ELEVADORES PARA ANDAMIO TUBULAR
TUBULAR SCAFFOLDING HOISTS

CAMAC MOM

MINOR ELEVADOR DE ESCALERA / *MINOR LADDER HOIST*

JAULA ESTÁNDAR
STANDARD CAGE
(600 mm. x 780 mm. x 690 mm.)
(2.17 ft x 2.56 ft x 2.26 ft)

- Las características de facilidad y rapidez en el montaje clasifican al elevador escalera como elemento ideal y ligero para trabajos de reformas, pequeñas obras y mantenimiento.
- Puede trabajar en posición vertical o inclinada adaptándose a las necesidades específicas de cada obra.
- El nuevo accesorio jaula especial para elevar placas junto con el contenedor automático para líquidos y cementos proporcionan al elevador escalera mayor versatilidad de trabajo.

- *With its easy and fast assembly system, this ladder hoist becomes a light and suitable machine for refurbishments, small construction work and maintenance.*
- *It can work in either a vertical or an inclined position in order to adapt to the needs of every building site.*
- *In addition to the traditional cage, it can fit a special cage for plaques, that along with its automatic container for liquids and concrete, work to provide higher versatility at construction sites.*

NTENEDOR AUTOMÁTICO (70 L)
TOMATIC CONTAINER (70 L)

TRAMO FINAL
FINAL SECTION

JAULA ALUMINIO
ALUMINIUM CAGE (900 mm. x 1.600 mm. x 830 mm.)
(2.95 ft x 3.28 ft x 2.72 ft)

Solar Panel Transport Equipment

TRAMO ARTICULADO
ARTICULATED SECTION

JAULA ESPECIAL
SPECIAL CAGE (480 mm. x 1.200 mm. x 1.100 mm.)
(1.57 ft x 3.94 ft x 3.61 ft)

FIJACIÓN ANDAMIO
SCAFFOLDING CLAMP

APOYO INTERMEDIO
INTERMEDIATE SUPPORT

APOYO FINAL
FINAL SUPPORT

Inclined Version

Vertical Version

CARACTERÍSTICAS	*SPECIFICATIONS*	ESCALERA / *LADDER*
Potencia de elevación	*Lifting Power*	450 lb (200 Kg)
Velocidad elevación	*Lifting Speed*	72 ft/min (22m/min)
Potencia motor	*Motor Power*	2 HP
Tensión Motor Monofásico	*Single Phase Motor Voltage*	220V / 110V
Tensión Maniobra	*Handling Voltage*	48 V
Longitud máxima inclinada	*Inclined Max. Length*	66 ft (20 m)
Longitud máxima vertical	*Vertical Max. Length*	132 ft (40 m)

LADDER MINOR HOIST 440 lbs

- Easy installation.
- Lighter and portable driving unit.
- Available in vertical or inclined version.
- Trolley safety brake.
- Bottom and top limit switch.
- Slack cable detection switch.

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PLAT. TRANSP. PLACAS SOLARES
SOLAR PANEL TRANSP. PLAT.

JAULA ESTÁNDAR
STANDARD CAGE
(600 mm. x 780 mm. x 690 mm.)

CONTENEDOR AUTOMÁTICO (70 l.)
AUTOMATIC CONTAINER (70 l.)

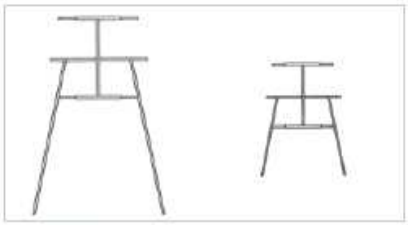
TRAMO ARTICULADO
ARTICULATED SECTION

JAULA ESPECIAL
SPECIAL CAGE (480 mm. x 1.200 mm. x 1.100 mm.)

FINAL SECTION

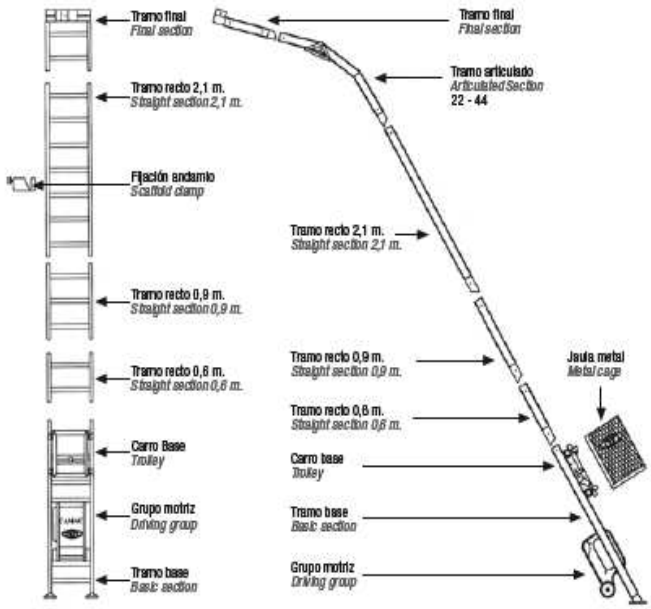
ALUMINIUM CAGE (900 mm. x 1.600 mm. x 830 mm.)

FIJACIÓN ANDAMIO
SCAFFOLDING CLAMP



APOYO INTERMEDIO
INTERMEDIATE SUPPORT

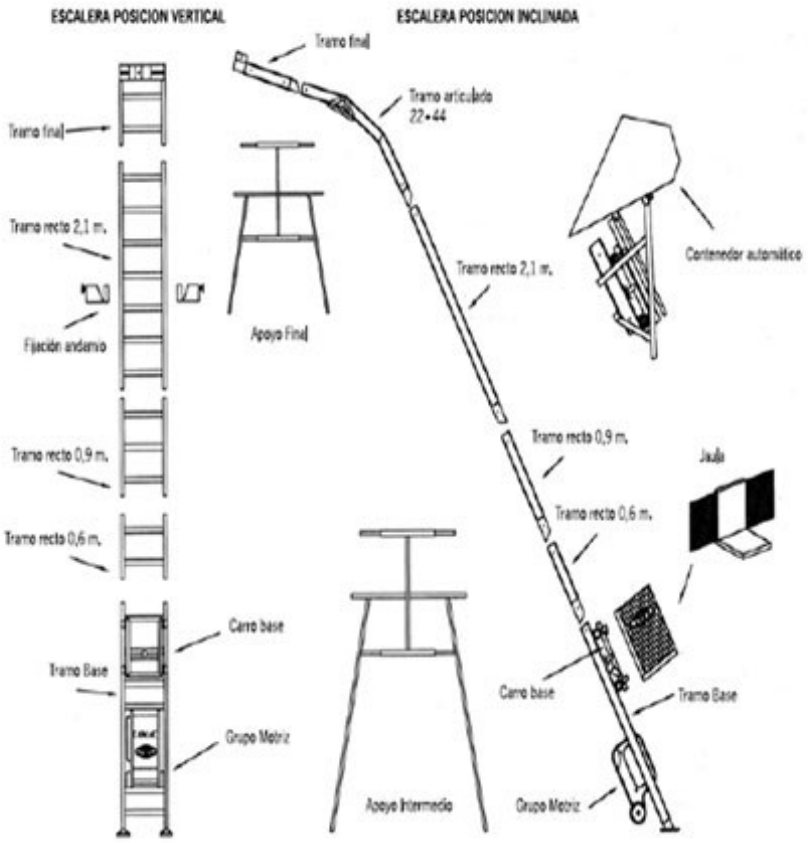
APOYO FINAL
FINAL SUPPORT



MONTE CHARGE – CARACTERISTIQUES

Lifting power	440 Lb
Lifting speed	72 ft/min
Motor powering rating	2 CV
Single-phase motor voltage	220 V or 110 V
Handling voltage	48 V
Cable diameter	5 mm
Cable rupture load	4.365 Lb
Vertical maximum length	131 Ft
Maximum inclined position length	65 Ft

LADDER HOIST



With its easy and fast assembling system, our ladder hoist becomes a light and suitable machine for rehabilitation, small construction works and maintenance.

It can work in vertical or inclined positions to adapt to the needs of every building site. In addition to our traditional cage, its new special cage for plaques and its automatic container for liquids and concrete, give a higher versatility at works.

Tramo articulado
Articulated part

Contenedor automático
Automatic container

Jaula Especial
Special Cage

Jaula Aluminio
Aluminium Cage

TECHNICAL SPECIFICATIONS

SPECIFICATIONS		
Lifting power	Kg.	200
Lifting speed	m/min.	22
Motor power rating	c.v.	2
Single-phase motor voltage	V.	220
Handling power	V.	48
Cable diameter	mm.	5
Cable rupture load	Kg.	1980
Vertical maximum length	m.	40

CABLE LIFTING EQUIPMENT

MODEL:

MINOR LADDER HOIST

OPERATING AND MAINTENANCE MANUAL

THIS MANUAL IS PART OF THE MACHINE

Important!
All assembly, dismantling, operating and maintenance operations should only be performed by authorised and trained personnel.
Read this manual carefully before switching on the machine.

CE

CAMAC MOM

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Rev2

T A B L E O F C O N T E N T S

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1.0 DESCRIPTION OF THE MACHINE

1.1 GENERAL FEATURES

This is a very useful machine for reform work, reaching places that other similar machines cannot. It is easy to assemble and lightweight and provides easy access to roofs and windows.

The MINOR LADDER HOIST has a modular structure, for fast on-site assembly. It is also easily to modify, either lengthening the ladder or adding accessories such as the articulated section or containers. The control is low voltage (48V) and easy-to-use.

1.2 SERVICE

The MINOR LADDER HOIST carries any load to a precise point where access is difficult, such as narrow streets, windows or roofs. For instance, when installing roof tiles they can be carried to the roof reducing the breakage occurring during manual transport. Productivity increases by eliminating unnecessary manual activities.

For reforms being carried out in flats or apartments, it is no longer necessary to transport material up staircases or in lifts, with less inconvenience for residents, and a much cleaner operation.

This machine is designed to **transport materials, NOT PEOPLE.**

1.3 GENERAL SAFETY

Read this operating and maintenance manual and all safety signs before transporting, assembling, using and maintaining this equipment.

Read the Operating Instructions in the manual carefully

It is compulsory to comply with current legislation relating to accident prevention and environmental protection wherever the machine is used (for example, use of individual protection such as helmets, reinforced boots, gloves, harnesses, etc.).
Pay attention to warning and danger signs.

1.4 EXCLUSION OF LIABILITY

CAMAC,S.A. is exempt from liability for damages derived from incorrect use of the equipment, and the failure to follow the instructions provided in this manual.
CAMAC,S.A. is exempt from liability for damages or problems due to:

- Incorrect use of the machine.
- Use by unqualified personnel.
- Non-compliance with safety regulations included in specific community and/or national legislations.
- Non-compliance, including partial non-compliance, with the instructions provided in this manual.
- Non-compliance, including partial non-compliance, with the maintenance instructions provided in this manual.
- Repairs not authorised by the manufacturer.
- Use of non-original spares other than those included in the spare part catalogue annexed to this manual.
- This manual is the property of **CAMAC, Catalana de Material Auxiliar de la Construcción, S.A,** and may not be copied, totally or partially reproduced or assigned to third parties without written authorisation.

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1.5 WARRANTY

The manufacturer's warranty is valid for 12 (twelve) months after delivery, and it only covers replacement of parts which, in the manufacturer's unquestionable opinion, are faulty.
The warranty is valid only for the material supplied and excludes all indemnity other than the part replacement specified in the previous paragraph.
The warranty is not valid, and the manufacturer is exempt from liability, in the following circumstances:

- When the user has altered any of the equipment's components or accessories without the manufacturer's written authorisation.
- When the damage is due to negligence in the application of maintenance instructions.
- When the equipment is used for purposes other than those for which it is specifically intended.
- When it is not correctly installed.
- When the power supply is faulty.
- When the instructions provided have not been followed in detail.

In any event, the warranty only covers true faults, and does not cover normal wear or incorrect use.

The guarantee does not cover the machine's electric components.

Valid legal jurisdiction: ESPARREGUERA – SPAIN

2.0 TECHNICAL CHARACTERISTICS

TECHNICAL CHARACTERISTICS (*MINOR LADDER HOIST)*	
Operating load	200 Kg
Power	2.2 CV (1.7 Kw) 220V 16A
Maximum height	20 m (at an angle) 40m (vertical)
Lifting speed	22 m/min
Cable diameter	Ø5mm length = 60/80m
Ends of travel	2 (48V)
Articulation (from the perpendicular ladder plane)	From 22º (minimum angle) to 44º (maximum angle)

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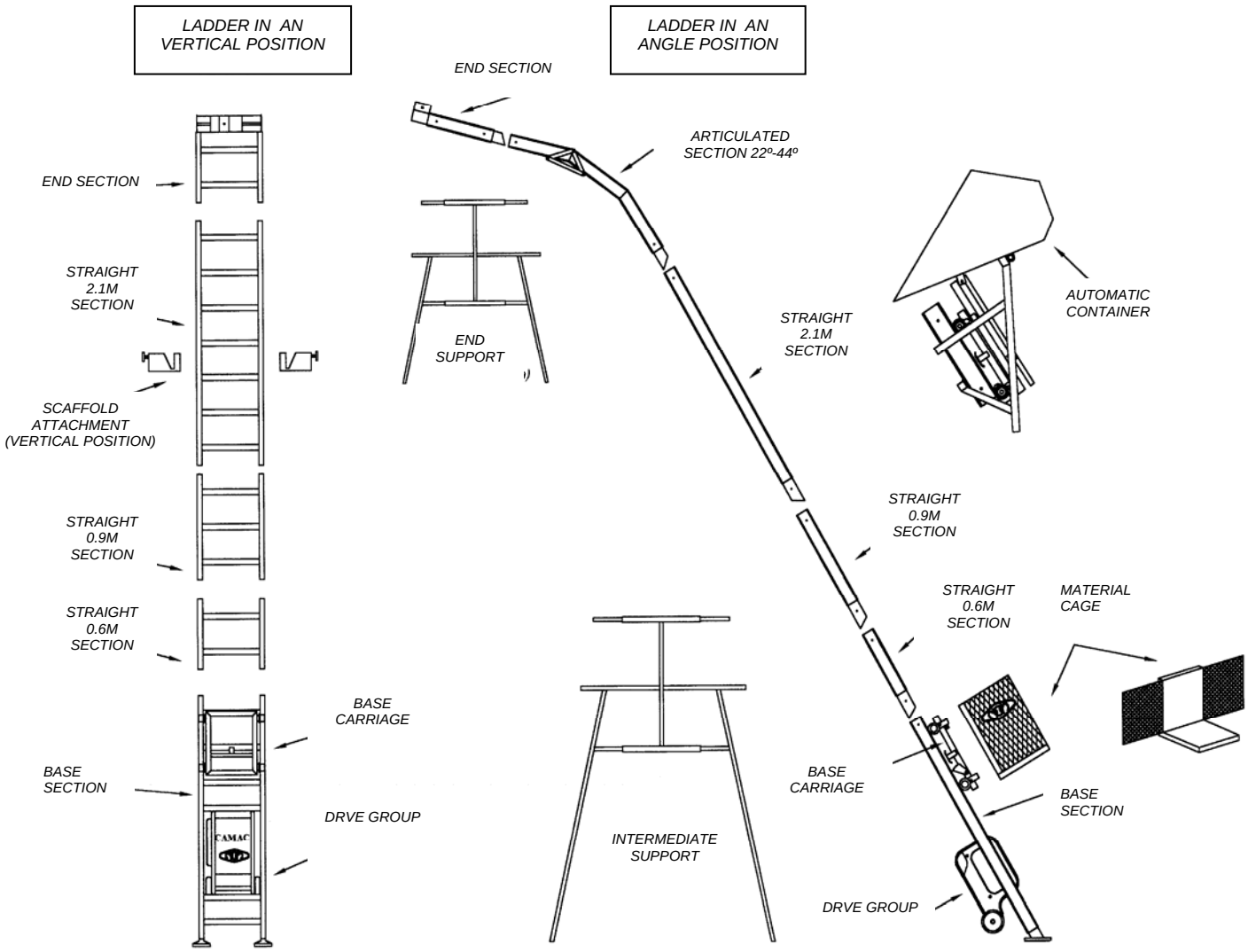
3.0 COMPONENTS.

The MINOR LADDER HOIST has a modular structure and is therefore divided into different components, which are easy to assemble.



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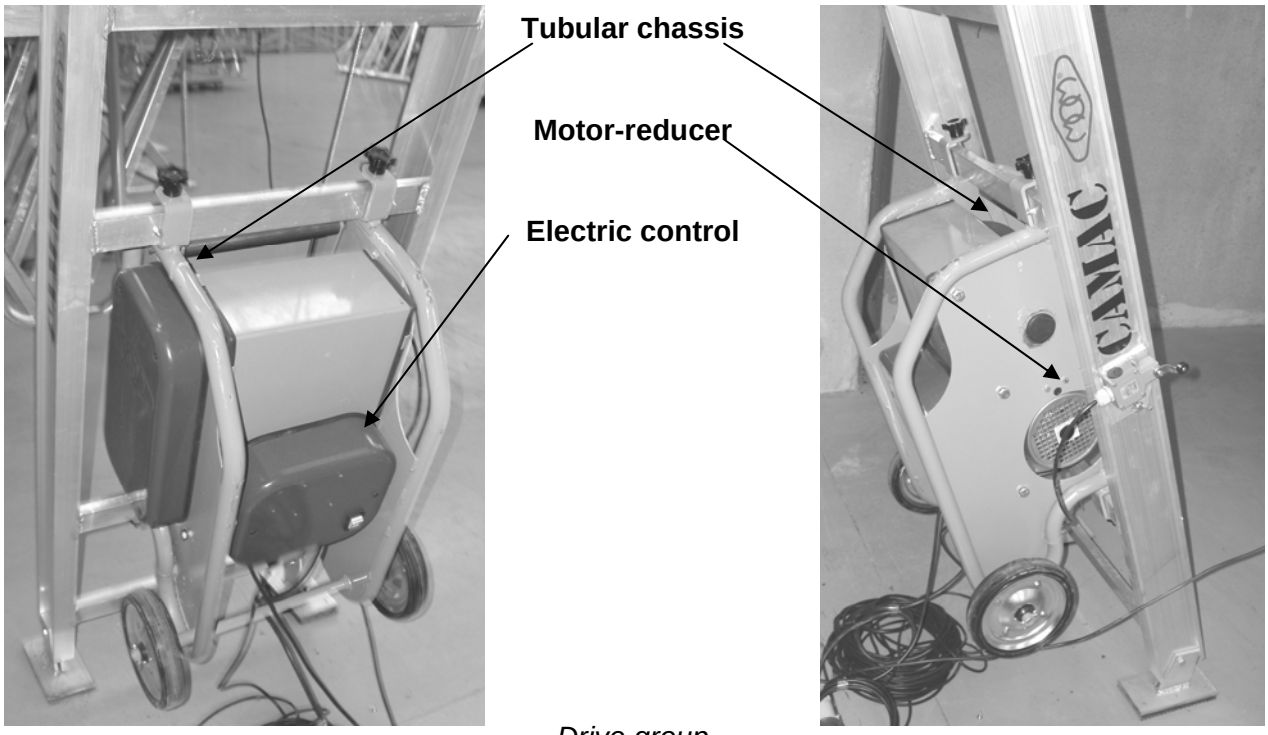
3.1 DRIVE GROUP.

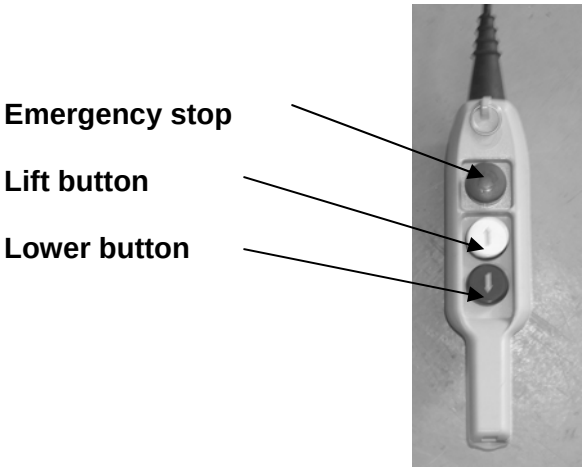
The **drive group** is our universal equipment, of sufficient size for the work to be performed. It consists of a highly resistant but lightweight **tubular chassis,** a **reducer** consisting of induction-hardened cast steel gearings, a 2 CV brake **motor** and an electric 48 V control.



Drive group

3.2 CONTROL PANEL

The **control panel** has an **emergency stop** button and two buttons to raise and lower the equipment. It is connected to the drive unit control module by a multiple connector for easy use and to prevent damage during transport.



Control panel

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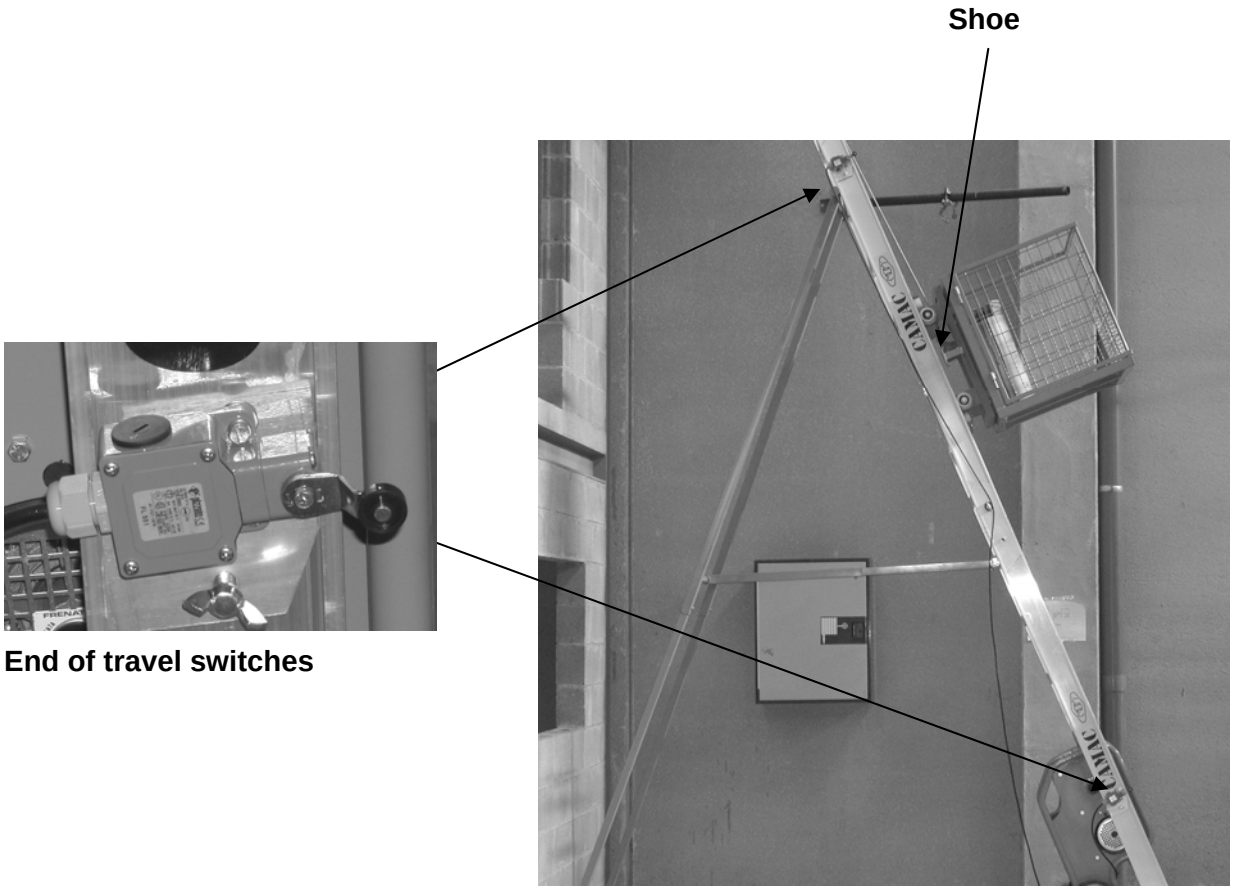
3. 3 END OF TRAVEL SWITCHES

The ladder lifting equipment has two of these elements to define maximum and minimum load displacement on the ladder structure. Thanks to their easy attachment system, they can easily be installed. They are connected to the drive unit control module by **multiple connectors**. They are activated by a **shoe** or cam in the base carriage. When displaced, it comes into contact with the upper or lower switch and stops the machine.



Position of the end of travel switches

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3.4 BASE SECTION

The **base section** is the first section of the structure. It is made out of high-resistance lightweight aluminium and it is 2.1 metres long. It contains the drive unit and the **base support,** rubber coated to prevent it from moving. It has two **joint assemblies** at the top where the next section is installed.

Joints

Base support

Base section

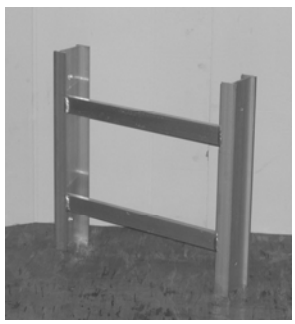
3.5 STRAIGHT SECTION

All the **straight sections** are made out of the same material as the base section and have joint assemblies where they are joined to the next section. There are different section lengths to form the total height of the ladder. There are 2.1 metre, 0.9 metre and 0.6 metre sections.

Straight 2.1 m section

Straight 0.9 m section

Straight 0.6 m section



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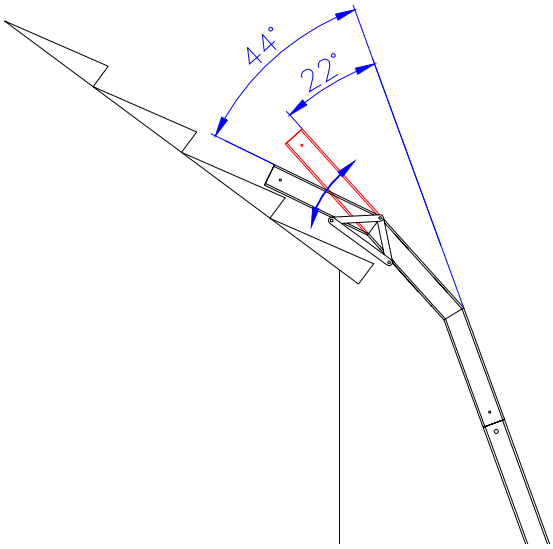
3.6 ARTICULATED SECTION

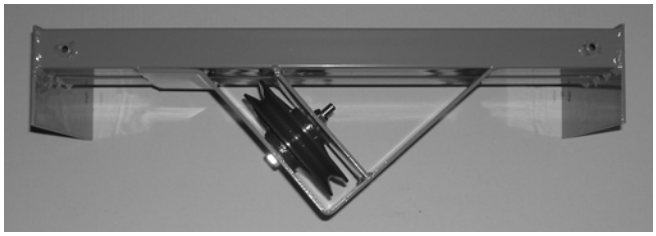
Built out of the same **aluminium profile** and reinforced with steel bars. It also has several **nylon wheels** incorporating ball bearings to smoothly guide the steel cable. With this section we can change the angle at which the load is displaced, according to the profile of the work to be performed. The **articulated section** provides for a 22º radius. In other words, it can be adjusted from a 22º (minimum) to a 44º (maximum) angle from the ladder.
This 22º - 44º angle is in relation to the ladder itself, and not to a vertical wall or tubular scaffolding.

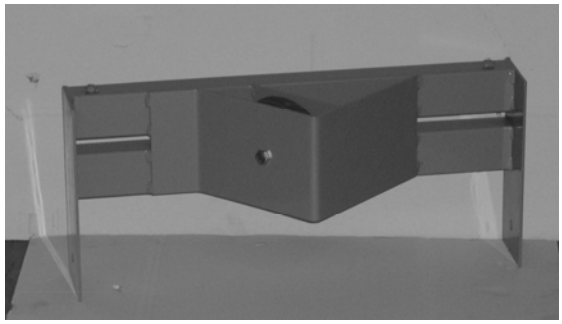


Articulation

3.7 END SECTION

This is the last **section** to be installed, since it is prepared to return the steel cable and is also the section on which the **end support** is installed (when the ladder is at an angle). It is also made out of aluminium and reinforced with **steel braces**.





End section

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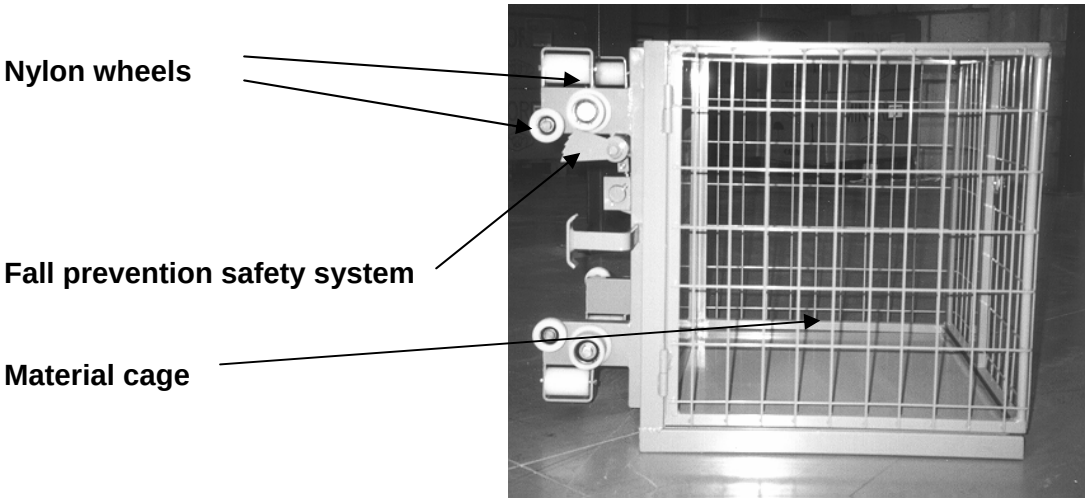
3.8 BASE CARRIAGE

This is the element that moves through the structure, to which the **material cage** or **container** is attached. The carriage has:

-Eight **nylon wheels** with ball bearings to guarantee a smooth movement.

-**Safety system** preventing the carriage from falling if the cable breaks. If the cable breaks or becomes loose, two wedges are released which secure the carriage against the aluminium profile structure.

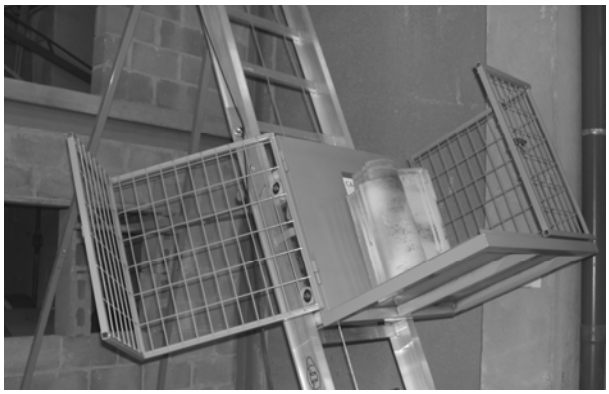


Base carriage

3.9 MATERIAL CAGE

It is attached to the **base carriage.** It is designed to carry solid materials (roof tiles, bricks, sacks, etc.) and it is equipped with barred doors so that the load is always visible. If the material to be carried is too large, these doors can easily be removed to transform the cage into a platform. When the doors have been removed, be aware that the load may fall.

Closed cage



Open cage

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3.10 CONTAINER

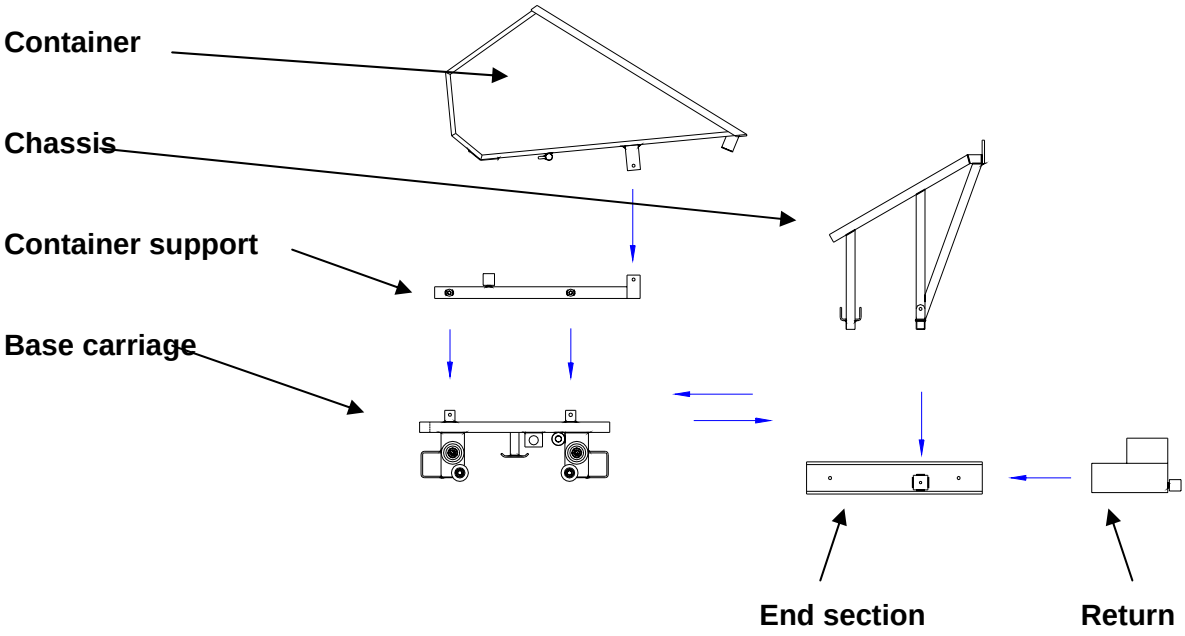
It is attached in the same way as the cage and is used to carry sand, gravel, etc. It has a tipper system for easy unloading. It is divided into two assembly groups:

Container-container support-base carriage assembly

The support is installed on the base carriage and the container is screwed to the support, which is able to swivel.

Container chassis-end section-return assembly

The chassis and the return are screwed to the end section. This is not the same end section that is used for the cage, since it has drilled holes to which the chassis is screwed. The return is also different, since it is equipped with a tipper stop.



Container components

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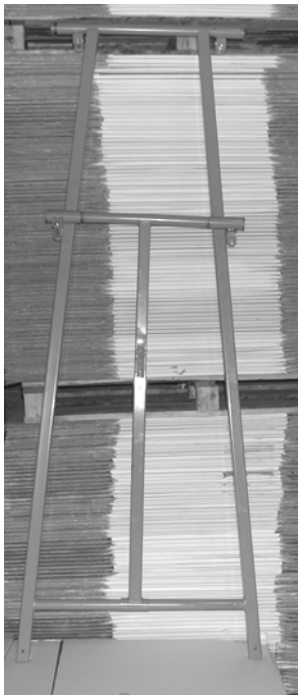
3.11 INTERMEDIATE SUPPORT

The **intermediate support** is used to support the structure and prevent it from bending. Depending on the total height of the ladder, either one or several supports will be used. They are designed to rest on the ground or against a wall.



Intermediate support

3.12 END SUPPORT

To be installed on the end section, when necessary. It will be easier to unload material and prevent bending.

End support

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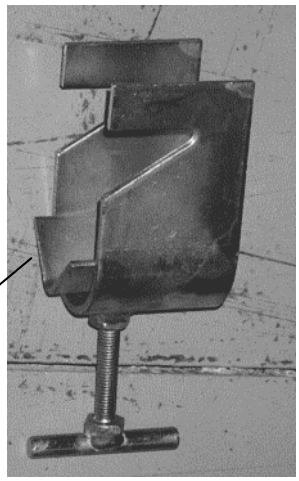
3.13 SCAFFOLD ATTACHMENT

When working with the ladder in a vertical position, the intermediate and end supports are not required and these attachments are therefore used to secure the equipment. They are fitted to the MINOR LADDER HOIST structure and have a length of tube adapted to standard scaffold flanges.

Attachment



Flange

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4.0 ASSEMBLY INSTRUCTIONS

4.1 GENERAL ASPECTS

When the equipment is delivered to the site, check for possible damage during transport. It necessary, inform the supervisor immediately.

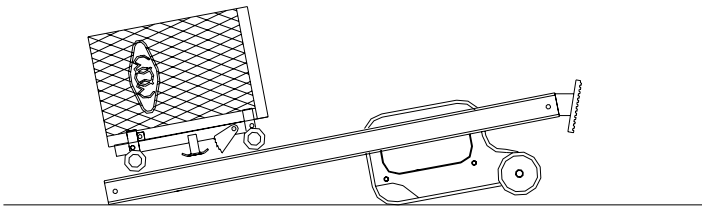
4.2 PLACE OF ASSEMBLY

The place of assembly requires electric power, lighting and lifting equipment to load/unload the MINOR LADDER HOIST. The ladder should never be installed on ground which is not fit for supporting loads (mud, plaster, etc.). Also make sure that it is installed in a place where the local wind conditions will not affect it (the tunnel effect caused by buildings, for instance).
The structure on which the equipment is assembled should be sufficient to withstand the forces transmitted.

4.3 PROCEDURE

Before assembling the MINOR LADDER HOIST, clearly define the conditions required (necessary height, angle, etc.) in order to use the right components. The equipment can then be assembled.

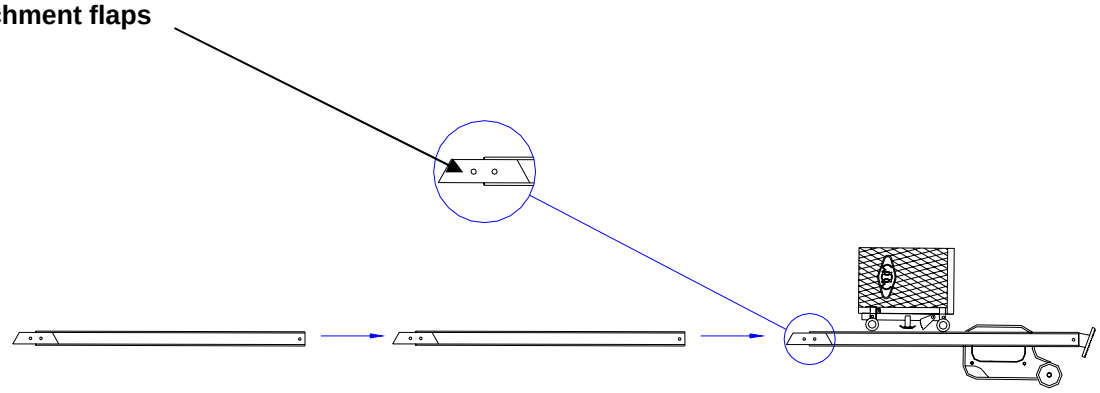
Assembly takes place on the ground. The sections are installed one after the other, starting with the **base carriage** and the **cage.** When the equipment is supplied, these two parts are already assembled in the **base section**.



Base carriage + cage assembly

After installing the base carriage and the cage, the different **sections** are easily fitted using the **flaps and guide** on the end of each section. The installation will be firmer if each section is attached using the **special screw and eyebolt** provided. Always use the **end section.** It forms part of all the possible configurations and is required for the equipment to operate properly.

Attachment flaps



Section assembly

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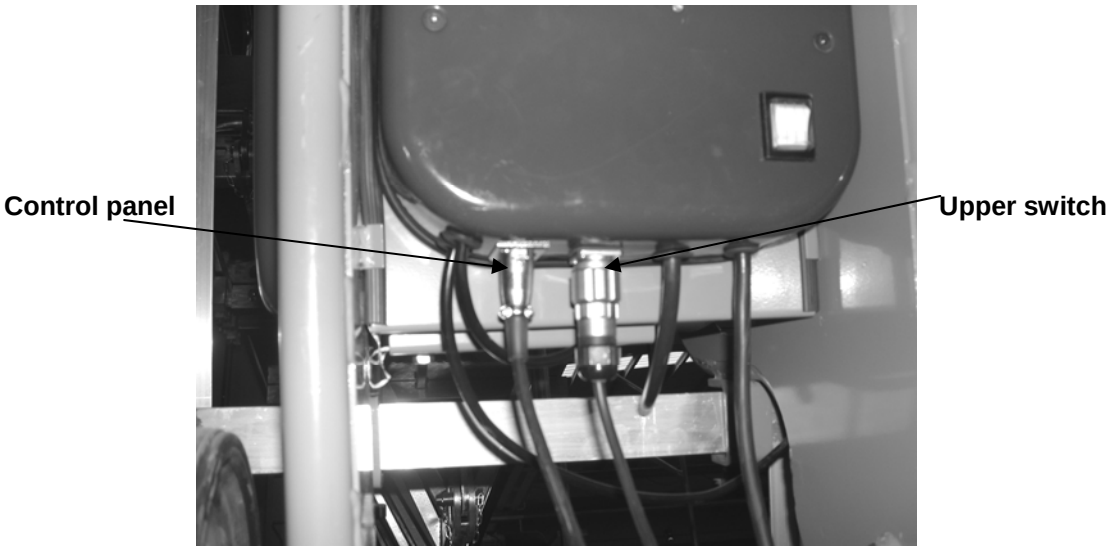
Once all the sections have been fitted, including the base and end sections, we connect the **upper safety switch and the control panel** to the drive unit **control module.** This is an easy connection since a multiple connector is used, although there are different multiple connectors. We set the upper safety switch approximately at the upper stop position, to be adjusted later. It is easy to install the switch. Swivel the support so that it is secured by the aluminium profile flaps, and then tighten the screw in the support structure.



Module connections

The next step is to connect the machine to the mains, but first:

-**Make sure that the mains are protected by a differential and 32 mA cut-off switch.**
-**Do not use more than 40 metres of 2x1.5mm cable, with H05VV-F grade earthing. In the 110V versions use a wire higher than 4x4mm^2**

The machine can now be connected to the mains. If the configuration is small enough to be put into place by hand, follow **procedure A.** Otherwise, follow **procedure B**.

-Procedure A: Press the **up button** to unwind the steel cable until it reaches the **return** in the final section. Open the **return box** removing **pin R**, pass the cable through and close the box, replacing pin R again. Continue to unwind the cable until it reaches the **carriage**, which will have been inserted in the base section aluminium profile. When the cable is hooked up, tighten it to prevent the carriage from moving. When the cable has been installed correctly, set the ladder in the desired position.

-Procedure B: Press the down button to unwind the cable until it reaches the return in the end section. Continue to unwind until the steel cable can be secured at least 1 metre above the maximum height of the ladder when installed. When the cable is secure, press the down button to rewind the cable, with which the ladder will be raised. Make sure that it is not prevented from being raised by a scaffold. Then release the cable when you are sure that the ladder is steady and will not fall. Attach the cable to the base carriage as in procedure A.

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The ladder is now assembled, but it is not yet **secure**. This will vary with the type of assembly, **vertical (maximum 40m)** or at an **angle (maximum 30m).** If the ladder is assembled in a **vertical position,** it will be secured **(always to a scaffold)** by **two flanges every 3 metres.** When it is at an angle, the **intermediate and end supports** are used. In this case, it does not have to be secured to scaffolding. All the supports are attached to the structure using the **flaps** provided.

When the MINOR LADDER HOIST is assembled and in place, **check that the upper safety switch** is in a correct position.

The entire ladder does not have to be dismantled to **increase or reduce its length,** depending on requirements. Just remove or add a section, making sure that the base carriage is empty and resting on the ground, and that enough cable is released before switching the equipment on again.
When working at an angle, the supports will have to be mode and other supports added if it is working in a vertical position.

5.0 USE

5.1 GENERAL ASPECTS

- The MINOR LADDER HOIST is designed to reach a maximum height of 20 m when at an angle and 40 m in a vertical position. Smaller heights are possible by combining different sections (for different configurations, contact the manufacturer).
- The MINOR LADDER HOIST is designed to lift objects and not people. The manufacture is exempt from liability if the equipment is used for any other purpose.
- The lift must be assembled and dismantled following these instructions.
- Always respect the equipment's maximum load capacity.
- Strictly follow the instructions provided in the manual when using the equipment.
- Do not use this equipment until you fully understand how it works and the relevant emergency procedures.
- The lift should only be used by personnel trained to do so. Said personnel must also be familiar with the relevant safety devices and regulations.
- Personnel must pay close attention to their work at all times. They should be in good physical condition, refrain from working under the effects of alcohol, drugs or medication that could affect their senses and/or reflexes.
- Personnel must give total priority to safety and refuse to work when they consider that it is not safe to do so and/or there is not full compliance with legal provisions.
- Personnel should make sure that there are no individuals, animals, equipment or materials within the field of action of this equipment.
- When the lift is in use, personnel should be fitted with individual safety devices.

5.2 POSSIBILITY OF FAULTS DURING USE

Power cut.
Wait for the power to return and make sure that it is not a fault located on the site itself.

End of travel switch faults.
This fault is detected when the machine does not move either up or down. If it does not move down, the lower switch is faulty and if it does not move up, the upper switch is faulty. It could be because it has stuck (unblock it by hand) or has been damaged by a blow.

Blocked guides.
This could lead to the base carriage coming loose from its guides. Always keep the base carriage guides clean.

Excess load.
In this case, the motor loses power or ceases to work. Empty the cage. Remember that the maximum load is 200Kg.

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6.0 MAINTENANCE

To ensure that the ladder hoist works properly and lasts longer, the different parts should be periodically checked and maintained.
Check the general condition of the equipment at least every three times that it is assembled.
Keep the machine free from objects that could block the wheels or cause other problems.

Always switch the machine off at the mains before cleaning

Some of the machine's parts should be checked often and eventually replaced when they become worn:

- Screws.
- Guide rollers.
- End of travel.
- Anchorage points.
- Emergency stop device.
- Cables, connections and electric panel.

WARNING!
Keep this document safe. When ordering spares, check the enclosed spare part lists

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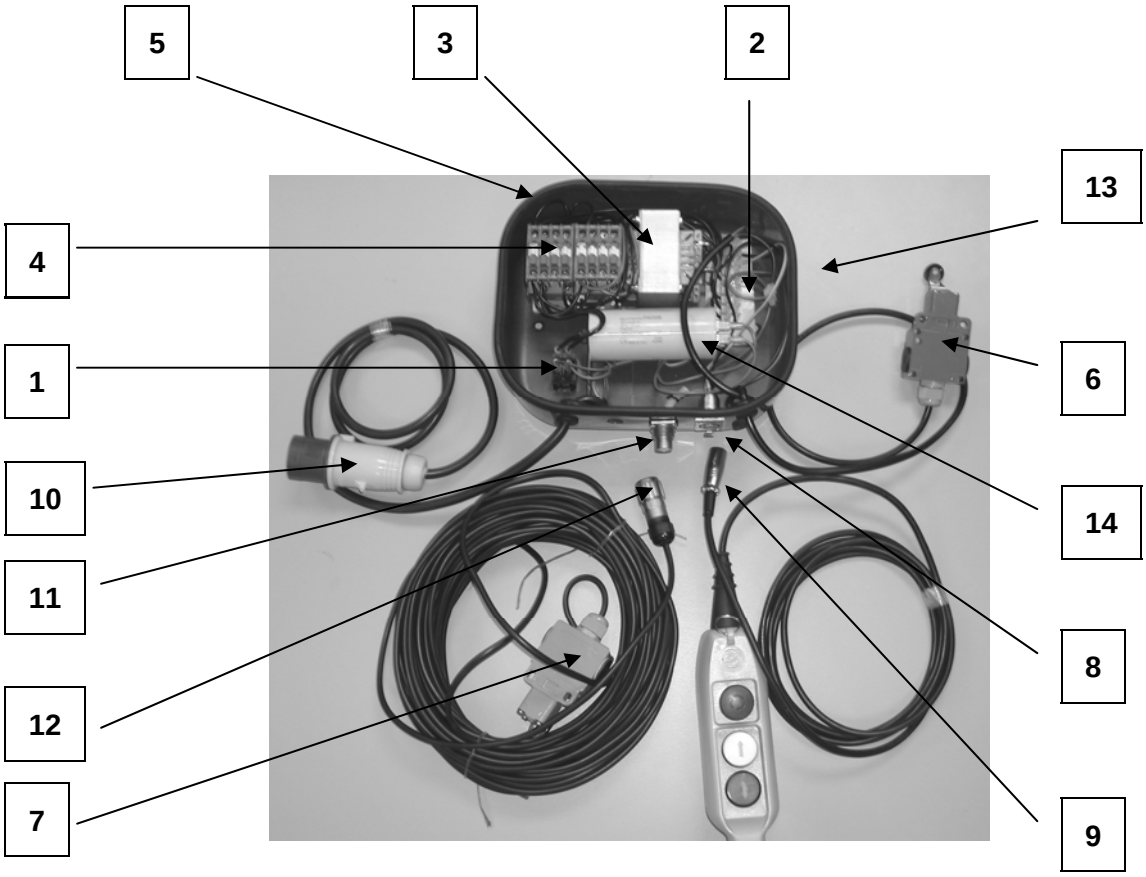
7.0 SPARE PARTS AND PART CODES



MINOR LADDER HOIST REMOTE CABLE MODULE			
PART	DESCRIPTION	REF.	UNITS
1	SWITCH	R-071044	1
2	TERMINAL STRIP	R-071504	1
3	220V TRANSFORMER	R-071229	1
4	CONTACTOR	R-071207	2
5	CABLE MODULE BASE PANEL	R-220048	1
6	LOWER END OF TRAVEL SWITCH	R-071282	1
7	UPPER END OF TRAVEL SWITCH	R-071282	1
8	10236/F AERIAL CONNECTOR	R-071136	1
9	10235/M AERIAL CONNECTOR (Control panel)	R-071134	1
10	AERIAL CONNECTOR (Voltage)	R-071062	1
11	AERIAL CONNECTOR	R-071124	1
12	AERIAL CONNECTOR (Upper switch)	R-071125	1
13	COMPLETE CABLE MODULE	R-320527	1
14	CONDENSER	R-071200	1
	CONTROL PANEL W/CABLE 3mts + connector	R-320021	1
	CONTROL PANEL W/CABLE 15mts + connector	-	1
	CONTROL PANEL W/CABLE 30mts + connector	-	1

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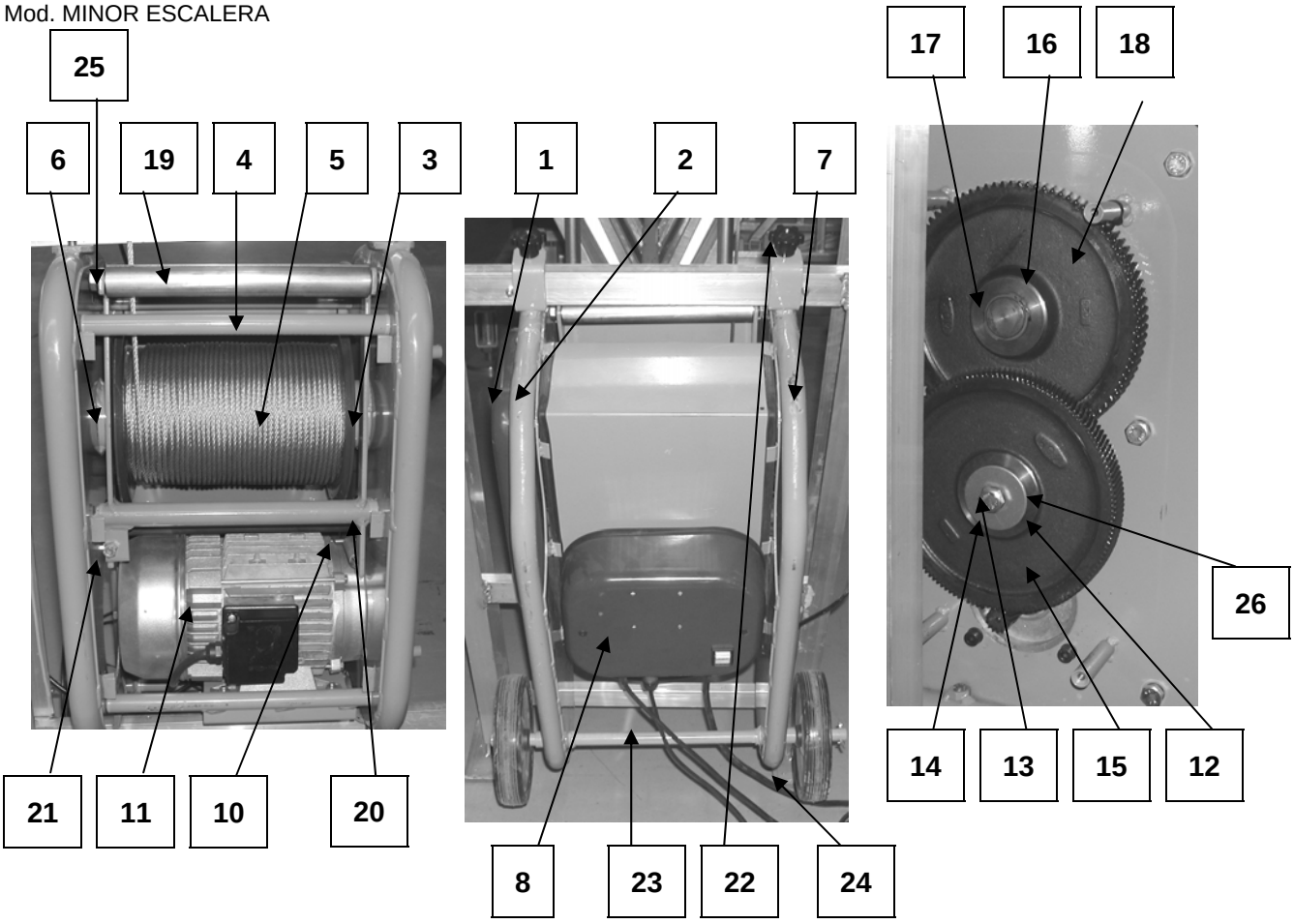

MINOR LADDER HOIST DRIVE UNIT			
PART	DESCRIPTION	REF.	UNITS
1	OIL PAN COVER	R-230012	1
2	SEMI-CHASSIS GEARING SIDE	R-230122	1
3	BEARING GEARING SIDE	R-081011	1
4	SEPARATOR BAR	R-001201	4
5	DRUM ASSEMBLY	R-210026	1
6	BEARING MOTOR SIDE	R-081017	1
7	SEMI-CHASSIS MOTOR SIDE	R-230123	1
8	MÓDULE COVER	R-220048	1
10	INTERMEDIATE AXLE	R-001202	1
11	220 V MOTOR WITH CABLE	R-320044	1
12	INTERMEDIATE AXLE SOCKET	R-021008	1
13	DIN-933 M10X25 SCREW	R-091041	1
14	ATTACH. WASHER	R-130050	1
15	INTERMEDIATE WHEEL ASSEMBLY	R-210019	1
16	DIN-471 E-30 RETAINER	R-097005	1
17	DIN-6885 8X7X30 PIN	R-095007	2
18	DRIVE WHEEL	R-001009	1
19	CABLE OUTLET GUIDE TUBE	R-001214	2
20	CABLE OUTLET GUIDE LEVER	R-001215	1
21	CABLE OUTLET LEVER END OF TRAVEL SWITCH	R-071139	1
22	DRIVE UNIT CONTROL	R-021044	4
23	LADDER WHEEL SHAFT	R-130098	1
24	WHEELS	R-021039	2
25	CABLE OUTLET GUIDE INNER TUBE	R-001206	2
26	INNER TUBE	R-001350	1

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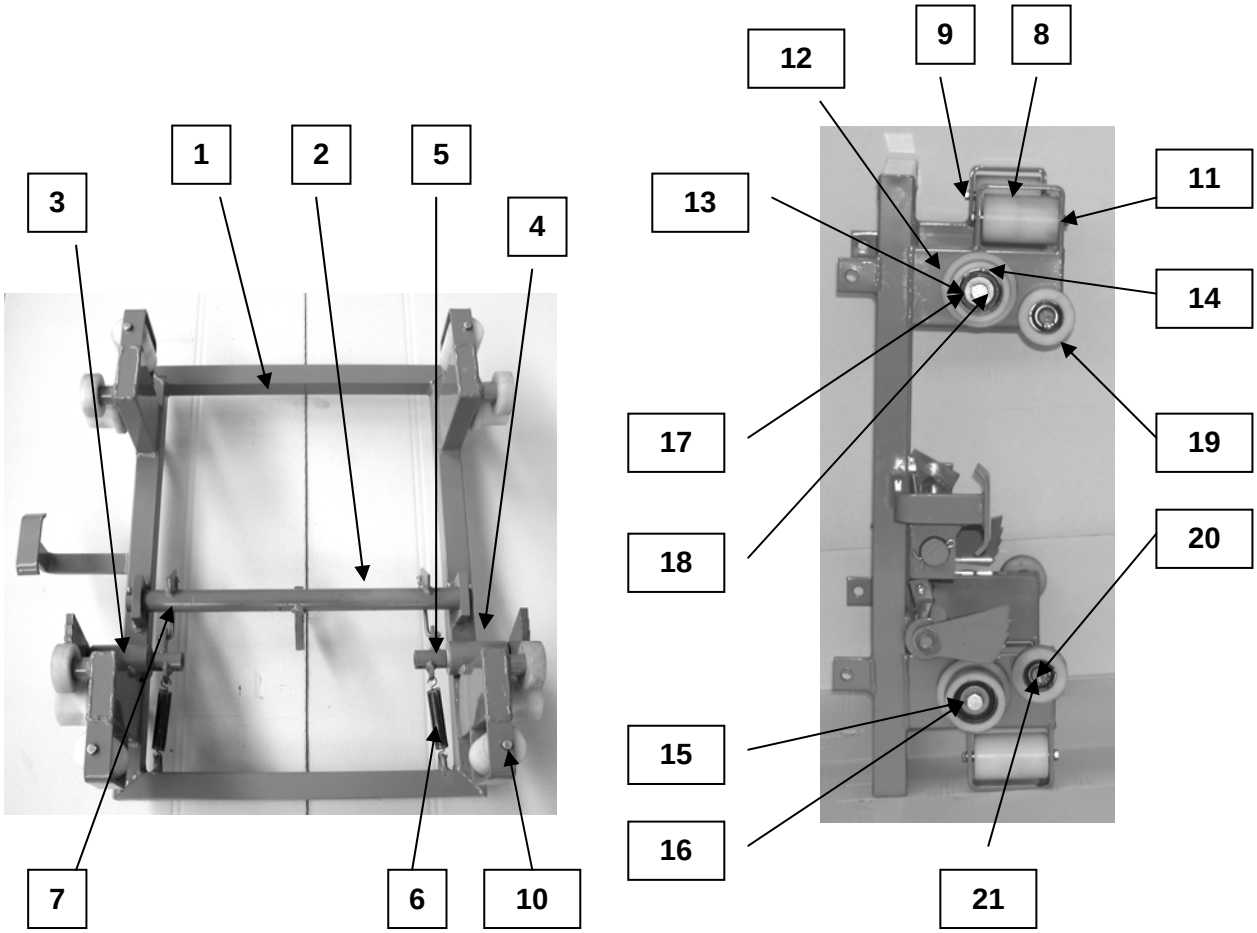

LADDER BASE CARRIAGE			
PART	DESCRIPTION	REF.	UNITS
1	BASE CARRIAGE CHASSIS	R-001209	1
2	BRAKE MECHANISM BAR	R-001210	1
3	RIGHT-HAND BRAKE MECHANISM ASSEMBLY	R-250055	1
4	LEFT-HAND BRAKE MECHANISM ASSEMBLY	R-250055-A	1
5	BRAKE MECHANISM SOCKET	R-001216	2
6	BRAKE MECHANISM SPRING	R-098007	2
7	BRAKE ADJUSTMENT BAR ASSEMBLY	R-098030	2
8	Ø50 ROLLER	R-150167	4
9	M6X16 DIN933 SCREW	R-091016	8
10	WASHER FOR M6 DIN125	R-093004	8
11	Ø50 ROLLER SHAFT	R-001224	2
12	Ø62 ROLLER	R-150095	4
13	Ø62 ROLLER BEARING	R-081025-A	4
14	Ø47 DIN472 SEEGER	R-097010	4
15	M10X25 DIN933 SCREW	R-091039	4
16	GROWER WASHER FOR M10 DIN7980	R-094004	4
17	WASHER	R-130050	4
18	Ø58 ROLLER	R-150094	4
19	Ø58 ROLLER BEARING	R-081003-A	4
20	Ø35 DIN472 SEEGER	R-097017	4
21	Ø35 DIN471 SEEGER	R-097003	4

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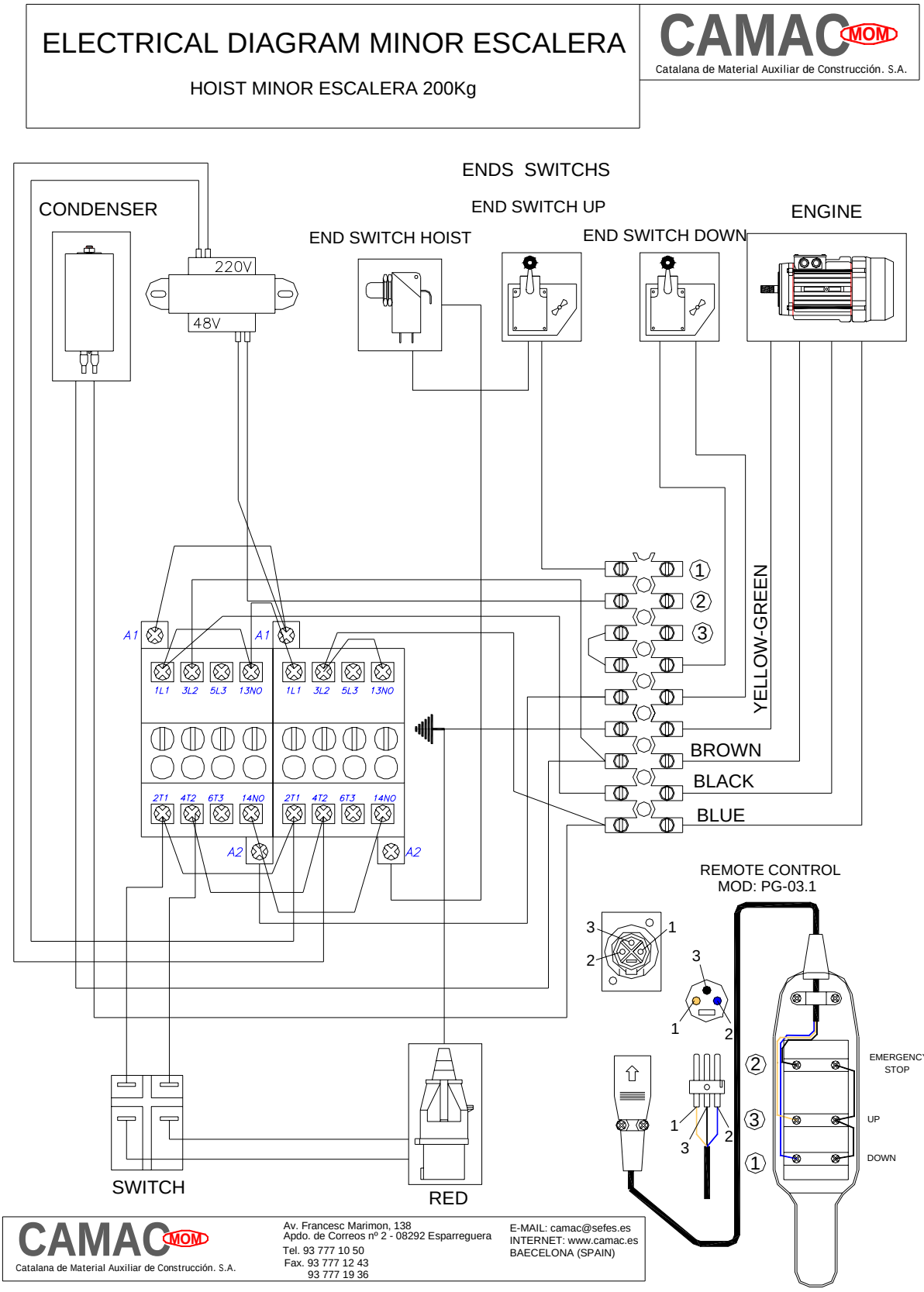
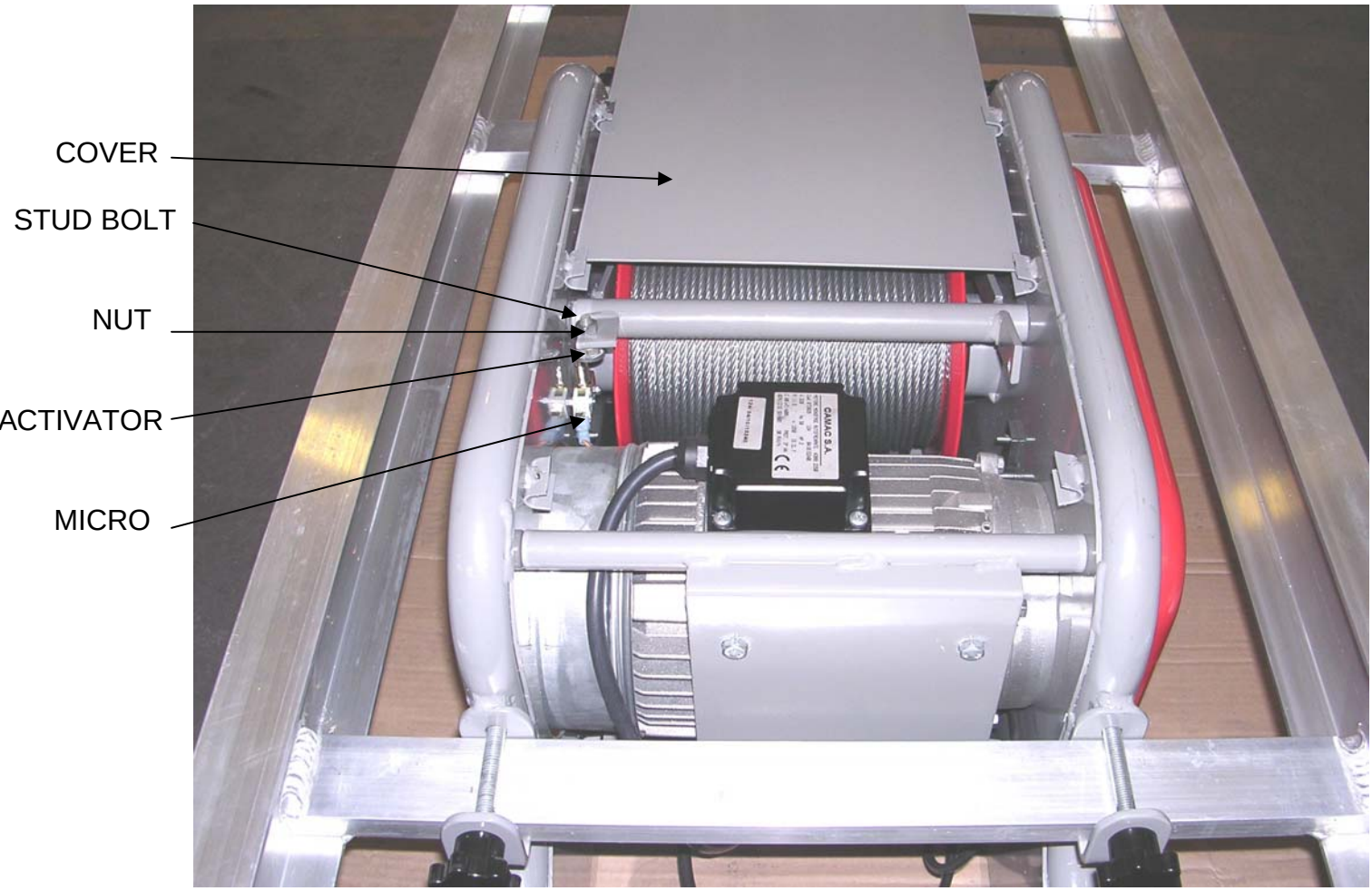
9. ELECTRIC DIAGRAMS





Due to a possible slope increase the ladder' s micro might loose contact and this will make the machine stop immediately. In this case, activation micro position should be place the following way:

1- Open the cover to see the micro
2- Loose the nut
3- Lower the stud bolt turning it twice
4- Tigth the nut again

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