EC-applications

Engergy-saving fans with EC-technology

Systemair

Energy-saving fans with EC-technology

Energy saving, what is it?

Someone who wants to save energy has two possibilities: Either he stops spending energy or he starts to utilise it better, that means: he increases energy efficiency. This includes also the utilisation of so far unutilised energy parts or to put it in other words: all methods which avoid unnecessary transformation of "useful" energy into non-useable energy (above all heat). Functionality and comfort should preferably stay the same.

Why energy saving?

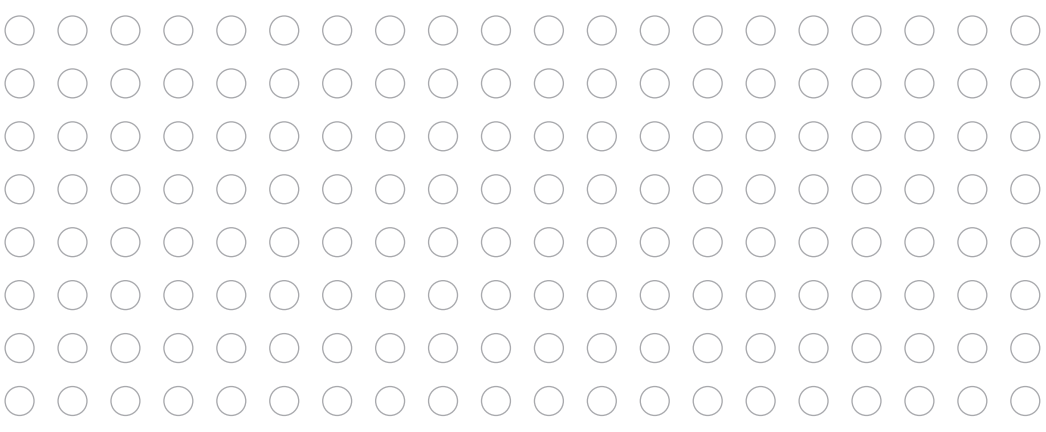
It is obvious. According to a study of the Fraunhofer Institute for system technology and innovative research in Karlsruhe, Germany, old fashioned pumps, fans and compressors consume an unnecessarily high amount of energy. The industry could save up to 2.6 billion Euro per year in operating cost, if motor systems would be optimised. The energy consumption for fans is estimated far more than 200 billion kWh (Europe)* . They consume according to the research 10 to 20 percent to much current. If there will be no measures to save energy in future, the current consumption will have increased from approx. 200 billion kWh to 220 billion kWh in 2020. As, however, the utilisation of fans will even increase during the next years, it is high time to act. Effective measures are demanded.

Fans and control systems

Today almost all fans built into comfort systems are operated with a controller. The goal is to achieve demand controlled ventilation. The fans mostly run with a so-called AC-motor (asynchronous motor). This type of motor transforms energy, which is not used, into heat. Quite a normal process, which is identical for each type of control unit.

Standard control systems of those AC fans are normally phase cutting systems or thyristor units (also called dimmer), which is the most simple version of speed controllers for small fans. For bigger fans either a 5-step or multiple step transformer is used. Such a transformer can easily be integrated into 230V or 400V systems. Both types of speed control are widely accepted. Fans driven by a standard motor (IEC motor) are speed controlled by a frequency inverter.

* Fraunhofer Institute, 2001



Energy-saving fans: efficient and convenient

Thus new, innovative solutions in the field of motors are in demand. EC-motors become because of their economical handling of energy and their excellent controllability more and more important. The so-called energy saving motors are using an electronic control (commutation unit), making the fan generally operate in the optimum modus. This means that the proportion of effective used energy is compared to AC-motors much higher. At the same time energy feed-in is very low. Figure 1 shows the above mentioned fan control systems in comparison with an EC drive. The X axis shows the fan speed in percent of the rated speed. When the fan speed is at 100 %, all fans run at rated power. The figure makes clear that the advantages of the EC drive are in speed controlled area, as they run more energy saving and efficiently when speed controlled.

Systemair energy-saving fans are not only very energy efficient, but also extremely convenient and time-saving to install. There is no need of additional wiring, as connection to a switch board with separate power- and electronic control unit is not required. Besides they can be used almost worldwide, as they work with standard main supply.

For every application the suitable control unit

Control of air volume

Systems intended to provide the service of same air volume all the time are called constant air volume systems.

In such systems the fans automatically adjust to the set air volume. The intelligent and innovative motor technology in the Systemair domestic heat recovery unit VR 400 EV/EC even goes one step further and is able to include a so-called balanced system. An additional sensor is monitoring the supply air and exhaust air to be absolutely equal.

Such systems avoid under- or overpressure in a building, which might be a problem especially with ovens having an open fire system.

Independent from the pressure situation in the system, i.e. by clogged filters, the unit always supplies the set air volume. This innovative system solution offers highest comfort in the area of domestic ventilation.

Pressure control

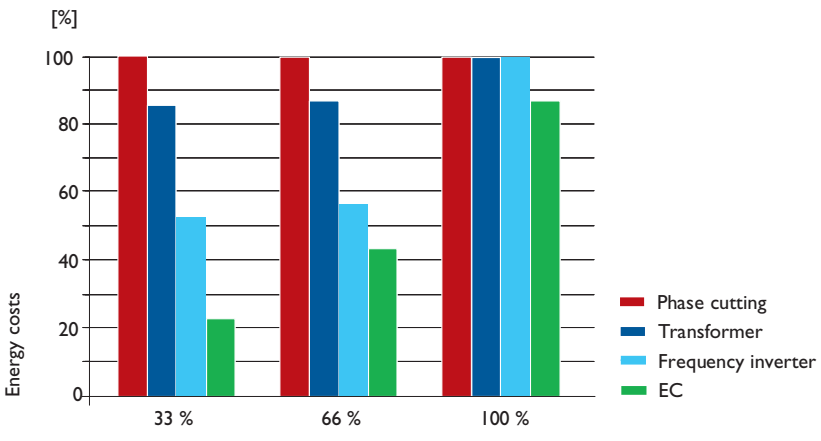
The application of a pressure controlled system offers advantages when the requirements in a ventilation system are constantly changing.

One good example is a typical application in a hotel: the varying use of bathrooms for example, especially during the morning hours, is making high demands on an exhaust system.

The ideal solution is the use of a pressure controlled system.

The installation is easy to handle, as all exhaust air ducts are collected in one common exhaust air shaft. In this exhaust air shaft the complete load, having influence on the system, is being measured. The exhaust air fan, very often a roof fan, is mounted at the end of the system (figure 2). The built in pressure control, as we can find it in the Systemair DVC-P roof fan, controls the fan depending on the load, according to the requirements being currently made to the system.

Figure 1



In the bathrooms electrical exhaust air valves have to be installed. These open for example when the light switch is activated, thus causing a pressure drop in the system. As the control is set to keep a constant pressure, it increases the air volume of the fan until the set pressure is reached. This solution offers a lot of benefits: Beside the energy-savings it stays enjoyably quiet in the bathroom. At the same time the speed adaption effects a minimum acoustic emission. For consultants this complete system offers reduced planning efforts. Systemair provides the whole system from one source.

Temperature control

In modern supply air systems room sensors measure the temperature felt by people, in order to achieve convenient tempered compartment air. Temperature sensors measure a certain upper limit or lower limit and adjust the fan accordingly to run on a higher or lower air volume. The temperature sensor adjusts the fan automatically, without the need of additional control units.

Systemair uses the new EC-technology in type series DVC, MUB-EC, the domestic heat recovery units VR and VM as well as in the compact units Rotovex and Topvex.

Advantages of EC-motors at a glance:

- High efficiency
- 100 % controllable
- Convenient and time-saving installation
- Almost silent
- Nearly worldwide applicable

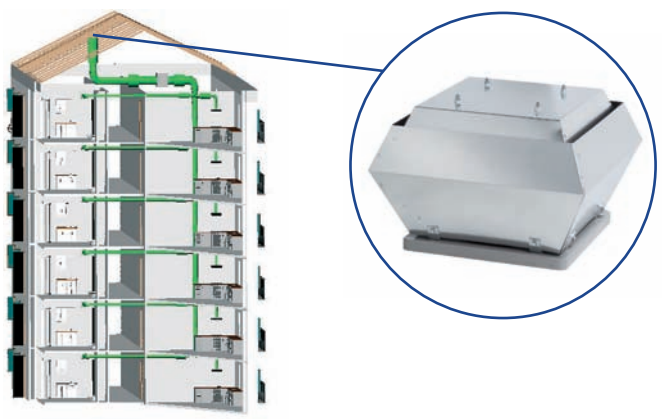
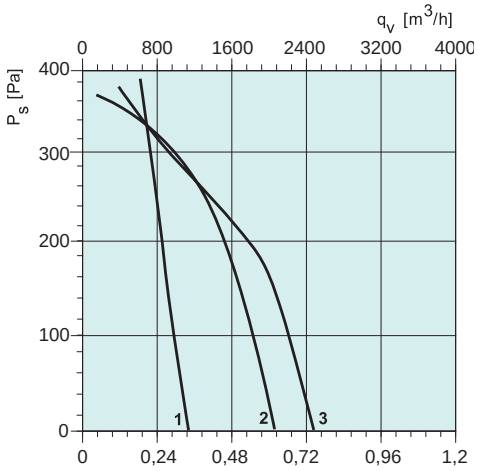
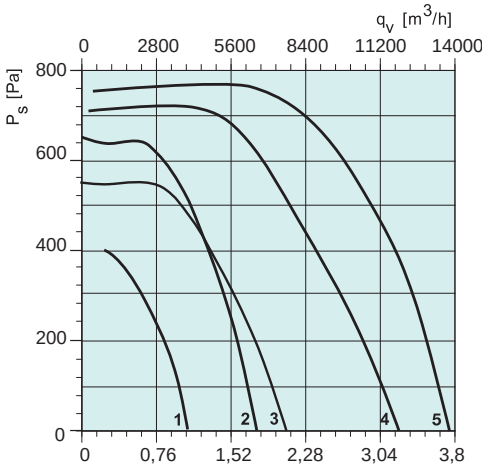


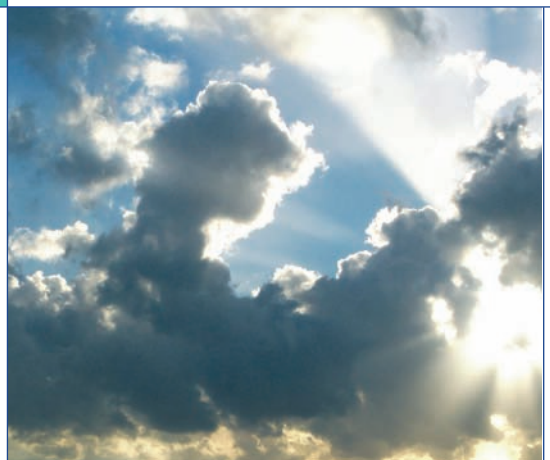
Figure 2



1 **DVC 225EC-P**
2 **DVC 315EC-P**
3 **DVC 355EC-P**



1 **DVC 400-P**
2 **DVC 450-P**
3 **DVC 500-P**
4 **DVC 560-P**
5 **DVC 630-P**



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02/2007 / E4088