# Safety in the system.

Safety in the system does not begin with the drives first, but at the control level.

With the expansion of the controller software to include the Safety Controller c250-S a complete automation solution is provided for safety engineering and control and drive tasks. Topped with the safety I/O module, all the safety aspects in the machine module can be evaluated. EtherCAT is used for data transfer.

Features

- Compact Controller c250-S for easy mounting using the DIN rail
- Directly stackable safety I/O module with integrated connection without extra wiring
- Plug-in connections of the safety I/O module for quick set-up
- Portfolio expansion means reduction in machine components
- High-quality solution thanks to PL e/SIL 3

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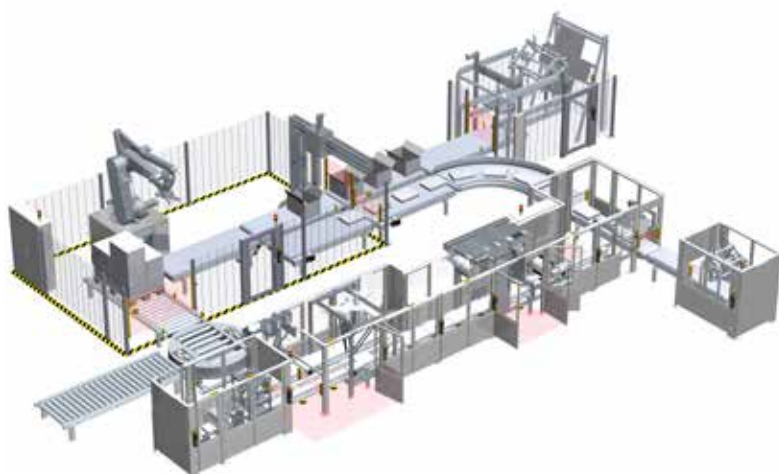
The machine module solution can really look that easy.

Simply expanding the modular system

- FAST machine module solutions are achieved these days with a controller and the corresponding servo drives. This solution is now topped with integration of the safety controller. Using the same network via EtherCAT, the system topography is the same.

- The safety controller can be parameterised via the PLC Designer engineering tool, in parallel with the controller 3200 C and the servo inverter.

Topology diagram:
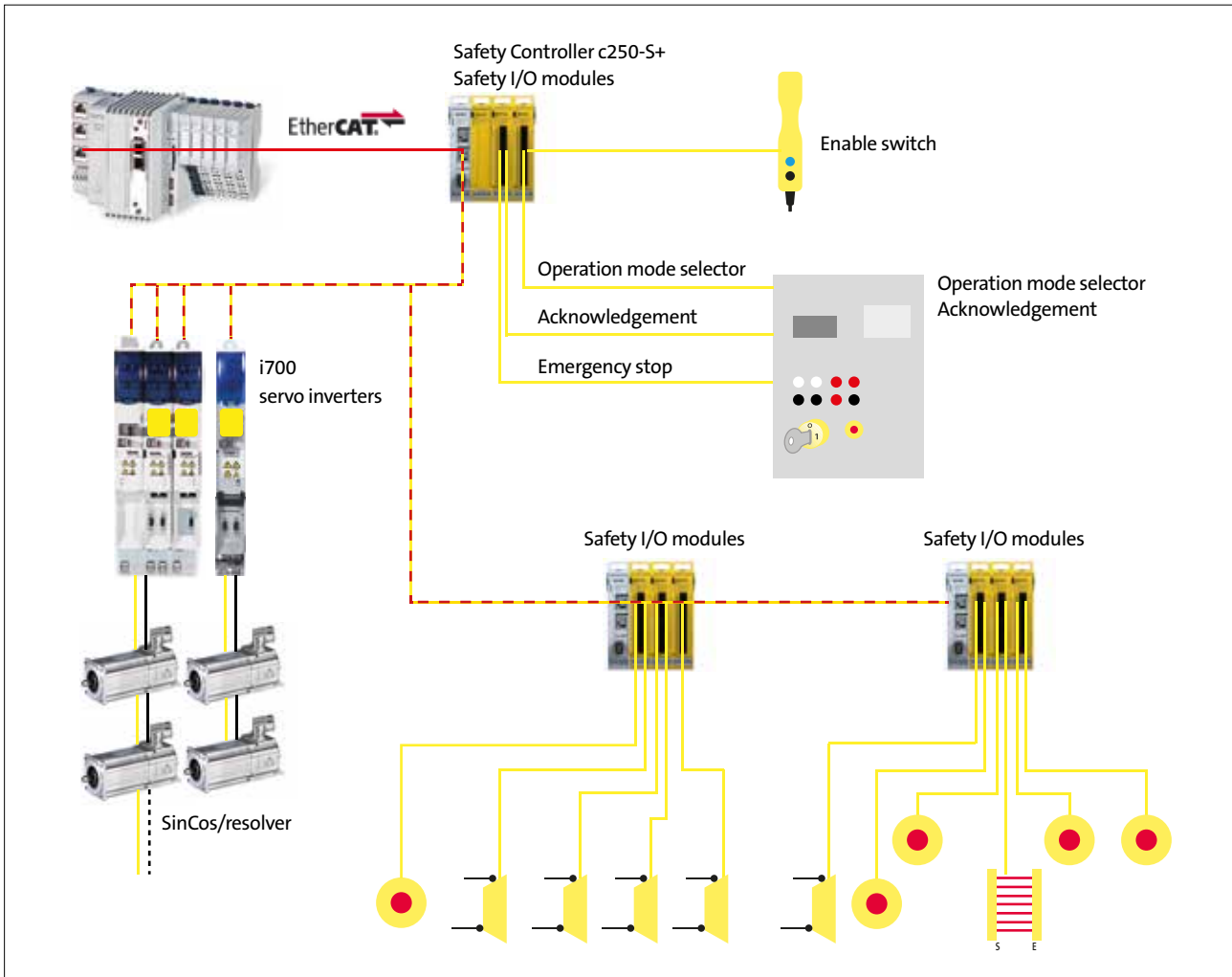
From drive-based safety to controller-based safety: this new simplicity can be seen among other things in the noticeably reduced amount of wiring. This is the result of directly interlinking the Lenze controllers for safety and motion – in addition to ready-made software solutions from the FAST Application Software Toolbox. Hence in practice, a FAST module can, for instance, control the reduction in traversing speed while at the same time the safety controller within the system can monitor the safe maximum speed.

Functions	Implementation according to PLCopen, TC 5
Equivalence / antivalence test	SF_Equivalent
	SF_Antivalent
Operation mode selector	SF_ModeSelector
Emergency stop, emergency off	SF_EmergencyStop
Monitoring of electro-sensitive protective equipment (ESPE)	SF_ESPE (electro-sensitive protective equipment)
Guard monitoring	SF_GuardMonitoring
Two-hand control	SF_TwoHandControlTypeII
	SF_TwoHandControlTypeIII
Guard monitoring with locking	SF_GuardLocking
Cyclic test of ESPE	SF_TestableSafetySensor
Muting	SF_MutingSeq
	SF_MutingPar
	SF_MutingPar_2Sensors
Enable switch	SF_EnableSwitch
Controlling safety output with standard controller and safety controller	SF_OutControl
Monitoring of feedback loop	SF_EDM (external device monitoring)

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