

Pressure Powered Pumps Package Unit

Description :

Pressure Powered Pump Package Unit is a positive displacement pump unit operated by steam, compressed air or pressurised gas. The unit is specifically designed to pump hot condensate and liquids of specific gravity 1.0 down to 0.9

Sizes & Pipe Connections :

SIZE : 40,50 & 80 NB PPPPU

MODEL	COND. INLET(NB)	COND. OUTLET(NB)	VENT (NB)
40PPPPU	50	40	50
50PPPPU	50	50	50
80PPPPU	80	80	80

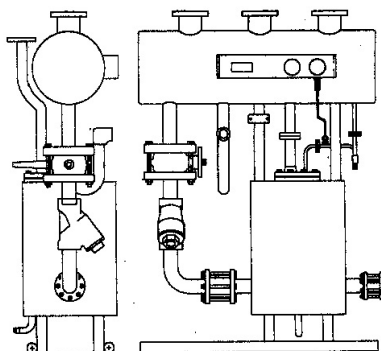
Condensate Inlet, Vent Flanged to BS 10 TAB 'E'
Condensate Outlet, use Flange provided with PPPPU

Limiting Conditions :

Body design - 8.7 bar (g) at 220 Deg. C.
Operating inlet motive pressure steam, compressed air or Pressurised gas 0.34 to 8.7 bar (g).
Pump Discharge per cycle - 30.0 Ltr.
Steam consumption : 3 kgs. of steam per 1000 kg. liquid pumped.
Air Consumption : 220 SCF per 1000 kg liquid pumped.

Standard Accessory :

Condensate flow meter (CFM1).
Insulation Jacket



7.1

How to specify :

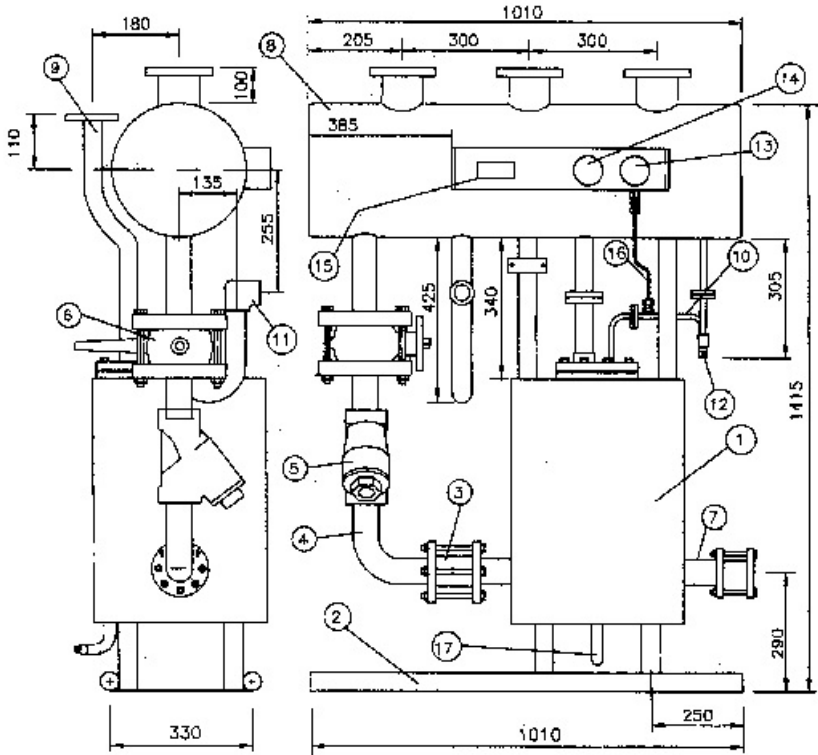
Example : 40 NB SPIRAX MARSHALL PRESSURE POWERED PUMP PACKAGE UNIT.

Available Spares :

Set of Internals
Gasket Kit (pkt. of 5)
Inlet Valve Kit
Exhaust Valve Kit
Float Assly.
Spring Assly. (pkt. of 2)

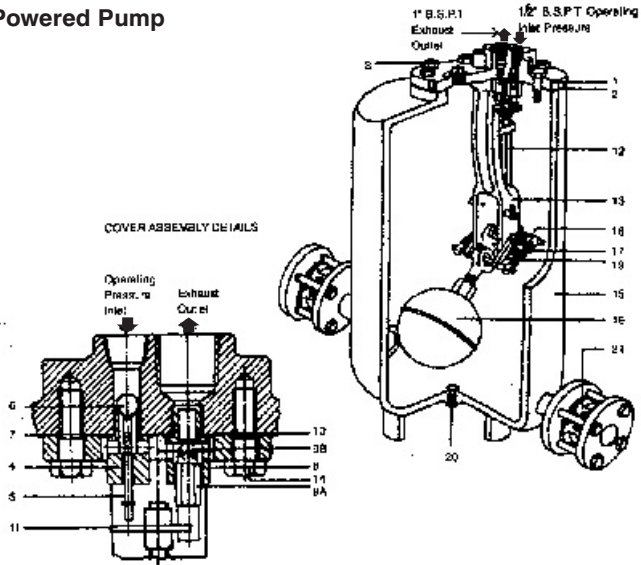
How to Order :

Always order spares by using the description given in the column headed Available Spares of User Manual for this product.



SR. NO.	DESCRIPTION	SIZE	MATERIAL	STANDARD	SR. NO.	DESCRIPTION	SIZE	MATERIAL	STANDARD
1	PRESSURE POWERED PUMP	ALL	REF ATT FIG.	-	9	EXHAUST LINE 25 NB	ALL	M.S.	IS 1239 CLASS C
2	FRAME ASSLY	ALL	M.S.	IS 2062 IS 1239 CLASS C	10	STEAM INLET LINE TO PUMP 15 NB	ALL	M.S.	IS 1239 CLASS C
3	DISC CHECK VALVE	ALL	S.S.	-	11	OVER FLOW LINE 40 NB	ALL	M.S.	IS 1239 CLASS C
4	CONDENSATE INLET LINE	ALL	M.S.	IS 1239 CLASS C	12	TD-21 TRAP	ALL	S.S.	S.S.
5	FIG 12 STRAINER	40 & 50	C.I.	IS 210 FG 260	13	PR. GAUGE	ALL	-	-
	FIG 32 STRAINER	80	C.I.	IS 210 FG 260	14	TEMP GAUGE	ALL	-	-
6	BUTTERFLY VALE	40, 50 & 80	C.I., S.S.	-	15	NAME PLATE	ALL	S.S. 304	ASTM A 240
7	CONDENSATE RETURN LINE	ALL	M.S.	IS 1239 CLASS C	16	PR. GAUGE CONNECTING PIPE	ALL	S.S. 304	ASTM A 213
8	RECEIVER	ALL	M.S.	IS 1239 CLASS C	17	DRAIN 15 NB	ALL	C.S.	IS 1239 CLASS C

Pressure Powered Pump



Material :

SR. NO.	DESCRIPTION	MATERIAL	STANDARD	SR. NO.	DESCRIPTION	MATERIAL	STANDARD
1	COVER	C.I.	IS 210	12	PUSH ROD	S. S. TYPE 304	ASTM A 276
2	COVER GASKET	ASBESTOS FREE SYNTHETIC FIBRE	--	13	MECHANISM YOKE	C. I.	IS 210 FG 260
3	STUD & NUT M-12	C.S.	--	14	MECHANISM SCREWS, M - 12	S. S. TYPE 304	IS 1364
4	INLET & VALVE SEAT	S. S. TYPE 304	ASTM A 276	15	BODY	C. S.	IS 2062
5	INLET & VALVE STEM	S. S. TYPE 304	ASTM A 276	16	FLOAT	S. S. TYPE 304	ASTM A 240
6	INLET VALVE HEAD	S.S.	--	17	LINKAGE MECHANISM	S. S. TYPE 304	ASTM A 351 CF8
7	INLET SEAT GASKET	Cu	--	18	PUSH ROD ACTUATOR	S. S. TYPE 304	ASTM A 351 CF8
8	EXHAUST SEAT	S. S. TYPE 304	ASTM A 276	19	SPRING	S.S.	--
9(A)	EXHAUST VALVE	S. S. TYPE 304	ASTM A 276	20	PLUG 1/2" BSPT	C.S.	ASTM A 105
9(B)	EXHAUST VALVE HEAD	S. S. TYPE 304	ASTM A 276	21	DISC CHECK VALVE	S.S.	--
10	EXHAUST SEAT GASKET	Cu	--				
11	VALVE ACCTUATOR DISC	S. S. TYPE 304	ASTM A 276				

How to select and size :

From the inlet pressure, back pressure and filling head conditions given below :

Select the pump size which meets the capacity requirements of the application. Select optional extras as required. Back pressure is the lift height (H in mtr x 0.1 plus bar (g) in return line plus downstream piping friction pressure drop in bar (g) at the lesser of six times the actual flow rate or 340 litre/minute.

Capacity kg/hr.

When installed with recommended filling head above top of pump :- 305 mm. For liquid specific gravity (0.9 to 1)

SR. NO.	OPERATING INLET PR. BAR	TOTAL LIFT OR BACK PR. BACK	PUMP SIZE		
			40 NB	50 NB	80X50 NB
1	8.7	1.0	2130	3040	5125
2	8.7	2.8	2040	2860	4810
3	8.7	4.2	1770	2720	4625
4	7.0	1.0	2085	2995	5080
5	7.0	2.8	1905	2765	4720
6	7.0	4.2	1635	2630	4490
7	5.25	1.0	1905	2995	5080
8	5.25	2.8	1725	2630	4445
9	5.25	4.2	1540	2270	3855
10	3.5	0.7	1815	2905	5000
11	3.5	1.75	1680	2630	4445
12	3.5	2.8	1450	2175	3720
13	1.75	0.35	1905	2765	4720
14	1.75	0.7	1770	2540	4355
15	1.75	1.0	1495	2315	3945
16	0.7	0.14	1495	2315	3945
17	0.7	0.35	1315	1860	3175
18	0.35	0.14	1225	1725	2810

Example :

Condensate Load..... 1600 kg/hr.
 Steam/Air Pressure available for operating pump...5.25 Bar
 Vertical Lift from Pump to return piping 9 m
 Pressure in return Piping (piping friction negligible)... 1.72 Bar
 Filling head on Pump..... 0.3048 mtr.

Solution :

- Calculate "h", the total lift or back pressure against which the condensate must be pumped.
 $= (9m \times 0.1) + 1.72$
 $= 2.62 \text{ Bar}$
- From capacity table with 5.25 Bar Operating Inlet Pressure and 2.8 Bar Back Pressure, choose a 40 NB pump which has a capacity of 1725 kg/hr.

Note from capacity factor charts :

- A Pump capacity if filling head is 0.610 mtr.
 $= 1.2 \times 1725 = 2070 \text{ kg/hr}$
 B Pump capacity using compressed air
 $(\% \text{ BP} / \text{MP} = 2.62 / 5.2) =$
 $= 50\%$
 $1.12 \times 1725 = 1932 \text{ kg/hr.}$

Capacity multiplying Factors for other filling heads :

FILLING HEAD MM	40 NB	50 NB	80 x 50 NB
152	0.7	0.7	0.84
305	1.0	1.0	1.0
610	1.2	1.2	1.08
914	1.35	1.35	1.20

Capacity multiplying Factors for motive gas supplies (other than steam)

% BACK PRESSURE VS. MOTIVE PRESSURE (BP / MP) :-

10%	20%	30%	40%	50%	60%	70%	80%	90%
1.04	1.06	1.08	1.10	1.12	1.15	1.18	1.23	1.28

CAPACITY MULTIPLYING FACTORS

Inlet Reservoir Piping

When draining a single piece of equipment and receiver is not supplied ahead of pump, sufficient piping as given in the table below and use 305 mm minimum filling head. This will prevent any flooding of equipment while pump is discharging. Sufficient reservoir volume is needed above the filling head level to accept the condensate reaching the pump during the discharge stroke. The receiver can be a length of pipe of large diameter or a tank.

Pipe Lengths in mm. above top of pump, when receiver is not installed

LIQUID LOAD KG/HR	PIPE SIZE					
	25 NB 1"	40 NB 1 1/2"	50 NB 2"	80 NB 3"	100 NB 4"	150 NB 5"
225 OR LESS	1220	610	-	-	-	-
450	2440	915	610	-	-	-
680	3353	1524	915	-	-	-
987	4572	1830	1220	610	-	-
1360	-	3050	1830	915	-	-
1814	-	3658	2440	1067	-	-
2268	-	-	3350	1372	610	-
2721	-	-	-	1677	762	-
3175	-	-	-	1830	1067	-
3629	-	-	-	2134	1220	-
4882	-	-	-	2440	1372	610
4536	-	-	-	2743	1524	670
4989	-	-	-	3050	1677	731

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