Safety technology

11

11

Safety technology

■ **Overview**

Functional safety of machines and plants – Basic safety requirements in the manufacturing industry

In order to protect people and the environment in many industrial applications in the manufacturing and process industries, machines and plants must meet fundamental safety requirements. The Machinery Directive applies in the EU. In addition to design solutions, automation systems and components are also expected to perform safety-related tasks. This means that the life and health of people and the physical integrity of capital goods and the environment depend on the proper operation of these systems and components, on "functional safety".

With the introduction of the uniform European Single Market, national standards and regulations affecting the technical realization of machines were consistently harmonized. This involved defining basic safety requirements which address, on the one hand, machine manufacturers in terms of the free movement of goods (Article 95) and, on the other hand, users in terms of industrial safety (Article 137).

EU Directives:

- Define requirements which must be met by plants and their operating companies in order to protect the health of people and the quality of the environment
- Include standards for health & safety at work (minimum requirements)
- Define product requirements (e.g. for machines) to protect the health and safety of consumers
- Differentiate between the requirements which must be met for the implementation of products in order to ensure the free movement of goods and the requirements which must be met for the use of products
- Similar requirements apply in many other countries and markets
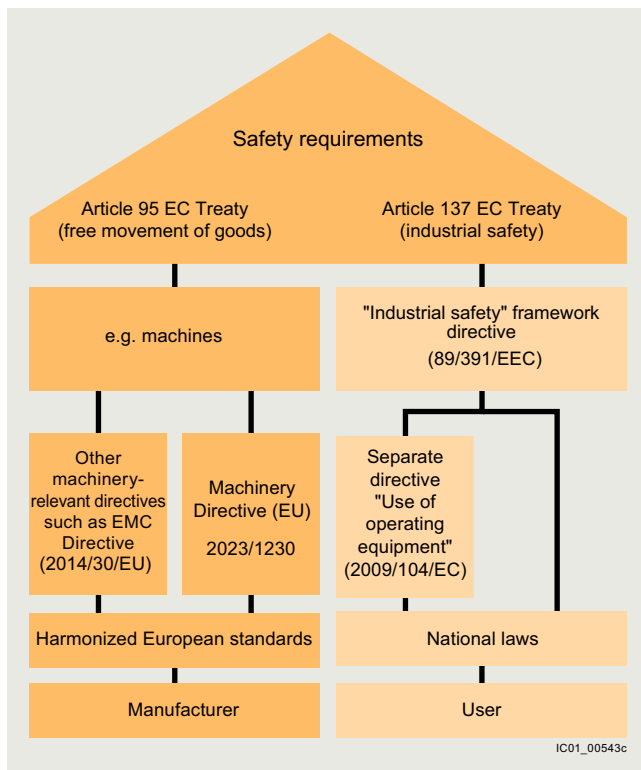
Safety requirements imposed on machines and plants

Objective of the standards

It is the objective of safety technology to minimize as far as possible the hazards from technical facilities for people and the environment while restricting no more than absolutely necessary the scope of industrial production, the use of machines or the production of chemical products.

Production automation is governed in particular by the following standards:

- IEC 62061 and
- ISO 13849-1

The IEC 62061 standard

The IEC 62061 standard "Safety of machines – Functional safety of electrical, electronic and programmable electronic control systems" defines comprehensive requirements. It includes recommendations for the design, integration and validation of safety-related electrical, electronic and programmable electronic control systems (SRECS) for machines. For the first time, one standard covers the entire safety chain, from the sensor to the actuator. The Safety Integrity Level, or SIL for short, is defined as the application parameter for this standard.

Requirements with respect to the capacity of non-electrical – e.g. hydraulic, pneumatic, or electromechanical – safety-related control elements for machines are not specified by the standard.

Safety of machines and systems

The ISO 13849-1 standard

ISO 13849-1 "Safety of machinery - Safety-related parts of controls – Part 1: General principles" replaced EN 954-1 at the end of 2011. It considers the complete range of safety functions with all the devices which are involved in their performance. ISO 13849-1 also provides a quantitative analysis of the safety functions. The standard describes how to determine the Performance Level (PL) for safety-relevant parts of control systems on the basis of architectures specified for the intended service life.

When combining several safety-related parts to form a complete system, the standard explains how to determine the resulting PL. It can be applied to safety-related parts of control systems (SRP/CS) and all types of machines, regardless of the technology and energy used, e.g. electrical, hydraulic, pneumatic or mechanical.

Safety Integrated – Integrated safety technology from a single source

Safety Integrated

The following applies equally for machine manufacturers and the companies which operate their machines: Maximum possible safety for personnel and machines. The solution: our Safety Integrated concept based on Totally Integrated Automation. Whether for simple safety functions or highly complex tasks – our portfolio offers you maximum safety.

Safety Integrated is a unique, complete and consistent range of safety products covering all safety-related tasks – from detecting, evaluating and reacting, from switches and control systems to operating mechanisms (see graphic on page 11/4). Our products meet the safety requirements in force in industry, including IEC, ISO, NFPA and UL, and are certified according to the latest safety standards.

All Safety Integrated products or systems can be seamlessly integrated in the standard automation environment. They are therefore particularly flexible and economical, reduce engineering time, increase plant availability and enable practice-related machine operation.

Designing a safety function

A safety chain normally comprises the following functions: detect, evaluate and react. In detail this means:

- Detect = the detection of a safety requirement with corresponding sensors, such as EMERGENCY STOP or position switches
- Evaluate = the detection of a safety requirement and the reliable initiation of a reaction, e.g. shutting down the enabling circuits
- React = shutting down the hazard using suitable motor switching devices such as contactors, fail-safe motor starters, or fail-safe soft starters
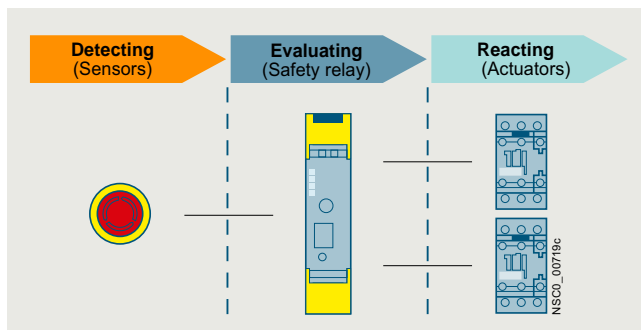

Possible configuration of a safety function

As a partner for all safety requirements, we not only support you with the respective safety-related products and systems, but also consistently provide you with the most current know-how on international standards and regulations. Machine manufacturers and plant managers are offered a comprehensive training portfolio as well as services for the entire lifecycle of safety-related systems and machines.

- A uniform, certified product range
- Courses on CE marking, risk assessment and standards, see www.siemens.com/sitrain
- For a collection of frequently required documents, see Safety Integrated - Safety in Factory Automation
- For application examples, see www.siemens.com/safety-selector
- Worldwide service and support, see https://support.industry.siemens.com

For more information, see www.siemens.com/safety-integrated.

Safety Evaluation in the TIA Selection Tool
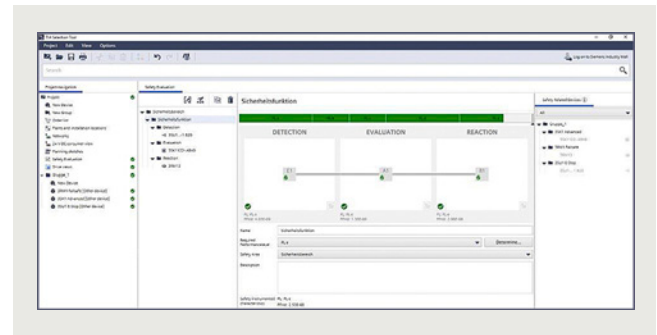
Safety Evaluation

The safety evaluation for the IEC 62061 and ISO 13849-1 standards is performed quickly and easily, directly in the TIA Selection Tool. In addition to the fast and safe calculation of machine safety functions – from the definition of the system structure to the selection of components – this enables shared data management during all project phases. Take the next step in the digital design of machinery and equipment with Safety Evaluation in the TIA Selection Tool.

In addition, the functionalities of the proven Safety Evaluation Tool are still available. It determines the achieved safety integrity (SIL/PL) step-by-step. You receive the results as a standards-compliant report that can be integrated in the documentation as proof of safety.

Your advantages at a glance:

- Automatic calculation according to current standards
- Fast results: Standard-compliant report
- Less time needed to evaluate the safety functions
- Fast access to the latest product data
- User-friendly archiving: Projects can be saved and called up again as required
- Selection menus for determining diagnostic coverage (DC) and common cause failures (CCF).
- Different operating cycles can be input when used in a 2-channel configuration
- Failure rate calculation

For more information, see www.siemens.com/safety-evaluation-tool.

Safety technology

Introduction

Detecting	Evaluating	Reacting

Highly flexible machine with variable project data volume

SIMATIC S7-1200F
SIMATIC IPC427C-RTX F
SIMATIC S7-1500F

■ PROFINET/PROFIsafe
■ PROFIBUS/PROFIsafe

SIRIUS ACT with PROFINET

SIMATIC ET 200SP

SIMOCODE pro Safety

SINAMICS S120

SIMATIC ET 200pro with motor starter

SIRIUS safety switch

SIRIUS ACT EMERGENCY STOP

Mobile panel

■ AS-Interface/ASIsafe

SIRIUS safety switch

SIRIUS ACT EMERGENCY STOP

ASIsafe compact module K45F, K20F

ASIsafe SlimLine compact module

SIMATIC ET 200SP with motor starter

SINAMICS G120

SIRIUS contactor

SINAMICS G120D

Compact machine with locally limited safety technology

SIMATIC S7-1200

■ PROFINET

SIRIUS safety switch

SIRIUS ACT EMERGENCY STOP

SIRIUS ACT EMERGENCY STOP

SIRIUS 3SK2 safety relays

SIRIUS 3RW55 soft starter

SIRIUS compact feeder

SIRIUS 3RM1 motor starter

SIMATIC ET 200SP with motor starter

SIRIUS contactor

Integrated safety solutions
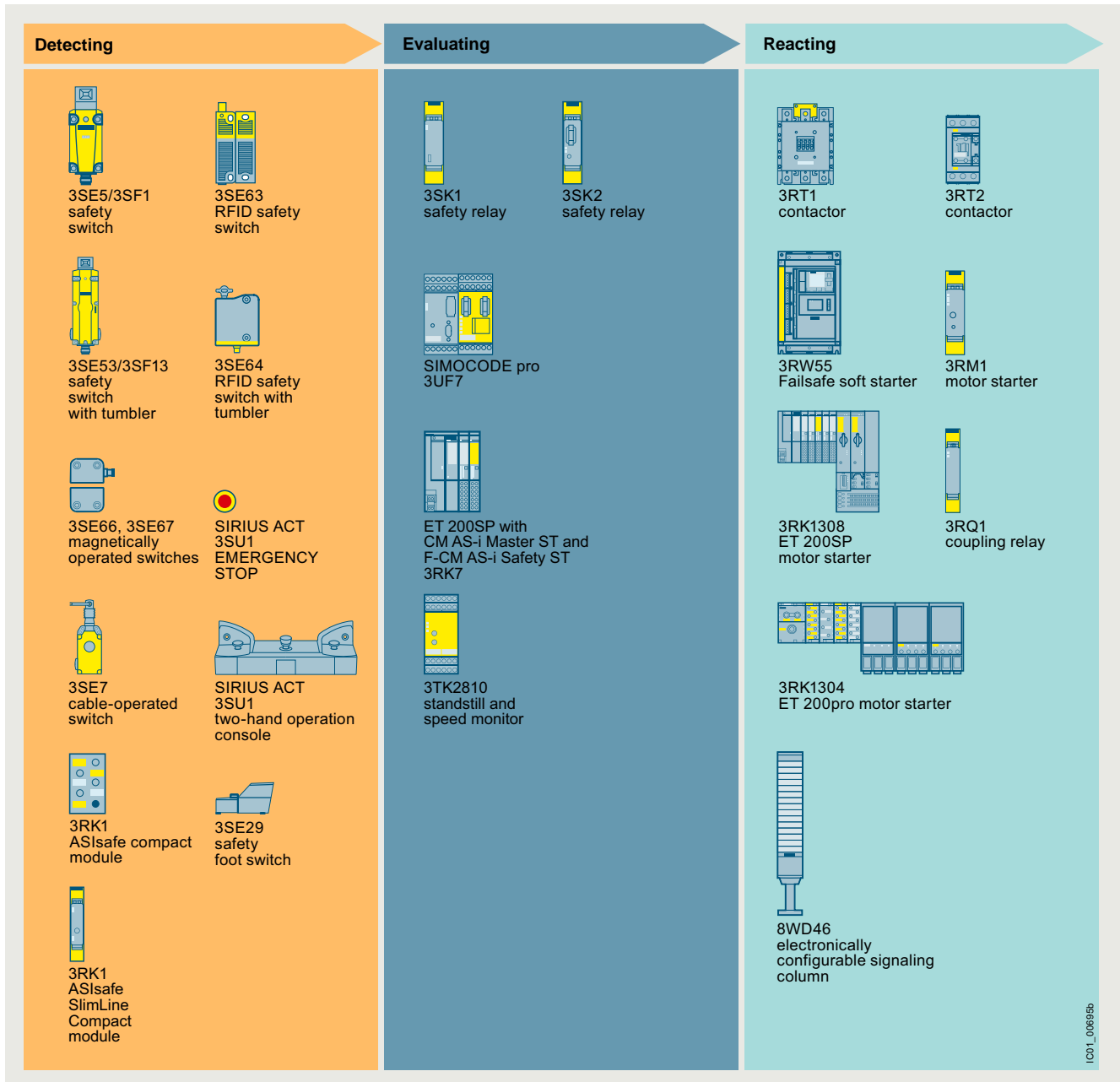
Independent safety solutions

NSB0_01822n

Safety Integrated

SIRIUS Safety Integrated

Our SIRIUS Safety Integrated controls are a central element of the Siemens Safety Integrated concept. Whether for fail-safe detecting, commanding and signaling, monitoring and evaluating or starting and reliable shutting down – our SIRIUS Safety Integrated controls are experts at performing safety tasks in your plant.

SIRIUS Safety Integrated uses fail-safe communication via standard fieldbus systems, such as ASIsafe via AS-Interface and PROFIsafe via PROFIBUS and PROFINET, to solve even networked safety tasks of greater complexity. This opens the door for flexible safety solutions for compact machines or large-scale plants.

Implementation of many typical safety applications, see Application Manual for SIRIUS Safety Integrated.

Detecting	Evaluating	Reacting
3SE5/3SF1 safety switch	3SK1 safety relay	3RT1 contactor
3SE63 RFID safety switch	3SK2 safety relay	3RT2 contactor
3SE53/3SF13 safety switch with tumbler	SIMOCODE pro 3UF7	3RW55 Failsafe soft starter
3SE64 RFID safety switch with tumbler		3RM1 motor starter
3SE66, 3SE67 magnetically operated switches	ET 200SP with CM AS-i Master ST and F-CM AS-i Safety ST 3RK7	3RK1308 ET 200SP motor starter
SIRIUS ACT 3SU1 EMERGENCY STOP		3RQ1 coupling relay
3SE7 cable-operated switch	3TK2810 standstill and speed monitor	3RK1304 ET 200pro motor starter
SIRIUS ACT 3SU1 two-hand operation console		8WD46 electronically configurable signaling column
3RK1 ASIsafe compact module		
3SE29 safety foot switch		
3RK1 ASIsafe SlimLine Compact module		

IC01_00695b

SIRIUS Safety Integrated

Safety technology

Introduction

Monitoring with safe evaluation devices from the 3SK series

The safe evaluation devices of the 3SK device series are perfectly suited for evaluating safety switches of the 3SE product family. These are not only suitable for simple position switches, but can also be used easily and without problems with non-contact position switches and switches with tumblers. The highest safety levels, SIL 3 according to IEC 62061 or PL e according to ISO 13849-1, can be achieved.

Position monitoring with non-contact safety switches			Safe protective door tumbler with safety switches and separate actuator, in accordance with EN ISO 14119	
3SE66, 3SE67 magnetically operated switches 2 NC + 1 NC (signaling contact)	3SE63 RFID safety switch	3SE64 RFID safety switch with tumbler	3SE53 safety switch with tumbler ➔	3SE53 safety switch with tumbler ➔
SIL 3/PL e			**SIL 2/PL d**	**SIL 3/PL e**
3SK1 3SK2 Safety relays			3SK2 Safety relays	

Monitoring with fail-safe evaluation units

Notes:

For more information, see FAQ article.
For information on safety switches, see page 12/1 onwards.

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Using SIRIUS 3RT contactors with fail-safe controllers and safety relays

Safety relays and fail-safe controllers work perfectly with SIRIUS contactors optimized for safety application regardless of their size:

- In the low performance range with 3RT201 or 3RT202 contactors with DC operating mechanism
- In the medium performance range with 3RT203 or 3RT204 contactors with solid-state operating mechanism and fail-safe control input
- In the high performance range with 3RT105, 3RT106 or 3RT107 contactors with solid-state operating mechanism and fail-safe control input

They offer the following advantages:

- Reduced current load on the controller outputs
- Minimization of wear for mechanical relays on controllers or safety relays
- Coupling links between controllers and contactors are no longer required

SIRIUS safety relays	SIMATIC controllers

Perfect combination

S00	S0	S2	S3	S6	S10	S12

3RT2 contactors	3RT1 contactors

IC01_00534a

Combination of SIRIUS 3RT contactors with fail-safe controllers and safety relays

Safety technology

Introduction

	Type	Page
SIRIUS Safety Integrated		
3SK safety relays		
• Key modules of a consistent and cost-effective safety chain		
• Can be used for all safety applications thanks to compliance with the highest safety requirements (SIL 3 according to IEC 62061 or PL e according to ISO 13849-1)		
• Suitable for use all over the world through compliance with all globally established certifications		
SIRIUS 3SK1 Standard basic units	**3SK111**	11/22
• Simple, compact devices for all important requirements for monitoring safety sensors and actuators		
SIRIUS 3SK1 Advanced basic units	**3SK112**	11/23
• Multifunctional series of safety relays with safe relay outputs, semiconductor outputs or time-delayed outputs for:		
- EMERGENCY STOP monitoring		
- Protective door monitoring		
- Monitoring of non-floating sensors such as light arrays, laser scanners, etc.		
- Monitoring of two-hand operation consoles		
- Monitoring of equivalent (NC/NC) and antivalent (NO/NC) sensors		
• Setting by means of DIP switch		
SIRIUS 3SK2 basic units	**3SK2**	11/24
• Series of safety relays that can be parameterized by software, with semiconductor outputs and independent output functions for:		
- EMERGENCY STOP monitoring		
- Protective door monitoring		
- Protective door monitoring with tumbler		
- Monitoring of non-floating sensors such as light arrays, laser scanners, etc.		
- Monitoring of two-hand operation consoles		
- Monitoring of equivalent (NC/NC) and antivalent (NO/NC) sensors		
- Muting		
- Communication via PROFINET (optional)		
Expansion units	**3SK121, 3SK122, 3SK123**	11/26, 11/28
• 3RO and 4RO output expansions for SIRIUS 3SK1 Standard basic units, SIRIUS 3SK1 Advanced basic units and SIRIUS 3SK2 basic units		
• 3RQ1 output expansions up to SIL 3/PL e for SIRIUS 3SK1 Standard basic units, SIRIUS 3SK1 Advanced basic units and SIRIUS 3SK2 basic units		
• Input expansion for SIRIUS 3SK1 Advanced basic units		
• Power supply for SIRIUS 3SK1 Advanced basic units		
• Integration of 3RM1 motor starters possible and, therefore, simple integration of a main circuit component in a system configuration of the safety relays. There is no need for complex wiring between the safety evaluation unit and the actuator.		
• Expansion of the Standard device series by means of wiring		
• Expansion of the SIRIUS 3SK1 Advanced and SIRIUS 3SK2 device series by means of wiring or without wiring outlay by means of 3ZY12 device connectors		
3TK2810 safety relays	**3TK2810**	11/33
• Further modules of a consistent and cost-effective safety chain		
• Can be used for all safety applications thanks to compliance with the highest safety requirements (SIL 3 according to IEC 62061/IEC 61508 and PL e according to ISO 13849-1)		
• Suitable for use all over the world through compliance with all globally established certifications		
Safe standstill monitoring with 3TK2810-0		
• Monitoring without external sensors		
• Universal use in applications possible		
Safe speed monitoring with 3TK2810-1		
• Monitoring of speed with encoders and proximity switches possible		
• Easy diagnostics options via display		
• Integrated monitoring of a spring-loaded locking protective door		

Image labels: 3SK111, 3SK112, 3SK2, 3SK121, 3TK2810-1BA41

	Type	Page

SIRIUS Safety Integrated (continued)

K45F   SC17.5F

AS-Interface safety modules
- Complete portfolio of ASIsafe modules
- For connection of safety switches with contacts (e.g. position switches)
- Degree of protection IP65/IP67 or IP20
- Especially compact dimensions, with widths from 17.5 mm
- Up to four safe inputs per module
- Standard outputs are available on the module in addition
- Up to SIL 3/PL e

Advantage: Easy integration of safe signals both in the control cabinet or in the field

3RK1 — From 2/26

CM AS-i Master ST and
F-CM AS-i Safety ST

CM AS-i Master ST and F-CM AS-i Safety ST for ET 200SP

The CM AS-i Master ST and F-CM AS-i Safety ST modules are plugged into an ET 200SP configuration and connect an AS-i network, including safety-related inputs and outputs, with the controller.
- Single, double and multiple masters possible
- Per CM AS-i Master ST up to 496 DI/496 DQ/124 AI/124 AQ possible
- Per F-CM AS-i Safety ST up to 31 safe input signals (2-channel)/16 safe output channels possible
- Configuration in the TIA Portal/STEP 7
- Plant-wide safety programming of the F-CPU via SIMATIC Distributed Safety/Safety Advanced
- Integrated diagnostics
- No other programming tools required

Advantage: Modular connection of fail-safe AS-i networks with system-wide programming in SIMATIC and SINUMERIK controllers.

6ES7, 3RK7 — From 2/29, from 2/34

3RT203.-1S.30   3RT204.-1S.30

SIRIUS 3RT contactors, 3-pole

18.5 to 55 kW
- Solid-state operating mechanism with fail-safe control input for safety-related applications up to SIL 2/PL c with one contactor or SIL 3/PL e with two contactors
- 3RT20 only for motor loads
- Version with auxiliary switch can be extended either on the front or on the side

3RT20 — 3/65

3RT1...-.S.36

55 to 250 kW or 690 A
- Solid-state operating mechanism with fail-safe control input for safety-related applications up to SIL 2/PL c with one contactor or SIL 3/PL e with two contactors
- 3RT10 for motor loads or 3RT14 for weak or non-inductive loads
- Version with removable lateral auxiliary switches or permanently mounted auxiliary switches

3RT10, 3RT14 — 3/67, 4/18

3RQ1

SIRIUS 3RQ1 force-guided coupling relays, fail-safe up to SIL 3/PL e
- They are used for safe coupling up to SIL 3/PL e of control signals from and to a control system or as an output expansion for the SIRIUS 3SK safety relays.
- Wide voltage ranges from 24 to 240 V AC/DC
- All versions with real load contacts, also in the NC circuit
- International standards and certifications including CE, UL/CSA, EAC, railway approvals, and more

3RQ1 — From 5/21

3RW55

3RW55 Failsafe soft starters
- 3RW55 soft starters for safety-oriented tripping
- SIL 1/PL c without additional safety evaluation unit or contactor with direct wiring of an EMERGENCY STOP to F-DI
- SIL 3/PL e with an additional contactor and safety evaluation unit or F-PLC
- For motors up to 315 kW (at 400 V) in the standard (inline) circuit or 560 kW (at 400 V) in the inside-delta circuit

3RW55 — From 6/39

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Safety technology

Introduction

		Type	Page
SIRIUS Safety Integrated (continued)			

3RM1

3RM1 Failsafe motor starters
- Motor starters for safety-oriented tripping as 3RM11 direct-on-line starters or 3RM13 reversing starters
- Compact devices with 22.5 mm width comprising combinations of relay contacts and power semiconductors (hybrid technology) and an electronic overload relay
- For switching three-phase motors up to 3 kW (at 400 V) and resistive loads up to 10 A at AC voltages up to 500 V under normal operating conditions
- Safety-related shutdown according to SIL 3 or PL e by shutting down the control supply voltage or control inputs possible without additional devices in the main circuit
- Combination with 3SK safety relay through conventional wiring or 3ZY12 device connectors
- Simple wiring and collective shutdown with device connectors in assemblies; there is no further need for complex looping of the connecting cables

3RM1 | From 8/83

3RK1308-0CB00-0CP0

ET 200SP fail-safe motor starters
- Fully integrated into the ET 200SP I/O system (including TIA Selection Tool and TIA Portal)
- Fully pre-wired motor starters for switching and protecting any AC loads up to 5.5 kW from 48 V AC to 500 V AC
- Less space required in the control cabinet (20 to 80%) as a result of greater functional density (direct-on-line and reversing starters in same width)
- Longer service life and reduced heat losses thanks to hybrid technology
- Self-assembling 32 A power bus, i.e. the load voltage is only fed in once for a group of motor starters
- High degree of flexibility when it comes to safety applications via SIMATIC F-CPU or 3SK safety relays up to SIL 3 or PL e
- Diagnostics capability for active monitoring of the switching and protection functions
- Digital inputs can optionally be used via a 3DI/LC module

3RK1 | From 8/94

ET 200pro Safety

ET 200pro Safety motor starters Solution

Safety motor starters Solution PROFIsafe are often found in safety applications of the more complex type that are interlinked. In this case, a safe control system is used with the PROFINET or PROFIBUS bus systems with the PROFIsafe profile.

It comprises:
- PROFIsafe modules
- Disconnecting modules
- Standard motor starters
- High Feature motor starters

3RK1 | From 9/11

SIMOCODE pro V

SIMOCODE pro S

SIMOCODE pro motor management and control devices
- Flexible, modular motor management system for motors with constant speeds in the low-voltage range
- Provides an intelligent interface between the higher-level automation system and the motor feeder
- Multi-functional, electronic full motor protection which is independent of the automation system
- Integrated control functions for the motor control
- Detailed operating, service and diagnostics data
- Open communication via PROFIBUS DP, PROFINET/OPC UA, Modbus RTU or EtherNet/IP
- Safety relay function for the fail-safe disconnection of motors up to SIL 3 according to IEC 62061/IEC 61508 or PL e according to ISO 13849-1

Fail-safe digital modules
- DM-F Local for direct assignment between a fail-safe hardware shutdown signal and a motor feeder
- DM-F PROFIsafe for when a fail-safe controller (F-CPU) creates the fail-safe signal for the disconnection

3UF7 | From 10/5

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	Type	Page
SIRIUS Safety Integrated (continued)		

3SE51

Mechanical position switches

- Easy assembly thanks to modular design
- Solid, rugged design
- Special versions are easily generated and quickly available, also in combination with standard modules
- With a 3SE51/3SE52 position switch, it is possible to achieve SIL 1 according to IEC 62061/IEC 61508 or PL c according to ISO 13849-1.
- SIL 2/PL d and SIL 3/PL e can be achieved by using a second 3SE51/3SE53 position switch.

Type: **3SE51, 3SE52** — Page: From 12/5

3SE53

Mechanical safety switches

- With separate actuator, hinge switch, or separate actuator and tumbler
- With a position switch, it is possible to achieve SIL 2 according to IEC 62061/IEC 61508 or PL d according to ISO 13849-1.
- SIL 3 according to IEC 62061/IEC 61508 or PL e according to ISO 13849-1 can be achieved by using a second 3SE51 or 3SE52 position switch.
- Version in various sizes made of metal or plastic
- In the case of safety switches with tumbler, versions in the high degree of protection IP69
- Version with integrated ASIsafe electronics available for all enclosure designs

Type: **3SE51, 3SE52, 3SE53** — Page: From 12/54
Type: **3SF1** — Page: From 12/99

3SE66, 3SE67

Non-contact magnetically operated safety switches

Magnetically operated switches

- Small, compact, safe
- Simple installation even in restricted spaces thanks to connector versions
- Two safety contacts and one signaling contact enable simple diagnostics at the maximum safety level

Type: **3SE66, 3SE67** — Page: From 12/119

3SE63

RFID safety switches

- Long service life due to non-contact switching
- Only one switch required for the maximum safety level SIL 3 according to IEC 62061/IEC 61508 or PL e according to ISO 13849-1
- Tamper protection better than with mechanical safety switches thanks to switches and actuators with individual coding
- LED status display including threshold indication for door displacement
- Degree of protection up to IP69 and resistance to cleaning products
- Larger switching displacement than with mechanical switches; offers better mounting tolerance and sagging tolerance of the protective door

Type: **3SE63** — Page: From 12/125

3SE64

RFID safety switches with tumbler

In addition to the features mentioned above for 3SE63, the RFID safety switch with tumbler has other advantages:

- 1 150 N locking force
- Suitable for protection of persons and/or processes (quiescent current or open-circuit principle)
- 25 N/50 N latching force adjustment by rotating the star handle 180°
- Guard locking possible from three sides (three directions of actuation) by means of a star handle
- Assisted or escape release of guard locking
- Actuator can be used for door stop (using damper)

Type: **3SE64** — Page: From 12/128

3SU14

3SU1 with PROFINET

3SU1

Commanding devices

SIRIUS ACT pushbuttons and indicator lights

- Using a special F adapter, EMERGENCY STOP devices according to ISO 13850 can be directly connected through the standard AS-Interface or PROFIsafe with safety-related communication. This F adapter/fail-safe interface module is snapped from the rear onto the EMERGENCY STOP device, enabling the achievement of SIL 3 according to IEC 62061 or PL e according to ISO 13849-1.
- Thanks to SIRIUS ACT with PROFINET, commanding and signaling devices can be connected directly via PROFINET to the controller and HMI devices – including with safety functions. Engineering and commissioning are simplified by the TIA Portal.
- EMERGENCY STOP devices for disconnecting plants in an emergency situation
- With positive latching function according to ISO 13850 and SIL 3 according to IEC 62061 or PL e according to ISO 13849-1
- Various mushroom diameters (also illuminated), with lock, in plastic/metal, as individual or complete units, and in combination with 3SU1 enclosure or two-hand operation console. The 3SU1 enclosures are also optionally available with ASIsafe interface

Type: **3SU1** — Page: From 13/6

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Safety technology

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	Type	Page
SIRIUS Safety Integrated (continued)		
Cable-operated switches	**3SE7**	
• Control functions and EMERGENCY STOP always within reach		
• More safety over long distances of up to 2 x 100 m length		
• Easy release		
• Fail-safe applications with SIRIUS Safety Integrated		
• Status display directly on the switch		
• Signal display for long distances in innovative LED technology with visibility over 50 m		
• Cable-operated switches with latching according to ISO 13850 (EN 418) and full EMERGENCY STOP function with positive-opening contacts		
• Quick and safe mounting using uniform mounting accessories		
• Versions with 1 NO/2 NC with yellow lid		
3SE7		
Safety foot switches	**3SE2924-3AA20**	
• Are used wherever manual operation is not possible		
• With hood, IP65 metal enclosure		
• With interlocking function according to ISO 13850, manual release by pushbutton switch		
• With 2 NO + 2 NC, NO contacts close by momentary contact, positive-opening NC contacts with independent latching (safety function)		
3SE2924-3AA20		
Electronically configurable 8WD46 signaling columns	**8WD46**	
• Compact and electronically modular design for flexible and versatile use		
• Flexible segment configuration through individually adjustable colors (multicolor LED), intensity and function (blinking, flashing, continuous or rotating light)		
• Adjustable tones and volume		
• Conventional signaling columns with configuration of the signaling columns via USB interface, with fast linking to the application through 8-pole M12 plug		
• Signaling columns for IO-Link configured via IO-Link interface (IODD) and fast linking to the application through 4-pole M12 plug		
8WD46		

Connection methods

The 3SK safety relays are available with screw or spring-loaded terminals (push-in).

The 3TK2810 safety relays are available with screw or spring-loaded terminals.

⊕	Screw terminals
⊟	Spring-loaded terminals, spring-loaded terminals (push-in)
	The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

3SK safety relays: Spring-loaded terminals (push-in) with TOP wiring

Push-in terminals are a form of spring-loaded terminals allowing fast wiring without tools for rigid conductors or conductors equipped with end sleeves.

As with other spring-loaded terminals, a screwdriver (with 3.0 x 0.5 mm blade) is required to disconnect the conductor. The same tool can also be used to wire finely stranded or stranded conductors with no end finishing.

The advantages of the push-in terminals are found, as with all spring-loaded terminals, in speed of assembly and disassembly and vibration-proof connection. There is no need for the checking and tightening required with screw terminals.

With the TOP wiring method, the wire inlet and terminals can be reached from the front. This helps to speed up the wiring process and eliminate wiring errors.

Video: SIRIUS spring-loaded terminals – Strong, flexible, safe, fast

Overview

SIRIUS 3SK safety relays

Video: 3SK safety relays – Select the optimum device - precisely for your application

Note:

More videos in the ExplaineArium, see www.siemens.com/sirius-xplained.

More information
Homepage, see www.siemens.com/sirius-safety-relays
SiePortal, see www.siemens.com/product?3SK
TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=Sirius3SK
Conversion tool, see www.siemens.com/conversion-tool
SIRIUS Sim 3SK2 simulation tool, see https://support.industry.siemens.com/cs/ww/en/view/109763750

SIRIUS 3SK safety relays are the key elements of a consistent, cost-effective safety chain. Whether you need EMERGENCY STOP functionality, protective door monitoring, light arrays, laser scanners or the protection of presses or punches – slimline SIRIUS safety relays enable all safety applications to be implemented in the best possible way in terms of engineering and price.

The following safety-related functions are available:

- Monitoring the safety functions of sensors
- Monitoring the sensor leads
- Monitoring the correct device function of the safety relays
- Monitoring the actuators in the shutdown circuit
- Safety-related disconnection when dangers arise

SIRIUS 3SK safety relays are approved for applications up to SIL 3 according to IEC 62061 or PL e according to ISO 13849-1.

Note:

Device versions with protective coating on the printed circuit board are available on request.

Device series

SIRIUS 3SK device series

Safety technology
Safety relays
SIRIUS 3SK safety relays

SIRIUS 3SK safety relays stand out due to their flexibility for both parameterization and system designs with several evaluation units. This reduces device variance, thus bringing advantages in terms of device selection and spare parts management. Optimized solutions when selecting components and reduced spare part inventory requirements are facilitated by a clearly structured component range. Device connectors are simply used for connecting most components. This considerably reduces the wiring effort and avoids possible errors.

3SK1 Standard basic units

The 3SK1 Standard basic units are characterized by the following features:

- Compact design
- Simple operation
- Relay and semiconductor outputs
- Economical solution

3SK1 Advanced basic units

The 3SK1 Advanced basic units also offer:

- Universal application possibilities thanks to multifunctionality
- Time-delayed outputs
- Expansion of inputs and outputs

3SK2 basic units

The 3SK2 basic units also offer:

- Up to six fail-safe, independent shutdown functions
- Flexible in use thanks to software parameterization
- Powerful semiconductor outputs
- Convenient diagnostics using diagnostics display and configuration software
- Communication via PROFINET/PROFIBUS by means of communications module

All three basic device series can be supplemented with output expansions. These provide further fail-safe, potential-free relay contacts for controlling actuators. In addition, the 3RM1 Failsafe motor starters can also be integrated into the 3SK system .

In the 3SK1 Advanced and 3SK2 device series, the output expansions are connected by means of device connectors, in the 3SK1 Standard series by means of wiring.

For the 3SK1 Advanced device series, there is also the possibility of supplementing the basic units with input expansions. Here too, the connection is made via device connectors. This means that no individual basic units need to be interconnected if more than one sensor is required in the safety application.

Since the 3SK1 Advanced device series comprises devices with 24 V DC operational voltage, a power supply is also available.

The 3SK2 device series can optionally be connected with a communications module via PROFINET to a control system, e.g. for diagnostics.

It is also possible to connect a diagnostics module to the 3SK2 system. This can be mounted in the control cabinet door, for example, and displays errors and diagnostics as well as configuration data quickly and clearly.

The 3SK1 Standard and Advanced and 3SK2 series are a high-quality replacement for the 3TK28 safety relays. In their narrower design, and equipped with greater functionality, they can replace every 3TK28 device. The only exception to this are the 3TK2810 devices.

The 3RQ1 force-guided coupling relays can be used as an output expansion for 3SK up to SIL 3/PL e. Connection is also possible with device connectors.
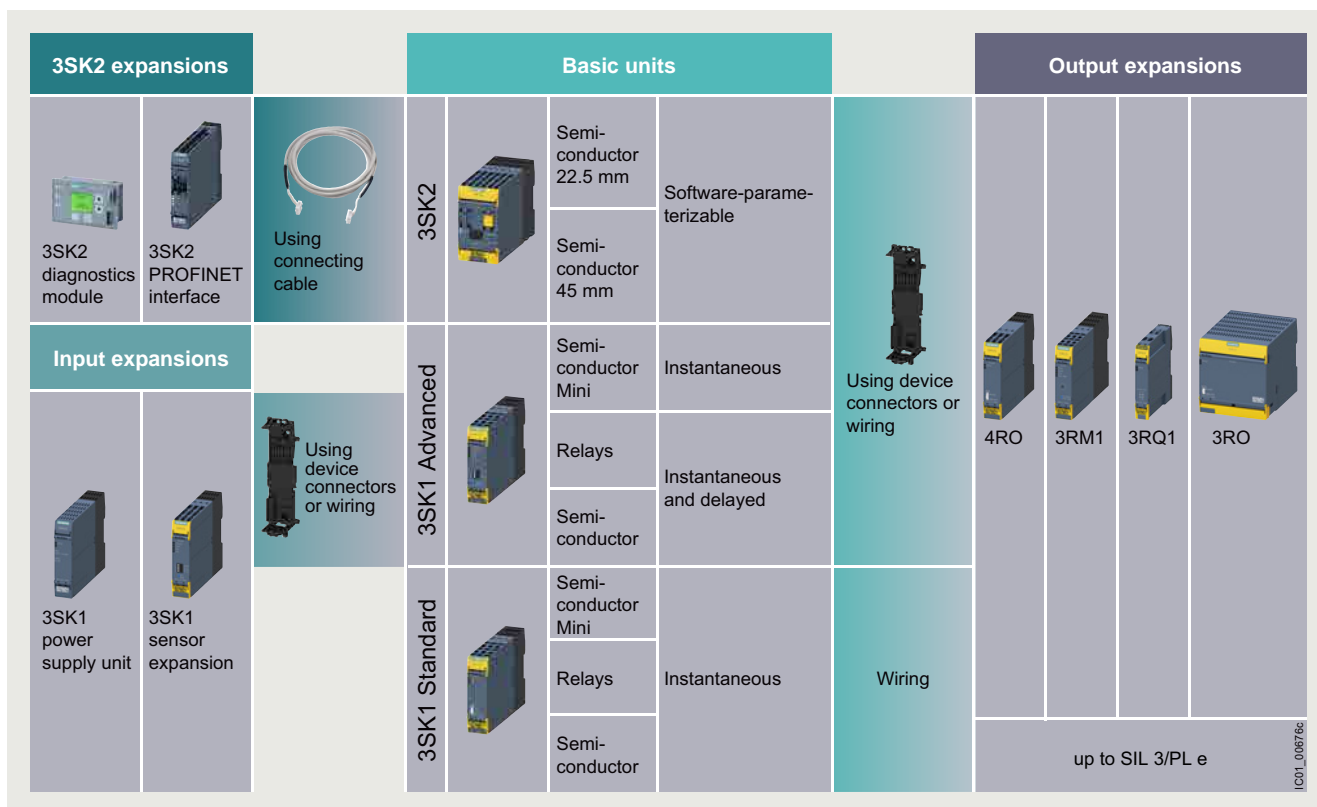
System overview

Overview of functions of the 3SK device series

Type	3SK1 Standard basic units		3SK1 Advanced basic units		3SK2 basic units 22.5 mm	45 mm
	Safe relay outputs	Safe semiconductor outputs	Safe relay outputs	Safe semiconductor outputs	Safe semiconductor outputs	Safe semiconductor outputs
Sensors						
• Mechanical	✓	✓	✓	✓	✓	✓
• Non-floating	✓[1]	✓	✓	✓	✓	✓
• Antivalent	--	--	✓	✓	✓	✓
• Expandable	--	✓ by means of cascading	✓	✓	--	--
Inputs	2 x 1-channel, 1 x 2-channel	2 x 1-channel, 1 x 2-channel	2 x 1-channel, 1 x 2-channel	2 x 1-channel, 1 x 2-channel	Freely configurable: 10 x 1-channel, 5 x 2-channel	Freely configurable: 20 x 1-channel, 10 x 2-channel
Parameters						
• Start (auto/monitored)	✓	✓	✓	✓	A variety of functions can be set for each input/output by means of software parameterization.	
• Sensor connection, 2 x 1-channel/ 1 x 2-channel	✓ by means of wiring	✓	✓	✓		
• Cross-circuit detection	✓ by means of wiring	✓	✓	✓		
• Start-up test ON/OFF	--	✓	✓	✓		
• Monitoring of two-hand operator panels according to EN 574/ISO 13851	--	--	✓	✓		
• Safety mat	--	--	✓	✓		
Safe outputs						
• Instantaneous	✓	✓	✓	✓	Configurable	Configurable
• Time-delayed	--	--	✓	✓	Configurable	Configurable
• Expandable with safe relay outputs	✓ by means of wiring	✓ by means of wiring	✓	✓	✓	✓
• Independent	--	--	--	--	✓[2]	✓[3]
• Device connectors	--	--	✓	✓	✓	✓
Options						
• External memory module	--	--	--	--	--	✓
• Display on the device	--	--	--	--	--	✓
• External diagnostics module can be connected	--	--	--	--	✓	✓
Control supply voltage						
• 24 V DC	✓[4]	✓	✓	✓	✓	✓
• 110 ... 240 V AC/DC	✓	✓[5]	✓[6]	✓[6]	--	--

✓ Available
-- Not available
[1] 24 V basic units only.
[2] Up to four independent safe outputs, two of which via device connectors.
[3] Up to six independent safe outputs, two of which via device connectors.
[4] 24 V AC/DC.
[5] Possible using 3SK1230 power supply by means of wiring.
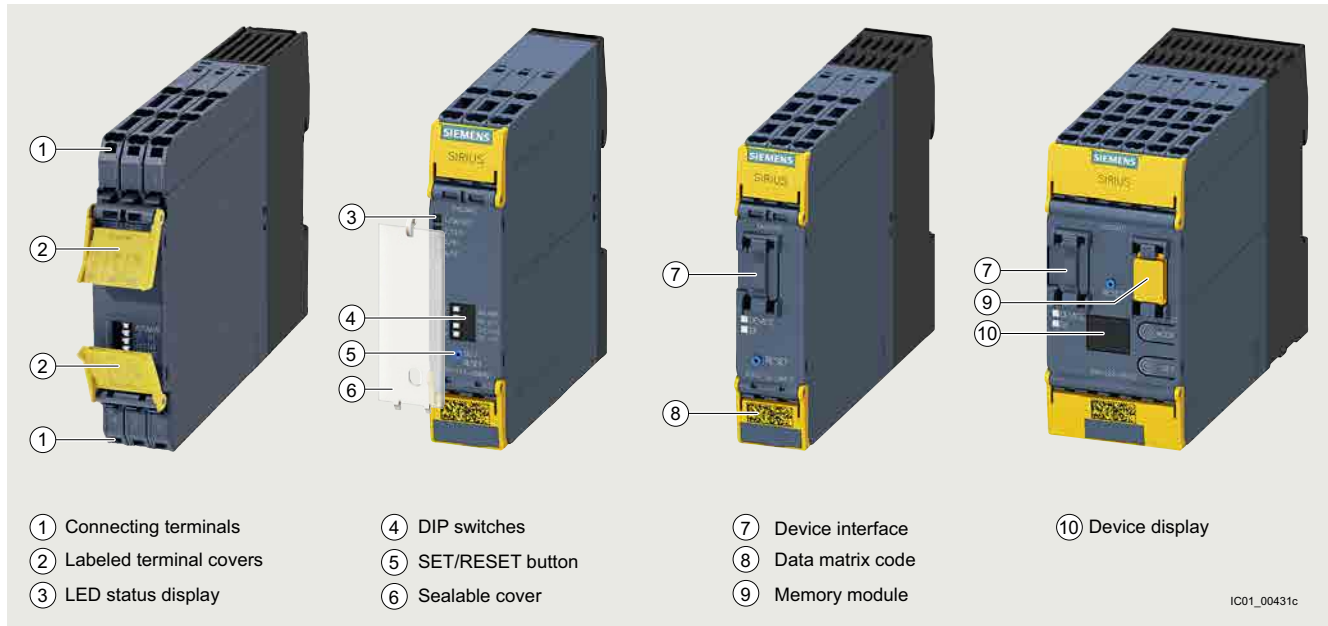[6] Possible using 3SK1230 power supply via device connector.

Safety technology
Safety relays
SIRIUS 3SK safety relays

General data

Enclosure concept

① Connecting terminals	④ DIP switches	⑦ Device interface	⑩ Device display
② Labeled terminal covers	⑤ SET/RESET button	⑧ Data matrix code	
③ LED status display	⑥ Sealable cover	⑨ Memory module	

IC01_00431c

Innovative enclosure concept for SIRIUS 3SK safety relays

Parameter assignment

3SK112 and 3SK1112 with DIP switch

The 3SK112 and 3SK1112 safety relays are configurable safety relays. They are used as evaluation units for typical safety chains (detect, evaluate, react). A number of functions can be set using the DIP switches on the front. 3SK112 and 3SK1112 are therefore universally applicable.

DIP switch No.	OFF	ON	Schematic
1	Sensor input Autostart	Sensor input Monitored start	
2	Without cross-circuit detection	With cross-circuit detection	
3	2 x 1-channel sensor connection	1 x 2-channel sensor connection	
4	With start-up test	Without start-up test	

3SK2 with software

The SIRIUS Safety ES (TIA Portal) software permits quick and easy parameterization, commissioning and diagnostics of SIRIUS 3SK2 safety relays.
Device configuration and device functionality can easily be created graphically directly on the PC and transferred to the switching device through a USB cable or an optional PROFIBUS/PROFINET interface.
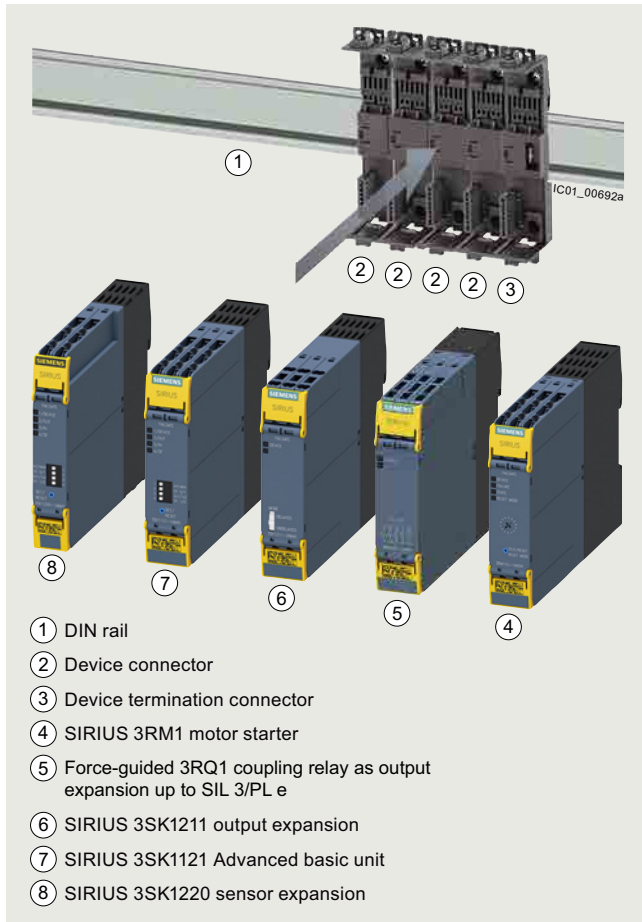
Note:

SIRIUS Safety ES (TIA Portal),

Communication

	3SK2112, 22.5 mm	3SK2122, 45 mm
PROFINET	✓	✓
PROFIBUS	✓	✓

✓ Available

Optimum connection with device connectors

1. DIN rail
2. Device connector
3. Device termination connector
4. SIRIUS 3RM1 motor starter
5. Force-guided 3RQ1 coupling relay as output expansion up to SIL 3/PL e
6. SIRIUS 3SK1211 output expansion
7. SIRIUS 3SK1121 Advanced basic unit
8. SIRIUS 3SK1220 sensor expansion

3RQ1 with 3SK1

In the case of 3SK1 Advanced basic units or 3SK2 basic units, the 3ZY12 device connectors allow safety functions involving several sensors and actuators to be constructed very quickly.

3RQ1 coupling relays as output expansion for 3SK

The SIRIUS 3RQ1 force-guided coupling relays in a modern titanium gray industrial enclosure are available in widths of 17.5 mm and 22.5 mm and can be used as an output expansion for SIRIUS 3SK safety relays.

They have safety certification up to SIL 3 according to IEC 62061/IEC 61508 or PL e according to ISO 13849-1.

Versions with a wide-range voltage input of 24 ... 240 V AC/DC and an installation depth of 90 mm, and versions with 24 V DC and an installation depth of 120 mm for use with 3SK device connectors are available.

The series consists of devices with up to five outputs and can be supplied with screw or spring-loaded (push-in) terminals.

Note:

SIRIUS 3RQ1 coupling relays, .

Seamlessly integrated safety right through to the main circuit
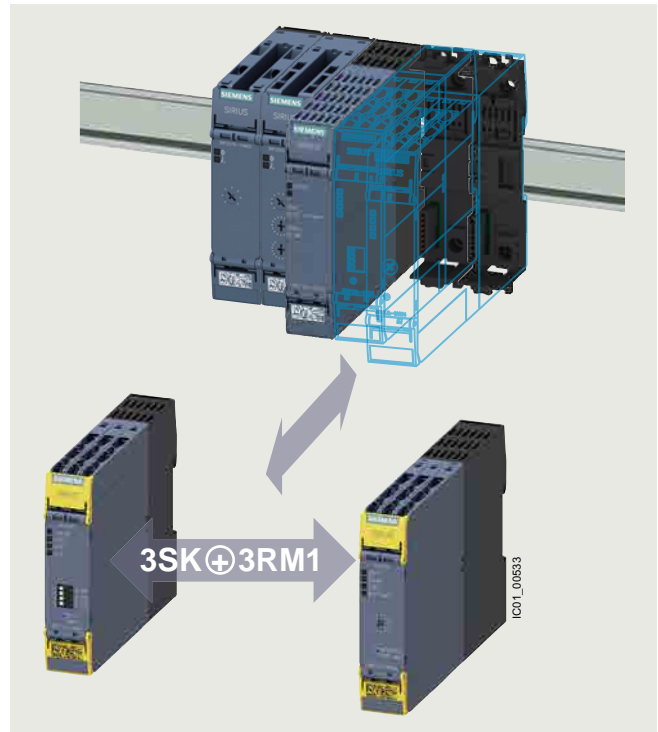
Problem-free integration of functional safety into the main circuit through the simple combination of 3RM1 and 3SK1 devices

Functional safety in the main circuit needs to be both simple and flexible

The unique compatibility of hybrid 3RM1 fail-safe motor starters and 3SK safety relays means that integrated functional safety right through to the main circuit is no longer a problem.

Their compact design allows the motor starters to be installed to the right of the safety relay in a simple manner, just like an output expansion. The wiring of the safety-related signals to the relay can be performed simply, quickly and in an error-free manner using the device connector.

The ergonomically designed enclosure with removable terminals and terminal labeling in the hinged cover allows for the cables to be conveniently diagonally mounted from the front. Either screw or spring-loaded terminals with push-in technology are available.

Highlights

- Fail-safe disconnection of motors up to 3 kW
- Problem-free combination of fail-safe motor starters and safety relays
- End-to-end system, simple setup using device connectors
- Ergonomic enclosure

Note:

SIRIUS 3RM1 motor starters, .

Safety technology
Safety relays
SIRIUS 3SK safety relays

General data

Ordering notes for multi-unit packaging

SIRIUS 3SK safety relays can also be ordered in practical and environmentally friendly multi-unit packaging on request.

Multi-unit packaging with order code X90

When ordering products in multi-unit packaging, the article number of the product concerned must be supplemented with **"-Z"** and, in addition, the order code **"X90"** must be specified.

Ordering example:
3SK1111-2AB30-Z X90;
Order quantity 12 items → Packed number of items 12

For more information, see page 16/7.

Article number schemes

Product versions		Article number								
3SK1 safety relays		**3SK1**	□	□	□ –	□	□	□	□	□
Device version	Basic unit		1							
	Expansion unit		2							
Device versions	3SK11: Standard; 3SK12: Output expansion			1						
	3SK11: Advanced; 3SK12: Input expansion			2						
Type of outputs	Relay outputs				1					
	Semiconductor outputs				2					
	Power outputs				3					
Connection type	Screw terminals					1				
	Spring-loaded terminals (push-in)					2				
Control circuit/actuation	3SK11: 3 enabling circuits						A			
	3SK11: 2 enabling circuits						B			
	3SK11: 4 enabling circuits						C			
Type of control supply voltage	3SK1213: 24 V AC, 50/60 Hz							B	0	
	3SK1: 24 V AC/DC, 50/60 Hz							B	3	
	3SK1: 24 V DC							B	4	
	3SK1213: 115 V AC, 50/60 Hz							J	2	
	3SK1213: 230 V AC, 50/60 Hz							L	2	
	3SK1: 110 ... 240 V AC/DC, 50/60 Hz							W	2	
Time delay	None									0
	0.05 ... 3 s									1
	0.5 ... 30 s									2
	5 ... 300 s									4
Example		**3SK1**	**1**	**1**	**1 –**	**1**	**A**	**B**	**3**	**0**

Product versions		Article number							
3SK2 safety relays		**3SK2**	**1**	□	**2 –**	□	**A**	**A**	**1 0**
Device versions	10 F-DI, 2 F-DQ, width 22.5 mm			1					
	20 F-DI, 4 F-DQ, width 45 mm			2					
Connection type	Screw terminals					1			
	Spring-loaded terminals (push-in)					2			
Example		**3SK2**	**1**	**1**	**2 –**	**1**	**A**	**A**	**1 0**

Product versions		Article number					
3SK2 interface modules		**3SK2**	**5 1 1 –**	□	**F**	**A**	**1 0**
Connection type	Screw terminals			1			
	Spring-loaded terminals (push-in)			2			
Example		**3SK2**	**5 1 1 –**	**1**	**F**	**A**	**1 0**

Product versions		Article number					
3RK3 interface modules		**3RK3**	**5 1 1 –**	□	**B**	**A**	**1 0**
Connection type	Screw terminals			1			
	Spring-loaded terminals			2			
Example		**3RK3**	**5 1 1 –**	**1**	**B**	**A**	**1 0**

Note:

The article number schemes show an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

Benefits

General

- Approved for all safety applications because of its compliance with the highest safety requirements (SIL 3/PL e)
- Universally usable thanks to adjustable parameters
- Usable worldwide thanks to globally valid certificates
- Compact SIRIUS design
- Device connectors with DIN-rail mounting for flexible connectability and expandability
- Removable terminals for greater plant availability
- Yellow terminal covers clearly identify the device as a safety component
- Sensor cable with a length of up to 2 000 m allows it to be used in extensive plants
- Can be used for installation altitudes up to 4 000 m

Relay outputs

- Different voltages can be switched through the floating contacts
- The relay contacts allow currents of up to 5 A at AC-15/DC-13 to be connected

Semiconductor outputs

- Wear-free
- Suitable for operation in frequently switching applications
- Insensitive to vibrations and dirt
- High electrical endurance

Power outputs (3SK1213 output expansion)

- Different voltages can be switched through the floating contacts
- With the power relay contacts currents up to 10 A AC-15/6 A DC-13 can be switched
- High mechanical and electrical endurance
- Protective separation between safe outputs and electronics

Expansion option by adding the 3RM1 motor starter

SIRIUS 3SK safety relays are ideal for combining with the SIRIUS 3RM1 motor starters

Combinations are made by means of SIRIUS 3ZY12 device connectors (in combination with 3SK1 Advanced/3SK2) or conventional wiring (for all 3SK1 and 3SK2 basic units).

This makes collective shutdown very easy in assemblies. The wiring, and ultimately the shutting down of the control supply voltage for the expansion components in EMERGENCY STOP situations, is performed via the device connector. There is no further need for complex looping of the connecting cables between the safety relay and the motor starters.

The 3RM1 motor starter combines the benefits of semiconductor technology and relay technology. This combination is also known as hybrid technology. The hybrid technology in the motor starter is characterized by the following features:

- The inrush current in the case of motorized loads is conducted briefly via the semiconductors. Advantages include protection of the relay contacts and a long service life due to low wear.
- The uninterrupted current is conducted via relay contacts. Advantages include lower heat losses compared with the semiconductor.
- Shutdown is implemented again via the semiconductor. The contacts are only slightly exposed to arcs, and this results in a longer service life.
- Integrated overload protection

Expansion option with 3RQ1 coupling relay

SIRIUS 3SK safety relays are ideal for combining with the SIRIUS 3RQ1 coupling relays . Combinations are made by means of SIRIUS 3ZY12 device connectors or wiring.

3ZY12 device connectors

Using 3ZY12 device connectors to combine devices reduces the time required to configure and wire the components. At the same time errors are avoided during wiring, and this considerably reduces the testing required for the fully-assembled application.

Configuration and stock-keeping

Variable setting options by means of DIP switches or software, a wide voltage range (3SK1111) and a special power supply unit (3SK1 only) reduce the cost of keeping stocks, along with the configuration considerations of which evaluation unit should be selected.

Communication

The 3SK2 safety relays can be easily integrated in the overall application via PROFINET or PROFIBUS using optionally available interface modules.

This provides the following advantages:

- Exchange of signals and information with the plant controller
- Read-out and visualization of diagnostics information of the safety relay via the controller supports troubleshooting and reduces plant downtimes
- Access with the Safety ES engineering software via the fieldbus for parameterization, commissioning and diagnostics

Simulation

The SIRIUS Sim simulation tool for 3SK2 can be used to quickly and easily test configurations that have been created without real devices. The configurations thus created can then be loaded directly into the real devices. Time and costs for engineering are thus reduced.

Application

3SK1 safety relays

SIRIUS 3SK1 safety relays are used mainly in autonomous safety applications which are not connected to a safety-related bus system. Their function here is to evaluate the sensors and initiate safety-oriented tripping in the event of hazards. Also they check and monitor the sensors, actuators and safety-related functions of the safety relay.

3SK2 safety relays

SIRIUS 3SK2 safety relays are used primarily in autonomous, more complex safety applications for which the functional scope of the 3SK1 devices is no longer sufficient, such as in the implementation of independent shutdown functions or integration into higher-level control systems for diagnostics via fieldbus. Their function here is to evaluate the sensors and initiate safety-oriented tripping in the event of hazards. Also they check and monitor the sensors, actuators and safety-related functions of the safety relay.

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Safety technology
Safety relays
SIRIUS 3SK safety relays

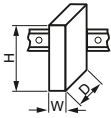## General data

Technical specifications

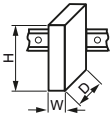| More information	
Equipment Manual 3SK1, see https://support.industry.siemens.com/cs/ww/en/view/67585885	Equipment Manual 3SK2, see https://support.industry.siemens.com/cs/ww/en/view/109444336
Technical specifications • 3SK1230, see https://support.industry.siemens.com/cs/ww/en/ps/16389/td • 3RK3511-.BA10, see https://support.industry.siemens.com/cs/ww/en/ps/16398/td	FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16382/faq

SIRIUS 3SK1 safety relays

Article number		3SK1111-.AB30, 3SK1211-.BB00, 3SK1211-.BB40	3SK1111-.AW20, 3SK1121, 3SK1211-.BW20	3SK1112	3SK1120, 3SK1220	3SK1122	3SK1213
General data:							
Width x height x depth	mm	22.5 x 100 x 121.6		22.5 x 100 x 91.6	17.5 x 100 x 121.6	22.5 x 100 x 121.6	90 x 100 x 121.6
Ambient temperature • During operation • During storage	°C °C	-25 ... +60 -40 ... +80					
Installation altitude at height above sea level, maximum	m	4 000, Derating, see Product announcement					
Air pressure according to SN 31205	kPa	90 ... 106					
Shock resistance		10 *g*/11 ms					5 *g*/10 ms
Vibration resistance according to IEC 60068-2-6		5 ... 500 Hz: 0.75 mm					
Degree of protection IP of the enclosure		IP20					
Touch protection against electric shock		Finger-safe					
Insulation voltage, rated value	V	300		50			300
Impulse withstand voltage, rated value	V	4 000		800			4 000
Safety Integrity Level (SIL) according to IEC 62061		3					
Performance Level (PL) according to ISO 13849-1		e					
T1 value for proof test interval or service duration according to IEC 61508	y	20					
Electromagnetic interference emission		IEC 60947-5-1, class B	IEC 60947-5-1, class A				IEC 60947-5-1, class B
Certificate of suitability • UL approval • TÜV approval		Yes Yes					

Article number		3SK1111, 3SK1121-.AB40, 3SK1211	3SK1112, 3SK1122	3SK1120	3SK1121-.CB4.	3SK1213
Switching capacity current of the NO contacts of the relay outputs • At AC-15 at 230 V • At DC-13 at 24 V	A A	5 5	-- --		3 3	10 6
Switching capacity current of the semiconductor outputs at DC-13 at 24 V	A	--	2	0.5	--	

Article number		3SK1111-.AB30, 3SK1211	3SK1111-.AW20	3SK1112, 3SK1220	3SK1120, 3SK1122-.AB40	3SK1121-.AB40	3SK1121-.CB4.	3SK1122-.CB4.	3SK1213
PFHD at high demand rate according to EN 62061	1/h	1.7×10^{-9}	1.5×10^{-9}	1.0×10^{-9}	1.3×10^{-9}	2.5×10^{-9}	3.7×10^{-9}	1.5×10^{-9}	1.0×10^{-9}
PFDavg at low demand rate according to IEC 61508		1.0×10^{-6}		7.0×10^{-6}					1.0×10^{-6}

SIRIUS 3SK2 safety relays

Article number		3SK2112-.AA10	3SK2122-.AA10	3SK2511-.FA10
General data:				
Width x height x depth	mm	22.5 x 100 x 124.5	45 x 100 x 124.5	22.5 x 100 x 124.5
Ambient temperature				
• During operation	°C	-25 ... +60		
• During storage	°C	-40 ... +80		-40 ... +85
Installation altitude at height above sea level, maximum	m	4 000		
Air pressure according to SN 31205	kPa	90 ... 106		
Shock resistance		15 g/11 ms		
Vibration resistance according to IEC 60068-2-6		5 ... 500 Hz: 0.75 mm		
Degree of protection IP of the enclosure		IP20		
Touch protection against electric shock		Finger-safe		
Insulation voltage, rated value	V	50		
Impulse withstand voltage, rated value	V	800		
Electromagnetic interference emission according to IEC 60947-1		Class A		
Certificate of suitability				
• UL approval		Yes		
• TÜV approval		Yes		

Article number		3SK2112-.AA10	3SK2122-.AA10
Safety Integrity Level (SIL) according to IEC 62061		3	
Performance Level (PL) according to ISO 13849-1		e	
T1 value for proof test interval or service duration according to IEC 61508	y	20	
Switching capacity current of the semiconductor outputs at DC-13 at 24 V	A	4	
PFHD at high demand rate according to EN 62061	1/h	1.0×10^{-8}	1.2×10^{-8}
PFDavg at low demand rate according to IEC 61508		1.5×10^{-5}	1.8×10^{-5}

Article number		3SK2511-.FA10
Transmission type for Industrial Ethernet		PROFINET with 100 Mbps full duplex (100BASE-TX)
Number of interfaces according to PROFINET		1
Type of interface Ethernet interface		Yes
Type of interface 1 RJ45 (Ethernet)		Yes
PROFINET Conformance Class		B
Network load class according to PROFINET		1
Volume of cyclic user data for PROFINET IO		
• For outputs	bit	64
• For inputs	bit	64

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Safety technology
Safety relays
SIRIUS 3SK safety relays

Basic units > SIRIUS 3SK1 Standard basic units

Overview

3SK111 Standard basic units

The 3SK111 Standard basic units are characterized by simple, variable functionality. These devices are recommended for safety functions requiring only a few sensors and a small number of outputs on the safety relay.

Note:

Use of device connectors not possible.

Selection and ordering data

3SK1111-1AB30

3SK1111-1AW20

3SK1112-1BB40

Control supply voltage		Number of outputs						Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
at AC at 50 Hz	at DC	as contacting contact block			as contactless semiconductor contact block							
		as NO contact, instantaneous switching	as NO contact, delayed switching	for signaling function, instantaneous switching	instantaneous switching	delayed switching	for signaling function, instantaneous switching					
V	V											
Standard basic units												
24	24	3	0	1	0	0	0	**3SK1111-☐AB30**		1	1 unit	41L
110 ... 240	110 ... 240	3	0	1	0	0	0	**3SK1111-☐AW20**		1	1 unit	41L
--	24	0	0	0	2	0	1	**3SK1112-☐BB40**		1	1 unit	41L

Type of electrical connection
• Screw terminals   **1**
• Spring-loaded terminals (push-in)   **2**

Overview

3SK112 Advanced basic units

The 3SK112 Advanced basic units form an innovative system landscape that allows even complex safety functions with large numbers of sensors and outputs to be built up using the device connectors. It is possible to increase both the number of inputs for sensors and the number of safe outputs of the basic unit without the need for wiring outlay between the devices.

Note:

Use of device connectors possible.

Selection and ordering data

Multi-unit packaging, see page 16/7.

3SK1121-1AB40   3SK1120-1AB40   3SK1122-1AB40   3SK1122-1CB41

Control supply voltage at DC	Number of outputs						Adjustable OFF-delay time	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	as contacting contact block			as contactless semiconductor contact block								
	as NO contact, instantaneous switching	as NO contact, delayed switching	as NC contact for signaling function, instantaneous switching	instantaneous switching	delayed switching	for signaling function, instantaneous switching						
V							s					
Advanced basic units												
24	3	0	1	0	0	0	--	**3SK1121-☐AB40**		1	1 unit	41L
	2	2	0	0	0	0	0.05 ... 3	**3SK1121-☐CB41**		1	1 unit	41L
							0.5 ... 30	**3SK1121-☐CB42**		1	1 unit	41L
							5 ... 300	**3SK1121-☐CB44**		1	1 unit	41L
24	0	0	0	1	0	0	--	**3SK1120-☐AB40**		1	1 unit	41L
	3	0	1				--	**3SK1122-☐AB40**		1	1 unit	41L
	2	2	0				0.05 ... 3	**3SK1122-☐CB41**		1	1 unit	41L
							0.5 ... 30	**3SK1122-☐CB42**		1	1 unit	41L
							5 ... 300	**3SK1122-☐CB44**		1	1 unit	41L

Type of electrical connection
• Screw terminals   **1**
• Spring-loaded terminals (push-in)   **2**

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* You can order this quantity or a multiple thereof.
Illustrations are approximate

Siemens IC 10 · 2024   **11/23**

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Overview

3SK2 basic units

The 3SK2 basic units have a large number of inputs and outputs within a narrow width. In addition, demanding safety applications can be implemented simply with several independent safety functions. Flexible application options are enabled by powerful semiconductor outputs, as well as by expandability with additional 3SK output expansions and 3RM1 Failsafe motor starters. Flexible time functions and diagnostics options are available.

The 3SK2 basic units can be easily integrated in control systems by means of optional communications modules for the purpose of diagnostics or access via software, for example. Furthermore, system states and fault diagnostics can be displayed easily and more rapidly on site using the diagnostics module for installation in the control cabinet front.

The 22.5 mm wide version of the 3SK2 basic units has 10 x 1-channel (5 x 2-channel) inputs, while the 45 mm wide 3SK2 version comes with 20 x 1-channel (10 x 2-channel) inputs.

Note:

For series applications, pre-programmed memory modules with customer-specific configurations can also be created. Please contact your responsible sales partner for this purpose.

We are offering new HMI faceplates with a uniform design for SIRIUS 3SK2. They provide a well-structured overview of all the disconnection and element diagnostics, see https://support.industry.siemens.com/cs/ww/en/view/109818076.

SIRIUS Sim 3SK2
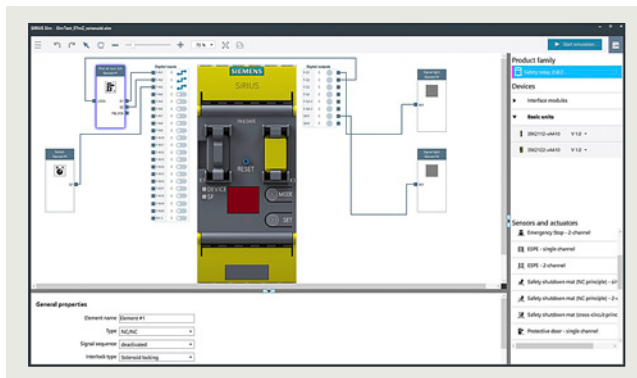
SIRIUS Sim 3SK2

The SIRIUS 3SK2 simulation tool can be used to quickly and easily test functions and configurations in an office environment. These configurations can then be loaded directly into real devices. Time and costs for engineering are reduced.

SIRIUS Sim 3SK2 is available free of charge as a download, see https://support.industry.siemens.com/cs/ww/en/view/109763750.

Note:

For more information, see page 14/25.

Starter kits

3SK2941 starter kit

Starter kits are cost-effective complete packages for the simple creation of complex safety applications.

The 3SK2941-2AA11 basic starter kit includes:
* 3SK2112-2AA10 basic unit, 22.5 mm wide, with spring-loaded terminals (push-in)
* SIRIUS Safety ES (TIA Portal) Basic software for configuration, commissioning, operation and diagnostics available as a free download
* USB PC cable for easy transmission of the configuration to the device by means of USB

The 3SK2942-2AA11 PROFINET starter kit includes:
* 3SK2122-2AA10 basic unit, 45 mm wide, with spring-loaded terminals (push-in)
* PROFINET 3SK2511-2FA10 interface module, 22.5 mm wide, with spring-loaded terminals (push-in)
* SIRIUS Safety ES (TIA Portal) Professional
* Required cables

■ **Selection and ordering data**

3SK2112

3SK2122

Control supply voltage	Number of outputs as contactless semiconductor contact block		Number of outputs to the device connector, safety-related	Width	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
at DC	safety-related 2-channel	non-safety-related							
V				mm					
Basic units									
24	2	1	2	22.5	**3SK2112-☐AA10**		1	1 unit	41L
	4	2	2	45	**3SK2122-☐AA10**		1	1 unit	41L

Type of electrical connection
• Screw terminals
• Spring-loaded terminals (push-in)

1
2

3SK2 multi-unit packaging, see page 16/7.

3SK2511-1FA10

3RK3511-1BA10

Application	Width	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	mm					
Interface modules						
For connecting 3SK2 safety relays via PROFINET	22.5	**3SK2511-☐FA10**		1	1 unit	41L
For connecting 3SK2 safety relays via PROFIBUS	45	**3RK3511-☐BA10**		1	1 unit	42B

Type of electrical connection
• Screw terminals
• Spring-loaded terminals: 3RK3 or spring-loaded terminals (push-in): 3SK2

1
2

Note:

The 3UF7930-0AA00-0 connecting cable is not included in the scope of supply and must be ordered separately, see page 11/30.

Product version	Spring-loaded terminals (push-in)		PU (UNIT, SET, M)	PS*	PG
	Article No.	Price per PU			
Basic starter kit					
Comprises 3SK2112-2AA10 basic unit, SIRIUS Safety ES (TIA Portal) as a free download and 3UF7941-0AA00-0 USB PC cable	**3SK2941-2AA11**		1	1 unit	4N1
PROFINET starter kit					
Comprises 3SK2122-2AA10 basic unit, PROFINET 3SK2511-2FA10 interface module, SIRIUS Safety ES (TIA Portal) Professional and required cables	**3SK2942-2AA11**		1	1 unit	4N1

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Safety technology
Safety relays
SIRIUS 3SK safety relays

■ **Overview**

3SK121 output expansion

The 3SK121 and 3RQ1 output expansions can be used for expanding all 3SK basic units.

3SK1211 output expansion (up to SIL 3/PL e)

The 3SK1211 output expansion is used to expand the safe outputs of a basic unit by adding another four safe outputs. These outputs have a switching capacity of AC-15 5 A at a switching voltage of 230 V. The devices can be connected to any 3SK basic unit by means of wiring. In addition, the devices with a 24 V DC control supply voltage can also be connected to 3SK1 Advanced basic units and 3SK2 basic units by means of the 3ZY12 device connectors.

3SK1213 output expansion (up to SIL 3/PL e)

The 3SK1213 output expansion is used to expand the safe outputs of a basic unit by adding three safe outputs with high switching capacity. These outputs have a switching capacity of AC-15 10 A at a switching voltage of 230 V. The devices can be connected to any 3SK basic unit by means of wiring. As with the 3SK1211, the devices with a 24 V DC control supply voltage can also be connected to 3SK1 Advanced and 3SK2 basic units by means of the 3ZY12 device connectors.

3RQ1 output expansion (up to SIL 2/PL c or SIL 3/PL e)

The 3RQ1 force-guided coupling relays serve as an output expansion up to SIL 2/PL c or SIL 3/PL e (depending on the version) and can be connected to all 3SK basic units by wiring and to all 3SK1 Advanced and 3SK2 basic units by using the 3ZY12 device connector. They have a switching capacity of AC-15 5 A (like 3SK1211) at a switching voltage of 230 V and are available in widths of 17.5 mm and 22.5 mm. Furthermore, they have NC contacts with a switching capacity of AC-15 for direct switching of loads, e.g. for anti-parallel switching or signaling, .

Note:

It is only possible to expand the Standard basic units by means of wiring. Advanced basic units and 3SK2 basic units can be expanded using the 3ZY12 device connector.

■ **Benefits**

- Perfect adaptation of the number of outputs
- Simple expansion of instantaneous and time-delayed safe outputs of the Advanced basic units using device connectors
- When using the device connector, the outputs on the terminals of the basic device can still be used
- Two further freely configurable shutdown functions on 3SK2 basic units when using device connectors
- Cost-effective multiplication of outputs up to SIL 2/PL c or SIL 3/PL e with 3RQ1

- Expansion with power contacts for high AC-15/DC-13 currents in the control circuit
- No wiring of the feedback circuit to the basic units is required when using device connectors
- Shorter installation times
- Less configuring and testing required

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■ **Selection and ordering data**

3SK1211 multi-unit packaging, see page 16/7.

3SK1211-1BB40

3SK1213-1AB40

Control supply voltage		Number of outputs as contacting contact block			Suitable for use with 3ZY12 device connector	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
at AC at 50 Hz	at DC	as NO contact instantaneous switching	as NO contact delayed switching	as NC contact instantaneous switching for feedback circuit						
V	V									
Output expansions										
24	--	4	0	1	No	**3SK1211-☐BB00**		1	1 unit	41L
--	24	4	0	1	Yes	**3SK1211-☐BB40**		1	1 unit	41L
110 ... 240	110 ... 240	4	0	1	No	**3SK1211-☐BW20**		1	1 unit	41L
--	24	3	0	1	Yes	**3SK1213-☐AB40**		1	1 unit	41L
115	--	3	0	1	No	**3SK1213-☐AJ20**		1	1 unit	41L
230	--	3	0	1	No	**3SK1213-☐AL20**		1	1 unit	41L

Type of electrical connection

1
• Screw terminals

2
• Spring-loaded terminals (push-in)

Note:

The 3RQ1 force-guided coupling relays can also be used as an output expansion for 3SK and have safety levels up to SIL 2/PL c or SIL 3/PL e, see page 5/21.

Safety technology
Safety relays
SIRIUS 3SK safety relays

Expansion units > Input expansions

Overview

3SK1220 sensor expansion

With the input expansions

- 3SK1220 sensor expansion
- 3SK1230 power supply

the 3SK1 Advanced basic units can be made more flexible.

3SK1220 sensor expansion

The 3SK1220 input expansion allows additional sensors to be integrated easily and flexibly. The device monitors two 1-channel sensors or one 2-channel sensor, whatever their output technology (floating/single-ended).

Note:

The 3SK1220 sensor expansion can only be connected to the 3SK1 Advanced basic units by means of the 3ZY12 device connector, .

3SK1230 power supply

The 3SK1230 power supply makes the 3SK1 devices universally usable, whatever control supply voltage is to be used.

Note:

Alongside the 3ZY12 device connector, the 3SK1230 power supply can also be wired to act as a power supply for 3SK1 devices.

Benefits

- A wide voltage range of 110 to 240 V AC/DC allows the devices to be used worldwide
- Low stock-keeping due to little variance
- Flexible expansion of the number of sensors without the need for additional wiring between the devices

- Perfect adaptation of the number of inputs to suit the application
- Universal use thanks to the wide range of adjustable parameters for sensor expansion (parameters as for 3SK1 Advanced basic units)

Selection and ordering data

Multi-unit packaging, see page 16/7.

3SK1220-1AB40

3SK1230-1AW20

Product version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Sensor expansions					
For safety-related expansion of the 3SK1 Advanced basic units by an additional 2-channel sensor or two 1-channel sensors	**3SK1220-□AB40**		1	1 unit	41L
Power supply					
For supplying 3SK1 Advanced basic units via 3ZY12 device connectors at voltages of 110 ... 240 V AC/DC	**3SK1230-□AW20**		1	1 unit	41L
Type of electrical connection					
• Screw terminals	1				
• Spring-loaded terminals (push-in)	2				

Overview

Numerous accessories are available for 3SK, such as device connectors, terminals, cables, adapters, covers, memory and diagnostics modules or software.

Note:

The last device in a system setup, i.e. the device on the far right, requires a device termination connector.

Device connectors for 3SK112., 3SK12.. and 3SK2

With the device connector, several devices of the 3SK/3RM1/3RQ1 system can be connected together.
Use of device connectors not possible with 3SK1 Standard.

Device connectors are available in various versions specifically for the 3SK safety relays:

For type	Device connectors				Device termination connectors		
	3ZY1212-1BA00 (for 3SK1/3RQ1, width 17.5 mm)	**3ZY1212-2BA00** (for 3SK1/3RQ1, width 22.5 mm)	**3ZY1212-2GA00** (for 3SK2, width 22.5 mm)	**3ZY1212-4GA01** (for 3SK2, width 45 mm)	**3ZY1212-1DA00** (for 3RQ1, width 17.5 mm)	**3ZY1212-2DA00** (for 3SK1/3RQ1, width 22.5 mm)	**3ZY1212-0FA01** (for 3SK1, set for enclosures ≥ 45 mm)
3SK1 Advanced basic units							
3SK1120	✓	--	--	--	--	--	--
3SK1121	--	✓	--	--	--	✓	--
3SK1122	--	✓	--	--	--	✓	--
3SK2 basic units							
3SK2112	--	--	✓	--	--	--	--
3SK2122	--	--	--	✓	--	--	--
Output expansions							
3SK1211	--	✓	--	--	--	✓	--
3SK1213	--	--	--	--	--	--	✓
3RQ1, 17.5 mm	✓	--	--	--	✓	--	--
3RQ1, 22.5 mm	--	✓	--	--	--	✓	--
Input expansions							
3SK1220	✓	--	--	--	--	--	--
3SK1230	--	✓	--	--	--	--	--

✓ Available

-- Not available

Removable terminals for 3SK

The following removable terminals are available for the 3SK safety relays for pre-wiring of the terminals in the control cabinet, or for replacing terminals:

For type	Removable terminals			
	Screw terminals		Spring-loaded terminals (push-in)	
	2-pole 3ZY1121-1BA00	3-pole 3ZY1131-1BA00	2-pole 3ZY1121-2BA00	3-pole 3ZY1131-2BA00
3SK1 basic units				
3SK1111	--	✓	--	✓
3SK1112	✓	--	✓	--
3SK1120	--	✓	--	✓
3SK1121	--	✓	--	✓
3SK1122	✓ bottom	✓ top	✓ bottom	✓ top
3SK2 basic units				
3SK2112	--	✓	--	✓
3SK2122	--	✓[1]	--	✓[1]
Output expansions				
3SK1211	✓	--	✓	--
3SK1213	--	--	--	--
Input expansions				
3SK1220	--	✓ top	--	✓ top
3SK1230	✓ bottom	--	✓ bottom	--

✓ Available

-- Not available

[1] Two sets of terminals are required for 3SK2122.

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Safety technology
Safety relays
SIRIUS 3SK safety relays

Accessories

◼ **Selection and ordering data**

Version		Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Device connectors for the electrical connection of SIRIUS devices in the industrial DIN-rail enclosure						
	Device connectors for 3SK1/3RQ1					
	• Width 17.5 mm	3ZY1212-1BA00		1	1 unit	41L
	• Width 22.5 mm	3ZY1212-2BA00		1	1 unit	41L
	Device connectors for 3SK2					
	• Width 22.5 mm	3ZY1212-2GA00		1	1 unit	41L
	• Width 45 mm	3ZY1212-4GA01		1	1 unit	41L
	Device connector for 3RM1					
	• Width 22.5 mm	3ZY1212-2EA00		1	1 unit	41L
	Device termination connectors					
	• For 3SK1/3RQ1, width 22.5 mm	3ZY1212-2DA00		1	1 unit	41L
	• For 3RQ1, width 17.5 mm	3ZY1212-1DA00		1	1 unit	41L
	• For 3RM1, width 22.5 mm	3ZY1212-2FA00		1	1 unit	41L
	Note: Positions of the slide switch, see Equipment Manual 3SK1.					
	Device daisy chain connector	3ZY1212-2AB00		1	1 unit	41L
	For 3SK/3RQ1/3RM1, 24 V DC, 22.5 mm, for implementation of distances between devices according to the installation guidelines					
	Device connector	3ZY1210-2AA00		1	1 unit	41L
	For height adjustment for devices without electrical connection via device connector, with a width of 22.5 mm or greater					
	Device termination connector set	3ZY1212-0FA01		1	1 unit	41L
	For 3SK1213, width > 45 mm, comprising 3ZY1212-2FA00 and 3ZY1210-2AA00					
Terminals for SIRIUS devices in the industrial DIN-rail enclosure						
	Removable terminals	**Screw terminals** ⊕				
	• Screw terminals up to 2 x 1.5 mm^2 or 1 x 2.5 mm^2					
	- 2-pole	3ZY1121-1BA00		1	6 units	41L
	- 3-pole[1]	3ZY1131-1BA00		1	6 units	41L
	- 4-pole	3ZY1141-1BA00		1	6 units	41L
		Spring-loaded terminals (push-in)				
	• Push-in terminals up to 2 x 1.5 mm^2					
	- 2-pole	3ZY1121-2BA00		1	6 units	41L
	- 3-pole[1]	3ZY1131-2BA00		1	6 units	41L
	- 4-pole	3ZY1141-2BA00		1	6 units	41L
PC cables for 3SK2 (essential accessory)						
	USB PC cable	3UF7941-0AA00-0		1	1 unit	42J
	For connecting to the USB interface of a PC/PG, for communication with 3SK2 through the system interface, recommended for use in connection with 3SK2					
Connecting cables for 3SK2 (essential accessory for diagnostics/interface modules)						

Device connector images: 3ZY1212-1BA00, 3ZY1212-2DA00

Removable terminal image: 3ZY1121-2BA00

USB PC cable image: 3UF7941-0AA00-0

For connecting diagnostics/interface modules to 3SK2 basic unit

Central unit with interface module	Diagnostics module with central unit or interface module	Length	Article No.		PU	PS*	PG
✓	--	• 0.025 m (flat)	3UF7930-0AA00-0		1	1 unit	42J
--	✓	• 0.1 m (flat)	3UF7931-0AA00-0		1	1 unit	42J
--	✓	• 0.15 m (flat)	3UF7934-0AA00-0		1	1 unit	42J
--	✓	• 0.3 m (flat)	3UF7935-0AA00-0		1	1 unit	42J
--	✓	• 0.5 m (flat)	3UF7932-0AA00-0		1	1 unit	42J
--	✓	• 0.5 m (round)	3UF7932-0BA00-0		1	1 unit	42J
--	✓	• 1.0 m (round)	3UF7937-0BA00-0		1	1 unit	42J
--	✓	• 2.5 m (round)	3UF7933-0BA00-0		1	1 unit	42J

Connecting cable image: 3UF7932-0AA00-0

[1] For 3SK2122 two terminal sets are required.

Accessories
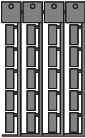
Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Operating and monitoring modules for 3SK2					
Diagnostics module	3SK2611-3AA00		1	1 unit	41L
For direct display of errors, e.g. of cross-circuits					
Note: The 3RK3611-3AA00 MSS diagnostics module cannot be operated on the 3SK2 devices.					
Door adapters for 3SK2					
For external connection of the system interface, e.g. outside a control cabinet	3UF7920-0AA00-0		1	1 unit	42J
Interface covers for 3SK2					
For system interface, titanium gray	3RA6936-0B		1	5 units	42F
Memory modules for 3SK2					
For backing up the complete parameterization of the 3SK2 safety system without a PC/PG through the system interface	3RK3931-0AA00		1	1 unit	42C
Software for 3SK2					
SIRIUS Safety ES (TIA Portal)					
Software for configuration, commissioning, operation and diagnostics of 3SK2, see page 14/22 or www.siemens.com/product?3ZS1.					
SIRIUS Sim 3SK2					
Available free of charge as a download for simulating configurations, see page 14/25 or https://support.industry.siemens.com/cs/ww/en/view/109763750.					
Accessories for enclosures					
Sealing covers					
• 17.5 mm (for 3SK1120 and 3SK1220)	3ZY1321-1AA00		1	5 units	41L
• 22.5 mm (for all 3SK1 devices except 3SK1120 and 3SK1220)	3ZY1321-2AA00		1	5 units	41L
Push-in lugs	3ZY1311-0AA00		1	10 units	41L
For wall mounting					
Coding pins	3ZY1440-1AA00		1	12 units	41L
For removable terminals of SIRIUS devices in the industrial DIN-rail enclosure; enable the mechanical coding of terminals					

Image labels (left column):
- 3SK2611-3AA00
- 3UF7920-0AA00-0
- 3RA6936-0B
- 3RK3931-0AA00
- 3ZS1326-2C.10-0Y.5
- 3ZY1321-2AA00
- 3ZY1311-0AA00
- 3ZY1440-1AA00

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Safety technology
Safety relays
SIRIUS 3SK safety relays

Accessories

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Accessories for enclosures (continued)					
Hinged covers					
Replacement covers, without terminal labeling					
• Titanium gray					
- 22.5 mm wide (for 3SK1230, 3SK2511)	**3ZY1450-1AB00**		1	5 units	41L
• Yellow					
- 17.5 mm wide (for 3SK1220, 3SK1120)	**3ZY1450-1BA00**		1	5 units	41L
- 22.5 mm wide (for 3SK11 except 3SK1120, 3SK1211, 3SK2112)	**3ZY1450-1BB00**		1	5 units	41L
- 45 mm wide (for 3SK2122)	**3ZY1450-1BC00**		1	5 units	41L
Blank labels					
Unit labeling plates[1]					
For SIRIUS devices					
• 10 mm x 7 mm, titanium gray	**3RT2900-1SB10**		100	816 units	41B
• 20 mm x 7 mm, titanium gray	**3RT2900-1SB20**		100	340 units	41B
Tools for opening spring-loaded terminals					
Screwdriver	**Spring-loaded terminals (push-in)**				
For all SIRIUS devices with spring-loaded terminals					
Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	**3RA2908-1A**		1	1 unit	41B

3ZY1450-1AB00

3ZY1450-1BB00

3RT2900-1SB20

3RA2908-1A

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH, .

■ Overview

SIRIUS 3TK2810 safety relays

More information
Homepage, see www.siemens.com/sirius-monitor
SiePortal, see www.siemens.com/product?3TK28

3TK2810-0 standstill monitors

The standstill monitor increases safety in hazardous areas. Without a sensor, it detects motor stoppage from the residual magnetization of the rotating motor. When an adjustable threshold value is undershot, it uses its outputs to allow access to hazardous areas, for example by unlocking a protective door.

3TK2810-1 speed monitors

The speed monitor combines two safety functions in one unit by continuously monitoring machines and plants for standstill and speed.

Through simple parameterization and permanent diagnostics on the display, faults can be quickly remedied at any time – often before they cause plant downtimes.

In addition to standstill and speed monitoring, the unit also features an integrated monitoring function of a protective door with spring-loaded interlocking. Therefore, an additional evaluation unit is not needed. In addition, it can be protected against unwanted changes by the optionally activatable parameterization lock.

Article number scheme

Product versions		Article number				
Safety relays with special functions		**3TK2810 – □ □ A □ □**				
Device version	Standstill monitor	**0**				
	Speed monitor for NPN/PNP proximity switches and encoders	**1**				
Type of control supply voltage	24 V DC		**B**			
	230 V AC, 50/60 Hz		**G**			
	400 V AC, 50/60 Hz		**J**			
	120 ... 240 V AC/DC; 50/60 Hz		**K**			
Time delay	0.2 ... 6 s (standstill)			**0**		
	0 ... 999 s (release delay)			**4**		
Connection type	Screw terminals				**1**	
	Spring-loaded terminals				**2**	
Version	Speed monitor for NAMUR proximity switches and encoders				**– 0 A A 0**	
Example		**3TK2810 – 0 B A 0 1**				

Note:

The article number scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

■ Benefits

3TK2810-0 standstill monitors

- No additional sensors required
- Signaling of faults with diagnostics display
- Standstill time can be set
- Unit can be used with frequency converters

3TK2810-1 speed monitors

- Menu-prompted, easy parameterization
- Direct diagnostics on the display means shorter downtimes thanks to early fault detection
- Integrated protective door monitoring means greater safety because access to the plant is allowed only in the safe state
- Suitable for all standard sensors, i.e. high flexibility

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Safety technology
Safety relays
SIRIUS 3TK28 safety relays

With special functions

Technical specifications

More information

Operating Instructions 3TK2810-0, see https://support.industry.siemens.com/cs/ww/en/view/25437254	Technical specifications, see https://support.industry.siemens.com/cs/ww/en/ps/16391/td
Equipment Manual 3TK2810-1, see https://support.industry.siemens.com/cs/ww/en/view/43707376	FAQs, see https://support.industry.siemens.com/cs/ww/en/ps/16391/faq

Type	3TK2810-0 standstill monitors	3TK2810-1 speed monitors
Sensors		
• Inputs	3	4
• Electronic	--	3
• With contacts	--	1
• Without sensors (measuring inputs)	3	--
• Magnetically operated switch (Reed contacts)	--	--
Safety mats	--	--
Start		
• Auto	✓	✓
• Monitored	--	✓
Cascading input 24 V DC	--	--
Key-operated switches	--	--
Enabling circuit, floating		
• Stop category 0	3 NO + 1 NC	2
• Stop category 1	--	--
Enabling circuit, electronic		
• Stop category 0	--	--
• Stop category 1	--	--

Type	3TK2810-0 standstill monitors	3TK2810-1 speed monitors
Signaling outputs		
• Floating	1 CO	--
• Electronic	2	2
Standards	IEC 60204-1, ISO 12100, ISO 13849-1, IEC 62061/IEC 61508	IEC 60947-5-1, ISO 13849-1, IEC 60204-1, IEC 62061/IEC 61508
Test certificates	TÜV, UL, CSA	TÜV, UL, CSA
SIL level max. according to IEC 62061/IEC 61508	3	3
Performance Level (PL) according to ISO 13849-1	e	e
Probability of a dangerous failure per hour (PFH$_d$)	1.5×10^{-8} 1/h	3.38×10^{-9} 1/h
Rated control supply voltage		
• 24 V DC	✓	✓
• 230 V AC	✓	--
• 400 V AC	✓	--
• 120 ... 240 V AC/DC	--	✓

✓ Available

-- Not available

Selection and ordering data

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41L
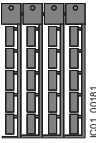
3TK2810-0BA01   3TK2810-1BA41

Rated control supply voltage U_s	Times	Screw terminals ⊕		Spring-loaded terminals	
		Article No.	Price per PU	Article No.	Price per PU
V	s				
Standstill monitors					
3TK2810-0					
• 24 DC	0.2 ... 6 (standstill)	**3TK2810-0BA01**		**3TK2810-0BA02**	
• 230 AC	0.2 ... 6 (standstill)	**3TK2810-0GA01**		**3TK2810-0GA02**	
• 400 AC	0.2 ... 6 (standstill)	**3TK2810-0JA01**		**3TK2810-0JA02**	
Speed monitors					
3TK2810-1 for NPN/PNP proximity switches and encoders					
• 24 DC	0 ... 999 (release delay)	**3TK2810-1BA41**		**3TK2810-1BA42**	
• 120 ... 240 AC/DC	0 ... 999 (release delay)	**3TK2810-1KA41**		**3TK2810-1KA42**	
3TK2810-1 for NAMUR proximity switches and encoders					
• 24 DC	0 ... 999 (release delay)	**3TK2810-1BA41-0AA0**		**3TK2810-1BA42-0AA0**	
• 120 ... 240 AC/DC	0 ... 999 (release delay)	**3TK2810-1KA41-0AA0**		**3TK2810-1KA42-0AA0**	

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Selection and ordering data

	Use	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Push-in lugs							
3RP1903	For 3TK28	**Push-in lugs** For screw fixing, 2 units are required for each device	**3RP1903**		1	10 units	41H
Adapters and connecting cables for speed monitors							
3TK2810-1A	For 3TK2810-1	**Adapters** For connecting encoders of type Siemens/Heidenhain • 15-pole	**3TK2810-1A**		1	1 unit	41L
3TK2810-1B		• 25-pole	**3TK2810-1B**		1	1 unit	41L
3TK2810-0A	For 3TK2810-1	**Connecting cable** For connecting the speed monitor to the 3TK2810-1A or 3TK2810-1B adapter	**3TK2810-0A**		1	1 unit	41L
Blank labels							
3RT2900-1SB20	For SIRIUS devices	**Unit labeling plates** 20 mm x 7 mm, titanium gray[1]	**3RT2900-1SB20**		100	340 units	41B
Tools for opening spring-loaded terminals							
3RA2908-1A	For auxiliary circuit connections	**Screwdriver** For all SIRIUS devices with spring-loaded terminals Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	**Spring-loaded terminals**				
			3RA2908-1A		1	1 unit	41B

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH,

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* You can order this quantity or a multiple thereof.
Illustrations are approximate

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Safety technology

Notes