

# Operating instructions for safety control unit mod. NC81



## Description

The NC81 control unit has been specifically designed to be used in safety circuits for lifts in accordance with EN 81-20 and EN 81-50 standards: the operation of this module is based on the use of guided contact safety relays.

### Safety Precautions

Safety sensors perform a personal protective function. Incorrect installations or manipulations can cause serious harm to people. Safety sensors must not be bypassed (by shorting the contacts), moved, removed or otherwise rendered ineffective.

The manufacturer or installer of the machine is responsible for its correct and safe operation.

The auxiliary outputs Y1 and Y2 of this control unit must not be used as safety outputs.

## Operation

The module has two control inputs S1 and S2 which, when activated, cause the switching of the 2 normally open safety outputs (13-14, 23-24) and the 2 signaling outputs (Y1, Y2): these are optically isolated and, when activated, carry a voltage signal (+ 24Vdc). The activation of the outputs is automatic, if the terminals S33-S34 are short-circuited, or by pressing the eventual reset button connected to the terminals S33-S34.

The outputs remain active until the two inputs are closed (see timing diagram).

Safety is guaranteed by the use of guided contact relays, by redundancy and by the contact interconnection scheme.

The control unit is equipped with an adequate circuitry which guarantees its correct operation even in case of short voltage dips.

## Assembly

Installation must be performed by authorized personnel only.

The NC81 control unit must be assembled in a suitable operating area (switch cabinet, protective housing, at least IP20).

The unit is installed by clipping it to a standard 35 mm top-hat rail in accordance with EN 50022.

## Electrical Connection

Electrical connection must be performed by authorized personnel only.

All the electrical inputs must either be isolated from the mains supply by a movable safety transformer in accordance with EN IEC 61558-2-6 with limited output voltage in the event of a defect or by another equivalent movable mechanism.

A1-A2 contacts are protected against polarity inversion.

Relay outputs hold a maximum current of 3A; a power supply connected to those outputs must be protected against overvoltages by means of devices adequate to the loads to protect.

All the output contacts must have an adequate protective circuit for capacitive and inductive loads. If a common power supply is used, all the inductive and capacitive loads (e.g. relay contactors) connected to the power supply must be connected to appropriate interference suppressors.

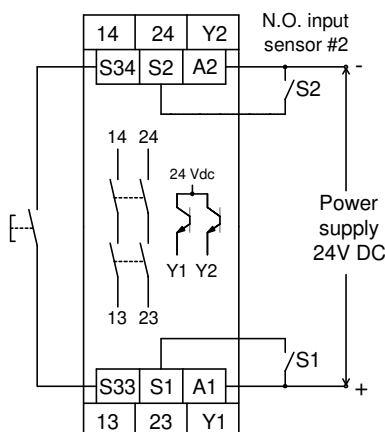
## Service and Inspection

The correct operation of the NC81 safety unit must be controlled by the operator and/or by the control circuit of the elevator in which it is used periodically, by checking:

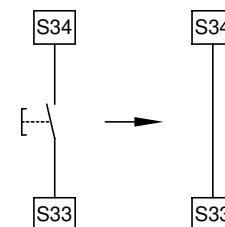
- Correct switching function of each sensor by checking:
    - a) that the opening of the single sensor will cause the opening of the safety outputs (13-14 / 23-24)
    - b) that the closure of the same sensor will cause the closing of the safety outputs (13-14 / 23-24) as a result of a startup command
  - secure mounting of components
  - correct connection fixing.
- The monitoring function of the unit is done at every switching cycle. If the elevator is in a door zone and, following the eventual start command, the safety device does not activate its safety outputs, do not turn off and turn on the device; then proceed to the checking of possible sensors fault and perform the above tests in point a) and b).
- In the event of damage or wear and tear, the damaged system component must be replaced.

### Liability coverage is void under the following circumstances:

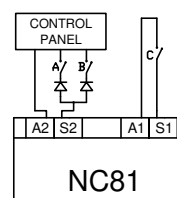
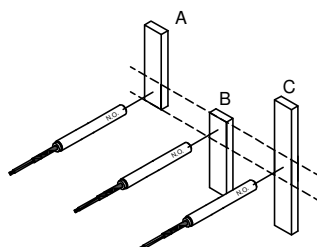
- if instructions are not followed
- non-compliance with safety regulations
- installation and electrical connection not performed by authorized personnel
- non-implementation of functional checks.



### For automatic configuration connect S33 - S34



### Example of sensors connection diagram for door bypass function during leveling



## Setup

If the control unit appears to be inoperative when the supply voltage is applied (the Power LED does not light up), the unit must be returned sealed to the manufacturer. Check if the safety outputs switch (see LED table) by activating the two inputs S1, S2

### Operation as a detector for uncontrolled movement

The safety module guarantees the opening of the safety contacts within 15ms from the opening of one of the sensors S1 and S2 and it can therefore be used as part (detector) of an uncontrolled movement detection system, according to EN81-20 §5.6.7.7.

The input sensors (typically magnetic type) must comply with EN 81-20. The sensor targets must be placed in the door zone and they must have a suitable length to ensure the blocking of the car within one meter of the landing threshold as indicated by the EN 81-20 standard. The dimensioning of the length of the magnets is left to the end user according to the response times of the blocking system and the maximum speed of the system.

Being only part of the system, the description of test methods according to EN 81-50 (§ 5.8.3.x) is left to the end user.

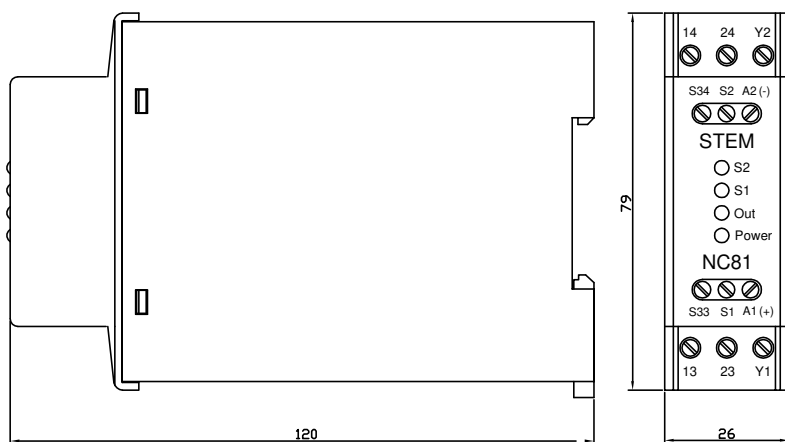


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TECHNICAL DATA	
Parameter	Value
Housing Material	Bayblend (Polycarbonate+ABS+fiber-glass)
Dimensions / Weight	120 x 79 x 26 mm / 140 g
Working (Storage) temperature	0 ... +55 (-25 ... +70) °C
Protection degree (IEC 60529)	IP20
Pollution degree (EN 60664-1)	3
Overvoltage category (EN 60664-1)	III
Assembly	35 mm standard top-hat rail (EN50022)
Connection type	Screw terminals
Supply Voltage	24 Vdc $\pm 10\%$
External fuse on the supply	250 mA quick-action (min)
Current consumption	OUT=off: 50 mA OUT=on: 100 mA
Max. switching frequency	10 Hz
Input synchronization time (ts):	$\infty$
Output closing response time	50 ms
Output opening response time	15 ms
External fuse on the output	3 A rapido
Safety outputs terminals	13-14 and 23-24 (normally open)
Safety Output maximum switching voltage (AC/DC)	250 Vac, 30 Vdc
Safety output Maximum switching current (AC/DC)	3 A (AC-15: 230V / DC-13: 24V)
Safety output maximum switching power (AC)	750 VA
Safety output maximum switching power (DC)	90 W
Auxiliary outputs terminals	Y1, Y2 (normally open, optoisolated)
Auxiliary Output switching voltage	+24 Vdc
Auxiliary output switching current	100 mA
Vibration resistance	in accordance with EN 81-20
Electrical operation life	$10^5$ (3A, 250 Vac, resistive load)
Mechanical operation life	$10^7$
EMC compliance	EN 12015, EN 12016
Standards compliance	EN 81-20:2014, EN 81-50:2014
Approval	TÜV EDCI 042

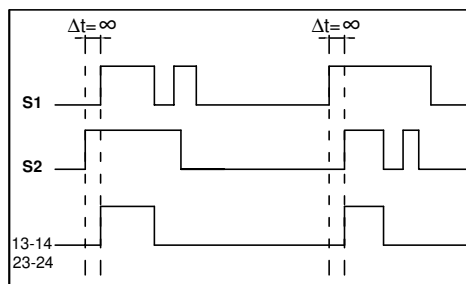
## Dimensions



## LED Table

Function	LED	Color	State
Operating voltage	Power	green	on
Outputs 13/14, 23/24, Y1 and Y2: OPEN	OUT	green	off
Outputs 13/14, 23/24, Y1 e Y2: CLOSED	OUT	green	on
Inputs S1, S2: OPEN	S1, S2	green	off
Inputs S1, S2: CLOSED	S1, S2	green	on

## Timing Diagram



## UL Certification Requirements

Power Source (input)				
Input Terminals		Voltage	Max. Current	
A1-A2		24Vdc	100mA	
Auxiliary Outputs (SAFETY)				
Output Terminals	Contacts Type	General Use Or Resistive	Pilot Duty	
13-14 23-24	NO	3A/240Vac Res	-	-
Signaling Outputs (SIGNAL)				
Output Terminals		Contacts Type	Nom. Ratings	
Y1-Y2		NO	100mA/24Vdc	
Environmental Ratings		Installation Notes		
Max. Surrounding Air Temperature: 55°C Pollution Degree: 2		Use with min. 60°C copper (CU) conductor only Terminal tightening torque: 4.5 LbIn (0,51 Nm)		
Environmental designation Open type equipment				

## Voltage dip

