"We ensure a good climate", is the mission statement of the technology leader in the HVAC sector. However, good air quality comes at a cost: This is why for many years now the company has chosen energy-saving components. They have been using IE2 as standard for a long time now in order to reduce operating costs to a minimum. The largest German airport also enjoys the benefits of the high energy efficiency.

The trend to save energy can be observed in many sectors. HVAC systems are certainly no exception. For more than 30 years now, Menerga GmbH located in Mülheim an der Rühr, Germany, has been concentrating on minimum energy applications. Based on its decades of know-how, the company sees itself as innovation leader in HVAC systems and offers sustainable efficiency.

The objective is that new technologies and energy-saving solutions establish themselves as quickly as possible in the field. Effective systems to recover thermal energy have proven themselves, especially in climate control systems for indoor swimming pools, one of the key business areas for this company. As a result of this competence, this climate control specialist now has sales offices in 25 countries around the globe. Menerga sets itself apart as it typically supplies complete solutions. The reason for this is that only with completely harmonized and coordinated units can considerable amounts of energy be saved.

These practical experts know that the capital investment costs for HVAC systems are only secondary. The operating costs are far more decisive, and here the energy usage represents the largest percentage. This is the reason that for over 10 years now, the company has been supplying Siemens IE2 motors as part of their drive solution. Ralph Berger, Head of Research and Development with Menerga explained: "Even back then, approximately ten percent of our customers selected energy-saving drive alternatives – with an increasing trend."
Efficiency class IE2 is mandatory

For airflow rates from approximately 5000 m³/h and higher, high-efficiency three-phase induction motors represent an extremely good solution, explained the two experts, who have a wealth of practical experience. Further, EU Regulation 640/2009 stipulates that all systems in this area are equipped with energy-saving IE2 or IE3 motors. This is because since June 16, 2011, only three-phase induction motors with efficiency class IE2 or higher may be marketed in the European Union (EU).

Generally, Menerga only integrates products that fulfill the presently applicable highest standards. As a consequence, the company does not have to retrofit or re-equip the customized climate control units to comply with country-specific regulations. "This speeds up the workflow and increases the cost effectiveness, and at the same time, complies with the applicable energy-saving regulations.

A good example for the use of energy-saving drives is the climate control system in Frankfurt Airport (Fraport AG). There, an existing pier (Fraport "root" or junction) was refurbished and a second pier was built to accommodate the currently largest passenger aircraft in commercial operation in the world, the A380 (pier A-Plus). Each of the 55 Adsolair climate control systems deployed there has two or four radial fans for airflow rates of 10,000 and 50,000 m³/h. These are driven by standard 1LE1 and 1LA9 Simotics motors from Siemens with IE2 efficiency.

First-class bearings

These motors directly drive the fan impellers in order to achieve the optimum combination of cost effectiveness, service friendliness and controllability. For the heavy fans weighing several hundred kilograms, with their correspondingly high mass moment of inertia, in addition to the high power capability and energy efficiency of the motors, Ralph Berger emphasized that there is also another quite important issue: "Siemens uses bearings with outstanding quality for its motors, and as a consequence we have no wear, service or maintenance problems at any of the operational fan units."

According to the experience of the specialists, the jump from IE1 to IE2 in the current projects is associated with an effective energy saving of between four and five percent. This adds up to a huge value in applications operating 8760 hours a year. Many of the Menerga units operate for 8760 hours per annum, i.e. around the clock. In addition to airports, climate control equipment is also used around-the-clock in hospitals, swimming pools and IT systems – and in many other areas. Motor manufacturer Siemens makes the following general statement regarding what this actually means: Energy costs represent approximately 97 percent of the lifecycle costs of a motor, while the capital investment costs represent only three percent.

Energy-saving motors with innovative rotors

For instance, the Simotics family includes the 1LE1 series of motors with innovative rotor technology. As a result of this innovative
technology, Siemens is able to offer IE2 motors with the same frame dimensions as the previous IE1 version. The advantage: When making a change, it is not necessary to modify system and machine designs. It is important to note that IE2 motors have an efficiency that is between one and seven percent higher than IE1 motors.

In Frankfurt airport, the units from Mülheim an der Ruhr provide 100 percent of the climate control. The building sensors in the building control system specify the airflow required. Using the frequency converters, only that power is provided, which is actually required at a particular point in time. The base load is maintained over 24 hours; the demand only quickly peaks when aircraft arrive and depart. A sophisticated climate control system comes into its own especially for these types of peak loads.

According to experts, throttle-based systems to control the airflow are still being used today. This results in high energy usage and means that controllability is only possible within certain limits. On the other hand, since the company was founded over 30 years ago, Menerga has been using variable-speed fan systems; these have been used as standard for 15 years now.

Control systems that guarantee a high degree of flexibility

Further, the company has developed its own control solution, which allows it to flexibly and quickly address all requirements. According to Menerga this also has BACnet certification. This core competence increases the level of competitiveness and cost effectiveness of the company. One example is the ALMA research project, where the climate for 66 telescopes must be controlled in the Atacama desert in Chile. To meet the stringent requirements prevailing at the Chajnantor high plateau at an altitude of 5100 m, Menerga explained that in the end they were the only climate control supplier able to present an adequate solution.

Even if the customized climate control solutions from Menerga have higher capital investment costs than the previous standard solutions, they turn out to have more favorable overall costs for end users. As previously explained, the systematic integration of better and state-of-the-art technology, which is combined to form a complete energy-saving system, is decisive. This is why Menerga works closely with companies like Siemens that share the same ideology as Menerga.

Energy saving with efficiency class IE2

Menerga GmbH in Mülheim an der Ruhr, Germany was founded back in 1980 with a workforce of just 17. It has grown to become a medium-sized company with approximately 460 employees. This continuous positive development is also based on their philosophy

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1 Temperature, humidity and air quality; the room temperature is generally approx. 22 °C with a relative air humidity of approx. 50%
2 standard certification of the American and European BACnet Groups to comply with energy efficiency guidelines
3 Atacama Large Millimeter/Submillimeter Array
that state-of-the-art technology can be leveraged to create energy-saving solutions.

As technology leader in HVAC systems, the company provides ready-to-install, complete solutions. The use of energy-saving three-phase induction motors represented an important milestone in the company's history. Up to 11 kW, 1LE1 and 1LA9 Simotics low-voltage motors from Siemens are used as standard. Clearly understanding that their climate control systems are operated for long periods of time, they already offered efficiency class IE2 many years ago. Today, one hundred percent of the systems are equipped with IE2 motors.
For the climate control of the new A-Plus pier and an additional pier refurbishment, Menerga supplied 55 energy-saving Adsolair climate control units ready for installation – here, the last system belonging to the complete order shortly before being transported to Frankfurt.

Fig. 1A: Menerga
The IE2 motors from Siemens are directly coupled to the heavy radial fans weighing several hundred kilograms. This configuration is simply possible as a result of the first class motor bearings.

Photo: Siemens

LE1 Simotics motors with efficiency class IE2 are just as compact as the IE1 version. This is why the mechanical design does not have to be modified when making a change to IE2.

Photo: Siemens
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