



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

- Main functions
- For safety applications up to SIL 3 / PL e
 - Dual channel input circuit
 - Choice between automatic start, manual start or monitored start
 - Connection of the input channels to opposite potentials
 - Connectible to electromechanical contacts, to safety mats or to safety 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) 4

Markings, quality marks and certificates:

Approval UL: E131787
Approval GOST: POCC ITAB24.B04512

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 5/81, shape A

General data

SIL level (SIL CL): up to SIL 3 according to EN IEC 62061
Performance Level (PL): up to PL e according to EN ISO 13849-1
Safety category: upto cat. 4 according to EN ISO 13849-1
Safety parameters: see page 7/34
Ambient temperature: -25°C...+55°C
Mechanical endurance: >10 millions of operations
Electrical endurance: >100.000 operations
Pollution degree: outside 3, inside 2
Rated impulse with stand voltage (Uimp): 4 kV
Rated insulation voltage (Ui): 250 V
Over-voltage category: II
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_h=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_{MIN}: > 150 ms
Operating time t_A: < 120 ms
Releasing time t_{R1}: < 10 ms
Releasing time in absence of power supply t_R: < 80 ms
Simultaneity time t_C: infinite

In conformity with standards:

IEC 60947-1, EN 60947-5-1, 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, EN 60947-5-1, EN 62061, EN 13849-1, 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_{th}: 6 A
Max currents sum Σ I_{th}²: 36 A²
Min. current: 10 mA
Contacts resistance: ≤ 100 mΩ
Contact protection fuse: 6 A, F type
The number and the load capacity of output contacts can be increased by using expansion modules or contactors See page See page 5/51 - 5/61.

Code structure

CS AR-51V024

Kind of connection	Supply voltage
V screw terminals	024 24 Vac/dc ±15%
M connector with screw terminals	
X connector with spring terminals	

Data type approved by UL

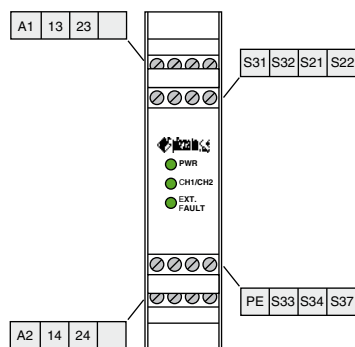
Rated operating voltage (Un): 24 Vac/dc; 50...60 Hz
Rated power consumption AC: < 5 VA
Rated power consumption DC: < 2 W
Max switching voltage: 230 Vac
Max switching current per contact: 6 A
Utilization category: C300

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.

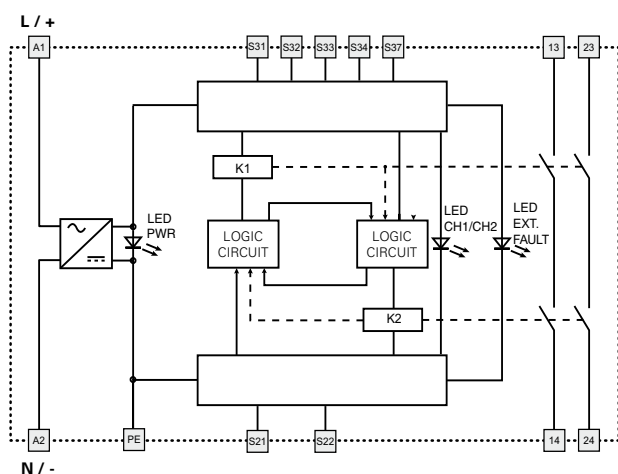
In particular, faults towards ground on control circuits must not cause an unwanted starting, either dangerous movements or obstruct the machine stop.

"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

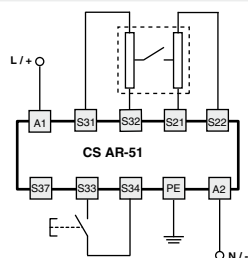


Inputs configuration

Safety mats and safety edges

Input configuration with manual start

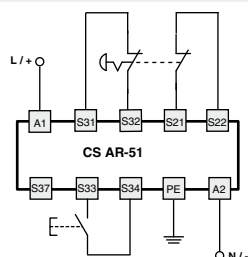
2 channels



Emergency stop

Input configuration with manual start

2 channels

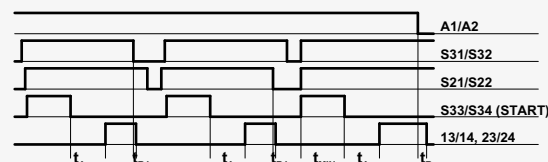


Operation diagrams

Configuration with automatic start



Configuration with monitored start



Configuration with manual start



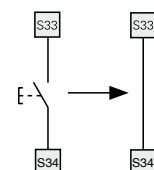
Legend:

t_{MIN} : Min. period of start impulse
 t_C : Simultaneity time
 t_A : Operating time

t_{R1} : Releasing time
 t_{R2} : Releasing time in absence of power supply

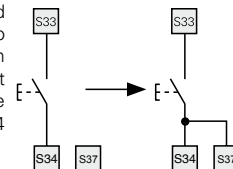
Automatic start

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.



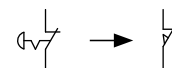
Monitored start

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.



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