Oilgear Towler

Prefill & Exhaust Valves

VPE Series

Sizes 130 / 190 / 250 / 300

Innovative Fluid Power

Bulletin FV 61 09/10

Issue 1.0
09.2010

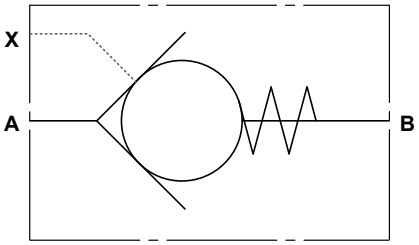
Prefilling

The valve is used to connect a cylinder to a gravity or low pressure fluid supply (tank) and allow the cylinder to be filled with fluid when the ram is being withdrawn from the cylinder by means other than the hydraulic fluid applied to the ram, and where the speed is greater than that which can be achieved by the system pump flow. After prefilling, the valve automatically closes. This prevents pump flow into the tank, so that cylinder movement can continue at a speed relevant to the pumped volume.

Exhaust

Open the valve, using the pilot piston after pressure in the cylinder has been decompressed to a level which will prevent shock, to allow large volumes of oil to be quickly returned to the tank without the need to pass through the rest of the system.

Function



All Oilgear Towler Prefill Valves are similar in design, construction and operation. Detail differences in construction are relative to the size of the valves. The valves can be simply described as consisting of three sub assemblies. The main headed valve with seat and closing spring, the pilot piston assembly with return spring and the casing. Three styles of casing are used. The styles are all face mounting for the high pressure or cylinder connection, with the low pressure connection at 90° to the centre line, in line or suitable for in tank mounting with the case directly open to the tank.

The main headed valve is fitted with a spring to return the valve to its closed position. However this spring is also designed to keep the pressure drop low in order to enable the valve to open naturally during the prefill cycle, and may not prevent flow to other or lower parts of the system from the tank.

The operating piston which is used to open the valve during return is not connected to the main poppet, and can only push the valve open. This design allows a strong spring to be fitted to the pilot piston to drive the piston back to its normal position independently of the main poppet, thus giving positive action without influencing the low pressure drop characteristics of the valve. Unlike other valves where the main valve and pilot piston are connected, the timing of this return operation is not critical as the main poppet can remain naturally open when the piston is retracted.

Some valves can be fitted with a proximity switch to indicate that the valve is closed. The switch is locked in a removable housing which can be turned to provide small final position signal settings. The switch can only be set to operate prior to closing position to ensure a positive signal and is therefore not an absolute true indication of valve closed.

To suit individual requirements, valves can be mounted in a customers' special housing or press head

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Valve Size			130	190	250	300
Max. Flow Prefilling (Tank to Cylinder). L/min, CB,CL			3400	7500	11900	20000
Max. Flow Prefilling (Tank to Cylinder). L/min, CT			4500	10000	16000	26000
Max. Flow Exhaust (Cylinder to Tank). L/min, CB,CL			7500	17600	30500	45000
Max. Flow Exhaust (Cylinder to Tank). L/min, CT			9000	20000	32000	52000
Maximum Pressure	**Cylinder, *Bar***		500	500	500	500
	Tank Standard Valve, *Bar*		3.5 *	3.5 *	3.5 *	3.5 *
	Pilot Connection, *Bar*		500	500	500	500
Pressure Required to Open Valve (*P* = Cylinder Pressure), Bar			6*P* + 6.2 + Tank	6*P* + 4 + Tank	7.8*P* + 5 + Tank	10.3*P* + 5 + Tank
Ratio, Main Valve to Pilot Piston			6:1	6:1	7.8:1	10.3:1
Volume, Pilot Piston Full Stroke, cm^3			97.5	226	506	506
Fluid	**Viscosity**	1 to 200 cSt				
	Mineral Oil	ISO 6743/4 Type HM or HV				
	Fire Resistant Fluids	*HFDR*	Phosphate Ester			
		HFC	Water Glycol			
		HFAt	High Water Based, Thickened Nominally, 46 cSt			
		HFAs	98% or 95% Water, Oilgear Towler manufacture a complete range of equipment to handle these fluids. Some may need special materials. Consult Oilgear Towler for information			
	Cleanliness	Filters should be provided in the system to maintain the fluid cleaner than ISO 4406 Code 18/13/11 (NAS 1638 7)				
Electrical Switch		Voltage 24 to 250 AC, or DC 4 Amp Rating				

* Tank Standard Valve, Maximum Pressure = 15 Bar when selected with High Pressure Casing, Code Variation CP.

Size	Approximate Weight, *kg*			
	CB / CP	**CT**	**CL**	**CC**
130	115	90	125	23
190	235	205	225	45
250	410	365	445	90
300	790	770	825	294

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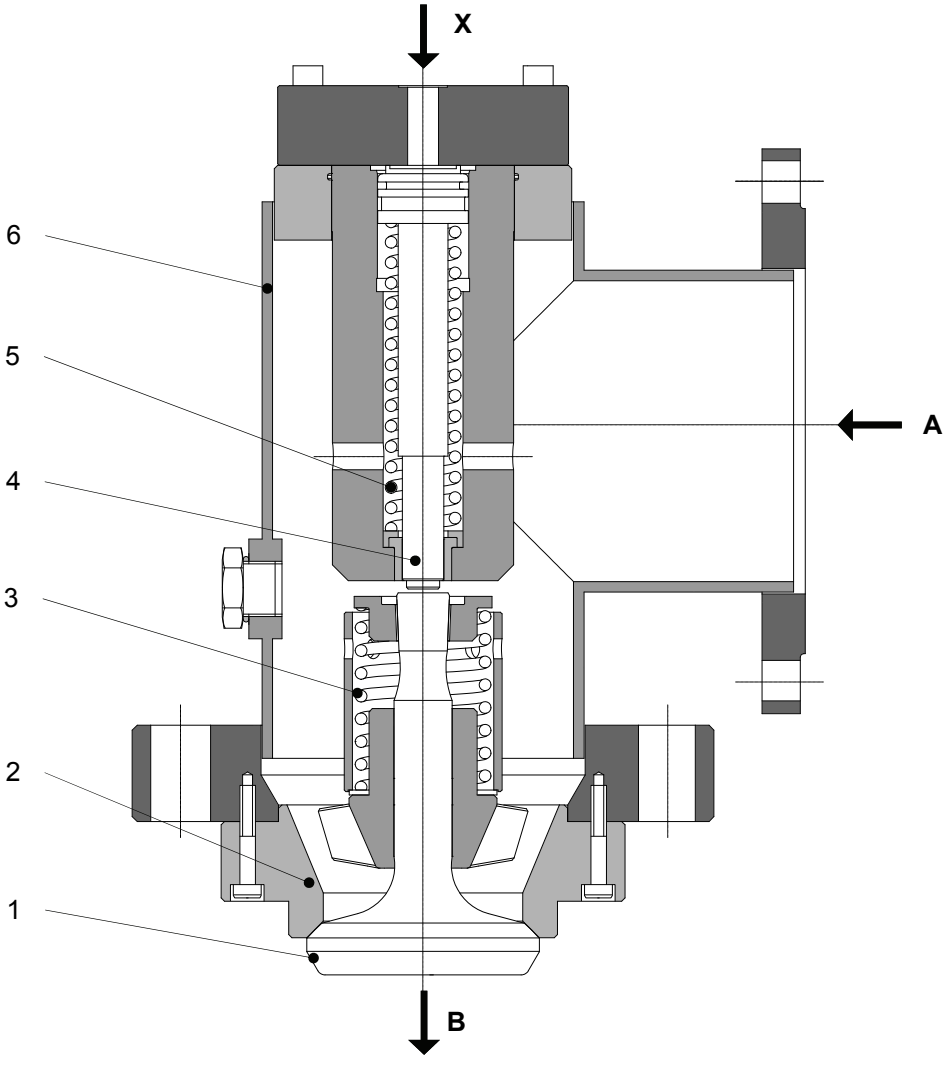
The valve consists of: Main Valve (1), Seat (2), Main Spring (3), Pilot Piston (4), Pilot Spring (5) and Case (6).

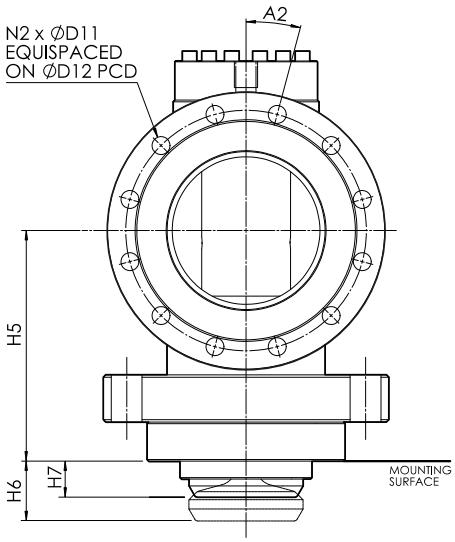
Prefilling

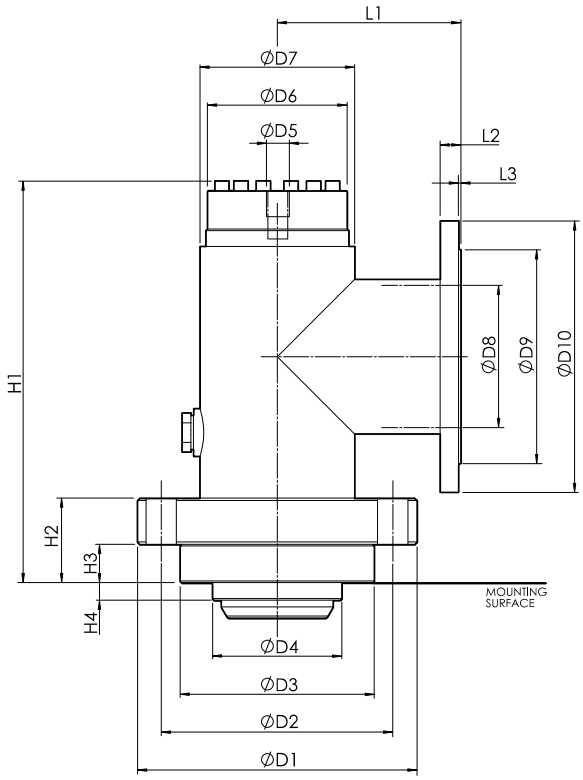
When the pressure at Port B falls to create a differential across the valve (from Port A to Port B) which is sufficient to overcome the force in the Main Spring (3), the Main Valve (1) will open allowing free flow from Port A to Port B.

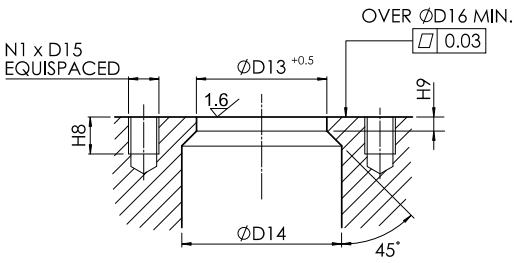
Exhausting

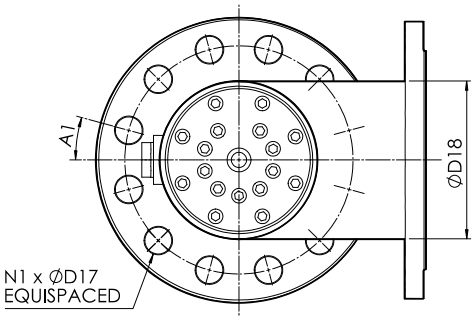
The pressure acting on Port B holds the Main Valve (1) on the Seat (2), keeping the valve closed. To allow flow in the return direction (from Port A to Port B) the pressure at Port B must first be decompressed to a level which will not cause shocks in the system. Pressure can then be applied to Port X, the Pilot Piston (4) is then forced down compressing the Pilot Spring (5) and opening the Main Valve (1), allowing exhaust flow from Port B to Port A.











Size	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17
130	350	280	243	162	½" BSP	185	194	181	268	340	22	295	162	200	M30	245	33
190	490	400	350	240	½" BSP	220	273	225	320	405	26	355	240	270	M45	355	48
250	610	510	455	285	¾" BSP	240	324	304	378	460	26	410	285	345	M48	460	52
300	700	585	520	362	¾" BSP	260	407	381	490	580	30	525	362	440	M56	525	60

Size	D18	A1	A2	H1	H2	H3	H4	H5	H6	H7	H8	H9	L1	L2	L3	N1	N2
130	194	15°	15°	503	106	48	22	283	85	45	45	20	230	26	3	12	12
190	245	15°	15°	658	134	50	16	375	92	42	70	16	293	29	3	12	12
250	324	11.25°	15°	750	195	75	20	485	127	52	75	20	375	32	4	16	12
300	407	11.25°	11.25°	903	235	95	38	580	161	81	85	38	405	38	4	16	16

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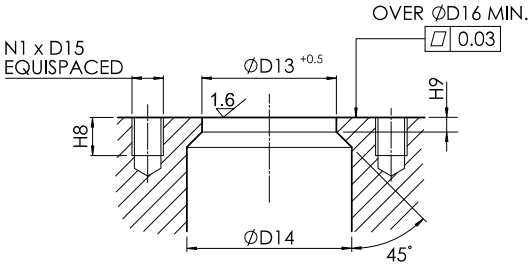

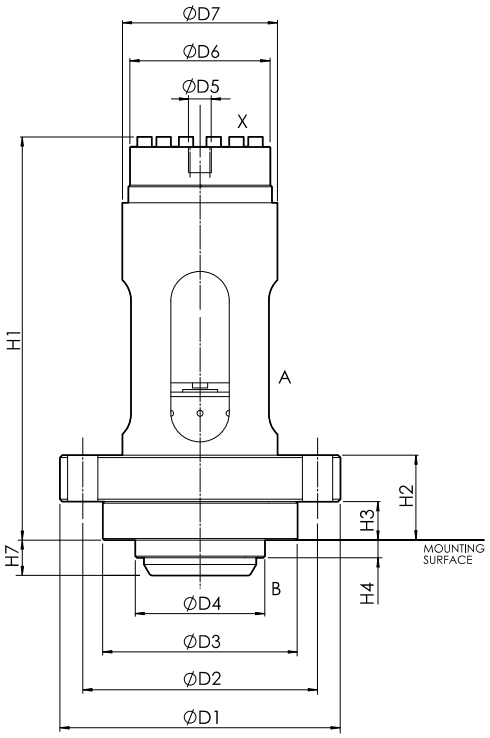

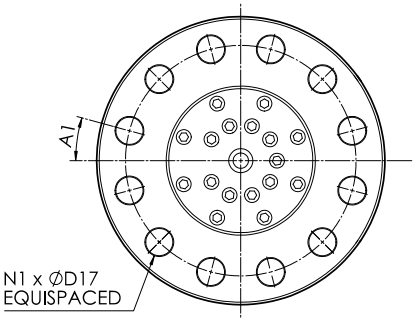

Size	D1	D2	D3	D4	D5	D6	D7	D13	D14	D15	D16	D17
130	350	280	243	162	½" BSP	185	194	162	200	M30	245	33
190	490	400	350	240	½" BSP	220	273	240	270	M45	355	48
250	610	510	455	285	¾" BSP	240	324	285	345	M48	460	52
300	700	585	520	362	¾" BSP	260	407	362	440	M56	525	60

Size	A1	H1	H2	H3	H4	H7	H8	H9	N1
130	15°	503	106	48	22	45	45	20	12
190	15°	658	134	50	16	42	70	16	12
250	11.25°	750	195	75	20	52	75	20	16
300	11.25°	903	235	95	38	81	85	38	16

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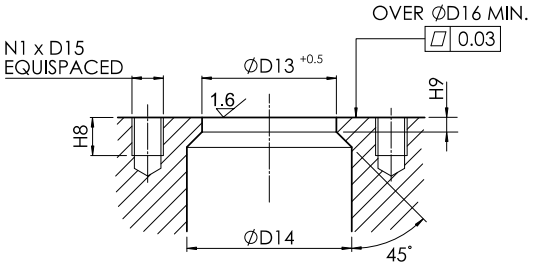

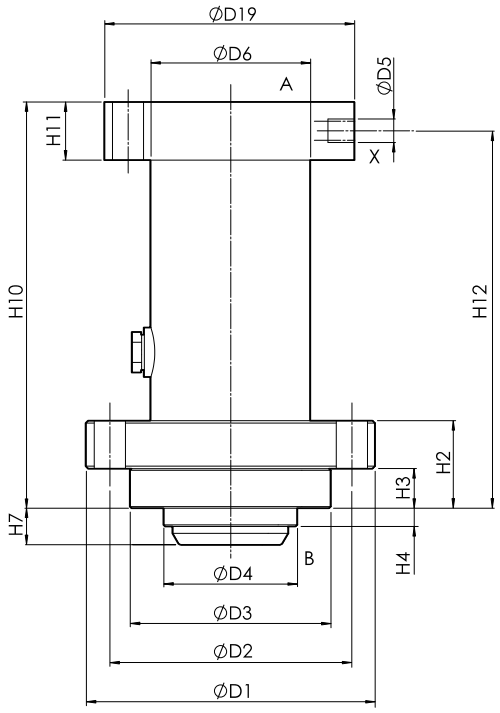

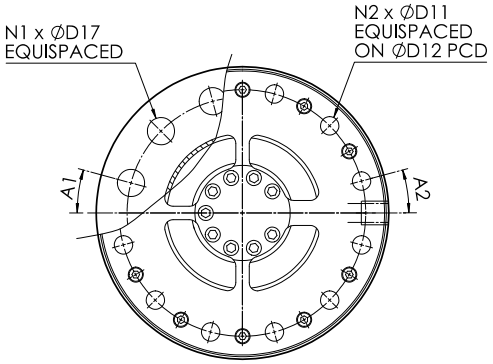

Size	D1	D2	D3	D4	D5	D6	D11	D12	D13	D14	D15	D16	D17	D19
130	350	280	243	162	½" BSP	185	22	295	162	200	M30	245	33	340
190	490	400	350	240	½" BSP	220	26	355	240	270	M45	355	48	405
250	610	510	455	285	¾" BSP	240	26	410	285	345	M48	460	52	460
300	700	585	520	362	¾" BSP	260	30	525	362	440	M56	525	60	580

Size	A1	A2	H2	H3	H4	H7	H8	H9	H10	H11	H12	N1	N2
130	15°	15°	106	48	22	45	45	20	493	85	463	12	12
190	15°	15°	134	50	16	42	70	16	649	110	614	12	12
250	11.25°	15°	195	75	20	52	75	20	750	130	705	16	12
300	11.25°	11.25°	235	95	38	81	85	38	895	130	850	16	16

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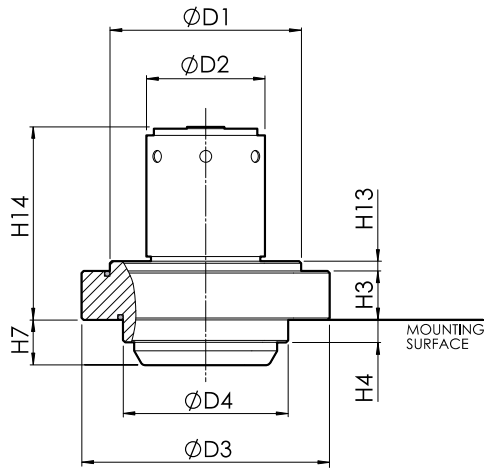

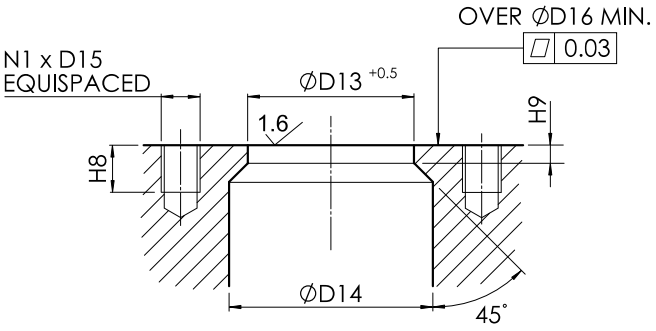

Size	D3	D4	D13	D14	D15	D16	D20	D21
130	243	162	162	200	M30	245	95	174
190	350	240	240	270	M45	355	114	240
250	455	285	285	345	M48	460	114	285
300	520	362	362	440	M56	525	140	362

Size	H3	H4	H7	H8	H9	H13	H14	N1
130	48	22	45	45	20	38	186	12
190	50	16	42	70	16	25	295	12
250	75	20	52	75	20	20	336	16
300	95	38	81	85	38	15	469	16

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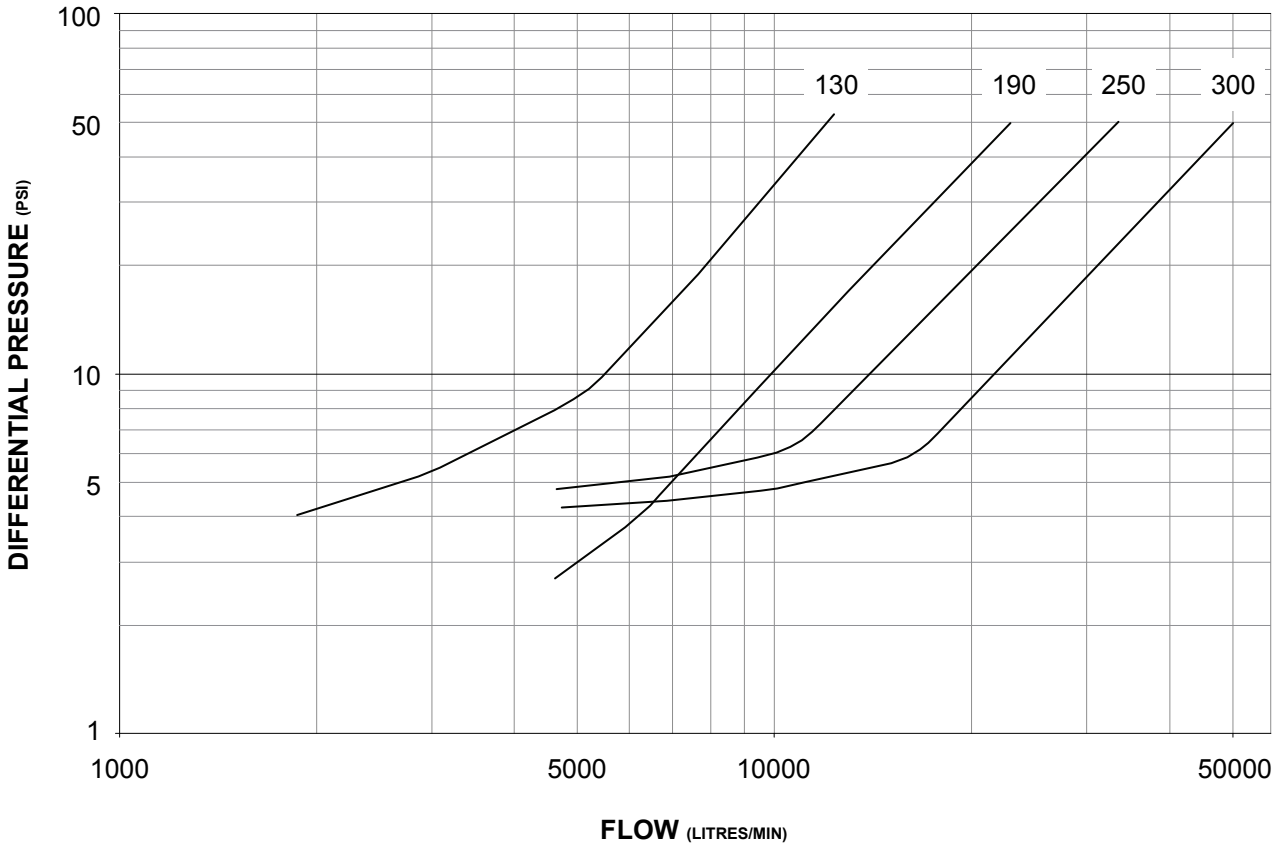
Pressure/Flow Curve
Type VPE - CB

Flow A to B, Mounted Horizontally
The values of flow and pressure are for an oil with viscosity 40 cSt at 40°C



V	P	•	•	•	•	-	50	•	•	•	HK	•	M	•	A1
1	2	3	4	5	6		7	8	9	10	11	12	13	14	15

1 Unit

V Valve

2 Basic Form

P Prefill

3 Valve Type

E Prefill & Exhaust

P Prefill Only

4 Variation

CB 90° Bend

CL Line

CT Tank

CC Check Valve (Not Available with Exhaust)

CP High Pressure Case (15 Bar)

5 Nominal Size

130 130 mm

190 190 mm

250 250 mm

300 300 mm

6 Mounting

B Sizes 130 & 300

C Sizes 190 & 250

N All Sizes (With Check Valve Only)

7 Max Working Pressure

50 500 Bar

8 Exhaust Flange

A For Variation CB, CP and CL

N For Variation CT and CC

9 Exhaust Mating Flange

M With Mating Flange and Fasteners (BS 4504 PN)

N Without Mating Flange

10 Pilot Connection

B For Use with Prefill & Exhaust (BSP Parallel Thread)

N For Use with Prefill Only

11 Ratio & Spring

HK Assigned by Factory

12 Additions

P Proximity Switch

N None

13 Dimensions

M Metric

14 Seals

B Buna N

E EPDM

V Viton

15 Design Series

A1 Assigned by Factory

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