

PPPPU-C

Compact Pressure Powered Pump Package Unit with IJ and CRM485R

Description

The Forbes Marshall Compact Pressure Powered Pump Package Unit, PPPPU-C, is a positive displacement pump unit operated by steam, compressed air or pressurised gas. The compact pump has an in-built receiver for condensate, which eliminates the need for a separate storage tank. The size enables this pump to be used with individual equipment also. The pump is specifically designed to pump hot condensate.

Size and Pipe Connections

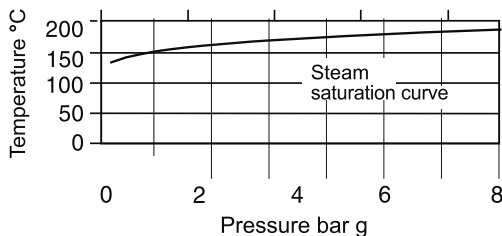
| Pump Size (DN) | Condensate Inlet connection (DN) | Condensate Outlet connection (DN) | Vent Conn. (DN) Class 150 | Empty Wt. (kg) |
|----------------|----------------------------------|-----------------------------------|---------------------------|----------------|
| 20 | 20 Class 150 | 25 Class 150 | 50 | 110 |
| 25 | 25 Class 150 | 40 Class 150 | 80 | 135 |

Limiting Conditions

| | |
|-----------------------------------|--|
| PMO Maximum operating pressure | 8.7 bar g |
| TMO Maximum operating temperature | 220°C |
| Operating inlet motive pressure | Steam / Compressed Air / Pressurised gas 3 to 7 bar g (max) |
| Pump discharge per cycle | 30 kg |
| Steam consumption | 3 Kg of steam per 1000 Kg condensate pumped |
| Air consumption | 22 SCF per 1000 Kg condensate pumped |
| Minimum operating temperature | 0°C |

Note: Receiver not to be pressurised .

Operating Range



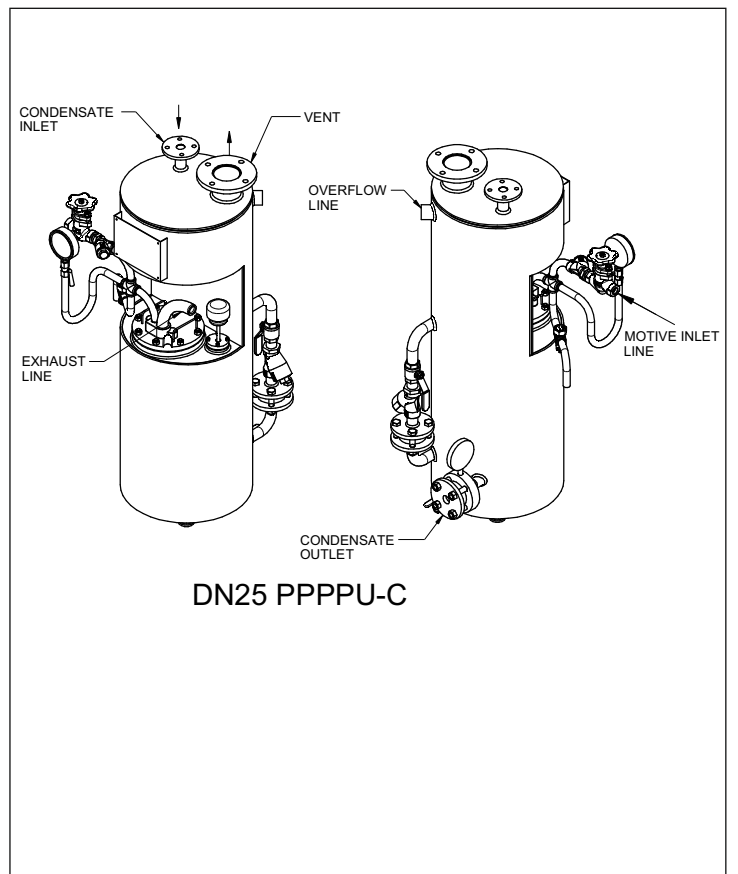
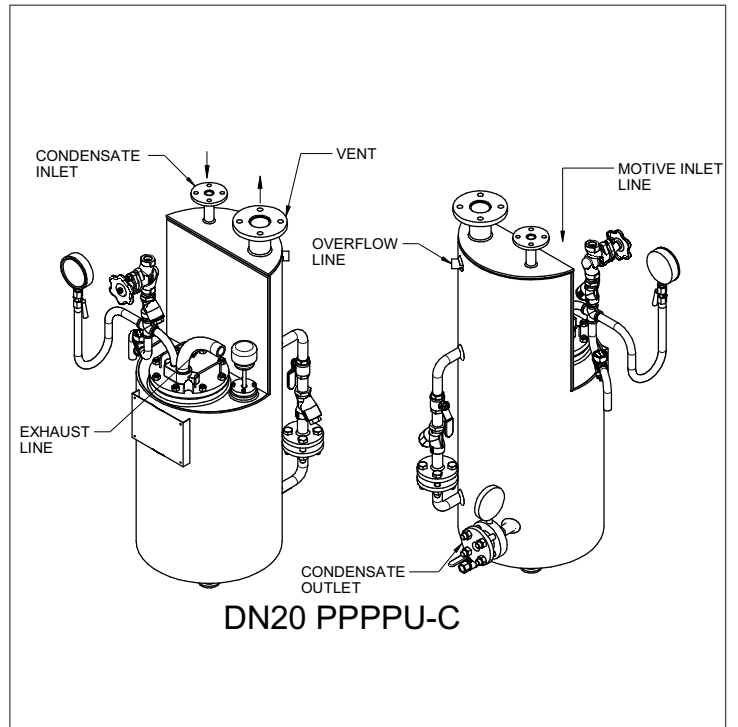
How to Order

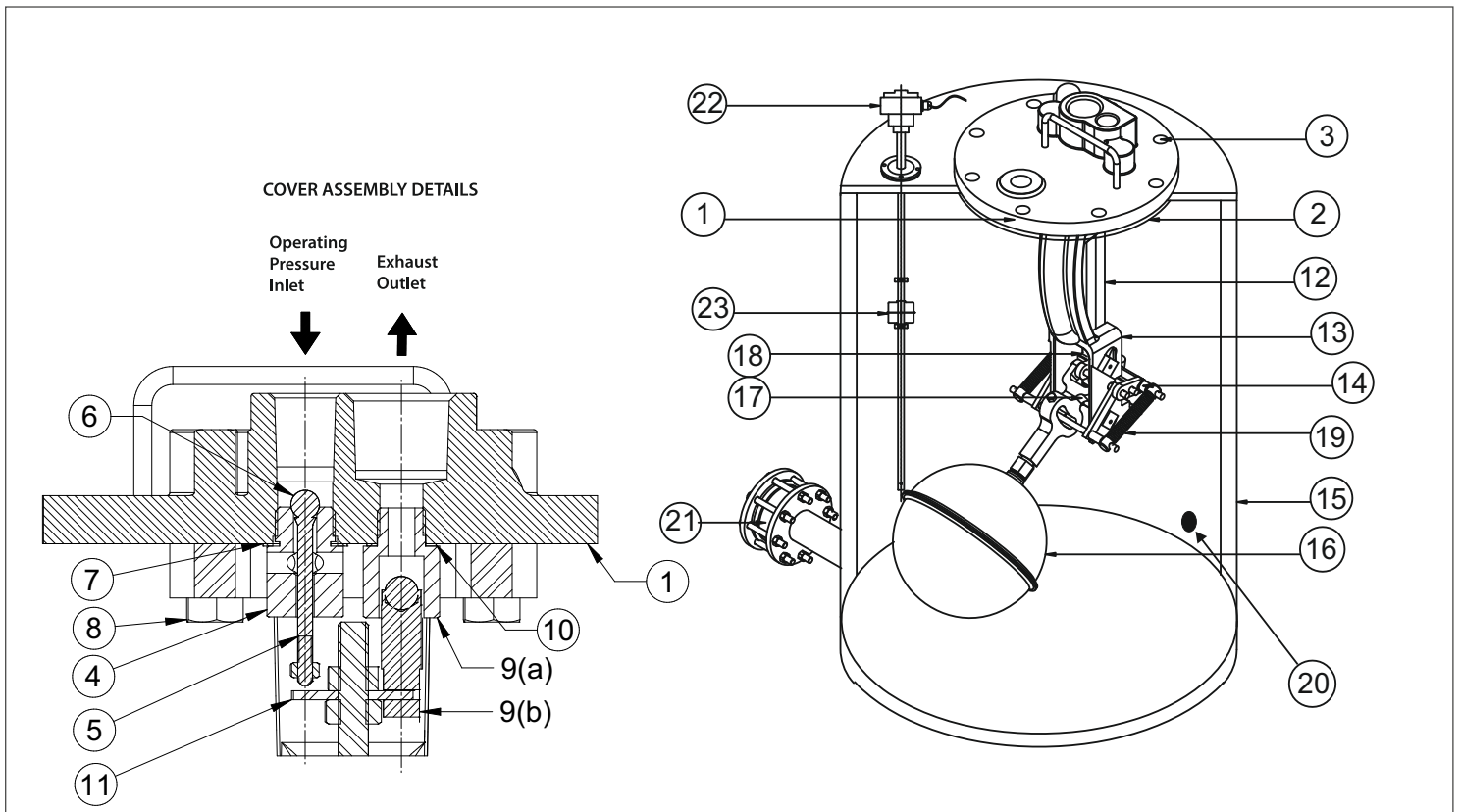
Example : DN 20 Compact Pressure Powered Pump Package Unit PPPPU-C

Standard Accessories

- Condensate recovery meter - 485 (CRM485R)
- Insulation jacket

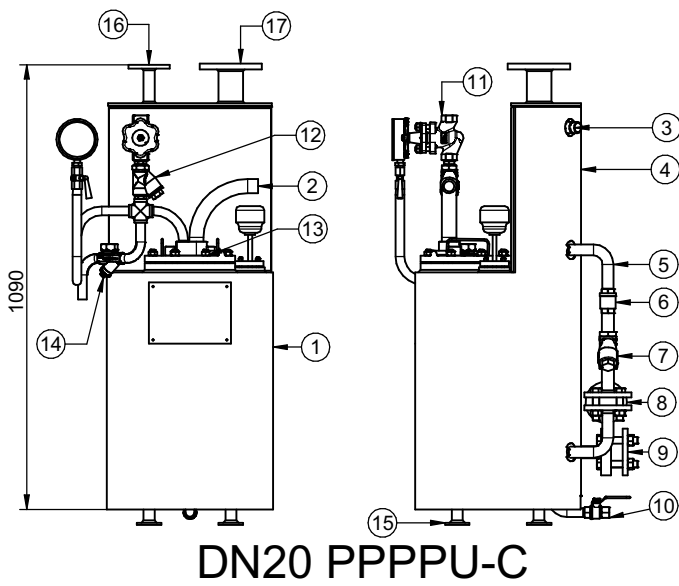
Note: Condensate Outlet - Use Flange provided with the Pump



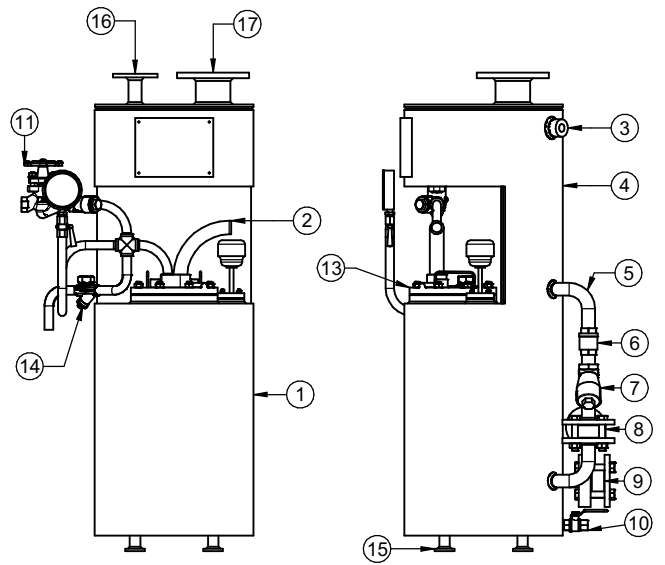


Material

| Sr. No. | Description | Material | Standard | Sr. No. | Description | Material | Standard |
|---------|---------------------|-----------------|--------------------|---------|--------------------|-----------------|------------------|
| 1 | Cover | Cast Iron | IS 210 Gr FG 260 | 12 | Push Rod | Stainless Steel | ASTM A240 SS 304 |
| 2 | Cover Gasket | Synthetic Fibre | AF154 | 13 | Mechanism | Cast Iron | IS 210 FG 260 |
| 3 | Stud and Nut M - 12 | Carbon Steel | - | 14 | Mechanism Actuator | Stainless Steel | SS304 |
| 4 | Inlet Valve Seat | Stainless Steel | ASTM A276 SS 304 | 15 | Body | Carbon Steel | IS 3589 |
| 5 | Inlet Valve Stem | Stainless Steel | ASTM A276 Type 304 | 16 | Float | Stainless Steel | ASTM A240 SS 304 |
| 6 | Inlet Valve Head | Stainless Steel | AISI 440 C | 17 | Linkage Mechanism | Stainless Steel | ASTM A351 CF 8 |
| 7 | Inlet Seat Gasket | Copper | - | 18 | Push Rod Actuator | Stainless Steel | ASTM A351 CF 8 |
| 8 | Exhaust Valve | Stainless Steel | ASTM A276 SS 304 | 19 | Spring | Inconel | - |
| 9(a) | Exhaust Valve | Stainless Steel | ASTM A276 SS 304 | 20 | Plug 1/2" BSPT | Forged Steel | ASTM A105 |
| 9(b) | Exhaust Valve Head | Stainless Steel | ASTM A276 SS304 | 21 | Check Valve | Stainless Steel | - |
| 10 | Exhaust Seat Gasket | Copper | - | 22 | Flow-temp Sensor | Stainless Steel | - |
| 11 | Valve Actuator Disc | Stainless Steel | ASTM A276 SS 304 | 23 | Sensor Float | Stainless Steel | ASTM A240 SS 304 |



DN20 PPPPU-C



DN25 PPPPU-C

All Dimensions shown above in 'mm'

| Sr.no. | Description | Material |
|--------|--|---------------------|
| 1 | PPPPU-C Shell | MS ERW Pipe |
| 2 | Exhaust Elbow | MS |
| 3 | Overflow Socket | MS |
| 4 | Reciever Shell | MS ERW Pipe |
| 5 | Condensate Inlet Line | MS |
| 6 | Ball Valve For Condensate Inlet | Carbon Steel |
| 7 | DN20 Strainer | C.I. |
| 8 | DN25 Check valve for condensate inlet | S.S. |
| 9 | DN25 Check valve for condensate outlet | S.S. |
| 10 | DN15 Drain | MS |
| 11 | Dn15 Piston Valve For Steam Inlet Connection | Forged Carbon Steel |
| 12 | DN15 Strainer Steam Inlet | CI |
| 13 | Cover Plate Assembly | CI |
| 14 | DN15 MLT21 Trap | SS |
| 15 | Leg Support | MS |
| 16 | Condensate Inlet Conn. DN20 Flanged to BS 10 TAB 'E' | CS |
| 17 | Vent Connection DN50 Flanged to ANSI # 150 | CS |

How to Select and Size

From the inlet pressure (motive pressure) and back pressure conditions given below, select the pump size which meets the capacity requirement 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 lit/min.

Capacity kg/hr

For liquid specific gravity (0.9 to 1)

| No. | INLET Pr. (M.P) bar g | TOTAL Lift or Back Pr. bar g | Condensate Flow Rate (Kg/hr) | |
|-----|-----------------------------|------------------------------------|------------------------------------|----------------------------|
| | | | DN 20 CRS 600 kg/hr | DN 25 CRS 1000 kg/hr |
| 1 | 8.7 | 1 | 600 | 1020 |
| 2 | 8.7 | 2 | 514 | 900 |
| 3 | 8.7 | 3 | 482 | 800 |
| 4 | 8.7 | 4 | 470 | 780 |
| 5 | 7 | 1 | 590 | 900 |
| 6 | 7 | 2 | 550 | 900 |
| 7 | 7 | 3 | 475 | 800 |
| 8 | 7 | 4 | 390 | 780 |
| 9 | 6 | 1 | 580 | 900 |
| 10 | 6 | 2 | 520 | 900 |
| 11 | 6 | 3 | 425 | 800 |
| 12 | 6 | 4 | 300 | 690 |
| 13 | 5 | 1 | 550 | 900 |
| 14 | 5 | 2 | 430 | 840 |
| 15 | 5 | 3 | 320 | 720 |
| 16 | 4 | 1 | 440 | 840 |
| 17 | 4 | 2 | 340 | 720 |
| 18 | 3 | 1 | 325 | 660 |

Available Spares

| | |
|--------------------|-------------------------------|
| • Set of internals | • Gasket kit (pkt. of 5) |
| • Valve kit | • Exhaust valve kit |
| • Float assembly | • Spring assembly (pkt. of 2) |

How to Order Spares

Always order spares giving description and P.C. No. given in 'User Manual' under the heading "Available Spares".

Example

Condensate load = 450 kg/hr
 Steam / air pressure available for
 Operating pump = 7 bar g
 Vertical lift from pump to the
 return piping = 9 m
 Pressure in return piping
 (piping friction negligible) = 1.72 bar g

Solution

1. Calculate "H", the total lift or back pressure against which the condensate must be pumped

$$= (9m \times 0.1) + 1.72 = 2.62$$
2. From capacity table : 7 bar g operating inlet pressure and 3 bar g back pressure pump has a capacity of 475 kg/hr.

Note from capacity factor charts

Pump capacity using compressed air
 $(\% \text{ BP} / \text{MP} = 3/7) = 42\% = 1.1 \times 475 = 522 \text{ kg/hr}$



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