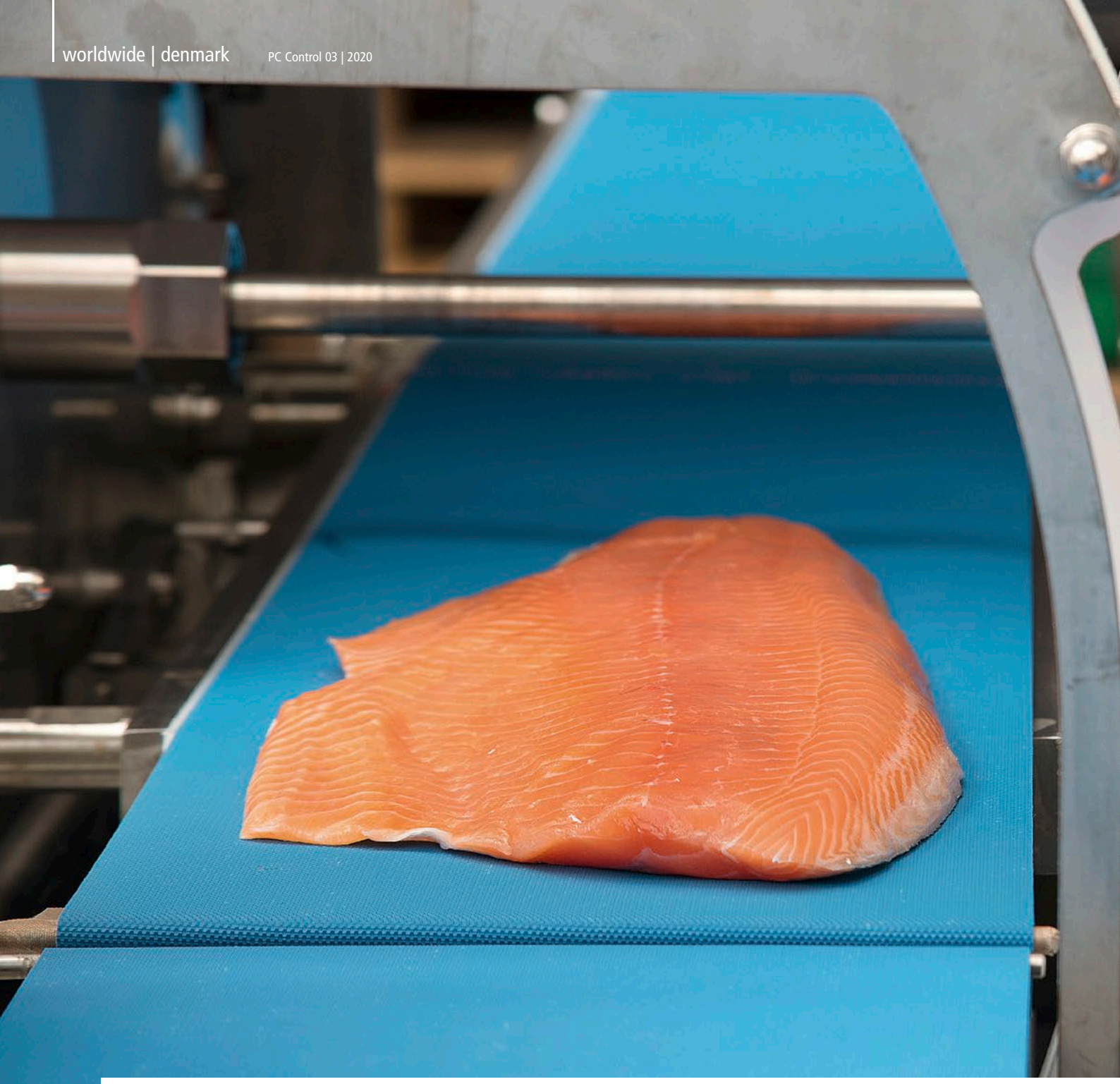


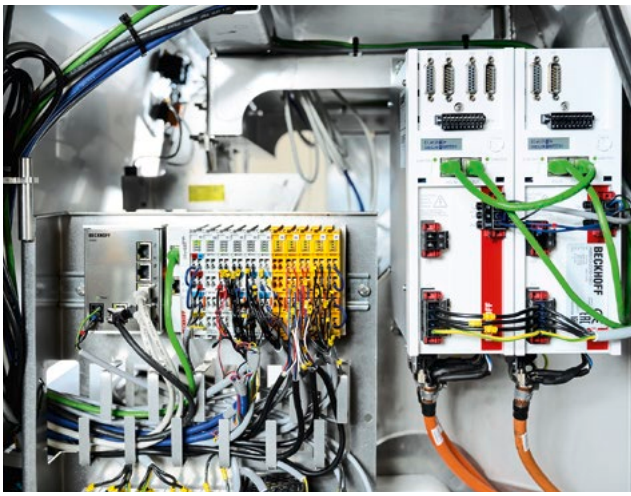
Portion cutter for fish and poultry

Extremely fast and highly precise meat portion cutter leverages PC Control

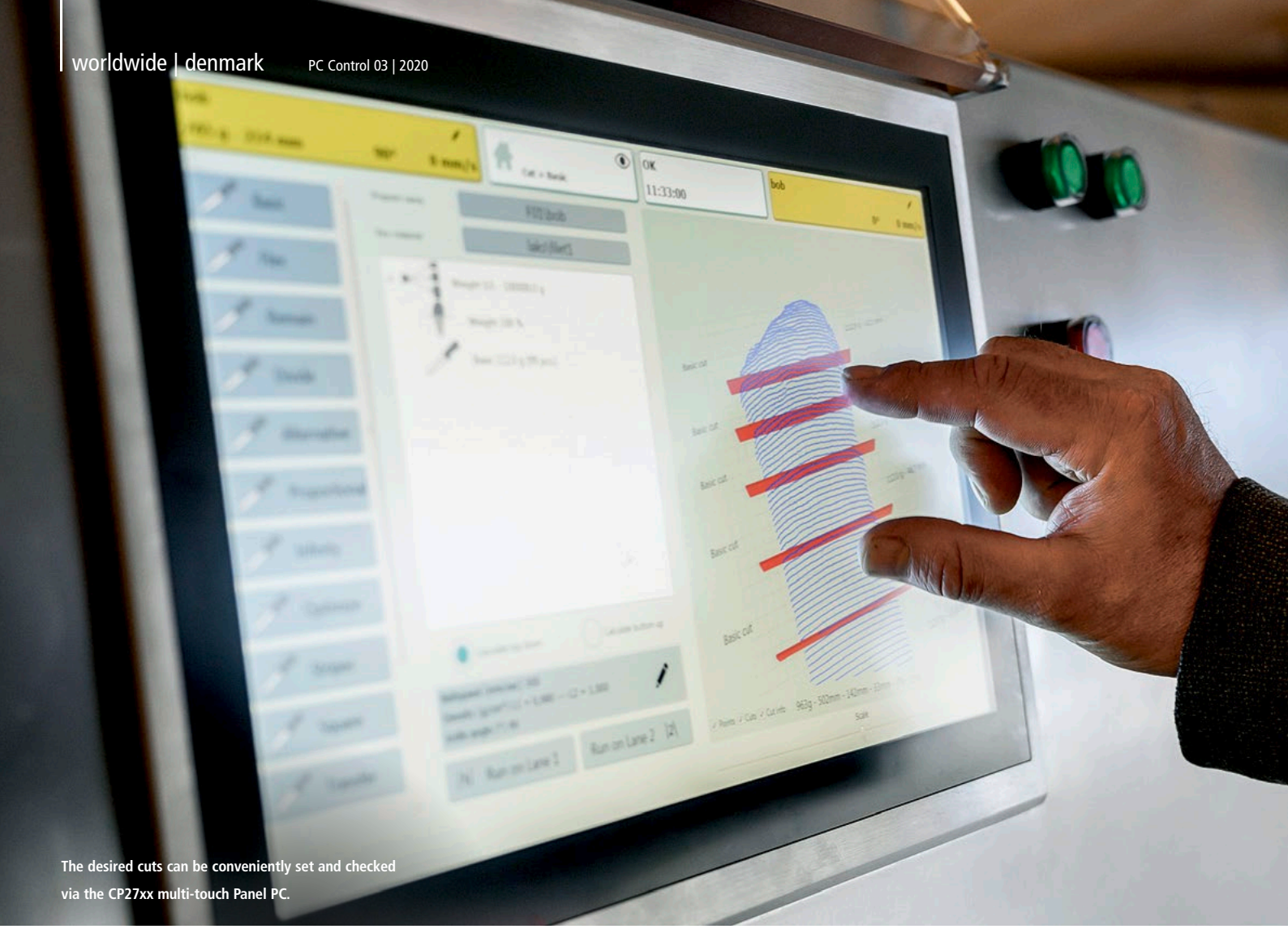
Danish company Borncut A/S, located in Rønne, has developed what they believe to be the world's fastest and most precise portion cutter for the food industry, based on specially developed software and the open control platform from Beckhoff. Fish or poultry is divided into exact portions in a flash – with knives that rotate at speeds of up to 200 km/h and can make over 2,100 cuts per minute.

The cutting blade (right) rotates at speeds of up to 200 km/h.

The Borncut BC225 portion cutter can process up to 4 tons of fish in just one hour to produce almost any number of individual pieces, cut to the desired weight and prepared for vacuum packaging. Speed and precision are key competitive parameters in the food industry, because even an apparently small increase in processing performance of, say, 0.5% can result in significant annual production cost savings. Gorm Sørensen, co-founder and CEO of Borncut, gives an example: "A processing challenge arises when foods such as fish and poultry are irregular in size and shape. It is difficult to cut them into equal



The EtherCAT and TwinSAFE terminals (center) and the AX5000 Servo Drives (right) enable a compact control technology design with minimum cabling effort, largely through the One Cable Technology used for the drive technology.



The desired cuts can be conveniently set and checked via the CP27xx multi-touch Panel PC.

At a glance

Solutions for the food industry
- portion cutter for fish and poultry

Customer benefit
- user-friendly machine operation
- blade speed of up to 200 km/h, more than 2,100 cuts per minute
- 3D scan of the food to be processed

Applied PC Control
- EtherCAT
- CP27xx multi-touch Panel PC
- TwinCAT PLC
- EtherCAT and TwinSAFE terminals
- AX5000 Servo Drive
- AM8000 servomotors

pieces and minimize cutting waste. If, for example, 10 tons of salmon are processed per day, a machine output optimized by only 0.5% can save around DKK 5,000, which adds up to around DKK 1.25 million – or around 170,000 euros – per year."

Fast EtherCAT communication increases machine performance

Peter Mikkelsen and Gorm Sørensen founded Borncut in 2016 with the aim of developing the most innovative portion cutter on the market. "With all due modesty, we have achieved our ambitious goal," says co-founder and software developer Peter Mikkelsen. "The tremendous machine speed is primarily due to the high-performance of EtherCAT communication. This is because EtherCAT enables the control components in the machine, i.e. PLC, servomotors, safety module and our own high-speed camera to communicate with each other very rapidly. This results in an extremely efficient process flow. At the same time, our machine requires minimum manual intervention since it uses network-compatible standard solutions. Neither the end user nor we have to touch the Industrial PC when we want to update the software. This means we can focus on our core competence, i.e. high-performance cutting algorithms."

Gorm Sørensen adds: "We know the market very well, so it was easy for us to define how we can stand out from the competition. With the right hardware, we were able to develop a user interface that is unique in the industry. In fact, we created the manual for the machine before the machine itself, to ensure that the focus is consistently on the user, not the technology."

The Borncut BC225 portion cutter – shown here as dual lane version – can carry out more than 2,100 cuts per minute.

Top right: Gorm Sørensen, co-founder and CEO of Borncut: "The control technology from Beckhoff enables us to build a machine that is based on open standards and achieves the desired high levels of speed and precision."

Bottom right: Peter Mikkelsen, co-founder and software developer at Borncut: "The high machine speed is mainly due to the EtherCAT communication protocol."

Borncut machines are available in single or dual lane versions, i.e. with one or two infeed belts. The corresponding setup can easily be changed via the CP27xx multi-touch Panel PC. The machine can be adjusted exactly to the desired portion size using drag-and-drop functions. In addition, the machine data can be called up as required for comparison with other production data.

A special feature is the integrated high-speed camera that scans the food on the belt. The camera captures 250 frames per second and displays a 3D image on the Panel PC. In this way, the end user can see exactly where the cuts are made. "The faster the volume of the fish or poultry can be calculated, the faster the food can pass through the machine. For example, in order to obtain only the best pieces or to cut the fish into different sizes, the cutting blades can be conveniently adjusted using the drag-and-drop function, and the cuts can be accurately checked based on the 3D image," explains Peter Mikkelsen.

Reliable machine operation is crucial

Borncut places high demands on the control platform, especially with regard to operational reliability and service. This is because the machines are used for a wide range of different food production processes, and it is therefore important that they can reliably and quickly be adapted to new functions without equipment downtime. A standstill would have significant consequences for the end users, as the machines are often part of large processing lines with many operators. In addition, the food to be processed usually has a short shelf life at normal temperatures, and short delivery times are essential. Should a machine failure occur, it is crucial that the fault can be quickly located and rectified.

"It is important to us that we use as few components as possible, with minimal cabling. This makes the machine more reliable and easier to maintain," says Peter Mikkelsen. "The Beckhoff Panel PC in conjunction with TwinCAT PLC provides a powerful platform that combines all the necessary functionalities in one controller." Gorm Sørensen adds: "PC-based control from Beckhoff enables us to build efficient and very reliable machines. The openness of the system makes it very easy to integrate third-party components such as the high-speed camera, which gives us additional options. Another key factor is our good cooperation with Beckhoff, who took note of our requirements right from the start. Beckhoff staff were quickly available on site when the need arose and offer excellent service. The innovative solutions perfectly complement our own philosophy."

More information:
www.borncut.com
www.beckhoff.dk