PIATTAFORME AEREE SEMOVENTI
SELF-PROPELLED WORK-PLATFORMS
PLATES-FORMES DE TRAVAIL AUTOMOTRICES
SELBSTFAHRENDE HUBARBEITSBÜHNEN
PLATAFORMAS ELEVADORAS AUTOPROPULSADAS
ZELFRIJDENDE HOOGWERKERS
SJÄLVGÅENDE ARBETSPLATTFORMAR
SAMOKRETNE RADNE PLATFORME

"SG" SERIES

SG1850-J SG2100-J

USE AND MAINTENANCE MANUAL
- ENGLISH -

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Tigieffe thanks you for purchasing a product of its range, and invites you to read this manual. Here you can find all the necessary information for a correct use of the purchased machine; therefore, you are advised to follow the instructions carefully and to read the manual thoroughly. The manual should be kept in a suitable place where no damage can occur to it. The content of this manual may be modified without prior notice and further obligations in order to add changes and improvements to the units already delivered. No reproduction or translation may take place without the written permission of the owner.

Contents:

Annexes: hydraulic and electric circuit diagrams
conformity declaration
spare parts manual

1. INTRODUCTION

This Use and Maintenance Manual provides general instructions concerning the complete range of units indicated on the cover. Therefore the description of their components, as well as control and safety systems, may include parts not present on your unit since supplied on request or not available. In order to keep pace with the technical development *AIRO-Tigieffe s.r.l.* reserves the right to modify the product and/or the use and maintenance manual at any time without updating the units already delivered.

Legal aspects

Delivery of the unit

Within EU (European Union) member countries the machine is delivered complete with:
- Use and Maintenance manual in your language;
- CE mark applied on the unit;
- CE conformity declaration.

It is to be noted that the Use and Maintenance Manual is an integral part of the machine and a copy of this, together with copies of the documents certifying that the periodical checks have been carried out, must be kept on board in its suitable container. In the event of a transfer of property the machine must always be provided with its use and maintenance manual.

Declaration of commissioning, periodical checks and transfers of ownership

The legal obligations of the owner of the machine vary according to the country of commissioning. It is therefore recommended to inquiry about the procedures in force in your country from the boards responsible for industrial safety. This manual contains a final section called "Check register" for a better filing of documents and recording of any modifications.

Declaration of commissioning

In ITALY the owner of the Aerial Platform must notify the use of the unit to the local competent ISPESL (National Institute for the prevention of accidents at the workplace). To declare the commissioning of the unit in Italy, use the form that is supplied together with other documents upon machine delivery.
ISPESL issues a "Control booklet" indicating only the detectable data of the machine already in use or inferable from the relative User Manual. Afterwards ISPESL sends a copy of the same booklet to the territorial inspection boards (ASL/USL or ARPA) which carry out the periodical mandatory checks (every year).

Periodical checks

The annual checks are compulsory and must be carried out also when the "Check booklet" is not available. In Italy the owner of the Aerial Platform must apply for a periodical check by sending a registered letter to the local competent inspection board (ASL/USL or ARPA) at least twenty days before the expiry of the year from the purchase date or the last periodical check.

Transfers of Ownership

In case of transfer of ownership (in Italy) the new owner of the Aerial Platform must notify the ownership of the unit to the local competent inspection board (ASL/USL or ARPA) by enclosing a copy of:
- conformity declaration issued by the manufacturer;
- declaration of commissioning carried out by the first owner.

Intended use

The machine described in this use and maintenance manual is a self-propelled aerial platform intended for lifting persons and materials (equipment and building materials) in order to carry out maintenance, installation, cleaning, painting, de-painting, sand-blasting, welding operations, etc.
The max. capacity allowed (which varies according to the model – see paragraph “Technical features”) is divided as follows:
- 80 Kg for each person on board;
- 40 Kg for equipment;
- any remaining load is represented by the material being worked.

In any case NEVER exceed the maximum capacity allowed as indicated in paragraph "Technical features”.
All loads must be positioned inside the basket. Do not lift loads (even if complying with the maximum capacity allowed) hanging from the platform or lifting structure.
Do not carry large-sized panels since they increase the resistance to wind force thus causing the machine to overturn.
While de-placing the unit with lifted platform do not load horizontal loads onto the platform (the operators on board must not pull ropes, wires, etc.).
A load limiter interrupts the operation of the unit if the load on the platform exceeds by 30% the rated load (see chapter "General use instructions”).
The unit cannot be used in areas where road vehicles operate. Always surround the working area by means of suitable signs when the unit is used in public areas.
Do not use the machine to tow trucks or other vehicles.

Description of the unit

The machine described in this use and maintenance manual is a self-propelled aerial platform equipped with:
- motorized chassis equipped with wheels;
- hydraulically driven rotating turret;
- articulated boom operated by hydraulic cylinders (the number of articulations and cylinders varies according to machine model);
- operator platform (the max. capacity varies according to the model - see chapter "Technical features”).

The chassis is motorized to allow the machine to move even when the platform is lifted (see “General use instructions”).
The machines can be delivered with the following drive and steering features:
- two steering and driving wheels and two fixed idle wheels;
- two steering and driving wheels and two steering idle wheels;
- four driving wheels, of which two steering and two fixed;
- four steering and driving wheels.

In addition, to all the a.m. combinations, it is possible to fit a self-locking oscillating axle.
All driving wheels are equipped with hydraulic parking brakes, positive logic type (when drive controls are released brakes are automatically activated).
The turret rests on a turntable fixed to the chassis and can be oriented (rotated) by 360° continuously around the central axle of the machine by means of geared motor with built-in hydraulic brake.
The lifting system, with articulated boom, can be divided into three main structures:
- the first, with vertical extension, consists of a “double parallelogram” system named “scissors”;
- the second, consists of a lifting boom with telescopic extension;
- the third, consists of the terminal boom named “Jib”.

Such lifting structures are driven by 4 double-acting hydraulic cylinders:

- one cylinder for the “scissors” extension;
- one cylinder for the boom extension;
- one cylinder for the extension/retraction of the telescopic boom (for SG2100-J two systems of chains for extraction and retraction of the last extractable arm are also supplied)
- one cylinder for the “jib” extension.

The hydraulic cylinders which move the articulated structure (except for the boom inclination sensor cylinder) are provided with over-centre valves directly flanged on the same. These devices allow the booms to remain in position even if one of the supply tubes accidentally breaks.

The platform, hinged to the end of the “jib”, can be rotated by 180° totally (90° on the right and 90° on the left) by means of a rotary actuator fitted with over-center valve. It is fitted with guardrails and toe boards of prescribed height (the guardrails height ≥ 1100 mm; the toe boards height ≥150 mm). The platform levelling is automatic and is ensured by mechanical ties and two cylinders in closed circuit. The manual level compensation is possible by acting on the relevant control only with completely lowered booms (and with “Jib” inclination with respect to the horizontal axle ranging between +10° and –70°).

Control stations

The machine is equipped with two control stations:

- at platform for normal use of the unit;
- at turret (or at ground) for emergency controls to lower or stop the unit in emergency situations. The ground control station is also equipped with a key-selector to select the control station and to start the unit.

Power supply

The machines can be powered by:

- an electric-hydraulic system composed of rechargeable accumulators and electric pump (models –E);
- a heat engine (Diesel engine models are identified by the abbreviation “-D”; petrol engine models are identified by the abbreviation “-B”)
- a bi-fuel (electric/thermic) system (bi-fuel Electric/Diesel models are identified by the abbreviation “E/D”; bi-fuel Electric/Petrol models are identified by the abbreviation “E/B”).

In any case both the hydraulic and the electric systems are equipped with all necessary protections (see electric and hydraulic circuit diagrams annexed to this manual).

Do not use the machine for purposes different from those it was intended for.
If disposal of the unit is necessary, comply with current local regulations.

Identification

In order to identify the machine, when spare parts and service are required, always mention the information given in the serial number plate. Should this plate (as well as the various stickers applied on the unit) be lost or illegible, it is to be replaced as soon as possible. In order to identify the machine when no plate is available the serial number is also stamped on the chassis. To locate the plate and the stamp of the serial number, see the following picture. It is recommended to copy such data in the following boxes.

Model.....……..	Chassis:.....……..	Year:.....……..

SGXX.XX.XXX

Fig.1

Location of main components

Below is a diagram showing the machine and its components.

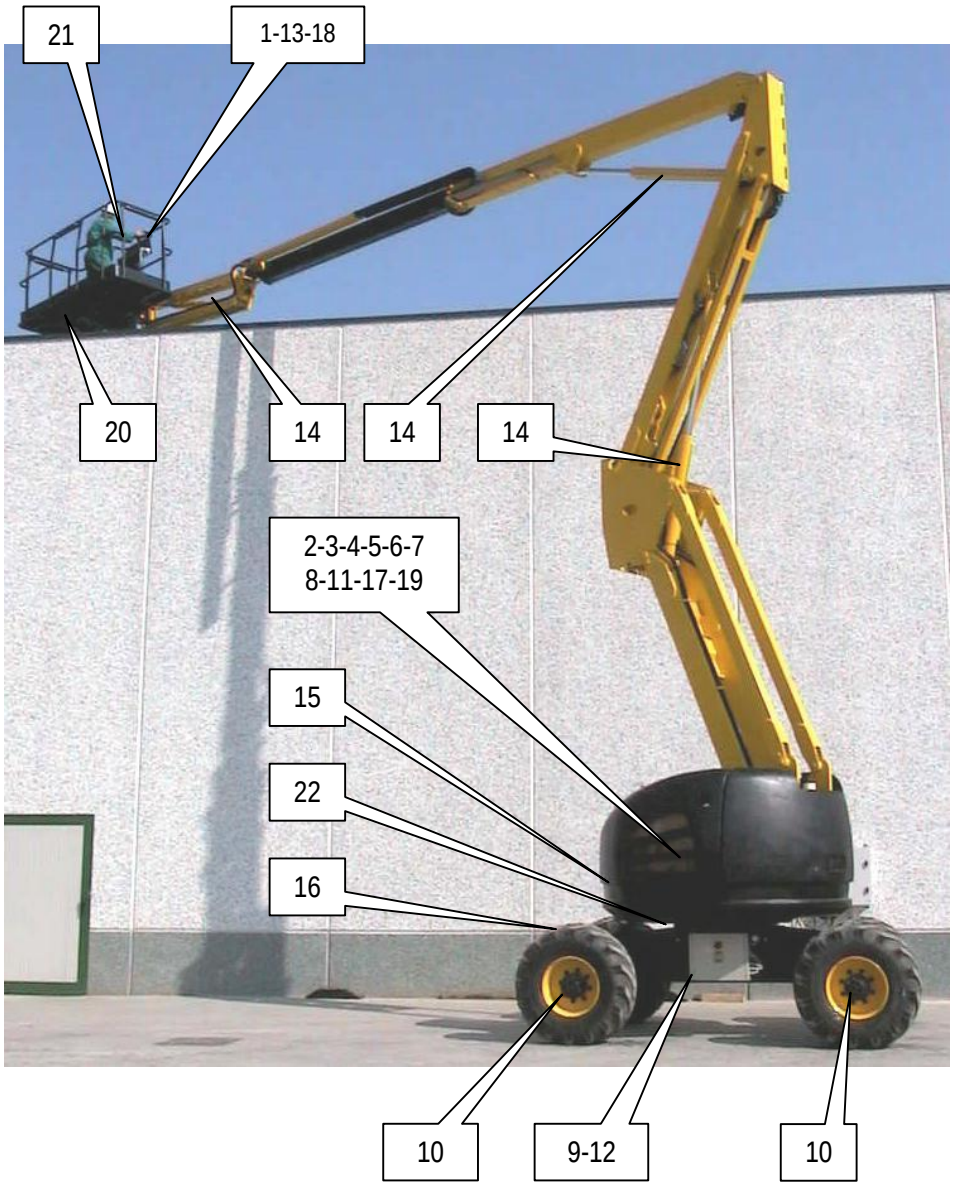


Fig.2

1) Control panel;
2) Electric control unit;
3) Hydraulic oil tank;
4) Diesel tank (models – D; -E/D);
5) Diesel motor (models – D; -E/D);
6) Drive pump;
7) Movement pump;
8) 12V emergency electric pump (only models – D);
9) 380V three-phase electric pump (optional)
10) Hydraulic drive motors;
11) Turret rotation geared motor;
12) 220V socket;
13) Bubble level for visual check of machine levelling;
14) Lifting cylinders;
15) Battery;
16) Power steering;
17) Base inclinometer;
18) Basket inclinometer;
19) Heat engine fuel tank;
20) Limiting sensors of platform load;
21) Control board of platform load;
22) Turntable.

2. TECHNICAL FEATURES OF STANDARD MACHINES

Description	SG1850-J				SG2100-J			
	D-4WD-2WS (DIESEL)	D-4WD-4WS (DIESEL)	E-4WD-2WS (ELECTRIC)	E-4WD-4WS (ELECTRIC)	D-4WD-2WS (DIESEL)	D-4WD-4WS (DIESEL)	E-4WD-2WS (ELECTRIC)	E-4WD-4WS (ELECTRIC)
Max. working height - m -	20.55	20.55	20.55	20.55	23.1	23.1	23.1	23.1
Max. walking surface height - m -	18.55	18.55	18.55	18.55	21.1	21.1	21.1	21.1
Max. outreach from turntable centre - m -	11.3	11.3	11.3	11.3	13.9	13.9	13.9	13.9
Turret rotation (continuous) - degrees -	360	360	360	360	360	360	360	360
Platform rotation - degrees -	180	180	180	180	180	180	180	180
Standard basket dimensions - mm -	800x1700	800x1700	800x1700	800x1700	800x1700	800x1700	800x1700	800x1700
Optional basket dimensions - mm -	900x2400	900x2400	900x2400	900x2400	900x2400	900x2400	900x2400	900x2400
Optional basket dimensions - mm -	1000x2400	1000x2400	1000x2400	1000x2400	1000x2400	1000x2400	1000x2400	1000x2400
Max. capacity - steel basket - Kg -	230	230	230	230	230	230	230	230
Max. capacity -aluminium basket - Kg -	--	--	--	--	--	--	--	--
Max. No. of people on platform	2	2	2	2	2	2	2	2
Machine weight (unloaded) - Kg -	12250	12400	13000	13150	14300	14450	--	--
Volume - m^3 -	51	51	51	51	51	51	--	--
Max. hydraulic pressure - bar -	350 / 230	350 / 230	350 / 230	350 / 230	350 / 230	350 / 230	350 / 230	350 / 230
Standard tyre dimensions - mm -	Ø1010 x 405	Ø1010 x 405	Ø1010 x 405	Ø1010 x 405	Ø1010 x 405	Ø1010 x 405	Ø1010 x 405	Ø1010 x 405
Standard tyre type	15x19.5-16PR	15x19.5-16PR	15x19.5-16PR	15x19.5-16PR	15x19.5-16PR	15x19.5-16PR	15x19.5-16PR	15x19.5-16PR
Optional tyre dimensions - mm -	Ø1080 x 460	Ø1080 x 460	Ø1080 x 460	Ø1080 x 460	Ø1080 x 460	Ø1080 x 460	Ø1080 x 460	Ø1080 x 460
Optional tyre type	18x19.5-16PR	18x19.5-16PR	18x19.5-16PR	18x19.5-16PR	18x19.5-16PR	18x19.5-16PR	18x19.5-16PR	18x19.5-16PR
Max. operating temperature - °C -	+50	+50	+50	+50	+50	+50	+50	+50
Min. operating temperature - °C -	-5	-5	-5	-5	-5	-5	-5	-5
Stability limits:								
Longitudinal inclination - degrees -	4	4	4	4	4	4	4	4
Transversal inclination - degrees -	4	4	4	4	4	4	4	4
Max. gradeability - % -	50	50	30	30	30	30	30	30
Max. wind force - m/s -	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Oil tank capacity - l -	120	120	120	120	120	120	120	120
Max. drive speed - m/s -	1.7	1.7	0.8	0.8	0.8	0.8	0.8	0.8
Min. drive speed - m/s -	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Battery model (model – E)								
Battery voltage and capacity - V/Ah -	--	--	48/750	48/750	--	--	48/750	48/750
Max. capacity - KW -	--	--	17	17	--	--	17	17
Max. power absorbed by engine - A -	--	--	400	400	--	--	400	400
three-phase battery charger - V/A -	--	--	48/80	48/80	--	--	48/80	48/80
Max. current absorbed by battery charger - A -	--	--	14	14	--	--	14	14
Diesel model STANDARD (model -D)								
Engine type - standard -	Hatz 3L41C	Hatz 3L41C	--	--	Hatz 3L41C	Hatz 3L41C	--	--
Max. engine power - standard - KW -	36.7	36.7	--	--	36.7	36.7	--	--
Starter battery - standard - V/Ah -	12/132	12/132	--	--	12/132	12/132	--	--

Diesel model OPTIONAL (model -D)								
Engine type - standard -	Hatz 4L41C	Hatz 4L41C	--	--	Hatz 4L41C	Hatz 4L41C	--	--
Max. engine power - standard - KW -	48.8	48.8	--	--	48.8	48.8	--	--
Starter battery - standard - V/Ah -	12/132	12/132	--	--	12/132	12/132	--	--
Diesel model OPTIONAL (model -D)								
Engine type - optional -	ISUZU 4LE1	ISUZU 4LE1	--	--	ISUZU 4LE1	ISUZU 4LE1	--	--
Max. engine power - optional - KW -	40.5	40.5	--	--	40.5	40.5	--	--
Starter battery - optional - V/Ah -	12/132	12/132	--	--	12/132	12/132	--	--
380V three-phase electric pump (OPTIONAL for boom movement)								
Max. capacity - KW -	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Max. absorbed current - A -	12	12	12	12	12	12	12	12

(*) In some cases different limits can be fixed. It is recommended to comply with the data shown on the machine plate.
NOTE: The abbreviations 4WD-2WS; 4WD-4WS are used to identify the different combinations of driving wheels and steering wheels. These abbreviations are not indicated on the machine plates. They stand for:

4WD-2WS= Four driving wheels, two steering wheels;
4WD-4WS= Four driving wheels, four steering wheels.

Noise tests have been carried out under the most unfavourable conditions to study the effects on the operator.

- ELECTRICAL MODELS: The level of acoustic pressure weighed (A) at work places does not exceed 70dB(A).
- MODELS WITH HEAT ENGINE: The level of acoustic pressure weighed (A) at work places does not exceed 106dB(A); the level of acoustic pressure at ground control station does not exceed 85dB(A); the level of acoustic pressure at platform control station does not exceed 78bD(A).

As to vibrations in ordinary working conditions:

- the rms. value weighed according to acceleration frequency relevant to the upper limbs is lower than 2.5 m/sec^2 ;
- the rms. value weighed according to acceleration frequency relevant to the body is lower than 0.5 m/sec^2 .

3. SAFETY PRECAUTIONS

Power supply

The electric and hydraulic circuits are provided with safety devices, calibrated and sealed by the manufacturer.

⚠ Do not tamper with and modify the calibration of any component of the electric and hydraulic system.

Work and maintenance rules

- Always wear personal protective clothes according to current regulations concerning industrial health and safety (in particular, helmet and safety belt are COMPULSORY. See picture below).
- The machine should be used in areas well lit up, checking that the ground is flat and firm. The machine may not be used if the lighting conditions are not sufficient.
- Do not use the thermic power (Diesel or Petrol engine) indoors or in insufficiently ventilated areas.
- Before using the machine check its integrity and conservation state.
- During maintenance operations do not dispose of any waste materials in the environment, but comply with current regulations.
- Do not carry out any service or maintenance operations when the machine is connected to the power supply. Follow the instructions given in the following paragraphs.
- For the maintenance of the heat engine (Diesel or Petrol engine) supplement the instructions given in this manual with those given in the heat engine manual.
- Do not approach the electric and hydraulic system components with sources of heat or flames.
- The platform is intended for people carriage; therefore comply with the current local regulations relevant to this class of machines.
- Do not increase the max. allowed height by means of scaffolds, ladders or other.
- Do not use the machine as a crane.
- Do not use the machine as a hoist and/or lift.
- Protect the unit (in particular the platform control panel) and the operator when working in adverse environmental conditions (painting, de-painting, sand-blasting, washing, etc.).
- Do not use the unit in case of severe weather conditions (rainstorms with wind exceeding the limit speed indicated in chapter "Technical features").
- In the event of rain or in parking condition always protect the platform control panel by means of the specially protection cover.
- Do not use the machine in areas where risks of fire or explosion exist.
- Do not use pressurized water jets (high-pressure cleaners) to wash the machine.

Fig.3

Safety rules

General

Only adults, after carefully reading this manual, should use the machine.

This machine must be used at a distance of at least 5 metres from high-tension lines (in any case not in proximity to live elements).

Use the machine according to the capacity values indicated in the technical features section. The max. No. of people allowed on the platform and the capacity are specified on the identification plate.

Do NOT use the framework of the platform or any of its elements for grounding connection while welding on platform.

Handling

Before any movement make sure that the machine plugs are disconnected from the power source. Always check the cable position during handling if the machine is powered with a 380V three-phase electric pump.

In order to avoid any instability, use the machine on regular and firm grounds. To prevent the machine from overturning, comply with the max. gradeability values indicated in the Technical features section under paragraph "Stability limits". However, movements on inclined grounds are to be carried out with the utmost caution.

As soon as the platform is lifted (the tolerance varies according to the model) the safety drive speed is automatically activated.

Drive the unit with lifted platform only on flat grounds, verifying the absence of holes or steps on the floor and bearing in mind the overall dimensions of the unit.

While driving the unit with lifted platform the operators are not allowed to place horizontal loads onto the platform (operators on board must not pull ropes, wires, etc.).

The machine must not be used directly for road transport. Do not use it for material transport (see paragraph 1.2 “Intended use”).

The machine is equipped with a load-on-platform control system stopping the platform in case of overloading. Platform operation can be resumed only after removing the exceeding load. Should the audible warning device and the red light located on the platform control panel turn on, then the machine is overloaded (see paragraph relevant to general use instructions). Remove the exceeding load before starting operations again.

The machine is equipped with a chassis inclination control system disabling lifting operations in case of unstable positioning. Working operations can be resumed only after placing the machine in a steady position. Should the audible device and the red light on the platform control panel turn on, the machine is not correctly positioned (see paragraphs relevant to general use instructions). Bring it to safety rest position before starting operations again.

The machine is equipped with a platform inclination control system disabling lifting and lowering of the telescopic boom in the event that the platform inclination is 5° over the max. allowed inclination for the chassis. Only after positioning the platform within the prescribed tolerance is it possible to control the telescopic boom lifting/lowering. If the audible alarm and the red lamp on the platform control panel are activated the platform has exceeded the max. inclination limits (see paragraphs relevant to general use instructions). Bring it to safety rest position before starting operations again.

Electric power machines are equipped with a device controlling the electric system isolation. In case of isolation loss or remote switch fault, such device (located on the chassis or on the turret) brings the machine to a complete halt and signals the fault by means of a continuous hissing sound.

Do not lean over the platform guard-rails. Avoid severe weather conditions and, in particular, windy days.

During operations in public areas, in order to prevent people other than the personnel from approaching the machine and being endangered, surround the working area by means of barriers or other suitable signs.

Do not use the thermic power (Diesel or Petrol engine) indoors or in insufficiently ventilated areas.

Make sure that no people, apart from the operator, are in the area where the machine is operating. While moving the platform the operator should pay particular attention to avoid any contact with the personnel on the ground.

Lift the platform only if the machine is resting on solid and horizontal surfaces.

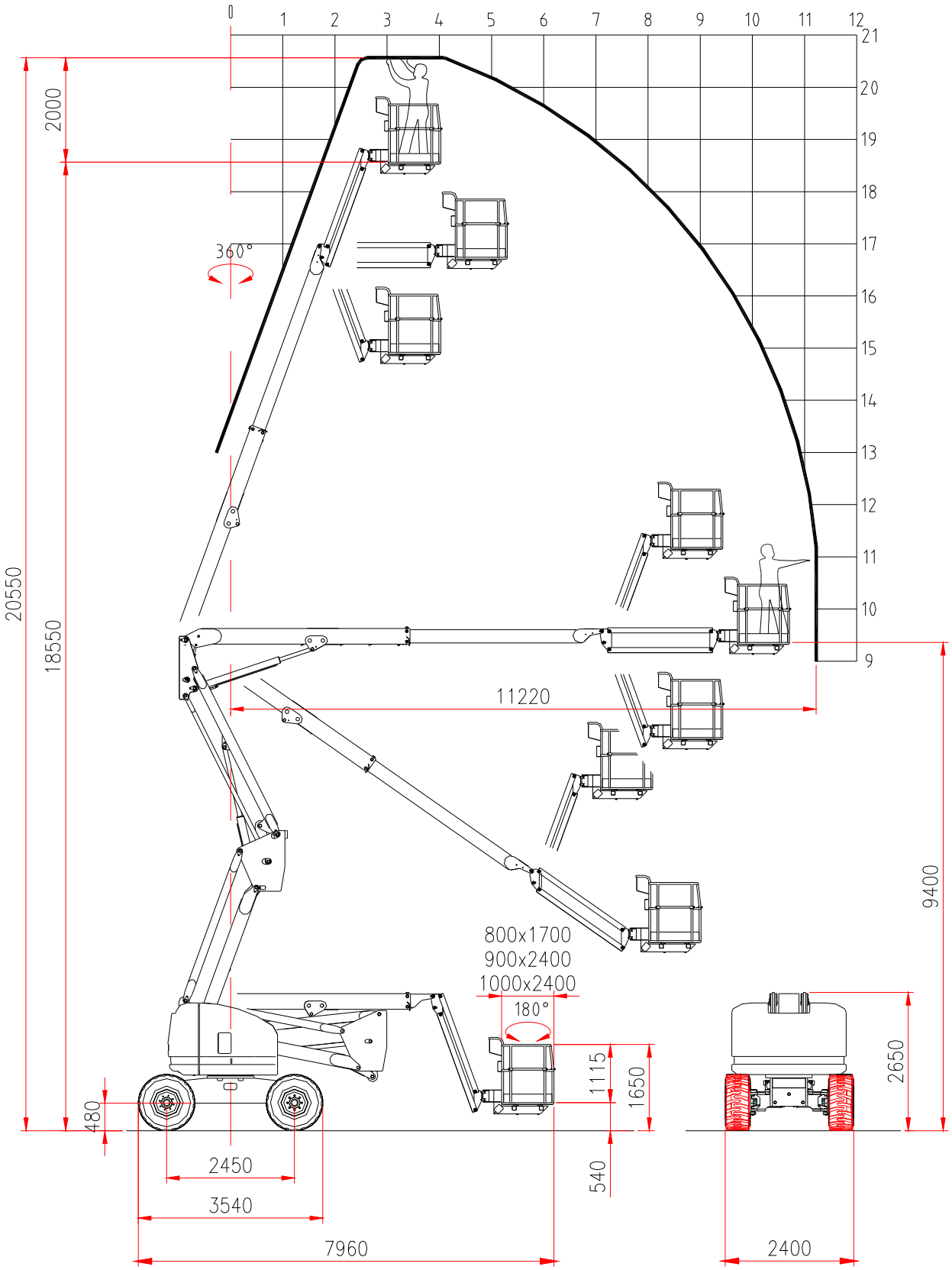
Drive the machine with lifted platform only if the ground is solid and horizontal. When the machine is driven with lowered platform, the oscillating axle (optional) is free and allows the wheels to adapt to the ground thus improving drive performances; once drive has been stopped the oscillating axle is automatically locked in that very position and the machine will allow the operator to lift the platform. Once the platform has been lifted, an automatic device detects the axle position. If the wheels of the oscillating axle are not on the same ideal plane as those of the fixed axle, drive is prevented and a danger red light will go off to signal the condition of instability. To drive the machine lower the platform completely (Jib inclination ranging between +10° and –70°).

After each work session, always take the keys out of the control panels and keep them in a safe place to prevent unauthorized people from using the machine.

Always place working tools in a steady position to prevent them from falling and hurting the operators on the ground.

- From the following pictures you can locate the action range of the platform while the chassis is kept in a fixed position. Watch these pictures carefully in order to position the chassis so as to avoid any contacts with obstacles present in the action range.

SG1850-J...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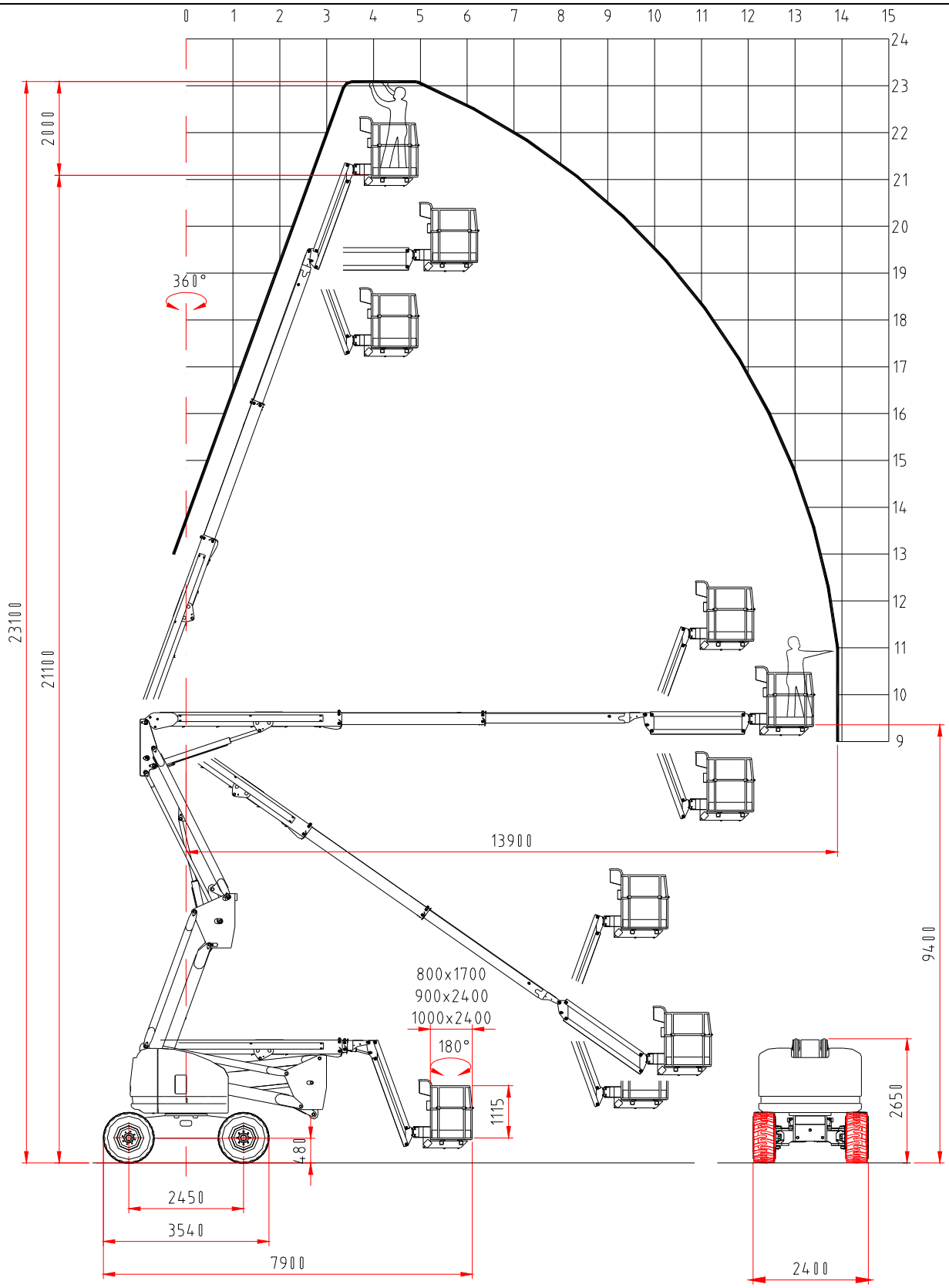
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4. INSTALLATION AND PRELIMINARY CHECKS

The machine is delivered completely assembled. No preliminary operation is required. To unload the machine, follow the instructions in paragraph “Handling and carrying”.
Place the machine onto a firm ground and with a gradeability lower than the max. allowed (see “Stability limits”). The machine is equipped with platform bubble level for visual check and an inclinometer on the chassis (or turret) to always check machine levelling, both transversal and longitudinal.
Before using the machine read the instructions given in this manual and the concise instructions indicated on the platform plate.
Before starting any operations verify the integrity of the unit (by means of a visual check) and read the plates indicating the operating limits.

Before using the machine

Before using the machine the operator must always check visually that:
- the battery is completely charged (electric models);
- the hydraulic oil level ranges between the min. and max. value (with platform completely lowered);
- the machine carries out all operations in safety;
- the wheels and drive engines are properly fixed;
- the wheels are in good condition;
- the guardrails are fixed to the platform and the self-closing gates are present;
- the structure does not show clear faults (check welding of lifting structure);
- the instructions plates are perfectly readable;
- the controls are perfectly efficient both at platform and at emergency ground control station.

5. GENERAL USE INSTRUCTIONS

Before using the machine read this chapter thoroughly.

Platform control panel

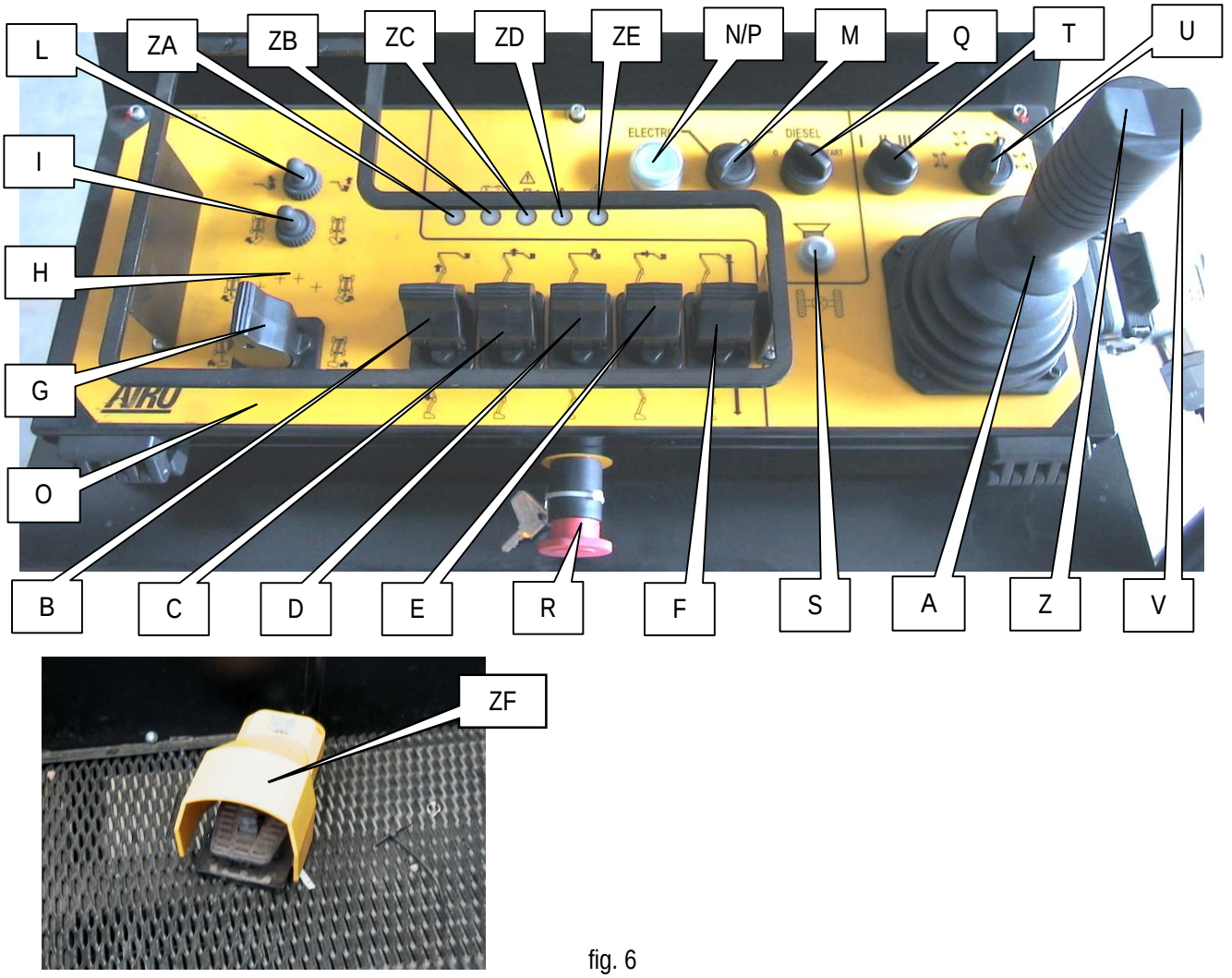


fig. 6

A) Drive proportional joystick control
B) Proportional lever control scissors up/down
C) Proportional lever control boom up/down
D) Proportional lever control jib up/down
E) Proportional lever control telescopic boom out/in
F) Proportional lever control QUICK UP/QUICK DOWN (fast lifting/lowering)
G) Proportional lever control turret rotation
H) Proportional lever control jib rotation - OPTIONAL
I) Platform rotation switch
L) Platform level switch
M Diesel/electric power selector
N) Electric power selector 12V (Battery) or 380V (three-phase mains) – if both installed –
O) Starter button electric pump 12V (Battery) or 380V (three-phase mains) – if both installed –
P) Starter button electric pump 12V – if individually installed –
Q) Diesel motor starting switch
R) Emergency brake (STOP)
S) Manual horn
T) Drive speed selector
U) Rear wheels alignment control and steering mode selector - OPTIONAL
V) Right steering switch
Z) Left steering switch
ZA) Warning light control station enabled
ZB) Warning light discharged battery – models – E
ZC) Warning light fault Diesel engine / low fuel level – models – D
ZD) Danger warning light
ZE) Overload warning light
ZF) Dead-man pedal

All movements (except for platform rotation and platform level compensation) are controlled by proportional joystick /levers; it is therefore possible to adjust movement speed by means of the relative controls. To avoid sudden shakes during movements, it is advisable to operate the proportional joystick controls gradually.

For safety reasons, to operate the machine, it is necessary to press the platform dead-man pedal ZF. If the dead-man pedal is accidentally released while the machine is operating, the movement is immediately stopped.

CAUTION! Holding down the dead-man pedal for over 10 seconds without carrying out any operation will disable the control station. This condition is signalled by a flashing green led (ZA). To operate the machine again it is necessary to release the pedal and press it again; the green led (ZA) will light up steady and for the next 10 seconds all controls will be enabled.

Follow exclusively the instructions given in the next paragraphs and the safety rules described both hereafter and in the previous paragraphs. Read the next paragraphs carefully in order to properly understand the on/off procedures as well as all operations and their correct use.

Before any movement, verify the presence of people in close proximity to the machine and, in any case, proceed with the utmost caution.

5.1.1 Drive and steering

Drive

To drive the machine it is necessary to carry out the following operations in sequence:
a) press the "dead-man" pedal ZF located on the platform; the green led ZA will light up steady indicating its enabling;
b) within 10 seconds from the green steady led lighting up, set the proportional joystick control A forward for forward drive or backward for reverse drive.

The machine can be equipped with an automatic reverse device of drive and steering; whatever the turret position might be, the operator at the platform control station will always face the front of the machine.

WARNING!! Beware the position of the turret orientated at +/-90° with respect to the direction of drive since this position causes the automatic reversal of drive and steering.
Drive and steering controls can take place at the same time but they are interlocked with the platform movement controls (lifting/lowering/rotation). With platform lowered (booms down, telescopic boom in, jib at a height between +10° and –70°) simultaneous steering-drive-turret rotation is possible to facilitate the machine positioning in narrow spaces.
By simultaneously controlling drive/steering and turret rotation, the drive/steering reversal takes place- only past the +/-90° turret position- after releasing the present drive/steering controls.

With platform lowered (booms down, telescopic boom in, jib at a height between +10° and –70°) it is possible to select different drive speeds by means of the speed selector T.

NOTE: To achieve maximum drive speed, set the speed selector (T) to position (III), and press down the proportional joystick (A).
To operate on high ascending slopes (e.g. while loading the machine onto a truck) set the speed selector (T) to position (II).
To operate on high descending slopes (e.g. while unloading the machine from a truck) and get the minimum speed with lowered platform, set the speed selector (T) to position (I).

With platform lifted the safety drive speed and steering mode (two front steering wheels) are automatically activated.

WARNING!! The machine is equipped with a monitoring sensor for drive pressure. This device cuts off the drive control (the machine stops temporarily) if the required power is higher than the one provided by the engine. To avoid the continuous intervention of the limiting device, it is recommended not to use the III drive speed with cold oil. The ideal oil temperature for a correct operation of the machine ranges between 50°C and 65°C. Operate with the machine for 5-10 minutes before controlling drive in III speed.

NOTE FOR MACHINES WITH 4 STEERING WHEELS:
If the steering mode with four discordant wheels has been selected (lower turning radius) the III drive speed is not enabled.

IT IS FORBIDDEN to drive the unit when the platform is lifted unless the ground is flat and steady.

NOTE FOR MACHINES WITH OSCILLATING AXLE:
A sensor controls the swinging of the oscillating axle. With platform raised (booms up and jib at a height over +10° with respect to the horizontal axis) if the wheels of the oscillating axle are not on the same ideal plane as those of the fixed axle (with some tolerance) drive is prevented and a red light will turn on to warn of this condition (ZC). The audible danger alarm will not go off. To drive the machine lower the platform (booms down and Jib at a height between +10° and –70°).

Steering

To steer, press the buttons Z / V located on the drive proportional joystick control (press the right button for right steering and vice versa). Also the steering control is enabled by the "dead-man" pedal and it is possible only if the green led ZA is lit up steady.

The machine can be equipped with an automatic reverse device of drive and steering; whatever the turret position might be, the operator will always face the front of the machine.

WARNING!! Beware the position of the turret orientated at +/-90° with respect to the direction of drive since this position causes the automatic reversal of drive and steering.
Drive and steering controls can take place at the same time but they are interlocked with the platform movement controls (lifting/lowering/rotation). With platform lowered (booms down, telescopic boom in, jib at a height between +10° and –70°) simultaneous steering-drive-turret rotation is possible to facilitate the machine positioning in narrow spaces.
By simultaneously controlling drive/steering and turret rotation, the drive/steering reversal takes place- only past the +/-90° turret position- after releasing the present drive/steering controls.

For machines with 4 steering wheels, if the booms are completely lowered and the jib is at a height between +10° and –70° with respect to the horizontal axis, three steering modes can be selected:

1) two front steering wheels;
2) four concordant steering wheels (the four wheels steer in the same direction and allow the machine to move sideways with respect to the chassis);
3) four discordant steering wheels (the four wheels steer differently between the front axle and the rear axle, and allow the machine to steer in narrow spaces).

With platform lifted the safety drive speed and steering mode (two front steering wheels) are automatically activated.

WARNING!! MACHINES WITH 4 STEERING WHEELS:
With booms up and jib at a height over +10° with respect to the horizontal axis the only possible steering mode is the one with two front steering wheels regardless of the selector position of steering mode. With platform raised (booms up and jib at a height over +10°) if the rear wheels are not straight, drive is prevented and a red light will turn on to signal this condition (ZD). The audible danger alarm will not go off. To steer it is necessary to align automatically the rear wheels by means of selector (U) after that the red light (ZD) has turned off.

NOTE FOR MACHINES WITH 4 STEERING WHEELS:
With platform lowered (booms down, telescopic boom in and Jib at a height between +10° and –70°) if the steering mode with four discordant wheels has been selected (lower turning radius) the III drive speed is not enabled.

5.1.2 Platform positioning

To carry out all movements other than drive, use proportional levers B, C, D, E, F, G, H and switches I and L.
To achieve the movement it is necessary to carry out the following operations in sequence:

a) press the “dead-man” pedal ZF located on the platform; the green led ZA will light up steady indicating its enabling;
b) within 10 seconds from the green steady led lighting up set the proportional joystick control or the desired switch in the direction shown by the serigraphy on the control panel.

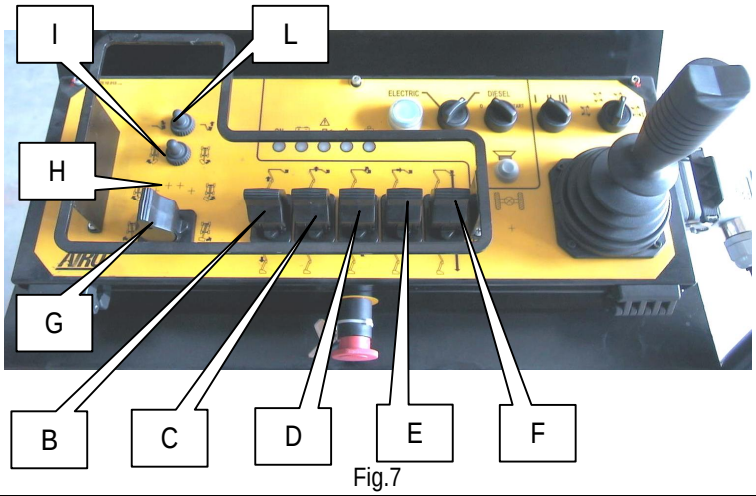


Fig.7

NOTE: before activating the proportional joystick control or the desired switch the dead-man pedal must be pressed.
Release the “dead-man” pedal and the manoeuvre will be immediately stopped.

5.1.2.1 Scissors (first boom) lifting/lowering

To lift/lower the scissors (first boom), use the proportional lever B.
Set the proportional lever B to position 1 to lift the scissors, or to position 2 to lower the scissors.

⚠ In the event of any interference between the scissors and the boom while lowering, a special microswitch will block the manoeuvre of “scissors lowering” and “second boom lowering”.

5.1.2.2 Second boom lifting/lowering

To lift / lower the second boom, use the proportional lever C.
Set the proportional lever C to position 3 to lift, or to position 4 to lower the second boom.

⚠ In the event of any interference between the scissors and the boom while lowering, a special microswitch will block the manoeuvre of “scissors lowering” and “second boom lowering”.

5.1.2.3 Jib lifting/lowering

To lift/lower the JIB, use the proportional lever D.
Set the proportional lever D to position 5 to lift the jib, or to position 6 to lower the jib.

5.1.2.4 Telescopic boom extraction/retraction

To extend / retract the telescopic boom, use the proportional lever E.
Set the proportional lever E to position 7 for extraction or to position 8 for retraction.

This manoeuvre does not work while turret rotation is taking place.

5.1.2.5 QUICK UP/QUICK DOWN

This lever controls the quick lifting/lowering of the platform, while simultaneously controlling the following manoeuvres:
- scissors lifting/lowering;
- second boom lifting/lowering;
- jib lifting/lowering;
- telescopic boom extraction/retraction (DIESEL MODELS ONLY).

To carry out the QUICK UP/QUICK DOWN manoeuvre, use the proportional lever F.
Set the proportional lever F to 1-3-5-7 position for quick lifting, or to 2-4-6-8 position for lowering.

In the event of any interference between the scissors and the boom while lowering, a special microswitch will block the manoeuvre of “scissors lowering” and “second boom lowering”.

5.1.2.6 Turret orientation (rotation)

To carry out the turret orientation (rotation), use the proportional lever G.
Set the proportional lever G to 9 position to rotate the turret to the right, or to position 10 to rotate it to the left.

Before carrying out this manoeuvre make sure that the mechanical lock device of the turret –if any- be deactivated (see chapter 6 “handling and transport”).

This manoeuvre does not work while the telescopic boom extraction/retraction is taking place.

With platform lowered (booms down, telescopic boom in, jib at a height between +10° and –70°) simultaneous steering-drive-turret rotation is possible to facilitate the machine positioning in narrow spaces.

5.1.2.7 Jib rotation (OPTIONAL)

To rotate the JIB, use the proportional lever H.
Set the proportional control H to position 11 to rotate to the right, or to position 12 to rotate to the left.

5.1.2.8 Platform rotation

To rotate the platform, use the switch I. Set the switch I to position 13 for right rotation, or to position 14 for left rotation.

Warning!! This manouvre cannot be carried out when other operations are taking place.

5.1.2.9 Platform levelling

The platform is automatically levelled. Should it be necessary to reset the correct level, use switch L.
Set switch L to position 16 for backward levelling, or to position 15 for forward levelling. This manoeuvre does not work while other manoeuvres are taking place.

Warning!! This manouvre cannot be carried out when other operations are taking place.

Warning!! This operation can be carried out only when booms are completely lowered. No result is achieved if these operations are carried out when the platform is lifted.

5.1.3 Other functions of the platform control panel

5.1.3.1 Selection of electric/thermic propulsion

On some models it is possible to select the type of propulsion using the selector M. Set it to position Electric to use the electric propulsion (12V battery for emergency boom operations or 380V three-phase for boom work operations - OPTIONAL); set it to position Thermic to use the thermic propulsion.

5.1.3.2 12V or 380V three-phase electric power selector (OPTIONAL)

On some models, once the electric power has been selected by means of selector M, it is possible to select the type of power using the selector N (if both electric pumps installed):

- set it to position 12V to enable the power for emergency operations (lifting/lowering and rotation only) through the 12V electric pump which is directly powered by the starting batteries of the heat engine;
- set it to position 380V to enable the power through the 380V three-phase electric pump for platform work operations (lifting/lowering/rotation).

CAUTION! Power by means of 12V emergency electric pump is only for platform recovering in case of faults in the main powers. Do not use it during normal work operations.

5.1.3.3 Starting button for 12V (Battery) or 380V (three-phase mains) electric pump - OPTIONAL -

Use button P (instead of selector N, if only the 12V electropump is installed) to start the 12V electropump for emergency operations (excepting drive and steering).
Use button O (if both electric pumps are installed) to start:

- the 380V three-phase for platform movement (excepting drive and steering) if selector N is set to position 380V and the ground electric panel is connected to three-phase electric mains.
- the 12V electric pump for emergency operations (excepting drive and steering) if selector N is set to position 12V;

See next paragraphs for operations modes of the starting button of the electric pump.

5.1.3.4 Warning light electric pump on

Placed near button O (if any) signals that the 380V three-phase electric pump to operate the platform (excepting drive and steering) is on (if selector N is in position 380V and the ground control panel is connected to the three-phase power mains).

5.1.3.5 Heat engine starting switch (P)

It starts the heat engine (Diesel and Petrol) on bi-fuel models (“E/B” and “E/D”) and on thermic propulsion models (“B” and “D”).

- In START position it enables starting;
- in position 3 sec it pre-heats the plugs (motors with plugs only);
- in position 0 it stops the heat engine.

5.1.3.6 Manual horn

The horn warns that the machine is moving. It is operated by means of the press-button S.

5.1.3.7 Emergency brake (STOP)

By pressing button R all control functions are interrupted. Normal functions are enabled by rotating the button of 1/4 turn clockwise.

5.1.3.8 Warning lights

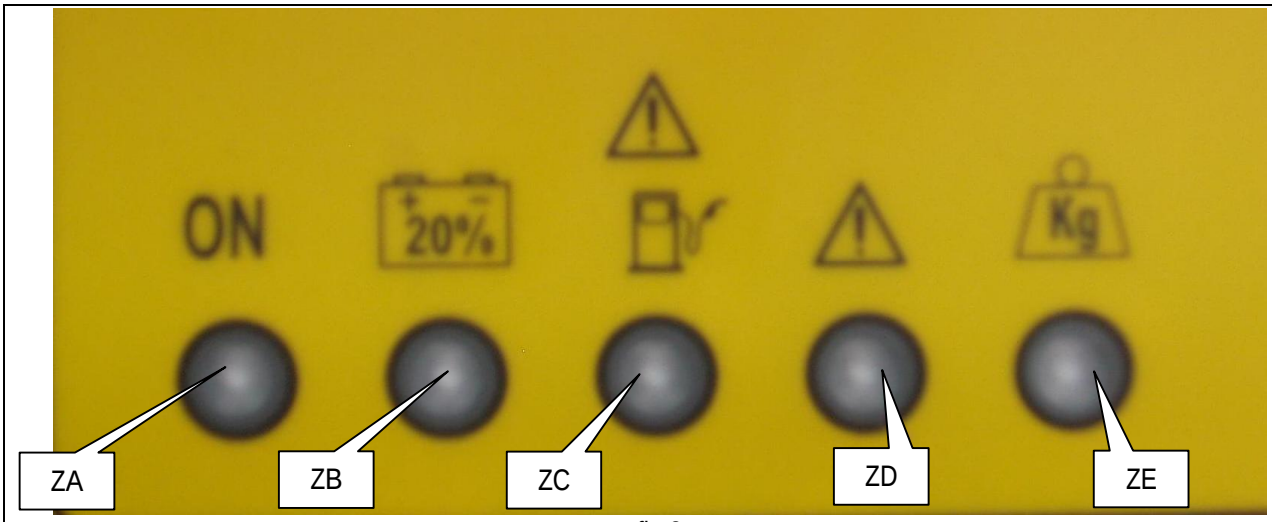


fig.8

5.1.3.8.1 Enabled control station green warning light (ZA)

On with flashing light when the machine is turned on. If the platform control station has been selected and this light flashes the controls are not enabled because the dead-man pedal is not pressed or it was pressed for more than 10 seconds and no operation was performed.
On steady with machine on and dead-man pedal pressed for less than 10 seconds. With platform controls all controls are enabled (unless other types of warning show up – see next paragraphs).

5.1.3.8.2 Discharged battery red warning light (ZB) – electric models only

Flashing when the battery charge is at 20% (only models "E" or "E/D" with current continuous electric pump). In this condition lifting and telescopic boom extraction are disabled. It is necessary to recharge the battery immediately.

5.1.3.8.3 Diesel engine fault / low fuel red warning light (ZC)

This warning light indicates malfunctioning of diesel engine or low fuel.
On steady with: machine on; platform controls; Diesel power selected. Diesel engine off, ready for start-up. Insufficient engine oil pressure.
Slow flashing in the event of the engine head overheating. If on, it stops the Diesel motor; if off, it prevents the Diesel motor from starting.
Fast flashing in the event of low fuel (approx. 10 litres of fuel left). This warning is active only with the engine on.

5.1.3.8.4 Danger red warning light (ZD)

It flashes quickly for 4 seconds together with the acoustic alarm at the machine start-up in case of fault during safety test on controls (pedal, joystick control, switches, etc).
It flashes with a series of three flashes when the chains of extraction and/or retraction are slackened or faulty (SG2100-J ONLY). If the platform is lifted, extraction and retraction of the telescopic boom are inhibited, but all other functions are still possible to allow the platform to lower to the ground. With lowered platform, lifting of boom and scissors and telescopic extraction and retraction are inhibited, but jib lifting and lowering remain active.
It is lit up steady together with the acoustic alarm when the chassis inclination exceeds the allowed value. All lifting operations and telescopic extraction are inhibited (except JIB lifting). If the machine is lifted, drive is also blocked. It is necessary to lower the booms completely and then place the machine onto a flat surface. The same signal is activated if the platform is inclined 5° higher than the chassis inclination. In this condition all lifting/lowering controls of the telescopic boom are blocked in order to prevent an increase of the platform inclination. The emergency lowering of the telescopic boom can be carried out by manually setting the platform inclinometer in the opposite direction to the platform inclination. A visual bubble level placed on the inclinometer indicates the direction in which to set the inclinometer in the event of an emergency.
Lit up steady with no activation of the acoustic alarm when, with lifted platform, drive is blocked due to:

- oscillating axle not parallel to the chassis;
- impossibility to align the rear wheels.

CAUTION! The activation of this indicator warns of a dangerous situation since the machine or the platform have reached a dangerous inclination level for the machine stability.
When the chassis inclination exceeds the allowed value, to prevent increasing the overturn risk, the operator on the platform is recommended to retract the telescopic boom first and to lower it as the last operation.
If the scissors are lifted and the telescopic boom is lowered and the latter interferes with the former, the system allows a gradual lifting of the boom, the consequent lowering of the scissors and finally the total lowering of the platform.
For adjustment or activation in emergency situations read the MAINTENANCE chapter.

5.1.3.8.5 Red warning light overload (ZE)

On steady and activation of acoustic alarm with a platform overload exceeding 25% the rated load. If the platform is lifted, the machine is completely locked. If the platform is lowered all driving/steering operations are still possible but lifting/rotation are prevented. Remove the overload before using the machine again.
Fast flashing in case of fault in the control system of the platform load. With lifted platform the machine is completely blocked. After reading the manual instructions, trained staff can carry out an emergency manoeuvre for platform recovery.

CAUTION! The activation of this indicator is a synonym of danger since the load at platform is exceeding or no load control is active upon signalling.
For adjustment or activation in emergency situations read the MAINTENANCE chapter.

5.2 Ground control station and electric control unit

The ground control station is to be used to:
- turn the machine ON/OFF;
- select the control station (ground or platform);
- operate the platform in emergency cases;
- display some operating parameters (working hours; Diesel engine operational faults; battery charger operation; etc.).

The ground control station (or electric control unit) contains the main electronic boards necessary to operate the machine and to carry out safety checks.

⚠ Access to the electric control unit is allowed to specialized personnel only for maintenance and/or repair purposes. Access the electric control unit only after the machine has been disconnected from any 220V or 380V power sources.

5.2.1 Ground control station

The ground control station is located on the rotating turret (see paragraph "Location of main components").
The ground control station corresponds with the electric control unit.

⚠ Use the ground controls only in emergency situations to allow the platform to be recovered.
IT IS FORBIDDEN to use the ground control station as a workstation when personnel is on the platform.

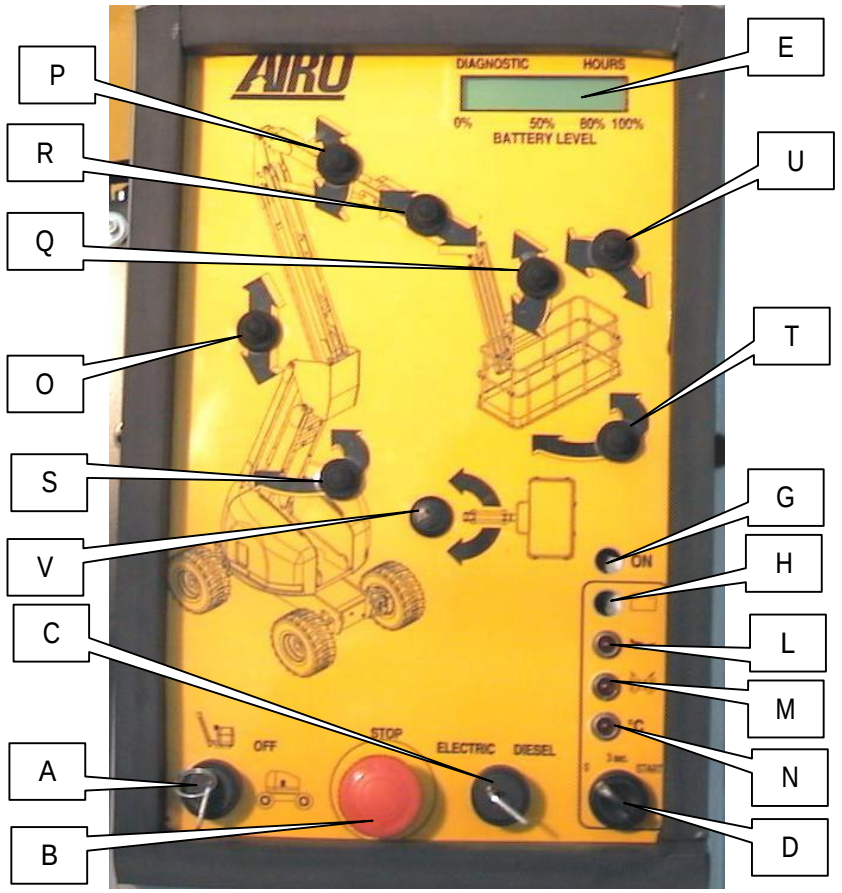


fig.9

A) ON-OFF key and control station selector (ground/platform)
B) Emergency stop button
C) Selector for Diesel power for work or 12V electric power for emergency operations
D) Heat engine starting button (models “D” and “E/D”)
E) User interface display
F) Battery charger warning light (models “E” and “E/D”)
G) Warning light: machine on
H) Alternator warning light (models “D” and “E/D”)
L) Oil warning light (models “D” and “E/D”)
M Air filter warning light (models “D” and “E/D”).
N) Motor head temperature warning light (models “D” and “E/D”)
O) SCISSORS LIFTING/LOWERING lever
P) BOOM LIFTING/LOWERING lever
Q) JIB LIFTING/LOWERING lever
R) TELESCOPIC BOOM OUT/IN lever
S) TURRET ROTATION lever
T) PLATFORM ROTATION lever
U) PLATFORM LEVEL compensation lever
V) JIB ROTATION lever (OPTIONAL)

The key must be given only to authorized personnel. A duplicate key should be kept in a safe place.

5.2.1.1 On-off key and control station selector

The on-off key located on the ground control station is used to:
- turn ON the machine by selecting one of the two control stations:
  - platform controls enabled with key switch set to platform symbol. Stable key position with possibility to extract the key;
  - ground controls enabled (for emergency operations) with key switch set to turret symbol. Position with action to be kept. When the key is released the machine is turned off.
- turn OFF the control circuits by turning it to OFF;
- turn ON the battery charger by turning it to OFF (models “E” and “E/D”).

5.2.1.2 Emergency stop button

By pressing this button the machine (as well as the heat engine on models “D”, “E/D” and “E/B”) is completely stopped; by rotating it of 1/4 turn (clockwise) the machine can be turned ON by means of the ON-OFF key (see chapter 5.2.1.1).

5.2.1.3 Selector for Diesel power for work or 12V electric power for emergency operations

Holding the ON-OFF key in position “ground controls” it is possible to select the type of power for the ground controls:
- if ELECTRIC is selected and the ON-OFF key is kept active in position “ground controls” the 12V electric pump is started for the emergency controls;
- if DIESEL is selected and the ON-OFF key is kept active in position “ground controls” the Diesel engine can be started.

5.2.1.4 Heat engine starting switch

Holding the ON-OFF key in position “ground controls” after selecting the DIESEL power, the diesel engine can be started by means of the relevant switch.
In “0” position the Diesel engine is off;
In “3 sec” position the plugs pre-heating takes place (only for engines with plugs);
In “Start” position the engine starts.

5.2.1.5 User interface display

The multifunction display for machine/user interface is used to:
- display the operation parameters of the machine during normal functioning or in the event of a fault;
- working hours of Diesel engine (when Diesel power is selected the working hours are displayed in the format HOURS: MINUTES and final letter D);
- working hours of the emergency electric pump with continuous current (when 12V electrical power is selected the working hours are displayed in the format HOURS: MINUTES and final letter M);
- working hours of the three-phase work pump (when 380V electric power is selected – at platform – the working hours are displayed in the format HOURS: MINUTES and final letter E);
- charge level of the battery (only electrical models E).

The user interface display is also used during any interventions by specialized personnel to calibrate/adjust the working parameters of the machine. This function is not available to the user.

5.2.1.6 Battery charger warning light

Electric power and bi-fuel models (“E”, “E/D” and “E/B”), equipped with a built-in high frequency battery charger, are provided with this warning light indicating the operation of the battery charger (for more detailed information read the paragraph: “Battery charge”).

5.2.1.7 Warning light: machine on

The green warning light ON indicates that the machine is ON.

5.2.1.8 Diesel engine warning lights

These warning lights warn the user of any Diesel engine operational faults (models “D” and “E/D”). One of these warning lights turns ON when the engine is stopped. A “fault” message is sent to the operator on the platform (see paragraph “Platform control panel”).
Once the Diesel engine has stopped due to a problem signalled by one of these warning lights, the engine can no longer be re-started until such problem has been solved.

5.2.1.9 Platform control levers

The various levers shown in the figure allow the platform to be operated. According to the various signs the corresponding movements are activated. These controls can be operated only if the on-off key is set to ON downwards (ground control station selected).

Use the ground controls only in emergency situations to allow the platform to be recovered.
IT IS FORBIDDEN to use the ground control station as a workstation when personnel is on the platform.

5.3 Platform access

⚠ To get on the platform use only the access equipment the platform is provided with.

To get on the platform, lift the bar and get on board. Check that, once you are on the platform, the bar falls down closing the access.

⚠ Do NOT block the closing bar so as to keep the platform access door open.

With the ground controls (see paragraph “Ground control station”) it is possible, operating the boom, to lower the height of access to the platform for a better access to the platform itself.

fig.10

5.4 Start-up

To start the machine the operator shall:

- release the stop button located on the ground control station by rotating it by 1/4 turn clockwise;
- turn the on-off key on the ground control station to "Platform" position;
- remove the starting key and keep it in a safe place or hand it over to a person in charge on ground, properly informed of the use of the emergency controls;
- get onto the platform;
- release the stop button on the platform control panel by rotating it by 1/4 clockwise (see previous paragraphs).

For electric propulsion machines (models “E”), at this point the various functions can be performed by thoroughly following the instructions given in the previous paragraphs.

On dual propulsion models (Electric/Diesel) (models “E/D” or “E/B”), it is necessary to select the power supply type by means of the selector. To use the electric propulsion once this option has been selected the operator can start performing the various functions by following the instructions given in the previous paragraphs. To use the thermic propulsion read the next paragraphs to start the heat engine.

For Diesel propulsion machines (models “D”):

- to use Diesel power select the power type “Diesel” with the selector and then read the next paragraphs to start the heat engine;
- to use the 380V electric power select the power type “Electric” with the selector and then (if available) the “380V” voltage and read the next paragraphs to start the three-phase electric engine;
- to use the 12V electric power (only for emergency controls) select the power type “Electric” with the selector and then (if available) the “12V” voltage and read the next paragraphs to start the 12V electric engine;

5.4.1 Diesel engine start-up

By turning the starting key on the platform control panel:
- to “0” position the Diesel engine stops (models “D” and “E/D”);
- to “3 sec” position the plugs pre-heating takes place (only engines with plugs) (models “D” and “E/D”);
- in “Start” position the engine starts.

Do not insist on the starting position for longer than 3 seconds. In the event of failed start, check the fuel level by means of the relevant indicator and read the use and maintenance manual of the engine.
Do not try to start the engine if it is already running. This operation may cause the pinion of the starter to break (under normal conditions the control system blocks this operation).
In the event of operational faults, check the engine warning lights and read the Use and Maintenance manual of the engine.
NOTE: The Diesel engine can be started only if the dead-man pedal is neither pressed nor enabled. This means that the engine can be started only if the platform green warning light ON is flashing.

5.4.2 Start-up of 380V work electric pump (OPTIONAL)

Diesel power models can be equipped, on request, with a 380V three-phase pump for those operations of the booms (lifting, lowering, rotation).

To start the three-phase electric pump:

1) Insert the 380 V plug of the power cable into socket (A) on the chassis;
2) Set the switches (C) shown in figure to ON position;
3) Set the angular red switch (F) to ON position turning it downwards or upwards. If the connection has been successfully carried out it is possible to start the electric pump as indicated in next paragraphs. On the contrary, in the event of a phase fault in the electric power the acoustic alarm is automatically enabled, and the electric pump cannot be started. In this case it is possible to compensate the power phases by turning the angular red switch (F) on the electric case by 90°.
4) To start the electric pump with the platform controls:
   - Select the platform control station with the key switch on the ground control unit;
   - Unlock the mushroom button (R) turning by a ¼ of turn clockwise;
   - Set the power selector (M) to "Electric" position;
   - Select the 380V power with selector (N);
   - Press the green button (O);
   - Wait 5 seconds before moving the machine.
5) To stop the electric pump press button (O) again.

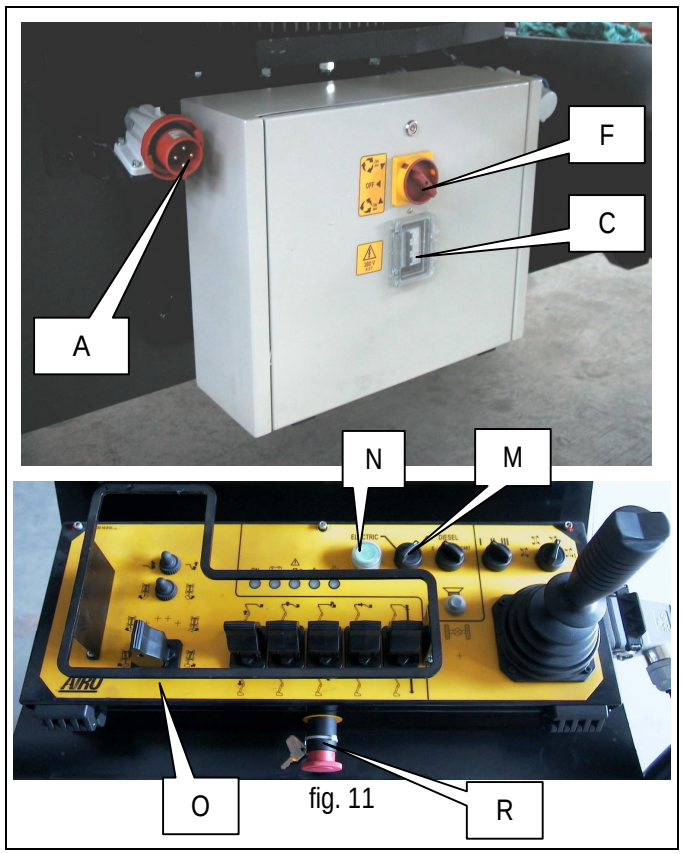


fig. 11

NOTE: The electric pump can be started only if the dead-man pedal is neither pressed nor enabled. This means that the electric pump can be started only if the platform green warning light ON is flashing.

WARNING!! Disconnect all electric power supplies before opening the cases.
The platform with 380V three-phase power can be operated only from the platform.

N.B. when the machine is powered with 380V electric pump only platform positioning and not drive/steering can be performed. Moreover, remember that operations carried out with 380V electric pump are slightly slower than those with diesel engine.

5.4.3 Start-up of 12V emergency electric pump (Diesel Models)

Diesel power models are equipped with a 12V electric pump for the operation of the booms (lifting, lowering, rotation) in the event of an emergency.

To start the emergency electric pump with platform controls:
1) Select the platform control station with the key switch on the ground control unit;
2) Unlock the mushroom button (R) turning by a ¼ of turn clockwise;
3) Set the power selector (M) to "Electric" position;
4) Select the 12V power with selector (N) if 380V electropump is present;
5) Press and hold down the green button (O) as long as the desired operation has been carried out if only the 12V electropump is present, press and hold down the green button (O) if also the 380V electropump is present. In this condition the 12V emergency electric pump is started;
6) Press and hold down the dead-man pedal ZF as long as the desired operation has been carried out;
7) Operate the controls of the machine as indicated in previous paragraphs.

WARNING!! To start the 12V emergency electric pump it is necessary to follow the sequence of the above mentions operations.

To start the emergency electric pump with ground controls:
1) Select the ground control station with the key switch on the ground control unit keeping it active;
2) Set the power selector (C) to "Electric" position;
3) In this condition the 12V emergency electric pump is started, and the machine controls can be operated as indicated in previous paragraphs.

CAUTION! The power by the 12V emergency electric pump is only for platform recovering in case of faults in the main powers. Do not use it during normal work operations.

5.5 Machine stop

5.5.1 Normal stop

In normal operating conditions:
- By releasing the controls the operation is stopped. Stop occurs within a time limit set in the factory, which guarantees smooth braking.
- By releasing the dead-man pedal located on the platform, the operation is immediately stopped. In the event of an immediate stop, braking is sudden.

While performing long-lasting works, press the press-button located on the control panel to stop the machine.

5.5.2 Emergency stop

Should it be necessary, the operator may immediately stop all machine functions from both platform and ground control station.

From the platform control station:
- By pressing the mushroom button on the control panel the machine is stopped.
- By releasing the "dead-man" pedal, the operation is immediately stopped. Due to the immediate stop, braking is sudden.

From the ground control station:
- By pressing the stop button on the ground control station (if available) the machine (all models) and the heat engine (models "D", "E/D"; "E/B") are stopped.
- By pressing the power stop button (if available – "E" models), thus cutting out machine power (power circuit cut-out).

To resume the operations:

From the platform control station:
- Turn the stop button of 1/4 turn clockwise.

From the ground control station:
- Turn the stop button (if available) of 1/4 turn clockwise;
- Pull the power circuit mushroom button (if available) to the outside until it locks in position to power the unit again.

5.5.3 Diesel engine stop

In order to stop the Diesel engine:

1) From the platform control station:
- Turn the starting key anticlockwise to position "0".
- Otherwise, press the mushroom button.

2) From the ground control station:
- Turn the starting key anticlockwise to position "0".
- Otherwise, press the mushroom button.

Do not stop the engine when the r.p.m. is high. Before stopping the engine wait until the r.p.m. is at the lowest.

5.6 Emergency manual controls

This function is to be used only in emergency situations when no motive power is available.

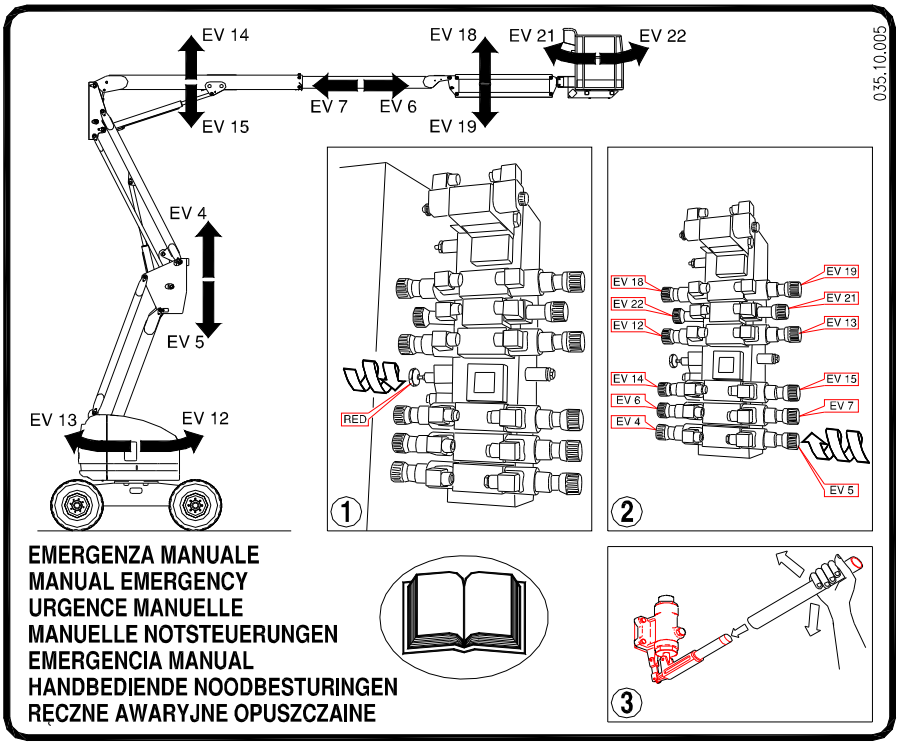


fig.12

In case of fault in the electric or hydraulic system, carry out the following emergency procedures:

1) Screw the read tap completely (behind solenoid valve EV11);
2) Insert the specially provided lever on the manual pump handle;
3) Screw the knurled knob of the solenoid valve corresponding to the desired movement;
4) Activate the emergency pump;
5) Check the correct execution of this procedure;

Electric valves and relevant movements:

EV5= Scissors lowering
EV6= Telescopic boom extraction
EV7= Telescopic boom retraction
EV12= Turret right rotation
EV13= Turret left rotation
EV15= Boom lowering
EV18= Jib lifting
EV19= Jib lowering
EV21= Platform right rotation
EV22= Platform left rotation

WARNING: THE EMERGENCY CONTROL CAN BE INTERRUPTED AT ANY MOMENT BY RELEASING THE KNOB OR BY STOPPING THE PUMP.

⚠ Once this emergency manoeuvre has been carried out, the knurled knobs and the tap must be set to their initial position again in order to resume the operations (in normal position the knobs are completely unscrewed).

5.7 Socket for electric tool connection

The platform is equipped with a socket (220-230V AC) enabling the operator to connect the electric tools necessary to carry out his operations and to power the battery charger.
To activate the electric line (see picture aside) introduce a cable into the socket (220-230V Ac. 50 Hz) and set the earth-leakage circuit breaker switch, close to the socket, to ON position. It is advisable to check the earth-leakage circuit breaker by means of the specially provided TEST button.

The plugs and sockets equipped on standard machines comply with EEC standards and can therefore be used in EU member countries.
On request the machine can be equipped with plugs and sockets in compliance with local standards or with particular needs.

Fig. 13

5.8 End of work

After stopping the machine according to the instructions given in the previous paragraphs, you are advised to:
- always set the machine to rest position;
- press the Stop button on the ground control station;
- remove the keys from the control panel to prevent unauthorized people from using the machine;
- close the red fuel supply tap (models “E/B”);
- recharge the battery according to the instructions given in section "Maintenance" (models “E” and “E/D” only).

6 HANDLING AND CARRYING

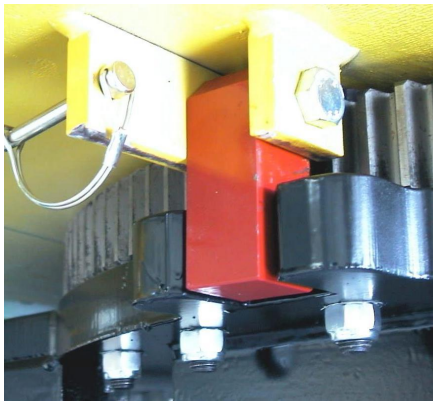
6.1 Handling

Before using the machine, make sure that the mechanical lock device of the turret (if available) is disabled (see figure aside).

To handle the machine in normal operating conditions follow the instructions given in chapter "GENERAL USE INSTRUCTIONS" under paragraph "Drive and steering".

When the platform is completely lowered (booms down, telescopic boom completely in and jib at a height between +10° and –70° with respect to horizontal axis) the machine can be handled (i.e. drive can be performed) at different speeds to be freely selected by the user.

When the platform is lifted and exceeds a given height, the enabled machines (see chapter “Technical Features) can be driven at a reduced speed (automatically) up to the height specified in chapter “Technical Features”.



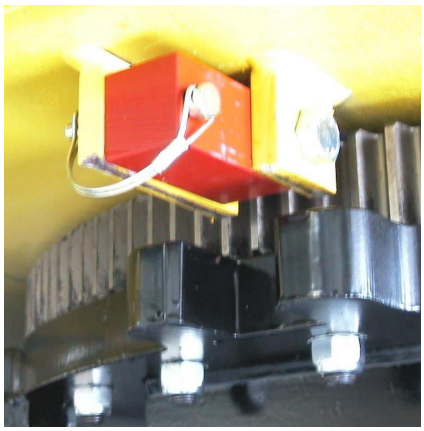


fig. 14

CAUTION! Drive with lifted platform may be subject to different restrictions according to the country where the machine is used. Find out about the legislative limits concerning this manoeuvre from the bodies of Health and Safety at work.

It is absolutely forbidden to drive the unit when the platform is lifted unless the ground is horizontal, flat and steady.

Check that there are no holes or steps on the floor and bear in mind machine overall dimensions.

Before any movement, verify the presence of people in close proximity to the machine and, in any case, proceed with the utmost caution.

Before any movement make sure that the machine plugs are disconnected from the power source.

Before steering and driving the unit, check the actual position of the rotating turret so as to achieve the correct movement direction.

While de-placing the unit with lifted platform do not load horizontal loads onto the platform (the operators on board must not pull ropes, wires, etc.).

6.2 Carrying

In order to carry the machine to the various working sites, follow the instructions given below. Considering the large dimensions of some models, before carrying, it is recommended to inquire about the overall dimension limits for road transport in force in your country.

⚠ Before carrying the machine, turn it off and remove the key from the control panel. No people are allowed in proximity to or on the machine to avoid any risks deriving from sudden movements.
For safety reasons never lift or tow the machine by means of its booms or platform.
Loading operations are to be carried out on a flat surface with a suitable capacity, after setting the platform to rest position.

To carry the machine the operator shall load it onto a vehicle either:

1) By means of chutes and translation controls located on the platform to load it directly onto the vehicle - if ramp slope is within the gradeability described in paragraph "TECHNICAL FEATURES" and capacity is adequate to weight - according to the instructions given in chapter "GENERAL USE INSTRUCTIONS" under paragraph "Drive and steering" for the correct operation of drive controls. During the loading operation following this system, it is advisable to lift the Jib (not over +10° of the horizontal axis to stop the safety speed from being inserted) to prevent the machine from hitting the ground. If the slope exceeds the gradeability, the machine is to be towed by means of a windlass only if the operator on the platform simultaneously activates the drive control to release the parking brakes.

2) By means of hooks and steel ropes (with safety factor = 5, see machine weight in Technical features) connected to the provided holes as indicated in the picture aside.

3) By means of a lift truck of a suitable capacity (see machine weight in table "Technical features" at the beginning of this manual) equipped with forks having at least the same length as the machine width. Insert the forks as indicated by the stickers on the machine. Should these stickers be not available, DO NOT lift the machine by means of a lift truck. Lifting the unit by means of a lift truck is a dangerous operation, which must be carried out by qualified operators only.

Fig.15

After placing the machine onto the carrying vehicle, fasten it by means of the same holes used for lifting.
Lock the turret with the mechanical blocking safety device (if available) as specified in the following figures (see fig. 14).

To avoid breaking the platform overload controller, thus causing the machine to stop, DO NOT fix the machine to the vehicle base by tying the platform.

Before carrying the unit check the stability grade.

Do not use the machine to tow other vehicles.

6.3 Emergency towing

In the event of a fault, carry out the following operations to tow the machine:

- Hook the machine to the provided holes;
- Loosen the three fixing screws of the central covers of all drive reduction gears (the reduction gears are 2 if the machine has two driving wheels or 4 if it has four driving wheels);
- Turn the covers clockwise so that the oversize holes match with the screw heads;
- Remove the covers and insert them again upside down exercising some pressure to withstand the resisting force of a spring inside the reduction gears;
- Turn the covers clockwise so that the three screws keep them pressed and tighten the screws;
- Tow at a very slow speed (remember that when the machine is being towed, brakes are out of order).

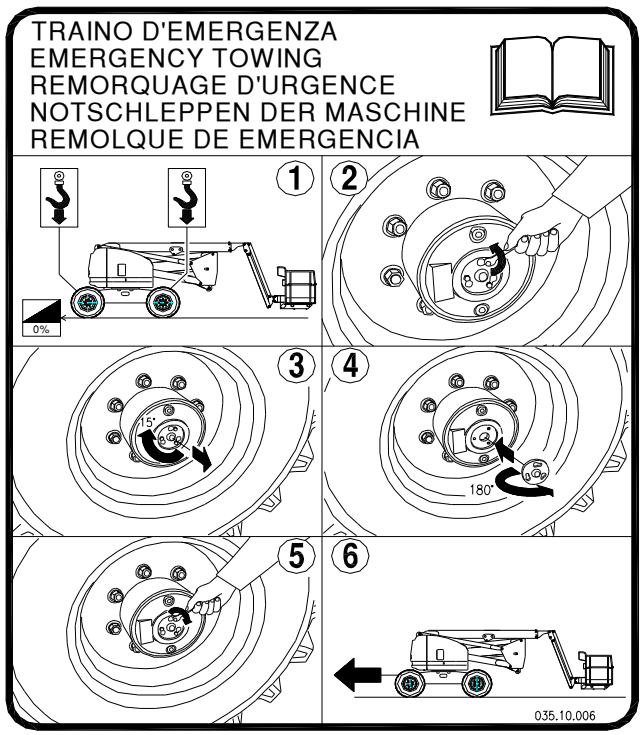


Fig.16

CAUTION! THIS OPERATION MAY CAUSE OIL LEAKAGE FROM THE DRIVE REDUCTION GEARS.

To resume the normal operation, set back the machine to initial conditions and, if necessary, top up the oil level inside the drive reduction gears.

Tow at a very slow speed (remember that when the machine is being towed, brakes are out of order).

Tow only on a flat ground.

Do not park the machine without brakes on. Should the brakes be completely out of order put wedges under the wheels to prevent the machine from moving accidentally.

7 MAINTENANCE

Always carry out maintenance operations when the machine is still, after having removed the key from the control panel, and with the platform in rest position. Carry out only the maintenance and adjustment operations described in this user manual. In emergency situations (e.g. breakdown, tyres replacement) contact Our Technical Support. Repairs and maintenance operations are to be carried out by trained personnel only. During interventions, check that the machine is completely blocked. Before carrying out maintenance operations inside the lifting equipment, check that this is off-line in order to avoid accidental lowering of the booms. Remove the battery cables and provide batteries with a suitable protection during welding operations. Carry out maintenance operations on the heat engine only when it is not running and sufficiently cool (except for those operations, such as oil change, which must be performed when the engine is hot). Risk of burns in contact with hot parts. Do not use petrol or other flammable materials to clean the heat engine. For maintenance operations on the heat engine, read the manufacturer's manual of the heat engine supplied on machine purchase. In case of replacement, use original spare parts only. Disconnect the 220V AC and/or 380V AC sockets, if any.
CAUTION! NEVER MODIFY OR TAMPER WITH MACHINE PARTS TO IMPROVE THE MACHINE PERFORMANCE AS THIS MAY AFFECT ITS SAFE OPERATION.

7.1 Machine cleaning

To clean the machine use non-pressurized water jets after properly protecting the following parts:
- the control stations (both platform and ground);
- the electric control unit and all electric boxes in general;
- the electric motors.

Do not use pressurized water jets (high-pressure cleaners) to clean the machine.

After washing the machine, always:
- dry the machine;
- check integrity of plates and stickers;
- lubricate the articulated joints equipped with greaser.

7.2 General maintenance

The table below indicates the main maintenance operations and their frequency. The machine is equipped with a service hour-meter.

Operation	Frequency
Screw tightening as indicated in paragraph "Various adjustments"	After the first 10 working hours
Oil level check in hydraulic tank	After the first 10 working hours
Drive and rotation reduction gear oil change	After the first 100 working hours
Turret rotation clearance adjustment	After the first 100 working hours
Battery state (charge and liquid level)	Every day
Deformation of tubes and cables	Every week
Heat engine fixing on elastic supports	Every month
Oil level check in hydraulic tank	Every month
Articulated joints and sliding blocks greasing	Every month
Stickers and code plates	Every month
Visual check of wear condition of chains of boom extraction (SG2100-J only)	Every three months
Check/adjustment of tension of chains of boom extraction (SG2100-J only)	Every three months
Operation check of dead-man pedal safety system	Every six months
Air purging from oscillating axe cylinders	Every year
Screw tightening as indicated in paragraph "Various adjustments"	Every year
Periodic operation check and structure visual check	Every year
Turret rotation clearance adjustment	Every year
Operation check and adjustment of chassis inclinometer	Every year
Operation check and adjustment of platform inclinometer	Every year
Operation check and adjustment of platform overload controller	Every year
Operation check of Microswitches M1	Every year
Operation check of Microswitch M9 (if available)	Every year
Operation check of Microswitch and proximity sensor M10	Every year
Operation check of proximity sensors M11 and M12	Every year
Operation check of proximity sensor M13	Every year
Operation check of microswitch M14 (SG2100-J only)	Every year
Operation check of microswitch M15 (SG2100-J only)	Every year
Brake system operation check	Every year
Suction / discharge filter cleaning	Every two years
Drive and rotation reduction gear oil change	Every two years
Total oil change in hydraulic tank	Every two years

⚠ DIESEL (D) AND ELECTRIC-DIESEL (E/D) MODELS. As it is possible to install different types of Diesel engines, refer to the instructions manual of the engine manufacturer for all maintenance operations.

7.2.1 Various adjustments

Check the conditions of the following components and, if necessary, tighten:

1) wheel screws;
2) traction motor fixing screws;
3) steering cylinder fixing screws;
4) fixing screws of steering hub pins;
5) basket fixing screws;
6) hydraulic fittings;
7) screws and safety dowels of boom pins;
8) rotation reduction gear fixing screws;
9) elastic supports of heat engine.

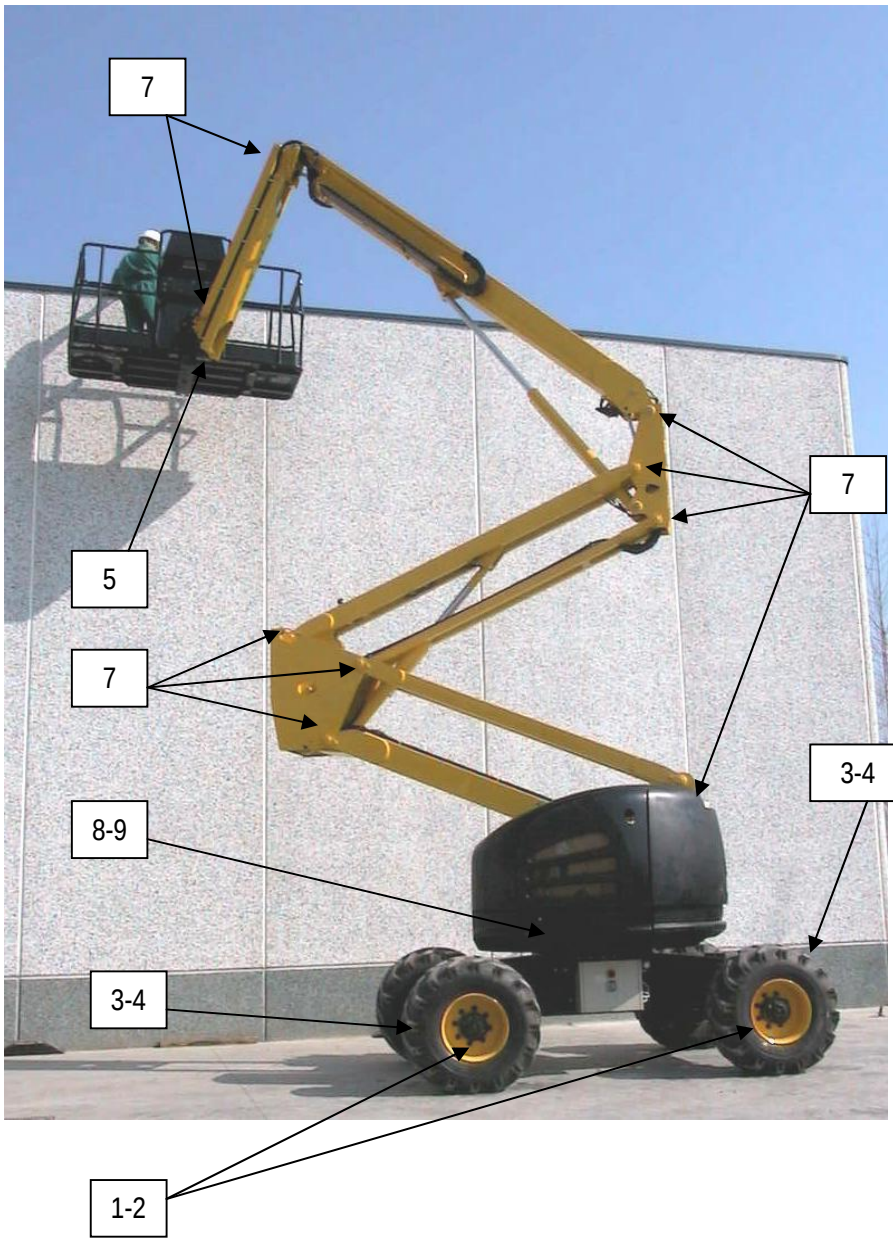


Fig.17

7.2.2 Greasing

Grease all articulated joints at least every month.
Moreover, remember to grease the articulated joint in the following cases:

- after washing the machine;
- before using the machine again after a long time-interval;
- after using the machine in adverse environmental conditions (high humidity levels; presence of dust; coastal areas, etc).

Grease all points indicated in the picture aside (and all articulated joints equipped with greaser) with grease type:

ESSO BEACON-EP2

or similar.

Fig.18

7.2.3 Hydraulic circuit oil level check and change

Check the level in the tank periodically by means of the provided indicator (detail A in the picture aside) and make sure that, with booms completely down, the level always lies between the max. and min. values; if necessary, top up until the max. level is reached.

To empty the oil tank, place a container under cap B and unscrew it.

The oil tank capacity, which varies according to the models, is indicated in the table at page 51.

Do not dispose of used oil in the environment. Comply with the current local standards.

Use only the types of oil indicated in the table at page 51.

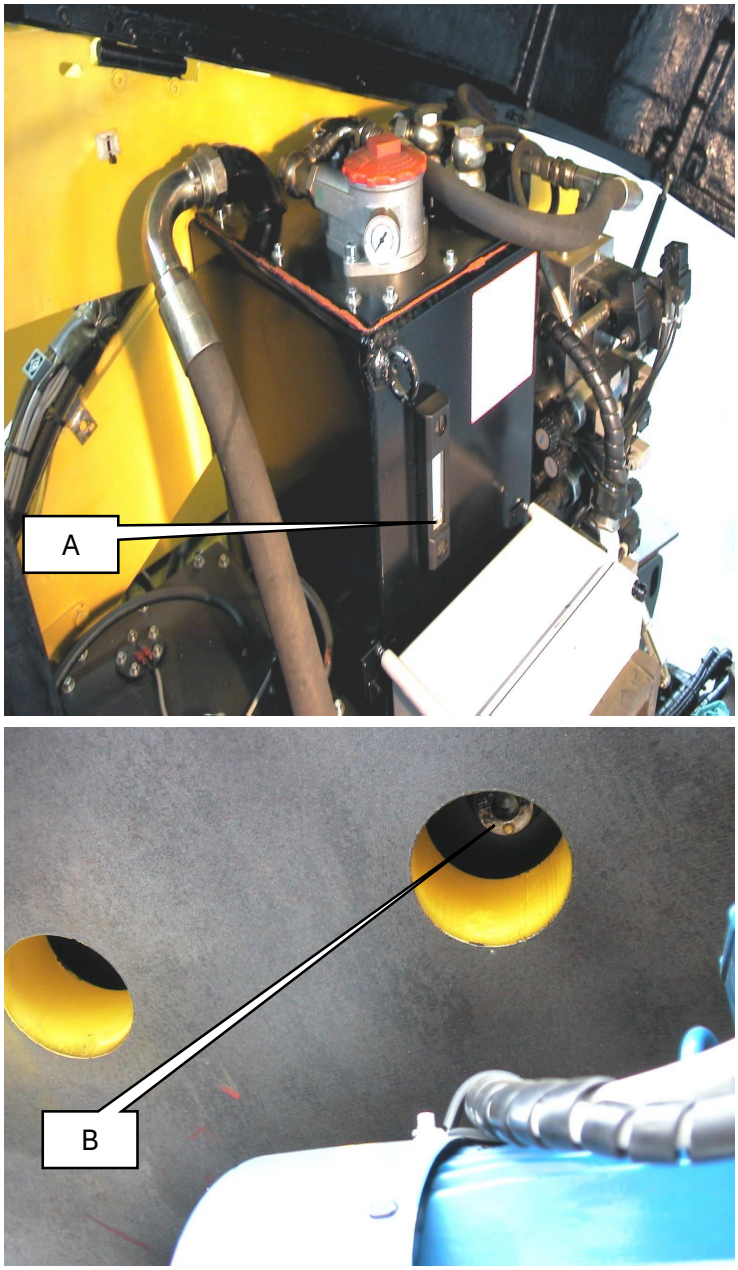


fig.19

7.2.4 Hydraulic filters cleaning / replacing

7.2.4.1 Suction filters

7.2.4.1.1 Main gear pump filter

All models are equipped with a suction filter installed inside the tank at the base of the suction tube, which has to be cleaned (or replaced) at least every two years.

To replace the suction filters installed inside the tank (see figure):

1) stop the machine by pressing the push-button of the ground control unit;
2) empty the hydraulic tank;
3) unscrew the tank cover with the metal suction tubes;
4) extract the cover from the tank;
5) unscrew the filter from the suction tube and clean it with a detergent and a compressed air jet by blowing from the connection or replace the filtering element;
6) to restore the initial condition, carry out the above-mentioned operation in reverse order.

During these operations a quantity of oil may leak out. In this case remove the oil by means of cloths or let the oil flow by placing a suitable container under it.

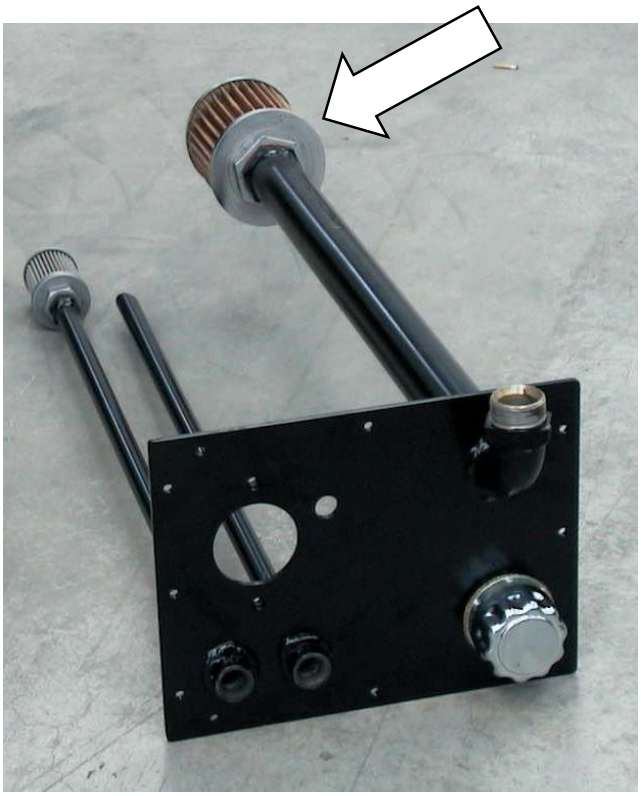


fig.20

7.2.4.1.2 Filter of electric pumps, 380V (OPTIONAL) and 12V (emergency on Diesel models)

The models equipped with a 380V electric pump (OPTIONAL) and/or a 12V emergency pump have an extra suction filter inside the suction tube, which has to be cleaned (or replaced) at least every two years.

To replace the suction filters installed inside the tank (see figure):

1) stop the machine by pressing the push-button of the ground control unit;
2) empty the hydraulic tank;
3) unscrew the tank cover with the metal suction tubes;
4) extract the cover from the tank;
5) unscrew the filter from the suction tube and clean it with a detergent and a compressed air jet by blowing from the connection or replace the filtering element;
6) to restore the initial condition, carry out the above-mentioned operation in reverse order.

During these operations a quantity of oil may leak out. In this case remove the oil by means of cloths or let the oil flow by placing a suitable container under it.

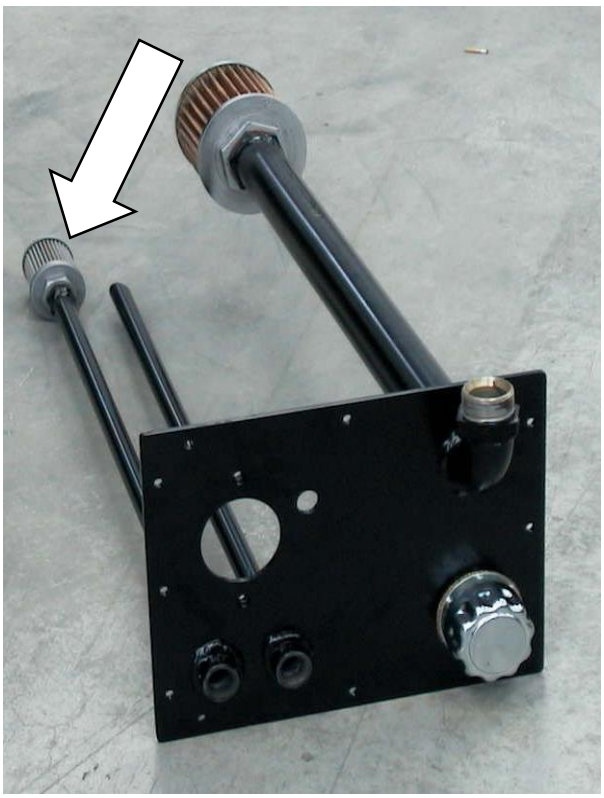


fig. 21

7.2.4.2 Return filter

The return filter is directly flanged to the tank cover.
The return filter is equipped with a clogging indicator to indicate when the filtering cartridge is to be cleaned or replaced.
During normal operation, the visual indicator is in the green zone. When the indicator is in the red zone, the filtering cartridge is to be replaced. To replace the filtering cartridge:

- stop the machine by pressing the push-button on the ground control unit;
- remove the filter cover;
- remove the cartridge;
- fit the new cartridge paying attention to the correct position of the retaining spring and place the cover again.

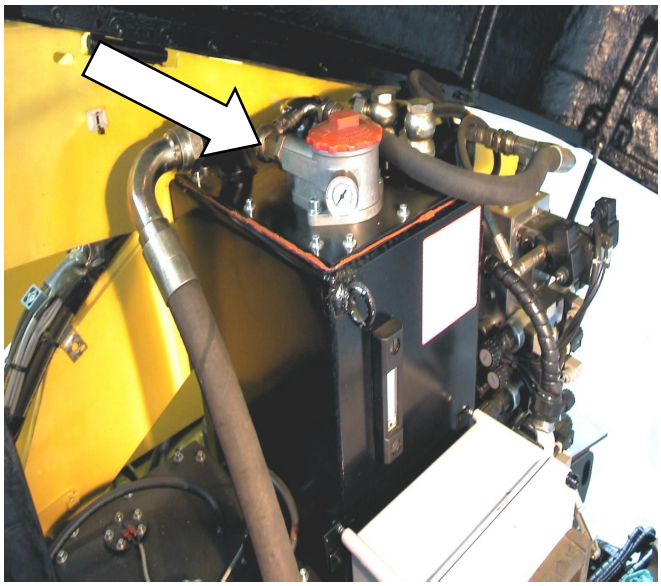


fig. 22

During these operations a quantity of oil may leak out. In this case remove the oil by means of cloths or let the oil flow by placing a suitable container under it.

IT IS FORBIDDEN to start the machine when the filter cover is missing or not properly tightened.

Replace the filters using only original accessories available at our Technical Support.
Do not re-use used oil and do not leave it in the environment, but dispose of in compliance with local standards in force.
Once the filters have been replaced (or cleaned), check the hydraulic oil level in the tank.

7.2.5 Turret rotation reduction gear oil level check and change

The oil level should be checked at least once a year.
Check the level by means of cap (A). Oil check must be carried out when the oil is hot. The level is correct when the reduction gear body is full of oil up to the cap limit.
Should a lubricant volume higher than 10% be topped up, check that there is no oil leakage in the system. Do not mix different types of oil, of the same or of different brands. Do not mix mineral oils and synthetic oils.

The oil must be changed the first time after 50-100 working hours, and afterwards after every 2500 working hours or at least every two years. Depending on the actual operating conditions, these intervals may be varied for each single case. While changing the oil it is advisable to wash the internal part of the crankcase with a fluid recommended by the lubricant producer. To avoid sludge deposits, the oil must be changed when the reduction gear is hot.
To change the oil, unscrew caps (A) and (C) and place a container of at least 3-litre capacity under cap (C).
Empty the reduction gear body completely, clean it as described above and then fill it up to the limit level of the cap (C) (for max. capacity see table at page 51) through cap (A).

NOTE: the oil type to be used is indicated in the table at page 51.

fig.23

7.2.6 Traction reduction gear oil level check and change

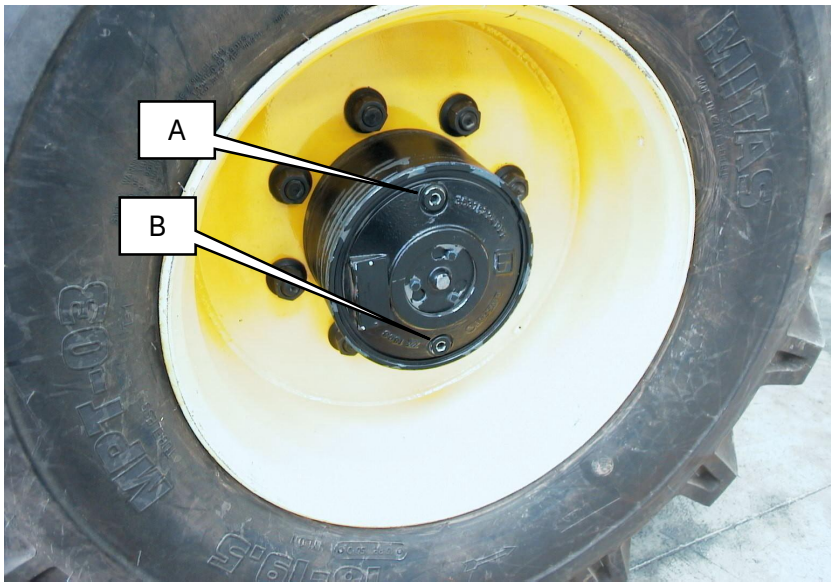


fig. 24

The oil level should be checked at least once a year. Position the machine until the two caps (A and B) reach the position indicated in the picture aside. Check the level by means of cap (A). Oil check must be carried out when the oil is hot. The level is correct when the reduction gear body is full of oil up to the cap limit (A). Should a lubricant volume higher than 10% be topped up, check that there is no oil leakage in the system. Do not mix different types of oil, of the same or of different brands. Do not mix mineral oils and synthetic oils. The oil must be changed the first time after 50-100 working hours, and afterwards after every 2500 working hours or at least every two years. Depending on the actual operating conditions, these intervals may be varied for each single case. While changing the oil it is advisable to wash the internal part of the crankcase with a fluid recommended by the lubricant producer. To avoid sludge deposits, the oil must be changed when the reduction gear is hot. To change the oil unscrew cap B, and place a container of a 2-litre capacity under it. Empty the reduction gear body completely, clean it as described above and then fill it up to the limit level of cap A through the same hole (for max. capacity see following table).

HYDRAULIC SYSTEM OIL		
BRAND	TYPE	REQUIRED QUANTITY
ESSO	Invarol EP46	120 litres
AGIP	Arnica 45	
ELF	Hydrelf DS46	
SHELL	Tellus SX46	
BP	Energol SHF46	
TEXACO	Rando NDZ46	

LUBRICATING OIL FOR REDUCTION GEARS			
BRAND	TYPE	REQUIRED QUANTITY	
		Turret rotation reduction gear	Drive reduction gears
ESSO	Compressor Oil LG 150	2.5 litres	1 litre
AGIP	Blasia S 220		
CASTROL	Alpha SN 6		
IP	Telesia Oil 150		

7.2.7 Air purging from oscillating axle locking cylinders

Once drive has been stopped and with raised platform, the axle locking cylinders are locked in position thus increasing the machine stability.
Check that no air is present inside the oscillating axle cylinders every year.
To carry out this check it is necessary to:

- remove the protection cylinder crankcases (A) of the oscillating axle.
- Unscrew the cap (B) of one of the two cylinders of the oscillating axle;
- carry out the drive operation by bringing the two oscillating axle cylinders to stroke position several times, until there is only oil leaking out of the plug of the locking valve.
- Once purging has been completed, screw cap (B) and check the oil level in the tank.

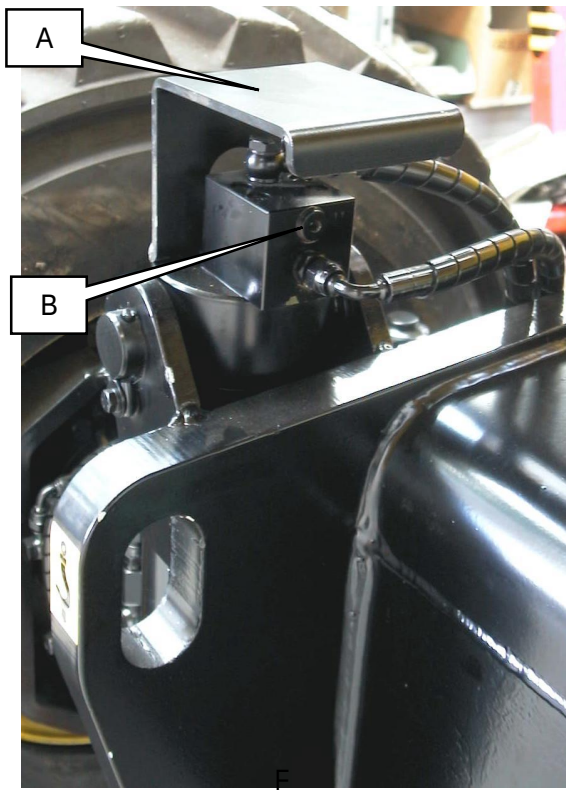


Fig.25

⚠ Attention! This operation ought to be carried out simultaneously by two operators: one is to drive the unit, the other is to check the operation and collect the leaking oil.
This operation ought to be carried out in rooms that allow the oil leaking from the cylinders to be recovered.

CALL THE TECHNICAL SUPPORT

7.2.8 Turret rotation clearance adjustment

Check the coupling between the rotation pinion and the turntable every six months. In normal operating conditions, the coupling clearance must be minimum. Otherwise, adjust according to the following instructions:

- unscrew the four cylinder head screws (A) which fix the reduction gear support to the turret;
- release the two locking counter-nuts (B) of the adjusting screws;
- unscrew both adjusting screws (C) to minimize clearance;
- tighten the two locking counter-nuts (B).

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SPECIALIZED TECHNICIANS ONLY.

CALL THE TECHNICAL SUPPORT

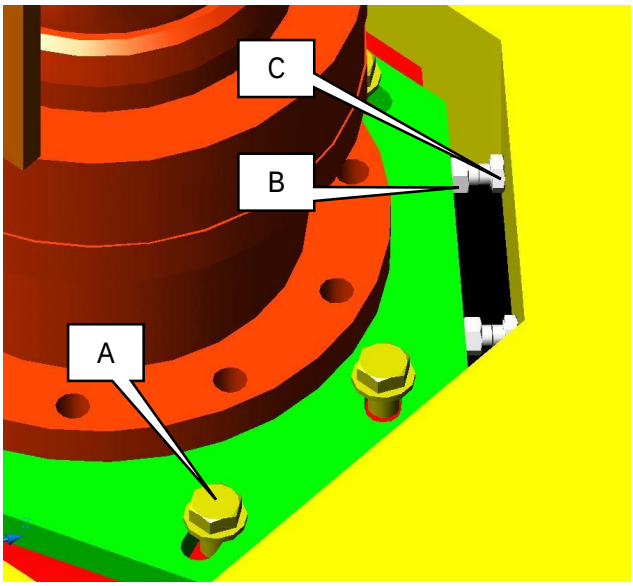


fig.26

7.2.9 Telescopic boom sliding blocks clearance adjustment

Check the wear of the telescopic boom sliding blocks every year.
The correct clearance between the blocks of the boom is 0,5-1 mm; in case of higher clearance tighten the sliding blocks as follows:

- unscrew the dowel A;
- screw the sliding block B with a suitable screwdriver until the above mentioned clearance is reached.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SPECIALIZED TECHNICIANS ONLY.

CALL THE TECHNICAL SUPPORT

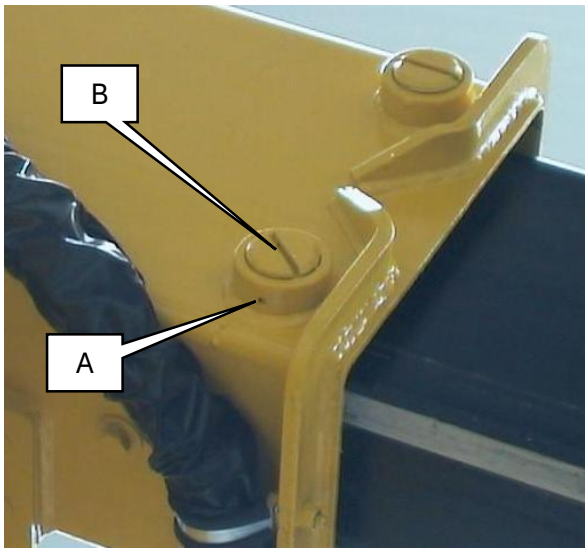


fig.27

7.2.10 Visual check of condition of chains of telescopic boom extraction (SG2100-J only)

Every three months check the wear condition of chains of extraction or telescopic boom.

The type of chain used is Fleyer BL466, the pitch 12.7 mm (*).
The check is to be carried out by measuring 10 pitches.
The max. allowed extension in the most worn-out section is to be 3%.
If the measuring of 10 pitches is higher than 130.8 mm (127 + 3%) the chain is to be considered worn-out and needs replacing.

To check the extraction chains, extract the telescopic boom for about 1 metre, and carry out the above mentioned operations according to the position in the picture A.

To check the retraction chains, remove the cover indicated by X and carry out the above mentioned operations, according to the position indicated in the picture B.

<u>AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SPECIALIZED TECHNICIANS ONLY.</u>

(*) Note: the type of chain used may change depending on the manufacturing changes not necessarily indicated in the manual. If the chain used was not of the type prescribed, ask the after-sales service for the correct type.
The rule indicated for determining the wear condition is always valid.

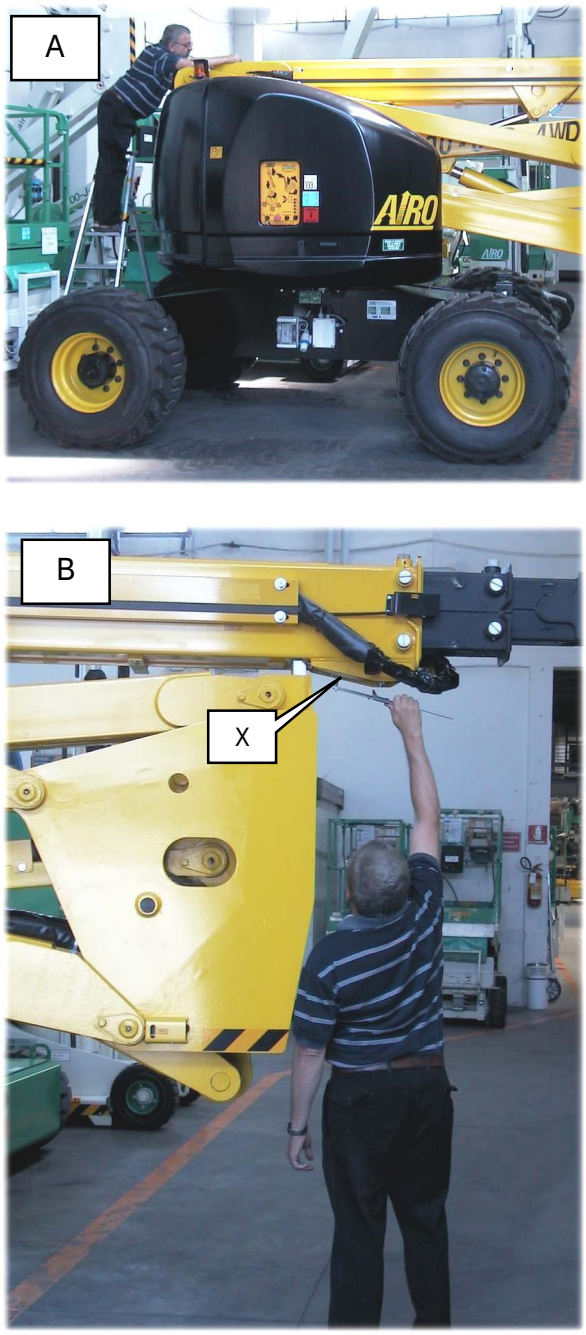


fig.28

⚠ AFTER 10 YEARS THE CHAINS MUST BE REPLACED COMPLETELY.
THIS OPERATION IS TO BE CARRIED OUT BY AUTHORIZED TECHNICAL ASSISTANCE.

7.2.11 Check/adjustment of tension of chains of telescopic boom extraction (SG2100-J only)

Every three months check the tension of chains of boom extraction.
The correct tension is achieved when the two telescopic deck extensions start simultaneously during extraction (or retraction).
Microswitches (M14 and M15) control the tension state of the chains.

Should it be necessary to tension the chains, proceed as follows:
- unscrew the lock-nut;
- screw in the adjusting nut until you get the desired tension.
- Once the tension has been adjusted, block the lock-nut.

To adjust the extraction chains, extract the telescopic boom for about 1 metre, and carry out the above mentioned operations according to the position in the picture A of the previous page.

To adjust the retraction chains, remove the cover indicated by X and carry out the above mentioned operations, according to the position indicated in the picture B of the previous page.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SPECIALIZED TECHNICIANS ONLY.

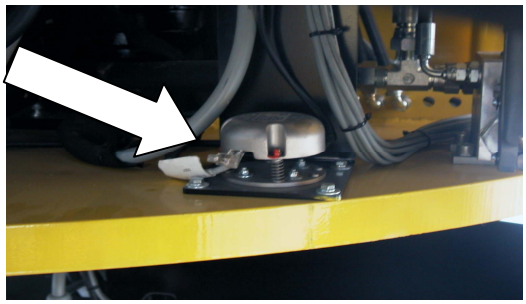
AFTER 10 YEARS THE CHAINS MUST BE REPLACED COMPLETELY.
THIS OPERATION IS TO BE CARRIED OUT BY AUTHORIZED TECHNICAL ASSISTANCE.

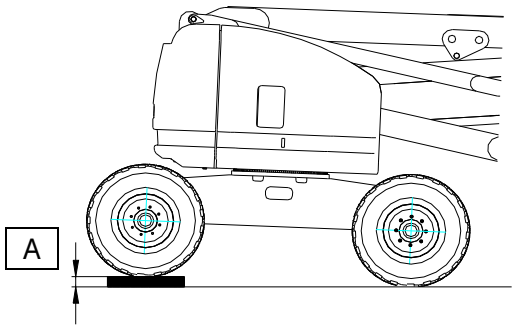
7.2.12 Operation check and adjustment to chassis inclinometer

The inclinometer (see figure aside) does not require any adjustment since it is calibrated in the factory before the machine is delivered.
This device controls the chassis inclination and when inclined over the allowed value:

- it disables lifting when the platform exceeds a given height (varying according to model);
- it disables drive when platform exceeds a given height (varying according to model);
- it warns the operator of the instability condition by means of an audible warning device and a warning light located on the platform (see “General use instructions”).

Adjustment is required only if the device is to be replaced.
The inclinometer checks the inclination with respect to the two axes (X; Y). On machine models with the same transversal and longitudinal inclination limits, the control is carried out with reference to one axis only (X-axis).





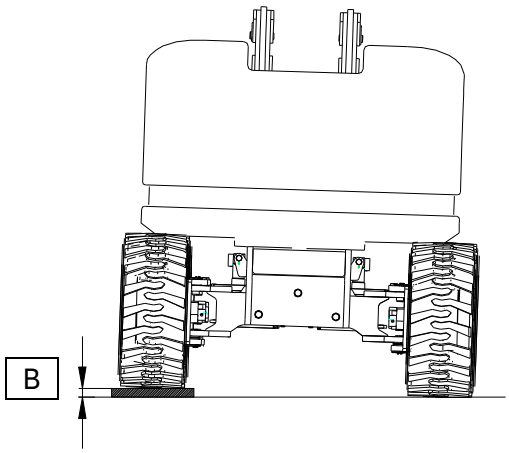


Fig.29

To check the inclinometer operation according to the longitudinal axis (generally X-axis):

- using the controls of the control panel set the machine so as to place a shim of dimension (A+10 mm) under the two rear or front wheels (see following table);
- wait three seconds (intervention delay set at factory) until the danger red light and the audible platform device turn on;
- with platform lowered (booms down, telescopic boom in and jib at a height between +10° and –70°) all manoeuvres are still possible;
- lifting one of the booms and/or extracting the telescopic boom and/or lifting the jib over 10° with respect to the horizontal axis, the machine control system locks the lifting and drive controls.

To adjust the inclinometer according to the transversal axis (normally Y-axis):

- using the controls of the control panel set the machine so as to place a shim of dimension (B+10 mm) under the two side right or left wheels (see following table);
- wait three seconds (intervention delay set at factory) until the danger red light and the audible platform device turn on;
- with platform lowered (booms down, telescopic boom in and jib at a height between +10° and –70°) all manoeuvres are still possible;
- lifting one of the booms and/or extracting the telescopic boom and/or lifting the jib over 10° with respect to the horizontal axis, the machine control system locks the lifting and drive controls.

CAUTION! Usually the inclinometer does need to be adjusted. The equipment necessary for the replacement and adjustment of this component is such that these operations should be carried out by skilled personnel.

CALL THE TECHNICAL SUPPORT

MODELS				
SHIMS	SG1850-J-D-4WD	SG1850-J-E-4WD	SG2100-J-D-4WD	SG2100-J-E-4WD
A [mm]	170	170	170	170
B [mm]	138	138	138	138

CAUTION! The dimensions of shims A and B refer to max. allowed inclination as indicated in table "TECHNICAL FEATURES". To be used during the inclinometer calibration.

7.2.13 Operation check and adjustment of platform inclinometer

The inclinometer (see figure aside) does not require any adjustment since it is calibrated in the factory before the machine is delivered.
This device controls the platform inclination and when inclined 5° over the allowed value for the chassis:

- it disables lifting and lowering of the telescopic boom when the platform exceeds a given height (varying according to model);
- it warns the operator of the instability condition by means of an audible warning device and a warning light located on the platform (see "General use instructions").

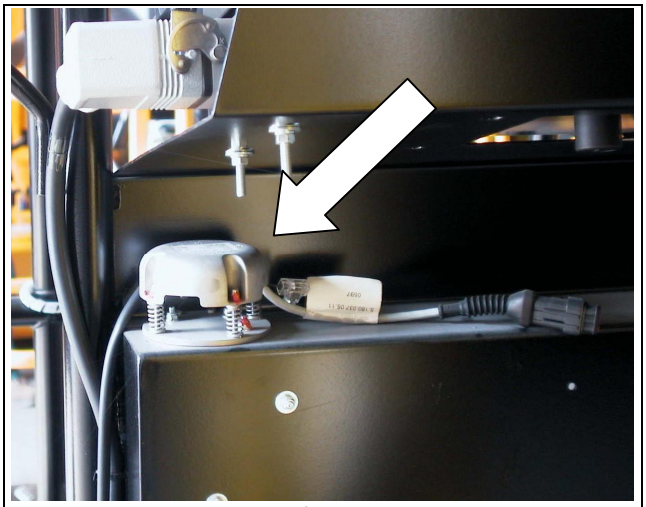


Fig.30

Adjustment is required only if the device is to be replaced.
The inclinometer checks the inclination with respect to the two axes (X; Y). On machine models with the same transversal and longitudinal inclination limits, the control is carried out with reference to one axis only (X-axis).

<u>To check the inclinometer operation according to the longitudinal axis:</u>

- using the controls of the control panel, with booms completely down, control the platform levelling forward (see paragraph "Platform control panel") until an inclination evidently unbalanced forward is reached (the alarm will be activated when the inclination exceeds the allowed value for the chassis by 5°);
- wait three seconds (intervention delay set at factory) until the danger red light and the audible platform device turn on;
- with platform lowered (booms down, telescopic boom in and jib at a height between +10° and –70°) all manoeuvres are still possible;
- lifting the scissors and/or extracting the telescopic boom and/or lifting the jib over 10° according to the horizontal axis, the machine control system locks the lifting and lowering controls of the telescopic boom while all the other functions are still possible. The emergency lowering of the telescopic boom can be carried out by manually setting the platform inclinometer in the opposite direction to the platform inclination. A bubble level placed on the inclinometer indicates the direction in which the inclinometer is to be positioned in case of an emergency.

⚠ CAUTION! Usually the inclinometer does need to be adjusted. The equipment necessary for the replacement and adjustment of this component is such that these operations should be carried out by skilled personnel.

<u>CALL THE TECHNICAL SUPPORT</u>

7.2.14 Operation check and adjustment of platform overload controller

The AIRO self-propelled articulated boom aerial platforms are equipped with a sophisticated system controlling the platform overload.
Normally the overload controller does not require any adjustment, since it is calibrated in the factory before the machine is delivered.

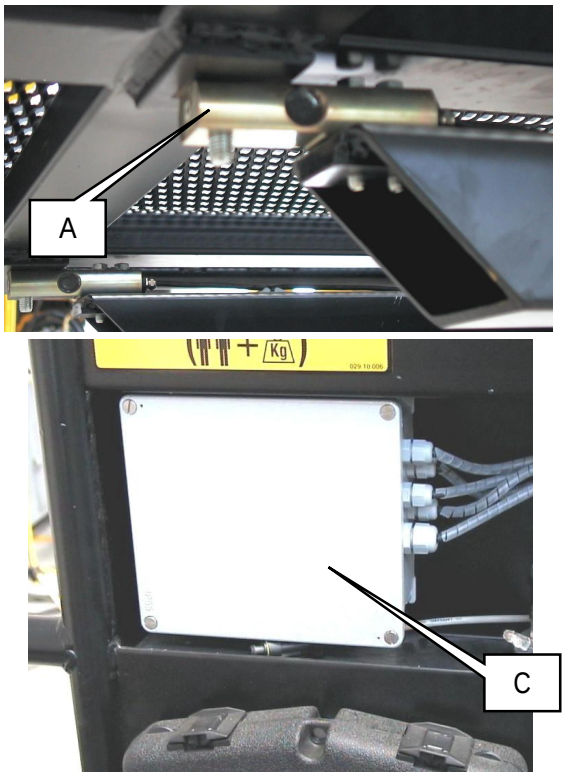


Fig.31

This device checks the load on the platform and:

- it disables all movements if the platform is overloaded by 30%(*) compared to the rated load;
- it warns the user of the overload condition by means of the audible warning device and the platform warning light (see "General use instructions").

By removing the exceeding load, the machine can be operated again.

The overload controller consists of:

- deformation transducers (A);
- electronic board (B) to calibrate the device and by-pass in case of emergency, located inside a tight case (C) on the platform;

Device operation check:

- when the platform is completely lowered load a charge evenly distributed equal to the normal load allowed by the platform (see paragraph "Technical features"). In this condition all manoeuvres should be possible both from platform and ground control station;
- when the platform is completely lowered add to the rated load an overload of 30% of the rated load. In this condition the red light and the audible device turn on (see "General use rules") but all manoeuvres are still possible;
- extract the telescopic boom (implies lifting control): when one of the two microswitches for boom control activates (the jib activates its microswitch after exceeding a height of 10° according to the horizontal axis) the alarm condition blocks the machine completely. To operate the machine again, remove the excessive load.

The calibration of the system is necessary:

- in case of replacement of one of the items composing the system;
- when, following an excessive overload or a collision, without the excessive load the danger condition is signalled anyway.

To calibrate the device:

- turn off the machine;
- open the box which contains electronic board C;
- with no load on the platform, introduce the jumper to connector G;
- turn on the machine;
- press button D (the yellow and red light turn on);
- press button E (the luminosity of the red light increases a few seconds), and the load system will be reset;
- on the furthermost part of the platform overhang place a load equal to the rated load plus 25%;
- press button F (the green light turns on a few seconds);
- press button D again to exit the calibration procedure (the yellow light turns off and if the procedure has been carried out correctly, the red light stays on signalling the overload);
- turn off the machine;
- open the jumper on connector G;
- turn on the machine;
- check that after removing the 25% overload (only the rated load stays on the platform) the alarm condition does not occur in any of the platform positions (platform down, up, driving, rotated);
- once the adjustment has been completed, close the box which contains the board.

In case of fault and impossibility to calibrate the device, a by-pass of the system is possible by means of key switch (H) under the control panel.
Turn it from its rest position of 1/4 turn and hold this position at least 3 seconds.
WARNING!! IN THIS CONDITION THE MACHINE CAN CARRY OUT ANY OPERATION, THOUGH THE RED FLASHING LED AND THE INTERMITTENT AUDIBLE DEVICE SIGNAL THE DANGER CONDITION. TURNING OFF THE MACHINE WILL RESET THE SYSTEM, AND UPON STARTING THE LOAD DETECTING SYSTEM OPERATES AGAIN SIGNALLING THE PREVIOUS OVERLOAD CONDITION.
THIS OPERATION IS ALLOWED ONLY FOR EMERGENCY HANDLING OF THE UNIT. DO NOT USE THE MACHINE IF THE OVERLOAD CONTROLLER IS NOT EFFICIENT.

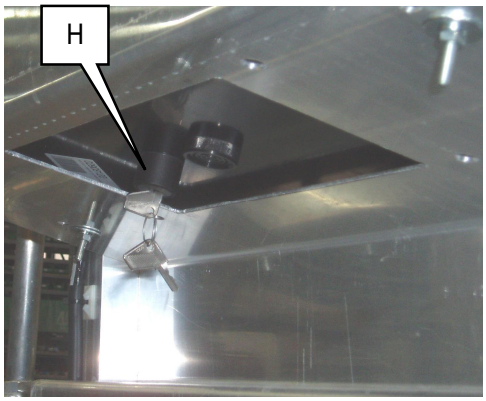


Fig.31

CAUTION!
Calibration is to be carried out by skilled personnel. This operation may not be performed by the operator.

7.2.15 Operation check of microswitches M1

The three lifting booms and the telescopic extraction are controlled by microswitches:

- M1A on the scissors;
- M1B on the boom;
- M1C on the Jib;
- M1D on the telescopic extraction.

Once a year check that with platform outside its rest position (at least one of the microswitches M1 is activated – the Jib activates the microswitch M1C only if lifted with inclination higher than +10° according to the horizontal axis):

- if the chassis is inclined over the max. allowed inclination the controls for lifting and drive are inhibited;
- it the platform is inclined over the max. allowed inclination the controls for lifting/lowering of the telescopic boom are inhibited;
- the safety drive speed is automatically activated;
- the compensation control for platform levelling is automatically activated;
- if the oscillating axle (if available) is not aligned with the fixed axle drive is inhibited;
- if rear wheels are not aligned with the chassis (machines with four steering wheels) drive is inhibited;
- when the platform is overloaded ALL operations until removal of overload are inhibited.

fig. 33

7.2.16 Operation check of microswitch M9 (if available)

The position of the swinging turret with respect to the chassis can be controlled by the microswitch M9 (OPTIONAL).
This microswitch at the centre of the platform will allow the operator on board to have the drive and steer direction always consistent with the platform position; The operator on the platform control station will always have the direction of drive and steering consistent with his own position.

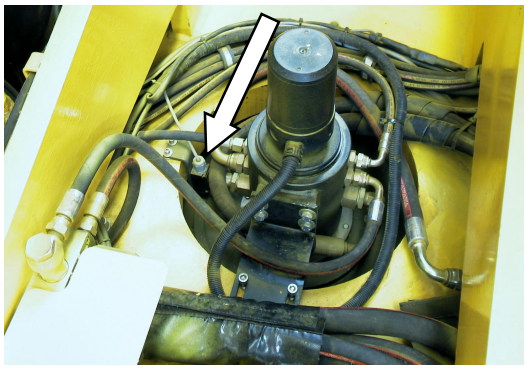


fig.34

CAUTION!
Be careful when the drive and steering controls match the +/-90° turret rotation according to the drive direction; in this position pay attention before operating the drive and steering controls.
Due to the possibility of performing simultaneously the controls of drive/steering and turret rotation, the reverse of drive/steering controls once the exchange point has been overcome takes place upon release of steering and drive controls.

7.2.17 Operation check of Microswitch (A) and proximity sensor (B) M10

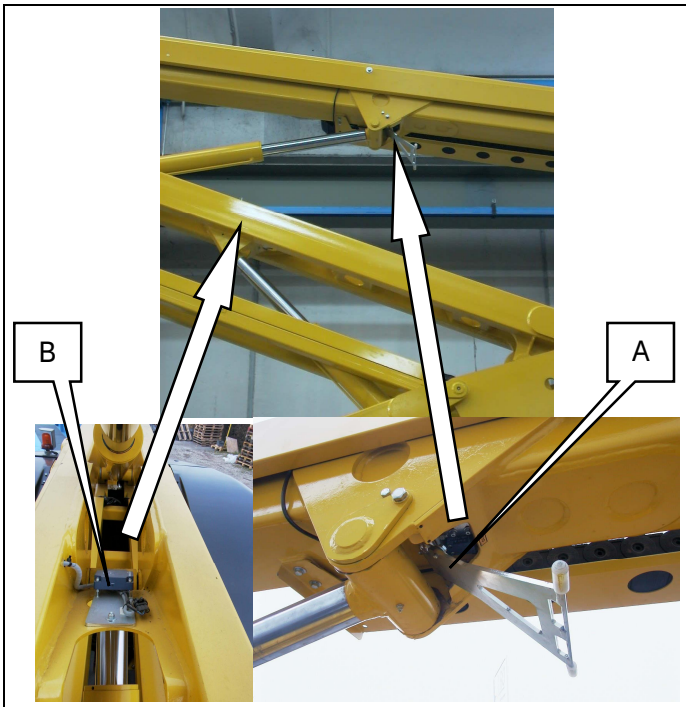


fig.35

The microswitch (A) and the proximity sensor (B) M10 on the second boom of the scissors check the interference between the scissors and telescopic boom.
In case of interference between scissors and telescopic boom the microswitch M10, by means of special levers, stops and inhibits the following operations:

- scissors lowering;
- telescopic boom lowering.

If the microswitch M10 does not work, the proximity sensor M10 near it will perform the same functions.

In the event that interference between scissors and telescopic boom occurs in conditions of chassis instability (danger red light and audible device ON – lifting operations are inhibited) the system allows the telescopic boom to be lifted gradually in order to – together with the scissors lowering – recover the platform up to rest position.

7.2.18 Operation check of proximity sensors M11 and M12 (OPTIONAL)

The proximity sensors M11 and M12 (OPTIONAL) check the position of the 4 steering wheels (OPTIONAL) and are located:

- one on the front steering axle;
- one on the rear steering axle.

Their function is:

- to locate the point of “rear straight wheels” controlled by the operator on the platform;
- to inhibit the drive operation with booms up if the rear wheels are not aligned with the direction of travel (this condition is signalled by the platform danger red light - the audible alarm is not activated).

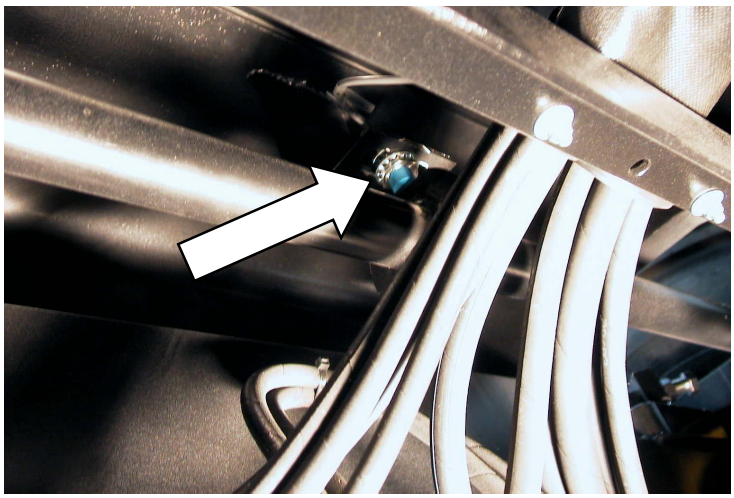


fig. 36

7.2.19 Operation check of proximity sensor M13 (OPTIONAL)

The proximity sensor checks the position of the oscillating axle (OPTIONAL) and is located on the chassis, above the oscillating axle.

Its function is:

- when the platform is lifted (the oscillating axle locks in the position it was before lifting) if the two wheels of the oscillating axle are not on the same ideal plane as those of the fixed axle, drive is prevented (this condition is signalled by the danger red light at platform - the audible alarm is not activated).

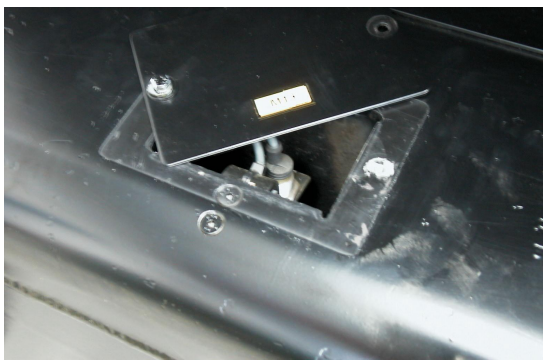


fig.37

7.2.20 Operation check of microswitches M14 and M15 (SG2100-J only)

The microswitches M14 and M15 control the tension of the chains of extraction (M14) and retraction (M15) of the telescopic boom.

If one or both checked chains are slackened:

- the operator on the platform is informed of the danger condition through a flashing red light of general danger (series of 3 flashes);
- with lowered platform, lifting of boom and scissors and telescopic extraction/retraction are inhibited but jib lifting is still allowed (EV18);
- with lifted platform, telescopic extraction/retraction is inhibited to bring the platform to access position.

7.2.21 Operation check of dead-man pedal safety system

The platform dead-man pedal is for enabling the operation controls of the machine from the platform control station.
If the control panel is selected but the dead-man pedal is not pressed the green light on the platform is flashing and the machine cannot be operated.
Pressing the dead-man pedal the operation controls of the machine are activated and the condition is signalled by a steady green led.
Once the pedal has been pressed, the controls are to be activated within 10 seconds, after which they are deactivated and the green light will flash again.

7.2.22 Starter battery models “D”

The starter battery is for:
- powering the machine control circuits;
- starting the heat engine;
- powering the 12V electric pump for emergency operations.

7.2.22.1 Starter battery maintenance

The starter battery does not require any maintenance operation.
- Keep terminals clean by removing any oxidation residues;
- Check correct terminal tightening.

7.2.22.2 Starter battery recharge

Starter batteries do not require any recharge.
During normal operation of the Diesel engine an alternator recharges the battery. On those machines equipped with a 380 three-phase electric pump, the electric pump control system keeps the starter battery charged.

CAUTION!
Check the charge of the starter battery after carrying a recovery operation of the platform with the 12V emergency electric pump.

7.2.23 "DRIVE" battery for models "E", "E/D" and "E/B"

The battery is one of the most important elements of the machine. It is recommended to keep it in an efficient condition to increase its useful life, to avoid faults and to reduce the management costs of the machine.

7.2.23.1 General instructions for DRIVE battery

• Charge the battery in airy rooms and open the caps to allow the outflow of gas.
• Do not approach the battery with open flames. Risk of explosion due to the formation of explosive gases.
• Do not carry out temporary or irregular electric connections.
• The terminals must be tightened and without deposits. The cables must be provided with a good insulation.
• Keep the battery cleaned, dry and free of oxidation products by using antistatic cloths.
• Do not place tools or any other metal object on the battery.
• Check that the electrolyte level is 5-7 mm higher than the splashguard level.
• During charging operations check that the electrolyte temperature is not higher than 45°C max.
• If the machine is equipped with an automatic topping up device, follow the instructions described in the battery user manual carefully.

7.2.23.2 DRIVE battery maintenance

• For normal water operating conditions, water topping up is to be carried out every week.
• Top up using distilled or demineralised water.
• Top up after battery charging. The electrolyte level must be 5-7 mm higher than the splashguard level.
• For machines equipped with automatic topping up device, follow the instructions given in the battery user manual.
• Battery discharge must be stopped when 80% of the battery rated capacity has been used. An excessive and prolonged discharge irreversibly damages the battery. The machine is equipped with a device that, when the battery is discharged by 80%, lifting operations are inhibited. The battery needs to be recharged. This condition is signalled by a flashing light of the relevant led on the platform control panel.
• Battery charge is to be carried out according to the instructions given in the next paragraphs.
• Keep caps and connections covered and dry. A careful cleaning allows electric insulation protection, good operation and useful life of the battery.
• In case of faulty operations due to the battery, avoid any direct intervention and call the Technical Support.

7.2.23.3 Battery charger: DRIVE battery recharge

⚠ Explosive gas is originated during battery charging process; therefore, charging must take place in airy rooms where no risks of fire and explosion exist and in the presence of fire extinguishers.
WARNING!! After charging, when the battery charger is still connected, the electrolyte density values should range from 1.260 to 1.270 g/l (at 25°C).

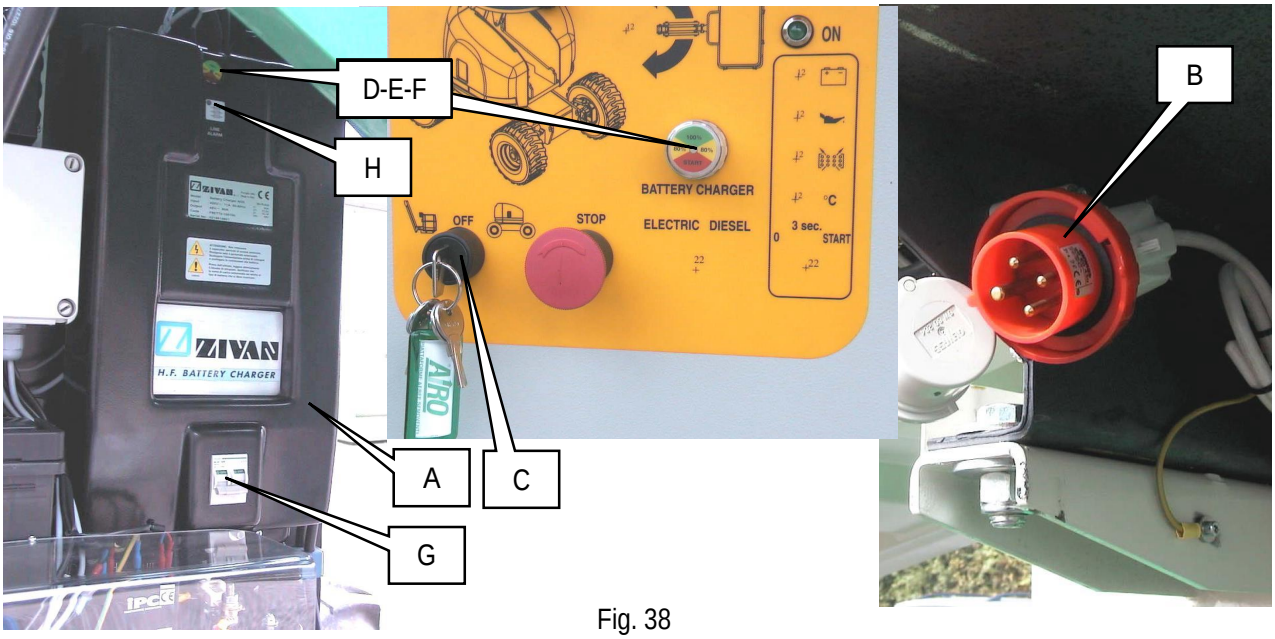


Fig. 38

A Battery charger
B Three-phase wall plug
C On-off switch
D Red LED charge check indicator (Start)
E Yellow LED charge check indicator (80%)
F Green LED charge check indicator (100%)
G Switch on the battery charger
H Power alarm warning light

To use the battery charger follow this procedure:

- § connect the battery charger by means of plug B to a 380V (400V +/-15%) 50Hz/60Hz socket, equipped with all protections according to the current standards in force;
- § set the switch on battery charger (G) to ON position;
- § set the on-off switch C of the ground control station to OFF position (machine off), checking battery charger connection by means of LED D (red) (if it is on, connection is on-line);
- § if LED E (yellow) lights up, battery charger is approximately 80%;
- § if LED F (green) lights up, battery charge is over. The battery charger automatically turns off.

CAUTION! Light H turns on when a phase is missing in the power circuit. In this condition the battery charger does not work and the charge check indicator becomes yellow (check the power and inlet fuses).

CAUTION!
At the end of recharge remove the battery charger supply cord before starting machine operations.

7.2.23.3.1 Battery charger: fault report

An intermittent audible signalling and the flashing LED on the battery charger indicator described in the previous paragraph indicate that a warning situation has occurred:

Signalling	Alarm type	Problem description and troubleshooting
Audible signalling + flashing RED	Battery presence	Battery is disconnected or faulty (check connection and the rated voltage of the battery).
Audible signalling + flashing YELLOW	Thermal probe	Thermal probe is disconnected during charging or outside working range (check probe connection and measure battery temperature).
Audible signalling + flashing GREEN	Timeout	Phase 1 and/or Phase 2 of duration higher than the max. allowed value (check battery capacity).
Audible signalling + flashing RED-YELLOW	Battery Current	Loss of output current control (fault in control logic).
Audible signalling + flashing RED-GREEN	Battery Voltage	Loss of output voltage control (battery disconnected or fault in the control logic).
Audible signalling + flashing RED-YELLOW-GREEN	Thermal	Overtemperature of semiconductors (check the fan operation).

CAUTION!
In presence of alarm the battery charger stops the current delivery.

7.2.24 Battery replacement

Replace the old batteries only with models of the same voltage, capacity, dimensions and mass.
Batteries must be approved by the manufacturer.

AS THIS OPERATION IS VERY IMPORTANT IT IS TO BE CARRIED OUT BY SPECIALIZED TECHNICIANS ONLY.

CALL THE TECHNICAL SUPPORT

8 MARKS AND CERTIFICATIONS

The models of self-propelled aerial platform described in this manual were subject to the CE type test according to the EEC Directive 98/37/EC.
The certification was issued by:

I.C.E.P.I Srl Via P. Belizzi, 29/31/33 29100 Piacenza ITALIA	CE

Test carrying out is shown by the above plate with CE mark applied on the machine and by the declaration of conformity enclosed in this user manual.

9 CHECK REGISTER

The check register is released to the user of the platform in conformance with Attachment 1 of Directive 89/392/EEC, according to the integration required by Directive 91/368/EEC.
This register is to be considered an integral part of the equipment and must accompany the machine for its entire life until its final disposal.

The register is provided for the notation, according to the proposed format, of the following events that regard the life of the machine:

- Periodic obligatory inspections under the care of the agency responsible for checking it (in Italy, the A.S.L.).
- Obligatory periodic inspections to verify the structure, proper machine functioning and the protection and safety systems. Such inspections are the responsibility of the safety manager of the company that owns the machine and must occur with ANNUAL frequency.
- Transfers of Ownership. In Italy, the purchaser must notify the ISPESL department responsible that the installation of the machine has occurred.
- Extraordinary maintenance work and replacement of important elements of the machine.

REQUIRED PERIODIC INSPECTIONS BY THE REGULATORY AGENCY		
Date	Observations	Signature + Stamp

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Visual check	Check the integrity of the guardrails; of any access stairs; rust; state of the tyres; oil leaks; locking pins on the structure.

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Various adjustments	See chapter 7.2.1

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Deformation of tubes and cables	Most of all, check at junction points that tubes and cables do not show any evident defects.

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Greasing (monthly operation; confirm that it was carried out at least once a year)	♦ See chapter 7.2.2

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Stickers and plates check (monthly operation; confirm that it was carried out at least once a year)	Check the legibility of the aluminium plate on the platform where the main instructions are summarised; that the capacity stickers are on the platform and that they are legible; that the stickers on the ground and platform control stations are legible.

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Total oil change in hydraulic tank and traction and turret rotation reduction gears (EVERY TWO YEARS)	See chapters 7.2.3, 7.2.5, 7.2.6

	Date	Observations	Signature + Stamp
2nd Year			
4th Year			
6th Year			
8th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Hydraulic filters cleaning / replacing (EVERY TWO YEARS)	See chapter 7.2.4

	Date	Observations	Signature + Stamp
2nd Year			
4th Year			
6th Year			
8th Year			
10th Year			

♦ Air removal from oscillating axle locking cylinders (only on machines equipped with oscillating axle)	♦ See chapter 7.2.7

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Turret rotation clearance adjustment	♦ See chapter 7.2.8

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Telescopic boom sliding blocks clearance adjustment	♦ See chapter 7.2.9

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Visual check of condition of chains of telescopic boom extraction SG2100-J	♦ See chapter 7.2.10

	Date	Observations	Signature + Stamp
1st Year 1			
1st Year 2			
1st Year 3			
1st Year 4			
2nd Year 1			
2nd Year 2			
2nd Year 3			
2nd Year 4			
3rd Year 1			
3rd Year 2			
3rd Year 3			
3rd Year 4			
4th Year 1			
4th Year 2			
4th Year 3			
4th Year 4			
5th Year 1			
5th Year 2			
5th Year 3			
5th Year 4			

6th Year 1			
6th Year 2			
6th Year 3			
6th Year 4			
7th Year 1			
7th Year 2			
7th Year 3			
7th Year 4			
8th Year 1			
8th Year 2			
8th Year 3			
8th Year 4			
9th Year 1			
9th Year 2			
9th Year 3			
9th Year 4			
10th Year 1			
10th Year 2			
10th Year 3			
10th Year 4			

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Check/adjustment of tension of chains of boom extraction SG2100-J	♦ See chapter 7.2.11

	Date	Observations	Signature + Stamp
1st Year 1			
1st Year 2			
1st Year 3			
1st Year 4			
2nd Year 1			
2nd Year 2			
2nd Year 3			
2nd Year 4			
3rd Year 1			
3rd Year 2			
3rd Year 3			
3rd Year 4			
4th Year 1			
4th Year 2			
4th Year 3			
4th Year 4			
5th Year 1			
5th Year 2			
5th Year 3			
5th Year 4			

6th Year 1			
6th Year 2			
6th Year 3			
6th Year 4			
7th Year 1			
7th Year 2			
7th Year 3			
7th Year 4			
8th Year 1			
8th Year 2			
8th Year 3			
8th Year 4			
9th Year 1			
9th Year 2			
9th Year 3			
9th Year 4			
10th Year 1			
10th Year 2			
10th Year 3			
10th Year 4			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Operation check of the turret inclinometer	♦ See chapter 7.2.12

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Operation check of platform inclinometer	♦ See chapter 7.2.13

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Platform overload controller check	♦ See chapter 7.2.14

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Operation check of microswitches M1	♦ See chapter 7.2.15

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Operation check of microswitch M9 (if available)	♦ See chapter 7.2.16

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Operation check of microswitch M10	♦ See chapter 7.2.17

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Operation check of proximity sensors M11 and M12 (if available).	See chapter 7.2.18

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Operation check of proximity sensor M13 (if available)	See charter 7.2.19

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Operation check of proximity sensors M14 and M15 (if available).	See chapter 7.2.20

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Operation check of dead-man pedal safety system	See chapter 7.2.21

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Battery condition (Electric models –E)	See chapter 7.2.23

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

♦ Emergency manual controls check	♦ See chapter 5.6

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

REQUIRED PERIODIC INSPECTIONS BY THE OWNER

CHECK	*DESCRIPTION OF OPERATIONS TO BE PERFORMED*
♦ Braking system efficiency check	Going down a ramp with max. slope indicated in chapter “Technical features”, at the lowest speed, the machine should be able to stop, upon release of the joystick, in a space of less than 1.5 meters

	Date	Observations	Signature + Stamp
1st Year			
2nd Year			
3rd Year			
4th Year			
5th Year			
6th Year			
7th Year			
8th Year			
9th Year			
10th Year			

TRANSFERS OF OWNERSHIP

FIRST OWNER

Company	Date	Model	Serial Number	Date of Delivery

AIRO – Tigieffe S.r.l.

SUBSEQUENT TRANSFERS OF OWNERSHIP

Company	Date

We affirm that, as of the date quoted above, the technical, dimensional and functional characteristics of this machine were in conformance with what was originally required and that any changes have been recorded in this register.

The Seller

The Purchaser

SUBSEQUENT TRANSFERS OF OWNERSHIP

Company	Date

We affirm that, as of the date quoted above, the technical, dimensional and functional characteristics of this machine were in conformance with what was originally required and that any changes have been recorded in this register.

The Seller

The Purchaser

SUBSEQUENT TRANSFERS OF OWNERSHIP

Company	Date

We affirm that, as of the date quoted above, the technical, dimensional and functional characteristics of this machine were in conformance with what was originally required and that any changes have been recorded in this register.

The Seller

The Purchaser

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

IMPORTANT BREAKDOWNS

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager

DATE	Description of Breakdown	Solution

Spare Parts Used		Description
Code	Quantity	

Service

Safety Manager