

Safety Modules

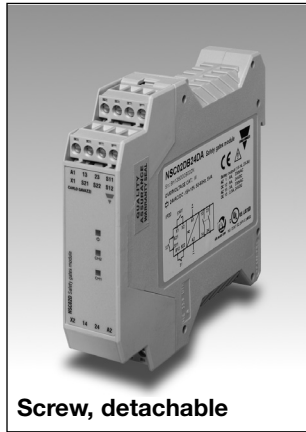
Safety Gate and Safety Magnetic Sensor

Types NSC02D, NSC13D

CARLO GAVAZZI



Screw, fixed



Screw, detachable

- Safety Category 4, Performance Level e, according to EN 13849-1
- Safety Category 4 according to EN 954-1
- Category 0 Emergency Stop (EN 60204-1)
- Input type: 1 NO + 1 NC
- 2 x 6 A NO safety outputs (NSC02D)
- 3 x 6 A NO safety outputs and 1 x 6 A NC auxiliary output (NSC13D)
- Automatic / manual or monitored manual reset
- Single / double channel operations
- LED indication for outputs status and power supply ON
- Connection by fixed or detachable terminals
- For mounting on DIN-rail in accordance with DIN/EN 50 022
- 22.5 mm Euronorm housing

Product Description

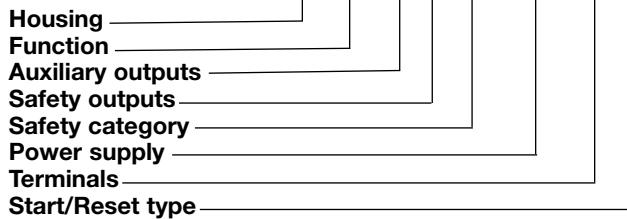
Safety gate and safety magnetic sensor modules according to EN 60204-1, EN 292-1/-2, EN 418 and EN1088.

This family of safety module in Safety Category 4,

Performance Level e, includes fixed screw and detachable screw as well as automatic / manual or monitored manual restart versions.

Ordering Key

N SC 0 2 D B24 S A



Type Selection

Auxiliary outputs	Safety outputs	Terminals	Start/Reset type	Supply: 24 VAC/DC
	2 NO	Screw, fixed	Automatic / Manual	N SC 0 2 D B24 S A
	2 NO	Screw, fixed	Monitored manual	N SC 0 2 D B24 S C
	2 NO	Screw, detachable	Automatic / Manual	N SC 0 2 D B24 D A
	2 NO	Screw, detachable	Monitored manual	N SC 0 2 D B24 D C
1 NC	3 NO	Screw, fixed	Automatic / Manual	N SC 1 3 D B24 S A
1 NC	3 NO	Screw, fixed	Monitored manual	N SC 1 3 D B24 S C
1 NC	3 NO	Screw, detachable	Automatic / Manual	N SC 1 3 D B24 D A
1 NC	3 NO	Screw, detachable	Monitored manual	N SC 1 3 D B24 D C

Time Specification

Delay ON energisation	< 150 ms
Delay ON de-energisation	< 30 ms
Recovery time	≥ 30 ms
Channel simultaneity during outputs closing	Infinite
Input operating to START operating delay NSC...C	> 500 ms

Input Specification

Function	1 NO + 1NC, voltage free
Input current	
NSC02D	
Terminals S12-S22	max. 35 mA
Terminals S11-S21	max. 10 mA
NSC13D	
Terminals S11-S12	max. 35 mA
Terminals S21-S22	max. 10 mA
Input resistance	
NSC02D	
Terminals S12-S22	max. 3.3 kΩ
NSC13D	
Terminals S11-S12	max. 3.3 kΩ
External contact resistance	
NSC02D	
Terminals S12-S22	max. 60Ω
Terminals S11-S21	max. 60Ω
NSC13D	
Terminals S11-S12	max. 60Ω
Terminals S21-S22	max. 60Ω

Output Specification

Safety outputs	Category 4, Performance Level e (EN 13849-1)
NSC02D	2 NO (13-14, 23-24)
NSC13D	3 NO (13-14, 23-24, 33-34)
Auxiliary output	
NSC13D	1 NC (41-42)
Rated insulation voltage	250 VAC (rms)
Contact ratings (AgSnO₂)	2 µm Au
Safety outputs	
Resistive loads	AC1 6 A @ 230 VAC DC12 6 A @ 24 VDC
Small inductive loads	AC15 3 A @ 230 VAC DC13 2.5 A @ 24 VDC
Auxiliary output	6A, 24 VAC/DC
External contact fuse protection	5 A fast, 4 A slow
Mechanical life	> 10 ⁷ operations
Electrical life	> 10 ⁵ operations
Dielectric strength	
Dielectric voltage	4 kVAC (rms)

Supply Specifications

Power supply	Rated operational voltage through terminal: A1, A2	Overvoltage cat III (IEC 60664)
		24VAC - 15% / 10%, 50 to 60 Hz 24 VDC - 15% / +10%
Short circuit protection		Internal PTC
Dielectric voltage	Supply to input Supply to output Input to output	DC supply none 4 kV 4kV AC supply none 4kV 4kV
Rated operational voltage		max 5 VA

General Specification

Indication for		Weight	Approx. 200 g
Power supply ON	LED, green	Screw terminals	
Output relays ON	LED, green (CH 1, CH2)	Tightening torque	Upper terminals
Environment	(EN 60529)	Max. 0.5 Nm	Lower terminals
Degree of protection	IP 20	Lower terminals	Max 0.8 Nm
Pollution degree	2	Approvals	cULus, TUV
Operating temperature	-25 to 65°C, R.H. < 95%	CE Marking	Yes
Storage temperature	-30 to 65°C, R.H. < 95%	EMC	
Minimum protection degree of the installation location	IP 54	Immunity	Electromagnetic Compatibility
Housing dimensions	22.5 x 99 x 114 mm	Emission	According to EN 61000-6-2 According to EN 61000-6-3

Mode of Operation

The safety modules NSC02D and NSC13D monitor both mechanical switches and safety magnetic sensors (1 NO + 1 NC contact outputs), according to 98/37/CE Machinery Directive. If the unit is correctly supplied and the input terminals are operated (S1 closed and S2 open, i.e. safety gate closed), the module is enabled to close the safety outputs and the external contactors can be energized. When the input terminals are released (S1 open and S2 closed, i.e. safety gate open) the module is not enabled to close the safety outputs and the external contactors can not be energized.

Automatic START

Provided that the terminals X1 and X2 (NSC02...A) or S33 and S34 (NSC13...A) are connected, the safety outputs close and the auxiliary output opens (NSC13...A) as soon as both S1 and S2 switches operate. The relevant CH1 and CH2 LED turn on. Releasing even one input contact (S1 and/or S2) forces immediately the safety outputs to open and the auxiliary output (NSC13...A) to close.

A new operating cycle is possible only after releasing both input contacts and then operating them again.

Manual START

Provided that S1 switch is

closed and S2 is open, the safety outputs close and the auxiliary output opens (NSC13...A) as soon as the NO START pushbutton is pushed [connecting X1 and X2 (NSC02...A) or S33 and S34 (NSC13...A)] A new operating cycle is possible only after releasing both input contacts, closing them again and pushing the START button.

Monitored manual START

The monitored manual START versions (NSC...C) work as described in the previous paragraph (Manual START) except for a minimum delay of 500 ms from the operated status of the input contacts (S1 closed, S2 open) to the

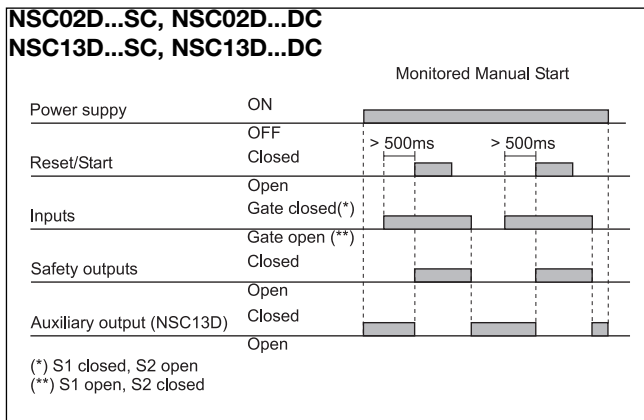
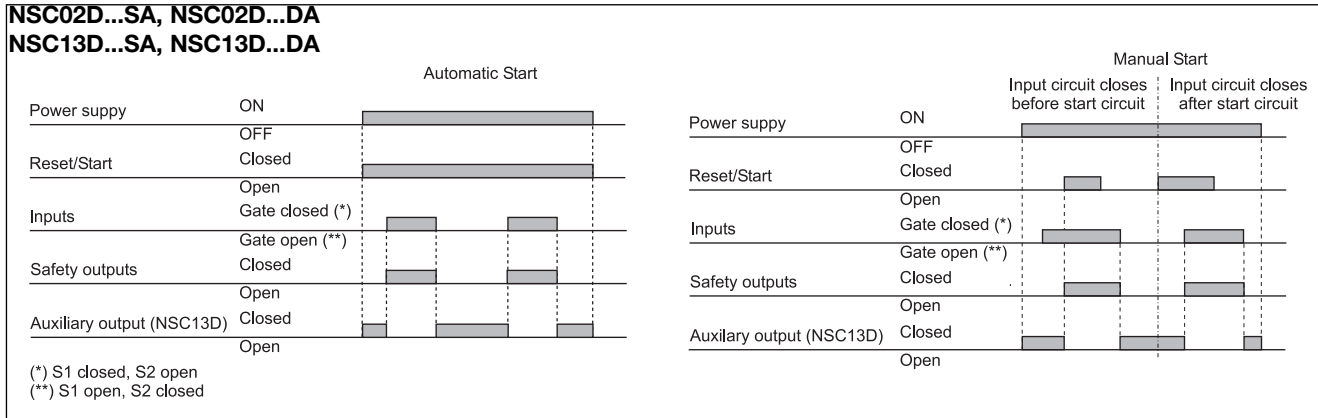
pushing of the START button. If the input terminals get operated with the START switch already closed, the safety outputs don't close and the auxiliary doesn't open (NSC13...C): it is necessary to release the START button and the input contacts before starting a new cycle, then operate the input contacts and finally, after at least 500 ms, operate the START button.

So if the NO START button gets welded, the outputs don't close anymore.

Note.

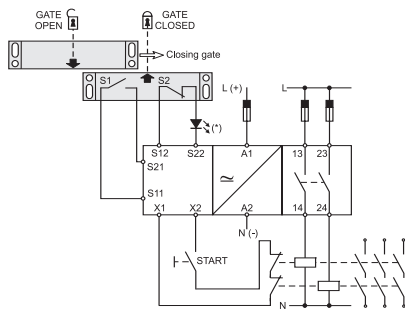
NSC02D and NSC13D can be also used as Emergency Stop modules, ensuring up to Safety Category 3.

Operational Diagram



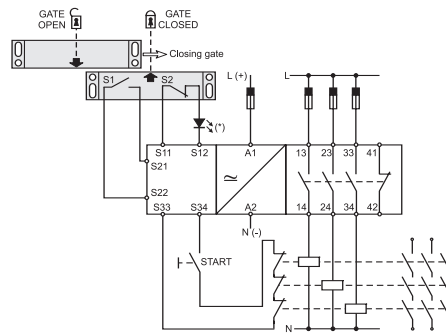
Wiring Diagrams

NSC02D - Magnetic sensor and one access monitoring (Double channel)



(*) External device signalling LED

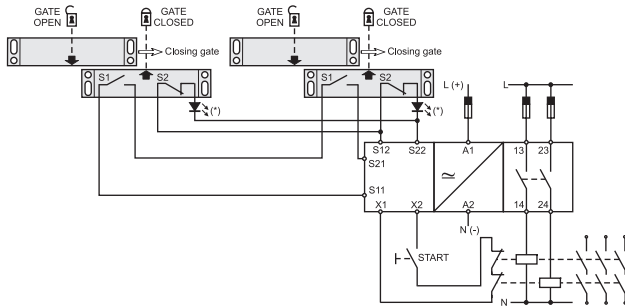
NSC13D - Magnetic sensors and one access monitoring (Double channel)



(*) External device signalling LED

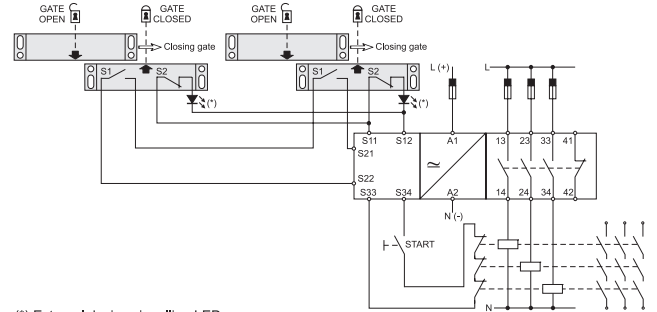
Wiring Diagrams (cont.)

NSC02D - Magnetic sensors and two accesses monitoring (Double channel)



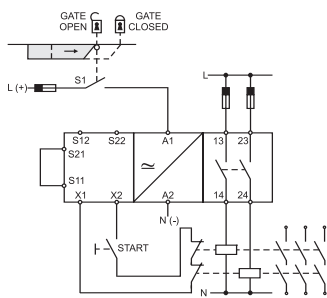
(*) External device signalling LED

NSC13D - Magnetic sensors and two accesses monitoring (Double channel)

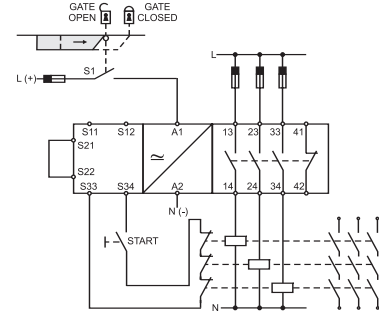


(*) External device signalling LED

NSC02D - Mechanical switch and one access monitoring (Single channel)

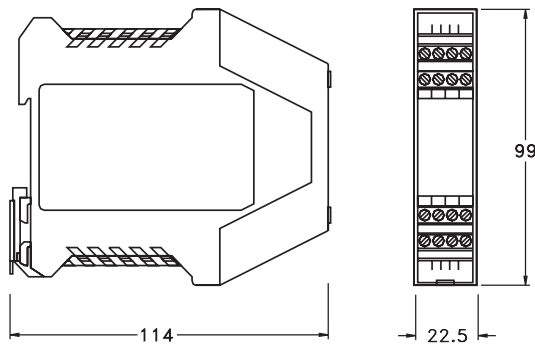


NSC13D - Mechanical switch and one access monitoring (Single channel)

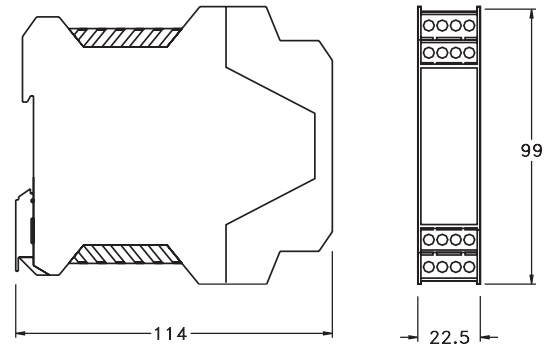


Dimensions

Versions with fixed terminals



Versions with detachable terminals



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