

Description

The safety sensors described below are magnetically coded and can be classified as a type 4 interlock with a low coding level according to EN ISO 14119. These instructions are only valid in conjunction with the operating instructions for the relevant NCxx control units.

If they are not used with the relevant NCxx control boxes, the sensors must be interfaced with a safety control unit or PLC and the entire system must be approved for this function. The responsibility for using these sensors as safety sensors lies with the machine manufacturer.

Correct Use

The **N25HGx**, **N30HGx**, **N51HGx** and **N52HGx** sensors are suitable for monitoring the status of removable safety guards on the machine. They ensure that hazardous work on machines can only be carried out if the safety guards are closed.

A stop command is only activated if a safety guard is opened while the machine is running.

Before using the sensors, a risk assessment must be carried out on the machinery in accordance with:

- EN ISO 13849-1, Safety of machinery - Safety-related parts of systems

Part 1: General principles for design.

- EN ISO 14119, interlocking devices associated with guards.

- EN 60204-1, electrical equipment of machines.

- EN 60947-5-3, Low voltage equipment.

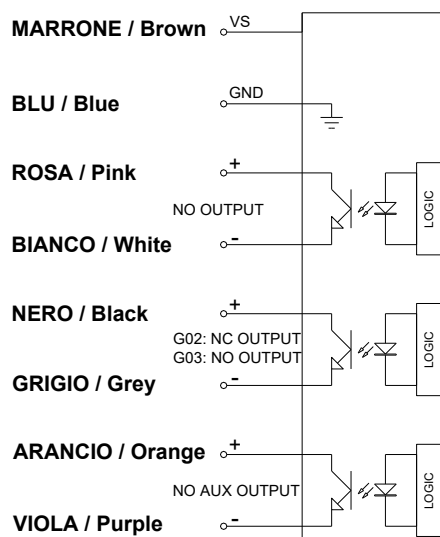
Part 5-3: Devices for control circuits and switchgear - Requirements for proximity devices with defined fault behaviour (PDDb).

Operation

The safety system consists of a control unit, sensors and actuators and is only functional in particular configurations (see "STEM control unit sensor matching options" table)

The devices connected to the control unit contain magnetic Hall effect sensors that are activated by the actuators.

When the actuator approaches the sensor at a distance less than or equal to the assured tripping distance (Sao), the two outputs switch by activating the inputs of the safety control unit and the green signal LED lights up.



The safe state is defined as the state in which the sensor is away from its activation actuator; in this state the signal LED is off, the sensor outputs are one open and the other closed in the case of NO-NC configuration (G1, G2 versions) or both open in the case of NO-NO configuration (G3 version); the auxiliary output is open.

When the actuator is close to the sensor, its outputs reverse their state, becoming respectively one closed and the other open in the case of NO-NC configuration (G1, G2 versions) or both closed in the case of NO-NO sensor (G3 version); the auxiliary output closes.

Electrical connections

Electrical connections should only be made by authorized personnel.

The connection cable of the sensors must not be extended. The sensors must be connected to the control unit according to the suggested diagrams (see also the operating instructions for control units).

CONNECTIONS

COLOR	TPOLOGY	FUNCTION
Brown	Power supply	Positive Power Supply (Vs)
Blue	Power supply	Negative Power Supply (GND)
Pink - White	Opto-isolated output	Channel 1 Output (NO)
Grey - Black	Opto-isolated output	Channel 2 Output (G1, G2 = NC; G3 = NO)
Orange - Purple	Opto-isolated output	Auxiliary Output (NO)



PRECAUTIONS



No liability is accepted for the safe use or operation of sensors or actuators without the relevant NCxx control units.

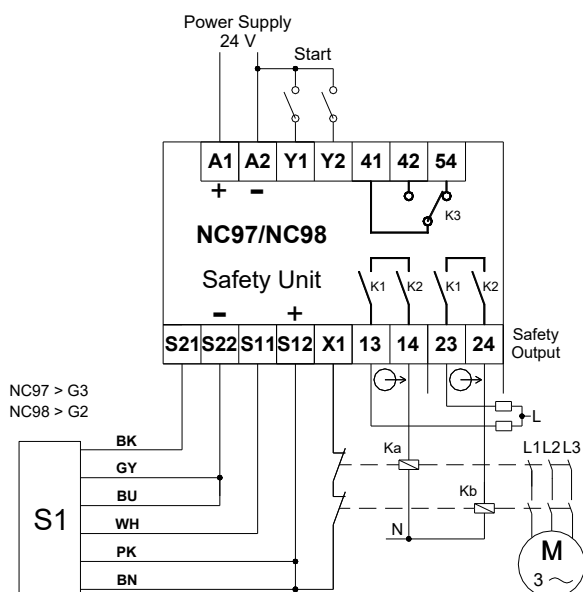
Safe operation is only ensured when the complete system of safety control units is used

If sensors and actuators are used as safety devices without the corresponding control units, the responsibility lies with the plant/machine manufacturer.

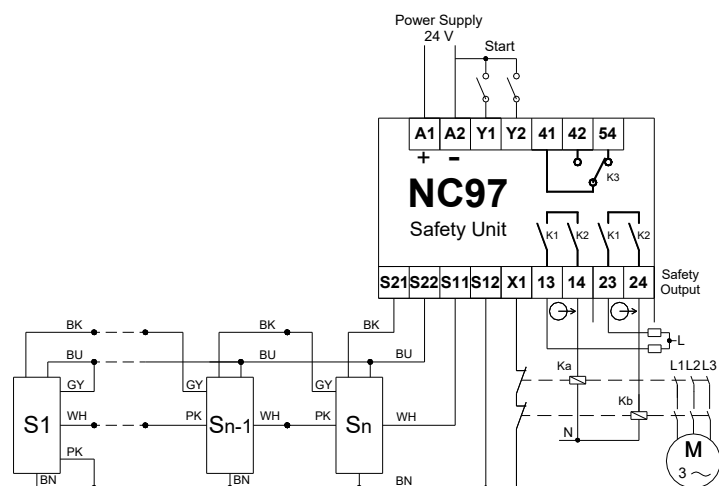
Safety sensors perform a personal protection function. Incorrect installation or manipulation can cause serious personal injury.

Coded sensors should not be bypassed (by shorting contacts), moved, removed, or otherwise rendered ineffective. Switching may only be controlled by coded actuators supplied exclusively for this purpose that are permanently connected to the safety guard.

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

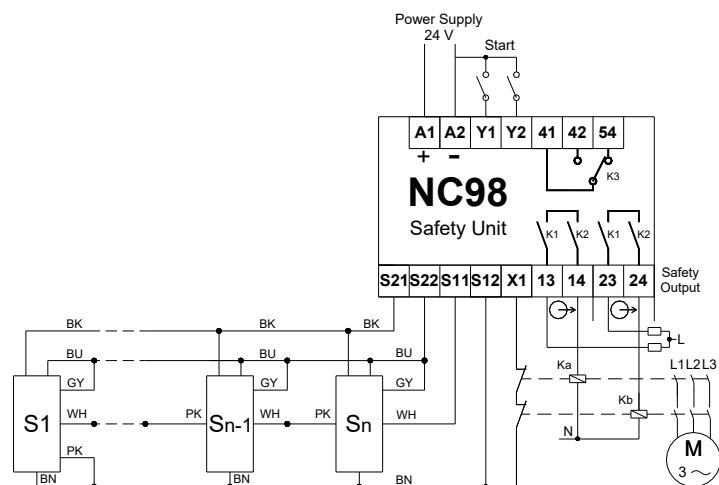


Connection diagram of a single sensor to the NC97/NC98 control units or equivalent models



Connection diagram to the NC97 control unit or equivalent model in case of use of several sensors with G03 option (NO-NO):

- Channels 1 (Pink-White, NO) in series
- Channels 2 (Black-Grey, NO) in series



Connection diagram to the NC98 control unit or equivalent model in case of use of several sensors with G02 option (NO-NC):

- Channels 1 (Pink-White, NO) in series
- Channels 2 (Black-Grey, NC) in parallel

Mounting

Installation must only be carried out by authorized personnel. Prevent dismantling or displacement of actuators (actuators) by the use of non-removable fastening (gluing, one-way screws).

Sensors and actuators should not be used as a mechanical stop.

Sensors and actuators should not be used in an environment with strong magnetic fields.

Sensors and actuators must be attached to safety guards.

Sensors and actuators can be installed in any position. Remember to align between sensors and actuators (see "Alignment between Sensors and Actuators").

Small misalignments are allowed to ensure proper operation even in the event of wear that can result in mechanical slack.

Install sensors and actuators so that:

- 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 magnet are aligned (see "Alignment between Sensors and Actuators");
- the actuator is within the sensor activation area when the guard is closed;
- an extra guide and locking system are inserted in the moving part of the guard;
- a stop mechanism is inserted on the protective doors for the closed position.

If multiple sensors and their actuators are mounted close to each other, the switching distance is reduced depending on the distance between the sensor-actuator pairs and depending on the material of the protection.

If sensors and actuators are mounted on ferromagnetic material, the read distance is reduced.

Maintenance and checks

Remove any iron swarf from the sensors and actuators at regular intervals. Use only solvent-free cleaners to clean sensors and actuators.

Additional safety measures (EN ISO 14119:2025, Table 5)

One of the following safety measures must be applied:

- 1) mount sensors and magnets out of the operator's reach
- 2) physically obstruct or shield sensors and magnets
- 3) mount sensors and magnets in a hidden position
- 4) periodically check (at the beginning of each shift or at the latest within 8 hours) the correct functioning of the sensors by verifying the following:
 - correct switching of each sensor by checking:

- correct switching of each sensor by checking:

- a) that when the single sensor/guard opens, the safety outputs of the control unit open
 - b) that when the same sensor/guard closes, the safety outputs of the control unit close following of any start command
- secure fixing of components
 - correct fixing of the connections.

If one of points 1, 2, 3 is applied, it is still necessary to carry out the check as described in point 4.

The device monitoring function is carried out at each intervention of the device itself by the connected control units.

If, with all the guards closed and following a possible start command, the control unit does not activate its emergency outputs, avoid switching the device off and on, then check any open guards and carry out the checks indicated above in points a) and b).

In the event of a failure or wear, the damaged system must be replaced.

The warranty coverage as well as the manufacturer's liability ceases in the following circumstances:

- The instructions are not followed
- Non-compliance with safety regulations
- Installation and electrical connection not carried out by authorized personnel
- failure to carry out functional checks
- tampering with the product

SENSOR TECHNICAL DATA		
Parameter	Value	Unit
GENERAL FEATURES		
Housing material	PPS Fiberglass Reinforced	
Operating Ambient Temperature	-25 ÷ +80	°C
Degree of protection (IEC 60529)	IP 67	
Connections	Cable with ferrules	
Supply voltage	20-35	V DC
Max no-load current	35	mA
Insulation voltage (U _i)	35	V
Rated withstand voltage (U _{imp})	1500	V
Pollution degree	3	
External fast fuse on the power supply	100	mA
FEATURES SAFE AND AUXILIARY OUTPUTS		
Rated Operating Voltage (U _e)	24	V DC
Insulation voltage (U _i)	35	V
Rated withstand voltage (U _{imp})	1500	V
Maximum output current (I _e)	15	mA
Minimum Operating Current (I _m)	<1	mA
Current at OFF state (I _r)	<0.5	mA
Rapid external fuse in series with the releases	50	mA
Category of use Attention: use freewheeling diode in case of inductive load	DC12, DC13: U _e =24Vdc, I _e =15mA	
Max. freq. switching	500	Hz
Voltage Drop (U _d)	0,7	V
N25HGx ACTIVATION PARAMETERS WITH M110		
Insured Intervention Distance (S _{ao})	14	mm
Assured Release Distance (S _{ar})	18	mm
Repetition accuracy	<10%	
N30HGx ACTIVATION PARAMETERS WITH M113		
Insured Intervention Distance (S _{ao})	14	mm
Assured Release Distance (S _{ar})	18	mm
Repetition accuracy	<10%	
N51HGx ACTIVATION PARAMETERS WITH M140 H1		
Insured Intervention Distance (S _{ao})	10	mm
Assured Release Distance (S _{ar})	20	mm
Repetition accuracy	<10%	
N52HGx ACTIVATION PARAMETERS WITH M120 H1		
Insured Intervention Distance (S _{ao})	6	mm
Assured Release Distance (S _{ar})	13	mm
Repetition accuracy	<10%	

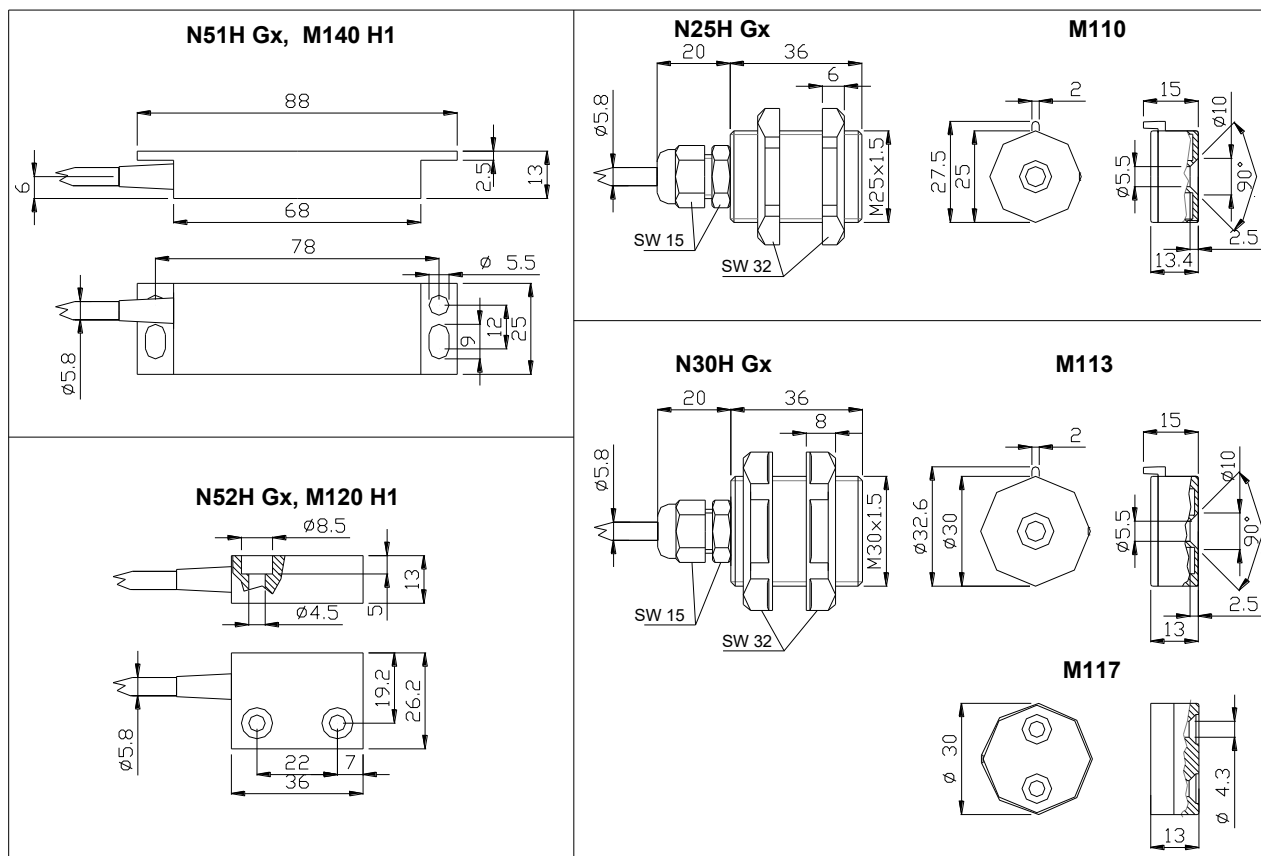
All the distances have a tolerance of ±1 mm.
Activation and release distances are influenced by ferromagnetic materials.
All the data applies to the frontal direction of approach and a center offset of 0,0 mm.

RELIABILITY PARAMETERS			
Parameter	Sensor	Value	Unit
MTTFd	N25HG1	1128	years
	N30HG1	1026	
	N51HG1	1100	
	N52HG1	1100	
	N25HG2	1075	
	N30HG2	983	
	N51HG2	1051	
	N52HG2	1051	
	N25HG3	1060	
	N30HG3	970	
	N51HG3	1037	
	N52HG3	1036	
TM		20	years
Diagnostic Coverage (DC)		Delegated to the control unit control	
Deactivation time		< 10	ms
Time to Risk		Delegated to the control unit control	
APPROVALS			
Vibration and shock resistance		EN60947-5-3	
Electromagnetic compatibility		EN60947-5-3, EN61326-3-1	
Product Compliance		EN60947-5-3, EN14119 Type 4 Low level of coding	
Certificate		TUV IT 25 MAC 510	

ACTUATORS TECHNICAL DATA		
Parameter	Value	Unit
Body material	PPS Fiberglass Reinforced	
Operating Ambient Temperature	-25 ÷ +80	°C
Degree of protection (IEC 60529)	IP 67	
Vibration and shock resistance	EN60947-5-3	

COMBINATIONS OF SENSORS – ACTUATORS – STEM CONTROL UNITS			
Sensor	Actuator	Type of outputs	Units
N25HG1	M110	NO-NC	NC20, NC21, NC62, NC66, NC98, NC9801
N30HG1	M113		
N51HG1	M140 H1		
N52HG1	M120 H1		
N25HG2	M110		
N30HG2	M113		
N51HG2	M140 H1		
N52HG2	M120 H1	NO-NO	NC96, NC85, NC86, NC97, NC9701
N25HG3	M110		
N30HG3	M113		
N51HG2	M140 H1		
N52HG2	M120 H1		

Mechanical Dimensions (mm)



ORDERING CODES

N51H Gx / N52H Gx

N5xH Gx xx x xxx x

Esempio di codice d'ordine sensore / Sensor ordering code example

N51H G1 OL P 196 N

Serie corpo:
N51H, N52H
Body series:
N51H, N52H

Tipo di uscita:
G1, G2=NO-NC, G3=NO-NO
Output type:
G1, G2=NO-NC, G3=NO-NO

Tipologia di cavo e presenza uscita AUX:
EE = 6 poli, NO AUX; OL = 8 poli, AUX
Cable type and AUX output presence:
EE = 6 poles, NO AUX; OL = 8 poles, AUX

Terminazioni cavi:
P = Cavo con puntalini, x = Eventuali altre connessioni;
Cable terminations:
P = Cable with end-sleeves; x = Any other connection;

Lunghezza cavo in cm
Cable length in cm

Caratteristiche speciali ed eventuali personalizzazioni:
Es. colore corpo: - = Rosso, N = Nero
Special features and possible customizations:
Ex. body colour: - = Red, N = Black

N25H Gx / N30H Gx

NxxH Gx xx x xxx x

Esempio di codice d'ordine sensore / Sensor ordering code example

N25H G1 OL P 196 N

Serie corpo:
N25H, N30H
Body series:
N25H, N30H

Tipo di uscita:
G1, G2=NO-NC, G3=NO-NO
Output type:
G1, G2=NO-NC, G3=NO-NO

Tipologia di cavo e presenza uscita AUX:
EE = 6 poli, NO AUX; OL = 8 poli, AUX
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P = Cable with end-sleeves; x = Any other connection;

Lunghezza cavo in cm
Cable length in cm

Caratteristiche speciali ed eventuali personalizzazioni:
Es. colore corpo: - = Rosso, N = Nero
Special features and possible customizations:
Ex. body colour: - = Red, N = Black

M1x x H1 xxxxxx

Esempio di codice d'ordine attuatore / Actuator ordering code example

M14 0 H1 xxxxxxxx

Serie corpo:
M12, M14
Body series:
M12, M14

Colore Corpo:
0=Rosso, 1=Nero
Body colour:
0=Red, 1=Black

H1 = attuatore codificato per sensori Hall
H1 = coded actuator for Hall sensors

Opzioni Future
Future Options

M11 x H1 xxxxxx

Esempio di codice d'ordine attuatore / Actuator ordering code example

M11 0 H1 xxxxxxxx

Serie corpo:
M11
Body series:
M11

Colore e dimensioni corpo:
Chiedere per dettagli
Body colour and dimensions:
Ask for details

H1 = attuatore codificato per sensori Hall
H1 = coded actuator for Hall sensors

Opzioni Future
Future Options