Automatic logging-in on HMI operator panels via RFID key

WinCC Comfort / V14 SP1 / SIRIUS ACT-ID /

https://support.industry.siemens.com/cs/ww/en/view/109749912

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1 Introduction

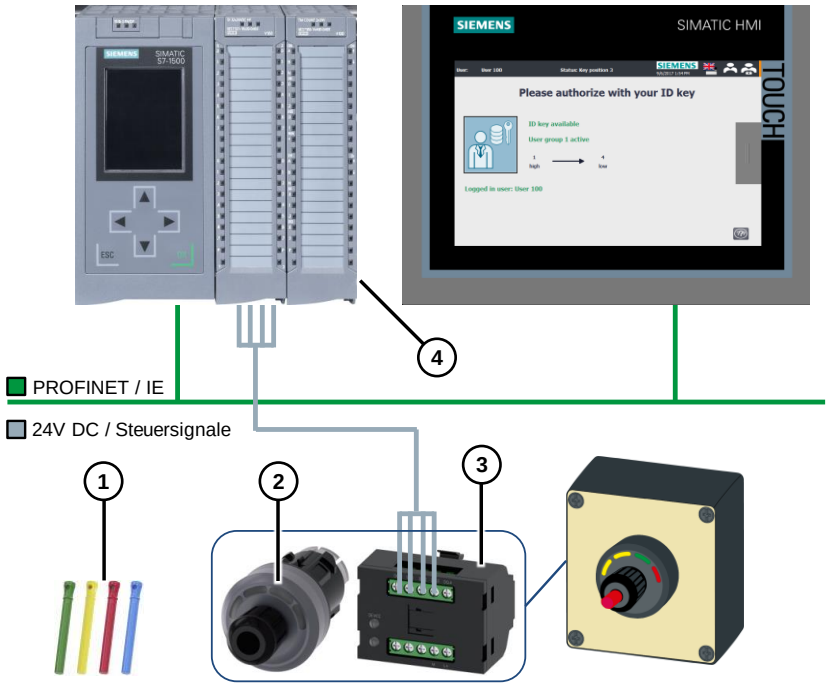
Automation systems are sophisticated and complex technical systems.
Operation by unauthorized personnel can result in operating errors and therefore disruptions in the production process.
In order to prevent this, an access restriction to functions of the system, so that only authorized persons have access, is recommended.

The access protection can take the form of a key switch or prior request of a user name and password. The aim is to ensure the greatest possible system-related operation and accessibility.

1.1 Overview

To implement an access protection of a system, with WinCC (TIA Portal) and the integrated user administration both with the ID key and the electronic modules, SIEMENS offers the possibility of implementing this kind of concept in your system. A detailed description of the concept used can be found in Chapter 1.2 Mode of operation.

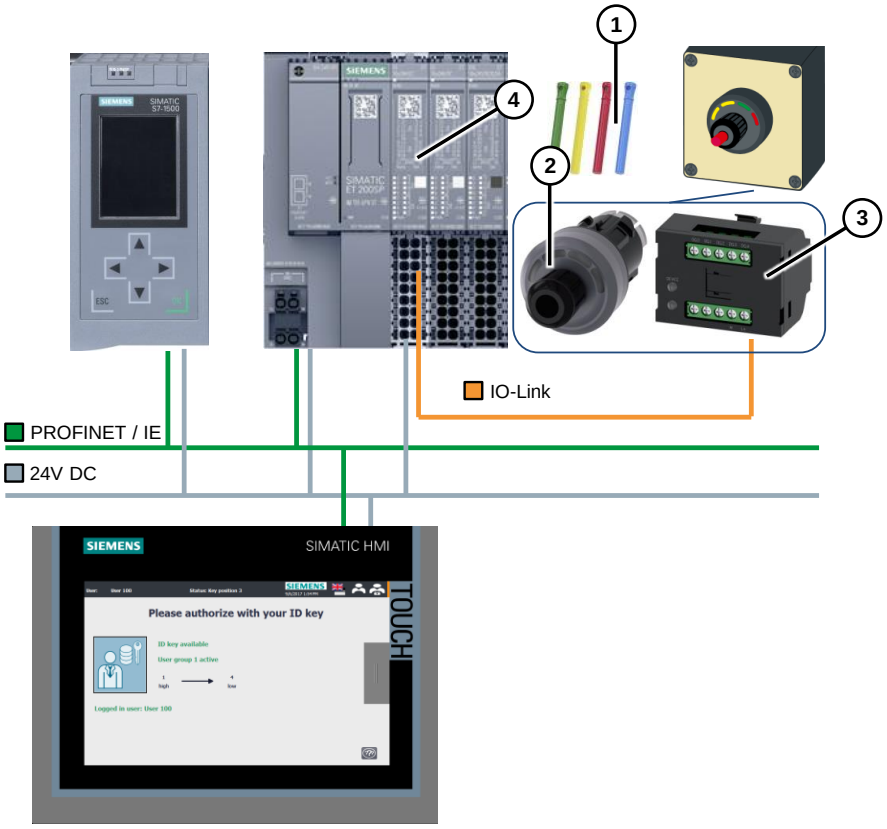
- Example 1:
  ID key switch with electronic module without IO-Link.
  (Evaluation of the key position).



Depending on the ID key used (1), 1 to 4 key positions can be selected on the ID key switch (2). Via the electronic module (3), the selected key position is forwarded as a digital signal to the EA module (4).

Via the control program, the read-in signals of the EA module are further processed to release the operating mode "manual operation", for instance.

- Example 2:
  ID key switch with electronic module and IO-Link interface for tamper-proof system (identification of the user).



Depending on the ID key used (1), 1 to 4 key positions can be selected on the ID key switch (2). Via the electronic module with IO interface (3), the selected key position and the properties of the ID key are forwarded via an "IO-Link telegram" to the serial interface module of the CM 4xIO-Link module (ET 200SP) (4).

Via the control program, the information of the "ID key" is read out via a program-specific function block (FB) to allow a personal application, for instance.

Note

Outputs of the IO-Link module

The outputs can be evaluated via a program-specific function block. Alternatively, the outputs can also be wired and evaluated via an IO module.

1.2 Mode of operation

Note

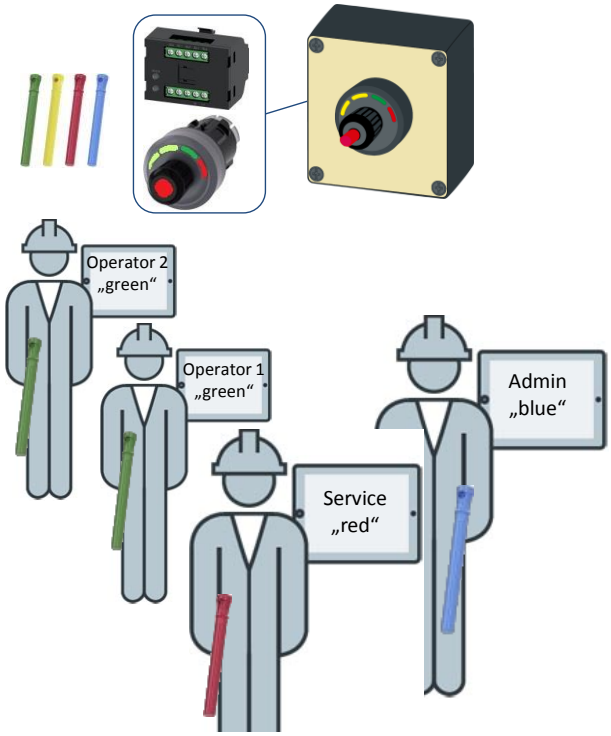
If you are new to the hardware components, refer to chapter 6 "Useful information". Make sure that the hardware has two different "IO-Link modules".

- IO-Link without communications interface (3SU1400-1GC10-1AA0).
- IO-Link with communication interface (3SU1400-1GD10-1AA0).

1.2.1 Example 1, without IO-Link communication interface

ID key switch with electronic module without IO-Link communication interface

Figure 1-1



- Each plant operator is assigned a color-coded ID key according to his area of responsibility.
- To be able to carry out an operation on the HMI operator panel, the plant operator first inserts his ID key into the ID key switch.
- To carry out further adjustments, the plant operator selects a switch position.
- The position of the ID key is forwarded via the outputs of the electronic module to the IO module and evaluated by the control program.
- The color coded ID key defines the maximum key position.
  - **Example:**
    A system operator with the "green ID key" can only select the 1st key position depending on the system.
  - A system operator with the "red ID key" can select key positions 1 to 3 depending on the system.

Note

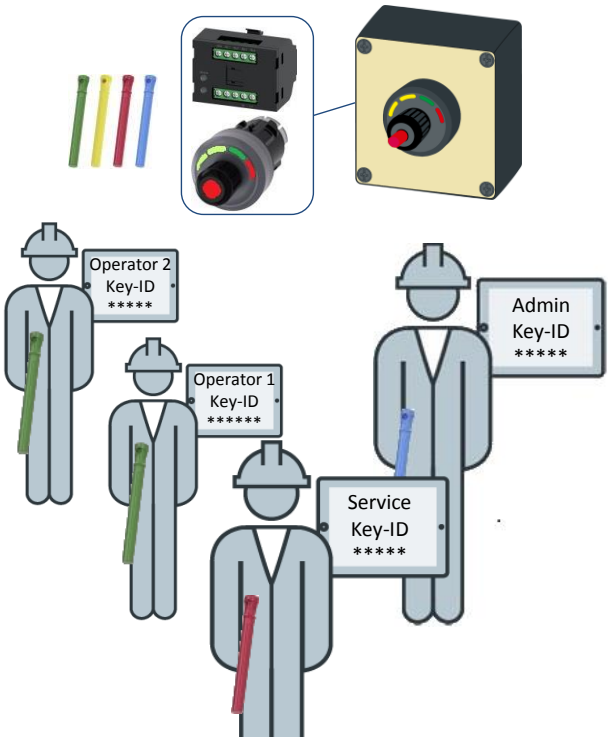
If several system operators have the same "color-coded ID key", then it is not possible to evaluate via the control program which system operator has logged on, for example, with the "green ID key".

If personal authorization is required (user administration), then the electronic module must be used **with** the IO-Link interface

1.2.2 Example 2, with IO-Link communication interface

ID key switch with electronic module and IO-Link communication interface

Figure 1-2



- Each plant operator gets a personal ID key. The admin has the option of reading the manufacturer-specific ID number of the ID key. The personal ID number is assigned to the plant operator ("user name") as a "password" in the user administration.
  Note
  The ID number is read out via the software tool "PCT" (see chapter 3), which is available as a free download \4\). Alternatively, the ID number can be read out via a program-specific function block (see chapter 5.2).
- To be able to carry out an operation on the HMI operator panel, the plant operator first inserts his ID key into the ID key switch. If the read-out ID number matches the ID number stored in the user administration, the assigned function is released.
- To carry out further adjustments, the plant operator selects a key position.
  - The position of the ID key, the ID key used (color code) and the ID number is read out via a program-specific function block (FB).

- Another function is used to read out the name of the currently logged-in plant operator.
- A system message documents when a user has logged in or out.

1.2.3 Function overview, electronic module with / without IO-Link

The table shows an overview of the evaluation option of the electronic module in the version **with / without** "IO-Link communication".

Table 1-1

No.	Function	Electronics module with IO-Link communication	Electronics module without IO-Link communication
1.	Communication via IO-Link	✓	—
2.	Automatic user logon on the operator panel.	✓	—
3.	Read out of the logged in user.	✓	—
4.	Evaluation of the key position (electronic).	✓	—
5.	Evaluation of the key position (digital).	✓	✓
6.	Evaluation of inserted ID key.	✓	✓
7.	Evaluation of type of inserted ID key (green...blue)	✓	—
8.	Subsequently assign new users to an ID key in the user administration.	✓	—
9.	Additional software required (PCT - Port Configuration Tool).	✓	—
10.	IO master module required.	✓	—

1.3 Components Used

The application example was created with these hardware and software components:

Table 1-2

Component	Number	Article number	Note
ID key switch 1	1	3SU10x0-4WS10-0AA0	
Bracket for attachment in housing	1	3SU1500 0AA10-0AA0	
ID key	1	3SU1900-0Fxy0-0AA0	
-green	1	3SU1900-0F**V40**-0AA0	Key position 1 (low)
-yellow	1	3SU1900-0F**W30**-0AA0	Key position 1 to 2
-red	1	3SU1900-0F**X20**-0AA0	Key position 1 to 3
-blue	1	3SU1900-0F**Y50**-0AA0	Key position 1 to 4 (high)
Electronics module for IO-Link	1	3SU1400-1G**D**10-1AA0	
Electronics module without IO-Link	1	3SU1400-1G**C**10-1AA0	
CPU 1516F-3 PN/DP	1	6ES7 516-3FN01-0AB0	All 1200 / 1500 CPU
DI 32x24VDC HF	1	6ES7 521-1BL00-0AB0	Each DI module
TP700 Comfort Panel	1	6AV2 124-0GS01-0AX0	Example 1: All panels Example 2: All panels except basic panels.

This application example consists of the following components:

Table 1-3

Component	File name	Note
Documentation	109749912_ID_key_Sirius_ACT_ID_de	
Library	109749912_Lib-Code.zip	Program blocks and HMI configurations.
Example project	109749912_Code.zip	Contains two projects.

2 Quick start guide

The application example has two project templates.

- WinCC (TIA portal), configuration
- WinCC (TIA portal), library

WinCC (TIA portal), configuration

All the functions and settings described are stored in WinCC (TIA portal), configuration. No other settings are necessary. You can adapt the configuration template to your hardware as required.

WinCC (TIA portal), library

The function blocks used are all combined in one library. Via drag & drop you can integrate the configurable function blocks into your application.

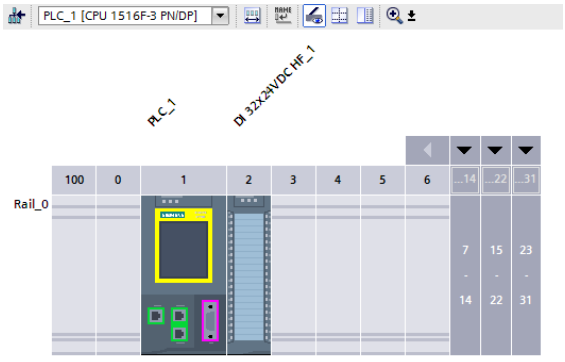
The inputs and outputs of the function blocks must be given "values" according to the block description.

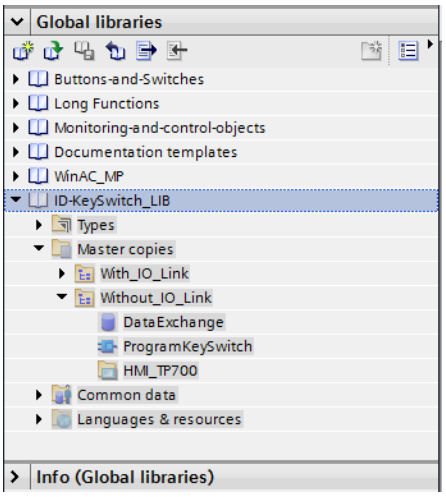
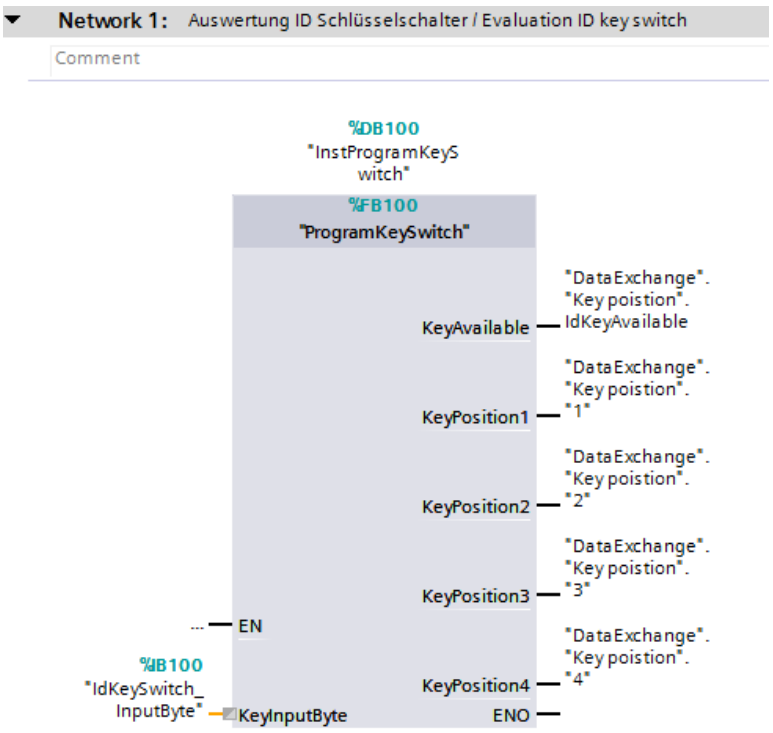
In addition to the function blocks, the HMI operator panel (TP700 Comfort Panel) is stored in the library.

2.1 Configuration without IO-Link Communication

2.1.1 STEP 7 Configuration

Table 2-1

No.	Description
1.	Create a configuration with the following components. • SIMATIC CPU • Digital input module • HMI operator panel 

No.	Description
2.	Open the enclosed library file "ID-KeySwitch_LIB" • Navigate to the "Templates > Without_IO_Link" folder. • Drag the two program blocks into your STEP 7 configuration. 
3.	• Open the OB1 "Main" and insert the “ProgramKeySwitch” block into a network. • Assign the variables to the input / output parameters. You can use the "DataExchange" data block for this purpose. • At the input parameter "KeyInputByte", enter the input byte of the DI module on which the outputs of the electronic module are wired. 

2.1.2 HMI program

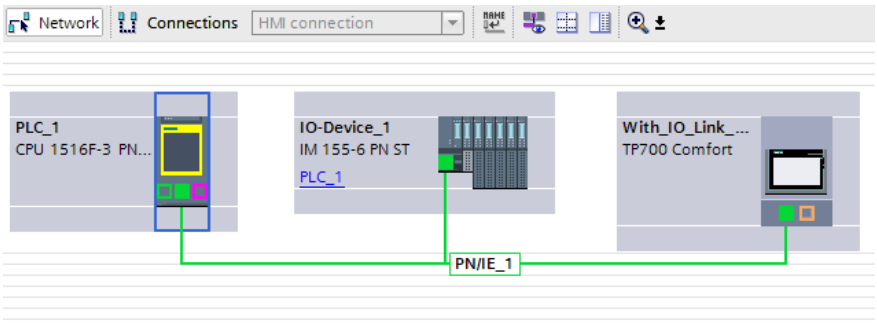
Table 2-2

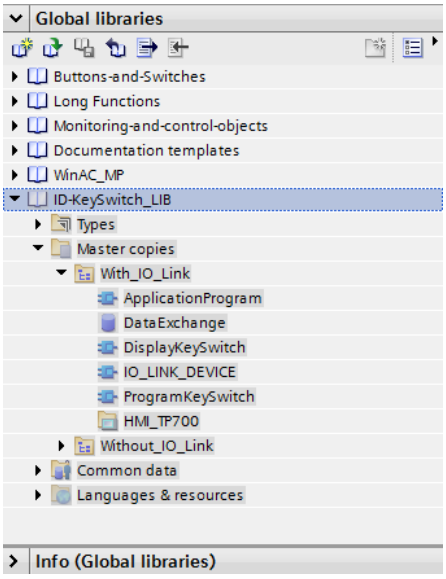
No.	Description
1.	• Create an HMI configuration or use the HMI template from the enclosed library. To do this, drag the folder "HMI_TP700" into the project tree via "drag & drop". If necessary, you can subsequently change the HMI operator panel type. • Adjust the connection settings. • If you use the enclosed "DataExchange" data block, check the "Connection" in the tag editor. • The text and graphics lists required for evaluation are under the menu “Text and graphics lists”. • The following images already contain all described functions: - "Topic_001.0" (Project tree > 001_Application) - Template image "Template_Topic" (Project tree > Image management > Templates)

2.2 Configuration with IO Link Communication

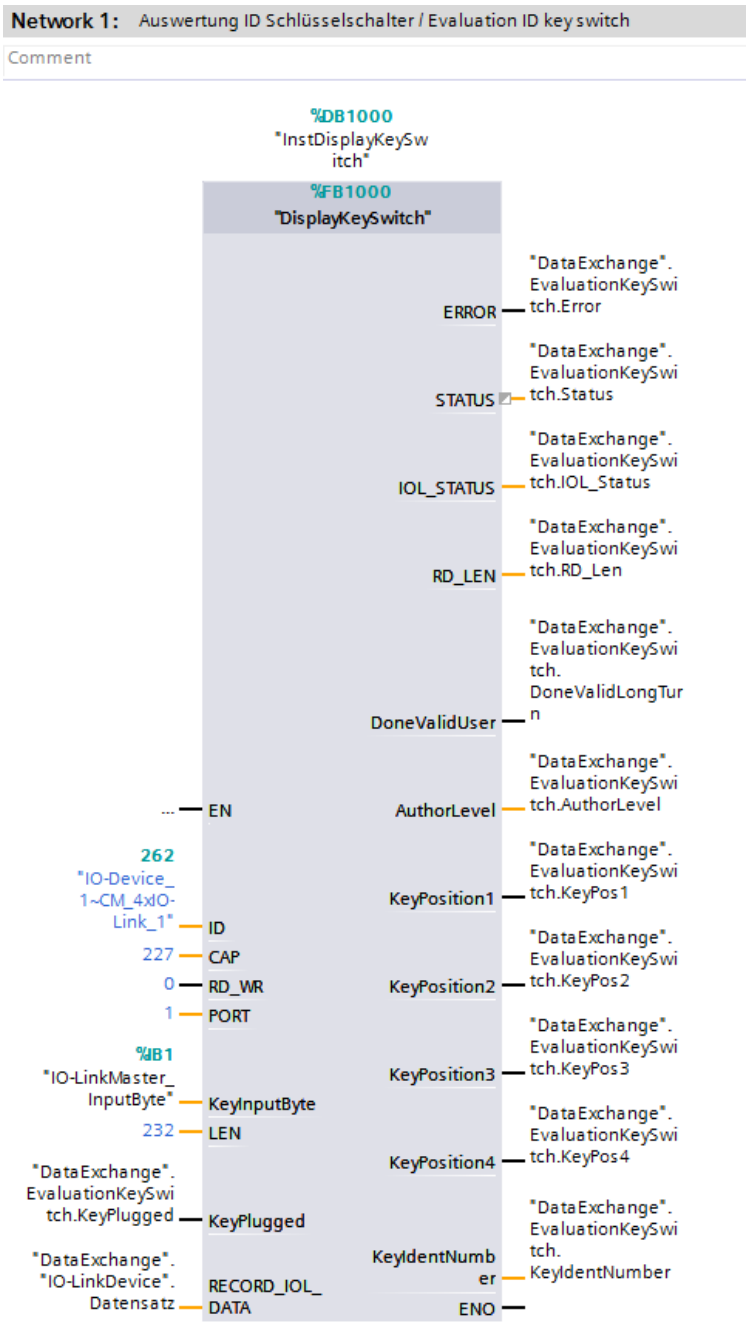
2.2.1 STEP 7 Configuration

Table 2-3

No.	Description
1.	Create a configuration with the following components. • SIMATIC CPU • ET 200SP interface module with 4-channel interface module (CM 4xIO-Link) for connecting IO-Link devices • HMI operator panel 
2.	• Install the "PCT tool" • Configure the IO-Link devices with the "PCT tool".

No.	Description
3.	Open the enclosed library file "ID-KeySwitch_LIB" • Navigate to the "Templates > With_IO_Link" folder. • Drag the five blocks into your STEP 7 configuration. 

No.	Description
4.	• Open the OB1 "Main" and insert the block "FB1000, DisplayKeySwitch" into a network. • Assign the variables to the input / output parameters. You can use the "DataExchange" data block for this purpose. • If you integrate the enclosed HMI operator panel in your configuration, you also add the "FB104, ApplicationProgram" block to the OB1 "Main"



2.2.2 HMI program

Table 2-4

No.	Description
1.	• Create an HMI configuration or use the HMI template from the enclosed library. To do this, drag the folder "HMI_TP700" into the project tree via "drag & drop". If necessary, you can subsequently change the HMI operator panel type. • Adjust the connection settings. • If you use the enclosed "DataExchange" data block, check the "Connection" in the tag editor. • The text and graphics lists required for evaluation are under the menu “Text and graphics lists”. • The following images already contain all described functions: - "Topic_001.0; Topic_002.0; Topic_003.0" (Project tree > 001_Application) - Template image "Template_Topic" (Project tree > Image management > Templates) • Note that for the implementation of the task in the sample project ... - scripts are used. - a function is executed via the "task scheduler". - a user administration is used. - all program-relevant variables are stored under "Project tree > HMI variables > Application".

3 Program “PCT (Port Configuration Tool)”

Note

You only need the "PCT" program if you use the electronic module with IO-Link communication interface.

A "Getting started" video on "Automation with IO-Link" can be found under the following link: https://support.industry.siemens.com/cs/ww/en/view/84214594

3.1 Basic procedure and requirements

Use the Port Configuration Tool S7-PCT to configure the connected IO-Link devices. In this case, it is the IO-Link master module (ET 200SP), via which the ID key-operated switch with the electronic module and IO Link is evaluated.

Installation

You can optionally install S7-PCT when installing STEP 7 from V5.4 SP5 or STEP 7 TIA Portal as of V12.0, or you can download it from the Internet http://support.automation.siemens.com/WW/view/en/37936752.

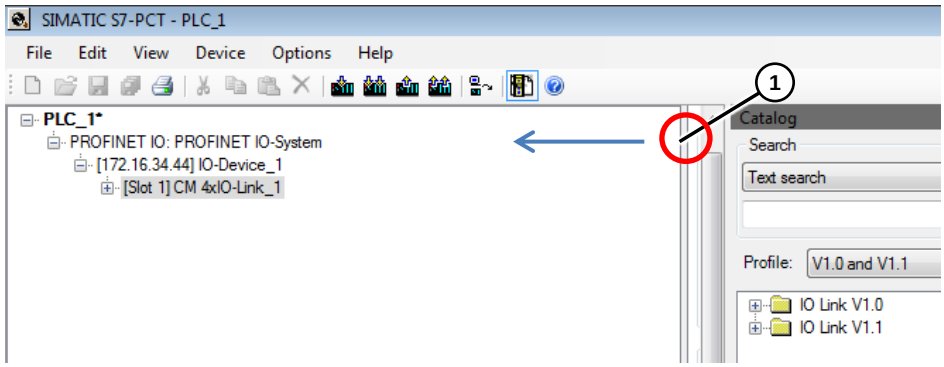
3.2 Configuring the IO-Link device

Configure the IO-Link device with the Port Configuration Tool S7-PCT.

Info:
Note the following points with the PCT Tool.

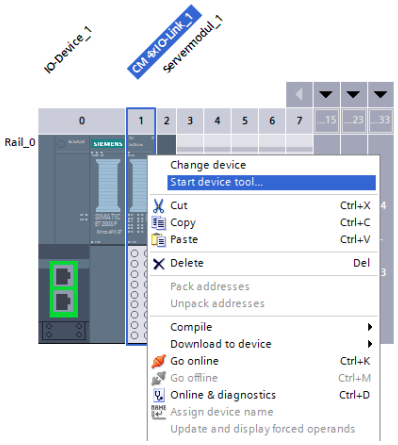
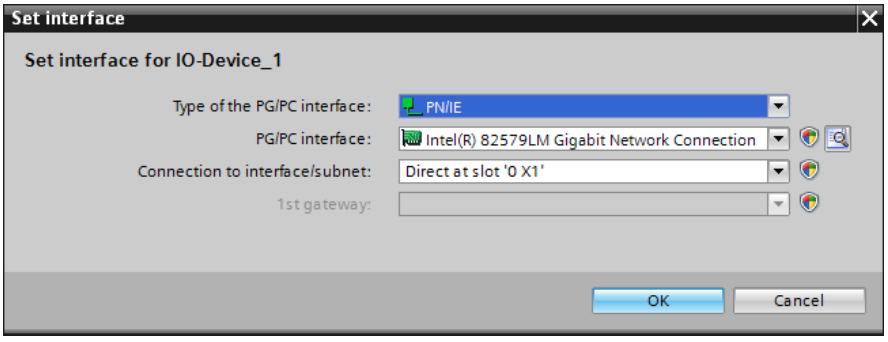
- There must be a connection between the configuration PC and the IO-Link master for the configuration.
- Hidden menu
  After the opening of the PCT tool, it may be that the "middle" section with the properties is not displayed Highlight the "menu bar" and drag the menu to the left (1) with the left mouse button pressed down.

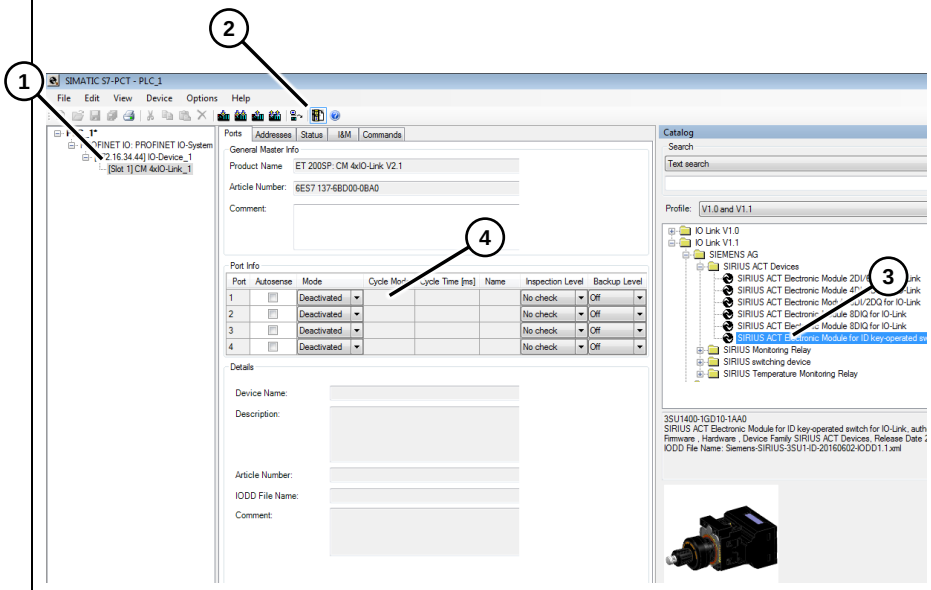
Fig 3-1

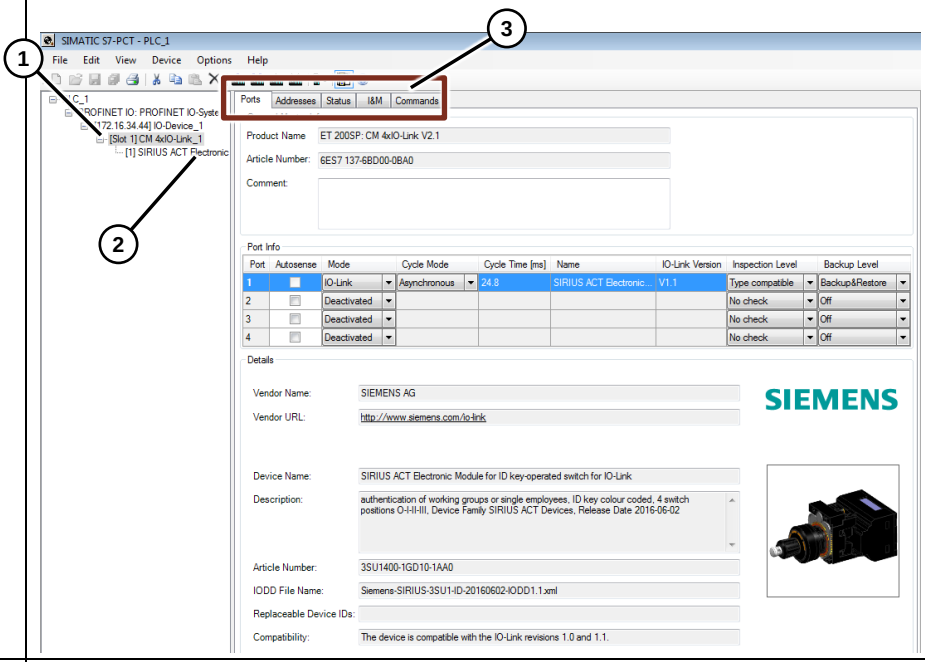
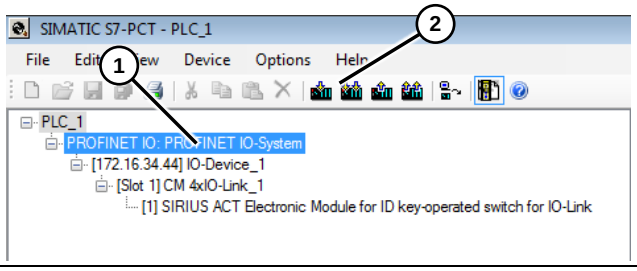


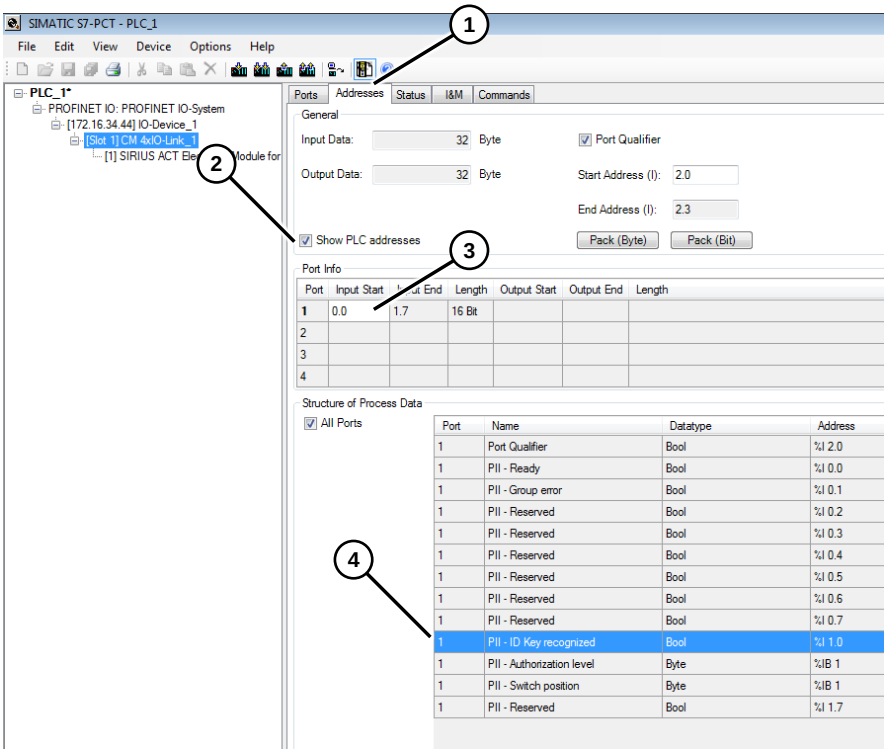
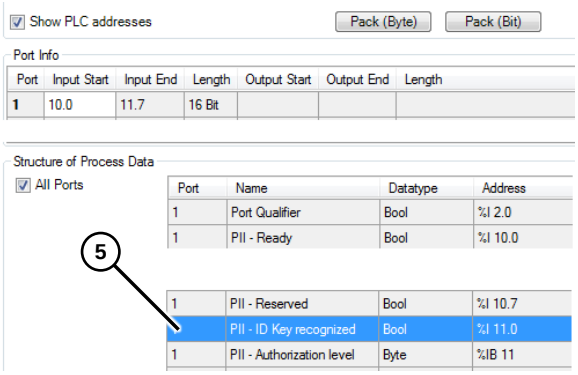
- The hardware configuration has been transferred.
- If the program "PCT" is started, the WinCC (TIA Portal) configuration cannot be accessed. For this, first the "PCT" program must be closed.

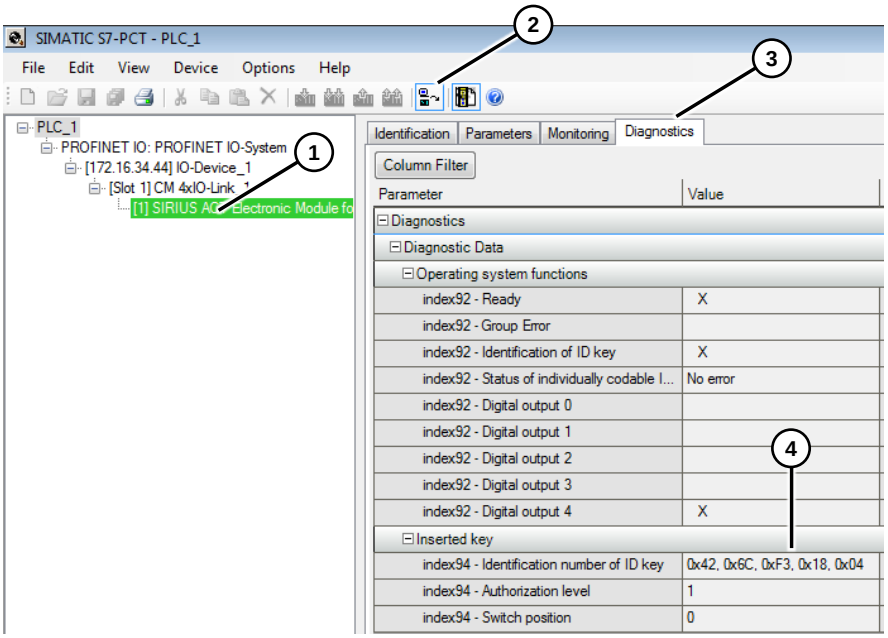
Table 3-1

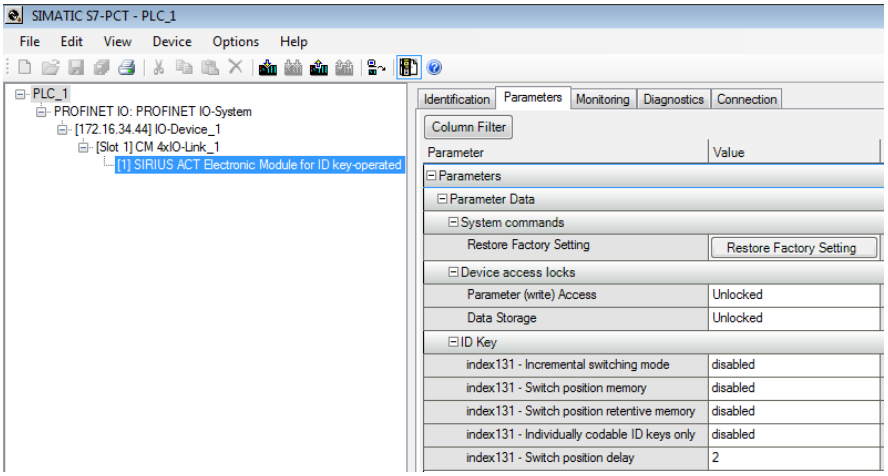
No.	Description
1.	**Open PCT program** Open the device configuration of the ET 200SP.
2.	• Open the context menu of the "IO-Link module" with the right mouse button. Select the "start device tool..." option.  In the next window, select the "S7-PCT" tool and press the "Start" button.
3.	**Setting the interface** • When you connect to the IO-Link master for the first time, the "Set interface" menu appears. • Set the connection settings and confirm the entry with "OK". The PCT tool is started. 

No.	Description
4.	**PCT menu** • Navigate to the end of the project tree (1). • Open the catalog (2) and navigate to the ID key switch "IO Link V1.1> SIEMENS AG> SIRIUS ACT Devices" (3). • Drag & drop the object into the 1st port of the "module".  **Note** The selected port depends on your wiring of the CM 4xIO-Link module -> see Link.

No.	Description
5.	**Menus and data** You can call up various kinds of information about the "CM 4xIO-Link" module (1) and the "ID key-operated switch" via the project tree (2). To do this, mark the corresponding entry. Use the menu bar to get the information (3). 
6.	**Transferring the configuration** Mark the 1st entry in the project tree (1). Click on the symbol for transferring the file (2) in the toolbar. 

No.	Description
7.	**Further settings and information** • Start address for evaluating the key position - Open the menu under "Slot CM 4xIO_Link_1 > Addresses" (1). - Activate the check box "Display PLC addresses" (2). - Then enter the input area in the table under "Input Start". In this case "0.0" (3). The default ("0.0") defines the "peripheral input byte" (PAE), which is used to evaluate the key position. In this example, the evaluation takes place via the PAE% E1! **Example:** Selected input address: "0.0" => Evaluation = EB1 (4) Selected input address: "10.0" => Evaluation = EB11 (5) Further evaluation is done via the "FB1000, DisplayKeySwitch" (Link).  

No.	Description
8.	• Read ID number from the ID key - Mark the ID key switch in the project tree (1). - Click the ""“Online" icon in the toolbar (2), - Click on "Diagnosis" in the menu field (3). - Under the entry "Insert key> index 94 - Identification number of the ID key", the ID number is displayed in "Hex" (4).  **Info:** Using the example of the ID number shown here, the following password is the result. Evaluation in the project is done via the "FB1000, DisplayKeySwitch" (Link). "Index94 - Identification number of ID key 0x42, 0x6c, 0xF3, 0x18; 0x04 ID key: 0x42 => 66 0x6c => 108 0xF3 => 243 0x18 => 24 0x04 => 4 The result of these is the following password: Password:66108243244

No.	Description
9.	• Parameter assignment of the ID key You have the option to customize various properties of the ID key. - To do this, mark the ID key switch (1). - Click on the parameter to be changed (2). - Select the desired option via the drop-down list. - Then transfer the changes to the device. 
10.	The relevant settings for the application example are completed. To quit the program, click in the menu bar on "File > Exit".

Note

The enclosed example project is based on the factory settings of the ID key parameters. These parameters must not have been edited with the "PCT" program.

The ID keys must have these settings:

- DS131 - Stepwise switching disabled
- DS131 - Store switch position disabled
- DS131 - Remnant storage… disabled

4 Engineering, without IO-Link

4.1 Hardware configuration

The hardware consists of a...

- CPU 1500 (1).
- DI module (2).
- TP700 Comfort Panel (3).
- ID key switch with electronic module without IO-Link interface (4)
- All participants are connected via PROFINET. For a better overview, only the wiring of the ID key switch is shown in Figure 4-2.

Figure 4-1

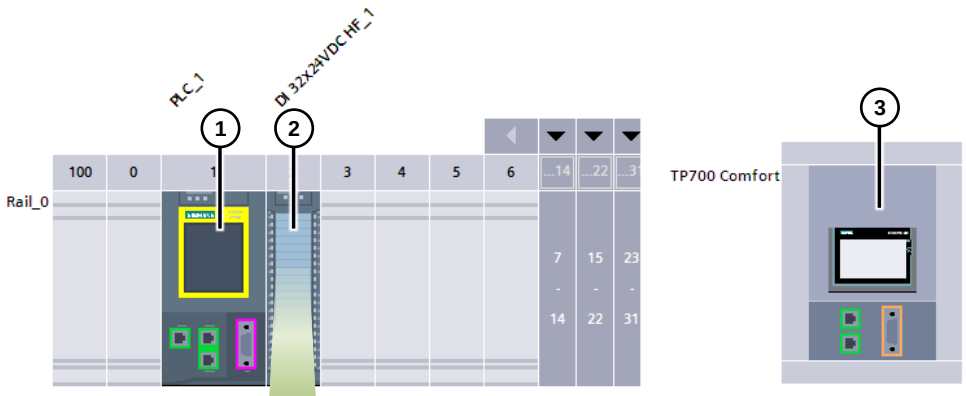
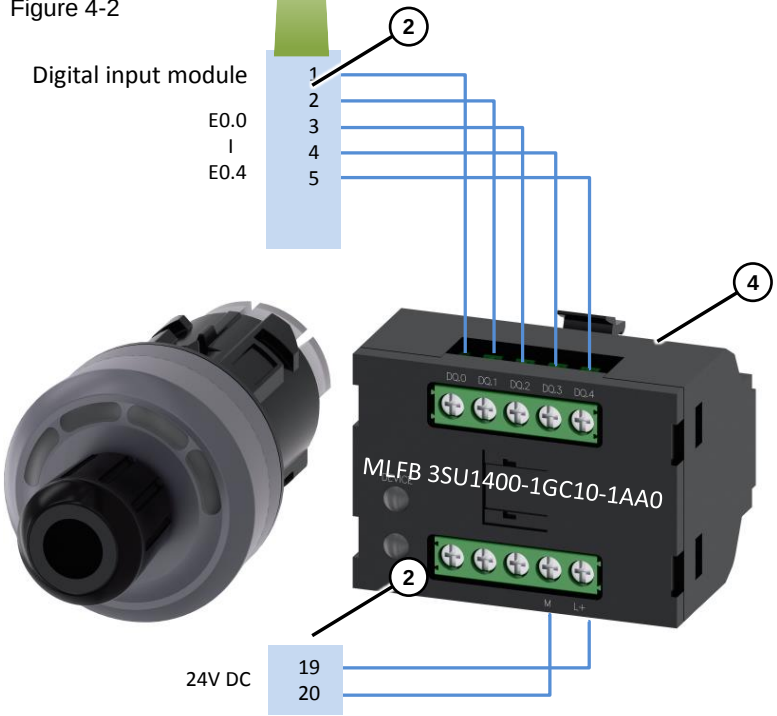


Figure 4-2



ID key switch with electronic module without IO-Link interface

The electronic module requires a 24V DC power supply. The outputs of the electronic module are wired to the inputs of the DI module.

Details on the wiring of the DI board can be found in the manual \6\.

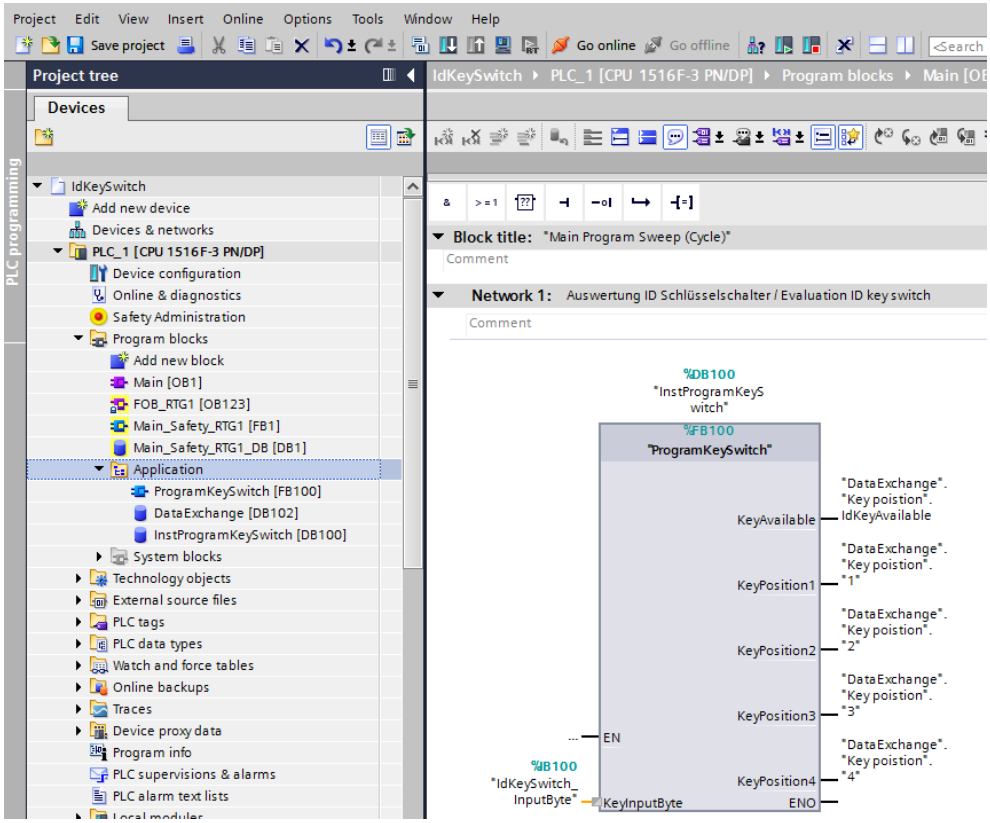
4.2 STEP 7 Configuration

For the evaluation of the key position, a parameterizable function block (FB100) was created.

The created blocks are located in the project tree under "STEP 7 Project Folder > Program Blocks > Folder "Application ".

Alternatively, you can insert the FB from the enclosed "ID-KeySwitch_LIB" library into your configuration. Information about the enclosed library can be found in the chapter 2 "Quick start guide".

Figure 4-3



4.3 Interface description

FB100, ProgramKeySwitch

The block is written in SCL and evaluates the information of the key positions.

Figure 4-4ProgramKeySwitch

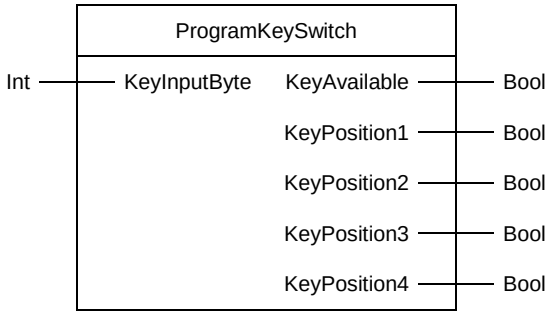


Table 4-1: Parameters of ProgramKeySwitch

Name	P type	Data type	Comment
KeyInputByte	IN	Int	Address of the input byte of the DI module, via which the output signals of the electronic module are read.
KeyAvailable	OUT	Bool	1-signal, if there is an ID key in the ID key switch.
KeyPosition1	OUT	Bool	1-signal, if the 1st key position is selected.
KeyPosition2	OUT	Bool	1-Signal, If the 2nd key position is selected.
KeyPosition3	OUT	Bool	1-Signal, If the 3rd key position is selected.
KeyPosition4	OUT	Bool	1-Signal, If the 4th key position is selected.

DB100, InstProgramKeySwitch

Instance DB for the FB100, InstProgramKeySwitch.

DB102, DataExchange

The data exchange between the control program and the HMI operator panel takes place via the DB.

STEP 7 Program description

There are a total of four different ID keys, which differ in color. Each ID key with the same color has the same "basic properties" in the factory.

If an ID key is inserted in the ID key switch and a key position is selected, an output is set via the electronic module and the signal is read in via a DI module.

The "FB100" created for the application example evaluates the DI module and provides the values as a digital output signal depending on the key position.

Note
It is not possible to evaluate which color code the inserted ID key has (green, yellow, red or blue).

4.4 Error handling

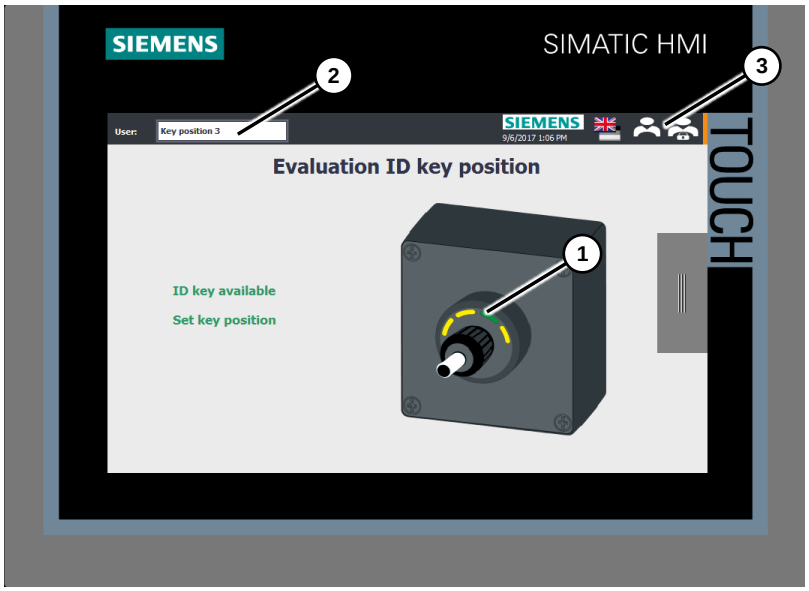
No outputs are set

- Check the used input byte of the DI module.
- Check the wiring of the hardware components.

4.5 HMI configuration

The HIM operator panel is used to visually display the four possible switch positions. The most important configuration steps are described below.

Table 4-2

No.	Description
1.	**Screen "Topic_001.0** The image is stored in the HMI project tree "Images > 001_Application".  The key position is displayed graphically via the image (1). The graphical evaluation is done via a graphics list. Depending on the variable "IdKeyOperatorSwitch_InputByte", the corresponding graphic is displayed. The evaluation and the value assignment takes place via the "FB100".
2.	**Permanent window** The "Permanent window" is stored in the project tree "Image management > Templates > Template_Topic". Via the window, the key position status is output via the "SelectedKeyPosition" text list (2). Depending on the variable "IdKeyOperatorSwitch_InputByte", the associated text is displayed. The evaluation is done via the "FB100".

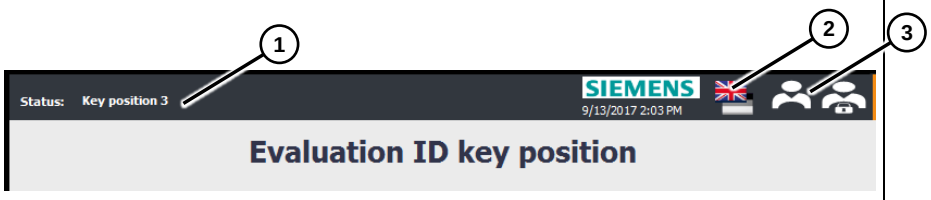
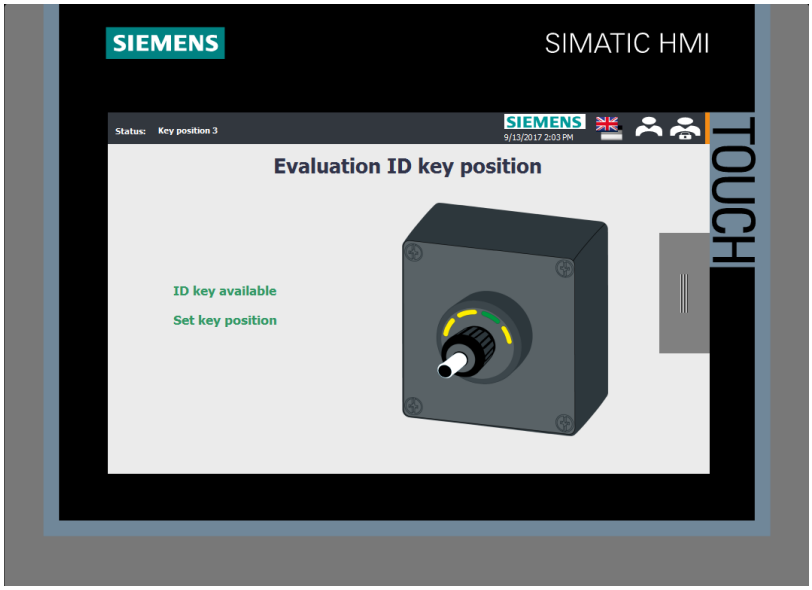
No.	Description
3.	**Text list "SelectedKeyPosition"** The text list displays the current status of the key position.
4.	**User logon/off** A user can log in or out via the graphical symbols. No project-specific user administration has been created for this application example.
5.	**Graphics list "AnimateKeyPos"** The graphic list displays the current status of the key position.

4.6 Operation

It is assumed that all components are wired and the configuration is transferred.

Table 4-3

No.	Description
1.	**Start screen** When Runtime starts, the following startup screen is called. You can navigate to the pages via the slide-in-image on the right. 

No.	Description
2.	**Permanent window** Via the permanent window... • the status is displayed as to whether an ID key is inserted and which key position is selected (1). • the language can be changed (2). • a user can log in or out via the two graphical symbols (3).  **Note on user login:** **No** project-specific user administration has been defined for this application example.
3.	**Image "Evaluation of the key position".** The image is used to output the information about the selected key position. The selectable key position depends on the color code of the inserted ID key (see Basics). If the ID key is removed, a selected key position is reset.  **Note:** The inserted key type (green ... blue) cannot be evaluated.

5 Engineering, with IO-Link

5.1 Hardware configuration

The hardware consists of a...

- CPU 1500 (1).
- ET 200SP interface module with 4-channel interface module (CM 4xIO-Link) for connecting IO-Link devices (2)
- TP700 Comfort Panel (3).
- All participants are connected via PROFINET. For a better overview, only the wiring of the ID key switch is shown
  Figure 5-2

Figure 5-1

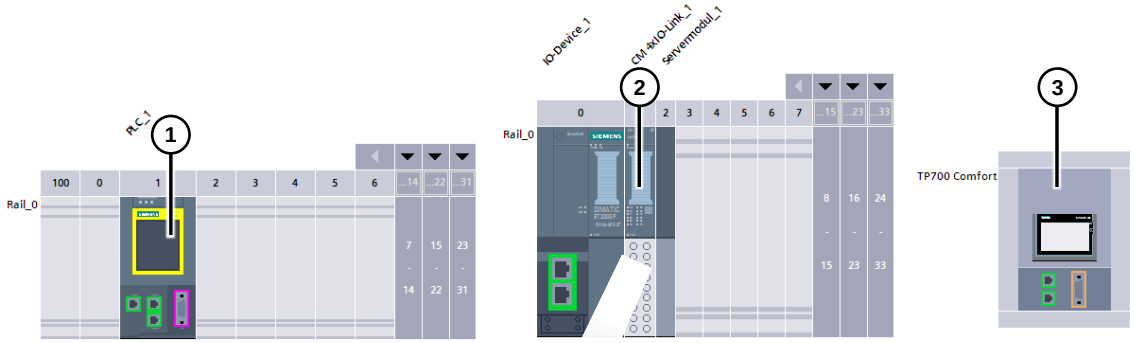
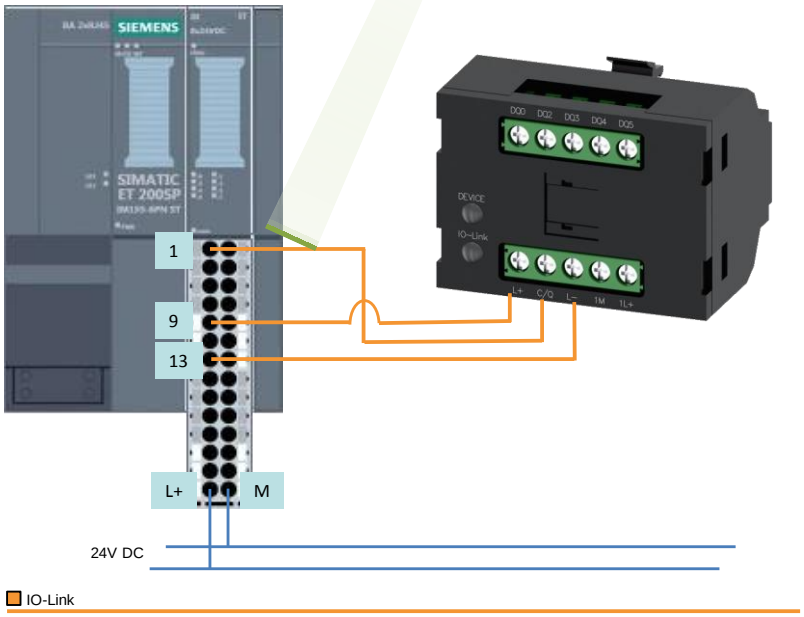


Figure 5-2



Serial interface module "CM 4xIO-Link" in conjunction with electronic module and IO-Link interface

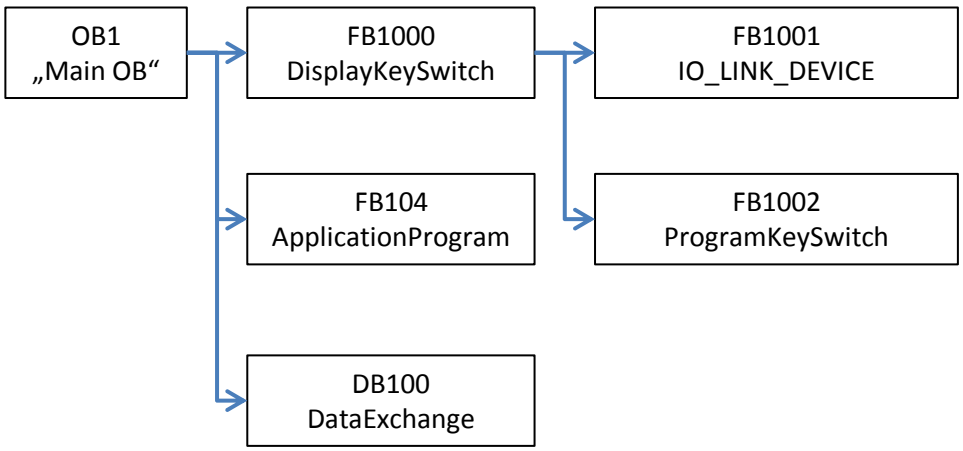
The electronic module was wired on the 1st port of the CM 4xIO-Link module. In the "PCT program" you must assign the ID key switch to this port. Please note the following information (Link).

Details on the wiring of the ET 200SP station can be found in the manual \7\

5.2 STEP 7 Configuration

Overview

Figure 5-3



Program description

The function block "FB1000, DisplayKeySwitch" evaluates a variety of information from the ID key switch, such as the selected key position. Two further FBs are required for the evaluation.

- FB1001, IO_LINK_DEVICE.
- FB1002, ProgramKeySwitch

The two FBs are called within the "FB1000, DisplayKeySwitch". For this reason, the three function blocks must always be stored together in the STEP 7 program.

Via the "FB104, ApplicationProgram" the output information of the "FB1000, DisplayKeySwitch" is summarized and processed for output on the HMI operator panel.

5.2.1 FB1000, ProgramKeySwitch

Figure 5-4IOLinkKeySwitch

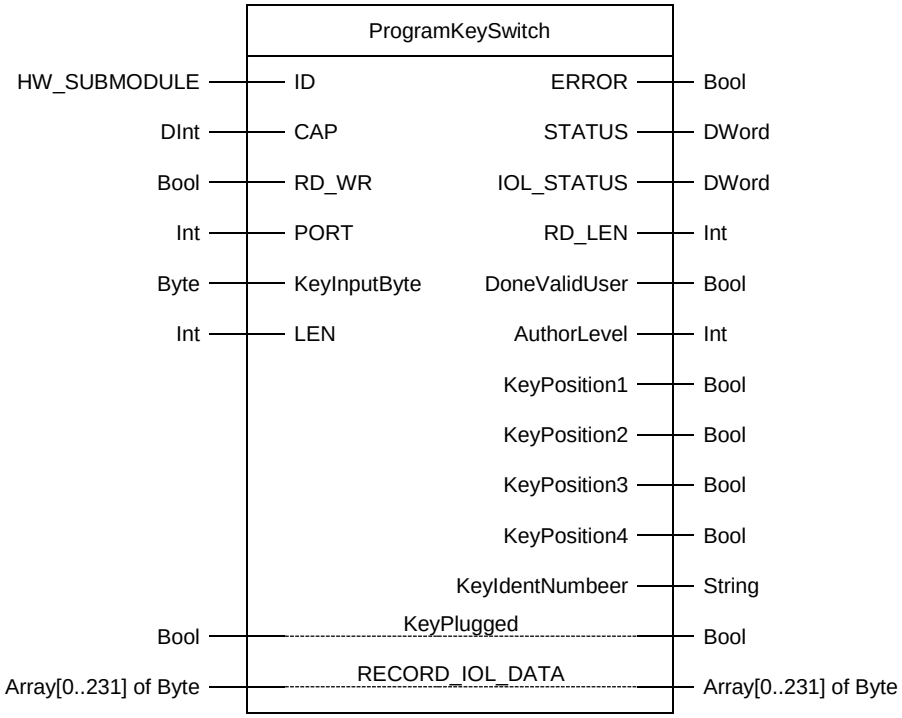


Table 5-1: Parameters of DisplayKeySwitch

Name	P type	Data type	Comment
ID	IN	HW_ SUBMODULES	With the creation of the hardware configuration for the "CM 4xIO-Link", a system constant is created (Project tree > PLC variables > System constants). Select the module used here. In this case "IO Device_1_CM_4xIO-Link_1".
CAP	IN	DInt	Fixed constant. In this case "**227**".
RD_WR	IN	Bool	Specifies whether data is read or written. **0**=Read only
PORT	IN	Int	Specification on which channel (port) the "electronic module" is wired (Link). In this case channel "**1**".
KeyInputByte	IN	Byte	In the program "PCT" you have assigned an initial address to the "CM 4xIO-Link module" (see Link). The corresponding % EB 1 is assigned to this parameter In this case EB1.

Name	P type	Data type	Comment
LEN	IN	Int	Specification of the length of the following parameter "RECORD_IOL_DATA". The data range has a length of "**232**" ("Array(0..231) of Byte").
ERROR	OUT	Bool	The parameters are used for error analysis. The output is interconnected but will not be evaluated further.
STATUS	OUT	DWord	[No commentary.
IOL_STATUS	OUT	DWord	IO-Link error status. See error information in the manual \3\
RD_LEN	OUT	Int	Length of the read data (net data). The output is interconnected but will not be evaluated further.
DoneValidUser	OUT	Bool	If the block has read / written the data without errors, then the signal changes for a cycle from 0 → 1. This is used to read out the current user in the further course.
AuthorLevel	OUT	Int	Depending on the inserted ID key (green....blue), the authorization level specified by the system is output. • Green : 1 • Yellow: 2 • Red: 3 • Blue: 4
KeyPosition1	OUT	Bool	Depending on the key position, the signal changes from 0 → 1
KeyPosition2	OUT	Bool	Depending on the key position, the signal changes from 0 → 1
KeyPosition3	OUT	Bool	Depending on the key position, the signal changes from 0 → 1
KeyPosition4	OUT	Bool	Depending on the key position, the signal changes from 0 → 1
KeyIdentNumber	OUT	String	Each ID key has its own ID key number that is output via this parameter. Later, the number will be used for the user login.
KeyPlugged	IN_OUT	Bool	The signal changes from 0 → 1 if the ID key has been inserted in the ID key switch.
RECORD_IOL_DATA	IN_OUT	Array[0..231] of Byte	The system writes or reads the data of the IO-Link in this data area. The data area consists of an "array" with a length of 232 "bytes". **=> Array (0..231) of Byte**

The two following function blocks are called within the function block "FB1000, DisplayKeySwitch"

- FB1001, IO_LINK_DEVICE.
- FB1002, ProgramKeySwitch

FB1001, IO_LINK_DEVICE

The FB is used to communicate with the IO-Link peripheral device (ID key switch) connected to the IO-Link communication module. More information on the block can be found under the following link \3\.

FB1002, ProgramKeySwitch

The FB evaluates the read out information of the "FB1001, IO_LINK_DEVICE". Furthermore, via this block, the
identification number of the ID key is read out and assembled as a password for the user administration.

FB104, ApplicationProgram

The FB is optional and is used to display

- the key position ...
- the key type (green....blue)...

graphically on the HMI operator panel.

The FB receives the data from the "FB1000, DisplayKeySwitch".

DB100, DataExchange

The data block is used for data exchange between the function blocks themselves and the HMI operator panel.

DB104, instProgramApplication

Instance DB for the FB104, ProgramApplication.

5.3 Error handling

- There are no values in the data record.
  - Check the input byte used against the one stored in the PCT program
  - Check the wiring of the hardware components.
  - Check the output signals "BUSY"; ERROR” and "STATUS” on FB1000.
- No user login is carried out.
  - Under the Runtime settings, check that the option "Login only possible with password" is activated.
  - Check the ID key number you have stored as "password".

5.4 HMI configuration

The following functions of the ID key-operated switch are implemented via the HIM operator panel.

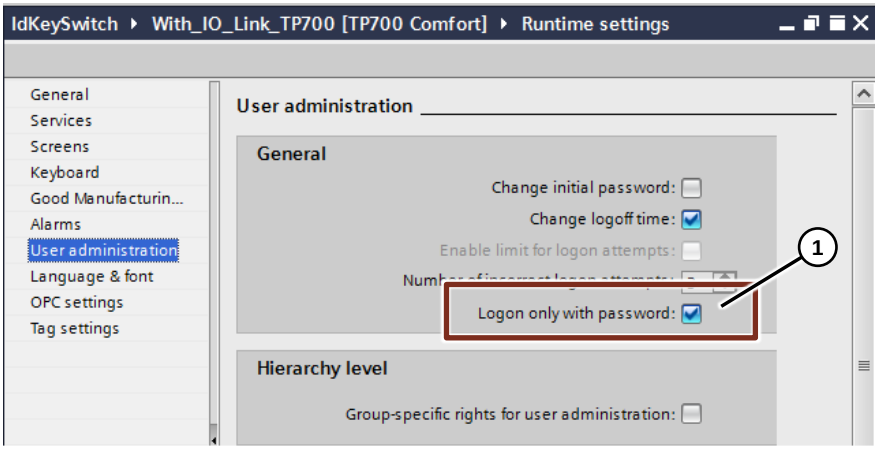
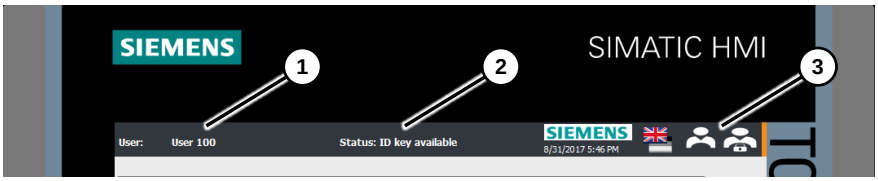
- Evaluation of the currently logged in user.
- Automatic logon to the operator panel with the ID key.
- Display of the current key position.
- Display of which ID key is inserted/used.
- Reading of the ID key number.
- Creation of new users (user administration via the HMI operator panel).

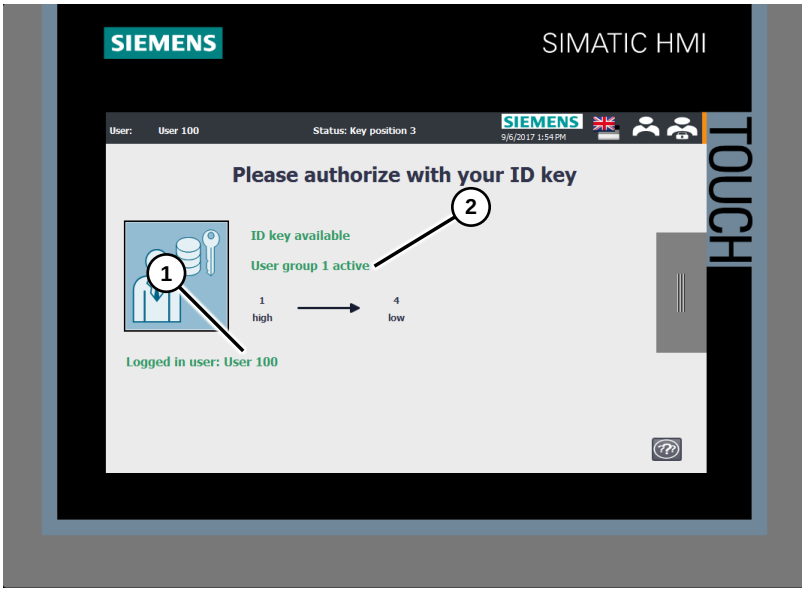
The most important configuration steps are described below.

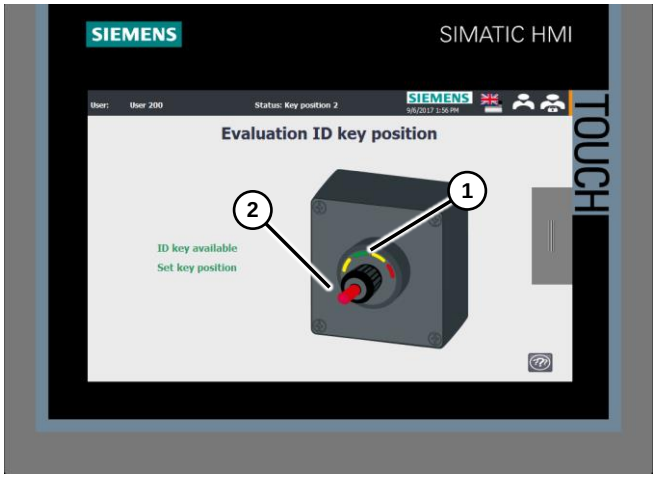
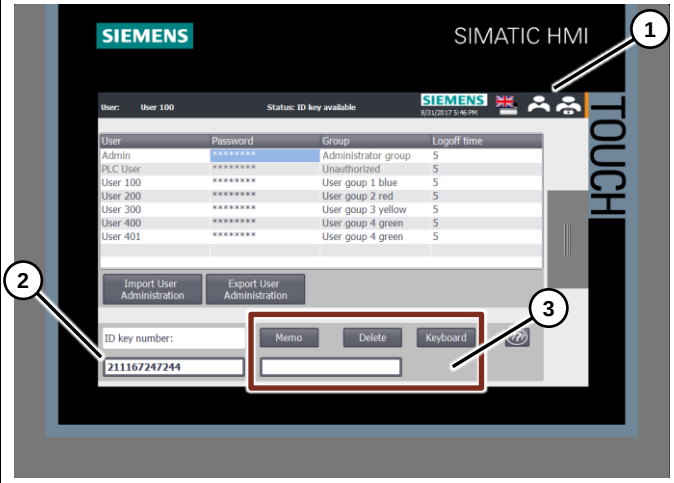
The following figure shows two out of three configured images. The graphic/textual output of the key information is done via the images.

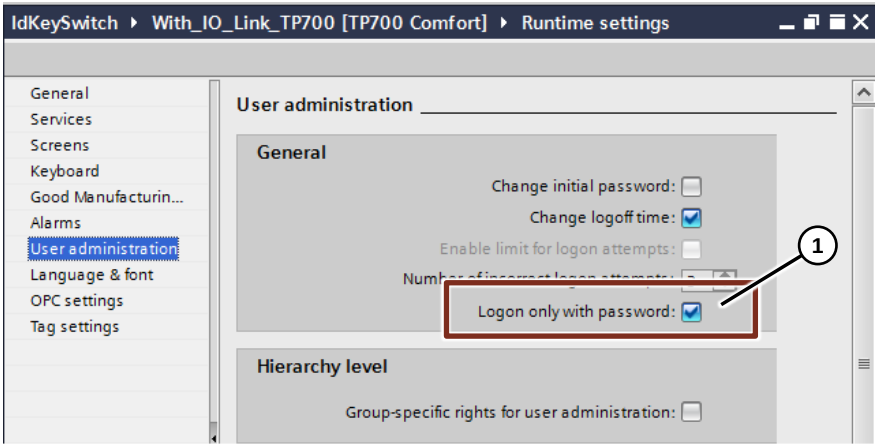
Figure 5-5

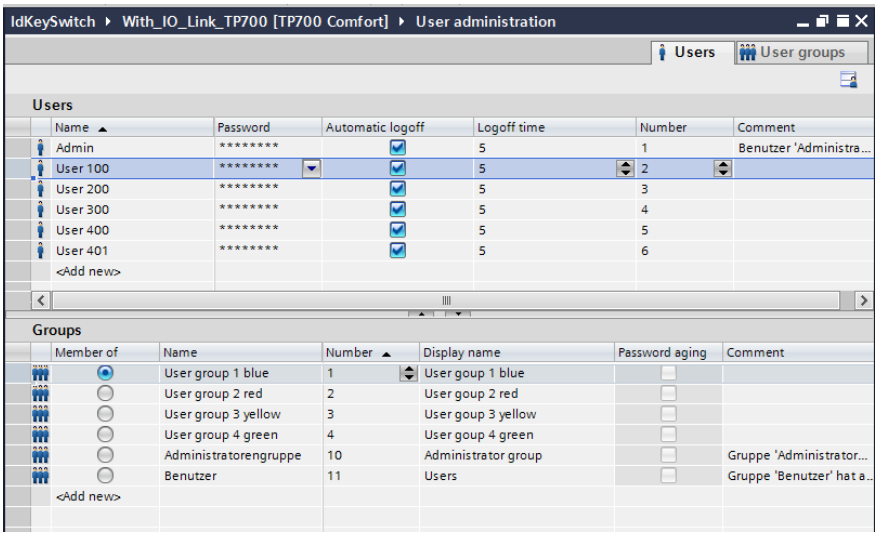
Table 5-2

No.	Description
1.	**Runtime settings user administration** The application example is based on the fact that the login is possible only with the password. The operator does not have to specify a user name when logging in.  • Call up the "Runtime Settings" via the project tree of the HMI configuration. • Under "User administration > General" you activate the check box "Login only possible with password".
2.	**Permanent window** The "Permanent window" is stored in the project tree "Image Management > Templates > Template_Topic".  • The logged in user is displayed via the window. The information on this comes from the user administration (1). • Via the window, the status of the key position is output via the text list "SelectedKeyPosition" The evaluation is done via the "FB104" (2). • If registration with an ID key is not possible, the operator can log in and out via the two graphical symbols (3).

No.	Description
3.	**Screen "Topic_001.0** The image is stored in the project tree "Images > 001_Application".  The image shows the information about the logged-in user in a summary. • User name: In this case "User 100" (1). • User group: In this case "User group 1" (2). The system receives the data via the user administration. The login is done automatically by the user inserting his personal ID key into the ID key switch. The user data is read out via the "Task Scheduler" and the "Read User Name" and "Read Group Number" system functions. **Notes** • The users and the passwords are stored in the "user administration" (see Link). • The information about the user in the image is only displayed if an ID key is inserted (Properties > Animation > Visibility).

No.	Description
4.	**Screen "Topic_002.0** The image is stored in the project tree "Images > 001_Application".  The image graphically displays the current key position (1) and the ID key used (green ... blue) (2). The graphical evaluation is done via a graphics list. Depending on the variable "UserAdministration_Default_AnimationKeyPos", the corresponding graphic is displayed. The evaluation and the value assignment takes place via the "FB104".
5.	**Screen "Topic_003.0** The image is stored in the project tree "Images > 001_Application".  The image performs the following functions. • Creating or deleting users. • Customizing user data • Export user administration • Reading ID key number Admin rights are required to access the page and edit the user administration. In this example, the page can be called up with the "blue" ID key inserted. Alternatively, you can log in using the symbols in the "Permanent window" (1).

No.	Description
	Password 100 If an ID key is inserted, the ID key number is output in a text field. The information comes from an output parameter of the "FB102" (2). The area marked with (3) only serves to facilitate the "handling" to create a new user. The text field is used, for example, to save the displayed "ID key number" on an interim basis. The functions used are self-explanatory. Details on the operation are given in Chapter 5.5.
6.	**Information page** The button takes you to an information page. The page describes how to create a new "user". 
7.	**Runtime settings user administration** The application example is based on the fact that the login is possible only with the password. The operator does not have to specify a user name when logging in.  • Call up the "Runtime Settings" via the project tree of the HMI configuration. • Under "User administration > General" you activate the check box "Login only possible with password".

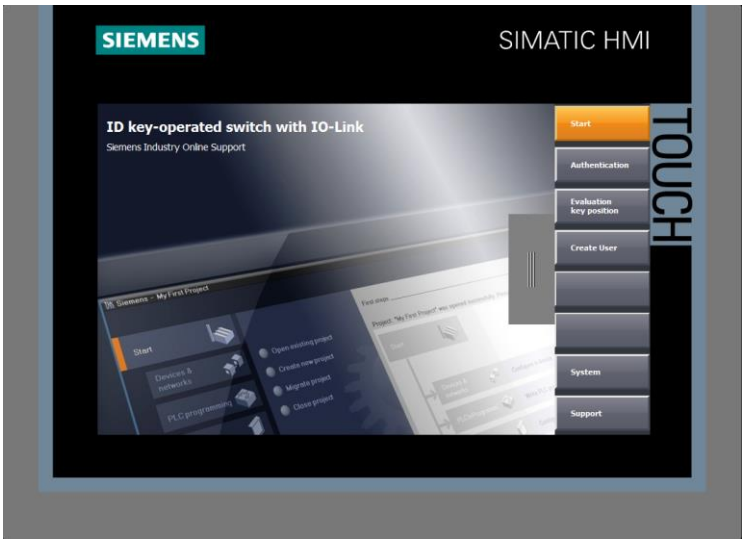
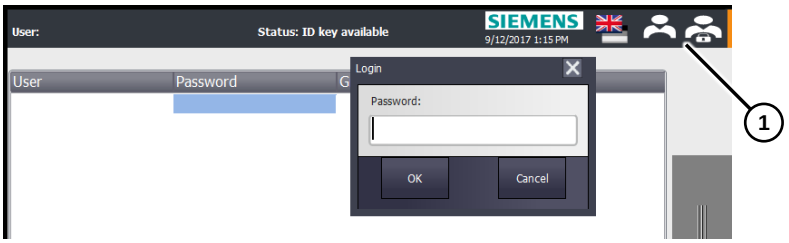
No.	Description
8.	**User administration**  The following has been set for the user administration. - The "blue" ID key is in group 1 with the highest authority. - The "red" ID key is in group 2. - The "yellow" ID key is in group 3. - The "green" ID key is in group 4 with the lowest privilege. **Note** The standard evaluation of the "AuthorLevel" was changed programmatically. See "Online Value" on "FB1000, DisplayKeySwitch". **Password assignment** Each ID key has an individual ID number and is used as a "password". • Enter the name of the user in the "Name" field. • Assign the user an ID key. Depending on the task of the user, he or she gets a "green...blue" ID key. • Read out the ID key number of the user and enter it in the "Password" field. You do not need to provide the ID key number to the user. **Note** The ID number is output unencrypted at the "FB1000, DisplayKeySwitch" at the "KeyIdentNumber" output. If the user inserts his ID key in the ID key switch, the system compares the “stored” passwords" (ID key numbers) with those of the read ID key number. If the data match, the user is logged in.
9.	**Script "LogOnUser"** When changing the value of the "DoneValid" output parameter ("FB1000"), the "User logon" function is executed. The function is only executed when the signal changes from 0 → 1. In addition, a system message displays the name of the logged-in user.

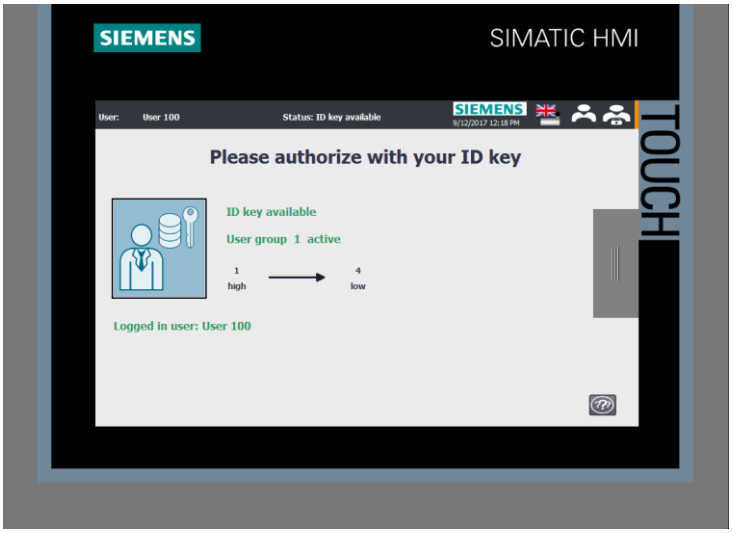
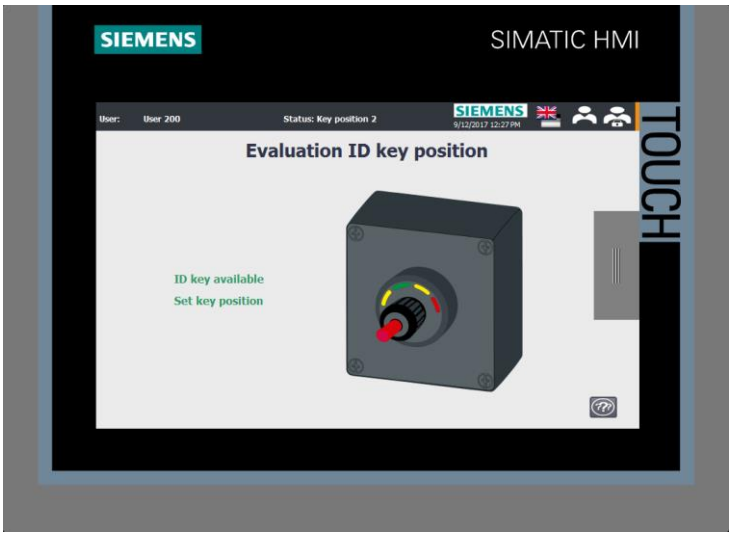
No.	Description
10.	**Script "UserLogOff"** When changing the value of the output parameter "KeyPlugged" "FB1000", the “User LogOff” function is executed. The function is only executed when the signal changes from 1 → 0. A system message displays the name of the logged-out user. In this way, it can be documented when the user has logged off.
11.	**Text list "SelectedKeyPosition"** The text list is used to output the status of the key position. The value assignment takes place via the "FB104".
12.	**Graphics list "KeyPositionAnimation"** The graphics list is used to output the status of the key position and the ID key used. The value assignment takes place via the "FB104".
13.	**Task scheduler** Using the task scheduler, the "User change" trigger executes the "Read user name" and "Read group number" functions.

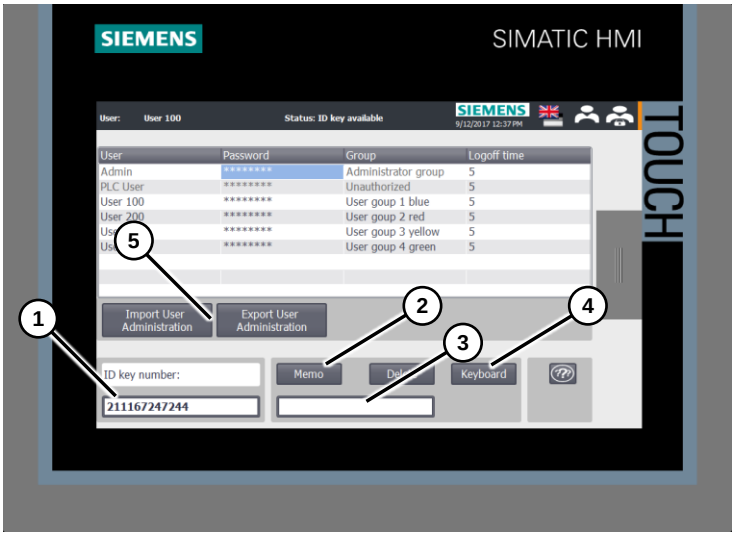
5.5 Operation

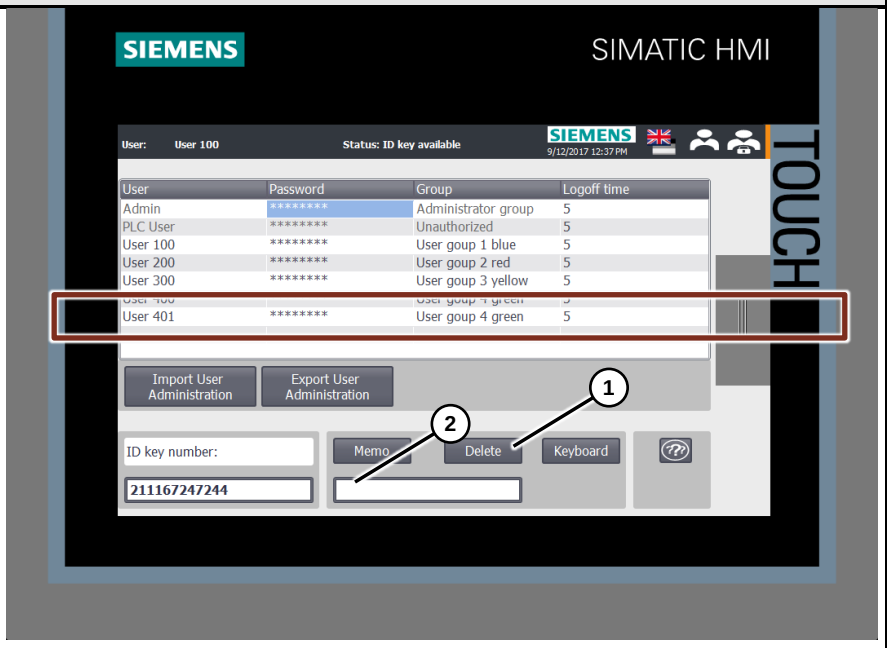
It is assumed that all components are wired and the configuration is transferred.

Table 5-3

No.	Description
1.	**Home page** When Runtime starts, the following startup screen is called. You can navigate to the pages via the slide-in-image on the right. 
2.	**Permanent window, login without ID key** By default, a user logs on via his ID key. If this is not possible, a user can log on or off via the two graphic symbols in the permanent window.  • In the permanent window, click on the "graphic symbol" to log a user on (1) • Enter the password in the login dialog. The system automatically identifies the "user" via the password. **Notes on the test password** The user must know the identification number of his ID key.

No.	Description
3.	**Image "Authentication"** The image is used to output the information about the selected key position. If an ID key is inserted in the ID key switch, the user is logged on automatically depending on the access rights stored in user administration. If the ID key is removed, the current user is automatically logged out. 
4.	**Image “Evaluation of the key position”.** The image is used to output the information about the selected key position and which key type ("green...blue") is inserted. The selectable key position depends on the color code of the inserted ID key. If the ID key is removed, the selected key position is reset. The same thing happens when the logoff time of the current user has expired. 

No.	Description
5.	**Image "User Administration" - General.** The image is used for the user administration. To call up the image, you must have administrator rights or a "blue" ID key. **Note** In the configuration, the "blue" ID key was assigned to group 1 (group 1 = admin rights). **User display, create new user.**  • Insert the "blue" ID key into the ID key switch. The page can now be called without entering a password. • Remove the ID key and insert the ID key of the new user in the ID key switch. • The ID number of the ID key is displayed in the left text box (1). • Make a note of the number or click the "Memo" button (2). The ID number is temporarily stored via a second text field (3). • Remove the ID key and put the "blue" ID key back in the ID key switch. • In the user display, enter the new user name, the group and, as password, the cached "Identification number of the ID key". For easier input, you can first call up the system keyboard via the "Keyboard" button (4). • Use the Import/Export user administration buttons to carry out the listed functions (5). View of the user display with the newly created user "User 401".

No.	Description
	 **Note:** If the identification number is temporarily stored, the cached identification number in the second text field can be deleted again using the "Delete" button (1) (2).

6 Useful information

Note To find detailed information on the products listed here in the manual, see \5\.

SIRIUS ID key switch with electronic module

The ID key-operated switch is an electronic key-operated switch that can switch up to four switching positions by means of differently coded keys. The ID key switch is primarily intended to replace the mechanical locks on various machines.

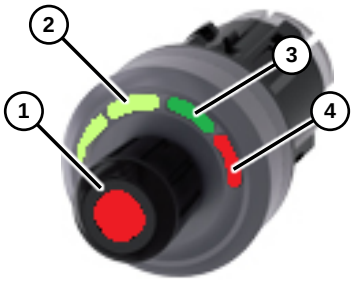
Figure 6-1

An essential component of the solution is the SIRIUS ID key-operated switch consisting of the following components.

1. ID key switch.
2. Bracket for attachment in housing
3. Electronic module for ID key-operated switches
   (Two versions - without/with IO-Link communication interface)
4. Inserted ID key.
5. Coded ID keys with different key positions.

ID key switch

Figure 6-2



The ID key switch has 4 key positions and automatically recognizes how many key positions the currently inserted ID key allows. Which key position is currently selected - and which are still selectable, is indicated by LEDs.

Table 6-1

Component	Description
Rotary switch (1):	The key position is selected via the rotary switch. The rotary switch can be rotated continuously in both directions, whereby the switch noticeably engages with every 1/8 turn. A key position is always selected to the right. If the switch is turned to the left, the currently selected position is reset. A renewed selection always starts with the first key position, regardless of whether the 4th key position was previously selected. **Exception:** Depending on the configured delay time (for a position change), it is also possible to “switch back” one step.
LED "bright green" (2):	Selectable key positions.
LED "dark green" (3):	Currently selected key position.
LED "red" (4):	The key position cannot be selected with the currently inserted ID key due to the system. **Note:** The rotary switch can be turned further via the "red position".

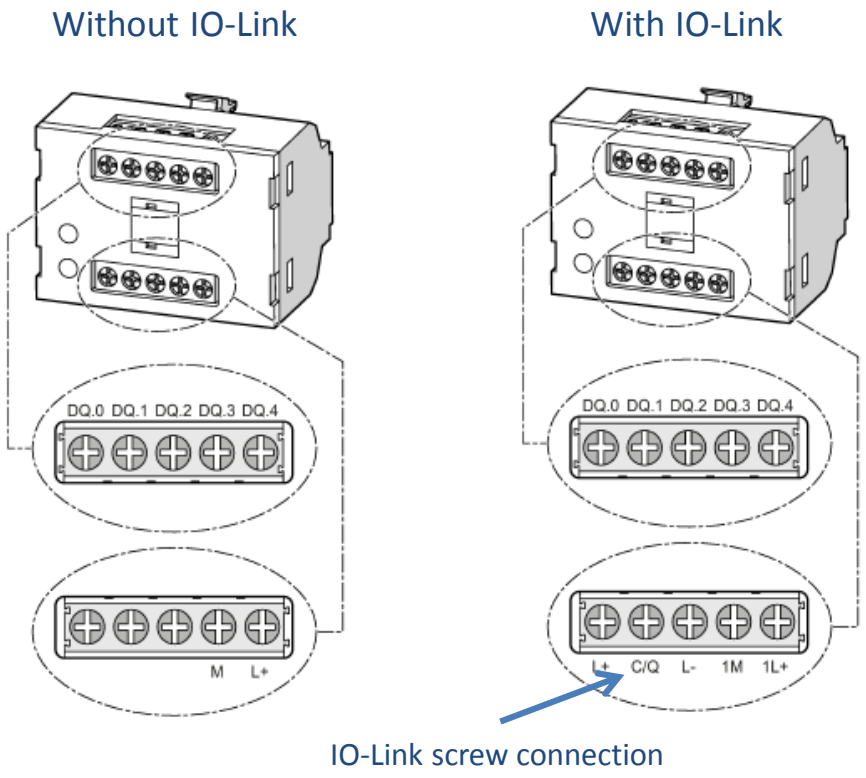
Electronic module

Two different versions of the electronic modules are available for the ID key switch.

- Without IO-Link communication interface
- With IO-Link communication interface

The electronic modules for ID key switches have five digital outputs. The setting of outputs 0 to 3 depends on the current key position and the module settings. If a valid ID key is detected, output 4 is active; otherwise output 4 is inactive.

Figure 6-3



The functional differences are listed in chapter 1.2.3.

ID key

There are four different ID keys that are color coded to distinguish between them more easily. There is a fifth, freely configurable ID key (white), which is not considered in this application example.

Figure 6-4

The number of possible "key positions" is fixed for the ID keys of the same color.

- blue: 4 key positions (1 to 4)
- red: 3 key positions (1 to 3)
- yellow: 2 key positions (1 to 2)
- green: 1 key position (1)

Thus, only the first key position can be selected with the "green" ID key. The key positions 1 to 4 can be selected with the "blue" ID key.

Note The word "key position" is to be equated with "authorization levels".

HMI user administration

The user administration that is integrated in the WinCC TIA Portal is used. Information about "user administration" can be found here \10\.

Each ID key has a vendor-specific ID number, via which the plant operator obtains authorization and logs on to the HMI operator panel.

ET 200SP with communication module IO-Link master CM 4xIO-Link

The communication module serves as an IO-Link master and communicates with the
electronic module in the version **with** “IO link communication".

The parameter assignment of the ID key is done via the "PCT Software" (Port Configuration Tool).

7 Appendix

7.1 Service and Support

Industry Online Support

Do you have any questions or need assistance?

Siemens Industry Online Support offers round the clock access to our entire service and support know-how and portfolio.

The Industry Online Support is the central address for information about our products, solutions and services.

Product information, manuals, downloads, FAQs, and application examples – all the information you need is accessible with just a few mouse clicks at:
https://support.industry.siemens.com

Technical Support

The Technical Support of Siemens Industry provides you fast and competent support regarding all technical queries with numerous tailor-made offers – ranging from basic support to individual support contracts.

You can send queries to Technical Support via the web form:
www.siemens.com/industry/supportrequest

SITRAIN – Training for Industry

With our globally available training courses for our products and solutions, we help you with innovative learning methods.

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https://www.sitrain-learning.siemens.com/DE/en/index.do

Service offer

Our range of services includes the following:

- Plant data services
- Spare parts services
- Repair services
- On-site and maintenance services
- Retrofitting and modernization services
- Service programs and contracts

You can find detailed information about our range of services in the service catalog:
https://support.industry.siemens.com/cs/sc?lc=en-WW

Industry Online Support App

You can also receive optimum support wherever you are on the go using the "Siemens Industry Online Support" app. The app is available for Apple iOS, Android and Windows Phone:
https://support.industry.siemens.com/cs/ww/en/sc/2067

7.2 Links and Literature

Table 7-1

No.	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to the entry page for the application example https://support.industry.siemens.com/cs/ww/en/view/109749912
\3\	Acyclic Read and Write with the IO-Link Library https://support.industry.siemens.com/cs/ww/en/view/82981502
\4\	S7-PCT V3.4 HF2 for IO-Link Master https://support.industry.siemens.com/cs/ww/en/view/32469496
\5\	System Manual - SIRIUS ACT 3SU1 Pushbuttons and Signaling Devices https://support.industry.siemens.com/cs/en/en/view/107542462
\6\	SIMATIC S7-1500/ET 200MP Manual Collection https://support.industry.siemens.com/cs/en/en/view/86140384
\7\	SIMATIC ET 200SP Manual Collection: https://support.industry.siemens.com/cs/ww/en/view/84133942
\8\	IODD file for SIRIUS ID key switch 3SU1 https://support.industry.siemens.com/cs/ww/en/view/109478099
\9\	Getting Started - Automation with IO-Link https://support.industry.siemens.com/cs/ww/en/view/84214594
\10\	User administration in WinCC WinCC (TIA Portal) https://support.industry.siemens.com/cs/ww/en/view/109738532

7.3 Change documentation

Table 7-2

Version	Date	Modification
V1.0	01/2018	First version