

# Safety Technology

## Introduction

### Monitoring with fail-safe evaluation units from the 3SK, 3TK28 and 3RK3 series

Safe protective door tumbler with safety switches and separate actuator, in accordance with EN ISO 14119:

Position monitoring with non-contact safety switches:

Safe evaluation units

Maximum achievable safety level according to type of switch

Safety switches with tumbler



3SE53

3SE53

Safe evaluation units

Maximum achievable safety level according to type of switch

Magnetically operated switches RFID safety switches



2 NC/2 NC + 1 NC (signaling contact) 3SE66/3SE67

3SE63



3SK2

SIL 2/PL d

SIL 3/PL e



3SK1, 3SK2

SIL 3/PL e



3TK2845

SIL 2/PL d

SIL 3/PL e



3RK3

#### Notes:

For more information, see <http://support.automation.siemens.com/WW/view/en/35443942>.

Information on safety switches, see [Position and Safety Switches](#).

## SIRIUS Safety Integrated

## Article No.



3SK111.

**3SK safety relays**

- Key modules of a consistent and cost-effective safety chain
- Can be used for all safety applications thanks to compliance with the highest safety requirements (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

SIRIUS 3SK1 Standard basic units

- Simple, compact devices for all important requirements for monitoring safety sensors and actuators

**3SK111**SIRIUS 3SK1 Advanced basic units

- Multifunctional series of safety relays with safe relay outputs, semiconductor outputs or time-delayed outputs for:
  - EMERGENCY-STOP monitoring
  - Protective door monitoring
  - Monitoring of non-floating sensors such as light arrays, laser scanners, etc.
  - Monitoring of two-hand operation consoles
  - Monitoring of equivalent (NC/NC) and antivalent (NO/NC) sensors

**3SK112**

- Setting by means of DIP switch

SIRIUS 3SK2 basic units

- Series of safety relays that can be parameterized by software, with semiconductor outputs and independent output functions for:
  - EMERGENCY-STOP monitoring
  - Protective door monitoring
  - Protective door monitoring with tumbler
  - Monitoring of non-floating sensors such as light arrays, laser scanners, etc.
  - Monitoring of two-hand operation consoles
  - Monitoring of equivalent (NC/NC) and antivalent (NO/NC) sensors
  - Muting

**3SK2**Expansion modules

- Output expansions 3RO and 4RO for SIRIUS 3SK1 Standard basic units, SIRIUS 3SK1 Advanced basic units and SIRIUS 3SK2 basic units
- Input expansion for SIRIUS 3SK1 Advanced basic units
- Power supply for SIRIUS 3SK1 Advanced basic units
- Integration of 3RM1 motor starters possible and simple integration of a main circuit component in a system configuration of the safety relays. There is no need for complex wiring between the safety evaluation unit and the actuator.
- Expansion of the Standard device series by means of wiring
- Expansion of the SIRIUS 3SK1 and SIRIUS 3SK2 Advanced device series by means of wiring or without wiring outlay by means of 3ZY12 device connectors

**3SK121,  
3SK122,  
3SK123**

3SK112.



3SK2



3SK121.



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**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**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

**3TK285**Safety relays with special functionsSafe standstill monitoring with 3TK2810-0

- Monitoring without external sensors
- Universal use in applications possible

**3TK2810**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



3TK2845-1HB40








3TK2810-1BA41

		Article No.
<b>SIRIUS Safety Integrated (continued)</b>		
 <p>3RK3</p>	<p><b>3RK3 Modular Safety System (MSS)</b></p> <ul style="list-style-type: none"> <li>• Freely configurable modular safety relays</li> <li>• Safety-related applications up to PL e according to EN ISO 13849-1 or SIL 3 according to IEC 62061 can be implemented</li> <li>• High flexibility and planning reliability thanks to a modular design</li> <li>• More space in the control cabinet and lower costs thanks to highly modular project data</li> <li>• More functionality and time savings thanks to a software-configurable system</li> <li>• Comprehensive diagnostics on-site with the SIRIUS Safety ES software</li> <li>• Improved plant diagnostics and higher plant availability thanks to exchange of data using PROFIBUS</li> <li>• Automatic creation of plant documentation with regard to MSS and software parameterization</li> <li>• 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</li> <li>• Graphic parameterization of the logic, online diagnostics, and automatic creation of documentation using SIRIUS Safety ES</li> <li>• Consistent further development of the safety monitors with the Advanced and ASIsafe central units of the SIRIUS 3RK3 Modular Safety System (MSS)</li> </ul> <p><u>Additionally with AS-Interface (ASIsafe):</u></p> <ul style="list-style-type: none"> <li>• Modularly expandable and freely configurable safety monitor</li> <li>• With MSS Advanced/ASIsafe up to 50 two-channel, fail-safe outputs (38 central outputs and 12 outputs via AS-i)</li> <li>• Safety-related and standard communication between multiple MSS devices and/or safety monitors</li> <li>• Distributed detection of sensors and disconnection of actuators through AS-Interface</li> <li>• Much more space is available without wiring outlay using AS-Interface</li> <li>• Ready-to-use function blocks (e.g. muting or protective door with tumbler) can also be used on AS-i</li> </ul>	3RK3
 <p>3RK3 MSS ASIsafe</p>	<p><b>AS-Interface safety modules</b></p> <ul style="list-style-type: none"> <li>• Complete portfolio of ASIsafe modules</li> <li>• For connection of safety switches with contacts (e.g. position switches) as well as solid-state safety sensors (ESPE)</li> <li>• Degree of protection IP65/IP67 or IP20</li> <li>• Particularly compact dimensions, from 17.5 mm width</li> <li>• Up to four safe inputs per module</li> <li>• Up to one safe output per module</li> <li>• Standard outputs are available on the module in addition</li> <li>• Up to Category 4, PL e, SIL 3</li> </ul> <p>Advantage: Easy integration of safe signals both in the control cabinet or in the field</p>	3RK1
 <p>K45F      SC17.5F</p>	<p><b>AS-i Master and AS-i Safety module for ET 200SP</b></p> <p>The CM AS-i Master ST and F-CM AS-i Safety ST modules are plugged into an ET 200SP configuration, and they connect an AS-i network, including safety-related inputs and outputs, with the controller.</p> <ul style="list-style-type: none"> <li>• Single, double and multiple masters possible</li> <li>• Up to 31 safe input signals (2-channel)/16 safe output channels possible per F-CM AS-i Safety ST module</li> <li>• Plant-wide safety programming of the F-CPU via SIMATIC Distributed Safety/ Safety Advanced</li> <li>• Together with an ET 200SP F-CPU 1510SP F / 1512SP F (firmware V1.8 and higher), pre-processing of safe AS-i signals directly in the ET 200SP station is possible, as well as the configuration of an autonomous AS-i Safety station without a higher-level CPU</li> <li>• Integrated diagnostics</li> <li>• No other programming tools required</li> </ul> <p>Advantage: Modular connection of fail-safe AS-i networks with system-wide programming in SIMATIC and SINUMERIK controllers</p>	6ES7
 <p>CM AS-i Master ST and F-CM AS-i Safety ST</p>	<p><b>3RM1 motor starters</b></p> <ul style="list-style-type: none"> <li>• Motor starters for safety-related shutdown as 3RM11 direct-on-line starters or 3RM13 reversing starters</li> <li>• Compact devices with 22.5 mm width comprising combinations of relay contacts and power semiconductors (hybrid technology) and a electronic overload relay</li> <li>• 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</li> <li>• 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</li> <li>• Combination with 3SK safety relay through conventional wiring or 3ZY12 device connectors</li> <li>• Simple wiring and collective shutdown with device connectors in assemblies; there is no further need for complex looping of the connecting cables</li> </ul>	3RM1
 <p>3RM1</p>		

		Article No.
<b>SIRIUS Safety Integrated (continued)</b>		
	<p><b>ET 200S Safety Motor Starter Solutions</b></p> <p>The ET 200S Safety Motor Starter Solutions comprise:</p> <ul style="list-style-type: none"> <li>• Safety modules</li> <li>• Standard motor starters</li> <li>• High-Feature motor starters</li> <li>• Failsafe motor starters</li> </ul> <p><u>ET 200S Safety Motor Starter Solutions local</u></p> <p>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.</p> <p><u>ET 200S Safety Motor Starter Solutions PROFIsafe</u></p> <p>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.</p>	3RK1
	<p><b>ET 200pro Safety Motor Starter Solutions</b></p> <p>The ET 200pro Safety Motor Starter Solutions comprise:</p> <ul style="list-style-type: none"> <li>• PROFIsafe modules</li> <li>• Safety repair switch modules</li> <li>• Disconnecting modules</li> <li>• Standard motor starters</li> <li>• High-Feature motor starters</li> </ul> <p><u>ET 200pro Safety Motor Starter Solutions local</u></p> <p>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.</p> <p><u>ET 200pro Safety Motor Starter Solutions PROFIsafe</u></p> <p>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.</p>	3RK1
	<p><b>SIMOCODE pro motor management and control devices</b></p> <ul style="list-style-type: none"> <li>• Flexible, modular motor management system for motors with constant speeds in the low-voltage range</li> <li>• Provides an intelligent interface between the higher-level automation system and the motor feeder</li> <li>• Multi-functional, electronic full motor protection which is independent of the automation system</li> <li>• Integrated control functions for the motor control</li> <li>• Detailed operating, service and diagnostics data</li> <li>• Open communication through PROFIBUS DP and PROFINET</li> <li>• 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)</li> </ul> <p><u>Fail-safe digital modules</u></p> <ul style="list-style-type: none"> <li>• DM-F Local for direct assignment between a fail-safe hardware shutdown signal and a motor feeder</li> <li>• DM-F PROFIsafe for when a fail-safe controller (F-CPU) creates the fail-safe signal for the disconnection</li> </ul>	3UF7
	<p><b>Mechanical position switches</b></p> <ul style="list-style-type: none"> <li>• Easy assembly thanks to modular design</li> <li>• Solid, rugged design</li> <li>• Special versions are easily generated and quickly available, also in combination with standard modules</li> <li>• 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</li> <li>• Categories 3 and 4 can be achieved by using a second 3SE51/3SE53 position switch</li> </ul>	3SE51, 3SE52
	<p><b>Mechanical safety switches</b></p> <ul style="list-style-type: none"> <li>• With separate actuator, hinge switch, or separate actuator and tumbler</li> <li>• With a position switch it is possible to achieve Category 3 according to EN ISO 13849-1 or SIL 2 according to IEC 61508</li> <li>• 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</li> <li>• Version in various sizes made of metal or plastic</li> <li>• Integrated ASIsafe electronics for all enclosure designs</li> </ul>	3SE51, 3SE52, 3SE53

# Safety Technology

## Introduction

SIRIUS Safety Integrated (continued)	Article No.	
 <p>3SE66, 3SE67</p>	<p><b>Non-contact magnetically operated safety switches</b></p> <ul style="list-style-type: none"> <li>• Small, compact, safe</li> <li>• Simple installation even in restricted spaces thanks to connector versions</li> <li>• Two safety contacts and one signaling contact enable simple diagnostics at the maximum safety level</li> </ul>	<p><b>3SE66, 3SE67</b></p>
 <p>3SE63</p>	<p><b>Non-contact RFID safety switches</b></p> <ul style="list-style-type: none"> <li>• Long service life due to non-contact switching</li> <li>• Only one switch required for the maximum safety level PL e or SIL 3 according to EN ISO 13849-1 and IEC 61508</li> <li>• Tamper protection better than with mechanical safety switches thanks to switches and actuators with individual coding</li> <li>• LED status indication including threshold indication for door displacement</li> <li>• Degree of protection up to IP69 K and resistance to cleaning products</li> <li>• Larger switching displacement than mechanical switches; offers better mounting tolerance and sagging tolerance of the protective door</li> </ul>	<p><b>3SE63</b></p>
 <p>3SU1400</p>  <p>3SU1001</p>	<p><b>Command devices</b></p> <ul style="list-style-type: none"> <li>• Using a special F adapter, EMERGENCY-STOP devices according to ISO 13850 can be directly connected through the standard AS-Interface or PROFI-safe with safety-related communication. This F adapter is snapped from the rear onto the EMERGENCY-STOP device, enabling the achievement of maximum performance level "e" according to EN ISO 13849-1, or SIL 3 according to IEC 62061.</li> <li>• EMERGENCY-STOP devices for disconnecting plants in an emergency situation</li> <li>• 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</li> <li>• Various mushroom diameters (also illuminated), with lock, in plastic/metal, as individual or complete units, and in combination with 3SU1 enclosure or two-hand operation console. The 3SU1 enclosures are also optionally available with ASIsafe interface</li> </ul>	<p><b>3SU1</b></p>
 <p>3SE7</p>	<p><b>Cable-operated switches</b></p> <ul style="list-style-type: none"> <li>• Control functions and EMERGENCY-STOP always within reach</li> <li>• More safety over long distances of up to 2 x 75 m length</li> <li>• Easy release</li> <li>• Fail-safe applications with SIRIUS Safety Integrated</li> <li>• Status display directly on the switch</li> <li>• Signal display for long distances in innovative LED technology with visibility over 50 m</li> <li>• Cable-operated switches with latching according to ISO 13850 (EN 418) and full EMERGENCY-STOP function with positive-opening contacts</li> <li>• Quick and safe mounting using uniform mounting accessories</li> <li>• Versions with 1 NO/2 NC with yellow lid</li> </ul>	<p><b>3SE7</b></p>