ENGINEERING
TOMORROW

Case story | VLT® HVAC Drive FC 102 with CBM technology

Driving maximum uptime in aseptic pharmaceutical production

The situation

There's no room for error in the world of pharmaceuticals. And that means there's certainly no room for downtime within the mechanical systems of a continuous production cycle.

For these aseptic environments, HVAC plays a critical role in maintaining the highly controlled temperature and air quality. And while it may only take an hour to repair a potential system breakdown, it takes many more to reestablish the aseptic environment—which means many costly hours of lost production time.

Hence, a leading global pharmaceutical company was determined to find an intelligent HVAC solution that prevents downtime with real-time system monitoring and customizable instant alarms. Plus, the solution needed to fit within the organization's ambitious digitalization strategy.

Fortunately, the Danfoss VLT® HVAC Drive FC 102 with integrated condition-based monitoring has done exactly that.

24/7/365

real-time monitoring, alarms, and control with intelligent condition-based monitoring

The challenge

An HVAC breakdown, regardless of scale, could instantly contaminate the pharmaceutical company's production. And that could cost millions in lost production revenue for every hour it takes to reestablish the aseptic environment.

Preventing downtime calls for an intelligent solution that provides on-site technicians with real-time monitoring of the vibration inside an air handling ventilation system. And one that will send warnings and alarms precisely before a breakdown occurs.

The solution

Based on the pharmaceutical company's specific requirements, their engineering team conducted an experiment to test three different vibration monitoring solutions for the HVAC system. Using an Air Handling Unit (AHU) fan system test rig, built-in vibration irregularities simulated real-time changes in the AHU to evaluate the solutions' performance.

We proposed the **VLT® HVAC Drive FC 102 with integrated condition-based monitoring (CBM).** A CBM solution empowers the drive to act as a smart sensor, transforming monitoring data into actionable insights.

The outcome

Out of the three tested solutions, the Danfoss CBM solution was the only one to succeed in capturing the damage to the AHU test rig at the exact moment the faults were introduced into the application. Plus, it succeeded in reporting real-time warnings and alarms proving that the on-site technicians could prevent costly downtime—instead of reacting to an automatic shutdown.

The pharmaceutical company now has the confidence to implement CBM on an industrial scale in their operations with the knowledge that their production facility can operate safely and reliably.

Why the Danfoss CBM solution was chosen

- Detects application changes with warnings and alarms to prevent a breakdown
- Simplifies the implementation with and upgrade of existing drives with broadly compatible edge CBM intelligence
- Records the actual application baseline to indicate real-time operating conditions and stability
- Vibration sensors connect directly to the converter for real-time application monitoring (from lowest to maximum speed of the application) and easy installation
- Changes in operating conditions requiring inspection are indicated by simple color codes on the drive
- Changes in operating conditions are sent via fieldbus to the SCADA production system, Building Management System (BMS), and/or via cloud connection and emails to the defined service team

0

hours of downtime with smart condition-based monitoring

"For us, predictability is essential to maintaining 24/7 production—which is why the monitoring and control of our HVAC system is key to preventing downtime."

Utility Engineer responsible for the pharmaceutical company's project.