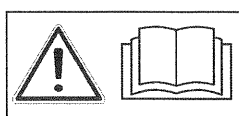
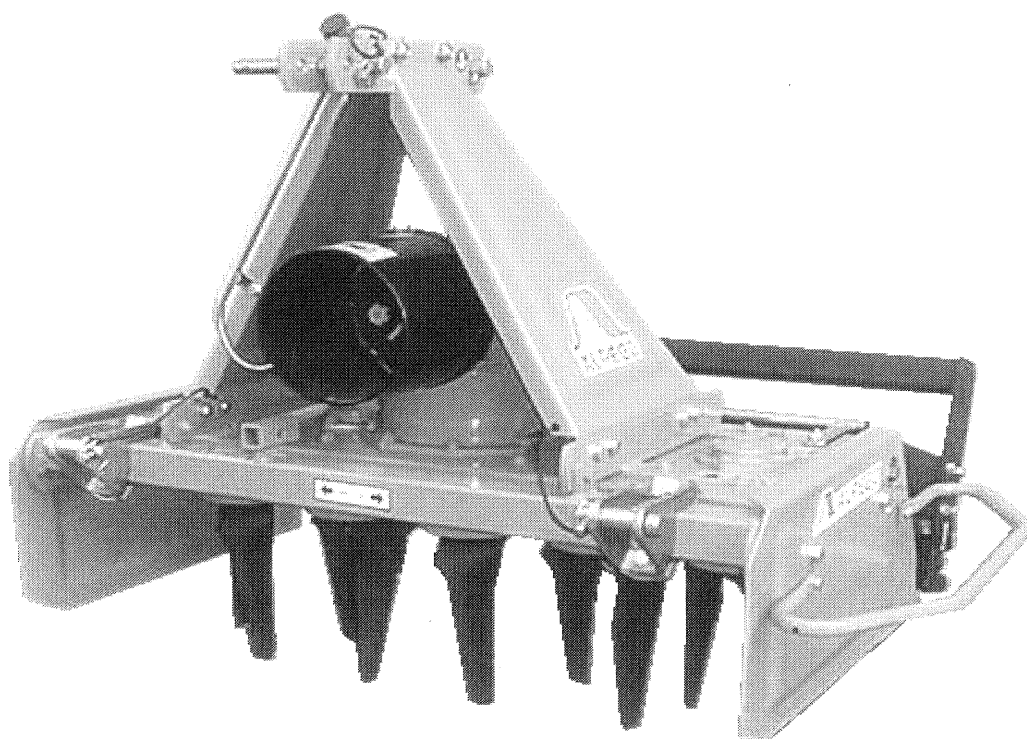


**ROTARY HARROW ROTODENT:**

**RA**



**MANUAL OF USE AND MAINTENANCE**

## INTRODUCTION

This manual provides all the necessary information concerning the use and maintenance of the rotary tillers and power harrows, mounted on the 3rd point of the tractor, as well as the list of spare parts.

The rotary tillers and power harrows here described can be mounted on any tractor having a 3 point hitch of the category 1, 2 or 3 and an input shaft running at a maximum speed respectively of 540 or 1000 revolutions per minute, depending from the type of transmission of each model.  
The horsepower required to run the rotary tillers and the power harrows vary for each model.

The rotary tillers and power harrows are designed and manufactured for the agricultural use in open fields as well as in orchards, vineyards and other type of coltures and crops.  
Therefore any other use different from the one in agriculture is forbidden.

Regular and adequate operation of the machine depends on correct use and maintenance.

The technical instructions that are contained in this manual must be therefore strictly complied with, to prevent any problem which could obstacle the correct use of the machine and reduce its life.

Compliance to the safety requirements mentioned herein is also essential to prevent accidents or injuries to the operator and other parties.

**ANY USER OF THIS MACHINE IS WARMLY REQUIRED TO READ CAREFULLY AND UNDERSTAND ALL THE INSTRUCTIONS OF THIS MANUAL BEFORE STARTING TO USE THE MACHINE.**

Should these instructions, or even one of them, not be complied with, then the Manufacturer cannot be held liable for any damages whatsoever that are caused to the machine itself, to things or to persons.

**This handbook is part of the machine and must be carefully kept on file as long as the machine is operative.**

Please refer to the Manufacturer's Engineering Dept. should you need any technical details or any information on how to improve the machine operation and efficiency.

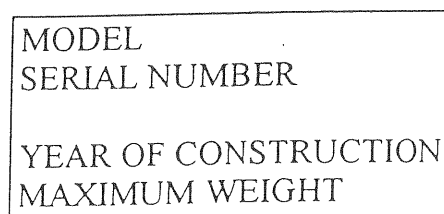
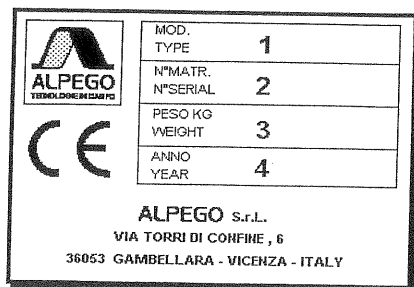
Any repair have to be carried out only by skilled technicians, of a Dealer authorised by the manufacturer or by the distributor.

For the repairs only original spare parts can be used. Failing this the Manufacturer shall not be held liable for incorrect operation of the machine and nor the user will then be entitled to any guarantee.

Should any doubt arise on the meaning of any part of this manual, the Italian text shall be considered as the valid reference text.

On the machine the user will find the following plates or decals:

- marking plate containing the name of the manufacturer, the year of construction, the model, the serial

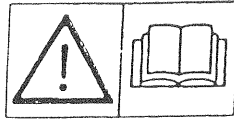


- decals with general maintenance and lubrication instructions.
- danger signals.
- warning signals.
- marking signals.

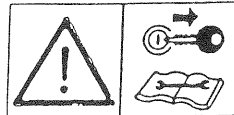
Plates, decals and signals on the machine are part of the machine itself and cannot be removed.

The operator must comply with the instructions affixed on the machine and keep them in clean and legible conditions as long as the machine is operative.

## WARNING SIGNALS

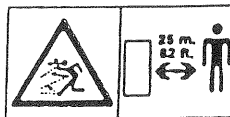


Please carefully read and understand the operating instruction before using the machine.



Before performing any service, stop both the machine and the tractor, lay the machine on the ground and read the instructions of this manual in the section referred to the service.

## DANGER SIGNALS



**Danger:** the machine could throw heavy or sharp objects.  
Keep at a safe distance from the machine



**Danger:** hands and feet could be severely injured.  
Keep away from rotating parts.



**Danger:** do not stay behind the machine as it could roll over you.



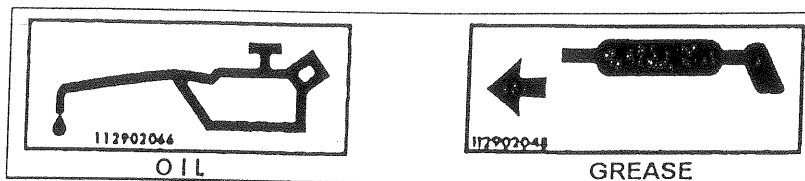
**Danger:** never get near to the PTO shaft while it is in operation.  
ACCIDENTAL CONTACT COULD CAUSE DEATH.

## MARKING SIGNALS



Hitching point for lifting the machine.

Make sure that the capacity of the vehicle used for transport is sufficient to lift the maximum weight of the machine.



- This part needs to be lubricated or greased.

## GENERAL SAFETY PROVISIONS AND ACCIDENT PREVENTION



**Before using the machine, please carefully read the safety rules and the recommendations of how to prevent accidents which are described in this manual.**

These rules must be strictly complied with to ensure safety of the operators and other people as well as the environment.

The Manufacturer and its Sales network will not be considered liable in the case that such rules are not complied with.

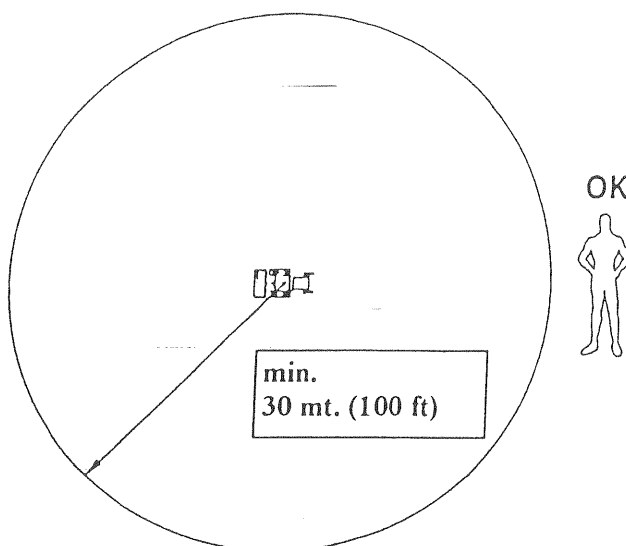
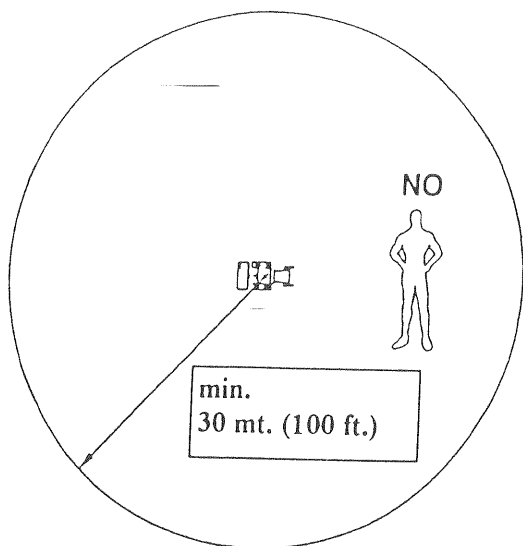


**BEWARE:** the rotary tillers and the power harrows are machines where some parts are rotating at a very high speed, which, even if protected, are still potentially dangerous.

- 1) Pay careful attention to warning, danger and marking signals which are both contained in this handbook and affixed to the machine.
- 2) Any time the machine needs to be serviced, the motor of the tractor must be off, the gear engaged, the parking brake pulled and the machine must be sitting on the ground.
- 3) Never touch parts while in motion.



When in operation, the machine may throw soil, stones or other objects which are in or on the ground. Therefore, always make sure that no persons or animals are within the reach of the machine. Minimum distance between persons and working place: 30 Mt. (100 ft). Never work when persons are in areas at risk.



The machine must be used by one person only who must operate it from the tractor's driver seat.

Nobody else is necessary, therefore no other persons must approach the dangerous area (Min. distance from the machine while in operation: 30 Mt. (100 ft.)).

Should someone come too close to the machine, then immediately stop any operation you are carrying out and warn these persons with acoustic and light signals until they leave the dangerous area, where they could be hit by thrown objects, overrun by the tractor or be injured by machine mechanisms. Risks due to parts that are in motion could be unavoidable.

## SAFETY SHIELDS



The machine is provided with safety shields, the purpose of which is to prevent people from being injured or possibly killed with the rotating parts, such as, but not only, the blades or the drive shaft, **WARNING:** never run the machine without any of the safety shields of which the machine has to be provided.

Should, for any reason, some shield being damaged or missing, replace it immediately before starting to work. Contact the authorised Dealer for getting the original parts.

## SAFETY RULES FOR MACHINE OPERATORS

When working, the operators should never leave the safe driver's seat, which must have been built or updated in compliance with safety regulations required for tractors. From the driver's seat the operator should be capable to take any action in case of problems.

The operator must have a good visibility from the seat of the tractor in order to check if somebody is within the dangerous area (Minimum 30 mt.: 100 ft.).

Should this happen however, then **EVERY MACHINE OPERATION MUST BE STOPPED** until the dangerous area is free.

Never wear clothes with free ends (such as belts, scarves, long skirts, etc.) which could drag you towards the machine parts while they are in motion.

Never get off the tractor without first:

- disconnecting the Power Take Off
- laying the machine on the ground
- turning off the engine and engaging a low gear
- engaging parking brake



**It is strictly forbidden to stay between the tractor and the machine when the engine is on. This can cause your death.**

Should you need to operate the power lift from the outside, it is strictly forbidden to stay between tractor and machine.

The operator should keep all shields of which the machine is equipped, in steady and sound conditions. **After any service or repair, all the shields must be put in the original place.**

Before starting the engine make sure that the gear is in neutral and the PTO is disengaged.

When replacing any worn out pieces or during any other operation on the machine (which must be carried out by skilled technicians) please proceed as follows:

- make sure the PTO is disengaged;
- make sure the tractor is off and a gear and parking brake are engaged;
- in case of the need of servicing the machine from underneath, make sure it would rest safely on proper supports, in order to prevent any accidental fall which would seriously injure someone.
- every intervention must be carried out on a clean horizontal floor.



Should the machine accidentally bump into an obstacle, then proceed as follows:

- stop immediately the machine and following all the above-mentioned safety instructions. Check the machine carefully, to be sure there are no damages. In the case of doubts please check with the service department of an authorised dealer.

From tests made with the tillers and power harrows it resulted that the noise level close to the machine is of..... decibel. This means that the operator has to use appropriate noise cancelling headset or stay inside an appropriately sound dampened tractor cabin.

## ROAD CIRCULATION

Before driving the tractor with the machine on the road, make sure that it is sufficiently clean in order to avoid to drop soil, grass, stones or other objects on the road.

The operator must also ensure that the Rules of the Road in force are complied with, such as, but not only:

- total length of the convoy
- overall width
- axle load
- lifting capacity
- light and refractive signals
- brake efficiency
- whatever else the Rules of the Road provide for.



It is strictly forbidden to transport persons, animals or goods on the machine.



**Operators that are: not of age, without driving licence, unskilled and not in good physical or mental health conditions, cannot drive the tractor or be entrusted with driving it.**

Please consider that a towed or 3 point mounted implement can have serious influence on roadability, drive and braking efficiency of a tractor. When the tractor takes a curve, the side stress varies considerably as a function of the centre of gravity.

Before parking the tractor, please proceed as follows:

- lower to the ground the machine attached to the 3 point hitch.
- turn off engine and engage a low gear
- set on parking brake
- take the ignition key out of the console

Farm machines are manufactured for field work.

Should they be driven on public roads, then they must be equipped as provided for by Rules in force.

During road transportation with the machine attached to the 3 point hitch, be sure that the hydraulic lift system would be in the stable locked position and that the machine would not be swinging on the sides.

## TRUCK TRANSPORT

Check if the vehicle's capacity is adequate.

Make sure to respect the limits foreseen by the rules of road circulation.

Adequately fasten the machine and detached parts, if any (e.g. drive shaft).

## ATTACHMENT TO THE TRACTOR



The attachment of the machine to the tractor is a dangerous operation. It is recommended that such operation is carried out strictly complying with the following instructions and paying careful attention.

**BEWARE:** In order to attach or set the machine, any operations must be carried out with the machine laid flat, tractor on standstill, engine off, pulled parking brake and low gear inserted. Only the machine operator and the technical staff authorised by the Dealer can be there.

When working on the machine make sure nobody else is coming too close.

Make sure that positioning is correct, that the three point hitch is vertical and that the machine does not run the risk of overturning or shifting, since this would cause damages or injuries.

The correct position of the tractor and of the machine to be attached, is established by setting the implement at such a distance from the tractor so that the PTO shaft would result extended between 5 to 10 cm (2 to 4 in.) from its maximum closed position.

Make sure the tractor power is appropriate for the machine is going to be attached.

Never use tractors whose power exceeds that foreseen for the machine, as this has been tested with such power, exceeding which all machine members could suffer serious damages which are not covered by the guarantee.

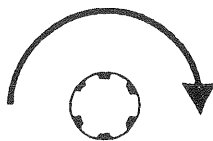
Make sure the lifting capacity is sufficient. Consider that the machine's barycenter is on the longitudinal centreline and that it may be necessary to add an appropriate ballast to the tractor.

Make sure that the tractor's and the machine's 3 point hitches are of the same category.

Check that the input shaft of the tractor would have the same size, type and number of splines as the yoke of the drive shaft on the tractor side.

Check if the RPM of the tractor's PTO are the same foreseen for the machine to be attached (normally either 540 or 1000 RPM).

Check if the tractor's PTO rotates clockwise (please look at it from behind).

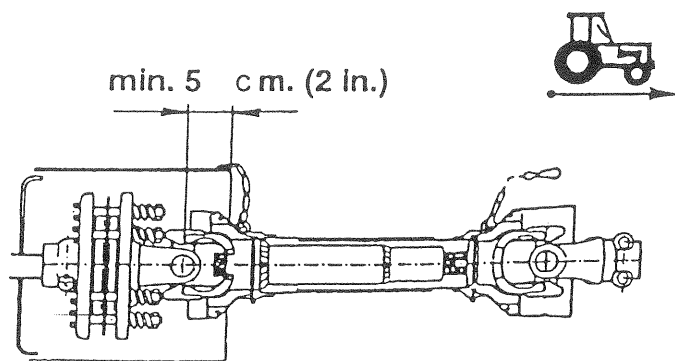


Use only the drive shaft supplied or recommended by the Manufacturer.

Mount the drive shaft to the input shaft of the machine paying attention if there is any mark showing the tractor side and machine side (for example any limiting device like a shear bolt or a slip clutch are to be mounted on the side of the machine).

Lay the drive shaft to the appropriate holding hook to prevent that the sliding half would drop to the floor.





Link to the machine the chain which is attached to the guard of the shaft, which prevents it from rotating.

Drive the tractor close to the machine with PTO in neutral, switch the motor off, pull the hand brake and leave a low gear engaged.

Attach both bottom lifting arms to relevant machine's hitches.

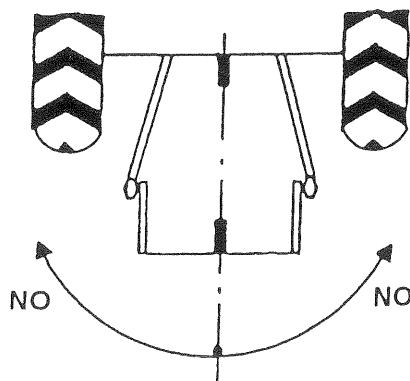
Insert pins and hold them with their clips.

Connect the drive shaft to the input shaft of the tractor, double checking again that a minimum distance of 5 to 10 cm (2 to 4 in.) is allowed to the completely closed position of the drive shaft.

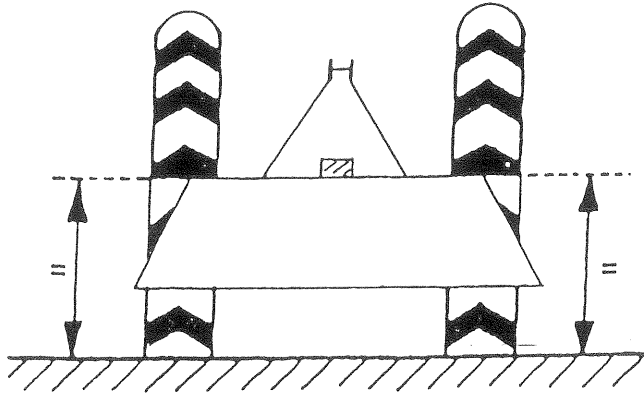
Connect the anti rotation chain of the shaft guard to the tractor-side.

Connect the top link of the tractor to the 3rd point of the machine and insert the pins. Regulate top link rod in order that the machine and the tractor would have the respective input shafts perfectly parallel. The parallelism is very important to grant appropriate performance and long life to the drive shaft.

Fix lifting arms so that the machine is on the centreline and has no side oscillation.

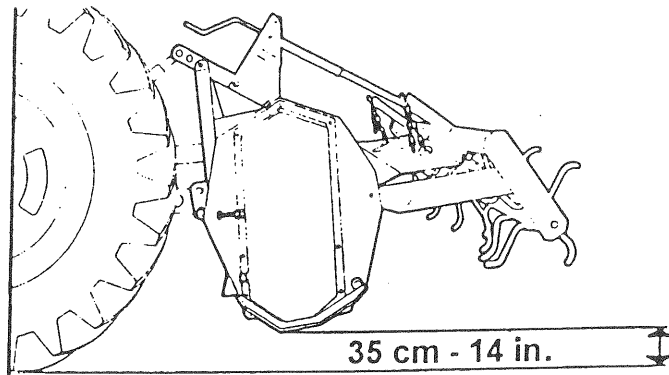


Adjust lifting arms' height: when lifted, the machine must be parallel to the ground.



Make sure at least 20% of total weight (tractor + machine working condition) lays on front axle. If not add proper ballast. However, never exceed tyres' capacity.

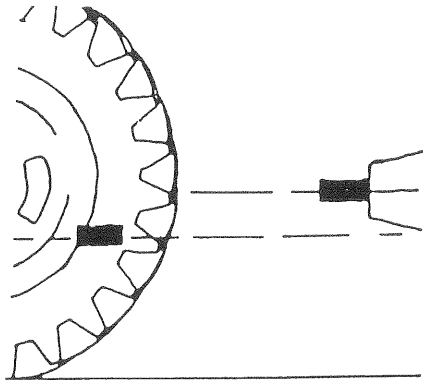
Adjust the power lift of the tractor so that the arms would stop when the lowest part of the machine is at a maximum height of 35 cm (13 in.) from the ground. In fact, lifting the machine too much could cause severe damages to the drive shaft.



Before starting the work, make sure to have lifted and stored any stand leg of which the machine could be provided.

## CORRECT USE OF THE DRIVE SHAFT

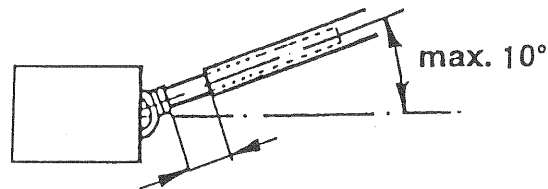
Check the working angles of the drive shaft making sure, in working position, that both input shafts of the tractor and of the machine are parallel.



Make sure that drive shaft's angles do not exceed  $10^\circ$  in working position bearing in mind that wider is the angle, shorter is the life of the drive shaft.

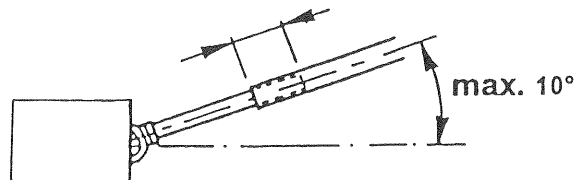
Check the drive shaft extension along the whole path of lift from the bottom to the top.

In its shortest position the shaft must allow at least 5 more cm (2 in.) to get to the completely closed position in order to avoid any possible damage.



min. 5 cm ( 2 in.)

In its longest position the two halves of the telescoping tubes of the shaft must overlap of at least  $1/3$  of their length. In the case that the drive shaft would result too short, get from an authorised dealer a new one of the same type approved by the manufacturer.



$1/3$  overlap

Should it be necessary to change the length of the drive shaft, it is essential, for safety reasons, that the operation is carried out by skilled technicians. Safety devices must comply with the new length. Proper equipment must be used to keep rotating parts coaxial and yokes in their original angle position.

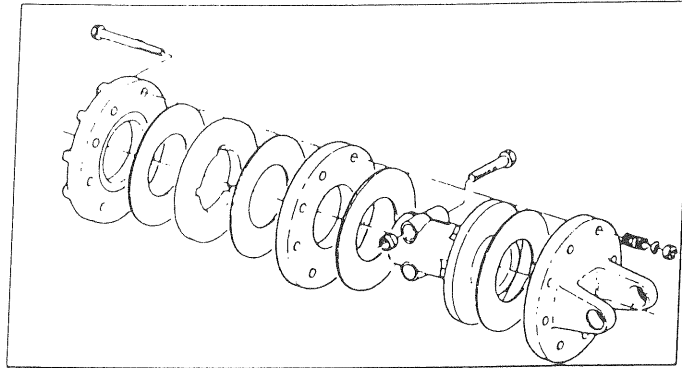
## LIMITING DEVICES ON DRIVE SHAFTS

The great majority of drive shafts are provided with a limiting device such a shear bolt or a slip clutch which are designed to protect the transmission parts both of the machine and of the tractor from sudden shocks which may happen during the work.

### SLIP CLUTCH

If your machine is provided with a drive shaft with slip clutch, this is pre-adjusted to an average torque. It is anyhow necessary to check it during the first 10 minutes of work. In the case that the clutch would slip during standard work, it is necessary to tighten the bolts of the springs, turning **each one of the same number of turns**. The same operation, but loosening the bolts, would be necessary if the clutch does not intervene when the machine comes in contact with obstacles which would slow down or block the work.

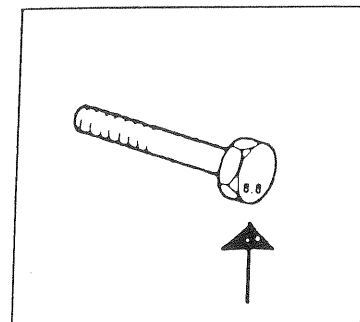
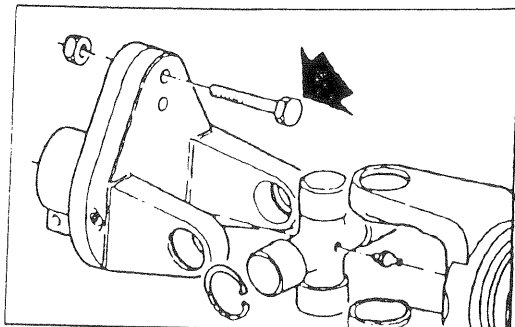
Any operation to the clutch has to be performed by skilled personnel authorised by the Dealer.



### SHEAR BOLT

If your machine has a drive shaft with a shear bolt limiting device, the bolt is calibrated for a certain breakage load. The bolt will break when the machine is subjected to an excessive load. When this happens, replace the bolt with one of the same type and grade (the grade of the bolt is shown on the head).

The shear bolt has normally to be inserted into the external hole of the limiting device, unless it would not break under excessive stress. In this case it is necessary to insert the bolt into the internal hole of the limiting device. Should the bolt still not shear under excessive stress or, opposite, shear too frequently, then contact the Dealer or the Assistance department of the Manufacturer.



FOR OTHER IMPORTANT INFORMATION ABOUT THE DRIVE SHAFT, PLEASE SEE ALSO THE MANUAL PROVIDED WITH IT BY THE SHAFT'S MANUFACTURER.

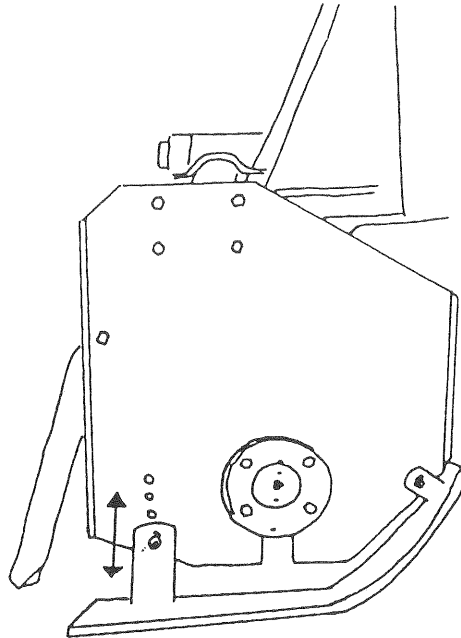
**BEWARE:** incorrect use of the drive shaft may cause damages to it. Such damages are excluded from warranty, event though they are caused within the warranty period. The misuse and/or abuse to the drive shaft can cause damages to the tractor, to the machine and injuries to people.

## ADJUSTMENT OF THE WORKING DEPTH

Both on rotary tillers and on power harrows it is possible to adjust the depth on working into the ground. The adjustment can be made either with the skids or with the rollers, depending of which of the two systems the machine is equipped-with.

### ADJUSTMENT WITH SKIDS

To adjust the working depth, when the machine is provided with skids, loosen the bolts which are on the rear of each skid and choose the appropriate position. Lower is the skid, less is the working depth.

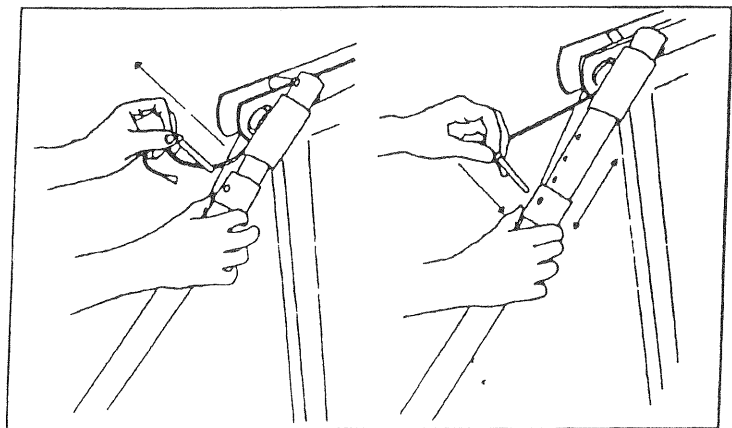
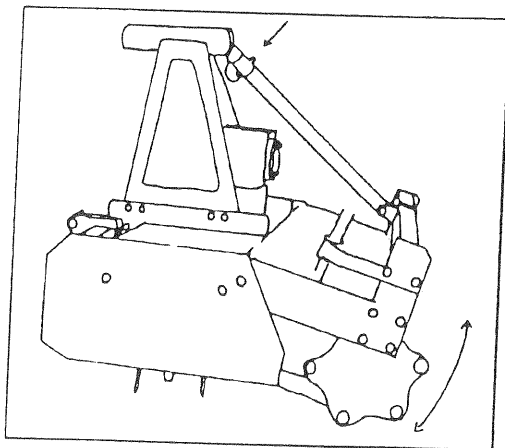


### ADJUSTMENT WITH ROLLER

The arm of the roller which is connected to the 3Pt hitch of the machine has a number of holes in which has to be inserted the pin which locks the position.

To adjust the roller act as follows:

- 1) lift the machine with the power system of the tractor. The roller, which is floating, will go all the way down.
- 2) Place the bushing in the position where you want the roller would stop and insert the pin into the hole. Lower is the bushing, less deep the machine will work.



## STORAGE OF THE MACHINE

If the machine has to be stored for one or more months of inactivity, please proceed as follows:

- grease all supports
- grease cardan shaft
- wash machine
- check screw tight
- check blades wear and replace those which need to.
- check oil level in gearbox
- store machine in a dry place and cover it with a canvas

## LUBRICATION



Keep oil and grease off children.

Always read warnings carefully and comply with precautionary measures as shown on the box.

Avoid any contact with your skin.

Wash thoroughly after use.

The lubrication is a very important operation which needs to be carried with care according to the recommendations of each model (see chart specific to the model)

Use recommended products only.

Always use the same type of oil or grease for every change and refill.

**BEWARE:** used oil must not be scattered in the environment; keep it in containers that comply with norms in force and deliver it to authorised companies in charge of waste disposal, in accordance with the provisions of the law.

## MULTIPLE SPEED GEARBOX

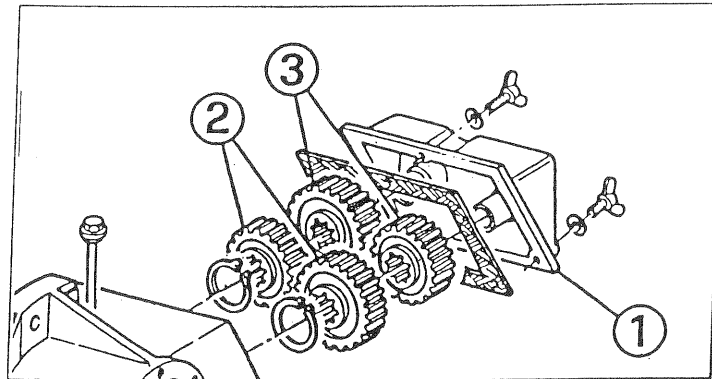
Some models of rotary tillers and power harrows are equipped with a multiple speed gearbox. This allows the operator to select the most suitable speed of the blades according to the conditions of the soil and the type of work intended to be done.

If your machine has a multiple speed gearbox, before performing any operation please proceed as follows:

- lay the machine on the ground with gearbox slightly tilt toward the tractor to prevent any oil leak.
- disconnect PTO
- turn off engine of the tractor.
- engage a low gear
- set on parking brake
- **Make sure that the temperature of the housing is not too high (max. 50° C - 120° F), otherwise use insulated gloves or wait until it is cool, to avoid burns.**

To change the speed of the blades proceed as follows:

- Remove the cover of the gearbox (1)
- Reverse the position of the gears already inserted into the shafts (2)
- Alternatively replace them with the other two supplied with the machine (3) or available as an accessory.
- **Notice: some sets of gears are designed only for 540 rpm tractors, some other only for 1000 rpm tractors. Be therefore careful when choosing the gears to be mounted.**



# USE AND MAINTENANCE

## BEFORE STARTING THE MACHINE

Make sure all the shields are in place

- 1) Check gearbox and chain case oil level: The negligence to this may can cause serious damages to the transmission parts, for which the Manufacturer cannot be held responsible.
- 2) Check if all the bolts are tight
- 3) Grease the spiders of the drive shaft and telescoping tubings
- 4) Grease the spindle of the rotor (on rotary tillers only)
- 5) Grease the bearings of the roller (roller version only)

## EVERY 50 HOURS WORK OR AFTER SEVERAL WEEKS OF INACTIVITY

- 6) Check gearbox oil level.
- 7) Check chain case oil level (rotary tillers only)
- 8) Grease telescoping tubings

## EVERY 400 HOURS OR EVERY YEAR

- 9) Disassemble and clean the chain case and change the oil.
- 10) Clean the gearbox and change the oil.
- 11) On drive shafts which are provided of, disassemble the slip clutch and clean the plates (Note: this operation can be carried only by personnel of an authorised Dealer)

The type and quantity of lubricants to be used are shown on the section referred to the model of the machine

## GREASING

Use recommended products only:

Before greasing, clean the nipples to prevent that dust or mud would mix with the grease, as any foreign body would reduce, if not definitely eliminate, greasing efficiency.

Notice: The frequencies indicated for the maintenance jobs to be performed to the machine are referred to a normal use and average conditions of working. Different use of the machine, different climatic conditions, different environment etc. may effect on the frequency of maintenance jobs to be performed.

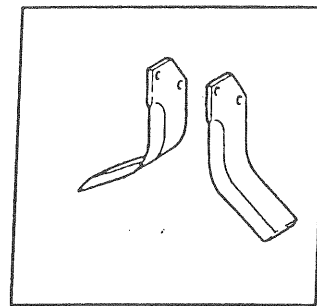
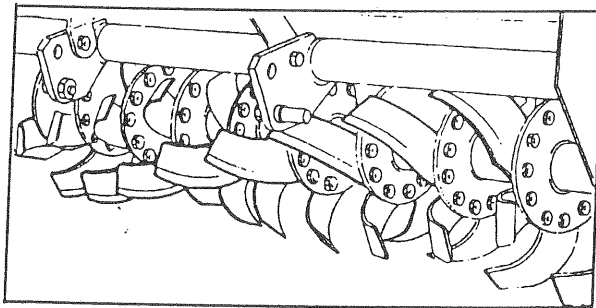


## TINES, USE AND REPLACEMENT (ROTARY TILLERS)

On the rotary tillers the tines are the "working tool" of the machine. They have been designed and built to work the ground in the best way, to last as long as possible and to absorb the minimum possible power from the tractor. **Therefore trying to spare money by not using original tines, may have, as consequence, more consumption of fuel of the tractor, shorter life of the transmission parts, shorter life of the tines and void the warranty.**

- The tines are left and right hand and the sharp part has always to face the direction of rotation of the rotor shaft.
- Check daily if all the bolts are tight and if any tine needs to be replace because broken or worn.
- When replacing tines it is advisable to do it one at the time to avoid mistakes in the positioning.
- Make sure that the head of the bolt is on the side of the tine, while the washer and the nut are on the side of the flange.
- When replacing the tines, it is advisable to replace also the washers and eventually also bolts and nuts when they are too worn out.

Bear in mind that the life of a tine depends very much from the conditions of the soil.

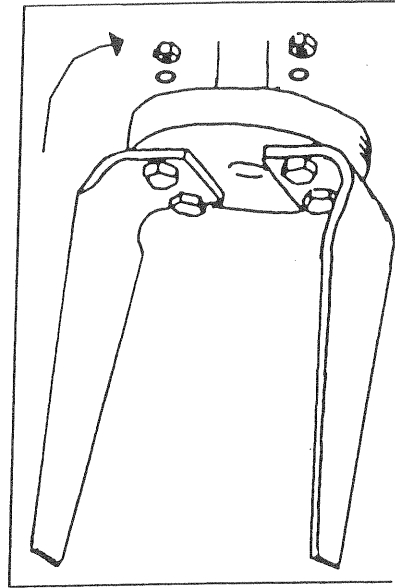
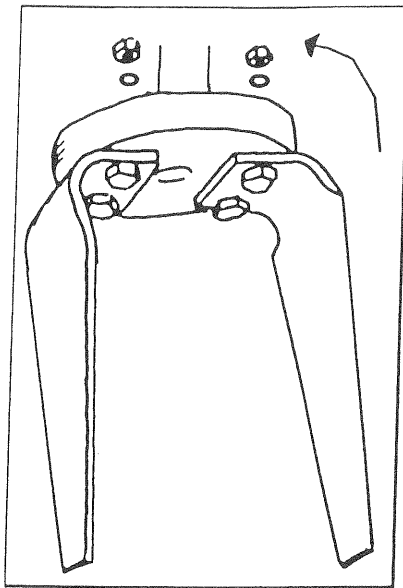


## BLADES, USE AND REPLACEMENT (POWER HARROWS)

On the power harrows the blades are the "working tool" of the machine. They have been designed and built to work the ground in the best way, to last as long as possible and to absorb the minimum possible power from the tractor. **Therefore trying to spare money by not using original blades, may have, as consequence, more consumption of fuel of the tractor, shorter life of the transmission parts, shorter life of the blades and void the warranty of the machine.**

- The blades are left and right hand and the sharp part has always to face the direction of rotation of the rotor
- Check daily if all the bolts are tight and if any blade needs to be replaced because broken or worn.
- When replacing the blades, it is advisable to do it one at the time to avoid mistakes in the positioning.
- Make sure that the head of the bolt is on the side of the blade, while the washer and the nut are on the side of the flange.
- When replacing the blades, it is advisable to replace also the washers and eventually also bolts and nuts when they are too worn out.

Bear in mind that the life of a blade depends very much from the conditions of the soil.



## START TO WORK

- Drive the tractor at the edge of the field which needs to be worked.
- Lower the machine until it is very close to the ground
- Engage the PTO and start to accelerate progressively (**Beware: the machine has to be low, close to the ground to avoid too sharp angulation of the drive shaft which could be damaged if run too angulated**).
- Lower slowly the machine into the ground and engage the gear of the tractor for starting to work.
- After a short distance, check if the working depth is adequate. If it is the case, adjust either the skids or the roller.
- At the end of the field, always disengage the PTO before lifting the machine to avoid damages to the drive shaft.
- The speed of the tractor has never to exceed 10 km/h (6 miles/h) to avoid damages to the machine.

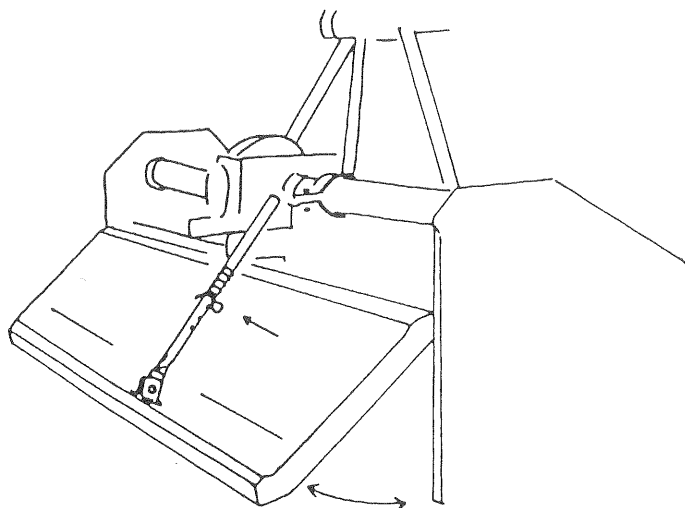
Always remember that the quality of the work you are going to do is strictly connected to the type of soil where you are working, to the working depth, to the speed of the tractor and, last but not least, to the adjustment of the machine.

The soil would result finer and more uniform lower is the speed of the tractor and when the tailboard is completely on the clods smasher completely down.

**Beware: on rotary tillers, when the tailboard is lifted, stones and clods can be shot at a far distance and hit someone. Pay always much attention to the safety warnings described in this manual.**

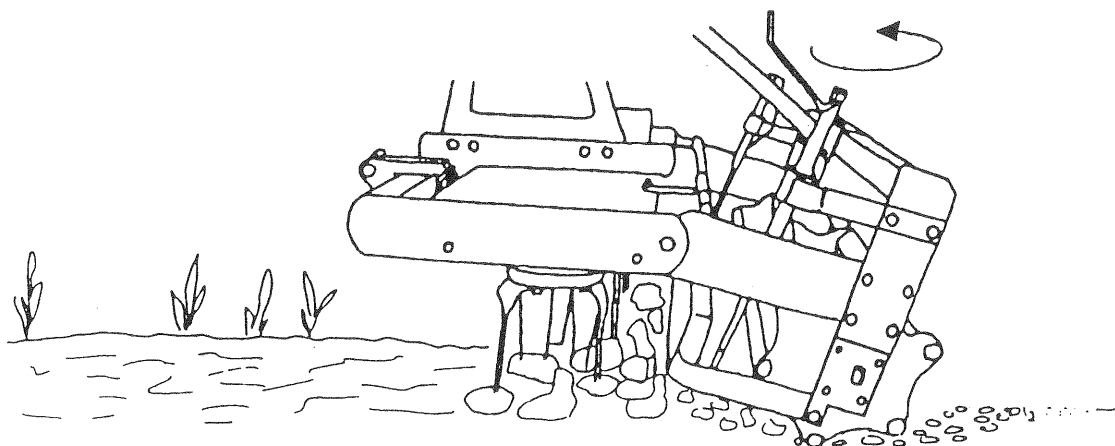
## TAILBOARD

The rotary tillers and the power harrows with skids are provided with a tailboard the use of which is to contain the large clods until they have been broken up by the rotating blades. The tailboard has an adjustment system which permits to regulate it to different positions. At the end of the work, when the machine needs to be parked, the tailboard has also the function to support the machine and prevent that it would roll over. For this function, the tailboard has to be latched all the way down.



## CLOUDS SMASHER

The rotary tillers and power harrows with the rear roller can be provided with a levelling bar, the function of which is to contain the large clods until they have been broken up by the blades. This tool is very important to get an uniformly worked soil. The clods smasher has two handles, one on each side, to adjust the distance from the ground, i.e. practically select the size of clods on the worked soil. When starting to work, lift completely the clods smasher, and then adjust it down progressively until you have reached the uniform size of clods you want on the worked soil.



**USATE SEMPRE RICAMBI ORIGINALI**  
*EMPLOYEZ TOUJOURS LES PIECES DE RECHANGE ORIGINALES*  
*IMMER DIE ORIGINAL-ERSATZTEILE VERWENDEN*  
*ALWAYS USE ORIGINAL SPARE PARTS*



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