



These operating instructions are only valid in conjunction with the operating instructions of the relevant sensors and magnets used, which can be downloaded from the main manuals section at the following link <https://www.stemsrl.it/it/downloads/>. Refer to the table below for the type of STEM sensors combined with the control unit.

Sensor Code	Type	Operating Instructions
See table on next page	Reed encoded	Coded Sensors Manual
Dxxx 3Q, Exxx 3Q	Reed unencoded	Uncoded Sensors Manual

Correct Use

The coded magnetic safety sensors are a series of safety devices suitable for monitoring the status of removable safety guards on board the machine. They ensure that dangerous work on the machines can only be carried out if the safety guards are closed. A stop command is activated only if a safety guard is opened while the machine is in operation.

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PRECAUTIONS

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The safety sensors perform a personal protection function. Incorrect installation or manipulation can cause serious injury to people.

The safety sensors must not be bypassed (short-circuiting the contacts), moved, removed or otherwise rendered ineffective. The switching of the coded sensors can only be controlled by magnets supplied exclusively for this purpose that are permanently connected to the safety guard.

When using non-coded sensors, it is recommended to implement the risk reduction measures provided for in ISO 14119:2024 at point 8.3 a) by making the position of the sensors and actuator magnets inaccessible and hidden.

A complete safety system is generally composed of many signaling devices, sensors, control units. The manufacturer of the machine, or the installer, is responsible for correct and safe operation.

The NC11 01 control unit is not suitable for operation in the presence of ionizing and non-ionizing radiation (X-rays, microwaves, lasers, ultraviolet rays) (EN 60204-1:2018, §4.4.7).

Functioning

The safety system is composed of a control unit, sensors and activation magnets and is only functional in particular configurations (see combination options)!

The sensors connected to the control unit contain reed contacts that are activated by coded magnets. The safety control unit converts the information and transfers the status of the protections to the control system through a safety output.

Following the intervention of the control unit, its reset occurs automatically; the behavior of the machine when the control unit is reset depends on the way the control circuit of the machine itself is created, which must be created in such a way that the closing of the guards does not cause the automatic restart of the dangerous elements; this start must be explicit.

The unit is checked by opening and closing the guard door to ensure its operation. This allows internal errors on the path from the sensors to the control unit output to be detected. Failure to restore correct operation after opening and closing a guard may indicate a fault in the sensor controlling the guard. If an error is detected, the control unit goes into a lockout state. The safety outputs remain open. A maximum of 2 sensors can be connected to the control unit.

Mounting
Installation should only be carried out by authorised personnel. The NC11 01 control unit must be installed in a suitable area of use (switchboard, junction box, at least IP54). The control unit is installed by fixing it to a standard 35 mm DIN rail.

Electrical connections
Electrical connections must be made by authorised personnel only. All inputs must be isolated from the mains supply either by a separate winding transformer in accordance with EN IEC 61558-2-6 with limited output voltage in the event of a fault, or by an equivalent removable mechanism or by a power supply electrically isolated from the mains supply. Terminals A1 and A2 are protected against polarity reversals. Sensors must be connected to the unit with cables of maximum 30 m length. Output 13-14 has a maximum current rating of 3 A; the power supply connected to these outputs must be protected against overcurrent by devices appropriate to the loads to be protected. All output contacts must have an adequate protection circuit for inductive and capacitive loads. All inductive and capacitive loads connected to the power supply must be connected to an appropriate interference suppressor. The supplied jumpers must be inserted, in accordance with the connection diagram, according to the number of sensors connected.

Maintenance and checks
The correct operation of the control unit must be checked by the operator and/or the control circuit of the machine in which it is used at each installation, new wiring or modification of the sensor configuration and in any case periodically (at the beginning of each shift or at the latest within 8 hours) by checking the following :

- Correct switching of each individual sensor

- checking:
- a) that when the individual sensor/guard is opened, the safety exit opens
- (13-14)
- b) that when the same sensor/guard is closed, the safety exit closes
- (13-14)
- Secure fixing of the components
- Correct fixing of the connections.

The monitoring function of the device is carried out at each intervention of the device itself. If with all the protections closed the control unit does not activate its safety output, avoid turning the device off and on, then proceed to check any open guards and carry out the checks indicated above in points a) and b). In case of failure or wear, the damaged system must be replaced.

The warranty coverage is void in the following circumstances:

- if the instructions are not followed
- non-compliance with safety regulations
- installation and electrical connection not carried out by authorised personnel
- failure to carry out the operation checks.

Setup
If the control unit does not appear to operate when the supply voltage is applied (the green PWR LED does not light up), the unit must be returned sealed to the manufacturer. Check whether the safety outputs switch by opening and closing the protective doors. The S1 and S2 LEDs are not indicative of the safety output status of the control unit, but indicate the correct positioning of the sensors and their magnets.

LED displays

Function	LED	Colour	State
Operating voltage	PWR	green	on
Sensor 1			
Magnet in activation area	S1	green	on
Magnet not in activation area	S1	green	off
Sensor 2			
Magnet in activation area	S2	green	on
Magnet not in activation area	S2	green	off

If the sensors are in the activation area, safety output 13/14 is closed and LEDs S1 and S2 are lit.
If only one sensor is used, the LED for the jumpered input lights up and stays lit.

Installing Sensors and Magnetic Units
Install Sensors and Magnetic Units so that:

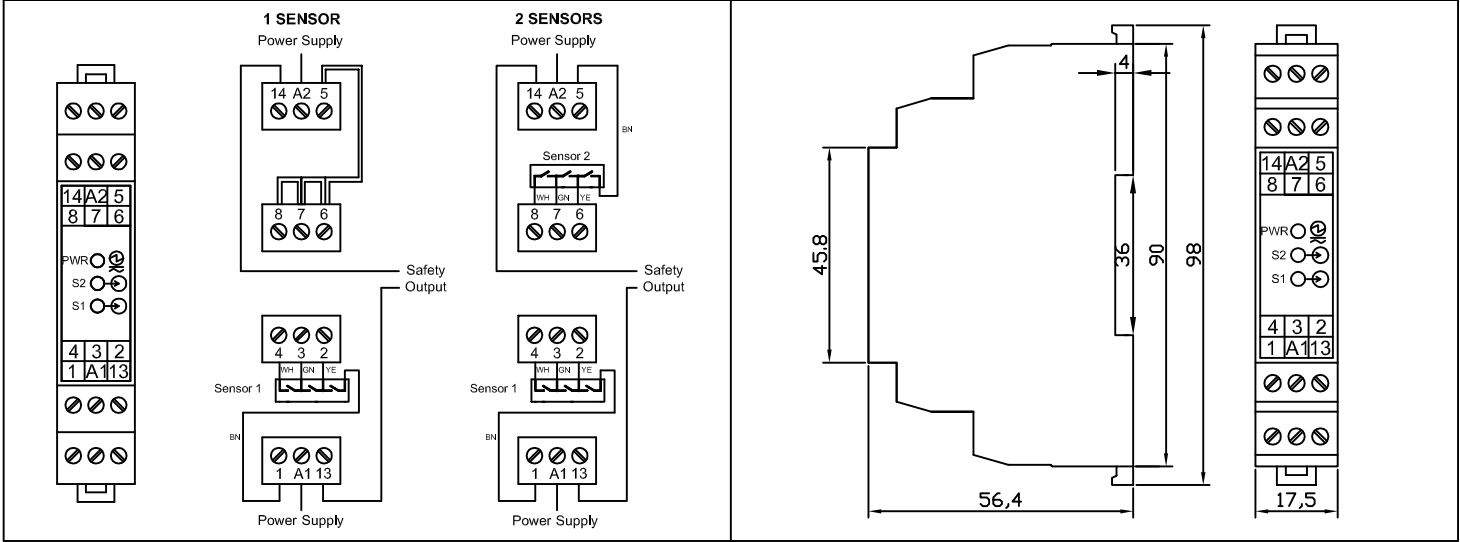
- They are accessible for inspection work and for the installation of spare parts.
- When the safety guard is closed, the active regions of the sensor and the magnetic unit are aligned (**see "Alignment between Sensors and Magnets" in the sensor manual**).
- the magnetic unit is within the activation area of the sensor when the guard is closed.
- An extra guide and locking system are fitted to the moving part of the guard.
- A stop mechanism is fitted to the guard doors for the closed position.

If several Sensor-Magnetic Unit pairs are mounted close to each other, the switching distance is reduced depending on the distance between the pairs and the material of the safety guard.
If Sensors and Magnetic Units are mounted on ferromagnetic material, the switching distance is reduced.
The approach speed between sensor and magnet must not be too low if the unit is configured with automatic start.
To ensure that the round Magnetic Units cannot rotate when fixed to the protective doors, a 2 mm hole must be drilled during installation for the anti-rotation pin that each magnet is equipped with.



Connections (the illustrated input contact configurations refer to open guards or ESBs not pressed)

Dimensions



Combination Options Table

Shape	Sensor	Safety Category	Circuit Diagram	Activation Magnet	Activation Distance Son [mm]*	Deactivation Distance Soff [mm]*	Reset Distance [mm]*
	N510 FC N510 LC	1		M140	< 6	> 14	-
	N510 FD N510 LD			M148	< 18	> 30	-
	N520 FE N520 LE			M125	< 6	> 14	-
	N180 FB			M110 M11A	< 7	> 13	-
	N250 FB N250 LB			M110 M11A	< 7	> 13	-
	N300 FB N300 LB			M113	< 7	> 13	-
	N55x FE			M15x	> 2 *** < 6	> 18	-

* The activation, deactivation and reset distances are affected by ferromagnetic materials. All data refers to an approach in the frontal direction and a central offset of 0.0 mm.

**The activation of the Sensor is guaranteed if included between the two values.

All distances have a tolerance of ±1 mm.

UL Certification Requirements

Power Source (Input)				
Input Terminals		Voltage	Max. Current	
A1-A2		24Vac/dc	45mA	
Auxiliary Outputs (SAFETY)				
Output Terminals	Contacts Type	General Use Or Resistive	Pilot Duty	
13-14	NO	4A/250Vac 4A/24Vac	1A/240Vac 1A/24Vac	-
Environmental Ratings Max. Surrounding Air Temperature: 50°C Pollution Degree: 2 Environmental designation Open type equipment		Installation Notes Use with min. 60°C copper (CU) conductor only Terminal tightening torque: 4.5 LbIn (0,51 Nm)		

Technical Data

Parameter	Value	Units
Container Material	Poliamide PA66	
Dimensions	98 x 56,4 x 17,5	mm
Weight	115	g
Operating temperature	0 ... +50	°C
Storage temperature	-25 ... +70	°C
Degree of protection (IEC 60529)	Terminals: IP20 / Housing: IP40	
Degree of Contamination	2	
Categoria di sovratensione	II	
Assembly	35mm standard DIN rail (EN50022)	
Max number of sensors	2	
Connection type	Terminali a vite	
Supply Voltage	24 ±10%	V AC/DC
Internal fuse on power supply	750 mA PTC	
Output switching voltage	250	V AC
Typ. current consupcion	45	mA
Switching current (Imax @ 24 V)	4	A
Switching current (Imin @ 12 V)	4	mA
Output switching power	1000	VA
Fusibile esterno sull'uscita	4 A gG (acc. to IEC EN 60269-1)	
Safety outputs	1	
Usage category (safety output)	AC-1: 4A, 250V / AC-15: 1A, 250V AC-1: 4A, 24V / AC-15: 1A, 24V DC-13: 4A, 24V	
Security category (EN ISO 13849-1)	1 PL c	
nop (n. of operation / years)	34000	13200 N. cycles/ years
MTTFd	39	100 years
PFHd	2,93x10 ⁻⁶	1,14x10 ⁻⁶
TM	20	years
Output open response time	20	ms
Estimated insulation voltage	250	V
Mechanical life	10 ⁷	N. cycles
Vibration and shock resistance	EN 60947-5-1, EN 60947-5-3	
EMC compliance	EN 60947-5-1, EN 60947-5-3 IEC 61326-3-1	
In accordance with	EN 60204-1, IEC 60664-1, EN ISO 13849-1, EN ISO 13849-2	
Approval	TÜV IT 0948 10 MAC 0008	