0 ▶▶ Introduction ◀◀

Thank you for choosing to purchase a MEWP (aerial work platform) CMC, we are sure you will be pleased with your choice.

0.1 ▶ Use and maintenance manual ◀

This manual is added to the sold machine and contains the instructions for its transfer, use and maintenance. While drawing up this manual, we took into consideration all the operations that are part of a normal use and regular maintenance of the machine. So for a correct and optimum use, you have to follow the described instructions carefully.

This manual has been drawn up in order to:

- Describe the use of the machine
- Show the main technical specifications of the machine
- Provide with the instructions for the placement and use of the machine
- Describe the safety devices
- Point out the potential risks and/or possible dangerous situations
- Provide with the necessary instructions for the ordinary maintenance operations
- Provide with the instructions for the filling of the check register.

🕮 THE USE AND MAINTENANCE MANUAL IS INTEGRAL PART OF THE MACHINE. In case of sale of the MEWP,

🕮 please give this manual to the new owner.

KEY FOR THE SYMBOLS USED IN THIS MANUAL

 **(CAUTION)**	**= warns the user about the risk of serious damages to people or to part of the equipment or the vehicle, if you do not obey the safety regulations.**
(WARNING)	**= notifies the possibility of minor injuries to people or little damages to the platform or vehicle PARTS..**
 **(FORBIDDEN)**	**= prohibition signal**
➔ **(OBLIGATION)**	**= obligation signal**
 **(CAUTION)**	**= warns the user about the risk of environmental pollution.**
* **(OPTIONAL)**	**= indicates an optional outfit.**
☞ **(IMPORTANT NOTE)**	

➔ This instruction manual is addressed to:

- **Operators**
- **Ground assistants**
- **Staff in charge of the platform (MEWP) guard**
- **Security manager**
- **Maintenance manager**

0.2 ▸ Disclaimer ◂

CMC declines all responsibility in case of partial or total non-observance of the following instructions

1. ➔ **Before proceeding with any operation of installation and use of the machine,** the user is obliged to **read carefully the text of this manual, with particular reference to all the laws and indications concerning the safety of its use; and he is obliged to observe carefully these laws and indications during all the operations carried out with the MEWP.**
2. ➔ **This manual cannot replace in any way a suitable experience that the persons in charge must have gained previously on similar machines or that they will able to get on this machine, under the guidance of an already trained staff.**
3. ➔ **The operator shall carefully observe the safety standards foreseen by national legislations.**
4. ➔ **The use of the machine must be entrusted only to trained and authorized staff.**

The non-observance of the aforesaid items automatically invalidates the guarantee.

0.3 ▸ Where and how to store the manual ◂

➔ **This manual** (or its copy) **must always be kept on the machine (in a box mounted on the turret)** for any immediate consultation by the operator and must be kept in good conditions, **sheltered from sunbeams**.

0.4 ▸ Normative references ◂

This manual has been drawn up according to the following laws and directives:

EC directive 2006/42/CE	UNI-EN 12100 1ª and 2ª	EN 280:2009
EC directive 91/368	UNI-EN 294	EN 60204-1
EC directive 93/44	UNI-EN 349	CEI-EN 60947-5-1
EC directive 93/68	UNI-EN 418	CEI-EN 60529

0.5 ▶ Amendments and integrations ◀

The information and references present in this manual are those in force at the moment of printing.

Due to the constant and continuous improvement of their product by the manufacturers, the supplied machine could present some technical specifications different from those described on this manual. Any change will be however accompanied with particular attached explaining functional characteristics. In case of difference in comparison with the basic contents of this manual, the user is kindly asked to contact CMC and ask for supplementary technical specifications

As this manual includes both current and optional components, you could find information not applicable to your equipment.

CMC reserves the right to update its production and its relation instruction manuals (without prior notice) according to the development of the technique, to the acquisition of new experiences and/or to the change of law provisions, without being anyway obliged to intervene on the previously sold machines and on their manuals.

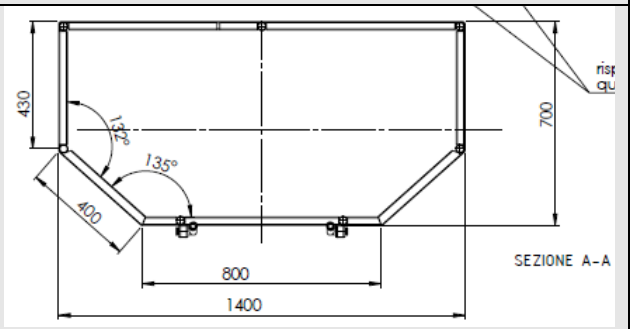
CMC reserves the right to modify - totally or partially - any datum or specification of this publication (without prior notice).

Data and references indicated in it are those in force at the moment of printing.

Year 2013
CMC s.r.l.

1 Specifications

1.1 Technical sheet and performances

Platform brand	**CMC s.r.l.**
Platform model	**SUP15**
Max basket load capacity	**200 Kg (incl: n° 2 people +equipment)**
Max height from the ground of the basket	**12,9 m**
Max horizontal outreach with 200Kg	**6,0 m (at the edge of the basket)**
Turret rotation	**+/- 180°**
Basket size	
Basket rotation	**0°** (the basket is fixed)

Max lifting and descending speed of the MEWP	**0,4 m/s**
max arm extension and withdrawal speed	**0,4 m/s**
Max rotation speed	**0,7 m/s**

MAX TRANSLATION SPEED	**0,3 m/s**

Max manual force allowed in the basket with 1 operator	**400N**

		Tightening torque
Bolts of the bearing	**M16 cl 10.9**	**28 daNm**

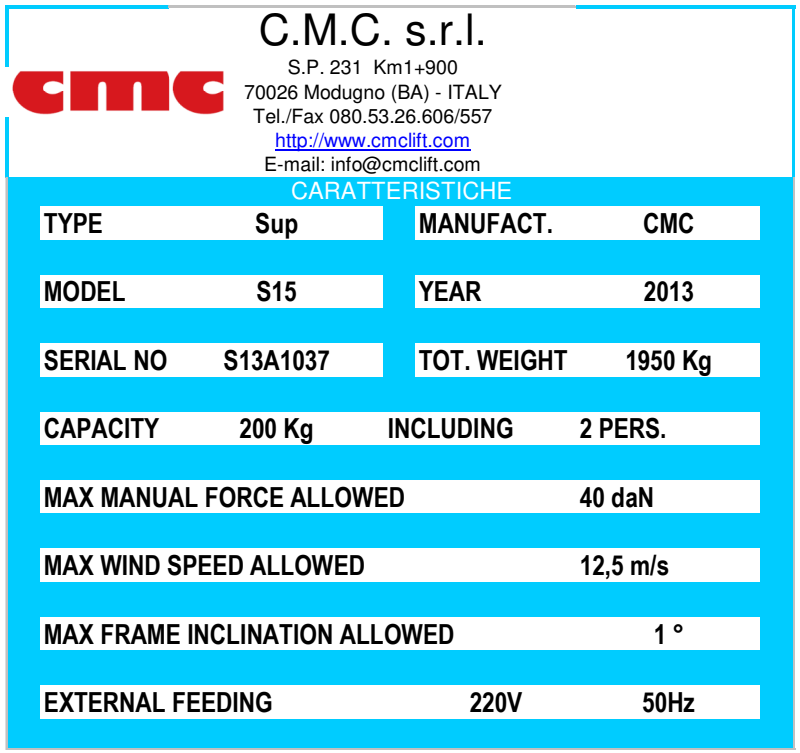
Max load under the stabilizers	**1200 daN**
Max specific pressure under the stabilizers	**5 daN/cm2**

Transversal moving on slope	**10°**
Max slope allowed surmountable in translation	**25% (13°)**
Max inclination allowed by the frame	**1° (+/- 0.5°)**

Crawler length Crawler width	**1207 mm** **770 mm**
Fuel endothermic engine	**8,2 KW / 3600 RPM** **(REFER TO THE USER MANUAL DELIVERED)**
Batteries type voltage / capacity	**Lead-acid** **12/44 V / Ah**
Battery charger supply output	**220 V 60 Hz**
Electric system voltage	**12 V**
Electric engine power	**2.2 kW**
Min and max pressure	**70 / 210 bar**

1.2 ▶ Identification plate ◀

On the turret there is a plate with all the identification data of the machine:



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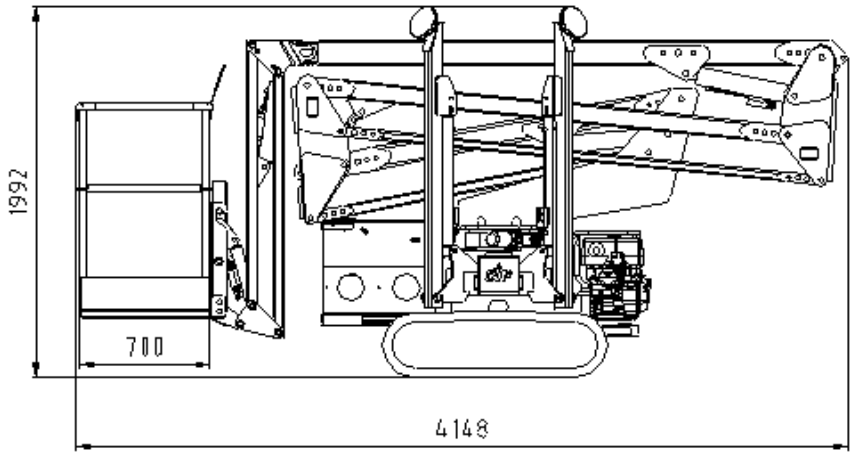
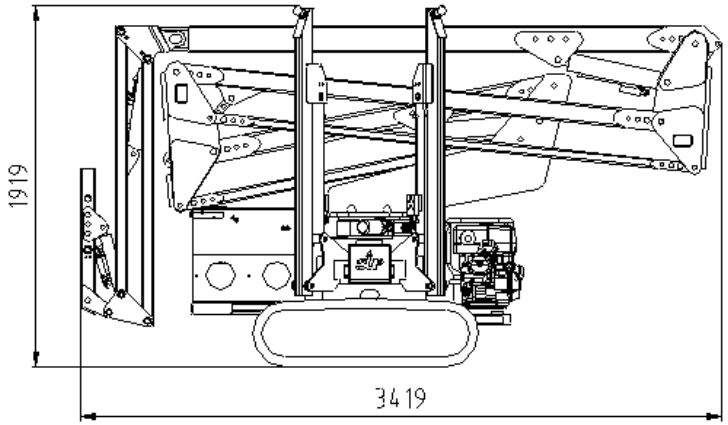
CARATTERISTICHE

TYPE	Sup	MANUFACT.	CMC
MODEL	S15	YEAR	2013
SERIAL NO	S13A1037	TOT. WEIGHT	1950 Kg
CAPACITY	200 Kg	INCLUDING	2 PERS.
MAX MANUAL FORCE ALLOWED			40 daN
MAX WIND SPEED ALLOWED			12,5 m/s
MAX FRAME INCLINATION ALLOWED			1 °
EXTERNAL FEEDING		220V	50Hz

Picture 1: identification plate - facsimile

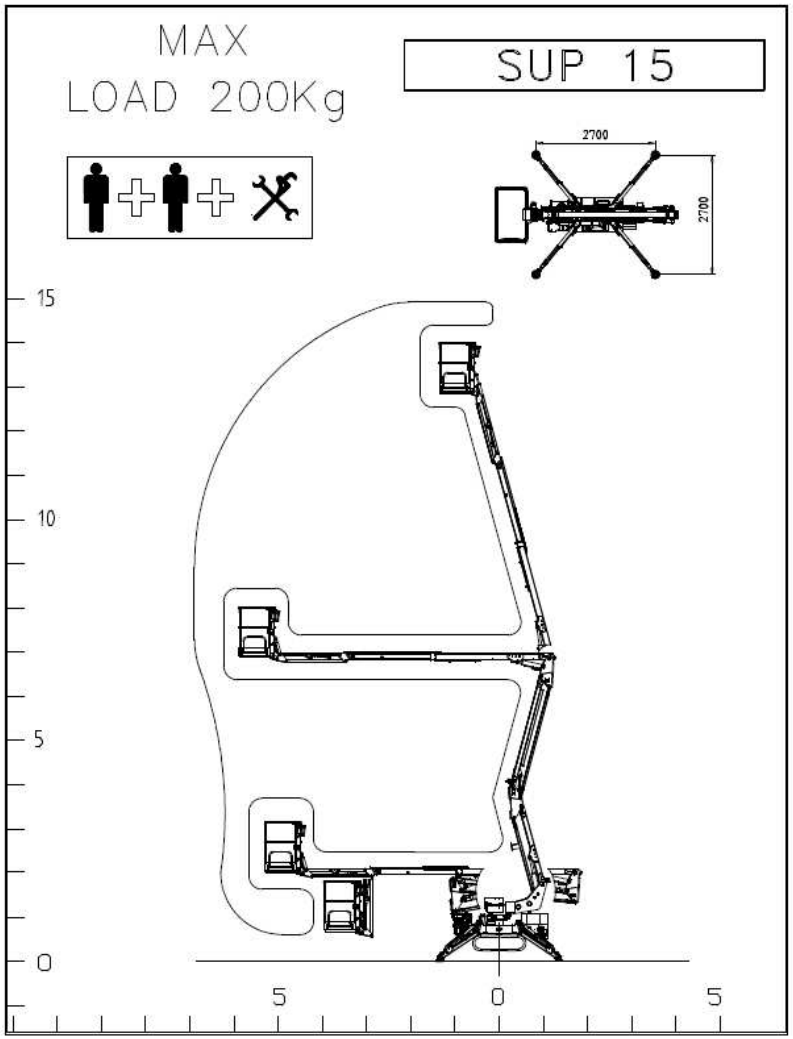
1.3 ▶ MEWP in rest position ◀



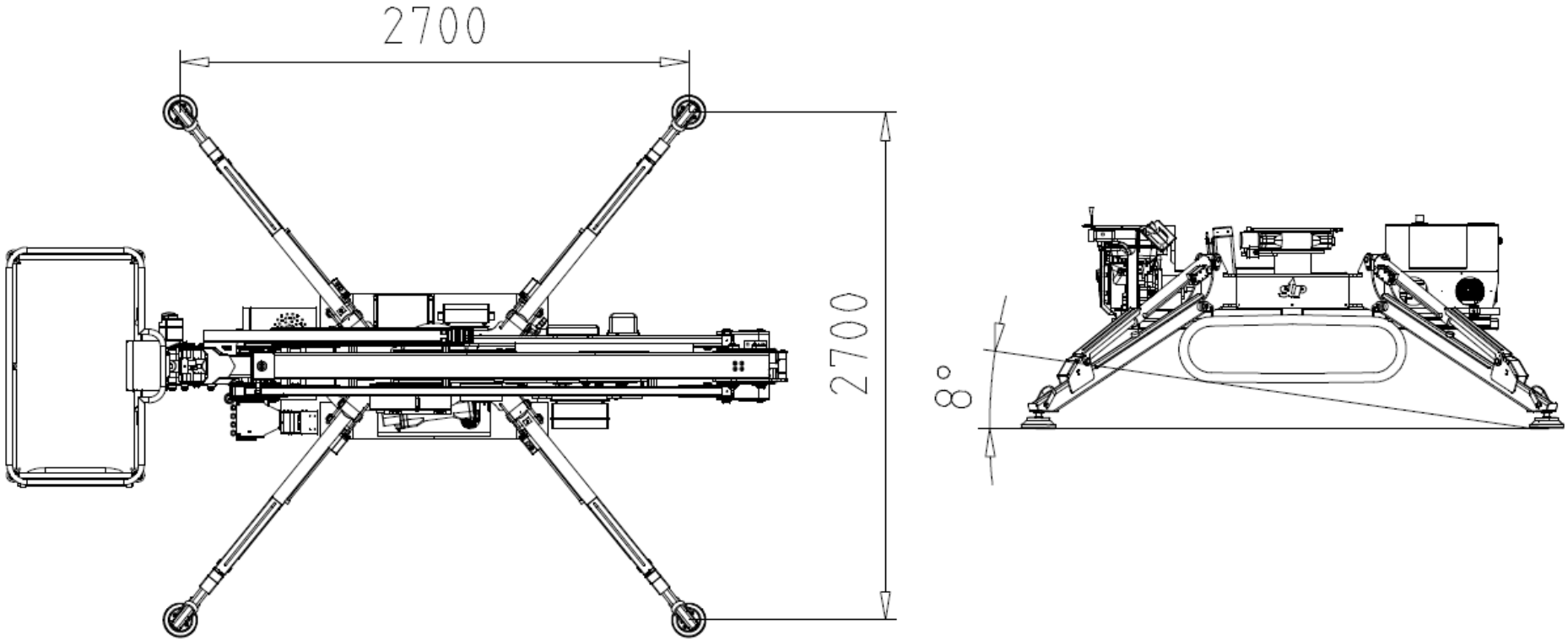


Picture 2: Overall drawing with basket connected

1.4 Working diagram and stabilization area



Picture 3: working diagram



Picture 4 - stabilization area (mm)

1.5 ▶ Classification ◀

The aerial work platform Sup15 belongs to the group B: during the working phases, the vertical projection of the load gravity centre can be out of the turnover lines (EN 280:2009 par. 1.4).
As to the movement, it belongs to the type No 1: the movement is allowed only when the work platform is in transport position (EN 280:2009 par. 1.4).

1.6 ▶ Loading cycles ◀

The machine is expected to live for 40.000 working cycles [1] (i.e. 10 years, 40 weeks per year, 20 hours per week, 5 cycles per hour).

Within this term, the machine must undergo at least 2 (two) in-depth checks (structural, mechanical, electric, elements, etc.)**, in case of particular heavy uses** (frequent use at the performance limit, particular unfavourable environmental conditions such as steel systems, paper mills and so on) **it is better to increase the checks.** Anyway **it is advisable to have the state of the machine checked by the manufacturer factory or by an authorized assistance point, at least every 1500 – 2000 working hours or once a year**.

[1] Loading cycle: cycle starting from the access position, performing the work and returning to the access position.

1.7 ▶ CE Certification ◀

CMC s.r.l. states under its own responsibility that the MEWP Sup15 was designed and produced in compliance with national and European standards, and that the machine is identical to the model submitted to control and test for the “CE” certification by the Notified Institute **n° 1878 VERICERT srl Via Cavina 19 – 48100 Ravenna - Italy**

2 Description and purpose

2.1 Definition

The machine is called Sup15 and it is a mobile elevating work platform (MEWP):
mobile machine designed to take people to the work positions, where they carry out duties from the work platform, with the understanding that people get on or off the work platform through a defined access position and that it is made of at least one work platform with controls, an extendible structure and a frame. It is forbidden to **access or to get off the work platform at different levels.**

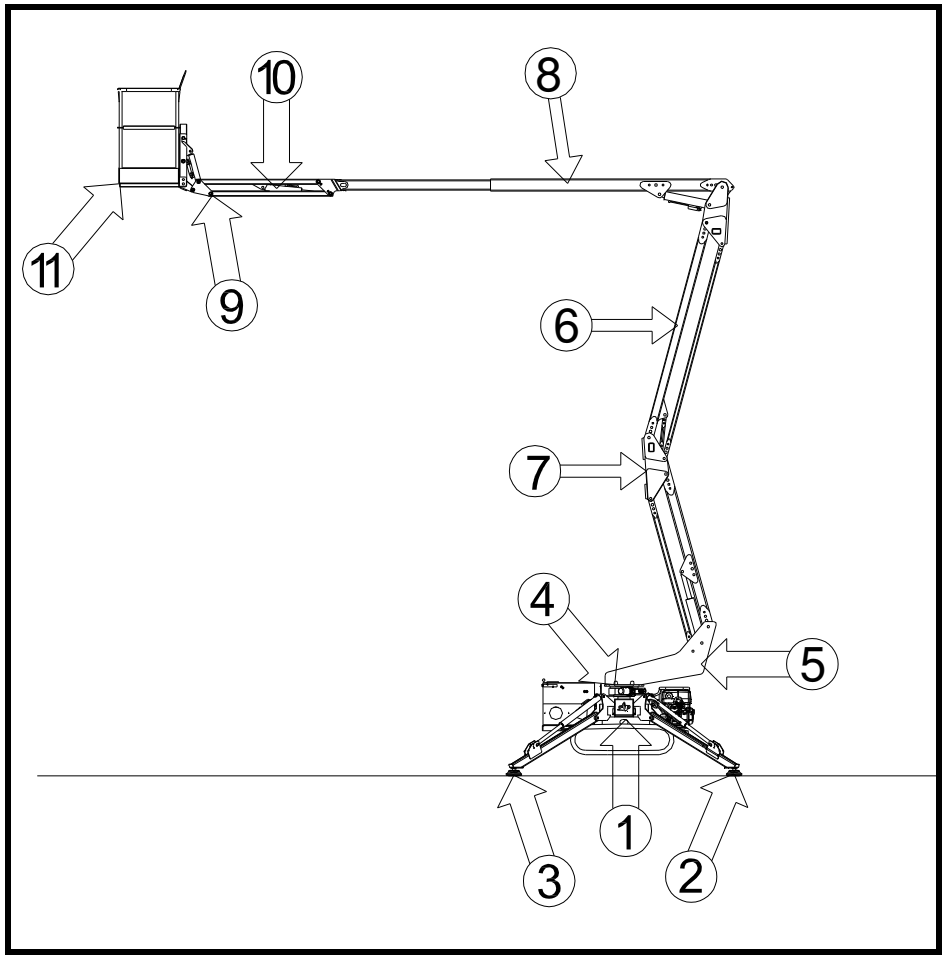
2.2 Machine purpose

The aerial work platform Sup15 is an equipment which enables the operators to reach the working place when this is high-positioned.

The machine has been designed for an essentially vertical development. It must be carried with the machinery set on the stop position**.**

 **The only professional use of the machine is allowed only to specialized or trained staff.**

2.3 ▶ Description of the main components ◀



Picture 5: MEWP main components

2.3.1 ▸ Frame 1 (Picture 5)

Quality steel structure able to equally divide the equipment's weight when the MEWP is in transport position. The frame has 4 oil-pressure jack arms for stabilization [2 front stabilizer cylinders 2 (Picture 5), 2 rear stabilizer cylinders 3 (Picture 5)]. The basis for the bearing is placed on the frame 4 (Picture 5), it enables the swinging of the equipment through the rotation group.

2.3.2 ▸ Turret 5 (Picture 5)

The turret, in quality steel, is fixed on the bearing. It is started by a hydraulic engine (whose brake is normally closed), placed inside the turret. It enables the rotation of the superstructure.

2.3.3 ▸ Double Pantograph 6 (Picture 5)

The pantograph is composed by two couples of parallel arms **(Picture 5)** and by the pantograph connecting rod 7. The arms (tubular with rectangular section, press-formed and electro welded) and the connecting rod are in quality steel sheets. The movement of the pantograph (pantograph lifting and descent) is realized by the pantograph lifting oil-pressure cylinder. This cylinder is hinged to the turret (rod side) and to the pantograph upper crank (stem side) and it has a double effect balancing valve This cylinder is hinged to the turret.

2.3.4 ▸ Telescopic arm 8 (Picture 5)

The telescopic arm is hinged to the turret 8 (Picture 5). The telescopic arm is composed by two elements: 1 fixed arm, hinged to the pantograph connecting rod, and 1 sliding arm.
The sliding or re-entry movement of the telescopic arm is activated by operating the "telescopic arm sliding cylinder device".
The lifting or descend movement of the telescopic arm is activated by operating the "telescopic arm lifting cylinder device".

2.3.5 ▸ Jib 9 (Picture 5)

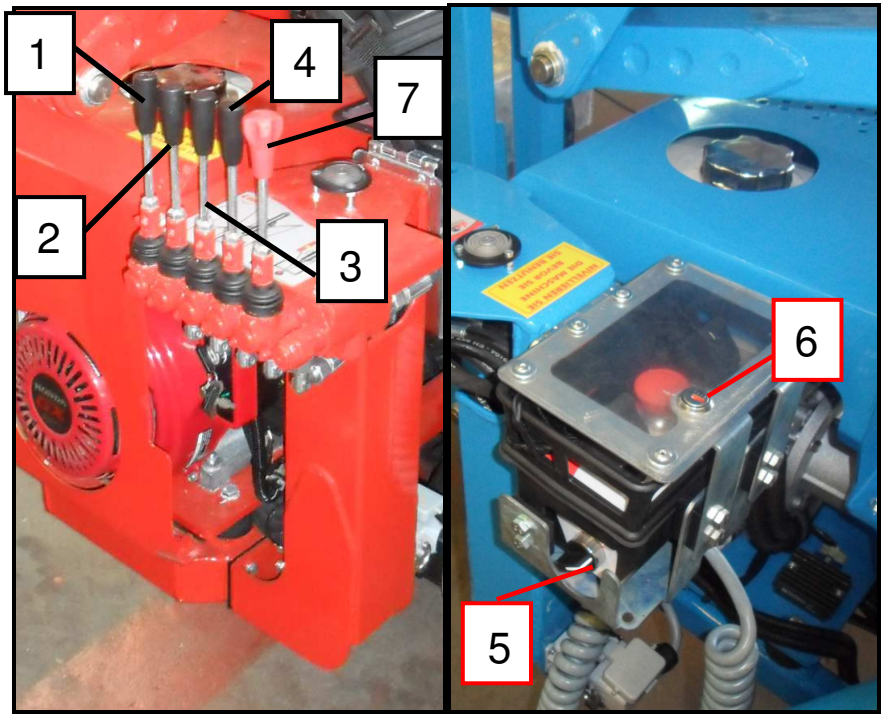
At the end of the telescopic arm is hinged an arm named Jib. The lifting or descent of the Jib is done by operating the "Jib lifting cylinder" 10 (Picture 5).

2.3.6 ▸ Basket 11 (Picture 5)

In aluminium tubular, it has a lateral opening to allow the entrance of the operators. The lateral opening is an auto-shutter and built to avoid accidental openings. The basket has strong points for safety belts, a guard-rail 1,1m high from the basket floor, an intermediate guard-rail and a foot protecting band along all sides of the platform. The floor is in antiskid and auto-draining aluminium. The basket is removable: it is connected to a support through which it is possible to couple it with the jib.

3 Control positions

3.1 Stabilizers control station



Picture 6: stabilizers control station

The stabilizers control station (**Picture 6**) is placed close to the turret when the MEWP is set in the transport configuration and it is formed by:

-right rear stabilizer lever 1 (**Picture 6**)
- pushing the lever forward the stabilizer lowers.
- pushing the lever backwards, the stabilizer withdraws.

-right front stabilizer lever 2 (**Picture 6**)
- pushing the lever forward the stabilizer lowers.
- Pushing the lever backwards, the stabilizer withdraws.

-left front stabilizer lever 3 (**Picture 6**)
- pushing the lever forward the stabilizer lowers.
- pushing the lever backwards, the stabilizer withdraws.

-left rear stabilizer lever 4 (**Picture 6**)
- pushing the lever forward the stabilizer lowers.
- pushing the lever backwards, the stabilizer withdraws.

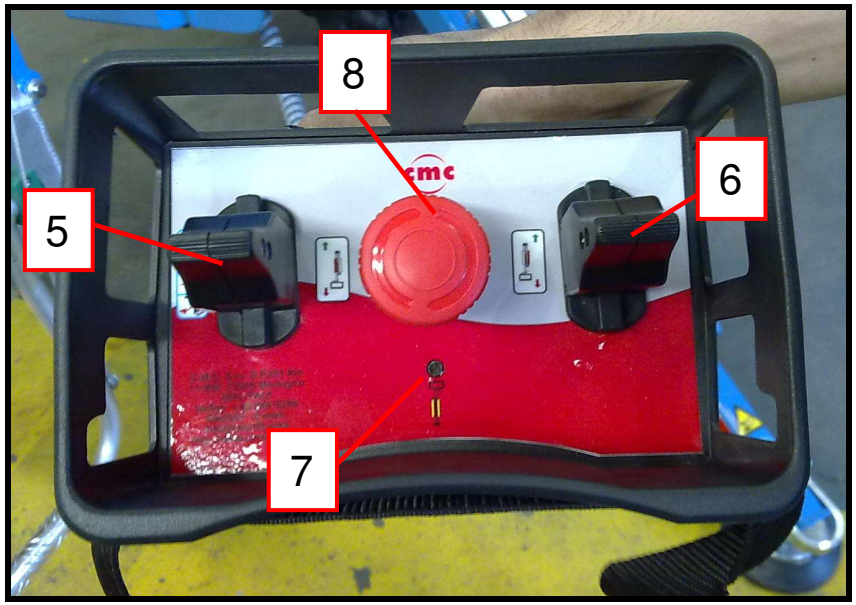
-OPTIONAL: on the hard right of the levers, you can find another lever which carries out the crawlers extraction/withdrawal.

- "translation / stabilization" selector 5 (**Picture 6**)

-key lock for the door opening of the translation cabled remote control 6 (**Picture 6**).

- Crawlers extraction/retraction red lever 7 (**Picture 6**)

3.2 ▸ Translation station / parking operations ◂



Picture 7 – MEWP travel (wired remote control) station

-left crawler activation joystick 5 (Picture 7)
- pushing the green button the left crawler rotates forward;
- pushing the red button the left crawler rotates backwards;

-right crawler activation buttons 6 (Picture 7)
- pushing the green button the right crawler rotates forward;
- pushing the red button the right crawler rotates backwards;

-travel light 7 (Picture 7)
- orange light: the light ON indicates the consent to the travel operations.

Emergency mushroom-shaped button 8 (Picture 7): blocks the machine unfeeding the control circuits; being mechanically self holding, to reset the machine function it is necessary to unlock it rotating it CW this switch has the priority on any other control; it is only possible to use the emergency lowering to the ground.

Picture 8 – left and right side of the wired remote control

-Dead man switch for parking operations 9 (Picture 8): hold the button pressed during parking operations;

-Selector use of remote control for parking operations or for travel operations 10 (Picture 8).

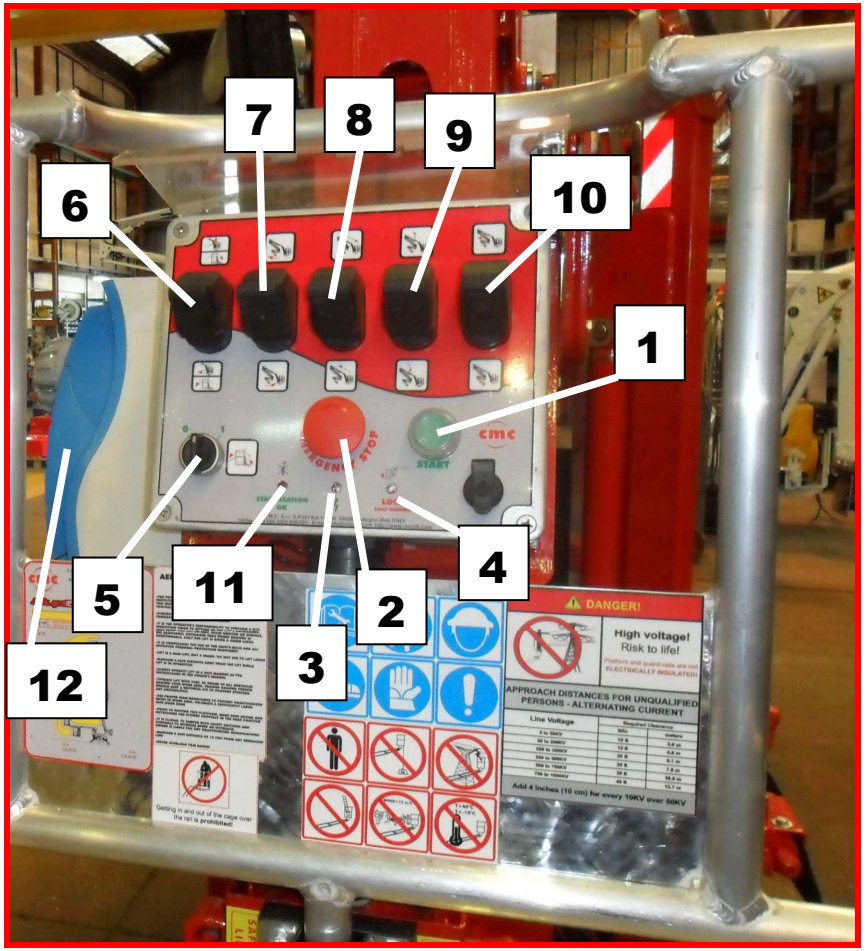
On the MEWP frame you will find some coloured arrows which will show the directions set on the radio control.

3.3 ▶ Platform control positions ◀

There are two platform control stations: the first (operation) is placed on the basket (**Picture 9**), the second (emergency) placed on the turret (**Picture 10**).

Through connecting the emergency station (opening padlock and door emergency station protection) the exercise station controls are disabled.

3.3.1 ▶ Platform control (exercise) position



Picture 9: Platform control (exercise) position

The platform control (exercise) station (Picture 9) is located inside the basket, and it is formed by:

- Start button 1 (Picture 9): pushing this button (green) the thermic (or electrical) motor starts.

- Emergency stop switch 2 (Picture 9) it blocks the machine unfeeding the control circuits; the machine has a mechanical blocking device, therefore, to reset its operability, it is necessary to unblock the switch turning it clockwise. This switch has the priority on any other control; it is only allowed to manually descend on the ground.

- platform control station - consent led light 3 (Picture 9): green light: the green light on indicates the consent to the use of the station controls;

- "load sensing" led light 4 (Picture 9): red light : the light on indicates that the platform is locked because is overloaded (>200 Kg): **OPTIONAL**;

-"Dead man" switch – levelling operation consent 5 (Picture 9): for the levelling operation it is necessary to push this button together with the lever 6 (Picture 9);

- Joystick lever for jib lifting control /basket levelling 6 (Picture 9): it carries out the aforementioned operations; pushed together with the "dead man" switch 5 (Picture 9) it carries out the levelling;

Perform the basket levelling operation only when the MEWP aerial part is in the transport configuration.

It is strictly forbidden to carry out the basket levelling operation when the machine is open.

- Joystick lever for turret rotation control 7 (Picture 9)

- Joystick lever for extension control 8 (Picture 9)

- Arm lifting control lever 9 (Picture 9)

- Joystick lever for pantograph lifting control 10 (Picture 9)

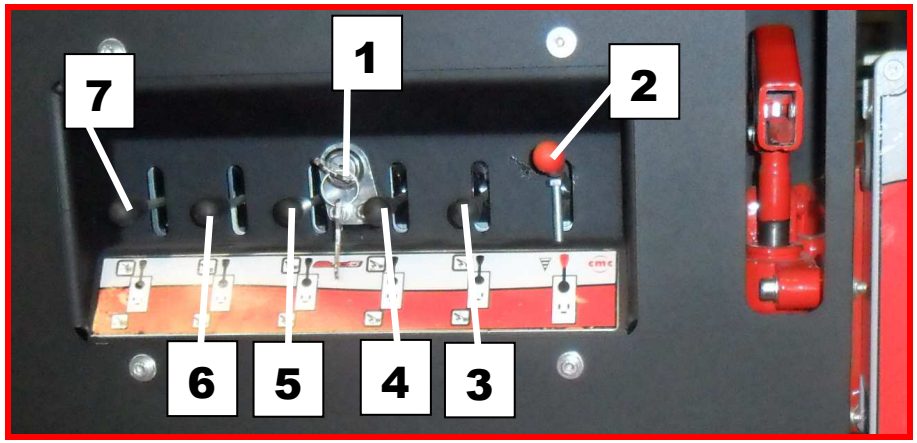
- stabilization control station - led light 11 (Picture 9): green light: the green light on, indicates that the stabilization is ok;

-220V socket 12 (Picture 9) (For England: 110 V)

Overload signal spy light could be supplied/mounted as an OPTIONAL.

3.3.2 ▸ Platform control (emergency) station

The control panel of the emergency station is placed on the right side of the turret and it is composed by:



Picture 10: platform control (emergency) station

-Key selector for the use of the station 1 (**Picture 10**)**: in horizontal position, it enables the emergency station; rotated clockwise, it enables the basket control station;**

-Proportional lever 2 (**Picture 10**)**:** it is operated together with the operations;

- Pantograph lift-descent 5 **(Picture 10**): it operates the lifting (lever upwards) and the lowering (lever downwards); the movement stops at its release.

- Arm lift-descent 6 **(Picture 10**): it operates the lifting (lever upwards) and the lowering (lever downwards) ; the movement stops at its release.

- Arm extension-withdrawal 3 **(Picture 10**): it activates the extension (lever upwards) and withdrawal (lever downwards) movement; the movement stops at its release .

- Turret rotation 4 **(Picture 10**): it operates the MEWP clockwise (lever upwards) and counter clockwise (lever downwards) rotation of the turret; the movement stops at its release .

- Jib lift-descent 7 **(Picture 10**): it operates the lifting (lever upwards) and the lowering (lever downwards) ; the movement stops at its release .

Under the lever 2 there is an adjustable bolt. This bolt has to be completely unscrewed when you utilise the emergency operation with the manual pump.

4 Use procedures

4.1 Environmental exercise conditions

The equipment can work normally in the following environmental conditions (for uses in different conditions, a special equipment is required):

- **temperature from –20° C (-4 °F) to + 55° C (131 °F)** (even +70°C (158 °F) for short periods which do not exceed 24 h)
- humidity from 30% to 90% (at 20° C)
- max wind speed 12,5 m/s **(45 Km/h) (27,96 mph)**

Do not cover the equipment with cloths in order to avoid condensation inside the electrical boards.

.

After storage in closed and very wet places for a long period, the machine could have some problems due to condensation in the electrical boards: in this case, should this occur, please contact the Technical Assistance Service before use.

Do not operate in areas with dangerous environmental conditions: poor visibility, storms, lightning risk, etc..

Do not to operate inside refrigerating rooms.

Do not operate when the wind speed exceeds a 12,5 m/s (45 Km/h). We hereby enclose (Schedule 1) Beaufort wind scale (**Table 1: Beaufort wind scale**):

Wind power		Wind speed		Land conditions
Beaufort number	description	m/s	Km/h	
0	Calm	0-0,2	1	Calm. Smoke rises vertically
1	Light air	0,3-1,5	1-5	Wind motion visible in smoke.
2	Light breeze	1,6-3,3	6-11	Wind felt on exposed skin. Leaves rustle
3	Gentle breeze	3,4-5,4	12-19	Leaves and smaller twigs in constant motion.
4	Moderate breeze	5,5-7,9	10-28	Dust and loose paper raised. Small branches begin to move. Dust and loose paper raised. Small branches begin to move.
5	Fresh breeze	8-10,7	29-38	Branches of a moderate size move. Small trees begin to sway.
6	Strong breeze	10,8-13,8	39-49	Large branches in motion. Umbrella use becomes difficult.
7	Near gale	13,9-17,1	50-61	Whole trees in motion. Effort needed to walk against the wind
8	Gale	17,2-20,2	62-74	Twigs broken from trees. It is difficult to move
9	Severe gale	20,3-24,4	75-88	Light damages to buildings, tiles removed
10	Storm	24,5-28,4	>89	Trees are broken off or uprooted, heavy damages to buildings

Table 1: Beaufort wind scale

4.2 ▶ Approach distances for qualified employees – Alternating current ◀

Voltage range (phase to phase) / Minimum approach distance

300 V and less / Avoid Contact
Over 300 V, not over 750 V / 1 ft. 0 in. (30.5cm),
Over 750 V, not over 2 kV / 1 ft. 6 in. (46 cm),
Over 2 kV, not over 15 kV / 2 ft. 0 in. (61 cm),
Over 15 kV, not over 37 kV / 3 ft. 0 in. (91 cm),
Over 37 kV, not over 87.5 kV / 3 ft. 6 in. (107 cm),
Over 87.5 kV, not over 121 kV / 4 ft. 0 in. (122 cm),
Over 121 kV, not over 140 kV / 4 ft. 6 in. (137 cm).

4.3 ▶ Transport, storage and package ◀

To load/unload the platform, it is possible to use a travelling crane of adequate capacity. For this operation, sling the MEWP as in Picture by the coupling at the foot of the stabilizers.

Picture 11: harness

Lifting operations are to be carried out when the machine is closed.

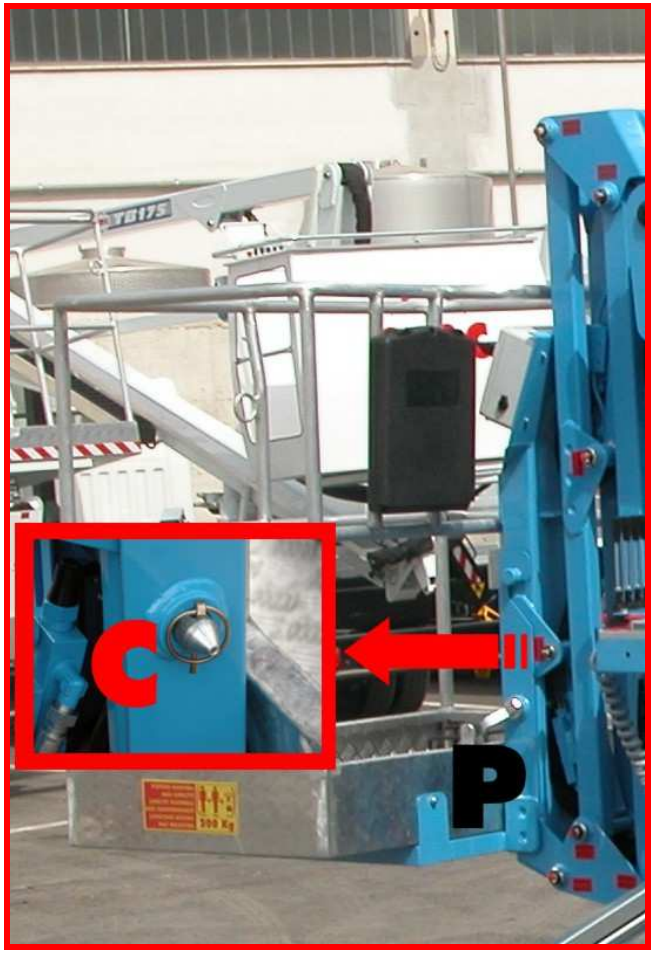
- ☞ Be careful not to damage the railings.
- ☞ Always use the personal protection equipments; do not handle ropes or chains without gloves.
- ☞ The presence of persons in proximity during the operations is forbidden.

Alternatively, the load/unload can be done through ramp, exploiting the motricity of the machine as well as its ability to overcome slopes not > **25% (13°)**. If you choose this option, please proceed with the following procedure, and carefully reading the danger notes suggested.

- ☞ Comply with the rules in force relevant to the width, height, weight and transport speed allowed.

  Check that the limit gauge is compatible with the features of the route to travel (i.e. galleries, bridges, electrical and phone lines etc.).

WARNING: in both cases, i.e. choosing one of the two methods, the user shall remove the basket: this to help the operations and reduce the encumbrances.



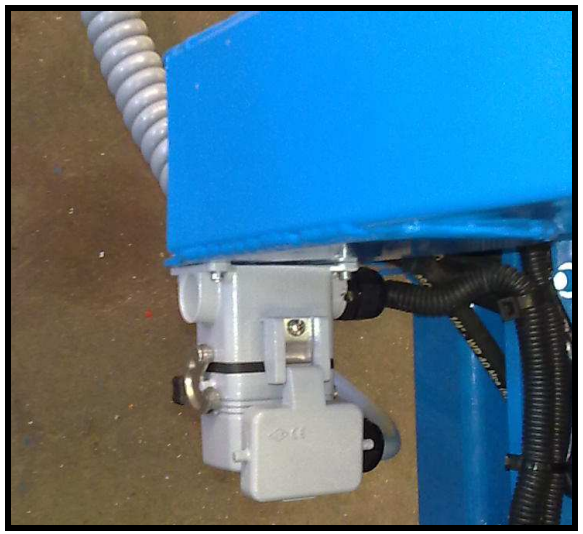
Picture 12: basket joint - pin and splint pin

4.3.1 ▸ Load/upload through ramp and translation

0. **Set the selector** 5 Picture 6 **on the "translation" symbol:**

Picture 13 – cabled remote control selector

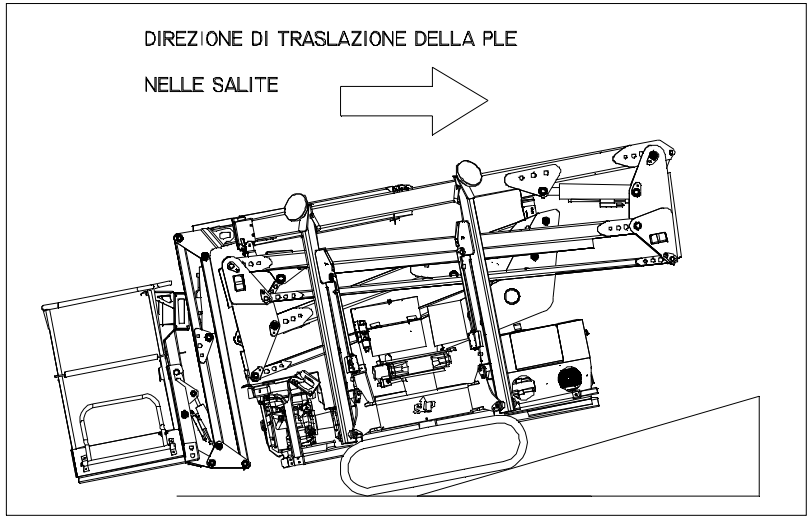
1. Release the basket by taking off the pin and pulling up the basket, decoupling it from the support assembled on the jib (see **Picture 12**). This will automatically enable the crawlers translation station (par. 3.2 Picture 7) provided that the cabled remote control is correctly fastened to its connection.



Picture 14 – electrical connection of the cabled remote control

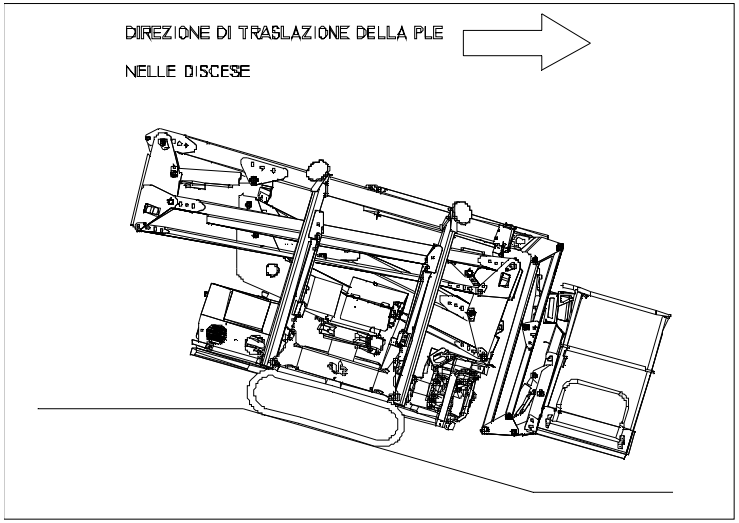
2. Check that no one is in proximity.
3. Place the couple of ramps (of adequate dimensions) and bring in correspondence of the machine tracks;
4. Check that the ramps slope does not exceed **25**% and that those are perfectly clean from grease, mud, snow or ice.
5. Reposition the pin in the box and reinsert the splint pin.
6. Start the endothermic engine.
7. Control the progress operations slowly and only in the direction indicated in the following pictures:

- If you have to climb, the basket has to be positioned at the back

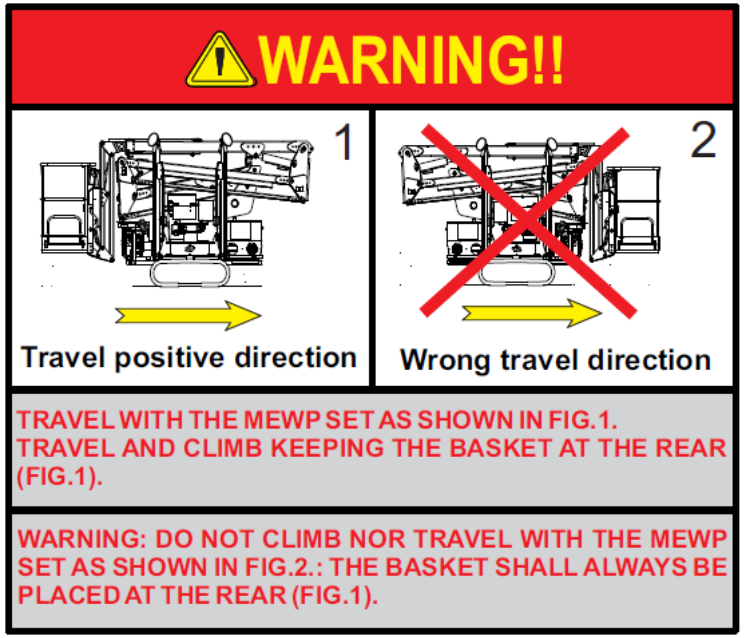


Picture 15 – translation direction upward

- If you have to descend, the basket has to be positioned at the front



Picture 16 – translation direction downward



Picture 17: driving direction during translations

WARNING: in case the arm lifting and/or turret rotation lever is accidentally activated, the machine enters into alarm mode and all movements are blocked. To reset the normal working conditions , hold the microswitch for the arm positioning or turret centering pressed down and take the machine back to its rest condition.

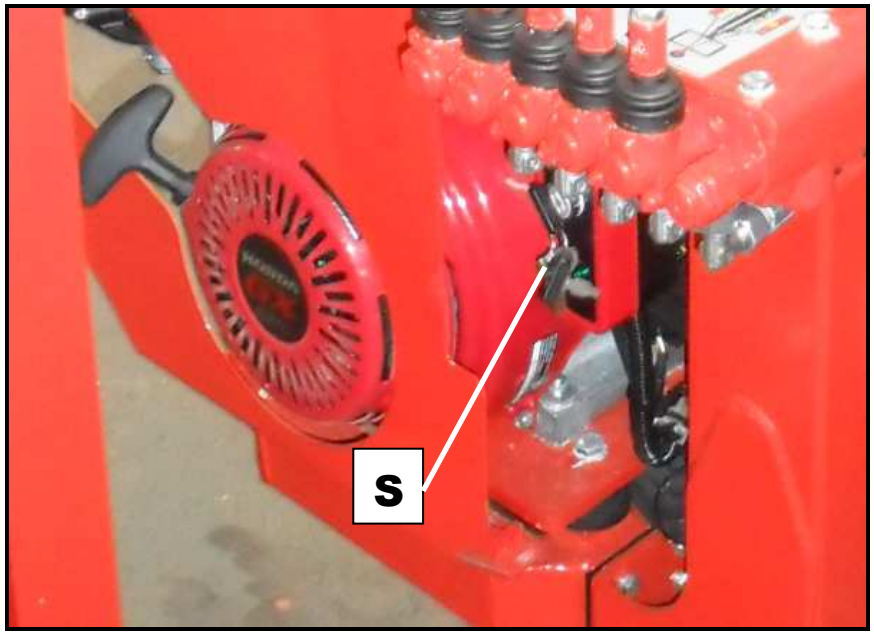
WARNING:. Should the machine get on a truck, use loading ramps with suitable dimensions and strength. Secure the machine to the truck plane by the junctions on the base cart. Make sure the machine is turned off during transportation

4.4 ▶ MEWP use procedures ◀

The following procedures shall be carefully carried out in the correct chronologic order.

4.4.1 ▶ Endothermic (or electric) engine start and positioning on the work station

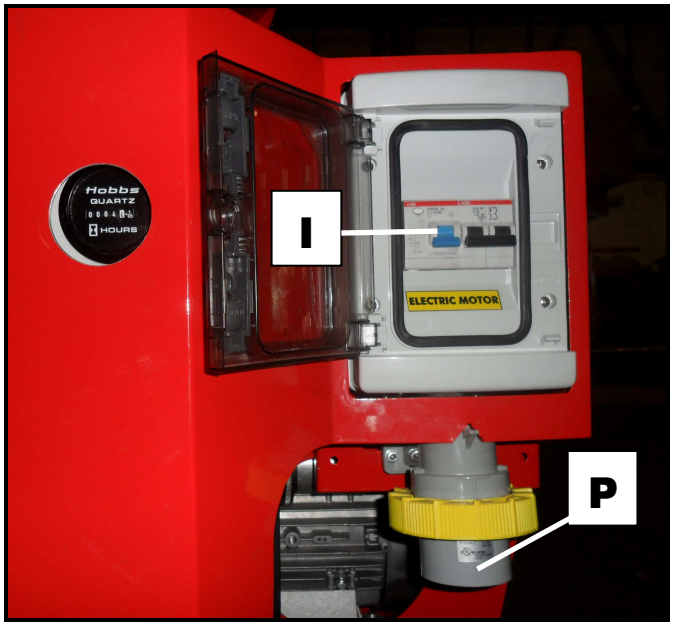
1. Turn on the endothermic engine with the supplied engine start key (S **Picture 18)**.



Picture 18: endothermic engine start key

2. If you want to use the electrical engine:

- ✓ Connect the 220 V electrical socket P **(Picture 19)** to the nearest electrical source (110 V in England).
- ✓ Set the I switch on ON **(Picture 19).**
- ✓ Start the engine pushing the start button 1 **Picture 9 par. 3.3.1);**



Picture 19: Control board for the electrical starting

3. The machine is ready for translation or to be stabilized.

4. **Identify the area (work station area)** which is nearest to the place to reach, and reach it by the machine handling operating the translation buttons ***left crawler operation button*** (5 **Picture 7)** and ***right crawler operation button*** (6 **Picture 7)**.

C.M.C. requires to use the remote translation controls in order to ensure the translation operations in the utmost safety (Picture 20: remote translation).

Picture 20: remote translation

5. **Ensure the soil bears the load of the stabilizers indicated on the same and that in the contact point of every stabilizer plate with the ground, there are no manholes, floors or other soft structures;**

   If such conditions are not met, it is strictly forbidden to use the MEWP.

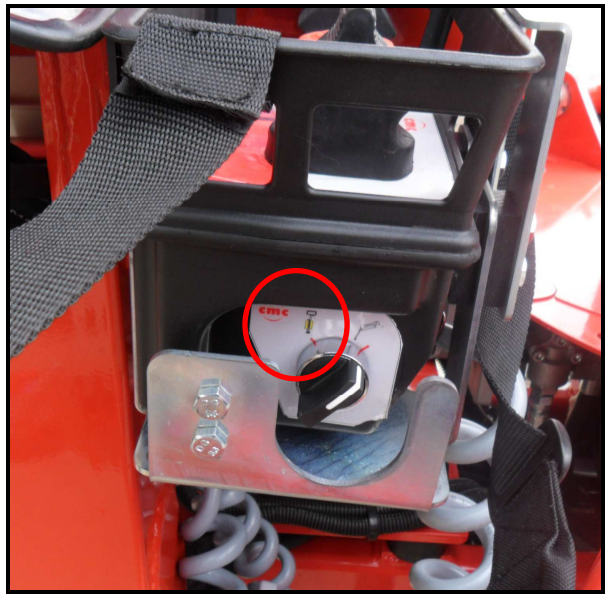
6. **Place the MEWP** on the selected area;

7. **Define the work station area** with appropriate signage (white-red ribbon, white-red chains, cones etc.).

During the translation operations, respect a distance of at least 4 meters and make sure that no one stays within a radius of at least 5 meters.

4.4.2 ▸ MEWP stabilization

8. Reach the stabilizers control position (par. 3.1).
9. Set the selector 5 **Picture 6** on the "stabilizers" symbol:



Picture 21 - cabled remote control selector

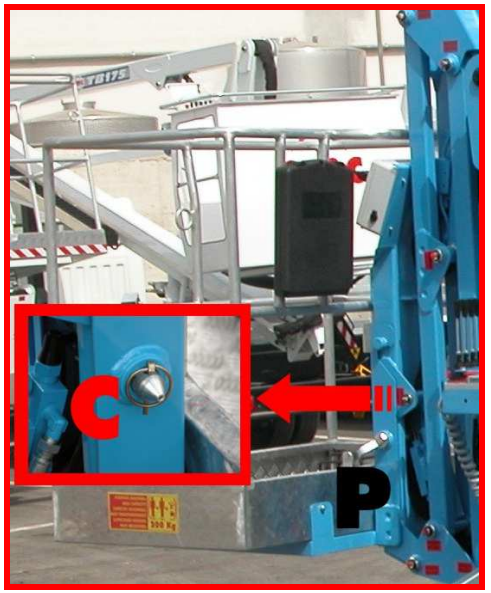
10. Using the "Stabilizers control position (par. 3.1) lower the front and rear stabilizers with the levers 1 ,2 , 3, 4 (par. 3.1 - 3.1). **The release of the stabilizers leads first to the contact of the four stabilizers plates with the ground and then to the lifting oft the frame. Proceed with the stabilisation of the vehicle.** Check the levelling of the vehicle**, by comparing the air bubble on the counter frame: the maximum frame slope allowed is 1° (one degree).** Once the stabilization is over, **lights 3 Picture 24 and 4 Picture 9 respectively indicating "stabilization" and "consent to the operation of the platform aerial part". At the same time the two lights 3 and 4 Picture 9 par. 3.3.1 will turn on, respectively indicating "platform use consent" and "balance".**

Carry out the basket levelling operation only whet the MEWP aerial part is in the transport configuration.

It is strictly forbidden to perform the basket levelling operation when the machine is open.

4.4.3 ▸ Basket assembly and access

11. To carry out the basket operations, it is necessary to proceed with the basket assembly after having turned off the machine.



Picture 22: basket coupling

12. Once the basket is coupled, insert the pin P and the splint pin C of **Picture 22**.

13. The entrance into the basket occurs lifting the self-locking closing bar and using the underlying step; **ensure the bar is back into the closing position; fasten the safety belts to the proper handholds in the basket.**

4.4.4 ▸ Basket levelling

14. **Insert the supplied key 1 (par. 3.3.2 - Picture 10) and keep it in vertical position;**

15. **After verifying that the light 3 (par. 3.3.1 - Picture 9), is on, using the platform control (exercise) position (par. 3.3.1) operate the basket levelling using at the same time the "dead man" button and the *Joystick lever for the basket levelling control* (5 and 6 Picture 9- par. 3.3.1 if the floor of the same is out of level.**

4.4.5 ▸ Use of the aerial part

16. Using the platform control (exercise) position (par. 3.3.1) carry out the MEWP aerial part operations through the lever controls described in the same paragraph. Once lifted from the support, the light 4 **(par. 3.3.1 - Picture 9) will turn off.**

First lift the pantograph in order to rise from the support. It is therefore strictly forbidden to rotate the turret as first movement since it could cause heavy damages to the carpentry.

4.4.6 ▸ Positioning of the MEWP in the transport position

17. To place the work platform in the transport position, it is necessary to first operate the MEWP aerial part to have the return of the telescopic arm, and the support of the arm on its own support and the MEWP balancing by using the platform control (exercise) position (par. 3.3.1)).
18. If the operation is carried out correctly, lights 3 and 4 **Picture 9** will turn on again.

Before carrying out the lowering of the arm to bring it back on its support, the ground operator shall work the bolt of the stabilizers control station bringing it back in the closing position: this to avoid possible interferences with the telescopic arm or with the jib.

19. Unfasten safety belts, get off the basket using its underlying step.
20. **Perform the withdrawal of the stabilizers**, operating the appropriate levers 1 ,2 , 3, 4 (**Picture 6**).
21. **After these operations, it is possible to re-start the MEWP to bring it back in the parking position.**

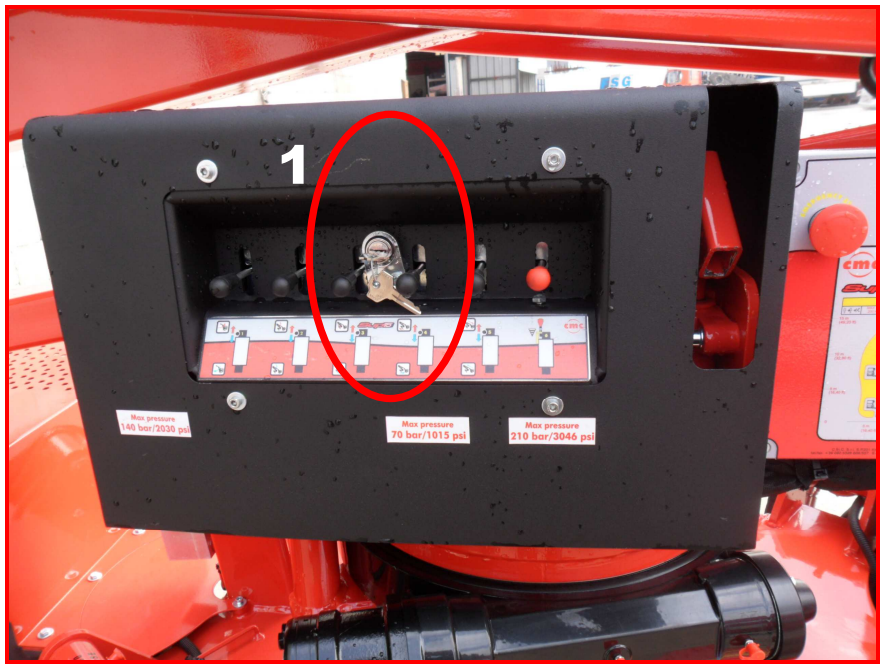
4.5 ▸ Emergency operations ◂

4.5.1 ▸ Emergency button

In case of emergency , push the emergency button 2 (Picture 9) and 8 (Picture 7) pushing this button (with mechanical blocking device) the MEWP thermal or electrical engine stalls and all operations are disabled. To reset the normal working conditions, rotate this button clockwise.

4.5.2 ▸ Platform controls (emergency) station

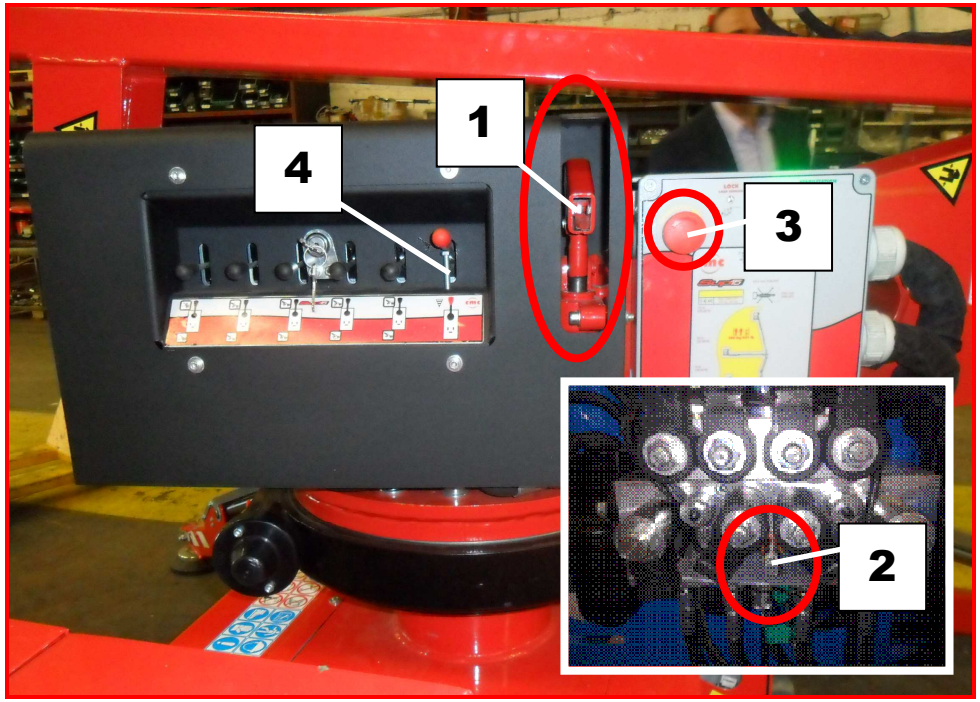
In case of emergency, the controls of the MEWP aerial part can be operated by the ground operator, by using the “Platform controls (emergency) station” described in par.3.3.2. This station can be operated by turning in vertical position the key clockwise 1 (Picture 23).



Picture 23: emergency station closing carter

4.5.3 ▸ Hand pump (hydraulic system failure)

In case of emergency (fuel exhaustion etc.) to get the pressure inside the hydraulic circuit, necessary for the functioning of the MEWP components, it is possible to use the hand pump 1 (**Picture 24**).



Picture 24: hand pump

First close the platform by unfastening the hydraulic handle 2 (**Picture 24**) near the hydraulic seat in picture and start closing the MEWP.

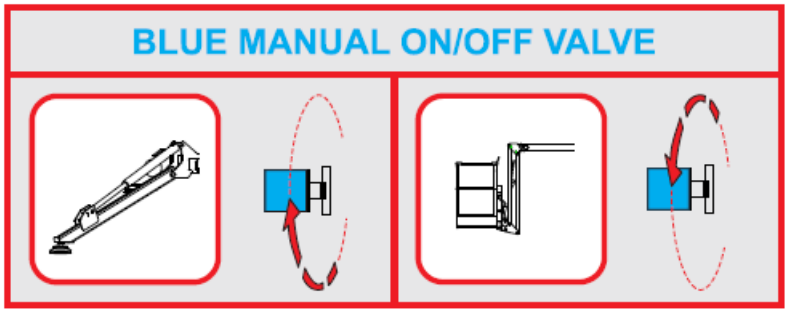


Figure 25 - blue manual on/off valve

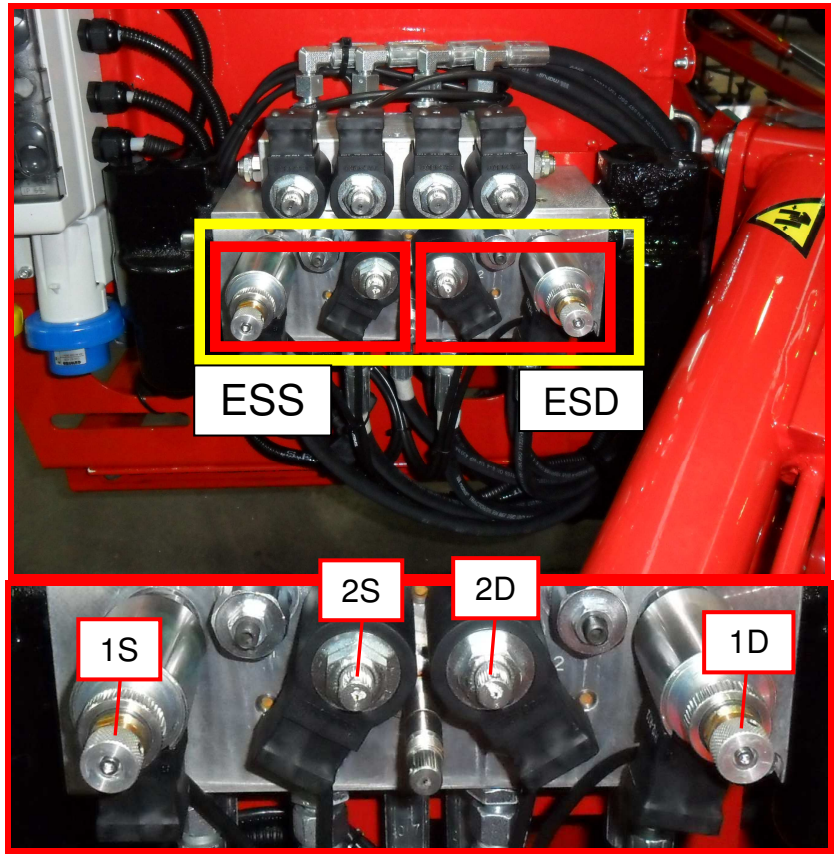
While the ground operator activates the pump (after inserting the supplied lever), the operator inside the basket can withdraw and lower the telescopic arm using the “platform control (exercise) station ”. These operations can be also carried out by enabling the “Platform control (emergency) station” described in paragraph 3.2.2.

In case of emergency, first withdraw the telescopic arm and then lower telescopic arm and Jib.

After repositioning the platform in rest position, fasten the handle 2 (**Picture 24)** and start destabilizing the MEWP . While the ground operator activates the pump (after inserting the supplied lever), the other operator carries out the destabilizing operations, activating the stabilizers control station levers.

4.5.4 ▸ Closing the MEWP in case of electrical and hydraulic failure

In case of electrical system failure, to close the platform in emergency it is necessary to have two/three operators.
In case of emergency (electric system failure) to get the pressure, inside the hydraulic circuit, necessary to the functioning of the platform components, you can use the hand pump 1 (**Picture 24**) on the right of the turret distributor as an alternative to the thermal engine.



Picture 26: electro valves group

First close the platform unscrewing the hydraulic tap knob near the tank 2 (Picture 24) and start the MEWP closing operations chronologically following these steps:

- Ground operator activates the pump (after engaging the supplied lever);
- Another operator first removes the deal seal from the golden lock ring, then the ring, then screws the cursor of the left exchange electrovalve 1S (**Picture 26)**;

- Then unscrew the knob on the exchange electrovalve knob 2S.;
- Then go to the emergency operations bench (**Picture 10)** and operate manoeuvres as follows:

  - ✓ Boom retraction taking the lever 5 in **Picture 10** down;
  - ✓ Boom lowering taking the lever 4 in **Picture 10** down;
  - ✓ pantograph lowering taking the lever 3 in **Picture 10** down.

In case of emergency, first retract telescopic boom and then lower telescopic boom and Jib.

After resetting the platform in its rest position, screw the knob 2 (Picture 24) enabling the MEWP destabilization operations. While the ground operator activates the pump (after engaging the supplied lever), the other operator will carry out destabilization first performing – in chronological order – these steps:

- another operator first removes the lead seal from the golden lock ring, then the ring, then screws the right exchange electro valve cursor 1D **Picture 26**;
- then unscrew the knob on the exchange electrovalve 2D;

then go to the outriggers operations bench and carry out destabilization.

RESETTING THE MEWP TO ITS REST POSITION, DECELERATION RAMPS AND OPERATIONS SPEEDS WILL BE INACTIVE: PORRE, CAREFULLY CARRY OUT OPERATIONS WEARING ALL PPES PROVIDED FOR BY LAW.

AFTER CARRYING OUT ALL THE NECESSARY OPERATIONS TO RESET THE REST CONDITION AND TO CLOSE THE MEWP, CONTACT THE NEAREST SERVICE CENTRE FOR TECHNICAL SUPPORT.

4.6 ▸ Safety rules ◂

THE NON-OBSERVANCE OF ONE OF THE FOLLOWING SAFETY RULES, MAY CAUSE SERIOUS DAMAGES TO PEOPLE, THINGS AND PARTS OF THE EQUIPMENT OR THE VEHICLE.

4.6.1 ▸ Before and during the movements with the MEWP in transport position

-  It is forbidden to rent the MEWP without non-trained operators and staff.

  ➔The hirer is responsible for the training of his operators and of the staff renting the MEWP. CMC s.r.l. declines any responsibility coming from damages to people and/or things due to the inexperience of these operators;

  ;
- ➔Before starting the machine, check the tracks wear status as well as the correct inflation pressure;
-  Do not use the MEWP to perform drawing or pushing operations;

4.6.2 ▸ Before positioning the MEWP

- ➔ Carefully and chronologically follow the instructions given in this manual;
-  Do not use the MEWP out of the environmental working conditions described in paragraph 4.1;
- ➔ **Check that the staff allowed to use the MEWP** (minimum two people: the first operator in the basket, the second operator on the ground), **is qualified and trained and know the MEWP use and maintenance rules**;
- ➔ Follow the testing instructions indicated in “Maintenance” chapter (cap. 8);
- ➔ Check that the safety device are working and efficient;;
- Some of the platform components (integrated groups for the stabilizers, max pressure valve on the turret) which are important for the safety of the MEWP, are calibrated in CMC s.r.l. factory and the containers are sealed before the delivery of the MEWP to the customer.

   It is strictly forbidden to tamper with these components. The missing of the sealing according to the guarantee of the machine causes the revocation of the guarantee. Therefore the user will take the charge of the responsibility for the non-correct working of the safety devices.
-  It is forbidden to remove or modify the safety devices;
- ➔ Wear the safety helmet;
- ➔ Wear all the protective cloths and the personal safety devices**;**

4.6.3 ▸ During the positioning of the MEWP

-  It is forbidden to operate in dangerous situations for the safety of people;
-  It is forbidden to operate in explosion hazard areas;;
- ➔ Check that the working area is suitable to the MEWP performances and to the operations and that it is enough enlightened;
- ➔ Check that the places for operation and the working area are sufficiently enlightened and well visible;
- ➔ If operating in a closed or little aired environment, ensure, before starting the vehicle engine, that his has appropriate ventilation or convey exhaust gases outside:

   Exhaust emissions produced by the MEWP engine are toxic;

- ➔ Appropriately define the working area through suitable signs; observe the laws in force about the traffic, in case you use the MEWP where road circulation is allowed;
- ➔ Check that there is nobody within the MEWP action range.
- ➔ Stabilize the truck through the stabilizers.
- ➔ Check that the stabilizers rest on a non-soft, solid ground that bears the load indicated on each stabilizer.
- ➔ In case of soft ground, use supporting plates.
-  It is forbidden to make the stabilizers rest on ground roughness: they could be damaged.
- ➔ Level the truck in order to make the MEWP work on a horizontal plane, maximum drop of the chassis: 1st maximum slant of the ground: 3rdº.

4.6.4 ▸ During the entrance in the basket

-  **It is absolutely forbidden to use the equipment with loads different from those indicated on the diagram or for forbidden uses;**
-  Do not overload the MEWP;
- ➔ **During the different working operations, the use of the safety belts is compulsory**. Do not fasten the safety belts to external structures but only to the supplied eyelets in the basket;
- ➔ Make sure that the bar lifted to enter the basket, has returned in lock position;

4.6.5 ▸ During the use of the MEWP

- ➔ In any dangerous or irregular conditions, stop the machine by using the emergency button. Before starting the machine again, check that the dangerous conditions are over;
-  It is strictly forbidden to level the basket when the machine is in working position;;
-  Do not operate when the MEWP is in failure;
-  It is forbidden to use the “platform control (emergency) position” when there are operators inside the basket, unless there is emergency or for testing operations before starting the work (which shall be carried out without anyone in the basket): from downstairs, it is difficult to esteem how far the basket and the MEWP structure components are from possible obstacles;
- ➔ Follow the MEWP working diagram;
-  It is strictly forbidden to use the platform as a crane, to hang posters, banners, poles, etc. to the basket or to any other part of the MEWP;
-  It is absolutely forbidden to lift or lower loads by using ropes and pulleys;
-  It is forbidden to lean out;
-  It is forbidden to use the MEWP for recreational purposes;
-  Do not perform the basket rotation operation together with other operations;
-  No material shall fall from above: fasten the working material properly;
-  Do not throw objects (tools) upside down or vice versa.
-  In case of particular works (pruning, plants maintenance etc.) it is forbidden to let trunks, pipes, poles etc. fall inside the basket or on the MEWP structure: they can severely impair the MEWP stability;

- ➔During particular works (paintings, etc), protect yourselves and the machine;
-  It is strictly forbidden to put tools, body parts in the areas marked by the stickers indicating crushing, shearing hazard; keep the hands away from any hole or slit;
-  It is forbidden to use tools not complying with the laws in force;
- ➔When working at low temperatures, it is necessary to perform some in-vain operation so that the hydraulic circuit oil reaches the exercise temperature;
-  It is forbidden to let people walk or stay within the MEWP working area;
-  It is forbidden to stay on the counter frame floor, during MEWP operations.
-  It is forbidden to operate near electrical lines: it is compulsory to keep the safety distance of 14 feet (5 m) ;
- ➔ Firmly cling to the work platform during lift and descent;
-  Controls shall be started by slow and gradual movements;
-  It is forbidden to make the platform swing ;
- ➔ Check the vehicle and the MEWP stability during all the operations phases;
- ➔ Do not move the vehicle during the working operations with the MEWP;
- ➔Keep a proper safety distance from obstacles: avoid contacts with fixed (buildings, etc) and moving (vehicles, cranes, etc.) objects with the truck cabin, with the stabilizers and with other structure parts;
-  It is forbidden to use ladders or tables on the basket in order to increase the MEWP's outreach or working height;
- ➔Be careful when working in close buildings: due to the "wind tunnel" effect, sudden blasts could cause swinging, thus impairing the machine stability;
-  It is forbidden to lift "full surface" panels (i.e. signs, advertising panels, boards, etc.): these could cause the "sail" effect;
-  It is forbidden to leave the MEWP unattended when it is in working position;
-  It is forbidden to exceed the max number of basket operators allowed;
-  During the normal use of the platform, it is absolutely forbidden to use electronic instruments which do not meet the requirements of the directive 72/245/CE and its following amendments: the additional electronic instruments could impair good functioning of the platform electronic components;

4.6.6 ▸ At the end of the works

- ➔Before moving the vehicle, check that the MEWP aerial part is set in the transport position: check that the telescopic arm is withdrawn and the Jib rests on its own support;
- ➔ Before moving the vehicle, check that all stabilizers are set in the transport position, with the plates completely lifted;
- ➔ Before moving the vehicle, check that the stabilizers beams are withdrawn;

4.7 ▶ Safety devices ◀

A - Electrical devices

- Removable key for the MEWP start.
- Emergency stall self-blocking buttons placed in the two control positions and on the translation position
- Microswitch which stops the stabilizers controls when the arm and the pantograph have been lifted and extended
- Microswitch for the stabilizer end of stroke
- Overloading protection fuses, both on power and control circuits.
- All the machine controls need the presence and action of the operator.
- *Charge limiting device (OPTIONAL).

B - Hydraulic devices

- Max pressure valves.
- Block valve and parachute valve mounted on the lifting cylinders
- Manual pump for the emergency operations.
- Oil flow adjuster for the control of the descent speed.

C - Mechanical devices

- Hydraulically controlled negative disc brakes.
- 1,10 m height border guardrail on the basket.
- Basket access self-locking bar.
- Basket with safety belts eyelets

 All the safety devices could wear out and loose their calibration, so it is necessary to control and keep them in perfect working order.
Do not trust the functioning of these devices to value their working and safety conditions; the operator is in any case responsible for a proper and responsible use of the machine.
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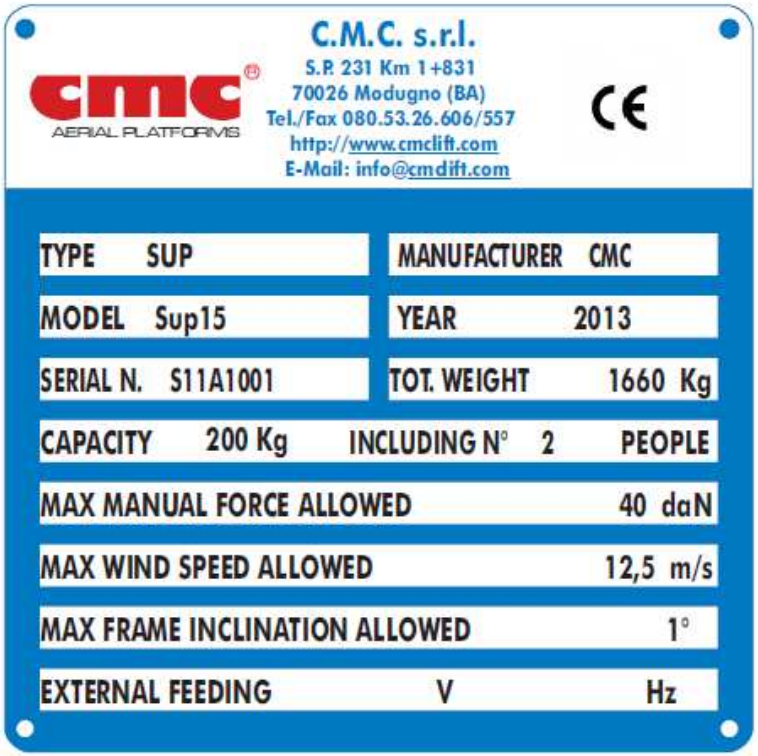
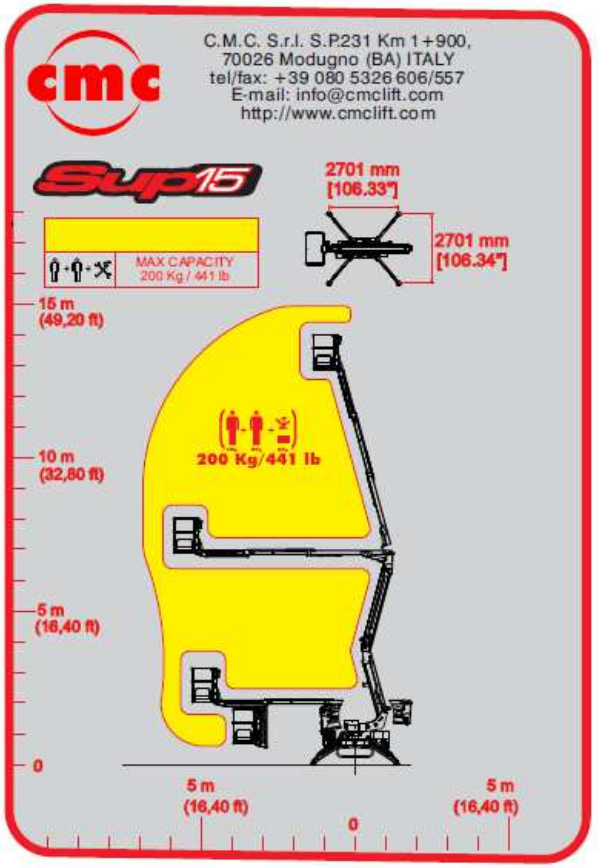
5 Markings

On the machine there are the following marks.

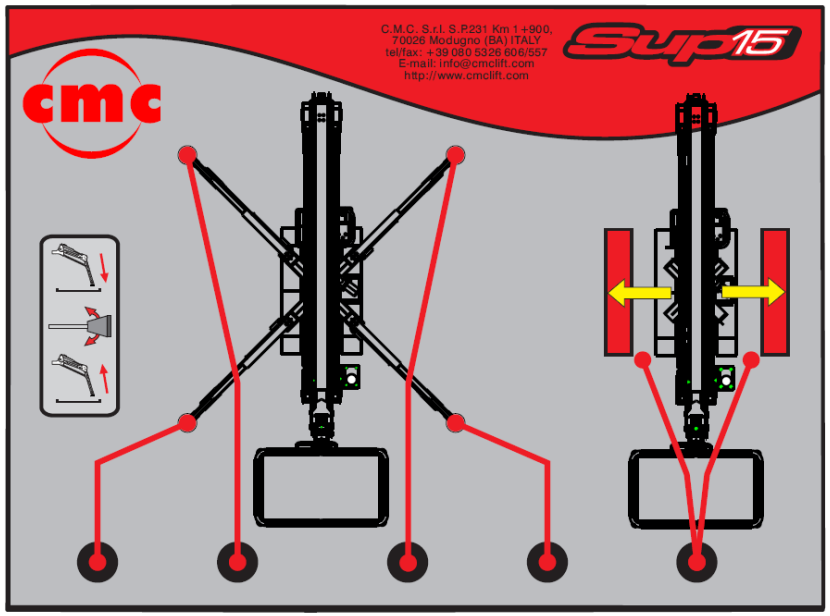
➔ **Before using the MEWP, it is compulsory to check the presence and the perfect readability of these marks. In case of absence or decay of the marks, contact the Servicing.**



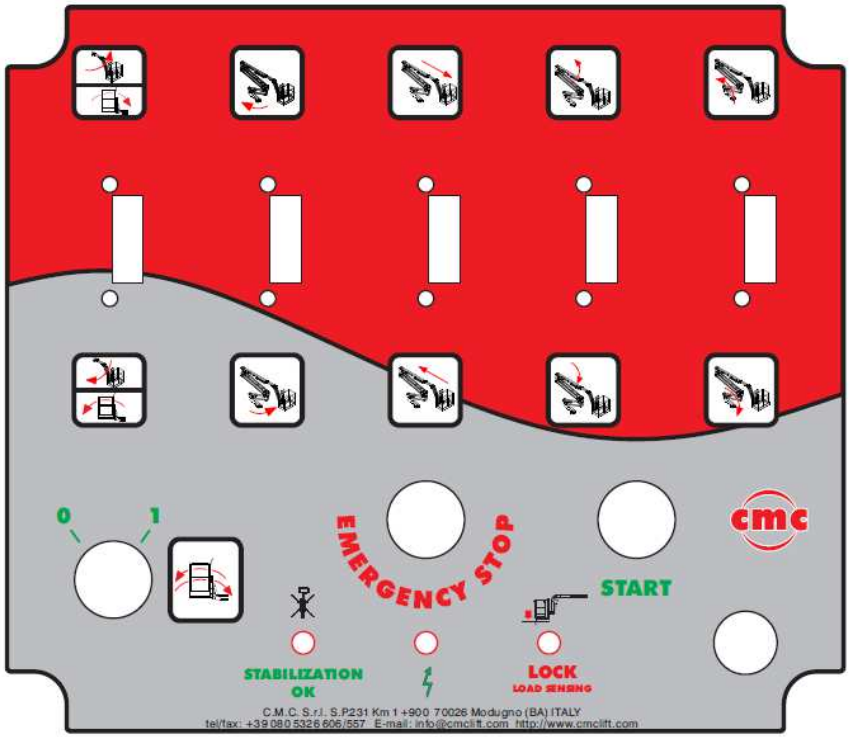
Picture 27: identification plate (example)



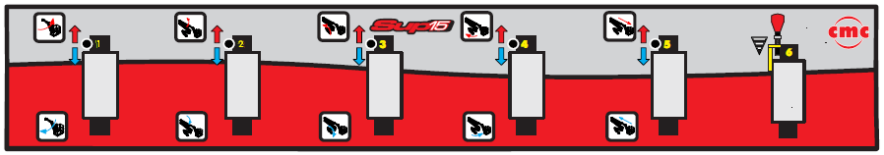
Picture 28: working diagram



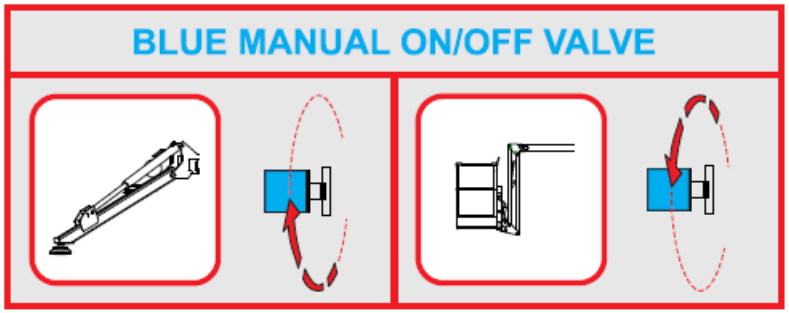
Picture 29: stabilizers controls



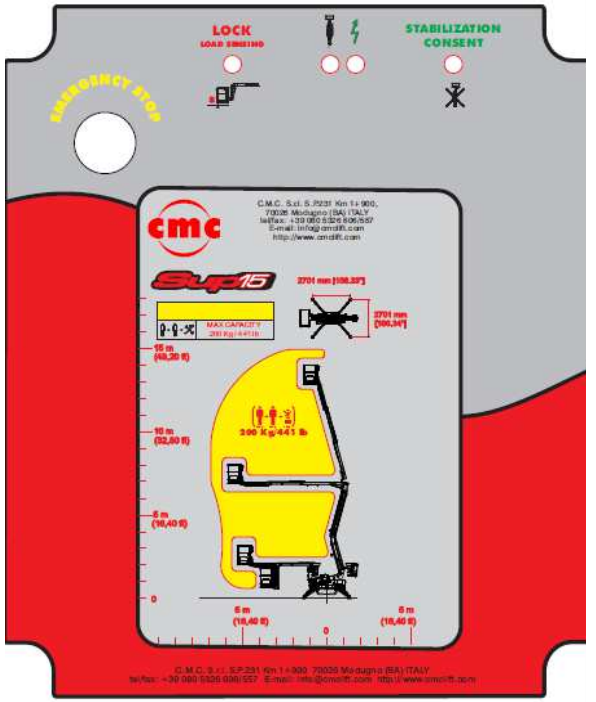
Picture 30: platform controls (basket work station)



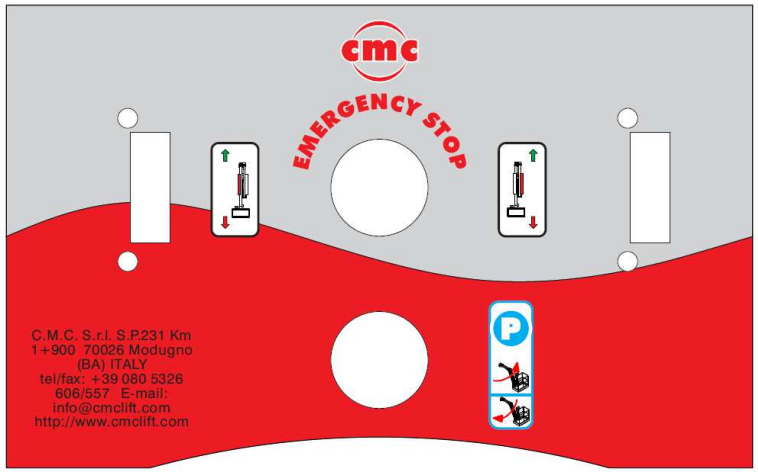
Picture 31: platform control (emergency position)



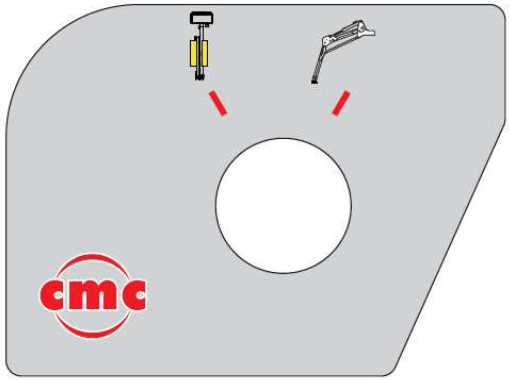
Picture 32: emergency turnout



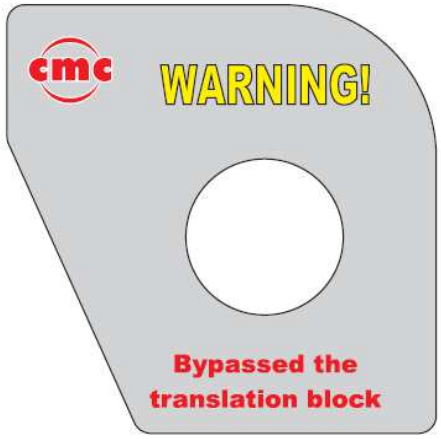
Picture 33: parking operations box



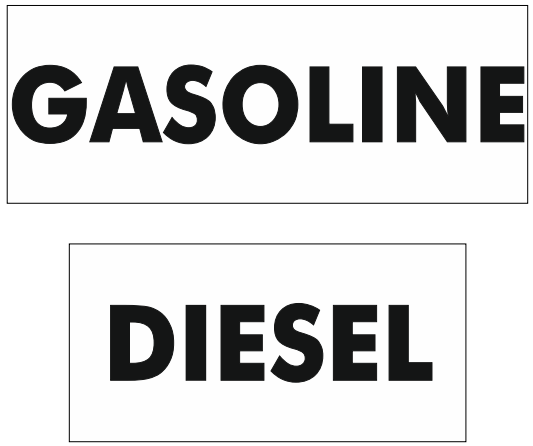
Picture 34: main box



Picture 35 – selector for translation/stabilization



Picture 36 – parking dead man button



Picture 37

Max Oil Level

Min Oil Level

Picture 38

DANGER!

High voltage!
Risk to life!

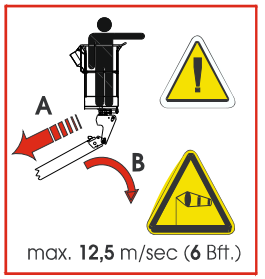
Platform and guard-rails are not **ELECTRICALLY INSULATED!**

APPROACH DISTANCES FOR UNQUALIFIED PERSONS - ALTERNATING CURRENT

Line Voltage	Required Clearance	
	ft/in	meters
0 to 50KV	10 ft	3.0 m
50 to 200KV	15 ft	4.6 m
200 to 350KV	20 ft	6.1 m
350 to 500KV	25 ft	7.6 m
500 to 750KV	35 ft	10.6 m
750 to 1000KV	45 ft	13.7 m

Add 4 inches (10 cm) for every 10KV over 50KV

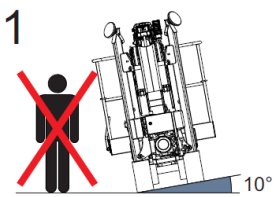
Picture 39



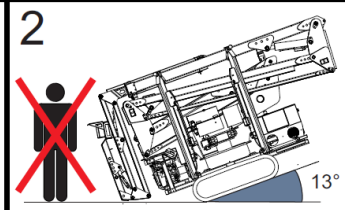
Over 27.97 mph **wind force (grade 6)** stop using the lifting machine immedi-ately!

Picture 40

WARNING!!



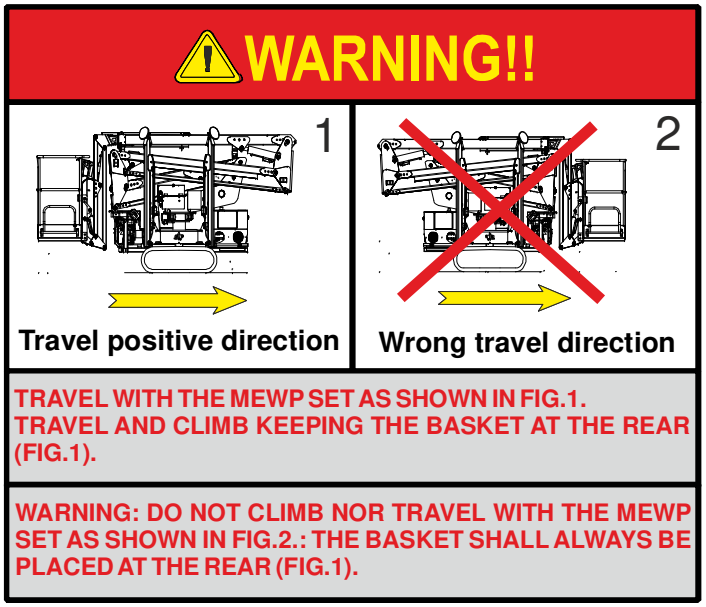
TRANSVERSAL MOVING ON SLOPE



MAX SLOPE ALLOWED SURMOUNTABLE IN TRANSLATION

IT IS MANDATORY TO CLIMB/GO DOWN WITH MAXIMUM VALUES SET IN FIG.1 AND FIG.2.
BEFORE TRAVELLING, MAKE SURE THE WAY IS CLEAR FROM SLOPES EXCEEDING THOSE INDICATED.
DURING TRAVEL OPERATIONS, THE OPERATOR SHALL ALWAYS KEEP AT LEAST 13,12 ft AWAY FROM THE MEWP.

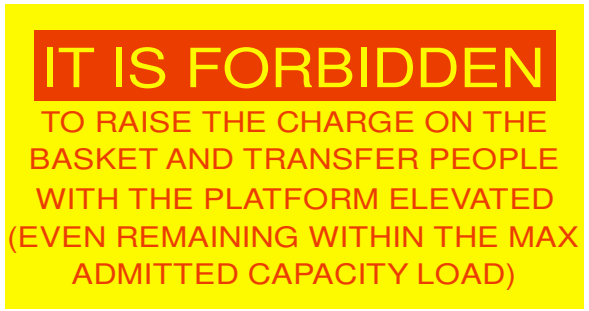
Picture 41



Picture 42: right translation direction

Picture 43: max capacity allowed in the basket

Picture 44: do not stay in the MEWP working area



Picture 45: do not overload or load when the machine is open

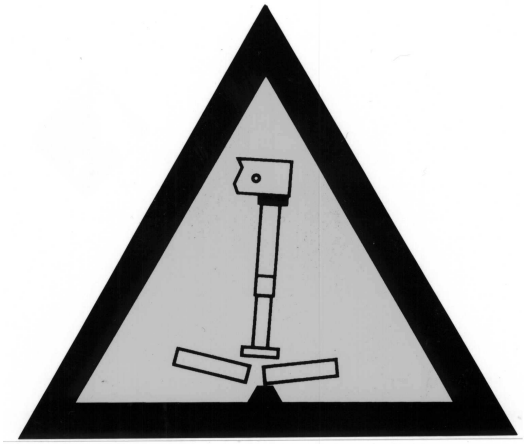
Picture 46: indicates the position of the emergency manual pump

Picture 47: level the frame

Picture 48: indicates the position of the safety belts fastening rings

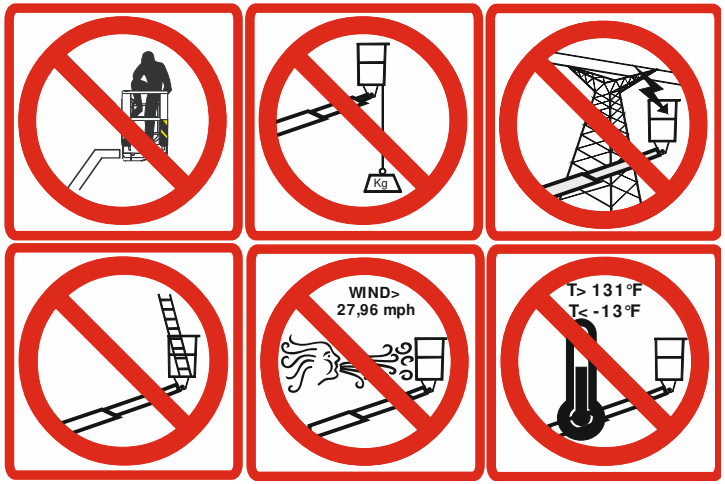
Picture 49: shearing and cutting hazard

Picture 50: shearing and cutting hazard



Picture 51: instability hazard in case of soft ground

Picture 52: warning signs on the machine



Picture 53: prohibition signs on the machine

Picture 54: max load and specific pressure on the stabilizers

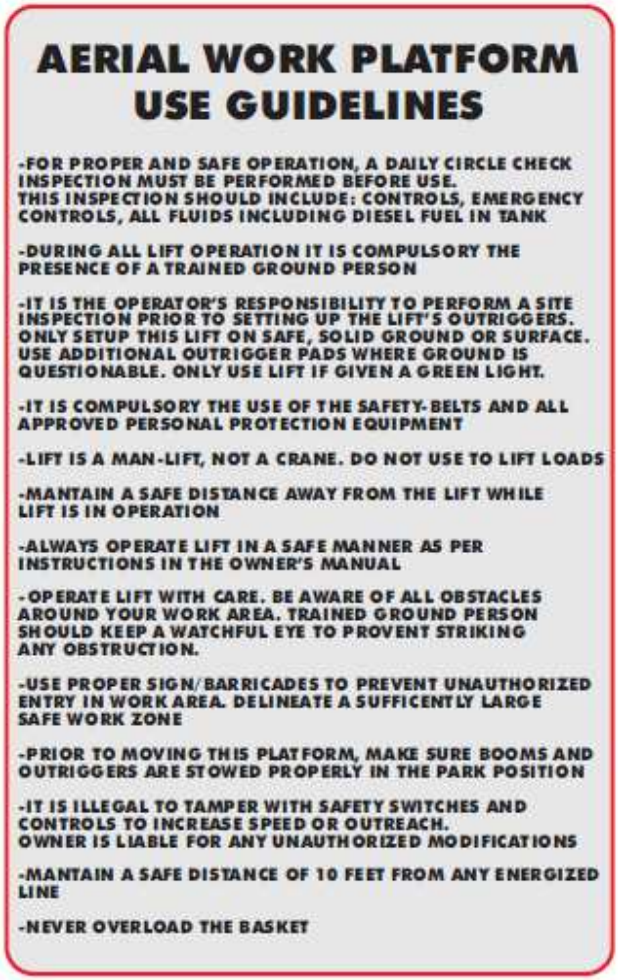


Figure 55 - aerial work platform use guidelines

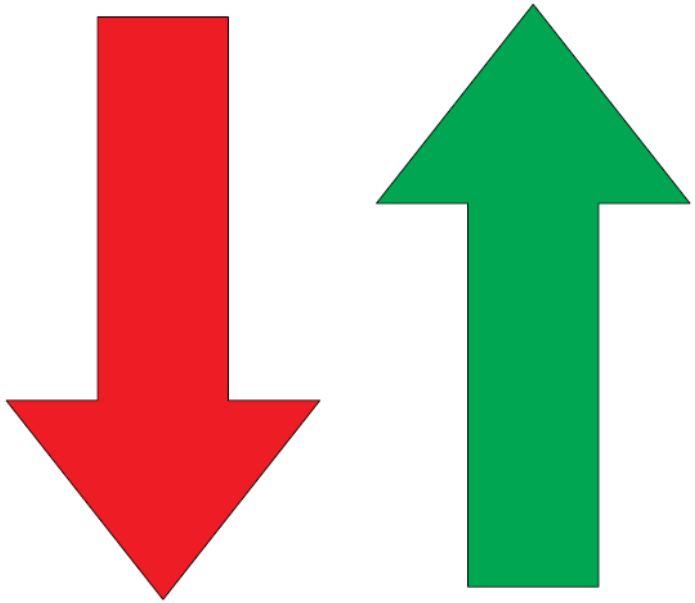


Figure 56 – adhesive arrows on frame

6 Electrical system

Electrical system is supplied in attachment to this manual.

MEWP is electrically fed, automatically, when the power take-off control is operated and the parking brake is engaged.
The platform's electric system is connected to the truck electrical system by means of a fuse (15 A – services).
Possible anomalies in the functioning of the truck electrical system affect the platform's functioning, thus impairing its normal performances.
Periodically check the efficiency of the electric plant: batteries, alternator, charge alternator regulator.

All operations requiring the intervention on the machine components are to be performed by authorized and trained technical staff.

Non-authorized staff shall not replace any of the components**. Many components have been calibrated: a correct calibration of these parts (possible only in CMC or in authorized workshops) is necessary to ensure the safety of the machine..**

7 Hydraulic system

The hydraulic plant of the machine is at the end of the use and maintenance manual.

 **All the operations requiring the intervention on the components of the machine, shall be carried out by authorized and trained technical staff.**

 Non-authorized staff shall not replace any of the components**. Many components have been calibrated: a correct calibration of these parts (possible only in CMC or in authorized workshops) is necessary to ensure the safety of the machine.**

8 Maintenance

Carefully read and scrupulously follow the following maintenance instructions and safety laws during the maintenance.

If an intervention that is different from the following ones is necessary, ask the Technical Assistance Service for authorization and instructions.

The operations indicated with **USER** are to be performed by the user.

The operations indicated with **CMC** shall be performed only by CMC or in its authorized workshops.
Use only CMC original spare parts (even if on the market there are equivalent or similar parts).
The frequency of the maintenances is indicated in the relevant table. By this frequency we mean a normal use of the equipment; while for particularly rough uses or in harmful environments (presence of dust, sand, etc.) an optional frequency is left to the good sense of the user.

A correct use of the platform and a regular maintenance are crucial to keep it always in the best working, efficiency and safety conditions. The frequent washing of the equipment by high-pressure water jet machines is absolutely crucial to get rid of the harmful remains coming from the works performed and from atmospheric agents.

8.1 ▶ Daily maintenance ◀

Every day, before starting the MEWP**, perform what follows**

Operations by USER	In case of negative result of the checks:	settlement by
Check the **level of the hydraulic oil** in the tank	Top up	USER
Check **the level of the gas-oil** in the tank	Top up	USER
Check **the level of the refrigerating liquid**	Top up	USER
Check the **batteries charge condition**	Charge or replace	USER
Check the **cleanliness of the floor**: oily or greasy residues could cause slipping;	Clean	USER
Check the wholeness of the instruction and warning **stickers**;	Replace and/or integrate	USER
Perform the following testing operations by using the (emergency) controls placed on the turret when no one is aboard: ☞ Lifting and lowering of the telescopic arm; ☞ Lifting and lowering of the jib; ☞ Clockwise and anticlockwise rotation of the turret; ☞ Extension and withdrawal of the telescopic arm; - **During the test operations, check that the basket floors keeps a horizontal position** - **Check the functioning of the stabilizers block valves**, keeping the arm lifted: ○ Extend the stabilizers and level the MEWP; ○ Push the "EMERGENCY" button to turn off the engine; ○ Operate the lever for the lifting and lowering of the stabilizers; **STABILIZERS SHALL NOT MOVE**	If the problem can be solved following the instructions given in the paragraph "Trouble shooting", perform the operations indicated in the said paragraph.  If the problem is not solvable following the instructions indicated in the paragraph "Trouble-shooting", it is strictly forbidden to use the MEWP. Contact the Servicing.	USER CMC

Operations by USER	In case of negative result of the checks:	settlement by
- **Check the functioning of the block valve of the arm extension cylinder**: o Extend the arm and set it vertically; o Push the "EMERGENCY" button to turn off the engine; o operate the lever for the telescopic arm extension and withdrawal; **THE ARM SHALL NOT WITHDRAW**	If the problem can be solved following the instructions given in the paragraph "Trouble shooting", perform the operations indicated in the said paragraph.	USER
- **Check the functioning of the block valve of the arm lifting cylinder**: - load the basket with 200 Kg (**only WEIGHTS**)  During check, it is strictly forbidden to load the MEWP placing people in the basket. o o Extend the telescopic arm; o Push the "EMERGENCY" button to turn off the engine; o Operate the levers for the lifting and lowering of the telescopic arm; **TELESCOPIC ARM SHALL NOT MOVE**	 If the problem is not solvable following the instructions indicated in the paragraph "Trouble-shooting", it is strictly forbidden to use the MEWP. Contact the Servicing.	CMC

Operations by USER	In case of negative result of the checks	settlement by
Check the **absence of splits**, **cracks**, **rust** on the structure of the MEWP	 It is strictly forbidden to use the MEWP. Contact the Servicing	CMC
Check that the safety devices (emergency buttons, inter-block system for stabilizers-arm) **work perfectly**	 It is strictly forbidden to use the MEWP. Contact the Servicing	CMC
Check that **the controls, the pilot lights, the emergency buttons work perfectly**	 It is strictly forbidden to use the MEWP. Contact the Servicing	CMC
Check the wholeness of the **cable chains**	 It is strictly forbidden to use the MEWP. Contact the Servicing	CMC
Check that the **blocking systems** (pins, locknut, etc.) are in perfect condition and efficient	 It is strictly forbidden to use the MEWP. Contact the Servicing	CMC

Operations by USER	In case of negative result of the checks:	settlement by
Check **the wholeness of the flexible pipes, of the pipe fitting and the components of the hydraulic circuit**: check that there are no oil leakage in hydraulic circuit	Replacement	USER/ CMC
Check that the **electrical contacts** are not slacken	Reset connections	USER/ CMC
Check that there are no **trace of clashes** on the equipment	 It is strictly forbidden to use the MEWP. Contact the Servicing	CMC

8.2 ▶ Weekly maintenance (or every 40 hours) ◀

Operations	by
Check the **absence of splits**, **cracks**, **rust** on the MEWP counterframe (use torches or lamps to inspect the internal part under the floor)	USER / CMC
Check the **cleanliness of the** chassis engine and auxiliary motor **air filter**	USER / CMC
Check the **cleanliness of the hydraulic filters**	USER / CMC
Check the right positioning and integrity of the stickers	USER / CMC
Check that there are no consumption signals and/or corrosion signal on the paint of the hydraulic couplings.	USER / CMC

8.3 ▶ Monthly maintenance (or every 120 hours) ◀

Operations	by
Greasing of pins and movable parts	USER / CMC
Washing of the equipment	USER / CMC
Check the **tightening of the bolts of the bearing, the geared motor and the frame**	USER / CMC

8.4 ▶ Quarterly maintenance (or every 300 hours) ◀ ◀

Operations	by
Check the **tightening of the bolts of the bearing, the geared motor and the frame**	USER / CMC

8.5 ▶ Maintenance after the first 400 hours ◀

Operations	by
Replacement of the **hydraulic filters**	USER / CMC
Registration of the movement of the arms	CMC

8.6 ▶ Six-monthly maintenance (or every 750 hours) ◀

Operations	by
Replacement of the **hydraulic filters** (25 micron)	USER / CMC
Complete check of the whole machine and note the results in the appropriate manual section	USER / CMC

8.7 ▶ Annual maintenance (or every 1500 hours) ◀

Operations	by
Replacement of the **hydraulic oil**	CMC

For the replacement of the hydraulic oil, follow these instructions:

1. Place the machine in transport position with the oil at working temperature; to do that operate some manoeuvre before going on with the above-described operations.
2. Suck in the oil from the tank;
3. Dismantle the hydraulic filter;
4. Replace the filter;
5. Fill the tank letting the oil pass through a filter with 25 micron filtration.

N.B.: The dipstick is placed inside the oil tank cap. The tank is placed on the back of the turret base. The hydraulic filters are placed on the sides of the stabilizers control station.

8.8 ▶ Biennial maintenance ◀

Operations	by
Complete check of the whole machine and note the results in the appropriate manual section	CMC

8.9 ▶ Five-yearly maintenance ◀

Operations	by
Complete check of the whole machine and note the results in the appropriate manual section	CMC

8.10 ▶ Safety rules during maintenance ◀

THE NON OBSERVANCE OF ONE OF THE FOLLOWING SAFETY RULES CAN SERIOUSLY HARM PEOPLE OR CAUSE SEVERE DAMAGES TO THINGS OR PARTS OF THE EQUIPMENT OR OF THE VEHICLE.

- ➔ To assure the safety of the machine the **use of original spare parts installed by CMC or by authorized repair shops** is compulsory: in fact some components can be calibrated only in CMC or in authorized workshops.
-  **It is forbidden to do maintenance operations when the MEWP is moving**: make sure that the parts to maintain are absolutely motionless and do these operations with the motor of the chassis stalled, taking the keys away from the panel;
- ➔Perform the maintenance operations in a sufficiently large space and suited to the sizes of the truck: Mark the area assigned for the maintenance operations by suited enclosure or by a red/white band ribbon and do not allow entrance to unauthorized staff.
- ➔ Do not modify or remove safety devices.
- ➔ Do not modify calibrated pieces
- ➔ During the washing operation, do not lead the water jet directly on the electrical panels of the MEWP and do not use cleansing, aggressive chemicals dangerous for the components of the MEWP (rubber parts, painted parts, etc.).
-  **It is forbidden to perform any intervention on parts of the MEWP, such as welding, piercing**, and so on, without prior written authorization by CMC.
- ➔ Wear appropriate accident-prevention clothes (clothes, gloves, goggles, etc).
- ➔ During maintenance operations, be careful not to damage the hydraulic circuit and avoid impurities to enter the circuit.
- ➔Before any maintenance operation that involves the disassembly of hydraulic circuit parts, make sure that the system is not under pressure. This, in order to avoid violent emissions of oil: moving all the truck motor stalled, no component shall move

8.11 ▶ GASOLINE engine ◀

Diesel engine HONDA GX390UT1, single cylinder, 4-stroke, overhead valve, gasoline engine.

Data	Value	Unit
Cylinder capacity	389 (23.7)	cm^3 (cu-in)
Highest performance at 3600 min-1	8.2 (11.1, 11.0)	KW (PS, bhp)
Fuel type	Gasoline fuel	//
Fill quantity approx. (fuel tank)	6.1 (1.61)	L (US gal)

8.12 ▶ Hydraulic system ◀

Data	Value	Unit
Platform functions	210 (3045)	Bar (psi)
Outrigger functions	190 (2755)	bar (psi)
Chain drive	220 (3190)	bar (psi)

8.13 ▶ Maintenance: consumables ◀

Gazpromneft Hydraulic	HDZ ISO	32	46
Density,15 °C, kg/l	ASTM D1298	0,867	0,872
Kinematic Viscosity, 40 °C, mm2/s	ASTM D445	32	46
Kinematic Viscosity, 100 °C, mm2/s	ASTM D445	6,32	8,03
Viscosity Index	ASTM D2270	151	154
Pour Point, °C	ASTM D97	-42	-42
Flash Point COC, °C	ASTM D92	204	216
Air release, 50 °C, min	ISO DIS 9120	5	6
Copper corrosion, 3 hrs, 100°C	ASTM D130	1a	1a
FZG, Damaged Load, A/8,3/90	DIN 51354	12	12

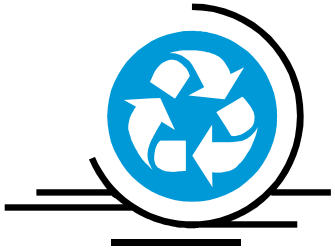
(hydraulic tank capacity 21 litres)

Grease: For arm extension and stabilizers

WHITE STAR NLGI 0 AND 2 for lubricators and bearing
MOLYTEX EP 2 for lubricators and bearing
GEARTEX EP-A 80W-90 for lubricators and bearing

Before oil replacement, place the oil drip tray in order to avoid the leakage of the oil in the environment.
Do not disperse the exhausted oil or other consumables in the environment, but put them in the specially provided containers and give them to the authorized collection centres.

8.14 ▶ Indications for the demolition of the MEWP ◀



Nota Ecologica

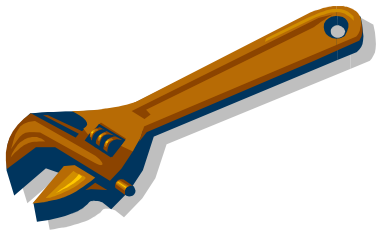
In case of demolition, the machine must be dismantled completely according to the laws in force.

The different types of materials must be destined to the respective authorized centres of collection.

The following material must undergo differentiated disposal therefore placed in suitable places and containers:

- Irony materials**: framing and mechanical components.**
- Plastic materials**: gaskets, straps, and protections.**
- Electrical materials**: windings, controls, solenoid valves and similar.**
- Oils and lubricants**: hydraulic oil, reducer lubricants, and lubricants greases.**

8.15 ▶ Servicing ◀



For repairs and service of your platform refer only to

Servicing
CMC s.r.l.
S.P. 231, km. 1+900
70026 Modugno (BA) - Italy
Phone. +39 080 5326606
Fax +39 080 5368541
info@cmclift.com
www.cmclift.com

PLEASE NOTICE

FOR ANY COMMUNICATION, PROVIDE WITH THE TYPE OF THE MACHINE AND ITS SERIAL NUMBER

All the interventions requiring interventions on the components of the machine, must be left to the authorized and trained staff

Non authorized staff is not allowed to replace the components. Many components have been calibrated: a correct calibration of these parts (which is possible only in CMC or in authorized repair shops) is necessary to assure the safety of the machine.

9 Troubleshooting

All the operations requiring interventions on the components of the machine, must be left to the authorized and trained staff.

Non authorized staff is not allowed to replace the components. Many components of the MEWP have been calibrated: a correct calibration of these parts (which is possible only in CMC or in authorized repair shops) is necessary to assure the safety of the machine.

Problem: STABILIZERS RED LIGHT DOES NOT TURN ON
Cause: 1. The MEWP aerial part is not in transport position.
2. The red light does not work.
3. One of the stabilizers micro-switches is not working.
Remedies: 1. Place the MEWP aerial part in the transport position.
2. Replace the light
3. Replace the MEWP supply DPDT relay (double pole double throw.
4. Replacement of micro-switches
If the problem persists, contact the servicing.

Problem: STABILIZERS DO NOT WORK.
Cause: 1. The hydraulic pump group is in failure.
2. Stabilizers electro valve does not work.
Remedies: 1. Replace hydraulic pump.
If the problem persists, contact the servicing.

Problem: WITH THE STABILIZED MEWP, THE GREEN LIGHT DOES NOT TURN ON.
Cause: 1. The green light does not work.
2. Micro-switch system does not work.
3. Stabilization is insufficient.

Remedies: 1. Replace micro-switch
2. Further extract stabilizers
If the problem persists, contact the servicing.

Problem: MEWP AERIAL STRUCTURE DOES NOT WORK WHEN THE STABILIZERS CONTROL GREEN LIGHT IS ON.
Cause: 1. The hydraulic pump group is in failure..
2. Emergency button on.
Remedies: 1. Replace the hydraulic pump.
2. Turn the emergency button and reset the MEWP

If the problem persists, contact the servicing
.

Problem: PLATFORM LEVELLING DOES NOT WORK.
Cause: 1. Oil leakage.
2. Cylinders gaskets wear
Remedies: 1. Tighten hydraulic connections.
2. Replace gaskets.
If the problem persists, contact the servicing

Problem: OPERATIONS ARE SLOW.
Cause: 1. Pump in failure.
2. Insufficient hydraulic oil.
3. Blocked oil filter.
Remedies: 1. Replace hydraulic pump.
1. Hydraulic oil top up.
2. Filter replacement.
If the problem persists, contact the servicing

Problem: MOTOR START NOT WORKING.
Cause: 1. Emergency button inserted;
2. Discharged battery.
Remedies: 1. Disconnect emergency;
2. Replace battery.
If the problem persists, contact the servicing

10 Control register

This register to note down the following events relevant to the machine life:

- Following ownership transfers (par. 10.2)
- Mechanisms replacements(par. 10.3)
- Replacement of structural elements (par. 10.4)
- Replacement of hydraulic components (par. 10.5)
- Replacement of electrical components (par. 10.6)
- Replacement of safety devices (par. 10.7)
- Considerable failures and relevant repairs (par. 10.8)
- Periodical checks and maintenance journal (par. 10.9)
- Notes (par. 10.10)

10.1 Delivery of the MEWP to the first owner

The aerial work platform
brand **CMC** model **S15**
serial number **S13A1037**
manufacture year **2013**

ha sbeen delevered by CMC s.r.l.

to the firm

_____

_____

according to the contractual conditions
established with the technical, dimensional and
functional features indicated in the use manual

date **02/07/13**

CMC s.r.l.

_____

10.2 Following ownership transfers

On the ……............... the ownership of the MEWP in subject is transferred

to the firm/company ………………………………………………………………

It is certified that, on the above date, the functional, dimensional and technical features of the MEWP in subject are in keeping with those foreseen at the beginning and that further changes have been written on this register.

The seller The buyer

On the ……............... the ownership of the MEWP in subject is transferred

to the firm/company ………………………………………………………………

It is certified that, on the above date, the functional, dimensional and technical features of the MEWP in subject are in keeping with those foreseen at the beginning and that further changes have been written on this register.

The seller The buyer

On the ……............... the ownership of the MEWP in subject is transferred

to the firm/company ………………………………………………………………

It is certified that, on the above date, the functional, dimensional and technical features of the MEWP in subject are in keeping with those foreseen at the beginning and that further changes have been written on this register.

The seller The buyer

On the ……............... the ownership of the MEWP in subject is transferred

to the firm/company ………………………………………………………………

It is certified that, on the above date, the functional, dimensional and technical features of the MEWP in subject are in keeping with those foreseen at the beginning and that further changes have been written on this register.

The seller The buyer

10.3 ▶ Mechanisms replacement ◀

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

10.4 ▶ Replacement of structural elements ◀

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date…….

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date…….

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date…….

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date…….

Stamp and signature of the responsible
for the firm in charge The user

10.5 ▶ Replacement of hydraulic components ◀

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

10.6 ▶ Replacement of electrical components ◀

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date……

Stamp and signature of the responsible
for the firm in charge The user

10.7 ▶ Replacement of safety devices ◀

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date…….

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date…….

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date…….

Stamp and signature of the responsible
for the firm in charge The user

Description of the component.....

Manufacturer.....

Provided by.....

Cause of the replacement.....

……

Place……. Date…….

Stamp and signature of the responsible
for the firm in charge The user

10.8 ▶ Considerable failures and relevant repairs ◀

Description of the failure.....

.....

.....

Cause.....

.....

.....

Repairs performed .....

.....

.....

Place..... Date.....

Stamp and signature of the responsible

for the firm in charge The user

Description of the failure.....

.....

.....

Cause.....

.....

.....

Repairs performed .....

.....

.....

Place..... Date.....

Stamp and signature of the responsible

for the firm in charge The user

10.9 ▶ Periodical checks and maintenance journal ◀

➔ **The user shall observe the maintenance and control program described in this manual.**

DATE	DESCRIPTION OF THE INTERVENTION	SIGNATURE

DATE	DESCRIPTION OF THE INTERVENTION	SIGNATURE

DATE	DESCRIPTION OF THE INTERVENTION	SIGNATURE

DATE	DESCRIPTION OF THE INTERVENTION	SIGNATURE

10.10 ▶ Notes ◀

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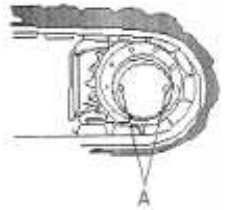
10.11 ▶ Maintenance of tracked undercarriages ◀

5.1 Correct inspection and maintenance procedures

- Learn how to perform correct maintenance on the tracked undercarriage and how to perform the inspection procedures described in this manual.
- Always perform maintenance on a solid and level surface.
- Never grease or lubricate or perform maintenance on the machine while it is in motion.
- Solidly support the undercarriage if it needs to be lifted up for maintenance.
- Use great care when maintaining the hydraulic system since oil is very hot when the machine has just finished working.
- Circuits are under high pressures not only when working but also when work is
  - Keep all components properly installed and in good condition.
- Immediately repair all damage and replace worn or broken parts.
- Remove any build-ups of grease, oil or debris.
- Check for oil leaks and/or damaged hydraulic hoses.
- Use recommended lubricants. Do not mix different brands of lubricants.
- Use only original **Hinowa** spare parts.
- Keep undercarriage widening cylinder and track-stretcher grease nipples clean.
- Intervals for periodic maintenance are indicated for normal work conditions. If the tracked undercarriage is used in severe work conditions then maintenance must be performed at shorter intervals.
- Dispose of lubricants in an ecologically safe way. Thoughtless disposal of lubricants can damage the environment. Become familiar with local anti-pollution laws and regulations before disposing of lubricants.
- Use suitable containers when draining lubricants. Do not use beverage or food containers that might tempt someone to drink from them. Never pour lubricants on the ground or in a canal, pond or watercourse. Comply with current environmental protection regulations when disposing of lubricants.

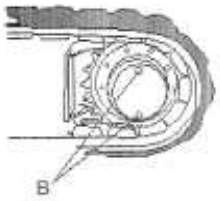
5.2 Maintenance of drive geared motors

5.2.1 Checking the oil level in the reduction unit



Every 100 hours check the oil level in the reduction unit gearbox. Usually on the external side of the reduction gear drive there are two plugs: A1 and B or A2 and B, depending on the type of reduction gear drive, as indicated in the picture. Stop the reduction gear drive when the plug B is in the upper position. Remove the plugs A1 or A2 and check that the oil level is aligned with them. If this was not the case, re-fill from B using A1 and A2 as a level check.

5.2.2 Replacement of oil in the reduction unit



Replace the oil after the first 100 operating hours and then at subsequent 1000 hour intervals. Proceed as follows to perform the replacement:
- stop the reduction gear drive when the B plug is in the lower position, as indicated in the picture;
- remove both plugs, A1 and B or A2 and B and let the oil come out completely;
- then put the reduction gear drive as indicated in 5.2.1 and fill using the B plug and A1 or A2 as a level check

IMPORTANT Avoid using oils with different characteristics and brands.

5.2.3 Choice of type of reduction unit oil

We recommend, for reduction units, using gear oils with E.P. additives and viscosity class according to ISO VG 150 or SAE 80W/90.
When temperature variation ranges are very high we recommend using synthetic oils with E.P. properties and minimum 165 viscosity index and viscosity class VG 150 and VG 220.

	VG100	VG150	VG320	VG150-200
ISO 3448	-20°C +5°C IV 95min	+5°C +40°C IV 95min	+30°C +50°C IV 95min	-30°C +65°C IV 165min

In all cases select oils that are not subject to rapid aging at their operating temperatures. Continuous duty temperature must not exceed 90°C.

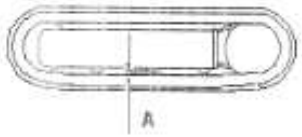
5.2.4 Hydraulic circuit oil

Use mineral oil with anti-wear additives such as HLP (DIN 51524) or HM (ISO 6743/4) and viscosity according to ISO VG46. Recommended filtration must be 10 m absolute or b10Ú75.

5.3 Rubber track maintenance

5.3.1 Checking track tension

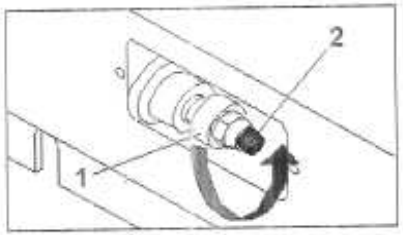
Stop your machine on a flat and solid surface. Lift it in safe conditions and put stable supports under the undercarriage frame to properly support it. Measure distance A at the central roller of the undercarriage from the bottom of the roller to the rigid inside surface of the rubber track. Track tension is normal if dimension A is between 10 and 15 mm.
Adjust tension as described in the following paragraph if track tension does not comply with these dimensions (loose or too tight).



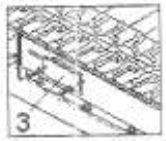
THE CONTROL OF THE CORRECT TENSIONING OF THE TRACKS HAS TO BE MADE EVERY 8 HOURS DURING THE PERIOD OF USE OF THE MACHINE UNTIL THE FIRST ROUTINE MAINTENANCE.
AFTERWARDS, THE TENSIONING OF THE TRACK HAS TO BE MADE DURING EVERY ROUTINE MAINTENANCE OF THE MACHINE.

5.3.2 Track loosening/tightening procedures

1. Remove the screws and take off cover 3 to access the adjustment system.
2. To loosen the track turn valve 1 counter-clockwise no more than 1 turn. One turn of valve 1 is sufficient for loosening the track.
3. If grease does not start to drain out then slowly rotate the track.
4. When you have obtained correct track tension then turn valve 1 clockwise and tighten it. Clean all traces of extruded grease.
5. To stretch the track connect a grease gun to grease nipple 2 and add grease until track tension falls within specified values.



DANGER



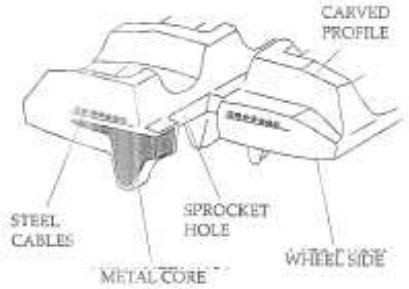
The grease contained in the hydraulic track is pressurized. Never loosen grease valve 1 for more than one turn. If the valve is loosened too much you risk expelling grease under pressure and possible serious injury to the machine operator. Also never loosen grease nipple 2.
Remove gravel or mud when they are jammed between the sprocket and the track link before loosening the track.

DANGER

It is not normal for the track to remain too tight after turning valve 1 counter-clockwise or for it to remain loose after introducing grease into grease nipple 2. Never try to remove the tracks or disassemble the track-stretching cylinder since pressure of the grease inside the track tension cylinder is extremely dangerous.

5.3.3 Checking the rubber tracks

Fig. A



The structure of the rubber track is shown in fig. A. The steel cables and metal core are embedded in the rubber. The carved profiles function to give stability on soft terrain. They are made on the bottom part that rests on the ground. The wheel guides, located on the inside of the track, prevent the track from sliding off the guide rollers.

Causes of damage

A) Breakage of steel cables

Excess track tension can cause steel cables to break in the following conditions:
- when stones or foreign matter accumulate between the track and the undercarriage frame;
- when the track slips off its guide system;
- in case of great friction such as rapid changes in direction.

B) Wear and breakage of metal cores

Excess track tension can cause the metal cores to bend or break just like the steel cables as stated above. Other causes include:
- improper contact between track and sprocket;
- rotation of internal rollers;
- operation on sandy terrain.

C) Detachment of metal cores

The metal core functions as an adhesive for the rubber, especially between the core itself and the steel cables. Detachment can be caused by excess track tension or by cable breakage for the following reasons:
- metal cores have been rolled by a worn sprocket as indicated in the figure. When this type of wear or abrasion is encountered the sprocket must be replaced as soon as possible.

Rubber abrasion resulting on surfaces where guide rollers work incorrectly is illustrated in photo 9 (see appendix 2).
This type of breakage, like that indicated in paragraphs A-B-C, leads to total functional inefficiency and the track must be replaced.

D) Fatigue cracks and abrasion

1. Cracks at the base of the carved profiles are caused by fatigue due to rubber bending caused by the sprocket or the track-stretching wheel as indicated in photo 4 (see appendix).

2. Cracks and bends on the edge of the rubber are caused by maneuvering the track on concrete edges and curbs.

3. Cracks and abrasions in the rubber on the guide roller paths are caused by compression fatigue of the rubber due to the weight of the wheel combined with operation on sandy terrain or repeated sudden changes in direction. These are illustrated in photos 6-8-9 (see appendix).

4. Abrasion of the carved profile may be caused, in particular, by rotation on concrete or gravel surfaces or hard surfaces (see photo 7 in the appendix 2).

Damage as indicated in paragraph D, points 1, 2 and 3, is not fatal for the track and the track can continue to work even in the presence of gradual and progressive damage.
Continuation of the damage indicated at point 3 leads to exposure of the metal cores. If this exposure extends for more than half of the circumference of the track then it is time to replace the track, even though it can still be used.

E) Cracks caused by external factors

Cracks on the outside surface of the track (the surface in contact with the terrain) are often due to contact with gravel, sharp stones, sharp materials such as sheet metal, nails, glass. These cause cuts as illustrated in photo 10 (see appendix 2). This type of damage is inevitable given the very nature of rubber itself, although the entity depends on how the track is used.
Cracks on the inside surface of the circumference and on the edge of the rubber are caused by contact between track and the undercarriage structure or with sharp concrete edges. These are indicated in photos 12 and 13 (see appendix).
Even though it does not look very good the track can still be subjected to severe working conditions.

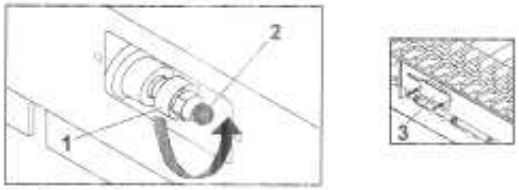
5.3.4 Replacement of rubber tracks

The grease contained in the hydraulic cylinder is under pressure. Never loosen grease valve 1 for more than 1 turn. If the valve is loosened too much then pressurized grease may exit and cause severe injury to the machine operator. Never loosen grease nipple 2.
Remove gravel or mud when they are jammed between the sprocket and the track link before loosening the track.

⚠ DANGER

Removing the rubber track

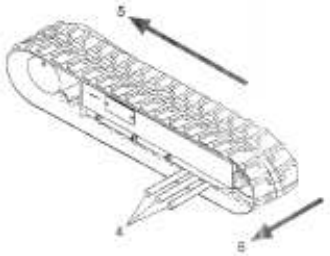
1. Stop your machine on a solid and level surface. Lift it up and support it in safe conditions as described in paragraph 5.3.1.



2. Remove the screws and take off cover 3 that gives access to the adjustment system.

3. To loosen a track slowly unscrew valve 1 counter-clockwise for no more than 1 turn. One turn of valve 1 is sufficient for loosening the track.

4. If grease does not start to drain out then slowly rotate the track.



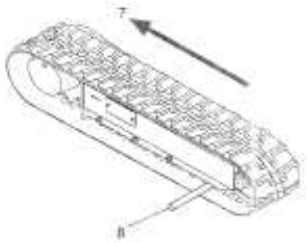
5. Insert 3 steel tubes (4) inside the track in the space between the rollers. Rotate the driving gear in reverse (5) so that the steel tubes proceed with the track and are between the track tension wheel and the track tensioner. Exercise force (6) sideways to slide the track and and release it from the track-stretching wheel.

Installing the rubber track

⚠ DANGER

1. Make sure that you are always in safe conditions with the machine lifted so to perform the operation for track installing.

2. Check that the grease contained in the hydraulic cylinder has been removed.



3. Mesh the track links in the sprocket and place the other end of the track on the track-stretching wheel.

4. Rotate the driving gear in reverse (7) and pull the track soles inside the frame (8)

5. Position the track using a steel tube and turn the driving gear again.

6. Make sure track links mesh correctly in the sprocket and in the track-stretching wheel.

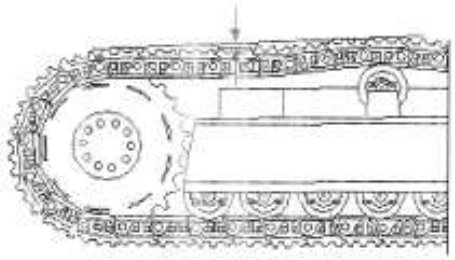
7. Adjust track tension (see paragraph 5.3.2 - Track loosening procedures).

8. Set the tracked undercarriage on the ground.

5.4 Steel track maintenance

5.4.1 Checking track tension

Stop your machine on solid and level terrain. Check that there is a 15÷20 mm deflection on the top part of the track in the longest section of unsupported track.

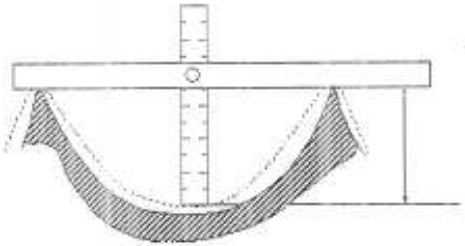


If track tension is not within the above-specified dimensions then follow the procedures described in paragraph 5.3.2 to tighten or loosen tension.

5.4.2 Checking pin and bush wear

This type of wear can prevail compared to wear of other chain parts when work is done on terrain that is too abrasive. Replace these units when the length of 4 chain links exceeds the nominal value by more than 2%. Check the number on the track's reference reported in the order confirmation of your undercarriage.

5.5 Checking sprocket wear



Measuring wear on sprocket and driving gear teeth is one of the most difficult measurements to be done.
In normal operating conditions, in fact, wear takes place so that no trace of preexisting tooth remains to furnish a clear reference for determining tooth wear. As a consequence precise data cannot be furnished and it is always necessary, to make any type of judgement, to refer to a new sprocket or wheel of the same type. As a general rule a sprocket should be replaced when wear reaches the illustrated limits. Since wear is never uniform you must always consider the point where wear is greatest.
Calculate, in order to determine the maximum admissible wear for each sprocket or driving gear, that this maximum wear must not exceed 3% of the pitch of the chain that meshes with the gear itself.

5.6 Checking bolt tightness

Check the tightness of bolts and components which may become loose depending on the tracked undercarriage's type of use.
Pay particular attention to frame components such as track-stretching wheels, drive geared motors, driving gears and guide rollers. Make sure these are adequately tightened according to the following table.

Threading diameter mm.	Pitch mm.	kgm
6	1	1,3 ± 0,15
8	1,25	3,2 ± 0,3
10	1,5	6,5 ± 0,6
12	1,75	11 ± 1
14	2	17,5 ± 2
16	2	27 ± 3
18	2,5	37 ± 4
20	2,5	53 ± 6
22	2,5	73 ± 8
24	3	92 ± 10
27	3	135 ± 15
30	3,5	184 ± 20

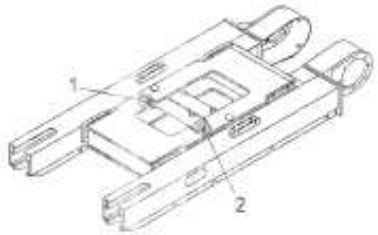
5.7 Grease points (only for tracked undercarriages with hydraulic widening only)

Perform this maintenance procedure every 100 work hours, using lithium grease with EP2 consistency.

- Clean grease nipples before connecting them to the grease gun.
- Clean all grease that exits out after greasing.
- Lubrication should be at more frequent intervals if the tracked undercarriage is used in particularly severe operating conditions.

IMPORTANT

The grease points for the tracked undercarriage widening cylinder pins are illustrated below.



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