

Medical Vacuum System

mVAC 380V 60Hz - EN ISO 7396-1/HTM 02-01 and HTM2022

SPECIFICATION

The mVAC Medical Vacuum System shall conform to EN ISO 7396-1/ NHS Health Technical Memorandum No. 02-01 (HTM 02-01) or NHS Health Technical Memorandum No. 2022 (HTM 2022)- depending on model selected. The Medical Vacuum System shall ensure the minimum pipeline vacuum level of 450mmHg is maintained at the plant service connection point at the rated volumetric 'free air' flow rate with either two pumps in standby (ISO7396-1/HTM02-01) or with one pump on standby (HTM2022). The bacteria filtration system shall be 'duplexed' such that each filter can be isolated for replacement of the filter cartridge.

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 578mmHg and 728mmHg. Composite carbon fibre rotor blades shall be fitted to minimise the cost of maintenance. Rotors shall be driven by directly coupled TEFV, IE3 efficiency 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 have an integral separator filter to ensure a virtually oil-free exhaust. Each pump shall be fitted with anti-vibration pads between the pump foot and mounting frame.

Bacteria Filters

The duplex bacteria filter system shall incorporate high efficiency filter elements using stainless steel cores, epoxy sealed caps and an anti-corrosive coated filter housing. A differential vacuum indicator shall be installed across the filter to indicate blockage. Additional pressure sensors shall be installed at the inlet and outlet of the filter to measure the pressure drop across the filters. Each filter shall be designed and sized to carry the full plant design flow capacity with a pressure drop not exceeding 33mbar (25mmHg). Bacteria Filter elements shall have penetration levels not exceeding 0.005% when tested by the sodium flame method in accordance with BS 3928 and utilising particles in the 0.02 to 2 micron size range. Performance shall be validated by a 3rd party test agency and shall be available upon request. Drain flasks 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.

Control System

The central control system shall provide an intelligent human machine interface incorporating on board flash memory and realtime 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.

Optional Control Equipment

An advanced monitoring system shall be available to give immediate access to valuable information such as system status, trends, historical data and system performance. Data collected from all pumps shall be made available in real-time visualisation pages and shall be accessed through the hospital's LAN, such that total data security is assured.

The Airconnect™ monitoring system shall also include:

- Logging and trending for an accurate performance status of your system.
- Desktop event notification to avoid constant status checking.
- E-mail and SMS event notification for additional convenience.

Optional Items

There shall be the followings options available for enhanced operation of the vacuum plant system:

- Synthetic oil for increased pump life..
- Painted hot dipped galvanised vessels.
- Oil level switch and integrated ES-VAC alarm for notification of low oil level in the pumps

Vacuum Receiver(s)

Vacuum receiver(s) shall be supplied with relevant test certificates and have a total volume of at least 100% of the plant output in 1 minute in terms of free air aspired at normal working pressure. Each vacuum receiver shall be painted as normal, with galvanized as option.

Pyrex® is a registered trademark of Corning Glass.

CE Marking

The standard range of BeaconMedaes Medical Vacuum (mVAC) systems are 'CE' marked with approval from notified body (more detailed information available on request).

Installation instruction:

It is advised to always keep a clearance of 500 mm between the plant and a plant room wall and 800 mm between the plant's individual components (vessels and pumps/frames) for servability reasons. The exact dimensions and sizes of the different plant variants (pumps and vessels) can be requested from your sales responsible. In the plant data tables are the reference to the installation proposal documents.

Tank Mounted:**Frame Mounted:****Floor Mounted:**

Data Tables

Tank Mounted HTM02-0160 Hz

Model Number	mVAC-300-TH	mVAC-400-TH
Part Number	8152 1306 60	8152 1306 62
Plant Output (litres/minute)	300	400
System Flow (m ³ /h- l/m)	48 800	63 1050
Number of pumps	3	3
Number of receivers	1(H)	1(H)
Total receiver volume (litres)	500	500
Receiver connection(s) (mm)	n/a	n/a
Inlet/service connection (mm)	54	54
Exhaust connection (mm, per pump)	54	54
Maximum exhaust back pressure (mbar)	60	60
Noise level/pump (dB[A])	67	75
Weight (kg)	650	690
Motor rating (kW)	1.7	2.4
Motor cables size (mm ² /Amps)	1.5 (13)	1.5 (13)
Motor rated supply per pump (A)	10	10
FLC per pump (A)	4	5.7
Starting current (A)	20	29
Central control supply-single phase (mm ² /Amps)	1.5 (5)	1.5 (5)
Maximum Inlet Temperature (C)	40	40
Cooling air flow per pump (m ³ /s)	0.1	0.1
Installation Proposal	9820 6365 00	9820 6365 00

- Plant Output in terms of free air aspired at a vacuum of 450 mmHg at the inlet connection with two pumps on standby and with a tolerance of ±10%.
- System Flow at atmospheric pressure at the inlet connection with two pump on standby and with a tolerance of ±10%.
- Plant dimensions include the required space around the plant for maintenance access.
- Mean sound level measured at a distance of 1m as measured to ISO 2151 / DIN 45635.
- Electrical details are provided for guidance only and are referenced at 40°C ambient temperature. Site conditions may impose a larger cable size. For exact cable sizing, and fuse / MCB ratings, consult a qualified electrical engineer.
- Plant weight includes packaging for shipping purposes.
- Electrical values calculated for the most critical voltage: 380V



Frame Mounted HTM02-01 60 Hz

Model Number	mVAC-620-T	mVAC-800-Q	mVAC-1200-Q	mVAC-1500-T	mVAC-3000-Q	mVAC-3900-Q	mVAC-4500-P	mVAC-5850-P	mVAC-7800-H
Part Number	8152 1306 64	8152 1306 66	8152 1306 68	8152 1306 70	8152 1306 72	8152 1306 74	8152 1306 76	8152 1306 78	81521 306 80
Plant Output (litres/minute)	620	800	1200	1500	3000	3900	4500	5850	7800
System Flow (m ³ /h- l/m)	98 1630	127 2115	190 3165	238 3965	476 7930	619 10315	714 11900	928 15465	1238 20630
Number of pumps	3	4	4	3	4	4	5	5	6
Number of receivers	2	2	2	2	2	2	3	3	4
Total receiver volume (litres)	1000	1000	2000	2000	3000	4000	4500	6000	8000
Receiver connection(s) (mm)	54	54	54	54	54	76	54	76	76
Inlet/service connection (mm)	54	54	54	54	76	76	108	108	108
Exhaust connection (mm, per pump)	54	54	54	54	54	54	54	54	54
Maximum exhaust back pressure (mbar)	60	60	60	60	60	60	60	60	60
Noise level/pump (dB[A])	72	75	72	74	74	77	74	77	77
Weight (kg)	1050	960	1260	1545	2380	2560	3185	3340	4080
Motor rating (kW)	3.4	2.4	3.4	9.2	9.2	9.2	9.2	9.2	9.2
Motor cables size (mm ² /Amps)	1.5 (13)	1.5 (13)	1.5 (13)	4 (23)	4 (23)	4 (23)	4 (23)	4 (23)	4 (23)
Motor rated supply per pump (A)	25	10	25	25	25	25	25	25	25
FLC per pump (A)	7.4	5.7	7.4	18.5	18.5	20.8	18.5	20.8	20.8
Starting current (A)	37	29	37	93	93	104	93	104	104
Central control supply-single phase (mm ² /Amps)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)
Maximum Inlet Temperature (C)	40	40	40	40	40	40	40	40	40
Cooling air flow per pump (m ³ /s)	0.2	0.1	0.2	0.3	0.3	0.4	0.3	0.4	0.4
Installation Proposal	9820 6368 00	9820 6368 00	9820 6368 00	9820 6368 00	9820 6368 00	9820 6368 00	9820 6369 00	9820 6369 00	9820 6370 00

- Plant Output in terms of free air aspired at a vacuum of 450 mmHg at the inlet connection with two pumps on standby and with a tolerance of ±10%.
- System Flow at atmospheric pressure at the inlet connection with two pump on standby and with a tolerance of ±10%.
- Plant dimensions include the required space around the plant for maintenance access.
- Mean sound level measured at a distance of 1m as measured to ISO 2151 / DIN 45635.
- Electrical details are provided for guidance only and are referenced at 40°C ambient temperature. Site conditions may impose a larger cable size. For exact cable sizing, and fuse / MCB ratings, consult a qualified electrical engineer.
- Plant weight includes packaging for shipping purposes.
- Electrical values calculated for the most critical voltage: 380V

Floor Mounted HTM02-01 60 Hz

Model Number	mVAC-640-T-FL	mVAC-1140-T-FL	mVAC-1280-T-FL	mVAC-1630-T-FL	mVAC-1900-T-FL	mVAC-2280-Q-FL	mVAC-2560-Q-FL	mVAC-3270-Q-FL	mVAC-3890-Q-FL	mVAC-5640-Q-FL	mVAC-4910-P-FL	mVAC-5840-P-FL
Part Number	4233 3000 97	4233 3000 98	4233 3000 99	4233 3001 00	4233 3001 01	4233 3001 02	4233 3001 03	4233 3001 04	4233 3001 05	4233 3001 06	4233 3001 07	4233 3001 08
Plant Output (litres/minute)	640	1140	1280	1630	1900	2280	2560	3270	3890	5640	4910	5840
System Flow (m³/h- l/m)	94	168	188	240	279	335	377	481	572	830	722	859
	1569	2795	3138	3996	4658	5590	6276	8017	9537	13827	12037	14317
Number of pumps	3	3	3	3	3	4	4	4	4	4	5	5
Number of receivers	1	1	1	1	1	2	2	2	2	2	2	2
Total receiver volume (litres)	750	1300	1300	1900	1900	3000	3000	4000	4000	6000	6000	6000
Receiver connection(s) (mm)	54mm	54mm	54mm	54mm	54mm	54mm	54mm	76mm	76mm	76mm	76mm	76mm
Inlet/service connection (mm)	54mm	54mm	54mm	76mm	76mm	76mm	76mm	76mm	76mm	108mm	108mm	108mm
Exhaust connection (mm, per pump)	54mm	54mm	54mm	54mm	54mm	54mm	54mm	54mm	54mm	76mm	54mm	54mm
Maximum exhaust back pressure (mbar)	60	60	60	60	60	60	60	60	60	60	60	60
Noise level/pump (dB[A])	68	72	74	74	76	72	74	74	76	79	74	76
Motor rating (kW)	3.2	6.6	6.6	9.2	9.2	6.6	6.6	9.2	9.2	15	9.2	9.2
Motor cables size (mm²/ Amps)												
Motor rated supply per pump (A)	20	20M25	20M32	32M40	32M40	20M25	20M32	32M40	32M40	40	32M40	32M40
FLC per pump (A)	8.42	14.62	14.62	20.42	20.42	14.62	14.62	20.42	20.42	35.6	20.42	20.42
Starting current (A)	50.5	87.7	87.7	122.5	122.5	87.7	87.7	122.5	122.5	203.1	122.5	122.5
Central control supply-single phase (mm²/Amps)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)
Maximum Inlet Temperature (C)	40	40	40	40	40	40	40	40	40	40	40	40
Cooling air flow per pump (m³/s)	0.36	0.7	0.7	0.9	0.9	0.66	0.66	0.9	0.9	1.8	0.9	0.9
Installation Proposal	2212 0201 02	2212 0201 02	2212 0201 02	2212 0201 03	2212 0201 03	2212 0201 04	2212 0201 05	2212 0201 06	2212 0201 06	2212 0201 11	2212 0201 07	2212 0201 07

1. Data measured and stated in accordance with Pneurop 6602 with two 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.
6. Electrical values calculated for the most critical voltage: 380V

Note:

For plant above 500l/min 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.

Floor Mounted HTM02-01 60 Hz

Model Number	mVAC-8460-P-FL	mVAC-7780-S-FL
Part Number	4233 3001 09	4233 3001 10
Plant Output (litres/minute)	8460	7780
System Flow (m ³ /h- l/m)	1244	1144
	20741	19074
Number of pumps	5	6
Number of receivers	3	3
Total receiver volume (litres)	9000	9000
Receiver connection(s) (mm)	76mm	76mm
Inlet/service connection (mm)	108mm	108mm
Exhaust connection (mm, per pump)	76mm	54mm
Maximum exhaust back pressure (mbar)	60	60
Noise level/pump (dB[A])	79	76
Motor rating (kW)	15	9.2
Motor cable size (mm ² /Amps)		
Motor rated supply per pump (A)	40	32M40
FLC per pump (A)	35.6	20.42
Starting current (A)	203.1	122.5
Central control supply-single phase (mm ² /Amps)	1.5 (5)	1.5 (5)
Maximum Inlet Temperature(C)	40	40
Cooling air flow per pump (m ³ /s)	1.8	0.9
Installation Proposal	2212 0201 12	2212 0201 08

1. Data measured and stated in accordance with Pneurop 6602 with two 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.
6. Electrical values calculated for the most critical voltage: 380V.

Note:

For plant above 500l/min 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.



Tank Mounted HTM2022 60 Hz

Model Number	mVAC-300-DH	mVAC-500-TH
Part Number	8152 1307 37	8152 1307 39
Plant Output (litres/minute)	300	500
System Flow (m ³ /h- l/m)	48 800	79 1315
Number of pumps	2	3
Number of receivers	1(H)	1(H)
Total receiver volume (litres)	500	500
Receiver connection(s) (mm)	n/a	n/a
Inlet/service connection (mm)	54	54
Exhaust connection (mm, per pump)	54	54
Maximum exhaust back pressure (mbar)	60	60
Noise level/pump (dB[A])	67	67
Weight (kg)	540	650
Motor rating (kW)	1.7	1.7
Motor cable size (mm ² /Amps)	1.5 (13)	1.5 (13)
Motor rated supply per pump (A)	10	10
FLC per pump (A)	4	4
Starting current (A)	20	20
Central control supply-single phase (mm ² /Amps)	1.5 (5)	1.5 (5)
Maximum Inlet Temperature (C)	40	40
Cooling air flow per pump (m ³ /s)	0.1	0.1
Installation Proposal	9820 6364 00	9820 6365 00

- Plant Output in terms of free air aspired at a vacuum of 450 mmHg at the inlet connection with one pump on standby and with a tolerance of $\pm 10\%$.
- System Flow at atmospheric pressure at the inlet connection with one pump on standby and with a tolerance of $\pm 10\%$.
- Plant dimensions include the required space around the plant for maintenance access.
- Mean sound level measured at a distance of 1m as measured to ISO 2151 / DIN 45635.
- Electrical details are provided for guidance only and are referenced at 40°C ambient temperature. Site conditions may impose a larger cable size. For exact cable sizing, and fuse / MCB ratings, consult a qualified electrical engineer.
- Plant weight includes packaging for shipping purposes.
- Electrical values calculated for the most critical voltage: 380V.



Frame Mounted HTM2022 60 Hz

Model Number	mVAC-800-TH	mVAC-1200-T	mVAC-1860-Q	mVAC-3000-T	mVAC-4500-Q	mVAC-5850-Q	mVAC-7800-P	mVAC-9200-H
Part Number	8152 1307 41	8152 1307 43	8152 1307 45	8152 1307 47	8152 1307 49	8152 1307 51	8152 1307 53	8152 1307 55
Plant Output (litres/minute)	800	1200	1860	3000	4500	5850	7800	9200
System Flow (m ³ /h- l/m)	127 2115	190 3165	295 4915	476 7930	714 11900	928 15465	1238 20630	1460 24330
Number of pumps	3	3	4	3	4	4	5	6
Number of receivers	1(H)	1	1	2	3	3	4	5
Total receiver volume (litres)	1000	1500	2000	3000	4500	6000	8000	10000
Receiver connection(s) (mm)	n/a	54	76	54	54	76	76	76
Inlet/service connection (mm)	54	54	54	76	76	108	108	108
Exhaust connection (mm, per pump)	54	54	54	54	54	54	54	54
Maximum exhaust back pressure (mbar)	60	60	60	60	60	60	60	60
Noise level/pump (dB[A])	75	72	72	74	74	77	77	77
Weight (kg)	800	980	1480	2565	2935	3090	3880	4510
Motor rating (kW)	2.4	3.4	3.4	9.2	9.2	9.2	9.2	9.2
Motor cables size (mm ² /Amps)	1.5 (13)	1.5 (13)	1.5 (13)	4 (23)	4 (23)	4 (23)	4 (23)	4 (23)
Motor rated supply per pump (A)	10	25	25	25	25	25	25	25
FLC per pump (A)	5.7	7.4	7.4	18.5	18.5	20.8	20.8	20.8
Starting current (A)	29	37	37	93	93	104	104	114
Central control supply-single phase (mm ² /Amps)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)
Maximum Inlet Temperature (C)	40	40	40	40	40	40	40	40
Cooling air flow per pump (m ³ /s)	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4
Installation Proposal	9820 6365 00	9820 6367 00	9820 6367 00	9820 6368 00	9820 6369 00	9820 6369 00	9820 6370 00	9820 6370 00

- Plant Output in terms of free air aspired at a vacuum of 450 mmHg at the inlet connection with one pump on standby and with a tolerance of $\pm 10\%$.
- System Flow at atmospheric pressure at the inlet connection with one pump on standby and with a tolerance of $\pm 10\%$.
- Plant dimensions include the required space around the plant for maintenance access.
- Mean sound level measured at a distance of 1m as measured to ISO 2151 / DIN 45635.
- Electrical details are provided for guidance only and are referenced at 40°C ambient temperature. Site conditions may impose a larger cable size. For exact cable sizing, and fuse / MCB ratings, consult a qualified electrical engineer.
- Plant weight includes packaging for shipping purposes.
- Electrical values calculated for the most critical voltage: 380V



Floor Mounted HTM2022 60 Hz

Model Number	mVAC-2280-TFL	mVAC-2560-TFL	mVAC-3270-TFL	mVAC-3890-TFL	mVAC-5640-TFL	mVAC-4910-Q-FL	mVAC-5840-Q-FL	mVAC-8460-Q-FL	mVAC-7780-P-FL
Part Number	4233 3000 70	4233 3000 71	4233300072	4233 3000 73	4233 3000 74	4233 3000 75	4233 3000 76	4233 3000 77	4233 3000 78
Plant Output (litres/minute)	2280	2560	3270	3890	5640	4910	5840	8460	7780
System Flow (m³/h- l/m)	335	377	481	572	830	722	859	1244	1144
	5590	6276	8017	9537	13827	12037	14317	20741	19074
Number of pumps	3	3	3	3	3	4	4	4	5
Number of receivers	2	2	2	2	2	2	2	3	3
Total receiver volume (litres)	3000	3000	4000	4000	6000	6000	6000	9000	9000
Receiver connection(s) (mm)	54mm	54mm	76mm	76mm	76mm	76mm	76mm	76mm	76mm
Inlet/service connection (mm)	76mm	76mm	76mm	76mm	108mm	108mm	108mm	108mm	108mm
Exhaust connection (mm, per pump)	54mm	54mm	54mm	54mm	76mm	54mm	54mm	76mm	54mm
Maximum exhaust back pressure (mbar)	60	60	60	60	60	60	60	60	60
Noise level/pump (dB[A])	72	74	74	76	79	74	76	79	76
Motor rating (kW)	6.6	6.6	9.2	9.2	15	9.2	9.2	15	9.2
Motor cable size (mm²/ Amps)									
Motor rated supply per pump (A)	20M25	20M32	32M40	32M40	40	32M40	32M40	40	32M40
FLC per pump (A)	14.62	14.62	20.42	20.42	35.6	20.42	20.42	35.6	20.42
Starting current (A)	87.7	87.7	122.5	122.5	213.6	122.5	122.5	213.6	122.5
Central control supply-single phase (mm²/Amps)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)	1.5 (5)
Maximum Inlet Temperature(C)	40	40	40	40	40	40	40	40	40
Cooling air flow per pump (m³/s)	0.66	0.66	0.6	0.6	1.8	0.9	0.9	1.8	0.9
Installation Proposal	2212 0201 04	2212 0201 05	2212 0201 06	2212 0201 06	2212 0201 11	2212 0201 07	2212 0201 07	2212 0201 12	2212 0201 08

1. Data measured and stated in accordance with Pneurop 6602 with two 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.
6. Electrical values calculated for the most critical voltage: 380V

Note:

For plant above 500l/min 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.

