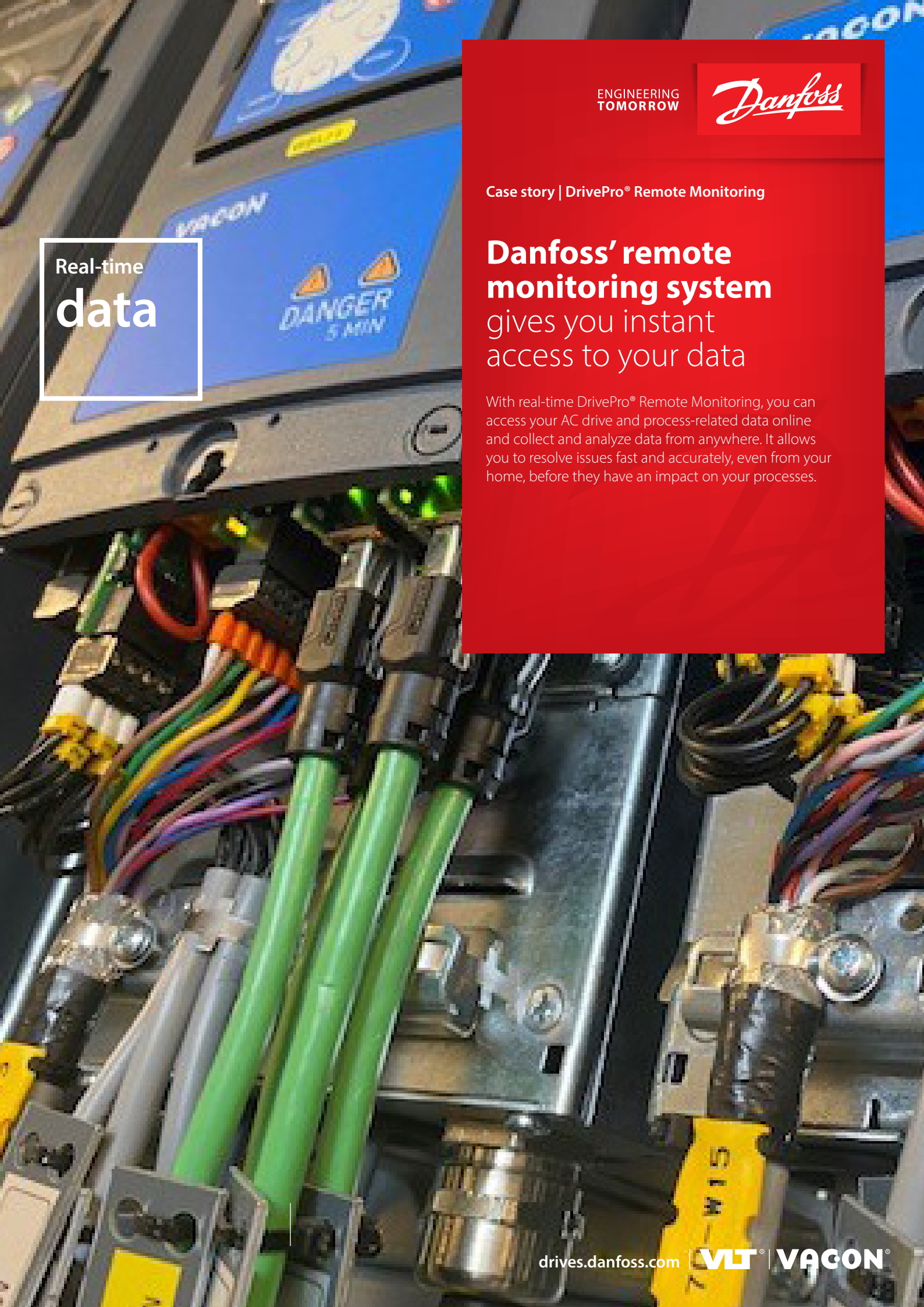

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Case story | DrivePro® Remote Monitoring

Real-time
data

Danfoss' remote monitoring system gives you instant access to your data

With real-time DrivePro® Remote Monitoring, you can access your AC drive and process-related data online and collect and analyze data from anywhere. It allows you to resolve issues fast and accurately, even from your home, before they have an impact on your processes.

DrivePro® Remote Monitoring is a remote condition-based monitoring service from Danfoss Drives. It collects data from the AC drives and presents it to the customer in a way that supports decision making, providing information about the status and condition of the AC drives, 24 hours per day. The service helps to reduce unplanned downtime and anticipate potential failures or service needs, leading to more uptime.

DrivePro® Remote Monitoring provides detailed information about the AC drive and the process. The customer will have access to this information in the cloud-based service at any time and from anywhere. This means that you can monitor your AC drives, even from home, and receive alerts to your device that you can forward further, either to your customer's own maintenance staff or to external service partners. This allows you to react to problems quickly and decide on the required corrective actions.

The service also includes remote expert help. It allows customers to call Danfoss Drives' local technical support, where the technical experts can connect to the service securely, for example, to view the fault log. This reduces visits to the site and makes troubleshooting faster, eventually leading to cost savings. When information is quickly made available to those responsible for maintenance, they are able to decide fast, whether corrective action is needed. This results in the fastest response times.

Information in the cloud **at your fingertips**

Alarms and warnings sent by the AC drive allow you to react to problems quickly. All data, values, and parameters received from the AC drive are stored in the cloud. This allows Danfoss to obtain relevant information that can be used to improve processes, such as maintenance. Furthermore, it is possible to restore the set parameters in the AC drive, for example when changing hardware.

Because all fault information is available at your fingertips, service personnel can view the fault codes and download log files to their own devices. In this way, the data can be analyzed in more detail using Danfoss PLC tools, and decisions on corrective actions can be made quickly.

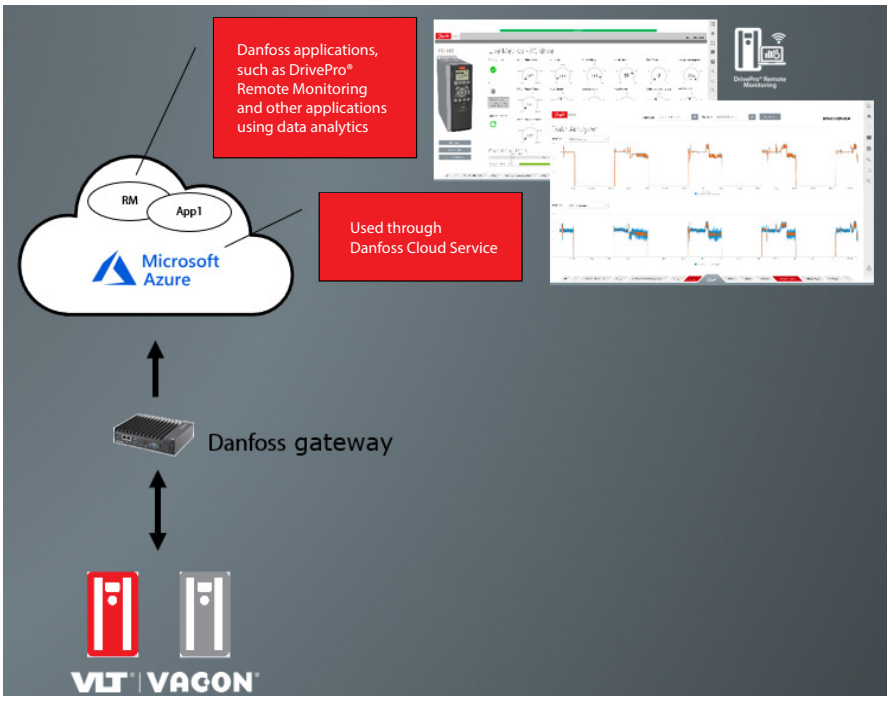
Historical data are important because they can be used to predict failures. For instance, they can anticipate the remaining service life of key components such as fans and intermediate circuit capacitors. Danfoss is currently developing these and other functions based on data analytics and the data history of the AC drive.

"We believe that collecting data to this extent allows us to provide our customers with focused, higher-quality maintenance services. For example, it enables us to better schedule maintenance operations to coincide with planned maintenance downtimes," says Jarno Frusti, who is in charge of product life cycle management at Danfoss Drives.

Smooth **troubleshooting**

By allowing service partners access to fault information, customers can rest assured that they will be able to get help fast, and make quick decisions on corrective action.

The service is available for web browser access through a secure internet connection on any device, such as a computer, tablet, or mobile phone. Just enter your own login details. This means you can access the service at any time and from anywhere as long as you have a live network connection.



After logging in, the customer can see an overview of the AC drive's current status. The most important metrics and the AC drive status are visualized. In another view, the customer can check the serial number of the device, software versions, and option cards installed, for example.

Create an overview of the entire installed device base showing the status of all the AC drives. Or view all the details of an individual AC drive. The summary view features can be adjusted based on the customer's needs, for instance to show the most important signals and indicators necessary for the customer.

The service includes all the parameters of the AC drive and their real-time values. Periodic backup copying of parameters in the cloud service is also included, which makes it easy to copy the parameters to the new device if needed.

Values from the signals selected by the customer will be stored for one year.

The fault history view with fault codes can be expanded so that the customer will receive alarm notifications by email of faults reported by the AC drive and a signal exceeding the set limit. The AC drive itself generates a fault log indicating, for example, what has happened in a Vacon device just before the fault. The fault log is automatically stored in the cloud service, and it is easy to download on your local computer for further analysis using Danfoss's PC tools.

The customer's devices are connected to a gateway provided by Danfoss, which collects and sends data from the AC drives to the cloud. The data collected contain the entire internal data model of the AC drive, including the data from external sensors. The service works on EtherNet/IP-based networks. It is the customer's responsibility to set up the network connection, for example via the office network or a wireless 4G router.

The condition-based monitoring system will be delivered to the customer as a turnkey solution, including:

- The collected data that are stored in the Danfoss Cloud. A dedicated, secure area for each customer.
- Access for the customer to the service through a web-based portal.
- Configuration of the system to connect the agreed AC drives to the cloud service, the required gateway devices, and any necessary updates.
- Remote support.

The service does not include:

- On-site maintenance, repair, or spare parts.
- Option cards and cabling.
- Monitoring of customer devices by Danfoss.
- Organizing a network connection, location of gateway devices, and arrangement of cabling. These tasks are done in collaboration with Danfoss.

Experiences of a **Danfoss Remote Monitoring System** from a supplier's perspective — **Nordautomation**, Raimo Tarkka

Nordautomation Oy is a market-leading manufacturer of log-handling technology. Established in 1991, Nordautomation Oy is a specialist in project deliveries for the wood processing industry, providing state-of-the-art technical solutions for its customers mainly on a turnkey basis.

"Our aim at Nordautomation is to deliver top-quality equipment, and that is why we only accept selected suppliers as our partners," says Raimo Tarkka, Electrical and Automation Manager at Nordautomation. He continues:

"We have been cooperating with Vacon Oy and Danfoss Drives for a long time. We must have been one of the first companies to introduce VACON®AC drives. Initially, we purchased VACON® NXS units for saw infeed and log handling as well as for other sorting equipment. We cope pretty well with Danfoss firmware applications, but for electric kickers we use a special application particularly designed for this purpose. All of these devices are VACON® NXP drives that tolerate heavy duty use and allow us to run the system at maximum power.

Mika Matila, Key Account Manager for the sawmill industry at Danfoss Drives, contacted Nordautomation regarding DrivePro® Remote Monitoring.

Many customers have asked for a service like this, and we were willing to try it out. We want to be at the forefront of saw technology applications and the top supplier of projects in the sawmill industry. Nordautomation did not even notice that we did this extra thing, as Danfoss Drives took care of its part, and the entire process took place in parallel with other activities," says Tarkka.

Remote monitoring helps dimension drives

Through remote monitoring, Nordautomation receives valuable information used to optimize the operation of drives, for instance, when planning the power requirement for their sawmill equipment.

"When we receive data over a long period of time, we can examine it and determine whether our drives have been correctly dimensioned. Nordautomation does not use data from remote monitoring for preventive maintenance but rather to control the behavior of AC drives. It is important for us that our equipment starts even in the cold of winter.

"I am optimistic regarding remote monitoring and believe that it will bring us the benefits we are looking for. We are interested in finding out whether the calculations regarding the need for power for our equipment have been correct or if we should increase or reduce it somewhere," says Tarkka.

Collaboration with Danfoss Drives will continue in a similar manner.

"Especially customers from major corporate groups have been inquiring a lot about DrivePro® Remote Monitoring."

Tarkka enthusiastically praises the technical experts at Danfoss Drives who are always ready to help. "We particularly appreciate that Danfoss Drives has not left us alone, and they are always available to help. With implementations taking place on a tight schedule, it is important to us that we get help immediately — not in a week's time."

Experiences of a **Danfoss DrivePro® Remote Monitoring system** from an end customer's perspective — **Keitele Timber Alajärvi**

Keitele Timber is a forerunner in sawmill technology, and the company's Keitele sawmill is one of the largest production plants in Finland. Its strengths include highly skilled personnel and environmentally sound and efficient operation. The company supplies high-quality, cut-to-size softwood from Finland, pre-sorted and shipping or specially dried.

In 2013, Keitele Timber Oy acquired a plant in Alajärvi in South Ostrobothnia, exclusively focusing on the production of pine. The production capacity of the sawmill in Alajärvi is 300,000 m^3/year.

Seppo Paananen, Development Manager at Keitele Timber, visits the Alajärvi production site frequently. Because of the coronavirus, visits to the Alajärvi sawmill have become fewer, so the benefits of remote monitoring of AC drives in observing the performance of the lines have become apparent.

"Keitele Timber Oy had a need for a new log-sorting plant, so we purchased an area in Alajärvi, covered with wood and coppice. We felled the trees and carried out an earthmoving project. The new location of the Alajärvi log-sorting plant is better than the previous one, as it has a private connection to Pyhälahdentie. The plant is located a good distance from residential areas that are not expanding toward the plant, so we will not cause disturbance to other activities in society. The Alajärvi log-sorting plant, fields, and machine base are a modern and environmentally friendly whole," says Paananen.

Keitele Timber's long-standing cooperation with Vacon dates back to the late 1990s, when Vacon Oy was called Vaasa Control Oy.

VACON® AC drives were introduced in the various Keitele plants already in the early 1990s, including Keitele Energy Oy's heating plants from 1993. These AC drives have kept running until today, with maintenance performed as needed. The AC drives used in Keitele Energy Oy's heating plants are all VACON® units.

In 1997, a sorting and packaging plant was built in Keitele where all the AC drives were VACON® units. Since then, VACON® AC drives have been initially installed in the Keitele Timber Kemijärvi and Alajärvi heating plants, glulam factories, and dry kilns. Keitele Wood Products Oy's Keitele and Kemijärvi production plants are leading producers of glulam in Europe. All AC drives installed in the glulam factory have also been VACON® units. The device base at the Alajärvi production plant only comprises VACON® units.

Keitele Timber is a forerunner in sawmill technology and always wants to use the latest technology. "We don't want to be left behind, and we hope that the AC drives in particular have such good and advanced features that, using them, we can get the most out of our machines. Our own electrical engineers have always been happy to use VACON® products from Finland, which come with product support closely focusing on customer needs. We can also obtain spare parts and replacement products from Finland," says Paananen.

Remote monitoring makes the operations immediately more efficient and offers many other benefits in the future

Mika Matila, Key Account Manager for the sawmill industry at Danfoss Drives, contacted Keitele Timber in the autumn of 2019 regarding Danfoss DrivePro® Remote Monitoring.

"The discussion was excellent on both sides because the customer immediately understood the benefits that remote monitoring would bring to their process. A longer-term preventive maintenance plan is an investment that saves money," says Matila.

In early 2020, discussions were initiated with Nordautomation that supplied Keitele Timber's Alajärvi sawmill with log-sorting and saw-infeed machines. In June 2020, the introduction of remote monitoring started at the Alajärvi production site.

The remote monitoring screen features can be adjusted based on the customer's needs, for instance by selecting the most important signals and indicators that the customer needs to monitor. For the moment, Danfoss Drives is planning development ideas for Keitele Timber's remote monitoring view based on the data collected.

"Delivery of the remote monitoring was a success, and the entire process was very painless. We can eliminate downtime by analyzing data over a longer period of time, and we have already received suggestions for improvement. It helps us plan the half-yearly and annual maintenance better," says Paananen.

Seppo Paananen is currently viewing real-time images of log sorting at the Alajärvi sawmill via their own camera system.

"For instance, in case of an alarm, we can start troubleshooting via remote monitoring of AC drives, even from another location. It enables locating the fault in the line quickly and drawing conclusions on whether the fault is caused by the AC drive or if there is some other fault in the line. This can be seen from the stored AC drive signals. The long-term approach supports our own systems very well."

"In remote monitoring, we were attracted to an idea of devices being viewed by more than one pair of eyes and potential problems being solved by several people who look at things from different perspectives. We are interested in seeing how remote monitoring can optimize operations in the most efficient way. Remote monitoring provides real-time information for many different parties—OEMs, electrical engineering, Keitele Timber, and of course Danfoss Drives —for product development purposes, for instance. By combining all this information you always get one step further. If others take three steps, we'll take four so we are always one step ahead of the others," says Paananen.

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Remote DrivePro® Monitoring is available for the following AC drives:

VLT® HVAC Drive FC 101/102
VLT® Refrigeration Drive FC 103
VLT® AQUA Drive FC 202
VLT® Automation Drive FC 301/302

VACON® NXS product family
VACON® NXP product family
VACON® 100 FLOW
VACON® 100 Industrial
VACON® 100 X