

From wood to window frames in 60 seconds

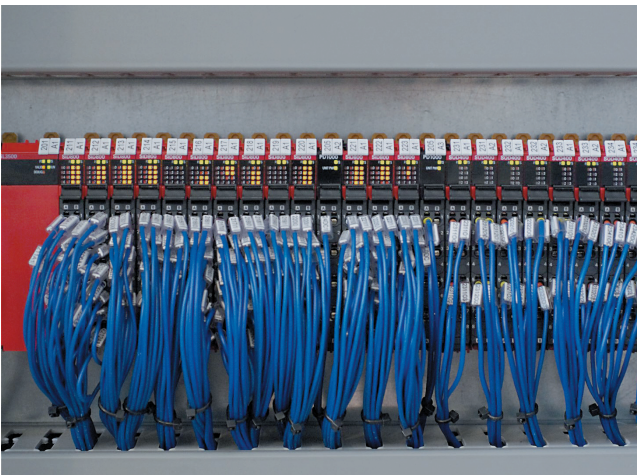
Thanks to our Sysmac platform, Working Process, located in Rivergaro, Italy, revolutionised the machining of wooden frames, using a single automated line, and all completed in accordance with the relevant safety standards.

With more than 16 years of experience in developing woodworking machines, Working Process [holder of CML and WP trademarks], understood the needs of the window frame market, creating innovative solutions to simplify processes and reduce operating costs.

These skills were funnelled into the design of a new production line for windows frames, developed for a French brand industry leader.

The solution, with a total length of about 120 metres, was designed with the aim of improving the level of automation and reducing downtime. It also allows operation by relatively unskilled labour. From a simple rough wooden rod with a length of approximately six metres, the machine is able to produce five pieces, completely finished; lathed, milled, drilled, squared, profiled internally and externally in all the details - in about 60 seconds.

"Our mission is to improve the level of flexibility in a rigid manufacturing industry" explains Filippo Schegginetti, marketing manager of the company. „Today, thanks to the collaboration with a partner like Omron, we are able to perform several processing steps, that before were independent, with just one production line. In practice, from the raw element we can produce a finished product which needs only to be assembled and painted."



Sysmac Safety NX-SL nodes.



Operation terminal HMI NA series controls the complete line

More than 200 axes controlled and full safety

The integration of specialised work stations for individual machining operations i.e. turning of several sides, drilling, milling, profiling, is the basis for the new production line for window frames, CML branded, developed by Working Process. The work stations are all linked via one network, reducing design and installation costs significantly, including inverters and servo drives Omron (V1000, J1000, A1000).

"This production line - says Fillippo Schegginetti - is the perfect combination of the flexible production, based on CNC functionality and the more typical high capacity fixed production. The synergy of mixing the know-how and skills of the companies CML and WP, has been the basis for the creation of a complete production line offering improved flexibility and higher productivity."

To control the complete production line – which includes more than 200 controlled axes - Working Process decided to use only one Machine Controller (Omron NJ), and distributed safety over EtherCAT integrated in the Sysmac Platform via the safety controller NX - SL3500. The module controls the access to movable guards for maintenance, the power line of the motors and energised devices, all the safety circuits including the Safe Torque-Off and EDM check. A cross dual-channel check verifies the integrity of the safety device and wiring in either activation or deactivation status.



Sysmac NJ Machine controller for production line control.

The occurrence of any non-standard situation promptly generates the safety status for the affected area informing the operator, and enabling access to maintenance personnel to restart production promptly.

Working Process has also offered to the end customer the possibility to interact with some parts of the line even whilst it is being worked on, to allow a continuous production even during some selected maintenance procedures.

To provide this functionality the power supply cables have been split; independently of the production it is possible to enter in the storage area of the tools and allow the operator to work safely: "The motors and energized devices - points out Andrea Gardella, Automation Engineer in the company - will turn off when the door is opened for access."

More flexibility in all the stages of development

The integrated development environment Sysmac Studio allows the user to program the PLC logic, motion control, HMI and safety. The development of the machine, from the concept to delivery, has been much more flexible than in the past. Working Process was able to change the design choices made originally even during the machine construction, without any impact on either time or cost. There has been the maximum flexibility during production, development and commissioning phases for standard machine and safety programming.

The use of a Safety PLC in the programming phase, instead of dedicated safety modules, has ensured a greater level of freedom especially in the setting of the timings and in the identification of the areas for machine access. Even the integration of third-party devices has proved easier than any electromechanical solution.

Sysmac Studio's Integrated Development Environment (IDE) allows the user to configure safety inputs and outputs distributed throughout the complete EtherCAT network.



"The use of a Safety PLC in the programming phase gave us a lot of flexibility - said Gardella - because it allowed us to change the safety program easily in any stage of the development, even during testing. In long production lines the distributed safety integrated in the Sysmac Platform has many advantages, first and most evident is the substantial reduction in the development time".

All the possible interactions between man and machine were considered and evaluated. „We tried to establish a strict line of demarcation, what the operator can do and what is forbidden in the interaction with each part of the production line. All the situations were considered to ensure its safety, either in terms of prevention, monitoring and training. Whenever there is an interaction between the operator and the production line, we have a possible contact between the human and a moving machine, thus a potentially dangerous situation. For this reason we have decided to use an automation platform that has integrated machine and safety controllers".



Detailed and precise diagnostics

Despite a high number of stations, the production line offers a fully integrated management of activities from the HMI NA series, including diagnostic level for safety and standard line situations. The NA HMI allows the operator to view and check the status of all components (including guards, interlocks, and power contactors) and to know their real-time situation. Each time that an interaction occurs with the machine, for example the opening of a guard, it is easier for the operator to analyse the events. Working Process has dramatically reduced the number of devices in any electrical panel and, above all, has allowed the end user to reduce machine downtime thanks to guided procedures for maintenance, eliminating the need of skilled technicians to analyse the cabinet wiring diagrams. The consultative contribution of the **Omron Safety Services** has allowed Working Process to deploy the correct approach in the design guidelines of the application with reference to the existing legislation related to machinery safety. The result is that the correct solutions are applied for all the persons working on the machine - thanks to the professionalism and preparation of the people working within the Omron Safety Services team. "Working on a production line with this complexity has been the trigger to investigate an effective solution with intrinsic safety", closes Fillippo Schegginetti. "In the past, safety systems design was conducted after the machine design. We have learned the advantages of doing the two aspects in parallel in just one integrated design. Starting with the right step with a partner who knows the opportunities and problems to develop a machine which respects the safety regulations is the key to avoid expensive experiences that often companies like ours can face during the development of a new project".



Working Process is the winner of the "Omron Safety Contest 2015", both in the Italian and European stages

Machine Safety Program		Achieve a holistic approach with our Machine Safety Program to all your legal obligations in one stroke so that you can focus on what you do best - manufacturing.
Machine Safety Health Check		With a Machine Safety Health Check for your machines, you will be in the best possible position to plan your safety future.
Machine CE Health Check		Early identification of non-conformance prior to shipping produces tangible cost reductions. It also leads to swift machine installations and earlier production capability. For integration of multiple machines this service guides you to what CE marking requirements are for the completed assemblies.
Machine Risk Assessment		You fulfil your obligations to carry out the legally required risk assessment on the machine, and you identify which of your machines are dangerous and need attention. We create a highly detailed output from the assessment report.
Conceptual Safety Design		Our Conceptual Safety Design enables you to use your own engineers to perform some remediation using a written guidance document from our consultants.
Formal CE Marking		Our team members are very experienced in the CE marking process and all of its intricacies, therefore we save you a considerable amount of time and expense by supporting you through the process - simply by ensuring the CE marking process is carried out correctly the first time and without any problems, and ensuring that the machine to which the CE mark has been applied is legal for use.
Engineered Design Solution		You get peace of mind. We take the responsibility for the safety sign-off and train your staff to safely operate the machine with its new safety functionality.
Use of Work Equipment Directive Assessment		We perform this assessment on your behalf and we can help correct any non-conformances that the assessment identifies.
Machine Safety Requirement Specification		Our Machine Safety Requirement Specification enables you to use your own engineers to perform some or all of any identified remediation needs.
ESPE Stop Time Testing		We provide the formal determination of the stopping time of a machine, and then carry out the calculation and verification of the positioning of any safety device that is used to prevent access to moving parts of machinery which falls under the scope of EN ISO 13855, and the requirements of the Use of Work Equipment Directive.
Determination of Performance Level		Get peace of mind and let us take responsibility for the determination of the Performance level under EN ISO 13849-1. Both of these additional specific assessment services can be provided separately to clients, or in conjunction with any of our other machinery safety services as a supplementary option.
Validation and Verification		Let us help you to make sure with our supplementary services that you comply with your legislative and regulatory obligations, and to ensure that equipment that is safe for use, and fit for purpose.
Supplementary Assessments and Testing		You can build a machine safety conformance strategy around the expertise and man-power that you have in-house and supplement this with expertise from us. This optimises your business efficiency.

About WORKING PROCESS S.R.L.

Application:

Production line for window frames.

Keys to success:

Sysmac Platform - integrated solution.

Omron Safety Service - consultant services for integration of Safety starting from the machine design phase.

About Omron

Omron Electronics Ltd is a UK subsidiary of the Omron Corporation, a global leader in the field of automation. Established in 1933, Omron has more than 37,500 employees in over 36 countries working to provide products and services to customers in a variety of fields including industrial automation, electronic components industries, and healthcare. Omron Electronics Ltd provides a comprehensive sales and support service for Omron's vast range of industrial automation products including industrial components, sensing and safety, automation systems and drives.

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