

# / SAFE CONTROL COMPONENTS

## A SENSOR ALONE DOES NOT MAKE A SAFE WORKPLACE

Not until the safety sensors are efficiently and reliably integrated in the machine safety circuit can the topic of safety at work be implemented in such a way that the sensors do not interfere with the machine processes and yet still offer the best-possible protection. Our safety relays and AS-Interface solutions open all possibilities to you here.



**Safety relays**

**Page 328**

**Programmable safety controllers**

**Page 337**

**AS-Interface Safety at Work**

**Page 341**



Switching  
sensors

Measuring  
sensors

Products for  
safety at work

Identification

Data transmission /  
Control components

Industrial image  
processing

Accessories

# //SAFETY RELAYS

## MORE SPACE IN THE CABINET

With a width of just 17.5 mm and 22.5 mm, these safety relays are characterized by very narrow housings. As a result, you can realize the one- or two-channel connection of safety-related sensors in a space-saving and simple manner over up to 3 switch-off circuits. The devices have interchangeable connection terminals.

### /// MSI-CM



The MSI-CM safety relay is used as a contact extension module in accordance with DIN EN 60204-1/VDE 0113 Part 1 for contact extension for E-Stop relays and two-hand control units. Depending on the wiring and proper integration of the feedback path, a Performance Level PL e in accordance with EN ISO 13849-1 is achieved.



#### Benefits:

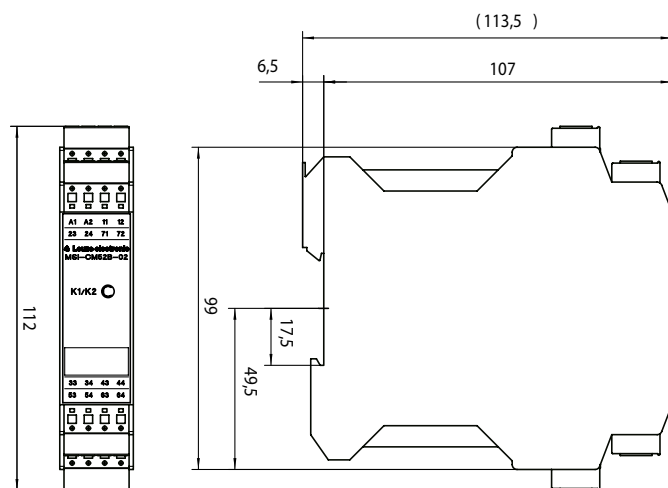
- Contact extension module with extension block in accordance with DIN EN 60204-1/VDE 0113 Part 1
- Contact extension for E-Stop relays and two-hand control units
- 1- or 2-channel wiring
- Designs with screw terminals as well as with spring-cage terminals
- 5 release contacts, 1 signal contact, 1 feedback contact
- Detachable connection terminals for simple device swap-out



Direct access to the online product selector at [www.leuze.com/en/msi-cm](http://www.leuze.com/en/msi-cm)

Part no.	Part description	Connection	PL	Category	STOP category
547933	MSI-CM52B-01	Screw terminal	e	4	0
547934	MSI-CM52B-02	Spring-cage terminal	e	4	0

### Dimensioned drawings: MSI-CM



MSI-CM52B-02 safety relay, spring-cage terminal

### /// MSI-DT



This safety relay with adjustable delay time is equipped with two release current paths which release undelayed in accordance with stop category 0. Two additional release current paths release in accordance with stop category 1 with adjustable delay time.



#### Benefits:

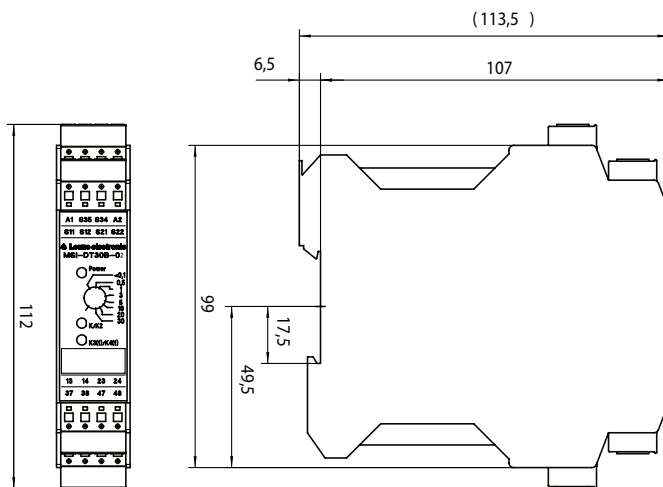
- Adjustable delay time (can be steplessly preset from 0.1 ... 30 s)
- Monitoring of E-Stop buttons, safety doors, AOPDs
- Monitoring of safety circuits in accordance with DIN EN 60204-1/VDE 0113-1
- 1- or 2-channel wiring with cross-circuit detection
- Designs with screw terminals as well as with spring-cage terminals
- Two undelayed and two slow-release contacts
- Automatic and manual start circuit
- Detachable connection terminals for simple device swap-out



Direct access to the online product selector at [www.leuze.com/en/msi-dt](http://www.leuze.com/en/msi-dt)

Part no.	Part description	Connection	PL	Category	STOP category
547935	MSI-DT30B-01	Screw terminal	e	4	0
547936	MSI-DT30B-02	Spring-cage terminal	e	4	0

### Dimensioned drawings: MSI-DT



MSI-DT30B-02 safety relay, spring-cage terminal

Switching  
sensors

Measuring  
sensors

Products for  
safety at work

Identification

Data transmission /  
Control components

Industrial image  
processing

Accessories

### /// MSI-SR4



The MSI-SR4 is used for evaluating safety-sensor input signals. Light curtains, E-Stop buttons and safety switches, for example, can thereby be integrated in the machine process in a safety-oriented manner.



#### Benefits:

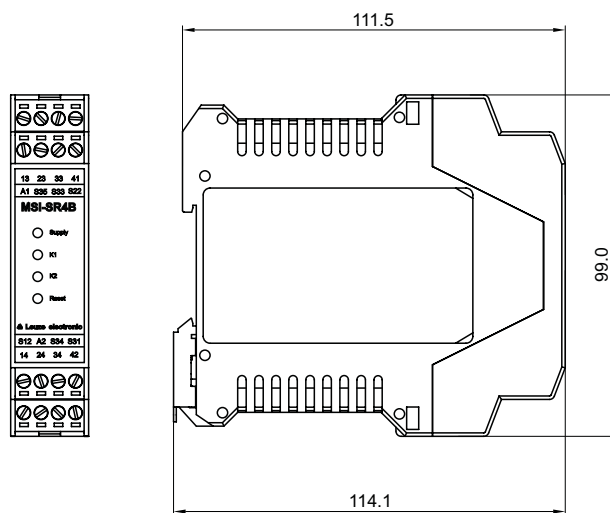
- Standard link between machine control and optoelectronic protective devices as well as safety switches
- Flexibly covers a wide range of applications
- Monitored start/restart button,
- Automatic start/restart
- Short reaction time of just 10 ms, easy connection and time-saving mounting
- Detachable connection terminals for simple device swap-out
- Designs with screw terminals as well as with spring-cage terminals



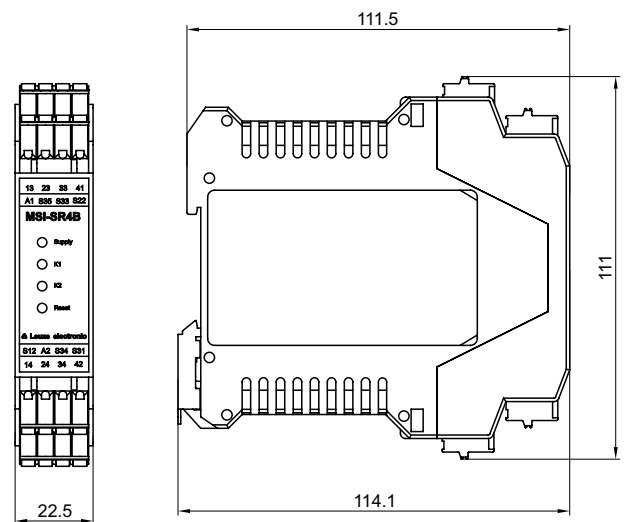
Direct access to the online product selector at [www.leuze.com/en/msi-sr4](http://www.leuze.com/en/msi-sr4)

Part no.	Part description	Connection	PL	Category	STOP category	Number of safety-related switching outputs (OSSDs)	Switching element
547950	MSI-SR4B-01	Screw terminal	e	4	0	3x	Relay, make-contact
547951	MSI-SR4B-02	Spring-cage terminal	e	4	0	3x	Relay, make-contact

### Dimensioned drawings: MSI-SR4



MSI-SR4B-01 safety relay, screw terminal



MSI-SR4B-02 safety relay, spring-cage terminal

## /// MSI-SR5



Two devices can be connected to the MSI-SR5 safety relay, either with two transistor OSSDs or by designing as a two-channel contact circuit. As a result, two sensors can be connected to a common switch-off circuit – for applications up to Performance Level PLe acc. to EN ISO 13849-1.

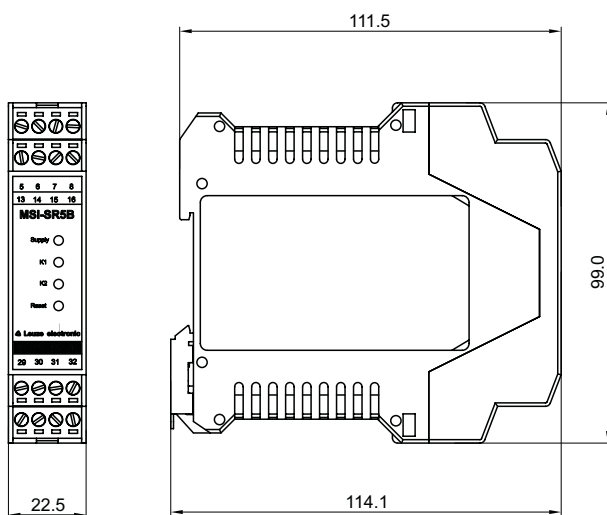
**Benefits:**

- Very short response time
- Monitored reset button
- Dual evaluation of different sensor technologies
- LED displays, K1 and K2, supply voltage
- Housing width 22.5 mm
- Potential-free safety-related switching outputs
- Detachable connection terminals for simple device swap-out
- Designs with screw terminals as well as with spring-cage terminals

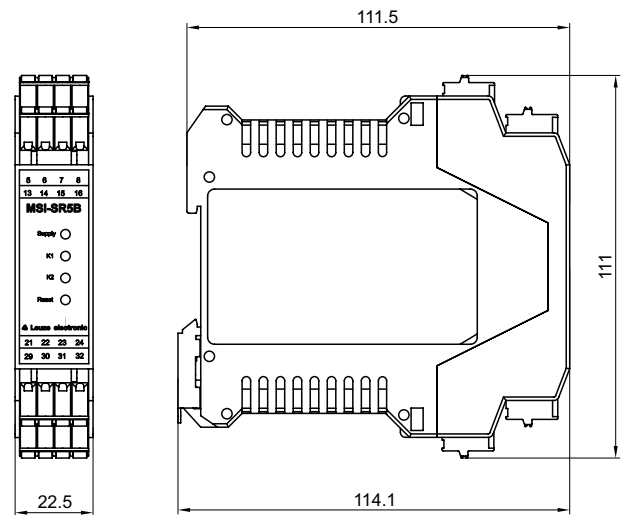


Direct access to the online product selector at [www.leuze.com/en/msi-sr5](http://www.leuze.com/en/msi-sr5)

Part no.	Part description	Connection	PL	Category	STOP category	Number of safety-related switching outputs (OSSDs)	Switching element
547952	MSI-SR5B-01	Screw terminal	e	4	0	2x	Relay, make-contact
547953	MSI-SR5B-02	Spring-cage terminal	e	4	0	2x	Relay, make-contact

**Dimensioned drawings: MSI-SR5**

MSI-SR5B-01 safety relay, screw terminal



MSI-SR5B-02 safety relay, spring-cage terminal

Switching sensors

Measuring sensors

Products for safety at work

Identification

Data transmission / Control components

Industrial image processing

Accessories

## /// MSI-RM2



With the MSI-RM2 relay module, a compact and – at the same time – economical solution is available in combination with safety sensors for applications up to Performance Level PL<sub>e</sub>. The relay module, only 17.5 mm wide, has two potential-free make contact circuits with a response time of only 10 ms.

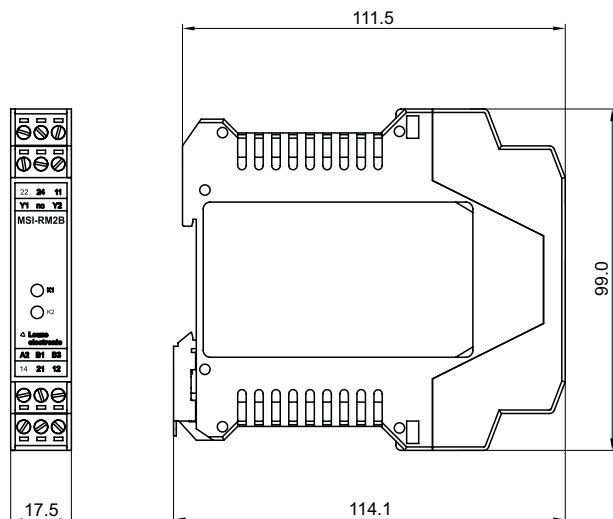
**Benefits:**

- For converting electronic switch-off signals from safety sensors to potential-free, contact-based signals
- Detachable connection terminals for simple device swap-out
- Designs with screw terminals as well as with spring-cage terminals

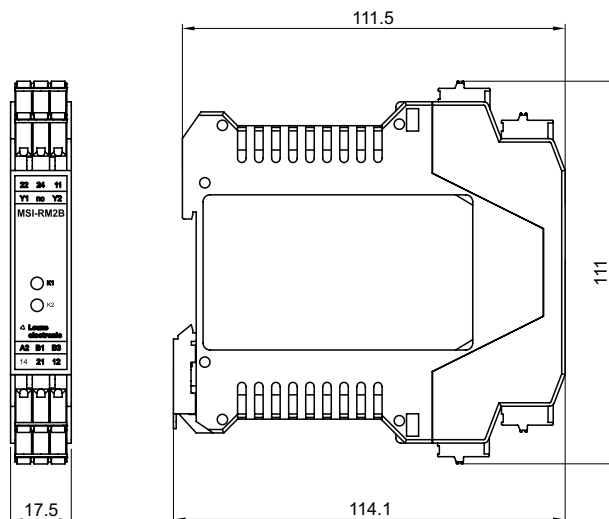


Direct access to the online product selector at [www.leuze.com/en/msi-rm2](http://www.leuze.com/en/msi-rm2)

Part no.	Part description	Connection	Category	Number of safety-related switching outputs (OSSDs)	Switching element
547954	MSI-RM2B-01	Screw terminal	Up to 4 (depending on the category of the upstream protective device)	2x	Relay, make-contact
547955	MSI-RM2B-02	Spring-cage terminal	Up to 4 (depending on the category of the upstream protective device)	2x	Relay, make-contact

**Dimensioned drawings: MSI-RM2**

MSI-RM2B-01 safety relay, screw terminal



MSI-RM2B-02 safety relay, spring-cage terminal

**SMARTER CUSTOMER SERVICE****User knowledge about machine safety topics**

The online adviser, Safety know-how, provides a selection of European directives and important standards relating to machine safety and offers assistance with the selection and application of protective devices.

- 1. Introduction
- 2. Machine safety in the EU
- 3. Machine safety in the USA
- 4. Protective devices
- Videos
- Calculation wizards



Detailed information regarding machine safety: [www.leuze.com/en/safetyknow-how](http://www.leuze.com/en/safetyknow-how)



### /// MSI-2H



The MSI-2H is the link between two-hand command devices and the machine control. The device checks the simultaneous activation of the two, 2-channel buttons and ensures a controlled process start. The module is used everywhere that feeding-in is not automatic, but rather has to be performed manually by people.



#### Benefits:

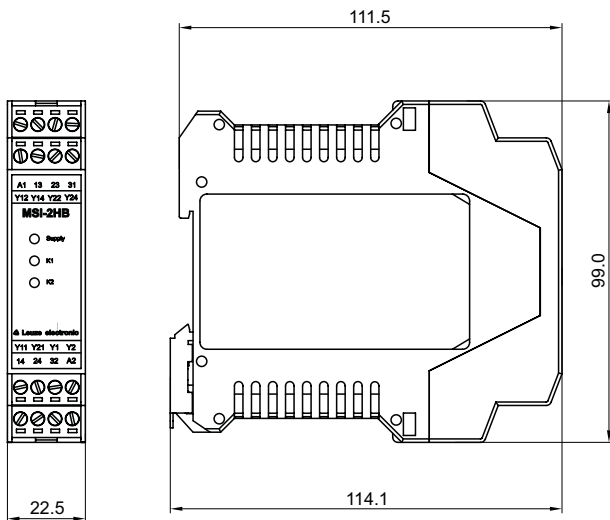
- Two-hand control unit for presses, punching machines and other machines that are manually loaded
- Extended simultaneity monitoring for an increased level of acceptance of the safeguards
- Can also be used as a protective door monitor acc. to EN 60204-1 STOP-0
- Detachable connection terminals for simple device swap-out
- Designs with screw terminals as well as with spring-cage terminals



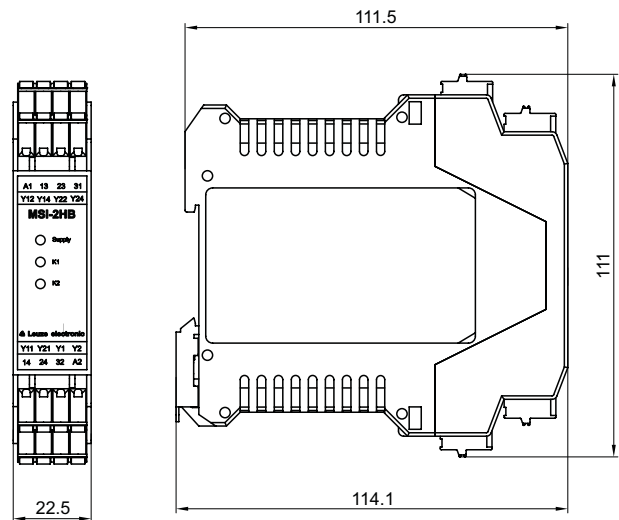
Direct access to the online product selector at [www.leuze.com/en/msi-2h](http://www.leuze.com/en/msi-2h)

Part no.	Part description	Connection	PL	Category	STOP category	Number of safety-related switching outputs (OSSDs)	Switching element
547956	MSI-2HB-01	Screw terminal	e	4	0	2x	Relay, make-contact
547957	MSI-2HB-02	Spring-cage terminal	e	4	0	2x	Relay, make-contact

### Dimensioned drawings: MSI-2H



MSI-2HB-01 safety relay, screw terminal



MSI-2HB-02 safety relay, spring-cage terminal

Switching sensors

Measuring sensors

Products for safety at work

Identification

Data transmission / Control components

Industrial image processing

Accessories

## /// MSI-T



MSI-T is a safety monitoring device for the periodic testing of one-channel testable opto-electronic protective devices of type 2 acc. to EN IEC 61496. Up to six type 2 sensors can be connected to the device in daisy chain.

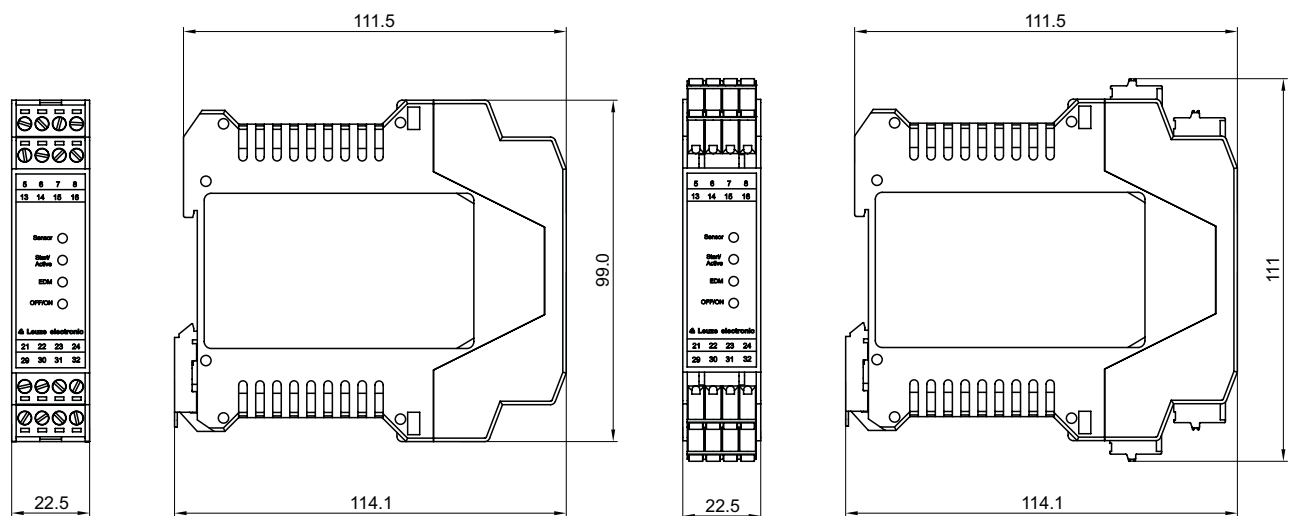
**Benefits:**

- 2 safety relay outputs with internal monitoring
- Filter time 130 ms
- STOP 1 function
- LED indicators
- Low space requirements
- Detachable connection terminals for simple device swap-out
- Designs with screw terminals as well as with spring-cage terminals



Direct access to the online product selector at [www.leuze.com/en/msi-t](http://www.leuze.com/en/msi-t)

Part no.	Part description	Connection	PL	Category	Number of safety-related switching outputs (OSSDs)	Switching element	Number of digital switching outputs	Number of digital switching inputs	Filter time	Time delay
547958	MSI-TR1B-01	Screw terminal	Up to c	2	2x	Relay, make-contact	3x	4x		
547960	MSI-TR2B-01	Screw terminal	Up to c	2	2x	Relay, make-contact	3x	4x	130 ms	
547962	MSI-TSB-01	Screw terminal	Up to c	2	2x	Relay, make-contact	3x	4x		600 ms
547959	MSI-TR1B-02	Spring-cage terminal	Up to c	2	2x	Relay, make-contact	3x	4x		
547961	MSI-TR2B-02	Spring-cage terminal	Up to c	2	2x	Relay, make-contact	3x	4x	130 ms	
547963	MSI-TSB-02	Spring-cage terminal	Up to c	2	2x	Relay, make-contact	3x	4x		600 ms

**Dimensioned drawings: MSI-T**

MSI-T ... B safety relay, screw terminal

MSI-T ... B safety relay, spring-cage terminal

## /// MSI-TRM



MSI-TRM is a safety monitoring device for the evaluation of one-channel testable opto-electronic protective devices of type 4 acc. to EN IEC 61496. Up to six type 4 sensors can be connected to the device.

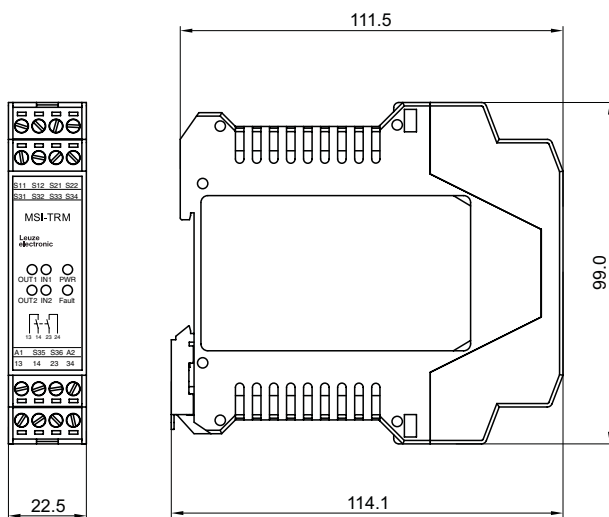
**Benefits:**

- Evaluation of up to 6 type 4 sensors
- E-stop switch connectable
- Low space requirements
- Designs with screw or spring-cage terminals

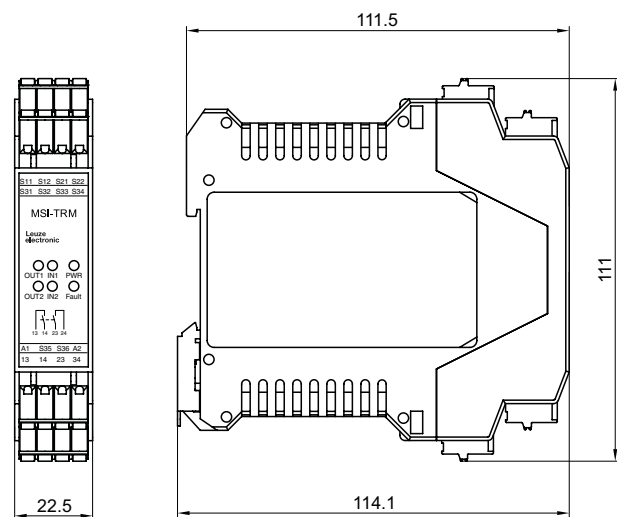


Direct access to the online product selector at [www.leuze.com/en/msi-trm](http://www.leuze.com/en/msi-trm)

Part no.	Part description	Connection	PL	Category	Number of safety-related switching outputs (OSSDs)	Switching element	Number of safety-related switching inputs	Number of digital switching outputs	Number of digital switching inputs
547931	MSI-TRMB-01	Screw terminal	Up to and including e	4	2x	Relay, make-contact	2x	3x	2x
547932	MSI-TRMB-02	Spring-cage terminal	Up to and including e	4	2x	Relay, make-contact	2x	3x	2x

**Dimensioned drawings: MSI-TRM**

MSI-TRMB-01 safety relay, screw terminal



MSI-TRMB-02 safety relay, spring-cage terminal

Switching sensors

Measuring sensors

Products for safety at work

Identification

Data transmission / Control components

Industrial image processing

Accessories

## /// MSI-MC3x



MSI-MC300 safety relays are suitable for integration of MC3x magnetically coded sensors in control circuits up to category 4 and Performance Level PL<sub>e</sub> in accordance with EN ISO 13849-1. These kinds of magnetically coded safety systems are used, for example, to monitor movable guards such as protective doors, sliding grids or flaps.

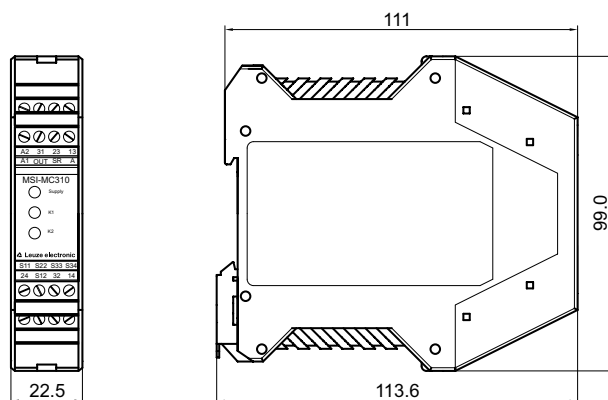
**Benefits:**

- Compact controller with long mechanical life time (10 million switching cycles)
- All magnetically coded sensors (1NC/1NO) from Leuze electronic are connectable
- Automatic and start/restart operation

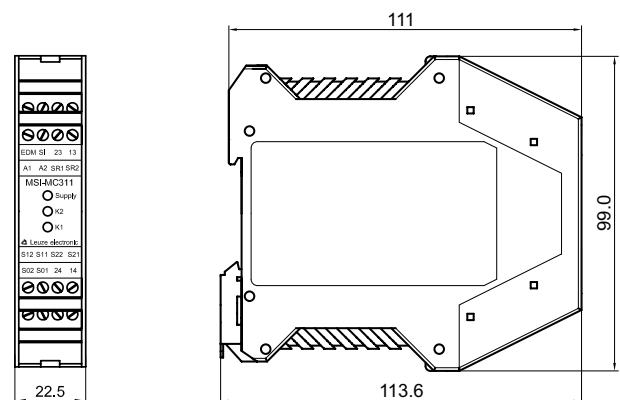


Direct access to the online product selector at [www.leuze.com/en/msi-mc3x](http://www.leuze.com/en/msi-mc3x)

Part no.	Part description	Connection	PL	Category	STOP category	Number of safety-related switching outputs (OSSDs)	Switching element	Number of digital switching outputs	Pickup delay, automatic start	Pickup delay, manual start
549941	MSI-MC310	Screw terminal	Up to and including e	Up to and including 4: 1 sensor connected	0	2x	Relay, make-contact	1x	400 ms	600 ms
549942	MSI-MC311	Screw terminal	Up to and including e	Up to and including 4: 1 sensor connected	0	2x	Relay, make-contact	1x	30 ms	150 ms

**Dimensioned drawings: MSI-MC3x**

MSI-MC310 safety relay, screw terminal



MSI-MC311 safety relay, screw terminal

**SMARTER APPLICATION KNOW-HOW**

Take a look at our product clips: [www.leuze.com/en/product-clips](http://www.leuze.com/en/product-clips)

# //PROGRAMMABLE SAFETY CONTROLLERS

## PROGRAMMED FOR SAFETY

With the MSI 100 and MSI 200 programmable safety controllers, you obtain a system solution for small- to medium-size machines with maximum flexibility. Extension with I/O and communication modules possible. Configuration and start-up is simple and fast with the convenient MSIsafesoft programming software and its function modules.

### /// MSI 100



The relay monitors E-Stop buttons, two-hand controls, safety doors or safety sensors with 2 transistor outputs in machines and systems. With an overall width of just 67.5 mm, the device makes available 20 safe inputs, 4 signal outputs for diagnostics and 4 safe outputs (OSSDs).



#### Benefits:

- Freely configurable safety base module
- Monitoring of all safe functions in machines and systems
- Transfers diagnostic data to the PLC via MSI-FB fieldbus modules (option)
- Free choice of connection system: screw terminal blocks or spring-cage terminal blocks; both can be pulled off and interchanged as desired

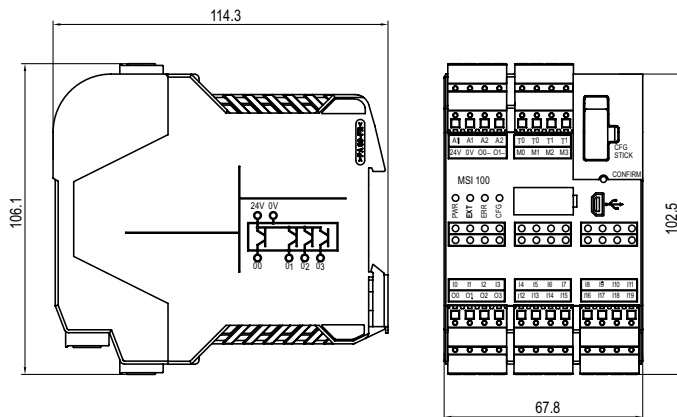


Direct access to the online product selector at [www.leuze.com/en/msi100](http://www.leuze.com/en/msi100)

Part no.	Part description	Connection	Number of safe inputs	Number of safe semiconductor outputs	Number of ground-switching outputs	Number of signal outputs	Number of cycle outputs
547802	MSI101	Screw terminal	20x (up to SIL 3 / IEC 62061)	4x	2x	4x	2x
547812	MSI102	Spring-cage terminal	20x (up to SIL 3 / IEC 62061)	4x	2x	4x	2x

Included in delivery: 1 terminal set, 1 data memory module, 1 TBUS safety connection plug  
Note: Commissioning set must be ordered separately

### Dimensioned drawings: MSI 100



MSI 100 programmable safety controller

Switching sensors

Measuring sensors

Products for safety at work

Identification

Data transmission / Control components

Industrial image processing

Accessories

/// MSI 200



The relay features the same functionality as the MSI 100. In addition, it can be expanded with dockable extension modules to up to 140 safe inputs or 100 inputs and 44 safe outputs – quickly and easily with the TBUS DIN rail connection system.



**Benefits:**

- Up to 10 safe MSI-EM I/O extension modules can be connected, i. e., up to a maximum of 140 inputs or 100 inputs and 44 outputs are feasible
- Convenient and fast extension or modular exchange of the components via the TBUS connection system

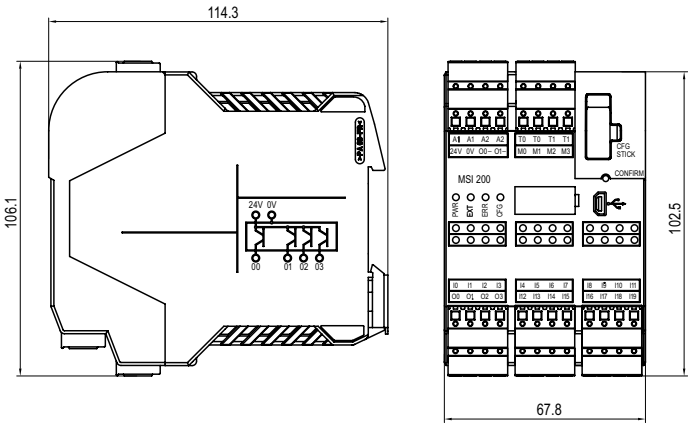


Direct access to the online product selector at [www.leuze.com/en/msi200](http://www.leuze.com/en/msi200)

Part no.	Part description	Connection	Number of possible safe extension modules	Number of safe inputs	Number of safe semiconductor outputs	Number of ground-switching outputs	Number of signal outputs	Number of cycle outputs
547803	MSI201	Screw terminal	10x	20x (up to SIL 3 / IEC 62061)	4x	2x	4x	2x
547813	MSI202	Spring-cage terminal	10x	20x (up to SIL 3 / IEC 62061)	4x	2x	4x	2x

Included in delivery: 1 terminal set, 1 data memory module, 2 TBUS safety connection plugs  
Note: Commissioning set must be ordered separately

Dimensioned drawings: MSI 200



MSI 200 programmable safety controller

## /// MSI-EM



The MSI-EM extension module expands the MSI 200 programmable safety controller with 8 safe inputs and 4 freely configurable channels. These may be either safe inputs or outputs (OSSDs).

**Benefits:**

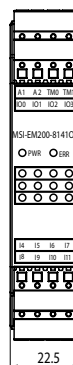
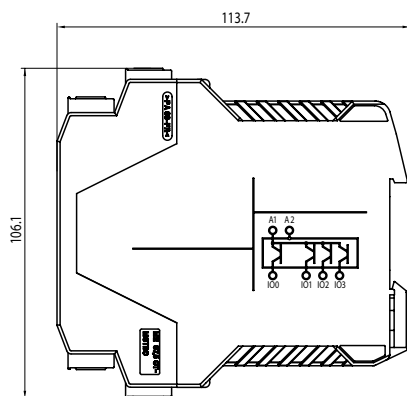
- 4 freely configurable channels-either safety outputs (OSSDs) of safe inputs
- Connect up to 10 MSI-EM and realize up to 140 inputs or 100 inputs and 44 outputs
- Designs with screw terminals as well as with spring-cage terminals – both types of terminal blocks can be freely interchanged
- Simple connection via TBUS DIN rail connector
- Compact housing width 22 mm



Direct access to the online product selector at [www.leuze.com/en/msi-em](http://www.leuze.com/en/msi-em)

Part no.	Part description	Connection	Number of safe inputs	Number of safe semiconductor outputs	Number of signal outputs	Number of clock/signal outputs
547815	MSI-EM202-4R0	Spring-cage terminal			4x	
547814	MSI-EM202-8I4IO	Spring-cage terminal	12x (up to SIL 3 / IEC 62061) of which 4 are configurable as input or output	4x		2x
547805	MSI-EM201-4R0	Screw terminal			4x	
547804	MSI-EM201-8I4IO	Screw terminal	12x (up to SIL 3 / IEC 62061)	4x		2x

Included in delivery: 1 TBUS safety connection plug

**Dimensioned drawings: MSI-EM**

MSI-EM20x-8I4IO extension module

Switching sensors

Measuring sensors

Products for safety at work

Identification

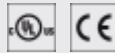
Data transmission / Control components

Industrial image processing

Accessories

**/// MSI-FB**

This is a fieldbus module for the MSI 100 and MSI 200 programmable safety controllers for connecting to PROFIBUS.

**Benefits:**

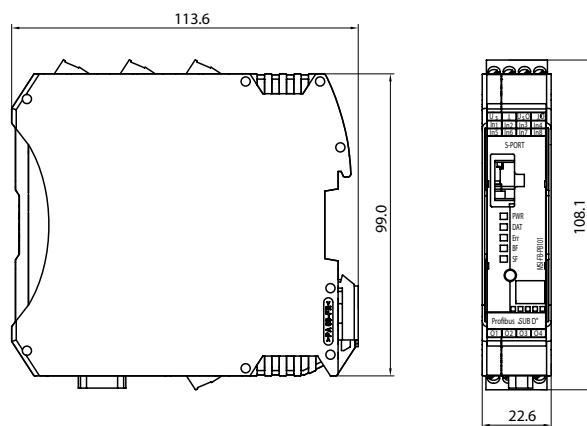
- Transfers diagnostic data (not safety-oriented)
- 4 additional inputs and 4 additional outputs for communication of the PLC with field devices (sensor/actuator systems)
- Certified in accordance with DPV1 specification (EN 50170)
- Simple connection via TBUS DIN rail connector
- Compact housing width 22 mm



Direct access to the online product selector at [www.leuze.com/en/msi-fb](http://www.leuze.com/en/msi-fb)

Part no.	Part description	Connection	Interface
547806	MSI-FB-PB101	Screw terminal	PROFIBUS DP

Included in delivery: 1 TBUS safety connection plug

**Dimensioned drawings: MSI-FB**

MSI-FB-PB101 fieldbus module

**ACCESSORIES: MSI 100, MSI 200****Connection technology****Interconnection cables**

Part no.	Part description	Connection 1	Connection 2	Cable length
547822	AC-MSI-USB	USB 2.0 Standard-A	USB 2.0 Mini-A	3,000 mm

**General**

Part no.	Part description	Description
547820	AC-MSI-CFG1	10x plug-in data memory module
547823	AC-MSI-TC	10x MSI TBUS standard connection plug (for fieldbus gateways)
547821	AC-MSI-TCS	10x MSI TBUS safety connection plug
547825	MSI-SWC1	Configuration software MSIsafesoft, USB cable, quick start guide

# //AS-INTERFACE SAFETY AT WORK

## LEADER FOR A GOOD REASON

Compared to conventional point-to-point wiring, AS-Interface (AS-i) excels with its low installation, wiring and connection costs. The very simple retrofitability of the safety technology with larger AS-i systems can further greatly reduce installation costs.

### Safety monitor

The ASM1 AS-i safety monitor is the core component of the AS-Interface safety at work system. Using configuration software, it monitors the safety-related network devices that are assigned to it, e. g., command devices, multiple light beam safety devices and safety switches.

### /// ASM1



The ASM1 AS-i safety monitor is the core component of the AS-Interface safety at work system. Using configuration software, it monitors the safety-related network devices that are assigned to it, e. g., command devices, multiple light beam safety devices and safety switches.



#### Benefits:

- Housing width 45 mm
- Height/installation depth: 102/120 mm
- Degree of protection IP 20
- Performance Level PL e and category 4 acc. to EN ISO 13849-1, SIL 3 acc. to IEC 61508 as well as SILCL 3 acc. to EN IEC 62061
- Up to 31 safe AS-i slaves can be connected
- 48 system components can be configured (e. g. E-Stop monitoring devices, OR, AND, turn on/off delays)
- RS 232 interface for PC-supported system configuration and system diagnostics as well as configuration data transfer to replacement device
- SERVICE button for automatic system integration (teach-in) of AS-i sensors on sensor exchange
- Immediate switch-off STOP 0 and delayed switch-off STOP 1 of the release circuits can be configured

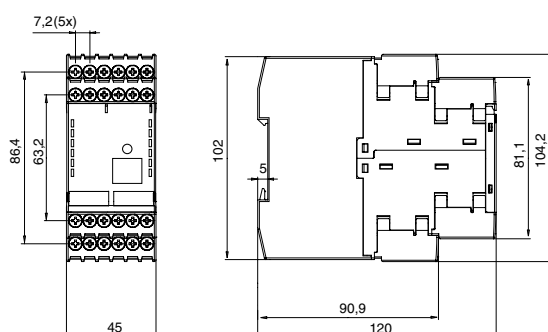


Direct access to the online product selector at [www.leuze.com/en/asm1](http://www.leuze.com/en/asm1)

Part no.	Part description	Number of safety-related switching outputs (OSSDs)	Number of configurable function modules	Number of OR and AND inputs	Muting function
580020	ASM1/1	1x	32x	2x	No
580055	ASM1E-m/1	1x	48x	6x	Yes
580024	ASM1E/1	1x	48x	6x	No
580021	ASM1/2	2x	32x	2x	No
580056	ASM1E-m/2	2x	48x	6x	Yes
580025	ASM1E/2	2x	48x	6x	No

Included in delivery: device front cover for protection and sealing

### Dimensioned drawings: ASM1



AS-i safety monitor ASM1 / ASM1E

Switching sensors

Measuring sensors

Products for safety at work

Identification

Data transmission / Control components

Industrial image processing

Accessories

## /// ASM2



In addition to the functions of the ASM 1, this safety monitor offers higher-level start and E-Stop functions through safe coupling of adjacent AS-i networks. Moreover, safe activation of decentrally distributed AS-i actuators with the same AS-i address is possible.

**Benefits:**

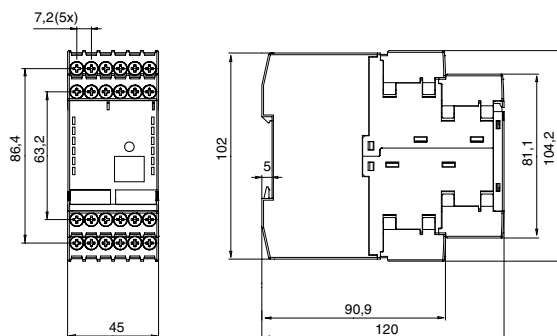
- Housing width 45 mm
- Height/installation depth: 102/120 mm
- Degree of protection IP 20
- Performance Level PL e and category 4 acc. to EN ISO 13849-1, SIL 3 acc. to IEC 61508 as well as SILCL 3 acc. to EN IEC 62061
- Up to 31 safe AS-i slaves can be connected
- 48 system components can be configured (e. g. E-Stop monitoring devices, OR, AND, turn on/off delays)
- RS 232 interface for PC-supported system configuration and system diagnostics as well as configuration data transfer to replacement device
- SERVICE button for automatic system integration (teach-in) of AS-i sensors on sensor exchange
- Immediate switch-off STOP 0 and delayed switch-off STOP 1 of the release circuits can be configured



Direct access to the online product selector at [www.leuze.com/en/asm2](http://www.leuze.com/en/asm2)

Part no.	Part description	Number of safety-related switching outputs (OSSDs)	Number of configurable function modules	Number of OR and AND inputs	Muting function
580057	ASM2E-m/1	1x	48x	6x	Yes
580028	ASM2E/1	1x	48x	6x	No
580058	ASM2E-m/2	2x	48x	6x	Yes
580029	ASM2E/2	2x	48x	6x	No

Included in delivery: device front cover for protection and sealing

**Dimensioned drawings: ASM2**

AS-i safety monitor ASM2E

**ACCESSORIES: ASM1, ASM2****Start-up/diagnosis**

Part no.	Part description	Connection 1	Connection 2	Cable length	Contains
580032	ASM-SWC				Configuration and diagnostic software asimon, connecting and operating instructions (PDF file on CD-ROM), user's guide, software (PDF file on CD-ROM), programming cable, device exchange data line
50104079	CB-ASM-DK1	RJ45	RJ45	300 mm	
50104078	CB-ASM-PK1	Sub-D, 9-pin, axial, female	RJ45	2,500 mm	