# Safety modules SMS20, SMS31

## Original datasheet - For emergency stop, safety gates, magnetic switches, safety limit switches


## Description

The SMS20 and SMS31 safety modules are designed in Category 4, Performance Level e in accordance with the Machine Directive and EN ISO 13849-1 to monitor and control safely the safety circuits in applications with emergency stops, safety gates, safety magnetic switches, safety limit switches and electromechanical interlocks.
They are also used to control safely the safety circuits of the lift car levelling, unintended car movement and the lift pit inspection, in compliance with the Lifts Standards EN 81-20 and EN 81-50.

## Main features

- **Multiple types inputs.** The safety modules can monitor the safety state of several types of inputs: E-stop, E-gate, limit switches, non-contact switches
- **Machinery Directive compliance.** Cat. 4, PL e in accordance with EN ISO 13849-1
- **Lifts Directive compliance.** EN 81-20 and EN 81-50 standards
- **Multiple operating modes.** The modules can operate with automatic, manual or monitored manual start/reset
- **Safety outputs.** Electromechanical forcibly guided safety relays with 3NO+1NC aux outputs (SMS31) or 2NO outputs (SMS20)
- **Flexible wiring.** The modules are equipped with detachable screw terminals for easy wiring and product maintenance; the terminal blocks are coded so to avoid wiring mistakes
- **Diagnostic.** LED indications for power supply, state of the safety inputs and state of the safety outputs
- **Compact.** 1-DIN, W x H x D: 17,5 x 110,8 x 121,1mm
- **Approval** by TÜV. CE, cULus

## Main functions

- Monitoring of safety circuits in applications with emergency stop buttons, emergency gates with electromechanical or non-contact safety switches, safety accesses with safety magnetic switches and interlocks
- Monitoring of safety circuits with magnetic or electromechanical safety switches in Lifts to control the lift car levelling
- Double or single safety channel operation
- Control of up to 3 NO safety outputs with electromechanical safety relays
- Selectable start/reset operating mode Manual, Automatic or Monitored Manual Start
- Diagnostic of the safety circuit through on-board LED indications for power supply, status of safety channels and status of safety outputs
- 1 NC auxiliary output (SMS31) that can be used for external status indication

# References

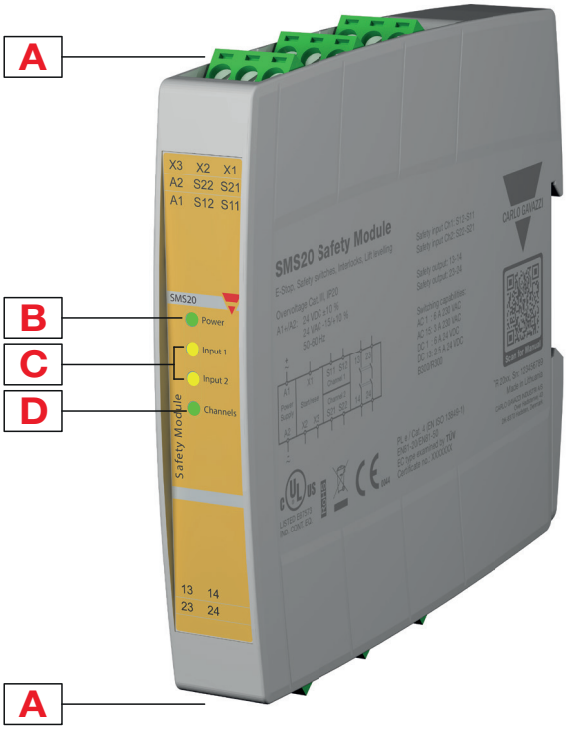
## Type selection

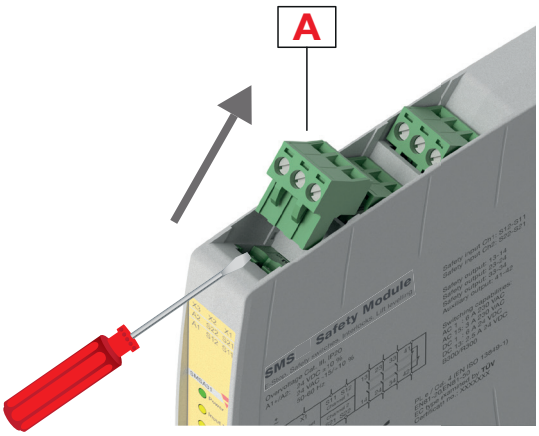
| NO safety outputs | Aux NC output | Ordering code |
|---|---|---|
| 2 | 0 | **SMS20** |
| 3 | 1 | **SMS31** |

## Further reading

| Information | Where to find it | QR |
|---|---|---|
| Instruction manual | http://cga.pub/?240e1c | |
| Software SISTEMA | http://www.dguv.de/webcode/e34183 | |

# Structure



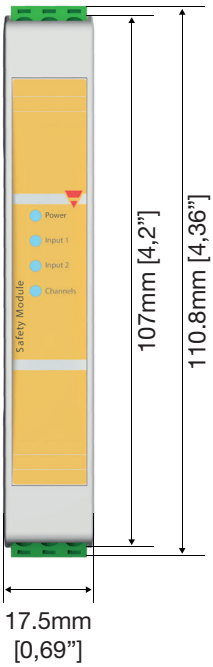



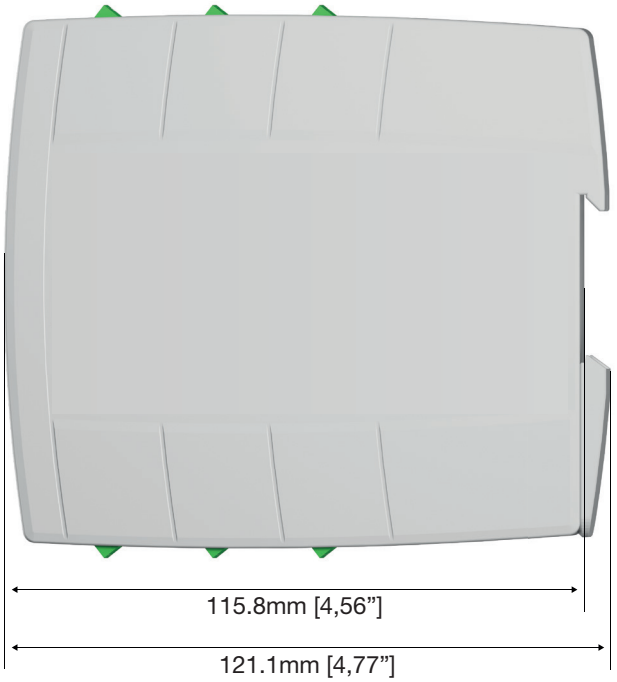

| Element | Component | Function |
|---|---|---|
| A | Pluggable terminal blocks | Power supply, start signal, safety inputs and outputs |
| B | LED | Power supply status |
| C | LED | Safety inputs status |
| D | LED | Safety outputs status |

# Features

## General

| | SMS20 | SMS31 |
|---|---|---|
| **Material** | PA-GF, self-extinguishing: UL 94 V-0 | |
| **Weight** | 209g | 239g |
| **Assembly** | DIN rail mounting (According to EN 50022) | |




## Electrical data

| | |
|---|---|
| **Supply voltage** | 24Vdc ± 10%; 24Vac -15%/+10%, 50…60 Hz, Class 2 |
| | Overvoltage category III |
| | Short circuit protection internal PTC |
| **Rated insulation** | 4 kV coil to contacts<br>4 kV contact to contact |

## Inputs

| | |
|---|---|
| **Number of safety channels** | 2 |
| **Safety inputs (contact inputs)** | S11-S12 and S21-S22 |
| **Loop resistance** | Max. 1 kΩ |
| **Input current** | Typical 5 mA |

## Outputs

| | SMS20 | SMS31 |
|---|---|---|
| **NO safety outputs** | 2 | 3 |
| **NC auxiliary output** | 0 | 1 |
| **Type** | Voltage free contact output, relays with forcibly guided contacts | |
| **Max current rating - single output** | @ 60°C (140°F) operating temperature:<br>AC 1: 250V / 6A / 2000 VA - AC 15: 230V / 3A<br>DC 1: 24V / 6A - DC 13: 24V / 2.5A / 0.1 Hz<br>UL508, pilot duty: B300 / R300 | |
| **Max quadratic current** | Spacing between modules ≥100mm: 72A$^2$ @40°C (104°F) ambient temperature<br>Modules mounted stacked: 26A$^2$ @25°C (77°F) ambient temperature<br>Please refer to the derating curves in installation manual | |
| **Mechanical life** | > $10^7$ operations | |
| **Electrical life AC1 (360 s/h)** | ~ $10^5$ operations | |

## Safety parameters

| | |
|---|---|
| **ISO 13849-1 Safety Category** | Cat. 4 |
| **ISO 13849-1 Performance Level** | PL e |
| **EN 81-20** | Certified |
| **EN 81-50** | Certified |
| **$MTTF_D$ [a]** | 420,8 |
| **$PFH_D$ [1/h]** | 1,85 E-10 |
| **DCavg** | 99% |
| **ß** | 5,00 E-02 |
| **$ß_D$** | 2,00 E-02 |
| **Mission time** | 20 years |

## Compatibility and conformity

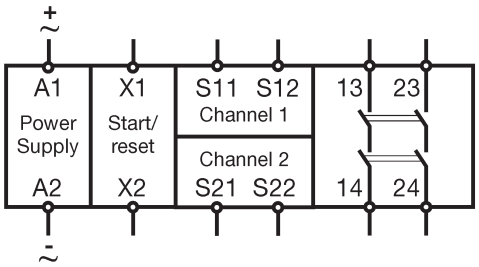
| | |
|---|---|
| **Low Voltage Directive 2014/35/EU** | **EN 60947-5-1**<br>Low-voltage switchgear and controlgear - Control circuit devices and switching elements - Electromechanical control circuit devices |
| **EMC Directive 2014/30/EU** | **EN 60947-5-1**<br>Low-voltage switchgear and controlgear - Control circuit devices and switching elements - Electromechanical control circuit devices |
| **Machinery Directive 2006/42/EC**<br>**EC type examined by TÜV Rheinland**<br>**Cert. no. 01/205/6003.00/25** | **EN ISO 13849-1**<br>Safety of machinery - safety related parts of control systems - General principles for design<br>**EN 60204-1**<br>Safety of machinery - Electrical equipment of machines - General requirements E-stop category 0<br>**EN 61326-3-1**<br>Electrical equipment for measurement, control and laboratory use. EMC requirements. Immunity requirements for safety-related systems and for equipment intended to perform safety-related functions (functional safety) - General industrial applications |
| **Lifts Directive 2014/33/EU**<br>**EU type examined by TÜV Rheinland**<br>**Cert. no. 01/208/4A/6149.00/25** | **EN 81-20**<br>Safety rules for the construction and installation of lifts. Part 20: passenger and goods passenger lifts<br>**EN 81-50**<br>Safety rules for the construction and installation of lifts. Part 50: design rules, calculations, examinations and tests of lift components<br>**EN 12015**<br>Electromagnetic compatibility. Product family standard for lifts, escalators and passenger. Emission<br>**EN 12016**<br>Electromagnetic compatibility. Product family standard for lifts, escalators and passenger. Immunity |
| **Approvals** | CE c UL us LISTED RoHS COMPLIANT |

## Environmental

| | |
|---|---|
| **Protection grade** | IP40 on frontal part of the housing, IP20 on the terminals. The device has to be installed in a cabinet with protection degree of IP54. |
| **Pollution degree** | 2 |
| **Operating Temperature** | -25…+60°C (-13…140°F), UL: +40°C (104°F);<br>tested @ temp 65°C (149 °F) as per lift norm |
| **Storage Temperature** | -30…+70°C (-22…158°F) |
| **Ambient humidity range** | R.H. ≤95% non condensing |

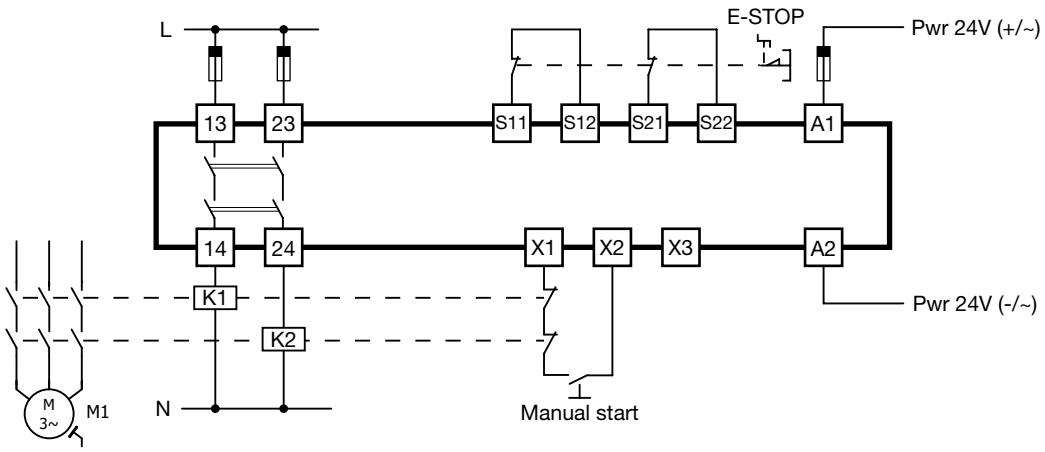
# Connection Diagrams

## SMS20

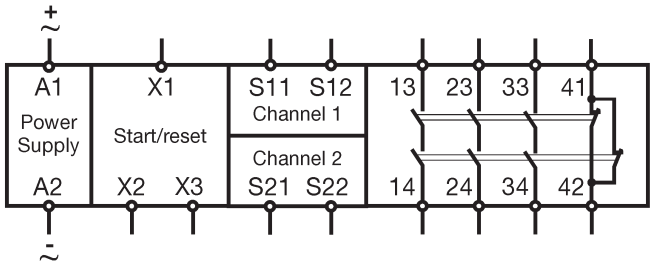



| Terminal | Function |
|---|---|
| **A1** | power supply 24 Vdc (+)/Vac(~) |
| **A2** | power supply 24 Vdc (-)/Vac(~) |
| **S11-S12** | channel 1 NO input |
| **S21-S22** | channel 2 NO input |
| **X1-X2** | manual start / automatic start |
| **X1-X3** | monitored manual start |
| **13-14** | NO safety output |
| **23-24** | NO safety output |

### Double channel mode



## SMS31

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| **S21-S22** | channel 2 NO input |
| **X1-X2** | manual start / automatic start |
| **X1-X3** | monitored manual start |
| **13-14** | NO safety output |
| **23-24** | NO safety output |
| **33-34** | NO safety output |
| **41-42** | NC auxiliary output |

### Double channel mode