



MAINTENANCE AND USE MANUAL

MOD. **ZL**

CENTRAL AND OFFSET MOWERS



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Use and maintenance manual in conformity with Enclosure V Directive 89/392/CEE and following modifications and additions –

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INDEX

1 GENERAL INFORMATION	3
1.1 Introduction and aim of the present manual	3
1.2 Identifying the machine	3
1.3 Spare parts	3
2 TECHNICAL FEATURES	4
2.1 General description of the machine	4
2.2 Technical Specifications (Tab. 1)	5
2.3 Noise	5
2.4 Width of Cut	5
2.5 Optional Equipment	6
2.6 Versions of the machine:	6
3 SAFETY RULES	7
3.1 General safety rules	7
3.2 Safety Rules concerning the Hydraulic System	7
3.3 Safety Rules Concerning Road Traffic	8
3.4 Safety Rules During Use	8
3.5 List of Guards fitted to the Shredder (FIG. 7)	8
3.6 Description and Location of Safety Decals (FIG. 8)	9
3.7 Driver protection	10
4 INSTRUCTIONS FOR INSTALLATION AND HANDLING	11
4.1 Lifting and unloading	11
4.2 Unpacking	11
4.3 Attachment to and detachment from the Tractor	11
4.4 Fitting the PTO shaft	12
4.4.1 Fitting	12
4.4.2 Guards	12
4.5 Tractor Stability	13
4.6 Parking	13
5 ADJUSTMENT AND SETTING UP	15
5.1 Adjustment of the height of cut	15
5.2 Adjusting belt tension	15
6 USE AND OPERATING RULES	16
6.1 Ram control	16
6.1.1 Standard control	16
6.2 Starting	16
6.3 Working Mode	17
6.3.1 Adjustment of the height of cut and working speed	17
6.3.2 Arms safety: (FIG. 24)	17
6.4 Stopping	18
6.5 Transport Position	18
6.6 Controls with distributor (OPTIONAL) cod. ZL1605	18
7 MACHINE MAINTENANCE	19
8 TROUBLE SHOOTING CHART	20
9 REPLACING PARTS	21
9.1 Flail replacement	21
9.2 Pipe Replacement	21
9.3 Pin Replacement	21
9.4 Belt Replacement	21
10 DEMOLITION, DIFFERENTIATED DIVISION OF THE MATERIALS AND DISPOSAL	22

1 GENERAL INFORMATION

1.1 Introduction and aim of the present manual

This operation and maintenance manual is intended for the professional user. It is mandatory to follow these instructions in order to prevent events which could endanger the operator's and other people's safety, apart from the correct functioning of the shredder. In case of doubt, do not experiment, call "FERRI" after-sales service instead, or the specialized "FERRI" dealer.

1.2 Identifying the machine

Each shredder is fitted with an identification plate; both the data necessary to identify the model and the serial number to order spare parts or after-sales service are stamped on the plate (see FIG. 1).

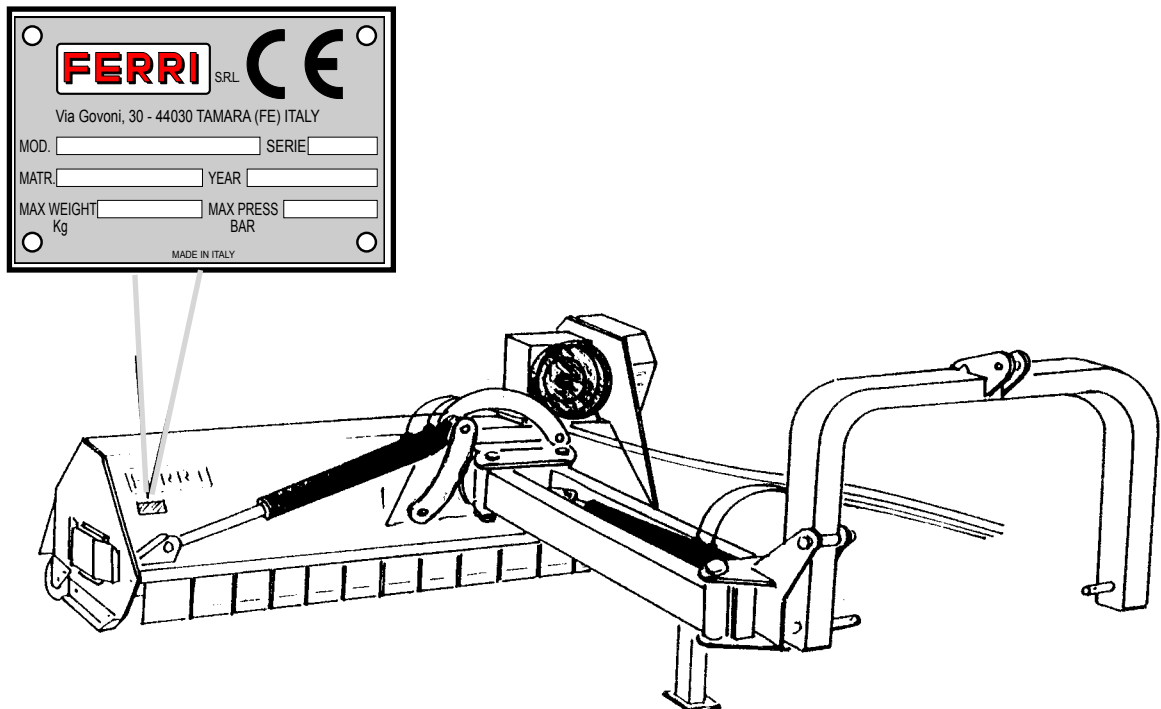


FIG. 1

1.3 Spare parts

It is strongly recommended to use genuine "FERRI" spare parts to avoid altering the technical features of the shredder. "FERRI" is not responsible for any damage or injuries to people due to unauthorized modifications or to the use of non-genuine spare parts.

2 TECHNICAL FEATURES

2.1 General description of the machine

“FERRI” shredders, from now on also called “machine”, have been designed to shred materials growing or laying on the ground, e.g. grass, bushes, sticks and shrubs of up to 3 cm. diameter (proper use). Any other use is considered improper and the manufacturer disclaims all responsibility for any consequential injuries to people, or for damage to the machine.

“Proper use” also refers to the safety and maintenance rules provided for by the manufacturer.

Technical names (FIG. 2)

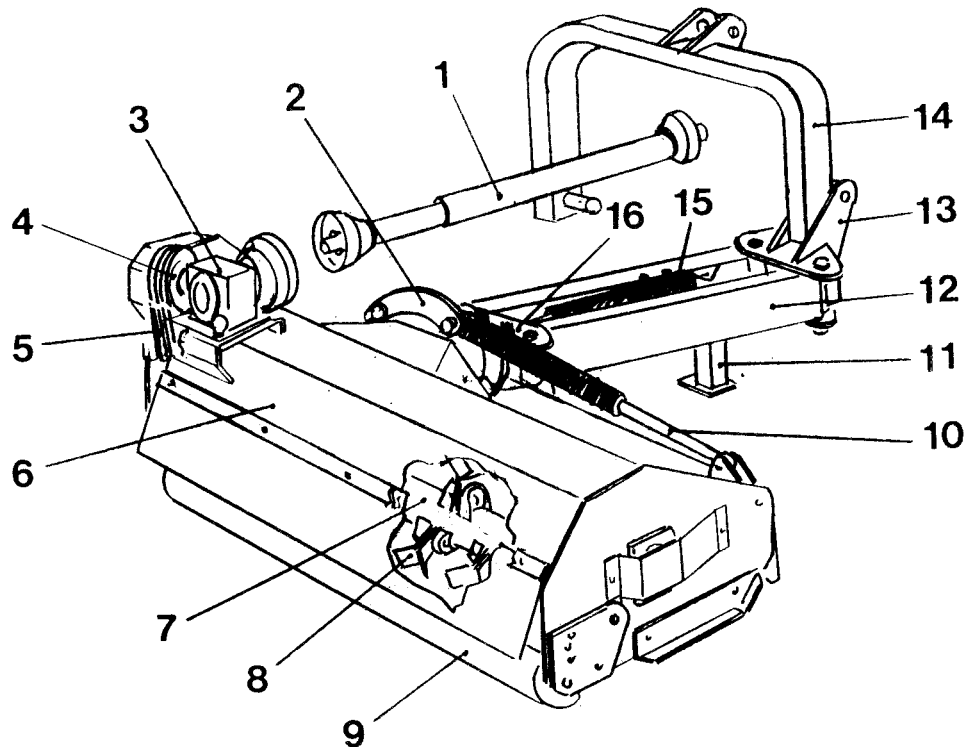


FIG. 2

1 - PTO shaft	9 - Roller
2 - Levers to adjust flail head	10 - Ram to adjust flail head
3 - Gearbox	11 - Stand
4 - Pulleys	12 - Arms for side movement
5 - Belts	13 - Joint to support arms
6 - Frame	14 - 3 Point Linkage
7 - Rotor	15 - Ram for side movement
8 - Flails	16 - Joint to adjust flail head

This machine is in conformity with the following provisions of law:

- Directive Machine 89/392/CEE and following additions: 91/368/CEE, 93/44/CEE and 93/68/CEE;
- Regulations UNI EN 292/1 and 292/2 (machinery safety);
- DPR 27th April 1955, N. 547 (Rules for the prevention of industrial accidents).

2.2 Technical Specifications (Tab. 1)

TAB. 1				
Mod.		ZL 160	ZL 180	ZL 200
Width of cut	cm (in)	160 (63)	180 (71)	200 (79)
Min. Tractor required power	HP (KW)	60 (45)	70 (52)	90 (66)
Min. tractor weight	Kg (lbs)	2400 (5280)	2700 (5900)	2800 (6200)
Power takeoff speed	giri/min.	540	540	540
Max. Absorbed Power*	HP (KW)	35 (26)	35 (26)	50 (37)
Weight	Kg (lbs)	530 (1160)	560 (1230)	595 (1300)
Attachment to the tractor	cat.	II-III	II-III	II-III
Rotor speed	giri/min.	2250	2250	2250
Articulated flails	N.	72	84	84
Articulated rams	N.	36	42	42
Max. pressure	Bar (PSI)	190 (2750)	190 (2750)	190 (2750)
Hydraulic oil - type	type	ISO-L-HM68	ISO-L-HM68	ISO-L-HM68
Filter	micron	30	30	30

* When the absorbed power exceeds the maximum power indicated in Tab. 1, it is recommended to use a PTO clutch (torque limiter).

2.3 Noise

The sound level of this machine, as measured at the operator's ear, ranges from 76 dB to 76.2 dB when the cab is closed, and from 82.9 to 84.4 dB when the rear window is open. The acoustic power level is LWA 102.1. When the sound level perceivable at the operator's ear ranges over 85 dB the use of ear protectors is recommended.

2.4 Width of Cut

Figure 3 shows the width of cut of the shredder. Dimensions are shown in Table 2.

TAB 2			
Mod.	ZL 160	ZL 180	ZL 200
	cm (in)	cm (in)	cm (in)
A	160 (63)	180 (71)	200 (79)
B	136 (54)	136 (54)	136 (54)
C	216 (85)	236 (93)	256 (100)

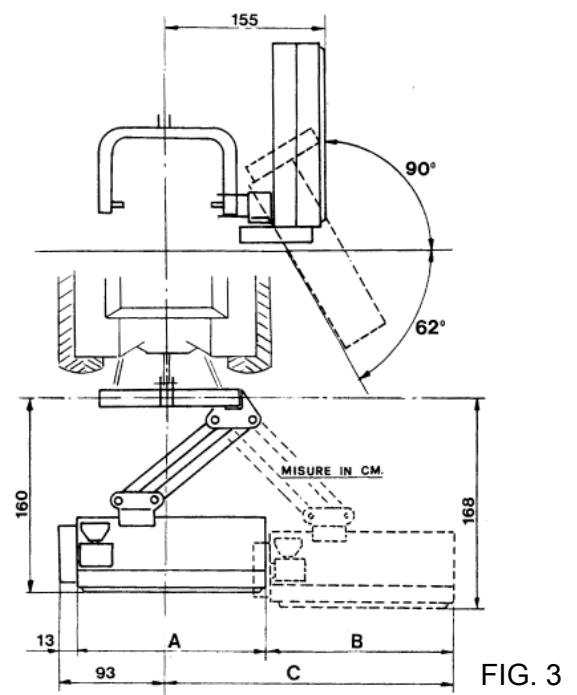


FIG. 3

2.5 Optional Equipment

Flails

Depending on the different crops to be cut, suitable flails can be fitted and used:

- Articulated flails for grass, shrubs, sticks and bushes up to 2 cm diameter
Part Number 0901068 (FIG. 4)

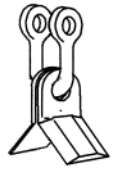


FIG. 4

- Hedge trimming blades for grass and hedges up to 3 cm. diameter.
Part Number 0901139 (FIG. 5)



FIG. 5

2.6 Versions of the machine:

The mower is produced in rear right hand (DX) and rear left hand (SX) version (FIG. 6).
FIG. 6

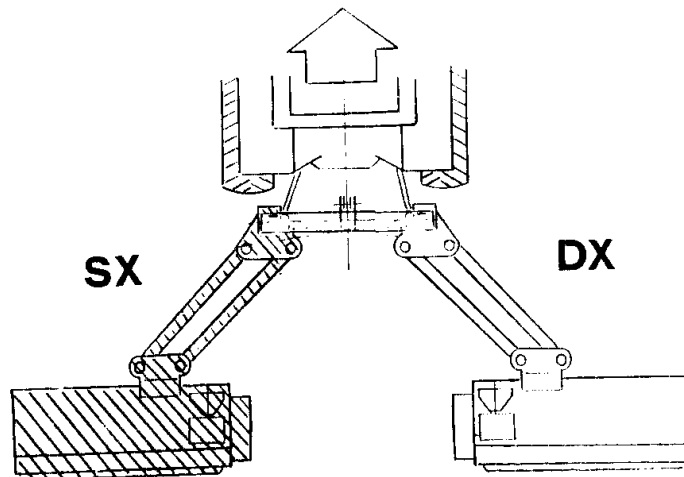


FIG. 6

3 SAFETY RULES



3.1 General safety rules

- It is mandatory to read and follow the instructions for the use and maintenance manual before carrying out any operation or move with the shredder. Improper use or an incorrect move may seriously damage things and people.
- Both the operator and the maintenance fitter must know the shredder well, especially regarding dangers resulting from improper use or incorrect repairs.
- Before starting, checks on tractor and shredder must be carried out as regards: functionality; road safety; accident prevention rules.
- Even when using the shredder correctly, stones or other objects may be thrown a long distance. Therefore nobody must stand within the danger area. Special attention must be paid when working near roads or buildings.
- Use tractors with cabs.
- The condition of flails and of all guards must be checked before beginning the daily work; they must be replaced if damaged or missing.
- During checks or repairs, make sure nobody could start the shredder by mistake.
- Never wear loose or fluttering clothes.
- Never carry passengers on the tractor.
- Never carry passengers on the shredder.
- Never connect the power takeoff with the engine stopped.
- Never approach the shredder until the rotor has completely stopped.
- Do not enter the working zone of the PTO shaft. It is dangerous to approach the rotating parts of the machine.
- Keep the PTO shaft guard in good order.
- Before starting, check the surrounding area for the likely presence of children and/or animals.
- Do not stand in the range of operation of the machine.
- The PTO shaft must be assembled and disassembled only with the engine stopped and the starting key removed.
- Before connecting the power takeoff, check that the speed and the rotational direction correspond to those of the shredder.
- Before leaving the tractor with the tool attached, proceed as follows:
 1. Disconnect the power takeoff.
 2. Put the machine steadily on the ground (with the hydraulic lift)
 - 3- Apply the hand brake and, if the ground is steeply sloping, wedge the tractor.
 4. Take out the starting key.
- Immediately replace any safety sign, or any missing or damaged decal.

3.2 Safety Rules concerning the Hydraulic System

- This shredder uses the hydraulic circuit of the tractor to carry out side movements and to adjust the flail head; the pressure of such system must not exceed 170 BAR.

IMPORTANT: Do not look for oil leaks with bare hands, but always with the aid of a cloth. Oil under strong pressure may seep into the skin causing serious infections. In this case contact a doctor immediately.

- Periodically check the flexible pipes; if they are worn or damaged they must be replaced with others of the same specification.
- Before working on the hydraulic system, lower the machine, take pressure out and stop the tractor.
- Used oils and greases must be stored and disposed of according to antipollution rules.

3.3 Safety Rules Concerning Road Traffic

- In transport, reduce speed, especially on bumpy roads. The very weight of the shredder may render driving difficult and damage the shredder itself.
- Check moreover that the levers which operate the hydraulic lift are locked, to avoid the lowering of the machine during transport.
- When driving on public roads, respect all road rules in force.
- Never transport the shredder with the rotor moving, even for short distances.
- Fasten the shredder with the appropriate chain (see sect. 6.5).

3.4 Safety Rules During Use

- Pay special attention, when working with the machine, not to touch fixed objects, such as road drain, wells, shafts, kerbs, guard rails, tracks, etc. This could cause the breakage of the flails, which would be thrown at very high speed.
- If wires, ropes or chains should get entangled in the rotor, stop immediately, to prevent damage or dangerous situations; stop the rotor and the tractor, take out the starting key. Put working gloves on, clear the rotor with the aid of pliers or shears. Do not try to disentangle by inverting the rotational direction of the rotor.
- Do not use the machine when there is vibration in the flail head, as this would cause breakage and serious damage. Find the cause of the vibration and eliminate it.
- Do not operate with the arm in extension if the tractor is on a sloping ground.

N.B.: During work, at regular intervals, verify (visual control) that the safety flaps are free and complete. The presence of earth, mud, stones and /or working residues could have blocked and/or damaged them: in this case, after having stopped the tractor and switched off the motor, replace immediately their efficiency and integrity. Never make any kind of maintenance and/or manual inspection when the machine turning: all its parts have to be still.

3.5 List of Guards fitted to the Shredder (FIG. 7)

- 1) PTO shaft
- 2) PTO shaft guard
- 3) Belt guard
- 4) Danger and warning decals
- 5) Rear guard
- 6) Side guard
- 7) Front guard
- 8) PTO shaft bearing
- 9) PTO shaft rest

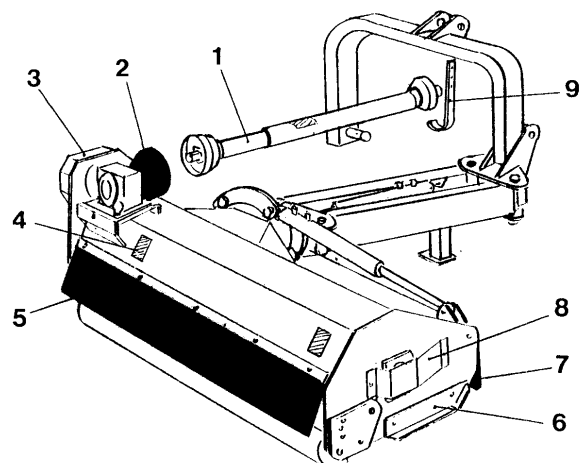


FIG. 7

3.6 Description and Location of Safety Decals (FIG. 8)

Carefully follow the instructions given on the decals.

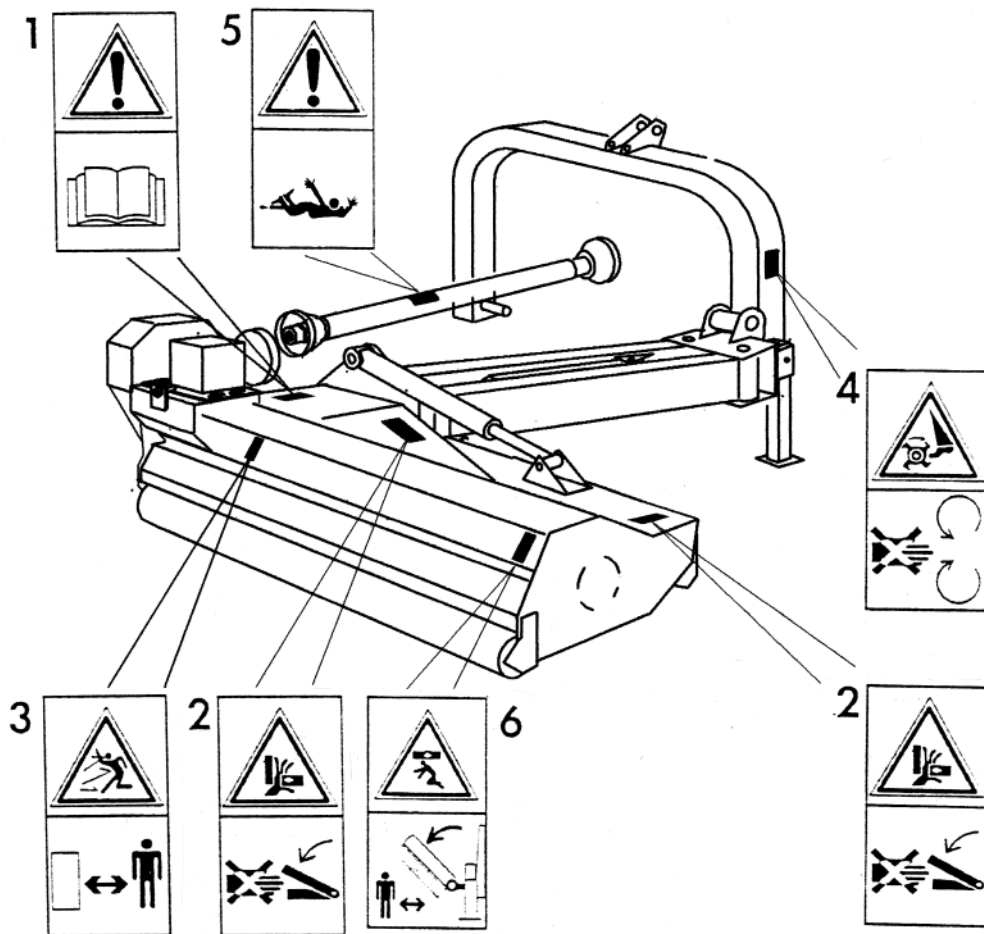


FIG. 8

Description of the Decals

- 1) Warning of danger through lack of knowledge of all the functions of the machine and the resulting risks. Read the use and maintenance manual before operating the shredder.
- 2) Danger sign of crushing or shearing: do not put limbs in the moving parts of the machine with this decal.
- 3) Danger sign; it shows the risk of flying stones or other objects and makes it mandatory to keep out of the danger zone
- 4) Danger sign of rotating flails; do not enter their area of operation with hands or feet.
- 5) Danger of getting entangled. Do not approach the rotating PTO shaft. Pay special attention to clothes, which must not be loose or fluttering.
- 6) Danger of crushing: keep out of the danger zone. Before to make any control or maintenance it is necessary to lock the hydraulic cylinders.

3.7 Driver protection

- In order to protect the operator from possible flying debris, stones or other materials, it is recommended to fit two protection grills (1) to the operator's cab (working side), so that the debris thrown by the end tool cannot reach the glass of the cab and break it, causing injuries to the operator (FIG.9).
- It is recommended to fit 5 mm sheets of polycarbonate (2) under the protection grills (1). They will prevent small stones and fragments from hitting the glass of the cab (FIG.9).
- Attach the machine only to tractors with approved type anti-roll over driving cab (ROPS).
- The operator and all personnel must wear a safety helmet and eye protectors as protection against possible flying material.

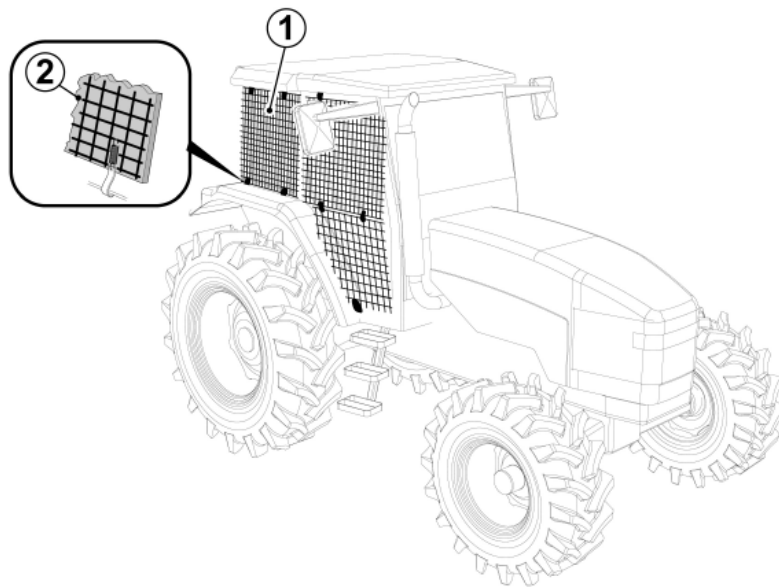


FIG.9

4 INSTRUCTIONS FOR INSTALLATION AND HANDLING

4.1 Lifting and unloading

To handle the shredder use a hoist or a crane with lifting capability suitable to the weight of the machine (see TAB. 1) and with proper chains and type approved hooks to be fixed in the marked points, as shown in FIG. 10.

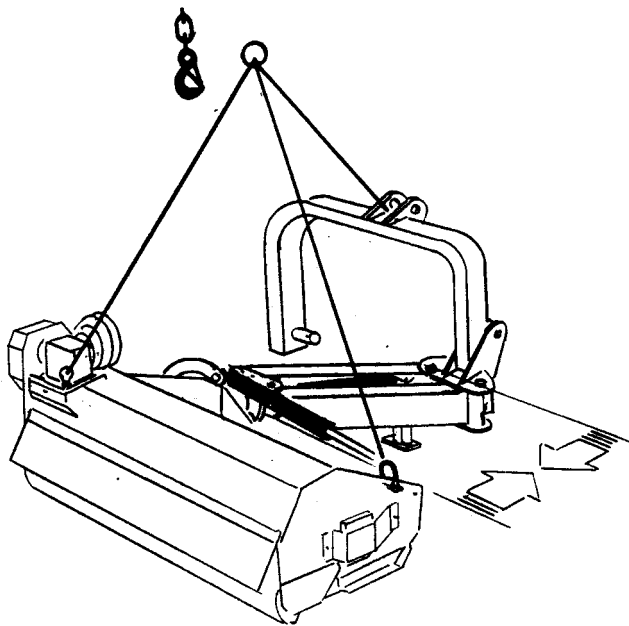


FIG. 10

4.2 Unpacking

To make transport easier, the shredder can be supplied in a special pack (disassembled and on pallets). In this case, a card showing the reassembling procedure will be attached to the Use and Maintenance Manual.

4.3 Attachment to and detachment from the Tractor

Before carrying out this operation and whenever the shredder is used, it is mandatory to:

- Visually check the machine in general
- Check that all guards are fitted and in good condition
- Confirm that all flails are fitted and in good condition
- Grease the bearings and any other part as indicated by a decal (FIG. 27)
- Check that all hydraulic pipes are in good condition, look for signs of leakage beneath the machine
- Check that the number of revolutions and the rotational direction of the power take off correspond to those required by the shredder (FIG. 11).

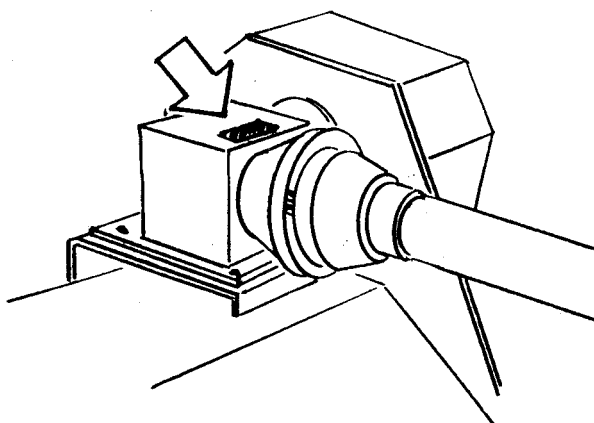


FIG. 11

- To attach the machine to the tractor (FIG 12), bring the tractor lower lines (1) near the shredder, to the points corresponding to the pins.
- Insert the pins (2) and secure them with the spring clips (3).
- Fit the top link (4), raise the shredder to a perpendicular position with the ground. Adjust the two tractor lower linkage stabilizers (3) thus fixing the machine to the tractor in a central position.
- Lift the stand (5)
- Connect the pipes for ram control to the tractor and mark them to avoid reversing them during assembly (see FIG. 21)
- Proceed in reverse order to detach the shredder from the tractor.

4.4 Fitting the PTO shaft

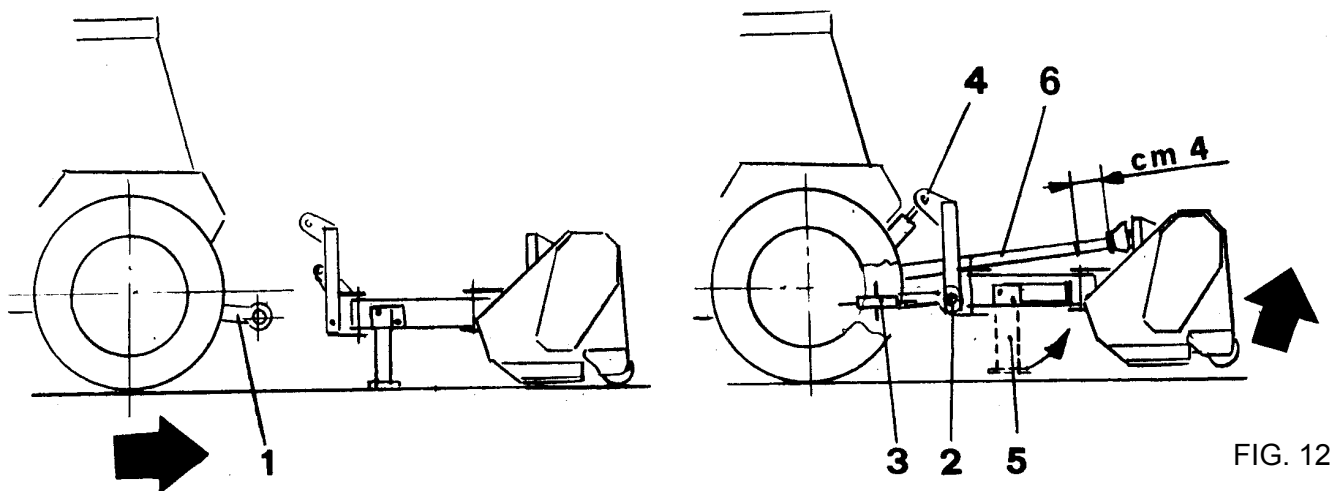


FIG. 12

4.4.1 Fitting

Following the instructions in 4.3, assemble the PTO shaft (6) and check that the overlap is not less than $\frac{2}{3}$ of L. Be sure to keep a 4 cm. backlash (FIG. 12). If it needs shortening, proceed as in (FIG. 13).

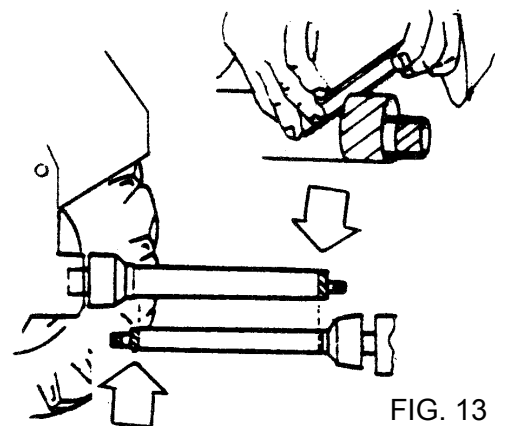


FIG. 13

4.4.2 Guards

The guards of the PTO shaft must be fixed to the shredder and to the tractor with chains, to prevent rotation. The minimum overlap of the guard and the PTO shaft must not be less than 5 cm. (FIG. 14)

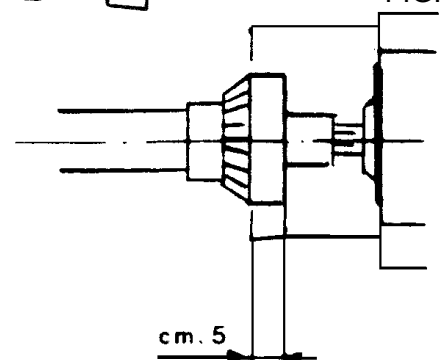


FIG. 14

4.5 Tractor Stability

Due to the design of the shredders and to the work they do, it is essential to ensure tractor stability, in order to eliminate any risk of imbalance or overturning.

Lift the shredder and check that the tractor does not mount up. In case it does, ballast the rear wheel of the tractor opposite to the extended arms and in front. (FIG. 15).

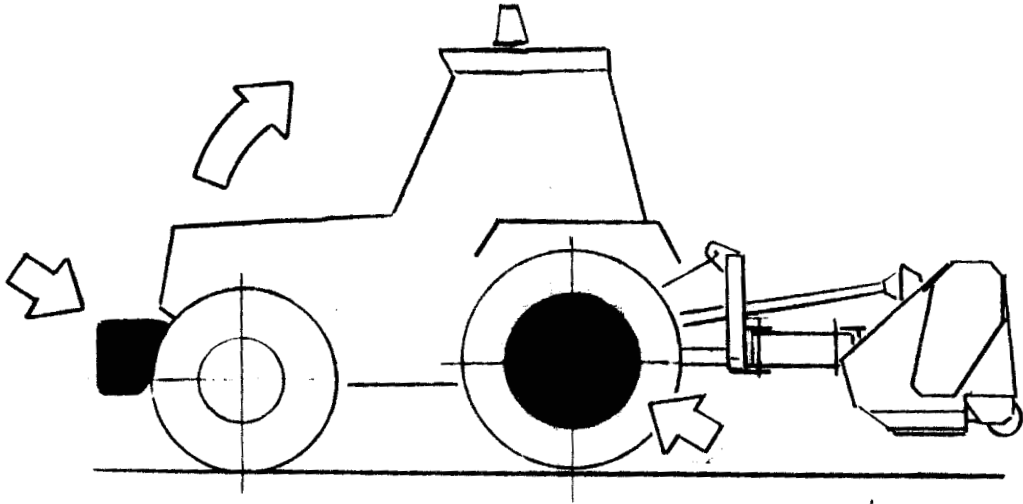


FIG. 15

Never work with the extended arms when the tractor is on sloping grounds.

4.6 Parking

- Park the machine in a safe and quiet place, on flat and firm ground, in order to prevent the risk of rolling over.
- Lower the shredder to the ground with the aid of the hydraulic lift of the tractor, after lowering and blocking the stand, closing the arms and lowering the flail head to the ground (FIG. 16).

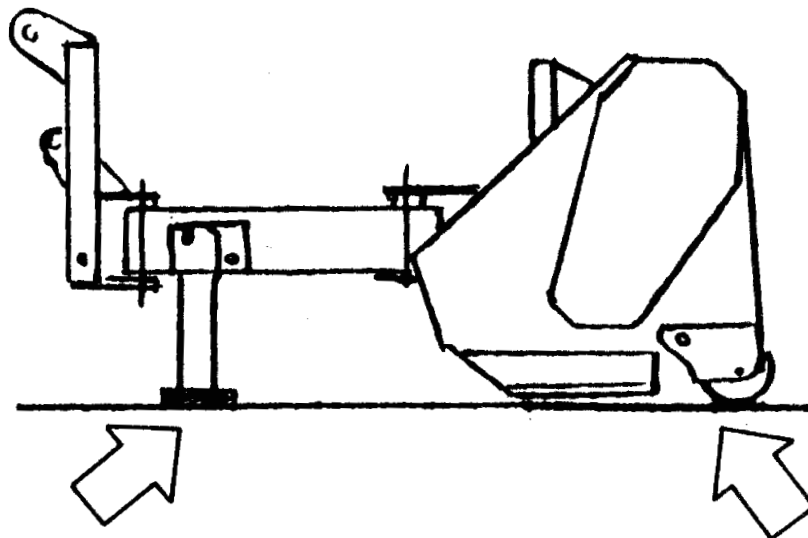


FIG. 16

4.7 Instructions for fitting

Instructions for the fitting of the mower when for transport reason it is supplied partially dismantled (FIG.17).

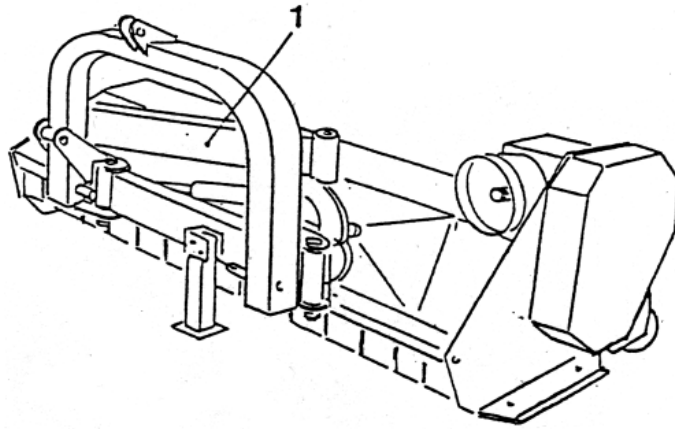


FIG. 17

- In order to have the mower stable during the operations, hook the mower up to the shift of tractor.
- Switch off the tractor.
- Cut the fixing strings used for transport reasons.
- Remove the arm 2 as shown on FIG. 18.
- Put the arm 1 on the proper support 3 and 4 and lock with thread pins 5.
- Fix the cylinder 6 (rod side) with thread pin 7.

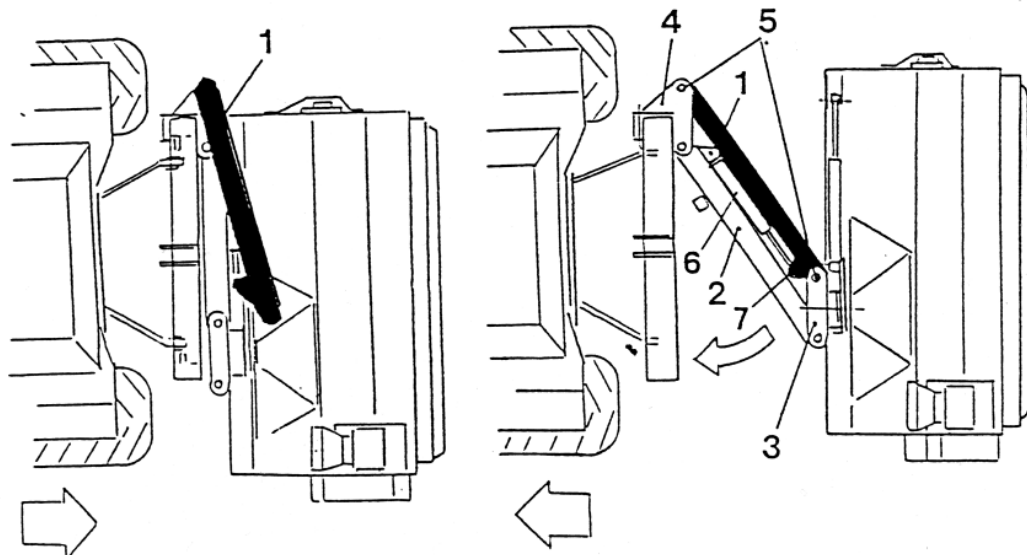


FIG. 18

WARNING:

The whole operations must be done without the pto shaft mounted.

5 ADJUSTMENT AND SETTING UP

5.1 Adjustment of the height of cut

Adjustment of the height of cut is obtained by shifting the flail head roller in order to suit the material to be cut and the required degree of chopping (FIG. 19).

IMPORTANT: Flails must never touch the ground.

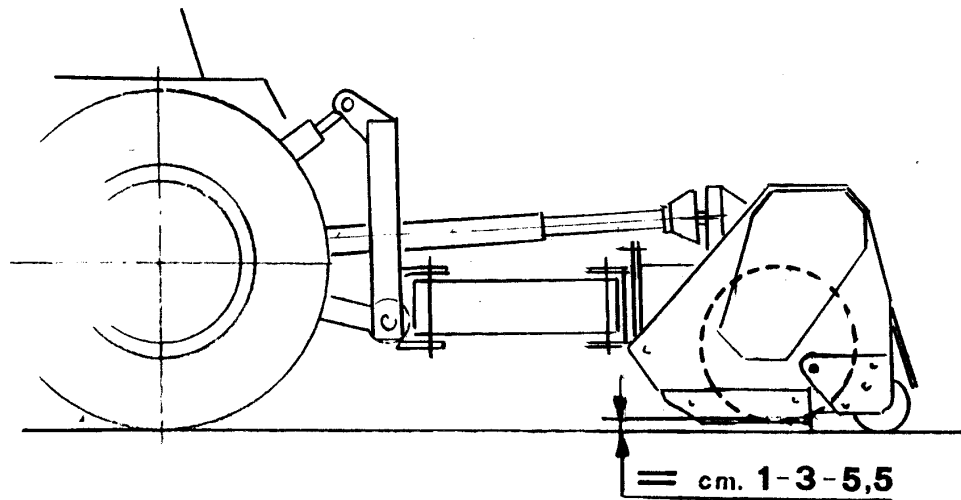


FIG. 19

5.2 Adjusting belt tension

This operation must be carried out with the shredder standing on the ground, the power takeoff disconnected and the starting key removed.

Remove the belt guard (1), loosen the nut (3) and adjust the screw (2) to obtain a belt deflection of no more than 1.5 cm. with 10 Kg. pressure applied (see FIG. 20)

At the end of the operation, tighten the screw (3), the nut (2) and reassemble the belt guard (1).

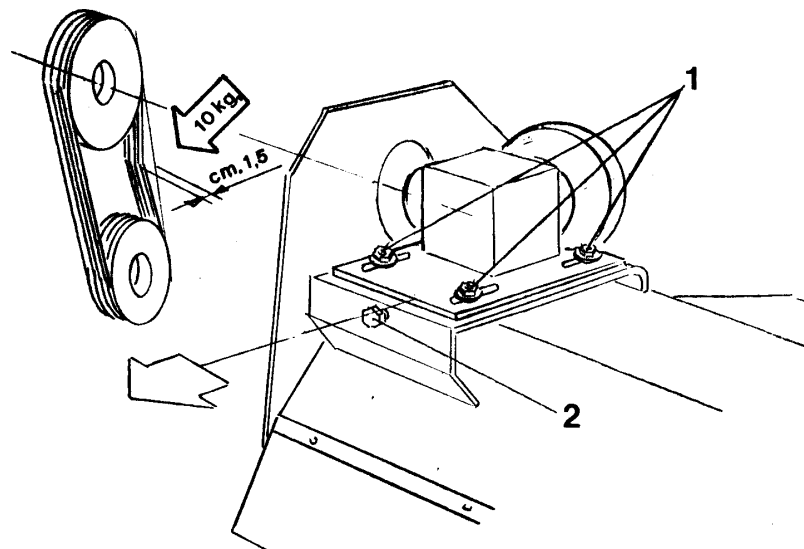


FIG. 20

6 USE AND OPERATING RULES

6.1 Ram control

6.1.1 Standard control

The ram control levers of the shredder are placed inside the cab and are part of the shredder; that derives the hydraulic power necessary for its functioning from it.

- Ram (1) (FIG. 21) controls the adjustment of the flail head.
- Ram (2) (FIG. 21) controls side movement of the flail head.

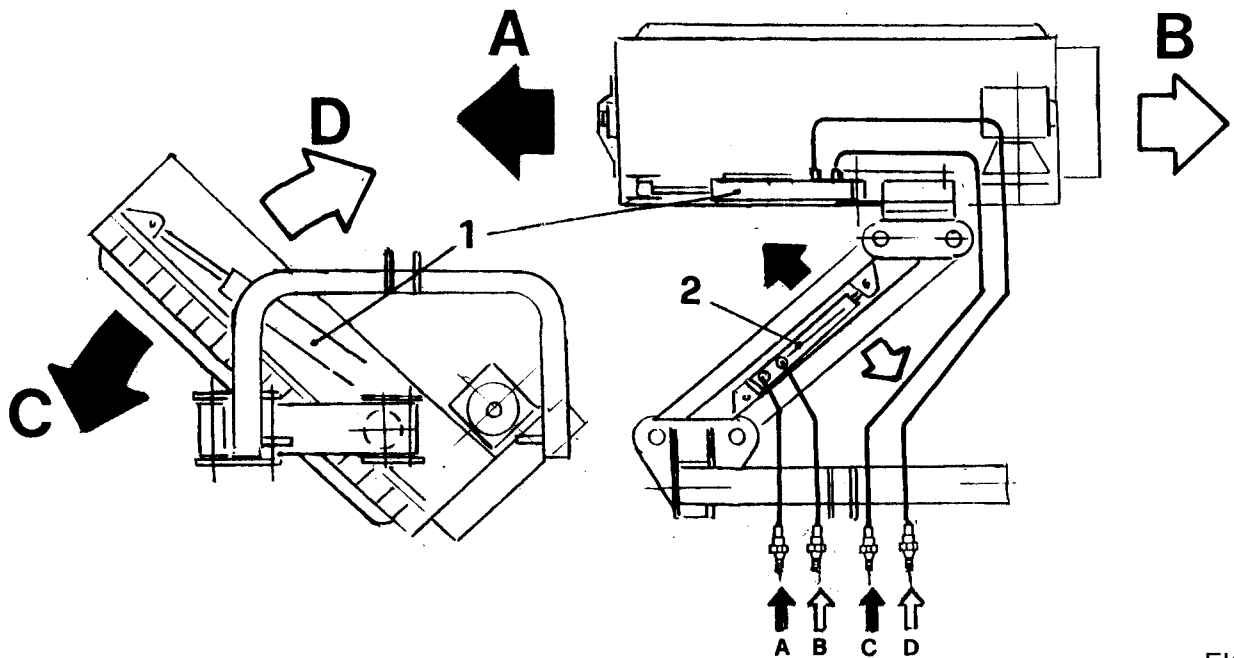


FIG. 21

6.2 Starting

Before using the shredder check the tightness of all bolts and the integrity of all guards. Check that the number of revolutions and the rotational direction of the power takeoff of the tractor correspond to those required by the shredder, see decal on the gearbox (FIG. 11) Engage the power takeoff at low engine RPM (without jerking) to avoid damaging the transmission (gearbox and belts).

6.3 Working Mode

6.3.1 Adjustment of the height of cut and working speed

Adjust the machine to suit the type of work to be done and the material to be cut:

- Adjust the height of cut, as shown in FIG. 19.

Working speed is chosen to suit the material to be cut and the degree of chopping required. The optimum speed ranges from 3 to 8 Km per hour.

IMPORTANT: When extending and closing the arms, lightly lift the flail head off the ground, to avoid damage to the frame (FIG. 22)

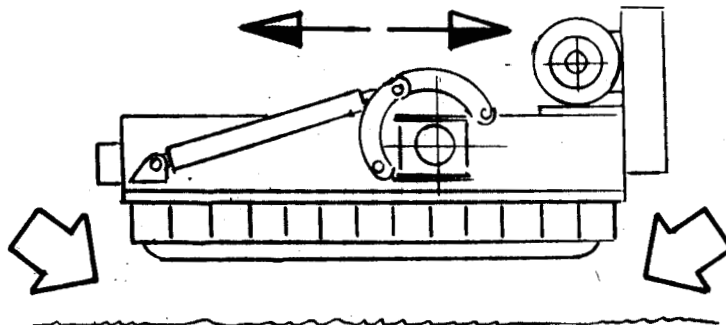


FIG. 22

IMPORTANT:

During reverse movement, lift the shredder off the ground to avoid damaging the machine (FIG. 23)

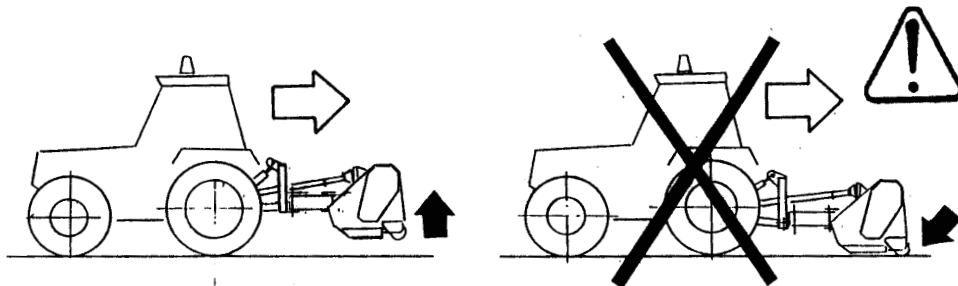


FIG. 23

6.3.2 Arms safety: (FIG. 24)

The machine is equipped with an automatic safety system that comes into operation when the flail head touches an obstacle and the tractor keeps moving. This safety system allows to withdraw the arm to avoid the blow. In this way the operator will have enough time to steer and drive past the obstacle. After this, the auto-return system shifts the arm back to the working position. When getting close to the obstacles you have to drive very slowly, because the space for withdrawing the arms is very narrow.

ATTENTION: During the withdraw of the arm never exceed an angle of 10°; this to avoid to stress the structure of the frame and of the arms irregularly.

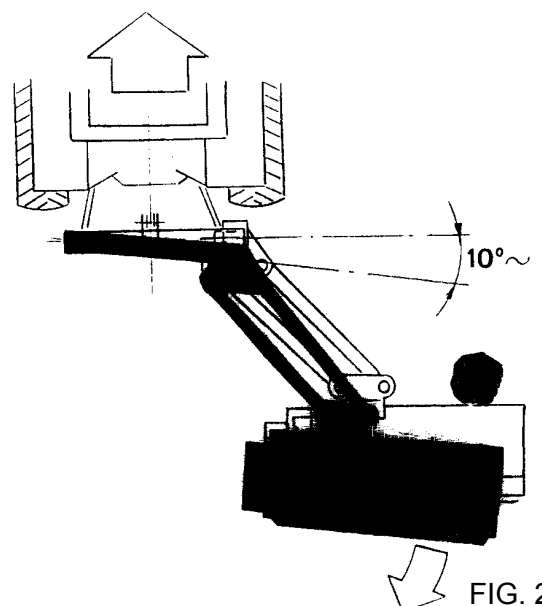


FIG. 24

6.4 Stopping

- Close the arms and lower the flail head to the ground.
- Disconnect the power takeoff.
- Before stopping the tractor:
 - Stop the tractor, take out the starting key and apply the hand brake.
 - If the ground is sloping, block the tractor wheels.

6.5 Transport Position

- For transport it is mandatory to:
 - Observe all road transport requirements and fit the necessary warning signs (FIG. 25).
 - Secure the arm and the flail head with the appropriate chain, to prevent movement.

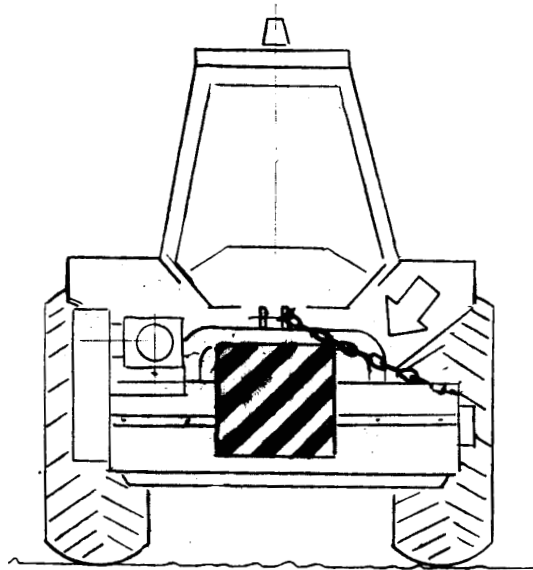


FIG. 25

During transport reduce speed especially on bumpy roads. The weight of the shredder may render driving difficult and damage the machine itself. The power takeoff must be disconnected during transport.

6.6 Controls with distributor (OPTIONAL) cod. ZL1605

For tractors equipped with just one pressure tube or when requested by the user, a distributor (2) for ram control can be fitted to the shredder. This is also equipped with a floating position to control the ram (1) (FIG. 26). (When delivering the machine the fitting instructions will be enclosed by our after sales service).

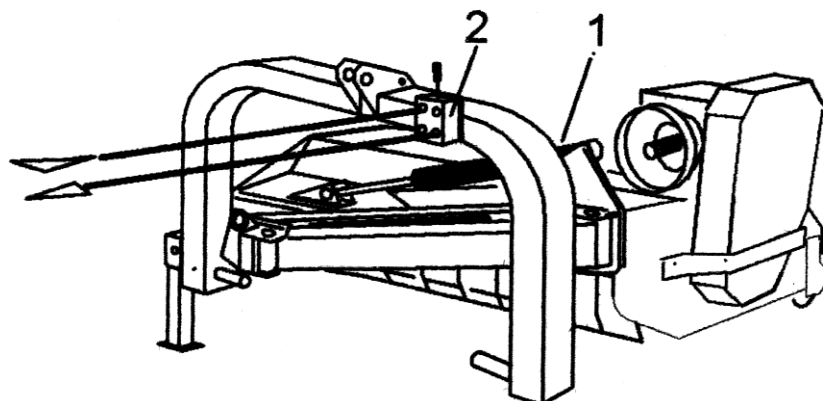


FIG. 26

7 MACHINE MAINTENANCE

All maintenance, cleaning and repair operations must be carried out with the shredder firmly lowered to the ground and detached from the tractor, or with disconnected PTO, engine off and starting key out.

After the first 2 hours' operation from new (or after fitting new belts) check belt tension.
Regularly, every 8 hours' operation:

- Tighten bolts and nuts.
- Check wear and condition of flails
- Check the safety guards
- Check belt stretch and condition
- Visually check the frame and arms to detect possible damage caused by earlier work
- Check gearbox and extension lubricating levels
- Grease the parts on the appropriate decal (FIG. 27).

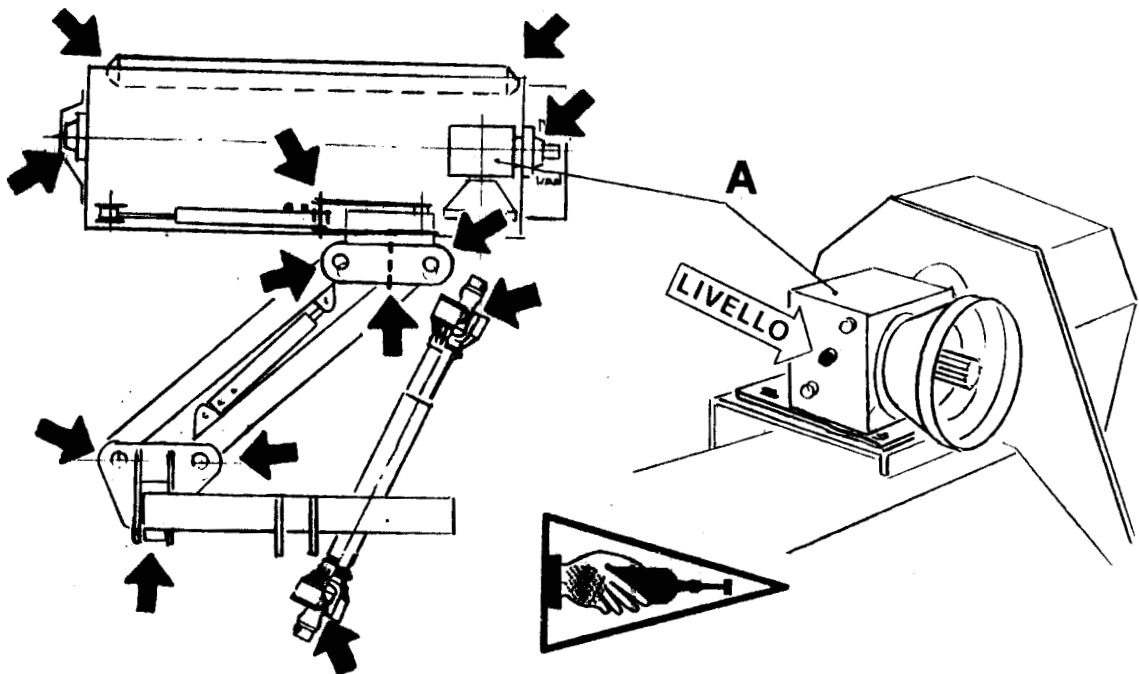


FIG. 27

This operation must be always carried out at the end of each working day. This facilitates the removal of mud or other material from the rotating parts (bearing, pins, etc.) in order to avoid rust and possible seizure.

- Every 100 hours' operation, grease the moving parts of the PTO shaft, extracting the two parts of the shaft.
- After long inactivity, repeat the operation before re-using the machine.
- Use grease such as AGIP GR MU EP/2 (classification DIN 51825 (KP 2 K))

To fill oil to level, use:

- For gearbox use oil AGIP BLASIA 220 or compatible oils (classification ISO VG 220)).
- Amount of oil Lt. 0,68 - gal 0,18

8 TROUBLE SHOOTING CHART

TROUBLES	CAUSES	REMEDIES
Irregular cut	• Worn, bent or broken flails	• Replace
	• Machine is not level with the ground	• Level it, adjusting the flail head hydraulic ram
	• Clogged material due to excessive working speed	• Reduce working speed
Machine noise	• Loose bolts	• Tighten bolts
	• Cracks or initiation of flail head	• Have it repaired in specialized workshops
	• Bearings	• Have it repaired in specialized workshops
Gearbox noise	• Lack of oil	• Fill to level
	• Worn gears	• Replace
	• Worn bearings	• Replace
Vibration	• Broken or worn flails	• Replace
	• Unbalanced rotor	• Have it repaired in specialized workshops
	• Worn rotor bearings	• Have it repaired in specialized workshops
Premature flail wear	• Flails touching the ground	• Adjust height of cut
Excessive backlash in the arms and joints	• Worn pins	• Replace
	• Worn arm sliding blocks	• Adjust
Flail head lowers involuntarily	• Worn glands in the rams	• Replace glands in authorized shops
Breakage of roller bearings	• Violent impact on the ground when the arm is lowered	• Lower it gently
	• Dirty or little greased bearings	• Clean and grease
Belts overheating	• Flails touching the ground	• Adjust height of cut
	• Working speed unsuitable to amount of material to cut	• Reduce speed
	• Belts slip on the pulleys	• Adjust belt tension

9 REPLACING PARTS

Before carrying out any work, it is mandatory to:

- Lower the shredder to the ground
- Disconnect the power takeoff, stop the tractor and take out the starting key.
- Wear working gloves.

9.1 Flail replacement

When the flails are worn, they must all be replaced. In case of a partially broken flail, it is advisable to replace the broken one and the one diametrically opposite, in order to maintain the balance (See FIG. 28).

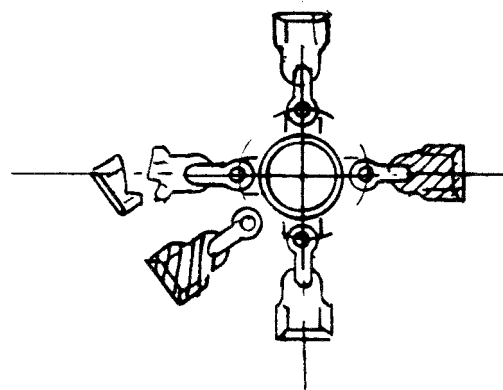


FIG. 28

9.2 Pipe Replacement

- Before working on the hydraulic system, exhaust all pressure, working with the engine stopped and using all control levers.
- Pay particular attention to cleanliness as dirt and dust can cause considerable damage to the hydraulic system
- Replace any damaged pipes with genuine spare parts, or with others of the same specification; ensure that they are not kinked or twisted, remembering to check this throughout the entire cycle of arm movement.

9.3 Pin Replacement

- Carry out this operation with the aid of a lift or hoist, to prevent detached component from falling, and also to avoid upsetting the balance of the machine.
- When replacing parts, clean and grease their housings.

9.4 Belt Replacement

This operation must be carried out with the flail head touching the ground, the power takeoff disconnected and the starting key out.

- Remove the belt guard, slacken the 4 screws (1) FIG. 20, unscrew the tightener (2), remove the belts and replace them with similar ones for dimensions and type.

See 5.2 for registration.

IMPORTANT: More complex operations must be done in authorized workshops.

10 DEMOLITION, DIFFERENTIATED DIVISION OF THE MATERIALS AND DISPOSAL

If the machine is out of order, all its parts that might cause dangers have to be made inoffensive. The materials forming the machine that have to undergo a differentiated division are:

- steel
- mineral oil
- rubber
- plastic

All the above mentioned operations, and the final disposal, have to be carried out in total respect of the present provisions of law on the subject.