OPERATIONAL DETECTION CONDITIONS FOR SKY NG RADIO

In order to guarantee the proper functioning of the system, a preventive maintenance must be carried out every 12 months. Please contact MADE company for the establishment of a maintenance contract.

HIGH LIFT EQUIPMENT OPERATIONAL AID

Detection of overhead power lines from 11000 volts ~

REMARK : Given that the detection threshold of the electric field is 4 meters at 20 KV, for low voltage lines of 380 V, the device reacts at a distance of less than 10cm.

Thus the device will not warn of direct current lines.

SUMMARY

1. SECURITY INFORMATION

1.1 Use of safety instructions :

Thank you to carefully read this manual before unpacking, set up or operate this equipment. Pay attention to all statements of danger and warnings. Failure to follow instructions could result in serious injury to the operator or damage the equipment. To ensure the protection of this equipment is appropriate, do not use or install other than in the conditions indicated in this manual.

Opening the devices is prohibited. It is reserved to qualified personnel authorized by the company MADE.

DANGER : Indicates an eminently or potentially hazardous situation which, if not avoided, lead to serious injury or death.

CAUTION : Indicates a potentially hazardous situation that could result in minor or moderate injury.

Note : Information that should be highlighted.

1.2 Label warning

Read all labels on the instrument. Personal injury or damage to the instrument could occur if their instructions are not followed.

	Symbol referring to the instruction manual on the operation and / or safety information.
	Classe II - double insulation and reinforced insulation
Cat. II	Overvoltage category or installation
IP 65	Degree of protection - IP Standard

1.3 Reminder

DEVICE FOR DRIVING ASSISTANCE

Detection airlines AC voltage from 15,000 volts ~.

Warning :

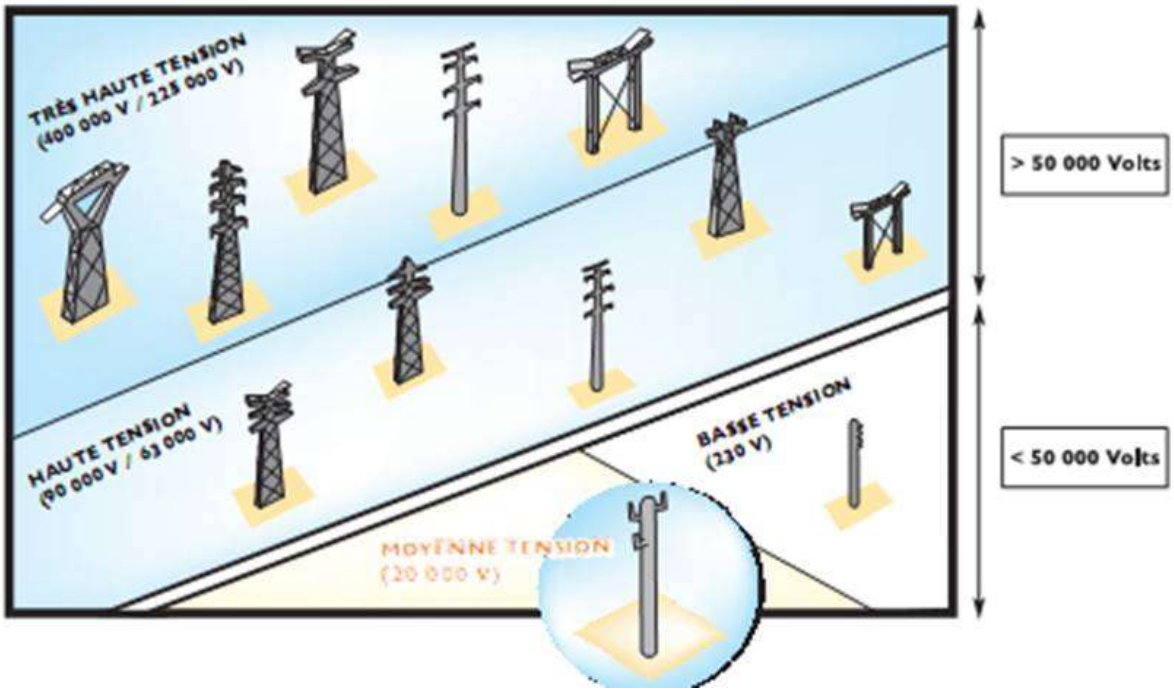
The system is inoperative on:

- Overhead power lines Low Voltage (380V)

- Overhead power lines Medium Voltage Direct Current (trams power, railways in general ..)

The VIGILANCE and the operator must remain CAUTION maximum to approach energized electrical lines.

Reminder of high voltage lines :



2. OBJECT OF THE DOCUMENT

This document is the user guide and installation of SKY NG RADIO proximity sensor SKY NG range.

in particular there are the information about the installation, maintenance and testing of the device.

- Electrical diagrams,

- The nomenclature of the component pieces of equipment,

- The nomenclature of spare parts,

- A service manual and repair of all electrical components in the context of empowering technicians ensuring the first level maintenance,

For the user, a specific fact sheet (reference "FS_SNG_RADIO_V0_00_EN.pdf") is more appropriate. A version is appended.

1.4 TERMINOLOGY

This document is the use of SKY NG RADIO device guide.

It describes the commissioning of the apparatus, as well as the different modes of operation to facilitate the use of this device.

3. GENERAL PRESENTATION

1.5 Presentation:

SKY NG RADIO is composed of a **CPU**, coupled to a plurality of **radio sensors** placed on the long arm of the machine to be protected, for detecting the electric field,a **cab display unit** and an **external display unit**.

The sensors are interrogated continuously by the processing module, to verify their good working order, and avoid any failure of the system, which would be dangerous for the work of staff (sound and light Signalling a sensor fault) …

The central controller is powered via a two-core cable with 24V, turned on by the engagement of the vehicle power take-off.

An **external display unit** is used to report and acknowledge the alarm without going back into the cabin.

SKY NG RADIO is an **AID TO CONDUCT** to detect the proximity of a power line MV and HV power in OPEN FIELD.

It alerts the user with an acoustic signal and a warning light when the vehicle enters an electric field detection area.

1.6 Principle:

SKY NG RADIO warns the operator by an audible signal and a light, when an element of the high lift equipment enters an electric field detection zone.

The driver can stop external sound alarm and cutoff movement (if connected) by pressing the acknoledge button "Acquittement" on the external display unit ..

The cabin buzzer remains active, and the outside buzzer sounds 2 phone reminder every 2 min.

After one hour, the system reboots.

4. START SYSTEME

The system will connect to 24V after switching on the PTO.

Commissioning is automatic, no adjustment is necessary for the user.

5. OPERATION

A power-on **SKY NG RADIO NG** 2 beeps, then queries its sensors.

At start all visual and audible alarms are activated 2 times.

If the ambient electric field exceeds the threshold :

- The **SKY NG RADIO** operates his "Alarms Sound" (Buzzer) cabin and exterior.

- The **SKY NG RADIO** operates its "Visual Alarm" (red LED) cabin and exterior.
- The **SKY NG RADIO** operates the "Movement cut" relay that can be coupled to the hydraulic leakage by a set of solenoid valve to control the radio relay (used for movement block) or other means to cut movement of the arm.
- The user must press the acknoledge button "Acquittement" to unlock the cut motion (Relay) and switch the system to "unlock mode". This ensures that the presence of the line is well known by the user.
- The **SKY NG RADIO** operates the red lights "danger" of the cabin casing and the outer casing all the time of detection.

<u>After this phase, if the ambient electric field is always present :</u>

- The **SKY NG RADIO** operates the buzzer cabin all the time of detection to remind the danger to the driver.
- The **SKY NG RADIO** is in “unlock mode" to unlock the machine.
- The **SKY NG RADIO** makes a sound return on the buzzer of the outer casing 2 shots every 2 minutes.

After the "unlock mode" delay (1 hour), the system returns to position alarm until the pressed button of acknowledgment of a visualization packages.

6. SPECIFICATIONS OF SKY NG RADIO

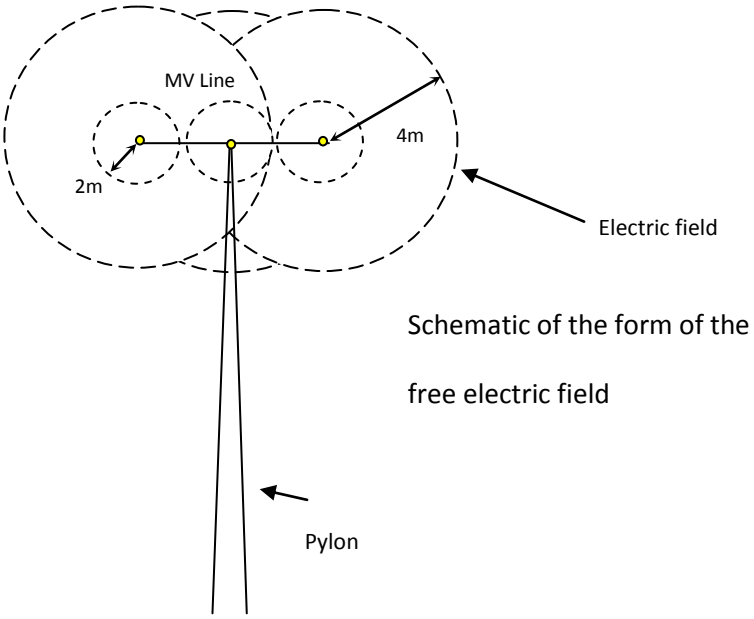
	Processing housing CPU	Molded independent sensors
Alimentation	12V / 24V (On the vehicle power supply) 1A max	Powered by a lithium battery 3.6V
Sizes	160 x 120 x 90 mm	160 x 100 x 580 mm
Température d’utilisation	-20° C à +60° C	
Impermeability	IP 67	
Measuring accuracy	± 50 cm of hypertension Online **FREE FIELD WITHOUT ELECTRIC FIELD COMPOSITION**	

<u>Normalization</u> :

NF EN 50082-1 : CEM

NF EN 61010-1 : Electrical safety.

Detection LOBE of the **SKY NG RADIO** sensors



Schematic of the form of the free electric field

IMPORTANT :

In practical, the electric field is not exactly spherical, it has not a definitive form, as it depends on weather conditions, and other parameters.

Moreover, for all the distances of detection announced, other parameters have to be considered as, but not exhaustive, speed of approach of the arm, angle of approach, weather conditions, and other parameters which do not allow any mathematical formula to be applied on the distance of detection.

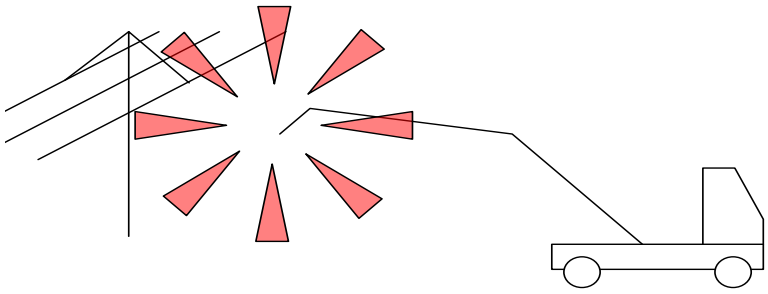
7. THE « UNLOCK MODE »

If the system is near a line HTB 220Kv, it may be that the detection distances are too great. Therefore the use of the machine can be disturbed due to switching of the movement and the noise generated by the external alarm. In this case, the user can actuate the “unlock mode”.

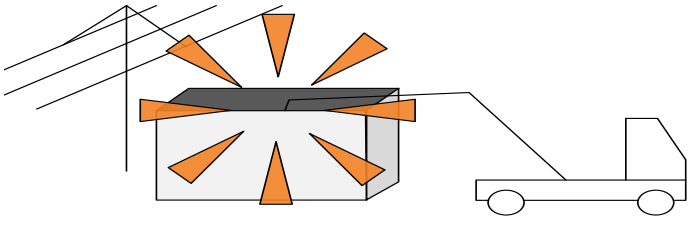
- The **SKY NG RADIO** operates the buzzer cabin all the time of detection to remind the danger to the driver.
- The **SKY NG RADIO** is in “unlock mode" to unlock the machine.
- The **SKY NG RADIO** makes a sound return on the buzzer of the outer casing 2 shots every 2 minutes.

After the "unlock mode" delay (1 hour), the system returns to position alarm until the pressed button of acknowledgment of a visualization packages

8. SUMMARY OF OPERATIONAL CONDITIONS

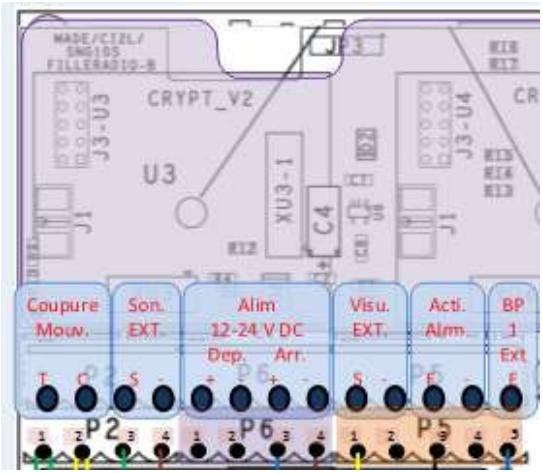


SKY NG RADIO 2 works on 15KV cables from 6 meters; the alarm distance is measured in free field (unobstructed).
SKY NG RADIO 2 does not work on power lines less than 15 kV.
SKY NG RADIO 2 does not work on insulated cables and the cables 380V (3+ 1 wires).



The presence of obstacles disturbs the measurement and may generate false alarms.
The radio transmission between the (s) sensor (s) and the base may be affected by the environment (masking walls, einforcement, Radio Communications parasites ...).

1.7 CPU



- The LED "Audible alarm" corresponds to the state of the member mounted on the output P2-3.4 "Son. EXT.".
  1- Contact"S" (P2-3):
     a- LED on = 24V,
     b- LED off = no 24V,
  2- Contact"-" P2-4-> Ground.

- The "Movement cut" LED corresponds to the state of the relay output P2-1.2 " Movement cut ".
  This relay generally controls the movement of the locking control by opening the electrical circuit.
  1- On Contact RC (P2-1.2) :
     a- LED on = Contact open RC.
     b- LED off = Contact closed RC.

- The indicator "Visual alarm" is the status of the relay output P5-1.2 "Visu Ext. ".
  1- Contact « S » (P5-1) :
     a- LED on = 24V,
     b- LED off = no 24V,
  2- Contact « - » (P5-2)
     a- Ground.

- The « SERVICE » light indicates system status :
  - LED blinks slowly, the system is in alarm activation wait.
  - Lamp illuminated steadily, the system is activated (alarm on if voltage is present).
  - Flashes 2 brief flash, a sensor or more are down.

- The indicator "Alim" corresponds to the state of the system power :
  - Light Illuminates when the system is powered.

- The key to forcing position :
  - "On" (not present key) powers the system.
  - "Off" (present and turned key) :

a- disables the cut motion (Contact closed RC).

b- cut system power.

1.8 CPU defective

At power up, by switching on the PTO, the SKY NG RADIO NG tests itself. It beeps (buzzer cab display unit) and activates its EXIT "Vis" is the relay output P5-1.2 "Visu Ext. ".

It is the user's responsibility to verify that the Central Unit

(Located in the cab) is on (Alim. Lit LEDs), service indicator blinks.

1.9 Cab display unit (option)

Placed in the visual field of the driver, it can signal the electric field sensing.

If warning, it informs the driver with an audible alarm (buzzer) and visual (seeing danger).

The driver can carry external alarm and cutoff movement (if effective) by pressing the "Acknowledge" button on the outside of the vehicle or inside the vehicle.

The service light operates as follows:

- flashing slowly, the system is in alarm activation waiting
- Fixed lights, the system is in use (active alarm if there is voltage)
- flashes 2 brief flash, a sensor or more are down.

1.10 External display unit

This report is the cabin housing for audible and visual alarms.

The presses the "button danger acquittal" inhibits the cut and positions the output "Audible alarm" (external buzzer) in deferred mode.

1.11 Defective sensor

If the **SKY NG RADIO** may not question its sensor,

The external light "Danger" is fixed.

The indicator "Danger" cabin flashes.

The internal buzzer buzzes slowly.

The user must press the button acknowledgment of viewing boxes to unlock the exit "CUT" (Who used to unlock the movement).

9. INSTALLATION

1.12 Mounting sensors

The sensors are magnetic. They are laid along the arm.

A silicone fillet around the magnetic base, prevents the slip thereof.

A security cable can recover the sensor, if it is torn by a branch.

This cable also connects the sensor to the metal mass of the vehicle.

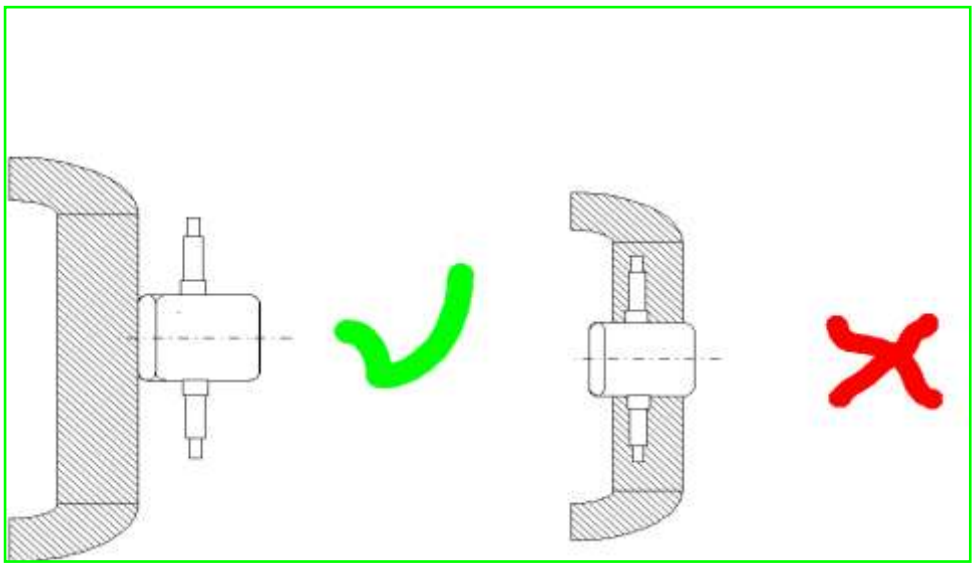
The sensor must always be in free field.

1.12.1 Fixing the sensor

Positioning sensors on the media :

Each sensor is set in open space around the arm to handle.

To be operational, the sensor must be installed in front of any surface,



10. INSTALLATION PROCEDURE

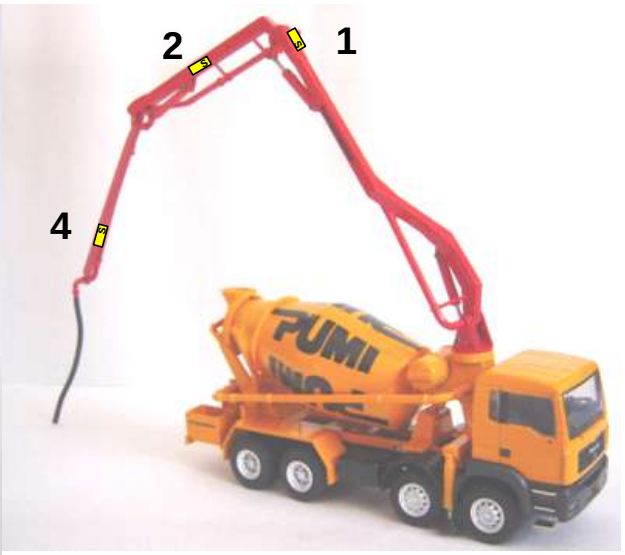
Before making the placement of the sensors, verify by folding and unfolding his arms several times to confirm that they are not an obstacle and do not interfere with the movements together. Similarly, for cable passages, which generally follow the hydraulic circuit.

Ideal installation :

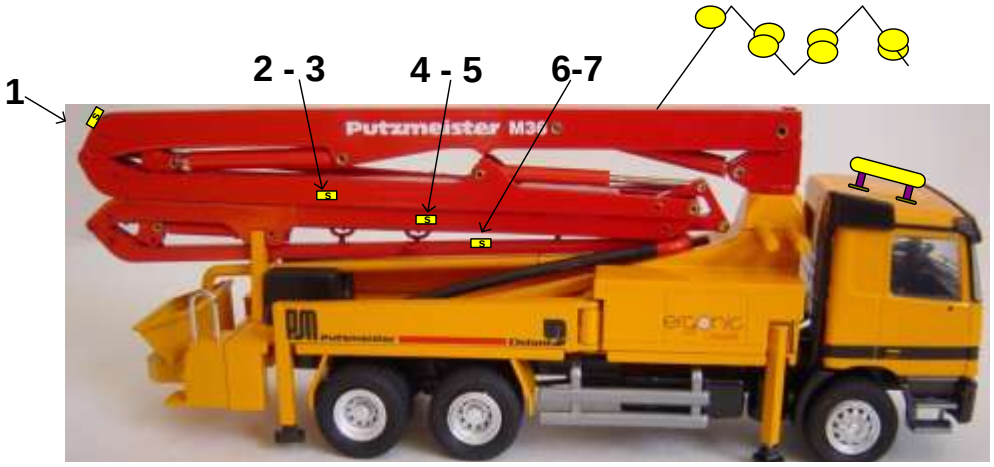
- Pumps **3 arms** : **5 sensors**
- Pumps **4 arms** : **7 sensors**
- Pumps **5 arms** : **9 sensors**

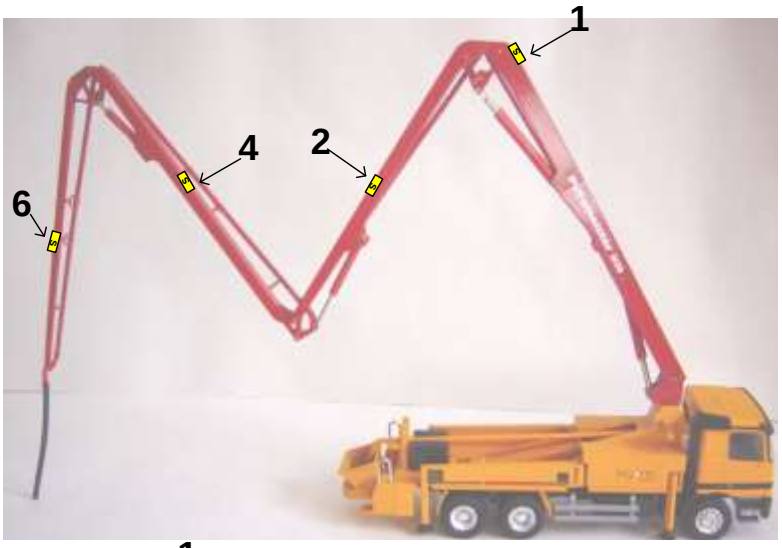
- Single rug : 2 **sensors**

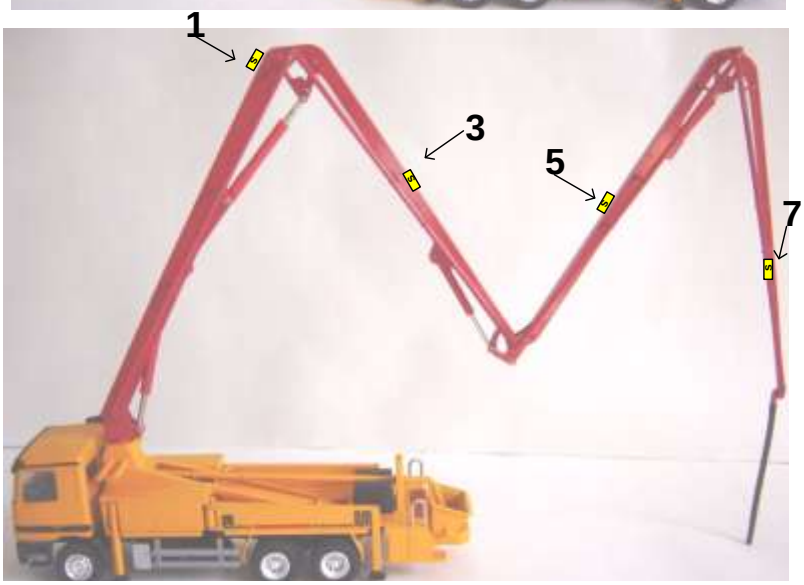
1.13 Ideal installation : PUMP MALAXING or PUMP 3 ARMS



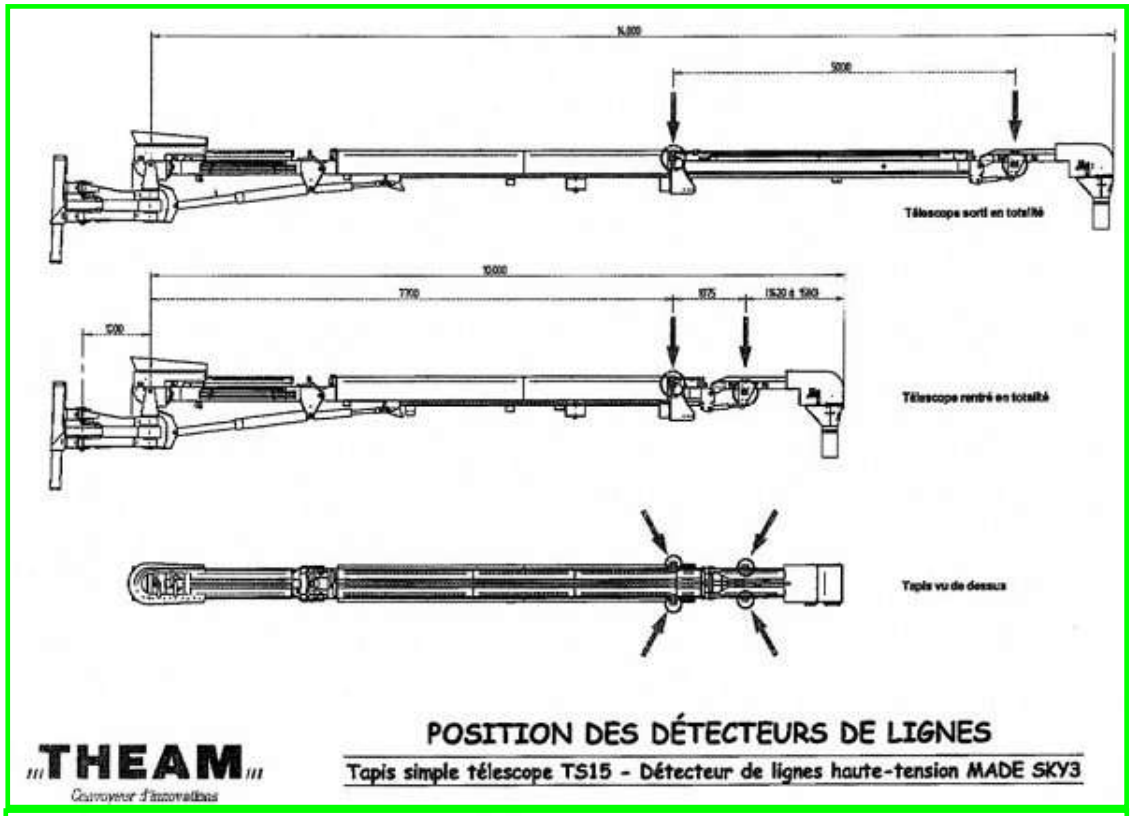
1.14 Ideal installation : PUMP 4 ARMS

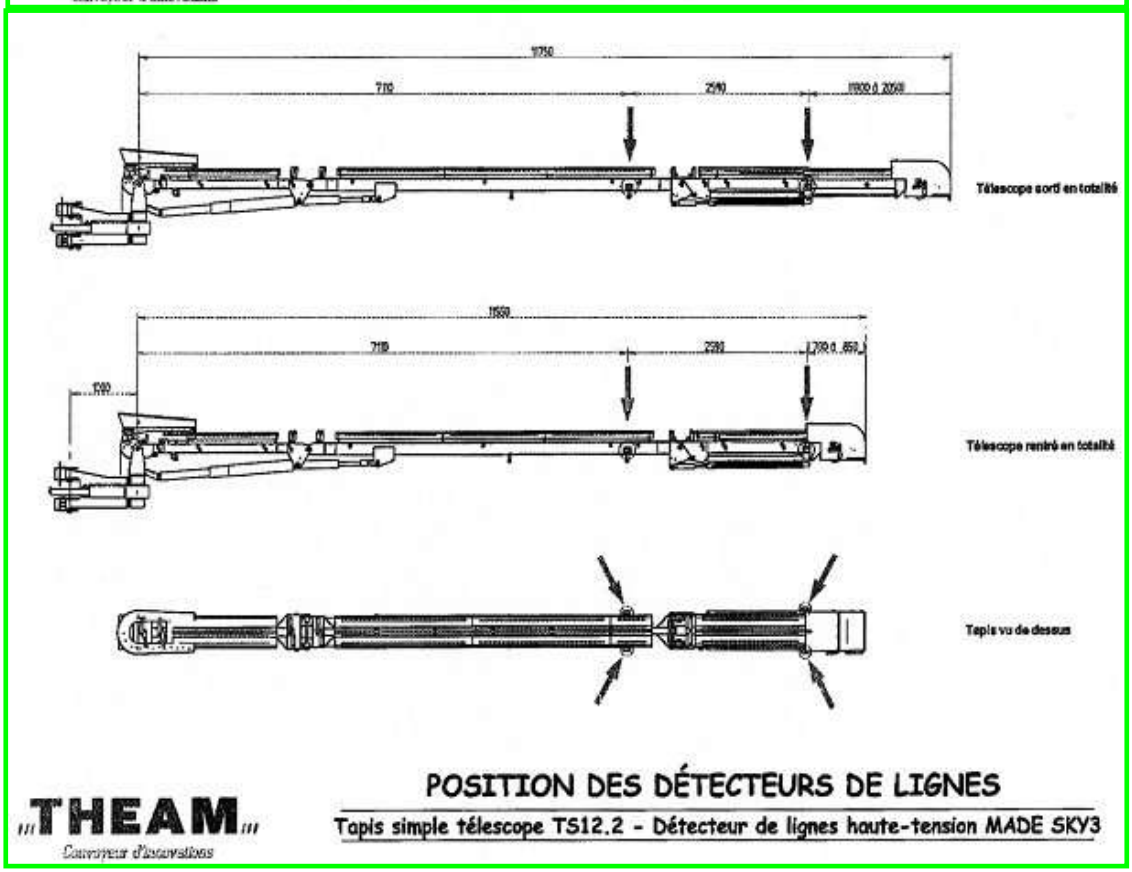






1.15 Ideal installation : **TELESCOPIC CARPET**





1.16 Assembly of sensors

- The sensors are mounted along the arms.

Caution: when mounting the sensors, it is necessary to please observe the following :

SENSOR IS OPEN FIELDS

SENSOR IS CONNECTED ELECTRICALLY IN FRAME OF CRAFT

Ground cable

Ground cable

1.17 BATTERY CHANGE

With a wrench of 7mm remove the sensor from its magnetic base.

Unscrew the battery cover and unplug the connector.

Replace the lithium battery including its connector for sensor
Ref. : SKR_CAP_110SKR_PIL_110.

Put the battery cover back to its place and the sensor back to its magnetic base.
Verify that the base is well fixed as well as the link cable.

New version sensor are black with blue stick

But for system more than 7 sensors

Be carefull

The sensor with the yellow stick (wake-up relay radio RR1.0)

Do not use for the détection .

But you must put it, on the first arm.

11. INSTALLATION EXAMPLE

The central unit is mounted either in the cabin or in the arms of the control box,

Based around the tower in free field sensors, in free field along the arm.

It requires a PC with a serial connection and MADE SKY_W software to change the sensors.

1.18 Installation of the CPU

The central unit is installed in the cab behind the passenger seat or in a protected box near the outside command box.

The external display unit is positioned at the bottom, outside near the cabin door or the outside command box

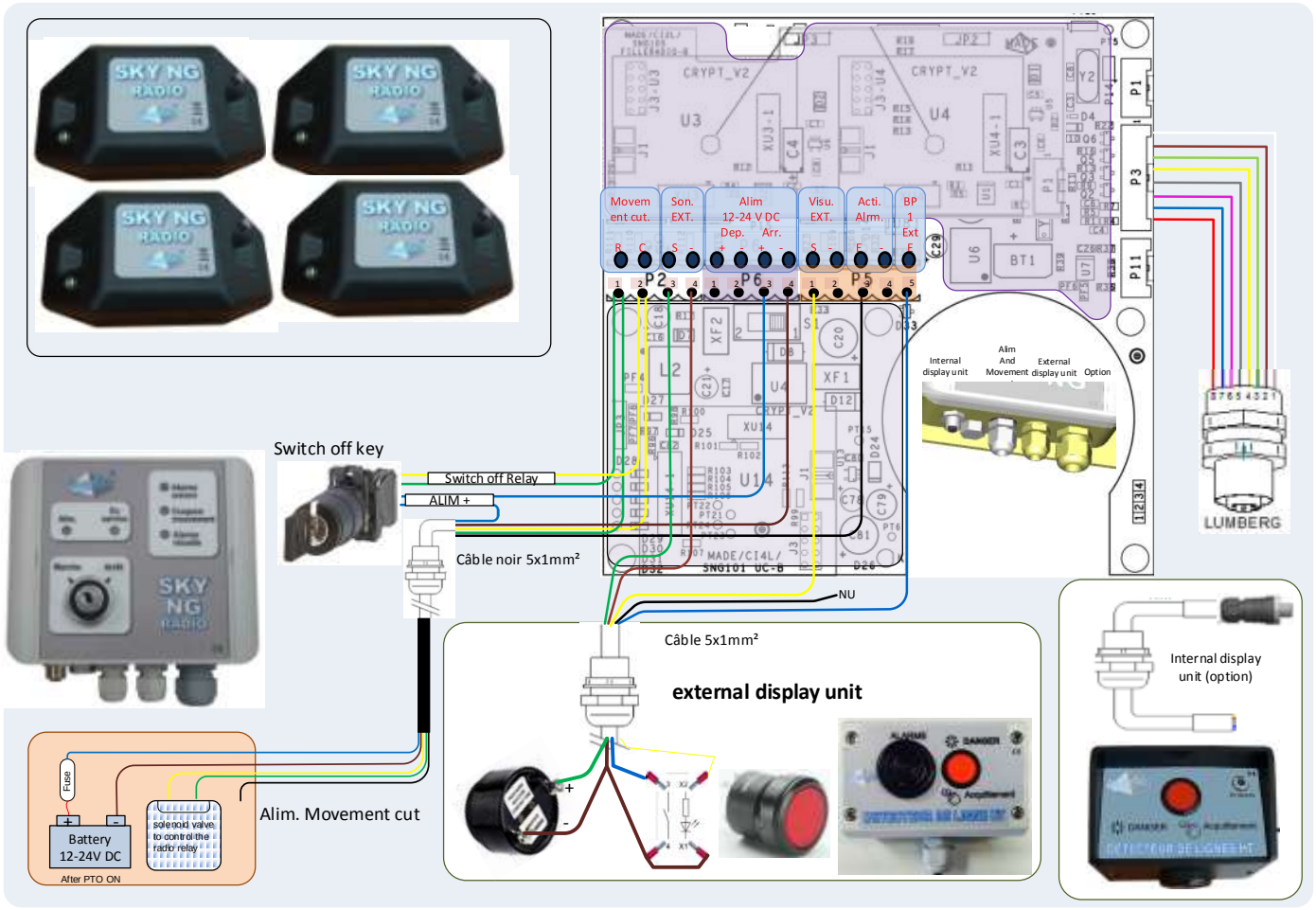
Make the following connections :

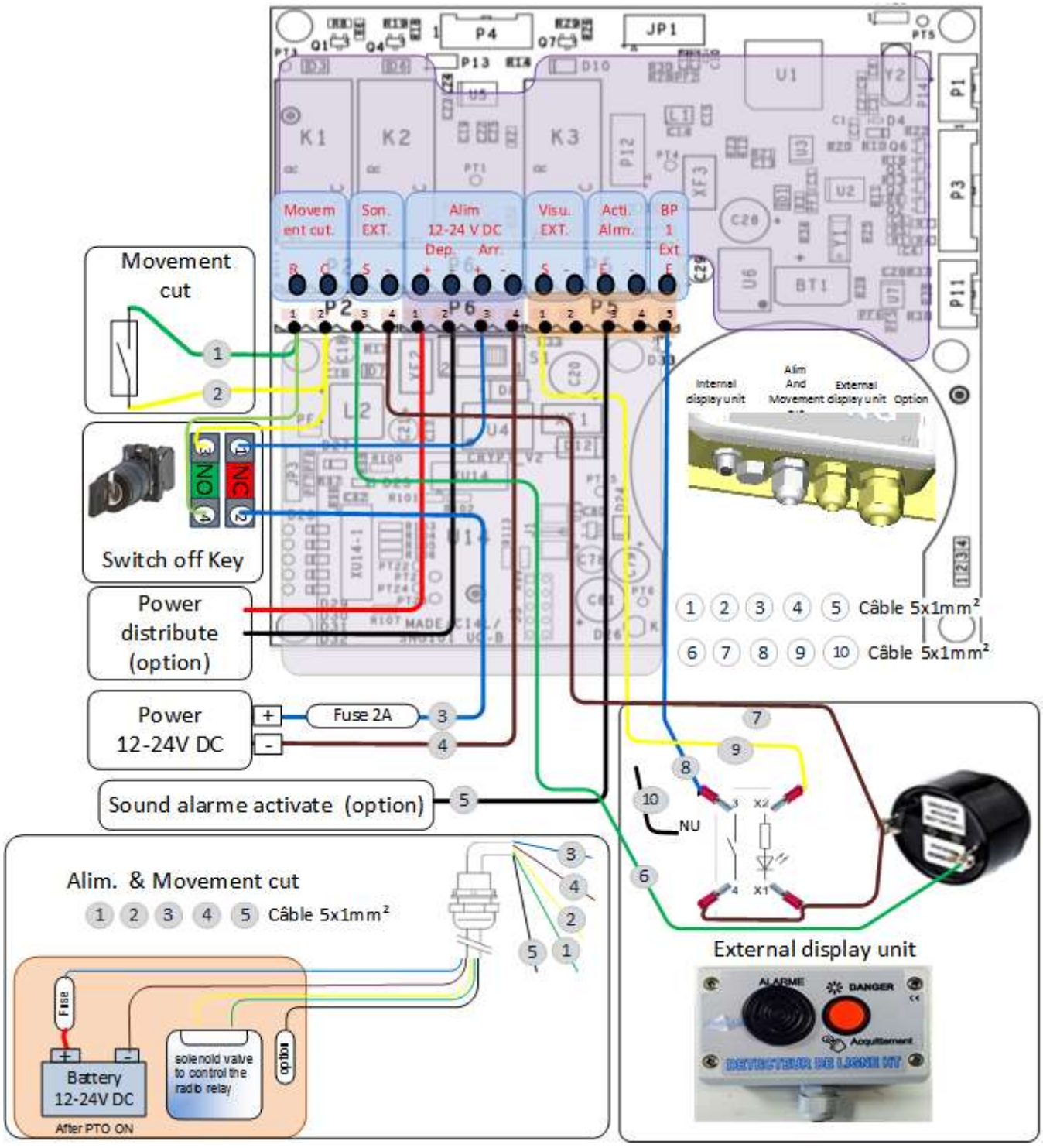
- Connect an external 24V supply on pins 3-4 P6 terminal (+ 24V P6.3, P6.4 GND),
- Connect the sensor cable (extension card, P1 connector),
- Connect the cab display unit to the connector "Lumberg" at the bottom left of the CPU housing,
- Connect the external display unit (P5.5 button P5.4, P5.1 P5.2 LED, buzzer + P2.3 - P2.4),
- Connect the option eventually cut motion (dry loop P2.1 P2.2).

Overview of interconnections

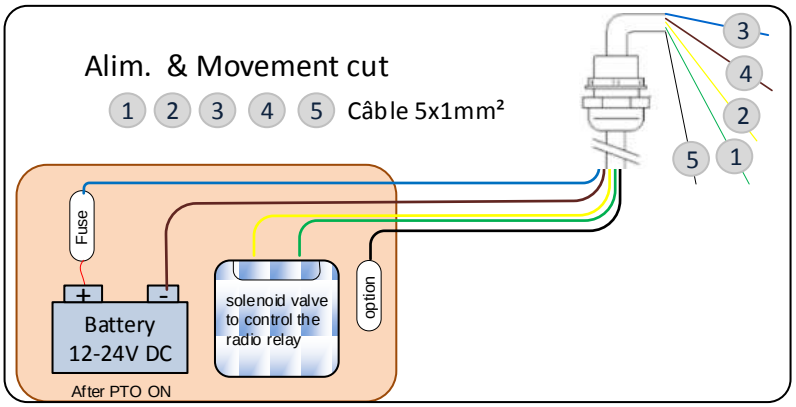
1.19 Wiring in the CPU

1.19.1 Internal wiring of the central unit




Movement cut
1
2
Switch off Key
NO
NC
Power distribute (option)
Power 12-24V DC
+
-
Fuse 2A
3
4
Sound alarme activate (option)
5
Movem ent cut.
Son. EXT.
Alim 12-24 V DC
Dep. Arr.
Visu. EXT.
Acti. Alim.
BP 1 Ext
P2
P6
P5
Internal display unit
Alim And Movement
External display unit
Option
1 2 3 4 5 Câble 5x1mm²
6 7 8 9 10 Câble 5x1mm²
7
8
9
10
NU
6
X2
X1
External display unit
ALARME
DANGER
Acquittement
Alim. & Movement cut
1 2 3 4 5 Câble 5x1mm²
Fuse
Battery 12-24V DC
After PTO ON
solenoid valve to control the radio relay
option

1.19.2 Power



Wire 1 = Green , movement cut 1

Wire 2 = Yellow ,movement cut 2

Wire 3 = Blue Alim +

Wire 4 = Brown (Alim -),

Wire 5 = Black (Activation alarm by external contact if uses)

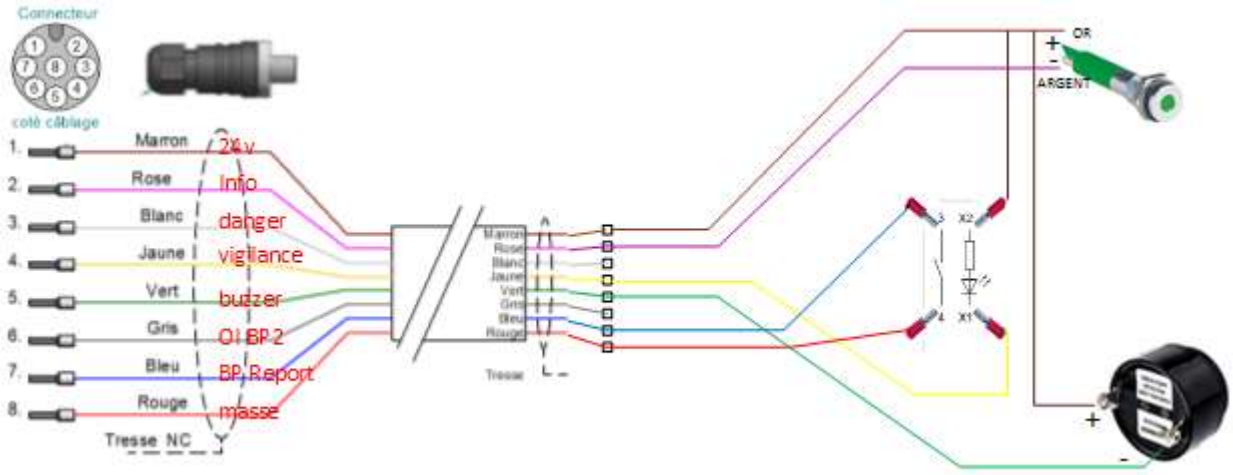
Note:

The wire 1 and 2 are optional for switching the movement,

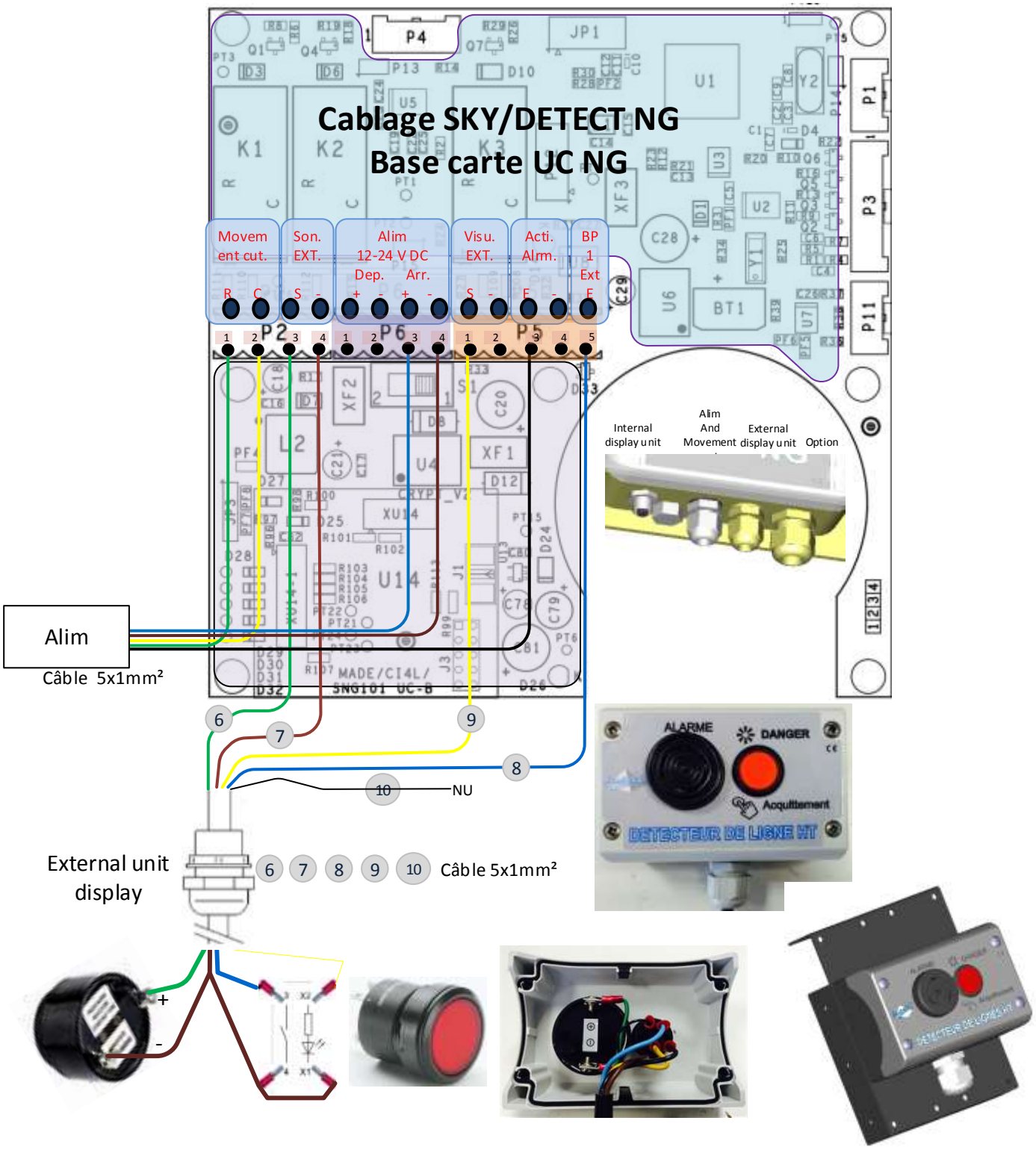
wire 5 is optional for the activation such as "engagement PTO".

The wire 3 + Alim must be fuse (2A) at the source.

1.19.3 Internal wiring cab display unit



1.19.4 Internal wiring for external display unit

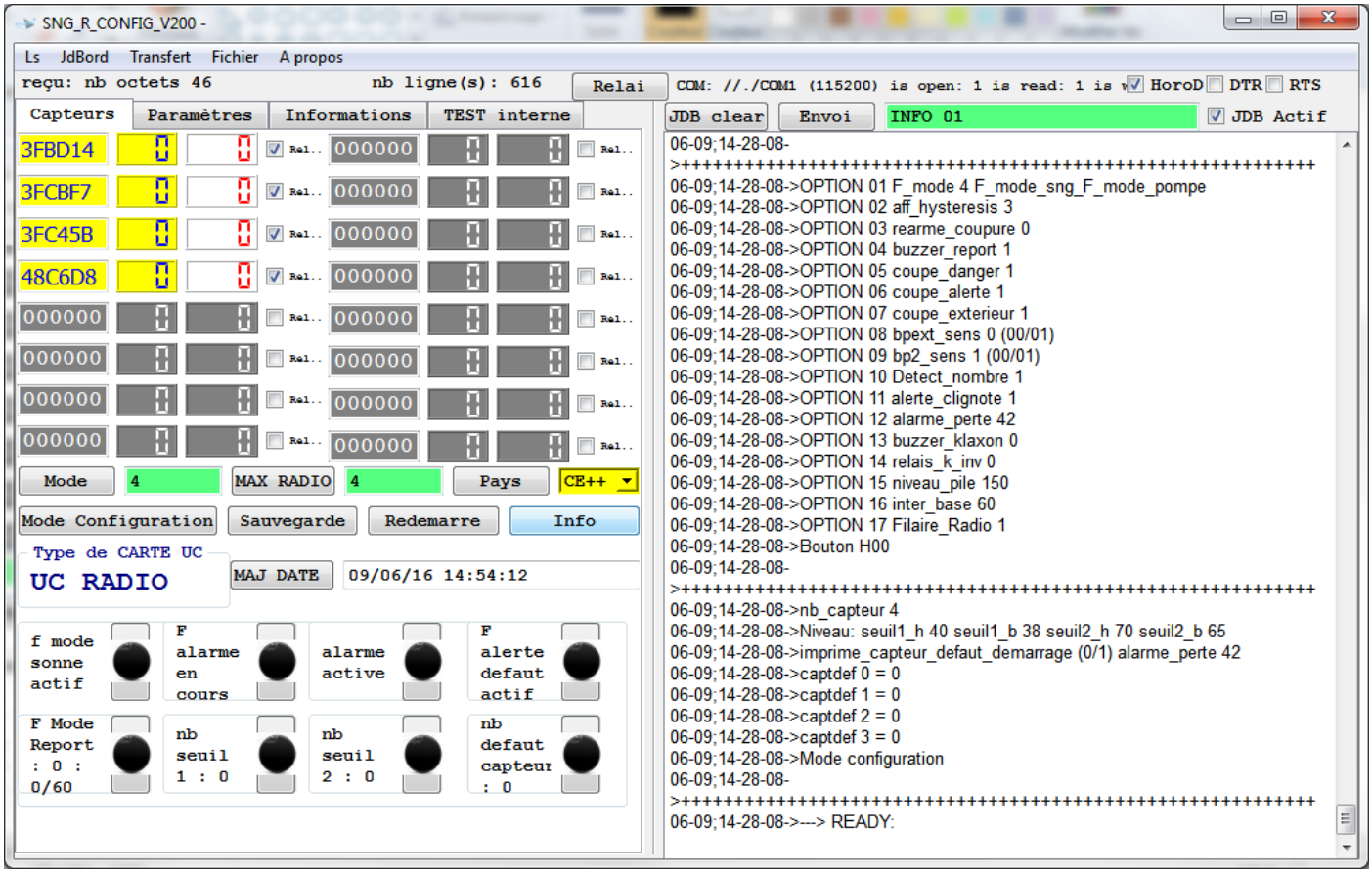


- wire 6 and 9 : carrying the 24V,

- wire 7 is the mass,

- wire 8 is an entry (in any way connected to Alim + Live).

12. SOFTWARE OF INITIALIZATION AND SETUP



Note : The CPU needs to be configured with the software SNG_CONFIG.exe.

This configuration software runs on a PC with the operating system: Win 98/2000 / XP / SEVEN, with a serial link (eg COM1). It is available on the website www.made-sa.com :

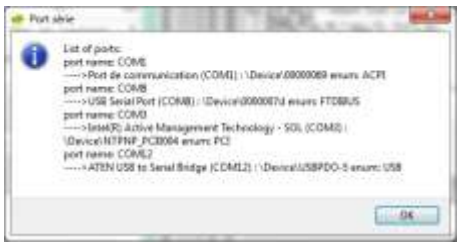
In **SNG_RADIO->** **configuration software of SKY NG RADIO – SKY NACELLE**

It automatically installs by running the file "SNG_instal.exe"

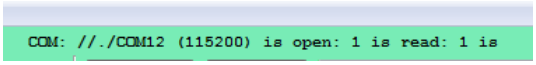
The connecting cable is of the type RS232 - female-female crossover.

Must first select the corresponding serial port in the menu "Is config"

The first screen shows the serial ports available :



Then enter the port number to use and the speed (must be 115200) :

The result is in the main window 

(the open fields, read and write must be 1).

Once the serial link, press the "info" :

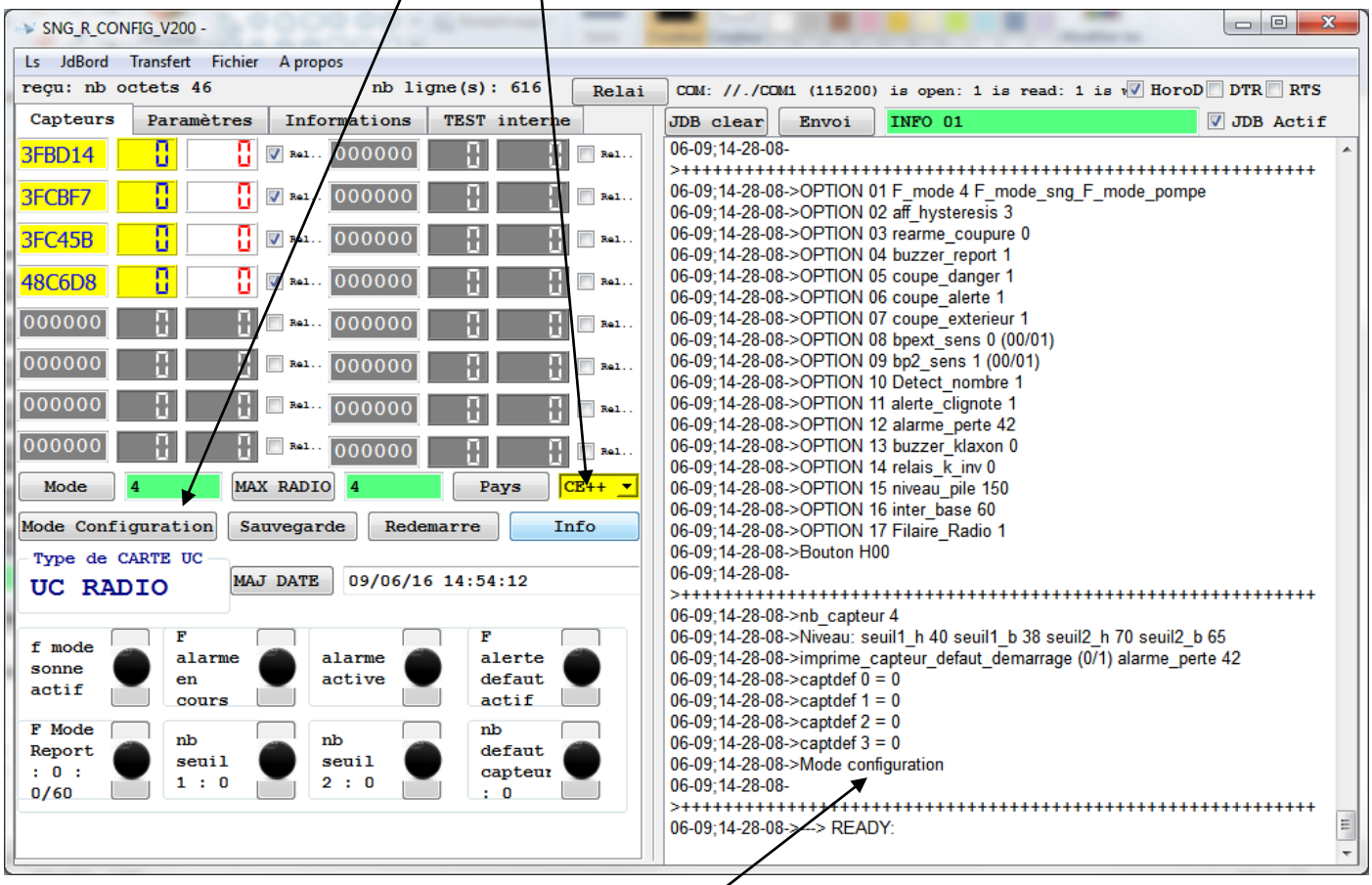
The refreshed information program

1.20 Sensor configuration :

Switch on the SKYR CPU unit : and click « INFO »

The CPU informs the sensors in memory:

Clich on « MODE Configuration »

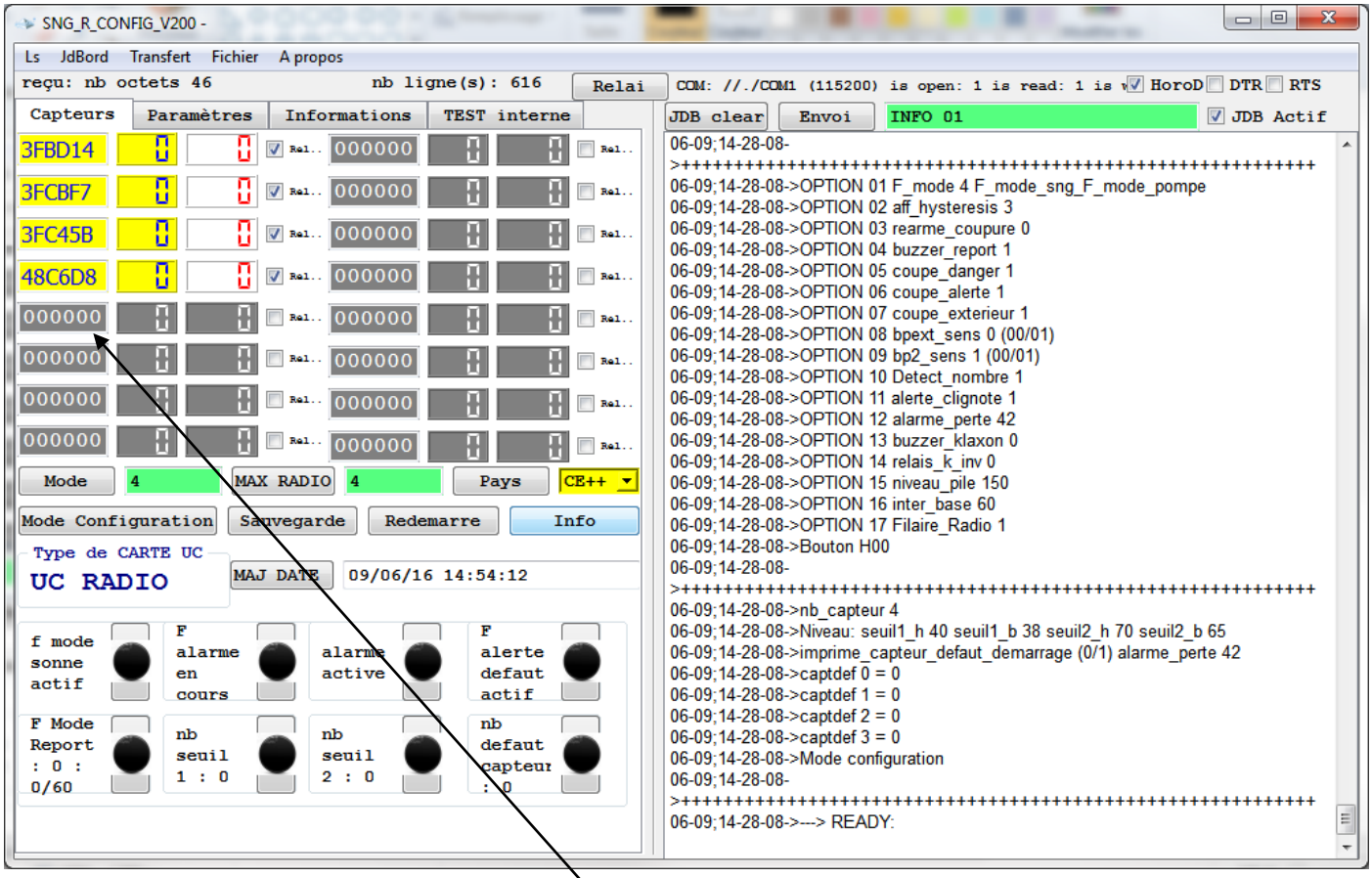


Check the screen to be sure to be in configuration mode

1.21 Maximum number of sensors

Enter the maximum number of sensors 

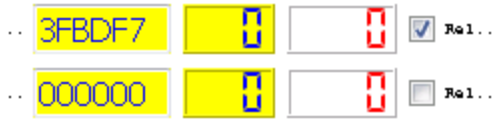
1.22 Entering the number of sensors



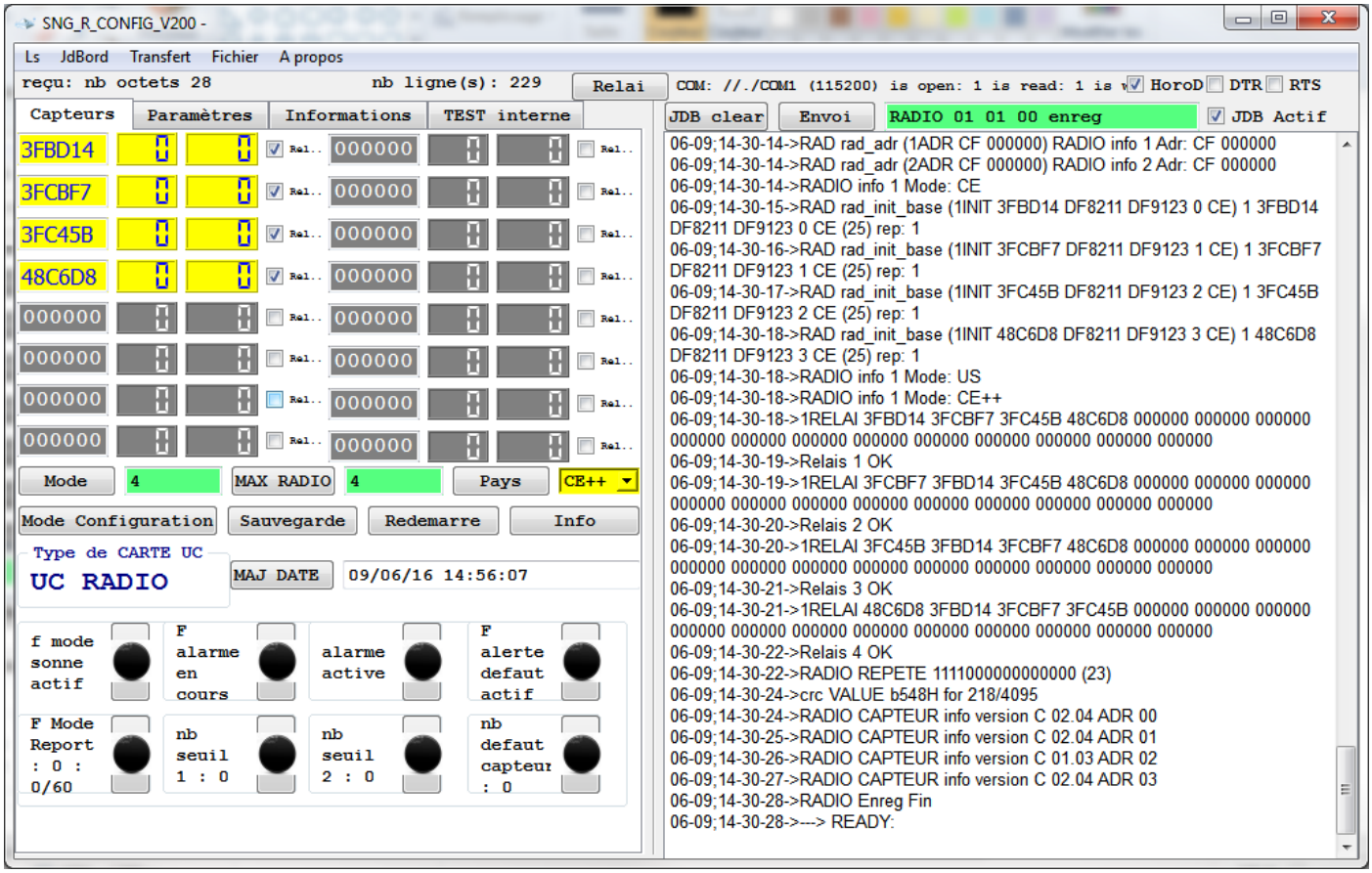
Write "000000" (six zero) in the unused sensors

Write the sensor number (see on the sensors cover).

Be careful, the sensors used 6 digits or letters "0123456789ABCDEF" (no space), the non-used must be six zero (no space)



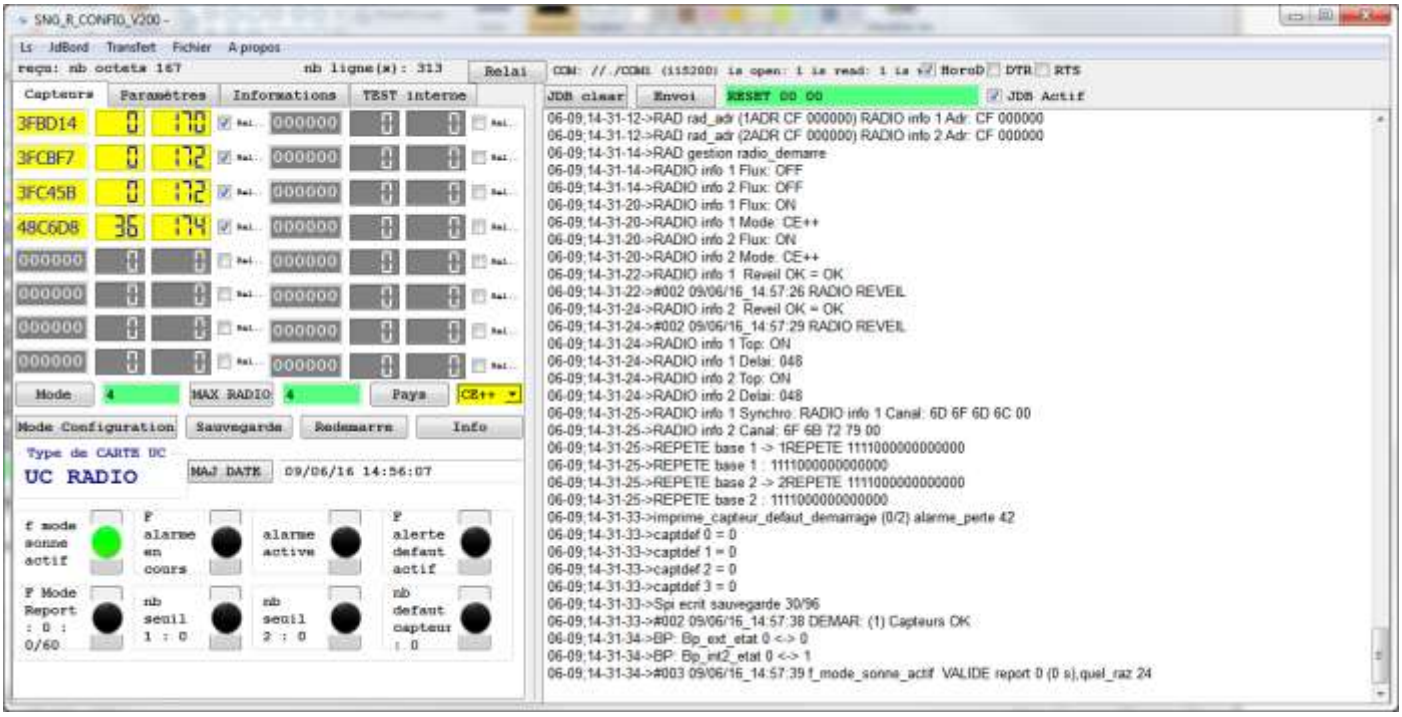
clik on «SAUVEGARDE»



Wait until the system has been configured

Reboot the system click on «REDEMARRE»

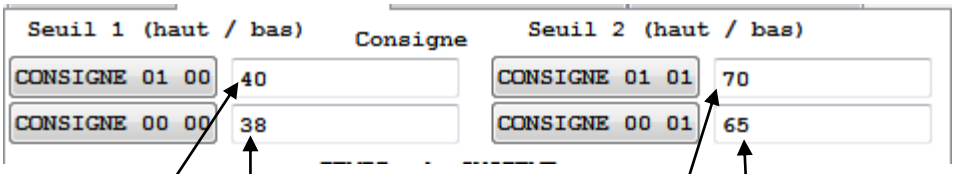
After 30 seconds the system is operational



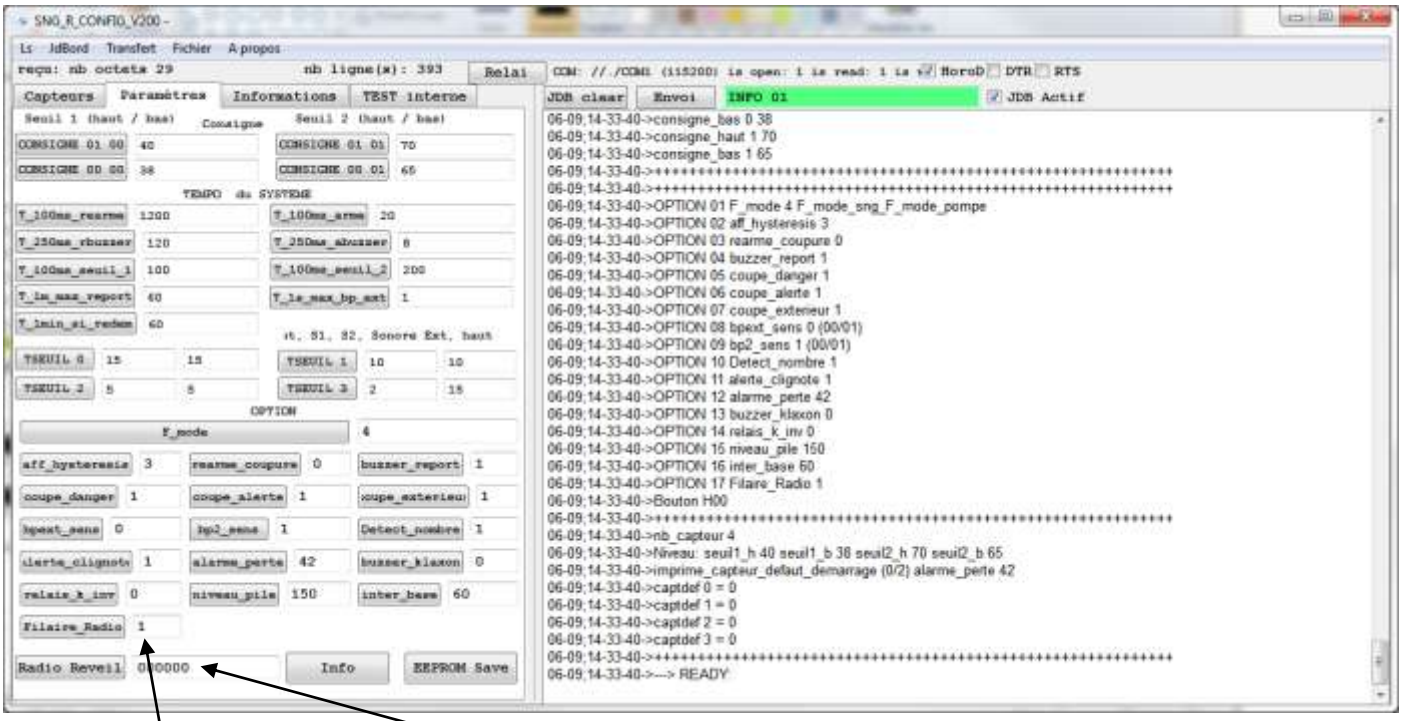
13. THRESHOLD SETTINGS

ATTENTION: The "Settings" tab gives access to the modification of the factory (detection limits , duration of alarms, etc ..) it is not necessary to touch in normal times.

Any changes can only be performed by an authorized person . Consult us.



Fisrt alarm on off second alarm on off



Radio mode 1 Wake up Relay RADIO (for more than 7 sensors)

14. TEST

1.23 Procedure

Turn the system on.

Connect the computer via the RS232 serial link to the central unit; then open the SNG_CONFIG_V100.exe software.

Check the following points :

1.23.1 Visual control

A visual check should be made to the sensors to the central unit and the wiring.

The sensors are molded, they must not have liked or cracks.

The central unit and the remote box in the cabin must not have liked or cracks.

The info light should flash regularly.

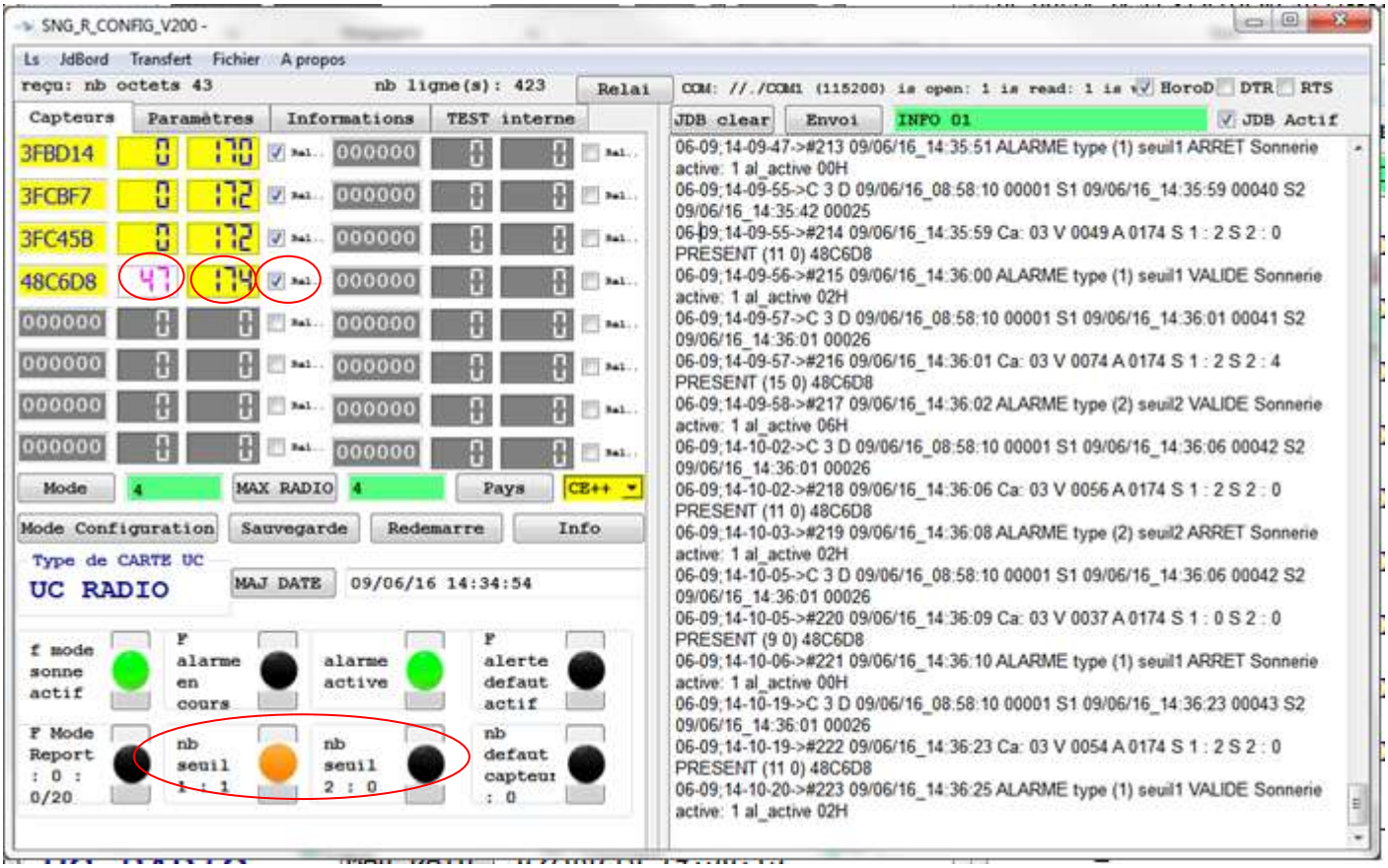
The "Supply" LED is on.

1.23.2 Verification software

Connect the computer via the RS232 serial link to the central unit; then open the SKY3_config.exe software.

Once the software is launched and the recognized CPU (see section above on the connection), press the INFO button.

He must simply verify that the sensors are recognized (red circle in the figure below).



Verification sensors

To check the sensitivity of the sensor, a simple way is to approach an electric cable (extension) connected to 110V on the sensor.

The sensors being sensitive enough to detect the electrical field around a cable fed to a 110 volt outlet.

Check the operation of the system by triggering the alarm for each sensor tested.

15. UPKEEP

Opening the devices is prohibited. It is reserved to qualified and authorized personnel by MADE.

An annual check can be performed in our premises.

Never use solvents or solvent base, to maintain the equipment and / or accessories.

16. MAINTENANCE

The system itself does not require recalibration, there is no wear parts such.

Nevertheless regular monitoring of the entire system to verify its operational functioning.

If the CPU or the sensors are changed, must re-apply the procedure "Configuring the system"

Maintenance involves unwinding the test procedure.

17. OPERATING RESTRICTIONS

SKY NG RADIO device is **a operationnal aid**.

The VIGILANCE and the operator must remain CAUTION maximum to approach energized electrical lines.

The principle used is the measurement of the electric field radiated by the conductors.

SKY NG RADIO has been validated for use OPEN FIELD: no physical obstacle between the sensor and the power line.

SKY NG RADIO detects electrical power lines from 11,000 volts.

Low voltage electrical lines (380V) are not detected.

Special cases (intersecting or parallel power lines) may change the value of the electric field.

In this case, extra care is needed.

MADE disclaims all liability for use of the equipment not in accordance with manufacturer's specifications. MADE company could not be held responsible for an accident by contact with power lines, given the multitude of particular cases encountered in the field.

18. RECYCLING

In accordance with Decree No. 2005-829 of 20 July 2005 on the disposal of waste electrical and electronic equipment (WEEE), user agrees and takes over the collection and disposal of WEEE in accordance with Articles 21 and 22 of this decree.

19. GUARANTEE

MADE guarantees this product to the original purchaser against defects in material or vice workmanship for a period of one year from the date of delivery, unless otherwise specified in the product manual. If a defect was discovered during the warranty period, MADE agrees at its option to repair or replace the product, excluding initial costs of handling and delivery. Any product repaired or replaced under this agreement will be warranted for the remainder of the original warranty period of the unit.

1.24 Limitations

This warranty does not cover:

• Damage caused by force majeure, natural disasters, strikes, war (declared or undeclared), terrorism, social conflicts or acts of any governmental jurisdiction

• Damage due to misuse, neglect, accident or application or improper installation

• Damage caused by a repair or attempted repair by unauthorized MADE

• Any product that is not used in accordance with instructions provided by MADE

• Transport costs of goods referred to MADE

• Transportation costs on the express parcel delivery or fast secured parts or product

• Mission expenses associated with on-site repair warranty

This warranty is the only express warranty made by MADE in terms of its products. All implied warranties, including, but not limited to, warranties of merchantability and product adaptation for a particular purpose are expressly rejected.

This warranty gives you certain rights: the laws of the country or jurisdiction you may also have others. This warranty constitutes the final, complete and exclusive warranty terms and no person is authorized to issue other warranties or representations on behalf of MADE.

1.25 Limitations of use

The action seeking repair or replacement are the only remedies for breach of this warranty. MADE company can not be held responsible, either on the basis of strict liability or any other legal theory, any incidental or consequential damages resulting from breach of warranty or negligence.

20. COPYRIGHT

21. APPENDIX

1.26 Automotive EMC Compliance Statement

MADE
S.A. au capital de 270 130 €
167, Impasse de la garrigue
F 83210 LA FARLEDE
Tél:+ 33 (0) 494 083 198 - FAX : + 33 (0) 494 082 879
E-mail: contact@made-sa.com - Web : www.made-sa.com

Déclaration CE de conformité

Déclaration n : **CE_DLG_09/2015**

Le fabricant soussigné :

MADE SA

167, Impasse de la Garrigue
F 83210 LA FARLEDE

Déclare que le produit

Nom du produit : **Détecteur de lignes à hautes tensions HTA, HTB**
Référence du modèle : **DETECLINE NG**

Est conforme aux dispositions réglementaires définies par :
Les directives européennes :

- CEM 2004/108/CE relative au « Marquage CE»
- 2006/95/CE relative à la sécurité des matériels électriques destinés à être employés dans certaines limites de tension.

L'équipement référencé ci-dessus est conforme aux normes ci-dessous, suite aux essais :

- EN 61010-1– Partie 1 : Règles de sécurité pour appareils électriques de mesurage.
- normes EN 61000-6-3 (01) et EN 61000-6-1 (01) EMC (Compatibilité Electromagnétique), qui englobent les essais
    - EN 55022 (98) + A2(03) : Mesures champs électriques rayonnés,
    - EN 61000-4-2 : Immunité aux décharges électrostatiques,
    - EN 61000-4-3 : Immunité aux champs électromagnétiques rayonnés,
    - EN 61000-4-4 : Immunité aux transitoires rapides sur ligne téléphonique,
    - EN 61000-4-5 : Immunité aux chocs haute énergie,
    - EN 61000-4-6 : Immunité aux courants HF induits sur ligne téléphonique,
    - EN 61000-4-8 : Immunité aux champs magnétiques,

Par ailleurs, le produit désigné ci-dessus a été conçu, fabriqué et contrôlé, dans le cadre d'un Système d'Assurance Qualité certifié conforme à la norme : ISO 9001/2008, par l'Association Française pour l'Assurance Qualité – AFAQ, certificat : QUAL / 2005 / 24473B du : 05 / 05 / 2011.

Fait à La Farlède, le 07/09/2015

Directeur Général Délégué	Directeur Technique	Responsable Qualité
Marc RIVASSEAU	Laurent Zoméro	Jean Yves Creste

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N° TVA Intra communautaire FR 20 381537604