

# Installation Instructions

Original Instructions



**Allen-Bradley**

by ROCKWELL AUTOMATION



## Minotaur MSR124RT Monitoring Safety Relay

Bulletin Number 440R

### 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	3

### Introduction

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.

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.

### Repair

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

**IMPORTANT** Do not dismantle the unit.

### 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 the 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.

### Specifications

Table 1 - Technical Specifications

Attribute	Description
Functional safety data	According to ISO 13849-1: <ul style="list-style-type: none"><li>• PLe, Cat. 4</li><li>• MTTF<sub>d</sub> [a]: 416</li><li>• DC average: 99%</li></ul>
	According to IEC 62061 and IEC 61508: <ul style="list-style-type: none"><li>• SIL CL 3</li><li>• PFH [1/h]: 2.00E-09</li><li>• HFT: 1</li><li>• DC: 99%</li></ul>
	<ul style="list-style-type: none"><li>• TM (PTI) [a]: 20</li><li>• dop [d]/hop [h] <sup>(1)</sup>: 365/24</li><li>• tcycle [h] <sup>(2)</sup>: 8/28,800</li></ul>
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
Allowable input resistance, max	50 Ω
Outputs	5 N.O. safety, 1 N.C. auxiliary
Output rating	<ul style="list-style-type: none"><li>• UL: B300</li><li>• 6 A/240V AC</li><li>• AC-15: 4 A/250V AC</li><li>• DC-13: 2 A/24V DC</li></ul>
Fuses output (external)	6 A slow blow or 10 A quick blow
Switched current/voltage, min	10 mA/10V
Thermic current/I <sub>th</sub>	According to the derating diagram (maximum 10 A in one current path)
Contact material	AgSnO <sub>2</sub> + 0.5μAu

Table 1 - Technical Specifications (Continued)

Attribute	Description
Electrical life (operations)	<ul style="list-style-type: none"> <li>• 100,000 (220V AC/4 A/880VA cosφ = 0.35)</li> <li>• 500,000 (220V AC/1.7 A/375VA cosφ = 0.6)</li> <li>• 1,000,000 (30V DC/2 A/60 W)</li> <li>• 2,000,000 (10V DC/0.01 A/0.1 W)</li> </ul>
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)
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...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 minimum of IP54
Weight	<ul style="list-style-type: none"> <li>• 24V AC/DC: 550 g (1.21 lb)</li> <li>• 115/230V AC: 710 g (1.57 lb)</li> </ul>
Vibration	10...55 Hz, 0.35 mm (0.01 in.)

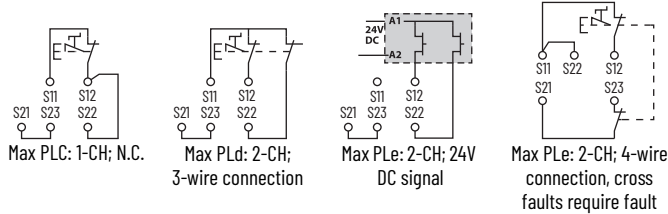
(1) Operation time (day, hour)

(2) Cycle time (hour, sec)

### Safety Input

If the inputs S12 and S22 are activated with the external 24V DC (light curtain application), the negative pole must connect to terminal PE. In this case, the 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 - The unit is available with automatic/manual start and manual monitored reset.

#### Automatic/manual start T

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

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

#### Manual monitored reset R

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

### Wiring Examples

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

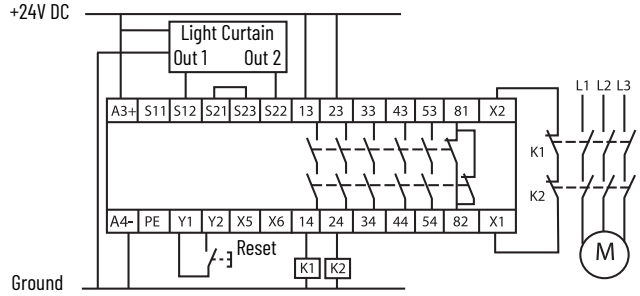


Figure 3 - 115/230V AC Supply, 24V DC Light Curtain, Automatic Reset, Monitored Output

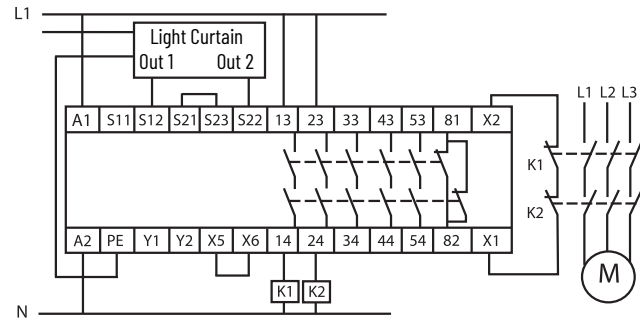


Figure 4 - Dual-channel E-stop, Monitored Manual Reset, Monitored Output

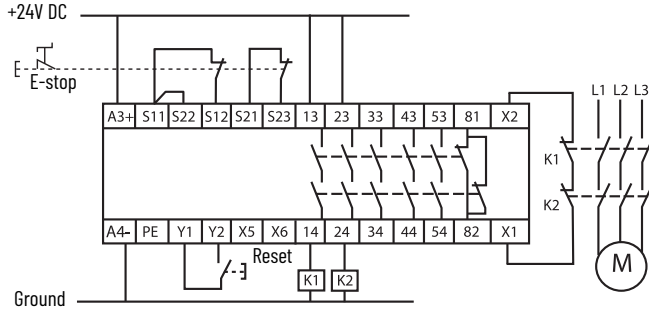
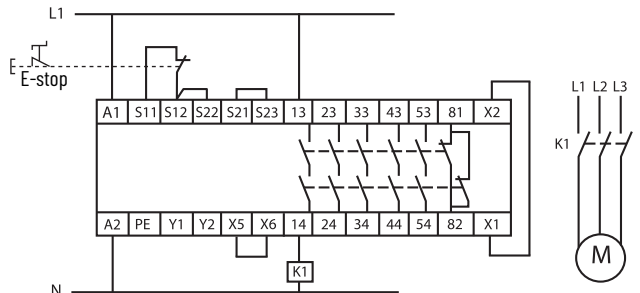
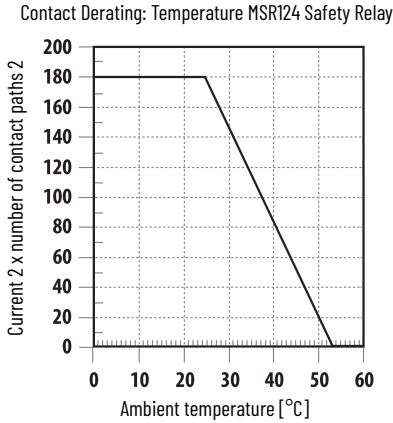


Figure 5 - Single-channel E-stop, Automatic Reset, No Output Monitoring



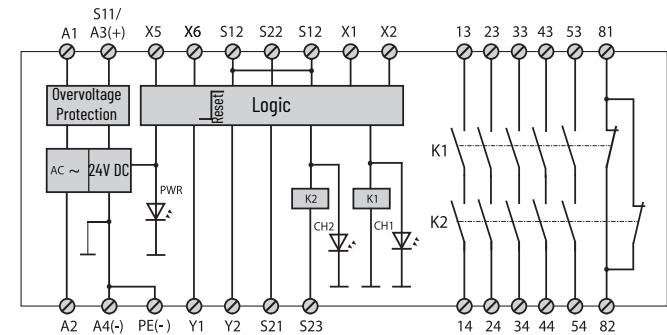
## Limit Curve

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



## Circuit Diagrams

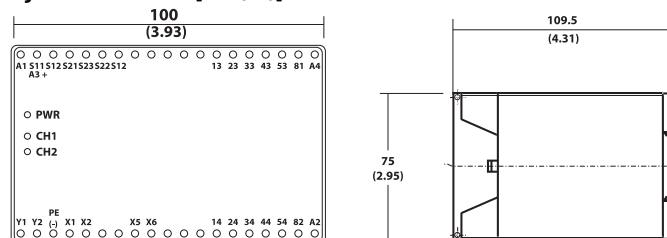
Figure 7 - Circuit Diagram



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.
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

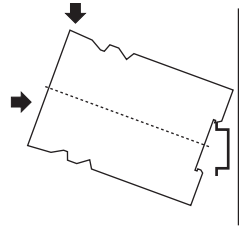
Figure 8 - Dimensions [mm (in.)]



## 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

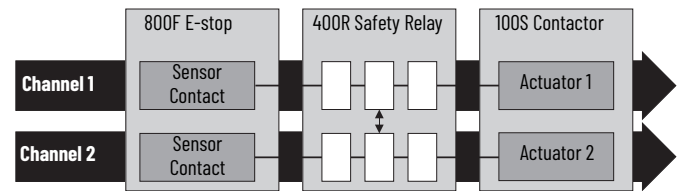


## Safety Specifications

The MSRT24RT 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



## 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), EMC Directive (2014/30/EU), and RoHS Directive (2011/65/EU).

For a comprehensive CE certificate visit: [rok.auto/certifications](http://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), Electromagnetic Compatibility Regulations (2016 No. 1091), and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations (2012 No. 3032).

For a comprehensive UKCA certificate visit: [rok.auto/certifications](http://rok.auto/certifications).

# 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>

## Documentation Feedback

Your comments help us serve your documentation needs better. If you have any suggestions on how to improve our content, complete the form at [rok.auto/docfeedback](http://rok.auto/docfeedback).





## 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).

Rockwell Otomasyon Ticaret A.Ş. Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400 EEE Yönetmeliğine Uygundur

Connect with us.    

**rockwellautomation.com** — expanding **human possibility**<sup>®</sup>

AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

ASIA PACIFIC: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

UNITED KINGDOM: Rockwell Automation Ltd. Pitfield, Kiln Farm Milton Keynes, MK11 3DR, United Kingdom, Tel: (44)(1908) 838-800, Fax: (44)(1908) 261-917

Allen-Bradley, expanding human possibility, Guardmaster, Minotaur, and Rockwell Automation are trademarks of Rockwell Automation, Inc. Trademarks not belonging to Rockwell Automation are property of their respective companies.

Publication 440R-IN082B-EN-P - July 2022 | Supersedes Publication 440R-IN082A-EN-P - January 2022  
Copyright © 2022 Rockwell Automation, Inc. All rights reserved. Printed in the U.S.A.

MM-95302163  
10000176973 Ver 02