

## PRESSURE OPERATED PUMP ADCAMAT PPO14

### DESCRIPTION

The ADCAMAT PPO (Pressure Operated Pump) fabricated in carbon steel (stainless steel on request) is recommended in the transfer of high temperature liquids such as condensate, oils and others, to a higher elevation or pressure.

Under certain conditions, it can drain a closed vessel under vacuum or pressure.

The pump can be operated by steam, compressed air or other gases, and can be used for lifting any kind of non-corrosive liquids.



### OPERATION

Liquid flows by gravity into the pump through an inlet check valve lifting a float which, at the upper limit of its stroke, opens the supply valve, allowing steam or compressed air to enter the pump's body. Pressure in the pump builds up until it's just sufficient to overcome back pressure.

The pressurized liquid opens the outlet check valve and discharge begins. When the float reaches the minimum lower level, it closes the steam or compressed air supply valve and opens the vent, allowing the liquid to fill the pump again.

As the amount of liquid discharged at each stroke is known, the total volume that flows during a given period of time can be calculated by counting the number of cycles during that period. For that purpose, a special counter is available which screws into a tapped connection on the top cover of the pump. This counter records the number of pumping strokes, thus enabling the pump to function as a reliable flow meter.

### MAIN

**FEATURES:** No electric requirements.

**OPTIONS:** Stainless steel construction.  
Level gauge.  
Stroke counter.

**USE:** To lift condensate or hot and cold liquids.

### AVAILABLE

**MODELS:** ADCAMAT PPO14S - Carbon steel construction.  
ADCAMAT PPO14SS - Stainless steel construction.  
(Carbon steel version is sandblasted, metallized and black painted.)

**SIZES:** DN 25; DN 40; DN 50.

**CONNECTIONS:** Flanged EN1092-1 PN16.  
Female screwed ISO 7/1 Rp (BS21) (Threaded flanges).  
Others on request.

**INSTALLATION:** Horizontal installation.  
See IMI – Installation and maintenance instructions.

**MOTIVE GAS:** Steam or compressed air.

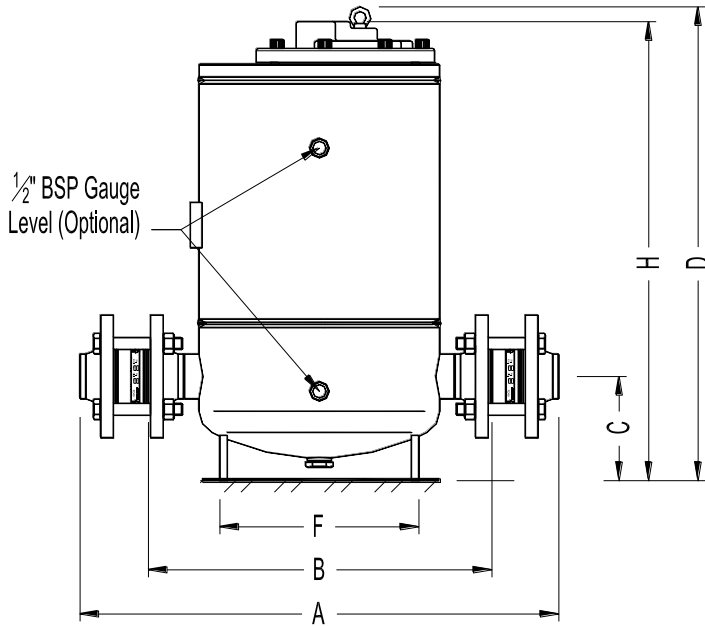
APPLICATION LIMITS	
Minimum density	0,80 kg/L
Maximum viscosity	5 °Engler
Maximum motive pressure	10 bar
Minimum motive pressure	0,5 bar
Pump discharge per cycle DN 25 to DN 50	16 L

CE MARKING – GROUP 2 (PED – European Directive)	
PN16	Category
All sizes	2 (CE marked)

**DIMENSIONS (mm)**

SIZE DN	A *	B	C	D	E	F	G	H	I	J	L	M	WGT. (kg)	VOL. (L)
25	578	444	140	640	323	268	250	617	598	17	18	327	75	32,2
40	615	454	140	640	323	268	250	617	598	17	18	327	72	32,3
50	644	460	140	640	323	268	250	617	598	17	18	327	66	32,5

\* A – with welding neck EN 1092-1 flanges. Dimensions are different if threaded flanges are requested.

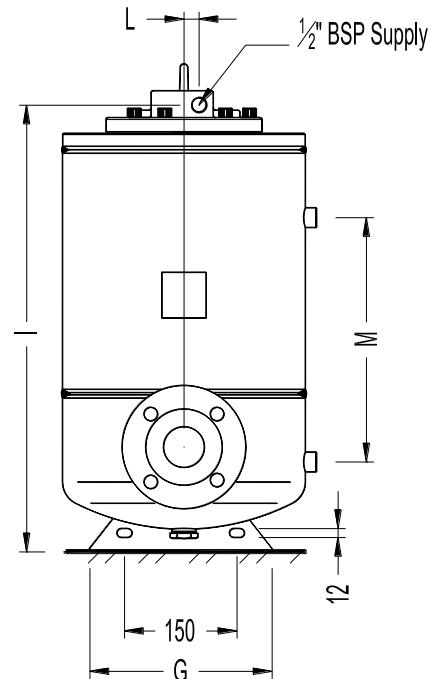
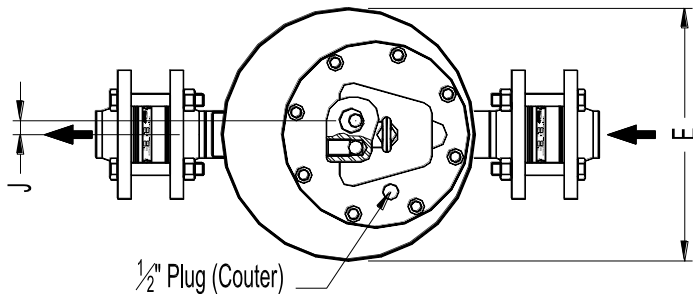


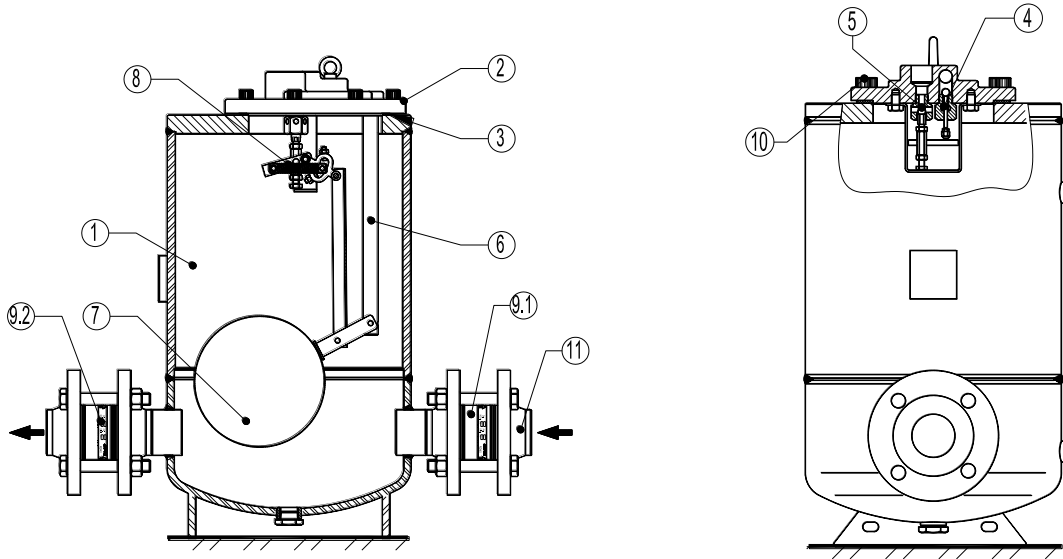
**LIMITING CONDITIONS \***

		PPO14S		PPO14SS	
	Pressure (bar)	Temp. (°C)		Pressure (bar)	Temp. (°C)
PN16	16	50	PN16	16	50
	14	100		16	100
	13	195		13	195
	12	250		12	250
ANSI 150 lb	16	50	ANSI 150 lb	16	50
	13	195		13	195

Min. operating temp.: -10 °C; Design code: ASME VII.

\* Rating according to EN 1092-1:2018.





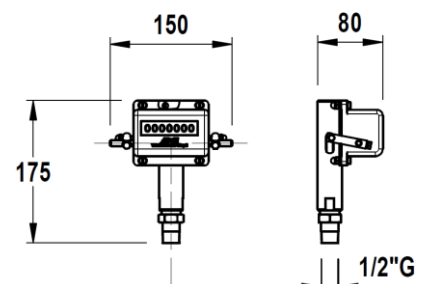
MATERIALS			
POS. Nº	DESIGNATION	MATERIAL PPO14S	MATERIAL PPO14SS
1	Pump body	P265GH / 1.0425 ; P235GH / 1.0345 ; S235JR / 1.0038	AISI 316 / 1.4401; AISI 304 / 1.4301
2	Cover	GJS-400-15 / 0.7040	AISI 316 / 1.4401; AISI 304 / 1.4301
3	* Cover gasket	Non asbestos	Non asbestos
4	* Inlet valve / Seat assembly	Stainless steel	Stainless steel
5	* Exhaust valve / Seat assembly	Stainless steel	Stainless steel
6	Internal mechanism	Stainless steel	Stainless steel
7	*Float	Stainless steel	Stainless steel
8	* Spring assembly (2 pieces)	Inconel	Inconel
9.1	* RD40 inlet check valve	CF8M / 1.4408	CF8M / 1.4408
9.2	* RD40 outlet check valve	CF8M / 1.4408	CF8M / 1.4408
10	Bolts	Steel 8.8	A2-70
11	** PN16 EN 1092-1 flanges	P250GH / 1.0460	AISI 316 / 1.4401

\* Available spare parts;

\*\* Welding neck EN 1092-1:2018 flanges. Threaded flanges on request.

### Stroke counter:

Available on request, it can be screwed directly into the top cover of the pump or above the pump through a 1/2" size pipe for easier reading (max. 1 m).



## SIZING AND INSTALLATION

### SIZING OF THE SYSTEM

The discharge capacity of the pump is a function of:

1. Condensate load (kg/h).
2. The pressure of operating medium (steam, compressed air or gas).
3. The total lift or back pressure the pump will have to exhaust against. This includes the change in fluid level elevation after the pump (0.0981 bar/m of lift), plus pressure in the return piping, plus the pressure drop in bar caused by pipe friction, plus any other system component pressure drop the pump exhaust will have to overcome.
4. Filling head available (300 mm is recommended).

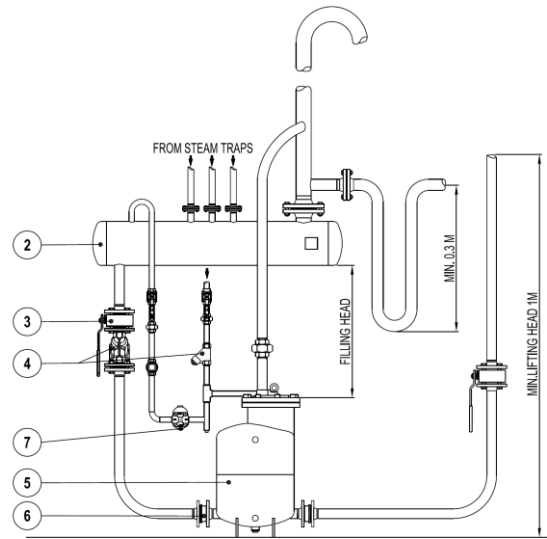


Fig. 1

### INSTALLATION

Fig.1 shows a typical example of installation of ADCAMAT automatic pump. For further details and instructions please contact the distributor.

MATERIALS			
POS.	DESIGNATION	POS.	DESIGNATION
2	Receiver	5	Pump
3	Ball valve	6	Disc check valve
4	Strainer	7	Steam trap

Table 1

### RECEIVER

A receiver is recommended to temporarily hold the liquid and prevent any flooding of the equipment, while the pump is in the pumping phase. Some suggested receiver sizes are described in Table 2.

SUGGESTED RECEIVER			
Pump size	25	40	50
Pipe size with 1 m lenght	6"	6"	8"

Table 2

CAPACITY CORRECTION FACTOR FOR GASES OTHER THAN STEAM					
% Backpress. vs Motive press. (BP/MP)	10%	30%	50%	70%	90%
Correction factor	1,04	1,08	1,12	1,18	1,28

Table 3

CAPACITY MULTIPLYING FACTORS FOR OTHER FILLING HEADS				
Pump size DN	Filling head (mm)			
	150	300	600	900
25	0,7	1	1,2	1,35
40	0,7	1	1,2	1,35
50	0,7	1	1,2	1,35

Table 4

FLOW RATE (kg/h) Installation with 300 mm filling head above the pump cover				
Motive pressure (bar)	Total lift (bar)	DN 25 x 25	DN 40 x 40	DN 50 x 50
1	0,35	840	1490	2320
2		1030	1520	3160
3		1140	1640	3560
4		1180	1680	3840
5		1240	1740	3910
6		1270	1760	3940
8		1300	2200	3990
10		1310	2205	4000
2	1	805	1560	2550
3		940	1790	2990
4		1080	1930	3160
5		1110	2010	3200
6		1140	2090	3250
8		1180	2190	3280
10		1190	2200	3320
3	2	780	1495	2470
4		900	1690	2620
5		1000	1820	2830
6		1040	1910	2860
8		1100	2010	2880
10	1110	2060	2900	
4	3	740	1400	2360
5		860	1545	2540
6		910	1675	2560
8		970	1805	2590
10	980	1850	2650	
5	4	720	1335	2280
6		820	1480	2460
8		910	1675	2500
10	930	1760	2540	
6	5	680	1290	2080
8		740	1530	2180
10		810	1630	2220
7	6	660	1230	1880
8		730	1370	1940
10		820	1490	2150

Table 5 (based on liquid specific gravity 0,9 – 1,0).

**Example:**

Condensate load 1800 kg/h  
 Filling head 150 mm  
 Motive fluid Compressed air  
 Available pressure 8 bar  
 Vertical lift after pump 6 m  
 Return piping pressure 1,5 bar  
 Piping friction pressure drop Negligible

**Calculations:**

Total back pressure:  $1,5 \text{ bar} + (6 \text{ m} \times 0,0981) = 2,09 \text{ bar}$ .  
 Pump choice, assuming steam as motive fluid at a pressure of 8 bar and a back pressure of 3 bar, the DN 50 pump has a capacity of 2590 kg/h, according to Table 5, so it is the one we should select.

**Correction for filling Head:**

With 150 mm filling head the correction factor from Table 4 is 0,7. The corrected capacity is:  
 $2590 \text{ kg/h} \times 0,7 = 1813 \text{ kg/h}$ .

**Correction for air as a motive fluid:**

The % back pressure  $2,09 \text{ bar} / 8 \text{ bar} = 30\%$   
 The correction factor, from Table 3, is 1,08.  
 The corrected capacity is  $1813 \text{ kg/h} \times 1,08 = 1958 \text{ kg/h}$ , and so, the DN 50 pump is still recommended.

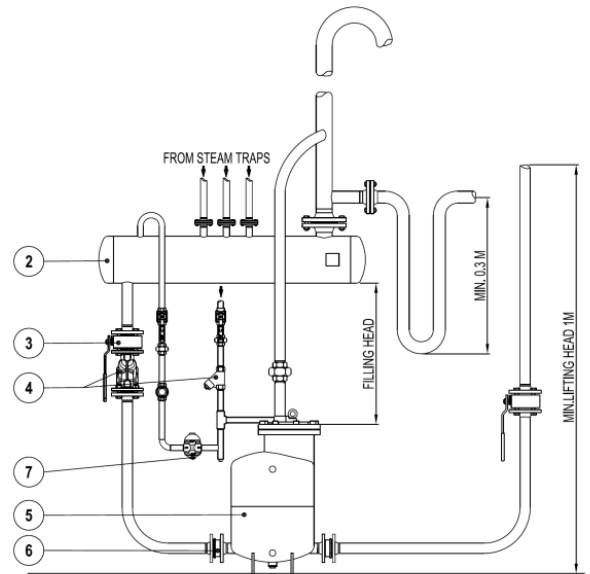
## TYPICAL APPLICATIONS

### Condensate recovery - open system

The pump removes high temperature condensate without cavitation problems.

**WARNING:** Vent line must be unrestricted and self draining to the receiver.

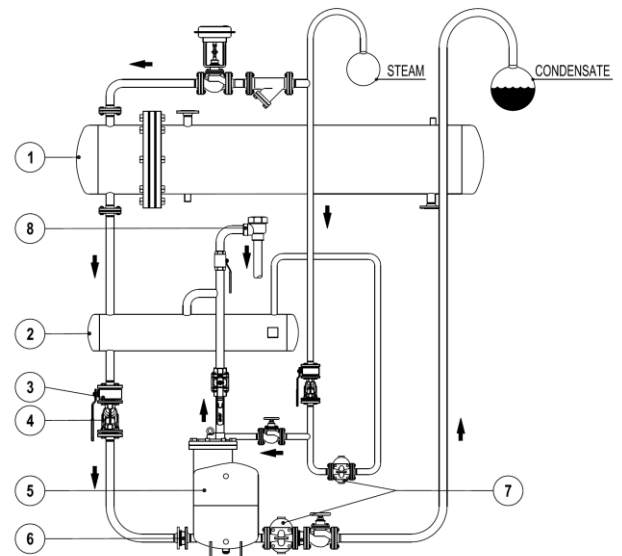
MATERIALS			
POS.	DESIGNATION	POS.	DESIGNATION
1	Heat exchanger	5	Pump
2	Receiver	6	RD40 disc check valve
3	Ball valve	7	Steam trap
4	Strainer	8	Air vent



### Removal of condensate under pressure with PPO pump and steam trap combination

When the steam pressure is sufficient to overcome back pressure, the trap operates.

If the pressure decreases, then the pressure operated pump starts to work, removing the condensate by pumping through the float steam trap.



### Drainage of a single unit under vacuum (max. 0,2 bar abs)

Head H1 must range between 1 and 2 m. The lift H must be as minimum as possible, but never less than 1 m (otherwise a siphon is required, as shown in H2). Use steam as operating medium (max. pressure 2-3 bar).

