

# Safety Modules

## Safety Mat and Safety Edge modules

### Types NST02C, NSE02C



- Performance Level d (safety category 3) according to EN 13849-1: 2007
- 2 x 5 A NO safety outputs
- Automatic / manual or monitored manual reset
- Four (NST02C) or two (NSE02C) wire inputs
- LED indication for outputs status and power supply ON
- Connection by fixed screw terminals
- For mounting on DIN-rail in accordance with DIN/EN 50 022
- 22.5 mm Euronorm housing

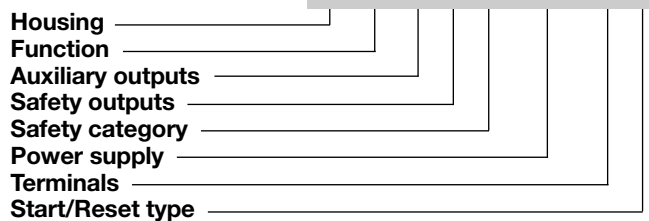
### Product Description

Safety Mat (NST02C) and Safety Edge (NSE02C) modules according to EN 13849-1:2007. These products are the control unit of the safety system for dangerous areas monitoring and they are

designed to be used with the Carlo Gavazzi SM safety mat and SE safety edge. Both automatic/manual or monitored manual restart versions are available.

### Ordering Key

**N ST 0 2 C B24 S A**



### Type Selection

| Safety outputs | Performance Level/<br>Safety Category | Application | Start/Reset type   | Supply: 24 VAC/DC         |
|----------------|---------------------------------------|-------------|--------------------|---------------------------|
| 2 NO           | d/3                                   | Safety Mat  | Automatic / Manual | <b>N ST 0 2 C B24 S A</b> |
| 2 NO           | d/3                                   | Safety Mat  | Monitored manual   | <b>N ST 0 2 C B24 S C</b> |
| 2 NO           | d/3                                   | Safety Edge | Automatic / Manual | <b>N SE 0 2 C B24 S A</b> |
| 2 NO           | d/3                                   | Safety Edge | Monitored manual   | <b>N SE 0 2 C B24 S C</b> |

### Time Specifications

|                          |              |
|--------------------------|--------------|
| Delay ON energisation    | ≤ 30 ms      |
| Delay ON de-energisation | ≤ 30 ms      |
| Recovery time            |              |
| Nxx02CB24SA              | 2 s ± 20%    |
| Nxx02CB24SC              | 400 ms ± 20% |

### Input Specifications

|   |                                |
|---|--------------------------------|
| Function  | 4 wires (NST)<br>2 wires (NSE) |
| External resistor to be connected between the two layers (NSE02C) | 8.2 kΩ                         |
| Input current   |                                |
| NST02C  |                                |
| Terminals T11-T12   | Max. 2 mA                      |
| Terminals T21-S22   | Max. 2 mA                      |
| Terminals S1-S2   | Max. 4 mA                      |
| NSE02C  |                                |
| Terminals T11-T22   | Max. 2 mA                      |
| Terminals S1-S2   | Max. 4 mA                      |

### Output Specifications

|                                       |   |
|---------------------------------------|---|
| Safety outputs                        | Performance Level d (Safety category 3) (EN 13849-1: 2007)<br>2 NO (13-14, 23-24) |
| Rated insulation voltage              | 250 VAC (rms)   |
| Contact ratings (AgSnO <sub>2</sub> ) | 2 μm Au   |
| Resistive loads                       | AC1 5 A @ 230 VAC<br>DC12 5 A @ 24 VDC  |
| Small inductive loads                 | AC15 1.5 A @ 230 VAC<br>DC13 1.2 A @ 24 VDC                                       |
| External contact fuse protection      | 5 A fast, 4 A slow  |
| Mechanical life                       | > 10 <sup>7</sup> operations  |
| Electrical life                       | > 10 <sup>5</sup> operations  |
| Dielectric strength                   |   |
| Dielectric voltage                    | 2.5 kVAC (rms)  |

## Supply Specifications

|   |  |
|---|--|
| <b>Power supply</b><br>Rated operational voltage through terminals:<br>A1, A2       | Overvoltage cat. III (IEC 60664)<br><br>24 VAC $\pm 15\%$ , 45 to 65 Hz<br>24 VDC $\pm 15\%$ |
| <b>Short circuit protection</b>   | Internal PTC   |
| <b>Dielectric voltage</b><br>Supply to input<br>Supply to output<br>Input to output | None<br>4 kV (1.2/50 $\mu$ s)<br>4 kV (1.2/50 $\mu$ s)                                       |
| <b>Rated operational power</b>  | Max. 5 VA  |

## General Specifications

|  |   |
|--|---|
| <b>Indication for</b><br>Power supply ON<br>Output relays ON   | LED, green<br>LED, green (CH1, CH2)   |
| <b>Environment</b><br>Degree of protection<br>Pollution degree<br>Operating temperature<br>Storage temperature | (EN 60529)<br>IP 20<br>2<br>0 to 55°C, R.H. < 95%<br>-30 to 65°C, R.H. < 95%            |
| <b>Housing dimensions</b>  | 22.5 x 84 x 100 mm  |
| <b>Weight</b>  | Approx. 200 g   |
| <b>Screw terminals</b><br>Tightening torque  | Max. 0.5 Nm   |
| <b>Approvals</b>   | TUV   |
| <b>CE Marking</b>  | Yes   |
| <b>EMC</b><br>Immunity<br>Emission   | Electromagnetic Compatibility<br>According to EN 61000-6-2<br>According to EN 61000-6-3 |

## Mode of Operation

The safety modules NST02C and NSE02C monitor the status and the integrity of Safety Mats and Safety Edge respectively, according to 98/37/CE Machinery Directive.

If the unit is correctly supplied and the safety mat (or edge) is not pressed, the module is enabled to close the safety outputs and the external contactors can be energized.

When the safety mat (edge) is pressed the module opens the safety outputs and the external contactors can not be energized.

### Automatic START

Provided that the terminals S1 and S2 are connected and the safety mat (edge) is not pressed, the module closes its own safety outputs.

The relevant CH1 and CH2 LED turn on.

If the safety mat (edge) is pressed (layers in contact to each other), the module immediately forces the safety outputs to open.

After the releasing of the safety mat (edge), a new operating cycle starts when a time of 2 seconds has expired.

### Manual START

Provided that the mat (edge) is not pressed, the safety outputs close as soon as the START pushbutton is pushed (connecting S1 and S2).

The relevant CH1 and CH2 LED turn on.

A new operating cycle is possible only after mat (edge) releasing, pushing the START button and waiting for a time of 2 seconds.

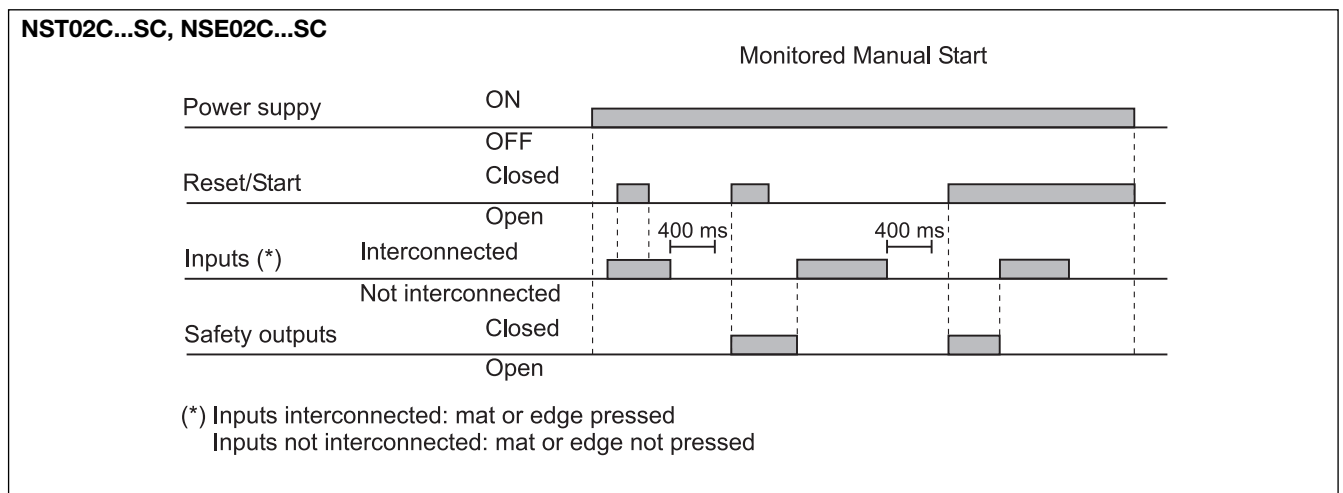
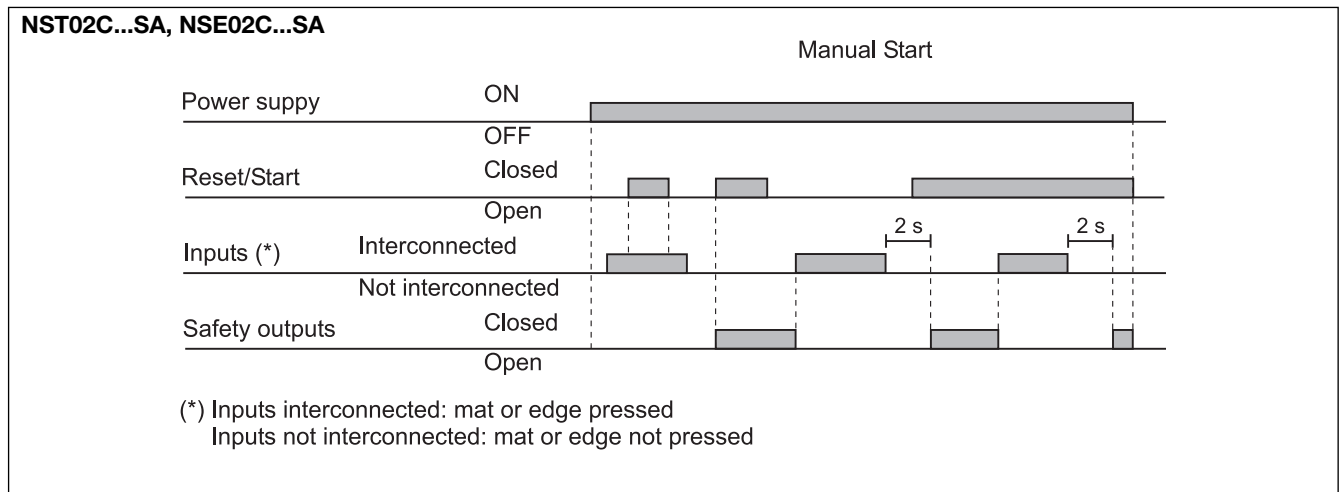
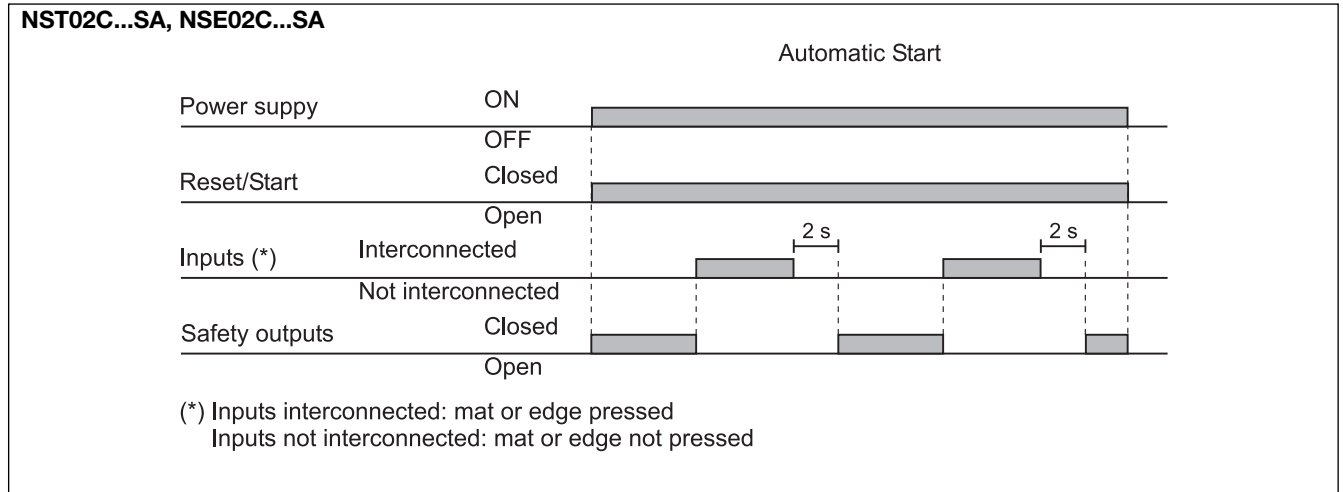
### Monitored manual START

The monitored manual START versions (NST...C and NSE...C) work as described in the previous paragraph (Manual START) except for a minimum delay of 400 ms from the mat (edge) releasing to the pushing of the START button.

If the mat (edge) is released with the START switch already closed, the safety outputs do not close: it is necessary to release the START button and the safety mat (edge) before starting a new cycle, then (after at least 400 ms) operate again the START button.

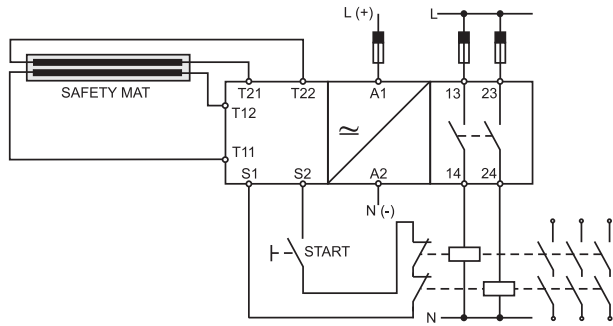
It means that if the START button gets welded, the outputs do not close anymore.

## Operation Diagrams

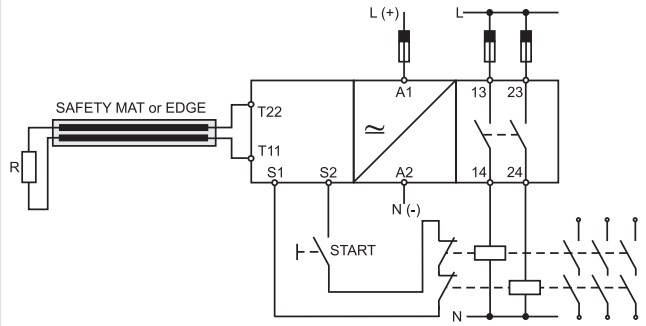


## Wiring Diagrams

NST02C...SA, NST02C...SC



NSE02C...SA, NSE02C...SC



## Dimensions

