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SEAMLESS SAFETY SOLUTION FOR FLOORING MACHINES

Decentralised Safety Separated system with PROTECT PSC1 safety controller

Large machine – little wiring required Gebr. Schroeder in Warendorf, which specialises in wood flooring production machines, utilises an efficient safety solution from Schmersal for its system for longitudinal and cross-profiling of planks. The modular PROTECT PSC1 safety controller forms the heart of the system.

Gebr. Schroeder GmbH & Co. KG in Warendorf is the one of the few specialists in solid wood flooring machines in the world. Schroeder makes machines for the production of traditional solid wood flooring in block, slat and mosaic designs and production systems for 2-ply parquet blocks and 3-play planks. The company exports 90 percent of what it produces. The machines and systems need to not only comply with the applicable health and safety requirements, they also need to guarantee optimum efficiency. This is not easy when the systems are of the sizes required for making parquet flooring. With these kinds of production lines, the aim is to avoid complex cabling which takes up a lot of space, time-consuming installation processes and complicated troubleshooting during operation.

“Safety Separated” is part of the company philosophy

Shroeder's new machine line for profiling polished multi-layer parquet using the modular PROTECT PSC1 safety controller from Schmersal shows just how well this can work. The production line largely consists of two machines for longitudinal and cross-profiling of planks. It can process workpieces of up to 1.1 x 5 metres in size. On machine 1, the longitudinal profiler, the long edges of the planks are sawn to size and tongue and groove profiles are ground in. On machine 2, the cross-profiler, the edges on the short side are processed. Between them, there are conveyor belts with turning stars which transport the planks and put them in the correct position. The processing machines are secured with protective covers and solenoid

interlocks, and Schroeder has developed a safety fence system with access doors fitted with safety switches for the handling area. Laser scanners and multi-beam safety light barriers are used to secure the area. To evaluate the signals from these safety components, Schroeder now uses the modular PROTECT PSC1 safety controller as part of a decentralised “Safety Separated” concept. “It is part of Schroeder's philosophy of keeping the machine controller and the safety controller separate,” explains Lothar Glorius, Electrics/Electronics Project Manager at Schroeder. This means that, if there are any changes to the machine, the safety controller can remain untouched and does not need to be revalidated.

Decentralised modules communicate via Ethernet SDDC

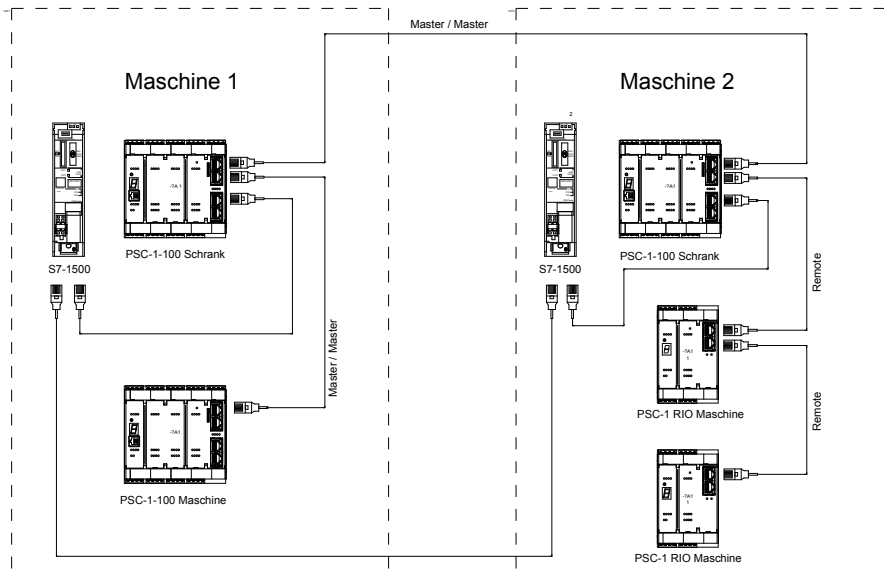
The core components of the PSC1 safety controller system are two freely programmable compact controllers (PSC1-C-10-FB1 and PSC1-C-100-FB1). In the basic version, both have 14 safe inputs (to PL e in accordance with ISO 13849 or SIL 3 in accordance with IEC 61508), 4 safe semiconductor outputs, two safe relay outputs, two signalling outputs and two pulse outputs for sensors with contacts. The PSC1-C-10 also has 20 configurable safe inputs/outputs (to PL e in accordance with ISO 13849 or SIL 3 in accordance with 61508). Safe I/O expansion modules are available for both variants.



The processing machines on the Schroeder production line are secured with protective covers and solenoid interlocks.



The decentralised safety solution with the PSC1 safety controller from Schmersal reduces the wiring required.



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operating controller via two PSC1 master controllers. The remote I/O modules would have provided us with too few inputs in this area," explains Lothar Glorius.

Information exchange across all levels

For larger systems with multiple functionalities, Schroeder uses programmable safety controllers by default. It was also very important to Schroeder that there was an option for the safety controller to send diagnostic data back to the operating controller. "Around 15 to 20 emergency stop buttons are fitted to a system like this. So, it is a real benefit if it is easy to recognise which button triggered the emergency stop. This makes trouble-shooting much easier," explains Lothar Glorius.

Comprehensive diagnostics data and status information can be transmitted via the SD Bus gateway integrated into the PSC1; this allows the connection of up to 31 safety sensors with advanced diagnostics functions. The serial diagnosis interface is used to transmit non-safety data for electronic safety switchgear devices connected in series. The safety controller uses the universal communication interface to communicate the data to the operational controller.

"With only one piece of hardware, the universal communications interface allows the configuration in software of simultaneous communication with the fieldbus level (i.e. exchange of information between the controllers), the local level (between the modules of the PSC1) and the sensor level via the SD bus," explains Steffen Richter. "This means the PSC1 system is very flexible."

The PSC1 system was rounded off by a user-friendly, intuitive piece of programming software: SafePLC2 has comprehensive libraries with pre-defined functions for the safe monitoring of sensors and axes. These can be linked together to form complex applications using "Drag & Drop".

This means everything fits together seamlessly from a safety perspective, like a good parquet floor with cleanly finished edges.

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On machine 1, the status information is forwarded to the operating controller via two PSC1 master controllers. Machine 2 is secured via a decentralised concept and remote I/O modules.

The I/O expansion modules for the PSC1-C-100 can be installed either centrally in the control cabinet or on a decentralised basis. The decentralised modules communicate with the compact controller via Ethernet SDDC (Safe Device to Device Communication).

These features of the PSC1 proved to be a benefit for the Schroeder production line, as they meant there was no need to wire every single piece of safety switchgear individually to the control cabinet, which would not have been practicable given the size of the system. Instead, the safe remote I/O modules on the PSC1 collect the status and transfer it via the Ethernet SDDC safe communication protocol. The data is then forwarded to the operating controller via a PSC1 master controller. This means only very little cabling is required.

The safe remote I/O communication and the safe cross-communication between the master controllers is enabled by a universal communications interface integrated into the PSC1. "The communications interface allows not only the simple selection and configuration of different fieldbus protocols via software but also user-friendly programming and configuration via Ethernet," explains Steffen Richter, Sales Manager at Schmersal. "The user can therefore establish a connection to all common fieldbus systems via a homogeneous hardware platform."

This decentralised system with remote I/O modules makes sense for machine 2, as it consists of various fixed parts and movable stands. On machine 1, by contrast, all the machine parts are in a single housing. The status information is forwarded to the



Schroeder's machine line for profiling polished multi-layer parquet uses the modular PROTECT PSC1 safety controller from Schmersal.



There are some 15 to 20 emergency stop buttons on the system, so it is important that the safety controller can forward diagnostic data to the operating controller.