

# Modular Safety Relays

## MSR210P



### Description

The MSR210P forms one of the base units for the modular Minotaur MSR200 family of monitoring safety relays. It can be combined with other modules of the MSR200 Series to configure a safety control system with numbers of inputs and outputs matching users' specific application requirements, as well as diagnostic and networking capabilities. Up to ten input modules and two output modules can be connected to one base unit by simply removing the terminator, included with each base unit, and connecting the ribbon cables of the neighboring module. The terminators must be inserted into the final input and output modules.

The MSR210P has two inputs. Each input can be wired in one of four ways: one normally closed, two normally closed, three normally closed, safety mat connections. The MSR210P uses pulsed input monitoring to check for faults to power, ground or between inputs before a demand is placed on the safety system. Connecting a single device (must be at least dual channel) to each input meets the requirements of Category 4 per EN 954-1.

The MSR210P has the capability to perform external device monitoring (EDM). The EDM capability works in conjunction with the reset option. The user selects EDM and the reset function by jumpers across terminals Y40, Y41 and Y42.

The MSR210P has two semiconductor outputs designed to send status information to a PLC. Terminal Y33 indicates the inputs are closed (the ready LED is on). Terminal Y32 indicates the outputs are active.

The outputs include two normally open safety rated outputs and one normally closed auxiliary output.

### Features

- Category 4 per EN 954-1
- Stop category 0
- Pulsed input monitoring
- Two input circuits: safety gate, E-stop or safety mat
- Up to 22 diverse input devices
- Two safety outputs, three auxiliary outputs
- Ten diagnostic LEDs
- Removable terminals

### LED Indicators

Green	Input 1 Closed
Red	Input 1 Open
Green	Input 2 Closed
Red	Input 2 Open
Green	CH1 Output Active
Green	CH2 Output Active
Green	Power
Green	Run (Outputs Active)
Red	Stop (Outputs Off) + Diagnostics
Amber	Ready (Inputs Closed)

### Specifications

Safety Ratings	
Standards	EN 954-1, ISO 13849-1, IEC/EN 60204-1, IEC 60947-4-1, IEC 60947-5-1, ANSI 11.19, AS 4024.1
Safety Classification	Cat. 4 per EN 954-1 (ISO 13849-1), SIL CL3 per EN IEC 62061, PLe per ISO 13849-1
Functional Safety Data * <b>Note:</b> For up-to-date information, visit <a href="http://www.ab.com/Safety/">http://www.ab.com/Safety/</a>	PFH <sub>D</sub> : < 3.44 x 10 <sup>-9</sup> MTTF <sub>d</sub> : > 203 years Suitable for performance levels PLe (according to ISO 13849-1:2006) and for use in SIL3 systems (according to IEC 62061) depending on the architecture and application characteristics
Certifications	CE Marked for all applicable directives, cULus, c-Tick, and TÜV

Power Supply	
Input Power Entry	24V DC 0.8...1.1 x rated voltage
Power Consumption	8 W

Inputs	
Safety Inputs	1 N.C., 2 N.C., 3 N.C., or SM
Input Simultaneity	Infinite
Input Resistance, Max.	Inputs: 900 Ω Reset: 3200 Ω
Reset	Auto./Manual or Monitored Manual
Power On Delay/Recovery Time	3 seconds/ 40...145 ms, depending on expansion modules used
Response Time	MSR210: 29 ms MSR210 + Input Exp. Mod.: 34 ms + 6 ms/module

Outputs	
Safety Contacts	2 N.O.
Auxiliary Contacts	1 N.C., 2 PNP
Thermal Current <sub>I<sub>th</sub></sub>	1 x 6 A or 2 x 4 A (nonswitching)
Rated Impulse withstand Voltage	2500V
Switching Current @ Voltage, Min.	10 mA @ 10V DC
Fuses, Output	External 6 A slow blow or 10 A fast acting
Solid State Output Rating	20 mA @ 30V DC short-circuit protection
Electrical Life (Operations)	(With surge suppression) 250V AC/6 A/1500VA cosφ = 1...0.1 M 250V AC/2 A/500VA cosφ = 1...0.5 M 250V AC/4 A/1000VA cosφ = 0.35...0.3 M 250V AC/1.5 A/1000VA cosφ = 0.6...0.1 M 24V DC/2 A/48 W = 1 M 10V DC/0.01 A/0.1 W = 2 M
Mechanical Life	2,000,000 cycles

Utilization Category		
Inductive: AC-15	3 A @ 250V AC	3 A @ 125V AC
Inductive: DC-13	2.5 A @ 24V DC	
UL	1 x B300, R300, or 2 x C300 1 x 6 A or 2 x 4 A Resistive	

Environmental and Physical Characteristics	
Enclosure Type Rating/ Terminal Protection	IP40 (NEMA 1)/ IP20
Operating Temperature [C (F)]	-5...+55 ° (23...131 °)
Vibration	10...55 Hz, 0.35 mm
Shock	10 g, 16 ms, 100 shocks
Mounting	45 mm housing, 35 mm DIN Rail
Weight [g (lb)]	280 (0.62)
Conductor Size, Max.	0.2...4 mm <sup>2</sup> (24...12 AWG)

\* Usable for ISO 13849-1:2006 and IEC 62061. Data is based on the following assumptions:  
 - Mission time/Proof test interval of 20 years  
 - Functional test at least once within six-month period

**Product Selection**

Inputs	Safety Outputs	Auxiliary Outputs	Solid State Outputs	Terminals	Reset Type	Power Supply	Cat. No.
Two independent inputs; 2 x 1 N.C., 2 N.C., 3 N.C., or Safety Mat	2 N.O.	1 N.C. and 2 PNP Solid State	2 PNP	Removable	Auto./Manual or Monitored Manual	24V DC from the base unit	440R-H23176

**Accessories**

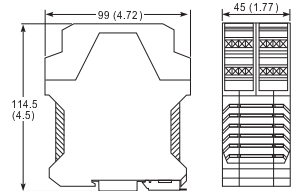
Description	Cat. No.
MSR200, Two Terminators	440R-A17138
Bag of 4, 4-Pin Screw Terminal Blocks	440R-A23209
Bag of 4, 4-Pin Spring Clamp Terminal Blocks	440R-A23228

**Diagnostics—Red Stop LED Blinks**

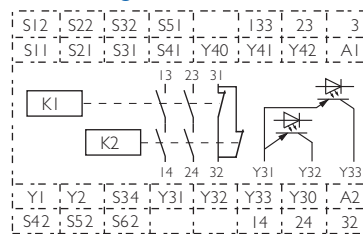
Blink Rate	Description
2	Change in Y40/Y41/Y42 circuit during operation.
3	Fault in external feedback circuit Y1-Y2. Clear fault and cycle power to reset the module.
Continuous	Internal fault in base or expansion module.

**Approximate Dimensions**

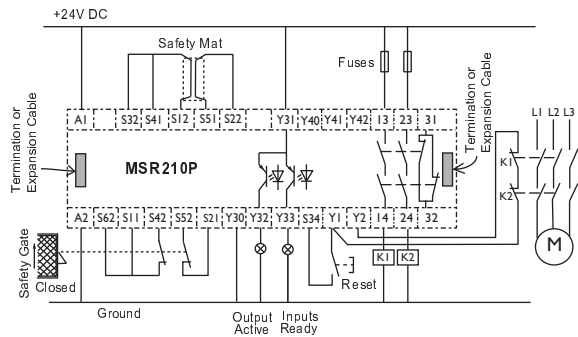
Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.



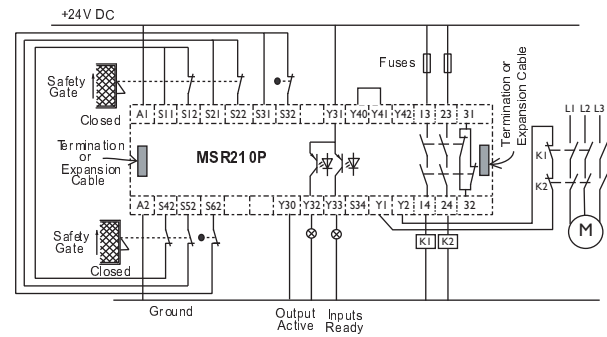
**Block Diagram**



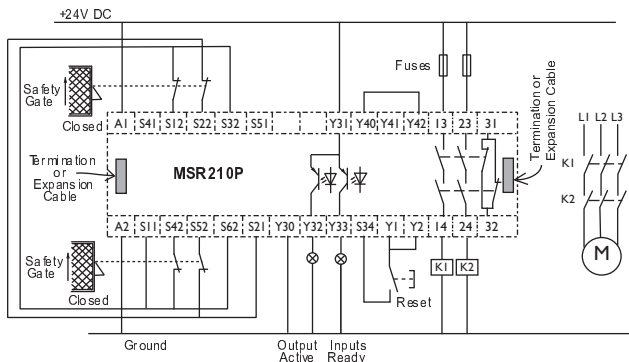
**Typical Wiring Diagrams**



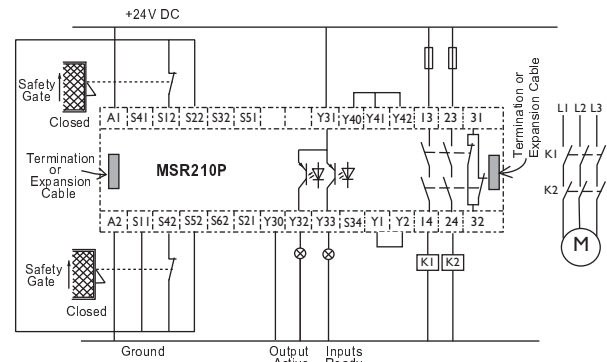
**Safety Mat and Dual Channel Safety Gate, Monitored Manual Reset, Monitored Output**



**Two Triple Channel Inputs, Automatic Reset, Monitored Output**



**Two Dual Channel Safety Gates, Monitored Manual Reset, No Monitored Output**



**Two Single Channel Safety Gates, Automatic Reset, No Monitored Output**

**5-Safety Relays**