

## A new phase of climate cleverness

The Air Change research team has discovered how variable speed drives reduce hospital energy consumption

Hospitals require very precise control of temperature and humidity, and high levels of outdoor air. Cool air must be delivered to operating rooms, even if the airflow is varied.

Outdoor air ventilation is perhaps the single most important element of a HVAC system, influencing indoor air quality, energy efficiency, the control of odours and inhibiting the spread of airborne diseases. However, cooling or heating outdoor air is the most expensive and difficult function for an air conditioning system.

***“The variable speed will respond to suction pressure, which is related to the room’s thermal loading. In other words, the compressor will consume minimal energy to maintain the design room condition”***

The standard Air Change Heat Recovery HVAC range offers Enthalpy or Sensible heat exchangers to pre-condition outdoor air, economy cycle, CO<sub>2</sub> sensors, variable speed drives, return air bypass and desuperheaters.

The next generation of Air Change rooftop units started with the delivery in 2004 of the first Air Change variable refrigeration volume system delivered to the North Shore Hospital in New Zealand. The 52kW rooftop package unit was found by the hospital to provide major energy savings.

The Air Change research team of Herman Chiu, B.Eng (Hons) B.Sc. GDM M.AIRAH, M.ASHRAE, ARC and Andy Soeparto, B.Eng (Hons 1) has now incorporated variable speed compressors as a new option for the outdoor air DX range, to precisely control temperature, humidity and reduce compressor energy usage.



Compressor and Compressor VSD (Variable speed drive)

“Besides controlling temperature and humidity, we also provide exceptional indoor air quality, providing essential oxygen from Mother Nature and eliminating germs and odours,” Herman says. “We achieve this with minimum energy. This system will adjust output efficiently to meet the variable thermal loading of the building.”

The system is designed and manufactured in Australia.

“The variable speed drive provides soft start to prolong the life of the compressor,” Herman explains. “Moreover, the variable speed will respond to suction pressure, which is related to the room’s thermal loading. In other words, the compressor will consume minimal energy to maintain the design room condition.”

The system contains a refrigerant accumulator, lubrication oil separator, high and low pressure switches and hot gas de-ice to protect the compressor under all extreme conditions.

“The most reliable and efficient scroll compressor was selected, and pipe works were designed for vibration-free and minimum-pressure loss,” Herman says. “Over the four years of field testing and ongoing refinement, we believe our system will provide you with ‘green peace of mind’.”

An electronic TX valve regulates the superheat precisely in order to safeguard the compressor under all operating conditions. Other than the TX valve, it contains a pressure transducer, temperature sensor, and electronic controller.

Utilising heat recovery for the introduction of outside air provides numerous benefits of peak-load savings, reduced carbon emissions, improved indoor air quality and reduced operating cost. And now with the introduction of variable speed compressors and variable speed drives to control airflow, the control of HVAC in the hospital environment will enter a new phase of climate cleverness.

For more information contact Herman Chiu, Engineering Manager on 02 9531 4699.

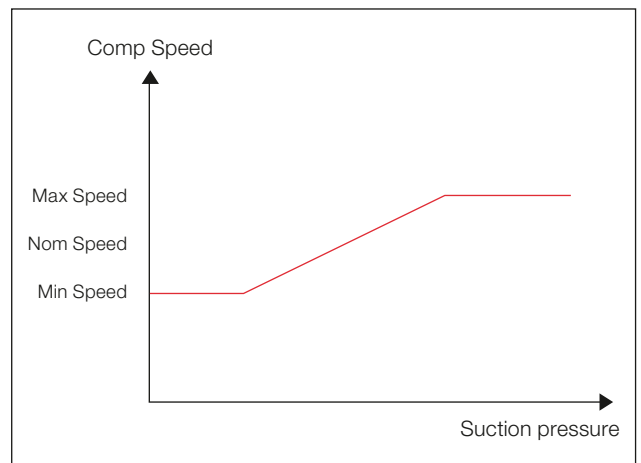


Figure 1: Compressor speed and suction pressure