

Motion Control og Robotics

Søren Jakobsen




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- Safety Motion 
- SIMATIC Robot Library 



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Safety integrated drives

TIA Portal Startdrive safety



SINAMICS G120
drive family



Converter system for general applications

SINAMICS
G115D/G120D



Distributed converter system for applications in
conveyor technology

SINAMICS S210

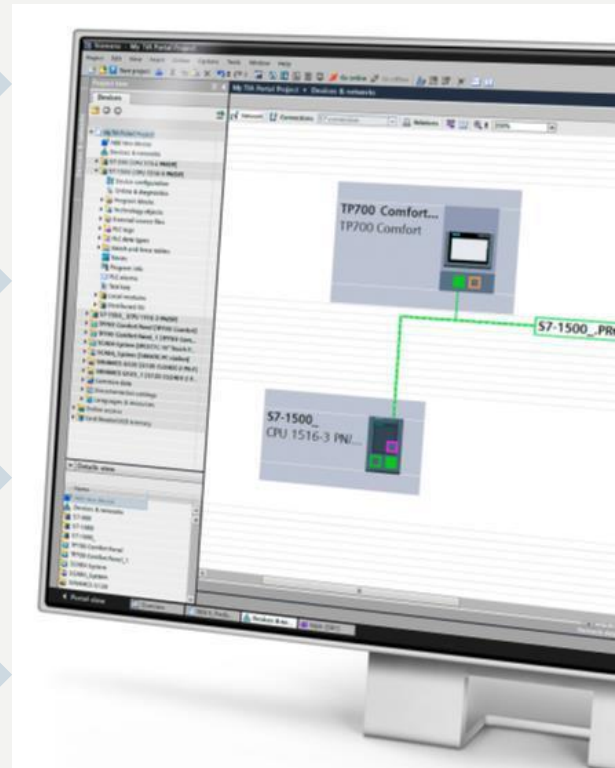


Servo drive system with Safety Integrated, simple
engineering, high dynamic performance and precision
for machinery construction

SINAMICS S120
& Large Drives



Flexible and modular servo drive system over a wide
range of power ratings for high-performance
applications in the production industry



New Safety Activation Test

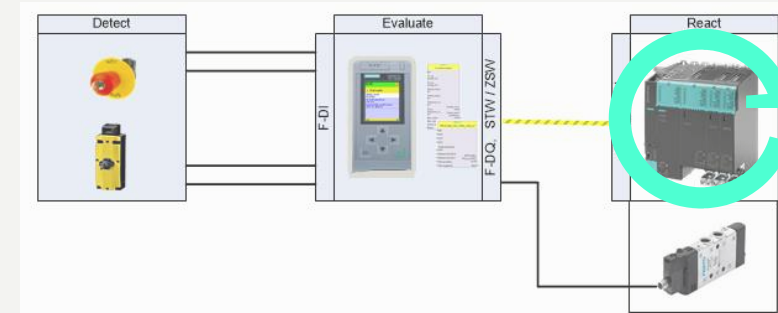
Acceptance Test and Activation Test

Safety Acceptance Test (existing since V15)

Validation of correct safety function for the drive

E.g.:

- Are the braking ramps set correctly?
- Are the limitations and fault reactions set correctly?

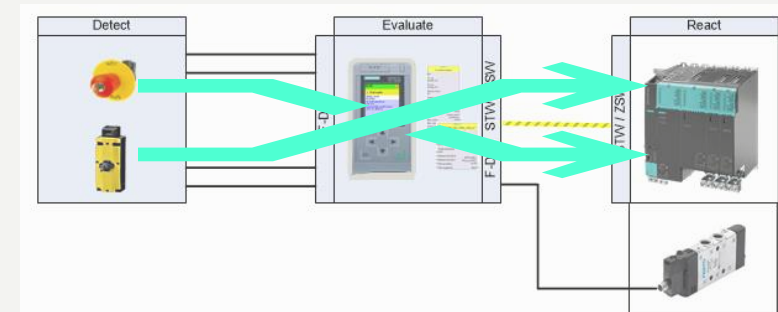


Safety Activation Test (NEW in V17)

Validation of the safety control chain from sensor to actuator.

E.g.:

- Does every drive select the correct safety function when a safety sensor is activated?
- Are all safety functions realized according to the risk minimization?
- Are there wiring errors for the safety sensors?
- ...



1. Define all safety functions via the wizard: operation mode, input conditions, expected reaction (this step can be done by the project engineer already in advance to the commissioning phase)
2. After machine commissioning execute the tests and go through all defined safety functions using the guided step by step assistant
3. Automatic creation of the test protocol with all necessary information

▼ Acceptance test

Overview

▼ Drive axis_1

- Mechanical system
- STO
- SS1
- Test stop
- Result transfer

▼ Drive axis_2

- STO
- SS14
- Test stop
- Result transfer

▼ Safety activation test

- Add new test
- SF 1
- SF 2
- Completion

Drive unit S120 - Safety activation test - SF 1

Describe the safety function of the machine for which an activation test is to be performed.

Name: Not-Halt Handbediengerät

Description: Drücken Sie den Not-Halt-Taster am Bedienpult. Der Not-Halt-Taster am Handbediengerät ist muss entriegelt sein.

Selection of operating mode

Operating mode: Automatik Variable: "DB5.1" Betriebsart State: True

Input conditions

Sensor	Initial	Ausgeführt
"Not-Halt Bedienpult"	False	True
"Not-Halt Handbediengerät"	False	False

Add new row

Expectations

Aktor	Reaktion	State
Drive axis_1	STO	False
Drive axis_2	SS14	True

Add new row

Test of the Safety Integrated Functions

During the control test the relations between only orders and expectations are checked. Checking the control wiring is not part of the control test.

Drive unit_1

Test overview

Tested function	Test status
OP 1	OK
OP 2	OK

Detailed tests

Test description	Status
1) The machine is in operation mode "automatic". Active for test is executed	OK
2) Check condition	OK
3) The test conditions are fulfilled	OK
4) Execute the test	OK
5) The test is completed	OK

Test conditions and expectations

Test description	Status
1) The machine is in operation mode "automatic". Active for test is executed	OK
2) Check condition	OK
3) The test conditions are fulfilled	OK
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Test conditions and expectations

Test description	Status
1) The machine is in operation mode "automatic". Active for test is executed	OK
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Preparation of the test

The safety of the operating personnel must be ensured.

Starting the acceptance wizard

Start

Drive unit S120 - Safety activation test - SF 1

Eingangsbedingungen initialisieren Ansteuerungstest durchföhren

Schalten Sie die Maschine in die Betriebsart "Automatik". Drücken Sie den Not-Halt-Taster am Bedienpult. Der Not-Halt-Taster am Handbediengerät anschlieöhend schalten Sie "Weiter".

Betriebsart

"DB5.1" Betriebsart

Eingangsbedingungen (ausgeföhrt)

"Not-Halt Bedienpult"

"Not-Halt Handbediengerät"

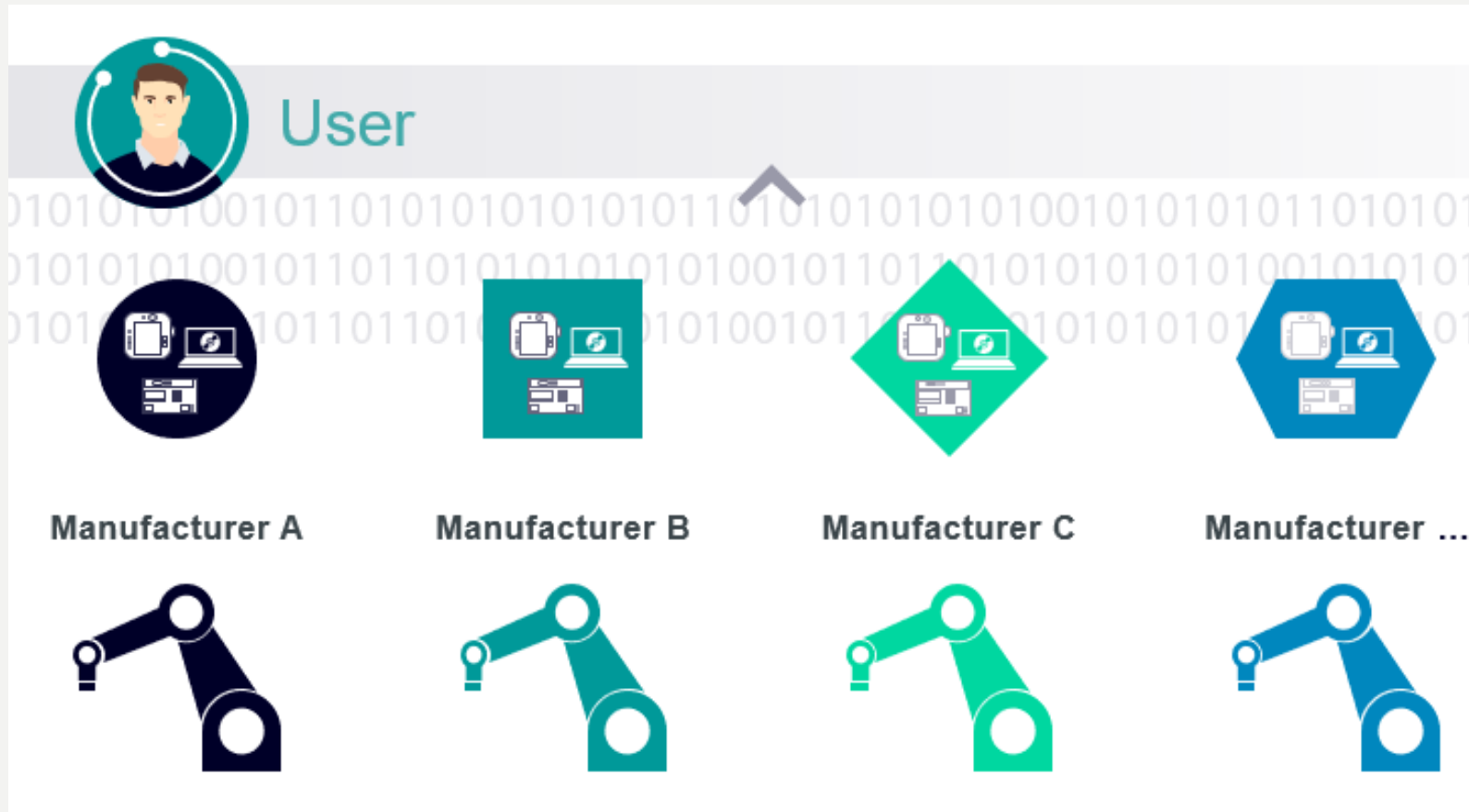
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The challenge

Increasing complexity due to robot manufacturer variance

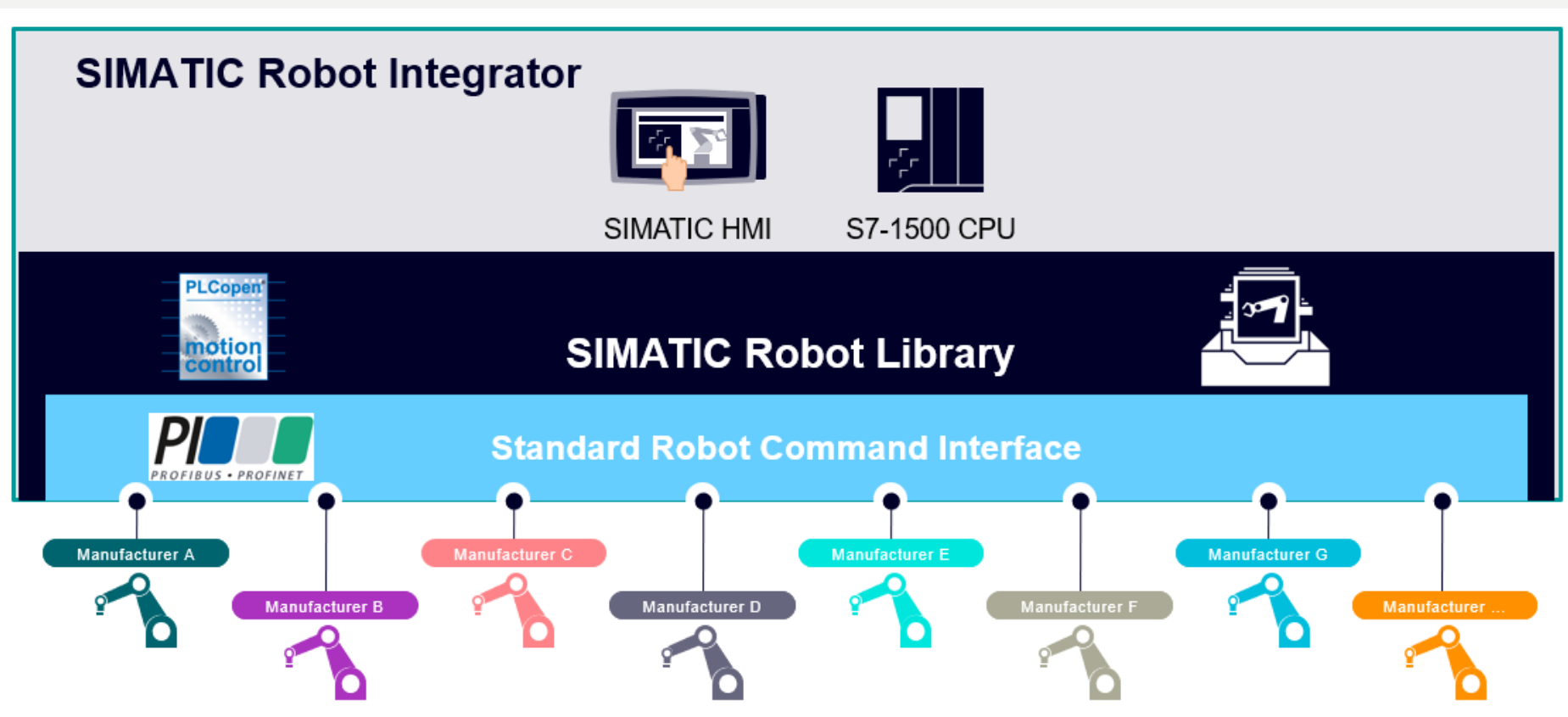


Challenges

- Handling of robot manufacturer-specific SW and HW
- Robot manufacturer-specific programming know-how required
- Program must be newly created for every robot manufacturer
- Manufacturer-specific interface definition between robot and machine
- High complexity for service and maintenance

Robot Integration with SIMATIC Robot Library

Standardization at a glance



SIMATIC Robot Integrator

Robot programming in the TIA Portal



Functions

- No programming in the engineering tool of the robot manufacturer
- "Ready-to-use"
TIA Portal program example for the operation of robots
- HMI faceplates independent of the robot manufacturer
- Complete creation of the robot trajectory possible with the SIMATIC HMI



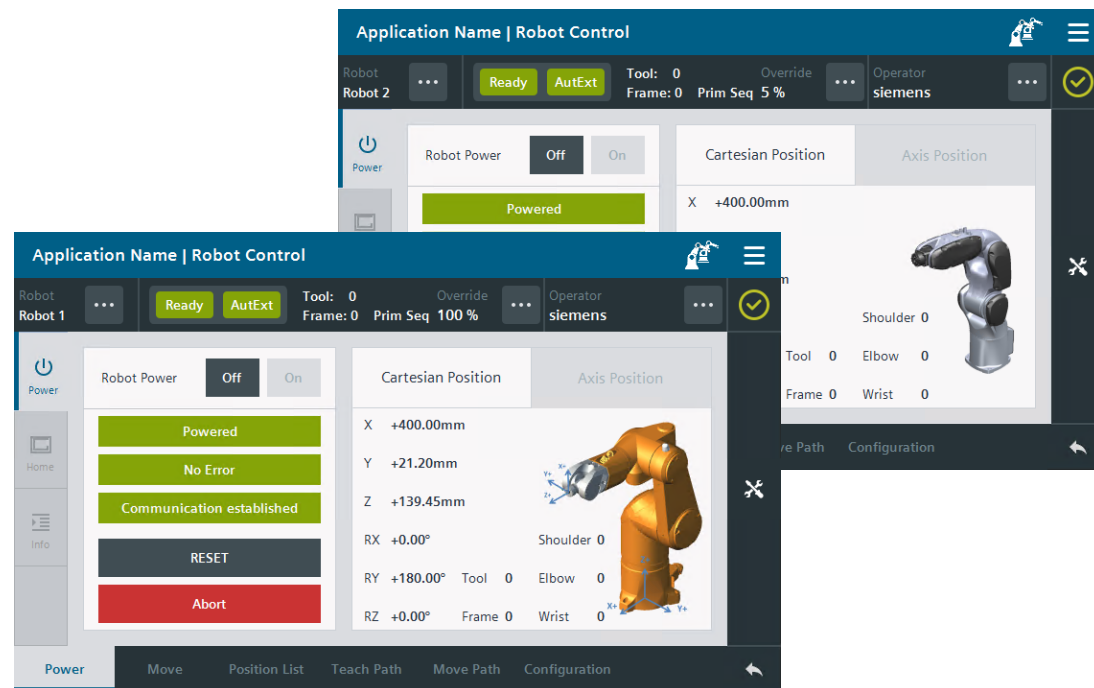
Uniform faceplates for robots from different manufacturers

SIMATIC Robot Integrator

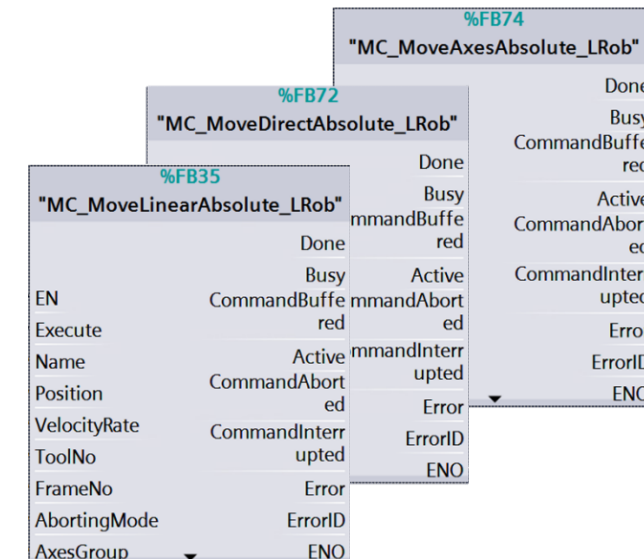
Robot programming online and offline



Online programming via HMI











Offline programming via function blocks



SIMATIC Robot Integrator

Offer with SIMATIC Robot Library



		Actual Partners							
Interpreter	Interpreter available	ABB	COMAU	EPSON EXCEED YOUR VISION	FANUC	JAKA 节卡	Kawasaki Robotics	KUKA	NACHI
		 Release 2022				 Release 2022	 Release 2022	 Release 2022	
Interpreter	Interpreter available	Panasonic INDUSTRY	STÄUBLI	TM ROBOT	UNIVERSAL ROBOTS	YAMAHA	YASKAWA		
			 Release 2021		 Release 2022		 Release 2022		

The interpreter is provided by the robot manufacturers



Available



In work



In planning

SIMATIC Robot Integrator + Library

Offering and Pricing Strategy



SIMATIC Robot Integrator

- Free of charge



SIMATIC Robot Library V1.0

- Trial: free of charge for 8h
- Single Runtime license: 490€ (LP)
- One license per robot arm



Digital twin of robot interpreter

- Free of charge



MCD Model

- Generic robot arm
- Free of charge

Testing the SIMATIC Robot Library does not require any robotics specific tools

Kontakt



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