

USE AND MAINTENANCE MANUAL FIXED TILLER

Trademark: BERTI Machine Agricole Model:

		
VENERE	TERRA	NETTUNO
		
URANO	SATURNO	GIOVE
		
POLARIS	LUNA	
		
GIOVE-BIO	POLARIS-BIO	



Carefully read this manual before operating the machine



Translation of the original language

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INTRODUCTION

This instruction manual contains a description of the operation and the instructions necessary for performing correctly the main operations of use, routine and periodic maintenance of the tiller, which will henceforth be called machine.

To facilitate consultation, this instruction manual is divided into clearly identifiable chapters.

The indications contained in this manual are intended for professional users, with specific knowledge regarding the methods of use of the machine, that are authorised, instructed and properly trained.

The use of original spare parts and accessories is recommended. The use of non-original parts causes the voiding of the warranty and may cause dangers, reducing the lifetime and performance of the machine as well as serious damages/injury to persons, property and animals.

The manual must always accompany the machine, even if the latter is sold, and must always be delivered together with the machine. If the manual is damaged or lost, a copy should be requested to the Manufacturer of the machine or to the owner. This manual is an integral part of the machine.



ATTENZIONE

For the USER: Before using the machine you must carefully read this instruction manual in which are indicated the actions to be performed for proper use of the machine, paying particular attention to all the safety-related regulations. Abuse of performance and lack of compliance with the use and safety standards render the user responsible for any damages that may occur to persons, property or animals as a result of the use of the equipment.

The manufacturer of the machine cannot directly control its use, the use method or the maintenance method and therefore the user is responsible to respect the rules of common sense in the operating areas, especially in the critical ones, paying utmost attention to his own safety, to the safety of other persons, animals and property, always assessing the danger before performing any operation.

If the user transfers the use of the machine to a third party, it is their responsibility to make sure that the other user has properly read and understood this instruction manual.

This instruction manual must always be kept in an accessible place, so that it can be immediately consulted in case of need.

For the SUPPLIER, DEALER and IMPORTER: the person in charge of delivering the machine to the end user must apply it to the tractor. It is therefore their responsibility to read this Instruction Manual and to understand the contents before the machine is definitively handed over. It is also their responsibility to train the final user and make sure that the latter has read and understood the indications in the instruction manual.

GLOSSARY

Machine	Tiller
Tractor	Motorised vehicle used to tow other vehicles, especially agricultural machines.
User	The user is considered as the owner and/or staff, the operator/user in charge of operating, cleaning, maintaining and repairing the machine, able to recognise and therefore avoid the dangers arising from the use of the machine.
Specialised personnel	Persons purposely trained and enabled to carry out maintenance or repair interventions requiring a particular knowledge of the machine, of its functioning, of the relative safety devices and their intervention modalities.
Safety personnel	Personnel in charge of making sure that no persons are inside the machine operating area.
Manufacturer	Company that manufactures the machine → Berti Macchine Agricole S.p.A.
 PERICOLO	DANGER - This sign indicates an imminent and real dangerous situation that may cause serious injuries or death if not avoided.
 ATTENZIONE	ATTENTION - This sign indicates a potentially dangerous situation that may cause serious injuries or death if not avoided. Dangers marked by this sign present lesser degree of risk of serious injury or death than those indicated by the DANGER sign.
 CAUTELA	CAUTION - This sign indicates a potentially dangerous situation that may cause minor injuries or moderate wounds. This symbol is used to inform that certain actions may cause personal injuries or damage.
 PLEASE NOTE	

1 INFORMATION REGARDING THE MANUAL

This manual is an integral part of the machine and must accompany the same in case of resale and until its demolition.

In case of loss or damage of the present manual, a copy can be requested from the manufacturing company ("BERTI macchine agricole S.p.A.", via Musi 1/A – 3, Caldiero – Vr., Tel. +39.045.6139711) or from the dealer.



The presence of this symbol informs the user to pay utmost attention to the subject in case.

Some of the devices described in this manual may not be present on your machine, depending on the chosen set up and on the market of destination.

1.1 MANUAL UPDATES

The information, descriptions and illustrations contained in this manual reflect the state of the art of the machine at the moment it was placed on the market.

The Manufacturer reserves the right, at any time, to apply modifications to the machinery for technical or commercial reasons. These modifications do not oblige the Manufacturer to intervene on vehicles marketed up to that time and do not invalidate this documentation.

Any addition that the Manufacturer will consider opportune to supply later on must be preserved together with the manual and be considered an integral part of the same.

1.2 COPYRIGHT

The copyright for this manual belongs to the machine Manufacturer. This manual contains technical texts, drawings and illustrations, which must not be disclosed or transmitted to third parties in full or partially, without the written authorisation of the Manufacturer.

1.3 MACHINE IDENTIFICATION AND CE MARKING

The identification plate is affixed close to the attachment points to the tractor on the left side of the machine and contains:

CE Marking;
Country of manufacture;
Manufacturer's name and address;
Model and type;
Serial number with year of manufacturing;
Weight.
Version of the model

			
MACCHINE AGRICOLE S.p.A. Via Musi 1/A - 3 - 37042 CALDIERO - VR - ITALY www.bertima.it - www.bertiprofessional.it - info@bertima.it			
Modello - Model - Modèle - Modelli - Modeli		XXXXXXXXXXXX XXXXXXXXXX	
Matricola - Serial Number - Numéro de série Seriennummer - Matricula		XXXXXXXXXXXX	
Anno Produzione - Manufacturing Year - Année de Production - Baujahr - Año de Producción		XXXXX	
Massa - Weight - Poids - Gewicht - Peso		XXXXX	
Versione Modello - Model Year - Année du Modèle - Modelljahr - Año del Modelo		XXXXX	



The machine is supplied as standard with:

- The machine use and maintenance manual;
- The manufacturer "EC" declaration of conformity.

1.4 DECLARATION OF CONFORMITY OF THE MACHINE



BERTI MACCHINE AGRICOLE S.p.A.
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Dichiarazione CE di Conformità ai sensi della direttiva 2006/42/CE e 2014/30/EU(*)
EC Certificate of Conformity - conforming to EEC Directives 2006/42/CE and 2014/30/EU(*)

La Ditta / We

BERTI Macchine Agricole S.p.A. Via Musi
1/A-3-4
37042 CALDIERO - VERONA - ITALY

dichiara sotto la propria responsabilità, in qualità di costruttore, che la macchina a cui si applica questa dichiarazione, è conforme ai requisiti essenziali di sicurezza e di tutela della salute di cui alla Direttiva 2006/42/CE e 2014/30/EU (*). Per la verifica delle macchine sono state consultate le seguenti norme armonizzate:

declare in sole responsibility, that the product to which this certificate applies, conforms to the basic safety and health requirements of EEC Directives 2006/42/CE and 2014/30/EU (*), and according to the European harmonized standards.

UNI EN ISO 4254-5:2018
UNI EN ISO 4254-1:2015
UNI EN 15811:2015

Nonché le seguenti specifiche tecniche:
And the following technical specifications:

ISO 11684:1995

(*)
Valido solo se la macchina è dotata di dispositivi e accessori soggetti alle direttive/norme armonizzate/specifiche tecniche ivi indicate.
Valid only if the machine is equipped with devices and accessories that are subjected to the directives/harmonized norms/technical

MODELLO -- TYPE

Epoca rotante _____

MATRICOLA -- SERIAL NUMBER

Peso netto _____

Custode del fascicolo tecnico / Technical file repository

ALESSANDRA BERTI

Cio Ufficio Tecnico: BERTI MACCHINE AGRICOLE S.p.A.

Via Musi 1/a - 3-4 - 37042 CALDIERO (Verona) - ITALY

Caldiero, li _____

per la società / for the Company
für die Firma / pour la société

BERTI® Macchine Agricole S.p.A.
Legale Rappresentante

La presente certificazione è parte integrante della macchina
This EC certificate is an integral part of the unit

P.PRG_R01_5_0121

1.5 INFORMATION REGARDING THE MACHINE

1.5.1 ENVISAGED USE

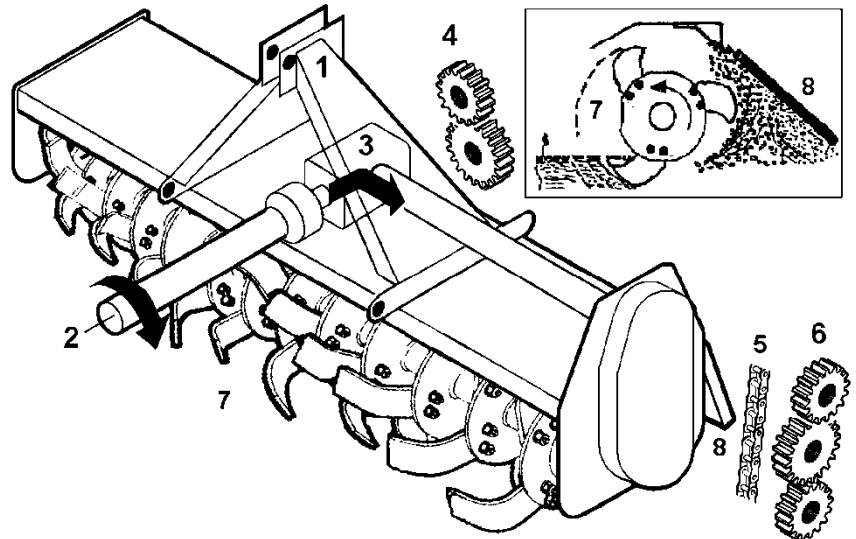
The tiller is an agricultural machine designed and built to be exclusively used in cultivation works for the preparation of vineyards, orchards and other types of culture, also in open fields

Is supplied with three-point attachment (1) in order to be attached to the hydraulic lifting device on the tractor.

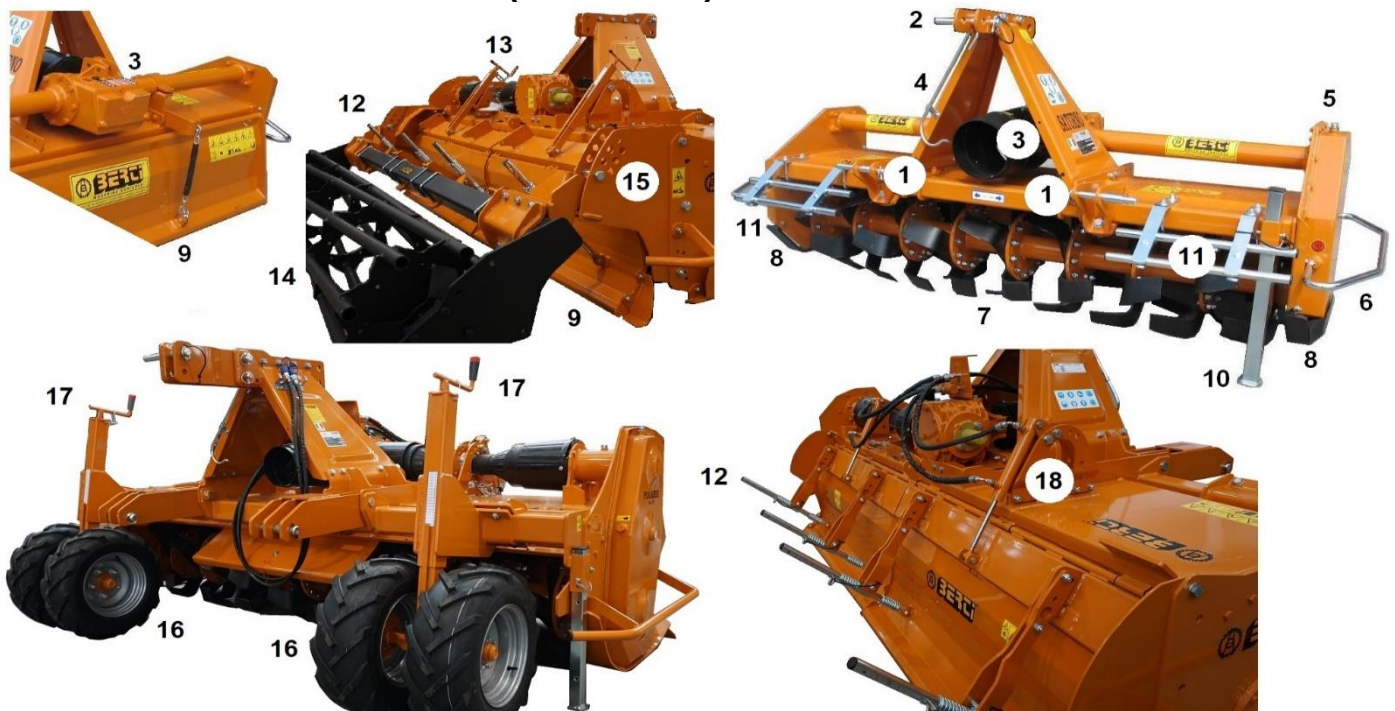
The machine is driven by the power take-off of the tractor through a cardan shaft (2) connected to the gearbox (3) or to some other type of speed shift (4).

The gearbox (3) or the speed shift (4) transmits the movement to the lateral chain transmission (5), or to gears (6) in some models, which, by their turn, rotate the shaft with the hoes (7). Thanks to the action of the hoes (7) that cut the soil and launch it against the rear hood (8), an ideal fracturing of the soil is obtained thus producing the best sowing bed.

The degree of soil fracturing depends on the advance speed of the tractor and the rotation speed of the hoes (7), which in some models can be changed by means of a speed shift (4).



1.5.2 PRINCIPAL COMPONENTS (IF PRESENT)



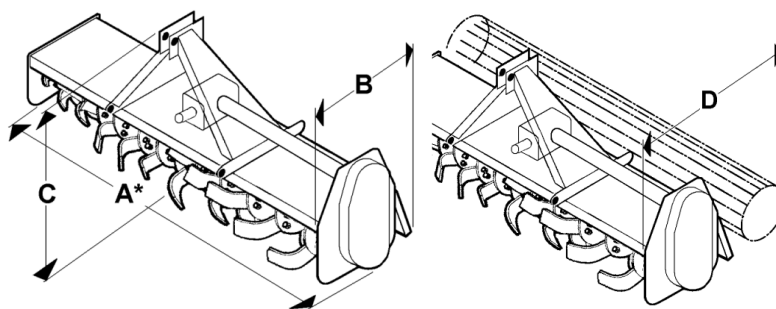
NAME OF THE MARKED PARTS:

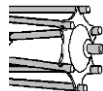
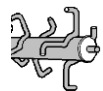
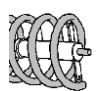
Pos.	Description	Pos.	Description
1	Lower attachment arms with 3-point attachment to the tractor's lifting device	10	Front support leg
2	3rd point 3-point attachment to the tractor 's lifting device	11	Front guards
3	Gearbox or speed shift	12	Spring-loaded hood pressing rod
4	Cardan shaft joint support	13	Hood adjustment handwheel
5	Lateral chain transmission or gears	14	Work depth adjustment roller
6	Lateral guards	15	Depth adjustment of the work roller
7	Hoe shaft	16	Work depth adjustment wheel BIO version
8	Work depth adjustment slide	17	Work depth adjustment handwheel BIO version
9	Rear hood	18	Hood adjustment jack BIO version

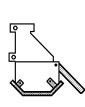
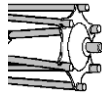
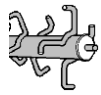
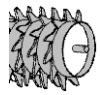
1.5.3 DIMENSIONS AND WEIGHTS

The following drawing and table report all the maximum overall dimensions of the complete machines, the weight relates to the complete machine with cardan shaft, excluding eventual accessories.

N.B.: the indicated dimension A* excludes the lateral accident protection guard. With the lateral protection mounted this dimension increases by 30 cm.



Model	Dim ens ion s	A* cm	B cm	C cm	D cm											
						Kg	Diameter cm	Kg	Diameter cm	Kg	Diameter cm	Kg				
VENERE	90	97	63	81	-	125	-	-	-	-	-	-				
	100	113			-	-		-								
	120	129			-	-		-								
	135	145			-	-		-								
TERRA	90	95	71	95	-	195	-	-	-	-	-	-				
	100	107			-	-		-		-						
	120	127			-	-		-		-						
	135	142			-	-		-		-						
	150	157			-	-		-		-						
	165	172			-	-		-		-						
	180	187			-	-		-		-						
NETTUNO	150	162	70	107	120	295	358	45	363	-	-	37	405			
	165	178				310	382		386		-		435			
	180	194				325	405		408		-		465			
URANO	120	134	76	110	130	350	32	400	45	405	-	-	37	435		
	140	156								385		435		440	-	475
	165	178								415		470		475	-	515
	185	200								440		505		505	-	565
	205	222								485		545		545	-	620
	230	244								510		580		580	-	670
SATURNO	120	134	76	110	130	355	32	400	45	410	-	-	37	440		
	140	156								390		445		455	-	480
	165	178								415		475		495	-	520
	185	200								440		510		520	-	565
	205	222								490		550		580	-	625
	230	244								510		590		615	-	675
GIOVE	165	191	110	110	190	610	43	720	48	730	47	780	48	840		
	185	213								640		770		775	820	900
	205	235								685		825		820	865	960
	230	257								730		895		885	935	1040
	250	279								760		930		935	985	1105
	280	303								800		990		985	1040	1170

Model	Dimension s	A* cm	B cm	C cm	D cm	 Kg	 Diameter cm Kg	 Diameter cm Kg	 Diameter cm Kg	 Diameter cm Kg
GIOVE BIO	230	246	140	125	-	810	-	-	-	-
	250	268				855	-	-	-	-
	280	298				900	-	-	-	-
POLARIS	250	271	115	125	200	1120	56	1360	55	1400
	280	297				1225	56	1485	55	1525
	300	323				1335	56	1615	55	1655
POLARIS BIO	250	271	195	140	-	1365	-	-	-	-
	280	297				1415	-	-	-	-
	300	323				1460	-	-	-	-
LUNA	250	275	125	148	200	1570	56	1750	-	-
	300	330				1610	56	2000	-	-
	350	360				1655	56	2250	-	-
	400	430				1700	56	2500	-	-

1.5.4 TECHNICAL DATA TABLE

Model	Dimensi on	Work width cm	Tractor attachm ents	Min/max power Hp	Power take- off rpm	standard rotor* rpm	no. hoes	Maximum work depth cm.
VENERE	90	85	1	15/28	540 1"3/8 Z=6	240	10+10	12
	100	101		18/28			12+12	
	120	117		21/28			14+14	
	135	133		24/28			16+16	
TERRA	90	87	1	14/40	540 1"3/8 Z=6	250	10+10	14
	100	100		17/40			12+12	
	120	120		20/40			14+14	
	135	135		25/40			16+16	
	150	150		30/40			18+18	
	165	165		35/40			20+20	
	180	180		35/40			22+22	
NETTUNO	150	150	1	25/50	540 1"3/8 Z=6	240	27+27	15
	165	180		30/50			30+30	
	180	195		40/50			33+33	
URANO	120	120	1/2	30/75	540 1"3/8 Z=6	220	15+15	15
	140	140		35/75			18+18	
	165	165		40/75			21+21	
	185	185		50/75			24+24	
	205	205		60/75			27+27	
	230	230		65/75			30+30	

Model	Dimension	Work width cm	Tractor attachments	Min/max power Hp	Power take-off rpm	standard rotor* rpm	no. hoes	Maximum work depth cm.
SATURNO	120	120	1/2	30/75	540 1"3/8 Z=6	163 200* 244 298	15+15	15
	140	140		35/75			18+18	
	165	165		40/75			21+21	
	185	185		50/75			24+24	
	205	205		60/75			27+27	
	230	230		65/75			30+30	
GIOVE	165	164	2	50/130	540 1"3/8 Z=6	149 182 222* 272	21+21	20
	185	186		55/130			24+24	
	205	208		60/130			27+27	
	230	230		70/130			30+30	
	250	252		80/130			33+33	
	280	276		80/130			36+36	
GIOVE BIO	230	230	2	70/130	1000 1"3/8 Z=6	257 337*	30+30	20
	250	252		80/130			33+33	
	280	276		80/130			36+36	
POLARIS	250	249	2/3	100/170	1000 1"3/4 z=6	229	27+27	23
	280	275		110/170			30+30	
	300	301		130/170			33+33	
POLARIS BIO	250	249	2/3	100/170	1000 1"3/4 z=6	286	27+27	23
	280	275		110/170			30+30	
	300	301		130/170			33+33	
LUNA	250	247	2/3	130-220	1000 1"3/4 Z=20	263	27+27	26
	300	299		160-220			33+33	
	350	351		180-220			39+39	
	400	403		200-220			45+45	

*=standard speed for machine with speed shift

1.5.5 CARDAN SHAFT



Each machine is supplied with a cardan shaft joint with «CE» marking, equipped with a safety device against overload.

It is absolutely forbidden to replace the cardan shaft supplied for another joint different from the original one because the correct safety margin will no longer be guaranteed.

The tables report the dimensions and the characteristics for the identification of the cardan shaft belonging to each single machine.

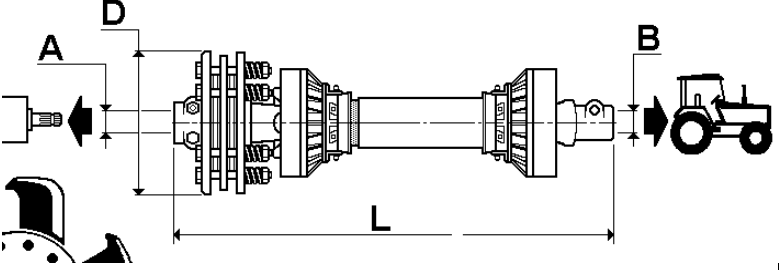
The cardan shaft guards must always be effective, must be inspected periodically and fixed with the chains installed to prevent their rotation.

Read the instructions contained in the instruction book attached to each cardan shaft.

Model	L	A	B	V	R	
VENERE	900	1"3/8 Z=6	1"3/8 Z=6	8x45*	50	
TERRA 90-100 120-135 150-165	900	1"3/8 Z=6	1"3/8 Z=6	8x45	55	

V= safety bolt R= work radius *total thread

Model	L	A	B	D
TERRA-180	950	1"3/8 Z=6	1"3/8 Z=6	180
NETTUNO	800	1"3/8 Z=6	1"3/8 Z=6	200
URANO	800	1"3/8 Z=6	1"3/8 Z=6	200
SATURNO	800	1"3/8 Z=6	1"3/8 Z=6	200
GIOVE	1020	1"3/8 Z=6	1"3/8 Z=6	200
GIOVE BIO	1320	1"3/8 Z=6	1"3/8 Z=6	200
POLARIS	1020	1"3/8 Z=6	1"3/4 Z=6	200
POLARIS BIO	1320	1"3/8 Z=6	1"3/4 Z=6	200
LUNA	1100	1"3/4 Z=20	1"3/4 Z=20	200



1.6 NOISE AND VIBRATION LEVEL



During the work the machine exceeds 80dB(A) and it is necessary to protect the ears from the noise generated during the operation: use earphones or earplugs.

According to the provisions of the legislation in force it is the user's own obligation to carry out, after the installation and, in any case, before placing the machine in service, the measurement of the noise emissions from the assembly composed by the tractor - machine

The tractor - tiller assembly may produce an increased level of noise over time due to wear phenomena: it is recommended to periodically evaluate the risk of exposure to noise.

The use of P.P.E. is mandatory and must ensure the abatement of the noise level registered in compliance with the standards in force.

2 ACCIDENT PREVENTION AND SAFETY STANDARDS

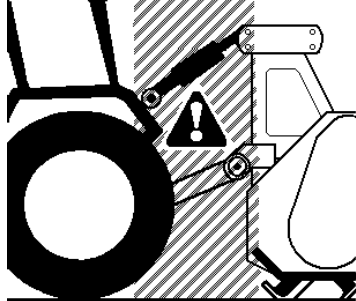
2.1 GENERAL SAFETY STANDARDS

The proper use of the machine and compliance with the standards indicated in this manual, along with the strict application of all precautions to avoid any dangerous situations, will help to avoid accidents or damage, extending the machine lifetime and minimising faults.

The Company "BERTI Macchine Agricole S.p.A." declines any responsibility, objective or subjective, if the indications contained in this instruction manual are not respected.

	The machine must not be used in sectors other than agricultural and different than those it was designed for; a use different than that specified is considered improper.
	The machine must only be used by one operator driving the tractor. It is mandatory for the user to check the correct tractor - machine coupling
	Before leaving the tractor and before any maintenance operation on the machine, disengage the power take-off, engage the parking brake, switch the engine off and remove the ignition keys from the dashboard
	It is prohibited to abandon and/or leave the tractor-machine unit when the tractor is running.
	During use, the user must have proper visibility of the working areas that present dangers, therefore the mirrors and windows of the tractor must be properly cleaned.

 PERICOLO	The machine must be used exclusively by authorised, instructed and conveniently trained operators. The operator, besides having read and understood the instructions contained in this manual, must also be sufficiently prepared on the proper use of the machine, must hold a driver's licence and must be an adult. The operator must contact the manufacturer if in doubt regarding the use of the machine or interpretation of this manual.
	Never use the machine without knowing its features.
	The manual must always be at hand so it can be consulted when necessary. If it should be lost or damaged, request a replacement copy from the manufacturer.
	The user must handle all the safety devices and wear personal protection equipment (P.P.E.) in the phases of operation, adjustment, repair and handling of the machine. 
	The machine may emit dust during work on dry soil. The filters of the cabin ventilation system should be periodically checked and operators should always wear proper protection devices for the respiratory system, such as anti-dust masks.
	The operator assigned to the machine must not wear clothing that can cause entanglement.
	It is prohibited to use the machine to lift and transport persons, animals or objects.
	It is strictly forbidden to use the flexible tubes as supports; these components are mobile and do not offer proper support.
	The operating area must be thoroughly inspected before using the machine, paying attention to remove any stones, iron residues, steel cables, manholes, strains and all those materials and obstacles, without any limitation, which may constitute a source of danger, accidents and serious damage to the user, people, animals and property.
	The operator must make sure that no person or animal remains within the working radius of the same during the machine operation. The user is responsible of stopping the machine immediately and clearing the machine operating area from people and animals. Never operate the machine near persons and animals standing or moving within the radius of action of the machine.
	If the machine is used in public areas and on roads, take all necessary precautions for the safety of persons, animals and property, for example, using safety personnel, warning signs, placing them at the ends of the machine operating area, according to the laws in force in the country of use.
	Never work in areas with steep slopes, on slippery surfaces and in areas / zones that reduce the adhesion of the tractor to the ground. Pay utmost attention to changes of direction.
	Use the machine during the day and under conditions of perfect visibility.
	It is strictly forbidden to operate in adverse environmental conditions, for example during storms, snow, in windy, rainy or cloudy days, etc.
	Avoid working on muddy, sandy or soft terrain.
	Pay attention to the risk of accidental ignition of an electric arc between the machine and overhead power lines.
	Do not use the machine if you are tired, ill or under the effect of alcohol, medicines or drugs.
	Carefully check the machine each time before starting it.

 PERICOLO	Before using the machine, make sure that all safety devices are properly in place and in good conditions. If there are failures or damage to the guards, replace them immediately.
	It is absolutely forbidden to remove or tamper with all guards and/or safety devices.
	Make sure that the safety pictograms are in proper conditions, readable and clean. If the pictograms have deteriorated, they must be replaced with other original versions requested from the manufacturer and placed in the positions indicated by the use and instruction manual (paragraph 2.3). If necessary, clean with a damp cloth.
	The signs on the machine provide important indications: follow them for your safety.
	It is strictly forbidden to perform any modification that may alter the original condition of the machine.
	Any arbitrary modification made on this machine exempts the manufacturer from any responsibility for damage or injuries that could result to operators, third parties or objects.
	Keep the machine free from foreign materials (debris, tools, other items), which may damage the operation or the operator.
The area between the tractor and the machine is very dangerous, before accessing the same, make sure: • that the cardan shaft rotation has stopped • that the machine rests stably on the ground • that the tractor is not running • that the parking brake is engaged • that a wedge or stone is inserted under the wheels.	 

	The following paragraphs list other highly important safety standards. It is mandatory to read the entire instruction manual before using the machine.
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2.2 FIRE-FIGHTING MEASURES

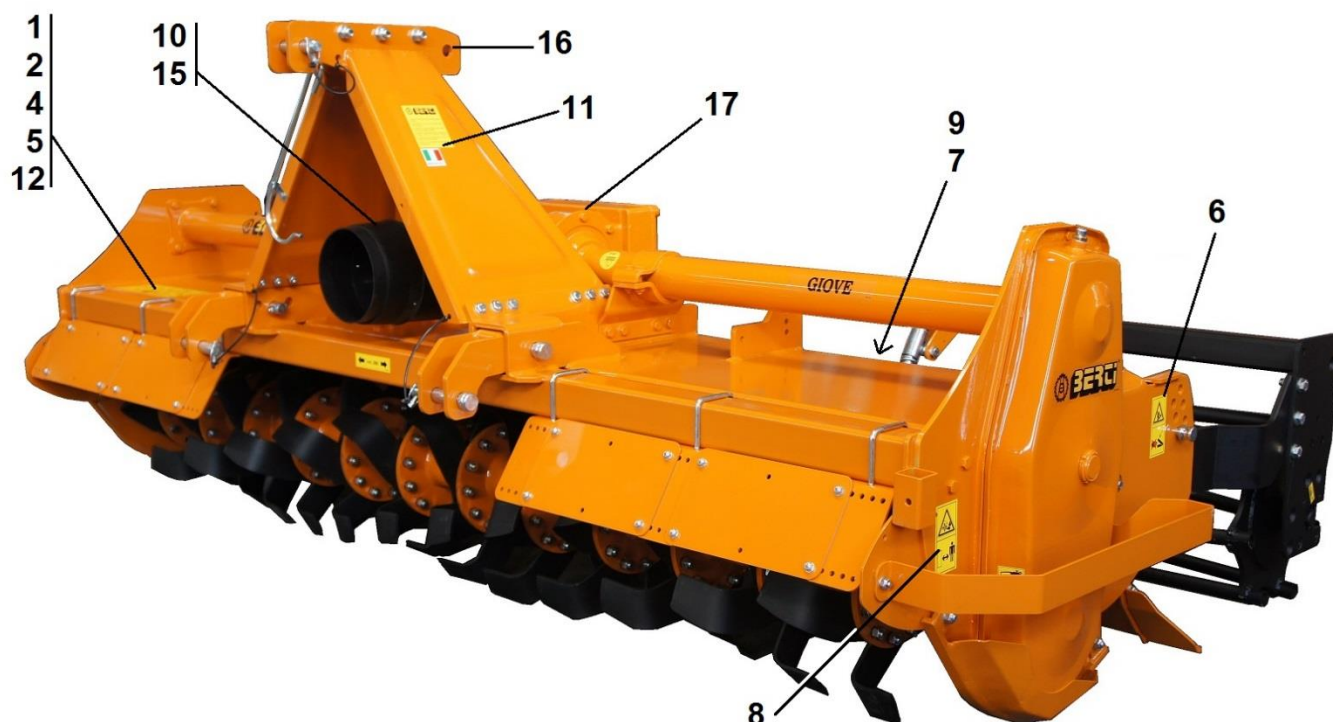
 PERICOLO	Keep an extinguisher of proper capacity in the tractor and maintain it periodically. The hand extinguisher may only be used by personnel that know how to use it. The user is therefore responsible for providing its own training via particular courses.
	The personnel that use the machine must know the main intervention techniques in case of fire.
	Do not use the machine in areas that present explosion and/or fire hazard.
	Maintenance residues, such as, rags or replaced materials containing flammable residues, must be kept away from sources of ignition and disposed of in accordance with applicable laws in the country of use.
	Use appropriate extinguishing means: e.g. carbon dioxide, foam, chemical powder.
	Do not perform any welding near containers, pipes, tanks, electric wires, or flammable materials in general.
	In case of welding protect the flammable parts with appropriate screens.

2.3 SAFETY SIGNAGE

Make sure the safety pictograms are in good conditions. If the pictograms have deteriorated, they must be replaced with other original versions requested to the manufacturer and placed in the position indicated in the use and maintenance manual. Make sure that the safety pictograms are readable. Clean them using a cloth, water and soap.

1		ATTENTION: Read the instruction book before starting to operate.	2		ATTENTION: Before any maintenance operation, stop the machine, rest it on the ground and consult the instruction book.
3		ATTENTION: Pipes with fluids, in the event of breakage of high pressure flexible hoses, pay attention to the oil jet. (Optional)	4		ATTENTION: it is prohibited to climb onto or to be transported by the machine.
5		DANGER OF CRUSHING do not enter between the machine and the tractor	6		ATTENTION - DANGER of shearing hands.
7		ATTENTION - DANGER of projection of objects. Keep at a safe distance.	8		ATTENTION – DANGER of contact with rotating tools. Keep at a safe distance.
9		ATTENTION - DANGER do not approach the machine when operating	10		ATTENTION - DANGER of being entangled by the cardan shaft. Never approach moving parts
11		PERSONAL PROTECTIVE EQUIPMENT.	12		ATTENTION DANGER wait until the parts in rotation stop their movement
13		FILLING POINT AND OIL LEVEL.	14		GREASING POINTS.
15		540 or 1000 rpm, mandatory speed and rotation direction of the power take-off, it is forbidden to change these settings	16		LIFTING POINT.
17		Danger of burns, do not touch the indicated surfaces during and soon after the use.	18		Do not bring high-pressure flexible piping close to the driver station if not protected by sheath. (Optional)

2.4 POSITION OF THE PICTOGRAMS



3 USE

INTRODUCTION

	Before using the machine, carefully read and understand the instruction manual and get familiar with the machine. The machine may only be used by expert and properly trained users.
 PERICOLO	Before getting down from the tractor and before any maintenance operation on the tiller, engage the parking brake, switch the engine off and remove the ignition keys from the dashboard.
	The safety of the user and of the people around him depends on his judgement and prudence in the use of the machine. Therefore the functions of the machine and the safety standards must be properly known.
	The user must handle all the safety devices and wear personal protection equipment (P.P.E.) in the phases of operation, adjustment, repair and handling of the machine. 
	The machine must always be in perfect working condition and must be repaired only with original spare parts.

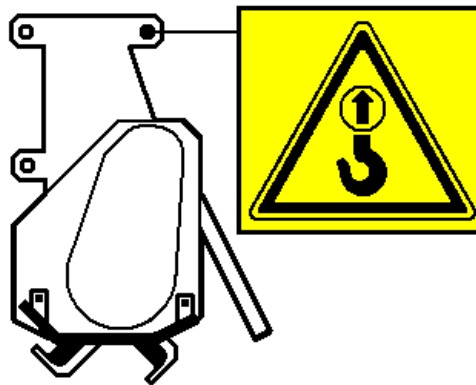
3.2 HANDLING AND TRANSPORT

Pay the utmost attention to safety during the loading and unloading operations, that must be performed only by qualified personnel (slingers, truck operators, etc.). Check suitability of the lifting means by referring to the dimensions and weights table on page 8

In case the machine is lifted, it is mandatory to make use of suitable lifting hook and chain applied to the point indicated in the pictogram.

In order to transport the machine, use a suitable vehicle with appropriate power and size.

Once loaded, the machine and any detached parts (e.g. the cardan), must be fastened down using anchoring ropes.



The procedures described below may present dangerous situation; also, due to the size and weight of the components, you need to use an appropriate lifting device.

3.3 MACHINES SUPPLIED PARTIALLY DISASSEMBLED

Due to clearance, machines can be supplied with units detached, **but contained and fixed inside the same packaging.** These are normally the lateral and front guards.

Assemble these parts, also making reference to the spare parts catalogue tables.

In particular, respect the values of the tightening torques of the screws supplied, as indicated in the table on page 25.

3.4 TRANSIT ON PUBLIC ROADS



ATTENZIONE

If a public road must be used, it is necessary that all machine parts are integral and in good condition. The operator must also check and adapt the machine for full compliance of the Highway Code in force in the country of use. During transport give maximum attention to speed to avoid dangers for the people and vehicles in transit, comply strictly with the Public Road Code in force.

Moreover, it is important to check the following before going onto public roads:

- The tractor must be fitted with yellow or orange flashing light.
- Clean the tyres thoroughly from any mud residues
- The tractor power take-off must be disconnected.
- That all of the machine parts are integral and in good condition
- That the machine is blocked and does not swing sideways, act on the lifting device adjustment chains
- That guards are present for the elements projecting outside the clearance area.
- If envisioned, clearance signs must be applied.
- That load limits on the axles are respected. (see next chapter)
- That the machine is high enough with respect to the ground, in order to prevent contact with the same

3.5 MACHINE TRANSPORT PROCEDURE



The weight of the machine interferes with the stability tractor-tiller assembly, affecting its steering and braking capacity, therefore it is necessary to use moderate speeds.

In particular, remember that the front axle must always be loaded with a weight equal to at least 20% of the tractor weight. Check the lifting capability and tractor stability using the following formula and, if necessary, apply ballasts on the front.

						$M \times (S+E) \leq [0,2 \times T \times i] + [Z \times (D + i)]$ <i>i</i> = tractor wheelbase distance <i>D</i> = distance of the front axle from the ballasts <i>S</i> = distance between the centre of the rear axle and the centre of the lower arm attachment spheres of the tractor lifting device <i>E</i>* = distance of the machine centre of gravity to the lower arm attachment spheres of the tractor lifting device (see table below) <i>T</i> = tractor mass + 75 kg (operator) <i>Z</i> = ballast mass <i>M</i>** = machine mass (see dimensions and weights table on page 8)				
Dimension E	VENERE	TERRA	NETTUNO	URANO	SATURNO	GIOVE	GIOVE BIO	POLARIS	POLARIS BIO	LUNA
	330	350	370	400	400	450	550	530	650	600

If the machine is assembled onto tractors that were type-approved and registered before 6 May 1997, check that the following formula is respected: $M < 0.3 \times T$

3.6 VISIBILITY

The working areas can be inspected using the rear view mirrors of the tractor and the operator's range of view.



While moving in reverse, blind areas may be created that cannot be seen using the rear view mirrors

3.7 ATTACHING THE MACHINE TO THE TRACTOR

Before installing the machine, make sure that it is in perfect condition, placed on the ground, levelled and in stable position, that there is the proper amount of lubricant, that all parts subject to wear and/or to deterioration are effective and that the protections are complete and functioning.

	It is mandatory to check the correct tractor - machine coupling. The lifting capacity and the stability of the tractor must respect the parameters described in chapter 3.4	
	The area between the tractor and the machine is very dangerous, before accessing for connection, make sure: - to operate on flat and solid ground - that the tractor is not running - engage the parking brake - get unauthorised persons away from the radius of action of the machine	
	Before using the machine, the operator must know the commands and the features of the machine. Always keep all parts of your body inside the tractor cabin, to reduce to a minimum the exposure to any external dangers such as thrown objects.	
	Before getting down from the tractor and before any maintenance operation on the machine, engage the parking brake, switch the engine off and remove the ignition keys from the dashboard.	

3.7.1 ATTACHING PROCEDURE



Check the compatibility of the tractor with the machine to be connected (power, attachment categories, power take-off speed etc.), respecting the values stated in the technical data table on page 9.

Coupling to tractors with higher or lower power could cause dangers due to stability and unexpected breakage



During use, adjustment, maintenance, repair or handling, the operator must use adequate Personal Protection Equipment (PPE).



The following operations are very dangerous.

Avoid standing in front of the machine while moving the working vehicle closer. Avoid the presence of uninvolved persons.

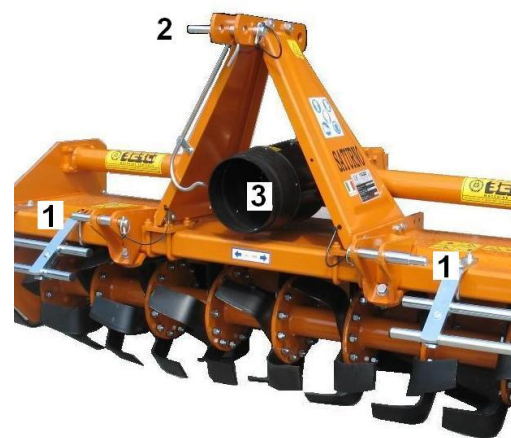
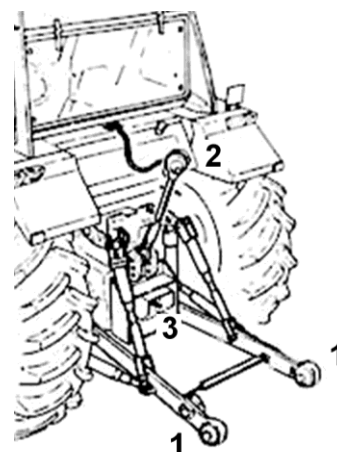
During the installation phases, the machine's power take-off should be disengaged.

After having verified the items previously described, connect the machine to the tractor, observing the following procedure:

- Remove the safety pin and the pins from the attachment holes 1 of the machine
- With the tractor in reverse gear and by activating the lifting device, fit the lower arms 1 with the corresponding lower attachment holes 1 of the tiller
- Insert the pins and lock them with the corresponding safety pins
- Connect in the same way the third point of the tractor 2 with the corresponding hole 2 on the machine
- Adjust the third point so the machine will stand horizontally to the ground
- lift and secure every supporting foot provided on the machine



ATTENTION: BE SURE TO HAVE ENGAGED THE SAFETY PINS IN THE PINS OF THE COUPLING HOLES 1 AND 2

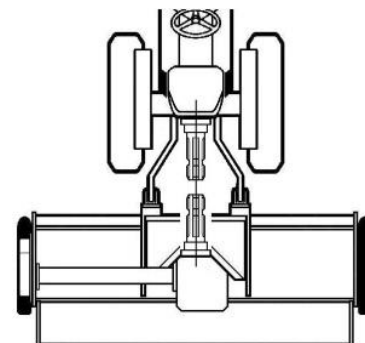


3.7.2 CHECKS AFTER THE COUPLING

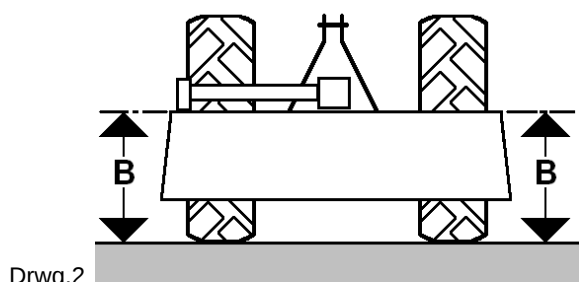
This operation is carried out on a flat pavement.

Then lift the machine from the pavement and check:

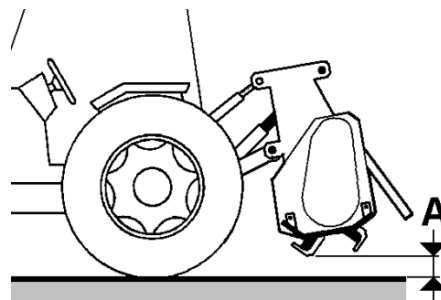
- The alignment of the machine with the power take-off of the tractor, eventually shorten one of the two lifting arms of the tractor (see drwg. 1)
- evenness of the machine regarding the pavement plane resulting in equal B dimensions, also in this case act on the adjustable arm of the tractor's lifting device (see drwg. 2)
- adjust the lifting device so the machine cannot be lifted from the pavement higher than dimension A = 35cm to protect the cardan shaft (see drwg. 3)



drwg.1

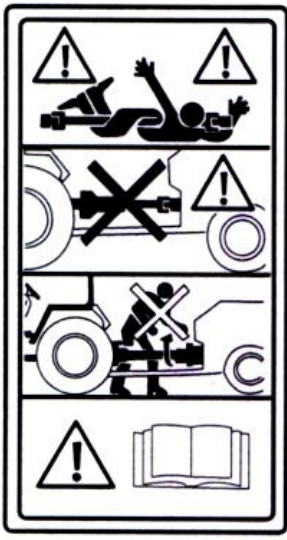
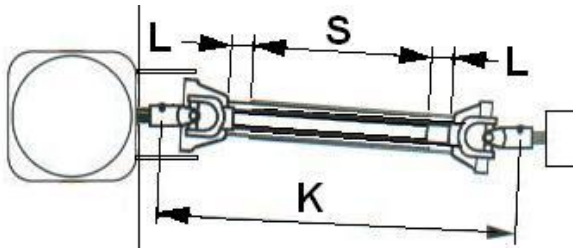
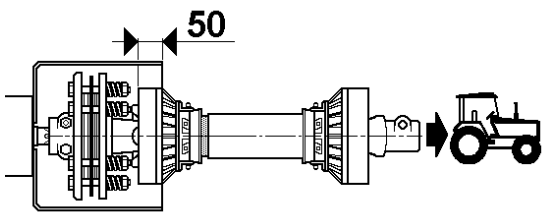


Drwg.2



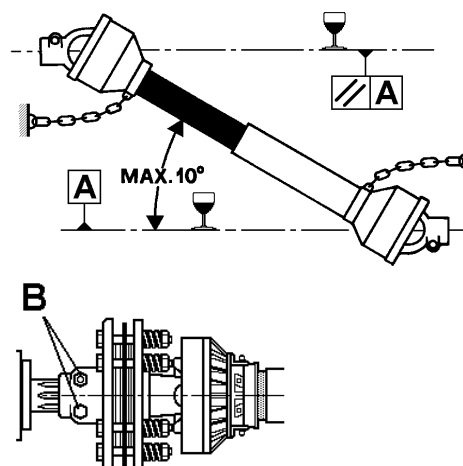
drwg.3

3.8 CONNECTION OF THE CARDAN SHAFT

	During operation, the cardan shaft may generate dangerous situations. Therefore you should: • read and store the use and maintenance booklet near the cardan shaft; • only use the cardan shaft delivered with the machine; • make sure that the guards are properly installed, complete and functioning; • replace the worn, damaged or missing guards; • turn off the engine of the tractor before working on the cardan shaft or on the machine; • never allow unauthorised persons to come near to the machine when it is operating and/or undergoing maintenance; • when not in use, place the cardan shaft on the appropriate support; • Wear appropriate clothing (that does not oppose resistance and entanglement), particularly adhering clothing (ex: work overalls with elastic on the wrists and ankles and active).	
 ATTENZIONE	On the first installation of the cardan shaft, measure the distance K between the outside of power take-off buttons with the machine resting on the ground, level and with the overgear axially aligned with the tractor's power take-off. If necessary, adapt the length of the cardan shaft, making sure that the telescopic tubes overlap for a length that permits between 40 and 50 mm of play. This operation must be carried out on commissioning, at every replacement and every time the machine is installed on another tractor. After installing the cardan shaft, fasten the guard on both sides using appropriate chains. When the machine is out of service, the cardan shaft must be reinserted on the relevant support bracket, envisioned on the third point. After installation of the cardan shaft, lift and lower the machine several times to check that the shaft pipes are free to slide without obstruction and that the minimum overlapping distance S is 150mm.	
	Check that there is an overlapping of at least 50 mm between the guard mounted on the cardan shaft and the one mounted on the machine power take-off, as foreseen by the safety standards	
	Check the rotating direction of the power take-off for the cardan, on the tractor, looking from the rear side, it should rotate clockwise	

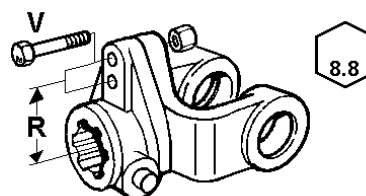
3.8.1 USING THE CARDAN SHAFT

- Read the instruction book attached to the cardan shaft thoroughly. To guarantee correct use and long duration, the following standards must be respected:
- Adjust the 3rd point rod so that the power take-offs will be always parallel, therefore avoiding the rupture of the crosspiece.
- Always disengage the power take-off when the cardan shaft angle is too wide (never more than 10 degrees) and when it is not in use.
- Block the rotation of the cardan shaft protection with the chain supplied.
- Should the cardan shaft supplied be equipped with a hub that can be blocked with bolts B, make sure that these are strongly tightened.



3.8.2 CARDAN SHAFT WITH LIMITER

For tillers of models: **VENERE and TERRA**, the cardan shaft is equipped with a limiter with safety V bolts against overload, in case the safety V bolts are ruptured, they must be replaced with V bolts with the same size and material (read the value written on the bolt head). Positioned on the exact hole indicated (dimension R) for each type of machine. See table 1.5.5 where the values of V and R are listed



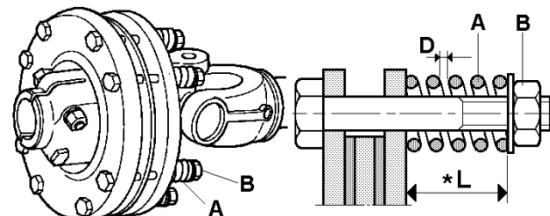
3.8.3 CARDAN SHAFT WITH CLUTCH

For tillers of models: **NETTUNO, URANO, SATURNO and GIOVE** the cardan shaft is protected against overload by a safety clutch. The springs A loaded by the corresponding bolts B are used to keep constant the pressure on the friction disks, tightening the bolts increases the pressure on the friction disks that only intervene if the load is exceeded. For correct operation of the clutch, the force applied by the springs must not exceed a certain value, otherwise there is the danger of blocking thus cancelling the safety. During the use it may be necessary to adjust the tightening of the bolts due to wear of the linings, which reduces the pressure.



ATTENZIONE

never tighten the bolts to the end of their travel, which closes the gap D of the springs thus blocking the clutch and cancelling the safety.



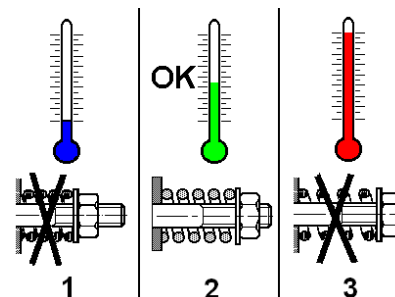
3.8.4 CONTROL AND ADJUSTMENT OF THE CLUTCH

To make sure that the clutch works correctly it is enough a periodical control of its **temperature**, when working under severe conditions it must be **warm when touched**. (2)

If it is cool (1) this means that it is blocked, therefore loosen evenly by half turn at a time all the bolts that compress the strings.

If it is too hot (2) this means that the springs are too loose, therefore tighten evenly by half turn at a time all the bolts that compress the strings.

N.B.: However, if all nuts were tightened and the clutch still slips it is necessary to replace the friction disk



ATTENZIONE

Grease the cardan shaft following the recommendations provided in the instruction manual of the cardan shaft.
Do not operate with cardan shafts without guards.
Carefully read the instruction booklet attached to the cardan shaft.
Check that all safety pins are properly inserted and functioning correctly.
Make sure the anti-extension devices are inserted in the attachment swivel pin.

3.9 CONNECTION OF THE HYDRAULIC EQUIPMENT



The tiller of models GIOVE-BIO and POLARIS-BIO are equipped with a double effect hydraulic unit for the adjustment of the rear hood. Make sure that the pins, eventual quick attachments of the tractor and the safety stops are actually effective and placed in the appropriate housing. Now connect the two quick couplings of the hydraulic circuit to the two sockets of the tractor (a pressure of 160/190 bar is required). Follow the direct lines from the cylinders to the tractor, be careful to keep the pipes away from moving parts. At this point the equipment is now adapted to the terrain, coupled to the tractor with the 3 attachment points and with the hydraulic couplings connected.



4 STARTING THE MACHINE



Before starting the machine, you must follow the indications below:

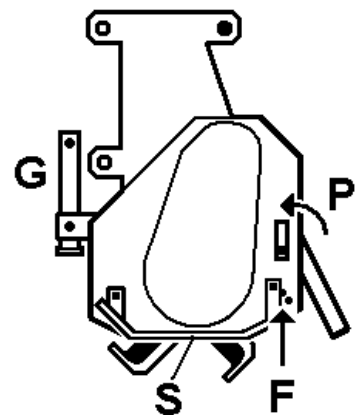
- Do not allow any persons, animals or things to get near and to stand in the machine operating radius.
- before using the machine, it is necessary to get familiar with the commands and with its work capacity.
- Always keep the guards in perfect state, properly placed and effective.
- The engine of the tractor must be stopped, the parking brake engaged, the power take-off disengaged, the ignition key out of the dashboard and placed in a secure place.
- Always inspect the machine, checking the tightness of all screws and nuts and the presence of damage which must be repaired before start-up, in order to take the machine back to its original state;
- Check that the position and the terrain conditions in the work area do not compromise in no way the stability of the tractor – tiller assembly.
- Make sure the safety pictograms are in good conditions. If the pictograms are deteriorated, they must be replaced with other original versions requested from the manufacturer and placed in the position indicated by the instruction manual. Make sure that the safety pictograms are readable. Clean them using a wet cloth.
- The user must handle all the safety devices and wear personal protection equipment (P.P.E.) in the phases of operation, adjustment, repair and handling of the machine.



4.1 WORK PHASE

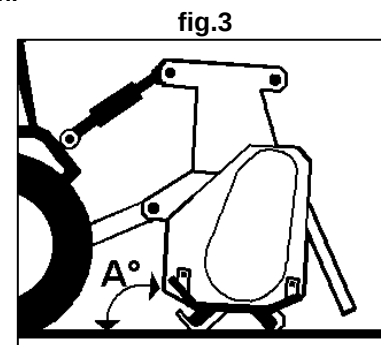
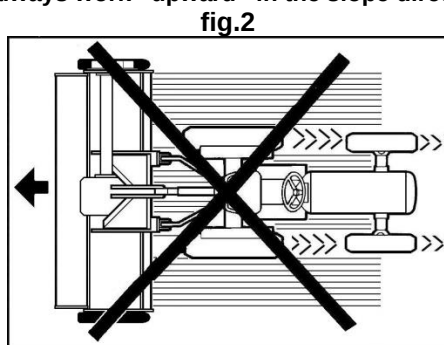
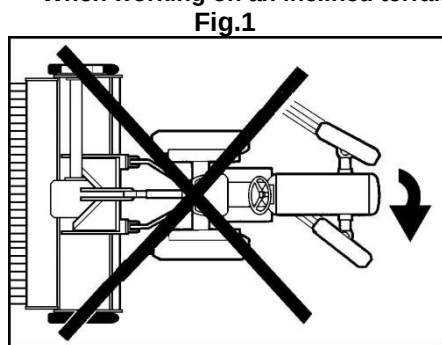
Make sure that all previously described standards are complied with. With the machine correctly attached to the tractor, move towards the working area and then proceed as follows:

- 1) Lift and block the support leg G
- 2) Disengage the rear hood stop P
- 3) Acting on the lifting device commands, lower the machine until the hoes are at 5/10 cm above the terrain;
- 4) Engage the power take-off and accelerate the tractor gradually until the regime rpm of the tractor's power take-off is reached;
- 5) Acting on the lifting device commands, lower the tiller slowly until it is supported on: lateral slides/rollers/front wheels that adjust the work depth, engage the gear and start working (the lifting device must remain on a floating position);
- 6) Move along a short distance, stop the hoe rotation and turn off the tractor, then check:
 - A. **The work depth:** adjustable (see chapter 5)
 - B. **fracturing:** adjustable with the rear hood, with the tractor advance speed or by varying the rpm if the machine is equipped with speed shift. (for adjustment see chapter 5).



4.2 RECOMMENDATIONS FOR USE

- Do not make curves or use the reverse gear with the machine working on the terrain. Fig.1 and fig.2
- Adjust the tractor's third point so the machine will work always slightly inclined backwards, so angle A will always be 90° or slightly higher (2° or 3°). This will favour the entrance into the terrain to be worked. Fig.3
- The speed of the machine when working must not exceed 8 km/h
- Always put the machine onto the ground slowly, avoiding sudden downward movements
- Moderate speed on stony ground
- When working on an inclined terrain always work «upward» in the slope direction.



In the work phase it is possible that stones or other sharp objects are projected upwards by the rotating hoes.
Therefore check that there are no persons or animals within the machine working range and that the operator is protected from any projected objects.

4.3 DISCONNECTING THE MACHINE

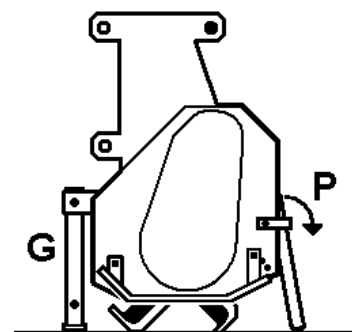


The operations described below may present dangerous situations: do not allow unauthorised people where the machine will be placed and nearby.



To disconnect the machine, carefully follow the indications given below:

1. Make sure that the working machine is on flat, stable ground;
2. disengage the P.T.O;
3. brake the tractor;
4. lower the support leg G
5. disengage the rear hood stop P
6. support the machine completely on the ground and shut off the tractor;
7. disconnect the third point fixing pin;
8. Remove the pins from the lower arms and move the lifting device downwards
9. disconnect the cardan shaft from the tractor and place it on the bracket;



Reposition the attachment pins and the safety pins in their respective housings, so that they can be found when the machine is to be used again.



During use, adjustment, maintenance, repair or handling, the operator must use adequate Personal Protection Equipment (PPE).

5 ADJUSTMENTS



Attention: in order to carry out the operations described below, ensure that the p.t.o. is disengaged.
The tractor must have the brake engaged and be shut off.

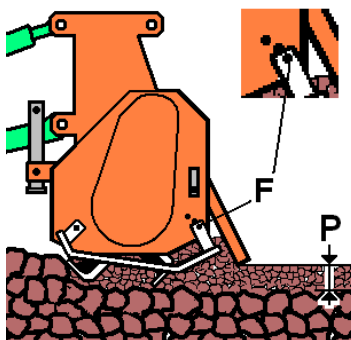
5.1 ADJUSTMENT OF THE WORK DEPTH MACHINES WITH SLIDES

The adjustment of the work depth P of the machine is determined by the position of the lateral slides.

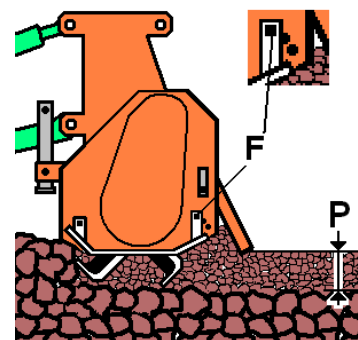
To adjust the slides it is necessary to loosen bolt F positioning the slide on one of the other holes present on the side.

To reduce the depth position the slide on a hole below and then fix it with bolt F see drwg.1.

To increase the depth position the slide on a hole above and then fix it with bolt F see drwg.2.



Drwg.1



drwg.2



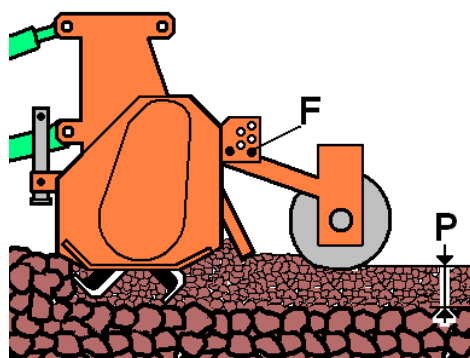
The operations described above must be carried out on both slides always keeping the same adjustment

5.2 ADJUSTMENT OF THE WORK DEPTH MACHINES WITH ROLLER

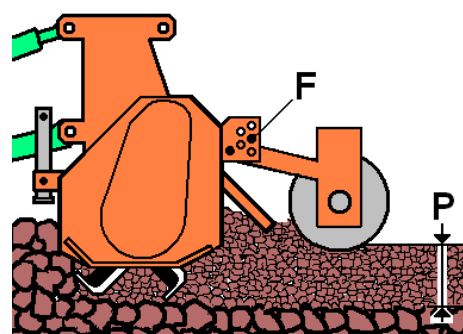
The adjustment of the work depth of the machine is determined by the position of the rear levelling roller.

To adjust the levelling roller it is necessary to act on the pins F placing them on one of the holes present on the adjustment plates.

To reduce the depth the pin is placed downwards, see drwg.4, to increase it the pin is placed upwards, see drwg.4.



drwg.3



Drwg.4



The operations described above must be carried out on both sides of the roller always keeping the same adjustment

5.3 ADJUSTMENT OF THE WORK DEPTH “BIO” MACHINES

The work depth adjustment of the machines GIOVE-BIO and POLARIS-BIO is determined by the rubber wheels located in front of the machine.

To adjust the wheel act on the handwheel M shown in drwg.5



drwg.5



The operations described above must be carried out on both wheels always keeping the same adjustment

5.4 REAR HOOD

Depending on the desired fracturing, adjust the hood acting on chain C. If the soil must be highly fractured, move the hood downward, the more it is adjusted upward the fracturing will be lower.

In the case of humid soils it is recommended to keep the hood high to avoid clogging the rotor, it is kept high also in the presence of stony soils to favour the material discharge.

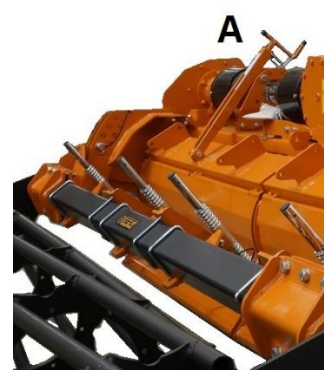
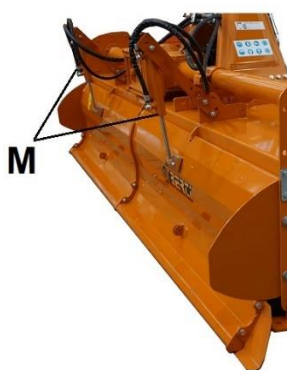
Use the lateral stops to block the hood only when it is detached from the machine, to avoid falls during work the stop must remain always free.

To adjust the soil fracturing with higher precision, some machines are equipped with adjustment devices:

with hydraulic jacks M to make the adjustment easier.

with a simpler hood press with springs P manually adjustable.

in some machines a handwheel A is available to make the operation easier.



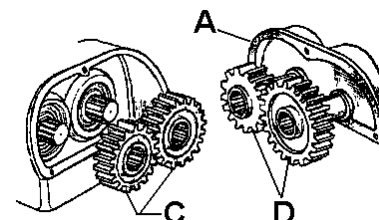
5.6 SPEED SHIFT

The desired fragmentation degree depends on the type of soil and on the rotors rpm. In machines of mod.: SATURNO and GIOVE/GIOVEBIO there is a speed shift present that allows the selection of the ideal rotation speed with regard to the maximum torque regime transmitted by the tractor.

This allows the achievement of a better setting with low fuel consumption, meaning a better efficiency of the tiller/tractor.

To carry out the speed shift, remove the rear cover A, then invert the 2 gears mounted there, or mount another of the pairs supplied, reposition cover D.

To choose the correct speed consult the adhesive signs corresponding to the gear shift and illustrated below.



			Pd.F. 540
1°	23	17	163
2°	21	19	200
3°	19	21	244
4°	17	23	298

mod. SATURNO (ingr.)

			Pd.F. 540	Pd.F. 1000
1°	23	17	150	275
2°	21	19	182	337
3°	19	21	222	
4°	17	23	272	

mod. GIOVE (ingr.)



ATTENZIONE

During this operation it is necessary to tilt the machine in the tractor direction to avoid oil spills, if this operation is carried out after a prolonged use of the machine, wait until it cools down to avoid burns, for this operation wear the recommended protective means.

6 MAINTENANCE



In the event of breakdown, the operator must stop the cardan rotation, remove the ignition key, get down from the tractor and ascertain the kind of the problem; he must then proceed with any interventions on the machine.



Before performing any maintenance operation, carefully read and fully understand the instruction manual.

Please note that all maintenance must be performed by qualified and trained personnel with the machine stopped. Maintenance and repair operations must not be carried out in open air, but in a suitably equipped workshop.



During use, adjustment, maintenance, repair or handling, the operator must use adequate Personal Protection Equipment (PPE).

Used oil must be properly recovered and should not be released in the environment, since, according to the prevailing legislation, it is classified as hazardous waste and as such should be given to specialised collection sites. Therefore contact the nearest Used Oils Consortium.

Before starting any maintenance, the following operations must be carried out:

- the machine must be positioned over a flat and compact surface during the maintenance operations;
- shut off the operating machine engine, engage the parking brake and remove the ignition key from the panel;
- do not carry out any maintenance operation before the oil temperature has lowered below 60 °C;
- always wear the recommended Personal Protective Devices (safety shoes, work overalls and gloves, etc....);
- provide all forms of accident prevention measures for the type of operation being conducted;
- if compressed air is used to clean the machine, it is necessary to protect yourself with appropriate goggles;
- If the maintenance operation requires access to parts of the machine that cannot be reached standing on the ground, and in any case in points higher than 1.50 m above the ground, use a ladder or a platform according to the standards in force;
- do not perform repairs of which you have no knowledge. Always follow instructions; in the absence thereof, contact the dealer or experienced staff;
- attention: if present, always replace hydraulic pipes if damaged;
- do not use lifting points different from those prescribed;
- make sure that the lifting equipment is suitable to carry out the operations in compliance with safety rules;
- do not keep the tractor engine running in places that are closed and lacking a ventilation device capable of dispersing the exhaust gas.
- avoid prolonged and repeated contact of the skin with fuel/lubricants/fluids, because they may create skin diseases or other syndromes;
- do not ingest fuel/lubricants/fluids. In case of accidental contact with eyes, rinse the affected area thoroughly with clean water, contact a physician if necessary;
- pay maximum attention to the cause of possible high temperatures of the discharged oil/ fluid;
- do not carry out welding in closed rooms or that are not suitably ventilated;
- do not carry out welding on painted surfaces or close to them, to avoid the emission of toxic vapours. Remove paint with suitable products, then wash the surfaces and let them dry.
- release the pressure of hydraulic circuits before carrying out interventions;
- do not try to detect leakages of pressurised fluids with your hands; leakages of pressurised fluids can penetrate the skin and eyes with very serious consequences.

6.1 MAINTENANCE INTERVENTIONS THAT CAN BE PERFORMED BY THE OPERATOR

The interventions described below do not require any specialisation.

The operator must be aware of and accurately follow the indications and must have disconnected the machine as described in parag. 4.3.

Periodic inspections and maintenance must be performed in the times and manner prescribed and are the operator's responsibility. Failure to comply with rules and maintenance schedules undermine the proper operation of the machine and its duration and therefore voids the warranty.

Increase the frequency of maintenance under heavy duty operating conditions (frequent stopping and starting, extended winter period, etc.).

To use and maintain the machine in the best way possible, follow the indications (after the first 4 working hours and successively every 50 working hours), check the tightness of all bolts, pins, plugs; respecting the tightening torques indicated in the following tables:

6.1.1 TIGHTENING TORQUE TABLE

Tightening torque table for steel screws 8.8

Large pitch screw	M8	M10	M12	M14	M16	M20	M24
Tightening torque Nm	25	49	86	135	210	410	710
Fine pitch screw	M8x1	M10x1.25	M12x1.25	M14x1.5	M16x1.5	M20x1.5	M24x2
Tightening torque Nm	27	52	95	150	225	460	780

Tightening torque table for steel screws 10.9

Large pitch screw	M8	M10	M12	M14	M16	M20	M24
Tightening torque Nm	35	69	120	190	295	580	1000
Fine pitch screw	M8x1	M10x1.25	M12x1.25	M14x1.5	M16x1.5	M20x1.5	M24x2
Tightening torque Nm	38	73	135	210	315	640	1100

6.2 GREASING AND LUBRICATION

Periodical greasing and lubrication of the machine will keep its performances high and increase its lifetime

6.2.1 LUBRICATION OF THE SPEED SHIFT

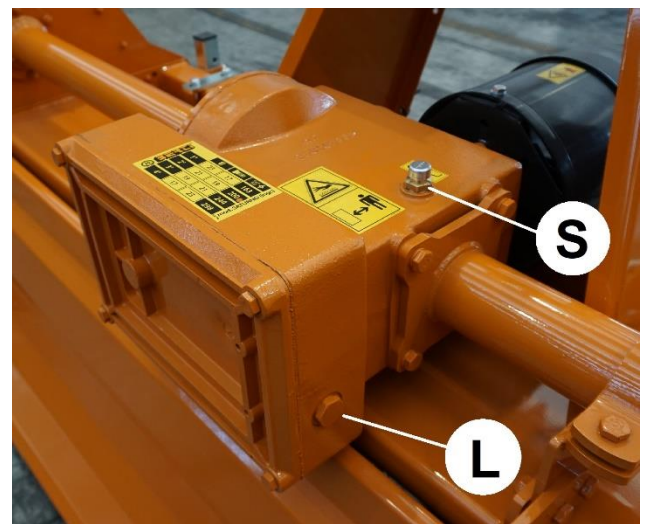
Before acting on the speed shift, clean carefully the area around the caps, to avoid the entrance of dirt inside these groups.

For tillers equipped with speed shift of mod.: SATURNO and GIOVE / GIOVE-BIO it is necessary:

- 1- During the first 20 work hours check the oil level. Unscrew the oil level cover L, with the machine in horizontal position the oil level must touch the lower part of the orifice. Add oil if necessary; into the orifice where the cover was removed. Then check the levels every 50 hours;
- 2- After the first 40 work hours replace the oil of the transmission group completely. Then repeat the operation every 250 working hours.

To avoid pressure inside the transmission group, the cap with vent S must be kept always clean, if damaged it must only be replaced with an original spare part.

Recommended lubricant: see table 6.2.6



6.2.2 GEARBOX LUBRICATION

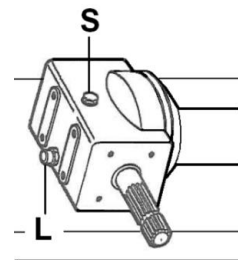
Before any intervention in the gearbox, clean carefully the area adjacent to the caps to avoid the entrance of residues inside these groups.

For tillers equipped with gearbox of the mod.: VENERE, TERRA, NETTUNO, URANO, POLARIS and LUNA it is necessary:

- 1- During the first 20 work hours check the oil levels: the oil must reach the hole of level L. If required, add oil and then check the oil level every 50 hours;
- 2- After the first 40 work hours replace the oil of the transmission group completely. Then repeat the operation every 250 working hours.

Check the level with the cap L, fill the oil through the vent cap S. To prevent pressure inside the transmission unit, the vent cap S must always be clean. In the event of damage, it must only be replaced with a cap with the same characteristics.

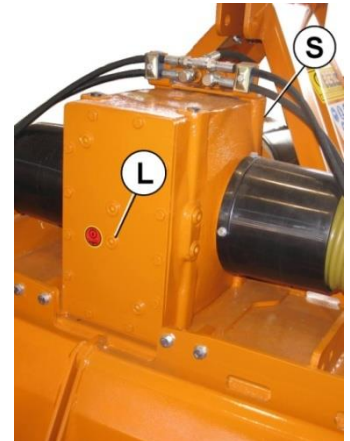
Recommended lubricant: see table 6.2.6



**Mod. POLARIS /
POLARIS-BIO**



Mod.: LUNA



6.2.3 LUBRICATION OF THE LATERAL TRANSMISSION

Before acting on the transmission carter, clean carefully the area around caps S and L, to avoid the entrance of dirt inside this carter.

- Remove the level cap L.
- With the machine perfectly horizontal check that the oil level reaches the lower part of the hole.
- If necessary refill with oil of the same type.
- Reposition the level cap L.

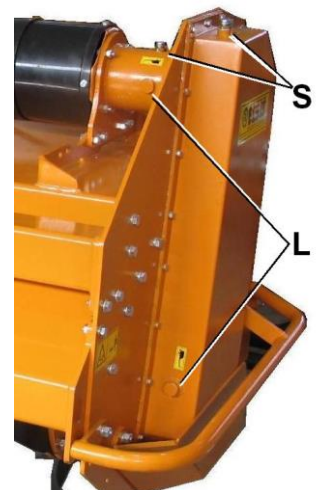
The vent cap S must always be kept clean in order to prevent pressure inside the transmission unit. In the event of damage of the same, it must be replaced only with a cap of the same type.

The check must be made periodically every 50 working hours

Recommended lubricant: see table 6.2.6



**Mod.: POLARIS /
POLARIS-BIO and
LUNA**

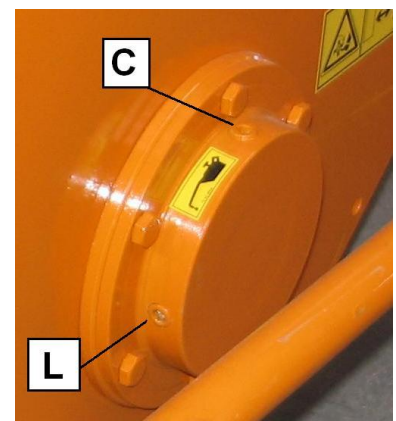


6.2.4 LUBRICATION OF THE EXTERNAL WATERTIGHT SUPPORT

For machines equipped with "watertight" sealing (GIOVE, POLARIS, LUNA), the lubrication is exclusively made with the oil indicated in the corresponding adhesive. Before any intervention in the gearbox, clean carefully the area adjacent to the caps to avoid the entrance of dirt inside these groups.

- Remove the level cap L.
- With the machine perfectly horizontal check that the oil level reaches the lower part of the hole.
- If necessary refill with oil of the same type using cap C.
- Reposition the level cap L.

Recommended lubricant: see table 6.2.6



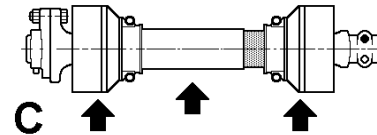
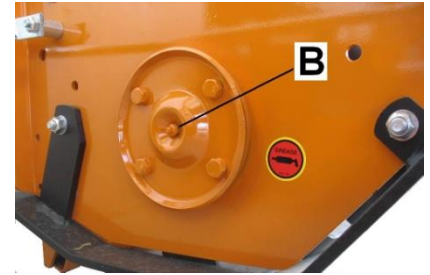
6.2.5 GENERAL GREASING

Use a relevant greaser pump, lubricate all points fitted with a grease nipple and indicated with the adhesive illustrated at the side. Only use a manual greasing pump, in order to prevent the breaking of bearing seals and grease passage pipes.

Grease the following points periodically:

B – LATERAL ROTOR BEARING: (except machines with watertight sealing), grease every 40 work hours applying 2 strokes per grease nipple

C – grease the cardan shaft every 8 hours as indicated in the respective use and maintenance manual, supplied by the cardan shaft manufacturer



Recommended lubricant: see table 6.2.6



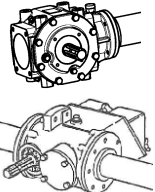
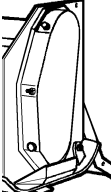
ATTENZIONE

All level control operations must be performed with the machine at rest for at least 2 hours and resting on a perfectly level surface.

Used oil must be properly recovered and should not be released in the environment, since, according to the prevailing legislation, it is classified as hazardous waste and as such should be given to specialised collection sites. Contact the "Mandatory Consortium for used oils" for the collection of waste oil.

6.2.6 LUBRICANT TABLE

The following table copies the adhesive applied to the machine, the recommended lubricant is highlighted with grey background

		RECOMMENDED LUBRICANTS - lubrificanti raccomandati empfohlenen Schmiermittel - lubrifiant recommandé						
		AGIP	IP	ESSO	SHELL	MOBIL	BP	TOTAL
		ROTRA 85W-140	PONTIAX HD 85W/140	GEAR OIL GX 85W/140	SPIRAX A 85W/140	MOBILUBE HD 85W/140	ENERGEAR HYPO 85W/140	EP 85W/140
GREASE 		GREASE MU EP 2	ATHESIA EP GREASE 2	BEACON EP 2	ALVANIA GR. EP 2	MOBILUX EP 2	GREASE LTX 2	MULTIS EP 2

6.3 MACHINE HOT POINTS



Before any maintenance intervention make sure that the parts potentially hot have cooled down. Pay attention to:

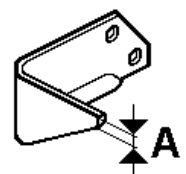
- Gearbox or speed shift;
- Lateral transmission carter;
- eventual hydraulic piping.

6.4 TOOL CONTROL

The hoes installed on the machine are suitable for normal consistency soils, they are built with high-resistance hardened boron-steel products.

The hoes are subject to wear and must be replaced when dimension A becomes lower than 20 mm.

Check the wear and integrity of the hoes daily and their fastening to the flanges as well.



6.5 REPLACEMENT OF THE TOOLS

Should the hoes bend during the work due to accidental causes (or rupture) it is necessary to replace them immediately, being careful to reinstall the new hoes in the exact position of those being replaced.

In case of hoe replacement, it is recommended to always disassemble and reassemble one hoe at a time, to avoid positioning errors.

In any case always follow the mounting helix created by the hoes and originally supplied (see fig.1).

However, the cutting edge of the hoe must always be oriented according to the rotor rotation and advance, fig.2 enhances the difference between the left hand and right hand hoes.

Be careful to always mount the bolt on the hoe side, while the washer and nut are mounted on the flange side (fig.3)

Fig.1

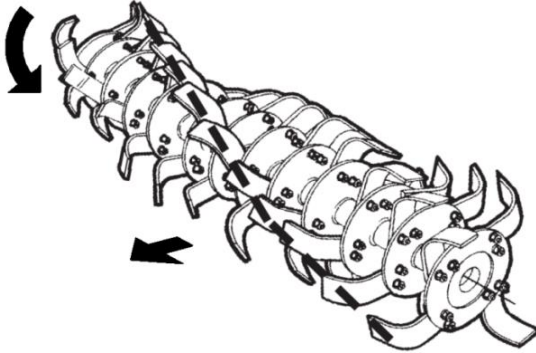


Fig.2

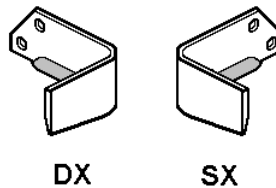
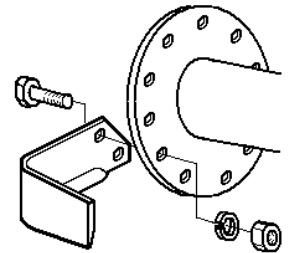


Fig.3



PERICOLO

To replace worn-off or ruptured hoes it is necessary to attach the tiller to the third point and lift it with an appropriate lifting device, then it is kept suspended at 2/3cm. By two strong trestles or supports capable of supporting the weight in case of unforeseen release, to ensure work in complete safety during the entire operation.



ATTENTION: it is recommended to install only original hoes and fastening bolts.

6.6 STORAGE – GARAGING

If the machine is immobilised for long periods, it must be stored in a place sheltered from atmospheric conditions and be protected to avoid damage. Before garaging, it is recommended to clean all the machine thoroughly and suitably lubricate all mechanical parts in order to protect them from rust.

Before putting the machine in rest mode for long periods, it is good practice to operate as follows:

- clean the machine thoroughly;
- carry out a general visual control of the machine to identify structural damage, to detect deep paint abrasions, to check that all original safety pictograms are in place, and that they are integral and legible;
- grease all mechanical components;
- if possible, recover the machine in a covered place, on flat and consistent ground.

Contact the "Mandatory Consortium for used oils" for the collection of waste oil.



Make sure that the storage temperature is between 0 °C and 50 °C.

6.7 COMMISSIONING OR PUTTING INTO SERVICE AFTER A LONG PERIOD OF INACTIVITY

Before using the machine for the first time, or after a long period of downtime, proceed as follows:

- check that the machine does not present damages;
- check that the mechanical components are well conserved and not rusted;
- check the wear condition of the tools;
- accurately grease all moving parts;
- check that there are no oil leaks;
- check that all guards are integral and positioned correctly.
- check that original safety pictograms are present in their positions and that they are integral and legible;

6.8 DISPOSAL

If the machine is scrapped, it must be disposed of in the appropriate waste sites in accordance with the laws in force. Before scrapping, separate the parts in rubber or plastic as well as the electric and electronic equipment (if present). Recover any waste oils and dispose of them at relevant collection centres.



Used oil must be properly recovered and should not be released in the environment, since, according to the prevailing legislation, it is classified as hazardous waste and as such should be given to specialised collection sites. Contact the "Mandatory Consortium for used oils" for the collection of waste oil.

The parts made only in plastic, aluminium, steel, can be recycled, if collected by appropriate centres.

7 SCHEDULED MAINTENANCE TABLE

GENERAL MACHINE CHECKS	FREQUENCY
Cardan shaft greasing	Every 8 hours of work
Greasing of the lateral bearing of the hoe holder shaft	Every 40 hours of work
Check bolt tightness	After the first 4 h and then every 50 h
Tool wear control	Before each work shift
Tool replacement	If damaged or shorter than 20 mm
GEARBOXES, SPEED SHIFTS, TRANSMISSION CARTER	FREQUENCY
Check oil level	Every 20 hours of work
Oil change	After the first 40 h and then every 250 h

8 TROUBLESHOOTING TABLE

PROBLEM	CAUSE	SOLUTION
Machine is noisy	Power take-off not parallel	Adjust the arms of the tractor's lifting device and the third point to place the power take-off in a parallel position
Insufficient depth	- position of the depth slides - worn-off teeth - high advance speed - soil too hard	- Adjust the work depth - Replace the tools - reduce the speed, tractor with insufficient power - work with more passages
Excessive fracturing	- advance speed low - high rotor rpm (versions with speed shift) - rear hood low	- increase advance speed - reduce the rotor rpm - lift the rear hood
Insufficient fracturing	- high advance speed - low rotor rpm (versions with speed shift) - rear hood high - soil too humid	- reduce the advance speed - increase the rotor rpm - lower the rear hood - do not work
clogging of the rotors	- rear hood low - soil too humid - high advance speed - machines with 6 hoes per flange	- lift the rear hood - do not work - reduce speed - reduce the number of hoes to 4 per flange
The machine vibrates	- blocked foreign objects - hoes mounted in the wrong side - worn-off or ruptured hoes - cardan shaft pto not parallel	- check and remove it - check and mount it correctly - provide its replacement - adjust parallelism with the third point
The machine works only on one side	- length of the lifting arms - position of the depth slides	- check the length, reduce lifting device oscillations - check that the 2 adjustments are the same

9 SPARE PARTS

Repairs and replacements must be performed using original spare parts, which must be requested from the Dealer. Remember that the request for spare parts must be correct and accompanied by the following indications:

- type of vehicle;
- serial number;
- spare part code that can be obtained from the Spare Parts Catalogue.

If it is a component that is part of a major unit (rotor, multiplier unit, guards), you should also specify the model and serial number of the unit.

10 WARRANTY

Check on delivery that the machine was not damaged during transportation and that the accessories are complete.

CONDITIONS OF WARRANTY:

- The manufacturer guarantees its products for a period of 12 months from the date of delivery on the condition that the attached form is filled in completely and sent to the manufacturer within 15 days of date of delivery.
- In accordance with the terms mentioned above, the manufacturer is deemed to agree to provide under warranty all parts to be replaced according to its assessment, or in the opinion of its authorised representatives, with respect to defective parts in both the material and construction. In any case, the transport and labour costs will be borne by the customer.
- The warranty does not include payment for damages due to incorrect use of the machine by the operator and for parts subject to wear and rupture as: hoes, rear hood, depth slides, etc.
- The manufacturer is not liable for accidents involving the operator or third parties, deriving from improper use of the machine.
- This warranty is void if:
 - a) maintenance and repairs have been performed by unauthorised individuals or companies.
 - b) machine has been previously repaired or modified with non-original spare parts.
 - c) if there is an incorrect manoeuvre error;
 - d) the machine was not properly maintained/lubricated;
 - e) the permitted power limit is exceeded;
 - f) whenever the instructions given in this manual are not followed;
 - g) any unauthorised modifications were performed.
- Any damage to and faults on the machine that have occurred during or after the period covered by the warranty do not involve any right to suspend payments for already delivered goods. No breakage or fault may be used as a motive to delay the payment.
- The manufacturer reserves the right, at all times, to make any modifications in order to improve its own product and is not obligated to add these modifications to previously manufactured machines, which have already been delivered or are undergoing manufacture.
- These general warranty conditions replace and cancel any other previous condition, expressed or implied.

WARRANTY CERTIFICATE (copy of the purchaser):

CERTIFICATO DI GARANZIA GUARANTEE CERTIFICATE GARANTIESCHEIN CERTIFICAT DE GARANTIE CERTIFICADO DE GARANTÍA GARANTIBEVIS GARANTIECERTIFICAAT	 
Nome / Name / Nom / Nombre / Nomin / Naam Indirizzo / Address / Anschrift / Adresse / Dirección / Adres	Si confermo di aver ricevuto il libretto uso e manutenzione e di essere stato informato circa il trattamento dei dati personali in base al Decreto Legislativo 196/03. We confirm to have received the instructions manual and that we were informed about the information of the Legislative Decree 196/03 about the treatment of personal information. Wir bestätigen, dass wir das Betriebs- und Wartungshandbuch erhalten haben und dass wir alle Informationen über die Verarbeitung unserer persönlicher Daten (Verordnung 196/03) gelesen haben. Nous confirmons d'avoir reçu la notice d'emploi et d'entretien de l'appareil et d'être informés notamment le traitement de nos coordonnées selon le décret législatif 196/2003. Se confirma la recepción del manual de uso y mantenimiento y haber sido informado acerca del tratamiento de los datos personales en base al Decreto legislativo 196/03. Underteekend bekräftigt mottagandet av användar- och underhållsmanualen och har informerats angående hantering av personuppgifter enligt lagdekret 196/03. Ik bevestig de handleiding voor gebruik en onderhoud te hebben ontvangen en dat ik geïnformeerd werd betreffende de behandeling van mijn persoonlijke gegevens, krachtens het Wetsdecreet 196/03. Firma dell'acquirente / Purchaser's signature / Unterschrift des Käufers / Signature de l'acheteur / Firma del comprador / Koparens underskrift / Handtekening van de koper _____ Data /Date/Datum/Fecha _____



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