

Single-Function Safety Relays with Delayed Outputs

MSR138DP



Description

The MSR138DP can be connected in 3 different input wiring configurations: 1 normally closed, 2 normally closed, or 2 OSSD. When connected in the two normally closed fashion, the MSR138DP checks for cross faults across the two inputs. When connected to light curtains, the light curtain must perform the cross-fault detection.

The MSR138DP has output monitoring that can accommodate either automatic/manual reset or a monitored manual reset. When configured with automatic/manual reset (jumpers on X1-X2 and X3-X4), the MSR138DP can have the reset terminals S33-S34 jumpered or can be converted to an unmonitored manual reset by adding a normally open switch in the monitoring loop (S33-S34). When configured to monitored manual reset, the MSR138DP checks the output monitoring circuit through the manual application of the reset switch. The unit cannot be reset until the timing function has completed.

The outputs of the MSR138DP include two normally open immediate safety outputs and three normally open delayed safety outputs. The outputs of the MSR138.1DP include two normally open immediate safety rated outputs, two normally open delayed safety outputs and one normally closed delayed safety output. The safety outputs have independent and redundant internal contacts to support the safety function. If a reset request is made during the time cycle, it will cause a lockout condition. Cycle inputs after timing has completed and reset after the delay time has expired to clear lockout. Connecting contacts 55-56 of the MSR138.1DP in series to Y1-Y2 can avoid this lockout.

A normally closed timer reset switch can be added to force the delayed contacts open prior to the completion of the timing cycle.

Features

- Category 4/3 per EN 954-1
- Stop category 0 and 1
- Light curtain, E-stop, safety gate inputs
- Two immediate safety outputs
- Delayed outputs: 3 N.O. safety or 2 N.C. safety and 1 N.C. aux.
- Cross fault monitoring
- Monitored or automatic reset
- Removable terminals

LED Indicators

| | |
|-------|---|
| Green | Power—Illuminates when power on |
| Green | Start—Illuminates when S33-S34 is closed |
| Green | CH1 IN—Illuminates when channel 1 input is closed |
| Green | CH2 IN—Illuminates when channel 2 input is closed |
| Green | CH1—Illuminates when K1 is closed |
| Green | CH2—Illuminates when K2 is closed |
| Green | CHT1—Illuminates during timing period |
| Green | CHT2—Illuminates during timing period |

Specifications

| Safety Ratings | |
|--------------------------|---|
| Standards | EN 954-1, ISO 13849-1, IEC/EN 60204-1, IEC 60947-4-1, IEC 60947-5-1, ANSI B11.19, AS4024.1 |
| 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 * | PFH _D : < 2.38 x 10 ⁻⁹ MTTF _d : > 195 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 AC/DC, 115V AC or 230V AC |
| Power Consumption | 4 W |

| Inputs | |
|------------------------------|----------------------------------|
| Safety Inputs | 1 N.C., 2 N.C. or LC |
| Input Simultaneity | Infinite |
| Input Resistance, Max. | 135 Ω |
| Reset | Auto./Manual or Monitored Manual |
| Power On Delay/Recovery Time | 1 second/100 ms |
| Response Time | 15 ms |

| Outputs | |
|---|---|
| Safety Contacts | 2 N.O. |
| Auxiliary Contacts | Delayed 3/2 N.O. |
| Thermal Current _{I_{th}} | 5 x 2.5 A or 3 x 3.5 A nonswitching |
| Rated Impulse withstand Voltage | 2500V |
| Switching Current @ Voltage, Min. | 10 mA @ 10V |
| Fuses, Output | External 6 A slow blow or 10 A fast acting (With surge suppression) 250V AC/6 A/1500VA cosφ = 1...0.1 M 250V AC/2.5 A/625VA cosφ = 1...0.5 M 250V AC/1.5 A/375VA cosφ = 0.35...0.3 M 250V AC/5 A/1250VA 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 | | |
|----------------------|---------------------------|------------------------|
| Resistive: AC-1 | 7 A@ 250V AC | |
| Resistive: DC-1 | 7 A/24V DC | |
| Inductive: AC-15 | 6 A@ 250V AC | 6 A @ 125V AC |
| Inductive: DC-13 | 3 A/24V DC | 6 A/24V DC @ 6 ops/min |
| UL | B300, 5 A/250V AC, 24V DC | |

| 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 | 35 mm DIN Rail |
| Weight [g (lbs)] | 24V DC: 350 (0.77); 115/230V AC: 490 (1.08) |
| Conductor Size, Max. | 0.2...4 mm ² (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

Logic Single-Function Safety Relays with Delayed Outputs

MSR138DP

Product Selection

| Inputs | Safety Outputs | Delayed Safety Outputs | Delayed Auxiliary Outputs | Time Delay | Terminals | Reset Type | Power Supply | Cat. No. |
|----------------------------------|----------------|------------------------|---------------------------|-----------------------|---------------------|--|--------------|------------------------------------|
| 1 N.C., 2 N.C., Light Curtain | 2 N.O.* | 3 N.O.* (MSR138DP) | — | 1.0 seconds, fixed | Removable | Auto./Manual or Monitored Manual | 115V AC | 440R-M23080 |
| | | | | 0.15...3 s | Spring Clamp | | 24V AC/DC | 440R-M23143 440R-M23143S |
| | | | | | 0.15...3 seconds | | Removable | 115V AC |
| | | | | 0.5...10 s | | | Spring Clamp | 230V AC |
| | | | | | 0.5...10 seconds | | Removable | 24V AC/DC |
| | | | | 115V AC | | | | 440R-M23145 |
| | | | | 1.5...30 seconds | Removable | | 230V AC | 440R-M23144 |
| | | | | | | | 24V AC/DC | 440R-M23151 |
| | | | | 0.15...3 seconds | Removable | | 115V AC | 440R-M23149 |
| | | 230V AC | 440R-M23148 | | | | | |
| | | 0.5...10 seconds | Removable | 24V AC/DC | 440R-M23084 | | | |
| | | | | 115V AC | 440R-M23082 | | | |
| | | 1.5...30 seconds | Removable | 230V AC | 440R-M23081 | | | |
| | | | | 24V AC/DC | 440R-M23088 | | | |
| | | 0.15...3 seconds | Removable | 115V AC | 440R-M23086 | | | |
| | | | | 230V AC | 440R-M23085 | | | |
| | | 0.5...10 seconds | Removable | 24V AC/DC | 440R-M23092 | | | |
| | | | | 115V AC | 440R-M23090 | | | |
| 1.5...30 seconds | Removable | 230V AC | 440R-M23089 | | | | | |
| | | 24V AC/DC | 440R-M23089 | | | | | |

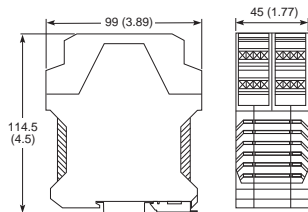
* Instantaneous safety outputs Cat. 4
* Delayed safety outputs are Cat. 3

Accessories

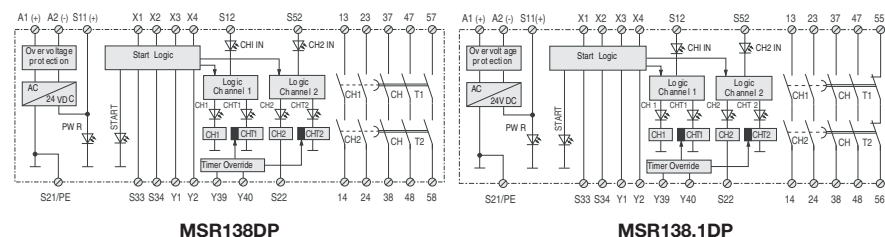
| Description | Cat. No. |
|--|-------------|
| Bag of 4, 4-Pin Screw Terminal Blocks | 440R-A23209 |
| Bag of 4, 4-Pin Spring Clamp Terminal Blocks | 440R-A23228 |

Approximate Dimensions

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

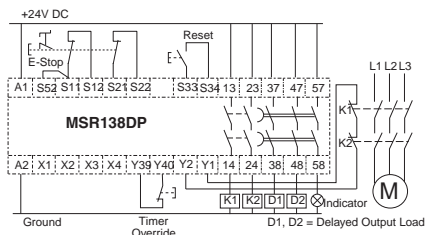


Block Diagram

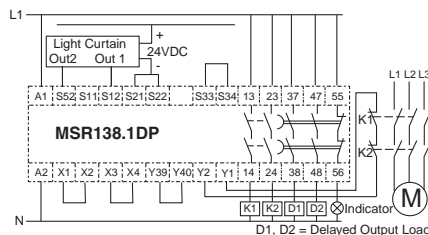


In applications with 24V AC supply: terminal S21 must not be connected to PE.

Typical Wiring Diagrams



**24V DC Supply Dual Channel E-Stop,
Monitored Manual Reset, Monitored Output**



**115/230V AC Supply, 24V DC Light Curtain,
Automatic Reset, Monitored Output**

5-Safety Relays