GreenIntelligence EC Upgrade

Improve the air-side efficiency of your building

ebmpapst

engineering a better life

- *Easy 3-step upgrading*
- *Reduce energy consumption and maintainence cost*
- *Improve reliability and provide built-in redundancy*

GREEN INTELLIGENCE

The leader in EC technology

Introduction

The ebm-papst Group is the world's leading manufacturer of fans and motors. Since it was founded, the technology company has continuously set global industry standards: from interconnected, electronically controlled EC fans and aerodynamic improvements for fan blades to the use of materials that conserve resources. As a wholly-owned subsidiary of the ebm-papst Group, ebm-papst Southeast Asia provides the right solution for your challenges.

Energy Efficiency Standards for Buildings

Singapore, like many other countries in the world, has set the path to reduce its emissions significantly. The energy consumption of buildings itself in the tropical city-state play a vital part in this journey to meet the 36% reduction by 2030. Over 80% of the buildings are targeted to achieve Green Mark certification by then.

Air-side components account for roughly 30% of the energy use in air-conditioning systems of typical commercial buildings. Fans and blowers are the main drivers of energy use, therefore becoming a focal point in energy efficiency efforts. Within the latest Green Mark Standards for both new and existing buildings (GM:NRB 2015 and GM:ENRB 2017), air-side efficiency has become a critical component as initial studies of Singapore's Building and Construction Authority and successful ebm-papst retrofit projects on air-side equipment revealed that there are significant saving potentials left. ebm-papst's GreenIntelligence EC product range addresses these increasing requirements – not only in terms of efficiency but also with respect to reliability, connectivity and redundancy.

What is EC Technology?

EC motors consume on average about 30% less electricity than conventional AC motors - but what is an EC fan and what makes it more efficient? EC stands for 'Electronically Commutated', which means it is a fan with a Permanent Magnet Motor (PMM). EC motors are more efficient than AC motors because they use permanent magnets rather than inducing a secondary magnetic field in the rotor. ebm-papst has pioneered the development of EC motors and fans, which can be connected directly to an AC mains supply rather than a separate DC power supply, making them easy to retrofit as replacement for inefficient AC fans. EC fans with integrated commutation electronics offer a high efficiency across the entire speed range, optimum noise characteristics with minimum installation complexity and overall unmatched cost-effectiveness.

AC vs EC

AC motors are designed to operate at a certain point on their performance curve which coincides with their peak efficiency. At either side of this operating point, the efficiency can drop considerably. EC motors, on the other hand, have an almost flat efficiency curve, which varies relatively little across the speed range. Unlike AC motors, this range is not limited by synchronous speeds and is not as susceptible to voltage fluctuations. This makes the EC fan much more flexible and able to match the performance requirements of different applications while still benefitting from increased efficiency.

Benefits over traditional fan and motor technology:

- Fully interchangeable with AC products for retrofit
- Reduced Energy Consumption
- Significant noise reduction
- Stepless and infinite variable speed control
- Remote monitoring via MODBUS
- Fully integrated mains input power supplies
- Fully sealed electronics

EC upgrade

Easy as 1-2-3

HVAC equipment accounts for 50% of the energy consumption in a commercial building.
But you don't need a complete retrofit or replacement of a system to maximize performance, reduce energy consumption and maintenance costs. Simply switching to variable EC fans in air cooled chillers, air handling units (AHUs) and fan coil units (FCUs) will improve efficiency and cut costs.

Step 1 - Site Survey

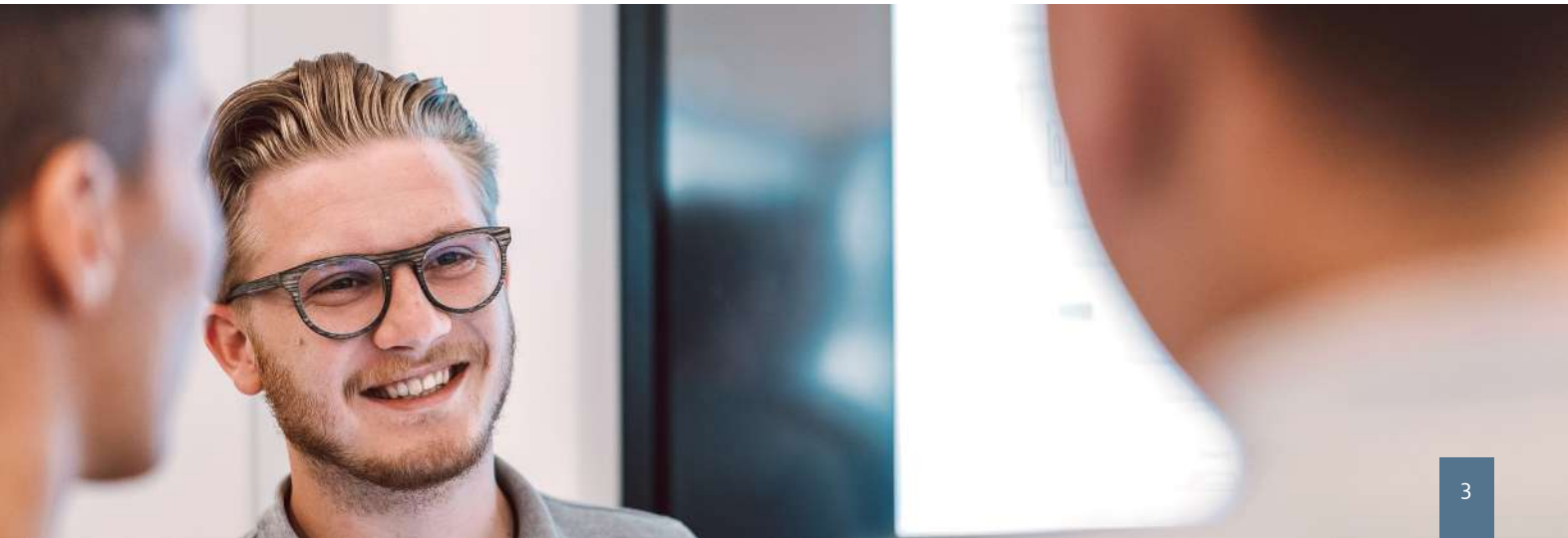
Get in touch with us and we will arrange a site survey of your existing equipment to see what you currently use and what you would like to achieve. Our immense experience with all types of systems means that we can provide you with advice on the possible solutions.

Step 2 - ROI Assessment

After our initial feedback, we will consider your requirements in more detail and provide an estimate of the potential cost savings and payback period. The fan installation cost will also be indicated.

Step 3 - Site Rollout

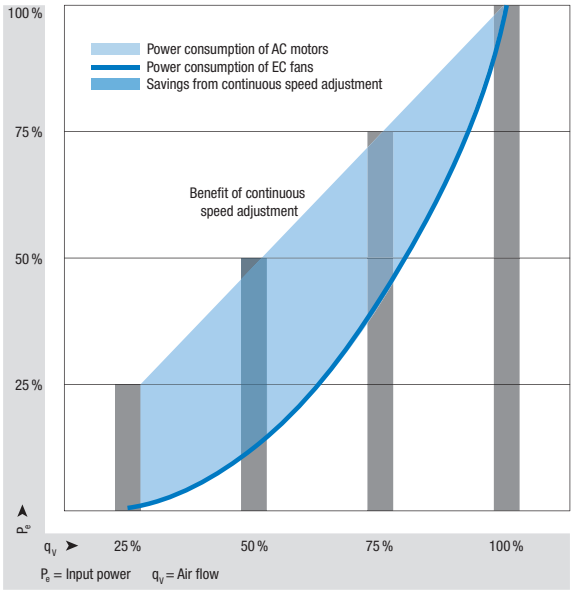
Following a successful assessment, you will have all the information you need to implement a site-wide upgrade. You may even decide whether this is done all at once or in a phased programme over a period.



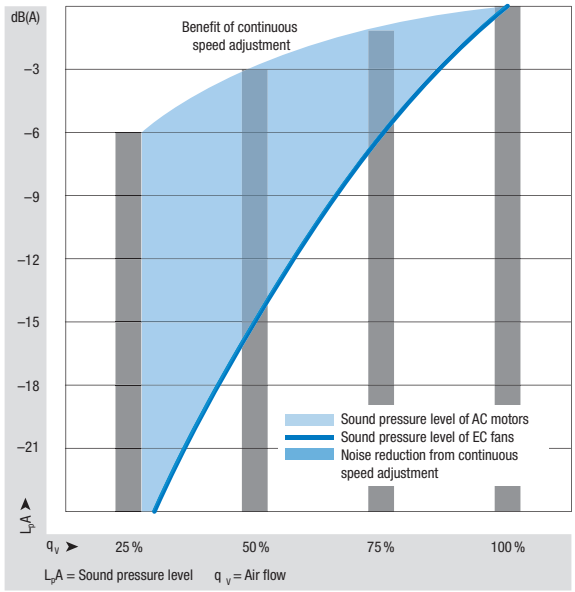
The benefits of EC technology

Speed Control with Advanced Electronics

Having successfully integrated our advanced electronics into the motor, we realized that it would be a waste to not fully utilize its potential. Our large motors have fully programmable networking capabilities for integration with BMS systems. They can also be individually programmed. Constant volume and constant pressure functionality are easily achieved with the connection of one simple sensor or, in some cases, without any external sensors at all. Silent, infinitely adjustable speed control can be as simple as connecting a potentiometer to the motor. Commissioning becomes simplicity itself. The graphs below illustrate the possible energy savings and noise reduction possibilities in a direct comparison between on/off operation and EC variable speed control:



Lower Energy Consumption: The grey bars show the power consumption of fans which are switched on gradually as required (staging). The air performance drops by 50 % if two fans are switched off. The blue curve shows the power consumption with in-built variable speed control, resulting in up to 80% energy savings.



Less Noise: Whereas switching off half the fans (halving the air flow) only reduces noise generation by approx. 3 dB, speed reduction to half the air flow yields an improvement of 15 dB.

The EC microprocessor-based commutation provides further features:

- Alarm outputs/speed monitoring
- Simple speed control (no inverter required)
- Closed loop sensor control (demand ventilation)
- Reduced starting current with soft starting

- High efficiency
- Sustainable design
- Compact size
- Variable control
- Easy monitoring
- Reduced noise emissions
- High power density

Upgrade to higher efficiency

Energy efficiency means lower operating costs. Our centrifugal fans with GreenIntelligence EC technology are so much more advanced than conventional fans systems that upgrading existing units quickly pays for itself.

Furthermore, our GreenIntelligence EC range has a particularly long service life and requires minimal maintenance, which results in further cuts to operating and life cycle costs. Finally, we deliver the fans complete with housing and installed controlled electronics (VSD) to reduce your installation costs to a minimum.

When comparing this to an obsolete belt drive and a flange-mounted motor, it makes the difference clear to see. Instead of connecting multiple components to each other at great effort and expense, RadiFit and RadiPac has everything integrated, combined with minimal size and maximum energy efficiency.

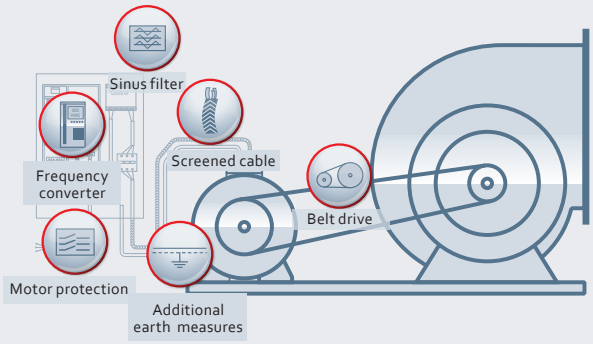
Benefits of GreenIntelligence EC RadiPac Centrifugal Fan

Compact Design.
The high-performance impeller is mounted directly on the rotor of the external rotor motor. This saves space and allows the entire rotating unit to be balanced at the same time.

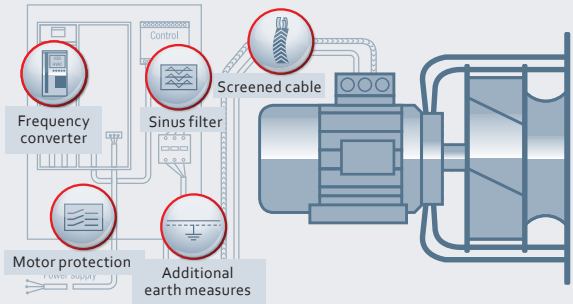
Effective Logistics.
The single RadiPac part number includes all components required for your ventilation demands, making shipping and storage easy – in the fashion of one-stop shopping.

Simple and Safe.
Together, the electronics and motor form one unit. It doesn't just save space, but also ensures easy installation: in this respect, an integrated electronics system for commutation and control replaces an external frequency converter. What's more, as the motor and electronics in the motor system are already tailored to one another, additional electronic filters and shielded cables are unnecessary. To sum it up: there is no need for any costly component matching on commissioning or for earthing and screening work.

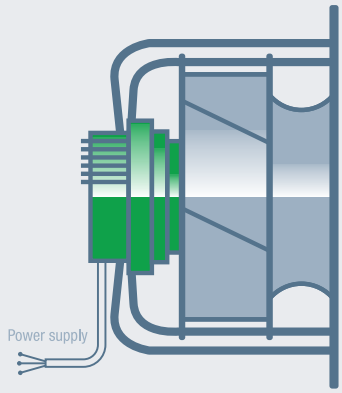
AC Centrifugal fans with Belt Drive



AC Centrifugal fans with Direct Drive



GreenIntelligence EC RadiPac Centrifugal Fan



GreenIntelligence EC Fan

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