GRUPPO Electroelsa

EUROPLATFORM

EP - 2818_6/22

OPERATION AND MAINTENANCE
INSTRUCTION MANUAL

Doc. n°. EP2001M1I Rev. 0.0

REGISTER Nr : 2001

ELECTROELSA s.r.l.
Via Pisana, 18/20/22 - 50021 Barberino val d'Elsa (FI) - Italia - Ph.+39-0558078367/368
Fax +39-0558078479

Company: _____ Doc. n.: EP2001M1I

ID number: _____ Revision: 0.0

Operation and Maintenance Instruction Manual

MODEL: EUROPLATFORM EP - 2818/ 6-20

ID NUMBER: _____

		DATE	SIGNATURE
Written by:	GSF studio	_____	_____
Approved by:		_____	_____

INDEX

LIST OF ORIGINAL PAGES

CHAPTER	TOTALPAGES	DATE
OVERVIEW	Page A1	December 2000
Index	From page I-1 to page I-7	December 2000
1	From page 1-1 to page 1-6	December 2000
2	From page 2-1 to page. 2-2	December 2000
3	From page 3-1 to page 3-22	December 2000
4	From page 4-1 to page 4-11	December 2000
5	From page. 5-1 to page 5-3	December 2000
6	From page 6-1 to page 6-22	December 2000
7	From page 7-1 to page 7-3	December 2000
8	From page 8-1 to page 8-22	December 2000
9	From page. 9-1 to page 9-3	December 2000
10	From page 10-1 to page 10-2	December 2000
11	From page. 11-1 to page 11-4	December 2000
12	From page. 12-1 to page 12-12	December 2000
13	Page. 13-1	December 2000
14	Page. 14-1	December 2000

LIST OF ORIGINAL PAGES

Rev.	Modification descriptium	Page	Date

CHAPTER 1

INTRODUCTION

1.1 OPERATION AND MAINTENANCE INSTRUCTION MANUAL

1.1.1 The importance of the manual

Thank you for choosing EUROPLATFORM Mod.2818 by Electroelsa. We remind you that the manual you are holding is an integral part of the equipment itself. It is necessary to keep this manual as long as the product is in use and pass it to any subsequent equipment operator or owner.

1.1.2. Manual storage

This manual is to be kept in a place away from humidity and heat and used with care under all conditions to preserve its contents. Do not remove, tear or rewrite any part of the manual.

1.1.3. How to work with your manual

This manual is mainly divided into the following parts:
- Page identifying the manual version and the date of the version
- Table of contents
- Instructions and/or notes
- Appendices

The warning messages throughout the manual will draw your attention to the specific procedures or operational details.
There are three types of warning messages:
NOTE: guides and optimises the operator's work. Also highlights particular equipment haracteristics.

ATTENTION: denotes important warnings specifying what to do / not to do and particular precautions to be taken before use in order to avoid damages to the equipment.

DANGER: denotes very important warnings specifying what to do / not to do and well as particular precautions to be taken before use in order to avoid health hazards.

.

NOTE

All the personnel involved in operating this equipment must read this manual thoroughly

The operation and maintenance manual for construction work platform EP2818 is designed for:

– Supervisor;
– Owner;
– Manager of the construction site where the equipment will be installed and used;
– Staff performing assembly/disassembly;
– Maintenance staff;
– Operators;
– Movers.

This instruction manual should be consulted before moving, installing, using, servicing, or discontinuing the use. Keep the entire contents of this manual in a safe place. You can make copies of it for frequent consultation.
Moving, installing, using, servicing, or discontinuing the use of this equipment may pose danger if the procedures of this manual are not followed or followed without necessary care.

1.2 THE GOALS OF THE INSTRUCTION MANUAL

This manual provides information and procedures necessary for a correct equipment usage consisting of the following operations:
– INSTALLATION
– OPERATION
– MAINTENANCE
– STORAGE AND DISPOSAL

NOTE

ELECTROELSA is not responsible for any damage or failure if the procedures of this manual were not followed

The Manufacturer is not responsible for any result of non-compliance with the procedures and instructions set by this manual. Below are examples:

– Improper use;
– Use by an untrained operator;
– failure to follow the manual's instructions completely or partially;
– use without complying with national/state safety standards;
– incorrect installation;
– power malfunctions;
– Failure to follow the manual's instructions for scheduled maintenance;
– Unauthorized modifications or
– Use of replacement parts other then those provided by ELECTROELSA

ELECTROELSA will not be responsible for any risks caused by non-compliance with such instructions. The manual may not be used as reference for any alteration of the equipment configuration. The manufacturer's warranty is limited to the defects in material and workmanship.

NOTE

The correct equipment use assumes knowledge of all instructions and awareness of possible risks caused by incorrect actions

DANGER

Disabling of the safety system and other systems designed by the Manufacturer for worker protection is a complete responsibility of the buyer or the user.

1.3 UPDATES OF THE MANUAL

This instruction manual reflects the equipment state at the time of sale. The manual cannot be considered invalid only because an update has been issued. In accordance with its continuous improvement policy ELECTROELSA keeps the right to update its line of products and manuals. This policy is not retrospective to any preceding products or manuals, with the exception of special cases.
The manufacturer will not be responsible for replacing the present Instruction, Operation, and Maintenance Manual with any updated edition. However, when the Manufacturer introduces new procedures reducing the risks associated with the equipment operation or if the equipment functionality has been changed as a result of custom modifications, the Manufacturer will provide the Client with a new version of the manual.

1.4 DEFINITIONS

The following definitions are used in the text of this manual:

– SUPERVISOR
– OPERATOR
– EQUIPMENT

– "Supervisor" is a supervisor of the construction site where the work platform will be installed, or safety manager directly responsible for the site
– "Operator" is a worker qualified to install, operate, perform maintenance, clean, repair, and move the equipment.
– "Equipment" is EUROPLATFORM EP2818

ATTENTION

The operator needs to be trained to use the equipment, other related accessories and tools, as well as safety devices. While using the equipment the operator has to wear individual protective devices and clothing specific to such activities (gloves, hearing protection, anti-slide heavy sole boots ("construction boots"), safety harness, hard hat, goggles, etc.)

1.5 REQUIREMENTS FOR THE SUPERVISOR

The information provided by this manual becomes effective only through exemplary work performance, and following the principles of safety, training, inspection, assembly, maintenance, and operation. It is also necessary to take into consideration environmental and other available data pertaining to the target operational mode.
Since the supervisor has direct control of the equipment and its use, it is responsibility of the supervisor and his staff to verify the work platform compliance with the necessary safety requirements. All decisions on the equipment use and functioning have to take into account the fact that this equipment is designed to transport loads. Safety of people working around this equipment depends on such decisions.

1.5.1 Operation and maintenance training

The supervisor has to train the staff performing inspection, assembly, and maintenance in accordance with the appropriate sections of this manual, and with Manufacturer's recommendations.

1.5.2 Responsibilities of the supervisor

It is a responsibility of the supervisor to verify that each work platform operator has been adequately trained as required by this manual and as required by the specific instructions provided by the supervisor himself.

1.5.3 Operator training for a specific work platform model

It is a responsibility of the supervisor to assure that the operator is using the same model of the work platform for training, as he will for actual work. Such training must be conducted in an open area under the supervision of a qualified person. The length of training must be sufficient for the operator to show proficiency in using the equipment. Only proficient and authorized personnel may be permitted to use the work platform.
Prior to issuing such authorization the supervisor has to verify that the operator:

– Has read and understood the instructions provided by this manual and by the supervisor
– Has read and understood the operating instructions and safety rules, or learned those from a qualified instructor;
– Understand that the equipment is intended to be used for applications defined by the Manufacturer

1.6 REQUIREMENTS FOR THE EQUIPMENT OPERATOR

The equipment operator must use the information provided by this manual together with common sense, adequate safety controls, and caution in evaluating each specific case.
It is the responsibility of the operator while using the work platform to comply with the safety requirements for the site. The operator's decisions must take into account the safety of his own his own, of the people working on the work platform (only during installation and disassembly), and those around it.

1.6.1 Preliminary information

The operator has to know the exact location of this operation manual on the work platform. The operator has to have confidence in using the manual and consult it every time he has doubts or questions about the proper use of the equipment.

1.6.2 . Operator training

The operator has to be trained on the same model of the work platform or a model with similar controls and characteristics to the one he intends to use. Such training must be conducted in an open area under the supervision of a qualified person. The length of training must be sufficient for the operator to show proficiency in using the equipment. Only proficient and authorized personnel may be permitted to use the work platform.
Before becoming authorized to use the work platform the operator must:

– Be trained by a qualified instructor to understand the use of all controls;
– Read and understand the operating instructions and safety rules, or learn those from a qualified instructor;
– Read the manual in order to understand all the warning messages and other information posted on the equipment, or learn those from a qualified instructor;

CHAPTER 2

GENERAL INFORMATION

2.1 ID data for the manufacturer and the equipment

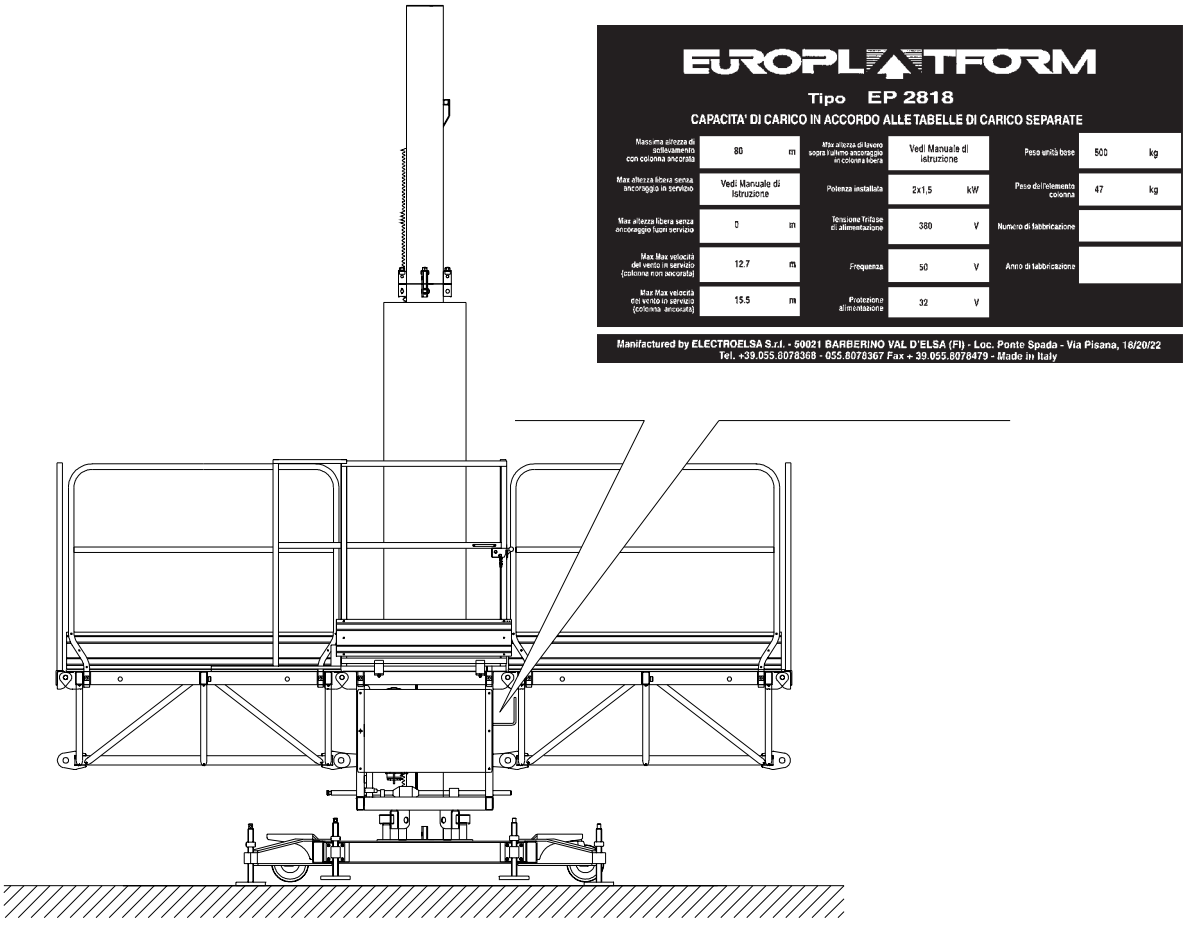
Manufacturer: ELECTROELSA s.r.l. Via Pisana 18/20/22 – 50021 BARBERINO VAL D'Elsa (FI) ITALIA Ph. +39 055 8078368 Fax +39 055 8078479

Model: EUROPLATFORM EP2818

Id. No. _____ Year: _____

2.2 Product ID Label

The product ID label is fixed on the left side of the drive unit as shown in the picture 2.1. The ID label allows a clear identification of the equipment type, its characteristics, the manufacturer data and the product ID number.



PICTURE 2.1

2.1 Meaning of the product ID initials

The machine is identified with the alphanumeric code EP2818.

- The suffix EP stands for “EUROPLATFORM”, indicating a model of mast climbing work platform.
- The number 2818 indicates a mast climber that can reach 5,56 m length in single mast configuration and 21,60 in twin mast configuration with a maximum height of 80 m. The number put after the code EP2818 indicates normally the length of the platform (for instance EP2818/6, EP2818/22 and so on).

The machine can be assembled in several different configurations, both in single and twin mast version, by the use of identical modules given the complete modularity of the structures.

NOTE

The load capacities expressed above include workers on the platform. For more detailed information consult the load diagrams in this manual.

CHAPTER 3

EQUIPMENT INFORMATION

3.1 PREFACE

The construction work platform EP2818 was designed and built in accordance with the highest standards of quality and safety. This manual provides instructions and advice making operation and servicing of the work platform safe and reliable. This manual has to be available to all operating personnel throughout all length of work.
The drawings used in the manual are for illustration purposes only and not an exact representation of the products on the market. These products must be used in accordance with standard practices and safety norms. The product specifications and pricing are subject to change without prior notice.

3.2 GENERAL DESCRIPTION

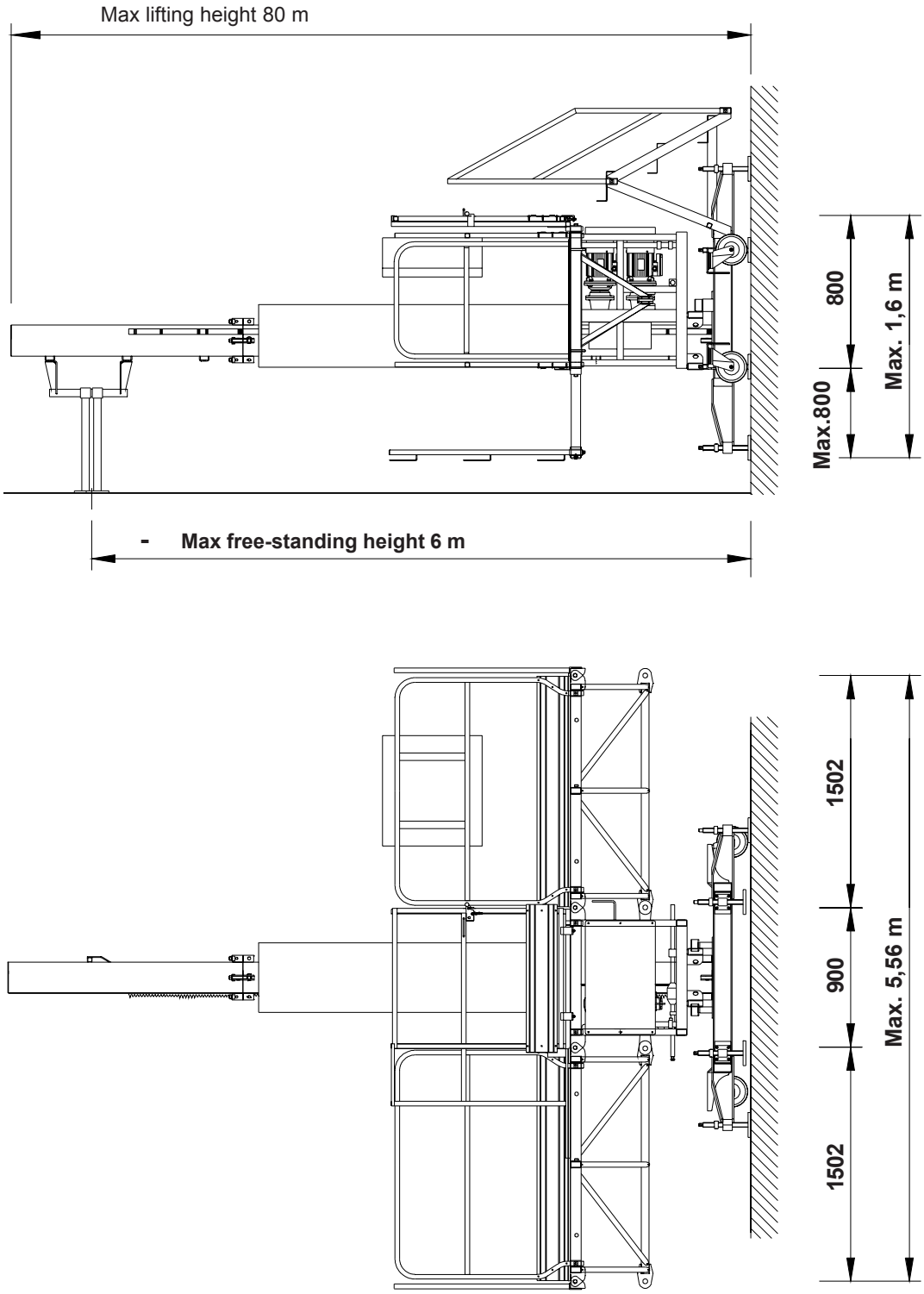
Construction work platforms are designed and built according to the following standards:

– EQUIPMENT REGULATION 98/37 EU received with D.P.R 24 July, 1996 # 459.
– EQUIPMENT REGULATION 89/392 amended with regulations 91/368, 93/44 and 93/68.
– UNI EN 1495 November 1999 Mast climbing work platforms
– UNI EN 292 part 1,2 and 2-A/1 on equipment safety, fundamental concepts, specifications, and technical principles.
– CEI EN 60204 - 1 on equipment safety, and equipment electric systems.
– ELECTROMAGNETIC COMPATIBILITY (89/33//EU, 92/31/EU, 93/68/EU, 93/97/EU received with Dec.Leg.12 November 1996 # 615.
– ELECTRIC MATERIAL UNDER LOW VOLTAGE (73/23/EU, 93/68/EU) received with Statute # 791 of 1991, and Statute #626 of 1996.

Proper equipment use and various components of the construction work platform EP2818 are the subjects of the next chapter. For the specific information on operating procedures please consult further chapters of this manual

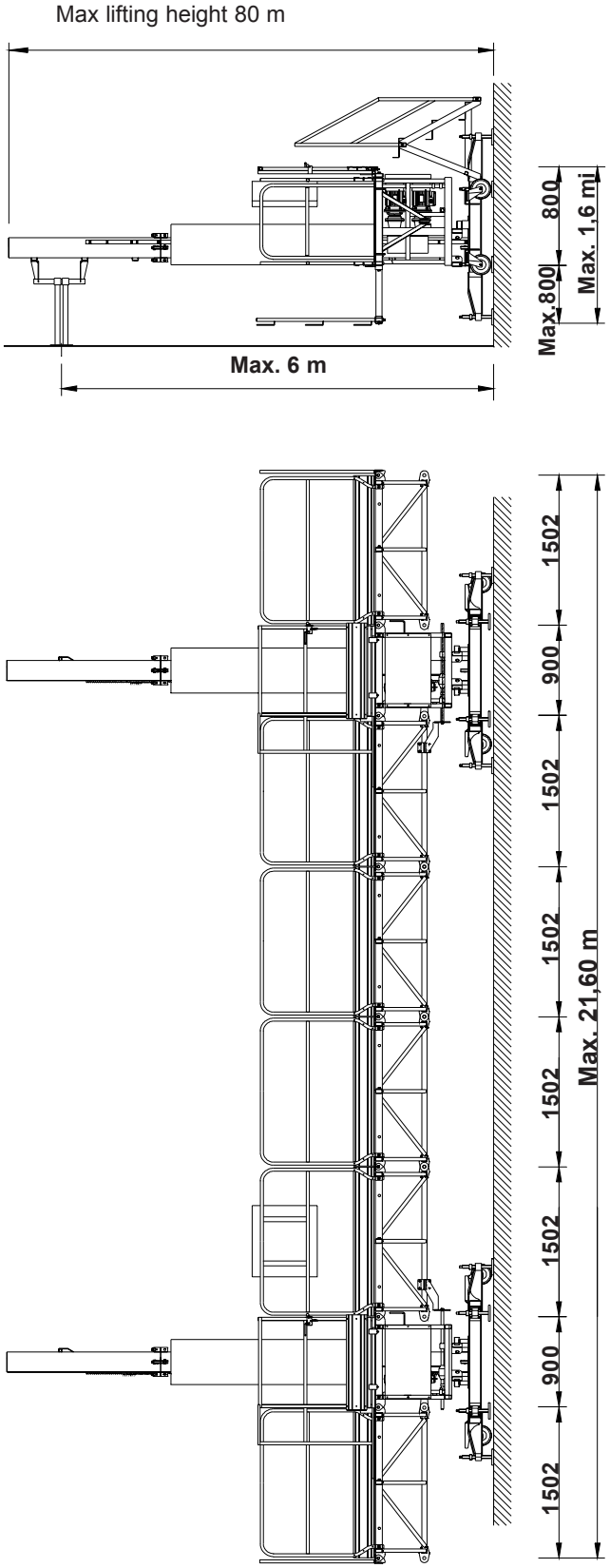
3.3 EQUIPMENT LAYOUT

3.3.1 Configuration of the single mast EP2818/6



PICTURE 3.1

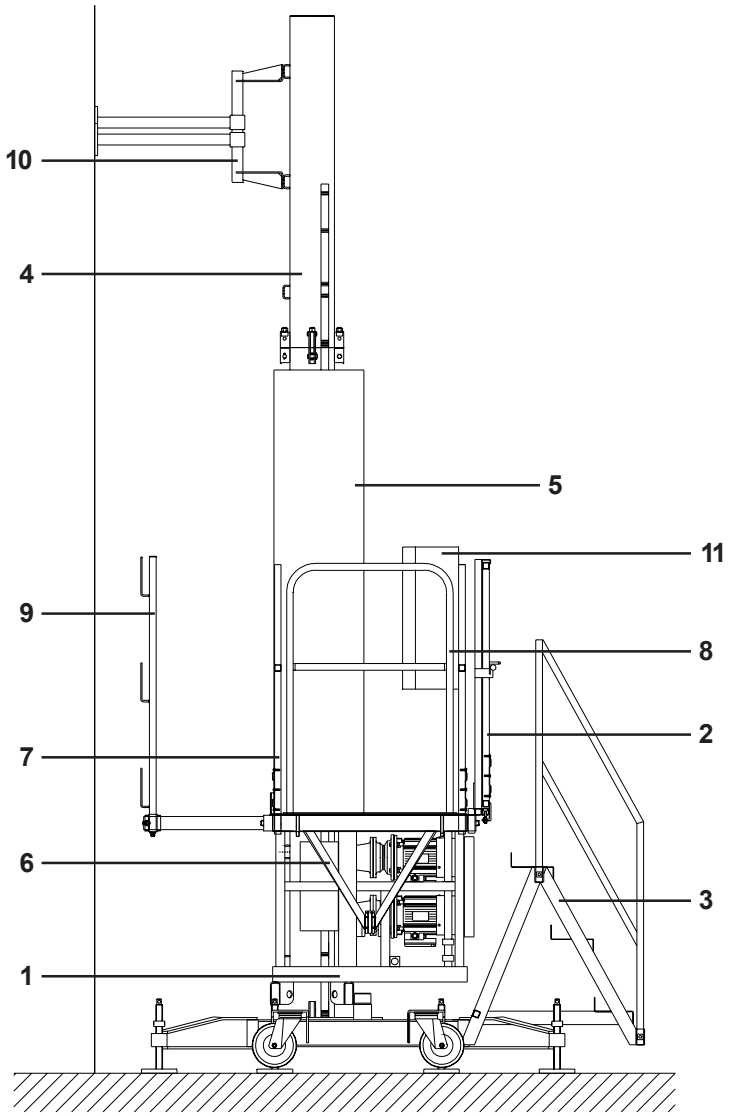
3.3.2 Configuration of the twin mast EP2818/22



PICTURE . 3.2

3.4 EQUIPMENT DESCRIPTION

Main components of the equipment are indicated in the picture 3.3 and listed here below.
A more detailed description is available in the following paragraphs of the manual.



PICTURE 3.3

KEYS

1 Base unit
2 Access gate
3 Access steps
4 Vertical mast
5 Vertical mast protection net
6 Deck module
7 Guardrails
8 Terminal guardrails
9 Protection guard-rails on facade side
10 Wall anchors
11 Control panel

The equipment is composed of a base frame, made of structural steel that supports the vertical part of the equipment. The base frame is equipped with outriggers to keep the equipment levelled on the ground. On the base frame the first mast section is fixed (the mast section is tubular with square section 200 x 200 mm) on which the drive units moves. The drive units carry the platform itself.
The platform floor is covered with anti-slip aluminium plates and had lateral guardrails as protection.

The vertical mast is composed of modular elements that allow reaching the maximum height of 80 m. The mast sections that constitute the vertical mast can be assembled easily from the inside of the platform. The mast is fixed to the building by means of wall anchors.
The lifting of the loading platform is operated by means of gear reducers with self-braking electrical motors that engage the rack that is welded on the vertical mast. From the control panel fixed on board to can operate the equipment.

The gear reducers with self-braking electric motors are provided with manual unlocking for cases of power interruption or technical malfunction. Such device allows the loading platform to slide down under G force until it reaches adequate safety conditions.
In the following chapters we will describe the equipment components used both in standard and custom made models according to special country laws.

3.4.1 Base unit

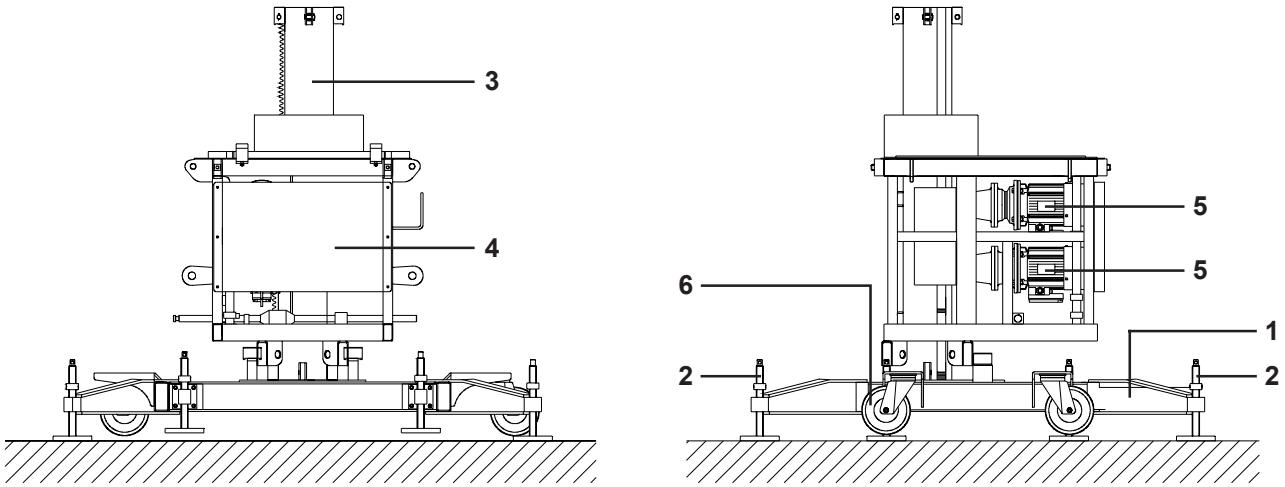
The base unit is composed of: the metal base frame (1) equipped with four screw-jacks (2) with for levelling the machine, the first mast section (3) and the drive unit (4) complete with two gear reducers, electric motors (5) that through pinions engage the rack of the mast.

The first mast section is fixed on the base frame that is made of structural steel sections. The base frame has four rotating wheels (6) or can be equipped with a towing kit with pneumatic wheels to be moved on the job site. In single mast configuration the machine has one base unit, while in twin mast configuration are two of them Rotating wheels are useful to move the equipment on solid grounds and to load it on the truck with the help of ramps. The towing kit with pneumatic wheels it is very handy to move the machine in difficult grounds in the job site.

The four levelling screw jacks are mounted on the base frame. Screw jacks are adjustable in order to reach a perfect levelling. A level gauge may be used for this purpose. When the perfect verticality of the mast is achieved, the screw jacks can be blocked by means of nuts.

The frame of drive unit, the group that enables the movement of the equipment, is made of welded metal profiles. This frame is fixed to the work platform by means of apt pins. All components, such as lifting elements, guide elements, lifting devices and limit switches are fixed on the drive unit. The movement is performed by means of two epicycloidal gear reducers with 1.5 kW power each.

The gear reducers guarantee a lifting speed of about 10.6 m/min both in ascent and descent. On the drive unit there is a lever to unblock the brakes and bring the machine downward in case of power interruption. This is of course a procedure to be used just in emergency cases.



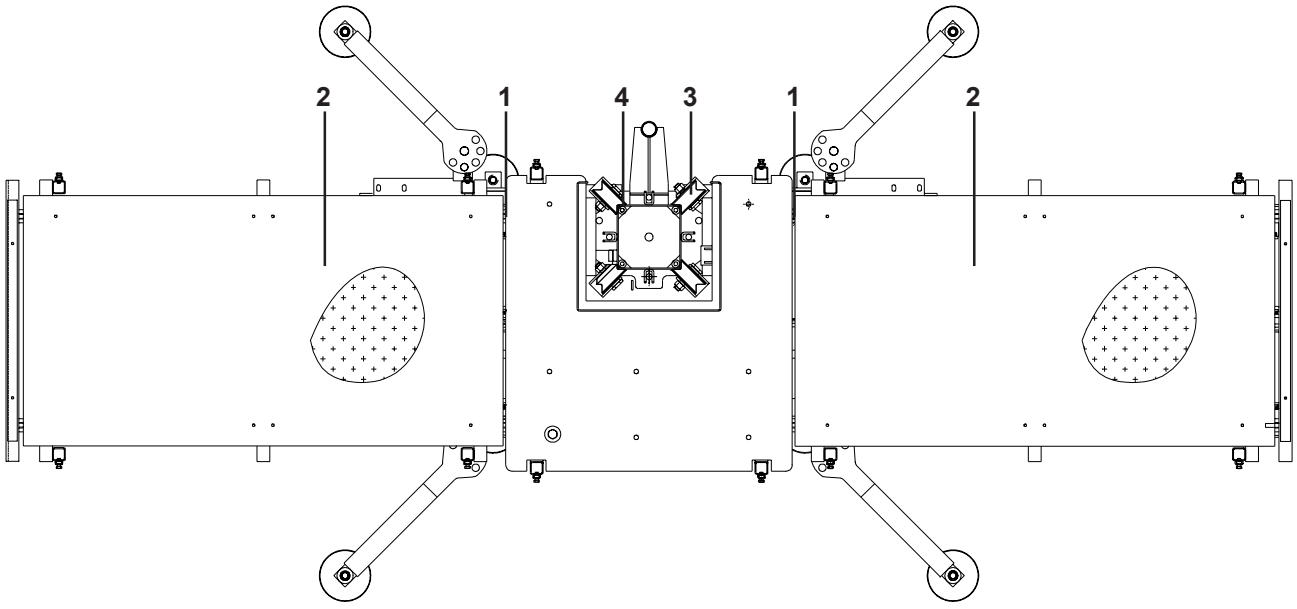
PICTURE 3.4

An overrun micro switch in descent ensures the right function of the motor brakes. When this micro switch intervenes the power supply is cut, with an immediate consequential stop of the machine. At this point the malfunction of the motor brakes will be signalled. Motors are equipped with centrifuge brake that controls the speed in case of emergency manual descent.

Through connection pins (1) the drive unit is fixed to deck modules (2). Adjustable contrast rollers (3) allow regulating perfectly air gaps between the mast and the rollers themselves.

The equipment is provided with top and bottom limit switches that, together with their apposite cams, let the platform stop at the top and at the bottom of the vertical mast. Further micro switches (overrun limit switches) stop the equipment during emergency cases cutting the command circuit.

The platform in twin mast configuration is equipped with a levelling device that controls the horizontal levelling of the central span. This device constitutes of two micro switches that cut the power to one of the two derive units, allowing the other one to move till when the central span is horizontal again. This device gets in function when the inclination of the central span exceeds the admitted parameters.



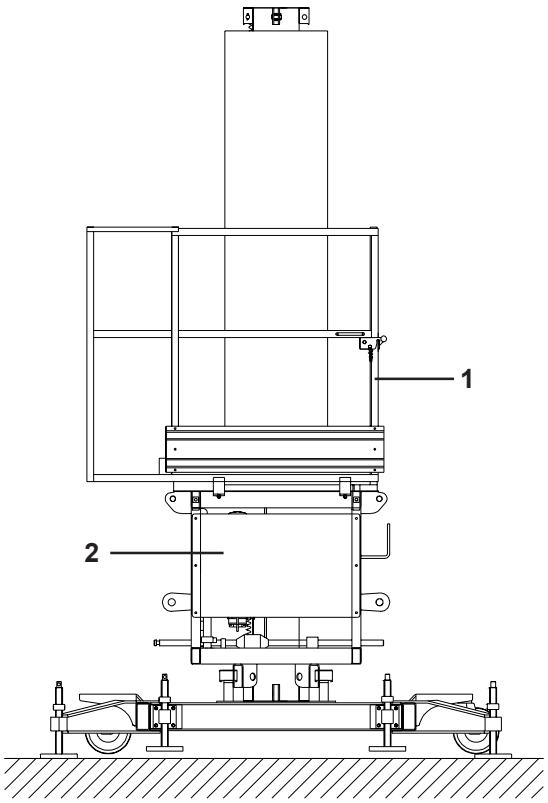
PICTURE 3.5

3.4.2. Access sliding door

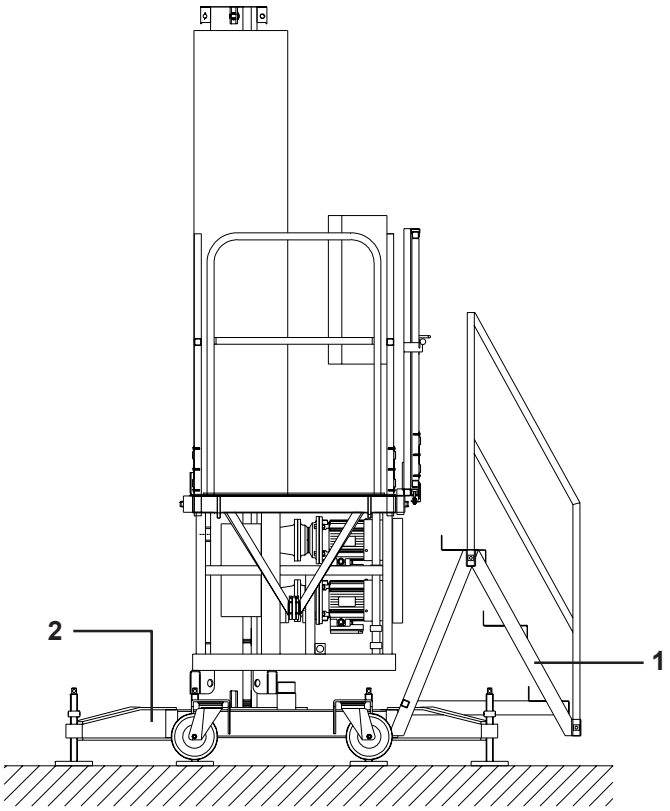
The access sling door (picture 3.6) allows the access to the work platform. Its design is similar to the design of guardrails, but it is articulated as to be opened and closed easily. The access to the work platform is from the drive unit (2) on the opposite part of the vertical mast. In twin mast configuration there are two access doors. Access doors are electrically controlled; therefore the equipment does not move if the door is open or not correctly closed.

3.4.3. Access steps

Access to the work platform is achieved by means of three steps (1) as shown in the picture 3.7. Access steps are fixed on apposite holes on the base frame (2). Access steps are supplied along with every machine (single and twin mast configuration).



PICTURE 3.6



PICTURE 3.7

3.4.4. Vertical Mast

The vertical mast shown in the pictures 3.8 is the component that to develop the machine vertically. The mast is tubular and has a square section. Each mast section is 1.5 m (exactly 1489 mm). Conic joints to align one mast to the other are not considered in this dimension.

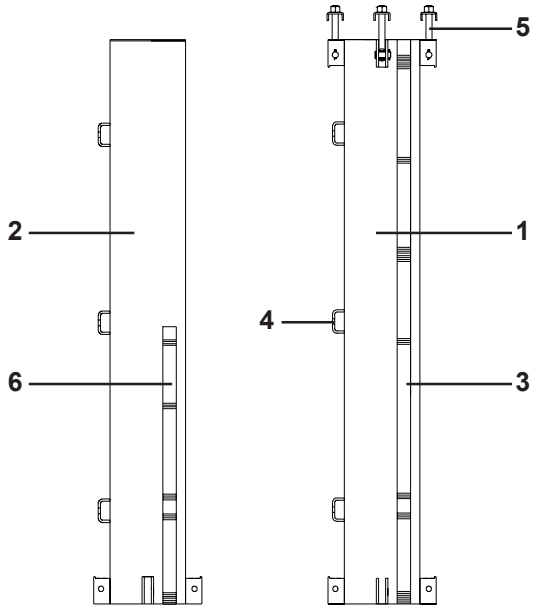
All mast sections (exception made for terminal mast sections) are hot deep galvanised.

Each mast section weighs 47 kg and can be handled and assembles in two people. The rack is welded on the side of the square section, while the predisposition for wall anchor frame is welded on the left side. Mast sections are fixed one each other with four screws (5) welded on the top of each mast section. The descent limit switch and the overrun limit switch are fixed on the first mast section at the base.

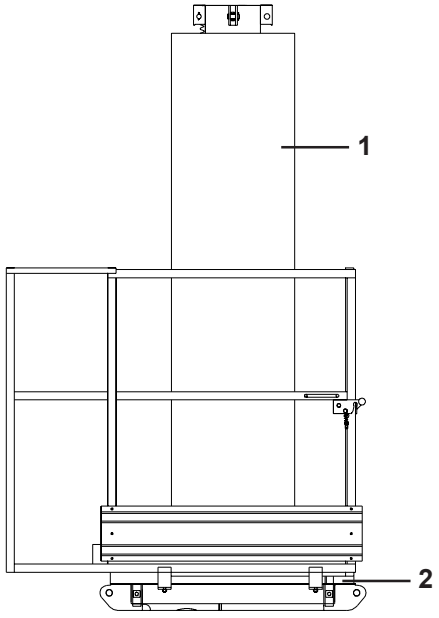
The terminal mast sections are painted in red to be easy individuated. On terminal mast section the rack is welded only in the lower half part, constituting a further safety device in case of malfunction of the top limit micro switch. The top limit cam is fixed on the terminal mast section.

3.4.5 Vertical mast protection

A net panel (1) as shown in the picture 3.9 is installed on the drive unit. This protection avoids the contact with the vertical mast that could be especially dangerous while the platform is moving.



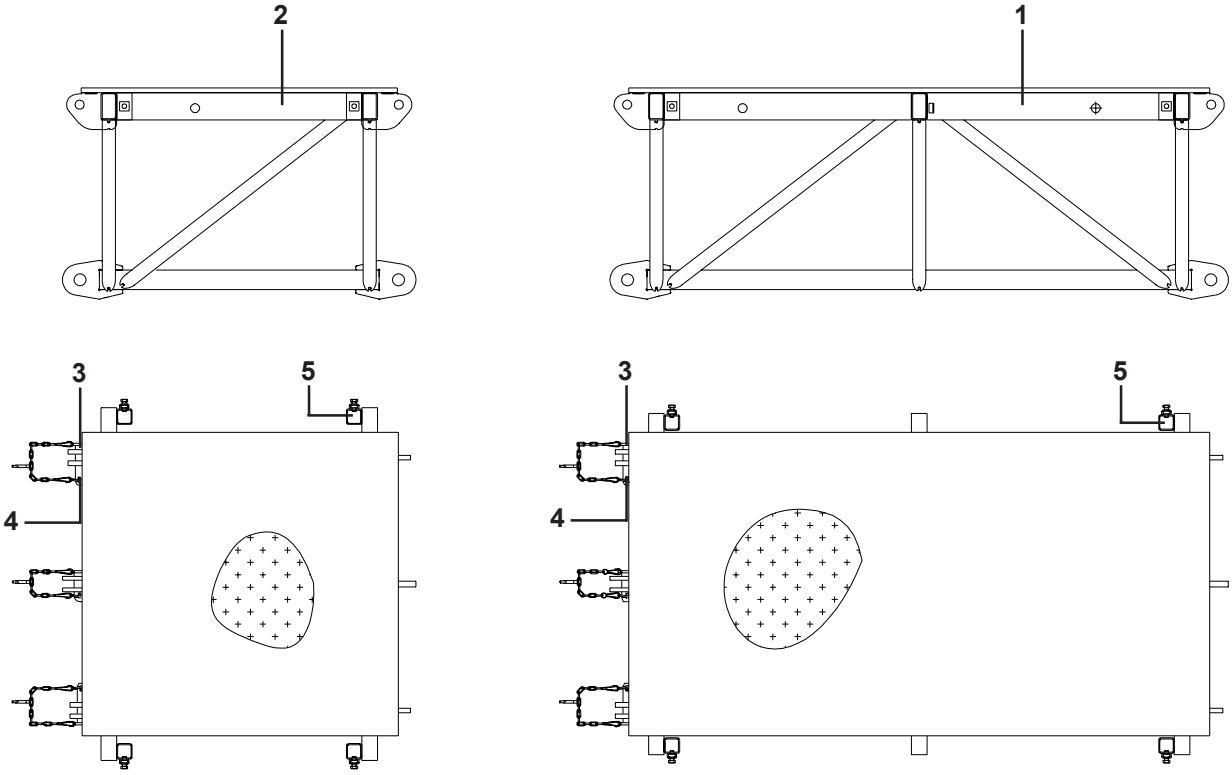
PICTURE 3.8



PICTURE 3.9

3.4.6 Deck Module (standard part)

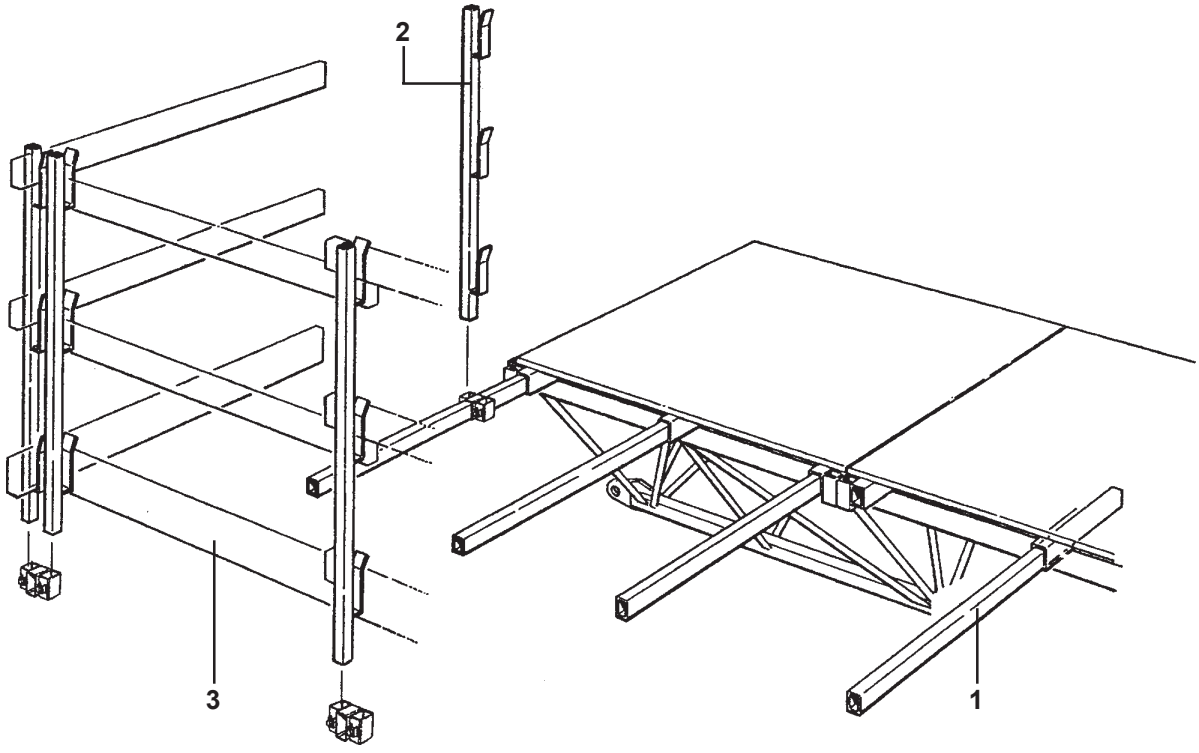
Work platforms are realised with deck modules. The deck module length can be 1502 mm (1) or 821 mm (2).
Both single and twin mast configurations are realised with the above mentioned deck modules.
A crew of two, avoiding the necessity of any lifting device can move each deck module. Anyway, in case of access difficulties and hard conditions, the crane or other lifting devices can be of great help.
Deck modules are connected by means of plugs (3) and blocked in their position with the help of elastic pins (4). The above-mentioned plugs are supplied with every deck module.
Guardrail supports are welded on each deck module.
The deck module width can be increased, getting very near to the building façade by the use of telescopic wall extensions. Telescopic wall extensions have their seat inside the structural profiles of the deck module.



PICTURE 3.10

Telescopic wall extensions can be partly or completely extracted according to the shape of the building. Standard wall extensions can reach a width of 800 mm (on request for particular applications longer extensions are available). On the extreme point of the telescopic extension the support for the guardrails (5) has to be inserted.

In order to fix the protection on the wall side,ou can put small wood tables (not supplied by the manufacturer) or the guardrails of the front side when the dimension matches.
The floor of the deck module is in anti-slip aluminium plate. The floor of wall extensions can be covered with 40 mm table woods - those used in traditional scaffolding - with 19 mm thick marine multi -layer wood panels, (not supplied by the manufacturer) or aluminium tiles (manufactured by Electroelsa on request).



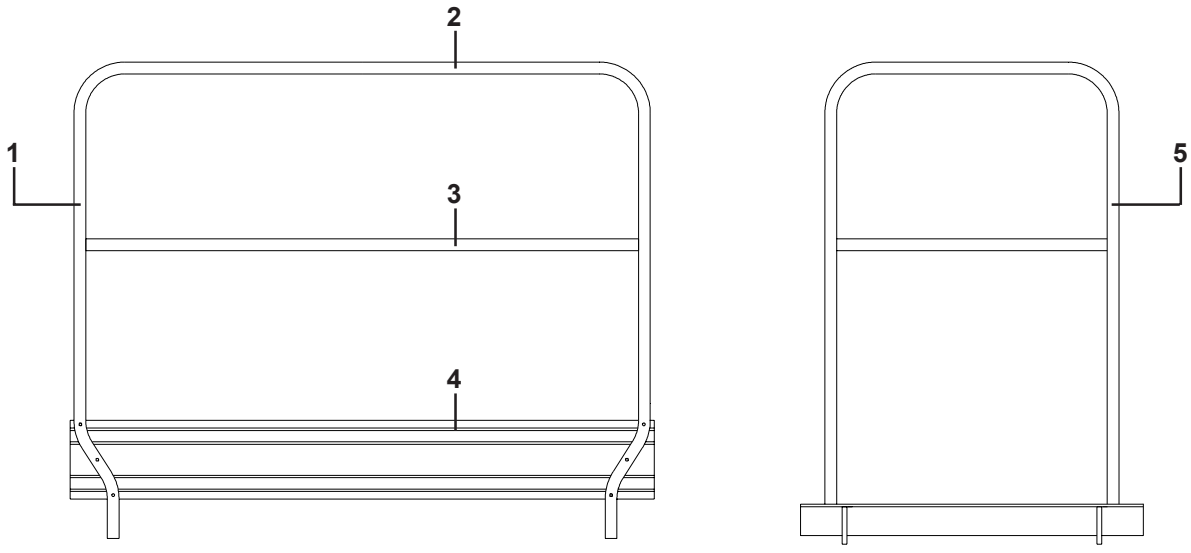
PICTURE 3.11

3.4.7 Guardrails

Guardrails constitute a protection barrier on the side opposite to the building. They are made of tubular square profiled and they are protected from corrosion by means of hot deep galvanisation. Parapets as per their design constitute triple (2+3+4) horizontal protection (see picture 3.12). On the base a 200 mm galvanised protection plate (4) is fixed on the guardrail to prevent the operator feet go out of the platform surface. These guardrails, as said above, can be used on the building façade side as well, provided that configurations and dimensions of wall extensions match.
The number of parapets supplied along with the standard machine is sufficient just be used on the side opposite to the building.

3.4.8 Side guardrails

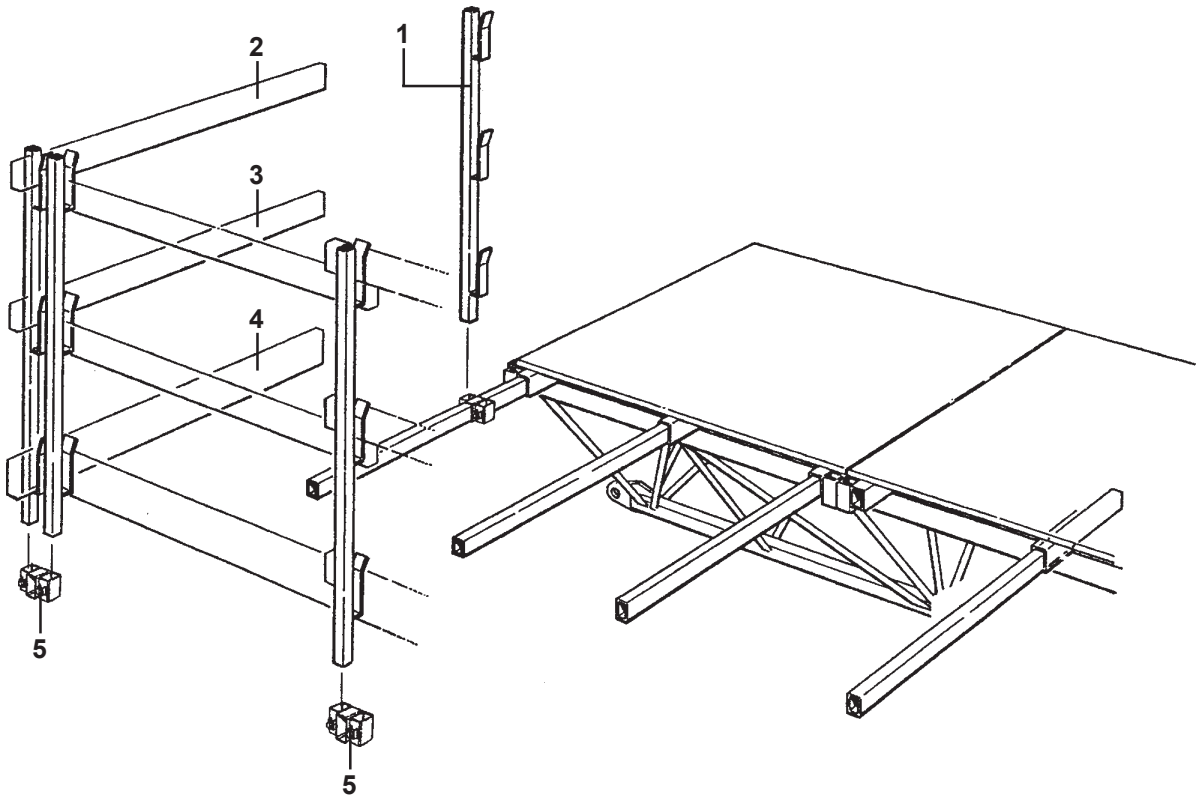
These guardrails are similar to those described above, but have special joint to be connected to male and female deck hinges.



PICTURE. 3.12

3.4.9 Protection guard-rails on facade side

Protection guardrails on facade side are realised with the use of posts (1). These posts have three supports for wood tables (not provided by the manufacturer). By this system a parapet is reconstituted with upper (2), medium (3) and lower (4) (for feet) protections like the standard ones. Wood tables can be fixed in their supports with nails or screws (each allocation has a small hole for this purpose). Each post is inserted in its clamp (5). Clamps are fixed at the extreme points of telescopic wall extensions

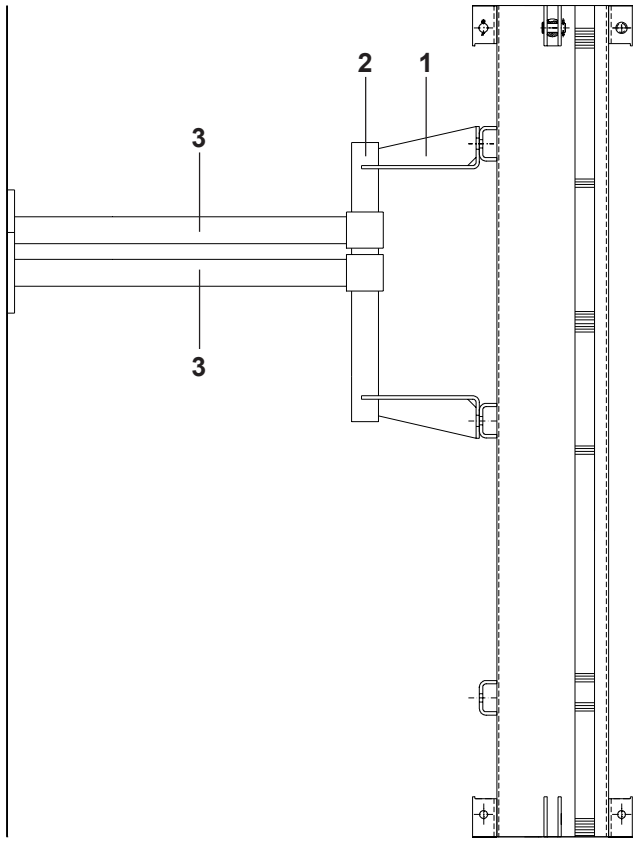


PICTURE. 3.13

3.4.8 Wall anchors

The anchor frame is fixed to the mast section during assembly at a defined distance between each other. This frame can be fixed on the mast at any level. The anchor frame is made of a 0,5 m vertical pipe (2) that can be completely used to fix wall anchors pipes. The maximum standard distance between wall anchors is 6 m, while the last wall anchor can be distant from the top of 3 metres.

For more detailed information about wall anchors and forces on them, consult the chapter dedicated to this theme.



PICTURE 3.14

3.4.8 Platform control panel

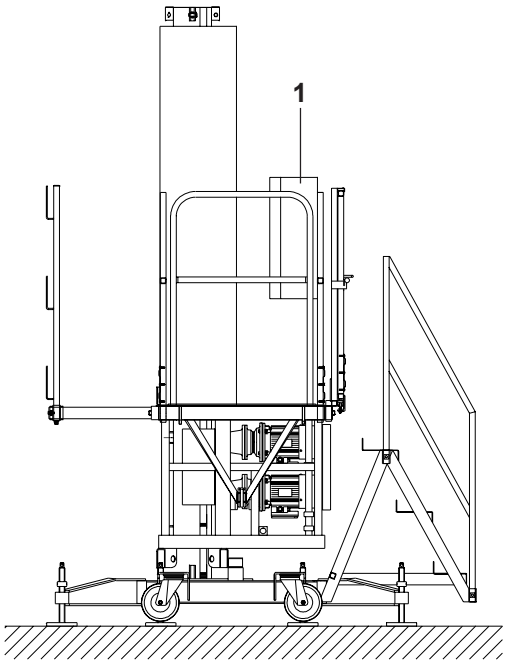
The control panel can be installed on the central guardrail as shown in the picture 3.15. The control panel is equipped with a phase sequencer. To put into action the single mast configuration it is necessary to use a special connector that closes the plug destined to the drive unit that in this case will be not used. This device is used during installation when deck modules are connected to form the central span. It is also used in the first installation phases. The control panel has two buttons that control separately the two drive units (left and right drive unit). The red palm-push emergency button is put on the front of the control panel.

A joystick on the side of the control panel allows the movement upward and downward of the work platform. This joystick is a human-operated device, therefore it must be kept pressed by the operator otherwise the machine stops.

The machine before moving emits an acoustic signal. Actually when you put the machine in operation the first contact that closes is the one of the acoustic signal, afterwards the one that gives power to the engines. The time that passes from the closing of the first contact to the second can be adjusted through a timer inside the control panel.
On the side of the control panel, there is a plug for 220 V power for small tools to be used on the platform. This plug gives power up to 6 kVA.

3.4.8 Power cable (not supplied along with the platform)

The cable is normally hanged in the central part of the machine on a tube of the parapets in the twin mast configuration, while in single mast configuration is put on the side. The power cable lays on the ground and rolls and unrolls on a reel freely.



PICTURE. 3.15

3.5.1 TECHNICAL EQUIPMENT DATA

3.5.1 General Data

	EP2818/6	EP2818/20
Lifting speed (m/min)	10.6	10.6
Max freestanding height allowed in operation (m)	6	6
Max freestanding height allowed out of operation (m)	0	0
Max wind speed during installation (m/sec)	12.7	12.7
Max wind speed allowed in operation (m/sec)	15.5	15.5
Max wind speed allowed out of operation (m/sec)	42	42
External power consumption (kW)	6	10

3.5.2. Electric data

	EP2818/6	EP2818/20
Power of the drive unit (kW)	2x1.5	4x1.5
Power consumption during ascent (kVA)	5	10
Power tension (V)	380	380
Power frequency (Hz)	50	50
Voltage for controls (V)	24	24
Frequency range for controls (Hz)	50	50
Maximum current spike (A)	32	64
Power tension of the plug for tools on board (V)	220	220
Max power consumption from the 220 V plug on board (A)	16	16

3.5.3 Dimensioni e portate

	EP2818/6	EP2818/20
Standard dimensions of the platform – Length x Width (m)	5.56x1.6	20.10x1.6
Nominal load included people on board (kg)	540	1100
Max lifting height with wall anchors (m)	80	80
Maximum distance among wall anchors (m)	6	6
Max overhung over the last wall anchor (m)	3	3
Max force to exercised on the mast (freestanding condition) (N)	200	200

3.5.4 Dimension of the main components of the machine

	EP2818/6	EP2818/20
Minimum height required for transport (m)	1.8	1.8
Minimum height of the deck surface from the ground (m)	0.95	0.95
Normal deck module dimensions – Length x width (m)	1.502x0.8	1.502x0.8
Short deck module dimensions – Length x width (m)	0.82x0.8	0.82x0.8
Mast section dimensions	1.5x0.2	1.5x0.2
Drive unite dimensions – Length x width x height (m)	0.95x0.9x1.25	0.95x0.9x1.25
Base frame dimension - Length x width (m)	1.7x1.89	1.7x1.89

3.5.5 Main component weights

	EP2818
Base unit complete (kg)	500
Drive unit (kg)	235
Base frame (kg)	231
Normal deck module 1.502 m (kg)	68
Short deck module 0.82 m (kg)	42
Access door (kg)	13
Deck connection plug (kg)	0.45
Standard guardrail (kg)	14
Final guardrail (kg)	14
Side guardrail on the drive unit (kg)	4.7
Mast section (kg)	47
Terminal mast section (kg)	38
Mast guard (kg)	23
Complete wall anchor (kg)	18
Wall anchor frame (kg)	5.5
Wall anchor extension pipe (kg)	3.5
Post (kg)	3.5
Access steps (kg)	20
Control panel with its support (kg)	32
Rotating wheel (kg)	3
Post clamp (kg)	1
Orthogonal clamp (kg)	1.4
Tool kit (kg)	2.5
Limit switch cam (kg)	1
Complete levelling system (kg)	2
Expanding plug (kg)	0.1

3.5.6 Electric motor manufacturing characteristics

	EP2818
Type	self-braking / threephase
Size	90
Construction shape	B5
Atmospheric protection	IP55
Number of poles	4

3.5.7 Electric motor technical characteristics

	EP2818
Nominal power (kW)	1.5
Round per minute (RPM)	1400
Nominal tension (V)	440/230 3 PH
Nominal current (A)	4
Current spike absorbed (A)	16
Motor connection type	DELTA -STAR
Power factor (cos ø)	0.79
Frequency (Hz)	50
Brake Nominal tension (V)	110-1PH
Nominal tension of the brake rectifier (V)	230-1PH
Insulation category	B

3.5.8 Power cable

	THREEPHASE
Cable length (m)	no. of poles x minimum section
Length < 40 metres	5x2.5 mm^2
Length 40: 60 metres	5x2.5 mm^2
Length 60: 80 metres	5x4 mm^2
Length 80: 100 metres	5x6 mm^2

	SINGLEPHASE
Cable length (m)	no. of poles x minimum section
Length < 40 metres	3x4 mm^2
Length 40: 60 metres	3x6 mm^2
Length 60: 80 metres	3x6 mm^2
Length 80: 100 metres	3x10 mm^2

3.5.9 Safety equipment

	EP2818
Assembly limit switch equipment	YES
Descent limit switch equipment	YES
Micro switch on the access door	YES
Double gearbox with self-braking engines	YES
Manual brake opening for emergency descent	YES
Descent limit switch	YES
Ascent limit switch	YES
Terminal mast with half rack	YES
Phase sequencer (control command/direction)	YES

3.5.10 Recommended torque values

The following table reccommends the dimension of the tools to be used during assembly.

Bolt	Wrench	Torque Nm
M 6	10 mm	10
M 8	13 mm	24
M 10	17 mm	47
M 12	19 mm	81
M 14	22 mm	128
M 16	24 mm	198
M 20	30 mm	386
M 24	36 mm	668

This table is effective for bolts and nuts of resistance category 8.8 on dry surfaces.

3.6 NORMAL STORAGE CONDITIONS

Storage of the work platform components does not demand special environmental conditions. The only recommendation in storing these parts is to avoid contact with water. Over a long period of time water can compromise reliability of the work platform's electrical equipment. Do not cover the work platform or its components with synthetic fabrics or plastic in order to avoid possible condensation. If the work platform and its components are stowed away while wet, the storage facility has to be well ventilated

3.7 STORAGE AT TEMPERATURES ABOVE -4ºF (-20ºC)

SNo particular requirements exist for storing the work platform in a heated facility. The temperature above -4ºF (-20ºC) has to be maintained. When the work platform is stored outdoors at temperatures close to -4ºF (-20ºC) it is necessary to check for possible structural damages caused by water infiltration and freezing.

3.8 STORAGE AT TEMPERATURES BELOW -4ºF (-20ºC)

When the work platform is stored at temperatures below -4ºF (-20ºC), the following procedures must be performed:

– Drain oil from the gear reducer.

ATTENTION

Remember to fill the gear reducer with oil every time the work platform is brought back into operation

- Disassemble the current rectifiers in the brake (which are guaranteed above - 13ºF (-25ºC). Install them back before bringing the work platform into operation. Make sure the connections are correct.

– Systematically replace the gas rings on the reducer shaft when resuming the work platform operation. Low temperatures change the structure of the material compromising its holding abilities.

– Systematically replace all bearings when resuming the work platform operation. Their protective washers tend to become fragile. Alternatively, you may specify these particular storage conditions when placing your initial order with the Manufacturer. Timely notification is necessary for the Manufacturer to install the bearings appropriate for such conditions.

– Disassemble the electric control panel and the motor cable sheathing and stow them away in a dry and warm place at temperatures above -4ºF (-20ºC).

3.9 ENVIRONMENTAL CONDITIONS

The EH - M900 work platform is designed and manufactured for operation at temperatures above 5º F/14ºF (-10 C /-15 C). In this temperature range lubrication of the epicycloid reducer is performed according to the table for temperatures from 5ºF to 77ºF (-15ºC to +25ºC) (see appendix).
At temperatures below 5ºF (-15ºC) mechanical and structural integrity of the electric motors, generators, etc. is not guaranteed. These parts are sensitive to low temperatures and tend to become fragile. Do not start the work platform at temperatures around or below -4ºF (-20ºC).

3.10 APPLICATIONS

The EP2818 is used for the following applications:

- Traditional construction work such as bricklaying, wall repairs.
- Industrial plant works such as application of protection panel on the facade
- Refurbishment works: facade painting, restoration of roofs, window installation.
- Decoration, installation of insulation panels, balcony repairs

The EP2818 provides the user with the following advantages:

– Transporting materials and equipment safely, efficiently, and economically;
– optimising and rationalizing work at a modern construction site;
– Easily assembly and disassembly by a crew of two;
– Safe transportation, assembly, disassembly, and relocation within a construction site;
— Conformity to all the specific international regulations existing for this type of equipment.

DANGER

Safe operation of the work platform is guaranteed only for applications and materials listed in this manual. ELECTROELSA disclaims any responsibility if the equipment is used for the applications not listed in this manual or if the written instructions were not observed.

3.11 EQUIPMENT CONFIGURATION

In single mast configuration the work platform can be composed as indicated in the following scheme:

	no. DECK MODULE 0.821 m		
no. DECK MODULE-1.502m	0	1	2
0	0,900 m	1,721 m	2,542 m
1	2,402 m	3,223 m	4,044 m
2	3,904 m	4,725 m	5,546 m

In twin mast configuration the work platform can be composed as indicated in the following scheme:

	no. DECK MODULE 0.821 m				
no. DECK MODULE-1.502m	0	1	2	3	4
4	7,808 m	8,629 m	9,450 m	10,271 m	11,092 m
5	9,310 m	10,131 m	10,952 m	11,773 m	12,594 m
6	10,812 m	11,633 m	12,454 m	13,275 m	14,096 m
7	12,314 m	13,135 m	13,956 m	14,777 m	15,598 m
8	13,82 m	14,64 m	15,46 m	16,28 m	17,10 m
9	15,32 m	16,14 m	16,96 m	17,78 m	18,60 m
10	16,82 m	17,64 m	18,46 m	19,28 m	20,10 m
11	18,32 m	19,14 m	19,96 m	20,78 m	21,60 m

CHAPTER 4

ACCESSORIES

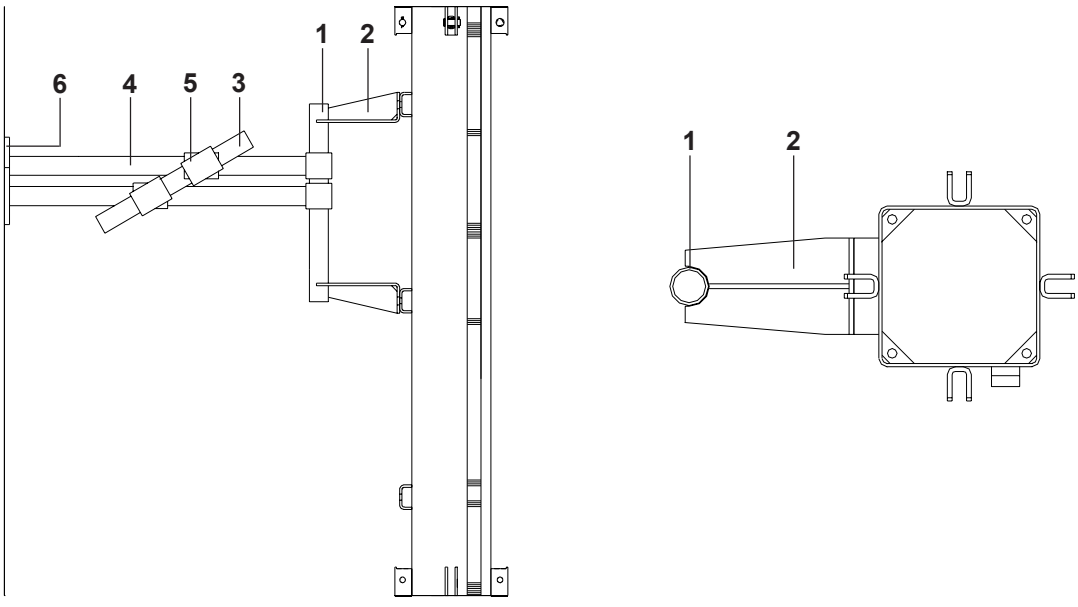
4.1 WALL ANCHOR

When the height of the machine exceeds 3/6 metres, the vertical structure must be anchored to the building.

There are two types of anchors; in both cases they are composed as follows:
- Anchor frame
- Strengthening cross pipe
- Wall anchor extension

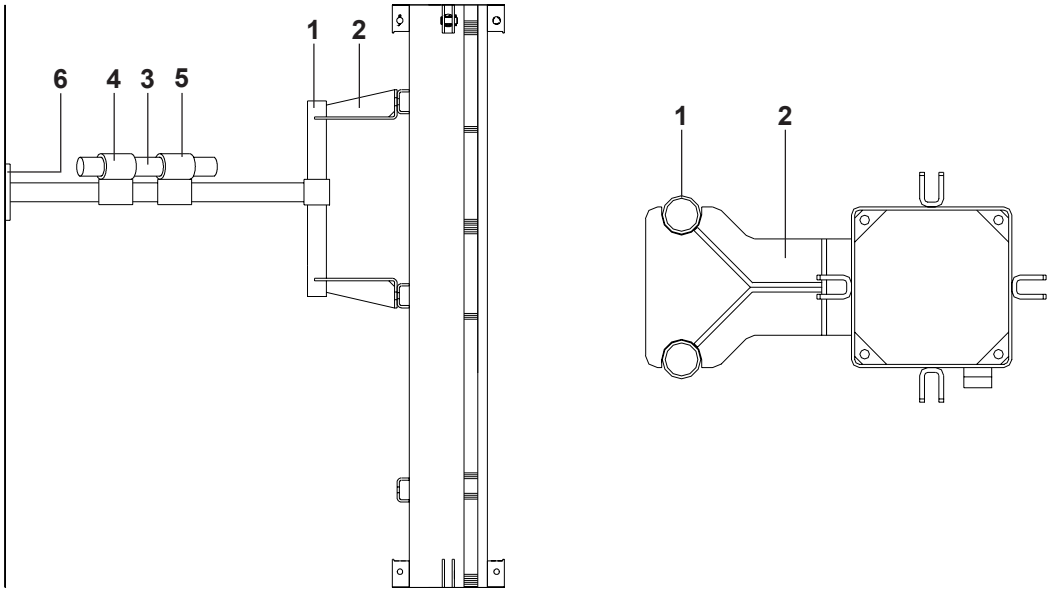
The anchor frame (picture 4.1) is made of a 0.5 m long and 48.3 mm thick (diameter) pipe (1). This pipe is tied to the vertical mast by means of with two brackets (2) that are welded on the mast itself. The wall extensions (4) are the connection between the anchor frame and the building wall; they can be fixed all along the anchor frame pipe (1) (depending on the building configurations) by means of fixed orthogonal clamps (like those used on traditional scaffolding) Wall extensions are made of a pipe with 48.3 mm diameter, 3.2 mm thickness and 1 metre as standard length. Each wall extension has its wall plate.
The maximum wall anchor interval can be 6 metres.

The anchor frame is fixed to the vertical mast during the installation, respecting the intervals that the machine configuration requires.
The strengthening cross pipe (3) gives robustness to the complete wall anchor.



PICTURE. 4.1

The anchor frame described in the picture 4.2 has the main components as the one described above, exception made for the type of frame that connects the wall extensions to the vertical mast. In this case, the frame is made of two parallel pipes welded on brackets (2). This kind of frame is suitable for flat facades.



PICTURE. 4.2

Wall plates of wall extension pipes are of three different types as shown in the picture 4.3:

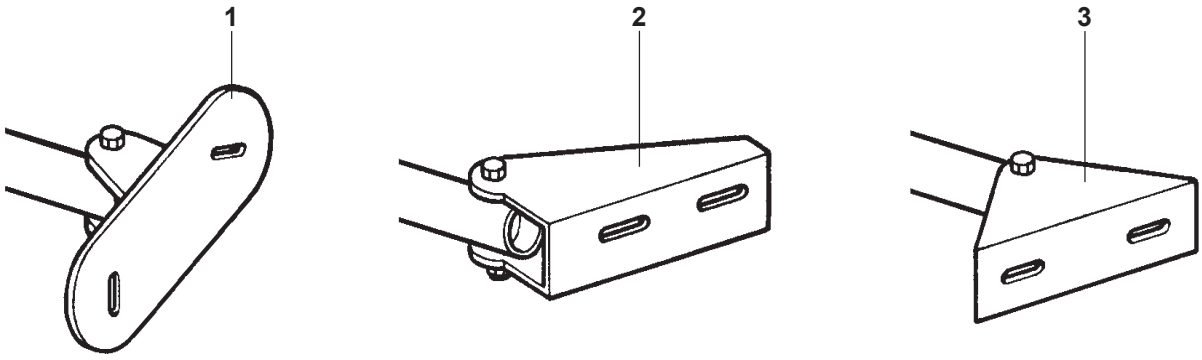
- Wall-plate type 1 (1)
- Wall-plate type 2 (2)
- Wall-plate type 3 (3)

WALL –PLATE TYPE 1
The wall-plate type 1 has two staggered holes compared to the rotation axe of the wall extension. This solution allows a simple screwing of wall expanding plugs.

ATTENTION
The fixing of the wall-plate type 1 has to be carried out with two expanding plugs with suitable mechanical resistance, able to sustain the force exercised on the wall anchor. The expanding plug dimensions must be, anyway, not smaller than M12.

WALL –PLATE TYPE 2
The wall-plate type 2 has just one hole for expanding plug; therefore it is a good solution when it is required to perform as fewer holes on the wall as possible.
The fixing expanding plug dimensions, of course, must be bigger.

ATTENTION
The fixing of the wall-plate type 1 has to be carried out with one expanding plug with suitable mechanical resistance, able to sustain the force exercised on the wall anchor. The expanding plug dimensions must be, anyway, not smaller than M16.



PICTURE. 4.3

WALL –PLATE TYPE 3

The wall-plate type 3 has two aligned holes compared to the rotation axe of the wall extension. This solution allows the fixing when the floor slab is particularly thin.

ATTENTION

The fixing of the wall-plate type 1 has to be carried out with two expanding plugs with suitable mechanical resistance, able to sustain the force exercised on the wall anchor. The expanding plug dimensions must be, anyway, not smaller than M12.

On request, longer or shorter wall extensions are available.
All wall anchor components are protected from environmental corrosion by means of electrolytic galvanisation and consequent passivation.

DANGER

IMPORTANT! ! ! It is mandatory for the installation technician to consult this manual before performing anchoring procedures.

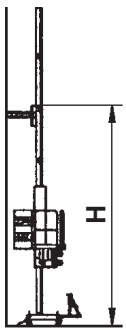
The installation technician must know the forces that anchorage induces on the structure serviced by it, and to assure that the structure can withstand such forces. The technician has to choose the appropriate fasteners depending on the wall masonry. If the work platform is planned to be used together with traditional scaffolding, all measurements must calculated specifically for that configuration. If anchorage type is not listed in this manual, the construction supervisor must receive an explicit authorization from the Manufacturer. Anchoring procedures must be performed only from an appropriate assembly platform or using comparably efficient and reliable aids such as a hydraulic lift, scaffolding, existing balconies, etc. Workers must wear personal protection devices such as harness, hardhat, construction boots, and gloves. While performing anchoring the worker must stay within the limits of the platform or other structure mentioned above and not lean out of it. It is also prohibited to climb the vertical column or any other protruding part of the work platform and use them in place the above-mentioned systems. ELECTROELSA disclaims any responsibility if these instructions were violated or not followed.

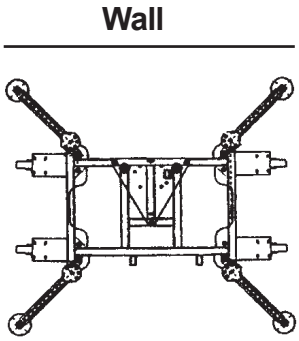
4.1.1 Interval between anchors

The interval between anchors depends on various factors, for instance the profile of the building to which the hoist is being attached.
In the following pages you can find wall anchor intervals admitted both in single and twin mast configuration. In any case, maximum interval between anchors must not exceed 6 m. (approximately 20 ft.).

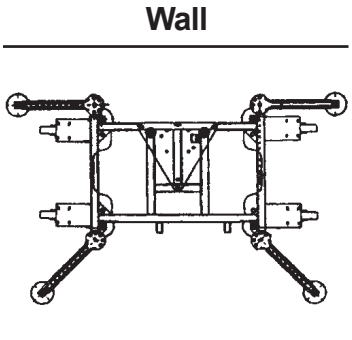
As shown in the following appropriate diagrams, the maximum allowed distance between the ground and the first anchor, depends on the positioning of outriggers (stabilisers) and accordingly to max wind speed allowed in operation (12.7 m/sec).

Stabiliser configurations reported here below are the only admitted.

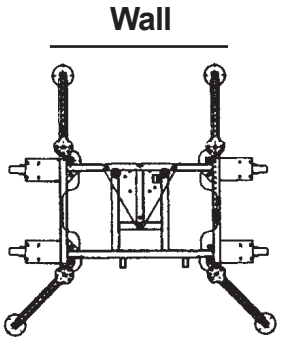




Installation 1



Installation 2



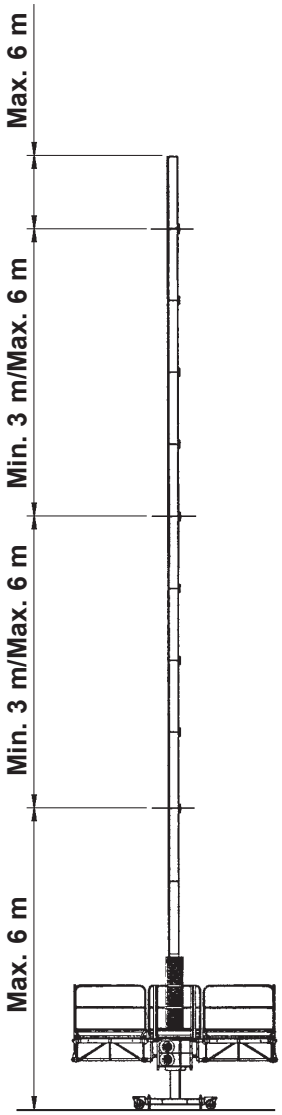
Installation 3

	Installation 1		Installation 2		Installation 3	
Distance between ground and first mast tie H (m)	**single mast**	**twin mast**	**single mast**	**twin mast**	**single mast**	**twin mast**
	6	**6**	**3**	**3**	**not allowed**	**6**

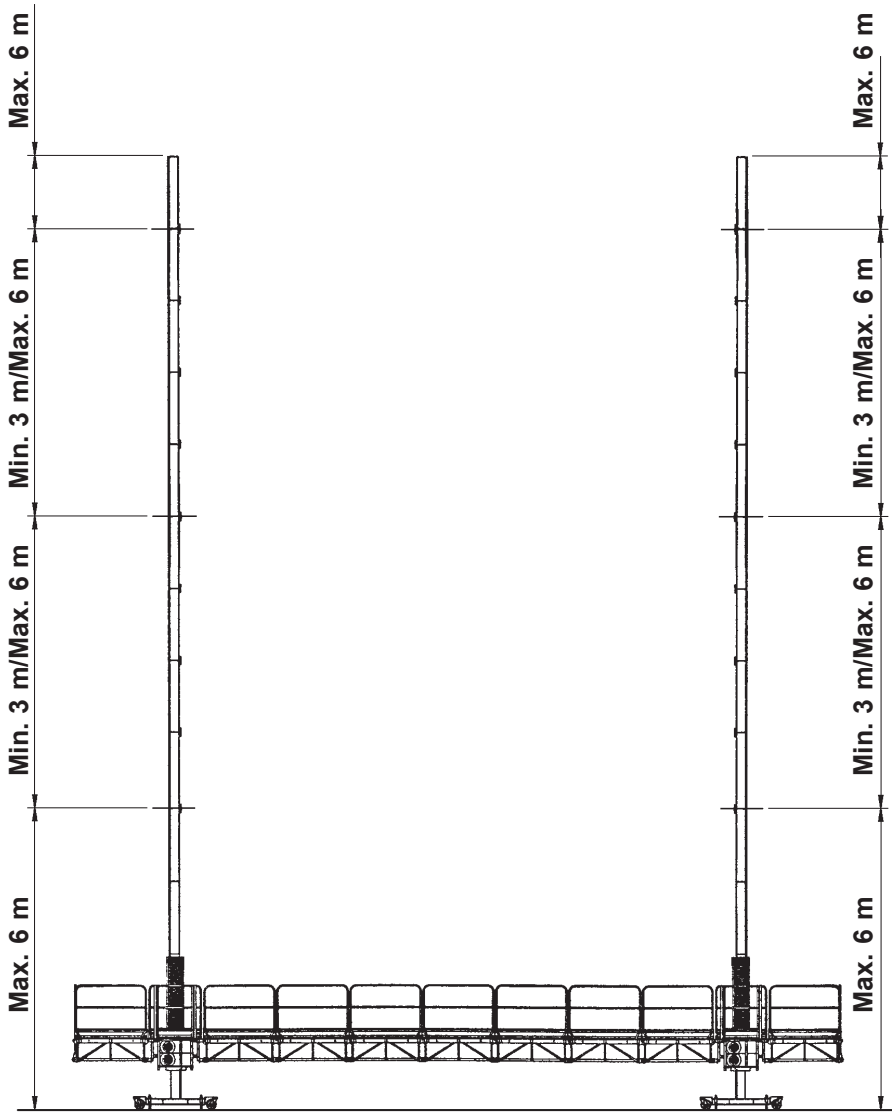
To determine the intervals between anchors refer to the following diagrams. Choose the value according to the base unit installation options. Take the wind factor in consideration; when in doubt choose the more conservative value.

DANGER

It is strictly prohibited to install the work platform with wall anchor interval superior to what indicated by diagrams here below. It is prohibited also to use the machine with a free height higher than here below indicated.



SINGLE MAST
ANCHOR CONDITION



TWIN MAST
ANCHOR CONDITION

4.1.2 Free column height allowed above the top anchor

Regardless of the anchorage type, the maximum column height allowed above the top anchor is 6 m (approx. 20 ft.) Always refer to the appropriate diagrams and take the wind factor in consideration. When in doubt choose the more conservative.

4.1.3 Assembly conditions in freestanding configuration

The equipment structure allows working in freestanding configuration (without any wall anchor) up to 6 metres (3 mast section plus terminal mast section)

In this configuration, the following limitations have to be taken into account:

- Max wind speed 12,5 m/sec
- Max lifting height 6 metres

In this configuration the equipment stabilisers must obligatorily be in 45° position.

DANGER

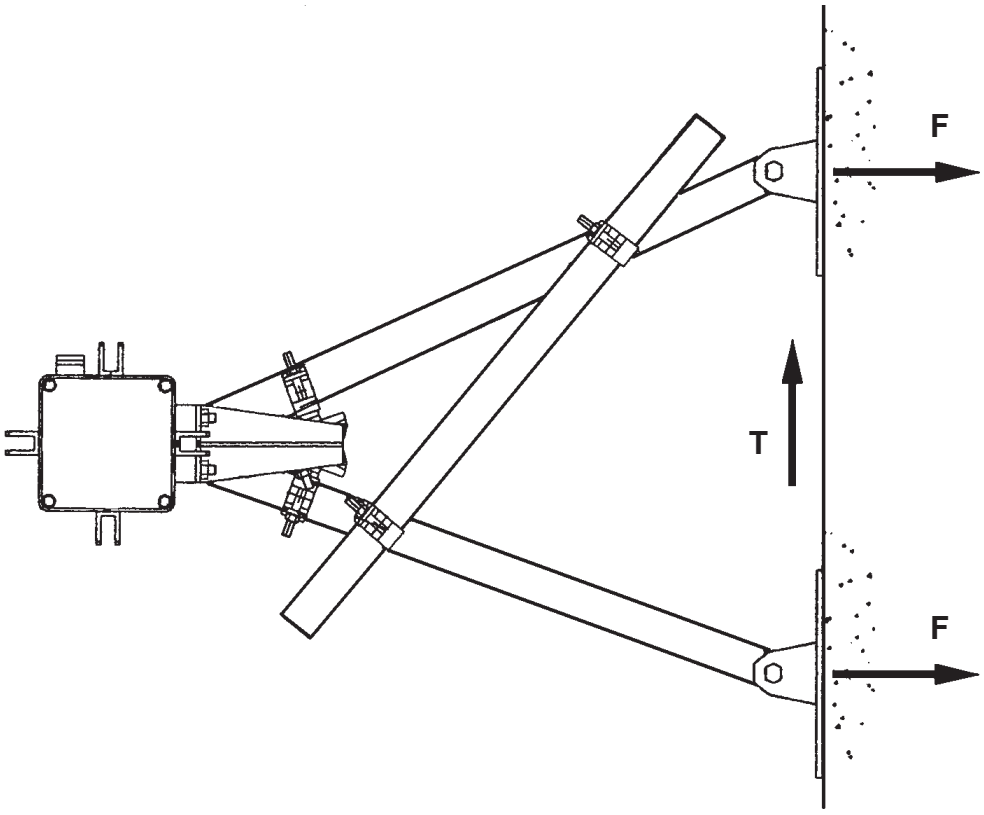
It is strictly forbidden to use the equipment in freestanding configuration if the above-mentioned conditions are not respected.

4.1.4 Forces on the wall anchors

Forces exercised on wall anchors are mainly due to wind conditions when the machine is out of service and when the machine in full load condition passes or stops near the wall anchor.
The building structure must be of course in condition to bear these forces. It is very important to use suitable expanding plugs according to the wall type.
In case the work platform will be anchored to the traditional scaffolding it is compulsory to verify its state and stability.

Here below we reported a scheme about forces exercised on wall anchor both in single and twin mast configuration. For a better comprehension see picture 4.4

TIE MAST INTERVAL		Max. forces exercises on wall anchor			
		SINGLE MAST		TWIN MAST	
Min. (m)	Max. (m)	**F (Kg)**	**T (Kg)**	**F (Kg)**	**T (Kg)**
3	**6**	**1096**	**882**	**1016**	**850**



PICTURE. 4.4

4.1.5 Anchorage types

The building part most appropriate for performing anchorage is a floor slab made of reinforced concrete. Such material allows performing a strong and sturdy anchor installation using extending plugs of adequate strength to support the hoist. The following example is for illustration purposes only: When M12 steel extending plugs are used (two pieces for each extension bar), the extraction forces are much superior to anchor withstanding reactions.

Solutions are available for special cases:

– When a building wall or oddly-shaped structures (windows, terraces, obelisks) Cannot resist the above-mentioned forces on the anchor;

– When special techniques are used, such as facade remodelling using isolating panels or glass panels.

In these cases anchorage of a yoke type is the solution that meets the construction requirements. Windows or internal metal beams can be used for anchoring. This type of anchorage is performed only when critical for the continuation of work.
In special anchorage cases, when only one plug is used per anchor bar, or when the extension bars are extremely elongated, it is necessary to use oversized plugs and a supporting traverse to make this type of anchorage as strong as it would have been under normal circumstances.

Consult with an expert and contact ELECTROELSA Technical Support to decide if a special on-site investigation to obtain an authorization.
ELECTROELSA disclaims any responsibility for unauthorized anchor installation, or if the installation is performed using inappropriate techniques even if those are approved by the builder. Consult ELECTROELSA Technical Support with special installation cases.

DANGER

Approximation during installation is a major and most frequent cause of accidents.

IMPORTANT ! ! ! It is a complete responsibility of the installation technician to: supervise and give proper operation instructions, provide safety procedures, assure the use of personal protection devices, use a proper location, control the quality of work such as using parts of proper diameter, drilling holes of proper depths, applying proper torque to bolts and nuts.

4.2 FOUNDATION FOR THE PLACEMENT OF THE EQUIPMENT

It is necessary to thoroughly inspect the future installation area and verify that it can withstand the pressure at the contact points. When the use of support legs does not guarantee adequate pressure distribution, special crossing panels or other adequate structures should be used. This operation is of fundamental importance. Support structure tends to subside thus impacting the column vertical orientation and pulling the anchors down. Such subsidence would present an imminent danger for the hoist stability. The technician must take this into consideration and operate according to the instructions in this manual. For example, a fully loaded hoist with a 50 m (approx. 16 ft. 5 in.) column generates pressure on the ground around 2.5 MPa. According to the practices used in civil engineering, the following pressure is considered acceptable:

for firm ground: 0.4 - 1.0 MPa;
for moving ground: 0.2 MPa.

To verify pressure during each particular installation refer to the equipment weight table and the appropriate foundation criteria.
A concrete slab or a metal pad must be used for installations with anchored base unit. The pad minimum dimensions are 2 m X 2.2 m (approx. 6 ft. 6in. X 7 ft 3 in.), the minimum weight is 1000 kg (2200 lbs.)

The concrete slab must be made according to the following requirements:
– Concrete must be well stirred;
– Finished surface must be horizontal and perfectly flat;
– The foundation must be of one of the types described below, depending on the desired raise of the pad above the ground level.

4.2.1 Concrete pad raised above the ground level

The concrete pad raised above the ground level has the following advantages and disadvantages:

Advantage: drainage is not necessary
Disadvantage: high threshold

4.2.2 Concrete pad on the ground level

The concrete pad on the ground level has the following advantages and disadvantages:

Advantage: drainage is not necessary
Disadvantage: high loading platform threshold

This is the most common type of foundation. A wooden or steel ramp is usually constructed to help reach the platform.

4.2.3 Concrete pad under the ground level

The concrete pad under the ground level has the following advantages and disadvantages:

Advantage: there is no threshold between the loading platform and the ground
Disadvantage: foundation corrosion when water drainage is not sufficient

This option requires an adequate ground drainage system.
It is very important to isolate the foundation from the ground around it or to prevent the surrounding ground from freezing.

CHAPTER 5

TRANSPORTATION AND MOVING

5.1 TRASPORTATION

Equipment modules are packed in the most compact way. Not all pieces can be packed in a container. Some of them, such as galvanized metal parts, are tied together with galvanized metal wire. This type of packing significantly facilitates equipment unloading. A crane or a forklift is required during unloading operations for safety and efficiency reasons. Such techniques help avoid equipment damages while unloading.
Only small parts and components are grouped together and packed in cardboard boxes. Moreover, the control panel, which constitutes the most delicate part of the equipment, is packed accurately with cellophane, and, when possible, put in a card box together with the other small components mentioned above.

It is a standard practice to join together modules of the same type. The platform modules are loaded as follows:

– Mast sections joined in groups of seven or nine (depending on the space available) are stowed first. Various packages are connected together with galvanized wire to further guarantee the load stability.
- Deck modules are loaded on the truck/container vertically due to their shape, and put besides mast sections;
- Drive unit(s) are loaded standing on their base frame.

After basic equipment is stowed, the accessories (such as brackets, anchor extension bars, anchor ramp fasteners, tool kit, stop bars, etc.) are placed in available remaining space. Accessories are packed in cardboard boxes so that a forklift could handle them during unloading. Such weight distribution allows the transportation vehicle to stabilize its centre of gravity in the middle and as close to the driving wheel axle as possible.

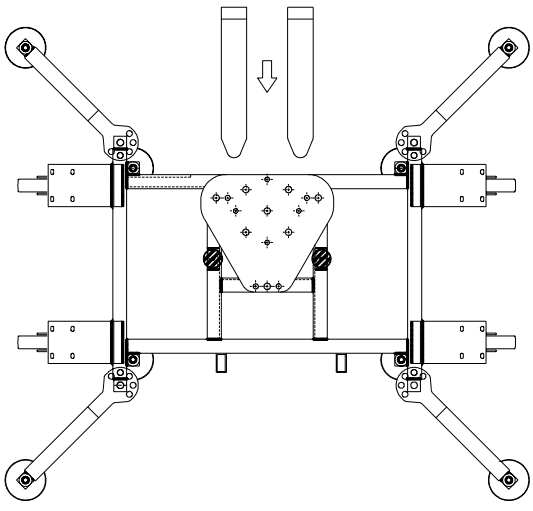
5.2 Moving

The hoist must be transported in accordance with the road and vehicle requirements even if it is moved between two neighbouring construction sites. For the initial equipment shipment ELECTROELSA uses a standard proven system to position various components on various types of vehicles. This system serves to match the load size with the appropriate type of vehicle for any shipment originating from the warehouse. This system provides instructions for equipment placement on a truck and inside a container. The following instructions are valid for all types of hoist moving during its operational life.

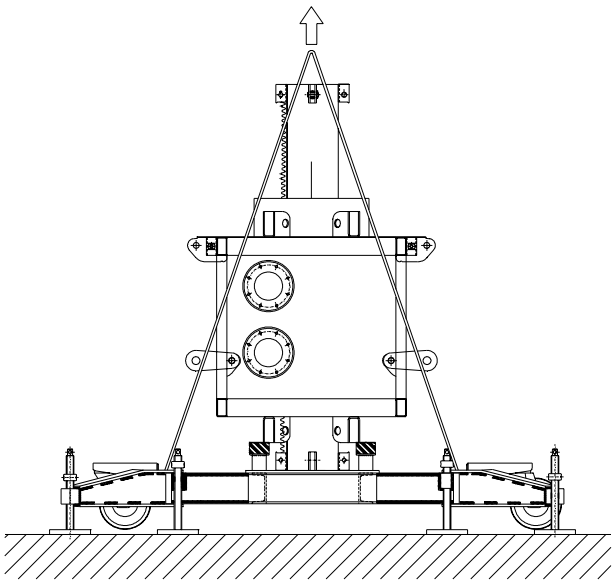
General criteria must be followed to avoid accidental equipment damage, especially during loading and unloading. Equipment can be severely damaged during these critical operations.

Moving personnel must follow the instructions below:

-- To move equipment, use a forklift as shown in fig. 5.1, or a crane as shown in fig. 5.2. The crane can be a part of the transportation vehicle or a separate unit. It is necessary to use the lifting equipment commensurate with the weights lifted.
-- Verify that the component or box being lifted will not accidentally pull up other segments or boxes.
-- If several packages of the same type are lifted together, assure that the integrity of the load is properly secured (for example, that the galvanized wire holding the load is of adequate strength).



PICTURE. 5.1



PICTURE. 5.2

— Do not use accessories such as eyebolts to facilitate equipment lifting. They can inflict structural damages on various components of the hoist.
-- If the control panel is not packed with other accessories, move it by hand, in order to prevent it from being crashed or damaged.
– Use appropriate and authorized strapping. Connect the straps correctly, according to each strap capacity.
– Avoid bumping the load against other elements of equipment or against the ground.
– Assure load stability when placing it on the ground.

Avoid shakes and jolts during lifting. Assure the right load placement on the ground to prevent damages to levelling screw jacks.

DANGER

It is prohibited for personnel to stay in the operating range of the crane (or forklift) while loads are being lifted and moved.

CHAPTER 6

INSTALLATION

6.1 INTRODUCTION

Assembly, use, and disassembly of the construction hoist have to by performed by qualified and trained personnel under direct control of the site **supervisor**. The supervisor has to assure that the above procedures are performed diligently in strict accordance with the instructions in this manual.

ATTENTION

Approximation during installation is a major and most frequent cause of accidents.

DANGER

All unauthorized personnel must not be allowed to use the hoist during the installation phase.

Inspect thoroughly all hoist components before each installation. Discard all broken, deformed, cracked, and corroded parts as unreliable.

The personnel qualified and trained to assemble, control, move, use, and disassemble the hoist must wear personal protection devices according to the hazards they are exposed to: gloves, hard hat, construction boots, safety harness.

During assembly perform the following operations on a constant basis:

– Control the exact placement of the structures and elements according to the installation instructions and drawings. Particularly observe horizontal and vertical measurements specified in the drawings.
– Verify if anchoring equipment and assembly platform railings are installed correctly. Follow all the drawings and instructions provided by the Manufacturer.
– Verify functionality and efficiency of the electrical, electro-mechanical, and mechanical safety devices required for equipment assembly, use, and disassembly.

Attention

Wind speed during installation must not exceed 12,5 m/sec

6.2 PRELIMINARY OPERATIONS

Before starting the installation of the machine, carry out the following operations:

- Delimitate the unload and installation area with a fence avoiding the access of unauthorised personnel. It is important to remind that installation operations take place at a determinate height from the ground; therefore accidental fall of components constitutes real danger for people on the ground.
- Verify the condition of the ground where the equipment is placed according to the indications given in the chapter of this manual dedicated to foundation for the placement of the equipment (4.3)
- Unload the truck by means of suitable elevating devices. If you use the forklift to unload the base unit, lift it from the base frame. Put forks between the base frame and the ground. In case you use a crane, put appropriate belts near levelling screw jacks (in four points) so that the machine is balanced.
- During unloading phase for no reason personnel should stand under hanging loads. In case of crane operations, only the operator is allowed to be near the load in order to place it on the ground (only when the load is 0,2 m from the ground). If operations are carried out by forklift, all personnel exception mad for the forklift driver, must keep away from the operation area. During these operation personnel must wear individual safety protection devices, such us hardhat, gloves, construction boots.
- Once the base unit is unload, unload the remaining parts and place them tidily in the delimitated area.

DANGER

Delimitate the unload and installation area with a fence avoiding the access of unauthorised personnel. Installation operations take place at a determinate height from the ground; therefore accidental fall of components constitutes real danger for people on the ground.

6.3 INSTALLATION DATA CHART

The installation data chart is an attachment of the manual. The trained person who carries out the installation must fill one copy of the chart. The name and address of the installer must be written in this chart. The above-mentioned copy when completely filled must be delivered to the job site supervisor or to the equipment owner.

REMARK

All check operations listed in the chart permit the operator a correct execution of all installation operation described in the following paragraphs.

The installation data chart is comprehend the following parts:

Part 1 Check of damage derived from transport and moving

- **DECK MODULES** ☐

Remarks.....

- **MAST SECTIONS** ☐

Remarks.....

- **GUARD RAILS AND PALTFORM ACCESS GATES** ☐

Remarks .....

- **BASE FRAME** ☐

Remarks .....

- **DRIVE UNIT** ☐

Remarks .....

- **CONTROL PANEL** ☐

Remarks.....

- **DECK ACCESSORIES** ☐

Remarks.....

Part 2 – Missing parts

- **DECK MODULES** ☐

Remarks .....

- **MAST SECTIONS** ☐

Remarks.....

- **GUARD RAILS AND PALTFORM ACCESS GATES** ☐

Remarks .....

- **BASE FRAME** ☐

Remarks .....

- **DRIVE UNIT** ☐

Remarks .....

-**CONTROL PANEL** ☐

Remarks .....

- **DECK ACCESSORIES** ☐

Remarks .....

Part 3 – Electric component check

- **ASCENT MICROSWICTH** ☐

Remarks .....

- **DESCENT MICROSWITCH** ☐

Remarks .....

- **LEVELLING MICROSWITCH (ONLY IN TWIN MAST CONFIGURATION)** ☐

Remarks .....

Part 4 – Check of the safety equipment

- **OVERRUN MICROSWITCH** ☐

Remarks .....

- **DESCENT OVERRUN MICROSWITCH** ☐

Remarks .....

- **ACCESS GATE MICROSWITCH** ☐

Remarks .....

- **EMERGENCY BUTTON** ☐

Remarks .....

Part 5 – Check of the brake release device

- **CHECKING OF DEVICE GAPS** ☐

Remarks .....

- **CHECKING OF COMPONENTS CONDITIONS** ☐

Remarks .....

6.4 ASSEMBLY

The work platform must adhere to the standards and regulations of the country where it is to be used. These regulations are of a generic nature and must be implemented based on each specific case. For assembly and operation of the work platform follow the procedures listed below.

ATTENTION

Only authorized and trained personnel must perform all assembly and disassembly work.

6.5 Assembly of the equipment

Before starting the installation, verify that the complete installation area, as well as the area along the deck, is completely free of any obstacle or juts fixed or mobile that could hamper the movement of the machine. Electric lines must be at least 5 m far from the equipment area.

Here below the assembly phases are listed chronologically:

- **Preparation of the installation area**
- **Positioning of the drive unit**
- **Deck modules connection**
- **Accessory assembly**
- **Control panel installation**
- **Definitive positioning of the machine**
- **Electric wiring**
- **Mast erection**
- **Levelling system installation**
- **Adjustment of the mechanical levelling device**
- **Adjustment of the electric levelling device**
- **Test of the levelling system in descent**

6.5.1 Preparation of the assembly area

As already said, the installation area must be free from obstacle, clean and as more levelled as possible. The safety of the installation phase strongly depends on the condition of the area; therefore take much care in preparing the installation zone.

6.5.2 Drive units placement

The drive units must be placed on the ground according to the installation layout. The drive unit weight must be evenly distributed on its support points. Please check the robustness of the support surface and in case the machine lays on a balcony or other surface, verify if the structure can bear the total weight of the machine.
In order to consider the total weight of the machine, use the following scheme. The scheme reports the total weight of the equipment at several heights. To this weight you have to add the nominal lifting capacity of the machine.

Platform height (m)	Platform weight "Kg" on each base frame **EP2818/6**	**EP2818/20**
3,00	**1117**	**1413**
6,00	**1211**	**1507**
9,00	**1305**	**1601**
12,00	**1399**	**1695**
15,00	**1493**	**1789**
18,00	**1587**	**1883**
21,00	**1681**	**1977**
27,00	**1869**	**2071**
30,00	**1963**	**2165**
33,00	**2057**	**2259**
36,00	**2151**	**2353**
39,00	**2245**	**2447**
42,00	**2339**	**2541**
45,00	**2433**	**2635**
48,00	**2527**	**2729**
51,00	**2621**	**2823**
54,00	**2715**	**2917**
57,00	**2809**	**3011**
60,00	**2903**	**3105**
63,00	**2997**	**3199**
66,00	**3091**	**3293**
69,00	**3185**	**3387**
72,00	**3279**	**3481**
75,00	**3373**	**3575**
78,00	**3476**	**3669**
81,00	**3561**	**3763**

Once the drive units (1) are placed, adjust the levelling screw jacks (2) making the base frame (3) levelled with the help of the suitable key. This is an important operation because the four screw jacks support the total load of the e equipment. A faulty levelling creates consequently a faulty distribution of weights, overloading some of them and creating damage to the structure.

Once the base frame is levelled, put the outriggers (6) (stabilisers) in position and block their screw jacks (5).

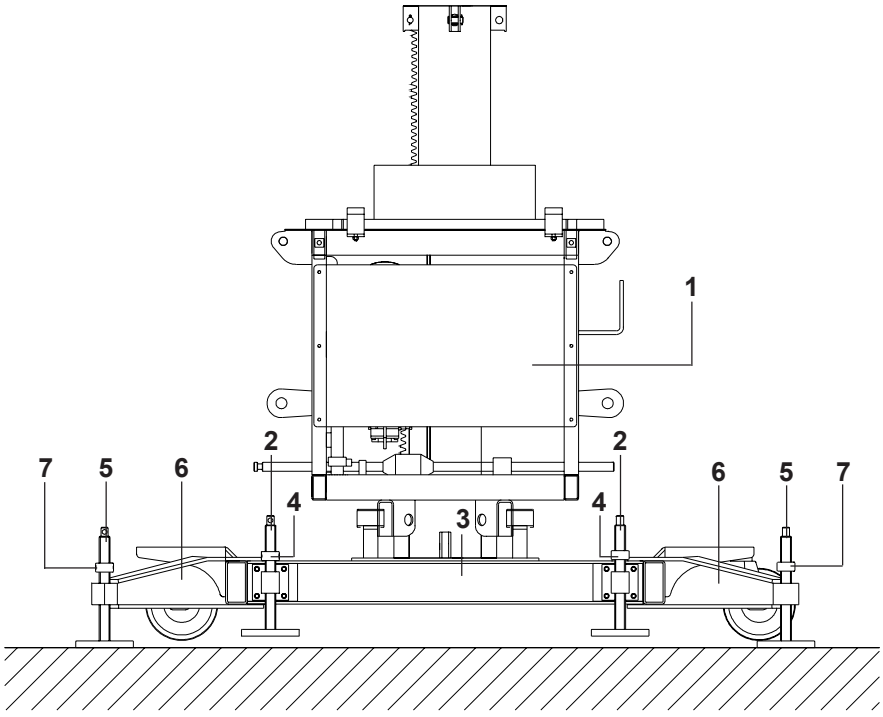
Outriggers have the only function to stabilise the machine, preventing it from capsizing in case of faulty operation situations (such as faulty distribution of weights, sudden wind blasts… ect.)

Therefore, the static weight must not rest on outrigger screw jacks, but on base frame screw jacks.

ATTENTION

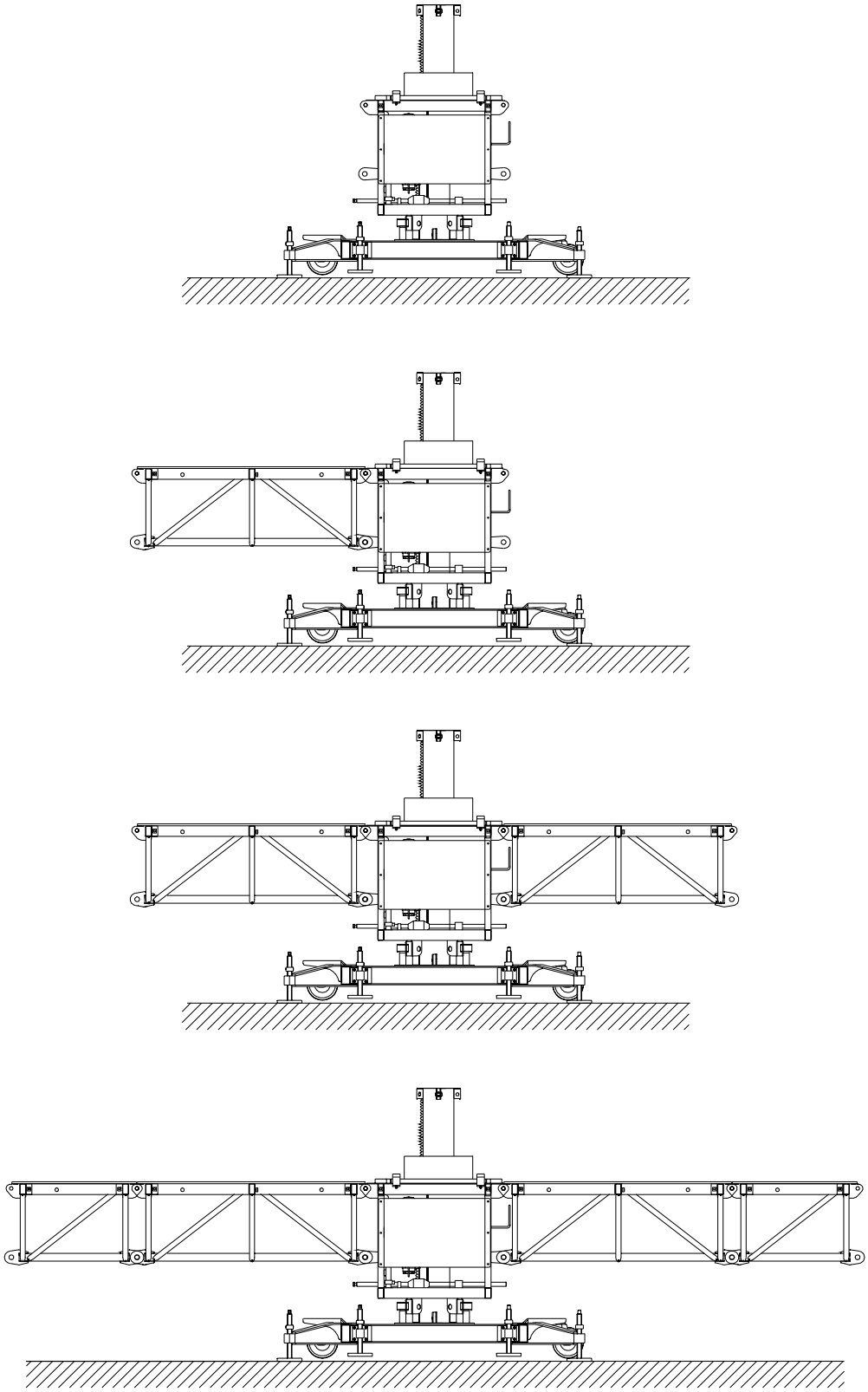
During installation, firstly adjust base frame screw jacks, secondly outrigger screw jacks. Do not change this order.

For a faster comprehension of the installation procedures, see drawings reported in the following chapters.

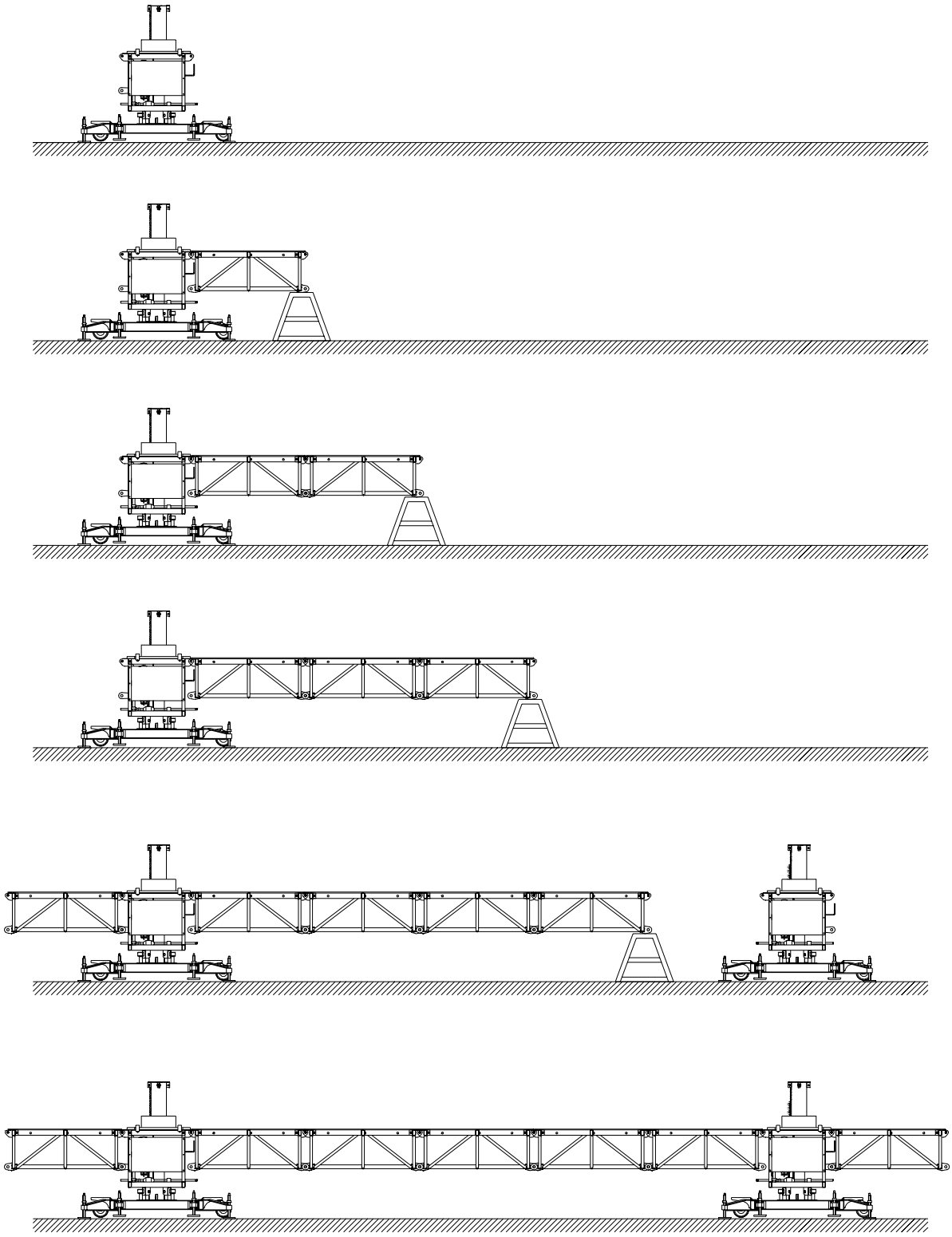


PICTURE. 6.1

6.5.3 Assembly sequence for the assembly in single mast configuration



6.5.4 Assembly sequence for the assembly in twin mast configuration



6.5.5 How to connect deck modules

Deck modules must be assembled according to the required configuration and following the assembly scheme and safety regulations explained in this manual.
Deck wings must not be necessarily of the same length, but it is important that each terminal deck module has its final guardrail.
As shown in the picture 6.2, deck modules are connected to the drive units and among each other by means of connecting pins (1) and safety pins (2).

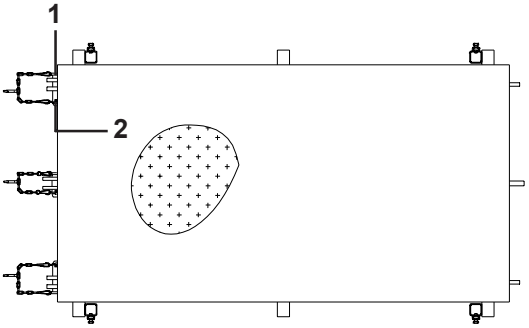
6.5.6 Accessories assembly

Once the assembly of the complete deck is finished and the deck is put in perfect horizontality and verticality in comparison to the wall, we can assembly accessories as shown in the picture 6.3.

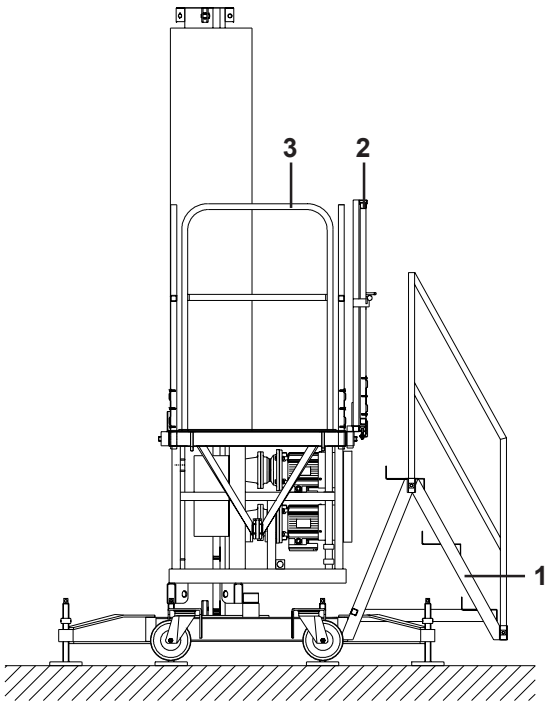
Place the access steps (1) in their apposite holes on the base frame and block it using its screws.

Unscrew bolts on each guardrail post, insert guardrails and screw them to prevent them from coming out from their seat.

Once you installed guardrails on the frontal side of the machine, install the protection fence on the façade side.



PICTURE. 6.2



PICTURE 6.3

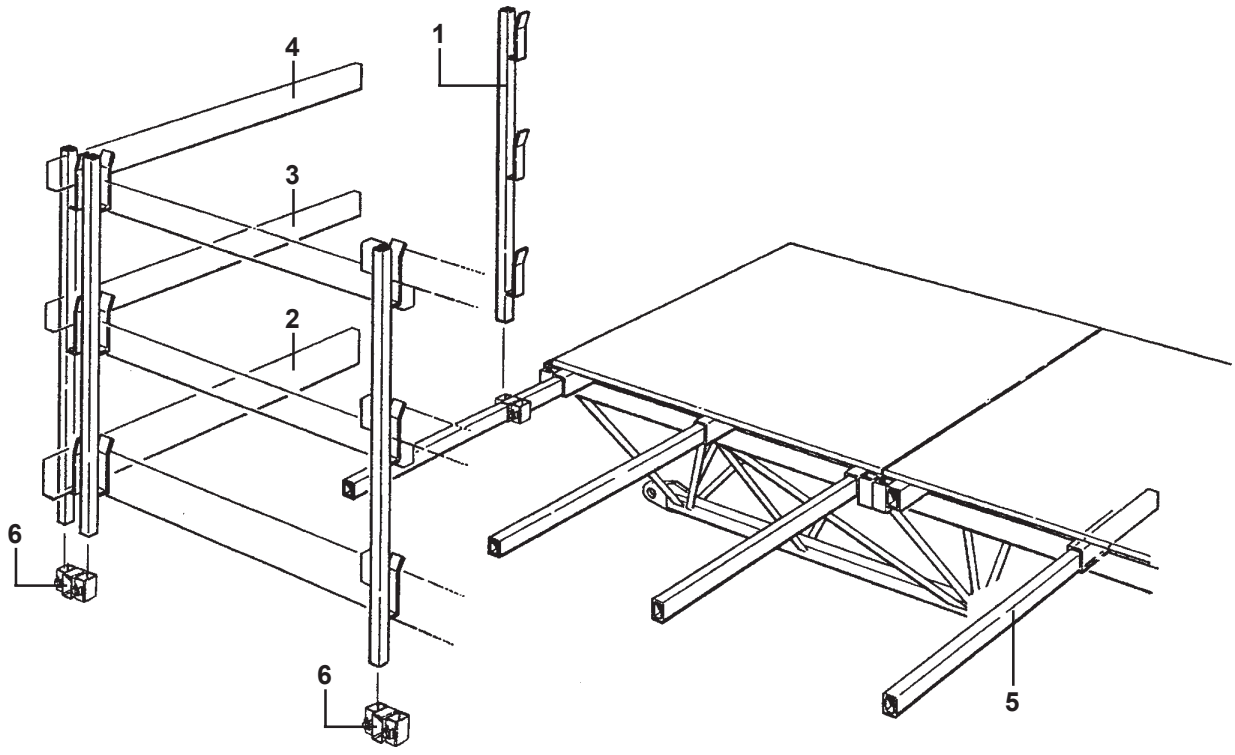
Protection guardrails on façade side are realising with the use of posts (1). These posts have three supports for wood tables (not provided by the manufacturer). By this system a parapet is reconstituted with upper (4), medium (3) and lower (2) (for feet) protections like the standard ones. Wood tables can be fixed in their supports with nails or screws (each allocation has a small hole for this purpose).

In order to get near to the building façade, in case the building structure requires the machine to be distant from the wall, you can use wall telescopic extensions (5). They can be extracted according to the required length and blocked with appropriate screws. In order to create the protection guardrail, use posts (1). Each post is inserted in its clamp (5). Clamps are fixed at the extreme points of telescopic wall extensions.

The wall extension floor can be made with wood tables according to the following characteristics:
- Appropriate thickness to bear the load, anyway not less than cm 4
- Width not less than cm 20
- The direction of wood fibres must be parallel to the longitudinal axe of the table.
- Wood table must be fixed tightly to telescopic extensions, preventing from moving or shifting. The fixing of tables to wall extensions must not diminish their resistance. It is not allowed to make holes and put crossing bolts on them.

Aluminium tiles for telescopic wall extensions are available on request.

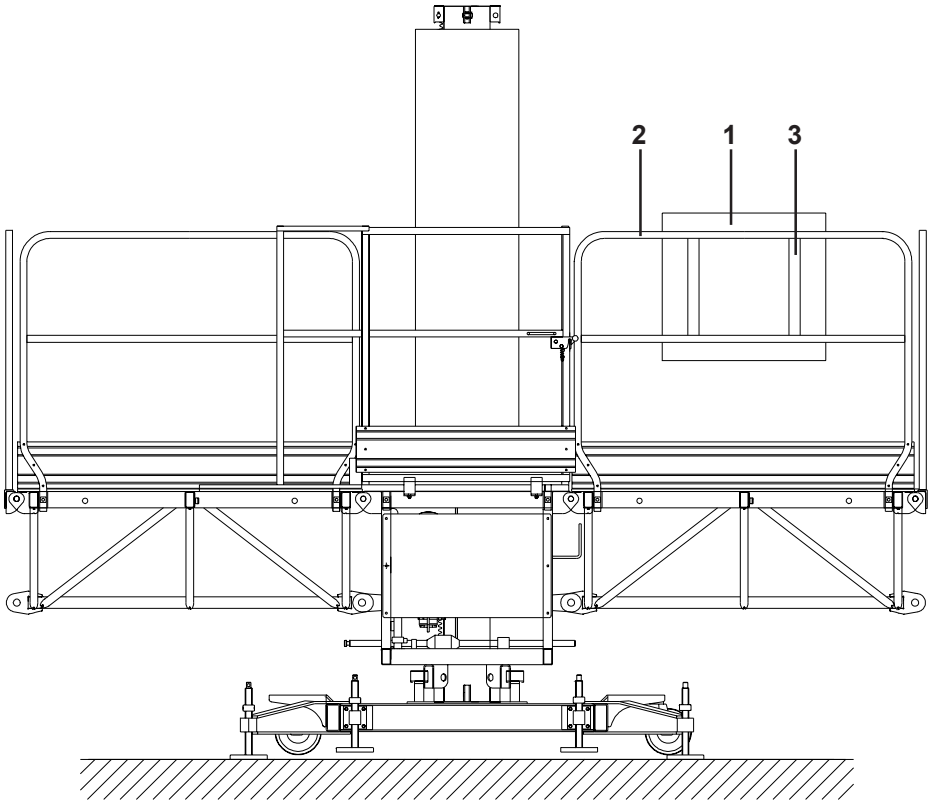
All these operation must be carried out at a maximum height of 2 m from the ground level.



PICTURE. 6.4

6.5.7 Electric panel assembly

Fix the control panel on a guardrail using apposite brackets.
Connect the drive unit to the control panel; making sure that the cable cannot get entangled in other components provoking serious damage.



PICTURE. 6.5

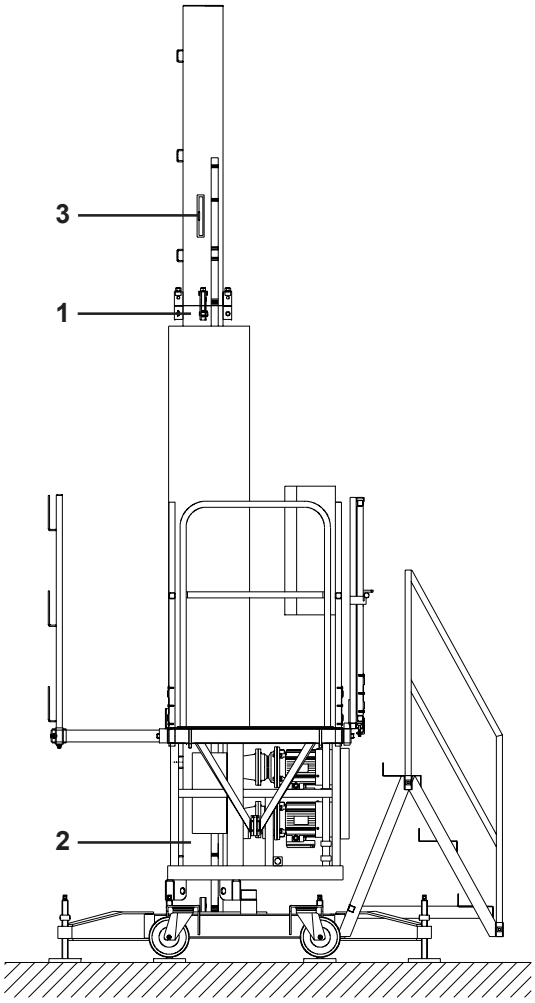
6.5.8 Definite positioning of the machine

The machine must be perfectly parallel to the wall and adequately distant from it.
Adjust base frame screw jacks putting underneath wood tablets of adequate dimension.
Put one mast section on the mast section fixed on the base frame and check the levelling with a spirit level.

ATTENTION

The vertical mast levelling is a very important operation. The mast must be absolutely vertical. Inclinations above 1 degree are not admitted.

Block base frame screw jack with their nuts, checking that all of them are touching the ground.
Before supplying power to the control panel, make sure that the earth wire fixed on the base frame is connected.



PICTURE 6.6

6.5.9 Electrical connection

Make sure that power supply is protected by means of a suitable magnetothermic switch and a differential switch.
Connect the control panel with the apposite power cable (it must be a pentapolar type, with three phases + ground + neutral, the sheath must be in pilyclorophene according to CEI 20/19 Tab. UNEL 35364/78)
Check that the incoming power tension is in accordance to the one required by the control panel. In any case, it is possible to adjust the 220-380 V selector inside the control panel itself. Check the motor connection.
Make sure that the red palm-push emergency button is released. Put the main switch in position 1. Before staring the machine, control the exactitude of indications put on command buttons. If the work platform moves wrongly adjust the inverter on the apposite plug on the control panel.

ATTENTION

As first control, try to move the machine downwards operating with the up and down lever.

6.5.10 Vertical mast section assembly

Before staring the assembly of mast sections, the user must verify the following points:

- All guardrails must be installed and as well as the protection fence on façade side.
- Telescopic wall extensions, if extracted, are tightly fixed.
- Try the functioning of the overrun micro switch and the descent limit switch.

Having done this, load on the work platform all components to reach the height of the first wall anchor (mast sections, wall anchor frame, wall extensions and expanding plugs).
Start to climb and the assembly of mast sections. Mast section assembly must be performed by trained person.

ATTENTION

The maximum number of mast sections and wall anchors admitted on the work platform while assembly is:

- **For single mast configuration: 4 mast sections and 1 wall anchor**
- **For twin mast configuration: 8 mast sections and 2 wall anchors**

Insert the mast section (1) in its seats (2) and bock it with eyebolts (3) already assembled on the lower mast section. After having assembled the third mast section, make the first wall anchor. After that, you continue the mast section assembly, anchoring the mast each 6 metres. The wall anchor is composed of the anchor frame to be fixed on the mast section and two extensions pipes to be fixed with orthogonal clamps of 48 mm. Before fixing the wall anchor, make sure that the vertical mast is in exact verticality.

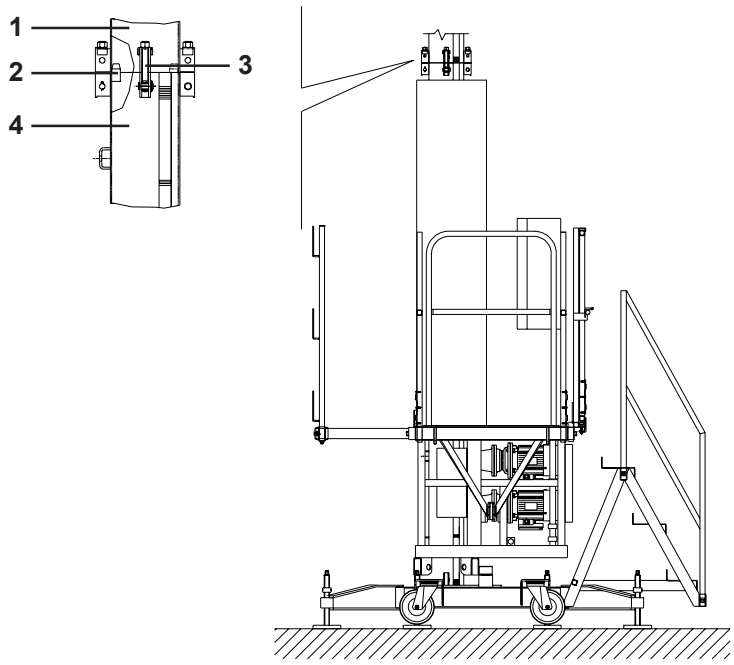
Check that the four base frame screw-jacks are all touching the ground before going on with wall anchors

DANGER

The equipment is not provided with an anti-collision device. The runway of the work platform must be always under control.

DANGER

Inaccurate valuation of installation conditions is the most frequent cause of accidents.



PICTURE. 6.7

Continue the mast section assembly till the height required, putting as last mast section the one painted in red (terminal mast section). The terminal mast section has the rack welded only in the lower part and it is already equipped with ascent limit tab.

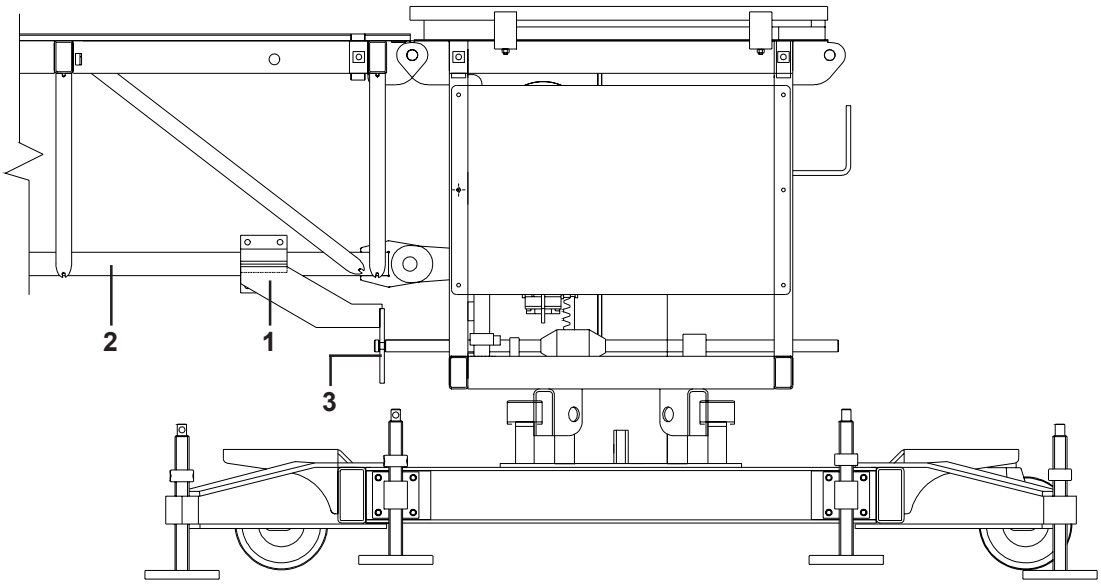
Lubricate the rack with grease. Assemble the mast guard screwing it to the floor of the drive unit.

Execute the final test following the instructions of this manual and filling the installation chart attached to the manual.

6.5.11 Levelling system installation

The work platform is equipped with a mechanic and electric levelling system. The mechanic levelling system controls the levelling in case of emergency descent made through the manual release of the motor brakes. The electric levelling system keeps the platform levelled during its normal use in ascent and descent.

In order to connect this device, firstly you assemble the bracket (1) on the lower beam of the deck (2) inserting and blocking it into its seat (3) on the levelling device lever.



PICTURE. 6.8

6.5.12 Mechanical set up of the levelling device

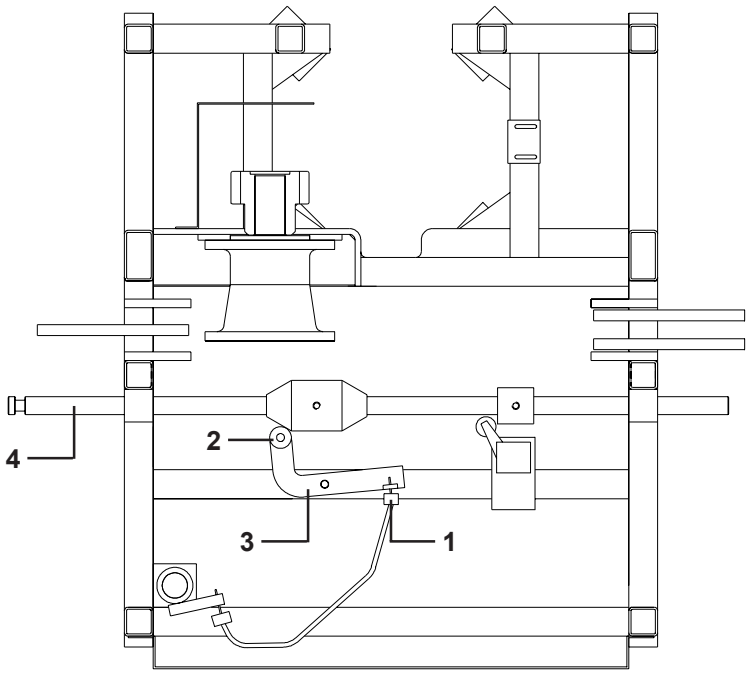
For the mechanical set up of the levelling system, look at the picture 6.9 and follow the following instructions:

- Control levelling of the central span putting a spirit level in its centre. Level the work platform blocking one of the two drive units with the buttons on the control panel.
- The levelling system bracket that acts on the levelling system rod must be screwed on the lower batten of the deck module.
- Adjust the connection wire with the connecting screw (1) on the levelling group. Make sure that the gap between the ring (2) of the lever (3) and the levelling system rod is at least 1 mm when the brake release lever is completely pulled.

NOTE

The installation of the levelling system mast be carried out when the platform is completely lowered and laying on the buffers on the base frame.

- Check the gap between the ring (2) of the lever (3) and the levelling system rod because if it is too tight you can not release motor brakes.



PICTURE. 6.9

With reference to the picture 6.10, carry out the following actions to adjust the levelling system:

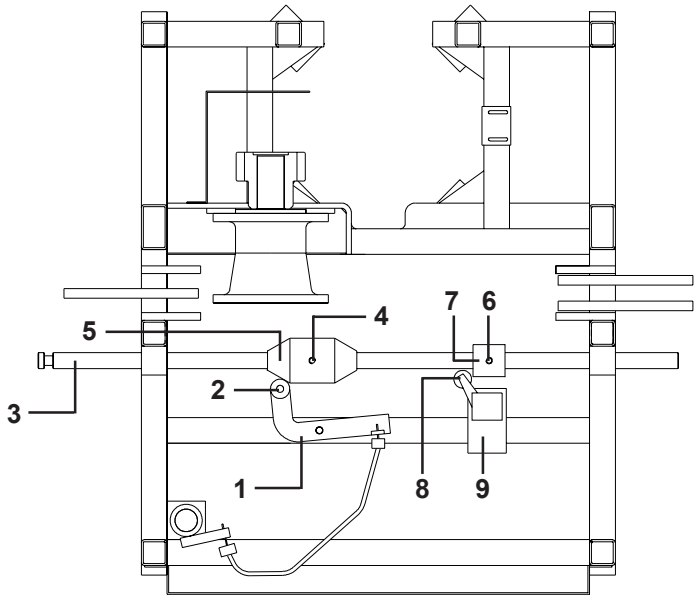
- Push the lever (1) with the hands so that the ring (2) would touch the levelling rod (3), than shift left (or right) the cone-shaped cam(5) by loosening the screw (4)till it touches the ring (2) of the lever.
- Block the cone-shaped cam in this position tightening the screw.
- Carry out the same operations on the other drive unit.

NOTE

By correctly adjusting the left and right cone-shaped cams on the levelling system rods the work platform will be constantly levelled.
The levelling device has a tolerance of 3°.

6.5.13 Electric set up of the levelling device

- with the central span in perfect horizontality, adjust the cylinder cam (7) loosening the screw (6) and shift it till it touches the wheel (8) of the micro switch (9)
- Block the cylinder cam in this position.



PICTURE. 6.10

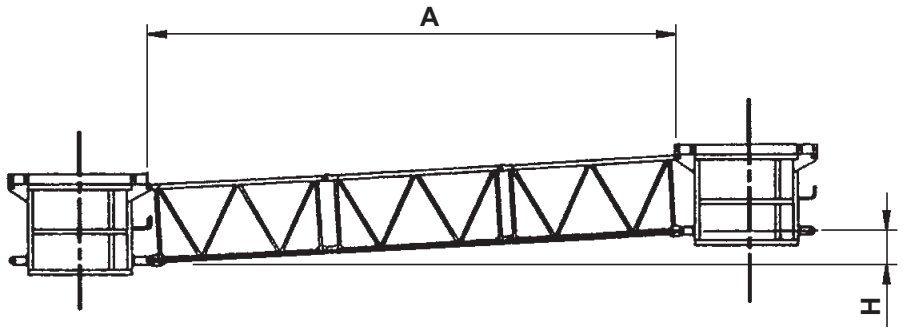
6.5.14 Check test of the levelling device in descent

After the installation and the mechanical set up of the levelling device from the ground, it is necessary to test it in descent.

- Lift the platform at 3 metres above the ground level.
- Put the main switch in position O (zero)
- Check with a spirit level the horizontality of the central span.
- With a marker make a sign on the mast section indicating the height of the drive unit.
- Under this sign, make another mark indicating the maximum height difference admitted between the two drive units according to the scheme here below:

Central span lenght A (m)	Max. allowed difference H (mm)
6	314
7,5	393
9	471
10,5	550
12	628
13,5	706

— Release the brakes with the help of the apposite key till the levelling system gets in action and stops the descent.
---- Verify signs on the mast. The drive unit should not have gone beyond the lower sign.
----If that happened, carry out again the mechanical adjustment of the levelling device.



PICTURE. 6.11

After the installation and the electrical set up of the levelling device from the ground, it is necessary to test it in descent.

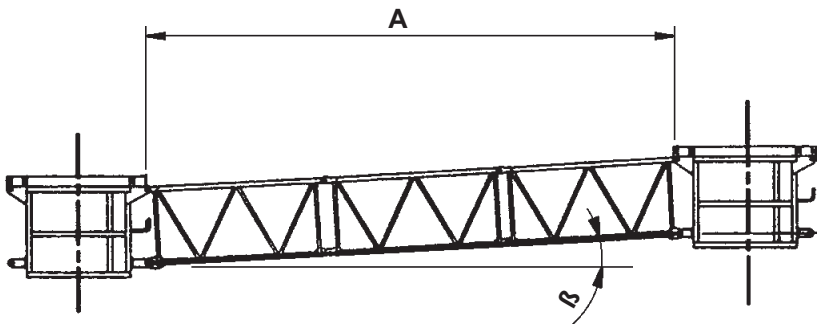
- Lift the work platform and verify that the maximum tolerance is never overstepped. The maximum tolerance (height difference between the two drive units) admitted, expressed in degrees is indicated on the following scheme and in the drawing 6.12.

Central span lenght A (m)	Max. difference ß (degree) - H (mm)
6	**1° - 104**
7,5	**1° - 130**
9	**1° - 157**
10,5	**1° - 183**
12	**1° - 209**
13,5	**1° - 235**

— If the height difference between the two drive units exceeds what admitted, carry out again the electrical adjustment of the levelling device.

DANGER

Stop immediately the test if this if the height difference between the two drive units exceed what admitted as shown in the table above. Carry out again the electrical adjustment and if necessary contact ELECTROELSA technical department.



PICTURE. 6.12

6.6 DISASSEMBLY OF THE MACHINE

When you need to move the work platform from a job site to another it is necessary to disassemble the machine. In order to do that you have to perform all assembly actions backwards, observing the following indications:

- disassemble mast sections gradually on both sides (left and right mast)
- disassemble wall anchors gradually on both sides (left and right mast)

ATTENTION

-----The maximum number of mast sections and wall anchors admitted on the work platform while assembly is:

- **For single mast configuration: 4 mast sections and 1 wall anchor**
- **For twin mast configuration: 8 mast sections and 2 wall anchors**

- do not throw down components, but bring them down on the work platform

CHAPTER 7

COMMAND AND CONTROL UNITS

7.1 Control panel

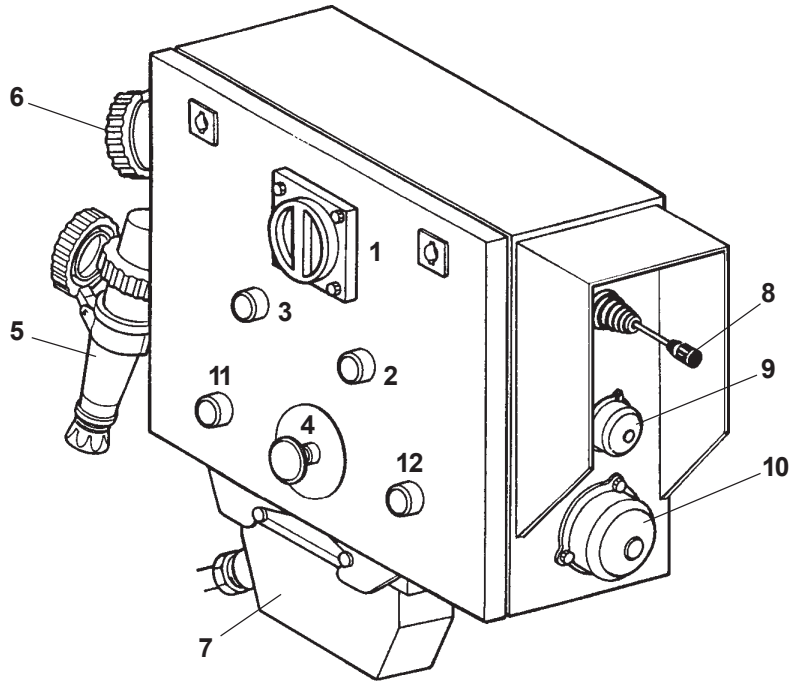
Buttons and devices placed on the control panel allow the operator to command the machine in all its functions.

The control panel is composed as follows:

1- **Main switch with door block**
2- **Motor fault light indicator**
3- **Power presence light indicator**
4- **Red palm-push emergency button**
5- **Power plug**
6- **220 V power plug for tools on board**
7- **Connector**
8- **Up and down lever**
9- **Warning siren**
10- **Alarm siren**
11- **Left levelling**
12- **Right levelling**

7.1.1 General electric switch with panel door lock

The main switch of a padlock type shuts off the electric power to the work platform when set to "0."
The main switch blocks the control panel door in its closed position under normal operating conditions. When set to "0," the switch safely stops the work platform for maintenance.



PICTURE. 7.1

7.1.2 Light indicator for thermo switch intervention

This light signals a faulty absorption of the motors. When the light is on, it means that save-engine thermo protections intervened. These devices once they intervened, they reset automatically therefore, when the light indicator turns off and the machine can be newly operated.

7.1.3 Power presence light indicator

When this light is on, the machine has its power supply and can consequently be operated.

7.1.4 Emergency stop palm-push button

It is a safety device that when pressed cuts immediately the power supply to the control panel. Once activated to bring the machine back to use, rotate it rightwards.

7.1.5 Power plug

Its function is to give power to the machine. It is of the type “phase inversion”, in case this type of operation is necessary, see instructions near the plug.

7.1.6 Power plug for tools on board

It is to supply power to tools on board. It is very useful during assembly as well to avoid the use of long wire extension for the electrical wrench.

7.1.7 Connectors

They electrically connect and supply power to the two drive units. By disconnecting them at the end of the work day, the control panel can be stored in safe and dry place.

7.1.8 Up and down lever

It is a dead-man control. When pushed upwards the machine moves up and when pushed downwards the machine descents.7.1.2 Lampada di segnalazione intervento

7.1.9 Warning siren while descending

The machine emits an intermittent beep- beep sound while descending. It is a very important device to warn people around the machine that the platform is moving especially when operators on board do not have a clear sight of the ground underneath.

7.1.10 Alarm siren while setting in motion

The machine emits a long beep before moving (up or down). The duration of the beep can be adjusted by means of a timer inside the control panel. This is an important device to advise all operators on board that the machine is going to move.

7.1.11 Left levelling button

The button cuts the power to the left drive unit, in order to execute levelling of the central span.

7.1.12 Right levelling button

The button cuts the power to the right drive unit, in order to execute levelling of the central span.

CHAPTER 8

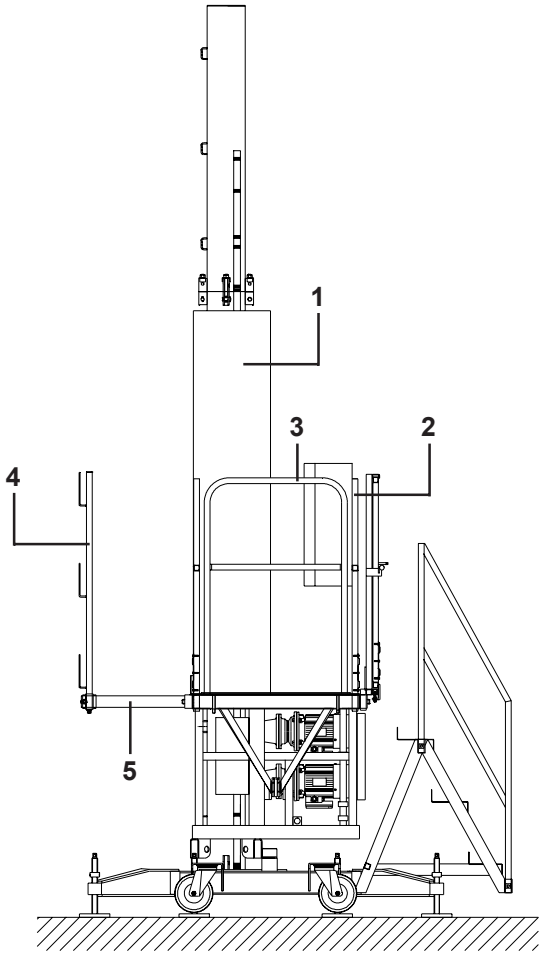
SAFETY REGULATIONS

8.1 Safety Equipment Description

The vertical mast on which the pinion engages the rack is protected by a net panel (1) fixed on the floor of the base unit.
To prevent operators to fall from the platform, guardrails are fixed all along the platform perimeter. Guardrails are of three types: standard side guardrails (2), right and left terminal guardrails (3) and protection guardrails on facade side (4) that are realised with the use of posts fixed on clamps on wall extension (5) and horizontal wooden tables.

DANGER

It is forbidden to use the machine without the above mentioned protection systems. It is forbidden to substitute these system with alternative types not in accordance to local regulation.



PICTURE. 8.1

8.2 Safety Devices

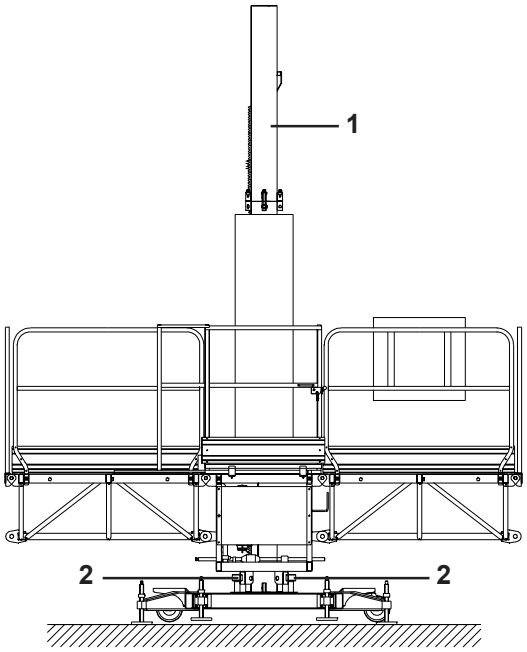
The work platform is equipped with the following safety devices:
- mechanic devices
- electro mechanic devices
- electric devices

8.2.1 Mechanic safety devices

The work platform is provided with the following mechanic safety devices:
- terminal mast section with the rack welded only in the lower part
- buffers on the base frame

The terminal mast section (1) is the one painted in red that must be installed on the top of the vertical mast. On the terminal mast section the rack is welded just on the lower part. In case the up limit switch and the overrun limit switch would not function , the pinion stops anyway to climb because the rack is interrupted. When the machine stops because of this device, the operator on board will notice an abnormal noise and consequently notice what happened.

Buffers (2) placed on the base frame amortize the impact in case of faulty operation or free fall.



PICTURE. 8.2

8.2.2 Electro mechanic safety devices

The work platform is equipped with two epicycloidal geared motors of 1.5 kW each. Each geared motor alone is able to carry and stop the work platform, therefore one of them functions exclusively as a safety device.

8.2.3. Electric safety devices

The work platform is equipped with several function and safety micro switches. Function micro switches operate during the platform normal use (ascent, descent and levelling). Safety micro switches are the followings:

- Assembly Overrun micro-switch
- Bottom overrun limit switch
- Door lock safety micro switch

The machine is moreover equipped with a red palm-push emergency button.

ASSEMBLY OVERRUN MICRO-SWITCH
This device is composed of a wheel micro switch that runs on the vertical mast. If this wheel micro switch does not detect the presence of the mast, it cuts immediately the power to the motors and prevents the drive unit to come out of the mast. Once this device intervened, there are two way to put the machine in function again:

- Release the brakes manually for a short trait
- Pull towards you the wheel micro switch bracket as if the mast section is present and press down the operation lever to perform descent.

This device can be used as normal overrun micro switch in case of particular installation where the terminal mast is not assembled.

BOTTOM OVERRUN LIMIT MICRO SWITCH

This micro switch is fixed on the lower part of the drive unit together with the descent limit switch. The two micro switch are practically identical but the bottom overrun limit micro switch is placed higher and it intervenes and stop the engine only if the descent micro switch does not function and the platform continue its descent.

This device intervenes in the following cases:
- When the descent micro switch is broken
- When the platform slips down a little bit before definitely stopping. This normally happens when motor brakes worn.
- When we perform manual descent by releasing the brakes and the machine stops on base frame buffers.
- In case of inverted phase. The machine moves contrarily and when you try to start it, it moves down instead of climbing.

DOOR LOCK SAFETY MICRO SWITCH

This microswitch is placed on the access sliding door. The micro switch is placed under the platform gate and determinates if the door is open or closed. In case the door if open, the micro switch cuts the power to the main control panel. If this happens check the integrity of the micro switch and the correct positioning of the access gate.

RED PALM-PUSH EMERGENCY BUTTON
The emergency button is placed on the control panel. If activated, it cuts power to the main control panel. Once activated it remains pressed and in order to release it you need to rotate it rightwards.

8.3 LIST OF SAFETY WARNING SIGNS AND PLATES OF THE EQUIPMENT

There are safety-warning signs on the most dangerous parts of the equipment. Their warning messages are listed below (refer to fig.8.2):

Exclamation sign
1 - General danger. Consult the instruction manual for maintenance, adjustment, specifics of use, etc.

Gear sign
2 - Danger posed by moving parts. This sign indicates that chains, gear, and other moving parts are located inside the unit.

Glove sign, hearing protection sign, boot sign
3 - Personal protection is necessary. This sign requires wearing of personal protection devices (gloves, hearing protection, construction boots).

“Hand between plates” sign
4 - Danger. Hands can be cut off or trapped. The operator’s hands may be cut off or trapped if placed in closed proximity of this equipment.

“Hook with arrow “sign
5 - Use the spot indicated. This sign indicates the right spots to use for equipment lifting (to insert the forklift blades or to hook up lifting straps).

8.3.1 Installation plate on single mast configuration

GRUPPO Electroelsa

ELECTROELSA s.r.l. Via Pisana, 18/20/22 - 50021 Barberino val d'Elsa (FI) - Italia
Ph.+39-0558078367/368 - Fax +39-0558078479

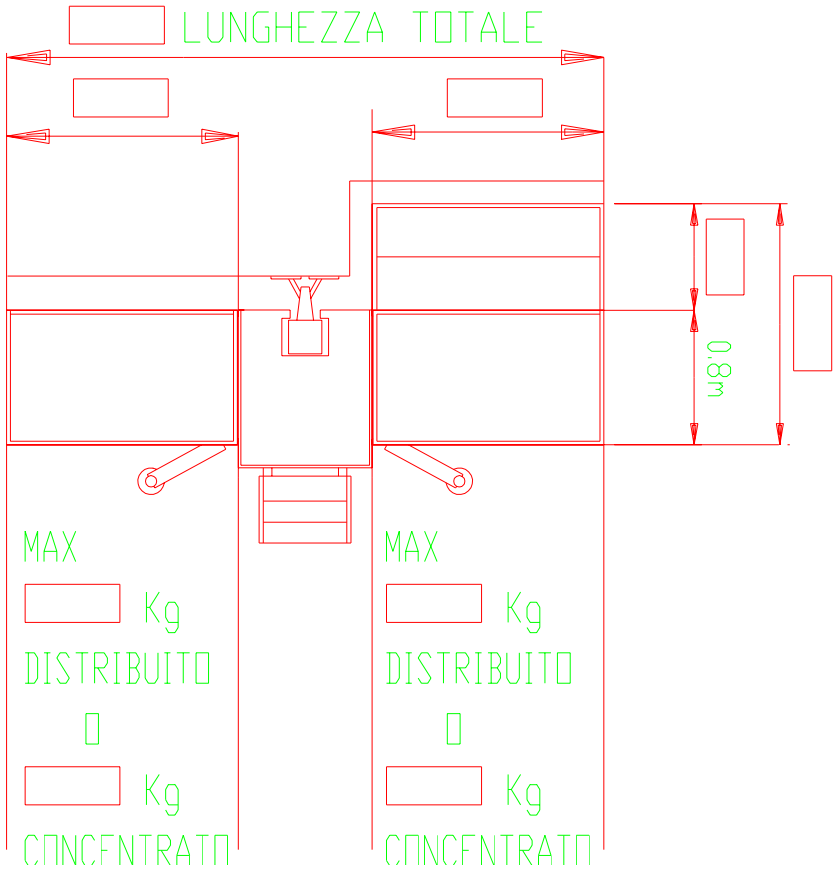
WORK PLATFORM EP - 2818/6

PLATFORM N°. _ _ _ _ **OVERALL LENGHT _ _ _ _**

MAX. LOAD _ _ _ _ **PLATFORM WEIGHT _ _ _ _**

MAX. NUMBER OF PERSON ALLOWED ON PLATFORM_ _ _ _ _ _

SUPERVISOR SIGNATURE _



8.3.1 Installation plate on twin mast configuration

ELECTROELSA s.r.l. Via Pisana, 18/20/22 - 50021 Barberino val d'Elsa (FI) - Italia
Ph.+39-0558078367/368 - Fax +39-0558078479

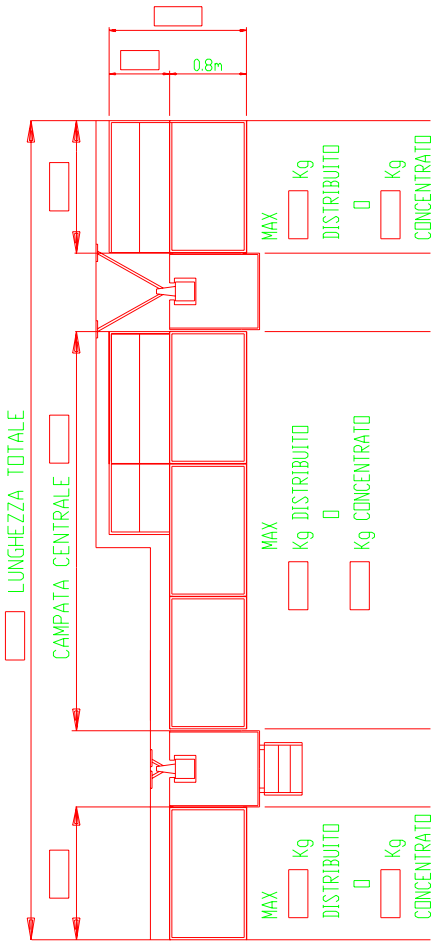
WORK PLATFORM EP - 2818/20

PLATFORM N°. _ _ _ _ **OVERALL LENGHT _ _ _ _**

MAX. LOAD _ _ _ _ **PLATFORM WEIGHT _ _ _ _**

MAX. NUMBER OF PERSON ALLOWED ON PLATFORM_ _ _ _ _ _

SUPERVISOR SIGNATURE _



8.4 Fundamental safety provisions

Over the years a series of accidents have been registered during assembly and disassembly of rack and pinion lifting equipment. These accidents were caused by human factor, such as negligence in obeying the safety regulations or lack of common sense. This document is for all personnel and other workers involved in assembly and disassembly operations, or those assisting them.
For example, if a worker leans out of the moving assembly platform opening a cable guide rack or a wall anchor on the way can hit him. Another example is incomplete tightening of the trellis bolts. Such negligence can cause the trellis sections to separate and platform fall resulting in injuries and possible fatalities.
Many other examples can be cited. To avoid such accidents read thoroughly the instructions in this manual. Do not put yourself in danger; operate the equipment properly.

8.4.1 General safety regulations

Follow the procedures listed below during equipment installation, operation, and maintenance:

– Read all instructions and warnings. Pay attention to danger signs.
– Keep the operating area clean. Remove oil spills to avoid accidental tripping. Reduce the risk of stumbling by removing unnecessary materials (disassembled equipment parts or other) from the operating area.
– Do not move the platform if a person is inside the base enclosure, on the trellis, or on an anchor. During these operations the main power has to be shut off.
– Complete one part of work before starting another or taking a break. This is particularly important for installation operations while trellises are being mounted, or anchors and other structures are being installed.
– Apply the required torque when tightening bolts (it is also advisable to use a dyno wrench), as indicated in the appropriate specifications table.
– Stop equipment operation immediately after noticing any structural damage or significant corrosion of column sections or trellis anchorage. The damage must be identified and repairs performed before the hoist can be operated again (these operations must be performed by authorized and trained personnel, or ELECTROELSA Technical Support must be contacted).

8.4.2 Local safety regulations
Strictly adhere to all national safety regulations of the country where the equipment is installed

8.4.3 Environmental conditions
Lifting equipment must not be assembled or disassembled if the wind force exceeds 12.7 m/sec (27.5 mph) or as specified in a more restrictive local regulation.

8.4.4 Procedures before installation
To correctly install lifting equipment, the operator must perform the following procedures:

– Study thoroughly the operation and maintenance instruction manual before starting the work.
– Clearly mark the assembly/disassembly area, or surround it with a fence. Unauthorized personnel, as well as visitors not wearing personal protection devices must not be allowed in this area.
– Access to the work platform by unauthorized personnel is strictly prohibited during assembly, disassembly, and operation

8.4.5 Personal protection requirements
Operators must wear personal protection devices such as hard hats, construction boots, safety harness, and other items required by safety provisions for a specific operation.

DANGER
It is forbidden to work on the platform without individual protection devices as described above

8.4.6 Requirements for electrical equipment handling
Only competent personnel are allowed to perform work on electrical equipment. Electric power must be shut off before starting these operations. Measures must be taken to prevent others form inadvertently turning on the power while this work is performed

8.4.7 Spare part regulations
Only original or other authorized spare parts can be used with this equipment. The original spare parts must be provided by ELECTROELSA Technical Support.

8.5Instructions about maximum loads admitted

The capacity of the work platform musts be in accordance to its configuration and to load diagrams reported here below.
The supervisor musts verify the platform configuration and consequently expose the load diagram plate.

DANGER

It is forbidden to put loads on the floor of wall extensions. Only operators are admitted on this surface. See picture 8.3

The weights indicated refer only to materials transported on board. To this load you need to add the operator weight.:

- Single mast configuration: 2 operators admitted (weight esteemed 240 kg)
- Twin mast configuration: 4 operators admitted (weight esteemed 400 kg)

ATTENTION

It is recommended to evenly distribute loads on the platform in order to reduce wear of rollers running on the vertical mast.

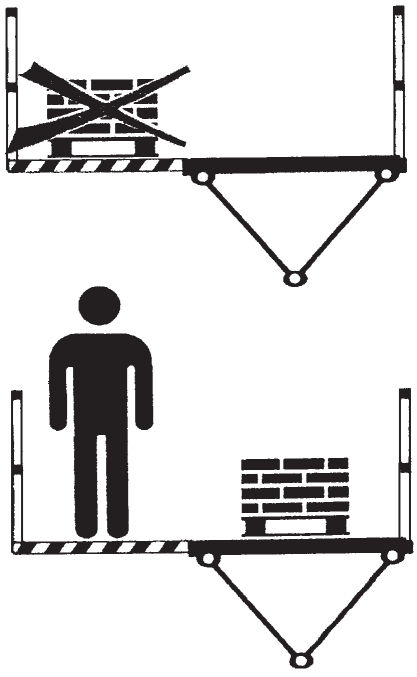


Fig. 8.3

8.5.1 Maximum load admitted on single mast configuration

The following loads listed in the diagram do not include operators' weight. Normally for two operators and their equipment we consider 240 kg.

Loads with wall extensions extracted 0.8m

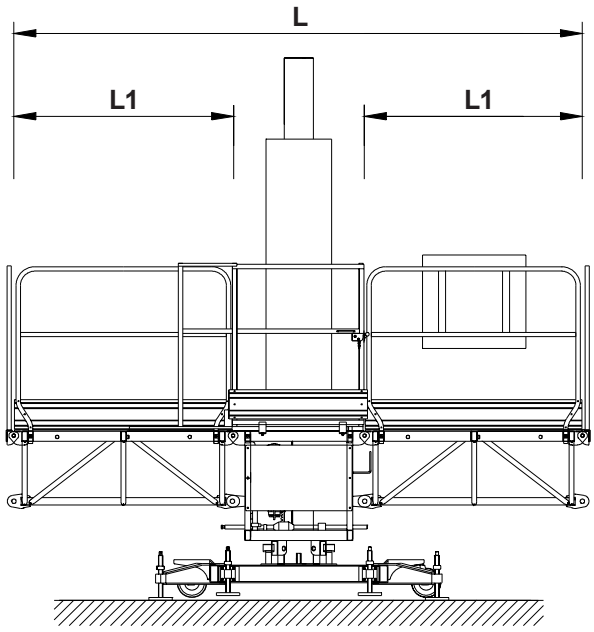
L (m)	L1 (m)	Q1 (Kg)	Q (Kg)
2,54	0,82	600	1200
3,9	1,50	350	700
5,54	2,32	150	300

Loads without wall extensions

L (m)	L1 (m)	Q1 (Kg)	Q (Kg)
2,54	0,82	625	1250
3,9	1,50	375	750
5,54	2,32	175	350

Keys:

L(m) Total length of the platform expressed in metres
L1 (m) Side wing length expressed in metres
Q1(kg) load admitted on each side wing expressed in kilograms
Q (kg) Total load admitted on the platform expressed in kilograms



PICTURE. 8.4

8.5.2 Maximum load admitted on twin mast configuration

The following loads listed in the diagram do not include operators' weight. Normally for four operators and their equipment we consider 400 kg.

Keys:

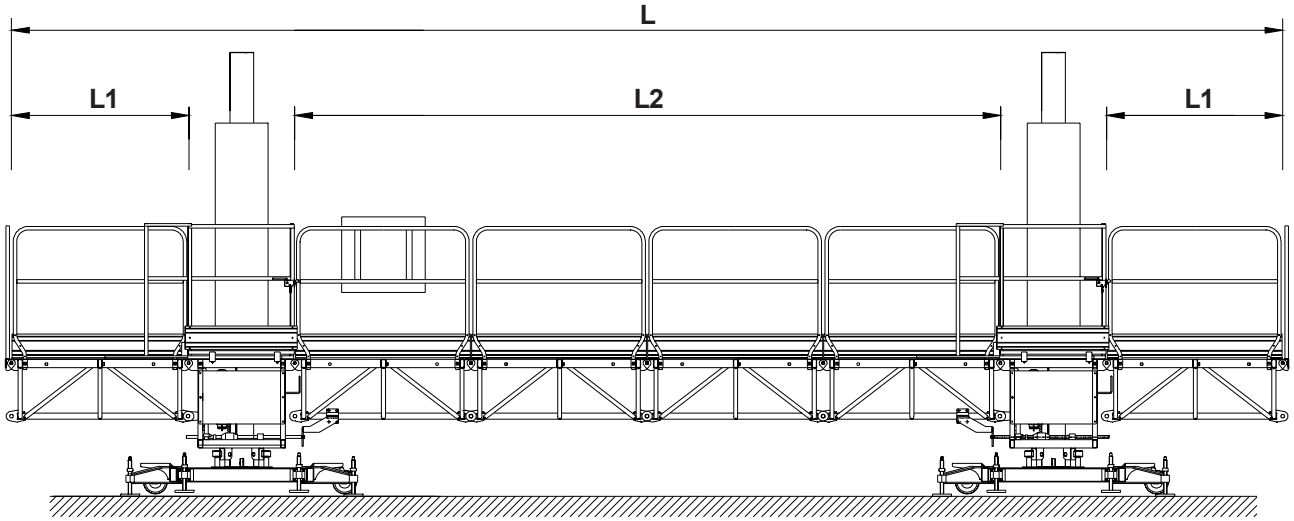
L(m) Total length of the platform expressed in metres
L1 (m) Side wing length expressed in metres
L2 (m) Central span length expressed in metres
Ext (m) Wall extension length expressed in metres
Q1(kg) Load admitted on each side wing expressed in kilograms
Q2 (kg) Load admitted on central span expressed in kilograms
Q (kg) Total load admitted on the platform expressed in kilograms

NOTE

All data, such as maximum height, maximum loads admitted, operators adimitted on board, refer exclusively to standard installations and usage and do not refer to extraordinary usage or unconventional installations.

ATTENTION

In case of unconventional installations, consult Electroelsa technical department.



Loads with wall extensions extracted 0.5 / 0.8m

L (m)	L1 (m)	L2 (m)	Estens. (m)	Q1 (Kg)	Q2 (Kg)	Q (Kg)
7,808	0,0	6,0	0,8	0	1205	1205
8,629	0,0	6,8	0,8	0	1160	1160
9,450	0,8	6,0	0,8	600	1205	2405
10,271	0,8	6,8	0,8	600	1160	2360
11,092	0,8	7,65	0,8	600	1060	2260
9,310	0,0	7,50	0,8	0	1060	1060
10,131	0,0	8,30	0,8	0	1015	1015
10,952	0,8	7,50	0,8	600	1060	2260
11,773	0,8	8,30	0,8	600	1015	2215
12,594	0,8	9,10	0,8	600	920	2120
10,812	0,0	9,00	0,8	0	920	920
11,633	0,0	9,80	0,8	0	875	875
12,454	0,8	9,00	0,8	600	920	2120
13,275	0,8	9,80	0,8	600	875	2075
14,096	0,8	10,60	0,8	600	775	1975
12,314	0,0	10,50	0,8	0	775	775
13,135	0,0	11,30	0,8	0	700	700
13,956	0,8	10,50	0,8	600	775	1975
14,777	0,8	11,30	0,8	600	700	1900
15,598	0,8	12,10	0,5	600	530	1730
13,82	1,5	9,00	0,8	350	920	1620
14,64	1,5	9,80	0,8	350	870	1570
15,46	0,8	12,00	0,5	600	530	1730
16,28	0,8	12,80	0,5	600	480	1680
17,10	0,8	13,60	0,5	600	400	1400
15,32	1,5	10,50	0,8	350	775	1475
16,14	1,5	11,30	0,8	350	700	1400
16,96	1,5	12,10	0,5	350	530	1230
17,78	2,3	11,30	0,5	150	530	830
18,60	2,3	12,10	0,5	150	530	830
16,82	1,5	12,00	0,5	350	530	1230
17,64	1,5	12,80	0,5	350	470	1170
18,46	2,3	12,00	0,5	150	530	830
19,28	2,3	12,80	0,5	150	470	1170
20,20	2,3	13,60	0,5	150	400	700

Loads without wall extensions

L (m)	L1 (m)	L2 (m)	Estens. (m)	Q1 (Kg)	Q2 (Kg)	Q (Kg)
7,808	0,0	6,0	0,0	0	1350	1350
8,629	0,0	6,8	0,0	0	1300	1300
9,450	0,8	6,0	0,0	625	1350	2600
10,271	0,8	6,8	0,0	625	1300	2550
11,092	0,8	7,65	0,0	625	1250	2500
9,310	0,0	7,50	0,0	0	1250	1250
10,131	0,0	8,30	0,0	0	1200	1200
10,952	0,8	7,50	0,0	625	1250	2500
11,773	0,8	8,30	0,0	625	1200	2450
12,594	0,8	9,10	0,0	625	1145	2395
10,812	0,0	9,00	0,0	0	1145	1145
11,633	0,0	9,80	0,0	0	1095	1095
12,454	0,8	9,00	0,0	625	1145	2395
13,275	0,8	9,80	0,0	625	1095	2345
14,096	0,8	10,60	0,0	625	1040	2290
12,314	0,0	10,50	0,0	0	1040	1040
13,135	0,0	11,30	0,0	0	900	900
13,956	0,8	10,50	0,0	625	1040	2290
14,777	0,8	11,30	0,0	625	900	2150
15,598	0,8	12,10	0,0	625	640	1890
13,82	1,5	9,00	0,0	375	1145	1895
14,64	1,5	9,80	0,0	375	1095	1845
15,46	0,8	12,00	0,0	625	640	1890
16,28	0,8	12,80	0,0	625	570	1820
17,10	0,8	13,60	0,0	625	450	1700
15,32	1,5	10,50	0,0	375	1040	1790
16,14	1,5	11,30	0,0	375	900	1650
16,96	1,5	12,10	0,0	375	640	1390
17,78	2,3	11,30	0,0	175	900	1250
18,60	2,3	12,10	0,0	175	640	990
16,82	1,5	12,00	0,0	375	640	1390
17,64	1,5	12,80	0,0	375	570	1320
18,46	2,3	12,00	0,0	175	640	990
19,28	2,3	12,80	0,0	175	570	920
20,20	2,3	13,60	0,0	175	450	800
18,32	1,5	13,50	0,0	375	450	1200
19,14	1,5	14,30	0,0	375	350	1100
19,96	2,3	13,50	0,0	175	450	800
20,78	2,3	14,30	0,0	175	350	700
21,61	2,3	15,10	0,0	175	300	650

8.6 Other risks

This paragraph has the purpose to underline possible risks derived from the used of the work platform such as:

- Risks derived from unusual applications not indicated by the manufacturer
- Risks derived from an erroneous positioning of the machine
- Risks derived from the transport of the machine
- Risks derived from an erroneous assembly of the machine on the ground
- Risks derived from an erroneous erection of the machine
- Risks derived from function tests
- Risks derived from the normal operation of the machine
- Risks during disassembly

For each situation described above, in the following paragraph we provide you the description of possible risks and suitable safety procedures.

8.6.1 Risks derived from unusual applications not indicated by the manufacturer

Before the machine installation, verify that the machine dimensions are suitable to the building on which the machine has to work.

In order to verify this, you need to look at the drawing of the project and at the Instruction manual.

Possible Risks:

- Dimension differences between the project and the real dimension of the building and/or the machine
- Presence of obstacles at any height that could hamper the run on the machine
- Wall anchor checks
- Mistakes in the installation configuration of the platform

Prevention and Safety Measures

- The actual dimension of the building must be measured accurately. The responsible of the installation musts check accurately if platform dimensions and wall extension dimensions are within those allowed.
- Check if there are suspended cable (power cables, telephone cables and so no) that could hamper the run of the platform. In that case, study another configuration or remove where possible those obstacles.
- The responsible of the installation must ascertain the positions at which the wall anchors must be made according to the instruction manual. If the situation on the building site does not allow the use of the standard solutions laid down in this instruction manual, each anchor must be subject to a project drawn up and signed by an engineer.
- The responsible for installation must check that the installation is carried out as described in the project.

8.6.2 Risks derived from an erroneous positioning of the machine

The platform must be installed exactly as indicated in the project, paying attention to the robustness of the ground surface carrying the total load of the machine.

Possible Risks:

- The ground can not carry the total load of the machine
- Presence of hollows or underground tunnels
- The machines lays in an area where job site personnel is obliged to pass underneath.
- Difficulties for power supply

Prevention and Safety Measures

- Calculate in advance the total weight of the platform as explained along this manual. The stability of the ground must be certified by an authorized technician.
- Verify that the ground underneath is free of hollows and underground tunnels in order to prevent the machine to collapse during its use.
- The area underneath the work platform must be adequately fenced and the passage of people forbidden. In case the passage of people can not be avoided, protect this area in order to prevent materials to fall in this area.
- Check the exactitude of the power supply. The power cable must be connected to a lawful power panel.

8.6.3 Risks derived from the transport of the machine

In order to unload the equipment in perfect safety, follow carefully the instructions reported in this manual and use the apposite lifting tools and devices.

Possible risks:
- Damage on the equipment
- Instability of heaps and piles
- Delivery mistakes
- Collision, squashing and shearing for personnel
- Injury to personnel when lifting loads

Prevention and Safety Measures
- The person responsible for the building site, must inspect the components to ascertain their structural integrity
- The job site supervisor must check that the components that are required for the previously defined layout are ready, paying special attention to components that could create confusion being similar to others.
- All loads must be mechanically moved, adequately harnessed with regulatory cables, bands or chains. Just one operator will have the responsibility to help the operator of the lifting vehicle placing the loads on the ground. No one may walk or remain under suspended loads, and the area must be fenced off and signalled.
- The operators used for the manual movement must be informed of the weight of the single components and the best way of holding and moving them.

8.6.4 Risks derived from an erroneous assembly of the machine on the ground

The components of the base units, the drive units and the platform beans are assembled together with the first elements of the mast.

Possible risks:
- Erection errors
- Erection non corresponding with the job site authorisation

- Falling objects or equipment
- Errors in electrical connections

Prevention and Safety Measures

- All the personnel used for erection must be qualified and be exactly aware of the procedures laid down in this manual. Particular attention must be paid to the exact positioning and fixing of each component, carefully following the instructions of this manual.
- Both during and after erection the exact layout must be checked with the erection scheme shown in this manual
- Personnel must wear and use the safety hardhat, construction boots and protective gloves. Nobody should transit or stop under the platform during assembly.
- All electrical connections must be carried out exclusively by qualified personnel and functionally checked before use.

8.6.5 Risks derived from an erroneous erection of the machine

The vertical masts are erected and the necessary wall anchors realised. For this operation consult relative instructions in this manual. Moreover all equipment for mast erection must be used as explained in this manual in order to carry out works in total safety.

Possible Risks:
- Erection errors
- Erection not corresponding with the authorisation
- Falling objects or equipment
- Errors in fixing wall anchors

- Shearing or squashing
- Presence of a projection
- Faulty positioning of the limit switches

Prevention and Safety Measures

- Particular attention must be paid over the exact positioning and fixing of each component, carefully following the indications in the instruction manual.
- Both during and after erection the exact layout must be scrupulously checked with erection scheme shown in the instruction manual.
- All personnel must always wear protective helmets, safety boots and protective gloves
- All wall anchors must be realised according to the relative instructions received from the jobsite supervisor, after having consulted the works director. If the anchor being fixed does not hold properly, work must be stopped and the situation reported to the job site supervisor.

- Movement of the platform must be controlled by just one operator; he mast carry out a manoeuvre only after having ascertained the position of all the other operators who must place themselves in safe positions. Before moving, all the objects placed on the platform must be well and solidly positioned to avoid interference and falls.
- While moving pay maximum attention to possible projections to avoid that personnel does not risk being squashed under it.
- To pass over a projection withdraw all telescopic wall extensions.
- The apt limit switches must be positioned to prevent the platform from crashing on the projections all along the building.

8.6.6 Risks derived from function tests

Correct operation and movement of all manoeuvring and safety devices of the mast climbing platform is checked.

Possible risks
- Electrical or mechanical connection errors
- Incorrect adjustment of the levelling system
- Falling objects or equipment during the levelling test
- Inability to adjust descending movement of the platform

Prevention and safety measures
- All the personnel must be qualified and must be aware of the procedures shown in the instruction manual. All the functions of the normal manoeuvring, starting from the very simplest and proceeding with those more complicated must be verified.
- The levelling system must be tested first of all near the ground and adjustment must be made from the ground.

- During levelling tests the platform must be empty, especially free from objects that could roll out and fall.
- If, for any reason, difficulty is found in completing the functional tests and the descent of the platform to the ground seems difficult, the test must be suspended and personnel must connect the spring catch of the safety belt to the anti-fall cable that will be connected to a suitable structural part of the building. The director of the building site must be warned and, under his supervision, the platform must be abandoned with the help of specialised personnel.

8.6.7 Risks derived from the normal operation of the machine

The work platform is used in its normal operation in the job site.

Possible Risks:
- Platform overloading
- Incorrect positioning of guardrails and work surfaces
- Falling objects or equipment during work
- Personnel falling
- The platform stops due to mains supply failure
- Loosening of a wall anchor
- The platform stops due to a failure of the drive unit
- Passing a projection during run upward
- Passing a projection during run downward

Prevention and safety measures
- All personnel must be qualified and must be aware of the procedures shown in the instruction manual. The job site supervisor must supervise platform loading operations making sure not to overload the work platform.
- Guardrails and work surfaces must always be left assembled and periodically checked; they must never be removed, not even to facilitate work.
- No one may walk or remain under the platform during work and the area must be fenced off.
- Personnel must make sure to remain behind the guardrails and must not use ladders, temporary platforms or any other device to reach a higher level or projection.
- If the mains supply fails, the job site supervisor must be immediately warned and he must call in qualified personnel. The personnel on the platform must remain in their safety positions and must not improvise any manoeuvre. If it is not possible to solve the problem quickly, personnel must follow the instructions shown in this manual for manual descent from the platform.

- The anchors must be periodically checked, especially after particular intense atmospheric events, under the supervision of the jobsite supervisor. If a setting of anchor is suspected, the platform must be abandoned in complete safety under the supervision of the job site supervisor.
- If a failure of the drive unit is suspected the building site director must be warned and the platform must be abandoned in complete safety. Contact Electroelsa technical department to repair the platform.
- To pass a projection during the run upward, the platform must be brought to the lower limit switch and there the telescopic wall extension dismantled or withdrawn until the interference with the projection is eliminated. Once the lower/upper limit switch has been dismantled and the projection passed, the platform can be moved to the new lower/upper limit switch and there the telescopic extensions can be refitted and the lower and upper limit switch replaced.

8.6.8 Risks during disassembly

Mast sections and wall anchors are dismantled according to all the instructions shown in this manual.

Possible Risks:
- Instability of placing dismantled components
- Loss of machine stability
- Falling objects, equipment or people

Prevention and safety measures
- Pay particular attention when positioning the dismantled components, carefully following the indications in the instruction manual.
- Wall anchors must be dismantled simultaneously with mast sections.
- No one must walk or remain under the platform while it is being dismantled and the area must be fenced off. The use of ladders and other devices to reach wall anchors is forbidden.

CHAPTER 9

PREPARATIONS FOR EQUIPMENT USE

9.1 PRELIMINARY SAFETY INSTRUCTIONS

BEFORE CARRYING OUT ANY ASCENT OR DESCENT MANOEUVRES MAKE SURE THAT:

- The area underneath the platform has be fenced off with barriers so as to block access;
- Luminous and/or visual warnings have been adequately positioned;
- No electrical lines that could be dangerous are present in the area where the platform operates
- Material or elements do not jut out of the building all along the run of the platform
- The guardrails and their protections have been installed safely and properly
- All electrical, electromechanical or mechanical platform safety devices are efficient.
- The rack, pinions and rollers are perfectly efficient.
- Safety belts are available on the platform in case of emergency
- During ascent and descent the personnel and loads are evenly distributed on the work platform
- The right functioning of the red palm-push emergency button that cuts the power supply to the main.
- In case wind speed will exceed 18 m/s the platform must be brought to the ground level.
- At the end of each working day the platform is brought to its lowest level and the main supply is disconnected.
- In case of power failure, the platform is brought to the ground level using the manual release key for the brake motors. The operation must be carried out at intervals making the units descent not more than 100-150 mm at a time.
- Any snow or ice is removed from the platform before use.
- The up and down lever correctly moves the work platform in the right direction and not contrarily.
- After having tested an up and down run and of the machine, all limit switches and levelling devices are working.

9.2 9.1 SAFETY INSTRUCTIONS DURING THE EQUIPMENT USE

During normal use of the machine, in order to work in safety, remember to respect the following prescriptions:

- It is forbidden to build work surfaces higher than the standard work surface of the machine
- The abandonment of the platform when drive units are at high altitude is allowed only in emergency cases and using personal protection equipment.

In any situation of trouble shooting, bring the platform to the ground using equipment safety devices.

DANGER

Solve and repair troubles before setting the machine in use again.

- For safety reason, on the platform can work always at least two operators, so that in case of injure of one of them, the other can perform emergency procedures.
- At the end of every work shift, the platform must be brought to the ground and must be disconnected from power supply.

9.3 MANUAL DESCENT PROCEDURE

During the platform operation, in case drive units accidentally stop at high altitude, it is necessary to perform manual brake release and descent to a safety height. In order to carry out this operation, follow these instructions:

- Put the main switch in position O
- Take the apposite key for the brake release and open brakes operating on the nut placed on the work surface on the drive unit.

DANGER

Release the brakes for short traits. The descent speed must be maximum 1/3 of the normal work speed. Moreover it is necessary to let the brakes cool for one minute every 20 seconds of manual descent. This feature is very important because brake overheating could let the entire brake system malfunction.

ATTENTION

In case, for any reason, manual descent will be not possible, remain on the platform and alert the safety responsible to accurately abandon the platform in safety.

CHAPTER 10

EQUIPMENT USE

10.1 OPERATING THE EQUIPMENT

The conduction of the work platform must be carried out only by trained personnel. For safety reason, at least two operators must work on the platform, so that in case of injury of one of the two, the other can perform safety procedures.
Carry our all function tests before putting the platform in use, than operate it as follows:

- Move the work platform in the desired direction operating of the up and down lever. When the platform reaches the desired height, before staring to work, stop the machine safely pressing the red palm push emergency button.

PERICOLO

Before operating the hoist perform all necessary safety, maintenance, and lubrication procedures as indicated in this manual.

ATTENTION

It is prohibited to enter the platform while it is in operation.

10.2 EQUIPMENT HALT AT THE END OF THE WORK SHIFT

At the end of work shift proceed as follows:

- Bring the platform to the ground level till it automatically stops with its lower limit switch. Put the main switch in position 0 (off). Disconnect the power cable and store it in a safe place. Make sure that platform access gates are closed. Ascertain that nobody during the absence of the responsible personnel could operate the hoist. Verify that access gates are closed and check that no material is left on the platform that could possibly fall.

10.3 LONG-TERM EQUIPMENT HALT

To stop the machine for long periods proceed as follows:

- Carry out the same procedures as explained in paragraph 10.2
- Remove the platform control panel and store it in safe and dry place.
- Open the brakes and bring the machine completely down laying on the base frame buffers.
- Remove any material from the work platform. Fence off the perimeter of the platform.
- Before setting the machine in use again, in case of ice, snow, heavy rain or particular weather conditions, let check all the main parts of the machine by trained personnel. The immobility of the platform for long periods, can cause various problems like seizure of the motorbrakes, corrosion of metal parts and rubber seal.

CHAPTER 11

TROUBLE SHOOTING

11. TROUBLE SHOOTING

Operating anomalies can happen during equipment operation. These situations and their possible troubleshooting are described below:

— the machine does not start;
— the machine stops unexpectedly.

11.1 THE MACHINE DOES NOT START

Follow the instructions below if the platform does not start when being operated:

- Verify that the main switch is set to ON and that the equipment is receiving power.
- Verify that all emergency buttons are completely released.
- Verify that all access gates are closed.
- Verify that none of the overrun limit switches are engaged. If so, carry out the procedure described in this chapter.
- No switch is released in the power supply line
- The phase sequence is correct.

If the hoist does not start after these verifications are performed, call ELECTROELSA Technical Support.

11.2 THE MACHINE STOPS UNEXPECTEDLY

If the platform stops between the floors due to a power blackout, a blown fuse, or a line interruption after a power surge, the operator in charge of the platform operation must:

- carry out the procedure to seek for electric troubles as described along this chapter.
- Carry out the manual descent as described in various paragraphs along this manual.

ATTENTION

In case the manual descent procedure is not possible, remain o the platform, alert the safety responsible and abandon the platform with appropriate means.

- Put the machine in safety position and call the maintenance service to let it be repaired.

11.3 SAFETY PROCEDURES FOR THE INTERVENTION OF EXTRA-RUN SWITCHES

In case the lower extra-run switch engages, to reset the machine in operation , use the reset key to move the junction box of the drive unit electrical cables that has the device pressed in. Turning the key in position 1, the lower extra-run switch is bridged. Now, move the machine upwards to disengage the extra-run switch. At this point return the key in position O again.

11.4 Procedures for the individuation of electrical problems

All forms of electric failure need specific procedures and equipment for the search and repair. General principles for the electric breakdown search are described below:

- the search must be carried out with the help of a phase detector screwdriver or a voltmeter. The voltmeter must be of universal type and it is a toll recommended for an efficient and reliable research.
- Only authorized electricians can carry out works on electrical system.

DANGER

Works on electric system must be carried out only by trained and authorized personnel.

DANGER

To execute works in the control panel it is necessary to wait about one minute after having disconnected the power supply to allow the power dissipating in the power cable.

To search for electrical failures, it is advisable to follow the instructions below:
- Use the electrical scheme. This scheme is kept inside the main control panel on the platform. The scheme shows how the electrical plant is wired and realized.
- Check that the circuit is not interrupted. That means that you have to verify that magneto-termo switch and phase sequence meter did not get engaged, that overrun limit switches are not engaged and that the red emergency button is not pressed. Check that the main switch is in position ON.
- Check that upper and lower limit switch function correctly;

- Connect the voltmeter or the phase detector between the joint O and the terminal as indicated in the electric scheme. Check that the power supply is correct. Pass through every joint, methodically one after the other, as to localize the failure.
- Begin checking that the power is supplied to all three incoming phases in the control panel.
- Check that the power cable connected to the control panel supply power when the main switch is in position ON.
- Check that power supply reaches the machine correctly
- Check the control panel to verify that the incoming three phase power supply is correct
- Check that the impulse “Up and Down” coming from the command lever reaches the control panel correctly
- Move the machine to test that the coil on the contactor (UP- DOWN) receives power. Check that the brake contactor is engaged and that the brake coil is correctly supplied with power in order to determine brake release.
- If the failure is not found in the command and power circuit, carry out the research as described above in the signal and illumination circuit. Check everything methodically until the failure is found.

Expertise shows that certain failure causes have specific symptoms that can indicate the position of the breakdown. In any case, here below you can find some examples of troubles with their possible cause and position.

DEFECT
- Fuses blow immediately

POSSIBLE CAUSE
- short circuit in the electrical equipment

POSSIBLE POSITION OF THE FAILURE
- power cables damaged
- control buttons damaged
- faulty positioning of the limit switches

DEFECT
- Fuses blow after a short while

POSSIBLE CAUSE
- Leakage of electrical supply
- Tension overload

POSSIBLE POSITION OF THE FAILURE
- Limit switches are wet
- Water in the junction box
- Damage on the electric circuit components
- New electrical equipment faulty installed.

DEFECT
- The machine stops
- The machine does not start

POSSIBLE CAUSE
- Overrun limit switch has been accidentally engaged
- Blown fuse

POSSIBLE POSITION OF THE FAILURE
- Emergency button pressed
- Thermo switch intervened for over load
- Improper actions while machine operation

DEFECT
- The machine stops, move and stops again

POSSIBLE CAUSE
- Overrun limit switch has been accidentally engaged

POSSIBLE POSITION OF THE FAILURE
- The overrun limit switch is faulty positioned or faulty adjusted.

CHAPTER 12

MAINTENANCE AND REPAIRS

12.1 GENERAL WARNINGS

Regular maintenance of mechanical and electrical equipment extends its life, assures its efficiency and safe operation. Follow the instructions in this manual for repair and regular maintenance. Repair and maintenance of electrical equipment must be performed by authorized and trained personnel only.

The maintenance technician must follow the instructions below:

— Always use personal protection devices (gloves, hearing protection, construction boots, goggles) while performing maintenance operations.
— Before starting any procedure shut off the electric power and assure that no one can inadvertently turn it on.
— Use only original parts for repair and maintenance service.
— A warning sign should be posted on the equipment while maintenance or repair work is performed.
— Verify that no tools or debris are left inside the hoist or on its platform after repairs or maintenance.
— Remember to perform regular verification of the equipment at the required frequency.
— Check off the maintenance procedures performed in a special register enclosed with this manual.

ATTENTION

All maintenance work must be performed according to the procedures above. ELECTROELSA disclaims any responsibility if these procedures are not adhered to.

ATTENTION

It is recommended to contact the Technical Support division or the manufacturer for repair procedures. If the repair work was performed in an improper manner, by an unauthorized technician, or with parts other than original, the supervisor who authorized such work carries complete responsibility for the equipment operation.

12.2 MAINTENANCE SCHEDULE

FREQUENCY	MAINTENANCE OPERATION
EVERY WEEK	General maintenance (see section 12.2.1)
EVERY MONTH	General maintenance (see section 12.2.2)
EVERY 3 MONTHS	General maintenance (see section 12.2.3)
EVERY 6 MONTHS	General maintenance (see section 12.2.4)

12.2.1 Weekly general maintenance

Perform the following maintenance procedures every week (approx. 40 work hours). The operator in charge of maintenance works must be adequately trained and need a specific authorization to carry out this procedure.

- Verify that the installation of the platform has not been modified in any case. If that happened, verify that the new configuration is correct and approved.
- Check that all screws, bolts and nuts of the drive unit are well tight .
- check the oil level of the geared motors; if necessary make a refill.
- check motor seals
- Inspect the rack and the transmission pinion for potential damage, wrong alignments, and defective connections.
- Lubricate pinion and rack as indicated.
- Check the levelling system adjustment
- Check all mast sections, their bolts and nuts and wall anchors
- Inspect the connections between the column and the anchors, and between the anchors and the wall.
- Move the machine till the upper limit switch to verify the presence of abnormal vibrations or noises.
- Check the integrity of the power cable
- Verify the absence of obstacles or objects where the power cable could get entagled.
- Check that the area under the machine is free, especially where the cable coils up
- Check the functioning of all mechanic and electric safety devices present on the platform
- Check that all guardrails and doors are well fixed.
- Check the good condition of buffers and its right positioning

12.2.2 Monthly general maintenance

Perform the following maintenance procedures:

- Remove any deposits from the electric motor housings and the relative fans.
- Check that the brakes of the electric motor work well; if necessary, clean them accurately and adjust the air gap to its normal working distance.
- Check the state of the manual brake release mechanism, make sure no elements are damaged, and adjust any play.
- Grease the whole rack correctly, and carefully check contact between the various pieces welded onto mast sections.
- Check the drive unit guide rollers, making sure the clearances are correct and that there are no unusual noises of wear and tear. If necessary replace immediately, adjust them and tighten the relative bolts
- Check the opposite and adjacent faces of the mast section. If any sign of damage is seen, check carefully the integrity of the running wheels involved.
- Check the mesh between the pinion and the rack, observing it while the platform is moving.

12.2.3 Three-month general maintenance

- Carry out weekly maintenance program
- Carry out monthly maintenance program
- Check the electrical control panel carefully and clean the inside, especially the electrical contactors, using appropriate substances
- Check the structure of the platform and the mast, making sure there are no cracks in the welding, bent connections or other similar damage.

DANGER

If any of such defects are present, replace the part involved immediately using exclusively original spare parts.

12.2.4. Six-month general maintenance

- Carry out three-month maintenance program
- Check electrical connections, and the integrity of the electrical plant
- Check the overheating protection of the engine are well set.
- Check all parts that support loads. If damaged, substitute them before using the machine again.

12.3 Reduction gear maintenance

Beside normal check of the oil level, the person authorized and qualified to carry out maintenance must also change completely the reduction gear oil. After about 300-400 hours of work, when the reduction gear has finished its running cycle, remove the oil completely; wash the inside well and refill with the new mineral oil as per the table below. The next oil change must be done after 5000 hours or after two years. Wash the inside well at every oil change.
Average viscosity ISO 150 CST at 40 °C.

NOTE

In case of topping up use the same oil type present in the reduction gear.

Produttore	Tipo olio
API	DT 150
AGIP	BLASIA
ARAL	DEGOL B.G.
B.P.	ENERGOL GR/XP
ESSO	SPATAN EP
FIAT	E.P.Z.
IP	MELANA OIL
MOBIL	MOBILGEAR 600
SHELL	OMALA
TEXACO	MEROPA
TOTAL	CARTER EP

12.4 ELECTRICAL MOTOR MAINTENANCE

For a correct maintenance of the electric motors, find here below some possible faults and relative causes and solutions:

DEFECT:
- Motor too hot (this can only be established after measurement)

POSSIBLE CAUSE:
- Motor not connected in conformity with mains voltage
- Mains voltage has a variation superior to 5% of nominal motor voltage. A higher voltage is particularly unfavorable for high polarity motors as when they are already at normal voltage their absorption reaches minimal values.
- Low volume of cooling air, air passage is blocked.
- Cooling air is preheated
- Overloading at normal mains voltage, absorption too high and speed too low.
- Bad contact of mains cables (temporary operation with one phase).

SOLUTIONS:
- Adjust connection
- Make sure mains voltage is correct
- Ensure good air circulation
- Make sure air is fresh
- Do not overload the machine
- Make sure contacts are good

DEFECT:
- The motor does not start or has problem in starting

POSSIBLE CAUSE:
- Fuse blown
- Contactor has interrupted mains.
- Motor relay does not work. Defect in command.
- Delta starting connected to star
- When starting the voltage or the frequency noticeably diminish with respect to their nominal value.
- Bad contact of the star-delta commutator.

SOLUTIONS:
- Replace blown fuse
- Check and adjust relay
- Check relay command and eliminate error
- Correct connection
- Improve the state of mains supply
- Repair the contact

DEFECT:
- Motor noisy and absorbs a lot of current

POSSIBLE CAUSE:
- Defective winding. The rotor rubs against the stator

SOLUTIONS:
- Substitute the motor

DEFECT:
- Fuse blow or the circuit breaker cuts out continuously

POSSIBLE CAUSE:
- Short circuit in the mains cable
- Short circuit of the motor
- Mains cables faulty connected

SOLUTIONS:
- Eliminate short circuit
- Repair the motor
- Correctly connect mains cables

12.5 Motor brake maintenance

For a correct maintenance of the motor brakes, find here below some possible faults and relative causes and solutions:

DEFECT:
- The brake does not release

POSSIBLE CAUSE:
- Incorrect voltage at rectifier
- Rectifier deteriorated
- Maximum air gap exceeded for wear on brake disc
- No cooling air, motor overheating
- Excessive drop in voltage at the mains (10 allowed)

SOLUTIONS:
- The brake must be supplied with the voltage indicated in the plate
- Replace rectifier
- Adjust brake. In case of total wear substitute brake disc
- Make sure voltage is sufficient
- Replace the BGE type rectifier.

DEFECT:
- The motor does not brake

POSSIBLE CAUSE:
- Brake disc totally worn.
- The adjustment nuts stick due to excessive air gap
- Manual release badly adjusted

SOLUTIONS:
- Replace brake disc
- Adjust air gap correctly
- Position the adjustment nuts correctly

DEFECT:
- Brake intervenes late

POSSIBLE CAUSE:
- Only single phase voltage interruption

SOLUTIONS:
- Connect brake for simultaneous interruption of single phase and a.c. circuit voltage

ATTENTION

All test and maintenance on brakes must be carried out by trained and authorized personnel or by ELECTROELSA Technical Department

12.6 Rectifier maintenance

Tests are carried out with a mobile coil instrument. Direct current between terminal (+) and (-) and alternating current between terminals marked with the appropriate symbol (**~)** is measured. The value of direct current must be between 35% and 45% of the value of alternating mains current.
The test is carried out with an ohmmeter or with a direct current measuring instrument.
- The diodes of the rctifier are chyecked to verify the continuity between the terminals marked on the diode
- The diodes must not let the current pass between (~) and (+) and between (~) and (-), but then, inverting the measuring instrument prods let it pass in the opposite direction. A residual resistance, detected in the direction of the passage of the current, is caused by the threshold voltage of the diodes.
- The resistance between terminals (+) and (-) must be 180-200 KOHM for the barke rectifier in one direction, in the opposite direction (inverting instrument prods) must be 0 (infinite). There must be no connection to check the quality of the diode.

ATTENTION

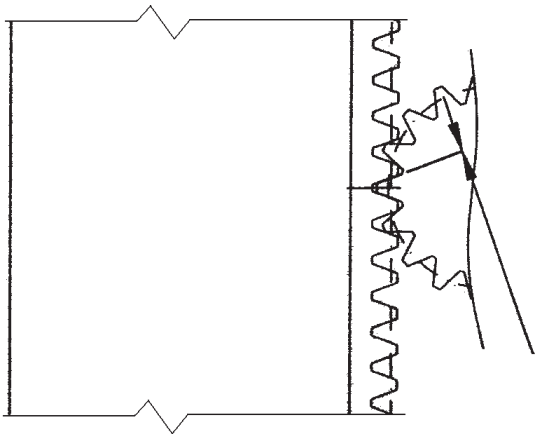
All test and maintenance on brake rectifiers must be carried out by trained and authorized personnel or by ELECTROELSA Technical Department

12.7 Extraordinary maintenance

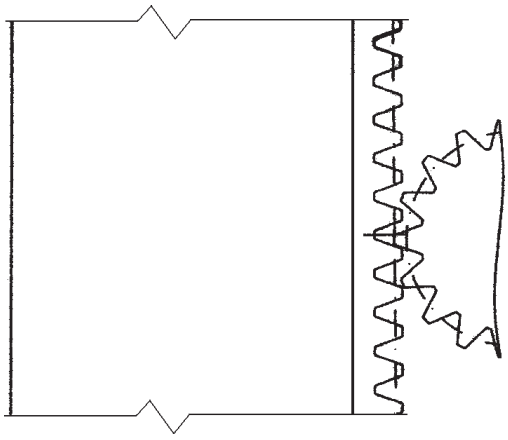
In order to avoid abnormal phenomena of wear and tear, together with a faulty gear movement (vibrations, noise and so on), it is important to lubricate the rack with grease (racommended greases are those used for roller bearings, even though greares used for agricultural machinery are suitable as well).

It is important that the pinion enegages the rack in the right way. The maximum play admitted between the bottom of the rack tooth and the head of the pinion tooth is shown in the picture 12.1 here below. In case the engaging is different to what indicated in the picture, it is necessary to adjust eccentric pins of the drive rollers.

Absolutely avoid engaging conditions similar to the one shown in the picture 12.2, because besides being very dangerous from the safety point of view, they provoke a fast and abnormal wear and tear of the components in question.



Picture 12.1



Picture 12.2

Moreover, it is very important that the axe passing through the centre of the pinions is parallel to the axe passing through the rack teeth as shown in the picture 12.3 position 1.

Absolutely avoid the situation as shown in the picture 12.3 position 2. In case you notice that the drive unit is working in that condition, it is necessary to adjust immediately eccentric pins of the guide rollers.

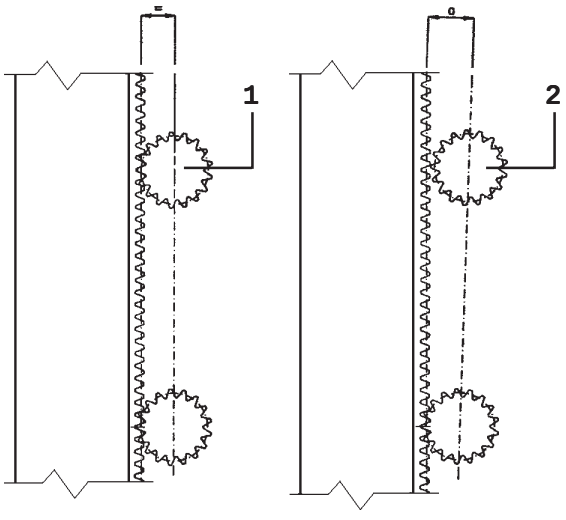
Concerning the maximum wear admitted on drive pinions, with reference to the picture 12.4, you can consider the following values:

- Maximum wear admitted on the pinion 0,4 mm
- Minimum pinion measure admitted 27,9 mm

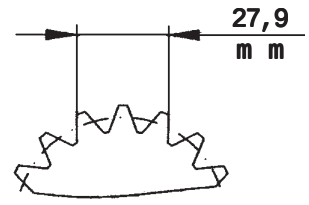
Concerning the maximum wear admitted on the rack, with reference to the picture 12.5, you can consider the following values:

- Maximum wear admitted on the rack 0,8 mm
- Minimum rack measure admitted 24,8 mm

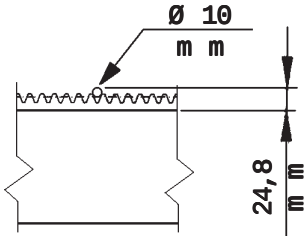
If the wear on rack and the pinion is beyond the above mentioned values, it is necessary to substitute them, to avoid damage on the machine.



PICTURE. 12.3



PICTURE 12.4



PICTURE 12.5

12.8 Technical support

The service of technical assistance and support is run directly by the company ELECTROELSA.
For assistance dial:

ph. +39 055 8078368
fax +39 055 8078479
email: info@electroelsa.com

CHAPTER 13

ADDITIONAL INSTRUCTIONS

13.1 OPERATING EQUIPMENT NOISE LEVEL

During operation the following noise level has been registered:

LPa = 89.8 dB (A)
LWa = 105.7 dB (A)

LPa : continuous level equivalent to the sound pressure at operator's place

LWa : sound power level

13.2 INSTRUCTIONS FOR EQUIPMENT DISPOSAL

To dispose of the equipment, disassemble it into mechanical components consisting of steel and aluminum alloys and electric/electronic components which are processed at special facilities according to the regulations of the country where the hoist is installed.

It is recommended to separate those materials in order to facilitate their stowage and recycling.

CHAPTER 14

ENCLOSERS

14.1 LIST OF APPENDICES

The operating and maintenance manual is supplemented with the following appendices:

– electric diagram;
– equipment drawings;
– spare parts manual;
– register of service records;
– statement of compliance.

14.2 TECHNICAL WARRANTY

All equipment is verified and tested in our manufacturing facility before it is shipped out. All mechanical parts are guaranteed against defects in material and workmanship for one year, electrical parts - for three months after the date of shipping. During this period we will replace or repair defective parts. These parts must be shipped to us FOB. ELECTROELSA disclaim any contractual or noncontractual responsibility for direct and/or indirect damages during shipping. This warranty does not cover normal parts wear.

This warranty is not valid for the equipment misused or tampered with by a third party. This warranty does not cover the client's property damages caused by equipment use. If the client wishes to submit the equipment for the acceptance tests before shipping it, such procedure will be done at the client's expense. Components that have their own warranties or provided by a third party are serviced according to their warranty statements, unless provided otherwise.

Design, manufacturing, sale, and use of this product are strictly regulated. It is absolutely prohibited to make unauthorized modifications to this product or to remove its parts. Nonobservance or partial observance of the above conditions immediately waives technical warranty and automatically exempts ELECTROELSA from any future responsibility.

C.P.M. ISTITUTO RICERCHE PROVE ANALISI S.r.l.
Via Artigiani, 63 - 25040 BIENNO (BS) - Tel. 0364/300342-300509 - Fax 300354

GRUPPO apave

In esecuzione dell'articolo 8.2.b della direttiva 98/37/CE (abrogante la direttiva 89/392/CEE modificata), riguardante il ravvicinamento delle legislazioni degli stati membri relative alle macchine

C.P.M. Istituto Ricerche Prove Analisi S.r.l.
Via Artigiani, 63
25040 BIENNO (BS)

autorizzato con decreti del Ministero dell'Industria del Commercio e dell'Artigianato in data 28 Luglio 1993 e 11 novembre 1994, notificato sulla Gazzetta Ufficiale delle Comunità Europee con il n° CE - I - 0398

ATTRIBUISCE LA

CERTIFICAZIONE CE DI TIPO
n°: 0398/760M/693/09/00

AL SEGUENTE MODELLO:

- Categoria di macchina: Piattaforma aerea su colonna destinata al sollevamento di persone per esecuzione lavori in quota con rischio di caduta verticale superiore a tre metri.
- Marchio Commerciale / Tipo: **EUROPLATFORM Mod. EP2818/6**
  (Piattaforma Elettrica Monocolonna)
- Fabbricante: ELECTROELSA S.r.l.
  Via Pisana, 18-22
  I-50021 BARBERINO VAL D'ELSA (FI)
- Richiedente dell'attestazione: Ing. Adriano Rossi
- Descrizione generale : Macchina equipaggiata di :
  - ✶una piattaforma composta da elementi smontabili
  - ✶una colonna composta da elementi smontabili
  - ✶un blocco di sollevamento (2 motori elettrici)
  - ✶un quadro elettrico di comando
- Altezza piattaforma max 80 m (pavimento piattaforma)
- Interasse ancoraggi max 6 m
- Lunghezza piattaforma max 5.55 m
- Portata 540 ÷ 1490 kg (di cui 2 persone)

Il suddetto modello è riconosciuto conforme alle esigenze essenziali di sicurezza e di salute (regole tecniche) applicabili menzionate nel rapporto n° 00.8401.

Bienno, 15/03/2001

Urbano Strada
Direttore Generale

Documento autenticato con timbro a secco

Nota: Ogni modifica apportata al materiale nuovo, oggetto della presente attestazione di esame CE di tipo deve essere portata a conoscenza dell'organismo abilitato in applicazione dell'allegato VI della direttiva 98/37/CE paragrafo 5.
Questa attestazione è composta di una pagina. Essa è stata rilasciata in due copie originali trasmesse al richiedente.
Non saranno forniti duplicati.

C.P.M. ISTITUTO RICERCHE PROVE ANALISI S.r.l.
Via Artigiani, 63 - 25040 BIENNO (BS) - Tel. 0364/300342-300509 - Fax 300354

GRUPPO apave

In esecuzione dell'articolo 8.2.b della direttiva 98/37/CE (abrogante la direttiva 89/392/CEE modificata), riguardante il ravvicinamento delle legislazioni degli stati membri relative alle macchine

C.P.M. Istituto Ricerche Prove Analisi S.r.l.
Via Artigiani, 63
25040 BIENNO (BS)

autorizzato con decreti del Ministero dell'Industria del Commercio e dell'Artigianato in data 28 Luglio 1993 e 11 novembre 1994, notificato sulla Gazzetta Ufficiale delle Comunità Europee con il n° CE - I - 0398

ATTRIBUISCE LA

CERTIFICAZIONE CE DI TIPO
n°: 0398/760M/694/09/00

AL SEGUENTE MODELLO:

- Categoria di macchina: Piattaforma aerea su colonna destinata al sollevamento di persone per esecuzione lavori in quota con rischio di caduta verticale superiore a tre metri.
- Marchio Commerciale / Tipo: **EUROPLATFORM Mod. EP2818/20**
  (Piattaforma Elettrica Bicolonna)
- Fabbricante: ELECTROELSA S.r.l.
  Via Pisana, 18-22
  I-50021 BARBERINO VAL D'ELSA (FI)
- Richiedente dell'attestazione: Ing. Adriano Rossi
- Descrizione generale : Macchina equipaggiata di :
  - una piattaforma
  - due colonne composte da elementi smontabili
  - due blocchi di sollevamento (con 2 motori elettrici ciascuno)
  - un quadro elettrico di comando
- Altezza piattaforma max 80 m (pavimento piattaforma)
- Interasse ancoraggi max 6 m
- Lunghezza piattaforma max 21.60 m
- Portata 1100 ÷ 3000 kg (di cui 2 ÷ 4 persone)

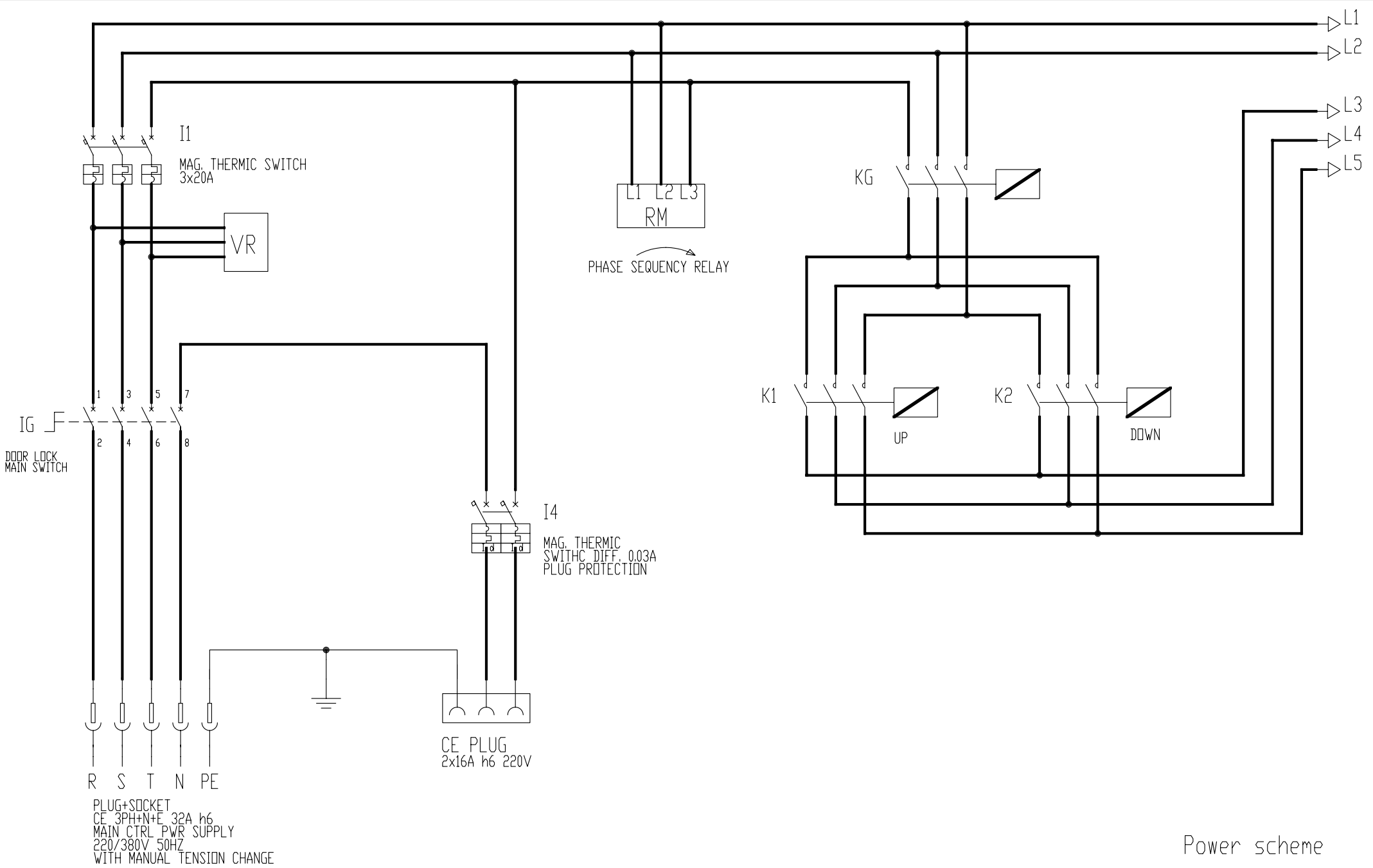
Il suddetto modello è riconosciuto conforme alle esigenze essenziali di sicurezza e di salute (regole tecniche) applicabili menzionate nel rapporto n° 00.8402.

Bienno, 15/03/2001

Urbano Strada
Direttore Generale

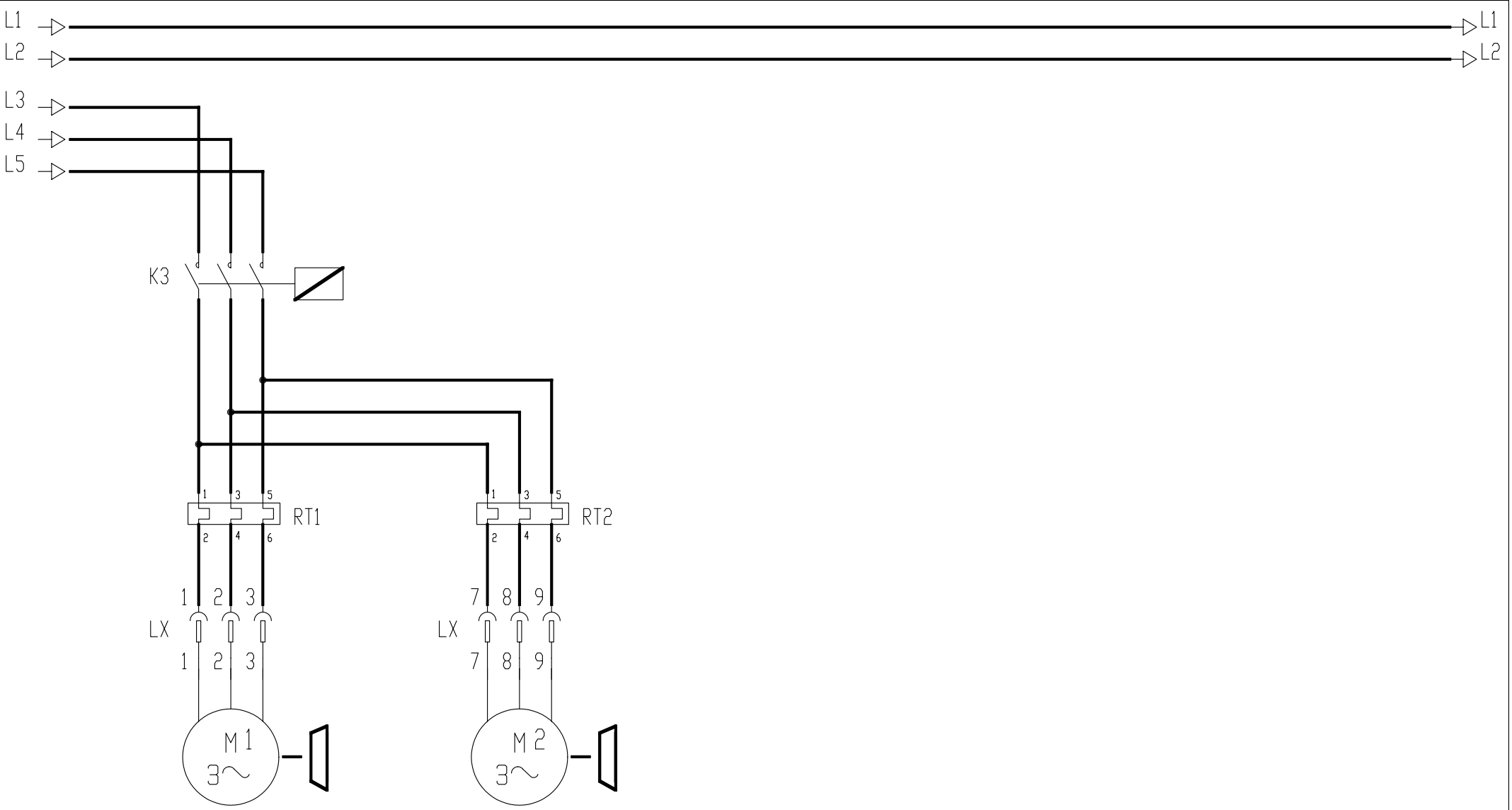
Documento autenticato con timbro a secco

Nota: Ogni modifica apportata al materiale nuovo, oggetto della presente attestazione di esame CE di tipo deve essere portata a conoscenza dell'organismo abilitato in applicazione dell'allegato VI della direttiva 98/37/CE paragrafo 5.
Questa attestazione è composta di una pagina. Essa è stata rilasciata in due copie originali trasmesse al richiedente.
Non saranno forniti duplicati.



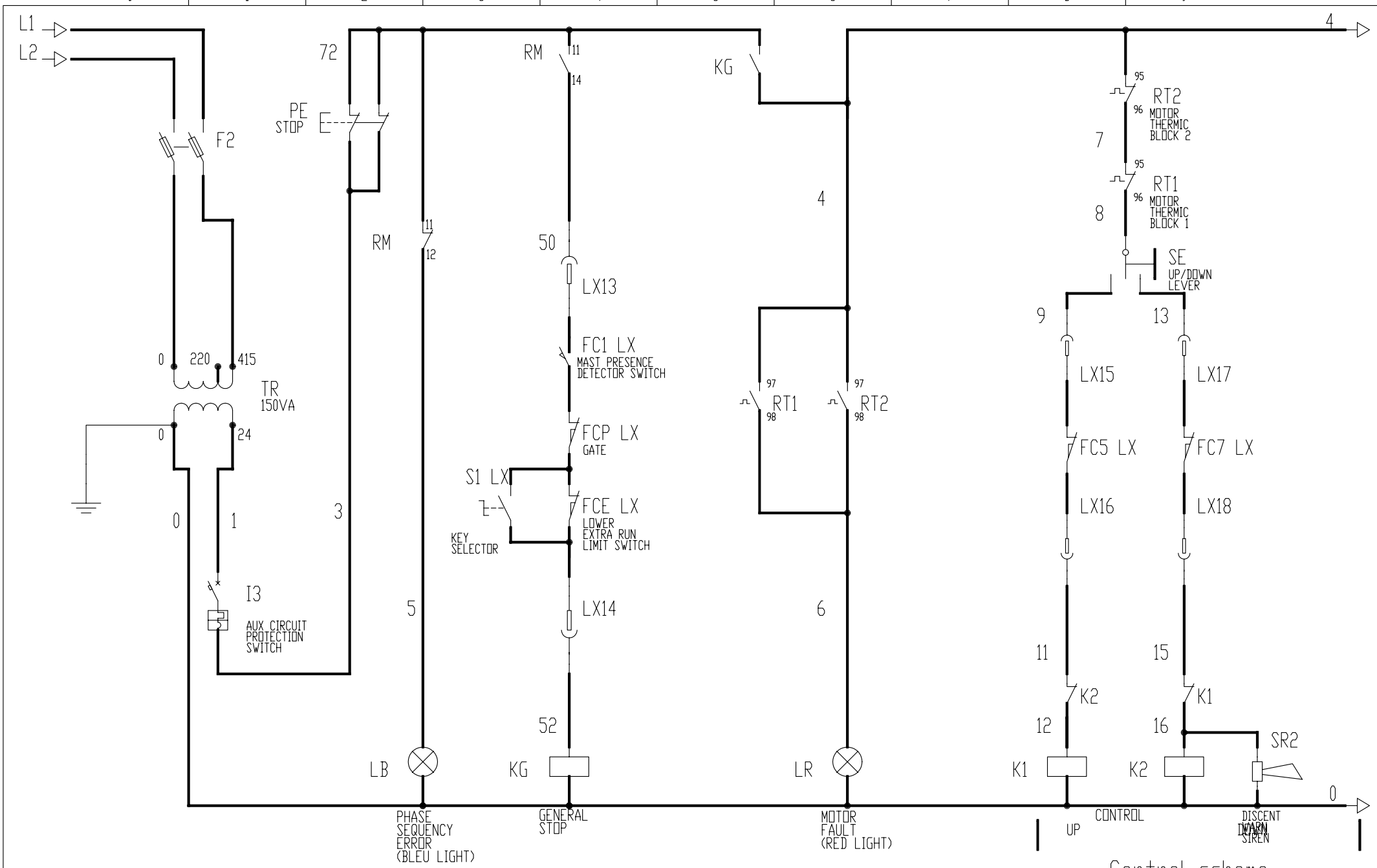
Power scheme

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 1
	TYPE: EP 2818 380 3KW EP 3125 380 4.4KW	IT SUBSTITUITED:	DATE	020423	DATE 10/05/02	Tot. Docs.: 8



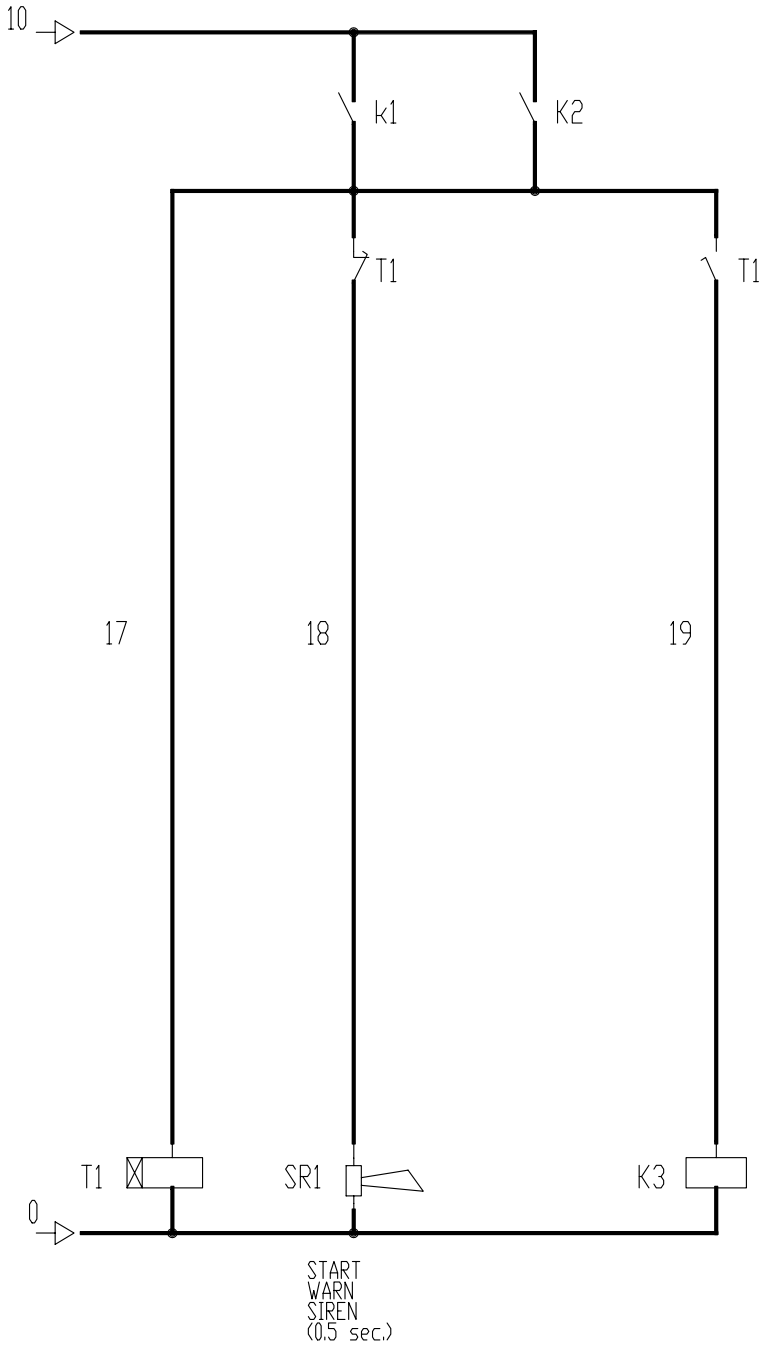
Power scheme

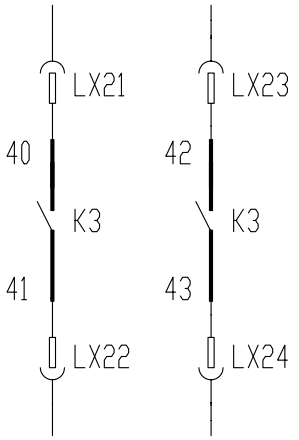
ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 2
	TYPE: EP 2818 380 3KW EP 3125 380 4.4KW	IT SUBSTITUITED:	DATE	020423	DATE 24/04/02	Tot. Docs.: 8



Control scheme

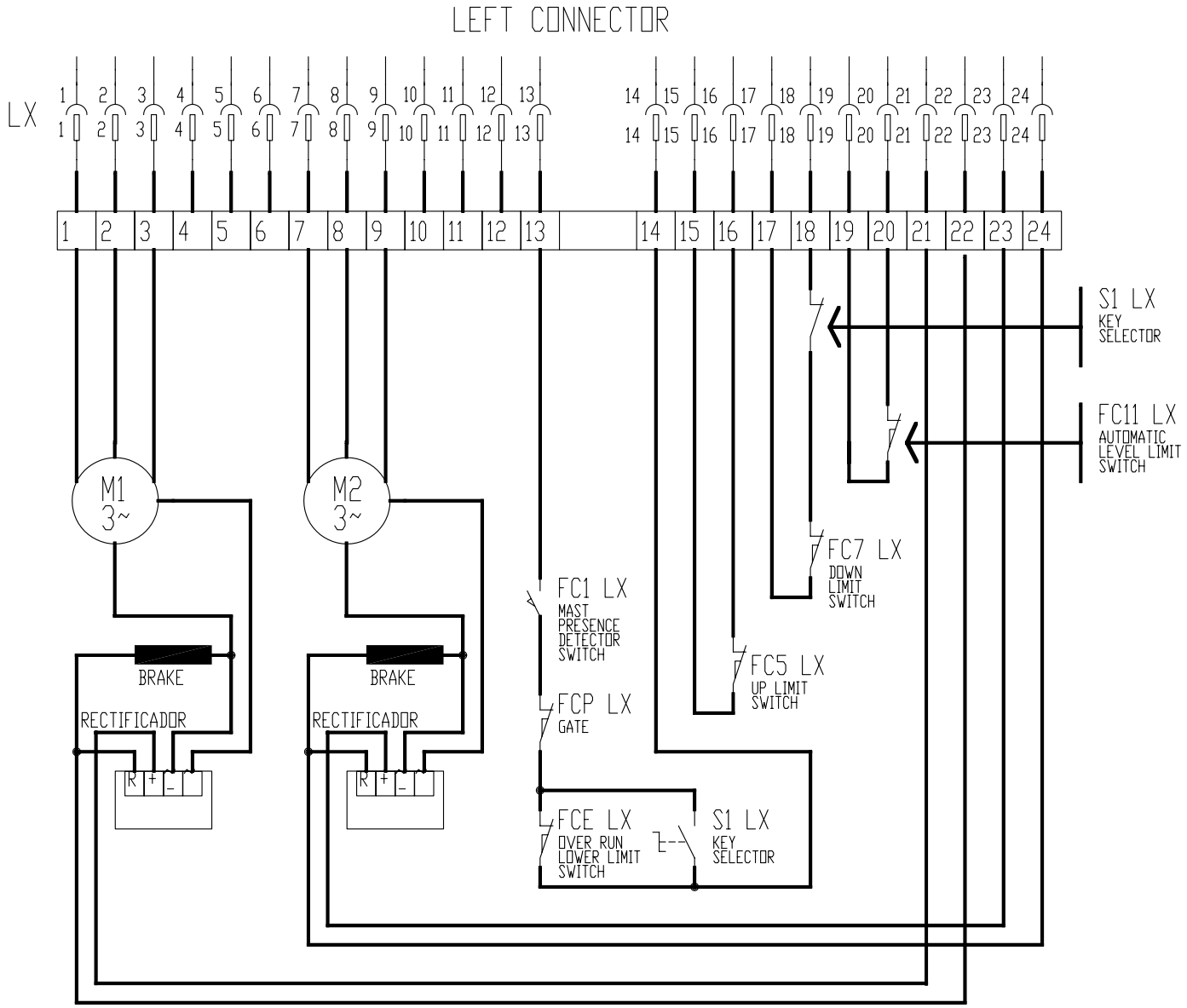
ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 3
	TYPE: EP 2818 380 3KW EP 3125 380 4.4KW	IT SUBSTITUITED:	DATE	020423	DATE 24/04/02	Tot. Docs.: 8





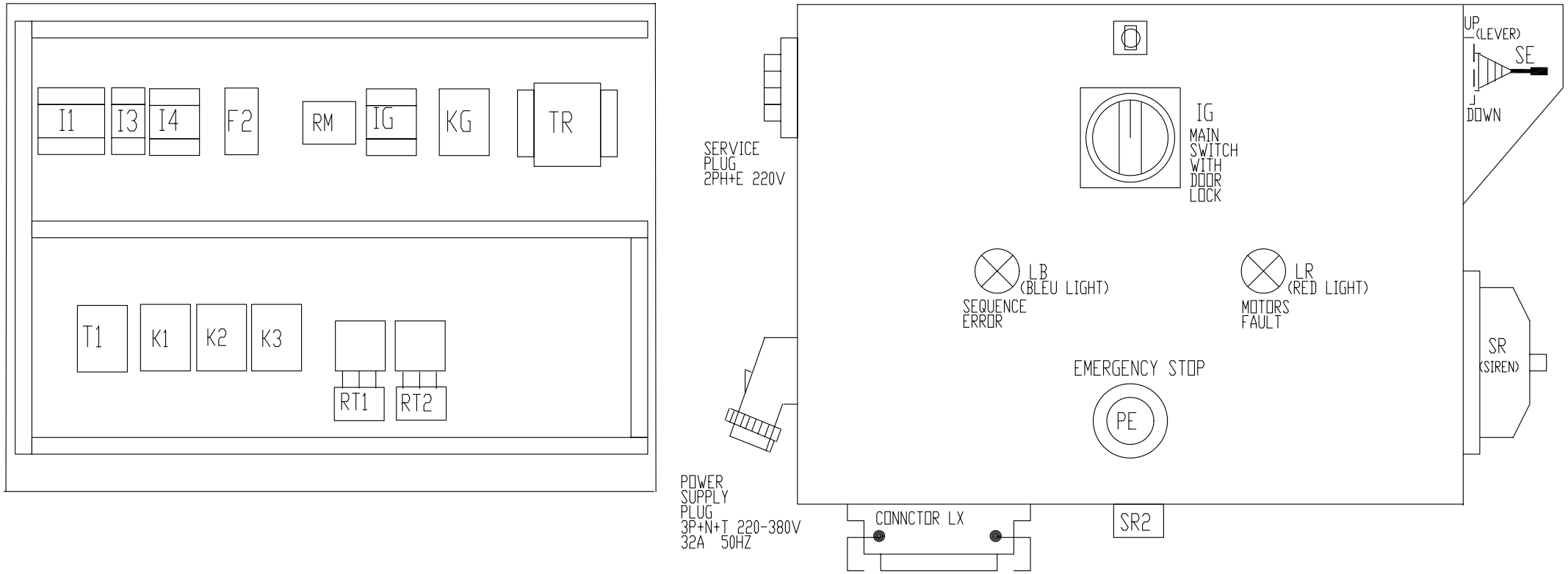
Control scheme

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 4
	TYPE: EP 2818 380 3KW EP 3125 380 4.4KW	IT SUBSTITUITED:	DATE	020423	DATE 24/04/02	Tot. Docs.: 8



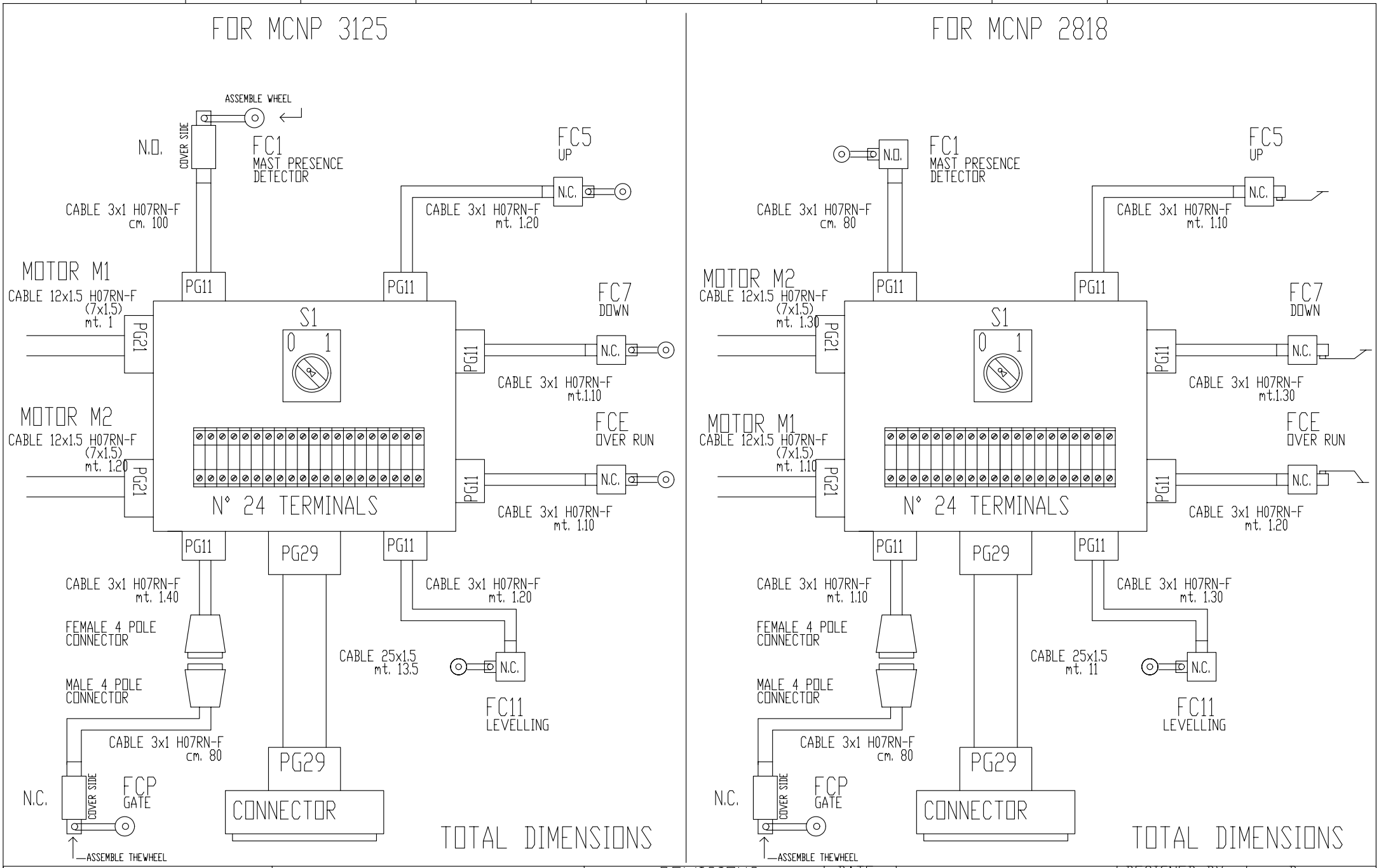
Control scheme

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 5
	TYPE: EP 2818 380 3KW EP 3125 380 4.4KW	IT SUBSTITUITED:	DATE	020423	DATE 24/04/02	Tot. Docs.: 8



CONTROL PANEL LAYOUT

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 6
	TYPE: EP 2818 380 3KW EP 3125 380 4.4KW	IT SUBSTITUITED:	DATE	020423	DATE 24/04/02	Tot. Docs.: 8



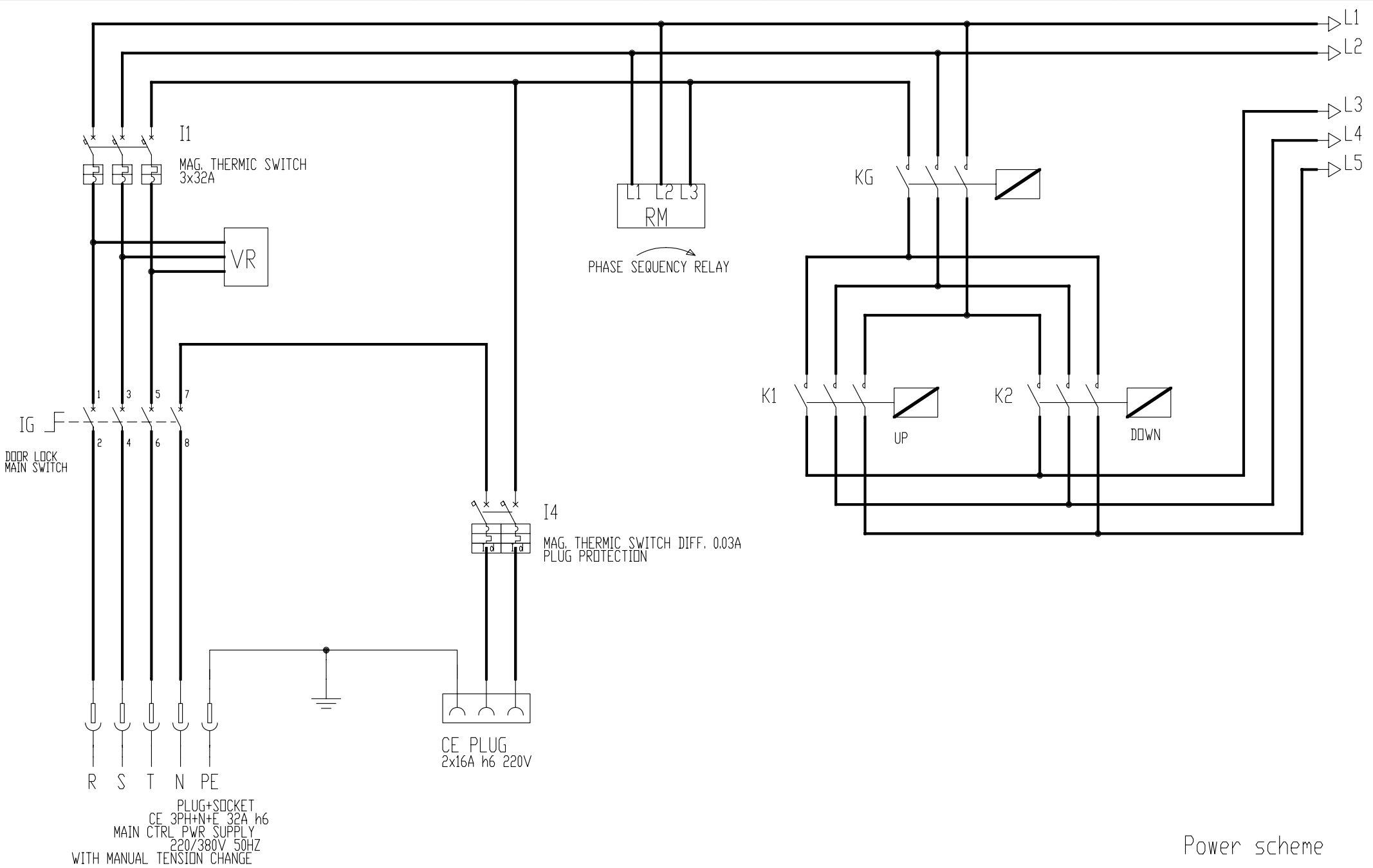
ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 7
	TYPE: EP 2818 380 3KW EP 3125 380 4.4KW	IT SUBSTITUITED:	DATE	020423	DATE 24/04/02	Tot. Docs.: 8

0	1	2	3	4	5	6	7	8	9

QUANTITA'	ARTICOLO		DESCRIZIONE
1	ZAD93/14		CAJA CUADRO ELECTRICO 400x500x200
1	W2608		ENCHUFE CEE 3P+N+T 32A 380V 50HZ
1	SCH17254		TOMA 2P+T 16A 220V 50HZ
1	SPLA2161754	IG	SELECCIONADOR BLOQUEO PUERTA
1	SPLFSN6175	IG	MANIOBRA AMARILLO ROJA
			BLOQUEO PUERTA
1	MG24285	I1	INT. MAGNETICO 3X20A CURVA C
1	WEPCH2X3832A	F2	PORTAFUSIBLE SEZ. 2 POLI 10.3x38
2	OM10.3x38 2A	F2	FUSIBLE 10.3x38 2A
1	MG19131	I3	INT. AUTOMATICO 1P+N CURVA C
1	MG19405	I4	INT. AUTOMATICO DIFF. 16A 30MA
4	LC1 D09 B7	KG-1-2-3	CONTACTOR 380V Ecc.24V
1	LA1 DN 11	K1-2	CONTACTOS AUX 1NO+1NC
1	TEZBE102		CONTACTOS AUX
2	TELAD7B10	RT1-2	BASE PARA TERMICO
2	TELRD10	RT1-2	TERMICO 4-6A
1	9300240301	SX	CONECTOR HARTING 24P-F
1	9330242701	SX	CARCASA PARA CON. HARTING 24P
1	VE 150VA	TR	TRASF. 0-220-380/0-24V 150VA
1	SIRENA 24V	SR	SIRENA 24V
1	RM4TG20	RM	RELE' SECUENCIA FASES
1	LO31L48TB3S24	T1	TEMPORIZADOR 24V 1sec.
1	EZZA2S8P	T1	BASE OCTAL PARA TEMPORIZADOR
1	ZB5AS54	PE	PULSADOR EMERGENCIA A SETA
1	EL030MTTN	SE	SELECTOR A CLOCHE
1	ZB5AZ102	PE	CONTACTO NC 24V
2	BA9.30.2	LR-B	LAMPARITA A BAYONETA 2W 30V
1	8LP2TIL214	LR	LAMPARA ROJA 24V
1	8LP2TIL216	LB	LAMPARA AZUL 24V
1	BIP 92	SR2	TIMBRE BAJADA 24V
3		VR	VARIADOR 475V 40A

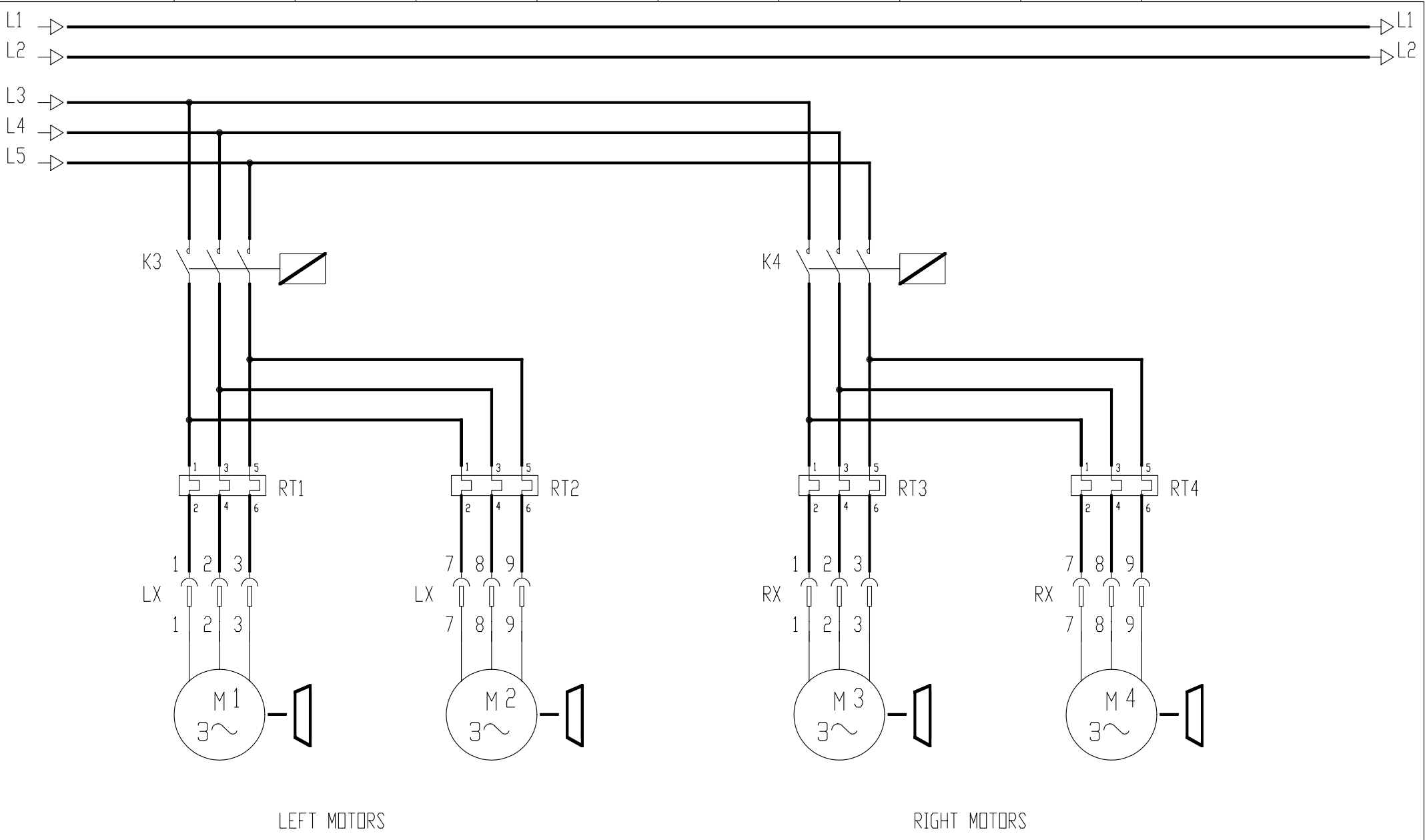
QUANTITA'	ARTICOLO		DESCRIZIONE
			CAJA DE DERIVACION
1	00350		CAJA SAREL
20	39060		BONES LEGRAND
1	ZB5AG4	S1	SELECTOR A LLAVE
1	ZB5AZ101	S1	CONTACTO NO 24V
6	FL P551		FC1SX-5SX-7SX-ESX-PSX-11SX FIN DE CARRERA
6	PG13.5		TOMACABLE SKINTOP
6	PG11		TOMACABLESKINTOP + DADO
2	PG29		TOMACABLE SKINTOP (+ 1 DADO)
1	09300241421		CARCASA PARA CON. HARTING 24P
1	09330242601		FRUTO CON. HARTING 24P-M
1			CABLE 3x1 H07RN-F PARA FINALES DE CARRERA
1			CABLE 12x1.5 H07RN-F PARA MOTORES
1			CABLE 25 x1.5 PARA CONEXIONES AL CUADRO

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 8
	TYPE: EP 2818 380 3KW EP 3125 380 4.4KW	IT SUBSTITUITED:	DATE	020423	DATE 24/04/02	Tot. Docs.: 8



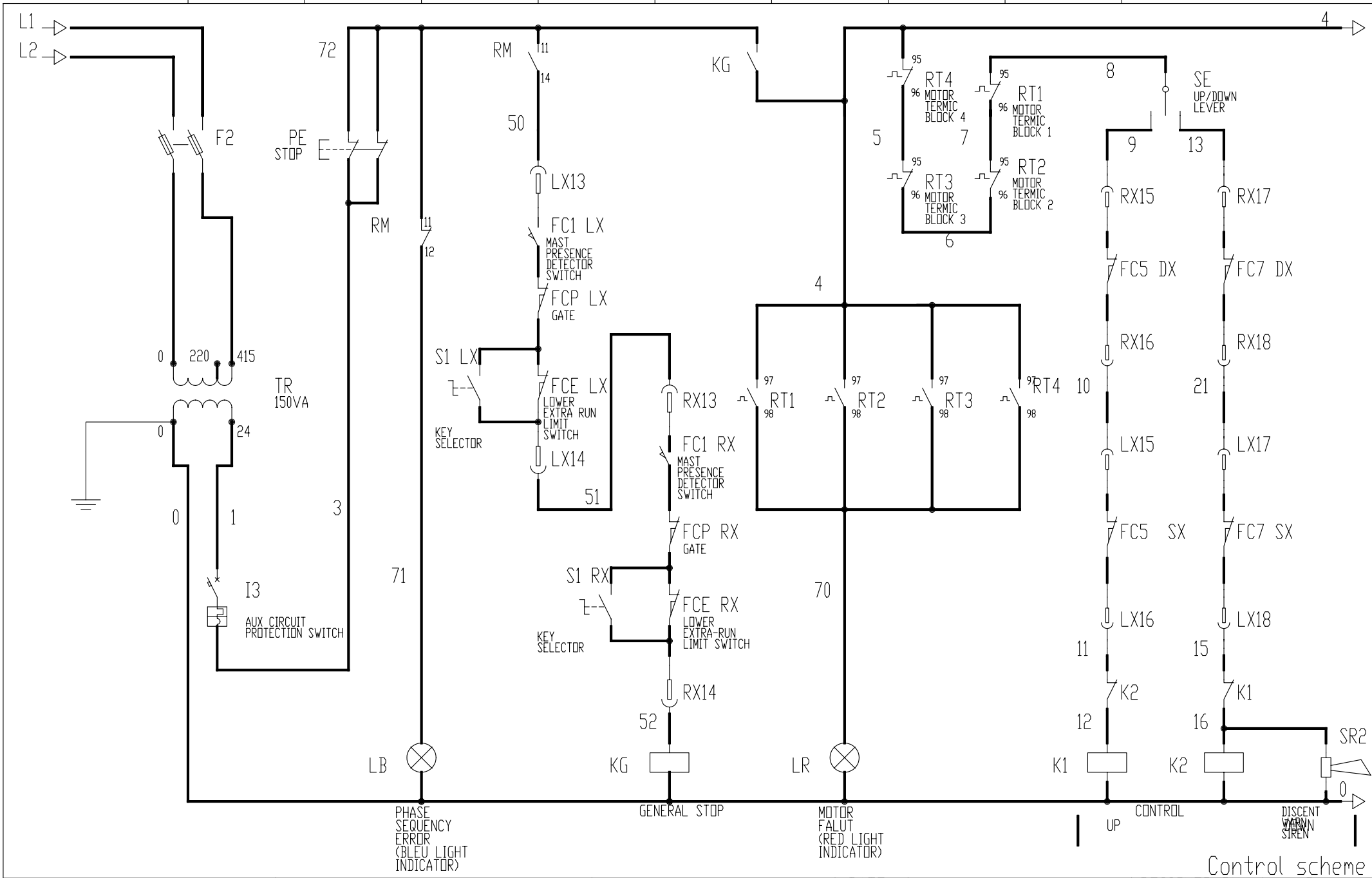
Power scheme

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 1
	TYPE: EP 2818 380 6KW EP 3125 380 9KW	IT SUBSTITUITED:	DATE	020422	DATE 10/05/02	Tot. Docs.: 8



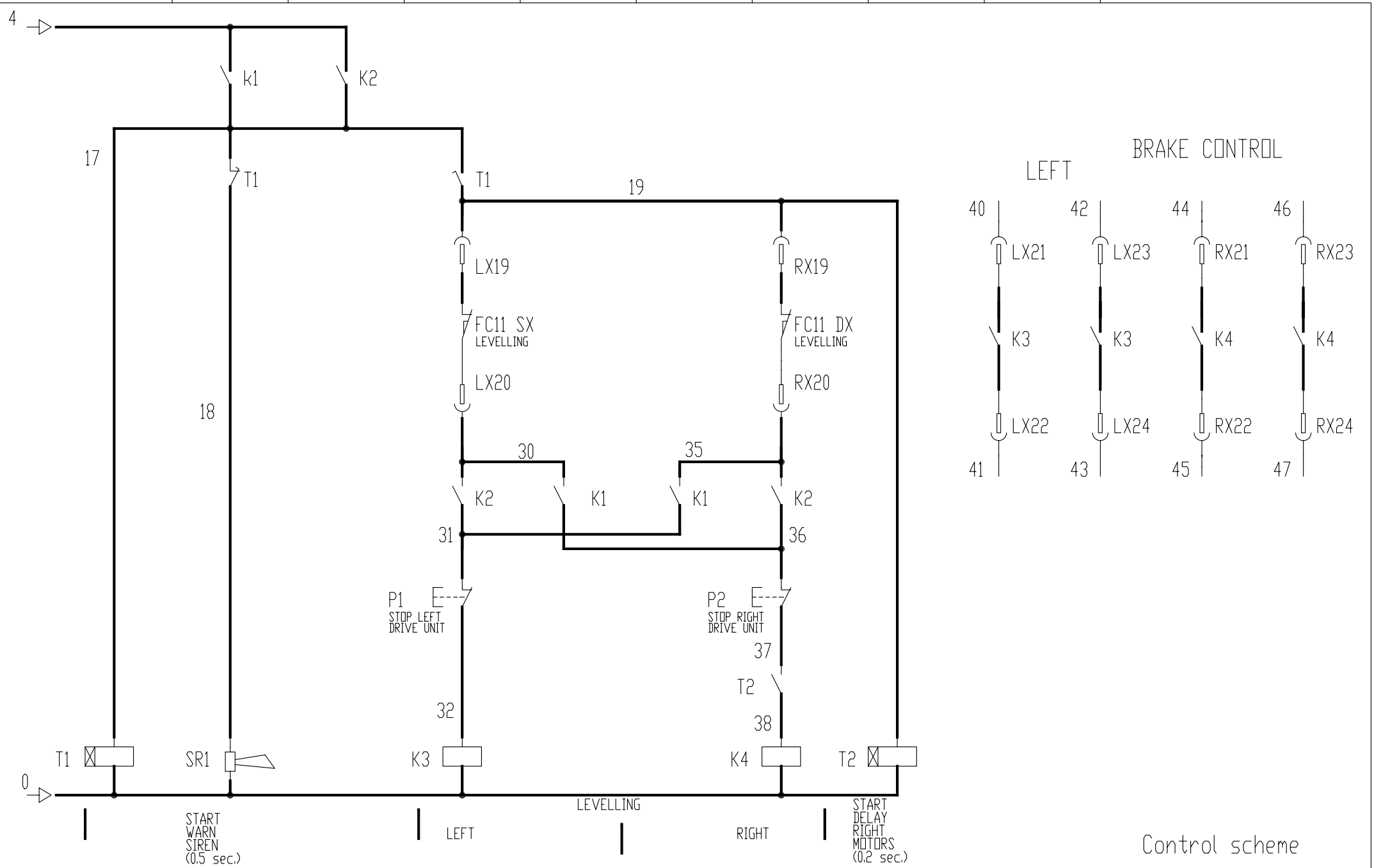
Power scheme

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 2
	TYPE: EP 2818 380 6KW EP 3125 380 9KW	IT SUBSTITUITED:	DATE	020422	DATE 24/04/02	Tot. Docs.: 8



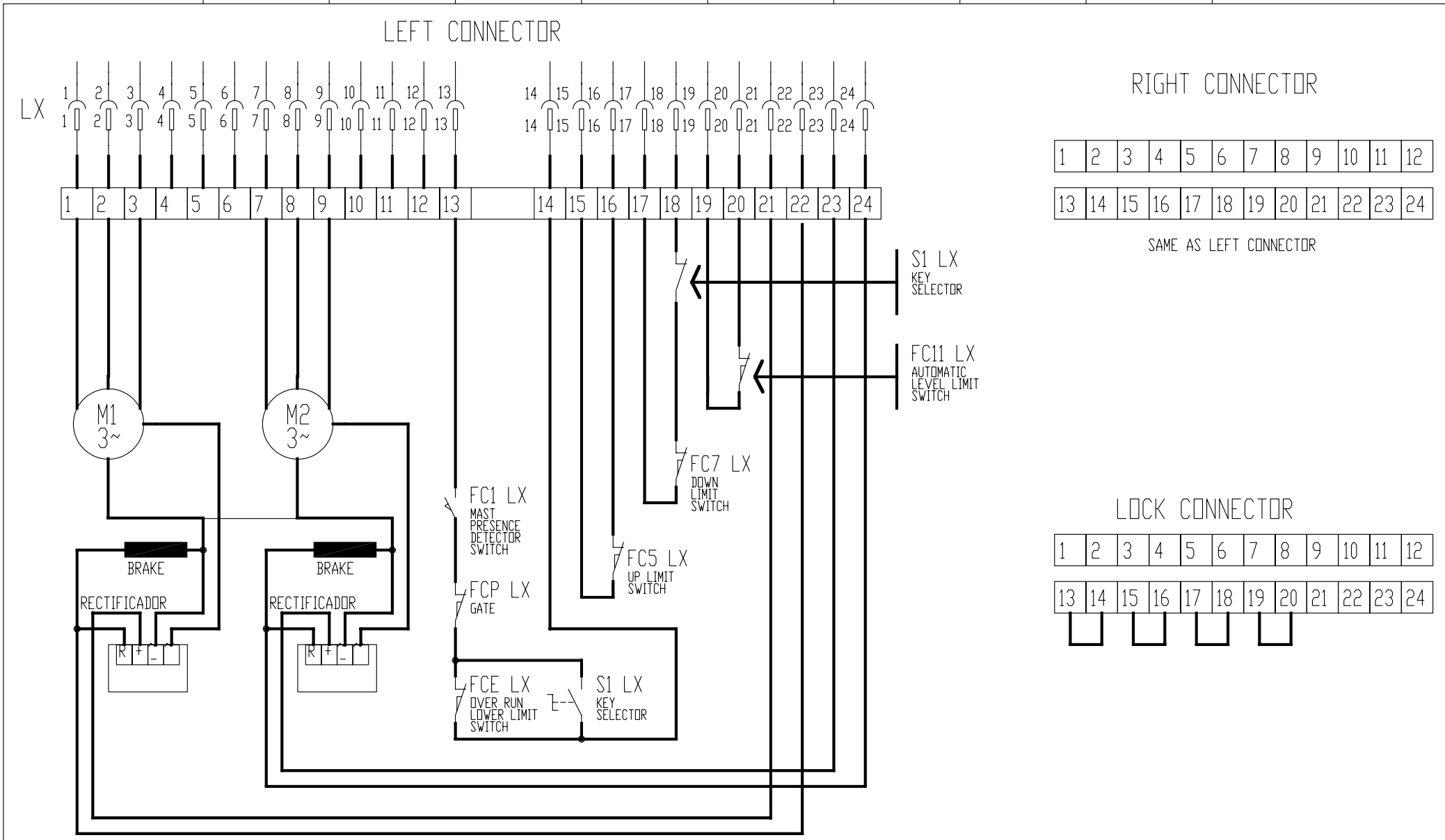
Control scheme

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 3
	TYPE: EP 2818 380 6KW EP 3125 380 9KW	IT SUBSTITUITED:	DATE	020422	DATE 24/04/02	Tot. Docs.: 8



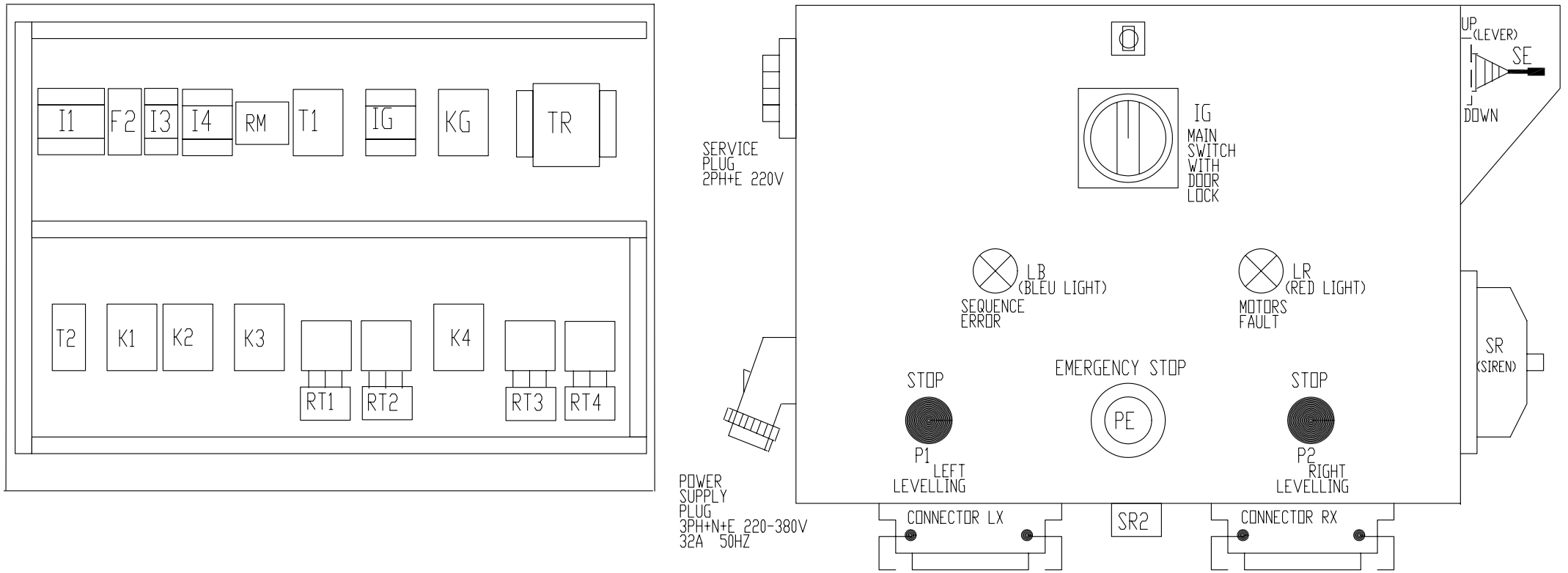
Control scheme

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 4
	TYPE: EP 2818 380 6KW EP 3125 380 9KW	IT SUBSTITUITED:	DATE	020422	DATE 24/04/02	Tot. Docs.: 8



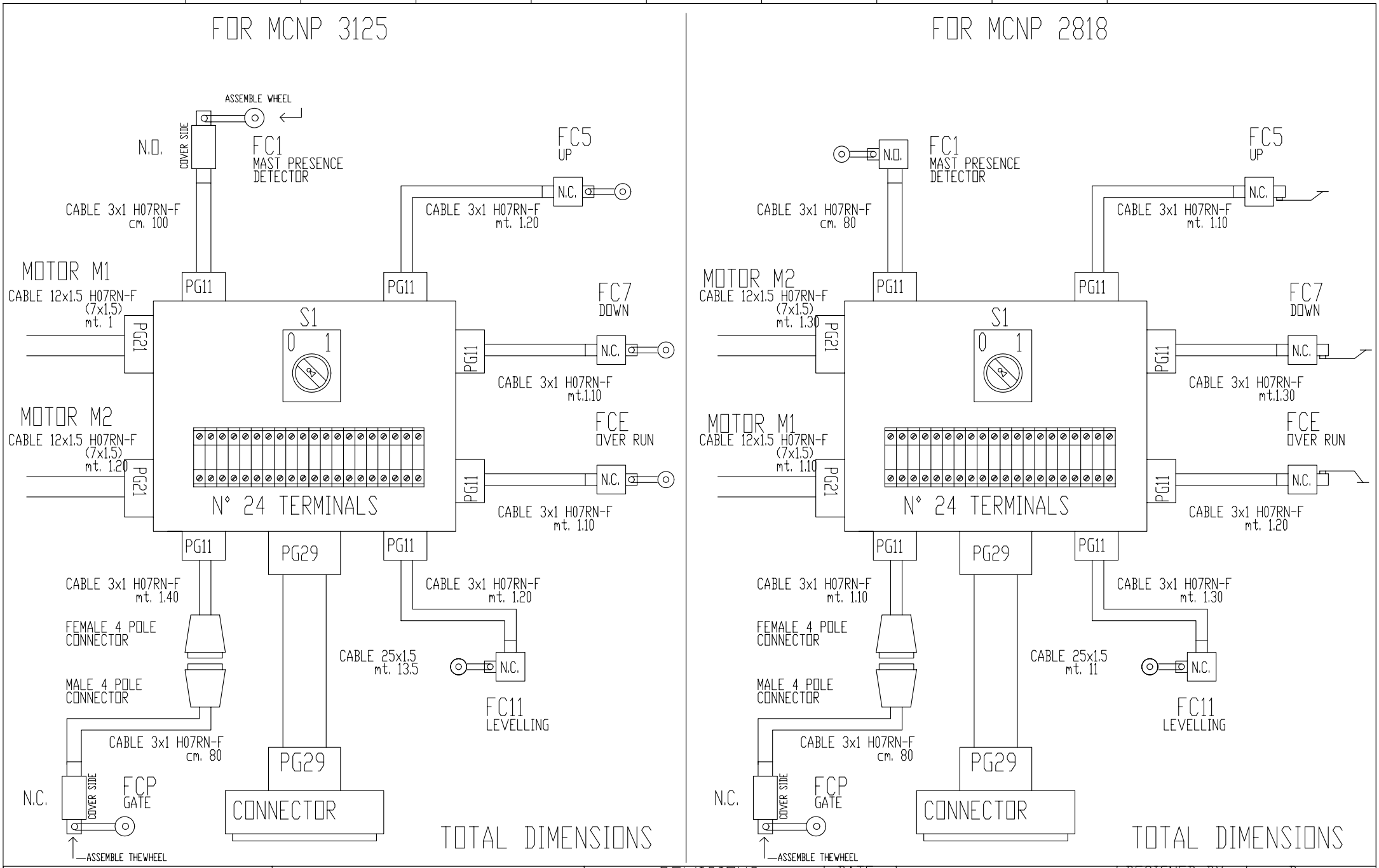
Control scheme

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 5
	TYPE: EP 2818 380 6KW EP 3125 380 9KW	IT SUBSTITUITED:	DATE	020422	DATE 24/04/02	Tot. Docs.: 8



CONTROL PANEL LAYOUT

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 6
	TYPE: EP 2818 380 6KW EP 3125 380 9KW	IT SUBSTITUITED:	DATE	020422	DATE 24/04/02	Tot. Docs.: 8



ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 7
	TYPE: EP 2818 380 6KW EP 3125 380 9KW	IT SUBSTITUITED:	DATE	020422	DATE 24/04/02	Tot. Docs.: 8

0	1	2	3	4	5	6	7	8	9

CANTIDAD	ARTICULO		DESCRIPCION	CANTIDAD	ARTICULO	DESCRIPCION
1	ZAD93/17		CAJA CUADRO ELECTRICO 600x400x200	4	TELRD10	RT1-2-3-4 RELE' TERMICO 4-6 A
1	SCH17254		TOMA CEE 2P+T 16A 220V	2	TELC1D09B7	K3-4 CONTACTOR 9A 1NO+1NC
1	W2608		ENCHUFE CEE 3P+N+T 32A 380V 50HZ			
1	SPLFS2N6175	IG	MANIOBRA AMARILLO-ROJA 1-0			
1	SPLA2201754	IG	INT. BLOQUEOPUERTA 4P			
1	LO8LP2TIL214	LR	LAMPARA ROJA			
1	LO8LP2TIL216	LB	LAMPARA AUZL			
2	BA9,30,2		LAMPARITA A BAYONETA 30V 2W			
1	TEZB5AS54	PE	PULSADOR EMERGENCIA A SETA			
2	TEZB5AA2	P1-2	PULSADOR NEGRO			
3	TEZB5AZ102		CONTACTO NC			
1	BIP92	BIP	SENAL ACUSTICO 24VAC/DC			
1	SIRENA24VAC		SIRENA ACUSTICA 24VAC 50Hz			
1	EL030MTTN		SELECTOR A CLOCHE			CAJA DE DERIVACION SX
2	09300240301		CARCASA PARA CON. 24P	1	03560	CAJA SAREL
2	09330242701		FRUTO HEMBRA 24P	26	39060	BONES LEGRAND
2	EN16511417		BONES 6MM T.	1	ZB5AG4	S1 SX SELECTOR A LLAVE
1	TEBE102		CONTACT NC	1	ZB5AZ101	S1 SX CONTACT NO 24V
1	OBOPG21			6	FL P551	FC1SX-5SX-7SX-ESX-11SX-PSX FIN DE CARRERA
1	MG24287	I1	INT. AUTOM. 3P 32A	6	PG13,5	TOMACABLE SKINTOP
1	WEPCH2x3832A	F2	PORTAFUSIBLE 2P 32A 10x38	6	PG11	TOMACABLE SKINTOP + TUERCA
2	OM10x382A	F2	FUSIBLE 10x38 2A	2	PG29	TOMACABLE SKINTOP (+ 1 TUERCA)
1	MG19131		INT. AUT. DPNA 1P+N 6A CURVA	1	09300241421	CARCASA PARA CON. HARTING 24P
1	MG19405		DPN/A VIGI 1P+N 16A 30MA	1	09330242601	FRUTO CON. HARTING 24P- MACHO
1	TERM4TG20	RM	RELE' SECUENCIA FASES 220/380V	1		CABLE 3x1 H07RN-F PARA FINALES DE CARRERA
2	EZZA2S8P	RM	BASE OCTAL PARA RELE'	1		CABLE 12x1,5 H07RN-F PARA MOTORES
2	LO31L48TB3S24	T1-2	TEMPORIZADOR 3S 24V 2 CONTATTI	1		CABLE 25x1,5 PARA CONEXIONES AL CUADRO
1	VE150VA	TR	TRASF. 150VA			
3	TELC1D18B7	KG-1-2	CONTACTOR 18A 1NO+1NC			
4	TELADN20		CONTACT AUX 2NO	1		
4	TELAD7B10	RT1-2-3-4	BONERA PARA TERMICO			
3	VARISTORE		VARISTORE RADDRIZZATORE			

ELECTROELSA s.r.l.	CUSTOMER: ELECTROELSA	REVISIONS SUBSTITUITED BY:	DATE	No. DRAWING	DESIGNED BY: Fusi	Doc.: 8
	TYPE: EP 2818 380 6KW EP 3125 380 9KW	IT SUBSTITUITED:	DATE	020422	DATE 24/04/02	Tot. Docs.: 8