



### Module for emergency stop, gate monitoring, safety mats and bumpers with 4 wires technology

#### Main functions

- Dual channel input circuit
- Choice between automatic start, manual start or monitored start
- Connectible to electromechanical contacts, to safety mats or to safe edges
- Output contacts:
  - 2 NO safety contacts,
  - Supply voltages: 24 VAC/DC

#### Utilization categories

Alternate current: AC15 (50...60 Hz)  
 Ue (V) 230  
 Ie (A) 3  
 Direct current: DC13 (6 operations/minute)  
 Ue (V) 24  
 Ie (A) 6

#### Markings, quality marks and certificates:



Approval UL: E131787

#### Complying with the requirements requested by:

Low Voltage Directive 2006/95/EC,  
 Machinery Directive 2006/42/EC,  
 Electromagnetic Compatibility 2004/108/EC

#### Technical data

##### Housing

Made of polyamide PA 6.6 self-extinguishing, class V0 (UL94)  
 Protection degree: IP40 (housing), IP20 (terminals)  
 Dimensions: see page 4/141, shape A

##### General data

Safety category: category 4 according to EN 954-1  
 Ambient temperature: -25°C...+55°C  
 Mechanical endurance: >10 millions of operations  
 Electrical endurance: >100.000 endurance  
 Pollution degree: outside 3, inside 2  
 Rated impulse with stand voltage (Uimp): 4 kV  
 Rated insulation voltage (Ui): 250 V  
 Over-voltage category: III  
 Weight: 0,3 Kg

##### Power supply

Rated operating voltage (Un): 24 VAC/DC; 50...60 Hz  
 Max residual ripple in DC: 10%  
 Supply voltage tolerance: ±15% of Un  
 Rated power consumption AC: < 5 VA  
 Rated power consumption DC: < 2 W

##### Control circuit

Protection against short circuits: resistance PTC, I<sub>h</sub>=0,5 A  
 Operating time of PTC: intervention > 100 ms, reset > 3 s  
 Max input resistance: ≤ 200 Ω  
 Current for each input: 10 mA  
 Min. period of start impulse t<sub>MIN</sub>: 150 ms  
 Operating time t<sub>A</sub>: 120 ms  
 Releasing time t<sub>R1</sub>: < 10 ms  
 Releasing time in absence of power supply t<sub>R</sub>: 80 ms  
 Simultaneity time t<sub>C</sub>: infinite

##### In conformity with standards:

IEC 60947-1, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 13849-1, EN 999, EN 1037, EN ISO 12100-1, EN ISO 12100-2, EN ISO 13850, IEC 529, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 62326-1, EN 60664-1, UL 508, CSA C22.2 n° 14-95

##### Output circuit

Output contacts: 2 NO safety contacts  
 Contacts type: forced guided contacts  
 Contacts material: silver alloy, gold plated  
 Max switching voltage: 230/240 VAC; 300 VDC  
 Max switching current per contact: 6 A  
 Conventional free air thermal current I<sub>th</sub>: 6 A  
 Contacts resistance: ≤ 100 mΩ  
 Contact protection fuse: 6 A  
 The number and the load capacity of output contacts can be increased by using expansion modules or contactors: see page 4/135 - 4/139

#### Code structure

## CS AR-51V024

Kind of connection

<b>V</b>	screw terminals
<b>M</b>	connector with screw terminals
<b>X</b>	connector with spring terminals

Supply voltage

**024** 24 VAC/DC ±15%

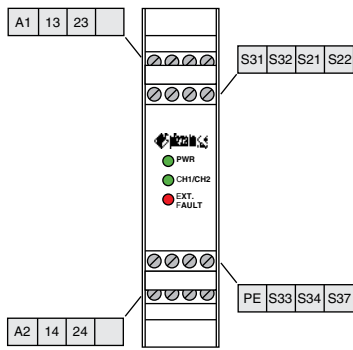
#### Data type approved by UL

Rated operating voltage (Un): 24 VAC/DC; 50...60 Hz  
 Rated power consumption AC: < 5 VA  
 Rated power consumption DC: < 2 W  
 Max switching voltage: 230 VAC  
 Max switching current per contact: 6 A  
 Utilization category: C300

Notes:  
 - Use 60° or 75 °C copper (Cu) conductor and wire size No. 30-12 AWG.  
 - Terminal tightening torque of 5-7 Lb-In.  
 - Only for 24 VAC/DC version, supply from remote class 2 source or limited voltage and limited energy.

**Safety module CS AR-51**

**Terminals layout**



**PE terminal connection**

The PE terminal has to be connected to the equipotential circuit of machine protection if it is necessary.

This connection is made for functional reason, to reduce effects of an insulation fault on the machine operation.

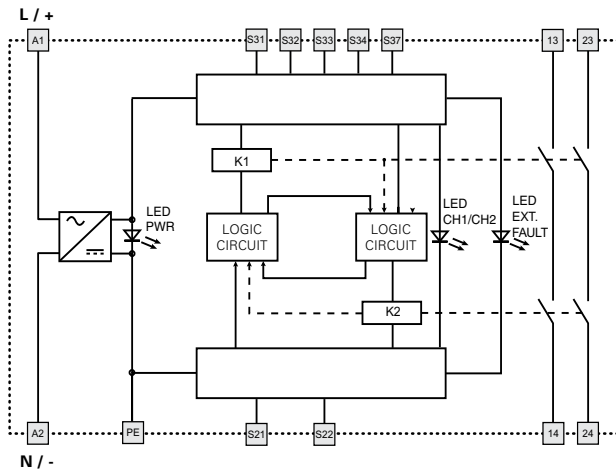
In particular, faults towards ground on control circuits must not cause an unwanted starting, either dangerous movements or obstruct the machine stop.

**"EXT. FAULT" LED function**

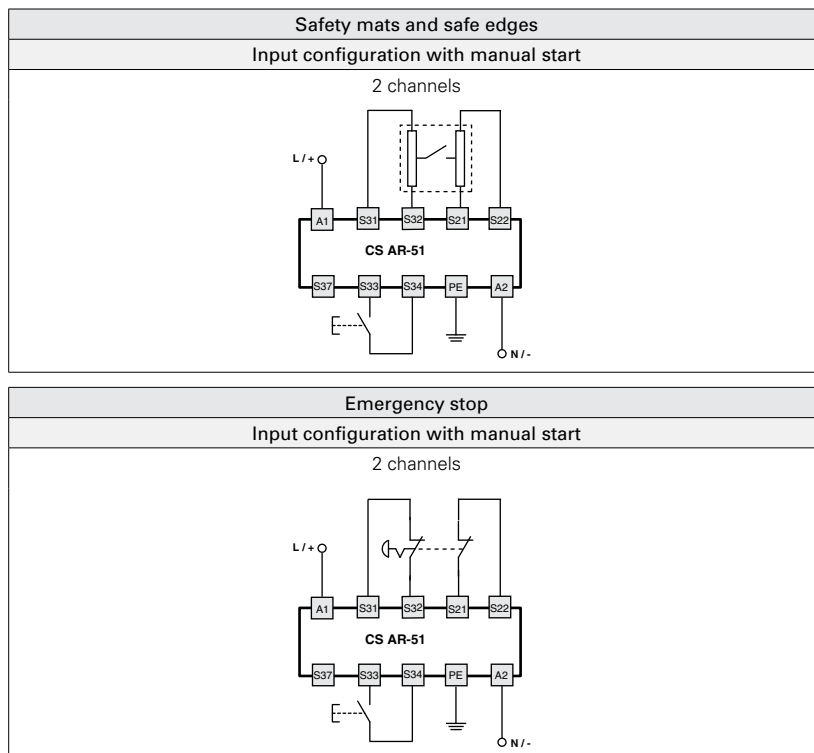
When a pressure is exerted on surfaces of a bumper or a safety mat or a bumper, we obtain a short-circuit between the two conductive elements which form the device and are connected to the entry channels of the safety module.

The produced signal cause the LED EXT.FAULT lighting to signal the short-circuit between channels and the output contacts opening, which produce the block of the control circuit and the safety setting of the machine. The EXT.FAULT LED does not activate in the case of wires or internal connection interruption of safety mat or bumper.

**Internal wiring diagram**



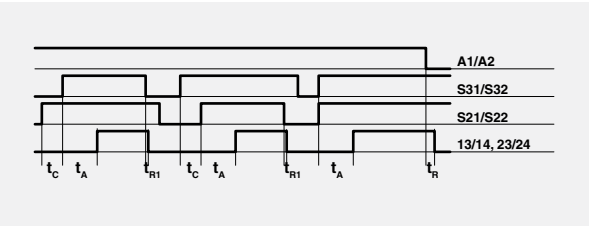
**Inputs configuration**



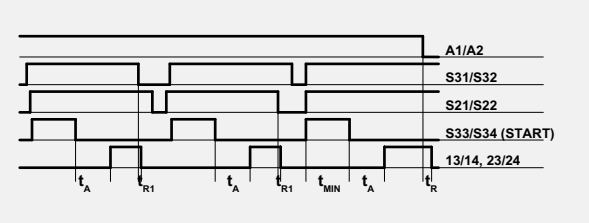
The diagram does not show the exact position of clamps in the product

**Operation diagrams**

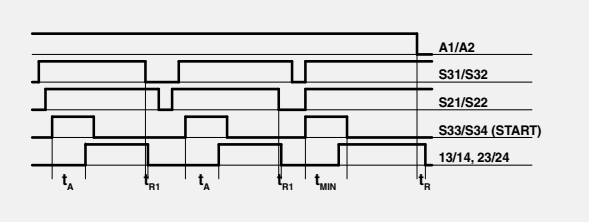
**Configuration with automatic start**



**Configuration with monitored start**



**Configuration with manual start**

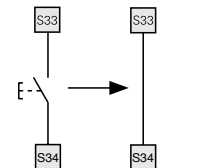


**Legend:**

- $t_{MIN}$ : Min. period of start impulse
- $t_C$ : Simultaneity time
- $t_A$ : Operating time
- $t_{R1}$ : Releasing time
- $t_R$ : Releasing time in absence of power supply

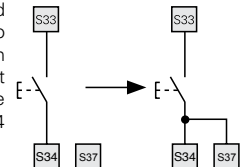
**Automatic start**

As regards the indicated diagrams, in order to activate the module with the automatic start, it is necessary to short the start button between S33 and S34 terminals.



**Monitored start**

As regards the indicated diagrams, in order to activate the module with the monitored start, it is necessary to add the connection between S34 and S37 terminals.



**Gate monitoring**

The safety module can control both emergency stop circuits and gate monitoring circuits, replacing the emergency stop contacts with switches contacts.

