

Auxpama

Bread Cutting Machine with Sysmac



AUXPAMA is a company located in Badalona and dedicated to the design, manufacture and installation of machinery for the processing sector of bread. With over 25 years in the industry, has always been a standard bearer in the implementation of new control technologies, providing solutions for advanced features.

AUXPAMA has, for years, with Omron as a technology partner in their control systems.

Recently, AUXPAMA has released a new version of Motion Control based machine. Call to greatly facilitate the work in bakeries, is an automatic cutter trays for bread carriages. The aim of the machine is making the cut surface (scarification) in loaves of bread before being baked.

For this new machine, AUXPAMA, along with technical advice from Omron, chose to incorporate the new automation platform Sysmac. The control architecture consists of the controller NJ501, as the cornerstone of the system, using its integrated network port EtherCAT to synchronize with Motion where nine G5 series servo motors are connected. The Ethernet / IP, also integrated in the controller, is reserved for connecting with the NS8 HMI, where all machine parameters can be controlled. The Ethernet port also allows the machine to communicate with the factory host systems (such as SCADA for data collection) and remote connections for remote maintenance.

The fermented loaves are placed in corrugated trays. These trays are placed in a car for floors. Once the operator has placed the carriage in the machine and the cycle has started working, raises the extraction module and cutting to detect the position of a tray by a photocell. The tray is removed from the carriage and the shear module is moved above the tray. Through an analog photocell recorded the heights of the different bars in the channel. This allows the cutting head, comprising an XY axis, making the cut at the height of each bar recorded. The cutting head has a bar with several blades that are making the incision in the bread dough.

Lifting module comprises two independent axes, which raises the extraction module and cutting. Due to the impossibility of uniting the two axes with a mechanical system and a single drive, we decided to mount two servo motors where one acts as master and one slave. By a simple instruction MC_Gearin, the two axes remain linked.

The extraction module has an axis which is responsible for performing the extraction and insertion of the tray in the car once it has been cut. Being able to work with the Jerk in Motion

function blocks has allowed rapid movement, yet soft, without damaging the trays in handling.

The shear module has an axis that moves the cutting heads. Each cutting head is formed by two axes XY with a horizontal and a vertical displacement. These two axis are synchronized with the displacement axis and its movement performed using electronic cams, CAM, for profiling of the bar. Working with CAM was really easy with the cam editor available Sysmac Studio.

The fact of working with libraries PLCopen function blocks simplifies the work in the Motion, as well as compliance with IEC 61131-3.

NJ-501 is a controller capable of performing high-speed PLC 500 microseconds to 64 axes that supports and controls up to 192 EtherCAT slaves. An integrated microprocessor 1.56 GHz Intel Atom running a Real Time Operating System (Hard Real Time OS) that give the driver the same characteristics of reliability and robustness that characterize conventional PLCs, but more computing power , performance and management among others.

One of the strengths of this platform is Sysmac Studio software that allows all programming to the entire system from a single software. All this, with simple tools for monitoring and testing of axes, has allowed AUXPAMA's technicians to perform and launch the machine in less time than previous solutions. Thanks to sophisticated auto tuning systems to adjust in a simple and fast all Drivers G5.

Another feature that facilitated the programming of the machine was the possibility of structured ST language programming in Ladder program, which gives the system great flexibility and convenience in programming.

NS screen manages all machine parameters and provides information to the user equipment status. It has a powerful recipe where all cutting parameters are stored, such as type of cut, length, depth, width, etc..



With the new automation system AUXPAMA can highlight the following advantages:

- Based on PLCopen programming standard
- Less time required for system implementation
- More powerful programming to be able to use new features such as Data Structures
- Performance Test Tool axis that allows movement without having adopted program
- Simulation of motion of the axes (including 3D models), which simplifies the pre-engineering
- Editor of CAM tables, simple and fast to implement, for cutting new formats
- Diagnostic screen all machine parameters for each axis
- Working with SD memory cards to send to the client recipe modifications for incorporation into machine.
- One software for configuring, programming and monitoring.

With this new control system, AUXPAMA has clearly optimized the machine, reaching movements to make the total cut of a car at 2.45 minutes (the previous design, based on pneumatic, was in 6 minutes). Today, AUXPAMA has already installed more than 8 machines with Sysmac platform, with the machine controller NJ-501 in different models of cutters.