



# **CONTROL TECHNOLOGY**

Business approach for solution providers

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Leader Product Management Control Technology

# KUHNKE CONTROL TECHNOLOGY

## Product lines



# KUHNKE CONTROL TECHNOLOGY

## Product lines

### Kuhnke HMI Line



**PLC with Touchpanel**  
Kuhnke Scout

**CODESYS HMI**  
Kuhnke Vico

**Web Terminal**  
Kuhnke Vico

### Kuhnke Controller Line



**PLC with Touchpanel**  
Kuhnke Scout

**Modular PLC**  
Kuhnke FIO Controller

**Compact PLC**  
Kuhnke Econo PLC

### Kuhnke I/O Line



**Modular I/O Terminal**  
**Modular Controller**  
Kuhnke FIO

**Compact I/O Module**  
Kuhnke CIO

### Kuhnke Industrial Heater Line



**Modular Heating System**  
Kuhnke MHS inductive

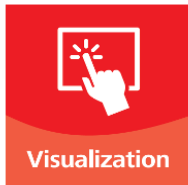
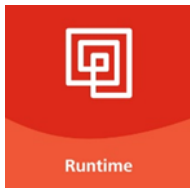
**Inductor**  
Kuhnke Inductor, customized

# KUHNKE CONTROL TECHNOLOGY

## Technology focus

CANopen

EtherCAT<sup>®</sup>  
Technology Group



Safety over  
EtherCAT<sup>®</sup>

# KUHNKE CONTROL TECHNOLOGY

## Chances for solution providers

Motion  
Controller for  
medium  
performance  
application

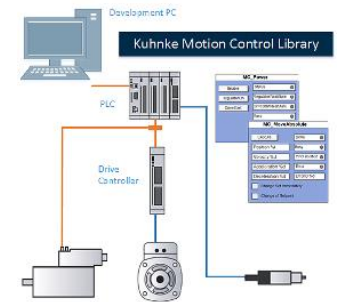


CODESYS  
HMI



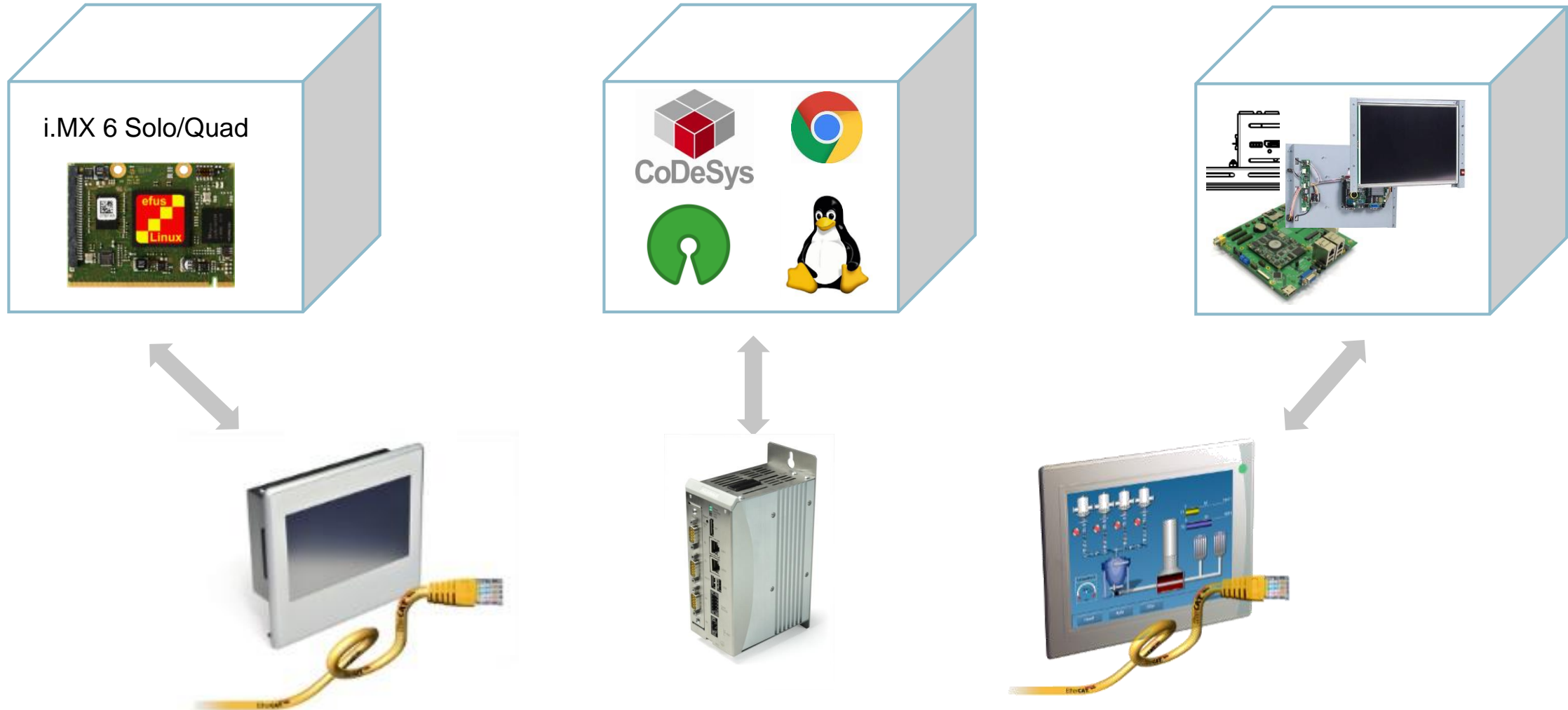
Safety  
integrated!

Your  
application  
knowhow  
and market  
access



# KUHNKE CONTROL TECHNOLOGY

## HMI/Controller Line - Modular visualization and control systems

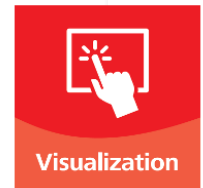
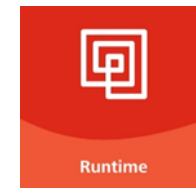
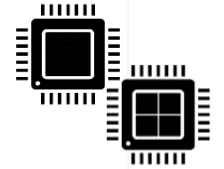


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# KUHNKE CONTROL TECHNOLOGY


## HMI/Controller Line - Modular visualization with integrated PLC

- CODESYS V3 Soft PLC, TargetVisu, WebVisu, Softmotion CNC+Robotics
- EtherCAT, OPC UA, CANopen, Modbus TCP/RTU
- Single or Quadcore i.MX6X Quad Core; 1 GHz
- 2 x Ethernet (LAN), 2 x CAN interface
- 1 x RS232, 1x RS485 (galv. isolated)
- 2x USB 2.0 host
- 4DI and 4DO optional
- 24 VDC power supply for control application



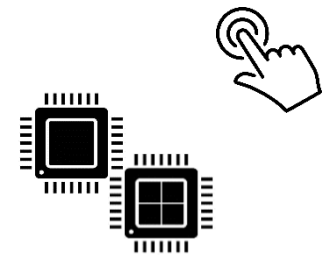
# KUHNKE CONTROL TECHNOLOGY

## Panel PLC – PLC with Visualization

			
	Scout 706	Scout 1006/1026	Scout 1206/1226
Display size	7" wide	10.4"	12"
Resolution	800x480 (WVGA)	800x600 (SVGA)	800x600 (SVGA))
Touch Technology	4- wire analogue resistive	4- wire analogue resistive	4- wire analogue resistive
Brightness	220 cd/m <sup>2</sup>	350 cd/m <sup>2</sup>	400 cd/m <sup>2</sup>
Background light	LED 50000h	LED 250000h	LED 50000h
Housing	IP 65, aluminium front panel, seamless film cover, sealed against dust, dirt and splash water Back: IP20		



[Panel PLC  
\(kendrion.com\)](http://kendrion.com)





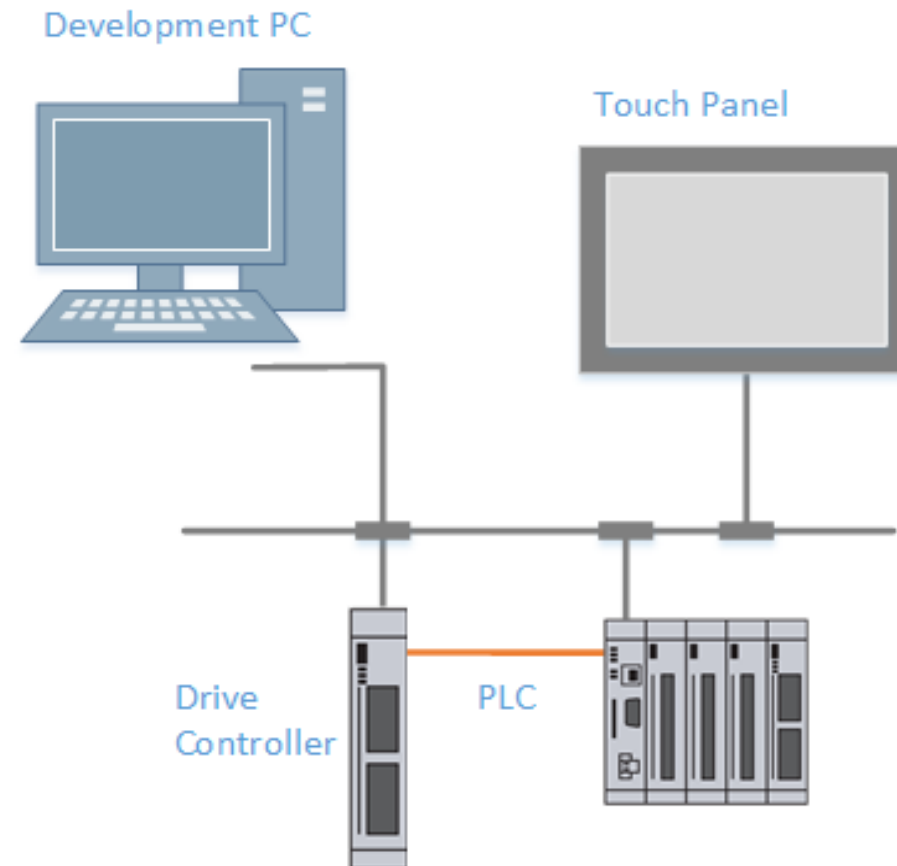
# KUHNKE CONTROL TECHNOLOGY

## CODESYS HMI

### The Visualization in the CODESYS Development System






- Simultaneous connection to different controllers
- Several visualizations for one PLC
- Visualization editor integrated in the CODESYS Development System
- Visualization of process data of CODESYS V2.3 and V3 PLCs
- Additional calculation of IEC-61131 programming code additional to the visualization possible



# KUNNKE CONTROL TECHNOLOGY

## HMI Line basic – Visualization with or without PLC

			
	Vico 404	Vico 704	Vico 1004
Display size	4,3" wide	7" wide	10,1" wide
Resolution	480x272 (PSP)	8000x480 (WVGA)	1024x600 (WSVGA)
Touch Technology	4- wire analogue resistive	4- wire analogue resistive	4- wire analogue resistive
Brightness	200 cd/m <sup>2</sup>	200 cd/m <sup>2</sup>	200 cd/m <sup>2</sup>
Background light	LED 20000h	LED 20000h	LED 20000h
Housing	Front: IP 66, plastic body with black, seamless film cover protection against dust, dirt and splash water Rear: IP 20		






[HMI Panel  
\(kendrion.com\)](http://kendrion.com)



# KUNNKE CONTROL TECHNOLOGY

## HMI Line premium – Visualization with or without PLC



			
	Vico MT 727	Vico MT 1027	Vico MT 1527
Display size	7" wide	10.1" wide	15" wide
Resolution	1024 x 600 (17:10)	1280 x 800 / (16:10)	366 x 768 / (16:9)
Touch Technology	Multitouch PCAP	Multitouch PCAP	Multitouch PCAP
Brightness	450 cd/m <sup>2</sup> (IPS)	420 cd/m <sup>2</sup> (IPS)	400 cd/m <sup>2</sup> (IPS)
Background light	LED 50000h	LED 50000h	LED 50000h
Housing	IP 65 chemically strengthened glass front resides in milled aluminium frame (with end caps) Back: IP 20, stainless steel, aluminium sheet housing		

[HMI Panel  
\(kendrion.com\)](http://kendrion.com)



# KUHNKE CONTROL TECHNOLOGY

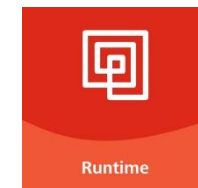
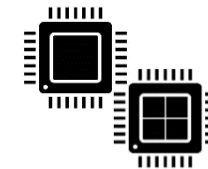
## Econo 206/226

### Compact PLC – PLCs for switching cabinets

- Compact dimensions, Robust mechanical construction
- Common industrial interfaces
- Single or Quadcore Freescale i.MX6X ; 1 GHz
- CODESYS V3 Soft PLC, WebVisu, Softmotion CNC+Robotics
- EtherCAT, OPC UA, CANopen, Modbus TCP/RTU
- Operation temp. 0°C...+50°C
- 24 VDC power supply for control application



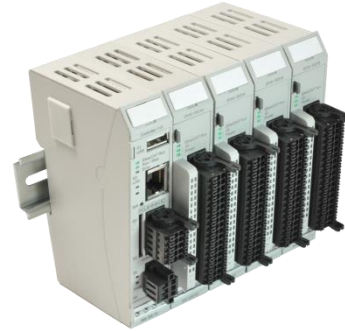
[Compact PLC  
\(kendrion.com\)](http://kendrion.com)



# KUHNKE CONTROL TECHNOLOGY

## I/O Line – EtherCAT IOs with integrated safety

- **FIO Controller (CODESYS PLC)**
- [Modular PLC \(kendrion.com\)](http://kendrion.com)
  
- **FIO EtherCAT Coupler**
  - with/ without integrated IOs
  
- **FIO IO-Extension modules ( > 40 types)**
- [Modular I/O \(kendrion.com\)](http://kendrion.com)
  - communication
  - digital in- and outputs
  - analogue in- and outputs
  - temperature
  - counter
  - motion controller
  - mixed I/Os
  - safety PLC and IOs



Controller 116 IRT as EtherCAT master and device for EtherCAT, Profinet and Ethernet



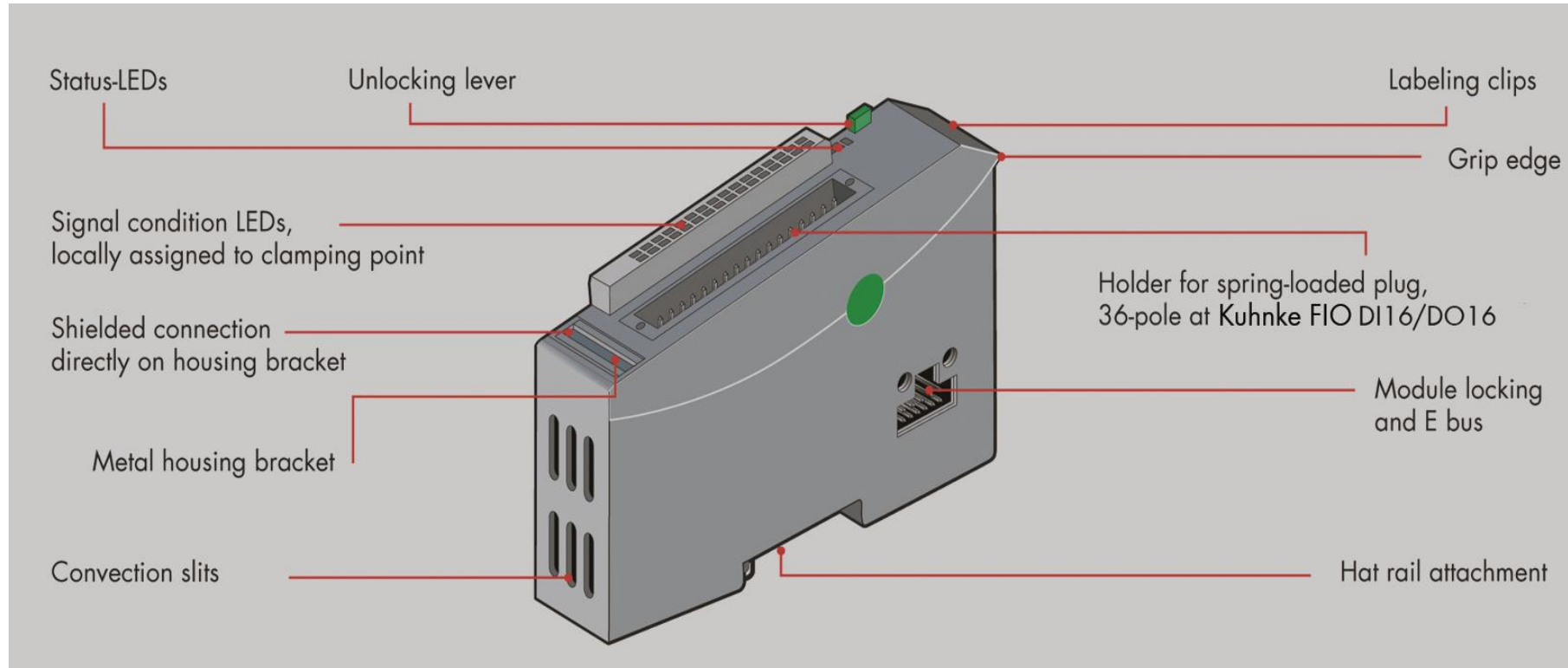
EtherCAT extension with buscoupler



Safety (FSoE) integrated [Safety Control Modules \(kendrion.com\)](http://kendrion.com)

# KUHNKE CONTROL TECHNOLOGY

## I/O Line – EtherCAT IOs with integrated safety

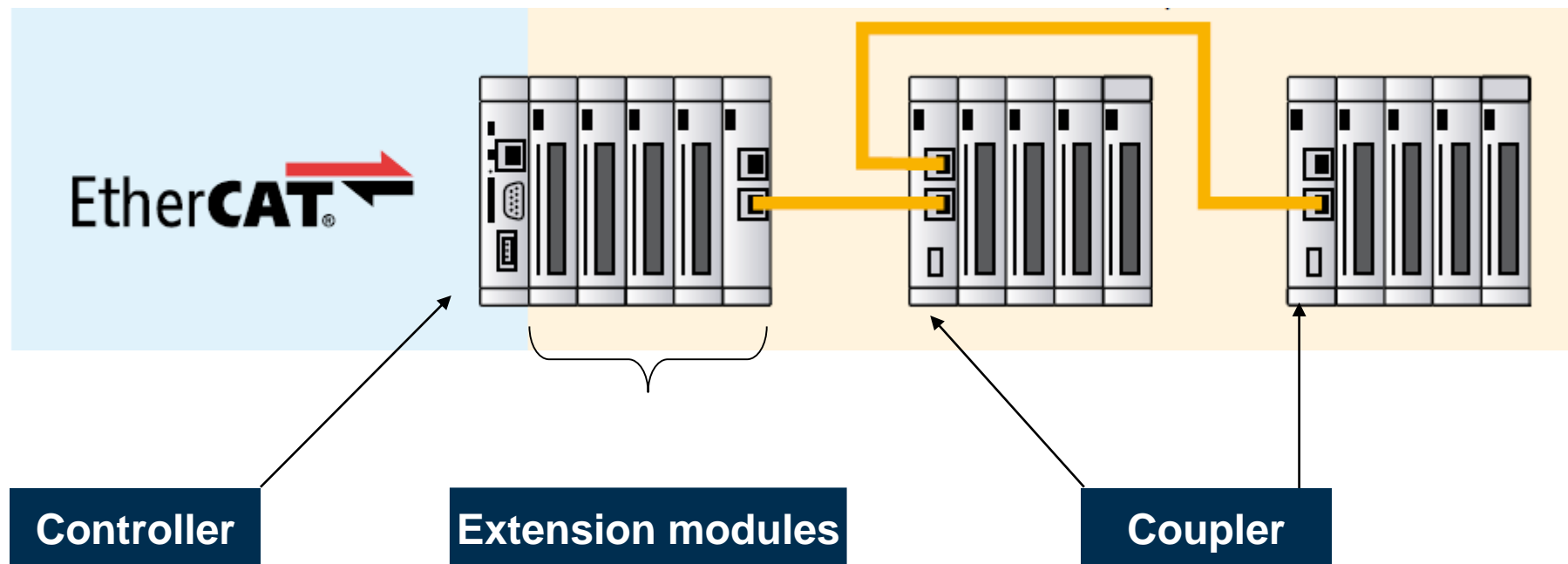


# KUHNKE CONTROL TECHNOLOGY

## I/O Line – EtherCAT IO system configuration

PLC with IO-Extension modules

EtherCAT® IO with IO-Extension modules



# KUNNKE CONTROL TECHNOLOGY

## Modular CODESYS Controller and EtherCAT Couplers

Order no.	Article name	Function
694 300 16 000	Kuhnke FIO Controller 116	PLC with RS232, CANopen®, EtherCAT®, Extensions

[Link to product finder](#)



Order no.	Article name	Function
694 400 00	Kuhnke FIO Coupler, 3A	EtherCAT® RJ45 In / Out
694 400 10	Kuhnke FIO Coupler DI16/DO16	EtherCAT® RJ45 In / Out + 16 Inputs 3ms, 16 Outputs 0,5A



# KUHNKE CONTROL TECHNOLOGY

## FIO Extension Modules - Communication

Order no.	Article name	Function
694 400 01	Kuhnke FIO Extender 1 Port	1 x EtherCAT RJ45 Out
694 400 02	Kuhnke FIO Extender 2 Port	2 x EtherCAT RJ45 Out
694 455 02	Kuhnke FIO RS485 1 Port	1 x RS485
694 455 04	Kuhnke FIO RS232 2 Port	2 x RS232
694 455 06	Kuhnke FIO CAN Master/Slave	EtherCAT-CAN Gateway



[Link to product finder](#)



All modules with cULus.

# KUHKE CONTROL TECHNOLOGY

## FIO Extension Modules – Digital In- and Outputs

Order no.	Article name	Function
694 450 02	Kuhnke FIO DI16/DO8	16 Inputs 1ms, 8 Outputs 0,5A
694 450 03	Kuhnke FIO DI16/DO16	16 Inputs 1ms, 16 Outputs 0,5A
694 450 05	Kuhnke FIO DI8/DO8	8 Inputs 1ms, 8 Outputs 0,5A
694 450 13	Kuhnke FIO DI16/DO16 LS	16 Inputs 1ms, 16 Outputs 0,5A GND switching
694 451 02	Kuhnke FIO DI32	32 Inputs 1ms
694 451 03	Kuhnke FIO DI16	16 Inputs 1ms
694 451 43	Kuhnke FIO DI16 2-wire	16 Inputs 1ms, 2-wire connection
694 451 43	Kuhnke FIO DI16 2-wire GI	16 Inputs 1ms, 2-wire, galvanic. isolated
694 452 01	Kuhnke FIO DO16	16 Outputs 0,5A
694 452 41	Kuhnke FIO DO16 2-wire	16 Outputs 0,5A , 2-wire connection
694 452 02	Kuhnke FIO DO8 1A	8 Outputs 1A
694 452 06	Kuhnke FIO DO8 2A	8 Outputs 2A
694 452 03	Kuhnke FIO DO8 Relay NO 24V	8 Relay Outputs, normally open, 2A
694 452 04	Kuhnke FIO DO8 Relais NO 230VAC	8 Relay Outputs, normally open, 2A

All modules pretested with ETG conformance test tool.

All modules with cULus.

[Link to product finder!](#)



# KUNNKE CONTROL TECHNOLOGY

## FIO Extension Modules – Analogue In- and Outputs

Order no.	Article name	Function
694 441 51	Kuhnke FIO AI4-I 12Bit	4 Inputs 0(4)..20mA
694 441 52	Kuhnke FIO AI4/8-U 13Bit	4 diff. / 8 s.e. Inputs 0..10V / -10..+10V
694 441 53	Kuhnke FIO AI8/16-U 13Bit	8 diff. / 16 s.e. Inputs 0..10V / -10..+10V
694 441 54	Kuhnke FIO AI8-I 12Bit	8 Inputs 0(4)..20mA
694 442 52	Kuhnke FIO AO4-U/I 16Bit	4 Outputs 0(4)..20(24)mA / 0..10V, -10..+10V
694 444 65	Kuhnke FIO AI4 12Bit/ AO4 16Bit	4 Outputs 0(4)..20(24)mA / 0..10V, -10..+10V 4 Inputs 0(4)..20(24)mA / 0..10V, -10..+10V

Each channel configurable via CoE

All modules pretested with ETG conformance test tool.

All modules with cULus.

[Link to product finder!](#)



# KUHNKE CONTROL TECHNOLOGY

## FIO Extension Modules – Temperatur

Order no.	Article name	Function
694 441 51	Kuhnke FIO AI4-Pt/Ni/TC 16 Bit*	4 Inputs PT100/PT1000/Thermo Type J, K, mV
694 441 52	Kuhnke FIO AI8-Pt/Ni/TC 16 Bit*	8 Inputs PT100/PT1000/Thermo Type J, K, mV

[Link to product finder!](#)



Each channel configurable via CoE

All modules pretested with ETG conformance test tool.

All modules with cULus.



# KUHKE CONTROL TECHNOLOGY

## FIO Extension Modules – Counter / Drive Controller

Order no.	Article name	Function
694 444 01	Kuhnke FIO Counter	2 counter 400kHz, 8DI, 2 DO,
694 454 01	Kuhnke FIO Counter / Posi 2	2 counter 400kHz, 8DI, 2 DO, 2 AO +/-10V
694 454 51	Kuhnke FIO Counter / Encoder	2 counter 200kHz HTL / 5kHz TTL, EnDat, SSI, 6DI
694 454 16	Kuhnke FIO Drive Control	brushless DC or stepper motor, 5A
694 454 56	Kuhnke FIO Stepper Control	3 x Stepper motors, 2.8A, 12-48 VDC, 3 DO, 9 DI

Remark:

Usage of 5V (RS422) and 24V rotary encoders possible.

[Link to product finder!](#)



All modules pretested with ETG conformance test tool.

All modules with cULus.



# KUHNKE CONTROL TECHNOLOGY

## FIO Extension Modules – Mixed I/Os

Order no.	Article name	Function
694 444 64	Kuhnke FIO MIX04	4 AI, 4 AO, 2 Counter / Encoder, configurable

[Link to product finder!](#)



# KUHNPKE CONTROL TECHNOLOGY

## FIO Extension Modules – Safety

Order no.	Article name	Function
694 330 00	Kuhnke FIO Safety PLC	FSoE Master, CODESYS Safety (PL e, CAT 4)
694 430 10	Kuhnke FIO Safety SDI8/SDO4	FSoE Slave, 8 S-Inputs, 4 S-Outputs (PL e, CAT 4)
694 430 20	Kuhnke FIO Safety SDI16/SDO8	FSoE Slave, 16 S-Inputs, 4 S-Outputs (PL e, CAT 4)
694 431 00	Kuhnke FIO Safety SDI16	FSoE Slave, 16 S-Inputs (PL e, CAT 4)



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# KUHNKE CONTROL TECHNOLOGY

## FIO Extension Modules – OC modules

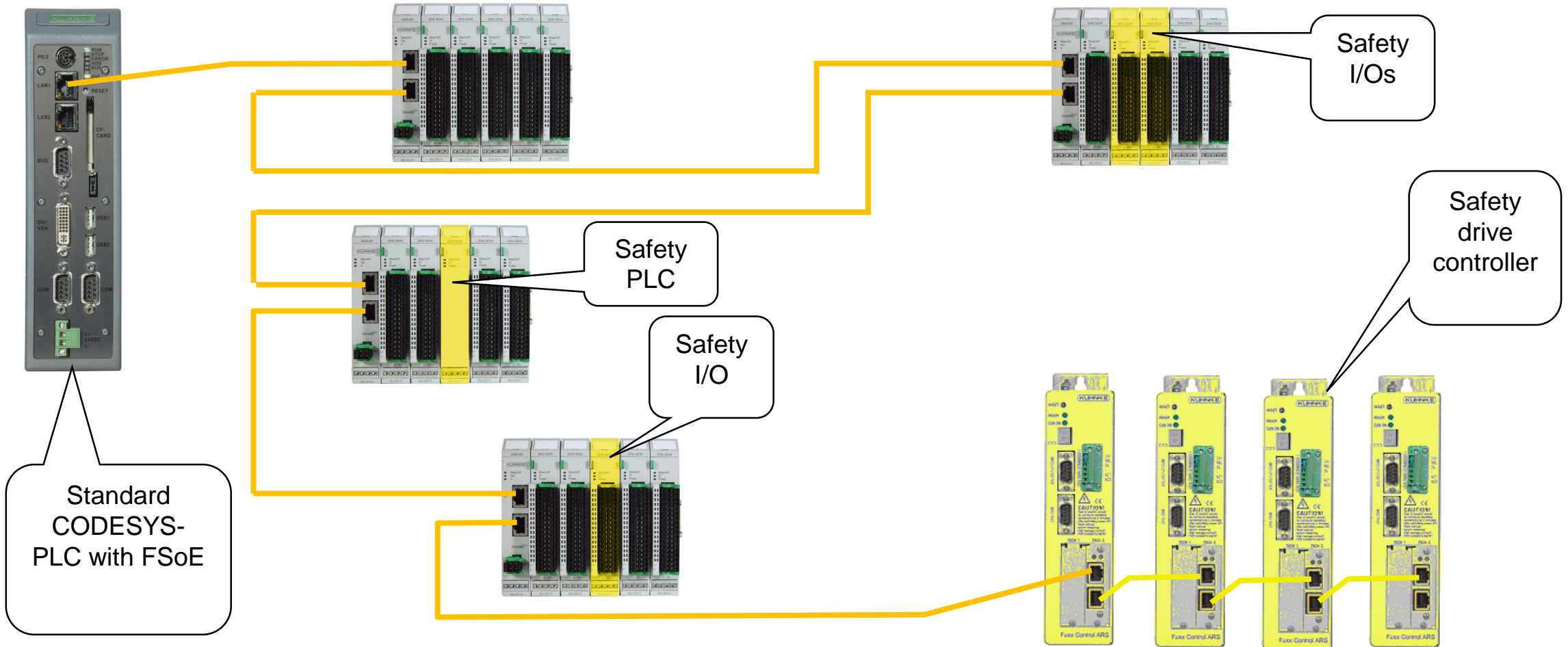
Order no.	Article name	Function
694 434 53	Kuhnke FIO OC Counter/Encoder	FSoE Master, CODESYS Safety (PL e, CAT 4)
694 434 65	Kuhnke FIO OC AI4	FSoE Slave, 8 S-Inputs, 4 S-Outputs (PL e, CAT 4)

With Safety PLC e.g. for application SLS (SafeLimitedSpeed) with Drive without FSoE



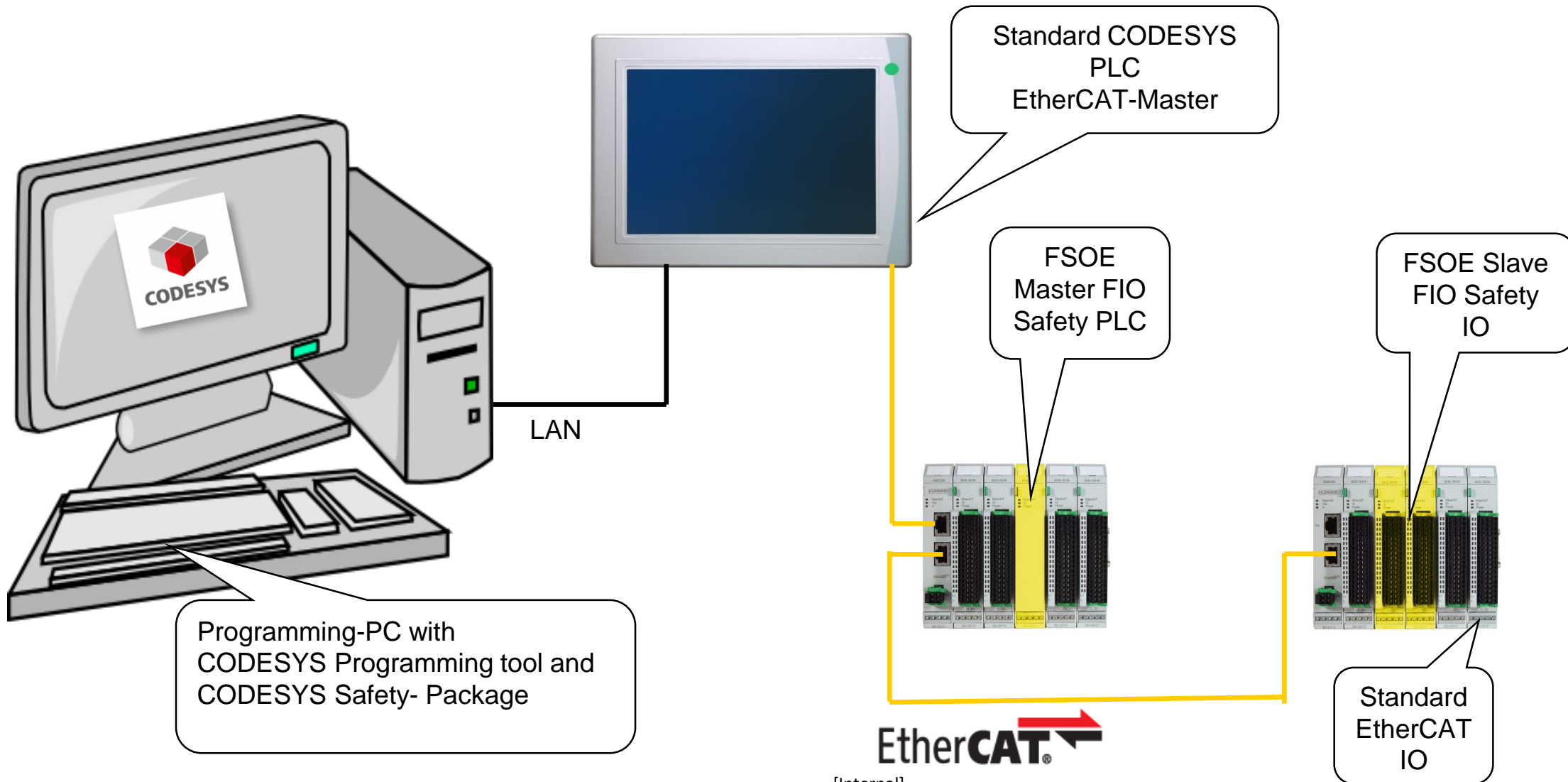
# KUHNKE CONTROL TECHNOLOGY

## I/O Line – EtherCAT IO safety configuration



# KUHNKE CONTROL TECHNOLOGY

## I/O Line – functional safety programming via CODESYS



## Our Safety FSoE portfolio

### Safety PLC(FSoE master)

Current version (bus coupler needed):

- IEC 61508 SIL3
- DIN EN ISO 13849 PL e, CAT 4
- PLCopen Safety FBs integrated
- KK Safety FBs for PL d



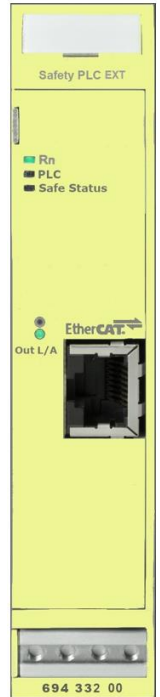
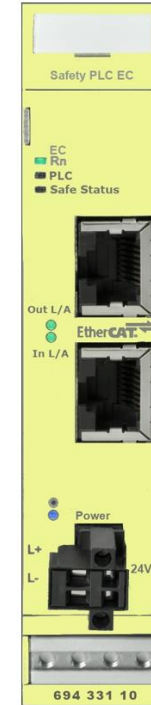
New version: bus coupler integrated or inline EtherCAT out

- FPU integrated
- more power, faster S-PLC cycle times
- SD-card for easy device replacement
- CODESYS 1.7x – 64bit Windows



## New S-PLC / Optimization compared to existing S-PLC

- Modern STM32 H7 Micro controller
  - Higher performance (CPU Benchmark test factor 3)
  - Frequency up to 400 MHz
  - FPU (double precision)
  - Sufficient “On Chip” memory
  - Long term availability (automotive)
- CODESYS Safety
  - Version 1.61 – 64 Bit Windows – module based realization
  - SD-Card support (usability)
  - FPU usable
  - Instruction Cache usable
  - Shorter S-PLC-task times (factor 4 - 6)
  - 512 kByte application program memory
  - 256 kByte data memory for application
  - EtherCAT cycle 500µs



## Our Safety FSoE portfolio

### Safety IOs(FSoE slaves)

#### Current versions

- IEC 61508 SIL3
- DIN EN ISO 13849 PI e, CAT 4
- 0.5A S-DO

#### New version planned: 2A outputs

- 8 S-DI
- 2 S-DO 2A
- replacement for existing 4SDI – 2SDO module

16 SDI – 4SDO



8 SDI – 2SDO

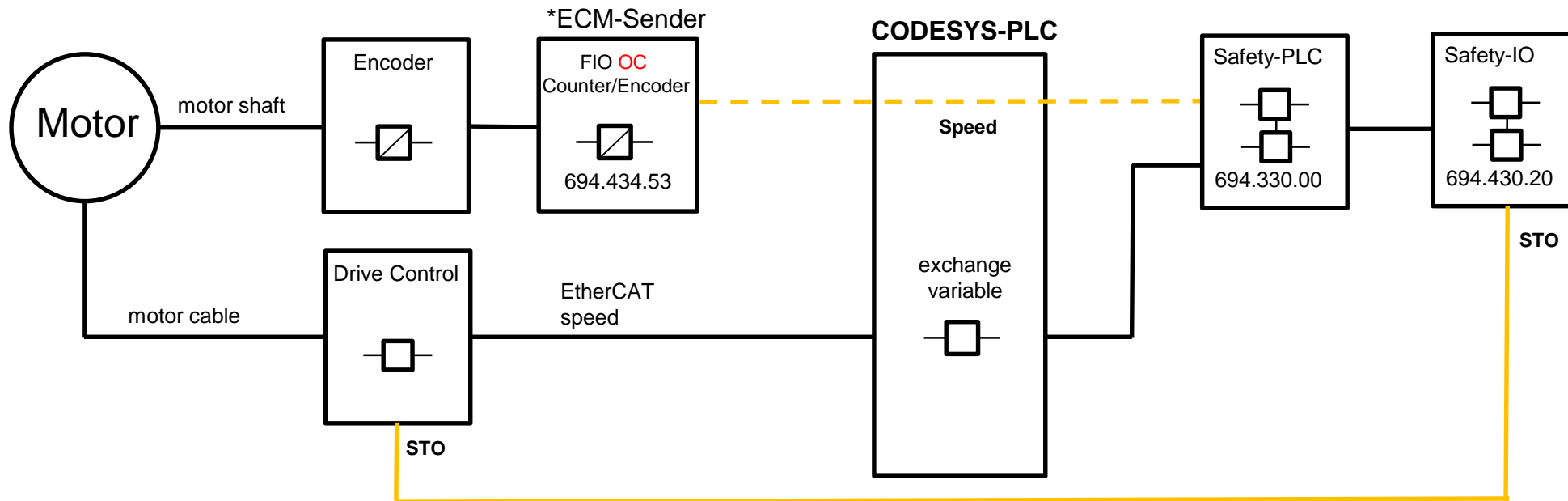


16 SDI



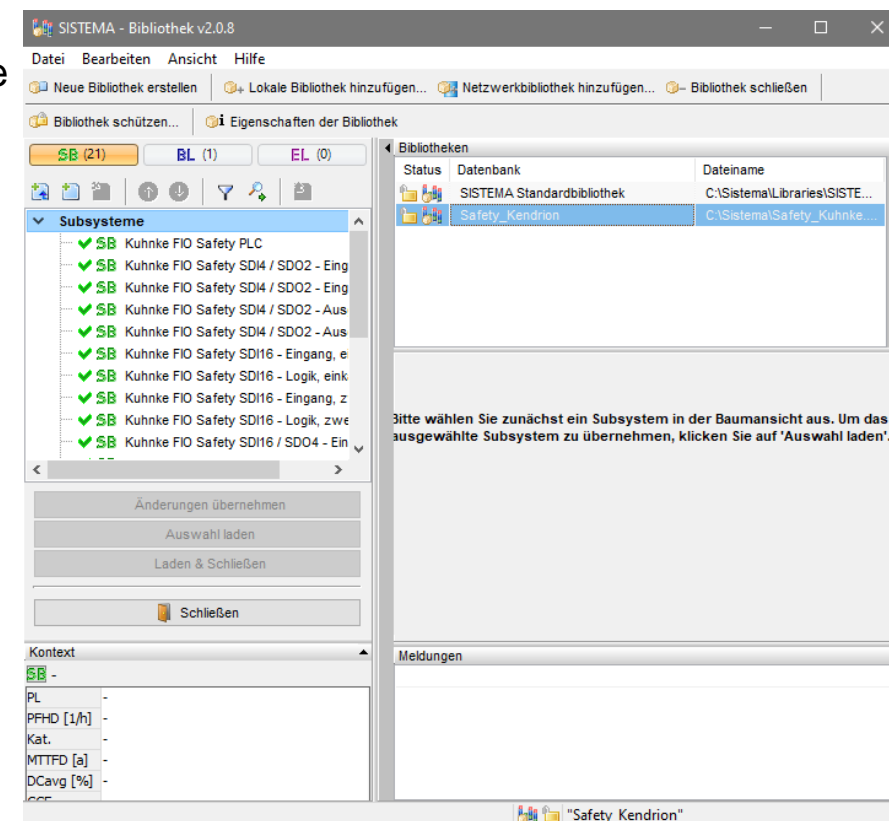
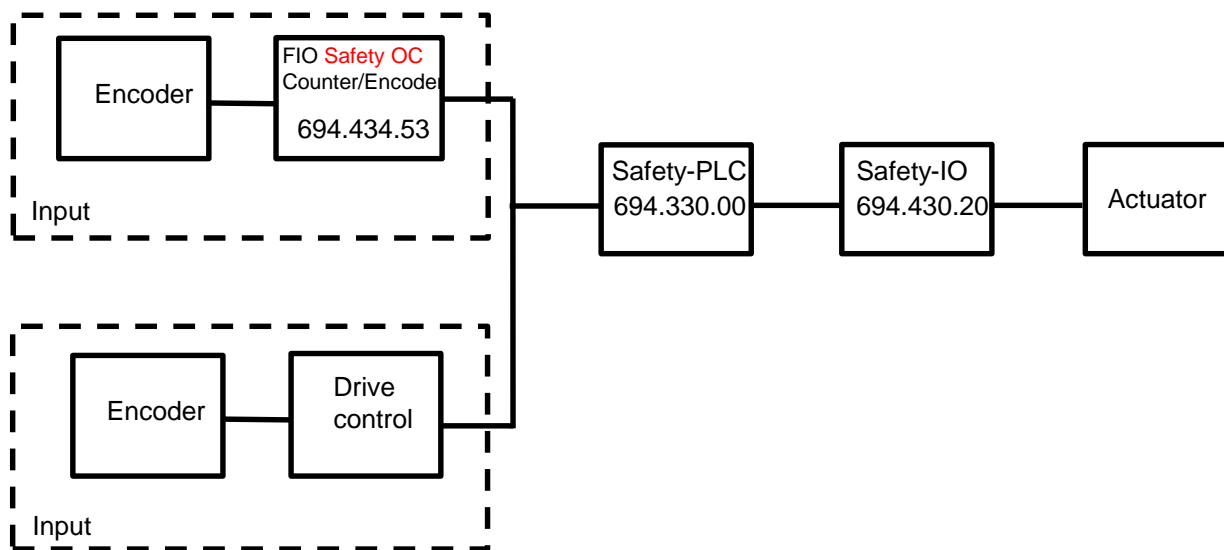
## OC modules and KICS Safety Library for Kendrion Safety PLC

- SF01\_Scale\_Verify + ECM
  - Application SLS (SafeLimitedSpeed) with FIO OC module for Drive without FSoE



## OC modules and KICS Safety Library for Kendrion Safety PLC

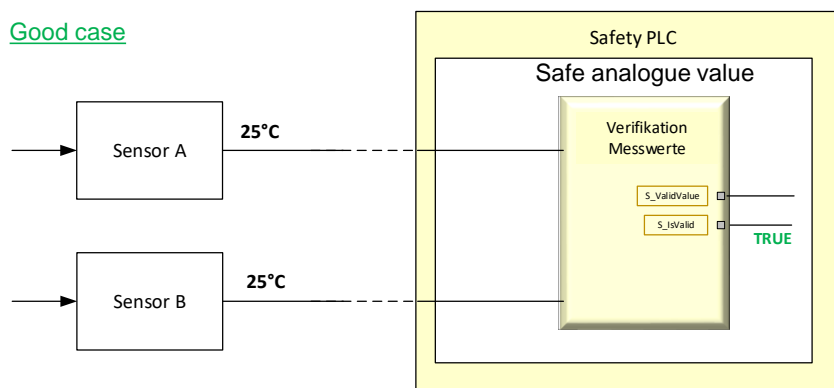
- Safety structure SLS (SafeLimitedSpeed)
  - PLd according to DIN EN ISO 13849
  - Characteristics for Kendrion-devices as library in Sistema available
  - ....



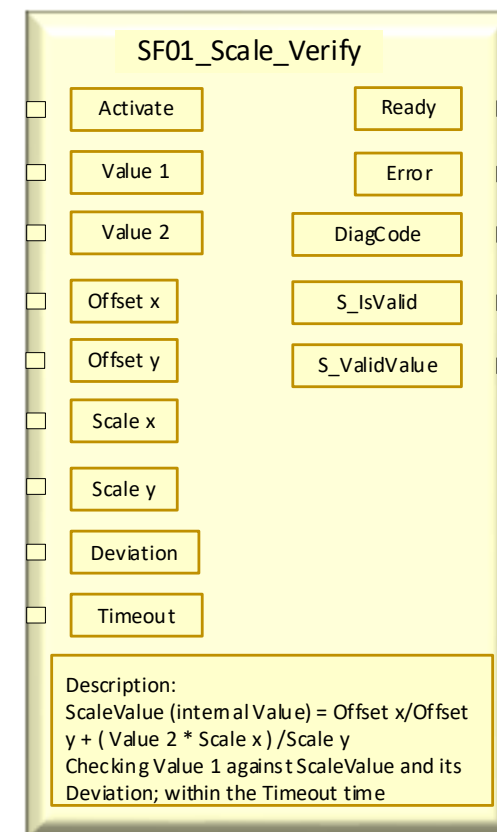
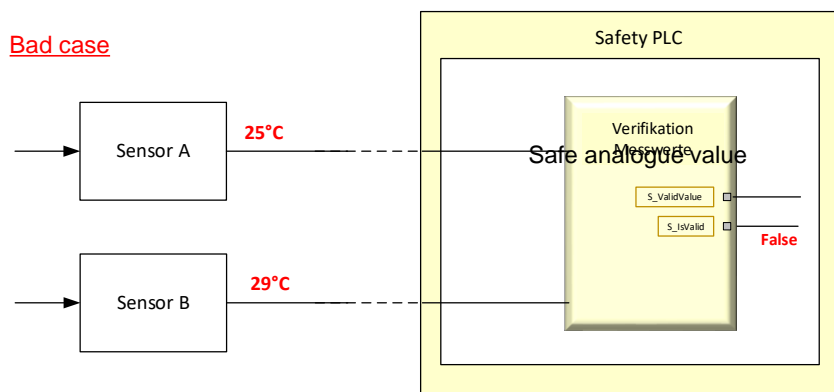
# OC modules and KICS Safety Library for Kendrion Safety PLC

- SF01\_Scale\_Verify  
Safe analogue value by verification of the process value

Good case



Bad case

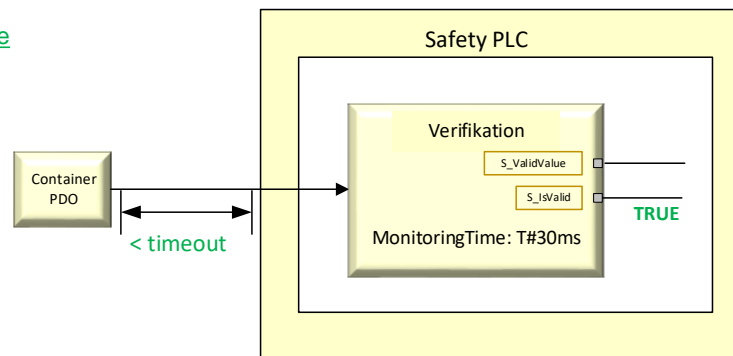




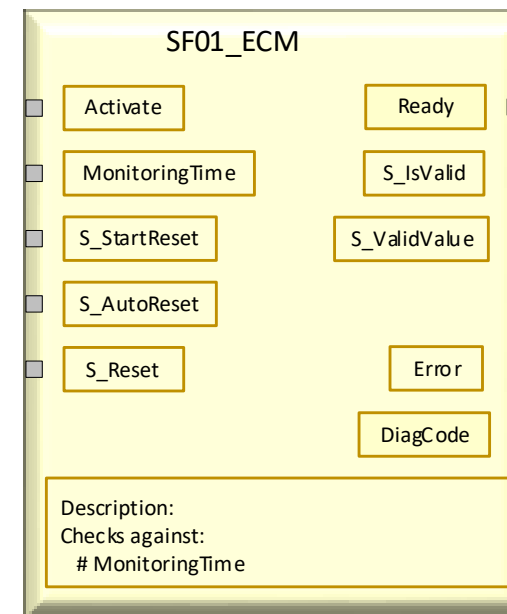
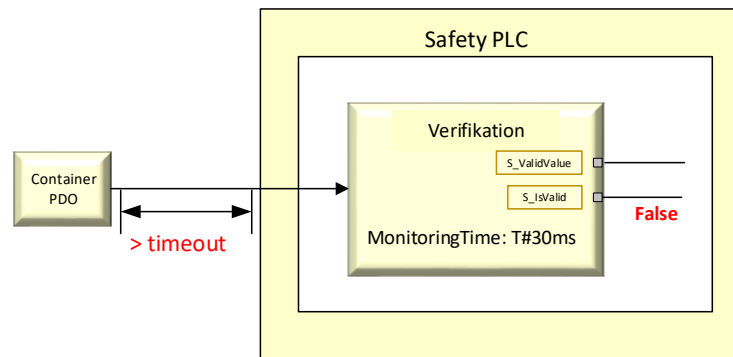
# OC modules and KICS Safety Library for Kendrion Safety PLC

- SF01\_ECM (External Communication Monitoring)  
Time monitoring of an external component by means of heartbeat – Fail Safe

Good case



Bad case



# KUHNKE CONTROL TECHNOLOGY

## Door-opener products / solutions

- **Kuhnke FIO Controller 116 with CODESYS HMI** (extendable with FIO-IOs)
- **Kuhnke FIO Controller 116 IRT** for EtherCAT based Profinet sub systems
- **EtherCAT coupler with 16DI/16DO** as stand alone EtherCAT I/O
- **FIO Drive Control** for demanding drive solutions with low-cost stepper motors
- **FIO Safety PLC** as a unique CODESYS-Standard solution for integrated safety with FSoE (Especially, in combination with EtherCAT-Drives with integrated safety)
- **Special-function module** (Mixed IO)
- **Econo 206 and Scout 706** as PLCs for drive applications (in preparation)



# KENDRION

PRECISION. SAFETY. MOTION.