

Installation Instructions

Original Instructions



Minotaur MSR5T Monitoring Safety Relay

Catalog Number 440R-B23020

Topic	Page
Summary of Changes	1
Safety Notes	1
Repair	1
Functional Description	1
Specifications	2
Application Examples	2
Installation	2
Wiring Examples	3
Circuit Diagram	3
Approximate Dimensions	3
Safety Specifications	4
Declaration of Conformity	4

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

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

Safety Notes

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.



ATTENTION: 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 steps that are described in [Safety Specifications on page 4](#).



ATTENTION: 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

Do not attempt repair if there is any malfunction or damage. Replace the unit before machine operation is allowed.



ATTENTION: Do not dismantle the unit.

Functional Description

The device can connect to safety gate switches or E-stop buttons and requires a supply voltage that is applied via the safety device to operate this relay unit. There are three N.O. safety outputs plus one N.C. auxiliary for control indication.

If input switch is closed and supply is on A1-A2, the MSR5T safety relay is ready for operation and the PWR status indicator is on. The MSR5T safety relay can now activate via the reset (feed back loop) circuit X1-X2. The safety contacts 13-14 and 23-24 and 33-34 close and enable operation, signaled by the second status indicator.

One N.C. contact respectively of the connected contactors or expanders must be wired in series into the feedback circuit X1-X2 and is used to monitor contactor function. This arrangement maintains that the MSR5T safety relay start is only possible if the contactors are at rest and their N.C. contacts are closed. If X1-X2 is closed at the time when voltage supplies at A1-A2, the unit performs an automatic reset.

Specifications

Attribute	Value
Functional safety data	According to ISO 13849-1: <ul style="list-style-type: none"> • PLe, Cat. 4 • $MTTF_d$ [a]: 456 • DC average: 98%
	According to IEC 62061 and IEC 61508: <ul style="list-style-type: none"> • SIL CL 3 • PFH [1/h]: 2.31E-10 • HFT: 1 • DC: 98%
	<ul style="list-style-type: none"> • TM (PTI) [a]: 20 • dop [d]/hop [h]⁽¹⁾: 365/24 • $tcycle$ [h]/[s]⁽²⁾: 8/28,800
Power supply	24V AC/DC 0.85...1.1 x rated voltage 50/60 Hz
Power supply fuse	2 A, 600V AC, fast acting
Power consumption	2 W
Safety inputs	1 N.C.
Input simultaneity	Infinite
Allowable input resistance, max	25 Ω
Reset	Manual monitored or automatic/manual
Outputs	3 N.O. safety, 1 N.C. auxiliary
Output rating	<ul style="list-style-type: none"> • UL: B 300 • 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 $\cos\phi = 0.35$) • 500,000 (220V AC/1.7 A / 375VA $\cos\phi = 0.6$) • 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	110 s
Response time	30 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 rating	IP40 (NEMA 1)
Terminal protection rating	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 an enclosure with a minimum rating of IP54
Weight	180 g (0.4 lb)
Vibration	10...55 Hz, 0.35 mm (0.1 in.)

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

Application Examples

Diagram (1)	Description
	Emergency stop with automatic resetting.
	Guard door interlock with automatic resetting.
	MSR5T as an emergency stop control relay and restart interlock.
	Emergency stop connected direct to the supply. With resetting facility.
	Controlled monitoring of external contactor, relay, or valve.
	Monitoring to confirm that the On button cannot stick in the pressed condition.

(1) Input connections only shown.

Installation

Mount in enclosure with a minimum rating of IP54.

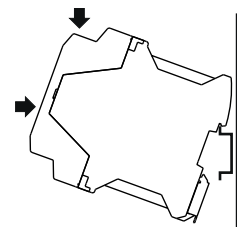
You must install an external fuse for the MSR5T (catalog number 440R-B23020) on the input power, see [Wiring Examples on page 3](#).

- Any R/C fuse (JDYX2/8), rating 2 A, 600V AC, fast acting, interrupting rating 100KA, dimensions 10.3 x 38.1 mm (0.41 x 1.5 in.).

Suggested Fuse: Bussman 4XC38, KTX-2, 600V AC fast-acting fuse

- Any fuse holder R/C (IZLT2/8), for fuse type (JDYX2/8), rating 2 A, 600V AC, fast acting, dimensions 10.3 x 38 mm (0.41 x 1.5 in.).

Suggested Fuse Holder: Cat. No. 1492-FB1M30, single-pole fuse holder



Wiring Examples

Figure 1 - Single-channel Gate Interlock, Automatic Reset, Single-channel Output, Not Monitored

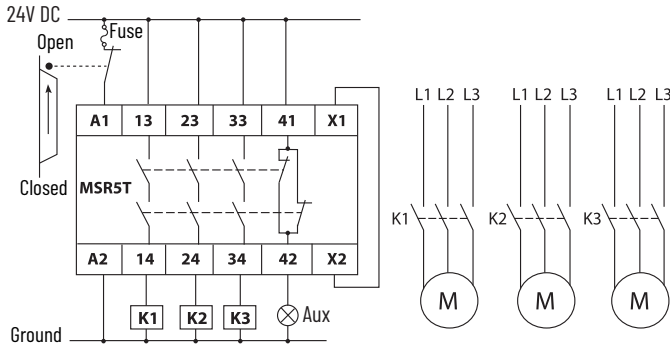


Figure 2 - Dual-channel E-stop, Automatic Reset, Dual-channel Monitored Output

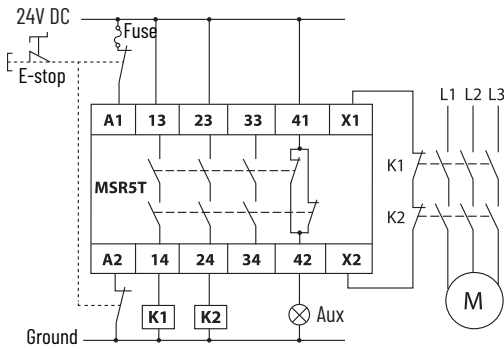


Figure 3 - Single-channel Gate Interlock, Automatic Reset, Monitored Output Expansion with MSR132

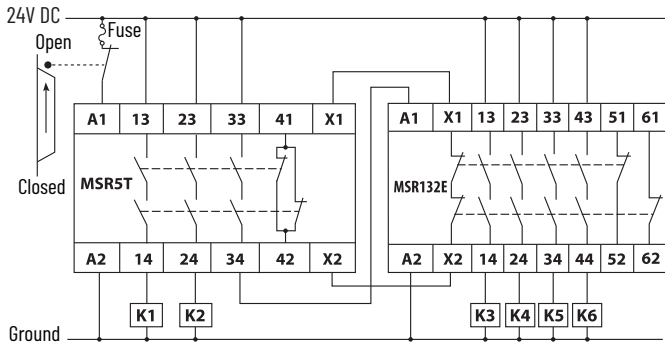
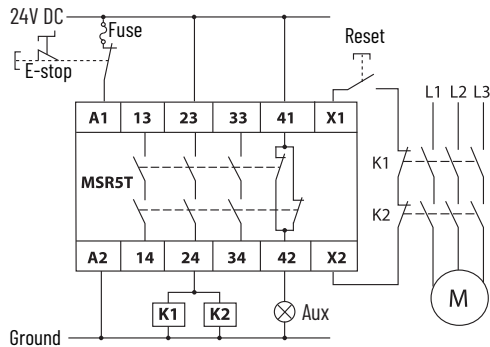
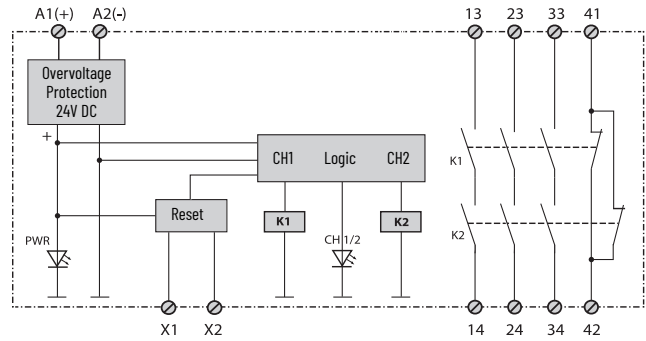


Figure 4 - Single-channel E-stop, Manual Reset, Dual-channel Monitored Output



Circuit Diagram



Connections	Description
A1, A2	Power
13, 23, 33, 14, 24, 34	Safety output (N.O.)
X1, X2	Monitoring feedback loop incorporating Reset button
41, 42	Auxiliary output (N.C.)

Approximate Dimensions

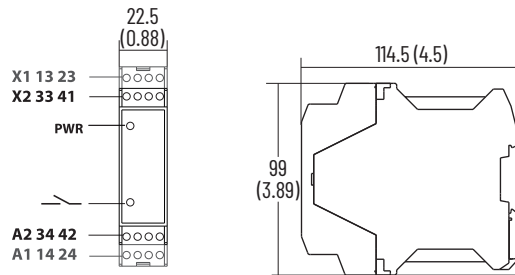


Table 1 - Status Indicators

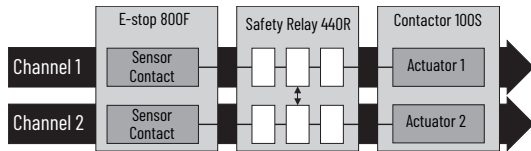
Status Indicator	Description
PWR	<ul style="list-style-type: none"> Green: Unit is powered Flashing green: Cross-loop faults detected
	Illuminates when K1 and K2 are closed

Safety Specifications

You can use the MSR5T safety relay in safety circuits according to DIN EN 60204-1/VDE 0113 part 1. Safety requirements that are specified in [Specifications on page 2](#) 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 5 - 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) 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).

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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.

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