Monitoring Safety Relays with Delayed Outputs

Minotaur MSR138DP



Description

The MSR138DP is a versatile monitoring safety relay. It can be connected in four different input wiring configurations: 1 N.C., 2 N.C., or 2 PNP connections from a light curtain. When connected in the 2 N.C. 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 rest. 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 outputs of the MSR138DP include 2 normally open immediate safety outputs and 3 normally open delayed safety outputs. The outputs of the MSR138.1DP include 2 normally open immediate safety rated outputs, 2 normally open delayed safety outputs and 1 normally closed delayed safety output. The safety outputs have independent and redundant internal contacts to help ensure the safety function.

A N.C. timer reset switch can be added to force the delayed contacts opened prior to the completion of the timing cycle. An electronic protection circuit detects shorts across the input, when the MSR138DP wired for cross fault detection.

Features

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

Specifications

Standards	EN 954-1, ISO 13849-1, IEC/EN 60204-1, IEC 60947-4-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
Category Instantaneous/Delayed	Cat. 4/Cat. 3 per EN 954-1
Approvals	C-Tick, CE marked for all applicable directives and cULus
Power Supply	24V AC/DC, 115V AC or 230V AC 0.8 to 1.1 x rated voltage, 50/60Hz
Power Consumption	4W
Safety Inputs	1 N.C., 2 N.C. or light curtain
Input Simultaneity	Infinite
Max. Allowable Input Resistance	135 ohms
Reset	Monitored Manual or Auto./Manual
Outputs	2 N.O. Safety; 3 N.O. Safety Delayed (MSR138DP); 2 N.O. Safety Delayed (MSR138.1DP); 1 N.C. Aux. Delayed (MSR138.1DP)
Output Utilization per IEC 60947-4-1 (Resistive)	AC-1: 7A/250V AC DC-1: 7A/24V DC
❶ Output Utilization per IEC 60947-5-1 (Inductive)	B300, AC-15 6A/250V AC, 6A/125V AC P300, DC-13; 3A/24V DC 6A/24V DC @ 6 ops/min
Thermal Current (non switching) Units with 24V AC/DC supply: Units with 115/230V AC supply:	Max 7A in one current path 5x3.5A or 3x4.5A 5x2.5A or 3x3.5A
Fuses Output (external)	6A Slow Blow or 10A Quick Blow
Min. Switched Current/Voltage	10ma/10V
Contact Material	$AgSnO_2$ + 0.5mAu
Power On Delay	1s
Response Time	15ms
Recovery Time	100ms
Indication LEDs	Green= Power Green= CH1 Output Active Green= CH2 Output Active Green=CHT1 Timed Output Act. Green=CHT2 Timed Output Act.
Impulse Withstand Voltage	2500V
Pollution Degree	2
Operating Temperature	-5°C to +55°C (+23°F to 131°F)
Enclosure Protection	IP40 (NEMA 1)
Terminal Protection	IP20
Conductor Size	0.2–4mm^2 (24–12 AWG)
Torque Settings—term. screws	0.4–0.5 Nm (3.54–4.43lb^2in)
Case Material	Polyamide PA 6.6
Mounting	35mm DIN rail
Weight 24V DC 110V AC or 230V AC	350g (0.77lbs) 490g (1.08 lbs)
Electrical Life (w/Surge Supp.) 250V AC/6A/1500VA cosφ=1 250V AC/2.5A/625VA cosφ=1 250V AC/1.5A/375VA cosφ=0.35 250V AC/5A/1250VA cosφ=0.6 24V DC/2A/48W 10V DC/0.01A/0.1W	 100,000 operations 500,000 operations 300,000 operations 100,000 operations 1,000,000 operations 2,000,000 operations
Mechanical Life	2,000,000 cycles
Vibration	10-55Hz, 0.35mm
Shock	10g, 16ms, 100 shocks

❶ See Output Ratings on page 1-29 for details. Consult factory for ratings not shown.

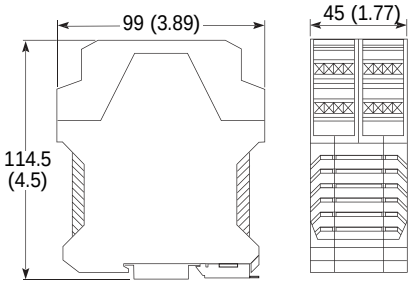
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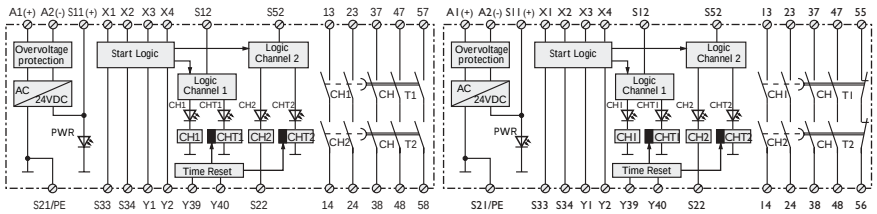
Product Selection

Inputs	Safety Outputs	Safety Delayed Outputs	Time Delay	Power Supply	Catalogue Number
1 N.C. or 2 N.C. or Light Curtain	2 N.O.	3 N.O. (MSR138DP)	1.0s fixed	115V AC	**440R-M23080**
			0.15 – 3s	24V AC/DC	**440R-M23143**
				115V AC	**440R-M23141**
				230V AC	**440R-M23140**
			0.5 – 10s	24V AC/DC	**440R-M23147**
				115V AC	**440R-M23145**
				230V AC	**440R-M23144**
			1.5 – 30s	24V AC/DC	**440R-M23151**
				115V AC	**440R-M23149**
				230V AC	**440R-M23148**
		2 N.O. 1 N.C. (MSR138.1DP)	0.15 – 3s	24V AC/DC	**440R-M23084**
				115V AC	**440R-M23082**
				230V AC	**440R-M23081**
			0.5 – 10s	24V AC/DC	**440R-M23088**
				115V AC	**440R-M23086**
				230V AC	**440R-M23085**
			1.5 – 30s	24V AC/DC	**440R-M23092**
				115V AC	**440R-M23090**
				230V AC	**440R-M23089**

Dimensions—mm (inches)



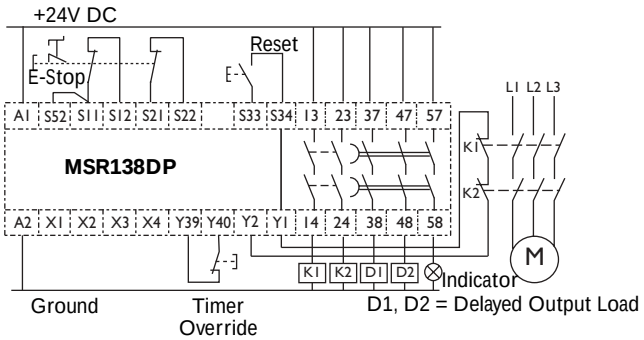
Block Diagram



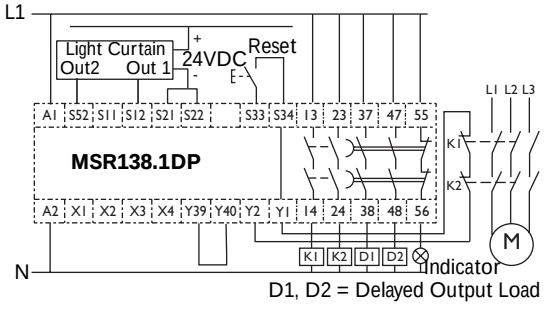
MSR138DP *MSR138.1DP*

In applications with 24V DC 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, Monitored Manual Reset, Monitored Output