

Fact Sheet | VLT® AutomationDrive FC 302

# Predictive/condition-based maintenance functions – for maximum availability of your application



A breakthrough in drive technology, the VLT® AutomationDrive FC 302 is now embedded with predictive and condition-based maintenance functionality. It allows you to use the drive as a smart sensor to monitor the condition of your motor and application, to detect early issues, and to find solutions before they have an impact on the process.

The condition-monitoring functions being embedded in the drive is a unique feature. It means that the drive can perform these functions without needing a connection to the cloud or to a PLC. However, the VLT® AutomationDrive is capable of cloud connectivity, and the condition monitoring data can be pushed to the cloud. This enables you to monitor a large number of conditions (such



## Condition-based maintenance

The VLT® AutomationDrive FC 302 features functions such as motor stator winding condition monitoring, mechanical-vibration monitoring and load-envelope monitoring. You can set various thresholds and automatically or manually determine the baseline for monitoring with different methods and according to relevant standards and guidelines, such as the ISO 13373 standard for Condition Monitoring and Diagnostics of Machines or the VDMA 24582 guideline for condition monitoring.

Feature	Benefit
Condition-based monitoring function embedded in the drive	<ul style="list-style-type: none"> <li>– Reduced total cost of installation</li> <li>– Condition-based maintenance can be performed also when installation is off-line or not connected to the internet</li> <li>– Condition-based maintenance can be performed without additional components, such as PLCs or SCADA systems</li> </ul>
Motor-stator-winding monitoring	<ul style="list-style-type: none"> <li>– Ability to detect and react to early faults in the motor stator winding before the fault develops into a crippling failure</li> </ul>
Vibration monitoring in application	<ul style="list-style-type: none"> <li>– Ability to quickly detect and react to signs of mechanical misalignment, wear-out and looseness</li> </ul>
Load envelope	<ul style="list-style-type: none"> <li>– Process optimization/maximized efficiency thanks to ability to compare actual system performance with baseline data and trigger maintenance actions</li> </ul>



as stator winding insulation or the vibration level of the application) at plant level, or to perform in-depth cloud analytics.

### Motor-stator-winding condition monitoring

Motor-winding failures do not occur suddenly; they develop over time. They start with a small single-turn short-circuit fault which causes additional heating. The damage then spreads to a level where the overcurrent protection is activated and the operation is stopped, causing unwanted downtime.

The unique Danfoss Drives winding condition monitoring function allows you to shift from corrective maintenance of faulty motors to

detecting motor isolation faults at an early stage and dealing with them during scheduled maintenance. In this way, unwanted and potentially costly machine downtime caused by 'burned' motors can be avoided.

### Mechanical-vibration monitoring

The accelerated wearing out of mechanical parts of a drive system can be avoided by using the VLT® AutomationDrive together with a sensor – an external vibration transducer – to monitor the vibration level in a motor or application.

The available functions are baseline measurement, broadband trending, vibration during acceleration and deceleration and transient-vibration trending.

Vibration monitoring is performed using standardized methods and threshold levels given in standards such as ISO13373 for *Condition Monitoring and Diagnostics of Machines* or ISO10816/20816 for *Measurement and Classification of Mechanical Vibration*. The advantage of performing this kind of monitoring in the drive is the possibility to correlate data with the actual operating conditions, such as steady-state running/ramping, load condition or speed.



### Load-envelope monitoring

By comparing the actual load curve to the initial values determined during commissioning, the VLT® AutomationDrive allows you to detect unexpected operating conditions, for example leakage in an HVAC system. Other instances of issues in applications include pumps which have become fouled or sanded, or fans where the air filters have become clogged.

When a part has worn out, the load curve changes compared to the initial baseline, and a maintenance warning is triggered allowing you to quickly and effectively remedy the issue. This can also help you to save energy by keeping the equipment running in optimal conditions.