# VALIANT V650
# INVICTUS K600

## AR RS MT

User and maintenance booklet

Translation of the original instructions – English -
Instructions comply with standard ISO 3600:1996

# Chapter 1: Premise



## Contents

# Section 1: Introductionand safety

| Note: |
| --- |
| Carefully store this “user and maintenance booklet” and consult it regularly. |

The purpose of this publication is to allow the owner and operator to use the tractor in complete safety.

The installation of the product by the dealer also ensures that these user and maintenance instructions have been understood correctly. Nevertheless, if you do not understand parts of this booklet, do not hesitate to contact our dealer since it is important that these instructions are understood and observed. Daily maintenance should be carried out regularly and the vehicle operating hours should be recorded in a register.

When replacement parts become necessary, use only original spare parts. Authorized retailers supply original spare parts and can give advice on their assembly and use. The installation of spare parts of a lower quality could cause extensive damage. The customer should therefore acquire the necessary spare parts exclusively from an authorized retailer.

Because of the considerable diversity of the conditions of use, the company cannot provide fully up-to-date and complete publications on the performance and methods of use of the vehicles it manufactures. It therefore cannot assume responsibility for loss or damages deriving from what is published or any error or omission. If the vehicle must be used in particularly heavy, abnormal conditions (e.g. in deep water or very muddy soil), we recommend contacting your retailer for special instructions to prevent annulment of the warranty.

The manufacturer of the tractor will not accept any responsibility for damage or injury due to improper use of the vehicle, any related risks being the responsibility of the user.

This machine is designed exclusively for generic agriculture works or similar.
Use in any other environment is considered improper use.

Compliance with and strict observance of the conditions of use, servicing, and repair specified by the manufacturer are also an essential part of envisaged use.

To use, service and repair this tractor, all of its special characteristics and the relative safety (accident prevention) standards must be fully understood.

Customers should contact an official retailer about any servicing or tuning problems.

Since operator safety is one of the main concerns of those who design and develop new tractors, the designers try to provide as many safety devices as possible. In spite of this, each year many accidents occur which could have been avoided if the operator had been less hasty and more cautious when handling machinery and farming equipment. Read and follow the safety instructions reported in detail in this chapter of the manual carefully.

Unless otherwise indicated, the data and information contained in this manual apply to all models.

The content of this manual corresponds to the latest technical information available at the time of printing. The manufacturer reserves the right to make changes at any time without advance notice or penalty.

In addition to the present instruction booklet, each tractor is delivered with a user and maintenance manual for the engine, which is an integral part of the supplied documentation.

# Section 2: Tractor identification

The tractor is identified by the data engraved on the identification plate on the right side of the gearbox guard. (Fig. 1.1).

To ensure prompt and efficient service, this data must be provided when ordering spare parts or requesting technical information or clarifications.

| | |
|---|---|
| Type of tractor | |
| Tractor type-approval number | |
| Identification number | |

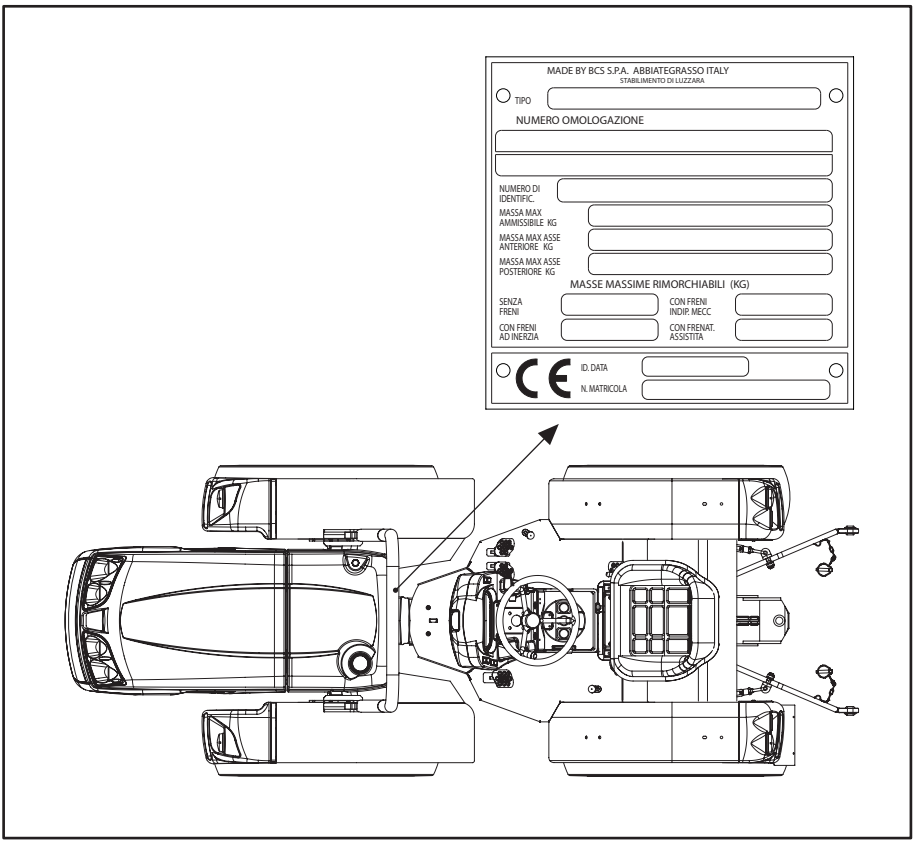


**Fig. 1.1**

# Section 3 : Engine identification

**VM "D753 TE3" motor.**

The engine is identified by the data engraved on the identification plate on the front of the engine itself (Fig.1.2).
To ensure prompt and efficient service, this data must be provided when ordering spare parts or requesting technical information or clarifications.
Contact VM regarding all interventions and notifications.

| | |
|---|---|
| Engine type-approval number | |
| Type of engine | |
| Technical characteristics | |

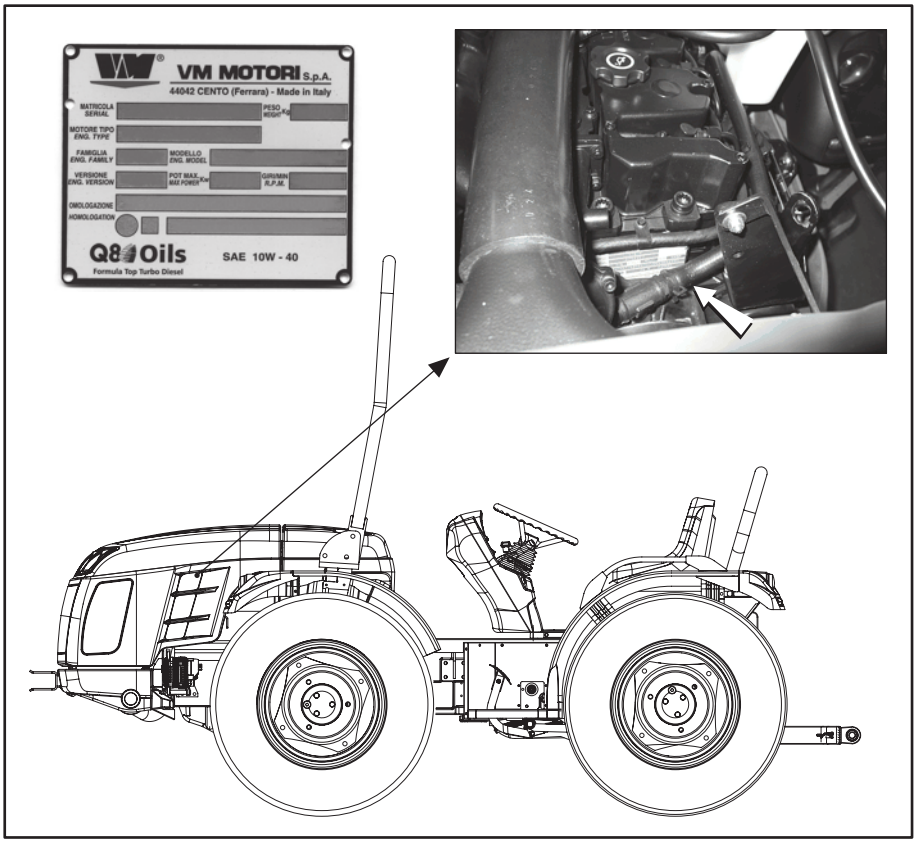


**Fig. 1.2**

**Kubota "V2203-M-DI-E" motor.**

The engine is identified by the data engraved on the identification plate on the top side of the engine itself (Fig.1.2.1). To ensure prompt and efficient service, this data must be provided when ordering spare parts or requesting technical information or clarifications.
Contact Kubota regarding all interventions and notifications.

| | |
|---|---|
| Engine type-approval number | |
| Type of engine | |
| Technical characteristics | |

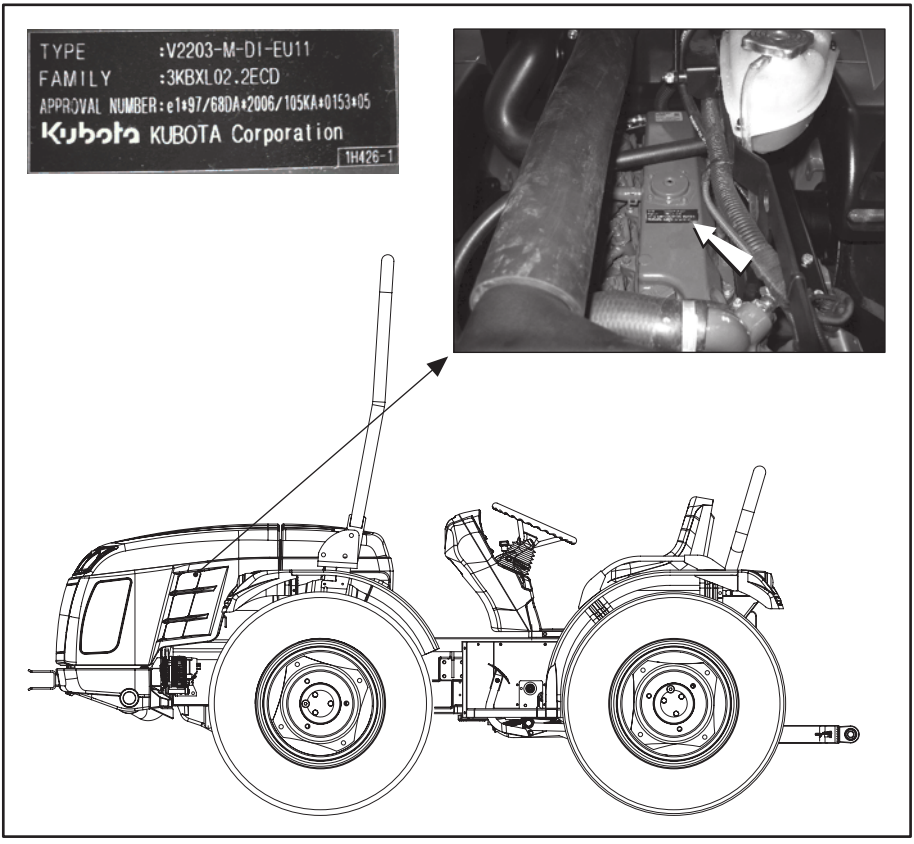


**Fig. 1.2.1**

## Section 4: Warranty

Bcs products are covered by a warranty that, under certain conditions, protects against material and construction defects. This booklet is published for worldwide circulation. The precise warranty terms and conditions regarding retail sales in each country therefore cannot be precisely described in detail. Purchasers of new tractors are kindly asked to request all of the details from the retailer where the tractor was purchased.

The retailer or dealer is obliged to supply certain services when delivering a new tractor to the customer. These services include thorough preliminary testing at the time of delivery to ensure that the vehicle can be used immediately as well as an explanation of all of the instructions on the main principles of use and maintenance. These instructions regard the instruments and controls, periodic maintenance and precautionary safety measures. This training course must be provided to all people who will use and maintain the tractor.

| Note: |
| --- |
| The tractor's manufacturer does not accept any responsibility for complaints due to unapproved installation of components or hitching of implements, and unauthorized modifications and alterations. |

Proper installation and regular maintenance are very helpful in preventing breakdowns. If, nevertheless, operation problems occur during the period of validity of the warranty, the following procedure should be used:

- Notify the retailer from whom the tractor was purchased immediately, indicating the model and serial number. It is very important that this is done right away since the warranty will not be valid if the anomaly is not resolved promptly, even if the original breakdown was covered;
- Provide your retailer with as much information as possible. The retailer will therefore know the number of operating hours, the type of work being carried out and the symptoms of the problem. Remember that normal maintenance operations such as tune-ups and brake/clutch adjustment, as well as the supply of materials used for servicing (oil, filters, fuel and antifreeze) are not covered by the warranty.

| Note: |
| --- |
| The installation of non-original parts could mean using a spare part of lower quality. The tractor manufacturer does not assume any responsibility for any loss or damage deriving from the installation of these parts. The manufacturer warranty will be annulled if they are installed during the period of validity of the warranty. |

During the period of validity of the warranty, all repairs and maintenance should be carried out by the retailer so that the operation and performance of your new tractor may be monitored carefully.

For optimum performance of your tractor, never skip regular maintenance checks or servicing, even after the warranty has expired. Contact your retailer for all of the main servicing operations: a specialized technician will take stock of the situation

between one intervention and another.

The mechanics are regularly informed and updated about the product, servicing techniques and the use of modern diagnostic instruments and equipment. They regularly receive bulletins on servicing, possess all shop manuals and all other technical information necessary for ensuring that repairs and servicing are up to standard.

| Note: |
| --- |
| Panels and guards have been removed in some of the illustrations in this operator instruction booklet for greater clarity. Never run the tractor without reassembling these components. If a panel or guard must be removed to carry out repairs, it will need to be reassembled before using the tractor. |

## Section 5 : Enclosures

In addition to this User Maintenance Manual, the tractor is supplied as standard with:

- Engine use and maintenance manual;
- Service booklet.

# Chapter 2: General safety regulations

## Contents

# Section 1: Terms and abbreviations

**Transporter:** person chosen and authorized, being in possession of the qualifications and skills required to load, unload and move the machine from the means of transport.

**Driver:** person chosen and authorized, being in possession of the qualifications and skills required to drive, use and service the vehicle.

**RS tractor:** tractor with steering wheels.

**AR tractor:** articulated tractor

**MT tractor**: wheel tractor, haymaking model

# Section 2: Alert and safety words and symbols

In the present instruction booklet there are warnings about tractor safety and damage. Observe these warnings carefully in order to prevent the risk of injury and damage. The types of warnings and how they appear and are used in this instructions booklet are described as follows:

| ⚠ Danger: |
| --- |
| This symbol and the word DANGER warn of an imminent hazard that could endanger the operator or other directly involved persons. |

| ⚠ Warning: |
| --- |
| This symbol and the word WARNING indicate a potentially dangerous situation for the machine, which could also compromise the operator's safety. |

| ⚠ Caution: |
| --- |
| This symbol and the word CAUTION warn the operator that he could risk damaging the machine unless he complies with a certain procedure. |

| Note: |
| --- |
| Underscores and informs the operator about the correct technique or procedure required. |

## Section 3: Safety - Tractor and implement

- The tractor is a source of mechanical and hydraulic power.
- When the tractor is used together with an implement or other equipment, it becomes a work unit.
- This instruction booklet has been compiled to illustrate the safety regulations associated with normal use of the tractor.
- This booklet does not cover all of the user and safety instructions for all of the implements and hitches that may be installed when the tractor is delivered or at any time in the future.
- **It is essential that the operator carefully follows the instructions contained in the manual relating to this machinery, both installed and towing and for the trailer.**
- **NEVER combine the tractor-machine or tractor-trailer unless you have carefully read the instructions for this equipment.**

## Section 4: Safety - Introduction

This chapter of your operator instruction booklet on safety intends to outline some of the most common safety situations that can occur during normal use and maintenance of your tractor WITH FOOTBOARDS or CAB and to suggest possible ways of behaving in these situations. This chapter is NOT a substitute for other safety regulations in other chapters of this manual.

Additional precautions may be necessary depending on the implements used and the work conditions on the field or in areas of maintenance and repair. The tractor manufacturer does not have direct control over applications, operations, inspection, lubrication or maintenance of the tractor. It is therefore YOUR responsibility to practice good rules of safety in these areas, using common sense as well.

## Section 5: Safety - Recommendations for the operator

It is **YOUR** responsibility to read and understand the chapter on safety contained in this booklet before using the tractor. You will need to follow these safety regulations and use them throughout the working day.

While reading this chapter you will notice that illustrations are used to better explain certain situations.

Always remember that **YOU** alone are responsible for your safety. Good safety regulations protect you as well as those around you. Study the characteristics shown in this manual thoroughly and make them an important part of your safety plan.

Always remember that this chapter has been written exclusively for this type of vehicle. Apply all other normal and regular precautions that ensure operating safety and especially REMEMBER THAT SAFETY IS YOUR RESPONSIBILITY AND YOU CAN PREVENT SERIOUS AND EVEN FATAL ACCIDENTS.

Every time you see the words and symbol indicated below, used in the present manual and on decals, you MUST take note of the instructions given because they refer to personal safety.

| ⚠ Warning: |
| --- |
| IThe symbol and word WARNING indicate a potentially dangerous situation. If the instructions or procedures are not carried out correctly, they can lead to personal injury or the loss of life. |

## Section 6: Safety - Decals

| ⚠ Warning: |
| --- |
| Do not remove or make the Danger, Warning, Caution or Instruction decals illegible. |

Replace every Danger, Warning, Caution and Instruction decal that is not legible or that has been lost. New decals are available at your dealer if lost or damaged The exact position of the decals on the tractor is indicated at the end of this chapter.

If a used tractor is purchased, refer to the figure at the end of this chapter to make sure that all of the safety decals are in the correct position and are legible.

# Section 7: Safety - Following a safety plan

To use a farming tractor safely, operators must be qualified and authorized. To be qualified, an instructional course and training must be taken at the place of work, the safety regulations and work regulations must be known and the instructions contained in this operator instruction booklet must be understood.

For example, some regulations specify that no one under the age of 18 years European regulations) can use motorized machinery: this includes tractors. You are responsible for knowing these regulations and observing them in the area or situation in which they are used.

These include, but are not limited to, the instructions below for using the tractor safely.

| ⚠ Warning: |
| --- |
| The operator must not use alcohol or drugs that can change or alter his or her state of alertness and coordination. An operator taking medication or monitored for drug use needs medical authorization stating whether or not he or she is able to use the tractor safely. |

Observe the following precautions:

- NEVER let children or young adults or unqualified personnel use your tractor. Keep others far away from your working area.
- Fasten the safety belts when the tractor is equipped with a vertical rollbar or cab.
- When possible, avoid operating the tractor near ditches, excavations and holes. Reduce the speed when turning, going over slopes or passing over bumpy, slippery or muddy surfaces.
- Stay away from steep slopes to operate safely.
- Watch where you are going, especially at the end of the field, on roads and around trees.
- Do NOT let anyone get on the tractor or the implement unless an approved passenger seat has been installed.
- Tow only with the drawbar or from its points and never above the center line of the rear axle.
- Operate the tractor calmly without sudden turns, starts or stops. When the tractor is parked, engage the parking brake.
- Never modify or remove any part of the equipment or use implements not envisaged for your tractor.

# Section 8 : Rollbar

The safety frame reduces the risk of injury should the tractor tip over.

Always operate with the safety frame in the upright position and the safety belts securely fastened.

Before using the tractor, make sure that the safety frame has not been damaged and that it is securely fastened to the tractor.

The operator must use safety belts in all work conditions, on the field as well as when driving on roads.

The safety belt must be worn and adjusted snugly against the body and must not be twisted.

The safety belt must be replaced if it has been strongly stressed, e.g. by a tractor overturning, or when it shows wear and tear, cuts or any visible signs of overload.

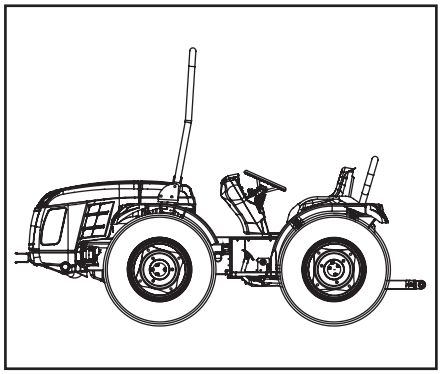

**Fig. 2.1**

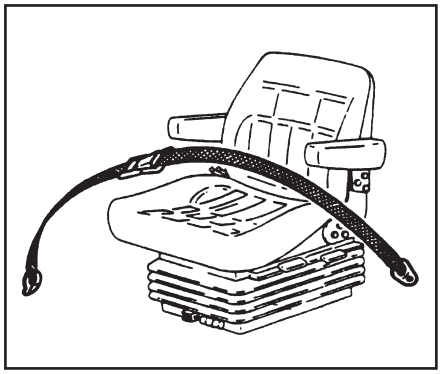

**Fig. 2.2**

Use:

- DO NOT ATTACH chains, cables, etc. to the rollbar for towing; they could cause the tractor to tip over: always tow from the drawbar.

If the tractor has rolled over or the rollbar has been damaged (for example, because it hit a suspended object during transport) it must be replaced to guarantee original levels of safety.

After an accident, check the rollbar, the operator seat, the safety belts and their anchoring points. Before using the tractor, replace all damaged parts.

DO NOT WELD, DRILL, BEND OR STRAIGHTEN THE ROLLBAR: these operations reduce the guaranteed level of the protection.

## Section 9: Cab safety

The safety cab (Fig. 2.3) has been specially designed to be installed on this series of tractors and observes all of the safety and noise requisites provided for by current regulations.

**NEVER use the machine, even if fitted with a cabin, in environments with a risk of objects and/or materials falling from above, since it is not type-approved as a safety device for this type of risk.**

**As regards the level of protection against hazardous substances, the cabin fulfils the "Category 1" requirements in compliance with standard EN 15695-1:2009, it therefore does not provide a specific level of protection.**

The cab MUST NEVER be drilled or modified to install accessories or implements. Welding the cab components and repairing damaged cab components IS PROHIBITED. Never attach towing chains or cables to the main chassis of the cab.

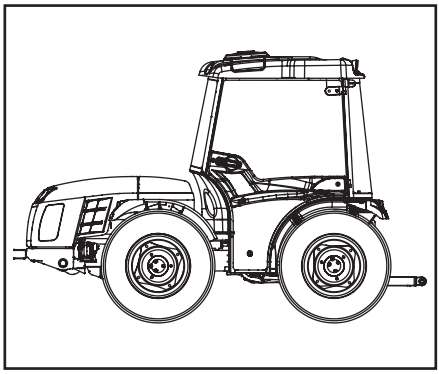

**Fig. 2.3**

# Section 10: Precautions for operating safely

Protect yourselves.

Wear all of the protective clothing (Fig. 2.4) and devices for personal safety made available and necessary for work.

Do not take risks.

You will need the following protective clothing:

- A protective helmet.
- Goggles or a protective mask.
- Earmuffs protect the ears..
- A protective mask or filter for breathing.
- Clothing for bad weather.
- Reflective clothes.
- Heavy work gloves (Neoprene for using chemical products, leather for heavy-duty work).
- Accident prevention protective shoes..

**DO NOT** wear loose clothing, jewelry or similar items and tie long hair back, as it could get caught on the controls or other parts of the tractor.

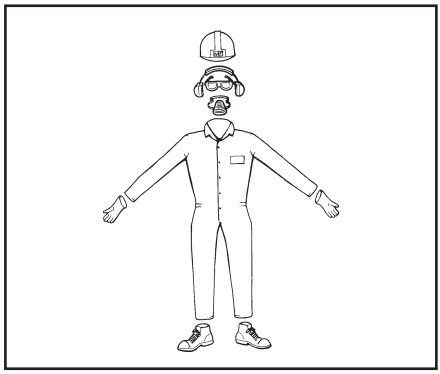

**Fig. 2.4**

Locate the position of the extinguishers and the first aid kit (Fig. 2.5) or the emergency equipment and identify how to call for help quickly. Make sure that you know how to use this equipment.

You must be familiar with your tractor.

Learn about the characteristics of your tractor. Learn how to use all of the equipment on your vehicle and the implements and hitches used on it. Learn how to use each control, indicator and instrument and their functions. You will need to know the rated load capacity, the speed range, the characteristics of the brakes and the steering system, the turning radius and necessary space of use.

Always bear in mind that rain, snow, ice, gravel and loose soil can change tractor handling. In difficult conditions, slow down and be more prudent and careful.

Study the DANGER, WARNING and CAUTION signs on you tractor and all of the reported information.

BEFORE STARTING THE ENGINE, READ THIS OPERATOR INSTRUCTION BOOKLET (Fig. 2.6).

STUDY THIS BOOKLET BEFORE BEGINNING WORK (Fig. 2.6).

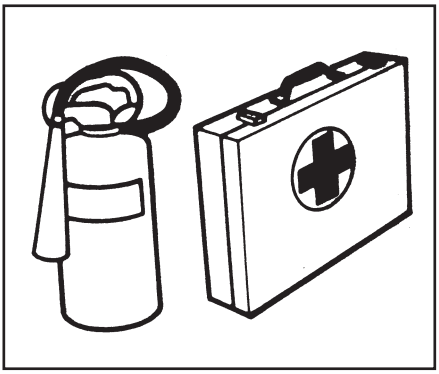

**Fig. 2.5**

IF YOU DO NOT UNDERSTAND SOMETHING IN THIS MANUAL, ASK SOMEONE (for example your dealer) TO EXPLAIN IT TO YOU

Always use all of the available protection and safety systems.

Keep all protective devices in their places and safely secured. Make sure that all of the guards, protective shields and safety signs are correctly installed as specified and are in good condition.

To guarantee your safety and that of others, your tractor must be equipped with:

- A rollbar, which must always be mounted in the protective position (Fig. 2.1). Safety belts should be used in accordance with current laws in the various markets.
- Protective shields of the PTO.
- Rearview mirrors.
- An extinguisher with characteristics that correspond to the legislative requirements in force in the various markets.
- A rollbar with a structure that protects against falling objects or with canopies (if installed). Remember that the safety rollbars of these shields do not protect against large falling objects such as large round bales or parts of fences.
- Slow moving vehicle (SMV) symbol.

Learn which devices are necessary for operating safely and always use them. Make sure that they are in their place and in good condition. NEVER remove them or disconnect them.

**Fig. 2.6**

## Section 11: Checking the equipment

Before starting your working day, check the tractor and make sure that all of the systems are working properly.

- Do NOT smoke during refueling. Do not use open flames. (Fig. 2.7).
- Make sure that there are no loose, broken, lost or damaged parts. Carry out proper repairs as necessary. Make sure that all of the safety devices are in their place.
- Make sure that the rollbar and safety belts are not damaged (a damaged rollbar or safety belt MUST be replaced).
- Make sure that the implements and attachments are installed correctly and that the tractor and the implements connected to the PTO have the correct speed ratios (rpm).
- Make sure that the tires do not have cuts or bulges and that the pressure is correct. Replace worn and damaged tires. Make sure that the brake pedals and the parking brake function correctly. If necessary, adjust them.
- Stop the engine and wait for it to cool before refueling.
- Check the engine oil level and top off, if necessary.
- Carry out all of the maintenance and adjustment operations indicated in the relative chapter of this manual.
- Verify that the safety hitching systems of the PTO are connected.
- Verify that the power take-off and the drive shaft guards are in position and function correctly.
- Check the tractor hydraulic systems and the connected implements. Repair or replace any damaged or leaking parts.
- Check the engine cooling circuit and add coolant, if necessary.

**Fig. 2.7**

| ⚠ Warning: |
| --- |
| Pressurized fuel or hydraulic fluids can penetrate the skin and eyes and cause serious injury, blindness or death. Leaking pressurized fluids may not be visible. Use a piece of cardboard or wood to find leaks. Never use bare hands. Always wear goggles to protect eyes. If, for any reason, a fluid penetrates the skin, it MUST be surgically removed within a few hours by a doctor who specializes in these types of accidents. |

Before pressurizing a fuel injection system or a hydraulic system, make sure that all of the connections have been tightened and that the lines, pipes and hoses are not damaged. Before disconnecting the hydraulic or fuel pipes, make sure that the circuit is not pressurized.

Make sure that all of the hydraulic lines are correctly installed and are not tangled.

| ⚠ Warning: |
| --- |
| The cooling circuits are pressurized when the engine is hot. Before removing the radiator cap, stop the engine and let it cool. |

## Section 12: Cleaning the tractor

- Keep the work surfaces and engine compartments clean.
- Before cleaning the vehicle, always lower the implement onto the ground, place the gear levers in neutral, engage the parking brake, turn off the engine and remove the key.
- Clean the footboards, steps and pedals. Remove grease and oil. Eliminate dust and mud. Remove ice and snow. Remember that slippery surfaces are dangerous.
- To clean plastic parts such as the console instrument panel and the indicators, avoid using gasoline, paraffin, paint solvents, etc.
  To clean these parts of the tractor, use water, neutral soap and a soft cloth ONLY.
  The use of gasoline, paraffin, paint thinners, etc. causes discoloration, cracking, and deformation of the cleaned parts.
- Remove implements, wrenches, hooks etc. and put them back where they belong.
- If using a self-propelled sprayer, never stand too near the tractor and avoid directing jets of water on the ignition panel, electrical components, electric-hydraulic controls, adhesives and on the cabin's air filter.

## Section 13: Protecting the environment

- Polluting canals, waterways and the ground is illegal. Use authorized dumping facilities, including municipal zones and garages that have containers for disposing of used oil. If in doubt, contact local authorities for information.
- To understand the correct methods for disposing of oil, filters, tires, etc., contact your local differentiated waste collection center or your dealer.
- **Scrapping the tractor**: the tractor is composed of parts that are subject to disposal regulations and standards. Therefore, when the tractor is discarded and no longer used, it must be scrapped by authorized agencies **Do not dispose of the tractor or its components in the environment**.

## Section 14: Safety - Tractor maintenance

- Do NOT carry out maintenance (Fig. 2.8) on the tractor while the engine is running or hot or while the tractor is moving.
- Before carrying our adjustments or maintenance on the electrical system, disconnect the battery cables, starting with the negative cable ( - ).
- To prevent fire and explosion, do not use open flames near the battery or cold start devices. To avoid creating sparks and possible consequent explosions, use jumper cables according to the instructions.
- When making repairs or adjustments, contact your local dealer and have specialized personnel carry out the work.
- The implements and/or the tractor must be supported with wooden blocks or suitable supports, NOT with hydraulic jacks.
- Periodically check the tightness of all of the nuts and bolts; especially the bolts of the wheel hubs, disks and rims. Tighten to the specified tightening torque.
- Regularly check the power steering tank and top off with approved oil, if necessary.
- Regularly check the brakes and, if necessary, top off the tank and/or adjust them. Make sure that the brakes are correctly adjusted, especially when towing trailers.

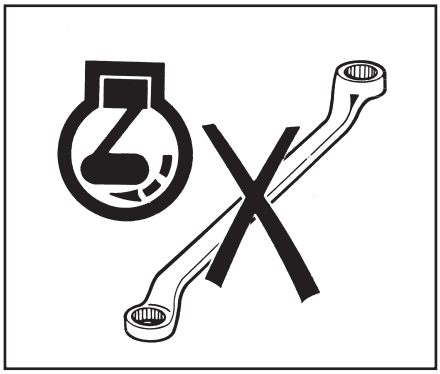

**Fig. 2.8**

# Section 15: Safety - Startup

Before starting the engine, walk around the tractor and the mounted implements Make sure that no one is under, above or near them. Notify other workers or people present that the tractor will be started and do not start it until they have moved to a safe distance from the tractor, implement or trailer.

Make sure that all present, **especially children**, are in a safe place before starting the engine.

## 15.1 Getting on and off of the tractor safely

When getting on the tractor, face and use the three points of contact. (Three points of contact means both hands and one foot or one hand and both feet in contact with the tractor at all times when getting on or off of it).

Clean shoes and dry hands before getting on. Use the points of support, handles, steps or rungs (if provided) when getting on and off.

NEVER use the control levers as handles or rest feet on the control pedals when getting on and off.

NEVER attempt to get on or off of the tractor while it is moving. NEVER jump down from the tractor at any time.

| ⚠ Warning: |
| --- |
| Before starting the engine, make sure that there is sufficient ventilation. Never start the engine in closed environments. The exhaust gases can cause asphyxia (Fig. 2.9). |

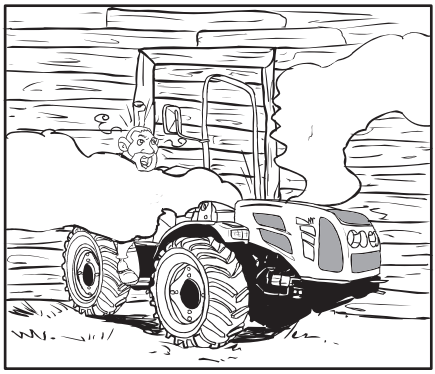

**Fig. 2.9**

## 15.2 Safe startup

Always start the engine from the operator position with all of the gear levers and the PTO lever in neutral.

Make sure that the brakes are correctly adjusted and simultaneously engaged.

Adjust the seat, fasten the seat belts (where applicable, according to regulations in force in your country), and place all of the controls in neutral before starting the tractor.

| ⚠ Warning: |
| --- |
| Before starting, always make sure that people and obstacles are not present within the tractor's radius of action (Fig. 2.10). |

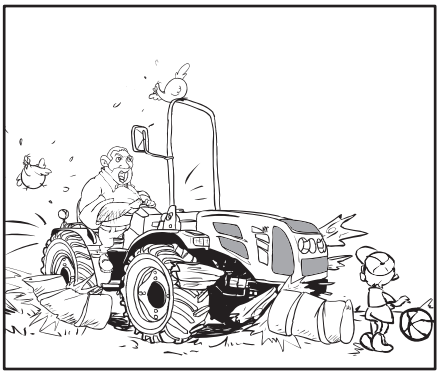

**Fig. 2.10**

Carry out the starting procedures described in chapter 5 - User Regulations of this instruction booklet; these include normal starting and starting in cold climates.

| ⚠ Warning: |
| --- |
| Start the engine using the ignition key from the operator seat only. Never attempt to start the engine by creating a bridge between the starter terminals. The tractor could start with an engaged gear if the safety ignition circuit is bypassed in neutral. This could cause serious injury or death to people that are near the tractor. |

After starting, check all of the instruments and lights. Make sure that they all function correctly. If the tractor does not respond correctly to the controls, do NOT use the vehicle until the breakdown has been resolved.

## Section 16 : Working safely

**⚠ Warning:**

An unbalanced tractor could tip over and cause serious injury or death. The weights of the wheels and the ballasts must be used as recommended by the manufacturer. NEVER add additional weight to compensate for overloading; reduce the load instead.

**⚠ Warning:**

When using the tractor, always remain inside the operator compartment without extending any part of the body outside of it.

## Section 17 : Carrying out the right maneuvers

Make sure that the tractor is ready for the type of work that must be carried out. Know the rated load capacities and never exceed them. Make sure that NONE of the implements or pieces of equipment that must be used exceeds the load capacity of your tractor. Check the output shaft/implement coupling.

Bear in mind that the tractor normally operates on bumpy, often uneven or sloping surfaces and not on paved roads. The operating conditions could reduce the maximum load permitted for transport or towing.

# Section 18 : Operating safely

- Activate the controls without sudden movements. Do not make sudden turns or abruptly use other controls.
- NEVER attempt to get on or off of the tractor while it is moving. Hold the steering wheel firmly at all times with the fingers far from the spokes of the wheel itself when driving.
- Make sure that there is enough space in all directions for the tractor, cab, rollbar and the implement.
- Do NOT use the tractor or the implements irresponsibly and do not joke around with them.
- NEVER use the controls while not seated in the operator position.
- Before getting off of the tractor, always disengage the power take-off, lower the hitches and implements to the ground, place the gearbox in neutral, engage the parking brake, turn off the engine and remove the key.

Do NOT touch, rest on or attempt to reach other components using the mechanisms of implements or allow others to do so.

Be very careful. If something breaks, comes loose or is not functioning, stop work, turn off the engine, check the vehicle and repair or make adjustments before starting work again.

Before starting the tractor, make sure that you have safe control of the speed and direction controls.

- Before starting work, inspect the area where work will be done to determine the best and safest work procedure. Plan work so that the tractor can be driven straight and forward, where possible. Pay attention to ditches, holes front and side dips, slopes, trunks and logs, still water, etc. Check for all conditions that could be a hazard. If you are using a front lift or foldable implements or raised components, make sure that nothing blocks their passage.

| ⚠ Warning: |
| --- |
| Contact with high-voltage lines can cause death. In the case of contact with voltage conductors, do NOT get off of the tractor, but rather move the tractor and/or the lift to eliminate contact and reach a safe distance (Fig. 2.11). |

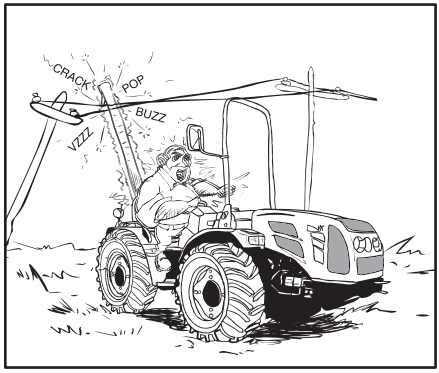


**Fig. 2.11**

## Section 19 : Paying attention to others

- Be aware of the maneuvers you are going to carry out. Never let unqualified or insufficiently trained people operate your tractor. They can be a risk to themselves and others.

**⚠ Warning:**

Your tractor is designed to be used by one person only. Do NOT allow others to get on the tractor or the implements (Fig. 2.12). Do not allow anyone to climb onto the implements or other equipment, including trailers, except on certain harvesting implements where it is specifically provided for, but only during actual harvesting (not during transport). This equipment must have instructions that define the area that can be safely climbed onto. Do NOT allow children to get on the tractor.

**⚠ Warning:**

Make sure that the speed and direction is safely under control before moving the tractor. Move slowly until you are sure that everything is functioning normally. After starting, recheck turning to the right and left. Make sure that the steering and the braking system function. If the differential lock is engaged, do NOT operate at high speeds or change direction until it is disengaged.

**⚠ Warning:**

NEVER raise a load above someone.

- Keep others far away from your area of maneuver. Do not let anyone stand or pass under a raised implement.
- Do NOT lift objects that are not perfectly housed in the bucket; use the appropriate hitch. Do not let anyone stand on the rollbar or fenders.
- When using a loader, avoid sudden starts, stops, and turns and sharply reversing direction. Keep the loads as close to the ground as possible during transport.
- Never stand (or let others stand) in front of, underneath or behind equipment that will be loaded or under a load. Never drive the tractor toward someone that is near a wall or fixed object.
- Keep others away from the cardan joints, drawbars or lift beams, power take-off shafts, cylinder transmission belts, pulleys and other moving parts. Keep the protective shields installed in their places.

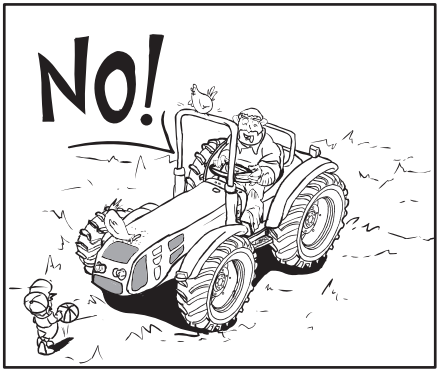


**Fig. 2.12**

# Section 20 : Risk of overturning

If a tractor overturns, hold on tightly to the steering wheel and do NOT attempt to leave the seat until the tractor has come to a stop. If the cab doors are jammed, exit the tractor through the rear flip-open window (Fig. 2.13).

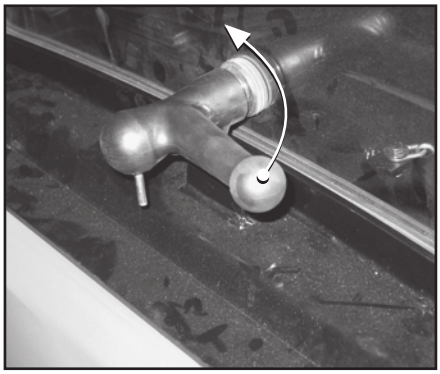

**Fig. 2.13**

# Section 21 : Preventing lateral overturning

- Adjust the wheel tract to the widest position suitable for the type of work to be carried out.
- Lock the brake pedals together before driving on roads at transportation speed.
- Reduce the speed according to the conditions of use. If the tractor is equipped with a front loader, keep the bucket and the load as low as possible.
- Make wide turns slowly.
  Do NOT let the tractor bounce on bumpy ground. You could lose control.
- Do NOT tow a load that is too heavy for your tractor. You could lose control of it on a steep hill or the tractor could rear up and rotate onto the towed load, “jack knifing”.
- Do NOT brake suddenly. Always brake gently and gradually.
- When going downhill, use the engine brake and the same gear as you would for going uphill. Insert the appropriate gear before starting downhill.

| ⚠ Warning: |
| --- |
| NEVER disengage the clutch or attempt to change gears after starting a descent. |

- It is always better to drive vertically when going up or downhill, rather than longitudinally.
- Do not overload a front implement or a trailer. Use suitable counterweights to maintain tractor stability (Fig. 2.14).
- When towing a load at transportation speed, lock the drawbar at the center position and use a safety chain.
- NEVER use the tractor for rounding up animals or herds.

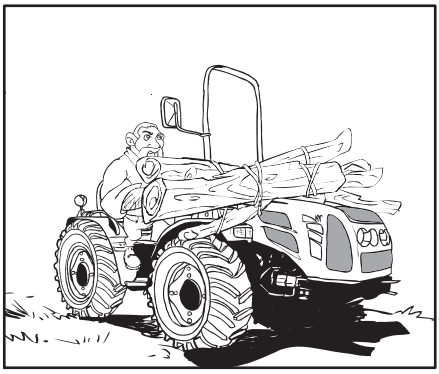

**Fig. 2.14**

- If operating near ditches or banks, keep the tractor behind the fracture line. Avoid ditches, embankments, banks and edges of rivers which could cave in (Fig. 2.15).
- If a steep slope must be passed over, avoid steering toward the incline, slow down and steer clear. Always travel the slope directly uphill or downhill and never longitudinally. When going up or down a slope, keep the heavy part of the tractor and the implement facing uphill.
- If you travel over a hill with side implements installed, keep the implements on the side of the incline. Do not raise the implements. Keep them as low as possible and near to the ground when going over a slope.
- If possible, avoid going uphill or over steep slopes. If you must do so, avoid holes or depressions on the downhill side. Avoid projections, trunks, rocks or raised areas on the uphill side.

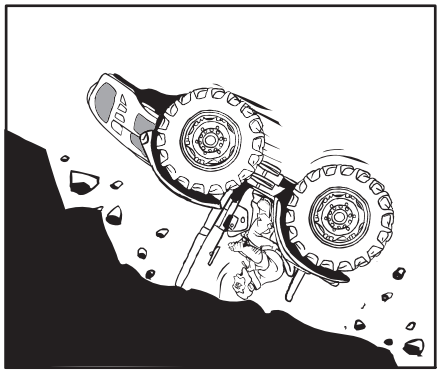

**Fig. 2.15**

# Section 22 : Preventing backward overturning

**⚠ Warning:**

Towing from the rear axle or any other point above the drawbar can cause the tractor to overturn backwards.

- Do NOT tow anything from the three-point hitch or any other point above the longitudinal axis of the rear axle. Always use an approved drawbar exclusively with a pin installed in the correct position.
- High hitching points for towing can cause the tractor to overturn backwards and cause serious injury or death. Tow loads from the drawbar only.
- When using the three-point hitch for towing, the top links must be installed and kept lowered.
- Use front ballasts to increase tractor stability when towing a heavy load or to counterbalance a heavy implement installed on the rear.
- Do NOT overload and do NOT ballast beyond the load capacity of your tractor. Never add ballasts to compensate for overloading. Reduce the load (Fig. 2.16).

**⚠ Warning:**

Overloading is ALWAYS dangerous. Verify the rated load capacities of your tractor and NEVER exceed them.

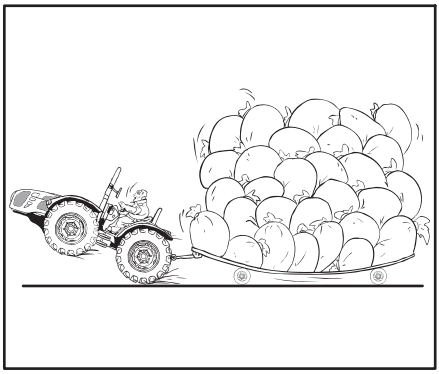

**Fig. 2.16**

- Start slowly and gradually increase the speed. Do NOT increase the engine rpm or lower the clutch. If the tractor is hitched to a heavy load or an unmovable object, improper use of the clutch could cause overturning.
- If the front of the tractor begins to rear up, disengage the clutch immediately.
- If the tractor is mired in mud or stuck in the ground, do NOT attempt to exit by driving forward. The tractor could rotate on its rear tires and overturn (Fig. 2.17). Lift or remove the installed implements and try to MOVE IN REVERSE. If this is not possible, tow the tractor out with another vehicle.
- If it is stuck in a ditch, try to BACK OUT, if possible. If you must go forward, do so slowly and carefully.
- A tractor with or without an implement hitched onto the rear must move in reverse when going uphill and move forward when going down a slope.
- A tractor with a front load must be driven in reverse when going downhill and forward when going uphill. Keep the bucket of the loader as low as possible.
- Always keep the tractor in gear when going downhill. Never let the tractor go downhill with the clutch disengaged or the transmission in neutral.

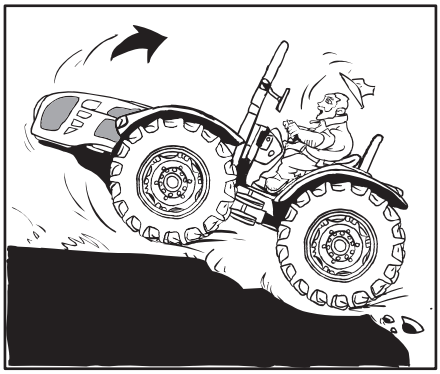

**Fig. 2.17**

# Section 23 : Risky operations

- Make sure that the power take-off (110) guard is in position and that the shaft's cap (111) is on when the power take-off is not used.
- Before connecting, disconnecting, cleaning or adjusting towed implements from the power take-off, turn off the engine, remove the key and make sure that the power take-off's shaft is locked in place (Fig. 2.19).
- Make sure that all of the power take-off shaft safety devices are installed and observe the instructions on the safety decals.
- Make sure that everyone is away from the tractor before engaging the power take-off. During stationary use of the tractor, always place the gearbox in the neutral, engage the parking brake and block the wheels of the tractor and the implement with wooden wedges or wheel clamps.
- When working with implements connected to the power take-off, never leave the operator seat until the power take-off has been disengaged, the transmission placed in neutral, the parking brake engaged, the engine off and the ignition key removed.
- Do NOT use adaptors, reducers or extensions that can lengthen the coupling shaft of the power take-off or the cardan joint beyond the protection offered by the power take-off protective shield.
- The top link of the three-point hitch and the vertical tie rods of the three-point hitch must not be extended beyond the point where the thread begins to appear.

| ⚠ Warning: |
| --- |
| NEVER attempt to unscrew the hydraulic connections or adjust an implement while the engine is running or the power take-off shaft is moving. This creates a dangerous situation with the risk of serious injury or death (Fig. 2.20). |

- When using chemical products, follow the instructions for use, storage and disposal carefully. Furthermore, follow the instructions of the manufacturers of the equipment for using chemical products.
- When working under conditions of poor visibility or in the dark, turn on the working lights and reduce the speed.
- Work with the wheel track in the widest position possible for the type of work that is being carried out. To adjust the wheel track, refer to the paragraph in chapter 5 - User Regulations.
- Reduce the speed when working on bumpy ground or slippery surfaces or when leaves and the foliage of trees reduce visibility.
- Do NOT make sharp turns at high speeds.

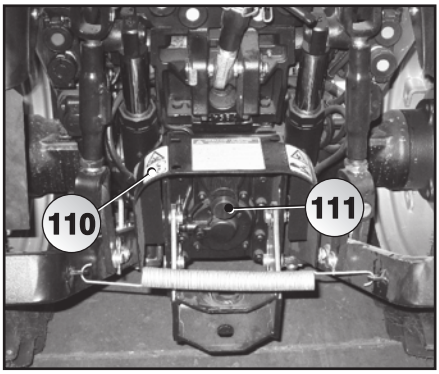


Fig. 2.18

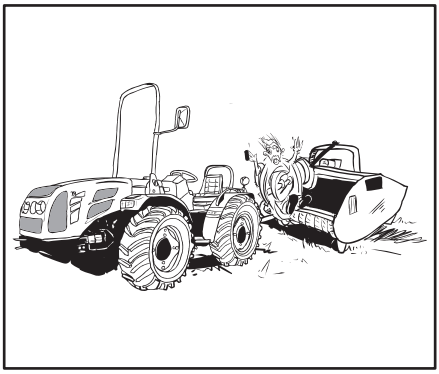

Fig. 2.19

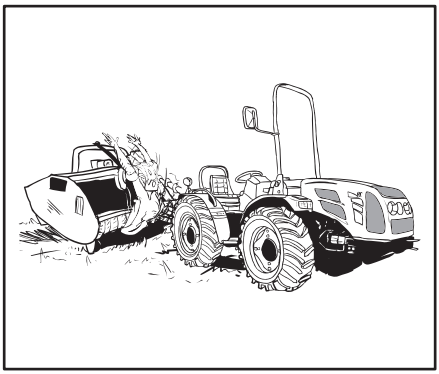

Fig. 2.20

# Section 24 : Implements and hitches

- The implements installed on the three-point hitch or laterally have a radius of turning space greater than implements towed from the drawbar. Make sure that there is enough space for the turn.
- When using implements or equipment with the tractor, read the part of the operator instruction booklet regarding these implements and equipment carefully and observe the recommended safety regulations.
- Tow from the drawbar only.
  Towing or hitching from other points can cause the tractor to overturn (Fig. 2.21).
- Improper use of the drawbar, even if positioned correctly, can cause longitudinal overturning backward.
- Improper use of the drawbar, even if positioned correctly, can cause longitudinal overturning backward.
- Use ballasts as recommended. NEVER add additional ballasts to compensate for a load that is heavier than permitted. Reduce the load.
- A safety chain will control the towed implement if it accidentally becomes separated from the drawbar while being transported. Using appropriate adaptors, attach the chain to the support of the tractor's drawbar or to other specified anchoring points. Leave the chain fairly free so that turning is possible Ask your dealer for a chain that has a capacity equal to or above the gross weight of the towed machine.
- The implements must be hitched and unhitched when the tractor is on flat ground without obstructions.
- Do not hitch implements with characteristics that are unsuited to those of the tractor (power, weight, etc.).
- Connect to the driveline in the correct way and make sure that the safety protections are perfectly efficient.
- First connect the driveline to the PTO of the implement and then to that of the tractor. Connect the safety chains correctly, to prevent the driveline protections from turning.
- Make sure that the driveline is the right length.
- Never operate the PTO unless the driveline that connects to the implements has been installed correctly.
- Never operate the driveline when manoeuvring the tractor, driving on the roads or when the implement is not in its operating position.
- Do not unhitch the implement unless it is resting on the ground and when the tractor has been stopped in safe conditions.
- Never use the front hook to tow implements.
- Hitch and tow implements that are preferably equipped with an independent braking system. Towed implements without independent braking systems may only be hitched if the weight (empty and with a full load) is within the permitted values.
- Do not make the hydraulic or electrical connections of the implement or insert any retention devices (plugs, split pins, etc.) unless the tractor has been stopped in safe conditions.
- Always lower the implement to the ground before leaving the tractor.

# Section 25 : Driving on roads

Before driving the tractor on public roads, take appropriate precautions.

- Observe the local and national rules of the road that apply to your tractor.
- Couple both brake pedals (RS model).
- Lift the implements into the transportation position and lock them into place.
- Place the implements in the tightest transportation configuration
- Disengage the power take-off and differential lock.
- Make sure that the tractor and any other implements have slow moving vehicle symbols or a rotating light, if provided for by law (Fig. 2.22).
- If the mounted implements project from the sides of the tractor, the overall width must be indicated by fitting panels with red and yellow stripes on the side ends. Make sure that the revolving beacon is installed and that it functions correctly.
- Make sure that flags or flashing lights are installed and function correctly.
- Make sure that an appropriate safety plug with a suitable safety restraint is used.
- Thoroughly clean all of the front and rear lights and make sure that they function correctly.
- Implements installed on the three-point hitch and implements that project out to the side when turning have a greater turning radius than towed implements. Always maintain a safe amount of space when turning.

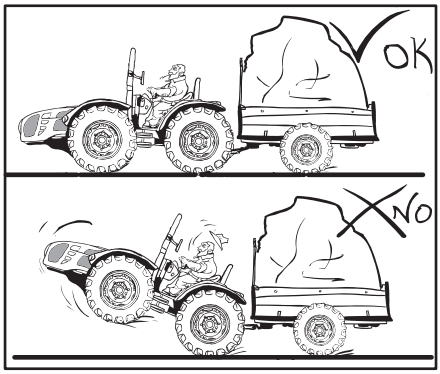


**Fig. 2.21**

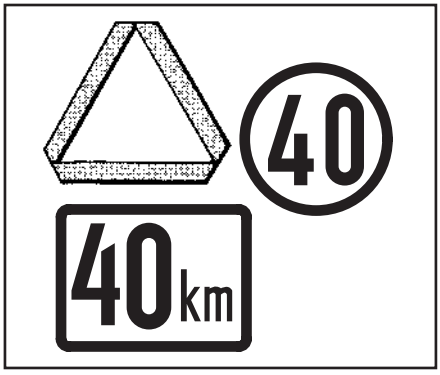


**Fig. 2.22**

# Section 26 : Rules of the road

Take appropriate precautions when driving the tractor on public roads.

> ⚠ Warning:
>
> Do NOT allow other passengers to climb onto the tractor or the towed implement.

- Make sure that you are familiar with the road that you will travel.
- Use intermittent lights or the rotating light during the day and at nighttime, unless prohibited by law, on roads.
- Take care when towing loads at transportation speed, especially if the towed implement is NOT equipped with brakes.
- Observe local and national regulations regarding the speeds allowed for your tractor.
- Pay very careful attention when driving on surfaces covered with snow and on slippery roads.
- Wait until the road is clear before pulling out.
- Be very careful at blind intersections. Slow down until visibility is safe.
- Do NOT attempt to overtake at junctions.
- Always signal your intention to slow down, stop or turn.
- Engage a slow gear before starting downhill or uphill (Fig. 2.23).
- Keep the gear engaged. Never drive downhill with the clutch disengaged or the gear in neutral (Fig. 2.24).
- Do NOT impede approaching traffic.
- Drive in the correct lane, staying near the edge of the road as much as possible.
- If the traffic increases behind you, pull over and let it pass.
- Pay attention when driving. Anticipate the maneuvers that others could make.
- When towing a heavy load, start braking early and slow down gradually.
- Be careful of overhead obstructions.

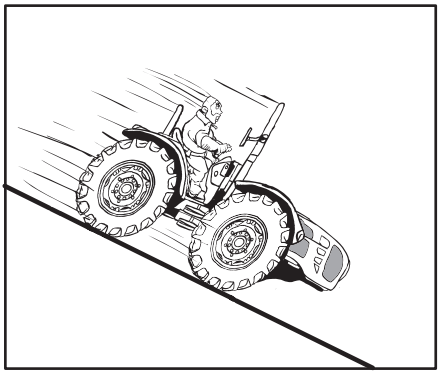

**Fig. 2.23**

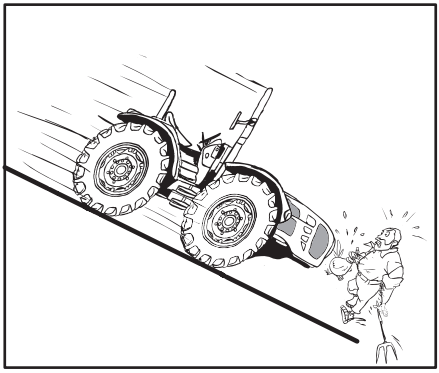

**Fig. 2.24**

## Section 27 : Safety - After use

Whenever stopping work, bring the tractor to a halt safely (do NOT park the tractor on a descent), engage the parking brake, disengage the power take-off, place all of the gear levers in neutral, lower the implement to the ground completely, turn off the engine and remove the ignition key BEFORE leaving the operator position.

## Section 27 : Personal protection equipment against noise

Personal protection equipment lessens the sound intensity transmitted to the ears through the air.

It should be used when harmful exposure cannot be avoided in other ways.

Various types with different attenuation capacities exist: helmets, earmuffs, earplugs (Fig. 2.25).

Helmets and earmuffs offer the greatest muffling but are bulky and annoying and therefore are useful for exposure to high noise levels for short periods of time (max. 2 hours).

Earplugs are generally better tolerated and are especially useful in the case of long exposure to less intense noise.

If the daily exposure level to noise is equal to or higher than 85 dBA, adequate personal protection equipment for protecting hearing should be used.

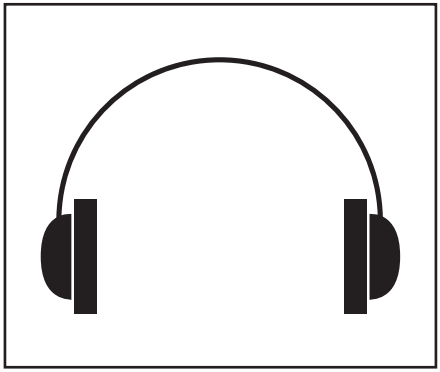

**Fig. 2.25**

# Section 29 : Position of safety decals

The following safety decals must never be removed from their original position on the tractor. If, for reasons of maintenance or deterioration, they need removing or become illegible replace immediately, contact your nearest dealership for replacements.

## 29.1 58074880 (Fig.2.26)

**General risk**

WARNING: read the user and maintenance booklet of the tractor and the engine for information on safety and use of the tractor.

Located on the dashboard just under the steering wheel.

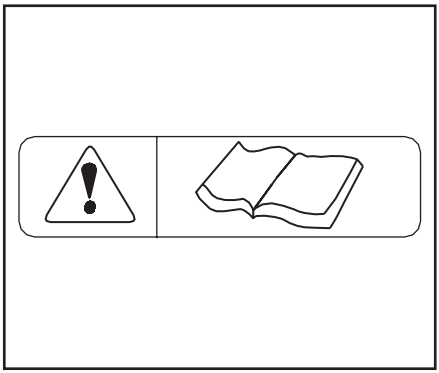

**Fig. 2.26**

## 29.2 580A1016 (Fig.2.26.1)

**Danger of burns**

Fare **Attenzione:** superfici surriscaldate, pericolo ustioni.

WARNING: Very hot surfaces. Danger of burns.

**Fig. 2.26.1**

## 29.3 580A1607 (Fig.2.26.2)

**Danger of entanglement**

Take **care**: keep well away from spinning shafts. Take care NOT to remain caught up by the PTO driveline. Keep all the guards mounted on the transmission shafts, on the tractor and on the implements.

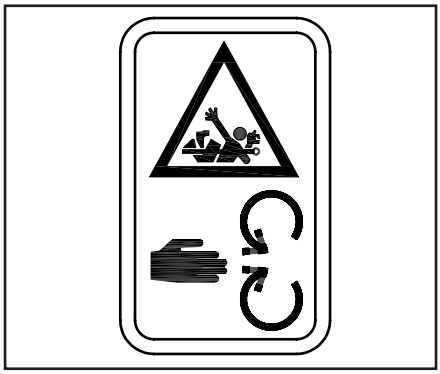

**Fig. 2.26.2**



## 29.4 580A1606 (Fig.2.26.3)

**Danger of being crushed**

Take **care**: risk of parts of the body being crushed. Keep will away of the area when the components are on the move.

**Fig. 2.26.3**

## 29.5 580A1605 (Fig.2.26.4)

**Danger of overturning**

Take **care**: never use the tractor when the protective structure is lowered.

**Fig. 2.26.4**

## 29.6 58076077 (Fig.2.27)

**Use of the PTO while the vehicle is not running**

WARNING: Risk of dragging. Stay away from the rotating shafts. Be careful not to get caught by the PTO propeller shaft. Leave all of the guards installed on the drive shafts, tractor and implements.

On the rear right fender on the inside just above the lift control levers.

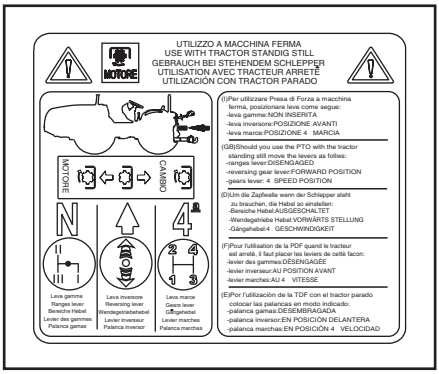


**Fig. 2.27**

## 29.7 580A1608 (Fig.2.28)

**Center articulated joint warning**

WARNING: Risk of crushing. Stay away from this area when turning. Do not stand near the center joints.

On the front right fender near the center joint.

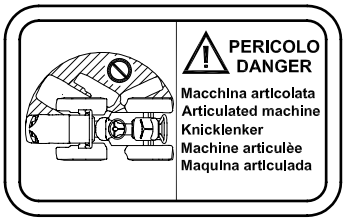


**Fig. 2.28**

## 29.8 580A1015 (Fig. 2.28.1)

**Warning for hydraulic hitch controls**

WARNING: Risk of blows and serious accidents.

Keep to one side of the tractor when using external hitch controls. Never stand between tractor and implement.

**Fig. 2.28.1**

## 29.9 580A1037 (Fig.2.28.2)

**Danger: Moving power takeoff**

Pay **Attention**: switch off the engine. Stand away from the power takeoff shaft when it is moving.


**Fig. 2.28.2**

## 29.10 580A1039 (Fig.2.28.3)

**Danger: Moving mechanical parts**

Pay **Attention**: switch off the engine, moving mechanical parts.

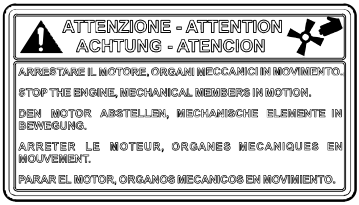


**Fig. 2.38.3**

## 29.11 580A1038 (Fig.2.28.4)

**Danger: pressurised cooling circuit.**

Pay **Attention**: switch off the engine. Before removing the radiator cap, wait for the circuit to cool.


**Fig. 2.28.4**

## 29.12 AR model tractor

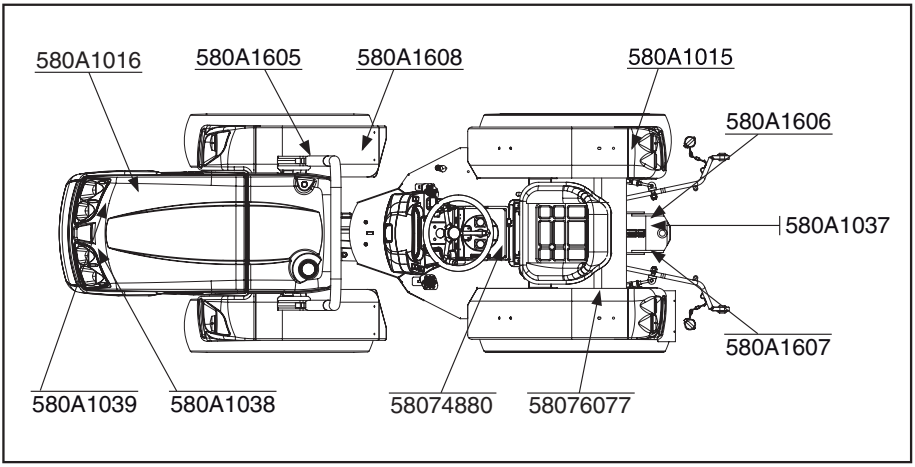


**Fig. 2.29**

## 29.13 RS-MT model tractor

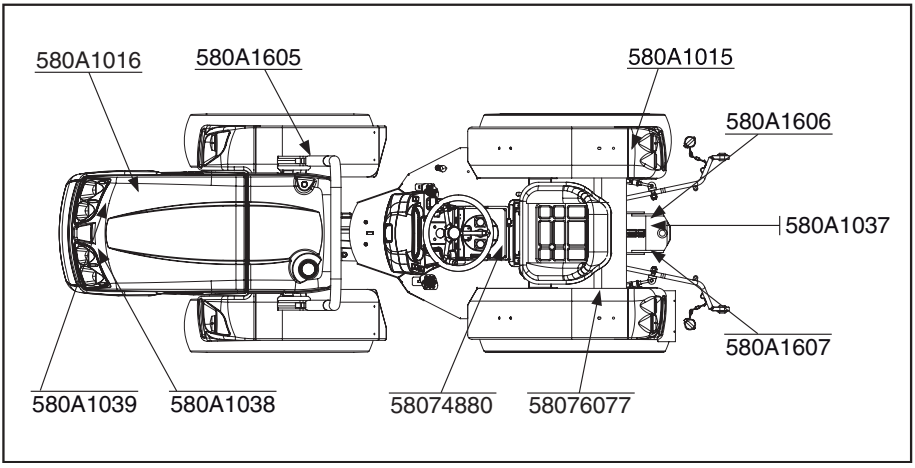


**Fig. 2.30**

## Section 30: Using the loaders

Fastening points have not been designed on the tractor for enabling a front loader assembly.

The tractor does not have any programmable functions with hydraulic sequential control.

## Section 31: Forestal use

The tractor is not fitted with fastening points for the installation of protective structures (FOPS) and has no optional equipment.

# Section 32: Using the sprayers

**⚠ Danger:**

The cabin meets “Category1” requirements in compliance with standard EN 15695-1:2009, therefore it does not provide a specific level of protection against hazardous substances.

Always remember that exposure to phytosanitary products can cause acute, chronic intoxication and allergic reactions irrespective of the hazard class to which the substance belongs (highly toxic, toxic, etc). Activities that expose farmers to phytosanitary products vary from the preparation of mixtures, distribution, decontamination of vehicles and equipment used, to agronomical activities in treated plots of land. All operatives should be aware of the risks to which they are exposed.

In the case of tractors with open roll bar, it is necessary to use suitable “PERSONAL PROTECTIVE EQUIPMENT” (rubber non-slip boots and gloves, double filter mask; overall, protective eyewear and so on).

- After treatment work, always wash clothing with soap and water.

- Do not wear casual clothing during treatment work.

- In the event of poisoning, immediately seek medical attention or a medic presenting the toxicological sheet.

**- Carefully clean the machine after carrying out treatments.**

**Note:**

Treatment residues are classed as “hazardous special waste”, and therefore should be sent to specialised facilities to be processed in suitable hazardous waste treatment systems.

# Chapter 3 : Technical data and characteristics

## Contents

# Section 1 : Weights and dimensions

## 1.1 AR Tractor

| | K600 AR | V650 AR |
|---|---|---|
| Curb weight: | 1560 Kg.<br>1720 Kg. with cab | 1540 Kg.<br>1700 Kg. with cab |
| The total weight of the tractor is distributed on the axles as follows: | 59% front axle - 41 rear axle<br>56% front axle - 44 rear axle (with cab) | 58% front axle - 42 rear axle<br>55,5% front axle - 44,5 rear axle (with cab) |

**Dimensions**

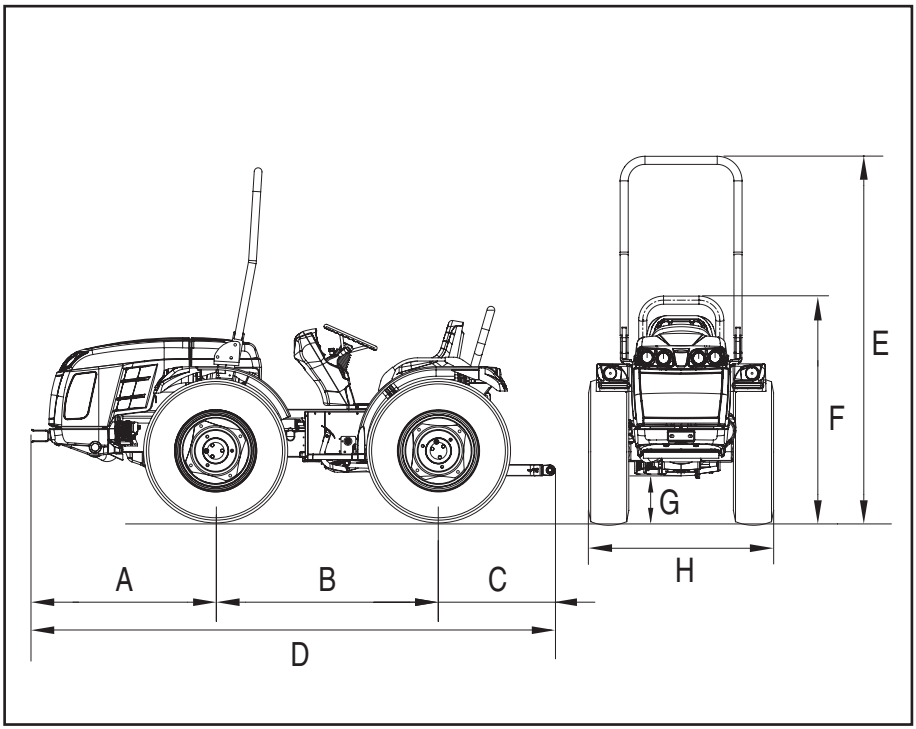


**Fig. 3.1**

| | A | B | C | D | E max | F max (sin.d.) max (rev) | G min max | H min max |
|---|---|---|---|---|---|---|---|---|
| mm | 1150 | 1390 | 730 | 3270 | 2220 | 1202<br>1344 | 207<br>266 | 1202<br>1397 |

## 1.2 RS Tractor

| | K600 RS | V650 RS |
|---|---|---|
| Curb weight: | 1580 Kg.<br>1720 Kg. with cab | 1560 Kg.<br>1700 Kg. with cab |
| The total weight of the tractor is distributed on the axles as follows: | 59% front axle - 41% rear axle<br>56% front axle - 44% rear axle (with cab) | 58% front axle - 42% rear axle<br>56% front axle - 44% rear axle (with cab) |

**Dimensions**

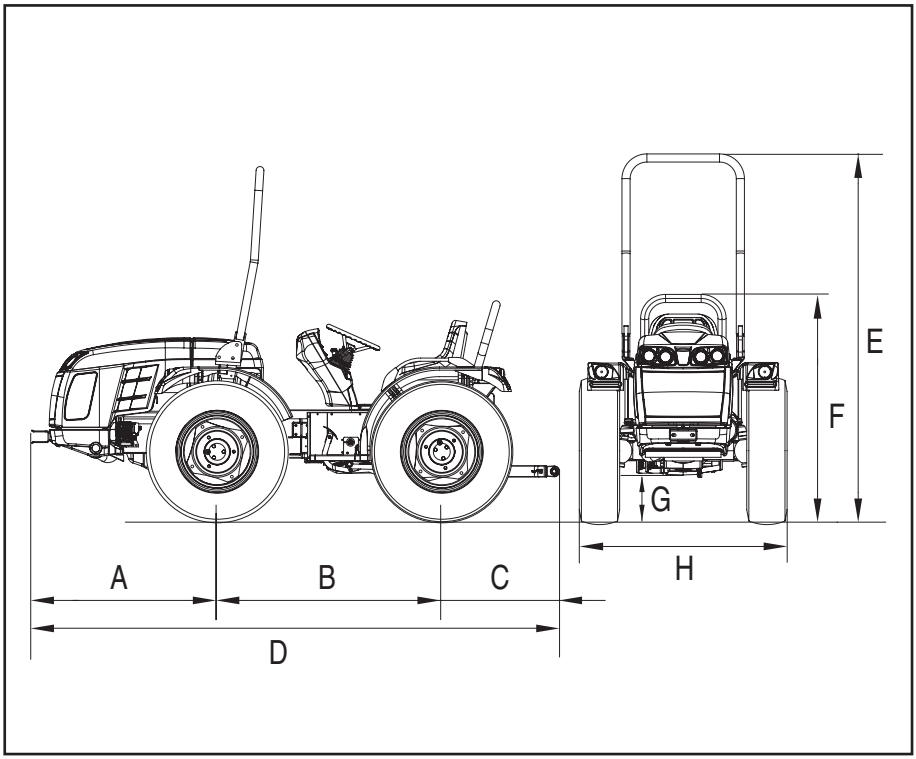


**Fig. 3.2**

| | A | B | C | D | E max | F max (sin.d.) max (rev) | G min max | H min max |
|---|---|---|---|---|---|---|---|---|
| mm | 1150 | 1390 | 730 | 3270 | 2200 | 1202<br>1344 | 207<br>266 | 1207<br>1667 |

## 1.3 MT Tractor

| | K600 MT | V650 MT |
|---|---|---|
| Curb weight: | 1650 Kg. | 1630 Kg. |
| The total weight of the tractor is distributed on the axles as follows: | 57% front axle - 43% rear axle | 57% front axle - 43% rear axle |

**Dimensions**

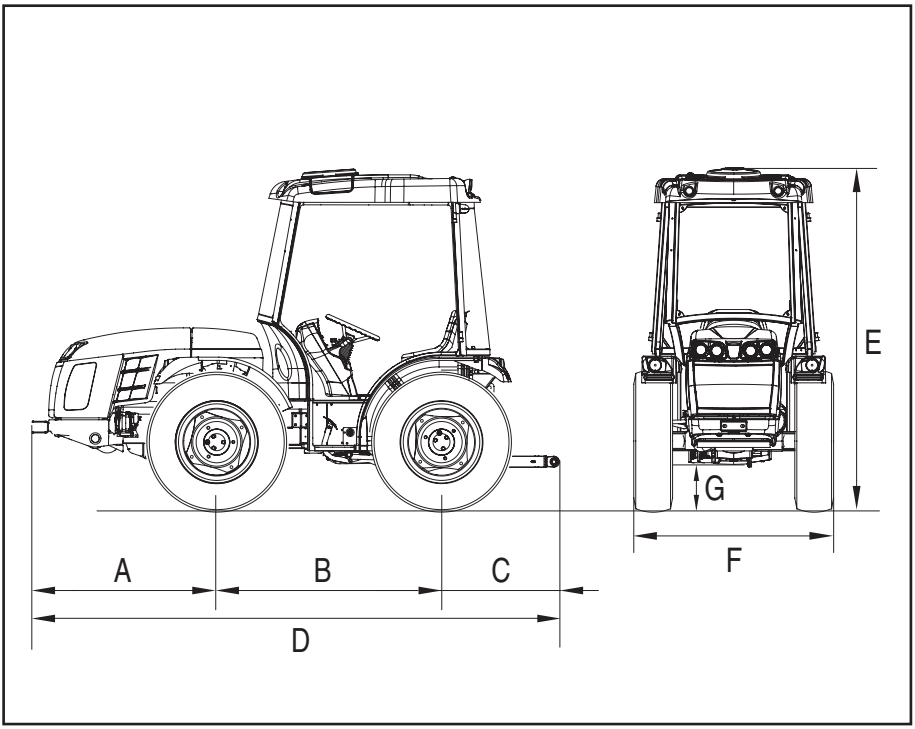


**Fig. 3.3**

| | A | B | C | D | E max | F min max | G min max |
|---|---|---|---|---|---|---|---|
| mm | 1150 | 1390 | 730 | 3270 | 2106 | 987 1325 | 207 266 |

# Section 2 : Engine

| | K600 | V650 |
|---|---|---|
| Manufacturer | Kubota | VM Motori spa |
| Type | V2203-M-DI-E | D753 TE3 |
| N° of cylinders | 4 | 3 |
| Displacement (cc) | 2197 | 2230 |
| Aspiration | natural | turbo |
| Emissions level | Tier 3 | Tier 3 |
| Power (KW/CV) | 35,2/48 | 42,6/58 |
| Rated speed (rpm) | 2800 | 2600 |
| Maximum torque (Nm/rpm) | 144,6/1700 | 185/1400 |
| Cooling | liquid | liquid |
| Specific fuel consumption (g/KWh) | - | 268 |
| Tank capacity (l) | 45 | 45 |



## 2.1 Noise level emissions in the environment (Directive 2009/63/EC)

| | K600 | V650 |
|---|---|---|
| Machine noise level stationary dB (A) | 79,2 | 83,9 |
| Machine noise level moving dB (A) | 83,9 | 87,5 |

## 2.2 Noise level in the driver's ears (Directive 2009/63/EC)

| | K600 | V650 |
|---|---|---|
| Machine noise level with arch dB (A) | 85 | 86 |
| Machine noise level with cabin dB (A) | 82 | 86 |
| Machine noise level with half cabin dB (A) | 86 | 86 |

## 2.3 Vibration level of the driver's seat (Directive 78/764/EEC)

| | MASS 60 Kg. | MASS 100 Kg. |
|---|---|---|
| SC74 - M91 | 1,13 $m/s^2$ | 0,75 $m/s^2$ |
| SC79 - M91 | 1,13 $m/s^2$ | 0,75 $m/s^2$ |
| XH2 P1 | 1,17 $m/s^2$ | 0,93 $m/s^2$ |
| XH2 P2 | 1,17 $m/s^2$ | 0,93 $m/s^2$ |
| 450 - S22 | 0,99 $m/s^2$ | 1,07 $m/s^2$ |
| COMPACT - S22 | 0,99 $m/s^2$ | 1,07 $m/s^2$ |

## Section 3 : Clutch

The transmission clutch is a mechanically-actuated, multi-plate, oil-immersed clutch.

The PTO clutch is a electrohydraulically-actuated, multi-plate, oil-immersed clutch and brake in the disengaged position.

## Section 4 : Gearbox

The constant mesh gearbox with helical gearing has 4 speed gears, 3 working ranges and a reverser. A total of 24 speeds are available: 12 forward and 12 reverse.

Gears and reverser have synchronized engagement.

## Section 5 : Rear drive

Hypoid differential bevel gear with electrohydraulic locking.

Final epicyclic reduction gears on the wheels.

## Section 6 : Differential block

Front and rear differential with simultaneous electrohydraulic locking.

## Section 7 : Four-wheel drive

There is permanent four-wheel drive.

## Section 8 : Power take-off

**Independent Power Take-Off for implements or machine tools.**

The independent PTO is engaged by means of an electrohydraulically-actuated multi-plate oil-immersed clutch. The PTO output shaft rotates to the right in forward gear.

**Synchronized Power Take-Off for trailers.**

Below, the rpm values of the synchronized PTO shaft are given for each revolution of the rear wheel:

- PTO 540: 6,598 rpm
- PTO 540E: 8,617 rpm



## Section 9 : Service brakes

The service brakes on the rear wheels are mechanically-actuated, multi-plate and oil-immersed.

They are activated by one pedal in the AR model and two pedals in the RS and MT models for forward operation and one pedal only for reverse operation.

For simultaneous braking on roads, the pedals have to be coupled using the relevant lockbolt.

## Section 10 : Parking brake

The parking brake acts on the service brakes and is mechanically controlled using a manual lever.

## Section 11 : Front axle

The front axle oscillates at the center (approx. ± 15°) and is always in drive.

Engagement of the front and rear differential lock is simultaneous with an electrohydraulic command from the switch on the dashboard.

## Section 12 : Hydraulic circuit

The circuit is equipped with two independent hydraulic pumps controlled by the power distribution gears.
One pump controls the hydraulic steering gear and services (differential locking device, p.t.o. clutch) the other pump controls the hydraulic lift and additional distributors.

Hydraulic steering gear capacity:

18,9 l/min.*
16,8 l/min.**

Lift pump capacity:

24,8 l/min.*
30,3 l/min.**

Two hydraulic pumps are available with higher capacity and are coupled to a heat exchanger having the following capacities.
Hydraulic steering gear pump regulated capacity:

6 l/min.

Lift pump capacity:

37,2 l/min.*
33,2 l/min.**

* D753 TE3 motor
** V2203-M-DI-E motor

## Section 13 : Rear hydraulic lift

The rear hydraulic lift is available in two mechanically-controlled configurations:

- position control, draft control, and combined position and draft control.
- position control, draft control, and combined position and draft control.

The lifting capacity is 1510 kg at the ball joints of the lift arms.

# Section 14 : Hydraulic direction control valves

The additional hydraulic directional control valves are mechanically controlled with up to 6 hydraulic ports.

The standard configuration (RS and AR models) envisages:

- one-piece double-acting directional control valve with “raise-lower” function.

The standard configuration (MT model) envisages:

- double-acting directional control valve for the hydraulic ports;
- single-acting drain hitch directional control valve for the lift.

As an option, the following is available:

- 1 single acting directional control valve and 1 double-acting floating directional control valve;
- 2 double-acting directional control valves.

As an option, the directional control valves can be electronically operated by a joystick in the following configuration:

- 1 single-acting adjustable flow directional control valve
- 1 single-acting directional control valve + 3 double-acting directional control valves, driven by a proportional valve

| Notes: |
| --- |
| In order to guarantee the correct maneuvrability of the hydraulic equipment, it is advisable to use lock valves on the hydraulic drive connected to the double-acting hydraulic ports. |

# Section 15 : Steering

The tractor has hydrostatic steering incorporated in the dashboard. A double-acting hydraulic jack is present on the central joint on the AR model and on the front axle on the RS model

Steering angle:

- AR model - approx. 38°
- RS model - approx. 46°

The steering wheel height is adjustable on the AR model while steering regulation is oscillating on the RS model.

The turning radius depends on the type of tires installed as shown below:

| Type of tire | Turning radius | | |
|---|---|---|---|
| | AR | RS | MT |
| 7.50-16 | 2450 | 2800 | - |
| 8.25-16 | 2450 | 2800 | - |
| 250/80-18 | 2500 | 2830 | - |
| 280/70-18 | 2530 | 2930 | - |
| 320/65-18 | 2650 | 2950 | - |
| 11.5/80-15.3 | 2550 | 3130 | - |
| 260/70-20 | 2600 | 3350 | - |
| 31x15.50-15 | 2700 | 3250 | 3250 |
| 33x12.50-15 | 2700 | 3200 | - |
| 33x15.50-15 | - | - | 3250 |
| 300/65-18 | 2530 | 2930 | - |

# Section 16 : Implement hitch

Cat. three-point hitch with side stabilizers for controlling lateral sway of implements.

Third point tie rod and vertical tie rods with manual regulation.

On request, the third point tie rod is available with quick coupling.

The lifting capacity is 1510 kg at the ball joints of the lift arms.

# Section 17 : Towing hitches

The tractor is equipped with a front maneuver hitch.

Two types of rear hitches are available, depending on the norms of individual countries:

- Category C hitch, approved for Italy, 6 positions for height adjustment;
- Hitch for European approval.

The maximum weight that the tractor can tow varies depending on the laws in force in individual countries.

**Maximum towable mass (unbraked):**

| | K600 | V650 |
|---|---|---|
| RS version | 1580 | 1560 |
| RS version with cabin | 1720 | 1700 |
| RS version with half cabin | 1650 | 1630 |
| AR | 1560 | 1540 |
| AR version with cabin | 1720 | 1700 |
| AR version with half cabin | 1650 | 1630 |

**Maximum towable mass (with independent braking system):**

| | K600 | V650 |
|---|---|---|
| RS version | 4740 | 4680 |
| RS version with cabin | 5160 | 5100 |
| RS version with half cabin | 4950 | 4890 |
| AR version | 3120 | 3080 |
| AR version with cabin | 3440 | 3400 |
| AR version with half cabin | 3300 | 3260 |

**Maximum towable mass (with inertia braking):**

| | K600 | V650 |
|---|---|---|
| RS version | 4740 | 4680 |
| RS version with cabin | 5160 | 5100 |
| RS version with half cabin | 4950 | 4890 |
| AR version | 3120 | 3080 |
| AR version with cabin | 3440 | 3400 |
| AR version with half cabin | 3300 | 3260 |

# Section 18 : Impianto elettrico

| Voltage |
|---|
| 12 V |

**Battery**

| | |
|---|---|
| type | “Maintenance Free” |
| Voltage | 12 V |
| Capacità per 20 ore | 70 Ah |

**Alternator**

| | |
|---|---|
| type | 70 A |
| Voltage | 14 V |
| Potenza | 980 W with built-in automatic voltage regulator |

**Starter motor**

| | |
|---|---|
| Voltage | 12 V |
| Sustained power | 2,4 kW*<br>1,4 kW** |

* D753 TE3 motor

** V2203-M-DI-E motor

**Rear auxiliary electrical outlet**

7 pin

**Headlights**

four front optical groups with halogen lamps: two dipped headlights, two full beam headlights and two position lights;

for orange indicator lights;

two tail lights including position light red brake light;

two red reflectors;

number plate light and rear working light;

on tractor with cab: two front and two rear working lights with halogen bulbs.

**Fuses**

Safety fuses on the bottom right-hand side of the dashboard and at the top inside the cab.

## Section 19 : Cab

Cab with monocoque rollbar assembled on “silent block”.

Ventilation and heating system with replaceable dust filter. Activated carbon filter available on request.

The cab is not pressurized.

## Section 20 : Rollbar

The front safety frame is securely fixed to the tractor’s transmission and can be lowered for particular maneuvers.

Frame with four uprights for the MT model, with roof, front and rear window.

## Section 21 : Body

Il cofano motore è del tipo ad apertura anteriore.

Parafanghi parzialmente avvolgenti.

Serbatoio gasolio e batteria sistemati sotto una protezione in plastica dietro il cofano.

## Section 22 : Operator position and seat

Operator position with platform suspended on silent blocks.

In the reversible model, the operator position revolves for using the tractor in reverse mode. The brake pedals and clutch are fixed to the transmission.

Adjustable steering wheel.

Sprung seat equipped with safety belts. Springs can be adjusted to the operator’s weight.

# Section 23 : Front and rear wheels

To adjust the wheel track, see the tables in chapter 5, User Regulations.

| Tires | Wheel radius under load | | RS | AR | MT |
|---|---|---|---|---|---|
| | mm | inch | | | |
| 7.50-16 | 363 | 14.29 | o | o | - |
| 8.25-16 | 375 | 14.76 | o | o | - |
| 250/80-18 | 393 | 15.47 | o | o | - |
| 280/70-18 | 380 | 14.96 | o | o | - |
| 320/65-18 | 400 | 15.75 | o | o | - |
| 11.5/80-15.3 | 380 | 14.96 | o | o | - |
| 260/70-20 | 396 | 15.59 | o | o | - |
| 31x15.50-15 | 350 | 13.78 | o | o | o |
| 33x12.50-15 | 368 | 14.49 | o | o | - |
| 33x15.50-15 | 368 | 14.49 | - | - | o |
| 300/65-18 | 381 | 15 | o | o | - |

# Section 24 : Supplies table

The engine cooling circuit consists of a mixture of a special coolant and distilled water in variable proportions.

These are the reference values:

| antifreeze (%) | freezing point (°C) | boiling point (°C) |
|---|---|---|
| 30 | -15 | 104 |
| 35 | -20 | 105 |
| 40 | -25 | 106 |
| 45 | -30 | 107 |
| 50 | -35 | 109 |
| 60 | -36 | 113 |

For the engine lubrication circuit quantities, see the instruction manual for the engine supplied with the tractor. Always store it in a safe place.

| Quantity | AR | RS | MT | type |
|---|---|---|---|---|
| Fuel tank | 45 lt | 45 lt | 45 lt | diesel |
| Front axle | 6.5 lt | 5 lt | 5 lt | BCS POWERLUBE W13T oil |
| Reduction gear of front wheels | - | 0.8 lt | 0.8 lt | BCS POWERLUBE W13T oil |
| Gearbox-rear axle unit and rear reduction gears | 14.5 lt | 16 lt | 16 lt | BCS POWERLUBE W13T oil |

| | | | | |
|---|---|---|---|---|
| Engine cooling circuit coolant | 8,5 lt*<br>10 lt** | 8.5 lt | 8.5 lt | antifreeze/distilled water mixture |
| Air conditioning circuit coolant | 0.8 Kg | 0.8 Kg | 0.8 Kg | R134a |

* D753 TE3 motor

** V2203-M-DI-E motor

# Chapter 4 : Instruments and controls

## Contents

# Section 1 : General view of controls

This paragraph provides an overview of all of the instruments and controls on the tractor.

Unless otherwise specified, they apply to the AR, RS and MT versions.

To use the controls listed here correctly, read chapter 5 - User Regulations carefully.

- User Regulations carefully.
  1 - Clutch disengagement pedal
  2 - Working range lever
  3 - Direction lever
  4 - Gearshift lever
  5 - Brake pedals (RS model)
  6 - Brake pedals (AR model)
  7 - Accelerator pedal
  8 - Steering wheel
  9 - Steering wheel height lever
  10 - Analog instrument panel
  11 - Lights switch and horn
  12 - Ignition switch
  13 - PTO engagement switch
  14 - Differential lock engagement switch
  15 - SCS (Self-Cleaning System) button (MT model)
  16 - Auxiliary electrical outlet (12 V)
  17 - Emergency switch
  18 - Hand accelerator lever
  19 - Parking brake lever

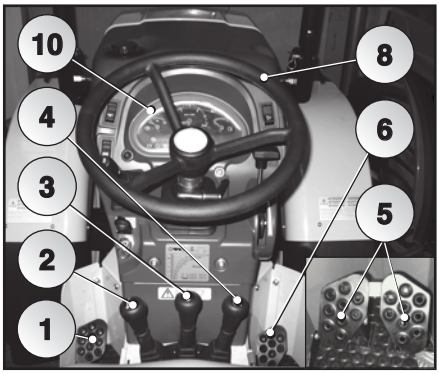


Fig. 4.1

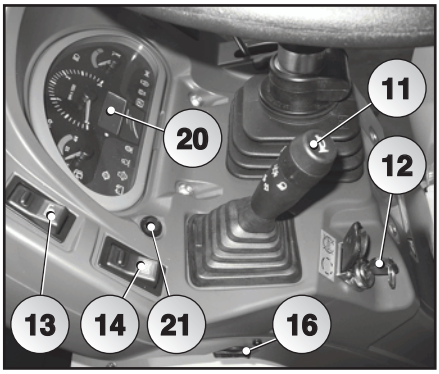


Fig. 4.2

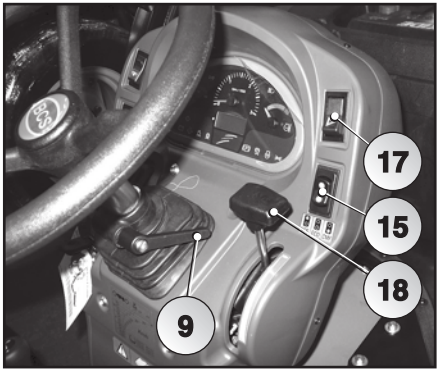


Fig. 4.3

20 - Digital instrument panel
21 - Digital panel functions button
22 - Up/down lift lever
23 - Lift arms down speed knob
24 - Position control lever (yellow) for pos./draft lift control
25 - Draft control lever (red) for pos./draft lift control
27 - Lift arms down speed lever

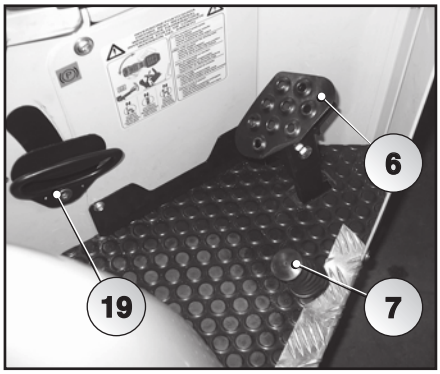


Fig. 4.4

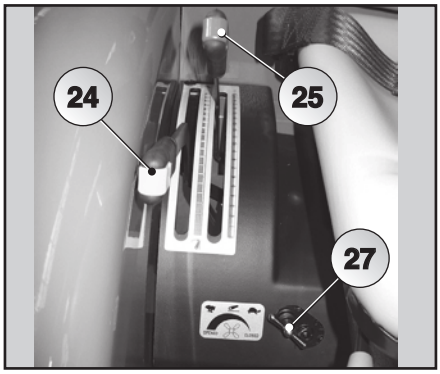


Fig. 4.5

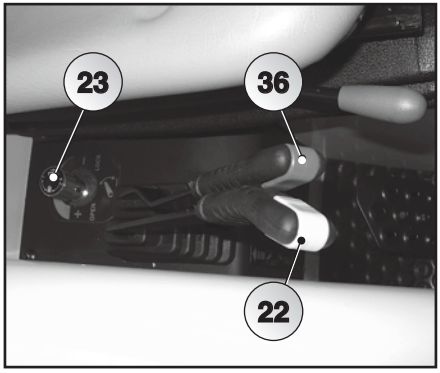


Fig. 4.6

28 - Independent or synchronized PTO lever
29 - Hydraulic directional control valve lever (matches rear quick hitch color)
30 - Hydraulic directional control valve lever (matches rear quick hitch color)
33 - PTO speed lever
34 - Electrical outlet for trailer
36 - Hydraulic directional control valve lever (matches rear quick hitch color)
37 - Lift lever (hydraulic suspension model)
38 - Accumulator charge/discharge lever (hydraulic suspension model)

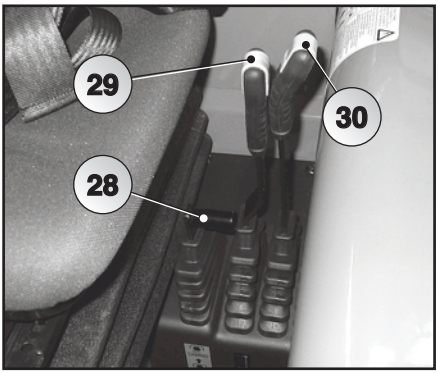


Fig. 4.7

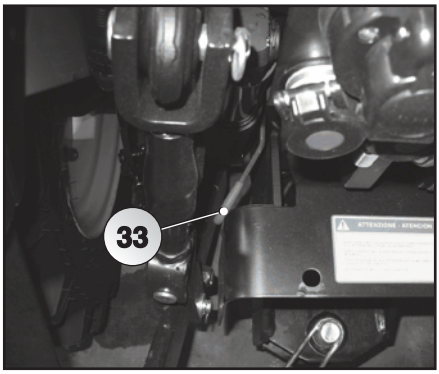


Fig. 4.8

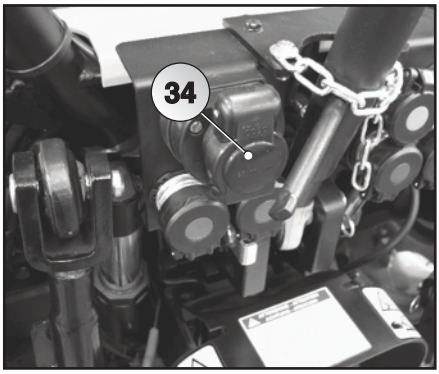


Fig. 4.9

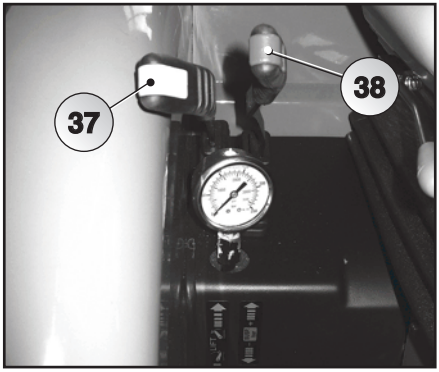


Fig. 4.10

# Section 2 : Controls in cab

This paragraph provides an overview of all of the instruments and controls on the tractor equipped with a cab.

Unless otherwise specified, they apply to the AR, RS and MT versions.

To use the controls listed here correctly, read chapter 5 - User Regulations carefully.

| Note: |
| --- |
| To clean the cab's upholstery, use water mixed with preferably neutral detergents; all products found on the market for cleaning car interiors may, in any case, be used. |

50 - Front work lights switch
51 - Rotating light switch
52 - Rear work lights switch
53 - Front windshield wiper switch
54 - Fan speed knob
55 - Air-conditioning temperature knob
56 - Heating knob

| Notes: |
| --- |
| The cab is equipped with front and rear work lights; these considerably improve visibility at night. They should therefore always be turned on when visibility is poor. |

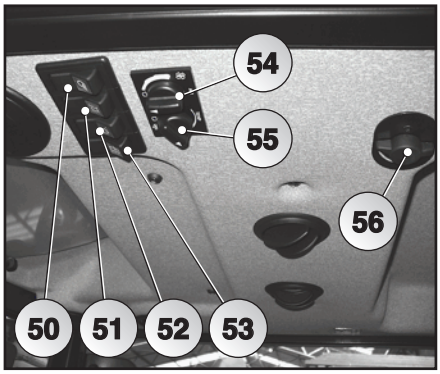


**Fig. 4.11**

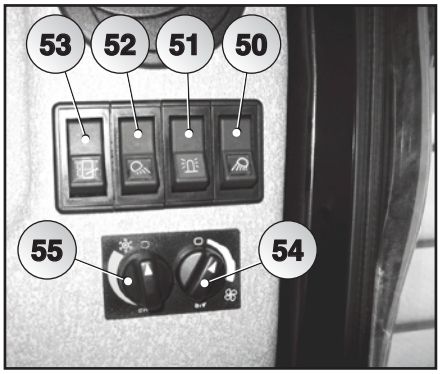


**Fig. 4.12**

**Fig. 4.13**

57 - Space for radio (optional)
58 - Cab interior lights switch

The switch (58) has three positions:

- Back - large interior light on
- Center - lights off
- Forward - reading light on

59 - Air circulation opening
60 - Air circulation opening
64 - Rear roller sun shade
67 - Directional hot/cold air vents
68 - Directional hot/cold air vents

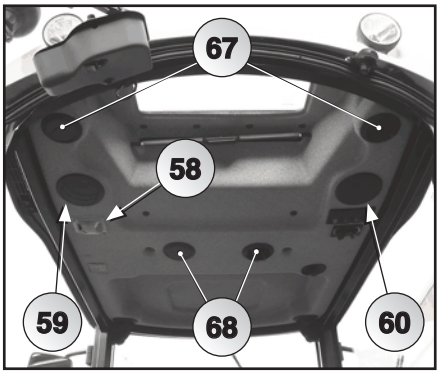


**Fig. 4.14**

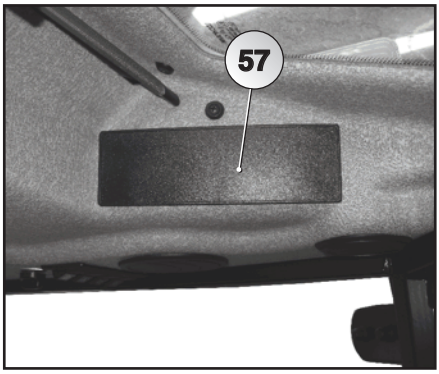


**Fig. 4.14.1**

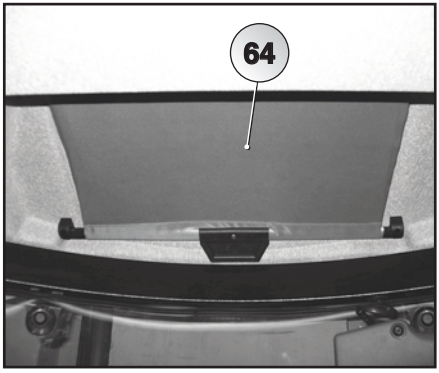


**Fig. 4.15**

65 - Rear windshield wiper switch
66 - Front and rear windshield wiper liquid tank

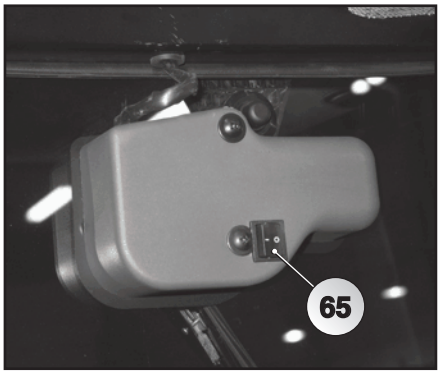


**Fig. 4.16**

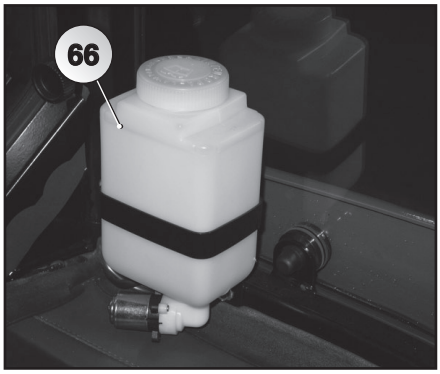


**Fig. 4.17**

**Side doors**

Both doors can be opened from the inside and the outside and are held open by shock absorbers.

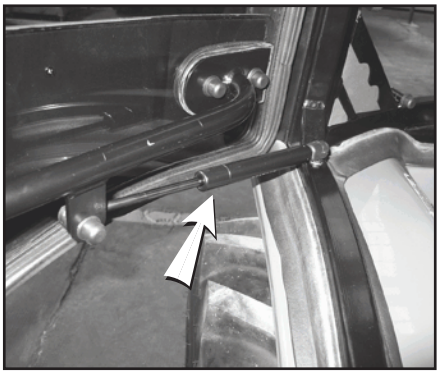

**Fig. 4.18**

**Front and rear windows**

The rear window may be opened

To open the window, simply free it by turning the handle counter-clockwise and pushing it. Special shock absorbers hold the window open.

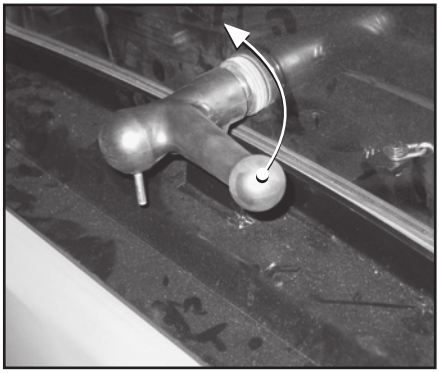

**Fig. 4.19**

# Section 3 : Heating and air-conditioning

The cab is equipped with vents that can be positioned to direct the air as desired (59-60). The controls for ventilation and heating are on the roof of the cab (Fig. 4.20).

> ⚠ Warning:
>
> If the tractor is not used for an extended period of time or if the air-conditioning is not used for a long time, run the system at least once a week for approximately 15 minutes to keep it operating well and to prevent gas leaks from the compressor.

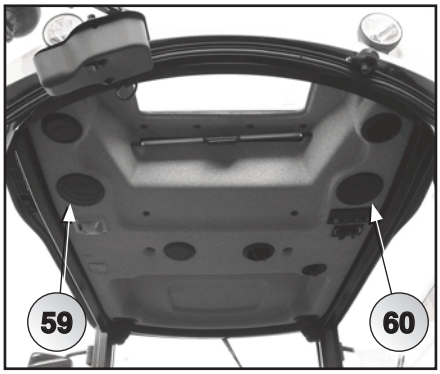


**Fig. 4.20**

## 3.1 Heating

The knob (56) is used to adjust the internal temperature of the cab from cold to hot through all of the desired intermediate temperatures using water from the engine cooling circuit. From the closed position (C), the valve can be turned until fully opened (A), corresponding to maximum heat.

To introduce air, use the fan speed knob (54).

| ⚠ Warning: |
| --- |
| To heat the cab quickly, open the air circulation vents inside the cab itself. |

| ⚠ Warning: |
| --- |
| When the heat is on, make sure that the air-conditioning knob (55) is in the off position. |

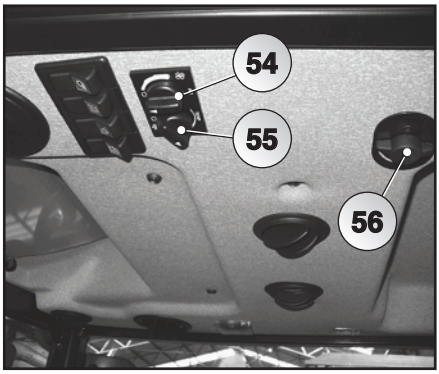


**Fig. 4.21**

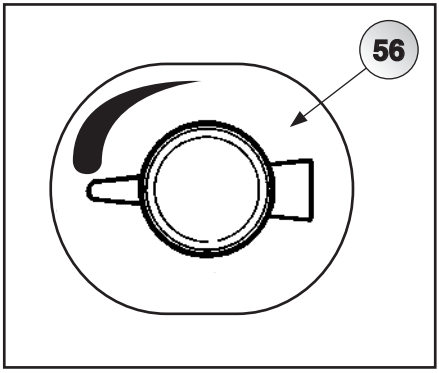


**Fig. 4.22**

## 3.2 Air-conditioning

| Note: |
| --- |
| Before turning on the air-conditioning, make sure that the heating knob (56) is in the off position. Also make sure that the side doors and the front and rear windows are closed. |

To cool the cab:

- With the engine running, turn the temperature setting knob (55) 1/4 from the off position clockwise;
- Turn the fan speed knob (54) clockwise to maximum;
- adjust the temperature knob (55) in order to reach a comfortable temperature.

**Tractor with cab**

To take the greatest possible advantage of the air conditioning system, always keep the cab windows and doors well closed. The greatest efficiency is gained by keeping the fan speed at the 1st or 2nd speed and the thermostat to 1/4 of its turn (follow the indications of the plate on the control knob).

Depending on the environment conditions, the setting of the thermostat in the highest cold position may lead to the freezing of the evaporating group with consequent reduction of the efficiency and water coming out from the group itself.

Should this happen, set the thermostat on the OFF-position (TOTALLY TURNED COUNTER-CLOCKWISE) keeping the ventilation in action at the maximum for about 3 minutes.

| Note: |
| --- |
| The tractor manufacturer does not assume any responsibility for any damages to people or objects resulting from the tampering of the system by third party or from lacks of maintenance or repairs. |

| Note: |
| --- |
| A low fan speed will keep the air fresher. |

| ⚠ Warning: |
| --- |
| Clean the cab air filter (116) at the specified times (see chapter 6 - Maintenance) and use special filters when using chemical products. |

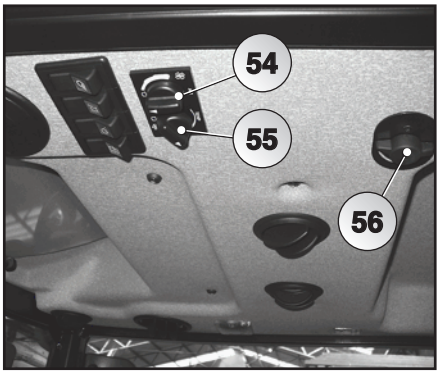


**Fig. 4.23**


**Fig. 4.24**

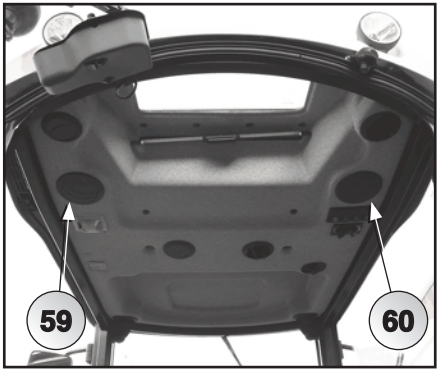


**Fig. 4.25**

# Notes

# Section 4 : Analog instrument panel

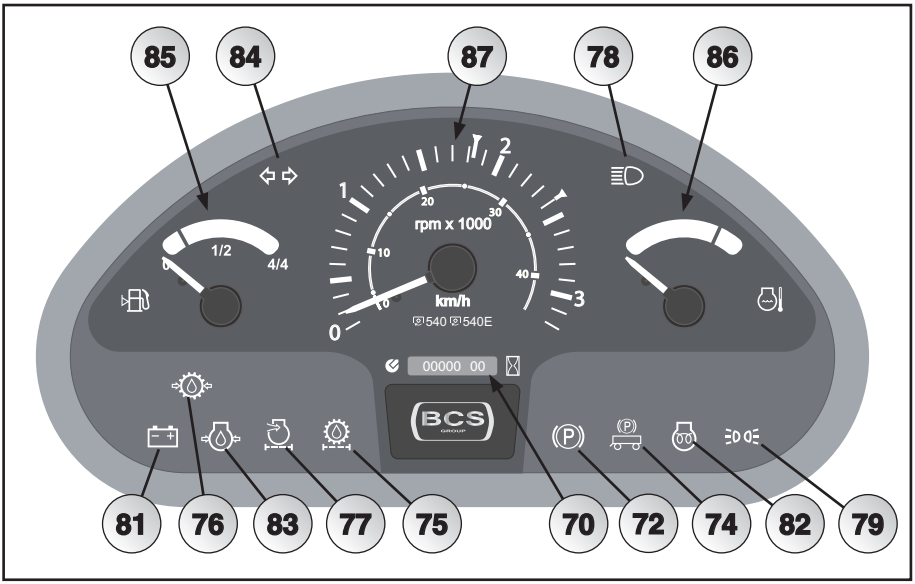


Fig. 4.26

| | | |
|---|---|---|
| 70 | Operation hours indicator | |
| 72 | Parking brake engaged light | red |
| 74 | Trailer parking light | red |
| 75 | Transmission oil filter light | red |
| 76 | Transmission oil pressure light | red |
| 77 | Engine air filter light | red |
| 78 | Full beam headlights light | blue |
| 79 | Position lights light | green |
| 81 | Battery light | red |
| 82 | Spark plugs preheating light | red |
| 83 | Engine oil pressure light | red |
| 84 | Turn signal light | green |
| 85 | Fuel level indicator | |
| 86 | Engine water temperature indicator | |
| 87 | Engine rpm indicator | |

# Section 5 : Digital instrument panel

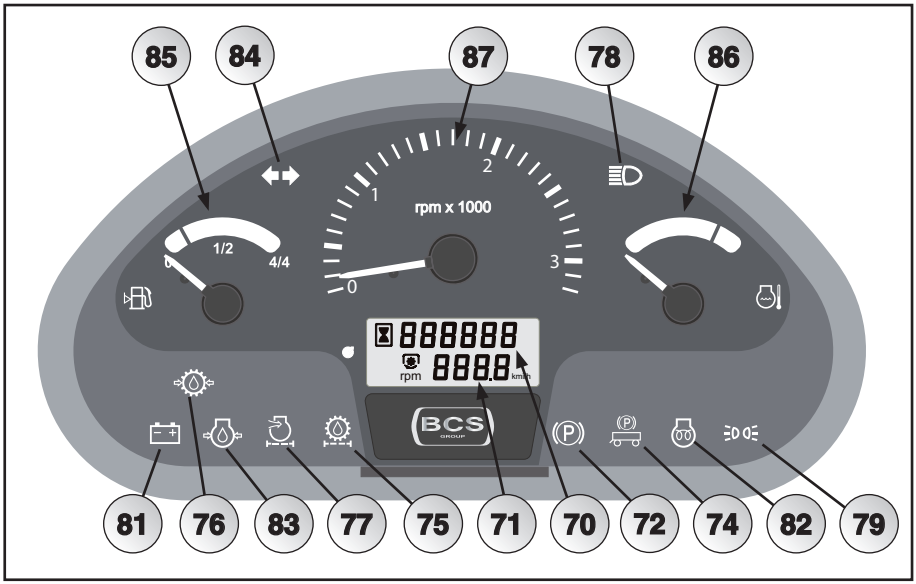


Fig. 4.27

| | | |
|---|---|---|
| 70 | Operation hours indicator | |
| 71 | PTO rpm / kph indicator | |
| 72 | Parking brake engaged light | red |
| 73 | Fast range | |
| 74 | Trailer parking light | red |
| 75 | Transmission oil filter light | red |
| 76 | Transmission oil pressure light | red |
| 77 | Engine air filter light | red |
| 78 | Full beam headlights light | blue |
| 79 | Position lights light | green |
| 80 | Slow range | |
| 81 | Battery light | red |
| 82 | Spark plugs preheating light | red |
| 83 | Engine oil pressure light | red |
| 84 | Turn signal light | green |
| 85 | Fuel level indicator | |
| 86 | Engine water temperature indicator | |
| 87 | Engine rpm indicator | |
| 90 | Operation hours indicator | |
| 91 | Digital display | |

**Digital display**

By turning the ignition key (12) to the simple contact position, as when starting the engine;

The display shows two pieces of information:

- the upper number (LCD1) indicates the working hours;
- the lower number (LCD2) indicates the tractor speed (kph).

Using the button (21) the function of the information provided in the LCD1 position can be varied in order to display the PTO rpm.

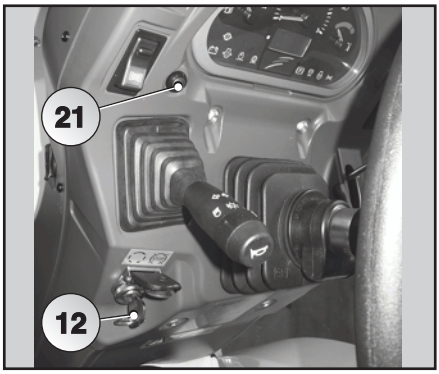


**Fig. 4.28**

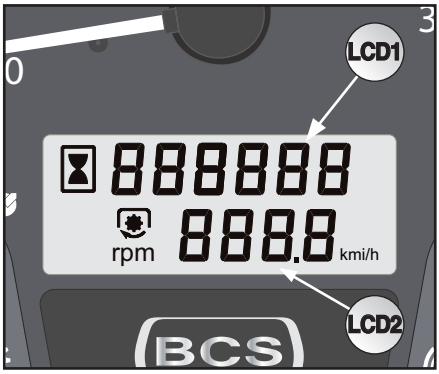


**Fig. 4.29**

# Section 6 : Steering wheel adjustment

The wheel activates the power steering:

- the center joint for AR tractor steering;
- the wheels for RS tractor steering.

| ⚠ Warning: |
| --- |
| Adjust the steering wheel height when the tractor is not moving. |

The steering wheel height may be adjusted by rotating the provided lever (9). The movement of the lever (9) releases the steering wheel position, allowing it to be adjusted to the height of the operator.

Height-adjustable steering wheel (AR model)


**Fig. 4.30**

Tilting steering wheel (RS model)

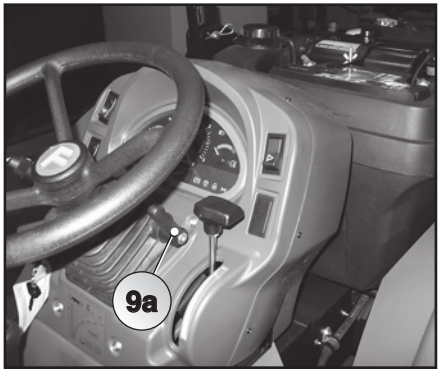


**Fig. 4.31**

# Section 7 : Standard seat adjustment

The tractor seat is equipped with devices for longitudinal, height and vertical adjustment according to the operator's weight.

| ⚠ Warning : |
| --- |
| Adjust the seat position when the tractor is not moving. |

## 7.1 Vertical adjustment (operator weight)

The seat suspension may be adjusted according to the operator's weight using the lever (42) under the rubber guard of the suspension itself.

To adjust:

- Pull the lever (42) outward;
- Turn the lever (42) clockwise to increase the weight sustained by the suspension; turn the lever (42) counterclockwise to reduce the weight sustained by the suspension.

| Note: |
| --- |
| The longitudinal setting and height of the seat should be adjusted while the operator is sitting on the seat itself. |

## 7.2 Longitudinal adjustment

The required position is achieved using the lever (40) and moving the seat longitudinally (forward or backward). After it has been adjusted, release the lever (40) to lock the seat in place.

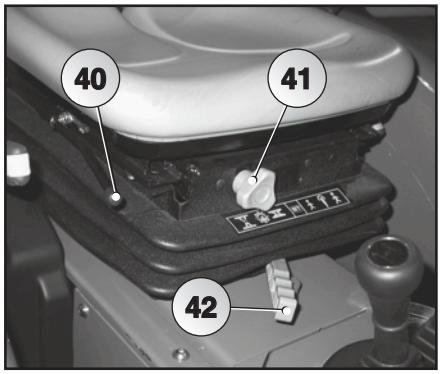


**Fig. 4.32**

## 7.3 Height adjustment (vertical)

Use the knob (41) to adjust the seat height. When turned clockwise, the seat is lowered; when turned counter-clockwise, the seat is raised.

# Section 8 : “Bostrom” seat adjustment (on request)

The seat suspension may be adjusted longitudinally and is also equipped with a device which allows the vertical travel of the seat to be adjusted according to the weight of the operator.

| ⚠ Warning : |
| --- |
| Adjust the seat position when the tractor is not moving. |

## 8.1 Operator weight adjustment

The lever (45) allows the adjustment device to be prepared according to the weight of the operator, while the index (46) displays the value compared to the data plate.

To adjust:

- pull the lever (45) outwards;
- turn the lever knob so that the + symbol appears in the window if the operator weighs more than the currently selected value or the - symbol appears if the operator weighs less;
- then activate the lever so that the index (46) is in the desired position; once adjustment has been completed, turn the lever (45) back inwards;
- once the seat has been adjusted according to the weight of the operator, subsequent adjustments must be carried out with the person sitting on the seat itself, observing the following procedure.

## 8.2 Longitudinal adjustment

| Note: |
| --- |
| It is advisable to perform longitudinal and height adjustments to the seat while the operator is actually sitting on the seat. |

Activate the lever (43) and move the seat longitudinally into the required position; once adjustment has been completed, release the lever and malke sure that the seat is locked in place.

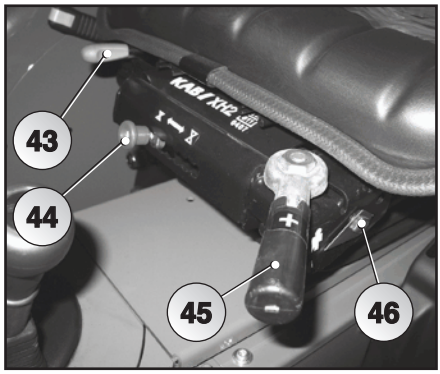


**Fig. 4.33**

## 8.3 Suspension adjustment

Move the knob (44), sliding it into the slit until it is positioned on a level with the required vertical adjustment value as shown on the data plate.

# Section 9 : Rotating light

**Tractor with cab**

On the tractors equipped with a cab, the rotating light is mounted at the rear of the cab itself.

It is turned on using the switch (51) inside the cab.

**Tractor with platform**

On the tractors with a platform, the rotating light must be installed, if necessary, on the rollbar.

It is turned on by inserting the connector of the “rotating light” kit into the auxiliary electric outlet (16) (12V) on the left-hand side of the dashboard.

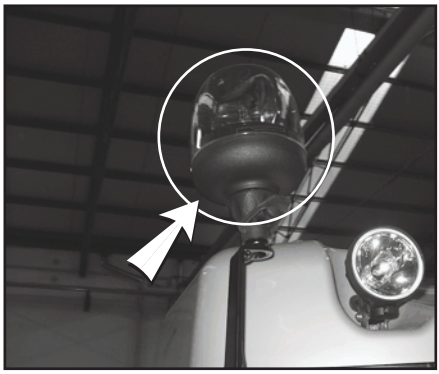

Fig. 4.34

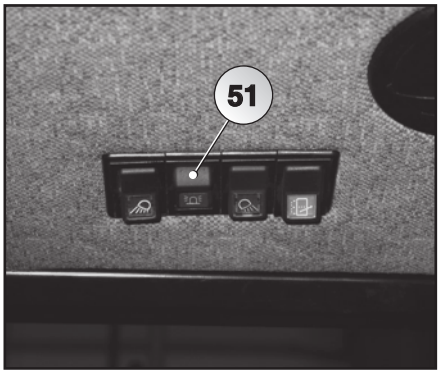


Fig. 4.35

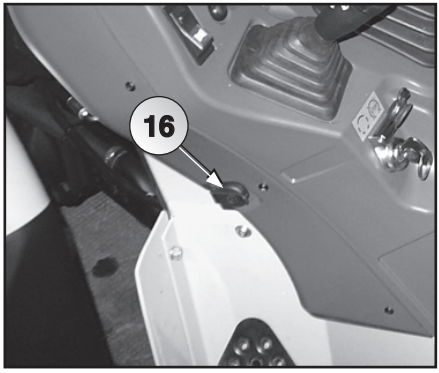


Fig. 4.36

# Chapter 5 : User regulations

## Contents

# Section 1 : Operator position direction (reversible)

| ⚠ Warning : |
|---|
| The rollbar must always be installed and vertical when using the tractor. The rollbar itself may be folded forward only to temporarily reduce the overall height of the tractor. |

| Note: |
|---|
| The operations and warnings regarding the operator position direction apply to both models with platforms and cabs. |

The tractor operator position may be directed in the normal direction of operation (A) or it may be reversed 180° (B).

| Note: |
|---|
| By rotating the operator position 180°, the power steering flow reverser is automatically positioned so that the vehicle steering always corresponds to the direction of the steering wheel. |

| ⚠ Warning : |
|---|
| The operator position must be in the normal operation direction when driving the tractor on roads. |

To reverse the operator position, the following instructions must be observed:

| ⚠ Warning : |
|---|
| The engine must be off and the parking brake must be engaged. |

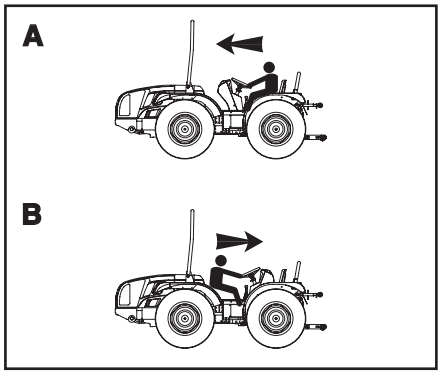


Fig. 5.1


Fig. 5.2

1 - adjust the steering wheel to the high position;
2 - position the three gearbox levers (2) (3) (4) (Fig. 5.3) in neutral;
3 - pull the unlocking lever (121) and lift the seat until the safety lock (122) clicks;
4 - Rotate the seat-dashboard unit counter-clockwise 180° to go from the normal operator position (road traffic) to the reverse operator position (Fig. 5.3); rotate clockwise to go from the reverse operator position to the normal operator position;
5 - Release the safety lock (122) and lower the seat again so that the lever (121) is reinserted into the locked position;

| Note: |
| --- |
| To allow the operator to use the accelerator pedal (7) even when the operator position has been reversed, the relative control pedal (7) is found on both footboards. |

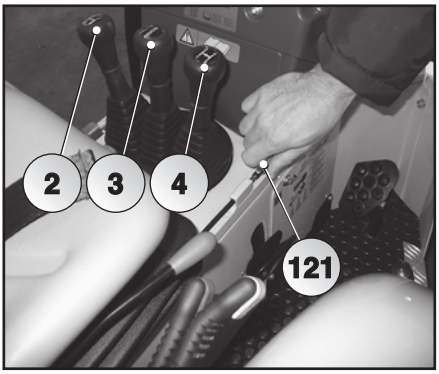


**Fig. 5.3**

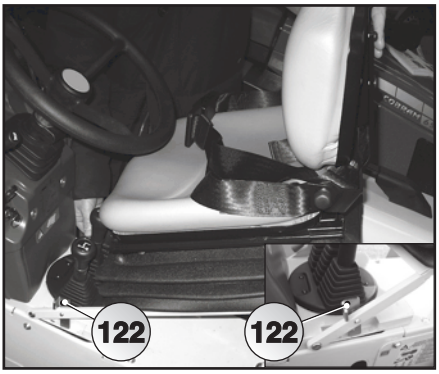


**Fig. 5.4**

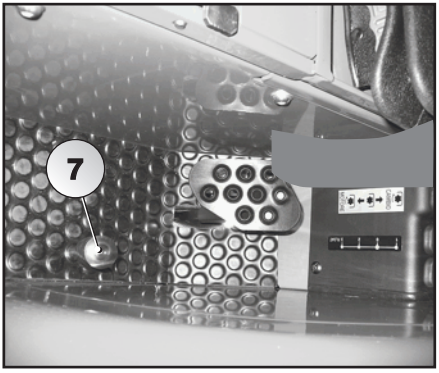


**Fig. 5.5**

# Section 2 : Starting the engine

| ⚠ Warning: |
| --- |
| Never run the engine in a closed environment: the exhaust gases are toxic. |

| ⚠ Warning: |
| --- |
| The parking brake must always be engaged when the tractor is at a standstill and the engine is off. |

| ⚠ Warning: |
| --- |
| Only start the engine when you are sitting in the driving seat. |

| Note: |
| --- |
| A safety device prevents the engine from being started if the clutch pedal is not pressed down completely. |

| Note: |
| --- |
| A safety device prevents the motor starting even if the engine cowl is opened. |

| Note: |
| --- |
| When the ignition key is turned to 1, the digital instrument panel carries out a brief operational test, turning on all of the display lights, after which the engine operation hours appear. |

1 - make sure that the parking brake knob (19) is in the 'brake on' position;
2 - make sure that all of the control levers are in neutral;
3 - make sure that all of the control switches are disconnected;
4 - press the clutch pedal (1) down fully and keep it pressed;
5 - press the accelerator pedal (7) approximately half way down;
6 - **Valiant V650**
Insert the ignition key (12) into the switch and turn it clockwise to position 1. Make sure that the following lights on the instrument panel come on:
- preheating spark plugs (82)
- engine oil pressure (83)
- battery charging (81)
- parking brake engaged (72)

As soon as the preheating spark plugs light (82) goes off, turn the key clockwise, keeping it in position 2. When the engine starts, release the key which will automatically return to position 1;

**Invictus K600**
Insert the ignition key (12) into the relative slot and turn it clockwise to position 1 "on". The total number of work hours will appear on the digital display. Make sure that the following indicator lights on the instrument come on:
- engine oil pressure (83)
- battery charge (81)
- parking brake engaged (72)

Turn the key clockwise to position 2 "warming up" and hold it there for about 5 seconds

Turn the key clockwise to position 3 "start" so as to start the engine.

7 - After the engine has been started, make sure that all of the red lights have gone off (except for the parking brake);
8 - If one of the red lights has not gone off, the engine must be turned off. Identify and eliminate the cause of the problem and repair it.

**⚠ Warning:**

NEVER ATTEMPT TO START THE ENGINE FOR MORE THAN 15 CONSECUTIVE SECONDS.

**⚠ Warning:**

To prevent accidents, never allow anyone to sit on the fenders or anywhere else on the tractor or the implement.

**⚠ Warning:**

When the engine is running, stay a safe distance away from the fan.

Note:

TURBO ENGINE: To permit turbo compressor lubrication, let the engine run at idle speed for a few minutes. Then bring the engine to 1,000-1,200 rpm without increasing it until the engine reaches the normal operating temperature.

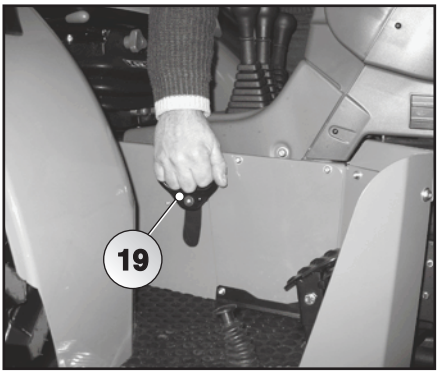


**Fig. 5.6**

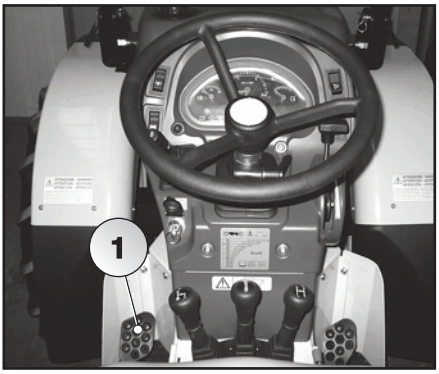


**Fig. 5.7**

**Fig. 5.8**

# Section 3 : Starting the engine with a low outdoor temperature

| Note: |
| --- |
| When the temperature is below or near 0°C, check and, if necessary, replenish the cooling circuit with the recommended antifreeze. |

| ⚠ Warning: |
| --- |
| Do not inject fluids (ethers) to facilitate starting at low temperatures. The tractor is equipped with a cold-start system. |

Procedere nel modo seguente:

1 - Make sure that the parking brake knob (19) is in the 'brake on' position;
2 - Make sure that all of the control levers are in neutral;
3 - Make sure that all of the control switches are disconnected;
4 - Press the clutch pedal (1) down fully and keep it pressed;
5 - Press the accelerator pedal (7) approximately half way down;
6 - **Valiant V650**
Insert the ignition key (12) into the provided switch and turn it clockwise to the preheating position and keep it there for 10 seconds. Then turn it to the engine "START" position. If the engine does not start after 15 seconds, place the key at the preheating position again.
Wait another 10 seconds and repeat starting by turning the key to the "START" position.
When the engine has started, release the key.
If the engine does not start, begin the heating and starting cycle again.

**Invictus K600**
insert the ignition key into the relative slot and turn it clockwise to position 1 "on".
Turn the key clockwise to position 2 "warming up" and hold it there for about 10 seconds.
Turn the key clockwise to position 3 "start" so as to start the engine.
If the engine fails to start after 15 seconds, turn the key back to position 1, turn it clockwise to position 2, wait a further 10 seconds and then attempt to start the engine by turning the key to position 3.
Release the key as soon as the engine starts.
If the engine fails to start, repeat the warming-up or starting procedure as described.

| Note: |
| --- |
| If the engine does not start after two or three attempts and smoke comes out of the exhaust, start the engine without the thermostarter. |

| ⚠ Warning: |
| --- |
| NEVER ATTEMPT TO START THE ENGINE FOR MORE THAN 15 CONSECUTIVE SECONDS. |

| Note: |
| --- |
| Wait at least 1 minute between attempts. |

If the engine does not start easily or normally, do not continue to try in vain because the battery could run down. Instead, try to bleed any air that might be in the fuel circuit and, if the problem persists, check:

- That the fuel filters are not clogged.
- The condition of the battery and the thermostarter.
- That the fuses of the ignition circuit are in good condition and that the solenoid valve that excludes the fuel is open (contact your dealer or specialized agent).

| Note: |
| --- |
| When the outdoor temperature is low and the engine is cold, the radiator may be covered with a protective screen. Remove the protective screen as soon as the normal operating temperature is reached. |

## Section 4 : Running-in

During the running-in period, the following precautions must be observed:

1 - Experience has shown that the first 50 hours of tractor operation are fundamentally important for engine performance and lifetime. The tractor must be used right from the beginning in working conditions that subject the engine to a load that is as similar as possible to normal operating conditions.
2 - Use low gears when pulling heavy loads.
3 - During running-in, frequently verify the tightness of all of the screws, bolts, nuts, etc.
4 - For a long lifetime of the clutch, the plates must settle correctly.

| Note: |
| --- |
| Carefully engage and disengage the clutch often during the first 15 hours of tractor operation. |

# Section 5 : Turning off the engine

1 - If used, place the hand accelerator lever (18) in the minimum position;
2 - Turn the ignition key (12) counter-clockwise to position 0;
3 - Engage the parking brake by turning the lever (19) counter-clockwise and pull it up. Make sure that the red light on the instrument panel that indicates the parking brake is engaged is on.

| Note: |
| --- |
| After running at full load, the operation for turning off the engine must be carefully observed. The engine should run at idle speed for 3-4 minutes before turning it off. This will let the overheated turbo compressor cool and reach an acceptable temperature. |

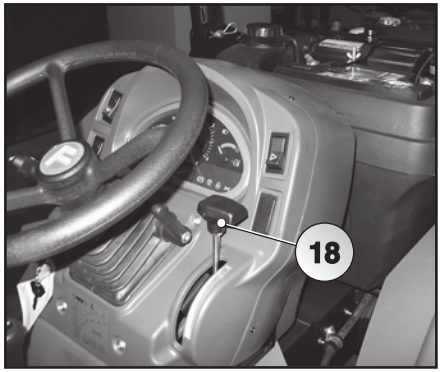


**Fig. 5.9**

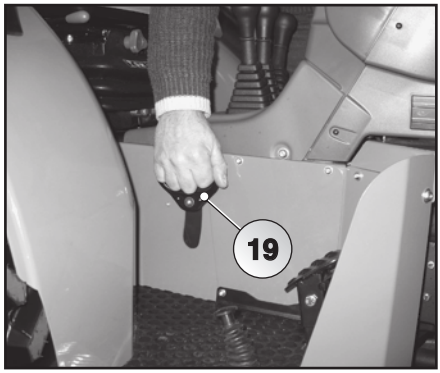


**Fig. 5.10**

# Section 6 : Starting the tractor

| ⚠ Warning: |
| --- |
| Before setting the tractor in motion, become familiar with the controls, the braking system, the transmission, the PTO, the differential lock controls and the engine stop control. |

| Note: |
| --- |
| Do not exceed 70% of the maximum engine power during the first 50 hours of operation. |

1 - With the engine running, press the clutch pedal (1) down completely;
2 - Select the desired gear using the lever (3);
3 - Select the desired range using the lever (2);
4 - Select the desired direction using the reverser lever (4);
5 - Release the parking brake by turning the knob (19) clockwise and pressing the brake pedal (6) (AR model) or the brake pedals (5) (RS model) (Fig.4.1).
6 - Gradually release the clutch pedal (1) and gradually accelerate the engine with the relative pedal (7).

| ⚠ Warning: |
| --- |
| Watch out for people in the vicinity, especially when in reverse |

| Note: |
| --- |
| Do not drive with the clutch pedal pressed and, to prevent damage, do not neglect clutch maintenance. |

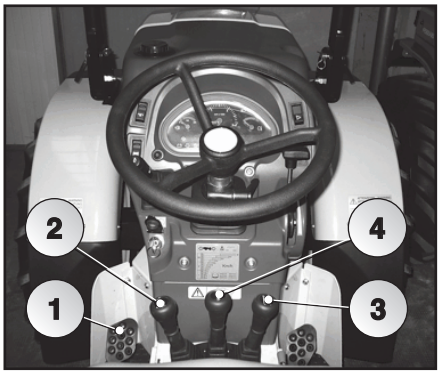


**Fig. 5.11**

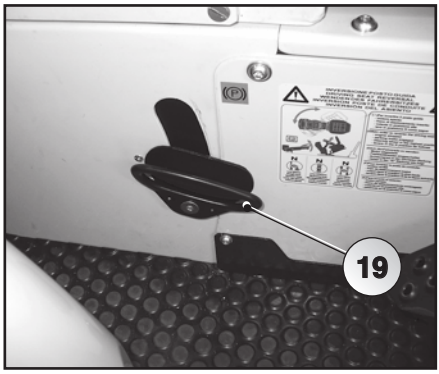


**Fig. 5.12**

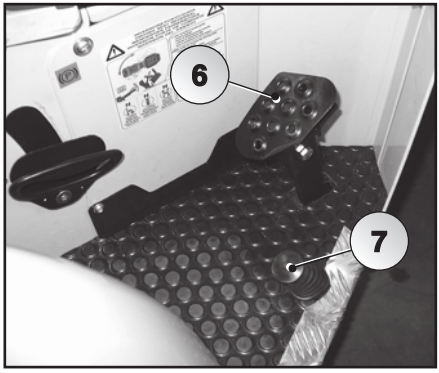


**Fig. 5.13**

## Section 7 : Pedal accelerator

Using the pedal accelerator (7) neutralizes the position of the hand accelerator (18) when the engine rpm increases. When the pedal is released, the engine returns to the rpm set by the hand accelerator.

The hand accelerator must be in the minimum speed position when using the pedal accelerator..

## Section 8 : Hand accelerator

The lever (18) permits manual control of the engine rpm, keeping it constant.

The lever "minimum" position corresponds to the top position; pulling it downward proportionally increases the engine rpm.

| ⚠ Warning: |
| --- |
| The hand accelerator lever can only be used when a constant engine rpm is desired.<br>The lever must not be used when driving the tractor on roads. |

# Section 9 : Stopping the tractor

To temporarily stop the tractor:

1 - Ridurre la velocità del motore;
2 - Disengage the engine-gearbox clutch, keeping the clutch pedal (1) down completely;
3 - With the tractor stopped, place the gearshift lever (4) in neutral and gradually release the clutch pedal (1);

To definitively stop the tractor, follow the operations described here and the operations described in section 5 “Turning off the engine”, and engage the parking brake.


**Fig. 5.14**


**Fig. 5.15**

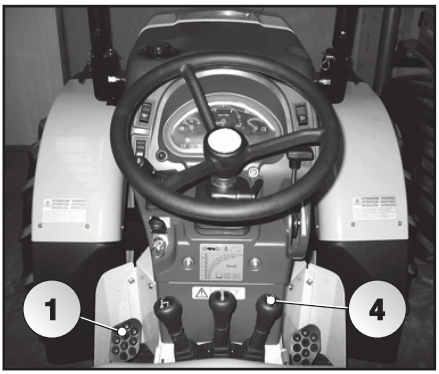


**Fig. 5.16**

# Section 10 : Battery disconnector

The battery disconnector is a safety device that cuts off the power supplied to the electrical system, thus shutting off the connection between the battery and the users.

The purpose of this is to:

- prevent the battery from discharging itself too much when the tractor is not used for a long time;
- provide protection if the electrical system short-circuits;
- allow servicing work or repairs to be carried out in safe conditions.

The battery disconnector is installed on the left-hand side of the engine and can be accessed by raising the bonnet. The switch has three positions:

- Switch in the “ON” position: electrical system powered (Fig. 5.16.1);
- The switch is set to the “OFF” position by turning it 1/4 of a turn in the anti-clockwise direction: electrical system not powered (Fig. 5.16.2);
- The switch releases and can be removed when turned again in the anti-clockwise direction (Fig. 5.16.3).

**Fig. 5.16.1**

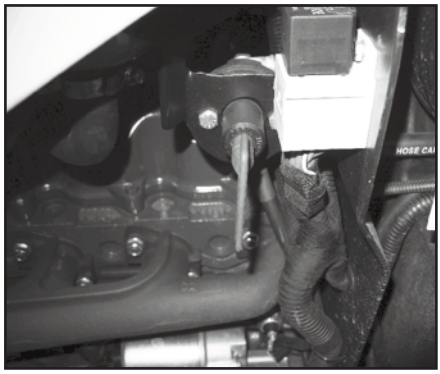

**Fig. 5.16.2**

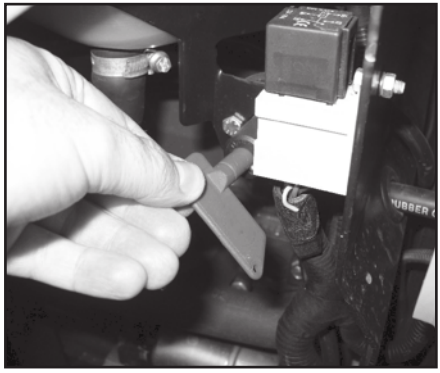

**Fig. 5.16.3**

# Section 11 : Clutch pedal

The engine-gearbox clutch is a hydraulically-actuated, oil-immersed, multi-plate clutch. The pedal (1) engages/ disengages the clutch:

- fully pressed pedal = disengaged clutch
- released pedal = engaged clutch

When the engine is carrying a load, avoid slipping the clutch to increase the rpm; instead, engage a lower gear.

| ⚠ Warning: |
| --- |
| Never leave your foot on the clutch pedal. |

| Note: |
| --- |
| A safety device prevents the engine from being started if the clutch pedal is not pressed down completely. |

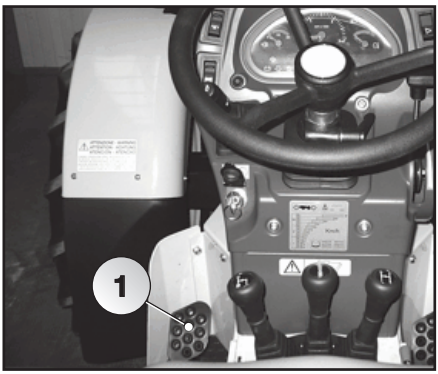


**Fig. 5.17**

# Section 12 : Transmission levers

## 12.1 Range lever

The lever (2) allows four different ranges to be selected for each of the speeds selected with the gearshift lever (4). Each range is indicated by a roman numeral on the lever handgrip (2):

- I - slow range
- II - normal range
- III - fast range

To move from one range to another, the engine clutch must be disengaged by pressing the pedal (1) down completely, the tractor must be stopped and the desired range must be selected using the relative lever (2).

| ⚠ Warning: |
| --- |
| Never attempt to change ranges while the tractor is moving. |

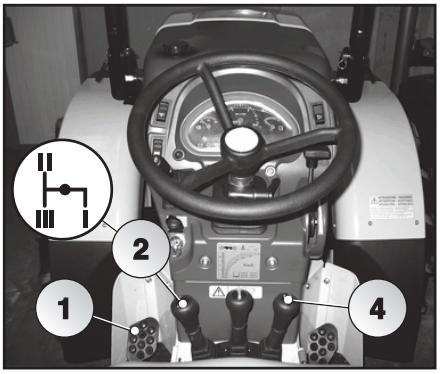


**Fig. 5.18**

## 12.2 Reverser lever

This lever (3) allows the tractor forward direction to be selected. The forward and reverse gears have synchronized engagement. To engage them, the engine clutch must be disengaged by pressing the pedal (1) down completely and the tractor must be stopped. This will safeguard the lifetime of the synchronizers.

| ⚠ Warning: |
| --- |
| Never attempt to change the direction while the tractor is moving. |

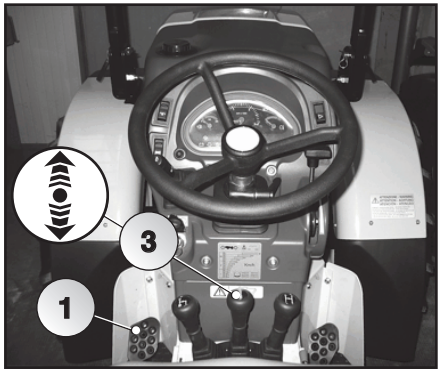


**Fig. 5.19**

## 12.3 Gearshift lever

This lever (4) allows 4 totally synchronized speeds to be selected, both forward and in reverse.

To move from one gear to another of the same range, press the clutch pedal (1) down completely and use the lever (4). The tractor does not need to be stopped. Each gear is indicated by a roman numeral on the lever handgrip (4):

a -first gear
b - second gear
c -third gear
d -fourth gear

The decal (123) just under the steering wheel on the right indicates the perfect progressions of the gears without speed overlapping both in forward and reverse, with the indicated tires and engine rpm (Fig. 5.21 and Fig. 5.22).

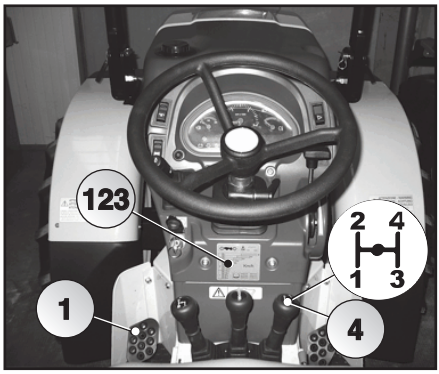


**Fig. 5.20**

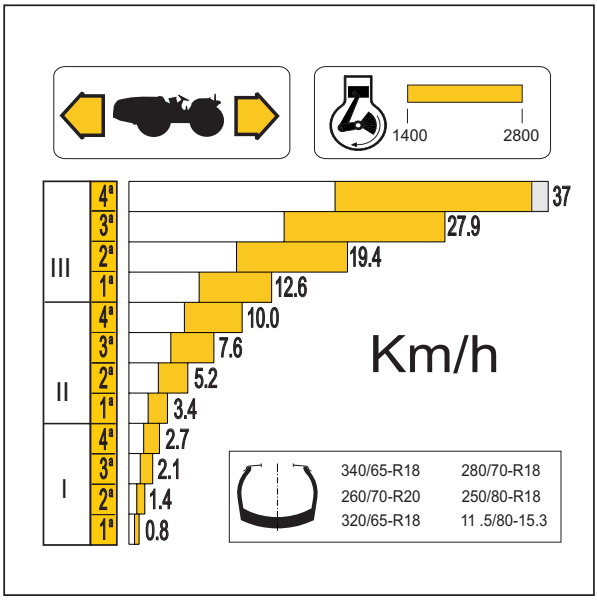


Fig. 5.21

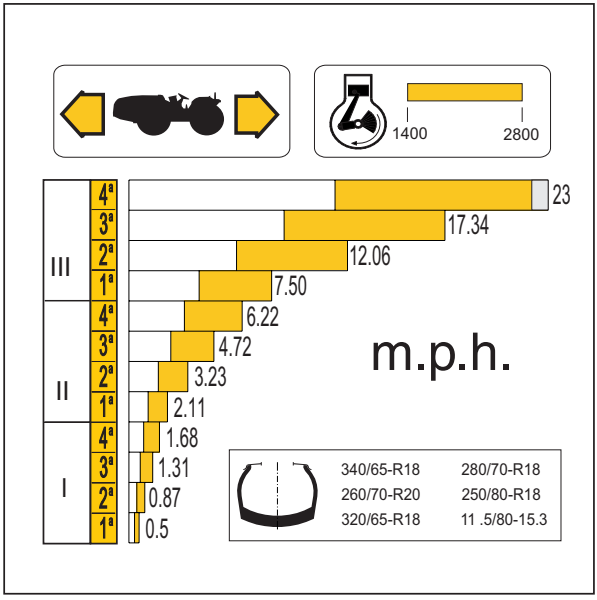


Fig. 5.22

# Notes

# Section 13 : Service and parking brakes

The **service brakes** on the four wheels are multi-plate and mechanically controlled.

In the AR model, tractor braking occurs by means of one pedal (6).

In the RS and MT models, tractor braking occurs by means of two pedals (5) that separately control the brake of each rear wheel. Braking with only one pedal permits sharper turns. In fact, by locking the internal rear wheel at a curve, the tractor turns by pivoting on the wheel itself.

The simultaneous action of the brakes during normal use and on roads is done by locking the two pedals with the lockbolt provided (124).

In reverse, the RS version has only one brake pedal.

| ⚠ Warning: |
| --- |
| When driving on roads, always keep the brake pedals coupled to ensure simultaneous braking on all four wheels. Never use the pedals independently when driving on roads. |

| ⚠ Warning: |
| --- |
| When the brakes feel loose, immediately identify the cause and eliminate the defect. |

| ⚠ Warning: |
| --- |
| When working in hilly areas, brake for the shortest necessary time only and always use the engine brake by inserting a low gear. |

| ⚠ Warning: |
| --- |
| When driving the tractor in the reversed position, the brake pedals must be coupled when in use. |

| ⚠ Warning: |
| --- |
| When driving the tractor in the reversed position, the brake pedals must be coupled when in use. |

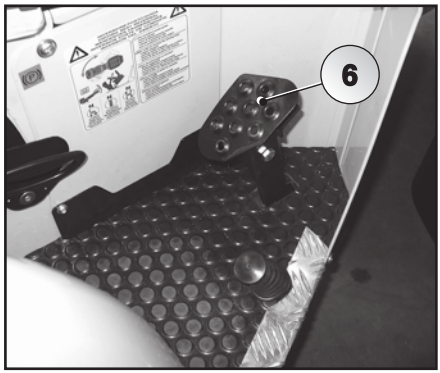


**Fig. 5.23**

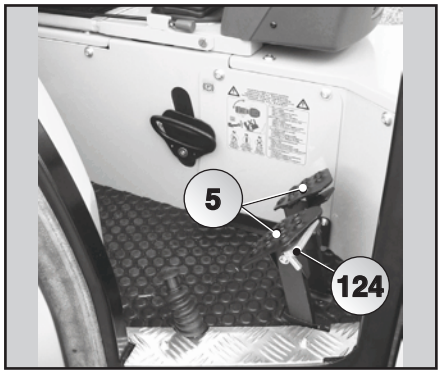


**Fig. 5.24**

The **parking brake** acts on the rear drive and is mechanically controlled by a lever on the right-hand side (19).

In order to activate the brake, pull the lever up and allow its coupling by rotating the lever itself in a clockwise direction.

To unlock the brake, turn the lever (19) gently in a counter-clockwise direction or lower it.

A red light (72) lights up on the instrument when the parking brake is engaged.


**Fig. 5.25**

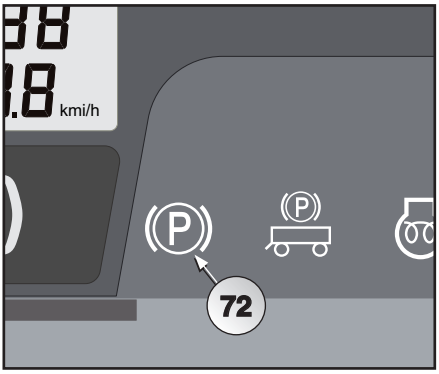


**Fig. 5.26**

# Section 14 : Controls on the dashboard

**Cobram V650**

The **ignition switch** (12) has three positions:

- Pos.0 - No circuit is powered except for the flashing indicator lights switch (17); engine off position; key may be remove.
- Pos.1 - Contact position, various users are powered and indicators and control instruments function; the engine is prepared for starting and the spark plugs are preheated.
- Pos.2 - Engine starting position; if released, the key automatically returns to contact position 1.

**Cromo K600**

The ignition switch (12) has four positions:

- Pos.0 - None of the circuits powered with the exception of the hazard light switch; engine stopped position; key can be removed.
- Pos.1 - Contact position; various users powered; the indicator lights and monitoring instruments function; presetting for starting the engine.
- Pos.2 - Glow plug preheating position.
- Pos.3 - Engine ignition position. If released, the key automatically returns to the contact position.

The **lights switch and horn** (11) is just under the steering wheel on the left. It works with the ignition switch (12) in contact position 1 and carries out the following functions:

- to the right - right turn signal
- to the right - right turn signal
- pressed - horn (functions regardless of the ignition switch (12) position)

The lights are activated by rotating the knob (125) on the end of the switch (11):

- ⬯ Lights off


Fig. 5.27

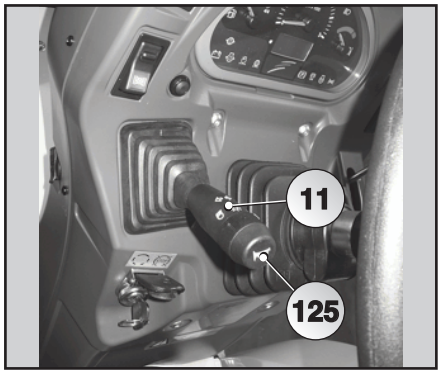


Fig. 5.28

Rotating the switch (in a counter-clockwise direction (11) the following light up in sequence:

- Position lights on and light (79) on instrument panel on;
- dipped headlights;
- when the switch (11) is pushed downwards, the full beam headlights, (78). When the switch is pushed upwards, the full beam headlights flash.

The **hazard lights switch** (17) is always powered regardless of the ignition switch (12) position.

If pressed, all of the indicator lights, the light of the switch itself, and the light (84) on the instrument panel blink intermittently.

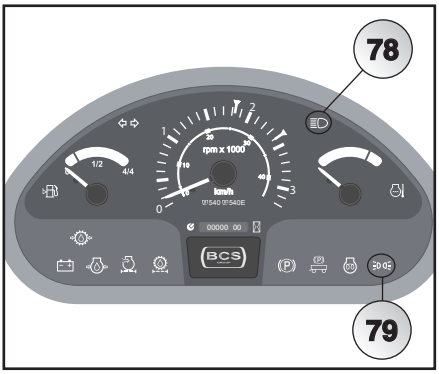


**Fig. 5.29**


**Fig. 5.30**

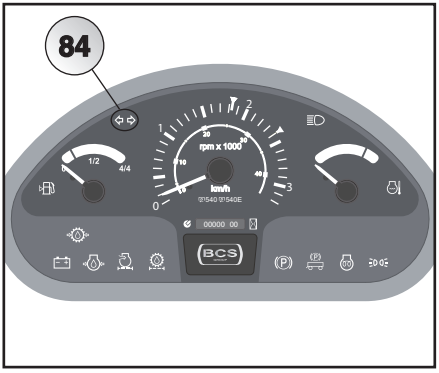


**Fig. 5.31**

# Section 15 : Power Take-Off

The rear PTO may be "independent" or "synchronized" and it is engaged by means of a hydraulically-actuated, oil-immersed, multi-plate clutch. Engagement and disengagement is electrohydraulic. The speed of the PTO synchronized with the gearbox is proportional to the tractor speed. The PTO shaft rotates counterclockwise in forward gear.

| ⚠ Caution: |
| --- |
| To prevent damage to the PTO braking system when pulling trailers, the PTO engagement button (13 Fig. 5.36) must be activated and/or kept activated, even if the PTO itself is not used. In this case, to prevent rotation of the PTO output shaft, the lever (18 Fig. 5.33) must be placed in neutral. |

The shafts of the power take-off and the implements activated by the power takeoff should therefore be used, along with common sense:

| ⚠ Warning: |
| --- |
| Do NOT drive without the PTO cap (111) or guard (110) assembled. They protect personnel from injury and the shaft grooves from damage. |

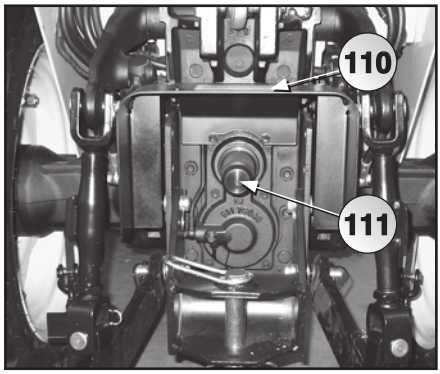


**Fig. 5.32**

**⚠ Warning:**

Always disengage the Power Take-Off, turn off the engine, remove the key from the panel and activate the parking brake before getting off the tractor.

**⚠ Warning:**

Keep well away from the machine until all its components, including the driveline, have stopped.

**⚠ Warning:**

Before connecting, adjusting or working on implements operated by the PTO, disengage the PTO, turn off the engine, remove the key from the panel and activate the parking brake. Do not work under raised implements.

**⚠ Warning:**

Make sure that all of the implements activated by the PTO have the proper guards installed, are in good condition and conform with current regulations.

**⚠ Warning:**

Before starting an implement connected to the PTO, ALWAYS make sure that people are at a safe distance.

**⚠ Warning:**

Attach the drawbar in the central position when using implements operated by the tractor PTO.

**⚠ Warning:**

When using the PTO while the tractor is parked, ALWAYS make sure that the ranges lever is in the neutral position, the reversing gear lever is in the forward position, the gears lever is engaged in the 4$^{th}$ gear and the parking brake is engaged.

**⚠ Caution:**

When choosing a universal joint, it's necessary to make an assessment based on the connection between the tractor and machine on which it will be assembled (shaft dimensions), the power takeoff speed, tractor's HP, the need to insert special joints, clutches, uncouplers. Also, take into consideration the largest permissible angle, which must not be exceeded. For this aspect, comply with the manufacturer's operating features.

**⚠ Caution:**

Make sure that the length of the universal shaft falls within the manufacturer's tolerances and that it is able to compensate the movements of the machine during movement.

**⚠ Warning:**

Before operating an implement activated by the PTO on the three-point hitch, carefully raise it using the position control lever to maximum height, check for play and make sure that at least 1/4 of the length of the telescopic section of the drive shaft is engaged.

**P.T.O. levers**

The independent or synchronised PTO must be selected, by means of the lever (28), while the engine is being turned off, before it comes to a complete standstill. In this way the internal selection organs can find the right alignment.

When the position has been selected, the lever (26) can be left always engaged, because the PTO can be engaged or disengaged by means of the button (13) on the dashboard.

PTO speed must be selected, on the contrary, with the engine off.

| ⚠ Warning: |
| --- |
| The selection of the PTO speed must be effected while the engine is off with the PTO clutch disengaged. |

| ⚠ Warning: |
| --- |
| Engage the PTO at a low rpm to protect the clutch and drive shaft. |

Before engaging the PTO, select the type of operation and rotation speed. The lever (28) to the left of the operator position selects the type of PTO:

- **independent**, where the PTO output shaft receives motion directly from the engine. In fact, its rotation speed is proportional to the engine's speed. Clockwise direction of rotation;
- **synchronized**, where the speed of the PTO output shaft is proportional to the tractor forward speed. Counter-clockwise rotation in forward mode.
- Lever (28) toward A - independent PTO engaged
- Lever (28) in center position N - PTO in "neutral"
- Lever (28) toward B - synchronized PTO engaged

The lever (33) on the rear of the tractor allows the rotation speed of the PTO output shaft to be selected.

- Lever (33) toward A:
  PTO at 540 rpm in "Economy" mode (540E)
- Lever (33) toward B:
  PTO at 540 rpm

The P.T.O. 540E (Economy) is ideal for the activities where it is not necessary the maximum power and where it needs working at reduced speed, thus reducing fuel consumptions and usually increasing the comfort.

| ⚠ Warning: |
| --- |
| The shifting of the PTO speed must be achieved. |

| ⚠ Warning: |
| --- |
| High inertia implements will not immediately stop after the PTO is disengaged. Wait for the implement to slow down and stop completely before cleaning or making adjustments. |

| Note: |
| --- |
| Before engaging the PTO clutch using the switch (13), the type of operation, independent or synchronized, must be chosen using the lever (28). |

To engage the PTO clutch, move the safety bar (112) to the side and press the switch (13). When the switch is pressed, the relative light inside the switch itself comes on.

| Note: |
| --- |
| Before switching off the engine, disengage the PTO clutch using the switch (13).<br>If the engine is started while the switch (13) is armed, in order to engage the PDF clutch, it is necessary to rearm the PTO clutch engagement switch and restart the engine. |

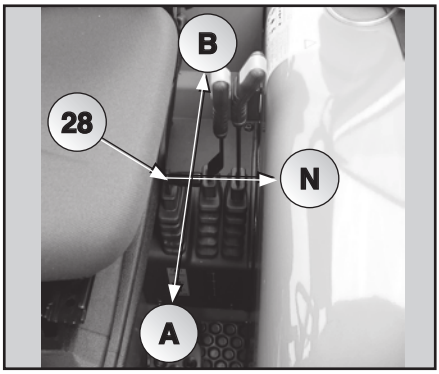


**Fig. 5.33**

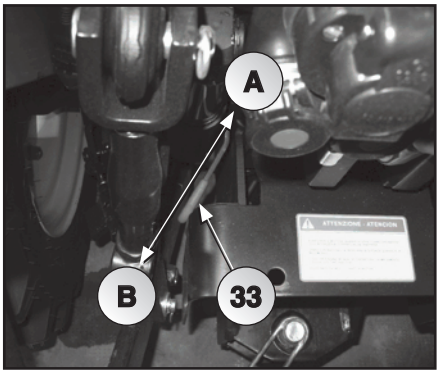


**Fig. 5.34**

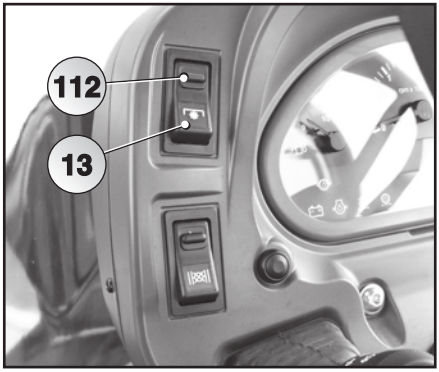


**Fig. 5.35**

**Using the independent PTO**

| ⚠ Warning: |
| --- |
| Do not connect implements or machine tools that require higher power than that provided by the PTO. |

1 - Select “independent” operation by placing the lever (28) in position A;
2 - Select the desired speed (540 - 540E rpm) using the lever (33).
3 - Move the safety bar (112) to the side and press the PTO clutch engagement switch (13). The light inside the switch will turn on;
4 - (analog instrument panel) Control The engine rpm so that the pointer of the tachometer moves onto the colored radial line corresponding to the selected PTO speed
    - (Y) 2413 rpm (PTO speed 540 rpm.)
    - (X) 1848 rpm. (PTO speed 540 rpm in “Economy” mode).
5 - (digital instrument panel). Control the engine rpm so that the instrument display shows the selected PTO speed.

The independent PTO receives motion directly from the engine and its operation is independent from the tractor speed.

To stop the independent PTO, press the switch (13); the light inside the switch will turn off.

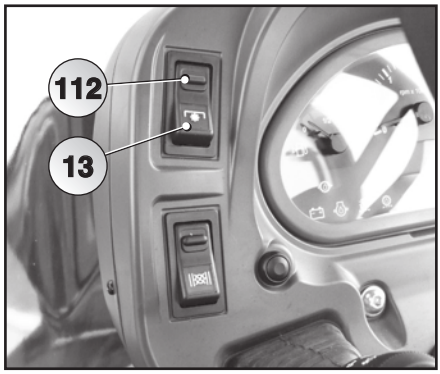


Fig. 5.36

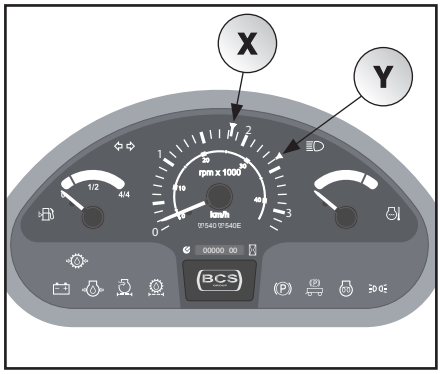


Fig. 5.37

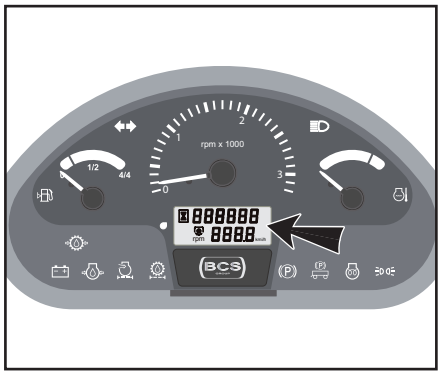


Fig. 5.38

**Using the synchronized PTO**

> ⚠ Warning:
>
> When using the synchronized PTO, if one or more reverse operations must be carried out, remember that the shaft's rotation direction will be inverted. Thus, with certain implements, it is advisable to disengage the selector lever of the independent/synchronised PTO (28) and let only the PTO engagement button (13) to be active to avoid damages to rotating organs as well as to PTO braking system.

Use of the PTO synchronized with the gearshift is only necessary for operating self-propelled trailers and, in general, for all agricultural implements that require synchronization with tractor advancement; they must not absorb more than 40-45% of the maximum engine power.

To engage the synchronized PTO:

1 - Make sure that the tractor is at a standstill;
2 - Select “synchronized” by placing the lever (28) in position B;

The synchronized PTO receives motion directly from the gearbox; the rotation speed of the PTO shaft is therefore proportional to the tractor speed.

To stop the synchronized PTO, place the PTO type lever (28) in “neutral”.

With the synchronized PTO and any gear engaged, the PTO grooved shaft carries out the following revolutions for every revolution of the rear wheels:

- P.T.O. 540: 6,598 revolution
- P.T.O. 540E: 8,617 revolution

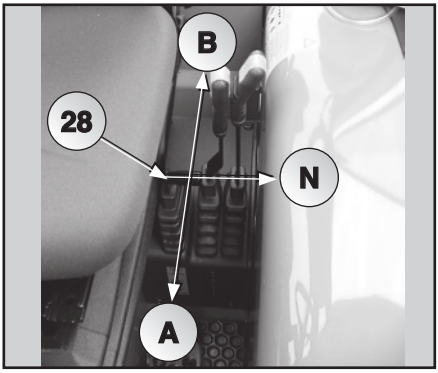


**Fig. 5.39**

# Section 165: Differential lock

The tractor is equipped with a front and rear differential lock, which should be engaged when a wheel slips due to a lack of traction.

| ⚠ Warning: |
| --- |
| Use the differential lock only when the tractor proceeds straight and when traction is unstable. Do not turn with the differentials locked. |

| ⚠ Warning: |
| --- |
| Disengage the lock when making turns. |

To lock the rear differential:

1 - Decrease the tractor speed;
2 - Move the safety bar (112) downwards and press the switch (14).

Locking of the rear differential is indicated by a light inside the switch (14) itself that comes on.

To release the differentials:

- press the switch (14).

Release of the differential locks is indicated by a light inside the switch (14) itself that turns off and of the warning light on the dashboard.

| Note: |
| --- |
| For best results, lock the differential before excessive slipping occurs. Do not engage it while a wheel is slipping excessively. |

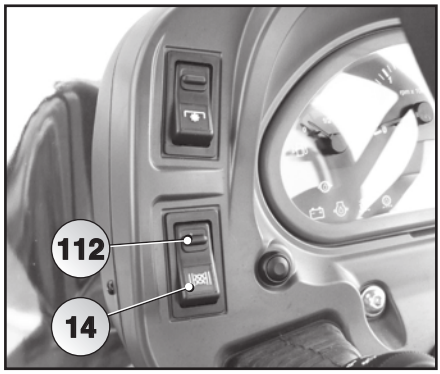


**Fig. 5.40**

Left - simultaneous front and rear differential locking.
N - release of differential locks
Right -rear differential locking

# Section 17: Hitch

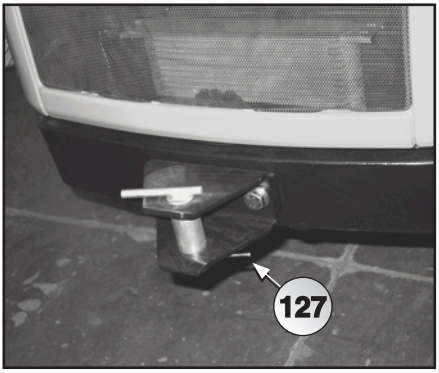


Fig. 5.41

### Front hitch

The tractor is equipped with a front hitch (127) to perform emergency trailer maneuvers or to tow the tractor.

| ⚠ Caution: |
| --- |
| The front hitch must be used exclusively for emergency towing of the tractor. The towing direction must coincide with the longitudinal axis of the tractor itself.<br>The tractor may not be towed in other directions that do not correspond to this axis or for purposes other than those described. |

**Rear hitch**

Depending on the type-approvals and regulations in individual countries, the following types of rear hitches are available:

- Cat.C hitch, approved for Italy (128)
- hitch approved for Europe (129)

These hitches can be used for farming implements and one or two-axle road trailers.

To facilitate hitching of the implement, the height of these devices can be adjusted to various positions using safety pins and rods.

The various heights from the ground are shown in Fig. 5.46 and Fig. 5.47.

To adjust the height, remove the connection pins (130) to free the hitch and secure it in the desired position.

| Note: |
| --- |
| Adjustment of the hitches is an operation that must be carried out carefully because proper hitch adjustment affects, in fact, the ease of handling of the tractor and, most of all, safety and stability during operation. |

| Note: |
| --- |
| The hitch placed in the highest position makes towing easier but also increases the risk of the tractor rearing up. |

| Note: |
| --- |
| With four-wheel drive, place the hitch in the low position, keeping the tongue nearly horizontal so that not too much weight is removed from the front axle. |

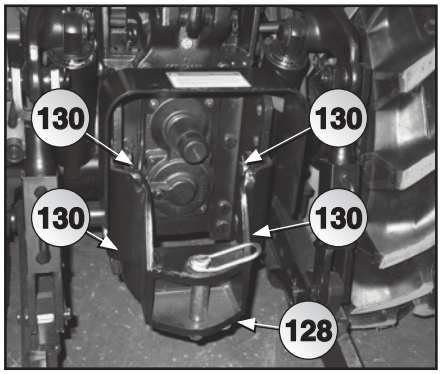


Fig. 5.42

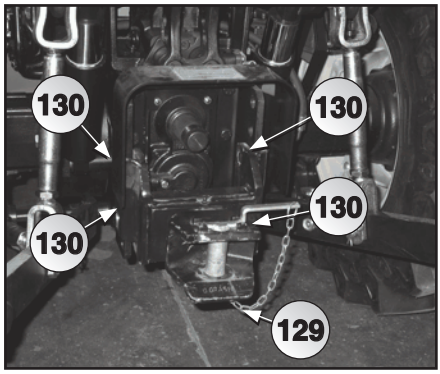


Fig. 5.43

**Towing trailers**

The braking system of the trailer is mechanical.

When a trailer is towed, the special hand brake system must be applied onto the tractor.

- Introduce the trailer hand brake lever into the provided housing (131) on the right of the tractor platform;
- Connect the trailer electrical circuit to the tractor's using the provided 7-pin outlet (34).

| ⚠ Caution: |
| --- |
| Remove the ignition key before making the electrical connections/ disconnections. |

| NOTE: |
| --- |
| Do not drive at a speed above 30 Km/h when towing a trailer. |

| Note: |
| --- |
| If the trailer that must be towed has driving wheels, the hitch must be positioned so that the power take-off is free and the cardan joint that connects the trailer can be installed. |

| Note: |
| --- |
| To prevent damage to the PTO braking system when pulling trailers, the PTO engagement button (13 Fig. 5.36) must be activated and/or kept activated, even if the PTO itself is not used. In this case, to prevent rotation of the PTO output shaft, the lever (33 Fig. 5.34) must be placed in neutral. |

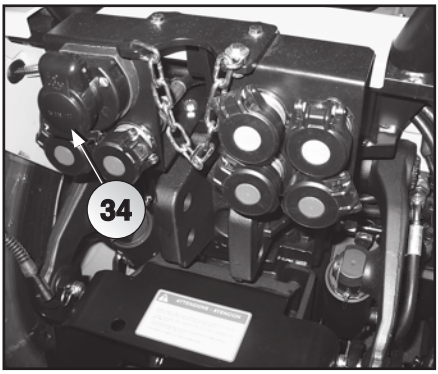


**Fig. 5.44**

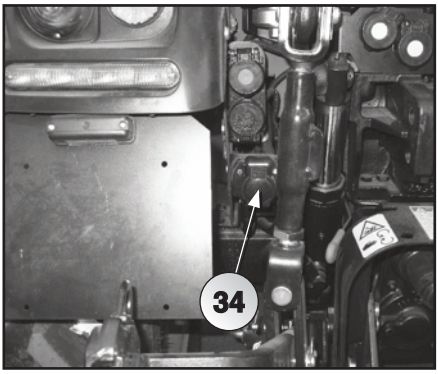


**Fig. 5.44.1**

| ⚠ Danger: |
| --- |
| It is strictly forbidden to remain in the area between the tractor and the towed vehicle as the engine will be running; and also without securely parking the tractor, using if necessary (on sloping or uneven ground) blocks under the wheels and steering crossways to the slope. |

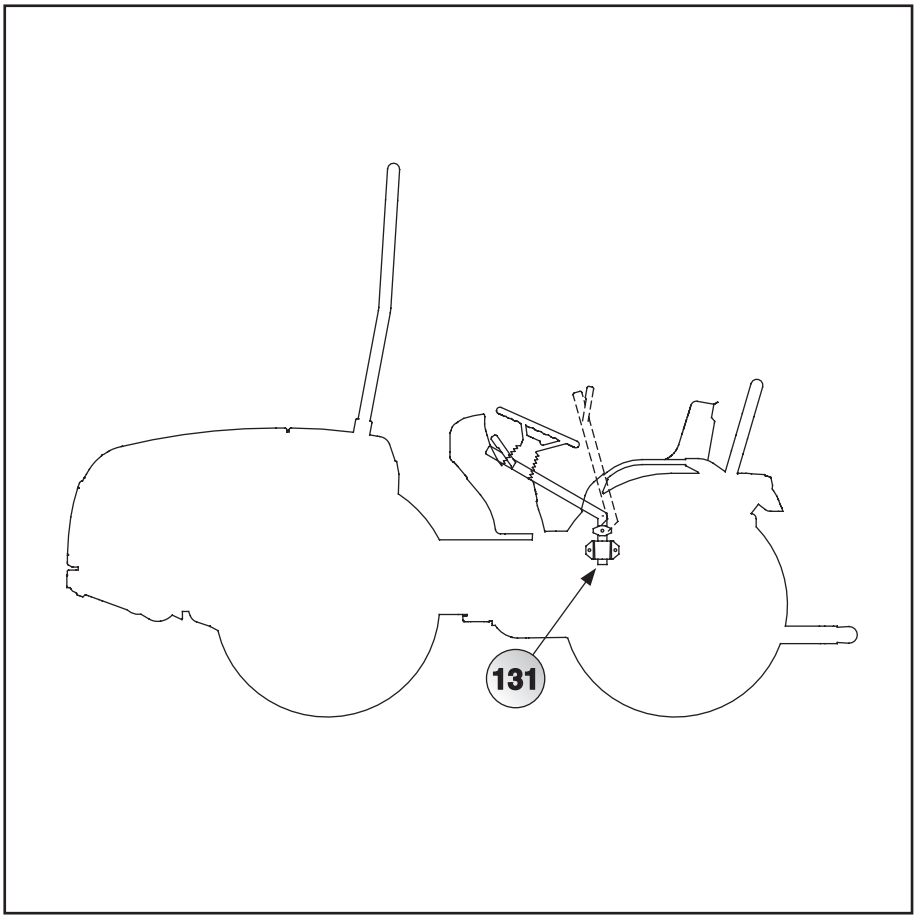


Fig. 5.45

**Hitch approved for Italy**

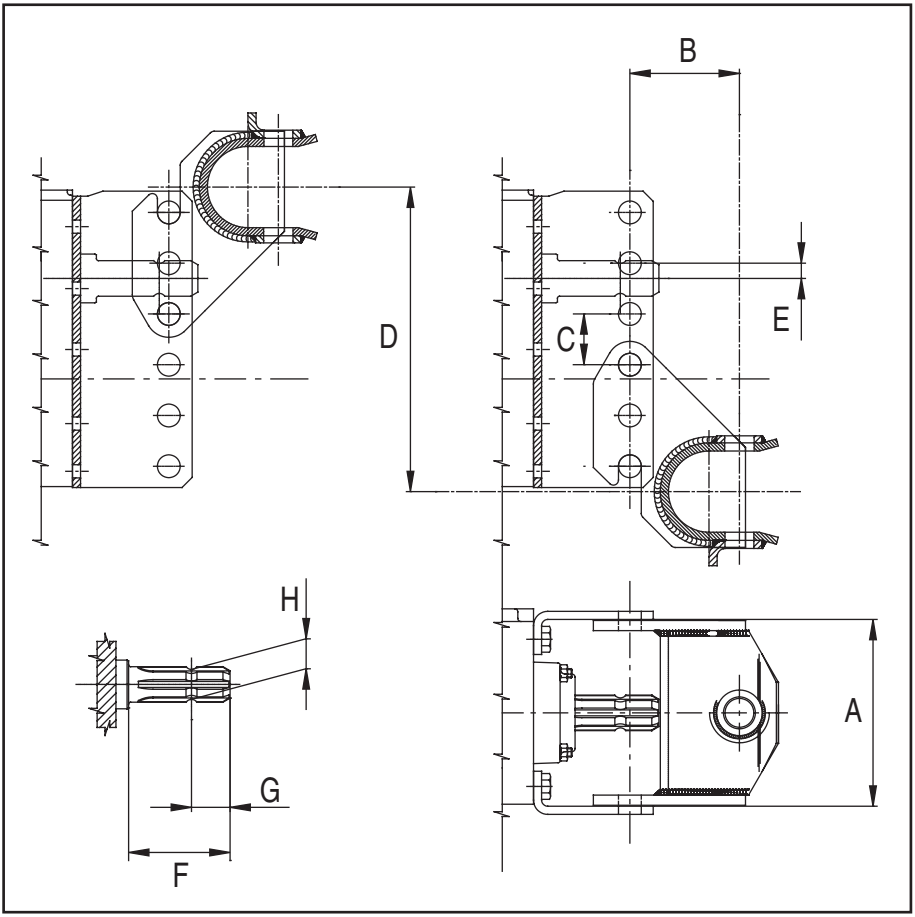


**Fig. 5.46**

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| mm | 184 | 108 | 50 | 300 | 15 | 95 | 38 | 29.5 |
| inches | 7.22 | 4.24 | 1.96 | 11.76 | 0.59 | 3.73 | 1.49 | 1.16 |

**Hitch approved for Europe**

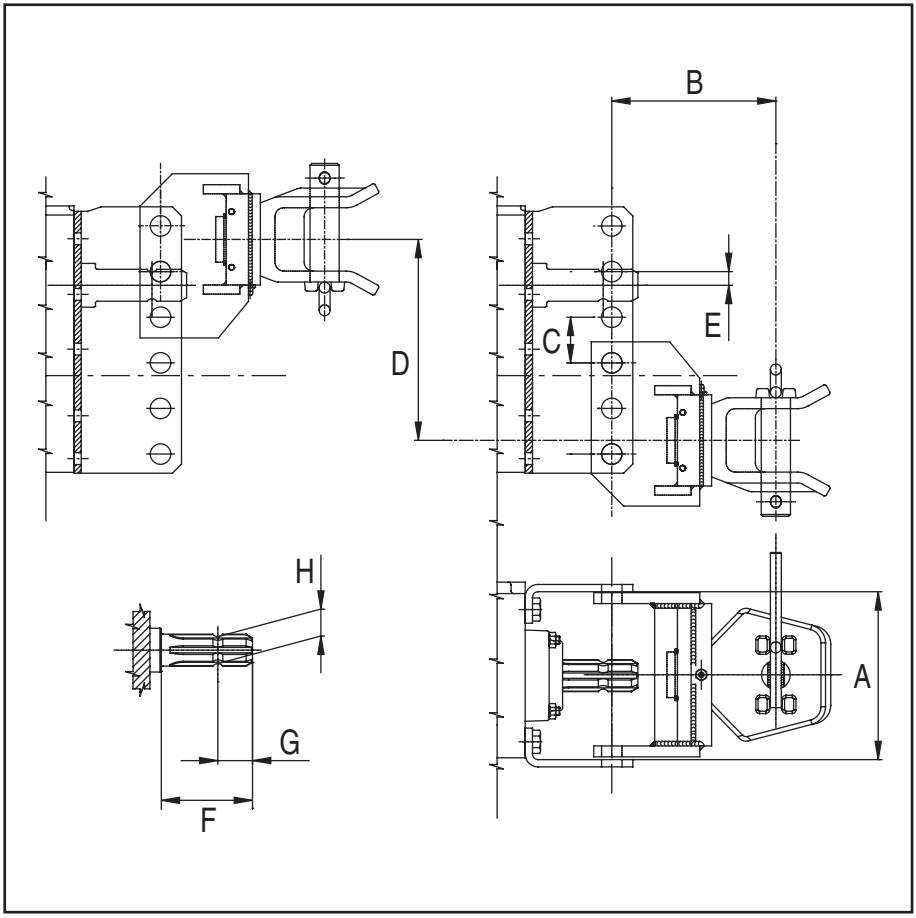


**Fig. 5.47**

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| mm | 184 | 180 | 50 | 270 | 15 | 95 | 38 | 29.5 |
| inches | 7.22 | 7.06 | 1.96 | 10.59 | 0.59 | 3.73 | 1.49 | 1.16 |

**Towing hook with "slider" frame for the Italian homologation**

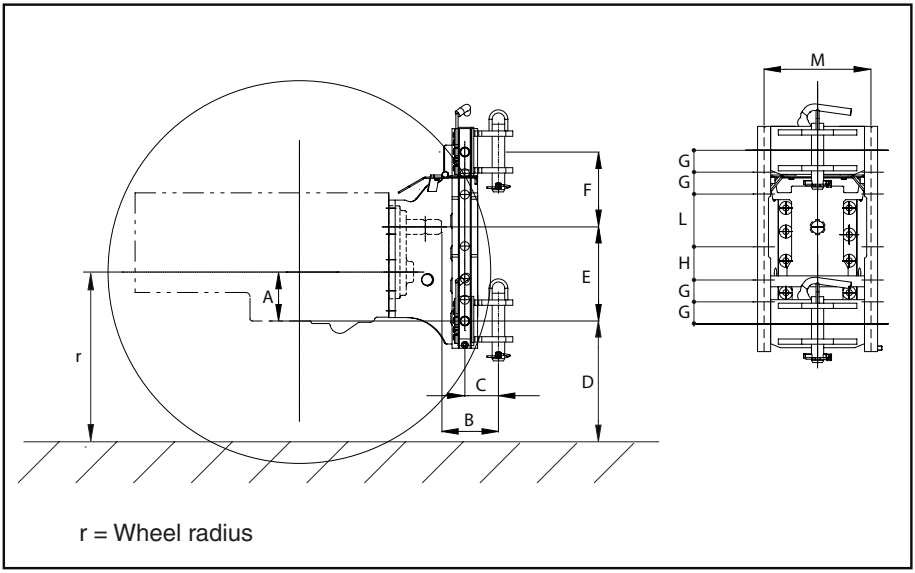


**Fig. 5.47.1**

| | A | B | C | D | E | F | G | H | L | M |
|---|---|---|---|---|---|---|---|---|---|---|
| mm | 114,9 | 134 | 79 | r - A | 221 | 176 | 50 | 76 | 121 | 245 |
| inches | 4.52 | 5.28 | 3.11 | | 8.7 | 6.93 | 1.97 | 2.99 | 4.76 | 9.65 |

**Towing hook with "slider" frame for the European homologation**

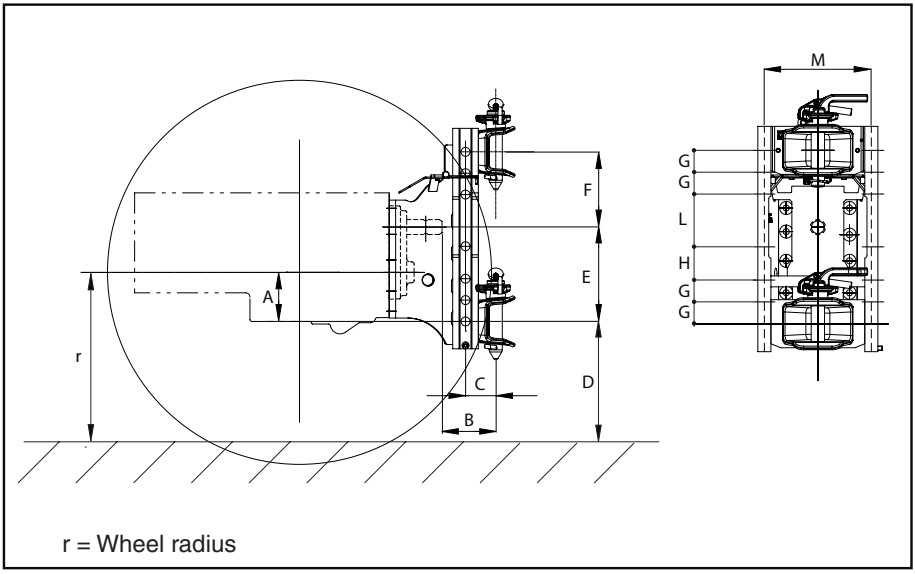


**Fig. 5.47.2**

| | A | B | C | D | E | F | G | H | L | M |
|---|---|---|---|---|---|---|---|---|---|---|
| mm | 114,9 | 125,8 | 71 | r - A | 221 | 176 | 50 | 76 | 121 | 245 |
| inches | 4.52 | 4.95 | 2.80 | | 8.7 | 6.93 | 1.97 | 2.99 | 4.76 | 9.65 |

## 17.1 Maximum vertical load on Rear coupling - "RS" version

| TRACTOR WITH CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "GRASSI e11 1572" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1580 | 610 | 540 | 650 | 580 |
| 11.5/80-15.3 (10 PR) | 1580 | | | | |
| 260/70 R20 (113 A8) | 1580 | | | | |
| 300/65 R18 (116 A8) | 1580 | | | | |
| 320/65 R18 (109 A8) | 1580 | | | | |
| 250/80 R18 (102 A8) | 1580 | | | | |
| 280/70 R18 (114 A8) | 1580 | | | | |
| 33x12.50-15 (6PR) | 1580 | | | | |
| 33x12.50-15 (4PR) | 1580 | | | | |
| 33x15.50-15 (6PR) | 1580 | | | | |
| 33x15.50-15 (8PR) | 1580 | | | | |
| 33x15.50-15 (4PR) | 1580 | | | | |
| 29x12.50-15 (4PR) | 1580 | | | | |
| 31x13.50-15 (4PR) | 1580 | | | | |
| 7.50-16 (8PR) | 1430 | 500 | 430 | 540 | 470 |
| 250/80-18 (8PR) | 1340 | 430 | 370 | 470 | 400 |
| 7.50-18 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH SAFETY FRAME | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "GRASSI e11 1572" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| **11.5/80-15.3 (8 PR)** | 1580 | 680 | 620 | 720 | 650 |
| **11.5/80-15.3 (10 PR)** | 1580 | | | | |
| **260/70 R20 (113 A8)** | 1580 | | | | |
| **300/65 R18 (116 A8)** | 1580 | | | | |
| **320/65 R18 (109 A8)** | 1580 | | | | |
| **250/80 R18 (102 A8)** | 1580 | | | | |
| **280/70 R18 (114 A8)** | 1580 | | | | |
| **33x12.50-15 (6PR)** | 1580 | | | | |
| **33x12.50-15 (4PR)** | 1580 | | | | |
| **33x15.50-15 (6PR)** | 1580 | | | | |
| **33x15.50-15 (8PR)** | 1580 | | | | |
| **33x15.50-15 (4PR)** | 1580 | | | | |
| **29x12.50-15 (4PR)** | 1580 | | | | |
| **31x13.50-15 (4PR)** | 1580 | | | | |
| **7.50-16 (8PR)** | 1430 | 570 | 510 | 610 | 540 |
| **250/80-18 (8PR)** | 1340 | 510 | 440 | 540 | 480 |
| **7.50-18 (8PR)** | | | | | |
| **8.25-16 (6PR)** | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "BCS DGM*6*0031GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1580 | 500 | 500 | 500 | 500 |
| 11.5/80-15.3 (10 PR) | 1580 | | | | |
| 260/70 R20 (113 A8) | 1580 | | | | |
| 300/65 R18 (116 A8) | 1580 | | | | |
| 320/65 R18 (109 A8) | 1580 | | | | |
| 250/80 R18 (102 A8) | 1580 | | | | |
| 280/70 R18 (114 A8) | 1580 | | | | |
| 33x12.50-15 (6PR) | 1580 | | | | |
| 33x12.50-15 (4PR) | 1580 | | | | |
| 33x15.50-15 (6PR) | 1580 | | | | |
| 33x15.50-15 (8PR) | 1580 | | | | |
| 33x15.50-15 (4PR) | 1580 | | | | |
| 29x12.50-15 (4PR) | 1580 | | | | |
| 31x13.50-15 (4PR) | 1580 | | | | |
| 7.50-16 (8PR) | 1430 | 500 | 450 | 500 | 490 |
| 250/80-18 (8PR) | 1340 | 450 | 380 | 490 | 420 |
| 7.50-18 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH SAFETY FRAME | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "BCS DGM*6*0031GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| **11.5/80-15.3 (8 PR)** | 1580 | 500 | 500 | 500 | 500 |
| **11.5/80-15.3 (10 PR)** | 1580 | | | | |
| **260/70 R20 (113 A8)** | 1580 | | | | |
| **300/65 R18 (116 A8)** | 1580 | | | | |
| **320/65 R18 (109 A8)** | 1580 | | | | |
| **250/80 R18 (102 A8)** | 1580 | | | | |
| **280/70 R18 (114 A8)** | 1580 | | | | |
| **33x12.50-15 (6PR)** | 1580 | | | | |
| **33x12.50-15 (4PR)** | 1580 | | | | |
| **33x15.50-15 (6PR)** | 1580 | | | | |
| **33x15.50-15 (8PR)** | 1580 | | | | |
| **33x15.50-15 (4PR)** | 1580 | | | | |
| **29x12.50-15 (4PR)** | 1580 | | | | |
| **31x13.50-15 (4PR)** | 1580 | | | | |
| **7.50-16 (8PR)** | 1430 | 500 | 500 | 500 | 500 |
| **250/80-18 (8PR)** | 1340 | 500 | 460 | 500 | 500 |
| **7.50-18 (8PR)** | | | | | |
| **8.25-16 (6PR)** | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM DGM*7*0012GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1580 | 620 | 550 | 660 | 590 |
| 11.5/80-15.3 (10 PR) | 1580 | | | | |
| 260/70 R20 (113 A8) | 1580 | | | | |
| 300/65 R18 (116 A8) | 1580 | | | | |
| 320/65 R18 (109 A8) | 1580 | | | | |
| 250/80 R18 (102 A8) | 1580 | | | | |
| 280/70 R18 (114 A8) | 1580 | | | | |
| 33x12.50-15 (6PR) | 1580 | | | | |
| 33x12.50-15 (4PR) | 1580 | | | | |
| 33x15.50-15 (6PR) | 1580 | | | | |
| 33x15.50-15 (8PR) | 1580 | | | | |
| 33x15.50-15 (4PR) | 1580 | | | | |
| 29x12.50-15 (4PR) | 1580 | | | | |
| 31x13.50-15 (4PR) | 1580 | | | | |
| 7.50-16 (8PR) | 1430 | 510 | 440 | 540 | 480 |
| 250/80-18 (8PR) | 1340 | 440 | 370 | 480 | 410 |
| 7.50-18 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH SAFETY FRAME | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM DGM*7*0012GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| **11.5/80-15.3 (8 PR)** | 1580 | 690 | 630 | 730 | 660 |
| **11.5/80-15.3 (10 PR)** | 1580 | | | | |
| **260/70 R20 (113 A8)** | 1580 | | | | |
| **300/65 R18 (116 A8)** | 1580 | | | | |
| **320/65 R18 (109 A8)** | 1580 | | | | |
| **250/80 R18 (102 A8)** | 1580 | | | | |
| **280/70 R18 (114 A8)** | 1580 | | | | |
| **33x12.50-15 (6PR)** | 1580 | | | | |
| **33x12.50-15 (4PR)** | 1580 | | | | |
| **33x15.50-15 (6PR)** | 1580 | | | | |
| **33x15.50-15 (8PR)** | 1580 | | | | |
| **33x15.50-15 (4PR)** | 1580 | | | | |
| **29x12.50-15 (4PR)** | 1580 | | | | |
| **31x13.50-15 (4PR)** | 1580 | | | | |
| **7.50-16 (8PR)** | 1430 | 580 | 510 | 620 | 550 |
| **250/80-18 (8PR)** | 1340 | 510 | 450 | 550 | 480 |
| **7.50-18 (8PR)** | | | | | |
| **8.25-16 (6PR)** | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM E11*2127" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| **11.5/80-15.3 (8 PR)** | 1580 | 620 | 550 | 650 | 590 |
| **11.5/80-15.3 (10 PR)** | 1580 | | | | |
| **260/70 R20 (113 A8)** | 1580 | | | | |
| **300/65 R18 (116 A8)** | 1580 | | | | |
| **320/65 R18 (109 A8)** | 1580 | | | | |
| **250/80 R18 (102 A8)** | 1580 | | | | |
| **280/70 R18 (114 A8)** | 1580 | | | | |
| **33x12.50-15 (6PR)** | 1580 | | | | |
| **33x12.50-15 (4PR)** | 1580 | | | | |
| **33x15.50-15 (6PR)** | 1580 | | | | |
| **33x15.50-15 (8PR)** | 1580 | | | | |
| **33x15.50-15 (4PR)** | 1580 | | | | |
| **29x12.50-15 (4PR)** | 1580 | | | | |
| **31x13.50-15 (4PR)** | 1580 | | | | |
| **7.50-16 (8PR)** | 1430 | 500 | 440 | 540 | 470 |
| **250/80-18 (8PR)** | 1340 | 440 | 370 | 470 | 410 |
| **7.50-18 (8PR)** | | | | | |
| **8.25-16 (6PR)** | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH SAFETY FRAME | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM E11*2127" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| **11.5/80-15.3 (8 PR)** | 1580 | 690 | 620 | 730 | 660 |
| **11.5/80-15.3 (10 PR)** | 1580 | | | | |
| **260/70 R20 (113 A8)** | 1580 | | | | |
| **300/65 R18 (116 A8)** | 1580 | | | | |
| **320/65 R18 (109 A8)** | 1580 | | | | |
| **250/80 R18 (102 A8)** | 1580 | | | | |
| **280/70 R18 (114 A8)** | 1580 | | | | |
| **33x12.50-15 (6PR)** | 1580 | | | | |
| **33x12.50-15 (4PR)** | 1580 | | | | |
| **33x15.50-15 (6PR)** | 1580 | | | | |
| **33x15.50-15 (8PR)** | 1580 | | | | |
| **33x15.50-15 (4PR)** | 1580 | | | | |
| **29x12.50-15 (4PR)** | 1580 | | | | |
| **31x13.50-15 (4PR)** | 1580 | | | | |
| **7.50-16 (8PR)** | 1430 | 580 | 510 | 620 | 550 |
| **250/80-18 (8PR)** | 1340 | 510 | 440 | 550 | 480 |
| **7.50-18 (8PR)** | | | | | |
| **8.25-16 (6PR)** | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

## 17.2 Maximum vertical load on Rear coupling - “MT” version

| TRACTOR WITH HALF CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "GRASSI e11 1572" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1580 | 650 | 580 | 680 | 620 |
| 11.5/80-15.3 (10 PR) | 1580 | | | | |
| 260/70 R20 (113 A8) | 1580 | | | | |
| 300/65 R18 (116 A8) | 1580 | | | | |
| 320/65 R18 (109 A8) | 1580 | | | | |
| 250/80 R18 (102 A8) | 1580 | | | | |
| 280/70 R18 (114 A8) | 1580 | | | | |
| 33x12.50-15 (6PR) | 1580 | | | | |
| 33x12.50-15 (4PR) | 1580 | | | | |
| 33x15.50-15 (6PR) | 1580 | | | | |
| 33x15.50-15 (8PR) | 1580 | | | | |
| 33x15.50-15 (4PR) | 1580 | | | | |
| 29x12.50-15 (4PR) | 1580 | | | | |
| 31x13.50-15 (4PR) | 1580 | | | | |
| 7.50-16 (8PR) | 1430 | 540 | 470 | 570 | 510 |
| 250/80-18 (8PR) | 1340 | 470 | 400 | 510 | 440 |
| 7.50-18 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH HALF CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "BCS DGM*6*0031GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| **11.5/80-15.3 (8 PR)** | 1580 | 500 | 500 | 500 | 500 |
| **11.5/80-15.3 (10 PR)** | 1580 | | | | |
| **260/70 R20 (113 A8)** | 1580 | | | | |
| **300/65 R18 (116 A8)** | 1580 | | | | |
| **320/65 R18 (109 A8)** | 1580 | | | | |
| **250/80 R18 (102 A8)** | 1580 | | | | |
| **280/70 R18 (114 A8)** | 1580 | | | | |
| **33x12.50-15 (6PR)** | 1580 | | | | |
| **33x12.50-15 (4PR)** | 1580 | | | | |
| **33x15.50-15 (6PR)** | 1580 | | | | |
| **33x15.50-15 (8PR)** | 1580 | | | | |
| **33x15.50-15 (4PR)** | 1580 | | | | |
| **29x12.50-15 (4PR)** | 1580 | | | | |
| **31x13.50-15 (4PR)** | 1580 | | | | |
| **7.50-16 (8PR)** | 1430 | 500 | 490 | 500 | 500 |
| **250/80-18 (8PR)** | 1340 | 490 | 420 | 500 | 460 |
| **7.50-18 (8PR)** | | | | | |
| **8.25-16 (6PR)** | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH HALF CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM DGM*7*0012GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1580 | 660 | 590 | 690 | 630 |
| 11.5/80-15.3 (10 PR) | 1580 | | | | |
| 260/70 R20 (113 A8) | 1580 | | | | |
| 300/65 R18 (116 A8) | 1580 | | | | |
| 320/65 R18 (109 A8) | 1580 | | | | |
| 250/80 R18 (102 A8) | 1580 | | | | |
| 280/70 R18 (114 A8) | 1580 | | | | |
| 33x12.50-15 (6PR) | 1580 | | | | |
| 33x12.50-15 (4PR) | 1580 | | | | |
| 33x15.50-15 (6PR) | 1580 | | | | |
| 33x15.50-15 (8PR) | 1580 | | | | |
| 33x15.50-15 (4PR) | 1580 | | | | |
| 29x12.50-15 (4PR) | 1580 | | | | |
| 31x13.50-15 (4PR) | 1580 | | | | |
| 7.50-16 (8PR) | 1430 | 540 | 480 | 580 | 510 |
| 250/80-18 (8PR) | 1340 | 480 | 410 | 510 | 450 |
| 7.50-18 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH HALF CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres<br>Front and rear axes | Capacities<br>(kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM E11*2127" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| **11.5/80-15.3 (8 PR)** | 1580 | 650 | 590 | 690 | 620 |
| **11.5/80-15.3 (10 PR)** | 1580 | | | | |
| **260/70 R20 (113 A8)** | 1580 | | | | |
| **300/65 R18 (116 A8)** | 1580 | | | | |
| **320/65 R18 (109 A8)** | 1580 | | | | |
| **250/80 R18 (102 A8)** | 1580 | | | | |
| **280/70 R18 (114 A8)** | 1580 | | | | |
| **33x12.50-15 (6PR)** | 1580 | | | | |
| **33x12.50-15 (4PR)** | 1580 | | | | |
| **33x15.50-15 (6PR)** | 1580 | | | | |
| **33x15.50-15 (8PR)** | 1580 | | | | |
| **33x15.50-15 (4PR)** | 1580 | | | | |
| **29x12.50-15 (4PR)** | 1580 | | | | |
| **31x13.50-15 (4PR)** | 1580 | | | | |
| **7.50-16 (8PR)** | 1430 | 540 | 470 | 580 | 510 |
| **250/80-18 (8PR)** | 1340 | 470 | 410 | 510 | 440 |
| **7.50-18 (8PR)** | | | | | |
| **8.25-16 (6PR)** | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

## 17.3 Maximum vertical load on Rear coupling - “AR” version

| TRACTOR WITH CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "GRASSI e11*1572" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 400 | 330 | 430 | 370 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH HALF CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "GRASSI e11*1572" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 430 | 370 | 470 | 400 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH SAFETY FRAME | | | | | |
|---|---|---|---|---|---|
| Tyres<br>Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "GRASSI e11*1572" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 480 | 420 | 520 | 460 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "BCS DGM*6*0031GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 410 | 340 | 450 | 380 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH HALF CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "BCS DGM*6*0031GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 450 | 380 | 490 | 420 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH SAFETY FRAME | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "BCS DGM*6*0031GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 500 | 430 | 500 | 470 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres<br>Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM DGM*7*0012GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 400 | 330 | 440 | 370 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH HALF CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM DGM*7*0012GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 440 | 370 | 480 | 410 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH SAFETY FRAME | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM DGM*7*0012GA" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 490 | 420 | 490 | 460 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM e11*2127" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 400 | 330 | 440 | 370 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH HALF CABIN | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM e11*2127" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 440 | 370 | 470 | 410 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

| TRACTOR WITH SAFETY FRAME | | | | | |
|---|---|---|---|---|---|
| Tyres Front and rear axes | Capacities (kg/Axle) | Vertical load on couplers | | | |
| | | COUPLER "CBM e11*2127" | | | |
| | | Sz | Cz1 | Cz2 | Cz3 |
| 11.5/80-15.3 (8 PR) | 1300 | 490 | 420 | 530 | 460 |
| 11.5/80-15.3 (10 PR) | | | | | |
| 260/70 R20 (113 A8) | | | | | |
| 300/65 R18 (116 A8) | | | | | |
| 320/65 R18 (109 A8) | | | | | |
| 250/80 R18 (102 A8) | | | | | |
| 280/70 R18 (114 A8) | | | | | |
| 250/80 R18 (8PR) | | | | | |
| 7.50-18 (8PR) | | | | | |
| 33x12.50-15 (6PR) | | | | | |
| 33x12.50-15 (4PR) | | | | | |
| 33x15.50-15 (6PR) | | | | | |
| 33x15.50-15 (8PR) | | | | | |
| 8.25-16 (6PR) | | | | | |
| 7.50-16 (8PR) | | | | | |
| 31x15.50-15 (4PR) | | | | | |
| 31x13.50-15 (4PR) | | | | | |
| 29x12.50-15 (4PR) | | | | | |

**Sz:** Without ballasts
**Cz1:** Ballasts on wheels
**Cz2:** Front ballasts
**Cz3:** Side ballasts

# Section 18 : Three-point hitch

The three-point hitch is used to connect category I and II implements with standard dimensions and characteristics, controlled by the hydraulic lift, to the tractor.

> ⚠ Warning:
>
> Always be very careful when using and adjusting the three-point hitch.

For proper operation of the lift, the dimensions of the implement to be attached to the tractor must be checked carefully.

These hitches must have the same standard as the tractor three-point hitch to prevent irregular stress on the unit due to incompatibility of the dimensions.

Implements must be lower than the maximum load that can be lifted. This is Only an approximate value; the distance of the center of gravity of the implement in relation to the three-point hitch is also very important.

In fact, if an implement is placed too far from the tractor, the weight on the three-point hitch will be considerably greater than the weight of the implement itself.

> ⚠ Warning:
>
> Always turn off the engine and remove the ignition key before making any adjustments to the three-point hitch or the implement.

> ⚠ Warning:
>
> Always use the lift in the control position when implements are moved using the three-point hitch.

> ⚠ Warning:
>
> Always use the lift in the control position when connecting or removing an implement of the three-point hitch.

> ⚠ Caution:
>
> Before leaving the tractor always lower equipment connected to the three-point coupling to ground level.

> ⚠ Warning:
>
> Never work under an implement raised solely by the hydraulic lift; instead, always use a suitable support to hold it in place and turn off the engine.

> ⚠ Danger:
>
> To prevent injuries to persons, never remain between the equipment and tractor whilst operating the three-point coupling.

> ⚠ Caution:
>
> Generally, with the equipment connected to the three-point coupling, the universal joint has a reduced extension and the articulation angle is almost equal. With the equipment raised the shaft is at its maximum extension and diversification of its articulation angle Therefore for high lifting heights it may therefore be necessary to stop the rotation.

The three-point hitch basically consists of the following parts (Fig. 5.48):

1 - a top link hinged to the tractor body, with a sleeve for adjusting the length;
2 - two lateral stabilizers that prevent transversal shaking of the hitch;
3 - two lower tie rods hinged to the tractor body;
4 - hitches with fixed ball joints (standard model);
5 - quick hitches (optional);
6 - two vertical tie rods with adjustable height, which connect the lower tie rods to the lift arms.

The lower tie rods (137) transmit the necessary pull and support to the implement. They have fixed ball joints 134) or quick hitches (135) on the ends.

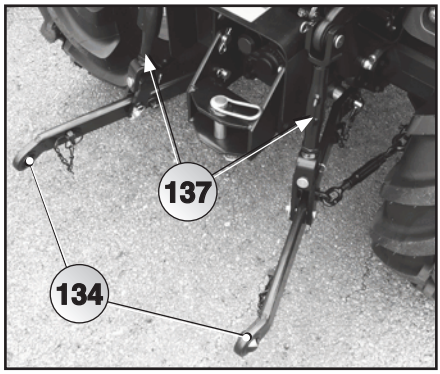


**Fig. 5.48**

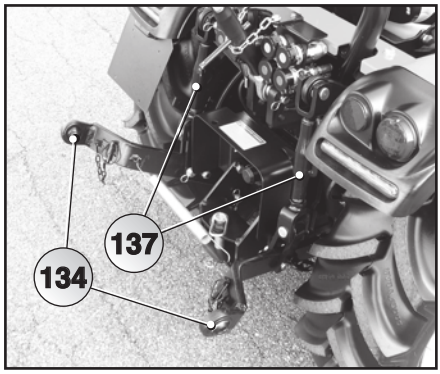


**Fig. 5.49**

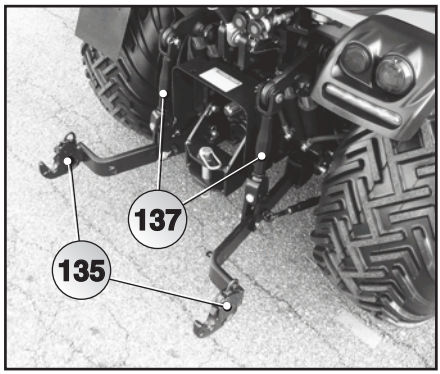


**Fig. 5.50**

**Vertical tie rods**

The height of the vertical tie rods (137) can be adjusted using the handles provided (140). This adjustment is very useful for leveling the implement according to the type of job.

Turn the fork clockwise to shorten the vertical tie rod.

Turn the fork counter-clockwise to lengthen the vertical tie rod.

After adjusting make sure that, with the lift at its highest point, the implement is not raised higher than necessary and, with the lift lowered, that the implement can travel lower.

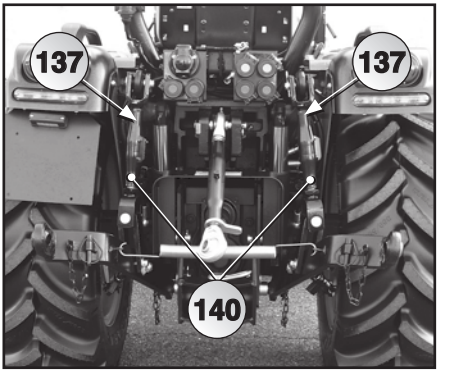


**Fig. 5.51**

**Top link**

The top adjustable link (132) is connected to the support by two holes. It must be selected based on the height of the implement.

The length of the top link may be varied so that the implement's angle of incidence can be adjusted in relation to the ground. When the top link is shortened, the incidence increases; when lengthened, the incidence decreases.

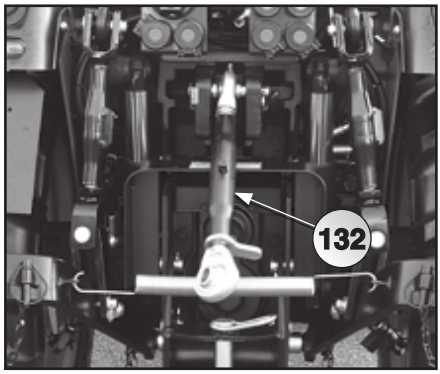


**Fig. 5.52**

**Implement attachment to the tractor**

| ⚠ Warning: |
| --- |
| When attaching implements to the front and rear three-point linkage, the following values must not be exceeded:<br>- maximum total weight<br>- maximum axial load<br>- maximum load capacity of tyres<br>Load on front axle must always be 25% at least of the tractor's empty weight.<br>Before buying an implement, check accurately that the above requirements are met. |

The tractor-implement assembly may be unstable owing to the weight of the machines: if the implements are too heavy for the tractor, they could lighten its front axle when they are hitched to the rear power lift, making the tractor difficult to drive and causing it to swerve round bends. Besides choosing the right tractor-implement combination, the remedy is to apply ballast, which must be done to suit the following conditions (Fig.5.52.1):

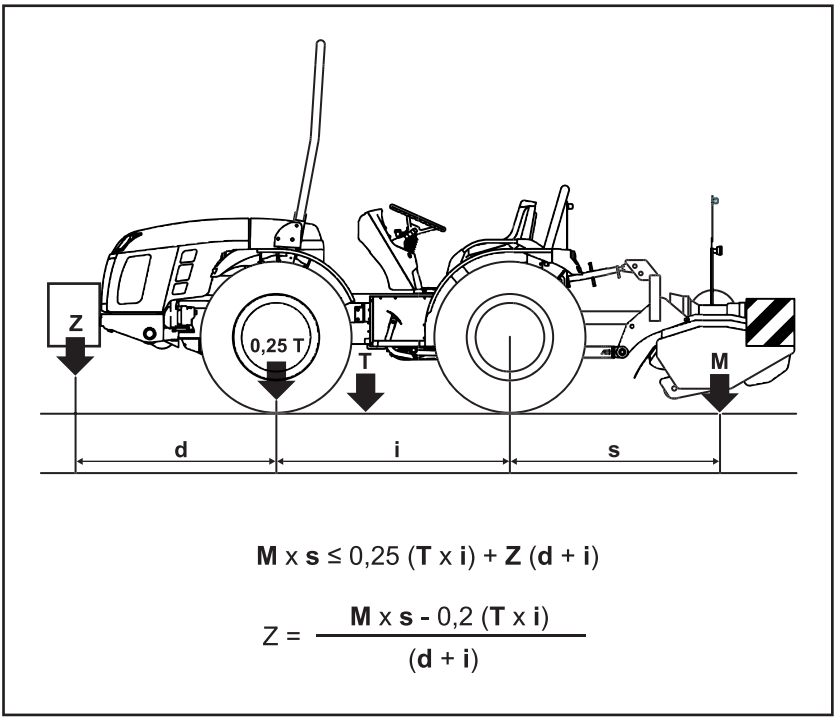


**Fig. 5.52.1**

**Maximum permitted operating weights (kg)**

| Tyre | Front axle | Rear axle | | Total |
|---|---|---|---|---|
| | | RS/MT | AR | |
| 280/70 R18 | 1300 | 1580 | 1300 | 2300 |
| 320/65 R18 | 1300 | 1580 | 1300 | 2300 |
| 11.5/80-15.3 | 1300 | 1580 | 1300 | 2300 |
| 260/70 R20 | 1300 | 1580 | 1300 | 2300 |
| 31x15.50-15 | 1300 | 1580 | 1300 | 2300 |
| 33x12.50-15 | 1300 | 1580 | 1300 | 2300 |
| 33x15.50-15 | 1300 | 1580 | 1300 | 2300 |
| 300/65 R18 | 1300 | 1580 | 1300 | 2300 |
| 7.50-16 | 1300 | 1430 | 1300 | 2300 |
| 250/80-18 | 1300 | 1340 | 1300 | 2300 |
| 8.25-16 | 1300 | 1340 | 1300 | 2300 |

**Hitching points - AR model tractor (basic)**

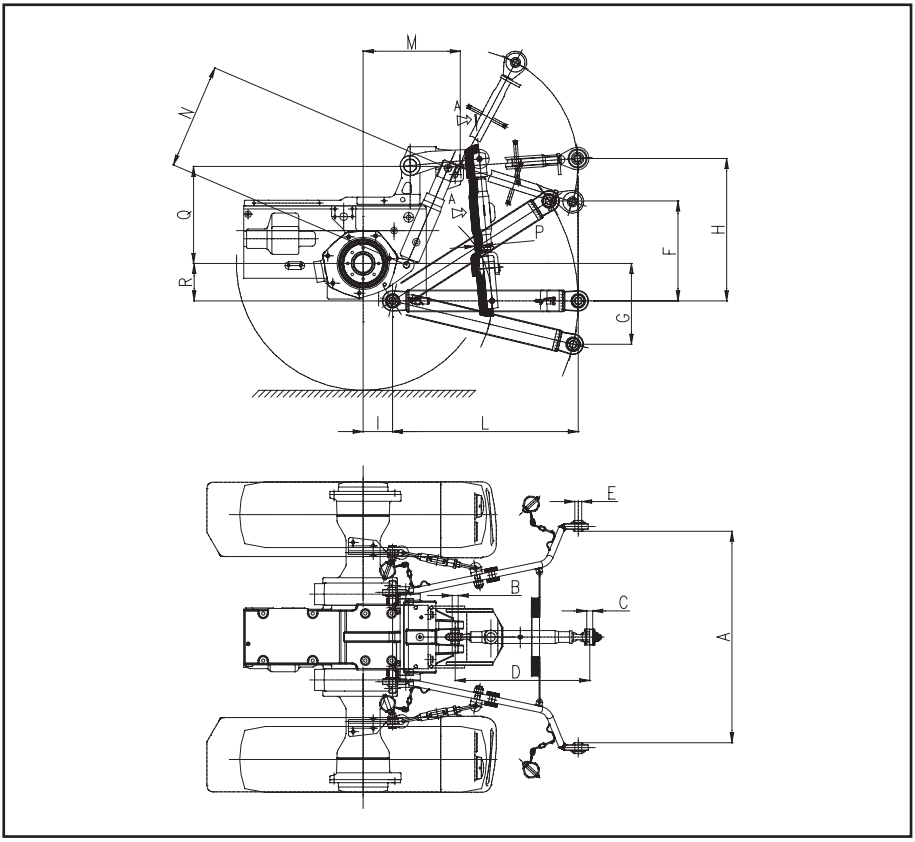


**Fig. 5.53**

| | A | B | C | D | | E | F | G | H | I | L | M | N | | P | Q | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | min | max | | | | | | | | min | max | | | |
| mm | 683 | 19.5 | 19 | 435 | 569 | 22.1 | 323 | 261 | 460 | 95 | 600 | 314 | 270 | 410 | 25 | 313 | 121 |

## Hitching points - RS - MT model tractor (basic)

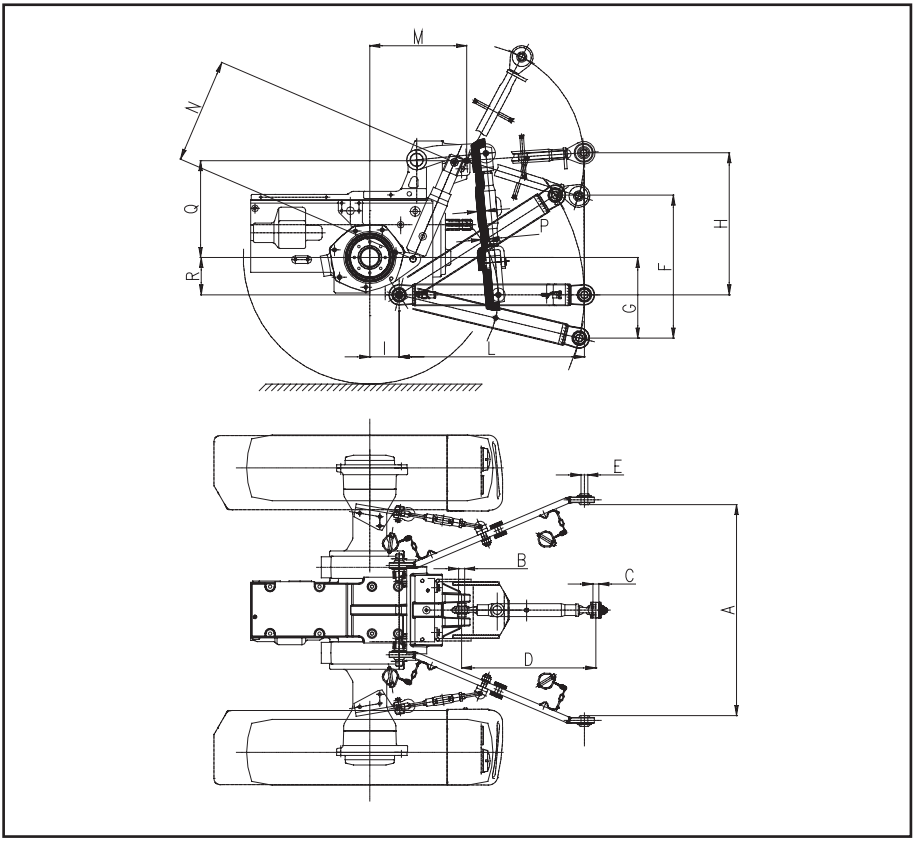


**Fig. 5.54**

| | A | B | C | D | | E | F | G | H | I | L | M | N | | P | Q | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | min | max | | | | | | | | min | max | | | |
| mm | 683 | 19.5 | 19 | 435 | 569 | 22.1 | 463 | 261 | 460 | 95 | 600 | 314 | 270 | 410 | 25 | 313 | 121 |

**Hitching points - AR - RS - MT model tractor (optional)**

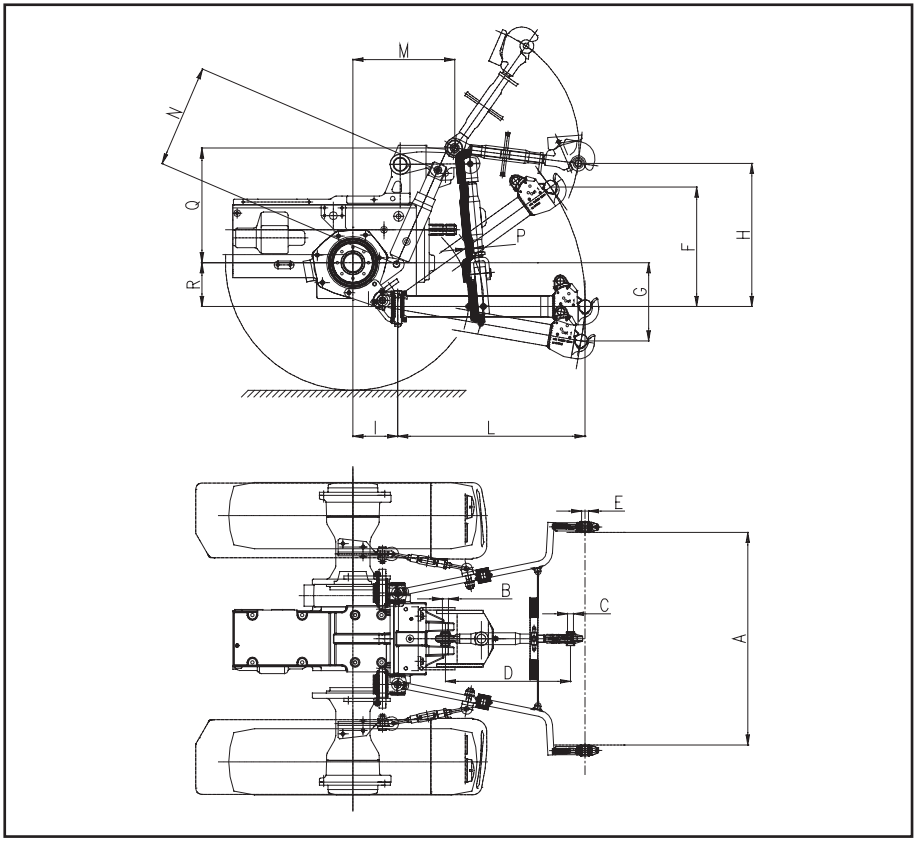


**Fig. 5.55**

| | A | B | C | D | | E | F | G | H | I | L | M | N | | P | Q | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | min | max | | | | | | | | min | max | | | |
| mm | 683 | 19.5 | 19 | 435 | 569 | 22.1 | 383.5 | 251 | 460 | 145 | 6002 | 327.5 | 270 | 410 | 25 | 368.5 | 140.5 |

## Hitching points - AR - RS - MT model tractor (optional)

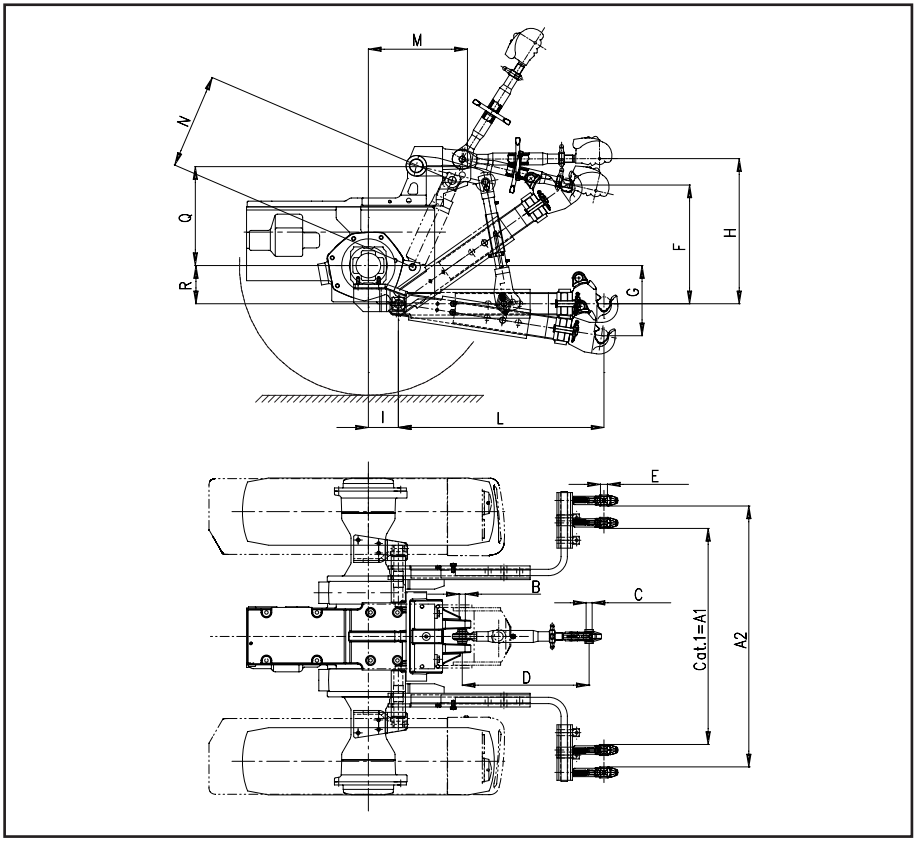


**Fig. 5.56**

| | A1 | A2 | B | C | D | | E | F | G | H | I | L | M | N | | Q | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | min | max | | | | | | | | min | max | | |
| mm | 683 | 825 | 19.5 | 19 | 435 | 569 | 22.1 | 376 | 222 | 460 | 95 | 651 | 314 | 270 | 401 | 313 | 121 |

## 18.1 Standard rear lift

The hydraulic lift raises and lowers the implements connected to the three-point hitch.

The position of the lift arms may be controlled using the lever (22), from completely raised to completely lowered.

- Lever (22) up - arms raised
- Lever (22) down - arms lowered

The lever (22) is on the right side of the operator seat..

A special decal is located near the lever (Fig. 5.57) that indicates the position of the lift arms in relation to the lever positions.

It is possible to lock the lever (22) in the lowest position by pressing on the lever itself, thereby obtaining the free movement of the arms (floating function).

The knob (23) adjusts the lowering speed of the lift arms.

Turning it clockwise reduces the speed, while turning it counter-clockwise increases the speed.

| Note: |
| --- |
| During road transfer with implements connected, it is necessary to close the valve in order to prevent the implement from being lowered. |

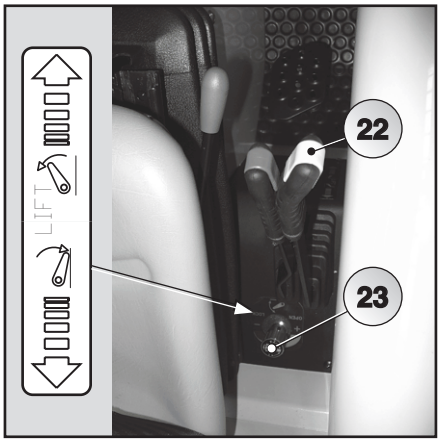


**Fig. 5.57**

## 18.2 Rear lift with hydraulic suspension "Dual Floating System" model

The "Dual Floating System" function allows the reduction of the implement load on the ground whilst working. The hydraulic lift can either operate normally as described on the previous page or, with the air of hydraulic suspension which allows controlled "floating" of the implement on the ground to be obtained using an nitrogen accumulator (190) pre-charged at 20 bar.

| Note: |
| --- |
| The accumulator pressure must never exceed 140 bar. |

The lever (186), connected to the directional control valve, controls the position of the arms of the implement lift, from completely raised (lever up) to completely lowered (lever down). When the lever is down, the directional control valve is in the float position and the lever remains in place with discharging.

In "suspension", the lever (187) is used for charging or discharging the accumulator to the desired pressure (lever up and lever down, respectively) based on the weight of the implement to be raised from the ground and to keep the system pressure constant; the pressure of the accumulator (190) is indicated by the pressure gauge (188).

| Note: |
| --- |
| The hydraulic circuit is, in any case, activated by the accumulator. The accumulator is also under pressure when the jacks are activated and therefore, when used, the jacks themselves slow down. |

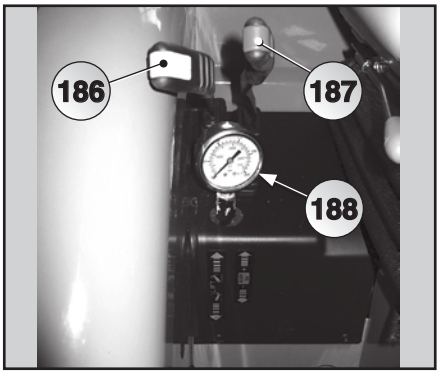


**Fig. 5.58**

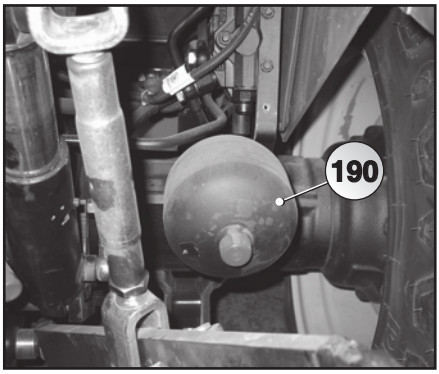


**Fig. 5.59**

| Note: |
| --- |
| Once the accumulator has been charged to the required pressure, it is possible to raise and then lower the lift using the lever (186), maintaining the floating function of the implement. |

## 18.3 Rear lift with position and draft control

The implement lift may be used in the following conditions:

- position control;
- controller draft;
- floating functio;
- combined position and draft control.

The lift may be used in various ways indicated above through combined use of the levers (24 and 25), position control and draft control, respectively.

The levers (24 and 25) are located to the right of the operator position, next to the seat (Fig. 5.60).

The lever (24) controls the position of the arms. Each position of the lever corresponds to a position of the lift arms, from completely raised (lever all the way back) to completely lowered (lever all the way forward).

The lever (25) allows the implement to be placed in the ground at the desired depth.

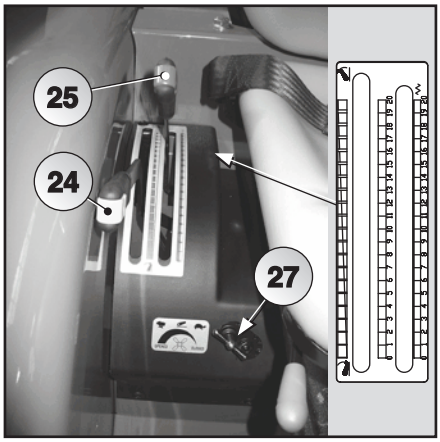


**Fig. 5.60**

**Position control**

Position control brings the implement to a certain position and keeps it there, whatever it may be, including the highest and lowest position, whether in or out of the ground.

Position control is used for:

- mounted implements, that is without wheels or other parts for resting on the ground;
- semi-mounted implements, that is with wheels or other parts for resting on the ground.

For this type of work:

- move the draft control lever (25) completely forward;
- move the position control lever (24) forward for lowering or backward for lifting.

| Note: |
| --- |
| The implement is moved proportionally to the position of the lever (24). |

### Draft control

Draft control of the lift consists of automatically keeping the tractor pull constant regardless of the varying work conditions.

Draft control is used with all mounted tractor implements without ground support like runners, wheels, etc.

For this type of work:

- move the position control lever (24) completely forward;
- gradually move the draft control lever (25) forward until the implement is placed in the ground at the desired depth;

| Note: |
| --- |
| The implement depth is proportional to the pull determined by the soil consistency. In this condition, the lift automatically keeps the pull required by the tractor constant. |

- Raise the implement at the end of each pass using the position control lever (24).

### Floating operation

Per ottenere questa modalità di lavoro:

- move the position control lever (24) and the draft control lever (25) completely forward;
- lower and raise the implement at the beginning and end of each pass using the position control lever (24).

### Combined position and draft control

For this type of work:

- place the implement in the ground and set the desired depth following the instructions described under “draft control”;
- when the implement is at the desired depth, move the position control lever 24) backward until the arms of the lift tend to rise.

| Note: |
| --- |
| In this situation, the lift uses draft control. However, if the implement runs into less resistant soil, it prevents the implement from going too far into the ground. |

- lower and raise the implement at the beginning and end of each pass using the position control lever (24).

### Transfer on roads with an implement attached

When driving on roads with an implement attached to the tractor:

- Turn the lever (27) that adjusts the lowering speed of the arms completely counter-clockwise;
- Move the position control lever (24) completely backward.

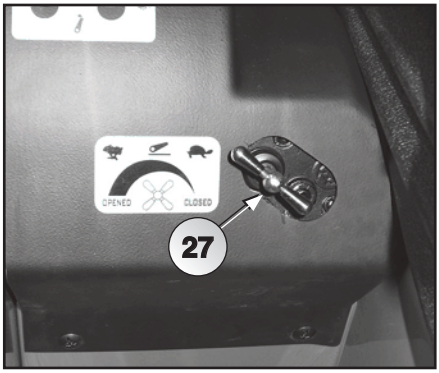


**Fig. 5.61**

## 18.4 Auxiliary hydraulic directional control valves

The tractor is equipped with additional hydraulic directional control valves for controlling external hydraulic cylinders. These additional directional control valves are combined with the lift hydraulic circuit and therefore use the same oil.

| Note: |
| --- |
| To ensure smooth operation of the hydraulic circuit, check the transmission oil level often and, if considerable oil is used for external circuits, increase the oil level as indicated in paragraph 6 -"Periodic Maintenance". |

The directional control valves can be various types:

- single-acting
- double-acting
- double-acting with lever locking in place
- double-acting float

These directional control valves are connected with pipes to hydraulic ports on the back of the tractor (Fig. 5.62).

The color of the hydraulic port cover corresponds to its control lever (29-30) to the left of the operator position (Fig. 5.63). The levers carry out the following functions depending on the types of installed hydraulic directional control valves:

- Single-acting hydraulic directional control valve lever: when the lever is up the jack extends; when the lever is down the jack retracts as a consequence of the installed implement mass.
- Double-acting hydraulic directional control valve lever: when the lever is up the jack extends; when the lever is down the jack retracts.

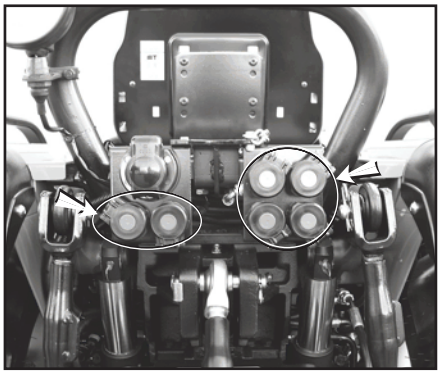

Fig. 5.62

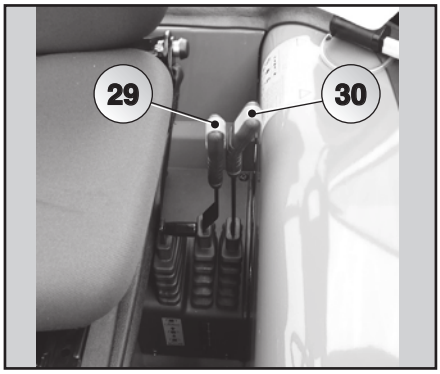


Fig. 5.63

| ⚠ Warning: |
| --- |
| Make sure that the hydraulic cylinders of the implements that are connected contain the same type of oil as the tractor transmission to prevent its pollution and possible malfunctioning. |

The quick hitch with the black cover permits “free discharging” of the external implement oil directly to the gearbox case.

The external hydraulic cylinders connected to the tractor hydraulic circuit must be equipped with hoses and 1/2” “push-pull” male couplings for connection with quick hitches on the rear of the tractor.

| ⚠ Warning: |
| --- |
| Leaking pressurized hydraulic fluid can be powerful enough to penetrate the skin. The fluid for hydraulic controls can also cause cuts in the skin. If injuries occur due to leaking fluid, see a doctor immediately. Otherwise, serious infection and skin reactions are possible. The tightness of all of the connection devices and the conditions of the hoses and pipes must be checked before placing the system under pressure. Discharge the pressure fully before disconnecting hoses and before carrying out other types of work on the hydraulic system. Never check for leaks with hands; instead, use a piece of cardboard or wood. |

To connect the hose to the tractor, proceed as follows:

- clean the implement male fitting;
- turn off the engine;
- make sure that the hydraulic lift is lowered;
- activate the directional control valve lever that will be used for the connection several times for its entire travel to discharge the pressure from the circuit;
- remove the protective cap of the quick hitch connected to the directional control valve;
- thoroughly clean the port and the coupling;
- act on the locking ring nut and push the coupling onto the port. Make sure that it is securely engaged by lightly pulling it backward.

After these operations have been carried out, the engine may be restarted and the directional control valve may be used.

To disconnect the hose from the tractor, proceed as follows:

- turn off the engine;
- activate the directional control valve lever that will be used for the connection several times for its entire travel to discharge the pressure from the circuit;
- act on the locking ring nut and forcibly pull the coupling to disconnect it from the rear port of the tractor;
- cover the port with the cap and clean it.

| ⚠ Warning: |
| --- |
| In order to guard the driver’s safety when engaging the quick hitches it is necessary to keep at distance from the range of the implements. For greater safety it is advisable to use throttle valves acting on the hydraulic workings. |

# Section 19 : Removing the tyres

| ⚠ Warning: |
|---|
| All persons fitting and removing tyres must have received appropriate training and possess the necessary equipment. |

To remove the tyre, proceed as follows:

1. Park the tractor on a firm, level surface.

2 Switch off the engine and remove the key.

3. Disconnect any connected equipment from the power takeoff.

4. Dismantle any ballast on the tyres.

5. Position a jack underneath the central gearboxes and raise the tractor.

6. Completely unscrew the nuts and remove the tyre.

| ⚠ Warning: |
|---|
| Pay attention when raising the tractor that the weight is evenly distributed and stop the axle swaying by placing suitable supports underneath the wheels. |

| ⚠ Warning: |
|---|
| Tighten all the nuts and bolts to the correct driving torque value. |

**Tightening torques (Nm)**

| | A | B |
|---|---|---|
| M14 | - | 112±12 |
| M16 | - | 270±27 |
| M18 | 285÷300 | - |

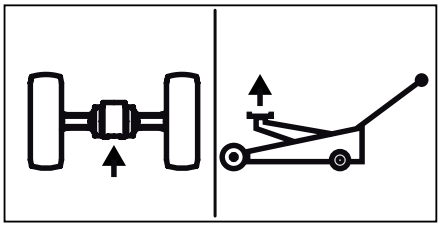

**Fig. 5.63.1**

**Fig. 5.63.2**

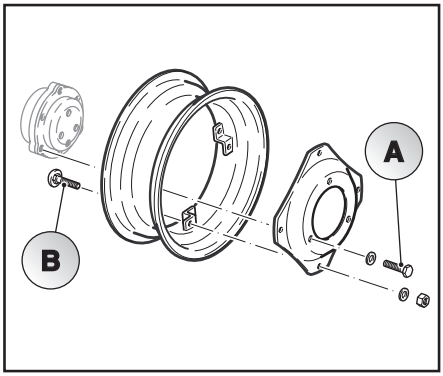


**Fig. 5.63.3**

## 19.1 Adjusting the wheel track

The tractor may be adjusted to carry out the work of the various implements and various crops, by changing the front and rear wheel track.

The tractor may be adjusted to carry out the work of the various implements and various crops, by changing the front and rear wheel track.

Certain tracks are not possible with certain types of tires.

| Note: |
| --- |
| Always check the pressure of the tires. |

**Fig. 5.64**

**Wheel track (AR model tractor)**

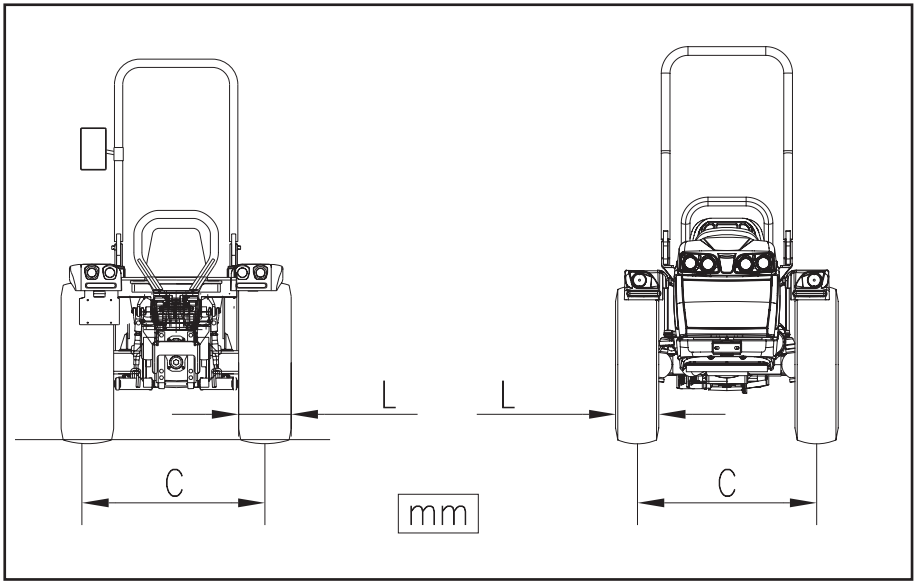


**Fig. 5.65**

| Tire | L | C | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | |  |  |  |  |  |  |  |  |
| 7.50-16 | 208 | 794* | 827 | 851 | 884 | 1010 | 1043 | 1067 | 1110 |
| 8.25-16 | 212 | 794* | 827 | 851 | 884 | 1010 | 1043 | 1067 | 1110 |
| 250/80-18 | 240 | - | 865 | 881 | 943 | 955 | 1017 | 1033 | 1107 |
| 280/70-18 | 282 | - | 869* | 877* | 931 | 967 | 1021 | 1029 | 1119 |
| 300/65-18 | 295 | - | 869* | 877* | 931 | 967 | 1021 | 1029 | 1119 |
| 320/65-18 | 319 | - | - | - | 931 | 967 | 1021 | 1029 | 1119 |
| 260/70-20 | 258 | - | 846* | 902 | 936 | 966 | 1000 | 1056 | 1120 |
| 11.5/80-15.3 | 290 | - | 877* | 1021 | 1087 | - | - | - | - |
| 29x12.50-15 | 308 | 907* | 991 | - | - | - | - | - | - |
| 31x15.50-15 XTC | 368 | - | 1003 | - | - | - | - | - | - |
| 31x15.50-15 STG | 394 | - | 1003 | - | - | - | - | - | - |
| 33x12.50-15 | 345 | - | 1037 | - | - | - | - | - | - |

* for single direction model only

**Wheel track (RS model tractor)**

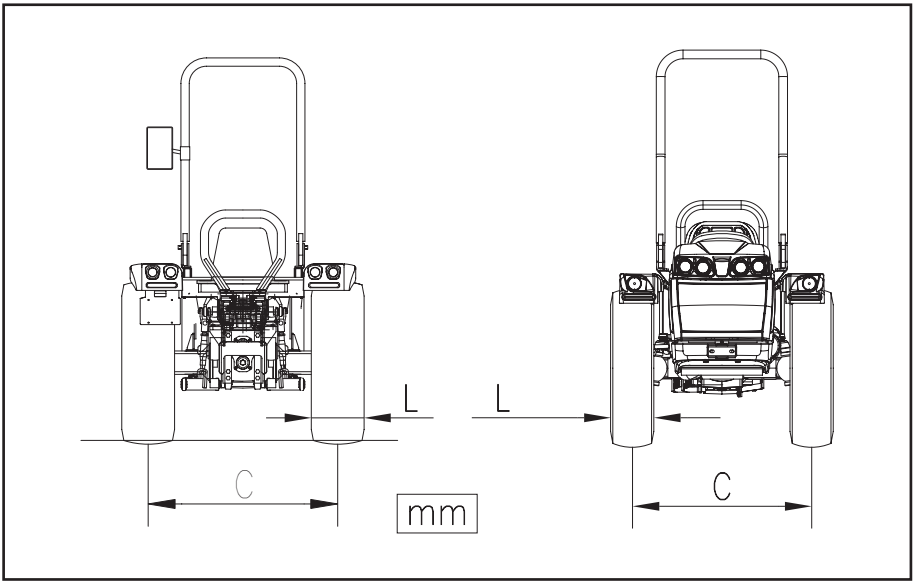


**Fig. 5.66**

| Tire | L | C | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | |  |  |  |  |  |  |  |  |
| 7.50-16 | 208 | 999 | 1032 | 1056 | 1089 | 1215 | 1248 | 1272 | 1305 |
| 8.25-16 | 212 | 999 | 1032 | 1056 | 1089 | 1215 | 1248 | 1272 | 1305 |
| 250/80-18 | 240 | 996 | 1070 | 1086 | 1148 | 1160 | 1222 | 1238 | 1312 |
| 280/70-18 | 282 | 984 | 1074 | 1082 | 1136 | 1172 | 1226 | 1234 | 1324 |
| 300/65-18 | 295 | - | 1074 | 1082 | 1136 | 1172 | 1226 | 1234 | 1324 |
| 320/65-18 | 319 | - | 1074 | 1082 | 1136 | 1172 | 1226 | 1234 | 1324 |
| 260/70-20 | 258 | 987 | 1051 | 1107 | 1141 | 1171 | 1205 | 1261 | 1325 |
| 11.5/80-15.3 | 290 | 1016 | 1082 | 1226 | 1292 | - | - | - | - |
| 29x12.50-15 | 308 | 1112 | 1196 | - | - | - | - | - | - |
| 31x15.50-15 XTC | 368 | 1100 | 1208 | - | - | - | - | - | - |
| 31x15.50-15 STG | 394 | 1100 | 1208 | - | - | - | - | - | - |
| 33x12.50-15 | 345 | 1066 | 1242 | - | - | - | - | - | - |

**Wheel track (AR model tractor with cab)**

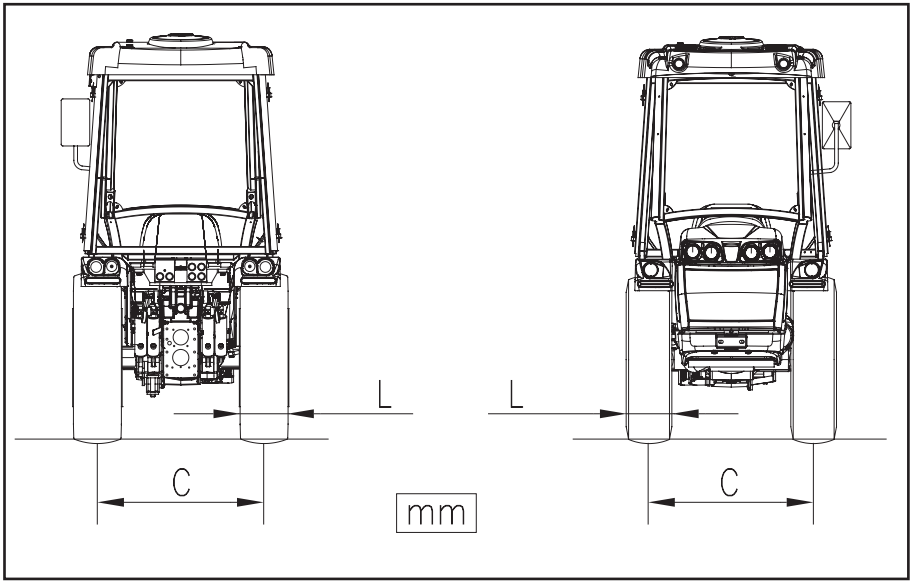


**Fig. 5.67**

| Tire | L | C | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | |  |  |  |  |  |  |  |  |
| 7.50-16 | 208 | - | 827 | 851 | 884 | 1010 | 1043 | 1067 | 1110 |
| 8.25-16 | 212 | - | 827 | 851 | 884 | 1010 | 1043 | 1067 | 1110 |
| 250/80-18 | 240 | - | - | - | 943 | 955 | 1017 | 1033 | 1107 |
| 280/70-18 | 282 | - | - | - | - | 967 | 1021 | 1029 | 1119 |
| 300/65-18 | 295 | - | - | - | - | 967 | 1021 | 1029 | 1119 |
| 320/65-18 | 319 | - | - | - | - | - | 1021 | 1029 | 1119 |
| 260/70-20 | 258 | - | - | - | 936 | 966 | 1000 | 1056 | 1120 |
| 11.5/80-15.3 | 290 | - | - | 1021 | 1087 | - | - | - | - |
| 29x12.50-15 | 308 | - | 991 | - | - | - | - | - | - |
| 31x15.50-15 XTC | 368 | - | 1003 | - | - | - | - | - | - |
| 31x15.50-15 STG | 394 | - | 1003 | - | - | - | - | - | - |
| 33x12.50-15 | 345 | - | 1037 | - | - | - | - | - | - |

**Wheel track (RS model tractor with cab)**

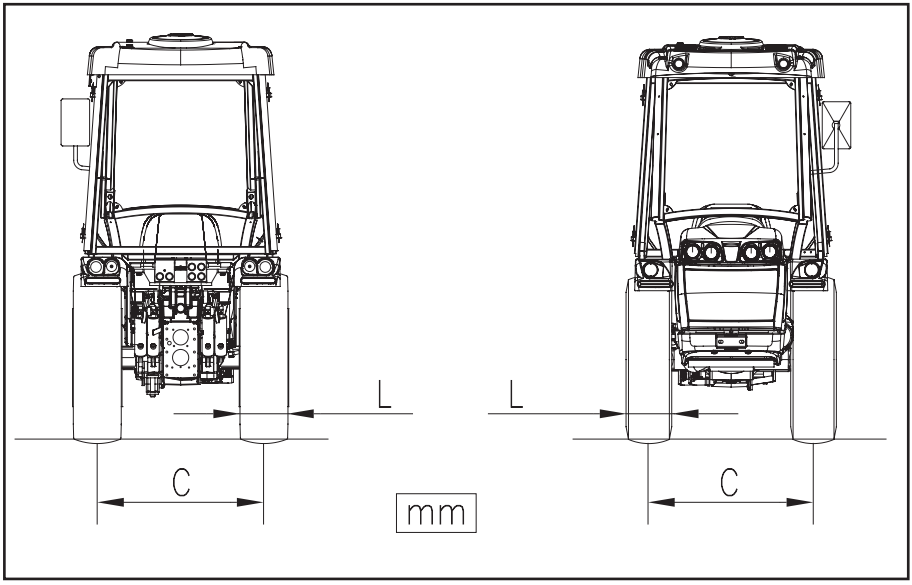


**Fig. 5.68**

| Tire | L | C | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7.50-16 | 208 | 999 | 1032 | 1056 | 1089 | 1215 | 1248 | 1272 | 1305 |
| 8.25-16 | 212 | 999 | 1032 | 1056 | 1089 | 1215 | 1248 | 1272 | 1305 |
| 250/80-18 | 240 | 996 | 1070 | 1086 | 1148 | 1160 | 1222 | 1238 | 1312 |
| 280/70-18 | 282 | 984 | 1074 | 1082 | 1136 | 1172 | 1226 | 1234 | 1324 |
| 300/65-18 | 295 | - | 1074 | 1082 | 1136 | 1172 | 1226 | 1234 | 1324 |
| 320/65-18 | 319 | - | 1074 | 1082 | 1136 | 1172 | 1226 | 1234 | 1324 |
| 260/70-20 | 258 | 987 | 1051 | 1107 | 1141 | 1171 | 1205 | 1261 | 1325 |
| 11.5/80-15.3 | 290 | 1016 | 1082 | 1226 | 1292 | - | - | - | - |
| 29x12.50-15 | 308 | 1112 | 1196 | - | - | - | - | - | - |
| 31x15.50-15 XTC | 368 | 1100 | 1208 | - | - | - | - | - | - |
| 31x15.50-15 STG | 394 | 1100 | 1208 | - | - | - | - | - | - |
| 33x12.50-15 | 345 | 1066 | 1242 | - | - | - | - | - | - |

**Wheel track (MT model tractor)**

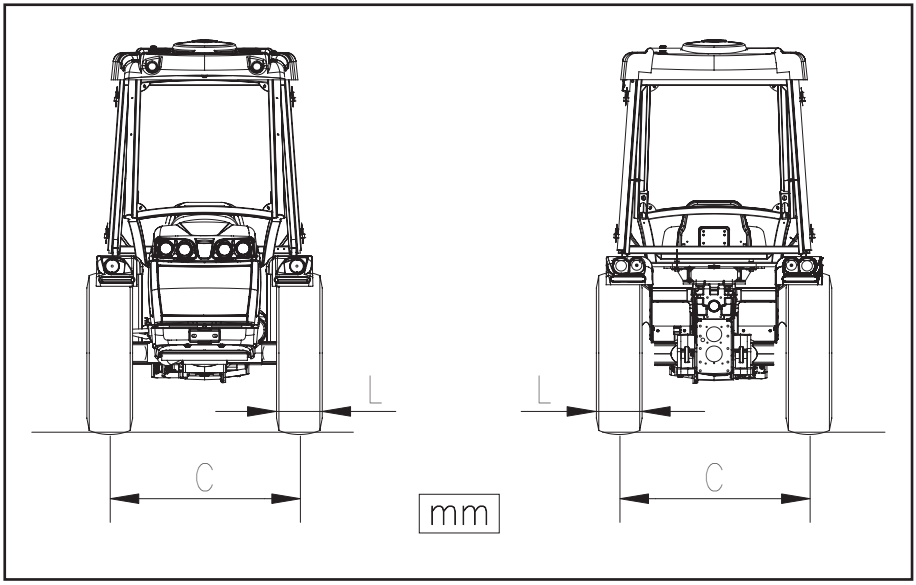


**Fig. 5.69**

| Tire | L | C | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | |  |  |  |  |  |  |  |  |
| 31x15.50-15 STG | 394 | 1100 | 1208 | - | - | - | - | - | - |
| 31x15.50-15 XTC | 391 | 1100 | 1208 | - | - | - | - | - | - |

# Section 20 : Transporting the tractor

The tractor must be transported with a suitable means of transportation.

| ⚠ Warning: |
| --- |
| Avoid lifting the tractor with a crane or other unsuitable lifting devices. |

Before transporting the tractor, the parking brake must always be engaged.

| ⚠ Warning: |
| --- |
| Use suitable ramps for loading on to the transport vehicle. |

| ⚠ Warning: |
| --- |
| Do not hook or connect chains around the tractor parts, which could be damaged by the chains themselves or by excessive loads. |

After the tractor has been loaded onto a suitable means of transportation, secure it with suitable anchoring belts or chains (143).

The trailer must always have the warning signs and lights that are required by law.

If the tractor is towed, the power steering system can be used to drive and turn for a short distance with the engine off.

Always operate the tractor from the operator position and:

- place the transmission levers in neutra;
- disengage the parking brake;
- place the PTO lever in neutral (28);
- always slow down and stop the tractor with the brake pedals coupled (RS model);
- use the rotating light and the flashing indicator lights.

| Note: |
| --- |
| When the engine is off, greater effort must be used for steering. |

| Note: |
| --- |
| Always tow or push the tractor at a moderate speed. |

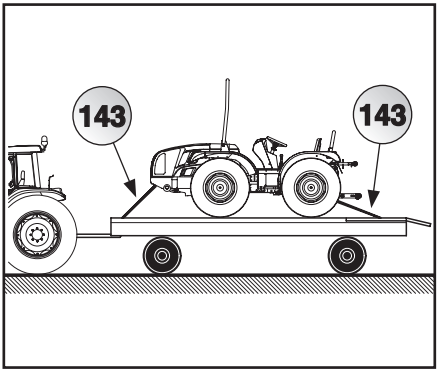


**Fig. 5.70**

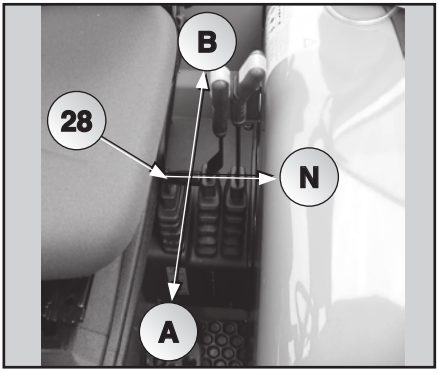


**Fig. 5.71**

# Section 21 : Front ballasts

Front ballasting by means of specific cast iron plates is foreseen, in case heavyweight implements are attached to the tractor and they compromise its longitudinal stability. Maximum four plates, 20 kilos each, can be attached to the tractor.

> ⚠ Warning:
>
> The total weight of the tractor, front ballasting and attached implements included, must not exceed the maximum load allowed on the axles.

**Fig. 5.72**

# Section 22 : Device of proportional control through a Joystick RS-AR version

A device of proportional control through a joystick can be supplied on request. It is assembled on an overturning support on the RH side and it allows to control both the front and the rear hydraulic lifts, besides all the auxiliary control valves.

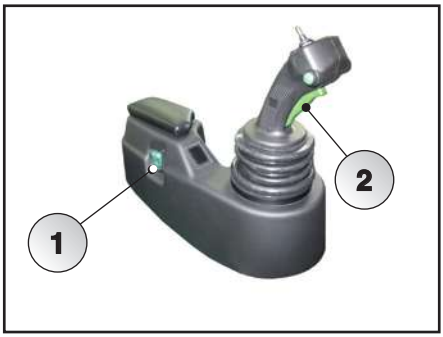


Fig. 5.73

**Main controls**

1. General switch
2. Safety button
3. Rear lift floating raise/lower control switch
4. Yellow button
5. Green button
6. White button
7. On-off switch
8. Joystick lever
9. Rear lift raise/lower control switch for moves with driver down the tractor

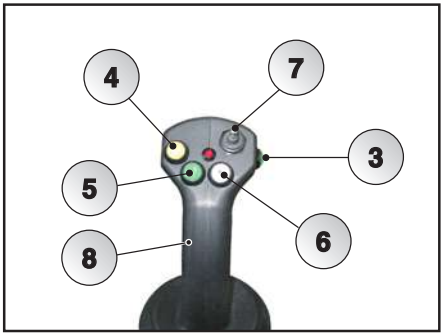


Fig. 5.74

**⚠WARNING:**

Keep to one side of the tractor when using the switch (9) to raise/lower the hitch. Never stand between tractor and implement.

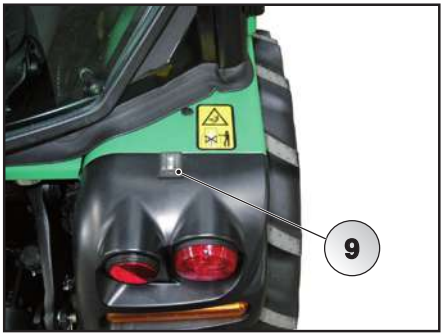


Fig. 5.75

**Joystick employ with yellow button pressed**

By keeping both the safety green button (2) (driver present) and the yellow button (4) pressed, it is possible to move the joystick lever in the directions indicated in the picture 5.76, to power the quick couplings as indicated in the picture 5.77

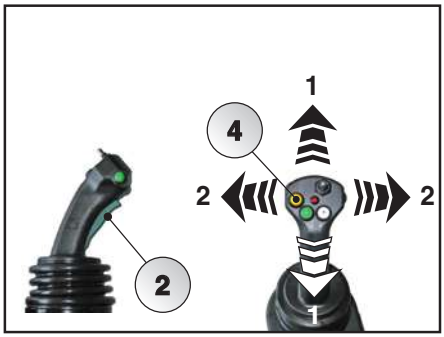


Fig. 5.76

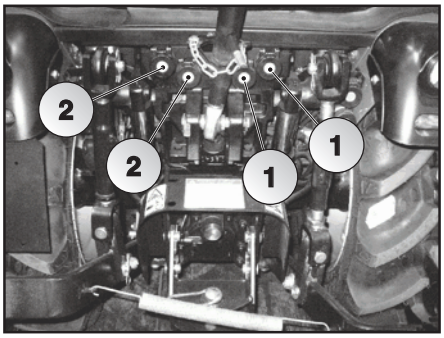


Fig. 5.77

### Joystick employ with green button pressed

By keeping both the safety green button (2) (driver present) and the green button (5) pressed, it is possible to move the joystick lever in the directions indicated in the picture 5.78, to power the quick couplings as indicated in the picture 5.79.

On all versions, by moving the lever in the position "1", the lift arms raise or lower. In this case, by pulling the lever backwards the lift arms raise, while by moving the lever forwards they lower.

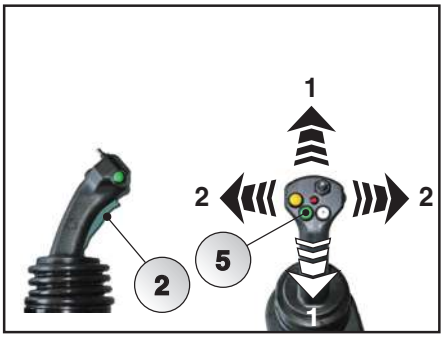


Fig. 5.78

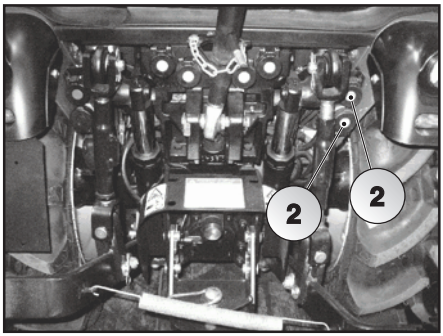


Fig. 5.79

### Joystick employ with side green button pressed

To set the floating function of the rear lift in action, keep the safety switch (2) pressed (driver present), press and then release the side green button (3) (red led on). The function is deactivated on keeping the safety button (driver present), the green button (5) pressed and moving the handle toward the position “1”.

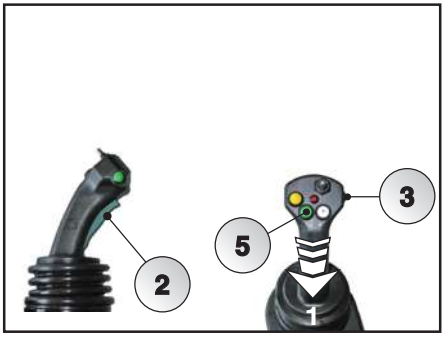


Fig. 5.80

**Joystick employ with white button pressed and flow regulator**

To put the hydraulic coupling (M) in action, so to achieve the continuous delivery of the oil in pressure (useful for ex. to control an hydraulic engine), keep the switch (7) pressed in the “on” position.
Press and then release the white button (6) (led on). Release the switch (7).
The hydraulic coupling (M) feeds the continuous delivery, while the coupling (R) is a free return (Fig. 5.82).
The function is deactivated on pressing the switch (7) in the “off” position and then releasing it (led off).
The knob (P) controls the flow rate of the hydraulic oil flowing from the pump, distributing the oil quantity among the continuous delivery (M) and all the other hydraulic couplings.

| ⚠WARNING: |
| --- |
| Adjust the knob (P) when the hydraulic coupling (M) is not in pressure. |

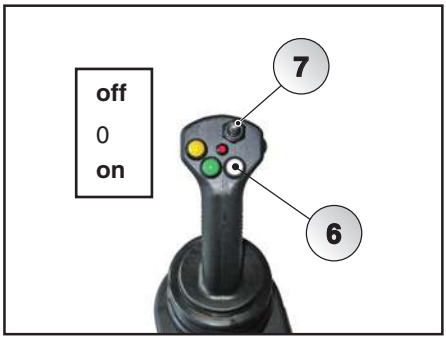


Fig. 5.81

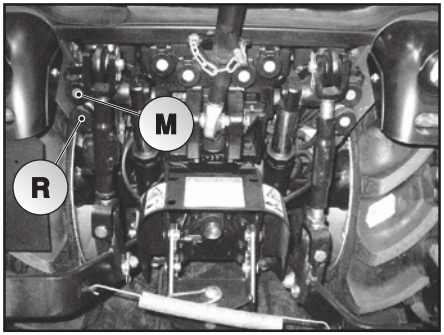


Fig. 5.82

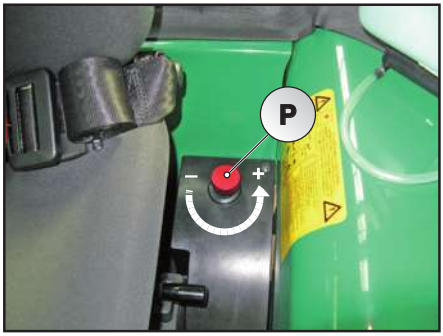


Fig. 5.83

# Notes

# Chapter 6 : Periodic maintenance

## Contents

# Section 1 : Introduction and safety

The maintenance procedures for keeping your tractor running well are indicated in this section. The table in the next section can be used as a quick reference for maintenance. Each operation indicated in the table is numbered and described in detail in later paragraphs. The intervals suggested in the table refer to “normal operating conditions” of the tractor. Under adverse operating conditions such as humidity, mud, sand and high dust levels, the intervals should be shortened.

| Note: |
| --- |
| The operations described in this section ensure proper operation of the tractor when carried out at the prescribed times. |

| Note: |
| --- |
| For engine maintenance, refer to the relative user and maintenance manual supplied with the tractor. |

Before proceeding with tractor maintenance, read and follow all of the safety precautions indicated in section 2 in the paragraph entitled “Tractor maintenance”.

| ⚠ Warning: |
| --- |
| Do not carry out checks, maintenance or adjustments on the tractor while the engine is running. All operations must be carried out with the engine off. |

| ⚠ Warning: |
| --- |
| Park the tractor on a level surface and, if possible, lengthen all of the cylinders before checking the oil levels. |

| Note: |
| --- |
| Dispose of used filters and liquids appropriately, in complete observance of current laws. |

**Fig. 6.1**

To prevent contamination when changing filters, oil, etc., always clean the areas surrounding the filler plugs, level plugs, drain plugs, dipsticks and filters.

| Note: |
| --- |
| The tractor instrument panel has lights that indicate the condition of your vehicle. Some of these indicate anomalies. Intervene promptly when these come on (see Section 4 - Instruments and controls). |

| ⚠ Warning: |
| --- |
| No special equipment is required. |

The following components should be checked periodically. In the event of anomalies, contact your area dealer for repair:

- Hydraulic hoses. The hoses must not be flattened or have cracks or bulges in the external sheath and must not leak oil between the hose and the fitting;
- Nut tightness;
- Tightness of screws that secure the rollbar;
- Tightness of nuts and bolts in general.

# Section 2 : Refueling the tractor

| ⚠ Warning: |
| --- |
| Do not smoke near diesel. Never add gasoline, alcohol, or a mixture of diesel or alcohol to diesel because the risk of fire and explosion increases considerably. In a closed container like a jerry can, they are more explosive than pure gasoline. |

| ⚠ Warning: |
| --- |
| Do not use these mixtures. Furthermore, diesel and alcohol mixtures are not approved due to insufficient lubrication of the fuel injection system. |

| ⚠ Warning: |
| --- |
| Clean the area of the filler plug and keep it clean.<br>Fill the tank at the end of the day to limit nighttime condensation. |

| ⚠ Warning: |
| --- |
| Never remove the plug or refuel while the engine is running. Keep the fuel nozzle under control while filling the tank. |

| ⚠ Warning: |
| --- |
| Do not fill the tank completely. Leave space for increasing volume. If the original tank plug is lost, replace it with an original spare part and tighten completely. |

**Fuel requirements**

Fuel quality is an important factor regarding engine performance and reasonable lifetime. The fuels must be clean, well-refined and not corrosive to parts of the fuel system. Be sure to use fuel with a known quality from a reliable source.

**Refueling**

Before filling the tank, clean the area around the filler plug to prevent foreign bodies from entering the tank. When fueling is finished, screw the plug on again and tighten well.

| Note: |
| --- |
| The fuel tank capacity is 45 liters. |

**Fig. 6.2**

# Section 3 : Accessibility for inspection and maintenance

| ⚠ Warning: |
| --- |
| Before opening the bonnet, always stop the engine, remove the ignition key and engage the parking brake. |

| ⚠ Warning: |
| --- |
| Touching hot surfaces causes burns. After running, the engine and its components and fluids may be hot. Let the engine cool down before carrying out servicing to the tractor or working near it. |

To access the engine parts and carry out inspections and maintenance of the engine itself and all of the assembled parts, the tractor hood must be opened.

The engine hood (Fig. 6.4) may be easily raised using the provided lever (154) located on the left just under the side guard panel.

Inspection windows are provided in the operator position footboard for lubrication operations. To remove them, use the screws that secure them to the tractor's chassis.

| ⚠ Warning: |
| --- |
| Do not use the tractor without the hood or sides. |

| Note: |
| --- |
| If the hood cannot be raised using the lever (154), use a screwdriver (155) to manually release the hood coupling pin. |


Fig. 6.3

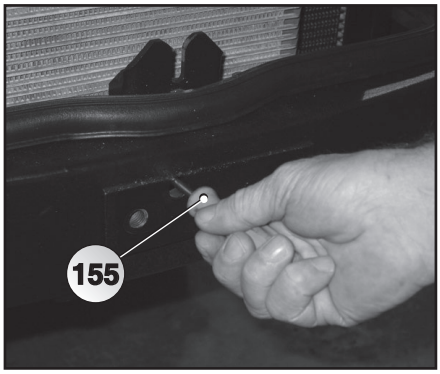


Fig. 6.4

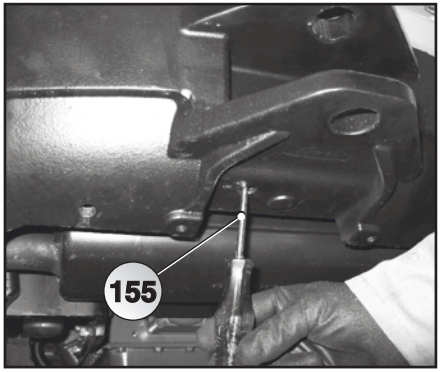


Fig. 6.5

# Section 4 : Running-in period

Normal tractor operation and long lifetime closely depend on the initial period of use (running-in) of the new vehicle. Following the instructions below is therefore very important:

- The new engine does not need to be gradually run-in. It must be used at full power right from the beginning (but not overloaded) with only one important warning: use at maximum power should take place only when the engine has reached at least 60°C.
- After every cold start, run the engine without a load at low speed for a few minutes. This is particularly important for turbo engines.
- Avoid running the engine at idle speed for long periods of time.
- Verify that there are no oil leaks on a regular basis.

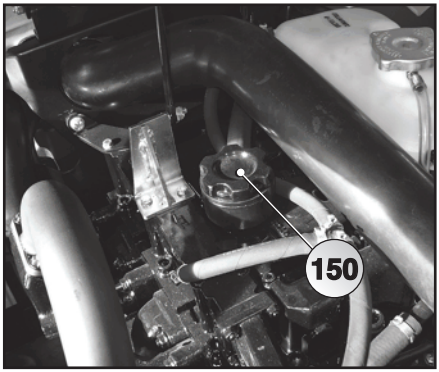


Fig. 6.6

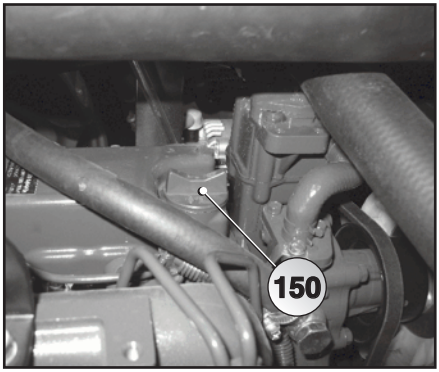


Fig. 6.6.1

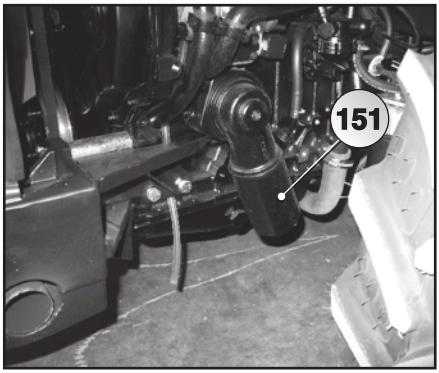


Fig. 6.7

**After the first 50 hours of operation**

- Replace the filtering elements (153).
- Check the oil level of the rear transmission unit (Fig.6.10), as described in the periodic maintenance instructions (Fig.6.9).
- Check the tightness of all of the bolts, screws and nuts.
- Lubricate all of the points with lubricators.
- Verify all of the oil levels (Fig. 6.8 - Fig. 6.8.1) and, if necessary, replenish with the prescribed type of oil.

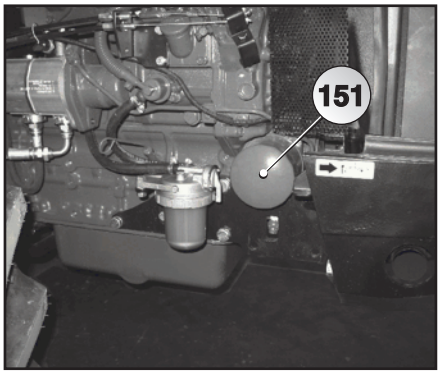


**Fig. 6.7.1**

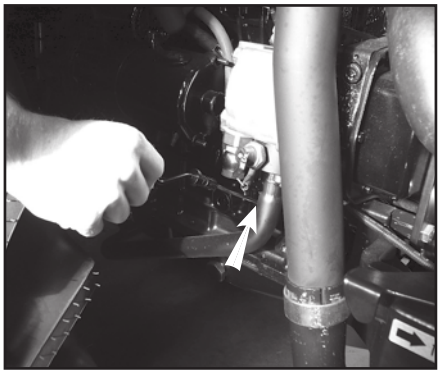

**Fig. 6.8**

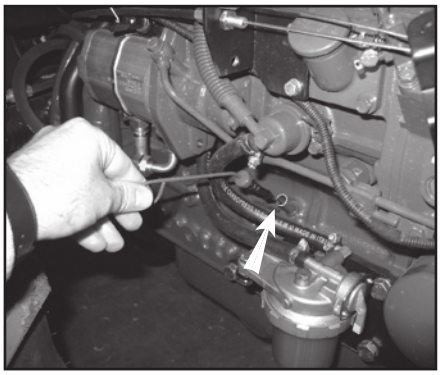

**Fig. 6.8.1**

- Verify the travel of the brake pedals.
- Check the pressure of the tires.
- Replace the oil in the engine pan (150) and the relative filter cartridge (151). Then replace the engine oil and the engine oil filter at the times specified in the periodic maintenance section. Follow the instructions in the engine's user and maintenance manual.
- Check the V-belt, following the instructions in the relative user and maintenance manual of the engine.

| Note: |
| --- |
| If using hydraulically-controlled implements, which take oil from the tractor, it is necessary to keep the oil level in the gearbox under control. |

| ⚠ Warning: |
| --- |
| The levels must be checked and topped up with the tractor parked on a flat surface and with the engine stopped for at least 10 minutes. |

| ⚠ Warning: |
| --- |
| Use oil with the same characteristics as those indicated in the "Fuel and lubricants table". Do not dispose of polluting material in the environment. Dispose of oils in compliance with the pertinent laws in force. |

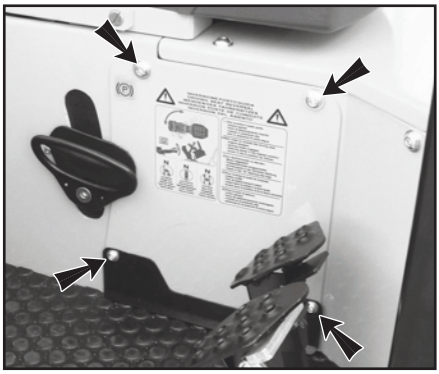

**Fig. 6.9**

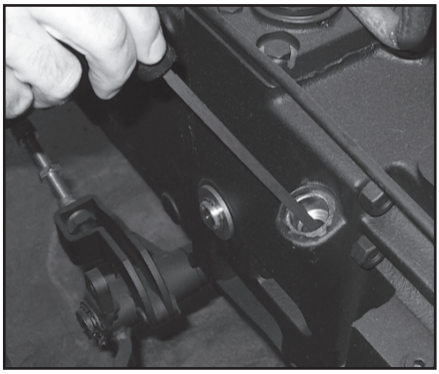

**Fig. 6.10**

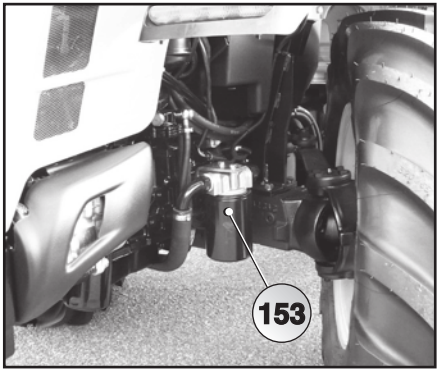


**Fig. 6.11**

## Section 5 : Periodic maintenance summary table

The maintenance and inspection periodic operations are listed in the “Routine maintenance” chapter of service manual, supplied together with the tractor.

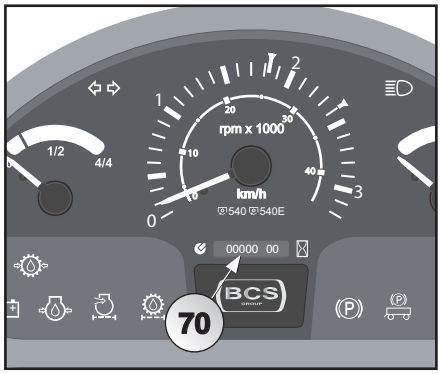


Fig. 6.12

## Section 6 : Flexible periodic maintenance

The maintenance operations that must be carried out at the specified times to keep the tractor running well are described in the following paragraphs.

The hours of tractor operation are indicated by the counter on the instrument panel (70 - analog panel) (90 - digital panel).

Before proceeding with lubrication of the parts with lubricators, clean their surfaces thoroughly and make sure that the ball bearing is free. After lubrication has been carried out, remove all grease residues to prevent the accumulation of soil and dust.

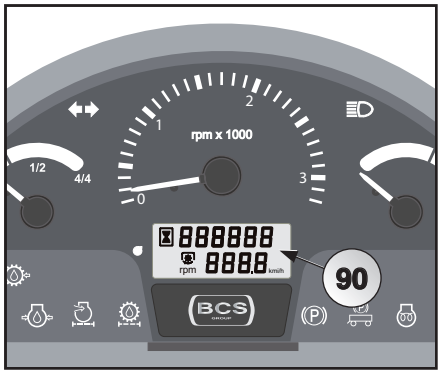


Fig. 6.13

## Section 7 : Radiator

For proper operation of the cooling circuit, it is important that the radiator fins (156) and the front grille (159) of the engine hood are clean.

| Note: |
| --- |
| If the work environment is particularly dusty, it should be cleaned often, even several times a day. |

Check the radiant surface often for obstructions, based on the conditions of tractor use. Monitor the engine cooling water temperature indicator (86) on the instrument panel.

| ⚠ Warning: |
| --- |
| The engine cooling system build up pressure as the engine gets hot. Before removing the radiator cap, shut off the engine and wait for the system to cool down. |

| ⚠ Warning: |
| --- |
| The radiators and grilles must be cleaned while the engine is cold; when overheated, they can burn fingers and hands. |

Clean the radiator (156) with compressed air directed from the inside to the outside.

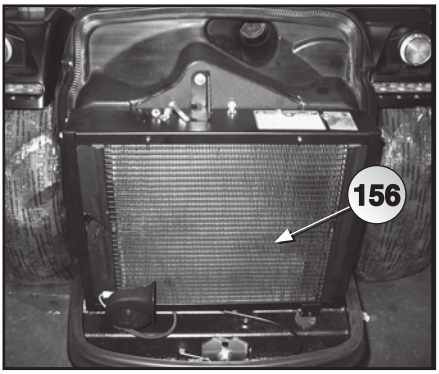


Fig. 6.14


Fig. 6.15

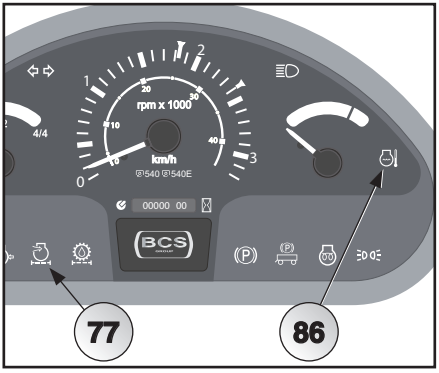


Fig. 6.16

**SCS (Self Cleaning System)**

The SCS is a device that guarantees the cleaning of the front grille (159) of the engine hood. The SCS is activated using the button (200), positioned on the right-hand side of the dashboard. The are three modes: SCS - ECO - CMF. Once the SCS has been activated, whenever the radiator temperature is not such to make the cooling fan enter in action, the fan (201) starts functioning, conveying the air outside and performing the cleaning of hood grille. In ECO mode, only the radiator cooling fan is in function, which is automatically activated on reaching the pre-set temperature. It is called ECO mode because the cooling fan only comes on when required, allowing fuel saving. In CMF mode, the SCS is excluded and the radiator cooling fan begins to operate and remains permanently active. If the horn sounds an alarm, severe overheating has occurred. In such a case, it is necessary to stop working and to investigate the causes of the overheating.


Fig. 6.17

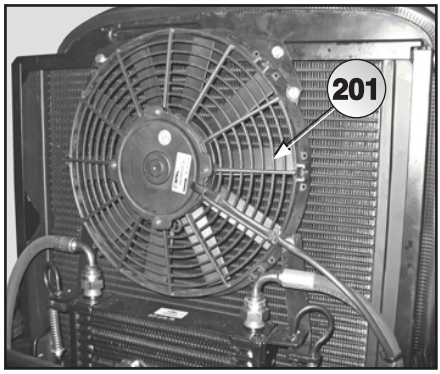


Fig. 6.18

## Section 8 : Air filter

If working in particularly dusty environments, the air filter should be cleaned often. This operation should be carried out every 8-60 hours; follow the instructions in the engine's maintenance booklet.

| ⚠ Warning: |
| --- |
| The filtering elements must always be cleaned while the engine is off. |

If the light (77) on the instrument panel comes on, the engine air filter is clogged. In this case, the filtering elements must be cleaned.

| ⚠ Warning: |
| --- |
| Never use oil, petroleum, diesel oil, paraffin or other solvents to clean the filter. Compressed air should be used. |

Per accedere al filtro (161) è necessario:

- remove the guard panel (160);
- open the filter cover (162) by unscrewing the knob (163);
- loosen the nut (164) that secures the filter container to facilitate removal;
- unscrew the knob (165) that holds the filter in place and remove the external cartridge (161) from the housing.

Clean the filtering element with compressed air or water, dry and reassemble. Always make sure that the filter housing is not damaged and that all of the pipes and fittings are tightened.

The external cartridge (161) may be cleaned or washed a maximum of six times.

The external cartridge (161) and the internal cartridge (186) must be replaced every 400 hours and, in any case, at least once a year.

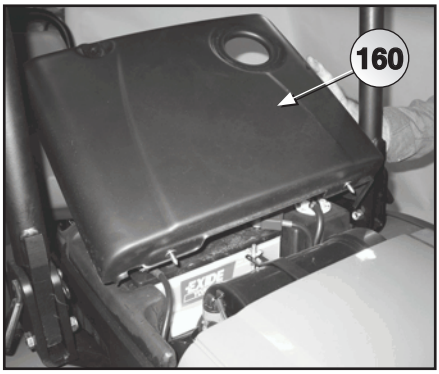


Fig. 6.19

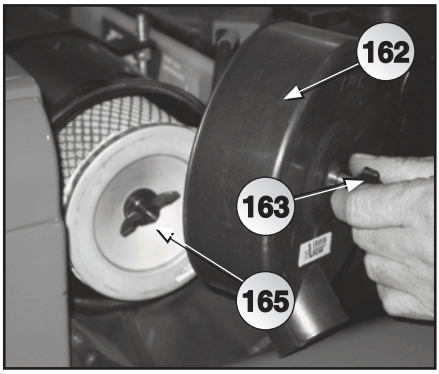


Fig. 6.20

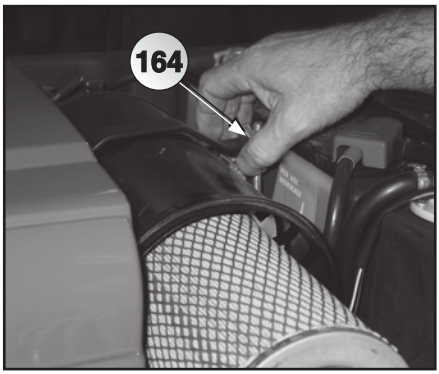


Fig. 6.21

**Condenser**

In case of work in heavy dusty environments, it is necessary to clean the condenser every 36/40 working hours, using compressed air only (to prevent the fins bending), in order to ensure the best cooler performance.

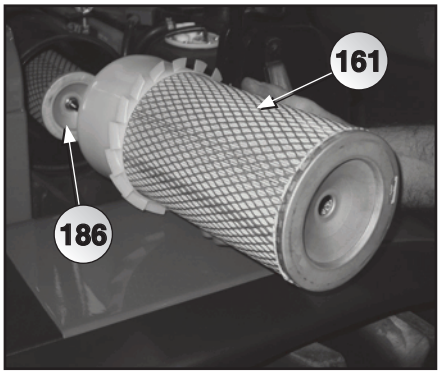


**Fig. 6.22**

# Section 9 : Tractor parts lubrication

Lubricate the various tractor parts every 50 hours, or more often depending on the environmental conditions, at the lubrication points indicated below.

| Note: |
| --- |
| After lubrication, carry out a general check of the tractor to verify that there are no oil leaks, loose parts or damage. |

Before proceeding with lubrication of these parts, clean their surfaces thoroughly and make sure that the ball bearings are free.

After lubrication has been carried out, remove all grease residues to prevent the accumulation of soil and dust.

Use AGIP GREASE SM 15 for lubrication.

| Ref. | Parts that must be lubricated | AR/Q.ty | RS/Q.ty | MT/Q.ty |
| --- | --- | --- | --- | --- |
| A | Steering joint | 2 | 4 | 4 |
| B | Front axle oscillation | 2 | 2 | 2 |
| C | Implements attachment's lower arms pins | 2 | 2 | 2 |
| D | Lifting arm pins | 2 | 2 | 4 |
| E | Three-point hitch lift (model with position and draft control only) | 1 | 1 | - |
| F | Upper shaft lift | 2 | 2 | 2 |
| G | Steering jack pins | - | 2 | 2 |

**Lubrication points (AR model)**

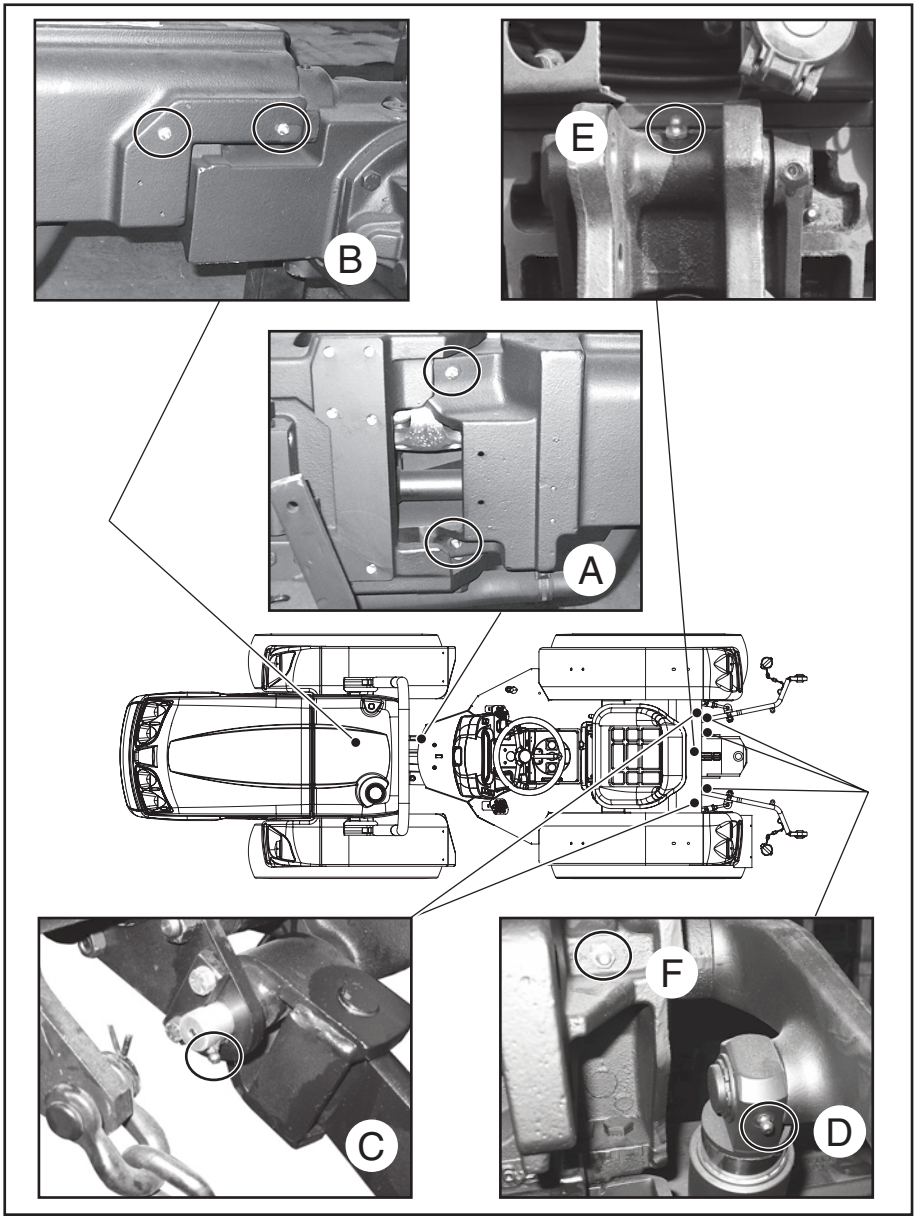


**Fig. 6.23**

**Lubrication points (RS model)**

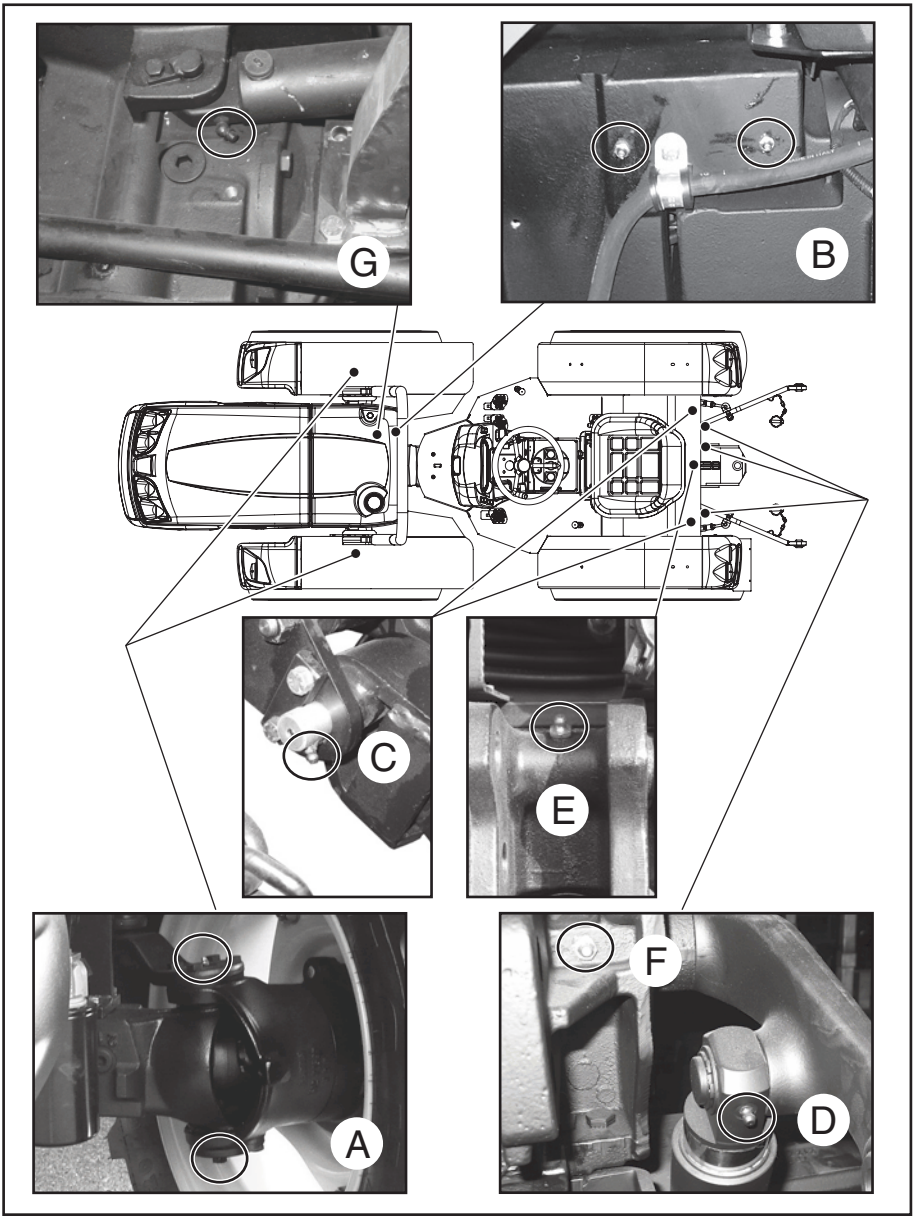


**Fig. 6.24**

**Lubrication points (MT model)**

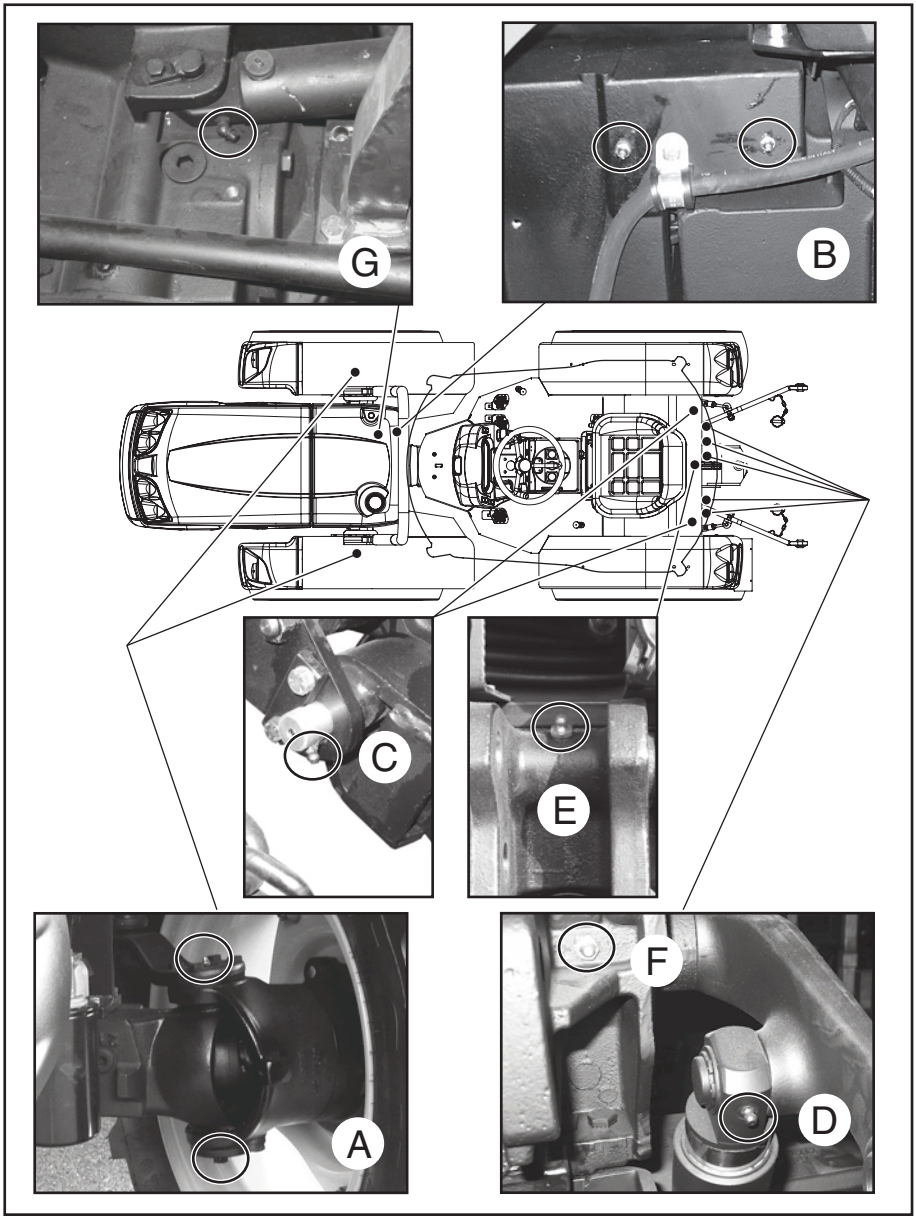


**Fig. 6.25**

## Section 10 : Front axle oil level

Regularly check the oil level in the front axle.

| Note: |
| --- |
| Before checking the oil level, let the oil settle in the transmission. |

To check the level:

- remove the plug (166);
- verify that the oil is close to the edge of the hole;
- if not, top off with **BCS POWERLUBE W13T** oil;
- replace the plug (166).

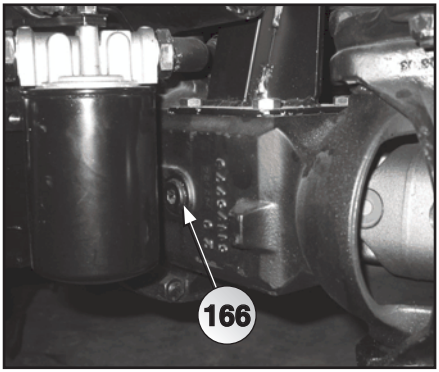


**Fig. 6.26**

## Section 11 : Reduction gears on front wheels oil level

Regularly check the oil level in the front reduction gears.

| Note: |
| --- |
| Before checking the oil level, let the oil settle in the transmission. |

To check the level:

- position the tractor so that the plug (1) is located on the horizontal center line of the tractor itself;
- remove the plug (167);
- verify that the oil is close to the edge of the hole;
- if not, top off with **BCS POWERLUBE W13T** oil;
- replace the plug (167).

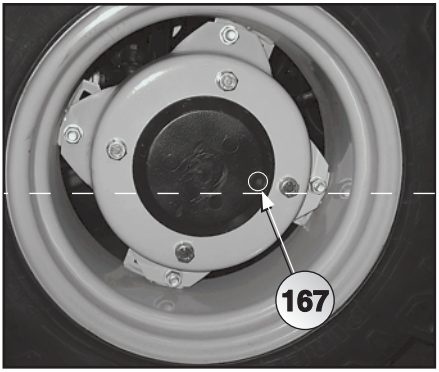


**Fig. 6.27**

## Section 12 : Gearbox and rear axle oil level

Check the oil level in the transmission units on a regular basis.

| Note: |
| --- |
| Before checking the oil level, let the oil settle in the transmission and make sure that the hydraulic lift arms are completely lowered. |

To check the level:

- remove the protective cover;
- remove the gearstick dipstick (168);
- check that the oil level is between the maximum and minimum notches on the dipstick (168);
- if this is not the case, top off with **BCS POWERLUBE W13T oil**;
- replace the dipstick (168) in the gearbox case.

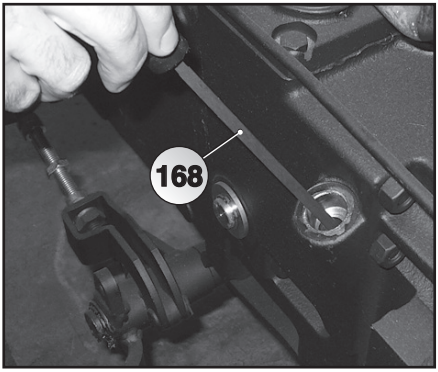


**Fig. 6.28**

## Section 13 : Tires

The tire pressure must be the same on all four tires. Therefore, periodically verify the correct inflation pressure.

The correct pressures are indicated in the table on the left.

The first value indicates the minimum pressure. The second value indicates the recommended pressure for driving on roads.

| Note: |
| --- |
| The values in the table refer to the weight of the tractor only. The inflation pressure of the tires should be increased depending on the type of implement attached. |

| | Pressure | |
| --- | --- | --- |
| Tires | bar | psi |
| 7.50-16 | 1,2 - 2 | 17.4 - 29 |
| 8.25-16 | 1,3 - 2 | 18.8 - 29 |
| 250/80-18 | 2 - 2,8 | 29 - 33 |
| 280/70-18 | 0.6 - 1.6 | 8.7 - 23.2 |
| 320/65-18 | 0.6 - 1,8 | 8.7 - 26.1 |
| 11.5/80-15.3 | 1.4 - 2,2 | 20.3 - 31.9 |
| 260/70-20 | 1 - 2,4 | 14.5 - 34.8 |
| 31x15.50-15 XTC o STG | 0.8 - 1.4 | 11.6 - 20.3 |
| 33x12.50-15 | 0,8 - 1,4 | 11.6 - 20.3 |
| 33x15.50-15 | 0,8 - 1,4 | 11.6 - 20.3 |
| 300/65-18 | 1 - 2,4 | 14.5 - 34.8 |

# Section 14 : Front axle oil change

To change:

- remove the plug (166);
- position a container under the drain plug (169) underneath the axle case;
- remove the drain plug (169) and let all of the oil in the axle drain out;
- then reinsert the drain plug (169);
- replenish the case with 6.5 lt (AR model) / 5 lt (RS-MT model) of **BCS POWERLUBE W13T** up to the edge of the plug (166);
- then replace the plug (166).

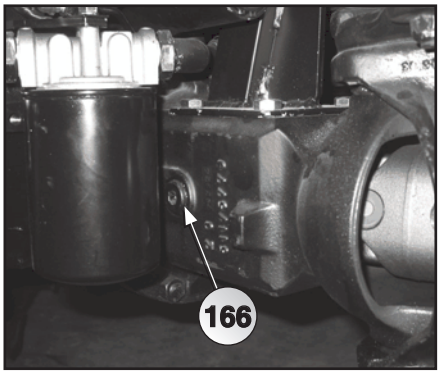


**Fig. 6.29**

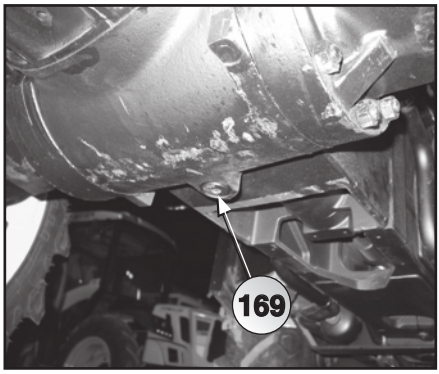


**Fig. 6.30**

# Section 15 : Reduction gears of the front wheels oil change

To change:

- position the tractor so that the plug (167 Fig. 6.31) is at the lowest point of the tractor itself;
- remove the plug (167) and let all of the oil in the reduction gear drain out;
- position the tractor so that the plug (167 Fig. 6.32) is on the horizontal center line of the tractor itself;
- replenish the case with **BCS POWER-LUBE W13T** (0.8 lt RS-MT tractor) up to the edge of the plug (167);
- then replace the plug (167).

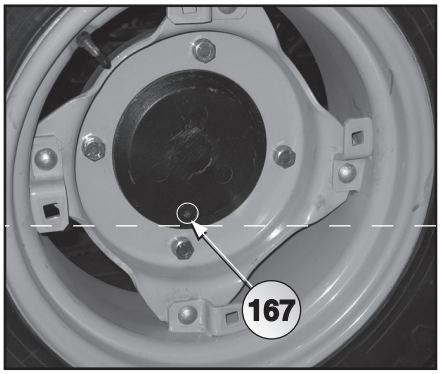


**Fig. 6.31**

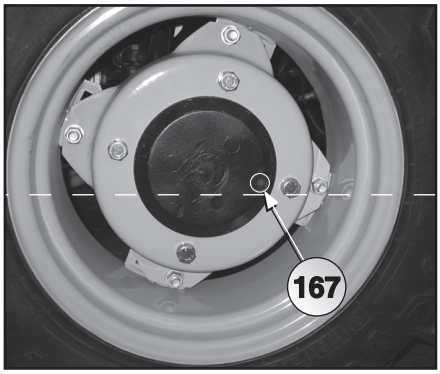


**Fig. 6.32**

# Section 16 : Rear axle oil change

| Note: |
| --- |
| Before changing the oil, let it settle in the transmission and make sure that the hydraulic lift arms are completely lowered. |

To replace:

- remove the protective cover;
- remove the gearbox dipstick (168);
- position a container under the drain plug (170) underneath the gearbox case;
- remove the drain plug (170) and let all of the oil in the gearbox drain out;
- then reinsert the drain plug (170) and the relative gasket;
- replenish the case with 14.5 lt (AR model) / 16 lt (RS-MT model) of **BCS POWERLUBE W13T** oil through the filler hole (185);
- reinsert the dipstick (168) into the gearbox case;
- start the engine and operate the hydraulic lift for a few cycles and then leave it in the lowest position;
- recheck the oil level in the case using the dipstick (168). If necessary, top off to the maximum level.

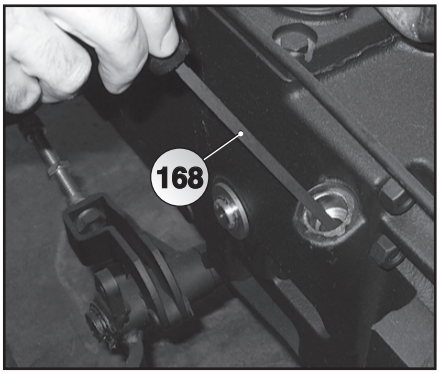


**Fig. 6.33**

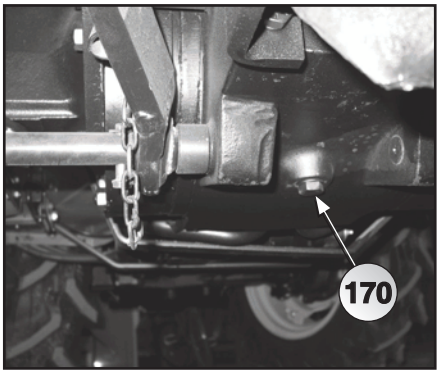


**Fig. 6.34**

# Section 17 : Air filter and hydraulic circuit filters change

The filter elements (161) (186) (153) should be replaced according to what it is described; it needs also check their efficiency whenever the warning light placed in the instrument panel (75-77 Fig.4.28 and Fig.4.29) is on.

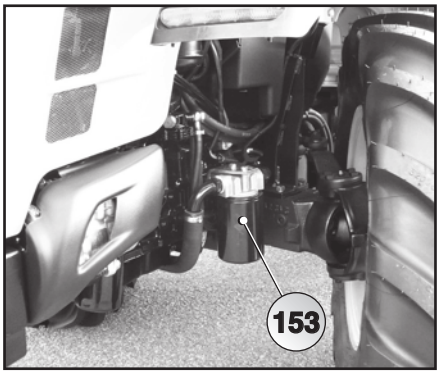


Fig. 6.35

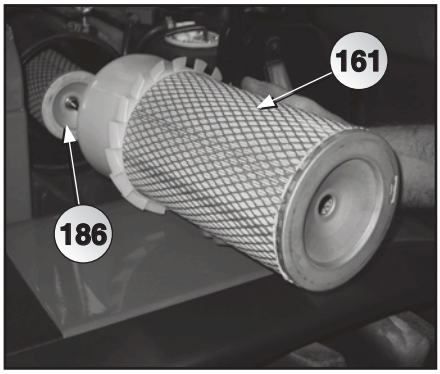


Fig. 6.36

## Sezione 18 : Cloutch

On a periodic basis, check that the empty stroke of the clutch pedal (1) is approximately 5-10 mm.

If it becomes necessary to adjust it, proceed as follows:

- tighten the nut (a) in order to restore the empty stroke;
- tighten the lock nut (b);
- if the clutch pedal stroke is excessive, it is necessary to adjust the same nut in the opposite direction, first unscrewing the lock nut (b).

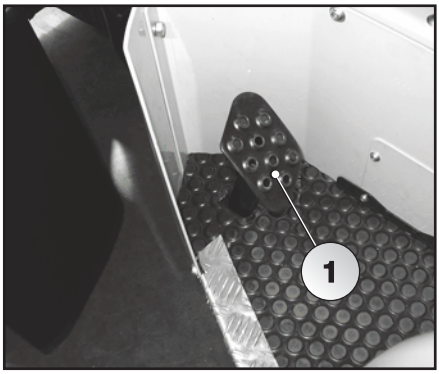


**Fig. 6.37**

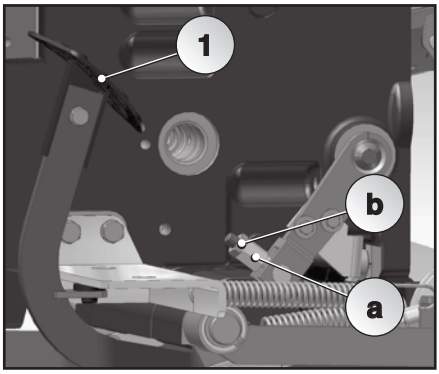


**Fig. 6.38**

# Sezione 19 : Service brakes

| ⚠ Warning: |
| --- |
| When the brakes feel loose, identify the cause and eliminate the defect immediately. |

Periodically check that the brake pedals have a slight empty stroke of approximately 20 mm.

The adjustment described below must be carried out on both tie rods of the service brakes.

- If the empty stroke of the pedals (or pedal in the AR model) is excessive, adjust the tie rods (6) using the nut (a).
- Once adjustment is complete, tighten the lock nut (b).

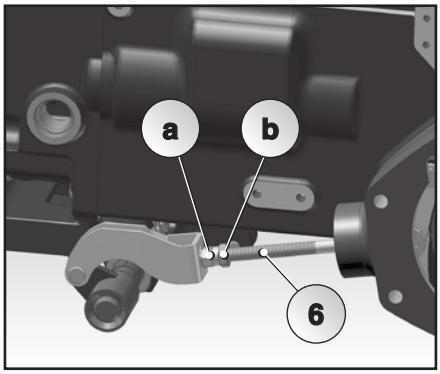


**Fig. 6.39**

## Section 20 : Extraordinary maintenance

If detailed inspection and maintenance operations become necessary such as tuning, adjustment, repair and replacement of components, contact qualified personnel. Contact your area dealer for these operations.

## Section 21 : Fuel circuit air bleeding

The presence of air in the pipes of the fuel circuit makes engine starting difficult. Air can enter the circuit when the filters and pipes are disassembled, during long periods of inactivity and when the fuel in the tank is depleted.

This operation should be carried out by qualified personnel; contact your area dealer.

| Note: |
| --- |
| Always try to keep fuel in the tank to prevent air from entering the relative engine ignition circuit. |

# Section 22 : Air conditioning system

| Note: |
| --- |
| Before checking the air-conditioning system operation, make sure that the fan knob (54) is in the off position. |

If the air-conditioning system does not work well, check the fans on the roof of the cab.

Remove the guard panel (178) and eliminate any dust from the fan with compressed air.

| Note: |
| --- |
| To carry out detailed maintenance or repairs on the air-conditioning system, contact you area dealer. |

When the air-conditioning system is not used for at least 30 days, it should be turned on each week for 10-15 minutes. This lubricates the seals and helps to prevent gas leaks from the system.

| ⚠ Warning: |
| --- |
| If there are leaks, wear protective clothing and goggles. The coolant can injure eyes. Coolant produces a toxic gas when it comes into contact with flames. |

Periodically check the tension of the compressor belt (179). If the belt has cracks or needs to be adjusted often, it, must be replaced at an authorized service center. To gain the greatest efficiency, pour the R134a cooling charge and check the system every year (starting of the warm season).


Fig. 6.40

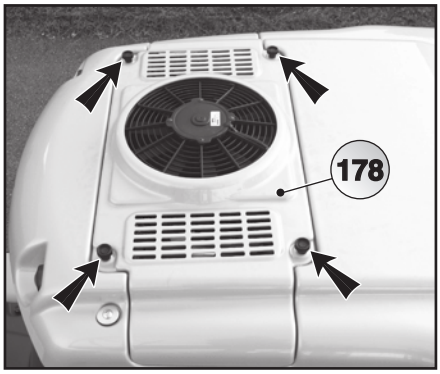


Fig. 6.41

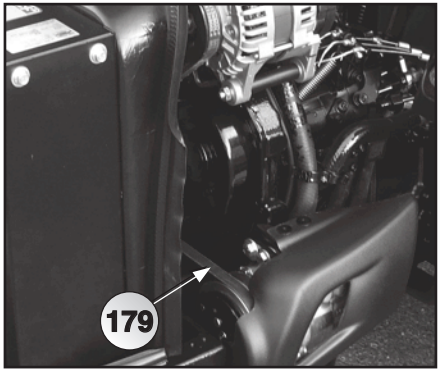


Fig. 6.42

# Section 23 : Alternator belt tension check

Periodically check the tension of the alternator belt.

To do so:

- loosen the screws (171);
- loosen the lock nut (172) on the tightener;
- move the alternator until the belt reaches the correct tension;
- tighten all of the screws and lock nuts.

| Note: |
| --- |
| If the belt has cracks or needs to be adjusted often, have it replaced at an authorized service center. |

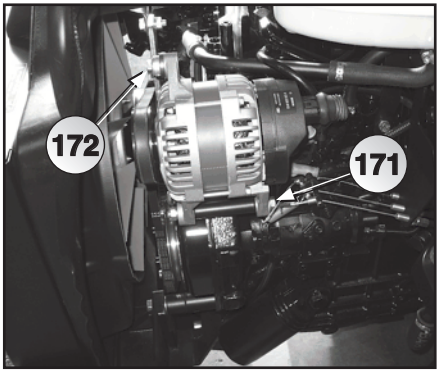


**Fig. 6.43**

# Section 24 : Air-conditioning compressor belt tension check

Periodically check the tension of the compressor belt.

To do so:

- remove the protective flanking;
- loosen the screws (173);
- loosen the lock nut on the tightener;
- move the compressor until the belt reaches the correct tension;
- tighten all of the screws and lock nuts.

| Note: |
| --- |
| If the belt has cracks or needs to be adjusted often, have it replaced at an authorized service center. |

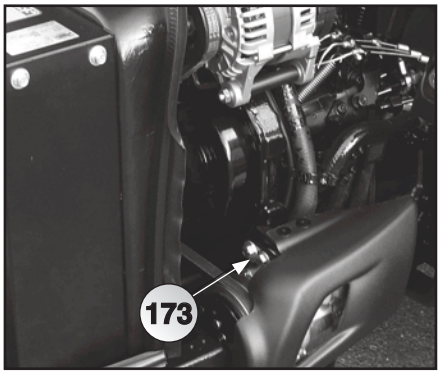


**Fig. 6.44**

# Section 25 : Cab air filter

At flexible intervals, disassemble and clean the cab air filters (116). Replace the filters every 500 hours of operation or at the most every year.

| Note: |
| --- |
| If the tractor is used in especially dusty environments, the electrically ventilated condensers must be cleaned frequently. |

| Note: |
| --- |
| If the tractor is used in especially dusty environments for long periods of time, they should be replaced more often. |

| ⚠ Warning: |
| --- |
| When using chemical products for crops, carefully follow the manufacturer's instructions. Do NOT use the cab air filter as protection against harmful chemical substances. Contact your area dealer to verify the availability of special carbon filters to reduce bad smells. |

To access the filter:

- remove the guard panel (117) by unscrewing the knob (118);
- extract the filter (116) from its housing, gripping it by the special extraction slots (119) on the sides;
- clean the filter by carefully tapping it against the palm of the hand to eliminate large granules. Then direct compressed air (maximum air pressure: 4 bar) through the filter in the opposite direction of normal air flow, from the inside to the outside keeping the nozzle at least 300 mm from the filter;
- clean the filter chamber with a damp, lint-free cloth;
- after thoroughly cleaning the filtering element, closely examine it to identify any signs of damage to the filter paper or gasket. Replace the filter with a new one if it is visibly damaged;
- correctly reassemble the filter in its housing.

The removal and cleaning of the cab filter described here applies to both filtering elements.

| Note: |
| --- |
| If the cab is washed without disassembling the air filters, be careful not to direct jets of water onto the protective grille to avoid damaging them. |

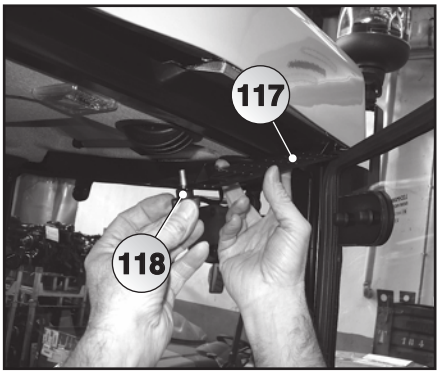


Fig. 6.45

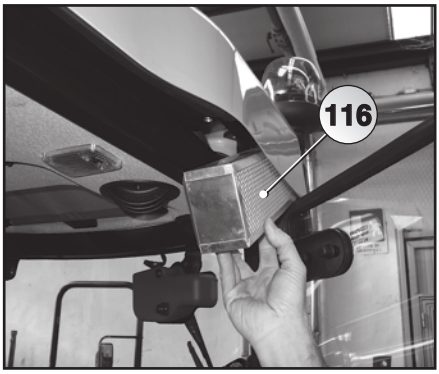


Fig. 6.46

**Activated carbon air filters**

| ⚠ Warning: |
| --- |
| Do NOT blow onto or wash activated carbon filters. |

| Note: |
| --- |
| If the cab is washed without disassembling the air filters, be careful not to direct jets of water onto the protective grille to avoid damaging them. |

The standard carbon filtering element, when new, is 99.9% effective, as determined by an ISO 5011 1988 test. The carbon filtering element filters dust and reduces odors. It therefore contributes to improving the working environment. It does not provide total protection against the spraying of chemical substances. Always follow the instructions of the substance manufacturer. If in doubt, wear protective clothing.

The carbon elements must be checked in the same way as the paper elements to verify any signs of damage to the filtering substance and the gasket. If necessary, replace them.

During this operation, a mask with a level of protection of at least FFP2 and protective clothing should be worn, suitable for the chemical substances used, especially if the element was previously used when spraying chemical substances.

Be careful when handling filters that were used when spraying chemical substances. These filters must be replaced every 250 hours or earlier if the odor of the chemical substances can be smelled inside the closed cab. Used filtering elements must be thrown into a closed container and eliminated in the same way as contaminated clothes.

For maximum performance of the paper or activated carbon filters, the tractor must be used with all of the doors and windows closed.

| Note: |
| --- |
| For long-lasting filters, use them exclusively for pesticide treatments. Disassemble and store them in a dry place after each use. |

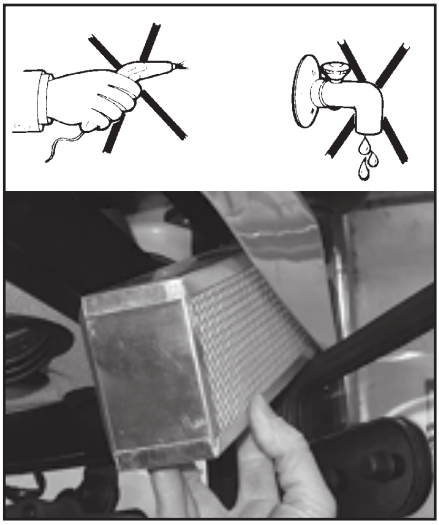

**Fig. 6.47**

# Notes

# Section 26 : Electrical system - battery

The battery (179) is located in the front. To access it, remove the guard panel (160).

The battery is maintenance free and therefore does not need to be topped off with distilled water. The top of the battery must be kept dry and clean. Periodically check that the fluid level never goes below the minimum mark.

If it must be replenished:

**⚠ Warning:**

Before recharging the battery, remember to disconnect the cables. It should be removed from its housing and should be recharged away from the tractor.

**⚠ Warning:**

During battery recharging, ventilate the room and do not approach it with sparks or lit cigarettes.

- remove the caps of the elements;
- add only distilled water to the specified level, being careful not to exceed the maximum line.

**⚠ Warning:**

Never top off the battery with sulfuric acid.

**⚠ Warning:**

The poles and terminals of the batteries and the relative accessories contain lead and lead compounds, chemical substances. Wash your hands every time they come into contact with these parts.

**⚠ Warning:**

When replacing the battery, disconnect the negative terminal first, then the positive terminal.

When fitting the battery back, connect the positive terminal first, then the negative terminal.

**⚠ Warning:**

Do not connect any other accessory to the battery.

**Note:**

In the case of frequent topping off or if the battery tends to run down, have the electrical system of your tractor checked by specialized personnel from your area dealer.

**Note:**

The batteries and the electric accumulators contain various components that can be harmful to the environment if they are not correctly recycled after use.

It is strongly recommended that all “dry” batteries that can be used in electric or electronic systems are returned to your dealer, which will guarantee proper disposal or recycling. In some countries this is required by law.

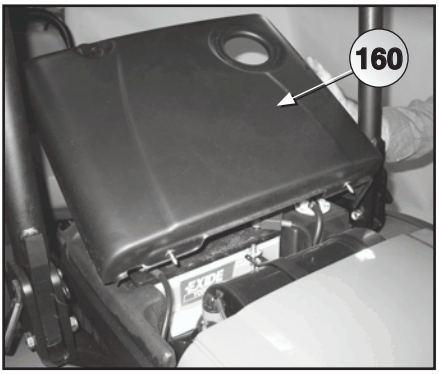


Fig. 6.48

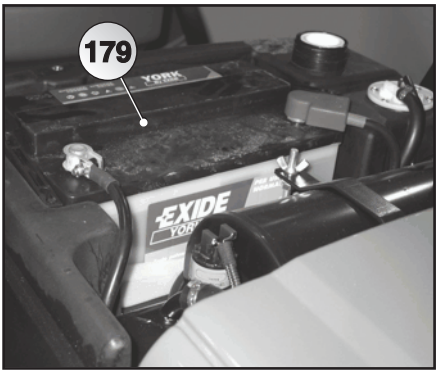


Fig. 6.49

## Section 27 : Electrical system - starter motor

The starter motor (180) needs to be thoroughly cleaned at least once a year. In particular, periodically check the state of wear of the brushes and the manifold.

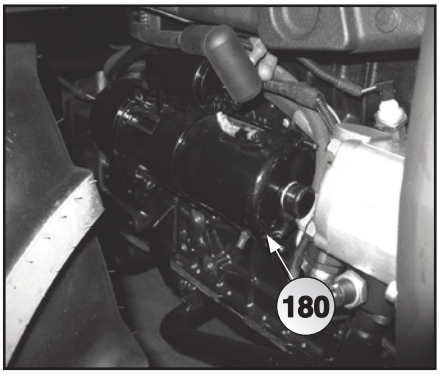


**Fig. 6.50**

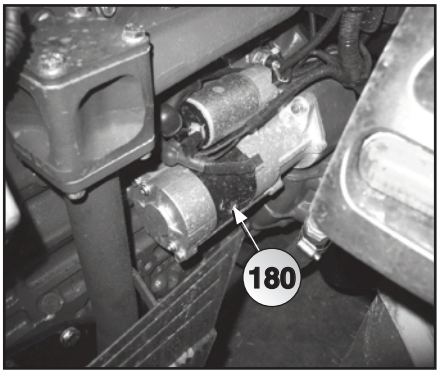


**Fig. 6.50.1**

# Section 28 : Electrical system - alternator

The alternator (181) always ensures maximum battery charge.

It does not require special maintenance since it does not have brushes, but does require a few special precautions..

1 - When the battery is installed, make sure that the ground poles of the battery and the alternator have the same mark. If the battery poles are inverted, it will short-circuit through diodes.
2 - When charging the battery, make sure that the poles correspond exactly, the positive pole of the charger with the positive pole of the battery (+) and the negative pole of the charger with the negative pole of the battery (-), to prevent damaging the diodes and the system.
3 - Never operate the alternator with the system disconnected.
If the battery is disconnected, the voltage could become too high and dangerous if someone touches the alternator output pole.
Before checking and testing the tractor, make sure that the connections are secured.
4 - Never short-circuit or ground one of the alternator poles since this would damage the electrical system.
5 - Do not invert the alternator polarity. It is extremely important that the battery ground and the alternator ground have the same polarity so that the diodes are not damaged.
6 - Never arc weld without first disconnecting the alternator cables.

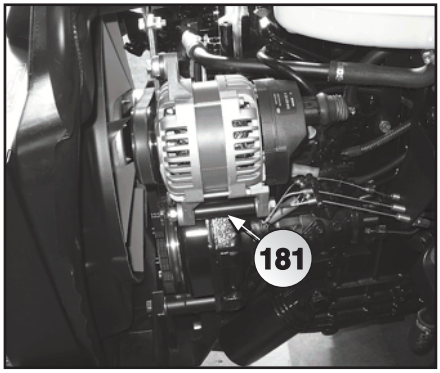


**Fig. 6.51**

# Section 29 : Electrical system - fuses

The tractor electrical system is protected against short circuits and excessive current absorption by fuses.

The main fuses (183) are located on the right-hand side of the dashboard, just under the chassis. To access them, remove the guard panel (182).

The tractor power circuit is protected by a special fuse (Fp) located at the front just under the hood (version with cab).

Fuse (Fp) 60 A - power circuit

| Note: |
| --- |
| Before replacing a fuse with a similar one, the causes that created the problem should be identified and repaired. |

The cab electrical system is protected against short circuits and excessive current absorption by fuses.

The fuses (184) are located on the roof of the cab itself.

| ⚠ Caution: |
| --- |
| If fuses must be replaced, only use ones with the same characteristics as those indicated in the following table. |

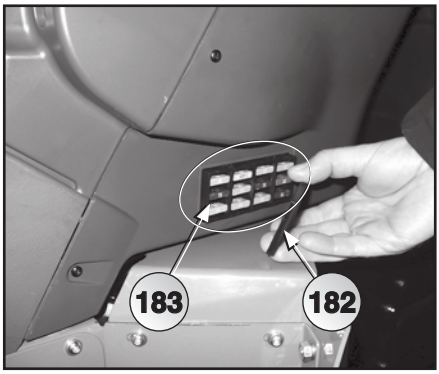


**Fig. 6.52**

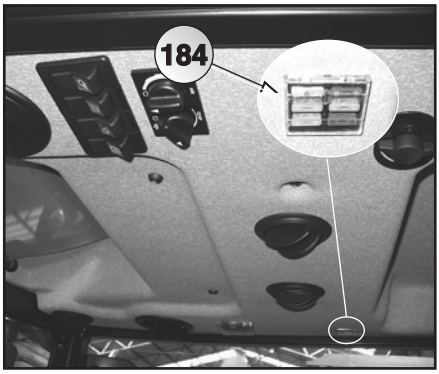


**Fig. 6.53**

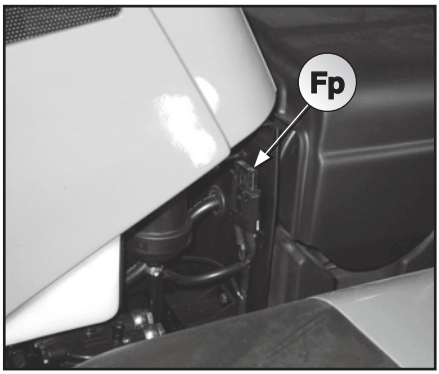


**Fig. 6.54**

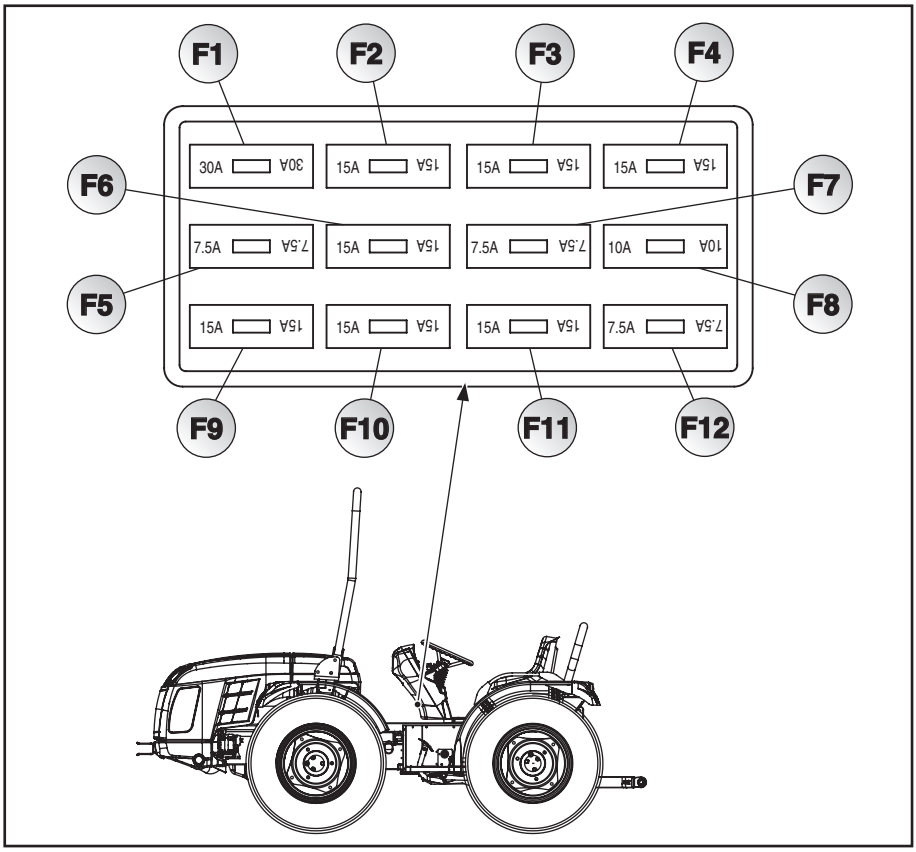


**Fig. 6.55**

| | | |
|---|---|---|
| F1 | 30 | General fuse |
| F2 | 15 A | Full beam headlights |
| F3 | 15 A | Dipped headlights |
| F4 | 15 A | Front right and rear left position lights, rear work light, license plate light |
| F5 | 7.5 A | Left front and right rear position lights |
| F6 | 15 A | Horn |
| F7 | 7.5 A | Turn signals |
| F8 | 10 A | Differential lock and PTO solenoid valves, PTO engagement relay |
| F9 | 15 A | Brake lights |
| F10 | 15 A | Emergency lights and instrument panel power (+15) |
| F11 | 15 A | Auxiliary electrical outlet and instrument panel power (+30) |
| F12 | 7.5 A | Engine stopping, preheating timer |

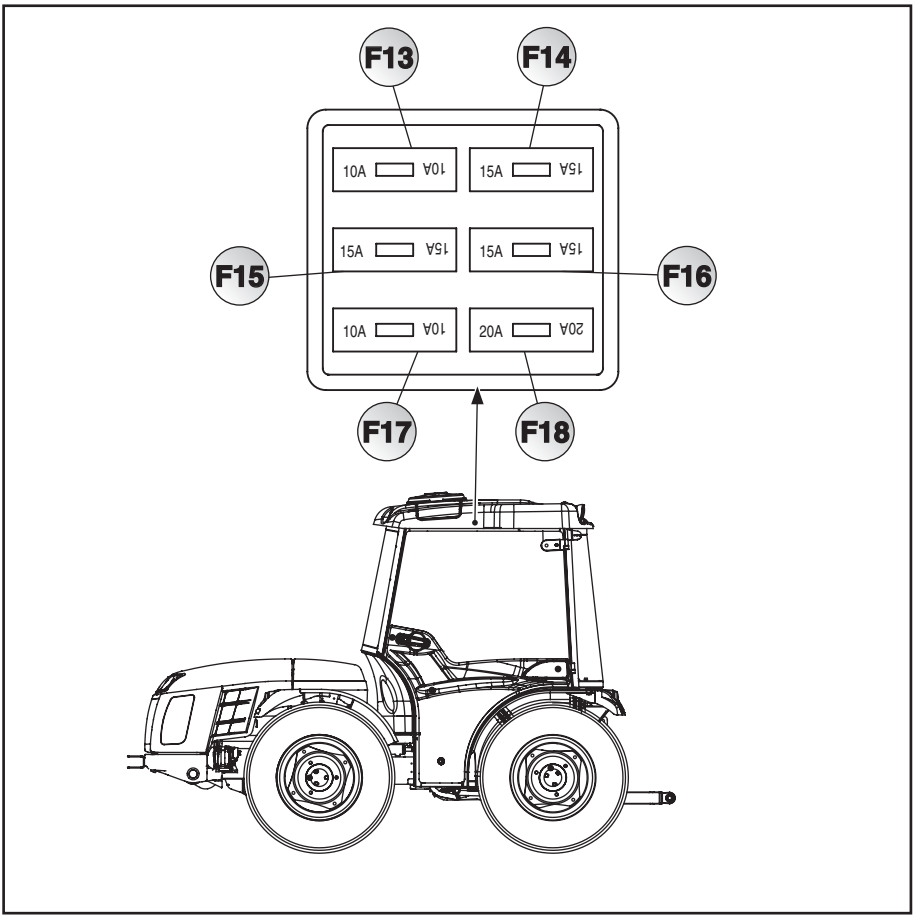


**Fig. 6.56**

| | | |
|---|---|---|
| F13 | 10 A | Rotating light, radio, courtesy light |
| F14 | 15 A | Rear windshield wiper motor |
| F15 | 15 A | Front work lights |
| F16 | 15 A | Rear work lights |
| F17 | 10 A | Front windshield wiper motor |
| F18 | 20 A | Internal ventilation |

# Section 30 : Electrical outlet for trailer

On the rear of the tractor there is a 7-pin electrical outlet (34) for connecting the electrical system of the trailer (lights system).

| ⚠ Warning: |
| --- |
| Remove the ignition key before making the electrical connections. |

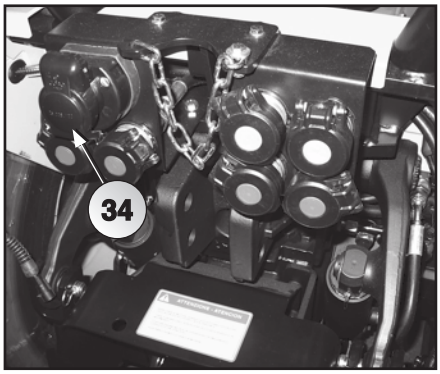


**Fig. 6.57**

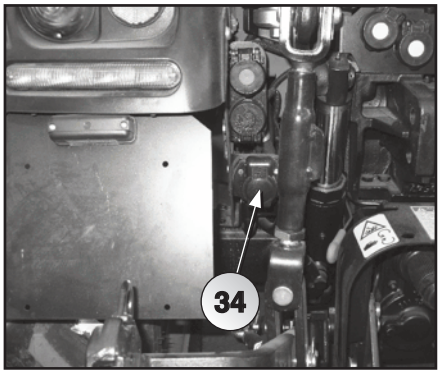


**Fig. 6.57.1**

# Section 31 : Lights - bulb replacement

To replace the bulbs:

- open the engine hood;
- loosen the airtight guards that lock the bulb into place;
- disconnect the bulb connectors and remove the bulb itself.

Fig. 6.58

**Front lights:**

| | |
|---|---|
| Position lights | 5W |
| Turn indicators | 3W |
| Dipped beams | 55W |
| Headlight main beams | 55W |

**Tail lights:**

| | |
|---|---|
| Position lights | 5W |
| Turn indicators | 3W |
| Brake lights | 21W |
| Licence plate light | 5W |
| Field light | 55W |
| Field light on cab | 50W |

# Section 32 : Extensive non-use of the tractor

When your tractor must remain unused for longer than one month, take the following precautions:

- place the tractor in a dry protected environment;
- protect the engine by observing the directions in the relative instruction booklet;
- drain the water from the radiator and the engine;
- lubricate all of the parts with lubricators;
- clean the fuel filter;
- remove the injectors, place a little engine oil in the cylinders, rotate the engine by hand, and then reassemble them;
- carry out general cleaning of the tractor and especially the body components. Protect painted parts by applying silicone wax and lubricate the unpainted metal parts. Place the tractor in a covered dry and, if possible, ventilated room;
- make sure that all of the controls are in neutral (including the electrical switches);
- do not leave the ignition key in the switch;
- make sure that the shafts of the cylinders (power steering, lift, etc.) are in the inclined position;
- empty the diesel tank and fill it with new diesel up to the maximum level;
- remove the battery, wipe off the lid and cover the terminals with Vaseline. Then place the battery in a ventilated room where the temperature does not go below 10°C, protecting it from the sun;
- check thecharge using a voltmeter and, if necessary, recharge it;
- arrange stands or other supports under the axles to keep the wheels suspended. With the tractor raised, the tires should be deflated. Otherwise, periodically check the tire pressure;
- perform general lubrication;
- cover the tractor with a cloth, avoiding waterproof material (oilcloth or plastic) because it tends to retain humidity, encouraging the formation of rust.

When non-use is finished, follow the operations below:

- remove the protective cloth;
- if the tractor was raised onto stands, inflate the tires to the specified pressure and then lower it to the ground;
- restore the engine to use by observing the directions in the relative user and maintenance manual;
- recharge the battery and reinstall it on the tractor.

| Note: |
| --- |
| When your tractor must remain unused for longer than one month, take the precautions at section 5: User regulations. |

# Section 33: Extraordinary maintenance

Only qualified personnel should carry out detailed inspection and maintenance work, for example registration, adjustment, repairs and replacement of components. Contact your nearest dealership for information.

# Section 34 : Troubleshooting

The following information will help you to identify and correct some of the more common faults and malfunctions.

**Engine**

| *Fault* | *Cause* | *Remedy* |
|---|---|---|
| The starter motor fails to operate | Main fuse damaged | Replace the fuse |
| | Discharged battery | Recharge or replace the battery |
| | Tarnished battery terminals | Clean the terminals and smear Vaseline grease over them |
| | Starter motor damaged | Replace the starter motor |
| | Ignition switch damaged | Replace the switch |
| | Battery disconnector switch in the “off” position | Turn the switch “on” |
| | Engine cowl opened | Close engine cowl |
| The engine don't start | No fuel in the tank | Check the fuel level |
| | Fuel filter clogged | Clean or replace the filter |
| | Air in the fuelling circuit | Bleed the air from the fuel system |
| | Glow plug preheater fuse damaged | Replace the fuse |
| | Faulty fuel injectors | Address to the care service of the engine manufacturer |
| | Fuel unsuitable for the operating temperatures | Use the correct type of fuel for the temperature conditions |

| Fault | Cause | Remedy |
|---|---|---|
| The engine functions badly or switches off | Polluted fuel system | Clean the system |
| | Faulty fuel injectors | Address to the care service of the engine manufacturer |
| Black smoke from the exhaust pipe | Dirty or defective injectors | Address to the care service of the engine manufacturer |
| The engine overheats (engine coolant temperature indicator light (red) on) | Radiator clogged | Clean the radiator |
| | Radiator fluid level low | Top up the level of the fluid in the radiator |
| | Faulty thermostat | Check the thermostat |
| | Faulty temperature gauge or indicator | Address to the care service of the engine manufacturer |
| | Worn or loosened fan belt | Check the belt stretcher. Replace the belt if worn |
| | Engine oil level low | Top up the oil level |
| Oil pressure low (engine oil pressure indicator (red) on) | Oil of the wrong type or viscosity | Stop the tractor immediately. Drain out the oil and fill with oil of the correct type and viscosity |
| | Engine oil level low | Stop the tractor immediately. Top up the oil level |
| | Faulty lubrication system | Address to the care service of the engine manufacturer |
| The engine fails to reach its maximum power | Engine overloaded | Engage a lower gear or reduce the load |
| | Air filter clogged | Clean the air filter |
| | Implement badly regulated | Consult the implement instruction manual |

If you are not able to identify the trouble reason, address to the care service of the engine manufacturer.

**Electrical system**

| Fault | Cause | Remedy |
|---|---|---|
| No current in the electrical circuit | Main fuse damaged | Replace the fuse |
| | Discharged battery | Recharge or replace the battery |
| | Tarnished battery terminals | Clean the terminals and smear Vaseline grease over them |
| | Battery disconnector in the “off” position | Turn the switch “on” |
| The battery fails to recharge (red alternator indicator light on with the engine running) | Worn or loosened alternator belt | Check the belt stretcher. Replace the belt if worn |
| | Faulty alternator | Contact your area dealer |
| | Faulty electrical system | Contact your area dealer |
| | Faulty battery | Replace the battery |

Call your area dealer if you are unable to find the cause of a fault.

**Hydraulic circuit**

| Fault | Cause | Remedy |
|---|---|---|
| The hydraulic circuit fails to function correctly | Oil level low | Top up the circuit |
| | Oil filter element clogged | Replace the filter |
| | Faulty hydraulic circuit | Contact your area dealer |
| The hydraulic oil overheats | Oil level too high or low | Top up the oil level |
| | Oil filter element clogged | Replace the filter |
| | Faulty hydraulic control valves | Contact your area dealer |

Call your area dealer if you are unable to find the cause of a fault.

**Hydraulic power lift**

| Fault | Cause | Remedy |
|---|---|---|
| The implement fails to lift | The implement is heavier than the maximum capacity of the power lift | Unhitch the implement.<br>Before hitching another implement, make sure that its characteristics are compatible with those of the tractor. |
| | Transmission oil level low | Top up the oil level |
| | Oil pressure too low | Contact your area dealer |
| | Hydraulic pump damaged | Contact your area dealer |
| The implement lowers too fast | The lowering governor valve is not closed to a sufficient extent | Adjust the valve with the knob to obtain the best speed |
| The implement lowers too slowly | The lowering governor valve is not open to a sufficient extent | Adjust the valve with the knob to obtain the best speed |

Call your area dealer if you are unable to find the cause of a fault.

**Clutch**

| Fault | Cause | Remedy |
|---|---|---|
| The clutch fails to release correctly (the gears are difficult to engage) | Clutch incorrectly regulated | Use the adjuster nut |
| | The clutch is worn | Contact your area dealer |

Call your area dealer if you are unable to find the cause of a fault.

**Brakes**

| Fault | Cause | Remedy |
|---|---|---|
| The tractor fails to brake correctly | Brakes incorrectly regulated | Contact your area dealer |
| | Worn brake lining | Contact your area dealer |
| The hand brake fails to brake correctly | Hand brake incorrectly regulated | Contact your area dealer |

Call your area dealer if you are unable to find the cause of a fault.

**Wheels and steering system**

| Fault | Cause | Remedy |
|---|---|---|
| Tyres worn unevenly | Tyre pressure too low | Inflate the tyres to the correct pressure |
| Steering wheel excessively stiff to turn | Oil pressure too low | Contact your area dealer |
| The tractor fails to maintain the direction of the steering wheel | Air in the hydraulic circuit | Contact your area dealer |
| | Hydraulic cylinder seals worn | Contact your area dealer |
| The tractor fails to turn | Oil pressure too low | Contact your area dealer |
| | Hydraulic pump damaged | Contact your area dealer |
| | Defective power steering system | Contact your area dealer |

Call your area dealer if you are unable to find the cause of a fault.

# Notes

**BCS S.p.A**
Viale Mazzini, 161
20081 Abbiategrasso (Milano)
info@bcs-ferrari.it

**www.bcsagri.it**

*P/N: F0907170207 - Ed. 05/2014*