



Press Release

Upgrading fans in Heating Ventilation Air conditioning equipment – made simple!

Commercial building owners and tenants are continually searching for ways to improve the performance of their buildings. HVAC (heating, ventilation, air conditioning) plays a vital part in keeping their buildings healthy, not only through ensuring that occupants feel comfortable but also through maintaining the fabric of the building by providing ventilation that helps protect buildings against damp and condensation.

However, one aspect that is often overlooked is the energy consumption of the HVAC equipment, which accounts for more than 40 per cent of a commercial building's energy consumption. Therefore, making it more energy efficient can offer considerable energy and CO2 savings.

It is important to note that improving this aspect of a building's energy efficiency does not require a complete retrofit or replacement of existing HVAC systems. Instead, it is possible to enhance the equipment that is already installed; maximising performance while at the same time reducing energy consumption and maintenance costs.

Even something as simple as adding variable-speed EC (electronically commutated) fans to the chillers, AHUs (air handling units) and fan coil units can save between 30 and 60 per cent on annual electricity costs.

While many new facilities built in the UK already incorporate EC fans into their HVAC equipment, it is often the case that older buildings continue to use inefficient equipment. Rather than investing in brand new equipment, the more cost effective option of upgrading the fans in existing equipment to new high efficiency EC fans is often chosen.

From a Sustainability perspective, refurbishments use fewer resources and create less waste than replacing equipment, while also improving the energy performance of the existing building stock.

One example of the potential energy savings is the applications of AHUs, which are commonly employed in commercial buildings. Although newer equipment may already have energy efficient EC fans installed, there are still thousands of inefficient AC fans installed in AHUs.

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My own company ebm-papst recently surveyed 12 AHUs in central London where the owner was looking for potential energy savings. Having conducted the initial survey, we calculated that to upgrade the AC fans to EC fans meant that minimum savings of 28 per cent were almost guaranteed prior to replacement. This estimation proved to be very modest; in fact the measurements taken after a trial installation confirmed overall savings were in the region of 70 per cent, with a payback of just under two and a half years. This payback was calculated by running the AHU ten hours per day, six days per week, with the savings having the potential to be even greater had the unit been running for a longer period.

The original AC fans consumed 6.3KW compared to the new EC fan at just 1.9KW providing annual savings of 13,727 kilowatts per hour, two tonnes of CO2 and £1,650 for each AHU. The total annual saving for all twelve AHUs was £19,768.

The main reasons for the huge savings were down to two main contributing factors.

Firstly, changing from AC to EC technology, as EC fans are on average 30 per cent more efficient than AC fans (due to motor losses). Secondly, the original fan design incorporated two AC belt driven fans, one running and one for redundancy (in case of belt failure). This meant that the running fan motor not only drove the fan but also pulled the standby motor along with it. The new EC fan is directly driven and as such is maintenance free, which means there is no requirement for a standby motor.

The trial installation was simple and was completed in less than a day, with this including the removal of the old belt driven fans and the installation of a new EC plug fan fitted into a dividing wall plate. In fact the owner was so happy with the results he placed an order for the remaining 11 AHU's.

Other benefits derived from upgrading AC fans to EC Fans include:

- Integrated, infinitely variable speed control;
- Reduced noise;
- Payback periods as low as two years;
- Direct drive motors for maintenance free operation;
- In most cases, EC fans are directly interchangeable with the AC predecessors, allowing for simple replacements with minimal disruption.

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Top tips for recognising EC fan upgrade opportunities:

- AC fans up to 12KW can normally be upgraded, with most HVAC equipment specifying on the model plate what type of fan motor is fitted i.e. motor type, nominal KW rating and voltage;
- EC fans can be supplied in different configurations including backward curved centrifugal fans (mainly found in AHUs and data centre cooling units), forward curved blowers (found in fan coil units), and axial fans (normally fitted to chillers and condensers);
- Any voltage combination can be accommodated i.e. DC or AC single or three phase, as the electronics are fully integrated into the motor.

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