Ing. BONFIGLIOLI S.p.A.

SHEARS

SQUALO

OPERATIONAL INSTRUCTIONS

AND MAIN SPARE PARTS

Ing. BONFIGLIOLI S.p.A.
Via S. Andrea, 11 Castello d'Argile
BOLOGNA - ITALY

Type of machine: **Shears for bulky scrap metal**
Model: _____
Manufacturer: ***Ing. BONFIGLIOLI S.p.A.***

SERIAL NUMBER	# 842
YEAR OF CONSTRUCTION	2009

1500 Shear

CAUTION

Do not use the machine before you have read this manual.
Most accidents that happen at work are caused by the failed observance of safety instructions and basic precautions. Many accidents could be avoided by knowing the causes in advance, consequently taking the required precautionary measures.

FOREWORD

These operational instructions have been written mainly for the operator and provide information on how to use the machine safely.

These instructions are not supposed to be a training manual for unskilled operators. All descriptions presume the employment of exclusively expert operators.

The operator is the person directly responsible for the machine.

Hasty and rushed procedures are often the cause for many accidents.

CAUTION

The machine is designed to cut metal or other material, provided that it is within the cutting capacity of the machine itself.

The following in particular are not to be cut:

- **Materials that may cause explosions**
- **Materials containing corrosive agents or pollutants**
- **Materials or matter that are not within the characteristics for which the machine has been manufactured**

Always observe the following fundamental rules:

- Get familiar with the machine movements before actually starting to use it. Read the manual and try out all the actions described herein step by step.
- Always keep this manual onboard the machine.
- Plan each job carefully.
- If the machine is to be transported, find out all the information needed to reach the place of work: itinerary, height of bridges and so on, load-bearing capacity of bridges etc.
- When driving on the road always observe all the norms and prescriptions established by current laws in terms of accident prevention and road traffic regulations.
- Do some research on where and how the machine is going to be used: the stability of the ground, if there is enough room to load the shears if working near buildings, electrical lines, telephone lines and similar.
- Do not use the machine if the conditions of visibility at the site are poor (insufficient lighting, fog etc.)
- Ensure that all the safety devices are efficient before you start the job. Never use the machine if you have any doubts on the efficiency of the safety devices.
- Always keep the machine in a perfectly safe state by preventively servicing it constantly and thoroughly. Do not put off any repairs needed and always have them carried out by experts. Use exclusively original spare parts.

CAUTION

The company Ing. Bonfiglioli SpA reserves the right to make any technical changes to this manual without requiring any authorization.

Reproduction of this manual is prohibited: The company Ing.Bonfiglioli enforces its rights on the drawings and technical documentation according to the law. Additional copies can be obtained from the Technical Services of the Company Ing.Bonfiglioli SpA.

CONTENTS

1. INTRODUCTION

These operational instructions are valid for all machines of the range. When you find graphs, drawings, data, norms etc. referred to a specific machine, the model to which the information refers will be explicitly indicated.

1.1. OPERATIONAL WARNINGS

Read the whole instruction manual before starting to work with the machine.

The following indications are enhanced in the instructions herein:

DANGER: This refers to activities that may involve hazards for persons.

WARNING: This refers to the risk of material damages (i.e. the machine).

Caution: This refers to integrations and suggestions on the use of the machine.

COMPLIANCE WITH REGULATIONS

The machine is designed and manufactured in accordance with the Essential Safety Requirements of Annex I to Directive 2006/42/EC commonly known as the Machinery Directive.

Is placed on the market capable of operating independently accompanied by the EC Declaration of Conformity and with CE marking.

EMISSIONS TO AIR DURING WORKING PROCESS

During working process the machine emits diesel exhaust fumes only and no other toxic/harmful substances as it is conceived and planned to compact only **purified and/or** adequately **secured products.**

LIGHTING

The machine does not have a lighting system and must be therefore located and operate in a well-lit environment.

VIBRATIONS

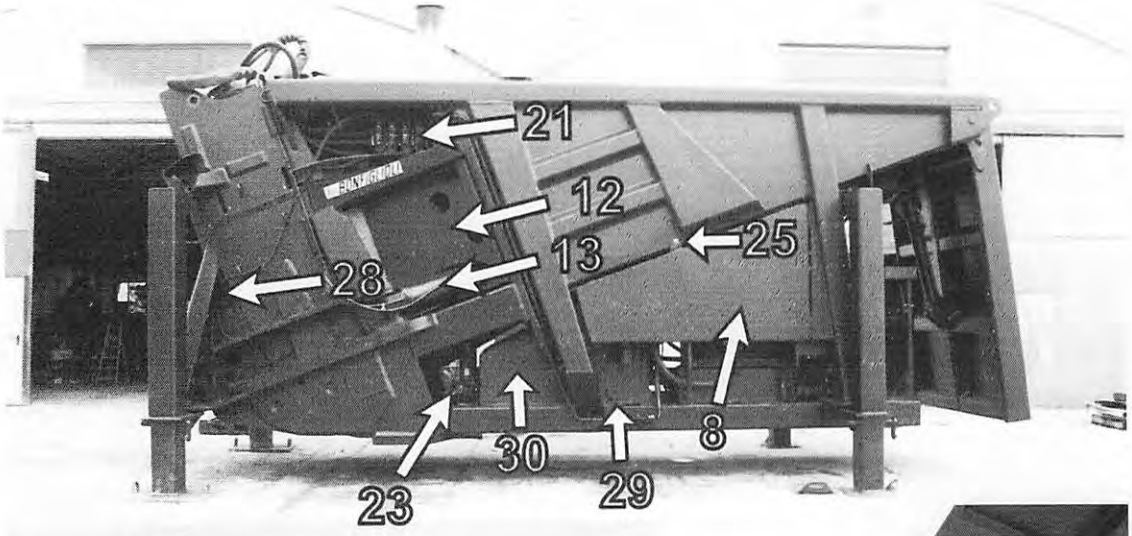
The vibrations produced by the machine are not dangerous to the health of the staff who work there. Excessive vibration can be caused by a fault and should be immediately reported and eliminated so as not to affect the reliability of the machine.

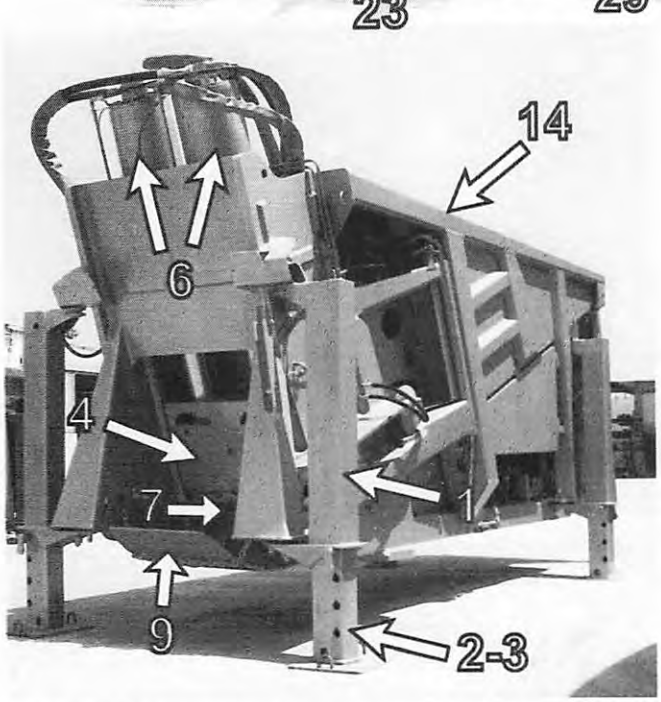
For an operator located at the control post of the machine, the machine vibrations do not exceed the level of 0,5 m/s^2.

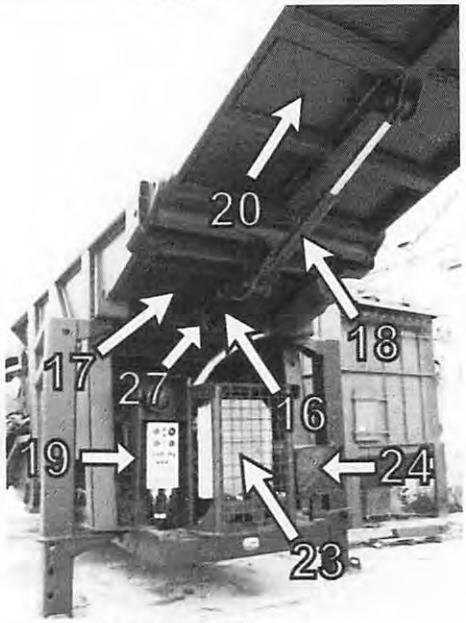
2. GENERAL CHARACTERISTICS

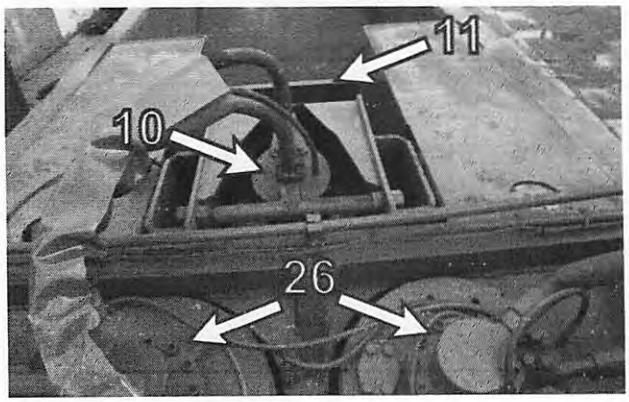
2.1. DESCRIPTION OF THE MACHINE

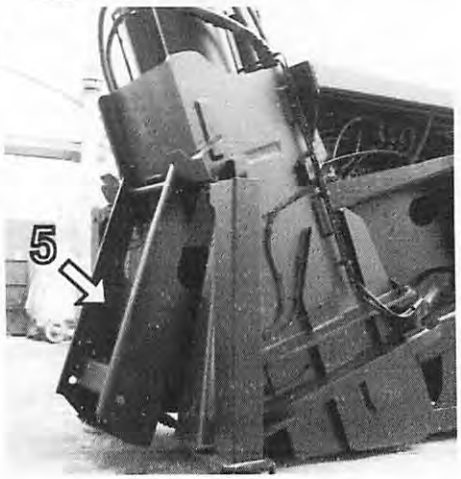
The machine referred to herein is an automatic hydraulic shears that can be transported on the back of a semi-trailer and that is used to cut scrap metal. The machine consists of the following main parts:











1) Stabiliser feet
2-3) Stabiliser feet extension with built-in jack
4) Mobile blade-carrier with blade
5) Cutting length adjustment unit
6) Main jack for the mobile blade
7) Fixed blade-carrier with blade
8) Engine bay hatch
9) Cut material conveyor
10) Blank holder jack
11) Blank holder
12) Flippers
13) Flippers jack
14) Hopper with loading surface
15) Control levers
16) Oscillating surface jack
17) Oscillating surface
18) Extension positioning jack
19) Control panel
20) Extension of the loading surface
21) Valves
22) Grease pump
23) Radiator with intercooler
24) Fuel tank
25) Safety closure
26) Cutting jacks quick discharge valves
27) Oscillating surface valve
28) Grease distributor
20) Inspection Cap and tank no. 30 cleaning
30) Hydraulic oil tank

2.2. CONDITIONS OF NORMAL USE

The machine has been devised to cut scrap metal or other material within the cutting capacity of the machine.

2.3. CONDITIONS OF ABNORMAL USE

The machine must not be used to:

- Cut materials that may cause explosions.
- Cut materials containing corrosive or dangerously polluting agents

2.4. REQUIRED OPERATOR TRAINING

The machine can be used **exclusively** by operators who:

- are physically and psychologically suitable
- are perfectly familiar with the machine and who have fully understood the theoretic and practical information provided by the manufacturer and who have thoroughly studied the operational instruction manual.

2.5. IDENTIFICATION PLATE AND COMPLIANCE WITH EEC STANDARDS

The following plate is fitted on the machine:

Identification plate

2.6. WARNING PLATES

The following warning plates are fitted around the machine in order to use it correctly. If any plates should be missing, either completely or partially, request the manufacturer immediately for other copies and fit them in place before using the machine. The nameplates must **always** be fitted on the machine and must be perfectly legible. They must be replaced in the case of wear. The labels shown here are for demonstration purposes only, but are provided translated into the main languages. **The plates with the distribution of the total mass of the machine on each stabiliser feet and positioned on them, vary according to the type and weight of the machine.**

3. SAFETY WARNINGS

The machine has been designed and manufactured based on the current state of the art and according to regulations currently in force.

The materials used and the equipment parts, together with the production, quality assurance and control procedures fully meet safety and reliability standards. High machine performance and extended life are ensured by using it for the designed purposes, according to the operational instructions, by manoeuvring correctly, by carrying out thorough maintenance and by perfectly servicing it.

3.1. TRAFFIC SAFETY

The machine can be loaded on semi-trailers. It must be loaded in compliance with current standards in force in the country of use.

3.2. ACCIDENT PREVENTION SAFETY

The manufacturer cannot be held liable for accidents whilst using the machine that are caused by the failed observance on behalf of the user of laws, provisions, prescriptions and regulations currently in force for these types of machines. The machine has been devised to work at temperatures from -10°C to +50°C. The manufacturer cannot be held liable for accidents that occur if the machine is used beyond these temperature conditions.

3.3. WORKING SAFETY

The manufacturer cannot be held liable for operational anomalies and damages if:

- The machine is used for purposes different to those for which it has been designed.
- The machine is not handled, manoeuvred and operated according to the operational instructions.
- The machine is not serviced as prescribed or non-original spare parts are used.
- The machine is modified or equipment is changed without authorisation on behalf of the manufacturer.
- The machine safety system is damaged or intentionally eliminated.
- The machine is used beyond the admitted temperature conditions.

3.4. GENERAL SAFETY RULES

3.4.1. Care and maintenance

The causes for many damages and accidents involve maintenance errors:

- Lack of oil, grease, anti-freeze.
- Dirt.
- Safety systems and emergency stop push buttons not working.
- Hydraulic deficiencies, i.e. damaged hoses and loose fittings.

WARNING: Service the machine carefully and thoroughly also for your own safety. Never put off repair jobs. Repairs must be carried out exclusively by experts.

3.4.2. Working with the machine

- Continuously ensure that nobody is standing near the work area of the machine. If anybody standing too near should fail to leave the area, warn them away with the horn or by voice and stop working.
- Never abandon the loader control post with the load suspended.

3.4.3. Load-bearing capacity of the ground and stabilisation

Carefully choose a place where the stabilisers can rest on the ground solidly. The most important aspect is that the ground is capable of withstanding the pressure forces created by the stabilisers. Check for hidden pipes and also if there are any channels or sewer lines underground. Choose a place where nothing will interfere with the field of rotation of the loader which will be used. The stabilisation plates transmit the pressure forces of the stabiliser to the ground. When the pressure on the surface of the stabilisation plate exceeds the admitted pressure on the ground, the support surface must be increased by placing a stable support underneath (i.e. metal sheets). This support is to be placed so that the stabilisation plates rest in the centre of the support surface. The support surface required can be calculated based on the reaction of the stabilisers and on the load-bearing capacity of the ground.

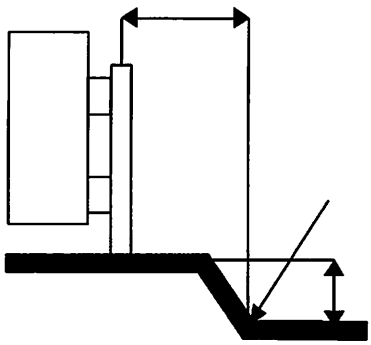
Indicative values for the load-bearing capacity of the ground:

TYPE OF GROUND	CAPACITY (kg/cm^2)
Filled-in ground, not compacted artificially	from 0.0 to 1.0
Filled-in ground, obviously virgin:	
- Mud, peat, marsh ground	0,0
Inconsistent ground, but sufficiently compact:	
- Fine and medium sand	1,5
- Coarse sand and gravel	2,0
Consistent ground:	
- Pasty	0,0
- Soft	0,4
- Rigid	1,0
- Semi-solid	2,0
- Solid	4,0
Rock with minimum flaws in the sound state, not altered by atmospheric agents and with favourable stratification:	
- Sealed stratification	15,0
- Solid formation or pillar	30,0

WARNING: You are recommended to take some tests if you have any doubts on the capacity of the ground (penetrametric analysis).

3.4.4. Safety distance from slopes and ditches

Set the machine at a sufficient safety distance from slopes and ditches.



Empirical rule:

In the case of landslips or filled-in land, the safety distance (A) must be double the depth of the ditch (B).

A = 2xB

In the case of compact ground, not slipping, the safety distance (A) must be the same as the dept of the ditch (B).

A = 1xB

The safety distance is measured from the foot of the ditch (C).

4. GENERAL INSTRUCTIONS

STRICTLY OBSERVE THE FOLLOWING INSTRUCTIONS:

- Ensure that nobody is standing near the work area before starting any jobs.
- Ensure that all the safety devices are perfectly efficient before you start the job (refer to chapter 10).
- Make sure that the environmental visibility is sufficient to work in safety.
- Position the machine in the best point possible to do the job without creating situations of possible hazard.
- Do not pass under a suspended load or stand within the machine operating radius.
- Do not work near telephone or electric lines.
- If the machine is not already in the working position, enable the cut material conveyor by freeing it from its locking devices.
- Do not operate the machine rested right down on the ground to avoid damaging the cut material conveyor.
- When lowering the stabiliser feet, move away from the line of action to avoid getting crushed (legs).
- After the stabiliser feet have lowered, always block them in place using the safety pins.
- The machine can only work on the flat or slightly inclined vertically, being careful not to compromise the stabilisation and suction of the hydraulic system. Operate with the stabilisers to ensure this.
- Do not start the machine before checking if the stabilisers are positioned firmly on the ground (if necessary, increase the support base accordingly).
- If the stabilisers rest on "giving" ground, increase the support surface of the plates of the stabilisers or better still arrange plates between the stabilisers and the ground to increase the support surface.
- Before manoeuvring the machine, make sure that the pins of the cutting length regulator are held by the dedicated pins.
- There are some adhesive warning plates fitted around the machine that make the machine safer to use. It is therefore very important to replace them if they should deteriorate and become illegible.
- The machine operator must not just be any person employed at random but he must have acquired a certain amount of experience with this type of machine.
- On a monthly basis, check the integrity and efficiency of all parts subject to wear following use (pins, valves, hoses, etc.). Replace these parts with original spares in the case of need.
- Do not tamper with the hydraulic system, electric system and the safety devices for any reason whatsoever, penalty the annulment of all forms of guarantee. Contact the manufacturer if the valves need adjusting. The overheating of oil damages the gaskets and seals of the hydraulic circuit and deteriorates the fluid itself. Overheating may be caused either by excessive operation with the jacks at the end of their stroke, by an excessive flow rate of the pump or by a fault in the heat exchanger.

5. COMMISSIONING

5.1. CHECKS AT THE BEGINNING OF EACH WORK DAY

- General inspection of the machine to check for leaks.
- Check the hydraulic oil level.
- Check the level of grease in the automatic lubricator container.
- Check the various greasing points.
- Check the state of the rubber hoses.
- Check the state of rigid pipes.
- Check the state of the diesel engine and its radiator (water, oil, fuel).
- Check if the radiators are clean so that the air can circulate freely.
- Check if the machine stop push button is working.

5.2. PRECAUTIONS FOR STARTING IN COLD WEATHER

Leave the engine run for 10 minutes before starting to work with the machine.

5.3. DRIVING ON THE ROAD

When transporting the machine on the road it must be firmly secured to the semi-trailer in the envisaged points and in compliance with current traffic regulations.

5.4. PROTECTION AND STORAGE

5.4.1. Short-term stoppage

Generally clean the machine and lubricate all the components complete with lubricator.

5.4.2. Long-term stoppage

Proceed as above. And also:

- Spray the whole machine with protective oil.
- Protect the machine by covering it with weatherproof sheeting.

6. CONTROLS

6.1. DESCRIPTION OF THE CONTROLS

The movements of the various machine parts are accomplished:

- Using levers at the side of the machine to operate the stabilisers and possible hydraulic loading extension.
- Using push buttons and small levers at the back of the machine on the control panel to move all the other parts of the machine, in automatic or manual cycle.

DANGER: Upon machine consignment check if the movements correspond with the levers and push buttons pressed and advise the dealer of any anomalies encountered.

Before you start to work with the machine, practice and get familiar with the various functions so that the use of the various controls becomes easy and straightforward.

The following is an explanation of the functions of the various controls and indicators fitted on the machine. The machine can be equipped with different types of engines. Therefore check the exact correspondence of the control panel installed on your machine.

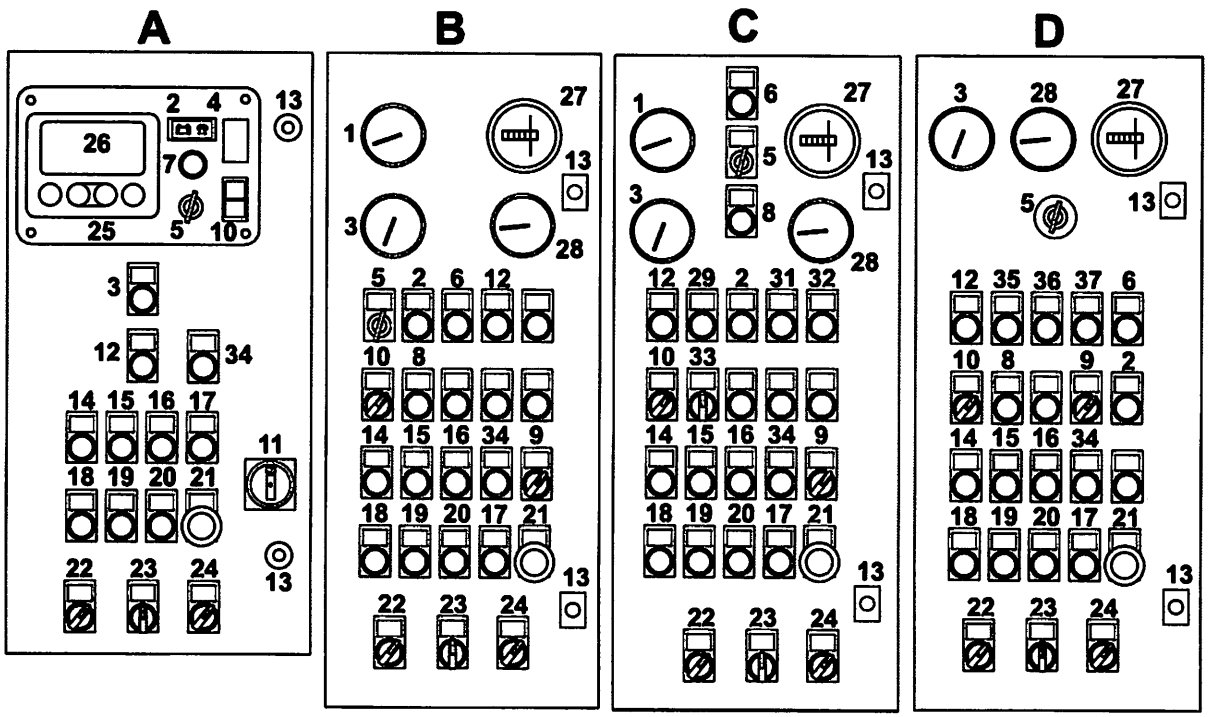
TYPE **A** CONTROL PANEL: For John Deere engines

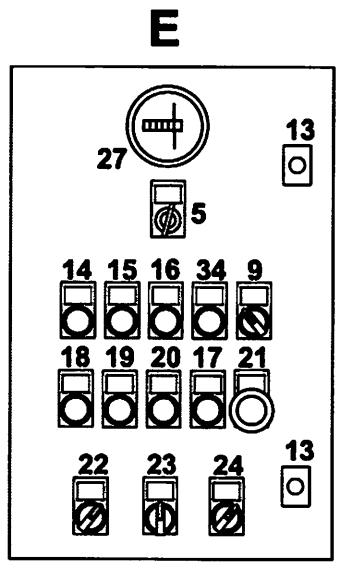
TYPE **B** CONTROL PANEL: for Iveco engines

TYPE **C** CONTROL PANEL: for Cummins engines

TYPE **C** CONTROL PANEL: for Caterpillar engines

TYPE **E** CONTROL PANEL: for **electric motors**

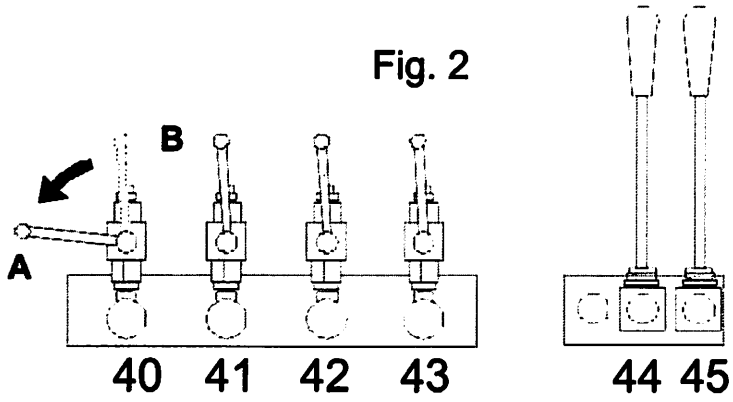




1) Oil pressure indicator
2) Battery charger LED
3) Fuel level indicator
4) Preheating/glow plug (only John Deere engines)
5) Ignition key
6) High engine temperature led
7) Fuse (only John Deere engines)
8) Low engine oil pressure led
9) Radio control enabling (optional)
10) Engine rev regulator (min. - max.)
11) Main switch (optional)
12) Diesel filter clogging led (presence of water)
13) Control panel front closures
14) No grease in lubricator tank signal led
15) Oscillating surface oil filter clogging led
16) Low hydraulic oil level led
17) Blank holder emergency led with reset button
18) Ignition push button (manual movements)
19) Automatic start button
20) Automatic cycle stop button and emergency led
21) Emergency stop button
22) Manual flippers movement lever
23) Manual Blank holder movement lever
24) Lever used to lower or raise the blade manually
25) Control push buttons for digital control panel (John Deere engines only)
26) Digital control panel (John Deere engines only)
27) Hour meter
28) Engine water temperature indicator
29) *Check Control - led/start enabling push button* (Cummins engines only)
31) Service alarm (Cummins engines only)
32) Service alarm (Cummins engines only)
33) Alarm management (Cummins engines only)
34) Inlet filters clogging led (optional)
35) Motor stop (Caterpillar engines only)
36) Alarm (Caterpillar engines only)
37) Cold start push button (Caterpillar engines only)

CONTROL LEVERS

Fig. 2



40 - 41 - 42 - 43) switching levers for each individual jack of the stabiliser feet (**blocked** in position A, **working** in position B)

44) lever used to operate the jacks of the stabiliser feet (push the lever forwards towards the engine to **raise**, and pull the lever back and outwards to **lower**)

45) lever used to operate the hydraulic loading extension (push the lever forwards towards the engine to **raise**, and pull the lever back and outwards to **lower**)

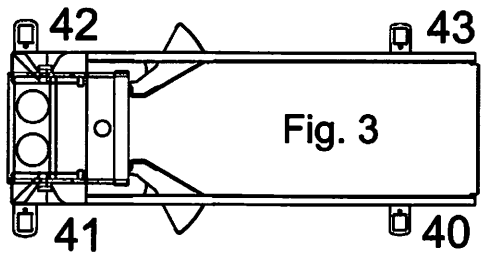
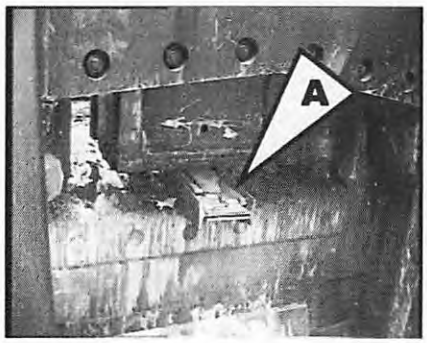
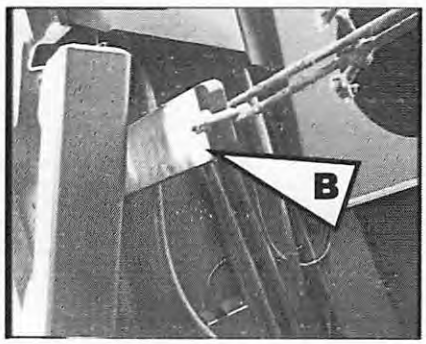


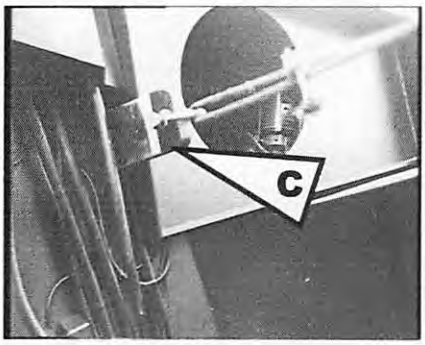
Fig. 3

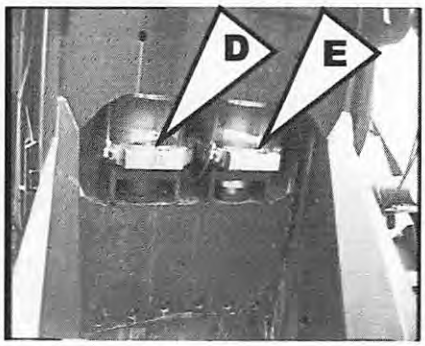
The diagram at the side explains how the levers of fig.2 operate on the four stabilisers of the machine (lever 40 operates foot 40 etc.).

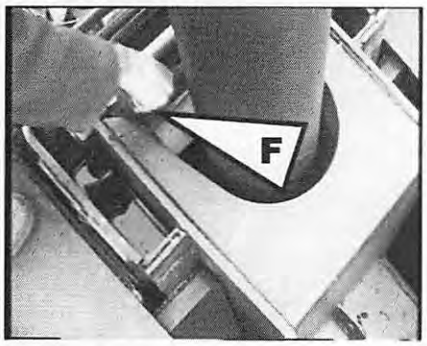
7. MANOEUVRING

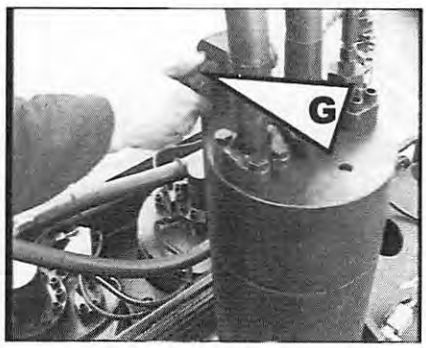


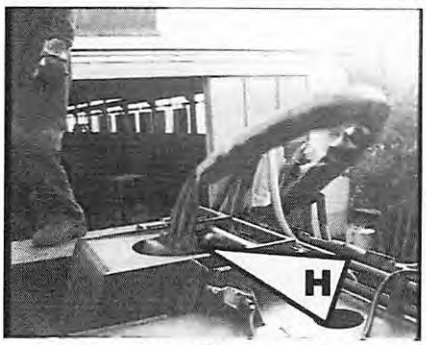












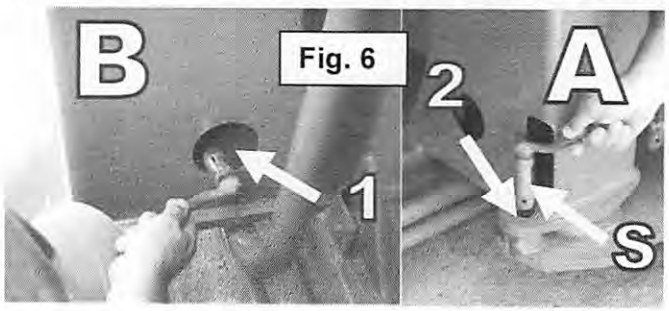
7.1.. LOADING THE MACHINE ON SEMI-TRAILER

- When the machine is to be transported to reach another work site, load it on a semi-trailer. The procedures to be carried out are as follows WITH THE MACHINE COMPLETELY LOWERED.
- Secure the conveyor of cut material with the chain using the special locking devices (if necessary, free it from any cut material left on it).
- Turn the engine on using key 5 of the control panel (to first notch) with the lever 10 of the control panel at minimum, for a few seconds. Turn key 5 to the second notch and start the engine.
- Leave the engine warm up for a few minutes with the lever 10 at minimum, then accelerate.
- Raise the Blank holder using lever 23.
- Raise the mobile blade using lever 24
- Put a very sturdy object between the fixed blade and the mobile blade and something that is long enough be able to insert it without risks for the operator, see photo A.

- Lower the Blank holder and the mobile blade using lever 23 and 24 respectively, being careful that the mobile blade does not cut the object placed between it previously.
- Extract the two mechanical locking devices B and C on the side of the machine, using lifting equipment.
- Lower the pistons of the mobile blade using lever 24 in the "shears up" position.
- Extract pin F that blocks the jack of the Blank holder in the work position and insert it in position G.
- Lower the piston of the Blank holder using lever 23 in the "Blank holder up" position.
- **TO RESTORE THE WORK POSITION (FOLLOWING TRANSPORT) FOLLOW THE PROCEDURES JUST DESCRIBED IN REVERSE ORDER.**
- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position B.
- Operate lever 44 (see fig. 2 chap.6 sect.1) to raise the machine just above the level of the truck and trailer on which it is to be loaded.
- Apply the locking devices that block the extensions of the stabiliser feet in place.
- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position A.
- Reverse the semi-trailer into the space between the stabilisers (fig.5) **being careful not to knock them** and stop in a position where the machine can be loaded.
- Remove the locking devices that block the extensions of the stabiliser feet in place.
- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position B.
- Operate lever 44 (see fig. 2 chap.6 sect.1) to lower the machine, resting it on the semi-trailer and completely raise the stabiliser extensions.


Fig. 5

- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position A.
- Turn off the engine, turn the lever 10 to lower the engine speed, then move the key 5 in the OFF position to turn off the diesel engine.
- Remove pin S of fig.6 from position 1, turn the stabiliser foot by 90° from position B to position A and insert pin S in hole 2. Do this for each stabiliser foot to block it in stand-by position.
- Secure the machine firmly to the semi-trailer by hooking it in the points pre-arranged.



7.2. UNLOADING THE MACHINE FROM SEMI-TRAILER

When you reach the work site, choose the best position with reference to sections 3.4.5. and 3.4.6. of this manual. Perform the following steps in the order:

- Remove pin S of fig.6 from position 2, turn the stabiliser foot by 90° from position A to position B and insert pin S in hole 1. Do this for each stabiliser foot to block it in the working position.
- Turn the engine on using key 5 of the control panel (to first notch) with the lever 10 at minimum engine speed, for a few seconds. Turn key 5 to the second notch and start the engine.
- Leave the engine warm up for a few minutes with the lever 10 at minimum, then accelerate.
- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position B.
- Operate lever 44 (see fig. 2 chap.6 sect.1) to raise the machine just above the level of the semi-trailer from which it is to be unloaded.
- Apply the locking devices that block the extensions of the stabiliser feet in place.
- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position A.
- Drive the semi-trailer right out of the space between the stabilisers **being careful not to knock them.**
- Remove the locking devices that block the extensions of the stabiliser feet in place.
- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position B.
- Operate lever 44 (see fig. 2 chap.6 sect.1) to lower the machine, resting it on the ground if it is not to be put to work straight away, or leave it raised just enough to be able to use the material conveyor. In this case, insert the locking devices that block the extensions of the stabiliser feet.
- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position A.
- If you do not have to work immediately with the machine shut off the engine by turning the lever 10 to the minimum engine speed and then the key 5 in the OFF position.

7.3. PREPARING THE MACHINE FOR THE JOB

Proceed as follows to prepare the machine for work:

- Turn the engine on using key 5 of the control panel (to first notch) with the lever 10 at minimum, for a few seconds. Turn key 5 to the second notch and start the engine.
- Leave the engine warm-up for a few minutes with the lever 10 at minimum and then take it to full rev.

In all cases:

- Free the conveyor (see chap.2 sect.1) from the chain that blocks it and rest it on the ground.
- Insert pin F (sect. 7.1) to block the jack of the blank holder in the working position. Proceed as follows to do this:

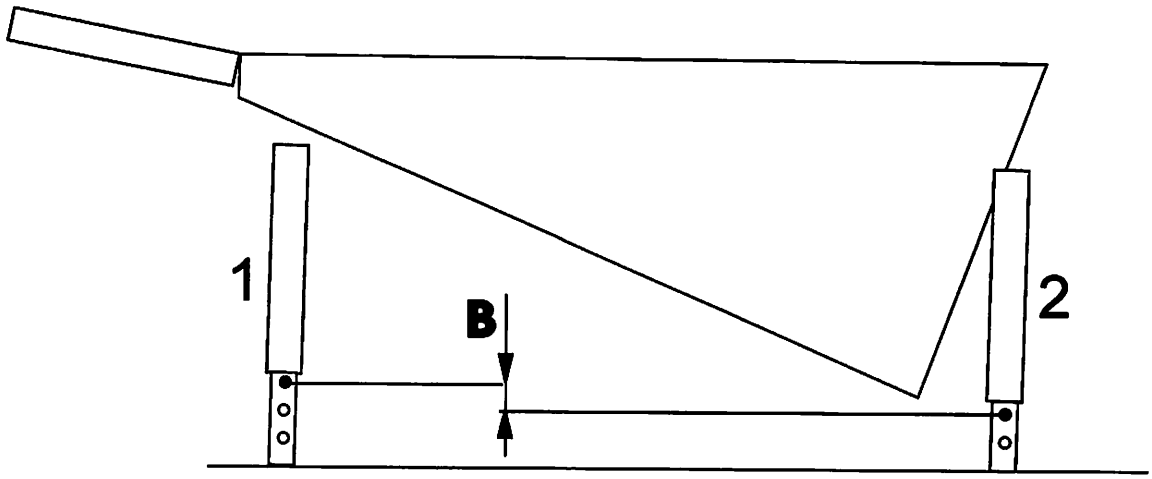
– push the little lever 23 to completely lower the blank holder in order to raise the jack liner to create the play required to be able to insert the pin F (sect.7.1).
– Insert the pin and secure with the safety clip.

If the machine is stopped and resting on the ground:

- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position B.
- Operate lever 44 to raise the machine just enough to be able to use the material conveyor.
- Apply the locking devices that block the extensions of the stabiliser feet in place.

- Move control levers 40 - 41 - 42 - 43 (see fig. 2 chap.6 sect.1) to position A.
- Move the extension of the work surface to the working position using lever 45 (see fig. 2 chap.6 sect.1).

7.3.1. WORKING CONFIGURATION



Position (see figure) the locking pins of the extensions of the stabiliser feet in such a way that the vertical dimension B, between the hole occupied by the pin of the foot 1 and the hole occupied by the pin of the foot 2, will be at least one and a half times the distance between the two adjacent holes (approx. 30 cm).

The operation has to be carried out on both feet which are disposed symmetrically on both sides of the machine, so that the machine will be inclined to the front side (cut material outlet).

7.4. STARTING IN CONTINUOUS CYCLE

Before starting the machine, observe the safety instructions given in this manual.

Proceed as follows on the control panel to start the machine (fig.1 sect. 6.1.): 6.1.) :

- Start the manual operational system by pressing push button 18 for a few seconds until the green LED 18 lights up.
- Press push button 19 to start the automatic operational cycle, at this stage the machine works completely self-sufficiently, as envisaged by the manufacturer.

In order to stop the machine push red button 20.

DANGER: Press the emergency mushroom head push button 21 if a hazardous situation should arise or more generally in the case of a problem for which all machine functions need to be stopped immediately. The emergency push button will stop the working cycle and the engine at the same time.

Proceed as follows if the emergency LED 20 should light up during the continuous cycle:

If the LED lights up without flashing, consult the manufacturer to resolve the problem.

If the LED should flash it means that it has been impossible to cut the material (the blade is unable to cut the material loaded); the machine stops with the blank holder, flippers and blade open. Press the push button 20 to reset the machine electronics and start again as explained previously, using push button 18 and 19. If the LED should flash again, remove the material from the cutting port.

If the emergency LED 17 should light up reset the machine using the dedicated push button 17 and start it again in automatic cycle; contact the manufacturer if the problem persists.

7.5. MANUAL MOVEMENTS

The machine is capable of working manually to be able to move the various parts of the machine individually or at the desired time. These movements are used to free jammed material and for maintenance purposes.

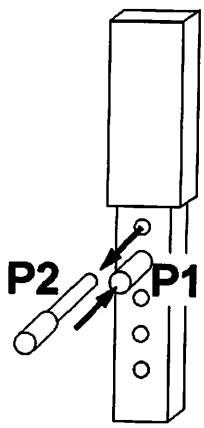
Caution: The machine has been devised to work automatically and therefore the manual movements must not be used to replace the automatic movements to carry out the job.

Let's take a look at how to use the manual controls, with reference to fig. 1 of section 6.1.
First and foremost, press the ignition push button 18 with the machine stopped and just the diesel engine running before accessing the manual controls.

Caution: If no control is used within a short amount of time when the machine is in this status (with just green LED 18 lit), the machine will switch to a safety stop status and the red LED will light up.

22) lever up: the flippers open
lever down: the flippers close
23) lever up: the Blank holder raises
lever down: the Blank holder lowers
24) lever up: the mobile blade raises
lever down: the mobile blade lowers

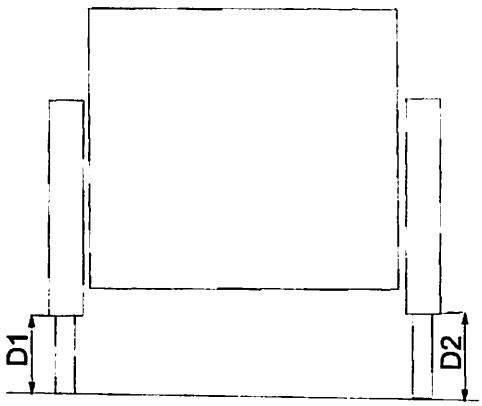
DANGER: When it says in this chapter to insert the locking pins of the stabiliser extensions, it means that the pins are continuously moved, during the up and down movements, one at a time (this is why **always** 5 pins are supplied together with the machine), so that there is never a free hole between the pin and the bottom part of the outer casing of the stabiliser.



EXAMPLE: During lowering, you have **always** to insert a pin P1 before removing the pin P2. Then you have to use the pin already removed in order to repeat the same operation also for the other three stabilisers, Only after having carried out this operation, you can start the machine and lower it accordantly to

the obtained space. These operations have to be repeated continuously until the wanted height is reached.

DANGER: When it says in this chapter to raise and lower the stabilisers, you must bear in mind that all the feet must raise and lower together, without creating differences in height, which could set the machine off balance. Basically, you need to check that the difference between D1 and D2 is not greater than roughly one third of the distance between the two holes next to those on the extensions of the stabiliser feet (those where the safety pins are inserted).



8. SERVICING THE MACHINE

GENERAL MAINTENANCE INSTRUCTIONS

Regular and thorough maintenance and repairs are crucial for the safe and efficient operation of this machine. This part of the manual summarises the basic procedures to be followed to service and repair in safety.

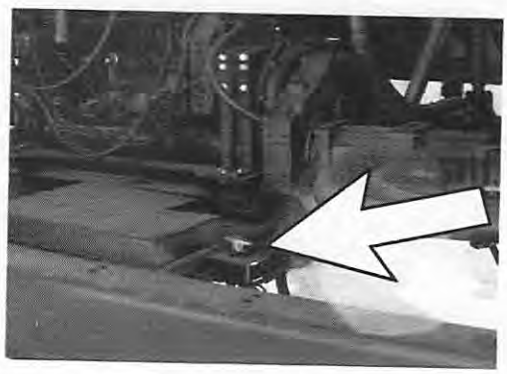
It is very dangerous to carry out inappropriate procedures, which could consequently involve personal injuries and material damages.

Ing. BONFIGLIOLI cannot foresee every single circumstance that could potentially involve a hazard, therefore, if a procedure or work method is employed but that is not specifically recommended in this manual, the person in charge must ensure that the job does not involve a hazard for himself, for others or for the actual machine.

Here's a list of the basic precautions that must **always** be observed:

- Do not start the machine, service or repair it without first having read and understood all the instructions given in this manual.

- All maintenance procedures must be carried out with the engine turned off and the battery disconnected, using the dedicated key in the front of the machine, under the engine.



- Always wear protective goggles and safety shoes when working around the machine; do not wear baggy, flappy or torn clothing and take off rings.

- Use the steps, hand grips and handles when climbing on and off the machine. Remove mud and detritus from the steps and work platforms to avoid slipping. Face the machine when climbing up the steps. When it is impossible or insufficient to use the provided means of access, use suitable stepladders or scaffolding to carry out the jobs in total safety.

- Do not lift heavy parts by hand but use suitable lifting tackle. Do not repair parts while they are still lifted by lifting tackle or equipment. Always rest them on solid blocks before servicing or repairing them.

- Be careful when working around hot parts of the machine and the hot fluids within the pipes, to avoid scalding, especially if the machine has just been turned off.

- Do not operate the machine if any part of it is damaged. Make sure that the problem has been resolved before using the machine again.

- Pipes, hoses and sleeves for fuel and hydraulic fluid, if left disconnected or damaged, can cause flames and are therefore to be replaced immediately with new ones. Do not bend or hammer high-pressure pipes. Tighten the connections to the correct coupling torque and make sure that the pipes and hoses are installed correctly so that they cannot vibrate or rub against other parts while the machine is operating. Put all safety guards dismantled when replacing parts back in place correctly.

- Be very careful when removing covers, relief valves or caps from the machine. Keep a rag over the cover or the cap to prevent pressurised liquid from spurting out. Where possible, avoid these jobs if the machine has just been stopped.

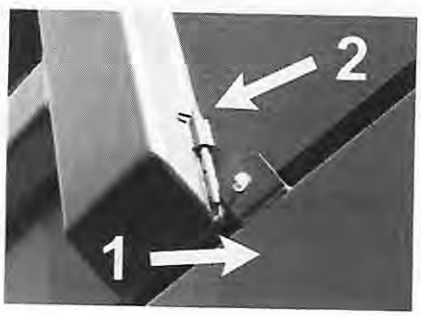
- In the case of leaks or replacement of hydraulic oil, avoid extended contact with skin and eyes; in the case of contact, remove any soiled clothing and rinse the skin with plenty of water until the irritation disappears. If swallowed, do not attempt to vomit but seek medical advice.

- In the case of oil leaks, stop the leak right from the source and do not allow the product to reach water courses and put a container under the leak.

- Any welding jobs must be done by adequately trained personnel, who are fully aware of the most suitable welding procedures, wearing a mask, safety shoes, gloves and welder's apron.

WARNING: Any maintenance jobs that are not included in this chapter are to be carried out exclusively by the manufacturer or by workshops authorized by the manufacturer; always disconnect the batteries of the machine using the dedicated key in the battery compartment before starting any maintenance jobs.

To be able to carry out most of the maintenance jobs, you need to open the safety panels **1** on each side of the machine. Considering the size of the panels, be very careful when opening the two panels in windy weather.
Unscrew the safety bolt and slide pin **2** out to open the panels.



8.1. VISUALLY CHECKING THE HOSES AND FITTINGS

Check for leaks in the flexible hoses and rigid pipes on a periodic basis and especially after the initial operational cycles. Also check if the fittings of the hydraulic system are firmly secured to prevent slight leaks of oil.

8.2. LONG-TERM INOPERATION

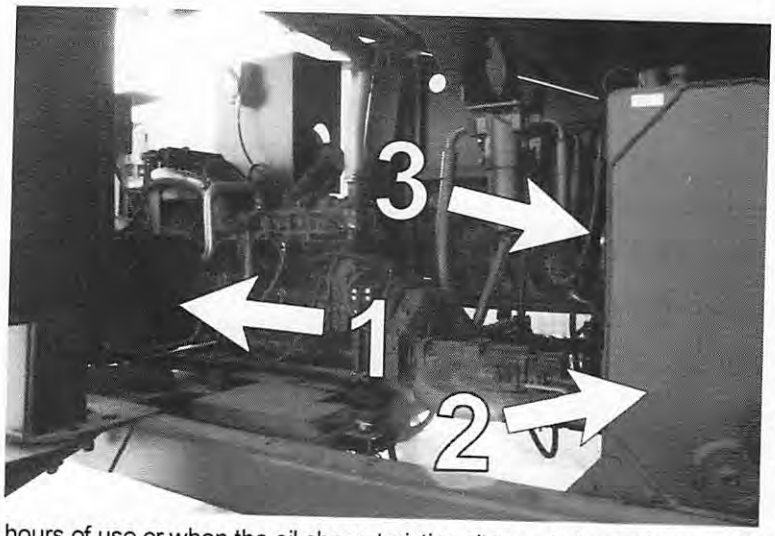
If the machine should be left inoperative for an extended period of time, it is advisable to leave it with the jacks closed and the rods free from dirt and dust.

8.3. CHECKING THE LIMIT SWITCHES

On a periodic basis, check if the mobile joint in all the limit switches is clean and if it moves freely without interference. If a limit switch is blocked, the red LED 13 lights up steady without flashing.

8.4. LUBRICATION

8.4.1 Hydraulic oil



1) Fuel tank (in case of diesel engine)

2) Hydraulic oil tank

3) Hydraulic oil level indicator

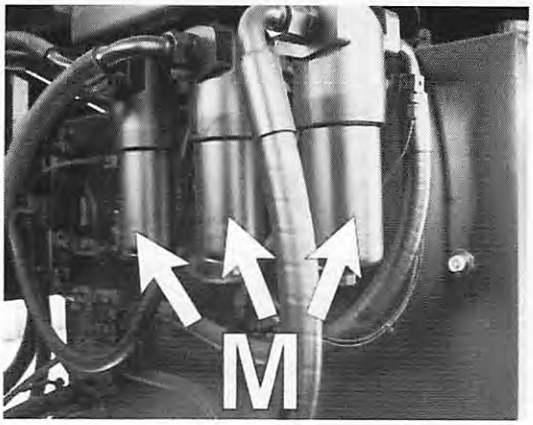
On a daily basis check the tank oil level through the dedicated indicators and fill-up if necessary using exclusively oil with identical specifications. In the case of consistent leaks try and find the cause. The oil of the hydraulic system is to be replaced roughly every 2000 hours of use or when the oil characteristics alter and also replace the filter cartridges when doing so and wash the tank with specific detergents. Use only oil type ESSO INVAROL EP 68 or equivalent. The oil is to be replaced with the machine turned off, by pouring it through the cap of the tank with the jacks closed and with cold oil.

CAUTION: Do not throw the oil away outdoors on the ground. Take spent oil to a disposal centre authorised to collect and dispose of spent oil.

8.4.2. Filters

Proceed as follows for the filters of the hydraulic system:

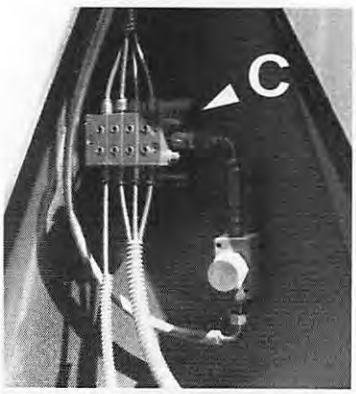
- After the first 80 hours of use, take out the cartridge of filters G and H and replace them, clean the cartridge of filter H with petrol or diesel and blow it with compressed air to dry it.
- Every 300 hours of use, take out the cartridge of filters G and H and replace them, clean the cartridge of filter H with petrol or diesel and blow with compressed air to dry it.
- The filters M and F are equipped with clogging indicators. It is advisable to check the condition of the filter every time you are starting the machine. When the filters are clogged replace them.
- Replace the EVERY cartridge at least once a year.



filter **M** (40-41-42H): Brand DONALDSON. model AP455.6 cartridge P760055
filter **G** (34H): Brand DONALDSON. model 180/3 cartridge CR180/3
filter **H** (16H): Brand DONALDSON. model 800/3 cartridge CR 800/03
filter **F** (26H): Brand DONALDSON. model 290/1 cartridge. CM29003

8.4.3. Greasing

DANGER: Never climb up the machine to reach the greasing points but use stepladders or other safe methods to avoid injuries from slipping and falling.



8.4.3.1. Automatic greasing

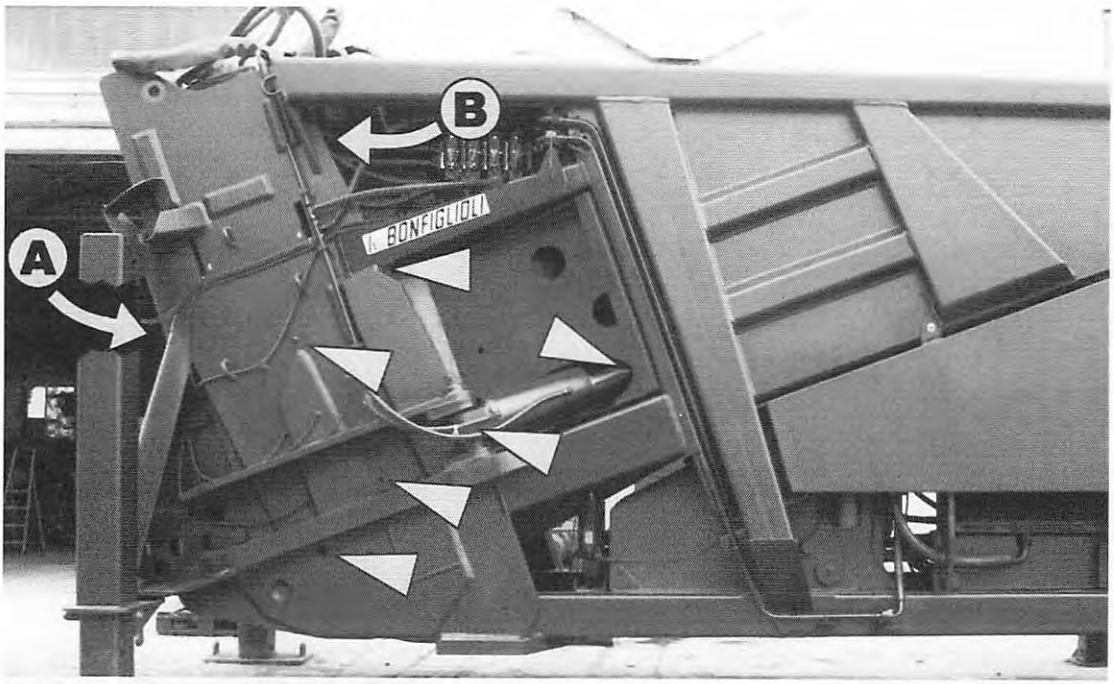
The machine is equipped with an automatic lubrication system, controlled from the control panel (see chap 6). The system lubricates all points in need of frequent lubrication by means of two grease distributors **C** positioned on both sides of the machine. The lubrication points reached by the automatic system are those of the mobile blade guides and those of the Blank holder guides. Tank **D** holds the grease utilised by the system and is to be filled up when the dedicated alarm LED lights up on the control panel. Check the tank frequently whatever the case to check if the alarm LED is efficient. When grease is lacking, fill the tank up with good quality semifluid grease using a manual or pneumatic grease gun through lubricator **E**.

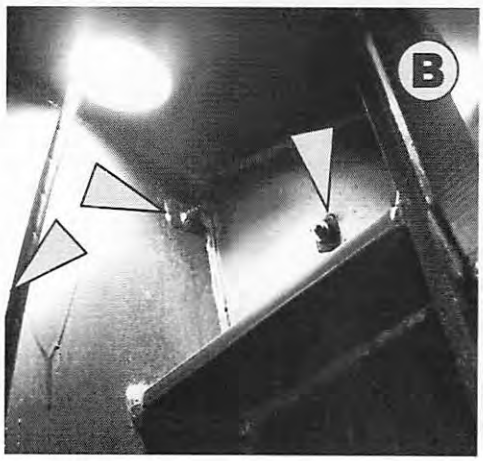
Check the operating efficiency of the system on a periodic basis.

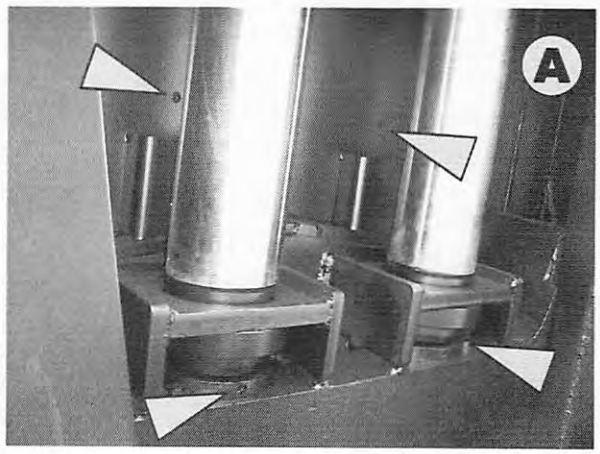
8.4.3.2. Manual greasing

The manual greasing points, foreseen on the machine, are indicated by the adhesive label shown beside (see example photo) and have to be greased every 20 hours of use, using multipurpose grease type IP Athina grease or a good quality grease using a manual or pneumatic grease gun. The manual greasing points support the automatic greasing points in the points that are not reached from the automatic system.

The following is the position of manual lubricators. These are placed on each side of the machine in an identical manner.





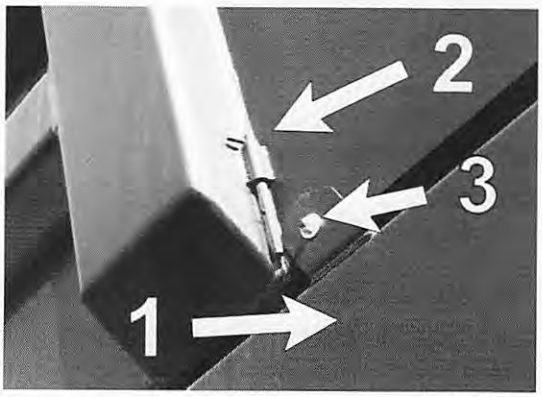


8.5 SERVICING THE ENGINE

DANGER: ALL MAINTENANCE JOBS ARE TO BE CARRIED OUT WITH THE ENGINE TURNED OFF.

Some maintenance jobs on the diesel engine can be carried out without removing the safety guards (i.e. checking the oil level); for all the other jobs, the side safety panels of the engine are to be opened as explained hereafter:

- Unscrew bolt 3.
- Pull safety pin **2** out.
- Open panel 1.

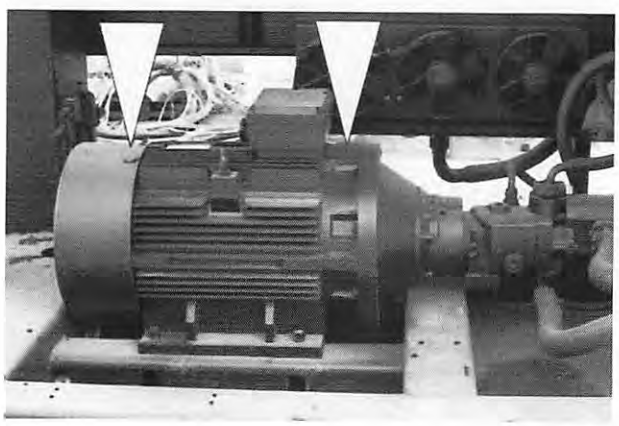


For the maintenance specifications of the diesel engine and/or the electric motor follow the instructions of the engine manufacturer enclosed herewith.

Also carry out the following maintenance jobs on a periodic basis:

- **Clean radiators**: Clean by spraying with a high-pressure cleaner or compressed air, from outwards inwards.
- **Tightening ducts and discharge piping**: Tighten when the engine is cold.
- **Check the tension of belts**: Press down halfway along the belt and ensure that it does not flex by more than 2-2.5 cm, otherwise tension to this condition, using the dedicated tensioners.
- **Cleaning the air filter relief valves**: On a periodic basis, check the state of these valves under the air filters.

On the electric motor there are two lubrication points, indicated by the arrows in the photo, that must be greased weekly with good quality bearing grease.



9. TROUBLESHOOTING

Below is a list of the most commonly encountered faults and anomalies that may possibly occur on the machine:

PROBLEM	CAUSE	SOLUTION
Oil temperature too high	Dirt obstructing the radiator mass or inefficiency of fans	Clean the radiators or check the electric system
Hydraulic pump excessively noisy	Low oil level or oil too dense.	Check the oil level. fill-up or if necessary replace it.
	The pump sucks air.	Tighten loose fittings.
	Faulty pump.	Replace the pump.
Oil leaks from jacks	Sealing gaskets worn.	Replace the gaskets.
	Scoring on rod or in liner.	Replace rod or liner.
No component working.	Battery disconnecting key turned off.	Turn the key on.
The machine fails to complete the movements.	Pressure switch not calibrated correctly.	Calibrate the pressure switch.
	Valve not calibrated correctly.	Calibrate the valve.
	Faulty pump.	Check and replace the pump if necessary.
Metal rubbish found in oil filter.	Elements of hydraulic circuit deteriorated.	Find the worn elements and replace.
One movement of the machine blocked.	Breakage of a hydraulic hose.	Contact immediately a workshop to replace the hose.
Gaskets damaged.	Oil overheated.	Replace the gaskets and check if the pump flow rate matches that recommended by the manufacturer and replace if necessary.
Red emergency LED lit steady,	Breakage of non-specifiable parts or limit switches dirty.	Clean the limit switches or contact the manufacturer.

Red emergency LED lit and flashing.	The blade fails to cut the material.	Reset the machine using the stop push button, start it again and if the problem persists, remove whatever has caused the problem.
Red LED "Filter clogged" on oscillating surface.	Filter clogged.	Unscrew filter base, clean or replace if necessary.
The machine blocks and the high pressure alarm LED of Blank holder lights up.	High pressure in hydraulic circuit.	Reset the machine using the dedicated button and start it again in automatic cycle; contact the manufacturer if the problem persists.

10. EMERGENCY DEVICES

The machine is equipped with a number of safety devices to make it safe to use.

DANGER: The fact that the machine is equipped with safety devices does not mean that accidents cannot happen due to incorrect use and operation, untrained operators or use of the machine in a poor state of efficiency

DANGER: Before starting to work, the operator must check if all the safety devices are perfectly efficient and also the overall state of the machine,

10.1. EMERGENCY PUSH BUTTON

10.1.1. Description

The red emergency push button is located on the control panel. It is used to immediately stop all machine movements in the case of danger.

10.1.2. Checking the efficiency

Press the emergency push button and check if all machine components stop immediately. To restore normal conditions, turn the push button clockwise. Make sure that any hazardous situation has been rectified before releasing the emergency push button.

10.2. BLOCKING VALVES

10.2.1. Description

These valves, positioned near the jacks of the stabilisers and the extension of the loading surface, control the lowering speed of the same and block all movements should any of the pipes burst.

10.4. LOCKING PINS OF THE STABILISER FEET

The machine is equipped with four pins (fig. 3, sect. 7.1) complete with grips for locking the stabilisers in two positions: Position A to lock the stabilisers during transport, position B to lock the stabilisers during work.

10.5. LOCKING PINS OF THE STABILISER EXTENSIONS

The machine is equipped with five locking devices (see chap.7 on how to use them) complete with grips to lock the extensions of the stabilisers safely at the height needed to be able to load and work.

10.6. BATTERY DISCONNECTING KEY

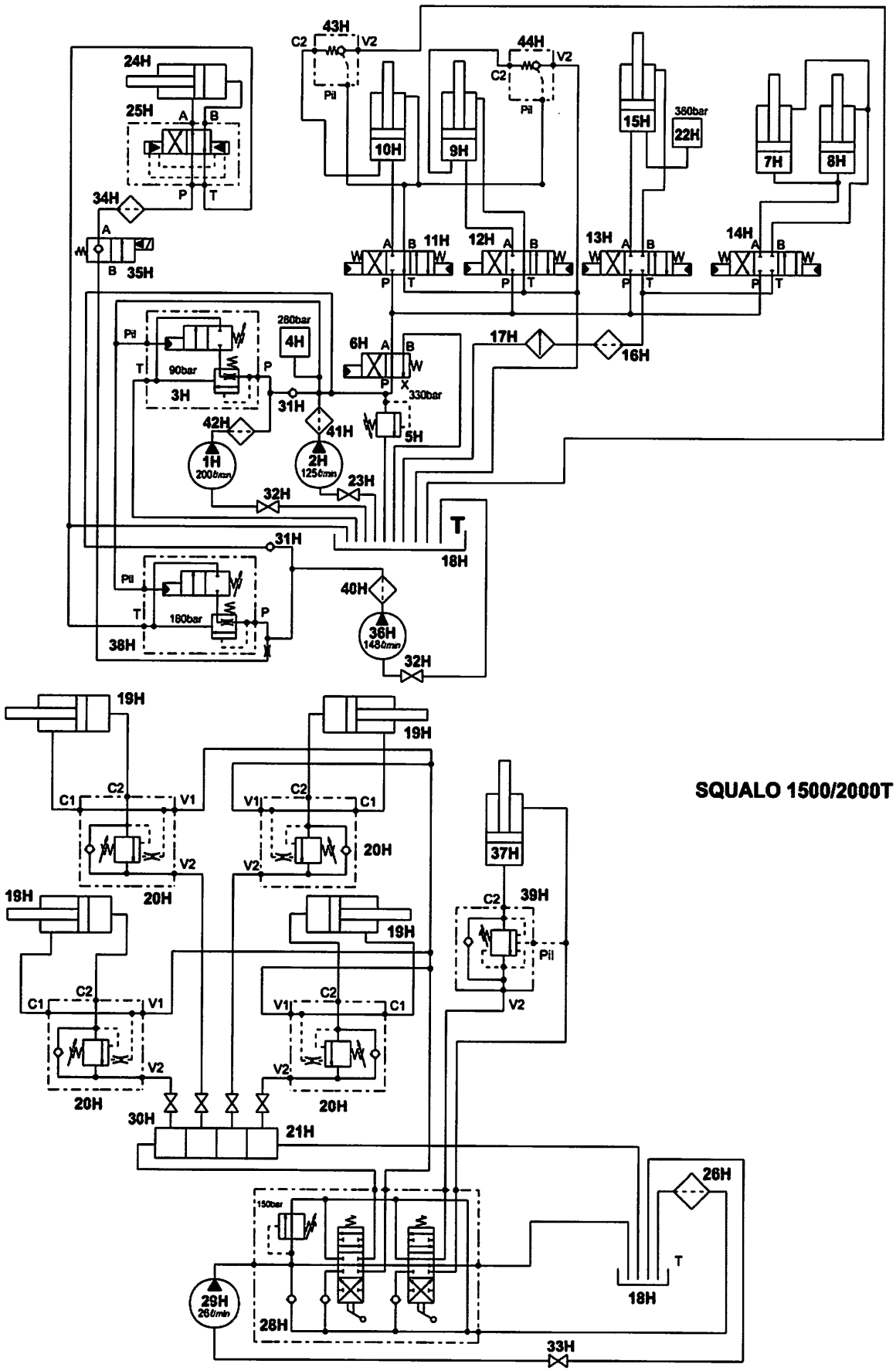
The machine is equipped with a key located near the battery compartment, which is to be used to disconnect the battery before starting any maintenance jobs.

11. ELECTRIC SYSTEM

With reference to the electric system observe the detailed diagram supplied together with this manual.

In case of electric motor or electric motor/diesel engine an other diagram will be supplied for electric start panel of the electric motor.

12. HYDRAULIC SYSTEM



SQUALO 1500/2000T

1H) GEAR PUMP
2H) PISTON PUMP
3H) CUT-OUT VALVE
4H) GENERAL PRESSURE SWITCH
5H) MAX. VALVE
6H) SOLENOID VALVE (V. MAX)
7H) FLIPPER JACK
8H) FLIPPER JACK
9H) RETURN MOBILE BLADE JACK
10H) MOBILE BLADE CUTTING MAIN JACK
11H) SOLENOID VALVE JACK. 10H
12H) SOLENOID VALVE JACK. 9H
13H) SOLENOID VALVE JACK. 15H
14H) SOLENOID VALVE JACK. 7H E 8H
15H) BLANK HOLDER JACK
16H) OIL FILTER
17H) HEAT EXCHANGER
18H) TANK
19H) FEET JACK (4 PIECES)
20H) BLOCKING VALVE 19H(4 PIECES)
21H) FLOW DIVIDER
22H) BLANK HOLDER PRESSURE SWITCH
23H) TAP 1½"
24H) OSCILLATING SURFACE JACK
25H) REVERSION VALVE
26H) FEET DISTRIBUTOR OIL FILTER
28H) FEET DISTRIBUTOR
29H) FEET GEAR PUMP
30H) TAP ¼" (4 PIECES)
31H) ONE-WAY VALVE (2 PIECES)
32H) TAP 2" (2 PIECES)
33H) TAP 1"
34H) OSCILLATING SURFACE JACK OIL FILTER
35H) OSCILLATING SURFACE SOLENOID VALVE
36H) GEAR PUMP
37H) JIB JACK
38H) CUT-OFF VALVE
39H) BLOCKING VALVE 37H
40H) ONE WAY OIL FILTER
41H) ONE WAY OIL FILTER
42H) ONE WAY OIL FILTER
43H) QUICK RELEASE VALVE
44H) QUICK RELEASE VALVE

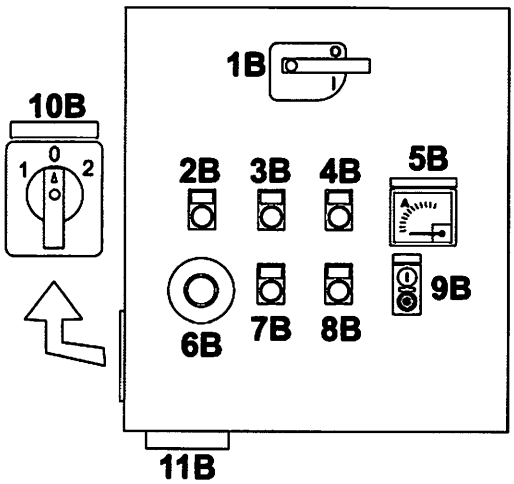
13 APPENDIX FOR ELECTRIC OR DIESEL/ELECTRIC MOTORISATIONS

The shears can be supplied with an electrical motorisation or a double independent diesel/electrical motorisation.

In case of double motorisation it is not possible the simultaneous operation of the two motors. **The choice has to be made by the user according to operational needs and can be selected, as described below, through an appropriate selector switch placed on the side of the electric panel.**

After having selected the type of motorisation, refer to this manual for all operational modalities because they are the same foreseen for the single, diesel o electrical motorisation.

ELECTRIC PANEL FOR STARTING THE ELECTRIC MOTOR



1B Panel main switch
2B 110V AC auxiliary line led
3B Emergency stop button triggered LED
4B Motor protection switch alarm LED
5B Amperemeter
6B Emergency stop button
7B Main start button
8B free
9B Shears motor start/stop button
10B Diesel engine or electric motor selector switch (pos. 1 electric motor, pos. 0 off, pos. 2 diesel engine)

11B Connector to panel B of the machine

△	**"WARNING"**: ***When using the electric motor the batteries of the diesel engine have to be disconnected using the battery disconnecting key, as explained before in cap. 10.5 of this manual.***

Together with this manual is supplied the connecting diagram provided by the manufacturer of the motor and a manual with the electric diagram of the electric panel for starting the electric motor.