Safety Relay Overview

Why Use a Minotaur?

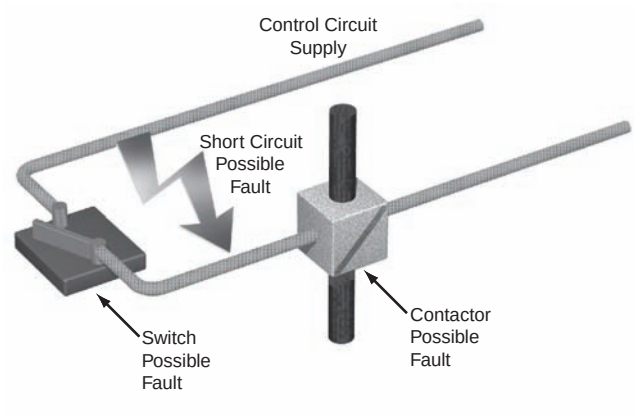
Control units provide functions such as time delays, motion sensing and two hand control supervision.

The functional requirements for monitoring safety relay units, such as the Guardmaster Minotaur range, will depend on their use in the system.

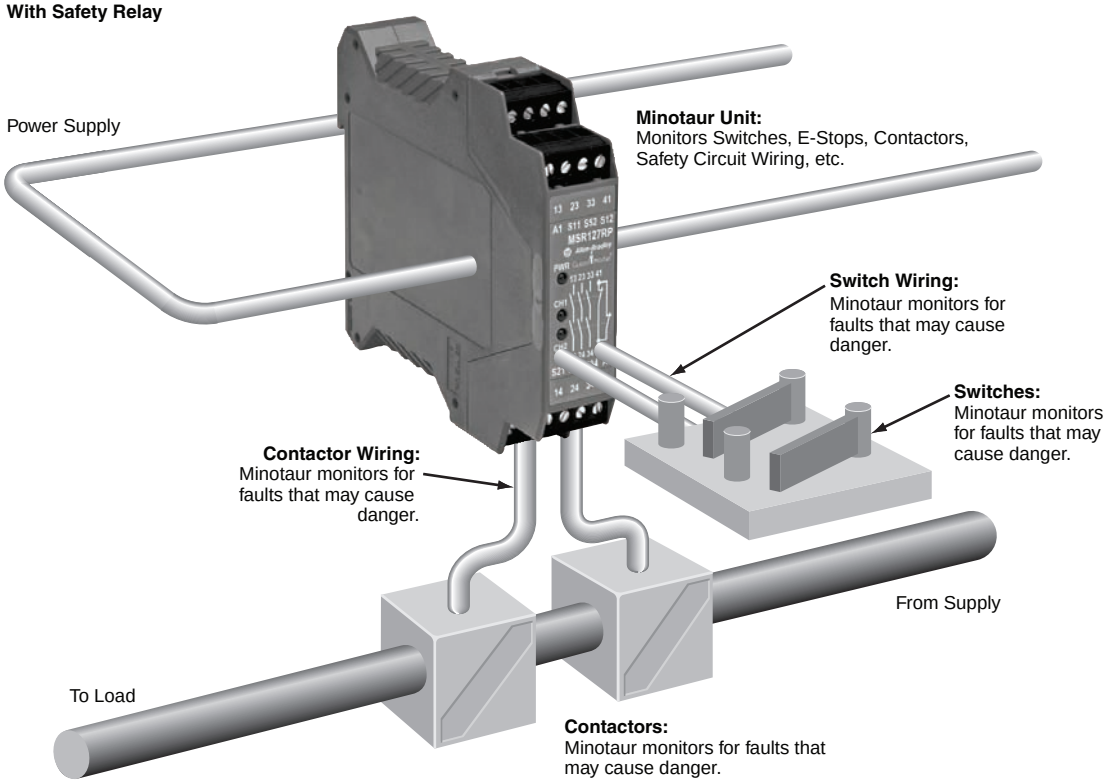
Their basic tasks are:

1. To detect faults on safety-related electrical control circuits, e.g. faults in sensors, wiring, contactors, etc.
2. To provide an ensured switching action, e.g. to act as an intermediate relay to amplify a signal or distribute it to multiple devices.
3. To provide a manual reset facility. They achieve their function by using internal redundancy (e.g. duplication) and monitoring.

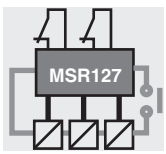
With Safety Relay



With Safety Relay



Applications



- Contactor monitoring circuit
- Contactor switching circuit
- Supply inclusive of switching circuit
- Contactor
- Monitored by Minotaur

Selection Guidelines

There are four safety system architectures available from Rockwell Automation. They are as follows:

1. Component systems: At the lowest level, a safety function can be accomplished with an actuating device and a control device. For example, an e-stop button that opens up the coil of a safety control relay performs a simple safety function. Component system architectures are typically used in low risk applications.

2. Dedicated safety monitoring relay systems: Dedicated safety relays are used for specific applications. These systems utilize packaged control modules that are designed to interface to common safety devices such as e-stops, safety gates, light curtains, and safety mats. Some dedicated relays provide special functions like timing, two-hand control, muting, and presence sensing device initiation. Since there are many different types of input devices and functions, there are many different types of dedicated safety monitoring relays. Dedicated safety monitoring relays have the ability to provide basic diagnostics in the form of LEDs on their front panels and auxiliary contacts that may be connected to a PLC or indicator lamp. Dedicated safety relays system architectures are typically used in medium to high-risk applications.

3. Expandable safety monitoring relay systems (MSR200): It provides the unique ability to easily add input and output modules to a "basic" safety relay module. Since the modular system is microprocessor based, it also has the ability to provide enhanced diagnostics over a communication connection. For instance, the I/O and error status can be communicated over a field bus network. Being a relatively new architecture, it currently accepts inputs from common types of safety devices: e-stops, safety gates, light curtains and safety mats. Modular safety relay system architectures are typically used in medium- to high-risk applications.

4. Configurable safety monitoring relay systems (MSR300): The MSR300 family of expandable modular safety relays handles larger, more complicated safety systems by allowing connection of multiple input modules to a single base unit. It offers the ability for a logic configuration with multiple inputs and the control of multiple independent outputs. The system can control up to three independent groups of outputs and perform simple function block logic configurations through rotary switch settings—no software needed. Mix and match modules to work with various input device types, reduces the need for multiple single-purpose relays, simplifies setup, wiring, maintenance and saves valuable panel space. The MSR300s diagnostic capabilities and communication functionality also reduces maintenance time by providing input, output and error status.

5. Safety PLC systems: Safety PLCs bring programmability, high I/O counts, distributed control and a high level of communications to safety architectures. They also bring some special functions not previously available in dedicated systems: high speed counters and analog signals. Safety PLC architectures are often applied in a variety of complex, high-risk applications.

Making the Right Choice

Begin the selection process by evaluating the needs of your application. The *Quick Guide* below can be used to direct you towards the best solution. Some of the guidelines will clearly point you to one type of architecture or another. Some will require further analysis before making a final decision. Due to the diverse nature of machine guarding, it is possible to create a hybrid system or a combination of architectures to provide adequate safeguarding of a particular machine or manufacturing system.

Quick Guide

Characteristics	Architecture
Application Complexity	
Low	Dedicated Relays
Medium	Dedicated or Expandable Relays
High	Safety PLCs
Communication	
Status	Expandable Relays
Control	Safety PLCs
Diagnostics	
Low	Dedicated Relays
Medium	Expandable Relays
High	Safety PLCs
Expandability	
Low	Dedicated Relays
Medium	Expandable Relays
High	Safety PLCs
Input Types	
Special	Dedicated Relays or Safety PLCs
Common	Dedicated or Expandable Relays
I/O Count	
Low	Dedicated Relays
Medium	Expandable Relays
High	Safety PLCs
I/O Location	
Contained	Dedicated or Expandable Relays
Spread Out	Safety PLCs
Sequential Shutdown	
None	Dedicated or Expandable Relays
Yes	Safety PLCs
Zone Control	
Few	Dedicated or Expandable Relays
Many	Safety PLCs