

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
Electrical Life (Operations)	
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	440R-M23141
							230V AC	440R-M23140
				0.5...10 s	Spring Clamp		24V AC/DC	440R-M23147
							440R-M23147S	
				0.5...10 seconds	Removable		115V AC	440R-M23145
							230V AC	440R-M23144
		1.5...30 seconds	Spring Clamp	24V AC/DC	440R-M23151			
				115V AC	440R-M23149			
		2 N.O.* (MSR138.1DP)	1 N.C.	0.15...3 seconds	Removable		230V AC	440R-M23148
							24V AC/DC	440R-M23084
							115V AC	440R-M23082
				0.5...10 seconds	Spring Clamp		230V AC	440R-M23081
							24V AC/DC	440R-M23088
							115V AC	440R-M23086
				1.5...30 seconds	Removable		230V AC	440R-M23085
24V AC/DC	440R-M23092							
115V AC	440R-M23090							
230V AC	440R-M23089							

* Instantaneous safety outputs Cat. 4

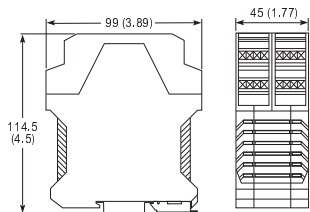
* Delayed safety outputs are Cat. 3

Accessories

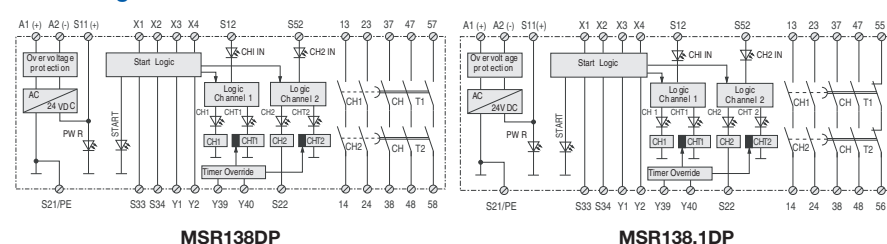
Description	Cat. No.
Bag of 4, 4-Pin Screw Terminal Blocks	440R-A23209
Bag of 4, 4-Pin Spring Clamp Terminal Blocks	440R-A23228

Approximate Dimensions

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

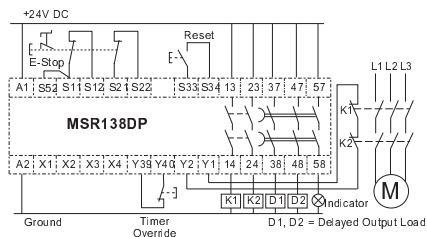


Block Diagram

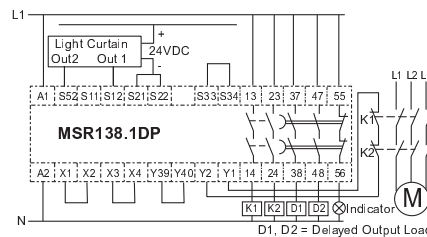


In applications with 24V AC supply: terminal S21 must not be connected to PE.

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**