Movement by Perfection

The Royal League in ventilation, control and drive technology

Technical report

Premium-class ventilation technology – the ZAbluefin HR high-efficiency module from ZIEHL-ABEGG

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ZIEHL-ABEGG, the ventilation technology expert, has a wide range of efficient fans in its portfolio. When it comes to meeting the increased demand in the premium class, the ZAbluefin free-running centrifugal impellers, designed according to bionic design principles, and the second generation of the ECblue IE5 drive technology with an integrated controller, which is optimally tailored to the impeller, come together to deliver very high system efficiency, enabling this combination to achieve huge success on the market thanks to its high level of efficiency. But, as the saying goes “Good is good, but better carries it”, so the company began looking for a solution to further increase the potential resulting from the combination of a highly efficient impeller and a powerful external rotor motor, especially with regard to energy-efficiency-related aspects.

The new module

This resulted in the development of the flow-optimised ZAbluefin HR high-efficiency module, whose powder-coated sheet steel housing (colour: ultramarine blue, RAL 5002) has a diffuser effect and therefore impacts the aerodynamics – similar to spiral housing. The new ventilation unit is available in a range of the ZAbluefin-ECblue’s six sizes from 315–560 and in three output variants.

Of course, ModBus can be used to connect to the ZAbluegalaxy cloud application or to integrate the device seamlessly into building management systems.

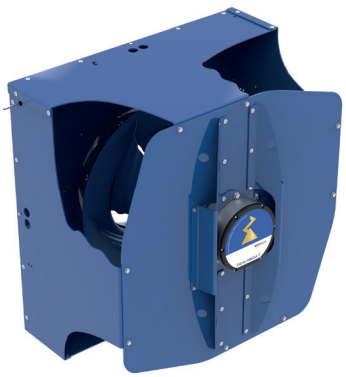

Figure 1 – HR high-efficiency module for maximum efficiency

Efficiency of the module

The innovative design of the high-efficiency HR module with a housing opening on all sides enables the air movement to be optimised, thereby reducing the blow-out speed with the same air flow. This results in a stronger switch from dynamic to static pressure, which has a positive aerodynamic effect and thus results in increased static efficiency.

Turbulence is also reduced, which means that the efficiency of HR modules is only slightly affected when installed. Reaching up to 75%, the maximum static system efficiency increases by 3 to 6 percentage points compared to the standard version (ventilation unit GR). The module can also impress with reduced sound power on the pressure side of 1–2 db(A) in the relevant power range. Because the air is guided more efficiently through the innovative housing, the current consumption of the ECblue drive is reduced despite improved system performance.

The higher acquisition costs are therefore paid off within a very short time. The module has various connection options for pressure sensors to determine the volume flow for testing and monitoring purposes. The pressure measurement line is located safely inside the housing.

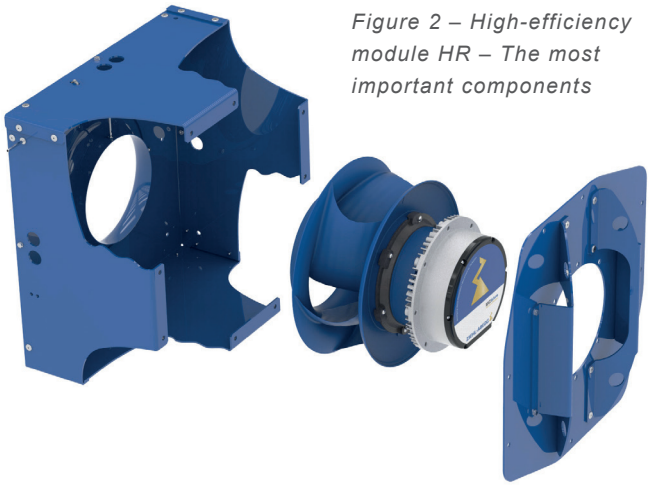

Figure 2 – High-efficiency module HR – The most important components

Dimensions and assembly

With regard to its installation positions, the module follows the strategy “one article number for all installation locations”. This means that it can be installed for both vertical and horizontal air guidance. In addition to use as a single fan, it can also be arranged in parallel mode, which makes a great deal of sense – especially for high volume flows. The external dimensions of the new HR module are larger than the standard ventilation module GR. In order to increase the aerodynamic efficiency, approximately 2.0 x the impeller diameter is needed during installation. However, these aspects are levelled out by the fact that the Ecodesign Directive requires new ventilation systems to be larger so as to achieve the required energy efficiency.

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This proves that the module is fit for the future. When replacing/ retrofitting existing fans, attention must be paid to the modified housing design of the HR module. However, even though it is larger in size, it has the same customer interfaces and connection dimensions as the standard units, so it is possible to switch to the higher efficiency at any time. A crane can be used for assembly.
It is important to note that the additional material required does not result in a negative environmental balance, as all the materials used are recyclable.

Maintenance and care

For maintenance, the unit can be disassembled without a great deal of effort by removing the motor support plate. Cleaning is facilitated by the module design that features large outlet openings and high-quality coating, so that the increased hygiene requirements in the area of ventilation technology can be met. In addition, the impeller, which is made of the high performance composite material ZAmid, generally does not offer any ground for bacteria and does not corrode.

Conclusion

The new high-efficiency HR module is a high-level premium product with maximum system efficiency. The curved lines of the housing not only visually complement the curved impeller, the innovative housing design also increases the power of the ZAbluefin impeller and the ECblue IE5 drive with regard to aerodynamics, which yields crucial energy efficiency advantages. Thanks to the combination of components, each of which meets the highest demands, top values can be achieved for system efficiency. This offers financial and environmental advantages and also allows greater flexibility for fan selection at the same operating point, making it even easier to implement future energy regulations.

The facts at a glance

- Aerodynamic housing
- Connection with a high-efficiency ZAbluefin impeller
- EC drive IE5 with integrated speed control
- Multiple sizes and performance classes
- Connectivity to ZAbluegalaxy
- Very good air flow characteristics
- High static system efficiency
- Reduced sound power
- Integrated pressure tapping for air flow measurement
- Easy to install
- Flexible installation positions
- Can be used alone or in parallel mode
- Future viability thanks to compliance with ErP requirements
- Identical customer interfaces and connection dimensions
- Optimum cleaning and maintenance conditions thanks to design and material

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