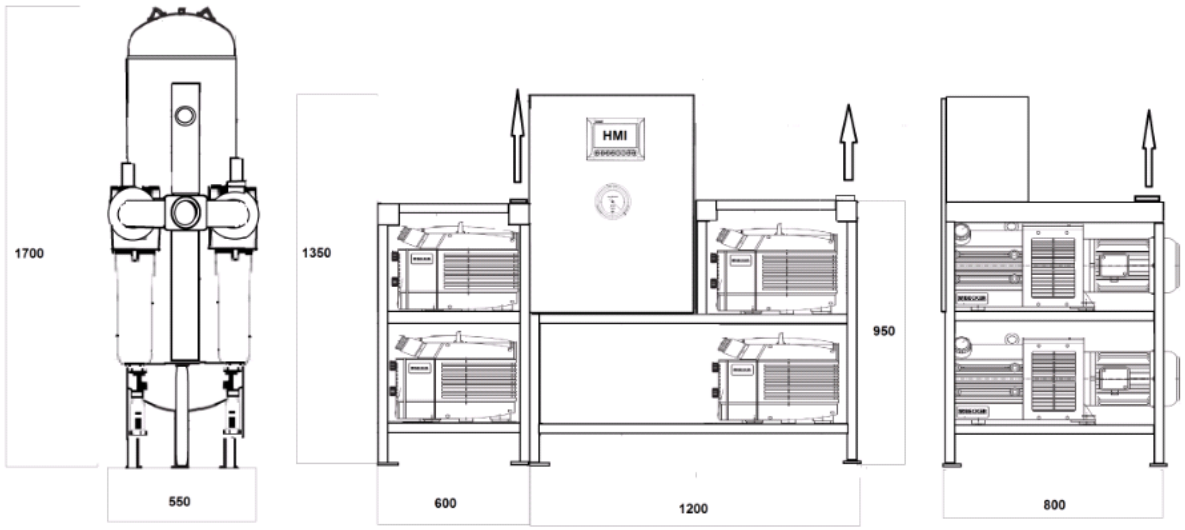
AUSTRALIAN MEDICAL SUCTION SYSTEMS
PROVIDED BY BECKER

ABN: 82 093 589 229 Early Minute Pty Ltd
Trading as Australian Medical Suction Systems

P: 1300 579 177 F: (07) 3386 0983
E: sales@beckerpumps.com.au
www.medicalsuctionsystems.com.au
Unit 5, 8 St Jude Court
Browns Plains QLD 4118



General

Model MS150-4-150 expandable/modular central vacuum system consisting of 4 Becker or approved equivalent KVX3.140-400 vacuum pumps mounted on a common skid with expandable automatic alternating electrical controls and 150Liter vertical receiver.

Each vacuum pump shall be a Becker Pump Corporation or approved equivalent rotary vane model KVX3.140-400 and shall have an open flow of no less than 140m3/hr and a maximum operating vacuum level of -85kpa.

The pumps shall be Oil Free and Variable speed controlled by Pressure Transducer, PLC and inverter.

Requirement

Each vacuum pump shall be direct-driven through a shaft coupling by a 4kw, TEFC, NEMA C-face, high efficiency, 1.15 service factor, electric motor wired for operation on a 50 hertz, 3 phase power supply. Actual kilowatts shall not exceed the rated kilowatts at any time or vacuum level. Belt drives shall not be permitted. Each pump shall be air-cooled and have absolutely no water requirements. Auxiliary heat exchangers shall not be permitted.

Capacity

Each Pumps shall be capable of 50m3/hr @ -600mbarG Free Air.

Total systems shall be 150m3/hr @ -600mbarG Free Air N+1

Standard

AS 2896-2011 Clause 2.10

Vacuum Pumps

Each pump shall be equipped with carbon/graphite vanes. A vacuum relief valve shall be incorporated into the design of the pump.

All pumps shall be skid mounted in a vertical arrangement that allows for future expansion to 5 or 6 pump system. Pumps shall be connected to a common manifold and piped to an ASME coded 150 Litre vertical receiver. The manifold shall include pre-installed fittings for all present and future pumps. Each vacuum pump shall be equipped with a check valve, and a flex connector.

The vacuum pump manufacturer shall be ISO 9001 certified, and all pumps shall be CE compliant, to ensure the highest level of quality control.

System Construction

The vacuum system shall meet all requirements of the current version of the AS2896-2011. The entire system shall be factory assembled to a welded mild steel frame by the vacuum pump manufacturer. Systems assembled by independent packagers shall not be permitted. The entire system shall be tested and pre-commissioned in the factory to ensure that all performance specifications are met.

Motors

The Electric drive shall be 415 volt 3 phase, 50Hz, IP54 degree of protection Class F insulated and capable of continuous operation while meeting the full load requirements of the drive equipment in 40°C ambient temperature.

Vacuum receiver

The Vacuum receiver shall be designed and tested with AS1210. Capacity shall not be less than 150ltr.

Bacterial Filters

Duplicated, combination bacterial filters and drain traps shall be installed in parallel in the suction pipe work prior to the receiver, each shall be provided with inlet and discharge isolation valves.

Each Filter shall be sized to have a maximum clear resistance of 5kPa at the design flow rate. The filter elements shall be readily replaceable.

Each filter shall be provided with a drain isolation valve discharging into a removable, transparent and auto-clavable glass vessel. Filters shall be labelled ‘bio-hazard’ and replacement element details clearly marked.

System Control

<u>Medical suction systems.</u>
As per AS2896-2011. A minimum of two suction pumps, preferably identical, shall be installed with each capable of supplying the design flow rate on its own. Multiple suction pump installations shall be electrically connected so that failure of one suction pump shall not interfere with the correct operation of the remaining pump (or pumps).

If more than two suction pumps are used as the source, the capacity of the pumps shall be such as to supply at least the designed flow rate for the system with any one pump out of operation, i.e. a source of N pumps shall meet or exceed the design capacity with (N-1) pumps operating.

Electrical requirements

The suction source shall be installed in accordance with the electrical requirements of AS/NZS 3000 and shall be equipped with a lockable isolator ready for connection to the essential services supply of the hospital.

Minimum electrical requirements for a VFD control system.

- 1 x VFD per pump.
- 1 x Circuit breaker per pump.
- 1 x PLC unit provided that VFD can run on failure at set speed.
- 2 x Volt free contacts for alarm connection.
- Display panel for adjustment.
- Program for PLC to incorporate lead/lag changeover.
- 1 x Pressure sensing transducer for activating additional pumps and also for alarm in the case of low vacuum.
- Volt free contacts to be tagged within the panel.
- Power on indication.
- Cabling for motor connection

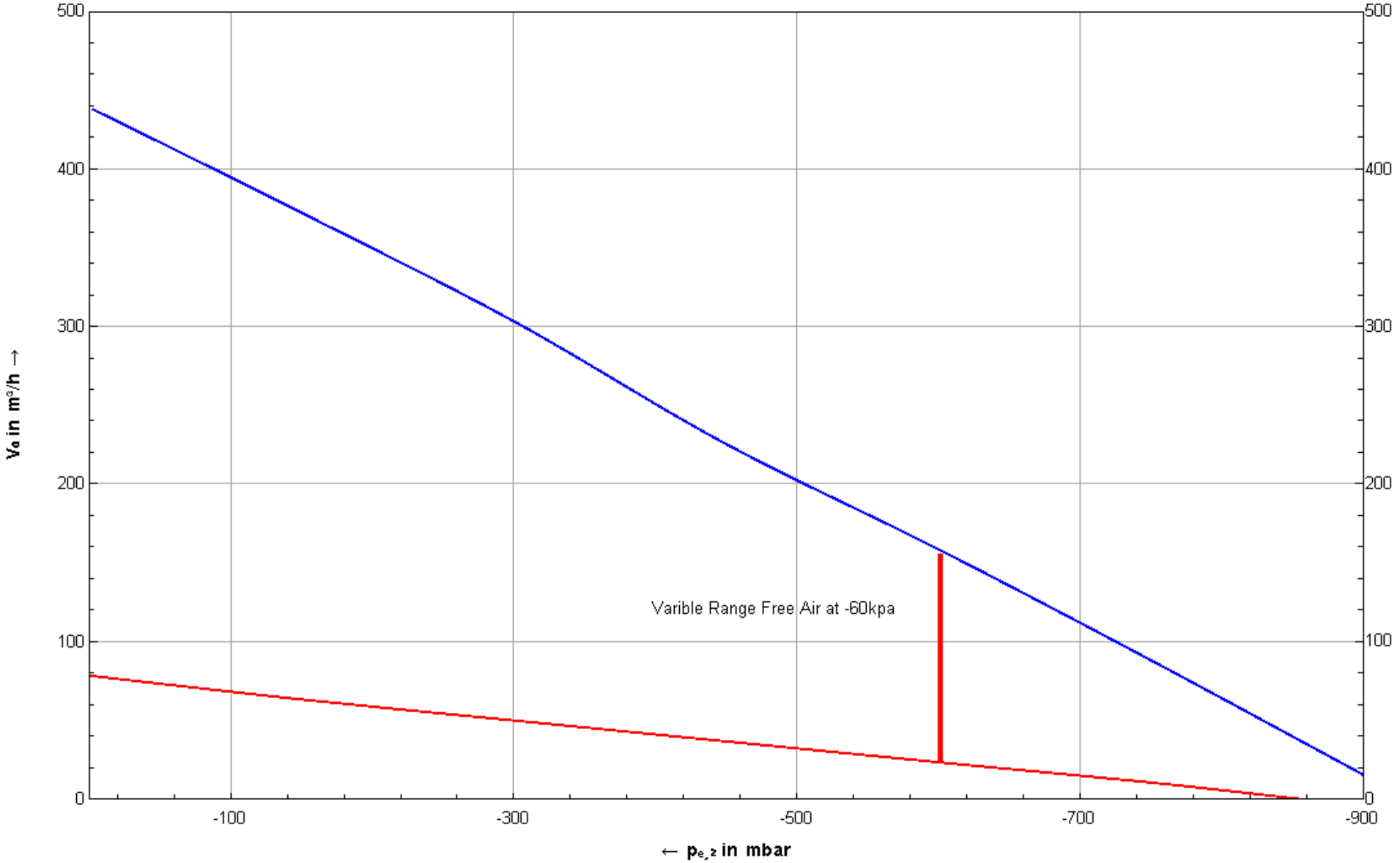
Control programs will have but not limited to the following.

- On/Off/Auto/Manual control for all pumps,
- Adjustable set point for frequency speed control,
- Pump fault output,
- Last pump running output,
- Alarms to operate volt free contacts as well as show on display,
- Individual pump selection,
- A usage meter shall be provided for each pump to allow maintenance to be programmed.
- Adjustable set points,
- Auto restart for in service power failure,
- Auto Lead pump changeover
- Indication of which pump running,
- If last pump running then this to initiate an alarm referred to as “All pumps running”,
- As flow requirements increase the vacuum pressure will fall and the pumps speed up when they reach the set point second and subsequent pump will be initiated conversely when the pumps are running at or above the set point then the pumps will slow and the lag pumps will shut down,

Start-up cycle. On connection of system to power initially or after power failure the system is to run at full speed until the high set point is achieved at which time the pumps will slow, this will then enable the full program to run. During start up all pumps may run however when set point is reached then the lag pumps will shut down.

BECKER

Volume Flow



SUCTION PUMP SYSTEM SPECIFICATIONS	
MODULE	
Arrangement	Self-Contained free standing rack style, receiver in rack,
Qty of Pumps	4 expandable to 6 (3 Pumps for Flow requirements)
Qty of Receivers	1
Design Capacity	150 m3/hr @ -60Kpa Intake Pressure Free Air
VACUUM PUMP DATA	
Make	Becker
Model	KVX 3.140.0-400
Type	Single Stage Oil Free Rotary Vane
Speed	Variable to 1700rpm
Capacity	50m3/h @ -60Kpa Intake Pressure each Pump
Installed Power	4 kW per pump
VACUUM RESERVIOR	
Code	Australian Standard AS 1210 1989/1997
Dimensions	D 390mm x H 1700mm
Capacity	150 Litres
Finish	Paint Dulux Process Blue
MOUNTING – RACK CONSTRUCTION	
Tubing	35x35x3 RHS
Finish	Fully welded and Powder coated BECKER Grey
Nominal Size	W=1800 mm D = 860mm H = 1845mm
BACTERIAL FILTERS	
Make	Becker
Type	Medical Vacuum
Model	FM140
Rated Flow	155 L/min Free air
Drain Flask	Yes
CONTROL SYSTEM	
Type	Variable Frequency drive fitted on each pump
Circuit Breakers	Direct on Line
Function Control	PLC with Touch Screen (HMI)
Motor Overloads	Inbuilt in VFD
Lead/Lag Control	Auto Lead Pump Rotation PLC controlled
On/Off Switch	On/ Off / Auto On Touch Screen (HMI)
Alarms BMS Monitoring	Green Indicator = Normal
	Red Indicator = Low Vacuum, General Alarm (VFD Fault, Transducer Fault, All Pumps Running
	Low Vacuum – General fault Volt Free Contacts
Monitoring	Vacuum Transducer 4-20 mA
Vacuum Level	Adjustable typically -65Kpa to -75Kpa
Hours Run	On touch Screen (HMI)
Pressure Indication	100mm diameter gauge and on Touch Screen (HMI)
Phase Failure	Automatic