

Runs on all M100 CPUs – from controller to HMI

SIL 3
PL e

License tier	Part number
M100 SafetyRT Basic	On request
M100 SafetyRT Standard	On request
M100 SafetyRT Advanced	On request
M100 SafetyRT Extended	On request

M100 SafetyRT

Integrated Safety – SIL 3 / PL e, no additional safety hardware

The M100 SafetyRT turns every M100 controller into a safety controller for applications up to SIL 3 (IEC 61508) and PL e (ISO 13849-1). Standard and safety functions run on the same CPU – from controller to HMI. No separate safety controller is needed: less hardware, fewer interfaces, one system for automation and safety.

The SafetyRT runs as a software runtime directly on the CPU. This allows its functionality to scale with the application: four license levels range from Basic for small applications to Extended for complex production plants. Upgrades are made by license on the same hardware or on future CPU generations – without redeveloping the application.

The safety program is created graphically or in Structured Text, each used as a limited variability language (LVL) as defined in ISO 13849-1. Certified PLCopen Safety function blocks and custom, tested libraries make existing know-how reusable.

With Machine Profiles, one safety application covers many machine variants: the matching, verified configuration is selected during commissioning.

Features

- Graphical and Structured Text programming (LVL as defined in ISO 13849-1)
- Certified function blocks according to PLCopen Safety
- Custom safety libraries with unit test environment and automated regression tests
- FailSafe over EtherCAT (FSoE) master, PROFIsafe master in preparation
- Variant management with Machine Profiles
- Scalable license levels, upgradable without changing hardware

Safety Runtime

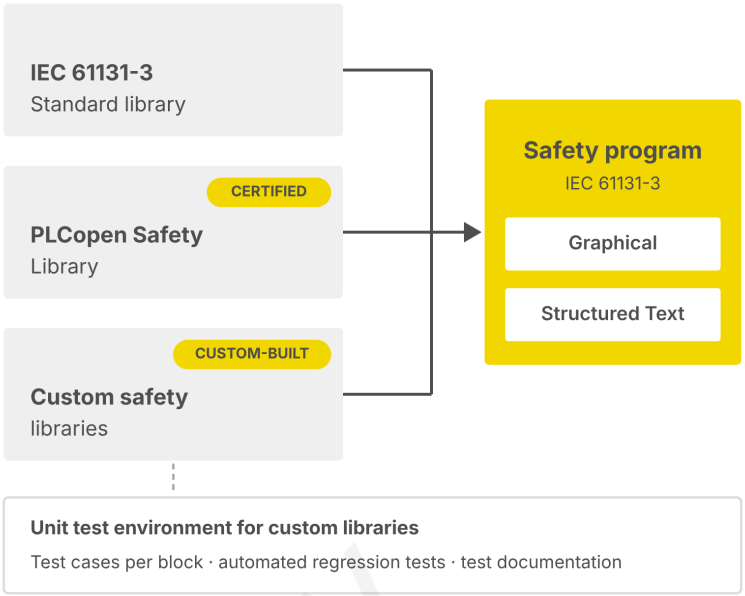
- Software safety CPU on every M100 CPU, no additional safety hardware
- For applications up to SIL 3 (IEC 61508) and PL e (ISO 13849-1)
- Cycle times from 1 ms
- Retain data
- In preparation: multitasking with several safety tasks, individual cycle times and inter-task communication, also distributed across multiple cores

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Libraries

Three sources of function blocks are available: the IEC 61131-3 standard library, the certified PLCopen Safety library and the user's own safety libraries. Proven functions such as guard door or axis monitoring can thus be reused across many projects.

A unit test environment is available for custom libraries. Test cases are created for each function block and run automatically as regression tests, and the results are documented.



Safety program built from certified and custom libraries

Full flexibility with custom function blocks and functions in Structured Text

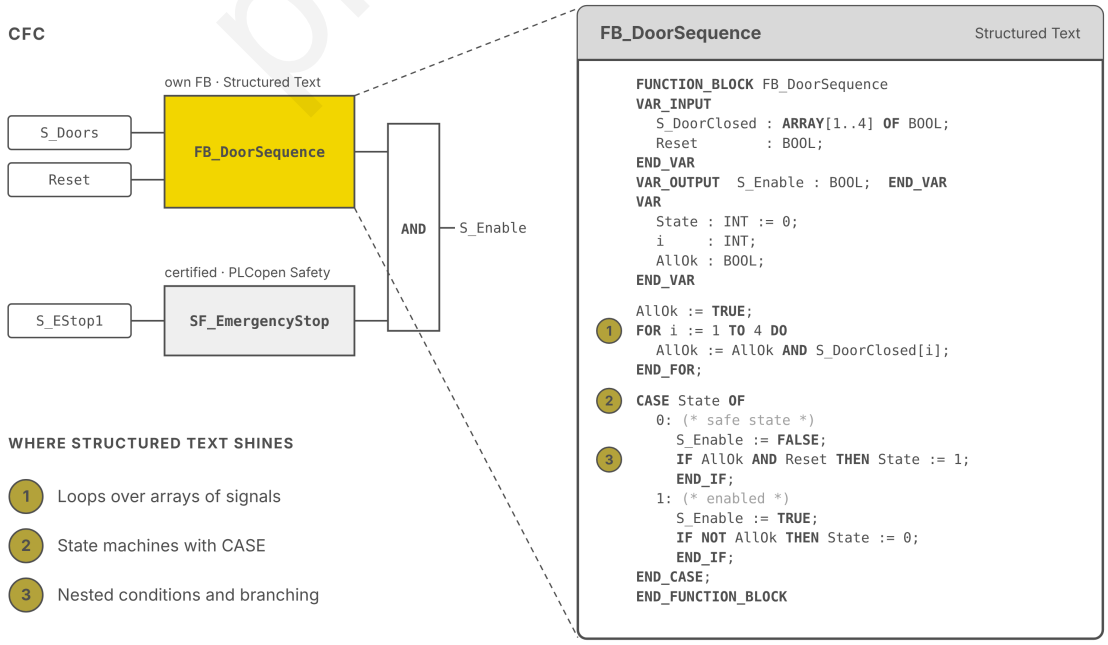
Both CFC and Structured Text (ST) are used as LVL (Limited Variability Language) as defined in ISO 13849 and can be combined in one safety program: a custom function block in Structured Text is wired in the CFC program just like a certified PLCopen block.

1 Graphical programming
Create safety applications graphically in the familiar Continuous Function Chart (CFC).

2 Combine CFC and ST
Choose the right language for each task – both in one safety program.

3 Software re-use
Use custom libraries across projects.

4 Structured Text
Custom function blocks and functions for complex logic.



Custom ST function block and certified PLCopen block in the CFC program

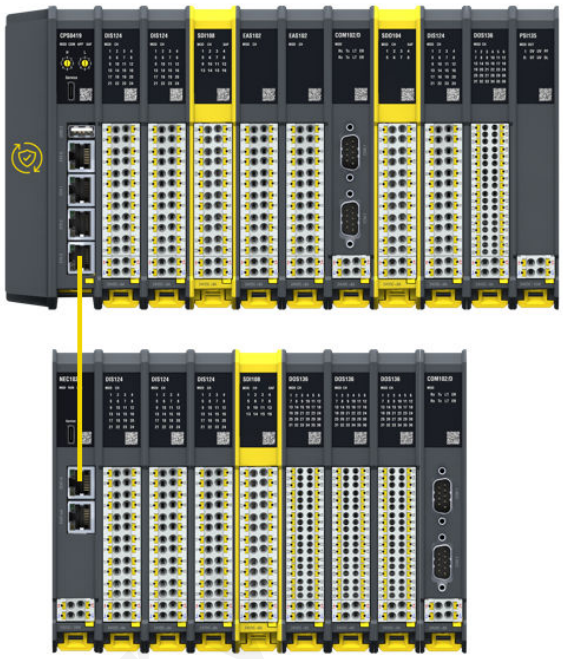
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Safety fieldbus

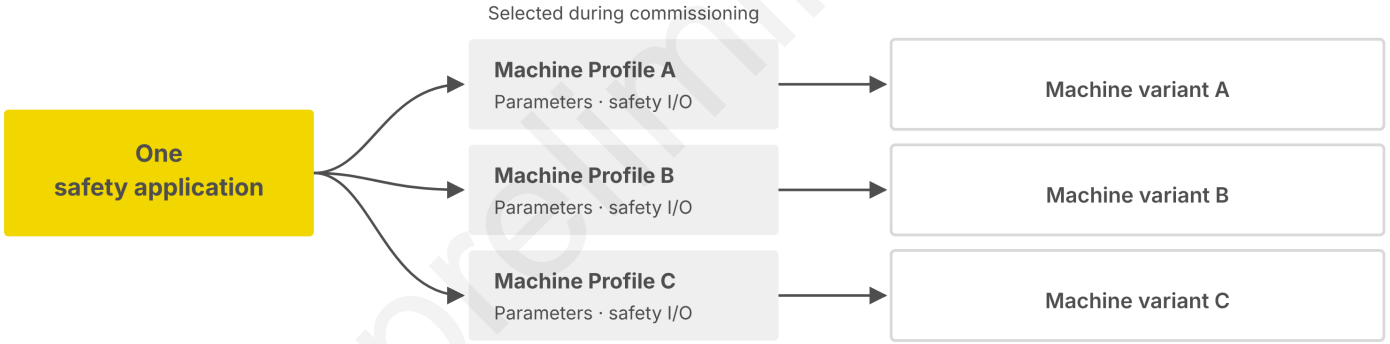
The M100 SafetyRT operates as a FailSafe over EtherCAT (FSoE) master. It connects safe digital inputs and outputs as well as analog 4–20 mA signals – using Bachmann safety I/O modules (SDI108, SDO104, SIO142, SIC103) or third-party safety modules. A PROFIsafe master is in preparation.

Variant management with Machine Profiles

One safety application covers many machine variants. During commissioning, the verified configuration of parameters and safety I/O is selected as a Machine Profile – without maintaining a separate program for each variant.



M100 system with safety I/O and remote station



One safety application for many machine variants

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Technical data M100 SafetyRT

Safety characteristics	
Safety integrity	SIL 3 according to IEC 61508, PL e according to ISO 13849-1
Runtime	
Safety task cycle time	From 1 ms
Multitasking	In preparation: several safety tasks with individual cycle times, inter-task communication
Multicore	In preparation: interacting safety tasks on multiple cores
Retain data	Yes
Programming	
Programming languages	Graphical and Structured Text, as LVL as defined in ISO 13849
Certified function blocks	PLCopen Safety
User libraries	Yes
Test support	Unit test environment, automated regression tests, documentable test results
Variant management	Yes, Machine Profiles
Communication	
Safety fieldbus	FailSafe over EtherCAT (FSoE) master; PROFIsafe master in preparation
Bachmann safety I/O	SDI108, SDO104, SIC103, SIO142
Third-party safety modules	Number depends on license tier

Supported data types

Data type	
Elementary data types	Boolean, (Unsigned, Short, Double, Long) Integer, 32 bit Duration, 64 bit Long Duration, Bit string with a length of 8, 16, 32, 64 bits
User-defined data types according to IEC 61131-3:2014: section 6.4.4.1	Yes
Fixed-length arrays according to IEC 61131-3:2014: section 6.4.4.5.1	Yes
Structured data types according to IEC 61131-3:2014: section 6.4.4.6	Yes
Derived data types according to IEC 61131-3:2014: section 6.4.4.9	Yes
OOP and classes for function blocks according to IEC 61131-3:2014: section 6.6.5	Yes

General features

Installation	
Delivery format	Bachmann software catalog M100
Target platform	All M100 CPUs (CPS, CPE, CPC12xx)
Licensing	Four license levels, upgradable on the same hardware
Demo mode	Yes (2 hours)
License protection	License file depending on hardware
System requirements	
CPU hardware	All M100 CPU series
Memory	On request
System software version	In preparation

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Order data

Part type designation	Part number	Description
M100 SafetyRT Basic	On request	Safety runtime license bundled with one SIO142 module, no third-party safety modules, graphical programming
M100 SafetyRT Standard	On request	Unlimited number of Bachmann safety modules, limited number of third-party safety modules, graphical programming
M100 SafetyRT Advanced	On request	As Standard, plus Structured Text; multitasking (several safety tasks with individual cycle times, inter-task communication) in preparation
M100 SafetyRT Extended	On request	As Advanced, plus unlimited number of third-party safety modules

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