



Prefill & Exhaust Valves

VPE Series Sizes 350 / 400 / 450

Innovative Fluid Power

Bulletin FV 62 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to a gravity or low pressure fluid supply (tank) and allow the cylinder to be filled with fluid when the ram is being withdrawn from the cylinder by means other than the hydraulic fluid applied to the ram, and where the speed is greater than that which can be achieved by the system pump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 and the casing with the low pressure connection at 90° to the centre line.

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. These large valves have a two-way hydraulically operated pilot actuator as a spring return becomes impractical in these sizes. The pilot piston can be driven 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 pilot 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	350	400	450			
Max. Flow Prefilling	ng (Tank to Cylinder)	. L/min, 90° Bend	26000	34000	37000			
Max. Flow Exhaus	Max. Flow Exhaust (Cylinder to Cylinder). L/min, 90° Bend			85000	100000			
	Cylinder, <i>Bar</i>		350	350	350			
Maximum Pressure	Tank Standard Va	llve, <i>Bar</i>	3.5	3.5	3.5			
	Pilot Connection,	Bar	350	350	350			
Minimum Operati	ng Pressure Port 'X',	Bar	10	10	10			
Pressure Require (<i>P</i> = Cylinder Pres	d to Open Valve ssure), Bar		11 <i>P</i> + 5	11 <i>P</i> + 5	11 <i>P</i> + 5			
Ratio, Main Valve (Port 'X' at Pressu	to Pilot Piston ure 'Y' = 0)		11:1	11:1	11:1			
Volume, Port 'X',	cm³		785	1195	1860			
Volume, Port 'Y', cm ³			454	687	968			
	Viscocity	1 to 200 cSt						
	Mineral Oil	ISO 6743/4 Type HM o	r HV					
		HFDR	Phosphate Ester					
		HFC	Water Glycol					
Fluid	Fire Resistant	HFAt	High Water Based, T	hickened Nominally, 4	6 cSt			
	Fluids	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 provid ISO 4406 Code 18/13/1	ded in the system to maintain the fluid cleaner than 11 (NAS 1638 7)					
Electrical Switch Voltage 24 to 250 AC			or DC 4 Amp Rating					

Size	Approximate Weight, kg					
5120	СВ	сс				
350	880	125				
400	1278	815				
450	1885	1164				



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

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, opening the Main Valve (1), allowing exhaust flow from Port B to Port A.



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Size	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
350	780	670	555	430	25	200	480	386	490	580	30	525	430
400	895	765	635	490	32	205	540	437	550	640	30	585	490
450	980	850	715	550	45	230	610	488	610	715	33	650	550

Size	D14	D15	D16	D17	D18	D23	D24	A1	A2	H1	H2	H3	H4
350	520	M56	785	61	406	260	25	10°	11.25°	1140	220	150	35
400	595	M64	900	70	457	285	25	10°	9°	1260	255	175	40
450	675	M64	985	70	508	310	32	9°	9°	1400	300	210	40

Size	H5	H6	H7	H8	H9	H15	H16	L1	L2	L3	N1	N2
350	560	193	88	85	40	874	586	480	38	4	18	16
400	630	220	100	100	50	980	659	540	42	4	18	20
450	690	250	105	100	50	1075	783	610	46	4	20	20

ALL DIMENSIONS IN MM

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Size	Port X SAE Code 62 (600 PSI)	Port Y SAE Code 62 (6000 PSI)
350	1"	1"
400	1 ¼ "	1"
450	2"	1 ¼ "



Port Size	А	В	D1	D2	т
1"	57.15	27.76	25	M12	22
1 ¼ "	66.68	31.75	32	M14	22
2"	96.82	44.45	45	M20	32

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Size	D1	D2	D4	D13	D14	D15	D16	D17	D20
350	780	670	430	430	520	M56	785	61	170
400	895	765	490	490	595	M64	900	70	194
450	980	850	550	550	675	M64	985	70	229
		•						·	•
Size	D21	H3	H4	H7	H8	H9	H13	H14	N1
350	455	150	35	88	85	40	20	595	18
400	510	175	40	100	100	50	25	670	18
450	580	210	40	105	100	50	20	795	20

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FLOW (LITRES/MIN)

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V	Р	•	•	•	•	-	35	•	•	•	ΗK	•	М	•	A1
1	2	3	4	5	6		7	8	9	10	11	12	13	14	15

	1	Unit
-	v	Valve
-	1	
	2	Basic Form
	Ρ	Prefill
-		
	3	Valve Type
	Е	Prefill & Exhaust
	Ρ	Prefill Only
_		
	4	Variation
(СВ	90° Bend
(СС	Check Valve (Not Available with Exhaust)
Г		
	5	Nominal Size
3	350	350 mm
4	400	400 mm
4	450	450 mm
_		
	6	Mounting
	6 B	Mounting With 90° Bend only
	6 B N	Mounting With 90° Bend only With Check Valve only
	6 B N	Mounting With 90° Bend only With Check Valve only
	6 B N 7	Mounting With 90° Bend only With Check Valve only Max Working Pressure
	6 B N 7 35	MountingWith 90° Bend onlyWith Check Valve onlyMax Working Pressure350 Bar
	6 B N 7 35	MountingWith 90° Bend onlyWith Check Valve onlyMax Working Pressure350 Bar
	6 B N 7 35	MountingWith 90° Bend onlyWith Check Valve onlyMax Working Pressure350 Bar

8	Exhaust Flange
Α	With 90° Bend only
Ν	With Check Valve only
9	Exhaust Mating Flange
М	With Mating Flange and Fasteners (BS 4504 PN)
Ν	Without Mating Flange
10	Pilot Connection
F	For Use with Prefill & Exhaust (BSP Parallel Thread)
Ν	For Use with Prefill Only
11	Ratio & Spring
ΗK	Assigned by Factory
12	Additions
Ρ	Proximity Switch
Ν	None
13	Dimensions
М	Metric
14	Seals
в	Buna N
Е	EPDM
v	Viton
15	Design Series

A1 Assigned by Factory

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