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Applicative conversion from 3SE6806 magnetic switch evaluation unit to 3SK2

3SE6806 / V1.0 / SIRIUS Safety

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1 Introduction

The latest range of 3SK1 safety relays has been available on the market since 2012. They are the successor products to previous safety relays. However, for a number of devices with specialized functional options such as the 3SE6808, the 3SK1 portfolio does not include a replacement product. The software-based 3SK2 safety relays are therefore being used to continue to provide a substitute for these functionalities. The basic units from the 3SK2 series allow users to freely configure functions for each individual application using simple graphical software. In this way, it is possible to emulate the functions of the 3SE6808. Products from the 3SK2 range offer benefits such as secure planning thanks to long-term market availability, outstanding flexibility and safety certification in accordance with current technical standards.

The intention of this document is to describe the procedure for converting from the 3SE6806-2CD00 magnetic switch evaluation unit to the 3SK2. In order to make the conversion process as fast and easy as possible, the following explanations are each based on a software template project in which the internal switching logic is already integrated. The software projects are designed in such a way they can be directly used for the described use case. Minor modifications such as, for example, changing the feedback circuit monitoring time are easy to make with the SIRIUS ES software. The following chapters provide all the relevant information about the necessary hardware and sensor/actuator wiring. Reference is made in the appropriate places to functional deviations that exist between the two types of solution.

Because of the differences between these two device series with respect to the output channels, the descriptions in this document are confined to three different variants for the most commonly used use cases.

 DANGER	As is also the case for the 3SE6806-2CD00, it is the responsibility of the user to test the solution for his application for correctness and completeness.
--	---

Detailed knowledge of all of the components used is the prerequisite for a complete, error-free application. It is therefore essential that the equipment and the parameterizing software conform to the specifications in the manuals listed below.

Compact Operating Instructions 3SE6806-2CD00

<https://support.industry.siemens.com/cs/ww/en/view/20136062>

Manual - SIRIUS 3SK2 Safety Relays

<https://support.industry.siemens.com/cs/ww/en/view/109444336>

Operating manual for SIRIUS engineering Safety ES V1.0

<https://support.industry.siemens.com/cs/ww/en/view/109444445>

1.1 Selecting a suitable solution variant

Depending on the application and the input/output channels used, different solution variants may be advisable. The following table provides an overview for selecting a suitable solution variant:

Table 1-1

Overview of solution variants	
Variant A	<ul style="list-style-type: none"> • Monitoring of up to 4 magnetic switches • Control of safe actuators via solid-state F outputs (24V DC) • The floating signaling circuit is not required
Variant B	<ul style="list-style-type: none"> • Monitoring of up to 6 magnetic switches • Control of safe actuators via solid-state F outputs (24V DC) • The floating signaling circuit is not required • Output of two status signals as a coded signal at one output. Evaluation of the coded signal via an external control logic (function block for S7-1200/1500 is supplied with the product)
Variant C	<ul style="list-style-type: none"> • Monitoring of up to 6 magnetic switches • Control of safe actuators via relay outputs • Output of all 6 status signals • The floating signaling circuit is not required

2 Conversion of the hardware components

2.1 Conversion of the order numbers

Depending on the application, magnetic switch evaluation unit 3SE6806 is applicatively replaced by several components of the 3SK2 series. The 3SK2 basic unit provides the safe inputs and the solid-state outputs and processes the logic. The safe relay outputs are provided by the 3SK1 4RO output expansion. If no relay contacts are required in any particular application, the output expansion does not have to be installed. In this case, the device connector (3ZY1212-2DA00) is not required either.

Table 2-1

Order number 3SE6806	Order number 3SK2			
	Article number (MLFB)	Quantity	Variant	Width (mm)
3SE6806-2CD00	3SK2122-*AA10	1	A	45
	3SK2122-*AA10	1	B	45
	3SK2122-*AA10	1	C	45
	3SK1211-*BB40	1		22.5
	3ZY1212-2GA00	1		--
	3ZY1212-2DA00	1		--

* = 1: Screw terminal;

* = 2: Spring-loaded terminals

2.2 Variant A: Expansion with max. 4 magnetic switches

This variant can be used if no relay outputs are required. Instead, the safe actuators are controlled via the solid-state F outputs of the 3SK2 with 24V DC. Due to the number of available outputs on the 3SK2, up to four signal outputs can be controlled. The number of useful magnetic switches was therefore also limited to four for this variant.

Nor does this variant have a floating signal circuit. If floating signal circuits are required, coupling relay 3RQ3 (e.g. 3RQ3018-2AM08-0AA0) can be used.

The associated template project

"*Template Conversion 3SE6 to 3SK2 Variant A_ V1.sdp*" can be downloaded from <https://support.industry.siemens.com/cs/ww/en/view/109757994>.

2.2.1 Block diagram with 3SK2

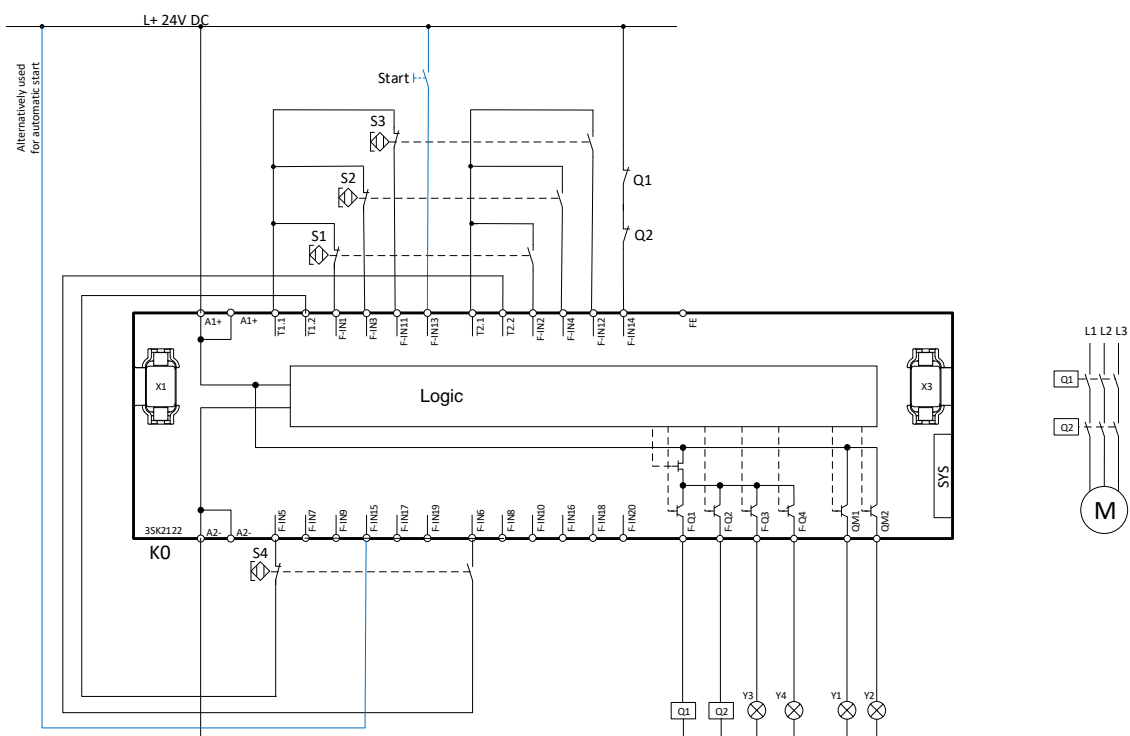


Fig. 2-1: Block diagram Variant A

- S1-S4: Safety magnetic switch
- Start: Pushbutton for resetting the safety function (monitored start). If automatic start is required, parameter input F-IN15 must be connected.
- Q1-Q2: Fail-safe actuators
- Y1-Y4: Signal lamps

2.2.2 Conversion of the terminals

Table 2-2

Connection terminal 3SE6806	Meaning	Terminal 3SK2	Comment
A1	+24V DC	A1+	
A2	Ground	A2-	
13, 14	Enabling circuit 1 (safe NO contact)	F-Q1	For 3SK2: Safe solid-state output (not a relay output)
23, 24	Enabling circuit 1 (safe NO contact)	F-Q2	For 3SK2: Safe solid-state output (not a relay output)
31, 32	Floating signaling circuit	---	
S11, S12	Switch 1, NC contact	T1.1, F-IN1	
S73, S74	Switch 1, NO contact	T2.1, F-IN2	
S11, S22	Switch 2, NC contact	T1.1, F-IN3	
S73, S74	Switch 2, NO contact	T2.1, F-IN4	
S31, S32	Switch 3, NC contact	T1.1, F-IN11	
S83, S84	Switch 3, NO contact	T2.1, F-IN12	
S31, S42	Switch 4, NC contact	T1.2, F-IN5	
S83, S84	Switch 4, NO contact	T2.2, F-IN6	
S51, S52	Switch 5, NC contact	not applicable	
S73, S74	Switch 5, NO contact	not applicable	
S51, S62	Switch 6, NC contact	not applicable	

2 Conversion of the hardware components

S73, S74	Switch 6, NO contact	not applicable	
Y1	Status signal, switch 1	QM1	Solid-state signaling output
Y2	Status signal, switch 2	QM2	Solid-state signaling output
Y3	Status signal, switch 3	F-Q3	
Y4	Status signal, switch 4	F-Q4	
Y5	Status signal, switch 5	not applicable	
Y6	Status signal, switch 6	not applicable	
X1, X2/X3	Feedback circuit	F-IN14	
---	ON button	F-IN13	Separate input for manual resetting
---	Parameter input Automatic restart	F-IN15	<ul style="list-style-type: none"> - Not connected Reset via switch. - +24V: Automatic restart

2.3 Variant B: Expansion with max. 6 magnetic switches, connection of status signals to PLC

On this variant, up to 6 magnetic switches can be connected. The status signals are wired to the inputs of a PLC. To reduce the number of IO terminals, only three termination points are required for six status signals. Two status signals of the 3SE6808 are transmitted via one output using clock signals. Separate control logic is required to decode the signals. In this example, a function block for a SIMATIC S7-1200/1500 is provided, which decodes the signals in question. Variant B is therefore suitable for applications in which the signal outputs of the 3SE6808 have already been connected to the machine controller.

Like Variant A, this variant also has two safety-related solid-state outputs (24V). If on the other hand, fail-safe relay outputs are required, Variant C can be used.

Variant B can also be used if the status signals are not used. In this case, the status signals are wired to the machine controller.

The associated template project "*Template Conversion 3SE6 to 3SK2 Variant B_V1.sdp*" can be downloaded from <https://support.industry.siemens.com/cs/ww/en/view/109757994>.

2.3.1 Block diagram with 3SK2

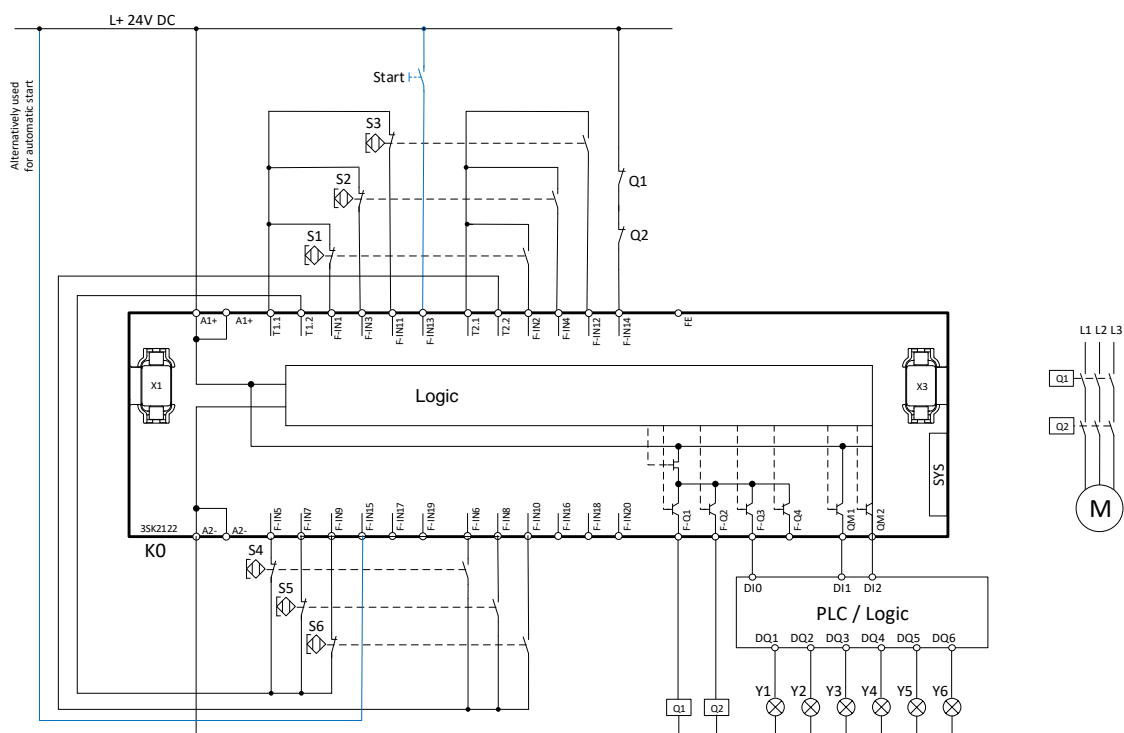


Fig. 2-2: Block diagram Variant B

- S1-S6: Safety magnetic switch
- Start: Pushbutton for resetting the safety function (monitored start). If automatic start is required, parameter input F-IN15 must be connected.
- Q1-Q2: Fail-safe actuators
- Y1-Y6: Signal lamps

2.3.2 Conversion of the terminals

Table 2-3

Connection terminal 3SE6806	Meaning	Terminal 3SK2	Comment
A1	+24V DC	A1+	
A2	Ground	A2-	
13, 14	Enabling circuit 1 (safe NO contact)	F-Q1	For 3SK2: Safe solid-state output (not a relay output)
23, 24	Enabling circuit 1 (safe NO contact)	F-Q2	For 3SK2: Safe solid-state output (not a relay output)
31, 32	Floating signaling circuit	---	
S11, S12	Switch 1, NC contact	T1.1, F-IN1	
S73, S74	Switch 1, NO contact	T2.1, F-IN2	
S11, S22	Switch 2, NC contact	T1.1, F-IN3	
S73, S74	Switch 2, NO contact	T2.1, F-IN4	
S31, S32	Switch 3, NC contact	T1.1, F-IN11	
S83, S84	Switch 3, NO contact	T2.1, F-IN12	
S31, S42	Switch 4, NC contact	T1.2, F-IN5	
S83, S84	Switch 4, NO contact	T2.2, F-IN6	
S51, S52	Switch 5, NC contact	T1.2, F-IN7	
S73, S74	Switch 5, NO contact	T2.2, F-IN8	
S51, S62	Switch 6, NC contact	T1.2, F-IN9	

S73, S74	Switch 6, NO contact	T2.2, F-IN10	
Y1, Y2	Status signals, switch 1 / 2	F-Q3	Coded signals for both switches S1 + S2
Y3 / Y4	Status signals, switch 3 / 4	QM1	Coded signals for both switches S3 + S4
Y5 / Y6	Status signals, switch 5 / 6	QM2	Coded signals for both switches S5 + S6
X1, X2/X3	Feedback circuit	F-IN14	
---	ON button	F-IN13	Separate input for manual resetting
---	Parameter input Automatic restart	F-IN15	- Not connected Reset via switch. - +24V: automatic start

2.3.3 Decoding/coding of the signaling outputs

Due to the limited number of signaling outputs, in this variant, the signals of two magnetic switches are coded and connected to one output of the 3SK2. In order to be able to communicate four different signal states at just one output, the signal pairs are coded with different cycle patterns (continuous 0, short cycle (200 ms), long cycle (400 ms), continuous 1).

These clock signals can be decoded again and separated into individual signals using external control logic.

Table 2-4

Excerpt from the logic diagram: Coding the signaling output	
The following excerpt from the logic diagram shows how the coded signal is formed for switches S1 / S2. Switches S3 / S4 and S5 / S6 are coded analogously.	
1	Logical ANDING of S1 and S2: continuous 1 if both switches are closed
2	Short clock signal generated (T=200 ms) if switch S1 is open and switch S2 is closed
3	Long clock signal generated (T=400 ms) if switch S1 is closed and switch S2 is open
4	Combination of previously generated signals
5	and output of the coded signal at the output

Table 2-5

Overview of signal states		
Signal state 3SE6806 Status signal Y1 / Y3 / Y5	Signal state 3SE6806 Status signal Y2 / Y4 / Y6	Signal to 3SK2 (FQ3 / QM1 / QM2)
0 (switch open)	0 (switch open)	1 0
0 (switch open)	1 (switch closed)	1 0 T=200ms
1 (switch closed)	0 (switch open)	1 0 T=400ms
1 (switch closed)	1 (switch closed)	1 0

2 Conversion of the hardware components

The function block DecodeSignal3SK2 supplied with this FAQ converts the coded signal of a magnetic switch pair back to the status signals of the individual magnetic switches. For this, the block must be called up separately for each signal pair:

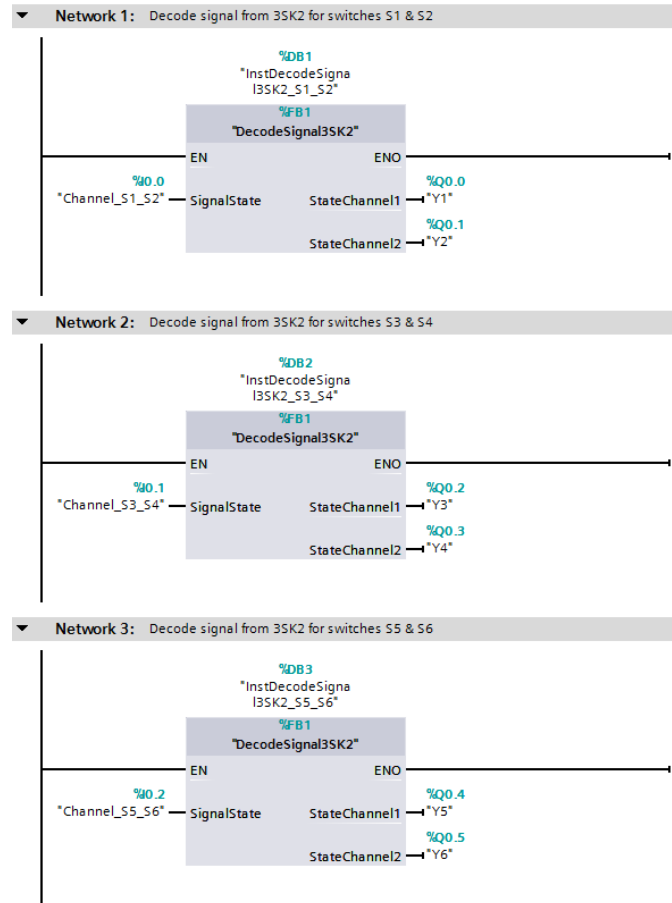


Fig. 2-3: Example call of function block DecodeSignal3SK2

Table 2-6

Overview of input and output parameters FB DecodeSignal3SK2		
Parameters	Data type	Description
SignalState	Bool	Coded signal of a status pair (Y1/Y2, Y3/Y4, Y5/Y6)
StateChannel1	Bool	Status of the first channel in each case (Y1, Y3, or Y5)
StateChannel2	Bool	Status of the second channel in each case (Y2, Y4, or Y6)

Note If the state of a magnetic switch changes, the block takes at least 420 ms to detect it. Outputs StateChannel1 and StateChannel2 respond with a delay.

2.4 Variant C: Expansion with max. 6 magnetic switches

On this expansion variant, up to six magnetic switches can be connected. This variant can be used if the safe outputs have to be used as relay outputs. Moreover, all six signaling outputs can be mapped via the outputs of the basic unit.

The associated template project

"*Template Conversion 3SE6 to 3SK2 Variant C_ V1.sdp*" can be downloaded from <https://support.industry.siemens.com/cs/ww/en/view/109757994>.

2.4.1 Block diagram with 3SK2

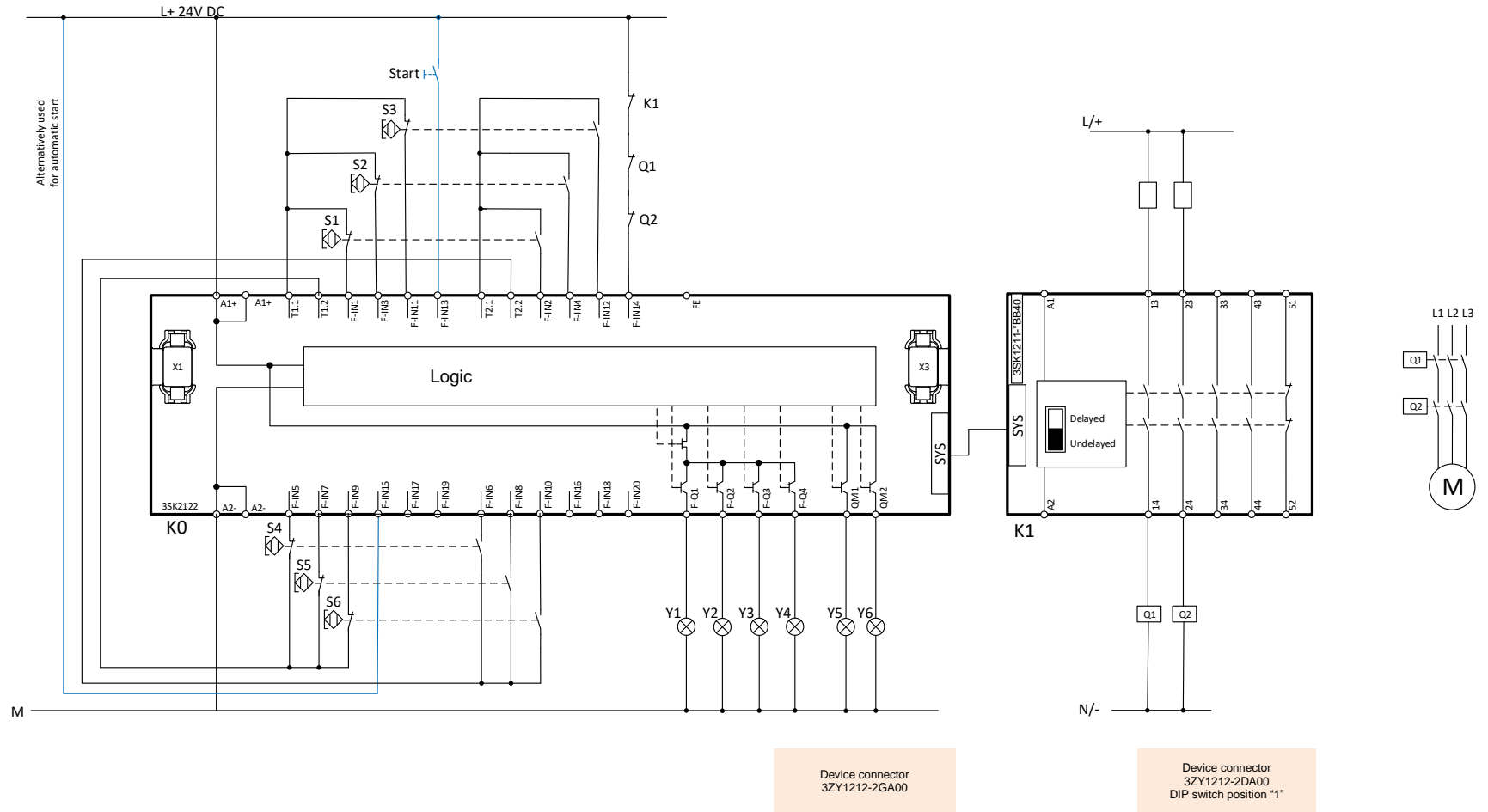


Fig. 2-4: Block diagram Variant C

- S1-S6: Safety magnetic switch
 Start: Pushbutton for resetting the safety function (monitored start). If automatic start is required, parameter input F-IN15 must be connected.
 Q1-Q2: Fail-safe actuators
 Y1-Y6: Signal lamps

2.4.2 Conversion of the terminals

Table 2-7

Connection terminal 3SE6806	Meaning	Terminal 3SK2	Comment
A1	+24V DC	A1+	
A2	Ground	A2-	
13, 14	Safe relay output instantaneous	13, 14	On output expansion 3SK1211-*BB40 (K1)
23, 24	Safe relay output instantaneous	23, 24	On output expansion 3SK1211-*BB40 (K1)
31, 32	Floating signaling circuit	---	
S11, S12	Switch 1, NC contact	T1.1, F-IN1	
S73, S74	Switch 1, NO contact	T2.1, F-IN2	
S11, S22	Switch 2, NC contact	T1.1, F-IN3	
S73, S74	Switch 2, NO contact	T2.1, F-IN4	
S31, S32	Switch 3, NC contact	T1.1, F-IN11	
S83, S84	Switch 3, NO contact	T2.1, F-IN12	
S31, S42	Switch 4, NC contact	T1.2, F-IN5	
S83, S84	Switch 4, NO contact	T2.2, F-IN6	
S51, S52	Switch 5, NC	T1.2, F-IN7	

2 Conversion of the hardware components

	contact		
S73, S74	Switch 5, NO contact	T2.2, F-IN8	
S51, S62	Switch 6, NC contact	T1.2, F-IN9	
S73, S74	Switch 6, NO contact	T2.2, F-IN10	
Y1	Status signals, switch 1	F-Q1	
Y2	Status signals, switch 2	F-Q2	
Y3	Status signals, switch 3	F-Q3	
Y4	Status signals, switch 4	F-Q4	
Y5	Status signals, switch 1	QM1	
Y6	Status signals, switch 2	QM2	
X1, X2/X3	Feedback circuit	F-IN14	
---	Start pushbutton	F-IN13	Separate input start pushbutton for manual start
---	Parameter input: Automatic start / monitored start	F-IN15	<ul style="list-style-type: none"> - Not connected Start via pushbutton. - +24V: automatic start

3 Explanatory notes about the software projects

Table 3-1

Protective door monitoring	
<p>A function element of type "protective door monitoring" is used for every safety magnetic switch. To achieve SIL 3 / PL e, the following parameters have been defined:</p> <ol style="list-style-type: none"> 1. Discrepancy monitoring activated between all inputs with a discrepancy time of 1500ms 2. Input type: Two-channel sensor with NC/NO combination 3. Cross-circuit detection: activated 	

3 Explanatory notes about the software projects

Table 3-2

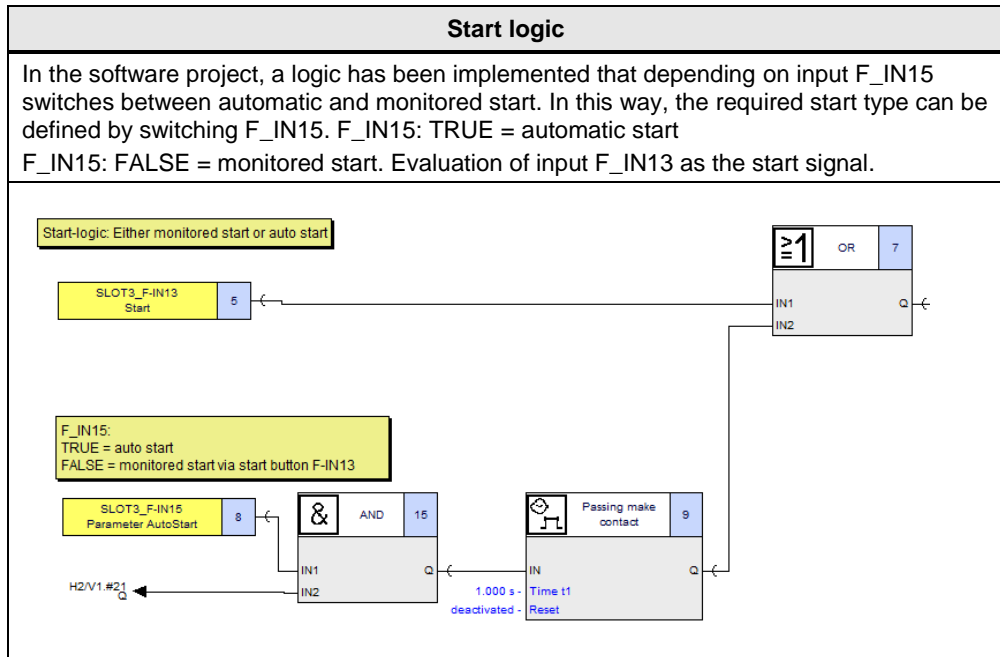


Table 3-3

Controlling the fail-safe outputs	
<p>For the fail-safe control of the actuators acc. to SIL3 / PL e, a function element "F Output" with the following parameters is used:</p> <ol style="list-style-type: none"> 1. Feedback circuit monitoring activated on OFF and ON status. Switching time = 500 ms 	

4 Differences / variations

4.1 Changed starting behavior

The 3SE6806 uses type of start "manual" (or automatic) However, in the solution variants with 3SK2 described here, instead of the manual start type, a monitored start type is used.

If manual start is to be performed analogously to 3SE6806, in the relevant Safety ES project, parameter "Start→Type of start" must be set from "monitored" to "manual" in the software element "F output redundant" (element No. 20):

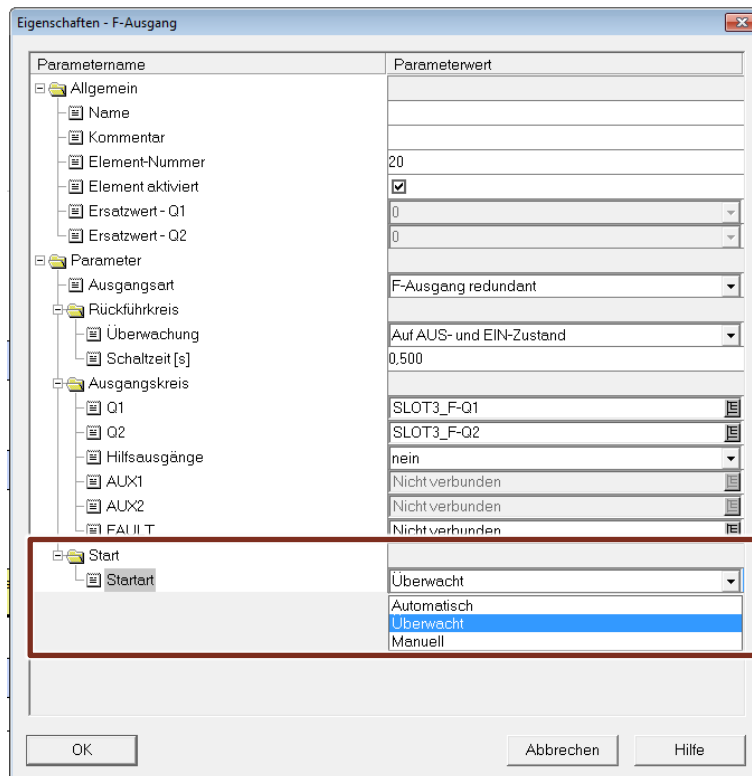


Fig. 4-1: Configured type of start with 3SK2: "monitored"

5 What to do when...

5.1 ...the feedback circuit time has to be adapted

In some applications, a different feedback circuit time may be necessary because, for example, the connected contactors switch more slowly. To adapt the time, in the relevant Safety ES project, the parameter "Feedback circuit → Switching time" in the software element "F output redundant" (element No. 20) must be adapted:

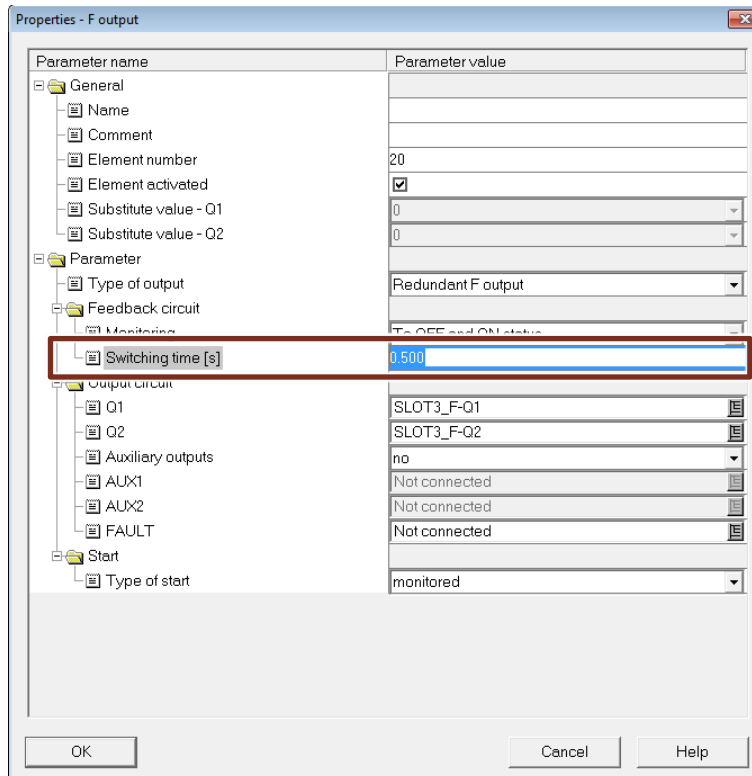


Fig. 5-1: Parameterization of the feedback circuit monitoring time

5.2 ... no actuator monitoring is required

In some applications (e.g. for controlling frequency converters), actuator monitoring (feedback circuit monitoring) may not be necessary.

In order to deactivate the feedback circuit monitoring for such cases, in the relevant Safety ES project, monitoring must be deactivated directly in the software element "F output redundant" (element No. 20).

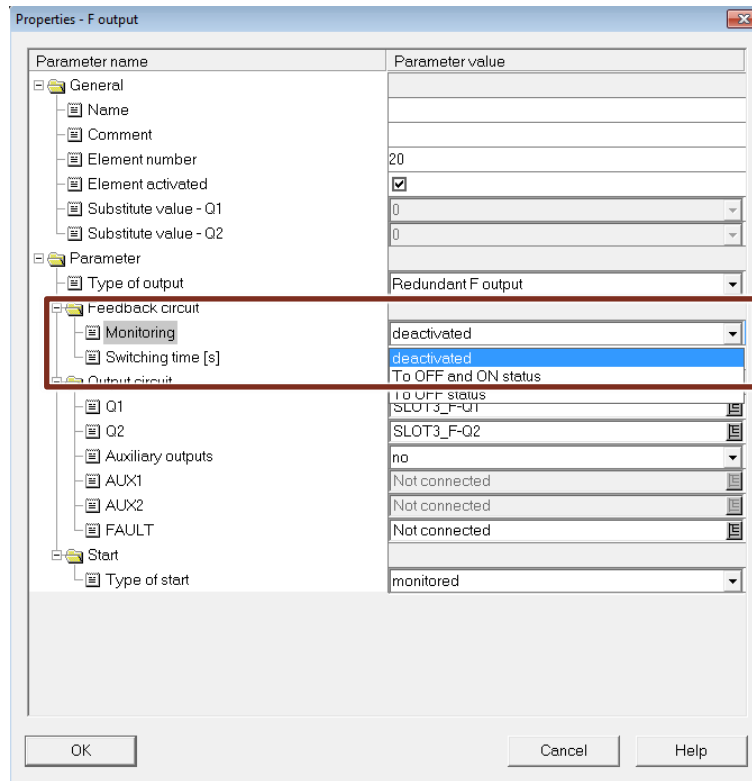


Fig. 5-2: Deactivating the feedback circuit monitoring

Because a dummy flag is used in the software project, it is enough to deactivate the feedback circuit monitoring. The input cell F_IN14 does not have to be deleted.

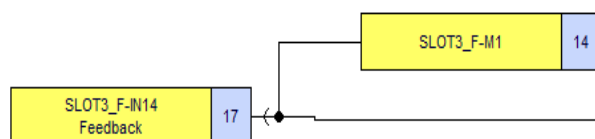


Fig. 5-3: Dummy flag F-M1

Note Deactivation of the feedback circuit monitoring only applies to variants A and B. In variant C, the output extension K1 remains in the feedback circuit. In this case, the software project does not have to be modified.

6 Commissioning and project release

6.1 Testing the application during commissioning

The 3SK2 system has a test mode for checking and testing applications.

The project can be tested in this mode prior to project release. Changes and corrections to the project configuration can be made quickly and easily in test mode. Test mode also enables signal forcing for the purpose of simulating particular system states.

Once all relevant parameters as per Chapter 2-5 have been checked, the configuration can be loaded into the basic unit of the 3SK2. To do this, connect the PG/PC to the basic unit using USB cable 3UF7941-0AA0-0. After the software has been successfully downloaded, the basic unit can be switched to test mode for software testing and acceptance.

You will find more information about test operation in the [SIRIUS engineering Safety ES V1.0 Operating manual](#)

6.2 Project release and safety mode

Following successful acceptance of the safety application, the 3SK2 basic unit must be switched to permanent operation in safety mode. This can only be done after the project has been released. The purpose of this step is to officially release the software project both online and offline. A release document, which must be included with the plant documentation, is also generated as part of this process. After the project has been released, the 3SK2 system can be switched to safety mode and the project can be downloaded to additional devices from the PG/PC. These devices will then boot in safety mode when they are restarted. Other systems also have to be tested for correct functioning (e.g. wiring error).

You will find more information about safety mode in the [SIRIUS engineering Safety ES V1.0 Operating manual](#)

7 Technical data

All technical data of the 3SK2 basic units and 3SK1 output expansions must be taken into account when implementing this application.

You will find all technical data for this product in the Siemens Industry Online Support <https://support.industry.siemens.com/cs/ww/en/ps/td>

1. Enter the entire article number of the device in the "Product" field and confirm with the input key.
2. Click on the link "Technical Data".

The screenshot shows the Siemens Industry Online Support search interface. At the top, there is a search bar with the text "Suchbegriff eingeben...". Below the search bar, there are three input fields: "Produkt" (Product), "Beitragstyp" (Contribution type), and "Datum" (Date). The "Produkt" field contains the article number "3RP2031-4BA10", the "Beitragstyp" field contains "Technische Daten (1)", and the "Datum" field is empty. Below these fields, there is a search button labeled "> Produkt suchen". The search results are displayed in a table with one entry for the product "3RP2031-4BA10". The entry includes a description: "LEISTUNGSSCHALTER SCHRAUBS 25A" and "LEISTUNGSSCHALTER 50A FÜR DEN MOTORSCHUTZ, CLASS 10, A-AUSL. 14, 25A, N-AUSL. 25A, SCHRAUBANSCHLUSS, STANDARDISCHALTERVERMÖGEN". Below the description, there is a link labeled "> Produktdetails" and a sub-link labeled "Technische Daten" which is highlighted with a red box.

8 3SK fault reaction time

The reaction time under consideration below refers to the length of time that it takes for the signal at the output terminal (either solid-state output at 3SK2 or 3SK1 output expansions) to change after a signal change terminal is detected at the input.

The switching times of the individual sensors and actuators used must also be added to calculate the total reaction time of the application.

Formula for calculating fault reaction times in the case of single-channel actuator wiring without bit memories

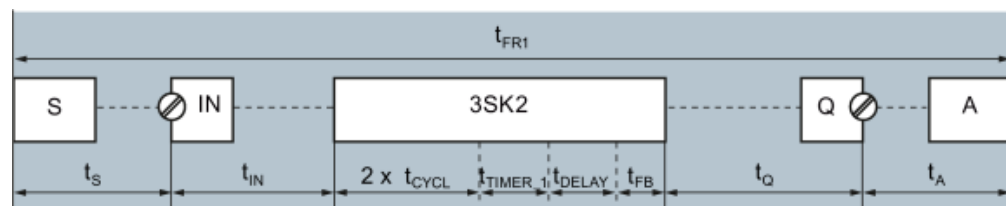


Table 8-1

Des.	Time parameter	Value
t_{CYCL}	3SK2 program cycle time	10ms*
t_{DELAY}	Input delay	0ms*
t_{IN}	Transmission time signal acquisition (= t_{CYCL})	10ms*
t_{FB}	Max. read-back time of F-outputs during dark test	3ms*
t_Q	Transmission time to output terminal	5ms
t_A	Off-delay time 3SK1 output expansion	50ms
T_{FR1}	Fault reaction time for Variant A and Variant B (via solid-state output) $= t_{IN} + 2 * t_{CYCL} + t_{FB} + t_Q$	= 35ms
T_{FR1}	Fault reaction time for Variant C (via relay output of the 3SK1 4RO) $= t_{IN} + 2 * t_{CYCL} + t_{FB} + t_Q + t_A$	= 88ms



WARNING

Extension of reaction time when parameter settings are changed

The values marked * in the table above correspond to the settings in the 3SK2 template project. These values need to be adjusted as soon as the user changes the setting of one or more of these parameters. If the values are increased, the fault reaction time (T_{FR1}) of the application increases.

9 Alternative configuration variants

In this chapter, further ways of replacing the 3SE6806 magnetic switch evaluation units are demonstrated.

9.1 3SK1 with expansion modules and magnetic switches (1NO + 2NC)

Safety relay 3SE6806 can also be replaced with a 3SK1 Advanced safety relay. Because only one magnetic switch (S1) can be connected to the basic unit, an input expansion must be used for every additional magnetic switch (S2-S6). If the signaling outputs are needed, as an alternative to the magnetic switches with one NO contact and one NC contact (1NO + 1NC), a magnetic switch with one NO contact and two NC contacts (1NO + 2NC) can be used. Here, the second NC contact is used as the signaling contact.

Table 9-1: Required components

Article number (MLFB)	Designation	Quantity	Width (mm)
3SK1121-*AB40	Advanced 3SK1 basic unit	1	22.5
3ZY1212-2DA00	Device termination connector	1	-
3SK1220-*AB40	Sensor extension	0 to max. 5	17.5 per expansion module
3ZY1212-1BA00	Device connector	0 to max. 5	-
* = 1: Screw terminal; * = 2: Spring-loaded terminals			
Suitable magnetic switch (1NO + 2 NC)			
3SE6606-2BA04	1 NO + 2 NC, with switching magnet (coded) 3SE6704-2BA		
3SE6626-3CA01	1 NO + 1 NC + 1 NC (the second NC contact is a signaling contact, not a safety contact), with switching magnet 3SE6714-3CA or 3SE6724-3CA offset by 90°		
3SE6616-3CA01	1 NO + 1 NC + 1 NC (the second NC contact is a signaling contact, not a safety contact), with switching magnet 3SE6714-3CA or 3SE6724-3CA offset by 90°		

9.1.1 Block diagram

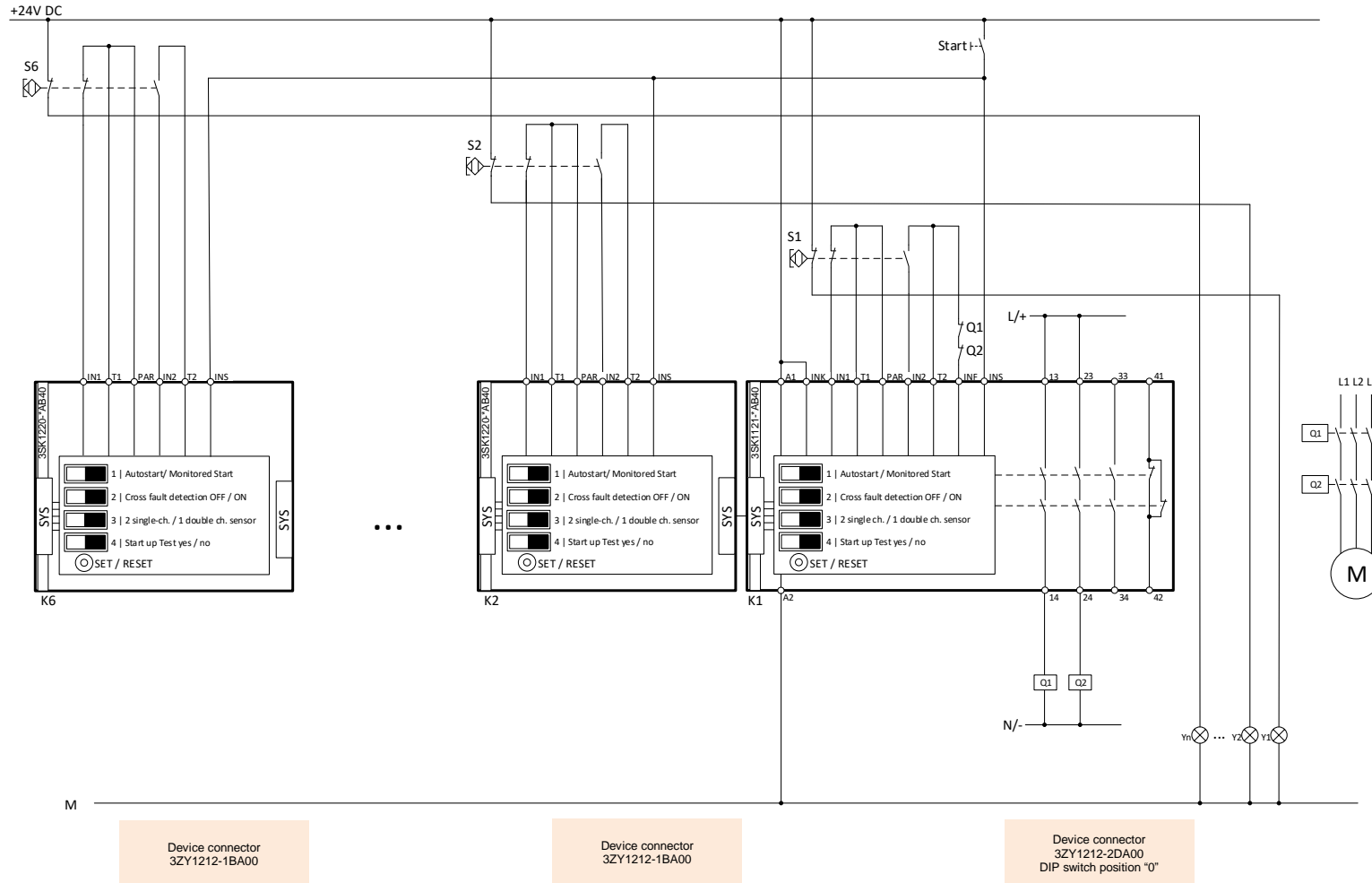


Fig. 9-1: Block diagram with 3SK1 and up to five input expansions for max. 6 magnetic switches

9.2 3SK1 with expansion modules and SIRIUS 3SE63 RFID safety switch

The variant with 3SK1 described in 9.1 can also be adapted for use with the RFID 3SE63 contact-free safety switch. Using the input expansions, the solution is modular for use with one up to maximum six safety switches. Safety switch RFID 3SE63 provides a conventional diagnostics output at pin 5 (OUT), which can be connected directly to the digital input of a PLC for evaluation purposes.

Table 9-2: Required components

Article number (MLFB)	Designation	Quantity	Width (mm)
3SK1121-*AB40	Advanced 3SK1 basic unit	1	22.5
3ZY1212-2DA00	Device termination connector	1	-
3SK1220-*AB40	Sensor extension	0 to max. 5	17.5 per expansion module
3ZY1212-1BA00	Device connector	0 to max. 5	-
* = 1: Screw terminal; * = 2: Spring-loaded terminals			
Suitable RFID safety switch			
3SE6315-xBB0y	RFID safety switch x = 0: No latching; x = 1: With magnet latching y = 1: Family-coded; y = 2: Individually coded, can be learned multiple times; y = 3: Individually coded, can be learned once		
3SE6310-zBC01	RFID actuator z = 0: No latching; z = 1: With magnet latching		

9.2.1 Block diagram

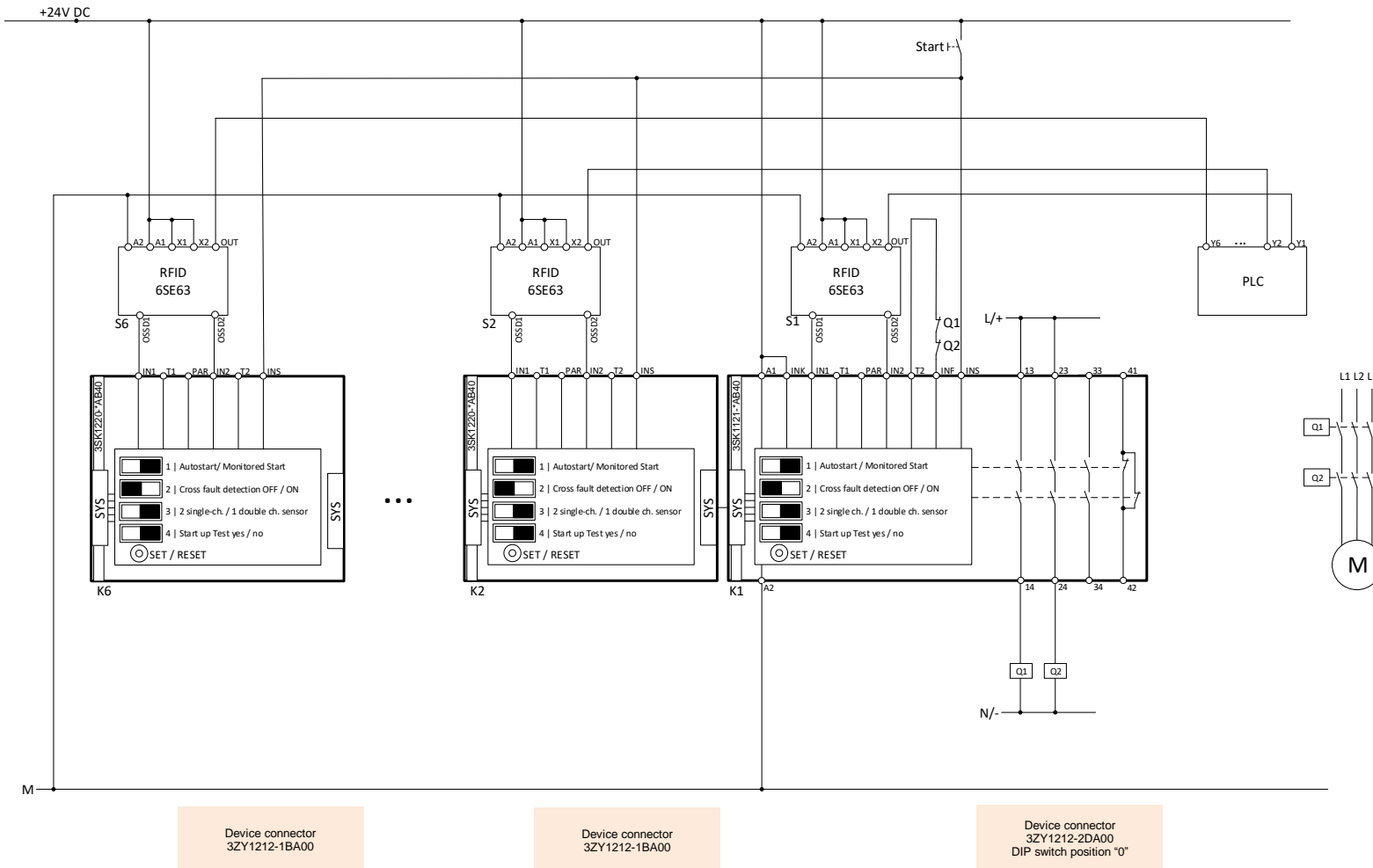


Fig. 9-2: Block diagram with 3SK1 and up to five input expansions for max. 6 RFID 6SE63 safety switches

9.3 3SK2 with SIRIUS 3SE63 RFID safety switch

The Variants A, B, and C described in Chapter 2 can also be used with the RFID 3SE63 contact-free safety switches instead of with the magnetic switches. The Safety ES projects can be used as a basis for this. Only the following modifications have to be made in the program.

Table 9-3

Required modifications in the Safety ES project	
In the function elements "Protective door monitoring" <ol style="list-style-type: none"> 1. Change the input type from "2-channel (NC/NO)" to "2-channel (NC/NC)" 2. Deactivate the cross-circuit detection: Cross-circuit detection has to be deactivated because it is integrated in the RFID switch 	

The signaling contacts can be evaluated with safety relay 3SK2 as for Variants A - C. Alternatively, the status output of the RFID switch can be used (see block diagram in 9.3.1)

Table 9-4: Required components

Safety relay
Components analogous with the selected variants A, B, or C (see Chapter 2.1)

Suitable RFID safety switch	
3SE6315-xBB0y	RFID safety switch x = 0: No latching; x = 1: With magnet latching y = 1: Family-coded; y = 2: Individually coded, can be learned multiple times; y = 3: Individually coded, can be learned once
3SE6310-zBC01	RFID actuator z = 0: No latching; z = 1: With magnet latching

9.3.1 Block diagram

The following block diagram shows a single 6SE63 RFID connected to a 3SK2 safety relay as an example.

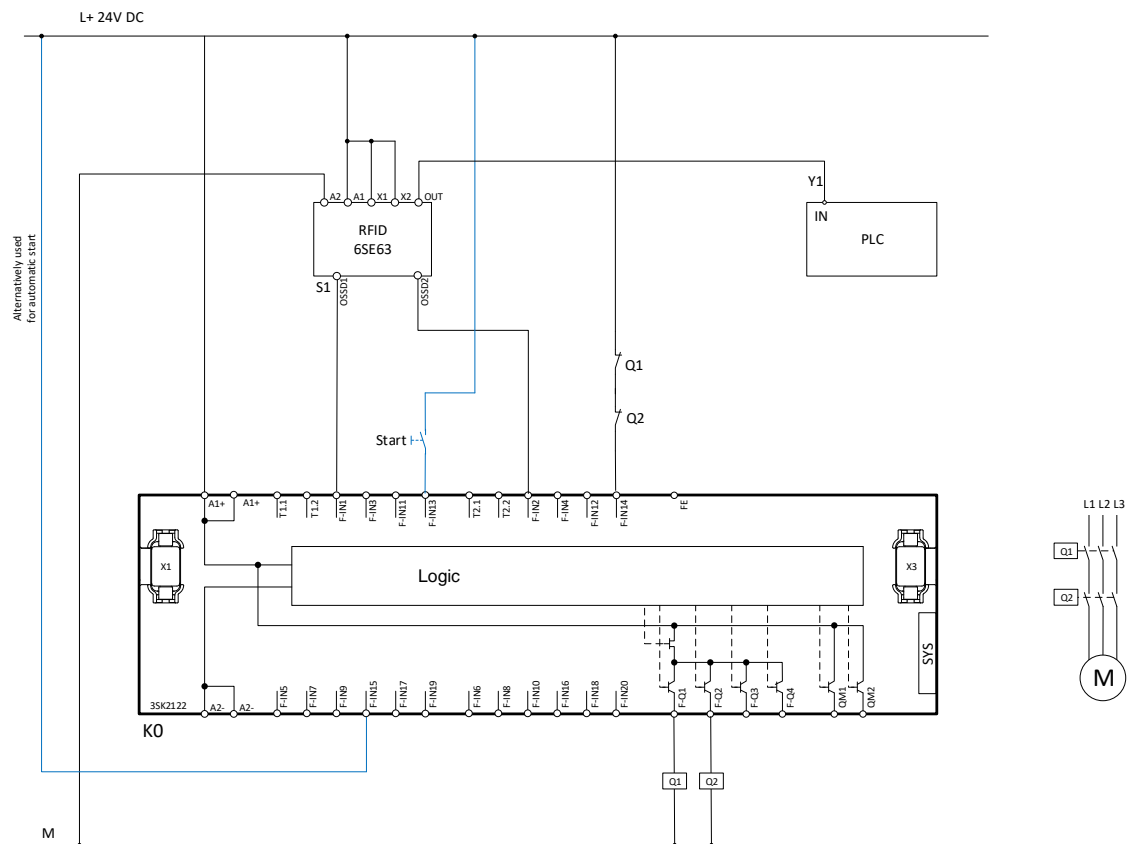
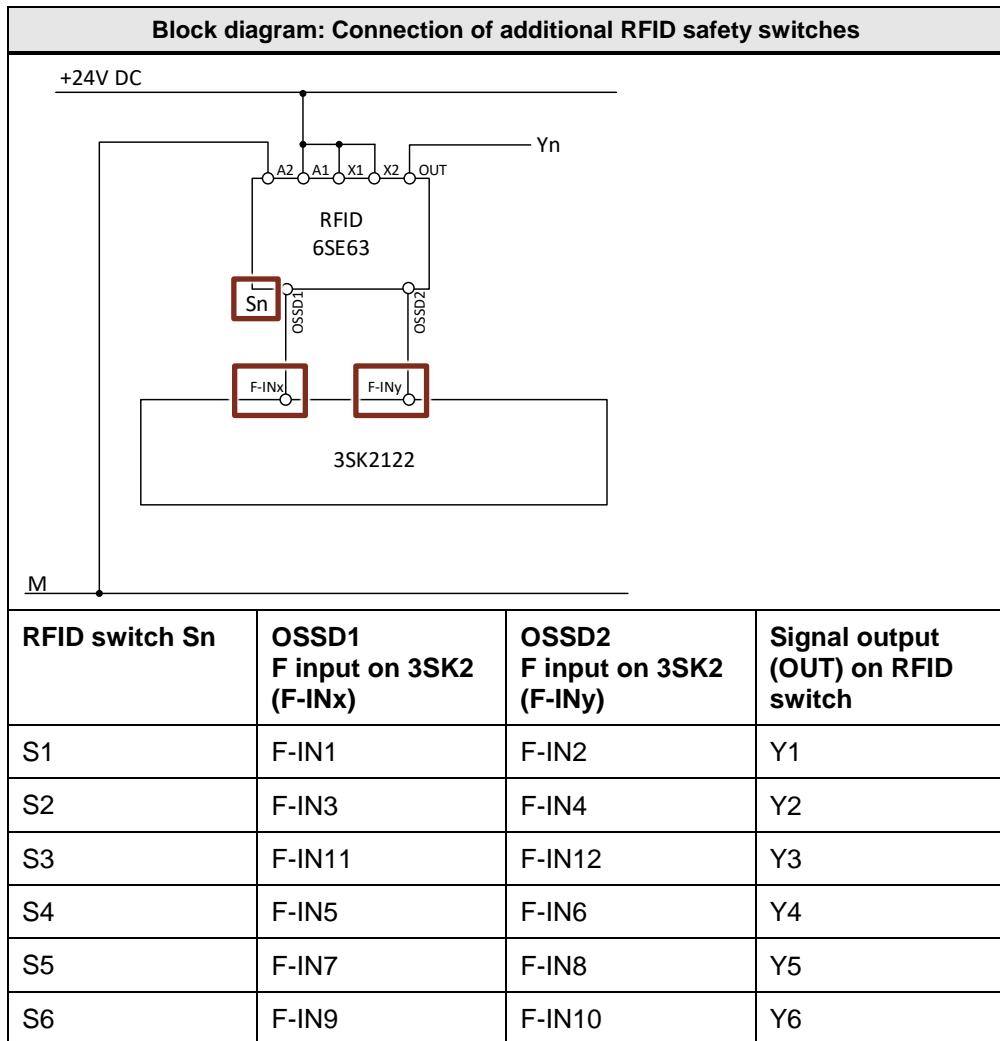


Fig. 9-3: Block diagram with 3SK2 and an RFID 3SE63 safety switch

Table 9-5



10 Download

The software projects for all three solution variants can be downloaded from <https://support.industry.siemens.com/cs/ww/en/view/109757994>.

Table 10-1

Assignment of SIRIUS Safety ES projects	
Variant A:	<i>Template Conversion 3SE6 to 3SK2 Variant A_ V1.sdp</i>
Variant B:	<i>Template Conversion 3SE6 to 3SK2 Variant B_ V1.sdp</i>
Variant C:	<i>Template Conversion 3SE6 to 3SK2 Variant C_ V1.sdp</i>

Under this post, you will also find the S7 function block DecodeSignal3SK2 created for Variant B.

The relevant circuit diagrams and SET calculations are also available here for downloading.

11 Contact

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12 References

Table 12-1

	Subject
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Download page of the article https://support.industry.siemens.com/cs/ww/en/view/109757994
\3\	Manual for 3SK1 safety relays Manual - SIRIUS 3SK2 Safety Relays Compact Operating Instructions 3SE6806-2CD00 Operating manual for SIRIUS engineering Safety ES V1.0

13 History

Table 13-1

Version	Date	Change
V1.0	06/2018	First Edition