

Case Story | VLT® HVAC Drive FC 102

Micheville achieves **high-performance tunnel ventilation** – even with long cables

Ventilation of the Micheville Tunnel in Luxembourg placed difficult demands on the electrical installations. However Danfoss met the challenge and provided a high efficiency, low harmonic, unscreened long cable solution. As a bonus, it also reduced costs by eliminating the need for a voltage booster transformer.



800 m

of unscreened motor
cable performs
interference-free



Micheville tunnel project

The Micheville Tunnel was built to facilitate access to the Belval area and to relieve congestion in the cross-border area of France and the Grand-Duché de Luxembourg by some 25,000 vehicles per day.

For good ventilation safety, the tunnel is constructed as two parallel tubes of 750 m each. A total of 22 ventilation units of 22 kW each were installed.

◀ Geographic location of the Micheville Tunnel.



Working on a ventilation unit.

The challenge: long motor cables and reverse flow

The project demanded high fan efficiency despite long motor cables, and the ability to reverse flow direction quickly.

Variable speed control via AC drives was applied to increase the energy efficiency of each jet fan in function of the requirements. The AC drives are located in an independent technical room at the entrance of each tunnel, which means the length of the motor

cable reaches up to 800 m. With such length, it is normally not possible to carry the high frequency output signal of a drive without significant loss. In addition, the cable would normally have to be screened to avoid the emission of interference, which would further reduce the quality of the signal. The fast reversibility of jet fan direction was required to guarantee a minimum speed of air flow in the event of fire outbreak.



One of the two technical rooms with brake resistors at the end wall.

The solution: VLT® HVAC Drive FC 102

To provide the required energy efficiency and keep the performance of the jet fans as high as possible, fan control was delivered by a VLT® HVAC Drive FC 102 supplemented with an all-pole sine filter. This solution makes it possible to use unscreened cable while complying with the EMC electromagnetic compatibility standards. Thanks to this solution, a voltage booster transformer is not required. The voltage drop is limited

to a minimum at the motor terminals, making this additional investment unnecessary.

To reverse rotation as fast as possible, the drive ensures a momentary over-torque acceleration and dissipates the energy generated by the deceleration on a brake resistor.

Micheville Tunnel ventilation project partners

Engineering consultants : Schroöder et Associés S.A. | Contractor : Socom S.A.

Danfoss Agent delivering technical assistance in Grand-Duché de Luxembourg: General Technic Building Solutions Sàrl