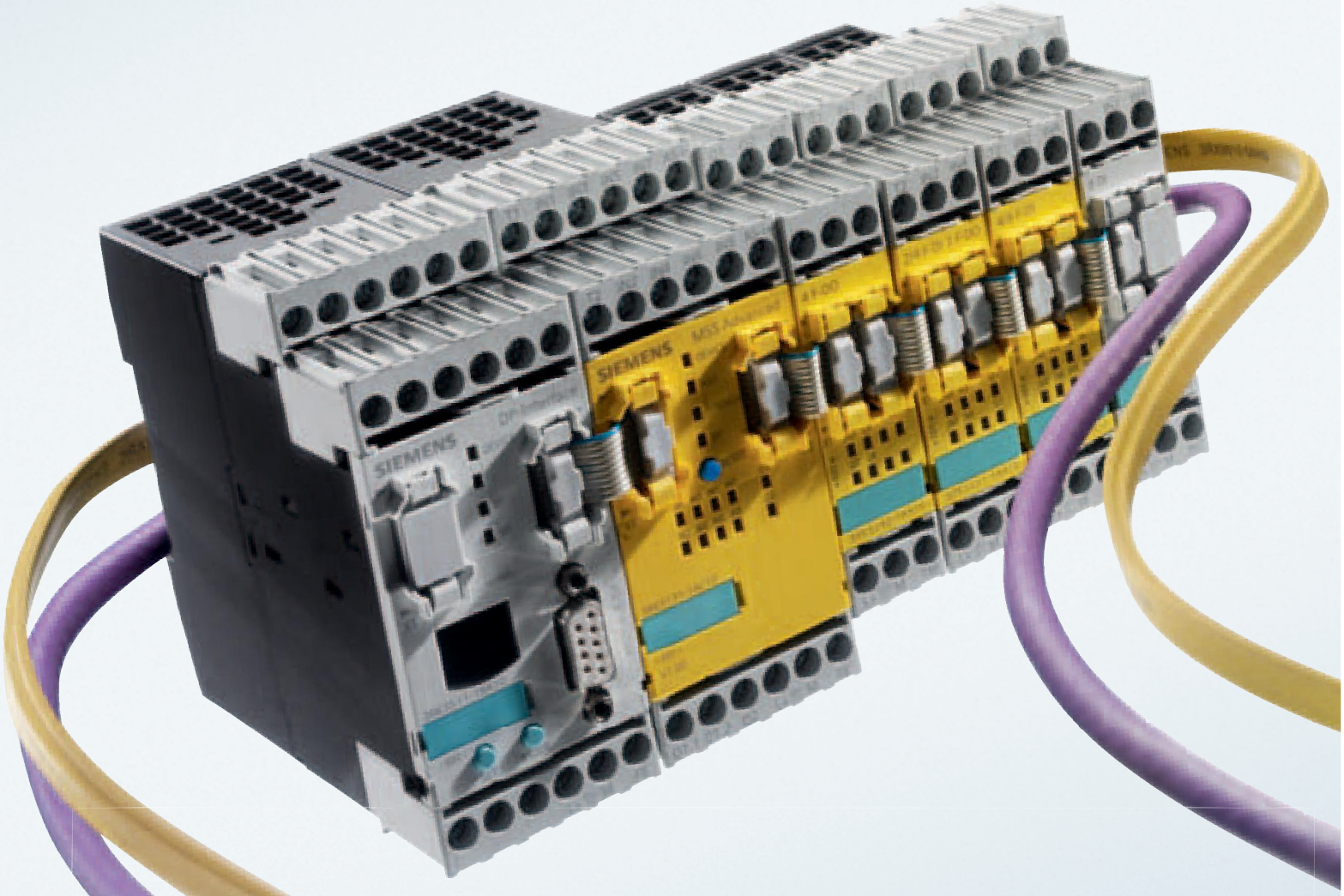
SIEMENS



System with more options: Flexibility and functionality in a new dimension

SIRIUS 3RK3 Modular Safety System – now also with AS-Interface

Safety Integrated

siemens.com/sirius-mss

Complete safety – with minimum overhead

With the SIRIUS 3RK3 Modular Safety System, users rely on more functionality and less time needed for implementing, linking and parameterizing safety applications.
And now, the configurable software system can do even more: The new 3RK3 Advanced central unit also enables connection to AS-Interface. So you can now utilize the advantages of switching devices that are easy to parameterize with AS-Interface, too.
This means you can systematically profit from even more options.

A modular system – for maximum flexibility and functionality

Whether simple individual application or complex safety application: With our Modular Safety System (MSS), you rely on a universal modular system that enables you to adapt machines and plants in the most flexible and economic way – during redesign as well as during retrofitting. Because safety functions can be parameterized quickly and easily using the MSS ES software. Thanks to the consistent modularity, you are also extremely flexible within your applications and save costs since you do not have to utilize more modules than necessary.

The SIRIUS 3RK3 Modular Safety System is part of our universal Safety Integrated safety concept which can be seamlessly integrated into the standard automation.
It can be used in SIL 3 safety applications in accordance with IEC 61508/62061 and Performance Level e in accordance with EN 13849-1.

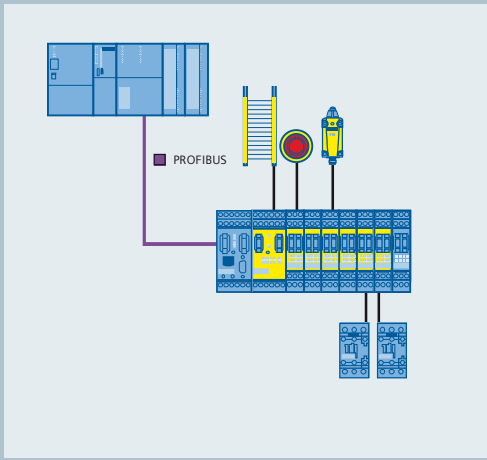
Now also for AS-Interface

The newest member of our safety system: the new SIRIUS 3RK3 Advanced central unit – an innovation that enhances ASIsafe by a modular expandable AS-Interface safety monitor.
The 3RK3 Advanced central unit offers not only the features of the tried and tested Basic version of our Modular Safety System, but also a number of additional benefits:

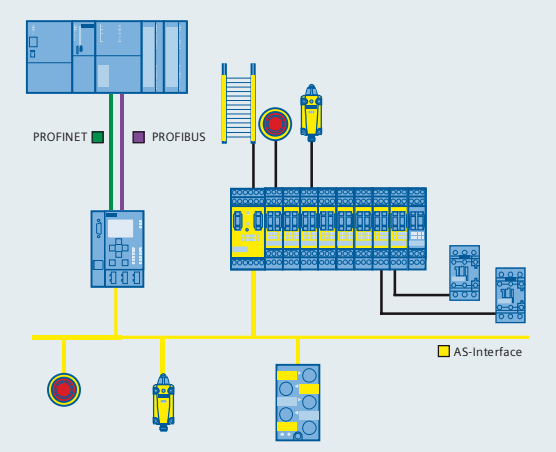
- Expansion of the existing system with respect to quantity structure and functionality
- Reading of standard and safety-related signals on the AS-i bus
- Download of parameterization via PROFIBUS
- Provision of 12 independent enabling circuits on the AS-Interface

Modular system for customized solutions

Central units in the Basic and Advanced versions are the core of our SIRIUS 3RK3 Modular Safety System, whose number of inputs and outputs you can flexibly modify using expansion modules.
This allows the quantity structure to be adapted to the respective application at any time. In addition, an interface module enables the transmission of diagnostics and status data to a higher-level PROFIBUS network.
The MSS ES parameterization software is a central component of the system and offers quick and simple parameter assignment of the safety functions as well as extensive diagnostics options.



System configuration of the SIRIUS 3RK3
Modular Safety System Basic central unit



System configuration of the SIRIUS 3RK3
Modular Safety System Advanced central unit

3RK3 Basic central unit

Wherever more than three safety functions have to be analyzed and where parameterizing the wiring of safety relays would be very time-consuming and expensive to implement, the 3RK3 Basic central unit is used. It reads inputs and controls outputs and communicates with higher-level controllers via an interface module. The entire safety program of an application is processed in the central unit. At the smallest configuration level, the 3RK3 Basic central unit is already
functional without the expansion modules that can be connected as options.

- 8 safety-related sensor inputs
- 1 safety-related relay output
- 1 safety-related solid-state output
- Up to 7 expansion modules can be connected
- Cyclic data exchange via PROFIBUS: up to 32 bit

3RK3 Advanced central unit

The 3RK3 Advanced central unit is the logical expansion of a Basic central unit – with the functionality of the AS-i safety monitor. It enables a standard AS-i network to be upgraded for safety-related tasks. Typical applications: Slave-to-slave communication in modular machine concepts or safety-related communication with plant components. In addition to the features of the Basic version, the 3RK3 Advanced central unit offers numerous additional features.

- 1 AS-i connection
- 8 safety-related inputs
- 1 safety-related relay output
- 1 safety-related solid-state output
- Up to 9 expansion modules can be connected
- Expanded cyclic data exchange via PROFIBUS: up to 64 bit

SIRIUS 3RK3 Modular Safety System
The highlights at a glance

- High flexibility and reliability of planning thanks to a modular design
- More space in the control cabinet and lower costs thanks to a highly modular quantity structure
- More functionality and time saving through a parameterizable software system
- Extensive diagnostics on site and project documentation using the MSS ES software
- Improved plant diagnostics and higher plant availability through data exchange via PROFIBUS

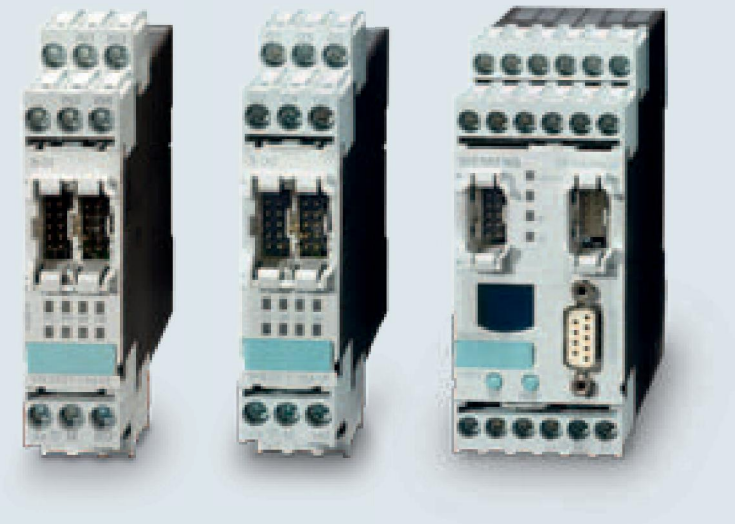
Even more benefits
with SIRIUS 3RK3 Advanced

- More flexibility Signals can be read in via central inputs or AS-Interface
  - Reduction of wiring overhead
  - Simplified collection of sensor signals in extensive plants via AS-Interface
  - Slave-to-slave communication via AS-Interface, i.e., data exchange between several central units
  - Distributed shutdown of drives via AS-Interface

Flexible adaptation to all requirements – the modules

Using expansion modules that are available as safety-related and standard input and output modules as well as mixed modules, the quantity structure of the SIRIUS 3RK3 Modular Safety System can be flexibly adapted to the requirements of the application. For this purpose, the module types can be combined as required.

The following versions of expansion modules are available:



Fail-safe expansion modules

Expansion module 4/8F-DI
- 8 safety-related sensor inputs

Expansion module 2/4F-DI 1/2F-RO
- 4 safety-related sensor inputs
- 2 safety-related relay outputs

Expansion module 2/4F-DI 2F-DO
- 4 safety-related sensor inputs
- 2 safety-related solid-state outputs

Expansion module 4/8F-RO
- 8 safety-related relay outputs

Expansion module 4F-DO
- 4 safety-related solid-state outputs

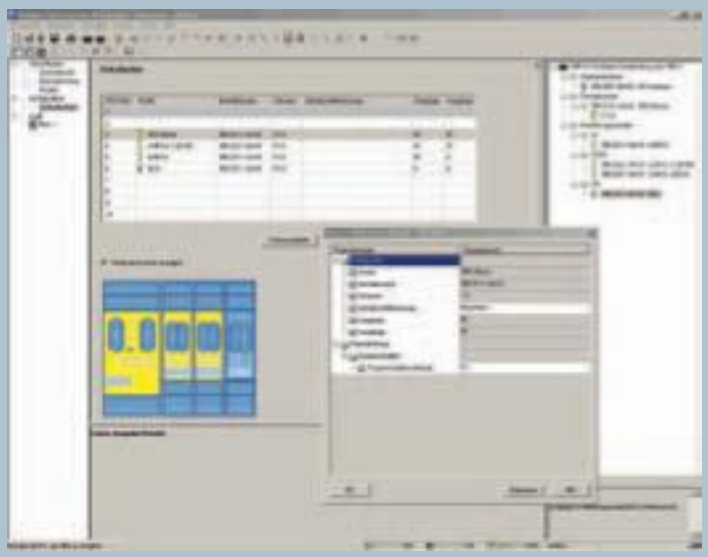
Standard expansion modules

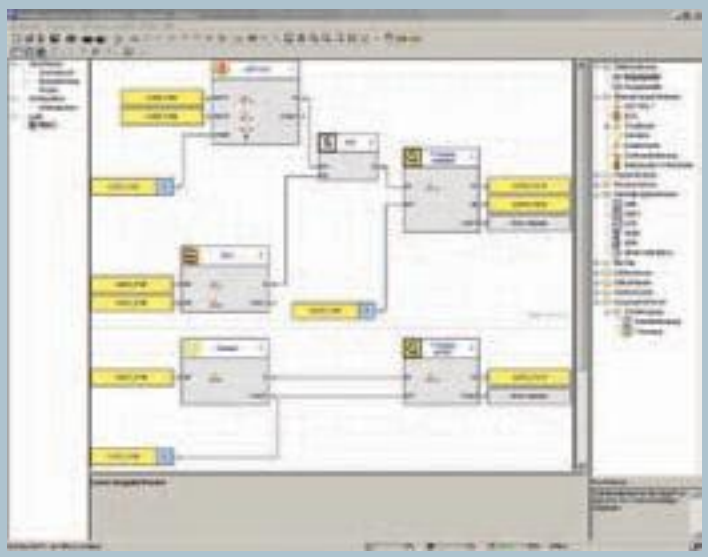
Expansion module 8DI
- 8 standard inputs

Expansion module 8DO
- 8 solid-state standard outputs

Interface module

The DP interface module is used for transferring diagnostics and device status data to a higher-level PROFIBUS network. The use of the Basic central unit allows 32 bits of cyclic data to be exchanged with the controller. If the 3RK3 Advanced central unit is used, the number doubles to 64 bits of cyclic data. Acyclically it is possible to call up diagnostics data for both central units.





One program, a lot of convenience: the MSS ES parameterization software

The MSS ES parameterization software is an essential component of our Modular Safety System. It replaces the tedious wiring of individual functions by using quick and easy parameter assignment.

Simple, fast and efficient

All function elements can be positioned using drag & drop.
All the functions – whether safety or logic functions – are available as blocks and, in addition, can easily be combined with each other.

A true highlight:
MSS ES enables the safety application to be tested by forcing. Outputs can be individually set in this case to monitor the response of the downstream safety function in advance. This facilitates and accelerates the commissioning of the safety application.

Diagnostics

In addition, our parameterization software is suitable as a reliable "diagnostics tool": The status of each element and the entire interconnection can be viewed online.

Documentation

In addition, an extensive documentation of the safety functions is created.

Besides even more functions, the current version of MSS ES offers the following innovations for the Advanced central unit:

- Download of parameterization via PROFIBUS
- Online diagnostics via PROFIBUS
- New function elements – shown on the next page in detail
- Macro function
  - Compiling a library with its own function units
  - Export or import of macros to other projects for reuse

Benefits at a glance

- **Fast parameter assignment:**
  MSS ES contains all the elements and tools that are required for configuring, diagnostics and commissioning of your application.
- **Easy linking:**
  MSS ES provides blocks for all the functions that can easily be linked with a click of the mouse.
- **User-friendly operation:**
  MSS ES provides a user-friendly and clearly arranged user interface with which the safety applications can be parameterized, operated, monitored and tested.

Overview of all the function elements

Monitoring functions	Icon	3RK3 Basic	3RK3 Advanced
Universal monitoring			✓
EMERGENCY STOP		✓	✓
Safety shutdown mat		✓	✓
Protective door monitoring		✓	✓
Protective door tumbler mechanism			✓
Enabling button		✓	✓
Two-hand operation		✓	✓
ESPE monitoring (electro-sensitive protective equipment)		✓	✓
Muting			✓
Mode selector switch		✓	✓
AS-i monitoring (AS-i 2F-DI)			✓

Logic functions	Icon	3RK3 Basic	3RK3 Advanced
AND		✓	✓
OR		✓	✓
XOR		✓	✓
NAND		✓	✓
NOR		✓	✓
Negation (NEG)		✓	✓
Flip-flop		✓	✓

Counter function	Icon	3RK3 Basic	3RK3 Advanced
Counter 0 –> 1		✓	✓
Counter 1 –> 0		✓	✓
Counter 0 –> 1/1 –> 0		✓	✓

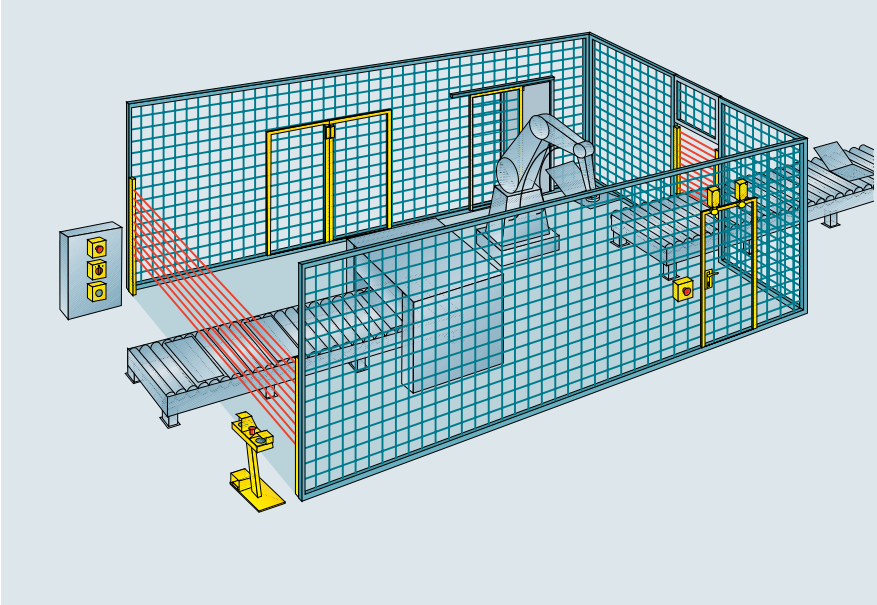
Time functions	Icon	3RK3 Basic	3RK3 Advanced
With ON delay		✓	✓
Passing make contact		✓	✓
With OFF delay		✓	✓
Clocking		✓	✓

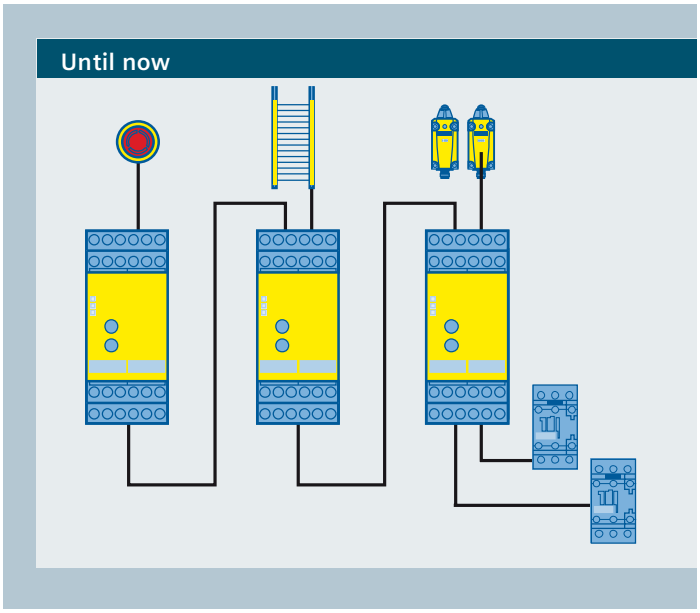
Start functions	Icon	3RK3 Basic	3RK3 Advanced
Monitored start		✓	✓
Manual start		✓	✓

Output functions	Icon	3RK3 Basic	3RK3 Advanced
Standard output		✓	✓
F output		✓	✓
AS-i output function			✓

Status functions	Icon	3RK3 Basic	3RK3 Advanced
Element status			✓

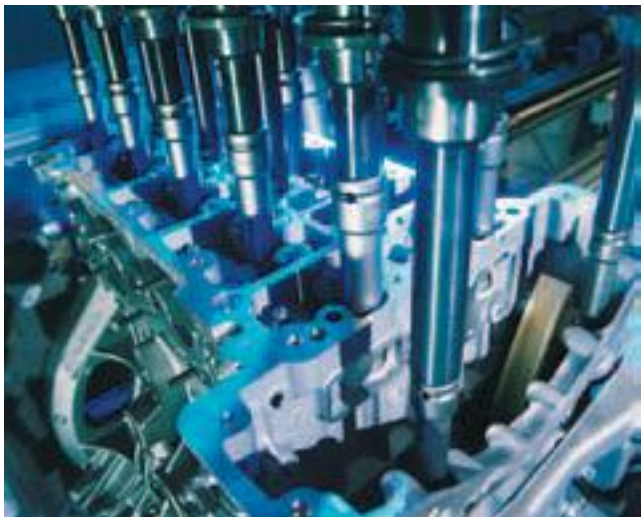
Whatever your safety requirements – with the SIRIUS 3RK3 Modular Safety System and the parameterization software you can parameterize and operate all standard safety functions. All the monitoring functions can be logically interconnected via the logic functions.

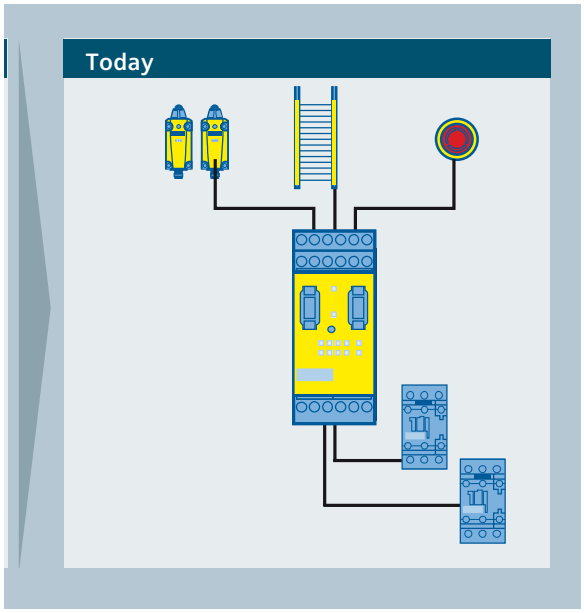




With three or more safety functions: simply the smarter solution

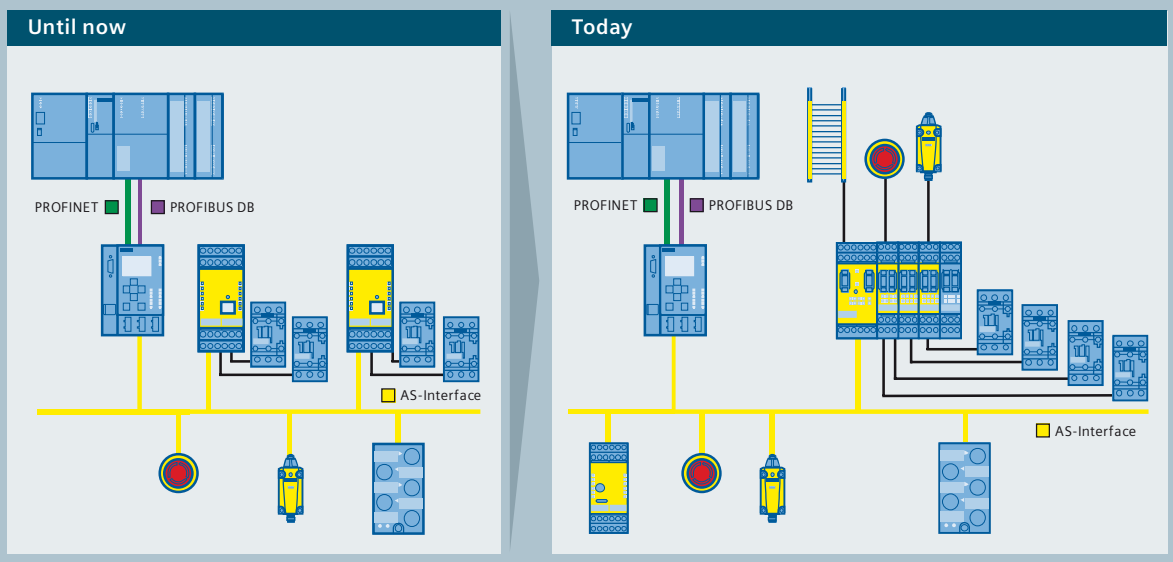
Whether Basic or Advanced: Our SIRIUS 3RK3 Modular Safety System is recommended for a host of applications – while offering numerous advantages compared to conventional solution concepts.





Simpler and more flexible than conventional safety relays

- Functions are simply interconnected in the parameterization software. You save the enormous wiring overhead which would otherwise be required by linking several functions.
- The modular design allows significantly more flexible expansion options – with significantly lower hardware hardware overhead. The parameterization software allows a significantly greater logic depth.
- Changes can easily be performed using expansion modules and parameterization software – without high engineering and wiring overhead.
- The physical boundaries can be greatly expanded by connecting AS-Interface (Advanced version only).



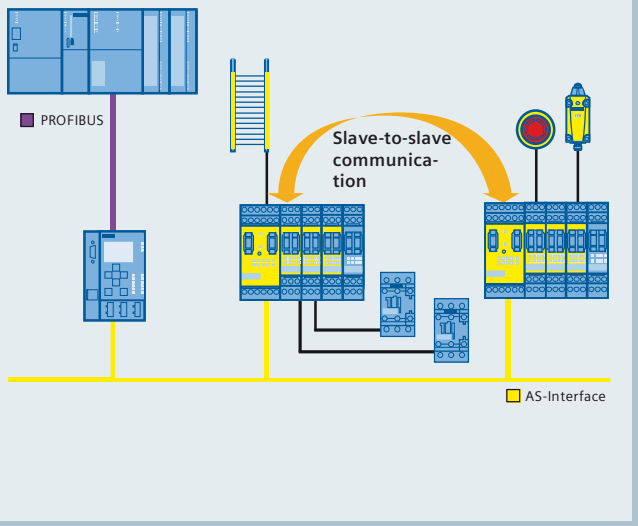
SIRIUS 3RK3 Advanced is more economic and flexible if more than two safety monitors are used in one application

Even more benefits with AS-Interface

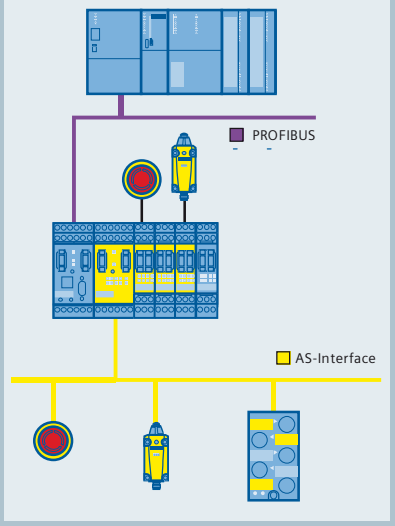
With the 3RK3 Advanced central unit, you profit not only from all the features that are offered by the Basic variant of our Modular Safety System:
On top of that, our innovation offers a series of additional highlights.

Economic alternative to conventional safety monitors

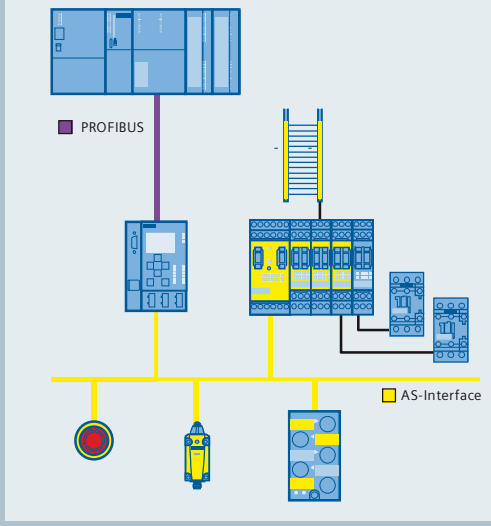
In all applications in which two or more safety monitors are used, the solution with our 3RK3 Advanced central unit is more economical. In this case, the device monitors the various safety-related and non-safety-related AS-Interface slaves. The 3RK3 Advanced central unit allows safety-related and non-safety-related signals to be read on the AS-i bus. In addition, up to 12 distributed safe AS-i outputs can be controlled.



Safety-related slave-to-slave communication between two Modular Safety Systems



Diagnostics of the Modular Safety System via an interface module



Diagnostics of the Modular Safety System via AS-Interface and PROFIBUS

Additional advantages compared to conventional safety monitors

- Number of independent safe outputs can be increased with expansion modules
- All outputs can be addressed with the results of logic operations
- Relay and solid-state outputs can be used
- Teaching of the code sequence during operation without stopping the MSS
- MSS can process more software blocks than a safety monitor and, therefore, map more complex functions

Safety-related slave-to-slave communication via AS-Interface

Our 3RK3 Advanced enables the fail-safe data exchange between several SIRIUS 3RK3 Modular Safety Systems. The AS-Interface functions as a communication bus here. The data of the safety systems can be processed directly. The advantage: There is no need for wiring or parameterizing a 1:1-relationship between the individual systems.

More efficient diagnostics options

For larger systems in which controllers are also used, the MSS can be connected with the controller via an interface module. Process and diagnostics data can be exchanged and visualized.
The 3RK3 Advanced central unit allows cyclic data exchange up to 64 bit, and the 3RK3 Basic central unit an exchange of 32 bit.

With the 3RK3 Advanced central unit, it is also possible to transfer the diagnostics data to the controller directly via AS-Interface. In this case, no interface module is needed.

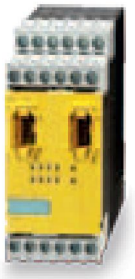
This allows the SIRIUS 3RK3 Modular Safety System to be incorporated into a higher automation level, very much in line with Totally Integrated Automation, and non-safety-related signals of the higher-level controller to be connected with the logic of the safety system. Furthermore, the parameterization data can be downloaded directly from any engineering station via PROFIBUS – without a direct local connection to the MSS.

AS-i Power 24 V-ready

Since our 3RK3 Advanced central unit is AS-i Power 24 V-ready, no additional 30 V AS-Interface power supply units are required for small to medium-sized systems. At times, the result can be significant cost savings: 30 to 50 % are not uncommon.

Technical data
Selection and ordering data

	3RK3 Basic central unit	3RK3 Advanced central unit	EM 4/8F-DI	EM 2/4F-DI 1/2F-RO	EM 2/4F-DI 2F-DO
Device data					
Number of sensor inputs (single-channel)	8	8	8	4	4
Outputs	1 two-channel relay output 1 two-channel solid-state output	1 two-channel relay output 1 two-channel solid-state output		2 single-channel relay outputs	2 two-channel solid-state outputs
Supply voltage/ rated control supply voltage Us (acc. to DIN EN 61131-2)	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Utilization category acc. to EN 60947-5-1 (relay outputs) – AC-15 at 230 V – DC-13 at 24 V (semiconductor outputs) – DC-13 at 24 V	AC-15 2 A, 230 V DC-13 1 A, 24 V DC-13 1.5 A, 24 V	AC-15 2 A, 230 V DC-13 1 A, 24 V DC-13 1.5 A, 24 V		AC-15 2 A, 230 V DC-13 1 A, 24 V	DC-13 1 A, 24 V
Mechanical service life at rated duty switching cycles	10 106 (relay)	10 106 (relay)		10 106 (relay)	
Switching frequency z at Rated operational current 1/h	1000	1000		1000	1000
Dimensions					
Height – Screw terminals – Spring-loaded terminals	111 mm 113 mm	111 mm 113 mm	102 mm 105 mm	102 mm 105 mm	102 mm 105 mm
Width	45 mm	45 mm	22.5 mm	22.5 mm	22.5 mm
Depth	124 mm	124 mm	124 mm	124 mm	124 mm
Ordering data					
With screw terminal	**3RK3111-1AA10**	**3RK3131-1AC10**	**3RK3211-1AA10**	**3RK3221-1AA10**	**3RK3231-1AA10**
With spring-loaded terminal	**3RK3111-2AA10**	**3RK3131-2AC10**	**3RK3211-2AA10**	**3RK3221-2AA10**	**3RK3231-2AA10**



EM 4 F-DO	EM 4/8 F-RO	EM 8 DI	EM 8DO	Interface mod- ule 3RK35
		8		
4 two-channel electrical outputs	8 single-channel relay outputs		8 solid-state standard outputs	DP interface PROFIBUS-DP interface, 12 Mbit/s RJ485
24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
DC-13 2 A, 24 V	AC-15 2 A, 230 V DC-13 1 A, 24 V		DC-13 0.5 A, 24 V	
	10 106 (relay)			
1000	1000		1000	
102 mm 105 mm	111 mm 113 mm	102 mm 105 mm	102 mm 105 mm	111 mm 113 mm
22.5 mm	45 mm	22.5 mm	22.5 mm	45 mm
124 mm	124 mm	124 mm	124 mm	124 mm
3RK3242-1AA10	**3RK3251-1AA10**	**3RK3321-1AA10**	**3RK3311-1AA10**	**3RK3511-1BA10**
3RK3242-2AA10	**3RK3251-2AA10**	**3RK3321-2AA10**	**3RK3311-2AA10**	**3RK3511-2BA10**

Software	Ordering data
MSS ES 2008 Parameterization and diagnostics software for the 3RK3 Modular Safety System – executable on PC/PG under Windows 2000/XP/VISTA,	
Basic Floating License:	3ZS1314-4CC10-0YA5
Standard Floating License	3ZS1314-5CC10-0YA5
Premium Floating License	3ZS1314-6CC10-0YA5

Software	Ordering data
Connecting cable	3UF7930-0AA00-0
PC cable	3UF7940-0AA00-0
Memory module	3RK3931-0AA00
USB adapter	3UF7946-0AA00-0

The software and additional technical data, such as the system manual, can be downloaded on the Internet at

www.siemens.com/sirius-mss

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