Safety Modules
Safety Gate and Safety Magnetic Sensor
Types NSC02D, NSC13D

Screw, fixed

Screw, detachable

- **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, 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

- **Housing**
- **Function**
- **Auxiliary outputs**
- **Safety outputs**
- **Safety category**
- **Power supply**
- **Terminals**
- **Start/Reset type**

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 Specifications

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 Specifications

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

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Output Specifications

Safety outputs	Category 4 (EN 954-1)
NSC02D	2 NO (13-14, 23-24)
NSC13D	3 NO (13-14, 23-24, 33-34)
Auxilary output	
NSC13D	1 NC (41-42)
Rated insulation voltage	250 VAC (rms)
Contact ratings ($AgSnO_2$)	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	Overvoltage cat. III (IEC 60664)	
Rated operational voltage through terminals: A1, A2	24 VAC -15% / +10%, 50 to 60 Hz 24 VDC -15% / +10%	
Short circuit protection	Internal PTC	
Dielectric voltage	**DC supply**	**AC supply**
Supply to input	none	none
Supply to output	4 kV	4 kV
Input to output	4 kV	4 kV
Rated operational power	max 5 VA	

General Specifications

Indication for	
Power supply ON	LED, green
Output relays ON	LED, green (CH 1, CH2)
Environment	(EN 60529)
Degree of protection	IP 20
Pollution degree	2
Operating temperature	-25 to 65°C, R.H. < 95%
Storage temperature	-30 to 65°C, R.H. < 95%
Mimimum protection degree of the installation location	IP 54
Housing dimensions	22.5 x 99 x 114 mm

Weight	Approx. 200 g
Screw terminals	
Tightening torque	
Upper terminals	Max. 0.5 Nm
Lower terminals	Max 0.8 Nm
Approvals	cULus, TUV
CE Marking	Yes
EMC	Electromagnetic Compatibillity
Immunity	According to EN 61000-6-2
Emission	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 nec-

Mode of Operation (cont.)

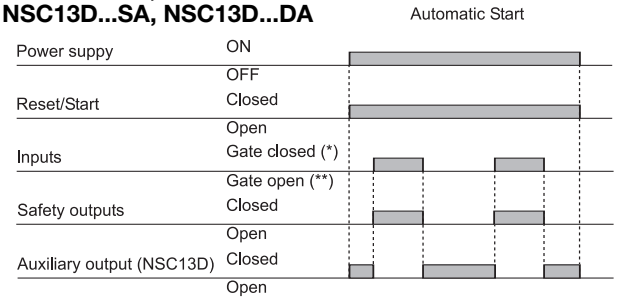
essary to release the START button and the input contacts before starting a new cycle, then operate the input contacts and finally, after at least 500 ms, operate the START button.

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

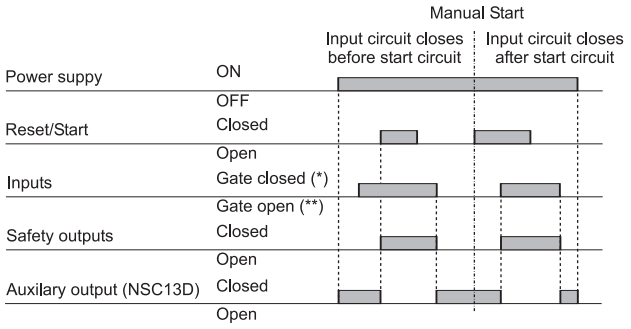
Note.
NSC02D and NSC13D can be also used as Emergency Stop modules, ensuring up to Safety Category 3.

Operation Diagrams

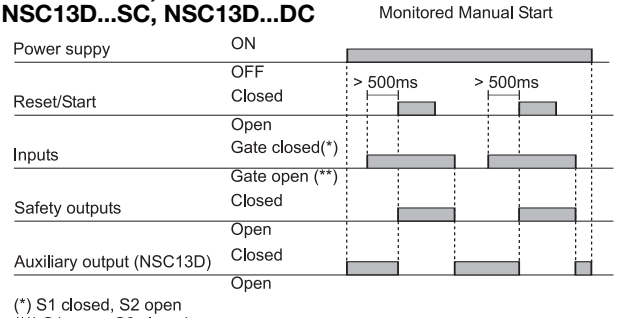
NSC02D...SA, NSC02D...DA
NSC13D...SA, NSC13D...DA



(*) S1 closed, S2 open
(**) S1 open, S2 closed



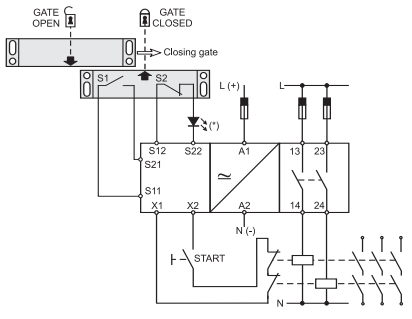
NSC02D...SC, NSC02D...DC
NSC13D...SC, NSC13D...DC



(*) S1 closed, S2 open
(**) S1 open, S2 closed

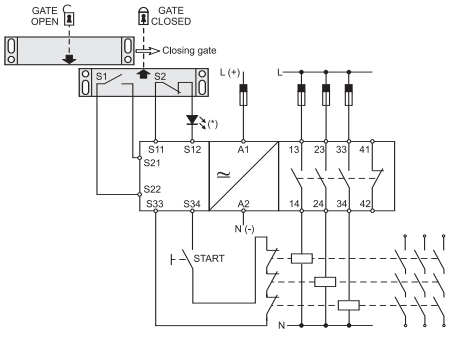
Wiring Diagrams

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

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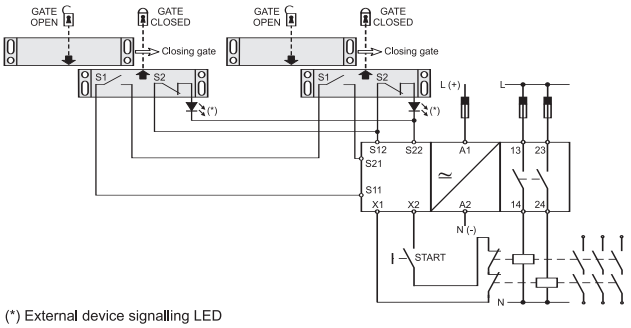
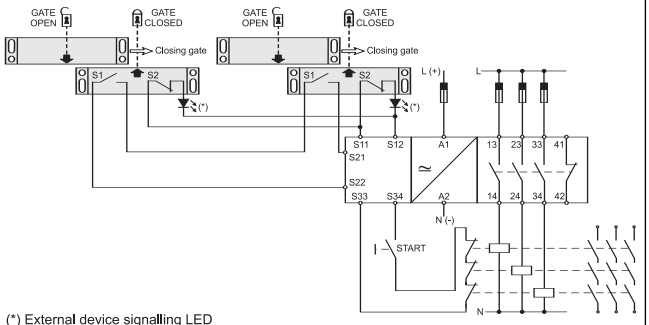
Wiring Diagrams (cont.)

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



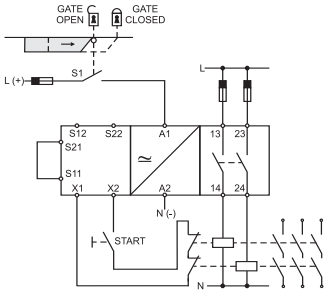
(*) External device signalling LED

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

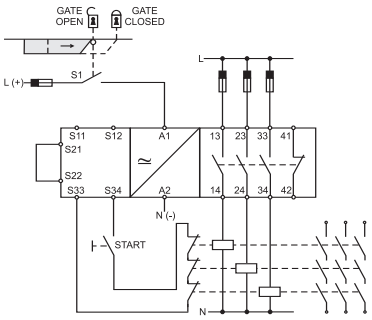


(*) External device signalling LED

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

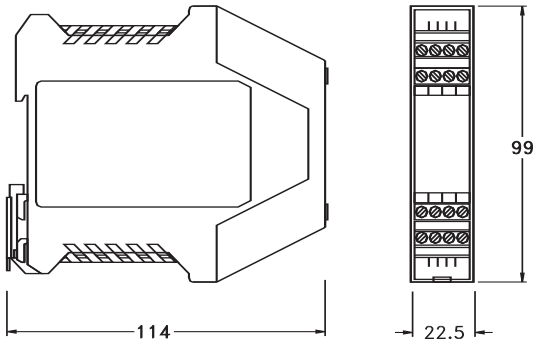


NSC13D - Mechanical switch and one access monitoring (Single channel)



Dimensions

Versions with fixed terminals



Versions with detachable terminals