	1	1245

TRUNNION TYPE VALVE + SPRING RETURN ACTUATOR B1J/B1JA

NPS	TYPE	ACTUATOR/ MOUNTING	DIMENSIONS IN mm							NPT/ ISO	WEIGHT [kg]
			F	G	H	I max	J	V	X		
10	M2CB/ M2CE	B1J/B1JA20/F14	1200	935	1040	291	570	97	395	3/4	480
10		B1J/B1JA25/F16	1530	1200	1115	310	595	121	505	3/4	650
12		B1J/B1JA25/F16	1530	1200	1215	310	650	121	505	3/4	800
12		B1J/B1JA32/F25	1830	1410	1270	348	685	153	540	1	1120
14		B1J/B1JA25/F16	1530	1200	1400	310	770	121	505	3/4	990
14		B1J/B1JA32/F25	1830	1410	1450	348	805	153	540	1	1310
16		B1J/B1JA32/F25	1830	1410	1500	348	830	153	540	1	1520
10	M2DB/ M2DE	B1J/B1JA25/F16	1530	1200	1115	310	595	121	505	3/4	820
12		B1J/B1JA25/F16	1530	1200	1215	310	650	121	505	3/4	950
12		B1J/B1JA32/F25	1830	1410	1270	348	685	153	540	1	1270
14		B1J/B1JA32/F25	1830	1410	1450	348	805	153	540	1	1490
16		B1J/B1JA32/F25	1830	1410	1500	348	830	153	540	1	1820

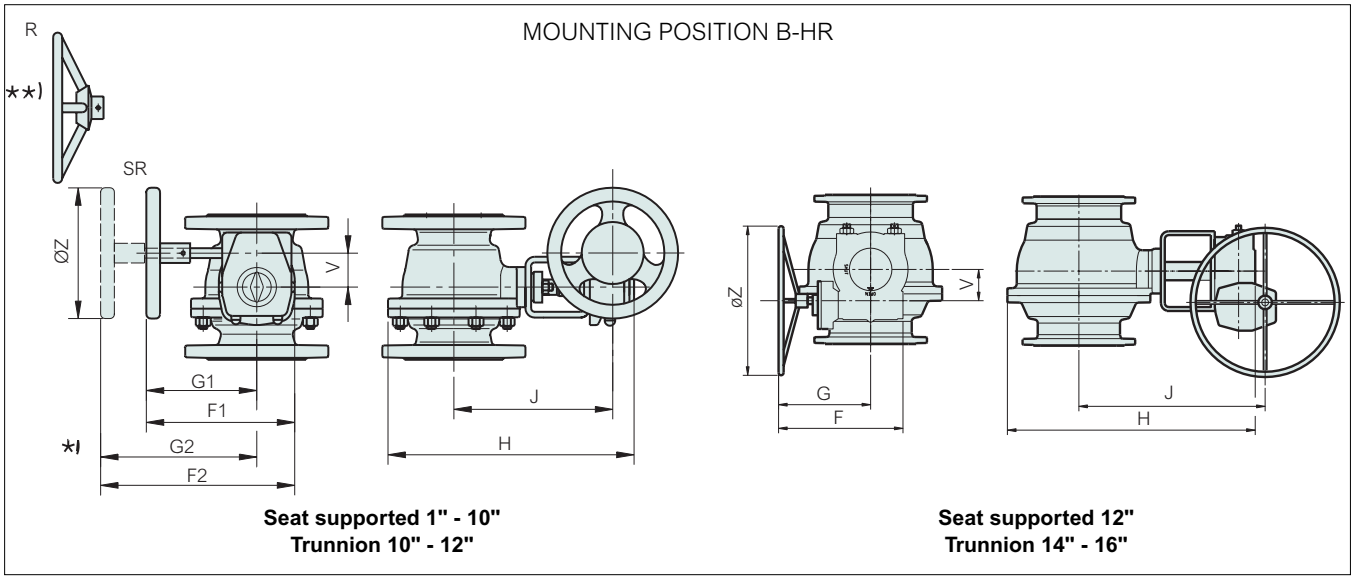
SEAT SUPPORTED VALVE + SPRING RETURN ACTUATOR, TYPE B1J AND EJ / EJ_A

NPS	TYPE	ACTUATOR / MOUNTING	DIMENSIONS [inch]							NPT/ISO	WEIGHT [lbs]
			F	G	H	I	J	V	X		
1	M2C	EJ/EJ_A07 / F07	17.44	11.54	17.52	8.15	6.50	0.94	4.61	1/4	35.2
1.5		EJ/EJ_A07 / F07	17.44	11.54	18.50	8.15	7.28	0.94	4.61	1/4	44.0
2		EJ/EJ_A07 / F07	17.44	11.54	20.67	8.15	9.06	0.94	4.61	1/4	52.8
2		EJ/EJ_A10 / F10	23.86	15.87	22.05	8.90	9.84	1.26	6.10	1/4	79.2
2		B1J/B1JA8 / F07	22.05	16.54	14.96	8.86	8.94	1.69	5.31	3/8	66
3		EJ/EJ_A10 / F10	23.86	15.87	23.82	8.90	10.63	1.26	6.10	1/4	110.0
3		EJ/EJ_A412 / F12	30.31	20.55	25.59	9.76	11.61	1.65	7.87	1/4	176.0
3		B1J/B1JA8 / F07	22.05	16.54	16.54	8.86	9.80	1.69	5.31	3/8	99
3		B1J/B1JA10 / F10	25.59	19.29	17.32	9.17	10.04	2.01	6.89	3/8	99
4		EJ/EJ_A412 / F12	30.31	20.55	29.13	9.76	11.61	1.65	7.87	1/4	209.0
4		EJ/EJ_A414 / F14	40.55	27.24	31.30	10.94	15.12	2.20	10.20	1/4	341.0
4		B1J/B1JA10 / F10	25.59	19.29	20.67	9.17	12.40	2.01	6.89	3/8	165
4		B1J/B1JA12 / F12	31.50	24.41	22.05	9.96	13.03	2.56	8.46	1/2	221
6		EJ/EJ_A414 / F14	40.55	27.24	35.43	10.94	17.28	2.20	10.20	1/4	473.0
6		B1J/B1JA16 / F14	38.98	29.92	27.76	10.63	15.79	3.07	10.43	1/2	452
6		B1J/B1JA20 / F14	47.24	36.81	31.10	11.46	16.54	3.82	15.55	3/4	617
8		B1J/B1JA20 / F14	47.24	36.81	36.02	11.46	19.69	3.82	15.55	3/4	783
8		B1J/B1JA25 / F16	60.24	47.24	38.98	12.20	20.59	4.76	19.88	3/4	1169
10		B1J/B1JA25 / F16	60.24	47.24	42.91	12.20	22.83	4.76	19.88	3/4	1455
10		B1J/B1JA32 / F25	72.05	55.51	45.08	13.70	24.29	6.02	21.26	1	2161
12		B1J/B1JA32 / F25	72.05	55.51	50.98	13.70	28.74	6.02	21.26	1	2558
1	M2D	EJ/EJ_A20 / F05	17.44	11.54	17.52	8.15	6.50	0.94	4.61	1/4	41.8
1		B1J/B1JA8 / F07	22.05	22.05	11.81	8.86	6.46	1.69	5.31	3/8	55
1.5		EJ/EJ_A35 / F07	17.44	11.54	17.52	8.15	7.28	0.94	4.61	3/8	50.6
2		EJ/EJ_A40 / F07	17.44	11.54	20.87	8.15	9.02	0.94	4.61	1/4	50.6
2		EJ/EJ_A45 / F10	23.86	15.87	22.44	8.90	9.84	1.26	6.10	1/4	88.0
2		B1J/B1JA10 / F10	25.59	19.29	15.94	9.17	9.17	2.01	6.89	3/8	99
3		EJ/EJ_A412 / F12	23.86	15.87	24.21	8.90	10.67	1.26	6.10	1/4	132.0
3		EJ/EJ_A45 / F10	30.31	20.55	25.98	9.76	11.57	1.65	7.87	1/4	198.0
3		B1J/B1JA10 / F10	25.59	19.29	17.52	9.17	10.04	2.01	6.89	3/8	154
3		B1J/B1JA12 / F12	31.5	24.41	18.9	9.96	10.67	2.56	8.46	1/2	209
4		EJ/EJ_A412 / F12	30.31	20.55	29.13	9.76	13.94	1.65	7.87	1/4	250.8
4		EJ/EJ_A414 / F14	40.55	27.24	31.50	10.94	15.12	2.20	10.20	1/4	382.8
4		B1J/B1JA12 / F12	31.50	24.41	22.24	9.96	13.03	2.56	8.46	1/2	265
4		B1J/B1JA16 / F14	38.98	29.92	23.82	10.63	13.62	3.07	10.43	1/2	364
6		EJ/EJ_A414 / F14	40.55	27.24	35.63	10.94	17.28	2.20	10.20	1/4	550.0
6		B1J/B1JA20 / F14	47.24	36.81	31.30	11.46	16.54	3.82	15.55	3/4	695
6		B1J/B1JA25 / F16	60.24	47.24	34.25	12.20	17.44	4.76	19.88	3/4	1080
8		B1J/B1JA25 / F16	60.24	47.24	39.57	12.20	20.59	4.76	19.88	3/4	1312
10		B1J/B1JA32 / F25	72.05	55.51	45.87	13.70	24.29	6.02	21.26	1	2315
12		B1J/B1JA32 / F25	72.05	55.51	51.77	13.70	28.74	6.02	21.26	1	2745

TRUNNION TYPE VALVE + SPRING RETURN ACTUATOR B1J/B1JA

NPS	TYPE	ACTUATOR/ MOUNTING	DIMENSIONS IN inch.							NPT/ ISO	WEIGHT [lbs]
			F	G	H	I max	J	V	X		
10	M2CB/ M2CE	B1J/B1JA20/F14	47.24	36.81	40.94	11.46	22.44	3.82	15.55	3/4	1058
10		B1J/B1JA25/F16	60.24	47.24	43.90	12.20	23.43	4.76	19.88	3/4	1433
12		B1J/B1JA25/F16	60.24	47.24	47.83	12.20	25.59	4.76	19.88	3/4	1764
12		B1J/B1JA32/F25	72.05	55.51	50.00	13.70	26.97	6.02	21.26	1	2470
14		B1J/B1JA25/F16	60.24	47.24	55.12	12.20	30.31	4.76	19.88	3/4	2183
14		B1J/B1JA32/F25	72.05	55.51	57.09	13.70	31.69	6.02	21.26	1	2889
16		B1J/B1JA32/F25	72.05	55.51	59.06	13.70	32.68	6.02	21.26	1	3352
10	M2DB/ M2DE	B1J/B1JA25/F16	60.24	47.24	43.90	12.20	23.43	4.76	19.88	3/4	1808
12		B1J/B1JA25/F16	60.24	47.24	47.81	12.20	25.59	4.76	19.88	3/4	2095
12		B1J/B1JA32/F25	72.05	55.51	50.00	13.70	26.97	6.02	21.26	1	2800
14		B1J/B1JA32/F25	72.05	55.51	57.09	13.70	31.69	6.02	21.26	1	3286
16		B1J/B1JA32/F25	72.05	55.51	59.06	13.70	32.68	6.02	21.26	1	4013

DIMENSIONS



Seat supported 1" - 10"
Trunnion 10" - 12"

Seat supported 12"
Trunnion 14" - 16"

SEAT SUPPORTED VALVE + MANUAL GEAR OPERATOR SERIES M

NPS	TYPE	ACTUATOR / MOUNTING	DIMENSIONS [mm]								WEIGHT [kg]
			F1	G1	F2	G2	J	H	V	ØZ	
1	M2C	M07 / F07	196	152	-	-	132	220	39	125	9
1.5		M07 / F07	196	152	-	-	152	250	39	125	13
2		M07 / F07	196	152	-	-	195	295	39	125	15
3		M07 / F07	196	152	-	-	217	335	39	125	30
4		M14 / F14	378	279	453	354	300	470	90	457	65
6		M14 / F14	378	279	453	354	355	570	90	457	125
6		M15 / F16	457	331	532	406	355	580	123	457	135
8		M15 / F16	457	331	532	406	435	710	123	457	210
8		M16 / F16	549	391	624	466	435	730	154	610	225
10		M16 / F25	549	391	624	466	492	830	154	610	350
12		WTRC 60 / F25	536	376	-	-	760	1020	128	610	685
1	M2D	M07 / F07	196	152	-	-	132	230	39	125	12
1.5		M07 / F07	196	152	-	-	152	265	39	125	15
2		M07 / F07	196	152	-	-	195	300	39	125	20
3		M07 / F07	196	152	-	-	215	350	39	125	40
3		M10 / F10	227	169	297	239	225	360	52	200	40
4		M14 / F14	378	279	453	354	300	470	90	457	85
6		M15 / F16	457	331	532	406	355	590	123	457	170
8		M16 / F16	549	391	624	466	435	745	154	610	290
10		M16 / F25	549	391	624	466	492	850	154	610	425
12		WTRC60 / F25	536	376	-	-	760	1035	128	610	770

*) Actuators can be equipped with extended input shaft only by special order.
**) Actuators M07 ... M12 are equipped with handwheel type SR.
Actuators M14 ... M16 are equipped with handwheel type R.

TRUNNION TYPE VALVE + MANUAL GEAR OPERATOR

NPS	TYPE	ACTUATOR/ MOUNTING	DIMENSIONS IN mm						WEIGHT [kg]
			F	G	J	H	V	øZ	
10	M2CB/ M2CE	M15/F16	457	331	505	846	123	457	335
12		M16/F16	549	391	561	962	154	610	500
14		WTRC60/F25	536	376	737	1186	128	610	840
16		WTRC60/F25	536	376	762	1236	128	610	1050
10	M2DB/ M2DE	M15/F16	457	331	505	846	123	457	505
12		M16/F16	549	391	561	962	154	610	650
14		WTRC60/F25	536	376	737	1186	128	610	1020
16		WTRC60/F25	536	376	762	1236	128	610	1350

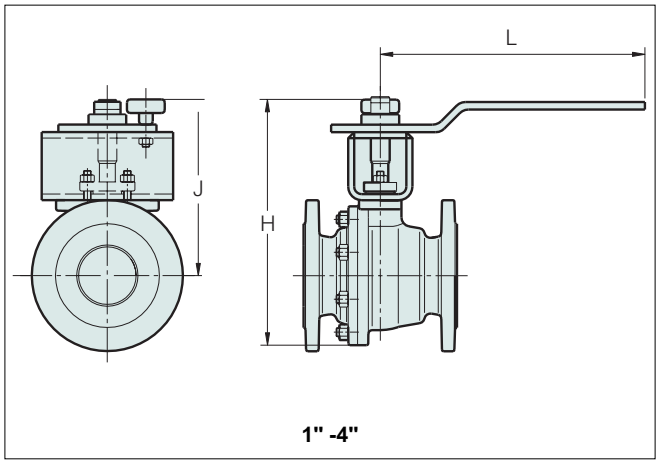
SEAT SUPPORTED VALVE + MANUAL GEAR OPERATOR

NPS	TYPE	ACTUATOR / MOUNTING	DIMENSIONS [inch]								WEIGHT [lbs]
			F1	G1	F2	G2	J	H	V	ØZ	
1	M2C	M07 / F07	7.72	5.98	-	-	5.20	8.66	1.54	4.92	20
1.5		M07 / F07	7.72	5.98	-	-	5.98	9.84	1.54	4.92	29
2		M07 / F07	7.72	5.98	-	-	7.68	11.61	1.54	4.92	33
3		M07 / F07	7.72	5.98	-	-	8.54	13.19	1.54	4.92	66
4		M14 / F14	14.88	10.98	17.83	13.94	11.81	18.50	3.54	17.99	143
6		M14 / F14	14.88	10.98	17.83	13.94	13.98	22.44	3.54	17.99	276
6		M15 / F16	17.99	13.03	20.94	15.98	13.98	22.83	4.48	17.99	298
8		M15 / F16	17.99	13.03	20.94	15.98	17.13	27.95	4.84	17.99	463
8		M16 / F16	21.61	15.39	24.57	18.35	17.13	28.74	6.06	24.02	496
10		M16 / F25	21.61	15.39	24.57	18.35	19.37	32.68	6.06	24.02	772
12		WTRC 60 / F25	21.10	14.80	-	-	29.92	40.16	5.04	24.02	1510
1	M2D	M07 / F07	7.72	5.98	-	-	5.20	9.06	1.54	4.92	26
1.5		M07 / F07	7.72	5.98	-	-	5.98	10.43	1.54	4.92	33
2		M07 / F07	7.72	5.98	-	-	7.68	11.81	1.54	4.92	44
3		M07 / F07	7.72	5.98	-	-	8.46	13.78	39	125	88
3		M10 / F10	8.94	6.65	11.69	9.41	8.86	14.17	2.05	7.87	88
4		M14 / F14	14.88	10.98	17.83	13.94	11.81	18.50	3.54	17.99	187
6		M15 / F16	17.99	13.03	20.94	15.98	13.98	23.23	4.84	17.99	375
8		M16 / F16	21.61	15.39	24.57	18.35	17.13	29.33	6.06	24.02	639
10		M16 / F25	21.61	15.39	24.57	18.35	19.37	33.46	6.06	24.02	937
12		WTRC60 / F25	21.10	14.80	-	-	29.92	40.75	5.00	24.02	1698

*) Actuators can be equipped with extended input shaft only by special order.
**) Actuators M07 ... M12 are equipped with handwheel type SR.
Actuators M14 ... M16 are equipped with handwheel type R.

TRUNNION TYPE VALVE + MANUAL GEAR OPERATOR

NPS	TYPE	ACTUATOR/ MOUNTING	DIMENSIONS IN inch.						WEIGHT [lbs]
			F	G	J	H	V	øZ	
10	M2CB/ M2CE	M15/F16	17.99	13.03	19.88	33.31	4.843	17.99	739
12		M16/F16	21.61	15.39	22.09	37.87	6.063	24.02	1103
14		WTRC60/F25	21.1	14.8	29.02	46.69	5.039	24.02	1852
16		WTRC60/F25	21.1	14.80	30	48.66	5.039	24.02	2315
10	M2DB/ M2DE	M15/F16	17.99	13.03	19.88	33.31	4.843	17.99	1114
12		M16/F16	21.61	15.39	22.09	37.87	6.063	24.02	1433
14		WTRC60/F25	21.1	14.8	29.02	46.69	5.039	24.02	2249
16		WTRC60/F25	21.1	14.8	30	48.66	5.039	24.02	2977



1" -4"

SEAT SUPPORTED VALVE + HAND LEVER LK

NPS	TYPE	HAND LEVER	DIMENSIONS [mm]			WEIGHT [kg]
			H	J	L	
1	M2C	LK180	195	140	140	6
1.5		LK220	235	170	170	10
2		LK350	300	222	350	15
3		LK350	340	244	350	30
4		LK450	430	309	450	45
1	M2D	LK180	205	140	140	9
1.5		LK220	250	170	170	13
2		LK350	305	222	350	20
3		LK350	350	244	350	40
4		LK450	435	309	450	65

NPS	TYPE	HAND LEVER	DIMENSIONS [inch]			WEIGHT [lbs]
			H	J	L	
1	M2C	LK180	7.68	5.51	5.51	13
1.5		LK220	9.25	6.69	6.69	22
2		LK350	11.81	8.74	13.8	33
3		LK350	13.39	9.61	13.8	66
4		LK450	16.93	12.17	17.72	99
1	M2D	LK180	8.07	5.51	5.51	20
1.5		LK220	9.84	6.69	6.69	29
2		LK350	12.01	8.74	13.8	44
3		LK350	13.78	9.61	13.8	88
4		LK450	17.13	12.17	17.72	143

HOW TO ORDER

MBV MODULAR BALL VALVE, Series M2

Q-	M2	C	A	06	A	P	F	
1.	2.	3.	4.	5.	6.	7	8	9

1. sign	Low noise construction
Q-	Attenuator in flow port of ball

2. sign	Valve series, face-to-face length
M2	Full bore, seat supported, f-to-f lenght acc. to ASME B16.10.

3. sign	Pressure rating of body and flanges
C	ASME 150
D	ASME 300

4. sign	Construction
A	Standard construction
T	Standard construction with live loaded packing for seat supported valves
B	Trunnion mounted 2-seats
E	Trunnion mounted 1-seat

5. sign	Size (inch)
01	1"
1H	1.5"
02	2"
03	3"
04	4"
06	6"
08	8"
10	10"
12	12"
14	14"
16	16"

6. sign	Materials			
	Body material	Trim (& Coating) material	Stem material	Bolting material/ thread
A	CF8M	CF8M (& Hard Chrome, if metal seat)	XM-19 (1-8") Type AISI 329 (10-16")	A193 Gr. B8M A193 Gr. 8M
C	CG8M	CG8M (& Hard Chrome, if metal seat)	XM-19 (1-8") Type AISI 329 (10-16")	A193 Gr. B8M A193 Gr. 8M
U	CK-3MCuN	CK-3MCuN (& Ceramic coating, if metal seat)	UNS S31254	A193 Gr. B8M A193 Gr. 8M
S	CF8M + Cobalt based alloy sleeves in flow ports	CF8M (cobalt based coating on ball surface and flow port)	XM-19 (1-8") Type AISI 329 (10-16")	A193 Gr. B8M A193 Gr. 8M

7. sign	Seat type	Seat material	Thrust bearing material	Back seal material
S (trunnion)	Unlocked	SS+ Cobalt based hard facing	PTFE + Graphite	Viton GF
P	Locked	SS+ Cobalt based hard facing	PTFE + Graphite	PTFE
S	Unlocked	SS+ Cobalt based hard facing	PTFE + Graphite	PTFE
E	Low Δp	SS+ Cobalt based hard facing	PTFE + Graphite	PTFE / FPM
M	Soft	Filled PTFE	PTFE + Graphite	–
T	Soft	PTFE	PTFE + Graphite	–

Sent constructions are shown on page 4.

8. sign	Packing	Body gasket
Standard, without sign	PTFE V-rings	PTFE
F	Graphite	Graphite
G	Live loaded Graphite packing for TRUNNION valves	Graphite
T	Live loaded PTFE packing for TRUNNION valves	PTFE

9. sign	End connection style
Standard, without sign	ASME B16.5 0.06" raised face (Ra 125 - 250 µ inch) (Ra 3.2…6.3 µm)