

## PROGRAMMABLE SAFETY CONTROLLERS

Programmable Safety Controller selection table



Control of individual safety components with programmable Safety Controllers.

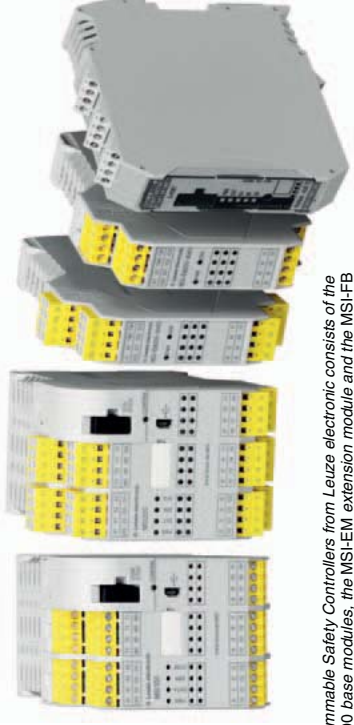


When creating safety circuits with the MSI 100 and MSI 200 Safety Controllers, the MSIsafesoft software facilitates menu-driven and trouble-free configuration.

For small- to medium-size machines, compact safety controls are used increasingly for monitoring the safety circuit. A simple and quickly realized safety system independent of standard controls is preferred by the user. With their simple handling during start-up, flexible configuration options and broad, on-board functionality, the MSI 100 and MSI 200 programmable Safety Controllers offer an optimum system solution for small- to medium-size machines.

Based on the MSIsafesoft programming software, the MSI 100 and MSI 200 Safety Controllers facilitate the efficient integration, communication and coordination of a machine's safety elements through the use of function modules and logic blocks. Depending on machine type, the advantage of the modularity of these safety controls becomes apparent in the simple expandability of the safety system through I/O modules and through the connection of communication modules for integration in the fieldbus level.

Selection table



The family of programmable Safety Controllers from Leuze electronic consists of the MSI 100 and MSI 200 base modules, the MSI-EM extension module and the MSI-FB fieldbus module.

Features, type-dependent		Dimensions (W x H x D)		Inputs/outputs (OSSDs)		Bus interface		Series		Page	
Category in accordance with EN ISO 13849	4	67.5 mm x 114.5 mm x 99 mm	20/4	With MSI-FB	20/4	Screw terminal	MSI 100	506	MSI 100	506	
SIL in accordance with IEC 61508 and SIL CL in accordance with IEC/EN 62061	3	67.5 mm x 114.5 mm x 112 mm	20/4	With MSI-FB	20/4	Screw terminal	MSI 200	514	MSI 200	514	
Performance Level (PL) in accordance with EN ISO 13849-1	e	22 mm x 114.5 mm x 99 mm	8/4 *)		8/4 *)		MSHEM	522	MSHEM	522	
Extension module		22 mm x 114.5 mm x 99 mm		PROFIBUS			MSI-FB	524	MSI-FB	524	
Programmable base module											

\*) configurable channels for input/output selectable

## PROGRAMMABLE SAFETY CONTROLLERS

### MSI 100 programmable Safety Controllers



*Programmable Safety Controllers, such as the stand-alone MSI 100 base module, control safety within automated production processes.*

In automated systems, sensors and actuators must interact with one another functionally and safely. The necessary coordination is performed by the MSI 100 programmable Safety Controller. The controller monitors all safety functions, e.g. of E-STOP buttons, two-hand controls, protective doors, AOPDs and similar, in machines and systems in extremely compact form. With an overall width of just 67.5 mm, the device makes 20 safe inputs and 4 safe outputs available to the user. Additional clock- and ground-switching outputs increase the safety of the monitoring circuits. Message outputs are available for diagnostics. The programming for defining the device function can be quickly and easily performed with the MSI*safesoft* software. The software's certified function blocks, which can be integrated using drag & drop functionality, facilitate menu-driven and trouble-free configuration of every safety circuit application.



*As stand-alone base module, the MSI 100 Safety Controller monitors safety components at 20 safe inputs, e.g. L100 Safety Locking Devices in a blister machine.*

#### Typical areas of application

- Robot cells
- Automatic processing centers
- Packaging machinery
- Tool manufacturing

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**Important technical data, overview**

SIL in accordance with IEC 61508 and SILCL in accordance with IEC/EN 62061	3
Performance Level (PL) in accordance with EN ISO 13849-1	e
Category in accordance with EN ISO 13849	4
Supply voltage	24 V DC
Reaction time	<30 ms
Ambient temperature, operation	-20...+55°C
Protection rating	IP 20
Dimensions (W x H x D)	67.5 mm x 114.5 mm x 99 mm
Connection system	Plug in screw terminals, spring-cage terminals
Number of safe inputs	20 (up to SIL 3 / IEC 62061)
Safety-related switching outputs (OSSDs)	4 (cat. 4 / EN 13849-1 / EN 954)
Interfaces	USB, TBUS DIN rail for bus coupler

**Functions**

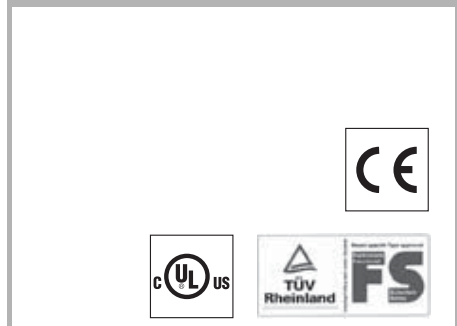
- Freely configurable safety base module
- Monitoring of all safe functions in machines and systems
- Transfers diagnostic data via MSI-FB fieldbus module (option)

**Special features**

- 20 safe inputs, 4 safe switching outputs (OSSDs)
- 4 message outputs, 2 clock switching outputs, 2 ground-switching outputs
- Free configuration with *MSI safesoft* software
- Extensive device library with certified function blocks
- Data stick with configuration storage
- Designs with screw terminals as well as with spring-cage terminals
- Start-up set for quickly getting up to speed



**Features**



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# PROGRAMMABLE SAFETY CONTROLLERS

## Ordering information

### MSI 100

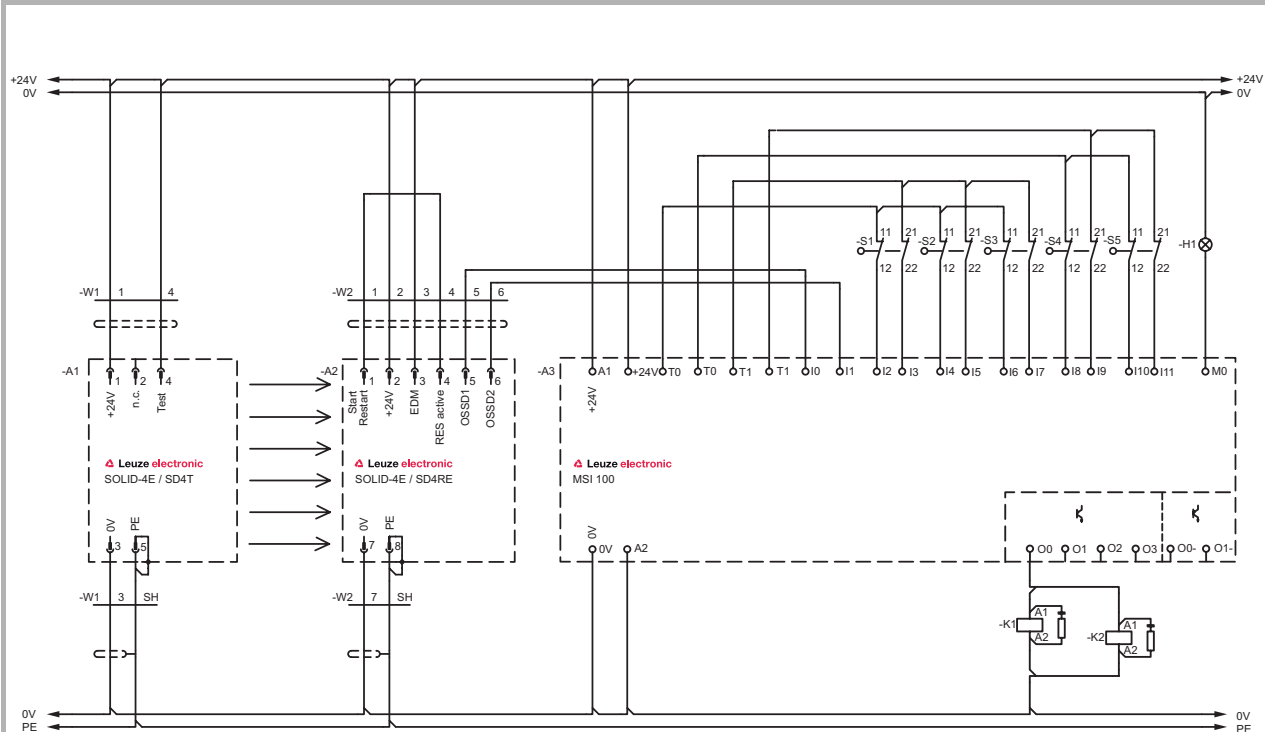
Included in delivery: Set of connecting and operating instructions (PDF file on CD-ROM). Start-up set can be ordered separately.

**Functions:** Freely configurable safety base module, monitoring of all safety-oriented functions in machines and systems

### MSI 100

Art. no.	Article	Description	Safe inputs / safety-related switching outputs (OSSDs)
547802	MSI101	Programmable MSI Safety Controller, screw terminal	20 safe inputs, 4 transistor outputs
547812	MSI102	Programmable MSI Safety Controller, spring-cage terminal	20 safe inputs, 4 transistor outputs

## Electrical connection, MSI 100 connection example



MSI 100 with SOLID-4E Safety Light Curtain and several S200 Safety Switches

**!** Please observe the operating instructions of the components!

**Technical data**

General system data		
SIL in accordance with IEC 61508 and SILCL in accordance with IEC/EN 62061	3	
Performance Level (PL) in accordance with EN ISO 13849-1	e	
Service life ( $T_M$ ) in accordance with EN ISO 13849-1	20 years	
Probability of a failure to danger per hour ( $PFH_d$ )	$1.37 \times 10^{-8}$ 1/h	
Category in accordance with EN ISO 13849	4	
Mean time to dangerous failure ( $MTTF_d$ ) in accordance with EN ISO 13849-1	8324 years	
Supply voltage	24 V DC	
Current consumption	Approx. 200 mA without external load	
Maximum reaction time	<30 ms	
Restart recovery time	<5 ms	
Readiness delay	4 s	
Protection rating	Housing	IP 20
	Connection terminals	IP 20
Ambient temperature, operation	-20...+55°C	
Ambient temperature, storage	-20...+70°C	
Dimensions (W x H x D)	67.5 mm x 114.5 mm x 99 mm	
Conductor cross-section	Screw connection	0.2 ... 2.5 mm <sup>2</sup>
	Spring-cage connection	0.2 ... 1.5 mm <sup>2</sup>
Housing material	Unreinforced polyamide PA	
Mounting	On 35 mm DIN rail	
Connection system	Plug-in screw terminals	
Interfaces	USB, TBUS DIN rail for bus coupler	
Input data logic		
Nominal input voltage $U_N$	24 V DC, -15 % to +10 %	
Typ. current consumption at $U_N$	200 mA	
Inputs		
Number of safe inputs	20 (up to SIL 3 / IEC 62061)	
Nominal voltage $U_N$	24 V DC (to ground A2)	
Typ. current consumption at $U_N$	4 mA	

## PROGRAMMABLE SAFETY CONTROLLERS

### Technical data

Outputs	
Safety-related switching outputs (OSSDs)	4 (cat. 4 / EN 13849-1 / EN 954)
Ground-switching outputs	2
Nominal voltage	24 V DC, -15 % to +10 %
Limiting continuous current for devices at A1 and A2 terminals (wired-through current paths A1/A1 and A2/A2)	6 A
Limiting continuous current via TBUS (when supplying external modules via TBUS)	4 A
Clock outputs	2, limiting continuous current 100 mA at 24 V DC
Signal outputs	4, limiting continuous current 100 mA at 24 V DC

Please note the additional information in the connecting and operating instructions and at [www.leuze.com/controller/](http://www.leuze.com/controller/).

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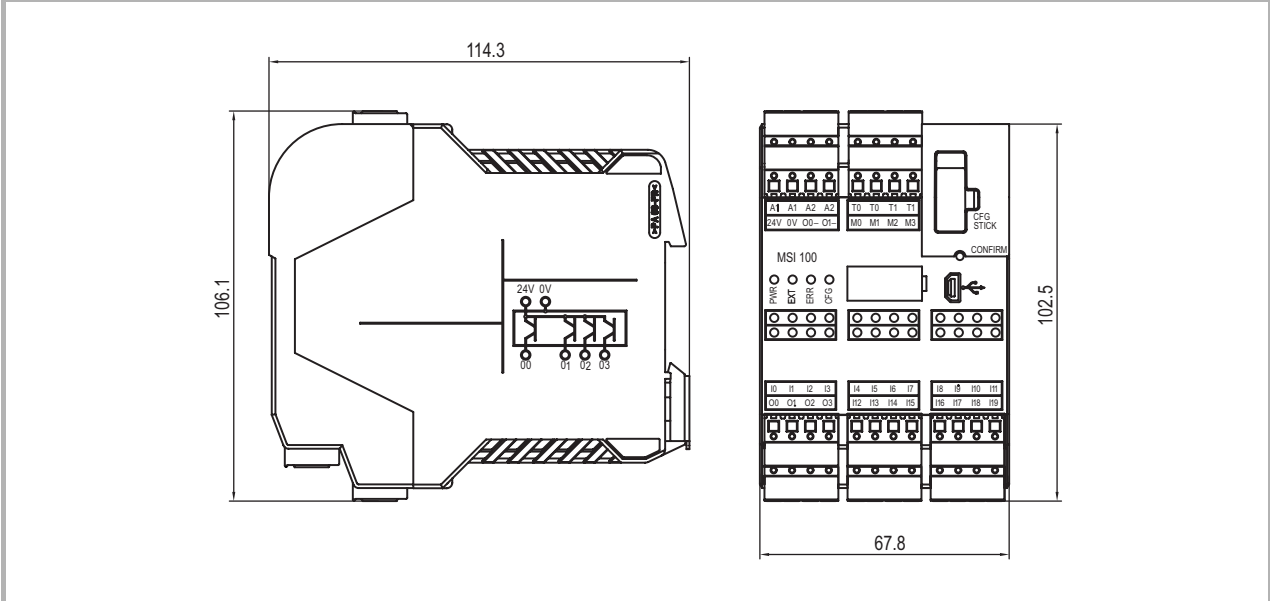
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**Dimensional drawings**

**MSI 100 programmable Safety Controller**



Dimensions in mm

Our 3D CAD models can be found at: [www.leuze.com/3d-cad-models](http://www.leuze.com/3d-cad-models).

## PROGRAMMABLE SAFETY CONTROLLERS

### Accessories ordering information

Art. no.	Article	Description
547820	AC-MSI-CFG1	Plug-in data memory module
547821	AC-MSI-TCS	MSI TBUS safety connection plug
547822	AC-MSI-USB	MSI TBUS standard connection plug (for fieldbus gateways)
547823	AC-MSI-TC	MSI USB cable MSI-PC, 2 m
547825	MSI-SWC1	MSI start-up set (includes: CD with <i>MSIsafesoft</i> , USB cable, Quick Start Guide)
<b>MSI-FB</b>		
547806	MSI-FB-PB101	PROFIBUS module, screw terminal

### Start-up set for MSI 100, MSI 200

The start-up set offers everything for fast realization of the application. It includes:

- *MSIsafesoft* configuration software
- USB cable for connecting the Safety Controller to a PC (not included in delivery)
- Quick Start Guide for a quick introduction to the topic: First Steps.



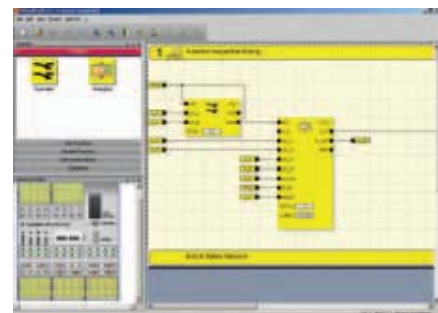
### *MSIsafesoft* configuration software for simple device configuration

The *MSIsafesoft* configuration software helps the user avoid systematic errors. The software supports the user with certified function modules, automatic logic testing, practical wiring inspection and extensive simulation.

With the software, users easily configure the functions of MSI modules through drag & drop functionality.

1. Select and configure safety functions.
2. Connect inputs and outputs of the module to the safety functions.
3. Test the safety functions and save—finished.

The integrated simulation mode and automatic logic testing provide safety even during creation. Configured with the click of a mouse, the device simultaneously reduces wiring and minimizes sources of error. Thanks to the simple configuration, new protective devices can be integrated quickly and safely at any time.



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[www.leuze.com/controller/](http://www.leuze.com/controller/)

## PROGRAMMABLE SAFETY CONTROLLERS

### MSI 200 programmable Safety Controllers



*Programmable Safety Controllers, such as the modularly expandable MSI 200 base module, control a range of safety components within complex, automatic production processes thanks to the numerous safe inputs.*



*In systems with many safety sensors, the modularly expandable MSI 200 Safety Controller has advantages, since the number of safe inputs can be significantly increased with additional MSI-EM extension modules.*

In automated systems, sensors and actuators must interact with one another functionally and safely. The necessary coordination is performed by the MSI 200 programmable Safety Controller. Unlike the MSI 100 controller, the MSI 200 facilitates the coupling of extension modules (safe I/O modules are available as accessories).

#### Typical areas of application

- Robot cells
- Automatic processing centers
- Packaging machinery
- Tool manufacturing

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**Important technical data, overview**

SIL in accordance with IEC 61508 and SILCL in accordance with IEC/EN 62061	3
Performance Level (PL) in accordance with EN ISO 13849-1	e
Category in accordance with EN ISO 13849	4
Supply voltage	24 V DC
Reaction time	<30 ms
Ambient temperature, operation	-20...+55°C
Protection rating	IP 20
Dimensions (W x H x D)	67.5 mm x 114.5 mm x 112 mm
Connection system	Plug in screw terminals, spring-cage terminals
Number of safe inputs	20 (up to SIL 3 / IEC 62061)
Safety-related switching outputs (OSSDs)	4 (cat. 4 / EN 13849-1 / EN 954)
Interfaces	USB, TBUS DIN rails for extension modules and bus couplers

**Functions**

- Freely configurable safety base module
- Monitoring of all safe functions in machines and systems
- Safety-oriented expandability with additional input/output modules
- Transfers diagnostic data via MSI-FB fieldbus module (option)

**Special features**

- **20 safe inputs, 4 safe switching outputs (OSSDs)**
- **Extension modules with additional input/output modules available for MSI 200**
- **4 message outputs, 2 clock switching outputs, 2 ground-switching outputs**
- **Free configuration with MSIsafesoft software**
- **Extensive device library with certified function blocks**
- **Data stick with configuration storage**
- **Designs with screw terminals as well as with spring-cage terminals**
- **Start-up set for quickly getting up to speed**



**Features**



Certification requested:



**Further information**

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[www.leuze.com/controller/](http://www.leuze.com/controller/)

## PROGRAMMABLE SAFETY CONTROLLERS

### Ordering information

#### MSI 200

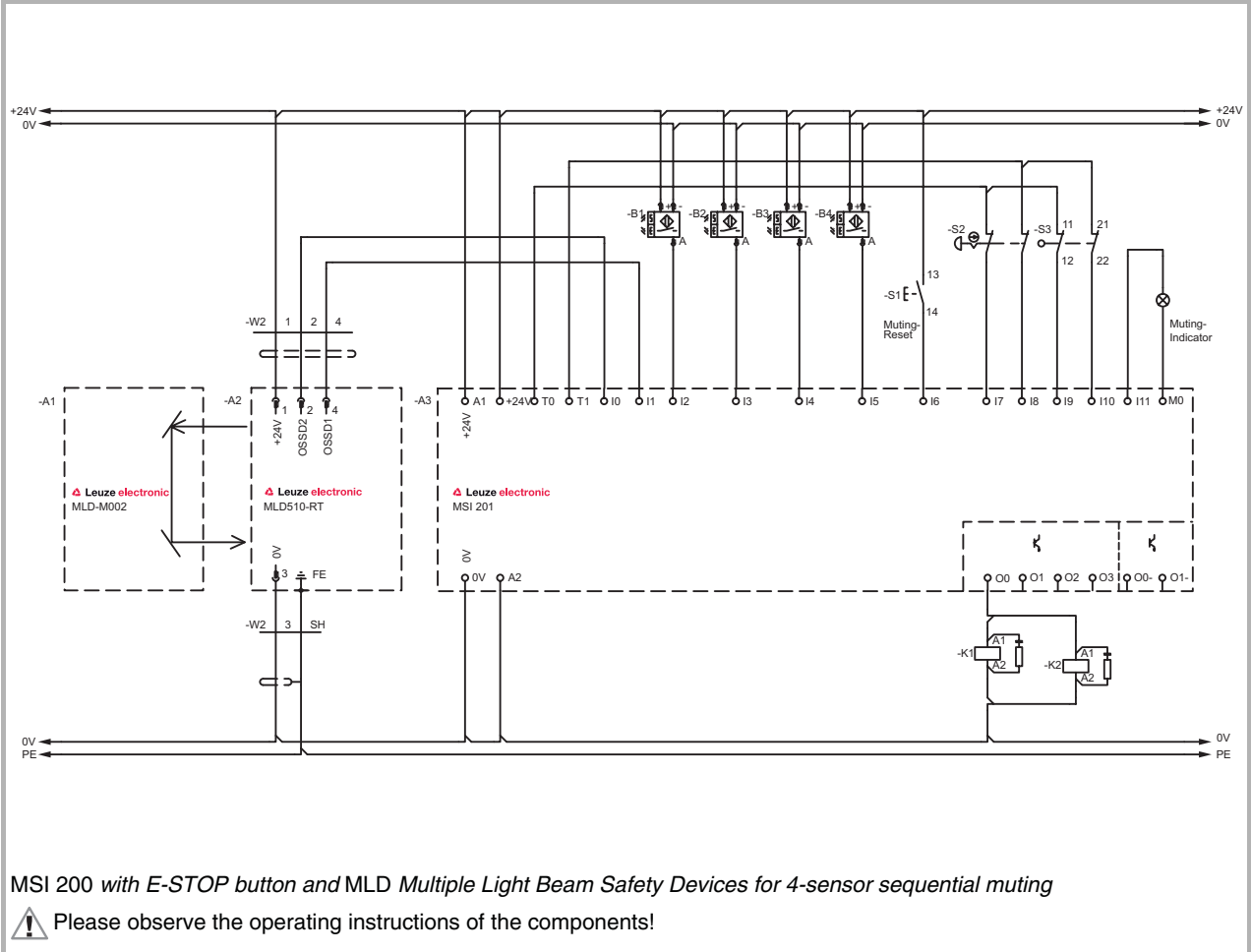
Included in delivery: Connecting and operating instructions (PDF file on CD-ROM). Start-up set can be ordered separately.

**Functions:** Freely configurable safety base module, monitoring of all safety-oriented functions in machines and systems, safety-oriented expandability with additional input/output modules

Art. no.	Article	Description	Safe inputs / safety-related switching outputs (OSSDs)
<b>MSI 200</b>			
547803	MSI201	Programmable MSI Safety Controller, expandable, screw terminal	20 safe inputs, 4 transistor outputs
547813	MSI202	Programmable MSI Safety Controller, expandable, spring-cage terminal	20 safe inputs, 4 transistor outputs

**Electrical connection**

**MSI 200 connection example**



## PROGRAMMABLE SAFETY CONTROLLERS

### Technical data

General system data		
SIL in accordance with IEC 61508 and SILCL in accordance with IEC/EN 62061	3	
Performance Level (PL) in accordance with EN ISO 13849-1	e	
Service life ( $T_M$ ) in accordance with EN ISO 13849-1	20 years	
Probability of a failure to danger per hour ( $PFH_d$ )	$1.37 \times 10^{-8}$ 1/h	
Category in accordance with EN ISO 13849	4	
Mean time to dangerous failure ( $MTTF_d$ ) in accordance with EN ISO 13849-1	8324 years	
Supply voltage	24 V DC	
Current consumption	Approx. 200 mA without external load	
Maximum reaction time	<30 ms	
Restart recovery time	<5 ms	
Readiness delay	4 s	
Protection rating	Housing	IP 20
	Connection terminals	IP 20
Ambient temperature, operation	-20...+55°C	
Ambient temperature, storage	-20...+70°C	
Dimensions (W x H x D)	67.5 mm x 114.5 mm x 112 mm	
Conductor cross-section	Screw connection	0.2 ... 2.5 mm <sup>2</sup>
	Spring-cage connection	0.2 ... 1.5 mm <sup>2</sup>
Housing material	Unreinforced polyamide PA	
Mounting	On 35 mm DIN rail	
Number of possible safe extension modules	10	
Connection system	Pluggable spring-cage terminals	
Interfaces	USB, TBUS DIN rails for extension modules and bus couplers	
Input data logic		
Nominal input voltage $U_N$	24 V DC, -15 % to +10 %	
Typ. current consumption at $U_N$	200 mA	
Inputs		
Number of safe inputs	20 (up to SIL 3 / IEC 62061)	
Nominal voltage $U_N$	24 V DC (to ground A2)	
Typ. current consumption at $U_N$	4 mA	

## Technical data

Outputs	
Safety-related switching outputs (OSSDs)	4 (cat. 4 / EN 13849-1 / EN 954)
Ground-switching outputs	2
Nominal voltage	24 V DC, -15 % to +10 %
Limiting continuous current for devices at A1 and A2 terminals (wired-through current paths A1/A1 and A2/A2)	6 A
Limiting continuous current via TBUS (when supplying external modules via TBUS)	4 A
Clock outputs	2, limiting continuous current 100 mA at 24 V DC
Signal outputs	4, limiting continuous current 100 mA at 24 V DC

Please note the additional information in the connecting and operating instructions and at [www.leuze.com/controller/](http://www.leuze.com/controller/).

Safety Switches

Safety Locking Devices

Safety Command Devices

Safety Relays

Configurable Safety Relays

Programmable Safety Controllers

Accessories

Glossary

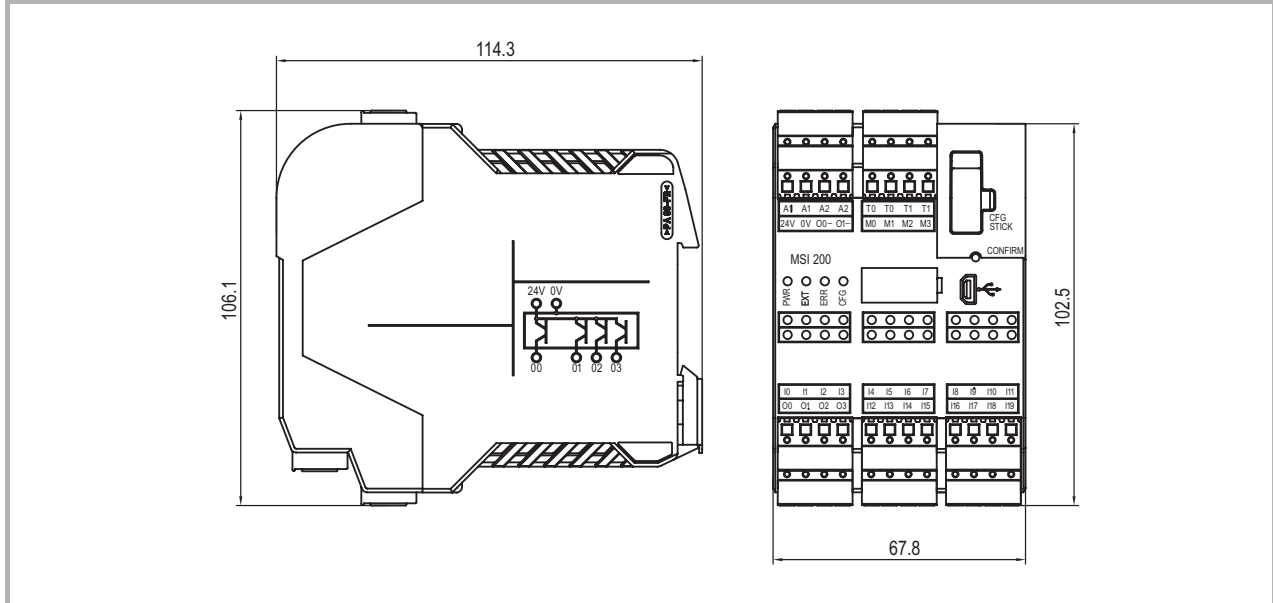
Product Finder

[www.leuze.com/controller/](http://www.leuze.com/controller/)

## PROGRAMMABLE SAFETY CONTROLLERS

### Dimensional drawings

#### MSI 200 programmable Safety Controller



Dimensions in mm

Our 3D CAD models can be found at: [www.leuze.com/3d-cad-models](http://www.leuze.com/3d-cad-models).

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## Accessories ordering information

Art. no.	Article	Description
547820	AC-MSI-CFG1	Plug-in data memory module
547821	AC-MSI-TCS	MSI TBUS safety connection plug
547822	AC-MSI-USB	MSI TBUS standard connection plug (for fieldbus gateways)
547823	AC-MSI-TC	MSI USB cable MSI-PC, 2 m
547825	MSI-SWC1	MSI start-up set (includes: CD with MSIsafesoft, USB cable, Quick Start Guide)
<b>MSI-EM</b>		
547804	MSI-EM201-8I4IO	Digital extension module, screw terminal
547814	MSI-EM202-8I4IO	Digital extension module, spring-cage terminal
<b>MSI-FB</b>		
547806	MSI-FB-PB101	PROFIBUS module, screw terminal

### Start-up set

See start-up set for MSI 100, MSI 200, page 512

### Configuration software

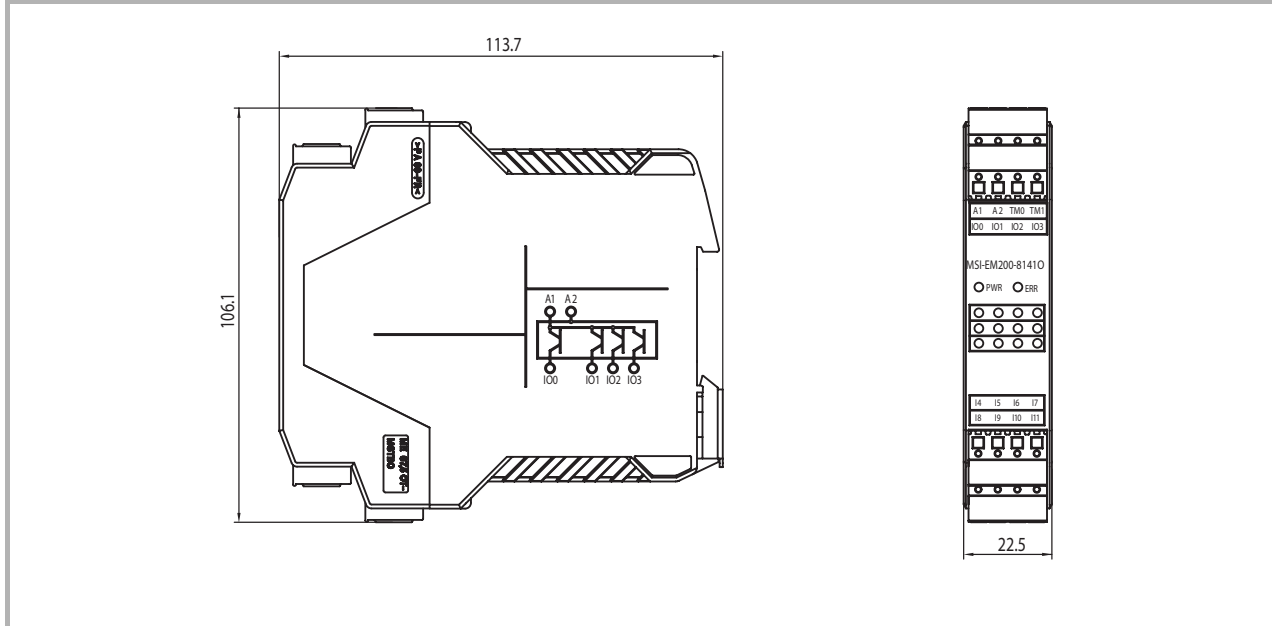
See MSIsafesoft configuration software for simple device configuration, page 512

[www.leuze.com/controller/](http://www.leuze.com/controller/)

## PROGRAMMABLE SAFETY CONTROLLERS

### MSI-EM extension module (accessories)

#### Dimensional drawings



Dimensions in mm

#### Ordering information

##### MSI-EM

Included in delivery: Connecting and operating instructions (PDF-file on CD-ROM).

**Functions:** Extension module for the MSI 200 programmable Safety Controller, extension with 8 safe inputs and 4 safe, freely configurable channels-either safe inputs or outputs (OSSDs)

Art. no.	Article	Description
547804	MSI-EM201-814IO	Digital extension module, screw terminal
547814	MSI-EM202-814IO	Digital extension module, spring-cage terminal

**Important technical data, overview**

Category in accordance with EN ISO 13849	4
Dimensions (W x H x D)	22.5 mm x 114.5 mm x 99 mm
Connection system	Plug in screw terminals, spring-cage terminals
Number of safe inputs	12, 4 of which are configurable as input or output
Safety-related switching outputs (OSSDs)	4 if using the configurable inputs/outputs as outputs
Interfaces	TBUS DIN rails for extension modules and bus coupler

Please note the additional information in the connecting and operating instructions at [www.leuze.com/controller/](http://www.leuze.com/controller/).

**Functions**

Extension module for the MSI 200 programmable Safety Controller  
 Extension with 8 safe inputs and 4 safe, freely configurable channels-either as safe inputs or outputs (OSSDs)

**Special features**

- Simple connection via DIN rail connector
- Designs with screw terminals as well as with spring-cage terminals
- Compact housing width 22 mm
- 4 freely configurable safety outputs (OSSDs)



**Features**



Certification requested:



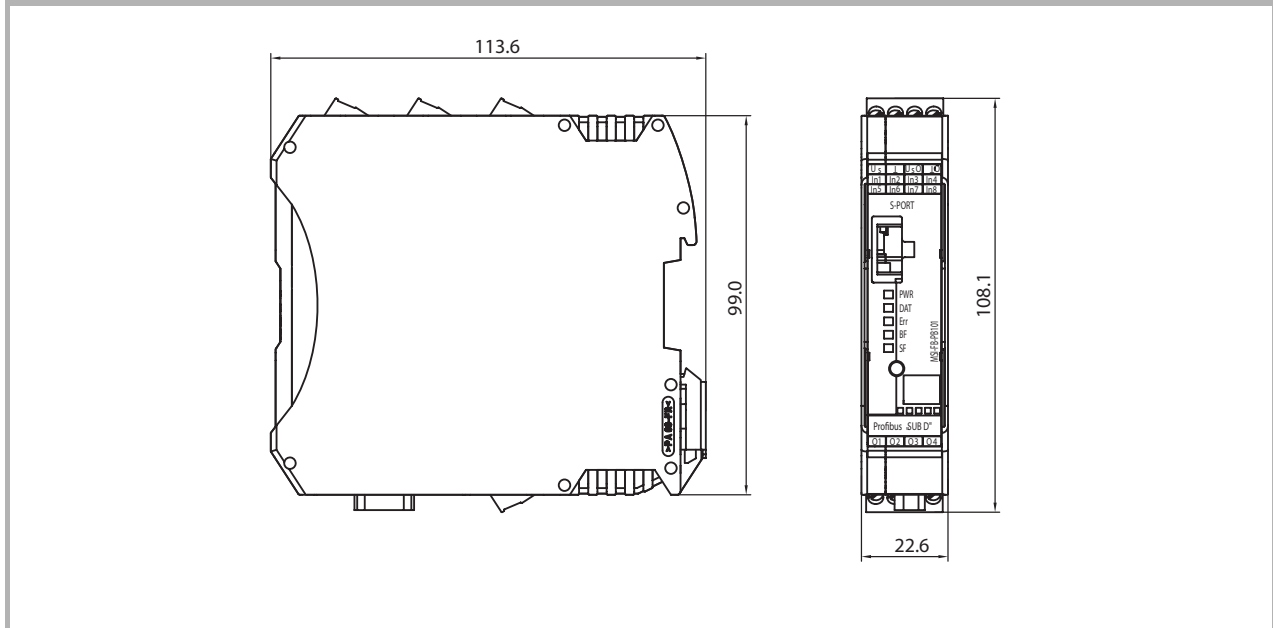
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[www.leuze.com/controller/](http://www.leuze.com/controller/)

## PROGRAMMABLE SAFETY CONTROLLERS

### MSI-FB extension module (accessories)

#### Dimensional drawings



Dimensions in mm

#### Ordering information

##### MSI-FB

Included in delivery: Connecting and operating instructions (PDF-file on CD-ROM).

**Functions:** Fieldbus module for the MSI 100 and MSI 200 programmable Safety Controllers for connecting to PROFIBUS

Art. no.	Article	Description
547806	MSI-FB-PB101	PROFIBUS module, screw terminal

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**Important technical data, overview**

Supply voltage	24 V DC
Protection rating	IP 20
Dimensions (W x H x D)	22.5 mm x 114.5 mm x 99 mm
Connection system	Plug-in screw terminals
Number of inputs	4
Number of switching outputs	4
Interface 1	IFS interface, T-BUS
Interface 2	PROFIBUS-DP, D-SUB-9

Please note the additional information in the connecting and operating instructions at [www.leuze.com/controller/](http://www.leuze.com/controller/).

**Functions**

Fieldbus module for the MSI 100 and MSI 200 programmable Safety Controllers for connecting to PROFIBUS

**Special features**

- Certified in accordance with DPV1 specification (EN 50170)
- Simple connection via DIN rail connector
- Compact housing width 22 mm



**Features**



Certification requested:



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[www.leuze.com/controller/](http://www.leuze.com/controller/)