



"A Device That Never Sleeps"

Location:

Aalen, Germany

Segment:

MOEM

Problem:

Development of a fully automated doner robot

Solution:

HMI/PLC XV102

Results:

The drive controllers are connected via CANopen to the XV102 HMI/PLC. The xSoft-Codesys-2 programming software enables the program to be implemented directly in the controller in compliance with IEC61131-3. The developer uses Eaton's Galileo project design environment for creating the visualization.

Contact Information

Paul Knodel
Sales Representative
Paul.Knodel@Eaton.com

Christian Buecker
Trade Press Manager
ChristianBuecker@Eaton.com

The technology used is simple and inexpensive. It nevertheless still offers a high degree of flexibility.

Günter Huyer, Alkadur RobotSystems

Background

"The Doner Robot": This was the name by which the SCR-Vg 2.1 fully automated doner kebab slicing robot gained its popularity far beyond the borders of Germany. The inventor of the robot is Duran Kabakyer, general manager of Alkadur RobotSystems GmbH, and the device was programmed by Günter Huyer from HuyerSolutions. "The Doner Robot" is controlled and operated via the XV102 touch panel from Eaton.

Challenges

In doner takeaways things are usually hot in the true sense of the word: Orders are taken, pitta breads are prepared and in the meantime, the meat is cut in the heat of the doner grill. This is mostly done by hand with a knife or with an electric doner cutter. This brought Duran Kabakyer to the idea of developing a fully automated doner robot: "I have worked as

a doner chef myself for many years, and was always annoyed at the fact that, although I have a sausage cutting machine and an electric dishwasher, there is no fully automated doner cutting device. I then came to the idea of developing this type of robot myself," Duran Kabakyer explained.

Solution

The benefits of the doner kebab slicing robot are obvious: As well as simple operation and tremendous flexibility, clean, precise slicing is possible – 24 hours a day, if necessary without interruption. With a daily output of up to 300 kg and a continuous cutting capacity, the doner kebab slicing robot is a valuable assistance for the daily work. Furthermore: You don't have to be a specialist to cut the meat properly. This means that time for training is unnecessary. In future "the Doner Robot" could also considerably simplify the work

in doner factories since the "fully automatic slicing" setting enables the meat slices to be cut without the operator having to be present.

The Doner Robot is controlled by four stepper motors. "Brushless DC motors are used in the device. The drive controllers from miControl are connected via CANopen to the Eaton XV102 HMI/PLC. This gave us a lot of flexibility in the configuration," explains programmer Günter Huyer. The optical detection is also technological highlight: the integrated optical sensors of the robot are used to locate the doner spit, position the knife and cut down the meat with millimeter precision. The development had the challenge of finding the correct machine setting for cutting, since the meat changes in heat. However, Günter Huyer and Duran Kabakyer found a solution for this as well.

"The technology used is simple and inexpensive. It nevertheless still offers a high degree of flexibility," Günter Huyer emphasizes the benefits and explains further:

"Programming the Eaton XV102 is really easy since the CoDeSys-based xSoft-Codesys-2 programming software enables the program to be implemented directly in the controller in compliance with IEC61131-3." The HMI/PLC also impressed on account of its small mounting depth, which ideally suited the limited space available on the left-hand column of the robot. The color touch panel with a 3.5" screen diagonal and a smooth front panel is easy to clean and easy to operate. The flexible menu guidance in any required language enables the machine manufacturer to sell his machines worldwide with just one hardware and software solution. The developer uses Eaton's powerful and comprehensive Galileo project design environment for creating

the visualization. Furthermore: He intentionally did not use the separate I/Os on the controller: "The controllers of the stepper motors already feature inputs and outputs onboard. Everything we need, we get from there, and thus save costs," Günter Huyer explains.

The display enables different operating modes to be activated. The left and right arrow buttons can turn the spit for cutting in one direction or the other. If the "Switchoff/knife sharpening" function is selected, the Z axis moves right down and the knife can be sharpened. The robot is also shut down in this position at the same time. The "Start/stop grill" function starts the grilling manually and the spit moves past the grill. If one of the slicing module buttons is actuated, the grill starts automatically. If the "Slice strips" button is selected, the operator can program the number of slices and modify the level of the light source via a setting screw – in order to thus set the required slice thickness. The robot also offers another key benefit: Whilst conventional doner knives can only cut up to a certain point on the core of the spit, the new automatic cutting technology of "the Doner Robot" can considerably increase the amount of meat cut from the spit. The spit of the fully automated doner robot is designed for meat cones of up to 60 cm in diameter and a maximum height of 80 cm – this corresponds to a weight in meat of 150 kg. The first doner robots have already been delivered to customers – in Hamburg, Bremen, Munich and in Switzerland. Duran Kabakyer is very optimistic about the future: "I assume that at least one "Doner Robot" will soon be in operation in every major German city."

Results

Günter Huyer sums up: "We chose the Eaton controller not least because we appreciated the support from the company. Moreover, the price performance ratio is absolutely outstanding. We have no regrets about choosing the Eaton controller since it is tailor made for our application."



The menu guidance of the touch panel is extremely flexible and intuitive



"The automation solution from Eaton is ideal for 'the Doner Robot'. The touch display operation is child's play and the entire PLC is also integrated." Duran Kabakyer, general manager of Alkadur RobotSystems GmbH