



ROTARY HEAT EXCHANGERS Pty Ltd

ABN 87 082 031 632

5 Halbert Road, Bayswater, Victoria, 3153, Australia

Phone: +61 409 796 146

Email: bill@ecopower.com.au

Web: www.rotaryheat.com

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VARIABLE SPEED ROTARY HEAT EXCHANGER ROTORS

We use variable speed on our larger RHE's (sizes R2750, R2540 and R2235) for soft mechanical start up and shut down to ensure smooth operation of these large inertial rotors. We program the onboard VSDs for this purpose and they only need to be switched on or off by the control system used in the installation.

WHY RHE'S IN ENERGY RECOVERY/RECYCLING VENTILATION MODE SHOULD NOT VARY ROTOR SPEED TO CONTROL TEMPERATURE

In air conditioning heating and cooling is achieved by the use of equipment such as refrigeration heat pumps, boilers, chillers and evaporative coolers. These involve the use of fans, pumps, compressors and heat exchangers. These heat exchangers could include plate type or RHEs.

The purpose of these systems is to control air temperature and humidity and can involve speed control including that of the RHE rotors used in specific air cycle modes. As the RHE is uniquely a variable heat exchanger its thermal performance can be varied by varying its rotor speed r (rpm). Its thermal efficiency is almost a linear function of r rising from zero efficiency (no heat transfer) when r is zero and plateau at an optimum high value at a relatively low r . For our Australian Mylar RHE's this optimum value is 18 rpm, ensuring that carryover mixing of exhaust and fresh air is kept to an acceptable negligible value.

When RHEs are used to provide fresh air, which is conditioned by recycling the exhaust air energy, they reduce the energy required to condition the fresh air, thus reducing the fresh air load on the air conditioning system. This is called Energy Recovery Ventilation. For this reason, they must always remain running at their maximum performance. That is they should not be VSD controlled to vary temperature. However, the exception to this is when outside ambient conditions become more favourable than indoor conditions. At the point when this occurs the RHEs providing the ventilation energy recovery can simply be turned off so the system provides forced ventilation.

Energy usage can be reduced by reducing the building fresh air intake through the RHEs at the possible detriment of building air quality. A side benefit of reducing airflow is the inherent increase in RHE performance at lower airflow.

In summary, the RHE's for heat recovery ventilation should not be speed controlled for temperature control, as we always need to maximise energy recovery efficiency to maximise energy recovery/recycling. In Economy Cycle mode, we can switch off the RHE rotor.

Yours faithfully

Bill Ellul BE(Hons), MAIRAH, FIEAust

Managing Director

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