

## Self-Commissioning Fancoil Blowers

ebm-papst UK is the market leader in energy-efficient fan products, and its continued research and development of its product ranges now means a wide range of traditional AC fans can be directly interchanged with an electronically commutated (EC) alternative. Not only does this mean more efficient motors but also advantages such as infinitely variable speed control, offering further energy savings, virtually no motor noise and removing the need for external control gear such as transformers or frequency inverters.

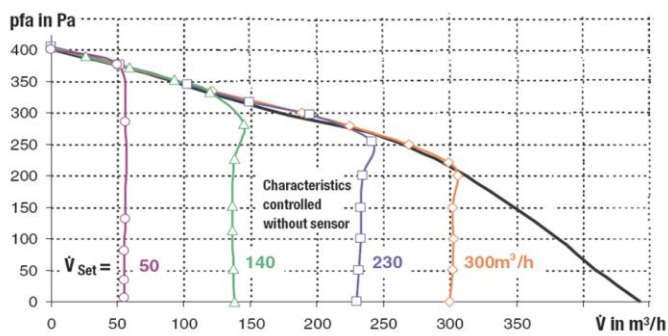
Amongst the latest generation of energy efficient fans is the range of double-inlet blowers fitted with EC motors which are used extensively in fan coil units. These 133mm diameter blowers offer approximately 50 – 60% energy saving compared to the AC equivalents and have the same footprint for easy retro-fitting and installation into current designs. The fans offer a simple 0-10V control input meaning speed can be directly controlled via sensors or a simple potentiometer.

Ongoing development work with OEM's in the fan coil market has revealed a demand for fans which can automatically adjust to provide the specified airflow independent of changing external influences. The amount of airflow being supplied varies on installation due to the type of ductwork being connected and in service due to filters becoming dirty. These changes affect the total system resistance and, with conventional fancoil blowers, lead to a reduction in airflow.



To overcome this issue, ebm-papst has developed a double-inlet blower with EC motor which offers constant volume performance. By making modifications to the control electronics, the performance curve of airflow against pressure becomes steeper (Fig 1), meaning that increases in pressure do not have an adverse effect on airflow.

Taking advantage of the on-board electronics already present on an EC fan, the speed of the motor can be automatically adjusted to compensate for changes to system pressure to ensure that the air volume is kept constant. Extensive development testing of the fan with regard to airflow and motor power measurements means that the fan can determine its current duty point from its own motor speed and current data. No external sensors or controls are required because the built in microprocessor is programmed with special algorithms which calculate the fan speed needed to maintain the required air volume at any workload. If the duty point changes due to external influences the fan compares the actual values against its preset values and adjusts the speed of the motor accordingly to ensure the same volume of airflow is maintained.



**Fig 1 – typical constant volume curve**

Alongside the development of constant volume fans, additional control options have been introduced to assist with the set up and monitoring of the fancoil unit itself. These controllers allow the operator to set up the fan or fans to a desired airflow within the unit. This can be carried out at the factory during manufacture or during installation and commissioning, ensuring that the fan coil unit

is set to operate at the required airflow from initial start-up. With noise being so critical in this market, it would be undesirable for the fans to keep increasing their speed as system resistance increases so the controllers have the ability to cap the speed of the fans at a set point. This ensures that the unit noise level does not exceed the manufacturer's chosen limit. In parallel with this, major and minor alarm functions can be set within the controller to warn of events such as fan fail (no rotation) and filter blockage (high system pressure). As a further aid to commissioning, set up and interrogation of the controller can be carried out via PDA or laptop computer.

As manufacturers continually drive to reduce costs and simplify their production processes, all EC products can now be supplied complete with "plug and play" wiring harnesses for up to five fans and control boards pre-mounted to bolt straight into the fancoil unit or as separate, fully enclosed units.

Initial development of the constant volume EC double-inlet blower utilised the already popular 133mm diameter version but this technology can now be applied throughout the range up to 454mm. With low noise, low heat gain and now constant volume, it's clear that the electronically commutated motor is not only energy efficient but also adaptable, highly controllable and the perfect product for the modern fancoil unit.

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