Notes:

More 3TK28 safety relays can be found

- in the Catalog Add-On IC 10 AO · 2015 at the Information and Download Center
- in the interactive catalog CA 01
- in the Industry Mall

Conversion tool
e.g. from 3TK28 to 3SK1, see www.siemens.com/sirius/conversion-tool

NEW

Click on the Article No. in the catalog PDF to access it in the Industry Mall and get all related information.

Article-No.
3RA1943-2C **3RA1943-2B** **3RA1953-2B** **3RA1953-2N**

Or directly in the Internet, e. g. www.siemens.com/product?3RA1943-2C

Overview

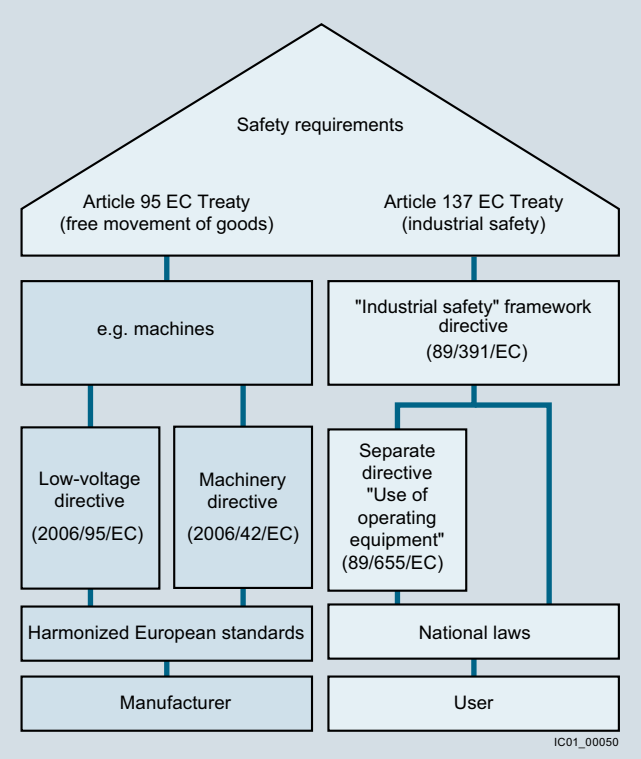
Functional safety of machines and plants – Basic safety requirements in the manufacturing industry

In order to protect people and the environment in many industrial applications in the manufacturing and process industries, machines and plants must meet the fundamental safety requirements of the EU Directives, particularly the Machinery Directive. 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, machine operators in terms of industrial safety (Article 137).

The 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 by 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



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 61508 or IEC 62061 and
- EN 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 development, integration and validation of safety-related electrical, electronic and programmable electronic control systems (SRECS) for machines. With the implementation of EN 62061, 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 placed on 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

Standard EN ISO 13849-1

EN ISO 13849-1 "Safety of machines – Safety-related components 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. EN ISO 13849-1 also makes 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 several safety-relevant parts are combined to form a single 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 product range offers you maximum safety.

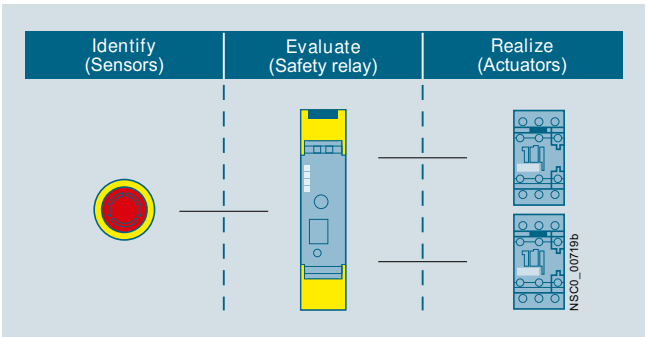
Safety Integrated is a unique, complete and consistent range of safety products covering all safety-related tasks – from identifying and evaluating to realizing, from switches and control systems to operating mechanisms (see graphic on page 11/4). Our products meet the safety requirements in force in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

Design of a safety function

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

- Identify = the detection of a safety requirement, e.g. when an EMERGENCY-STOP is actuated or someone enters a hazardous area which is protected by sensors such as light arrays or laser scanners.
- Evaluate = the detection of a safety requirement and the reliable initiation of a reaction, e.g. shutting down the enabling circuits.
- Realize = responding to a hazard, e.g. shutting down a power supply via the downstream contactors.



Design of a safety function

Our offering

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-safetyintegrated
- Worldwide service and support, see http://support.automation.siemens.com
- More information, see www.siemens.com/safety-integrated

Safety Evaluation Tool

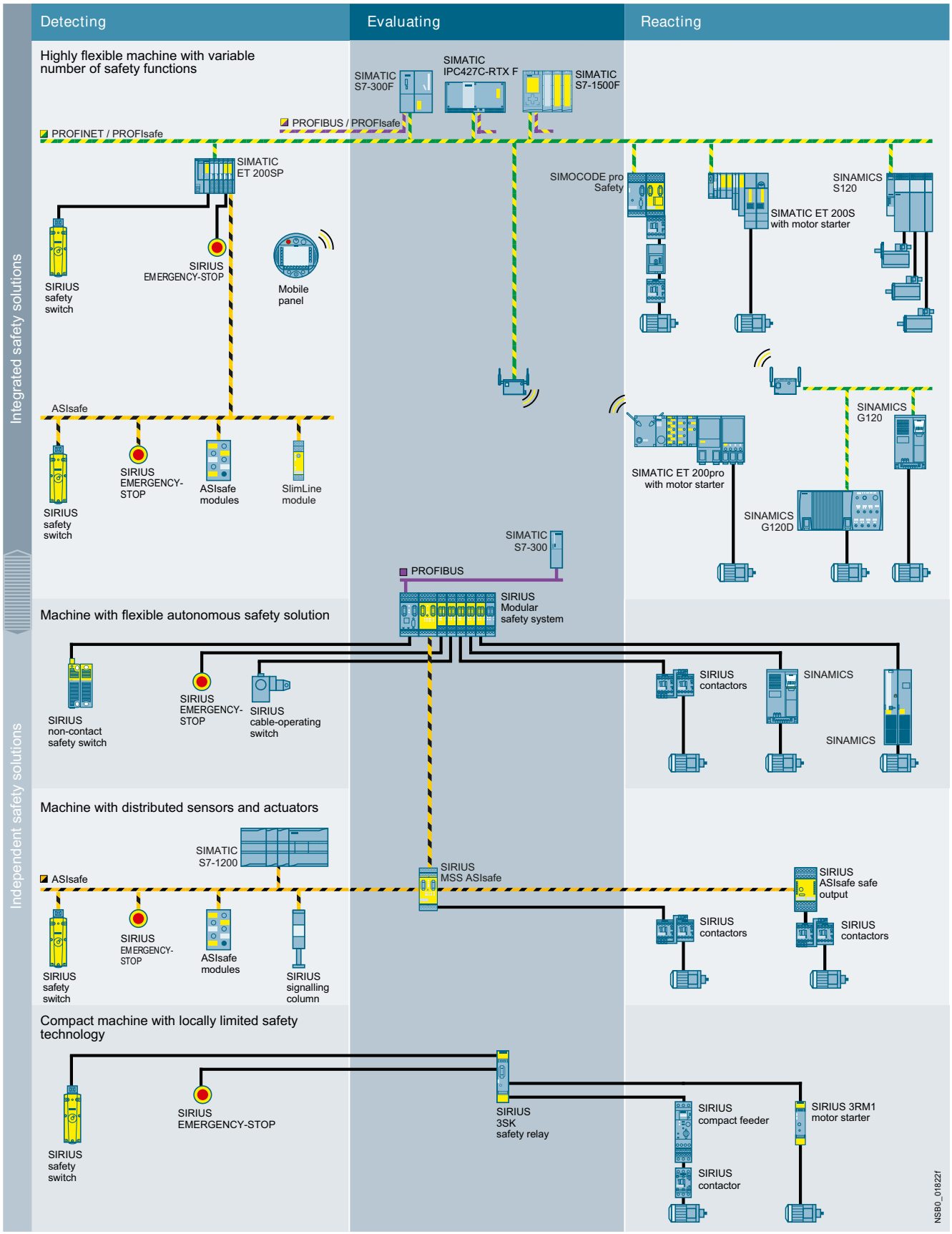
Safety Evaluation Tool

The Safety Evaluation Tool for the standards IEC 62061 and EN ISO 13849-1 guides you quickly and safely through all the calculation steps in implementing safety functions on a machine, from definition of the safety system structure through to selection of the components all the way to determination of the achieved safety integrity level (SIL/PL). You receive the results as a standards-compliant report that can be integrated in the documentation as proof of safety.

Benefits of the Safety Evaluation Tool to you:

- Less time needed to evaluate the safety functions
- Calculation in accordance with current standards
- User-friendly archiving: Projects can be saved and called up again as required
- Fast and easy handling: comprehensive, predefined libraries of examples
- Fast access to product data
- Import function for the safety parameters of products from other manufacturers in XML format according to VDMA Specification 66413
- Selection aids for determining variables and specifying the system design
- Helpful documents which can be downloaded as PDFs
- The online tool can be used free of charge – you pay only the usual costs for accessing the Internet

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

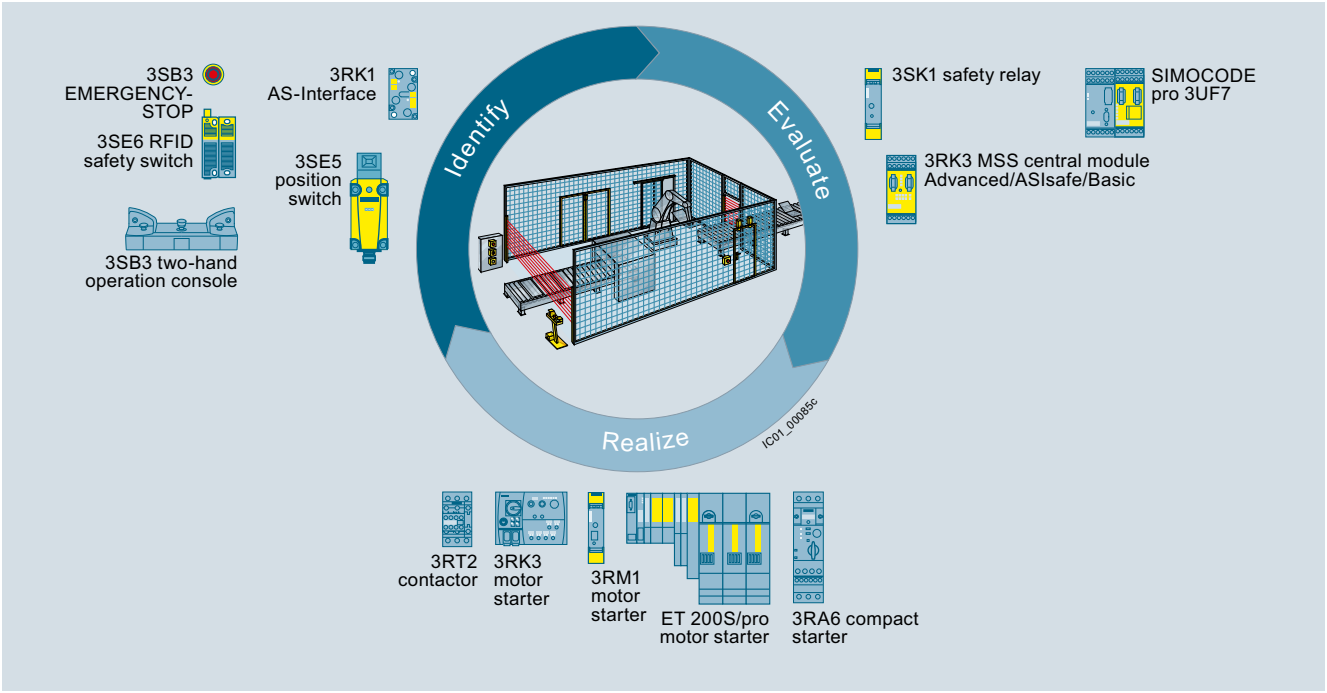


Safety Integrated

SIRIUS Safety Integrated

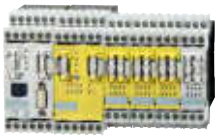
Our SIRIUS Safety Integrated controls are a central element of the Siemens Safety Integrated concept. Whether for fail-safe identifying, commanding and signaling, monitoring and evaluating or starting and reliable shutting down – our SIRIUS Safety Integrated controls are experts at performing safety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

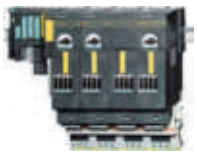
SIRIUS Safety Integrated uses fail-safe communication using standard fieldbus systems, e.g. ASIsafe via AS-Interface and PROFIsafe via PROFIBUS and PROFINET, to solve even networked safety tasks of greater complexity. This opens the door for flexible safety solutions for compact machines or large-scale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

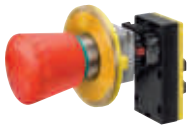


SIRIUS Safety Integrated

		Article No.	Page
SIRIUS Safety Integrated			
 3SK111.	**3SK1 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 (PL e according to EN ISO 13849-1 or SIL 3 according to IEC 61508) • Suitable for use all over the world through compliance with all globally established certifications Standard basic units • Simple, compact devices for all important requirements for monitoring safety sensors and actuators	**3SK111**	11/17
 3SK112.	Advanced basic units • Multi-functional series of safety relays with relay enabling circuits, 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	**3SK112**	11/18
 3SK121.	Expansion modules • The 3RO and 4RO output expansions can be used for Standard and Advanced basic units • Input expansion for Advanced basic units • Power supply for Advanced basic units • Integration of 3RM1 motor starters possible and 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 Advanced device series by means of wiring or without wiring outlay by means of 3ZY12 device connectors	**3SK121, 3SK122, 3SK123**	11/19, 11/21
 3TK2826-2BB40	**3TK28 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 (PL e according to EN ISO 13849-1 or SIL 3 according to IEC 61508) • Suitable for use all over the world through compliance with all globally established certifications Safety relays with relay enabling circuits • Different voltages can be switched through the floating contacts • Inductive currents up to 5 A can be switched with relay contacts	**3TK2826** **3TK2827, 3TK2828, 3TK283**	11/24 IC 10 AO
 3TK2845-1HB40	Safety relays with electronic enabling circuits • Wear-free • Suitable for operation in fast switching applications • Insensitive to vibrations and dirt • Good electrical endurance	**3TK2845** **3TK2840, 3TK2841, 3TK2842**	11/27 IC 10 AO
 3TK2810-1BA41	Safety relays with contactor relay enabling circuits • Different voltages can be switched through the floating contacts • Inductive currents up to 10 A can be switched with contactor relay enabling circuits • High mechanical and electrical endurance Safety relays with special functions 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-type locking protective door	**3TK285** **3TK2810**	IC 10 AO 11/30

		Article No.	Page
SIRIUS Safety Integrated (continued)			
 3RK3	**3RK3 Modular Safety System (MSS)** • Freely configurable modular safety relays • Safety-related applications up to PL e according to EN ISO 13849-1 or SIL 3 according to IEC 62061 can be implemented • High flexibility and planning reliability thanks to a modular design • More space in the control cabinet and lower costs thanks to highly modular project data • More functionality and time savings thanks to a software-configurable system • Comprehensive diagnostics on-site with the MSS ES software • Improved plant diagnostics and higher plant availability thanks to exchange of data using PROFIBUS • Automatic creation of plant documentation with regard to MSS and software parameterization • Up to 9 expansion modules can be plugged in for standard I/Os and fail-safe I/Os – optionally solid-state or relay-based fail-safe outputs • Graphic parameterization of the logic, online diagnostics, and automatic creation of documentation using MSS ES • Consistent further development of the safety monitors with the Advanced and ASIsafe central units of the SIRIUS 3RK3 Modular Safety System (MSS) Additionally with AS-Interface (ASIsafe): • Modularly expandable and freely configurable safety monitor • With MSS Advanced/ASIsafe up to 50 two-channel, fail-safe outputs (38 central outputs and 12 outputs via AS-i) • Safety-related and standard communication between multiple MSS devices and/or safety monitors • Distributed detection of sensors and disconnection of actuators through AS-Interface • Much more space is available without wiring outlay using AS-Interface • Ready-to-use function blocks (e.g. muting or protective door with tumbler) can also be used on AS-i	**3RK3**	11/33
 3RK3 MSS ASIsafe			
 SIMATIC AS-i F-Link	**SIMATIC AS-i F-Link** • Failsafe inputs and outputs on the AS-Interface cable are possible up to PL e, SIL 3 • Modular design with CM AS-i Master ST and F-CM AS-i Safety ST in one ET 200SP station • Single or multiple masters can be realized with or without Failsafe functionality • Functionality can be expanded using ET 200SP I/O modules • Safe data exchange with F-CPU via PROFIsafe Advantage: Easy connection of Failsafe AS-i networks to the distributed I/Os	**3RK7**	Ch. 2
 K45F	**AS-Interface safety modules** • Complete portfolio of ASIsafe modules • Up to four safe inputs per module • Up to one safe output per module Advantage: Easy integration of safe signals in the control cabinet or in the field up to Category 4, PI e, SIL 3	**3RK1**	Ch. 2
 3RM1	**3RM1 motor starters** • Motor starters for safety-related shutdown 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 a solid-state overload relay • For switching three-phase motors up to 3 kW (at 400 V) and resistive loads up to max. 10 A at AC voltages up to 500 V under normal operating conditions • Safety-related shutdown according to PL e or SIL 3 by shutting down the control supply voltage possible without additional devices in the main circuit • Combination with 3SK1 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**	Ch. 8

		Article No.	Page
SIRIUS Safety Integrated (continued)			
 ET 200S Safety	**ET 200S Safety Motor Starter Solutions** The ET 200S Safety Motor Starter Solutions comprise: • Safety modules • Standard motor starters • High-Feature motor starters • Failsafe motor starters ET 200S Safety Motor Starter Solutions local Safety Motor Starter Solutions local are preferred from the safety technology point of view for locally restricted safety applications. These motor starters are not dependent on a safe control system. ET 200S Safety Motor Starter Solutions PROFIsafe Safety Motor Starter Solutions PROFIsafe are often found by contrast 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.	**3RK1**	Ch. 8
 ET 200pro Safety	**ET 200pro Safety Motor Starter Solutions** The ET 200pro Safety Motor Starter Solutions comprise: • PROFIsafe modules • Safety repair switch modules • Disconnecting modules • Standard motor starters • High-Feature motor starters ET 200pro Safety Motor Starter Solutions Local Safety Motor Starter Solutions Local are preferred from the safety technology point of view for locally restricted safety applications. These motor starters are not dependent on a safe control system. ET 200pro Safety Motor Starter Solutions PROFIsafe Safety Motor Starter Solutions PROFIsafe are often found by contrast 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.	**3RK1**	Ch. 9
 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 through PROFIBUS DP and PROFINET • Safety relay function for the fail-safe disconnection of motors up to SIL 3 (IEC 61508/IEC 62061) or PL e with Category 4 (EN 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**	Ch. 10
 3SE63	**Non-contact RFID safety switches** • Long service life due to non-contact switching • Only one switch required for the maximum safety level PL e or SIL 3 according to EN ISO 13849-1 and IEC 61508 • Safety circuits connected in series, with up to 31 devices • Tamper protection better than with mechanical safety switches thanks to switches and actuators with individual coding • Version with optional 18 N magnetic catch • LED status indication including threshold indication for door displacement • Degree of protection up to IP69 K and resistance to cleaning products • Larger switching displacement than mechanical switches; offers better mounting tolerance and sagging tolerance of the protective door • No time-consuming mechanical installation needed, resulting in shorter installation and adjustment times and reduced maintenance	**3SE63**	Ch. 12

		Article No.	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 Category 2 according to EN ISO 13849-1 or SIL 1 according to IEC 61508 • Categories 3 and 4 can be achieved by using a second 3SE51/3SE53 position switch	**3SE51, 3SE52**	Ch. 12
 3SE53	**Mechanical safety switches** • With separate actuator, hinge switch, or separate actuator and tumbler • With a position switch it is possible to achieve Category 3 according to EN ISO 13849-1 or SIL 2 according to IEC 61508 • Category 4 according to EN ISO 13849-1 or SIL 3 according to IEC 61508 can be achieved by using a second 3SE51 or 3SE52 position switch • Version in various sizes made of metal or plastic • Integrated ASIsafe electronics for all enclosure designs	**3SE51, 3SE52, 3SE53**	Ch. 12
 3SB3/3SF5	**Command devices** • Using a special F adapter, EMERGENCY-STOP devices according to ISO 13850 can be directly connected through the standard AS-Interface with safety-related communication. This F adapter is snapped from the rear onto the EMERGENCY-STOP device, enabling maximum performance level "e" according to EN ISO 13849-1 or SIL 3 according to IEC 62061 to be achieved.	**3SF5**	Ch. 13
 3SB3	• EMERGENCY-STOP devices for disconnecting plants in an emergency situation • With positive latching function according to EN ISO 13850 and performance level "e" according to EN ISO 13849-1 or SIL 3 according to IEC 62061 • Various mushroom diameters, with lock, in plastic/metal, as individual or complete units and in combination with 3SB3 enclosure or two-hand operation console	**3SB3**	Ch. 13
 3SE7	**Cable-operated switches** • Control functions and EMERGENCY-STOP always within reach • More safety over long distances of up to 2 x 75 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**	Ch. 13

Connection methods

The safety relays and the Modular Safety System are available with screw or spring-type terminals.

⊕	Screw terminals
⊞	Spring-type terminals (push-in)
	The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Push-in connection method

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

As with other spring-type 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 fine-stranded or stranded conductors with no end finishing.

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

Overview

SIRIUS 3SK1 safety relays

SIRIUS 3SK1 safety relays are the key elements of a consistent, cost-effective safety chain. Whether you need EMERGENCY-STOP disconnection, protective door monitoring, light arrays, laser scanners or the protection of presses or punches – with SIRIUS safety relays of width 22.5 mm every safety application can be implemented to optimum effect 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 relay
- Monitoring the actuators in the shutdown circuit
- Safety-related disconnection when dangers arise

SIRIUS 3SK1 safety relays are approved for applications up to SIL 3 (IEC 61508/IEC 62061) or PL e (EN ISO 13849-1).

SIRIUS 3SK1 safety relays stand out due to their flexibility for both parameterization and system designs with several evaluation units. Optimized solutions when selecting components are facilitated by a clearly structured component range:

- Standard basic units
- Advanced basic units
- Output expansions
- Input expansions
- Accessories

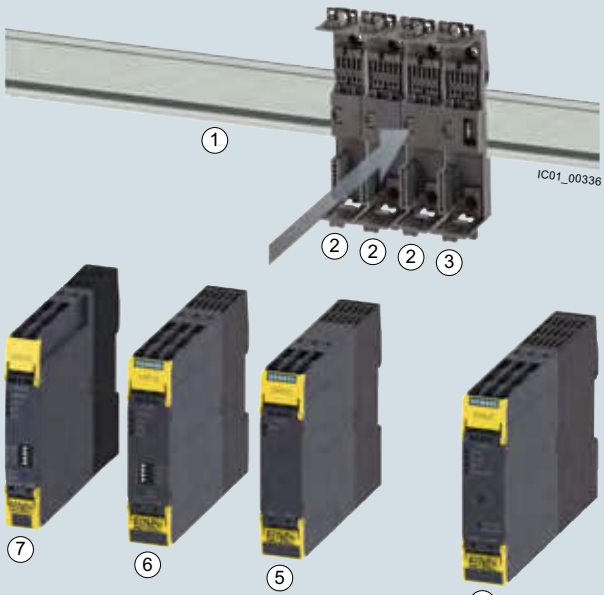
The 3SK1 Standard basic units are characterized by the following features:

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

However, the 3SK1 Advanced basic units also offer the following:

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

In the case of Advanced basic units, the 3ZY1 device connector allows safety functions involving several sensors and actuators to be constructed very quickly.



1 Standard mounting rail
2 Device connector
3 Device terminating connector
4 SIRIUS 3RM1 motor starter
5 SIRIUS 3SK1213 output expansion
6 SIRIUS 3SK1 advanced basic unit
7 SIRIUS 3SK1220 sensor expansion

System configuration example

The 3SK1 Standard and Advanced 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 exceptions are devices with special functions, such as 3TK2826, 3TK2845 and 3TK2810 devices.

Note:

Conversion tool e.g. from 3TK28 to 3SK1,
see www.siemens.com/sirius/conversion-tool

Overview of functions of the 3SK1 series

Type	Standard basic units		Advanced basic units	
	Relay enabling circuits	Electronic enabling circuits	Relay enabling circuits	Electronic enabling circuits
Sensors				
• Mechanical	✓	✓	✓	✓
• Single-ended	✓[1]	✓	✓	✓
• Antivalent	--	--	✓	✓
• Expandable	--	✓ by means of cascading	✓	✓
Parameters				
• Start (auto/monitored)	✓	✓	✓	✓
• Sensor connection, 2 x 1-channel/ 1 x 2-channel	✓ by means of wiring	✓	✓	✓
• Cross-circuit detection	✓ by means of wiring	✓	✓	✓
• Start test ON/OFF	--	✓	✓	✓
• Monitoring of two-hand operator controls according to EN 574	--	--	✓	✓
Enabling circuits				
• Instantaneous	✓	✓	✓	✓
• Time-delayed	--	--	✓	✓
• Expandable with relay enabling circuits	✓ by means of wiring	✓ by means of wiring	✓	✓
• Device connectors	--	--	✓	✓
Rated control supply voltage				
• 24 V DC	✓[2]	✓	✓	✓
• 115 … 240 V AC/DC	✓	--	✓[3]	✓[3]

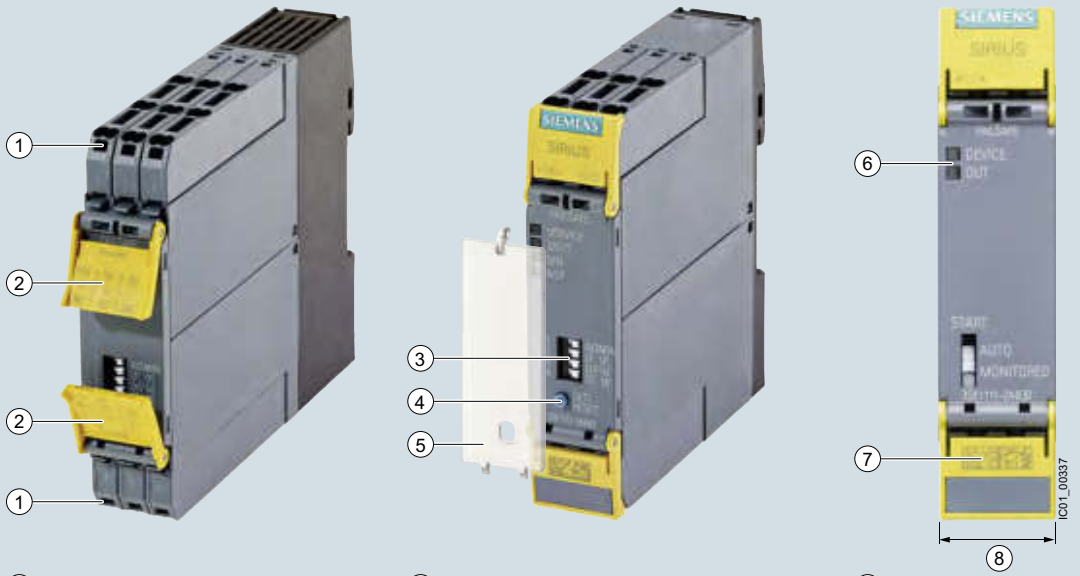
✓ Available
-- Not available

[1] 24 V basic units only.
[2] 24 V AC/DC.
[3] Possible using 3SK1230 power supply via device connector.

3SK112 and 3SK1112 safety relays with DIP switches

The 3SK112 and 3SK1112 safety relays are configurable safety relays. They are used as evaluation units for typical safety chains (identify, evaluate, realize). 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 crossover monitoring	With crossover monitoring	
3	2 x single-channel sensor connection	1 x 2-channel sensor connection	
4	With start test	Without start test	



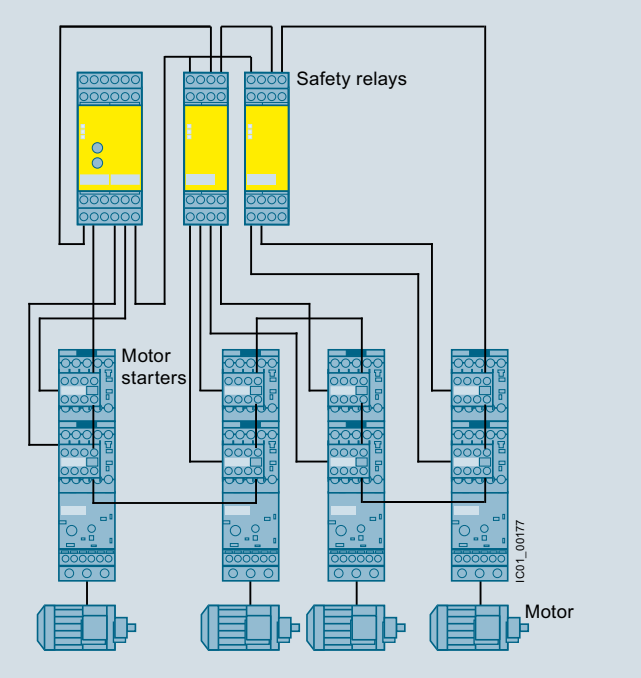
1 Connecting terminals
2 Labeled cover caps
3 DIP switches
4 SET/RESET button
5 Sealable cover
6 LED status display
7 Data matrix code
8 Width

Innovative enclosure concept for SIRIUS 3SK1 safety relays

General data

Can be expanded by adding the 3RM1 motor starter

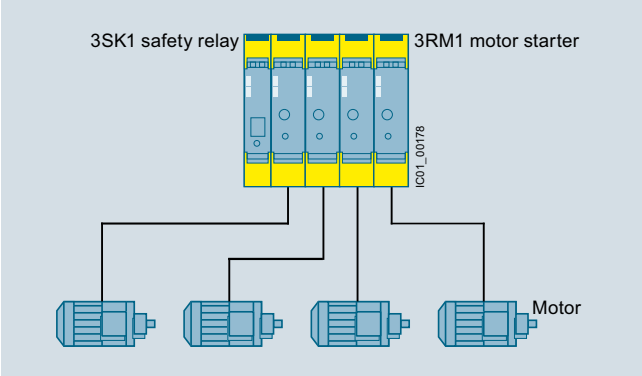
With previous safety relay and motor starter configurations, a huge amount of wiring was required to monitor the motor starters in safety applications.



Traditional system design

With the integration of the SIRIUS 3RM1 motor starter into the SIRIUS 3SK1 safety relay system family, this wiring has been minimized for the first time.

Motors up to 3 kW can easily be integrated into the safety relay system using SIRIUS 3ZY1 device connectors, without having to run a cable between the evaluation unit and the motor starter.



System design using 3SK1 and 3RM1

Article No. scheme

Digit of the Article No.	1st - 3rd ❒❒❒	4th ❒	5th ❒	6th ❒	7th ❒	–	8th ❒	9th A	10th ❒	11th ❒	12th ❒
Safety relays	**3SK**										
Generation		❒									
Device version			❒								
Device series				❒							
Type of outputs					❒						
Connection type							❒				
Rated control supply voltage									❒		
Type of rated control supply voltage										❒	
Time delay											❒
Example	**3SK**	**1**	**1**	**2**	**1**	**–**	**1**	**A**	**B**	**4**	**0**

Note:

The Article No. scheme is presented here merely for information purposes and for better understanding of the logic behind the article numbers.

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

Benefits

General

- Approved for all safety applications because of its compliance with the highest safety requirements (SIL 3 and PL e)
- Universally usable thanks to adjustable parameters
- Usable worldwide thanks to globally valid certificates
- Compact SIRIUS design
- Device connectors with standard 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 up to 2 000 m long allows it to be used in large-scale plants

Relay outputs

- Different voltages can be switched through the floating contacts
- Higher currents can be switched with relay contacts

Electronic outputs

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

Power outputs (3SK1213 output expansion)

- Different voltages can be switched through the floating contacts
- The power relay contacts allow currents of up to 10 A AC-15/DC-13 to be connected
- High mechanical and electrical endurance
- Protective separation between enabling circuits and between enabling circuits and electronics

Can be expanded by adding the 3RM1 motor starter

SIRIUS 3SK1 safety relays are ideal for combining with the 3RM1 motor starters.

Combinations are made by means of

- SIRIUS device connectors (3SK1 Advanced) or
- Conventional wiring (3SK1 Standard and Advanced).

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

Note:

SIRIUS 3RM1 motor starters, see Chapter 8 "Load Feeders and Motor Starters for Use in the Control Cabinet" → "SIRIUS 3RM1 Motor Starters".

3ZY1 device connectors

Using 3ZY1 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.

Microprocessor systems

- Flexible use thanks to many different integrated functions
- Easy parameterization using DIP switches on the front
- High functional reliability based on extensive monitoring functions
- Operated by the machine control system
- Also connection of non-contact sensors (light arrays, light barriers etc.)

Configuration and stock keeping

Variable setting options by means of DIP switches, a wide voltage range and a special power supply unit reduce the cost of keeping stocks and the considerations involved in configuration where the evaluation units to be selected are concerned.

Spring-type terminal with push-in functionality

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

As with other spring-type 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 fine-stranded or stranded conductors with no end finishing.

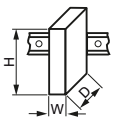
The advantages of the push-in terminals are found, as with all spring-type terminals, in speed of assembly and disassembly and vibration-proof connection. There is no need for the checking and tightening required with screw terminals.

General data

Application

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 the safety-related shutdown of hazards. Also they check and monitor the sensors, actuators and safety-related functions of the safety relay.

Technical specifications

Type		3SK1111, 3SK1211	3SK1112	3SK1120	3SK1121	3SK1122	3SK1213	3SK1220
Dimensions 								
• Width	mm	22.5	22.5	17.5	22.5	22.5	90	17.5
• Height	mm	100	100	100	100	100	100	100
• Depth	mm	121.6	91.6	121.6	121.6	121.6	121.6	121.6
General data								
Ambient temperature								
• During operation	°C	-25 … +60						
• During storage	°C	-40 … +80						
Installation altitude at height above sea level maximum	m	2 000						
Air pressure According to SN 31205	hPa	900 … 1 060						
Shock resistance		10 g/11 ms					5 g/10 ms	10 g/11 ms
Vibration resistance acc. to IEC 60068-2-6		5 ... 500 Hz: 0.75 mm						
IP degree of protection of the enclosure		IP20						
Touch protection against electric shock		Finger-safe						
Insulation voltage, rated value	V	300	50		300	50	300	50
Rated impulse withstand voltage	V	4 000	500		4 000	500	4 000	800
Safety integrity level (SIL) According to IEC 61508		SIL 3						
Performance level (PL) According to ISO 13849-1		e						
T1 value for proof test interval or service duration According to IEC 61508	a	20						
Electromagnetic compatibility (EMC) EMC emitted interference		IEC 60947-5-1, class B	IEC 60947-5-1, class A				IEC 60947-5-1, class B	IEC 60947-5-1, class A
Certificate of suitability								
• UL certification		Yes						
• TÜV approval		Yes						

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

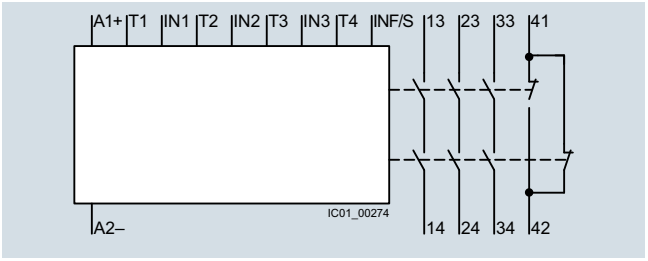
Type		3SK1111-.AB30, 3SK1211	3SK1111-.AW20	3SK1112, 3SK1220	3SK1120, 3SK1122-.AB40	3SK1121-.AB40	3SK1121-.CB41	3SK1122-.CB41	3SK1213
PFHd and PFDavg values									
Probability of a dangerous failure per hour (PFHd) at a high demand rate according to EN 62061	1/h	1.7×10^{-9}	1.5×10^{-9}	1.0×10^{-9}	1.3×10^{-9}	2.5×10^{-9}	$3.7 \times 10^{-}$	1.5×10^{-9}	1.0×10^{-9}
Average probability of failure of the safety function upon demand (PFDavg) at a low demand rate according to IEC 61508	1/h	1.0×10^{-6}		7.0×10^{-6}					1.0×10^{-6}

Note:

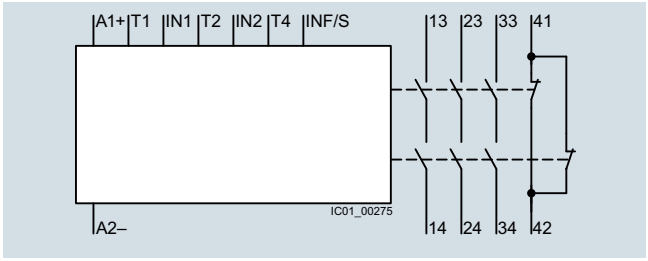
3SK1230 technical specifications,
see Manual "3SK1 Safety Relays",
http://support.automation.siemens.com/WW/view/en/67585885.

Circuit diagrams

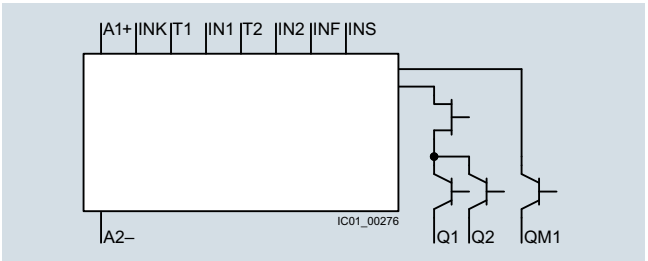
Basic Units



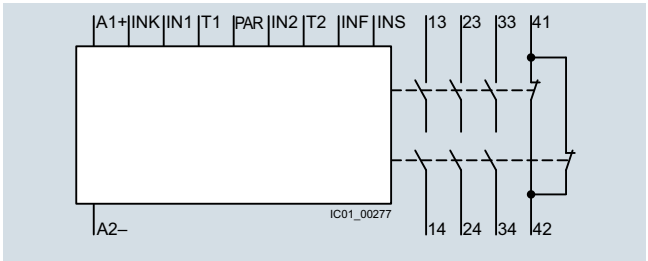
Basic unit 3SK1111-.AB30, Standard relay instantaneous (24 V AC/DC)



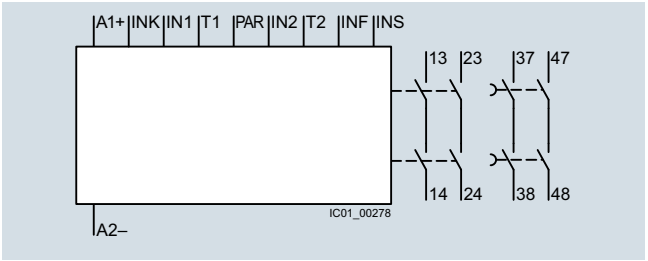
Basic unit 3SK1111-.AW20, Standard relay instantaneous (110 ... 240 V AC/DC)



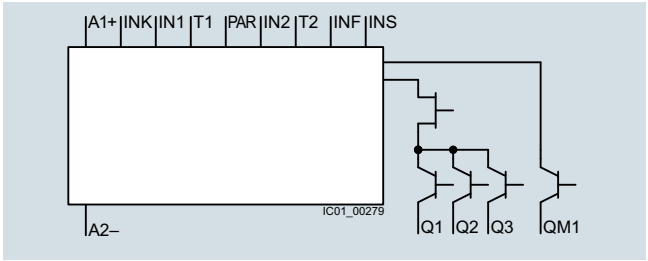
Basic unit 3SK1112-.BB40, Standard solid-state (24 V DC)



3SK1121-.AB40, Advanced relay instantaneous basic unit



3SK1121-.CB4, Advanced relay instantaneous basic unit



3SK1122-.AB40, Advanced solid-state instantaneous basic unit

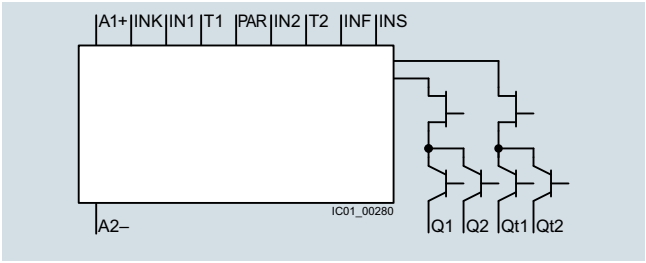
Legend:

A1, A2 = power supply of the device
13/14 to 33/34 = instantaneous enabling circuits, relays
41/42 = feedback contact
T1, T2 = test signal
IN1, IN2 = sensor input
INF = feedback circuit
INS = start circuit
INK = cascading input
PAR = parameterizing input (NO/NC monitoring)
Q1, Q2, Q3 = instantaneous enabling circuit, solid-state
QM1 = signaling output, solid-state

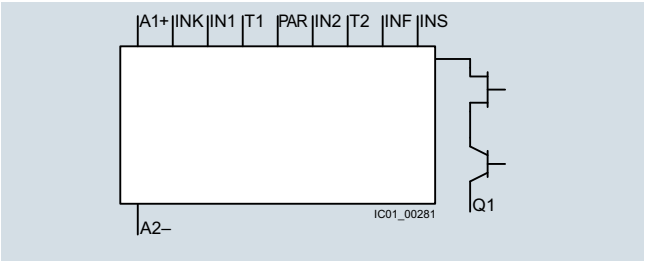
General data

Circuit diagrams

Basic units (continued)

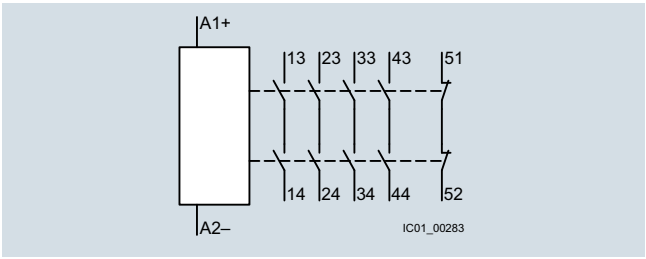


3SK1122-.CB4, Advanced solid-state instantaneous basic unit

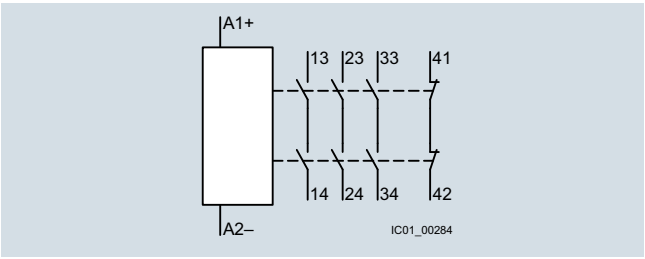


3SK1120-.AB40, Advanced 17.5 mm solid-state instantaneous basic unit

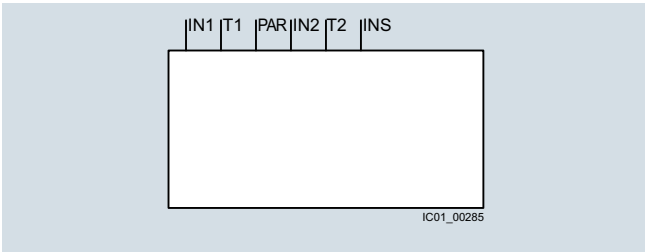
Expansion Modules



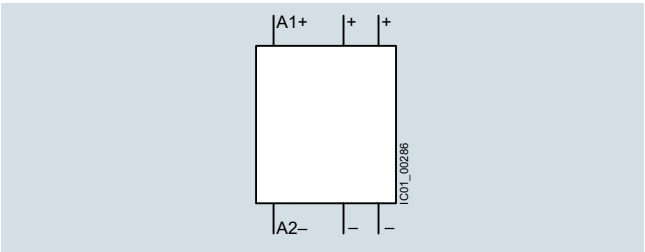
4RO 3SK1211 output expansion



3RO 3SK1213 output expansion



3SK1220 input expansion



3SK1230 power supply

Legend:

A1, A2 = power supply of the device
13/14 to 43/44 = instantaneous enabling circuits, relays
41/42 to 51/52 = feedback contact
T1, T2 = test signal
IN1, IN2 = sensor input
INF = feedback circuit
INS = start circuit
INK = cascading input
PAR = parameterizing input (NO/NC monitoring)
Q1, Q2 = instantaneous enabling circuit, solid-state
Qt1, Qt2 = instantaneous enabling circuit, solid-state

More information

Manual "3SK1 safety relays", see
http://support.automation.siemens.com/WW/view/en/67585885

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.

Number of safe outputs

	Type and number of enabling circuits				Signaling circuits	Rear panel connection
	Relays		Electronic			
	Instantaneous	Time-delayed	Instantaneous	Time-delayed		
3SK1 Standard basic units						
3SK1111-.A..0	3	--	--	--	1	--
3SK1112-.BB40	--	--	2	--	1	--

-- Not available

Selection and ordering data

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41L

3SK1111-1AB30

3SK1111-1AW20

3SK1112-1BB40

Rated control supply voltage U_s		DT	Screw terminals	DT	Spring-type terminals (push-in)
At 50 Hz At AC	At DC		Article No. / Price per PU		Article No. / Price per PU
V	V				
Standard basic units with 3 relay enabling circuits					
24	24	▶	**3SK1111-1AB30**	▶	**3SK1111-2AB30**
110 … 240	110 … 240	A	**3SK1111-1AW20**	▶	**3SK1111-2AW20**
Standard basic units with 2 safety-related semiconductor outputs					
--	24	A	**3SK1112-1BB40**	A	**3SK1112-2BB40**

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

Advanced basic units

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 enabling circuits of the basic unit without the need for wiring between the devices.

Number of safe outputs

	Type and number of enabling circuits				Signaling circuits	Rear panel connection
	Relays		Electronic			
	Instantaneous	Time-delayed	Instantaneous	Time-delayed		
3SK1 Advanced basic units						
3SK1120-.AB40	--	--	1	--	--	✓
3SK1121-.AB40	3	--	--	--	1	✓
3SK1121-.CB4.	2	2	--	--	--	✓
3SK1122-.AB40	--	--	3	--	1	✓
3SK1122-.CB4.	--	--	2	2	--	✓

✓ Available
-- Not available

Selection and ordering data

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41L

3SK1121-1AB40

3SK1120-1AB40

3SK1122-1AB40

3SK1122-1CB41

Rated control supply voltage U_s at DC	Adjustable OFF-delay time	Number of outputs as contacting contact blocks		Number of outputs as contactless semiconductor contact block		DT	Screw terminals	DT	Spring-type terminals (push-in)
		instantaneous switching	delayed switching	instantaneous switching	delayed switching		Article No. / Price per PU		Article No. / Price per PU
V	s								
Advanced basic units with relay outputs									
24	--	3	--	--	--	▶	**3SK1121-1AB40**	▶	**3SK1121-2AB40**
24	0.05 … 3	2	2	--	--	A	**3SK1121-1CB41**	B	**3SK1121-2CB41**
24	0.5 … 30	2	2	--	--	▶	**3SK1121-1CB42**	A	**3SK1121-2CB42**
24	5 … 300	2	2	--	--	B	**3SK1121-1CB44**	B	**3SK1121-2CB44**
Advanced basic units with semiconductor outputs									
24	--	--	--	1	--	A	**3SK1120-1AB40**	A	**3SK1120-2AB40**
24	--	--	--	3	--	A	**3SK1122-1AB40**	A	**3SK1122-2AB40**
24	0.05 … 3	--	--	2	2	B	**3SK1122-1CB41**	B	**3SK1122-2CB41**
24	0.5 … 30	--	--	2	2	A	**3SK1122-1CB42**	A	**3SK1122-2CB42**
24	5 … 300	--	--	2	2	B	**3SK1122-1CB44**	B	**3SK1122-2CB44**

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

Overview

3SK121 output expansion

The 3SK121 output expansions can be used for Standard and Advanced basic units.

3SK1211 output expansion

The 3SK1211 output expansion is used to expand the enabling circuits of a basic unit by adding another four enabling circuits. These enabling circuits have a switching capacity of AC-15 5 A at a switching voltage of 230 V. The devices can be connected to any 3SK1 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 by means of the 3ZY12 device connector.

3SK1213 output expansion

The 3SK1213 output expansion is used to expand the enabling circuits of a basic unit by adding three enabling circuits with high switching capacity. These enabling circuits have a switching capacity of AC-15 10 A at a switching voltage of 230 V. The devices can be connected to any 3SK1 basic unit by means of wiring. As with 3SK1211, it is also possible to use the version with a control supply voltage of 24 V DC on the 3ZY12 device connector.

Note:

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

Number of safe outputs

	Type and number of enabling circuits				Signaling circuits	Rear panel connection
	Relays		Electronic			
	Instantaneous	Time-delayed	Instantaneous	Time-delayed		
3SK1 output expansions						
• 4RO						
3SK1211	4	--	--	--	1[1]	✓[2]
• 3RO						
3SK1213	3	--	--	--	1[1]	✓[2]

✓ Available
-- Not available
[1] Feedback circuit.
[2] For 24 V DC.

Benefits

- Perfect adaptation of the number of inputs
- Simple expansion of instantaneous and time-delayed outputs of Advanced basic units by means of a device connector and slide switch on an expansion module
- Expansion with power contacts for high AC-15/DC-13 currents in the control circuit
- No enabling circuit required in the evaluation unit to control the expansion modules
- No wiring of the feedback circuit to the expansion modules
- Shorter installation times
- Less configuring and testing required

Output expansions

Selection and ordering data

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41L

3SK1211-1BB00

3SK1213-1AB40

Rated control supply voltage U_s		DT	Screw terminals	DT	Spring-type terminals (push-in)
At 50 Hz At AC	At DC		Article No. / Price per PU		Article No. / Price per PU
V	V				
3SK1211 output expansions with 4RO					
24	--	B	**3SK1211-1BB00**	B	**3SK1211-2BB00**
--	24	►	**3SK1211-1BB40**	A	**3SK1211-2BB40**
110 ... 240	110 ... 240	A	**3SK1211-1BW20**	B	**3SK1211-2BW20**
3SK1213 output expansions with 3RO					
--	24	B	**3SK1213-1AB40**	B	**3SK1213-2AB40**
115	--	B	**3SK1213-1AJ20**	B	**3SK1213-2AJ20**
230	--	B	**3SK1213-1AL20**	B	**3SK1213-2AL20**

✓ Available
-- Not available

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

Overview

3SK1220 sensor expansion

With the input expansions

- 3SK1220 sensor expansion
- 3SK1230 power supply

the Advanced basic units can be made more flexible.

3SK1220 sensor expansion

The 3SK1220 sensor 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 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.

Both devices can be combined with the 3SK112 basic units in the Advanced series without the need for wiring.

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 ... 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
- Universally usable thanks to the wide range of adjustable parameters for sensor expansion (parameters as for Advanced basic units)

Selection and ordering data

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41L

3SK1220-1AB40

3SK1230-1AW20

Version	DT	Screw terminals Article No.	Price per PU	DT	Spring-type terminals (push-in) Article No.	Price per PU
3SK1220 sensor expansions						
Sensor expansions for safety-related expansion of the Advanced basic units by adding a further 2-channel sensor or two 1-channel sensors. Note: Can only be used in conjunction with 3ZY12 device connectors, see page11/22.	A	**3SK1220-1AB40**		A	**3SK1220-2AB40**	
3SK1230 power supplies						
Power supplies for supplying Advanced basic units via 3ZY12 device connectors at voltages of 110 ... 240 V AC/DC	A	**3SK1230-1AW20**		A	**3SK1230-2AW20**	

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

Overview

The following accessories are available for SIRIUS 3SK1 safety relays:

- Device connectors
- Terminals
- Sealing covers
- Push-in lugs
- Coding pins
- Inscription labels
- Tools

Device connectors for 3SK112. and 3SK12..

The device connector allows several safety relays to be interconnected. The last device in a series is placed on a device termination connector. This closes the circuits that were built up with the connectors.

Device connectors are available in various versions specifically for the 3SK1 safety relays:

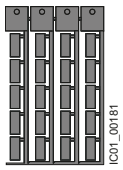
For type	Device connectors		Device terminating connectors	
	3ZY1212-1BA00 (for 3SK1, width 17.5 mm)	**3ZY1212-2BA00** (for 3SK1, width 22.5 mm)	**3ZY1212-2DA00** (for 3SK1, width 22.5 mm)	**3ZY1212-0FA01** (for 3SK1, set for enclosures > 45 mm)
3SK1 Advanced basic units				
3SK1120	✓	--	--	--
3SK1121	--	✓	✓	--
3SK1122	--	✓	✓	--
Output expansions				
3SK1211	--	✓	✓	--
3SK1213	--	--	--	✓
Input expansions				
3SK1220	✓	--	--	--
3SK1230	--	✓	--	--

✓ Available
-- Not available

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Device connectors for the electrical connection of SIRIUS devices in the industrial standard mounting rail enclosure						
 3ZY1212-1BA00						
Device connectors						
• For 3SK1, width 17.5 mm	A	**3ZY1212-1BA00**		1	1 unit	41L
• For 3SK1, width 22.5 mm	A	**3ZY1212-2BA00**		1	1 unit	41L
 3ZY1212-2DA00						
Device terminating connectors For 3SK1, width 22.5 mm Note: Observe positions of the slide switch, see Manual "3SK1 Safety Relays", http://support.automation.siemens.com/WW/view/en/67585885.	A	**3ZY1212-2DA00**		1	1 unit	41L
Device terminating connector set For 3SK1213, width > 45 mm, comprising 3ZY1212-2FA00 and 3ZY1210-2AA00	A	**3ZY1212-0FA01**		1	1 unit	41L
Terminals for SIRIUS devices in the industrial standard mounting rail enclosure						
 3ZY1121-1BA00						
Removable terminals		**Screw terminals**				
• 2-pole, screw terminals up to 2 x 1.5 mm² or 1 x 2.5 mm²	A	**3ZY1121-1BA00**		1	6 units	41L
• 3-pole, screw terminals up to max. 2 x 1.5 mm² or 1 x 2.5 mm²	A	**3ZY1131-1BA00**		1	6 units	41L
		Spring-type terminals (push-in)				
• 2-pole, push-in terminals up to max. 2 x 1.5 mm²	A	**3ZY1121-2BA00**		1	6 units	41L
• 3-pole, push-in terminals up to max. 2 x 1.5 mm²	A	**3ZY1131-2BA00**		1	6 units	41L

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

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Accessories for enclosures							
 3ZY1321-2AA00	**Sealing covers**						
	• 17.5 mm (for 3SK1120 and 3SK1220)	A	**3ZY1321-1AA00**		1	5 units	41L
	• 22.5 mm (for all 3SK1 devices except 3SK1120 and 3SK1220)	A	**3ZY1321-2AA00**		1	5 units	41L
 3ZY1311-0AA00	**Push-in lugs** For wall mounting	A	**3ZY1311-0AA00**		1	10 units	41L
 3ZY1440-0AA00	**Coding pins** For removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure. They enable the mechanical coding of terminals, see Manual "3SK1 Safety Relays", http://support.automation.siemens.com/WW/view/en/67585885	A	**3ZY1440-1AA00**		1	12 units	41L
Blank labels							
 3RT2900-1SB20	**Unit labeling plates** For SIRIUS devices 20 mm x 7 mm, titanium gray[1)]	D	**3RT2900-1SB20**		100	340 units	41B
Tools for opening spring-type terminals							
 3RA2908-1A	**Screwdrivers** For all SIRIUS devices with spring-type terminals; 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated		**Spring-type terminals**				
		A	**3RA2908-1A**		1	1 unit	41B

1) PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH, see Chapter 16, "Appendix" → "External Partners".

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

With relay enabling circuits

Overview

SIRIUS 3TK282. safety relay

Safety relays with relay enabling circuits – safety with floating contacts

SIRIUS safety relays with relay enabling circuits are not only extremely space-saving thanks to their compact design, they also offer extra safety with positively driven NO and feedback contacts in pairs. If one of the contact welds, the other assumes the disconnection of the circuit. A positively driven feedback contact (NC) then performs the fault detection of the faulty NO contact.

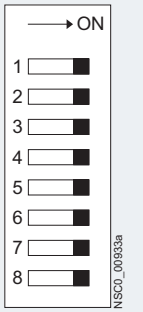
3SK121. expansion modules are available to increase the number of enabling circuits, see page 11/19.

3TK2826 safety relays

The 3TK2826 is a parameterizable safety relay. It is used as an evaluation unit for typical safety chains (identify, evaluate, realize). A number of functions can be set using the DIP switches on the front. The 3TK2826 is therefore universally applicable.

Safety sensors (e.g. EMERGENCY-STOP device) are connected at the input side while contactors or valves for disconnecting the "hazardous function" are connected at the output side.
The 3TK2826 performs the monitoring of the sensor and actuator functions as well as the safe disconnection of the outputs (enabling circuits).

3TK2826 with DIP switch:

DIP switch No.	ON	OFF	Schematic
1	Switching mat operation	Without crossover monitoring	
2	NC/NC evaluation	NC/NO evaluation	
3	1 x 2-channel	2 x 1-channel	
4	Debounce time for sensor inputs ≈ 10 ms	Debounce time for sensor inputs ≈ 50 ms	
5	Sensor input Monitored start	Sensor input Autostart	
6	Cascading input Monitored start	Cascading input Autostart	
7	Without start test	With start test	
8	Without automatic start after mains failure	Automatic start after mains failure (not permitted in connection with a start test)	

Benefits

- Compact design
- Floating safe outputs
- Can be used up to an ambient temperature of max. 70 °C
- Connection for all common sensor types
- Many functions available in just one device
- Status displays
- Extended diagnostic capabilities
- Approvals (EN ISO 13849-1, IEC 61508, UL/CSA)
- Reporting of trip faults in the actuator circuit
- Floating outputs
- Wide-range device
- Sensor condition saved in the event of voltage failure

Selection and ordering data

Type	**Basic units** **3TK2826**			
	24 V DC	Wide voltage range	24 V DC t_v	Wide voltage range t_v
Sensors				
• Inputs	1	1	1	1
• Electronic	✓	--	✓	--
• With contacts	✓	✓	✓	✓
• Magnetically operated switch (Reed contacts)	✓	✓	✓	✓
Safety mats	✓	✓	✓	✓
Start				
• Auto	✓	✓	✓	✓
• Monitored	✓	✓	✓	✓
Cascading input 24 V DC	✓	✓	✓	✓
Key-operated switch	--	--	--	--
Enabling circuit, floating				
• Stop category 0	4 NO	4 NO	2 NO	2 NO
• Stop category 1	--	--	2 NO	2 NO
Enabling circuit, electronic				
• Stop category 0	--	--	--	--
• Stop category 1	--	--	--	--
Signaling outputs				
• Floating	1 NC	1 NO + 1 NC	2 NC	1 NO + 2 NC
• electronic	2	--	2	--
Standards	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508
Test certificates	TÜV, UL, CSA	TÜV, UL, CSA	TÜV, UL, CSA	TÜV, UL, CSA
SIL level max. according to IEC 61508	3	3	3	3
Performance level PL according to ISO 13849-1	e	e	e	e
Probability of a dangerous failure per hour (PFH_d)	7.8×10^{-9} 1/h	7.8×10^{-9} 1/h	7.8×10^{-9} 1/h	7.8×10^{-9} 1/h
Rated control supply voltage				
• 24 V DC	✓	--	✓	--
• 24 ... 240 V AC/DC	--	✓	--	✓

✓ Available
-- Not available

With relay enabling circuits

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41L

3TK2826-1BB40

3TK2826-2BB40

Rated control supply voltage U_s	Start	OFF-delay t_v	DT	**Screw terminals**	DT	**Spring-type terminals**
				Article No. Price per PU		Article No. Price per PU
V		s				
Basic units						
With floating enabling circuits						
3TK2826						
• 24 DC	Auto/monitored	--	A	**3TK2826-1BB40**	A	**3TK2826-2BB40**
• 24 ... 240 AC/DC	Auto/monitored	--	A	**3TK2826-1CW30**	C	**3TK2826-2CW30**
With time-delayed enabling circuits						
3TK2826 t_v						
• 24 DC	Auto/monitored	0.05 ... 3	C	**3TK2826-1BB41**	C	**3TK2826-2BB41**
• 24 ... 240 AC/DC	Auto/monitored	0.05 ... 3	C	**3TK2826-1CW31**	C	**3TK2826-2CW31**
• 24 DC	Auto/monitored	0.5 ... 30	A	**3TK2826-1BB42**	C	**3TK2826-2BB42**
• 24 ... 240 AC/DC	Auto/monitored	0.5 ... 30	C	**3TK2826-1CW32**	C	**3TK2826-2CW32**
• 24 DC	Auto/monitored	5 ... 300	C	**3TK2826-1BB44**	C	**3TK2826-2BB44**
• 24 ... 240 AC/DC	Auto/monitored	5 ... 300	C	**3TK2826-1CW34**	C	**3TK2826-2CW34**

Note:

For additional 3TK28 safety relays, see Catalog Add-On IC 10 AO · 2015.

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

Overview

SIRIUS 3TK284. safety relay

Fast, safe and wear-free switching

Evaluation units with electronic components are becoming increasingly established in safety applications, as a considerably higher number of starting operations and electrical life of the devices is achieved with permanent functional checks and consistently wear-free operation. The compact and light devices also permit series connection or normal operational switching, e.g. through a PLC.

If several enabling circuits or floating enabling circuits are required in one application, the units can be expanded with expansion modules from the 3SK121. series, see page 11/19.

3TK2845 multi-function units

Up to now, standard combinations of safety applications such as EMERGENCY-STOP and protective door monitoring were possible only by using several individual safety relays. 3TK2845 combines several functions in a single unit. Two electronic and two relay enabling circuits ensure safe disconnection – in just a few actions, quickly and cheaply.

Benefits

- Permanent function checking
- No wear because switched electronically
- High switching frequency
- Long electrical endurance
- Evaluation of electronic sensors
- Sensor lead up to max. 2 000 m
- Cascading possible
- Insensitive to vibrations and dirt
- Compact design, low weight
- Approved for the world market
- Two sensor inputs (e.g. EMERGENCY-STOP, protective door)
- Also suitable for protective door tumblers and OK button
- Two electronic and two relay enabling circuits

With electronic enabling circuits

Selection and ordering data

Type	**Multi-function units 3TK2845**							
	"Automatic and monitored start"	"Automatic and monitored start" t_v	"Monitored start"	"Monitored start" t_v	OK button	OK button t_v	"Spring-actuated tumbler" t_v	"Solenoid tumbler" t_v
Sensors								
• Inputs	2	2	2	2	2	2	2	2
• Electronic	✓	✓	✓	✓	✓	✓	✓	✓
• With contacts	✓	✓	✓	✓	✓	✓	✓	✓
• Magnetically operated switch (Reed contacts)	✓	✓	✓	✓	✓	✓	✓	✓
Safety mats	✓	✓	✓	✓	--	--	--	--
Start								
• Auto	1	1	--	--	1	1	--	--
• Monitored	1	1	2	2	1	1	2	2
Cascading input 24 V DC	✓	✓	✓	✓	✓	✓	✓	✓
Key-operated switch	✓	✓	✓	✓	✓	✓	✓	✓
Enabling circuit, floating								
• Stop category 0	2 NO	1 NO	2 NO	1 NO	2 NO	1 NO	1 NO	1 NO
• Stop category 1	--	1 NO	--	1 NO	--	1 NO	1 NO	1 NO
Enabling circuit, electronic								
• Stop category 0	2	1	2	1	2	1	1	1
• Stop category 1	--	1	--	1	--	1	1	1
Signaling outputs								
• Floating	--	--	--	--	--	--	--	--
• Electronic	1	1	1	1	1	1	1	1
Standards	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508
Test certificates								
SIL level max. according to IEC 61508	3	3	3	3	3	3	3	3
Performance level PL according to EN ISO 13849-1	e	e	e	e	e	e	e	e
Probability of a dangerous failure per hour (PFH_d)	6.9×10^{-9} 1/h	6.9×10^{-9} 1/h	6.9×10^{-9} 1/h	6.9×10^{-9} 1/h	6.9×10^{-9} 1/h	6.9×10^{-9} 1/h	6.9×10^{-9} 1/h	6.9×10^{-9} 1/h
Rated control supply voltage 24 V DC	✓	✓	✓	✓	✓	✓	✓	✓

✓ Available
-- Not available

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41L


3TK2845-1HB40


3TK2845-1HB41


3TK2845-2DB40

Rated control supply voltage U_s	Start	OFF-delay t_v	DT	Screw terminals		DT	Spring-type terminals	
				Article No.	Price per PU		Article No.	Price per PU
V		s						
Multi-function units								
3TK2845 "Automatic and monitored start"								
• 24 DC	1/1	--	C	**3TK2845-1HB40**		C	**3TK2845-2HB40**	
3TK2845 t_v "Automatic and monitored start"								
• 24 DC	1/1	0.05 ... 3	C	**3TK2845-1HB41**		C	**3TK2845-2HB41**	
	1/1	0.5 ... 30	C	**3TK2845-1HB42**		C	**3TK2845-2HB42**	
	1/1	5 ... 300	C	**3TK2845-1HB44**		C	**3TK2845-2HB44**	
3TK2845 "Monitored start"								
• 24 DC	--/2	--	C	**3TK2845-1DB40**		C	**3TK2845-2DB40**	
3TK2845 t_v "Monitored start"								
• 24 DC	--/2	0.05 ... 3	C	**3TK2845-1DB41**		C	**3TK2845-2DB41**	
	--/2	0.5 ... 30	C	**3TK2845-1DB42**		C	**3TK2845-2DB42**	
	--/2	5 ... 300	C	**3TK2845-1DB44**		C	**3TK2845-2DB44**	
3TK2845 "OK button"								
• 24 DC	1/1	--	C	**3TK2845-1EB40**		C	**3TK2845-2EB40**	
3TK2845 t_v "OK button"								
• 24 DC	1/1	0.05 ... 3	C	**3TK2845-1EB41**		C	**3TK2845-2EB41**	
	1/1	0.5 ... 30	C	**3TK2845-1EB42**		C	**3TK2845-2EB42**	
	1/1	5 ... 300	C	**3TK2845-1EB44**		C	**3TK2845-2EB44**	
3TK2845 t_v "Spring-actuated tumbler"								
• 24 DC	--/2	0.05 ... 3	C	**3TK2845-1FB41**		C	**3TK2845-2FB41**	
	--/2	0.5 ... 30	C	**3TK2845-1FB42**		C	**3TK2845-2FB42**	
	--/2	5 ... 300	C	**3TK2845-1FB44**		C	**3TK2845-2FB44**	
3TK2845 t_v "Solenoid tumbler"								
• 24 DC	--/2	0.05 ... 3	C	**3TK2845-1GB41**		C	**3TK2845-2GB41**	
	--/2	0.5 ... 30	C	**3TK2845-1GB42**		C	**3TK2845-2GB42**	
	--/2	5 ... 300	C	**3TK2845-1GB44**		C	**3TK2845-2GB44**	

Note:

For additional 3TK28 safety relays,
see Catalog Add-On IC 10 AO · 2015.

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

With special functions

Overview

SIRIUS 3TK2810 safety relays

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 diagnosis 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-type interlocking. Therefore, an additional evaluation unit is not needed.

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 diagnosis 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

Selection and ordering data

Type	Standstill monitors 3TK2810-0	Speed monitors 3TK2810-1
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 switch	--	--
Enabling circuit, floating		
• Stop category 0	3 NO + 1 NC	2
• Stop category 1	--	--
Enabling circuit, electronic		
• Stop category 0	--	--
• Stop category 1	--	--

Type	Standstill monitors 3TK2810-0	Speed monitors 3TK2810-1
Signaling outputs		
• Floating	1 CO	--
• Electronic	2	2
Standards	IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508	IEC 60947-5-1, EN ISO 13849-1, IEC 60204-1, IEC 61508
Test certificates	TÜV, UL, CSA	TÜV, UL, CSA
SIL level max. according to 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 x 10^{-8} 1/h	3.38 x 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

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41L


3TK2810-0BA01


3TK2810-0GA02

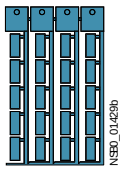

3TK2810-1BA41

Rated control supply voltage U_s	OFF-delay t_v	DT	Screw terminals	DT	Spring-type terminals
			Article No. / Price per PU		Article No. / Price per PU
V	s				
Standstill monitors					
3TK2810-0					
• 24 DC	0.2 ... 6	B	**3TK2810-0BA01**	C	**3TK2810-0BA02**
• 230 AC	0.2 ... 6	C	**3TK2810-0GA01**	C	**3TK2810-0GA02**
• 400 AC	0.2 ... 6	C	**3TK2810-0JA01**	C	**3TK2810-0JA02**
Speed monitors					
3TK2810-1 for NPN/PNP proximity switches and encoders					
• 24 DC	0 ... 600	A	**3TK2810-1BA41**	A	**3TK2810-1BA42**
• 120 ... 240 AC/DC	0 ... 600	B	**3TK2810-1KA41**	B	**3TK2810-1KA42**
3TK2810-1 for NAMUR proximity switches and encoders					
• 24 DC	0 ... 600	B	**3TK2810-1BA41-0AA0**	B	**3TK2810-1BA42-0AA0**
• 120 ... 240 AC/DC	0 ... 600	B	**3TK2810-1KA41-0AA0**	B	**3TK2810-1KA42-0AA0**

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

Accessories

Selection and ordering data

	Use	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Blank labels								
 3RT1900-1SB20	For 3TK28	**Unit labeling plates** For SIRIUS devices						
		20 mm x 7 mm, pastel turquoise[1]	D	**3RT1900-1SB20**		100	340 units	41B
	For 3TK28	**Adhesive labels** For SIRIUS devices						
		• 19 mm x 6 mm, pastel turquoise	C	**3RT1900-1SB60**		100	3 060 units	41B
		• 19 mm x 6 mm, zinc yellow	C	**3RT1900-1SD60**		100	3 060 units	41B
Push-in lugs and covers								
 3RP1903	For 3TK28	**Push-in lugs** For screw fixing, 2 units are required for each device	B	**3RP1903**		1	10 units	41H
	For 3TK2826	**Sealable covers** For securing against unauthorized adjustment of setting knobs	A	**3TK2826-0DA00-0HA0**		1	5 units	41L
	For 3TK28	**Sealing foils** For securing against unauthorized adjustment of setting knobs	►	**3TK2820-0AA00**		1	1 unit	41L
Adapters and connection cables for speed monitors								
	For 3TK2810-1	**Adapters** for connecting encoders of type Siemens/Heidenhain						
 3TK2810-1A		• 15-pole	A	**3TK2810-1A**		1	1 unit	41L
 3TK2810-1B		• 25-pole	A	**3TK2810-1B**		1	1 unit	41L
 3TK2810-0A	For 3TK2810-1	**Connection cables** For connecting the speed monitor to the 3TK2810-1A or 3TK2810-1B adapter	C	**3TK2810-0A**		1	1 unit	41L
Tools for opening spring-type terminals								
 3RA29 08-1A	For auxiliary circuit connections	**Screwdrivers** For all SIRIUS devices with spring-type terminals; 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated	A	**Spring-type terminals**  **3RA2908-1A**		1	1 unit	41B

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH, see Chapter 16, "Appendix" → "External Partners".

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

Overview

SIRIUS 3RK3 Modular Safety System

The 3RK3 Modular Safety System (MSS) is a freely parameterizable modular safety relay. Depending on the external circuit version, safety-related applications up to Performance Level e according to EN ISO 13849-1 or SIL 3 according to IEC 62061 can be realized.

The modular safety relay enables the interconnection of several safety applications.

The comprehensive error and status diagnostics provides the possibility of finding errors in the system and localizing signals from sensors. Plant downtimes can be reduced as the result.

The MSS comprises the following system components:

- Central units
- Expansion modules
- Interface modules
- Diagnostics modules
- Parameterization software
- Accessories

Central units

MSS Basic

The 3RK3 Basic central unit is used wherever more than three safety functions need to be evaluated and the wiring parameterization of safety relays would involve great cost and effort. It reads in inputs, controls outputs and communicates through an interface module with higher-level control systems. An application's entire safety program is processed in the central unit. The 3RK3 Basic central unit is the lowest expansion level and fully functional on its own, without the optional expansion modules.

MSS Advanced

The 3RK3 Advanced central unit is the consistent expansion of the Basic central unit with the functionality of an AS-i safety monitor. In addition to having a larger volume of project data and scope of functionality it can be integrated in AS-Interface and therefore make use of the many different possibilities offered by this bus system. The function can be optionally activated in the central unit.

The service-proven insulation piercing method of AS-Interface enables not only the distributed expansion of the project data volume using safe AS-i outputs, safe AS-i sensors and other MSS Advanced or safety monitors (F cross traffic) but also a highly flexible adaptation of the application, e.g. very fast connection of AS-i outputs such as LV HRC command devices, position switches with and without tumbler, or light curtains.

Safety-related disconnection using MSS or by distributed means using safe AS-i outputs and the formation of switch-off groups can be realized very easily. The same applies for any subsequent modifications. They are now easily possible by re-addressing, i.e. re-wiring is no longer necessary.

The AS-i bus is connected directly to the central unit.

MSS ASIsafe

The MSS ASIsafe basic and MSS ASIsafe extended central units are a logical development of the AS-i safety monitors based on the 3RK3 Modular Safety System.

Like MSS Advanced, MSS ASIsafe detects – in a comparable way to the safety monitors – safe sensor technology on the AS-i bus and switches actuators off in a safety-related manner via a configurable safety logic. It stands out by virtue of its greater project data volume, wider range of functions and the possibility of increasing the integrated I/O project data volume by means of expansion modules from the MSS system family. In this case the range of functions, such as the number and type of the logic elements that can be interconnected, is equivalent to that of MSS Advanced.

Expansion modules

With the optional expansion modules, both safety-related and standard, the system is flexibly adapted to the required safety applications.

Interface modules

The DP interface module is used for transferring diagnostics data and device status data to a higher-level PROFIBUS network, e.g. for purposes of visualization using HMI. When using the Basic central unit, 32-bit cyclic data can be exchanged with the control system. If an Advanced/ASIsafe central unit is used, the number is doubled to 64-bit cycle data. The acyclic calling of diagnostics data is possible with both central units.

Diagnostics modules

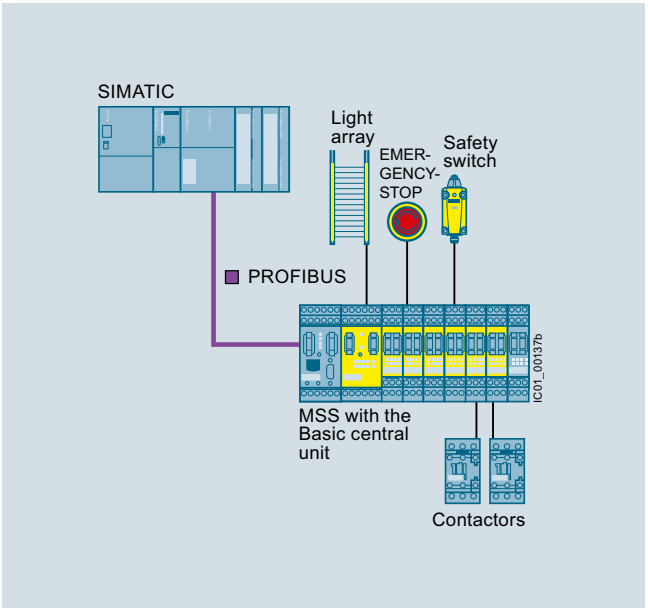
Faults, e.g. crossover, are indicated directly on the diagnostics display. The fault is diagnosed directly in plain text by the detailed alarm message. The device is fully functional upon delivery. No programming is required.

Parameterization software

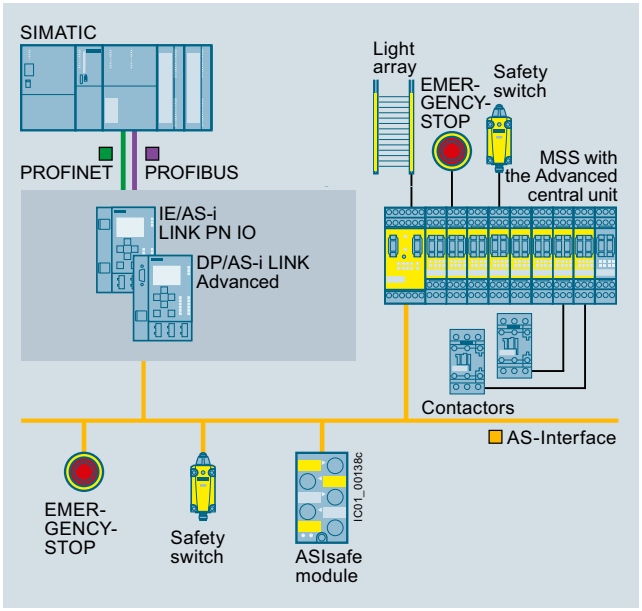
Using the MSS ES graphical parameterization tool it is very easy to create the safety functions as well as their logical links on the PC. You can define disconnection ranges, ON-delays, OFF-delays and other dependencies for example.

MSS ES also offers comprehensive functions for diagnostics and commissioning. Documentation of the MSS hardware configuration and the parameterized logic is created automatically.

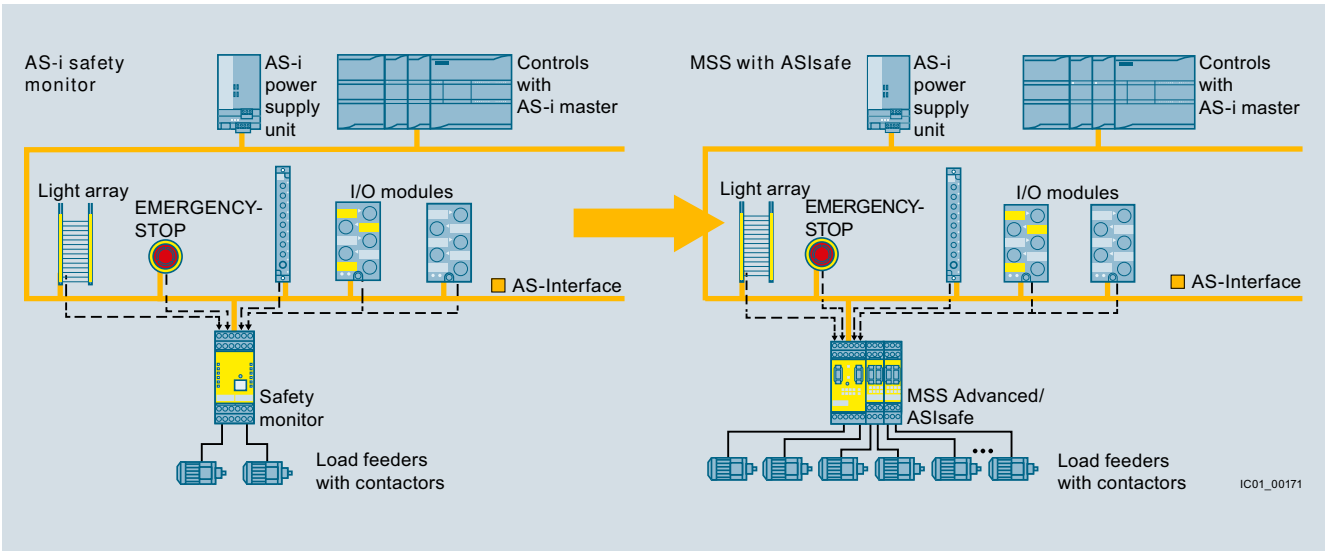
General data



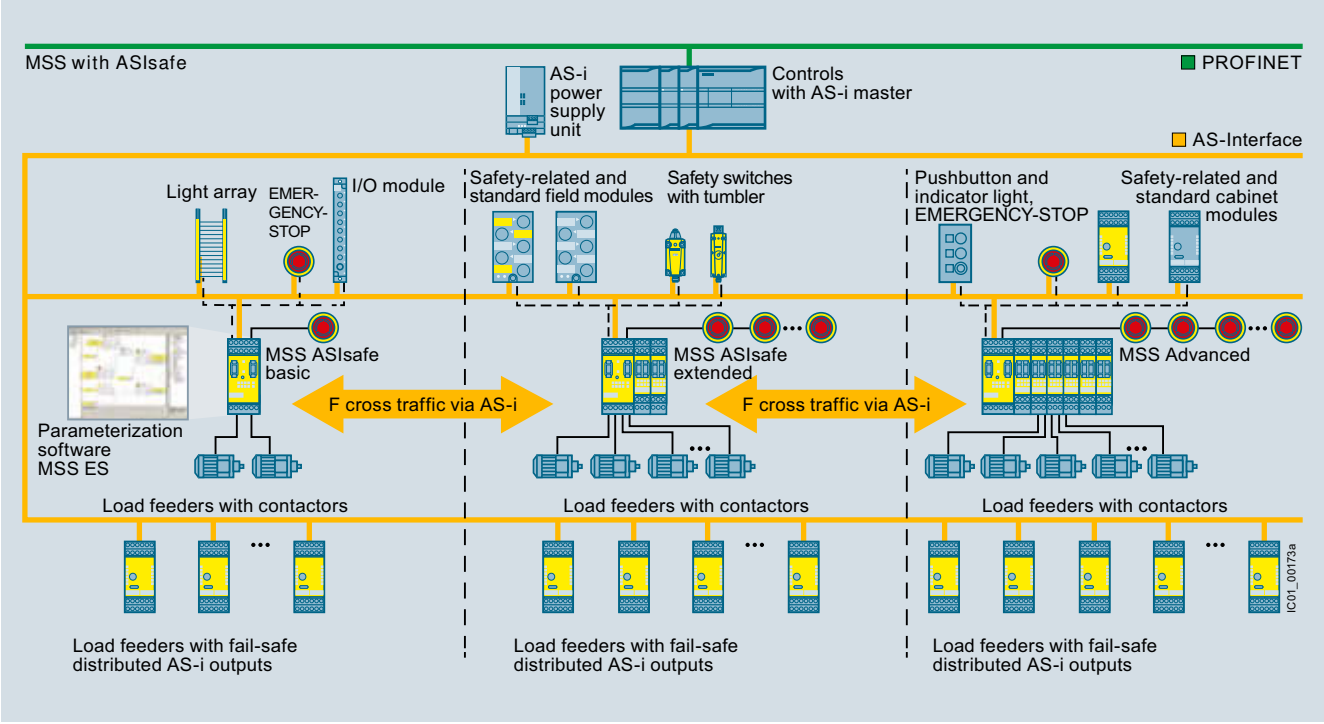
System configuration with the Basic central unit



System configuration with the Advanced central unit



Further development of the system design: From the safety monitor to MSS Advanced/MSS ASIsafe



MSS with ASIsafe

Article No. scheme

Digit of the Article No.	1st - 4th	5th	6th	7th		8th	9th	10th	11th	12th
	□□□□	□	□	□	–	□	□	□	□	□
Modular safety system	**3 R K 3**									
Device type		□								
Device type			□	□						
Connection type						□				
Communications							□	□	□	
Version										□
Example	**3 R K 3**	**1**	**1**	**1**	**–**	**1**	**A**	**A**	**1**	**0**

Note:

The Article No. scheme is presented here merely for information purposes and for better understanding of the logic behind the article numbers.

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

Benefits

- More functionality and flexibility through freely configurable safety logic
- Suitable for all safety applications thanks to compliance with the highest safety standards in production automation
- For use all over the world through compliance with all product-relevant, globally established certifications
- Modular hardware configuration
- Parameterization by means of software instead of wiring
- Removable terminals for greater plant availability
- Distributed collection from sensors and disconnection of actuators through AS-Interface
- All MSS ES logic functions are also usable for AS-Interface, e.g. muting, protective door with tumbler
- Up to 12 independent safe switch-off groups on the AS-i bus
- Volume of project data can be greatly increased by means of AS-Interface
- Up to 50 two-channel enabling circuits per system

Communication through PROFIBUS

The 3RK3 Modular Safety System can be connected to PROFIBUS through the DP interface and exchange data with higher-level control systems.

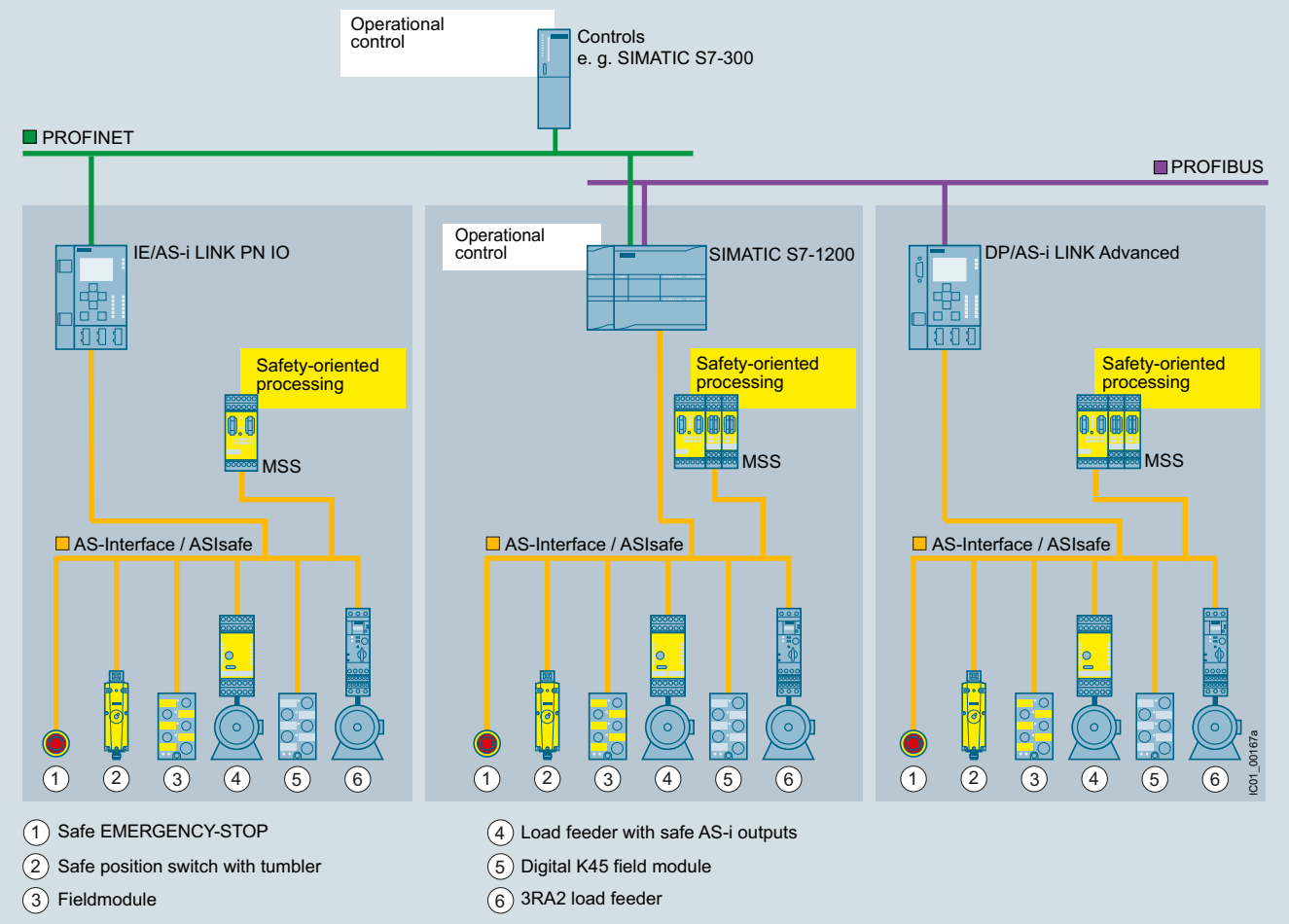
The MSS supports among other things:

- Baud rates up to 12 Mbit/s
- Automatic baud rate detection
- Cyclic services (DPV0) and acyclic services (DPV1)
- Exchange of 32-bit cyclic data with MSS Basic or 64-bit cyclic data with MSS Advanced/MSS ASIsafe
- Diagnostics using data record invocations

AS-Interface communication

Using the Advanced and ASIsafe central units, the 3RK3 Modular Safety System can be integrated in AS-Interface.

- MSS can read in up to 31 AS-i sensors
- Up to 12 preprocessed signals per MSS can be placed on the AS-i bus, e.g. for F cross traffic or for disconnecting safe AS-i outputs
- Safe cross traffic between MSS Advanced and MSS ASIsafe or between other AS-i safety monitors
- Standard signals, e.g. for acknowledgment, can also be applied to the bus



Integration of MSS into AS-Interface as ASIsafe Solution local

Notes:

MSS with communication function, see page 11/41 onwards.

Accessories, see page 11/43 onwards. MSS ES, see also Chapter 14 "Parameterization, Configuration and Visualization with SIRIUS".

For more information on AS-Interface with ASIsafe, see also Chapter 2, "Industrial Communication".

Application

The 3RK3 Modular Safety System can be used for all safety-related requirements in the manufacturing industry and offers the following safety functions:

	Symbol	MSS Basic	MSS Advanced, MSS ASIsafe
Monitoring functions			
Universal monitoring Evaluation of any binary signals from single-channel and two-channel sensors		--	✓
EMERGENCY-STOP Evaluation of EMERGENCY-STOP devices with positive-opening contacts		✓	✓
Switching mats Evaluation of switching mats with NC contacts and/or crossover detection		✓	✓
Protective door monitoring Evaluation of protective door signals and/or protective flap signals		✓	✓
Protective door tumbler Evaluation of protective doors with tumbler and of the actuation/release of this tumbler		--	✓
OK buttons Evaluation of OK buttons with NO contact		✓	✓
Two-hand operator controls Evaluation of two-hand operator controls		✓	✓
ESPE monitoring Evaluation of non-contact protective devices, e.g. light curtains and laser scanners		✓	✓
Muting Temporary bridging of non-contact protective devices, 2/4 sensors in parallel, 4 sensors in sequence		--	✓
Operating mode selector switches Evaluation of operating mode selector switches with NO contacts		✓	✓
Monitoring AS-i (AS-i 2F-DI) Logic element for monitoring of AS-i input slaves		--	✓

	Symbol	MSS Basic	MSS Advanced, MSS ASIsafe
Logic operation functions			
AND		✓	✓
OR		✓	✓
XOR		✓	✓
NAND		✓	✓
NOR		✓	✓
Negation		✓	✓
Flip-flop		✓	✓
Counting functions			
Counter 0 -> 1		✓	✓
Counter 1 -> 0		✓	✓
Counter 0 -> 1/1 -> 0		✓	✓
Timer functions			
With ON-delay		✓	✓
Passing make contact		✓	✓
With OFF-delay		✓	✓
Clock-pulsing		✓	✓
Start functions			
Monitored start		✓	✓
Manual start		✓	✓
Output functions			
Standard output		✓	✓
F output		✓	✓
AS-i output function		--	✓
Status functions			
Element status		--	✓

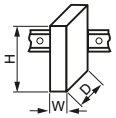
✓ Available

-- Not available

General data

Technical specifications

Central units and expansion modules

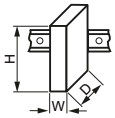
Type		Central units				Expansion modules						
		Basic	Advanced	ASIsafe basic	ASIsafe extended	4/8F-DI	2/4 F-DI 1/2 F-RO	2/4 F-DI 2F-DO	4/8 F-RO	4 F-DO	8 DI	8 DO
Dimensions (W x H x D)												
												
• Screw terminals	mm	45 x 111 x 124				22.5 x 111 x 124			45 x 111 x 124	22.5 x 111 x 124		
• Spring-type terminals	mm	45 x 113 x 124				22.5 x 113 x 124			45 x 113 x 124	22.5 x 113 x 124		
Device data												
Shock resistance (sine pulse)	*g*/ms	15/11										
Touch protection Acc. to EN 50274 or IEC 60529		IP20										
Permissible mounting position		Vertical mounting surface (+10°/-10°), deviating mounting positions are permitted for reduced ambient temperature										
Minimum distances		For heat dissipation through convection from the devices 25 mm to the ventilation openings (top and bottom)										
Permissible ambient temperature												
• During operation	°C	-20 ... +60										
• During storage and transport	°C	-40 ... +85										
Number of sensor inputs (1-channel)												
• Fail-safe		8	8	2	4	8	4	4	--	--	--	--
• Not fail-safe		--	--	6	4	--	--	--	--	--	8	--
Number of test outputs		2	2	2	2	2	2	2	--	--	--	--
Number of outputs												
• Relay outputs												
- Single-channel		--	--	--	--	--	2	--	8	--	--	--
- Two-channel		1	1	1	1	--	--	--	--	--	--	--
• Electronic outputs												
- Single-channel		--	--	--	--	--	--	--	--	--	--	8
- Two-channel		1	1	1	1	--	--	2	--	4	--	--
Weight	g	300	300	300	300	160	160	160	400	135	125	160
Installation altitude above sea level	m	2 000										
Environmental data												
EMC interference immunity		IEC 60947-5-1										
Vibrations												
• Frequency	Hz	5 ... 500										
• Amplitude	mm	0.75										
Climatic withstand capability		IEC 60068-2-78										
Electrical specifications												
Rated control supply voltage U_s Acc. to IEC 61131-2	V	24 DC ±15 %[1)]										
Operating range		0.85 ... 1.15 x U_s										
Rated insulation voltage U_i	V	300	300	300	300	50	300	50	300	50	50	50
Rated impulse voltage U_{imp}	kV	4	4	4	4	500	4	500	4	500	500	500
Total current input	mA	185	185	185	185	60	85	85	140	8	78	60
Rated power at U_s	W	4.5	4.5	4.5	4.5	1.5	2	2	3	4.8	1.9	1.5
Utilization category Acc. to IEC 60947-5-1 (relay outputs)												
• AC-15 at 230 V	A	2	2	2	2	--	2	--	2	--	--	--
• DC-13 at 24 V	A	1	1	1	1	--	1	--	1	--	--	--
(semiconductor outputs)												
• DC-13 at 24 V	A	1.5	1.5	1.5	1.5	--	--	1.2	--	2	--	0.5
Mechanical endurance During rated operation	Operating cycles (relay)	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6	--	10 x 10^6	--	10 x 10^6	--	--	--

[1)] Device current supply through a power supply unit according to IEC 60536 protection class III (SELV or PELV).

Type		Central units				Expansion modules						
		Basic	Advanced	ASIsafe basic	ASIsafe extended	4/8F-DI	2/4 F-DI 1/2 F-RO	2/4 F-DI 2F-DO	4/8 F-RO	4 F-DO	8 DI	8 DO
Electrical specifications (cont.)												
Switching frequency z At rated operational current	1/h	1 000	1 000	1 000	1 000	--	1 000	1 000	360	1 000	--	1 000
Conventional thermal current I_{th}	A	2/1.5	2/1.5	2/1.5	2/1.5	--	1	1.2	3	2	--	0.5
Protection for output contacts Fuse links LV HRC Type 3NA, DIAZED Type 5SB, NEOZED Type 5SE												
• Operational class gG	A	4	4	4	4	--	4	--	4	--	--	--
• Operational class quick	A	6	6	6	6	--	6	--	6	--	--	--
Safety specifications												
Probability of a dangerous failure												
• Per hour (PFH_d)	1/h	5.14×10^{-9}	3.8×10^{-9} with AS-i, 2.8×10^{-9} without AS-i	3.8×10^{-9} with AS-i, 2.8×10^{-9} without AS-i	3.8×10^{-9} with AS-i, 2.8×10^{-9} without AS-i	1.89×10^{-9}	3.79×10^{-9}	2.7×10^{-9}	7.15×10^{-9}	3.18×10^{-9}	--	--
• On demand (PFD)		1.28×10^{-5}	1.7×10^{-4}	1.7×10^{-4}	1.7×10^{-4}	4.29×10^{-6}	5.85×10^{-6}	8.34×10^{-6}	4.36×10^{-5}	2.2×10^{-5}	--	--
Parameters for cables												
Line resistance	Ω	100	100	100	100	100	100	100	--	--	100	--
Cable length from terminal to terminal With Cu 1.5 mm^2 and 150 nF/km	m	1 000	1 000	1 000	1 000	1 000	1 000	1 000	--	--	1 000	--
Conductor capacity	nF	330	330	330	330	330	330	330	--	--	330	--

General data

Interface and diagnostics modules

Type		Interface modules	Diagnostics modules
Dimensions (W x H x D) 			
• Screw terminals	mm	45 x 111 x 124	96 x 60 x 44
• Spring-type terminals	mm	45 x 113 x 124	--
Device data			
Shock resistance (sine pulse)	*g*/ms	15/11	
Touch protection acc. to EN 50274 or IEC 60529		IP20	
Permissible mounting position		Vertical mounting surface (+10°/-10°), deviating mounting positions are permitted for reduced ambient temperature	
Minimum distances		For heat dissipation through convection from the devices 25 mm to the ventilation openings (top and bottom)	
Permissible ambient temperature			
• During operation	°C	-20 ... +60	
• During storage and transport	°C	-40 ... +85	
Weight	g	270	90
Installation altitude above sea level	m	2 000	
Environmental data			
EMC interference immunity		IEC 60947-5-1	
Vibrations			
• Frequency	Hz	5 ... 500	
• Amplitude	mm	0.75	
Climatic withstand capability		IEC 60068-2-78	
Electrical specifications			
Rated control supply voltage U_s Acc. to IEC 61131-2	V	24 DC ±15 %	24 DC ±15 % via connecting cable to the central unit
Operating range		0.85 ... 1.15 x U_s	
Rated insulation voltage U_i	V	50	
Rated impulse voltage U_{imp}	kV	500	
Total current input	mA	--	24
Rated power at U_s	W	--	0.6

More information

System manual "3RK3 Modular Safety System", see http://support.automation.siemens.com/WW/view/en/26493228.

Selection and ordering data

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 42B

3RK3111-1AA10

3RK3121-1AC00
3RK3122-1AC00
3RK3131-1AC10

Version	DT	Screw terminals Article No.	Price per PU	DT	Spring-type terminals Article No.	Price per PU
3RK31 central units						
3RK3 Basic Central unit with safety-related inputs and outputs • 8 fail-safe inputs • 1 two-channel relay output • 1 two-channel electronic output Max. 7 expansion modules can be connected Note: Memory module 3RK3931-0AA00 is included in the scope of supply.	A	**3RK3111-1AA10**		A	**3RK3111-2AA10**	
3RK3 Advanced Central units for connecting to AS-Interface with safety-related inputs and outputs and extended scope of functions • 8 fail-safe inputs • 1 two-channel relay output • 1 two-channel electronic output Max. 9 expansion modules can be connected Note: Memory module 3RK3931-0AA00 is included in the scope of supply.	A	**3RK3131-1AC10**		A	**3RK3131-2AC10**	
3RK3 ASIsafe Central units for connecting to AS-Interface with safety-related inputs and outputs and extended scope of functions • 1 two-channel relay output • 1 two-channel electronic output						
"Basic" version • 2 fail-safe inputs • 6 non-fail-safe inputs No expansion modules can be connected	NEW A	**3RK3121-1AC00**		A	**3RK3121-2AC00**	
"Extended" version • 4 fail-safe inputs • 4 non-fail-safe inputs Max. 2 expansion modules can be connected Note: Memory module 3RK3931-0AA00 is included in the scope of supply.	NEW A	**3RK3122-1AC00**		A	**3RK3122-2AC00**	

Notes:

For more information on MSS, see www.siemens.com/sirius-mss.

More information on AS-Interface, see Chapter 2 "Industrial Communication".

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Selection and ordering data

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 42B

3RK3211-1AA10
3RK3221-1AA10
3RK3231-1AA10
3RK3242-1AA10

3RK3251-1AA10

3RK3311-1AA10
3RK3321-1AA10

3RK3511-1BA10

3RK3611-3AA00

Version	DT	Screw terminals Article No.	Price per PU	DT	Spring-type terminals Article No.	Price per PU
3RK32, 3RK33 expansion modules						
4/8 F-DI Safety-related input modules • 8 inputs	A	**3RK3211-1AA10**		A	**3RK3211-2AA10**	
2/4 F-DI 1/2 F-RO Safety-related input/output modules • 4 inputs • 2 single-channel relay outputs	A	**3RK3221-1AA10**		A	**3RK3221-2AA10**	
2/4 F-DI 2F-DO Safety-related input/output modules • 4 inputs • 2 two-channel electronic outputs	A	**3RK3231-1AA10**		A	**3RK3231-2AA10**	
4/8 F-RO Safety-related output modules • 8 single-channel relay outputs	A	**3RK3251-1AA10**		A	**3RK3251-2AA10**	
4 F-DO Safety-related output modules • 4 two-channel electronic outputs	A	**3RK3242-1AA10**		A	**3RK3242-2AA10**	
8 DI Standard input module • 8 inputs	A	**3RK3321-1AA10**		A	**3RK3321-2AA10**	
8 DO Standard output module • 8 electronic outputs	A	**3RK3311-1AA10**		A	**3RK3311-2AA10**	
3RK35 interface modules						
DP interface PROFIBUS DP interface, 12 Mbit/s, RS 485, 32-bit cyclic data exchange with Basic central unit or 64-bit with Advanced and ASIsafe central unit, acyclic exchange of diagnostics data	A	**3RK3511-1BA10**		A	**3RK3511-2BA10**	
3RK36 operating and monitoring modules						
Diagnostics module	A	**3RK3611-3AA00**			**--**	

Notes:

Connection cable required, see page 11/43.

For more information on MSS, see www.siemens.com/sirius-mss.

More information on AS-Interface, see Chapter 2 "Industrial Communication".

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

Selection and ordering data

	Version			DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Connection cables (essential accessory)									
 3UF7932-0AA00-0	**Connection cable** For connection of								
	Central units with expansion modules or interface module	Diagnostics modules with central unit or interface module							
	✓	✓	• Length 0.025 m (flat)	►	**3UF7930-0AA00-0**		1	1 unit	42J
	--	✓	• Length 0.1 m (flat)	►	**3UF7931-0AA00-0**		1	1 unit	42J
	--	✓	• Length 0.3 m (flat)	►	**3UF7935-0AA00-0**		1	1 unit	42J
	--	✓	• Length 0.5 m (flat)	►	**3UF7932-0AA00-0**		1	1 unit	42J
	--	✓	• Length 0.5 m (round)	►	**3UF7932-0BA00-0**		1	1 unit	42J
	--	✓	• Length 1.0 m (round)	►	**3UF7937-0BA00-0**		1	1 unit	42J
	--	✓	• Length 2.5 m (round)	►	**3UF7933-0BA00-0**		1	1 unit	42J
PC cables and adapters									
 3UF7941-0AA00-0	**USB PC cables** For connecting to the USB interface of a PC/PG, for communication with 3RK3 through the system interface, recommended for use in connection with 3RK3			►	**3UF7941-0AA00-0**		1	1 unit	42J
	USB/serial adapters For connecting a RS 232 PC cable to the USB interface of a PC			B	**3UF7946-0AA00-0**		1	1 unit	42J
Door adapters									
 3UF7920-0AA00-0	**Door adapters** For external connection of the system interface, e.g. outside a control cabinet			►	**3UF7920-0AA00-0**		1	1 unit	42J
Interface covers									
 3UF7950-0AA00-0	**Interface covers** For system interface			►	**3UF7950-0AA00-0**		1	5 units	42J
Memory modules									
 3RK3931-0AA00	**Memory modules** For backing up the complete parameterization of the 3RK3 Modular Safety System without a PC/PG through the system interface			A	**3RK3931-0AA00**		1	1 unit	42C
Push-in lugs									
 3RP1903	**Push-in lugs for screw fixing** e.g. on mounting plate, 2 units required per device Can be used for 3RK3			B	**3RP1903**		1	10 units	41H

✓ Available

-- Not available

Note:

More accessories and components that can be combined with MSS, see Chapter 2 "Industrial Communication".

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

Accessories

Parameterization, start-up and diagnostics software for 3RK3

- Runs under Windows XP Professional (Service Pack 2 or 3), Windows 7 32/64 Bit Professional/Ultimate/Enterprise (Service Pack 1)
- Supplied without PC cable (please order separately, see page 11/43)

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Modular Safety System ES 2008 Basic						
 3ZS1314-4CC10-0YA5 **Floating License for one user** Engineering software in limited-function version for diagnostics purposes, software and documentation on CD, 3 languages (German/English/French), communication through the system interface						
• License key on USB stick, Class A	A	**3ZS1314-4CC10-0YA5**		1	1 unit	42B
• License key download, Class A	►	**3ZS1314-4CE10-0YB5**		1	1 unit	42B
Modular Safety System ES 2008 Standard						
 3ZS1314-5CC10-0YA5 **Floating license for one user** Engineering software, software and documentation on CD, 3 languages (German/English/French), communication through system interface						
• License key on USB stick, Class A	B	**3ZS1314-5CC10-0YA5**		1	1 unit	42B
• License key download, Class A	►	**3ZS1314-5CE10-0YB5**		1	1 unit	42B
Powerpack for MSS ES 2008 Basic to Standard Floating license for one user, engineering software, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface	A	**3ZS1314-5CC10-0YD5**		1	1 unit	42B
Software Update Service For 1 year with automatic extension, assuming the current software version is in use, engineering software, software and documentation on CD, communication through the system interface	►	**3ZS1314-5CC10-0YL5**		1	1 unit	42B
Modular Safety System ES 2008 Premium						
 3ZS1314-6CC10-0YA5 **Floating license for one user** Engineering software, software and documentation on CD, 3 languages (German/English/French), communication through PROFIBUS or the system interface, online diagnostics via PROFIBUS, creating, importing and exporting macros						
• License key on USB stick, Class A	B	**3ZS1314-6CC10-0YA5**		1	1 unit	42B
• License key download, Class A	►	**3ZS1314-6CE10-0YB5**		1	1 unit	42B
Powerpack for MSS ES 2008 Standard to Premium Floating License for one user, engineering software, license key on USB stick, Class A, 3 languages (German/English/French), communication through PROFIBUS or the system interface, online diagnostics via PROFIBUS, creating, importing and exporting macros	A	**3ZS1314-6CC10-0YD5**		1	1 unit	42B
Software Update Service For 1 year with automatic extension, assuming the current software version is in use, engineering software, software and documentation on CD, communication through PROFIBUS or the system interface, online diagnostics via PROFIBUS, creating, importing and exporting macros	►	**3ZS1314-6CC10-0YL5**		1	1 unit	42B

Note:

Description of the software versions, see Chapter 14 "Planning, Configuration and Visualization for SIRIUS".

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