

Application example for using an RCCA-B/C/D without HMI

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Preconditions

To understand this example, the following components are required: RCCA-B/C/D with current firmware (V1.0.30 or newer) GSMDL file for the TST RCCA, Siemens S7-1200F PLC, Siemens TIA Portal development environment not older than version V15. TST FUF2/FU3F with activated RCCA functionality and activated parameter P.804 = 1.

To simplify the interaction between PG, PLC and RCCA, the use of an Ethernet switch is recommended. The address range of the adapter used in the PG must be set to 192.168.0.xxx/24.

Hardware configuration

Create a new project and add your control unit to the project. A Siemens S7-1212FC DC/DC/DC is used in the example. Support of ProfiSAFE® is a prerequisite for communication via an RCCA from variant B.

If you have already integrated the GSDML into your project, select the hardware variant "TST-RCCA-x" to be used from the hardware catalogue under "Other field devices" -> "PROFINET IO" -> "I/O" -> "FEIG ELECTRONIC GmbH" -> "Door control" and add it to your project.

Establish the ProfiSAFE connection between the control unit and RCCA under "Network view".

Configuration of the TST

Check the settings of the input profiles for input 13 and 14 as well as output 21, 22 and 23 in the door control unit.

Set the following profiles:

P.50D = 0101 Open command

P.50E = 0701 Close command

P.D01 = 0701 Flashing during open and close movement

P.D02 = 0101 Door in open position

P.D03 = 0201 Door in close position

Program blocks

Tags

To simplify the subsequent wiring, create a tag table with the tags shown in Fig. 1.

Default tag table					
		Name	Data type	Address	Comment
1		Q_Blink	Bool	%Q0.0	physical out 0
2		Q_Open	Bool	%Q0.1	physical out 1
3		Q_Closed	Bool	%Q0.2	physical out 2
4		m_In13	Bool	%M0.0	
5		m_In14	Bool	%M0.1	
6		m_open	Bool	%...	
7		m_stop	Bool	%M0.3	
8		m_close	Bool	%M0.4	

Figure 1

To control the safety functions of the RCCA correctly, create the following variables:

Safety				
		Name	Data type	Address
1		F-Open	Bool	%Q2.0
2		F-Stop	Bool	%Q2.1
3		F-Close	Bool	%Q2.2
4		Mask_F-Open	Bool	%Q2.4
5		Mask_F-Stop	Bool	%Q2.5
6		Mask_F-Close	Bool	%Q2.6
7		Q-EM_Stop	Bool	%Q3.0
8		ACK	Bool	%M100.0
9		Trigger_E-Stop	Bool	%M100.1
10		ACK_Req	Bool	%M100.2

Figure 2: Security variables

Example library

Open "Feig RCCA V1.1" under "Global libraries" and copy "Module" and "PLC data types" from the templates to the appropriate place in your project.

Security program

Open the "Main_Safety_RTG1" module. This module is created automatically when a fail-safe control unit is used and contains the programme for safety sequence group 1. This part of the programme takes over the actual control of the fail-safe components and thus the final movement commands to the RCCA.

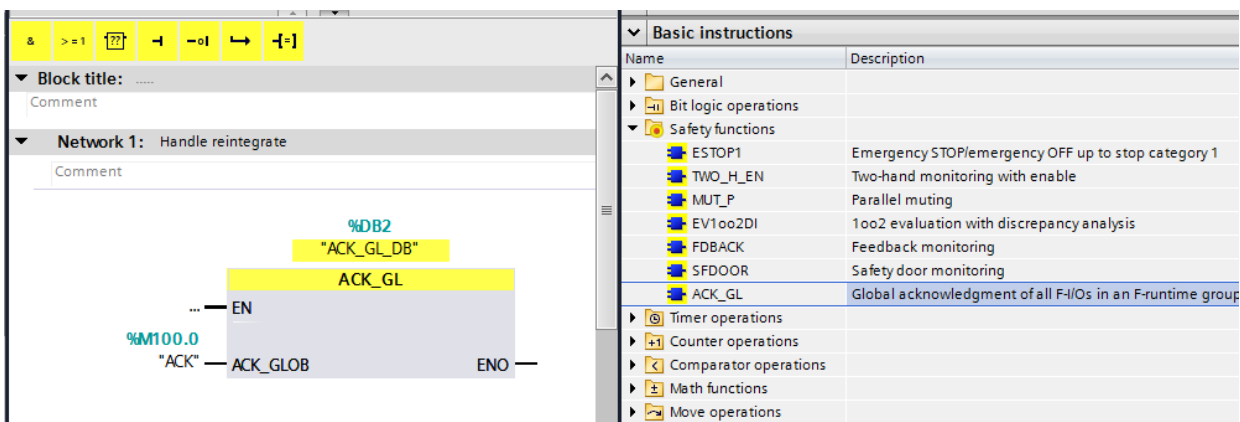


Figure 3: Network 1 - ACK_GL

Network 2 contains the handling of the fail-safe output of the RCCA. This is connected to the internal emergency stop of the door control unit. To control it, select the standard module "ESTOP1" from the standard library and insert it in network 2. The variables for control can be found in the "Safety[10]" variable table.

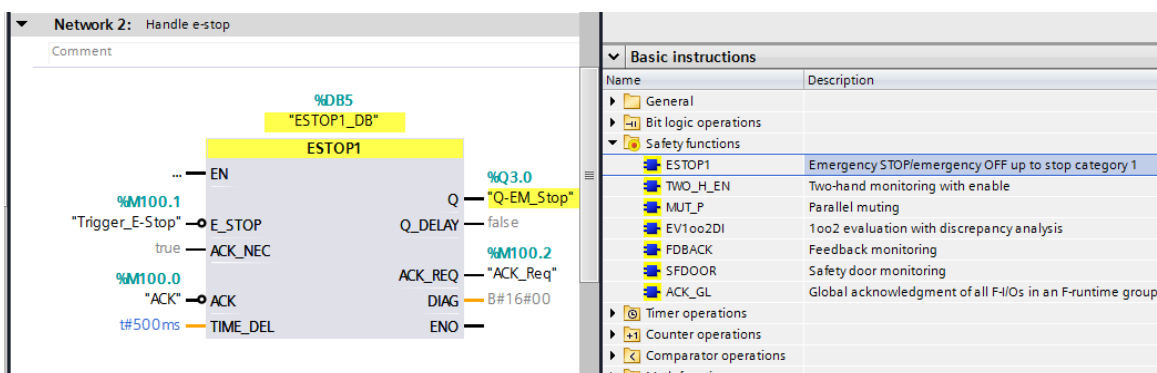


Figure 4: Network 2 - ESTOP1

In network 3, all movement masks are permanently set to the value "TRUE". A separate evaluation is not necessary for this example. Insert the module as shown in the figure:

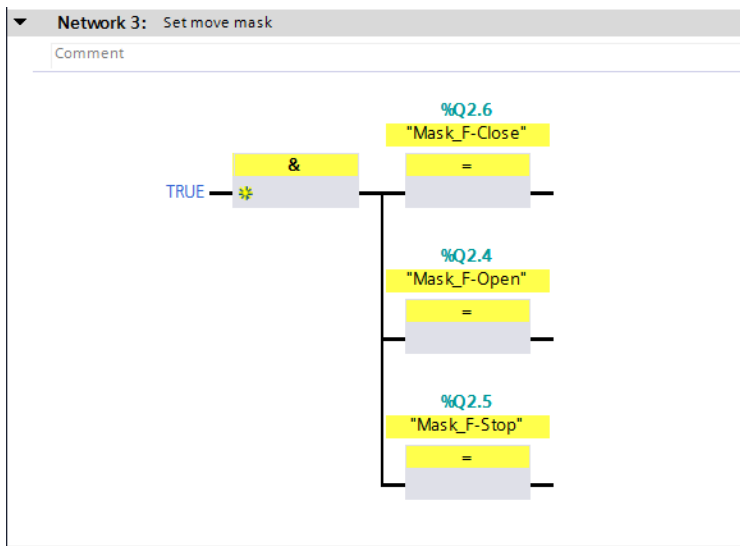


Figure 5: Mask bits of the movement commands

The following networks contain the forwarding of the movement commands to the input registers of the RCCA. Insert the networks as shown.

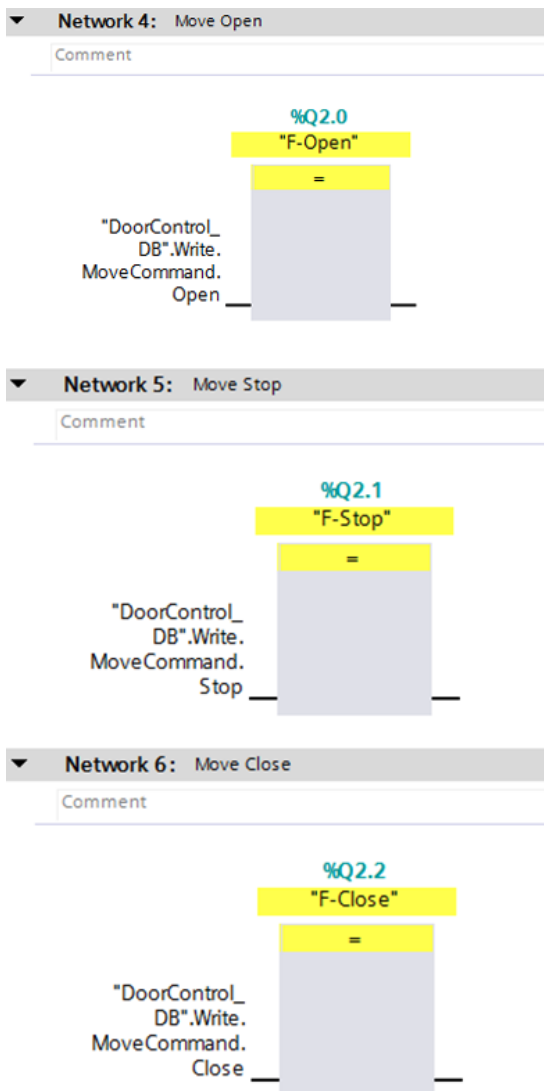


Figure 6: Input register control

F parameter

Some safety-related settings must be made so that the ProfiSafe-capable RCCA card can be controlled correctly. Switch to the device view and select the RCCA card. For this example, leave the configuration of the safe inputs at the default setting. Open the "Feig-iPar-CRC" programme by right-clicking on the RCCA module and selecting "Start device tool..."

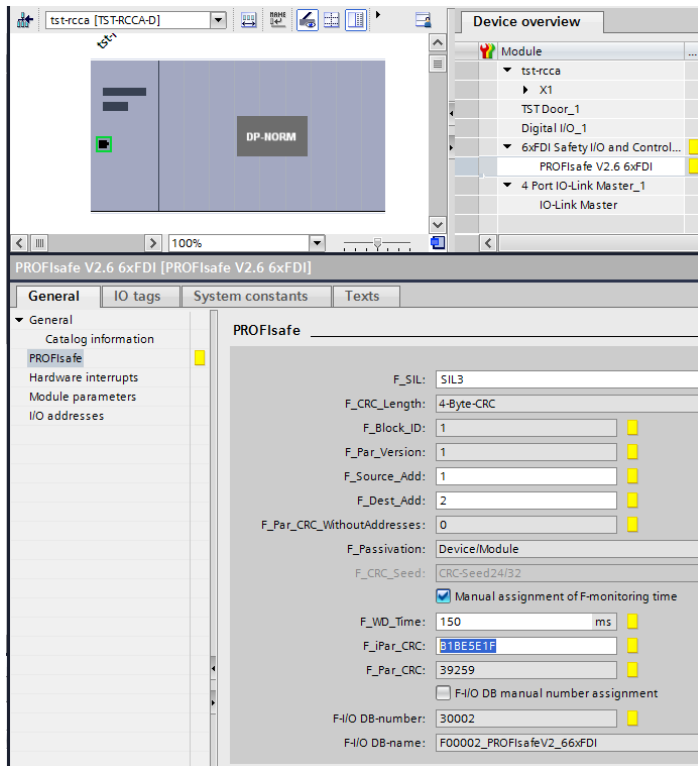


Figure 7: iPar CRC - CRC calculation

Check that all settings are correct and tick them off in the "accepted" column. Click on "calculate CRC" to obtain a checksum in the Decimal field. Insert this in the "F_iPar_CRC" field in the "General" tab -> "PROFIsafe" of the "PROFIsafe V2.6 6xFDI" module.

Program sequence of standard program

The program is processed cyclically in OB1 of the control program.

Create a sequence according to the scheme: Read data, edit commands, write data.

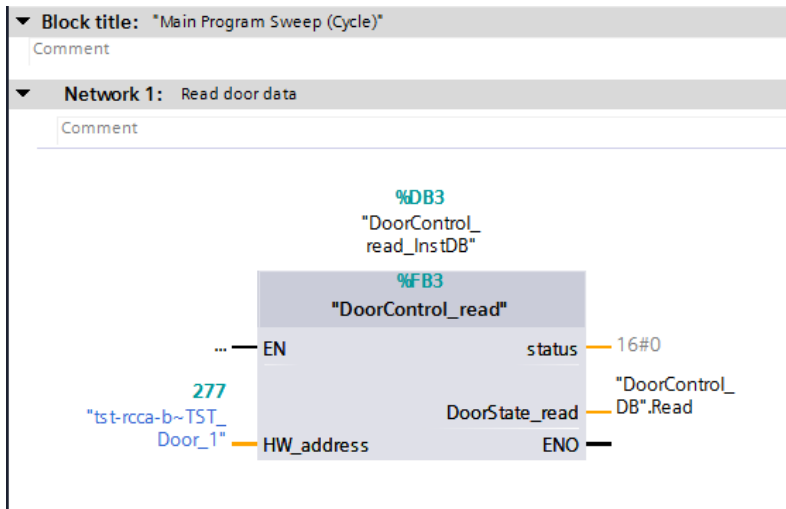


Figure 8: Read data

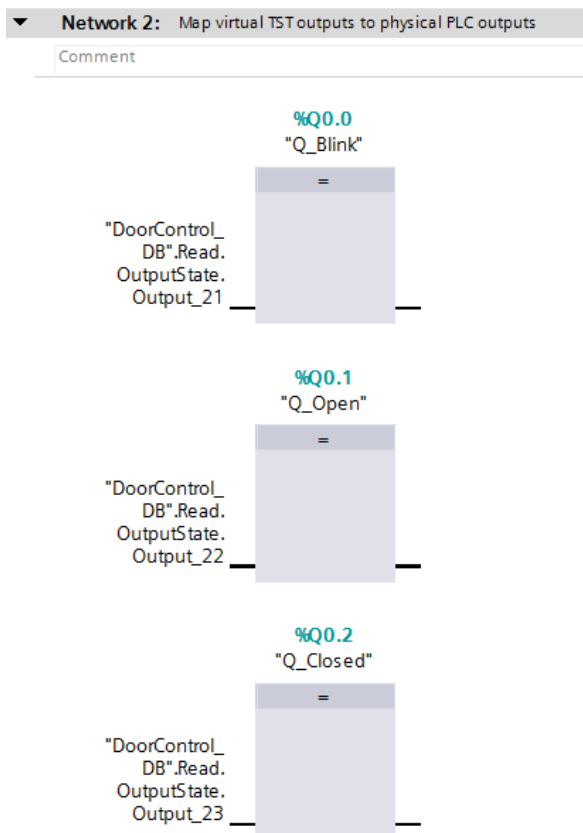


Figure 9: TST map virtual outputs

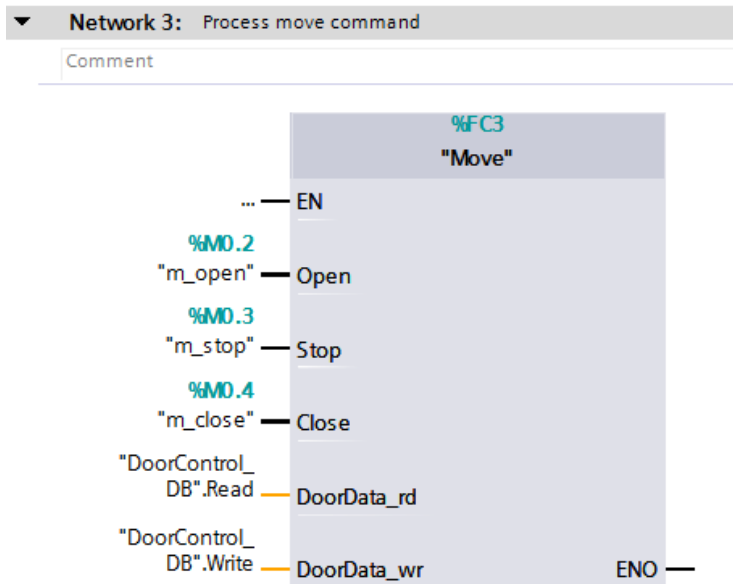


Figure 10: Edit movement command

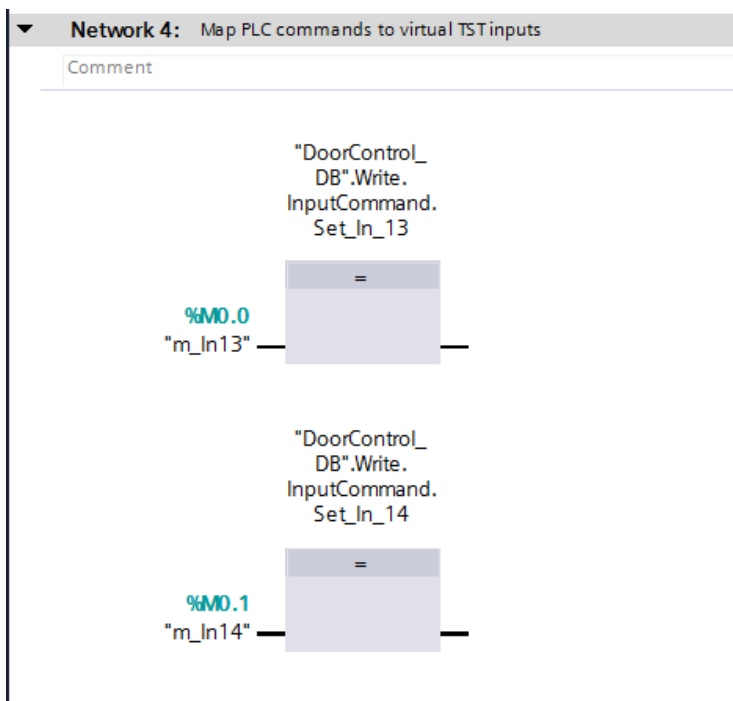


Figure 11: Map input commands

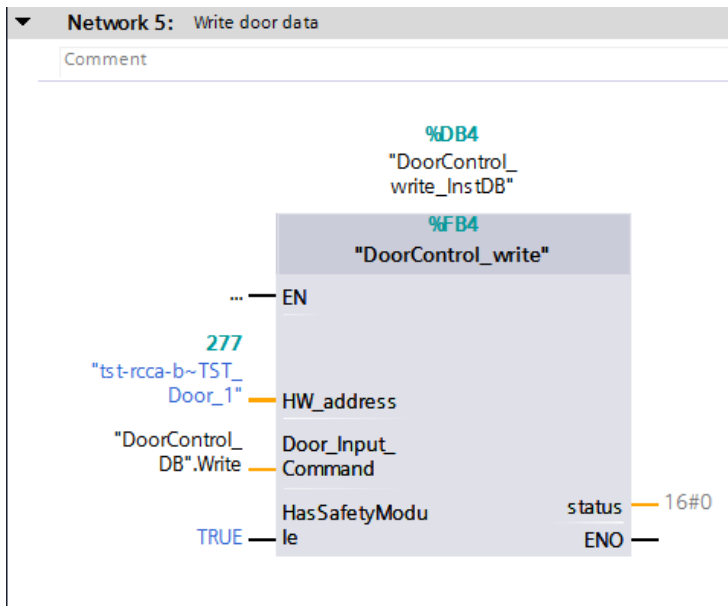


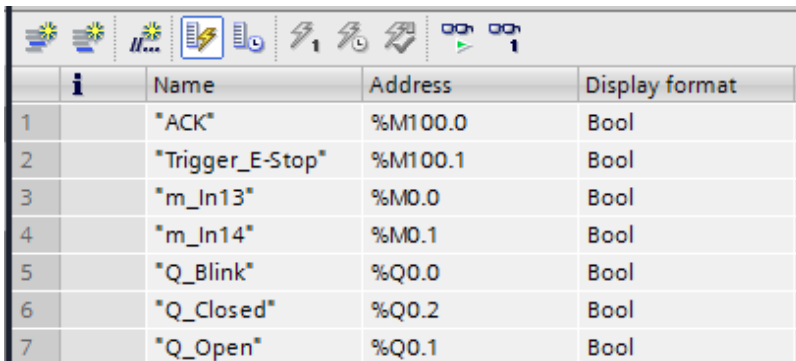
Figure 12: Write data

The hardware address of the "tst-rcca-x~TST_Door_1" module (x corresponds to the b/c/d variant) can be found in the PLC variables under "Standard variables".

Watch and control

Now translate and transfer the hardware configuration and control programme. Create a new monitoring table under "Monitoring and force tables", open it and add the control flags m_In13 and m_In14 to it. The Q_Blink, Q_Open and Q_Closed flags can also be monitored here. However, as they are assigned to discrete outputs, it is also possible to monitor the PLC indicators.

The door control unit now accepts input commands via the force table. An open command is triggered with m_In13 and a close command with m_In14.



The screenshot shows a software interface with a toolbar at the top containing various icons for control and monitoring. Below the toolbar is a table with the following data:

	i	Name	Address	Display format
1		"ACK"	%M100.0	Bool
2		"Trigger_E-Stop"	%M100.1	Bool
3		"m_In13"	%M0.0	Bool
4		"m_In14"	%M0.1	Bool
5		"Q_Blink"	%Q0.0	Bool
6		"Q_Closed"	%Q0.2	Bool
7		"Q_Open"	%Q0.1	Bool

Figure 13: Control and monitoring

All other available door control information can be called up via the DB "DoorControl_DB".