positioner fixing plates slide the whole linear positioner towards the front of the system and away from the engine end.

2. Attach each fixing plate to its counterplate inserting four bail head ¼ turn studs in the fixing plate customized holes (Figure 8). Optionally also four M5 security screws can be inserted in each fixing plate (always install the security screws with their o-rings).

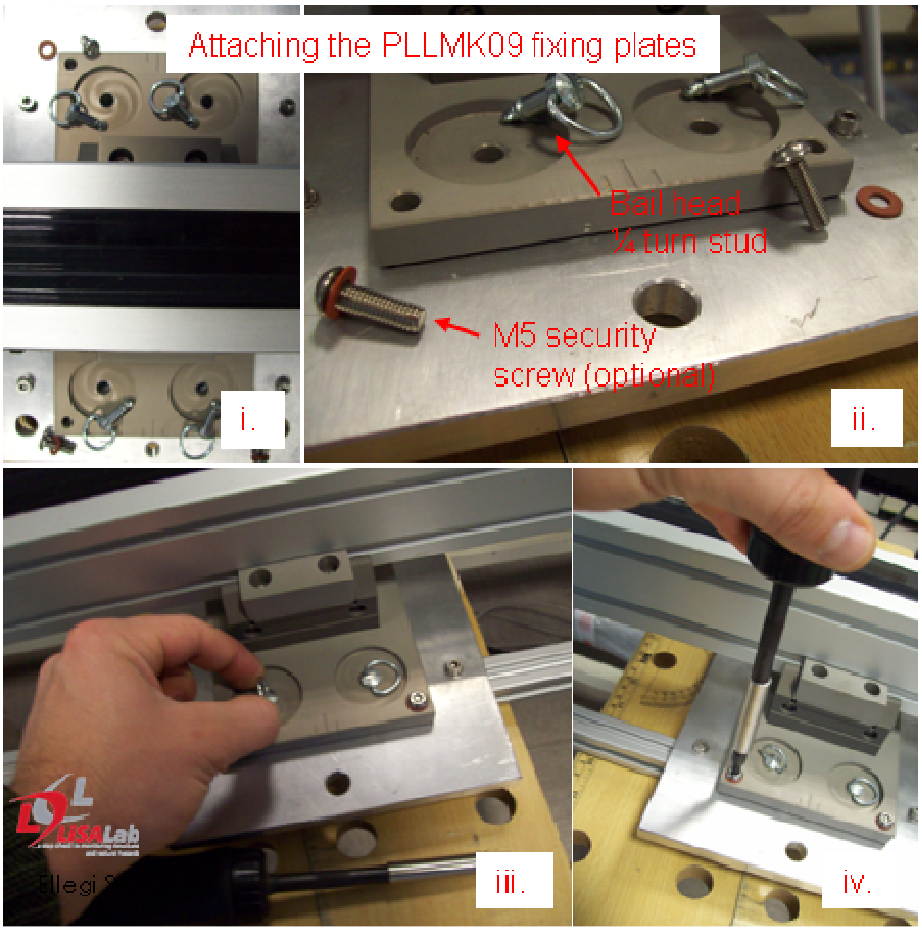

Figure 8: Step 2 of the installation procedure. Attaching the PLLM fixing plates to the counterplates.

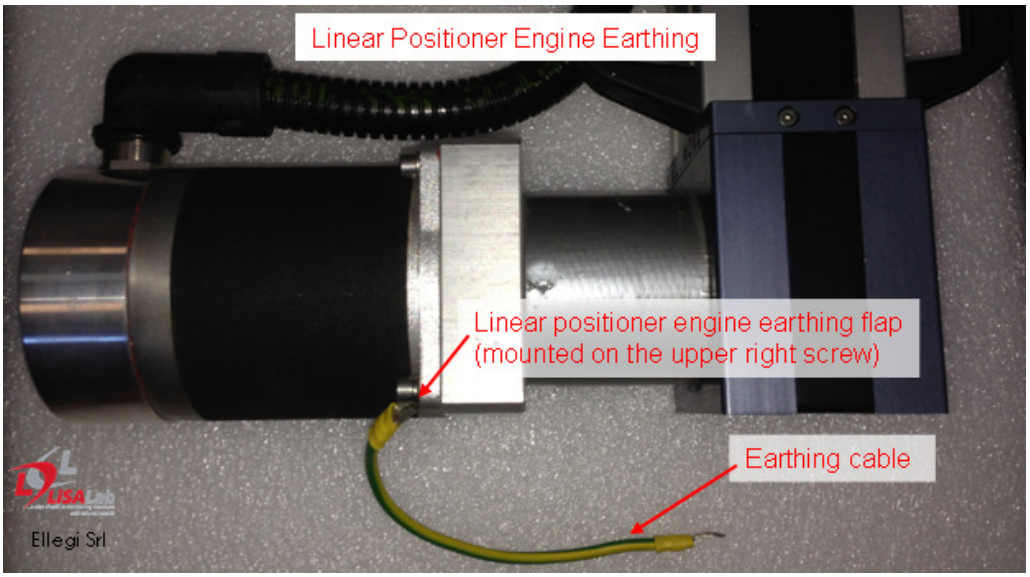

Figure 9: Step 3 of the installation procedure. Earthing of the linear positioner engine.

3. Use the earthing flap mounted on the upper right screw of the engine to perform the earthing (Figure 9). An earthing cable of adeguate diameter must be used to connect the engine earthing flap to an earthing plant.

4. Mount the system measuring head (LM) on the linear positioner sledge (Figure 10). When the system is switched off, the measuring head should be kept in the “transport position”. On the linear positioner sledge there are two pins similar to the one found on the system counterplate that are used to match the sledge and the measuring head base plate. There are also tree matching marks both on the sledge and on the measuring head base plate that must be aligned if the measuring head is mounted in the correct position. After having set down the measuring head on the linear positioner head it has to be secured with four bail head ¼ turn studs and optionally with four M5 security screws (always install the security screws with their o-rings).

NOTE: before securing the measuring head on the linear positioner moving sledge ensure that the sledge pins are touched on their rear and right side, i.e. once the sledge pins are inserted slide the measuring head base plate (without moving the linear positioner sledge) towards the front of the system and away from the engine end.

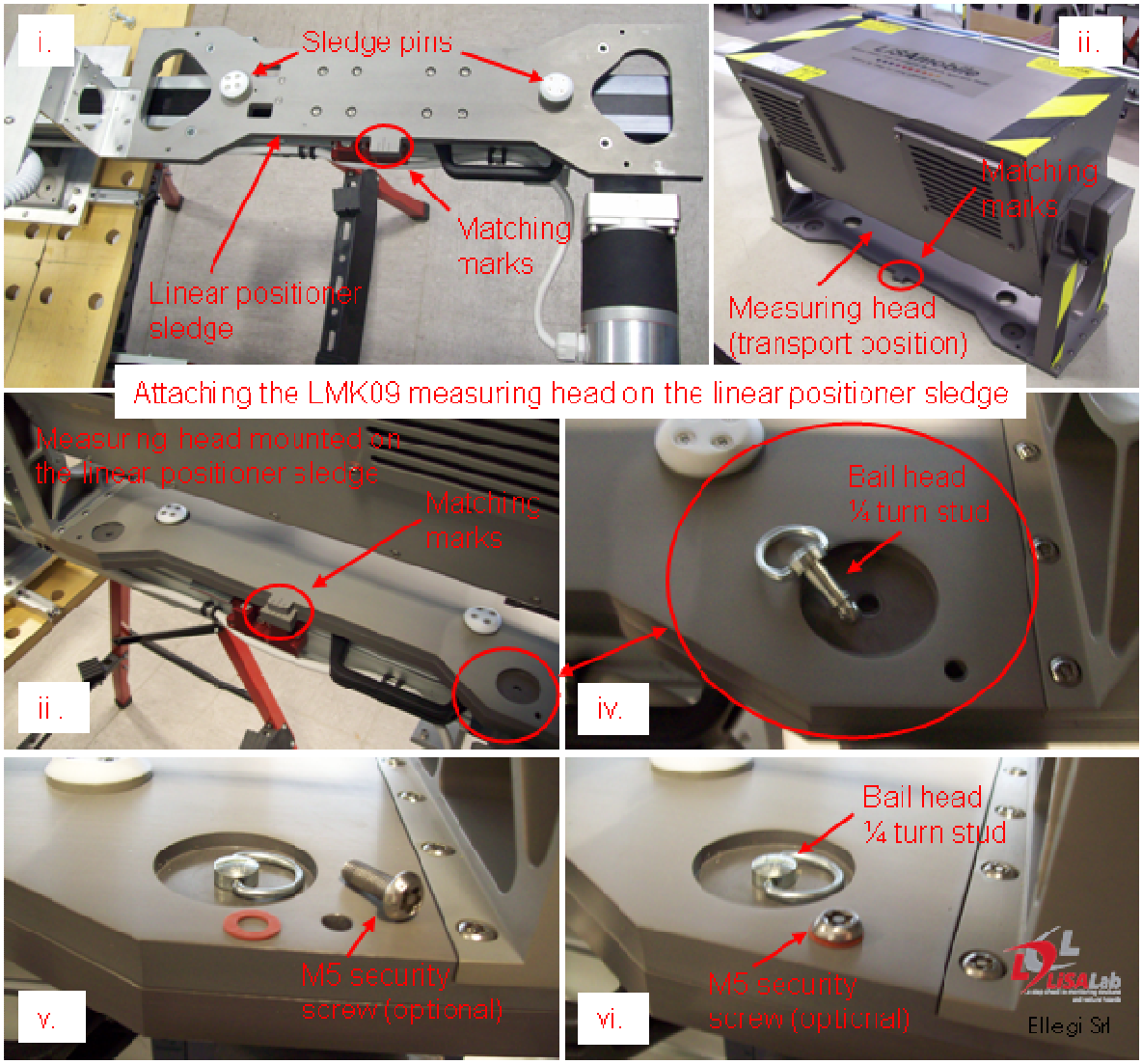

Figure 10: Step 4 of the installation procedure. Mounting the measuring head LM on the linear positioner sledge.

5. Leaving the measuring head in the transport position connect it with the 14 pins standard MIL connector of the cable chain and put the screw top that was on the head plug on the rest plug of the cable chain (Figure 11).

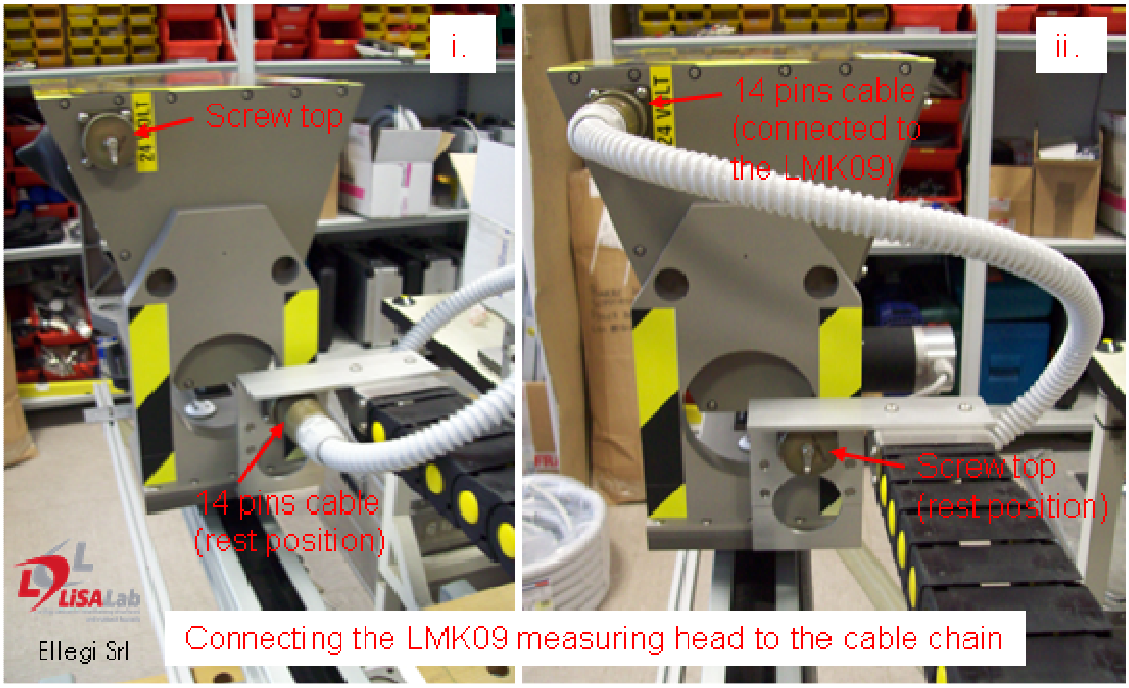

Figure 11: Step 5 of the installation procedure. Connect the measuring head LM to the cable chain.

6. Bring the power base (PBLM) in a safe position and connect it to the linear positioner junction box using the umbilical cable (LMUC). Note: the umbilical cable should not be stretched; before plugging it make sure that the power base and the linear positioner are close enough.

7. Verify that the security switch of the power base and the two red switches near its display are switched off and connect the power base (PBLM) to a power line using the power cable (LMPC). Note: make sure that also the power cable is not stretched or tangled (Figure 12).

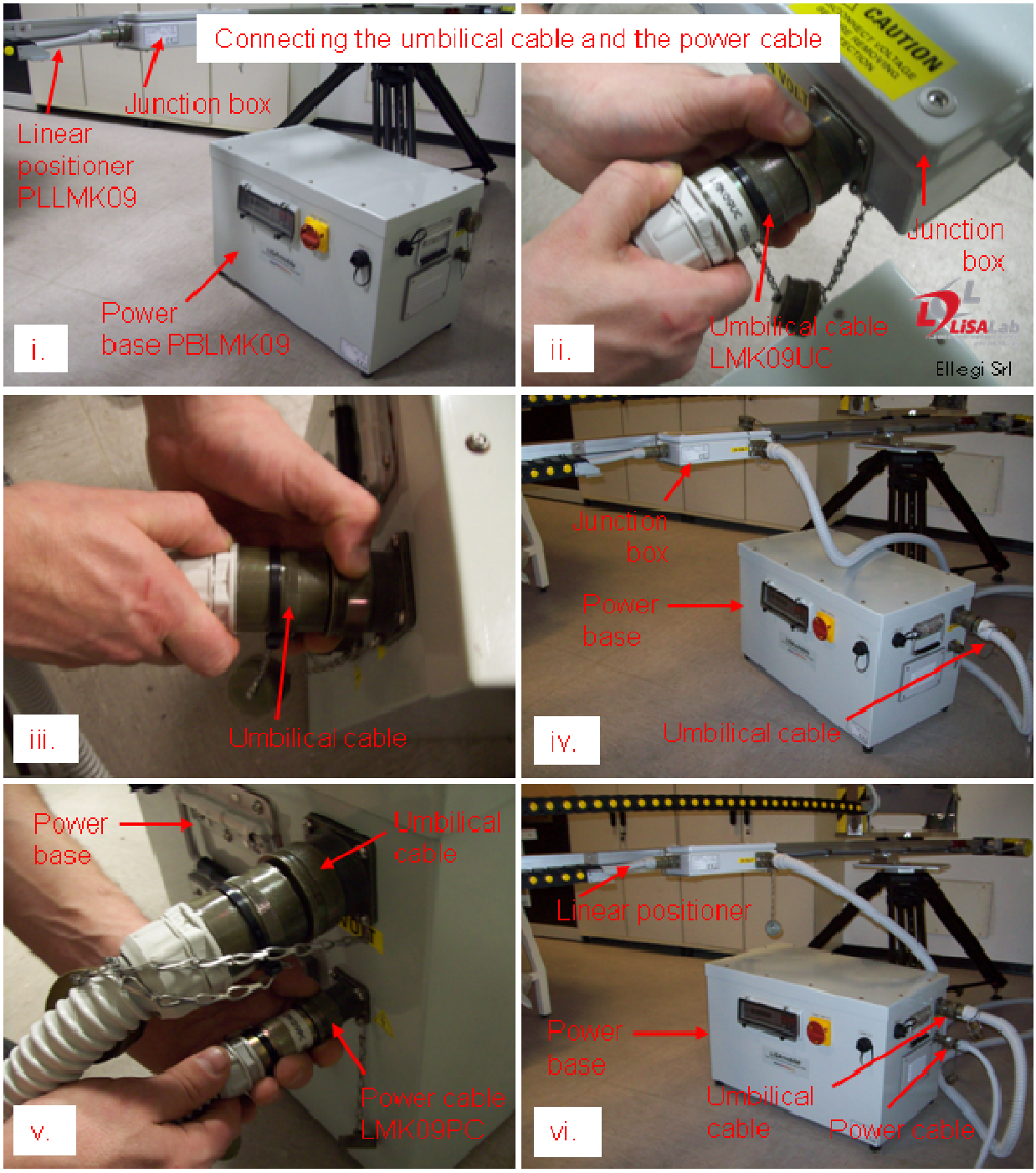

Figure 12: Steps 6 and 7 of the installation procedure. Connect the umbilical cable and the power cable.

8. Unscrew the protractor lock lever and rotate the measuring head pointing the radar antennas towards the target of the measures. Once the head is in the desired position secure it tightening again the protractor lock lever (Figure 13).

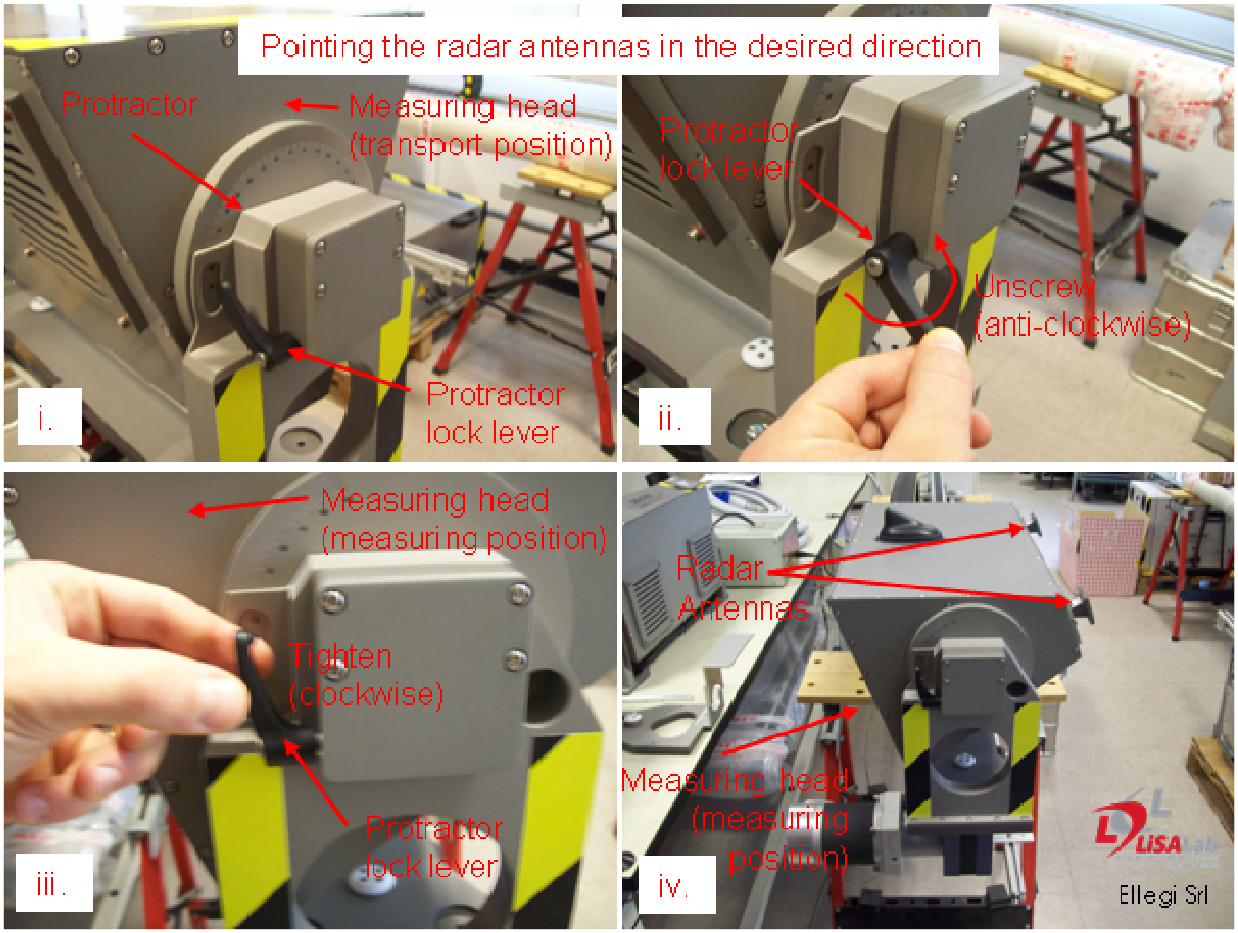

Figure 13: Step 8 of the installation procedure. Point the radar antennas towards the target.

9. Verify that every possible obstacle to the system moving parts is removed and that no one is standing in front of the radar antennas.

10. Switch to the "On" position the security switch of the power base; the system will switch on and the message "*InSAR LISA MOBILE ELLEGI srl lisalab*" appears on the power base display (Figure 14).

11. Lift the protective screen of the power base display and switch on the two red switches on the "I" position; firstly the "LP" switch and then the "MW" switch (Figure 14). Then close the display protective screen and secure it with the two fixing screws.

The system is now ready to start the measurements. Only skilled users should operate it referring to the instructions found in the "LEDA_ User's guide".

Note: the green status LED under the system switches indicates the correct functioning of the power base devices. The red led next to it indicates the presence of an over-temperature condition.

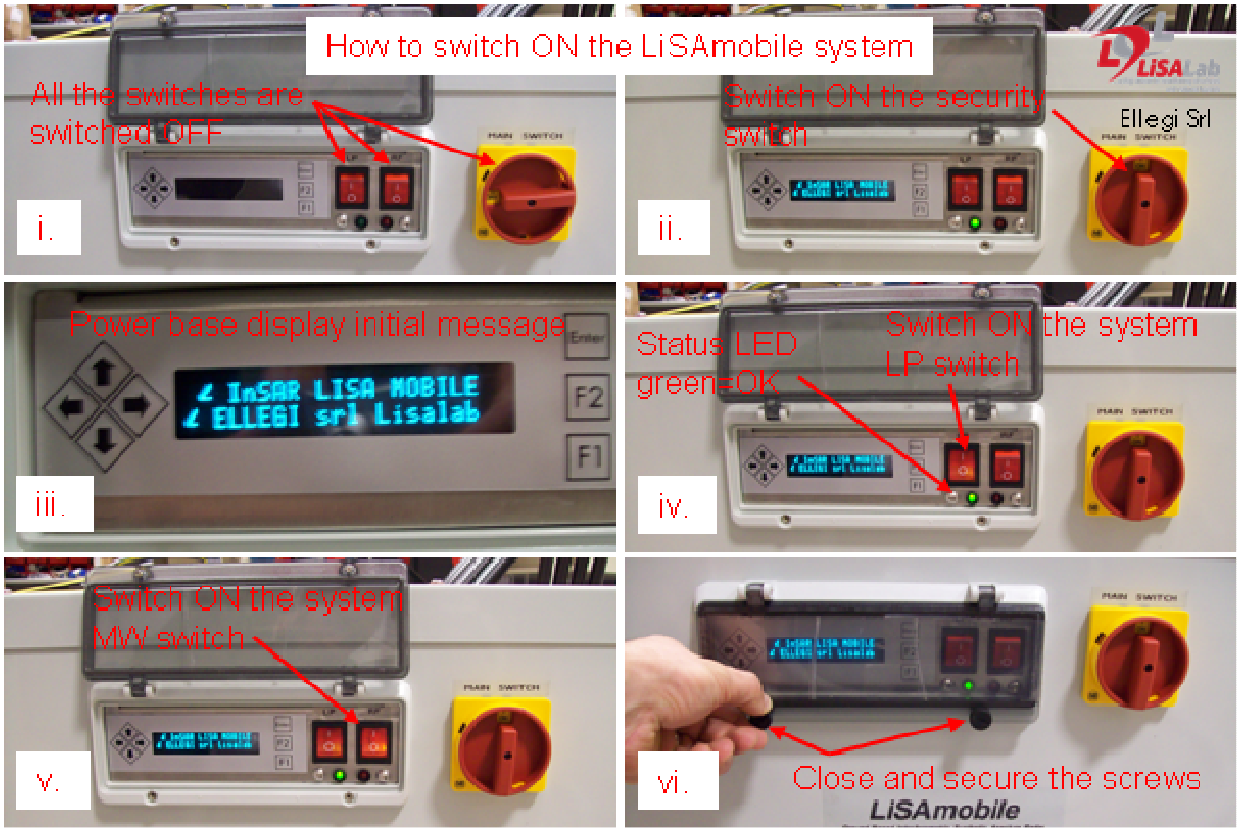

Figure 14: Steps 10 and 11 of the installation procedure.

Connecting to the GBInSAR LISAMOBILE system

To connect to the GBInSAR LISAMOBILE system the user should attach its pc to the frontal LAN socket of the power base (see Figure 4) and connect it using the “Main LISAMOBILE” software. For further information on the use of the “Main LISAMOBILE” software please refer to the software user’s guide “User's Guide - Main LiSA Mobile_rev0.doc”.

The LAN socket on the side of the power box can be used to connect to the system only if the power box is not equipped with a NAS device; otherwise this LAN socket is used to connect to the NAS.

Changing the GBInSAR LISAMOBILE system antennas

The GBInSAR LISAMOBILE © system can be used with different antennas. Different antennas have different characteristics and therefore depending on the monitored scenario one kind of antenna might be more suitable than another.

The following procedure gives a simplified guideline in the substitution of the GBInSAR LISAMOBILE system antennas (Figure 15):

1. Verify that the system is switched off.

2. Unlock the protractor and then secure the measuring head in a measuring position.

3. Unscrew the four fixing screws and remove the Tx (Rx) antenna horn.

4. Place the desired Tx (Rx) antenna horn on the Tx (Rx) aperture of the measuring head and secure it again with its four fixing screws.

NOTE: the Tx antenna horn must be placed on the Tx aperture which is on the protractor side of the measuring head and it is identified by a “Tx” label. There is a “Tx” label also on the antenna horn and it has to face the label on the measuring head (upwards). Also the Rx antenna horn has to be installed in correspondence of the Rx aperture of the measuring head with the label facing upwards.

5. Verify that the Rx and Tx antennas are coupled and in the right position, unlock the protractor and then secure the measuring head in the transport position.

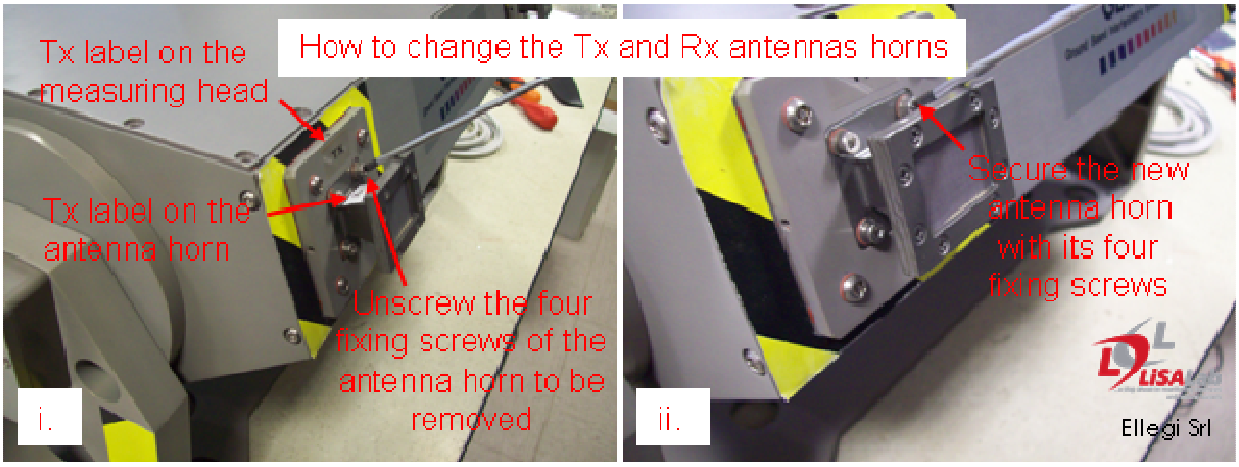

Figure 15: Changing the Tx and Rx antenna horns.

WARNINGS

- Never operate on the antennas when the system is switched on.
- Remove the antennas only in a clean environment.
- Avoid dust, dirt or water entering inside the antennas.
- The Tx and Rx antennas must always be mounted in the Tx and Rx position.
- The Tx and Rx labels on the horns of the antennas must be installed facing upwards.
- Tx and Rx antennas are always coupled and always have to be mounted toghether.

Maintenance operations

In this section are listed the ordinary maintenance operations to be performed on the LISAMOBILE system. Depending on the operating conditions the frequency of these maintenance operations must be varied, however it is recommended to perform all these operations (both cleaning and lubricating operations) after every periodical check campaign.

For permanent monitoring installations or for prolongued periodical check campaigns always refer to the graph presented at the end of this section resuming the required frequencies of the ordinary maintenance operations.

NOTE: In dusty/harsh environments the ordinary maintenance operations frequency must be increased.

Lubrication of the press-in receptacles with locking stops

The press-in receptacles with locking stops are found on the system counter-plates and on the linear positioner moving sledge. Their lubrication should be done at every installation of the system in order to preserve the functioning of their internal spring. Spray the internal part of the receptacles with an appropriate lubricating/protective fluid (e.g. siliconic lubricant).

Lubrication of the connectors' threads

The connectors' threads should be always kept well lubricated. When needed, put some lubricating/protective fluid (e.g. siliconic lubricant for electronic equipment) on a towel and lubricate the connectors' threads. Before lubricating, always make sure that no dust or dirt is present on the threads.

Cleaning of the system and maintenance of the protection belt and cable chain

Always keep clean the system, paying particular attention to its moving parts. The cleaning operations can be performed with a towel, water and a non aggressive cleaner. Make sure the system and the internal parts of the linear guide are well dried before operating.

After the cleaning operation the linear positioner protection belt and its cable chain should be treated with a silicon spray in order to preserve the plastic parts flexible and protected from ageing.

Cleaning of the system's fan filters

There are two fan filters in the lower part of the system's measuring head and two fan filters at the sides of the power base. These filters should be periodically cleaned or replaced to maintain their cooling efficiency. The filters can be cleaned with water and a non aggressive cleaner. The cleaned filters must be completely dry to be mounted again on the fan. The measuring head must be in the transport position before the removal of the fan filters.

For both the fan filters of the measuring head (Figure 16) and of the power base (Figure 17) follow this procedure:

- unscrew and remove the protection grid (frame);
- remove the fan filter;
- clean the fan filter with water and a non aggressive cleaner, and completely dry it;
- replace the cleaned filter (or a new one);
- secure again the protection grid.

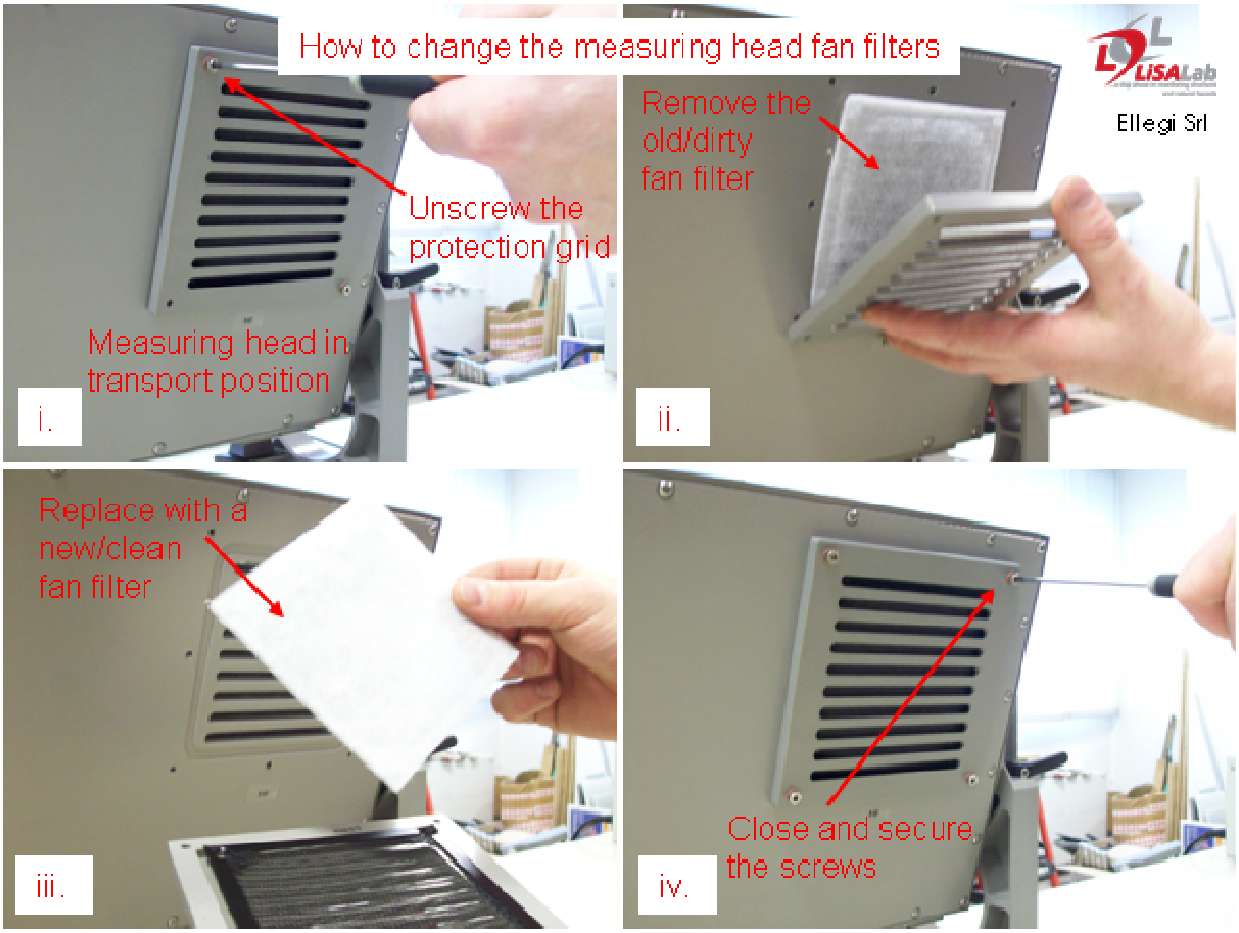

Figure 16: Changing the fan filter of the measuring head.

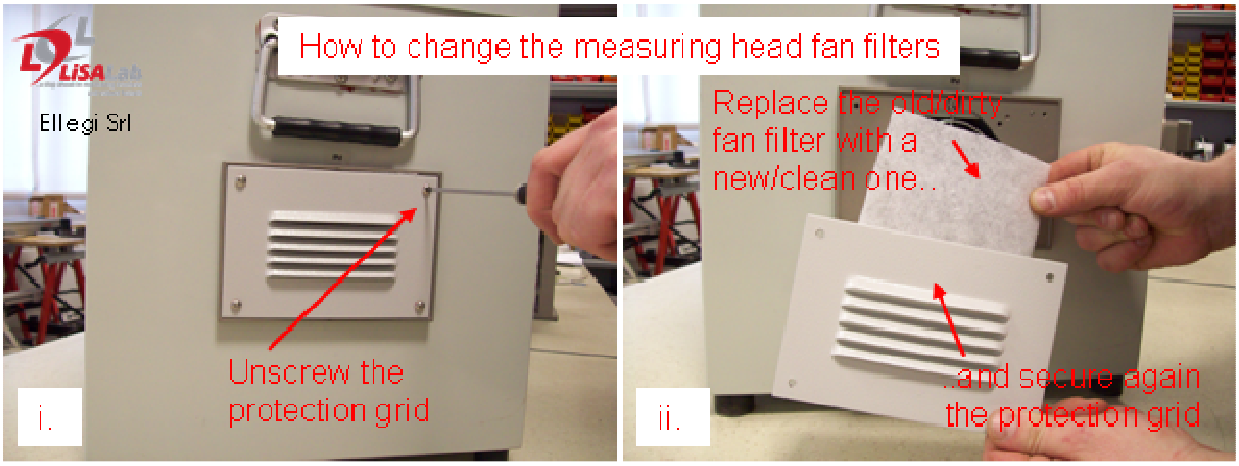

Figure 17: Changing the fan filter of the power base.

The two following lubricating methods (and the used lubricating products) should not be mixed: once a linear guide is manually lubricated it has to be re-lubricated in the same way. The choice of the manual lubrication must be done in case of dirt inside the guide.

Linear positioner automatic lubrication (NO DIRT inside the guide)

This operation should be performed only if the rail guides are clean and free from dust. In linear units maintainance-free linear ball guides are used. On the front plates of the linear blocks special lube-units are mounted which are continiuously providing the necessary quantity of grease to the ball. Insert the tip of the grease gun in the specific grease blocks (Figure 18).

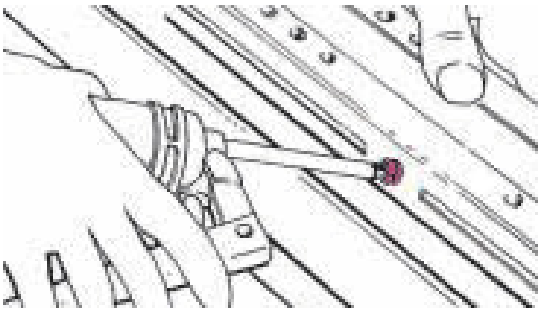

Figure 18: Linear positioner lubrication using the specific grease block.

For lubrication of linear units use one of the products recommended in the table of Figure 21. The quantity of lubricant necessary for re-lubrication is a 2g unit.

Linear positioner internal cleaning and manual lubrication (DIRT inside the guide)

In case of external or prolongued use some dust or dirt could enter inside the linear positioner guide. In this case before proceeding to the re-lubrication it is strongly recommended to carefully clean the internal parts of the guide otherwise the dirt could mix to the grease producing an abrasive compound that can lead to irreversible damages to the linear balls guides.

The cleaning of the internal parts of the linear positioner can be done as follows:

- Remove the cover of the idle head loosening only the four outer screws Figure 19.

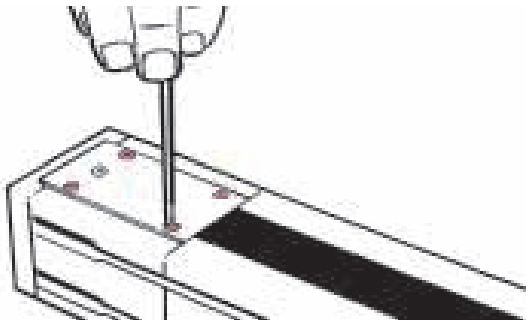

Figure 19: Removing the linear positioner cover.

- Lift the protection belt, move sidewards the driving belt and remove the dirt from the internal parts of the linear guide.
- Verify that no dirt or water is left inside the linear guide.
- Manually lubricate the linear guide rail using a suitable lubricant (see “Recommneded lubricating products”).

Further details of the linear guide construction are shown in Figure 20.

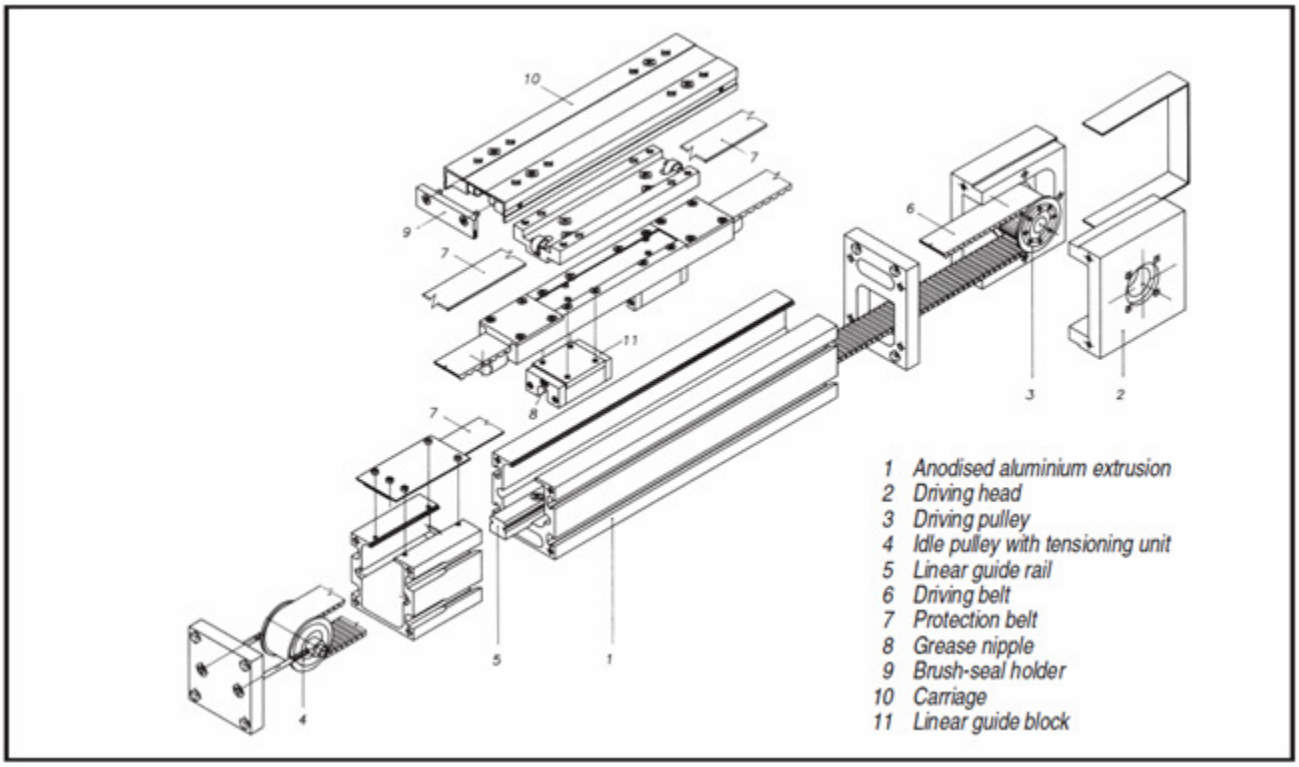

Figure 20: Linear unit components.

Reccomended lubricating prodoucts

In the table of Figure 21 are listed some lubricating products recommended for the automatic lubricating operations needed for the system manutention.

Grassi fluidi (Fluid greases)

Produttore - Producer	Descrizione - Description	Specifiche - Specs.
Aral	Fließfett N	GP 00/000 G-40
Fuchs-DEA	Renolit GLS 00	GP 00 K-50
Klüber	Klübersynth UH 1 14-1600	GHC 00 K-40
Mobil	Mobilith SHC 007	GPHC 00 N-40
Optimol	Optitemp LG 0	KPHC 0 G-50
Tribol	Tribol 3020/1000-000	GP 000 K-40

Oli lubrificanti (Lubricating oils)

Produttore - Producer	Descrizione - Description	Specifiche - Specs.
Aral	Vitam HF 32	Requisiti minimi:
Esso	Univis N 32	CLP secondo DIN 51517
Optimol	Optileb HY 32	Viscosita ISO VG 32 secondo DIN 51519
Tribol	Tribol 1555/32	

Figure 21: recommended lubricating prodoucts.

For the linear positioner internal cleaning and manual lubrication are suggested two specific products:

- Wurth HHS Fluid (NGLI 1 class); or
- CRC Silicone Grease (NGLI 2 class).

The use of a NGLI 2 class lubricant is preferred.
Avoid lubricants containing solid particles (PTFE).

Reccomended maintenance schedule

In the graph of Figure 21 is presented the maintenance schedule for the ordinary maintenance operations. **This schedule must be respected for normal operating conditions but the frequency of the ordinary maintenance performing should be increased in case of exposure to atmospheric agents, dusty environment or non optimal operating conditions (e.g. extremely high or low ambient temperatures).**

The graph shows for the three main aperture lengths (2 m, 2.5 m and 3 m) the maintenance intervals (in days) that should be respected depending on the revisiting time set between two acquisitions: shorter revisiting times involves more distance to be covered by the sledge and therefore more frequent maintenance interventions.

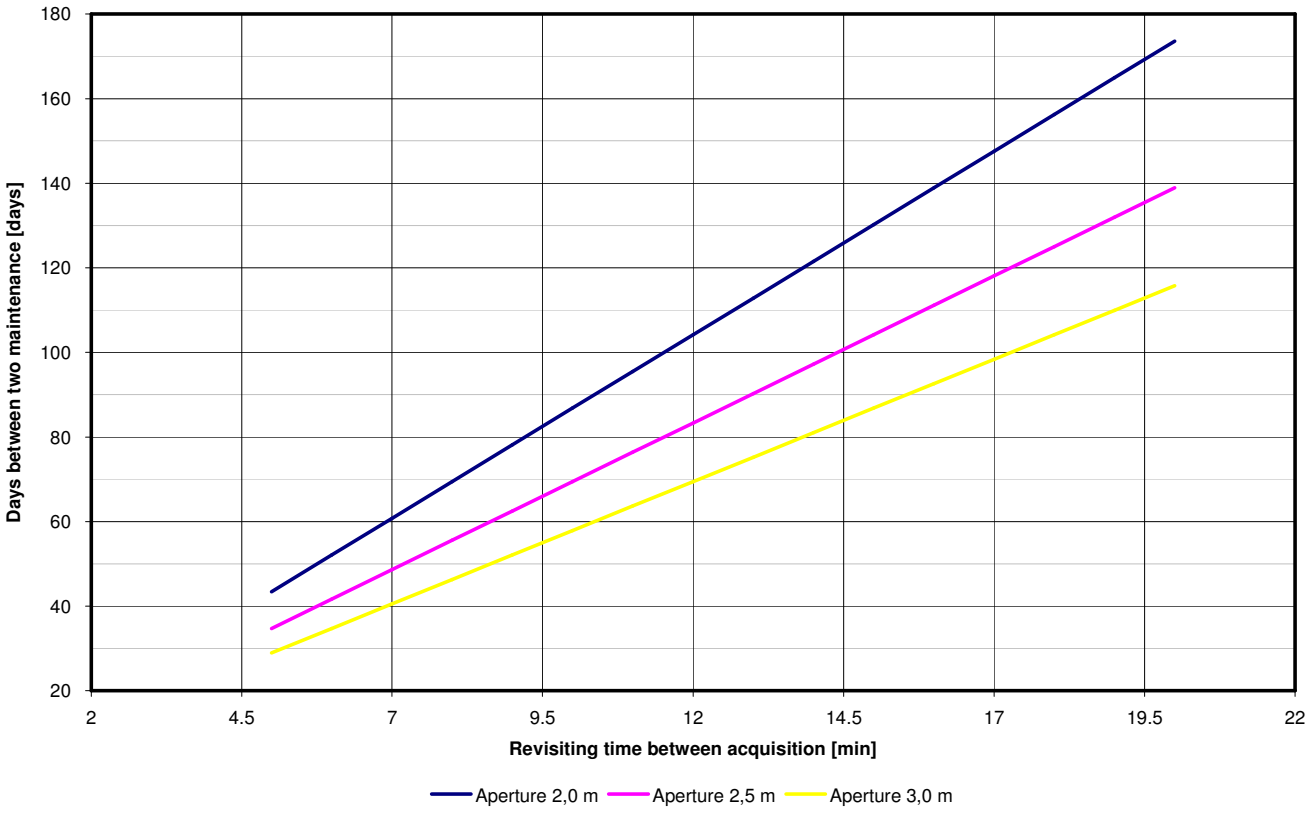

Figure 22: maintenance schedule for the ordinary maintenance operations in normal operating conditions.

Declaration of conformity regarding the directives RoHS 2002/95/CE and WEEE 2002/96/CE

With this declaration, we confirm that we are in conformity with the directive 2002/95/CE dated 2003/01/27, usually called RoHS directive, for electric and electronics appliances from 2006, July the first. This directive concerning the limitation of dangerous substances, in particular to clause 4 which forbids the use of the following elements:

- Lead
- Mercury
- Cadmium
- Hexavalant chromium
- Polybrominated biphenyls
- Polybrominated diphenylethers

All the answers and certificates from our partners demonstrate that the materials and components used on our production process of our appliances do not contain any of those prohibited substances or only limited to the specific cases that are allowed by the directive.
In consequence, we confirm that all our products are in accordance with the RoHS directive.

The European Directive WEEE defines the legal framework and the objectives for the recovery of waste from electrical and electronic equipment and entered into force on 13 February 2003. The purpose of the WEEE Directive is, as a first priority, the prevention of waste electrical and electronic equipment (WEEE), and in addition, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste. It also seeks to improve the environmental performance of all operators involved in the life cycle of electrical and electronic equipment, e.g. producers, distributors and consumers and in particular those operators directly involved in the treatment of waste electrical and electronic equipment.

This symbol on the system means that this prodouct must not be treated as household waste.
NOTE: an improperly disposed of the system can be harmful to the environmental and human health. Always confirm local regulation for system disposal and contact Ellegi s.r.l. for it.

CE Marking

All the instrumentation and the used components are CE marked because respect the following directives:

1. Directive 98/37/CEE known as EC Machinery Directive.
2. Directive 73/23/CEE known as Low Voltage EC Directive.

Declarations and notices regarding the FCC-IC directives

Radiofrequency radiation exposure Information:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Informations sur l'exposition de radiofréquences :

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimum de 20 cm entre le radiateur et votre corps.

Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou émetteur.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTICE:

This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standards.

Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio

exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

NOTICE:

Changes or modifications made to this equipment not expressly approved by (manufacturer name) may void the FCC authorization to operate this equipment.

FCC-IC LABEL:

ELLEGI SRL
Model: LISAMOBILE

FCC ID: 2AB7MLISAMOBILE

IC: 11895A-LISAMOBILE

This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Figure 23: FCC-IC Label Position

Technical data

Input variables

Rated imput voltage U_e:	AC 120 / 230 V 50/60 Hz
Operating voltage range:	85-132 / 176-264 V (Start-up at 93* / 183 V)
Surge resistance:	750 V_p / 1.3 ms
Mains buffering at 120* / 230 V:	20 ms
Input current I_e at 120* / 230 V:	7.7* / 3.5 A_{rms}
Making current limitation (25°C) standard:	<60 A, <9.9 A^2s
Recommended circuit-breaker characteristic C (or D):	10 A* / 6 A
Efficiency at full load (typical):	89%
Power consumption MAX (active power):	480 W
Power consumption TYP (active power):	150 W

Radiofrequency output variables

Sweeping minimum start frequency	17.105 GHz User selectable
Sweeping maximum stop frequency	17.295 GHz User selectable
Maximuim transmitted power	24dBm +/- 0.5dBm User selectable

Environment

Temperature

for storage and shipment:	-30°C to +70°C
for operation:	-20°C to +55°C

Humidity rating according to climatic category 3K3 to EN 60721, Part 3; no condensation

Natural air cooling

Pollution degree 2

Protective and monitoring functions

Static current limitation:	Typ. 1.15 x I_a
Behavior under short-circuit conditions (output):	Constant current/shutdown, can be switched over via selector switch B

Weight

94 Kg

Standards

Protection class 1

Safety to VDE 0805 (EN 60950):	SELV

Safety separation afforded according to EN 60950; EN 50178; VDE 0100 Part410; EN 61140 + EN 60947-1 (equivalent to VDE 0140 + VDE 0660 Part 100, replacing VDE 0100 Part 101); UL508; CSA C22.2

RI suppression according to EN 55022, limit-value curve B

Interference immunity to EN 61000-6-2

Limitation of input current harmonics to EN 61000-3-2

Contacts, Warnings and Legals

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e-mail: info@lisalab.com

WARNING

This document is only and specifically referred to the LiSALab (© & ™) technology and to the GBInSAR LiSALab system, and not to other similar technologies or instrumentations, and it is intended to be used only by experienced professionals. This document can never replace the professional knowledge of the users. People that use this technology, data and information are responsible of their supervision, their management and their control. These responsibilities include the choice of the appropriate uses of these technology, data and information to obtain the desired results. The users of the technology, data and information are moreover responsible of the evaluation of the suitability of independent procedures to examine the accuracy and the reliability of eventual interpretations and uses.

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