

# SE3.LN3 "CATEGORY 3" SAFETY ELECTRONIC CARD (EN9541) OF MOBILE AERIAL PLATFORMS



## SE3.LN3...

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**PATENT PENDING**  
n° MO2003A000296

### ORDERING CODE

<b>SE3</b>	Electronic card Aluminium box (IP67)
<b>LN3</b>	For levelling system with acceleration control
<b>***</b>	<b>312</b> = Supply voltage 12VDC <b>324</b> = Supply voltage 24VDC
<b>**</b>	<b>16</b> = 1.76A Maximum current (coil 12V) <b>08</b> = 0.88A Maximum current (coil 24V)
<b>*</b>	Variants: <b>0</b> = No variants
<b>4</b>	Serial No

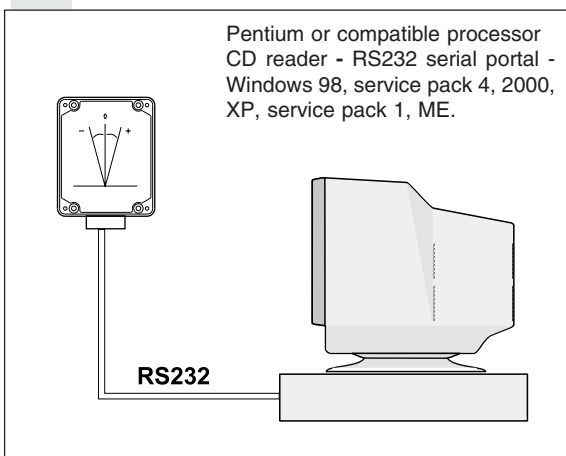
The category 3 safety electronic card was planned to permit automatic adjustment of the "boats" of mobile aerial platforms. Maintenance of the horizontal position is guaranteed independently from the geometrical configuration of the platform's articulated arms and of the variation of inclination of the machine with respect to the base plane, complying to the normative in force of the control systems bound to EN 954-1 safety.

The card is equipped with :

- two separate outlets (contact 13 and 14) live, 12 or 24V max. 1 Amp for the indication of exceeding the inclination threshold pre-alarm (the value can be set by the installer between 0 and 10°).
  - One power outlet (contact 3) managed by safety relays for movement blocking in the case of fault of the levelling system or for exceeding the maximum allowed inclination (intervention at 10°, the value can not be modified).
  - Two digital inlets (optional) configurable for the use of the card in particular applications.
- All adjustments and calibrations come about using a RS232 serial interface and relevant software supplied with the product.

Supply voltage	10 ÷ 36VDC
Max. supply voltage (peak)	40V
Maximum current supplied on the PWM outlets	3 Amps
PWM frequency	4000 Hz
Dither frequency	110 Hz
Offset adjustment field on the vertical	-6° ÷ +6° resolution 0.1°
Dead band	0 ÷ ±3° resolution 0.1°
Minimum current adjustment	0 ÷ 50% I <sub>max</sub> .
Current gain adjustment	0 ÷ 100% I <sub>max</sub> .
Adjustment intervention signal for exceeding pre-alarm inclination	0 ÷ ±10° resolution 0.1°
Intervention of safety relay for max inclination	10 °
Serial standard communication	RS232
optional communication	CAN 2.0B
Amp-seal connection	14 contacts wire section = 1.0mm <sup>2</sup>
Container protection level	IP67
Ambient operating temperature	-30° ÷ +85°C
Weight	Kg 0,721

### MINIMUM CONFIGURATION REQUESTED BY THE PC



**CE** registered mark with reference to the EU Community Directives, in accordance with the following norms:

- EN 954-1 - Safety-related parts of control systems - Part 1: General principles for design.
- EN61000-6-2 - Generic immunity standard, industrial environment.
- EN61000-6-3 - Generic emission standard, residential environment.
- EN 60255-21-1 / EN 60255-21-2 - Electrical relays - Vibration, shock, bump and seismic tests.
- EN61000-4-2 - EN61000-4-2/A1 - Electrostatic discharge immunity test.
- EN61000-4-3 - EN61000-4-3/A1 - EN61000-4-3/A2 - Radiated, radio frequency, electromagnetic field immunity test.
- EN61000-4-4 - Electrical fast transient/burst immunity test.
- EN61000-4-6/A1 - Conducted disturbances induced by radio-frequency fields, immunity test.
- ISO7637-2 Electrical disturbances by conduction and coupling.

#### • Material supplied with the card

- Connector AMPSEAL flying part, with 14 contacts
- Handbook of use with instructions of maintenance and assembly.

#### • Separately supplied material

- The software P35150004 for the programming of the card is supplied on Cd-rom support only upon request (please contact our Sale Offices).

#### • Material not supplied

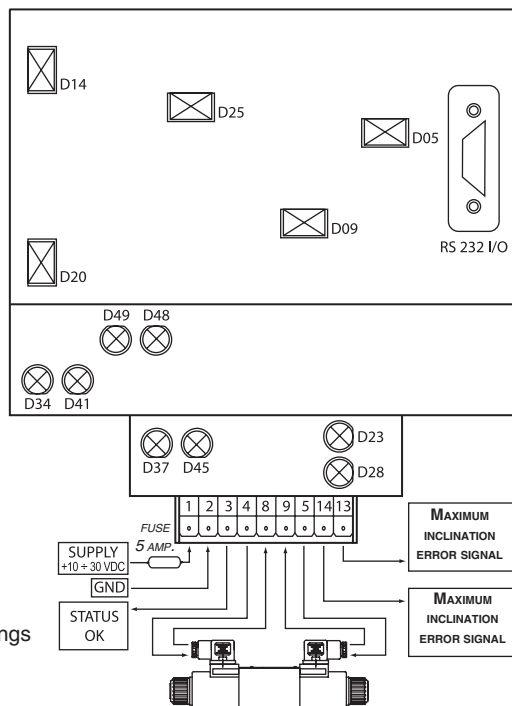
- RS232 cable is not supplied.

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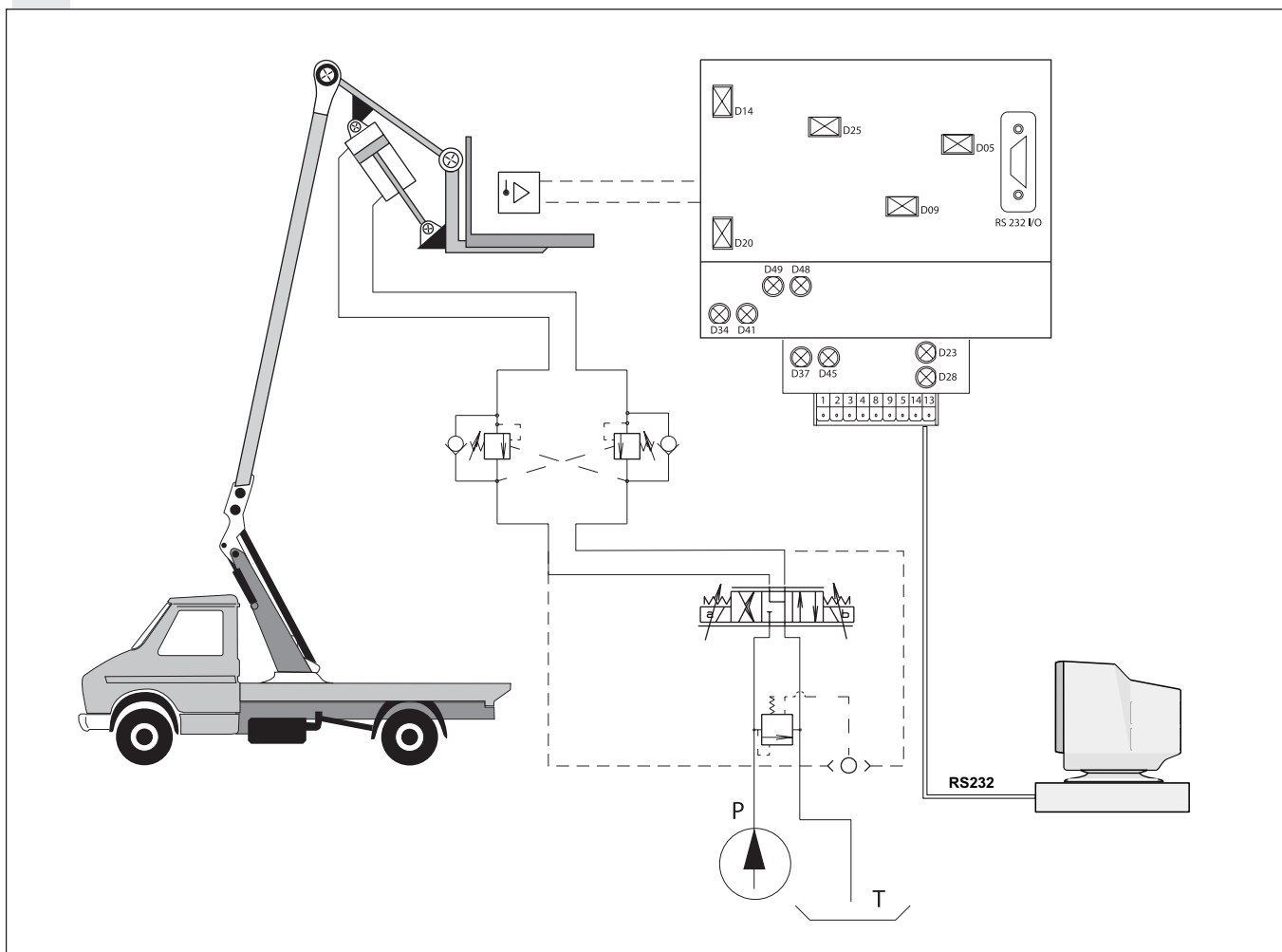
## CARD ADJUSTMENT

Led / colour	Function
D5 / green	Led on = $\mu$ P (microprocessor) OK
D9 / green	Led on = DSP (Digital Signal Processor) OK
D14 / green	Led on = Power supply stage 8V, OK
D20 / green	Led on = Power supply stage 3.3V, OK
D25 / green	Led on = Power supply stage 5V, OK
D23 / red	Led on = Alarm for Side A exceeding maximum inclination
D28 / red	Led on = Alarm for Side B exceeding maximum inclination
D34 / red	Led on = security relay 1, active card functioning (OK)
D37 / red	Led on = PWM outlet side A active
D41 / red	Led on = security relay 2, active card functioning (OK)
D45 / red	Led on = outlet PWM side B active
D48 / red	Led on = Digital inlet 1 enabled
D49 / red	Led on = Digital inlet 2 enabled

Other faults or malfunctioning are signalled by the flashing of LEDs D5 and D9. Flashing occurs at pre-established time intervals. A series of consecutive flashings corresponds to a specific error that identifies a fault. LED D5 signals the faults detected by the  $\mu$ P (microprocessor). LED D9 signals faults detected by the DSP (digital signal processor).



## MOUNTING SCHEME



**INSTRUCTIONS**

- Before proceeding to the calibration, ensure that any unexpected movement of the hydraulic system cannot cause material damage or injury to people.
- The correct work of the card is guaranteed inserting an external fuse 32V- 5Amp on the supply voltage line.
- The connection between the card and the solenoid must be direct.
- The common one of return to proportional solenoid must not be shared between other valve connections or electrical equipment worker.

**SUPPLY VOLTAGE SETTING**

The supply voltage can be 12 VDC or 24 VDC. Always check that the working voltage of the reels of the proportional valve is not higher than the general power supply voltage of the plant.

**OFFSET VERTICAL POSITION**

**ADJUSTMENT**

After having installed the card on the platform cage, it is possible to regulate the reference vertical through the "OFFSET" regulation. The value can be varied around a range  $\pm 6^\circ$ .

**DEAD BAND ADJUSTMENT**

It corresponds to a value between  $\pm 3^\circ$  with respect to the position of the vertical where the card results to be indifferent to the corrections. The value can be set using the "DEAD BAND" control.

**MINIMUM CURRENT ADJUSTMENT**

Minimum current allows to eliminate opening start delay of the valve caused by the mechanical covering of the cursor. The value of separate minimum current for channel A and B is pre-calibrated in the factory, it can be adjusted using the "I min. A" and "I min. B" control.

**CURRENT GAIN ADJUSTMENT**

Current gain allows to increase the opening section of the functioning valve of the greatest inclination of the "boat". Separate current gain for the A and B channel is pre-calibrated in the factory, it can be adjusted using the "Gain A" and "Gain B" control.

**ALARM INTERVENTIONS' ADJUSTMENT FOR EXCEEDING PRE-ALARM INCLINATION**

The card has two separate live outlets (12/24V, max. 1 Amp) to signal exceeding of a pre-set inclination value of the boat.

This value (between  $0^\circ$  and  $10^\circ$ ) can be set by the system installer separately for both channels using the "ALARM A" and "ALARM B" control.

The two live outlets are active (voltage value on the outlets = 12/24V) when the boat is at an inclination lower than the values indicated in "ALARM A" and "ALARM B".

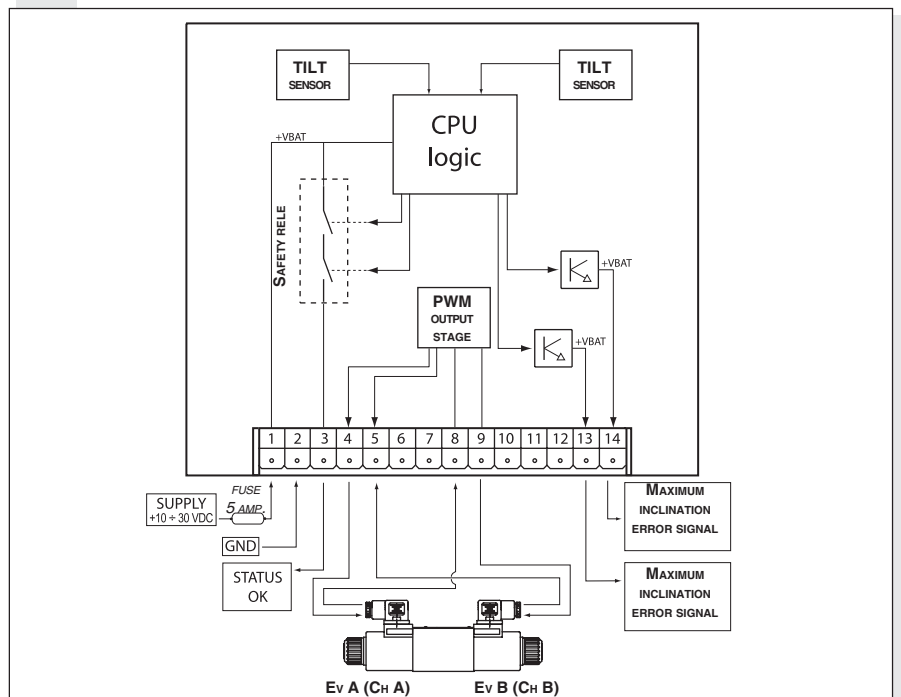
When inclination exceeds the indicated values the live outlets are disabled (voltage value on the outlets = 0V).

**CALIBRATION PROCEDURE**

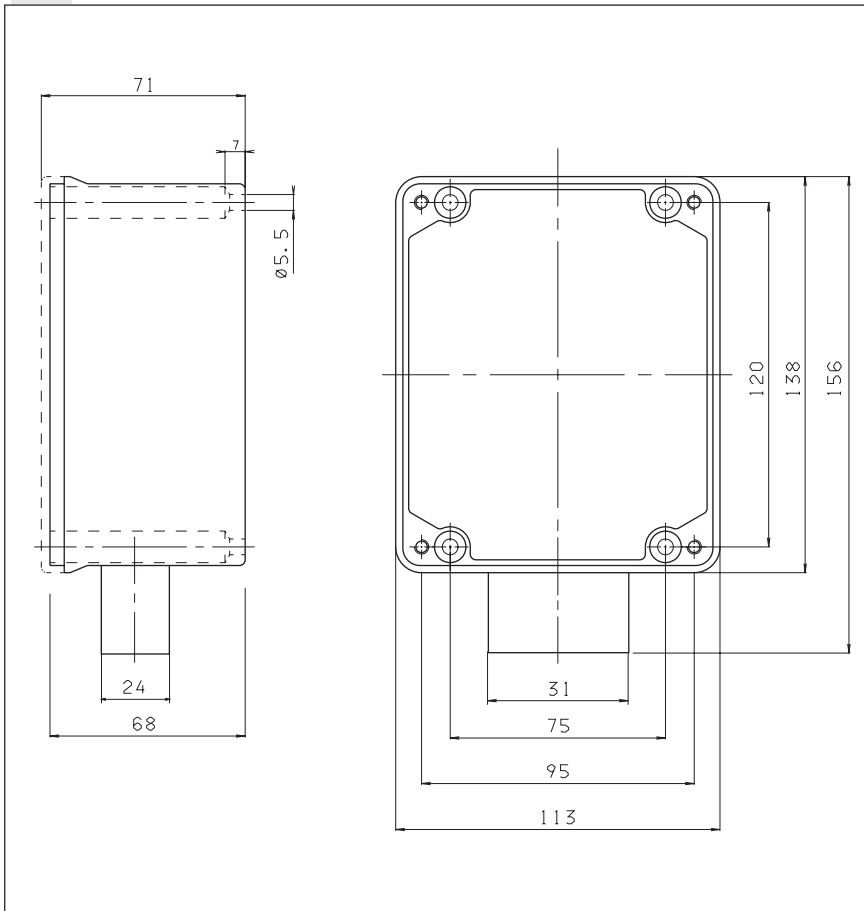
All calibration parameters are set using the PC. It is necessary to connect the levelling board to a PC using a serial connection. Refer to the instructions contained in the attached maintenance and installation manual for the procedure.

N° pin	Function	Description
1	Power supply	+Vbattery 10 ÷ 30 VDC
2	GND supply	-Vbattery GND
3	Status OK - Vbat output relè	Live outlet V of battery - max. 6Amps (live outlet is interrupted for exceeding max inclination $\pm 10^\circ$ or for breakage of the card)
4	Out PWM coil A +	Outlet PWM solenoid's side A max. 3Amps
5	Out PWM coil B +	Outlet PWM solenoid's side B max. 3Amps
6	RX/232	RS232 serial portal reception channel Optional CAN/L for Can-bus communication
7	TX/232	RS232 serial portal reception channel Optional CAN/H for Can-bus communication
8	Common PWM coil A	Common channel PWM A
9	Common PWM coil B	Common channel PWM B
10	12/24V - Digital input 1 – optional	Digital inlet 12/24V (function optional)
11	12/24V - Digital input 2 – optional	Digital inlet 12/24V (function optional)
12	GND RS232	Common serial portal Communication RS232
13	Digital output - 12/24V max. 1Amp	Pre-alarm outlet for exceeding threshold max. inclination positive (intervention angle programmable from 0 to $+10^\circ$ )
14	Digital output - 12/24V max. 1Amp	Pre-alarm outlet for exceeding threshold max. inclination negative (intervention angle programmable from 0 to $-10^\circ$ )

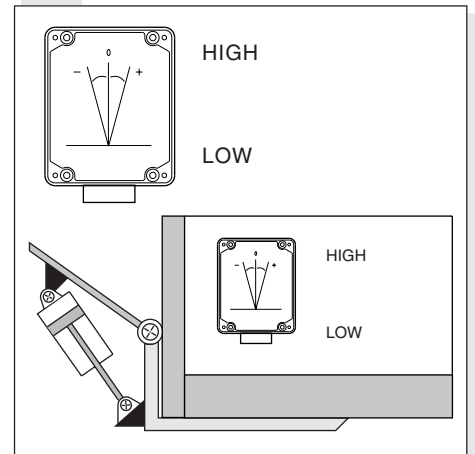
**CONNECTIONS SCHEME**



**OVERALL DIMENSIONS**



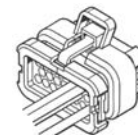
**CORRECT POSITION**



**SPARE PARTS AMPSEAL**



Receptacle contacts  
**COD. 770520-1\***

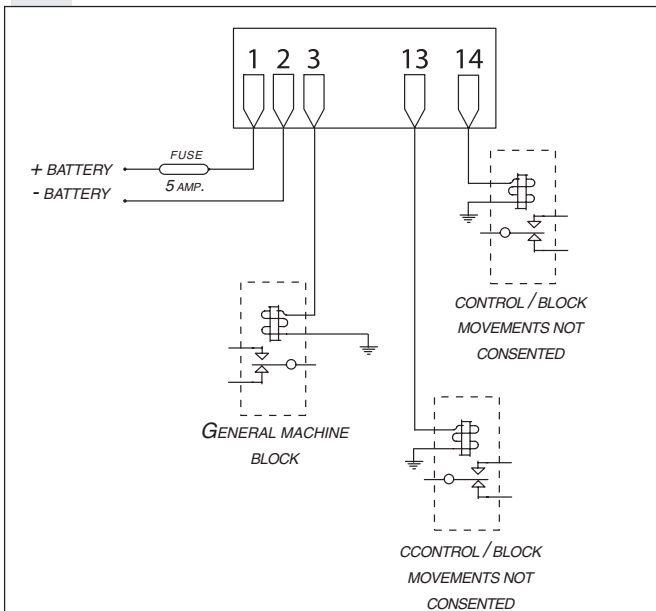


Plug housing 14 pin  
**COD. 776273-1\***

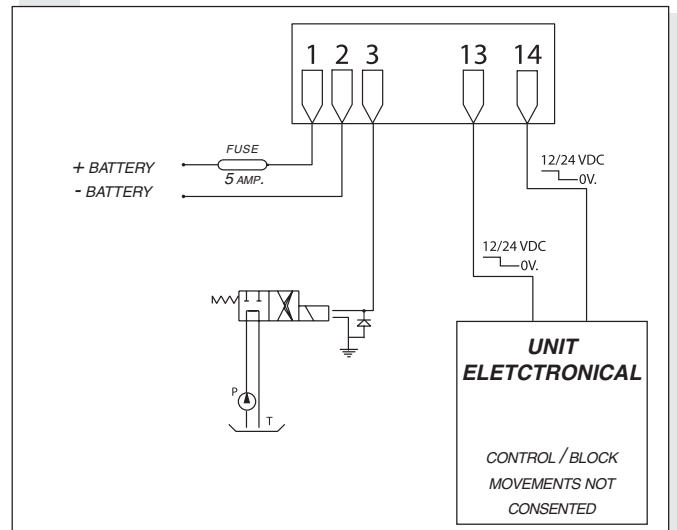
\* AMP code

**Spare parts kit, connectors and electrical contacts: V89950000**

**CONNECTION FOR SECURITY RELAY**



**CONNECTION FOR SECURITY SOLENOID VALVE**



- Before proceeding to the calibration, ensure that any unexpected movement of the hydraulic system cannot cause material damage or injury to people.
- The correct work of the card is guaranteed inserting an external fuse 32V- 5Amp on the supply voltage line.