# SIRIUS ACT
# Performance in Communication

Technical Slides



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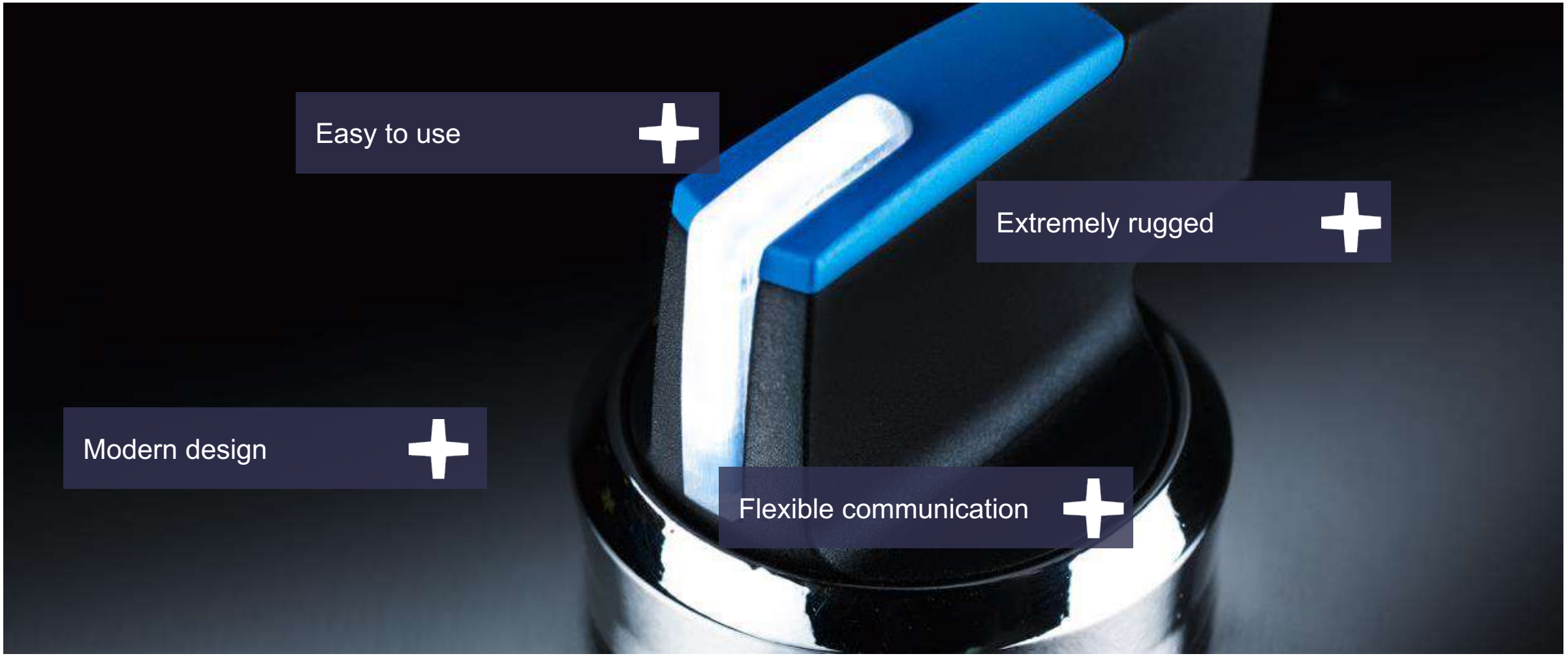
# SIRIUS ACT – Performance in Communication



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# SIRIUS ACT
## Convinces with its modern design

- Three design lines, one accessory range
- Ideal combination of design and function
- Improved look of the system

**Lend a new face to your plant.**

SIRIUS ACT
Performance in Action



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# SIRIUS ACT
## Convinces with its easy installation

- One-handed installation
- No special tools needed
- Twist prevention integrated into the holder

**Save on installation time!**

SIRIUS ACT
Performance in Action



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# SIRIUS ACT
## Convinces with its ruggedness

- IP69K as standard
- Insensitive to dust, oil, caustic solutions and water
- Design stability after many years of use

**Protect your plant against external influences.**

SIRIUS ACT
Performance in Action



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# SIRIUS ACT
## Convinces with its communication

- PROFINET, AS-i or IO-Link interfacing possible
- Fast and direct connection to the control system
- Integrated into the TIA Portal

**Reduce your wiring outlay through diverse communication solutions.**

SIRIUS ACT
Performance in Action



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# Short information…
# By one click!

Short information on
**SIRIUS ACT**
**with**
**PROFINET**

→ **Click on the picture**

Short information on
**SIRIUS ACT**
**with**
**IO-Link**

→ **Click on the picture**

Short information on
**SIRIUS ACT**
**with**
**AS-interface**

→ **Click on the picture**

**If you want to see the whole presentation, please continue.**



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# Agenda





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# Introduction



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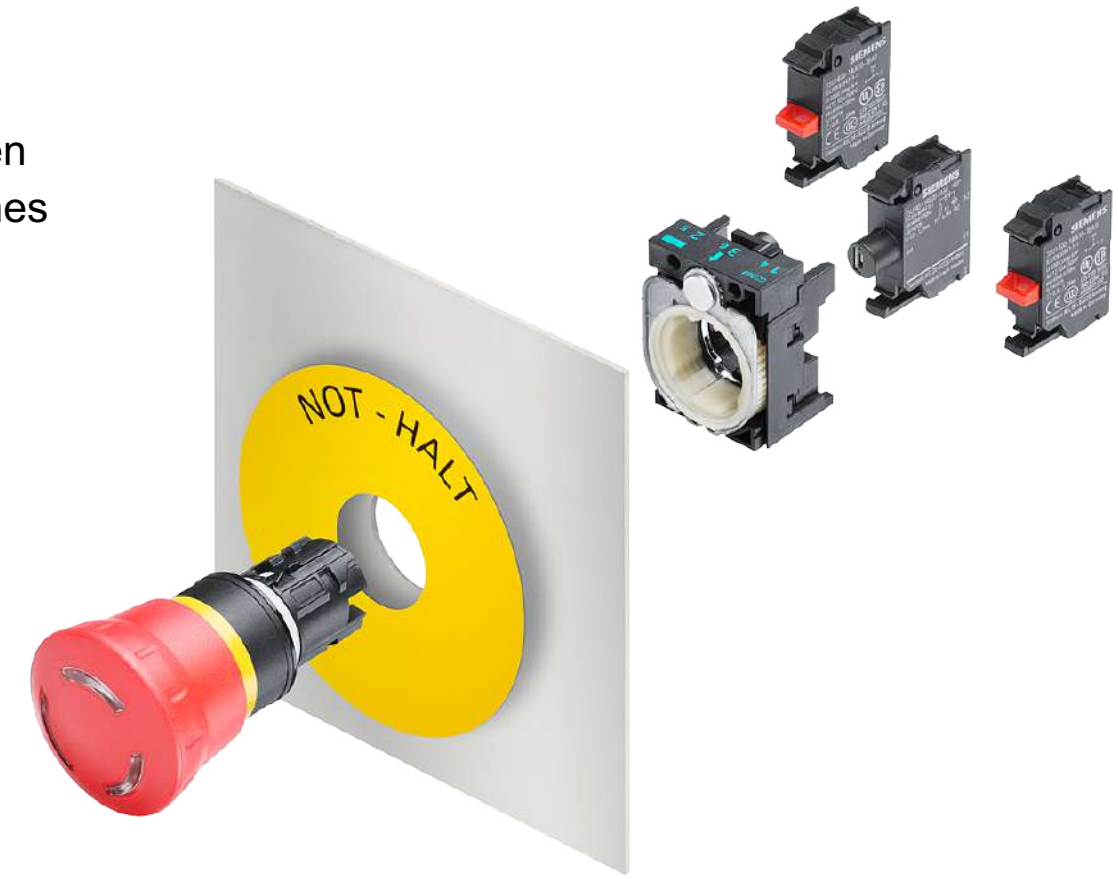
# SIRIUS ACT
# Performance in communication

## Introduction

In automation, push buttons and signaling devices have long been a tried and tested means of enabling communication with machines and systems. Operator panels or touch panels (HMI) are further means of communication between humans and machines.

The communication solutions provided by SIRIUS ACT enable simple combinations of push buttons and signaling devices, HMI touch screens and industrial PCs,

which means that complex input stations can be set up without extensive wiring outlay and engineering time and effort.



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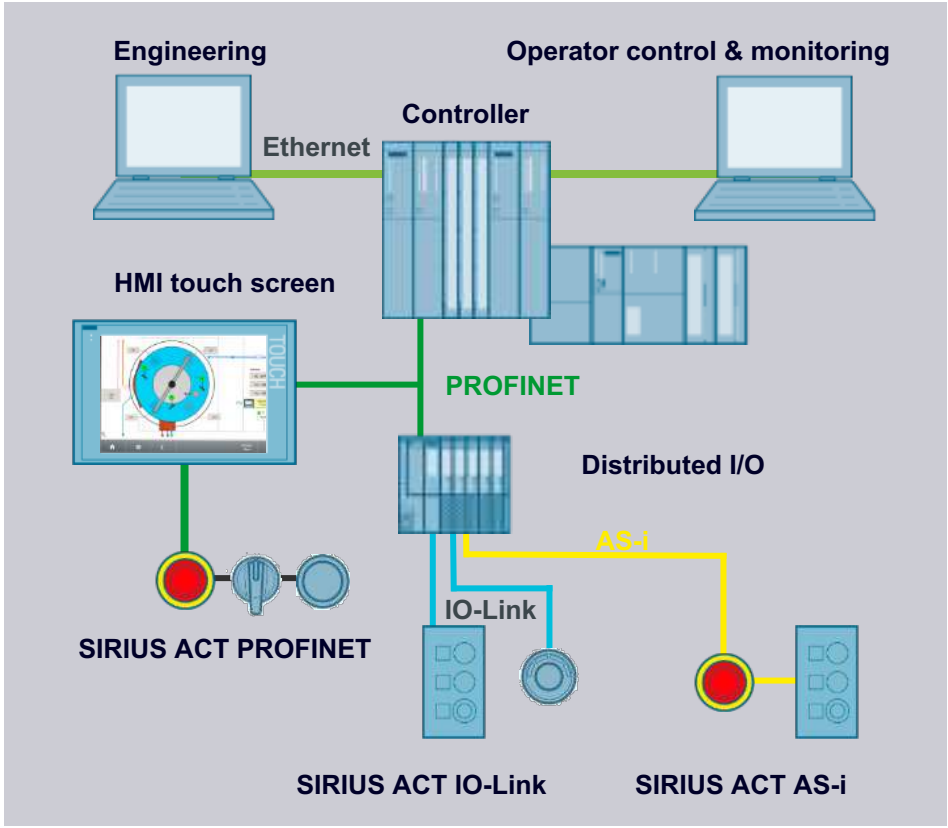
# SIRIUS ACT
## The interface between humans and machines

### Introduction

**Small devices but a big effect**




**SIRIUS ACT**
**Optimally integrated in the SIEMENS communication environment**



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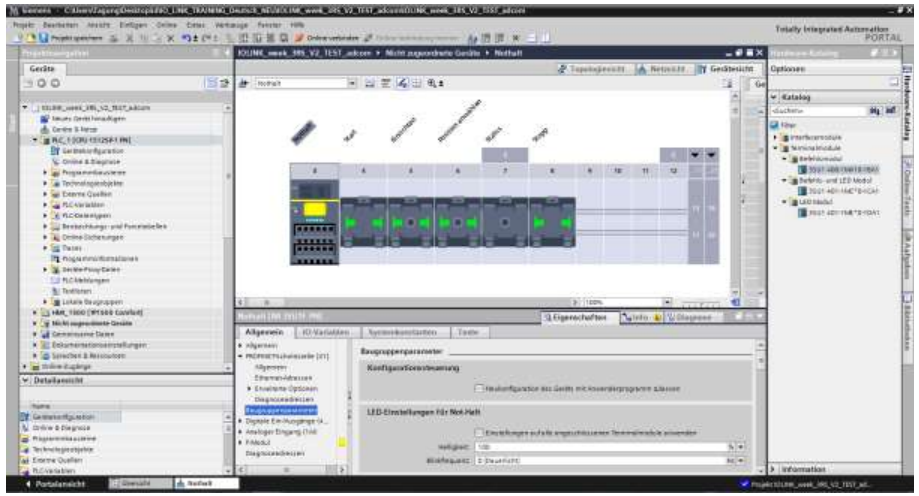
# SIRIUS ACT PROFINET
## The simple, quick and reliable route to the controller (PLC)

### Introduction

**SIRIUS ACT PROFINET** is a solution for linking push buttons and signaling devices quickly and for connecting them easily to a controller.

- **Fast and easy integration in a controller (PLC)**
- **Integrated into the TIA Portal**
- **Also for connectivity of safety technology**
- **Quick and easy installation**
- **Communication** via PROFINET and PROFIsafe
- **No address assignment for each Terminalmodul**
- **No additional components needed**





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# SIRIUS ACT PROFINET
## The simple, quick and reliable route to the controller (PLC)

### Introduction

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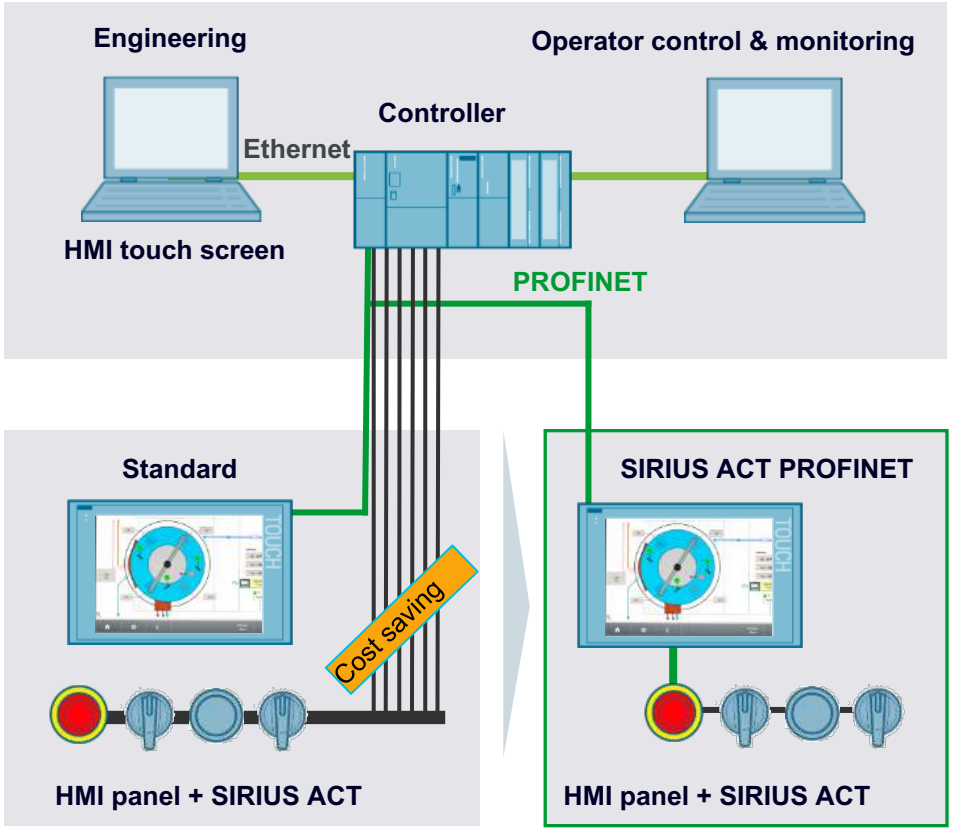


**SIRIUS ACT PROFINET**
**Optimized for combination with HMI, e.g. SIMATIC touch panel**



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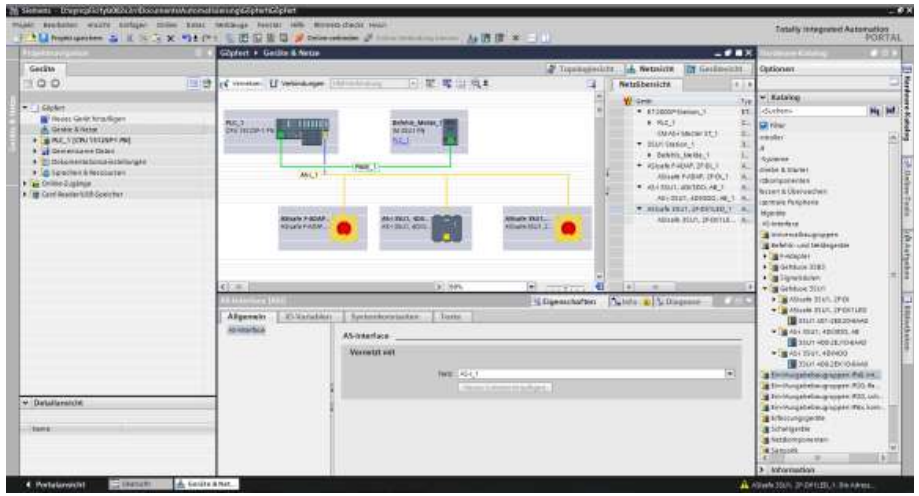
# SIRIUS ACT AS-Interface
# A rugged communication system particularly in the field

## Introduction

**SIRIUS ACT AS-Interface** offers diverse options of integrating push buttons and signaling devices easily and quickly into a controller.

- **Easy configuration of enclosure solutions via a configurator**
- **Shorter installation time thanks to pre-wired, customized enclosure solutions**
- **Simple design of safety applications**
- **Possibility of integrating all SIRIUS ACT devices**
- **Integrated into the TIA Portal**





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# SIRIUS ACT IO-Link
# The simple point-to-point connection

## Introduction

### SIRIUS ACT IO-Link
The intelligent interface between humans and machines

- **Identification of persons via SIRIUS ACT ID key-operated switches**
- **Creation of an authorization management system for your machine/system (ID key-operated switches)**
- **Easy configuration of customized enclosures with IO-Link via configurator**
- **Shorter installation time thanks to pre-wired, customized enclosure solutions with integrated IO-Link interface**




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# System



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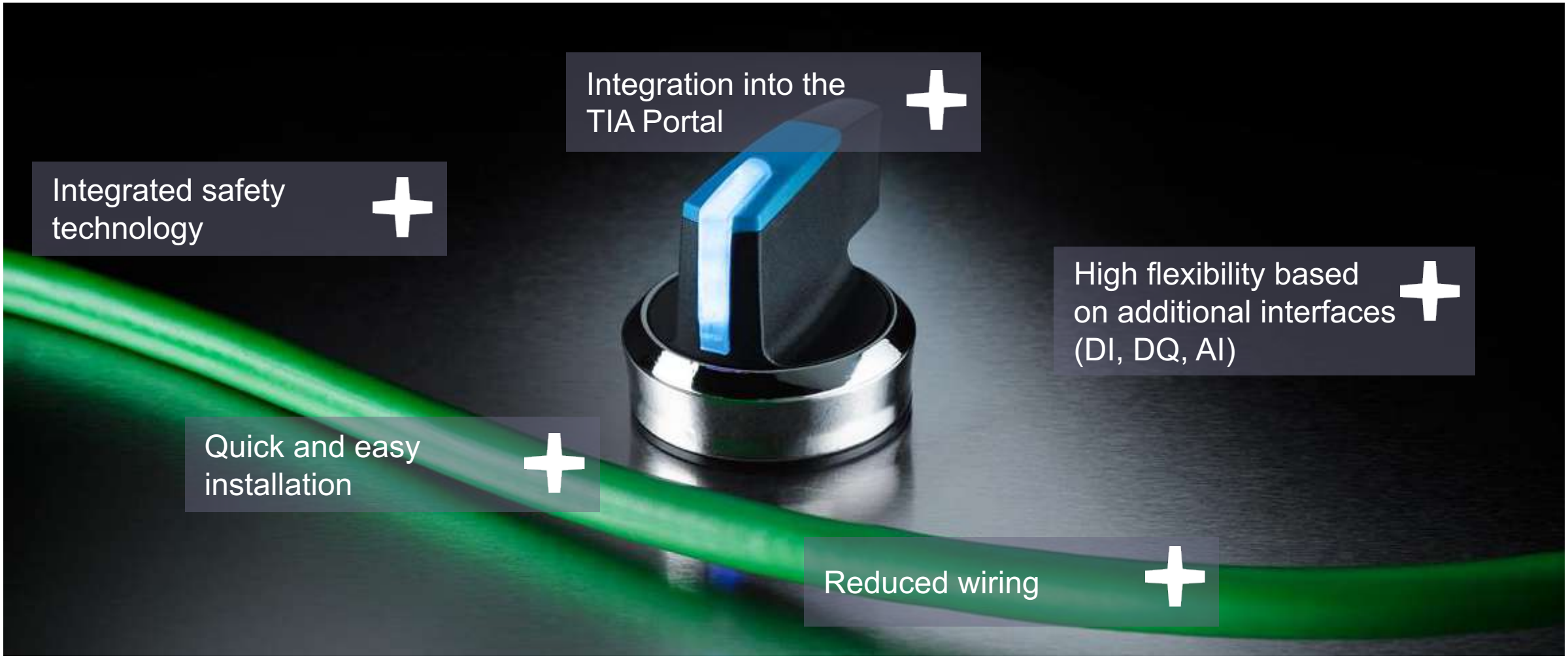
# SIRIUS ACT PROFINET
## A versatile system



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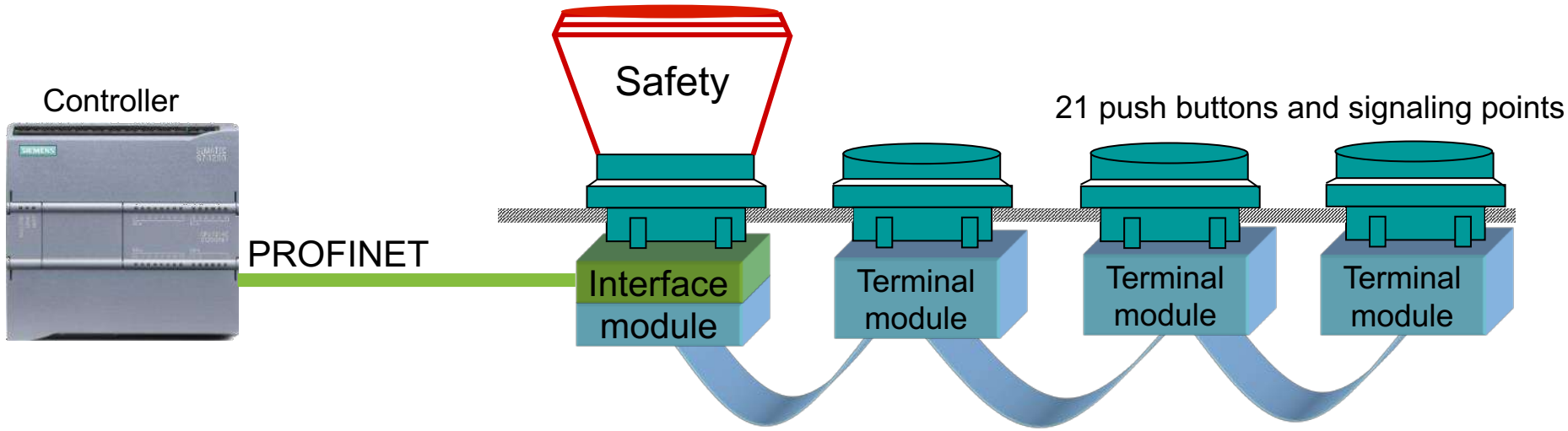
# SIRIUS ACT PROFINET
## Flexibility in all applications




### System data

- Maximum configuration: 1 interface module + 20 terminal modules
- Cable length between the modules: 1 meter
- Total cable length (IM – TM): 10 meters
- Power supply: 24 V DC



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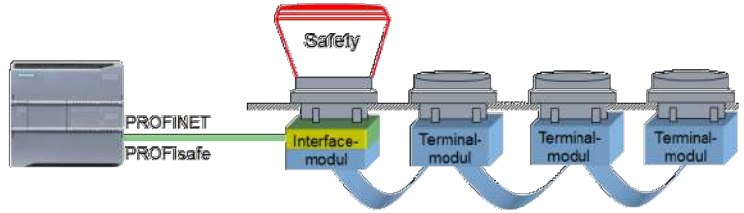
# SIRIUS ACT PROFINET
# Flexibility in all applications

## SIRIUS ACT PROFINET/PROFIsafe

- If there is a safety-related SIRIUS ACT device (e.g. EMERGENCY STOP up to SIL 3) in the application, it can be integrated easily via the fail-safe interface module (IM F).
- If safety-related, then connection to IM F.

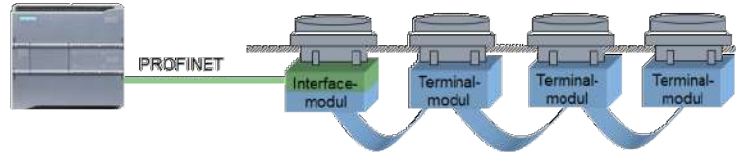
**SIRIUS ACT application WITH safety**




## SIRIUS ACT PROFINET

- All devices that are not safety-related can be integrated easily with one of the interface module (IM).

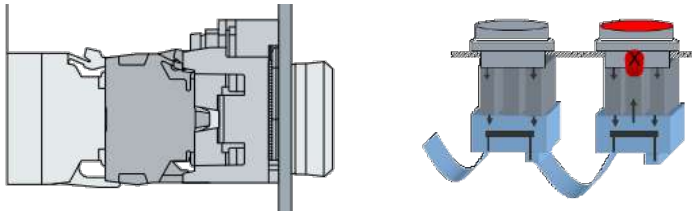
**SIRIUS ACT application WITHOUT safety**




## SIRIUS ACT PROFINET combined with standard cabling

- A combination of terminal modules with standard modules is also possible.
- The standard contact modules must be snapped on first, always three of them; then the terminal modules.

**SIRIUS ACT standard contact modules + communication application**





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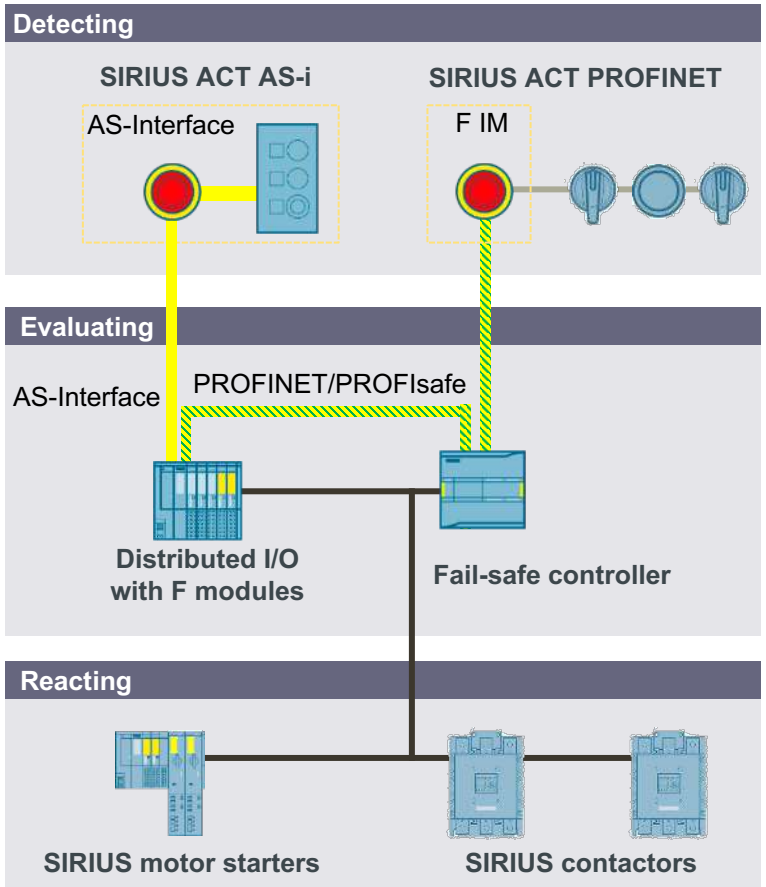
# SIRIUS ACT PROFINET
# is part of integrated safety technology

## Integrated safety technology




## Features

- SIRIUS ACT can be integrated easily and quickly into the safety technology of an automation process via PROFINET/PROFIsafe.
- SIRIUS ACT enclosures and devices can be integrated easily and quickly into the safety technology of an automation process via ASIsafe.
- SIRIUS ACT is also integrated in the Safety Evaluation Tool. Link: www.siemens.com/safety-evaluation-tool

## Customer benefits

- Reduces components and wiring
- Extended diagnostic capabilities
- Integrated in the TIA Portal
- Quick creation of reports and determination of the safety integrity level (SIL/PL) achieved via Safety Evaluation Tool



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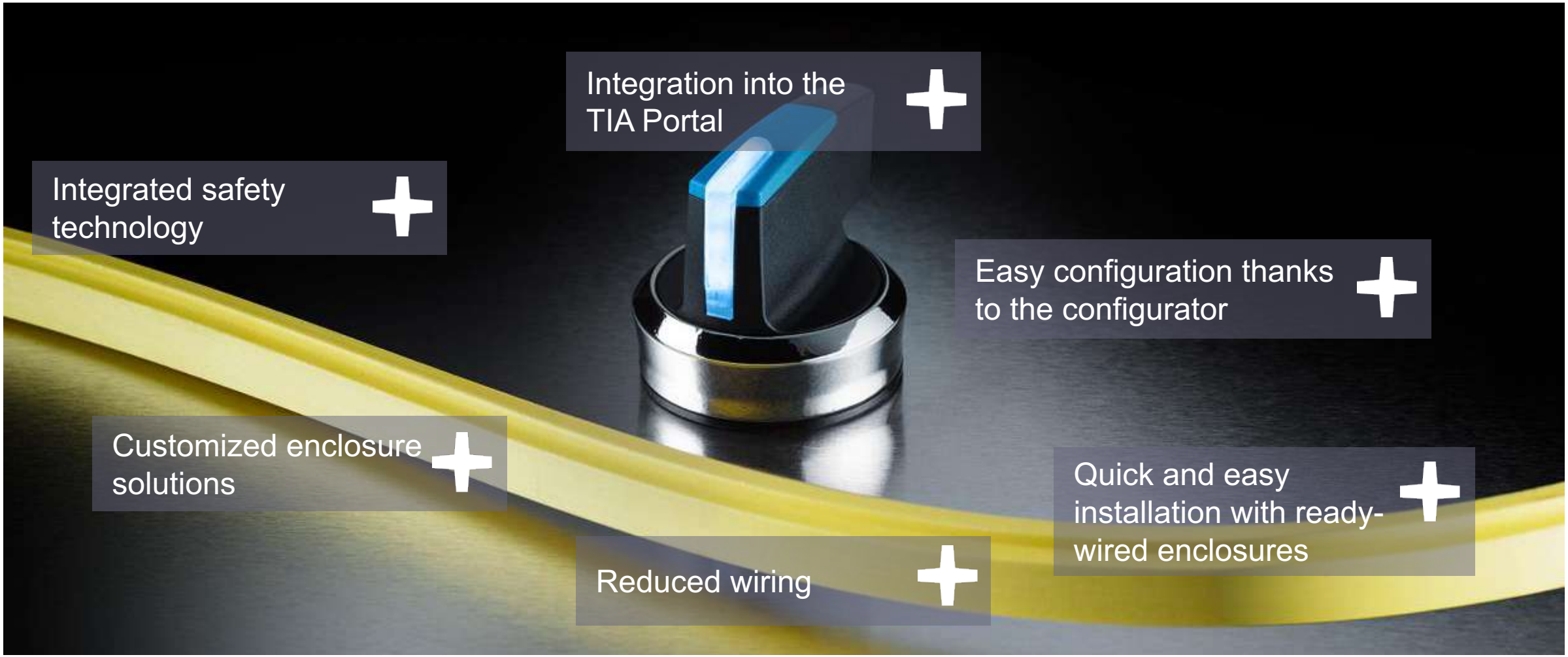
# SIRIUS ACT AS-Interface
# A versatile system



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# SIRIUS ACT IO-Link
# A versatile system




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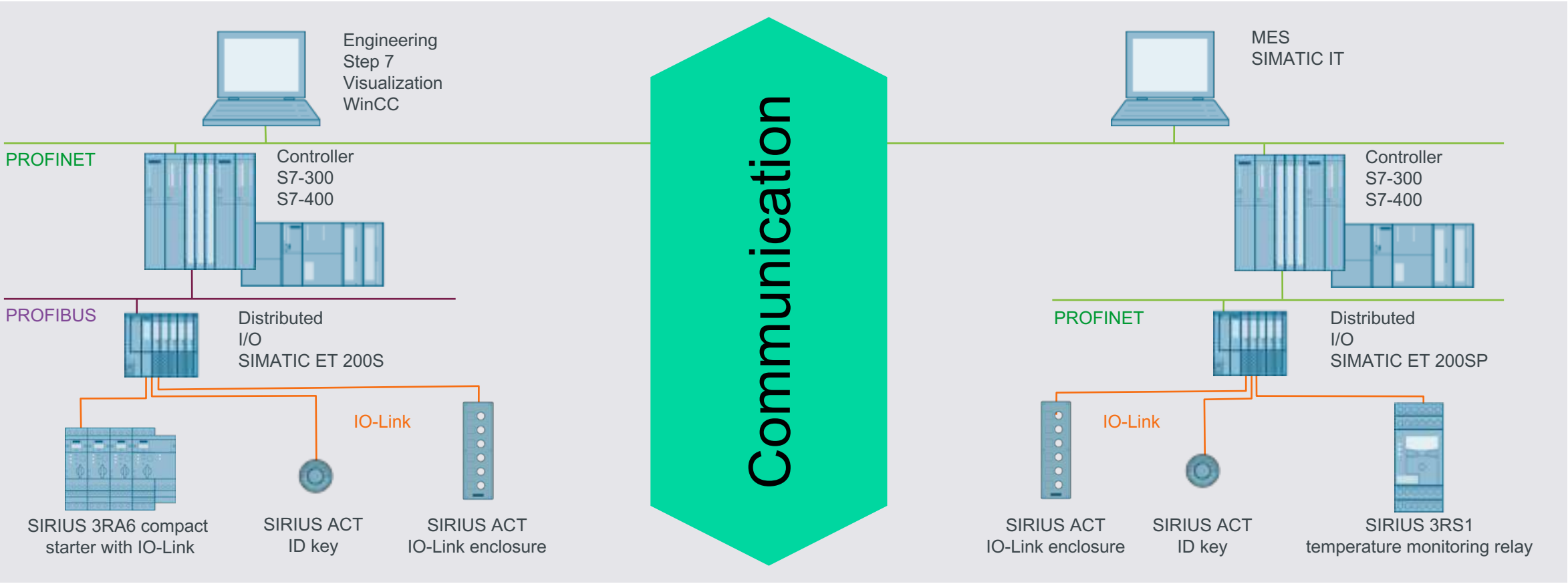
# SIRIUS ACT IO-Link




The SIRIUS ACT ID key is designed to ensure that only **authorized persons** can carry out work on your plants and machinery.



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# Product

## SIRIUS ACT PROFINET



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# SIRIUS ACT PROFINET
## Powerful hardware and innovative software

Components

- Interface module IM
- Interface module IM F Safety
- Terminal modules

Functions

TIA Portal

Getting started



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# SIRIUS ACT PROFINET
## Just a few components for a complex panel

### Interface module Failsafe IM F

- PROFINET/ PROFIsafe
- 4 DI (digital inputs)
- 1 DQ (digital output)
- 1 AI (analog input)
- 24 V power supply

**Spring-type connection:**
3SU1400-1LL10-3BA1

**Screw terminals:**
3SU1400-1LL10-1BA1

### Interface module IM

1)
- PROFINET
- 24 V power supply

2)
- 4 DI (digital inputs)
- 1 DQ (digital output)
- 1 AI (analog input)

**Spring-type connection:**
1) 3SU1400-1LK10-3AA1
2) 3SU1400-1LK10-3BA1

**Screw terminals:**
1) 3SU1400-1LK10-1AA1
2) 3SU1400-1LK10-1BA1

### Terminal module TM (command module)

- Max. 2 mechanical signals for mounting on all non-illuminated SIRIUS ACT devices
- Non-illuminated push buttons, selectors

**MLFB:**
3SU1400-1MA10-1BA1

### Terminal module TM (command and LED module)

- For mounting on all illuminated SIRIUS ACT devices, max. 2 mechanical signals
- *Colors:* red, green, yellow, white, amber, blue

**MLFB:**
3SU1401-1MC 2 3 4 5 6 0 0-1CA1

### Terminal module TM (LED module)

- For mounting on all SIRIUS ACT indicator lights
- *Colors:* red, green, yellow, white, amber, blue

**MLFB:**
3SU1401-1ME 2 3 4 5 6 0 0-1DA1



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# SIRIUS ACT PROFINET
## Accessories facilitate handling

| Memory module | LEDs that can be integrated | Cables |
|---|---|---|
|  |  |  |
| Enables fast device replacement without engineering tools and product-specific engineering know-how<br>Optional for IM; always available for IM F.<br><br>**MLFB:**<br>3RK3-9310-AA00 | Enhanced flexibility thanks to fast LED replacement on the interface module.<br><br>**MLFB:**<br>3SU1401-3BA 2 0-5AA0<br>3<br>4<br>5<br>6<br>0 | 7-wire ribbon cable<br>*Grid:* 1.27 mm<br>*Cross section:* 0.081 mm² (per stranded wire)<br><br>**Cable 5 m**<br>3SU1900-0KQ80-0AA0<br><br>**Cable 10 m**<br>3SU1900-0KP80-0AA0 |



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# SIRIUS ACT PROFINET
# Accessories facilitate handling

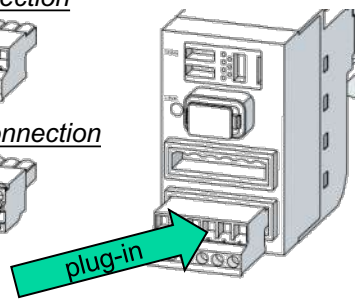
## Interface module **F** IM F

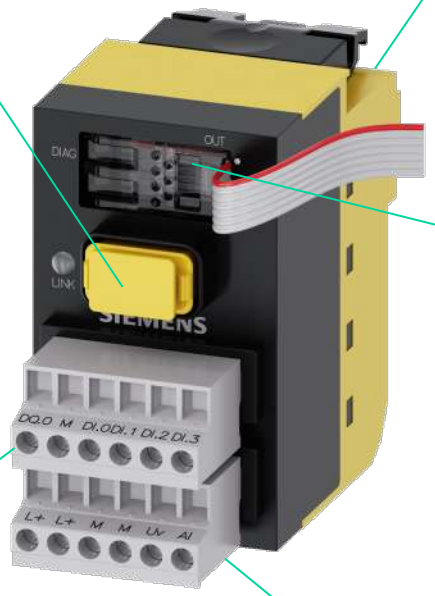
***Replaceable memory module***
- All data is stored here
- Enables fast device replacement

***Additional interfaces and power supply***
- 1x digital output (DQ) as per IEC 60947-1
- 4x digital inputs (DI) as per IEC 60947-1 24VDC/le = 25mA short-circuit proof
- 1x analog input (AI) 12-bit A/D. SIRIUS ACT potentiometer
- 24V DC power supply

*Screw connection*

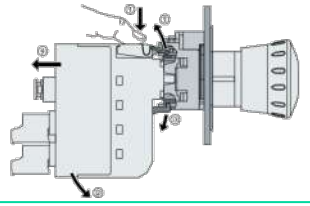
*Spring-type connection*



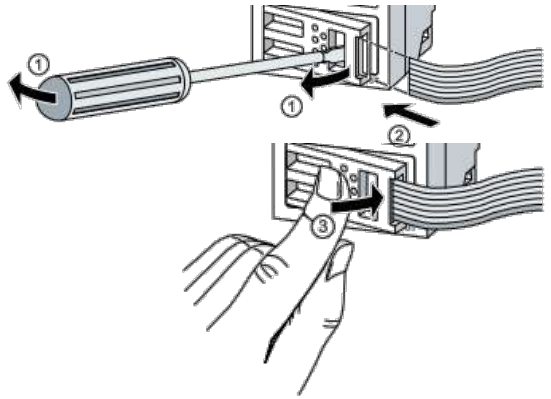




***PROFINET/PROFIsafe connection***
- 1x RJ45 socket (bottom)

***Installation interface***
Easy installation on the standard holder



***Restrictedal connection of SIRIUS ACT devices***
- Standard flat ribbon cable (7-wire)
- No connectors needed
- Easy and fast connection





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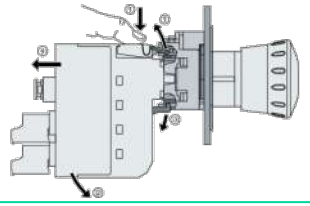
# SIRIUS ACT PROFINET
## The module for fast and simple applications

## Interface module

***Replaceable memory module***
- All data is stored here
- Enables fast device replacement

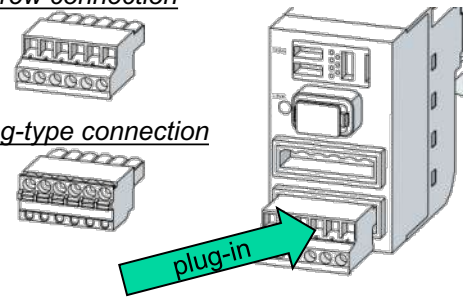

***Installation interface***
Easy installation on the standard holder



***Power supply***
- 24V DC power supply

*Screw connection*

*Spring-type connection*




***PROFINET connection***
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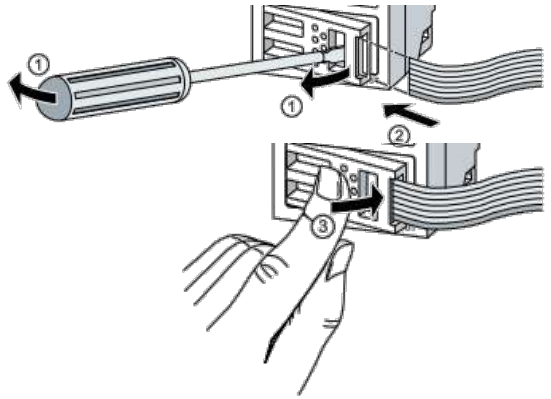



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# SIRIUS ACT PROFINET
# Accessories facilitate handling

## Interface module

***Replaceable memory module***
- All data is stored here
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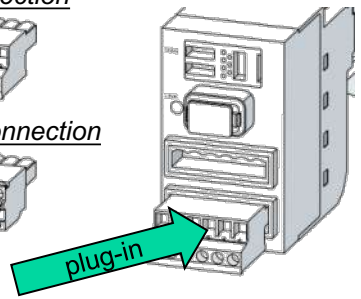
- 24V DC power supply

*Screw connection*

*Spring-type connection*





***PROFINET connection***
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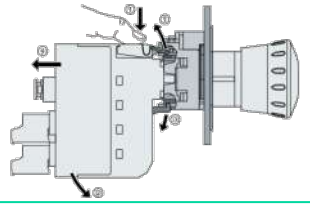
***Installation interface***
Easy installation on the standard holder



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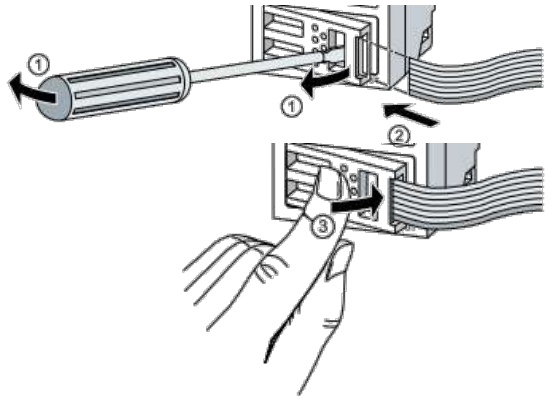



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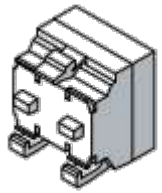
# SIRIUS ACT PROFINET
# Small modules for fast and simple expansion

## Terminal module

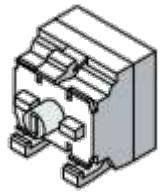
*Variance of terminal modules*

A distinction is made between three different variants

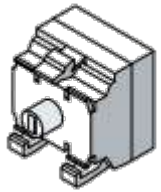
***Command module:***
Used for SIRIUS ACT command devices WITHOUT illumination, e.g. push buttons

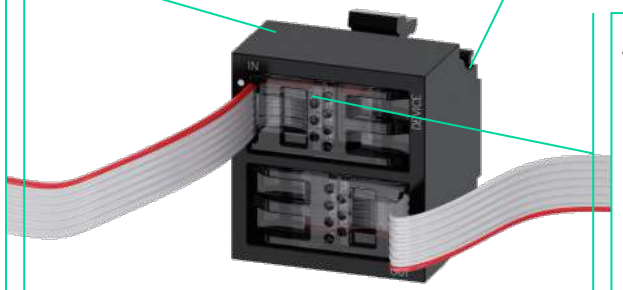


***Command and LED module:***
Used for SIRIUS ACT command devices WITH illumination, e.g. selector switches

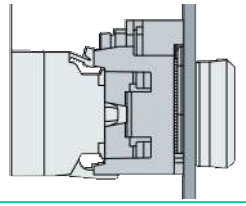


***LED module:***
Used ***only*** for indicator lights.

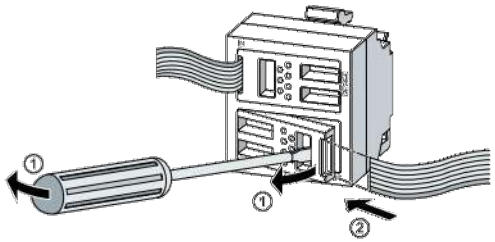




***Installation interface***
Easy installation on the standard holder



***Restrictedal connection of SIRIUS ACT devices***
- Standard flat ribbon cable (7-wire)
- No connectors needed
- Easy and fast connection





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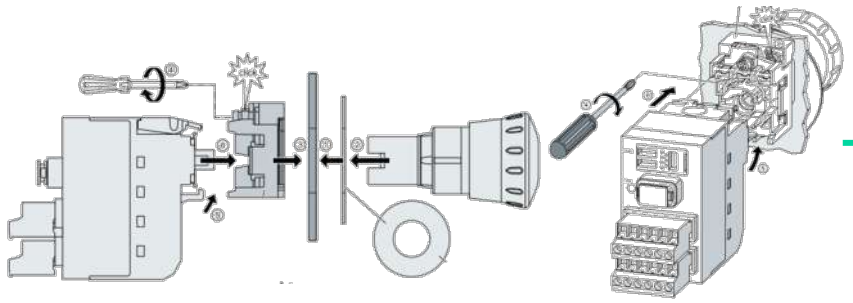
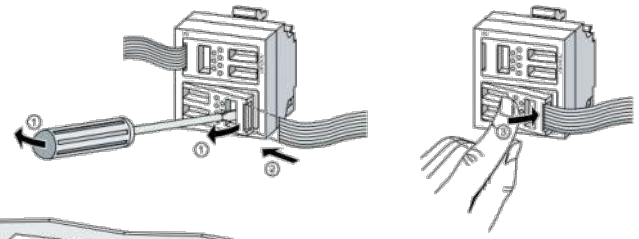
# SIRIUS ACT PROFINET
## Simple and fast in installation



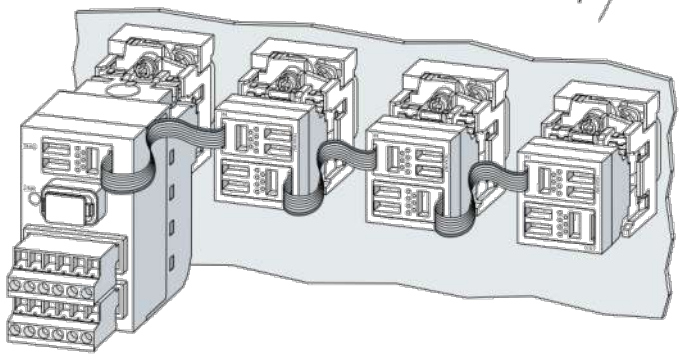
*Installing modules on the standard holder*

1. Same installation as standard system
2. No special tools needed



*Wiring the modules*

- Insert standard cable in the lever
- Close lever with your finger



*Installation rules*

- Safety device (e.g. EMERGENCY STOP) is always connected with the interface module F *(Safety)*.
- The physical installation must agree with the configured installation

**SIRIUS ACT PROFINET**
**enables simple and fast application setup**



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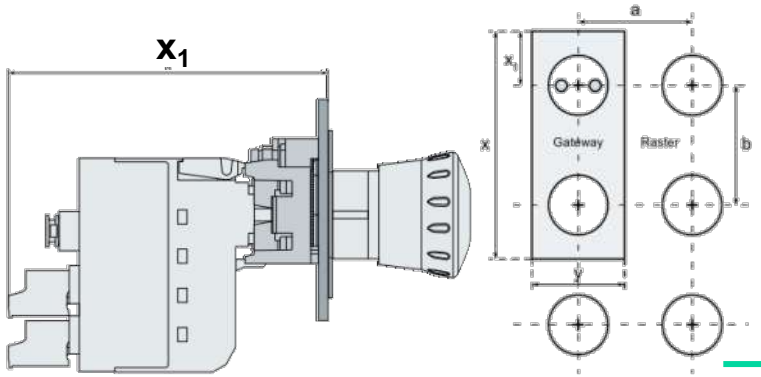
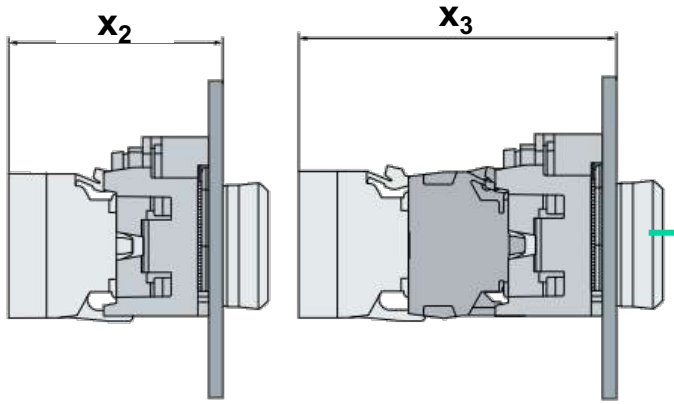
# SIRIUS ACT PROFINET
## Simple and fast integration




*Interface module grid dimensions*

1. In the SIRIUS ACT grid, the interface module occupies two positions vertically.

*Interface module dimensions*

- Dimension from control cabinet door (outer) $x_1$ = 83.1 mm

*Terminal module dimensions*

- Dimension from control cabinet door, terminal module only $x_2$ = 51.2 mm
- Dimension from control cabinet door in the combination of standard module + terminal module $x_3$ = 73.2 mm

**SIRIUS ACT PROFINET**
**offers flexibility comparable to the conventional structure of SIRIUS ACT**



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# SIRIUS ACT PROFINET
## Powerful hardware and innovative software





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# SIRIUS ACT PROFINET
## The most important functions always on board

### Features

| Functions | |
|---|---|
| 1 | Function check |
| 2 | LED test function |
| 3 | Device test function |
| 4 | LED brightness |
| 5 | LED flashing frequency |
| 6 | Auto configuration |
| 7 | Option handling |
| 8 | Device replacement |
| 9 | Digital inputs (DI) |
| 10 | Digital outputs (DQ) |
| 11 | Analog inputs (AI) |
| 12 | Integrated safety engineering (up to SIL 3) |
| 13 | Device replacement without engineering tool |
| 14 | No addressing needed |



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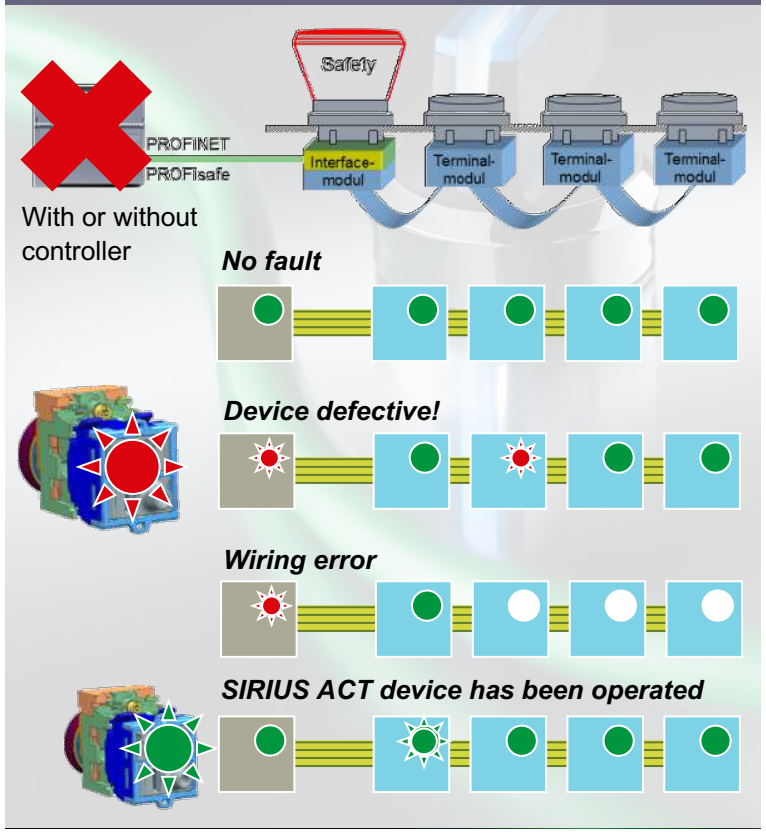
# SIRIUS ACT PROFINET
# Diagnostics options without controller

## Hardware diagnostics

### How are faults found?




## Features

- LED test: all LEDs light up for 2 sec. when the supply voltage is applied
- Diagnostics via status LEDs
- Function tests can be performed without controller

## Customer benefits

- Fast fault detection on the device
- Function test possible without controller and without controller know-how
- System configuration possible without subject-specific know-how



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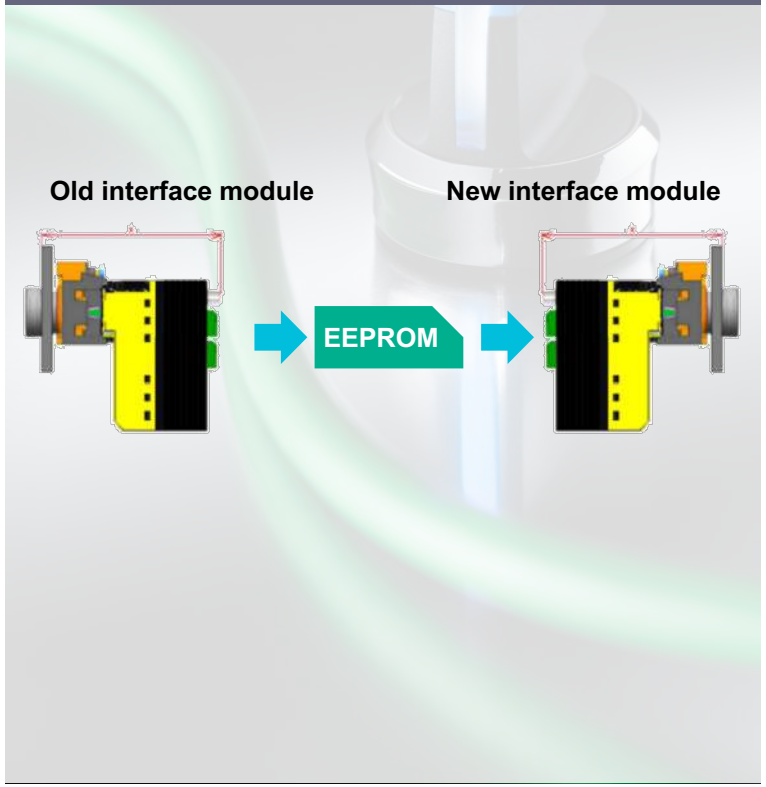
# SIRIUS ACT PROFINET
## Device replacement without software and without stopping the system

### Device replacement

**How can modules be replaced in the field?**




### Features

- Remove EEPROM
- All data is stored on the EEPROM
- Insert EEPROM in a new device

### Customer benefits

- Devices can be replaced by persons who have no special knowledge
- Rapid device replacement
- No/brief system downtime



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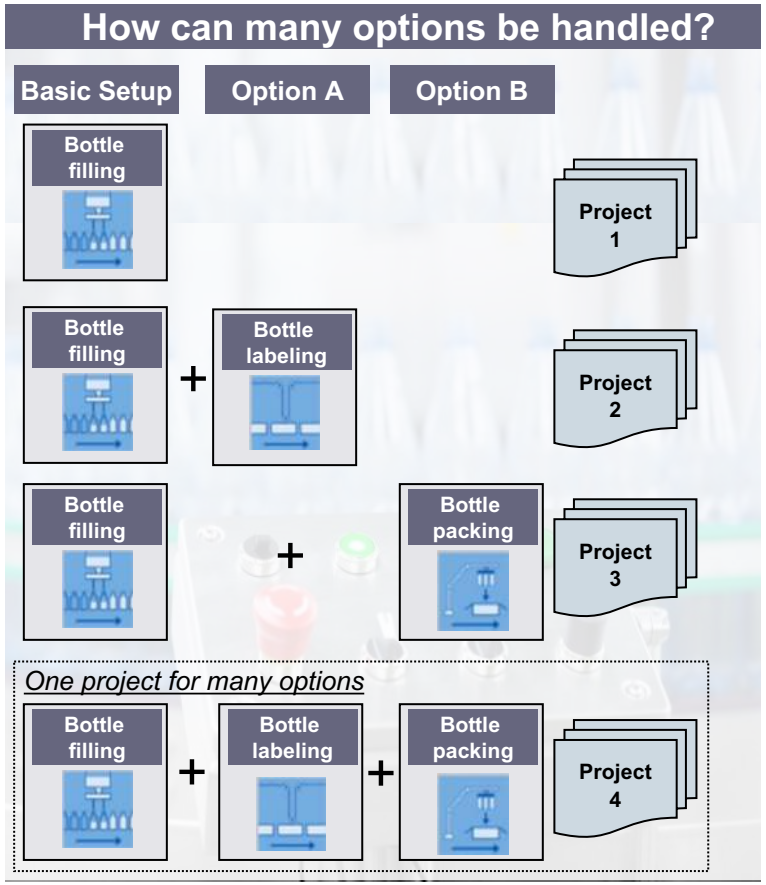
# SIRIUS ACT PROFINET
## Only one project for many options

### Handling options I




### Features

- One project for many options
- Possible options are defined and programmed in a project.
- Automatic detection of options by target/actual comparison
- Manual selection of options

### Customer benefits

- Flexibility
- Simpler project processing and commissioning
- Saves hardware
- Time and resource saving for plant expansions



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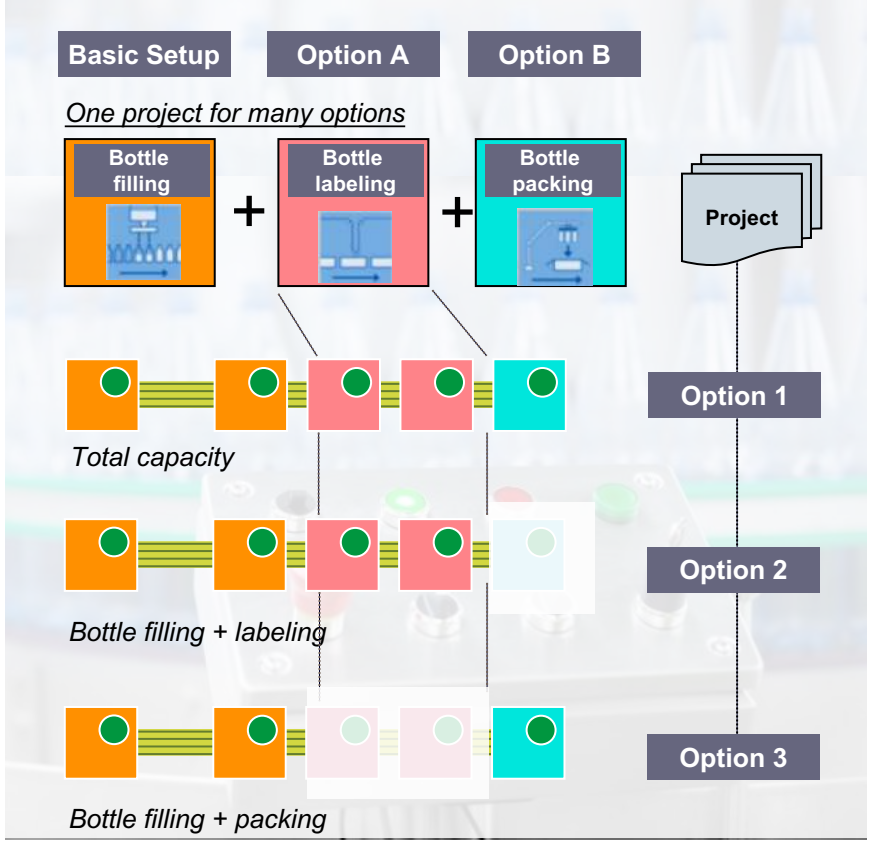
# SIRIUS ACT PROFINET
## Modular applications realized in one project

### Handling options II

**How can many options be handled?**




### Features

- One project for many options
- Possible options are defined and programmed in a project.
- Automatic detection of options by target/actual comparison
- Manual selection of options

### Customer benefits

- Flexibility
- Simpler project processing and commissioning
- Saves hardware
- Time and resource saving for plant expansions



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# SIRIUS ACT PROFINET
## Powerful hardware and innovative software

Components

- Interface module IM
- Interface module IM F Safety
- Terminal modules

Functions

TIA Portal

Getting started



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# SIRIUS ACT
# Integrated in the TIA Portal

## Integration into the TIA Portal

## Customer benefits

- Seamless and integrated engineering with a standardized operating concept
- Consistent central data storage with powerful editors and consistent symbols
- Universal library concept
- Several programming languages



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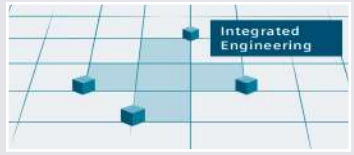
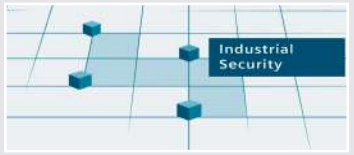
# SIRIUS ACT
# Integrated in the TIA Portal




## Integrated engineering
Less time, cost and work
thanks to consistent, holistic engineering in all phases of the production process


## Industrial data management
Maximum decision certainty for max. cost-efficient plant operation
thanks to real-time access to all important data arising during productive operation


## Industrial communication
Consistent communication: for maximum transparency at all levels
through use of Restricted national cross-manufacturer standards




## Industrial Security
Systematic minimization of the risk of an attack against machinery and systems
thanks to consistent use of security mechanisms in automation


## Safety Integrated
Reliable comprehensive protection of personnel, machinery and environment
thanks to seamless integration of safety technology into standard automation



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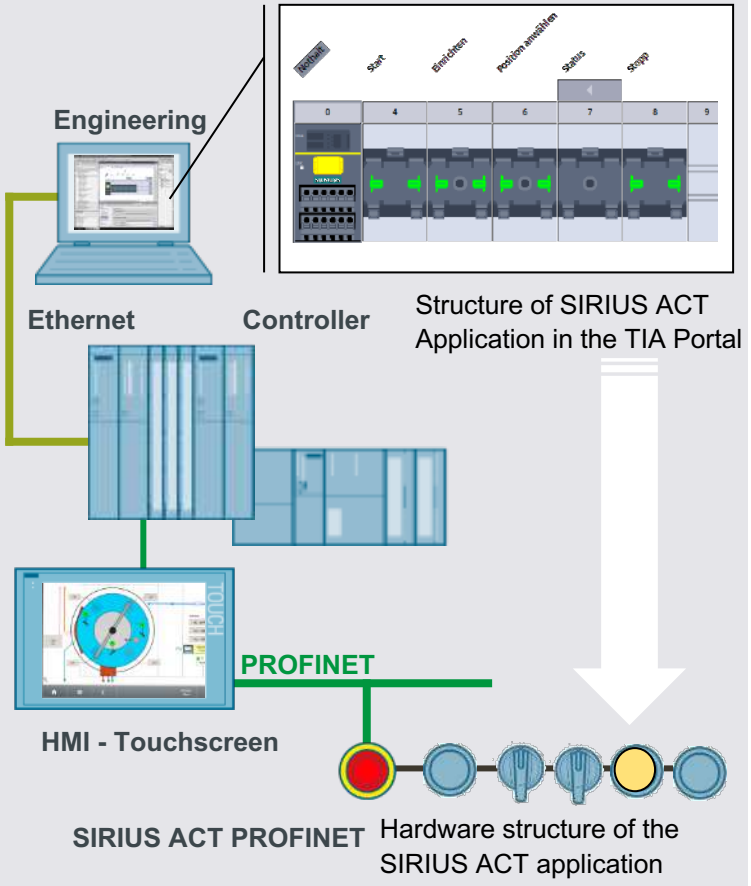
# SIRIUS ACT
## Create a digital twin

### Hardware configuration




### Features

- SIRIUS ACT PN integrated into the TIA Portal
- Visual representation in the TIA Portal for better matching with hardware structure
- Simple and fast hardware configuration thanks to visual representatives

### Customer benefits

- No addressing of individual modules, physical addressing according to sequence
- Standardized data management
- Time saving thanks to intuitive hardware configuration



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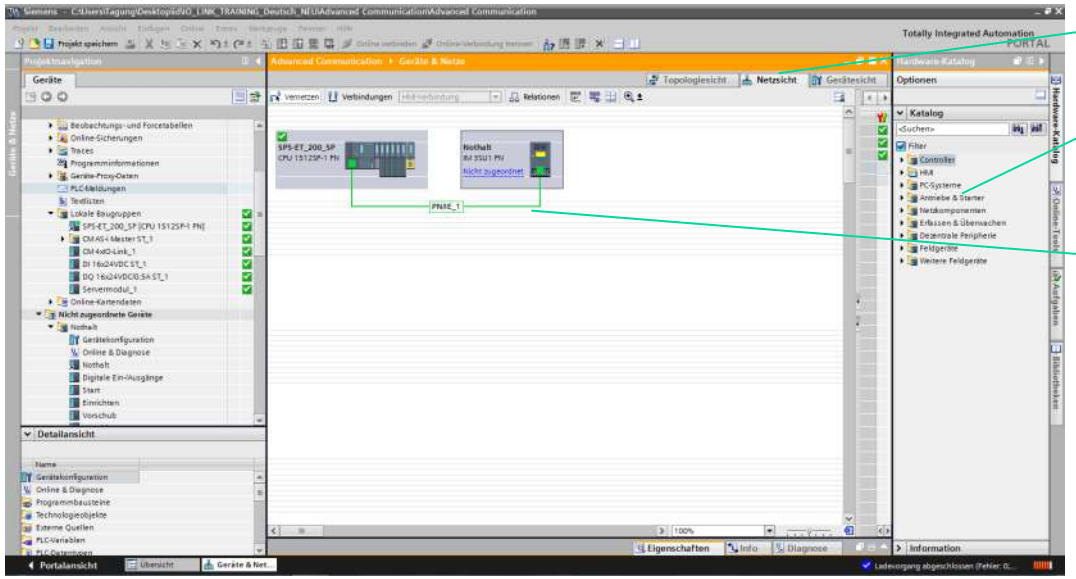
# SIRIUS ACT
# Simple programming by drag and drop

Step 1. Select interface modules and connect them via PROFINET



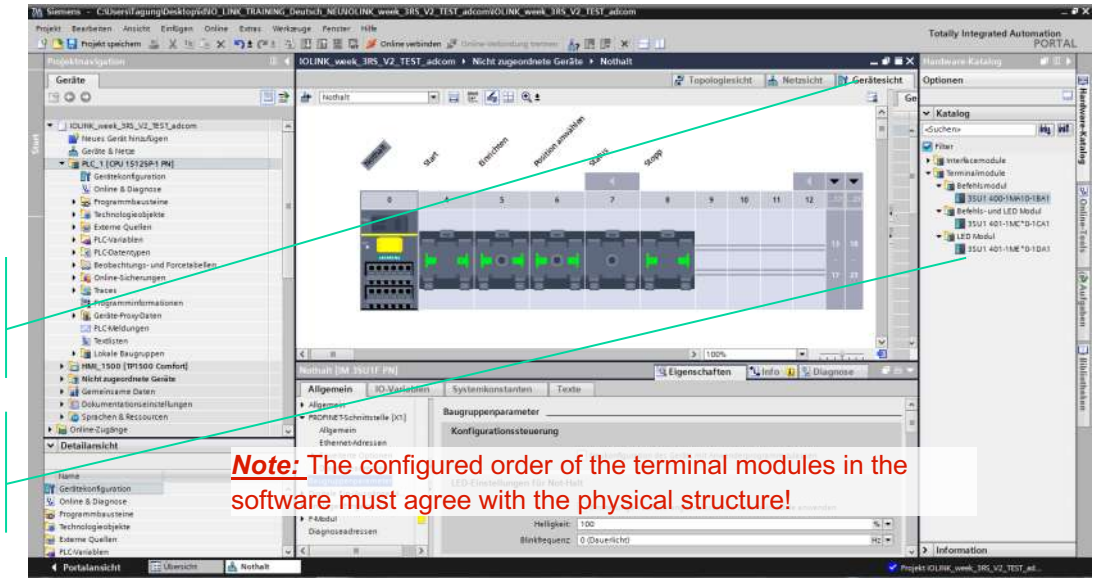
1. Switch to the network view

2. Select the interface module in the catalog and drag and drop it into the network view

3. Connect the interface module

4. Switch to the device view (double-click on the interface module)

5. Select terminal modules in the catalog and place them in the right position by drag and drop




Step 2. Select terminal modules and arrange them in the right order



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# SIRIUS ACT
## Powerful hardware and innovative software





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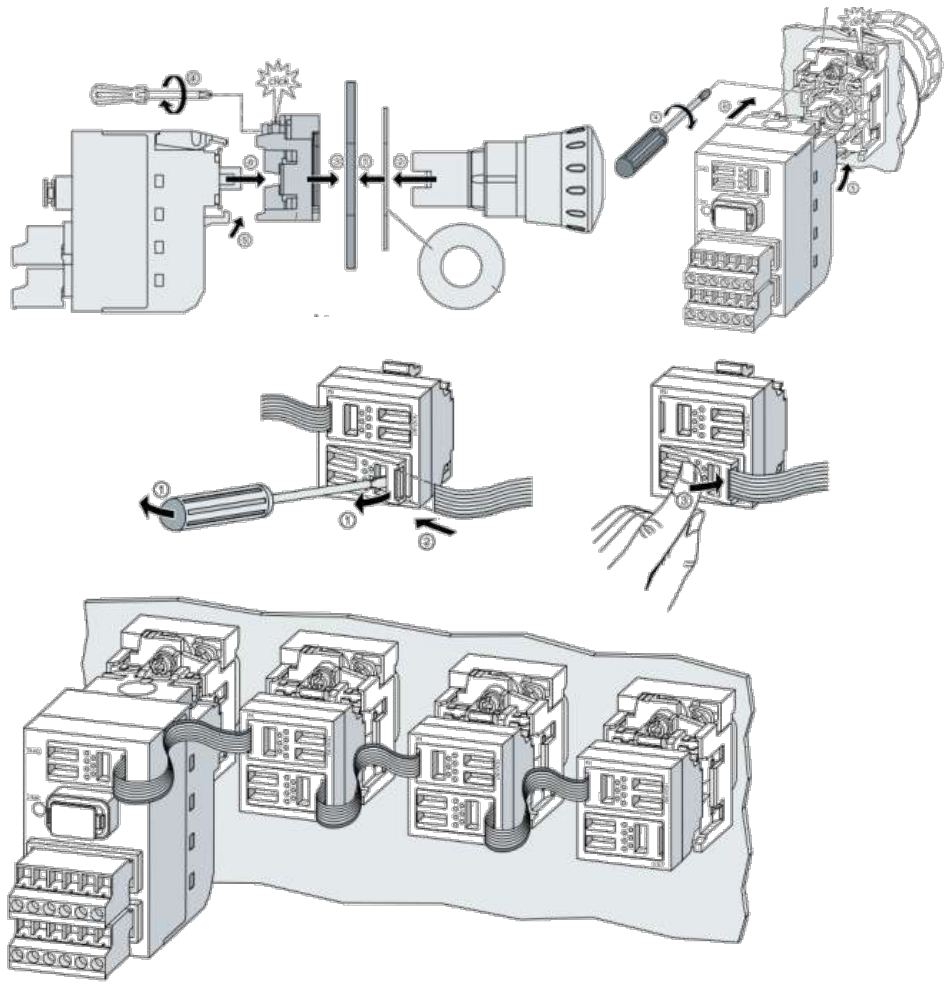
# SIRIUS ACT PROFINET
# Simple installation



*Step 1: Installing commanding and signaling devices*

*Step 2: Equipping EMERGENCY STOP with IM F*

Only the IM F is designed for safety applications!

*Info:* Further DIs, DQs and AIs can be connected on the rear of the interface module.

*Step 3: Equipping further devices with terminal modules*

A general distinction is made between three different kinds of terminal modules.

- Terminal modules for indicator lights (mechanical DQ)
- Terminal modules for commanding devices (mechanical 2DI)
- Terminal modules for commanding and signaling devices (mech. 2DI + DQ)

All terminal modules with LEDs are available in the colors red, green, blue, yellow, amber and white

*Step 4: Connecting interface and terminal modules*

The interface modules and terminal modules are connected with a standard flat ribbon cable in a row.

*Note:* The physical order of the modules must agree with the configured order (physical address). The cable orientation must be observed with regard to the wiring (see markings on the devices)



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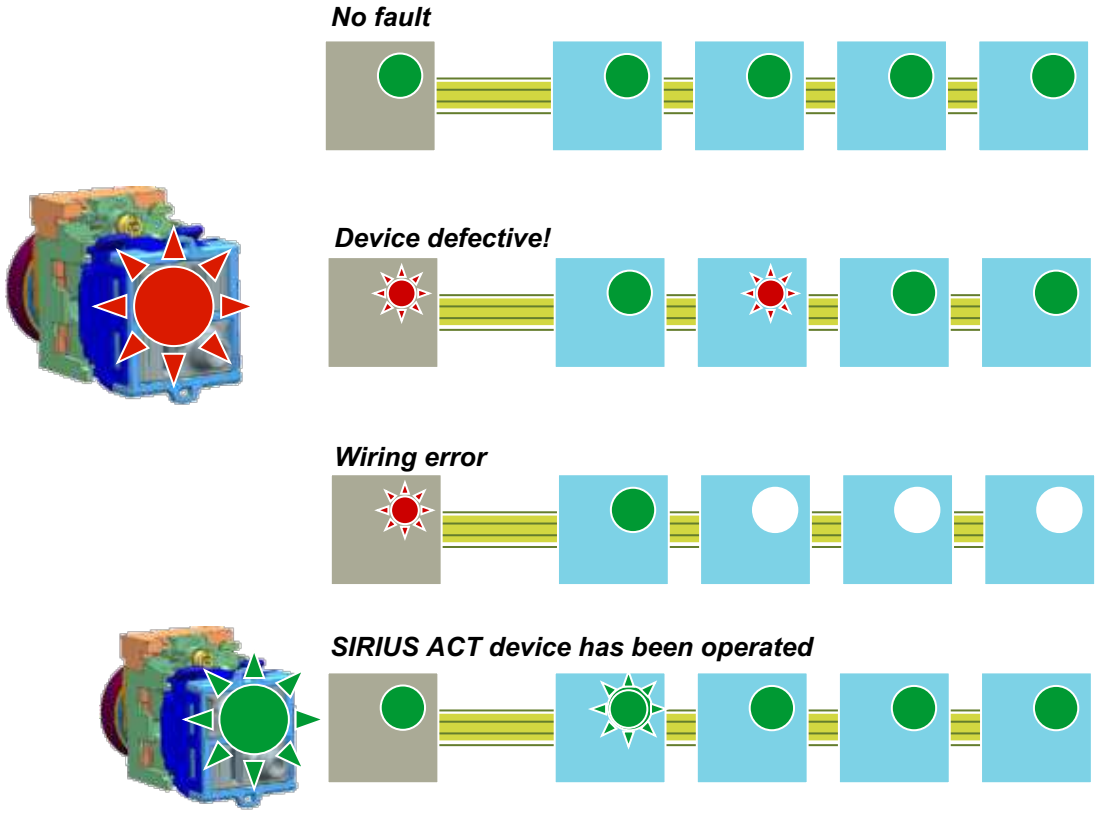
# SIRIUS ACT PROFINET
## Simple commissioning without CPU (controller)




*Step 5: Connecting the power supply*

24 V must be connected to the interface module

*Step 6: LED test of SIRIUS ACT devices*

→ After the power supply has been plugged in, all illuminated SIRIUS ACT actuators and indicator lights light up for approx. 2 sec.

*Step 7: Diagnosis correct, right installation/connection*

→ After the power supply has been plugged in, all status LEDs
→ on the rear of the interface or terminal modules must light up green.
The status LED is located next to the cable entry

*Step 8: Function test*

Functioning of the SIRIUS ACT devices can be tested as follows without a CPU: Operate the SIRIUS ACT device on the front. The status LED on the rear of the interface or terminal module must then flash green.



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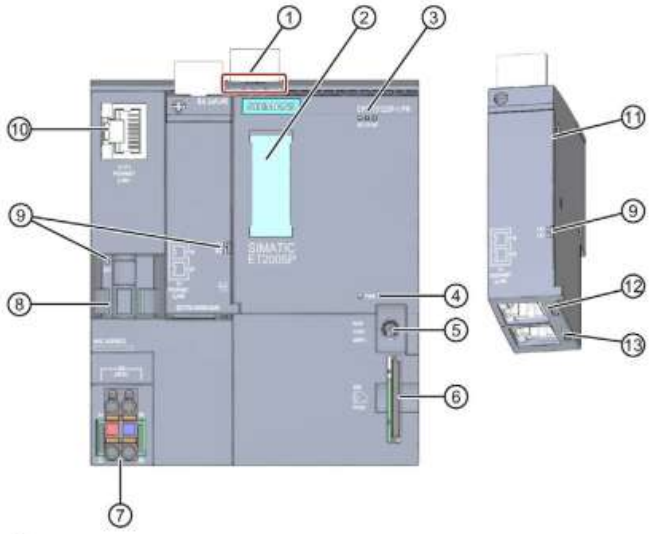
# SIRIUS ACT PROFINET
# Commissioning SIMATIC ET 200SP (CPU 1512SP F-1 PN)



① Profilschienenentriegelung
② Beschriftungsstreifen
③ LEDs für Status- und Fehleranzeigen
④ LED für Anzeige der Versorgungsspannung
⑤ Betriebsartenschalter
⑥ Schacht für die SIMATIC Memory Card
⑦ Anschluss für Versorgungsspannung (im Lieferumfang enthalten)
⑧ Kabelauflage und Befestigung für Port P3 der PROFINET-Schnittstelle
⑨ LEDs für Statusanzeigen der PROFINET-Schnittstelle: LK1 und LK2 auf BusAdapter, LK3 auf CPU
⑩ Port P3 der PROFINET-Schnittstelle: RJ45-Buchse
⑪ Einzelansicht des BusAdapters
⑫ Port P1 R der PROFINET-Schnittstelle: RJ45-Buchse auf BusAdapter BA 2×RJ45
R: Ringport zum Aufbau einer Ringtopologie mit Medienredundanz
⑬ Port P2 R der PROFINET-Schnittstelle: RJ45-Buchse auf BusAdapter BA 2×RJ45
R: Ringport zum Aufbau einer Ringtopologie mit Medienredundanz

*Step 9: Connecting the power supply*
The 24 V DC power supply must be connected at point 7

*Step 10: Connecting the PROFINET cable*
The interface module must be connected via a standard PROFINET cable (Ethernet cable) to the CPU via point 7

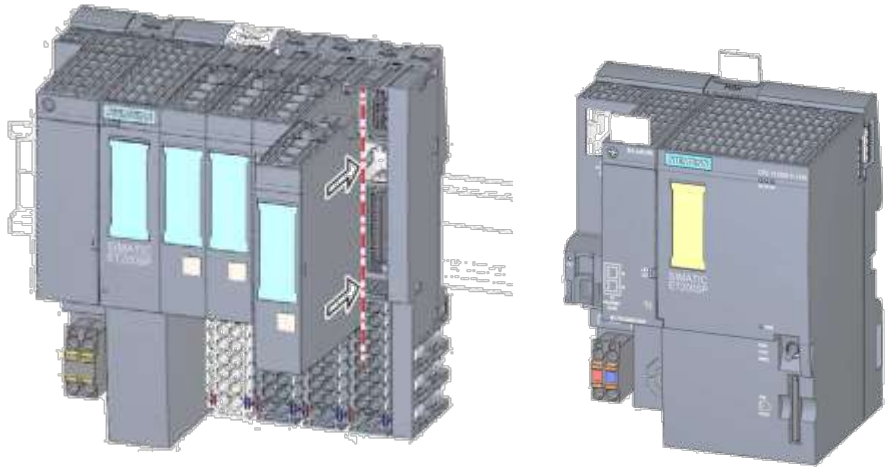


Bild 2-1 CPU 1512SP F-1 PN



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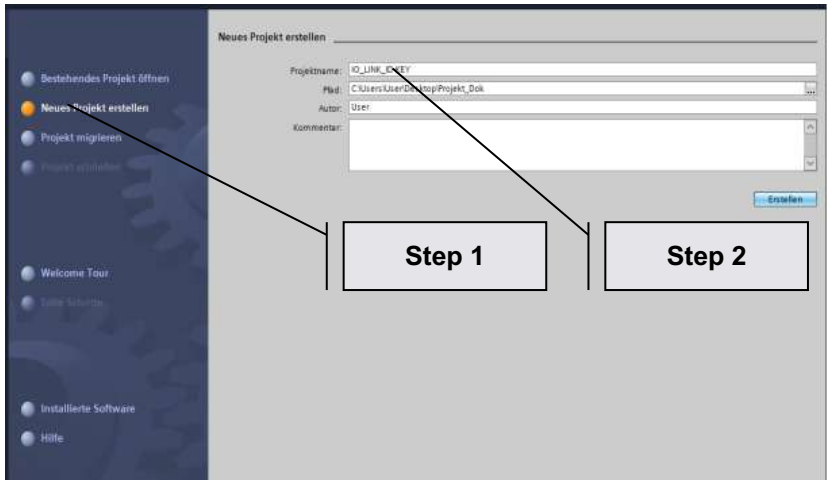
# SIRIUS ACT PROFINET
## Hardware configuration in the TIA Portal (new project)





*Step 1: Click on "Create new project"*

*Step 2: Enter a project name*

*Step 3: Click on "Configure a device"*



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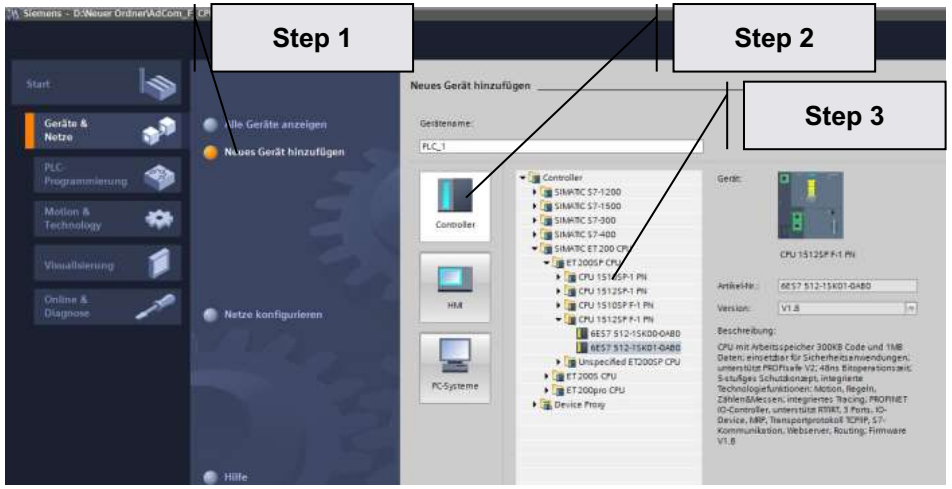
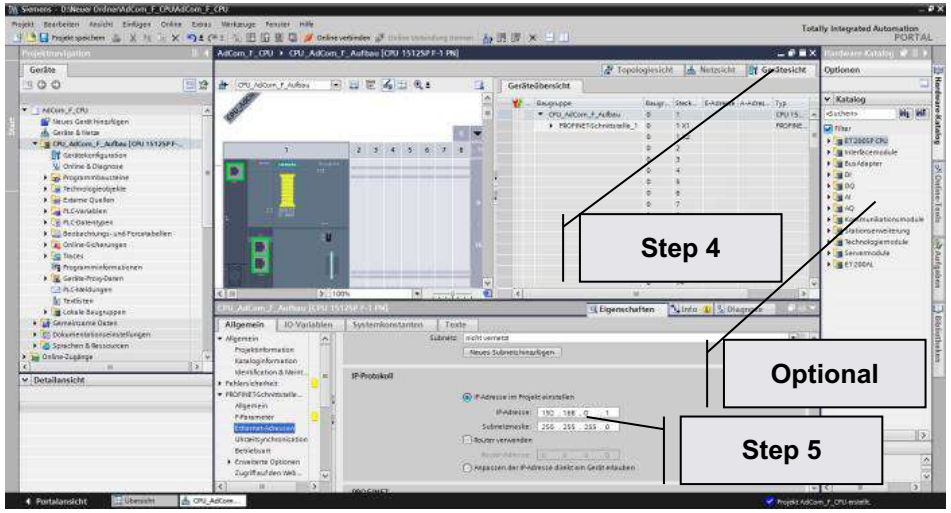
# SIRIUS ACT PROFINET
## Hardware configuration in the TIA Portal (selecting a CPU)




*Step 1: Click on "Add new device"*

*Step 2: click on "Controller"*

*Step 3: Select the controller (CPU)*

You can select the CPU as follows:

Search in the tree topology

Enter the article number (MLFB)

*Step 4: Switch to the device view*

*Optional: Select further devices for the ET 200SP from the hardware catalog,*

*e.g. AS-i master*

You can select devices from the hardware catalog as follows:

Search in the tree topology

Enter the article number (MLFB)

*Step 5: Enter an IP address*

Note: One IP address cannot occur twice in the network.

You can find the IP address under Properties-Ethernet-Addresses



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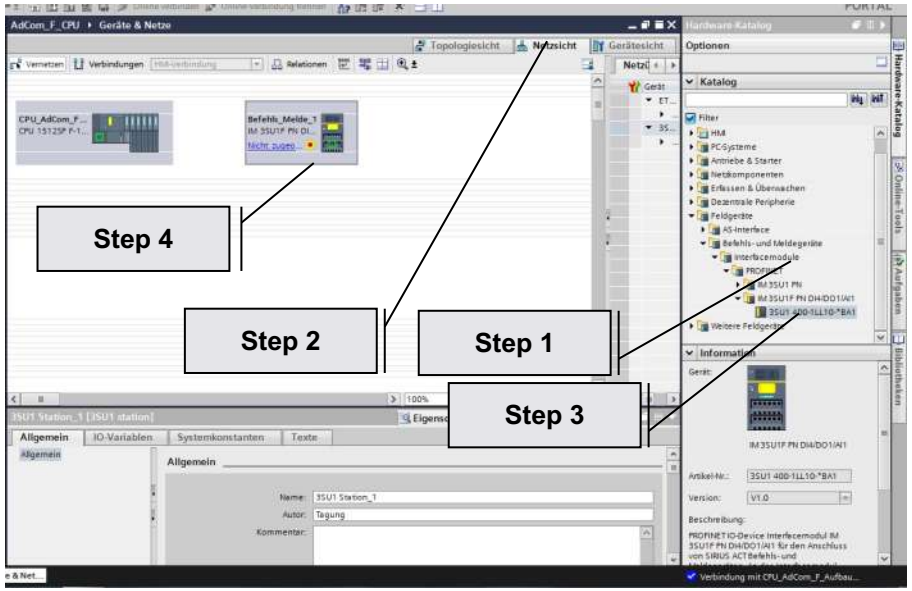
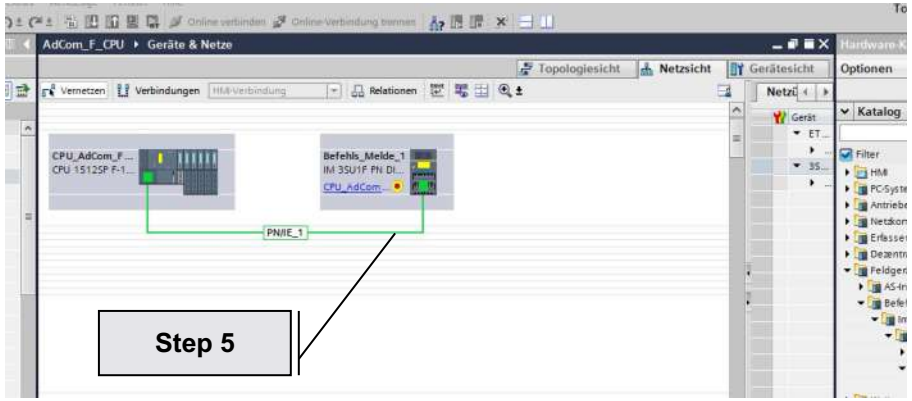
# SIRIUS ACT PROFINET
## Hardware configuration in the TIA Portal (selecting devices)




*Step 1: Open the "hardware catalog"*

*Step 2: Switch to the "network view"*

*Step 3: Select the SIRIUS ACT interface module from the hardware catalog*

You will find the interface modules in Field devices – Commanding and signaling devices – Interface modules – PROFINET
Or enter the article number (MLFB)

*Step 4: Drag and drop the interface module "3SU1-400-1LL10-*BA1"*

*to the network view*

*Step 5: Network the interface module*

Connect both devices using the mouse



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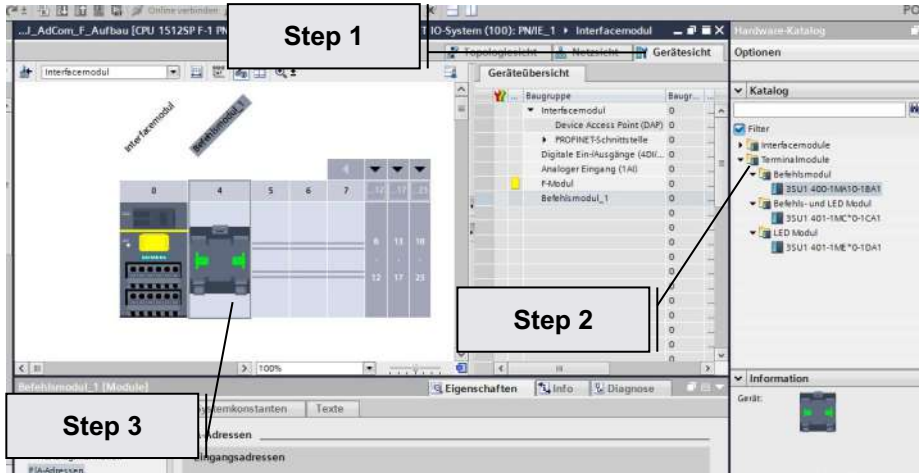
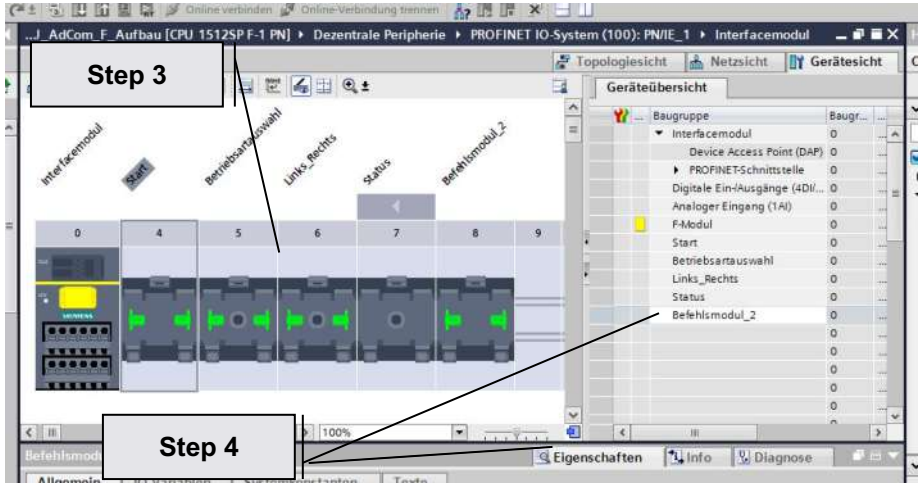
# SIRIUS ACT PROFINET
## Hardware configuration in the TIA Portal (selecting a TM)




*Step 1: Open the interface module's device view*

*Step 2: Open terminal modules in the hardware catalog*

*Step 3: Drag and drop the terminal modules to the relevant slots*

***Note:*** The order of the terminal modules in the TIA Portal must correspond to the physical structure in the field.

*Step 4: You can assign names to individual modules*

Names can be assigned as follows:

Free input in the device overview
Or free input under Properties – General - Project information



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# Product

## SIRIUS ACT IO-Link



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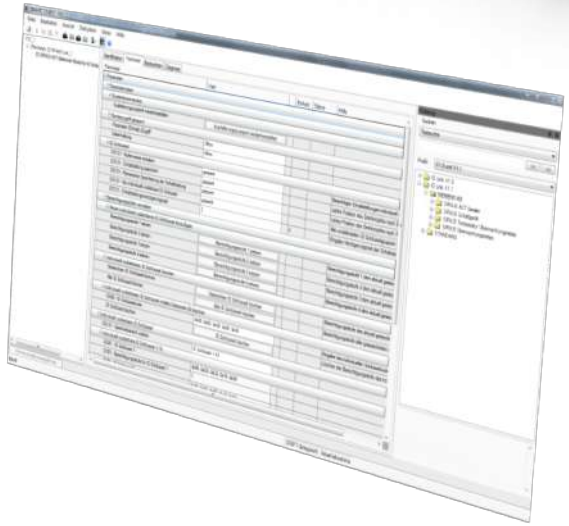
# SIRIUS ACT IO-Link
# Powerful hardware and innovative software





**Components**

- ID key-operated switches
- IO-Link electronic modules

**Functions**

- ID key-operated switches
- IO-Link electronic module

**Port Configuration Tool (PCT) & IO-Link blocks**

**Getting started**



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# SIRIUS ACT IO-Link ID key-operated switch
# Small device with many possibilities

| Commanding device | Standard holder | ID key-operated switch module | ID key |
|---|---|---|---|
|  |  |  |  |
| Plastic actuator needed for each application.<br><br>*Plastic MLFB:*<br>3SU1000-4WS10-0AA0 | The SIRIUS ACT standard holder is required for this system<br><br>*Holder MLFB (plastic):*<br>3SU1500-0AA10-0AA0 | There are two ID key-operated switch modules for IO-Link available.<br><br>1) A preprogrammed version. The functionality will be shown in the next slides.<br>2) A freely programmable version which sends impulses to the PLC for individual programming<br><br>*MLFB:*<br>1) 3SU1400-1GD10-1AA0<br>2) 3SU1400-1GE10-1AA0 | **Fixed authorization**<br>*Green:*<br>MLFB: 3SU1900-0FV40-0AA0<br>*Yellow:*<br>MLFB: 3SU1900-0FW30-0AA0<br>*Red:*<br>MLFB: 3SU1900-0FX20-0AA0<br>*Blue:*<br>MLFB: 3SU1900-0FY50-0AA0<br>**Customizable**<br>*White:*<br>MLFB: 3SU1900-0FU60-0AA0 |



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# SIRIUS ACT IO-Link ID key-operated switch
# This device shows whether you are authorized

## ID key-operated switch actuator

*Rotary actuator for selection of the authorization level (mode)*

- A mode can be selected by rotating the actuator (up to 4 modes)
- The ID key is also inserted in this actuator

*Operating mode status display*

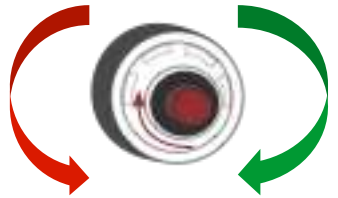
**Yellow** **Permissible position**

**Yellow** **Flashing** **Customized ID key NOT logged in**

**Red** **Impermissible position**

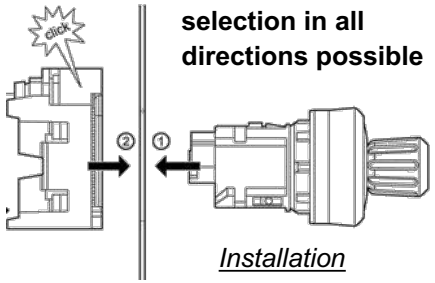
**Green** **Flashing** **Position selected Not active Active after approx. 3s**

**Green** **Selected position**



**Switching off counter-clock-wise**

**Selection module active after CW rotation →Then selection in all directions possible**




*Installation*



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# SIRIUS ACT IO-Link ID key-operated switch decides who is authorized

## ID key-operated switch module preprogrammed

*Physical outputs of operating modes*

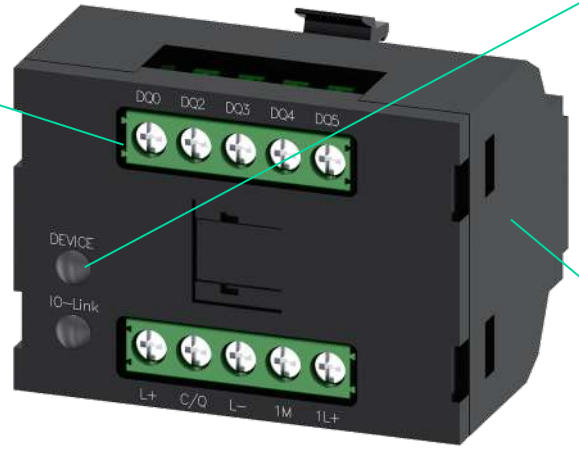
The status of operating modes can be queried via physical outputs or via the process image

| | |
|---|---|
| DQ.O | Mode 1 |
| DQ.1 | Mode 2 |
| DQ.2 | Mode 3 |
| DQ.3 | Mode 4 |
| DQ.4 | Key monitoring |

*IO-Link connection*

| | |
|---|---|
| L+ | Supply voltage for IO-Link |
| C/Q | Communication signal IO-Link |
| L- | Ground IO-Link |
| 1M | Ground (optional) |
| 1L+ | 24 V DC (optional)* |

*The power of the physical outputs can be increased by connecting a supply



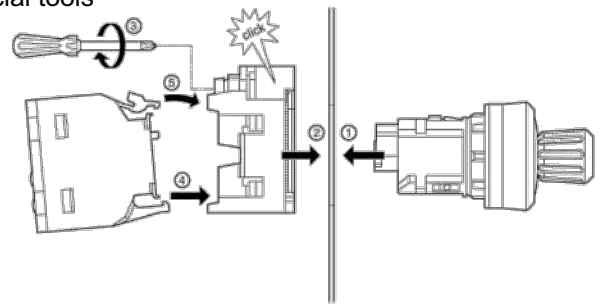

*Status LEDs*

| | | |
|---|---|---|
| DEVICE | Device LED → correct functioning of the device | Red = fault<br>Green = OK |
| IO-Link<br>0.9 s 0.1 s | IO-Link status display | Red = fault<br>Green flashing* = OK |

*acc. to IO-Link communication specification

*Installation interface*

Easy installation on the standard holder without special tools



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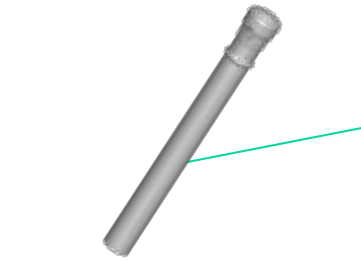
# SIRIUS ACT IO-Link ID key-operated switch
# Highly flexible authorization assignment

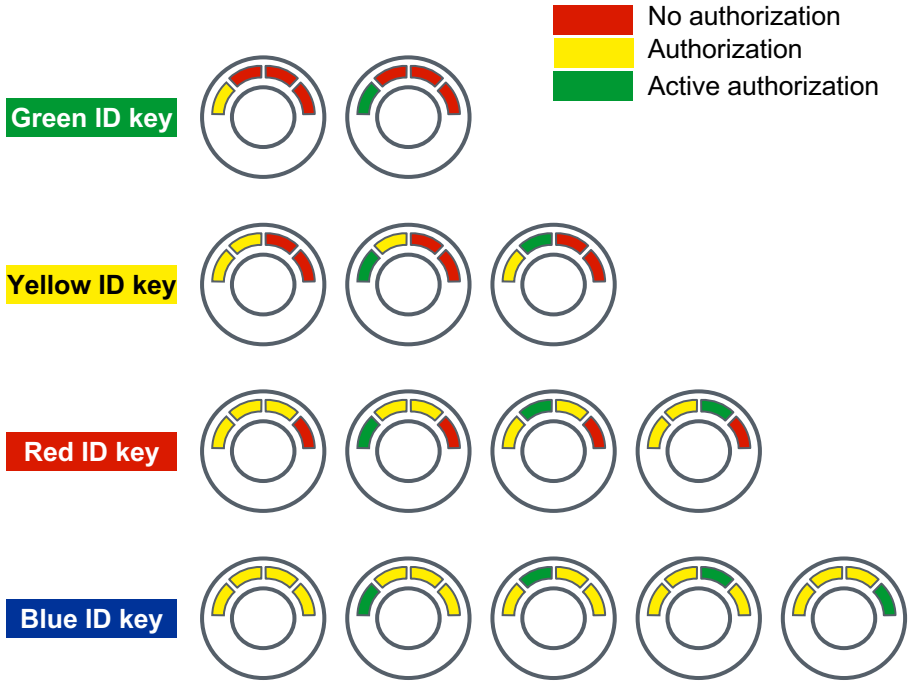
## ID key



*Customized (white) ID key*

- Assignment of one of the four modes (see colored ID key)
- Not programmed on delivery

*Colored ID keys*



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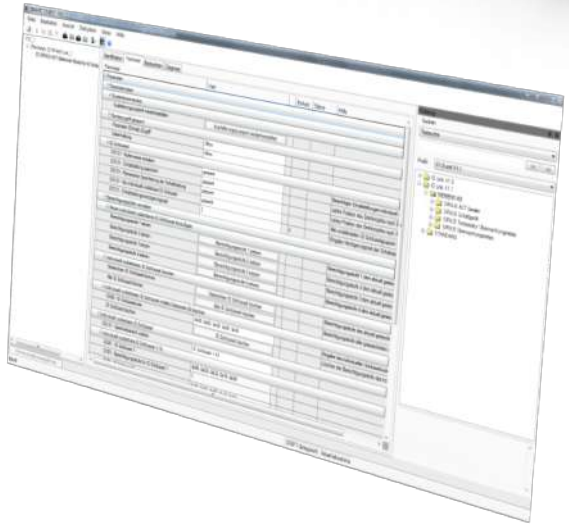
# SIRIUS ACT IO-Link
# Powerful hardware and innovative software





**Components**

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- IO-Link electronic modules

**Functions**

- ID key-operated switches
- IO-Link electronic module

**Port Configuration Tool (PCT) & IO-Link blocks**

**Getting started**



SIEMENS

# SIRIUS ACT IO-Link electronic module
# One device for many applications

## IO-Link electronic module for the enclosure

- 8 inputs and outputs possible
- In the quantity of 8, the DIs and DQs can be chosen (programmed) freely
- Default setting (6DI/2 DQ)

***Type of mounting:***
- Base mounting in the SIRIUS ACT enclosure

***Connection method:***
- Push-in

***MLFB:***
- 3SU1400-2HL10-6AA0

## IO-Link electronic module for holder installation (front plate mounting)

- 8 inputs and outputs possible
- In the quantity of 8, the DIs and DQs can be chosen (programmed) freely
- Default setting (6DI/2 DQ)

***Type of mounting:***
- Front plate mounting, i.e. mounting on the standard SIRIUS ACT holder

***Connection method:***
- Push-in

***MLFB:***
- 3SU1400-1HL10-6AA0

## IO-Link electronic modules for customized enclosures (configurator)

- Installed by the factory
- No catalog types
- **Fixed DI/DQ assignment**

***Type of mounting:***
- Base mounting in the SIRIUS ACT enclosure

***Connection method:***
- Push-in

| **Assignment** | MLFB |
|---|---|
| 4 DI/4 DQ | 3SU1400-2HM10-6AA0 |
| 2 DI/6 DQ | 3SU1400-2HN10-6AA0 |
| 6 DI/2 DQ | 3SU1400-2HK10-6AA0 |



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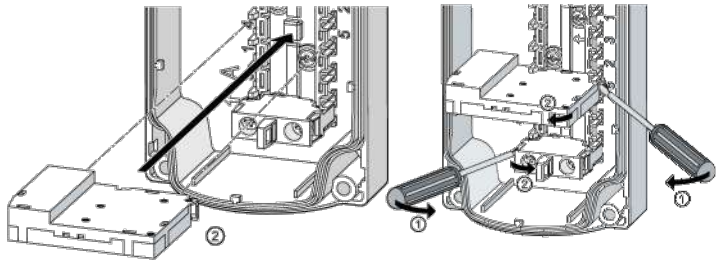
# SIRIUS ACT IO-Link electronic module
# The universal module for the enclosure

## IO-Link electronic module

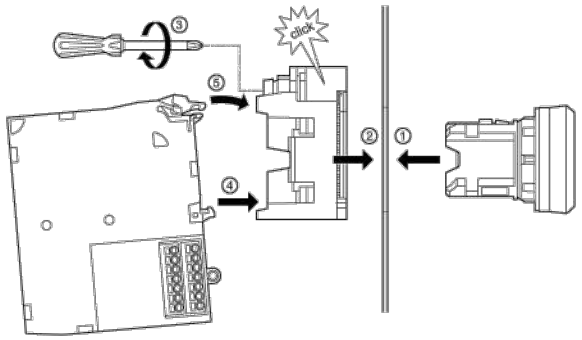
*Base mounting*

- IO-Link module is fitted in a free slot in the enclosure



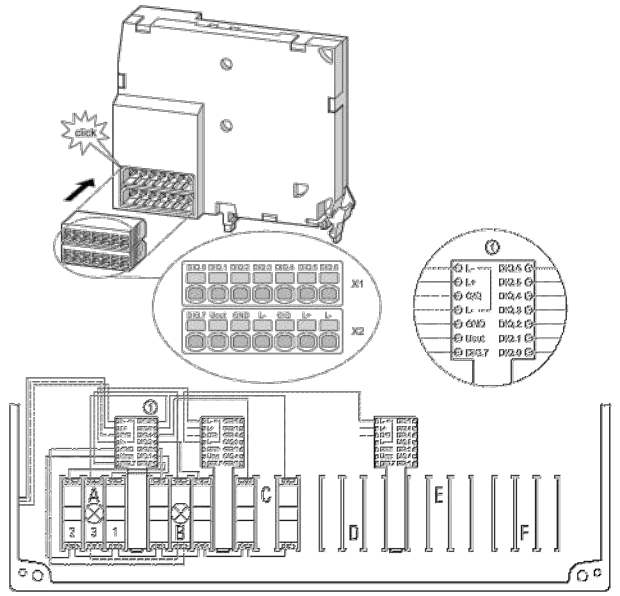

*Front plate mounting*

- IO-Link module is mounted onto the SIRIUS ACT standard holder
- Mounting position serves fastening only → no function
- DI must be wired to SIRIUS ACT standard contact module
- DQ must be wired to SIRIUS ACT standard LED module




*Connecting*

- Standard contact modules must be wired with the electronic module.
- Push-in connection on the electronic module
- Connection cross section from 0.2 – 0.5 mm²

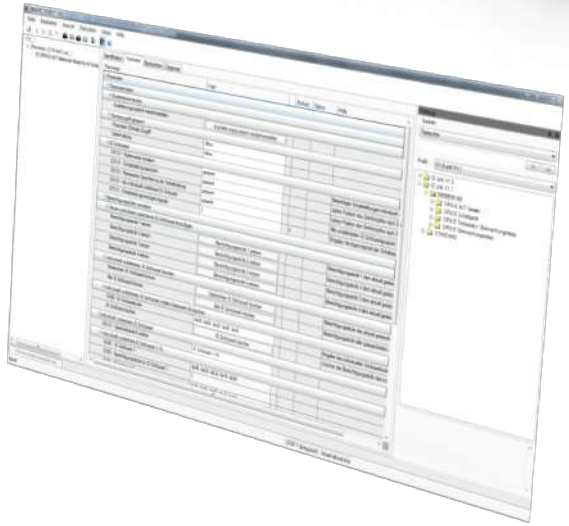





SIEMENS

# SIRIUS ACT IO-Link
# Powerful hardware and innovative software









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# SIRIUS ACT IO-Link ID key-operated switch
# A strong module with strong functions

## Overview of functions

| Functions | |
|---|---|
| 1 | Setting up a tamper-proof authorization system<br>(PCT: only individual keys → enabled) |
| 2 | One key (ID key) for all applications<br>(individual key can be read into several applications with different authorization levels) |
| 3 | Central deletion of key authorizations |
| 4 | Users identified via unique key number (all ID keys) |
| 5 | Activating authorization levels hierarchically (AND logic: authorization levels 1 and 2 and 3 and 4 PCT: "Incremental switching mode" → enabled) |
| 6 | Authorization level remains active after ID key is removed (PCT: "Switch position memory" → enabled) |
| 7 | Authorization level remains active after Power off (PCT: “Switch position retentive memory" → enabled) |
| 8 | Setting of 0...10s ON time delay on selection of authorization levels (PCT: switch position delay time → of 0s to 10s can be selected) |
| 9 | Restore factory setting (PCT: restore factory setting) |



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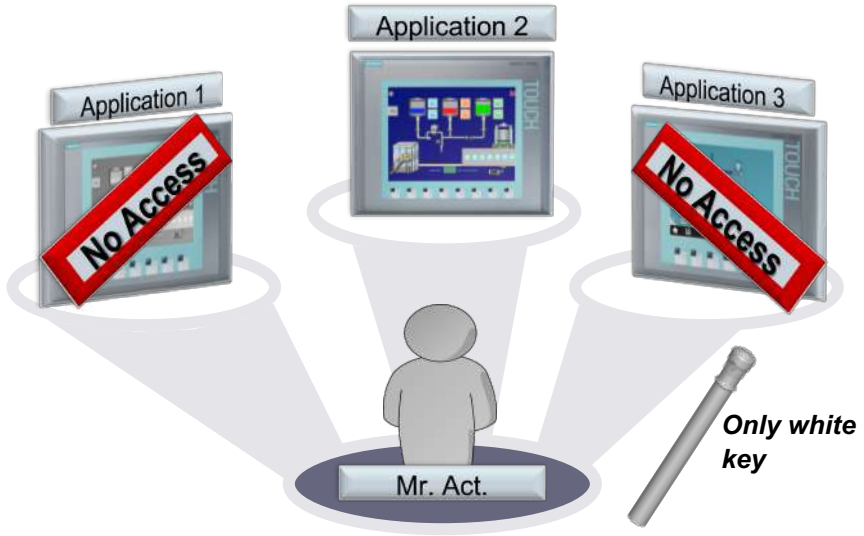
# SIRIUS ACT IO-Link ID key-operated switch
# Only authorized persons work on your system/machine

## DS131 – Only individual keys




Mr. Act can only work on the systems/machines where his individual ID key has been actively read in.
He is identified uniquely at each application.
Mr. Act's colored ID keys do not have any authorization on this system.

*Only actively read-in keys have authorization*

## Description

- By selection of this function, only individual keys can be used (ID key neutral white)
- The individual ID key can be read into several ID key-operated switches with different authorization levels

## Customer benefits

- Setting up a highly tamper-proof authorization system (individual keys only)
- **Only authorized persons** can work on the specific system/machine.



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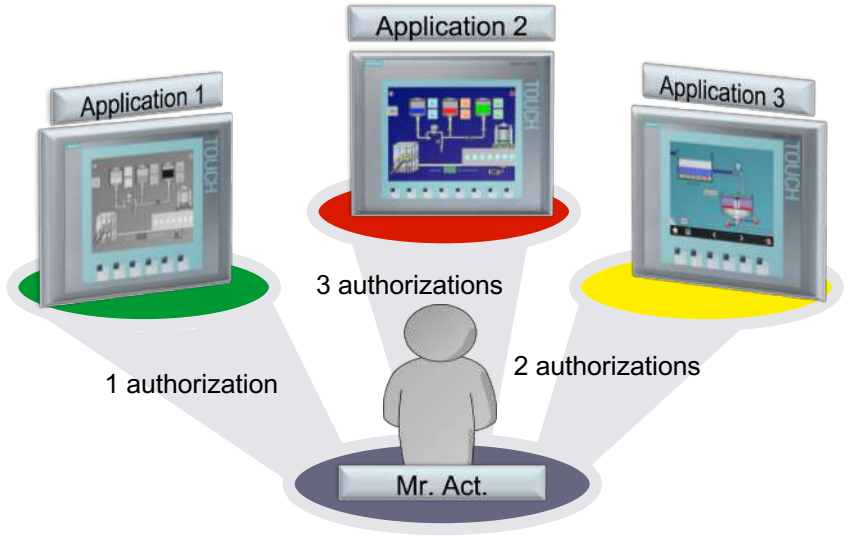
# SIRIUS ACT IO-Link ID key-operated switch
# More flexibility and security through individual ID keys

## Activating an individual key




Mr. Act can operate any number of applications with an ID key
He is identified uniquely at each application.
Mr. Act can select his authorization levels via the ID key *(up to 4 authorization levels)*

*Different systems/machines, different authorizations —> ONLY ONE ID key*

## Description

- Individual ID key is activated
- For every application (ID key-operated switch), one of the four authorization groups can be assigned to the individual ID key-operated switch
  (cf. green, yellow, red and blue)

## Customer benefits

- Software-assisted activation of the individual ID key
- Self-explanatory usability in the PCT
  (**P**ort **C**onfiguration **T**ool)
- One ID key with different authorizations in different applications.
  → only one key required



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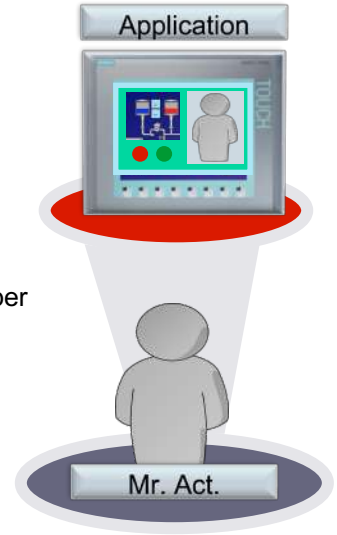
# SIRIUS ACT IO-Link ID key-operated switch
# Simple customization of applications to persons

## Identifying persons




Identification via unique ID key number

Mr. Act identifies himself with his key on the system.
Mr. Act is detected by the system via his unique ID key number.
An individual menu unique to Mr. Act builds up on the HMI (display).

*Persons are identified by the unique ID key number*

## Description

- ID key number can be read out via the acyclic data.
- This ID key number can be read out easily by the IO-Link function block

## Customer benefits

- User-specific menus on the HMI → users only see what they really need
- Identifying persons
- Setting up an authorization management system



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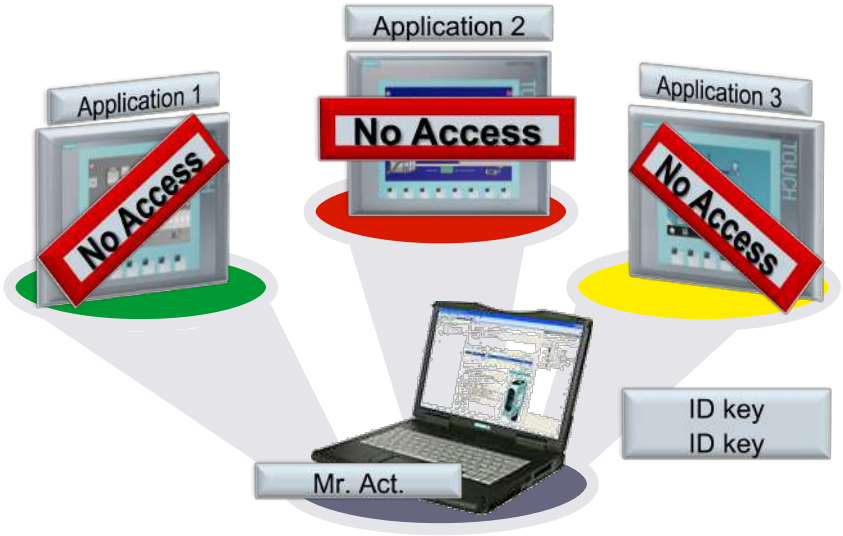
# SIRIUS ACT IO-Link ID key-operated switch
# Centrally deleting authorizations

## Deleting an individual key




Mr. Act can delete certain persons' authorizations from a central position.
By entry of the unique ID key number and the deletion command
Mr. Act can also delete an inserted ID key directly on the system.

*Simple deletion of an authorization*

## Description

- Deleting an individual ID key
- There are three possibilities of deleting an individual ID key
  1. Deleting by inserting the key
  2. Deleting by entering the number
  3. Deleting all ID keys simultaneously

## Customer benefits

- Lost ID keys can be deleted easily by way of the unique number
- Existing ID keys can be deleted quickly by inserting them
- All ID keys can be deleted at the push of a button



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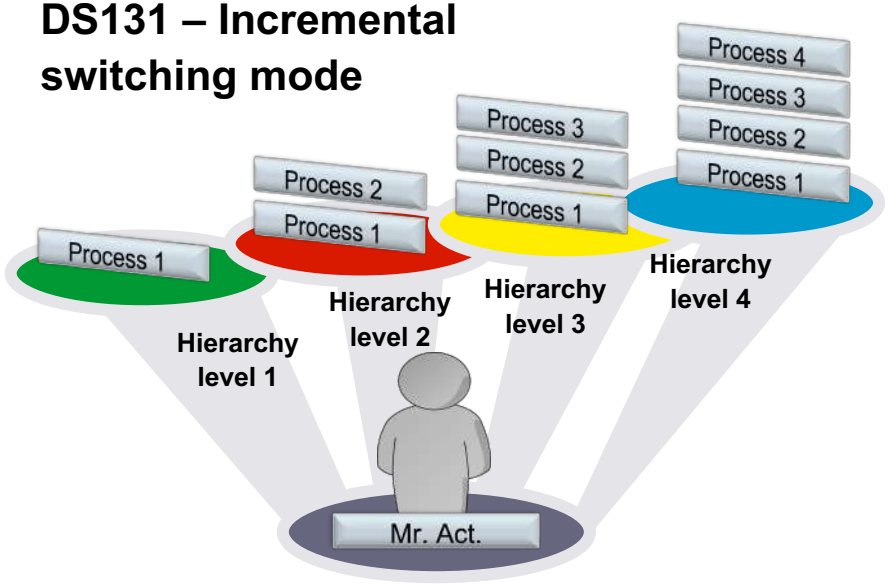
# SIRIUS ACT IO-Link ID key-operated switch
# Switching processes hierarchically on the basis of an authorization

## DS131 – Incremental switching mode




Mr. Act can activate processes based on a hierarchy.

He can only hierarchically activate the processes up to his authorization level

Each hierarchy level stands for one authorization level

*Hierarchical switching of process levels*

## Description

- With the "incremental switching" function, the outputs can be switched in ascending order (AND logic).
- Switching according to authorization levels (groups 1, 2, 3, 4)

## Customer benefits

- The outputs can be switched in ascending order
- For an application with ascending processes (AND logic)



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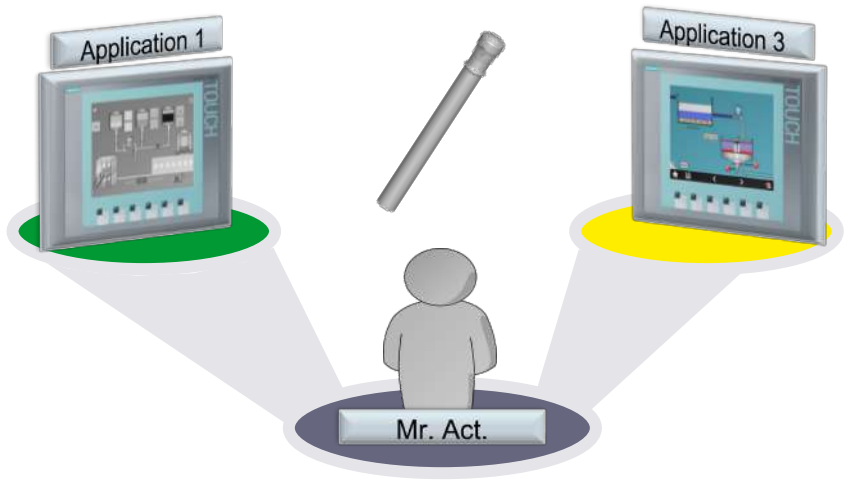
# SIRIUS ACT IO-Link ID key-operated switch
# Application continues to run even if the key has been removed

## DS131 – Switch position memory




Mr. Act can activate several systems with one ID key.
The system carries on running after removal of the ID key
Mr. Act can use all ID keys *(individual, green, yellow, red, blue)*.

*Several systems can be activated with one ID key*

## Description

- By means of this function, the key can be removed after selection of the authorization level. The authorization level then remains active.
- The selection can be changed by reinserting an ID key with the same or higher authorization level

## Customer benefits



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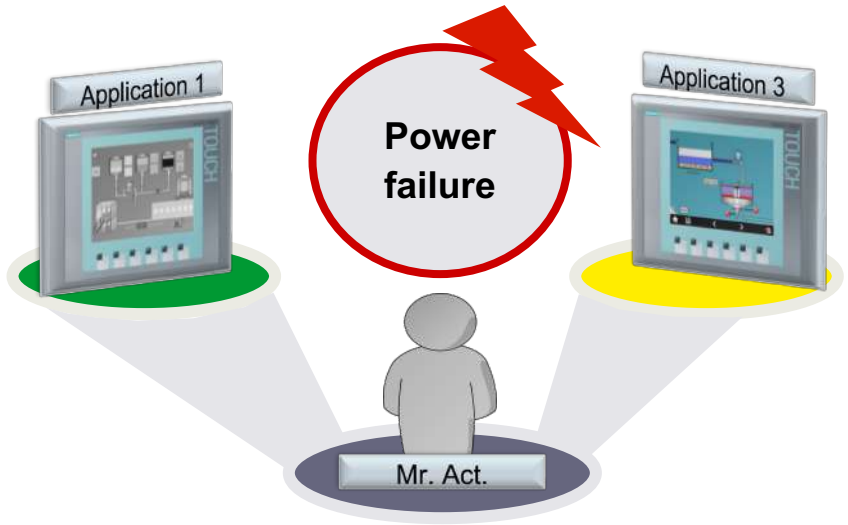
# SIRIUS ACT – IO-Link ID key-operated switch
# Supply voltage interrupted, last position stays active

## DS131 – Key memory




After a power failure, Mr. Act does not need to activate the system again

*Authorization level is active again after power failure*

## Description

- After interruption of the supply voltage, the previously set authorization level is automatically selected again (selection storage)

## Customer benefits

- Voltage drop security
- Application automatically continues to run after voltage drop



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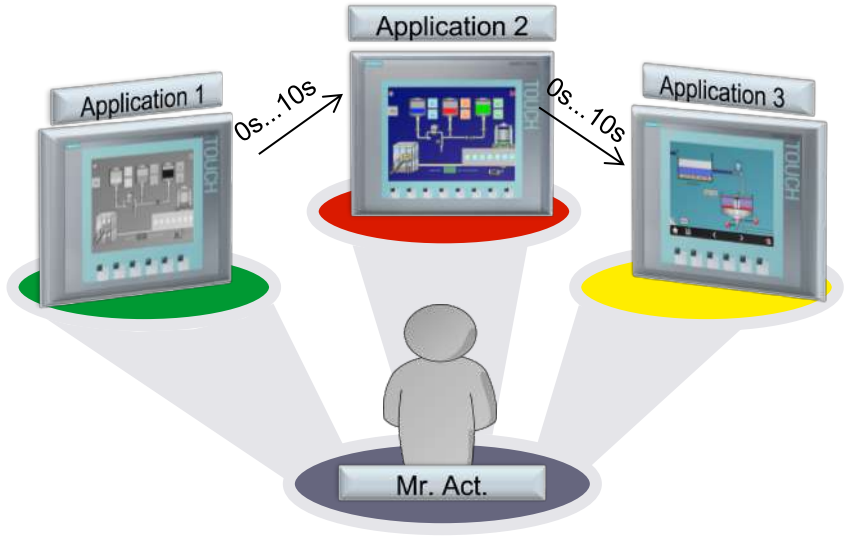
# SIRIUS ACT IO-Link ID key-operated switch
# Changeover time flexibly adjustable

## DS131 – ON delay




Mr. Act can flexibly adjust the ON delay from 0s to 10s.
If an ON delay of 0s is set, authorization level 2 is activated immediately after authorization level 1

*The ON delay can be chosen flexibly between 0s and 10s*

## Description

- The ON delay after selection can be adjusted individually by means of this function
- Selectable from 0s to 10s in 0.1 second increments

## Customer benefits

- Sensitive changeover operations between authorization levels can be assigned safety times (Prevents immediate changeover).
- The ON delay can be deactivated, thus enabling switching in real-time



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# SIRIUS ACT IO-Link ID key-operated switch
# Factory defaults restored at the push of a button

## Restore Factory Setting

*P*ort *C*onfiguration *T*ool - *PCT*

*"Restore Factory Setting"*

✓

*Factory setting restored quickly*

## Description

- This function restores the device's factory defaults
- All set values are reset to the default values

## Customer benefits

- You restore the factory settings with a "*click*"
- This allows a quicker changeover of devices from *application A* to *application B* with different settings



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# SIRIUS ACT IO-Link ID key-operated switch
# Functions explained briefly

**Activating a key group:** assigning an authorization group to an individual key
Up to 50 white keys can be read in

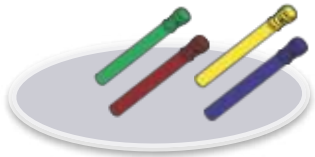
**Example:**

key code: **0x7B, 0xC5, 0xBE, 0x17, 0x04**

**Read in as:**

Group 1 | Group 2 | Group 3 | Group 4


**Enabling only individual keys (white keys):**
Blocking all standard ID keys



**Deleting an individual key:** deleting an individual key's assigned authorization group
- With the entered key code
- Delete inserted white ID keys
- Delete all white keys



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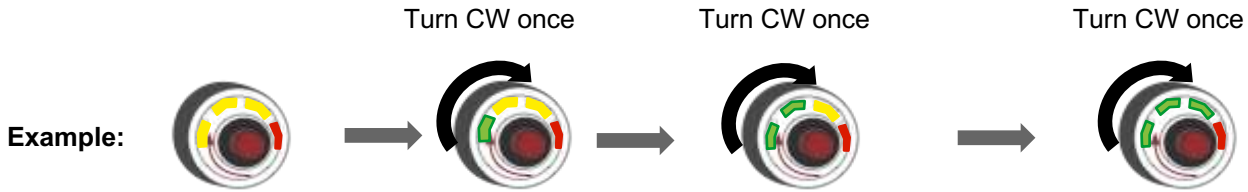
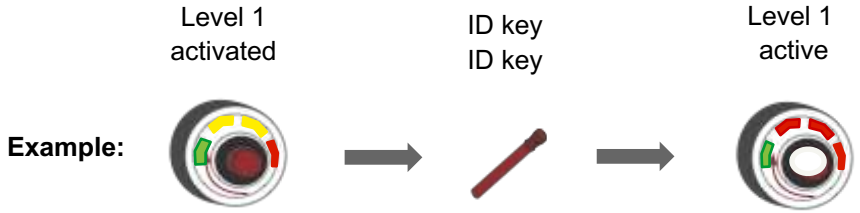
# SIRIUS ACT IO-Link ID key-operated switch
# Functions explained briefly

**Enabling incremental switching:** several authorization levels can be activated incrementally




**Switch position memory enabled:** the activated authorization level is not deactivated after removal of the key




**Properties:**
- On delivery, all parameters are disabled (not enabled)
- All ID keys can be used



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# IO-Link module functions

**Key memory released:** activated authorization levels are stored in the event of a power failure

**Example:**

Level 1 activated

In the event of a voltage drop

Voltage on again

**Change ON delay:** the ON delay can be changed

Flashing = ON delay active

Adjustable from 0, 1,……to 10 seconds

**Properties:**

- The ON delay can be deactivated (ON delay = 0 seconds)
- If the ON delay is deactivated, → **Change authorization levels** basic function no longer possible



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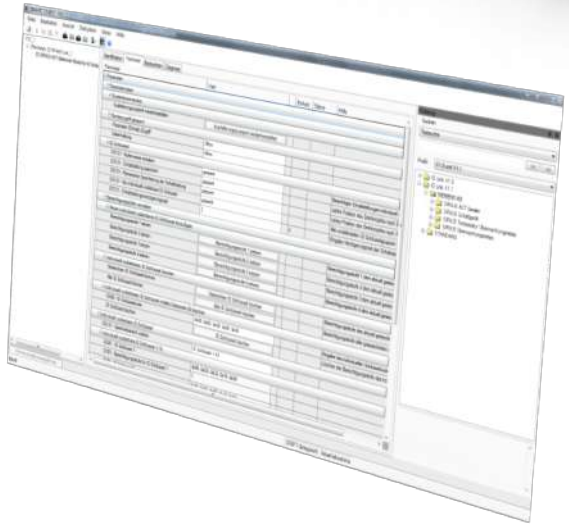
# SIRIUS ACT IO-Link
# Powerful hardware and innovative software





Components

- ID key-operated switches
- IO-Link electronic modules

Functions

- ID key-operated switches
- IO-Link electronic module

**P**ort **C**onfiguration **T**ool (PCT) & IO-Link blocks

Getting started



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# SIRIUS ACT IO-Link electronic module
# A strong module with strong functions

## Overview of functions

| Input functions (DI) | | |
|---|---|---|
| 1 | Static input | Input delay |
| | | Inverting input |
| 2 | Switching input | Input delay |
| | | Switching cycle counter threshold |
| | | Active edges |
| | | Inverting input |
| 3 | Switch-on duration input | Input delay |
| | | Threshold |
| | | Inverting input |

| Output functions (DQ) | | |
|---|---|---|
| 1 | Static output | Inverting output |
| 2 | PWM output (pulse width modulation → the duty cycle of a square-wave pulse is modulated at constant frequency) | PWM frequency |
| | | PWM duty cycle |
| | | Inverting output |
| 3 | Dimming output | Dimming time |
| | | Inverting output |
| 4 | Switching output | Threshold switching cycle counter |
| | | Active edges |
| | | Inverting output |
| 5 | Switch-on duration output | Threshold |
| | | Inverting output |




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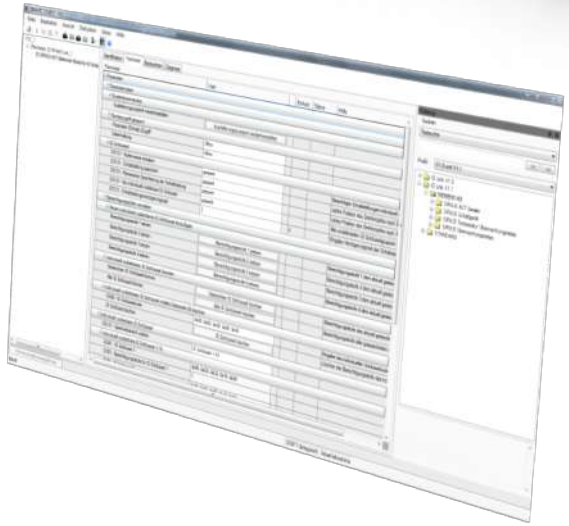
# SIRIUS ACT IO-Link
# Powerful hardware and innovative software





Components

- ID key-operated switches
- IO-Link electronic modules

Functions

- ID key-operated switches
- IO-Link electronic module

**P**ort **C**onfiguration **T**ool (PCT) & IO-Link blocks

Getting started



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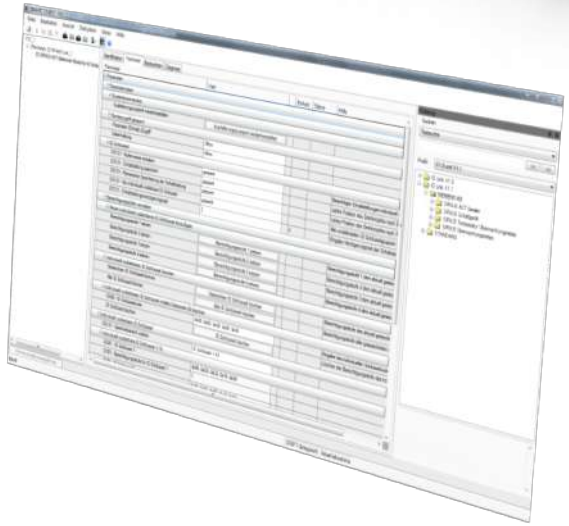
# SIRIUS ACT IO-Link
# Powerful hardware and innovative software





Components

- ID key-operated switches
- IO-Link electronic modules

Functions

- ID key-operated switches
- IO-Link electronic module

**P**ort **C**onfiguration **T**ool (PCT) & IO-Link blocks

Getting started



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# Getting started in the IO-Link environment

**Training steps**

| | |
|---|---|
| **Exercise 1** | Hardware configuration in the TIA Portal |
| **Exercise 2** | Parameterization of the SIRIUS ACT ID key-operated switch in the ***P***ort ***C***onfiguration ***T***ool (PCT) |
| **Exercise 3** | Reading in the switch position in the S7 program |
| **Exercise 4** | ID key-operated switch function block |



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# Getting started in the TIA Portal

Training steps

## Exercise 1 Hardware configuration in the TIA Portal

***Target:***

- Creating a project in the TIA Portal
- Configuring hardware in the TIA Portal
- Loading the project into the PLC



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# Basics



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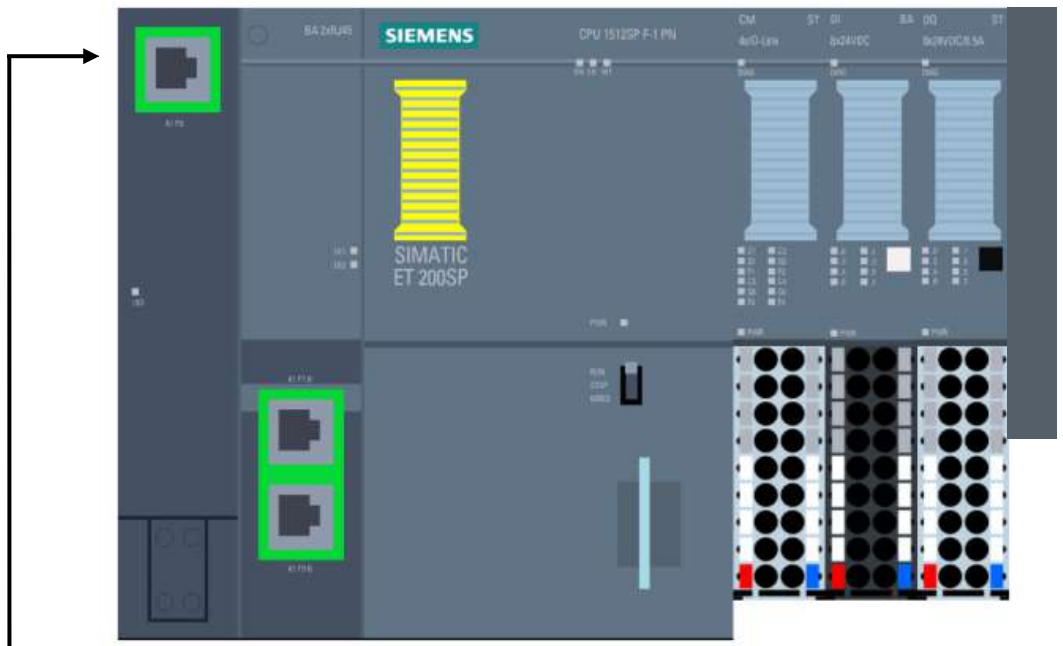
# PLC structure




- **PLC, ET 200SP CPU1512 F-1PN**
- **IO-Link master, CM 4xIO-Link ST**
- **8x digital input**
- **8x digital output**
- **Server module**

- Free slots for
  - SP motor starter
  - AS-i master and ASIsafety

Accessories
- Case, small TANOS box
- Profile frame
- 230/24V power supply
- AS-i data decoupling

Free interfaces for external devices
- IO-Link
- PROFINET
- Laptop



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# Preparations

## Download IO-Link tool PCT

https://support.industry.siemens.com/cs/document/32469496/s7-pct-v3-3-hf2-for-io-link-master-?dti=0&lc=en-WW

## Download IO-Link IODD device files

https://support.industry.siemens.com/cs/products?dtp=Download&pnid=15851&lc=en-WW

## Download Hardware Support Packages (HSP)

https://support.industry.siemens.com/cs/document/72341852/support-packages-f%C3%BCr-den-hardware-katalog-im-tia-portal-(hsp)?dti=0&lc=en-WW



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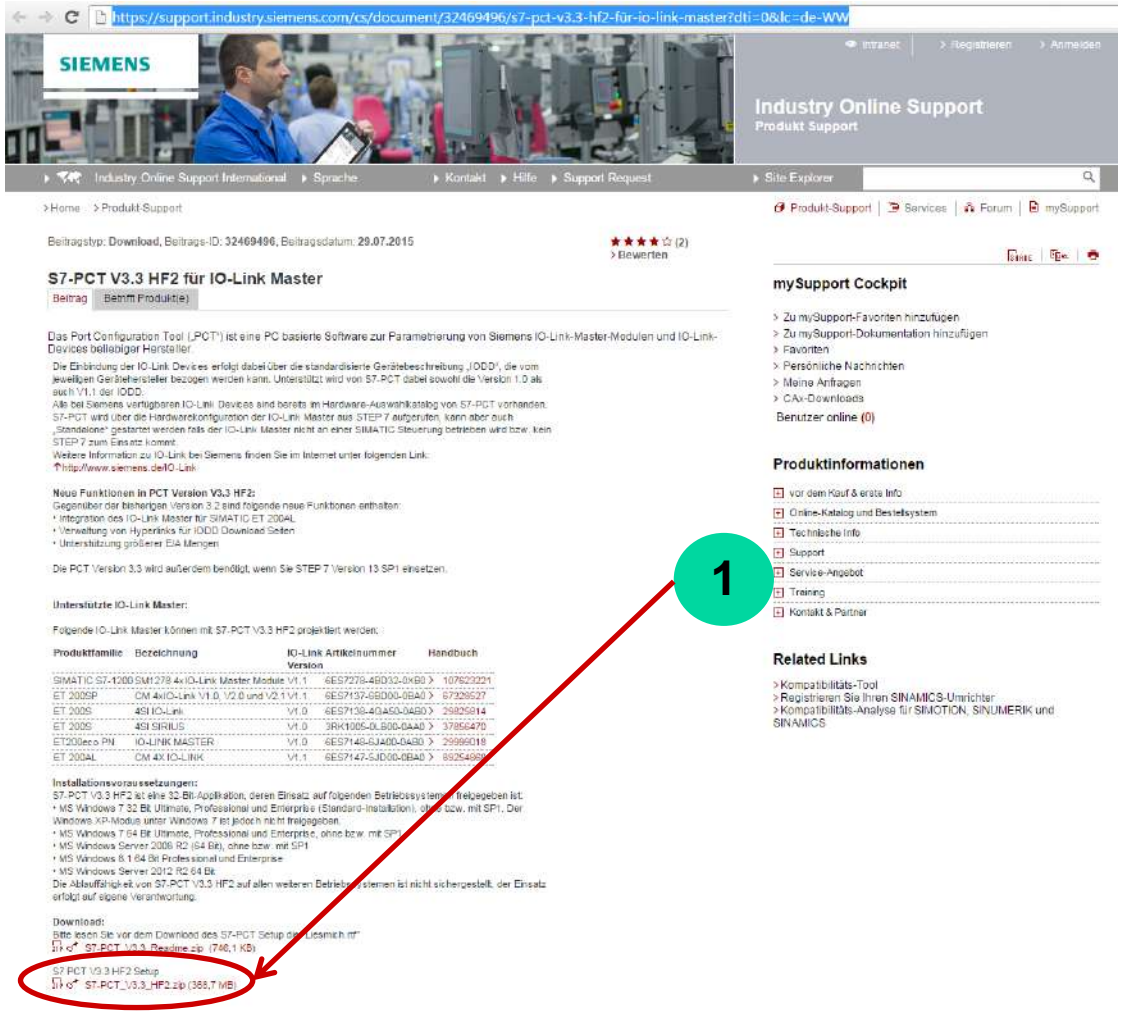
# Downloading PCT




***Info:*** You can download the port configuration tool free of charge from the Siemens website



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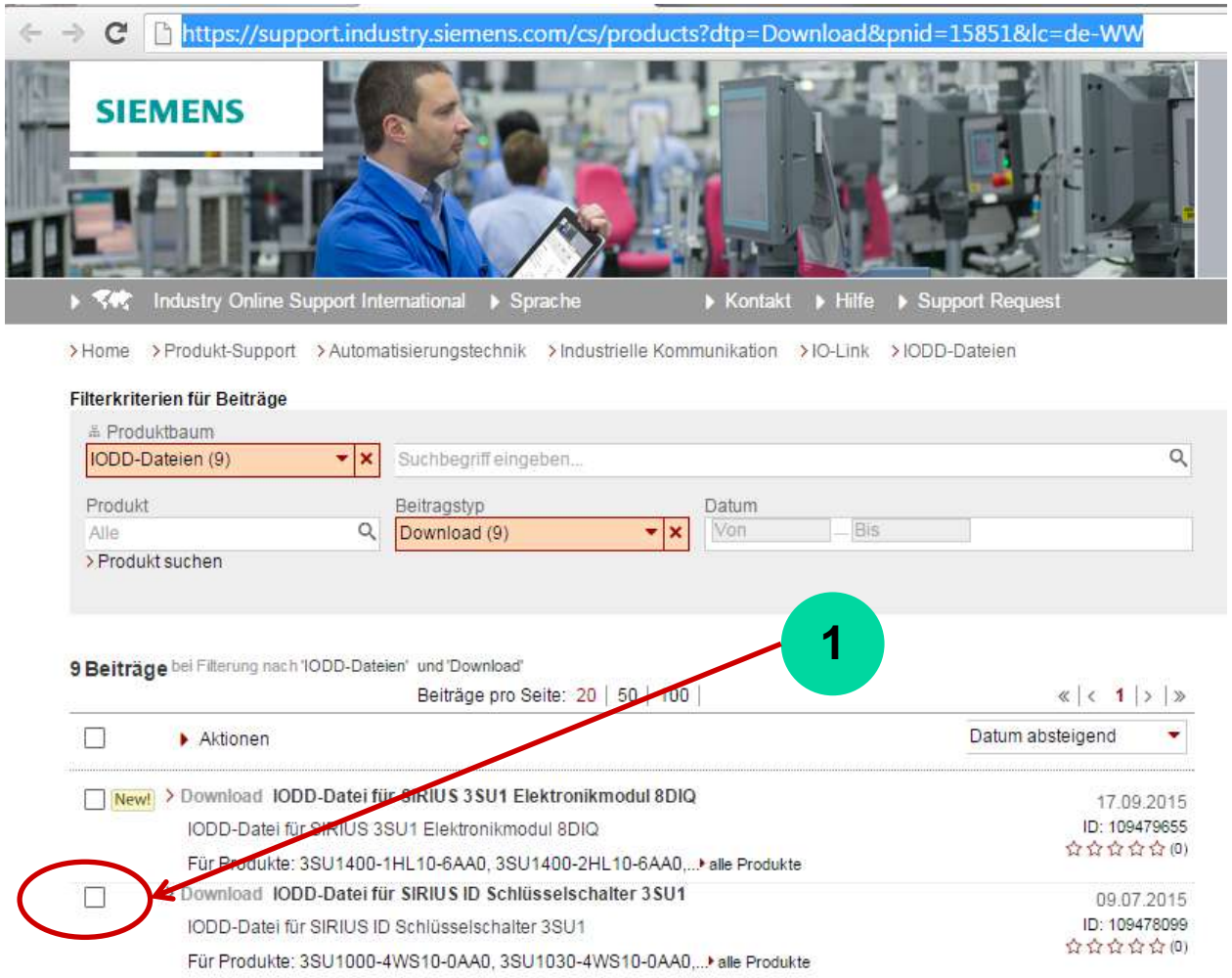
# Downloading IODD




***Info:*** Every IO-Link device (MLFB) has an IODD.



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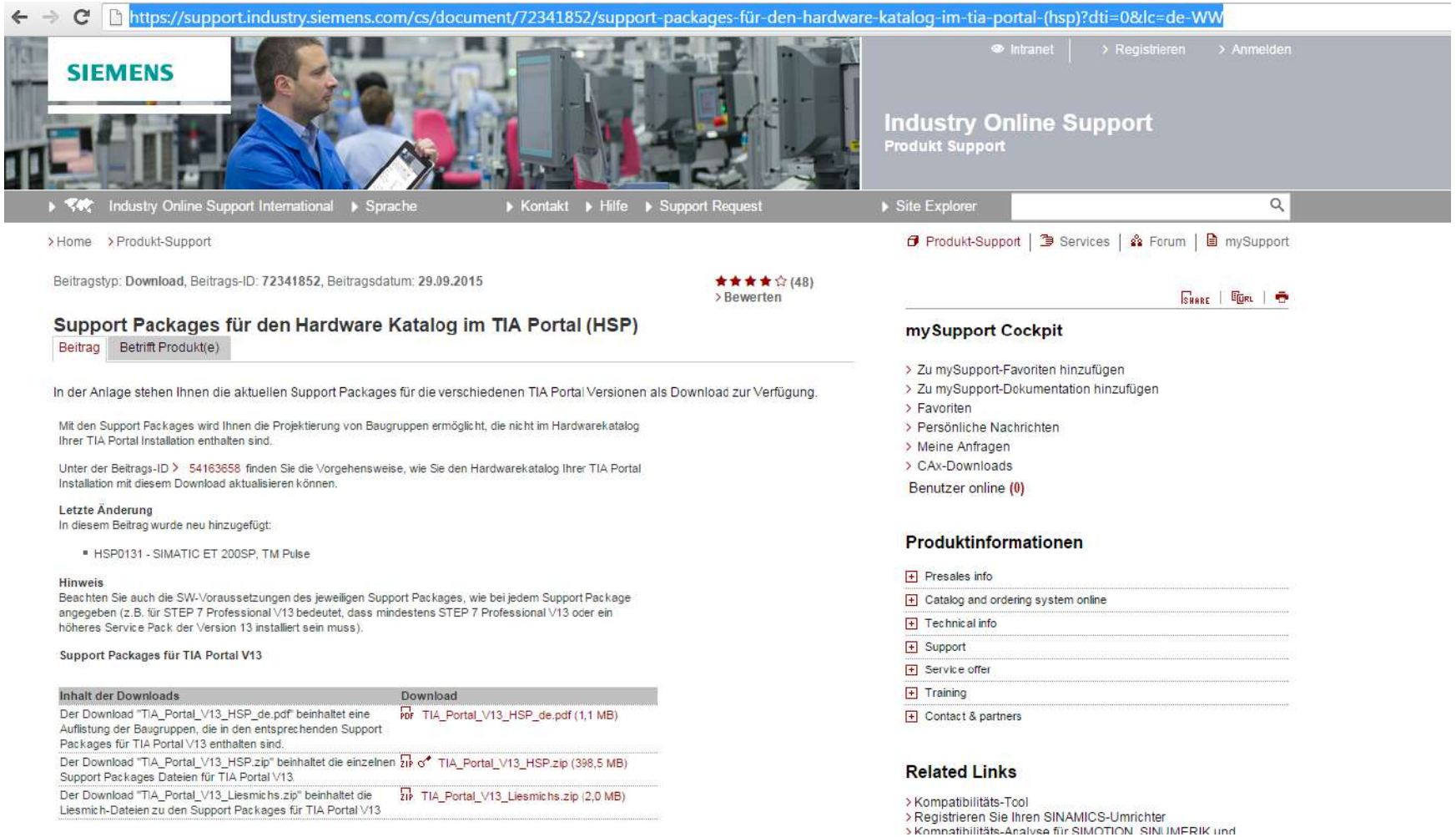
# Downloading HSP



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# Starting the exercise

Use case 1



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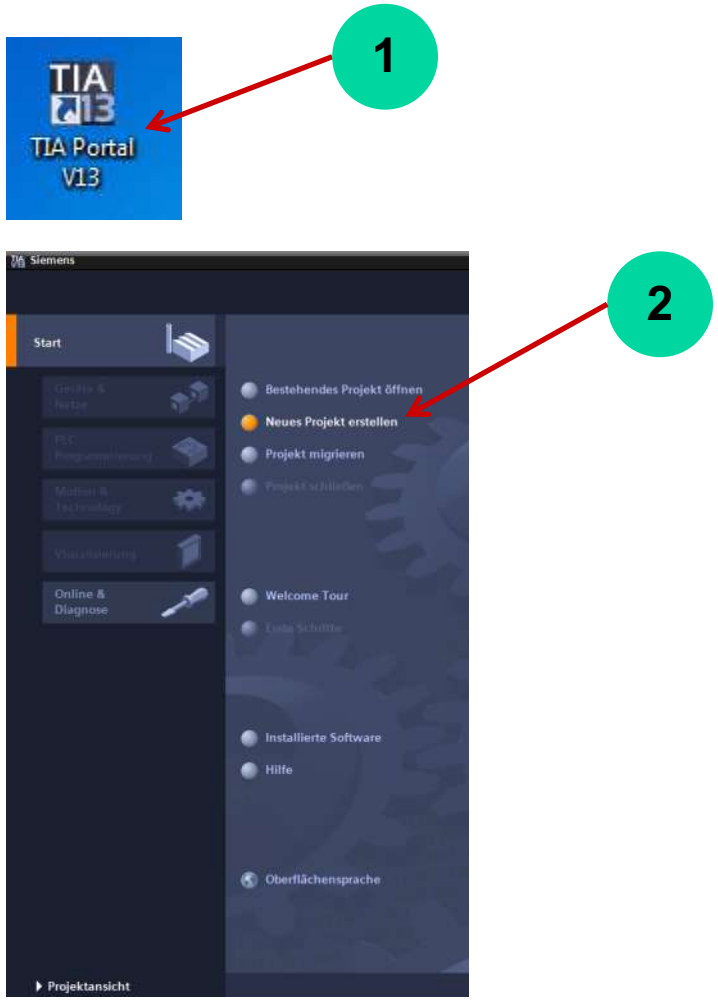
# Starting TIA Portal and creating a project




***Step 1:*** Start the TIA Portal in the usual way by double-clicking on the icon on the desktop

**Note: Program starts very slowly!**

***Step 2:*** Start a new project by clicking on "Create new project"



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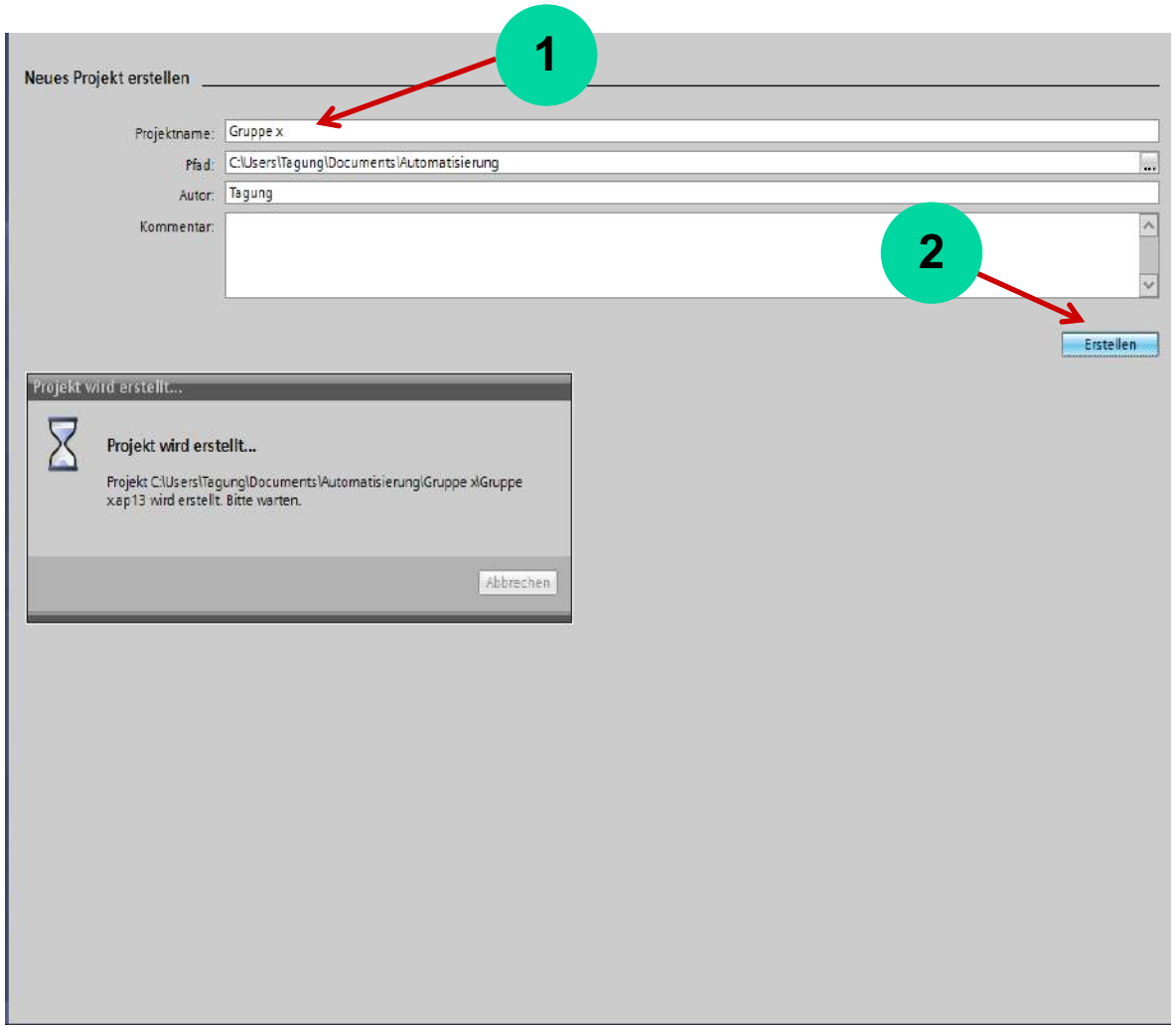
# Creating a project




***Step 1:*** Enter the project name in the "Project name" box. Enter Group X (number of your group), for example.

***Step 2:*** Then click on the "create" icon and the project will be created. You will see this in the information window.



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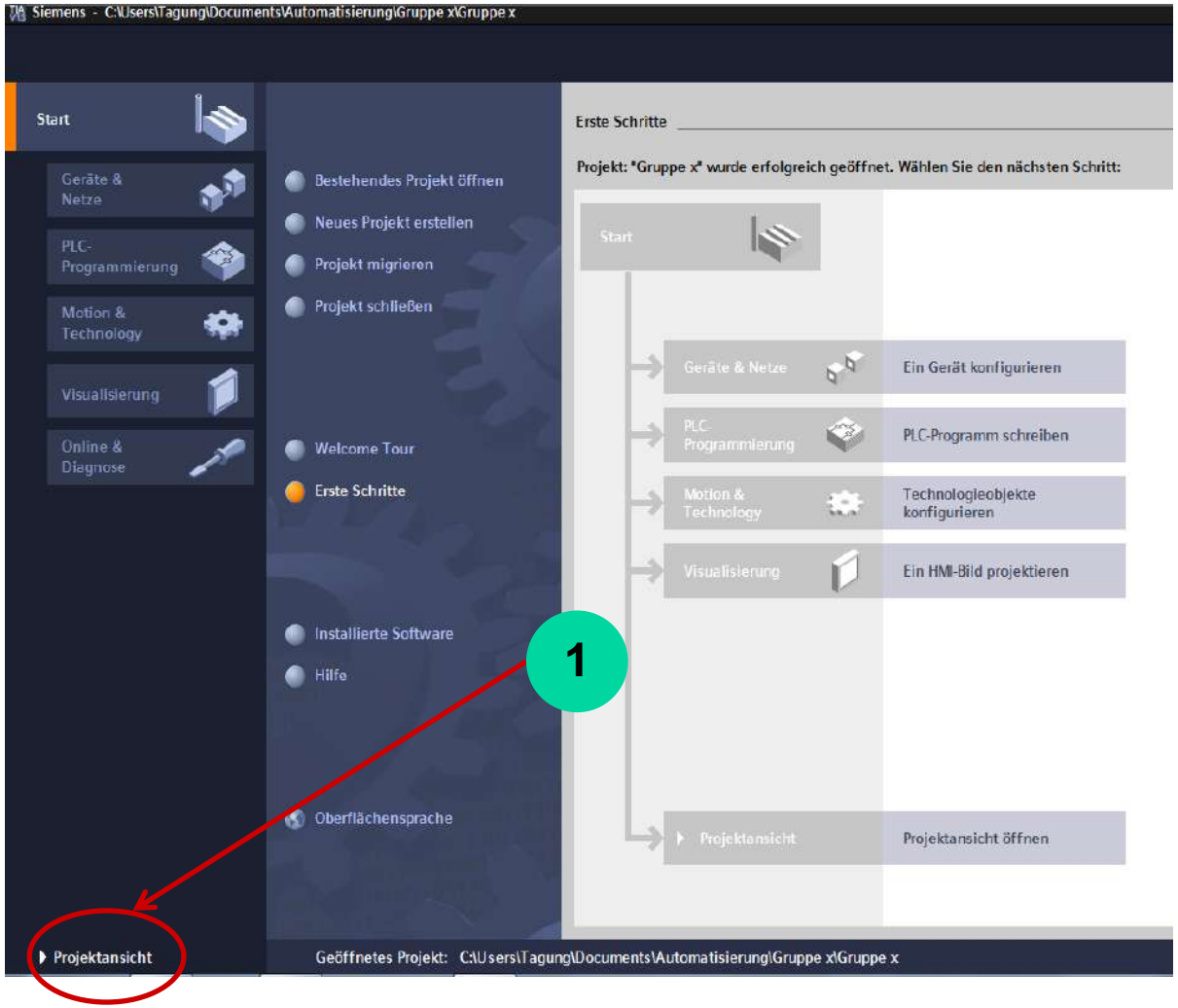
# Switching to the project view




***Step 1:*** Click on the Project view text, which you will find on the bottom left of the window.

***Info:*** There are several ways of reaching the project view. Alternatively also via "Configure a device".



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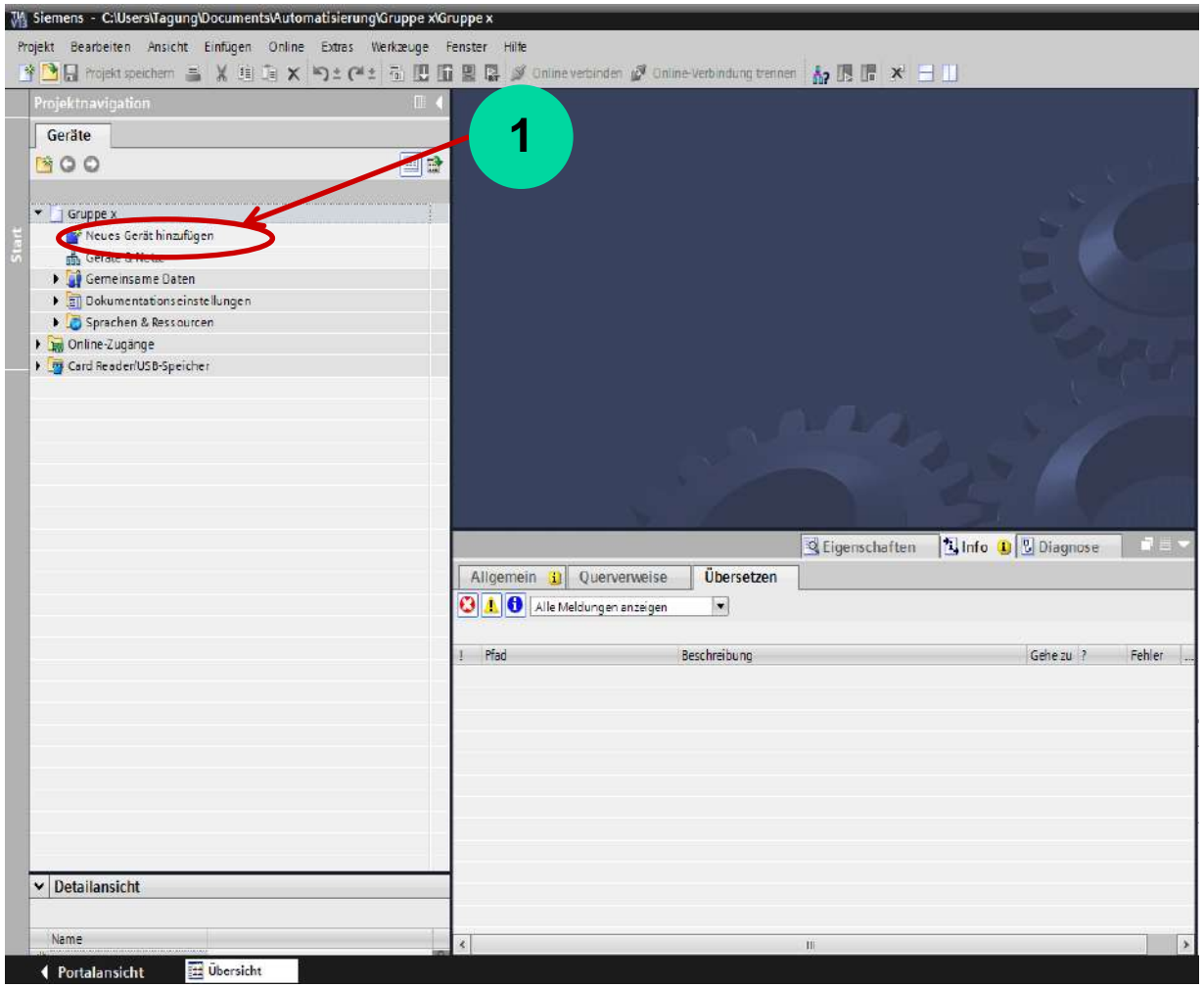
# Adding a new device




***Step 1:*** Double-click on the "Add new device" text. You will find it on the left in the project navigator. → An "Add new device" selection window must then open.

***Info:*** You will find all relevant data of your project in the project navigator.



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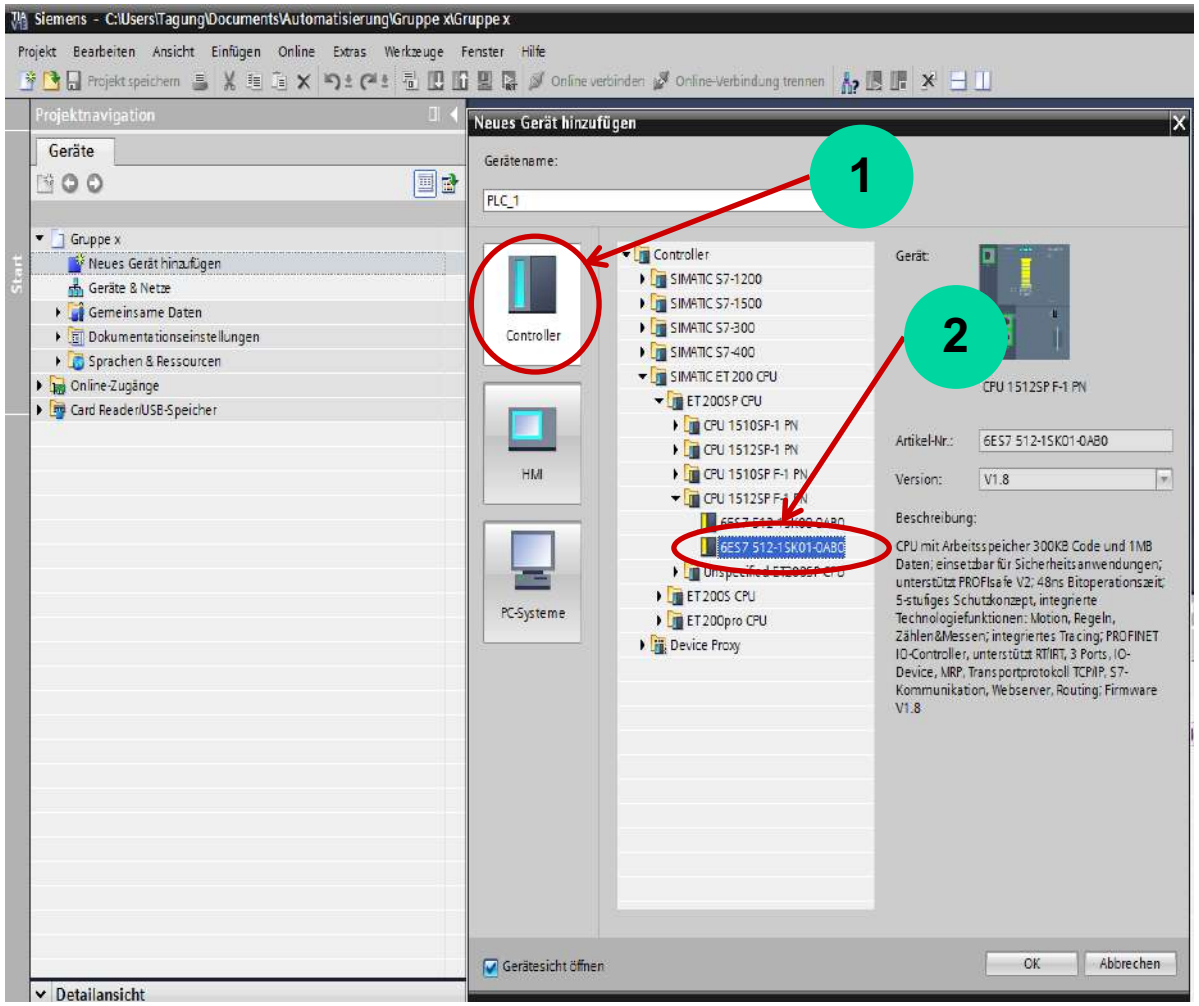
# Selecting ET 200SP CPU 1512SP F-1 PN




***Step 1:*** Click on the Controller icon, which you will find on the top left of the selection window.

***Step 2:*** Search for ET 200SP in the selection tree. Open the "SIMATIC ET 200 CPU" &
"ET 200SP CPU" &
"CPU 1512SP F-1 PN"
selection menu and then select the MLFB "6ES7512-1SK01-0AB0" by clicking on the applicable icon.

***Info:*** After making the selection, you will find product-specific information on the right. **!The version must agree with the device version!**



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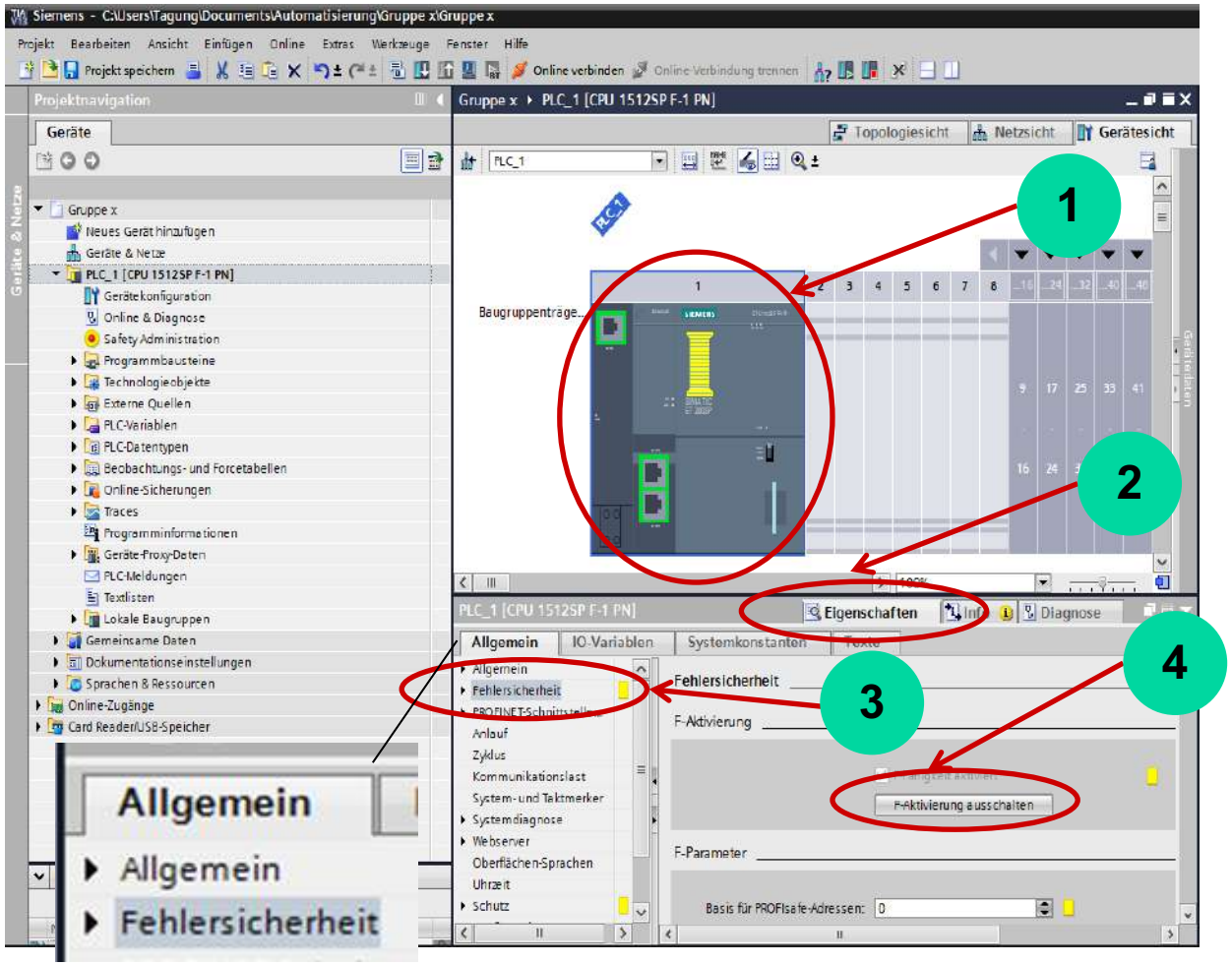
# Deactivating the F function in the case of the ET 200SP




***Step 1:*** (Single) click on the CPU

***Step 2:*** Click on the "Properties" tab

***Step 3:*** Search for the "Fail-safety" selection on the General tab in the selection tree and then click on it

***Step 4:*** Switch off F activation by clicking on the "Switch off F activation" button.

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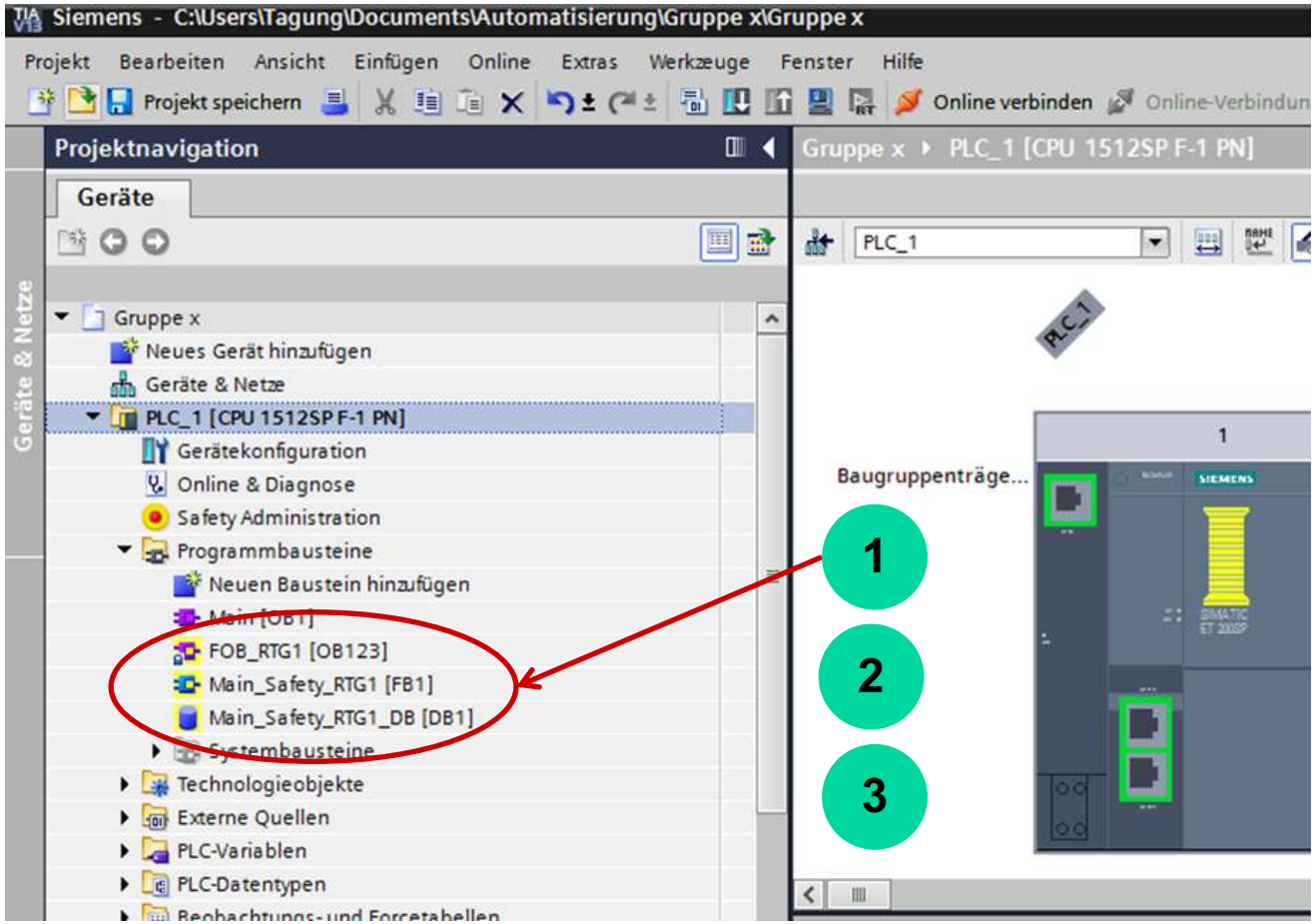
# Deleting all yellow safety F-PBs




***Step 1:*** Delete the F-PB "FOB_RTG1 [OB 123]"

***Step 2:*** Delete the F-PB "Main_Safety_RTG1 [FB1]"

***Step 3:*** Delete the F-PB "Main_Safety_RTG1_DB[DB1]"



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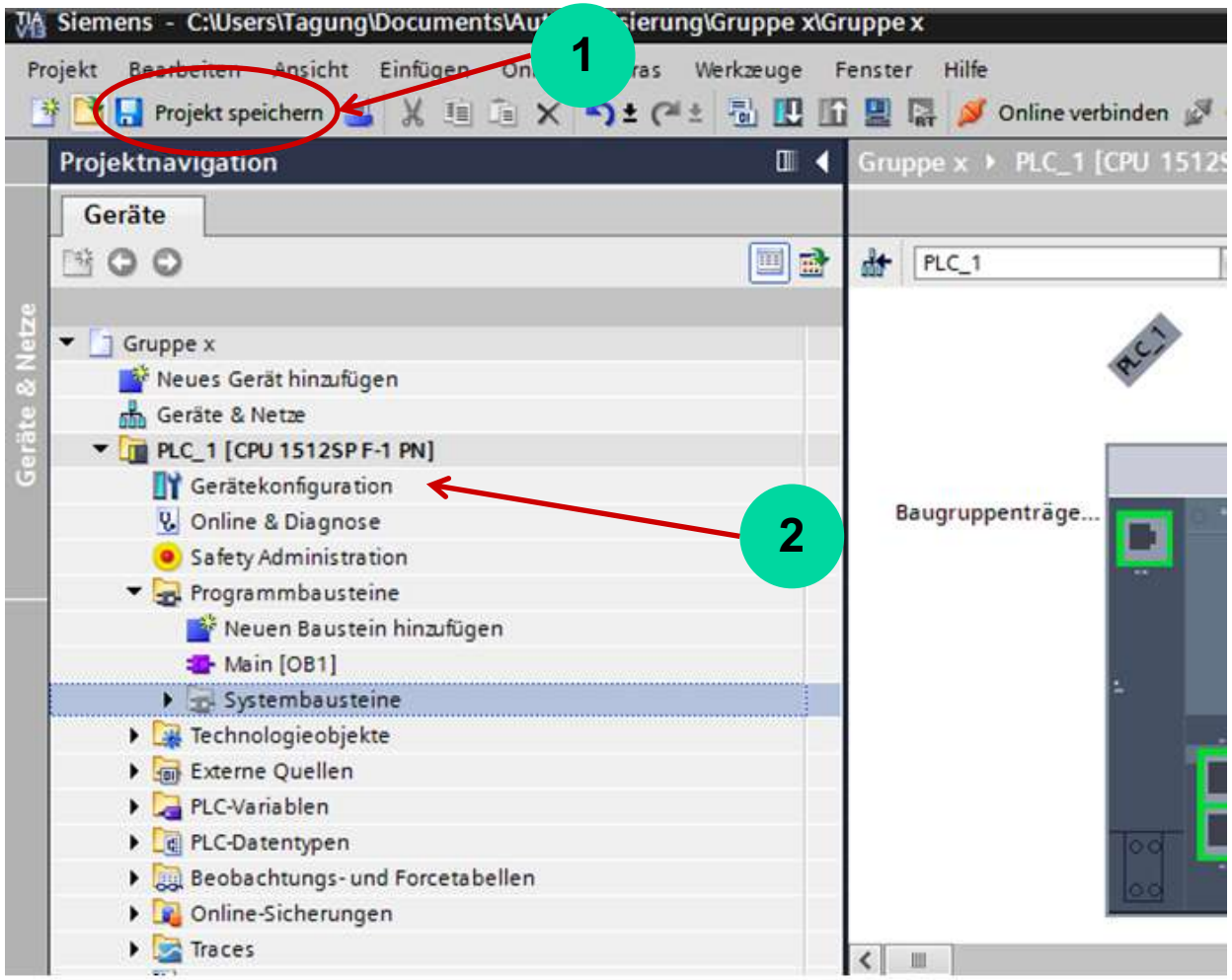
# Saving the project




***Step 1:***

Click on "Save project" to save this project.

***Step 2:***

Click on "Device configuration".



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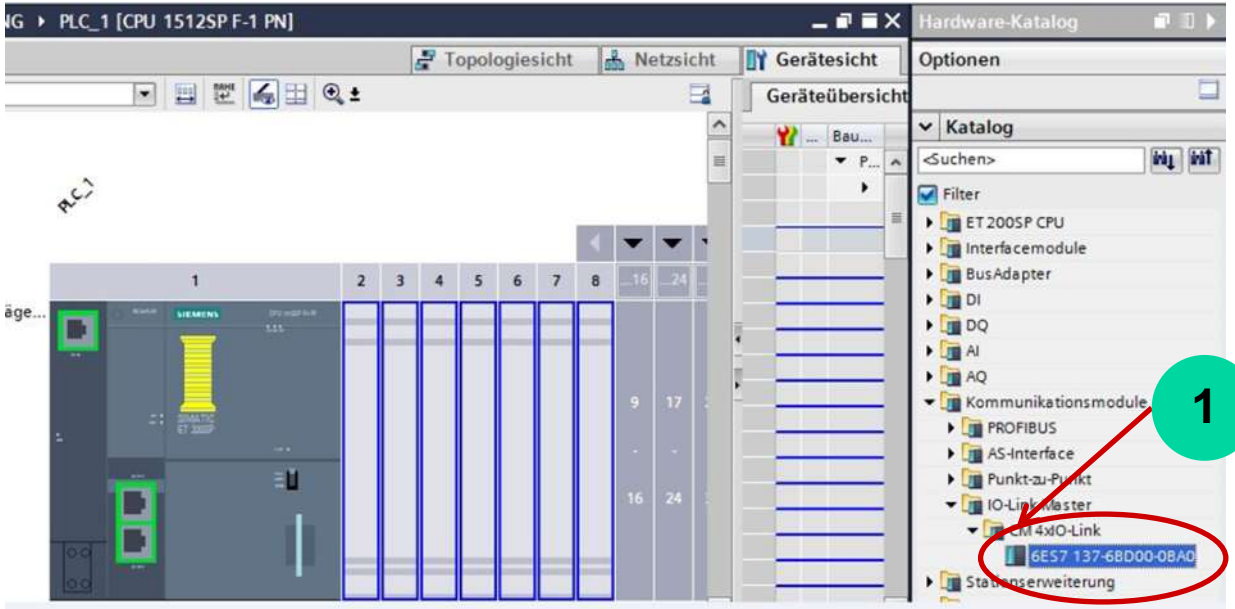
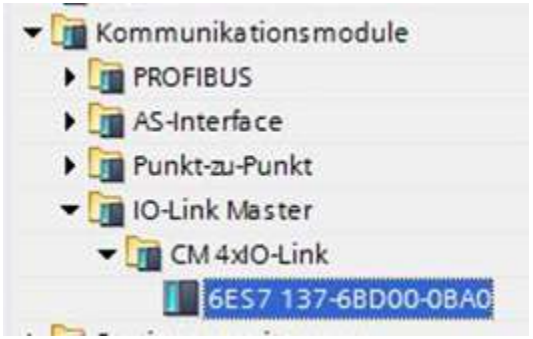
# Configuring IO-Link master (MLFB: 6ES7137-6BD00-0BA0)




***Step 1:*** Search for the IO-Link master in the hardware catalog. You will find it under

"Communication modules"

"IO-Link master"

"CM 4xIO-Link"

When you double-click on the MLFB

"6ES7137-6BD00-0BA0",

the IO-Link master is inserted in the first free slot.

Alternatively, you can also drag and drop the IO-Link master to a free slot.

***Note!*** You must be in the device view of the ET 200SP to be able to perform these steps



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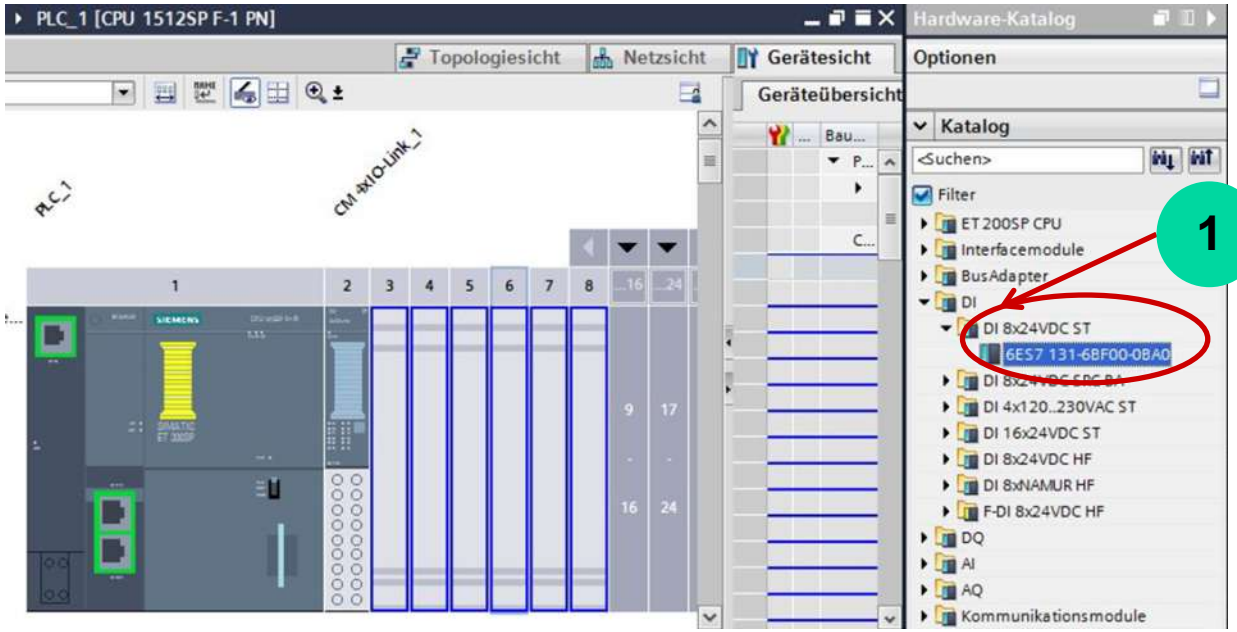
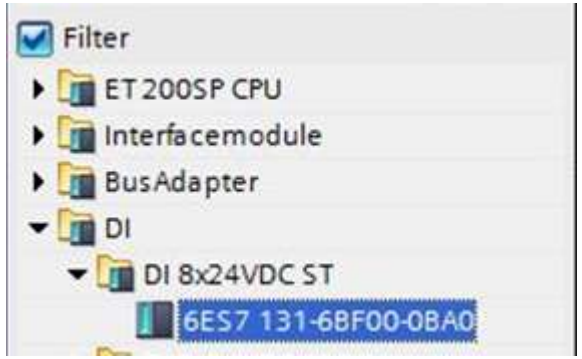
# Configuring the DI module (MLFB: 6ES7131-6BF00-0BA0)




***Step 1:*** Search for the signal module "DI 8x24VDC ST" in the hardware catalog. You will find it under

"DI"

"DI 8x24VDC ST"

When you double-click on the MLFB " 6ES7131-6BF00-0BA0", the signal module is inserted in the first free slot. Alternatively, you can also drag and drop the device to a free slot.

***Info:*** You can also find the device by entering the MLFB in the search

***Note!*** You must be in the device view of the ET 200SP to be able to perform these steps



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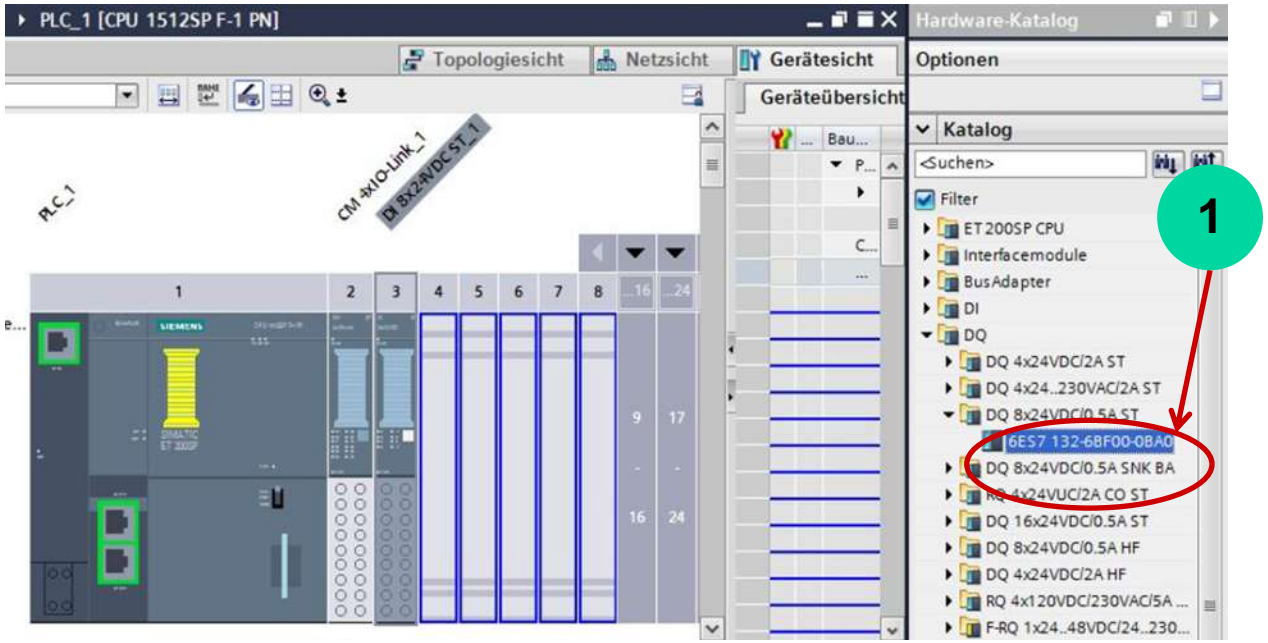
# Configuring the DQ module (MLFB: 6ES7 132-6BF00-0BA0)




***Step 1:*** Search for the signal module "DQ 8x24VDC/0.5A ST" in the hardware catalog. You will find it under

"DQ"

"DQ 8x24VDC/0.5A ST"

When you double-click on the MLFB " 6ES7 132-6BF00-0BA0", the signal module is inserted in the first free slot. Alternatively, you can also drag and drop the device to a free slot.

***Info:*** You can also find the device by entering the MLFB in the search

***Note!*** You must be in the device view of the ET 200SP to be able to perform these steps



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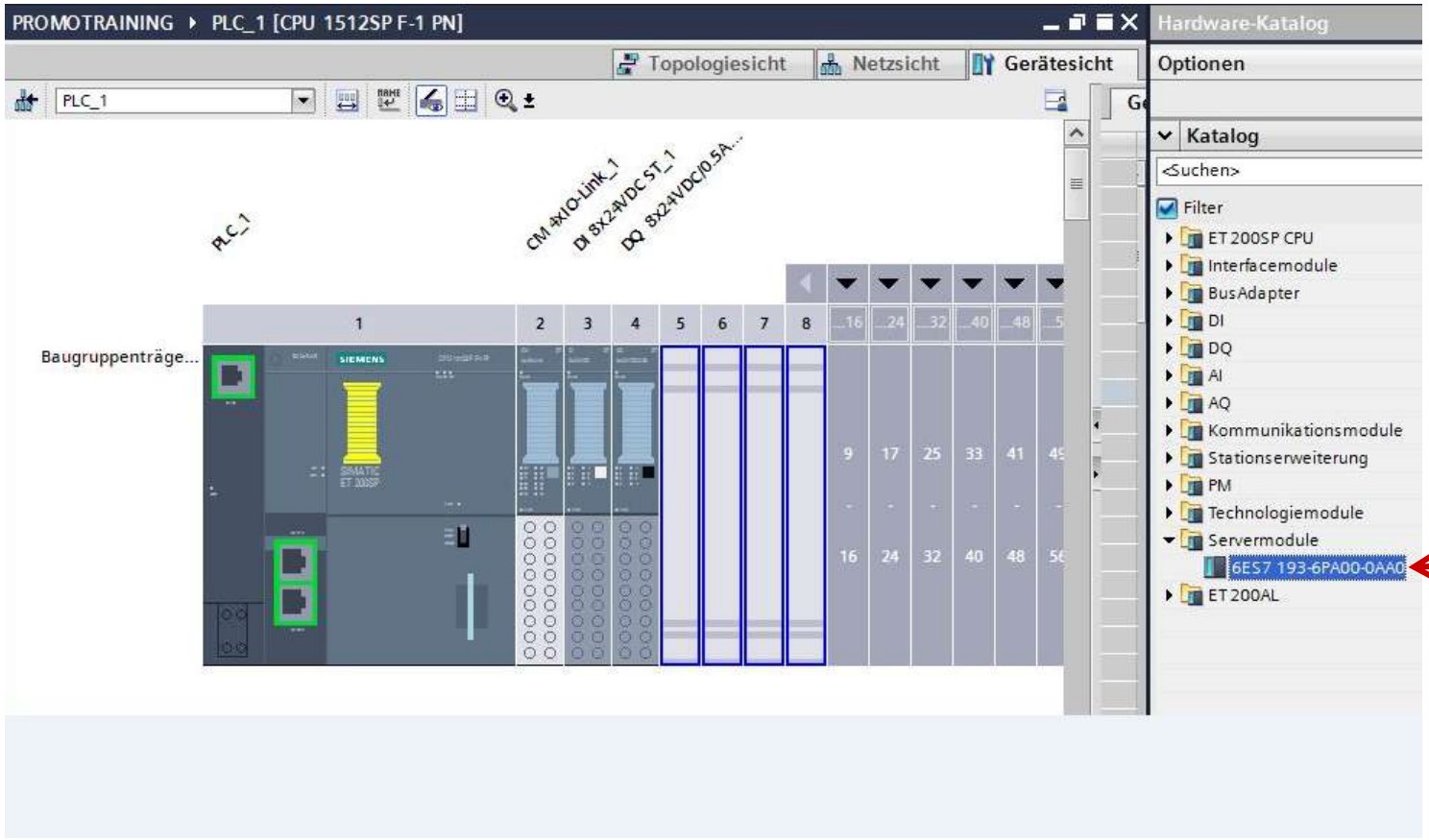
# Configuring the server module (MLFB: 6ES7193-6PA00-0AA0)




**Analogously to the steps before.**



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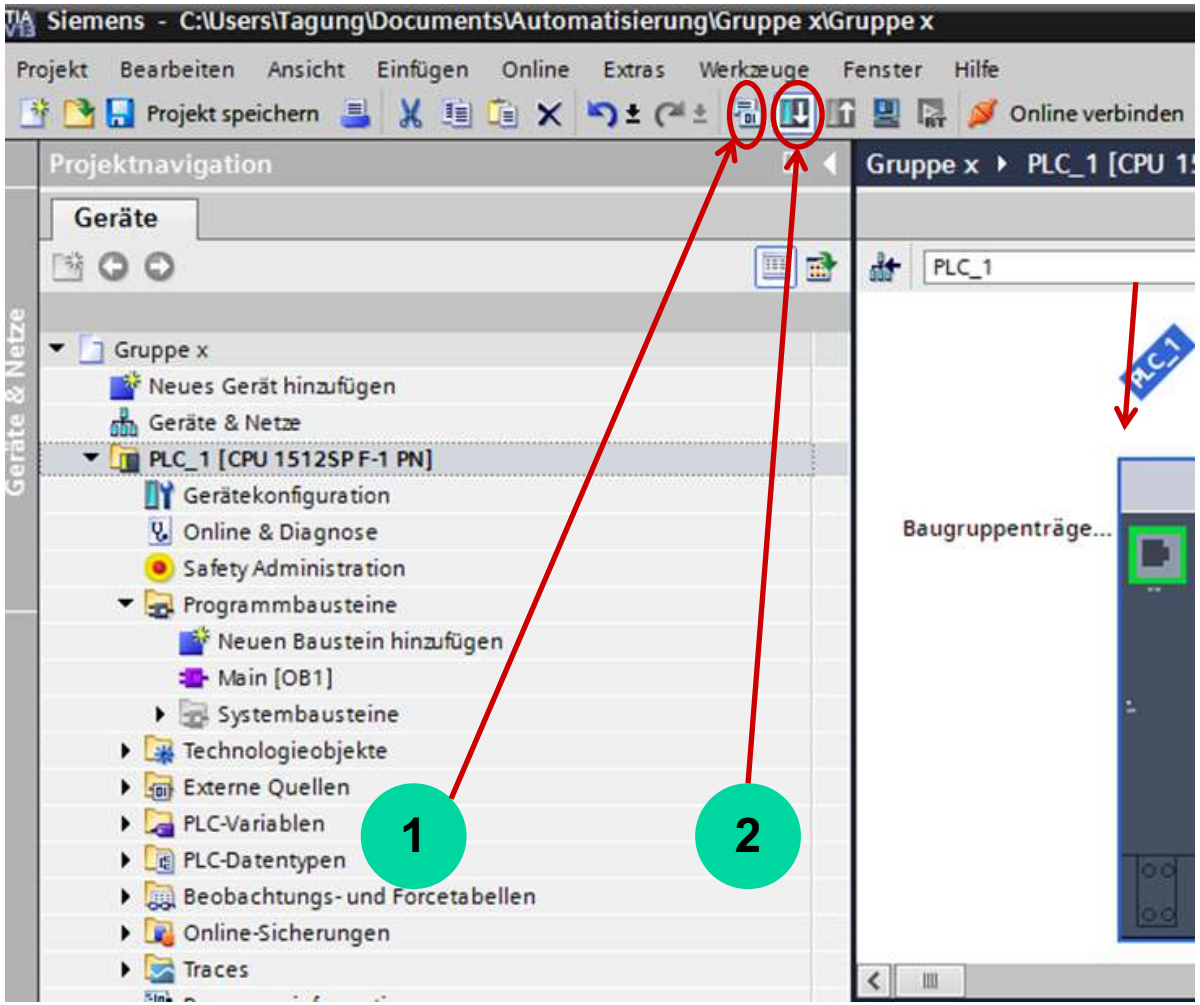
# Compiling the hardware configuration and loading it into the project




***Step 1:*** Click on the "Compile" button. You will find it in the menu bar.

***Step 2:*** Click on the "Load" button once compilation has been completed.

***Info:*** If you do not recognize the "button", hover with the mouse over the icon and the information will appear in the small info box



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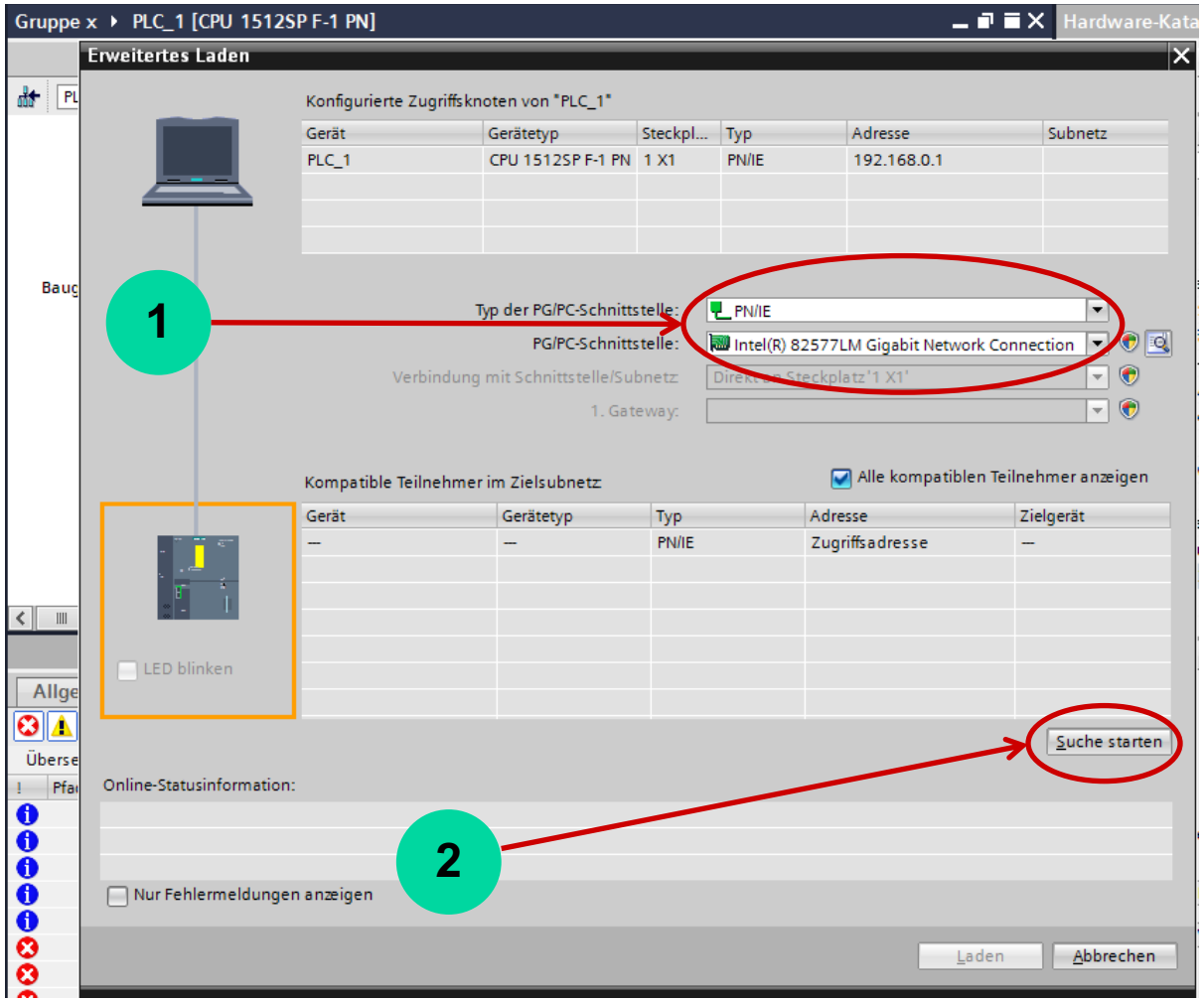
# Setting, searching for and then loading the interface




***Step 1:*** Set the computer interface.

***Step 2:*** Start the search by clicking on the "Start search" button.



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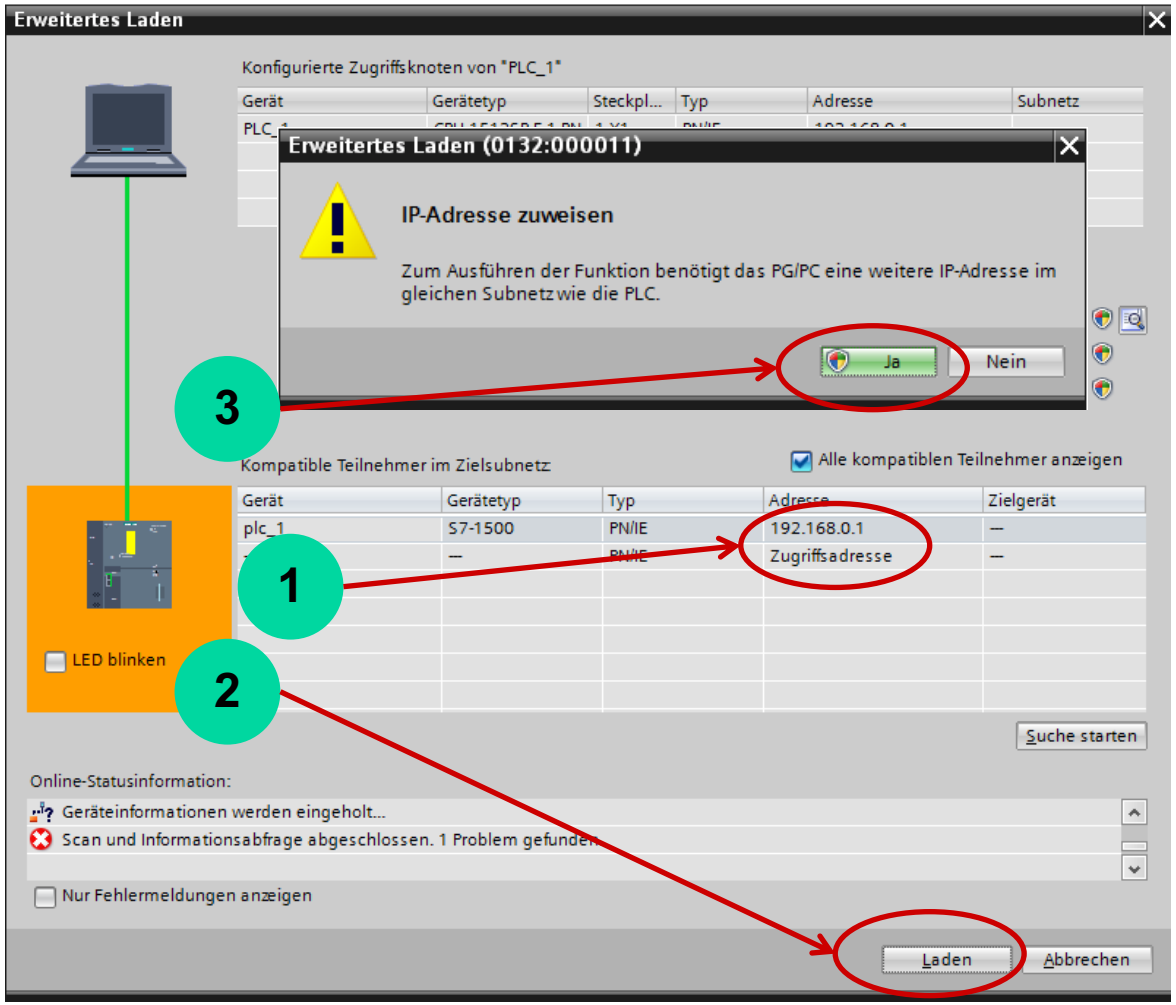
# Loading and automatically assigning the address




***Step 1:*** Choose the right CPU by clicking on it

***Step 2:*** Start loading by clicking on the Load button.

***Step 3:*** Assign an IP address automatically by clicking on "Yes" to confirm



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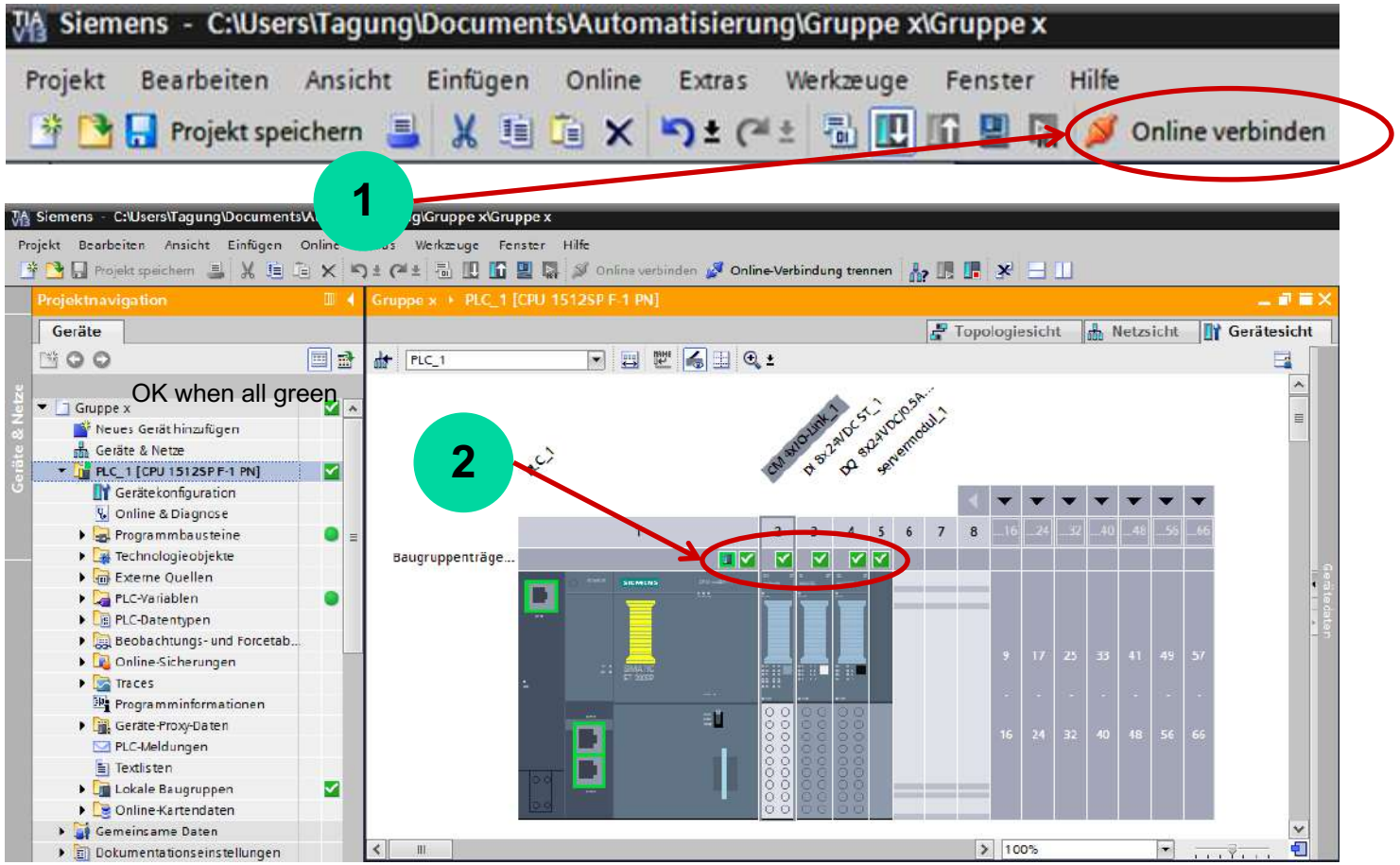
# Going online and checking the module status




***Step 1:*** Click on the "Go online" button. You will find this button on the menu bar

***Step 2:*** If all checkmarks are green, everything has been configured correctly and loaded into the CPU.



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# First target achieved!

**Training steps**

| | |
|---|---|
| **Exercise 1** | Hardware configuration in the TIA Portal |
| **Exercise 2** | Parameterizing the ID key-operated switch with the ***P***ort ***C***onfiguration ***T***ool (PCT) |
| **Exercise 3** | Reading in the switch position in the S7 program |
| **Exercise 4** | ID key-operated switch function block |



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# Second target

Training steps

**Exercise 2**

Parameterizing the ID key-operated switch with the ***P***ort ***C***onfiguration ***T***ool (PCT)

***Target:***

- Integrating the ID key-operated switch
- Reading in an individual key via PCT
- Reading out an ID key number via PCT



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# Starting the exercise

Use case 2



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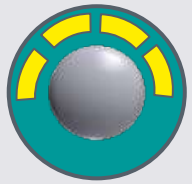
# Target in the second programming example

## Initial situation

### The ID key-operated switch

- Is not yet configured with the IO-Link master
- Is set to the factory setting



Flashing of the yellow LEDs means that the inserted ID key has not yet been read in this module.

## Target status

### The ID key-operated switch

- Is connected to the IO-Link master
- Individual key has been read in
- Online diagnostics shows ID number and switch position

Identifikation | Parameter | Beobachten | Diagnose

| Parameter | Wert | Einheit | Status | Hilfe |
|---|---|---|---|---|
| Diagnose | | | | |
| Diagnosedaten | | | | |
| Betriebssystemfunktionen | | | | |
| DS92 - Bereit | X | | geladen | |
| DS92 - Sammelfehler | | | geladen | |
| DS92 - Erkennung des ID Schl... | X | | geladen | |
| DS92 - Status des individuell c... | Kein Fehler | | geladen | |
| DS92 - Digitaler Ausgang 0 | | | geladen | |
| DS92 - Digitaler Ausgang 1 | X | | geladen | |
| DS92 - Digitaler Ausgang 2 | | | geladen | |
| DS92 - Digitaler Ausgang 3 | | | geladen | |
| DS92 - Digitaler Ausgang 4 | X | | geladen | |
| Gesteckter ID Schlüssel | | | | |
| DS94 - Identifikationsnummer d... | 0x34, 0xC6, 0x94, 0x17, 0x04 | | geladen | |
| DS94 - Berechtigungsstufe | 3 | | geladen | |
| DS94 - Schaltstellung | 2 | | geladen | |



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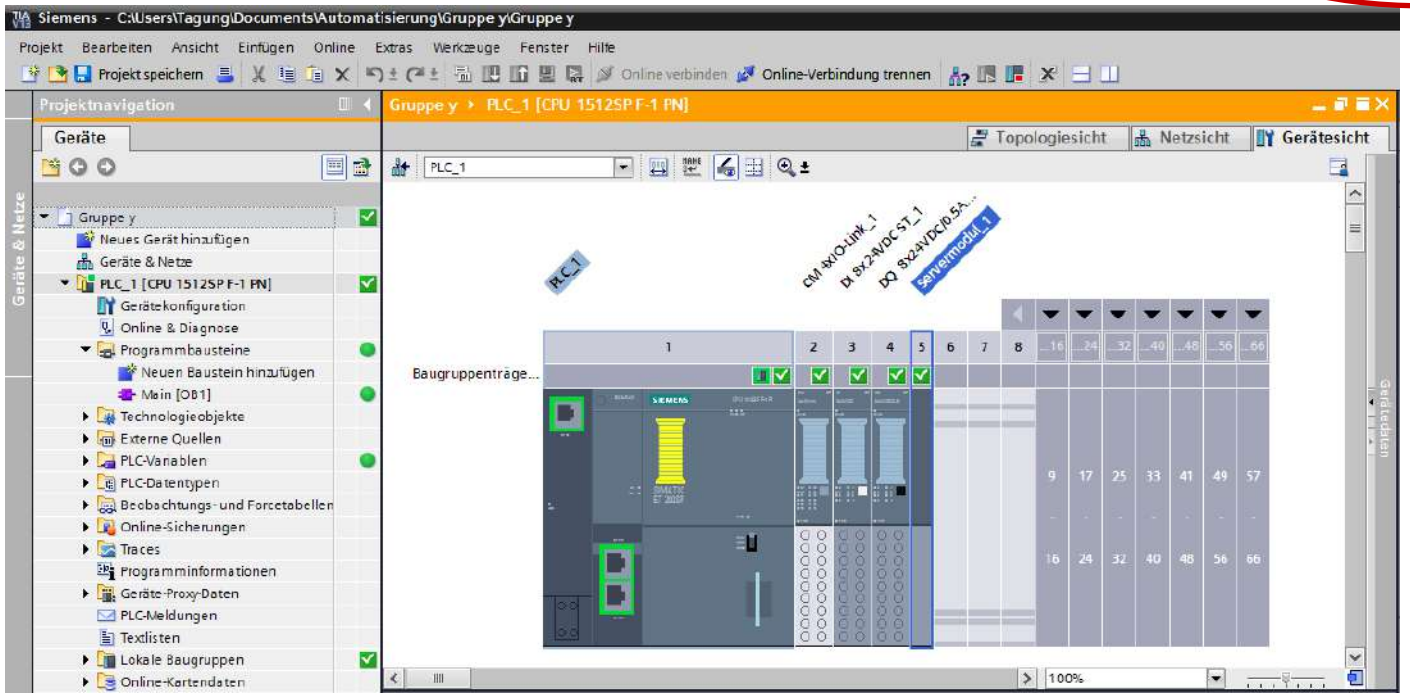
# Clearing an online connection


***Step 1:*** click on the "Go offline" button. You will find this button on the menu bar



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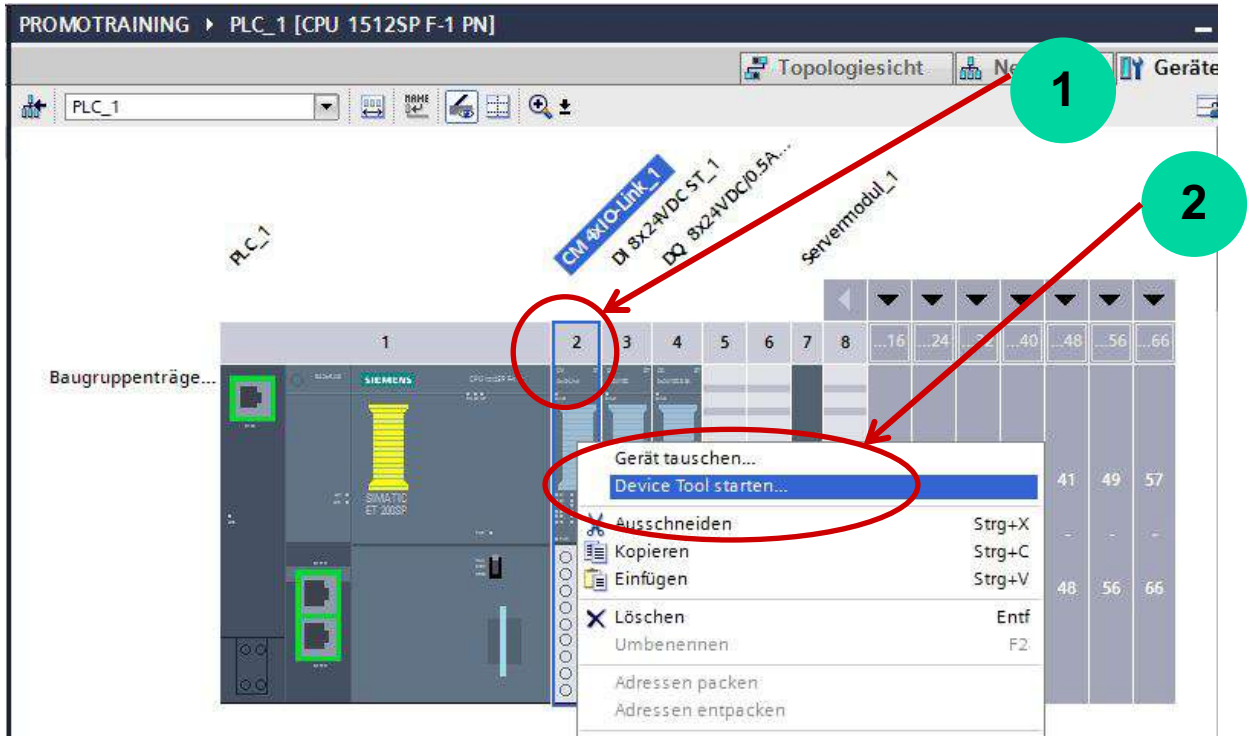
# Configuring a SIRIUS ACT ID Key electronic module




***Step 1:*** Select the IO-Link master in the device view of the ET 200SP by clicking on it. Then open the selection menu with a right click.

***Step 2:*** Open the Port Configuration Tool by clicking on "Start Device Tool" in the selection menu.

**Note: very slow!**



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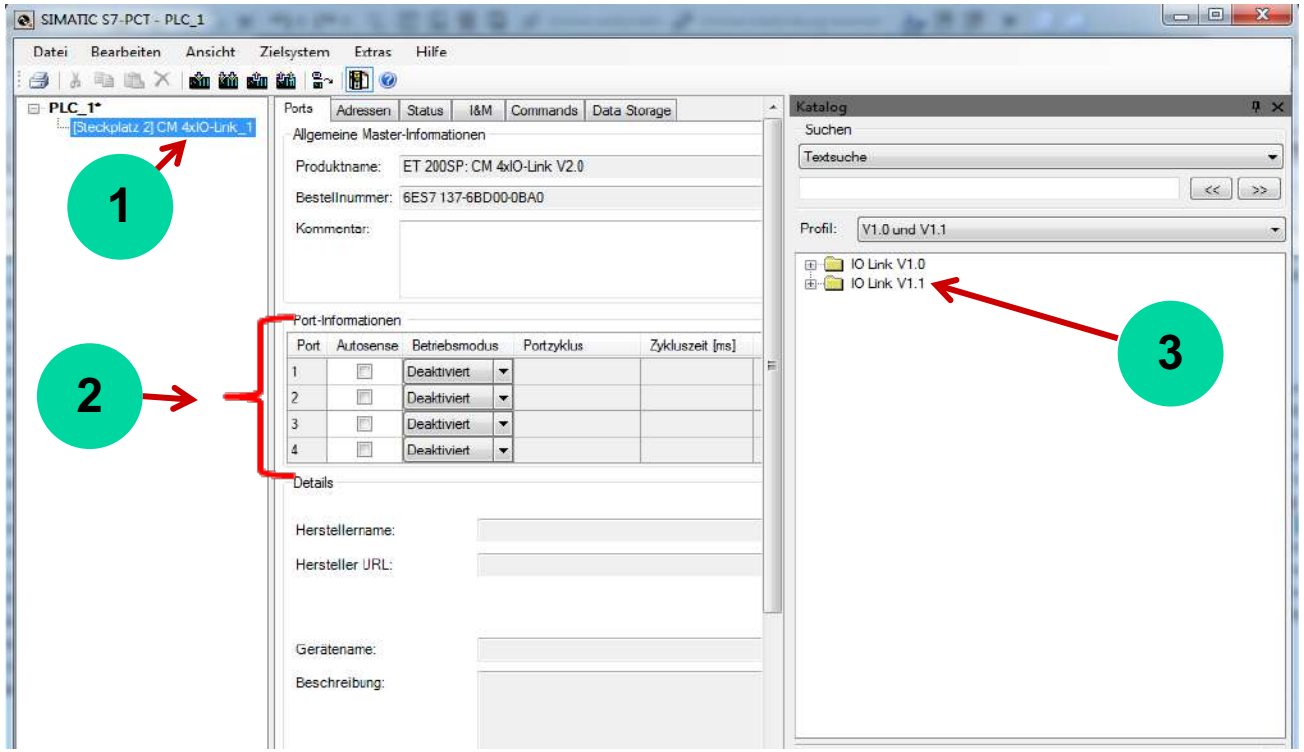
# Contents page




***1st info:*** The configuration of the IO-Link master is ready and is displayed in the S7–PCT

***2nd info:*** You will find the four IO-Link ports here

***3rd info:*** You will find all IO-Link modules on the right-hand side in the catalog.



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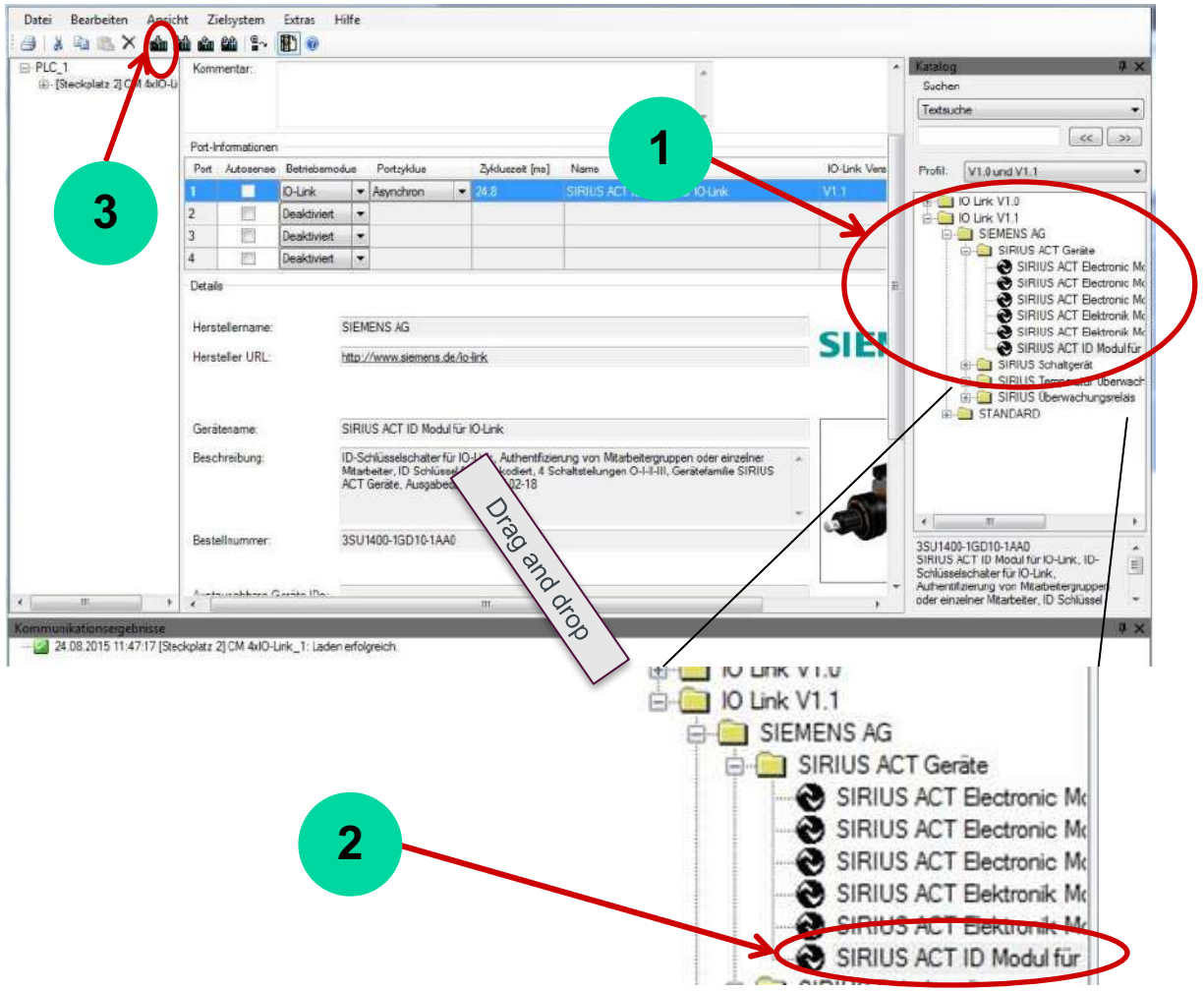
# Configuring the IO-Link module




***Step 1:*** Search for the SIRIUS ACT ID module for IO-Link in the catalog. You will find it under:

1. "IO Link V1.1"
2. "Siemens"
3. "SIRIUS ACT devices"

***Step 2:*** Select the SIRIUS ACT ID module for IO-Link and drag and drop it to the first port of the IO-Link master

***Step 3:*** Download the configuration into the device. You will find it in the menu bar.

***Info:*** There are the following IO-Link devices in the SIRIUS ACT portfolio:

ID key-operated switches

IO-Link enclosures This must be added (free download) if the IODDs should not be available for selection.



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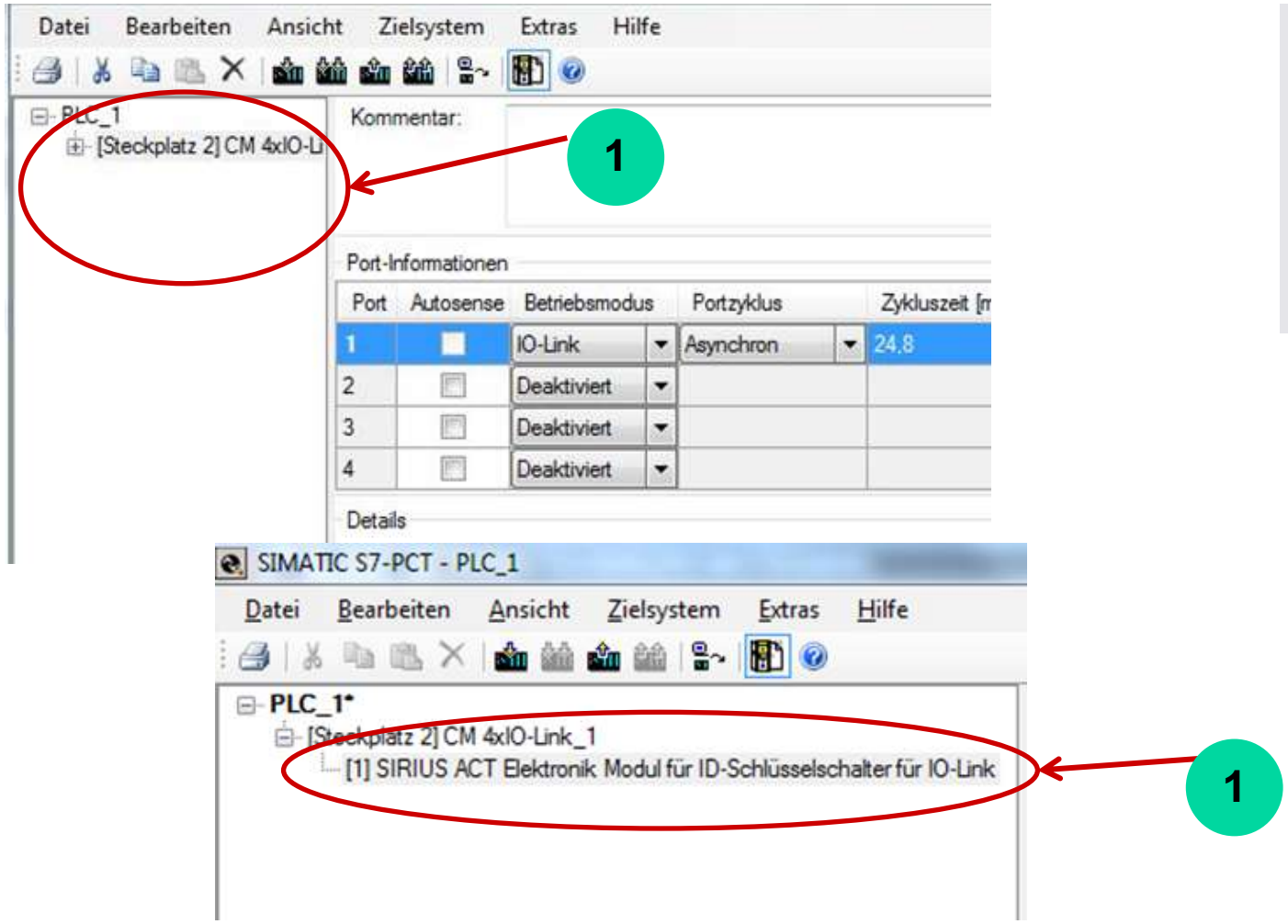
# Switching to the description file for the ID key-operated switch




***Step 1:*** Open the + in the tree topology of the IO-Link master and click on the SIRIUS ACT ID module for
IO-Link. You then switch to the description file (IODD) of the SIRIUS ACT ID module for IO-Link



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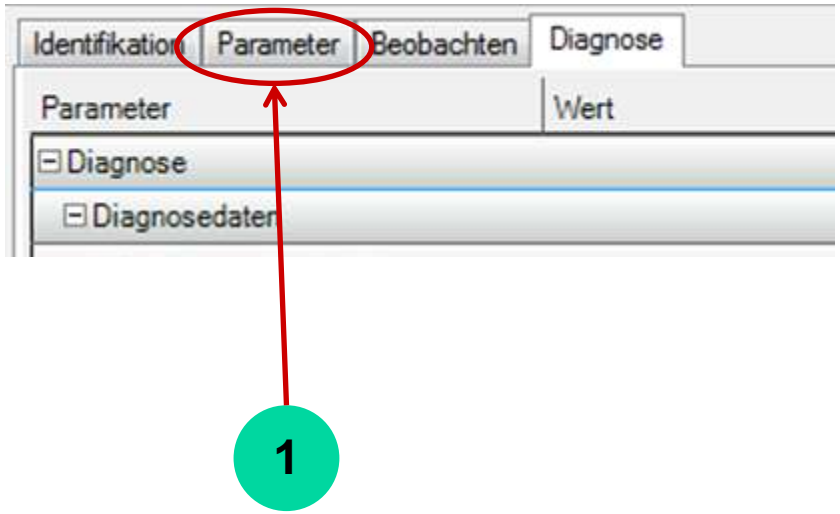
# IO-Link module: parameterizing in the S7 PCT (Port Configuration Tool)




***Info:*** You will find the following tabs for selection:

- Identification
- Parameters
- Monitoring
- Diagnostics

***Identification:*** You will find the device-specific information here

***Parameters:*** under Parameters you can select the applicable functions such as reading in the individual

ID key

***Step 1:*** **Click on Parameters**



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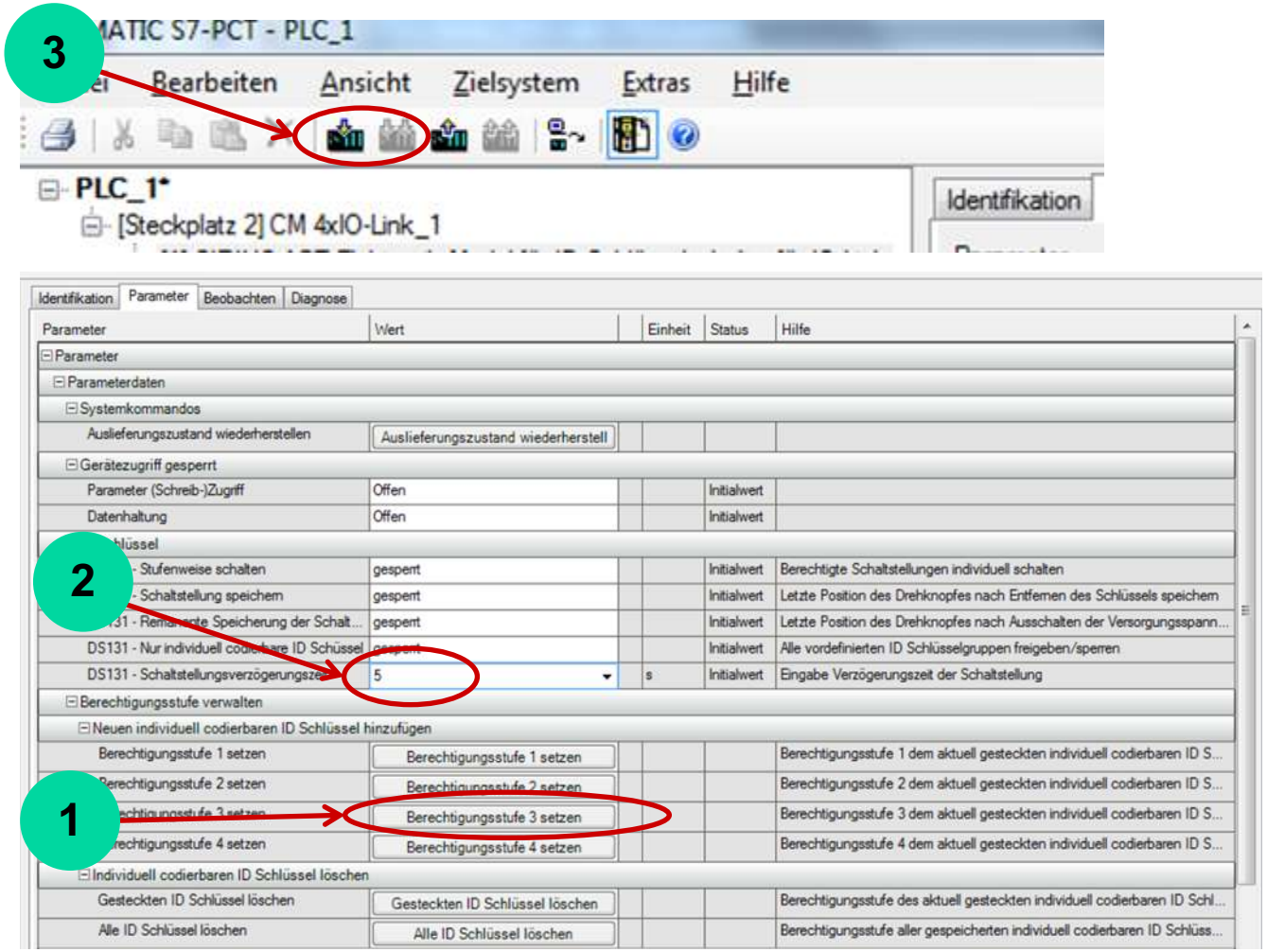
# Changing the ON delay and activating an individual key




***Step 1:*** Click on the "Set authorization level 3" button. You will find this button on the "Parameters" tab under "Add new individual ID key".

***Info:*** The individual ID key is read in or modified when you perform step 1.

***Step 2:*** Change the ON delay time from 3s to 5s

***Step 3:*** Download the changes to the device



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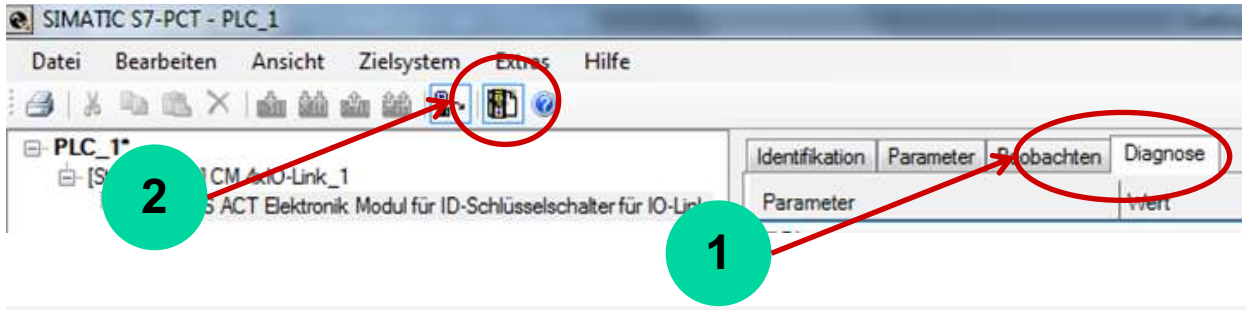
# Querying online diagnostics data




Identifikation | Parameter | Beobachten | Diagnose

| Parameter | Wert | | Einheit | Status | Hilfe |
|---|---|---|---|---|---|
| Diagnose | | | | | |
| Diagnosedaten | | | | | |
| Betriebssystemfunktionen | | | | | |
| DS92 - Bereit | X | | | geladen | |
| DS92 - Sammelfehler | | | | geladen | |
| DS92 - Erkennung des ID Schl... | X | | | geladen | |
| DS92 - Status des individuell c... | Kein Fehler | | | geladen | |
| DS92 - Digitaler Ausgang 0 | | | | geladen | |
| DS92 - Digitaler Ausgang 1 | X | | | geladen | |
| DS92 - Digitaler Ausgang 2 | | | | geladen | |
| DS92 - Digitaler Ausgang 3 | | | | geladen | |
| DS92 - Digitaler Ausgang 4 | X | | | geladen | |
| Gesteckter ID Schlüssel | | | | | |
| DS94 - Identifikationsnummer d... | 0x34, 0xC6, 0x94, 0x17, 0x04 | | | geladen | |
| DS94 - Berechtigungsstufe | 3 | | | geladen | |
| DS94 - Schaltstellung | 2 | | | geladen | |

***Step 1:*** Select the Diagnostics tab

***Step 2:*** Click on the "Online" button on the menu bar.

***Info:*** By performing step 2, you get all current states of the device, i.e. switch position, ID number, etc.

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# Second target reached!

**Training steps**

| | |
|---|---|
| **Exercise 1** | Hardware configuration in the TIA Portal |
| **Exercise 2** | Parameterizing the ID key-operated switch with the ***P***ort ***C***onfiguration ***T***ool (PCT) |
| **Exercise 3** | Reading in the switch position in the S7 program |
| **Exercise 4** | ID key-operated switch function block |



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# Third target

Training steps

## Exercise 3 Reading in the switch position in the S7 program

***Target:***

Showing four switch positions on LEDS of four outputs



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# Starting the exercise

Use case 3



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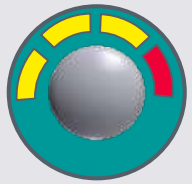
# Target in the third programming example

## Initial situation



Identifikation | Parameter | Beobachten | Diagnose

| Parameter | Wert | Einheit | Status | Hilfe |
|---|---|---|---|---|
| Diagnose | | | | |
| Diagnosedaten | | | | |
| Betriebssystemfunktionen | | | | |
| DS92 - Bereit | X | | geladen | |
| DS92 - Sammelfehler | | | geladen | |
| DS92 - Erkennung des ID Schl... | X | | geladen | |
| DS92 - Status des individuell c... | Kein Fehler | | geladen | |
| DS92 - Digitaler Ausgang 0 | | | geladen | |
| DS92 - Digitaler Ausgang 1 | X | | geladen | |
| DS92 - Digitaler Ausgang 2 | | | geladen | |
| DS92 - Digitaler Ausgang 3 | | | geladen | |
| DS92 - Digitaler Ausgang 4 | X | | geladen | |
| Gesteckter ID Schlüssel | | | | |
| DS94 - Identifikationsnummer d... | 0x34, 0xC6, 0x94, 0x17, 0x04 | | geladen | |
| DS94 - Berechtigungsstufe | 3 | | geladen | |
| DS94 - Schaltstellung | 2 | | geladen | |

## Target situation



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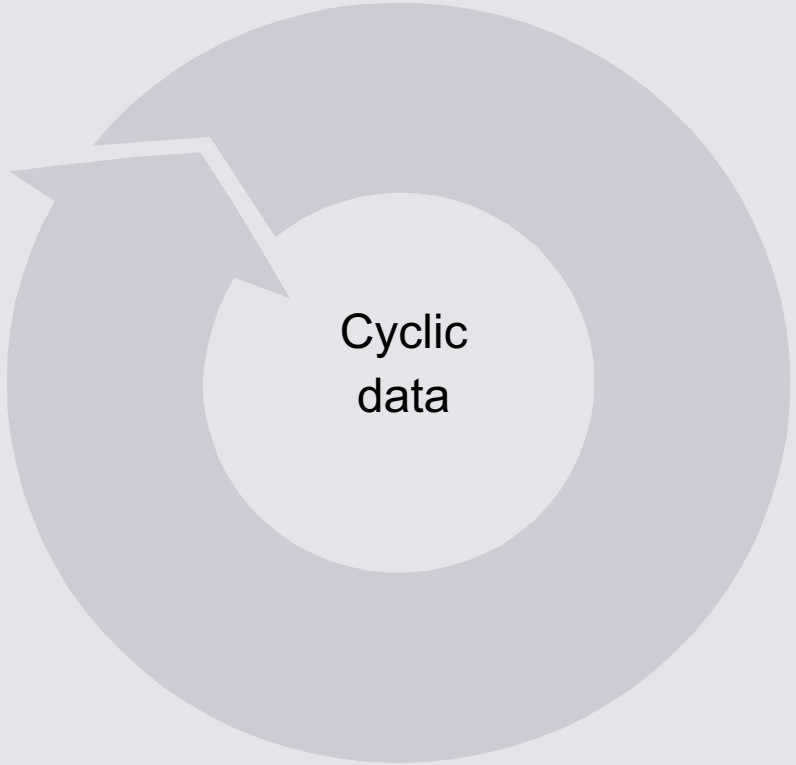
# Information

## Cyclic data




Data is provided cyclically via the process image.

## Acyclic data

**Use Cases – ID key-operated switches**

- Reading in an individual key
- Deleting an individual key
- Changing the authorization levels


Data is provided acyclically via function blocks.



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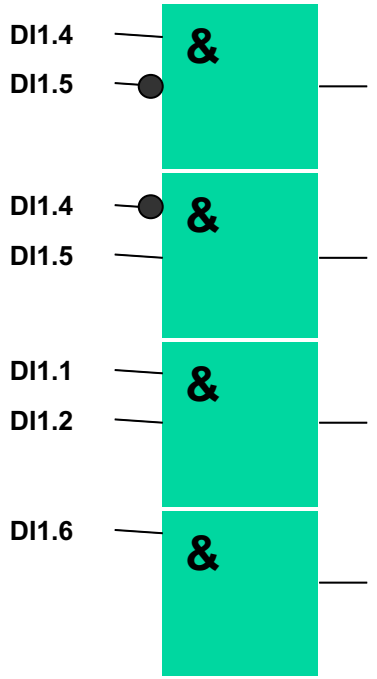
# Explanation of ID key-operated switch process image

| DI (2 bytes) | PII |
|---|---|
| DI0.0 | 1: Ready |
| DI0.1 | 1: Group error |
| DI0.2 | Reserved |
| DI0.3 | Reserved |
| DI0.4 | Reserved |
| DI0.5 | Reserved |
| DI0.6 | Reserved |
| DI0.7 | Reserved |
| DI1.0 | 1: ID key recognized |
| DI1.1 – DI1.3 | 1: Authorization level |
| DI1.4 – DI1.6 | 1: Switch position |

| Switch position | DI1.6 | DI1.5 | DI1.4 |
|---|---|---|---|
| **1** | 0 | 0 | 1 |
| **2** | 0 | 1 | 0 |
| **3** | 0 | 1 | 1 |
| **4** | 1 | 0 | 0 |



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# Step-by-step explanation

1. Creating variable names
2. Writing a program
3. Compiling
4. Loading
5. Testing



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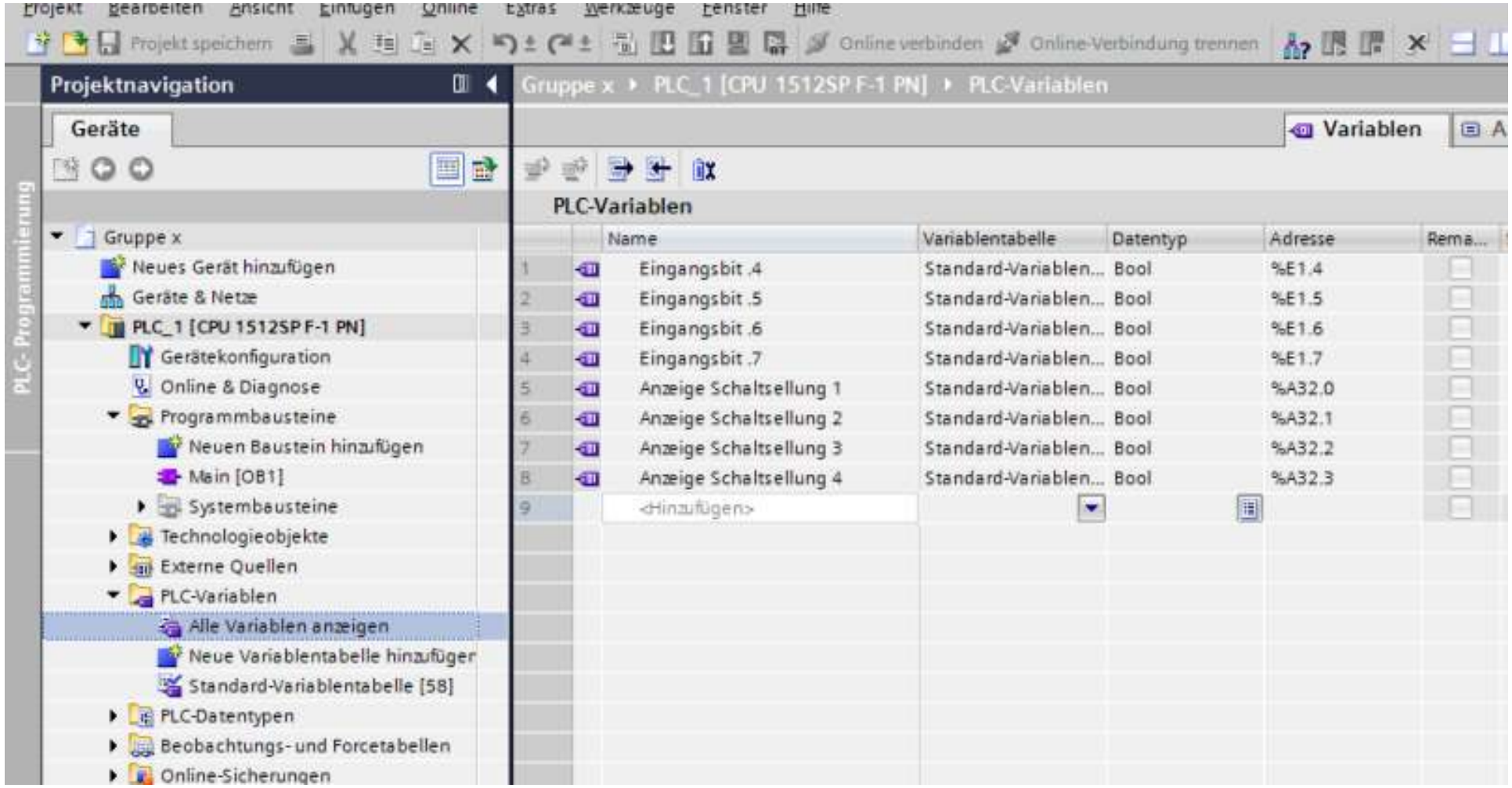
# Creating variable names



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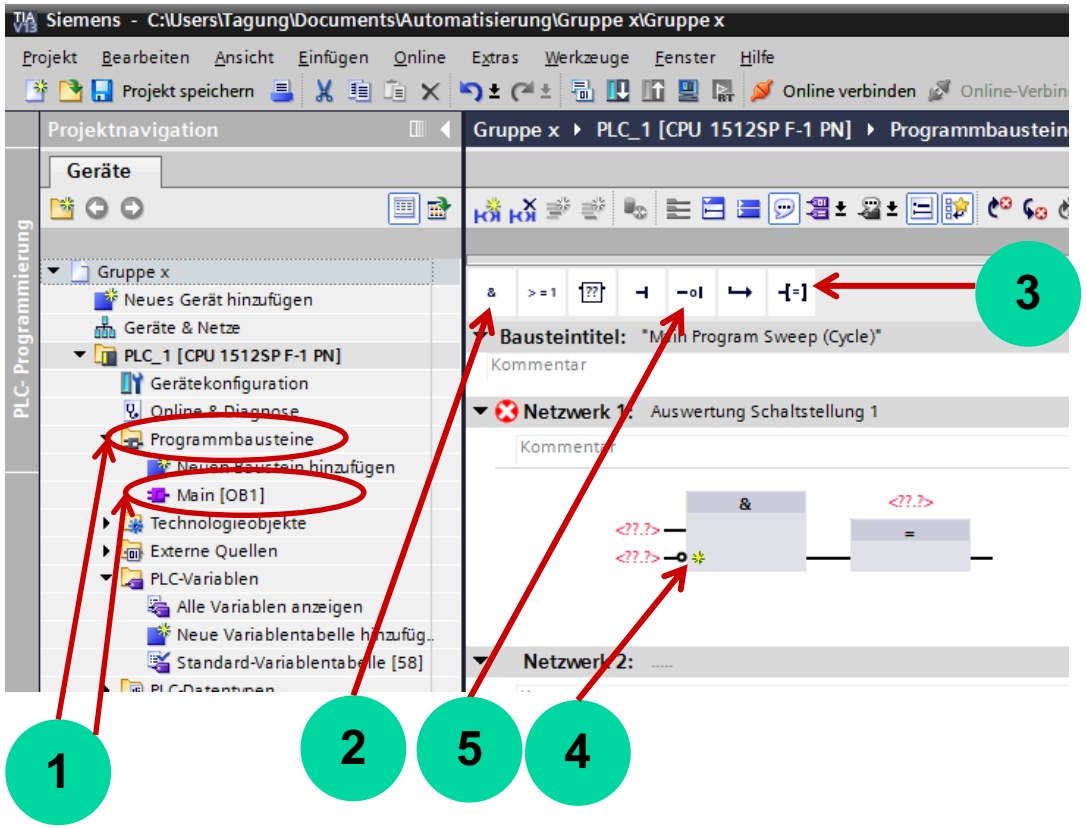
# Programming a switch position




***Step 1:*** Click on "F-PBs" and then on "My (OB1)"

***Step 2:*** Click on the "&" icon to insert an AND operation in network 1

***Step 3:*** Click on the "-[=]-" icon to add an assignment

***Step 4:*** Mark the bottom input pin with the mouse (click on it)

***Step 5:*** Click on the "-oI" icon to negate the input signal



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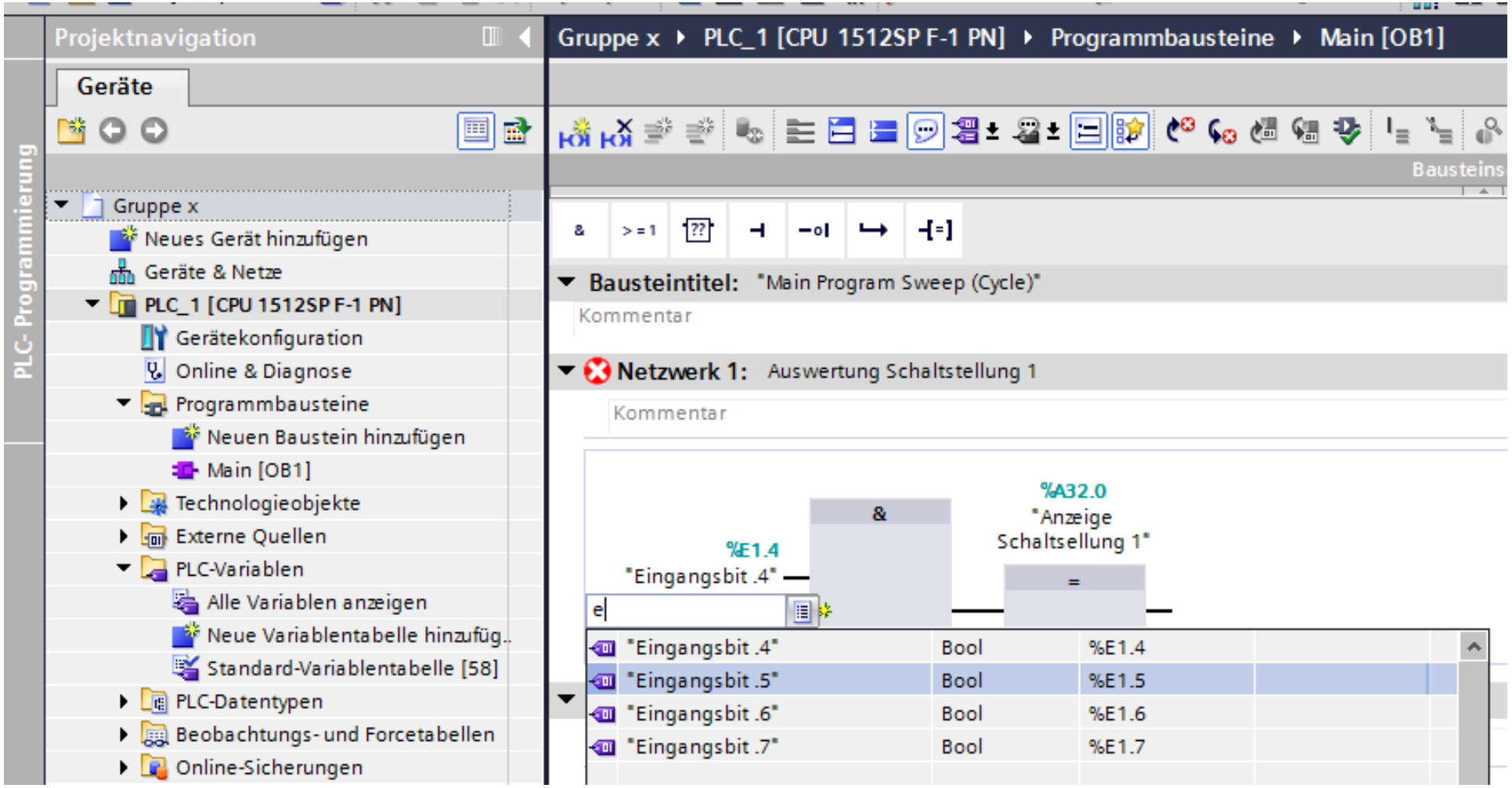
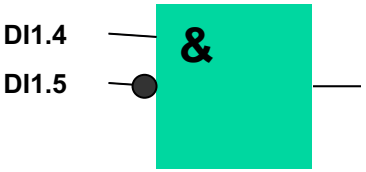
# Inserting variables in the S7 program




1. ***Step 1:***
   The pins must be wired with the applicable inputs and outputs.

2. **Note:**
   To this end, the first letter of the variable is entered. All relevant variables are shown in the window. The variable is selected with the mouse.



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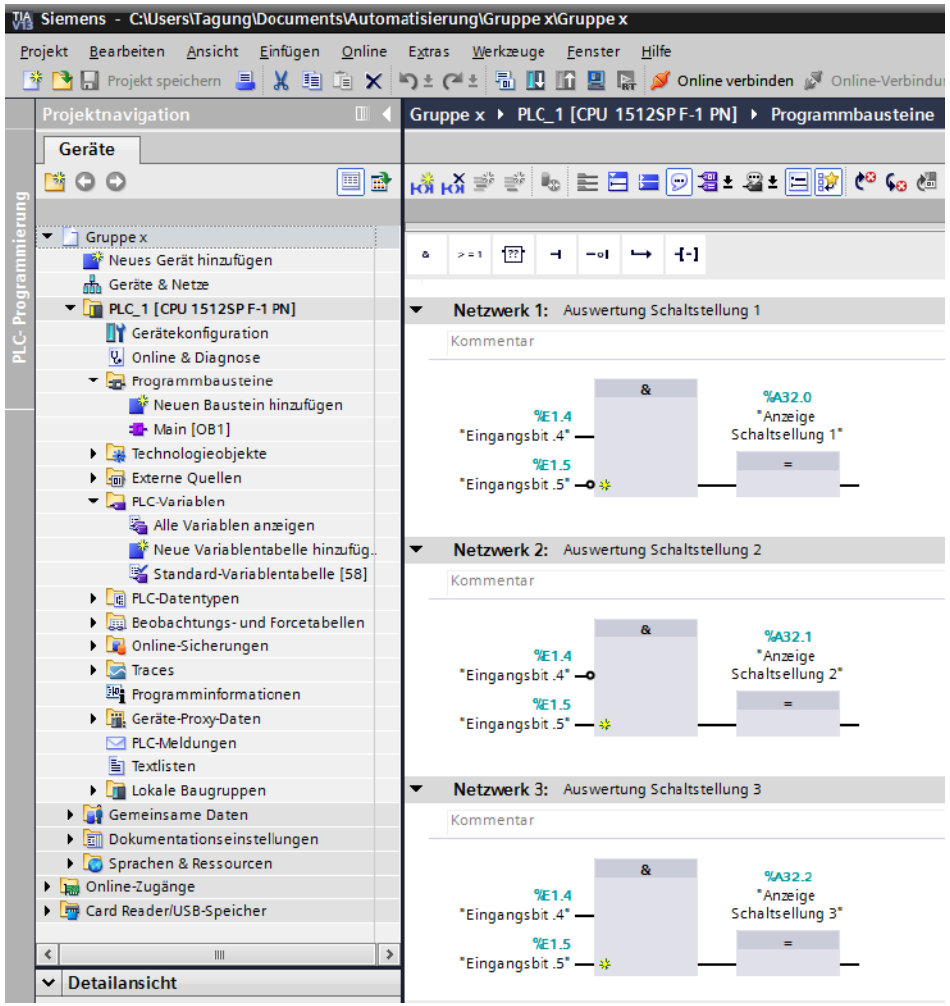
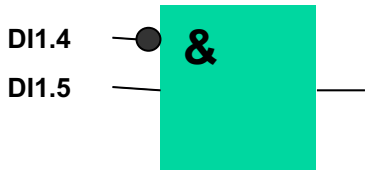
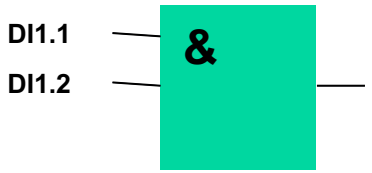
# Inserting further networks for the remaining switch positions



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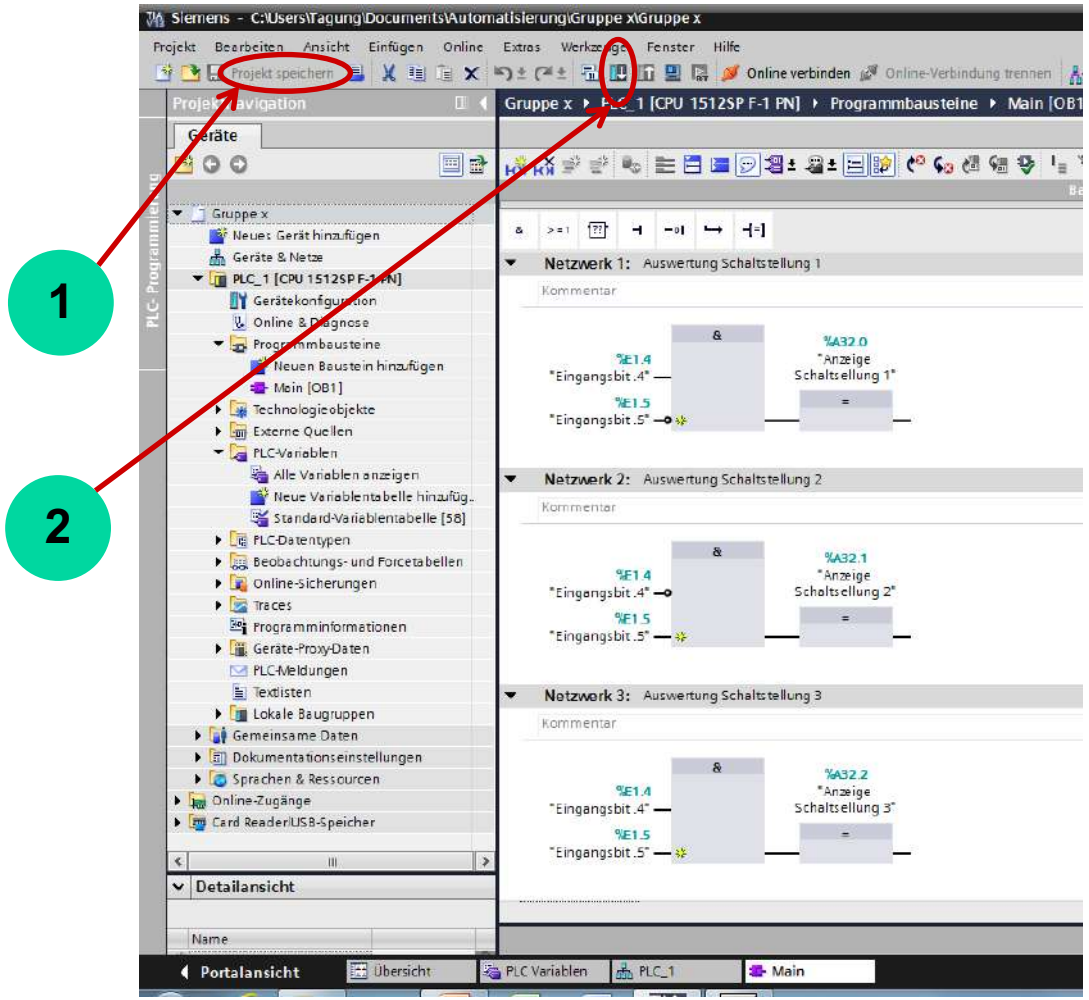
# Saving and loading into the PLC




1. ***Step 1:*** Save the project.

1. ***Step 2:*** Load the project into the PLC.

**Note:**

The project is compiled automatically when "Download" is run.



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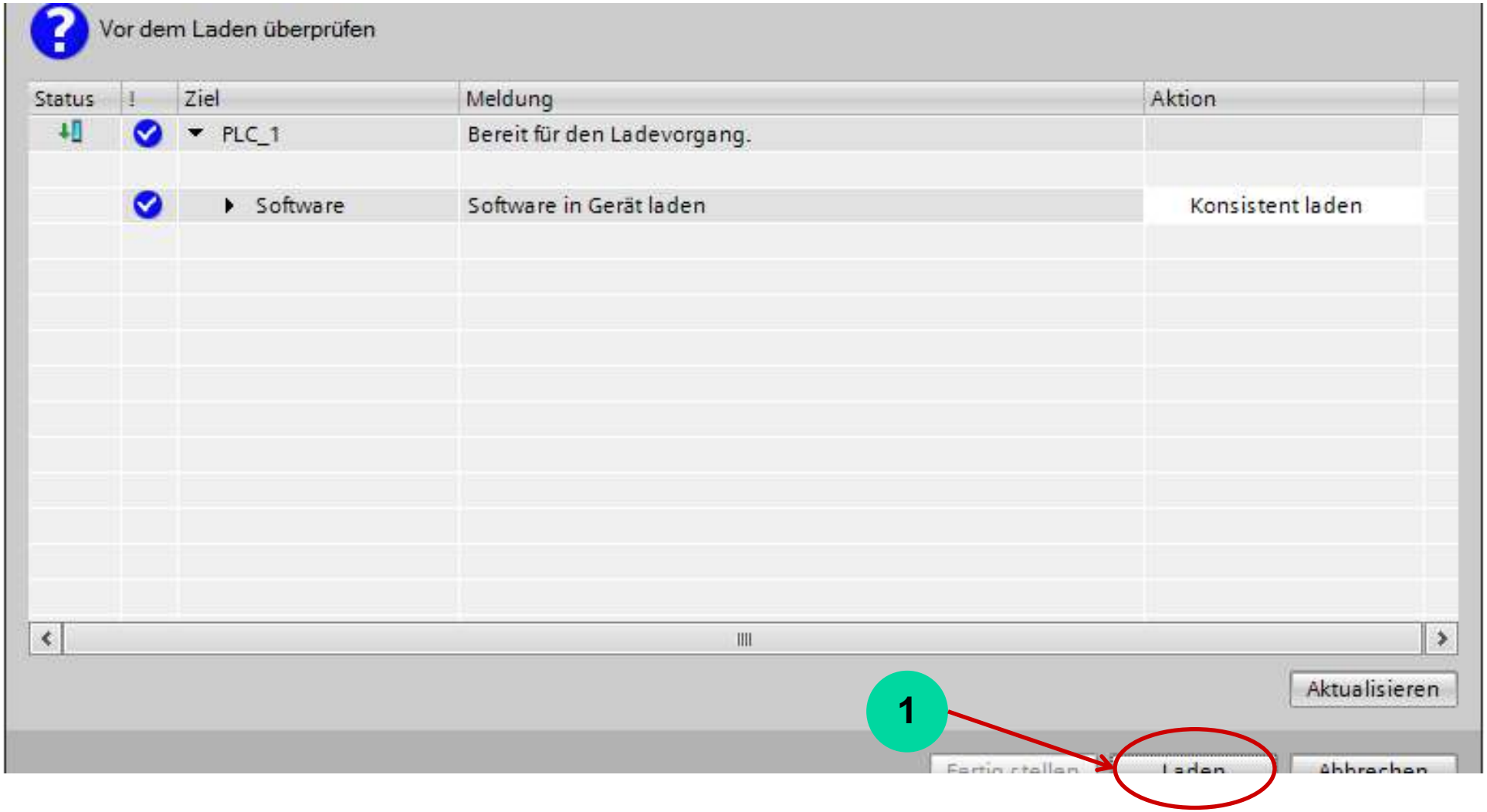
# Preview while loading



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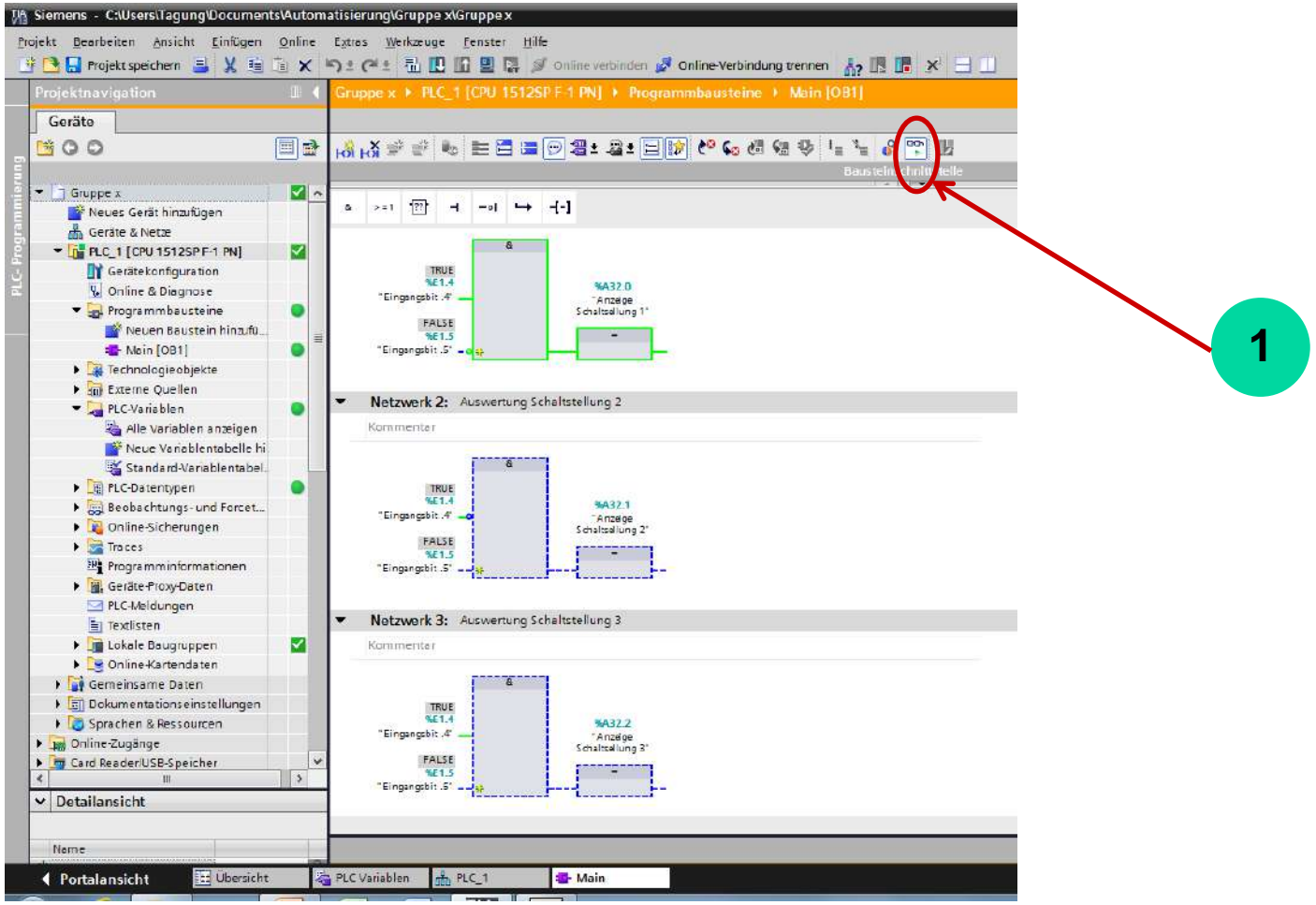
# Observing and testing the program online



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# Third target achieved!

**Training steps**

| | |
|---|---|
| **Exercise 1** | Hardware configuration in the TIA Portal |
| **Exercise 2** | Parameterizing the ID key-operated switch with the ***P***ort ***C***onfiguration ***T***ool (PCT) |
| **Exercise 3** | Reading in the switch position with the S7 program |
| **Exercise 4** | ID key-operated switch function block |



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# Third target

Training steps

## Exercise 4 ID-Key operated switch function block



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# Fourth target

Training steps

## Exercise 4 ID-Key operated switch function block



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# Overview of free SIMATIC function blocks

The following function blocks in STEP7 and TIA Portal are available and enhance IO-Link programming and parameterization convenience

- Device-specific function blocks
- IO_LINK_MASTER function block
- IO_LINK_DEVICE function block

| Function block | Application | Controller / master / device | Software environment |
|---|---|---|---|
| Device-specific FBs | Convenient reading and writing of data objects of Siemens IO-Link devices. | • Can run on all S7 controllers<br>• Can be used for Siemens IO-Link devices | • STEP7 V5.5 or higher;<br>• TIA-P V13 or higher<br>• TIA-P V13 SP1 (available from Apr 2015) |
| IO_LINK_MASTER | Backing up the data of the IO-Link master to the controller and restoring the data when replacing the master. | • Can run on all S7 controllers<br>• Can be used for Siemens IO-Link master | • STEP7 V5.5 SP4 or higher<br>• TIA-P V13 SP1 or higher (both available from Apr 2015) |
| IO_LINK_DEVICE (formerly IOL_CALL) | Reading and writing data objects of any devices. | • Can run on all S7 controllers<br>• Can be used for all devices | • STEP7 V5.5 or higher;<br>• TIA-P V13 SP1 or higher (available from Apr 2015) |

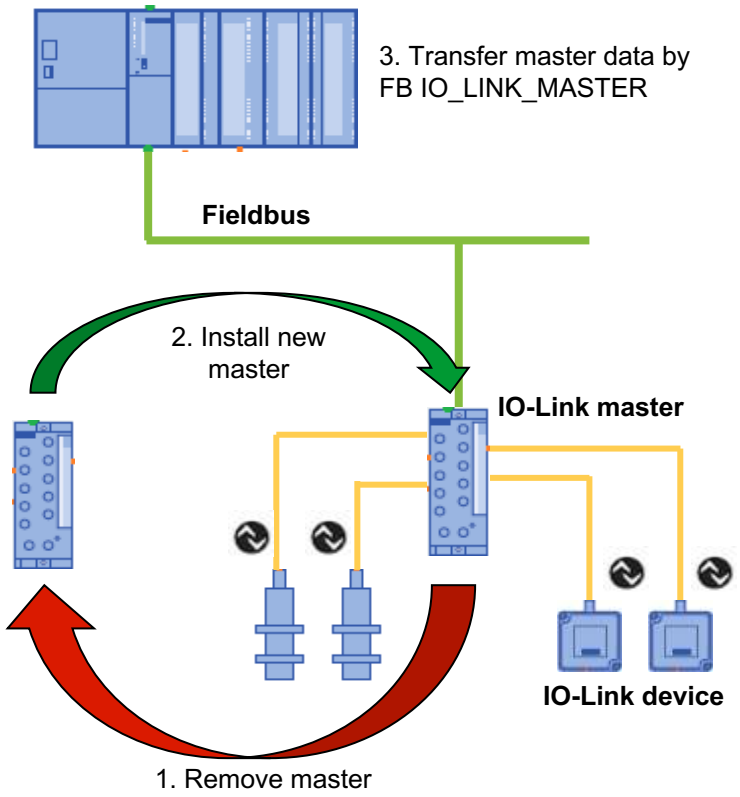
**Function blocks are available as free downloads in SIOS under entry ID 90529409 and entry ID 82981502**



SIEMENS

# Function block for backing up data of the Siemens IO-Link master

## Can run on all Siemens S7 controllers




### FB IO_LINK_MASTER function block

- The FB IO_LINK_MASTER supports backing up of data from Siemens masters to the controller and can transfer the data stored in the controller back to the master. This function can be used when replacing the master.
- The device parameters are not contained in the master data and must be backed up in the controller (see FB IO_LINK_DEVICE).
- What do you need to know for data access?
  - Address of IO-Link master

**Function blocks are available as free downloads in SIOS under entry ID 82981502**



SIEMENS

# IO_LINK_DEVICE function block for IO-Link devices of any manufacturers

## Function blocks available for STEP7 and TIA Portal

### FB IO_LINK_DEVICE

- The FB IO_LINK_DEVICE is a universal function block for reading and writing data objects of **any IO-Link devices** and supports
  - (Re)parameterization of an IO-Link device
  - Executing IO-Link port functions
  - Backing up/restoring IO-Link device parameters on device replacement
  - Reading out I&M data

- What do you need to know?
  - Address of IO-Link master
  - Port to which the IO-Link device is connected
  - As the function block does not have any device-specific knowledge, the specific structure of the device's data objects must be considered and specified for use.
    - Data type
    - Value range
    - Index
    - Subindex

**Function blocks are available as free downloads in SIOS under entry ID 82981502**



SIEMENS

# Easy interfacing of Siemens IO-Link devices to SIMATIC S7 CPUs with the aid of the "Siemens IO-Link Devices" function block library

**The library provides function blocks and UDTs for all IO-Link devices from the Siemens portfolio**

- A device-specific function block is available for every IO-Link device from Siemens (SIRIUS 3RA6, 3RA27, 3UG48, 3RS1, 3RR24, 3RB24, 3SU1 and RF200R).

- The data records read are stored in the local data of the instance DB belonging to the function block and can be used for interfacing to an HMI, among other things
- Function blocks and UDTs standardize and facilitate communication with the IO-Link devices
- For every read/write job, only the data record specified at the input is read/written
- "IO_LINK_DEVICENAME", e.g. "IO_Link_3SU1_IDKeySwitch", is an asynchronously operating function block
- https://support.industry.siemens.com/cs/ww/en/view/90529409



SIEMENS

# 3SU1 ID key-operated switch: data records are described in the SIRIUS ACT manual

**The IO-Link devices from Siemens provide different data according to their functionality.**

| Datensatz | | | Name | Zugriff | Wert | Länge (Byte) |
|---|---|---|---|---|---|---|
| Index (dez) | Index (hex) | Sub Index unterstützt | | | | |
| 0 | 0 | ja | Parameter Page 1 | r / w | — | 16 |
| 2 | 2 | ja | System Command | w | — | 1 |
| 3 | 3 | ja | Data Storage | r / w | — | 24 |
| 12 | 0C | nein | Device Access locks | r / w | — | 2 |
| 16 | 10 | nein | Vendor Name | r | Siemens AG | 10 |
| 17 | 11 | nein | Vendor Text | r | Internet (http://support.automation.siemens.com/WW/view/de/29801139/130000) | 64 |
| 18 | 12 | nein | Product Name | r | SIRIUS ACT electronic module for ID key-operated switch | 55 |
| 19 | 13 | nein | Product ID | r | 3SU1400-1GD10-1AA0 | 18 |
| 23 | 17 | nein | Firmware Revision | r | — | 5 |
| 24 | 18 | nein | Application Specific Name | r / w | — | 32 |
| 69 | 45 | ja | Process Data In | r | — | 6 |
| 80 | 50 | ja | Individuell codierbaren ID Schlüssel löschen Datensatz 80 | r / w | — | 5 |
| 81 | 51 | ja | Speicher der individuell codierbaren ID Schlüssel (1-30) Datensatz 81 | r | — | 180 |
| 82 | 52 | ja | Speicher der individuell codierbaren ID Schlüssel (31-50) Datensatz 82 | r | — | 120 |
| 92 | 5C | ja | Diagnose - Datensatz 92 | r | — | 20 |
| 94 | 5E | ja | Diagnose - Datensatz 94 | r | — | 22 |
| 131 | 83 | ja | Parameter - Datensatz 131 | r / w | — | 20 |



SIEMENS

# 3SU1 ID key: overview of data records 92 and 94

**You will find all all diagnostic information offered for a specific device in data records 92 and 94 of the 3SU1 ID key**

Tabelle A- 9 Datensatz (Index) 94 (ID Schlüssel)

| Byte.Bit | Sub Index | Bezeichnung |
|---|---|---|
| 0.0 ... 15.7 | 1 ... 3 | Reserviert |
| 16.0 ... 20.7 | 4 | Identifikationsnummer des individuell codi |
| 21.0 ... 21.2 | 5 | Berechtigungsstufe |
| 21.3 ... 21.5 | 6 | Schlüsselstellung |

- Data of the individual devices provides different content
- Attention must be paid to the individual structure of data storage when reading and writing data. Working with the devices can quickly become confusing and time-consuming
- **The library provided for Siemens devices facilitates work decisively.**

Tabelle A- 8 Datensatz (Index) 92 - Diagnose

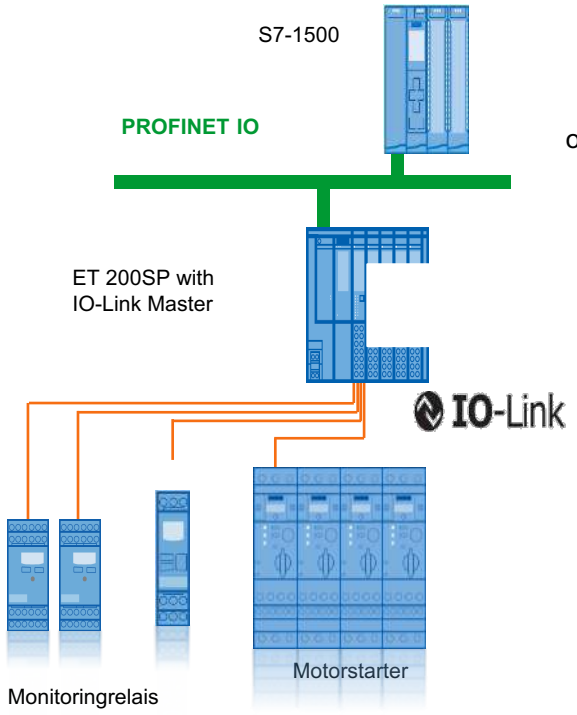
| Byte.Bit | Sub Index | Bezeichnung |
|---|---|---|
| 0.0 ... 15.7 | 1 ... 3 | Reserviert |
| 16.0 | 4 | Bereit |
| 16.1 | 5 | Sammelfehler |
| 16.2 | 6 | Reserviert |
| 16.3 | 7 | Reserviert |
| 16.4 | 8 | Reserviert |
| 16.5 | 9 | Reserviert |
| 16.6 | 10 | Reserviert |
| 16.7 | 11 | Reserviert |
| 17.0 | 12 | Digitaler Ausgang 0 |
| 17.1 | 13 | Digitaler Ausgang 1 |
| 17.2 | 14 | Digitaler Ausgang 2 |
| 17.3 | 15 | Digitaler Ausgang 3 |
| 17.4 | 16 | Digitaler Ausgang 4 |
| 17.5 | 17 | Reserviert |
| 17.6 | 18 | Reserviert |
| 17.7 | 19 | Reserviert |
| 18.0 | 20 | Erkennung des ID Schlüssels |
| 19.0 ... 19.7 | 21 | Status des individuell codierbaren ID S |



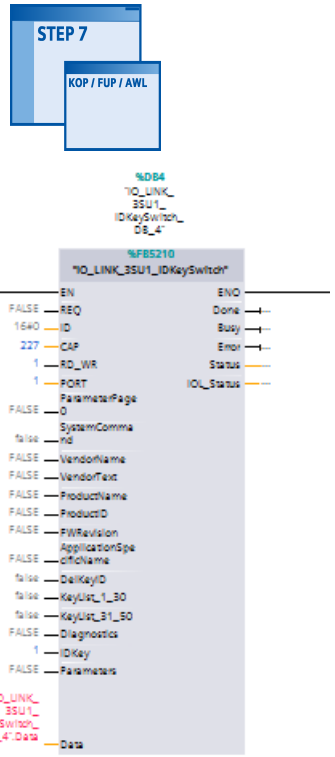
SIEMENS

# Function blocks for the IO-Link-capable Siemens devices facilitate work substantially

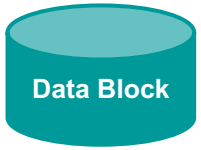
## Device-specific function blocks for simple and quick handling

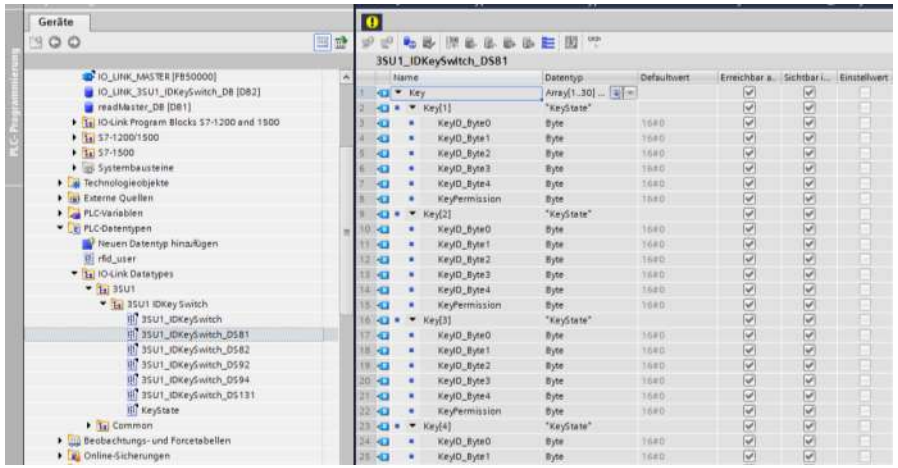



reading and
writing
of acyclic data




saving
acyclic datas
in a
data block

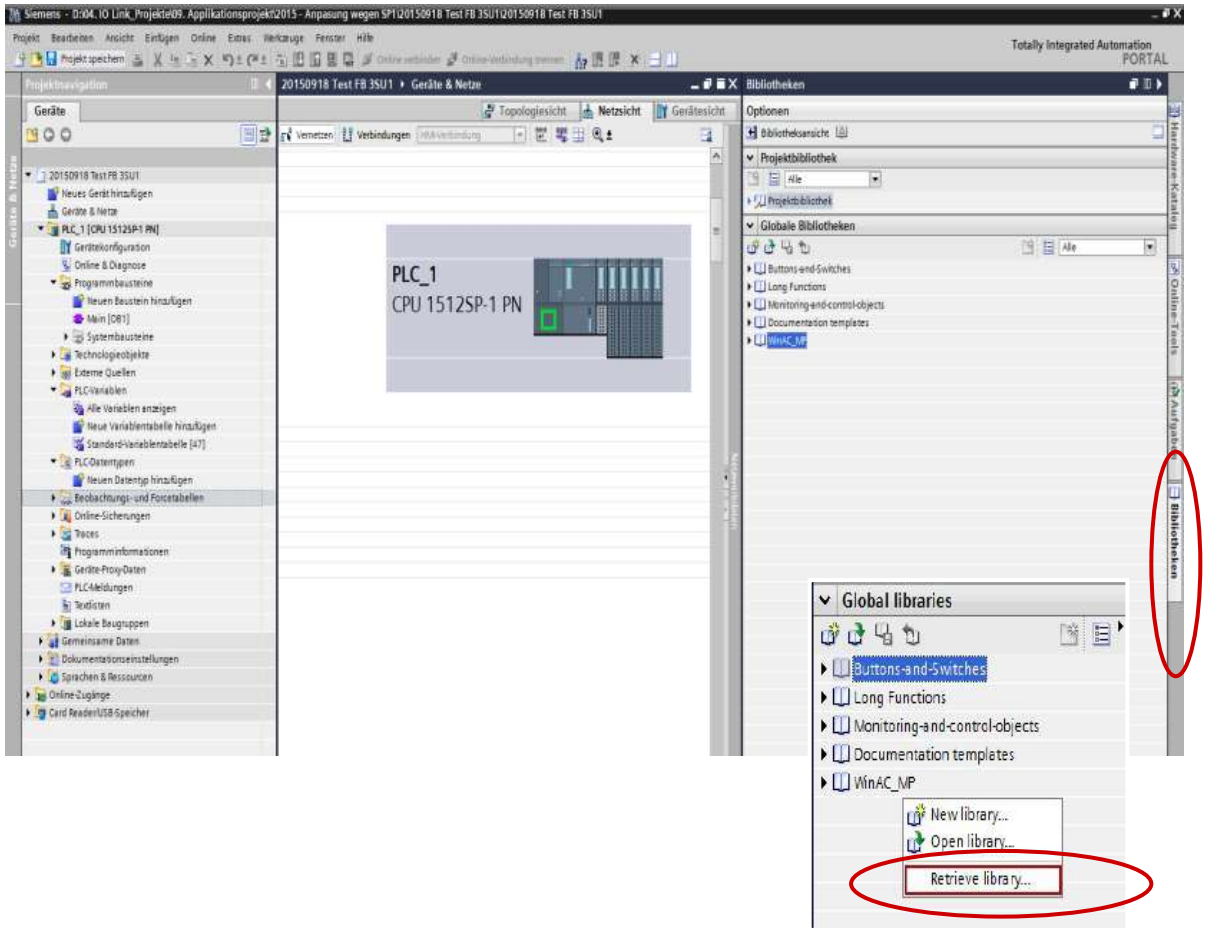





SIEMENS

# Procedure for using the IO-Link library

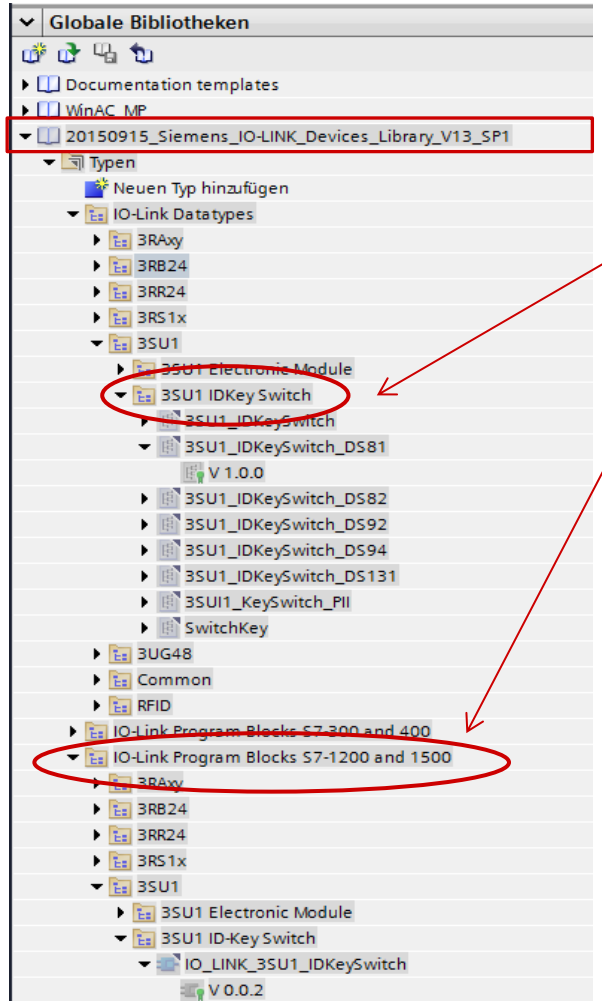



1. Download the library for STEP 7 V5.5 SP1 or STEP 7 V13 SP1 https://support.industry.siemens.com/cs/ww/en/view/90529409
2. Save the library to your hard disk and extract it
3. Open the project view and go to the "Libraries" tab
4. Under "Global libraries", right-click on "Retrieve library"



SIEMENS

# Procedure for using the IO-Link library

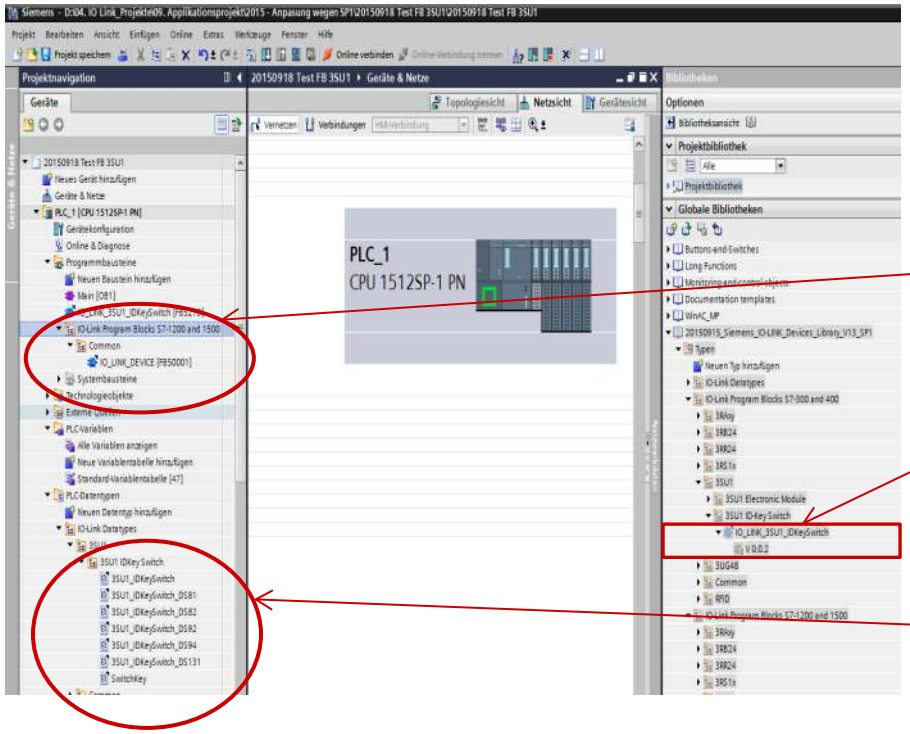



5. The library is then available under "Global libraries"
6. Open the library
7. The device-specific UDTs can be found in the "IO-Link Datatypes" folder. Here with reference to the SIRIUS 3SU1 ID key
8. The complete device-specific block including the UTDs can be found in the "IO-Link Program Blocks S7-1200 and 1500" folder
9. Note: indexes and subindexes are described in the relevant manuals



SIEMENS

# Procedure for using the IO-Link library




10. Copy the SIRIUS 3SU1 ID key function block needed for the exercise to your project. To do this, drag the "IO_LINK_3SU1_IDKeySwitch“ function block out of the "IO-Link Program Blocks S7-1200 and 1500" folder to "F-PBs" folder of your user program

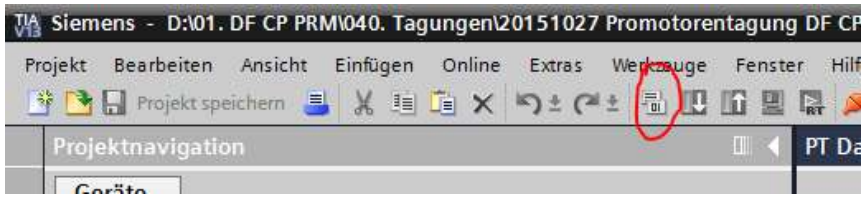
11. The associated PLC data types of the device are also automatically copied into the project

12. In the project navigator, you will find the UDTs in the "PLC data types" folder

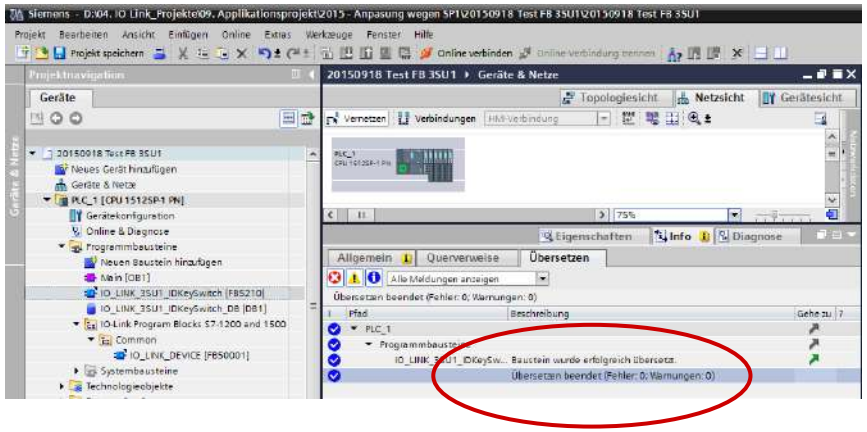


SIEMENS

# Procedure for using the IO-Link library




13. Click on the "IO_LINK_3SU1_IDKeySwitch" block and compile it.




14. The message "Block successfully compiled" appears.



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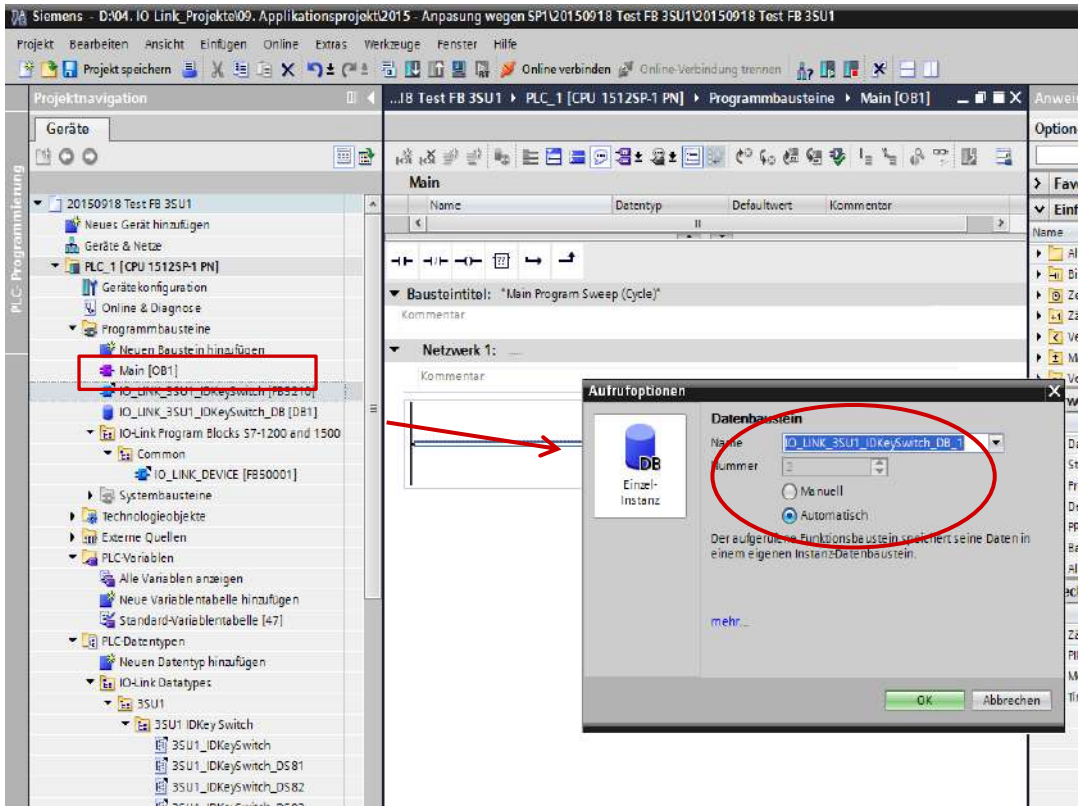
# Procedure for using the IO-Link library




15. Open the OB1 "Main".

16. Drag and drop the function block “ IO_LINK_3SU1_IDKeySwitch" to network 1.

17. Enter the data block with the number of the instance data block that you would like to use or have it assigned manually



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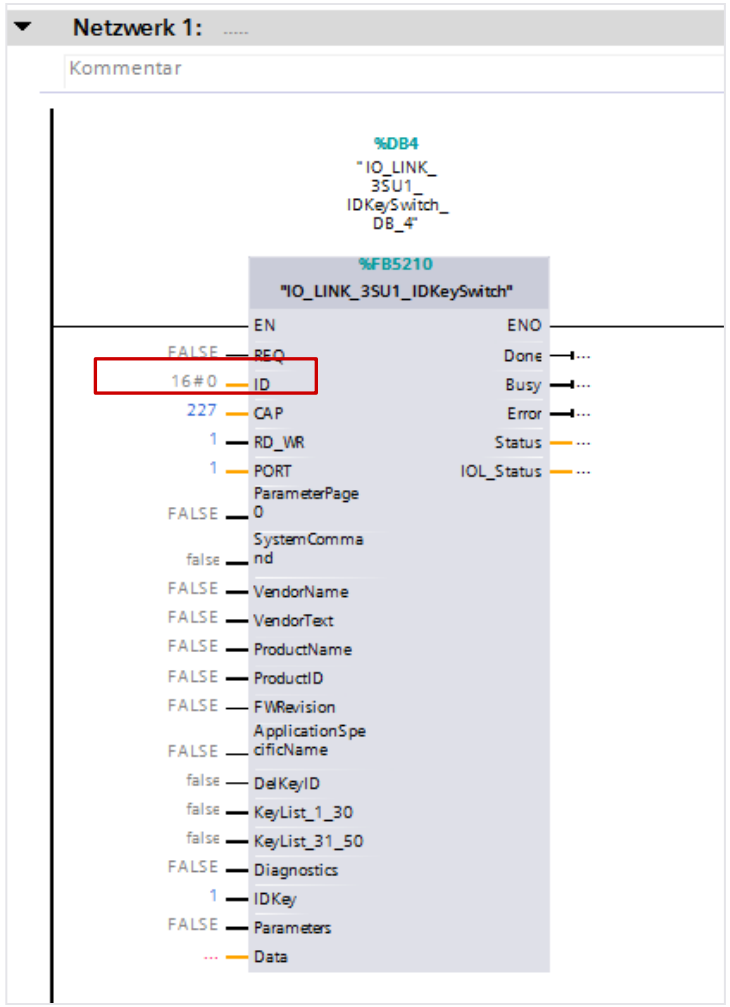
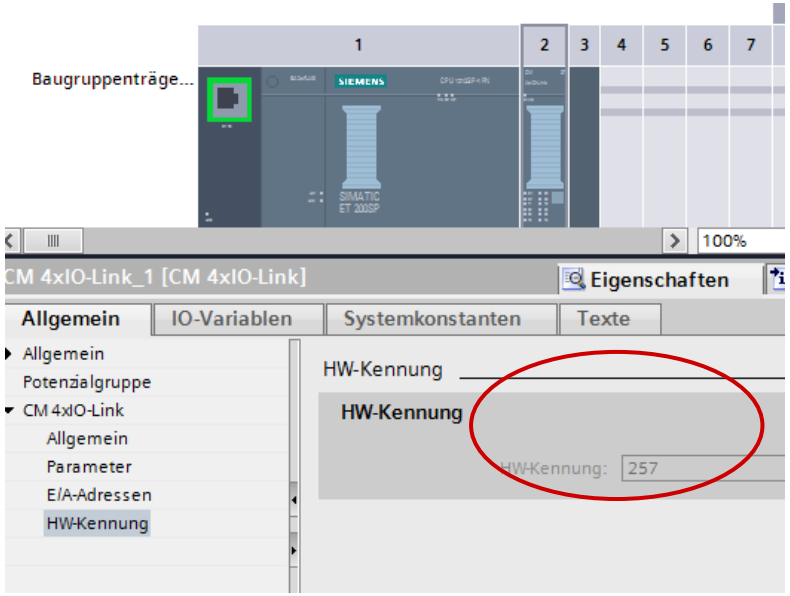
# Procedure for using the IO-Link library




18. Now assign the applicable values to the following input and output parameters

- ID = hardware detection of the IO-Link master

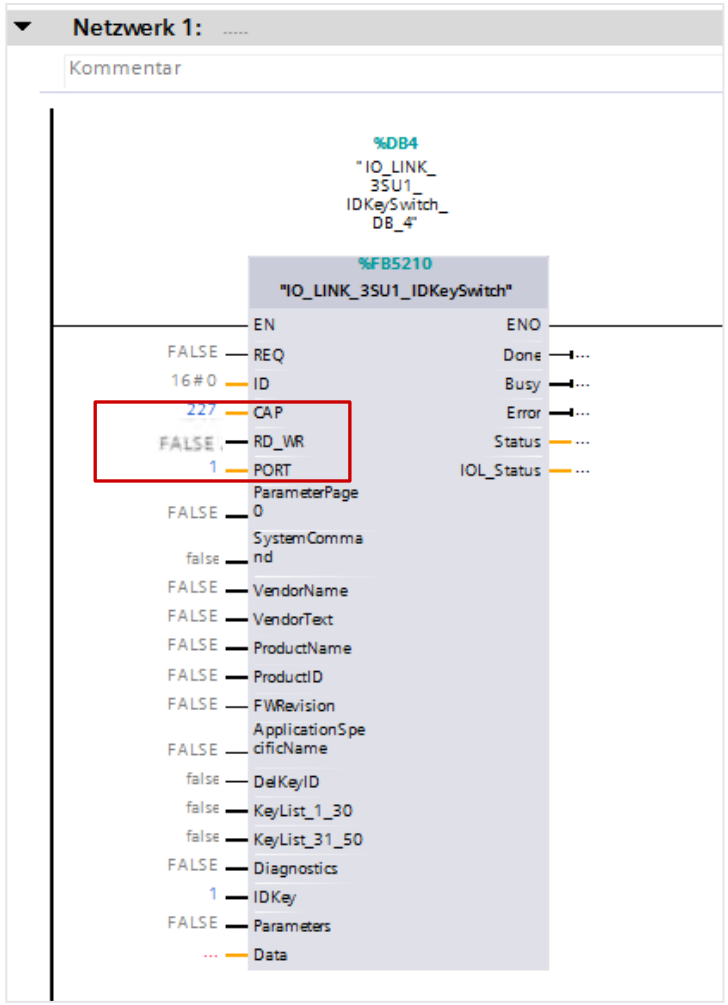
  You will find this in the IO-Link master module's "Properties" folder






SIEMENS

# Procedure for using the IO-Link library




19. Assign the following values to all formal parameters

- CAP = access point: "227" for Siemens

  Already assigned by default

- RD_WR = read "0" or "False; write access "1"

  Leave the False setting as it is because we want to omit the ID tag and the authorization level later

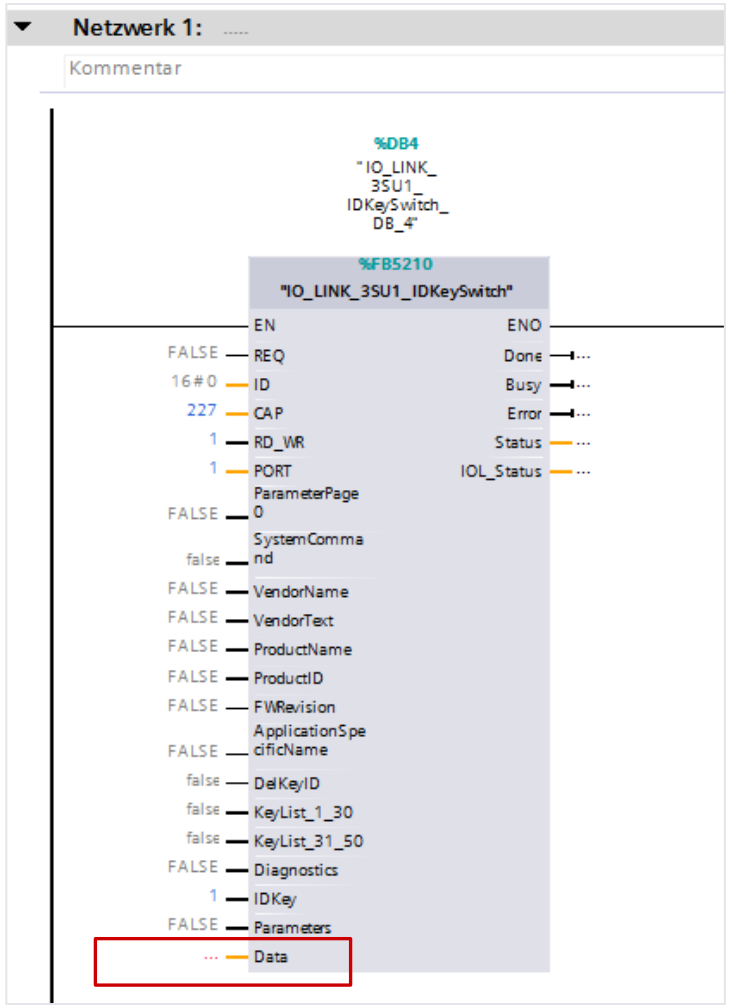
- Port = port number of the device "1-4" → 1 / 2 / 3 / 4

  Enter "1" here



SIEMENS

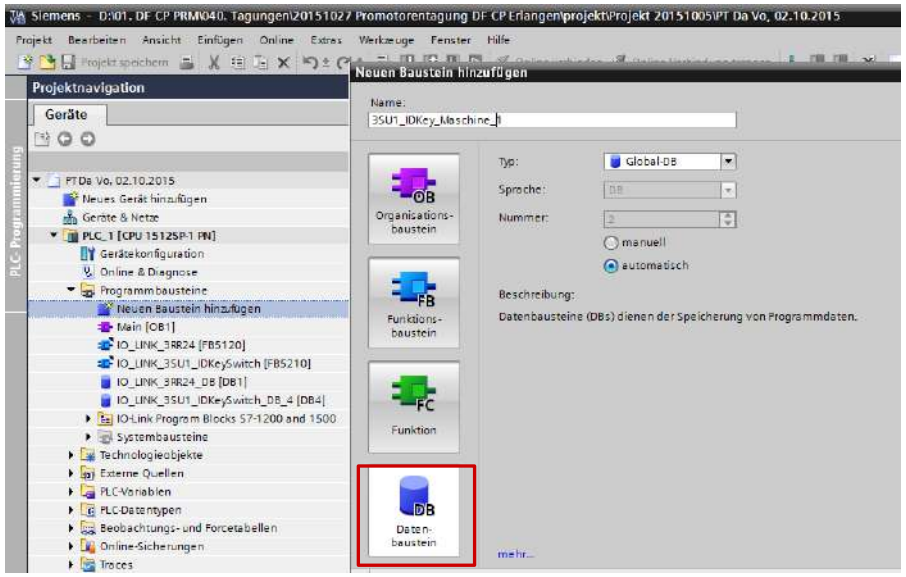
# Procedure for using the IO-Link library




20. Assign the following values to all formal parameters

- Data = destination area of the data record read → "IO_LINK_3SU1_IDKey_Maschine_1"

  To this end, first create a new Global Data Block in the "F-PBs" folder and assign the name "3SU1_IDKey_Maschine_1"!



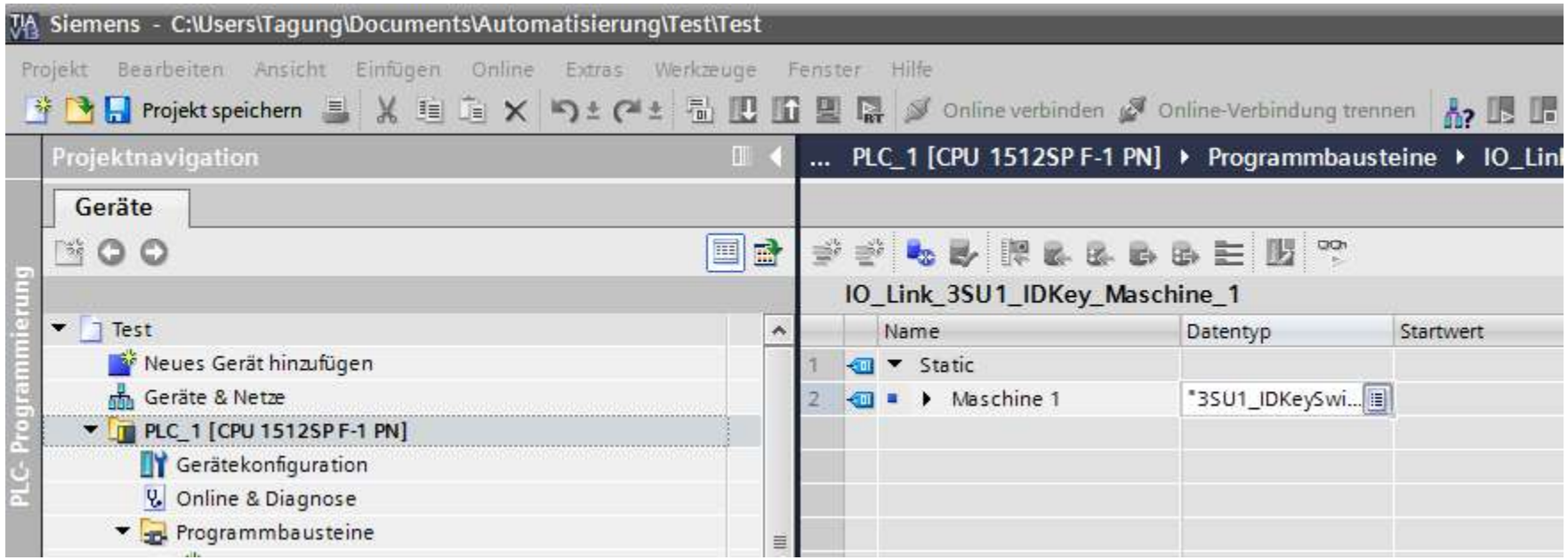



SIEMENS

# Procedure for using the IO-Link library

21. Open this data block and assign the name "Machine 1"

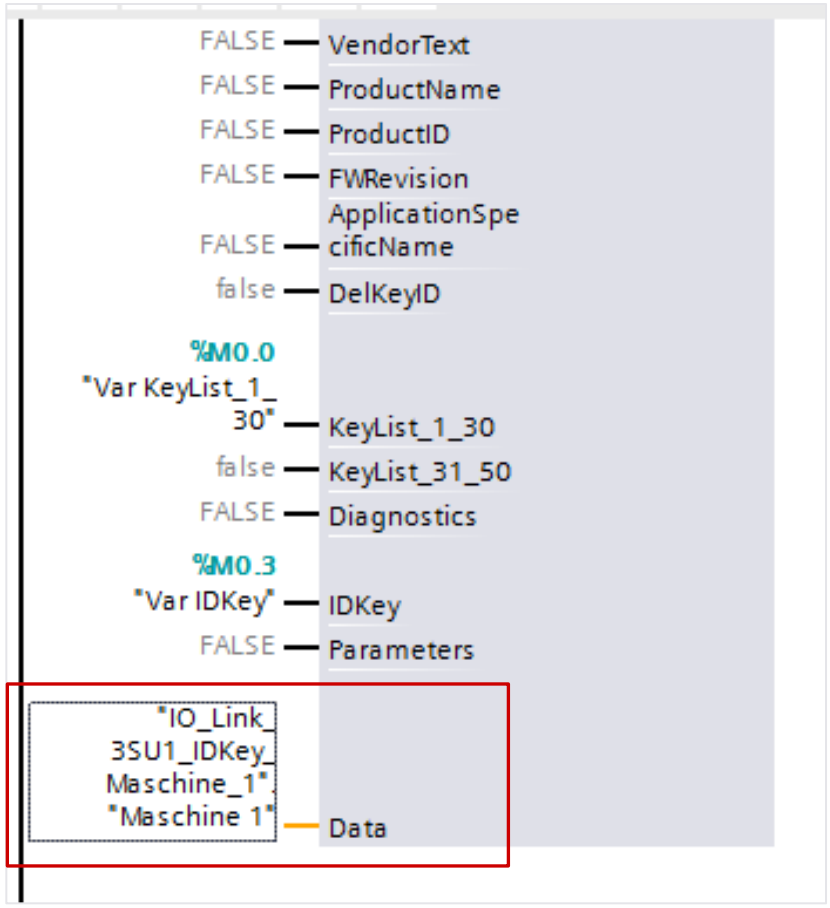
22. Select the data type "3SU1_IDKeySwitch" in the pull-down menu






SIEMENS

# Procedure for using the IO-Link library



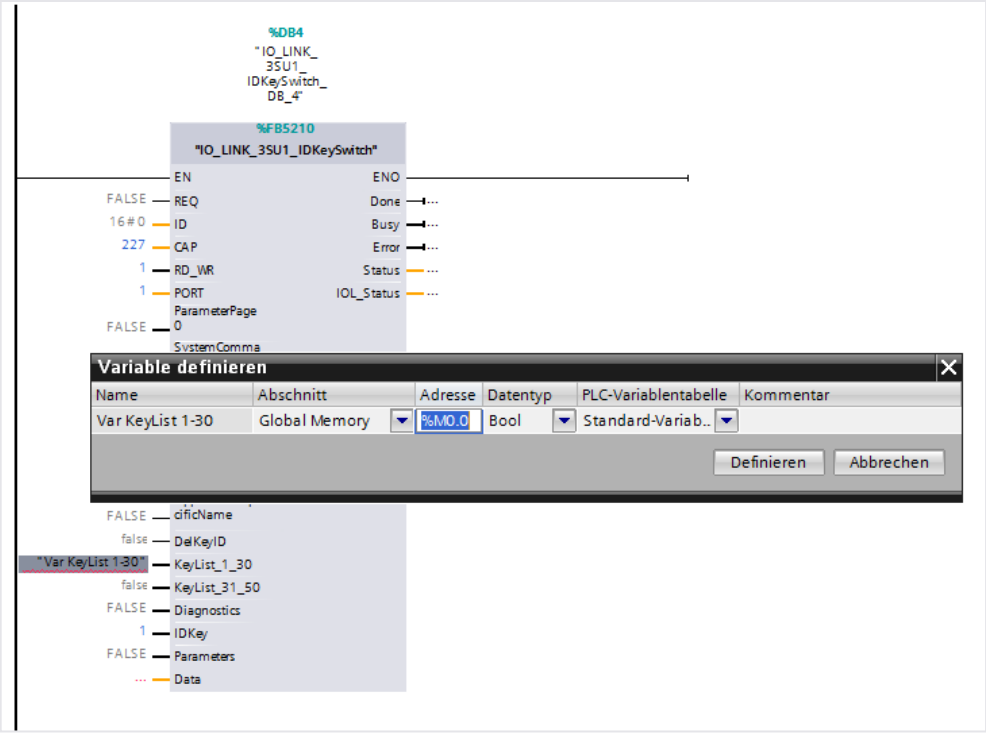

23. On the function block, the destination in which the values of the 3SU1 ID key read out are to be stored should be entered

24. To this end, enter the name "3SU1 …"



SIEMENS

# Procedure for using the IO-Link library




25. Now, input and output variables still have to be defined.

- To do this, double-click on the parameter "KeyList_1_30" and assign the name "var Keylist_1_30"

26. Right-click on the name and the "Define variable" menu opens

An address, e.g. M0.0, is already specified

27. Click on "Define"



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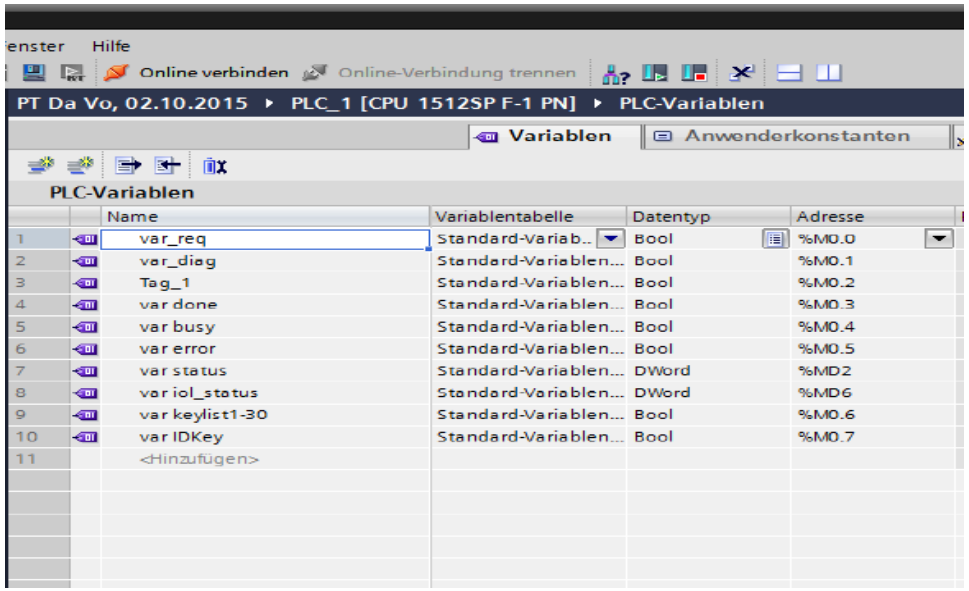
# Procedure for using the IO-Link library




28. Now assign further input and output parameters with the applicable variable names:

- var req
- var idkey
- var busy

29. Completely compile the project and load it into the device

30. To display the variable list, open the "PLC variables" directory in the project navigator

31. Double-click on "Show variable"



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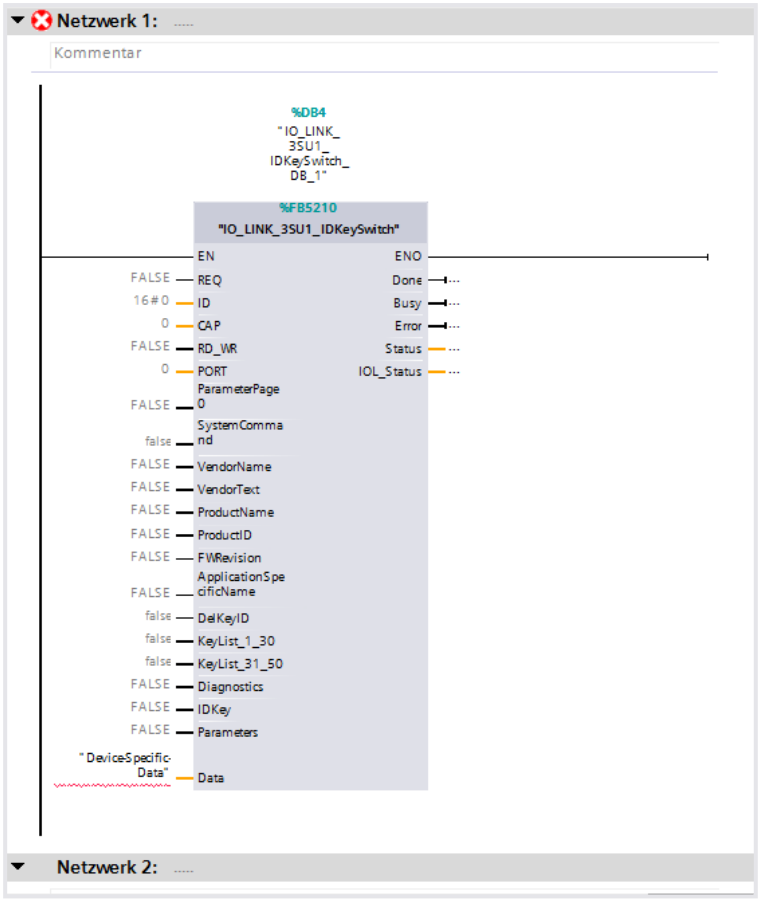
# Procedure for using the IO-Link library




32. Output parameters and their meanings

- DONE = validity: 0 = data not valid, 1 = valid

- Busy = request in progress: 0 = request closed,
  1 = request in processing

- Error = error status: 0 = no error, 1 = cancel with error

- Status = contains error information of the RDREC and WRREC system functions used

- IOL_Status = IO-Link error status

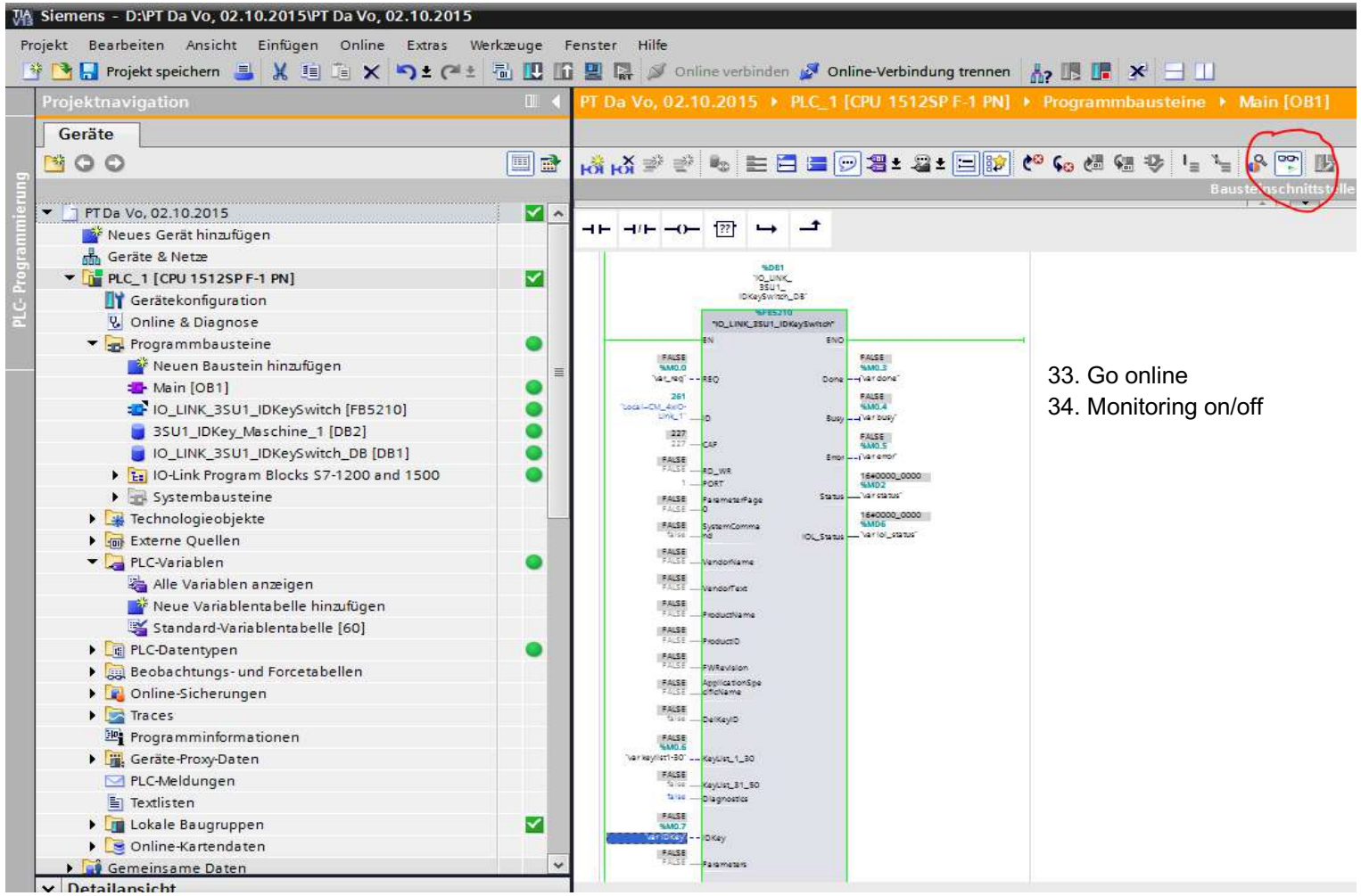
  - Variable is set to DW#16#00000000 if run is error-free

  - In the event of an error, see coding in the function block's manual



SIEMENS

# Procedure for using the IO-Link library




33. Go online
34. Monitoring on/off



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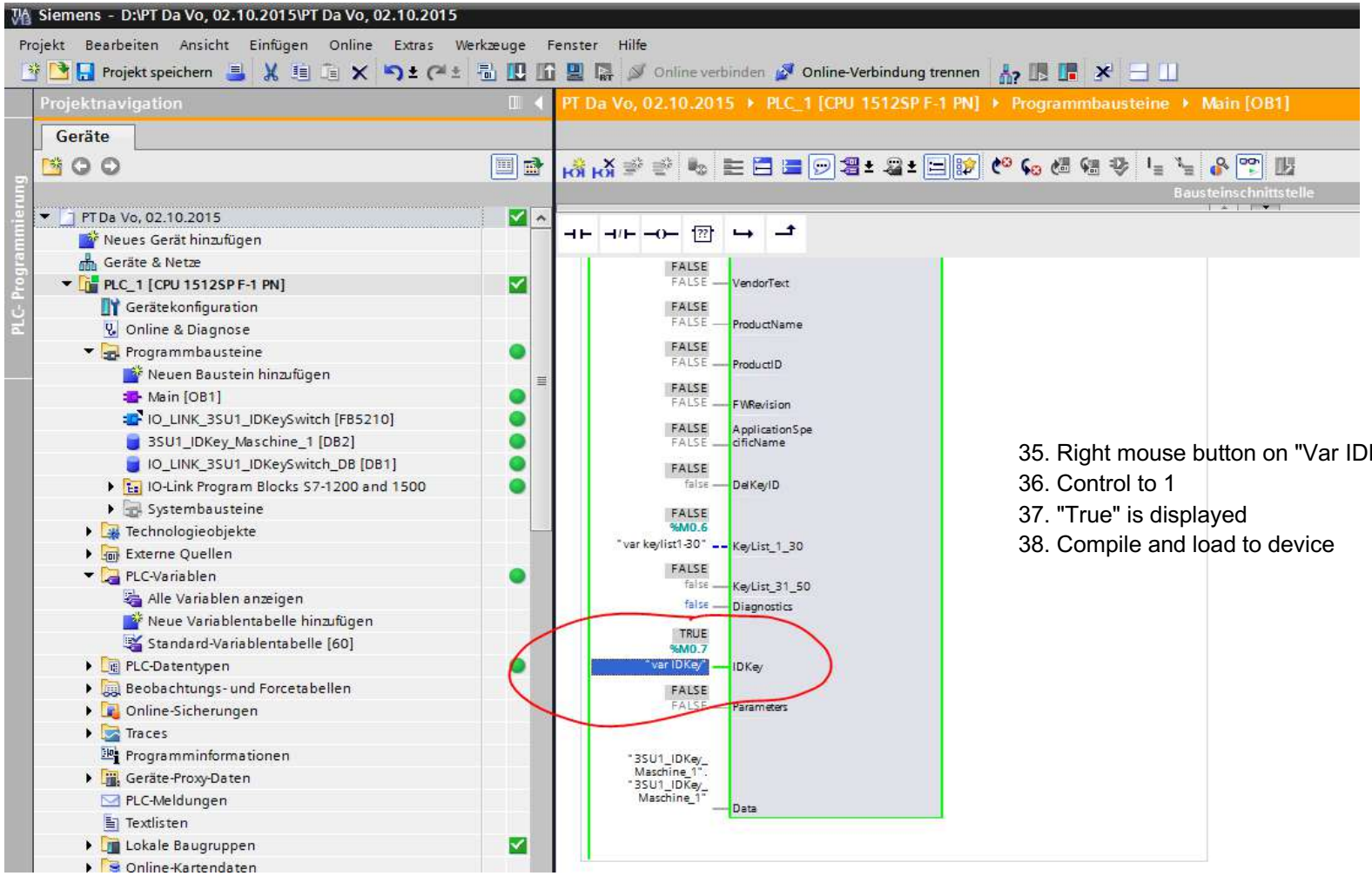
# Procedure for using the IO-Link library




35. Right mouse button on "Var IDKey" variable
36. Control to 1
37. "True" is displayed
38. Compile and load to device



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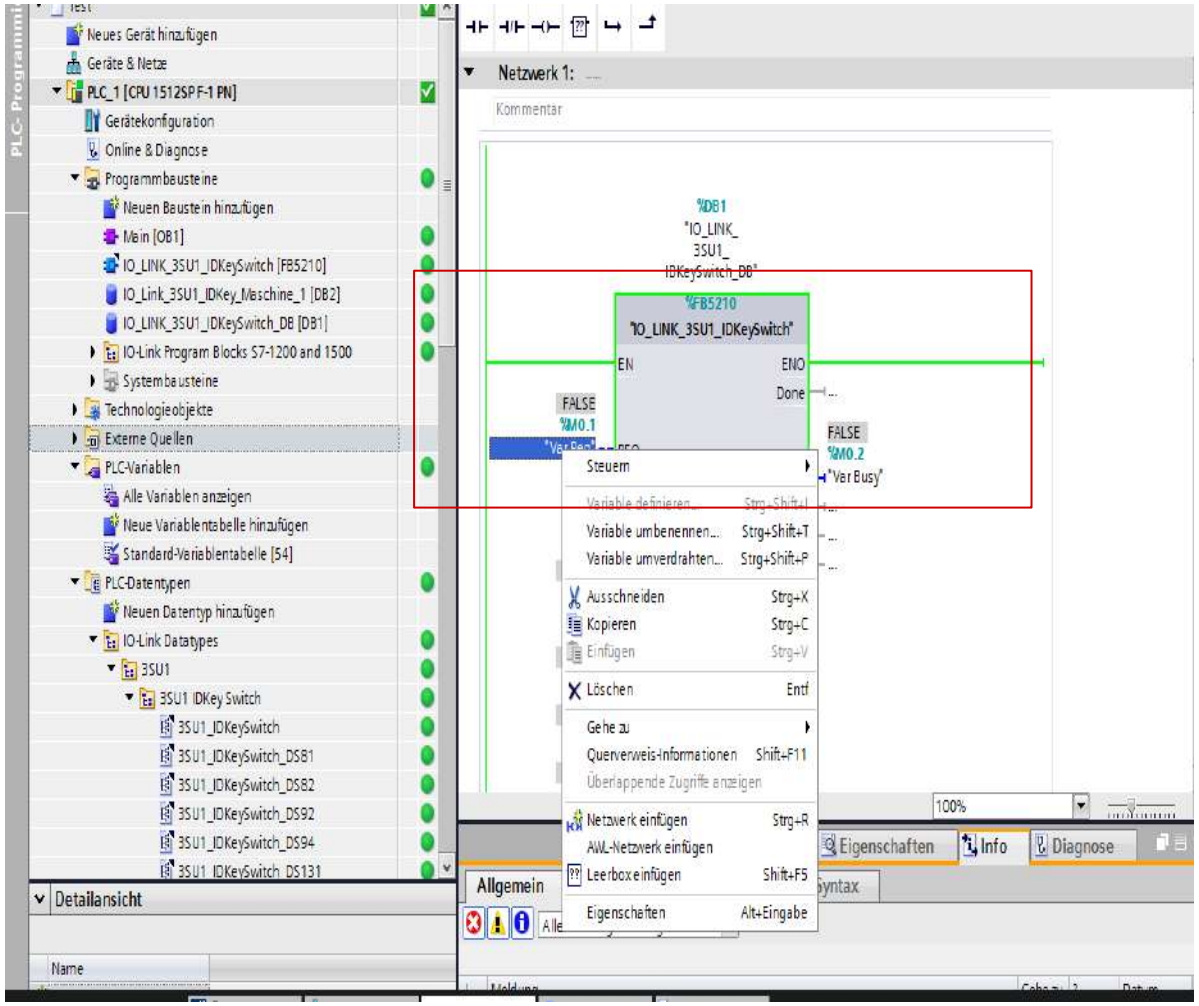
# Procedure for using the IO-Link library




39. Right mouse button on Request variable
40. Control to 1
41. "True" is displayed briefly for the "Busy" output parameter



SIEMENS

# Procedure for using the IO-Link library

The ID of the individually inserted key can now be seen in the data block (bytes 0 to 4).
Also the authorization level and the selected key position

| | | | | |
|---|---|---|---|---|
| 65 | ID_Individ_Key | "KeyState" | | |
| 66 | KeyID_Byte0 | Byte | 16#0 | 16#34 |
| 67 | KeyID_Byte1 | Byte | 16#0 | 16#C6 |
| 68 | KeyID_Byte2 | Byte | 16#0 | 16#94 |
| 69 | KeyID_Byte3 | Byte | 16#0 | 16#17 |
| 70 | KeyID_Byte4 | Byte | 16#0 | 16#04 |
| 71 | KeyPermission | Byte | 16#0 | 16#0A |
| 72 | Parameters | "3SU1_IDKeySwitch_DS131" | | |

The key permission indicates the authorization level and the selected key position.
See manual.

Tabelle A-9 Datensatz (Index) 94 (ID Schlüssel)

| Byte.Bit | Sub Index | Bezeichnung |
|---|---|---|
| 0.0 ... 15.7 | 1 ... 3 | Reserviert |
| 16.0 ... 20.7 | 4 | Identifikationsnummer des individuell codierbaren ID Schlüssels |
| 21.0 ... 21.2 | 5 | Berechtigungsstufe |
| 21.3 ... 21.5 | 6 | Schlüsselstellung |



SIEMENS

# Procedure for using the IO-Link library

| | | | | |
|---|---|---|---|---|
| 65 | ID_Individ_Key | "KeyState" | | |
| 66 | KeyID_Byte0 | Byte | 16#0 | 16#34 |
| 67 | KeyID_Byte1 | Byte | 16#0 | 16#C6 |
| 68 | KeyID_Byte2 | Byte | 16#0 | 16#94 |
| 69 | KeyID_Byte3 | Byte | 16#0 | 16#17 |
| 70 | KeyID_Byte4 | Byte | 16#0 | 16#04 |
| 71 | KeyPermission | Byte | 16#0 | 16#0A |
| 72 | Parameters | "3SU1_IDKeySwitch_DS131" | | |

**16# 0A =**

**Byte 21**

**Result 16#0A**

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| | | | Selected key position 1 (dec) | | | Authorization 2 (dec) | | |



SIEMENS

# Procedure for using the IO-Link library

## Summary

- The ID key-operated switch is conveniently configured with the ***P***ort ***C***onfiguration ***T***ool (PCT)
- With the PCT, basic settings of the ID key-operated switch can be set easily and quickly during commissioning
- The switch position is evaluated via the cyclic data of the process image

# Product

## SIRIUS ACT AS-Interface



SIEMENS

# SIRIUS ACT AS-Interface
# Powerful hardware and innovative software









SIEMENS

# SIRIUS ACT AS-Interface
# A strong, safe and flexible range

| AS-Interface F<br>Module for enclosure mounting<br>Base mounting | AS-Interface F<br>Module for enclosure mounting<br>Base mounting | AS-Interface module for enclosure mounting<br>Base mounting | AS-Interface module for control cabinet installation<br>Front plate mounting |
|---|---|---|---|
|  |  |  |  |
| • Two fail-safe inputs 2x F DI<br>• For base mounting in an enclosure<br><br>***Type of connection***<br>• Push-in<br><br>***MLFB***<br>3SU1400-2EA10-6AA0 | • Two fail-safe inputs 2x F DI<br>• One integrated LED for emergency stop mounting<br>• For base mounting in an enclosure<br><br>***Type of connection***<br>• Push-in<br><br>***MLFB***<br>3SU1401-2EE20-6AA0 | • Four inputs 4 x DI<br>• Three outputs 3 x DQ<br>• Or four outputs 4 x DQ<br>• For base mounting<br>• Optionally A/B technology for two slaves at one address<br>***Type of connection***<br>• Push-in<br>***MLFB with 4DI 3DQ AB***<br>3SU1400-1EC10-2AA0<br>***MLFB with 4DI 4DQ***<br>3SU1400-2EK10-6AA0 | • Four inputs 4 x DI<br>• Three outputs 3 x DQ<br>• Or four outputs 4 x DQ<br>• Front plate mounting (standard-holder)<br>• Optionally A/B technology for two slaves at one address<br>***Type of connection***<br>• Push-in<br>***MLFB with 4DI 3DQ AB***<br>3SU1400-1EJ10-6AA0<br>***MLFB with 4DI 4DQ***<br>3SU1400-1EK10-6AA0 |



SIEMENS

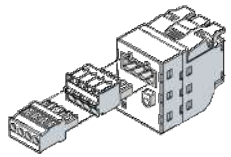
# SIRIUS ACT AS-Interface F adapter
# The power module for fail-safe application

## AS-i F adapter

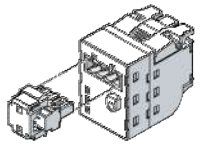
*Connection variants*

- The AS-Interface cable is connected to these terminals
- The terminals are of the plug-in type and so there is no need for wire stripping when replacing a module

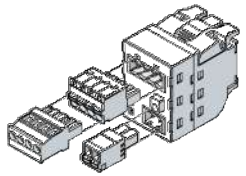
**Screw terminals**



**Insulation piercing method**



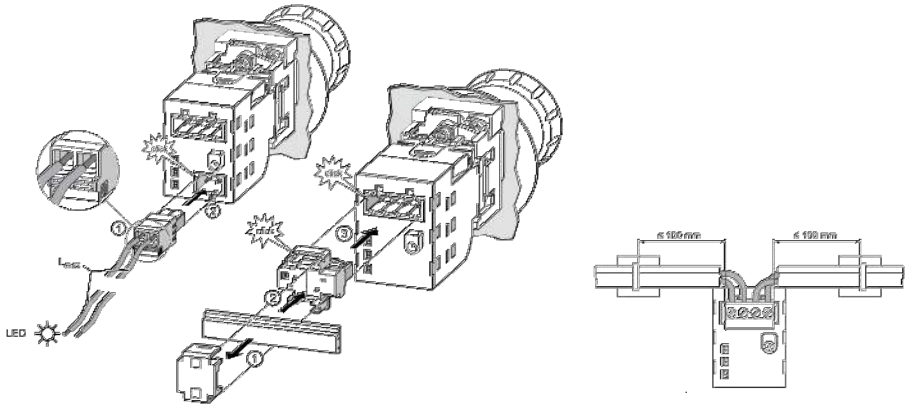
**Spring-type terminals**




*Connecting*

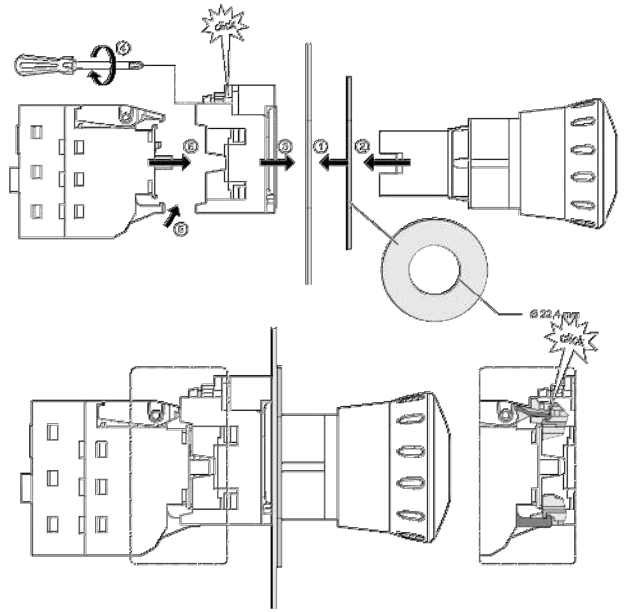
- Conductor cross-section at the screw terminals 0.2 – 2.5 mm²
- Conductor cross-section at the spring-type terminals 0.2 – 1.5 mm²
- DQ output U= 18 V – 24 V;

$I_{max}$ = 20mA




*Installation*

- The AS-Interface module is simply mounted on the standard holder of SIRIUS ACT
- No special tools needed





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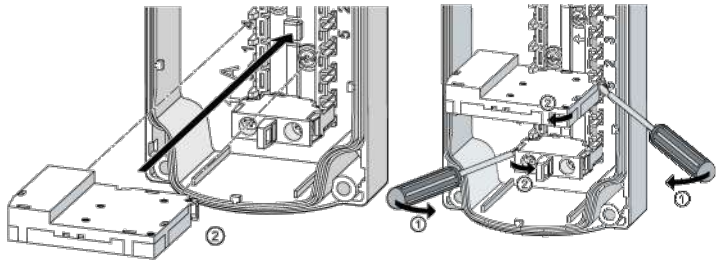
# SIRIUS ACT AS-Interface electronic module
# The universal module for the enclosure

## AS-i electronic module

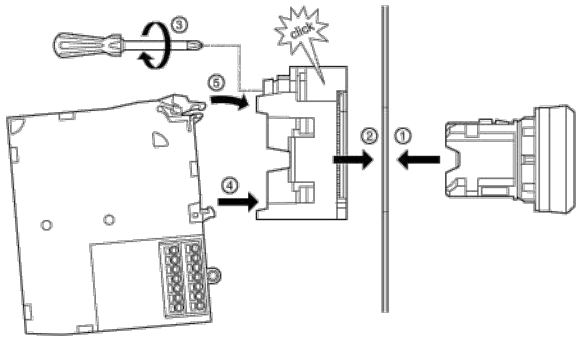
*Base mounting*

- AS-Interface module is mounted in a free slot in the enclosure



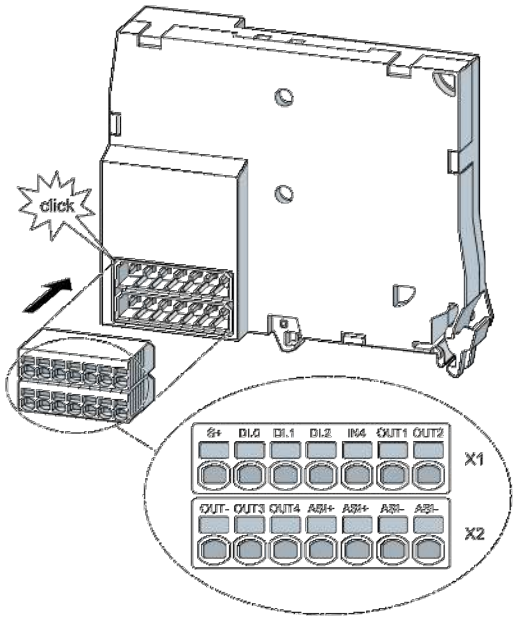

*Front plate mounting*

- AS-I module is mounted on the SIRIUS ACT standard holder
- Mounting position serves fastening only ☾ no function
- DI must be wired to SIRIUS ACT standard contact module
- DQ must be wired to SIRIUS ACT standard LED module




*Connecting*

- Standard contact modules must be wired with the electronic module.
- Push-in connection on the electronic module
- Connection cross section from 0.2 – 0.5 mm²



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# SIRIUS ACT AS-Interface
# Powerful hardware and innovative software









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# SIRIUS ACT AS-Interface
# Powerful hardware and innovative software









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# Customer Benefits



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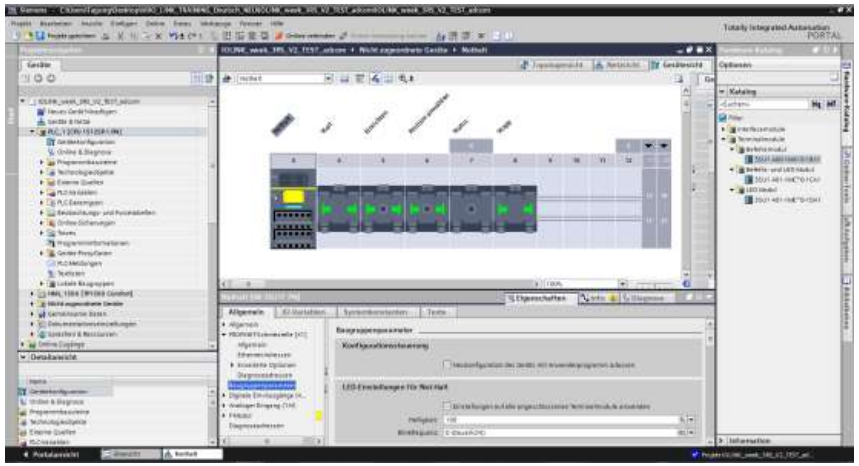
# SIRIUS ACT PROFINET
## The clever way to connect



| Features/functions | Advantages |
| --- | --- |
| **Integrated safety** always realized via the interface module | **Same integration** for safety-related requirements as well, such as EMERGENCY STOP up to SIL 3 |
| **TIA Portal integration** | **Quick and easy hardware configuration** |
| **Simple mounting** on standard SIRIUS ACT devices. No additional devices required. | **Less wiring outlay** and fewer components. No special tools needed. |
| **No addressing** of individual terminal modules | **Time saving, simple design.** One IP address for over 20 devices |
| **Option handling** | **Quick and easy application modification** Only one project for several applications. |



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# SIRIUS ACT IO-Link
## More than just a point-to-point connection

| Features/functions | Advantages |
| --- | --- |
| **Identification of persons** via SIRIUS ACT ID key-operated switch IO-Link | **Creation of an authorization system** for machines/plants |
| **Pre-wired enclosure solutions** configured via configurator | **Wiring time savings** |
| **Function blocks** for the TIA Portal | **Enormous time saving** during programming |
| Detailed **operating, service, and diagnostics data** | **Descriptive information** at all times |
| **Modular system** | **High flexibility** during mounting |



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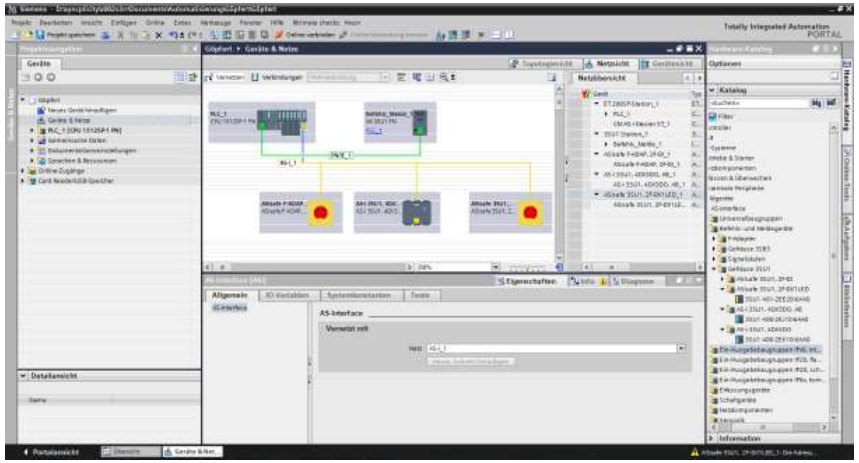
# SIRIUS ACT AS-Interface
# Fail-safe and rugged for all applications



| Features/functions | Advantages |
|---|---|
| **Integrated safety** | **Same integration** for safety-related requirements as well, such as EMERGENCY STOP up to SIL 3 |
| **TIA Portal integration** | **Quick and easy hardware configuration** |
| **Pre-wired enclosure solutions** configured via configurator | **Wiring time savings** |
| **Safety module designed for SIRIUS ACT EMERGENCY STOP** | **Simple realization of EMERGENCY STOP applications,** especially in the field |
| **Fast wiring** using proven insulation piercing method | **Time saving during mounting** |



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# Added Value



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# SIRIUS ACT PROFINET
# Powerful hardware and innovative software

## Added value topics – overview


- Reduced wiring
- Integrated safety
- TIA Portal



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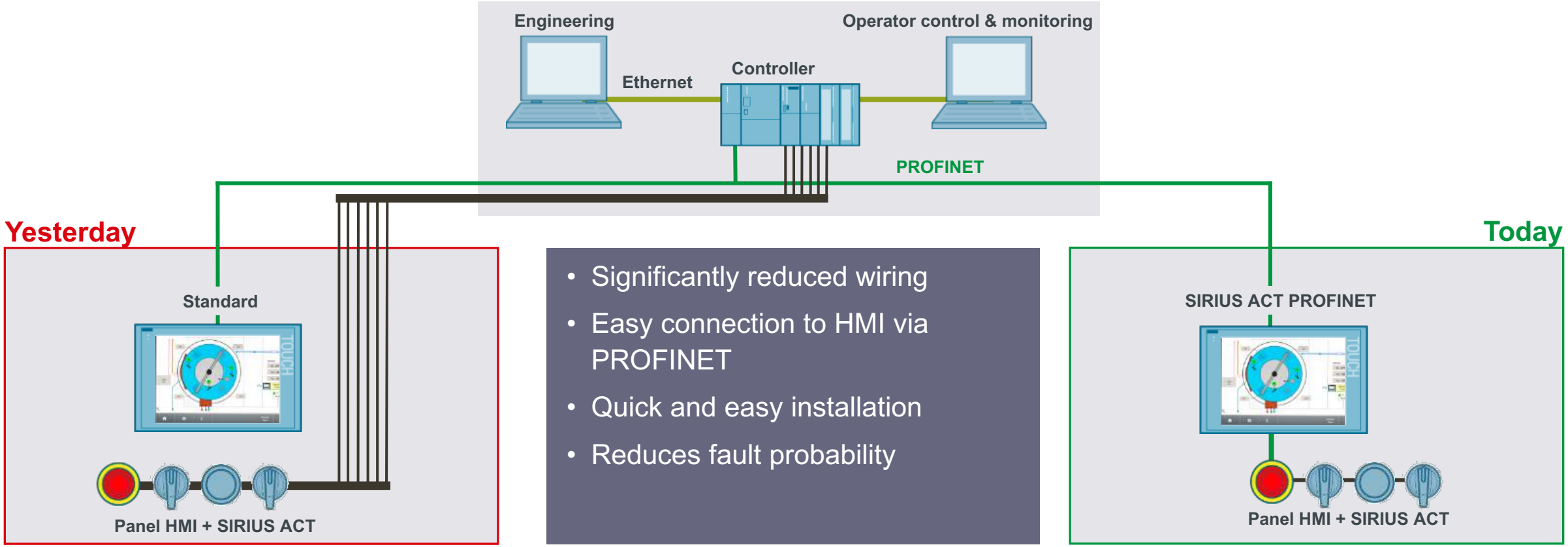
# SIRIUS ACT PROFINET
## The clever way to connect




- Significantly reduced wiring
- Easy connection to HMI via PROFINET
- Quick and easy installation
- Reduces fault probability

**SIRIUS ACT with PROFINET**
**Added value through reduced wiring**



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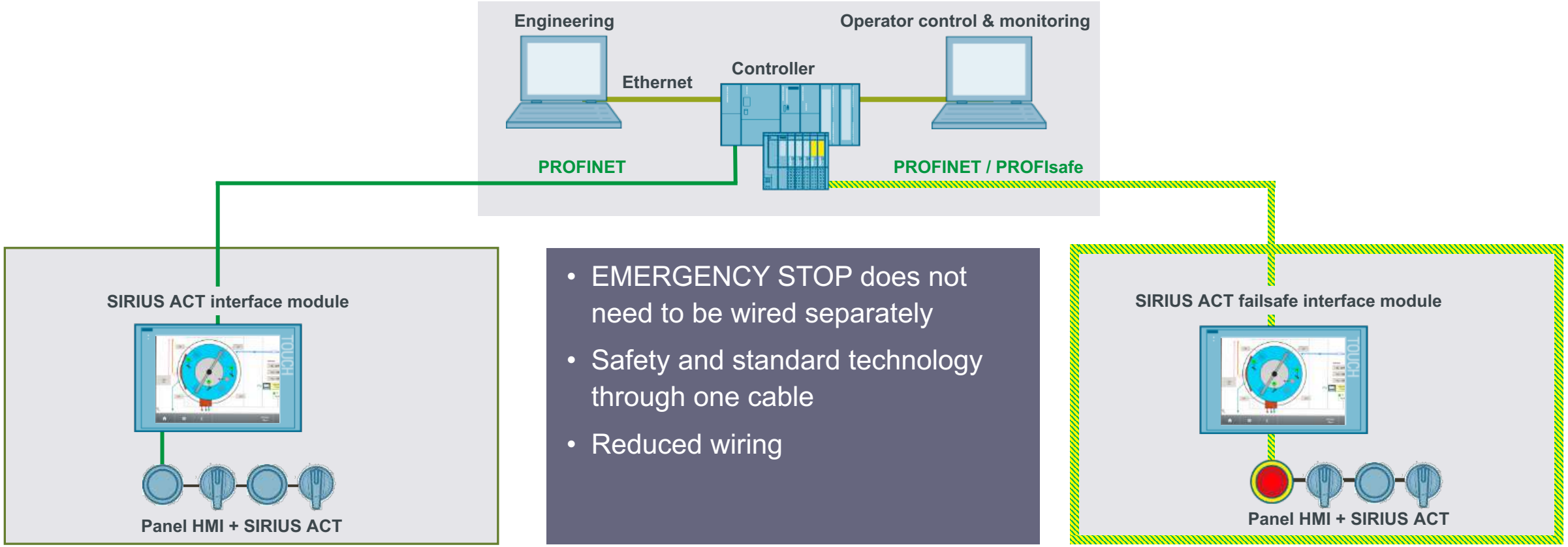
# SIRIUS ACT – PROFINET
## Fast and safe through PROFIsafe




- EMERGENCY STOP does not need to be wired separately
- Safety and standard technology through one cable
- Reduced wiring

**SIRIUS ACT PROFINET**
**Added value integrated safety technology**



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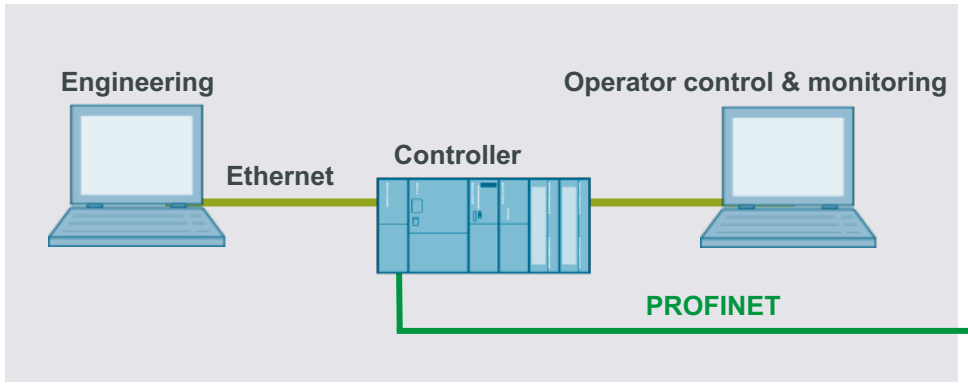
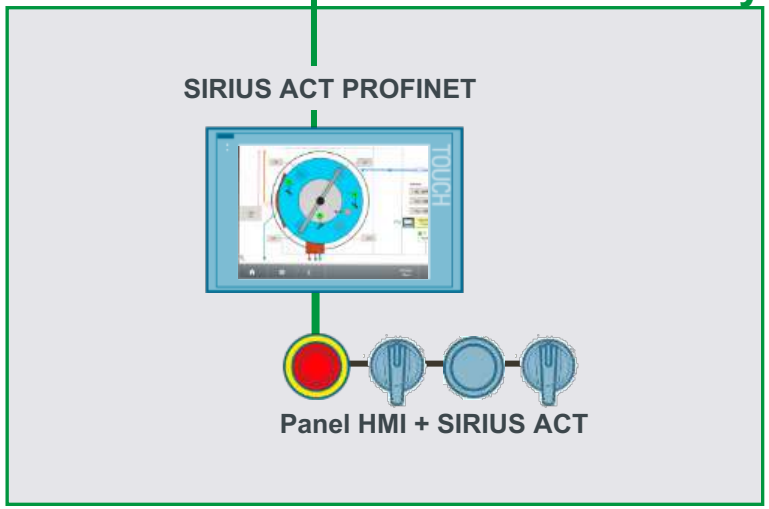
# SIRIUS ACT PROFINET
## Advantages of the TIA Portal now also for SIRIUS ACT parameterization


- Tasks and user-oriented breakdown → ***fast access to relevant tools***
- Uniform look and feel for all program editors → ***fast and uniform handling***
- Graphical network and device configuration → ***simple graphical configuration***

**Today**



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# Migration



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# You gain so much when you convert from 3SB3 AS-i to SIRIUS ACT AS-Interface

## Migration

### 3SB3 AS-Interface


### SIRIUS ACT AS-Interface

- 1 to 1 exchange possible.
- More selection and design lines with SIRIUS ACT
- Simple configuration of enclosure solutions thanks to SIRIUS ACT configurator
- Enhanced ruggedness, e.g. IP69K
- Quicker and easier installation



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# Service, Support, Training



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# Sales Support Tools


## 100 % CAx data

The whole range of CAx data and documentation right from the start

## Industry Online Support https://support.industry.siemens.com

Product Support: FAQs, Manuals, Certificates, Downloads and more
https://support.industry.siemens.com/cs/ww/en/ps
Specific questions can be directed to our 24/7 "Technical Support“
www.siemens.com/electrical-products/support-request


## An innovative graphical configurator

Easy, quick and intuitive – click on your solution and you get a graphical representation
https://siemens.com/sirius-act/konfigurator



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# Documentation for SIRIUS 3SU1

## Manuals

- System manual SIRIUS-ACT

## Operating instructions

- AS-Interface module
- Electronic module for IO-Link
- Electronic module for ID-Key Switch
- E-Stop
- E-Stop-Pushbuttons in enclosures
- Two-hand control station
- Palm pushbutton with trigger action
- AS-Interface module for front mounting
- Sensorbutton
- ASIsafe modul for base mounting

## Catalogs

- IC 10, Chapter 13: Commanding and signaling devices

## Brochures

- Downloads an more: go to website www.siemens.com/sirius-act



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# Applications and references



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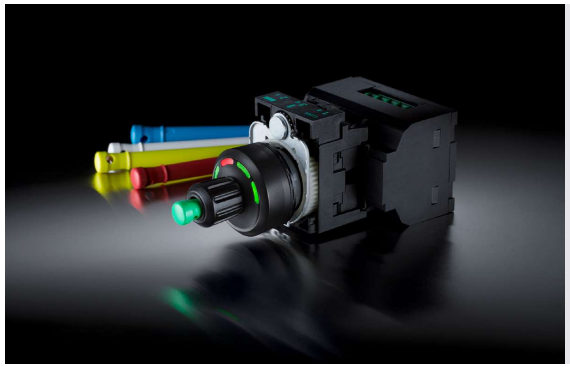
# Applications



**ID key operating mode selector switch**

**IO-Link for panel builder**

**Realization of automatic shutdown in case of system fault (wire break)**



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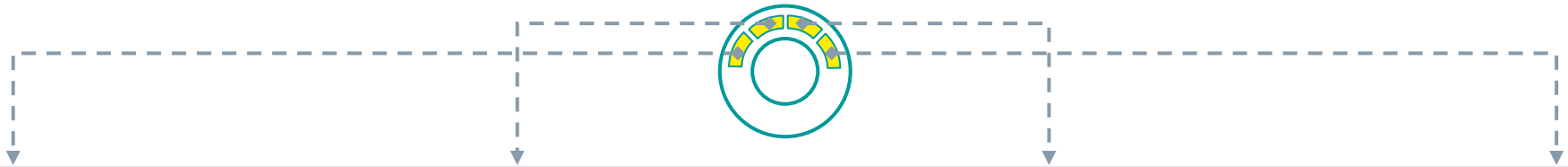
# Authentication and authorization made easy

## Requirement:

- Mode selector on a machine with four differently coded ID keys/four user groups on one production line

## Solution:



| Operating mode Automatic (operating personnel) | Operating mode Setting/maintenance (machine setter) | Operating mode Manual operation (service personnel) | Operating mode Calibration (calibration service) |
|---|---|---|---|
| • Normal process cycle<br>• Manual infeed and removal | • Setting up the machine for manufacturing a new part<br>• Setting<br>• Cleaning | • Step-by-step switching of the functions in the machine possible to determine the step where the fault occurs | • A special section in the control program is used to calibrate the machine<br>• The machine is provided with a sample part and carries out calibration with that |

## Customer benefits:

- Authentication and authorization of user groups



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# Using the SIRIUS ACT ID key-operated switch in safety environments

## Requirement for operating modes from the DIN EN 60204-1 standard

| Requirement of the standard | | Application |
|---|---|---|
| A machine must be safe in every operating mode | > | • Depending on the risk assessment, every operating mode is protected by one or several safety function(s) |
| General requirements for mode switches are not posed in DIN EN 60204-1 | > | • **The mode switch merely switches between the per se safe operating modes. This is why it does not need a safe design or inclusion in the calculation of the safety functions**<br>• **The mode switch is not part of the safety function** |
| Ensuring only one active operating mode<br>Mode selection by itself shall not initiate machine operation | > | • Ensured in combination by the fail-safe evaluation unit and the SIRIUS ACT ID key-operated switch |
| Type C standards can demand a fail-safe design of the mode switch | > | • Not applicable to the SIRIUS ACT ID key-operated switch |



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# Examples of C standards that demand a fail-safe design

**Extract from C standards:**

**DIN EN 13218**

Stationary grinding machines

→ The function of mode selection shall comply with category 1 in accordance with EN 954-1

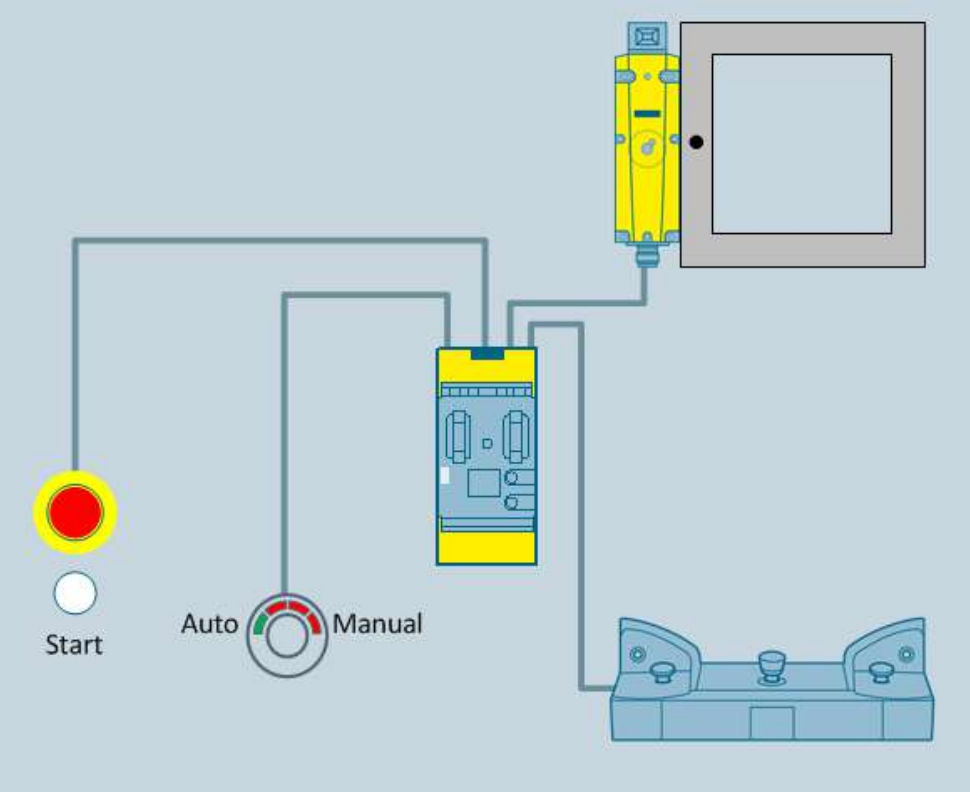
**DIN EN 1870-10**

Circular sawing machines - Single blade automatic and semi-automatic up-cutting cross-cut sawing machines

→ The function of mode selection shall be designed in compliance with PL c DIN EN ISO 13849-1

# Integration of the SIRIUS ACT ID key-operated switch with the 3SK2 safety relay

## Application in the safety environment




3SK2 safety relay

### Description

- Automatic mode: entry into the danger zone is prevented by the protective door with tumbler
- Manual mode: danger zone may be entered
  → safe operation must be ensured by two-hand operation console

### Description

- Changeover of per se safe operating modes

### Customer benefits

- Group authentication without explicit parameterization



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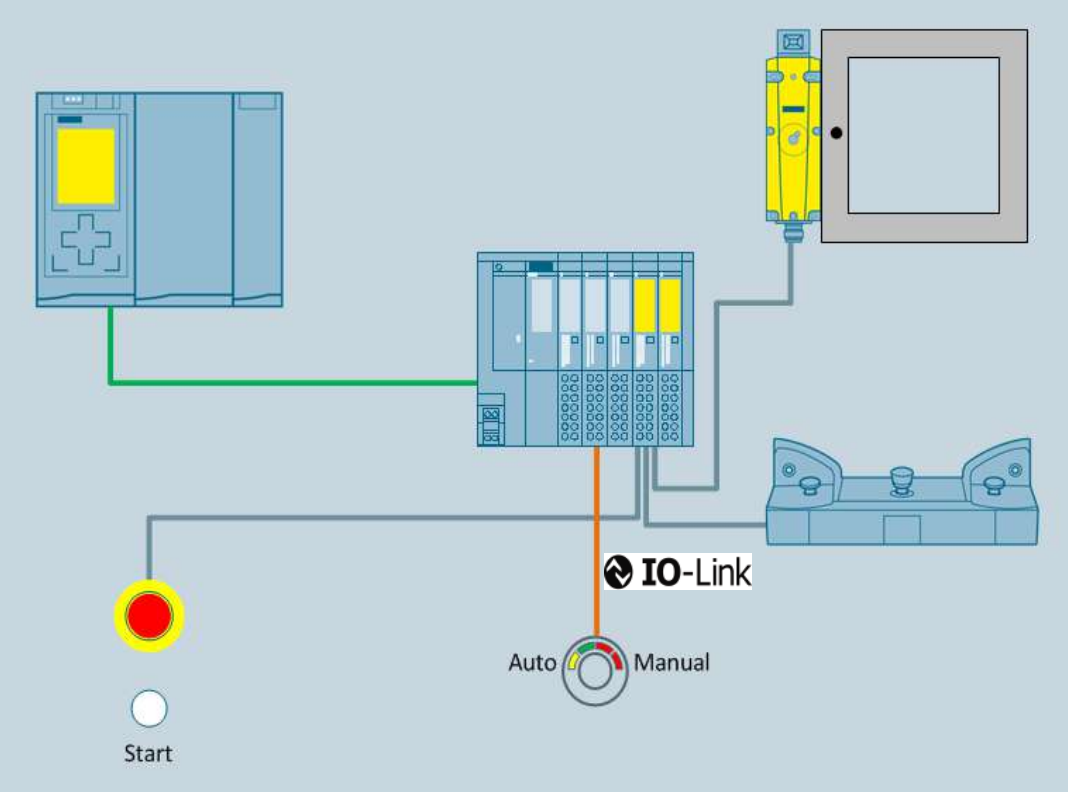
# Integration of the SIRIUS ACT ID key-operated switch with IO-Link

## Application in the safety environment




1500 F-CPU with distributed ET 200SP station,
IO-Link master and F-DI

### Description

- Automatic mode: entry into the danger zone is prevented by the protective door with tumbler
- Manual mode: danger zone may be entered
  → safe operation must be ensured by two-hand operation console

### Description

- Changeover of per se safe operating modes

### Customer benefits

- Authentication by individual coding



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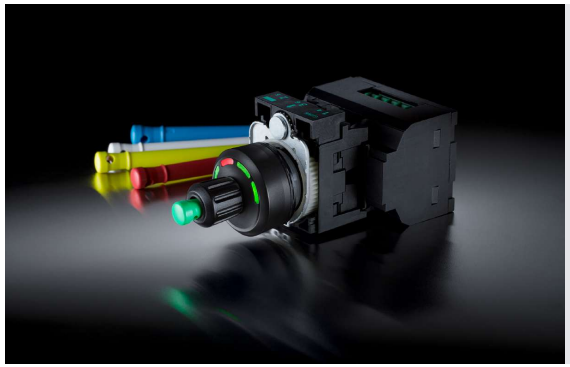
# Applications



ID key operating mode selector switch

**IO-Link for panel builder**

Realization of automatic shutdown in case of system fault (wire break)



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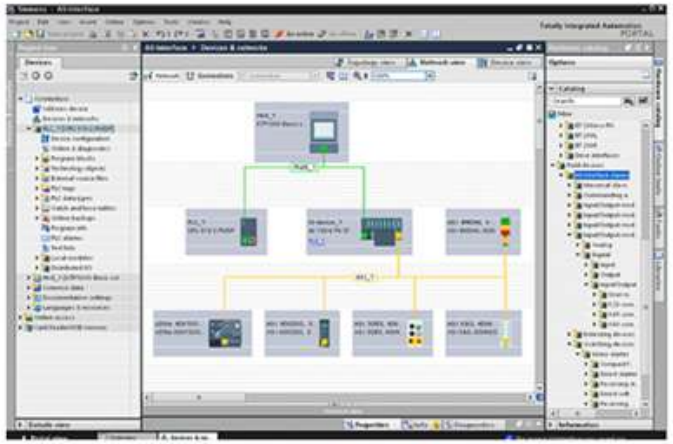
# Simplest connection of SIRIUS ACT ASIsafe to PROFIsafe in TIA Portal

**SIRIUS ACT Bediengehäuse mit AS-Isafe**
Volle Integration der Bediengehäuse im TIA Portal
Drag and Drop (Adressierung und Diagnose im TIA Portal)


Adresse x

Adresse 1 Adresse 2 Adresse 3

Adresse x Adresse x



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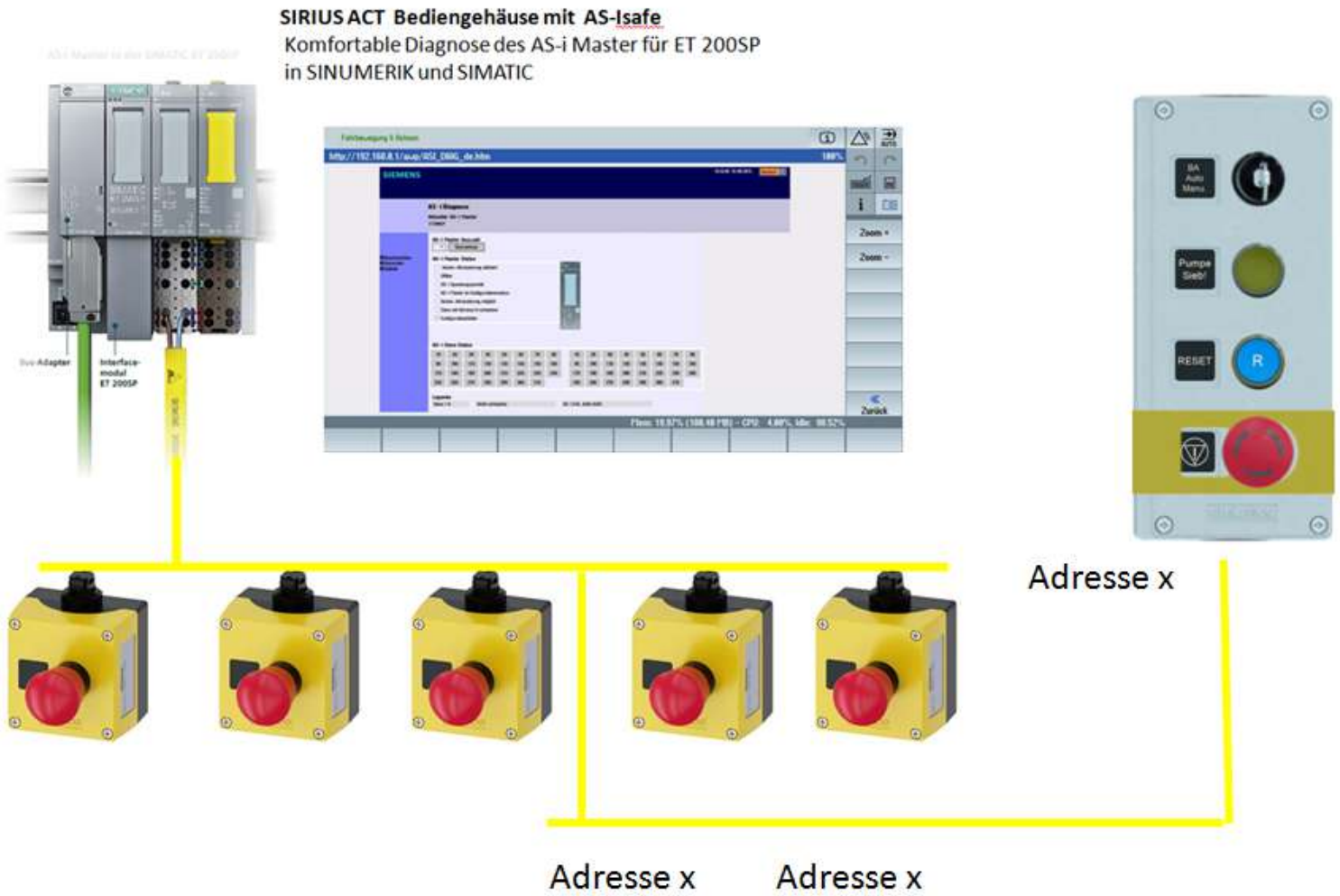
# Simplest connection of SIRIUS ACT ASIsafe to PROFIsafe SINUMERIK and SIMATIC



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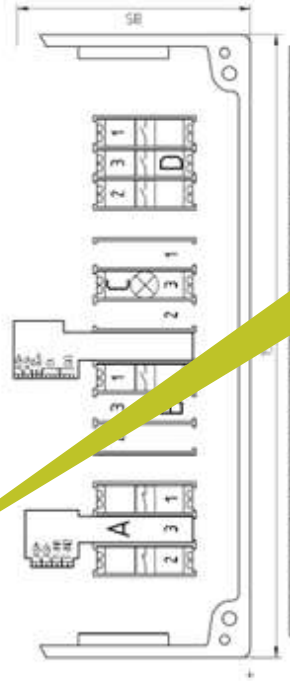
# Complete solution in the SIRIUS ACT configurator 3SU1 SRIUS ACT with AS-Interface

Gehäuseaufbau

Datum: 15.06.2016 11:47

| Komponenten | |
|---|---|
| | Anschlussklemme AS-I Leitung: 3SU19000HY100AA0 |
| D | Betätiger: 3SU10005BL010AA0 |
| | Bezeichnungsschild: 3SU19000AF160AZ0 |
| C | Betätiger: 3SU10310AD300AA0 |
| | Bezeichnungsschild: 3SU19000AF160AZ0 |
| B | Betätiger: 3SU10300AB500AA0 |
| | Bezeichnungsschild: 3SU19000AF160AZ0 |
| A | Betätiger: 3SU10011HB200AA0 |
| | Unterlegschild: 3SU19000BF310AA0 |
| | Bezeichnungsschild: 3SU19000AF160AZ0 |


| Mod | |
|---|---|
| Halter: 3SU150<br>Position 1: 3SU<br>Position 3: 3SU1400<br>Position 2: 3SU1 03BA0 | |
| | |
| Halter: 0AA100AA0<br>Po<br>on 3: 3SU14012BB303AA0<br>Position 2:<br>3SU14002EJ106AA0 | C |
| Halter: 3SU15000AA100AA0<br>Position 1: 3SU14002AA103BA0<br>Position 3:<br>Position 2: | B |
| | |
| Halter: 3SU15000AA100AA0<br>Position 1: 3SU14002AA103CA0<br>Position 3: 3SU14012EE206AA0<br>Position 2: 3SU14002AA103CA0 | A |

**AS-i Slave**



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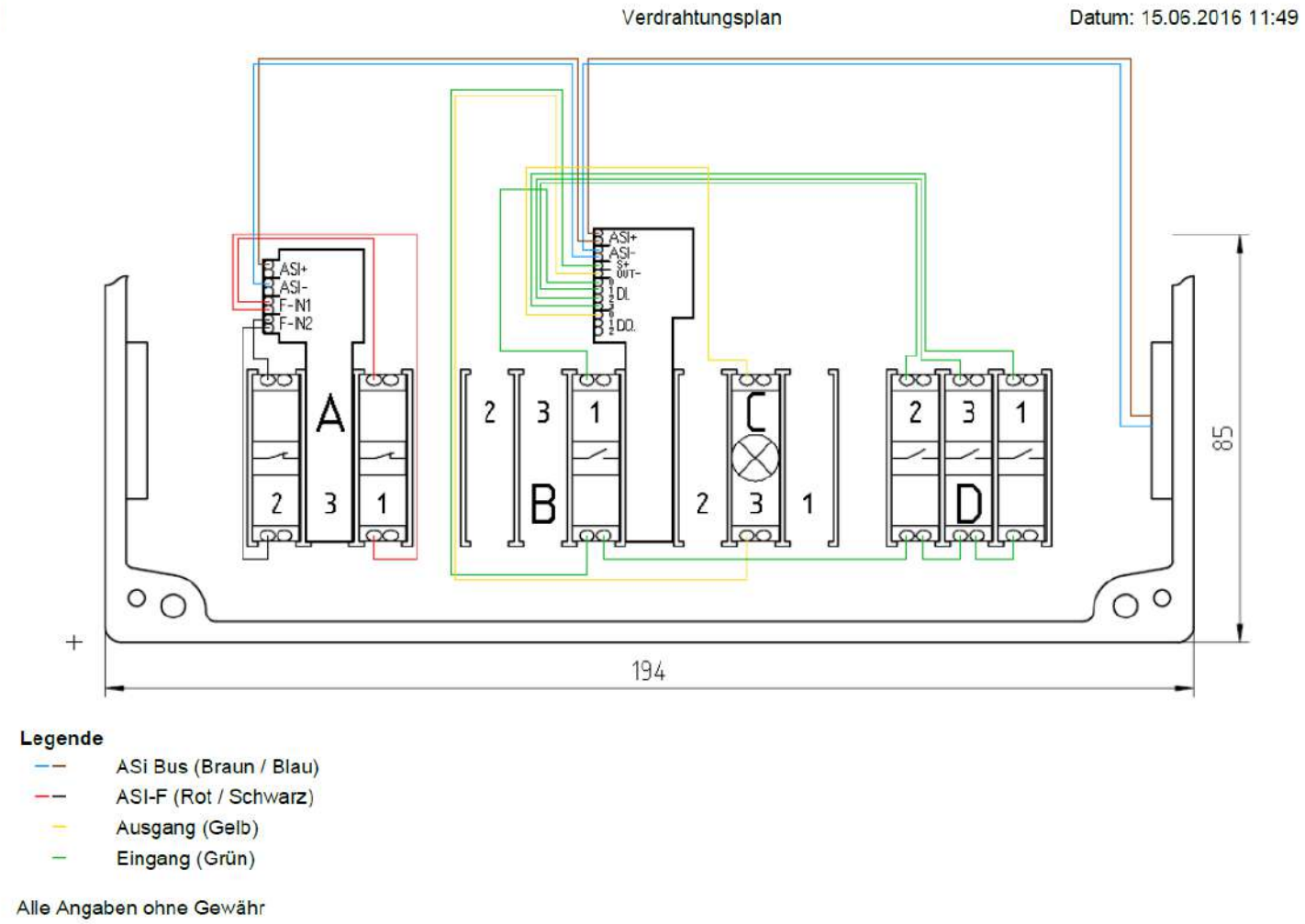
# Wiring diagram from SIRIUS ACT configurator
# SIRIUS ACT 3SU1 AS-Interface



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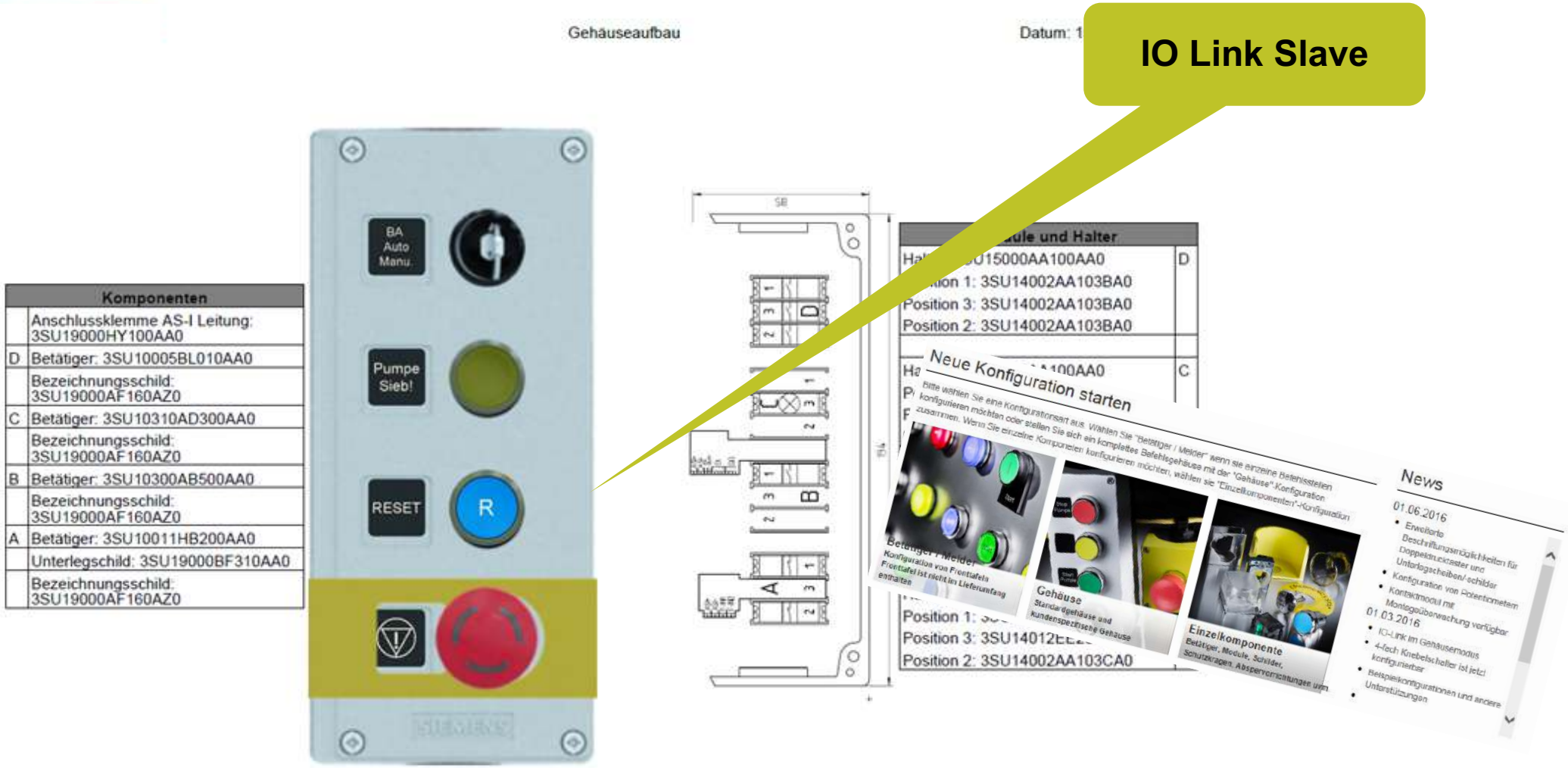
# Complete solution with SIRIUS ACT configurator
# 3SU1 SRIUS ACT with IO Link



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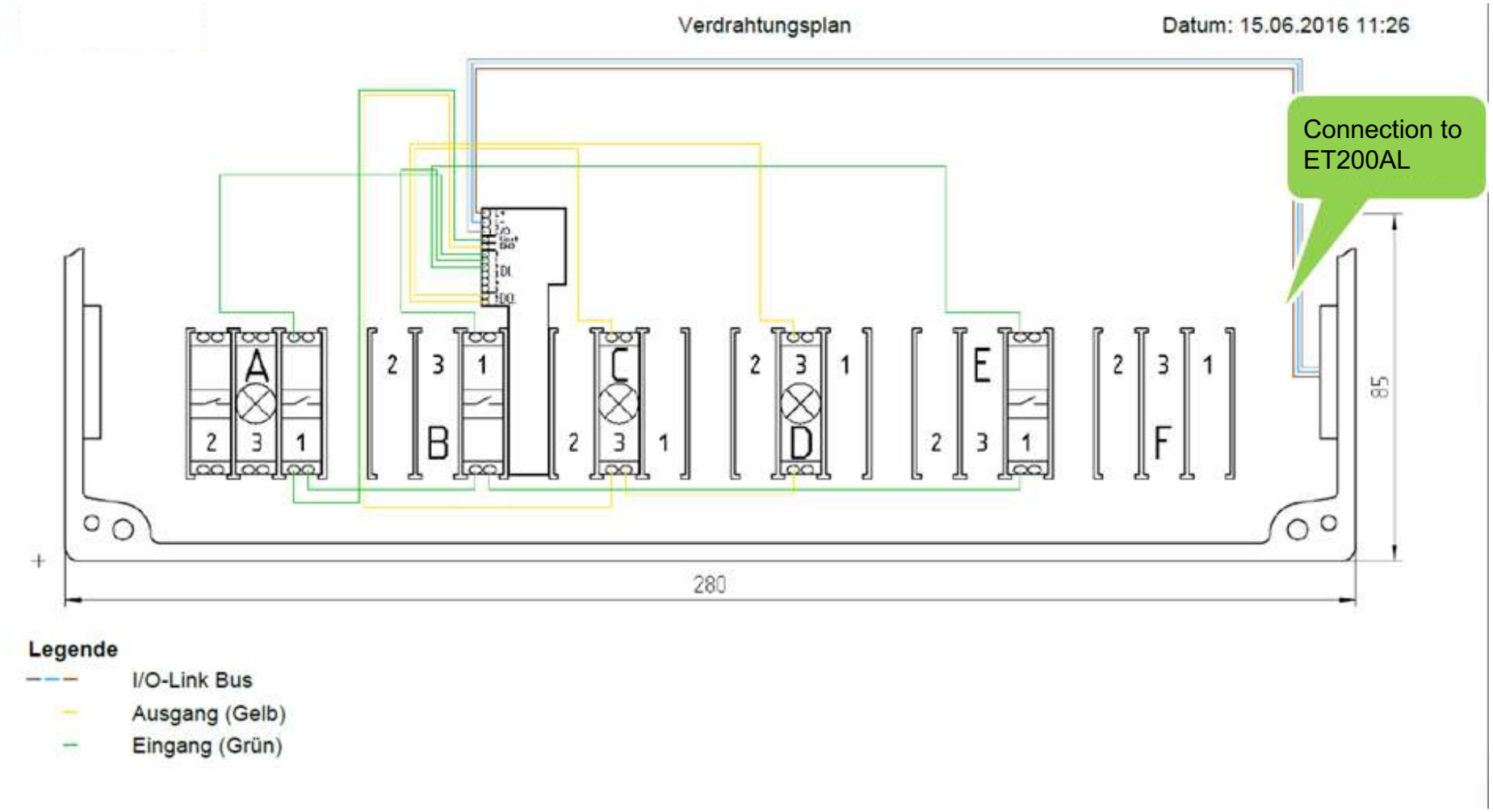
# Wiring plan out of the SIRIUS ACT Configurator
# SIRIUS ACT 3SU1 IO LINK







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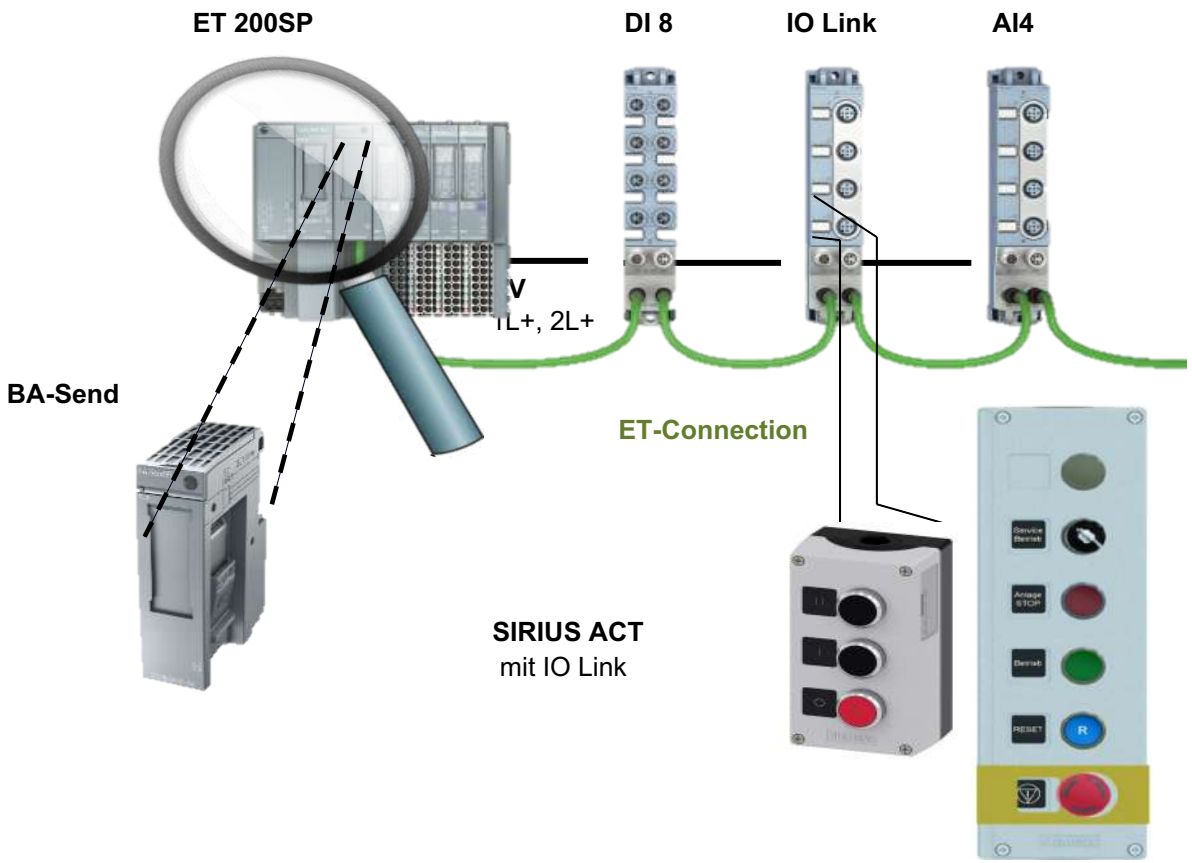
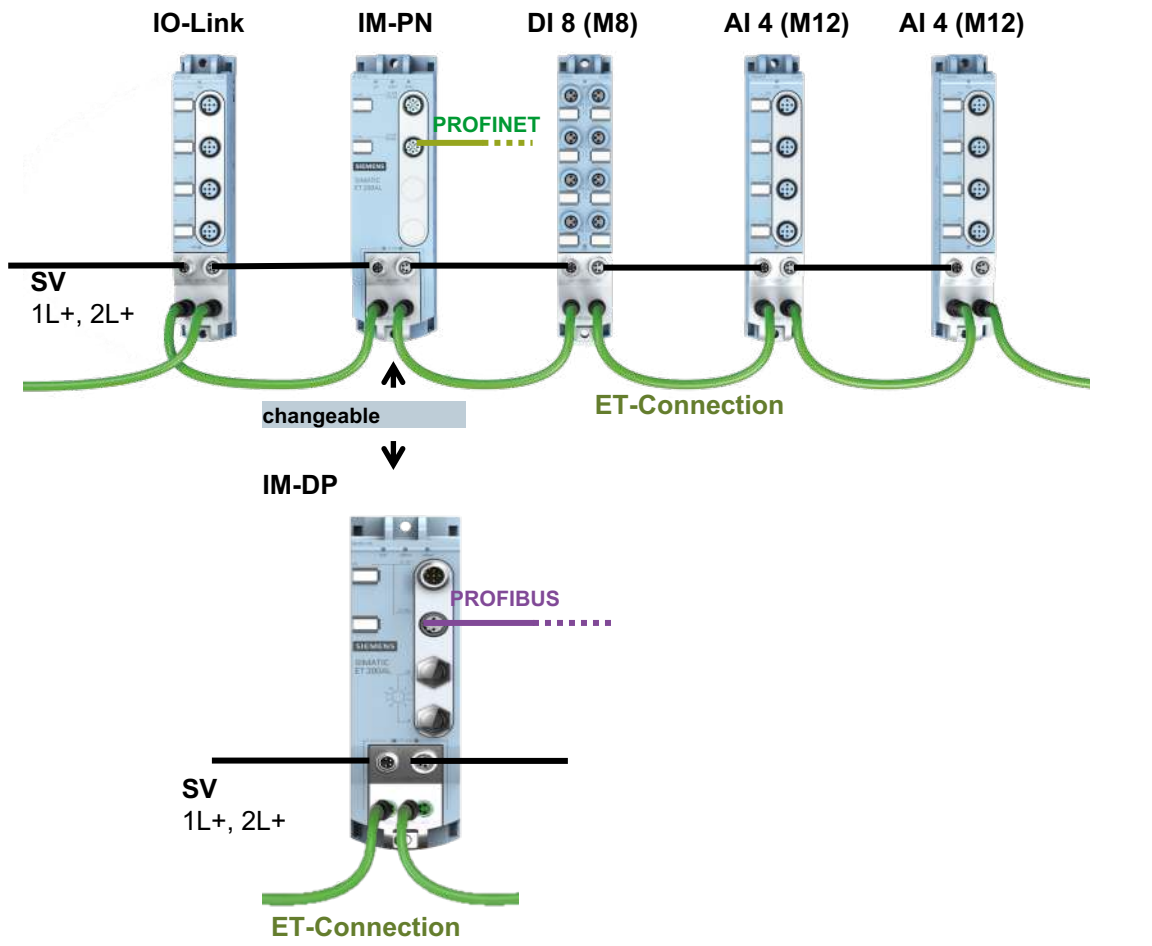
# SIRIUS ACT Application with SIMATIC ET 200AL with IO Link (SIRIUS ACT enclosure)

## Set up with ET 200SP




## Set up with IM



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# Contact

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91058 Erlangen, Germany

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