

# Installation Instructions

Original Instructions



## Minotaur MSR124RT Monitoring Safety Relay

Bulletin Number 440R

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

Before installation, you must 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 fitted. At regular intervals during the life of the machine, check whether the foreseen characteristics remain valid.



**WARNING:** Danger of serious injury. Misuse can result in malfunction.

- Only authorized and trained personnel can start, 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.

Responsibility is not accepted for a failure of this device if the procedures given in this sheet are not implemented, or if the device is used outside the recommended specifications in this sheet.



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



All information complies with state of this publication. Subject to change without notice.

### Repair

If there is any malfunction or damage, no attempts or repair must be made. The unit must be replaced before machine operation is allowed.

**IMPORTANT** Do not dismantle the unit.

### Declaration of Conformity

Rockwell Automation declares that MSR124RT safety relay is in conformity with Directives 2014/30/EU, 2006/42/EC, and 2011/65/EU as specified in the Declaration of Conformity available from [rok.auto/certifications](http://rok.auto/certifications).

### Functional Description

The safety-related function is the instant interruption of the safety-related contact paths. MSR124 safety relay can be used as a safety guard monitor or as an E-stop relay in single or dual-channel applications. The dual-channel operation

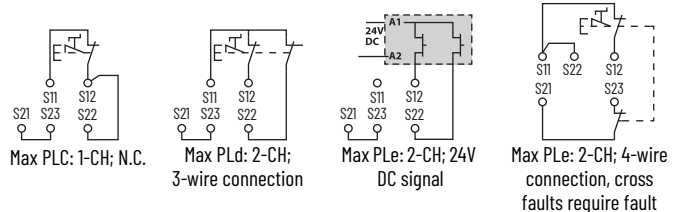
that is shown in [Figure 4 on page 2](#) includes cross-fault monitoring between both E-stop circuits. Shorts between the two E-stop channels of MSR124 safety relay de-energize the outputs. De-energization is achieved by an electronic protection circuit in the safety relay. After elimination of the malfunction, the MSR124 safety relay is ready for operation again. The application with monitored start checks the start circuit (Y1-Y2) and only activates the MSR124 safety relays if there is a leading edge in this circuit. The recovery time in this function must be at least 5 seconds.

If wired for autostart function (X5 and X6 linked), the MSR124 safety relay activates automatically once the E-stop circuits and the feedback loop (X1-X2) closes. In autostart applications, where both E-stop circuits do not close simultaneously (for example, safety gates), channel 2 must activate before channel 1. MSR124 safety relay can be supplied either with the rated AC voltage via terminals A1-A2, or with 24V DC supply to be connected via terminals A3-A4.

### Safety Input

If the inputs S12 and S22 are activated with external 24V DC (light curtain application), the negative pole must be connected to terminal PE. In this case, power supply on A1-A2 is only necessary to drive the Power status indicator.

Figure 1 - Single-channel (1-CH) and Dual-channel (2-CH) Diagrams



### Reset

Reset modes - Unit is available with automatic/manual start and manual monitored reset.

#### **T** Automatic/manual start

Automatic: Unit is active once the E-stop circuit closes.

Manual (not monitored): Unit is active once the E-stop circuit closes and then the reset circuit closes.

#### **R** Manual monitored reset

Positive Edge: Unit is active once the safety input circuit closes and once the reset circuit closes after the waiting period has elapsed (see [Specifications on page 3](#)).

## Wiring Examples

Figure 2 - 24V DC Light Curtain, Monitored Manual Reset, Monitored Output

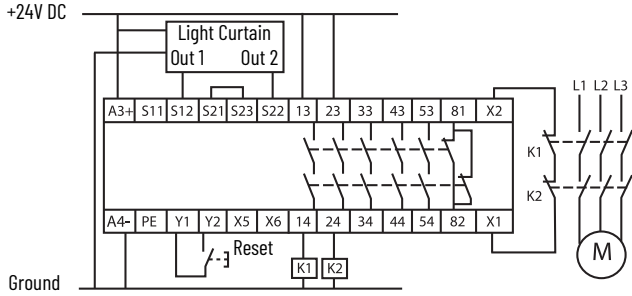


Figure 3 - 115/230V AC Supply, 24V DC Light Curtain, Automatic Reset, Monitored Output

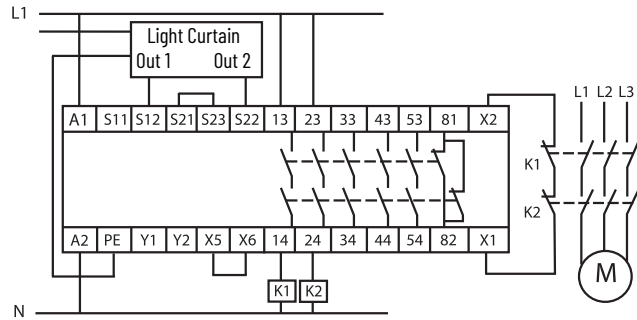


Figure 4 - Dual-channel E-stop, Monitored Manual Reset, Monitored Output

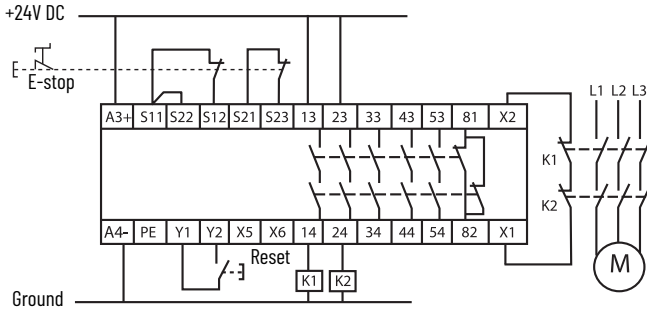
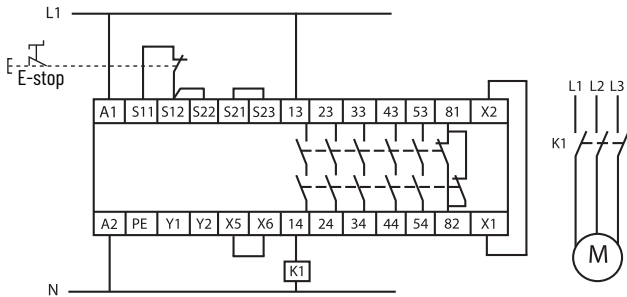
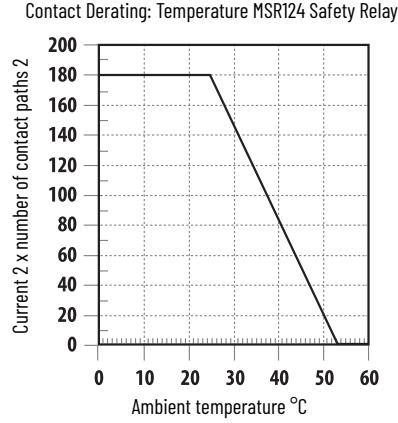


Figure 5 - Single-channel E-stop, Automatic Reset, No Output Monitoring



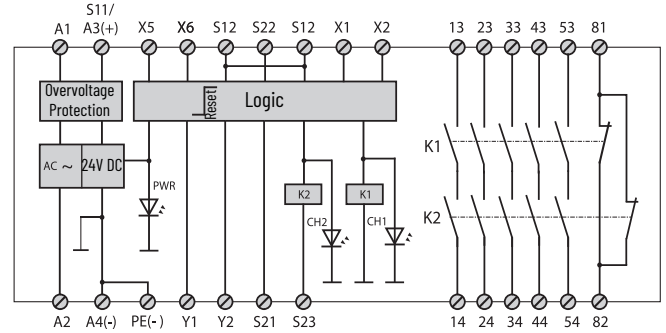
## Limit Curve

Figure 6 - 24V DC Light Curtain, Monitored Manual Reset, Monitored Output



## Circuit Diagrams

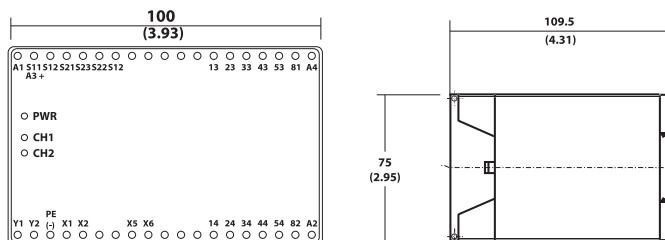
Figure 7 - Circuit Diagram



Circuit Diagram Labels	Description
<b>Connections</b>	
A1, A2, A3, A4	Power
S11, S12, S21, S22, S23	Safety input N.C.
X1, X2	Monitoring feedback loop, incorporating the Reset button
X5, X6	Automatic reset
13, 14, 23, 24, 33, 34, 43, 44, 53, 54	Safety output N.O.
Y1, Y2	Reset
81, 82	Auxiliary output N.C.
<b>Status Indication</b>	
PWR	Steady green - unit is powered Flashing green - cross-loop faults
CH1	Green - safety output channel 1 is activated
CH2	Green - safety output channel 2 is activated

## Approximate Dimensions

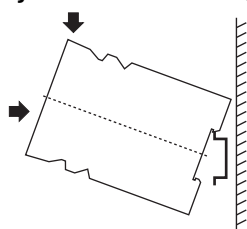
Figure 8 - Dimensions shown in mm (in.)



## Installation

Installation of this product must not take place until you obtain a copy of the manufacturer instructions in a language that you understand. This instruction sheet is available in multiple languages at [rok.auto/literature](http://rok.auto/literature).

Figure 9 - Mount in Enclosure, Min of IP54

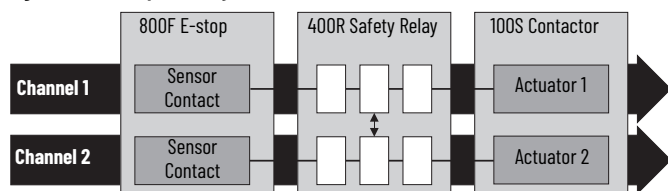


## Safety Specification

The MSR124RT safety relay can be used in safety circuits according to DIN EN 60204-1/VDE 0113 part 1. Based on the operation mode and wiring, the following safety requirements are achievable in maximum.

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 10 - Example Safety Circuits



## Specifications

Attribute	Description
Power supply	24V AC / DC, 115 / 230V AC and 24V DC (A3-A4) 0.8...1.1 x rated voltage 50/60 Hz (0.85...1.1 x 24V DC)
Power consumption	3 W
Safety inputs	1 N.C. or 2 N.C., or light curtain
Input simultaneity	Infinite
Max allowable input resistance	50 Ω
Outputs	5 N.O. safety, 1 N.C. auxiliary
Output rating	UL: B300 6 A / 240V AC AC-15: 4 A / 250V AC DC-13: 2 A / 24V DC
Fuses output (external)	6 A slow blow or 10 A quick blow
Min switched current / voltage	10 mA / 10V
Thermic current / I <sub>th</sub>	According to derating diagram (max 10 A in one current path)
Contact material	AgSnO <sub>2</sub> + 0.5μAu
Electrical life (operations)	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	1 ms
Response time	20 ms
Recovery time	100 ms
Impulse withstand voltage	2500V
Pollution degree	2
Installation group	Overvoltage category III, VDE 0110-1
Operating temperature	-5...+55 °C (23...131 °F)
Humidity	90% RH
Enclosure protection	IP40 (NEMA 1)
Terminal protection	IP20
Wiring	Use copper that withstands 60...75 °C (140...167 °F)
Conductor size	0.2...4 mm <sup>2</sup> (24...12 AWG)
Terminal screw torque	0.5 N•m (4 lb•in)
Case material	Polycarbonate
Mounting	35 mm (1.38 in.) DIN rail in enclosure to a min of IP54
Weight	24V AC/DC: 550 g (1.21 lb) 115/230V AC: 710 g (1.57 lb)
Vibration	10...55 Hz, 0.35 mm (0.01 in.)

Attribute	Description
TM (PTI) [a]	20
dop [d] / hop [h] <sup>(1)</sup>	365 / 24
tcycle [h]/[s] <sup>(2)</sup>	8 / 28,800

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

EN ISO 13849-1		IEC 61508/IEC 62061	
PL	e	SIL	3
MTTFd [a]	416	PFH [1/h]	2.00E-09
Cat.	4	HFT	1
DC avg.	99%	DC	99%

# Rockwell Automation Support

Use these resources to access support information.

<b>Technical Support Center</b>	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	<a href="http://rok.auto/support">rok.auto/support</a>
<b>Knowledgebase</b>	Access Knowledgebase articles.	<a href="http://rok.auto/knowledgebase">rok.auto/knowledgebase</a>
<b>Local Technical Support Phone Numbers</b>	Locate the telephone number for your country.	<a href="http://rok.auto/phonesupport">rok.auto/phonesupport</a>
<b>Literature Library</b>	Find installation instructions, manuals, brochures, and technical data publications.	<a href="http://rok.auto/literature">rok.auto/literature</a>
<b>Product Compatibility and Download Center (PCDC)</b>	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	<a href="http://rok.auto/pcdc">rok.auto/pcdc</a>

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## 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](http://rok.auto/pec).

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