accesus
PLATAFORMAS SUSPENDIDAS

TEMPORARY SUSPENDED PLATFORM: MODUBLADE

TRANSLATION OF THE ORIGINAL
INSTALLATION GUIDE

MODUBLADE INSTALLATION GUIDE ON: GAMESA WIND TURBINE G114.

This installation guide is not the instruction manual and does not exempt from reading and taking over the instruction manual of the Modublade suspended platform ref.: MI200009 EN

This guide is about the description of a procedure for installing suspension and safety wire ropes of the Modublade suspended platform of Accesus.

It is the responsibility of the user to ensure that the installation safety conditions described in this guide are the same as those of the wind turbine where the installation is performed.

Accesus is not responsible for ensuring that the conditions of the wind turbine where the installation is performed are adequate due to: changes of design, procedure or similar by the manufacturer of the wind turbine, Change in the state of the wind turbine due to lack of maintenance or other causes, or change in the strength of the anchors due to different causes.

Index:

DANGER	
Risk of wounds and injuries due to fall of objects, failure, incorrect application and / or incorrect utilization.	Read the whole operating instructions manual before the assembly and set up of the platform. Follow the instructions and procedures described in this manual in order to ensure a safe utilization of the equipment.

1-Information for this guide:

Date of edition:	**Manufacturer:**
1st Edition: September 2018	**ACCESUS Plataformas Suspendidas, S.L.** C/Energia 54 08940 Cornellà de Llobregat (Barcelona) SPAIN Telf.: (+34) 93 475 17 73 www.accesus.es accesus@accesus.es
Copyright: All rights reserved.	

2-Explanation of symbols used in this guide.

DANGER	
Type and origin of danger	Result: fatal or serious injuries.
	-Solutions to eliminate the danger.

IMPORTANT	
Type and origin of danger	Result: for example damage to machines or the environment.
	-Solutions to eliminate any possibility of accidents.

NOTE
Useful tips for optimum working. Instructions to operation / documentation in writing.

3-General:

This installation guide is destinated to the workers of the equipment described. This guide is NOT the equipment instruction manual and do not exempt from reading and assume the instruction manual of the suspended platform Modublade, document ref.:MI200009.

The mentioned instruction manual must be accessible to worker everytime. Request more copies if it's necessary.

This guide is about the description of a procedure for the installation of suspension and safety cables for the suspended platform Modublade of Accesus.

It is the responsibility of the user to ensure that the installation safety conditions described in this guide are the same as those of the wind turbine where the installation is performed.

Accesus is not responsible for ensuring that the conditions of the wind turbine where the installation is performed are adequate due to: changes of design, procedure or similar by the manufacturer of the wind turbine, Change in the state of the wind turbine due to lack of maintenance or other causes, or change in the strength of the anchors due to different causes.

ACCESUS Plataformas Suspendidas S.L. saves the rights to modify the product described in this installation guide as a part of his continued improvement.

The clients can obtain more information about other ACCESUS products throught address described at section 1. Please, check our website: www.accesus.es.

3.1-Glossary and abbreviations used in this guide:

Wind turbine.
A turbine having a large vaned wheel rotated by the wind to generate electricity.

W.L.L.
Working Load Limit

Electrician.
A professional worker who knows and has the correspondent and necessary qualification to know the risks and to avoid the danger that has an electrical environment.

Worker.
A person who works professionally with the machine.

T.S.P.
Temporary Suspended Platform.

4-Previous instructions and warnings:

• TSP (Temporary Suspended Platforms) is destinated exclusively to a **professional use**. Must be destinated only to qualified people with knowledges for set up and utilization. Workers must be prepared for works at heights. Workers must know and assimilate the Law of Labor Risk Prevention.

• The machine must be dismantled and stored at the end of the works.

• For a safety utilization the TSP requires at least 2 workers at the same time.

• This TSP can only be used by authorized staff with adequated formation and psichologically suitable. Keep out from unauthorized people.

• Before to install and use a TSP is essential, for safety and efficiency, **to read and assimilate all the contents of this guide** and proceed in agreement to this instructions.

• The responsible company must **apply the regulation of safety** relative to the assembly, utilization, maintenance and technical controls referred to all the equipment. The responsible company must give the instructions to the workers and verify his aptitudes.

• Before putting in service the platform, the person in charge of work, must verify and ensure the good condition of the TSP equipment.

• Don't use a TSP or an accessory (wire rope, suspension points, etc.) in bad condition. A periodic control of the machine by an authorized person is essential for safety. The maintenance not described in this manual must be realized by the manufacturer or by an authorized repairer.

• Don't use the equipment for other uses than the indicated in this guide. The manufacturer can't guarantee the product for other configurations not described in this manual. For other applications consult the manufacturer or a professional specialized technician before proceeding to assembly the equipment.

• A special care is needed by dangers that will appear when the loads are manipulate.

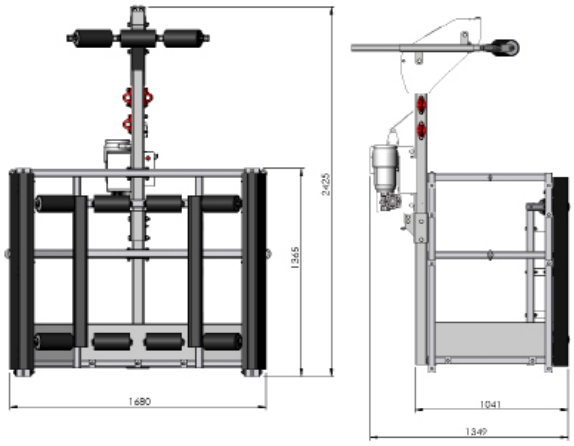
• **In some countries of the European Union is obligatory an inspection before the putting in service of a new work. This control must be realized by an authorized organism.**

• It performs vital importance to plan the work before beginning the works in a new tower and / or in every day. Especially to plan the suitable are for locate the materials in the base of the tower, the Nacelle's orientation, **check that the speed of the wind is never superior to 50 km/h (14 m/sec). In certain wind farms and / or wind turbine manufacturers suspended platform using wind speed limit is lower, 10m/seg.** Respect the limitation of the speed of the wind in the user's security plan if it's lower.

5-Setting up.

5.1-Configuration / dimensions.

Modublade is a suspended platform equiped with 1 e.lift501 powered hoist and 1 Securichute600 fall arrest device and all the accessories described at section 5.3.



5.2-Wire rope installation.

DANGER

Hurts for wire ropes manipulation. **Risk of wounds and injuries due to fall of objects, fall from different level and / or breaks.**	Danger of courts and scratches. Danger of death due to fall of objects, fall from different level and / or breaks.
	-Before the assembly of the wire ropes ensure that the suspension structure has enough capacity to support the efforts of the suspended loads described at section 5.2.1. of this installation guide. -Use adequated PPE's (Personal Protective Equipment): anticut protection gloves, safety boots, safety glasses, safety helmet and work clothes. Also mandatory PPE's according to windmill's safety manual. -Use only wire ropes specified by the manufacturer. -Ensure that the wire rope diameter is the same diameter than the specified in the e.lift501 hoist and securichute600 fall arrest device on his labels. Ensure that the wire rope length is enough to work and check the good condition of the wire rope's tip. -Avoid the formation of curls in the wire ropes. -Place the platform heavily under his suspensions. -Use an intercomunication system for a correct coordination of maneuvers between workers at the base of the tower and workers at placed at the nacelle.

DANGER

Hurts for wire ropes manipulation. **Risk of wounds and injuries due to fall of objects, fall from different level and / or breaks.**	Danger of courts and scratches. Danger of death due to fall of objects, fall from different level and / or breaks.
	-To position itself on the fiber of the nacelle, workers must wear safety harness with shock absorber and hooks or retractable fall arrester and be tied to a nacelle's anchorage point.

5.2.1-Efforts due to suspended loads.

The vertical reaction to the wire ropes traction is 15 kN. It means that the anchorage point of each wire rope must be capable to support this load in the direction of the anchorage sling, which depends of the type of wind turbine.

A qualified person must be realize the calculations of load test and be the responsible of the structure's capacity to support the efforts due to the suspended loads.

There are many ways of anchoring cables to the nacelle, in these lines one of the possible systems is described. All **lifting accessories used** in the chosen anchorage system, from the hook of the cables to the point of anchorage in the structure of the wind turbine must have a **minimum load capacity of 1T.** This applies to slings, shackles, hooks, etc. In case of use of textile slings, it is important that there is a sufficient and adequate anti-cutting protection.

ACCESUS recommends a test load for each model of wind turbine in order to verify that the anchorage points are adequated. ACCESUS proposes this service and gives you a certification of the load test.

The maximum capacity of utilization is 500 kg.

5.2.2- Installation of wire ropes on the main axis.

DANGER

Hurts for wire ropes manipulation. **Risk of wounds and injuries due to fall of objects, fall from different level and / or breaks.**	Danger of courts and scratches. Danger of death due to fall of objects, fall from different level and / or breaks.
	-Before the assembly and during the utilization of any TSP installed at a wind turbine by personal staff or subcontracted from GCT, is required a stop of the machine (only by wind turbines maintenance staff), block of the rotor (if it's necessary use a tool for a "Y" work position with a safety coefficient that guarantees enough safety for the operations or if it's needed use additional elements in order to maintain the safety coefficient), put the wind turbine in emergency state (throught emergency button), block and signpost the electric equipment, indicating the presence of workers in the machine and marking the work area capable of objects fall. -The user must ensure that he complies with the procedure applicable to the work to be performed, it is possible that the procedure is different from that described in this guide. -It is the responsibility of the user to ensure that the safety conditions of the installation described in this guide are the same as those of the wind turbine where the installation is performed.

There are a lot of ways to anchor the wire ropes to the nacelle, here we describe one of them. All the **components used** in this anchorage system, from wire rope hooks to anchorage point at the wind turbine structure, it must have a **minimum weight load limit of 1T**. This is for slings, shackles, hooks, etc. In case of use of textile slings, it is important that there is a sufficient and adequate anti-cutting protection.

A qualified person must be realize the calculations of load test and be the responsible of the structure's capacity to support the efforts due to the suspended loads. See section 5.2.1.

For fitting the wire ropes are necessary 3 people: 2 placed at the nacelle and 1 at the base of the tower.

Before the works choose the most adequated area for the materials at the base of the tower and the best nacelle's orientation for work at the blade. **Verify that the speed of the wind is never superior to 14 m/seg.**

Ensure that the wire ropes and electric hoses has an adequated length for the wind turbine height. The guide wire rope must have an increase of 50-60m than the suspension and secondary wire ropes.

Before initiating any maneuver of suspension with the hoist, the work area must be marked with beacons, putting up signs about prohibition of access to foreign staff and the risk of fall of loads. Finally check the good condition of the tools (suspension tools, boxes...) and his correct ubication.

Follow the next steps:

Lift the material to use at the nacelle:

-2 Metal slings for suspension 200028 Accesus length 3m.
-1 Metal slings for suspension 200028 Accesus length 1,5m.
-3 Shackles 1,8T with nuts and bolts.
-Auxiliary rope of loads of greater length than the height of the tower to descend the cables.
-Suspension, secondary and main guiding wire rope in the Accesus winder.
-1 Rope's fall arrest adequated to the rope.
-1 Fall arrest device for Ø8.3 wire rope.
-1 Textile sling 1.5m of lenght and 1 auxiliary shackle 1T for fall arrests.

Accesus winder

Operative at the nacelle:

1-Check that the drill holes for the wire ropes have been done, if not you can drill the nacelle's framework. It is necessary to realize 1 drill Ø100mm with a crown, the surplus of this drill is reserved to recover the hole once finished the works.
See warnings at section 5.2.

2- Embrace the main axis of the rotor at the nacelle's interior by means of a metal sling 200028 of 3m length and join both ends of the sling with a shackle and his nuts and bolts.

3-Fix the wire rope fall arrest by means of a textile sling and his shackle to an anchorage point sufficiently resistant for the wire rope weight (0.25kg/m) as a hoisted point of the trestle.

4-Descend the wire rope seeping it into the fall arrest device, then the descend velocity is controlled manually. The fall arrest device is a safety measure in case of escape of the wire rope.

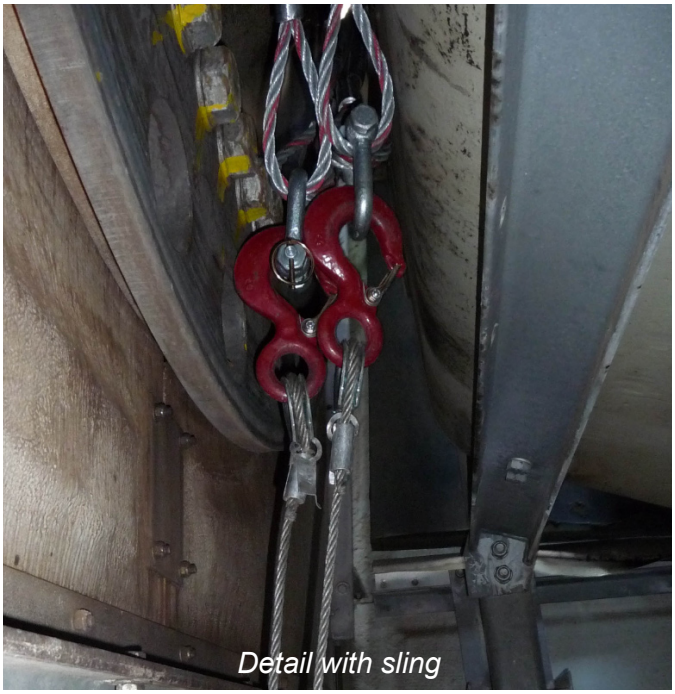
5-When the wire rope is seeped completely, the hook must be anchored to the shackle which joins both ends of the sling.

This is the situation when the first wire rope is installed:

When the wire rope of the sling is suspended the worker placed at the base of the tower must seep the end of this wire rope into the hoist and tight it a bit using the electric cabinet. The rest of the wire rope must be rolled. See section 6.3.2 of the instruction manual.

6-Proceed in the same way with the second wire rope.

This is the situation when the wire ropes are installed:



Detail with sling

This is the situation of the slings embracing the main axis of the rotor:

When the wire rope of the sling is suspended the worker placed at the **base of the tower** must introduce the end of this wire rope into the Securichute fall arrest device and seep all the wire rope length. The rest of the wire rope must be rolled. It's important to fix the counterweight into the secondary wire rope to ensure tension all the time. See section 6.3.2 of the instruction manual.

7-Proceed to install the **main guide wire rope**. This guide wire rope must be anchored to an internal structure of the wind turbine and go out by the frontal part of the nose through the nacelle's superior window.

8-Fix the wire rope fall arrest by means of a textile sling and his shackle to an anchorage point sufficiently resistant for the wire rope weight (0.25kg/m) as a hoisted point of the trestle.

9-At nacelle, the main guide wire rope must be prepared introducing his end in a 5 m stretch of hose thus we avoid damages at the wind turbine's nose.

10-By means of the winder, descend the wire rope seeping it into the fall arrest device and that must pass through the hose until the wire rope's hook gets accessible.

11-Once the hook is accessible it is anchored by means of a metallic suspension sling 200028 Accesus of 1.5m in length to a resistant point of those indicated in the images.

The installation is complete. You must continue with the assembly of the platform and installation of cables in the platform as shown in the instruction manual of the Modublade platform.

5.2.3- Installation of wire ropes by window.

DANGER

Hurts for wire ropes manipulation. **Risk of wounds and injuries due to fall of objects, fall from different level and / or breaks.**	Danger of courts and scratches. Danger of death due to fall of objects, fall from different level and / or breaks.
	-Before the assembly and during the utilization of any TSP installed at a wind turbine by personal staff or subcontracted from GCT, is required a stop of the machine (only by wind turbines maintenance staff), block of the rotor (if it's necessary use a tool for a "Y" work position with a safety coefficient that guarantees enough safety for the operations or if it's needed use additional elements in order to maintain the safety coefficient), put the wind turbine in emergency state (throught emergency button), block and signpost the electric equipment, indicating the presence of workers in the machine and marking the work area capable of objects fall. -The user must ensure that he complies with the procedure applicable to the work to be performed, it is possible that the procedure is different from that described in this guide. -It is the responsibility of the user to ensure that the safety conditions of the installation described in this guide are the same as those of the wind turbine where the installation is performed.

There are a lot of ways to anchor the wire ropes to the nacelle, here we describe one of them. All the **components used** in this anchorage system, from wire rope hooks to anchorage point at the wind turbine structure, it must have a **minimum load weight of 1T**. This is for slings, shackles, hooks, etc. In case of use of textile slings, it is important that there is a sufficient and adequate anti-cutting protection.

A qualified person must be realize the calculations of load test and be the responsible of the structure's capacity to support the efforts due to the suspended loads. See section 5.2.1.

For fitting the wire ropes are necessary 3 people: 2 placed at the nacelle and 1 at the base of the tower.

Before the works choose the most adequated area for the materials at the base of the tower and the best nacelle's orientation for work at the blade. **Verify that the speed of the wind is never superior to 14 m/seg.**

Ensure that the wire ropes and electric hoses has an adequated length for the wind turbine height. The guide wire rope must have an increase of 50-60m than the suspension and secondary wire ropes.

Before initiating any maneuver of suspension with the hoist, the work area must be marked with beacons, putting up signs about prohibition of access to foreign staff and the risk of fall of loads. Finally check the good condition of the tools (suspension tools, boxes...) and his correct ubication.

Follow the next steps:

Lift the material to use at the nacelle:

-3 Metal slings for suspension 200028 Accesus length 1,5m.
-3 Shackles 1,8T with nuts and bolts.
-Auxiliary rope of loads 20m longer than the height of the tower.
-Suspension, secondary and main guiding wire rope in Accesus winder.
-1 Rope's fall arrest adequated to the rope.
-1 Fall arrest device for Ø8.3 wire rope.
-1 Textile sling 1.5m of lenght and 1 auxiliary shackle 1T for fall arrests.

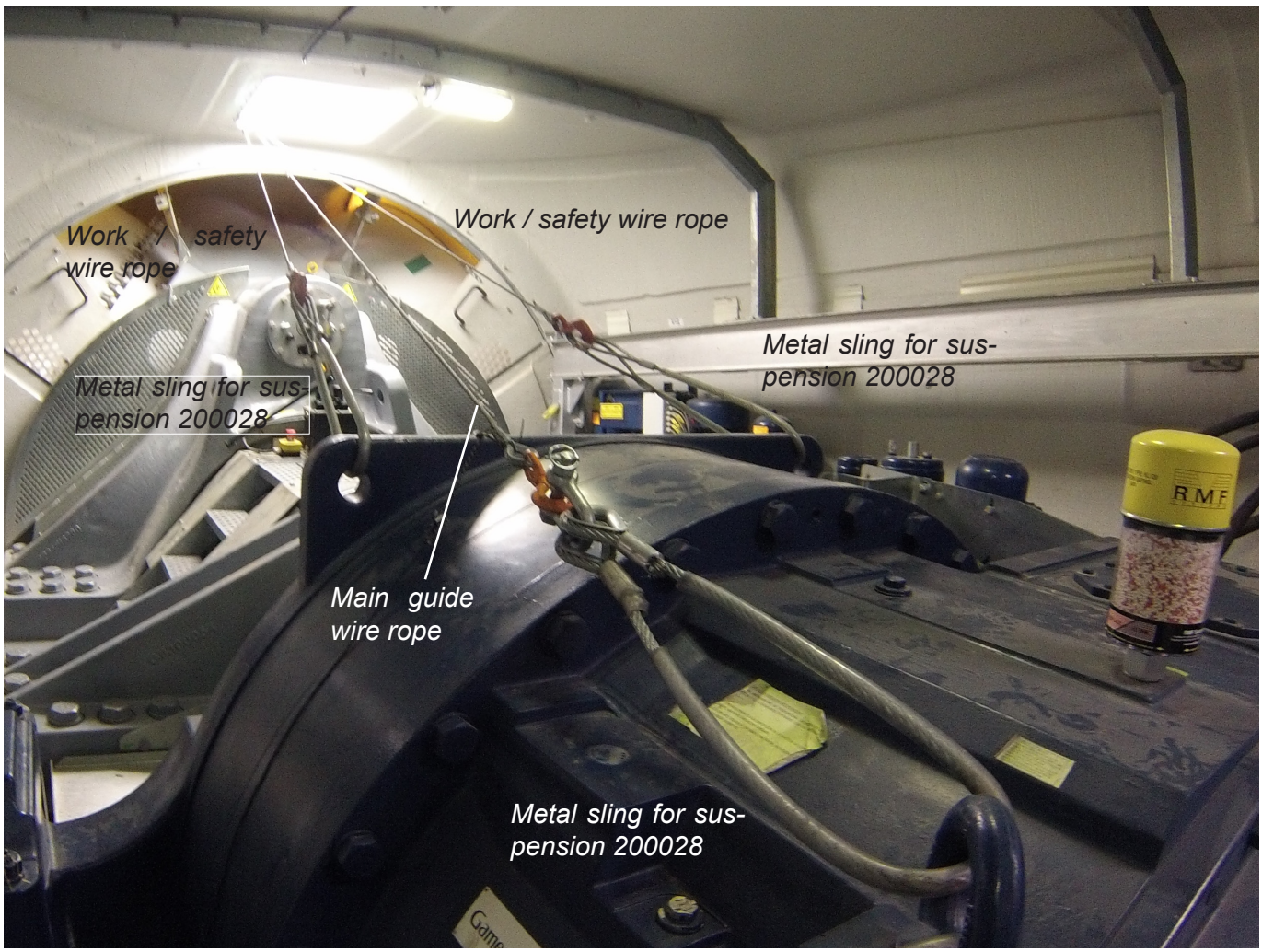
Accesus winder

Operative at the nacelle:

1-Install the 3 suspension slings 200028 Accesus of 1.5m length in the lifting points indicated in the image on the following page.
See warnings at section 5.2.

2-Fix the wire rope fall arrest by means of a textile sling and his shackle to an anchorage point sufficiently resistant for the wire rope weight (0.25kg/m) as a hoisted point of the trestle.

3-In the nacelle the wire ropes (suspension, safety and main guide wire) must be prepared by inserting the tip of the wire rope into a 5m length of hose to avoid damaging the nose of the wind turbine. The order of wire rope installation will be suspension, safety and finally the guide.



4-Descend the wire rope, using the winder, seeping it into the fall arrest device, then the descend velocity is controlled manually. The fall arrest device is a safety measure in case of escape of the wire rope.

5-When the wire rope is seeped completely, the hook must be anchored to the shackle 1,8T which joins both ends of the sling.

Once the wire rope is suspended from the sling, the operator at the base of the tower must move the wire rope away from the vertical, bringing the lower end to the area of the nacelle hoist. You can surround the tube from behind and leave the wire rope secured to the ladder.

6-Proceed in the same way with the next wire rope until the 3 wire rope have been installed.

Once the three wire ropes are installed, insert the end of the work wire rope into the elevator and the safety end into the fall arrest devide. See section 6.3.2 of the instruction manual..

The installation is complete. You must continue with the assembly of the platform and installation of cables in the platform as shown in the instruction manual of the Modublade platform.

5.3-Assembly of the platform.

DANGER	
Risk of wounds and injuries due to fall of objects, fall from different level and / or breaks.	Danger of death due to fall of objects, fall from different level and / or breaks.
	-The Modublade suspended scaffold must be mounted following the indications in the instruction manual ref.:MI200009..

6-Removing the wire ropes.

DANGER

Hurts for wire ropes manipulation. **Risk of wounds and injuries due to fall of objects, fall from different level and / or breaks.**	Danger of courts and scratches. Danger of death due to fall of objects, fall from different level and / or breaks.
	-Before to remove the wire ropes and during the maneuver, ensure that nobody is on the danger's area. -Use adequated PPE's: harness, protection gloves, safety boots, helmet, etc. -Avoid the creation of loops when manipulating the wire ropes. -Use intercomunicators in order to coordinate the maneuvers between the workers at base of the tower and the workers at the nacelle. -Follow all the safety instructions in section 5.2 of this installation guide.

For G114 wind turbines are necessary 3 people: 2 at the nacelle and 1 at the base of the tower.

a) Descend the platform until the ground and loose the wire ropes.

b) Extract the suspension wire rope from the hoist pressing the "descend" button.

IMPORTANT! These steps must be carried out following the instructions in the instruction manual of the Modulade platform

c) At the nacelle descend the lifting rope by means of a rope with a length equal to or greater than the height of the tower. At the base of the tower, extend the cable on the bottom and then pick it up on the winder.

d) Take out the secondary wire rope from the fall arrest device.

e) At the nacelle descend the lifting rope by means of a rope with a length equal to or greater than the height of the tower. At the base of the tower, extend the cable on the bottom and then pick it up on the winder.

f) At the nacelle descend the main guide wire rope by means of a rope with a length equal to or greater than the height of the tower. At the base of the tower, extend the cable on the bottom and then pick it up on the winder.

g) Once the wire ropes extended on the bottom proceed to pick them up on their corresponding winders.

h) The system is now unistalled.

accesus
PLATAFORMAS SUSPENDIDAS
C/Energia 54
08940 Cornellà de Llobregat (Barcelona) SPAIN
Telf.: (+34) 93 475 17 73
www.accesus.es
accesus@accesus.es