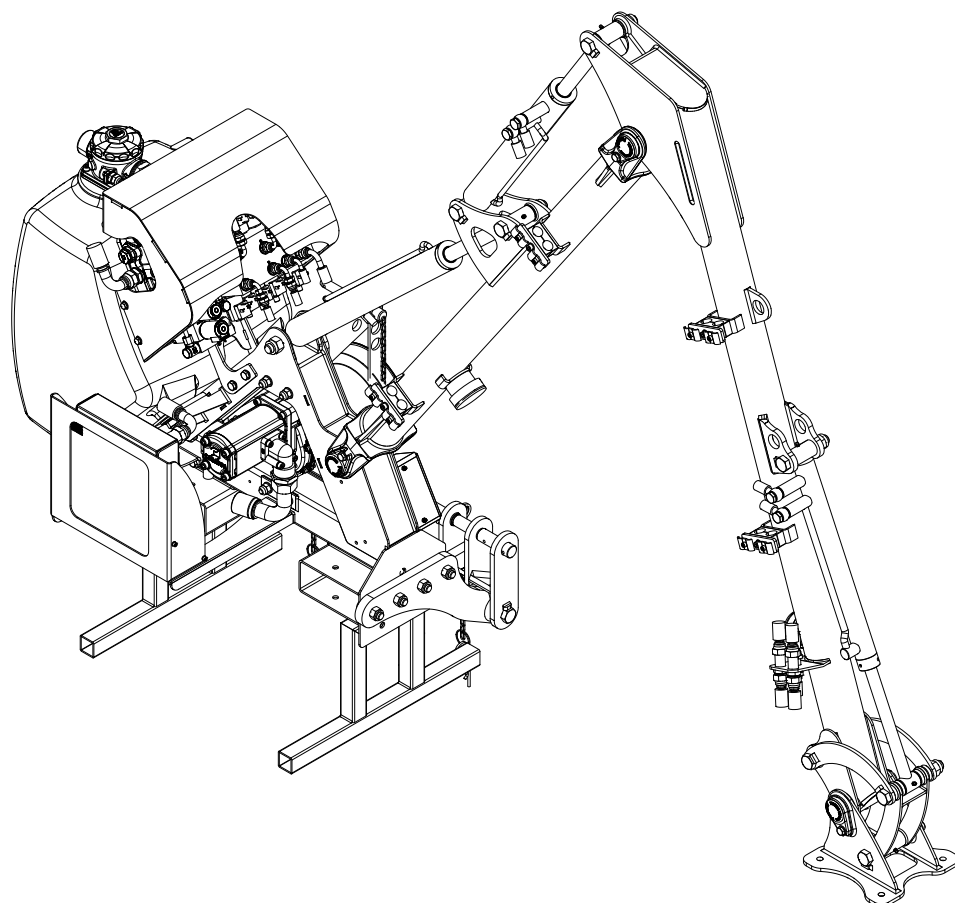




USE AND MAINTENANCE MANUAL

T250A-T320A



HYDRAULIC FLAIL HEDGE MOWER ARM

Model	Serial number
T250A right	01
T320A right	01
T320A left	01
T320A reversible LH driving position	01

EN-GB

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INDICE

DECLARATION OF CONFORMITY

The **CE Declaration of Conformity**, provided together with the machine, is the document with which the Manufacturer certifies, under its own responsibility, that it has complied with observance of the European Directives, the Standards and Technical Specifications necessary (specified in said Declaration) in order for the machine to conform to the basic requirements for sale and use in the European Union.

The Declaration of conformity must be considered as an integral part of the machine and must always accompany the machine until it is scrapped.

If this document is not delivered together with the machine or gets lost, please request a copy from the Manufacturer. The bottom part of the Declaration of Conformity contains the **Warranty Coupon** which must be completed in full and

Dichiarazione di conformità

N°

CE Declaration of Conformity
According to 2006/42/CE Directive
(that abrogate 98/37/CE Directive)

The undersigned **FERRI s.r.l.** state on its own responsibility that the machine

description of machine	code	series	(flail head/series)	serial no.

complies with the Essential Safety and Health Protection Requirements of the 2006/42/CE Directive and to the electromagnetic compatibility for models equipped with electro/electronic devices according to the 2004/108/CE Directive.
To answer to Conformity, according to the above mentioned Directives, following rules have been considered:

As well as the technical detailed list:

(Name and qualification of the delegate of the manufacturer)

Signature of the delegate

Tamara,
(Place and date)

Person authorised to form the Technical file
Dr. Sandro Ferri

FERRI s.r.l. – Via Govoni, 30 – 44034 Tamara (Ferrara) – Italia - Tel. +39.0532.866 866 - Fax +39.0532.866 851

(to cut along the outlined line)

To fill out by the Distributor with user's details

Date

Series	Surname	Name	Date
Machine Model	Company Ragione Sociale	User Signature	
Serial N°	Address		
	City or Town		
	State/Prov	Postal	
	Telefono	Fax	
Distributor Stamp	Distributor stamp and signature	Serial N°	Series
		Machine Model	

Taken note of the Use and Maintenance Book and of the use's rules (Safety Rules included)

User Signature (legible)

returned to the Manufacturer in order for the rights under the warranty to be valid (see Chapter 11).

The machine described in this manual complies with:

European Directives

2014/30/EU	Electromagnetic compatibility of machines with internal electrical power supply
2006/42/EC	Machinery directive

Harmonised standards

UNI EN ISO 13857	2008	Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs
UNI EN 13524	2014	Highway Maintenance Machines - Safety Requirements
UNI EN ISO 4254-1	2010	Agricultural machinery - Safety - Part 1: General requirements
UNI EN ISO 12100	2010	Safety of machinery - General principles for design – Risk assessment and risk reduction

Technical Specifications

UNI EN ISO 3767-2	1998	Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays - Part 2: Symbols for agricultural tractors and machinery
ISO 11684	1995	Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Safety signs and hazard pictorials – General principles
IEC EN 60204-1	2006	Safety of machinery. Electrical equipment of machines.

PRELIMINARY DECLARATION

SAFETY RULES

The safety instructions provided in this manual are preceded by a hazard symbol and a caution (CAUTION, WARNING and DANGER).

These precautions are intended to protect personal safety and the safety of those working and/or present in the danger zone of the machine.

Carefully read all the instructions provided in this manual.



THE WORD “CAUTION” REFERS TO SAFE CONDUCT PRACTICES BOTH IN OPERATING AND MAINTENANCE TO BE IMPLEMENTED FOR ALL PERSONS PRESENT IN THE DANGER ZONE OF THE MACHINE IN ORDER TO PREVENT ACCIDENTS.



THE WORD “WARNING” DENOTES A POTENTIAL OR HIDDEN DANGER THAT CAN CAUSE ACCIDENTS OR DEATH. IT IS USED TO ENCOURAGE OPERATORS AND THE OTHER PERSONS TO USE APPROPRIATE MEANS IN ORDER TO AVOID POSSIBLE ACCIDENTS.



THE WORD “DANGER” DENOTES A NON-PERMITTED PRACTICE THAT CAN CAUSE ACCIDENTS OR DEATH.

Prefazione

FAILURE TO OBSERVE THE INSTRUCTIONS, ESPECIALLY THOSE PRECEDED BY CAUTION, WARNING AND DANGER PRECAUTIONS, CAN CAUSE SERIOUS ACCIDENTS OR DEATH.

PREFACE

To operate safely it is necessary to:

- 1) Observe the general use precautions for all mechanical equipment, which are described in Chapter 2;
- 2) Always follow the use instructions contained in this manual.
- 3) In the case of difficulties in the installation, use or maintenance of the machine, contact specialised technical personnel (Manufacturer, Dealers, Technical Assistants, etc);
- 4) Never remove, tamper with or modify any part of the machine unless allowed specifically by this manual;
- 5) Repair or replace the protections and any worn or broken parts in the manner described in this manual;
- 6) Keep the safety decals perfectly legible;
- 7) Carry out maintenance operations in compliance with the instructions included in this manual;
- 8) Observe the safety rules established by law;
- 9) Always refer to qualified, authorised, adequately instructed and trained personnel.
- 10) Maintain all the guards in a perfect state of efficiency.



WARNING

All the technical measures for preventing the expulsion of objects adopted in the design of the machines do not allow absolute safety to be achieved.

Even if the machine is used correctly, there is always the possibility that small stones, splinters or other objects will get past the safety barriers and will be hurled a long distance.

It is absolutely mandatory to make sure that **THERE IS NOBODY INSIDE THE WORKING RANGE OF THE MACHINE (AT LEAST 50 METRES) WHILE IT IS OPERATING.**

Pay particular attention when working close to roads and/or buildings.



CAUTION

For machines equipped with electrical/electrohydraulic controls and/or a heat exchanger **IT IS ABSOLUTELY NECESSARY** to consult the assembly instructions for electrical connection before mounting them on the tractor.

Failure to observe the above-mentioned instructions can damage the electrical system and invalidate the warranty.

1 GENERAL INFORMATION

1.1 *Purpose and contents of the manual*

The purpose of this manual is to provide the customer with all the information necessary in order to use and manage the machine in a correct, independent and safe manner. The manual contains information on safety, technical aspects, operation, maintenance and spare parts.

Read this manual carefully and scrupulously observe the instructions provided before any use, check or operation of the machine.

Correct use and correct maintenance contribute to the good operation and the duration of the machine.

In the event of doubts or questions, please contact the Manufacturer.



This Manual has been drawn up according to the regulations in force at the time of printing.



**The illustrations have a purely indicative value.
Some elements might not graphically correspond to those actually fitted on the machine.**

1.1.1 *Who should read this manual*

The Manual is intended for the operator and the technicians responsible for the maintenance of the machine.

Operators must not carry out operations meant for qualified technicians.

The instructions contained in this manual are intended for an authorised qualified technician, appropriately instructed and trained on how to drive the tractor to which the machine is connected.

1.1.2 *Updates to the manual*

The information, descriptions, and illustrations contained in this manual reflect the state of the art at the moment of machine sale.

As part of the continuous commitment to improving its products and/or for market reasons, the Manufacturer reserves the right to modify the machine for technical or commercial reasons at any moment whatsoever without prior notice and without giving the purchaser any legal right to resolve the contract.

Any supplements must be conserved together with the manual and are to be considered as an integral part of the manual.

1.1.3 *Conservation*

This manual must be kept close to the machine and away from liquids and any other substance which could cause it to become illegible.

This manual and the Declaration of Conformity constitute an integral part of the machine up to the moment of its disposal. If the manual is lost or becomes unreadable, request a new copy from the Manufacturer.

1.1.4 *Copyrights*

The copyrights for this manual are the exclusive property of FERRI srl.

The technical texts, drawings and illustrations in this manual may not be disclosed or transmitted to third parties, not even in part, without the prior written authorisation of FERRI srl.

1.2 Spare parts

It is strongly recommended to use original "FERRI" spare parts to avoid altering the technical features of the machine. FERRI is not responsible for any damage or injuries to the machine, persons or things due to the use of non-original parts.



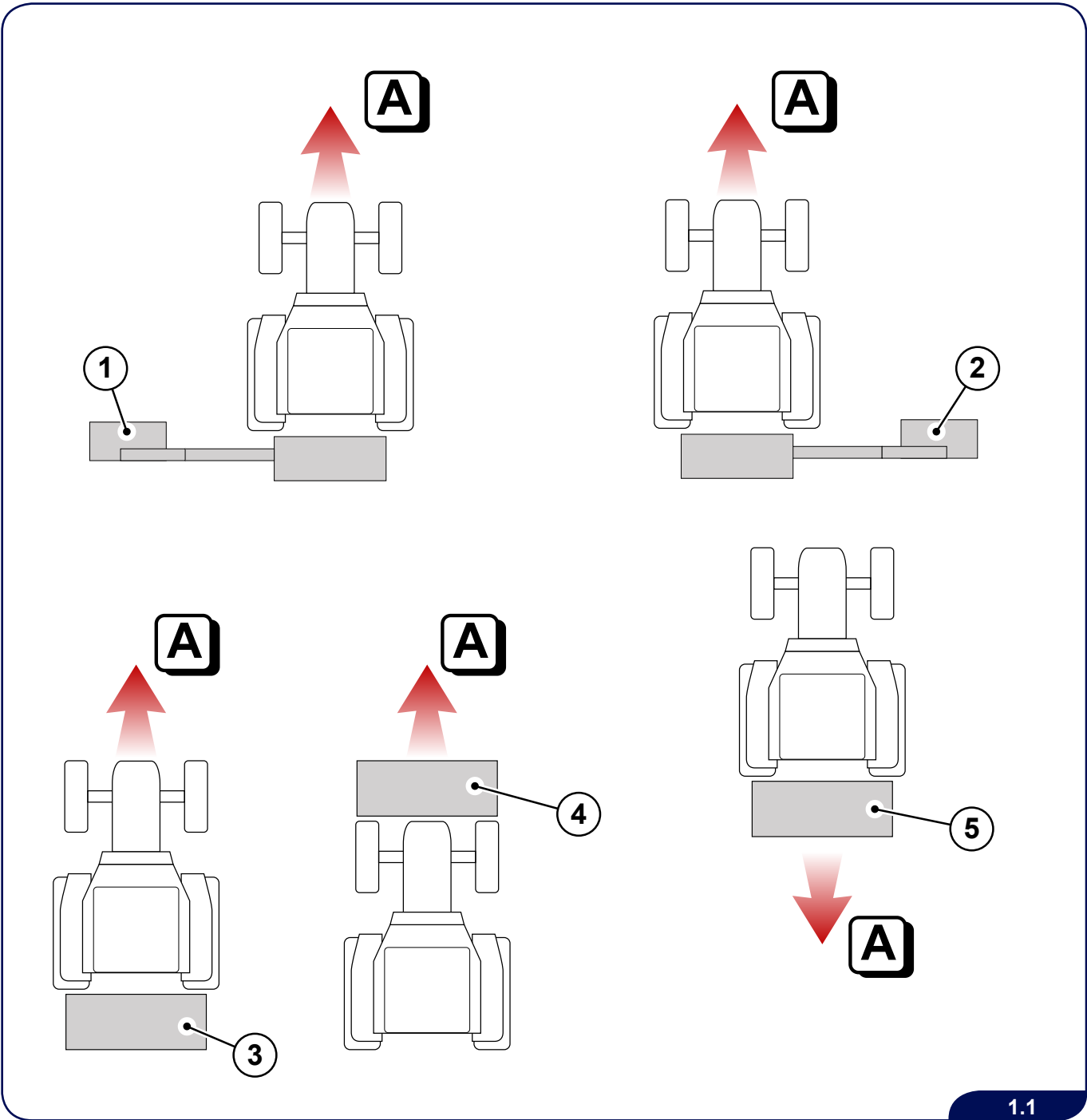
We recommend always using original spare parts and accessories. In addition to invalidating warranty coverage, the use of non-original parts and accessories will reduce the duration and performance of the machine.

1.3 Machine versions

During work, the machine version varies depending on the running direction and the position of the machine in relation to the tractor.

A	Direction of movement
1	Left machine
2	Right machine
3	Rear version
4	Front version
5	Back-face version

01-INFORMAZIONI GENERALI (Versione della macchina)



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01-INFORMAZIONI GENERALI (Versione della macchina)

2 SAFETY RULES

2.1 General safety rules

The machine was designed and constructed according to appropriate safety standards. Before using the machine, carefully follow all the precautions and instructions contained in the manual in order to avoid accidents.

- ▶ Ensure that, on the ground where you are to work, there are no large stones or rocks, protruding tree stumps, metal elements of any kind (mesh, wires, cables, chains, tubes, etc.).
- ▶ Carefully follow the instructions for the adjustment of the machine height above ground.
- ▶ While working with the machine, ensure that there are no persons or animals within a radius of at least 50 metres.
- ▶ Never work “flush to the ground” on wet terrain. In these conditions, in fact, there is a risk of taking too much power from the motor, filling the rotor protective casing with pressed mud, and causing excessive wear on the flails and the drive belts, thereby compromising machine performance and balance.
- ▶ A tractor of appropriate power must be used on each machine. If using a tractor with higher power than the maximum the machine can absorb, use a PTO shaft with a clutch (torque limiting device), without which the drive unit and the flail shaft could get damaged.
- ▶ Examine the safety decals applied to the machine and described in this manual. To work safely, clean them and, if they are not legible, replace them with new decals.



FERRI declines all liability for damage caused by improper use of the machine.



Carefully check the machine before each start-up.



Before starting up the machine or carrying out maintenance work, carefully read all the instructions and safety messages contained in the manual and on the machine. Carefully follow accident prevention and safety rules.



Never use the machine to carry or lift people, animals or objects.

- ▶ Before starting to use the machine you must be familiar with all its devices, controls and functions.
- ▶ Make sure that all safety devices are in good condition and in the correct position. In the event of faults or damage, replace them immediately.
- ▶ Before getting off the tractor and before each maintenance operation, apply the parking brake, switch off the engine and remove the ignition key from the dashboard.
- ▶ The user is responsible for the maintenance of the machine.

- ▶ It is the owner's responsibility to provide operators or employees with all the instructions before they operate on the machine, according to the regulations of the destination country.
- ▶ Only the operator who is adequately trained and instructed on the safety rules can operate on the machine.



DANGER

DO NOT OPERATE on the machine if there are any persons and/or animals within the working range of the machine.



DANGER

Start the machine only when properly seated.
Read the instructions for starting up the machine that are contained in the operator's manual.

- ▶ Always keep the manual within reach for quick consultation. If the manual is lost or damaged, request a replacement copy from the Manufacturer.
- ▶ Disengage the power takeoff of the tractor (or self-propelled machine) before starting the motor of the machine.
- ▶ The machine is designed to be used by one operator.
- ▶ It is strictly prohibited to work in poor physical conditions, or under the influence of alcohol, drugs or medicines.
- ▶ Keep the machine clean and free from foreign bodies (debris, tools, other objects), which could cause harm to the operator or damage to the machine.



WARNING

Always wear the seat belts. Falls or overturning of the machine can cause serious injury or death.



DANGER

This machine has been designed for use only with closed-cab tractors and/or self-propelled machines!

In the case of a tractor with an open cab, the following are required:

- 1) **Personal protective equipment for the operator;**
- 2) **Shielding from thrown objects;**
- 3) **Roll Over Protective Structure (ROPS) for the self-propelled vehicle.**

- ▶ Prolonged operations can cause physical and mental fatigue. Never operate the machine and tractor when tired or in a bored mental state.



DANGER

It is strictly forbidden to climb or hitch a ride on the machine when it is moving.

- ▶ Make sure that the PTO shaft is correctly fitted each time the machine is being coupled.
- ▶ Uncouple the machine from the tractor only on compact level ground, ensuring that the machine is at a standstill and stable.



DANGER

Check that the guards of the PTO drive shaft are intact and in good working order.
When the machine is not connected to the power unit, hang the hydraulic hoses on the supports provided.

- ▶ In the event of breakage or deterioration of the PTO shaft guards, replace them immediately.
- ▶ Do not use the controls or the hoses as handholds. These components are movable and do not offer steady support.
- ▶ Never work, walk or stand under the raised boom. To avoid accidental falls, do not carry out maintenance operations under the raised boom unless it is properly supported.
- ▶ Never use the boom to lift people or objects.



Do not, for any reason, get in between the tractor (or self-propelled machine) and the machine with the engine running and/or the power take-off engaged.



Avoid contact with hot surfaces including:

- 1) Oil tank;
- 2) Pumps;
- 3) Engines;
- 4) Valves;
- 5) Gearbox;
- 6) Hydraulic hose fittings.

To avoid scalds and/or burns, use protective gloves and goggles during maintenance work on hot surfaces.

Preferably use the machine in daytime.

In conditions of reduced visibility, use the lighting system of the tractor.

If the machine is used at night:

- 1) Provide an auxiliary lighting system in order to guarantee good visibility in the whole work area;
- 2) Do not create dangerous reflections for the operator;
- 3) Have sufficient lighting in the cab in order to guarantee identification of the controls.



Operate only in environments that are well lit by natural or artificial light. During work the operator must have a visibility of at least 100 metres.



Avoid contact with guard-rails or concrete structures so as not to damage the flails.



Replace bent or broken flails with new flails. Never straighten or weld the flails because doing so can reduce their strength and compromise safety.



Carefully inspect the area in which you will be operating and remove all debris or foreign material in order to avoid damage to the machine, to persons and/or property. Any objects that cannot be removed must be clearly marked and avoided by the operator. Stop cutting immediately if the flails hit a foreign object.



Never start the tractor engine in a closed area without adequate ventilation. The exhaust fumes can be hazardous to health.



ENSURE THAT THE CUTTING FLAILS HAVE FULLY STOPPED BEFORE APPROACHING THE MACHINE.



Before leaving the tractor seat and before each maintenance operation, always apply the parking brake and disengage the PTO. Stop the engine, remove the key from the dashboard, and wait for all moving parts to stop.



Never allow children or other people to climb on top or operate the tractor or the equipment. Falls can cause serious injury or death.



The user may carry out only maintenance operations that are described in this manual.



Make sure that you perform all (routine and extraordinary) maintenance operations on the tractor (or self-propelled machine) with which the machine will be coupled.

- ▶ Do not modify the equipment in any way. Unauthorised modification may impair the functionality and/or safety of the machine and could affect the life of the equipment. In such a case, the user will be the only party responsible in case of damage or injury.



Do not tamper with, remove or render inefficient the guards and/or safety devices of the machine.

- ▶ Use exclusively original FERRI spare parts.

FERRI declines all responsibility in case of:

- ▶ Improper use of the machine or use by untrained personnel.
- ▶ Serious shortcomings in the required maintenance.
- ▶ Unauthorised modifications or interventions.
- ▶ Use of non original spare parts or parts not specifically intended for this model.
- ▶ Total or partial failure to observe the instructions.
- ▶ Failure to observe the common rules for safety at work.

2.2 Safety rules concerning road traffic



Whenever the public road network must be used, scrupulously respect the highway code. Pay particular attention to the speed limit.

Observe the following rules when using the public road network with the machine coupled to the tractor (or self-propelled machine):

- ▶ Make sure that all the lights and reflectors are correctly working and positioned, clean, and clearly visible as required by local regulations.
- ▶ Before heading out onto the road, consider installing optional light bars.
- ▶ When driving on public roads, observe all road regulations.
- ▶ Before entering public roads from muddy or unpaved terrain, clean the tires of the tractor (or self-propelled machine) thoroughly of any residual mud.



Make sure the steering and brakes of the tractor (or self-propelled machine) are in excellent condition and operate properly.

- ▶ Switch off the tractor PTO.
- ▶ Never transport the machine with the moving flail holder shaft, not even for short distances. Make sure that the rotor control is disengaged and the moving parts of the machine have all come to a complete stop.
- ▶ Lock the machine with the safety devices provided.
- ▶ If the machine is used for verge maintenance on public roads:
 - 1) The machine must only be driven by personnel specifically instructed in safe use;
 - 2) The safety procedures imposed by the competent Body must be adopted;
 - 3) Follow the machine with a vehicle, positioned at a distance of approximately 20-30 metres, in order to notify road traffic of the possible danger;
 - 4) Place appropriate notices ahead of the machine so that vehicles arriving on the other side of the road will be able to stay at a safe distance from the working range of the machine;
- ▶ Do not allow anyone to ride on the tractor (or self-propelled machine) or on the machine during transport.
- ▶ Reduce speed on rough roads and surfaces.
- ▶ Use rotating flashing lights on the tractor (or self-propelled machine) during the transport, unless they are prohibited by local safety regulations.
- ▶ Make sure that the machine has been correctly installed on the tractor (or self-propelled machine) and that all the safety pins have been mounted correctly.
- ▶ Use the lifting device of the tractor (or self-propelled machine) to raise the machine coupled to the 3-point coupling to the maximum height above the ground.
- ▶ Test the tractor (or self-propelled machine) at low speed and then increase it slowly. Try the brakes gently to determine the stopping characteristics of the tractor (or self-propelled machine) with the machine coupled.



Always proceed at a moderate speed, especially on rough surfaces and steep gradients, to avoid overbalancing. The weight of the machine alters the stability of the tractor (or self-propelled machine) and influences its behaviour on the road, steering and braking capacity.

Check the lifting capacity and the stability of the tractor (or self-propelled machine) to avoid its tipping over and/or losing the grip of the steering wheels.

2.3 Safety rules during use



Always check the machine carefully before starting up, and particularly, verify the good working order of accident prevention equipment.



Many objects such as cables, ropes, wires, stones, chains or debris may be expelled outside the machine at high speed following an impact with the flails. Inspect the cutting area and remove any potentially dangerous objects from the site.

- ▶ When working with the machine take care to avoid contact with fixed objects such as: road drain wells, shafts, stones, guard rails, rail tracks. Such contact could cause the flails to break throwing them into the air at very high speed.
- ▶ If metal wires, ropes, chains or similar, get tangled around the rotor, disengage the rotor control and the other controls. Switch off the engine of the tractor (or self-propelled machine). Apply the parking brake. Remove the ignition key from the control panel of the tractor (or self-propelled machine). Wait for all the moving parts to stop moving in order to avoid damage or dangerous situations. **Put working gloves on, clear the rotor with the aid of pliers or shears. Do not attempt to disentangle it by reversing the rotor movement.**
- ▶ **Do not use the machine when there are anomalous or excessive vibrations, as this would cause breakages and/or serious damage. Inspect the machine to find the cause of the vibration and solve the problem. If the problem persists, contact an authorised workshop immediately.**
- ▶ Do not let the flail holder rotor spin when the machine is raised from the ground.
- ▶ Do not operate with the boom extended when working on sloping ground. On each occasion check the stability of the tractor (or self-propelled machine). Check stability from a safe position, keeping the flail head horizontal and as close as possible to the ground. Then extend the boom slowly.
- ▶ Before using the hydraulic controls for the movements of the machine, make sure that there are no persons, animals or objects within the working range of the machine.
- ▶ It is absolutely forbidden to keep the rotor running during the lifting or lowering of the shredding flail head.
- ▶ Read and carefully follow the Operator's Manual and all safety decals before operating, servicing, repairing and/or replacing parts of the machine.
- ▶ Do not allow anyone to get on the tractor (or self-propelled machine) and/or on the equipment.
- ▶ Check all guards and protective barriers. If they are damaged, repair and/or replace them before starting up the equipment.
- ▶ Keep hands, feet, hair and clothing away from all moving parts.
- ▶ Disengage all controls and stop the engine. Apply the parking brake and remove the ignition key from the control panel of the tractor (or self-propelled machine). Wait for all the moving parts to stop before performing any operation for maintenance, repair or replacement of machine parts.
- ▶ Before operating, always check to make sure that there are no children or persons inside the machine danger zone. If necessary, stop all moving parts of the machine.
- ▶ Keep all hydraulic fittings, couplers and hoses tightened. Make sure that there are no oil seepages.
- ▶ Keep all the lights, reflectors, and rear-view mirrors of the tractor (or self-propelled machine) constantly clean and in good working order.
- ▶ Use the rotating beacon on the tractor (or self-propelled machine) whenever the machine is running or during transport.
- ▶ Do not put your hands or feet beneath the machine or near its working parts while the equipment is working or the engine of the tractor (or self-propelled machine) is running.
- ▶ Objects can be thrown out with sufficient force to severely injure people within the working range of the machine (at least 50 metres). Make sure that there are no persons near the machine when it is in motion.
- ▶ Inspect the area on which to work, and make sure that there are no hidden obstacles.
- ▶ Do not stop or start suddenly when going up or down a hill.
- ▶ Review all the instructions with all operators at least once a year.
- ▶ Never leave the driving seat of the tractor (or self-propelled machine) while the machine is in the raised position. Lower the machine to the ground, disengage the PTO and switch off the engine of the tractor (or self-propelled machine) before leaving the driving seat.
- ▶ Never leave the machine unsupervised with the tractor (or self-propelled machine) running.



Safe operating speed depends on terrain condition, the type of material to cut, as well as its density and height.



Use slow operating speeds if working on steep slopes, overhead constructions, ditches and when obstacles or debris on the ground must be avoided.



Always keep the flail head close to the ground when the boom extensions are being opened, in order to ensure the machine is transversally stable regardless of the work conditions and of the characteristics of the ground.



Avoid opening the boom horizontally when above slopes, canals, ditches or the like.

2.3.1 Responsibility of the operator or owner

The owner or operator is responsible for reading this manual and instructing all operators before they begin working with this machine. Risk assessment and accident prevention depend on the prudence, attention and common sense of the personnel involved in the operation, transport, maintenance and storage of the equipment or in its use and service maintenance.

Follow all the instructions from beginning to end. Safety is in everybody's interest. Following all the safety procedures recommended allows processes to be performed safely, both for operators and for persons within the machine working area. Operators who have not followed instructional training are not qualified to operate with the machine.

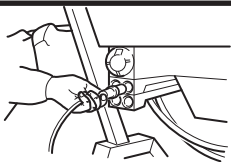
2.4 Safety rules concerning the hydraulic system



Any intervention or maintenance on the hydraulic system has to be carried out by specifically instructed personnel.

WARNING

- ▶ Replace any hydraulic hoses that are abraded, worn or cut and any metal pipes that are deformed.
- ▶ Do not try to repair the hydraulic system, the connections or hoses using tape, clamps or anything else. The hydraulic system operates under high-pressure. Makeshift repairs can be hazardous.
- ▶ Before applying pressure to the system, make sure all components are tightened well and that all the hydraulic lines, the hoses and couplings are not damaged.
- ▶ Stop immediately in the case of oil leaks.
- ▶ **IMPORTANT: Never search for oil leaks with bare hands. Wear suitable working gloves.**
- ▶ Oil under high pressure may seep into the skin causing serious infections or toxic reaction. In this case contact a doctor immediately.
- ▶ Check the state of wear of the hydraulic pipes. If they are worn (or at least every 6 years) replace them.
- ▶ Before working on the hydraulic system, lower the end tool, release all the pressure and turn off the tractor.
- ▶ Dispose of used oil and greases in accordance with anti-pollution rules.
- ▶ In tractors equipped with a hydraulic system, the pressure of the system must not exceed 190 bars.
- ▶ When the machine is not coupled to the power unit, place the hydraulic pipes in the supports provided.



Make sure that the hydraulic pipes are fitted and mounted correctly. If they are inverted this will cause movements opposite to those commanded.



Make sure that there is no pressure inside the hydraulic system before proceeding with maintenance or repair operations. If there is pressure, use the hydraulic controls repeatedly in order to release the pressure in the system.

DANGER

2.5 Fire-prevention methods

- ▶ Always keep a fire extinguisher of adequate capacity on board the vehicle and make sure that it is periodically recharged. The hand extinguisher is to be used by authorised personnel only.
- ▶ The personnel assigned to the vehicle must be trained in the firefighting techniques adopted.
- ▶ All fuels and most lubricants and hydraulic fluids are flammable.
- ▶ Switch off the engine before filling the tank with fuel.
- ▶ Never smoke while filling the tank with fuel or topping up hydraulic fluid levels.
- ▶ Never fill the fuel tank near open flames or in closed places.
- ▶ Never siphon fuel.
- ▶ Before starting the engine, make sure that there are no accumulations of spilt fuel, lubricants, or other fluids that might cause fire in the vicinity.
- ▶ Short-circuits can cause fires. Regularly check the conditions of the terminals to the batteries, cables, and electrical appliances.
- ▶ Never store flammable substances in inappropriate places.
- ▶ Never puncture or burn pressurised containers or canisters.
- ▶ Never accumulate material soaked with flammable substances.
- ▶ In order to reduce the risk of combustion to a minimum, clean the machine regularly using the appropriate equipment (compressed water or air spray cleaners).



DANGER

When washing the machine, never spray water directly onto the electric boxes.

- ▶ Use the appropriate fire extinguishing methods (carbon dioxide, foam, chemical powder).
- ▶ Use sprays of water only to cool off surfaces exposed to fire.
- ▶ Never use petrol, solvent, or other flammable and/or toxic fluids to clean mechanical parts. Use commercially homologated, non-flammable, non-toxic solvents.
- ▶ Never weld near tanks, hoses, drums, electrical cables or electric materials in general.

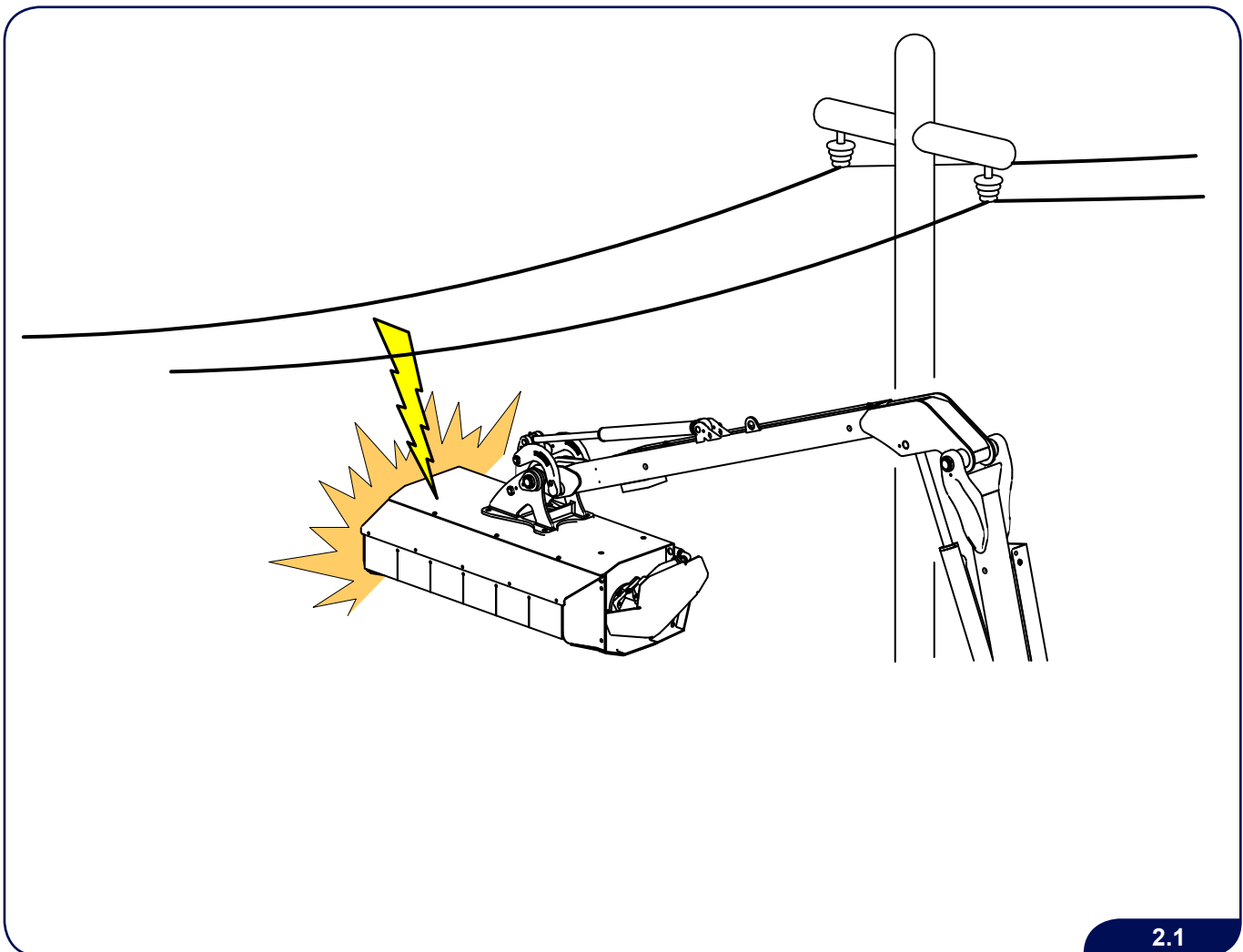
2.6 Overhead hazards



Pay special attention when working under or near electric lines: an electric arc may be released.



For the maximum working height of the tool, see TAB 2 in Chapter 3 or the Maintenance and Use Manual of the machine to which the tool is combined.



02-Pericoli aerei

2.7 Protection and equipment for the operator



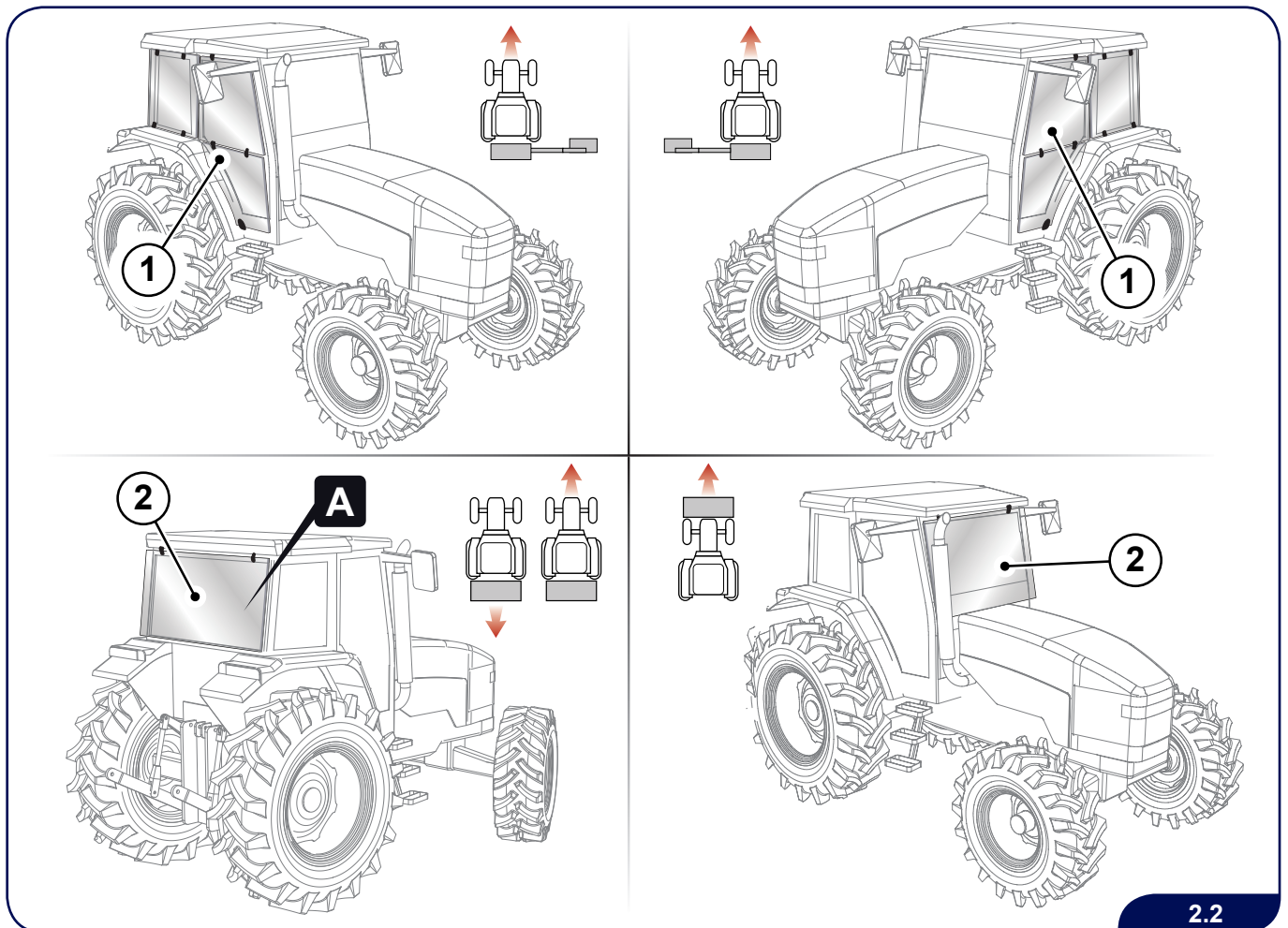
Always wear safety footwear, overalls, safety gloves and, if necessary, earmuffs and a dust mask during use and machine maintenance, repair, handling and storage operations.

In order to protect the operator from the violent expulsion of splinters, stones or other materials, install on the driver's cab - on the work side (1) or on the rear or front side (2) - a single pane (plexiglass or polycarbonate) 10mm thick that prevents the bodies expelled from the end tool from:

- ▶ Breaking the windows of the cab.
- ▶ Causing injury to the operator.

Attach the machine only to tractors with approved type anti-roll over driving cab (ROPS).

02-Equipaggiamento e protezioni dell'operatore



2.2



ONLY IN CASE OF VENTRAL MACHINES:
 due to the presence of the arms on one side of the tractor, it is obligatory to consider the rear door (A) as an emergency exit.

2.7.1 Maintenance: safety rules

- ▶ When the operator leaves the driving position of the tractor (or self-propelled machine) he/she must:
 - 1) Lower the mower onto a horizontal surface. If there are supporting feet, position them and lower the machine onto the ground using the lift of the tractor (or self-propelled machine);
 - 2) Disconnect the mechanical, hydraulic and electric power of the machine;
 - 3) Engage the parking brake of the tractor (or self-propelled machine);
 - 4) Stop the engine of the tractor (or self-propelled machine) and remove the ignition key from the control panel.



Never work underneath the machine or under any parts of the machine that have been raised but are not properly supported, in order to avoid sudden or accidental falling which could cause serious injury or even the death of the operator.

- ▶ Keep the working area clean and dry.
- ▶ Be sure electrical outlets and tools are properly grounded.
- ▶ Use auxiliary lighting during maintenance operations.
- ▶ Use only tools, jacks and lifts of sufficient capacity for the job.
- ▶ Never work on the frame, rotor or underneath the machine unless the tractor (or self-propelled machine) engine is off and the PTO is disconnected.
- ▶ On completion of maintenance work, make sure that all guards are in place, properly secured and in good condition.
- ▶ We advise the maintenance technician to refrain from wearing cumbersome clothing or accessories that could get caught in the machine (sleeves without closed cuffs, belts, necklaces, bracelets, rings).
- ▶ Check the pressure of the hydraulic circuit before servicing the machine or disconnecting it from the tractor.
- ▶ Make sure that the end tool is correctly supported on the ground.
- ▶ Release any residual pressure remaining in the system.
- ▶ Disconnect all electric wires from the battery of the tractor (or self-propelled machine) when carrying out welding operations. Disconnect the electrical system of the tractor (or self-propelled machine) if the welding operations are performed with the machine mounted on the tractor itself.
- ▶ Before applying pressure to the hydraulic system, make sure all hydraulic lines, fittings and couplers are tight and in good condition.
- ▶ Periodically inspect all moving parts for wear. If necessary, replace them with original spare parts.
- ▶ Never weld or attempt to repair or make weldings on parts subject to movement in order to avoid vibrations that are harmful to the machine and its safety.



Use a ladder or raised stand to access high spots which cannot be reached by the operator. Slipping or falling can cause serious injury or death. Do not lean the ladder against the machine.

2.8 Working range of the machine

- ▶ Objects can be thrown out with sufficient force to severely injure people within the working range of the machine (at least 50 metres). Make sure that there are no persons near the machine when it is running.
- ▶ Stay out of the working range of the machine.
- ▶ Always know where all additional support personnel are located when the machine is operating. Never allow anyone within the danger area of machine.

2.9 Safety decals

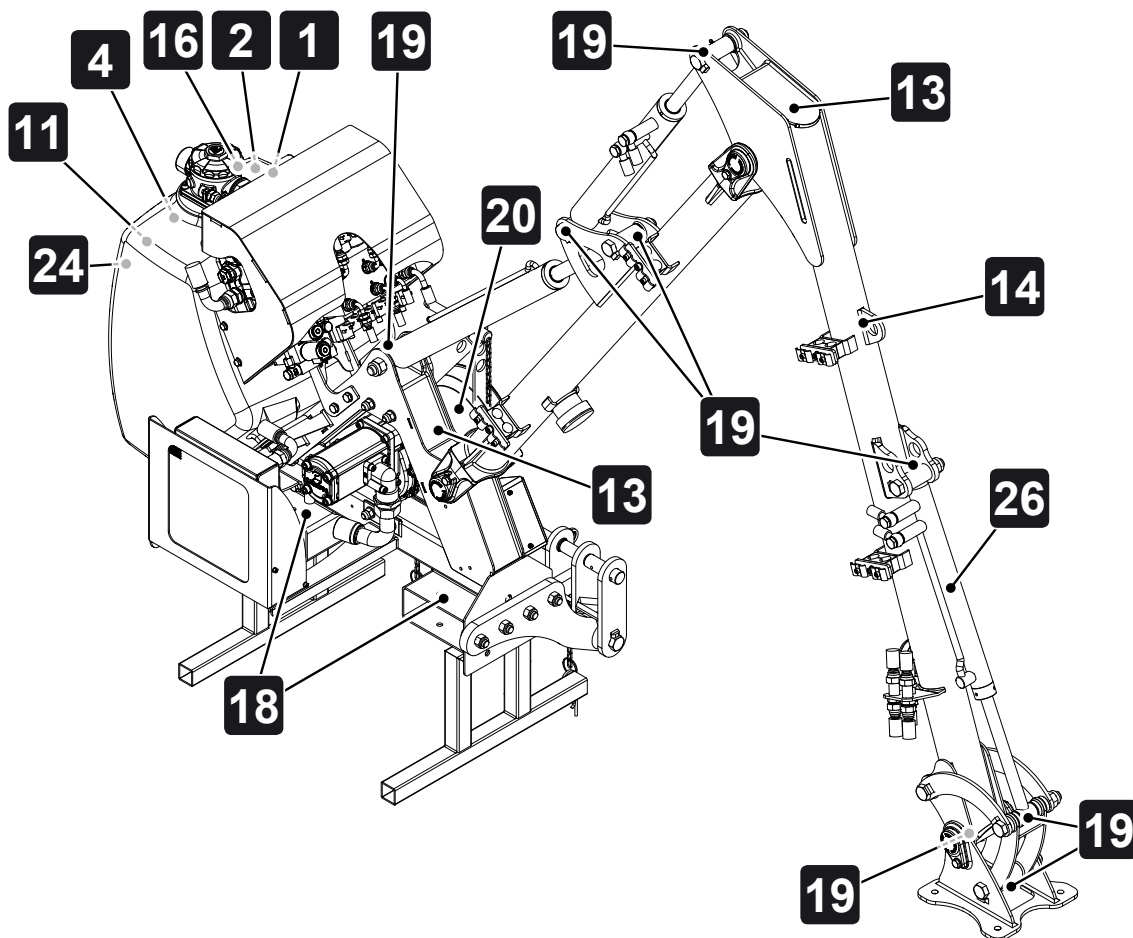
- ▶ Keep safety decals clean and legible at all times.
- ▶ Replace all safety decals that are missing or illegible.
- ▶ Whenever changing parts of the machine on which a safety decal is mounted, remember to apply the decal again on the new part.
- ▶ Safety decals can be ordered from your local dealer or directly from the Manufacturer.













Ensure that the safety decals are legible.











Clean them with a cloth, soap and water.

Replace damaged safety decals with other of the same type; make sure to apply such decals in their original positions.













DESCRIPTION OF THE DECALS	
1	 <p>Carry out regulation and maintenance operations only after reading the use and maintenance manual, with the machine stopped and the key removed.</p>
2	 <p>Check the direction of rotation and the number of revolutions (540 rpm) of the tractor p.t.o. before switching on the PTO shaft.</p>
3	 <p>Check the direction of rotation and the number of revolutions (1000 rpm) of the tractor p.t.o. before switching on the PTO shaft.</p>
4	 <p>Danger of throwing materials. Keep at a distance of at least 50 metres from the machine.</p>
5	 <p>Do not remove or open the casings until the belts have stopped completely.</p>
6	 <p>It is forbidden to climb or to ride on the machine.</p>
7	 <p>Danger of crushing the limbs. Maintain safety distances.</p>
8	 <p>Take care when working near overhead electricity lines.</p>
9	 <p>Danger of injury to the limbs, DO NOT APPROACH THE MACHINE IN ACTION. In the event of extraneous material (metal wire, ropes, etc.) becoming twisted round the rotor, stop the machine immediately.</p>
10	 <p>Ensure that the rotor shaft and the other parts of the machine are completely stopped before approaching.</p>

02-Tabella Pittogrammi (ISO)

DESCRIPTION OF THE DECALS	
11	 <p>Use the required personal protection equipment.</p>
12	 <p>Keep at a distance from: PTO transmission shaft; Do not perform any maintenance and/or inspection operations when the power takeoff is switched on.</p>
13	 <p>Risk of crushing and cutting the hands. Do not put your hands near the moving parts of the machine.</p>
14	 <p>Coupling point for lifting the machine. To lift the machine, attach hooks to the machine exclusively in the points indicated.</p>
15	 <p>Risk of falling of lifted parts of the machine. Do not stand below the machine or in its vicinity during the work phases.</p>
16	 <p>Do not, for any reason, get in between the tractor and the machine with the engine running and/or the power takeoff switched on.</p>
17	 <p>Ensure that the flails and the other parts of the machine are completely stopped before approaching.</p>
18	 <p>To handle the machine with a fork-lift truck, use only the points indicated.</p>
19	 <p>Grease points. Carry out routine maintenance every 8 working hours (see Chapter 7).</p>
20	 <p>Indicates the direction of rotation and the number of revolutions (540 rpm) of the tractor power takeoff.</p>

02-Tabella Pittogrammi (ISO)

DESCRIPTION OF THE DECALS	
21	 <p>Indicates the direction of rotation and the number of revolutions (1000 rpm) of the tractor power takeoff.</p>
22	 <p>Single decal with a series of warning labels described above.</p>
23	 <p>Single decal with a series of warning labels described above.</p>
24	 <p>The machine has been designed to be driven by one single operator. Never let children or other people up on top or operate the tractor or the machine.</p>
25	 <p>Risk of scalding. Keep a safe distance from all heated surfaces.</p>
26	 <p>Single decal with a series of warning labels described above.</p>
27	 <p>Single decal with a series of warning labels described above.</p>
28	 <p>Keep at a safe distance from the working radius of the machine.</p>
29	 <p>Single decal with a series of warning labels described above.</p>
30	 <p>Check for the tightening of screws every 24 hours.</p>

02-Tabella Pittogrammi (ISO)

2.9.1 Replacing safety decals

- ▶ Make sure that the area of application is clean and dry.
- ▶ Determine the exact position before you remove the protective paper from the decal.
- ▶ Remove a small portion of the protective paper from the adhesive decal.
- ▶ Align the decal over the specified area and carefully press the small exposed adhesive part.
- ▶ Remove the remaining part of the protective paper from the adhesive part and carefully press all over the decal until it sticks to the surface completely.
- ▶ The tiny blisters of air that may form and remain trapped beneath the surface of the decal can be eliminated by puncturing with a pin and then the decal can be flattened out by rubbing the previously removed protective paper backing over the decal surface.

3 TECHNICAL CHARACTERISTICS

3.1 *General description of the machine*

Trade name	Machine code
T250A right	SM25R
T320A right	SM32R
T320A left	SM32L
T320A reversible LH driving position	TR32R

The T model flail hedge mower, was designed, built and protected for use exclusively in the agricultural and road upkeeping sectors for cutting grass, reeds, bushes and shrubs with a diameter of up to 2 cm (1.18 inches) approx. During its design and construction, all necessary measures were taken to produce a high-quality, reliable product, fully compliant with the regulations in force and with particular regard to accident prevention.

The machines to which this manual refers are carried by the tractor by means of a three-point hitch and they act on the ground depending on their own weight and on the rotation of the flail rotor activated by the power take-off. These machines are composed of a structure in which the working part is formed by a rotor with a horizontal axis. Shaped flails which rotate at a faster speed than the moving speed are connected to this rotor.

The machines have a system for adjusting the working height, obtained by means of lateral runners and a rear roller. **The machine is not indicated for use in sectors other than agriculture and road upkeeping.**



The machine must be used by one operator. Any use other than that specified is considered unauthorised and dangerous (improper use).

3.1.1 *Proper and improper use of the machine*



FOR SAFETY REASONS IT IS STRICTLY FORBIDDEN TO USE THE MACHINE IN CONDITIONS OTHER THAN THOSE RECOMMENDED.

The materials used for construction were selected according to the specific use for which the machine was designed and manufactured. Improper use can cause damage to persons and/or property and can compromise satisfactory operation.

Respect for the use, repair and maintenance conditions described in this manual constitutes an essential element of the intended use of the machine.

The use of the machine for activities not envisaged during its design phase and not listed in this manual shall release the Manufacturer from all direct or indirect liability.

Any arbitrary modification to the machine shall release the Manufacturer from all liability for damage or injury, however serious it may be, to operators, third parties and/or property.

Correct use of the machine and scrupulous observance of the provisions contained in this manual and the thorough application of all precautions in order to prevent dangerous situations, accidents or injuries will extend the machine's working life, improve performance, and minimise malfunctioning.

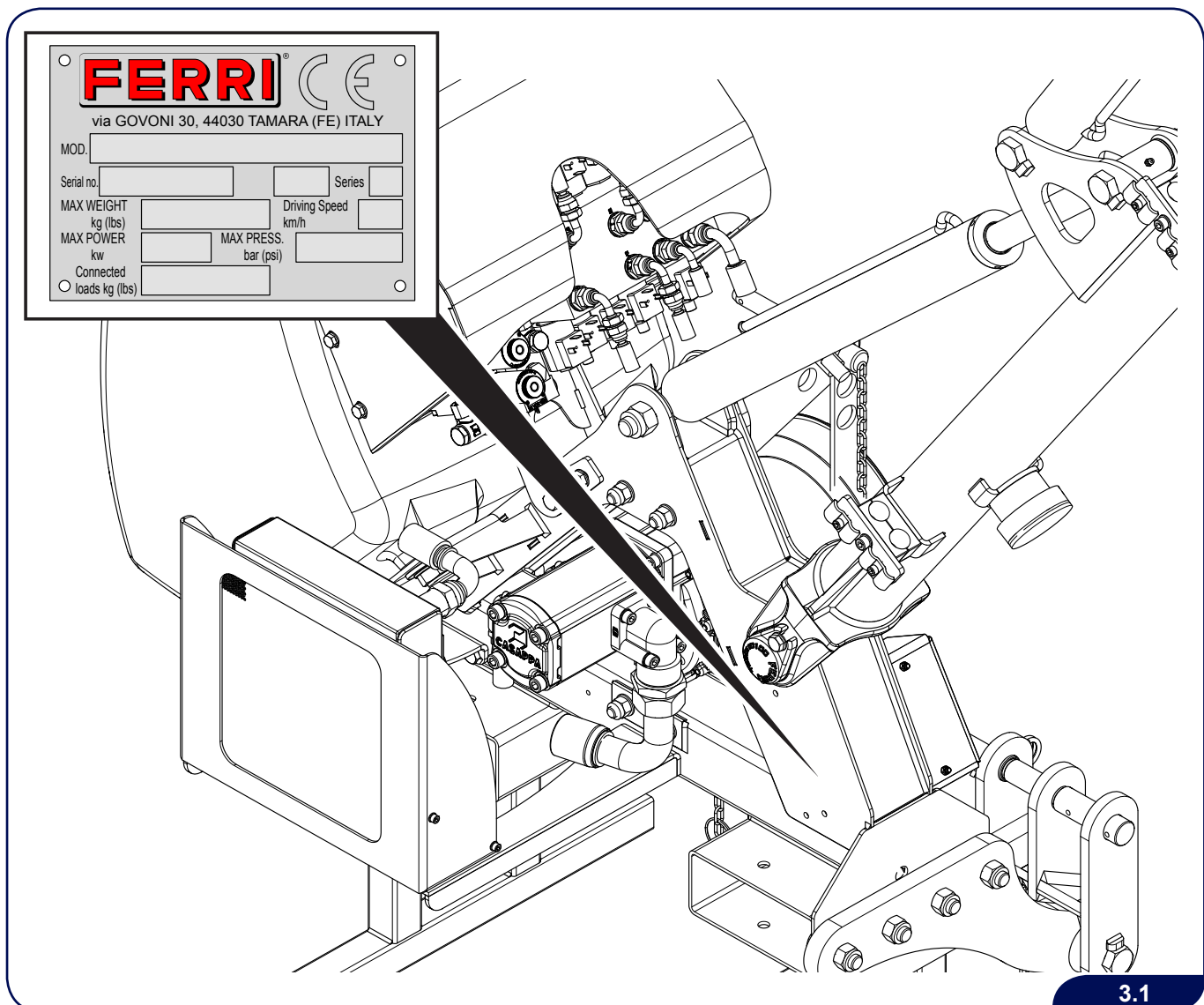


FERRI srl declines each and every objective liability deriving from failure to observe the regulations contained in this manual.

3.2 Machine identification

There is an identification plate attached to the machine frame, which includes the main technical data such as:

- 1) Data of the Manufacturer;
- 2) Series number;
- 3) Year of manufacture;
- 4) Weight of the machine;
- 5) Transmission power;
- 6) Maximum hydraulic pressure.



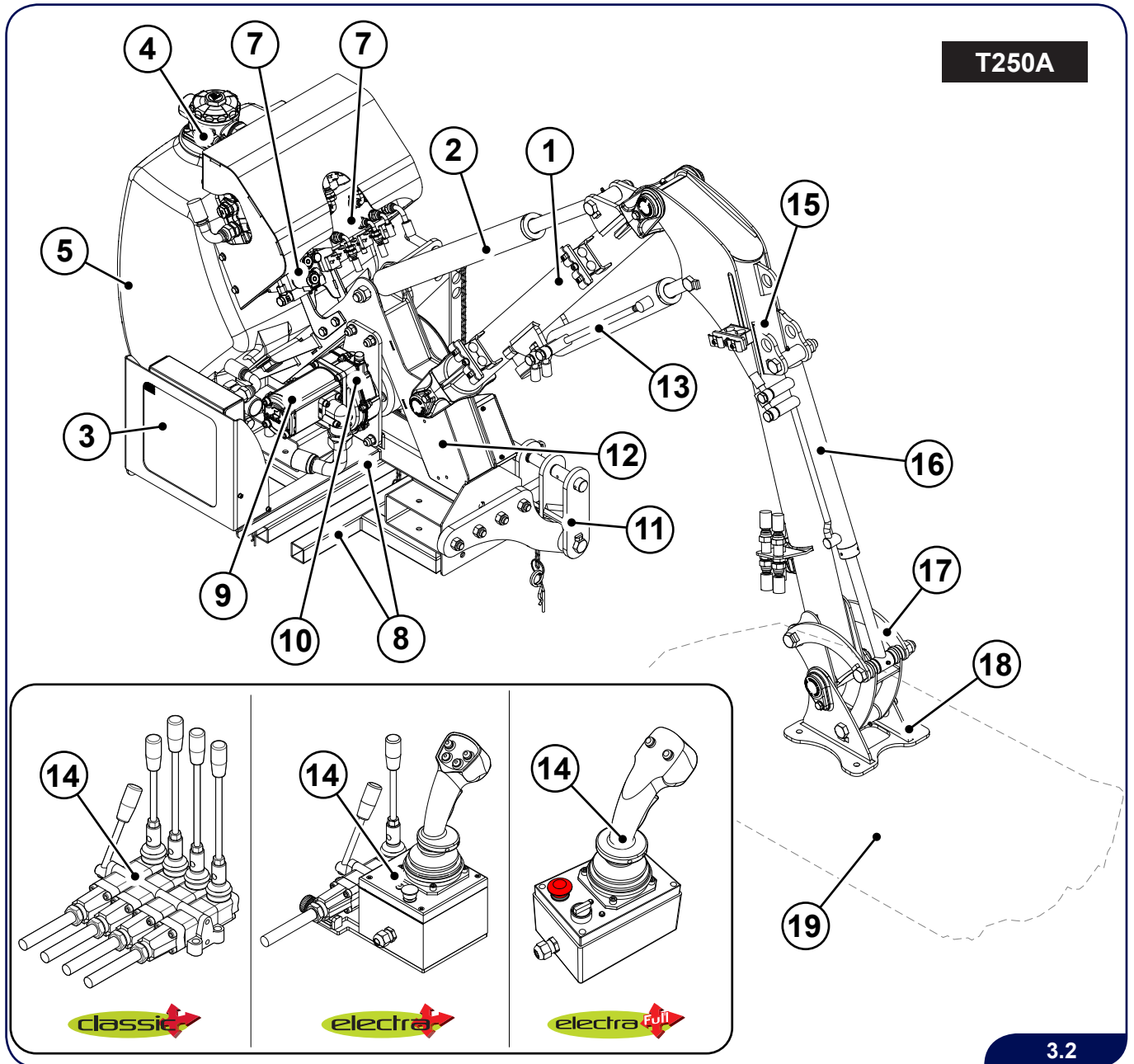
03-Posizione targhetta CE

3.1



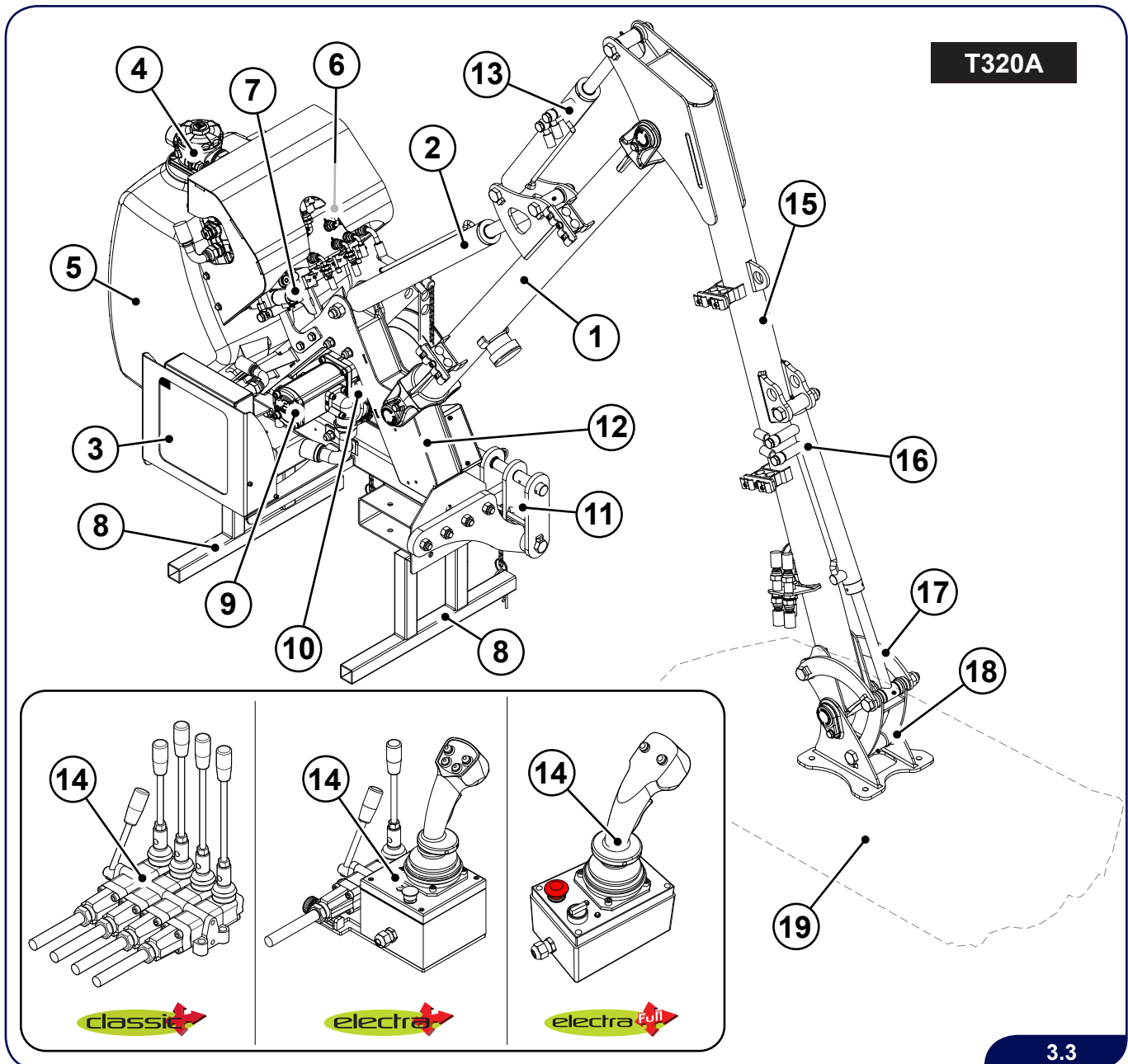
The data given on the identification plate are indispensable whenever asking for spare parts.

3.3 Description of the parts



03-Dati tecnici (T250A-T320A)

1	1 st boom	11	Tractor hitch
2	1 st boom jack	12	Frame
3	Heat exchanger (optional)	13	2 nd boom hydraulic jack
4	Oil filter	14	Control levers
5	Tank	15	2 nd boom
6	Hydraulic jack control valve	16	Flail head orientation hydraulic jack
7	Flail head control valve	17	Flail head orientation levers
8	Support foot	18	Flail head hitch
9	Pump unit	19	End tool
10	Gearbox		



1	1 st boom	11	Tractor hitch
2	1 st boom jack	12	Frame
3	Heat exchanger (optional)	13	2 nd boom hydraulic jack
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7	Flail head control valve	17	Flail head orientation levers
8	Support foot	18	Flail head hitch
9	Pump unit	19	End tool
10	Gearbox		

3.4 Technical specifications

TAB 1			
FLAIL HEDGE MOWER		T250A	T320A
Min. tractor power	HP(kW)	20 (14.7)	25 (18.4)
Max. tractor power	HP(kW)	35 (35.7)	40 (29.4)
Min. tractor weight	Kg(lbs)	700 (1543)	900 (1984)
Min. tractor width	m(ft)	1.00 (3.28)	1.20 (3.94)
PTO speed	RPM	540	
Electrical system voltage	Volt	12	
Max. absorbed power	HP(kW)	23.11 (17.23)	
Weight in standard version (with PP tank and TME)	Kg(lbs)	340 (749)	370 (816)
Weight in standard version (with FE tank and TME)	Kg(lbs)	358 (789)	388 (855)
Tractor hitch	cat.	I - II	
HYDRAULIC SYSTEM			
Total system capacity	l (gal.)	70 (18.49)	
Return filter	micron	30	
Hydraulic oil type		ISO-L-HM 68	
Max. boom system pressure	Bar (PSI)	190 (2756)	
Max. flail head system pressure	Bar (PSI)	160 (2321)	
Rotor power (540 rpm)	HP (kW)	19.66 (14.46)	

03-Dati tecnici (T250A-T320A)

3.5 Noise level

The noise level produced is checked on all the models of machines produced by FERRI.

The noise values indicated are emission levels and do not necessarily represent safe operational levels.

The relationship between emission levels and exposure levels cannot be reliably used to establish whether further precautions are required or not.

The factors which determine the exposure level to which the operator is subject include the duration of exposure, the characteristics of the work environment and other sources of noise (number of machines, nearby activities etc).

The permitted exposure levels can vary from one country to another.

The information provided allows the user of the machine to make the best possible evaluation of the danger and risk to which he/she is subject.

	Sound pressure (LPA)	Acoustic power (LWA)
Closed cab	74 - 75,2 dB(A)	103,2 dB(A)
Open cab	78 - 82,5 dB (A)	\

The tests were performed on a tractor (or self-propelled machine) selected by sample. The data may vary according to the application.



Use personal protection equipment (headphones) if the acoustic level exceeds 85 dB or if the machine is used on a tractor without a cab or with a cab with the windows open. Prolonged exposure can cause serious damage to hearing (noise level greater than 85 dB) or result in partial or permanent hearing loss (noise level greater than 90 dB).

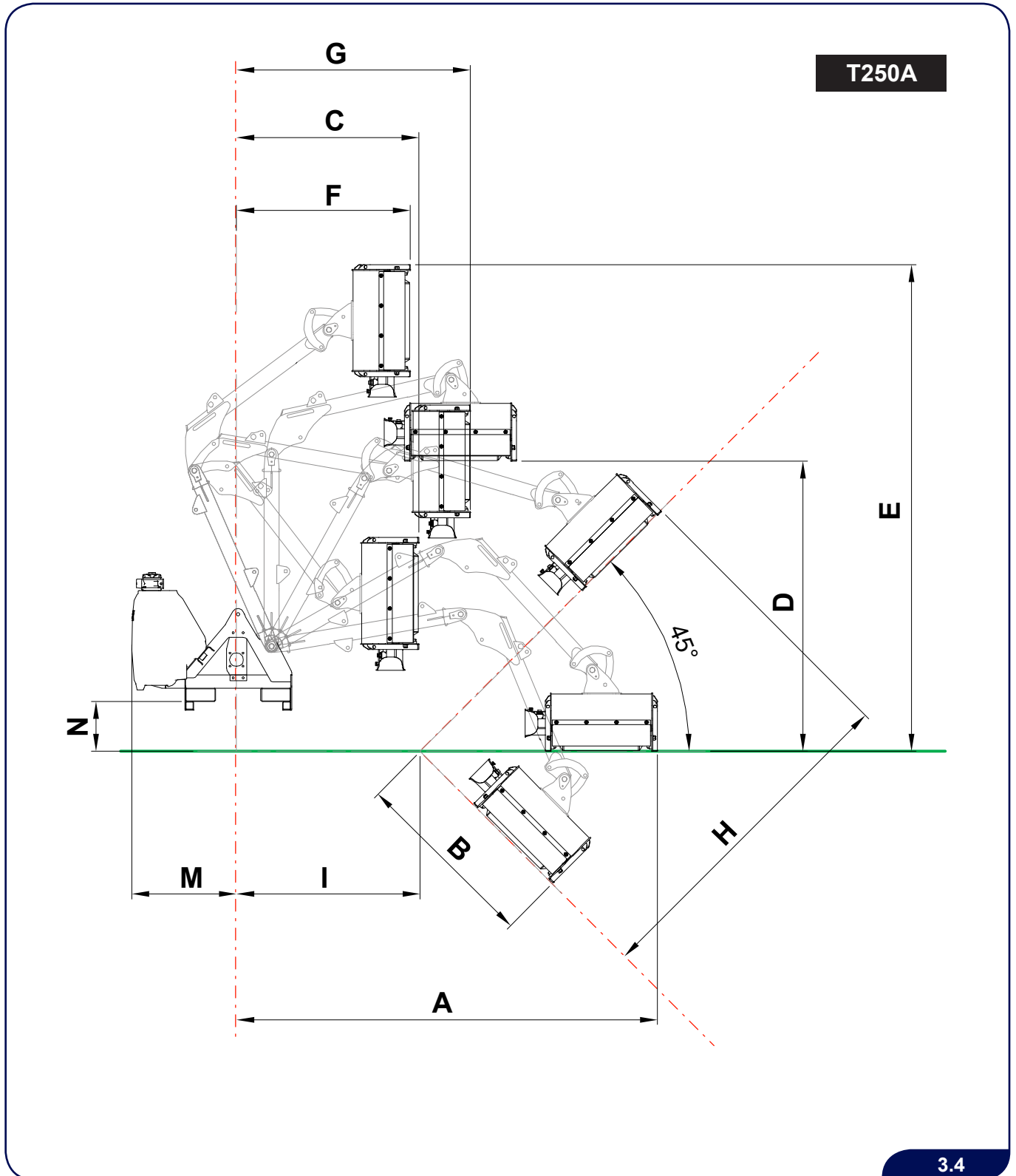


According to the data measured in the various positions examined, in the absence of a soundproofed cab, personal hearing protection equipment must be used.

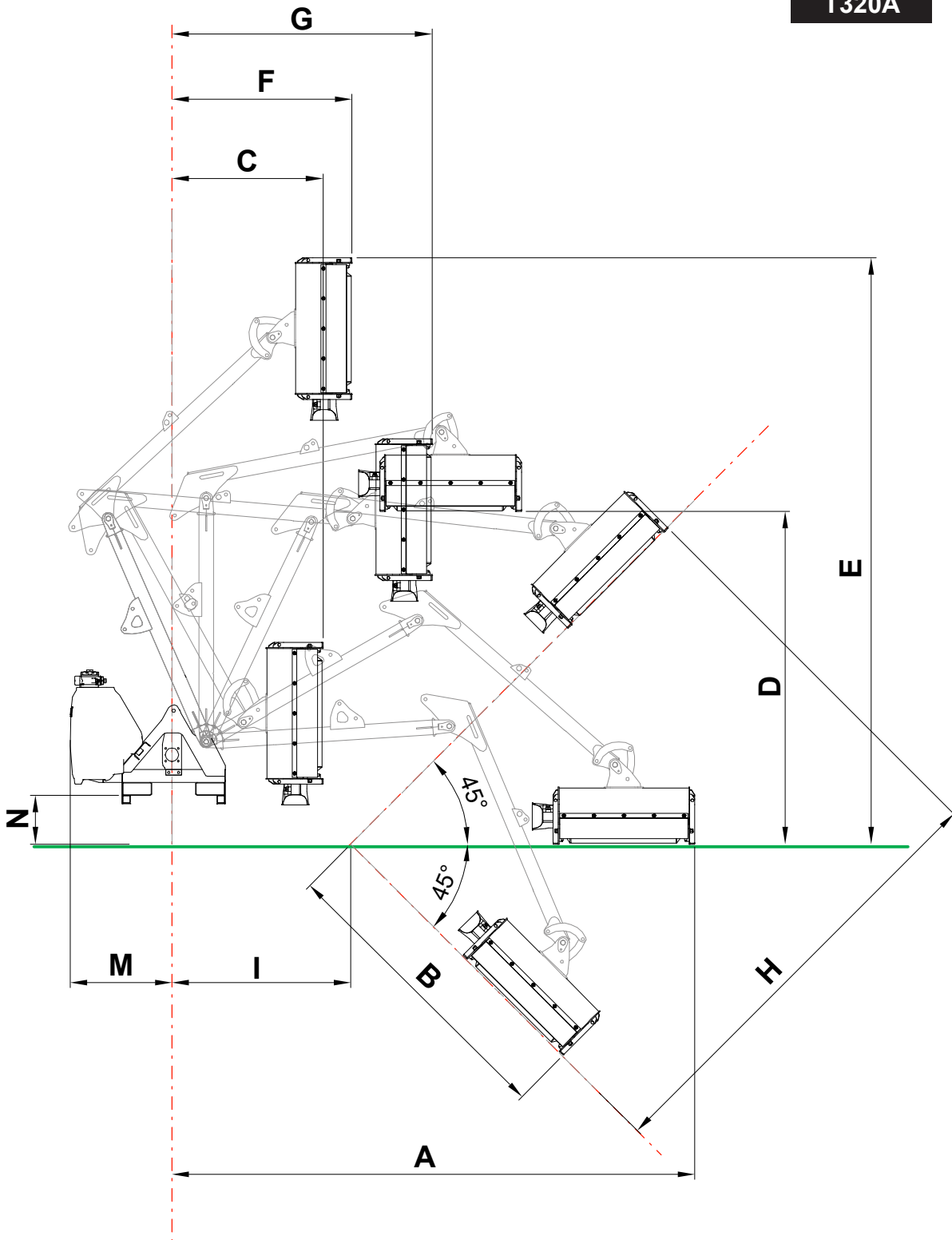
3.6 Radius of work

The data relating to the width of cut covered by the machine are provided below.
The measurements may vary depending on the flail head and its fastening position.

03-Raggio di lavoro (T250-T320)



T320A



03-Raggio di lavoro (T250-T320)

3.5

TAB 2		T250A	T320A
		TME60	TME80
A	m	2,52	3,22
	ft	8' 3"	10' 7"
B	m	1,12	1,84
	ft	3' 8"	6' 1"
C	m	1,09	0,93
	ft	3' 7"	2' 11"
D	m	1,74	2,05
	ft	5' 9"	6' 2"
E	m	2,91	3,61
	ft	9' 7"	11' 11"
F	m	1,04	1,10
	ft	3' 5"	3' 4"
G	m	1,40	1,60
	ft	4' 7"	5' 5"
H	m	2,04	2,76
	ft	6' 8"	9' 1"
I	m	1,10	1,10
	ft	3' 7"	3' 7"
M	m	0,62	0,62
	ft	2' 0"	2' 0"
N	m	0,30	0,30
	ft	0' 11"	0' 11"

3.7 End tools

The term 'end tools' is applied to all those machines that can be combined to the flail hedge mower and that usually come with their own Use and maintenance manual that contain all the information (technical data, type of flails, etc.) necessary for the correct use of the tool itself.

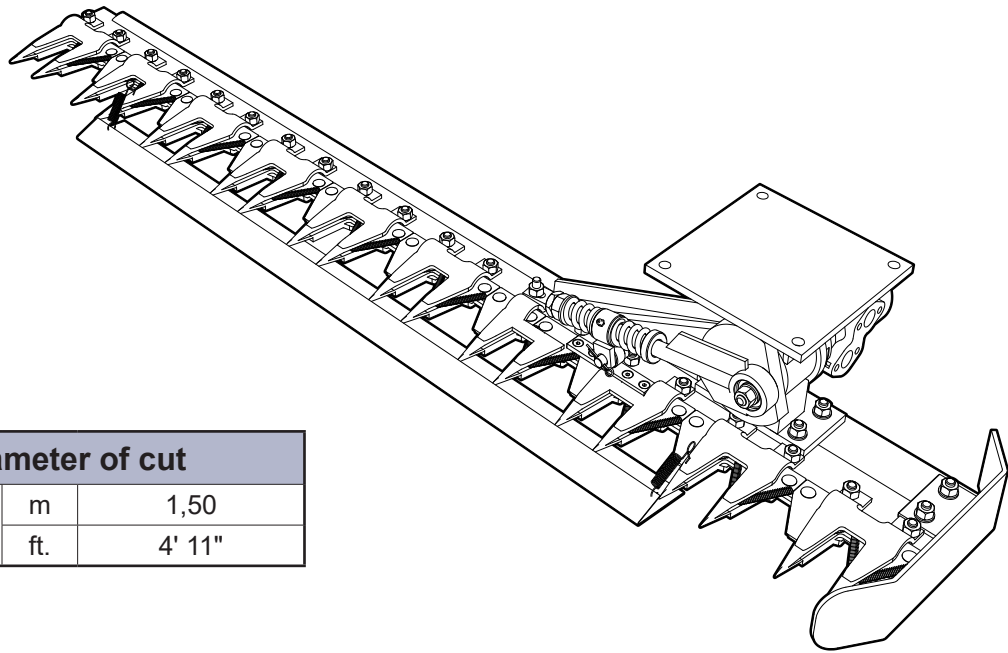
3.7.1 Flail heads

For combining the flail heads with the flail hedge mower, consult TAB.3.

TAB 3	FLAIL HEAD MODEL
T250A	TME60
T320A	TME80

3.7.2 Cutter bar

Cutter bar mod. **CSP150** to cut hedges and reed bed up to a maximum cutting diameter of 1 cm (0,39 in.) (proper use). In combination with this tool the dual effect kit is also provided(see Chapter 12) to allow a better control for arm positioning.



Diameter of cut		
CSP150	m	1,50
	ft.	4' 11"

03-Attrezzature terminali (Cimatrice) CSP150

3.6

3.8 *Optional equipment*

3.8.1 *Flails*

Depending on the different material to be cut, the most appropriate flails may be used.
For more information, consult the Use and maintenance manual of the respective tool (flail head, other tool, etc.).



If irregularities or strange noises are noticed after changing the flails, contact the manufacturer.

4 INSTALLATION AND HANDLING



Always wear safety footwear, overalls, safety gloves and, if necessary, earmuffs and a dust mask during use and during machine maintenance, repair, handling and storage operations.

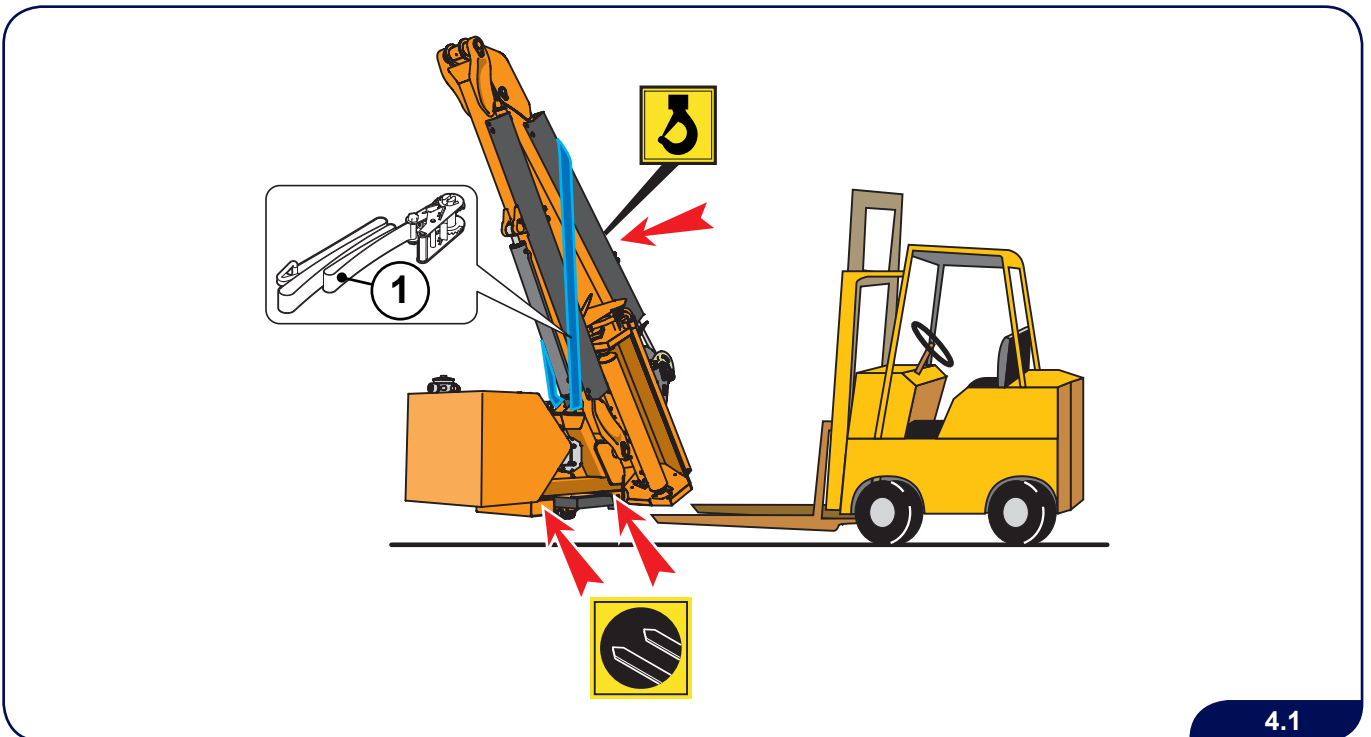
4.1 Lifting



To lift the machine, use safety hooks and cables with a suitable lifting capacity, to be inserted only in the points indicated for lifting, identified by the decals applied on the machine.

The machine may be placed on a wooden board and suitably anchored to it.
 The subsequent handling of the machine must be carried out exclusively by means of a fork-lift truck.
 The handling operation must be carried out by qualified and trained personnel (sling operators, fork-lift operators, etc.).

04-Sollevamento



4.1

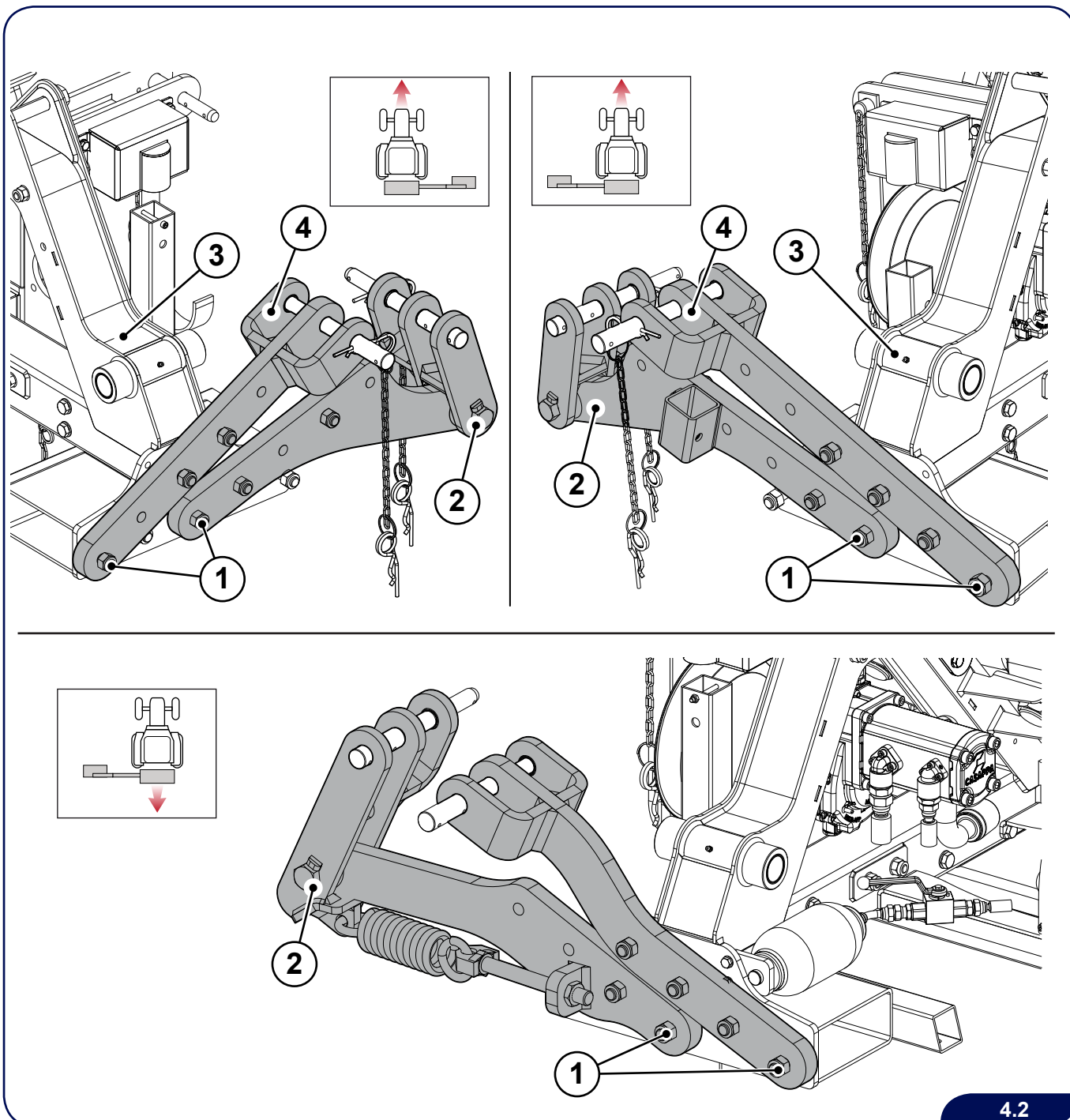


Lifting is a delicate manoeuvre, always carried out at the user's risk.

4.2 Removing the packaging

The mechanical guard is mounted in the non-operating position.
For correct assembly, proceed as follows:

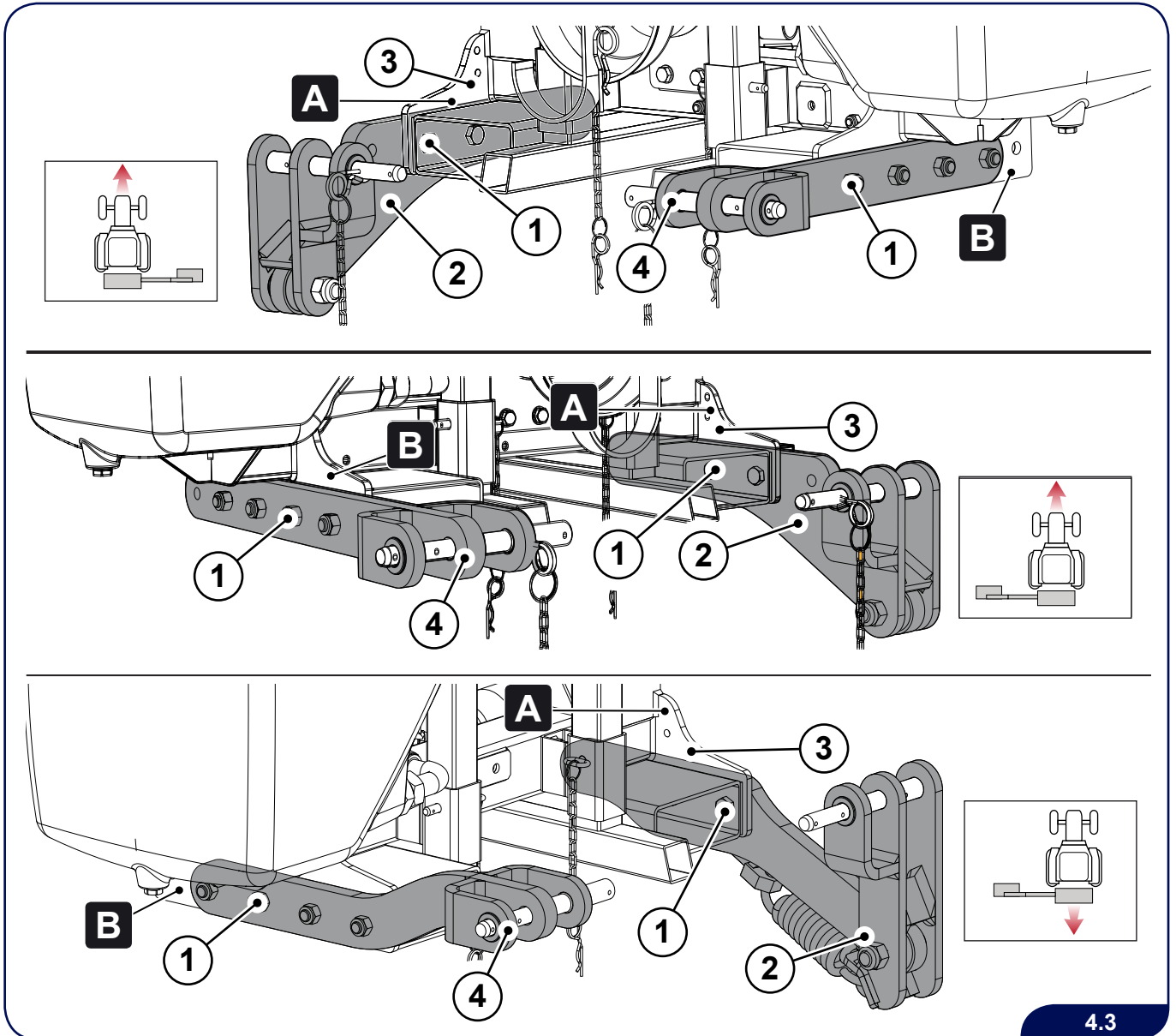
- Unscrew the screws (1);



04-Rimozione imballo (T380D-T430D+ Retroversa)

- ▶ Fit the bracket (2) in the **A** position, aligning the holes with the ones of the frame (3);
- ▶ Fit the bracket (4) in the **B** position, aligning the holes with the ones of the frame (3);
- ▶ Screw the screws (1).

04-Rimozione imballo (T380D-T430D+ Retroversa)



4.3

4.3 Tractor hitch



Prior to coupling the machine to the tractor, make sure that:

- A) All the controls have been disabled;
- B) The tractor engine has been switched off;
- C) The parking brake has been applied;
- D) The ignition key has been removed from the dashboard;
- E) All moving parts have come to a complete stop.

Illuminate the work areas whenever visibility is scarce.

During coupling operations keep all unauthorised people at least 5 metres away from the coupling point.



Position the tractor on a level compact area to avoid lateral loading of the machine on the tie rods.

- ▶ Before connecting the machine to the three-point hitch on the tractor, position the safety device of the lifting boom in order to avoid involuntary and/or accidental lifting or lowering.
- ▶ The three-point hitch on the tractor and the machine must coincide. If they do not, adapt them accordingly.

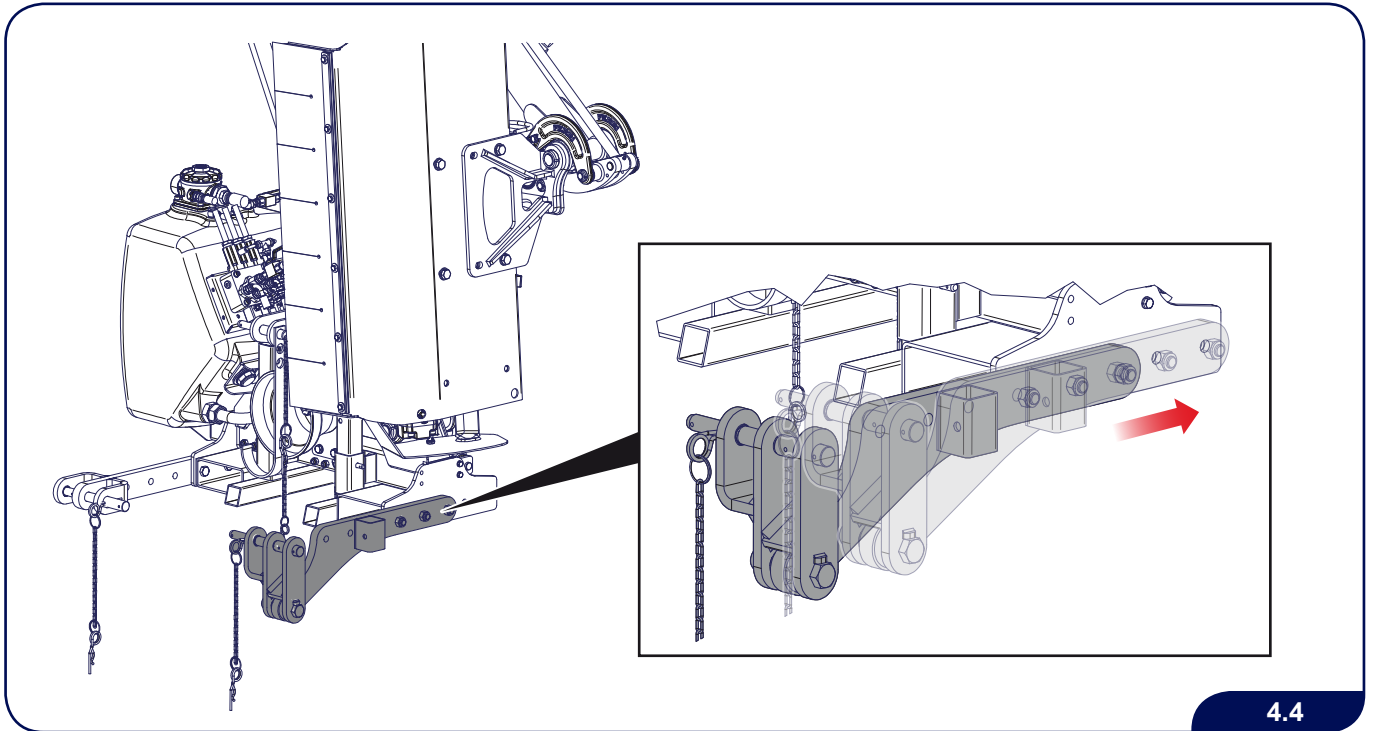


In the tractor lifting boom tie rod area there is a risk of injury due to the presence of points where crushing and cutting can occur.
Do not use the external control for lifting the machine.



During coupling phases do not allow anybody to remain between the tractor and the tool.

To eliminate possible interferences between the shredding flail head and the rear tractor wheel, in transport position, it is possible to move the machine backwards by 90/180mm moving the clamping device of the handlebar hitches by one/two position(s).



04-Attacco alla trattrice (T380D-T430D)

4.4

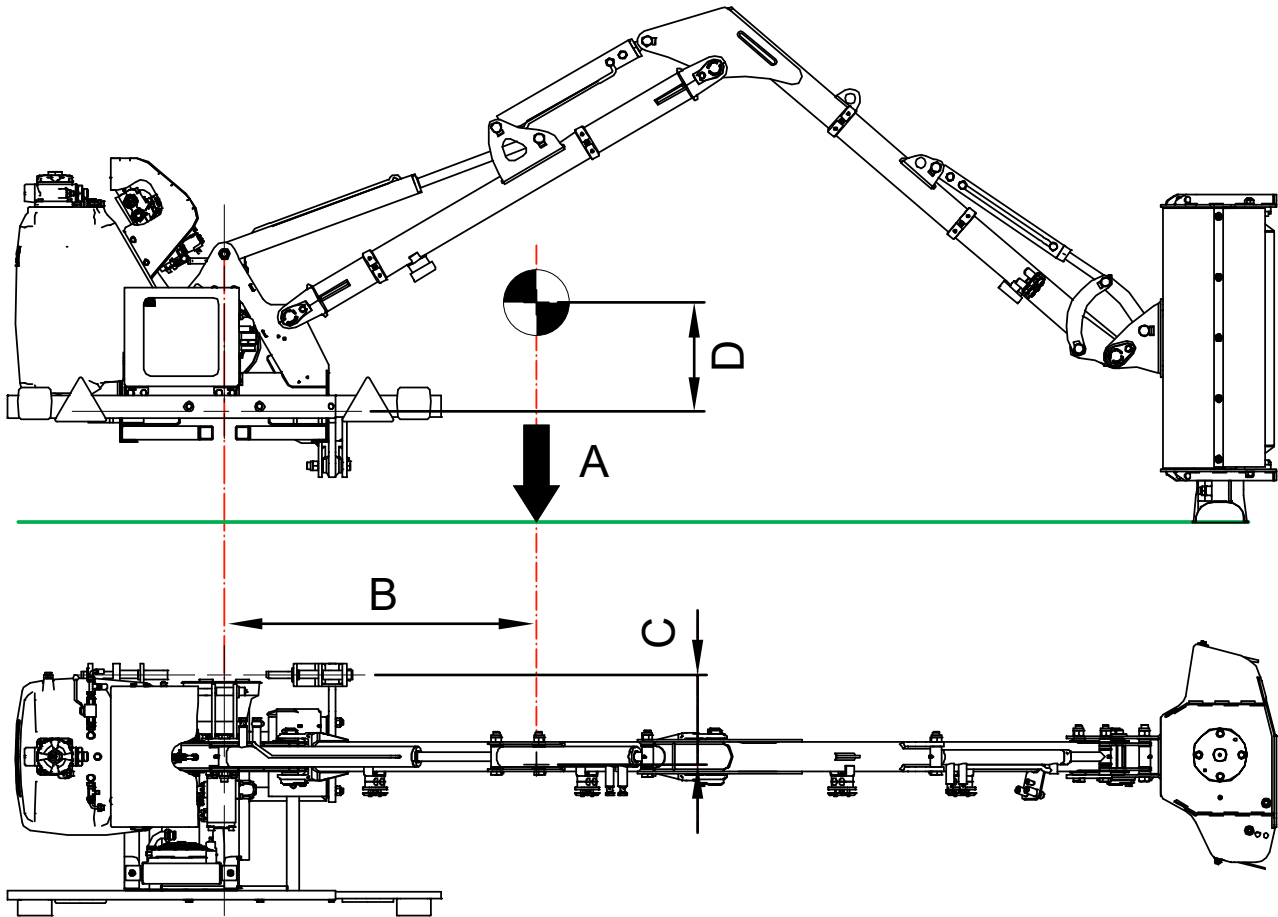


CAUTION

Always fasten the handlebar hitches using at least 3 bolts.
 If the interference persists, in transport position, it is possible to turn the shredding flail head with the flails facing outwards. The flails must be covered with a protective cover.

4.3.1 Position of the centre of gravity

Before mounting the machine on the tractor, make sure that the tilting moments have compatible features. The figure indicates the weight and position of the centre of gravity, with the arm at its maximum extension, in relation to the tractor centre line.

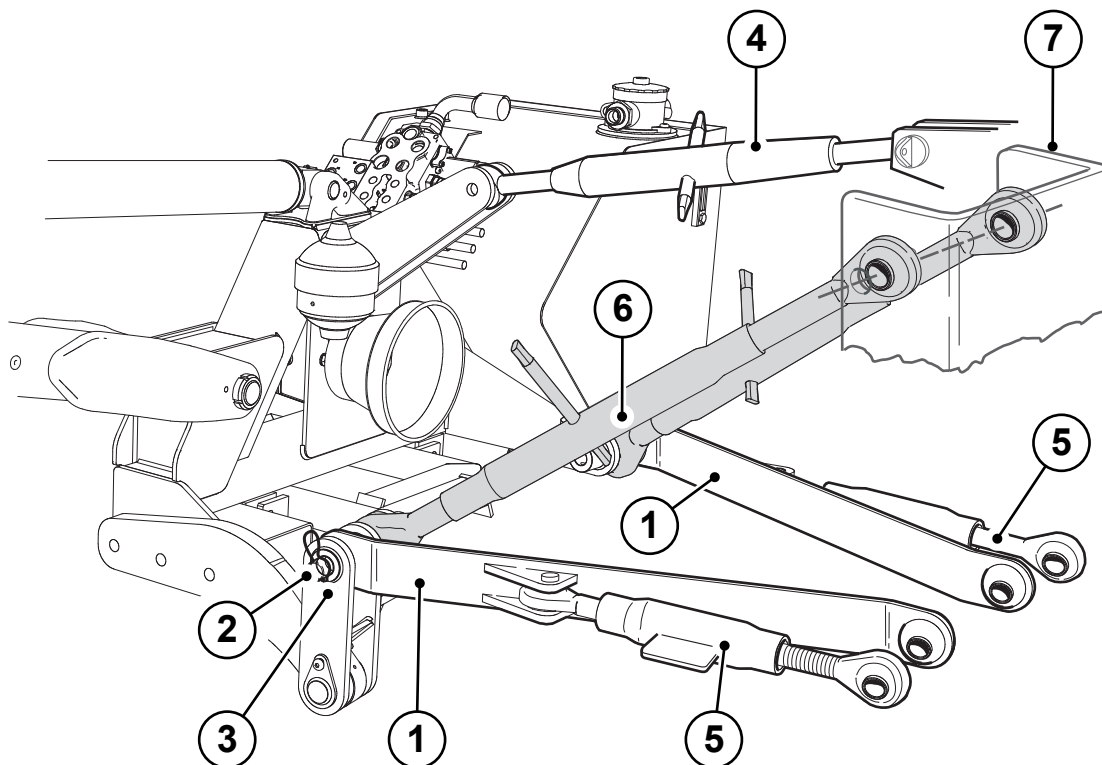


TAB 4		T250A	T320A
A	Kg	350	380
	lbs	772	838
B	m	0,65	0,95
	ft	2' 2"	3' 1"
C	m	0,27	0,27
	ft	0' 10"	0' 10"
D	m	0,29	0,33
	ft	0' 11"	1' 1"

04-Posizione baricentro

4.3.2 Attaching Without a Quick Hitch

- 1) Bring the 2 arms of the tractor hydraulic lifting device (1) closer to the machine near the attachment with the pins.
- 2) Insert the pins (2) with the respective elastic safety split pins (3).
- 3) Insert the third point stabiliser (4) and raise the machine. Align the power takeoff with the tractor PTO. Adjust the stabiliser (4) to bring the tank parallel to the ground.
- 4) When the shredding flail head is applied, check to make sure that it rests parallel with the ground. If it does not, adjust the correct positioning using the third point stabiliser (4).
- 5) Tighten the 2 arms of the lifting device by using the respective stabilisers (5) and set the machine in central position.
- 6) Tighten the stabilisers (6) to the tractor coupling plate (7).
- 7) Adapt the stabilisers (6) as follows:
 - ▶ Extend the stabiliser on the tank side and contract the stabiliser on the side opposite the tank;
 - ▶ After tensioning, lock the stabilisers in place using the appropriate lock nut.
- 8) Close again the stabiliser support feet.
- 9) Proceed in reverse order to detach the machine from the tractor.



4.3.3 Attaching Without a Quick Hitch

- 1) Approach with the tractor perpendicular to the machine with the lifting arms lowered, making sure that there is nobody between the tractor and the machine;
- 2) Bring the couplings of the lifting device into axis with the lifting pins;
- 3) Slowly raise the lifting device until automatic connection occurs;
- 4) Check that it is closed correctly;
- 5) Insert the safety pins;
- 6) Proceed in reverse order to detach the machine from the tractor.



CAUTION

Insert the safety pins into the pin hole and make sure that they are locked in place. Also lock the third point coupling anti-unscrew device.



CAUTION

Never use the tractor hydraulic lift when the stabilisers are mounted.

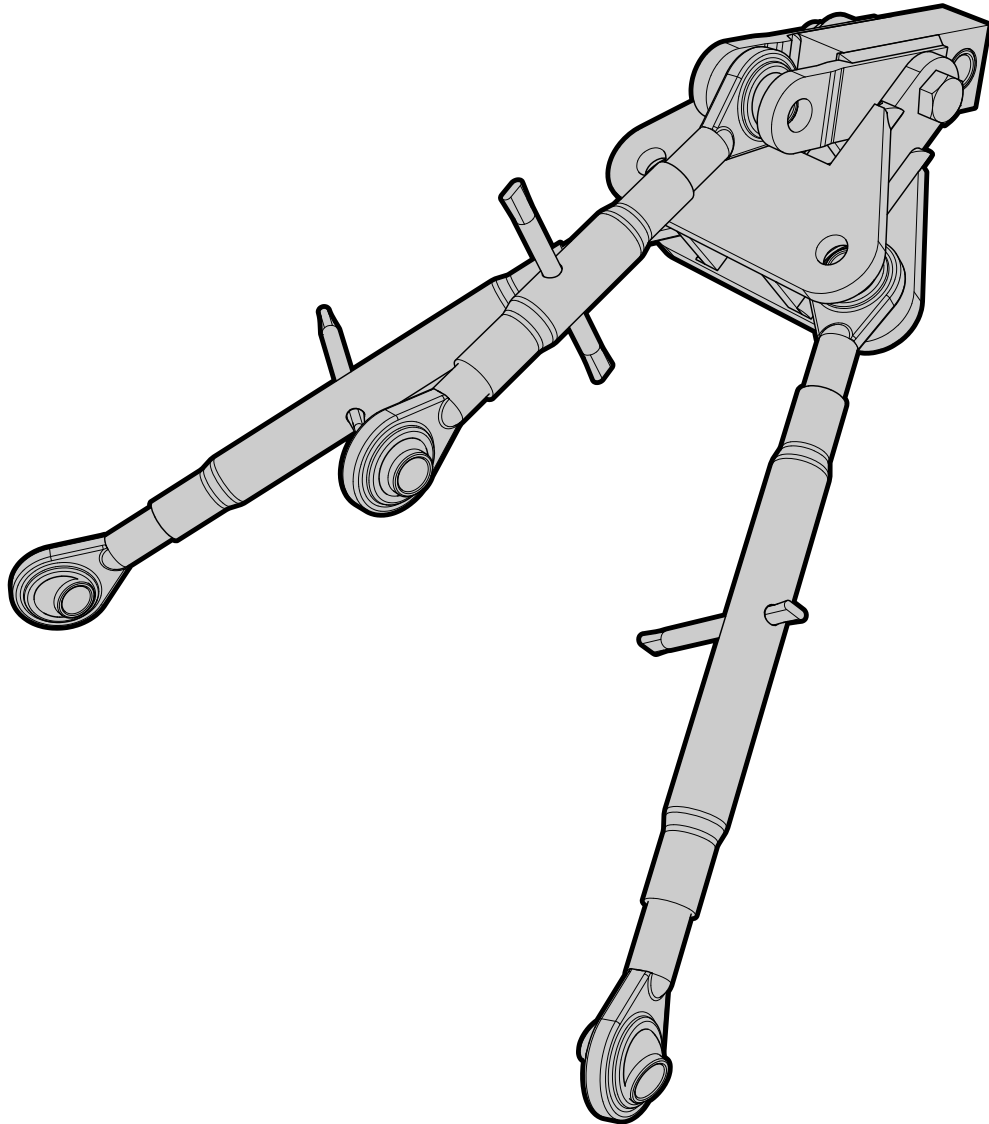


CAUTION

For more information, contact FERRI post-sales service.

4.3.4 DELTA coupling

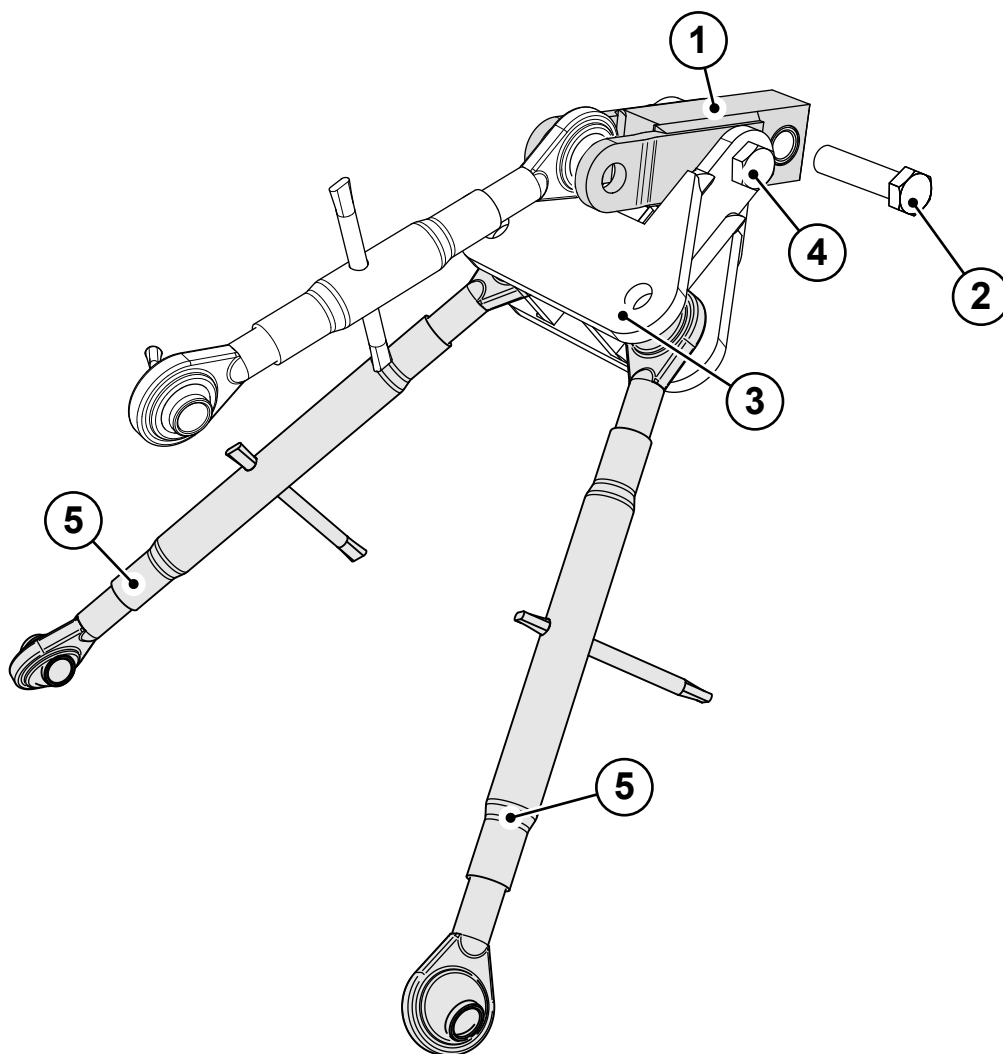
Upon request, the company FERRI provides a kit called "DELTA coupling", which allows the stabilisers to be coupled without any adaptation by the Customer.



04-Attacco DELTA

4.7

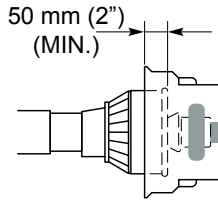
- 1) Connect part (1) to the third point connection on the tractor and fix it using pin (2) supplied, so that it remains parallel to the ground or sloping slightly upwards.
- 2) Fix part (3) to component (1) using pin (4).
- 3) Prepare the right size stabilisers (5) and fix them first to the delta coupling and then to the anchoring points on the frame.
- 4) After preparing the size of the third point stabiliser, fix it to the delta coupling and to the third point of the flail hedge mower frame so that the machine frame is parallel to the ground.



4.4 Fitting the PTO shaft

Before using the PTO shaft, carefully read the use and maintenance manual.

PTO SHAFT SPECIFICATIONS	
No. Splines	6
Fitting	1" 3/8



If the PTO shaft supplied with the machine is not being used, check that the cowlings of the machine and of the tractor are overlapped on the protection of the PTO shaft at least by the amount contemplated by the safety regulations in force (50 mm/1.97 in).



Do not exceed a PTO shaft angle of 15°, since operating at more than 15° will reduce the PTO shaft life by 75% and will invalidate the warranty.
If it is necessary to work with greater inclination angles, use PTO shafts with a double homokinetic joint.
If the same equipment is used on different tractors (with and without Quick-Hitch), you must use different drivelines.
A Quick-Hitch will change the distance between coupling-tractor and coupling-equipment. Check the distance between the two couplers.

Use only PTO transmission shafts with unbroken protections.
 The length of the PTO shaft must be suited to the type of tractor used.
 When the PTO shaft is detached from the tractor power takeoff, it must ALWAYS be placed on the support provided.



For correct and safe operation of the machine, use exclusively PTO shafts bearing the CE mark.



Check the direction of rotation and the number of revs of the tractor p.t.o. before fitting the PTO shaft.



Before getting off the tractor and before every operation, always engage the parking brake and disengage the PTO. Turn off the engine and remove the ignition key from the dashboard.

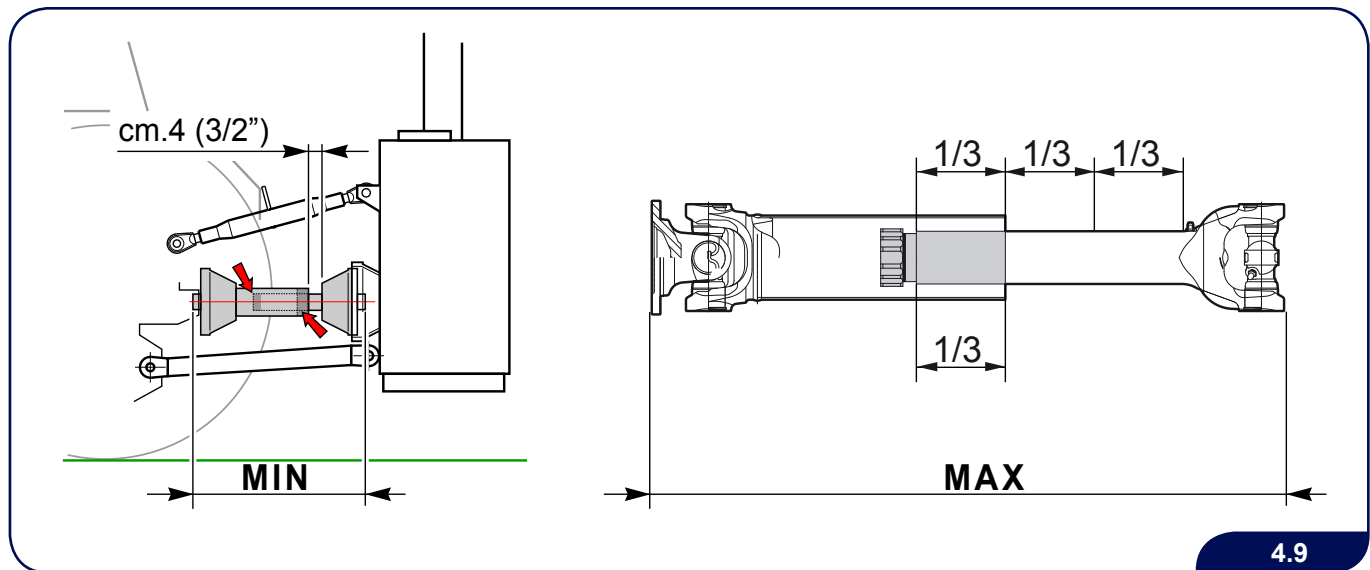


Absolutely avoid going beyond the PTO shaft area (when PTO shaft is at a standstill or when it is moving).

04-Montaggio albero cardanico

Whenever the machine is being coupled to a tractor for the first time, you must observe the following instructions:

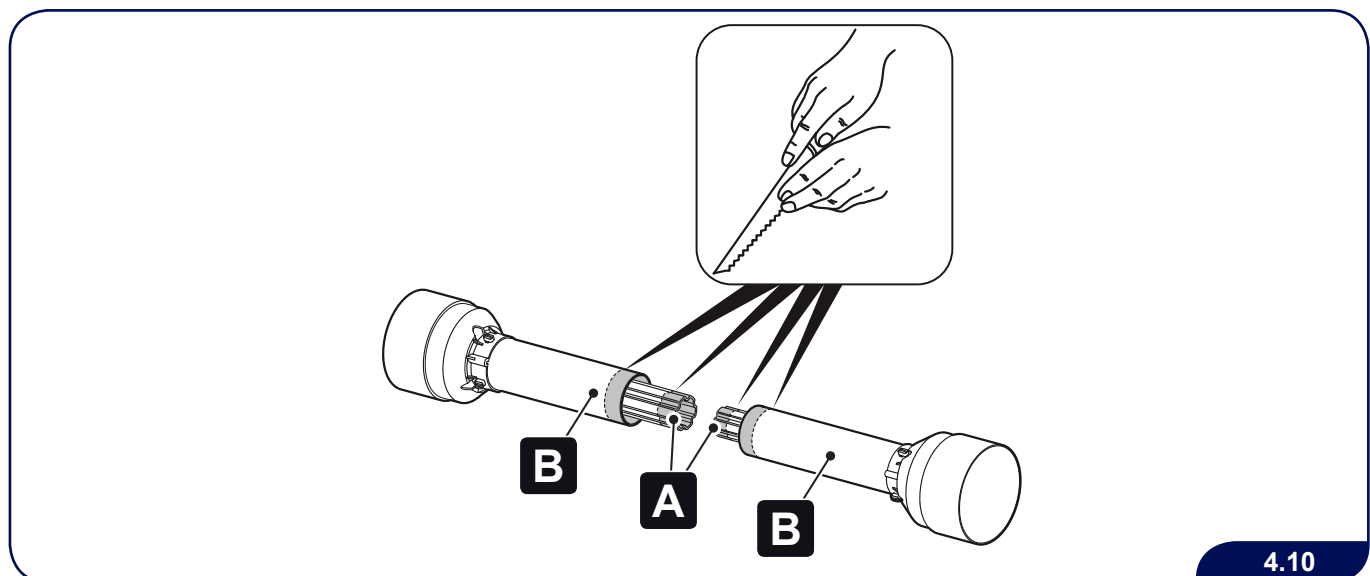
- ▶ In the condition of maximum steering, the PTO shaft must not be completely closed in order to avoid damage to the gearbox. If the PTO shaft is too long, shorten it as described in this paragraph.
- ▶ Make sure that the towing eyelet is positioned at the most appropriate height for coupling to the tractor. Otherwise, adjust the height of the eyelet as required.
- ▶ Transport the PTO shaft in a horizontal position in order to prevent potential disengagement from causing accidents or damaging the protections.
- ▶ Clean and lubricate the power takeoff and the gearbox coupling.
- ▶ Lubricate the PTO shaft if necessary. Follow the indications supplied by the PTO manufacturer (see PTO Use and Maintenance Manual).
- ▶ Using the tractor hydraulic lifting device, position the machine at the closest point between the respective power takeoffs and check the length of the PTO shaft. The semi-shafts of the PTO shaft must be overlapped by at least $\frac{1}{3}$ of their length in the maximum pulled-out position, and they must have a free span of at least 4 cm (1.57 in) in the maximum pushed-in position.



4.9

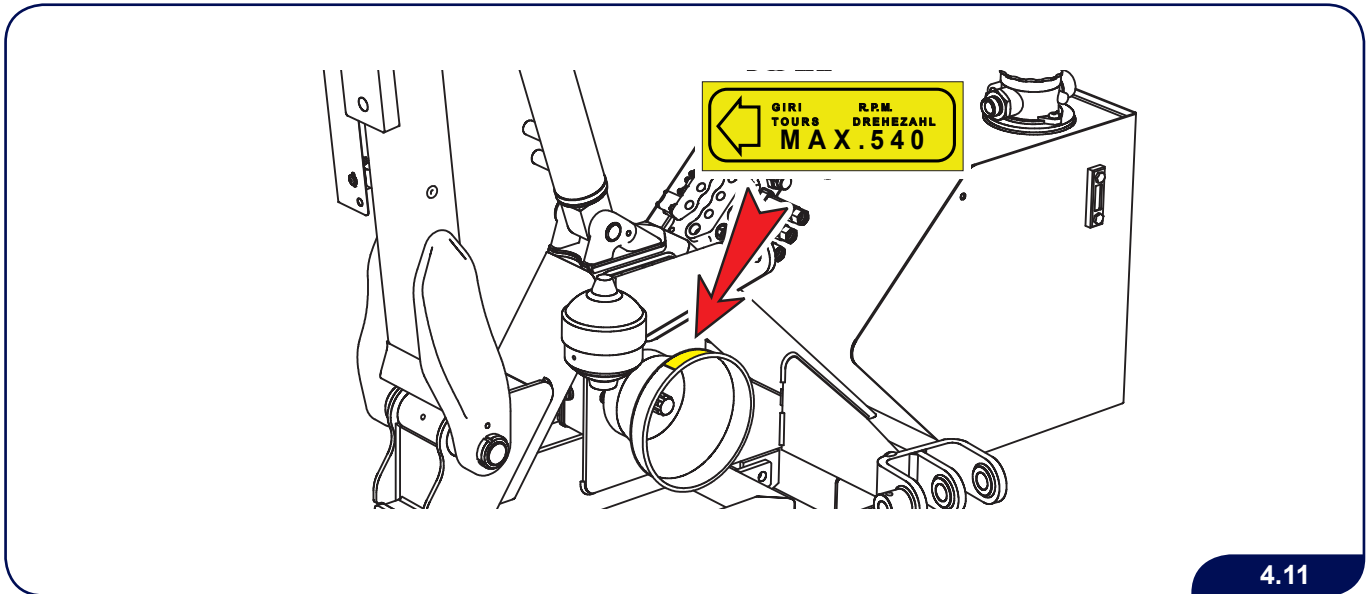
04-Montaggio albero cardanico

- ▶ Check that the length of overlap between the shaped pipes is not less than $\frac{2}{3}$ of the stroke with the PTO shaft closed. Otherwise, cut the excess part of both the telescopic pipes (A) and the guards (B). **Cut both sides the same length.**



4.10

- ▶ Fit the PTO shaft onto the machine gearbox assembly. Respect the assembly direction required by the Manufacturer and indicated on the outer covering of the protection and on the tractor power takeoff.


4.11

CAUTION

Always connect the PTO shaft last of all to the tractor PTO, and disconnect it first of all at the end of work.

- ▶ Fasten the protections of the PTO shaft with chains to the machine and to the tractor to prevent their rotation.
- ▶ Ensure that the anti-removal safety block (button) is correctly inserted and blocked in its housing.
- ▶ The overlap between cowling and PTO shaft must not be less than 5 cm (1.97 in).
- ▶ To connect the machine to the tractor PTO using the PTO shaft, pull the coupling collar back and align the splines with those of the PTO coupling.
- ▶ Push the coupling inside that of the PTO and release the locking collar. Move the coupling until it is inserted as well as possible to the PTO shaft.
- ▶ Push and pull the PTO shaft back and forth to ensure a secure attachment.
- ▶ Check that the PTO shaft slides easily and that the couplings rotate freely.


CAUTION

If the PTO shaft does not slide easily, pull it apart and clean the splines and re-insert it. Be sure the couplings are phased and the splines are in good condition. If the shaft does not slide freely and the couplings are not aligned, do not force the shaft as this will cause irreparable damage.

- ▶ Connect the PTO shaft to the tractor, retracting the safety pin. Make sure that the pin returns to the safety position in order to have the coupling assembled correctly. Be sure the coupling is locked in position.
- ▶ Always stop the power takeoff when lifting the tool or when the manoeuvring angles are too large.

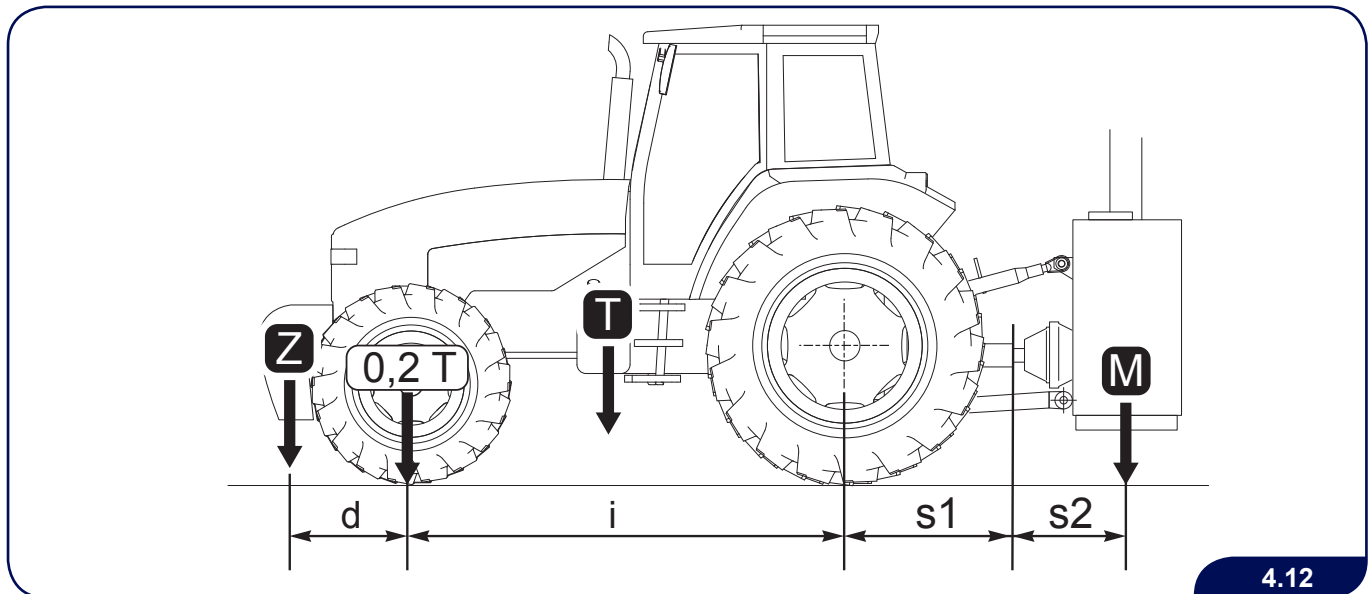

CAUTION

FERRI declines all responsibility for damage caused by incorrect assembly and use of the PTO transmission.

4.5 Tractor stability

Check the lifting capacity and the longitudinal stability of the tractor by means of the following formula. Add ballast at the front if necessary.

To determine the total weight of the machine, add up the weight of all the components (see Chapter 3).



4.12

$$M \times (s1+s2) \leq 0.2 T \times i + Z(d+i)$$

$$M \leq 0.3 T$$

i	=	tractor wheel base
d	=	distance of front axle from ballast
s1	=	overhang of the rear axle of the machine coupling points
s2	=	height of the machine coupling points from the centre of gravity
T	=	mass of the tractor + 75 kg (operator)
Z	=	mass of ballast
M	=	mass of the fully loaded machine



WARNING

The front axle of the tractor is lightened according to the weight attached at the time of coupling to the shredder. **THE LOAD ON THE FRONT AXLE MUST BE AT LEAST 20% of the total mass tractor/equipment ready to be used.**

Check the lifting capacity and the stability of the tractor to avoid its tipping and/or losing the grip of the steering wheels.

Lift the machine completely and check that the tractor does not pitch.

When the machine is at its maximum extension, check the stability of the tractor: open the arms slowly and keep the shredding flail head as close as possible to the ground. If necessary, ballast the tractor rear wheel opposite the extended arms.



CAUTION

Do not work with the arms extended while the tractor is sitting on sloping ground. During transport, move the machine into the central position.

4.6 Electrical connections



All machines with electrically/electro-hydraulically controlled distributors (low pressure) and/or heat exchanger, are equipped with electric cables whose wires are coloured as per current laws in force.

Also, to prevent the inversion of polarity near the terminals, the wires are tagged with plastic rings bearing the symbols (+) and (-).

Symbol	Colour	Polarity	Heat exchanger wire thickness	Control box wire thickness
◻	blue	+	2x6 mm ²	2x2.5 mm ²
◻	brown	-		



When making the connections it is vitally important to make sure of the following:

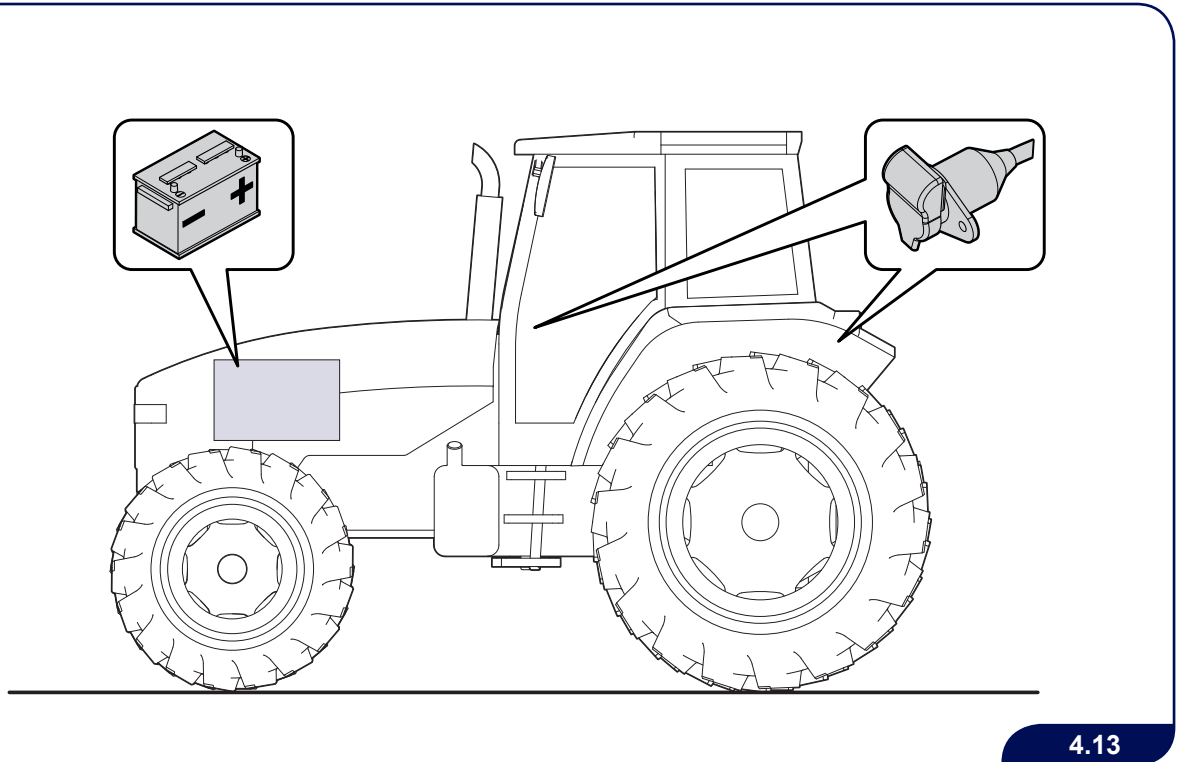
- 1) **DO NOT INVERT THE POLARITY**
- 2) **DO NOT ALTER THE WIRE THICKNESS**
- 3) **CHECK THAT THE VOLTAGE IS 12 V**

Once the connections have been made, before supplying voltage to the electrical system make sure that:

- ▶ the connections have been made as shown in the figures
- ▶ the battery terminals are securely tightened
- ▶ there are no bare wires

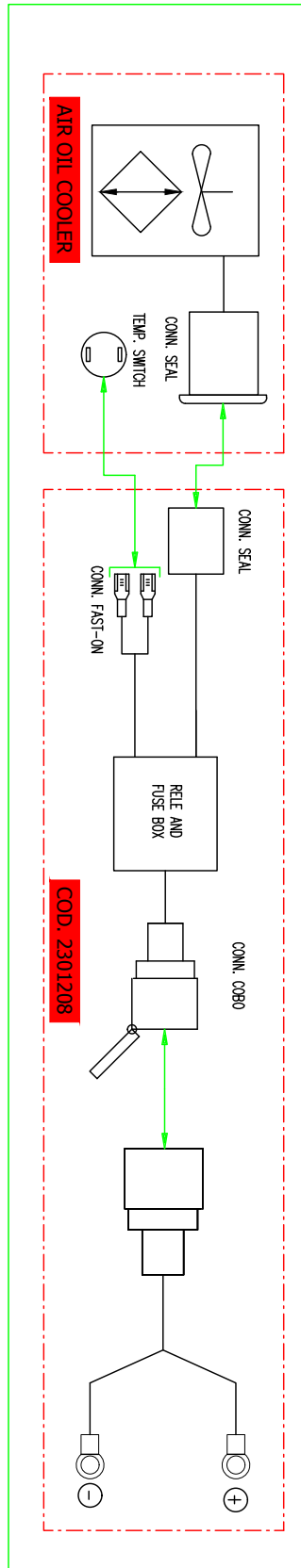


When washing the machine, never spray water directly onto the electric boxes.



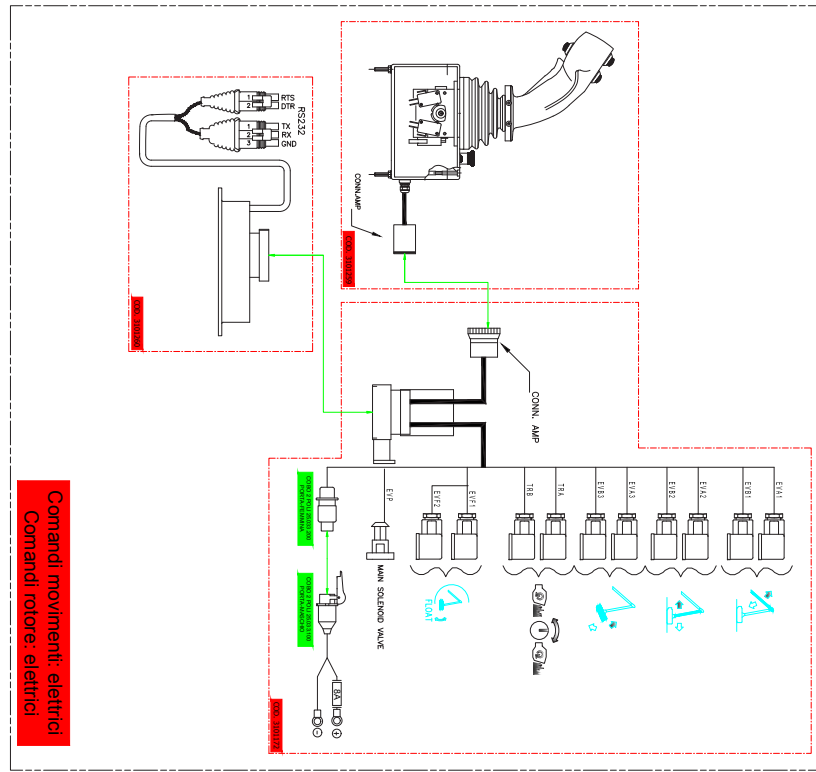
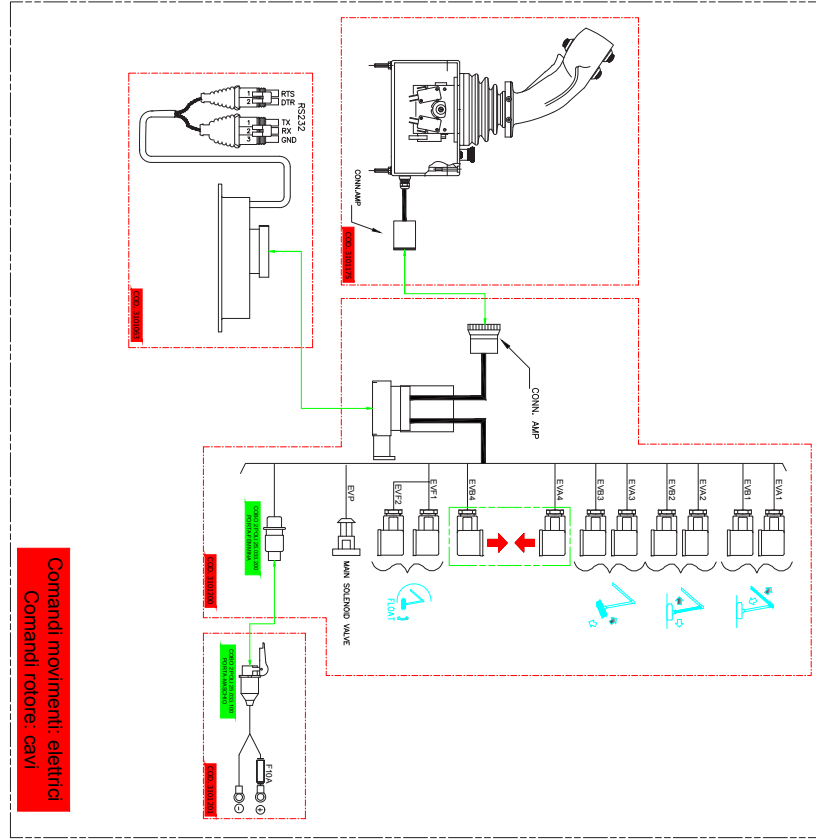
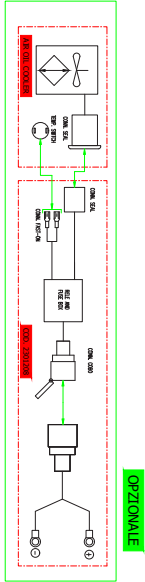
4.13

04-Collegamento Elettrico (TSP)



OPZIONALE

04-Collegamento Elettrico (TSP)



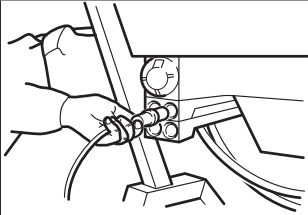
04-Collegamento Elettrico (TSP)

4.7 Assembling the end tool



Maintenance and other operations on the hydraulic systems must be performed only by specifically instructed personnel.

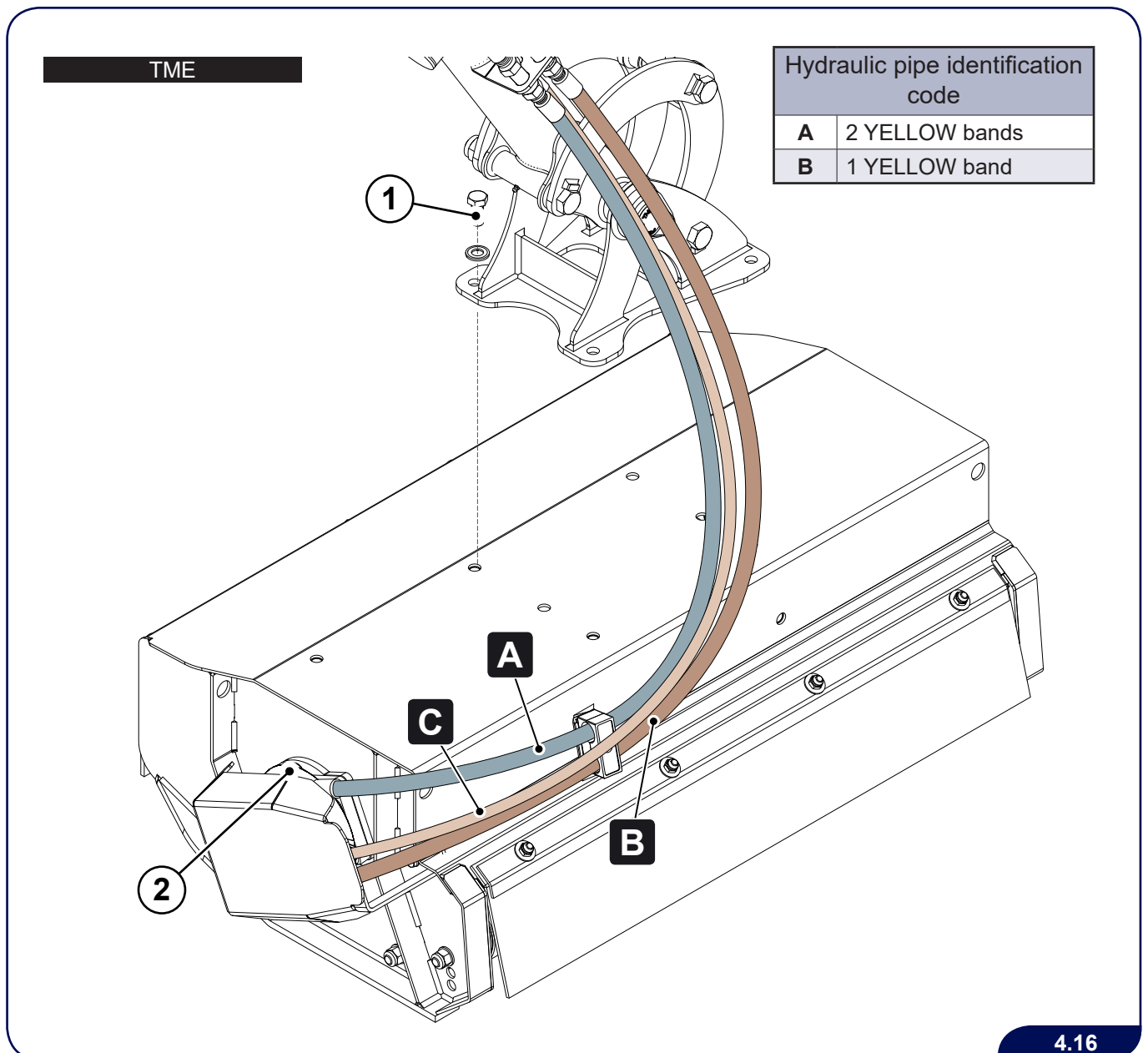
The end tool is normally supplied already fitted to the arm. It may happen that, for packing reasons or because it is interchangeable with other features, the end tool has to be assembled afterwards.



Ensure that the hydraulic pipes are correctly fitted, respecting the colour recognition code and remembering that inverting them causes opposite movements to those ordered with the controls.

4.7.1 Connecting the flail head

- 1) Ensure that the arm is open.
- 2) If you do not have the dual effect kit (Chapter 11), the arm falls by gravity and, when no tool is fitted, it is necessary to perform coupling operations using a hoist or fork-lift truck.
- 3) Start the tractor and regulate the PTO to about 300 rpm.
- 4) Raise the flail head with the aid of a lift [and rest it near the end of the arm (see the use and maintenance manual for the location of the lifting points of the flail head)].
- 5) Lower the arm so that the tie plate fits with the flail head.
- 6) Secure the flail head with the 4 screws (1) M16x40 and their washers.
- 7) Switch off the engine, apply the parking brake and remove the ignition key from the dashboard.
- 8) Make sure that there is no pressure inside the hydraulic system.
- 9) Connect the delivery (A) and discharge (B) pipes to the hydraulic motor (2), after exhausting the system pressure, using the rotor selection lever.
- 10) Connect the drain pipe (C) to the hydraulic motor (2).



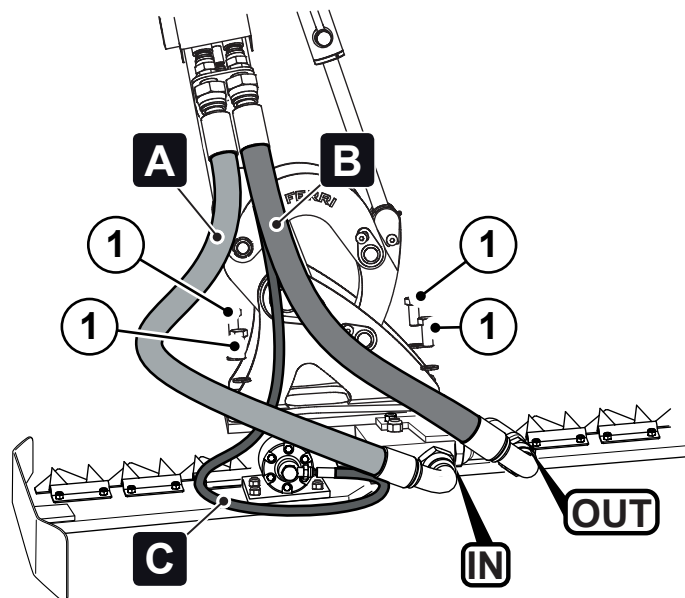
4.7.2 Disconnecting the flail head

- 1) Start the tractor and regulate the PTO to about 300 rpm.
- 2) Stop the arm at a height of about 1 metre above the ground (for operator safety).
- 3) Raise the flail head using a lifting device (for the location of the lifting points, see the relevant use and maintenance manual) and pre-tighten the belts of the lifting device.
- 4) Switch off the engine, apply the parking brake and remove the ignition key from the dashboard.
- 5) Make sure that there is no pressure inside the hydraulic system.
- 6) Disconnect the pipes (A), (B) and (C) from the hydraulic motor (2) of the flail head, and clean them, removing any dirt and/or impurities.
- 7) To avoid excessive oil leaks, equip yourself with a suitable collection tank and 1/2" G caps for the pipes (A) and (B) and 1/4" G caps for pipe (C).
- 8) Unscrew the four fastening screws (1).

4.7.3 Cutter bar connection

- 1) Raise the cutter bar using a lifting device (for the location of the lifting points, consult the relevant use and maintenance manual)
- 2) Bring the cutter bar the arm end plate.
- 3) Secure the cutter bar with the four screws (1) and their washers.
- 4) Switch off the engine, apply the parking brake and remove the ignition key from the dashboard.
- 5) Make sure that there is no pressure inside the hydraulic system.
- 6) Connect the hose (A) for the take 'IN' and the hose (B) for the let 'OUT' and the hose (C) for the discharge.
- 7) To disconnect the cutter bar, proceed in inverse order.

Hydraulic hose identification code	
A	2 YELLOW bands
B	1 YELLOW band



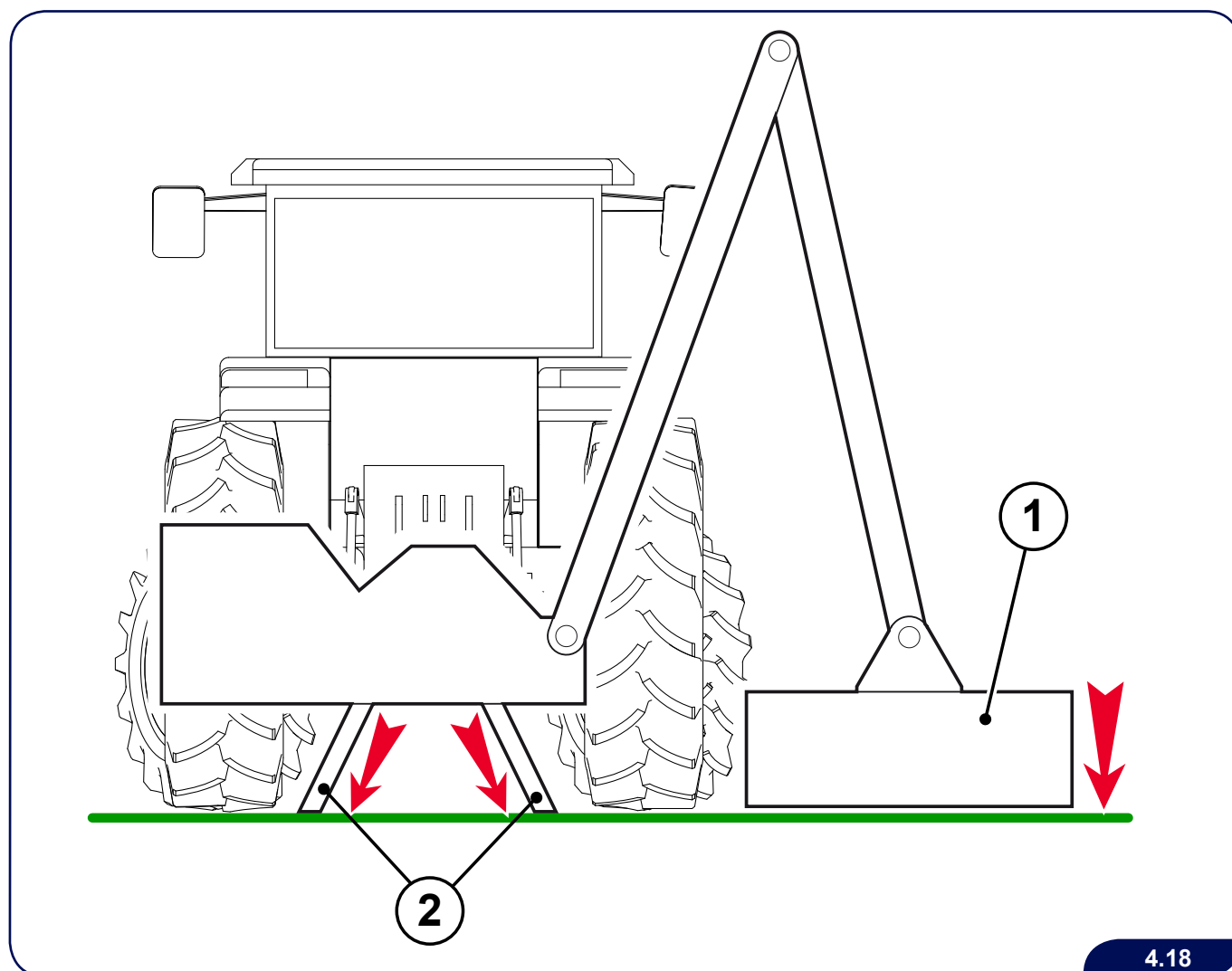
04-Collegamento cimatrice (TP-TM)

4.8 Detachment from the tractor

4.8.1 Detachment with head resting on the ground (TSA530-550-610)

Proceed as follows to uncouple the machine from the tractor:

- 1) Set the tractor parking brake.
- 2) Position the machine in working configuration and rest the shredding flail head (1) on the ground;
- 3) Lower the machine support feet (2) and lock them into place;
- 4) Position the machine on the ground using the tractor hydraulic lifting device.
- 5) Switch off the tractor PTO.
- 6) Switch off the tractor engine.
- 7) Remove the ignition key from the control panel.
- 8) Remove the PTO shaft by working on the anti-removal triggers and place it on the corresponding support.
- 9) Release the stabilizer of the third coupling point and remove the respective peg and pin.
- 10) Fasten the third coupling point to the respective support on the tractor.
- 11) Release the hydraulic lifting device arms from the machine coupling points by removing the respective anti-removal triggers and connection pins.
- 12) Get back on the tractor and start the engine.
- 13) Drive away carefully.



04-Distacco dalla trattore (Decespugliatrici)

4.18

5 ADJUSTMENTS



Always wear safety footwear, overalls, safety gloves and, if necessary, earmuffs and a dust mask during use and during machine maintenance, repair, handling and storage operations.

5.1 Working speed adjustment

Safe working speed depends on terrain condition, grass type to be cut, density, height of cut and the degree of chopping required.

In any case the optimum speed ranges from 1-2,5 Km\h (0,62-1,55 Mph).

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05-Regolazione velocità di lavoro

6 USE AND OPERATING RULES



Always wear safety footwear, overalls, safety gloves and, if necessary, earmuffs and a dust mask during use and during machine maintenance, repair, handling and storage operations.

6.1 Controls

Set the machine control levers inside the cab in an ergonomic position for the driver and fastened to a solid support on the tractor.

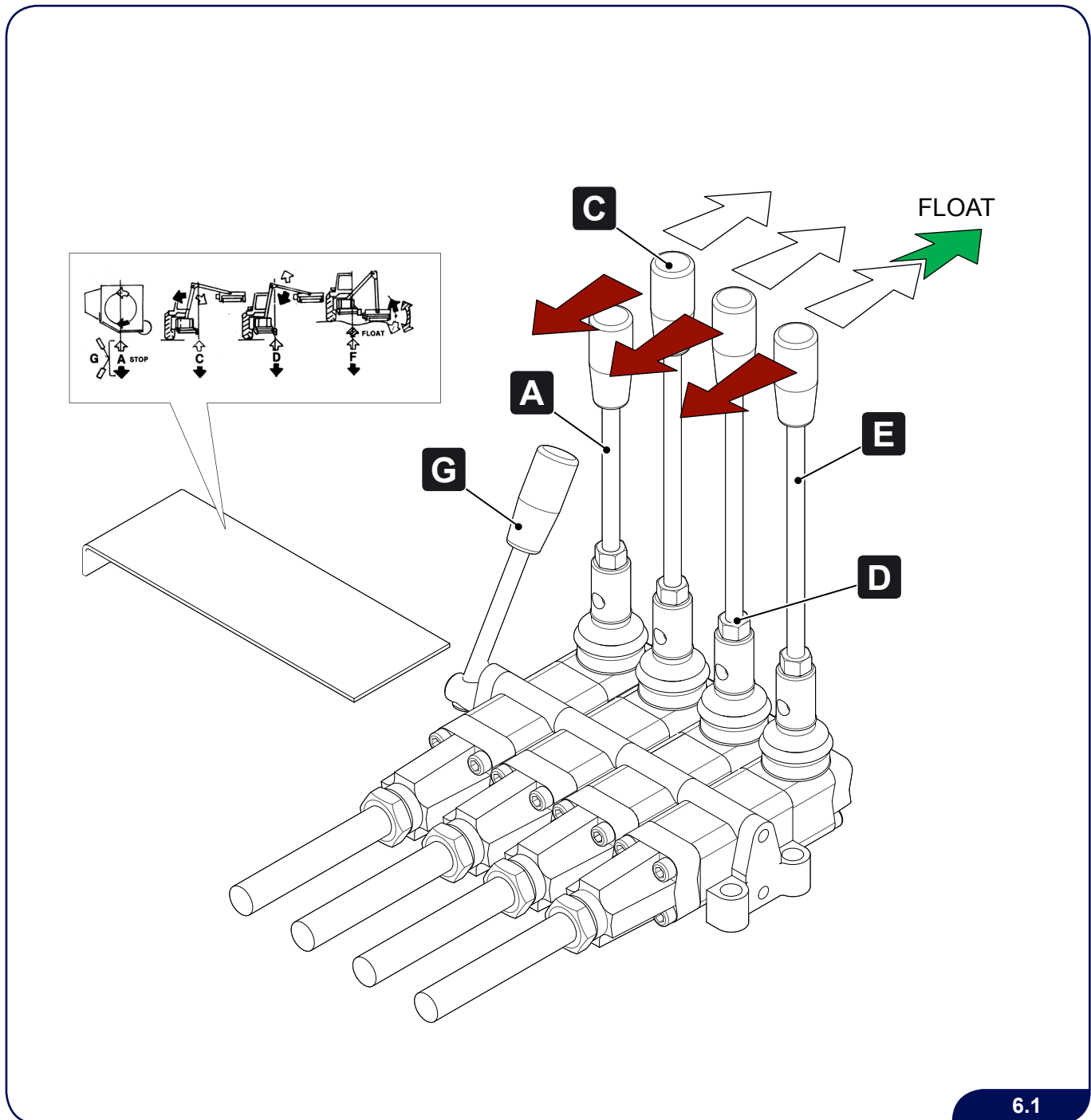
Always keep all parts of your body inside the cab in order to minimise the risk of exposure to any possible external hazards.



WARNING

Before operating the machine, familiarise yourself with all the controls and their functions.

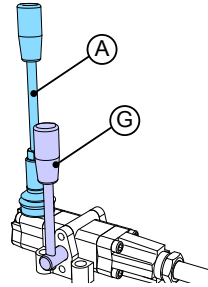
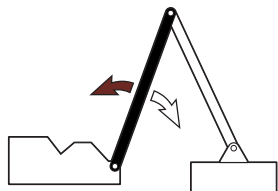
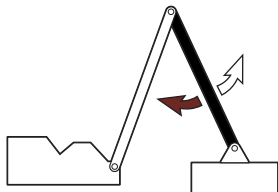
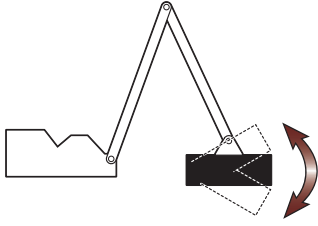
6.1.1 Cable controls (CLASSIC)



06-Comandi telefessibili (TM)

6.1

DESCRIPTION OF CONTROLS

<p>A</p>	<p>Controls the rotation direction of the rotor, after shifting the lever G. <u>See section 6.3.1. for further details.</u></p>	
<p>C</p>	<p>Controls the lifting (dark arrow) and lowering (white arrow) of the first arm. The simple effect hydraulic ram guarantees that the end tool rests correctly on the ground and avoids breakages. <u>For the machines with hydro-pneumatic suspension of the arms, see section 11.2</u></p>	
<p>D</p>	<p>Controls the lifting (dark arrow) and lowering (white arrow) of the 2nd arm. Controls the direction of the head.</p>	
<p>E</p>	<p>To select the float system, move the lever beyond the normal control position until the mechanical lock clicks into place. The float system allows the flail head to follow the profile of the soil autonomously without requiring adjustment by the operator. To shift to the normal working position, put the lever back to the neutral position. It avoids the accidental reversal of the direction of rotation.</p>	
<p>G</p>	<p><u>It must be activated to allow the command of lever A.</u></p>	

06-Comandi telefessibili (TM)

6.1.2 Electronic controls (ELECTRA version)

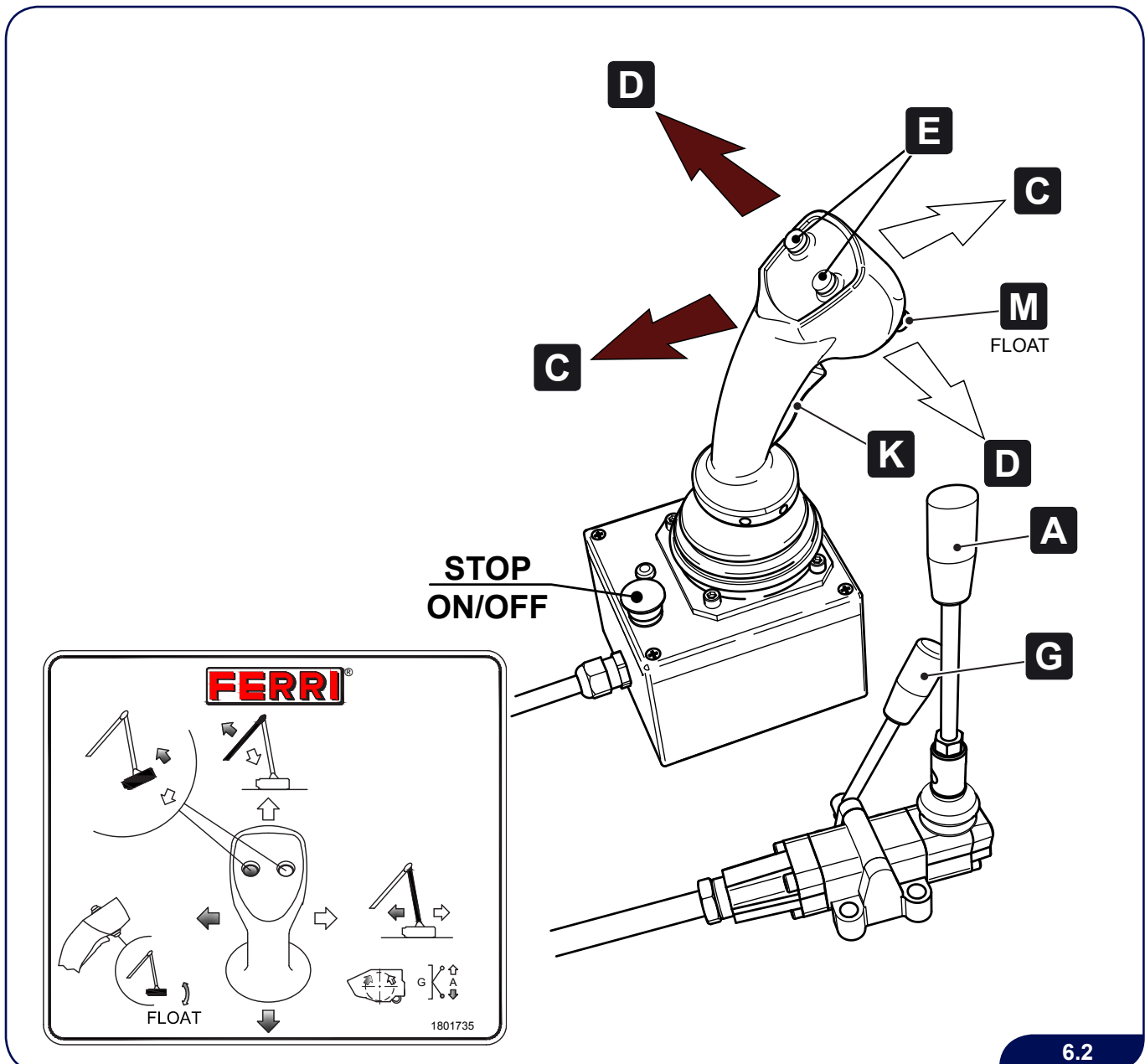
Arrange the flail hedge mower control levers inside the cab in an ergonomic position with respect to the tractor's driver seat and fastened to a support integral with the tractor.

The control valve is fitted with progressive electronic ON/OFF controls for all functions.
The control circuit input voltage is: 12V - 40 Amp.

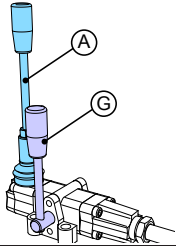
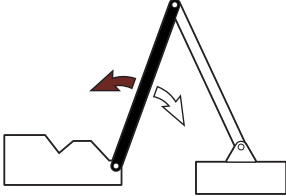
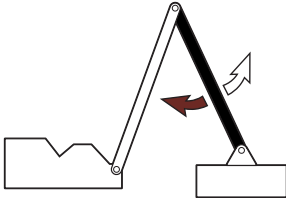
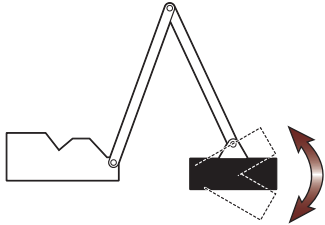


Never reverse the power socket polarity.

If the machine is parked outside, cover the control console with a strong plastic bag.
Pay attention NOT to aim water jets directly at the power boxes when cleaning the machine.



6.2

DESCRIPTION OF CONTROLS	
A	<p>Controls the rotation direction of the rotor, after shifting the lever G. See section 6.3.3. for further details.</p> 
C	<p>Controls the lifting (dark arrow) and lowering (white arrow) of the first boom. The simple effect hydraulic jack guarantees that the end tool rests correctly on the ground and avoids breakages. For the machines with hydro-pneumatic suspension of the booms, see section 11.2</p> 
D	<p>Controls the lifting (dark arrow) and lowering (white arrow) of the 2nd boom.</p> 
E	<p>Controls the direction of the head. Press the M button to switch on the floating control that allows the flail head to follow the profile of the soil independently, without requiring any adjustment by the operator. Press one of the E buttons to return to the normal position.</p> 
G	<p>Avoids the accidental reversal of the direction of rotation. It must be activated to allow the command of lever A.</p>
M	<p>Activates the floating control (see E control).</p>
K	<p>DEAD MAN'S CONTROL. Required to run all controls.</p>
STOP	<p>EMERGENCY BUTTON: If pressed, the controls' voltage is cut off.</p>

6.1.3 Controls (FULL ELECTRA version)

Arrange the flail hedge mower control levers inside the cab in an ergonomic position with respect to the tractor's driver seat and fastened to a support integral with the tractor.

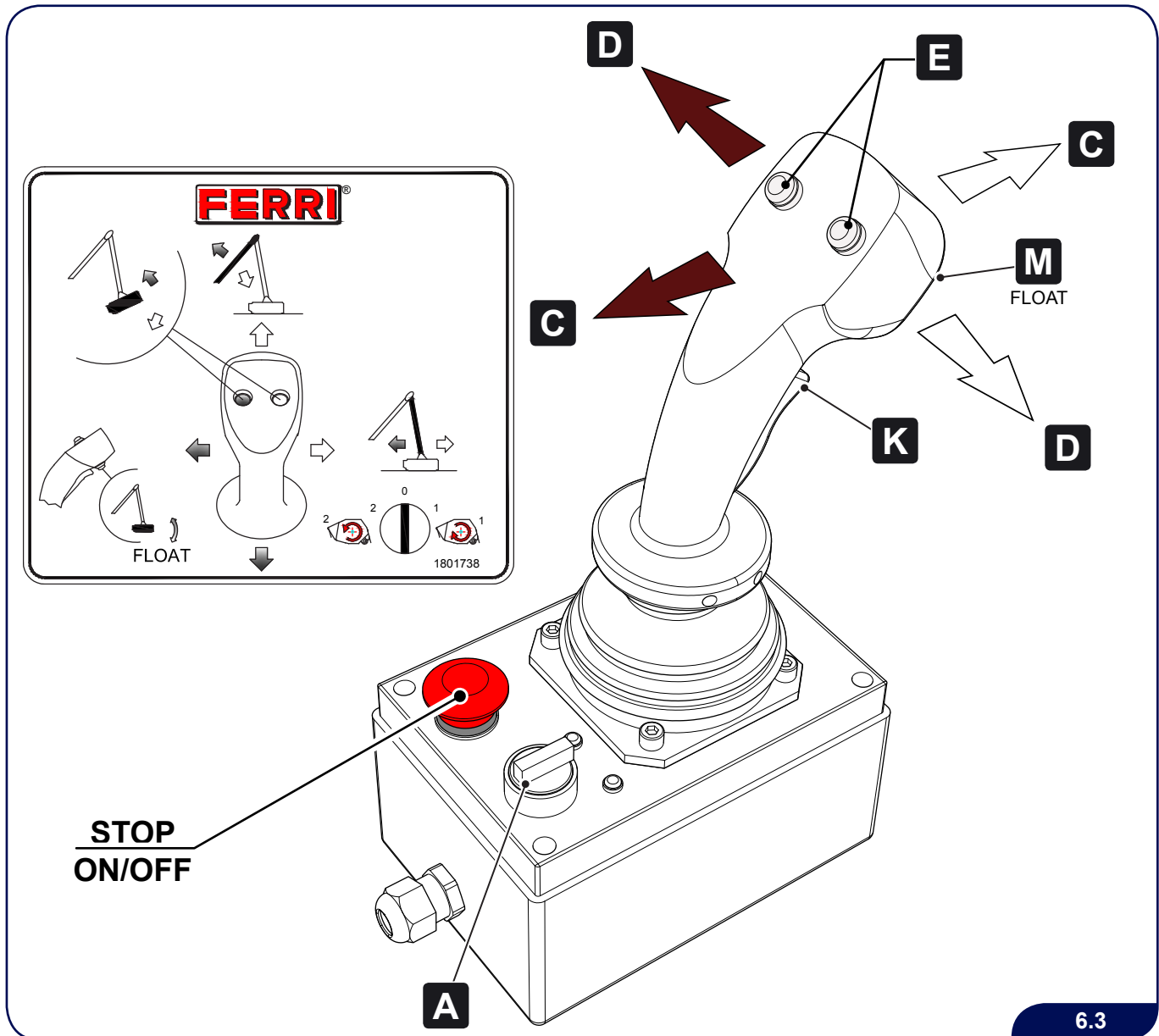
The control valve is fitted with progressive electronic ON/OFF controls for all functions.

The control circuit input voltage is: 12V - 40 Amp. The control valve is fitted with ON/OFF controls for all functions. The control circuit input voltage is: 12V - 40 Amp.



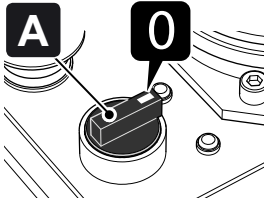
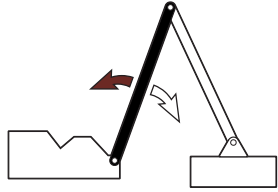
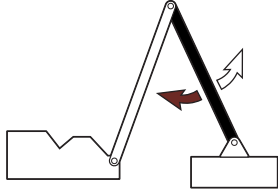
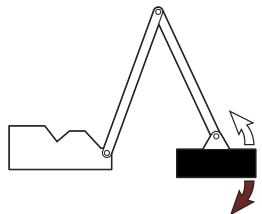
Never reverse the power socket polarity.

If the machine is parked outside, cover the control console with a strong plastic bag.
 Pay attention NOT to aim water jets directly at the power boxes when cleaning the machine.
 Pay attention NOT to aim water jets directly at the power boxes when cleaning the machine.



06-Comandi con distributore elettrico ON-OFF (FULL ELECTRA) T430

DESCRIPTION OF CONTROLS

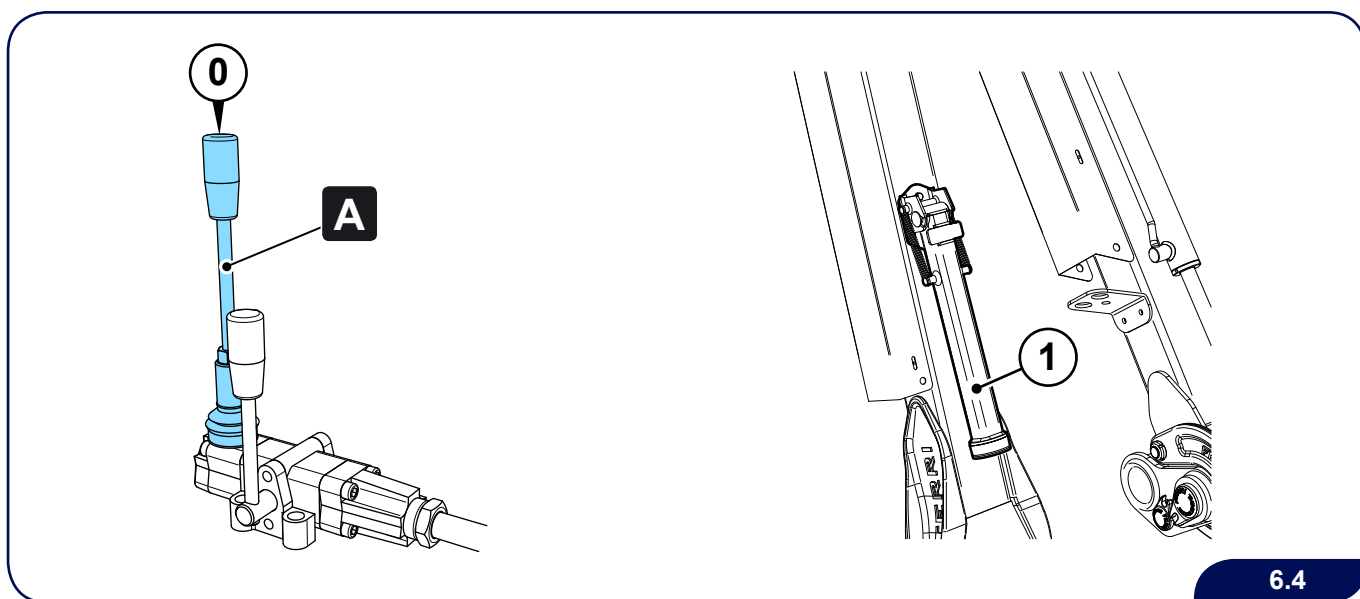
<p>A</p>	<p>Controls the rotor's direction of rotation. See section 6.3.1. for further details.</p>	
<p>C</p>	<p>Controls the lifting (dark arrow) and lowering (white arrow) of the first boom. The simple effect hydraulic jack guarantees that the end tool rests correctly on the ground and avoids breakages. For the machines with hydro-pneumatic suspension of the booms, see section 11.2</p>	
<p>D</p>	<p>Controls the lifting (dark arrow) and lowering (white arrow) of the 2nd boom.</p>	
<p>E</p>	<p>Controls the direction of the head. Press the M button to switch on the floating control that allows the flail head to follow the profile of the soil independently, without requiring any adjustment by the operator. Press one of the E buttons to return to the normal position.</p>	
<p>M</p>	<p>Activates the floating control (see E control).</p>	
<p>K</p>	<p>DEAD MAN'S CONTROL. Required to run all controls.</p>	
<p>STOP</p>	<p>EMERGENCY BUTTON: If pressed, the controls' voltage is cut off.</p>	

06-Comandi con distributore elettrico ON-OFF (FULL ELECTRA) T430

6.2 Starting up

6.2.1 Preliminary checks

- ▶ Make an overall visual inspection of the machine.
- ▶ Check the tightening of all the screws.
- ▶ Check the integrity of the guards.
- ▶ Check the level of oil in the transmission unit.
- ▶ Check the cutting unit (the condition of the shaft, the wear on the flails, etc.) and make sure that all the various parts are correctly tightened.
- ▶ Make sure that there are no oil spillages from fittings or piping.
- ▶ Check the correct operation of the electric system and the light bar (if present).
- ▶ Make sure that the speed and rotation direction of the tractor power takeoff are the same as those required by the machine (see the sticker on the gearbox).
- ▶ If applied on a self-propelled machine, check the number of motor revolutions and the available oil flow necessary for the hydraulic motor of the shredding flail head.
- ▶ Make sure that there are no people and/or animals present within a range of 50 metres.
- ▶ Grease all the parts of the machine.
- ▶ Move the rotor control lever (**A**) to the neutral position **0**.
- ▶ If the machine is equipped with a support foot (**1**), move it to rest position as shown in the figure. This will ensure the correct closing position for transport (included in the supply for shredding flail heads with rear hitch and for TRM18, TR22 and CS150 equipment, regardless of the type of hitch).



06-Avviamento (T380D-T430D)



IF THE INSTRUCTIONS ARE NOT OBSERVED, THE USER WILL BE CONSIDERED LIABLE FOR ANY AND ALL CIVIL AND/OR CRIMINAL DAMAGE THAT MAY BE CAUSED.

6.2.2 Starting up the machine



Do not start the machine while the cutting flails are immersed in the vegetation to be cut.

- 1) Keep the tractor engine running at low rpm.
- 2) Apply force to the PTO lever slowly in order to start the rotor.
- 3) Once the PTO has been inserted at low rpm, begin gradually raising engine rpm until it reaches the normal operating level.
- 4) Wait until the flail shaft rotor reaches maximum speed before proceeding with mowing.



Whenever unusual noises and/or vibrations occur, immediately uncouple the PTO.

- 5) Accelerate the tractor slowly and smoothly until optimum work speed is reached (see Chapter 5).
- 6) Use all the controls progressively in order to keep the machine running smoothly.
- 7) Always run the machine at an advance speed that is equal to or slightly lower than optimum speed.



Do not allow the PTO to exceed the maximum allowed value for the equipment being used. If it exceeds the maximum allowed value, the conditions will no longer be safe and serious damage could be caused to the machine.

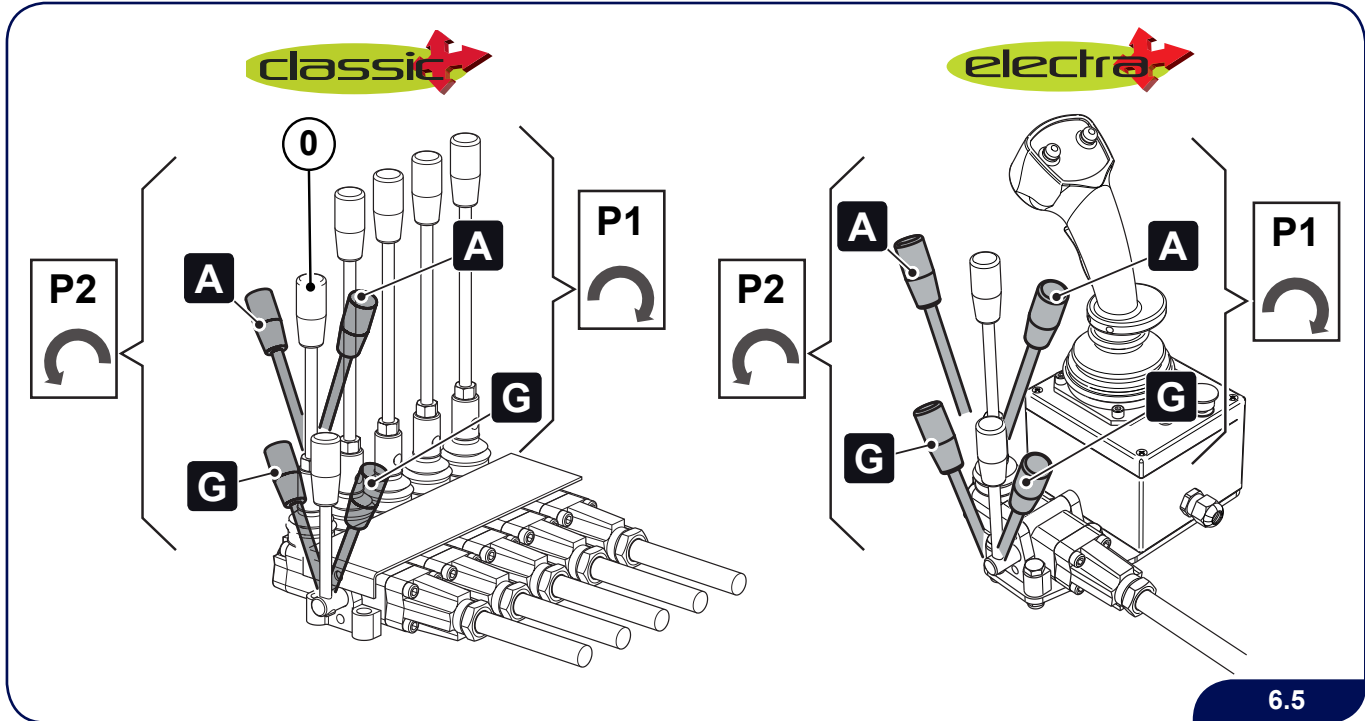


Do not allow the PTO to exceed the maximum allowed value for the equipment being used. Heat up the oil while keeping a hydraulic jack in the end-of-stroke position.

06-Avviamento (T380D-T430D)

6.2.3 Starting the flail head

- ▶ Position the flail head parallel to the ground.
- ▶ Keep the engine running at minimum.
- ▶ Increase tractor rpm.



The lever **A** controls the rotation direction of the rotor.
Engage the lever G in order to enable control for lever **A**.

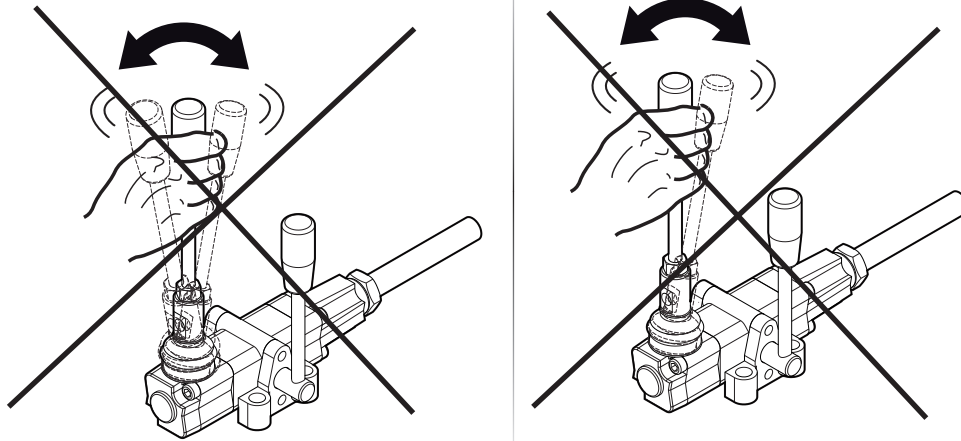


Lever **G** is a safety device that prevents the accidental inversion of rotation direction with the use of only one lever.



Before inverting rotation, wait for the rotor to stop (about 30 seconds) in order to avoid breakage of the hydraulic motor.

- ▶ Wait for a few seconds for the rotor to stabilise its rotation speed.



6.6



NEVER stop or rapidly clutch the motor even if in the same rotational direction.

6.2.4 Starting the cutter bar

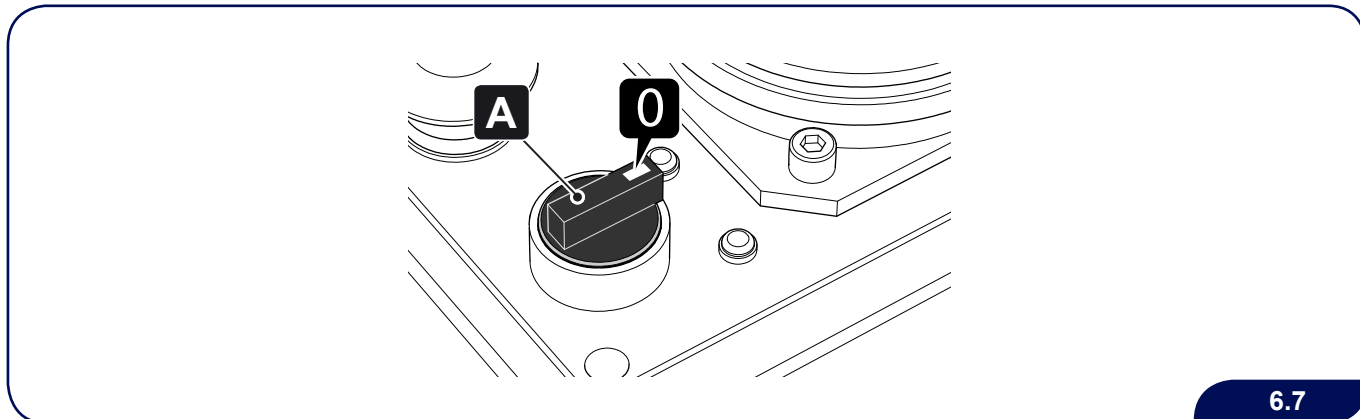
- ▶ Keep the engine running at minimum.
- ▶ Increase tractor rpm.
- ▶ Bring the rotor control lever (A) into position P1.



Positioning lever (A) in position P2 could damage the hydraulic system.

6.2.5 Starting up the flail head (FULL ELECTRA version)

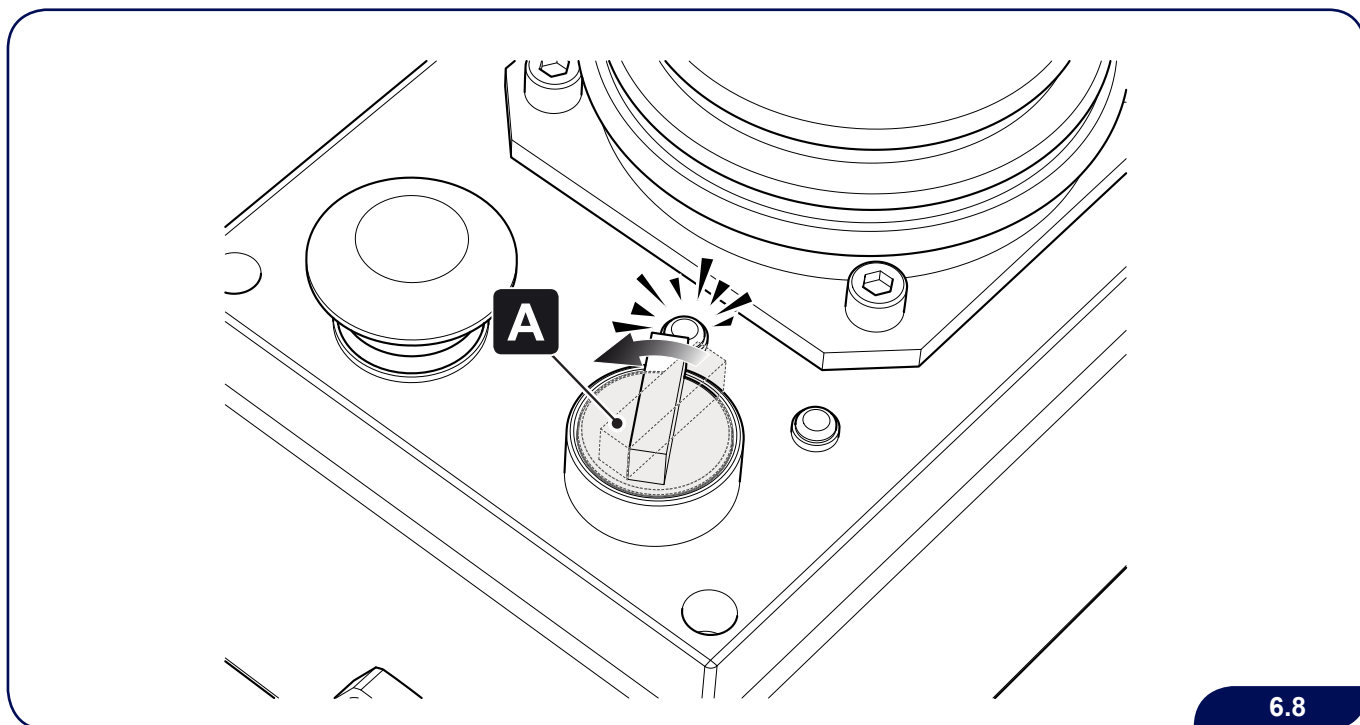
Make sure that the selector switch (A) is in neutral position - 0 -. Arrange the flail head in a safe position, increase the tractor rpm and start up the rotor in the required direction of rotation. After a few seconds the rotor will stabilise its rotation speed and be ready to work.



6.7

6.2.6 Starting up the cutter bars (FULL ELECTRA version)

Turn the selector switch (A) to the position indicated in the figure to start up the cutter bars.



6.8



This manoeuvre has to be performed with the tractor PTO running at low rpm. Then increase the rpm gradually up to the indicated operating level. If you turn the selector switch (A) to the direction opposite to that indicated (improper use), the equipment will not work and the system could get seriously damaged.

06-Avviamento (testata e troncatrice)_ELECTRA

6.3 Working mode



During use of the machine, there may be emission of dust.
 Use tractors with a cab with filters on the ventilation system, or use suitable systems to protect the airways, such as dust masks or masks with a filter.

Operate the machine briefly and then check to see if the work performed is satisfactory. If it is not, re-adjust the machine (see Chapter 5).



In the event of clogging on the rotor, before getting off the tractor and before any other operation, apply the parking brake, and switch off the engine. Remove the ignition key from the dashboard and wait until all the moving parts have stopped.



In the operation of extending and closing the machine, lift it slightly from the ground, to avoid damage to the structure.



To avoid damages to the structure of the machine or the arms during changes of direction or when reversing, raise the machine from the ground and uncouple the PTO, avoiding operation with the arm and/or the shredding flail head.



Do not let the flails turn when the flail head is raised from the ground. The possibility of objects being thrown by the flails can cause serious accidents or death.

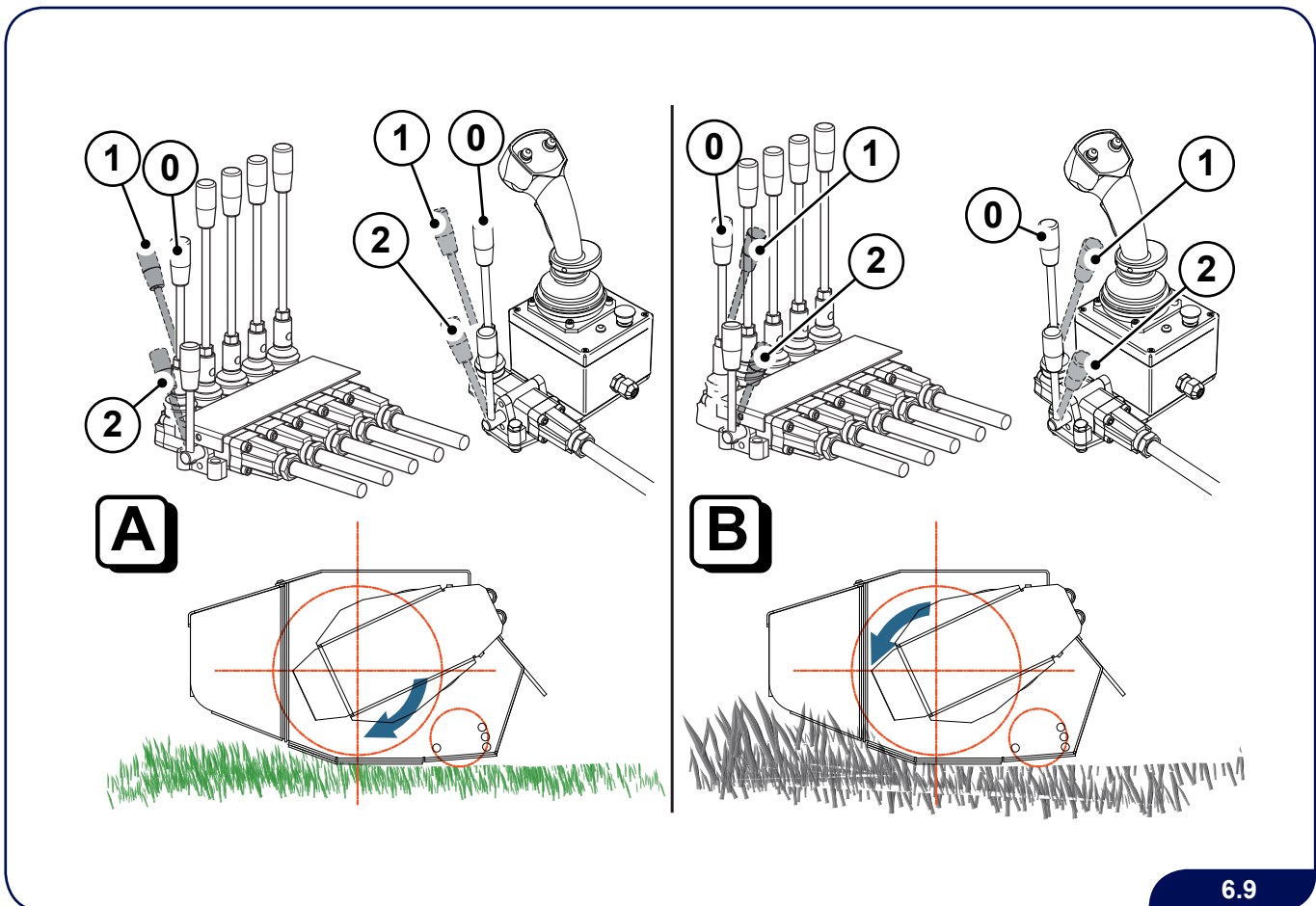
06-Fase di lavoro

6.3.1 Rotational direction of the rotor

Prepare the machine for the work to carry out and the type of material to cut, adjusting:

- ▶ The height of cut (see Chapter 5);
- ▶ The rotational direction of the rotor:
 - A) Cutting grass
 - B) cutting bushes, thorns and branches.

Lever 1 controls the rotation direction of the rotor, after shifting **lever 2 which must be activated** to allow lever 1 to carry out the command.



06-Senso di rotazione rotore (decespugliatrice)

6.9



Lever 2 prevents the accidental reversal of rotation direction with the use of only one lever.



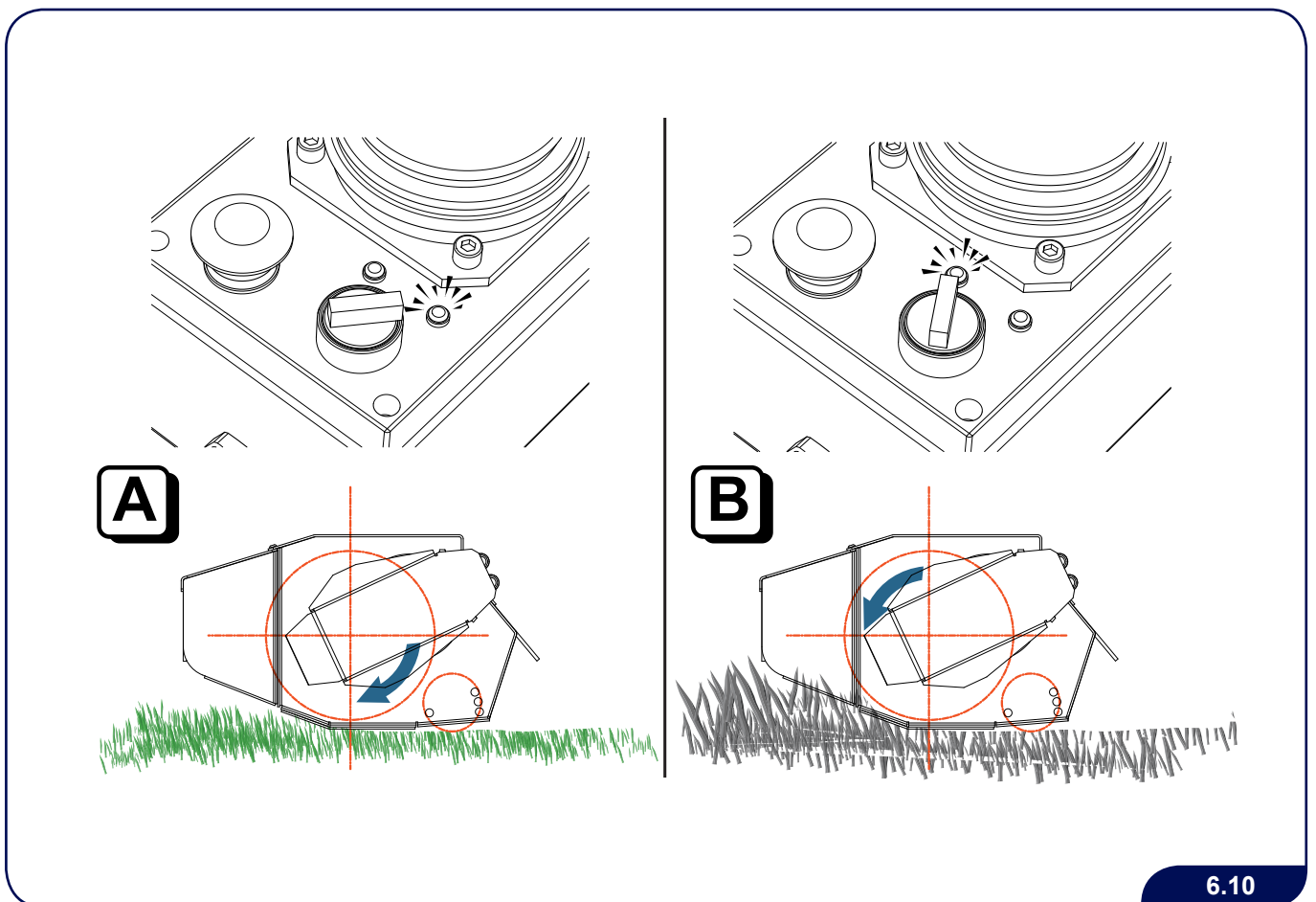
Before reversing rotation, wait for the rotor to stop (about 30 seconds) in order to avoid breakage of the hydraulic motor.

6.3.2 Rotor's direction of rotation (FULL ELECTRA version)

Prepare the machine for the work to be carried out and the type of material to be cut, adjusting:

- ▶ The cutting height (see Chapter 5);
- ▶ The rotor's direction of rotation:
 - A) Cutting grass
 - B) cutting bushes, thorns and branches.

06-Senso di rotazione rotore (decespugliatrice ELECTRA)



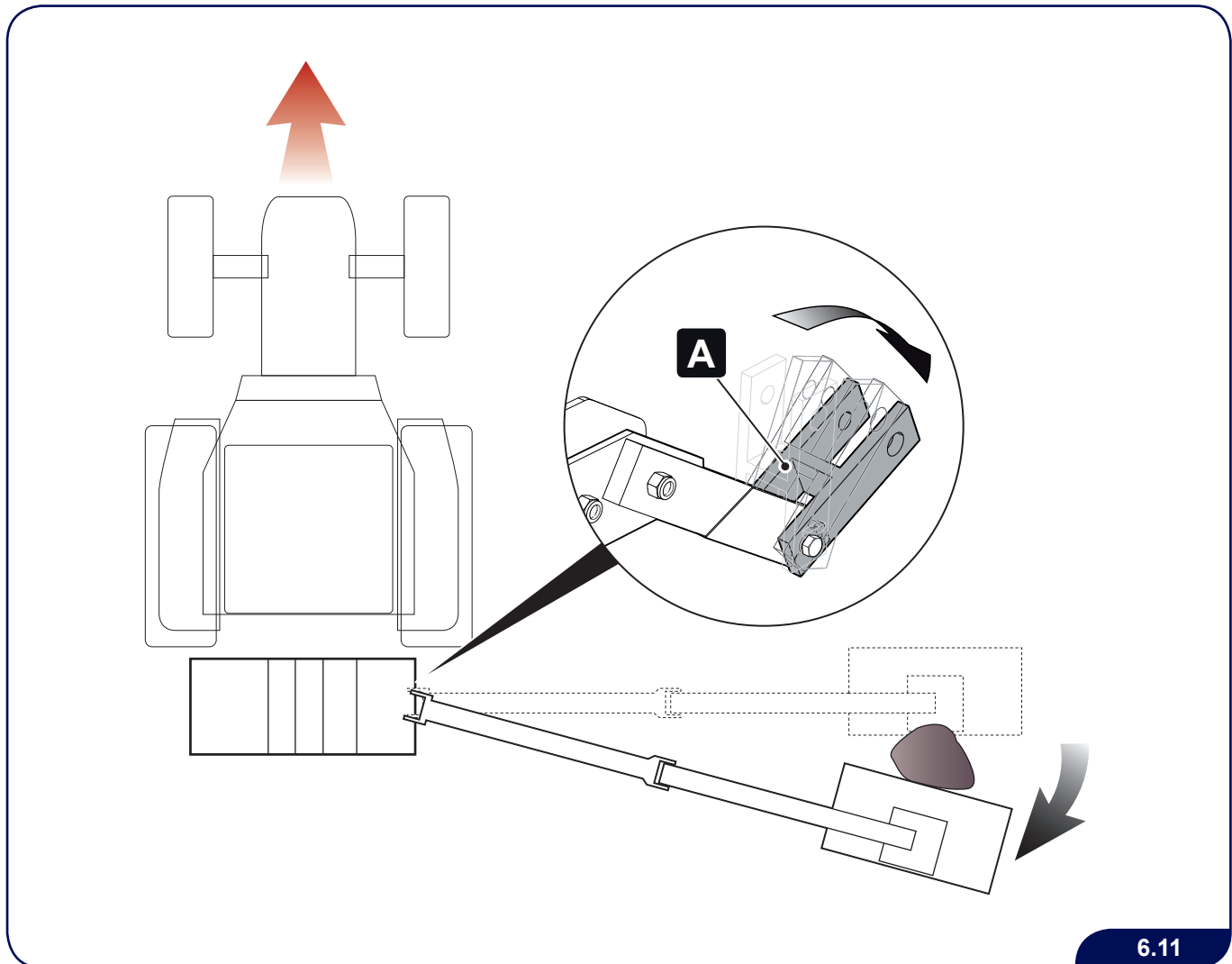
6.10



Before reversing rotation, wait for the rotor to stop (about 30 seconds) in order to avoid breakage of the hydraulic motor.

6.3.3 Arm safety

The machine is equipped with a mechanical safety device (A), which is set into operation when the end tool encounters an obstacle and the tractor continues moving forward. This device allows the arm to be moved back to absorb the shock and gives the operator the time to carry out the necessary manoeuvres to overcome the obstacle, then the arm returns to the work position.



06-Sicurezza bracci (TA-TD)

6.11



When folding the arms, do not go beyond an angle of 12° to avoid structural problems to the machine.



Be careful not to damage the structure of the machine when working with the end tool close to the wheel of the tractor or when advancing at a speed greater than 1-2,5 Km/h (0,62-1,55 Mph).

6.3.4 Work with arm close to a vertical position



Do not work if the shredding flail head is not clearly visible.

Take the following precautions:

- ▶ Before starting work, check that there are no foreign bodies, such as wires, stones or other items that could be thrown by the flail head.
- ▶ Before cutting the hedge, put up a danger notice advising people to keep at a safe distance due to the cut material being thrown.

Before each start-up and during use of the machine, make sure that there are no people and/or animals within a radius of 100 m.



This activity is EXTREMELY dangerous, because these work configurations do not allow the guards applied to hold back any foreign bodies inside the flail head as it is not resting horizontally on the ground.

Work with extreme caution outside built-up areas and stop work immediately if there are people and/or animals within a radius of 100 metres.

Cut the hedge in a side and at its foot (Points 1 and 2). In this way a lateral barrier is left that is sufficient to avoid detritus being expelled through the flail head.

Move to the other side of the hedge with the tractor to carry out cutting (Points 3, 4 and 5). In this way the operator always has a clear view of the shredding flail head.

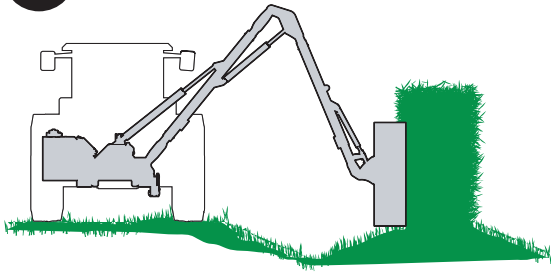


Do not cut with the flail head on the opposite side of the hedge to the tractor (Point 6). In this case it is impossible to be aware of potential hazards and the presence of persons and/or things.

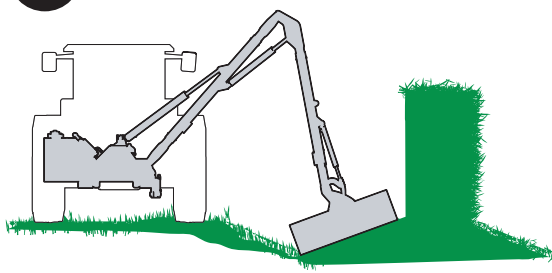
To cut hedge branches with a diameter greater than 1.5 ÷ 2 cm (0.59 ÷ 0.78 in), activate the flail holder rotor in the same direction as the wheel of the tractor (Point 7). In this way the material is directed towards the bottom or the rear part of the machine.

Proceed in an opposite direction only for finishing operations.

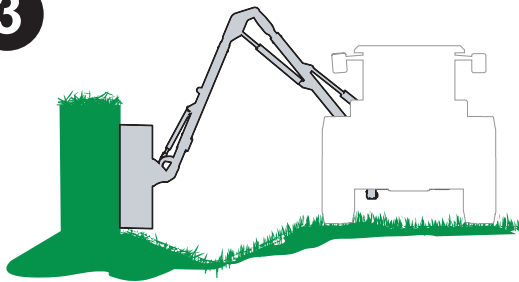
1



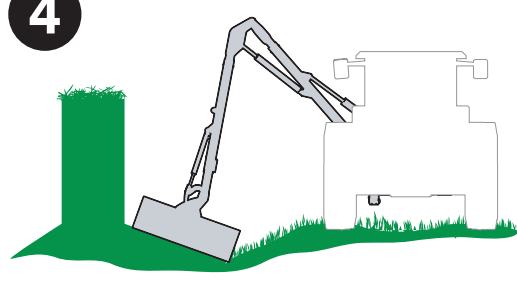
2



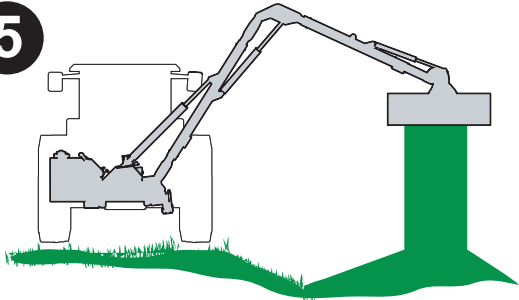
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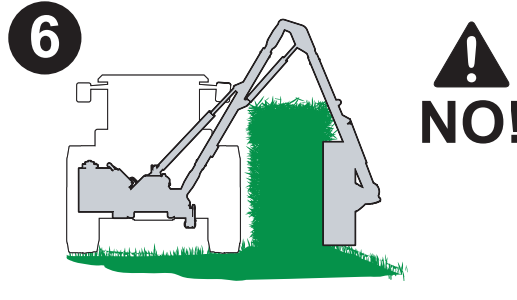
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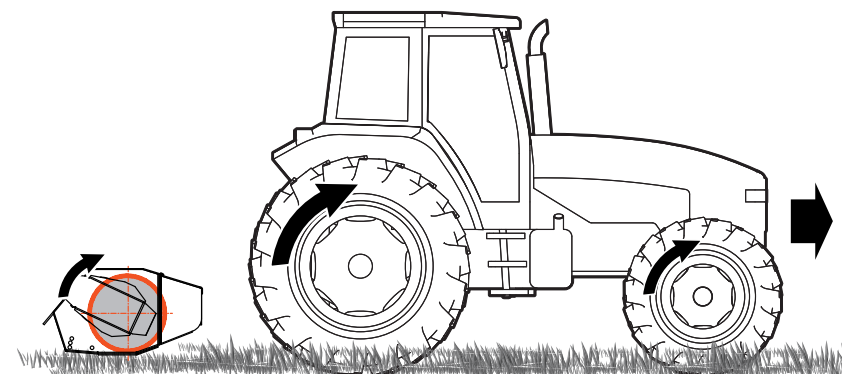
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6



7



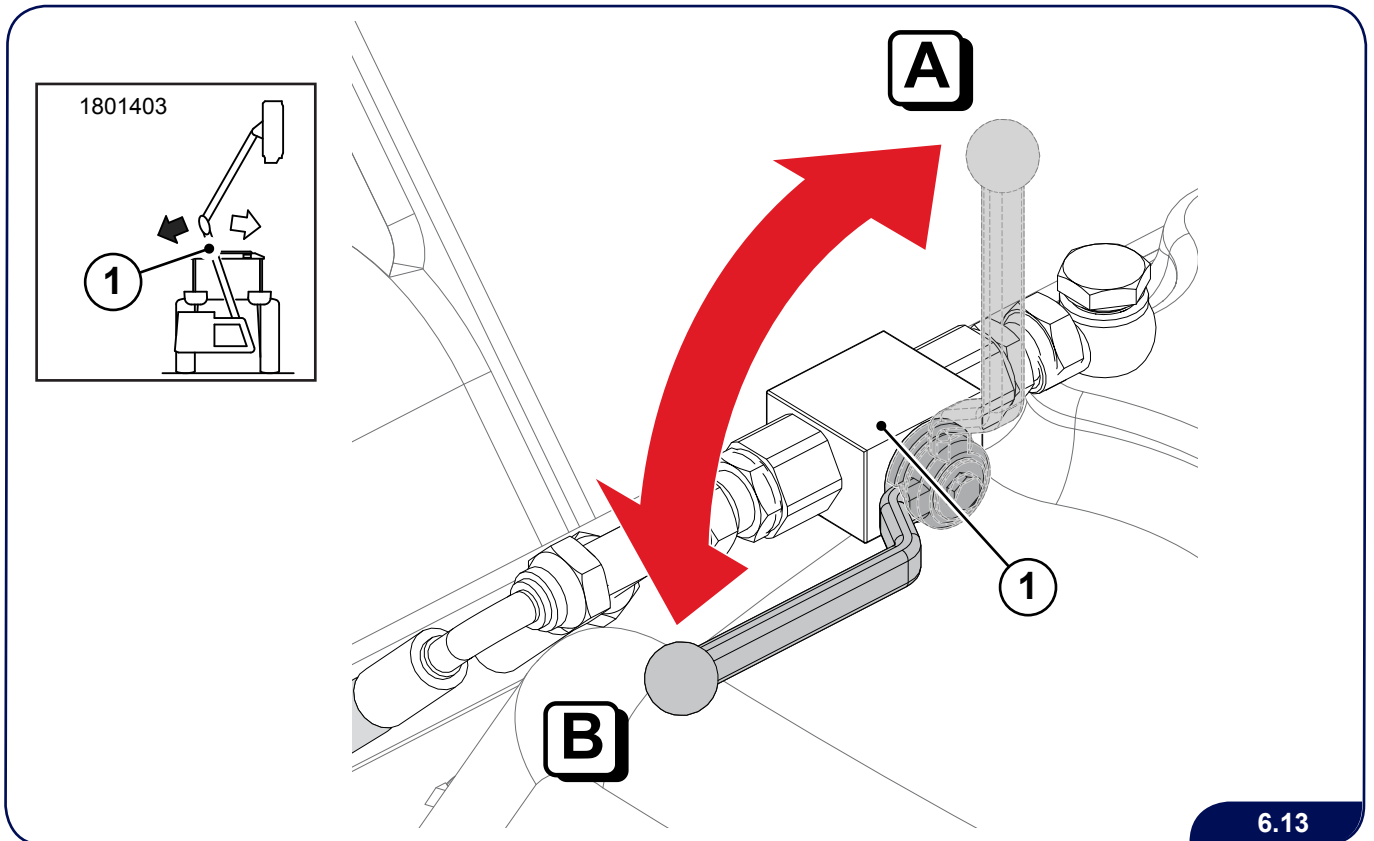
06-Lavoro su siepe

6.12

When the manual operation **dual effect Kit** is present, if working on hedges or with the arm in vertical position, close the tap (1), identified by the decal (A), to avoid that the 1st arm falls due to the weight of the flail head.



Open the tap if carrying out shredding works with tool on the ground to allow the machine to adjust to the rugged terrain without damaging the arm hydraulic rams.



06-Lavoro su siepe (TP)

If the machine is equipped with an electric anti-rollover device, the control of the dual effect system is performed in automatic mode.

The automatic anti-rollover kit improves the sensitivity of the end tool and makes it possible to work close to a vertical position and avoids the instability problems to the tractor-machine.

Depending on the position of the arms, the inclinometer permits the modification of the operating mode of the 1st arm from the dual effect to the simple effect and vice-versa.

6.4 Stopping

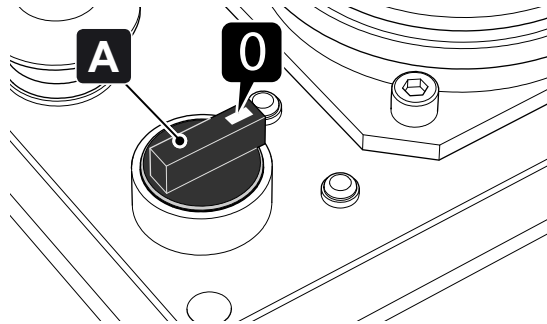
Before stopping the tractor:

- 1) Close the arms and lower the flail head to the ground;
- 2) Disengage the rotor drive and wait till the rotor has completely stopped (approx. 30 sec.);
- 3) Turn off the tractor, take the starting key out and apply the parking brake;
- 4) If the ground is sloping, insert wedges to block the tractor wheels.
- 5) Wait for all the moving parts to stop completely before switching off the tractor or moving the tractor to another place (machine not in operation).

6.5 Stopping (FULL ELECTRA version)

Before stopping the tractor:

- ▶ Turn off the rotor rotation with the selector switch **A** (FIG. 6.8), moving it to the '0' position and then **wait until it has come to a complete standstill. (Approximately 30 seconds).**
- ▶ Close the booms and rest the flail head onto the ground.
- ▶ Disengage the power takeoff.
- ▶ Turn off the tractor, remove the ignition key and pull the parking brake.
- ▶ If the ground is sloping, insert wedges to block the tractor wheels.



06-Arresto ELECTRA (TA-TD)

6.14

6.6 Transport position

- ▶ Raise the support foot 1) (**Rear coupling**)
- ▶ Close the arms.



Do not force the closure of the 2nd arm when it is resting on the foot (1).

- ▶ Position the flail head with its flails facing the inside of the machine.
- ▶ Raise the machine using the tractor rear lifting device.

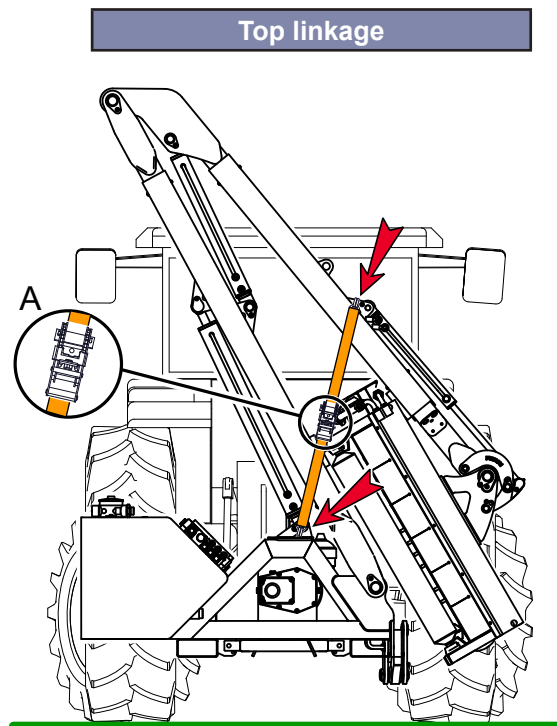


When PTO is disengaged, make sure that the cardan shaft does not exceed 30° inclination, to avoid damage to the shaft.

- ▶ Check that the tractor hydraulic lifting levers are blocked, to avoid the machine coming down during transport.
- ▶ If the machine profile covers the tractor tail lights, fit a rear bar with warning lights.
- ▶ Attach appropriate signs indicating machine overall dimensions and footprint.
- ▶ Observe all the road transport requirements.
- ▶ Consult section **2.2 -Safety rules concerning road traffic** in this manual.

When **flexible controls** are fitted:

- ▶ Close the hydraulic tap (1) turning it to (POS. A).



6.15

7 ROUTINE MAINTENANCE



Always wear safety footwear, overalls, safety gloves and, if necessary, earmuffs and a dust mask during use and during machine maintenance, repair, handling and storage operations.

7.1 General information

The criteria for routine maintenance of the machine are provided below, based on the company's experience and on advice received from our customers.

These criteria are not exhaustive and may, therefore, be supplemented thanks to the collaboration of our customers. Good routine maintenance keeps down the operating costs of the machine and allows you to make the most of its potential.

For specific repair or maintenance operations where it may be necessary to lift the machine from the ground or to tilt it, always use proper tools, lifters or hoists that are appropriate for this purpose (see Chapter 4).

Always use authorised dealerships and workshops.

For the replacement of machine parts, use only genuine spare parts supplied by the Manufacturer or by authorised dealers.

07-MANUTENZIONE ORDINARIA



WARNING

Before carrying out any type of maintenance:

- 1) Wait until all moving parts come to a complete stop;**
- 2) Lower the machine to ground level;**
- 3) Disconnect the power takeoff;**
- 4) Switch off the engine of the tractor (or self-propelled machine);**
- 5) Apply the parking brake;**
- 6) Take out the ignition key;**
- 7) Get off the tractor to check the extent of the problem;**
- 8) Wait for the oil and the hot surfaces to cool down;**
- 9) Proceed with any interventions required on the machine.**

7.2 Checklist

The Checklist serves to schedule all the maintenance operations and to monitor the frequency with which they are performed in order to ensure the correct routine maintenance of the machine.

The manufacturer recommends keeping the original document attached to the instruction manual, and creating personal copies for every authorised technician, to make a note of the interventions carried out on the machine.

7.2.1 Every 8 working hours or daily

- ▶ Check that screws and nuts are tightened
- ▶ Check that the tools are not worn and are intact
- ▶ Check that the accident prevention protections are intact
- ▶ Grease pins, bearings, universal joints and PTO shaft telescopic barrel, etc.

7.2.2 Every 50 working hours or every month

- ▶ Check the tension and efficiency of the transmission belts (where fitted)
- ▶ Check the oil level of the tank or gearbox
- ▶ Visually check the machine to identify the presence of any breakages or damage
- ▶ Check that the heat exchanger is clean and free from debris or leaves
- ▶ Check that the rotor bearings do not overheat during operation

Intervention date	Manager	Intervention date	Manager

07-Checklist_new

7.2.3 Every 200 working hours

- ▶ Check the rotor flails are not worn
- ▶ Check the balancing of the rotor
- ▶ Check the conditions of the oil filter cartridge (outlet and inlet where fitted)
- ▶ Check the correct adjustment of the controls

Intervention date		Manager	Intervention date		Manager

07-Checklist_new

7.2.4 Every 500 working hours or every month

- ▶ Replace the oil in the gearbox
- ▶ Replace the oil filter cartridge (outlet and inlet where fitted)
- ▶ Check the seal of the oil filling cap (if necessary replace)
- ▶ Check that the support roller bearings are not worn (if necessary replace)
- ▶ Check that the rotor bearings are not worn (if necessary replace)

07-Checklist_new

Intervention date	Manager	Intervention date	Manager

7.3 Oil table

The following table lists the oils to be used for topping up the levels.

TAB 5	OIL QUANTITY IN THE TANK	TYPE	CLASSIFICATION
		HYDROIL GF 68	ISO 11158 (DIN 51524)
		litres	gallons
		60	15,82
		TYPE	CLASSIFICATION
		HYDROIL GF 68	ISO 11158 (DIN 51524)
	OIL QUANTITY IN THE GEAR BOX	litres	gallons
		60	15,82
		TYPE	CLASSIFICATION
		BLASIA 220	ISO VG 220
	Kilograms	Pounds	
	0,2	0,05	

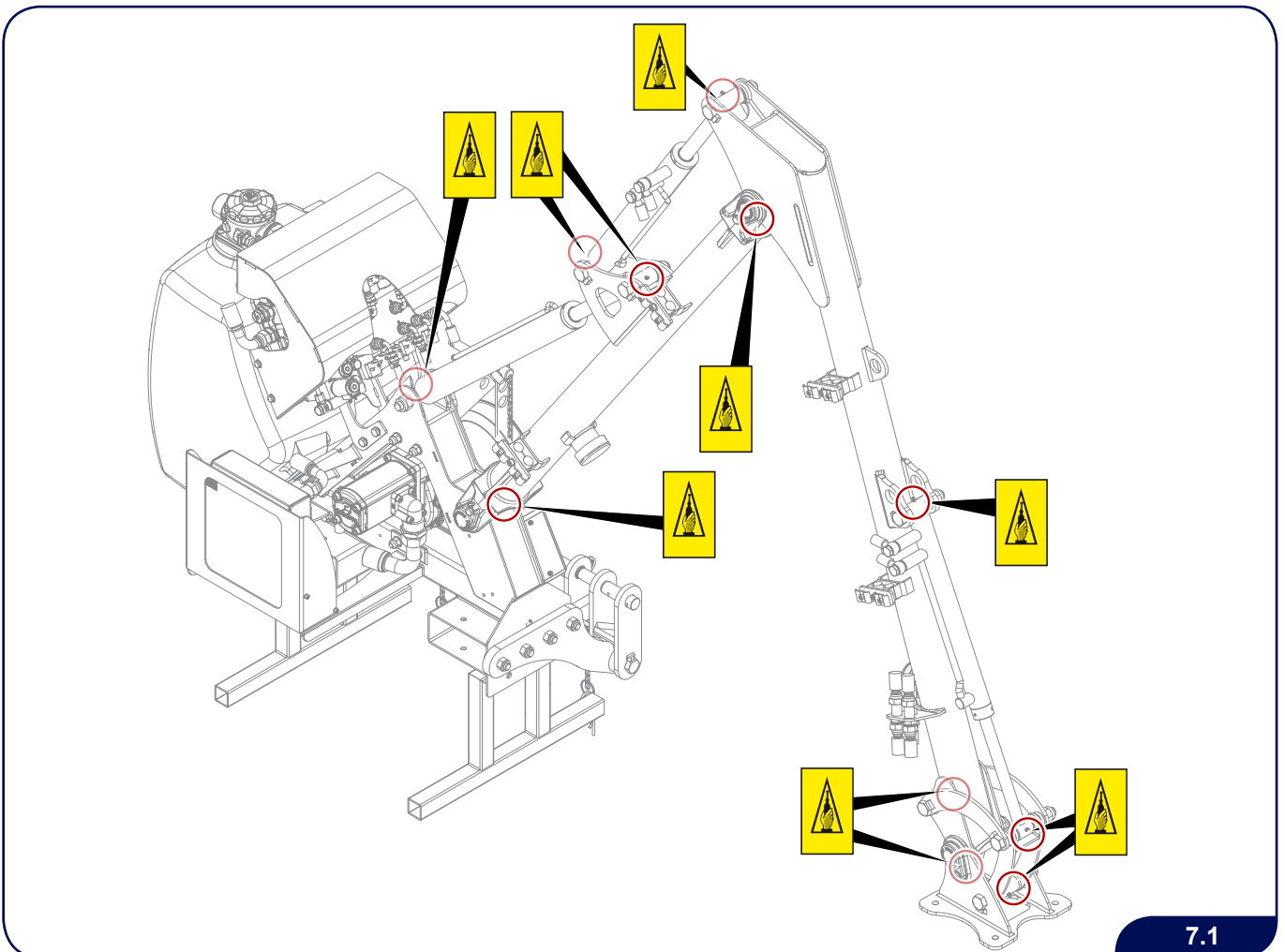
07-Tabella oli (T460)

7.4 Greasing

LUBRICANT	
TYPE	CLASSIFICATION
AGIP GR MU EP/2	SAE90

- ▶ Use a hand-held grease gun for all greasing.
- ▶ Wipe the grease nozzle with a clean dry cloth, to avoid injecting dirt and grit.
- ▶ Under particularly taxing work conditions, perform lubrication operations more frequently than the every 8 hours usually adopted.
- ▶ Replace or repair damaged or broken nozzles immediately.
- ▶ If the nozzles will not take grease, remove and clean them thoroughly. Also clean the lubricant passageway. Replace the nozzle if necessary.
- ▶ In the event of long inactivity, repeat these operations before using the machine again.

07-Ingrassaggio



7.1



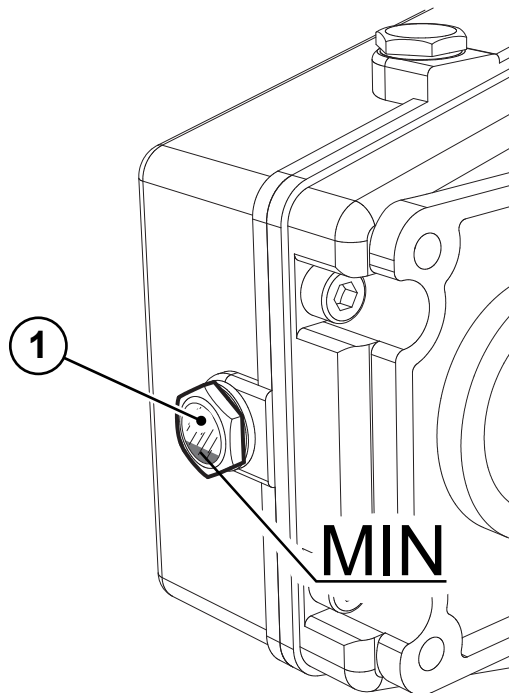
INCREASE THE FREQUENCY OF MACHINE MAINTENANCE IF IT IS BEING USED IN PARTICULARLY TAXING WORK CONDITIONS.

7.5 Changing the gearbox oil

The oil level in the gearbox must be checked every 50 working hours or each month by checking the indicator (1).



Pay attention not to exceed the recommended oil level during topping up and change of the oil in the gearbox to avoid spillages.



7.2

07-Sostituzione olio moltiplicatore



NEVER DISPOSE OF USED OIL INTO THE ENVIRONMENT: DELIVER IT TO THE APPROPRIATE COLLECTION CENTRES.

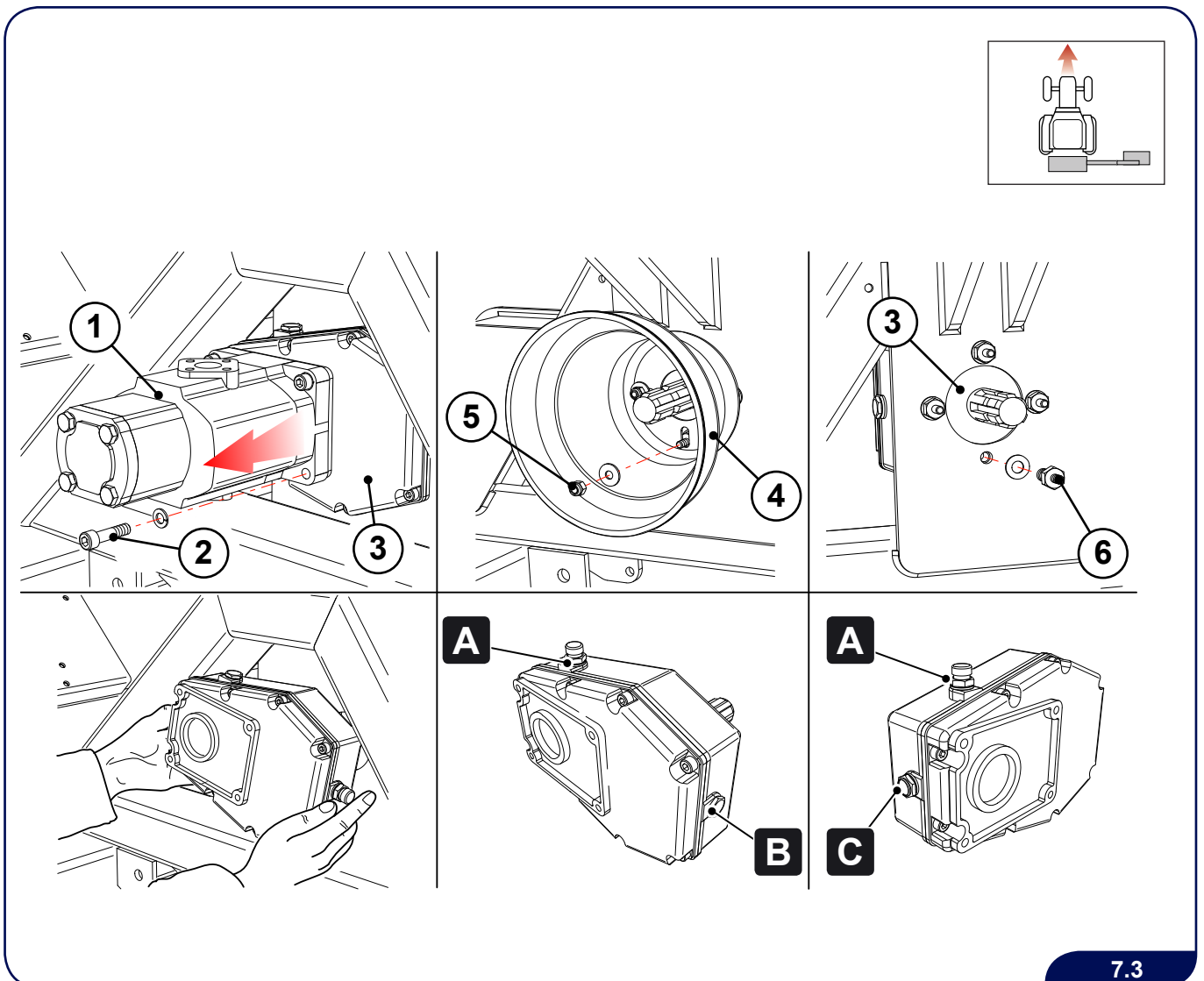


Replace the oil of gearbox every 500 hours.

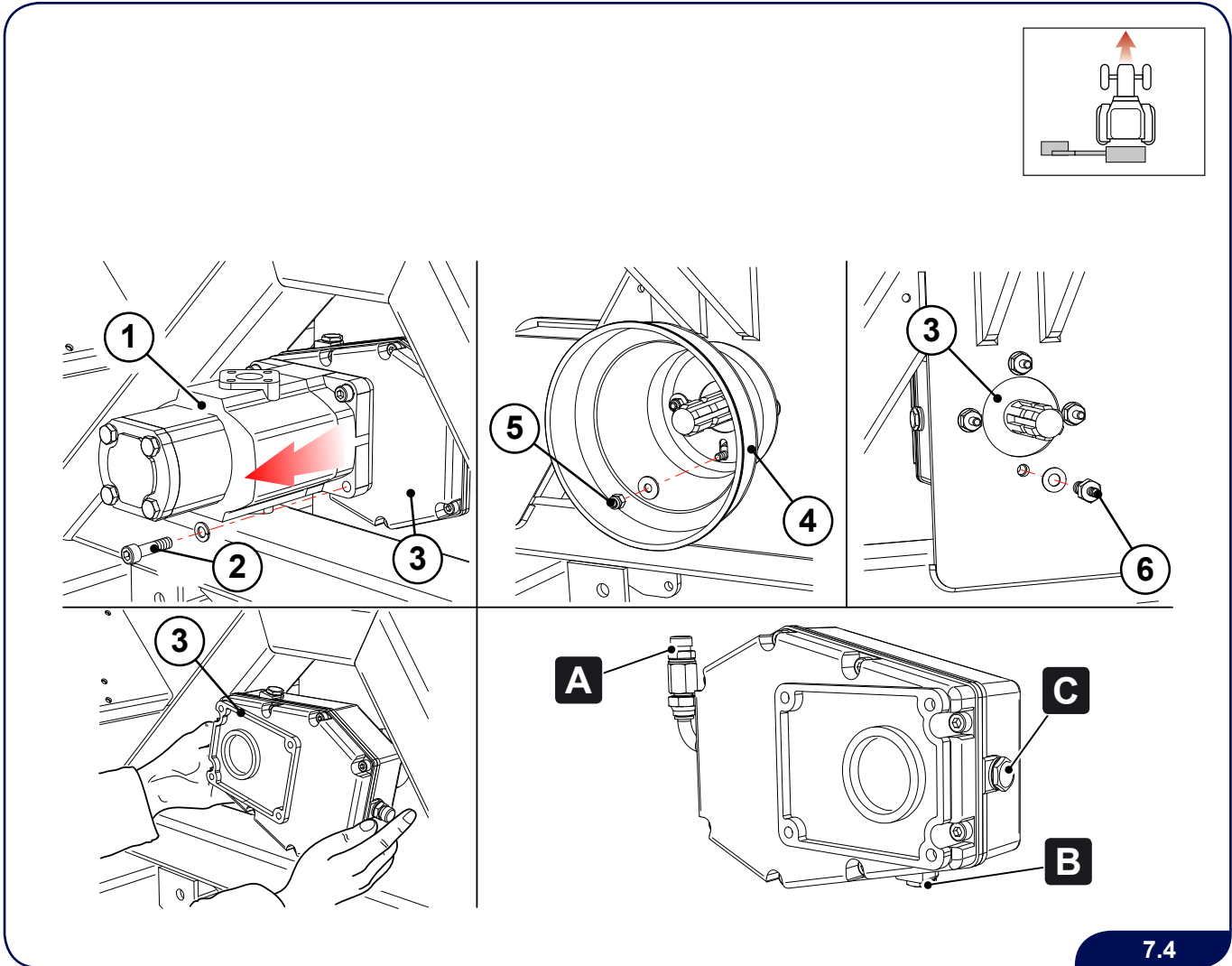
To change the oil in the gearbox, operate as follows;

- 1) disassemble the hydraulic pump (1) unscrewing the screws (2)
- 2) extract the hydraulic pump (1) to be able to remove the gearbox (3)
- 3) remove the protective cover (4) of the PTO unscrewing the fastening nuts (5)
- 4) unscrew the studs (6) that fix the gearbox (3) to the frame
- 5) extract the gearbox (3) from the frame
- 6) unscrew the vent cap (A) from the upper side and the blind cap (B) on the right side of the gearbox
- 7) let the exhausted oil come out of the gearbox, collecting it in appropriate containers and deliver it to the special oil collection centres, then screw the blind cap (B)
- 8) top up using the vent hole (A)
- 9) position the gearbox horizontally, then check, through the cap (C), that the level reaches the half of the cap itself.
- 10) re-positioning the vent cap (A), then re-fit the gearbox (3) following the reverse procedure.

07-Sostituzione olio moltiplicatore Decespugliatrice



7.3

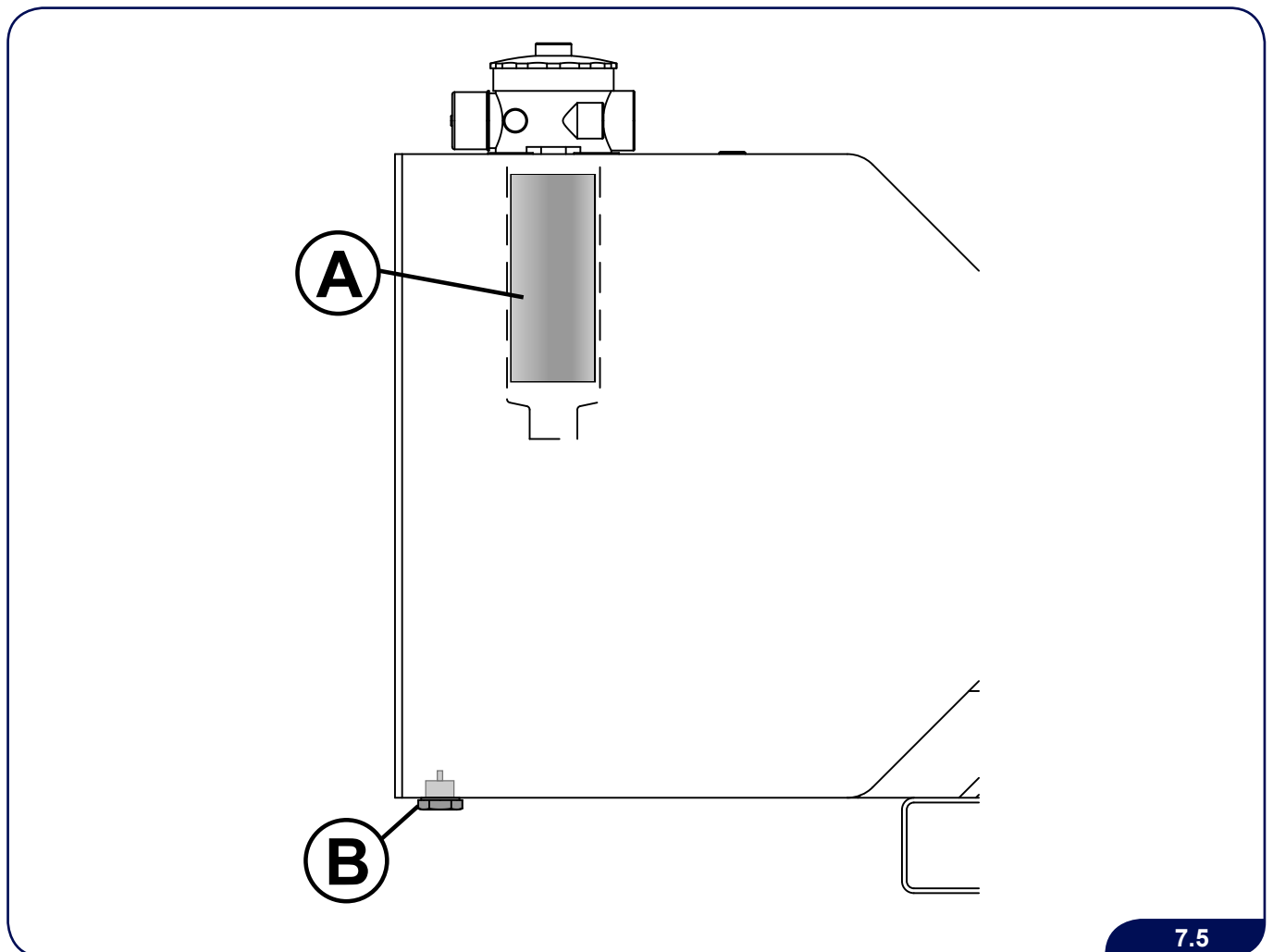


07-Sostituzione olio moltiplicatore Decespugliatrice

7.4

7.6 Replacing the oil and the filters

- ▶ Check the oil filter periodically. We recommend that you replace the oil filter cartridge (A) after the first 20 hours and then every 200 work hours and every 6 months. The oil level in the tank must be checked using the thermometer on the tank itself. It must be checked when the machine has the arms closed and the level must be between the two marks that indicate the minimum and maximum level.
- ▶ After 1000 hours of operation or in any case every 5 years, change all the hydraulic oil, letting it flow out of the cap (B).



07 - Sostituzione olio e filtri

7.5

7.6.1 Replacing oil filter cartridge

To replace the discharge oil filter of the hydraulic system perform these operations:

- ▶ remove the filter cover and the O-ring;
- ▶ remove the cartridge;
- ▶ replace the cartridge;
- ▶ replace the O-ring;
- ▶ close the filter cover.



The use of inadequate filters or the incorrect assembly of the same compromises the operation of the machine's hydraulic system. After maintenance and repair operations have been concluded, eliminate the spent filters in compliance with the anti-pollution regulations in force.



Carry out more demanding operations at specialised workshops.

7.7 Cleaning the Heat Exchanger

For good operation of the hydraulic system, clean the heat exchanger (if present) every 8 working hours.

- ▶ Use only compressed air at a maximum pressure of 2 Bar (29 PSI).
- ▶ Keep a safe distance of around 10 cm (4").
- ▶ Clean both the front and rear sides of the heat exchanger.



WARNING

Do not use water under pressure, in order to avoid possible damage to the heat exchanger fins and obstruction of the passage of air.

7.8 *Electrical system*



**Always use original spare parts and accessories.
Non-original parts invalidate the warranty, are dangerous and reduce the duration and performance of the machine.**

Prior to changing a blown fuse, switch off the machine.

Replace a fuse only after the cause of the fault has been eliminated.

Check the correct polarity and connection of the cables before connecting them to the tractor's battery.

Disconnect all the electrical connections of the machine's controls before performing any welding operation on the machine or the tractor.

7.9 Electric system diagnostics

In case of an electrical malfunction follow the diagnosis procedure. If the problem persists, contact an Authorised Ferri Assistance Centre.

The electronic control unit has a LED that provides information on the status of the control unit:

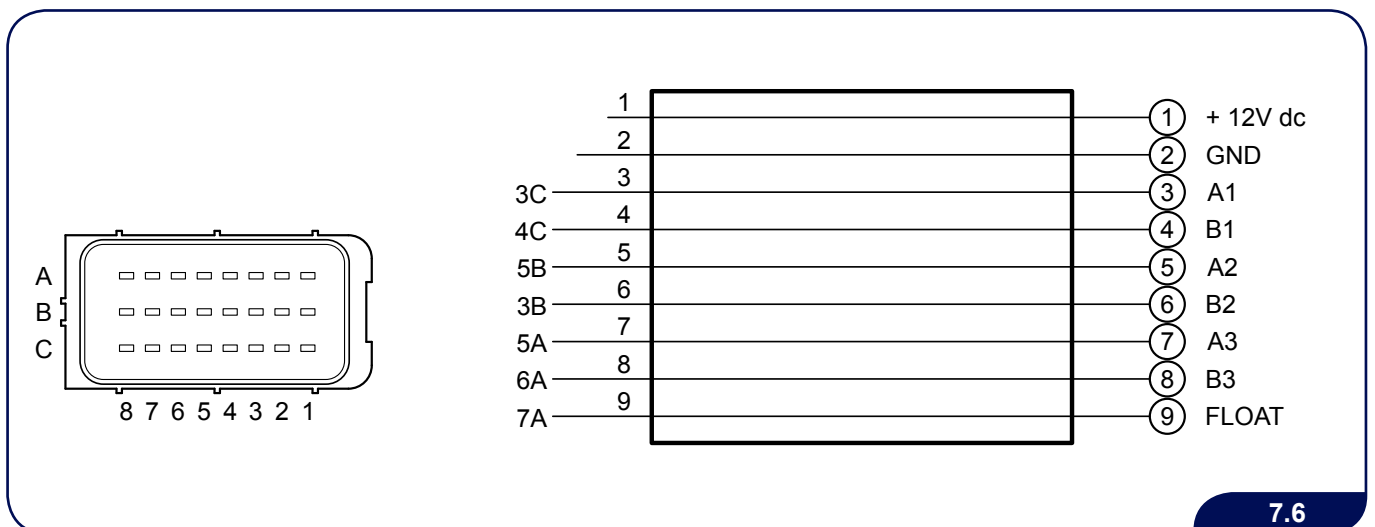
CODE 1	The LED stays on and every 3s blinks briefly	The control unit is working normally
CODE 2	The LED stays off and every 3s blinks briefly	There is a closed contact present. For example, when the system was switched on a button has been kept pressed.
CODE 3	The LED blinks 4 times and stays off for 3s	The general input valve is electrically damaged (problem with the coil, the connector or the wire)

The console does not provide any command:

- ▶ Check that the emergency mushroom pushbutton is not pressed.
- ▶ If the problem persists, check that the LED on the electronic control unit is blinking normally.
- ▶ If the LED is not blinking check that the fuse on the connecting cable from the battery (fuse of 8A) is intact. If damaged, replace it.
- ▶ If the LED is off, check that the power supply wiring of the electronic circuit board, a 2-pole connector, is intact.
- ▶ If the LED is off and is not blinking, the problem could be that the electronic control unit is not intact (please contact an Authorised Ferri Assistance Centre).
- ▶ If the LED on the electronic control unit is blinking normally and the console is not sending any command to the system, check that the wiring is intact.

The connector of the console has 16 poles.

07-Diagnostica Impianto elettrico



7.6

A command does not respond, whilst the other commands function normally:

- 1) Check if the command from the console is sent to the coil of the solenoid valve of the manoeuvre. In order to check: keep the power supply to the system on; the PTO of the tractor must not be enabled and the parking brake of the tractor must be engaged.
- 2) With a tester check if voltage reaches the coil of the solenoid valve when the electric command is operated. If no voltage reaches it, it means that the console wire to the control unit or the console button is causing problems. Contact an Authorised Ferri Assistance Centre.
- 3) Check the wiring from the control unit to the connector. Remove the connector and use a tester to check that the connectors of the distributor are being powered by the control unit. Check whether the console command is followed by a corresponding voltage output on the connector of the control unit (the pinout of the connector is shown below). If there is no voltage coming out of the control unit, the problem is located inside the control unit. Contact an Authorised Ferri Assistance Centre.
- 4) If there is no voltage, check that the wiring is intact. Check whether the command on the console is followed by a corresponding voltage on the connector of the coil of the solenoid valve of the same command. If no voltage reaches it, the problem is with the wiring. Contact an Authorised Ferri Assistance Centre.
- 5) If there is voltage present, there may be a problem with the solenoid valve of the distributor. Check whether the coil is intact. In order to check, replace the coil of the manoeuvre that is presenting the problem with another coil. If the problem does not persist and exists in the manoeuvre with the replaced coil, the problem is with the coil. Contact an Authorised Ferri Assistance Centre.

**CAUTION****Clean the electronic control unit and its wiring if they are dirty or wet:**

- 1) Disconnect the plug of the control unit;
- 2) Clean with a compressed air jet;
- 3) Spray an anti-rust product for electrical contacts.
- 4) Take care to apply some silicone (suitable for electric systems) to seal the screws of the type DIN electric connectors that might have been removed for maintenance operations.

7.9.1 Procedure for movement operation in case of electrical failure

In the case of damage to the electrical system, you can carry out manoeuvres in manual mode in order to allow closure of the arm in transport position and go to the nearest Authorised Service Centre.



Carry out the manoeuvres in manual mode making sure that there are no people within the working radius of the machine.
Carry out the operating interventions in manual mode and keep on the left hand side of the machine (external tank side).
Do not go in between the machine and the tractor.

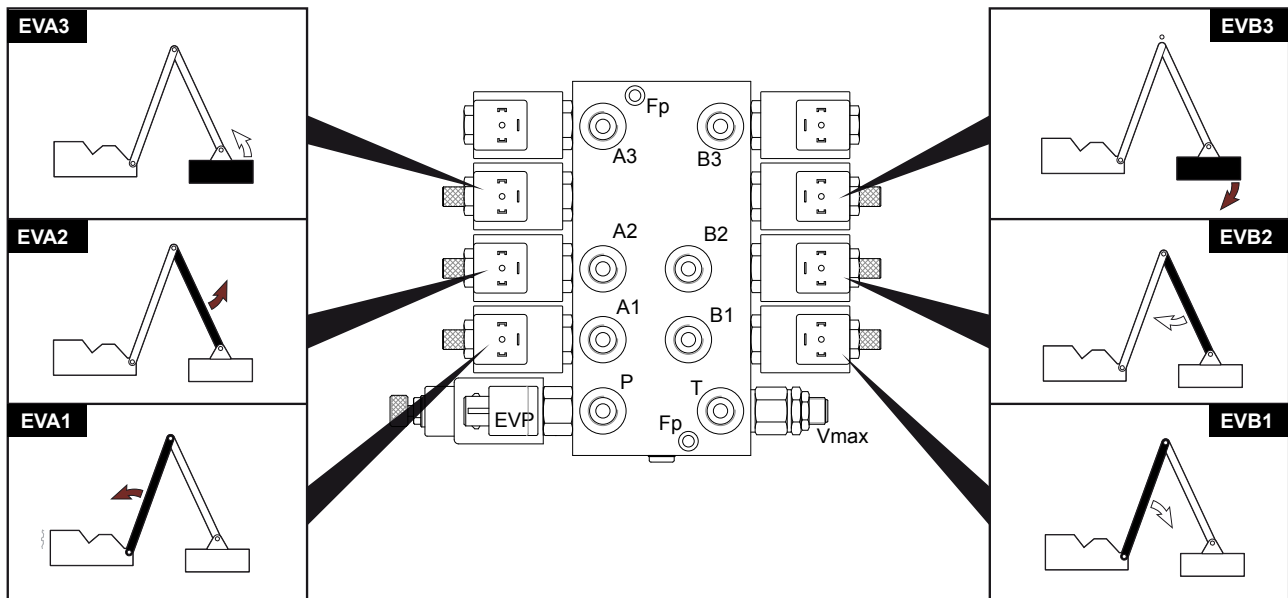
Procedure for manual operation of the distributor

Carefully follow the following procedures for manual operation of the distributor:

- 1) Start the tractor engine;
- 2) Make sure the parking brake of the tractor is engaged;
- 3) Check that the rotor commands are disconnected;
- 4) Operate the PTO of the tractor (the PTO must be regulated to 250-300 rpm in order to have a reduced flow of oil to the distributor and to operate more safely);
- 5) Leave the driving seat of the tractor and do not allow anybody else to access the cab;
- 6) Remove the protective casing of the distributor in order to access the distributor;
- 7) Start the movement procedure. Check that the pawls of the manual manoeuvres of the solenoid valves (EVA1-2-3 and EVB1-2-3) are fully tightened.
- 8) Tighten the manual manoeuvre pawl of the EVP solenoid valve: the distributor is now under pressure.
- 9) To carry out the manoeuvre, identify the solenoid valve that corresponds to this manoeuvre. In order to identify the correspondence between the solenoid valves and the manoeuvres refer to the list below. Unscrew the pawl of the solenoid valve. Carry out this operation very carefully, keeping your hand on the pawl. It is not necessary to completely unscrew the pawl since the speed of the manoeuvre can be regulated by adjusting it (screwing it reduces the speed, unscrewing it increases the speed). Proceed slowly with the unscrewing operation in order to minimise risks. In order to interrupt the movement, screw the pawl of the solenoid valve in fully again. The function remains active until the pawl is fully screwed in.
- 10) Follow the process described in point 9 to perform different manoeuvres.
- 11) Once the arm has been positioned correctly, check carefully that all the pawls of the solenoid valves EVA1-2-3 and EVB1-2-3 have been fully and completely screwed in. The pawl of EVP solenoid valve must be fully unscrewed.
- 12) **PAY VERY CAREFUL ATTENTION TO THE ABOVE POINT IN ORDER TO PREVENT UNCONTROLLED MANOEUVRES.**

In the event of electrical failure or while checking connections between the cable connectors and solenoid valves it is advisable to:

- 1) Unscrew the connector screw;
- 2) Remove the connector;
- 3) Check that there are no oxidised parts in the contact elements;
In the event of oxidation, clean carefully or replace;
- 4) Use anti-oxidants for electric contacts on the solenoid valve contacts and on the connector;
- 5) Assemble the connector on the solenoid valve;
- 6) Tighten the screws without making a hole in the connector so as not to damage it;
- 7) Apply silicone for electric contacts on the connector screw to seal it.



07-Diagnostica Impianto elettrico

7.10 Fastening the hydraulic hose couplings

Check that the hydraulic hose couplings have been correctly fastened (TAB 2).

TAB 2		
Screw thread type	Tightening torque MIN. N.m	Tightening torque MAX. N.m
1/8	12	14
1/4	14	16
3/8	25	28
1/2	45	60
5/8	55	70
3/4	90	110
1"	120	140
1" 1/4	170	190
1" 1/2	200	245



Tightening torque table for the cylindrical screw thread GAS UNI ISO 228 1 83 - BSPP

07-Serraggio viti (T460)

TAB 3	
Screw thread type	Tightening torque N.m
M12 x 1.5	20
M14 x 1.5	38
M16 x 1.5	45
M18 x 1.5	51
M20 x 1.5	58
M22 x 1.5	74
M24 x 1.5	74
M26 x 1.5	105
M30 x 2	135
M36 x 2	166
M45 x 2	290
M52 x 2	330







Tightening torque table for metric thread screws UNI 5541 - 65 UNI 5542 - 65

7.11 Bolt tightening

Check that the bolts are correctly tightened (TAB 3).

TAB 3															
STANDARD DIN 267		new ▶		4.8		5.8		6.8		8.8		10.9		12.9	
 ▼	 mm	Pitch		Pitch		Pitch		Pitch		Pitch		Pitch		Pitch	
		● mm	○ mm	● Nm	○ Nm	● Nm	○ Nm	● Nm	○ Nm	● Nm	○ Nm	● Nm	○ Nm	● Nm	○ Nm
M2	4	0,4	-	0,2	-	0,2	-	0,2	-	0,3	-	0,4	-	0,5	-
				0,2	-	0,2	-	0,3	-	0,4	-	0,5	-	0,6	-
M2.5	5	0,45	-	0,3	-	0,4	-	0,5	-	0,6	-	0,9	-	1,1	-
				0,4	-	0,5	-	0,6	-	0,8	-	1,1	-	1,3	-
M3	5,5	0,5	-	0,5	-	0,7	-	0,8	-	1,1	-	1,5	-	1,8	-
				0,6	-	0,8	-	1,0	-	1,3	-	1,9	-	2,3	-
M3.5	6	0,6	-	0,8	-	1,1	-	1,3	-	1,7	-	2,4	-	2,8	-
				1,0	-	1,3	-	1,5	-	2,1	-	2,9	-	3,5	-
M4	7	0,7	-	1,3	-	1,6	-	1,9	-	2,5	-	3,5	-	4,2	-
				1,5	-	1,9	-	2,3	-	3,1	-	4,3	-	5,2	-
M5	8	0,8	-	2,5	-	3,1	-	3,7	-	4,9	-	6,9	-	8,3	-
				3,0	-	3,8	-	4,5	-	6,0	-	8,5	-	10	-
M6	10	1,0	-	4,2	-	5,3	-	6,4	-	8,5	-	12	-	14	-
				5,2	-	6,5	-	7,8	-	10	-	15	-	18	-
M7	11	1,0	-	7,0	-	8,7	-	10	-	14	-	20	-	24	-
				8,6	-	11	-	13	-	17	-	24	-	29	-
M8	13	1,25	1,0	10	11	13	14	15	16	20	22	29	31	34	37
				13	14	16	17	19	20	25	27	35	38	42	46
M10	17	1,5	1,25	20	21	25	26	30	32	40	42	57	59	68	71
				25	26	31	33	37	39	50	53	70	74	84	89
M12	19	1,75	1,5	34	36	43	45	52	54	69	72	97	101	116	121
				42	45	53	56	64	67	85	89	119	125	143	150
M14	22	2,0	1,5	55	59	68	74	82	89	110	118	154	166	185	199
				68	74	84	92	101	111	135	148	190	208	228	250
M16	24	2,0	1,5	85	90	106	112	128	135	128	180	240	253	287	303
				106	113	132	141	159	170	212	226	298	318	357	382
M18	27	2,5	2,0	118	124	147	155	176	186	235	248	330	349	397	419
				145	155	182	194	218	233	290	310	402	436	490	523
M20	30	2,5	2,0	166	174	208	217	249	261	332	347	467	489	561	586
				206	218	258	273	310	327	413	436	580	614	697	736
M22	34	2,5	2,0	227	237	284	296	341	355	454	474	639	666	767	799
				284	299	355	373	426	448	568	597	798	840	958	1.008
M24	36	3,0	2,0	287	309	359	386	431	463	574	617	808	868	969	1.041
				357	390	446	488	535	586	714	781	1.004	1.098	1.204	1.317
M27	41	3,0	2,0	420	448	525	561	630	673	840	897	1.181	1.261	1.418	1.513
				525	570	656	712	788	855	1.050	1.139	1.477	1.602	1.772	1.923
M30	46	3,5	2,0	573	624	716	780	859	936	1.146	1.248	1.611	1.754	1.933	2.105
				714	795	893	994	1.072	1.193	1.429	1.590	2.009	2.236	2.411	2.648

07-Serraggio viti (T460)

SYMBOL	MEANING
	Screw
	Hex head
	Large
	Fine

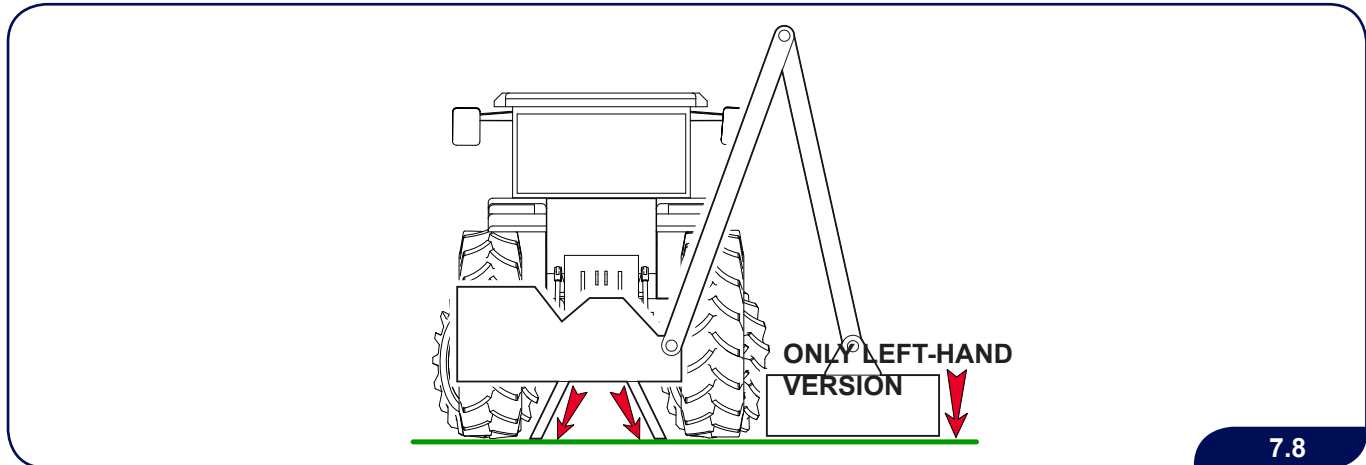
The torque values reported in table 3 correspond to 80% of the yield stress limit. In each column two values are reported of which the first refers to a friction coefficient of 0.10 and the second to a coefficient of 0.14. For our applications it is advised to refer to the values corresponding to the coefficient of 0.14.

The couplings are to be considered orientative in that they can notably vary in measurement in relation to the type of joint (rigid, semi-rigid, elastic etc.), the material on which the screws are tightened, the length of the screws, the type of screwdriver employed for tightening (impulse, friction, continuous torque etc.), the condition of the edging finish etc.

If the joint is carried out with nuts or self locking rings, the torque value should be increased by approx. 15%

7.12 Parking or storage

Whenever the machine will not be used for a long period of time, take the following measures to keep it in good condition and free of dust and rust.



7.8

- ▶ Park the machine on flat and firm ground, in order to prevent the risk of rolling over.
- ▶ Remove stabilisers (on the machines equipped with them).
- ▶ Lower the support feet and lock them. Close the booms and rest the end tool onto the ground. Position the machine on the ground using the tractor hydraulic lifting device.
- ▶ Remove the machine controls from the tractor cab.
- ▶ Disconnect any electric socket from the tractor.
- ▶ Thoroughly wash the machine in order to remove all debris, residues, dirt or mud.
- ▶ Make a general visual inspection of the machine to identify any structural damage and/or deep abrasions on the paintwork. Touch up all scratches and dents in the body with paint in order to prevent rust from forming. Replace and/or repair any damaged parts.
- ▶ Check for the integrity and the state of wear of the flails and supports. If worn, replace them.
- ▶ Check for the integrity of the accident-prevention guards of the machine. Replace and/or repair any damaged guards.
- ▶ Inspect all hydraulic hoses, couplers and fittings. Tighten any loose fittings. Replace any hose that is damaged, abraded or cut, or if the fitting crimping is damaged.
- ▶ Check that the original safety decals are intact, legible and in their correct positions. Immediately replace any damaged and/or illegible decals.
- ▶ If any lesions, abrasions or damage are found, make the necessary repairs.
- ▶ Grease all the mechanical parts, the tightening pins, and the hitch head to the PTO shaft. Make sure that all grease cavities have been filled with grease in order to remove any residual water left from cleaning the machine. This operation protects the seal of the bearings.
- ▶ Store the machine in an area sheltered from atmospheric agents and far from all possible human activities.
- ▶ Store the machine in a flat, dry area.
- ▶ Support the frame with the corresponding supports in order to increase the stability of the machine.
- ▶ Cover the machine with a tarpaulin, tying it suitably.
- ▶ To unhook from the tractor follow the instructions contained in this manual.



Never release used oil into the environment. Oil is classified as special waste and must be brought to the appropriate collection centres according to the regulations in force. Contact the nearest Collection centre for used oil.

8 EXTRAORDINARY MAINTENANCE



Always wear safety footwear, overalls, safety gloves and, if necessary, earmuffs and a dust mask during use and during machine maintenance, repair, handling and storage operations.



Before carrying out any type of maintenance:

- 1) Wait until all moving parts come to a complete stop;
- 2) Lower the machine to ground level;
- 3) Disconnect the power takeoff;
- 4) Switch off the engine of the tractor (or self-propelled machine);
- 5) Apply the parking brake;
- 6) Take out the ignition key;
- 7) Get off the tractor to check the extent of the problem;
- 8) Wait for the oil and the hot surfaces to cool down;
- 9) Proceed with any interventions required on the machine.

8.1 Pipe replacement



Any intervention or maintenance on the hydraulic system has to be carried out by specifically instructed personnel.

WARNING

- ▶ Before working on the hydraulic system, release all residual pressure, working with the engine off and using all the control levers.
- ▶ Pay particular attention to cleanliness: dust, chips or other material can cause an irreparable damage to the hydraulic components.
- ▶ Replace any damaged pipes with original spare parts. When fastening be careful not to twist them and bear in mind their complete range of movement.
- ▶ Do not spill any oil when replacing pipes. Collect the oil in containers and deliver it to the special oil collection centres.



Check the state of wear of the hydraulic pipes every day. Replace them in the case of abrasions or cracks.

WARNING



Change the hydraulic pipes at least every 6 years.

WARNING



Remember to open the oil suction cocks after replacing the hydraulic pipes. The pump only needs to rotate "dry" for a few seconds to be irretrievably ruined.

CAUTION



Periodically check the state of the filters and the level of hydraulic oil in the tank in order to avoid contamination, overheating or other damage to the hydraulic system.

CAUTION

8.1.1 Replacing the pipes in the hydraulic stopping devices

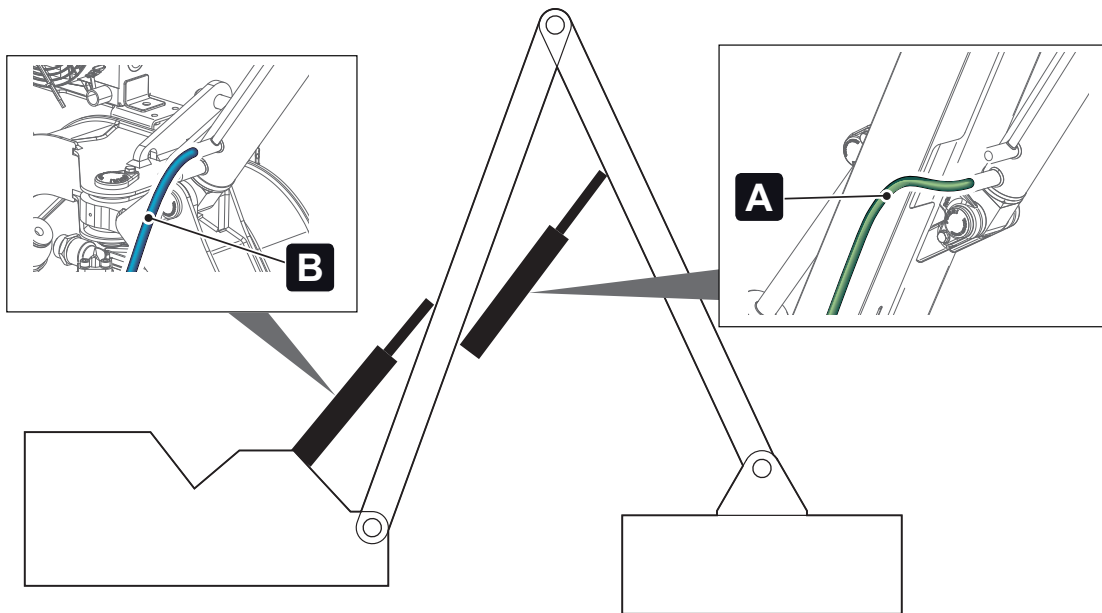


Any intervention or maintenance on the hydraulic system has to be carried out by specifically instructed personnel.

The flexible pipes refer to the hydraulic rams for moving the arms.

- 1) Open the arms in order to lower the end tool onto the ground.
- 2) Switch off the engine, apply the parking brake and remove the ignition key from the dashboard.
- 3) Make sure that there is no pressure inside the hydraulic system.
- 4) If the pipe to be replaced is burst: support the arm with suitable equipment and replace the pipe.

08-Sostituzione tubi flessibili del dispositivo di bloccaggio idraulici



8.2 *Pin replacement*

Carry out this operation by means of a lifting device or hoist, to avoid parts that are not fixed from falling or causing a loss of balance.

When replacing parts, clean and grease their housing.

9 TROUBLE SHOOTING CHART



Always wear safety footwear, overalls, safety gloves and, if necessary, earmuffs and a dust mask during use and during machine maintenance, repair, handling and storage operations.

9.1 Trouble shooting chart

The maintenance operations authorised by FERRI srl are the ones indicated in Chapter 7 – “ROUTINE MAINTENANCE”.

The content of this chapter is not exhaustive. Instead, it aims to provide information on the most common problems in order to help specialised technicians to find the fault in question.

The suggestions provided under “REMEDIES” in the following tables **DO NOT AUTHORISE** interventions that may compromise safety.



WARNING

To replace damaged the parts or flails, contact the specialised personnel of the FERRI Assistance Service or authorised dealers.

9.1.1 General

The following information regards common problems that occur in all the machines (flail heads, shredders, flail hedge mowers, etc) and problems typical of specific types of machine.

PROBLEMS	PROBABLE CAUSE	REMEDIES
Irregular cut	Worn, bent or broken flails	Replace
	The machine is not positioned parallel to the ground	Adjust the stabilizers connected to the tractor or the flail head rotation hydraulic ram
	Difficulty in unloading chopped material caused by excessive advance speed	Reduce advanced speed
	The rotor turns at insufficient rpm	Check the rpm on the tractor PTO and adjust it to the number of rpm required by the machine (see the machine technical data)
	Damaged motor and/or pump	Repair or replace the motor or the pump
	Slipping of the belts on the pulleys	Correct the belt tension

PROBLEMS	PROBABLE CAUSE	REMEDIES
Incorrect cutting height	Incorrect roller position	Adjust the roller in order to reduce or increase cutting height
Excessive machine operating noise	Loose bolts	Check and correct the tightening of screws and nuts if necessary
	Machine with cracks or initial signs of breakage	Have the frames repaired at authorised Ferri workshops. Check to see if there are any moving parts unbalanced and correct the defect
	Worn bearings	Replace
Gearbox noise	Lack of oil	Fill to level
	Worn or damaged gears	Repair or replace
	Worn or damaged bearings	Repair or replace
Premature flail wear	Flails touch the ground or work on rocky soil	Adjust height of cut
Breakage of roller bearings	Violent impact on the ground when the machine is lowered	Lower it gently
	Dirty or little greased bearings	Clean and/or grease
Flail-holder shaft speed decreases	The hydraulic circuit loses pressure	Check the efficiency of the pump and the hydraulic motor. Check the hydraulic system pressure settings. These checks must be performed at specialised workshops

PROBLEMS	PROBABLE CAUSE	REMEDIES
Vibrations	Broken, worn or missing flails	Replace the flails
	Unbalanced flail holder shaft	Check rotor balancing and have repairs or replacements made in authorised Ferri workshops
	Worn flail holder shaft bearings	Have it replaced in specialised workshops
	Moving parts unbalanced	Identify the part responsible for the problem (unbalanced rotor, defective bearing, broken or missing flail, etc.) and have it repaired or replaced at authorised Ferri workshops
	Couplings at the two ends of the PTO shaft out of parallel alignment	Check the coupling of the machine to the tractor and check the adjustments
	Flails blocked	Stop the machine and free them
	Plant waste or foreign objects wrapped around the rotor shaft and/or the cutting flails or encrustation visible on the cutting tools or supports	Remove waste/foreign objects or replace cutting tools (in this case, always replace opposing pairs). Clean the rotor and the cutting flails
	Loose bolts	Check and correct the tightening of screws and nuts if necessary
	Rotor flanges not perfectly adherent to the walls of the machine. Deformed machine side panels	Check the conditions of the machine side panels and repair if necessary. Check the correct assembly of the flanges and the tightening of the screws

PROBLEMS	PROBABLE CAUSE	REMEDIES
Hydraulic oil overheating (over 80°C)	Excessive material to chop	Reduce advance speed
	Hydraulic system requires checking	Get an authorised FERRI workshop to check the state of the filter, the hydraulic pipes, the setting of the valves etc.
	Malfunctioning heat exchanger	Check the electric system for the heat exchanger and thermostat
	Excessive rotor rpm	Check the tractor PTO rpm and reduce it as prescribed for the machine in use
Excessive backlash in the arms and joints	Worn pins or bushes	Replace
Flail-holder rotor speed is lower than expected	Loose belts	Restore right belt tightness
The flail head shifts backward during working	Incorrect max. pressure valve setting	Have valve pressure setting checked at authorised Ferri workshops
	Leakage of oil from hydraulic ram	Check the hydraulic ram oil seals and sealing in general and have repairs or replacements made at authorised Ferri workshops
	Advance speed excessive for the type of working being performed	Reduce advanced speed
Arm lower involuntarily	Excessive oil leakage from the hydraulic ram; oil seals worn-out inside the hydraulic ram	Check the hydraulic ram oil seals and sealing in general and have repairs or replacements made at authorised Ferri workshops
Excessive stiffness of the arm during work	Incorrect max. pressure valve setting	Have valve pressure setting checked at authorised Ferri workshops
Belts overheating	Belt slipping. Excessive belt tension	Check the pre-tension of the belts
	Working speed not suitable to the quantity of material to chop	Reduce work speed
	Flails touching the ground	Adjust height of cut

PROBLEMS	PROBABLE CAUSE	REMEDIES
Leakage of oil from motor	Motor gasket damaged	Replace motor gasket
		Check the condition of the discharge filter and replace if necessary
	Oil leakage onto the motor	Check the condition of the joints, seals, and hoses (especially for drainage). Replace if clogged or damaged
Pump makes excessive noise	Pump worn-out or damaged	Repair or replace the pump at authorised Ferri workshops. Check the condition of the discharge filter and replace if necessary
	Wrong oil in the hydraulic system	Check the condition of the oil in the tank and change if necessary
Pump makes excessive noise	Pump worn-out or damaged	Repair or replace the pump at authorised Ferri workshops. Check the condition of the discharge filter and replace if necessary
	Wrong oil in the hydraulic system	Check the condition of the oil in the tank and change if necessary
Difficulty in sliding out the PTO shaft	PTO shaft not lubricated	Lubricate the PTO shaft
	Bent PTO	Replace the PTO
Excessive play in the arm pins	Worn pins	Replace the pins
	Worn bushings	Replace bushings
Excessive noise from the arm hinges	Insufficient lubrication for clogging in the lubrication duct	Check the condition of the grease gun, clean and replace if damaged. Check clogging in the lubrication duct

PROBLEMS	PROBABLE CAUSE	REMEDIES
Irregular arm operation	Manoeuvre speed not suitable	Adjust the number of tractor PTO rpm
		Adjust the manoeuvre speed of the function involved by means of adjustable choke (if present). Otherwise, contact an authorised workshop
	Air present inside hydraulic circuit	Bleed the air from inside the circuit
Flail head rotor fails to start	Limited hydraulic flow	Check motor operation. Repair or replace motor
		Make sure that the hydraulic hoses are not clogged or damaged. Repair or replace the hydraulic hoses
		Make sure that the discharge filter or delivery filter (if present) is not clogged. If it is clogged, replace it
	Check the rotor distributor flexible hose control cable. Adjust the cable	
	Mechanical transmission missing	Check bevel gear pair box operation. Repair or replace
Leakage of oil from the pump	Oil excited from the pump	Check the condition of the joints, seals, and hoses (especially for drainage). Replace if clogged or damaged
Belts break too soon	Belt tension too high	Check the pre-tension of the belts
	Pulleys out of alignment	Align the belts
	Flails touch the ground	Adjust height of cut
	Tractor has more power than can be withstood by the machine	Connect the machine to a tractor with adequate power
Belts slip on pulleys	Insufficient belt tension	Check the pre-tension of the belts

10 SCRAPPING AND DISPOSAL

If the machine is to be scrapped, it must be disposed of in suitable waste disposal sites in accordance with the regulations in force.

In the case of demolition of the machine, all parts that could constitute a hazard must be made safe.

Recover any old oil and dispose of it in special oil disposal centres.

Before scrapping the machine, separate plastic or rubber parts, electric and electronic material.

The materials that make up the machine, and which must be disposed of in a differentiated manner, are:

- ▶ Steel
- ▶ Mineral oil
- ▶ Rubber
- ▶ Plastic
- ▶ Electrical system wires

The parts consisting exclusively of plastic, aluminium and steel can be recycled at appropriated differentiated collection centres.



Never dispose of used oil into the environment. Oil is classified as special waste and must be brought to the appropriate collection centres according to the regulations in force.

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11 WARRANTY

At the moment of delivery, check that the machine and the disassembled accessories have not been damaged by transport or handling.

Any complaints must be sent in writing to FERRI within 8 (eight) days of the date of receiving the machine, enclosing a copy of the delivery documents countersigned by the person in charge of transport or handling.

The purchaser can exercise his rights under the warranty only if he has:

- ▶ Respected the clauses in the supply contract;
- ▶ Respected the general warranty conditions, indicated on the coupon "General Warranty Conditions", with all the parts filled in, and signed the DELIVERY CERTIFICATE.

For the replacement of machine parts, use only original spare parts supplied by the Manufacturer or by authorised dealers.

When ordering spare parts, specify the data listed on the machine identification plate, in particular:

- 1) Series
- 2) Year of manufacture
- 3) Serial number

FERRI ensures the spare parts for a minimum period of **10 years from the end of production of the series**.

11-GARANZIA

Distributor Stamp

Machine Model

Serial N°

Date

Series

To fill out by the Distributor with user's details

FERRI

WARRANTY COUPON

Date

Surname Name

Company Ragione Sociale User Signature

Address

City or Town State/Prov Postal

Telefono Fax

Distributor stamp and signature

Serial N° Series

Machine Model

Taken note of the Use and Maintenance Book and of the use's rules (Safety Rules included)

User Signature (legible)

11.1

11.1 Voiding of the Warranty

THE GUARANTEE IS NO LONGER VALID WHEN:

- ▶ The fault is due to errors in manoeuvring;
- ▶ Routine maintenance has not been carried out;
- ▶ Routine maintenance has been performed in a way that is technically incorrect;
- ▶ Routine maintenance has been carried out by unqualified personnel;
- ▶ The power limit of the machine has been exceeded;
- ▶ **Spare parts are used that are not original and at any rate not supplied or authorised by FERRI;**
- ▶ The instructions contained in this manual have not been followed;

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11-GARANZIA

12 OPTIONAL UNITS



Always wear safety footwear, overalls, safety gloves and, if necessary, earmuffs and a dust mask during use and during machine maintenance, repair, handling and storage operations.



Before carrying out any type of maintenance:

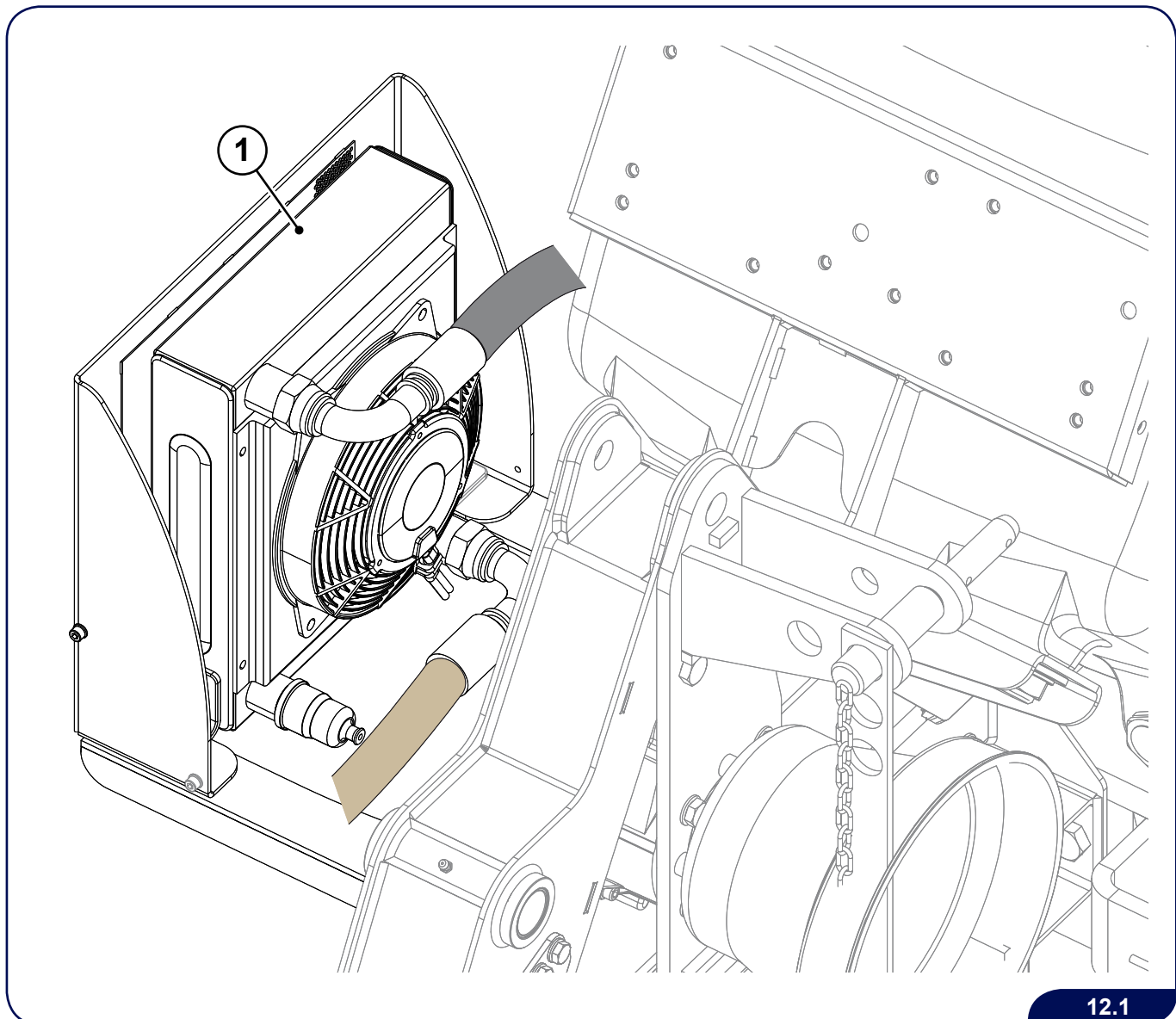
- 1) Wait until all moving parts come to a complete stop;
- 2) Lower the machine to ground level;
- 3) Disconnect the power takeoff;
- 4) Switch off the engine of the tractor (or self-propelled machine);
- 5) Apply the parking brake;
- 6) Take out the ignition key;
- 7) Get off the tractor to check the extent of the problem;
- 8) Wait for the oil and the hot surfaces to cool down;
- 9) Proceed with any interventions required on the machine.

12.1 Air-oil heat exchanger



The illustrations are purely indicative. Some elements might not graphically correspond to those actually fitted to the machine.

The heat exchanger (1) is particularly useful when the machine undergoes long periods of demanding work or is exposed to hot climates. When the hydraulic oil reaches a temperature of 50°C, the thermostat trips and the 12V/25A electrofan (powered by the tractor) switches on.



12-Scambiatore di calore aria-olio (T320)

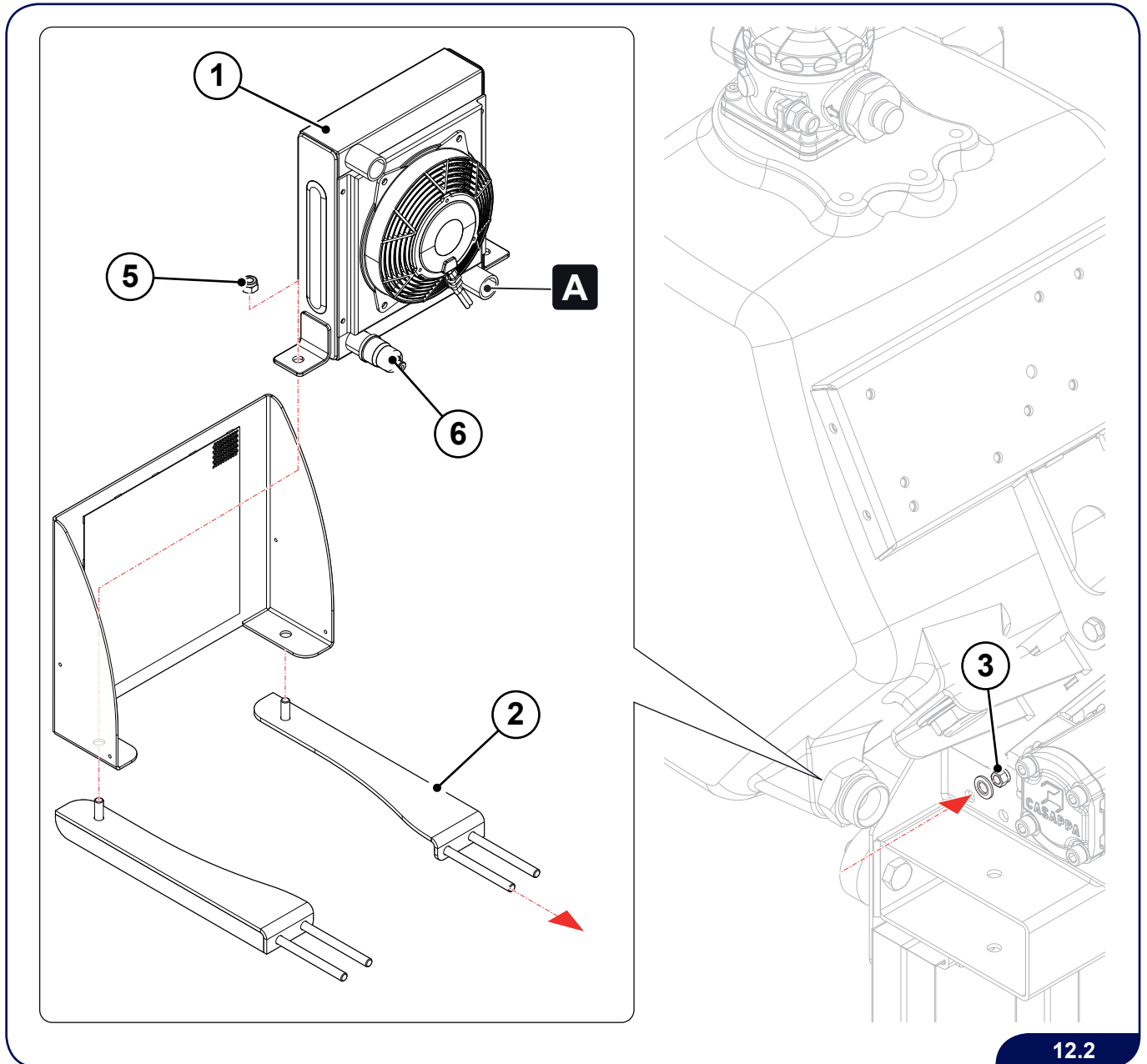
12.1

12.1.1 Assembly instructions

In order to assemble the kit, proceed as follows:

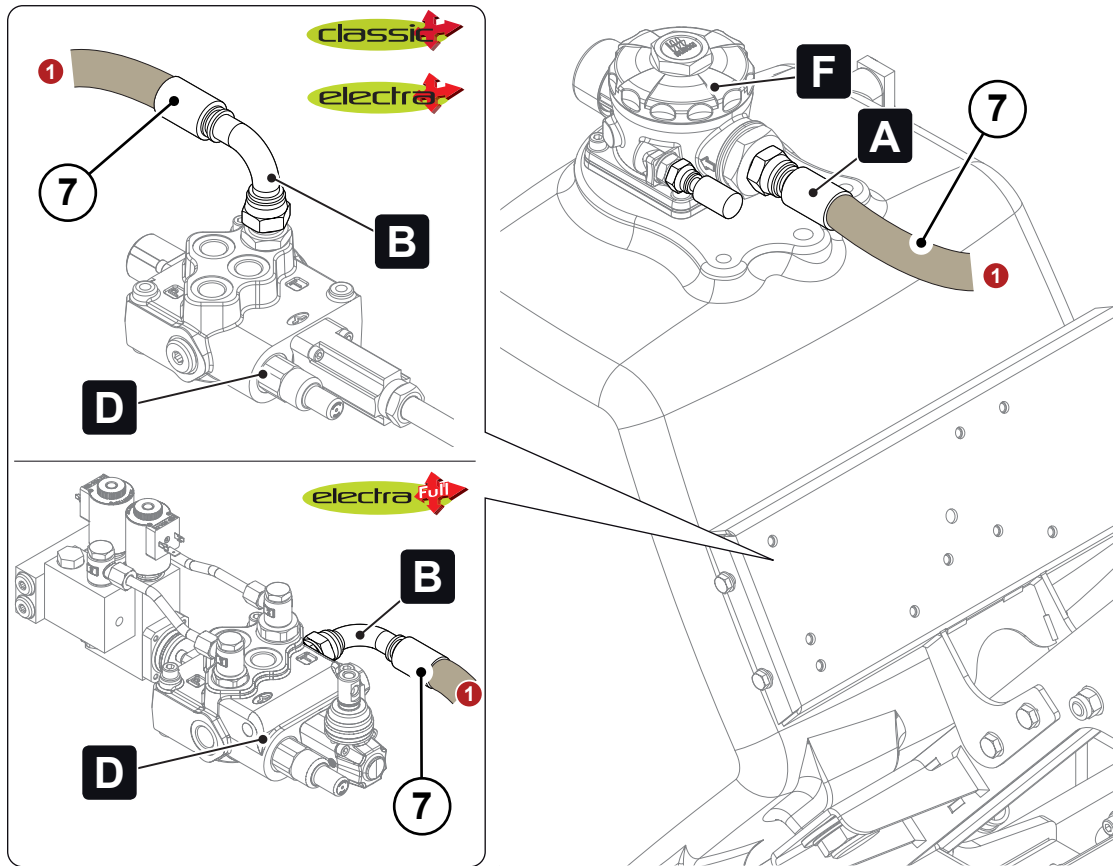
- 1) Secure the heat exchanger support (2) to the frame using the nuts (3).
- 2) Secure the heat exchanger (1) to the heat exchanger support (2) using the nuts (5).
- 3) Remove the caps from the heat exchanger (1) and fit the thermostat (6).

12-Scambiatore di calore aria-olio (T320)



12.2

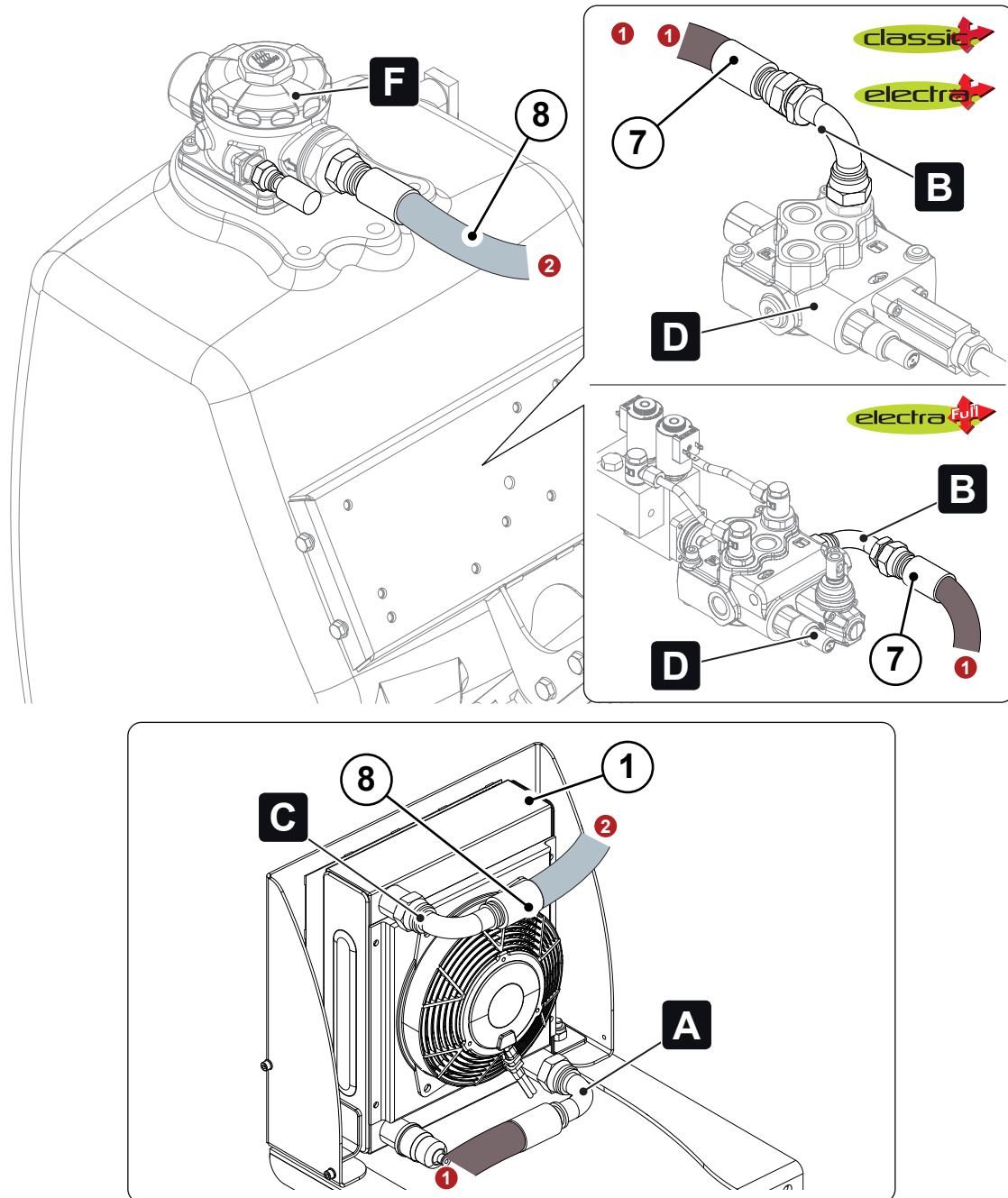
- 4) For convenience purposes, **A** and **B** are referred to as the ends of the hose (7), that are connected to the filter **F** and control valve **D**, respectively. Disconnect the hose (7) from the filter **F**.



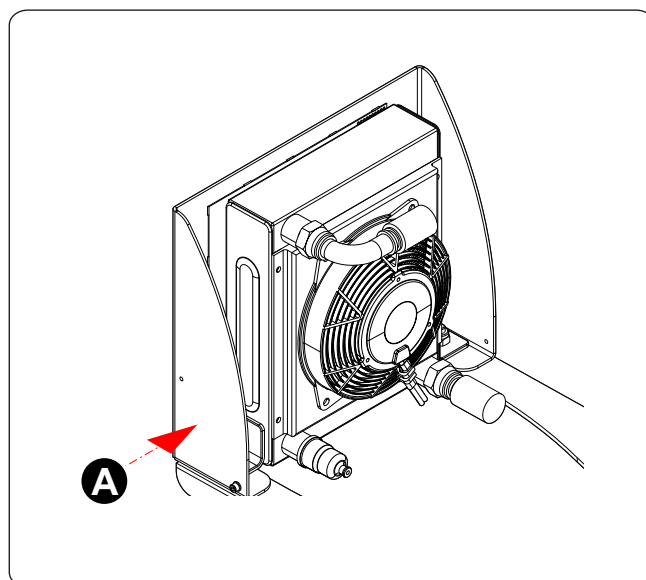
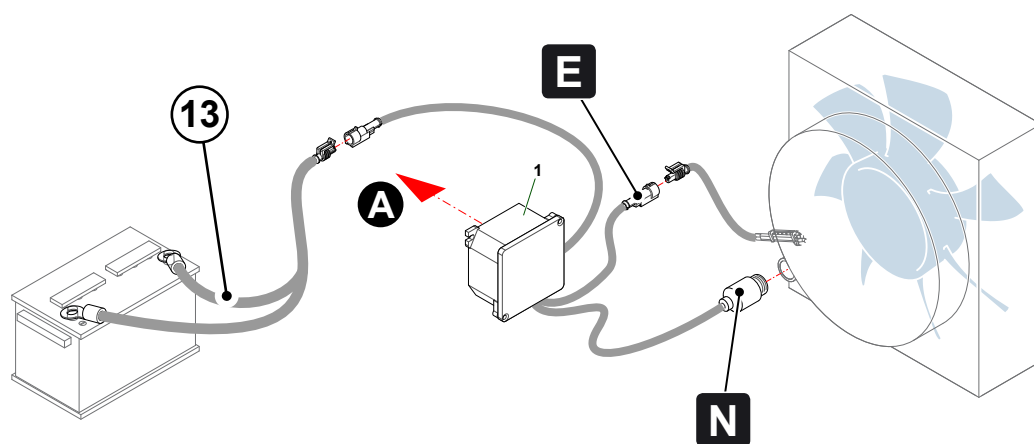
12-Scambiatore di calore aria-olio (T320)

- 5) Couple the end **A** of the pipe (7) with the exchanger (1) lower side outlet.
- 6) Couple the 90° elbow end of the hose (8), provided with the kit, with the exchanger (1) upper side outlet (end **C**).
- 7) Couple the free end of the hose (8) with the filter **F**, in the position in which the end **A** of the hose (7) was previously fastened.

12-Scambiatore di calore aria-olio (T320)



- 8) Perform the electrical connections (**N**) and (**E**) as indicated in the figure. Connect the cable provided (**13**) directly to the battery taking care **NOT TO REVERSE THE POLARITY.**



12-Scambiatore di calore aria-olio (T320)

12.2 1st boom dual effect kit



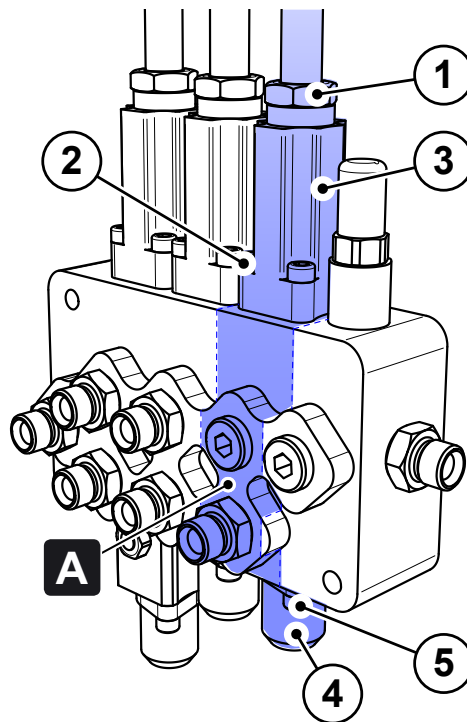
This kit is an option **ONLY** for RH machines, while it is provided as standard in LH machines.

The 1st boom dual effect kit makes it possible to work in a vertical position without the boom falling into rest position. This device improves the sensitivity of the tool.

12.2.1 Assembly instructions

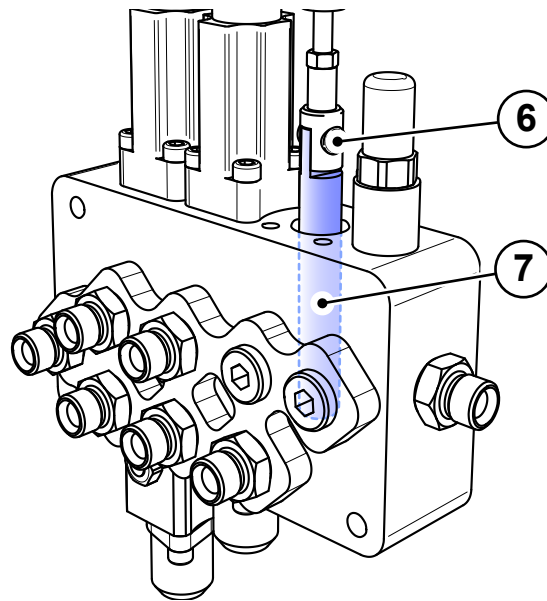
- ▶ Identify the control valve element (**A**) that controls the 1st boom (easily recognisable since it has only one hose), then fully unscrew the lock nut (1) of the cable pulling device and the four screws (2) that fasten the slider upper cover (3).
- ▶ Then, tighten the cable adjuster until the cover (3) is completely raised.
- ▶ Disassemble the lower cover (4) of the slider using the corresponding screws (5).

12-Kit doppio effetto 1° braccio (T430)



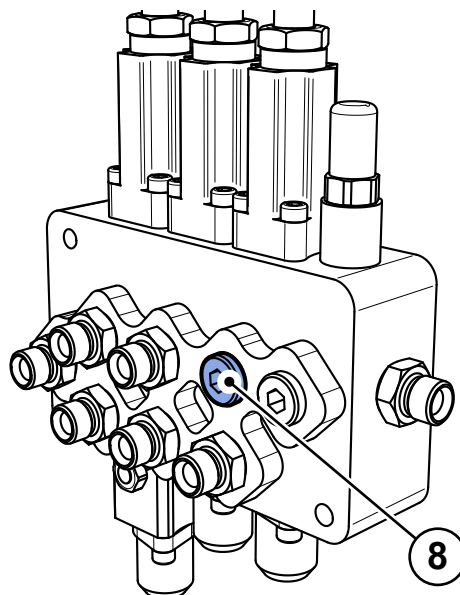
12.6

- ▶ Remove the cable retainer (6) from the slider, pushing from one of the two sides.
- ▶ Pull out the slider (7) pushing it from above until it comes out of the control valve (a certain oil amount will come out).
- ▶ Fit the spring, placed on the lower side of the slider, then re-fit it on the slider provided with the kit.
- ▶ Insert the new slider in the control valve, reconnect the control cable by means of the retainer (6), then re-fit the lower (4) and upper cover (3).
- ▶ Adjust the stroke of the first boom control lever so that it does NOT move idle.



12.7

- ▶ Unscrew the blind cap (8).

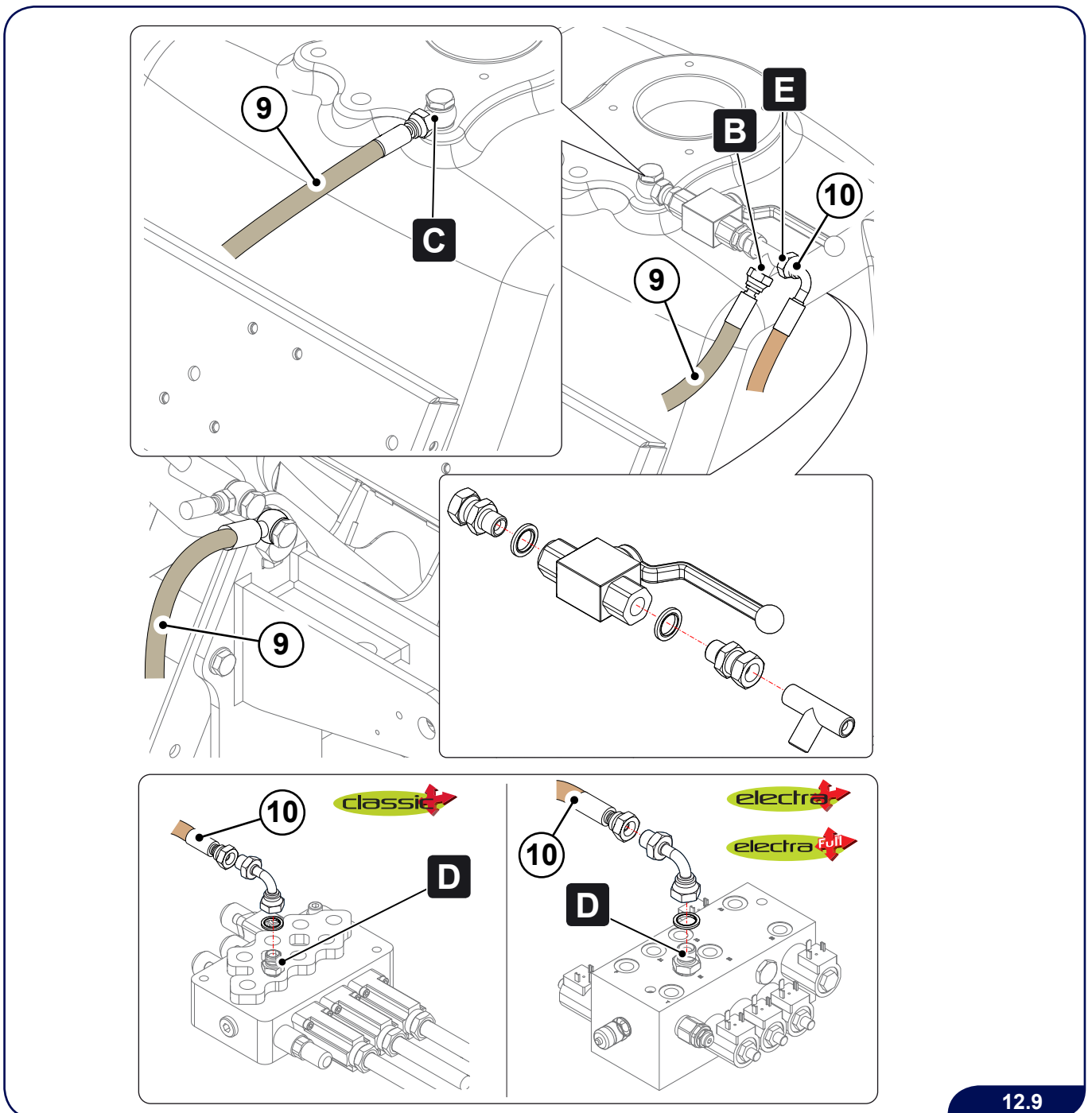


12.8

12-Kit doppio effetto 1° braccio (T430)

- ▶ Disconnect the end part of the hose (9) from the tank (point C).
- ▶ Fit the components provided with the kit to Point C and make sure you observe the assembly sequence shown in the figure below.
- ▶ Connect the end part of the hose (9) as shown in the figure (Point B).
- ▶ Install the components provided with the kit on the control valve (Point D) and make sure you observe the assembly sequence shown in the figure below.
- ▶ Connect the hose (10) (provided with the kit) as shown in the figure (Points D-E).

12-Kit doppio effetto 1° braccio (T430)



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12-Kit doppio effetto 1° braccio (T430)



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