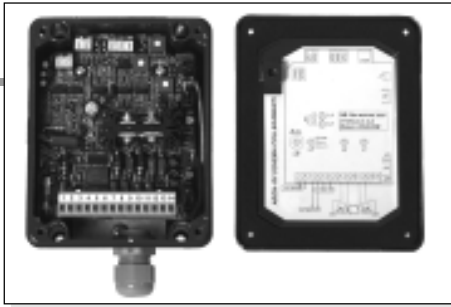


SE3.LN3... ELECTRONIC CARDS FOR LEVELLING OF MOVEABLE AERIAL PLATFORM



SE3.LN3...

CARD ADJUSTMENT	CH. IX PAGE 14
INSTRUCTIONS	CH. IX PAGE 15
FURTHER INFORMATIONS	CH. IX PAGE 16

This electronic card allows the automatic adjustment of an aerial platform cage; in this way the horizontal position is maintained regardless of the geometrical configuration of the platform articulated booms and of the machine inclination changes as against the support surface. The card is integrally mounted on the cage and is sized for controlling Aron proportional valves type XD.3C... and XDP.3.C...

The output stage operates on the basis of the Pulse Width Modulation (PWM) and is subject to the current feedback so that it is possible to obtain an output signal proportional to the input signal.

The acceleration control reads the position and also the acceleration of the angular transducer in order to obtain a better dynamic response during the correction phase. Reference vertical, gain, minimum current and dead band can be regulated in order to optimize the operation.

Other features:

- the card is provided with two safety relays, one each channel, to stop every movements in case of maximum error (from the inclinometer). Furthermore, as option, there is the possibility to connect an On-Off safety sensor
- it's protected against electrical polarity inversion and short circuit
- it's fitted into an aluminium case with protection degree IP 67.

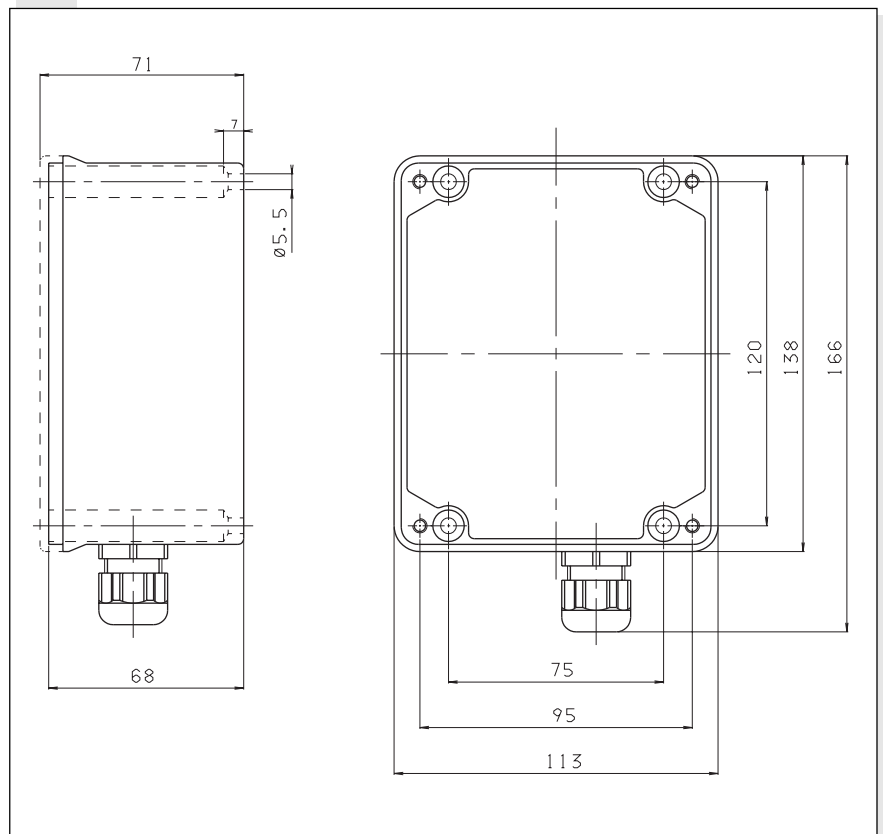
Supply voltage (stabilized)	12VDC - 24VDC \pm 10%
Max. power	40W
Input signal	from the inclinometer
Adjustment range of the vertical position (PT2A)	-6° \div +6°
Dead band adjustment (PT3)	0 \div -3° / 0 \div +3°
Minimum current adjustment (PT6 / PT7)	0 \div 50% I _{max}
Maximum inclination error adjustment	- 5° \div -15° / + 5° \div +15°
P.W.M frequency	» 4 KHz
Dither adjustment	0 \div 15% I _{max}
On / Off sensor tolerance (maximum inclination error)	8° \div 13°
Output safety Relay	max 500 mA
Output + 5V (Pin 14)	max 10 mA
Ambient operating temperature	-25°C \div +80°C

ORDERING CODE

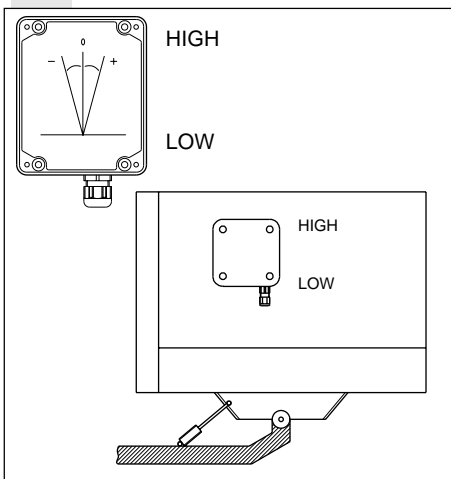
SE3	Electronic card Aluminium box (IP67)
LN3	For levelling system with acceleration control
***	312 = Supply voltage 12VDC 324 = Supply voltage 24VDC
**	16 = 1.6A Maximum current (coil 12V) 08 = 0.8A Maximum current (coil 24V)
*	Variants: 0 = No variants B = With ON-OFF safety sensor
3	Serial No

- CE** registered mark for industrial environment
with reference to the electromagnetic compatibility.
European norms:
- EN50082-2 general safety norm - industrial environment
- EN 50081-1 emission general norm - residential environment

OVERALL DIMENSIONS



CORRECT POSITION



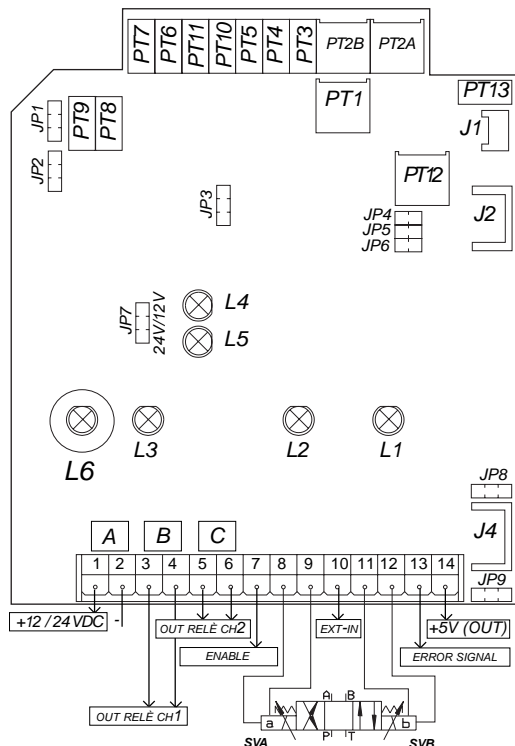
CARD ADJUSTMENT

- PT1** Dither amplitude adjustment
- PT2A** Vertical position adjustment (1)
- PT2B** Vertical position adjustment (2)
- PT3** Dead band
- PT4** Gain adjustment channel B
- PT5** Gain adjustment channel A
- PT6** Minimum current channel B
- PT7** Minimum current channel A
- PT8** Maximum inclination error adjustment Ch 1
- PT9** Maximum inclination error adjustment Ch 2
- PT10** Gain variation adjustment B
- PT11** Gain variation adjustment A
- PT12** Current limiter
- PT13** Vertical position fine adjustment for PT2A

- L1** Output Led channel B (red)
- L2** Output Led channel A (green)
- L3** Short circuit alarm Led (red)
- L4** Max. error Led Ch1 (yellow)
- L5** Max. error Led Ch2 (yellow)
- L6** Power on Led (green)

- JP1** Channel A and B inversion
- JP2** Maximum inclination error inversion
- JP3** Dither setting (100/300Hz)
- JP4** Max. current 3.2A
- JP5** Max. current 1.6A
- JP6** Max. current 0.8A
- JP7** Supply voltage setting (12/24 VDC)
- JP8** By-pass Ch2
- JP9** By-pass Ch1

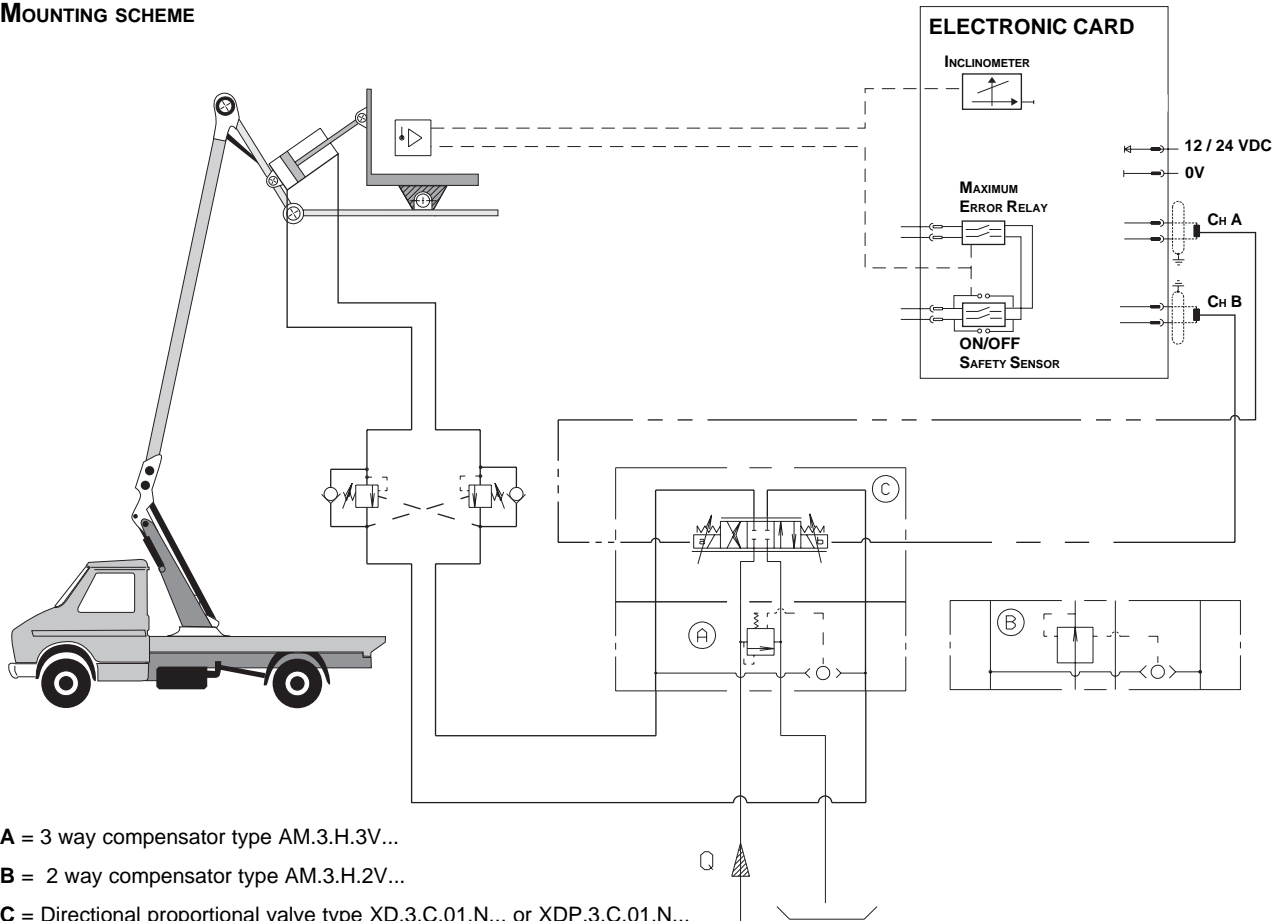
- J1** Current test point 1V/A
- J2** Proportional sensor connector
- J4** On/off sensor connector



CONNECTIONS

- A - Supply** 12VDC / 24VDC ± 10%
- B - Output safety relay Ch 1** Normally closed with card supplied
- C - Output safety relay Ch 2** Normally closed with card supplied

MOUNTING SCHEME



- A** = 3 way compensator type AM.3.H.3V...
- B** = 2 way compensator type AM.3.H.2V...
- C** = Directional proportional valve type XD.3.C.01.N... or XDP.3.C.01.N...

SUPPLY VOLTAGE SETTING

The supply voltage can be 12 VDC or 24 VDC, positioning properly the jumper JP7. (Pre-set)

VERTICAL POSITION ADJUSTMENT

After having installed the card on the platform cage, it is possible to regulate the reference vertical through the PT2A trimmer. By turning the trimmer clockwise or counterclockwise, a max. variation of $\pm 6^\circ$ against zero (the cage is horizontal positioned) can be obtained.

INVERSION OF THE CHANNELS

Positioning the jumper JP1, the inversion of the channels A and B is possible.

MINIMUM CURRENT ADJUSTMENT OF A AND B CHANNELS

The minimum current (for A and B channels) is presetted at the correct value by the producer. For further adjustments it is possible to vary the minimum current on the A and B channels by operating respectively on PT7 and PT6 trimmers. By turning the trimmers clockwise the minimum current increases.

GAIN ADJUSTMENT

Increase the gain by turning the trimmers PT4 and PT5 (respectively channels A and B) clockwise in order to keep the horizontal position dynamically (while moving). The acceleration control allows to avoid vibrations. If residual vibrations are still present, it is convenient to lower the gain (counterclockwise) by admitting a light delay during the dynamic correction.

MAXIMUM INCLINATION ERROR ADJUSTMENT

It is possible to regulate the max. admitted error during the correction by using PT8 and PT9 trimmers. By turning the trimmers clockwise it is possible to obtain an error increase. The error reaching makes the safety relays switching.

DEAD BAND ADJUSTMENT

It is the adjustment of the angle which is insensitive to correction. By turning the PT3 trimmer clockwise, the insensitive angle increases.

OUTPUT AMPLIFIER DISABLE

To disable the output power circuit, switch 12 or 24 VDC on input PIN 7. The output amplifier is normally enabled.

TEST POINT

Measuring the voltage on the test point J1 (or between PIN 1 and 2) is possible to read the current to the solenoid valve. The relationship between voltage and current is $1V = 1A$

On the electronic card further adjustment are allowed:

DITHER ADJUSTMENT (FREQUENCY AND WIDTH ADJUSTMENTS)

The dither width can be adjusted by potentiometer PT1; the frequency dither (100 and 300 Hz) by JP3

ADJUSTMENT OF MAX. CURRENT

JP6 = 0.8 A
JP5 = 1.6 A
JP4 = 3.2 A
(Pre-set)

CURRENT LIMITER

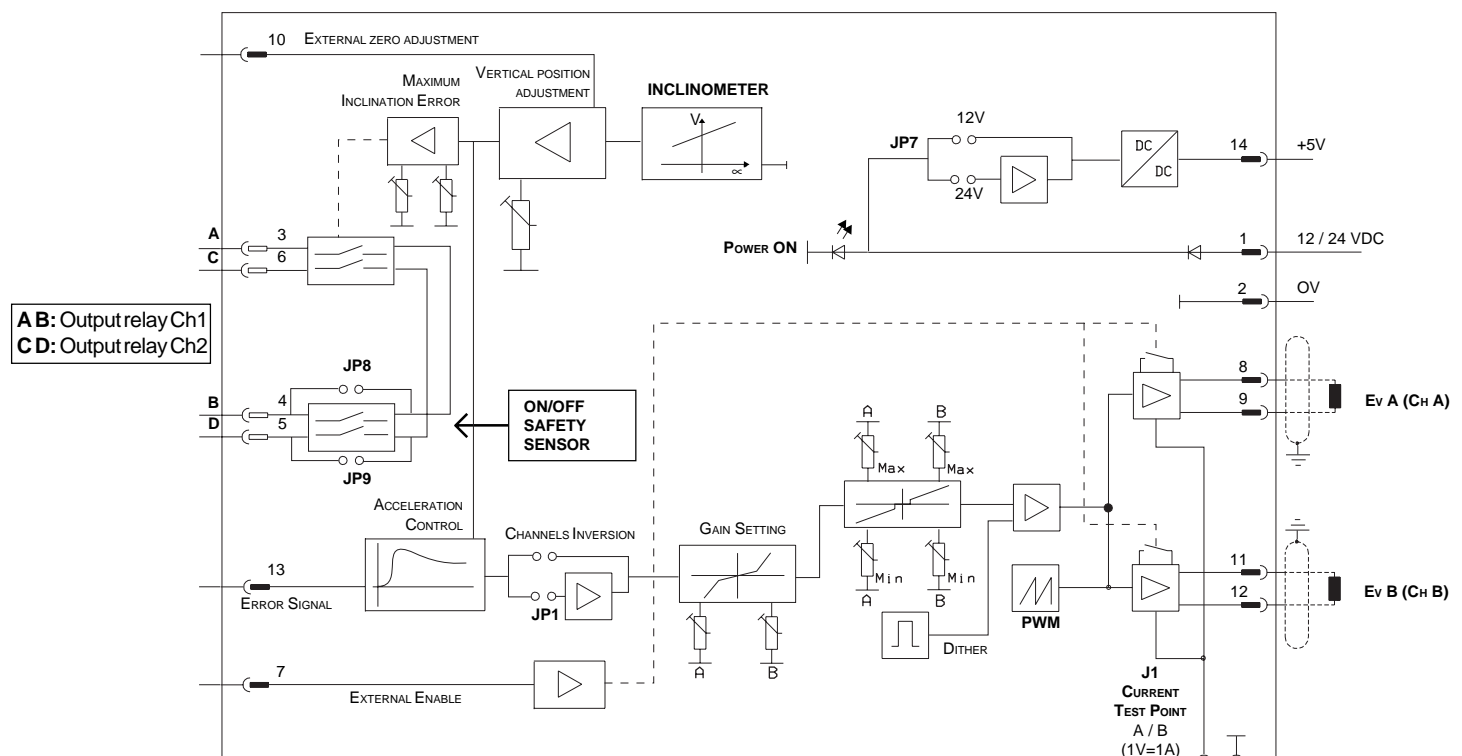
Setting the potentiometer PT12 is possible to demand the output current (min. 500 mA - max. 4A). (Pre-set)

BY-PASS ON-OFF SENSOR

It is possible to avoid the ON-OFF safety sensor signal using jumpers JP8 and JP9. (Pre-set)

- The connection between the card and the solenoid must be direct
- The common one of return to proportional solenoid mustn't be shared between other valve connections or electrical equipment worker.

ELECTRICAL CIRCUIT AND CONNECTIONS



SETTING PROCEDURE

1. Connect the voltmeter at test point J1.
1 Volt corresponds at 1 Ampere of current on the solenoid

2. MINIMUM CURRENT SETTING

Turn slowly anticlockwise the trimmer PT2A until the green led L2 lights up (the current is flowing through the solenoid). Set the current at the value advised in the "Table typical values", turning the trimmer PT7. Turning the trimmer clockwise the minimum current is increasing.

Repeat the calibration for the other channel, turning slowly clockwise the trimmer PT2A until the red led L1 lights up (the voltmeter should give a negative voltage). To set the minimum current, turn the trimmer PT6.

3. SETTING OF THE VERTICAL POSITION

Set the zero vertical reference of the cage turning slowly the trimmer PT2A until the desired position

4. GAIN SETTING

Turn clockwise the trimmers PT5 (channel A, green led L1) and PT4 (channel B, red led L2) to avoid a possible delay during the operation.

i.e. – if the GAIN is increased too much, vibrations can occur. In that case it's convenient to lower the gain admitting a light delay during the operation.

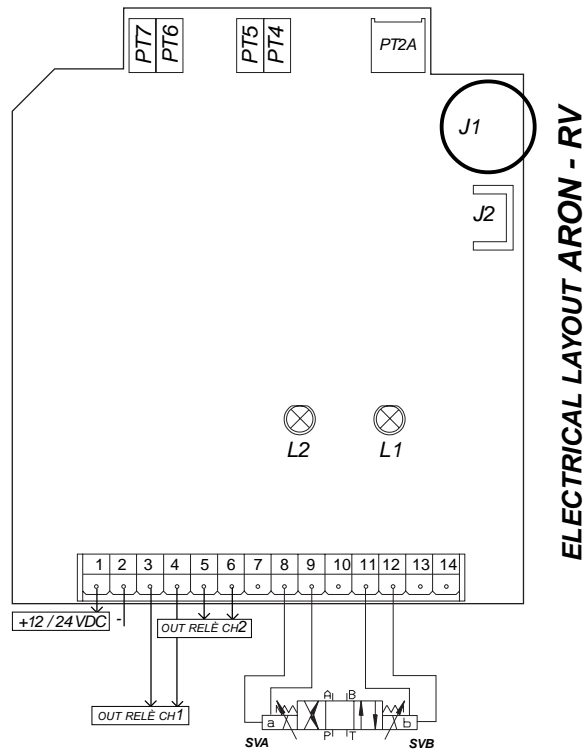
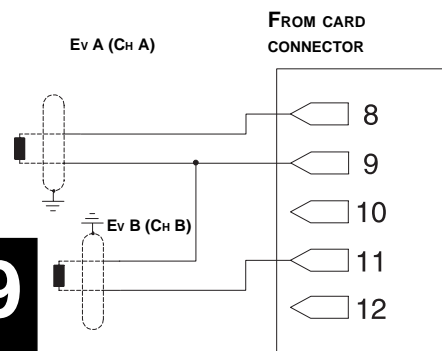


TABLE TYPICAL VALUES

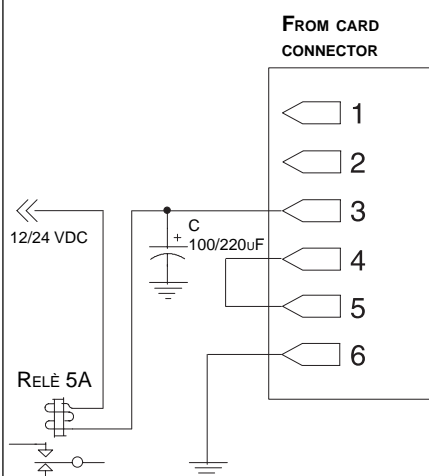
Aron valve	Imin. (12 VDC)	Imin. (24 VDC)
XDP.3...	380 ÷ 400 mA	180 ÷ 200 mA
XD.3...	480 ÷ 500 mA	230 ÷ 250 mA

**ONLY ONE CONNECTION
BACK FROM COILS**



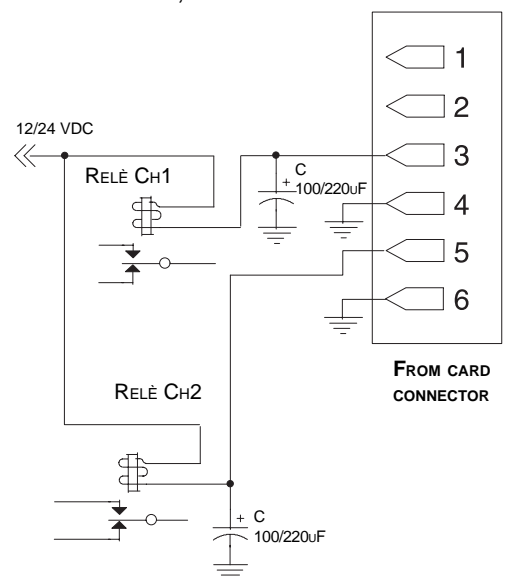
**CONNECTION FOR SECURITY RELAY
(ONE RELAY)**

BETWEEN 3, 4, 5, 6 I_{MAX.} = 500 mA



**CONNECTION FOR SECURITY RELAY
(TWO RELAYS)**

DIVIDE CH1 FROM CH2
BETWEEN PIN 3, 4 I_{MAX.} = 500 mA
BETWEEN PIN 5, 6 I_{MAX.} = 500 mA



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