

Installation Instructions

Original Instructions



Allen-Bradley

by ROCKWELL AUTOMATION



Minotaur MSR126R/T, MSR126.1R/T Monitoring Safety Relay

Catalog Numbers 440R, MSR126R, MSR126T, MSR126.1R, MSR126.1T

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated Declaration of Conformity	4

Introduction

This device is intended to be part of the safety-related control system of a machine.

IMPORTANT Before installation, perform a risk assessment to determine whether the specifications of this device are suitable for all foreseeable operational and environmental characteristics of the machine to which it is to be fitted. At regular intervals during the life of the machine, check whether the characteristics foreseen remain valid.



WARNING: Danger of serious injuries. Misuse can result in malfunction.

- Only authorized and trained personnel can start up, assemble, or retrofit the device.
- Installation must be in accordance with the following steps.



WARNING: Danger of serious injuries. Incorrect installation or manipulation can result in serious injuries. Do not defeat, tamper, remove, or bypass this unit.



ATTENTION: If any malfunction or damage is present, do not attempt to repair. Replaced the unit before machine operation is allowed. Do not dismantle the unit.

Rockwell Automation does not accept responsibility for failure of this device if you do not implement the procedures that are given in this publication, or if you use the unit outside the recommended specifications that are listed in this publication.

IMPORTANT The safety inputs of these products are described as normally closed (N.C.), that is, with the guard closed, the actuator in place (where relevant), and the machine able to start. You must prevent exposure to shock and/or vibration in excess of those specifications in IEC 60068 part: 2-6/7. Adherence to the recommended inspection and maintenance instructions forms part of the warranty.

IMPORTANT All information complies with the state of this publication and is subject to change without notice.

Description

The safety relay enables once the supply powers-up and the safety circuits close. The PWR status indicator is on.

A valid reset operation activates safety outputs. The output status indicators CH1 and CH2 are lighted. At the demand of the safety function and if any fault occurs, the safety outputs de-energize within the specified response time.

IMPORTANT Reset if a fault occurs.
If any fault occurs, the internal relay circuit forces a lockout of the safety relay. The status indicator of one output channel remains lighted. To enable the safety relay, remove the fault and cycle all safety inputs.

Specifications

Table 1 - Technical Specifications

Attribute	Value
Functional safety data	According to ISO 13849-1: <ul style="list-style-type: none">• PL_e, Cat. 4• MTTF_d [a]: 375• DC average: 99%
	According to IEC 62061 and IEC 61508: <ul style="list-style-type: none">• SIL CL 3• PFH [1/h]: 203E-9• HFT: 1• DC: 99%• TM (PTI) [a]: 20• dop [d]/hop [h]⁽¹⁾: 365/24• tcycle [h]/[s]⁽²⁾: 8/28,800
Power supply	24V AC/DC, 115V AC, 230V AC 0.85...1.1 x rated voltage 50/60 Hz
Power consumption	4 W
Safety inputs	1 N.C., 2 N.C. or light curtain
Input simultaneity	Infinite
Allowable input resistance, max	90 Ω
Reset	Manual monitored or automatic/manual
Outputs	2 N.O. safety
Output rating	<ul style="list-style-type: none">• UL: B 300• 5 A/250 V AC, 24V AC, 6 A/24 V DC• AC-15: 6 A/250V AC• DC-13: 3 A/24V DC
Fuses output (external)	6 A slow blow or 10 A quick blow
Switched current/voltage, min	10 mA/10V
Contact material	AgSnO ₂ + 0.5μAu
Electrical life (operations)	<ul style="list-style-type: none">• 100,000 (220V AC/4 A/880VA cosφ = 0.35)• 500,000 (220V AC/1.7 A/375VA cosφ = 0.6)• 1,000,000 (30V DC/2 A/60 W)• 2,000,000 (10V DC/0.01 A/0.1 W)
Mechanical life	10,000,000 cycles
Power on delay	300 ms
Response time	15 ms
Recovery time	100 ms
Impulse withstand voltage	2500V

Table 1 - Technical Specifications (Continued)

Attribute	Value
Pollution degree	2
Installation group	Overvoltage category III, VDE 0110-1
Operating temperature	-5...+55 °C (23...131 °F)
Relative Humidity	90%
Enclosure protection	IP40 (NEMA 1)
Terminal protection	IP20
Wiring	Use copper that withstands 60/75 °C (140/167 °F)
Conductor size	0.2...2.5 mm ² (24...12 AWG)
Torque settings	Terminal screws: 0.8 N·m (7 lb·in)
Case material	Polyamide PA 6.6
Mounting	35 mm (1.38 in.) DIN rail in enclosure to a minimum of IP54
Weight	24V AC/DC: 210 g (0.463 lb) 115V AC or 230V AC: 260 g (0.573 lb)
Vibration	10...55 Hz, 0.35 mm (0.01 in.)

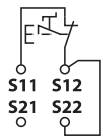
- (1) Operation time (day, hour)
- (2) Cycle time (hour, sec)

Safety Input

One safety device can be monitored per safety relay.

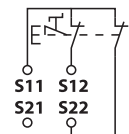
- The MSR126.1 safety relay is available with cross-loop monitoring. Cross-Loop monitoring is enabled for 2-channel safety inputs in 4-wire connection (S11-S12, S21-S22).
- The MSR126 safety relay is available without cross-loop monitoring. Cross-Loop monitoring is disabled for single-channel inputs, dual-channel inputs in 3-wire connection, and 24V DC signals. If external 24V DC signals are present, the negative pole must connect to S21.

1 MSR126



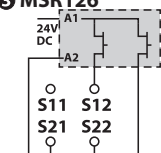
Max PLc: 1-CH ⁽¹⁾; N.C.

2 MSR126



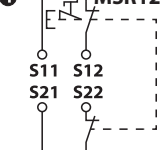
Max PLd: 2-CH ⁽²⁾; 3-wire connection

3 MSR126



Max PLe: 2-CH ⁽²⁾; 24V DC signal

4 MSR126.1



Max PLe: 2-CH ⁽²⁾; 4-wire connection, cross faults require fault reset

- (1) 1-CH = Single-channel
- (2) 2-CH = Dual-channel

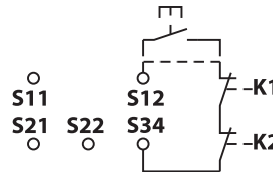
Reset

- Reset modes - The MSR126/.1T safety relay is available with automatic/manual start and the MSR126/.1R safety relay is available with manual monitored reset.

A valid start/reset is only possible if the feedback circuit is closed. Feedback contacts of controlled actuators connect in series with the start/reset circuit (S12-S34).

- T - Automatic/manual start (MSR126)

T In Automatic/Manual Start mode, the reset circuit S12-S34 is not monitored against signal changes (no edge detection). The safety relay is active once the safety inputs and the reset circuit close. If the safety inputs and reset circuit concurrently close during power-up, the safety relay activates immediately.

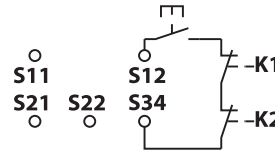


- R - Manual monitored reset

In Manual Monitored Reset mode, a signal change of the reset circuit (S12-S34) is required and monitored. A reset fault occurs if the safety inputs remain open while the reset circuit is closed.

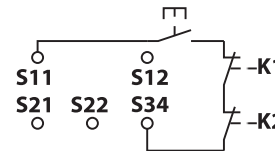
- **R** Positive edge (MSRxxxR):

The safety relay is active once the safety inputs close and then the reset circuit is closed.



- **R** Negative edge (MSRxxxR, 440R-xxxxM):

The safety relay is active once the safety inputs close and then the reset circuit closes and releases again. The circuit resets upon release of the Reset button.

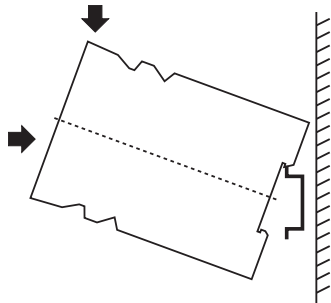


For both methods, the MSR126/.1 safety relay is suitable for the safety requirements according to EN/ISO 13849-1.

Installation

Do not install this product until the installer obtains a copy of the instructions of the manufacturer, in a language that they can understand. This instruction publication is available in multiple languages at rok.auto/literature.

Figure 1 - Mounting



Mount the enclosure to a minimum of IP54.

Wiring Examples

Figure 2 - Example 1

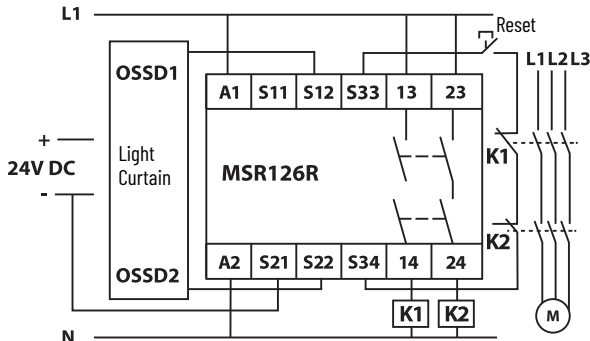


Figure 2 shows 115/230V AC supply, 24V DC light curtain, monitored manual reset, and monitored output.

Figure 3 - Example 2

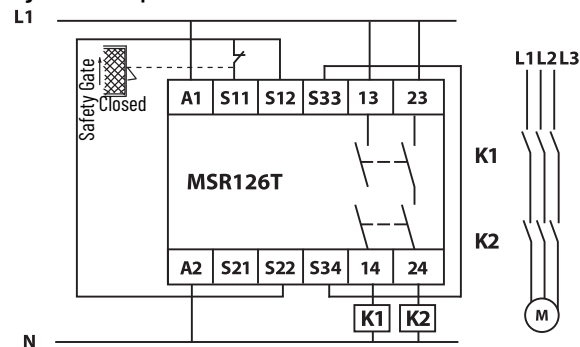


Figure 3 shows single channel safety gate, auto reset, and no monitored output.

Figure 4 - Example 3

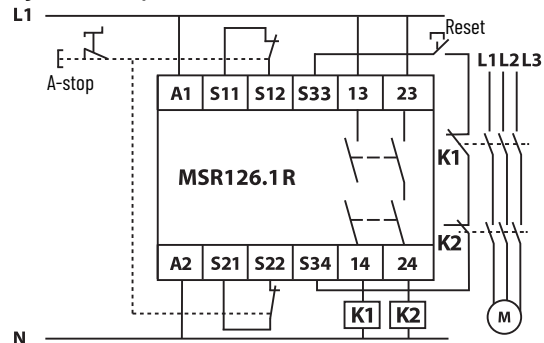


Figure 4 shows dual-channel E-stop, monitored manual reset, and monitored output.

Circuit Diagram

Figure 5 - Diagram

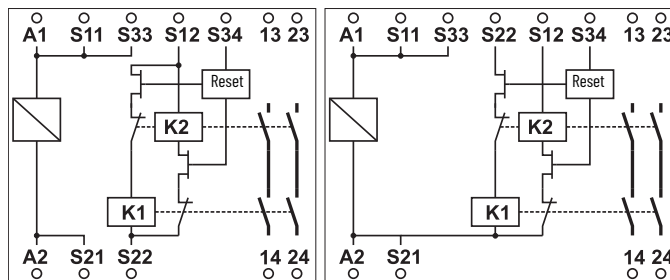
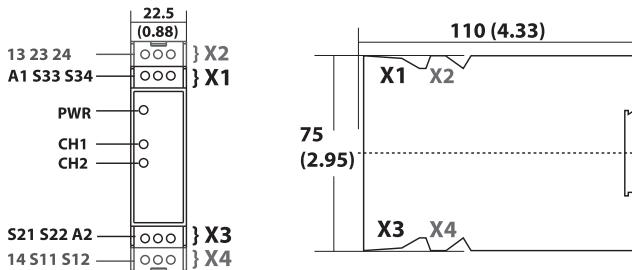


Table 2 - Circuit Diagram Explanation

Abbreviation	Description
A1, A2	Power
S11, S12, S21, S22	Safety input (N.C.)
S33, S34	Monitoring feedback loop incorporating reset button
13, 14	Safety output 1 (N.O.)
23, 24	Safety output 2 (N.O.)
PWR	Status indicator illuminates green when the unit is powered, flashing green if cross-loop faults occur
CH1	Status indicator illuminates green when the safety output channel 1 activates
CH2	Status indicator illuminates green when the safety output channel 2 activates

Approximate Dimensions

Figure 6 - Dimensions [mm (in.)]

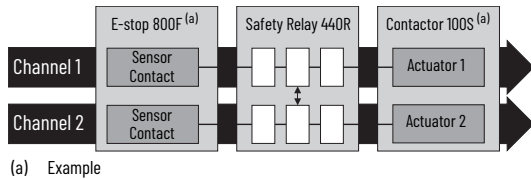


Safety Specifications

You can use the MSRI26.1 safety relay in safety circuits according to DIN EN 60204-1/VDE 0113 part 1. Safety requirements that are specified in [Specifications on page 1](#) are maximum, based on the operation mode and wiring.

Specifications are applicable only if the safety function is demanded at least once within 6 months. All diagnostic tests are conducted at least before next demand. The mission time (TM) for the proof test interval (PTI) is adopted. Components failure rates according to SN29500.

Figure 7 - Safety Circuit



Declaration of Conformity

CE Conformity

Rockwell Automation declares that the products that are shown in this document conform with the Essential Health and Safety Requirements (EHSRs) of the European Machinery Directive (2006/42/EC) and EMC Directive 2014/30/EU.

For a comprehensive CE certificate visit: rok.auto/certifications.

UKCA Conformity

Rockwell Automation declares that the products that are shown in this document are in compliance with the Supply of Machinery (Safety) Regulations (2008 No. 1597) and Electromagnetic Compatibility Regulations (2016 No. 1091).

For a comprehensive UKCA certificate visit: rok.auto/certifications.

Waste Electrical and Electronic Equipment (WEEE)







At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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