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 a continuous production cycle. For these aseptic environments, where a system breakdown results in many costly hours of lost production time, HVAC plays a critical role in maintaining the highly controlled temperature and air quality.

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

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

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.

"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."

Project's Utility Engineer

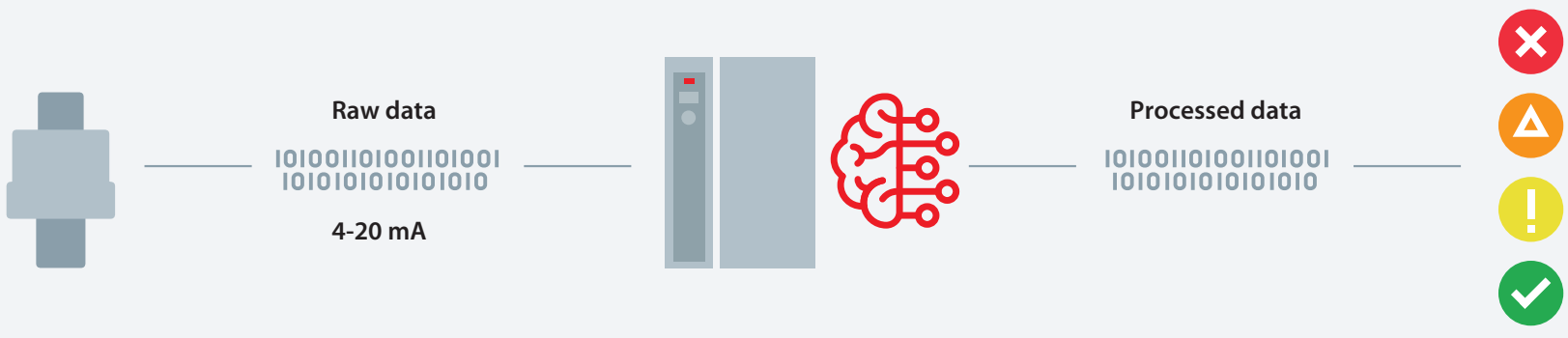
The solution

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.

Danfoss VLT® HVAC Drive FC 102 CBM Solution (Wired)

Uses an intelligent drive to monitor and instantly detect a specified application in all operating modes, from minimum to maximum speed.



Simple wired sensor connection to the drive

Easily establish the application baseline to receive warnings and alarms

Warnings and alarms integrated with SCADA and BMS system

ISO 10816/20816-compliant

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

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