When it comes to automation, Stork MPS relies on Beckhoff technology

Robots make their entrance in the meat industry

Stork MPS, located in the Netherlands, claims to sell more meat processing advanced slaughtering and logistics systems worldwide than anyone else in the industry. The company contributes their success to continuous development and commitment to innovation.

Stork MPS developed two fully automatic product lines with support from the Beckhoff distributor, IAL (Industrial Automation Link). The two lines are the F-line slaughtering robot and the MM-Meat Mover, warehouse and management system based on Beckhoff components.

The meat processing industry must adjust their production and marketing techniques in order to meet the industry's high quality and safety standards for food stuff. More and more stringent requirements in terms of meat quality and hygiene with simultaneous cost pressures require advanced processing systems, in order to produce valuable food stuff from animal products.

F-line – a new generation of modular pig slaughtering robots

For the development of F-line, Stork MPS deliberately chose a modular system. The basis is a universal motion generator with state of the art control technology. A variety of machining tools are used for the different production stages involved in processing the product.

The basic element of each F-line component is an anodized aluminum frame with servo drives for movements in the X-, Y- and Z-axis, which are controlled by the Beckhoff Industrial PC C6140 and the TwinCAT software PLC/NC. I/O interfacing is via Bus Terminals and Profibus DP. The controller configuration is identical for all F-line modules. The only difference is in the tools used.

Jos Out, general manager of IAL, explained: "Accurate meat processing is a highly complex tasks and is carried out with TwinCAT NC I, the NC system for interpolating path movements". TwinCAT NC I offers 3D interpolation (interpreter, set value generation, position controller), an integrated PLC with NC interface and I/O connection for axes via the fieldbus. "Every year we supply approximately 50 systems consisting of IPC, TwinCAT and Bus Terminals to Stork MPS", said Jos Out.

"Contact-free" operation

The synchronized robot, which is mounted stationary, moves with the animal carcass during the operation. Synchronization is ensured through mechanical connection with the slaughtering conveyor belt. This means that fewer tools are required for positioning and fixation, and contact with the animal carcass has to be made less frequently. "Contact-free" operation significantly reduces the risk of cross-contamination. Furthermore, in contrast to manual processing, machines offer consistent hygienic performance, thus ensuring consistent product quality and significantly higher yield.

The fully automatic F-line robot modules are suitable for a wide range of processing capacities and carcass weight classes. The crucial advantage of this system is the option to quickly convert or adapt existing systems, and to expand them with new functions. Different processing capacities can be realized through the installation of one or two tools within a frame, or through the installation of machines in series.

Standardized operator training, lower maintenance effort and fewer specific replacement parts are further significant arguments in favor of the F-line modules. Furthermore, process automation reduces labor costs, results in ergonomic improvements in working conditions and reduces the risk of injury.

Meat Mover – state of the art control for storage and management

If a dynamic storage system or shelving system is used, the Meat Mover manages the handling of the boxes. The type of warehouse and the storage or retrieval function determine the respective device type for box handling. Servo drives are used for horizontal transport (movement of the Meat Mover in X-direction) and for lifting (movement of the lifting device in Y-direction). Both drives are equipped with electromechanical brakes. The brakes are only active during maintenance and in an emergency. The Meat Movers are also controlled by a Beckhoff Industrial PC and Bus Terminals.

A bar code scanner at the box handling device identifies the box. The scanner is connected to the Beckhoff Industrial PC via Profibus. In 1998, Stork MPS started to replace the so-called "position cards" with PCs based on Windows NT or Windows 2000 and TwinCAT, thus enabling integration into a system. One of the benefits of PC-based controls is the option to process enormous amounts of data, since a whole range of statistical data are stored for each animal carcass.

Remote customer service

Via a modem connection, system support staff from Stork MPS can analyze the required statistics for a certain machine at any time and immediately rectify a fault, if necessary. The system can be configured to automatically send an e-mail to the Stork customer service department in the event of a machine failure. In theory, it is therefore possible for Stork MPS to be aware of a problem before the customer himself becomes aware of it.

PC-based control enables preventive maintenance measures to be carried out remotely. If, for example, a knife gradually becomes blunt, a message appears, indicating that it should be replaced within a certain period. In this way, the machine creates its own maintenance schedule and enables Stork MPS to schedule their own customer service staff effectively, and to keep the spare parts stock down to a reasonable level.

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