

Medical Vacuum Plant

HTM 2022 • 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 2022, 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

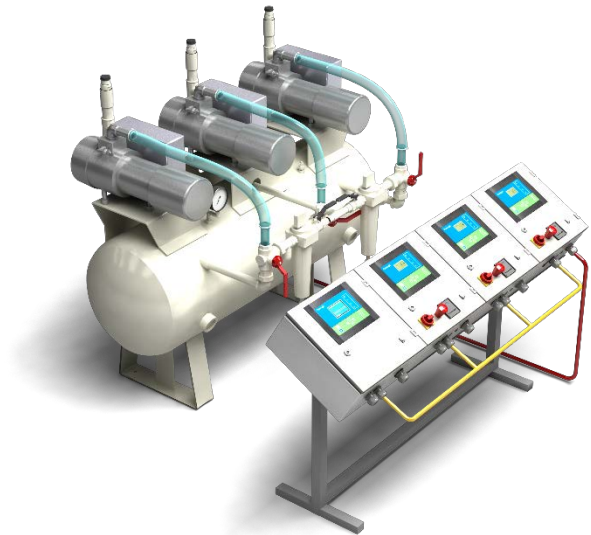
Vacuum pumps shall be air-cooled; oil lubricated rotary vane type suitable for both continuous and frequent start/stop operation at nominal inlet vacuum levels of between 475 mmHg and 650 mmHg. Rotors shall be driven by directly coupled totally enclosed fan-cooled electric motors. Pump inlets shall include 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.

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



Typical horizontal vessel configuration

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 level 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 2022 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⁾	HTM 2022 Design Flow (incl. 75% diversity per HTM 2022 para. 9.22)	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⁾
6001219	CV100D	100	133	0.55	380 V 3~ 60 Hz	DOL	1.55	9	6	Duplex	1	64	0.07	0.3	1	200	200	Horizontal	6000997
6001220	CV300D	300	400	1.5	380 V 3~ 60 Hz	DOL	3.6	22	10	Duplex	1	66	0.18	1.0	1	300	300	Horizontal	6000997
6001221	CV410D	410	547	2.4	380 V 3~ 60 Hz	DOL	4.9	29	16	Duplex	1	66	0.26	1.0	1	500	500	Horizontal	6000997
6001222	CV640D	640	853	3.5	380 V 3~ 60 Hz	DOL	6.7	40	20	Duplex	1	68	0.36	2.0	1	750	750	Horizontal	6000997
6001223	CV1140D	1140	1520	6.6	380 V 3~ 60 Hz	DOL	11.9	71	20M25	Duplex	1	72	0.7	5.0	1	1300	1300	Horizontal	6000997
6001224	CV1280D	1280	1707	6.6	380 V 3~ 60 Hz	DOL	14.2	85	20M32	Duplex	1	74	0.7	5.0	1	1300	1300	Horizontal	6000997
6001225	CV1630D	1630	2173	9.2	380 V 3~ 60 Hz	SD	15.4	92	32M40	Duplex	1	74	0.9	6.5	1	1900	1900	Horizontal	6000997
6001226	CV1900D	1900	2533	9.2	380 V 3~ 60 Hz	SD	15.5	93	32M40	Duplex	1	76	0.9	6.5	1	1900	1900	Horizontal	6000997
6001227	CV2280T	2280	3040	6.6	380 V 3~ 60 Hz	DOL	11.9	71	20M25	Triplex	2	72	0.66	5.0	2	1500	3000	Vertical	6070001745
6001228	CV2560T	2560	3413	6.6	380 V 3~ 60 Hz	DOL	14.2	85	20M32	Triplex	2	74	0.66	5.0	2	1500	3000	Vertical	6070001745
6001229	CV3270T	3270	4360	9.2	380 V 3~ 60 Hz	SD	15.4	92	32M40	Triplex	2	74	0.9	6.5	2	2000	4000	Vertical	6070001746
6001230	CV3890T	3890	5187	9.2	380 V 3~ 60 Hz	SD	15.5	93	32M40	Triplex	2	76	0.9	6.5	2	2000	4000	Vertical	6070001747
6001231	CV5640T	5640	7520	15	380 V 3~ 60 Hz	SD	25.1	151	40	Triplex	2	79	1.8	12.0	2	3000	6000	Vertical	6070001748
6001232	CV4910Q	4910	6547	9.2	380 V 3~ 60 Hz	SD	15.4	92	32M40	Quadruplex	3	74	0.9	6.5	2	3000	6000	Vertical	6070001748
6001233	CV5840Q	5840	7787	9.2	380 V 3~ 60 Hz	SD	15.5	93	32M40	Quadruplex	3	76	0.9	6.5	2	3000	6000	Vertical	6070001748
6001234	CV8460Q	8460	11280	15	380 V 3~ 60 Hz	SD	25.1	151	40	Quadruplex	3	79	1.8	12.0	3	3000	9000	Vertical	6070001750
6001235	CV7780P	7780	10373	9.2	380 V 3~ 60 Hz	SD	15.4	92	32M40	Pentaplex	4	76	0.9	6.5	3	3000	9000	Vertical	6070001749

- 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.

