

MSI-RM2 Safety Relays



Relay module for Optoelectronic Protective Devices acc. to IEC-, EN 60204-1, ISO 13849-1

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1 Product description

The MSI-RM2 relay module is suitable for use as a two-channel sequential circuit for safe Optoelectronic Protective Devices with 2 OSSDs.

1.1 System overview

- NC contact as signal circuit for contactor monitoring (EDM)
- Monitoring of external contactors in the signal circuit
- 2 release circuits (changeovers)
- LED displays, K1 and K2
- Operating voltage 24VDC
- Housing width, 17.5 mm

2 Safety

Before using the relay module, a risk evaluation must be performed according to valid standards and regulations.


For mounting, operating and testing, this document as well as all applicable national and international standards and regulations must be observed, printed out and handed to the affected personnel.

☞ Before working with the relay module, completely read and understand the documents applicable to your task.

In particular, the following national and international legal regulations apply for the start-up, technical inspections and work with relay modules:


- Machinery directive 2006/42/EC
- Use of Work Equipment Directive 89/655/EEC supplemented by Directive 95/63 EC
- Accident-prevention regulations and safety rules
- Other relevant standards
- Standards

2.1 Symbols

	Warning sign – This symbol indicates possible dangers. Please pay especially close attention to these instructions!
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2.2 Proper use

The relay module must only be used after it has been selected in accordance with the respectively applicable instructions and relevant standards, rules and regulations regarding labor protection and occupational safety, and after it has been **installed on the machine, connected, commissioned, and checked by a competent person**.

	WARNUNG
Improper or inappropriate use can result in danger to the life and limbs of the machine operator or in damage to property.	

- The MSI-RM2 does not have a safety category or Performance Level of its own. When used as intended, it can, however, satisfy the prerequisites for achieving the category and Performance Level PL that corresponds to the type of the connected AOPD.
- The AOPD must be equipped with 2 OSSDs in cross-connection- and short-circuit-monitored design (EDM). The contactor control function must check the closing of the signal circuit before the OSSD is switched on and the opening of the same after switch-on has occurred.
- With the exception of the output switching contacts of the downstream contactors, all voltages must be implemented as PELV circuits (max. 24 V DC).
- The connection voltage for B1 and B3 must only be switched on via the OSSDs of the corresponding AOPD.
- The release circuits of the MSI-RM2 are not cross-connection- or short-circuit monitored!
- Ideally, the MSI-RM2 is to be mounted in the same cabinet as the downstream switching elements.
- If the output-side, downstream switching elements are located in another cabinet, separate cables must be laid for each of both changeover contacts or the cable must be laid in a protected, sturdy pipe to prevent damage.
- During installation, the electrical connection that triggers the dangerous movement is to be disconnected and safeguarded against being switched back on.
- Only after proper function of the protective device, including that of the MSI-RM2 relay module, has been determined by a competent person may the connection to the machine be established.
- The MSI-RM2 must be tested regularly by competent personnel.
- The MSI-RM2 must be exchanged after a maximum of 20 years. Repairs or the exchange of parts subject to wear and tear do not extend the service life.

- The control of the machine or system that is to be safeguarded must be electrically influenceable. A switch-off command initiated by an MSI must result in an immediate shutdown of the dangerous movement.
- Depending on external wiring, dangerous voltages may be present at the switching outputs. In addition to the supply voltage, these must be switched off and safeguarded against being switched back on prior to all work on the MS-RM2.
- The MSI-RM2 may only be operated in combination with an Optoelectronic Protective Device (AOPDs in accordance with IEC EN 61496). It is only suitable for shutting down in an uncontrolled manner (IEC 60204-1 stop category 0).
- In the event of changes to the MSI-RM2, all warranty claims against the manufacturer of the safety interface device are rendered void.

HINWEIS

Also observe the safety and warning notices in the documentation of the connected protective devices.

2.3 Foreseeable misuse

Any use other than that defined under the „approved purpose“ or which goes beyond that use is considered improper use!

e.g.

- The MSI-RM2 is not suited for applications in explosive or easily flammable atmospheres.

2.4 Competent personnel

Prerequisites for competent personnel:

- has a suitable technical education
- he knows the instructions for the relay module and the machine
- he has been instructed by the responsible person on the mounting and operation of the machine and of the relay module

2.5 Responsibility for safety

Manufacturer and operating company must ensure that the machine and the implemented relay module function properly and that all affected persons are adequately informed and trained.

The manufacturer of the machine is responsible for:

- safe implementation of the relay module
- imparting all relevant information to the operating company
- adhering to all regulations and directives for the safe starting-up of the machine

The company operating the machine is responsible for:

- instructing the operating personnel
- maintaining the safe operation of the machine
- adhering to all regulations and directives for occupational safety and safety at work
- regular testing by competent personnel

2.6 Disposing

For disposal observe the applicable national regulations regarding electronic components.

3 Function

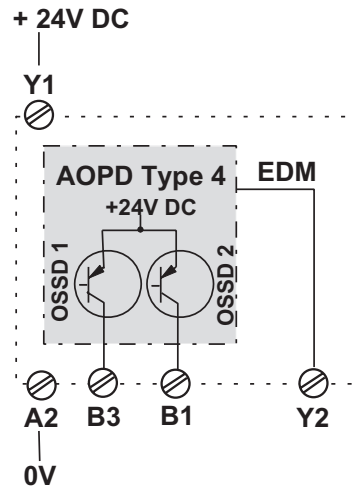
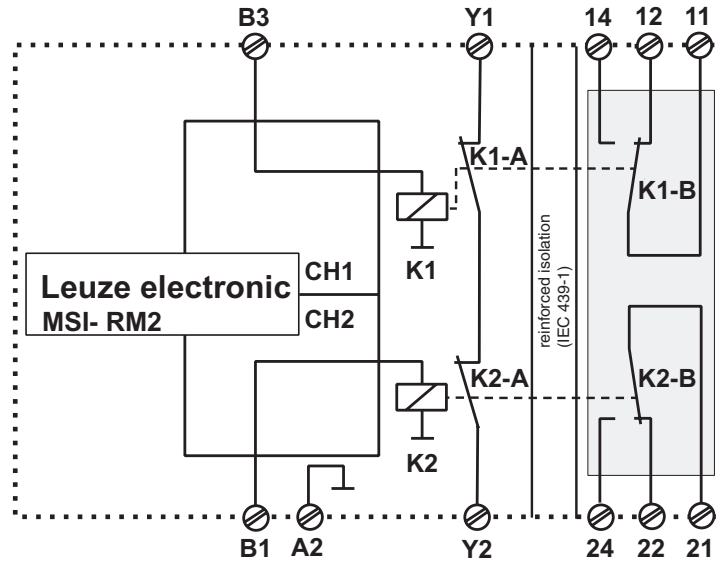


Figure 3.1: Connection example 1

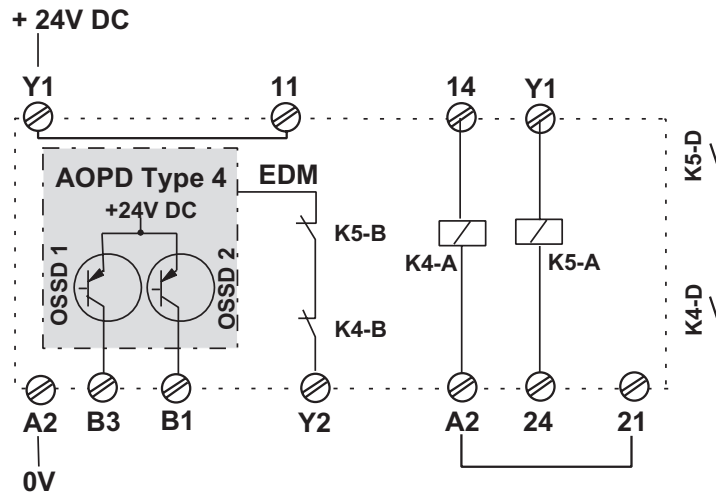


Figure 3.2: Connection example 2

Two-channel downstream safety circuit for Optoelectronic Protective Devices with integrated contactor monitoring function (EDM)

(see figure 3.1)

Relays K1 and K2 of the MSI-RM2 are directly actuated by OSSD1 and OSSD2 of the AOPD. Before the OSSDs of the protective device are switched on, the contactor monitoring function of the protective device checks whether the signal circuit between Y1 and Y2 is closed. If this is the case, the OSSDs are switched on, the release contacts (terminals 11–14 and 21–24) close and signal circuit Y1–Y2 opens.

Two-channel downstream safety circuit for Optoelectronic Protective Devices with integrated contactor monitoring function (EDM) and 24 V downstream contactors

(see figure 3.2)

Relays K1 and K2 of the MSI-RM2 are directly actuated by OSSD1 and OSSD2 of the AOPD. For the function check of the MSI-RM2 and the external contactors, the signal contacts of K1 and K2 as well as of K4 and K5 are connected in the contactor monitoring circuit.

Contactor monitoring (EDM)

Implementation of the contactor monitoring function is dependent on the used AOPD.

4 Start-up

WARNUNG

- ↳ Prior to the initial start-up on a power-driven machine, a competent person must inspect the connection of the connected protective device at the MSI-RM2 as well as the integration of the complete system in the machine control.
- ↳ Before switching on the supply voltage for the first time, it must be ensured that the outputs of the MSI have no effect on the machine. The switching elements that ultimately bring the dangerous machine into motion must be safely switched off or disconnected and protected against being restarted.
- ↳ The same safety measures apply after each function change, after repairs or during maintenance work

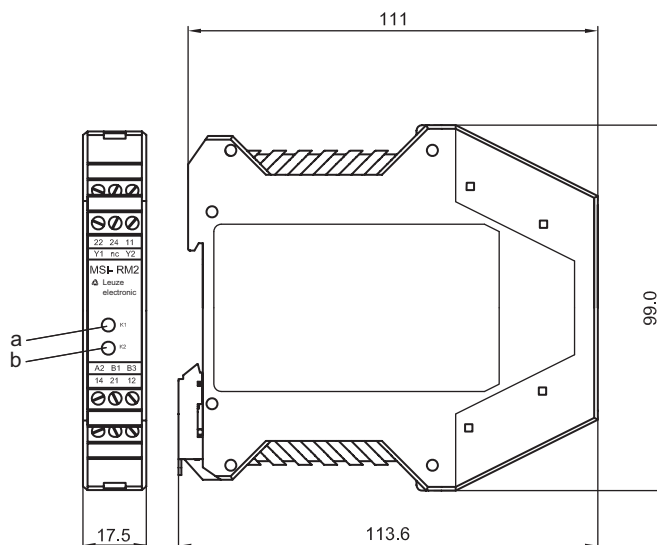
4.1 Installation instructions

WARNUNG

The general safety notices in Chapter 2 are to be observed.

- Protection rating of housing IP 40, terminals IP 20
- Installation in housing with IP 54 (e.g. cabinet) is mandatory!
- Terminal A2 is to be connected to the 0V potential of the AOPD.
- Protection against unintentional touch acc. to DIN VDE 0106 part 100
- To prevent welding of the output contacts, an external fuse of max. 5 A quick-action or 3.15 A delay-action must be interposed.
- Suitable spark extinction is to be provided parallel to the contactor coils.
- Maximum stripped length of the connection cables: 8 mm
- Connection of the monitored OSSD transistor outputs of the AOPD to the two inputs B1 and B3.
- Connection of the signal circuit of the MSI-RM2 and, if applicable, the contactors in series to the activated contactor monitoring of the AOPD.

4.2 Display and control elements



- a = Relay K1 picked up (green LED)
- b = Relay K2 picked up (green LED)

4.3 Tests

The test prior to the first start-up as well as regular tests by competent persons are intended to ensure that the protective devices and any other protective components are correctly selected and provide the required protection when properly used acc. to the local regulations, particularly the machinery and work equipment directive (and, in Germany, the Ordinance on Industrial Safety and Health (Betriebssicherheitsverordnung - BetrSichV) as well).

- ↪ Test the effectiveness of the protective devices on the machine in all operating modes that can be set on the machines.
- ↪ Test the protective device according to the local regulations and standards, e.g. IEC 62046
- ↪ Observe the regulations regarding the instruction of the operating personnel by competent persons before they begin their work. Training is the responsibility of the operating company.

5 Technical data MSI-RM2

Safety category	up to 4, only in combination with corresponding AOPD in accordance with ISO 13849
Connection voltage via OSSDs of the connected AOPD, B1 and B3	24V DC, -/+20%
Power consumption via AOPD	1.5 W
Output contacts	2 changeovers, 1 normal closed contact (N/C) (AgNi10 + 5 mm Au)
Switching capacity of the contacts acc. to EN 60947-5-1	Y1 and Y2, DC-13: normal closed contact (N/C) 24V / 2A 11, 12, 14, 21, 22, 24, DC-13: normal open contact (N/O) 24V / 4A, normal closed contact (N/C) 24V / 2A 11, 12, 14, 21, 22, 24, AC-15: normal open contact (N/O) 230V / 3A, normal closed contact (N/C) 230V / 2A
External contact fuse protection per current path	5 A quick-action or 3.15 A delay-action
Max. continuous current per current path	3 A
Max. switching frequency	10/sec.
Mechanical life time	10 ⁷ switching cycles
Pickup delay	20 ms
Regression delay, reaction time	10 ms
Control voltage/current on B1, B3	24V DC / 32 mA, per path
Admissible input line resistance	50 Ω
B10 _d	DC 13: 10 million switching cycles AC 15: 1.3 million switching cycles
T _M	20 years
Operating temperature	0° to +50° C
Storage temperature	-25° to +70° C
Air clearance and creepage distance	IEC / EN 60 730, IEC / EN 60 335
Dirt level	2
Interference emission	EN 50081-1
Interference rejection	EN 50082-2
Protection rating	Housing IP 40, terminals IP 20
Connection cross-sections	1 x 0.2 to 2.5 mm ² , fine-wired or 1 x 0.25 to 2.5 mm ² , fine-wired with wire-end sleeves 2 x 0.5 to 1.5 mm ² , fine-wired with Twin wire-end sleeves 1 x 0.2 to 2.5 mm ² , single-wired or 2 x 0.25 to 1.0 mm ² , fine-wired with wire-end sleeves 2 x 0.2 to 1.5 mm ² , fine-wired 2 x 0.2 to 1.0 mm ² , single-wired
Dimensions (H x W x D)	99 x 17.5 x 111.5 mm
Weight	120 g
Order No.	549918



the sensor people

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ERKLÄRUNG**

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CONFORMITY**

**DECLARATION CE DE
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Produktbeschreibung:	Description of product:	Description de produit:
Relais-modul MSI-RM2 Seriennummer siehe Typschild	Relay Module MSI-RM2 Part No. see name plates	Module relais MSI-RM2 Art. n° voir plaques signalétiques
Angewandte EG-Richtlinie(n):	Applied EC Directive(s):	Directive(s) CE appliquées:
2006/42/EG 2004/108/EG 2006/95/EG	2006/42/EC 2004/108/EC 2006/95/EC	2006/42/CE 2004/108/CE 2006/95/CE
Angewandte Normen:	Applied standards:	Normes appliquées:
EN ISO 13849-1:2006 (Kat 4 PL); EN 55011/A2:2007; EN 50178:1997; DIN EN 61496-1:2009 EN 60947-1:2007; EN 60947-5-1:2004; EN 60947-5-2:2007; EN 60947-5-3/A1:2005; EN 60204-1:2006		
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