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MANUAL

TRANSPORT PLATFORM

TORGAR PL-15 EXT-DC

MANUAL TORGAR PL-15 EXT-DC_R00 ENGLISH – NOVEMBER 2022

MANUAL REVISIONS

REVISION	SUBJECT	N. MACHINE
00	Initial Review	-

INDEX

1. CE

2. WARRANTY

2.1 DESIGNATION OF THE TRANSPORT PLATFORM

Stamp and Date.

FRACO MANUFACTURING, S. L.

Country of manufacture: Spain.

Name of the transport platform: PL 15-EXT-DC

2.2 GENERAL TERMS OF THE WARRANTY

- Valid for one year.
- The warranty covers the replacement of any part recognized to be faulty but does not include labor, transport and packaging.
- The warranty becomes invalid if the machine is damaged during transport or as a result of an accident, or due to improper use or mishandling on the part of unauthorized personnel.
- No return or refund will be granted.
- The customer shall be not entitled to compensation should the machine be temporarily out of service due to the repair or replacement of parts under warranty.

3. DESCRIPTION OF THE TRANSPORT PLATFORM

3.1 INTRODUCTION

This document contains the necessary information for the correct assembly, use and maintenance of the machine in accordance with European, US and Canada Standards. It also includes the machine warranty.

All the measures corresponding to the International System of Units and close to them appear the USCU units. In case of mistake or bad conversion, the ISU will prevail. All measures of the screws will be in metric and mm.

This instructions manual is delivered with the machine and must be kept with it. It must always be kept available and in good condition so that it can be consulted during the assembly, dismantling, transport and use of the machine. It should also be consulted whenever inspection and maintenance work is to be carried out.

Only authorised and properly trained personnel should be entrusted with operating the machine.

THE USER MUST READ THIS MANUAL AND FULLY UNDERSTAND ITS CONTENTS BEFORE PROCEEDING WITH ANY OPERATION INVOLVING THE INSTALLATION OR OPERATION OF THE MACHINE

FRACO MANUFACTURING, S. L. shall not be held responsible for any possible misinterpretation of the contents of this manual. If you are in any doubt or require technical assistance, please contact the manufacturer or the authorised distributor.

FRACO MANUFACTURING, S. L. shall not accept any responsibility for any problems or damage resulting from the following:

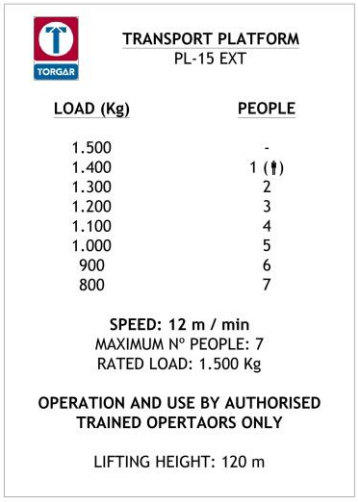
- The improper use of the machine.
- Use of the machine by inexperienced personnel.
- Use of the machine not meeting the safety regulations set out in specific EC and/or national legislation (included local regulations of authorities having jurisdiction).
- The total or partial failure to comply with the instructions laid out in this manual.
- Modifications or repairs that have not been authorized by the manufacturer.
- The use of non-original spare parts.

In its capacity as the manufacturer, FRACO MANUFACTURING, S. L. reserves the right to make modifications to its machines in order to improve their performance. It is possible, therefore, that there are some variations between the machines and the information contained in this manual.

3.2 MACHINE SIGNS

Transport platforms are equipped with several information and safety signs located in visible places. These signs are legible, indelible and comprehensible.

- Load capacity and maximum number of people. (The mass of people in platform must be reduced from the total load capacity of the transport platform).

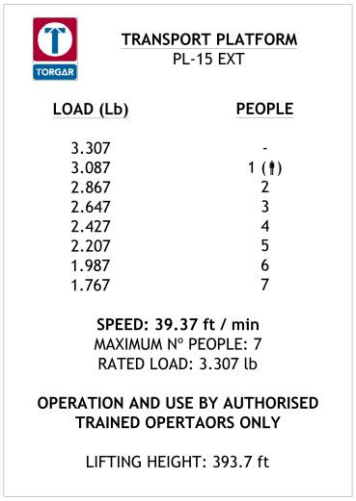

TRANSPORT PLATFORM
PL-15 EXT

LOAD (Kg)	PEOPLE
1.500	-
1.400	1 (🧍)
1.300	2
1.200	3
1.100	4
1.000	5
900	6
800	7

SPEED: 12 m / min
MAXIMUM Nº PEOPLE: 7
RATED LOAD: 1.500 Kg

OPERATION AND USE BY AUTHORISED TRAINED OPERTAORS ONLY

LIFTING HEIGHT: 120 m


TRANSPORT PLATFORM
PL-15 EXT

LOAD (Lb)	PEOPLE
3.307	-
3.087	1 (🧍)
2.867	2
2.647	3
2.427	4
2.207	5
1.987	6
1.767	7

SPEED: 39.37 ft / min
MAXIMUM Nº PEOPLE: 7
RATED LOAD: 3.307 lb

OPERATION AND USE BY AUTHORISED TRAINED OPERTAORS ONLY

LIFTING HEIGHT: 393.7 ft

- Speed limiter activation point (52.49 ft/min).

- Name, serial number, motor and date of manufacture.

These signs must be kept clean and legible. If wear and tear or loss, they have to be replaced immediately.

NONE OF THESE SIGNS CAN BE
HIDDEN, REMOVED, DISPLACED, MANIPULATED OR TEMPERED WITH

3.3 GENERAL MECHANICAL DATA

	LOAD		N. PEOPLE	SPEED		POWER	GEAR	TIE DISTANCE	
UNITS	Kg	lb	-	m/min	ft/min	kW	-	m	ft
PL-15-DC	1,500*	3,307*	7*	12	39.37	2(2 x 4)	2(1: 48.2)	3 / 6	9.84 / 19.68

*Note: The mass of people in platform must be reduced from the total load capacity of the transport platform.

	INNER DIMENSIONS		INSTALATION DIMENSIONS		FREESTANDING HEIGHT		MAXIMUM HEIGHT	
UNITS	m	ft	m	ft	m	ft	m	ft
PL-15-DC	1.6 x 4.4 x 2.1	5.24 x 14.43 x 6.88	5.4 x 5.9	17.71 x 19.35	4.0	13.12	120	393.70

Galvanized platform – mast sections – base - floor protection doors (optional) – base enclosure.

Module rack – pinion: 8.

Platform doors: Two small ramp to the sides, and in the front hinged doors.

Base enclosure: 2.0 m (6,56) enclosure.

Electrical and mechanical lock in all doors.

Noise level: less than 80 dB (A). Maximum level of vibration: 0.66 m/s^2 (2.16 ft/s^2).

Work temperature range: -25ºC (-13ºF) to +40ºC (+104ºF). Storage: -40ºC (-40ºF).

3.4 SAFETY EQUIPMENT

a) Electrical and mechanical interlock in access door. It prevents the operation of the machine if any of the doors are open and also deny the opening of the door if the platform is not at level.

b) Emergency manual lower if power cut.

c) Top and bottom end-of-travel detection. A limit switch ensures that the platform stops even if the stop limit switches fail.

d) Rack detector limit switch. Prevents the platform from coming out of the mast.

e) Frontal mesh to protect people from the mast sections controlled by a safety limit switch.

f) Safety mast section without rack.

g) Motor-brakes that hold the platform and its rated load even if power fails.

h) Nonslip surfaces.

i) 3 meters (9.84 ft) limit switch: The platform stops when reach 3 m (9.84 ft) before the bottom floor.

j) Safety device: Operates when the platform exceeds 15% its nominal speed. It is only mechanical and operates automatically even if there is no power. A limit switch cuts off the power to the motors.

k) Overload device: A electronic overload device with a cell prevents the transport platform from operating if the maximum load has been exceeded.

l) Base enclosure or anti-crushing mesh: They prevent any operator from standing under the vertical path of the cabin and when it descends, it can crush or injure him.

4. INSTRUCTIONS FOR ASSEMBLY AND DISMANTLING

Next, the basic procedure for assembling the machine is set out. It is useful to checking out the drawings and pictures in order to understand the following points.

THE MACHINE SHOULD ONLY BE ASSEMBLED AND DISMANTLED BY PROPERLY QUALIFIED AND TRAINED PERSONNEL

FRACO MANUFACTURING, S. L. RECOMMEND THAT ASSEMBLY AND DISMANTLE OPERATIONS SHOULD BE DONE BY THREE PEOPLE

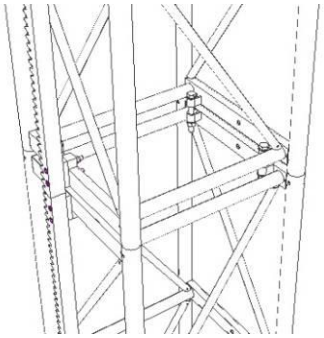
COMPULSORY THE USE OF PERSONAL PROTECTION EQUIPMENT (PPE'S)
GLOVES – HELMET – GOOGLES – BOOTS – SAFETY ARNES – REFLECTIVE VEST

¡MANDATORY!

INSTALLING A SECURITY CABLE IS COMPULSORY WHEN THE TRANSPORT PLATFORM IS BEING ASSEMBLED OR DISMANTLED

¡RECOMMENDATION!

THE SECURITY CABLE MUST BE INSTALLED IN THE SAME LINE OF THE UPRIGHT POST OF THE MACHINE. THE SECURITY CABLE MUST BE INSTALLED ACCORDING TO THE INSTRUCTIONS GIVEN BY THE SECURITY CABLE MAKER, ANCHORED TO ROOFS, BALCONIES OR FORGED THAT SUPPORT THE WEIGHT INDICATED BY THE HARNESS MANUFACTURER

<table>
<tr>
<td>  </td>
<td>¡ATTENTION!
¡DANGER!</td>
<td>  </td>
</tr>
<tr>
<td colspan="3">TIGHTEN THE MAST BOLTS WITH THEIR PROPER TORQUE EVERY TIME THAT A MAST SECTION IS PLACED

DO NOT MOVE THE PLATFORM IN ANY DIRECTION IF THERE ARE SECTIONS THAT ARE NOT TIGHTENED AND SECURED BY ALL THE MAST BOLTS: THE PLATFORM COULD BECOME DISCONNECTED FROM THE MAST AND DROP DOWN IMMEDIATELY

THIS TYPE OF ACCIDENT WOULD CAUSE DEATH OF PEOPLE ON BOARD THE UNIT</td>
</tr>
</table>

4.1 LOCATION

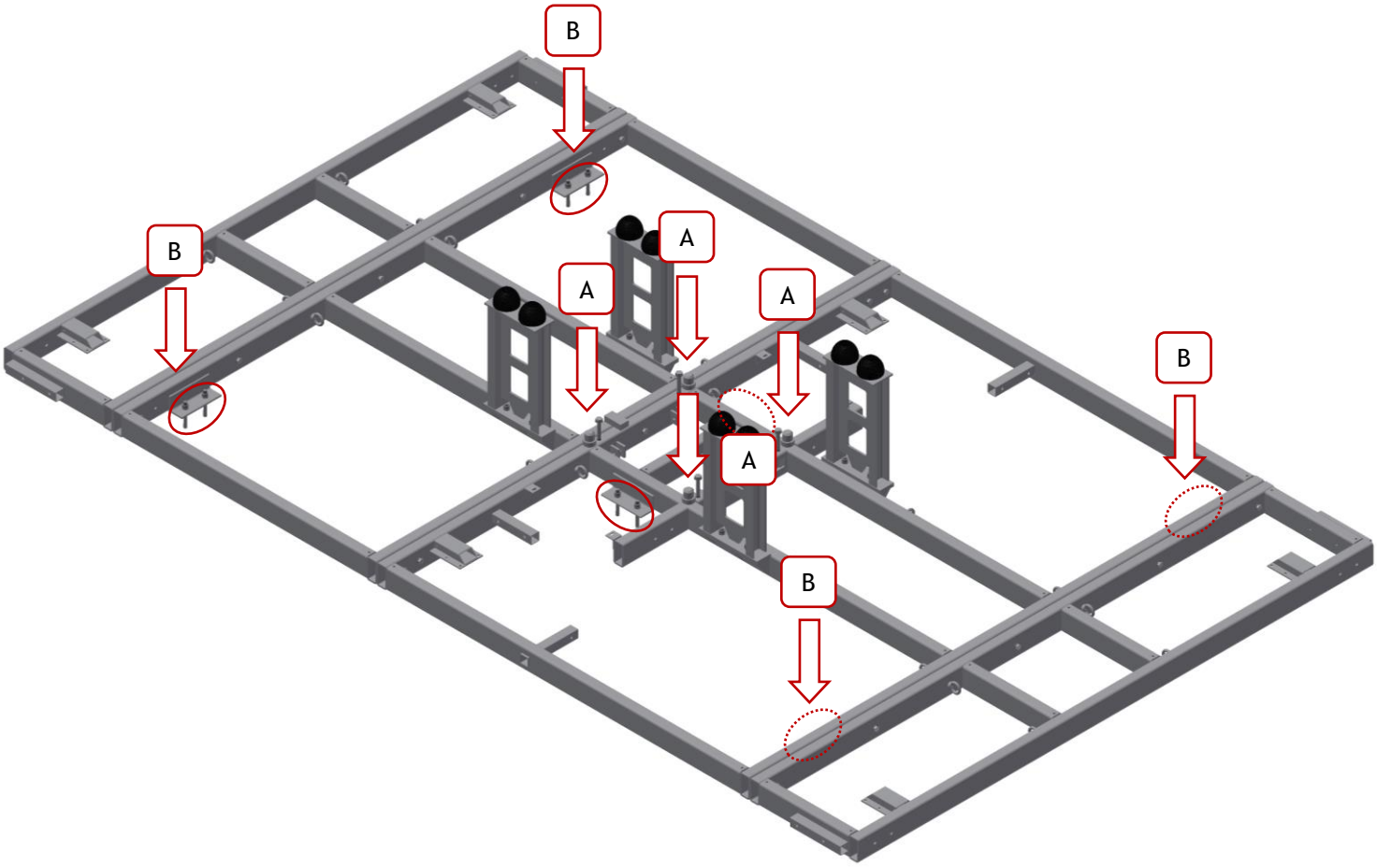
The machine should be placed under the following:

- Proximity to the area where goods are loaded and unloaded.
- Area clear of passing vehicles and other transport and lifting equipment.
- The base should be positioned on firm and solid ground.

The machine should be located as close as possible to the switch board to remove the need for excessively long power cables.

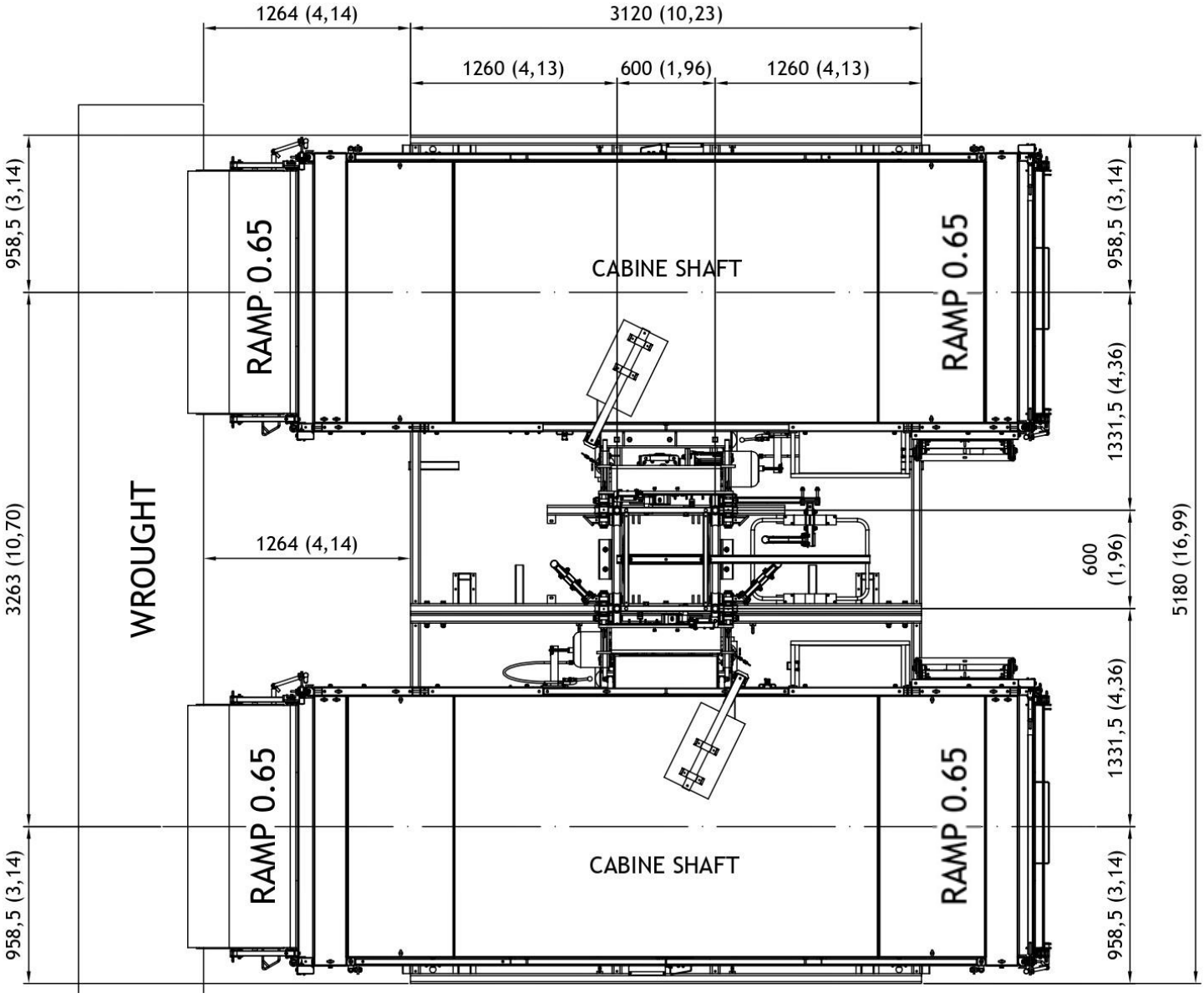
Install in zones without wind in order to avoid additional efforts to the machine.

4.2 FOUNDATION



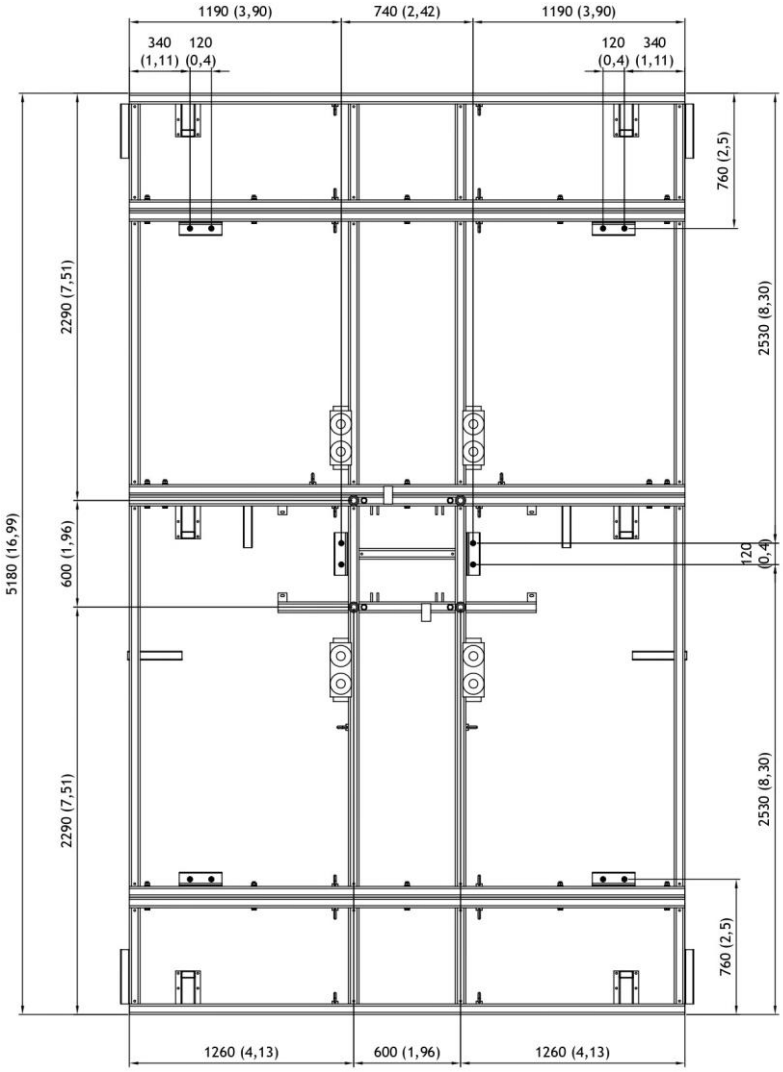
ESFUERZOS TRANSMITIDOS (Kg)				
PL-EXT-DC	A		B	
	Kg	lb	Kg	lb
	10.000	**22.046**	**3.000**	**6.650**

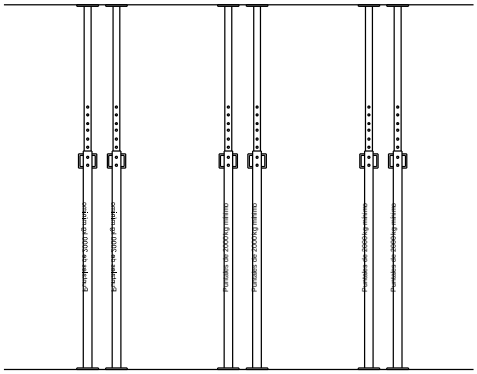
The foundation must be executed with these measures (mm and ft), the measures are different according to the modules of the cabin. For each cabin size, the distance from the base to the floor will be different:



- Minimum resistance: 180 Kg/cm^2 (2,560.2 lb/in^2)
- Mat reinforcement: Ø 8 x #250 mm (Ø 0.31 x #9.84 in)
- Thickness: 200 mm (7.87 in)

Note: Add shoring underneath the jack leg depending on the height of installation or in case of basements.





MINIMUM 2,000 Kg (4,409.24 lb)
EACH ONE

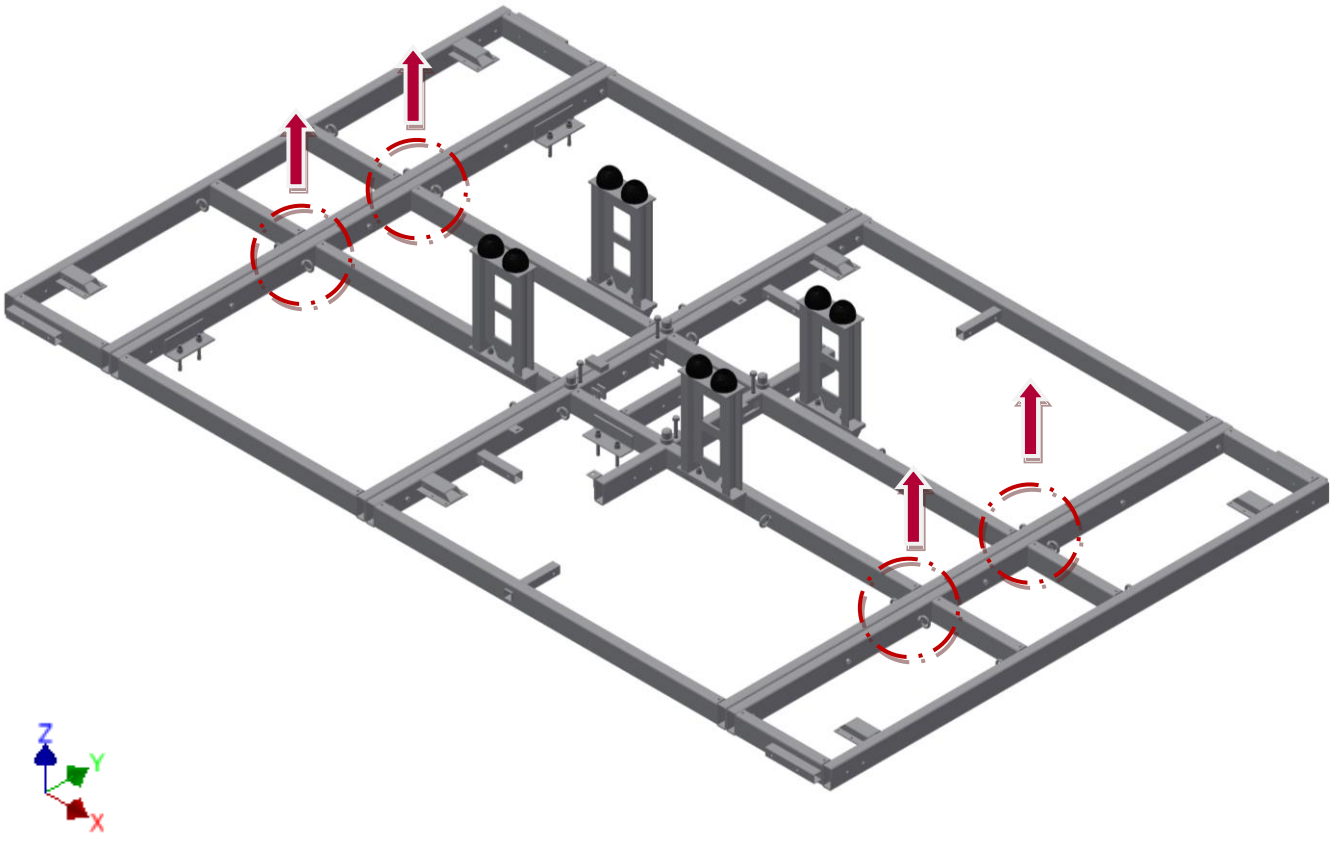
HEIGHT		LOAD	
m	**ft**	**Kg / cm²**	**lb / in²**
25	82.02	0.21	2.99
50	164.04	0.28	3.98
75	246.06	0.35	4.98
100	328.08	0.41	5.83
120	393.70	0.47	6.68

4.3 TRANSPORT AND HANDLING OF THE COMPONENTS

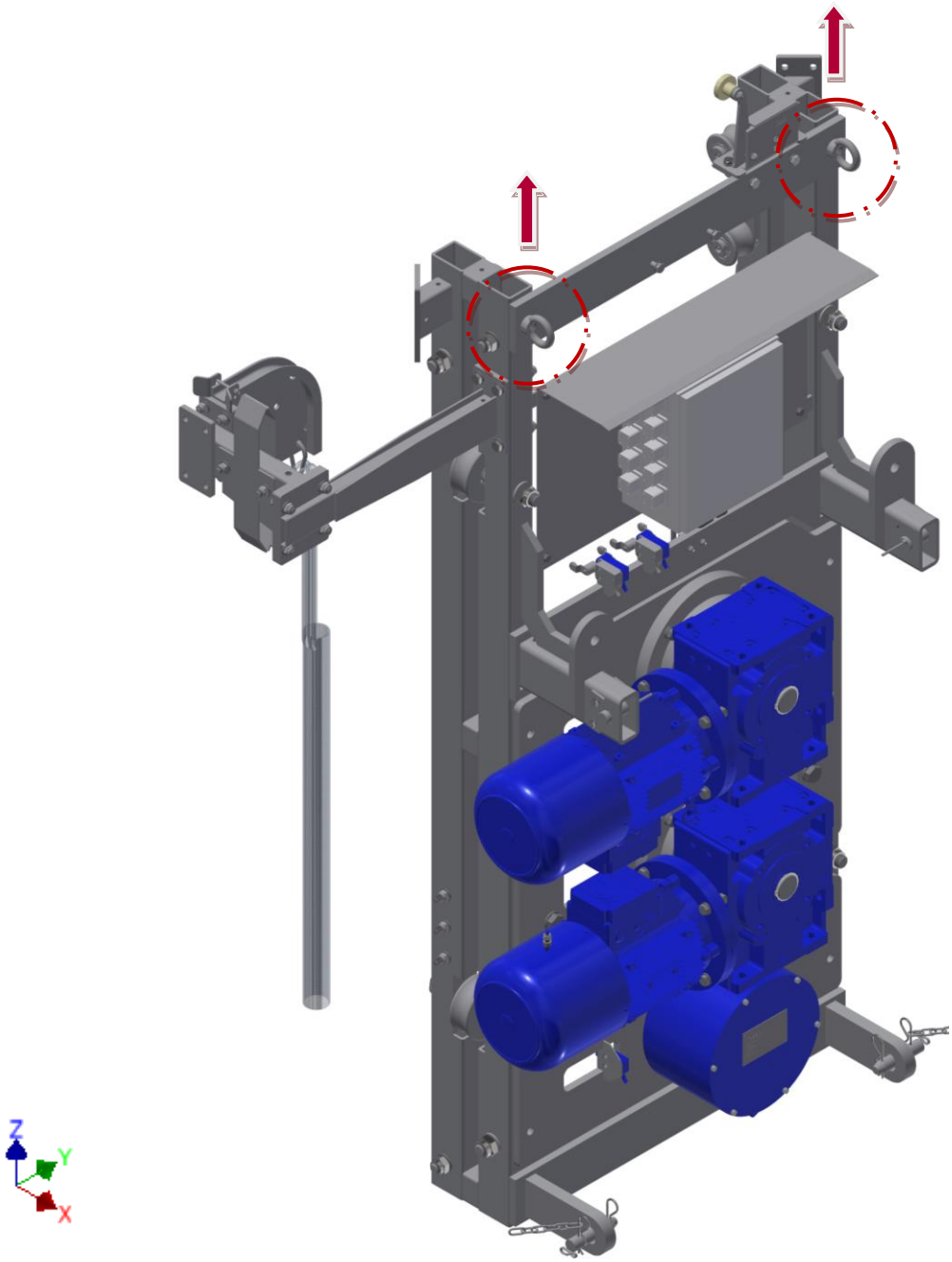
Once the position of the machine has been determined, all the components are moved to the site in order to fulfill the assembly.

Next are the recommended handling points of each component.

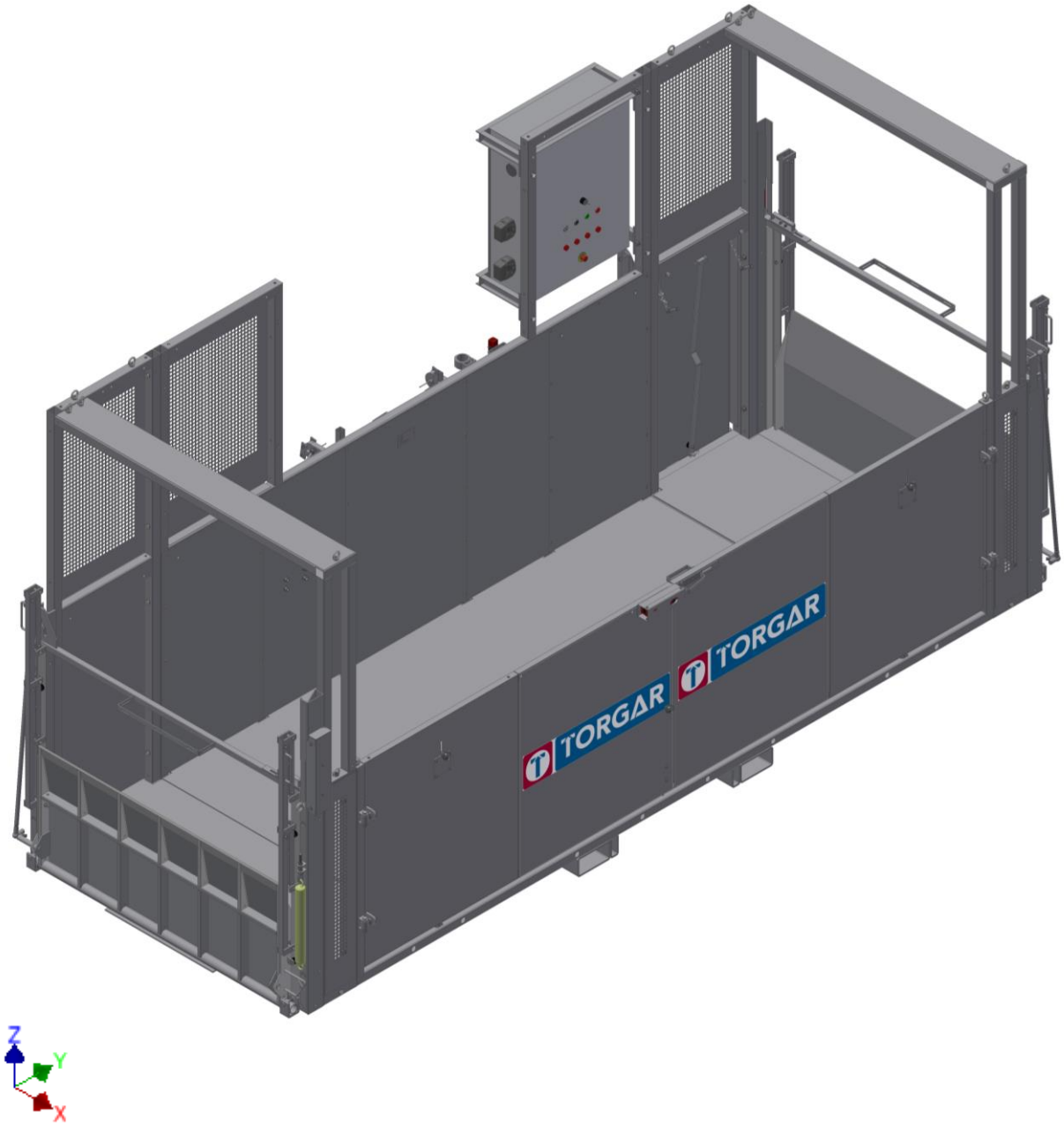
	X		Y		Z		WEIGHT	
BASE	mm	ft	mm	ft	mm	ft	Kg	lb
	5,180	16,99	3,120	10.23	755	2,47	1055	2314



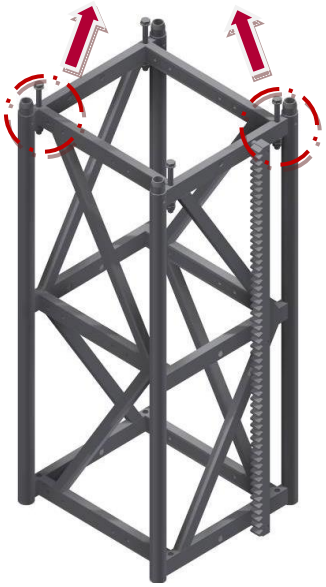
	X		Y		Z		WEIGHT	
MOTOR GROUP	mm	ft	mm	ft	mm	ft	Kg	lb
	460	1.5	820	2.69	2,000	6.56	650	1,433



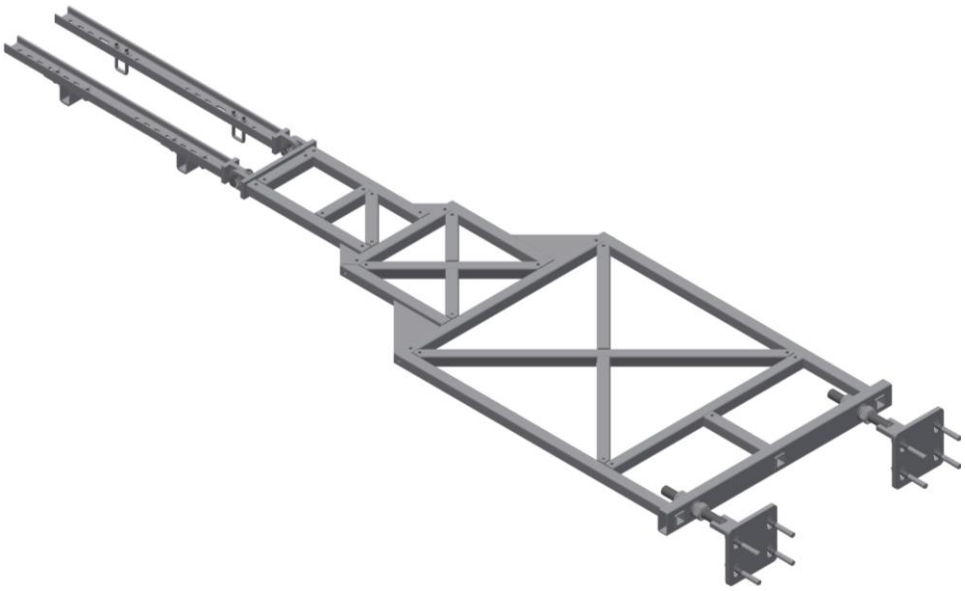
	X		Y		Z		WEIGHT	
PLATFORM	mm	ft	mm	ft	mm	ft	Kg	lb
	1,955	6.41	3,160	10.36	1,250	4.10	2,500	5,511



	X		Y		Z		WEIGHT	
MAST SECTION	mm	ft	mm	ft	mm	ft	Kg	lb
	600	1.96	600	1.96	1,500	4.92	92	202.82

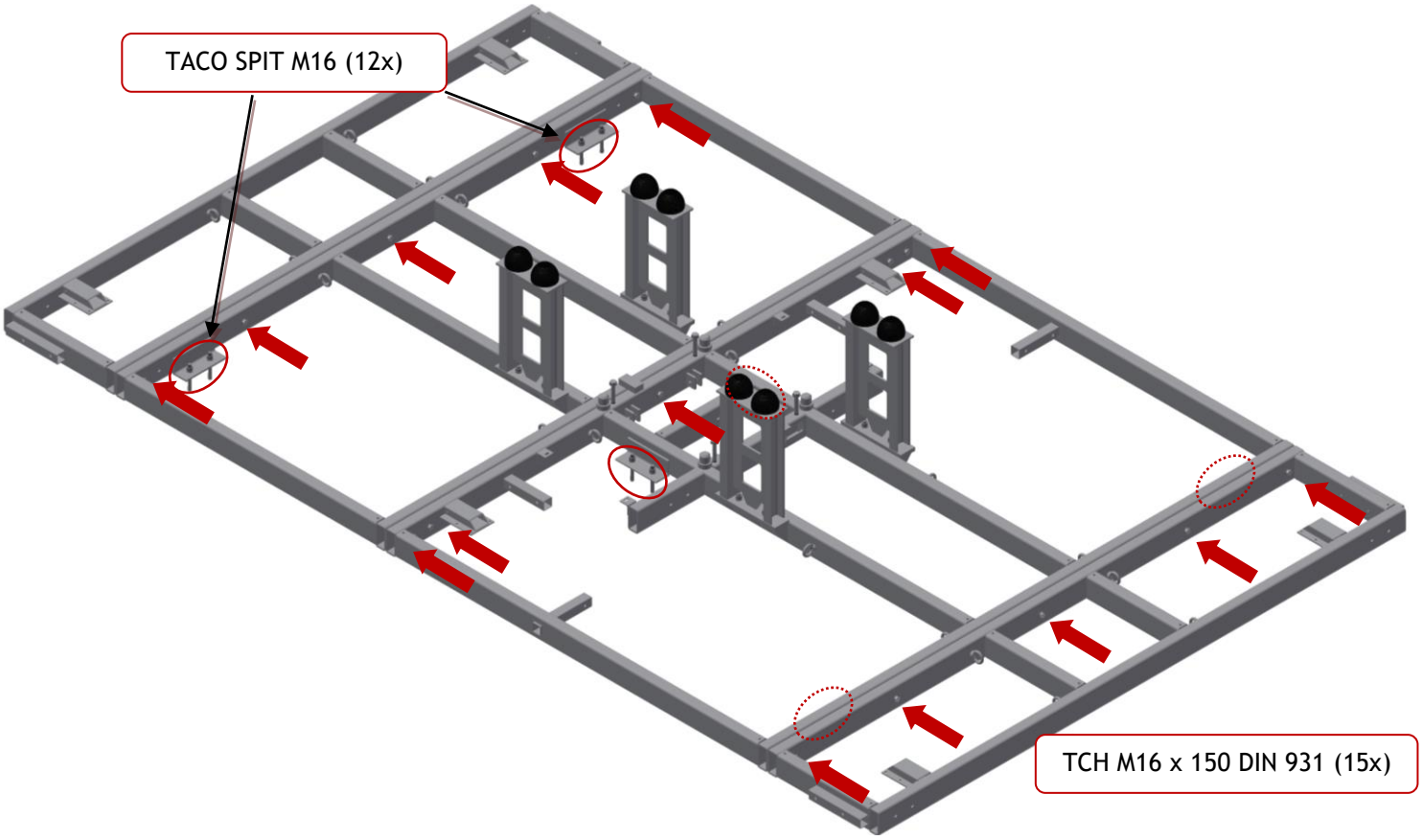


	X		Y		Z		WEIGHT	
ANCHORS	mm	ft	mm	ft	mm	ft	Kg	lb
	3315	10,87	890	2,91	200	0,65	90	198



4.4 BASE

Situate the base. Measures in mm and ft:



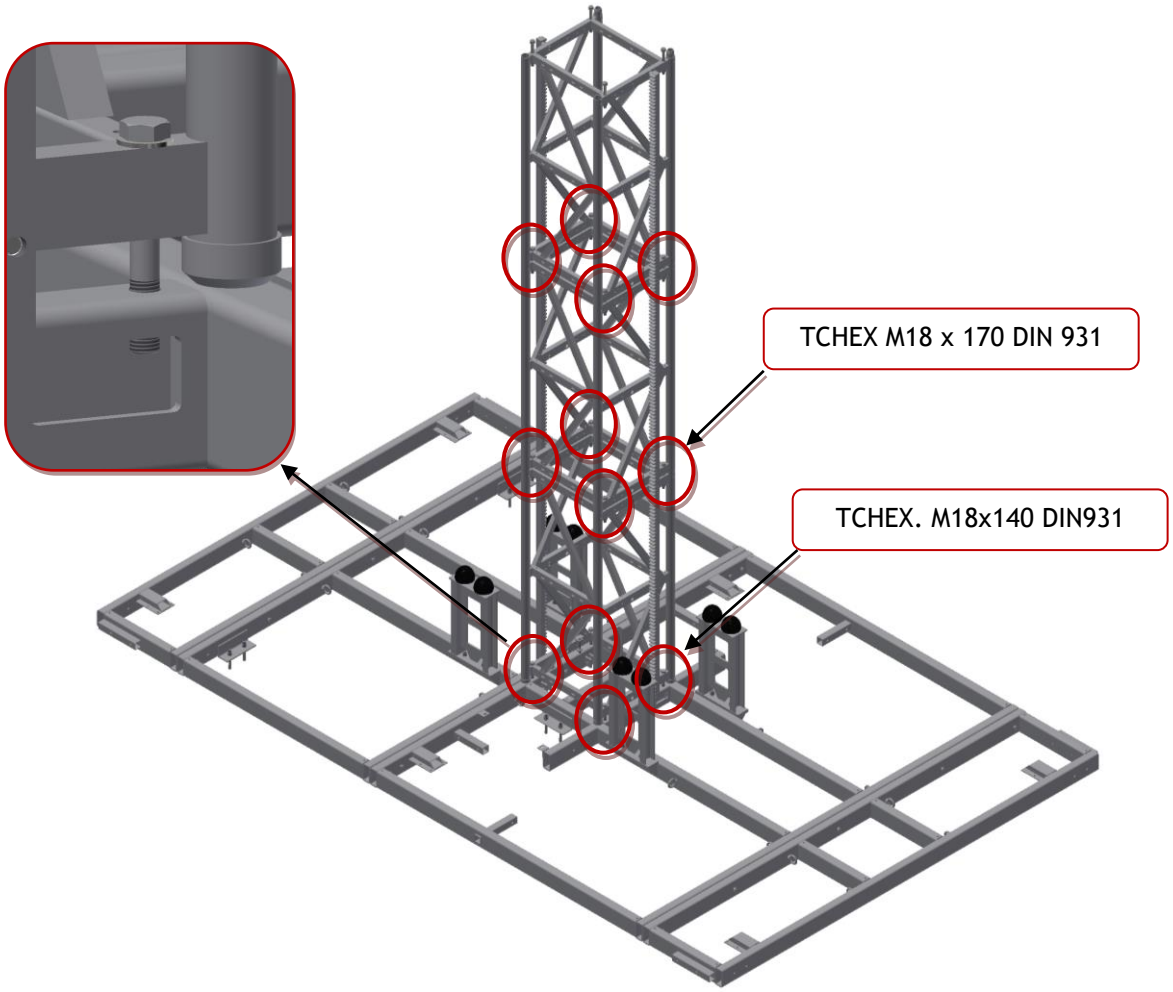
FRACO MANUFACTURING S.L. RECOMMENDS THAT THE PLACEMENT OF THE BASE BE DONE DIRECTLY ON THE CONCRETE FLOOR, USING THE WELDED PLATES MARKET IN THE PREVIOUS IMAGE.

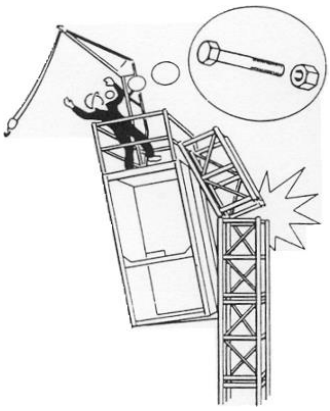
4.5 TIGHTENING TORQUES

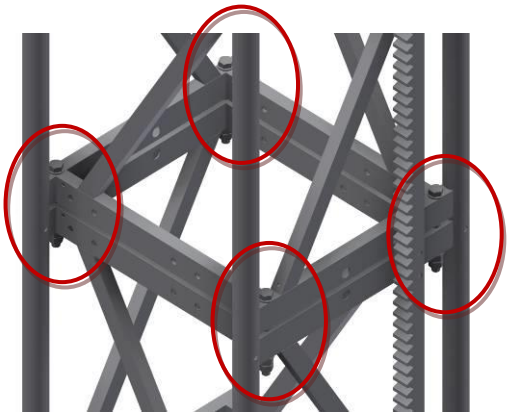
METRICS	STANDARD TORQUE		RECOMMENDED TORQUE	
	N x m	lb x ft	N x m	lb x ft
M6	10	7.37	7	5.16
M8	24	17.70	16	11.80
M10	48	35.40	35	25.81
M12	85	62.69	80	59.00
M16	210	154.89	120	88.50
M18	290	213.89	160	118.01

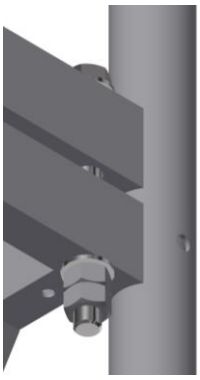
4.6 ROOT SECTIONS

Three mast sections must be assembled to the base. It is tight by means of screws, washers and nuts.







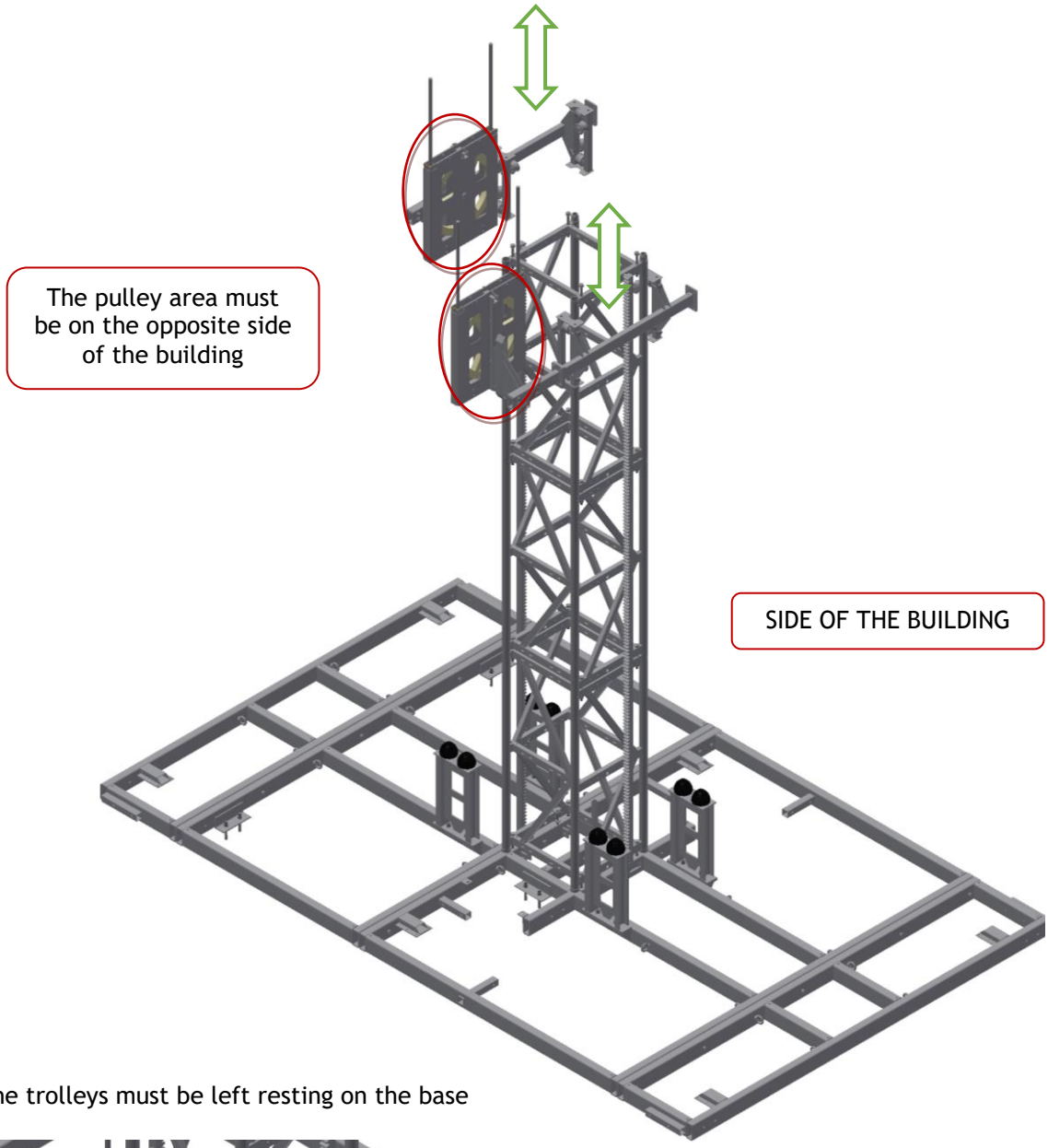


⚠	CHECK THE SCREWS ARE CORRECTLY TIGHTENED BEFORE THE OPERATION OF THE MACHINE

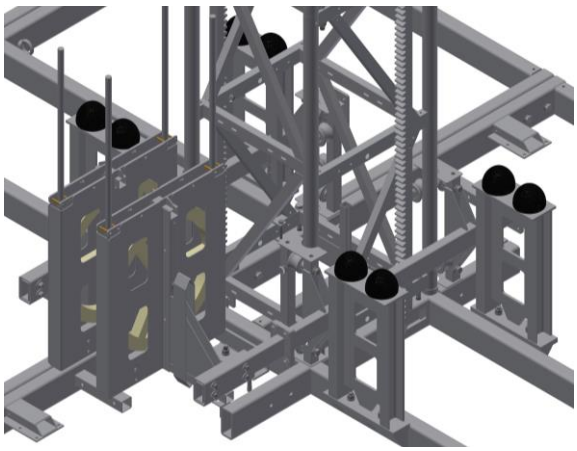
4.7 TROLLEY

Once the first three masts have been placed, the trolleys must be placed.

Special care must be taken to place them in the correct position as shown in the image:

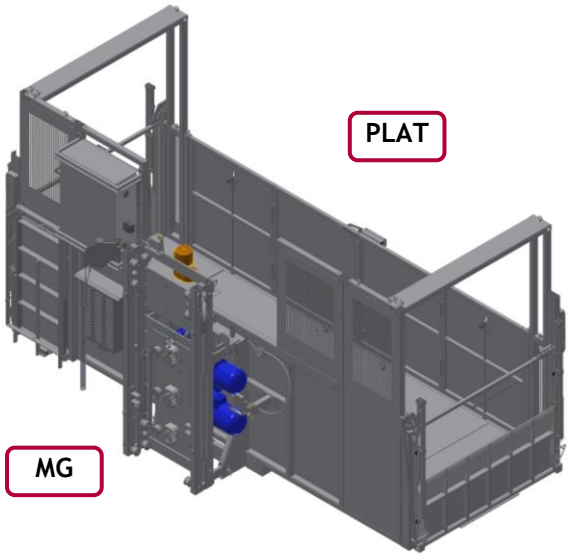


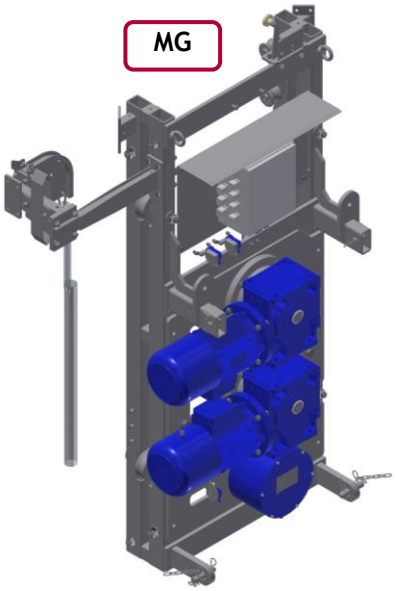
The trolleys must be left resting on the base

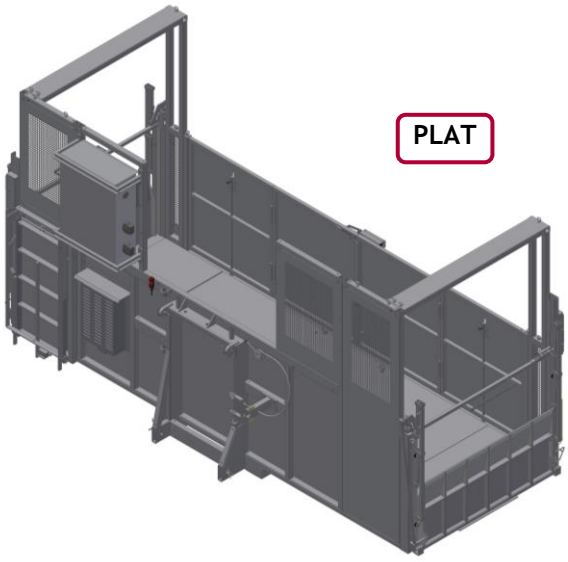


4.8 PLATFORM

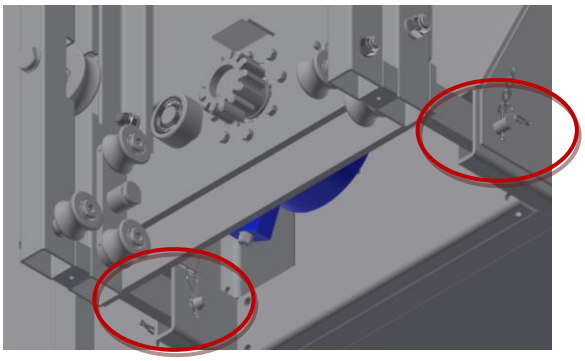
The platform could be transported in one or two pieces depending on the truck or container:



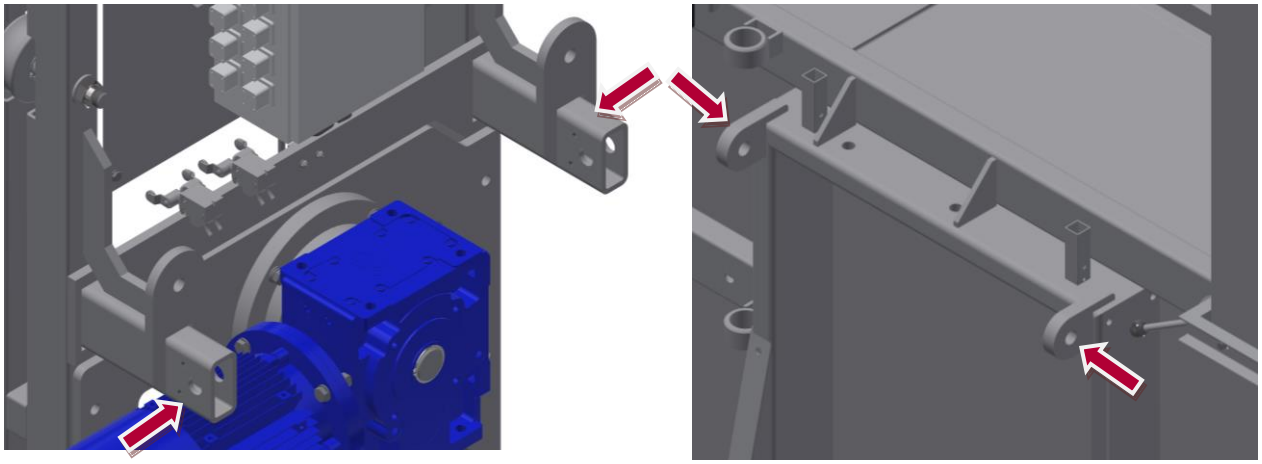




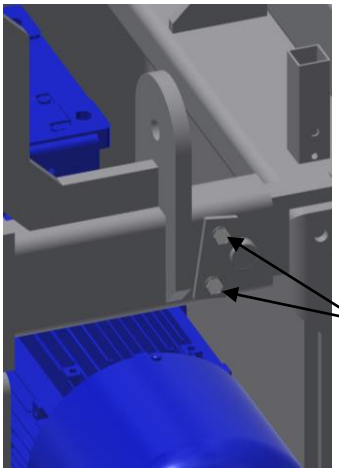
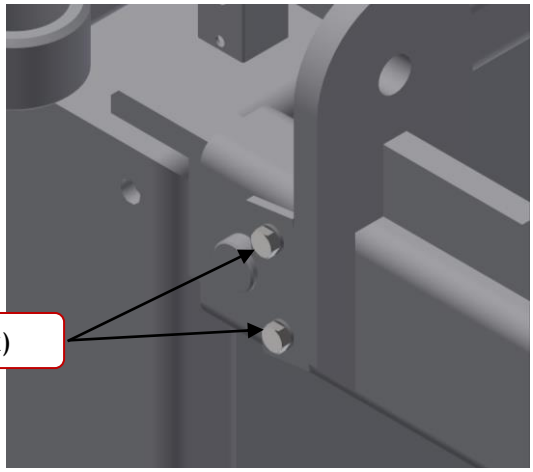
The connection between the motor group and the platform group is done with four pins; two steel pins on the bottom of the joint:



Two load cells on the top of the joint. They have their own position in the assembling as follows:



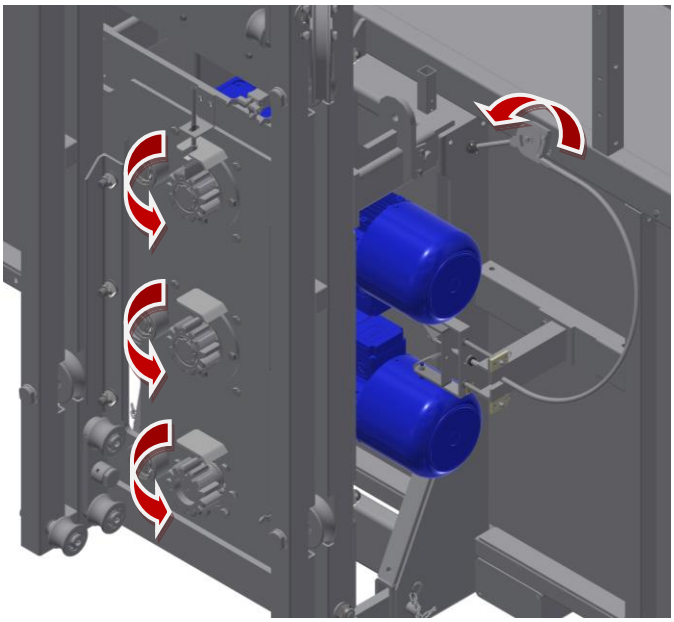
LOAD CELL	PLATE
	

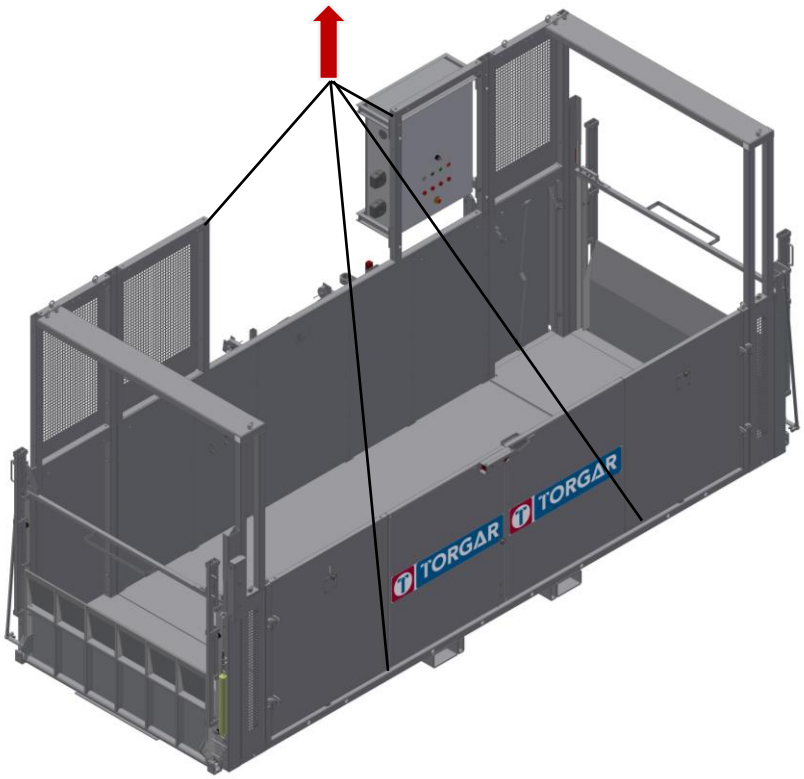
RIGHT SIDE	LEFT SIDE
	

*Note: Plates outer - Cable gland inner

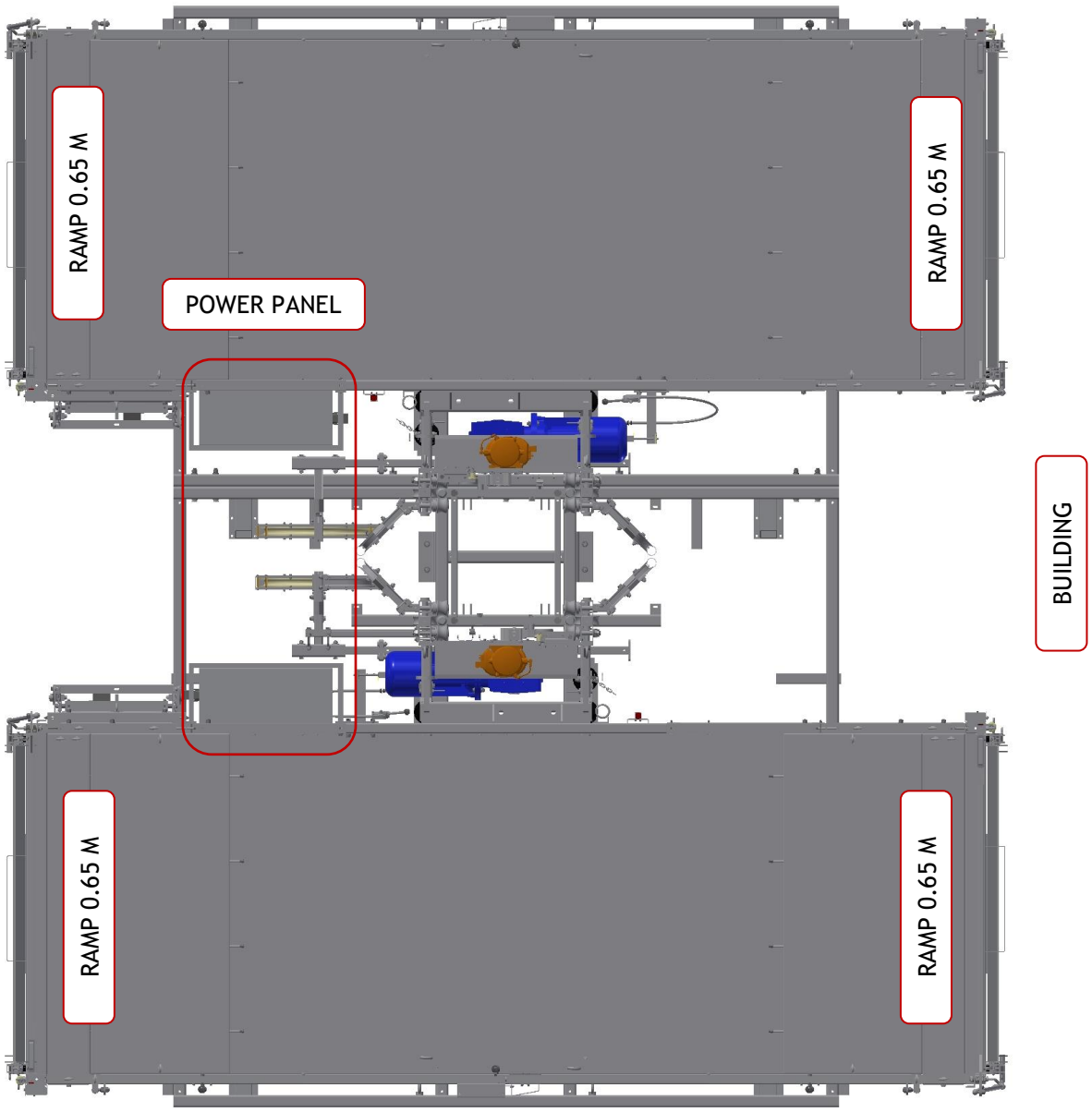
After preparing the transport platform, the platform should then be lifted by a crane and carefully moved into position above the sections. The lift car should be centered in relation to the mast.

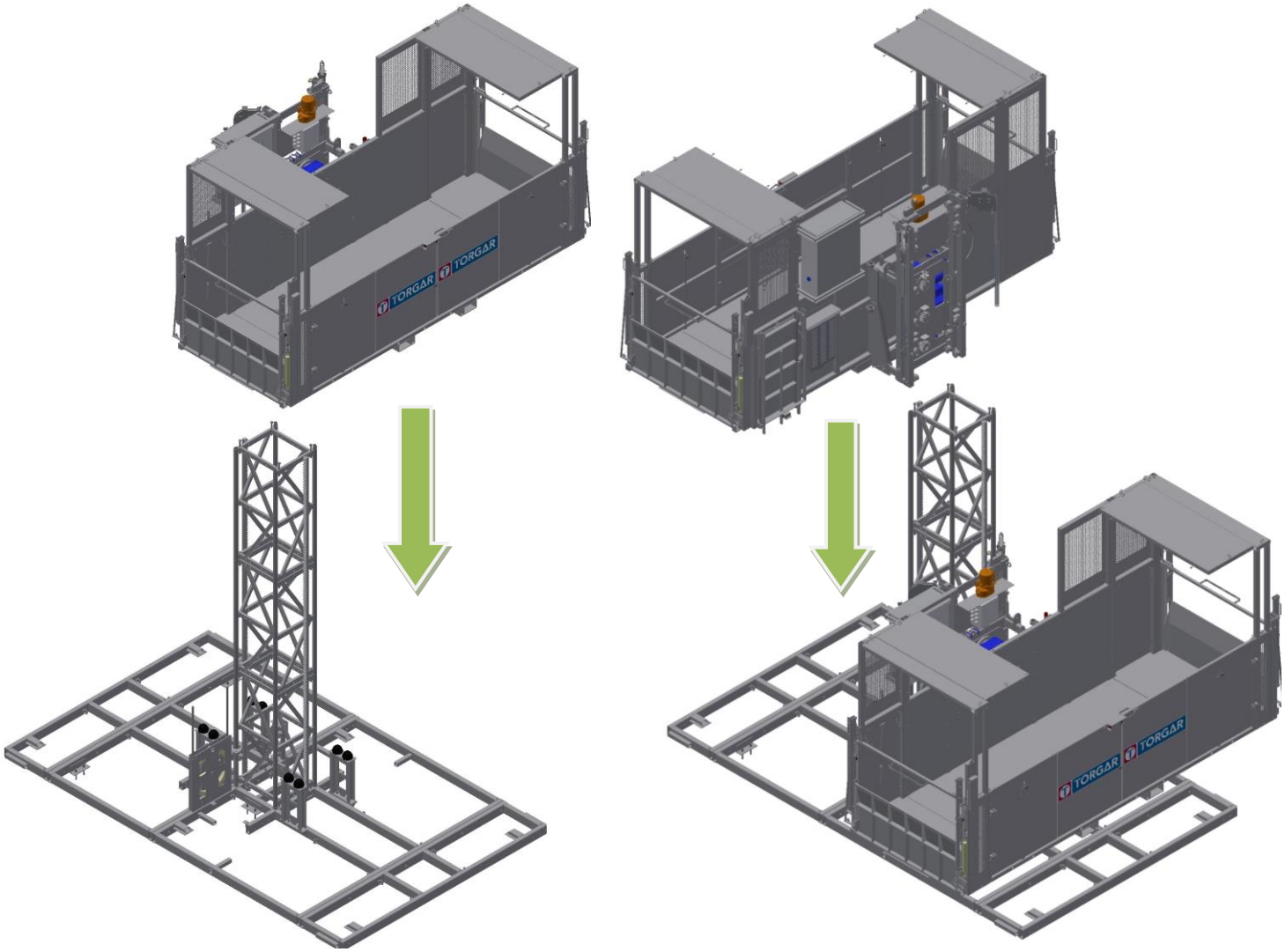
⚠	BEFORE LIFTING THE PLATFORM, THE MOTOR BRAKES MUST BE UNLOCKED OF THEIR WORKING POSITION USING THE HANDLE IN THE PLATFORM THE TWO PINIONS OF THE MOTORS SHOULD BE TURNING FREE



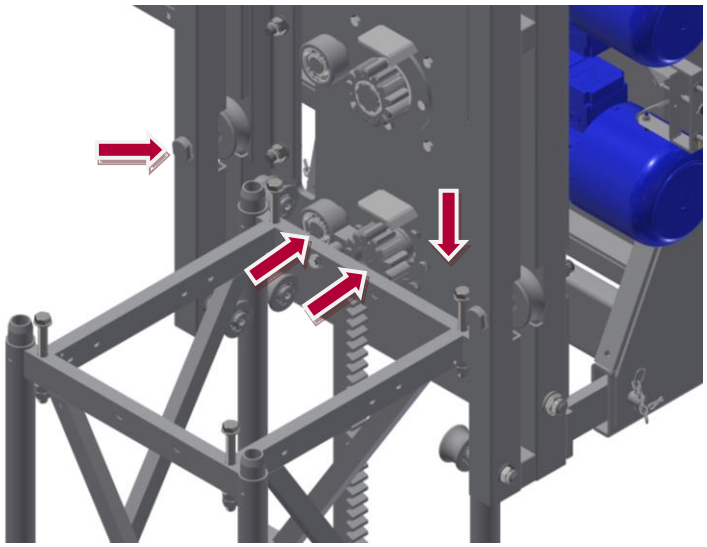


When placing the cabins, you must take into account which one goes on each side, look at the following image and place them as indicated.

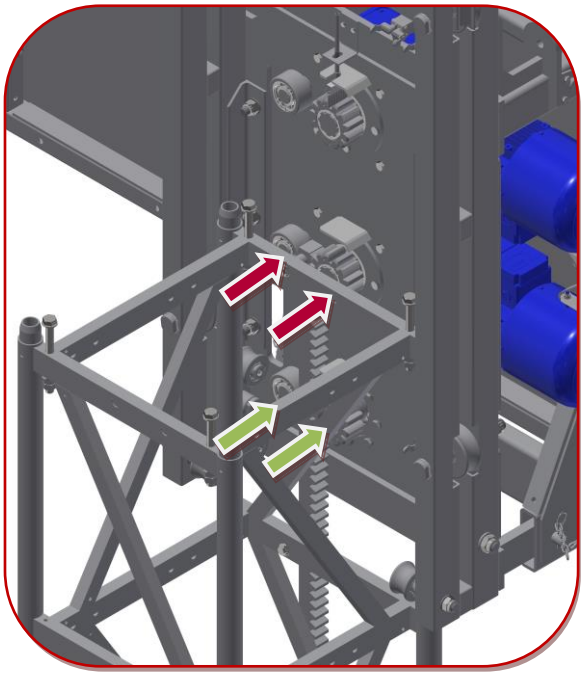


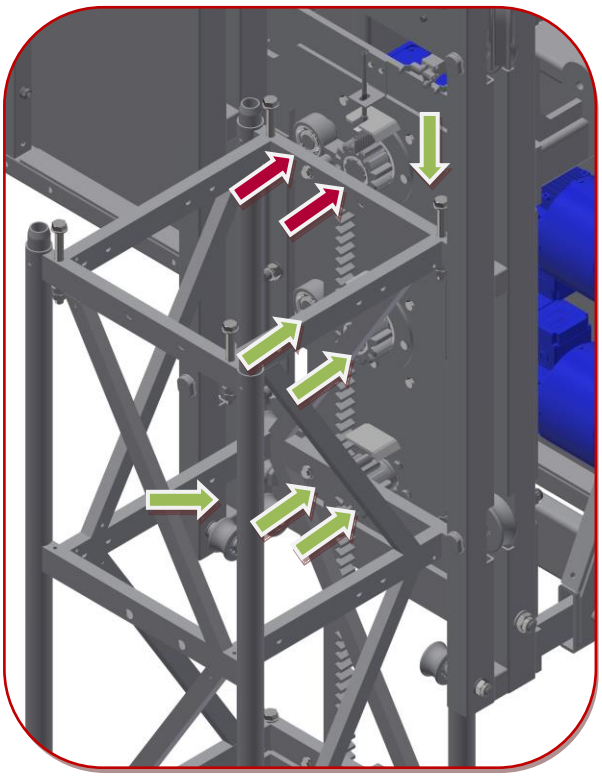


The platform is lowered onto the mast until the guide rollers come into contact with the main tubes on the mast. Pinion of the safety device is engaged in the rack with its corresponding counter-rack roller.

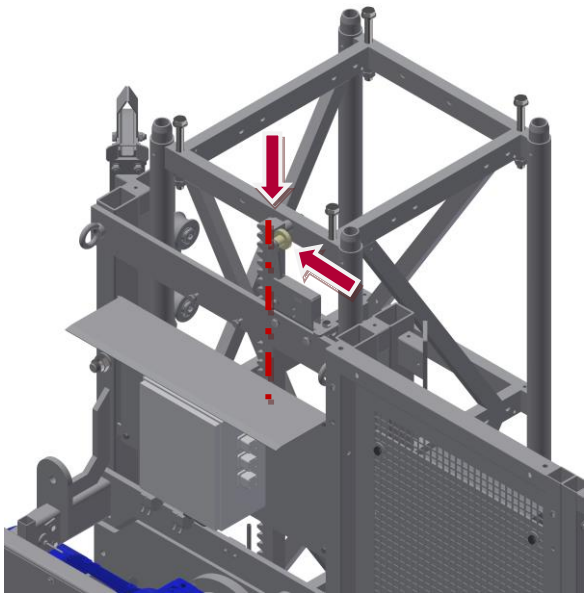


After that, the next is the pinion of the bottom motor. The same procedure: Pinion, counter-rack roller. Be careful the pinion turn totally free. The second pinion of the top motor follows the same steps.

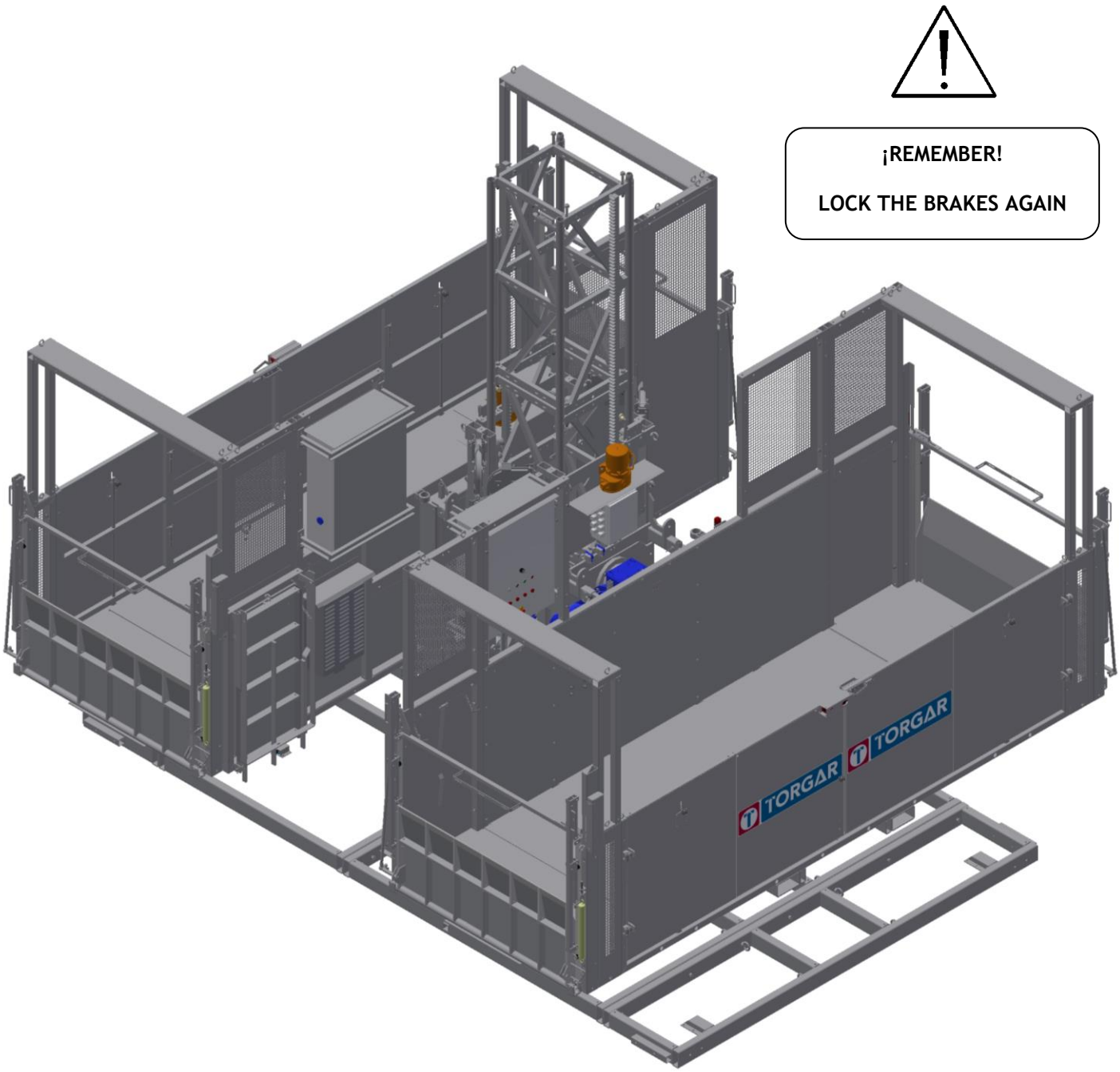




Control the position of the rollers on the top of the motor group in order to assemble them in a right way and the adjusted between the rack limit switch and the flat face of the rack.



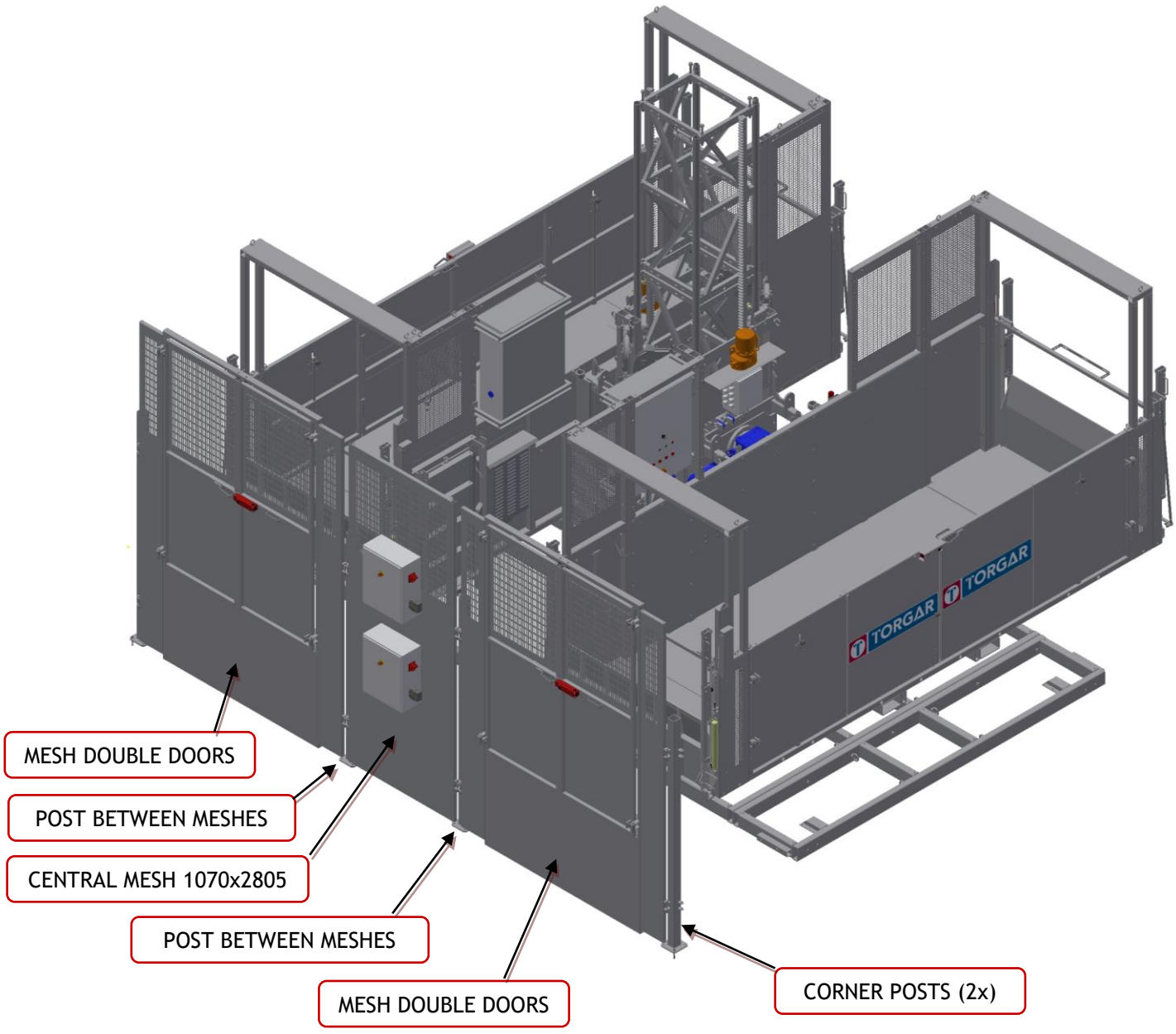
Reach the platform to the bottom position as possible inside the mast sections. After that, lock the brakes of the motors again to maintenance the platform in that final position.



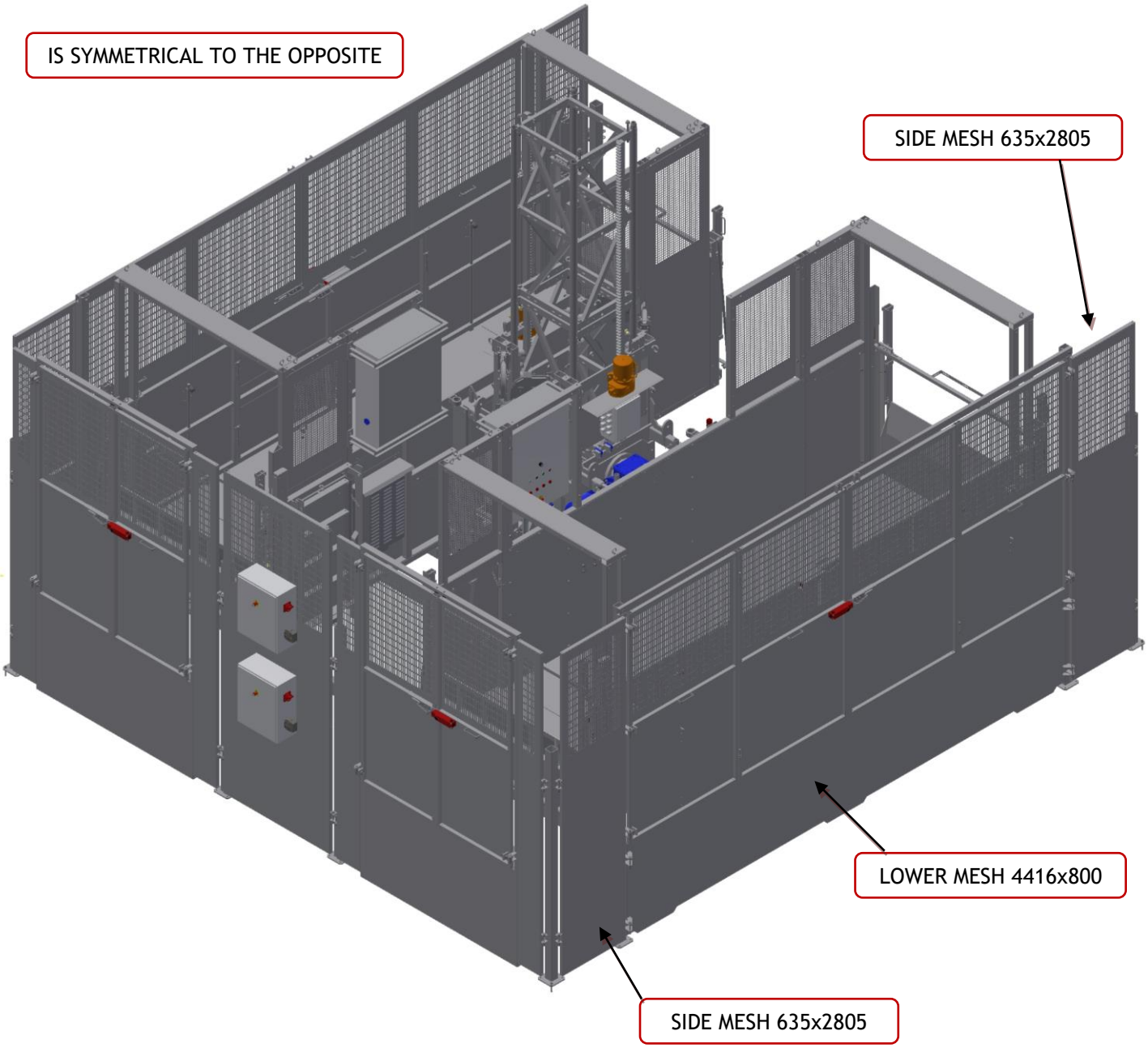
4.9 BASE ENCLOSURE

Once we have the cabins placed in place and supported on the base, the base enclosure must be installed to be able to place the electrical panels and thus be able to start with the assembly of the lifting tower.

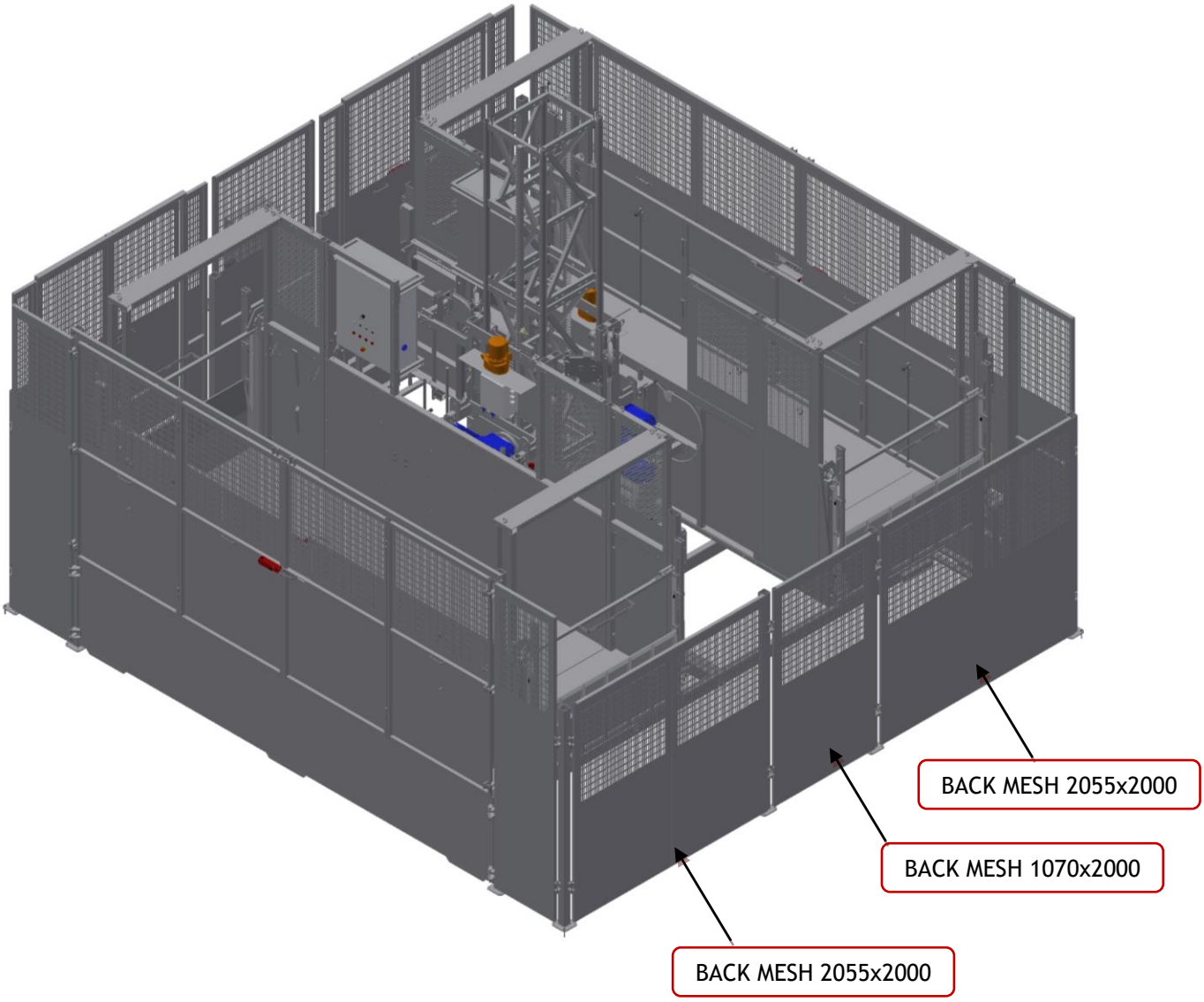
You must start by placing the double doors on the side of the cabin with the 1.1 M ramps, which must be on the opposite side of the building.



Install the quadruple doors, with their corresponding meshes.

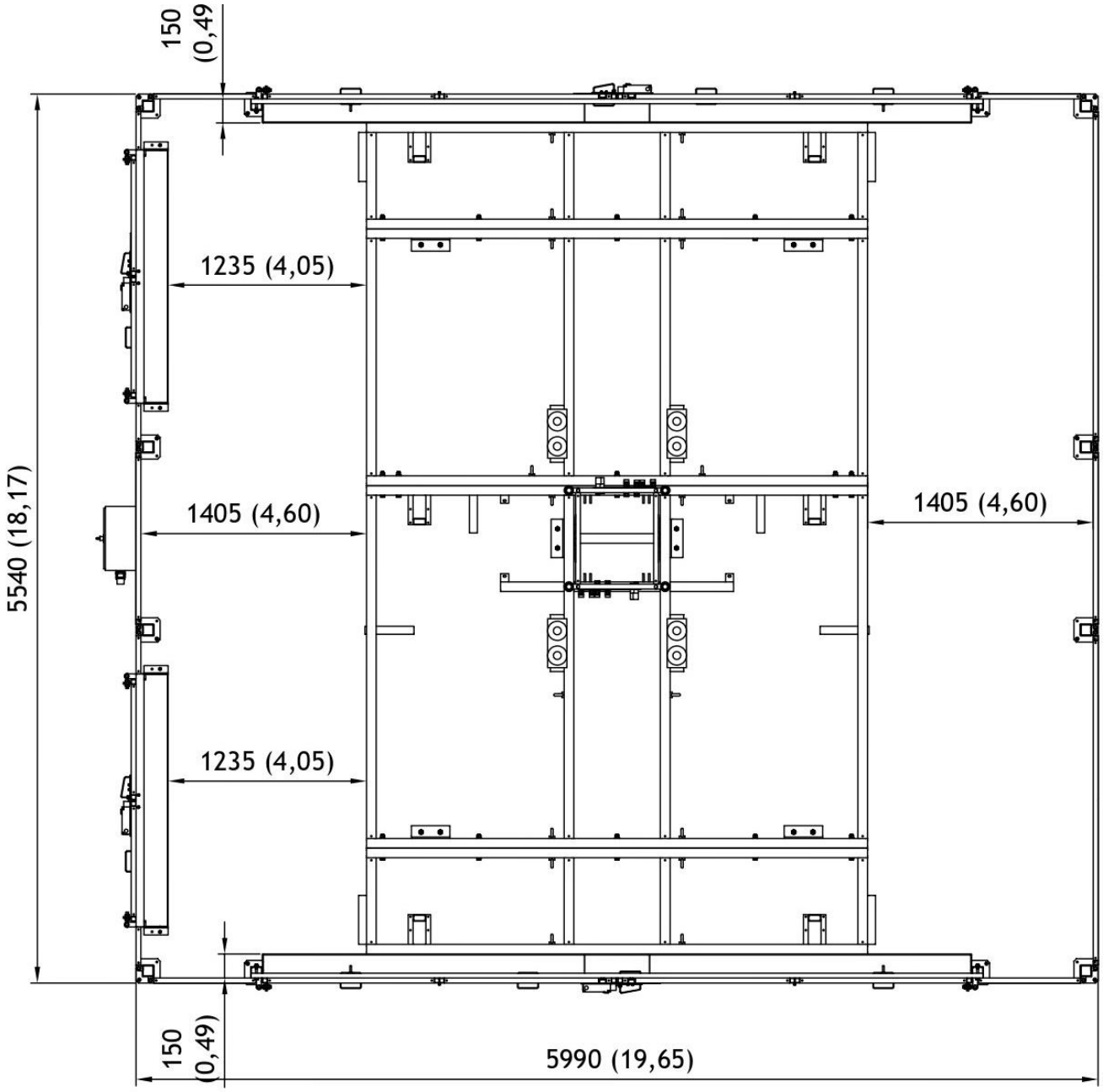


Finally, install the rear meshes that will be the smallest:



Once the base enclosure is installed, the electrical installation must be carried out in order to continue assembling the installation.

Measures to which the base enclosure must be:



4.10 PRELIMINARY ELECTRICAL INSTALLATION

This facility must have a trolley, so a first electrical installation must be done until we reach the height of half installation, at that point we must carry out the final electrical installation.

Once the platform has been installed, power will be necessary to join gradually the mast. Then, it is necessary to do four steps like it is showed:

1. Connect an electric cable from the main switch (customer's supply) to the transport platform's power panel. Check the voltage.
2. The power panel, next to the base, must be positioned in a place where not disturb the correct process of load and unload the platform.
3. The electric cable supplied by TORGAR has to pass from the bottom to the top of the installation. To get that, pass the cable through the bottom of the center mesh.
4. Reach the side part of the electric box where it has to be connected. The way of the cable in this connection must follow convenient places.

Finally, all the hose collected on the ground must be unfolded so that the cabin can rise and the electrical cable does not get caught.

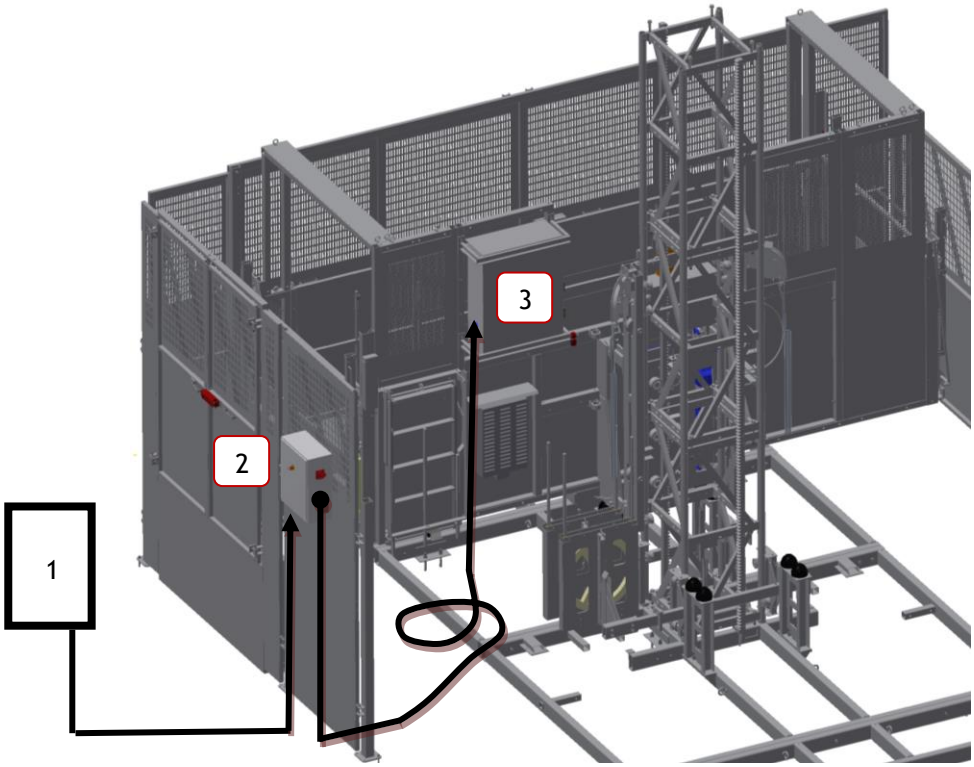
AS A SAFETY RULE, AND IN ORDER TO GUARANTEE THE RIGHT OPERATION OF THE MACHINE, IT HAS TO BE CORRECTLY CONNECTED TO AN ELECTRIC GROUND

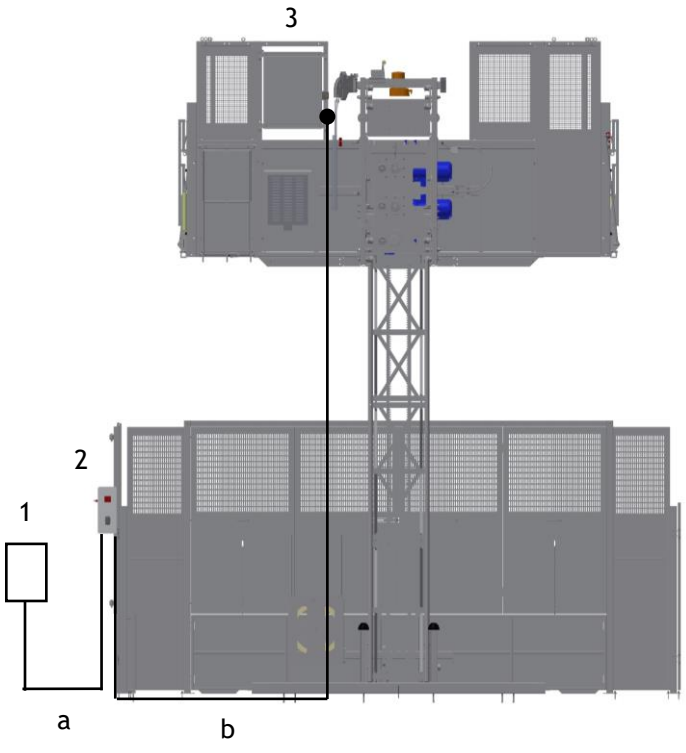
ELECTRICAL PANELS MUST BE CLOSED TO PREVENT INGRESS OF WATER AND DIRT

Once one booth has been connected, do the same with the other.

Electric diagrams are at the end of this instruction manual.

You can see a draft of the electric installation, showing the steps previously mentioned:





ELECTRIC PANELS		
1	Client Box	1
2	Base Enclosure Box	1+1 ud
3	Power Box	1+1 ud
ELECTRICAL HOSES		
a	1 de 4 x 35 mm^2	Client
b	1 de 4 x 35 mm^2	Torgar

4.10.1 BASE ENCLOSURE CONNECTIONS

- In case of having a base enclosure:

  Make the connection according to the page "Enclosure connections" included in the annex of the electrical diagrams.

- According to the EN 16719 standard, if the installation of a base enclosure is not mandatory:

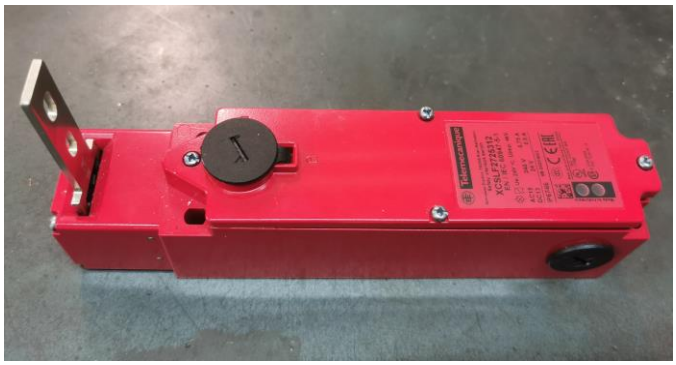
  Make a bridge between terminals, as indicated in the electrical scheme:

THE BRIDGE MENTIONED CANCELS THE SECURITY OF THE BASE ENCLOSURE

The machine will not move if there is no such bridge or a safety switch properly connected according to the page "Enclosure connections" in the annex to the electrical diagrams.

ALWAYS THERE IS AN ENCLOSURE WITH A SAFETY SWITCH, THIS BRIDGE SHOULD NOT BE MADE

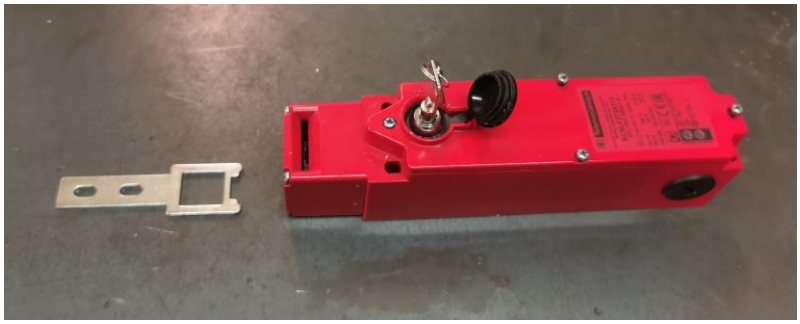
4.10.2 UNLOCK THE ELECTRO-MECHANICAL LIMIT SWITCH



WORKING POSITION - LOCKED LIMIT SWITCH

UNSCREW SECURITY COVER

TURNING THE RELEASE DEVICE



FREE POSITION - UNLOCKED LIMIT SWITCH

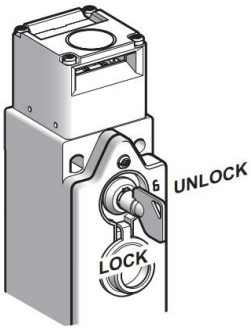
THE MACHINE WILL NOT OPERATE WHEN ANY DOOR IS MANUALLY OPENED AND / OR UNLOCKED WITH A KEY

Unlocking of the safety switch is indicated by a green light on the device itself:

- In the floor door / enclosure, this unlocking can be done either manually (with the key) or because the cabin is stopped in said floor door / enclosure.
- In the cabin, this unlocking can be done either manually (with the key) or because the cabin is stopped.

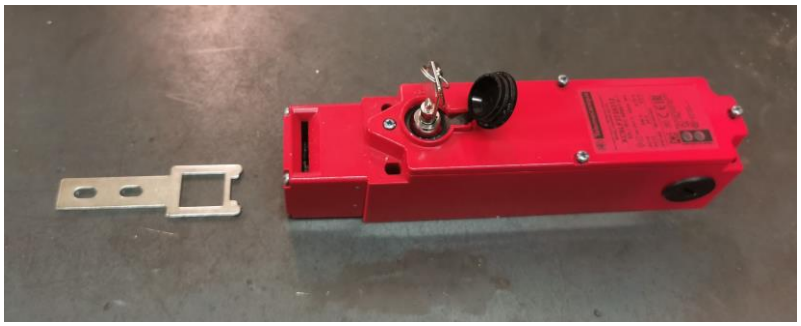
If one of the safety switches is manually unlocked with a key, the machine will not move until this lock is performed.

The search for a key unlocked safety switch can be performed by identifying the green light. However, what is stated in previous points must be taken into account since:

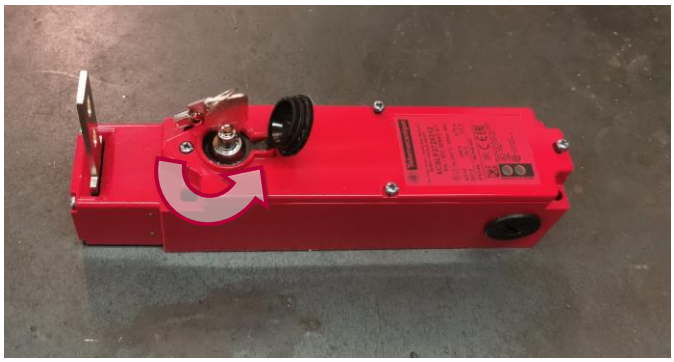


- Even if the floor door / enclosure safety switch is in the correct working position, the green light will remain on as long as the cabin remains in place (because it is allowing the door to open).
- Even if the cabin safety switches are in the correct working position, the green light will remain on as long as the cabin is stopped in a place where the opening of these doors is allowed (see maneuvering annex to see under what conditions it is allowed the opening of each door).

4.10.3 LOCK THE ELECTRO-MECHANICAL LIMIT SWITCH

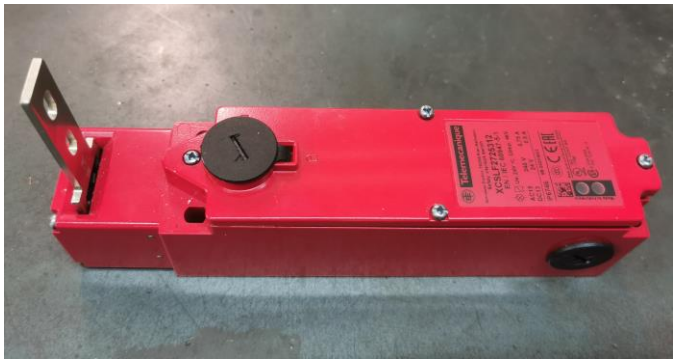


FREE POSITION - UNLOCKED LIMIT SWITCH



TURNING THE RELEASE DEVICE

UNSCREW SECURITY COVER

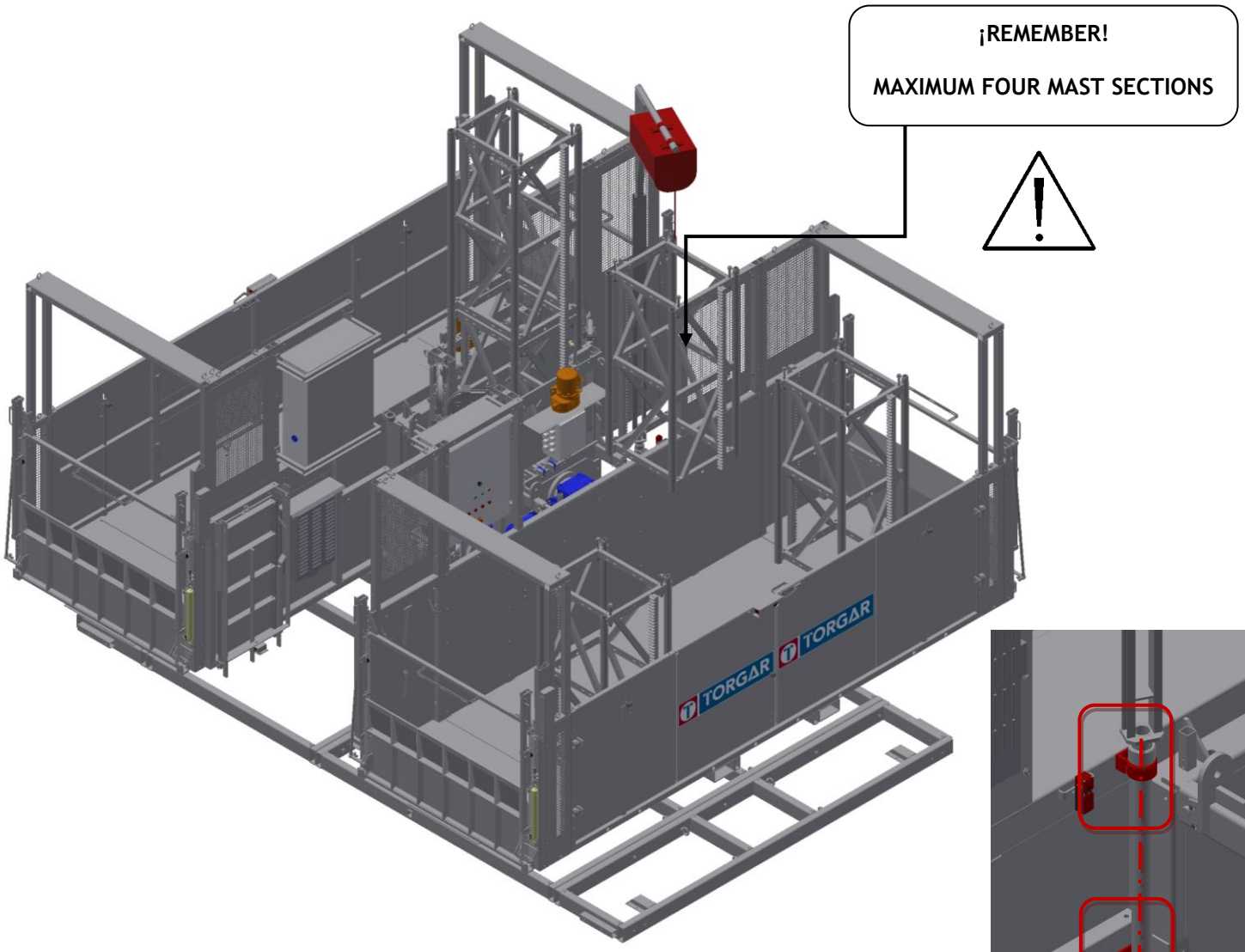


WORKING POSITION - LOCKED LIMIT SWITCH

4.11 THE FOLLOWING MAST SECTIONS AND ANCHORAGES

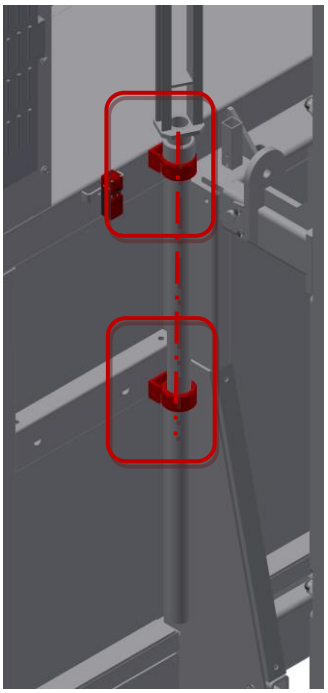
You can use an optional wire-rope hoist to help the assembling of the rest of the mast sections from inner of the platform.

THE MAXIMUM AMOUNT OF MAST SECTIONS ALLOWED IN CARRIAGE DURING ERECTION / DISMANTLE IS FOUR MAST SECTIONS



There are two supports for this optional wire-rope hoist welded

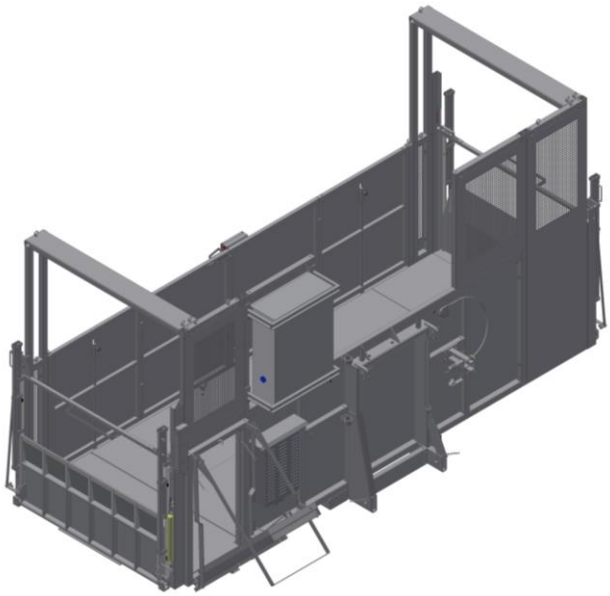
in the motor group as you can see in the image:



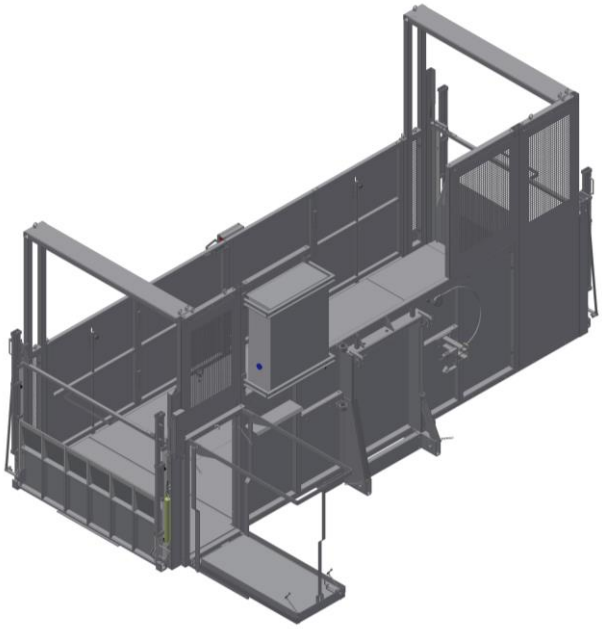
As well, there is a lateral auxiliary ramp to install the anchorages.

This ramp has two positions in order to be safe.

Position 1

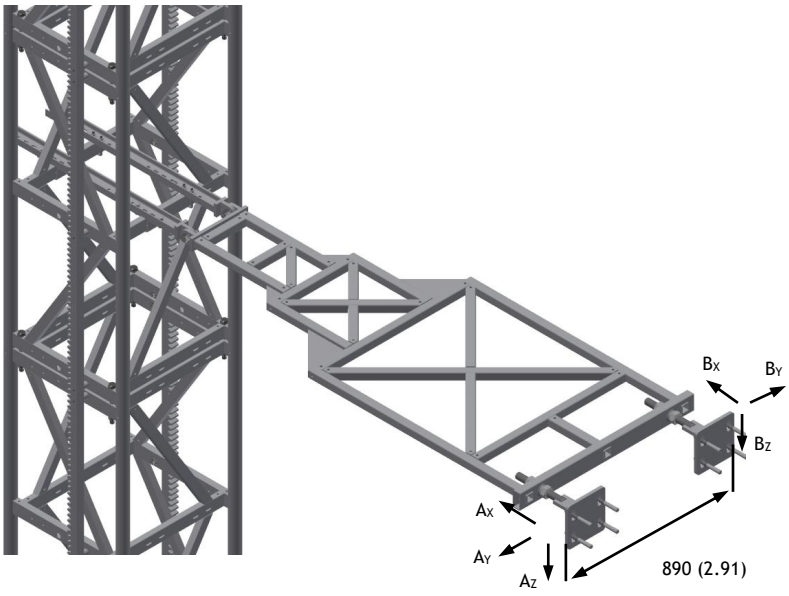


Position 2



Mast sections must to be tied to a stable structure. First anchorage should be done to the first-floor structure [4 meters (13.12 ft) or three mast sections free]. After that, every other anchorage must to be tied every maximum 6 meters (19.68 ft) or four mast sections free.

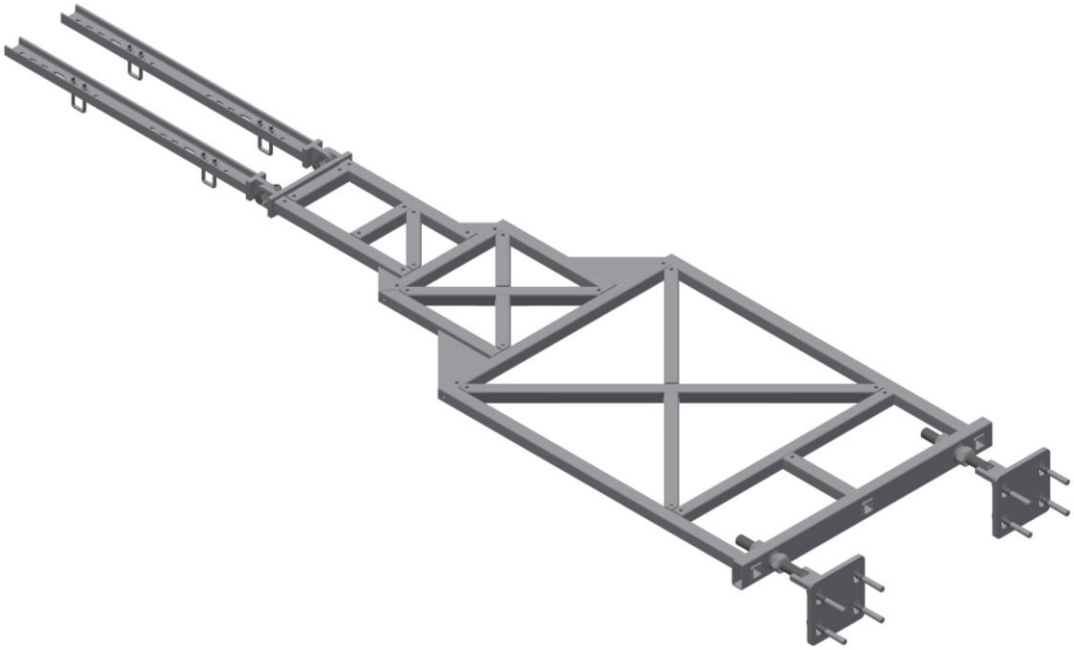
The efforts of the anchorages to the structure are as follow:

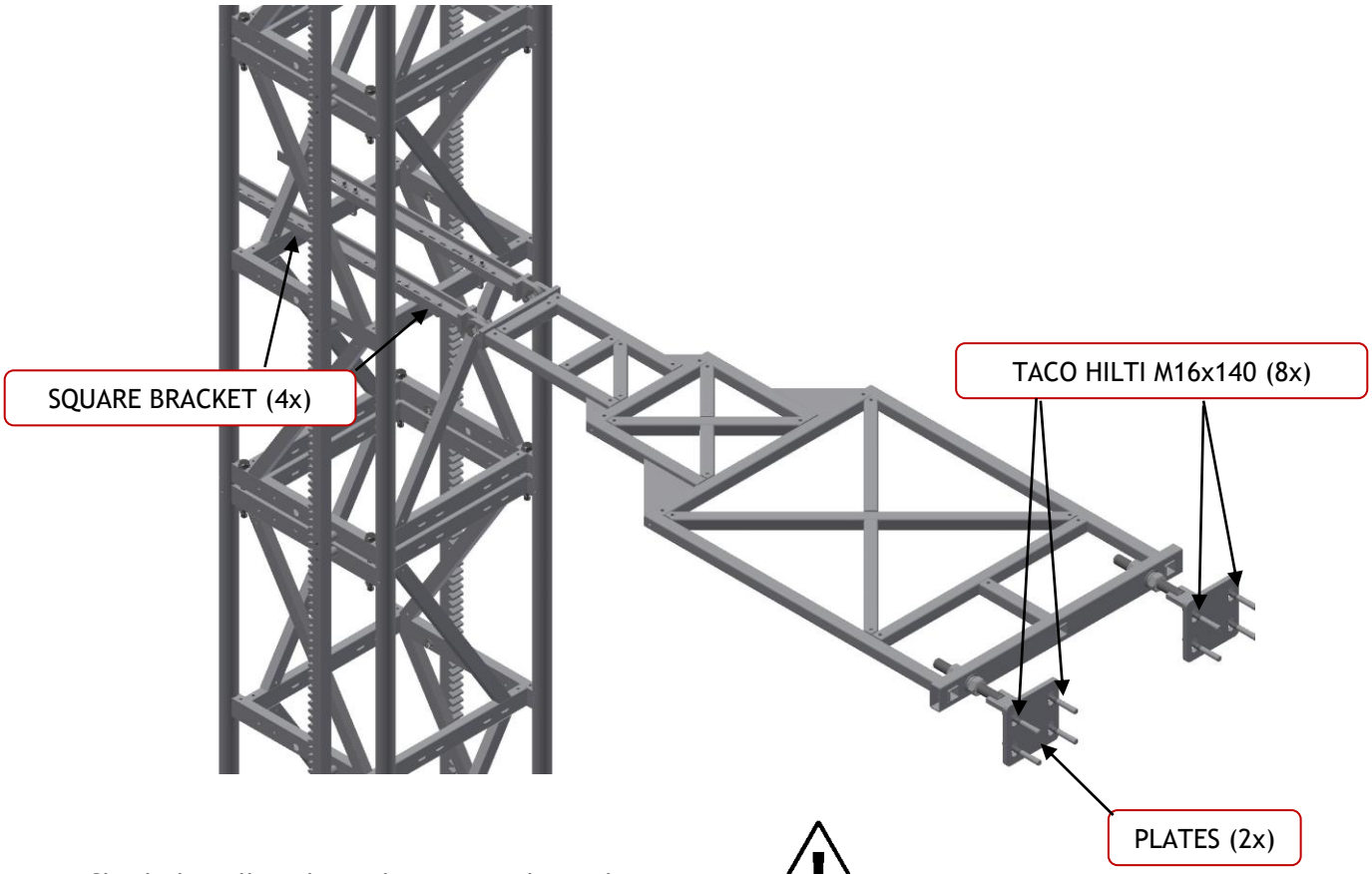


LOAD TRANSMITED TO ANCHORAGES					
A_X - B_X		A_Y - B_Y		A_Z - B_Z	
Kg	lb	Kg	lb	Kg	lb
2268	5000	850	1875	350	770

4.11.1 ANCHORAGES

The components of one anchorage are:

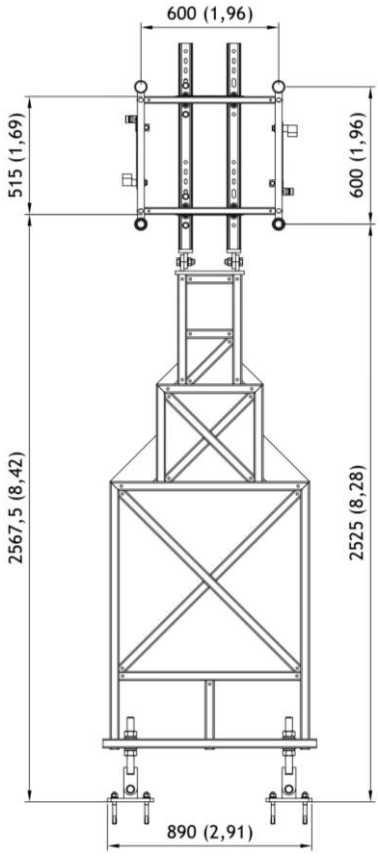




Check the rollers do not hit against the anchorages.

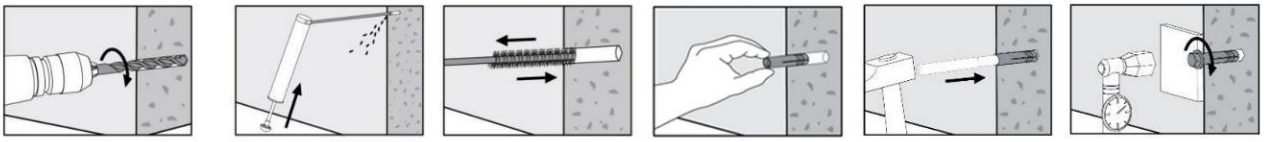
4.11.2 POSITIONING OF THE ANCHORS

The distance between the span and the building should be as follows:



The UPNs must be fixed to the mast and the plates at the other end must be fixed to the building floor.

Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.



Use of the anchor only as it is supplied, without exchanging the components of an anchor. Anchor installation in accordance with the technical specifications and using the appropriate tools.

Ensure that the strength class of the concrete before placing the anchor.

Effective anchorage depth, edge distances and spacing not less than the specified values without minus tolerances.

Check of concrete being well compacted, without voids.

Hole drilling by hammer drill.

Cleaning of the hole of drilling dust.

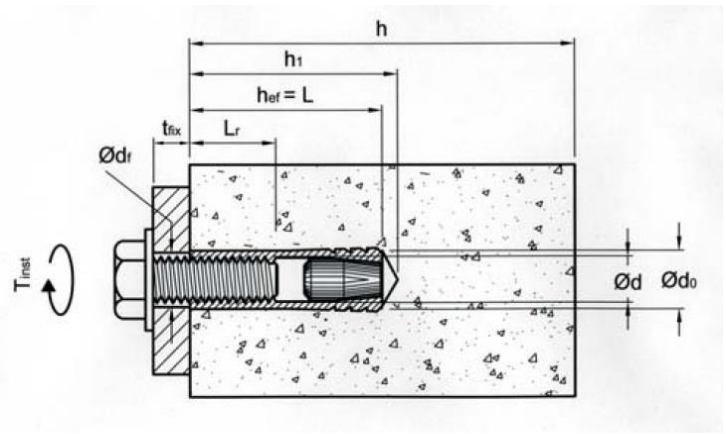
Positioning of the drill holes without damaging the reinforcement.

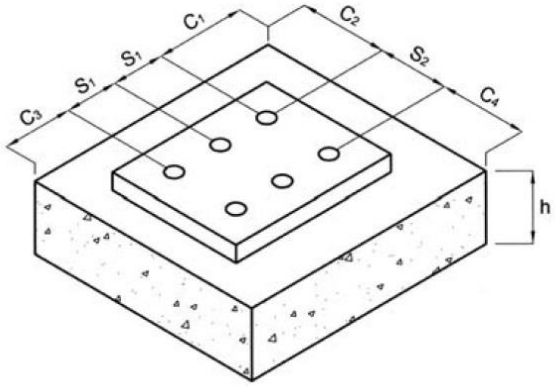
Use the setting tool for expansion the anchor. The anchor is properly set if the stop of the setting tool reaches the expansion sleeve.

Threaded the fastening screw or threaded rod.

Application of specified torque moment using a calibrated torque wrench.

In case of aborted hole, drilling of new hole at a minimum distance of twice the depth of the aborted hole and filled with high strength mortar the aborted hole.





h	200 mm	7.87 in
h1	65 / 68 mm	2.56 / 2.68 in
hef = L	65 mm	2.56 in
Lr	25 mm	0.98 in
tfix	45 mm	1.77 in
Ødf	18 mm	0.71 in
Ød	M16	M16
Ødo	20 mm	0.78 in
Tinst	100 - 110 N x m	73.76 - 81.13 lb x ft
S	225 mm	8.86 in
C	162 mm	6.38 in

ADMISSIBLE LOADS OF WORKING TO EXTRACTION AND SHEARING ON CONCRETE WITH Rk INDICATED										
TYPE	EXTRACTION (daN)					SHEARING (daN)				
	Concrete of					Concrete of				
	175	200	250	300	350	175	200	250	300	350
	Kg / cm^2									
M16	640	944	1,239	1,290	1,398	920	1,250	1,491	1,510	1,590

ADMISSIBLE LOADS OF WORKING TO EXTRACTION AND SHEARING ON CONCRETE WITH Rk INDICATED										
TYPE	EXTRACTION (lb)					SHEARING (lb)				
	Concrete of					Concrete of				
	2,489.09	2,844.67	3,555.84	4,267.00	4,978.17	2,489.09	2,844.67	3,555.84	4,267.00	4,978.17
	lb / in^2									
M16	1,438.77	2,122.19	2,785.38	2,900.03	3,142.83	2,068.24	2,810.11	3,351.90	3,394.61	3,574.46

Note: In case of doubt, check the manufacturers installation instructions on http://desa.es/en/

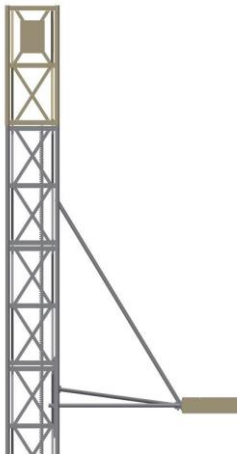
SPIT PLUG M16, DRILL A 20 MM (0.78 IN) DIAMETER HOLE IN THE CONCRETE

DEPTH: 65 MM (2.56 IN)

CHECK THE FACES OF THE RACK ARE VERTICAL
ALLOWED OUT OF LEVEL: 1 / 100 ~ 0.5º

This operation is repeated until the height of the machine is reached. The mast cannot exceed more than three mast sections over the last mast tie.

At the same time is mandatory to install a diagonal anchorage from the safety mast section to the last floor. If it is not possible, refer to your service provider for additional special instructions.



Once the assembly has been finished, all connections between mast sections have to be checked.

THE MAST HAS TO BE ASSEMBLED AND ADJUSTED TO STAY COMPLETELY UPRIGHT

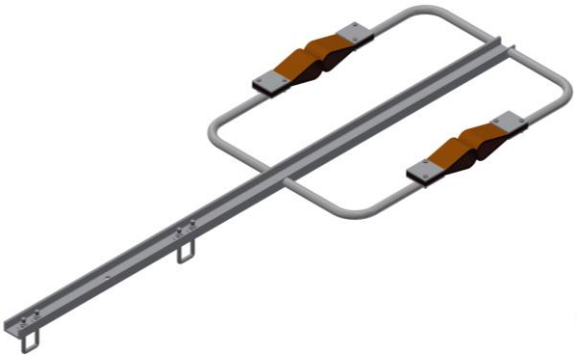
4.12 ELECTRIC CABLE GUIDE

As we gain height in the installation, the hose guides must be placed so that the hoses of the cabins are not free and can get caught in some projection, the hose outlet arm of the cabins must pass through the rubber bands.

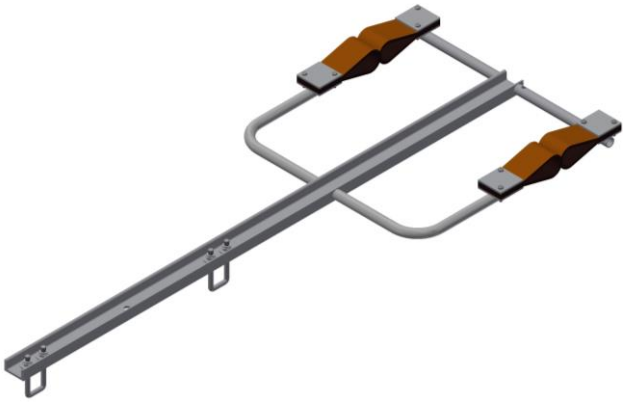
The cable guide is bolted to the mast every two mast sections.

In this installation there are two types of hose guides, so before placing them, they must be differentiated:

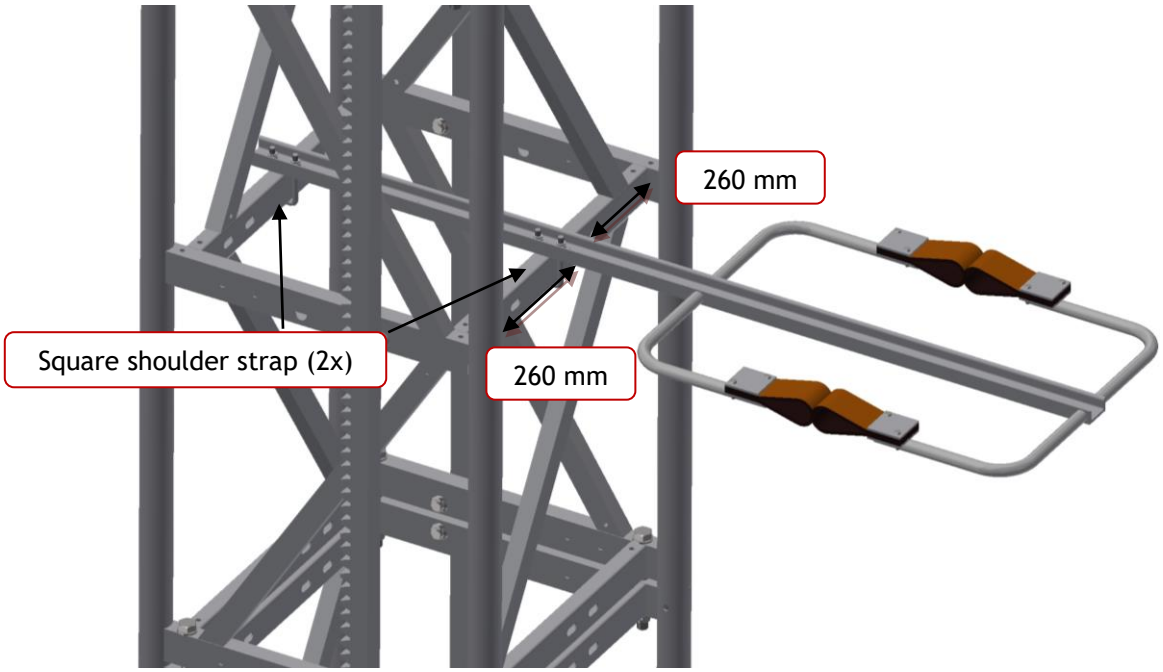
DOUBLE GUIDE CABLE



SINGLE GUIDE CABLE

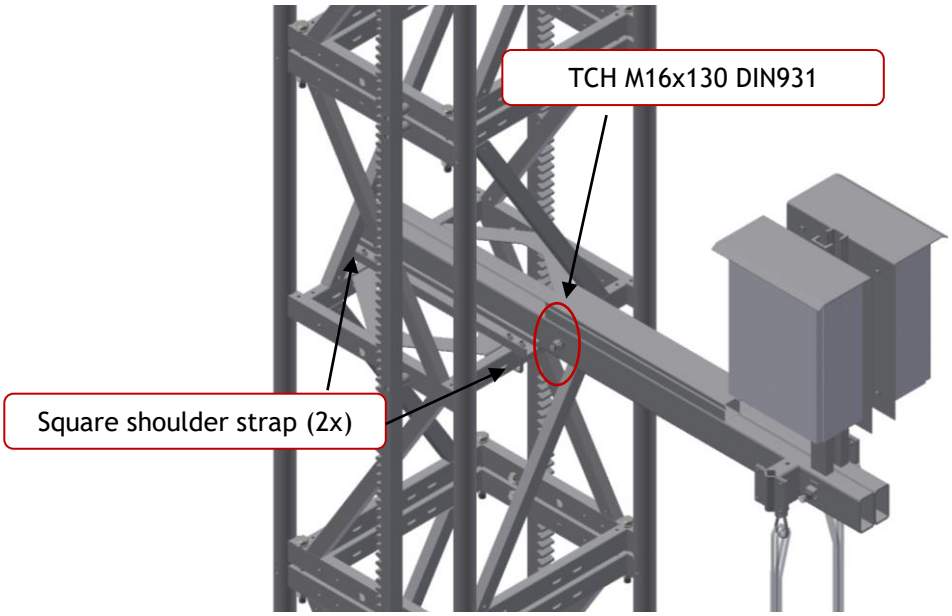


For the first half installation, the double cable guides must be placed, since the trolleys must pass through them. So, until the transfer box is installed at the height of half installation, these hose guides must be placed.



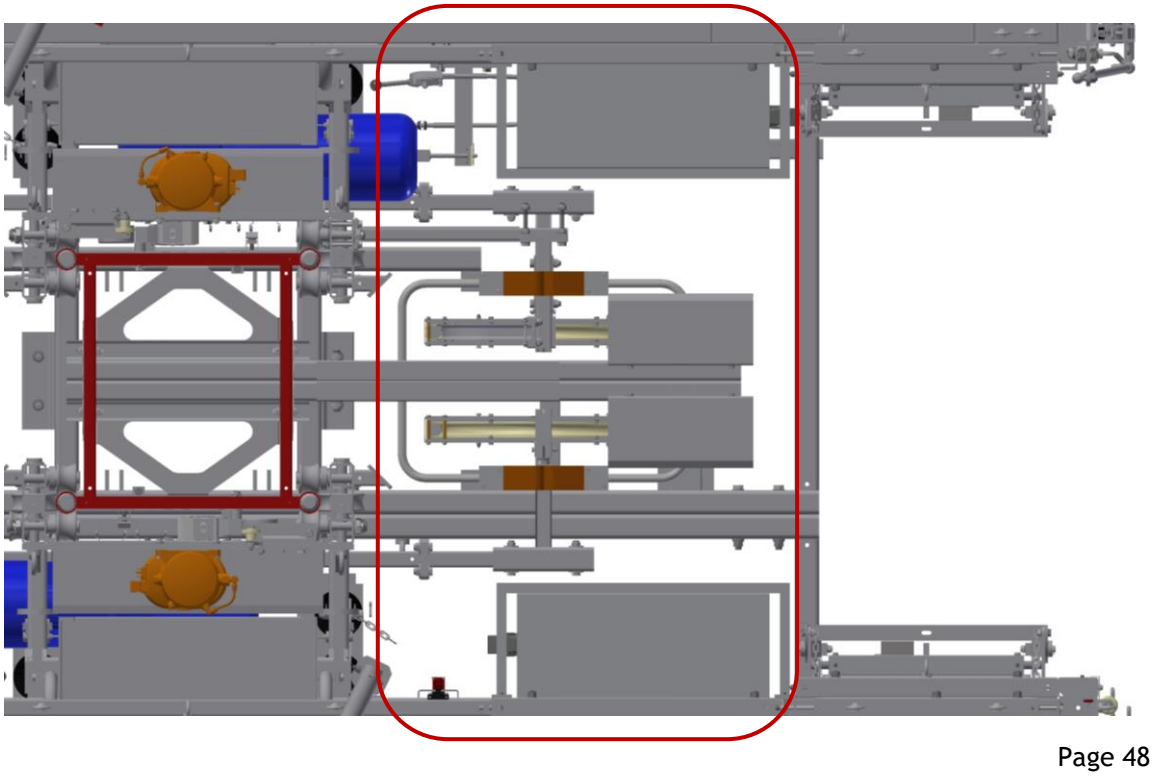
4.13 INTERMEDIATE FIXED ARM

Once half of the total sections of the installation has been placed, we must place the intermediate fixed arm, because at that height, the electrical hose that we have installed does not reach higher if the final electrical installation has to be carried out.



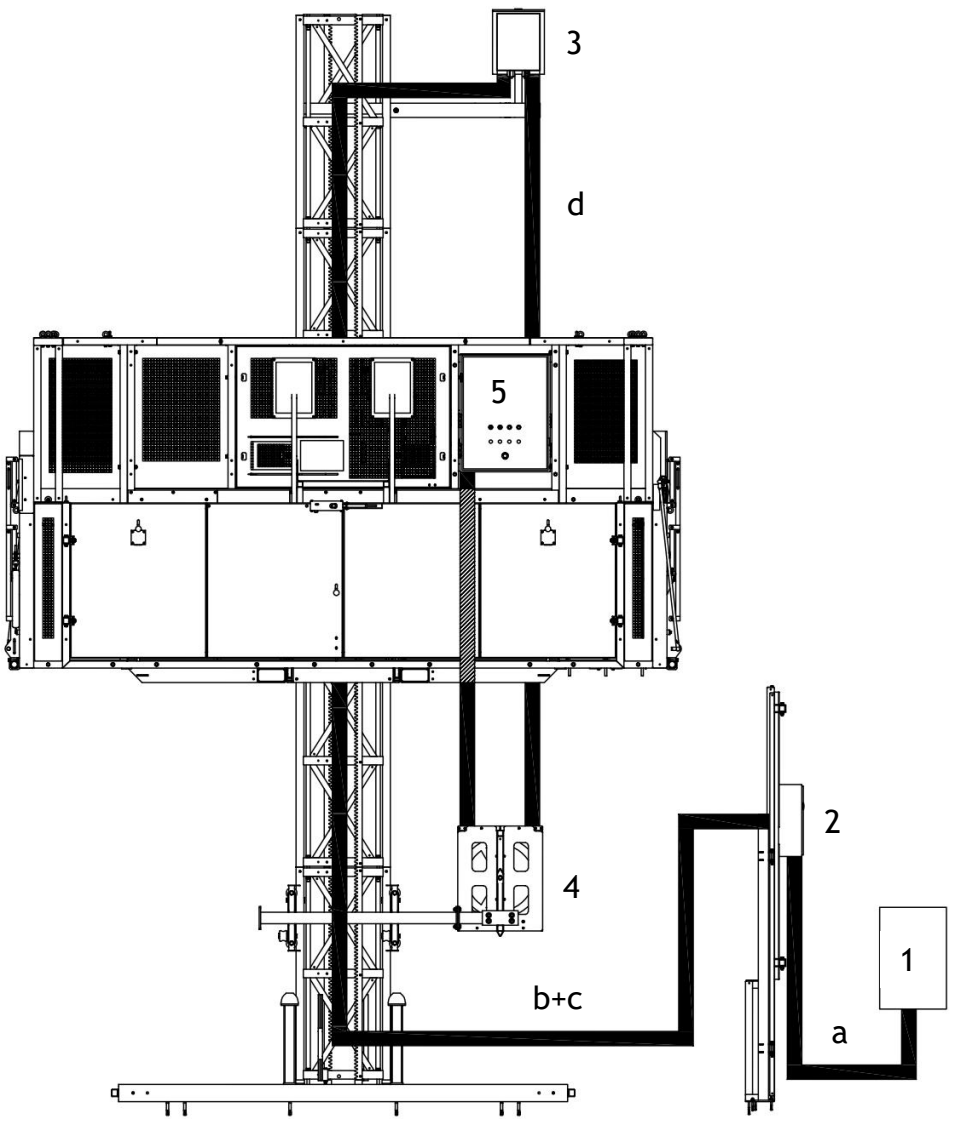
The two fixed arms must be placed, one for each cabin, they will be screwed together.

Both the hose guides and the intermediate fixed arms must be placed towards the side of the cabin frame and the assembly ramps.



4.14 FINAL ELECTRICAL INSTALLATION

Once the intermediate fixed arms are installed, the final electrical installation must be carried out.



ELECTRIC PANELS		
1	Client Box	1+1 ud
2	Base Enclosure Box	1+1 ud
3	Intermediate fixed arm	1+1 ud
4	Trolley	1+1 ud
5	Power Box	1+1 ud

ELECTRICAL HOSES		
a	2 de 4 x 35 mm^2	Client
b (fixed)	2 de 4 x 25 mm^2	Torgar
c (fixed)	2 de 12 x 1,5 mm^2	Torgar
d (mobile) Mixta	2 de 4 x 25 + 12 x 1 + 1 x 2,5 mm^2	Torgar

¡¡¡IMPORTANT!!!

THE AUXILIARY ELECTRICAL ASSEMBLY HOSE HAS THE METERS OF HEIGHT OF A HALF INSTALLATION, WITH WHICH THE COMPLETE ELECTRICAL INSTALLATION HAS TO BE MADE FROM NOW, FIRST FOR ONE CABIN AND THEN FOR THE OTHER.

Since, from the middle of the installation, the height almost exceeds the 60 meters that the auxiliary electric hose has, it is necessary to make all the necessary connections of sending and forwarding of the electric hose to be able to continue climbing.

This installation will be the final one. For it:

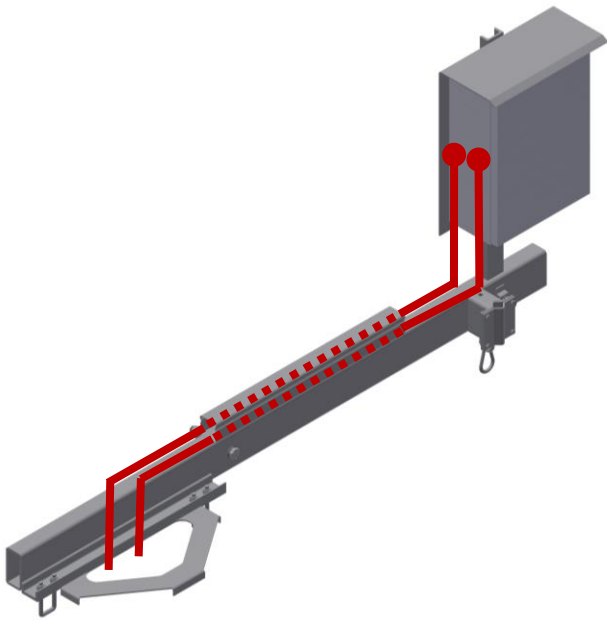
- Study the previous diagram where the tables that must be identified, types of existing hoses and the route that each one follows are specified.
- It is understood that connection (a) from the client to the box (2) is made.
- Connection hoses (b and c) between the frame (1) of the base enclosure and the intermediate fixed arm (2) must be made.
- Connect the mobile hoses (d) to the intermediate fixed arm and pass it through the carriage (4).
- Once the mobile hose (d) has been passed through the car, connect it to the cabin power panel (5).

We have to load on the roof of the cabin the two coils of hoses that are going to leave the installation working:

d (fixed)	1 de 4 x 25 mm^2
e (fixed)	1 de 12 x 1,5 mm^2

MAKE FINAL ELECTRICAL INSTALLATION IN THE CABIN

- Until now we have been working with the mobile hose connected from the base to the direct cabin.
- With this connection still made, the coils of the fixed hoses that we are going to install must be uploaded to the cabin.
- Raise the cabin up to the intermediate fixed arm with the connection box.
- Connect the round hoses as indicated:

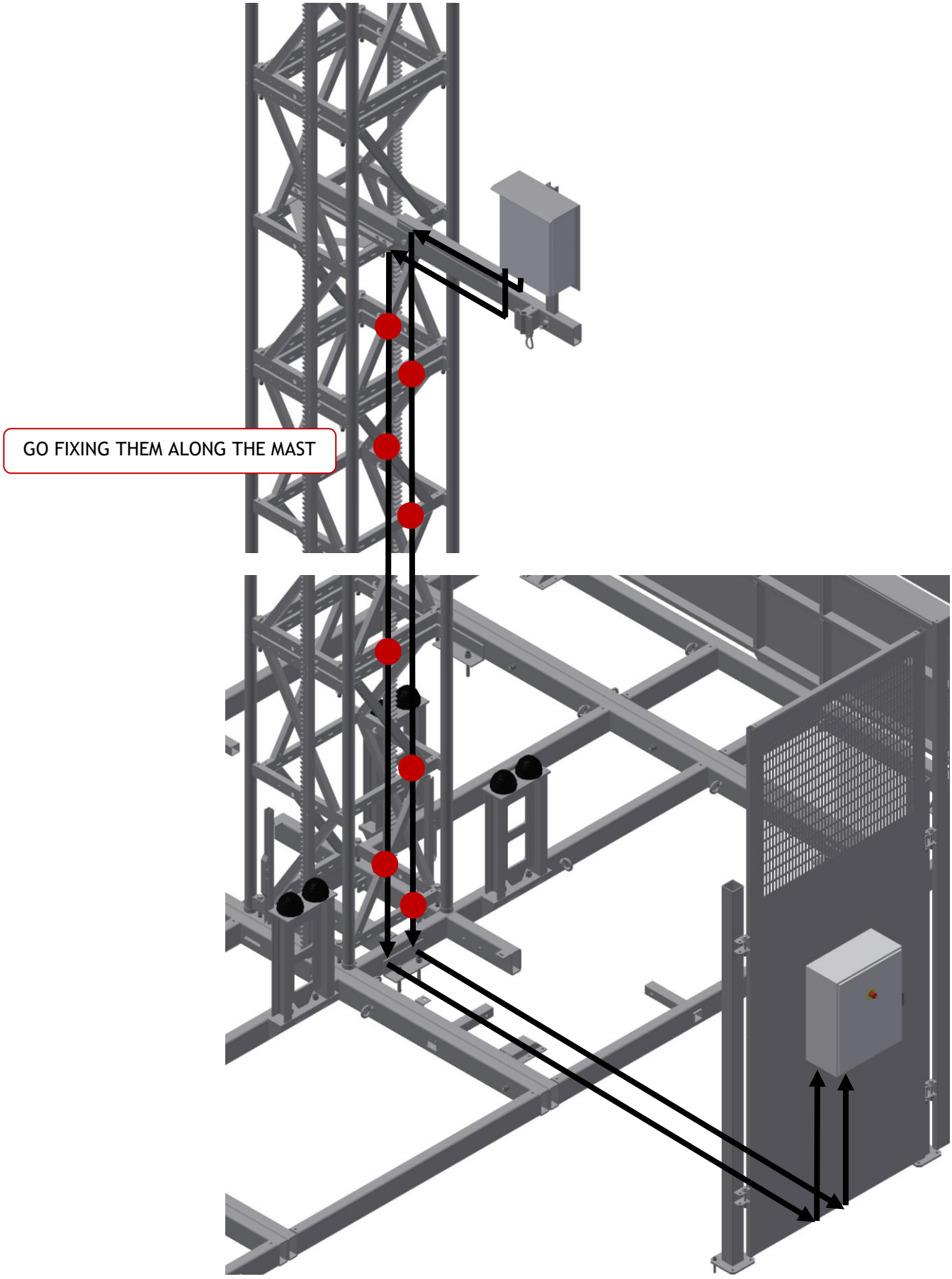


- Once we have the ends of the hoses connected, with the cabin at the height of the intermediate fixed arm, we must gradually drop the other ends of the fixed hoses to the base enclosure.
- With the mobile hose that we had connected to the cabin with the base enclosure, we will have to disconnect the end that is connected to the base enclosure, and go up the hose by hand until we have both ends in the cabin. When the cabin runs out of power, it will remain fixed in that position due to the brakes that the motors have.

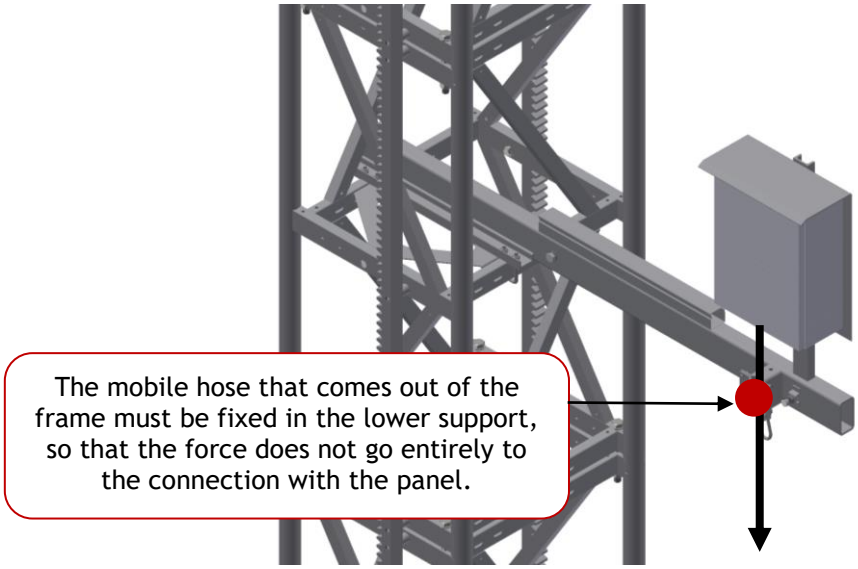
¡¡¡IMPORTANT!!!

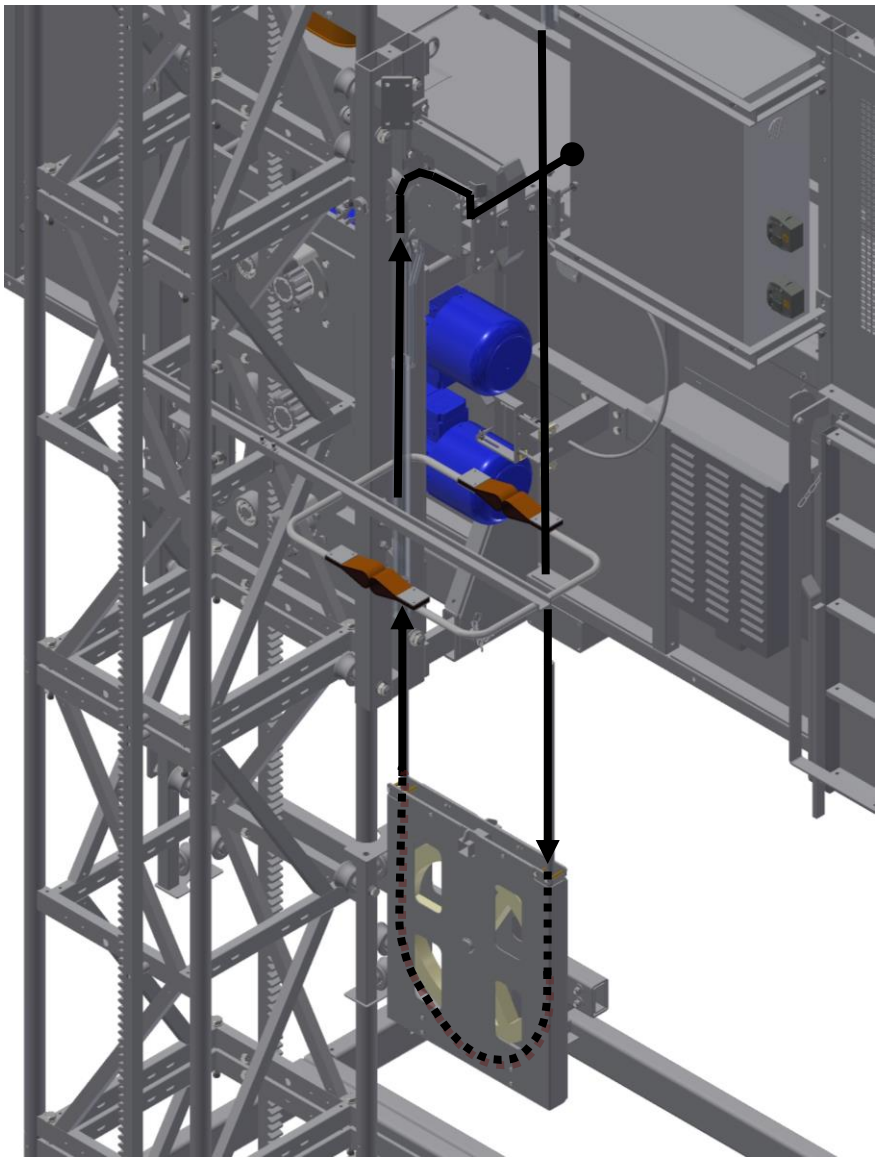
MAKE SURE THAT THE BOXES ARE NOT VOLTAGED BEFORE HANDLING THE HOSES.

- With the ends of the mobile hose that we have just uploaded, we have to connect it to the panel of the intermediate fixed arm.
- With the fixed hoses that we have lowered their ends, these ends must be connected to the frame of the base enclosure, thus, there will be power in the cabin again.
- The fixed round hoses will have to be taken to the mast and fixed. That is, they will be jointly attached to the mast.
- To do this, as the cabin is lowered, these hoses will have to be clamped on the horizontal profiles of the sections, diagonals or on any of the elements that we have screwed to them, whether they are anchors or guides, until reaching the base enclosure.


GO FIXING THEM ALONG THE MAST

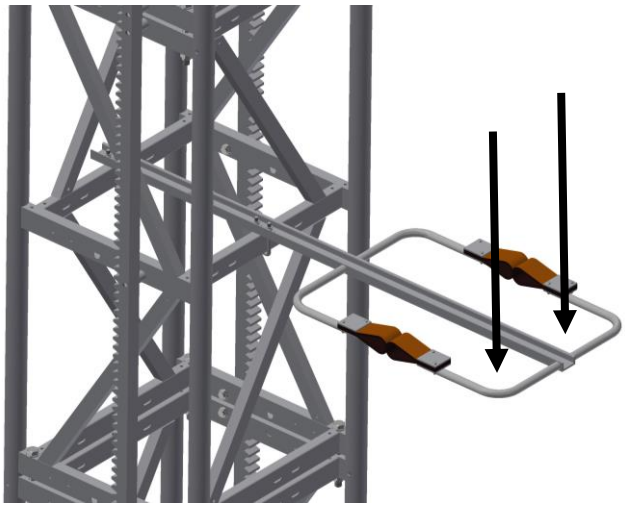
The route of the mobile hoses will be as follows:



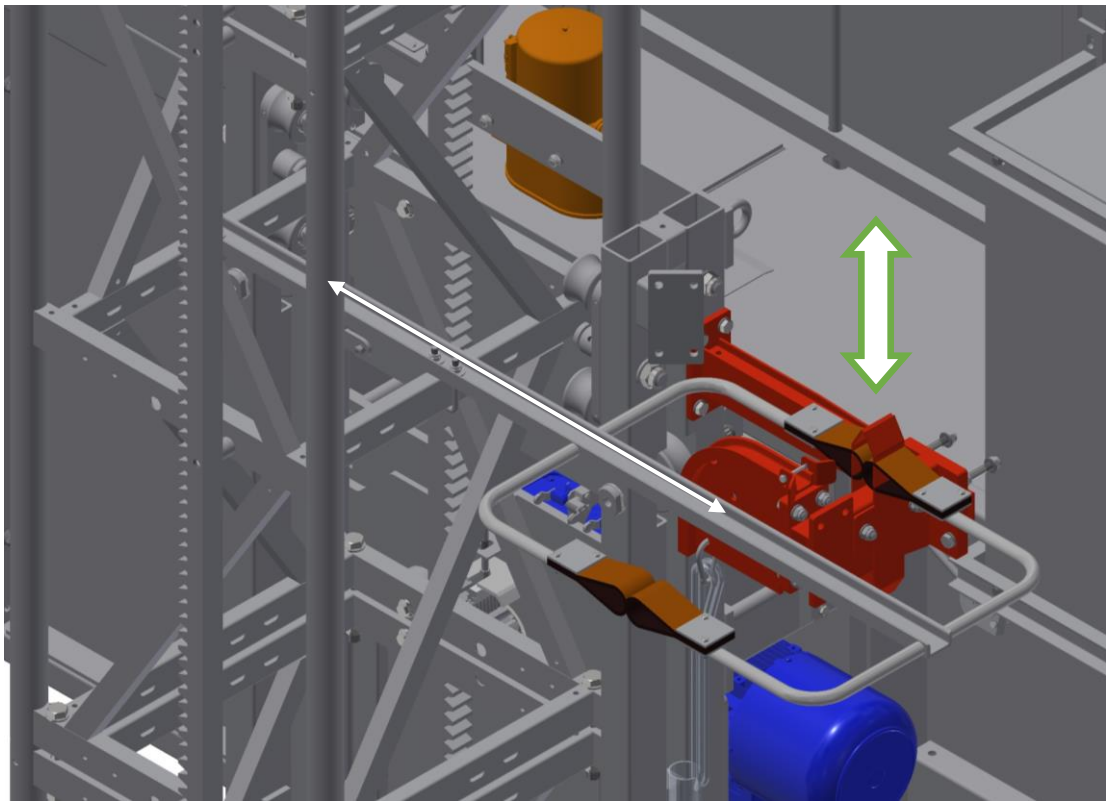


- When these changes have been made, the installation can be turned on again. The cabin will have power again.

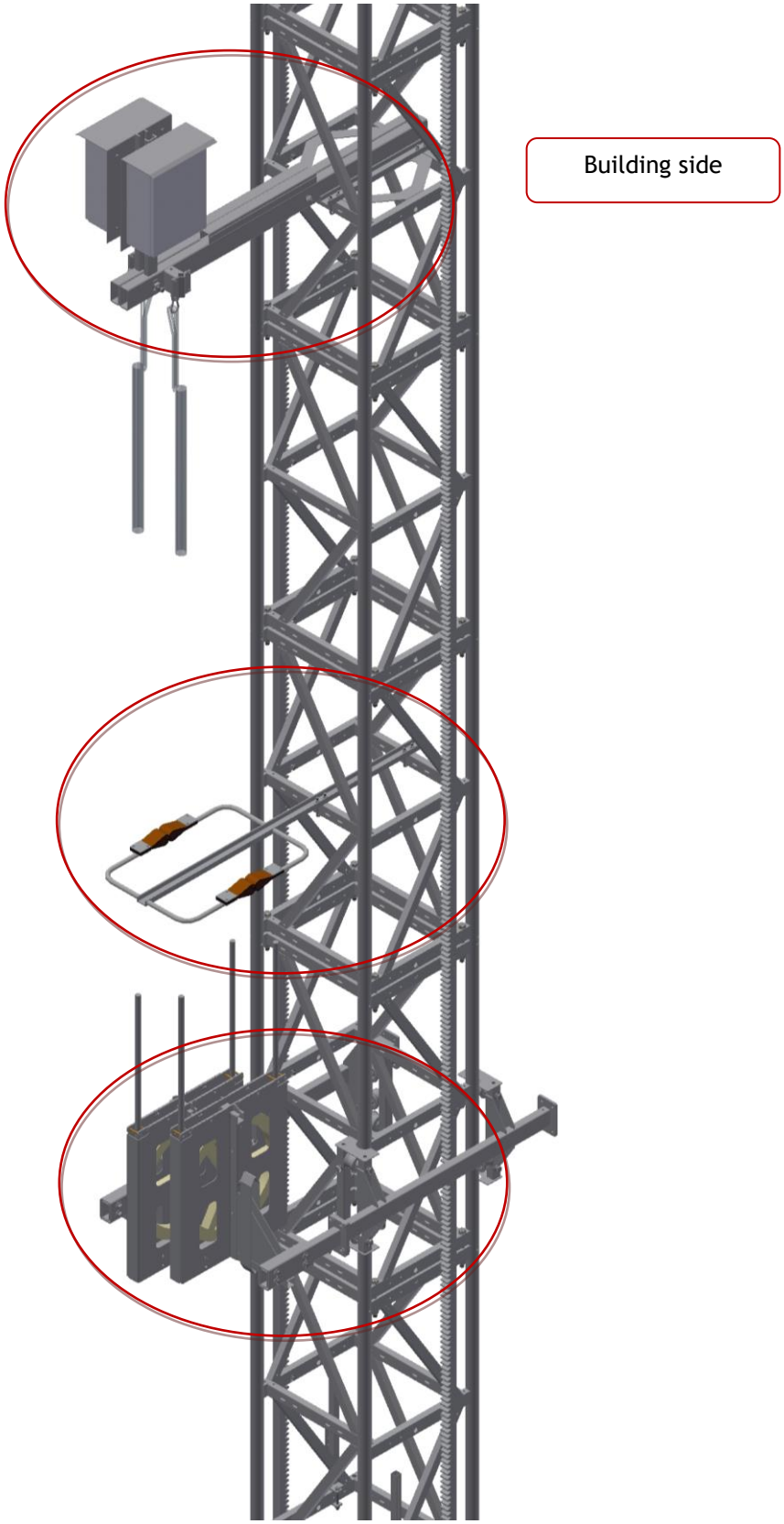
- This hose that comes from the intermediate fixed arm with the box for connections to the roof of the cabin must be inserted as the machine is lowered inside the corresponding hose guides:



- Position the hose outlet arm of the cabin. It is mounted on the side of the corresponding motor group and it is advisable to take the rubbers of the hose guides as a reference, matching the metal wedge of this cabin arm with the central vertical of the rubbers:



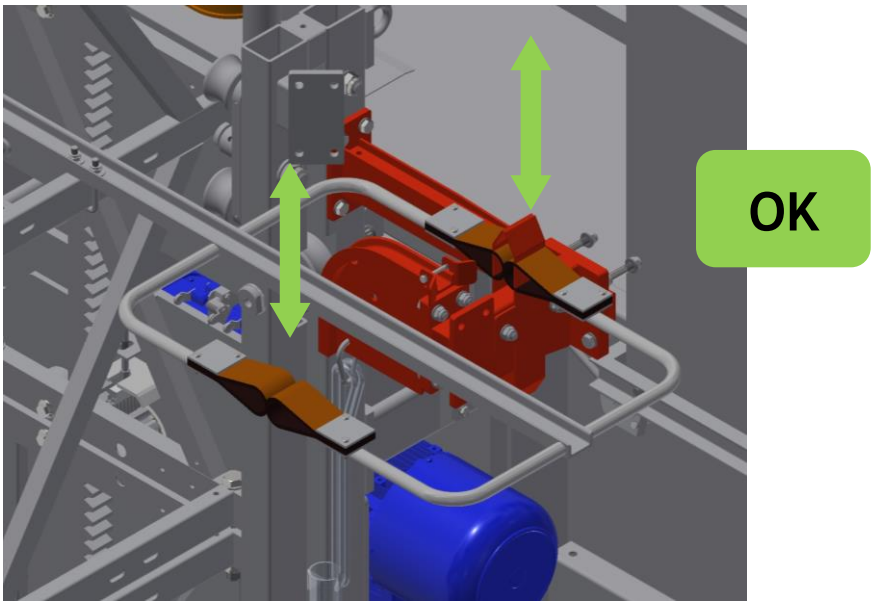
Once the installation has been assembled for one cabin, the same must be done for the other cabin symmetrically with respect to the section:



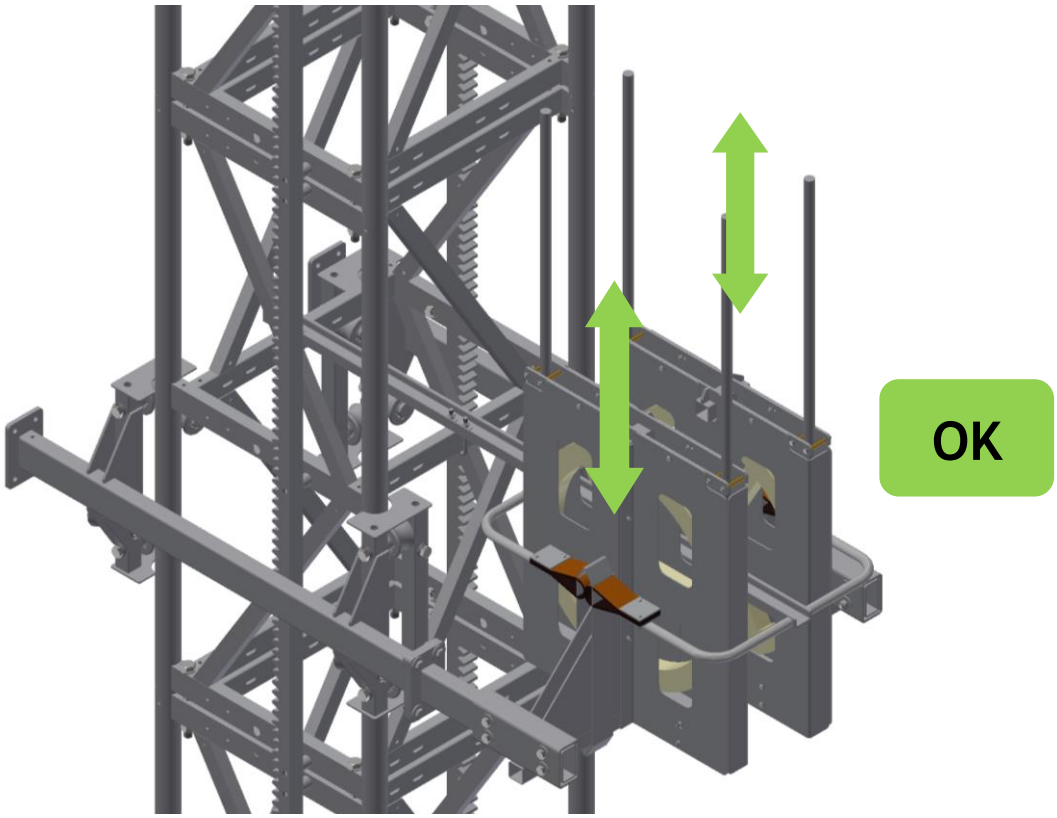
4.15 SECOND HALF OF THE INSTALLATION

Once the definitive electrical installation has been made, we must be able to raise and lower the cabins with caution at the following two points:

- Cabin hose arms and hose guides do not collide:

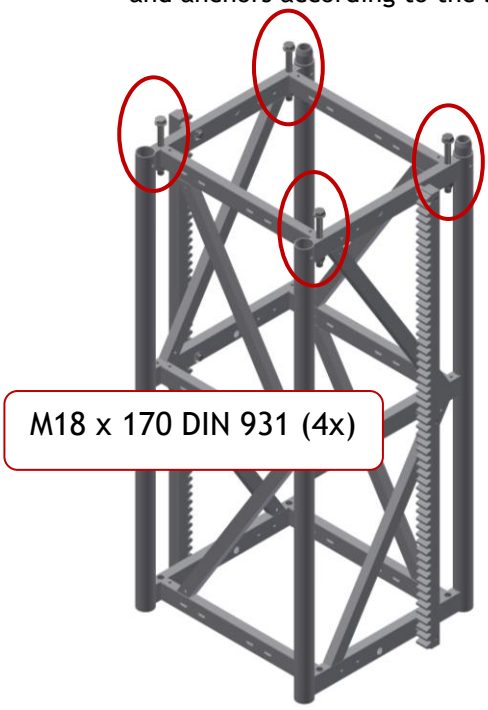


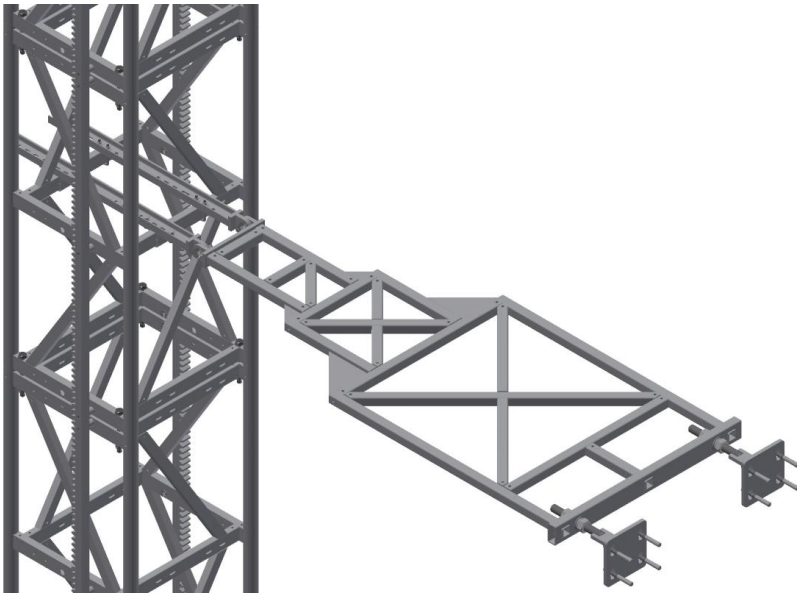
- The trolleys go up and down freely under the cabins and pass through the hose guides with some clearance:

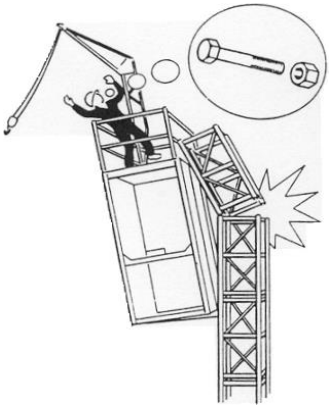


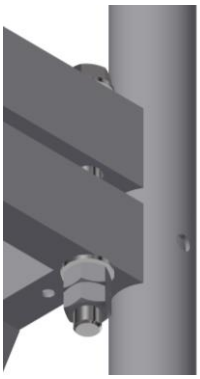
With these checks we can continue placing lifting masts, anchors and hose guides.

Masts of the main tower and anchors to the slab continue to be assembled as previously seen with sections and anchors according to the sequence:





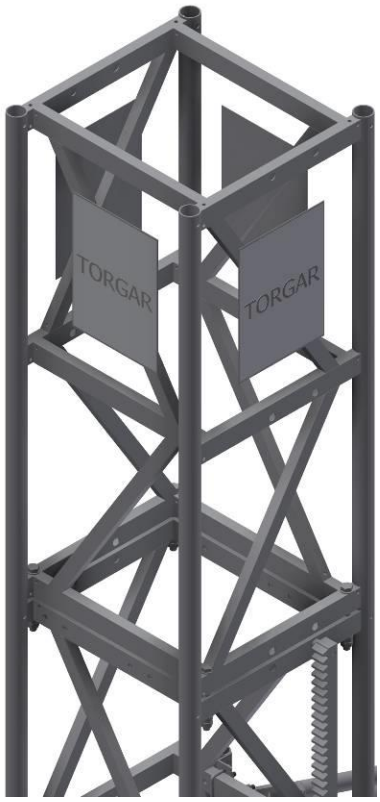




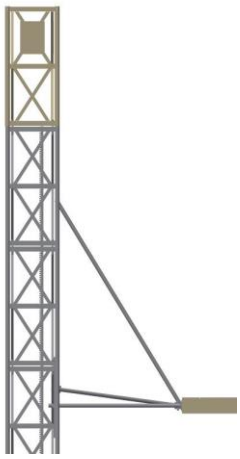
⚠	**DURING THE ASSEMBLY AND DISASSEMBLY PROCESSES, BAD BRACING OR INCORRECT FIXING OF ONE OF THE SECTIONS TOGETHER COULD CAUSE A SERIOUS ACCIDENT**
⚠	**VERIFY THE CORRECT TIGHTENING OF THE FOUR SECTION SCREWS BEFORE STARTING THE MACHINE**
⚠	**VERIFY THE CORRECT FUNCTIONING OF THE RACK PRESENCE DETECTOR BEFORE BEGINNING ASSEMBLY**

4.16 SAFETY MAST SECTION

Once you get the work height, assemble the safety mast section (without rack and with logo).



At the same time is mandatory to install a diagonal anchorage from the safety mast section to the last floor. If it is not possible, refer to your service provider for additional special instructions.

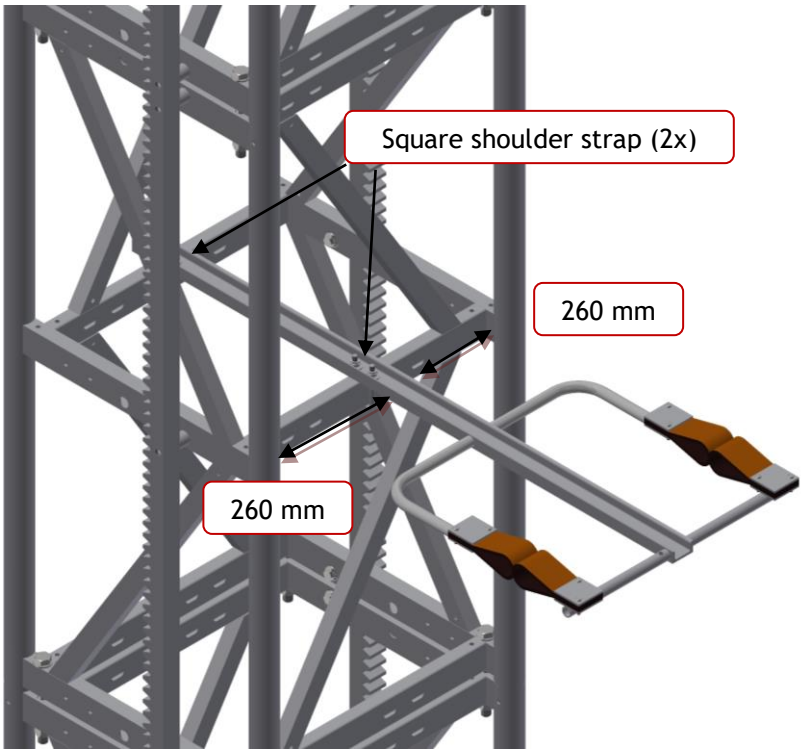


Once the assembly has been finished, all connections between mast sections have to be checked.

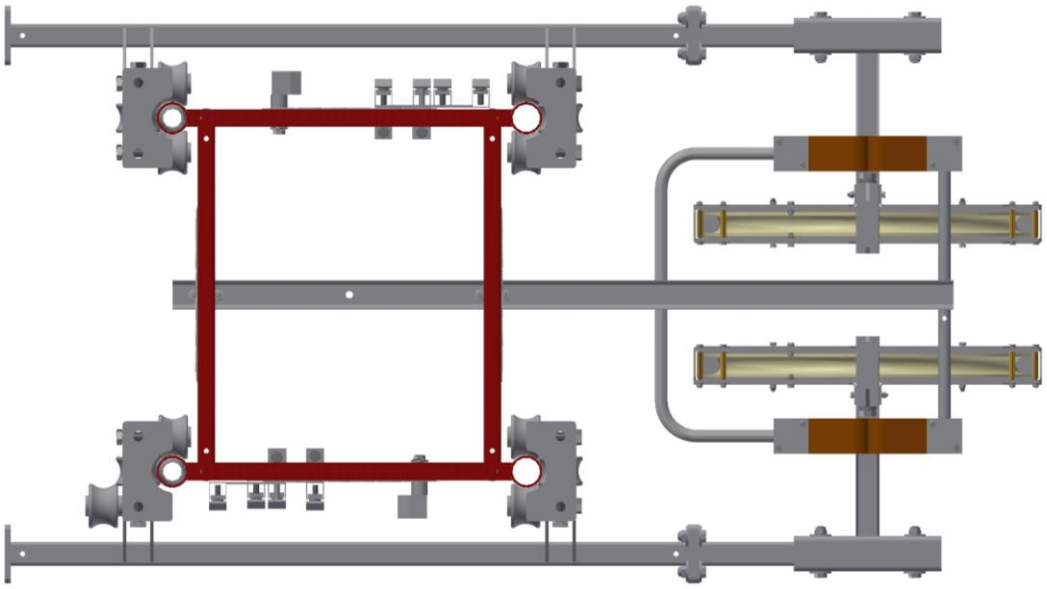
THE MAST HAS TO BE ASSEMBLED AND ADJUSTED TO STAY COMPLETELY UPRIGHT

4.17 SIMPLE HOSE GUIDE

Once we have the definitive electrical installation assembled, when we continue assembling the second half of the installation, we will have to place the simple hose guides, because the trolley should no longer pass through them.



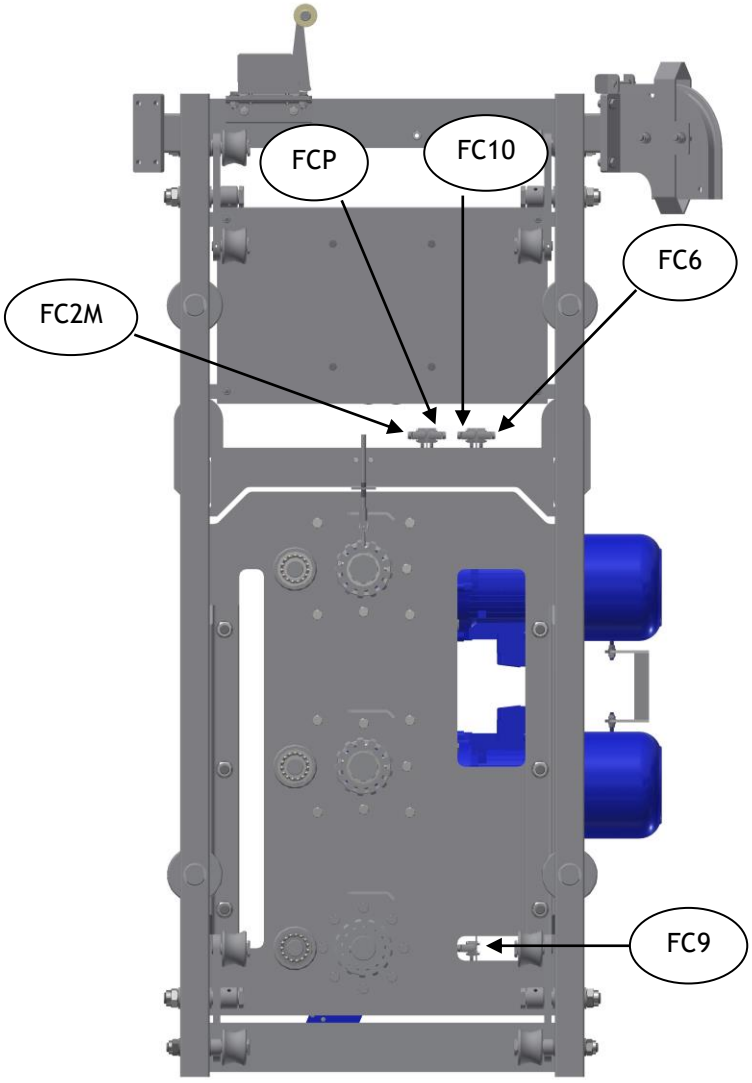
Next figure shows the position of the simple hose guide in relation to the trolleys.



4.18 SKIDS AND LIMIT SWITCHES (STOP AND SAFETY)

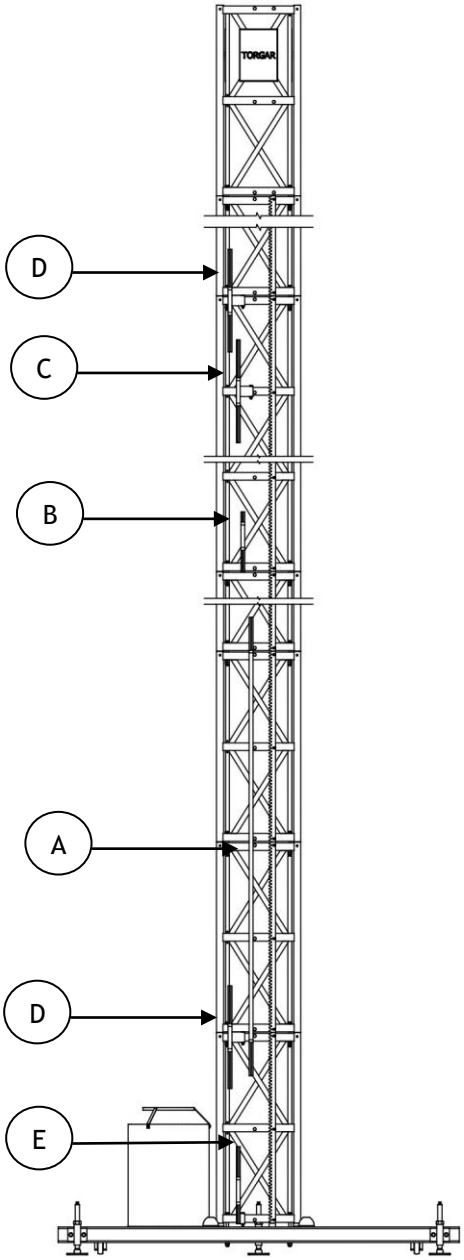
Once the tower is assembled, we have to proceed with the installation of the stop skids in each of the floors.

For this, it is necessary to have an idea of the limit switches in the platform and have very clear about their function as follows:



FC2M	3 meters (9.84 ft) stop
FCP	Intermediate landing doors
FC10	Top landing door
FC6	Safety (Top and bottom)
FC9	Base enclosure

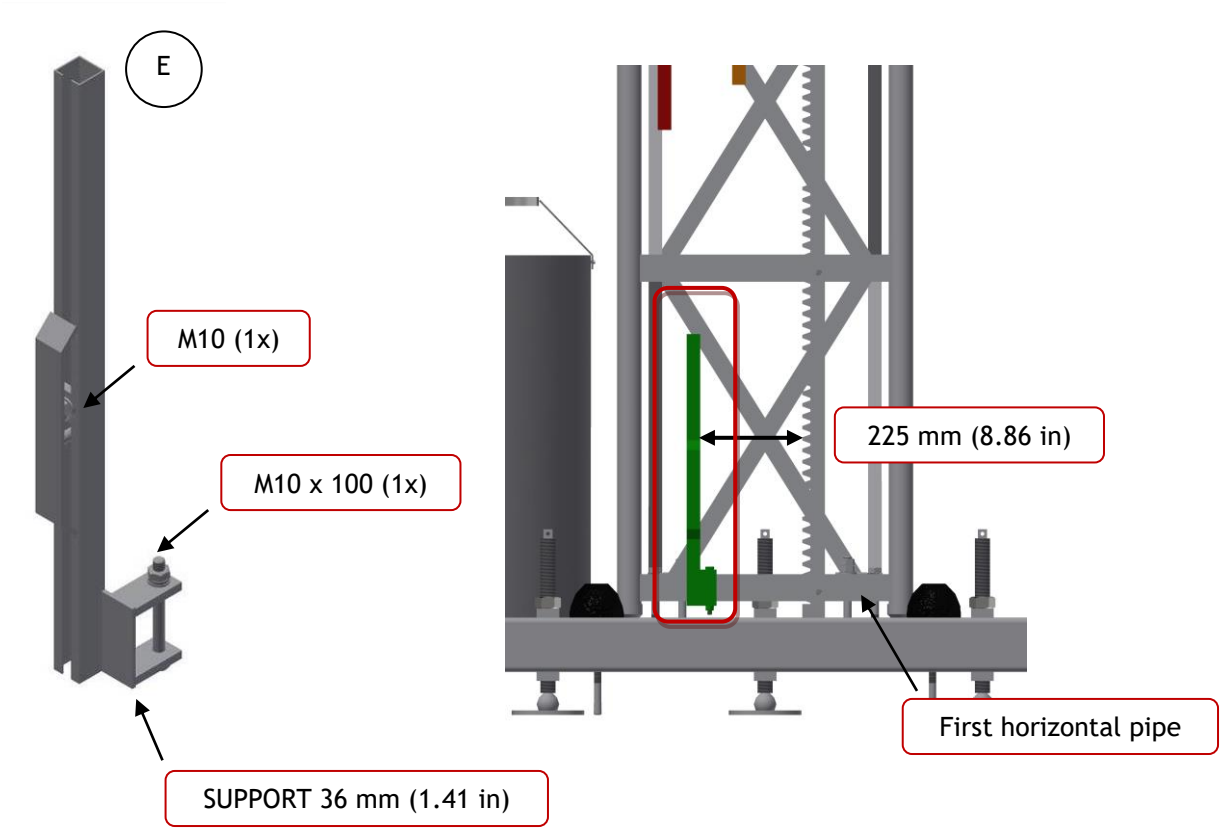
General scheme of the skids:

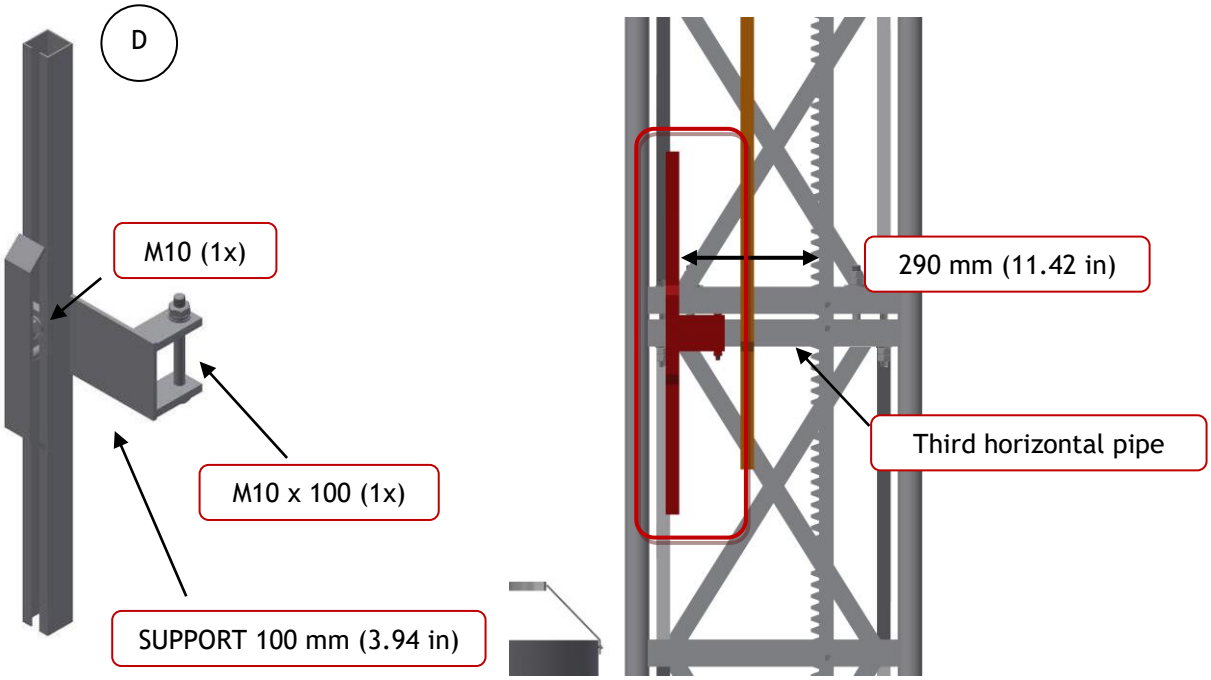


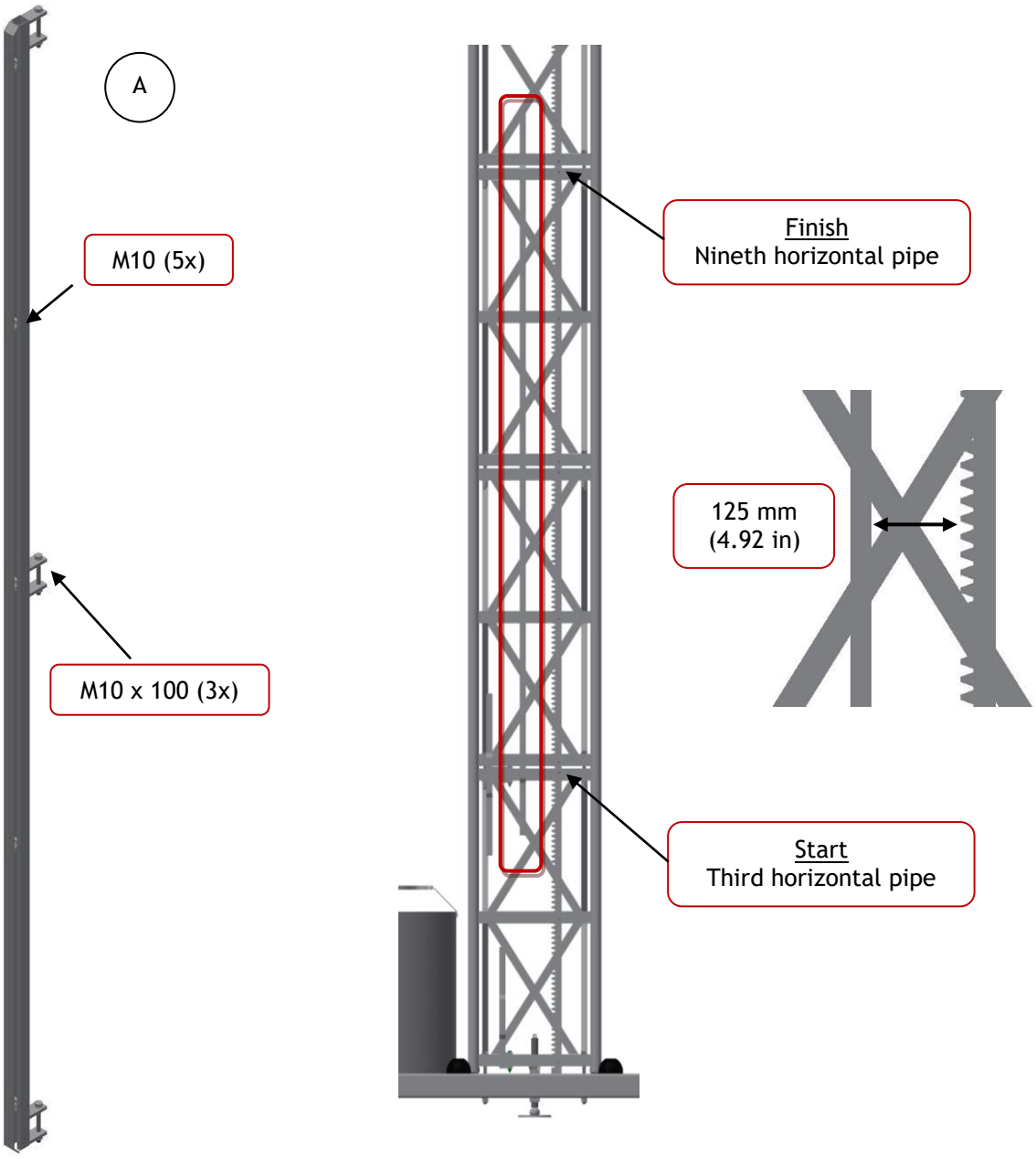
A	3 meters (9.84 ft) stop
B	Intermediate landing doors
C	Top landing door
D	Safety (Top and bottom)
E	Base enclosure

CHECKS SHOULD BE MADE ON EACH FLOOR TO ENSURE THE PLATFORM STOPS IN THE CORRECT POSITION. IF NOT, THE HEIGHT AND DEPTH OF THE SKIDS SHOULD BE ADJUSTED

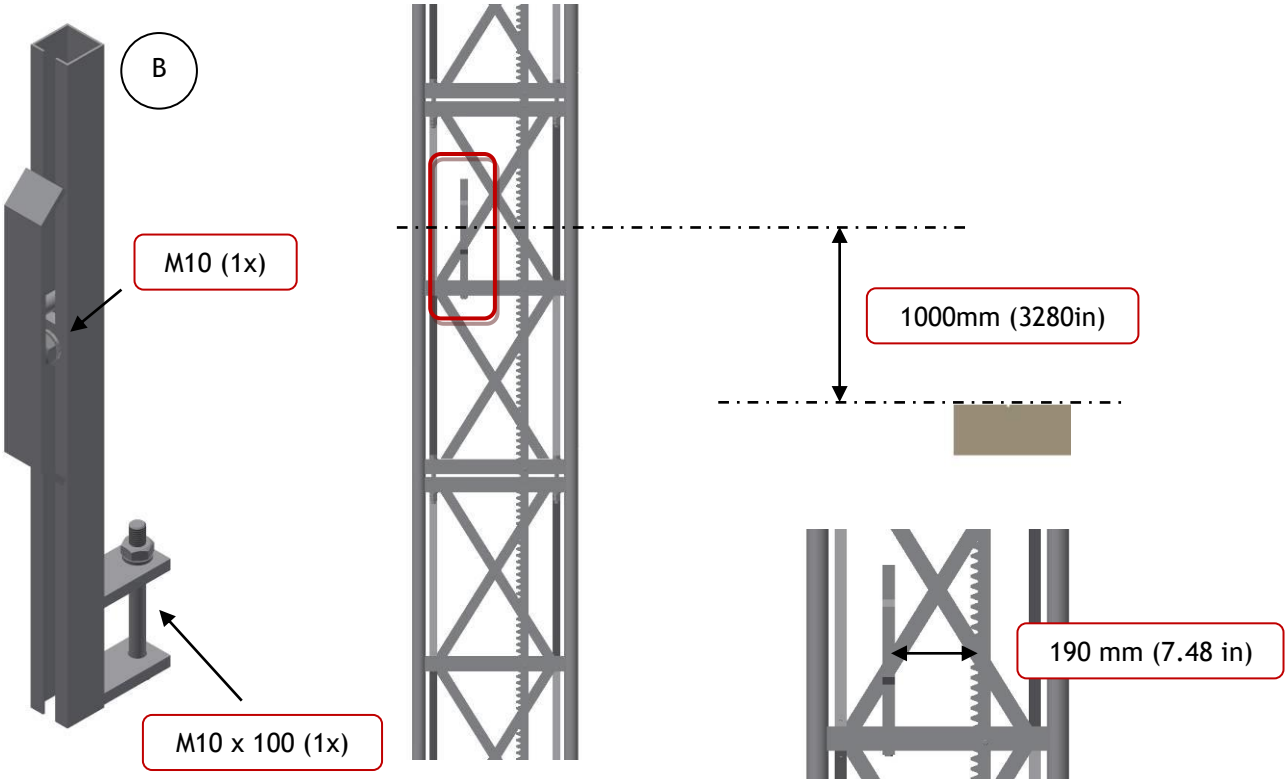
4.18.1 SKIDS AT THE BASE ENCLOSURE



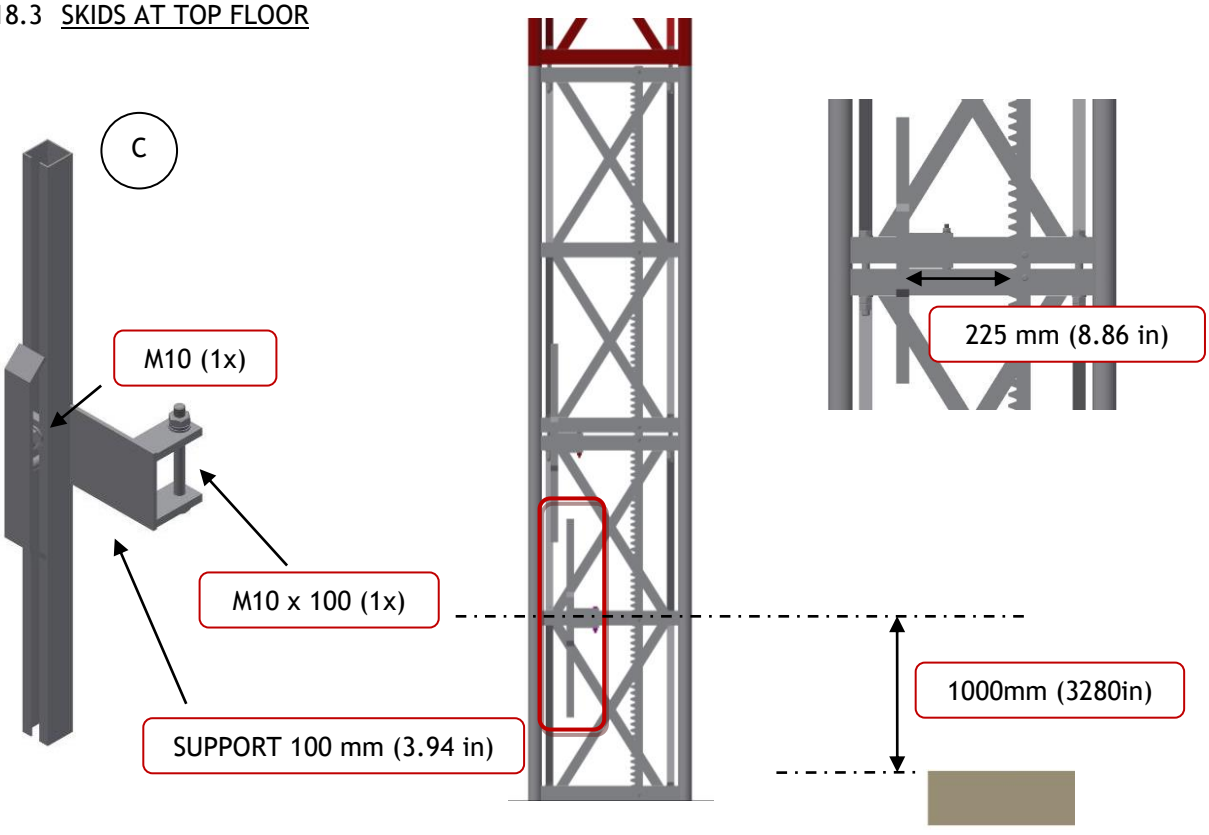


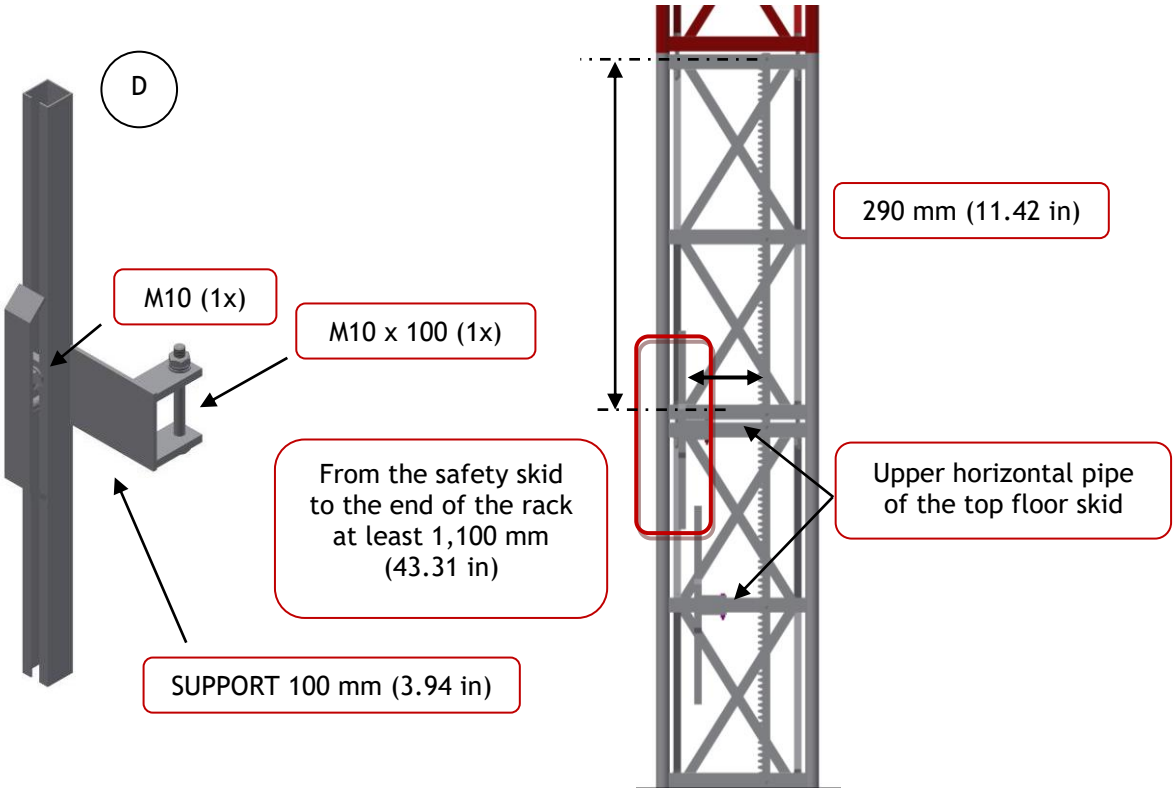

A
M10 (5x)
M10 x 100 (3x)
Finish
Nineth horizontal pipe
125 mm
(4.92 in)
Start
Third horizontal pipe

4.18.2 SKIDS AT INTERMEDIATE LANDING DOORS



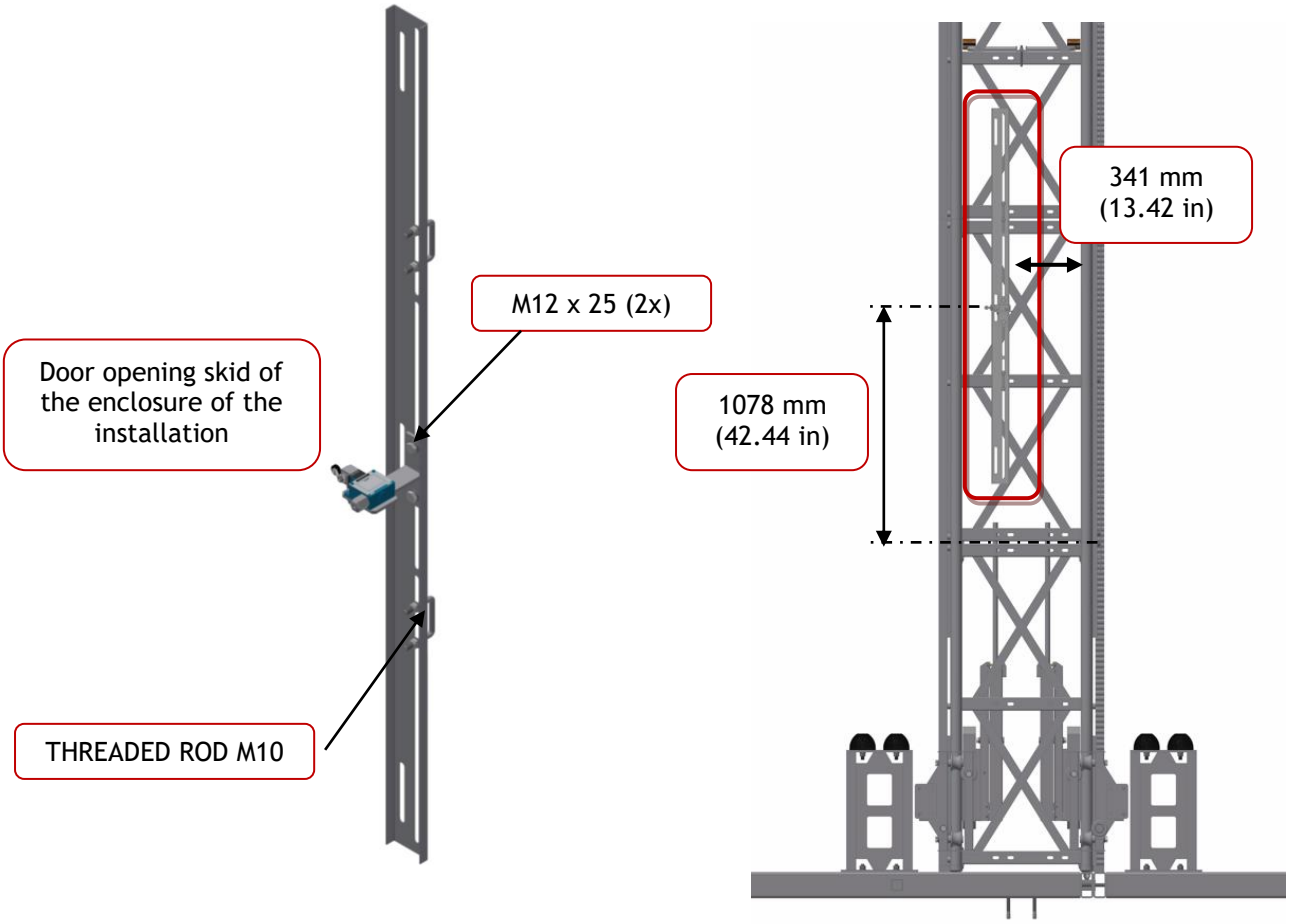
4.18.3 SKIDS AT TOP FLOOR

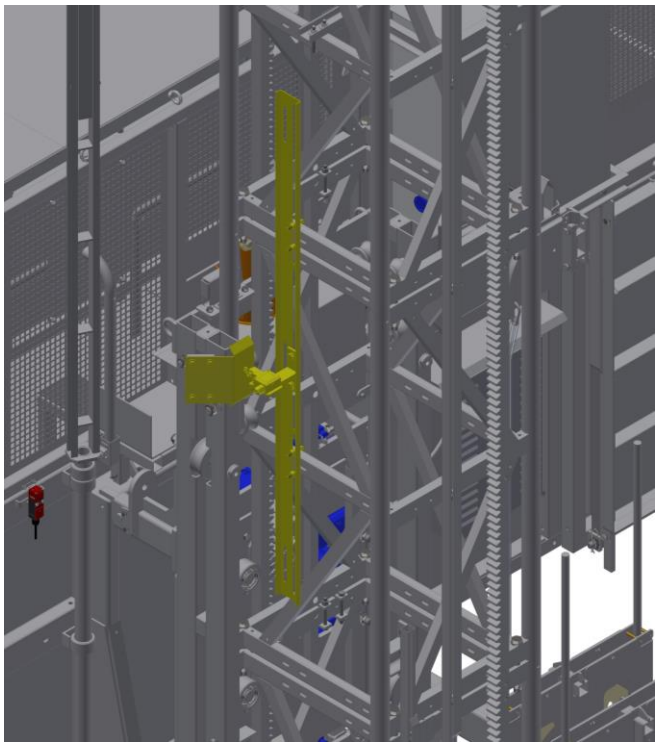




Once the skids of one cabin have been placed, those of the other cabin must be placed, although this process could be done by mounting both at the same time:

4.18.4 LIMIT SWITCH DOORS ENCLOSURE



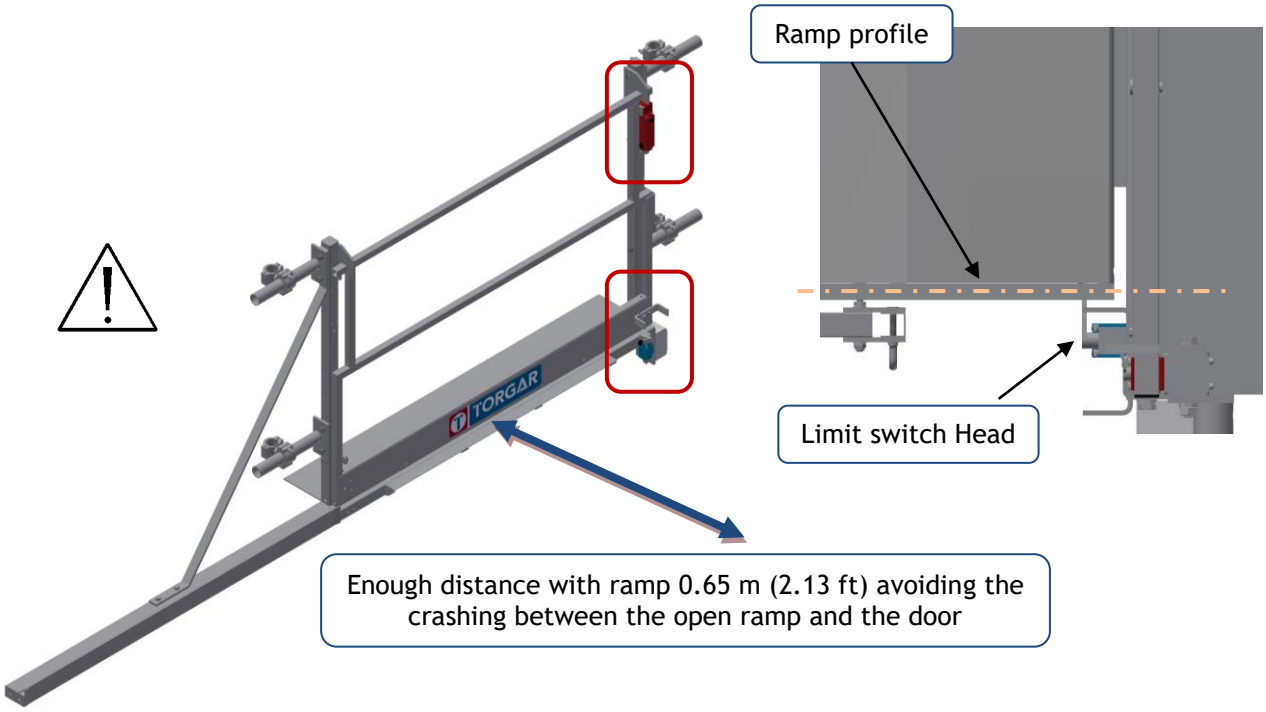


4.19 FLOOR PROTECTION DOORS (OPTIONAL)

There are two types of floor protection door:

4.19.1 FLOOR PROTECTION DOOR OF 1.1 METERS (3.6 FT)

At the same time, protection doors must be installed on every floor. Centre the door with the width of the platform. Keep a distance in order to let the ramp fall to the floor without hitting the floor door. Finally, install the limit switch to the front of the structure so that the transport platform operates mechanically on this device to allow the door opening.



The secuence of function, always will be as follows. Any other option will not be possible:

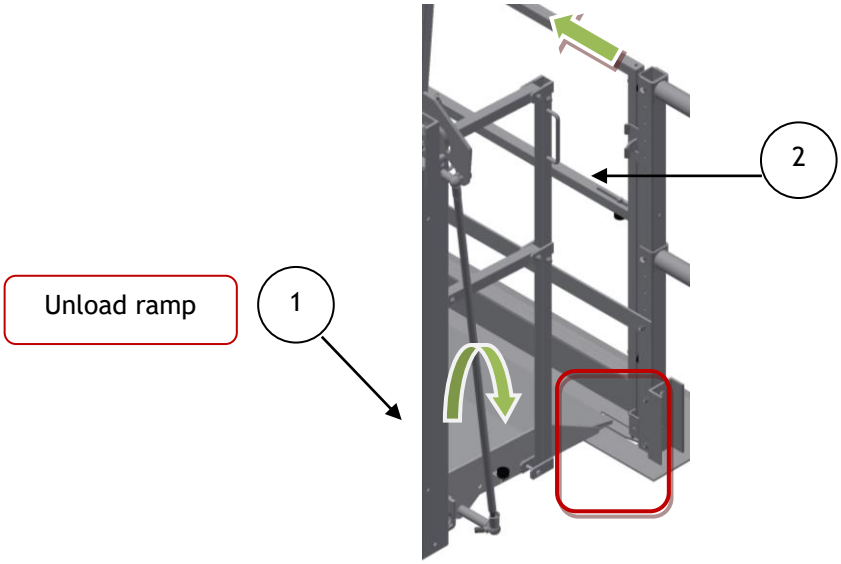
1.- OPEN THE RAMP

2.- OPEN THE SLIDING DOOR

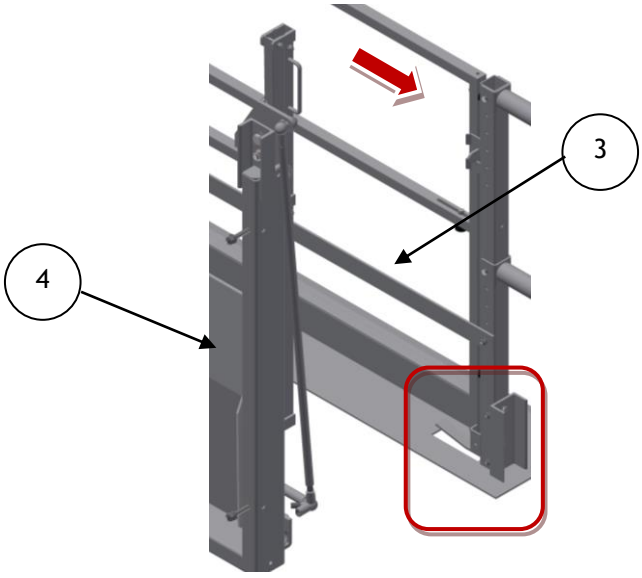
3.- CLOSE THE SLIDING DOOR

4.- CLOSE THE RAMP

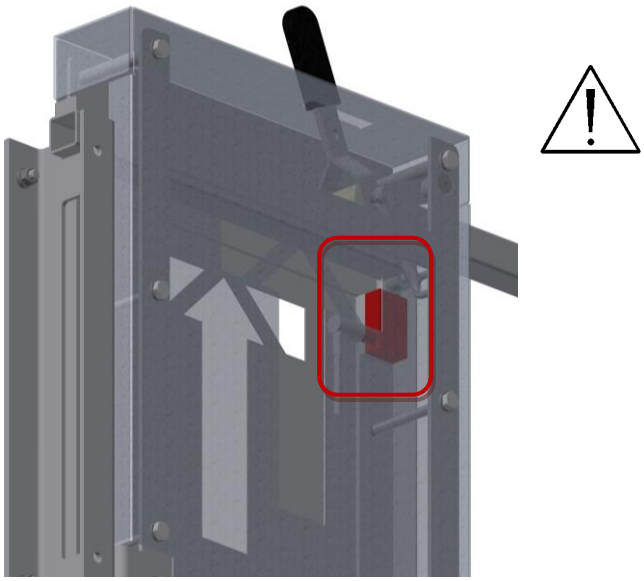
INITIAL POSITION	
ACTIVATED	**CAN BE OPENED**



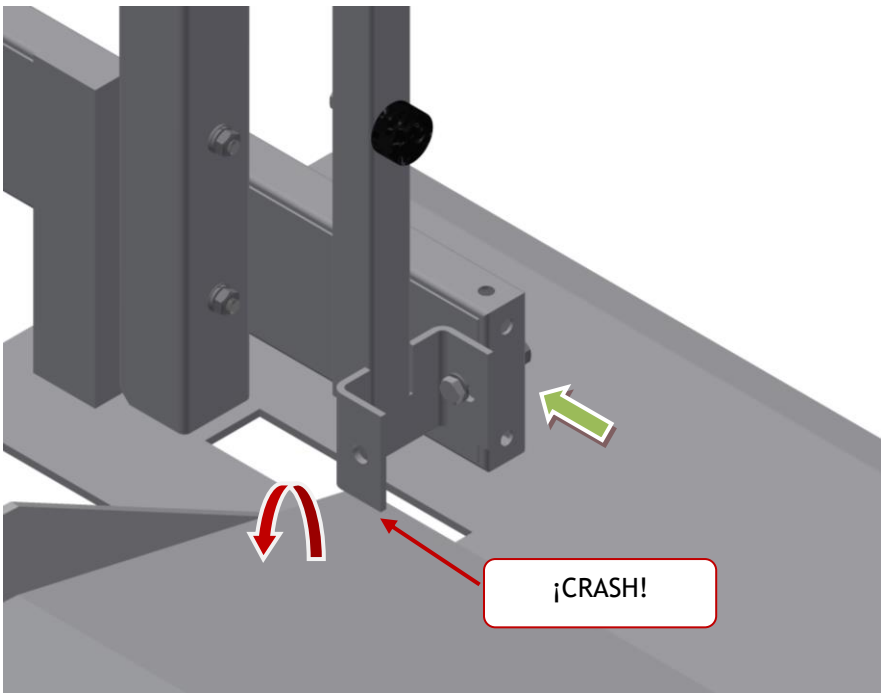
FINAL POSITION	
NO ACTIVATED	**CANNOT BE OPENED**



When the sliding door is open, a limit switch is activated so the machine cannot be moved.

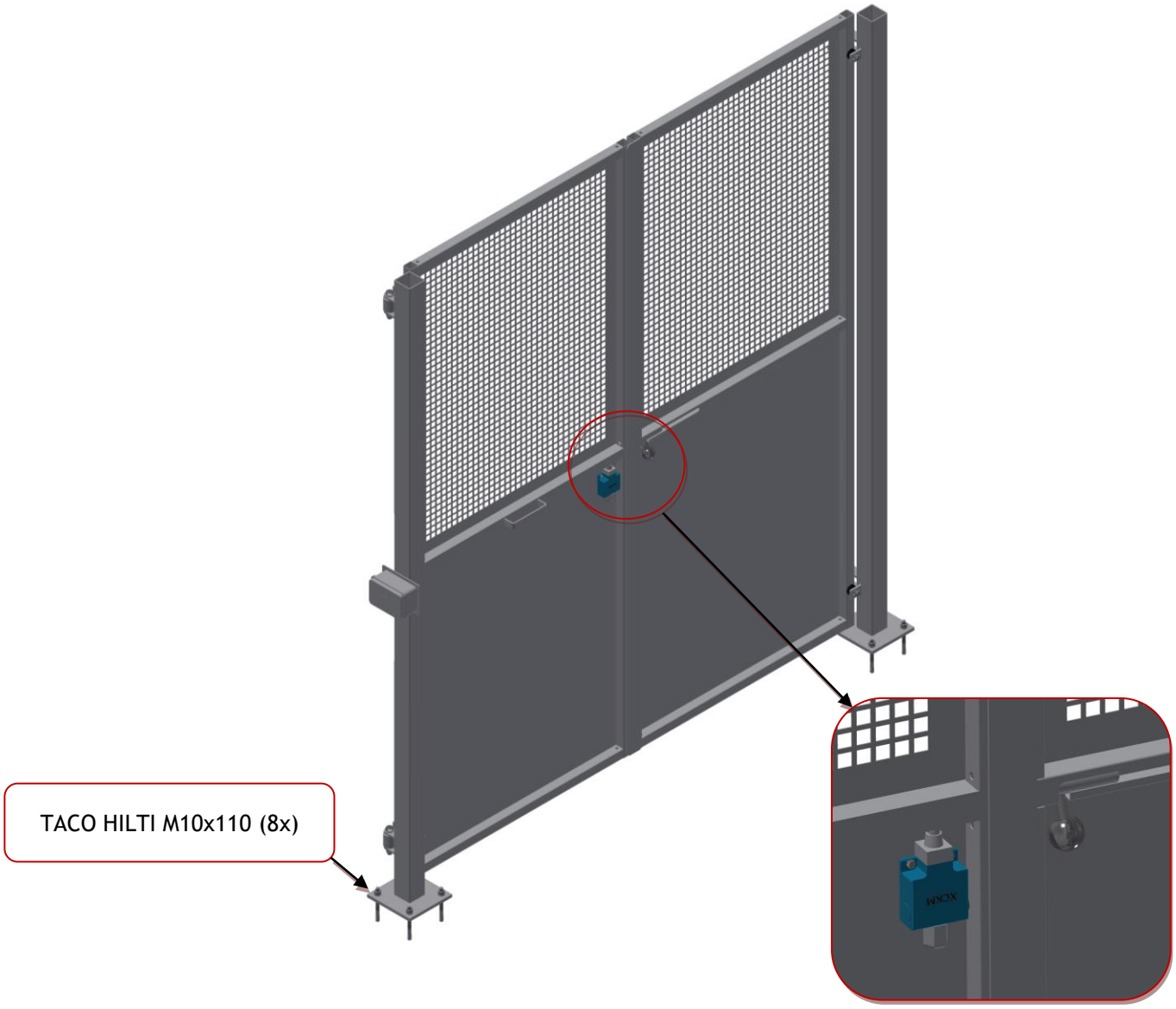


Once the sliding door is opened, it must be checked that the ramp cannot be closed in any position:



CHECK THE SEQUENCE
1 OPEN RAMP - 2 OPEN SLIDING DOOR - 3 CLOSE SLIDING DOOR - 4 CLOSE RAMP

4.19.2 FLOOR PROTECTION DOOR OF 2 METERS (6.56 FT)



This type of door is full height protection, but this door on the floor only has an electric limit switch that prevents the machine from working if any door on the floor is open but it does not prevent it from opening, because it does not have a mechanical lock.

THE FLOOR DOOR SHOULD NOT BE OPENED FOR ANY REASON IF THE CABIN IS NOT STOPPING AT THE LEVEL OF SAID FLOOR DOOR.

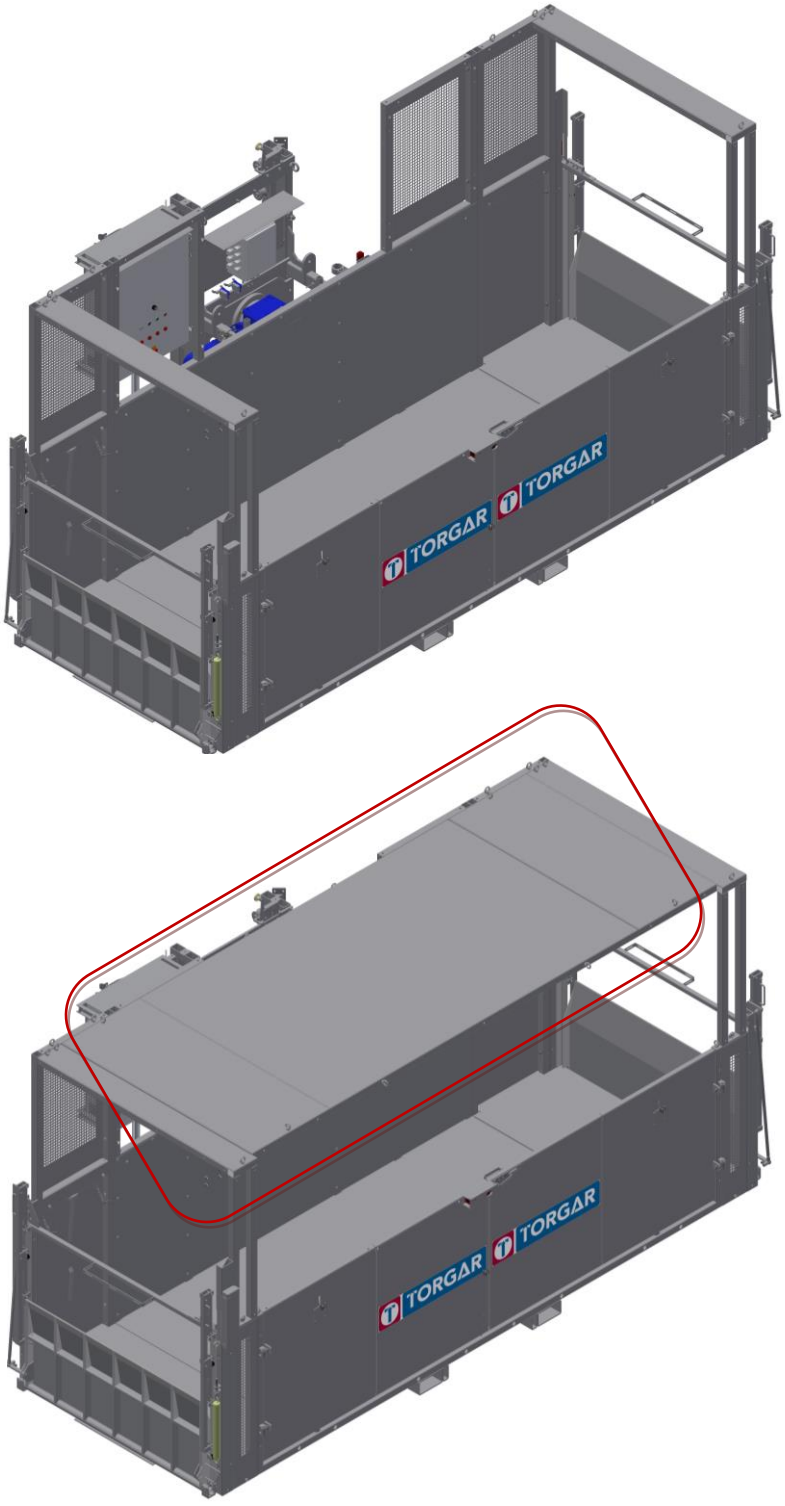
YOU ONLY HAVE TO OPEN THE FLOOR DOOR IN WHICH THE CABIN IS STOPPED TO BE ABLE TO ENTER OR EXIT IT

4.20 FINAL STEPS

4.20.1 INTERMEDIATE ROOF

The intermediate roof has the function to help the assembly in order to reach the zone of the mast sections. After finishing the installation of the different elements, this roof can be assembled.

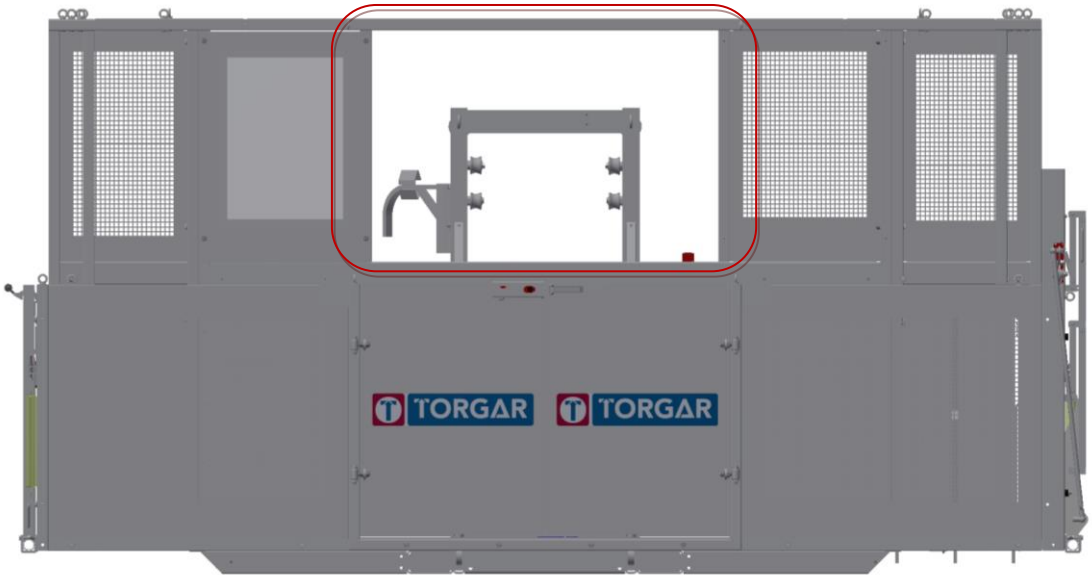
To do that, assemble the intermediate roof to the lateral roofs in the platform. They have holes with this goal.

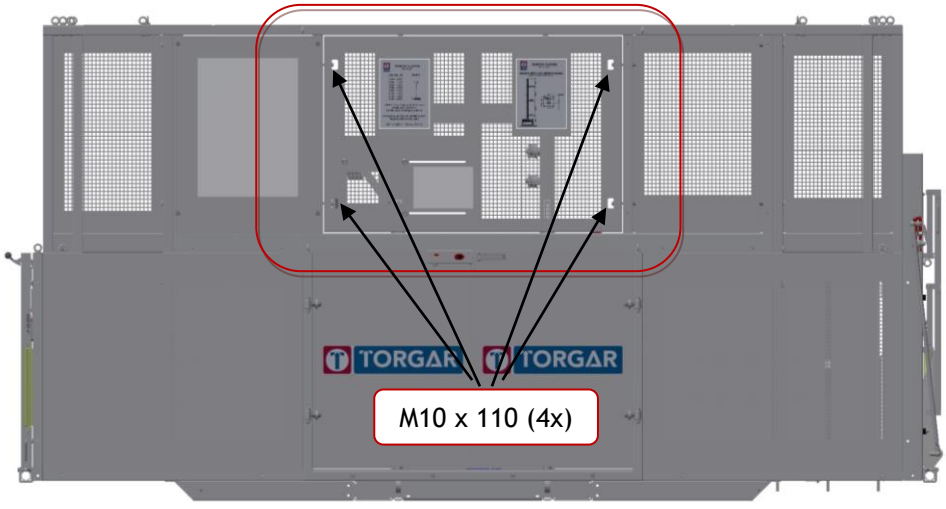


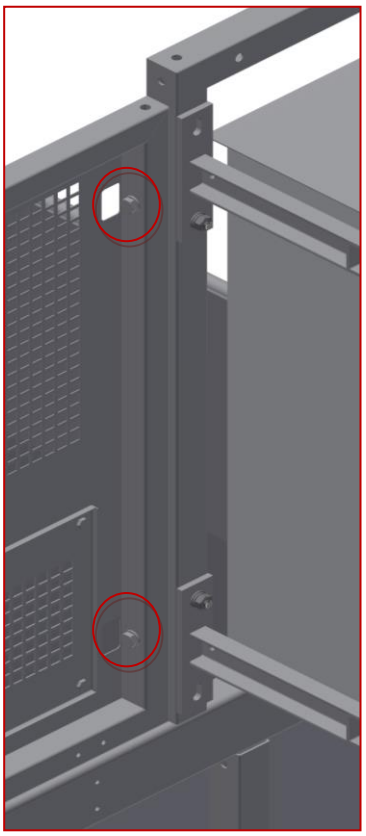
4.20.2 PROTECTION MESH FROM THE MAST SECTIONS

The protection mesh is another component that it is necessary disassembled during the process of the installation but, at the end, it is mandatory to re-assemble it.

Following you can see two pictures, with the protection mesh out of place and in place.







4.21 DISMANTLE

To dismantle the machine the operator has to follow all the assembly steps in the opposite order. Mainly:

1. Check with jobsite that platform is ready to be dismantled.
2. Check base and make sure its area is clean and free from debris.
3. Check platform is clear from any loads.
4. Change over any connections to jumper plugs in the base panels.
5. Check roof area clear.
6. Switch over any connections to enable platform to be driven from the platform.
7. Drive the transport platform up to the first tie level and check all mast tie fixings and mast bolt connections as you drive up.
8. Continue up checking all mast bolts and ties until you reach the highest point.
9. Drive to the lower level and starting from the bottom work your way up removing any landing gate skids.
10. Disconnect any landing gate wires.
11. Remove top landing gate and ensure that the appropriate barriers are in place and any fall hazards are eliminated.
12. Remove any other landing gates and wired connections and ensure that the appropriate barriers are in place and any fall hazards are eliminated.
13. Unload all landing gates and stack up neatly away from the base of the platform.
14. Fit the self erection crane and the electric winch.
15. Drive to the top and remove the skids at the top floor.
16. Remove the overrun mast section (safety mast section) and any other sections until you get to the top mast tie.
17. Drive down and unload any mast sections and ancillary parts.
18. Drive up to the top mast tie and slacken off all connecting bolts but do not remove.
19. Slacken off any turn buckles until there is no pressure on any bolts.
20. When you are sure that there is no load on the mast tie it is then safe to remove.

ANCHORAGES AND MAST SECTIONS: ONE STAGE EVERY TIME

21. Ensure that the platform is emptied and never overloaded during the dismantle process.

22. Continue with this operation until you reach the intermediate fixed arm where you will have to disassemble it, for this you will have to disassemble the electrical installation and reassemble the preliminary installation as was done during assembly.

23. Continue this operation until you get to the last one or two mast ties (depending on transport platform type) removing cable guides as you continue down.

24. If required attach a crane to the mast section above the first or 2nd tie and then continue dismantling the platform and mast ties until you reach the lowest level.

25. Remove the base enclosure and remove the platforms and any ancillary parts as required.

26. Disconnect the power supply.

*Note: You can see pictures of all of these points along this manual in opposite order

⚠	THE MACHINE SHOULD ONLY BE DISMANTLED BY PROPERLY QUALIFIED AND TRAINED PERSONNEL
⚠	MAXIMUM WIND SPEED IN DISMANTLING OPERATIONS CAN BE 45 KM/H (27.96 mph)

4.22 STORAGE AND TRANSPORT

Storage can be indoors or outdoors. Depending on the conditions, the period of storage can be longer or shorter.

4.22.1 ADVICES ABOUT STORAGE

Below are some images that can give an idea of how to properly store and transport the different components:

4.22.2 STORAGE PERIOD

Indoor storage means it is inside an industrial warehouse with walls and roof. The period of time estimated under these conditions is one year.

Any other storage is considered outdoors.

a) Favorable environment: maximum six months.

b) Unfavorable environment: maximum two months.

4.22.3 STORAGE INSPECTION

If the machine would be storage under the previous conditions for longer time than the specified, the official distributor will decide the new period of storage supported by the manufacturer.

The inspection will follow the next steps:

a) Appropriate repairs.

b) Check damages on structure. Repair if necessary.

c) Check components that can get worn.

d) Check all the recommended parts are in good conditions.

The new period of storage will be indicated in the following list:

PERSON IN CHARGE	COMPANY STAMP	DATE
		Inspection date:
		New date:

PERSON IN CHARGE	COMPANY STAMP	DATE
		Inspection date:
		New date:
		Inspection date:
		New date:
		Inspection date:
		New date:
		Inspection date:
		New date:
		Inspection date:
		New date:
		Inspection date:
		New date:
		Inspection date:
		New date:

5. GUIDELINES FOR USE

5.1 GENERAL GUIDELINES

COMPULSORY THE USE OF PERSONAL PROTECTION EQUIPMENT (PPE'S)
GLOVES – HELMET – GOOGLES – BOOTS – SAFETY ARNES – REFLECTIVE VEST

5.1.1 PERSONNEL TRAINING

The operation of the transport platform is carried out by personnel properly trained by FRACO MANUFACTURING, S. L. (or its official distributor or a competent person qualified to give transport platforms training designated by them).

To get the qualification the user needs a complete, specific and properly training. This training can be done on site or wherever FRACO MANUFACTURING, S. L. (or the official distributor or a competent person qualified designated) agrees to do it. The documentation and procedures indicated by the manufacturer will always be carried out.

This training expires every year so it has to be renewed after it.

USERS AND PERSONNEL HAVE TO BE QUALIFIED AND PROPERLY TRAINED BY FRACO MANUFACTURING, S. L., AN OFFICIAL DISTRIBUTOR OR A COMPETENT PERSON QUALIFIED TO GIVE TRANING DESIGNATED BY THEM

5.1.2 AMBIENT CONDITIONS

Maximum wind speed in freestanding work operations: 12.5 m/s (45 Km/h) - 27.96 mph.

Maximum wind speed in work operations: 20.0 m/s (56 Km/h) - 34.79 mph

Maximum wind speed in assembly - dismantle - maintenance operations: 12.5 m/s (45 Km/h) - 27.96 mph.

		SPEED OF WIND		
RANGE	**SCALE BEAUFORT**	**m/s**	**Km/h**	**mph**
0	Calm	0 – 0.2	0 – 1	0 - 0.62
2	Light breeze	1.6 – 3.0	6 – 11	3.73 - 6.83
4	Moderate breeze	5.5 – 7.7	20 – 28	12.43 - 17.39
6	Strong breeze	10.8 – 13.6	39 – 49	24.23 - 30.45
8	Gale	17.2 – 20.5	62 – 74	38.52 - 45.98
10	Storm	24.7 – 28.3	89 – 102	55.30 - 63.38
12	Hurricane	> 32.7	> 118	> 73.32

Do not use the machine if conditions (wind, rain, etc.) could mean dangerous situations for personnel.

5.2 NORMAL USE OF THE TRANSPORT PLATFORM

5.2.1 GOOD USE – BAD USE

a) Installation must be kept clean.

b) Keep it clear of objects that disturb the transport of personnel and materials.

c) Should add no materials to protrude from the confines of the carriage.

d) Check that it has not been used by any person not working on the site.

e) Do not overload the transport platform.

f) Heavy loads should be placed lengthwise in the center of the platform.

g) Load and download operation by the appropriate place.

h) Use the platform calmly and softly.

i) Do not use mast section to climb.

j) Do not enter under the travel of the platform unless it is at ground level.

k) Open and close the doors softly.

l) Access to the transport platform using the door.

m) Only the person in charge can do emergency rescue operations.

n) If the transport platform is out of service due to bad weather or failure it must be placed at ground level.

o) Bad use of the machine is doing the opposite to the previous points.

THE GUIDELINES FOR USE SET OUT IN THIS MANUAL MUST BE OBSERVED AND ALL USERS MUST BE FAMILIAR WITH THEM AND COMPLY WITH THEM

5.2.2 OUT OF ORDER SIGNS

It is mandatory not to use the transport platform with any of the safety devices disconnected or using them manually.

If failure, do a sign DIN A4 size, yellow background, black characters (capital TREBUCHET MS – black – 72 size) and protect with plastic layer: Put two signs on each access door and on the maneuver panel.

⚠	**¡DANGER!** **OUT OF ORDER**	⚠

⚠	**¡TRANSPORT PLATFORM OUT OF ORDER!** **DO NOT USE**	⚠

5.3 RESIDUAL RISKS – HUMAN MISTAKES

Risk analysis admits two situations at the same time that can lead to a dangerous situation.

1. Unconscious person + electrical fail = (evacuation) = procedure carried out by a mate.
2. Manual lower + person under the travel = (catch) = emergency + safety perimeter.
3. Lower + person under the travel = (hit) = space under the transport platform.

5.4 EVACUATION

DO NOT USE THE TRANSPORT PLATFORM IN CASE OF FIRE

5.4.1 TRAINING PEOPLE

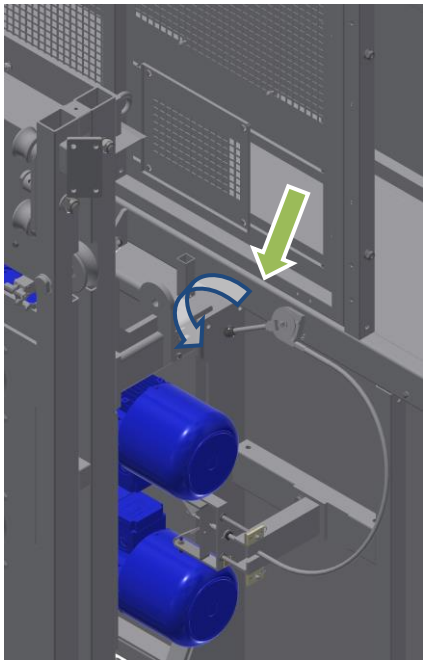
Personnel must to be trained in the following points in order to do the emergency procedures properly:

a) Emergency manual lowering

Use the manual lever that it is available in the platform.

The process must be intermittent: Descend a half mast and wait one second, in order not activate the safety device.

Only lower to first available floor exit.



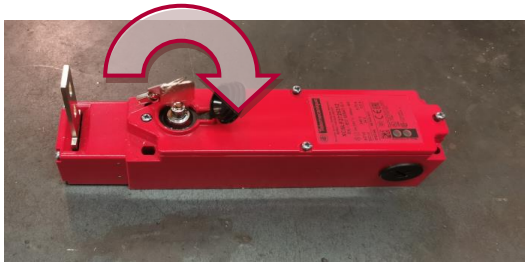
BE CAREFULL NOT TO REACH THE SAFETY DEVICE ACTIVATION SPEED
USE THE LEVER SLOWLY AND GENTLY

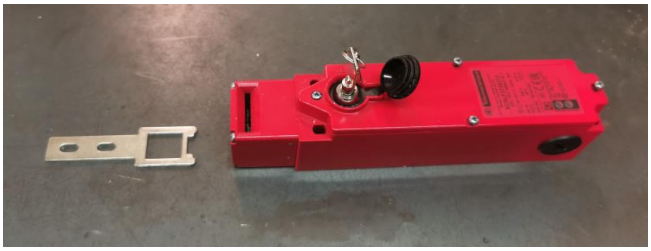
IF TRANSPORT PLATFORM STOPS BETWEEN TWO FLOORS WITH PEOPLE INSIDE ACTUATE THE LEVER OF THE MOTOR-BRAKE GENTLY UNTIL REACH NEXT FLOOR IN ORDER TO LEAVE THE PLATFORM

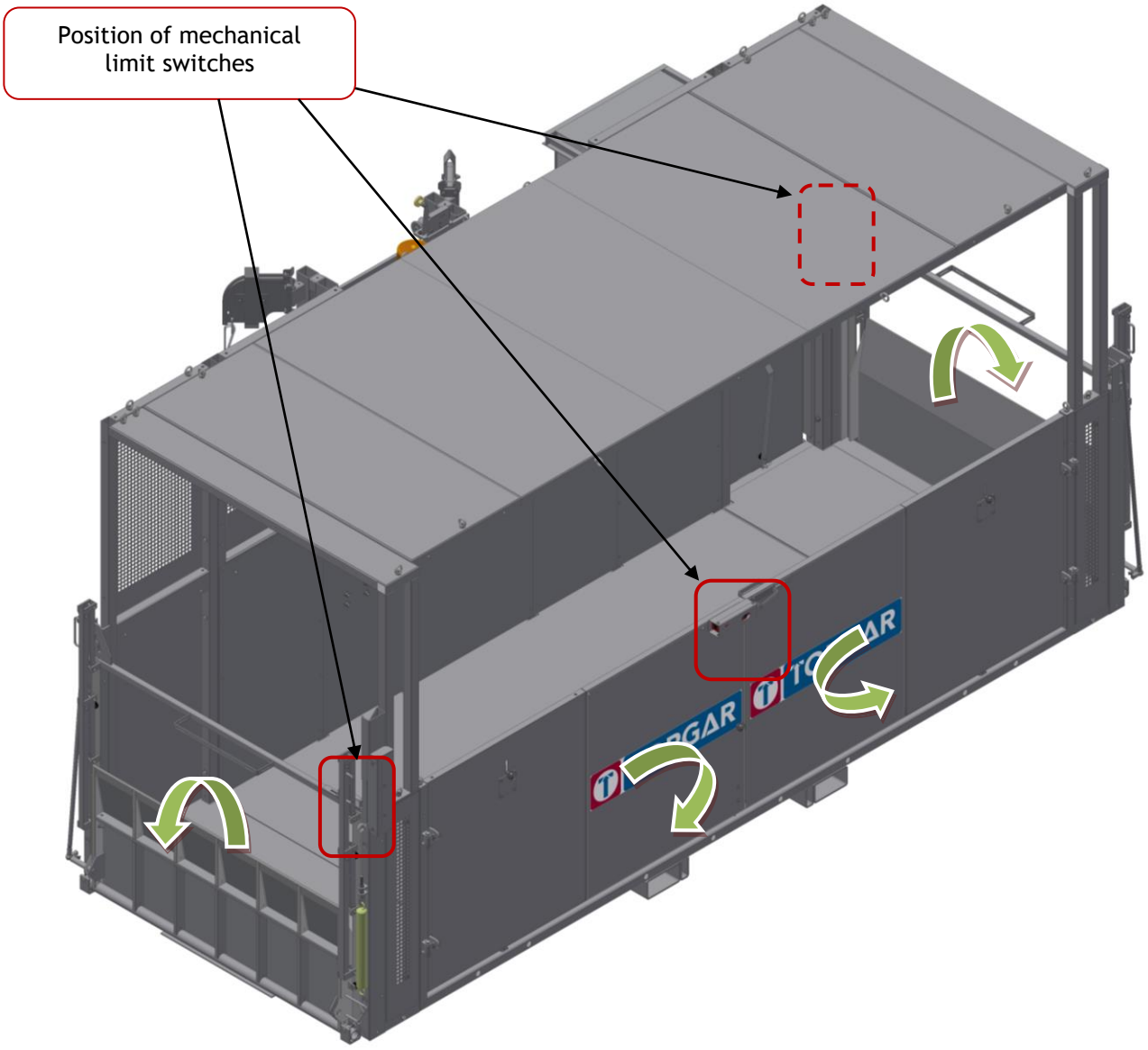
NOT IF OVERSPEED GOVERNOR DEVICE HAS WORKED

b) Opening of the platform **or floor protection doors**

A safety key is used to remove the actuator from the body of the safety lock when the solenoid is de-energized and is reason for rescue:







5.4.2 SITUATIONS OF EVACUATION

a) There is not power supply:

See the location of the transport platform.

Manual descent to the next bellower floor.

Open the platform and floor doors.

Rescue.

b) In case of injury:

A safety harness have to be available permanently in base:

Climb the tower structure until reaching the platform.

Access the platform.

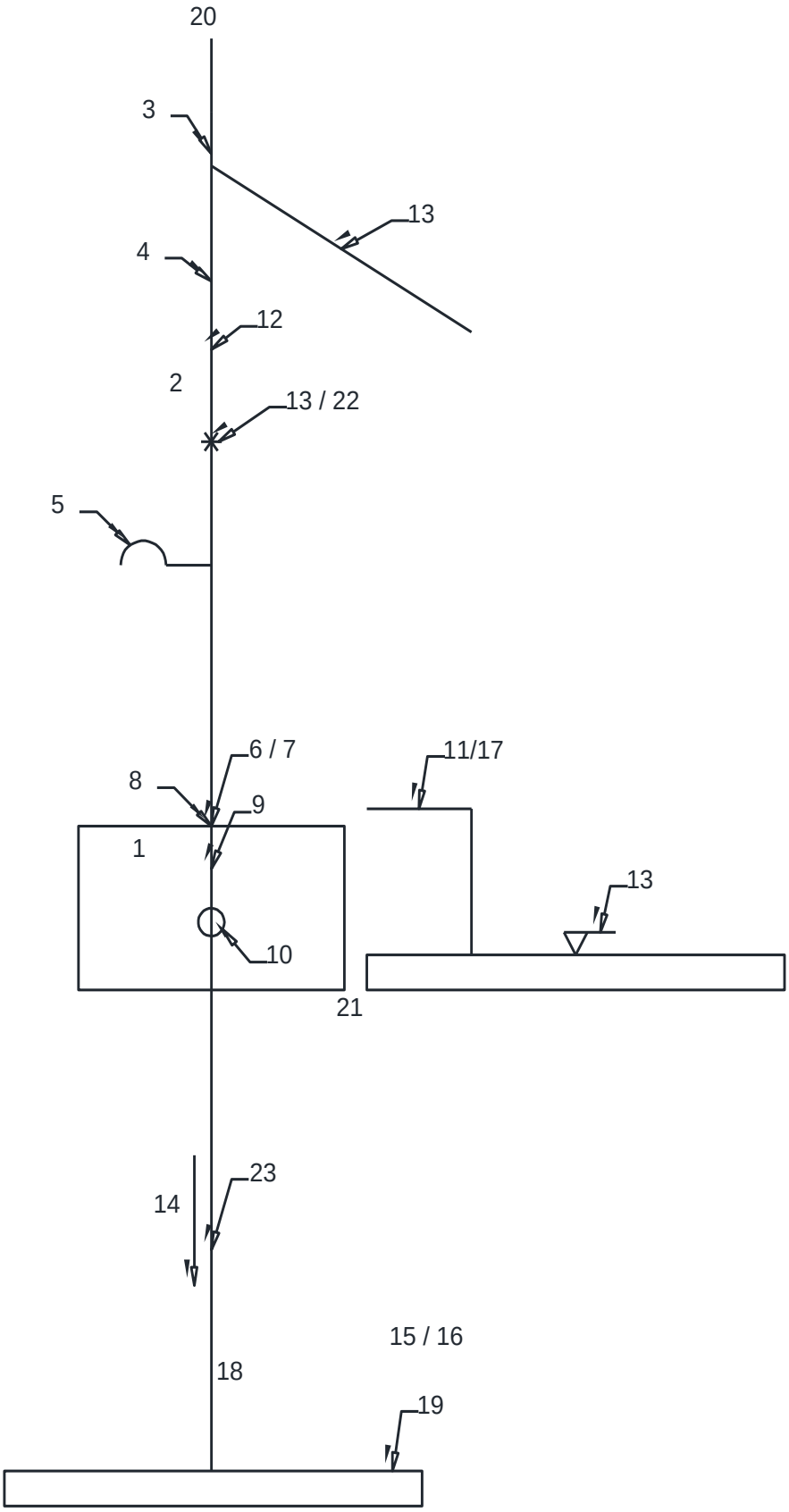
If there is electric current, reach the base with the platform transport control box.

If there is not electric current, manual descent to the next bellower floor.

Open the platform and floor doors.

Rescue.

5.5 PUT INTO SERVICE



5.5.1 CHECK-LIST

Before finishing the installation check these points:

BASIC POINTS			
No	**TASKS**	**ACTION**	**OK**
1	Information signs	Well located and visible	
2	Tightening torques (lb x ft) * Check N x m in the corresponding point of this manual	M6 (7.3-5.1) / M8 (17.7-11.8) / M10 (35.4-25.8) M12 (62.6-59) / M16 (154.8-88.5) / M18 (213.8-118)	
3	Safety mast section	Assembled	
4	Top stop limit switch	Working	
5	Cable guides	Assembled	
6	Rack detector	Working	
7	Platform limit switches	Working	
8	Overload device	Working	
9	Safety stop limit switch	Working	
10	Speed limiter safety device	Working	
11	Floor protection door	Assembled	
12	Floor stop skid	Assembled and adjusted	
13	Mast ties	Assembled and adjusted	
14	Mast verticality	1/100 - 0,5º	
15	Electrical boards	Closed and working	
16	Electrical supply	Checked	
17	Floor door interlocks	Working	
18	Bottom stop limit switch	Working	
19	Concrete foundation	Checked	
20	Height of the installation	≤ 120 m (≤ 393.70 ft)	
21	Distance between platform and structure	≥ 500 mm (≥ 1.64 ft)	
22	Distance between mast ties	≤ 6 m (≤ 19.68 ft)	
23	3 meters (9.84 ft) limit switch	Working	

5.5.2 STATIC AND DYNAMIC TESTS

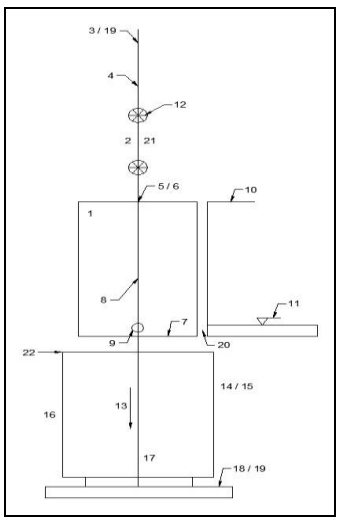
STATIC TESTS			
No	**Description**	**Remark**	**OK**
1	Constant position of the transport platform with 1,25 times the nominal load during the time indicated by the standards.	No displacements.	

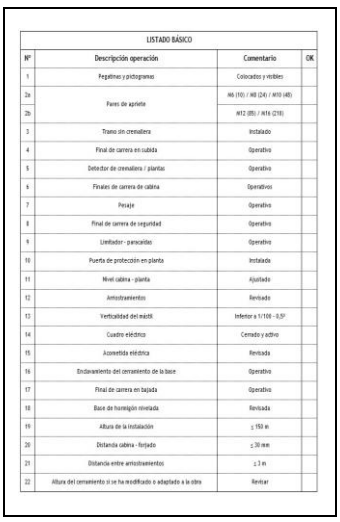
DYNAMIC TESTS			
No	**Description**	**Remark**	**OK**
1	Brake the transport platform with nominal load at nominal speed. Load has to be spread in a surface of 0,8 m^2 (2.62 ft^2).	Properly braking.	
2	Full up and down travel of the transport platform with nominal load.	No deformations.	

5.5.3 ASSEMBLY CERTIFICATION

Once the check-list and all the tests have been done, the machine is ready to get the assembly certification.

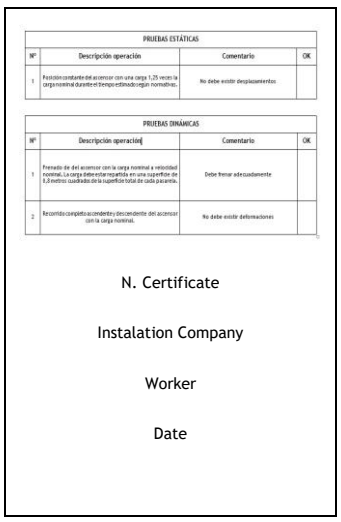
The certification refers to the points indicated in previous the check-list and tests.





LISTADO BÁSICO

Nº	Descripción operación	Comentario	OK
1	Pegatinas y pictogramas	Colocados y visibles	
2a	Pares de apriete	M6 (10) / M8 (24) / M10 (48)	
2b		M12 (85) / M16 (210)	
3	Tramo sin crenallera	Instalado	
4	Final de carrera en subida	Operativo	
5	Detector de crenallera / plantas	Operativo	
6	Finales de carrera de cabina	Operativos	
7	Perajle	Operativo	
8	Final de carrera de seguridad	Operativo	
9	Limitador - paracaidas	Operativo	
10	Puerta de protección en planta	Instalada	
11	Nivel cabina - planta	Ajustado	
12	Amortiramientos	Revisado	
13	Verticalidad del mástil	Inferior a 1/100 - 0,5°	
14	Cuadro eléctrico	Cerrado y activo	
15	Acometida eléctrica	Revisada	
16	Encharcamiento del cerramiento de la base	Operativo	
17	Final de carrera en bajada	Operativo	
18	Base de hormigón nivelada	Revisada	
19	Altura de la instalación	≤ 150 m	
20	Distancia cabina - forjado	≤ 30 mm	
21	Distancia entre amortiramientos	≤ 3 m	
22	Altura del cerramiento si se ha modificado o adaptado a la obra	Revisar	



PRUEBAS ESTÁTICAS

Nº	Descripción operación	Comentario	OK
1	Posición constante del ascensor con una carga 1,25 veces la carga nominal durante el tiempo estimado según normativa.	No debe existir desplazamientos	

PRUEBAS DINÁMICAS

Nº	Descripción operación	Comentario	OK
1	Frenado de del ascensor con la carga nominal a velocidad nominal. La carga debe estar repartida en una superficie de 0,8 metros cuadrados de la superficie total de cada parada.	Debe frenar adecuadamente	
2	Recorrido completo ascendente y descendente del ascensor con la carga nominal.	No debe existir deformaciones	

N. Certificate

Instalation Company

Worker

Date

6. REPAIR AND MAINTENANCE

6.1 INTRODUCTION

REPAIR AND MAINTENANCE OPERATIONS CAN ONLY BE DONE BY TRAINED AND QUALIFIED PERSONNEL

REPAIR AND MAINTENANCE OPERATIONS WILL BE DONE WITH THE TRANSPORT PLATFORM LOCATED AT GROUND FLOOR IF IT IS POSSIBLE AND OUT OF WORK

If fail or sudden risk, the installation must be put out of operation and cannot be used until the risk had disappeared. It is mandatory to repair all failures and problems of operation before starting again. Never work with a faulty transport platform.

MAINTENANCE CHECK-LIST MUST BE DAILY SIGNED, UP-TO-DATED AND IN POSSESION OF THE MAINTENANCE COMPANY

If the transport platform suffers any drop of material, collision or accident, damaged components and safety devices must be checked.

IF THE TRANSPORT PLATFORM HAS BEEN OUT OF WORK FOR MORE THAN TWO MONTHS, IT HAS TO BE DEEPLY CHECKED BEFORE OPERATING

6.2 WORKING LIFE

TORGAR transport platforms have a working life of 10 years. This period can change depending on the use and maintenance operations on the machine.

After the end of this 10 years period, the owner must contact the manufacturer or the official distributor to do a complete inspection.

After this complete inspection, having repaired all problems and replaced all damaged parts, the distributor or manufacturer can set a new working life period.

6.2.1 INSPECTION

When the working life of the transport platform expires, the inspection will be carried out as follows:

a) Official distributor will leave the machine out of work and sealed.

b) Follow the operation and maintenance procedure.

c) Repair parts and components if necessary.

d) Check metallic structures. Repair if damaged.

e) Switch all components that have worn out or past their replace dates.

f) Check all the recommended parts are in perfect conditions.

After having checked the machine, the official distributor and the manufacturer will set the new period of working life of the machine:

PERSON IN CHARGE	COMPANY STAMP	DATE
		Inspection date:
		New date:
		Inspection date:
		New date:
		Inspection date:
		New date:

*Make copies of this sheet to be sure all relevant failures are controlled and signed

6.2.2 MISUSE OF WORKING LIFE OF THE TRANSPORT PLATFORM

THE OWNER IS RESPONSIBLE OF ANY DAMAGE, FAILURE OR MAL-FUNCTIONING IF THE TRANSPORT PLATFORM IS USED OUT OF THE WORKING LIFE PERIOD

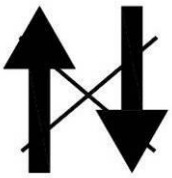
THE OWER IS RESPONSIBLE FOR ENSURING EVERY MAINTENANCE PROCEDURE

THE USER HAS THE MUST OF USING THE MACHINE PROPERLY INCLUDING NOTIFY ABOUT THE MAINTENANCE

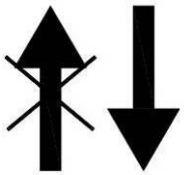
THE WORKING LIFE OF THE MACHINE HAS TO BE ACCORDING TO THE POINTS OF THIS MANUAL

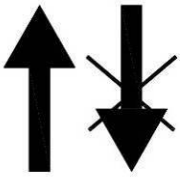
6.3 TROUBLESHOOTING

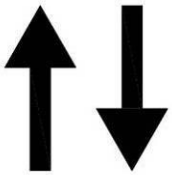
THE USE OF THE TRANSPORT PLATFORM UNDER FAULTY CONDITIONS CAN JEIPARDIZE THE SAFETY OF THE PERSONNEL

Breakdown	Cause	Solution
The transport platform cannot ascend nor descend.   ¡DANGER! Attempting to use the transport platform will jeopardize work safety.	A1 The emergency stop button is activated.	- Turn this button clockwise until it moves out to deactivate it.
	A2 Rack or pinions are damaged.	- Check the damage. - Evacuate the platform.
	A3 The service lift is stuck on an obstacle.	- Remove the obstacle. - Test the operational safety of affected tower sections. - Inform the supervisor.
	A4 Power failure. a) Main switch is set to OFF. b) Grid voltage is interrupted. c) Supply between grid connection and control is interrupted.	- Turn the main switch to ON. - Find the cause and wait for the power to return. - Test and if necessary repair the supply cable, fuses, and/or wiring from the control box.
	A5 Two phases are changed in the supply.	- Have TORGAR or qualified personnel authorized by TORGAR switch the two phases in the plug.
	A6 The hatch or door limit switches are triggered.	- Check that door and hatches are properly closed.
	A7 Motor thermal protection.	- Rearm. - If repeated, contact TORGAR.
	A8 Electromagnetic brakes do not open.	- Check voltage to the electromagnetic brakes. - Check the springs. - Check the brake disc. - Regulate the brake disc.
	A9 Magnetic thermal control.	- Rearm. - If repeated, contact TORGAR.
	A10 Control differential.	- Rearm. - If repeated, contact TORGAR.
	A11 Over voltage protection.	- Rearm. - If repeated, contact TORGAR.
	A12 Emergency top and bottom limit switch is activated.	- At top, perform manual descent until the switch is released. - At bottom, disassemble the bottom skid

		until the switch is released. - Check the position of the safety stop skid. - Check the top and bottom mechanical stop position.
	A13 Overload (overload light illuminates).	- Test and if possible reduce the load, until overload lights stops illuminating. - If repeated, contact TORGAR.
	A14 If trapped key is not present or the trapped key switch is in the OFF position.	- Insert the key and turn it to the ON position.
	A15 The guard locking switch is defective.	- Test / repair defective components.
	A16 The differential controller is tripped.	- Open the platform control box. - If any of the red lights of the differential controller is lighted up, have TORGAR or qualified personnel authorized by TORGAR adjust the differential controller.

Breakdown	Cause	Solution
The transport platform can descend but cannot ascend. 	B1 The transport platform is stuck under an obstacle.	- Carefully move the transport platform downwards and remove the obstacle. - Test the operational safety of the affected platform components. - Inform the supervisor.
	B2 Rack detector is activated.	- Check mast sections. - Check the status LED.
	B3 Top limit switch is activated.	- Test the top limit switch connection / function. Replace if necessary. - Descend the transport platform until top limit switch is released.

Breakdown	Cause	Solution
The transport platform can ascend but cannot descend. 	C1 Bottom limit switch is activated.	- Test the bottom limit switch connection / function. Replace if necessary. - Ascend the transport platform until bottom limit switch is released.
	C2 The service lift is stuck on an obstacle.	- Carefully move the transport platform upwards and remove the obstacle. - Test the operational safety of the affected platform components. - Inform the supervisor.

Breakdown	Cause	Solution
The transport platform can ascend and descend but motor hums loudly. 	D1 Motor is damaged.	- Contact TORGAR.

6.4 RECOMMENDED WELDING PRACTICE

The control of possible damages on the structure of the transport platform is one of the most important safety issues.

This point will cancel any transport platform warranty without express authorization.

DAMAGED METALLIC STRUCTURES HAVE TO BE REPLACED INMEDIATELLY WITH THE ONLY AUTHORIZATION OF THE MANUFACTURER

Screwed parts, such a rack section to the mast, should be replaced by a new one.

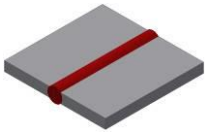
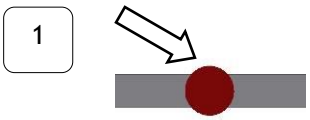
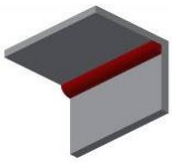
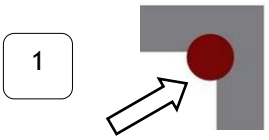
Small deformations of up to 10 mm (0.39 in) can be fixed cold if the thicknesses is less than 6 mm (0.23 in) or apply heat if the thicknesses is greater than 6 mm (0.23 in). If there are bigger deformations, damaged parts will be removed and replaced by welding a new one.

Any company which make this task will have its own welding procedures (based as follows), trained welders and will check the final results of the welded area. In any other case, the manufacturer will be exempt from liability.

Information about a welding procedure for different thicknesses, case 1:

BASE METALS	
Specification and grade: S235 JRG2 - EN 10025	Thickness angle parts (mm): 1.4 - 4 // (in): 0.055 - 0.157
Thickness flat parts (mm): 1.4 - 2.6 // (in): 0.055 - 0.102	Throat (mm): 1.5 - 3 // (in): 0.059 - 0.118

ADDED METALS	
Specification contribution metal: EN 14341 A - AWS 5.18	Commercial name of contribution metal: OK AUTROD 12.51
Classification of contribution metal : G 3 Si 1 - ER 70 S 6	Dimensions of contribution metal (mm): Ø 1.2 // (in): Ø 0.047

POSITION FLAT - ÁNGLE	WELDING PROCEDURE	THERMAL TREATMENT AFTER WELDING
		N/A
		

PRE-WARM	GAS PROTECTION
Pre-warm temperature: 5 - 20 ºC // 41 - 68 ºF	135 GMAW - Mixture: Ar 82% + CO_2 18% Volume: 16 l / min - 3.52 gpm Post-gas time (s): 1 - 2

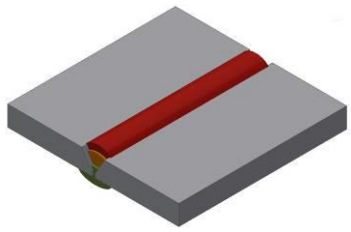
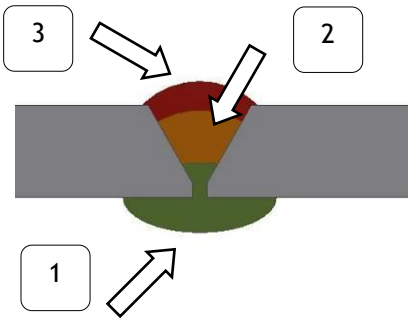
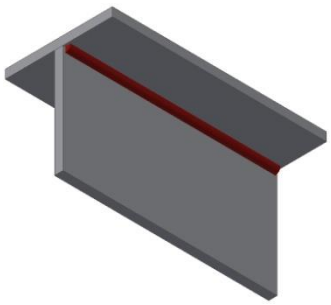
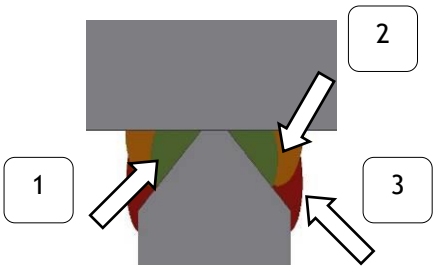
PROCEDURE	
Current: CCE+	Current intensity (A): 167 - 170
Thermal contribution (Kj/cm): 4.2 - 6.2 // (Kj/in): 10.67 - 15.78	Current voltage (V): 21 - 21,7

TECHNIQUE	
Weld bead straight or oscillating: Both Nozzle diameter (mm): 8 - 12 // (in): 0.315 - 0.472 Initial cleanliness and between pass: brushing Simple pass or multiple (by side): simple	Distance nozzle -part (mm): 4 - 8 // (in): 0.157 - 0.315 Simple electrode Transfer mode: short weld arc

Information about a welding procedure for different thicknesses, case 2:

BASE METALS	
Specification and grade: S355 J2N - EN 10025	Thickness angle parts (mm): 6 - 14.4 // (in): 0.236 - 0.567
Thickness flat parts (mm): 3 - 24 // (in): 0.118 - 0.945	Throat (mm): Without restriction

CONTRIBUTION METALS	
Specification contribution metal: EN 14341 A - AWS 5.18	Commercial name of contribution metal: OK AUTROD 12.51
Classification of contribution metal: G 3 Si 1 - ER 70 S 6	Dimensions of contribution metal (mm): Ø 1.2 mm // (in): Ø 0.047

POSITION FLAT - ANGLE	WELDING PROCEDURE	THERMAL TREATMENT AFTER WELDING
		N/A
		N/A

PRE-WARM	GAS PROTECTION
Pre-warm temperature: 5 - 20 ºC // 41 - 68 ºF	135 GMAW - Mixture: Ar 82% + CO_2 18% Volume: 16 l / min - 3.52 gpm Post-gas time (s): 1 - 2

PROCEDURE	
Current: CCE+ Thermal contribution (Kj/cm): 5.5 - 7.6 // (Kj/in): 13.99 - 19.34	Current intensity first pass (A): 167 - 170 Second - third pass (A): 237 - 242 Current voltage (V): 21 - 28,2

TECHNIQUE	
Weld bead straight or oscillating: Both Nozzle diameter (mm): 8 - 12 // (in): 0.315 - 0.472 Initial cleanliness and between pass: brushing Simple pass or multiple (by side): simple	Distance nozzle -part (mm): 4 - 8 // (in): 0.157 - 0.315 Simple electrode Transfer mode: short weld arc

6.5 REGULAR CHECKS

PERIODIC CHECKS MUST BE SIGNED IN THE FORM "MAINTENANCE CHECKING FORM"
SEE APPENDIX OF THIS MANUAL

The points listed below should be checked on a regular basis, bearing in mind that these periods have been calculated for a use of machinery in 8 – 10 hours of work per day and 80% of total work load.

Every travel of the platform:

- Check that there are no objects that may fall from the building in case of contact with the lift car.
- Any type of strange noise, vibration or malfunction should be investigated.

Every day and working shift (or 8 – 10 hours):

- General cleaning of the transport platform.
- Make sure that the support base is properly level and firmly supported on the ground.
- Make a visual check of the cross-braces on the structure and the connections to the mast.
- Check that the various parts of the transport platforms are in good working order.
- Run the platform the whole length of the mast UP and DOWN one time at the beginning of a new shift to check the adjustment and operation of end-of-travel stops, proximity detectors and skids.
- Check the grease over the rack. In case of absence, not to wait to "every week" (see next group of points).

Every week (or 40 - 50 hours):

- Check for possible oil leaks in the motor reducers.
- Clean and grease the rack and the platform rollers.

Lubricating greases for applying on opened gears must be water-repellent and adhesive to permit excellent protection of flanks of pinions and the rack. Lubricating greases must be based on mineral or synthetic oil and solid thickeners how Molybdenum Bisulfate, Graphite, Tungsten or Teflon.

Recommended lubricating grease grade 1 (NLGI) but it is possible using greases to grade 2.

The application of the lubricating grease in pinions and rack must be done by means of paintbrush, it would be better if the paintbrush had short bristles, brush or putty knife. It is very important to clean pinions and rack before of applying the grease to obtain better bond.

MARK	KLÜBER	AGIP	BP	KRAFFT
GREASE	GRAFLOSCON A-G 1 ULTRA	AGIP GR LP	TRIBOL MOLUB ALLOY 936 SF HEAVY	KRAFFT 165-X
	STRUCTOVIS HD			KGP-2/M

Every month (or 160 - 200 hours):

- Check the air gap on the electric brakes, the condition and the braking torque setting.
- Check the motor reducer is secured in place correctly.
- Check the position and the seating of the pinions.
- Check the torque of guide rollers and rack.
- Check that the bolts in the connections between the mast sections are properly tightened.
- Clean and grease the platform locks.
- Grease the shafts on the guide rollers and the rocker arms.
- Check that speed limiter is working ok and the setting of limit switch.
- Check the condition of the pinions, rack and guide rollers.
- Clean the control platform and the connections inside it.
- Check the condition of the terminal boxes for the motors and power sockets.
- Check that the electrical interlocks in the platform are working (door, hatchway, etc.).

Every three months (or 500 hours):

- Check the guide rollers and bearings for play.
- Drop Test: Follow the instructions in the corresponding point of this manual.
- Check and clean the pinion of the safety device.
- Check the plate with the serial number of the safety device.

Every six months (or 1,000 hours):

- Check the condition of the flexible motor reducer couplings.
- Dismantle and clean the reel-shaft contactor, in contactors and relays.

Every year (or 2,000 hours):

- Check the condition of the reducers (oil, bearings, etc.).
- Dismantle, clean, check and grease the motors.

3 years (6,000 hours):

- Disassemble and send the safety device to the factory for inspection and re-calibrated.

In the event of failure or imminent risk, the installation must be taken out of service and must not be used again until the cause of the risk has been identified. All malfunctions and malfunctions must be remedied before the machine can be reused. A defective machine must never be put into service.

In the event that the transport platform has been damaged in an accident or material has fallen on it, a general check should be carried out paying special attention to the affected areas and the safety systems.

If the lift is out of service for more than two months, it must be thoroughly inspected by appropriately trained personnel before being put back into service.

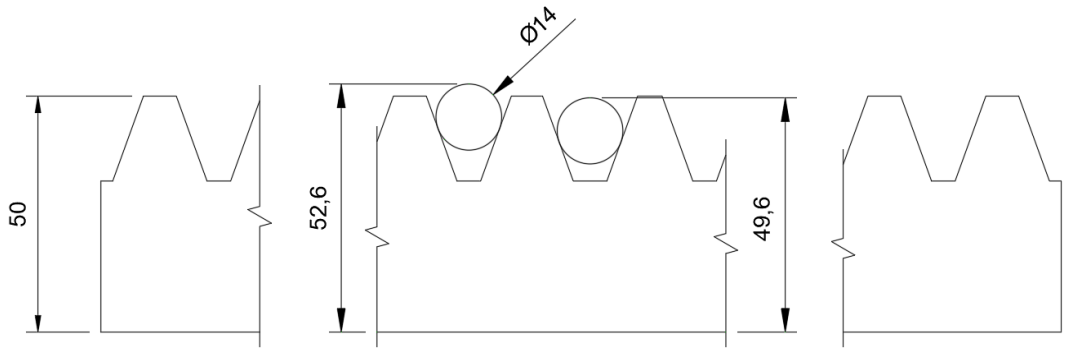
PERIODIC CHECKS MUST BE SIGNED IN THE FORM "MAINTENANCE CHECKING FORM"
SEE APPENDIX OF THIS MANUAL

6.6 WEAR OF COMPONENTS

6.6.1 RACK WEAR

The rack of the TORGAR transport platforms have a module M = 8. When the rack is new, its measurement is 50 mm (1.968 in). But as the machine is used, the rack suffers wear and the initial dimension is reduced. When the measurement reaches a certain value of wear, the corresponding stretch of elevation has to be replaced by a new one.

The following is a schematic of the procedure for measuring the wear of the rack, as well as its admissible size:



Pinion wear is determined by measuring the distance between two consecutive teeth. When this measurement exceeds the admissible value by default, the pinion will have to be changed for a new one.

New rack: Height equal to 60.4 mm (2.378 in).

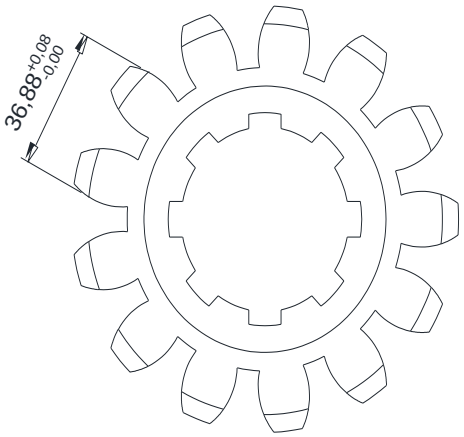
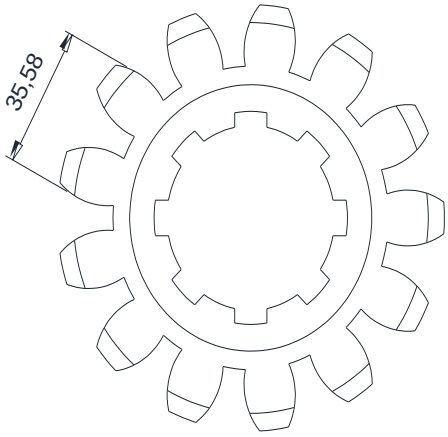
Worn rack: Height less than 57.3 mm (2.256 in).

6.6.2 PINION WEAR

The pinion of the TORGAR transport platforms (the motors and the safety device) have a module M = 8 and a number of teeth Z = 13.

The pinion wear is determined by measuring the distance between two consecutive teeth. When this measurement exceeds the admissible value by default, the pinion will have to be replaced by a new one.

The new and admissible values are outlined below:

NEW PINION [36.88 mm (1.452 in)]	WORN PINION [35.58 mm (1.400 in)]
MODULE 8 - 13 TEETH	
	

6.6.3 RACK – PINION ENGAGEMENT

The optimal rack - pinion gear happens when the primitive radius of the pinion and the primitive line of the rack are tangent.

For a correct pinion - rack adjustment, the separation between the primitive radius of the pinion and the primitive line of the rack cannot be greater than 1/3 of the module.

The diagram shows the optimal practical values and limits to consider:

Optimal gear

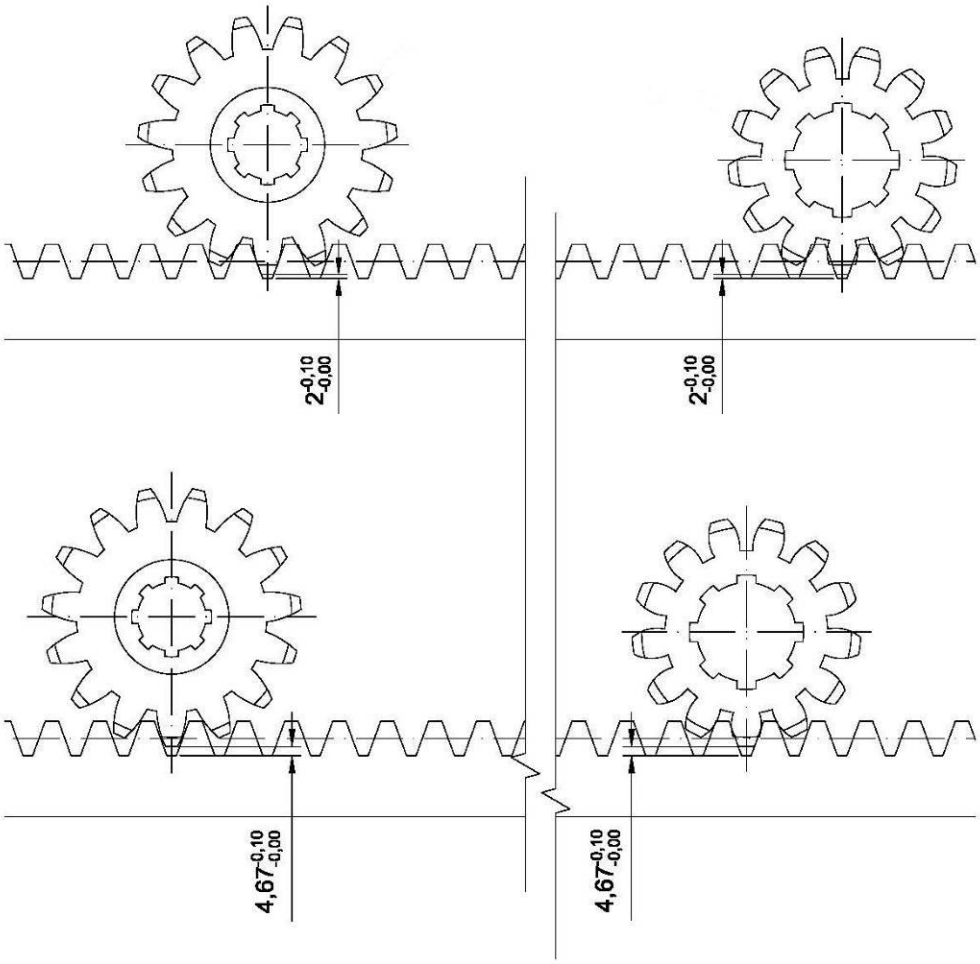
[2 mm (0.078 in)]

The primitive diameter of the pinion coincides with the primitive line of the rack.

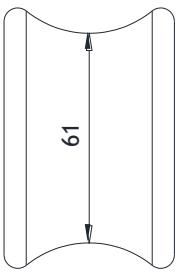
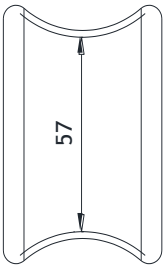
Minimum gear

[4.67 mm (0.184 in)]

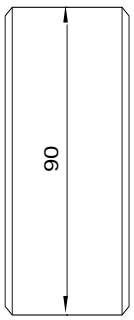
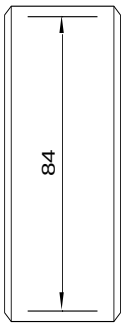
The primitive diameter of the pinion is not separated more than 1/3 of the module from the primitive line of the rack



6.6.4 GUIDE ROLLERS WEAR

NEW GUIDE ROLLER [61 mm (2.401 in)]	WORN GUIDE ROLLER [57 mm (2.244 in)]
	

6.6.5 COUNTER RACK ROLLERS WEAR

NEW COUNTER RACK ROLLER [90 mm (3.543 in)]	WORN COUNTER RACK ROLLER [84 mm (3.307 in)]
	

6.7 RECOMMENDED SPARE PARTS

1	FRONTAL GUIDE ROLLER	04818
2	LATERAL GUIDE ROLLER	7230B
3	RACK LIMIT SWITCH	31123
4	STOP LIMIT SWITCH	31014
5	COUNTER RACK ROLLER	04946
6	PINION	17937
7	DRIVE SHAFT	9521A
8	BEARING SUPPORT	9520A
9	SUPPORT BEARING	45025
10	BLOQUEO TELEMECÁNICA	31366

11	MOTOR-BRAKE ROSSI	31285
12	GEAR BOX ROSSI	31286
13	SAFETY DEVICE	04389
14	OVERLOAD CELL	31122
15	ASSEMBLING RAMP LIMIT SWITCH	30282
16	MANUAL EVACUATION	05940
17	FLOOR DOOR ELECTRIC LIMIT SWITCH	30686
18	SAFETY DEVICE PINION	16660
19	ELECTRIC CABLE 8 awg - 4C Type W	-
20	-	-

ORIGINAL SPARE PARTS FROM FACTORY

7. APPENDIX

7.1 MAINTENANCE CHECKING FORM

7.2 STRUCTURAL CHANGE FORM

7.3 ELECTRICAL CHANGE FORM

7.4 RELEVANT FAULT REPAIR FORM

7.5 SPARE PARTS

7.6 OVERLOAD CALIBRATING INSTRUCTIONS

7.7 LOAD CELLS

7.8 MOTOR – BRAKE & GEAR BOX: ROSSI 4 kW - 48.2

7.9 ELECTRIC DIAGRAMS

MAINTENANCE CHECKING FORM

NAME – SIGN	DESCRIPTION		REVISION DATE
		MONTHLY	
		TRIMESTRAL	
		SEMESTRAL	
		ANNUAL	
		MONTHLY	
		TRIMESTRAL	
		SEMESTRAL	
		ANNUAL	
		MONTHLY	
		TRIMESTRAL	
		SEMESTRAL	
		ANNUAL	
		MONTHLY	
		TRIMESTRAL	
		SEMESTRAL	
		ANNUAL	
		MONTHLY	
		TRIMESTRAL	
		SEMESTRAL	
		ANNUAL	

*Make copies of this sheet to be sure all regular checks are done and signed

STRUCTURAL CHANGE FORM

CHANGE OF STRUCTURAL COMPONENTS

Item description:.....

Reason for change: .....

Responsible and responsible company for change:.....

Member: .....

Date and location change:.....

CHANGE OF STRUCTURAL COMPONENTS

Item description:.....

Reason for change: .....

Responsible and responsible company for change:.....

Member: .....

Date and location change:.....

CHANGE OF STRUCTURAL COMPONENTS

Item description:.....

Reason for change: .....

Responsible and responsible company for change:.....

Member: .....

Date and location change:.....

*Make copies of this sheet to be sure all structural changes are controlled and signed

ELECTRICAL CHANGE FORM

CHANGE OF ELECTRICAL ELEMENTS

Item description:.....

Reason for change: .....

Responsible and responsible company for change:.....

Member: .....

Date and location change: .....

CHANGE OF ELECTRICAL ELEMENTS

Item description:.....

Reason for change: .....

Responsible and responsible company for change:.....

Member: .....

Date and location change: .....

CHANGE OF ELECTRICAL ELEMENTS

Item description:.....

Reason for change: .....

Responsible and responsible company for change:.....

Member: .....

Date and location change: .....

*Make copies of this sheet to be sure all electrical changes are controlled and signed

RELEVANT FAULT REPAIR FORM

FAILURE

Description of failure: .....

.....

Cause of failure: .....

.....

.....

FAILURE

Description of failure: .....

.....

Cause of failure: .....

.....

.....

FAILURE

Description of failure: .....

.....

Cause of failure: .....

.....

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*Make copies of this sheet to be sure all relevant failures are controlled and signed