

# MSR22LM

## Description

The MSR22LM safety monitoring relay is designed to monitor light curtains with the added features of muting and presence sensing device initiation (PSDI). It provides an output to a machine control system when the light curtain is clear. When the inputs to the MSR22LM are closed (conducting), the output relays are closed if the monitoring circuit is satisfied.



The MSR22LM has three sets of dual channel inputs. This allows it to operate in four different configurations:

1. Monitors up to three light curtains in guard only mode.
2. Monitors up to two light curtains with two muting sensors (only one curtain muted).
3. Monitor one light curtain with four muting sensors.
4. Monitors up to three light curtains with PSDI (only one curtain initiated).

The MSR22LM uses microprocessor based technology to offer a wide variety of advanced safety solutions in a small 45 mm DIN rail mounted housing. Internal selector switches provide for easy selection of up to ten different applications. Four LEDs give operational status as well as diagnostic information. Removable terminals reduce wiring and installation costs when replacement is necessary.

## Features

- Category 4 per EN 954-1
- Stop category 0
- Light curtain muting—two or four sensors
- Presence sensing device initiation—up to three breaks
- 45 mm housing
- Removable terminals
- 24V DC supply voltage
- Start/restart interlock

## LED Indicators

Power: Green	Ready
K1: Green	K1 Closed
If K1 alone is lit, check for short across reset button	
K2: Green	K2 Closed

## Specifications

Safety Ratings		
Standards	EN 954-1, ISO13849-1, IEC/EN 60204-1, IEC 60947-5-1, IEC 61496-1, ANSI B11.19, AS4024.3	
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 * Note: For up-to-date information, visit <a href="http://www.ab.com/safety/">http://www.ab.com/safety/</a>	PFH <sub>D</sub> : < See website MTTF <sub>d</sub> : > See website 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 and BG	
Power Supply		
Input Power Entry	24V DC	
Power Consumption	4 W	
Inputs		
Safety Inputs	2 N.C. Symmetric or Asymmetric, Switch Selectable	
Input Simultaneity	0.5 seconds	
Input Resistance, Max.	S12-S14: 300 Ω S21-S22: 200 Ω S33-S34: 250 Ω	
Reset	Auto./Manual	
Power On Delay Time	40 ms (Manual Reset); 200 ms (Auto Reset)	
Response Time	15 ms	
Outputs		
Safety Contacts	2 N.O.	
Auxiliary Contacts	1 N.C.	
Thermal Current $I_{Ith}$	5 A nonswitching	
Switching Current @ Voltage, Min.	1 mA @ 10V	
Fuses, Output	6 A fast acting (external)	
Electrical Life (Operations)	220V AC/4 A/880VA $\cos\phi = 0.35...0.1$ M 220V AC/1.7 A375VA $\cos\phi = 0.6...0.5$ M 30V DC/2 A/60 W = 1 M 10V DC/0.01 A/0.1 W = 2 M	
Mechanical Life	10,000,000 operations	
Utilization Category (Inductive)		
B500: AC-15	3 A @ 250V AC	3 A @ 120V AC
P300 DC-13	3 A/24V DC	
B300 AC-15	2 A @ 250V AC	2 A @ 120V AC
DC-13	2 A/24V DC	
Environmental and Physical Characteristics		
Enclosure Type Rating/ Terminal Protection	IP40 (NEMA 1), DIN 0470/ IP20, DIN 0470	
Operating Temperature [C (F)]	-15...+55 ° (5...131 °)	
Vibration	0.35 mm 10...55 Hz	
Mounting	35 mm DIN Rail	
Weight [g (lb)]	220 (0.485)	
Conductor Size, Max.	1 x 2.5 mm <sup>2</sup> (14 AWG) stranded, 1 x 4 mm <sup>2</sup> (12 AWG) solid	

\* 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

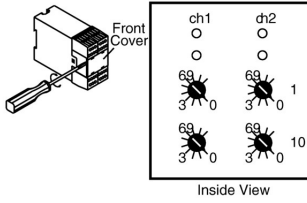
Inputs	Safety Outputs	Auxiliary Outputs	Terminals	Reset Type	Power Supply	Cat. No.
3 x 2 N.C.	2 N.O.	1 N.C.	Removable	Auto./Manual	24V DC	440R-P23071

## Accessories

Description	Cat. No.
70 mm Tower Light Clear LED Module—Black Enclosure	855T-B24YL7
70 mm Tower Light Clear LED Module—Grey Enclosure	855T-G24YL7

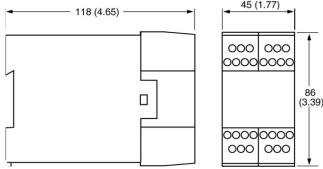
## Application Details

Disconnect power. Use a screwdriver to pop open cover to reveal internal switches.

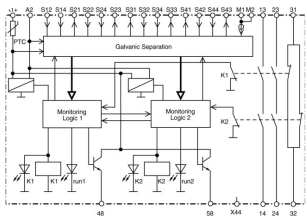


## Approximate Dimensions

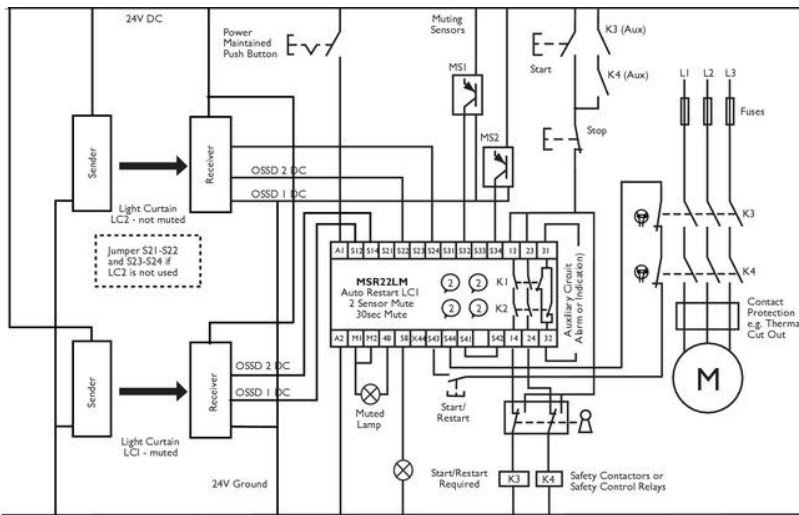
Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.



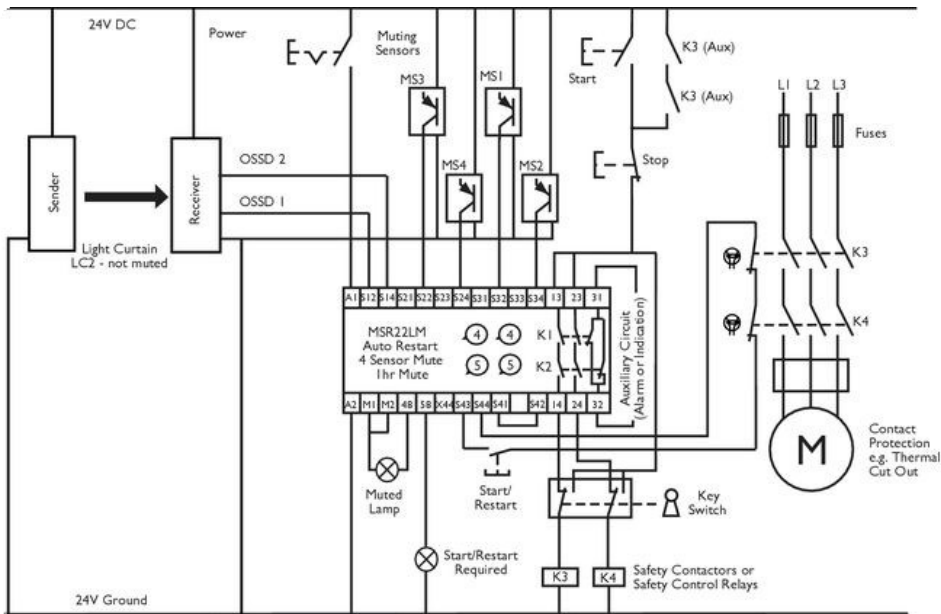
## Block Diagram



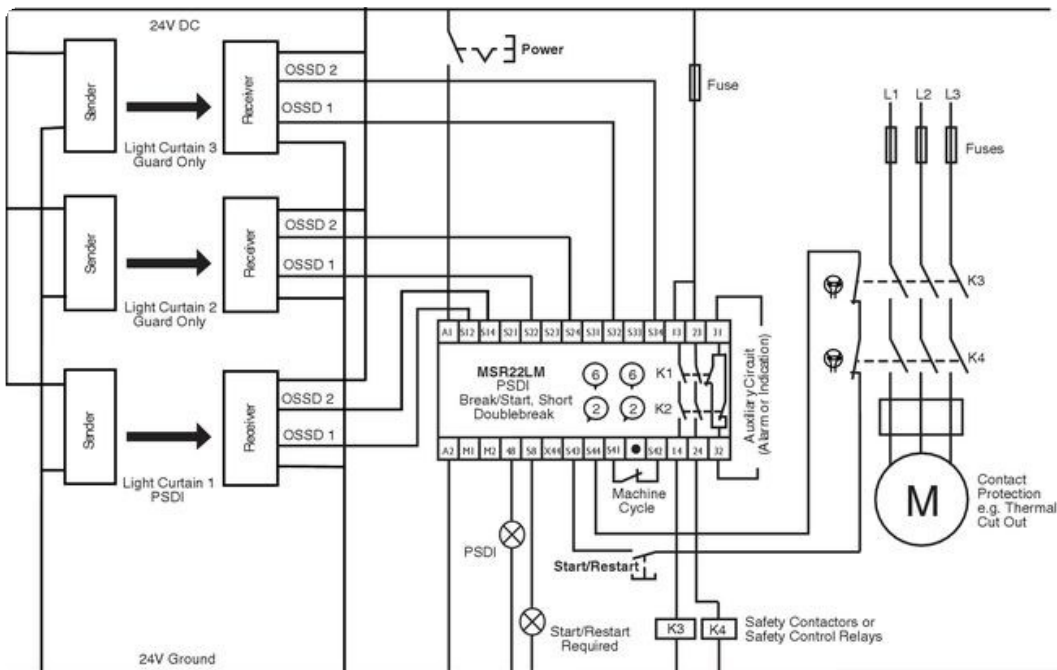
## Typical Wiring Diagrams



**Note:** Two light curtains with two-sensor muting and Auto Restart LC1.



**Note:**Typical one light curtain with four-sensor muting and Auto Restart LC1.



**Note:**Light curtain inputs, Presence Sensing Device Initiation (on LC1) Start/Restart Interlock, Dual Channel Output, Output Monitoring.

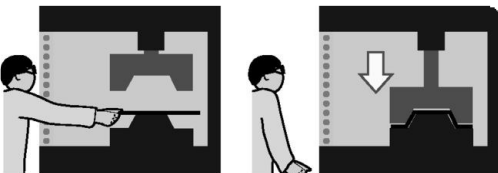
### Application Details

#### MSR22LM—Shown connected to a safety light curtain.

Multiple settings are available offering a variety of advantages. Below are the three most common settings.

#### Protective Mode

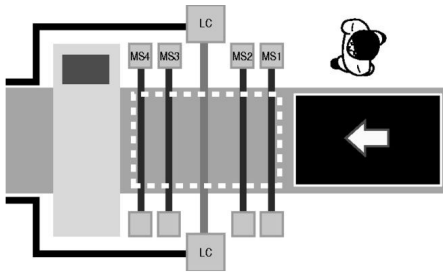
Example shows a press protected by a safety light curtain connected to the MSR22LM.



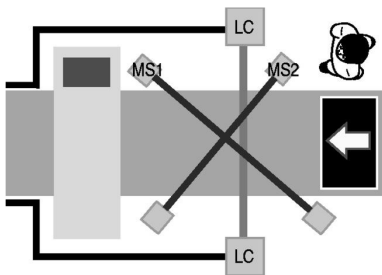
In machine operation, whenever the light curtain beams are broken the press immediately stops to help avoid danger to the operator. Once the beams are cleared the machine can then be started.

**Muting Mode**

Two examples are shown, both conveyor applications with a safety light curtain protecting the dangerous area. In-line and cross beam muting is used to allow the material to pass through the light curtain without stopping the machine. Any other object or person will be detected by the light curtain which will initiate machine stop.



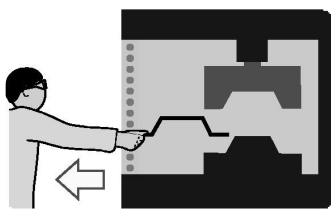
In-line muting requires the material to break the beams in a sequence, as shown. Only if all four MS beams are broken in turn and then clear in turn will the light curtain allow material through without initiating machine stop.



Cross-beam muting requires the material to break the beams in a sequence. MS1 first and then MS2. Only if the beams are broken in turn and then clear in turn will the light curtain allow material through without initiating machine stop.

**Auto Initiation Sequence (Stepping)—Double Break Shown**

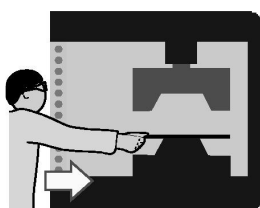
Auto initiation allows the machine to start and stop according to the number of times the light curtain beams are broken and cleared. Illustrated below is the MSR22LM set to auto initiation double break mode (after initial start-up sequence). Single- or three-break modes can also be selected.



First break—processed material removed

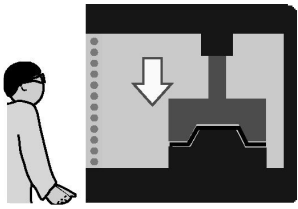
First clear—light curtain clear

Machine remains in stop mode



Second break—new material inserted

Machine remains in stop mode



Second clear—light curtain clear

Machine starts. Upon completion of cycle first break will start sequence again.

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