

Case Story

# Reliability a focal point for Danish Crown with Integrated Motion Controller

The VLT® AutomationDrive FC 302 with Integrated Motion Controller (IMC) has solved a costly problem for the Danish meat processing giant.

**30,000**

EUR annual savings  
on motors alone,  
thanks to IMC



*The VLT® AutomationDrive FC 302 with Integrated Motion Controller provides 100% precise positioning, so that meat processing employees can prepare the pig carcasses before the organ extractor takes care of the rest.*

## The world's most modern meat processing plant

Since September 2004, the food industry giant Danish Crown has made Horsens, Denmark, its home. At the "super slaughterhouse," as it's been dubbed, more than 20,000 pigs are processed each day – placing heavy demands on machinery, the employees and, in particular, the technology behind it all. In 2016, the company launched its five-year strategy, known as "4WD." It is, in part, a growth strategy, but it is also a plan for optimizing production throughout the concern. The strategy aims to put greater distance between the company and its competition, in the form of increased payments to the suppliers (the farmers)

compared to the competing meat processing companies. Implementing this strategy will place significant demands on both personnel and equipment, which is why options for optimizing flow and regular maintenance, as well as reducing costs, have been considered.

Danish Crown has approximately 1,000 VLT® drives installed throughout its plant in Horsens, where they control everything from simple conveyor belts to more advanced applications. One of the most advanced applications is an "organ extractor." The organ extractor has given rise to sizable challenges in recent years, as the it was previously controlled by a closed-loop

servo solution. The motors had to be replaced up to 37 times a year, as the resolver's fine mechanics had trouble functioning optimally in the meat processing environment. The application runs from 6 a.m. to midnight, Monday through Friday – and that places great demands on the technology.

## 100,000 pigs weekly - a demanding operation

The previous servo solution had been in operation since the opening of the plant in 2004. However the many motors that had to be replaced each year as a result of wear and tear from the servo solution prompted the plant

engineers to hunt for a more robust alternative. When they learned that the well-known VLT® AutomationDrive was now available with the Integrated Motion Controller solution, they immediately saw an opportunity to switch to a simpler, more stable solution.

### **Savings of over EUR 30,000 annually – on motors alone**

Ole Toft Madsen, an automation engineer at Danish Crown, had considerable experience with VLT® drives, and therefore did not hesitate to commission the two new VLT® AutomationDrive FC 302 units with Integrated Motion Controller himself. In spite of the new functionality, the operation and set-up are the same as ever in the well-known AC drives. Together with Danfoss Drives Service, they managed to implement an effective solution which, since November 2017, has run problem-free at the plant.

“We put the solution in operation in November, and since then we haven’t had a single ruined motor. In fact, the motor we’re using now is one of the discarded ones we had from when we used the servo solution,” Ole explains.

Ole also points out that, because they no longer have to replace motors so often, they are not only eliminating the cost of the equipment, but also the man hours incurred each time a motor had to be replaced. As if it weren’t enough that a new motor used to cost the company EUR 1,100, an employee would of course have to replace it – and that took about an hour of labor each time. During that hour, the organ extractor could not operate and that part of the operations came to a halt.

### **Integrated Motion Controller as alternative to a servo solution**

With Integrated Motion Controller (IMC) functionality, an ordinary VLT® AutomationDrive FC 302 takes on complex positioning and synchronization applications, to thereby provide significant savings. Furthermore, the set-up and operation uses the same, well-known user interface of the VLT® drive.



*The VLT® AutomationDrive with Integrated Motion Controller provides significant cost and time savings at Danish Crown.*

Positioning and synchronization are typically performed via a closed-loop servo system – this in spite of the fact that many of these applications do not require the dynamic performance of a servo system. This was also the case at Danish Crown, where the previous solution with servo control was not really necessary.

### **Many advantages with the new Danfoss Drives solution**

As Ole Toft Madsen notes, the significant savings are not the only advantage provided by the new solution. Danish Crown originally chose Danfoss Drives for several reasons:

- Stability, which ensures reliable production
- Simple operation of all VLT® drives

- Easy set-up that makes for fast commissioning and servicing

### **Everything is used – nothing is wasted**

At Danish Crown, the motto rings clear: “Everything is used – nothing is wasted.” All pigs must pass stringent control inspections and are measured so that each production line knows where the knives must enter to achieve the best result.

That is why the slaughterhouse employs staff to prepare each pig before the organ extractor takes care of the rest. The Integrated Motion Controller plays an important role in this process, as it provides precise positioning which, based on the size of the pig,

ensures that each animal is optimally cut up. Danfoss' solution provides open-loop positioning with a PM motor that allows for very precise positioning, without encoder/resolver feedback.

"One complication with this application, however, is that the knives sometimes hit bones that cause the motor to "hop over" one or more magnets. Because there is open-loop control, as a consequence the position is no longer correct, and the solution to this consists of 'homing on the fly' using a simple sensor that automati-

cally corrects positioning deviations each time the sensor is adjusted," explains Ole Gernhøfer, a Danfoss Drives product manager. "We've managed to avoid reconfiguring the mechanical design, and currently we still use one of the motors that had originally been damaged with our servo solution," says Ole. "Since commissioning, we've only seen ordinary wear and tear on the application, but we haven't yet had to replace any motors. Before, we had to replace the motor every other week, and we often had to replace the knives, as well, because they quickly became dull.

Thanks to the ramp function of the AC drive, the motor now gets off to a softer start that is gentler on our knives, which means we save both time and money," Ole Toft Madsen concludes.