

Case study | VLT® HVAC Drive

# EC+ Concept drives **optimal air conditioning** at Volkswagen's Navarra factory

AHUs with axial fans optimized with **VLT® HVAC Drive**

Since 2017, Volkswagen has been intensively investigating the technical possibilities of high-efficiency axial fans and has carried out a whole series of tests, measurements and practical trials. At the beginning of 2018, it was time for the next step: implementation of the knowledge obtained in new air conditioning technology.

Two production sites in two separate countries installed air handling units with new technology and highly efficient axial fans: Porsche in Stuttgart/Zuffenhausen, Germany and Volkswagen Navarra in Pamplona, Spain.



**20%**  
energy  
savings

*The demands placed on the air conditioning of buildings increase steadily. Axial fans can make a significant contribution to combining technical requirements with sustainable building design. The new trend-setting AHU technology installed at Volkswagen has fully met all expectations of Asier Matorell, Factory Planning Manager, Volkswagen Navarra (left) and Axel Rossmannek, Head of Supply Planning, Volkswagen Wolfsburg.*

# Volkswagen Navarra pioneers **sustainable ventilation** technology



Volkswagen Navarra assumes daily responsibility for the environment, safety of personnel, and relations with the local community. These focus areas means resource management and emissions receive special attention.

Through innovation and impressive planning at the site, the goal is to continuously reduce energy consumption and the associated CO<sub>2</sub> emissions.



*NOVENCO ZerAx® axial fans in parallel operation.*

The ventilation had to be completely renewed for one of the largest production buildings at the factory. Higher air volumes were needed and the space available for the installation of the equipment was insufficient. Therefore, a new installation location for the AHUs had to be found on the roof. The large 80,000 m<sup>3</sup>/h units were placed on a steel platform on the connection between two buildings. In addition to saving energy, the criteria unit size, weight saving and noise reduction were therefore also key requirements.



*Connection between fan outlet and duct system*



*Highly efficient axial fan system with aerodynamic design for the highest pressure increase are optimized using VLT® HVAC Drive FC 102.*

## Project overview

AHU manufacturer: Trubel Klimatechnik

Installation location: Pamplona, Spain

AHUs installed:

- 3 AHUs of 80,000 m<sup>3</sup>/h capacity
- 3 AHUs of 60,000 m<sup>3</sup>/h capacity
- Total capacity: 420,000 m<sup>3</sup>/h



*Three roof-mounted AHUs, each with capacity of 60,000 m<sup>3</sup>/h.*

# A new generation in air conditioning

The high demands could only be met with the new generation of air handling units, optimally utilizing the highly efficient axial fans from NOVENCO, with VLT® HVAC Drive FC 102. Performance exceeded all expectations. The ZerAx® axial fans currently represent the world's leading fan technology with fan efficiencies of up to 92%. NOVENCO, however, went one step further by optimizing the ZerAx® even more for use in the air handling units. Here the Danfoss EC+ Concept was an essential contributor to the energy savings.

## Technical scope

- All devices equipped with two parallel supply and exhaust fans
- Newly-developed diffuser 1.5 x D, optimized for free outlet
- New EC motors rated up to 31 kW with Danfoss EC+ Concept and VLT® HVAC Drive FC 102
- New AHU technology leads to 20% energy savings, is 30% shorter and 30% lighter

*The Danfoss-NOVENCO solution relies on the EC+ Concept using VLT® HVAC Drive FC 102.*

## Intelligent interaction of different components

The key phrase here is intelligent interaction of the system components. This interaction is embodied in the term EC+ and is developed in cooperation between Danfoss and NOVENCO. Only the optimal interaction of the system components fan - motor - electronics - diffuser, makes the full potential of a highly efficient fan realizable.

## System efficiency increase

- Axial fans with up to 92% efficiency
- Newly developed EC motors in power range up to 31 kW and efficiencies up to 96%
- Optimized AC drives optimized for EC motors, with up to 98% efficiency
- Newly developed diffusers, optimized for free outlet



## What is the Danfoss EC+ Concept?

When building an HVAC system, to get the highest performance and system efficiency, the individual components – motor, drive and

fan – need to be flexible and broadly compatible with each other. For instance, if you specify a high-efficiency motor that is only compatible with lower efficiency fans, the overall system efficiency would suffer and would not reflect the high performance – and investment – in the individual components.

Danfoss Drives' EC+ concept allows ventilation system designers to combine a VLT® HVAC Drive with the most efficient fan and permanent magnet motor.

## Advantages of the EC+ concept

- Free choice of motor technology: PM, asynchronous or synchronous reluctance with the same AC drive
- Device installation and operation remain unchanged
- Manufacturer independence in the choice of all components
- Superior system efficiency thanks to a combination of individual components with optimum efficiency
- Retrofitting of existing systems is possible
- Wide range of rated powers for standard, PM and synchronous reluctance motors



Photo: Volkswagen Navarra, Pamplona

## Strategy 2025 – Volkswagen on the road to sustainable mobility

The Volkswagen Group is Europe’s largest automobile manufacturer with production sites in seven European countries. With the group-wide future program “Strategy 2025”, Volkswagen wants to get fit for the future with the vision of becoming a world-leading provider of sustainable mobility. Sustainable means also responsible care for the environment. Sustainable growth is the basis of medium-term future planning and the associated increase in value and image of any company. In that context, the new generation of air handling units with axial fans can contribute greatly in all areas of ventilation and air conditioning.

Building & Industry



SCHAKO Group

NOVENCO Building & Industry was founded in Denmark in 1947 and today is a proud member of SCHAKO Group. It manufactures a wide range of efficient and reliable products and systems for ventilation in its 20,000 m<sup>2</sup> production facility. The company counts approximately 200 employees and is continuously expanding. Its parent company is located in Naestved, Denmark, with subsidiaries in The Netherlands, and offices in Germany, United Kingdom and Dubai. NOVENCO products and services are marketed and distributed through a network of subsidiaries and carefully chosen representatives.