

Installation Instructions

Original Instructions



Allen-Bradley
by ROCKWELL AUTOMATION



Minotaur MSR5T Monitoring Safety Relay

Bulletin Number 440R

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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 drawings in Wiring Examples section.	2
Updated Installation section.	3
Updated Technical Specifications table.	3

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

Safety Notes

Before installation, a risk assessment should be performed 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 [Installation on page 3](#).



ATTENTION: Danger of serious injuries! Incorrect installation or manipulation can result in serious injuries.

- Do not defeat, tamper, remove, or bypass this unit.

Responsibility cannot be accepted for a failure of this device if the procedures given in this publication are not implemented or if it is used outside the recommended specifications in this publication.

IMPORTANT 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 to be started.
Exposure to shock and/or vibration in excess of the values stated in IEC 60068 part: 2-6/7 should be prevented. Adherence to the recommended inspection and maintenance instructions forms part of the warranty.

IMPORTANT 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 should be made. The unit should be replaced before machine operation is allowed.



ATTENTION: Do not dismantle the unit.

Declaration of Conformity

Rockwell Automation hereby declares that MSR5T is in conformity with Directives 2004/108/EC, 2006/42/EC as specified in the Declaration of Conformity available from rok.auto/certifications.

Functional Description

The device can be connected 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 is ready for operation and the PWR status indicator is on. MSR5T can now be activated via the reset (feed back loop) circuit X1-X2. The safety contacts 13-14 and 23-24 and 33-34 close and enable operation, signalized by the second status indicator.

One N.C. contact respectively of the connected contactors or expanders has to be wired in series into the feedback circuit X1-X2 and is used for monitoring contactor function so that MSR5T start is feasible only if the contactors are at rest and their N.C. contacts are closed. If X1-X2 is closed at the time when voltage is supplied at A1-A2, the unit performs an automatic reset.

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.

Wiring Examples

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

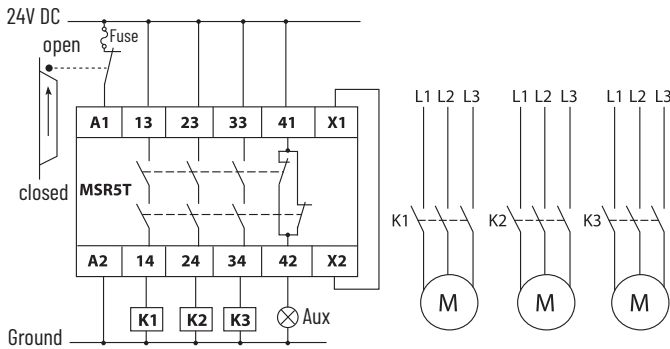


Figure 2 - Dual-channel E-stop, Automatic Reset, Dual-channel Monitored Output

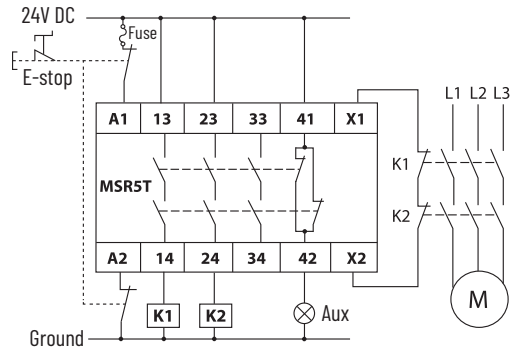


Figure 3 - Single-channel Gate Interlock, Automatic Reset, Monitored Output Expansion with MSR132

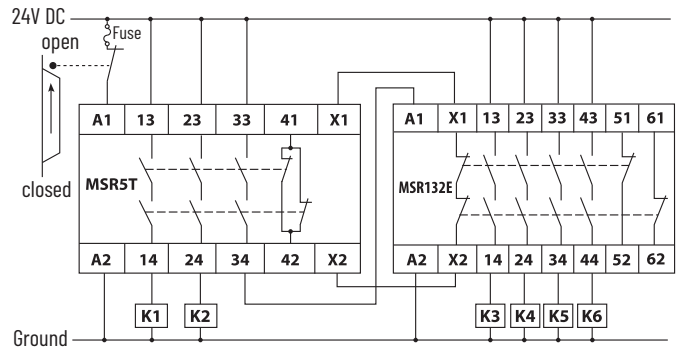
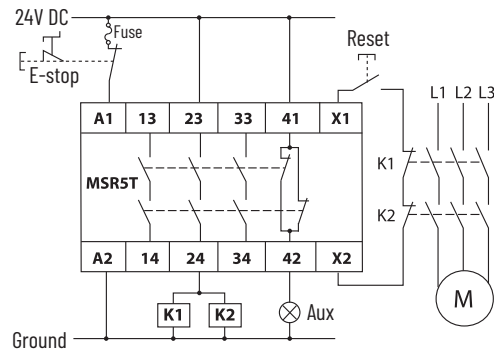
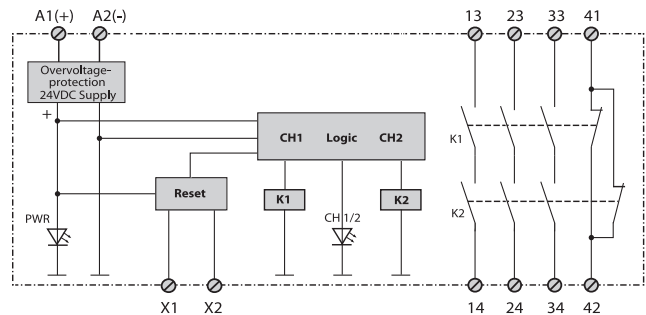


Figure 4 - Single-channel E-stop, Manual Reset, Dual-channel Monitored Output



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

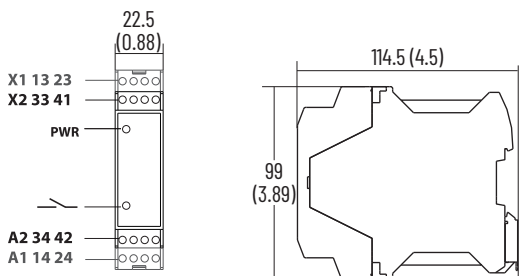


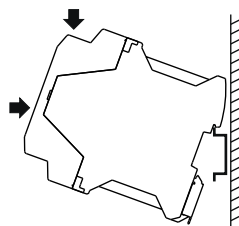
Table 1 - Status Indicators

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

Installation

Mount in enclosure with a minimum rating of IP54.

An external fuse for the MSR5T (catalog number 440R-B23020) should be installed on the input power as shown in [Wiring Examples on page 2](#) by the installer.



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.).

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.).

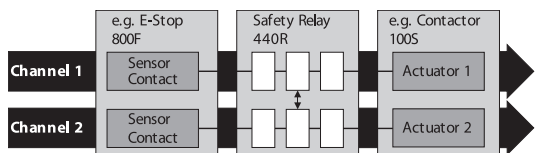
- Suggested Fuse: Bussman 4XC38, KTX-2, 600V AC fast-acting fuse
- Suggested Fuse Holder: Cat. No. 1492-FB1M30, single-pole fuse holder

Safety Specification

The safety relay MSR5T can be used in safety circuits according to DIN EN 60204-1/ VDE 0113 part 1. The following safety requirements are achievable in 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. As mission time (TM) the proof test interval (PTI) is assumed.

Components failure rates are according to SN29500.



Attribute	Value
TM (PTI) [a]	20
dop [d]/hop [h] ⁽¹⁾	365/24
tcycle [h]/[s] ⁽²⁾	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]	456	PFH [1/h]	2.31E-10
Cat.	4	HFT	1
DC avg.	98%	DC	98%

Technical Specifications

Attribute	Value
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 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	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)
Humidity	90% RH
Enclosure protection	IP40 (NEMA 1)
Terminal protection	IP20
Wiring	Use copper that withstands 60/75 °C
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 DIN rail in an enclosure with a minimum rating of IP54
Weight	180 g (0.4 lb)
Vibration	10...55 Hz, 0.35 mm

Rockwell Automation Support

Use these resources to access support information.

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

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.

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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