

Medical Vacuum Plant

HTM 02-01 • 450 mmHg • 60 Hz

Description

Medical Vacuum Plants are intended to provide a continuous supply of medical vacuum to a pipeline system in healthcare facilities. The system shall be 'duplexed' such that the supply is maintained in single fault condition. Two standby pumps shall be provided, such that the specified volumetric flow rate is achieved with two reserve pumps on standby. Horizontal Medical Vacuum Plants shall be supplied pre-piped, fully tested and comply with the United Kingdom Department of Health (DoH) publication HTM 02-01, BS EN ISO 7396-1 and NHS Model Engineering Specification C11.

The Medical Vacuum Plant shall be fully tested. A test certificate shall be provided showing the results of the tests, including the free-air flow rate obtained at an inlet vacuum of 450 mmHg. Type testing of plant flows or testing in component form is not acceptable.

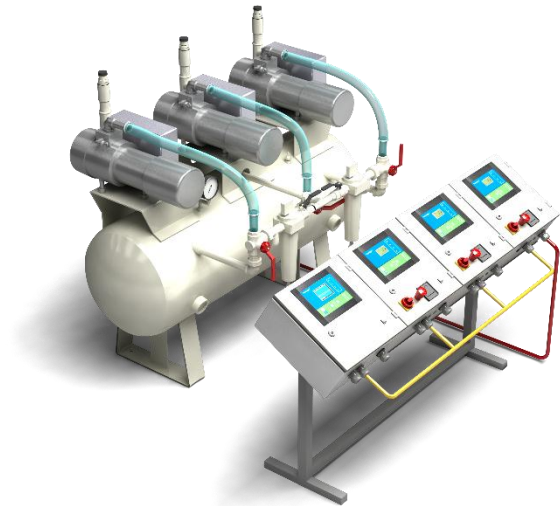
Pneumatech Medical Vacuum Plants are CE marked to the Medical Device Directive 93/42/EEC under the auspices of notified body no.0088 (Lloyd's). Under this directive, Medical Vacuum Plant is classified as Class IIb Medical Devices.

Vacuum Pumps

Vacuum pumps shall be air-cooled; oil lubricated rotary vane type suitable for both continuous and frequent start/stop operation at nominal inlet vacuum levels of between 475 mmHg and 650 mmHg. Rotors shall be driven by directly coupled totally enclosed fan-cooled electric motors. Pump inlets shall include a wire mesh filter and integral non-return valve to prevent oil suck back and pressure increases in the vacuum system. Each vacuum pump shall be provided with an oil mist eliminator delivering a virtually oil-free exhaust. Each pump shall be fitted with anti-vibration pads between the pump foot and mounting frame and an oil level sight glass. A pressure switch shall be included to provide an indication that the pump is operating normally once it has been called into service.

Pump Starter Units

The central control unit shall incorporate a user friendly colour display with clear pictograms and LED indicators, providing easy access to system operational information.



Typical horizontal vessel configuration

Bacteria Filters

A duplex arrangement of bacteria filters shall be provided, incorporating high efficiency filter elements. Each filter shall be generously sized to carry the full plant design flow capacity with a pressure drop not exceeding 22 mbar (16.5 mmHg). Bacteria Filter elements shall have penetration levels not exceeding 0.005% when tested by the sodium flame method in accordance with BS 3928:1969 utilising particles in the 0.02 to 2 micron size range. Each filter shall be provided with a differential pressure gauge. A drain flask shall be connected to each filter. Drain flasks shall be manufactured from transparent Pyrex® with a polymer coating on the inner and outer surfaces in order to maintain a seal in the event of inadvertent breakage of the Pyrex® flask. All drain flasks shall be suitable for sterilisation and be connected via a manual isolating valve.



Central Control System

The central control system shall provide an intelligent human machine interface incorporating on board flash memory and real-time clock for recording operational parameters in the in-built event log. The central control system shall operate at low voltage and include BMS connection for common fault. Visualisation of plant inputs, outputs and status through a web browser, using a simple Ethernet connection shall be available. The central control unit shall incorporate a user friendly 5.7" high-definition colour display with clear pictograms and LED indicators, providing easy access to system operational information.

Cascading of vacuum pumps shall be achieved by measuring the vacuum at the plant inlet with a pressure transducer. A mechanical back-up facility shall ensure continued operation in the event of a control system malfunction. The control system shall normally employ automatic rotation of the lead pump to maximise pump life and ensure even wear.

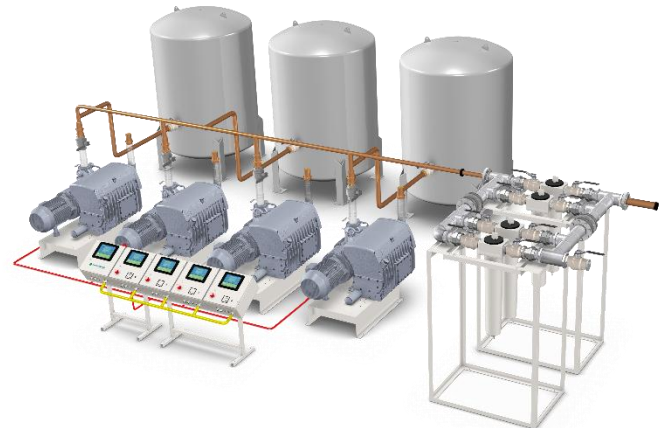
Vacuum Vessel(s)

Vacuum vessels shall comply with BS EN 286-1; +A2 2005 and be manufactured from heavy gauge fusion welded steel with a minimum wall thickness of 5 mm and dished ends with a minimum wall thickness of 6 mm. Total vacuum vessel volume shall be at least 100% of the plant capacity in 1 minute in terms of free air aspired at normal working pressure. Where only a single vessel is supplied it shall be connected to the bacteria filters in parallel with the pumps such that operation of the system can continue during receiver isolation for periodic internal inspection. The vessel shall include a drain valve and a 100 mm nominal diameter vacuum gauge complete with isolating valve.

Note:-

For plant above 500L/m all inter connecting pipework between components to be made on site and provided by the installer.

All control and starter cubicles will be supplied with connecting wire harnesses of 5m in length to suit standard configurations.



Typical vertical vessel configuration

*Interconnecting copper pipes to be made on site



HTM 02-01 Medical Vacuum Plant Specifications

Systems for 400V 3 phase 60 Hz Electrical Supply - Oil-Lubricated Rotary Vane Pumps

Part Number	Model Ref.	Free Air Aspired (l/min) @ -450 mmHg ⁽¹⁾	Nominal Motor Power per Pump (kW)	Electrical Supply	Starting Method	Full Load Current per Pump (A) ⁽²⁾	Approx. Starting Current (A)	Motor Rated Supply per Pump (A)	Pump Configuration	Duty Pumps	Sound Pressure Level/Pump dB(A) ⁽³⁾	Cooling Air Flow per Pump (m ³ /s)	Pump Oil Capacity (litres)	Vacuum Vessel(s) to BS 5169:1992	Vessel Volume (litres)	Vacuum Vessel Total Capacity (litres)	Vessel Orientation	Layout Drawing ⁽⁴⁾
8102341100	CV100T	100	0.55	380 V 3~ 60 Hz	DOL	1.55	9	6	Triplex	1	64	0.07	0.3	1	200	200	Horizontal	6000998
8102341101	CV300T	300	1.5	380 V 3~ 60 Hz	DOL	3.6	22	10	Triplex	1	66	0.18	1.0	1	300	300	Horizontal	6000998
8102341102	CV410T	410	2.4	380 V 3~ 60 Hz	DOL	4.9	29	16	Triplex	1	66	0.26	1.0	1	500	500	Horizontal	6000998
8102341103	CV640T	640	3.5	380 V 3~ 60 Hz	DOL	6.7	40	20	Triplex	1	68	0.36	2.0	1	750	750	Vertical	60700001751
8102341104	CV1140T	1140	6.6	380 V 3~ 60 Hz	DOL	11.9	71	20M25	Triplex	1	72	0.7	5.0	1	1300	1300	Vertical	60700001752
8102341105	CV1280T	1280	6.6	380 V 3~ 60 Hz	DOL	14.2	85	20M32	Triplex	1	74	0.7	5.0	1	1300	1300	Vertical	60700001752
8102341106	CV1630T	1630	9.2	380 V 3~ 60 Hz	SD	15.4	92	32M40	Triplex	1	74	0.9	6.5	1	1900	1900	Vertical	60700001744
8102341107	CV1900T	1900	9.2	380 V 3~ 60 Hz	SD	15.5	93	32M40	Triplex	1	76	0.9	6.5	1	1900	1900	Vertical	60700001744
8102341108	CV2280Q	2280	6.6	380 V 3~ 60 Hz	DOL	11.9	71	20M25	Quadruplex	2	72	0.66	5.0	2	1500	3000	Vertical	60700001745
8102341109	CV2560Q	2560	6.6	380 V 3~ 60 Hz	DOL	14.2	85	20M32	Quadruplex	2	74	0.66	5.0	2	1500	3000	Vertical	60700001745
8102341110	CV3270Q	3270	9.2	380 V 3~ 60 Hz	SD	15.4	92	32M40	Quadruplex	2	74	0.9	6.5	2	2000	4000	Vertical	60700001746
8102341111	CV3890Q	3890	9.2	380 V 3~ 60 Hz	SD	15.5	93	32M40	Quadruplex	2	76	0.9	6.5	2	2000	4000	Vertical	60700001747
8102341112	CV5640Q	5640	15	380 V 3~ 60 Hz	SD	25.1	151	40	Quadruplex	2	79	1.8	12.0	2	3000	6000	Vertical	60700001748
8102341113	CV4910P	4910	9.2	380 V 3~ 60 Hz	SD	15.4	92	32M40	Pentaplex	3	74	0.9	6.5	2	3000	6000	Vertical	60700001749
8102341114	CV5840P	5840	9.2	380 V 3~ 60 Hz	SD	15.5	93	32M40	Pentaplex	3	76	0.9	6.5	2	3000	6000	Vertical	60700001749
8102341115	CV8460P	8460	15	380 V 3~ 60 Hz	SD	25.1	151	40	Pentaplex	3	79	1.8	12.0	3	3000	9000	Vertical	60700001750
8102341116	CV7780S	7780	9.2	380 V 3~ 60 Hz	SD	15.4	92	32M40	Sextaplex	4	76	0.9	6.5	3	3000	9000	Vertical	60700001749

- 1) Data measured and stated in accordance with Pneurop 6602 with one pump on standby and with an air intake at 1013 mbar, 20°C. Flow rates stated are subject to a tolerance of +/- 10%.
- 2) These are typical figures and may vary with the specific motor used. Consult the motor nameplate for exact figures.
- 3) Measured in free field conditions at a distance of 1m in accordance with ISO 2151/DIN 45635. Subject to a tolerance of +/- 3 dB
- 4) Dimensions do not include the recommended 500 mm clearance for access and servicing.
- 5) Other models and layouts are available to suit particular site requirements. Contact your local representative for support.

