

Safety module SM2H21



Original datasheet - Two-hand control



Main features

- **Two-hand control.** SM2H21 monitors the safe operation of Type III-C two-hand control consoles in accordance with EN ISO 13851
- **Machinery Directive compliance.** Cat. 4, PL e in accordance with EN ISO 13849-1
- **Safety outputs.** Electromechanical forcibly guided safety relays with 2NO+1NC aux outputs
- **Flexible wiring.** The module is 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

Description

The SM2H21 safety module is designed in Category 4, Performance Level e in accordance with the Machine Directive and EN ISO 13849-1 to monitor and control safely the operation of two-hand control consoles (Type III-C according to EN ISO 13851).

The device enables the safety control outputs only if the two buttons of the console are activated by the operator simultaneously or with a max interval of 500 ms from each other.

Main functions

- Monitoring of the safe operation of two-hand control consoles (Type III-C as per EN ISO 13851), used in applications requiring the operator to supervise safely the operation of the machinery
- Double safety channels operation of two-hand control consoles
- Control of 2 NO safety outputs with electromechanical safety relays
- 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 that can be used for external status indication

References

Type selection

NO safety outputs	Aux NC output	Ordering code
2	1	SM2H21

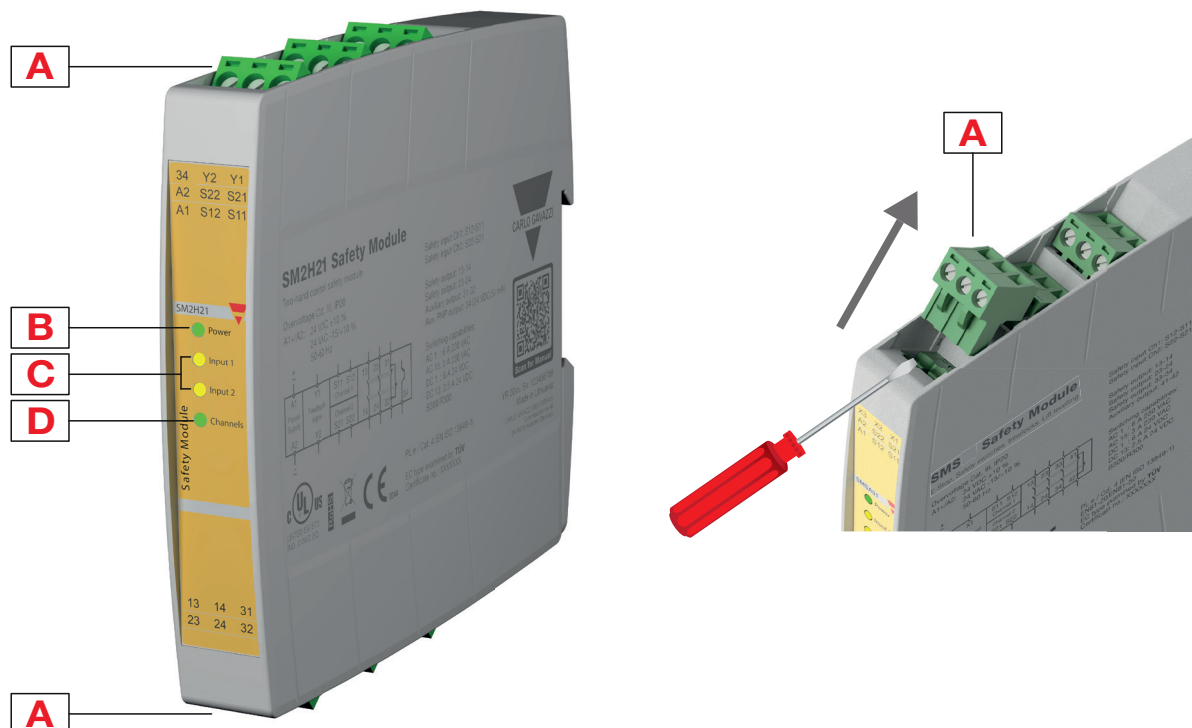
Further reading

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



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Structure

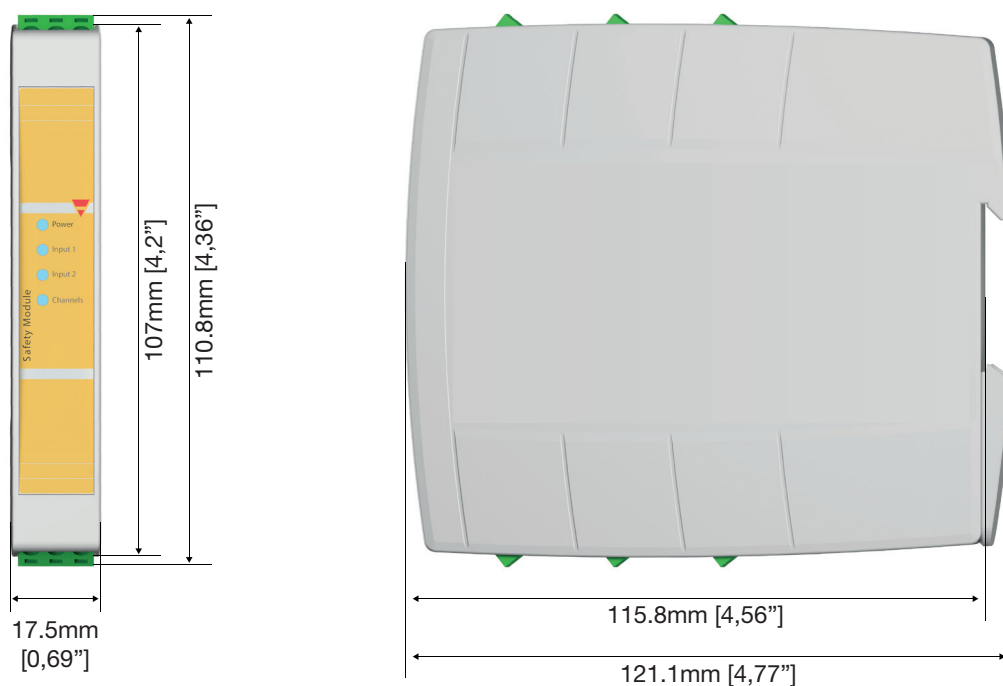


Element	Component	Function
A	Pluggable terminal blocks	Power supply, feedback signal, safety inputs and outputs
B	LED	Power supply status
C	LED	Safety inputs status
D	LED	Safety outputs status

Features

General

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



Electrical data

Supply voltage	24Vdc $\pm$ 10%; 24Vac -15%/+10%, 50...60 Hz, Class 2
	Overvoltage category III
	Short circuit protection internal PTC
Rated insulation	4 kV coil to contacts
	4 kV contact to contact

Inputs

Number of safety channels	2
Safety inputs (contact inputs)	S11-S12 and S21-S22
Loop resistance	Max. 30 k Ω (eq. 2500m 1,5mm ² Cu)
Input current	Typical 30 mA

Outputs

NO safety outputs	2
NC auxiliary output	1
PNP auxiliary output	1; PNP collector, 24 Vdc, min external resistive load 2.4 kΩ
NO and NC outputs type	Voltage free contact output, relays with forcibly guided contacts
Max current rating - single output	@ 60°C (140°F) operating temperature: AC 1: 250V / 6A / 2000 VA - AC 15: 230V / 3A DC 1: 24V / 6A - DC 13: 24V / 2.5A / 0.1 Hz UL508, pilot duty: B300 / R300
Max quadratic current	Spacing between modules ≥100mm: 72A ² @40°C (104°F) ambient temperature Modules mounted stacked: 26A ² @25°C (77°F) ambient temperature 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
MTTF _d [a]	422,1
PFH _d [1/h]	1,35 E-10
DCavg	99%
β	5,00 E-02
β _d	2,00 E-02
Mission time	20 years

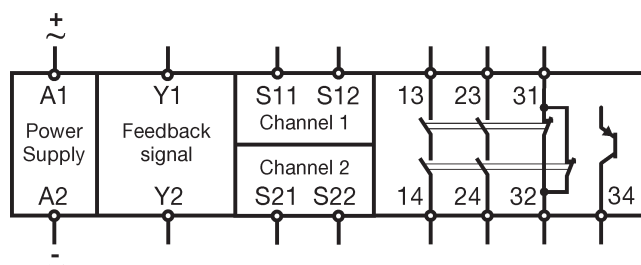
Compatibility and conformity

Low Voltage Directive 2014/35/EU	EN 60947-5-1 Low-voltage switchgear and controlgear - Control circuit devices and switching elements - Electromechanical control circuit devices
EMC Directive 2014/30/EU	EN 60947-5-1 Low-voltage switchgear and controlgear - Control circuit devices and switching elements - Electromechanical control circuit devices
Machinery Directive 2006/42/EC EC type examined by TÜV Rheinland Cert. no. 01/205/6003.00/25	EN ISO 13849-1 Safety of machinery - safety related parts of control systems - General principles for design EN 60204-1 Safety of machinery - Electrical equipment of machines - General requirements EN ISO 13851 Safety of machinery - Two-hand control devices - Principles for design and selection. Two-hand control type III-C EN 61326-3-1 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
Approvals	  

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)
Storage Temperature	-30...+70°C (-22...158°F)
Ambient humidity range	R.H. ≤95% non condensing

Connection Diagrams



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
Y1-Y2	NC feedback input
13-14	NO safety output
23-24	NO safety output
31-32	NC auxiliary output
34	PNP auxiliary output

