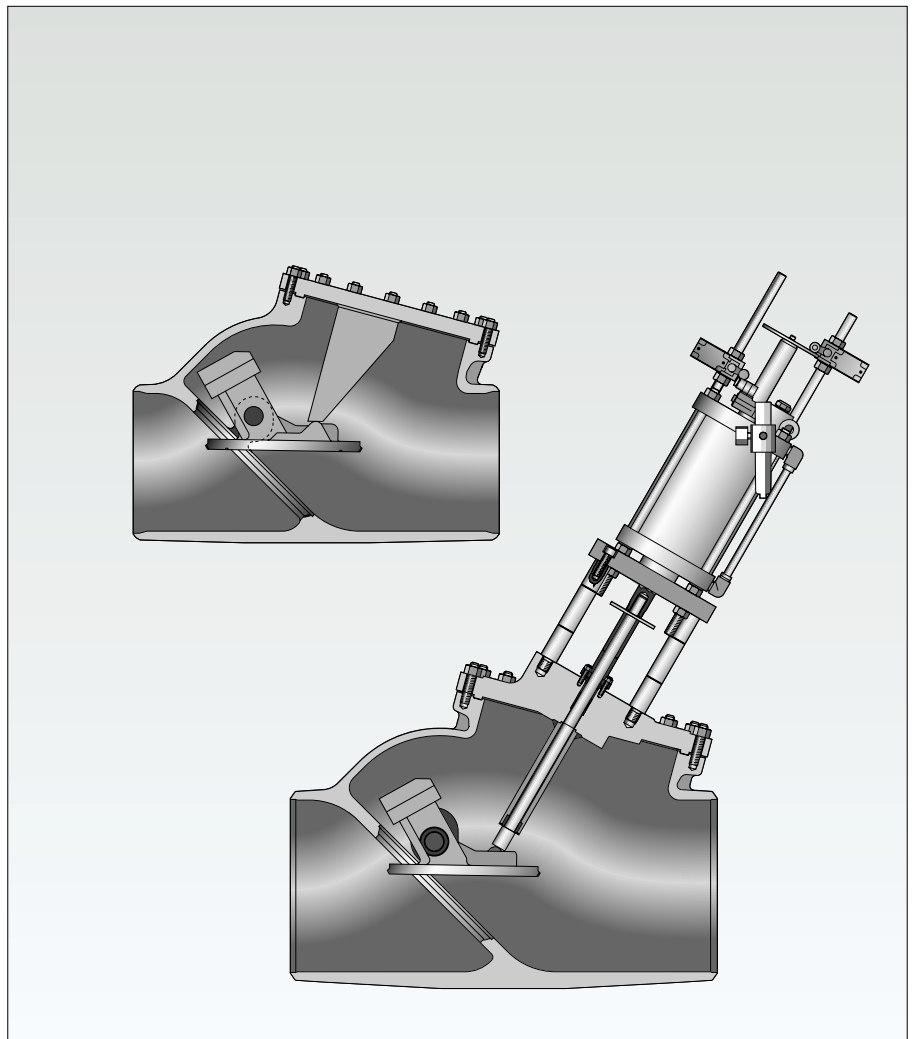


DEWRANCE

Features & Benefits

- Excellent Reliability
 - Internal Counterweight to balance disc under low load conditions
 - Direct deposited seats
 - Tilting disc design for quick closing due to lower centre of gravity
 - Lightweight disc with minimum travel, for quick closing in less than 1 second
 - Optimum performance under all flow conditions
 - Self-draining geometry
 - Pneumatic Power Assistance acts directly onto disc, without leakages to inhibit operation
- Low Cost Maintenance
 - Expanded graphite gasket pressure seal design
 - Nitrided hinge pin, supported in nitrided bearings, giving a low coefficient of friction and hard wearing surface for maximum performance
 - Easy access through cover
 - Simplified seat refurbishment, only requires lapping
 - Longer seat life due to non-scuffing action of seat to disc geometry
- Improved Performance
 - Aerodynamic self aligning tilting disc design for low pressure drop characteristics
 - Automatic self closure on flow reversal
 - Inclined seat geometry combined with conical seat & disc for tight seal without scuffing
 - No hinge pin gland to inhibit performance

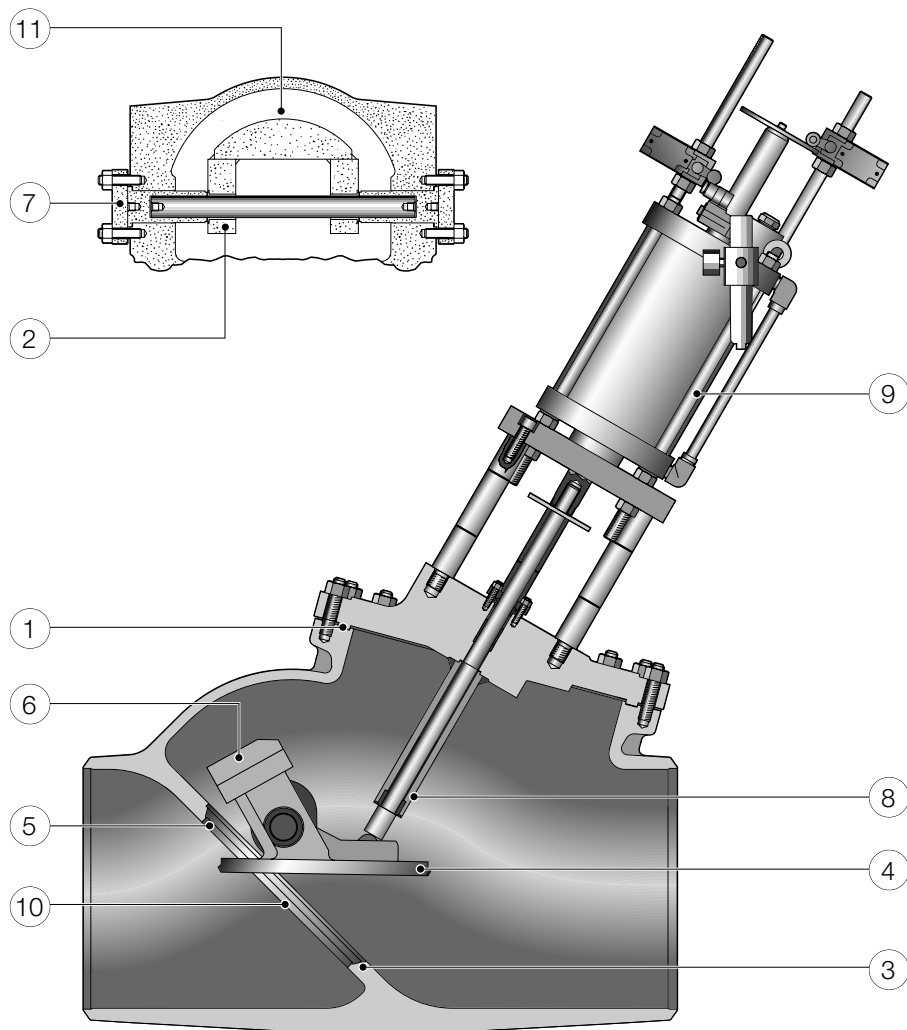


Technical data

Sizes	: 6" – 28"
ASME	: ASME B16.34 – 1996
Pressure Class	: 150, 400, 600

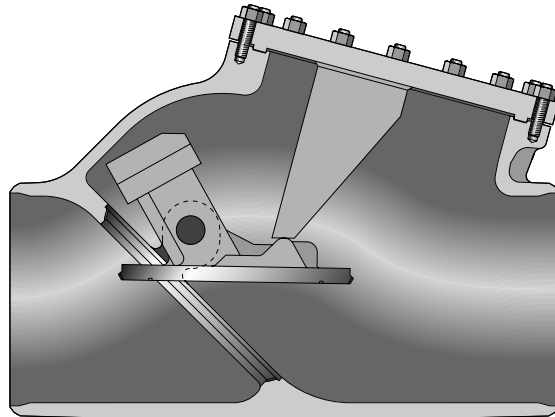
Check Valve

Bled Steam



Legenda

- 1 Graphoil Gasket/Pressure Seal bonnet (dependant on) Size/Pressure
- 2 Disc supported in Nitrided Bearings
- 3 Inclined seat and aerodynamic Tilting disc gives low pressure drop, and minimum disc travel
- 4 Variable seat/disc to suit actual condition for optimum flow characteristics
- 5 Hard faced Stellite® or equivalent disc
- 6 Internal counterweight if required to ensure maximum opening position under low flow conditions
- 7 No External Glands or keyway to inhibit operation
- 8 Positive open position stop and Aerodynamic disc provides stability over wide range of flow (no flutter)
- 9 Direct Mounted Quick Closing Pneumatic Actuator to assist closure, act directly onto disc
- 10 Unique seat geometry and seating materials prevent scuffing and ensure leak tight seals
- 11 Free swinging Tilting Disc design, no linkages, keys or pins to inhibit operation



Introduction

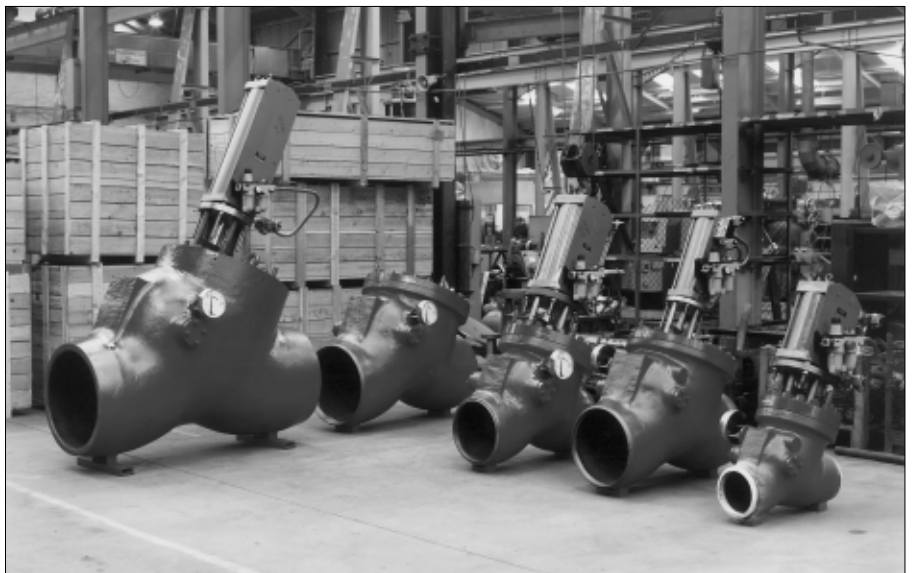
This range of valves has been specifically designed for installation in bled (extraction) steam lines between steam turbines and feed water heaters but are equally applicable to reheater connections and bleed on pass-out lines in process plants.

Their function is to prevent the reverse flow of stored steam and any water from the heater or its bled steam pipe to the turbine. Installation would be in a horizontal pipe as near to the turbine as possible.

These valves are Free Acting whereby the disc moves to the closed position when flow in the forward direction ceases. Gravity action on the disc provides a closing moment from the fully open to fully closed position. Where power assistance is required a Spring return pneumatic cylinder can easily be accommodated whilst still maintaining the automatic Gravity closing feature. The Dewrance bled steam Check Valve is the result of evolution from the original vertical seated design, field experience, customers requirements and is based on the Dewrance Tilting Disc Check Valve.

All Dewrance Tilting Disc Check valves are based on the same seat geometry of a conical seated disc in a conical body seat, which has been applied over a wide range of conditions from sub-atmospheric bled steam up to ANSI 2500 Class for steam and water. The seating intensity is high enough to give a good seal and yet low enough not to cause any surface scuffing. The position of the hinge pin ensures that the disc opens and closes without a rubbing action to effect a tight seal over the full range of pressures.

The combination of disc geometry and the body shape produce a seat angle which gives a short disc travel as the flow falls progressively with decreasing flow. This disc will be on the seat when flow ceases and before reversal takes place without SLAMMING. This arrangement gives a low pressure drop and flow under the disc assists in keeping the valve fully open over a wide range of flows.



Flow Tests

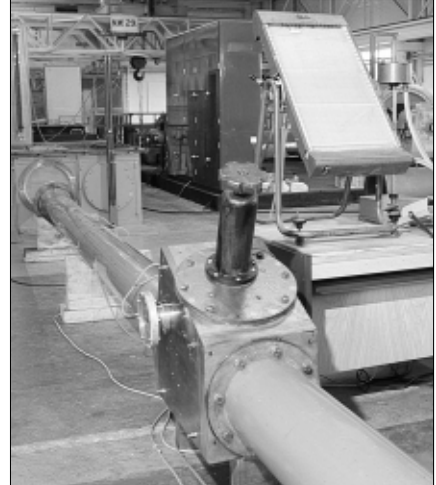
Extensive flow tests have been carried out to establish flow characteristics for these valves.

The tests consisted of:-

- 1 A scale model (230mm) tested with air to establish the aerodynamic torque on the disc and the flow coefficient at various angles of opening.

The lowest pressure drop occurs when the disc is in the fully open position.

2. A full size 400mm valve tested in Steam flows up to 300ft/sec (92 Metres/Sec) to confirm the disc opening angle and establish the body and disc design shape. These tests confirmed that the Dewrance design is stable under the flow conditions and achieves the fully open position at minimum flow, thus giving low pressure drop. (Details of flow coefficients are available on request).



Actual scale model under air test in GEC Aerodynamic Laboratory.

Actuator Tests

Power closing actuators designed for on-load testing are tested on a specially designed rig which simulates the increasing load as the valve closure occurs. The load is critically associated with the stroking time and this too is accurately checked.

Closing time and the pressure against which it must close the valve must be specified by the feed heating plant designer. Each actuator is specially designed for its particular application.

Functional Tests

Every Dewrance valve is hydrostatically tested to prove the shell and ensure the seat is leak tight prior to leaving the factory.

Gravity closing times are checked in still air to ensure the valve closes in one second or less.

Where pneumatic actuators are fitted the complete valve is stroked in free air in addition to the Actuator tests described above.



Pneumatic actuator functional test simulating increasing load over the full load.

Check Valve

Pressure/Temperature Ratings (Check Valve)

Imperial 150 Class (ASME B16.34 1996)

Prod. No.	ASTM		ASME code B16.34	-20° to 100°	Pressure in lbf/sq. in. at Temp. °F (for intermediate ratings use linear interpolation)																
	Body Mat.	Cast			200	300	400	500	600	650	700	750	800	850*	900	950	975	1000	1025	1050	1075
B21	E	A216	Std.	285	260	230	200	170	140	125	110	95	80	65	-	-	-	-	-	-	
B21	E	WCB	Spec.	290	290	290	290	290	275	270	265	240	200	130	-	-	-	-	-	-	
B21	J	A217	Std.	290	260	230	200	170	140	125	110	95	80	65	50	35	28	20	20	20	20
B21	J	WC6	Spec.	290	290	290	290	290	290	290	280	280	275	260	225	155	130	105	88	70	580
B21	L	A217	Std.	290	260	230	200	170	140	125	110	95	80	65	50	35	28	20	20	20	20
B21	L	WC9	Spec.	290	290	285	280	275	275	275	275	265	260	245	230	180	153	125	105	85	70

Metric 150 Class (ASME B16.34 1996)

Prod. No.	ASTM		ASME code B16.34	-30° to 38°	Pressure in Bar at Temp. °C (for intermediate ratings use linear interpolation)																
	Body Mat.	Cast			50	100	150	200	250	300	350	375	400	425	450*	475	500	525	550	575	600
B21	E	A216	Std.	19.6	19.3	17.7	15.8	14.0	12.1	10.2	8.4	7.4	6.5	5.6	4.6	-	-	-	-	-	-
B21	E	WCB	Spec.	20.0	20.0	20.0	20.0	20.0	20.0	19.3	18.5	18.0	16.4	14.0	9.7	-	-	-	-	-	-
B21	J	A217	Std.	20.0	19.5	17.7	15.8	14.0	12.1	10.2	8.4	7.4	6.5	5.6	4.6	3.7	2.8	1.9	1.4	1.4	1.4
B21	J	WC6	Spec.	20.0	20.0	20.0	20.0	20.0	20.0	20.0	19.8	19.3	19.3	19.0	18.1	16.1	12.4	8.8	6.2	4.2	2.9
B21	L	A217	Std.	20.0	19.5	17.7	15.8	14.0	12.1	10.2	8.4	7.4	6.5	5.6	4.6	3.7	2.8	1.9	1.4	1.4	1.4
B21	L	WC9	Spec.	20.0	20.0	20.0	19.6	19.3	19.0	19.0	19.0	18.9	18.3	17.9	17.1	16.1	13.7	10.4	7.4	5.2	3.5

Imperial 400 Class (ASME B16.34 1996)

Prod. No.	ASTM		ASME code B16.34	-20° to 100°	Pressure in lbf/sq. in. at Temp. °F (for intermediate ratings use linear interpolation)																
	Body Mat.	Cast			200	300	400	500	600	650	700	750	800	850*	900	950	975	1000	1025	1050	1075
B43	E	A216	Std.	990	900	875	845	800	730	715	710	670	550	355	-	-	-	-	-	-	-
B43	E	WCB	Spec.	1000	1000	1000	1000	1000	950	935	925	840	685	445	-	-	-	-	-	-	-
B43	J	A217	Std.	1000	1000	965	925	885	805	785	755	710	675	650	600	425	358	290	240	190	160
B43	J	WC6	Spec.	1000	1000	1000	1000	1000	1000	1000	980	970	960	905	785	530	445	360	300	240	200
B43	L	A217	Std.	1000	1000	970	940	885	805	785	755	710	675	650	600	505	425	345	290	235	190
B43	L	WC9	Spec.	1000	1000	990	965	960	960	955	955	920	895	855	800	630	533	435	363	290	238

Metric 400 Class (ASME B16.34 1996)

Prod. No.	ASTM		ASME code B16.34	-30° to 38°	Pressure in Bar at Temp. °C (for intermediate ratings use linear interpolation)																
	Body Mat.	Cast			50	100	150	200	250	300	350	375	400	425	450*	475	500	525	550	575	600
B43	E	A216	Std.	68.2	66.9	61.8	60.3	58.4	55.7	51.7	49.2	48.6	45.9	38.4	26.6	-	-	-	-	-	-
B43	E	WCB	Spec.	68.9	68.9	68.9	68.9	68.9	68.9	66.5	64.3	63.0	57.5	47.9	33.3	-	-	-	-	-	-
B43	J	A217	Std.	68.9	68.9	68.7	66.5	64	61.5	57	53.6	51.6	48.9	46.7	45.1	42.3	33.6	24.3	17	11.7	8.1
B43	J	WC6	Spec.	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.6	67.5	66.9	66.2	63	56.3	42.9	30.2	21.2	14.7	10.1
B43	L	A217	Std.	68.9	68.9	68.7	66.8	65	61.7	57	53.6	51.6	48.9	46.7	45.1	42.3	37.2	28.9	20.4	14.1	9.1
B43	L	WC9	Spec.	68.9	68.9	68.9	68.2	66.7	66.3	66.2	65.8	65.5	63.4	61.8	59.4	56.1	47.7	36.2	25.6	17.5	11.6

Imperial 600 Class (ASME B16.34 1996)

Prod. No.	ASTM		ASME code B16.34	-20° to 100°	Pressure in lbf/sq. in. at Temp. °F (for intermediate ratings use linear interpolation)																
	Body Mat.	Cast			200	300	400	500	600	650	700	750	800	850*	900	950	975	1000	1025	1050	1075
B51	E	A216	Std.	1480	1350	1315	1270	1200	1095	1075	1065	1010	825	535	-	-	-	-	-	-	-
B51	E	WCB	Spec.	1500	1500	1500	1500	1500	1425	1400	1390	1260	1030	670	-	-	-	-	-	-	-
B51	J	A217	Std.	1500	1500	1445	1385	1330	1210	1175	1135	1065	1015	975	900	640	535	430	360	290	240
B51	J	WC6	Spec.	1500	1500	1500	1500	1500	1500	1500	1465	1460	1440	1355	1175	795	668	540	450	360	300
B51	L	A217	Std.	1500	1500	1455	1410	1330	1210	1175	1135	1065	1015	975	900	755	638	520	435	350	285
B51	L	WC9	Spec.	1500	1500	1485	1450	1440	1440	1430	1425	1380	1345	1285	1200	945	798	650	543	435	355

Metric 600 Class (ASME B16.34 1996)

Prod. No.	ASTM		ASME code B16.34	-30° to 38°	Pressure in Bar at Temp. °C (for intermediate ratings use linear interpolation)																
	Body Mat.	Cast			50	100	150	200	250	300	350	375	400	425	450*	475	500	525	550	575	600
B51	E	A216	Std.	102.0	100.1	92.8	90.6	87.8	83.6	77.5	74.0	72.9	69.1	57.6	40.1	-	-	-	-	-	-
B51	E	WCB	Spec.	103.4	103.4	103.4	103.4	103.4	103.4	99.7	96.4	94.6	86.2	72.0	50.2	-	-	-	-	-	-
B51	J	A217	Std.	103.4	103.4	103.0	99.5	95.8	92.4	85.7	80.4	77.6	73.3	70.2	67.7	63.4	50.6	36.3	25.4	17.7	12.0
B51	J	WC6	Spec.	103.4	103.4	103.4	103.4	103.4	103.4	103.4	102.8	101.0	100.6	99.4	94.4	84.2	64.2	45.3	31.8	22.0	15.1
B51	L	A217	Std.	103.4	103.4	103.0	100.3	97.5	92.7	85.7	80.4	77.6	73.3	70.2	67.7	63.4	55.7	43.3	30.7	21.1	13.8
B51	L	WC9	Spec.	103.4	103.4	103.3	102.3	100.2	99.4	99.3	98.5	97.8	95.1	92.9	89.3	84.3	71.5	54.2	38.3	26.2	17.2

* Permissible but not recommended for prolonged usage above 800°F (425°C).

Check Valve B21

Bled Steam

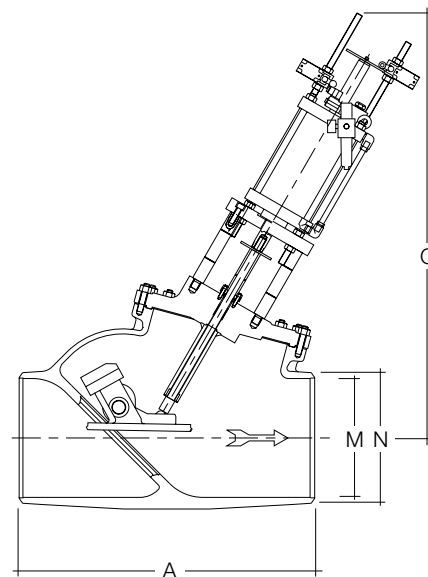
Sizes 8"–28" ASME B16.34 150 Class

Main component materials

Description	Carbon Steel	Alloy Steel
Body	A216 Gr. WCB	A217 Gr. WC9
Cover	A216 Gr. WCB	A217 Gr. WC9
Gasket	Aluminium Reinforced Expanded Graphite	Aluminium Reinforced Expanded Graphite
Disc	A216 Gr. WCB	A217 Gr. WC9
Hinge Pin	ASTM A565 XM32	ASTM A565 XM32

Hydrostatic shell & seat leak test pressures

Press. Class	Material		ASTM	
	ASTM		ASTM	
	A-216 WCB		A-217 WC6	
	Shell	Seat	Shell	Seat
150	450 psi	325 psi	450 psi	325 psi
150	30 bar	22 bar	30 bar	22 bar



Dimensions

Size	A	C	M	N	Weight	Product Numbers	
						Carbon Steel WCB	Alloy Steel WC6
8 in	23	47	8.07	8.63	695 lb	B21EN200-	B21LN200-
200 mm	584	1195	205	219.1	315 kg		
10 in	28	48.82	10.13	10.75	864 lb	B21EN250-	B21LN250-
250 mm	711	1240	257.4	273	392 kg		
12 in	31	52	12.09	12.75	1184 lb	B21EN300-	B21LN300-
300 mm	787	1320	307	323.8	537 kg		
14 in	33	53.15	13.25	14	1730 lb	B21EN350-	B21LN350-
350 mm	838	1350	336.6	355.6	785 kg		
16 in	37	54.33	15.25	16	1845 lb	B21EN400-	B21LN400-
400 mm	940	1380	387.4	406.4	837 kg		
18 in	42.52	63	17.13	18	2612 lb	B21EN450-	B21LN450-
450 mm	1080	1600	435	457.2	1185 kg		
20 in	47	65.75	19	20.00	2742 lb	B21EN500-	B21LN500-
500 mm	1194	1670	482.6	508	1244 kg		
22 in	50	68.11	21.06	22	3670 lb	B21EN550-	B21LN550-
550 mm	1270	1730	535	558.8	1665 kg		
24 in	54.72	72.05	22.87	24	4608 lb	B21EN600-	B21LN600-
600 mm	1390	1830	581	609.6	2090 kg		
28 in	61	76.77	26.81	28	5688 lb	B21EN700-	B21LN700-
700 mm	1550	1950	681	711.2	2580 kg		

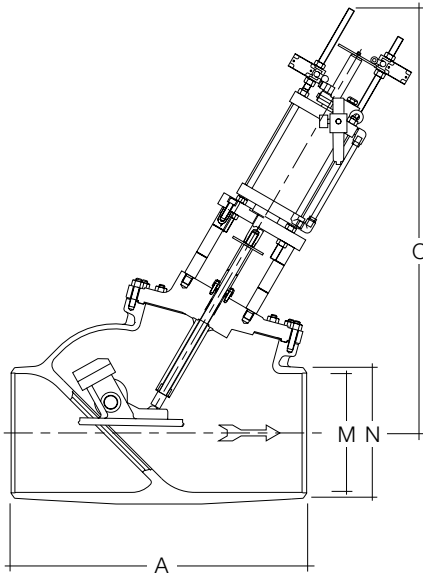
Notes

Sizes greater than 700mm are available on application.

* Per ASME B16.10 1992

Check Valve B43

Bled Steam



Sizes 6"-24" ASME B16.34 400 Class

Main component materials

Description	Carbon Steel	Alloy Steel
Body	A216 Gr. WCB	A217 Gr. WC9
Cover	A216 Gr. WCB	A217 Gr. WC9
Gasket	Aluminium Reinforced Expanded Graphite	Aluminium Reinforced Expanded Graphite
Disc	A216 Gr. WCB	A217 Gr. WC9
Hinge Pin	ASTM A565 XM32	ASTM A565 XM32

Hydrostatic shell & seat leak test pressures

Press. Class	Material			
	ASTM A-216 WCB		ASTM A-217 WC6	
	Shell	Seat	Shell	Seat
400	1500 psi	1100 psi	1500 psi	1100 psi
400	104 bar	76 bar	104 bar	76 bar

Dimensions

Size	A	C	M	N	Weight	Product Numbers	
						Carbon Steel WCB	Alloy Steel WC6
6 in	20	34.09	5.76	6.63	540 lb	B43EN150-	B43LN150-
150 mm	508	866	146.3	168.3	245 kg		
8 in	26	49.21	7.63	8.63	926 lb	B43EN200-	B43LN200-
200 mm	660	1250	193.7	219.1	420 kg		
10 in	31	51.18	9.56	10.75	1118 lb	B43EN250-	B43LN250-
250 mm	787	1300	242.8	273	507 kg		
12 in	35.43	54.33	11.38	12.75	1433 lb	B43EN300-	B43LN300-
300 mm	900	1380	289	323.8	650 kg		
14 in	37	58.07	12.50	14	2524 lb	B43EN350-	B43LN350-
350 mm	940	1475	317.6	355.6	1145 kg		
16 in	41	59.45	14.31	16	3097 lb	B43EN400-	B43LN400-
400 mm	1041	1510	363.6	406.4	1405 kg		
18 in	46	61.02	16.13	18	3659 lb	B43EN450-	B43LN450-
450 mm	1169	1550	409.6	457.2	1660 kg		
20 in	51	63.78	17.94	20	3828 lb	B43EN500-	B43LN500-
500 mm	1295	1620	455.6	508	1737 kg		
22 in	56	73.23	19.76	22	4595 lb	B43EN550-	B43LN550-
550 mm	1422	1860	502	558.8	2085 kg		
24 in	60	77.95	21.57	24	5371 lb	B43EN600-	B43LN600-
600 mm	1524	1980	547.8	609.6	2437 kg		

Notes

Sizes greater than 600mm are available on application.

* Per ASME B16.10 1992

Check Valve B51

Bled Steam

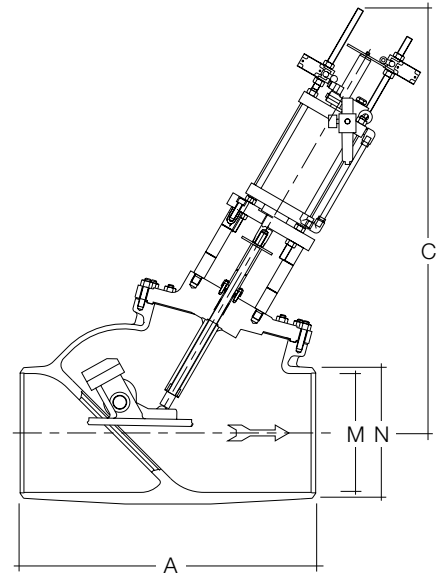
Sizes 8"–28" ASME B16.34 600 Class

Main component materials

Description	Carbon Steel	Alloy Steel
Body	A216 Gr. WCB	A217 Gr. WC9
Cover	A216 Gr. WCB	A217 Gr. WC9
Gasket	Aluminium Reinforced Expanded Graphite	Aluminium Reinforced Expanded Graphite
Disc	A216 Gr. WCB	A217 Gr. WC9
Hinge Pin	ASTM A565 XM32	ASTM A565 XM32

Hydrostatic shell & seat leak test pressures

Press. Class	Material		ASTM	
	ASTM		ASTM	
	A-216 WCB		A-217 WC6	
	Shell	Seat	Shell	Seat
600	2250 psi	1650 psi	2250 psi	1650 psi
600	156 bar	114 bar	156 bar	114 bar



Dimensions

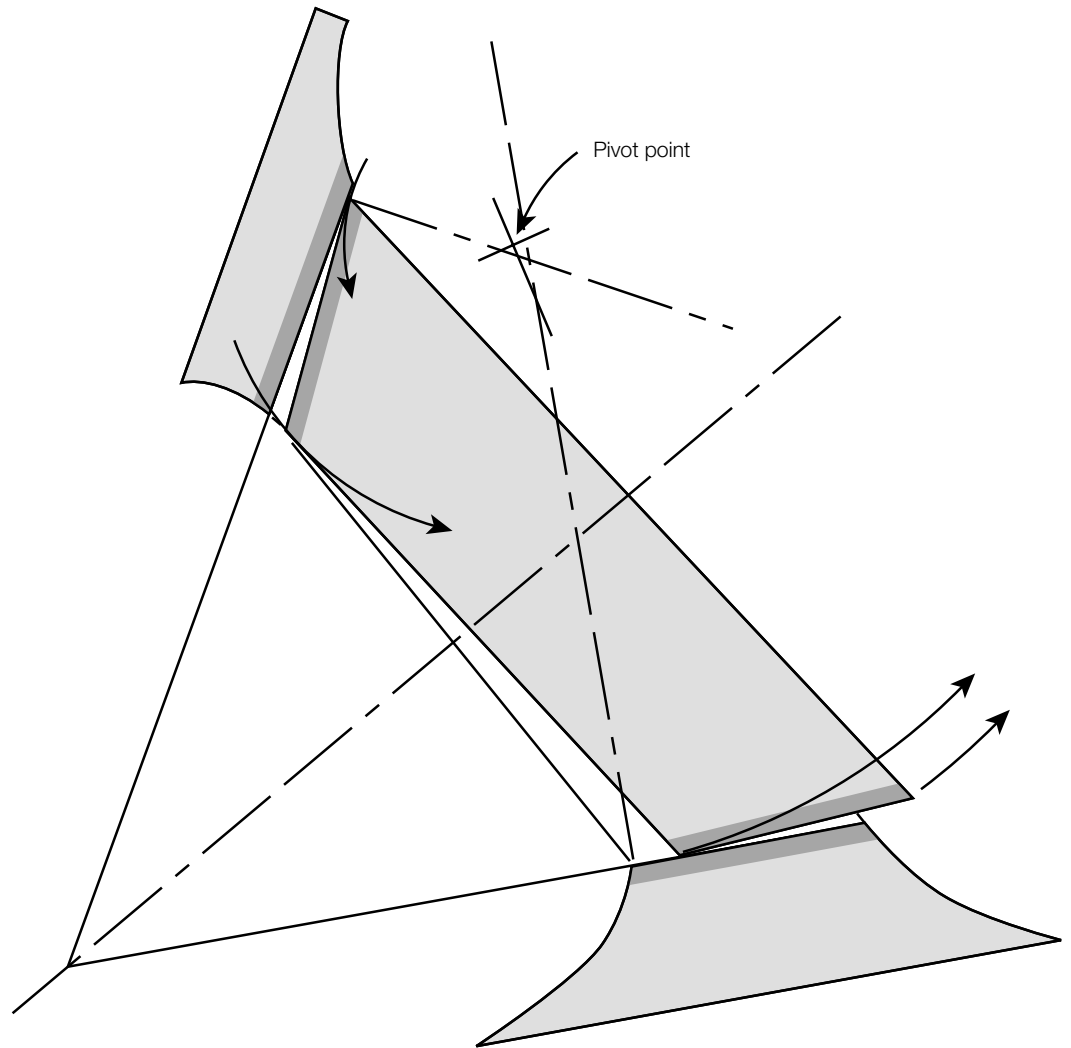
Size	A	C	M	N	Weight	Product Numbers	
						Carbon Steel WCB	Alloy Steel WC6
6 in 150 mm	20 508	36.22 920	5.76 146.3	6.63 168.3	760 lb 345 kg	B51EN150-	B51LN150-
8 in 200 mm	26 660	49.61 1260	7.63 193.7	8.63 219.1	1058 lb 480 kg	B51EN200-	B51LN200-
10 in 250 mm	33 838	53.15 1350	9.56 242.8	10.75 273	1355 lb 616 kg	B51EN250-	B51LN250-

Notes

Sizes greater than 250mm are available on application.

* Per ASME B16.10 1992

Cone in a cone



Design Features

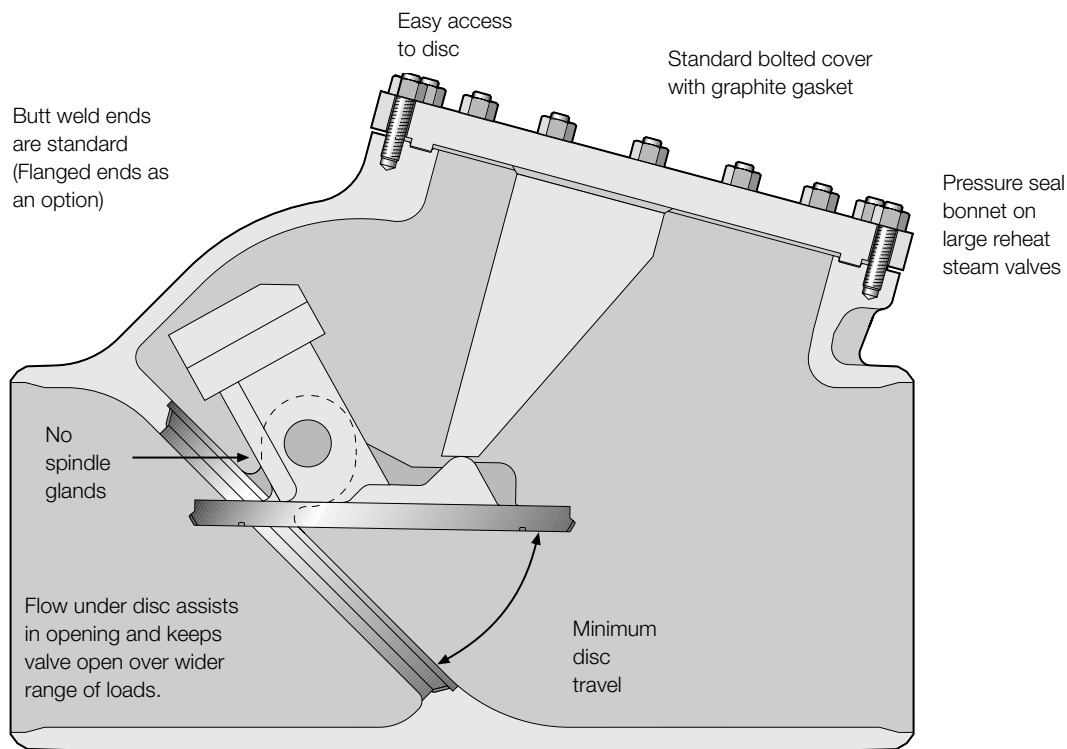
- 1 Proven cone in a cone seating geometry used on our standard Bled Steam Check Valve.
- 2 Non scuffing design ensures disc always leaves seat due to position of pivot.
- 3 Pressure intensity high enough to seal.
- 4 Dissimilar seating materials to prevent pick-up.

Check Valve Bled Steam

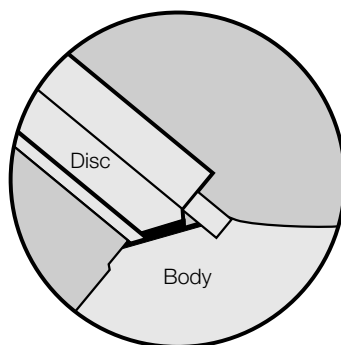
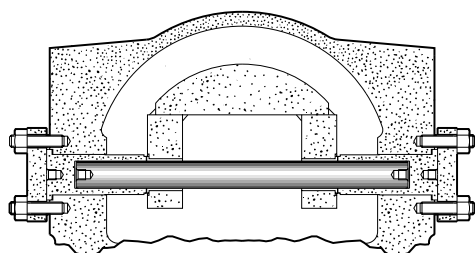
Design

Simple design for maximum reliability in operation

The disc is free to rotate on the hinge pin and the hinge pin is free to rotate on its bearings, thus ensuring freedom of movement and maximum reliability without the use of glands. Nitride treated hinge pin and bearings give hard wearing surfaces with a low coefficient of friction. Deposits on sealing surfaces are of different hardness and analysis to prevent 'scuffing'. In the full open position the valves offer a maximum flow area as will be seen from the illustrations. Standard designs close in less than one second, this time being determined by a test in still air.



Robust cast steel body to resist thrusts and moments from pipework. Reduces any tendency for valve to 'stick'.



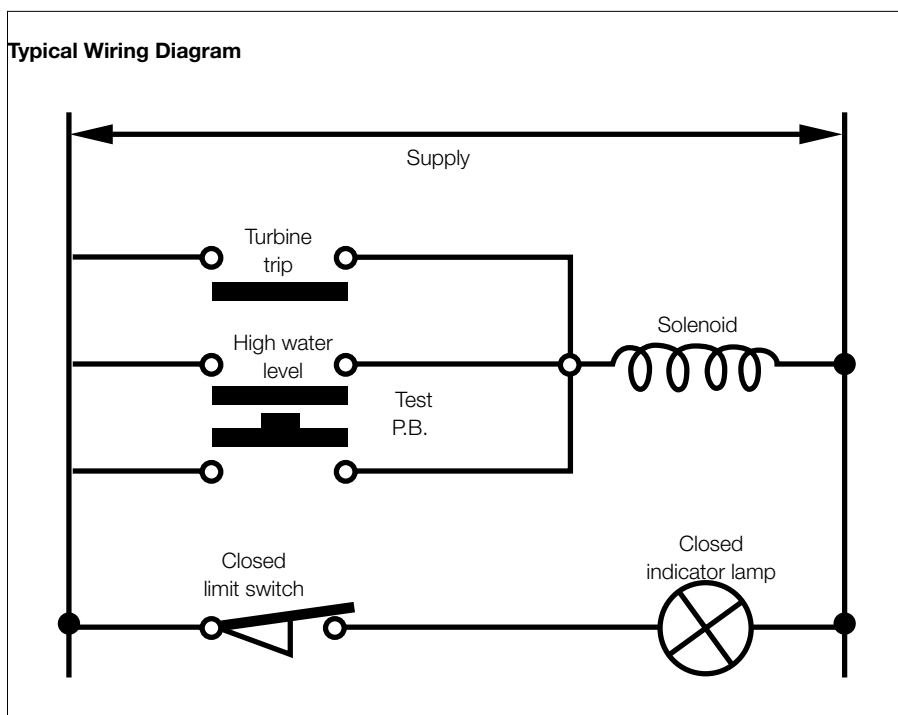
Power Closing

Where power assistance or 'power closing' is required an Air to open and Spring or Spring + air to close Pneumatic cylinder can easily be accommodated whilst still maintaining the Automatic Gravity Closing feature. Power assisted valves can close in less than half a second but is dependent on size and pressure.

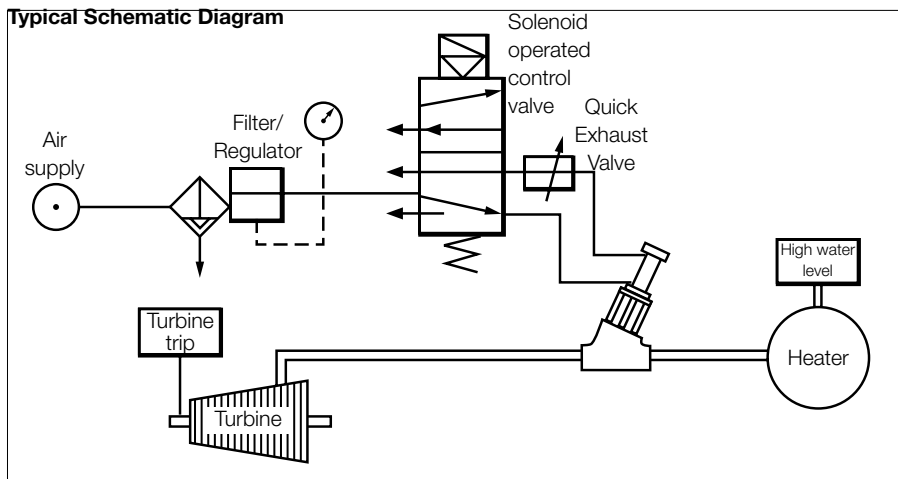
Typical Schematic and Wiring Diagram

This is a basic diagram, however, other arrangements can be supplied to suit specific requirements.

Typical Wiring Diagram



Typical Schematic Diagram



Check Valve Bled Steam

Materials of Construction

ASTM specification Ferrous

Type	Forgings						Castings				Studs		
Main use	Bonnets, Covers, Seats Discs						Valve Bodies				Covers, Glands		
ASTM Spec (UNS)	A105	A182 F22	A276 420	A182 F347	BS970 316S31	A182 F91	A216 WCB	A217 WC6	A217 WC9	ASTM A743 GR.C12A	A193 GR.B7	A193 GR.B16	A193 GR.B6
Carbon %	0.75 max	0.15 max	0.15 min	0.08 max	0.07	0.08/0.12	0.30 max	0.20 max	0.05/0.18	0.12	0.37/0.49	0.36/0.47	0.15 max
Silicon %	1.5 max	0.5 max	1.0 max	1.0 max	1.0	0.2/0.5	0.6 max	0.6 max	0.6 max	0.2/0.5	0.15/0.35	0.15/0.35	1.0 max
Mang.%	-	0.3/0.6	1.0 max	2.0 max	2.0	0.3/0.6	1.0 max	0.5/0.8	0.40/0.70	0.3/0.6	0.65/1.1	0.45/0.70	1.0 max
Chrom.%	-	2.0/2.5	12.0/14.0	17.0/20.0	16.5/18.5	8.0/9.5	*0.5 max	1.0/1.5	2.0/2.75	8.0/9.5	0.75/1.2	0.80/1.15	11.5/13.5
Molybd.%	-	0.87/1.13	-	-	2.0/2.5	0.85/1.05	*0.20max	0.45/0.65	0.90/1.2	0.85/1.05	0.15/0.25	0.50/0.65	-
Nickel %	-	-	-	9.0/13.0	10.5/13.5	0.4 max	*0.5 max	*0.5 max	*0.50 max	0.4	-	-	-
Copper	-	-	-	-	-	-	*0.3 max	0.5 max	*0.50 max	-	-	-	-
Sulphur	0.08 max	0.04 max	0.03 max	0.03 max	0.03	0.01 max	0.045 max	0.045 max	0.045 max	0.018	0.04 max	0.040 max	0.03 max
Phosp. %	0.08 max	0.04 max	0.04 max	0.045max	0.045	0.02max	0.04 max	0.04 max	0.04 max	0.02	0.035 max	0.035 max	0.04 max
Niobium %	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	75/85	-	-	-	-	-	0.03	-	-	-	-	0.25/0.35	-
Almumin.%	2.0 max	-	-	-	-	-	-	-	-	-	-	0.015 max	-
Iron %	BAL	BAL	BAL	BAL	BAL	BAL	BAL	BAL	BAL	BAL	BAL	BAL	BAL
U.T.S.ksi min	70	60		75	74	85	70	70	70	85	125	125	110
Yield ksi min	36	30		30	30	60	36	40	40	60	105	105	85

* Residual elements total 1.0% max

Ferrous

Type	Plate	Bar				Nuts		
Main use	Covers	Stems		Pillars		Covers, Glands		
ASTM Spes (UNS)	ASTM A516 GR 70	A276 S43100	ASTM A565-XM32	A108 G10200	A193 GR.B7	A194 GR.2H	A194 GR.4	A194 GR.B8
Carbon %	0.18/0.31	0.2 max	0.08/0.15	0.18/0.23	0.37/0.49	0.40min	0.4/0.5	-0.08 max
Silicon %	0.13/0.45	1.0 max	0.35 max	-	0.15/0.35	0.4 max	0.15/0.35	1.0 max
Mang.%	0.6/1.2	1.0 max	0.5/0.9	0.3/0.6	0.65/1.1	1.0 max	0.7/0.9	2.0 max
Chrom.%	-	15/17	11/12.5	-	0.75/1.20	-	-	18.0/20.0
Molybd. %	-	-	1.5/2.0	-	0.15/0.25	-	0.20/0.30	-
Nickel %	-	1.25/2.50	2.0/3.0	-	-	-	-	8.0/10.5
Copper	-	-	-	-	-	-	-	-
Sulphur	0.035 max	0.03 max	0.025 max	0.05 max	0.04 max	0.05 max	0.04 max	0.03 max
Phosp. %	0.035 max	0.04 max	0.025 max	0.04 max	0.35 max	0.04 max	0.035 max	0.045 max
Niobium %	-	-	-	-	-	-	-	-
Vanadium	-	-	0.25/0.40	-	-	-	-	-
Almumin.%	-	-	-	-	-	-	-	-
Iron %	BAL	BAL	BAL	BAL	BAL	BAL	BAL	BAL
U.T.S.ksi min	55		115		100			
Yield ksi min	30		75		75			

Non Ferrous

Type	Non Ferrous
Main use	Sleeve Gland
ASTM Spec (UNS)	B150 C63000
Almumin.%	9.0-11.0
Silicon %	0.25 max
Mang.%	1.5 max
Tin. %	0.2 max
Zinc %	0.3 max
Nickel %	4.0-5.5
Copper	BAL
Iron %	2.0-4.0
Phosp.%	-
Niobium %	-
Vanadium	-
Lead %	-
U.T.S.ksi min	94
Yield KIS MIN	46

Pressure class

21/22	-	150 Class
31/32	-	300 Class
51/52	-	600 Class
67	-	1000 Class
73	-	1690 Class
8A	-	1715 Class
83	-	2260 Class
91	-	2500 Class
95	-	2850 Class
X7	-	4500 Class

End Connection

Even number	-	Flanged
Odd number	-	Butt weld

Body material

D	ASTM A105
E	ASTM A216 Gr WCB
J	ASTM A217 Gr WC6
K	ASTM A182 Gr F22
L	ASTM A217 Gr WC9
R	ASTM A217 Gr C12A

Valve type

- A Automatic bypass valves
- B Bled steam check valve
- C
- E Leak off valve
- F Tilting disc check valve/Swing check valve
- G
- K
- L Automatic non-return valves
- M Stop valves
- N Screw down non-return valves
- P Parallel slide valves
- R Reheater Isolators
- T
- U Special products
- W Feed heater isolators
- Y Feed water heater divertor
- Z Miscellaneous

Valve operation on speciality

- A Bevel gear op. from below
- B Bevel gear op. from above
- C Chain Wheel
- D Hydraulic actuator
- E Direct mtd. Limitorque
- F Sleeve coupling
- G Bevel gear local operation
- H Local handwheel operation
- L Locking device
- M Adaptor plate
- N Pneumatic actuator
- P Spur gear op. from below
- Q Spur gear op. from above
- R Direct mounted Rotork
- T Universal joint
- U Undrilled or block ends with handwheel
- V Special
- W Power assisted
- Y Direct mtd. Auma actuator
- Z No external operator

B 1 5 E N 200 N F D A

Nominal end size (mm)
Minor design change

- N Non return
- T/P Standard flow
- S/R Venturi

Ancillary valve arrangement

- B One by-pass
- C One equalizing by-pass
- D One by-pass & one equalizing by-pass
- F No by-pass
- G Equalizing pipe
- H Vee port seat
- J One by-pass & one by-pass drain valve
- K One drain valve
- L One equalizing pipe & one drain valve
- M Vee port seat & equalizing pipe

Minor product variation
By-pass operation

- A Bevels op. from below
- B Bevels op. from above
- C Chain wheel
- D No by-pass
- E Direct mtd. Limitorque actuator
- F Sleeve coupling
- G Local op. through bevel gear
- H Local handwheel
- L Locking device
- N
- P Spur gear op. from below
- Q Spur gear op. from above
- R Direct mtd. Rotork actuator
- Y Direct mtd. Auma actuator