

Operator's Manual
HP | **MF400Xtra**
65-100

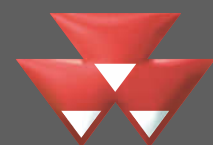
Tractors

Models: MF 425, MF 435, MF 440, MF 445 and MF 455

6280530M1 - 03/10



INNOVATION - COMMITMENT - PROXIMITY - VISION - RELIABILITY - LEADERSHIP - SUPPORT - TECHNOLOGY



MASSEY FERGUSON

**OPERATOR INSTRUCTION
BOOK
MF 400Xtra**

6280530M1

03/10

Operation Manual - MF 400Xtra

Tractor models applied:

MF 425, MF 435, MF 440, MF 445 and MF 455

Platform versions (Fig. 1) and with cab (Fig. 2)

CONGRATULATION!

You have just acquired a modern, strong, reliable and unique tractor.

The 400Xtra Series tractors are the result of research, improvements and a large experience in industrial and agricultural equipment manufacturing.

These tractors were designed to be operated in many different work conditions, showing an excellent performance, low fuel consumption and operational comfort.

Please carefully read this Manual before operating the tractor for the first time and also before performing any maintenance in the equipment. So you will be assuring the best performance and a long working life for your tractor.

At the Technical Delivery, please make sure the Dealer provides you all the necessary information. Besides the Genuine Replacement Parts, appropriate tools and factory trained personnel, only the Authorized Dealer can provide you reliable Technical Services.



Fig. 1



Fig. 2

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This publication was prepared according to the international standard ISO3600 concerning information, content and layout of operator manuals supplied with tractors and agricultural and forestry machines.

Operation Manual - MF 400Xtra

Dear Owner

- 1 - Always keep this Manual in perfect conditions and present it to the technician at the Dealer that attended you in order to note all Warranty Maintenance date.
- 2 - Please carefully read Chapter 1 for Safety procedures.
- 3 - The Warranty will only be valid if the tractor's Delivery Certificate is properly registered in AGCO do Brasil Services and Warranty Department.
So, make sure that your Dealer fills out the Delivery Certificate for your tractor.
- 4 - Tractor's Technical Delivery
It will be performed by a professional at your Dealer.
See the booklet attached to this Manual, where general important information of your interest.
 - ✓ Service Instructions.
 - ✓ Delivery Instructions.
 - ✓ Delivery Certificate.
- 5 - Changes in the tractors
Due to its policy of constant improvement for its products, AGCO do Brasil reserves the right to introduce changes and improvements in its products, without incurring in any liability or obligation for previously manufactured products.
In the same way, the content of this Manual is updated until the date of its printing and may be changed without previous notice.
- 6 - Many illustrations in this Manual are shown with covers, protections and components removed for a better comprehension. However, never operate the tractor with these parts removed.
- 7 - Some pictures may contain different details in relation to the ones showed in your tractor, since they have been taken from prototype tractors or tractors configured with accessories not present in your tractor.
- 8 - Massey Ferguson Original Parts
The use of parts other than MF original parts may result in a reduced performance of your your tractor and also affect some other components.
AGCO do Brasil will not be liable for any responsibility derived from the usage of non-original parts. In case such non-original parts are used during the Terms of the Warranty, the tractor's Warranty will be voided.
- 9 - Due to the great number of variables in the working conditions, it is not possible for AGCO to contemplate all detailed or definitive instructions on its Publications about the performance or usage methods of its machines, neither AGCO will be responsible for eventual losses or damages arising from such statements or any misstatement or omissions. If the tractor is used in abnormal conditions - as working in deep water - consult your Massey Ferguson Dealer for special instructions. Otherwise the Warranty will be voided.
These tractors are designed only for usage in regular agricultural operations (designed usage). Any use other than the above stated will not be AGCO do Brasil responsibility: these are solely the user's responsibility.
- 10 - The accomplishment and the observance, of the usage conditions, maintenance and servicing as stipulated by AGCO do Brasil are the fundamental basis for the "designed usage".
- 11- We do insist that these tractors be operated, maintained and repaired only by personnel familiarized with their respective characteristic and safety rules.
So, we strongly recommend that the Customer contacts the nearest Dealer for any problem or question related to the equipment's maintenance or setup.

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1. Safety Instructions

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1. Safety Instructions



1. Safety Instructions

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1 - Introduction

The purpose of this manual is to enable the owner and driver to drive the tractor safely and properly. If the instructions are carefully observed, the tractor will be in operation for many years, following Massey Ferguson's tradition. The configuration and the tractor setup at the Dealer will assure that these operational and service instructions will be correctly understood.

Always contact a Dealer if any part of this Manual is not fully understood. It is essential that these instructions are fully understood and observed.

The daily maintenance must become a routine. Always keep a record of the equipment's service hours.

When requesting new parts, use only MF original parts. MF Dealers network supply original parts and can provide you installation and use instructions. The use of low quality parts can cause severe damages to your equipment.

It is recommended to the customers to purchase service parts only at authorized MF Dealers.

Due to the variation on the operational conditions, it is impossible for the manufactures to make a comprehensive or a definitive statement on its publications related to the performance or ways of use for its equipments, nor be responsible for any damage or losses resulting from such statements, or inaccuracy or omission.

To avoid the possibility of voiding the warranty, consult your MF Dealer about special instructions, if the tractor is to be operated in special conditions, which can be harmful for the equipment (operation in deep waters or swamps, for example). These tractors were designed for use in agricultural applications only (proper use). Any other use will be consider as irregular.

AGCO will not be liable for personal injuries or damages to the equipment resulting from misuse. It will be totally the user's responsibility the consequences for all misuse of the equipment.

The unrestricted commitment and adherence to the operation, services and maintenance requirements, as per specified by AGCO, are considered essential factors for the proper use.

These tractors must be operated and serviced only by qualified personnel, familiarized with the tractor's characteristics and also with the safety rules and regulations (accident prevention).

It is recommended that the customers contact an MF Dealer in case of any after sale problem and for any setup which may be required.

1. Safety Instructions

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2 - General recommendations

Why is safety so important?

- 1 - Accidents can lead to disabling personal injuries or death.
- 2 - Accidents usually impose onerous costs.
- 3 - Accidents can be avoided.

This Manual describes safety procedures and recommendations related to the tractor, however it does not specify the details about the care with the accessory coupled and/or actuated by the tractor. Therefore, see the Manual of the accessory used.

This Section of the Manual aims to point out some basic safety situations related to your tractor, as well as some suggestions about how to avoid risk and accident situations.

Therefore, the user must be provided with all necessary means and orientation available. For each accessory and working situation, there is always a number of care that must be taken, which makes impossible to list all of them in this Manual.

It is impossible for AGCO do Brasil to make a direct control over all use situations, maintenance or service to which the tractor is submitted to. Therefore, it is the user's responsibility to observe the proper practices aiming his/her safety and the tractor integrity, and also the safety of other people or equipment at the same working area.

3 - The Tractor

The tractor is a source of mechanic and hydraulic power.

- The tractor alone has little practical value. Only when used along with an implement or other accessory, it becomes a work unit.
- This Manual has been compiled to cover the safety practices when the tractor is operating under normal conditions.
- This manual does not address the operation instructions relevant to all implements and accessories known that can be installed at the tractor delivery or any other date.
- It is essential that the operator read and understand the manuals of the relevant implements and accessories.

4 - Symbols and Safety Terms

The following symbol means: ATTENTION! BE AWARE! YOU MAY BE IN DANGER!



The symbol for safety alert identifies important safety messages in machines, safety boards, manuals, etc. When you see the symbol, be aware for potential injuries or death. Follow the instructions in the safety message.

Whenever you see one of the words and symbols below, used in this Operator's Manual and decals, you must be pay careful attention to the instructions, once they are directly connected to your personal safety.



WARNING:

Indicates an immediate hazardous situation which, if not avoided, will result in DEATH OR SERIOUS INJURY.



CAUTION!

Indicates a potential immediate hazardous situation which, if not avoided, will result in DEATH OR SERIOUS INJURY.



CAUTION:

Indicates a potential hazardous situation which, if not avoided, may result in minor or moderate injury.

The following words and instructions are not directly related to personal safety, but they are not used by this manual bringing you additional tips about operation and service of this equipment.



IMPORTANT:

they identify special instructions or procedure which, if not carefully observed, can result in damages or destruction to the equipment, the operational process or even to objects nearby.



NOTE:

It indicates additional information about some subject or procedure that will make the operation or repair more convenient or efficient.

1. Safety Instructions

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5 - Notes to the operator

It is your responsibility to read and understand the Safety Section in this Manual, before using the equipment. You must follow the safety instructions which will guide you step by step during your working journey.

Remember that you are an essential part to make the operation of the machine safe. Good safety practices not only protect you, but also the people near you. Carefully read the safety instructions herein and include them in your safety program.

Remember that this Safety Section was specially designed for this equipment. Follow all usual and habitual safety precautions and, above of all else, REMEMBER THAT YOUR SAFETY DEPENDS ONLY OF YOU. YOU CAN PREVENT ACCIDENTS.

6 - Follow a safety program

6.1 - For a proper operation

For a proper operation of the tractor, it must be operated by qualified and authorized staff. In order to be qualified, you must understand the instructions delivered in this Manual, receive proper training and know the safety standards and rules related to your work. For example, some traffic rules determine that people underage 16 years old are not allow to operate agricultural machines. In other locations, the law determines that only 18-year-old people are allowed. The tractors are part of this category. It is your responsibility to know such rules and obey them.

These regulations include, but they are not limited to, the following instructions for a safe operation:



CAUTION!

The operator must not drink alcoholic drinks or substances that may affect his consciousness or coordination. If the operator is taking prescription drugs or over the counter drugs, he must see a doctor in order to check if his ability to operate the machine may be impaired by such drug.



CAUTION:

If any implement or kit used has a manual, identify if there is other important safety information.

Observe the following instructions:

- DO NOT allow children or people non qualified for the job operate the tractor. Keep people away from the work area.
- Always use the safety belt.
- Whenever possible, avoid operating the tractor near ditches, barriers or holes. Reduce the speed in curves, when going up or down hills or on rough, slippery or muddy surfaces.
- Avoid very steep hills.
- Pay careful attention to where you are going to, mainly at the end of aisles, roads or when operating near trees.
- The instructor's seat must be used for short periods only.
- DO NOT allow children on the instructor's seat.
- DO NOT give ride to anyone on the machine or implement, unless there is a proper instructor's seat.
- The implement must only be coupled to the steering rod or to the coupling points recommended and never above the central line of the rear shaft.
- Operate the tractor slowly and carefully - with no maneuvers, sudden starts or sudden breaking. When the tractor is stopped, engage the parking break. Lower the implement and take the starting key from the ignition.
- DO NOT change or remove any part from the equipment and DO NOT use accessories that are not suitable for the tractor.

1. Safety Instructions

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7 - Protective Structure Against Overturn (PSAO)

The tractor has been mounted with a PSAO (Fig. 3) or cab and a safety belt. PSAO is effective to reduce potential harms or injuries during the overturn if the safety belt is being used correctly. Do not operate the tractor with the PSAO removed.

Before using the tractor, make sure that the PSAO or cab are not damaged, and that they are safely fixed to the tractor and, if the portable type is installed, make sure it is in the extended position and safely locked.

If for any reason, the PSAO has been folded, it must return to the extended position as soon as the conditions allow.

Do not mount additional components to the PSAO or cab, such as chains, ropes or cables with the purpose of pulling something, because it may cause displacement or damages to the PSAO.

Always use the safety belt, adjusting it properly (Fig. 4), except when operating the PSAO retracted. Check the safety belt for damages regularly. Damaged safety belt must be replaced.

The PSAO or cab must be inspected for damages regularly. Any damaged component must be replaced before the tractor is operated. If the PSAO is damaged during an overturn or damaged by the impact from any object that provokes deformation must be replaced. Do not try to repair a damaged PSAO.

NEVER weld or puncture the PSAO or structure of the cab, for any reason, because it may lead to failures and reduction on the protection for the structure.

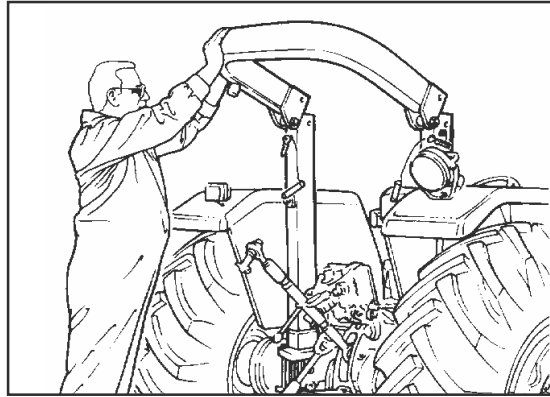


Fig. 3



Fig. 4

8 - Preparing for a safe operation

8.1 - Know your equipment

Know your tractor, know how to operate every equipment of your machine and the implements and accessories it uses. Know all functions of all controls, gauges, instruments and commands. Know the rated load capacity, the speed range, the breaking capacity and the steering characteristics of the machine, besides the turning radius and operations clearances.

Remember that rain, snow, gravel, soft soil, etc. may affect the tractor operation.

Under bad conditions of operation, drive slower and be more careful. Engage the front drive, if equipped. Study the safety decals for DANGER, WARNING, PRECAUTION or CAUTION located on the tractor, in addition to the information decal.

READ THIS MANUAL BEFORE STARTING THE ENGINE. STUDY IT BEFORE STARTING WORKING (Fig. 5). IF YOU DO NOT UNDERSTAND ANY INFORMATION IN THIS MANUAL, ASK SOMEBODY TO EXPLAIN TO YOU.

This Manual covers all generic safety practices for agricultural tractors. It must always be kept in the tractor. If additional copies of this Manual are required, contact your MF Dealer.

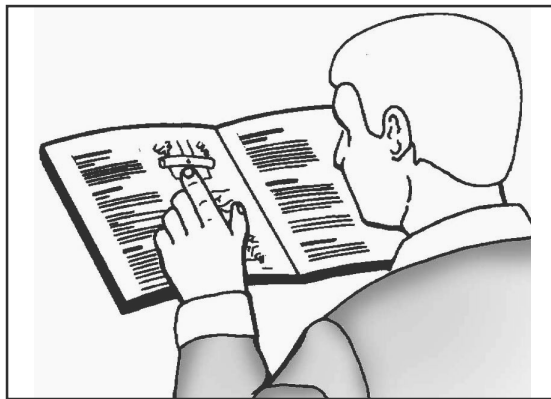


Fig. 5

8.2 - Protect yourself

Use equipments and protective clothing appropriate for your work. 6). Do not take risks.

You will need:

- A protective hard hat.
- Protective goggles or masks.
- Ear protection.
- Respirator or filter mask.
- Special clothing for cold weather.
- Reflective clothing.
- Heavy gloves (neoprene for chemicals or leather for heavy duty).
- Boots.

DO NOT wear loose clothing, jewel, or any other item that might

get caught in the controls or other parts in the tractor. Also, tie your hair if it is long.



Fig. 6

1. Safety Instructions

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Note the position of fire extinguishers and first aid kits (Fig. 7) and be aware of where to find assistance in case of an emergency. Know your equipment well and know how to use it.

8.3 - Use the safety and protection devices available

Keep all the protection devices in the position and properly attached. Make sure that all protections and covers are properly installed, as specified, and in good conditions.

In order to keep you and other people safe, the tractor must be equipped with:

- Safety belt.
- PTO protection.

According to the type of operation, the tractor may also need:

- Rearview mirror.
- Fire extinguisher.
- Safety triangle, protections, reverse gear alarm, lighting and additional safety decals.

It is very important to know how to use the tractor safety devices. Make sure they are in the position and in good conditions. DO NOT remove or disconnect any safety device.

8.4 - Check the equipment

Before starting your working day, reserve some time to check your equipment and make sure all systems are in good operational conditions.

- DO NOT smoke while refilling the tractor. Keep away from flames (Fig. 8).
- Stop the engine and wait it cools before refilling the tractor.
- Check for damaged, cracked, loose or missing parts. Keep all parts in good condition. Make sure all guards, protections and covers are in place.
- Check the safety belt for damages regularly. If the belt is damaged, it must be replaced.
- Make sure the implements and accessories are correctly installed and that the tractor PTO speed and implement are correct.
- Check the condition and calibration of tires (absence of cuts and bulges). Replace damaged or worn tires. Check if the parking break and pedal are working correctly. Adjust them if necessary.

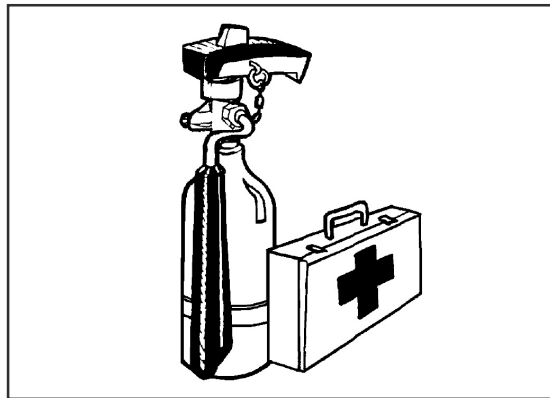


Fig. 7



Fig. 8

- Make sure the safety devices of the PTO shaft are locked.
- Make sure that the PTO protection and the shaft protections are in place and working properly.
- Check the hydraulic system of the implement and tractor. Repair or replace damaged or missing parts.

1. Safety Instructions



CAUTION!

Pressurized hydraulic fluid or diesel leak can penetrate in your skin and cause severe personal injuries, blindness or even death. Pressurized fluid leaks may not be visible. Use a carton board or wood to find the leaks. **DO NOT** place your hands directly to the equipment. Always wear protective goggles. If the fluid penetrates in your skin, it must be surgically removed within a few hours by a physician familiarized with such procedure (Fig. 9).

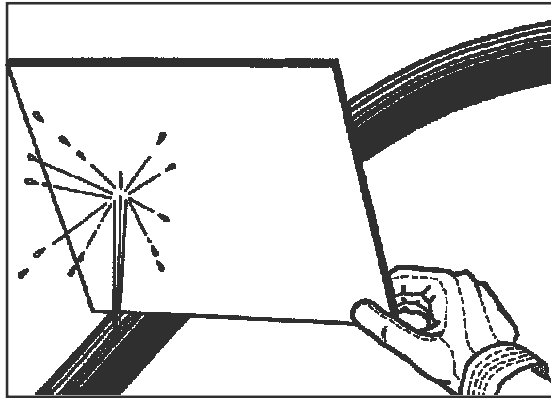


Fig.9

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Before applying pressure to the fuel or the hydraulic system, make sure that all connections are well fit and all tubing, pipes and hoses are in good conditions. Before disconnecting the hydraulic or fuel lines, relieve all pressure. Make sure that all hydraulic lines are correctly installed and without bents.



CAUTION!

The cooling systems accumulate pressure as the engine warms. Before removing the radiator cap, stop the engine and wait the system cool down.

8.5. Tractor cleaning

- Keep the working surfaces and engine compartments clean.
- Before cleaning the machine, always lower the implements to the ground level, set the transmission to neutral, engage the parking brake, stop the engine and remove the starting key from the ignition.
- Clean the steps, the pedals and operator platform. Remove the grease or oil. Clean all dust or mud off. In the winter, remove the snow or ice. Remember: slippery surfaces are dangerous.
- Remove and store the tools, chains or hooks.

8.6 - Protect the environment

It is illegal to pollute sewer, brooks or soil. The waste must be sent to authorized places, away from urban or preservation areas. Furthermore, the dirty oil removed from the tractor must be packed in proper containers before being disposed. If you have any question, see the local authorities.

1. Safety Instructions

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9. Tractor maintenance

- DO NOT make any repair or maintenance service with the engine running or still hot, or with the tractor in operation (Fig. 10).
- Before making adjustments or repair the electric system, disconnect the battery cables: first, disconnect the negative (-) cable.
- To prevent fire or explosions keep flames away from the battery or from the cold start devices. To prevent sparks, that can cause explosions, use jumper cables according to the instructions in this manual.
- When performing repairs or adjustments, it is recommended to contact a Massey Ferguson Dealer so the work can be performed by trained personnel.
- The implement and/or tractor must be placed on wood blocks or proper stands, NEVER on a hydraulic jack.
- Check all nuts and bolts for tightening periodically, mainly the hub wheel nuts and the wheel ring nuts. Fasten them according to the specified torque.



Fig. 10

10 - Start

10.1 - Alert before the start

Before starting the engine, walk around the tractor and the implement coupled. Make sure there is nobody under, on or near the machines. Tell people near the tractor you will start it soon. Do not start the tractor while there are people around the tractor, implements or towed equipment.

Make sure all pedestrians, mainly children, are at a reasonable distance before starting the engine.

10.2 - How to get on and get off the machine safely

Always adopt the “three-point contact” with the machine and keep a front position when getting on it. The three-point contact means both hands and one foot or one hand and two feet in contact with the machine, all the time, when getting on or off it. Clean your shoes and wash and dry your hands before getting on the machine. Use the handrail. Hold the handrails and always use the stairs or steps when getting on or off the machine.

DO NOT use the control levers as a handrail and never step on the pedal controls when getting on or off the machine.

DO NOT try to get on or off when the tractor is running. DO NOT jump off the tractor, unless it is an emergency.

10.3 - Safe start



IMPORTANT:

Before starting the engine, make sure there is enough ventilation. DO NOT start the engine in closed environments. The smoke from the engine may cause suffocation.

Always start the engine from the operator seat with all transmission levers in neutral and the PTO lever in neutral.

Make sure all the brake pedals are always locked by the locking device, except when in maneuvers in the field which requires the independent use of brakes. Make sure the brakes are properly regulated, so that both brakes are engaged at the same time.

1. Safety Instructions

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Adjust the seat, put on the safety belt, engage the parking brake and set all controls to neutral before starting.



WARNING!

Start the engine with the starting key and always sitting on the operator seat. NEVER try to start the engine by a direct start.

The machine will start engaged if the safety switch circuit is turned. This may cause severe injuries or death if there is someone near the tractor (Fig. 11).



Fig. 11

10.4 - Follow the start procedures recommended

Follow the start procedures recommended in the Operation Section in this Manual. Such procedures include normal start, cold start and the usage of boost fluids.

10.5 - Test the controls

After starting the machine, check all meters and lights again. Make sure everything is working properly. If the tractor does not respond correctly when every control is activated, DO NOT use the machine until the problem is solved. Make sure engine start solenoid cover is always in place.

10.6 - Start fluid



CAUTION!

It is very important that you read and follow all the instructions on the ether can before installing the ether base cold start aid in the tractor.

For tractors equipped with glow plugs or preheating system, these pieces of equipment must be removed before installing an ether start device.

DO NOT use aerosol packages of start fluids in tractors equipped with the reheating system connected to the electrical system. Ether combined with the preheating system may cause explosions, damaging the engine, provoking injury to whoever is handling it or both.

Handle the start fluid correctly. The start fluid must only be used when the ether start aid is used as original default equipment or when installed as accessory by the Dealer.



Fig. 12

1. Safety Instructions

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If start fluid aerosol cans or ether start aid is used, the preheating system must be disconnected. Remove the cable from the preheating system unit that is found in the intake manifold. Use isolating tape on the cable end to avoid short circuit.

- DO NOT try to activate the controls if you are not on the operator's seat.
- Before getting off the tractor, always disengage the PTO, lower the accessories and the implements to the ground, set the tractor to neutral, engage the parking brake, stop the engine and remove the key from the ignition.

11 - Safe operation



CAUTION!

An unbalanced tractor can overturn and cause serious accidents.

Make sure the counterweights in the front frame, the wheel weights and wheel ballasts are used according to the manufacturer's recommendations. DO NOT add extra weight to make up for an overloaded tractor. It is recommended to reduce the load. Keep all your limbs inside the operator compartment while operating the tractor.

11.1 - Do the correct movements

Make sure the tractor is ready for the work to be done. Know its rated load capacities and never exceed the numbers. Make sure that the equipment or implement used DO NOT exceed the tractor load capacity. Make sure the tractor PTO and the implement PTO are compatible.

Remember that the tractors normally operate on rough, unpaved or bumpy surfaces. The operating conditions can reduce the weight quantity that you can carry or tow.

11.2 - Safety practices

- Operate the controls carefully. Do not turn the steering or make sudden movements to activate other controls.
- DO NOT get on or off the tractor when it is in operation. Hold the steering wheel with both hands and firmly.
- Make sure there is enough room in all directions, for the tractor and the implement as well.
- DO NOT play with the tractor or equipment. They must be used for the purpose indicated only.

Be alert! If anything breaks down, get loose or fail in the equipment, stop working, inspect the machine and make the necessary repairs before starting the operation again.

Be careful with pedestrians

Be attentive to what is going on around you. DO NOT allow not trained or not qualified operate the tractor. They can cause serious accidents.



WARNING!

DO NOT give ride on the machine or implement (Fig. 13).

DO NOT allow that other people ride the implement or other equipment, such as wagons, except for some cropping equipment which are specially designed for passengers during the cropping operations (not during transportation). There must be some space in such equipment, so such type of transportation can be done safely. DO NOT allow children on the tractor.



Fig. 13

1. Safety Instructions

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- Make sure you can control both the machine speed and the steering before starting it. Move the machine slowly until everything is working properly. After the start, check the steering angle again - to the right and to the left. Make sure you can move the machine both to the right and to the left and can control the machine completely. If the differential is blocked, DO NOT operate or maneuver the tractor in high speed until the differential is unlocked.
- DO NOT lift objects that do not fit in the bumper. Purchase the correct equipment.
- DO NOT lift loads over other people.
- Keep people away from the working area. DO NOT allow other people to stay or pass under an implement lifted (Fig. 14).
- If a charger is used, avoid sudden stops, starts or maneuvers, or sudden changes of direction. Keep the loads close to the ground during the transportation.
- NEVER stop (or allow other to stop) in front of, under or behind loaded equipment or or equipment being loaded. DO NOT drive the tractor towards someone standing in front of a fixed object.
- Keep people away from the yokes, couplings, steering rod, lift arms, PTO driving parts, cylinders, belts, pulleys and other moving parts. Keep all protections and guards in their places.

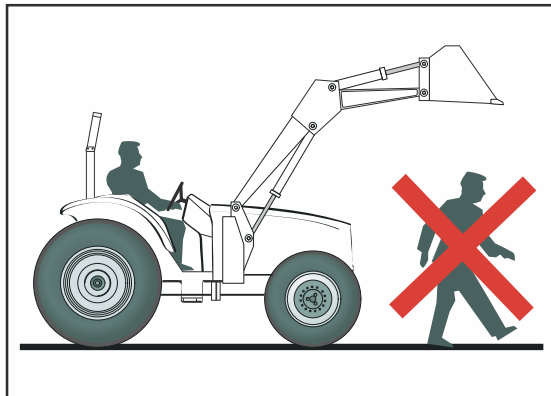


Fig. 14



CAUTION!

DO NOT stand nor allow anyone to stand between the tractor and the implement, unless the engine is off, the parking brake is applied, the transmission is in Neutral and all accessories are lowered to the ground level.

11.3 - Overturn risk

If a tractor equipped with PSAO overturns, hold the steering wheel firmly and DO NOT try to get off the seat until the tractor stops completely and DO NOT leave the operator's seat until the tractor stops completely (Fig. 15). If the cab doors are blocked, leave the tractor through the rear window or roof hatchway.

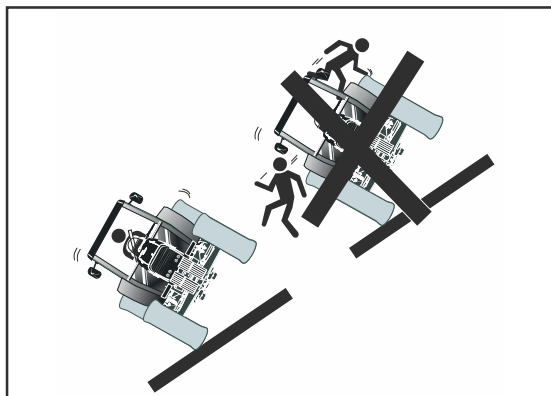


Fig. 15

1. Safety Instructions

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Do not operate near ditches or sand banks. The distance to the obstacle must be equal or bigger than the total height of the subject in question (Fig. 16).

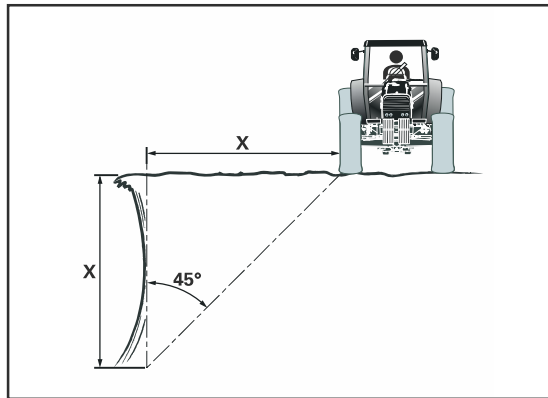


Fig. 16

11.4 - To avoid rear overturn



CAUTION!

Coupling in the rear shaft or any other point above the steering rod can cause rear overturns.

- ✓ DO NOT apply traction to any implement or accessory through the arm of the 3rd point, or any other point on the rear shaft of above. Use steering rods approved by Massey Ferguson only and use a pin with the correct size to lock the steering rod in place.
- ✓ Couplings in high positions can cause rear overturn which can result in serious accidents or death. Couple loads to the steering rod only.
- ✓ Use steering rods with 3-point engagement only when fasteners are used to keep it in the lowered position.
- ✓ Use front counterweights to improve the tractor stability when carrying heavy loads or to counterbalance the weight of a heavy implement at the rear part of the tractor.
- ✓ Start moving the tractor slowly and increase the speed gradually. DO NOT engage the reverse gear or release the clutch fast. If the tractor is coupled to a heavy load or an stationary object, using the clutch improperly can cause overturn.
- ✓ If the tractor front starts rising, reduce the speed and, if necessary, release the clutch.
- ✓ If the tractor gets stuck in mud or snow, DO NOT try to move forward because the rear wheels can skid and the tractor can overturn. Lift any coupled implement and try to MOVE IN REVERSE GEAR. If not possible, tow the tractor using another vehicle.

- ✓ Tractors with or without implements coupled to the rear must be maneuvered and go down slope ground forward.
- ✓ Tractors with front loaders must be maneuvered and go up slope ground forward. Keep the loader as close to the ground as possible.
- ✓ Always keep the tractor engaged when going down hills. DO NOT go down hill with the clutch disengaged and the transmission in neutral.

11.5 - To avoid lateral overturn

- ✓ Adjust the wheel gauge to a wider setting more suitable for the job being done.
- ✓ Lock the brake pedals with the locking device before using the transportation speeds.
- ✓ Reduce the speed to adjust it to the operating conditions. If the tractor is equipped with a front loader, load the bumper and the load to lowest level possible.
- ✓ Use lower speeds when making turns.
- ✓ Do not move loads by traction which are too heavy for the tractor capacity, because the load can fall off the tractor and go down the hill or the tractor may skid and hit the load being towed.

1. Safety Instructions

1

- ✓ Do brake suddenly. Apply the brake smoothly and gradually.
- ✓ On downhill, use the accelerator to reduce the tractor speed and use the same speed range to go up hills. Engage the gear before going down the hill.
- ✓ Engage the four-wheel drive (if equipped). This will cause braking the four wheels.



CAUTION!

DO NOT disengage the clutch or try to shift gears after beginning to go down the hill.

- ✓ It is less probable that the tractor overturns if you just go up or down sloping terrains by avoiding crossing them.
- ✓ Whenever possible avoid sloping terrains. If not possible, avoid holes when going down sloping terrains. Avoid stubs, stones, obstacles and rough areas when going up sloping terrains. Keep the tractor away from the border line when working near ditches and ravines. Avoid ditches, embankments that may fall or come down.
- ✓ When it is necessary to drive on sloping terrains, avoid turning on the top of the ground. Reduce the speed and make a turn with a large open circle. Drive on a straight line on sloping terrains and never cross them. Keep the heavier end of the tractor turned to the top of the ground when going up and going down sloping terrains.
- ✓ When crossing sloping terrains with implement mounted laterally, keep the implement on the slope side. Do not lift the implements. Keep them as close to the ground as possible when going up, going down or crossing sloping terrains.
- ✓ When towing load in transportation speed or in the field, lock the steering rod in the central position and use the safety chain.
- ✓ NEVER use the tractor to gather animals.

11.6 - Generic risks during the operation

- Make sure the PTO protection is installed when the PTO shaft is not in use.
- Before engaging, disengaging, cleaning or adjusting implements activated by the PTO, disengage it, stop the engine, remove the ignition key and make sure the PTO shaft is stopped.
- Make sure all PTO protections are in place and observe all the safety plates (Fig. 17).
- Make sure there is nobody near the machine before starting the PTO. For PTO stationary operations, always put the transmission in neutral, engage the parking brake and put shim on the tractor's and implement's wheels.
- When operating moving equipment by the PTO, DO NOT leave the tractor's seat until the PTO is disengaged, the transmission is in neutral, the parking brake applied and the engine is stopped and the key off the ignition.



Fig. 17

1. Safety Instructions

1

- DO NOT use adaptors, reducers or extensions with the PTO, once those components extended the coupler and universal joint in addition to the protection provided by the PTO.
- The arm of the 3rd point and the leveling arms must not be extended above the point where the threads begin to be displayed.



WARNING!

DO NOT try to disconnect the hydraulic connections or adjust the implement with the engine running or with the PTO activated. Failure to observe those instructions may cause serious injury or death.

- When using chemical substances, follow the manufacturer's instructions for use, storage and the appropriate places for disposal. Also follow the manufacturer's instructions for the applying the substance.
- When operating with little visibility or in the dark, use the tractor's lights for operation in the field and reduce the dislocation speed (DO NOT use the service lights when driving on roads, because those lights may be illegal in some locations - except when used as reversing light, because they make the drivers get mixed up.)
- Operate the tractor with wheels in highest gauge setting possible, according to the job being done. To adjust the wheel gauge, consult the Maintenance and Adjustment section.
- Reduce the speed when operating on rough or slippery grounds or when leafage obstruct the view.
- DO NOT make cornering at high speed.

11.7 - Points about ergonomic behavior

- Before starting the operation, adjust the seat for your comfort. Make the adjustment considering the operations to be performed.
- The tractor seat has been evaluated ergonomically to allow the maximum comfort during the maneuvers, but you need to adjust the seat considering your height and position, in relation to the operator.
- Changing positions during the operation in relation to the steering wheel will decrease fatigue. Try to hold the steering wheel with both hands while driving.
- That hand must operate the manual accelerator, like any other lever, with palm facing the tractor center, with the thumb point upwards.

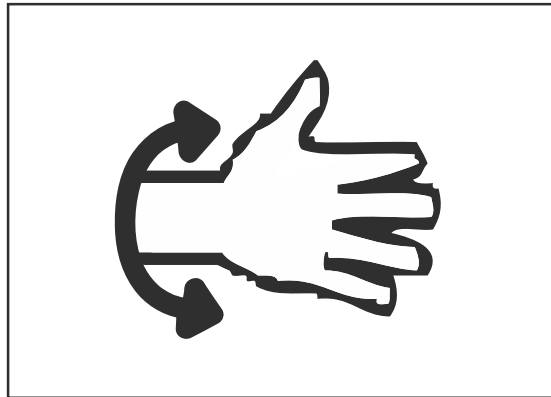


Fig. 18

- Try to have a break every 2 hours and make some stretching exercises, as shown below.



Fig. 19

12 - Additional implements and equipment



ATTENTION!

The front loader (bumper or forks) must be equipped with a proper restriction device to avoid the load (parcels, fence poles, wiring, etc.) from falling off the arms over the operator's compartment, smashing the driver when the loader is lifted. Misattached object may fall and hurt pedestrians as well.

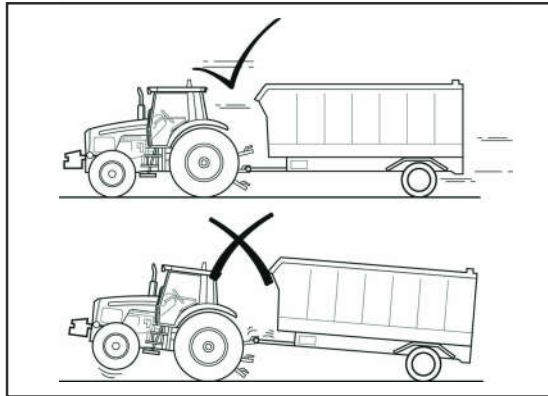


Fig. 20

1

- Implements mounted on the three point tow and lateral implements make an arch much bigger when the equipment towed is maneuvered. Keep enough space for the maneuvers. Use equipment approved by Massey Ferguson only.
- When using accessories or implement with the tractor, read the Manual of the respective accessory or implement attentively and follow the safety instructions. Use equipment approved by Massey Ferguson only.
- DO NOT overload the accessory or equipment towed. Use proper counterweights to assure the tractor's stability. Couple loads to the steering rod only.
- A safety chain will help you control the equipment towed if they disengage accidentally from the steering rod during the transportation. With the help of proper adaptors, couple the chain to the tractor steering rod support or another place specific for this purpose. Just leave a small play in the safety chain for maneuvers. Use a safety chain with power equal to or higher than the gross weight of the machine towed.
- Tow the implement through the steering rod. The towing by coupling to other places can make the tractor overturn (Fig. 18).

1. Safety Instructions

1

12.1 - Towing equipment

Towing equipment has no brakes, do not operate:

- With speeds above 32 km/h (20 mile/h); or
- With speeds below the recommended ones by the manufacturers; or
- When the tow is completely loaded, with weight above 1.5 t (3300 lb) and/or 1.5 times the tow weight.

Towing equipment has brakes, do not operate:

- With speeds above 50 km/h (51.50 km/h); or
- With speeds below the recommended ones by the manufacturers; or
- When the tow is completely loaded, with weight above 4.5 times the towing equipment weight.
- With speeds above 40 km/h (25 mile/h) when the tow is completely loaded, with weight above 3 times the towing equipment weight.



NOTE:

The tractor requires the installation of braking equipment suitable for the tow used.

The stopping distance increases with the speed and weight of the loads towed and on hill and sloping terrains.

Loads towed with or without brakes, which are too heavy for the tractor or towed too quickly, may cause the loss of control over the equipment. Consider the equipment total weight and its load.

13 - Transportation on roads

BEFORE operating the tractor on public roads, some precautions must be taken:

- Know and observe the traffic rules relevant to your machine.
- Lock the brake pedals with the locking device.
- Lift all implement to the transportation position and lock them in this position.
- Set all the implements in the lowest transportation setting.
- Turn off the tractor PTO and disengage the differential lock.
- Make sure all the hazard warning lamps are in place and working.
- Clean all the front and rear traffic lamp reflectors and make sure they are working properly.
- Make sure both the tractor and the implements are equipped with safety triangles for slow vehicles and other marking materials to improve the visibility on the road, if the law requires (Fig. 19).

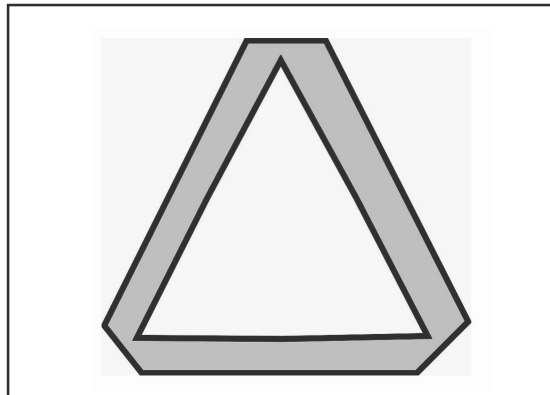


Fig. 21

1. Safety Instructions

1

13.1 - Road rules

When operating the tractor on public roads, some precautions must be taken:



ATTENTION!

NEVER allow people to ride on the equipment towed or mounted.

- Know the tractor route well.
- Use the hazard flasher when driving on roads, day and night, except when forbidden by law.
- Take care when towing loads in transportation speeds, mainly if the equipment towed has NO brakes.
- Observe all local or federal rules regarding the tractor speed.
- Take care when transporting equipment on slippery roads or covered with snow or ice.
- Wait till the vehicle traffic stops to enter the road.
- Take care with intersections or crossroads because they impair the visibility. Reduce the speed till you have a good road visibility.
- DO NOT try to surpass other vehicles in intersections or crossroads.
- Reduce the speed in curves.
- Make the maneuvers and open curves slowly.
- Use signal when you intend to reduce the speed, stop or turn.
- Shift the gear before going up or down sloping terrains.
- Keep the tractor engaged. DO NOT go down hill with the clutch disengaged and the transmission in neutral.
- Do not disturb the traffic of vehicles.
- Drive in the correct lane, keep as close as possible to the curb.
- If the traffic gets heavier behind you, pull over and let the vehicles pass.
- Drive defensively. You must be able to foresee what the other drivers are going to do.
- When towing load, start braking beforehand and reduce the speed gradually.
- Be careful with obstacles such as trees, etc.
- Make sure the load is not covering the hazard lamps or any other lamp.

14 - Safety after operation

Stop the tractor completely, engage the parking brake, turn off the PTO and put all gear shift levers in neutral, lower the equipment to the ground, turn off the engine and remove the key from the ignition BEFORE leaving the operator seat.



WARNING!

Remove the starting key from the ignition if nobody stays in the tractor.

1. Safety Instructions

1

15 - Fuel

15.1 - Storage, handling and cleaning

The fuel purity and cleanness are vital for the good operation of the engine and durability of the injection system.. So, in order to assure the fuel complies with the requirements, follow the recommendations below:

- 1 - Use reservoirs equipped with 2 taps, one on each end. Prefer plastic reservoirs. In case of metallic reservoir, use stainless steel reservoirs or with suitable internal coating, not made of zinc, because it contaminates the fuel, which affects the life of the injection system and engine.
- 2 - Never use galvanized pans, tanks, clocks or tubes, because the coating reacts with diesel producing residues.
- 3 - The drum or reservoir in use must be protected from sun, rain and dust. It should be supported by stands and in the horizontal position, with a light inclination, so that the draining side is around 10 cm higher in relation to the other side. Thus, the water and impurities will be deposited in the bottom, from where they will be drained by the tap of the opposite end.
- 4 - The reservoirs should have a breather, protected from water penetration, located on the higher end.
- 5 - Ideally, it should be used two drums with capacity to store fuel for a week each. After the filling, the oil must rest for 2 or 3 days for depositing the impurities on the bottom. Thus, while one rests, the other is being used.
If bigger tanks are used, there must be a upper cover (1) for cleaning, with a diameter of at least 40 mm.
- 6 - The tank filling point (2) must have easy access and minimum diameter of 65 mm. If there is a tube, it must finish 15 cm from the bottom and equipped with a filter. The cover must be equal to that used in tanks in vehicles.
- 7 - A breather with a minimum diameter of 80 mm, with a protective filter (5) must be installed on the upper part of the tank.
- 8 - The vehicles filling output (3) must be installed in the highest side of the drum at 80 mm from the bottom.

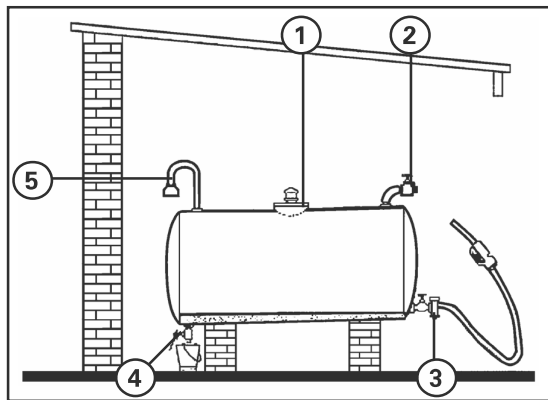


Fig. 22

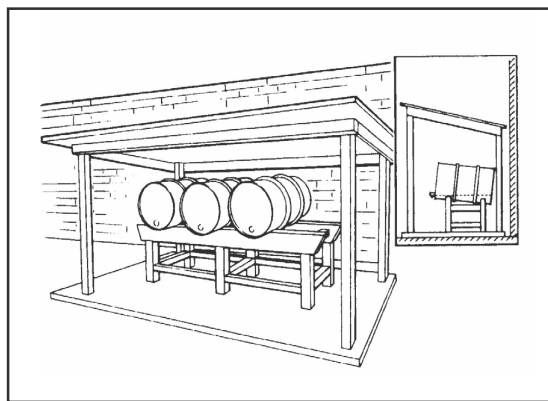


Fig. 23

- 9 - The height must be enough for filling be done by gravity, and the cover for the filling nozzle must allow access for cleaning.
- 10 - The fuel deposited on the lower part if full of impurities and must be drained once a week through the drain (4) installed on the bottom, before refilling the tank. Do not discard this fuel, it can be used for other purposes, such as wash parts, tools, etc.
- 11 - A graded rod can be adapted to the upper cleaning cover (1) to measure the fuel level.
- 12 - The tank must be emptied and clean once a year.
- 13 - To fill the vehicle or transfer diesel to another container, always use a funnel with a thin screen (mesh 80). Always use funnels, containers or pump completely clean. Never use shop cloth or shop rags, because the lint can adhere to the parts and get in contact with the fuel.

1. Safety Instructions

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- 14 - Fill the tractor always at the end of each work day. This will avoid that, during the night, the moisture inside the tank(s) condensate and turn into water, contaminating the fuel, which when reaching the pump and the nozzles would cause irreparable damages.
- 15 - Before handling fuel, clean the area around the filling cover. If the original cover is lost, replace by another original one. Tight it firmly.
- 16 - The drums must be stored under a protective shelter in order to prevent from entering, and they must have a light inclination to the water to flow out the upper border. The fuel drums must not be stored for long periods.
- 17 - Drums stored without protective shelter must have the plug firmly threaded to prevent water from entering.
- 18 - Under no circumstance add other types of fuel to diesel oil. This increases the risk of fire or explosion. In closed containers, as a fuel tank, this mixture is more explosive than pure gasoline. Mixing diesel with alcohol is not recommended, because it impairs the proper lubrication of fuel injection system.
- 19 - Build the fuel reservoir away from pits, houses or stables. Keep a clean space around the reservoir so that, in case of fire, materials that can help propagate fire are reached.
- 20 - Do not smoke or install electric equipment that produce sparks near the reservoir. Keep the filling hose under control.
- 21 - Never remove the cover or refill with the engine running or hot.
- 22 - Place visible warnings with the following words:



WARNING!
FLAMMABLE - DO NOT SMOKE



IMPORTANT:
Observe the maintenance procedures to keep the equipment in good conditions.

15.2 - Specifications

Limiting requirements for diesel oil:



NOTE:

Diesel oil is not classified as fuel No. 1 (No. 1-D) or No. 2 (No. 2-D).

Fuel Grade No. 1 is recommended for jobs in which the temperature is below 32 °F. Fuel grade No. 2 is recommended for jobs in which the temperature is 32 °F, or above. See the chart for fuel requirements.

- ✓ To achieve the special conditions of operation, changes of requirements for individual limitations can be agreed between the buyer, the seller and the manufacturer.
- ✓ For operation in hot weather, the pour point is 10 °F (5.6 °C) below the room temperature where the tractor is going to operate, except when facilities are provided to warm the fuel.
- ✓ When the pour point specified is lower than 0 °F (-17.8 °C), the viscosity must be 1.8 cSt (32.0 SUS) and at least 90 % shall be pointed out.
- ✓ In other countries, except USA, other sulphur limits can be applied.
- ✓ Where the cetane number by method D 613 is not available, method ASTM D 976 - Calculated Cetane Index for Distilled Fuels 2 - can be used as approximation. When there is a discrepancy, Method D 613 is preferred.
- ✓ Engine that run in low atmospheric temperatures, as well as in high altitudes, may require fuels with high rates of cetane.
- ✓ Fuels with low index of sulphur may require an additional lubrication agent to protect the injection pump. You must consult the fuel vendor to assure the fuel purchase has the suitable quantity of lubricant.

1. Safety Instructions

1

16 - Parts and lubricants storage

Always keep a stock of replacement parts, such as filters, belts, fuses, lamps, counter-pins, seals and lubricants (Fig. 22). The products must be stored away from acid and corrosive products, in a clean warehouse, moisture and dust free, well ventilated and organized.

Further more, make sure there are no insects which may enter into the filters and destroy them. The filters inner parts are a good environment for certain insects.

All the items must remain inside their packages until they are ready for use.

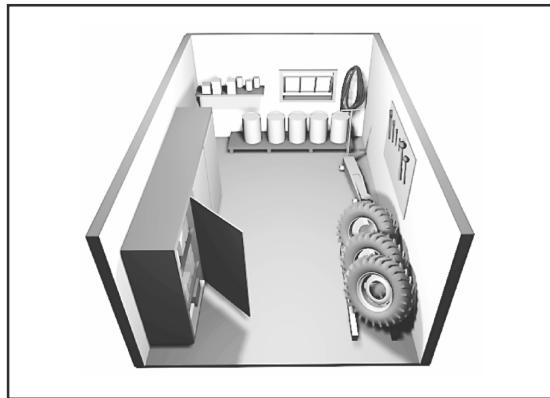


Fig. 24

17 - Quality, Environmental, Safety and Occupational Health Policy

AGCO América do Sul is committed with the development, manufacturing and trading products designed to attend the needs of mechanization in the world's agrobusiness, considering and implementing the most appropriate alternatives, aiming the workers' Security and Health and the Environment preservation.

17.1 - Main guidelines

- 1 - To obtain the profitability necessary for the development of the company's activities and the payment of dividends to stockholders.
- 2 - To obtain customers satisfaction by attending their requirements.
- 3 - Search for employee satisfaction aiming to improve the company's performance.
- 4 - Develop a suppliers and dealers network to attend the company's needs for production and service.
- 5 - Respect the Environment, by developing new activities, products and services, aiming the reduction of natural resources consumption and adopting pollution prevention practices.
- 6 - Prevent the occurrence of personal injuries and occupational diseases, aiming to keep a healthy working environment.
- 7 - Attend applicable legal requirement related to environmental aspects and harms to Safety and Occupational Health and other requirements subscribed by the Company.
- 8 - Assume commitments and be pro-active with internal and external community, developing and strengthening social responsibility actions and keeping permanent communication channels.
- 9 - To manage the Company, searching for a continuous improvement of the efficiency on its Quality System Management, Environment, Safety and Health for the employee.

How to reach the goals?

Betting on the Company partnership with the environment is to assure its existence in the future. Believing in the forementioned statement, AGCO has stipulated its Environmental Policy and the implementation for its consolidation, by the implementation of an Environmental Management system and a Cleaner Production Program.

1. Safety Instructions

1

17.2 - ISO 14000

ISO 14000 (Fig. 23) is a set of environmental management standards defined by the International Standards Organization (ISO). ISO 14000 consists of 6 sets of standards, each dealing with a specific environmental issue. Standard ISO 14001 applies to AGCO, because it deals with environmental management systems.

17.3 - Environmental Management System

Environmental Management System - EMS (Fig. 24) is a set of procedures for managing a company so as to obtain the best relationship with the environment.

This system implementation aims to completely analyze the company's activities, products and services related to their influence on the environment and assume a continuous commitment with the environmental quality.

17.4 - Environmental Issues

Greenhouse effect

This is the increasing of the planet temperature due to the accumulation of carbonic gas (CO_2) and methane gas (CH_4) in the atmosphere. The excess of carbonic gas is generated by industrial process, fossil combustible consumption and forests burning.

"The increased heating in the planet can melt down the polar cap and cause floods".

Reduction in the ozone layer

The Ozone (O_3) acts as a solar filter on the highest layers in the atmosphere, protecting us from the action of hazard rays. Some gases, such as Chlorofluorocarbon (CFC), used in refrigeration industry, destroy the ozone, causing a "hole" on the ozone layer. "As a result, it is estimated that 100,000 people around the world suffer skin cancer each year."

Population explosion

It has been estimated that by the year 2020 we can have more 8 billion people as related to the present population. The majority of these people will live in unsafe conditions, without basic sanitation, education or medical assistance. "Population growth, together with adverse conditions, is creating an unsustainable situation for the planet."



Fig. 25



Fig. 26

1. Safety Instructions

1

Sustainable development

It is a new type of development, which searches a compatible attending of the human being social and economic needs with the need of preserving the environment and natural resources, in a way to assure the live sustainability in earth.

It is believed that sustainable development is the only way of dealing with poverty, waste, environmental degradation and social problems.

17.5 - Recommendations for owners and users of MF tractors

In face of the ecologic issues previously stated, we have gathered bellow some suggestions, aiming to get your consciousness about these issues that involve the use and maintained of your tractor throughout its life cycle.

- Try to adopt good agricultural practices, which causes minimum impact to the environment;
- Use your tractor with the maximum efficiency possible, correctly adjusting the implements, using proper implements and operating in proper working conditions (gears, engine revolutions, speed..), as exposed in this Manual;
- Take the maximum advantage from your tractor during the longest time possible. It can be achieved by the proper preventive maintenance, as described in Section 5 of this Manual;
- Do *Integrated Plague Management*, which consists in a series of procedures and cropping monitoring, applying agricultural defensives only when necessary and on the correct amount;
- Do not permit fertilizing, seed and defensive wastes, etc; Use the product only on the indicated amount;
- Avoid burnings, adopting proper culture practices, like, for instance, "straw planting" or Direct Planting.
- Dispose fluids and parts replaced as stated by Law.

Take a look in some examples:

Metals

Metals recycling offers a lot of advantages. Each metric ton of steel recycled represents a saving of 1,140 kg of iron ore, 454 kg of coal, and 18 kg of lime.

Oils and fluids

The use of lubricants in the equipment represents a thermal-oxidative degradation and contaminants accumulation, which makes the changes necessary.

Never discard oils or fluids directly on the environment. Collect them and take to the gas service station where you bought these products. The oils can be refined or, in last case, incinerated in industrial facilities regulated by Law.

Batteries

Left on the wilderness, the batteries cause dramatic effects. So, take your used batteries to the recycling companies or return them to the manufacturer, as they have as obligation to give the batteries the destination regulated by Law.

Tires

The energy generation and rebuilding were the fist way of recycling these items. With improvements in technology, new options arose, such as mixing with asphalt.

Despite of the great number of tire rebuilding at the present, which extends the tires life cycle in 40%, the larger portion of wear tires are sent to landfills, thrown in roads or river edges, or even in the backyards of houses, attracting insects, carriers of disease.

Plastics

The petroleum is the raw material to produce plastic. The plastic, when recycled, spends only 10% of the energy necessary to produce the same amount by the conventional process. Like the glass, the plastic is not biodegradable. Therefore, and due to its growing usage, the recycling of plastic is essential.

Glasses

Glass scraps has several applications, such as: asphalt composition, foam and fiber glass production, novelty jewelry and reflexive inks.

Carton

One ton of recycled carton avoids the cut of 12 trees.

1. Safety Instructions

1

17.6 - CONAMA Resolution

CONAMA - the Brazilian National Environment Council - in resolution 257, dated June 30, 1999, defines rules and responsibilities related to the disposal and management of used batteries. This Resolution also states that all establishments that distribute or resale these products must be aware of this Resolution, and must be provided with information and advertisement capable of providing guidelines for the final users about their responsibilities in returning used batteries through the establishments that sell and/or provide technical assistance.

DEAR CUSTOMER:
Every consumer or end user is obliged to return used batteries to a point of sale. Do not throw them in the rubbish.

NOTE:
Points of sale are obliged to accept the return of used batteries, to store them adequately, and to return them to the factory for recycling.

17.7 - Risks of the contact with acid solution and with Lead

The acid solution and the lead in the battery, if discarded in the environment, can contaminate the soil, the underground and the waters.

Drinking contaminated water can cause hypertension, anemia, depression, weakness, leg pains and sleepiness.

The contact of acid solution with eyes, can cause chemical conjunctivitis, and with skin, contact dermatitis.

If accidental contact with the eyes or skin occurs, wash the area with running water and call a doctor.

Basic composition: Lead, diluted sulphuric acid and plastic.




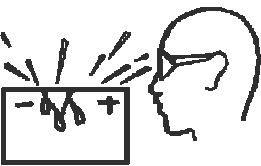

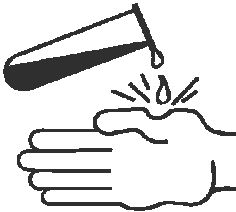
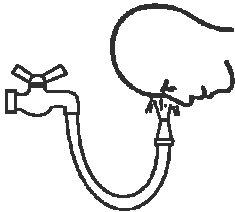
			
Lead - Pb	CAUTION!	Recyclable	
			
PROTECT YOUR EYES: Explosive gases can cause blindness or personal injuries.	AVOID: Sparks, open flames and smoking. They can cause explosions.	CORROSIVE: Sulphuric acid Can cause blindness and severe burns. Avoid the contact with cloths too.	CONTACT WITH EYES OR SKIN: Wash immediately with tap water. IF SWALLOWED: drink a lot of water and seek urgent medical assistance.
KEEP AWAY FROM CHILDREN'S REACH.			
MANDATORY RECYCLING. RETURN YOUR USED BATTERY TO THE RESELLER WHEN REPLACING IT.			

Fig. 27

1. Safety Instructions



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2 - Identification and safety decals

Index

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2 - Identification and safety decals



2 - Identification and safety decals

1 - Your tractor identification

The main mechanical assemblies in your tractor are identified by a plate with the Serial N°, which is fixed during the tractor manufacturing. Fill the spaces below with the corresponding serial numbers. Whenever you request replacement parts or technical information from your dealer, please inform these numbers.

1.1. - Tractor serial number

Fig. 28 - Cabin tractor

N°: [_____]

Stamped on a plate attached on the cabin rear side (1).

Fig. 29 - Platform tractor

N°: [_____]

Located behind the clutch and brake pedals (1).

1.2. - Monoblock serial number

N°: [_____]

Fig. 28 - Cabin tractor

N°: [_____]

Stamped on a plate attached on the cabin rear side (1).

Fig. 29 - Platform tractor

N°: [_____]

Located behind the clutch and brake pedals (1).

1.3. - Front shaft serial number

N°: [_____]

Located in the shaft right side (1)(Fig.30).

1.4 - Transmission series

N°: [_____]

Fixed on the gearbox right side (1)(Fig.31).

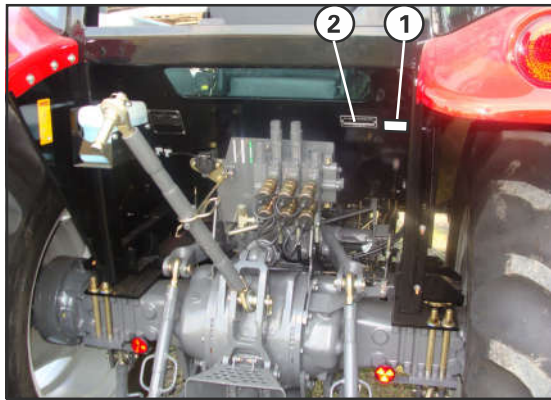


Fig. 28

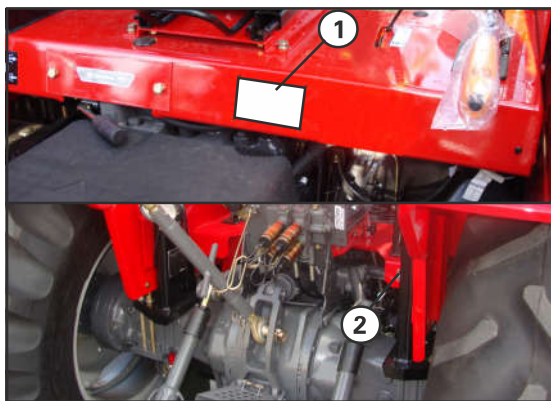


Fig. 29

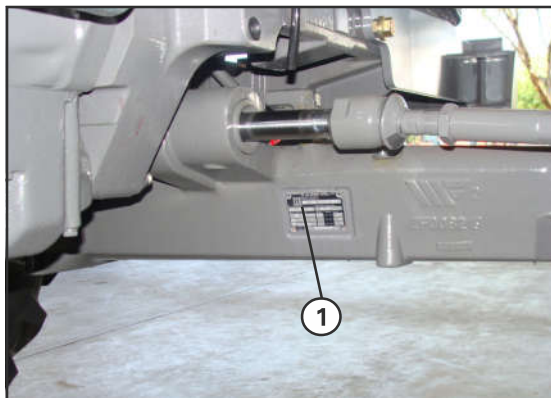


Fig. 30



Fig. 31

2

2 - Identification and safety decals

1.5 - Injection pump serial number

Nº: [_____]

2

Located in the plate attached on the pump body (Fig.32).

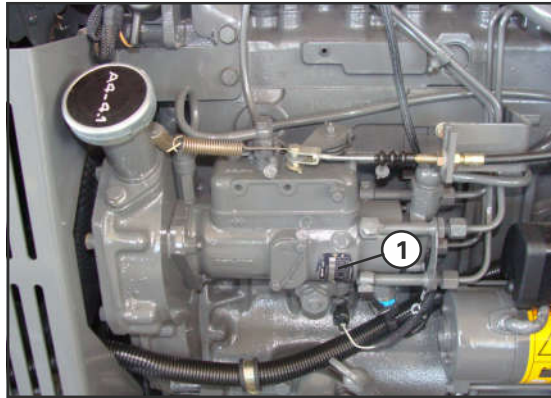


Fig. 32

1.6. - Engine serial number

Nº: [_____]

Stamped on the engine block, next to the starter motor (Fig.33).

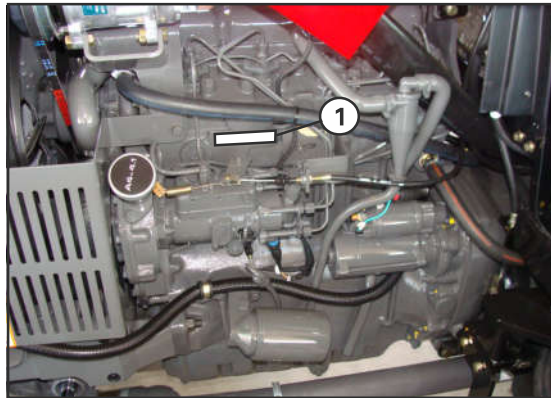


Fig. 33

Your nearest Massey Ferguson Dealer:

Phone:: _____

Fax: _____

e-mail: _____

Technical delivery date: _____

End of the warranty: _____

2 - Identification and safety decals

2 - Description of decals used in your product

ATTENTION!:

Do not remove, cover or damage the warning decals in the tractor.

Replace all damaged, missed or illegible decals.

Your Dealer can supply you the decals illustrated below

Located in the fender right side.

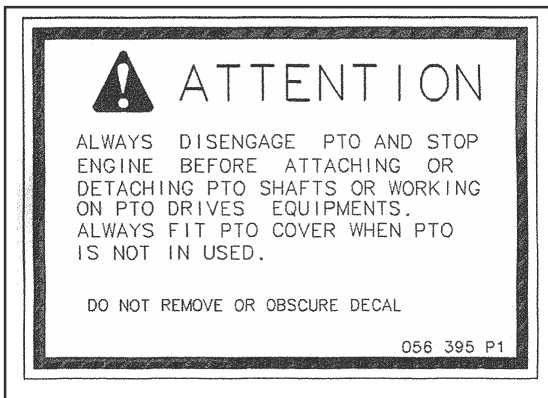


Fig. 34

Located in the cabin's pillar, on the left side

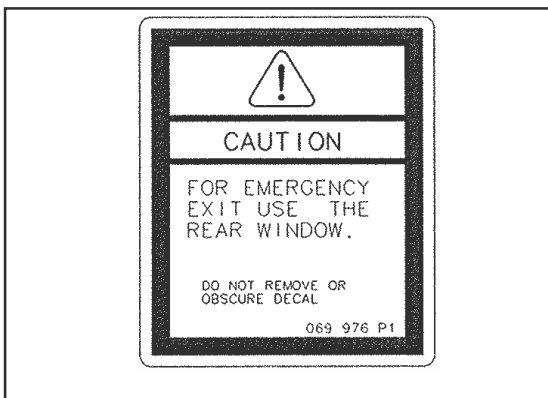


Fig. 36

Located on the hood.

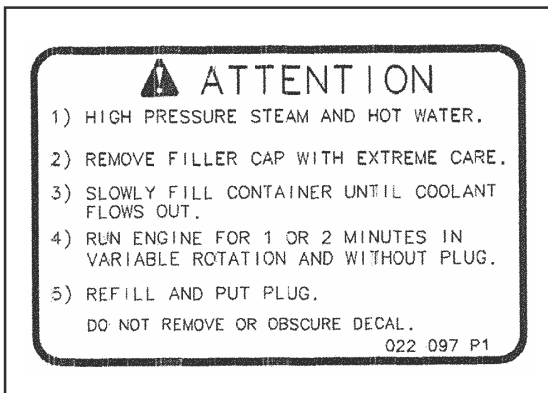
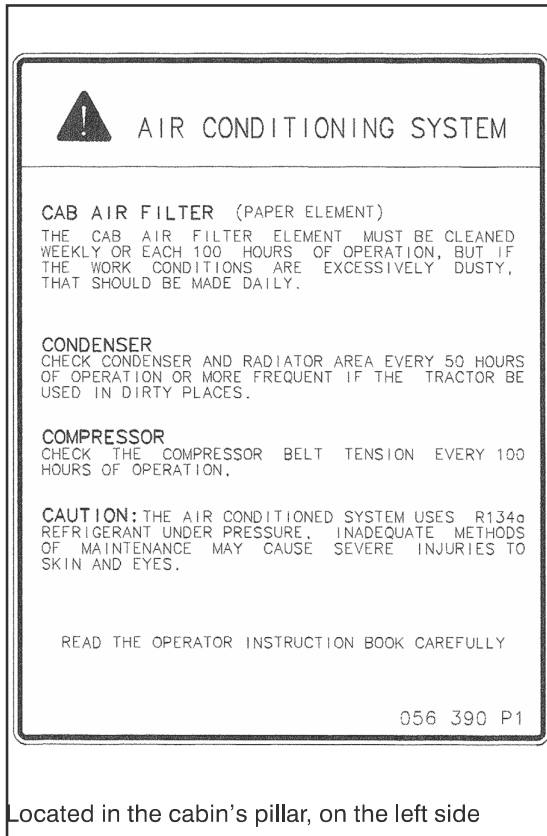
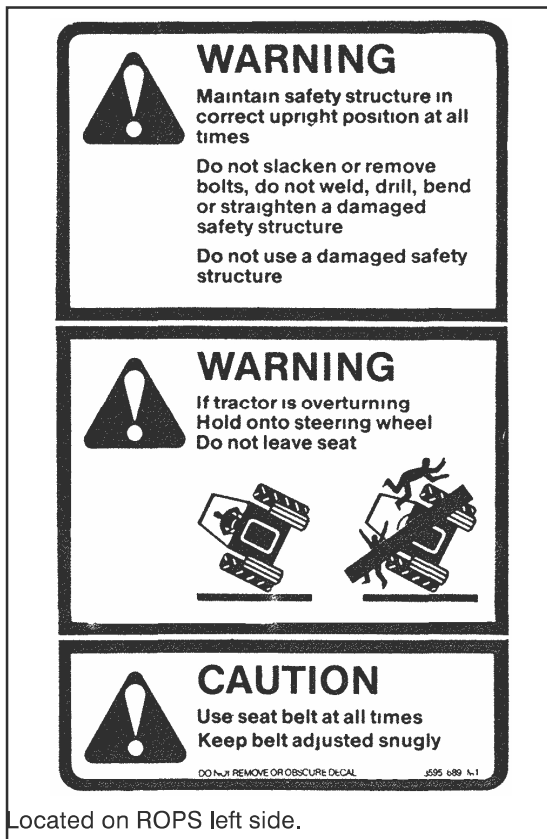


Fig. 37



Located in the cabin's pillar, on the left side

Fig. 35



Located on ROPS left side.

Fig. 38

2

2 - Identification and safety decals

Located on the operator's seat - left side.



Fig. 39

This decal warns about the importance of applying the parking brakes when parking the tractor. Otherwise, it may cause the tractor to move involuntarily.

Located on the operator's seat - left side.



Fig. 40

Located in the cabin's rear window.



Fig. 41

Located on ROPS left side.

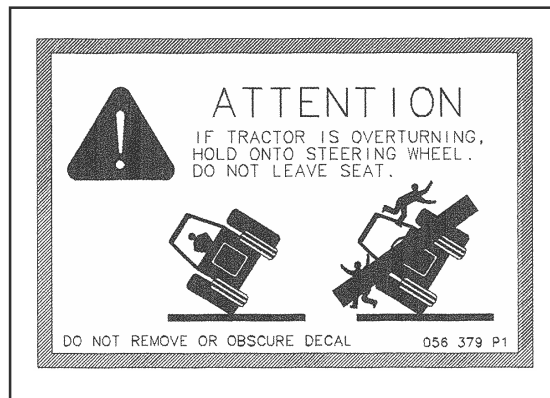


Fig. 42

Located on the traction bar, on the tractor rear side.

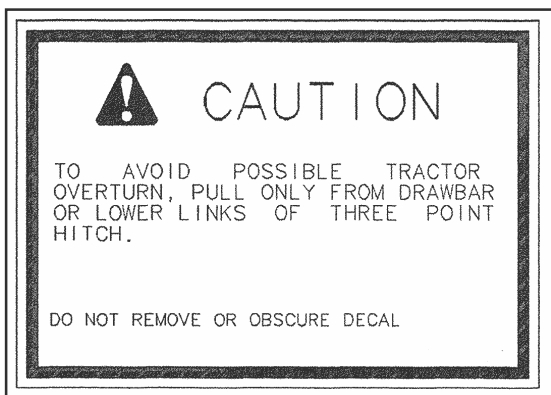


Fig. 43

Located on the battery, in the tractor's right side.

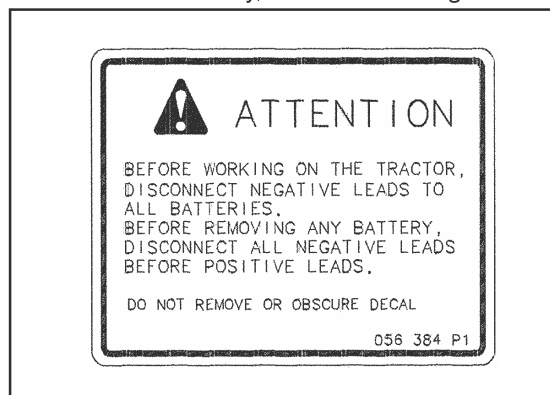


Fig. 44

2 - Identification and safety decals

You will find the decals as shown below. Know their meanings:

- 1- **Warning!** In case of overturn, grab the steering wheel and don't jump off the tractor. You certainly must be wearing the seat belt.
- 2- Be careful! Read the manual for the instructions about the tractor operation and safety.
- 3- Do not use jumpers or direct start on the starter motor.
- 4- Disconnect the negative cable of the battery before performing any services on the electrical system.
- 5- Keep away from moving parts, such as the PTO. Keep all protections properly installed and in good conditions.
- 6- When maneuvering the tractor in order to couple implements, do not allow anyone to stand between the tractor and the implement. Your assistant must remain beside the tractor.
- 7- Keep away from hot parts.
- 8- Keep your hands away from moving parts, such as belts and pulleys, when the tractor is operational. Keep all protections properly installed.
- 9- Keep your hands away from the fan area, while the engine is operating. Keep all protections properly installed.
- 10- Protect your body, specially your face, from hot water and steam from the radiator. Be very careful when removing the cap. First, remove it in 2 steps, in order to release the inner pressure.



Fig. 45

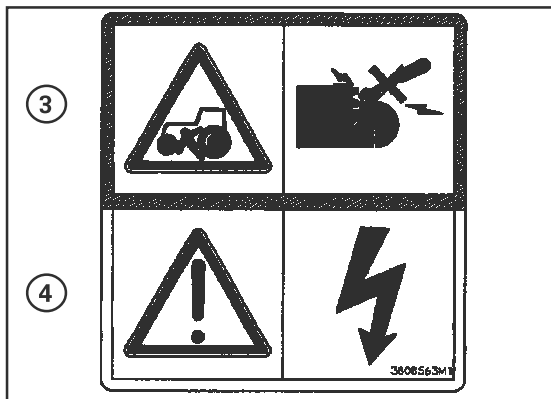


Fig. 46



Fig. 47

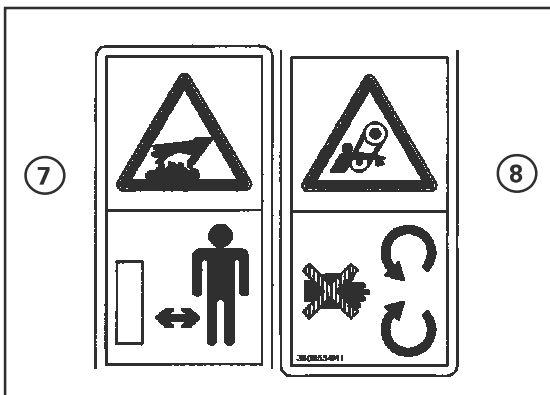


Fig. 48

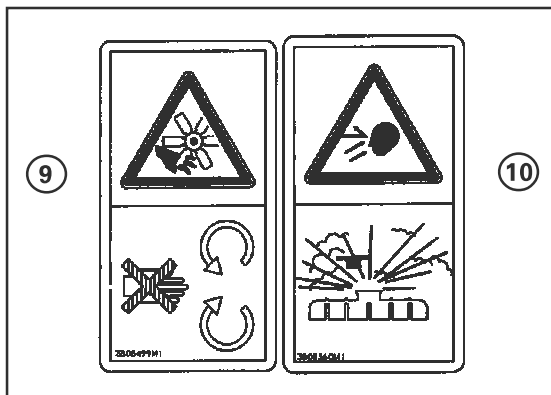


Fig. 49

2

2 - Identification and safety decals

3. Important recommendations

The usage of Personal Protection Equipment (PPE) and also the observance of the equipment limits can prevent accidents.

2

1 - Maximum operational speed

It is recommended not to drive the tractor over 25 mph (40 km/h).

2 - Noise level

Machine with cab: 85 to 86 dBA

Machine with header: 92 dBA

3 - Vibration specifications

These specifications are not available.



Fig. 50

3 - Combination meter and commands

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3 - Combination meter and commands

3

3 - Combination meter and commands

1 - General identification

1.1 - Identification - Cab

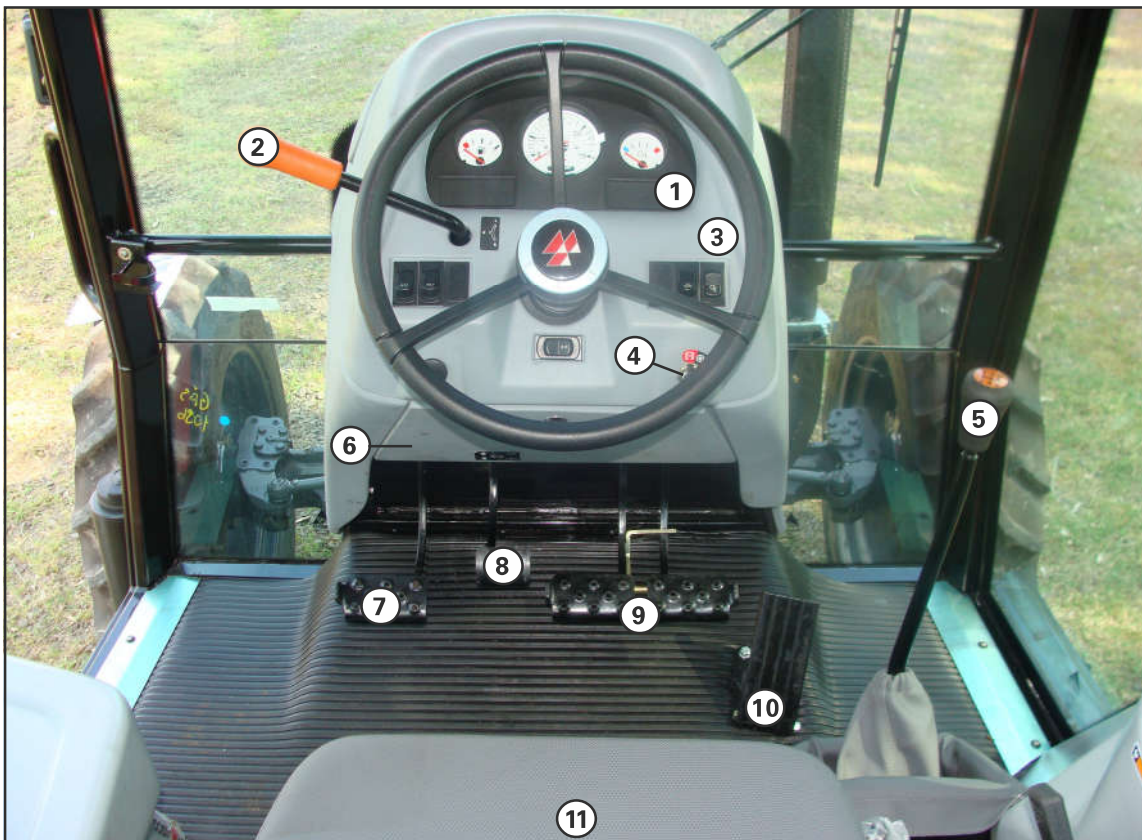


Fig. 52

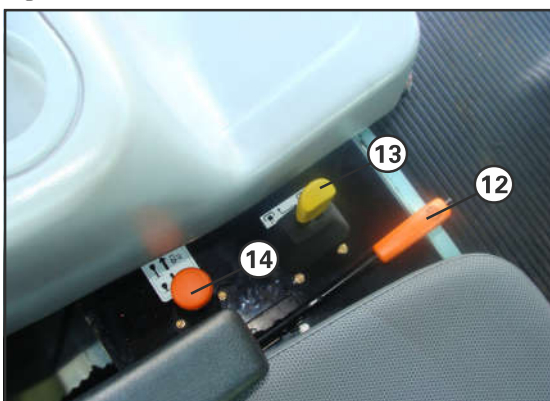


Fig. 53

- 1 - Instrument panel
- 2 - Reverse control lever 8x8 mechanical reversion gearbox tractors only
- 3 - Electrical controls
- 4 - Ignition key
- 5 - Main gear lever
- 6 - Fuse box
- 7 - Clutch pedal
- 8 - Differential blocking pedal
- 9 - Brake pedals
- 10 - Accelerator pedal

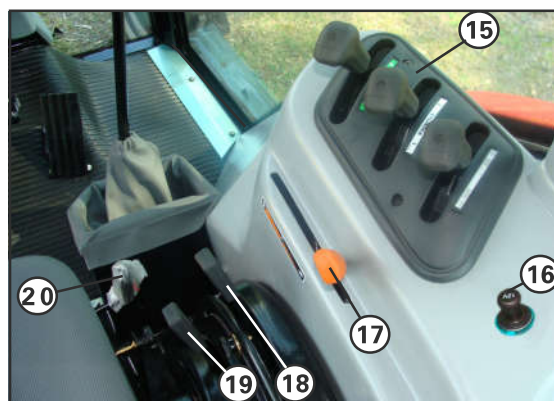


Fig. 54

- 11 - Operator's seat and seat belt
- 12 - Parking brake lever
- 13 - PTO/IPTO driving lever
- 14 - Front traction driving lever.
- 15 - Remote control lever(s) (if equipped)
- 16 - Electric outlet - 12V
- 17 - Manual accelerator
- 18 - Traction control lever / Hydraulic system depth (external)
- 19 - Hydraulic system "Position" control lever (internal)
- 20 - Combined flow selector lever

3 - Combination meter and commands

1.2.- Identification - Header

3

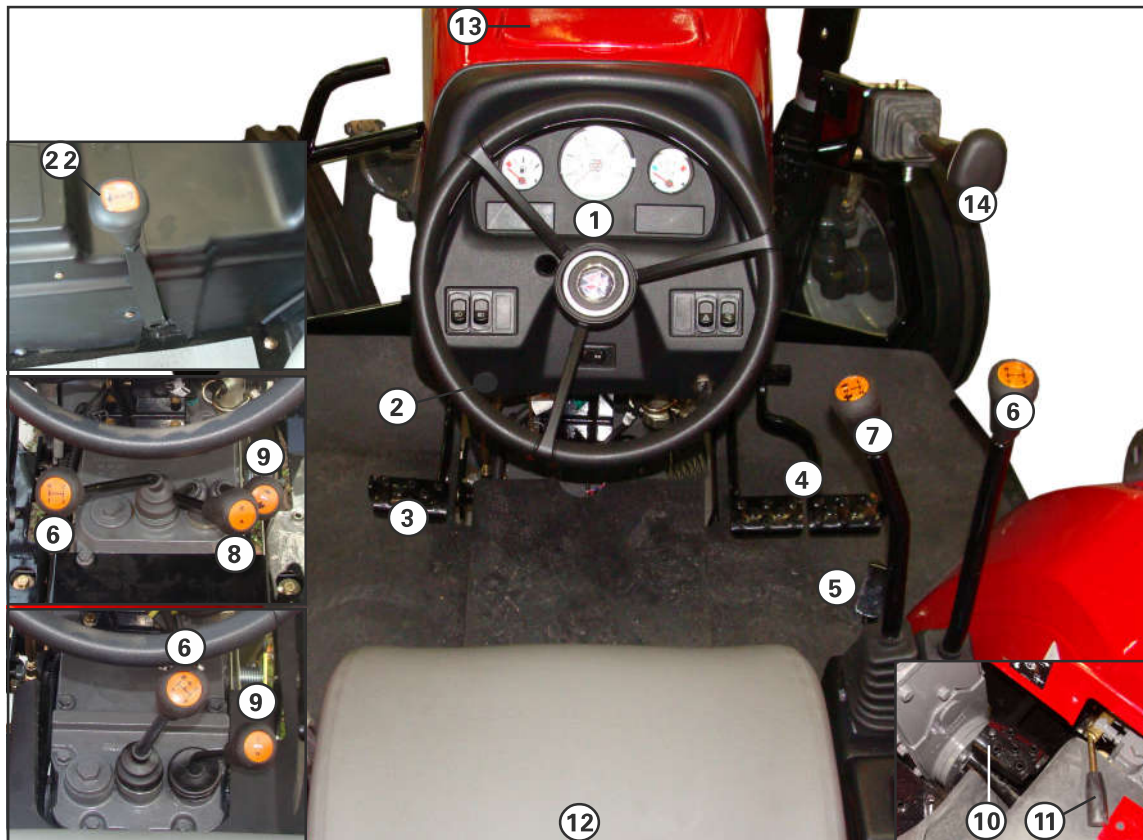


Fig. 55

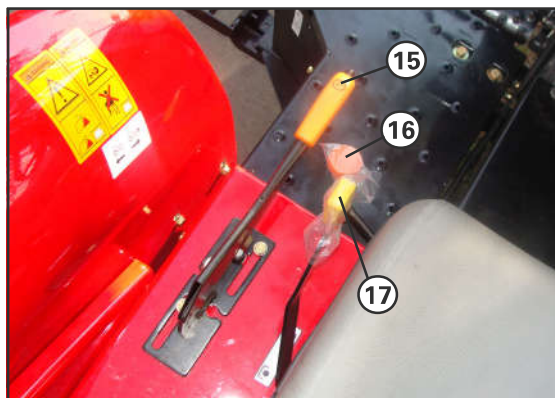


Fig. 56

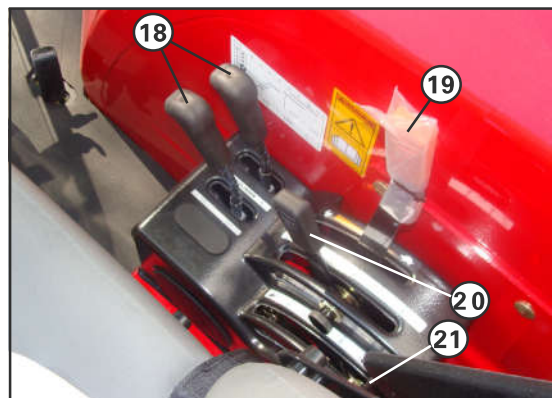


Fig. 57

- 1 - Instrument panel
- 2 - Clutch 2nd stage stopper
- 3 - Clutch pedal
- 4 - Brake pedals
- 5 - Accelerator pedal
- 6 - Main gear lever
- 7 - Speed selector lever (Hare or Tortoise and H or L)
- 8 - Speed selector lever (A or B)
- 9 - Speed selector lever (Hare (H) or Tortoise (L))
- 10 - Differential blocking pedal
- 11 - Combined flow selector lever
- 12 - Operator's seat and seat belt
- 13 - Fuse box

- 14 - Not applied
- 15 - Parking brake lever
- 16 - Front traction driving lever
- 17 - PTO/IPTO driving lever
- 18 - Remote control lever(s) (if equipped)
- 19 - Manual accelerator
- 20 - Traction control lever / Hydraulic system depth (external)
- 21 - Hydraulic system "Position" control lever (internal)
- 22 - "Creeper" selector lever (If equipped)

3 - Combination meter and commands

2 - Combination meter and commands description

2.1 - Steering wheel

The tractor is equipped with a hydraulic steering system which provides smooth operation and weight reduction on the steering wheel during the operation. The hydraulic pump delivers oil for the hydrostatic unit which, when operated, supplies oil for the the steering cylinder, and thus turning the wheels.

 **IMPORTANT:**

Do not keep the steering wheel on its lock position. Slightly move it to the opposite side in order to prevent the continuous operation of the relief valve, what would cause the system to overheat.

2.2 - Clutch pedal

When the pedal (1) is depressed, the clutch turns off the power from the engine to the transmission.

 **IMPORTANT:**

Never leave your foot "resting" on the clutch pedal during the operation. This leads to a premature wearing for the bearing and clutch discs.

2.3. Starter motor neutral switch

Located on the transmission, it prevents the engine from being cranked while the gears and groups levers (12x4) are not in Neutral position,



CAUTION!

Under any circumstance the starter motor neutral switch must be neglected, as the tractor may perform unexpected movements.

If the neutral switch fails, replace it for a new one.



Fig. 58

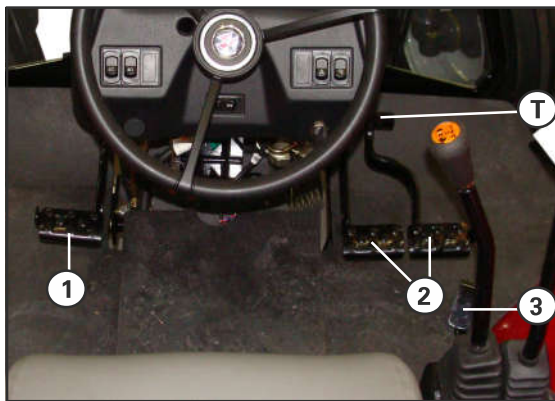


Fig. 59

2.4 - Brake pedals

The brake (2) has independent action for the rear wheels. It is possible to use the brakes as a help to make tight turns, by applying only the pedal for the desired direction. However, this assistance must only be used when required by the situation.

The excessive use of brakes will reduce the discs working cycle.



CAUTION!

When driving in roads, keep tractor brake pedals locked together through the union lock (T). This will assure both wheels will brake at the same time when required.

2.5 - Accelerator pedal

The depressing of the accelerator pedal (3) replaces the setup from the manual accelerator, when the engine speed increases. When the accelerator pedal is released, the engine will return to the speed set by the the manual accelerator.



WARNING:

When the tractor is operated with the accelerator pedal, the manual accelerator must be in the lower position.

Always use the accelerator pedal when driving in public roads. Avoid sudden variations on the engine speed.

3 - Combination meter and commands

2.6. Differential locking pedal

Whenever the ground conditions lead to a loss of traction on the wheels, this will cause one wheel to turn freely while the other is stationary. In such situation, depress the clutch pedal and the pedal lock (1) and then release the clutch again. The rear wheels are coupled. Uncouple the differential lock before making turns with the tractor.

3

Usually the pedal unlocking will occur automatically, so the pedal will be free and the traction returns to its normal condition. In case the differential does not unlock, depress the clutch pedal to unlock the differential.



NOTE:

Do not use the lock in turns or while driving downhill: in such cases the assembly will be uncoupled. The unlocking will occur automatically as soon as the wheel are in normal operating conditions.

2.7 - Gear selector lever/Ranges

You will be able to select two speed ranges with this lever (Low "L" and High "H") and neutral.



NOTE:

For 8x2 and 12x4, this lever should remain in the neutral position to start the engine.

2.8 - Gear selector lever/Ranges

(High, Neutral, Low)

For platform tractors 12x4 speed transmissions only, it selects the speed ranges between Hare or Tortoise.

2.9 - Gear selector lever/Ranges

For cabin tractors 12x4 speed transmissions only, it selects the speed ranges between Hare or Tortoise and High (H) or Low (L).

2.10 - Reverse lever control

8x8 speed transmissions only.

This lever (1) has 3 positions:

- F - Forward speeds
- N - Neutral (Initial position)
- R - Reverse speeds



NOTE:

For 8x2, this lever should remain in the neutral position to start the engine.

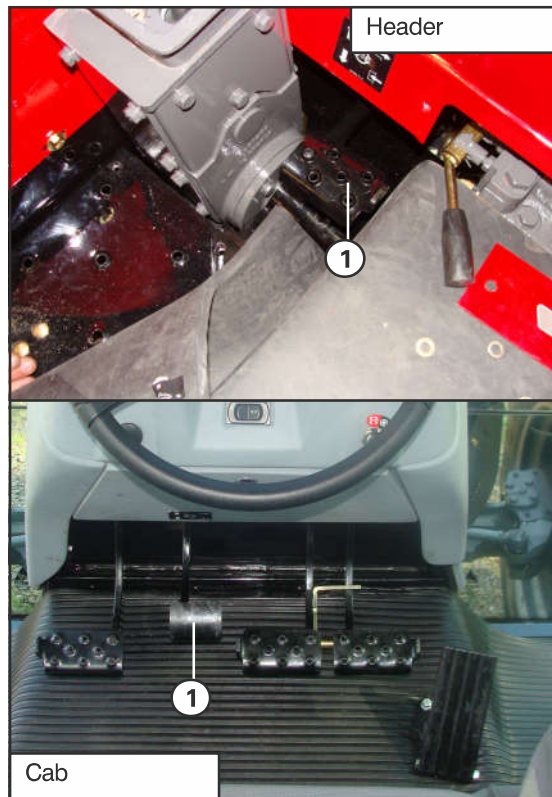


Fig. 60

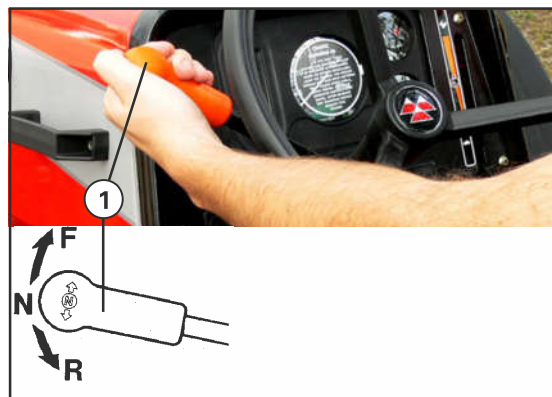


Fig. 61

3 - Combination meter and commands

2.11 - Gear selector main lever

- For 8x2 transmission, this lever selects 1st, 2nd, 3rd and 4th gear and reverse - "R".
- For platform 8x8 transmission, this lever selects the 1st, 2nd, 3rd and 4th gear.
- For cabin 8x8 transmission, this lever selects the 1st, 2nd, 3rd and 4th gear and the High (H) and Low (L) ranges.
- For 12x4 transmission, this lever selects 1st, 2nd, 3rd and 4th gear and reverse - "R".

8x2 speed transmissions - Speeds

Forward	Lever (1)	Lever (2)
1°	1	L
2°	2	L
3°	3	L
4°	4	L
5°	1	H
6°	2	H
7°	3	H
8°	4	H
Reverse	Lever (1)	Lever (2)
1°	R (Rev)	L
2°	R (Rev)	H

12x4 speed transmission - Speeds

Forward	Lever (1)	Lever (3)/(4)	Lever (2)/(4)
1°	1	Tortoise	L
2°	1	Hare	L
3°	2	Tortoise	L
4°	2	Hare	L
5°	3	Tortoise	L
6°	3	Hare	L
7°	1	Tortoise	H
8°	1	Hare	H
9°	2	Tortoise	H
10°	2	Hare	H
11°	3	Tortoise	H
12°	3	Hare	H
Reverse			
1°	R	Tortoise	L
2°	R	Hare	L
3°	R	Tortoise	H
4°	R	Hare	H

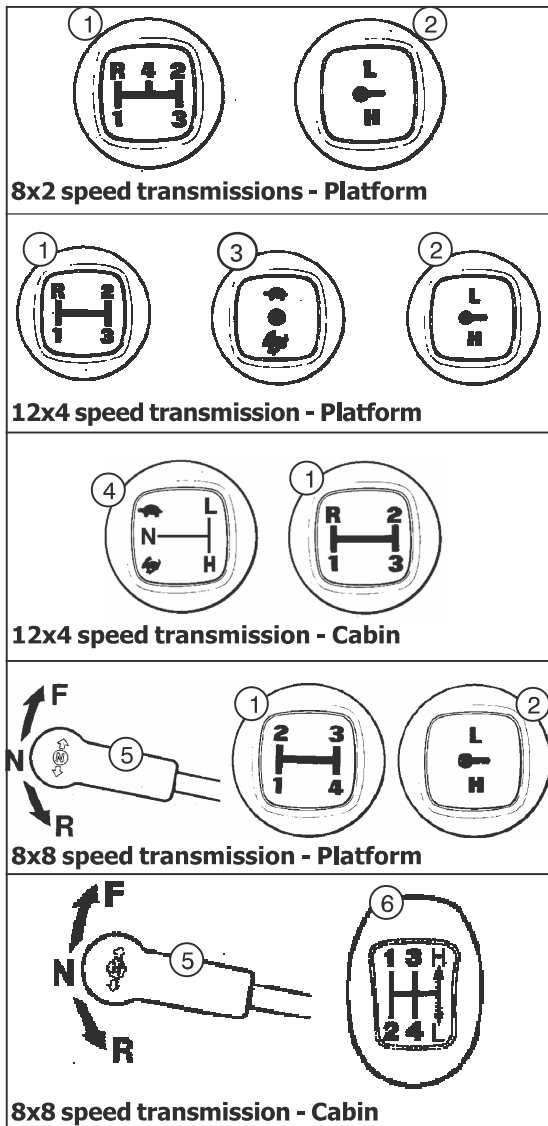


Fig. 62

8x8 speed transmission - Speeds

Forward			Reverse		
Gears	Levers:		Gears	Levers:	
	(1)/(6)	(2)/(6) (5)		(1)/(6)	(2)/(6) (5)
1°	1	L F	1°	1	L R
2°	2	L F	2°	2	L R
3°	3	L F	3°	3	L R
4°	4	L F	4°	4	L R
5°	1	H F	5°	1	H R
6°	2	H F	6°	2	H R
7°	3	H F	7°	3	H R
8°	4	H F	8°	4	H R



3 - Combination meter and commands

2.12 - "Creeper" selector lever (If equipped)

The creeper is a speed reducer mounted between the gearbox and rear shaft which allows double the number of gears and reach over reduced speeds for special applications. This lever has no Neutral position.

- By moving the lever forward, the speeds are normal (normal gearbox use).
I - Normal Range.
- By moving the lever backward, you reach the over slow speeds. This position must only be used for special applications which require over reduced speeds.
II - Reduced Range.

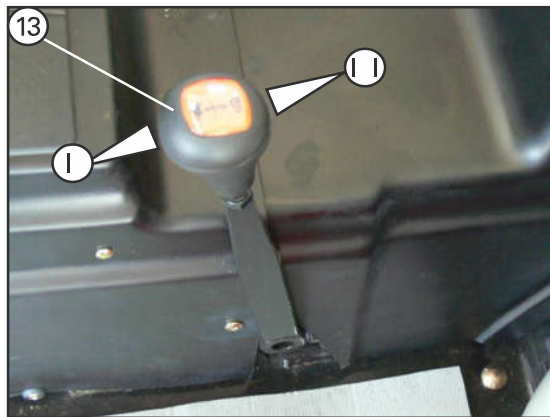



Fig. 63

2.13 - Parking brake lever

Apply the parking brake, by pulling the lever upward (1). To safely assist the parking braking applying, you can depress the brake pedal when pulling up the lever,

Release the parking brake, by pulling the lever upward (1), pressing the button (2) and then pushing the lever downward.

 **IMPORTANT:**
Do not leave the tractor without applying the parking brake.

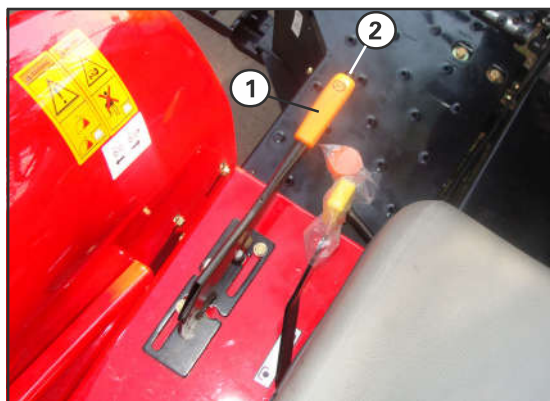


Fig. 64

2.14 - Manual accelerator

This will be used in operations in the field.

To be used during field operations. To increase the engine speed, move the lever (1) forward and to reduce the speed, move the lever backward.

While in operation, keep the engine within the ideal speed range.

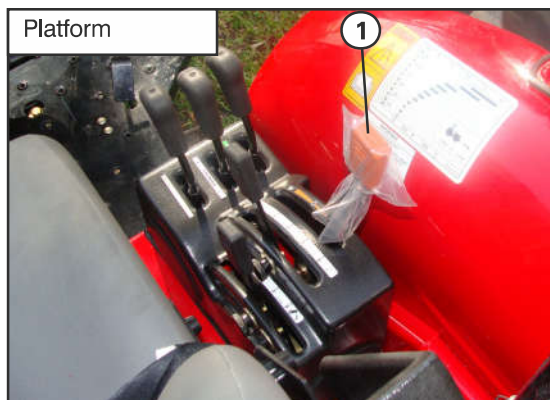


Fig. 65

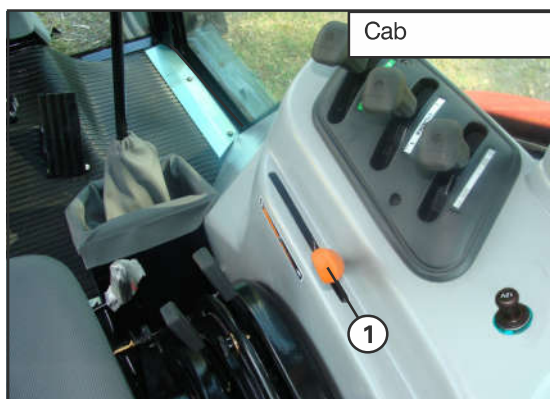



Fig. 66

3 - Combination meter and commands

2.15 - Front traction drive

For operations in the field which demand effort for the traction, apply the auxiliary front traction.

 **NOTE:**
DO NOT apply the front traction while driving in roads or in services which do not demand traction power.
Always stop the tractor to apply or turn off the front traction.

- Fig. 67 - For tractor with central front traction, stop the tractor and move the lever forward.
- Figs. 68 - For tractor with front traction and lateral drive and for cab tractors, stop the tractor and push the lever down.



Fig. 67



Fig. 68

2.16 - PTO and IPTO driving lever

To move the PTO lever, pull it to the right side to release it from the off position.

- To apply the IPTO (Independent Power Take Off), reduce the engine speed and pull the lever forward. It is not necessary to apply the clutch in this case.
- For the PTO (Dependent Power Take off), adjust the clutch pedal stopper to the 2nd position, which can be checked by a larger pedal travel. Then, press the clutch pedal to the end of its travel (2nd position), move the lever backwards and slowly release the lever. Afterwards, adjust the engine speed to reach the speed wanted in the PTO.

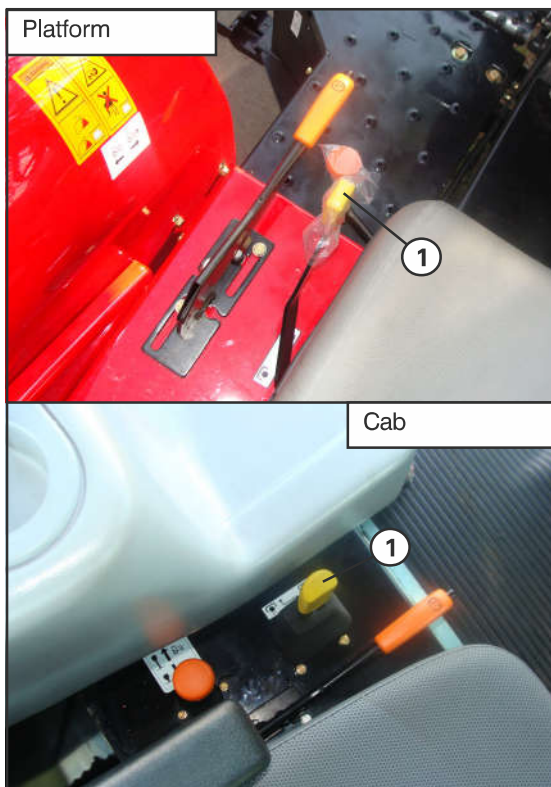


Fig. 69

3 - Combination meter and commands

2.17 - Depth control lever (traction)

The lever (1) is used to operate with implements for soil preparation, such as: plow, sub-soilers, furrower, etc. Thus, the system is activated to correct the implement penetration depth, while keeping the traction power within the specified limits.



Fig. 70

2.18. Hydraulic system positioning control lever

This levers (2) must be used to:

- Operate with implements which work above the ground surface, such as: pulverizer, loading platforms, brushcutters, etc.
- Implements coupling
- Transport of implements to the working area or loads (cranes, platforms, etc.)



NOTE:

For cab tractors, there is an auxiliary lever (3) for Positioning control at the rear, to facilitate the coupling and uncoupling of implements.

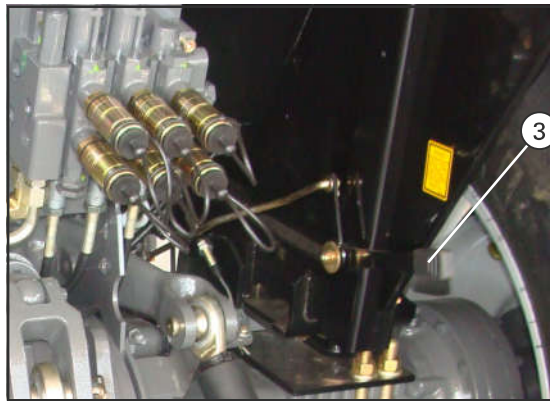


Fig. 71

2.19. Hydraulic system reaction control

Regulates the lowering speeds of the coupled implement.

With the selector fully down, the reaction is fast (fast lowering speed). When the lever is fully up, the reaction is slow,

To achieve intermediate adjustments, leave the selector in the intermediate range on the dial.



Fig. 72

3 - Combination meter and commands

2.20 - Remote control lever(s) (if equipped)

Your tractor cab be equipped with a independent type remote control for one or two lines.

Each lever allows the operation of one cylinder (or a pair of cylinders in parallel) for implements which use remote control.

This is a dual action command, i.e., it allows the extension and retraction of remote hydraulic cylinder(s) rod(s).

There valves for special applications, supplied as optional parts, with variable flow, valves with automatic return lever, valves with floating control, etc.



Fig. 73

3



Fig. 74

2.21 - Combined flow selector lever

for the cases where an increase of hydraulic fluid flow is necessary for the remote control, and the 3-points lifting system is not used, the combined flow can be activated; in this case, move the combined flow selector lever from the "A" position (Lifting system) to the "B" position ((Auxiliary hydraulic power - High flow).

At this moment, the oil flow in the lifting system is redirected to the auxiliary hydraulic system (Remote control). When the Combined Flow is activated, the lifting system becomes inoperant.

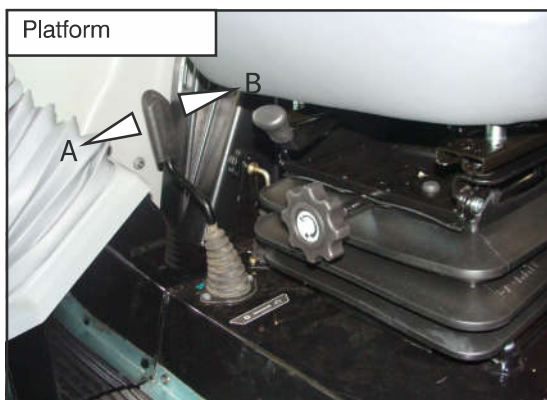


Fig. 75

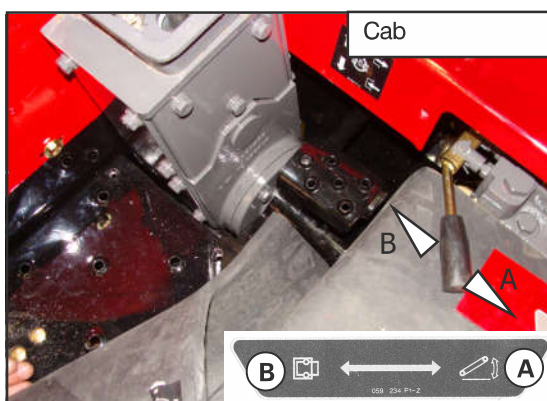


Fig. 76

3 - Combination meter and commands

2.22 - Seat

The tractor features a Protection Structure Against Roll-over (EPCC) directly assembled on the tractor's rear axle. This structure was designed to supply a protection for the conductor, in case of a roll over. However, for the Protection Structure Against Roll-over (EPCC) to become effective, it is of major importance the use of the seat belt and the conductor must remain seated in case of a roll over.

3

DO NOT WELD, DRILL HOLES, FOLD OR TRY TO FIX DENTS IN THE EPCC. Such procedures will reduce the protection provided by the device.

In case of damages, replace the EPCC.

Adjustment of the seat

Seat (1) - Cab

- A - Adjust the seat forward or backward. Move locking (A) upward.
- B - Seat height hardness adjustment: To do so, turn the handle (B) on the clockwise direction for a stiffer suspension.
- C - Adjust the seat's movement height: Release the bolts (C), located on both sides and on the rear side of the seat back, moving the seat up or down to achieve the desired height. Then re-tighten all bolts.

Seat (2) - Header

- A - Adjust the seat forward or backward: Move the locking lever (A) to the left side.
- B - Seat height hardness adjustment: To do so, turn the handle (B) on the clockwise direction for a stiffer suspension.
- C - Adjust the seat's movement height: Release the bolts (C), located on both sides and on the rear side of the seat back, moving the seat up or down to achieve the desired height. Then re-tighten all bolts.



Fig. 77



Fig. 78

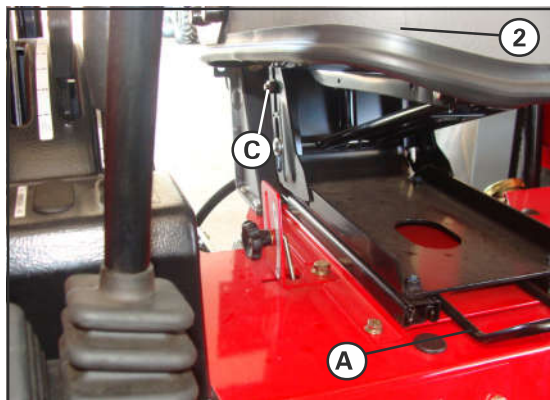


Fig. 79

2.23 - Seat belt adjustments

The retractable type seat belt (1), installed in tractors equipped with EPCC, does not require adjustments. The protection provided by the seat belt is only effective when:

- The seat belt is correctly adjusted.
- The seat belt is not twisted nor damaged from rubbing against a sharp edge.
- The buckle is firmly locked.
- There are no loose parts on the belt and on the retractable system.

To fasten, pull the buckle (2) in all its extension and push it against the lock (3): a click and a movement upward on the unlocking orange button indicate the seat belt is fastened.

To release it, press the unlocking button (3) downward.

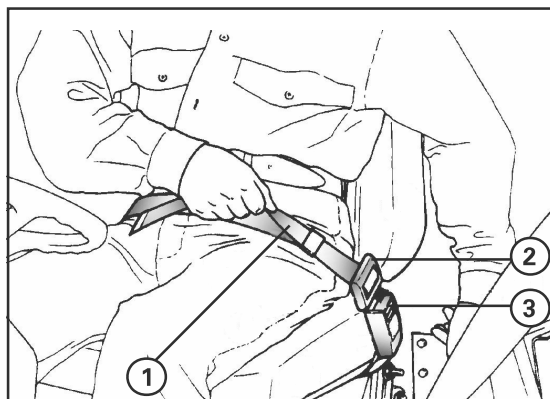


Fig. 80

3 - Combination meter and commands

2.24 - Low vehicle warning

The warning triangle (A) assembly is performed behind the seat, over the remote control valves.

If the adhesive on the warning triangle is missing or needs to be replaced, it can be done at your Massey Ferguson Dealer.

2.25 - Lightening outlet for the trailer

This is a 7-pins electrical outlet (SAE) (B) for the trailer electrical connection. Before use it, make sure the trailer socket is correctly cabled.

Pins identification:

- 1 - Negative (ground) - 31.
- 2 - Not used - 58L
- 3 - Left side turning light - LH
- 4 - Not used - 54
- 5 - Right side turning light - RH
- 6 - Brake lights - 58R
- 7 - Not used - 54G



IMPORTANT:

The tractor is not assembled with auxiliary electrical supply connectors.

DO NOT use electrical supply from the tractor by using auxiliary connectors or cutting the electric harness. This could result in a short circuit and serious personal injury.

Contact your Massey Ferguson Dealer for the correct information about approved equipments and also for the correct installation with the proper fuse.

The use of non approved accessories and fuses with wrong rating may cause damages to the tractor or to the accessory.

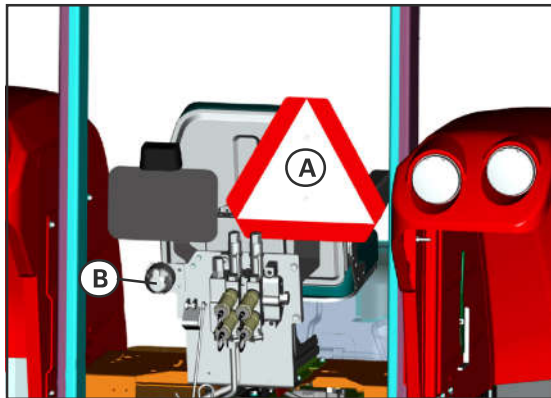


Fig. 81

3

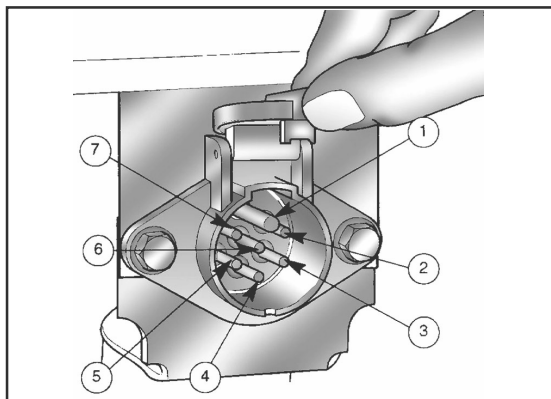


Fig. 82

3 - Combination meter and commands

3. Instrument panel and switches

3.1 - Panel overview



Fig. 83

- 1 - Fuel level indicator
- 2 - Tachometer
- 3 - Engine temperature sensor
- 4 - Warning lights
- 5 - Module not used
- 6 - Lighting activation switch.
- 7 - High or Low beam selector switch
- 8 - Module not used
- 9 - Module not used
- 10 - Warning light activation switch
- 11 - Rear headlight activation switch
- 12 - Turn signal activation switch
- 13 - Clutch 2nd stage stopper (If equipped)
- 14 - Starter switch

3 - Combination meter and commands

3.2 - Gauges

Fuel level indicator (1)

Shows the approximate level of fuel in the tank.

From the left to the right side, the needle shows the following instructions:

empty - half full - full. Do not run out of fuel: in this case the fuel system must be bled .

Engine temperature indicator (2)

Shows the engine temperature. The green zone shows the ideal engine temperature. Excessively high or excessively low temperatures can damage the engine.

In case of overheating, do not turn the engine off.

Reduce the engine speed to minimum range, until the temperature drops and then turn it off and check the cause for the overheating.



CAUTION!

Wait until the cooling system temperature cools down and only then remove the radiator cap. Use a shop cloth to protect your hands and slowly remove the cap from the radiator; wait a few seconds in order to allow the pressure to dissipate. Only then remove the radiator cap.

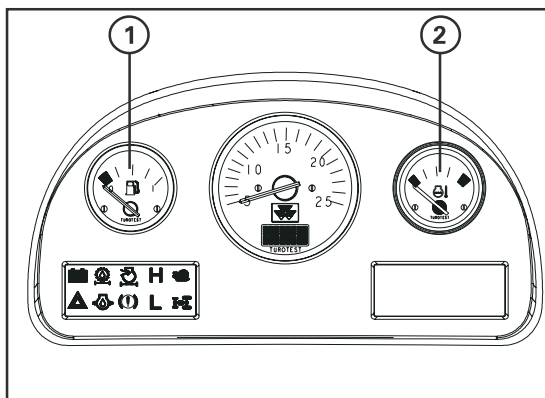


Fig. 84

3.3 - Tachometer

This is comprised by a tachometer (1) which indicates the engine speed in revolutions per minute (rpm) and a display (2), which shows the diagnosis functions, Power Take Off (PTO) speed and amount of working hours.

Each division on the scales equals 100 rpm, i.e., if the needle is under the number 20, the engine speed is 2000 rpm.

The display (2) may show warning messages, as presented on the next page.

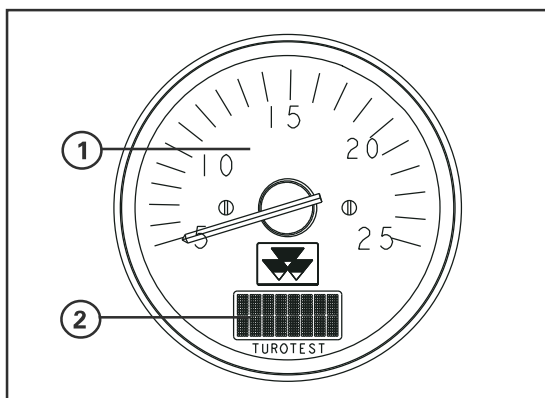


Fig. 85

3 - Combination meter and commands

Warning messages on the Display

The prioritization sequence presented informs that the messages are presented on the Display according to the order of importance, when more than one event occur at the same time. Scaling: 1st - Highest priority, 3rd Lowest priority

Description	Priority
CUIDADO!/WARNING!	1st
TDP/PTO:	2°
HOURS / HOURS	3°

3

Description

- CAUTION!/WARNING!: Indicates that the Power Take Off (PTO) speed presented is above the maximum recommended.
 - 630 RPM from the engine: 540 rpm on the power take off.
 - 1170 RPM from the engine: 1000 rpm on the power take off.
- TDP/PTO: Indicates the instantaneous speed of the power intake shaft.
- HOURS / HOURS: Shows the tractor operation hours.

When the power take off is not activated, usually it will be presented the tractor's operation hours on the Display.



CAUTION!

When the message WARNING is displayed, reduce the engine speed. so that the Power Take Off (PTO) speed stays below the maximum recommended speed, in order to prevent damages and personal injuries.

Adjust the power take off speed.

For tractors set with revolution speed of 540 rpm or 1000 rpm for the power take off, the panel must be adjusted when the shaft is replaced.

The tractors are delivered with a factory configuration to display the revolution according to the shaft installed in the factory.

However, when a 540 rpm shaft is replaced by a 1000 rpm shaft, or vice-versa, the button (p) must be pressed in order to show the correct speed on the display.

See the adjustment procedures in the section Preparation in this Manual.

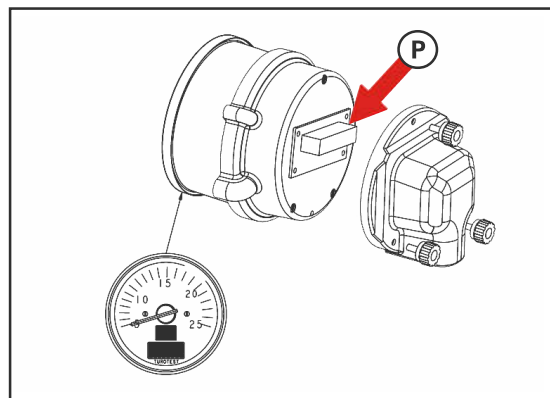


Fig. 86

3 - Combination meter and commands

3.4 - Warning lights

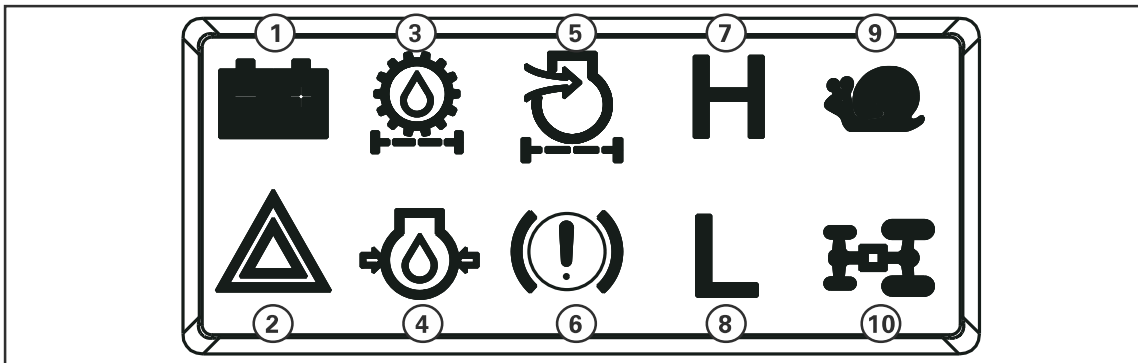


Fig. 87

1 - Battery charge warning light

With the engine operating, this warning light must be off, which means that the battery loading system is correctly operating.

If this light comes on while the engine is operating, check the loading system and the battery.

2 - Main warning light

Simultaneously blinks with the engine oil pressure, transmission oil pressure, battery load or air filter restriction lights.

3 - Transmission oil pressure warning light

If this light comes on while the engine is operating, it means that the transmission lubrication system presents a low pressure, which may lead to irreversible damages to some components on the system. Stop the engine IMMEDIATELY and find the cause.

4 - Engine oil pressure warning light

If this light comes on while the engine is operating, it means that the engine lubrication system identifies a lack of oil pressure. In this case, stop the engine IMMEDIATELY and find the cause.

5 - Air filter blockage warning light

If this light comes on while the engine is operating, it means that the main element (external) and the safety element must be replaced. See Section Maintenance for detailed information.

6 - Brake fluid level warning light and parking brake application warning light.

This light is lit when the brake fluid level is below the minimum required specification and when the parking brake is applied.

7 - High speed range selection warning light

Only cab tractors, with 8x8 or 12x4 transmission are equipped with this warning light.

8 - Low speed range selection warning light

Only cab tractors, with 8x8 or 12x4 transmission are equipped with this warning light.

9 - Speed reducer activation warning light (if equipped)

This light will only come on when the speed reducer is activated. The speed reducer provides an extra range of low speeds for your tractor.

10 - Not used



NOTES:

When turning the starter switch to the 2nd position "(engine off), all warning lights will be turned on.

After a few seconds, the lights 1, 2, 4 and 6 will be turned off. After the engine starting, the remaining lights will also be turned off.

If, during the engine operation, one of the 1, 3, 4, 5 and 6 warning lights comes on, immediately turn off the engine and check the cause.

In conjunction with the warning lights, the panel also sounds a buzzer when the main warning light (2) blinks for the following reasons:

- Air cleaner restriction.
- The transmission oil filter must be replaced.
- Low pressure on the engine oil pressure
- Engine temperature too high.
- Low battery charge from the alternator.

3 - Combination meter and commands

3.5. Electrical controls

1 - Lighting activation switch



NOTE:

The starter switch (6) must be on the 2nd position (B).

This switch has 3 positions:

0 - OFF

I - Instrument lights + rear turn lights + side lights + auxiliary headbeams (if fitted) in turn light mode + license plate light (if fitted)

II - Item from the previous position + front headlights in low beam

2 - High or Low beam selector switch

By pressing down this switch, the front headbeams turn to high beam and the auxiliary headlights become regular light.

3 - Hazard light switch

To turn on the hazard light, partially press down the switch. To turn it off, press the switch upper part.

Turn the hazard lights on whenever driving on public roads, unless the local traffic regulations do not permit it.

4 - Rear service headlight switch

By pressing down this switch, the rear service headlight is turned on.

5 - Turn indicator switch

Before moving sideways, use the turn lights by operating the switch (5). After the maneuver, it will be necessary to press the switch to the central position (off).



NOTE:

The cab front lights are turned on through the switch fitted on the cab roof, located next to the air conditioner controls.



Fig. 88

6. Starter switch

It has four positions, in sequence, on the clockwise direction:

A - Off. This position turns the engine off.

B - Turns on the warning light system.

C - Turns on the engine pre-heating system for cold starting (if equipped).

D - Activates the starter motor: The PTO drive lever must be on OFF position, the reverse lever (8x8 transmission) and/or the Low-High speed range selection lever must be in the neutral position.

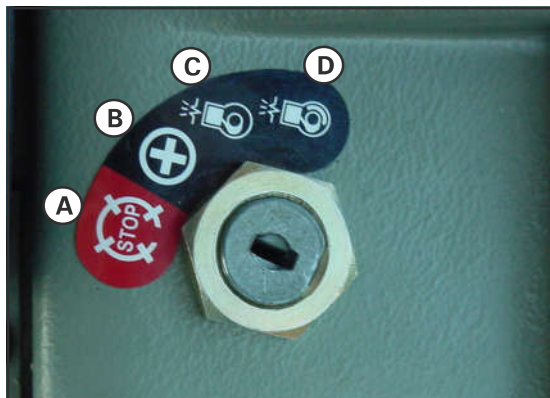


Fig. 89

3 - Combination meter and commands

4 - Identification of headlights and turn lights



NOTE:

All lamps are essential items for your safety. Thus, always keep them in perfect operational conditions. Burned lamps must be immediately replaced.

Always observe the current traffic regulations in your area to avoid problems.

4.1 - Cab tractors

- 1 - Front services headlamps

For night works. Turn them on under daylight when driving on public roads.

- 2 - Front headlamps (or traffic headlamps)
- 3 - Front turn lights
- 4 - Front turn signal lamps (flasher)
- 5 - Rear service headlamps
- 6 - License plate light
- 7 - Brake lights
- 8 - Turn lights
- 9 - Rear turn signal lamps (flasher)

3



Fig. 90

3 - Combination meter and commands

4.2 - Header tractors

- 1 - Front services headlamps

For night works. Turn them on under daylight when driving on public roads.

- 2 - Front headlamps (or traffic headlamps) (If equipped)
- 3 - Front turn lights
- 4 - Front turn signal lamps (flasher)
- 5 - Rear service headlamps
- 6 - Brake lights
- 7 - Turn lights
- 8 - Rear turn signal lamps (flasher)



NOTE:

All lamps are essential items for your safety. Thus, always keep them in perfect operational conditions. Burned lamps must be immediately replaced. Always observe the current traffic regulations in your area to avoid problems.

3



Fig. 91

3 - Combination meter and commands

5 - Cab and air conditioner

5.1 - General identification

Air outlet (1 and 2)

The air blown by a circular fan is directed to the cab interior through these points. Their opening and angle can be adjusted.

Room lamp (3)

Press the room lamp on, according to the positions indicated:

- Position "0" – (central): The room lamp will be turned on when the cab door is opened and will be turned off when the door is closed.
- Position "1" (ON - completely pressed): The room lamp remains lit.
- Position "2" (OFF - completely pressed): The room lamp remains off.

Space reserved for installation of a radio set (4).

Space reserved for installation of speakers (5).

One at each side, when the radio is installed.

Air flow (6)

Allows the air to circulate in the cab interior through the ventilation system.

Air flow adjustments (7)

By turning the handle to the right side, the air flow in the cab increases, and by turning it to the left side, there will be recirculation of air in the cab. The air flow through a paper filter, located on the roof, will enter into the cab interior.

Sun-visor (8)

The sun visor must be pulled down and can be adjusted, according to the operator's needs.

To return it to the original position, pull the handle (8A).

Rear window (9) and latch (10)

Allows the rear window to be kept open to provide a natural ventilation in the cab interior.

When the window is completely open, it is supported by gas dampers (9A).

Rear transparent panel (11)

Provides a visualization of the traction bar, the Power Take Off shaft and the implement during the tractor operation.

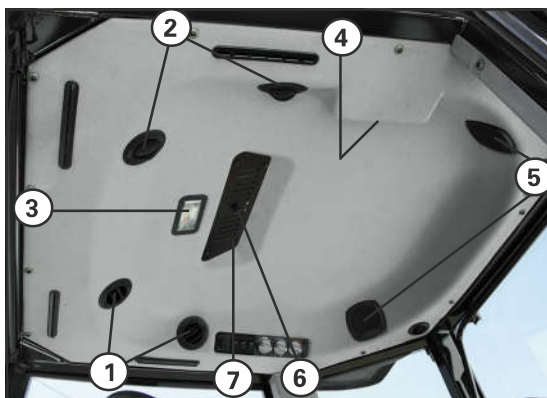


Fig. 92

3

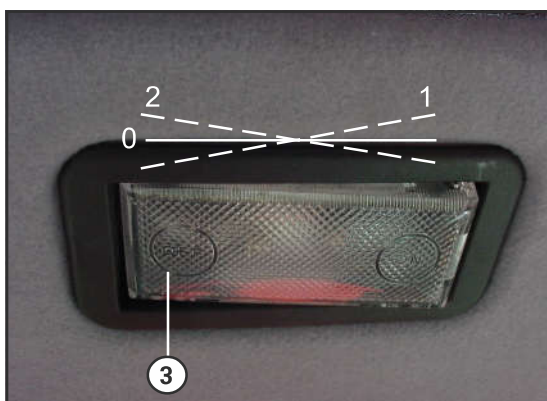


Fig. 93



Fig. 94



Fig. 95

3 - Combination meter and commands

Side windows (12)

The side windows are pivoted by hinges on the rear edge. To open them, push the lever outward.



Fig. 96

Rearview mirrors (13)

The rearview mirrors can be adjusted. If it is necessary to keep a stand still position, the following procedure must be performed:

- Mirror angle:
Turn the mirror on the vertical shaft, by releasing the bolt (13A). Then, re-tighten it.
- Moving the mirror forward or backward:
Release the bolts (13B) and reposition the mirror structure (mirror + strut), as necessary. Then re-tighten all bolts.

After installed, the from cab to the mirror can also be adjusted through the length adjustment on the mirror strut.



Fig. 97

Carrier (for objects) (14)

They allow the storage of a great number of useful objects in the cab interior.



Fig. 98

Electric outlet (15)

12V Outlet voltage and current between 5-8.5A.

Ash tray (16)




Fig. 99

3 - Combination meter and commands

5.2. Cab controls

Operation switch for the front service light in the cabin (1).

 **NOTE:**
Do not leave the front service lights in the cab turned on for long periods of time when the engine is not operating. This can discharge the battery.


Front wiper switch (2)

This switch has 3 positions: Off, Low and High speed.

Front washer nozzle switch (3)

Press down the switch to activate the nozzle. Keep the switch pressed until the glass is clean.


The nozzle electric motors are protected by thermal relays. So, if there are no obstacles to prevent the wipers from moving, the system will be protected and reset after 5 minutes.

 **NOTE:**
The washer water reservoir (8) for the windshield is located on the cab rear. Keep it within the correct level of water and antifreeze.

Do not use detergents, as these products can damage the wipers rubber and even the electric pump.

Precautions for low temperatures (Cold weather).

The Antifreeze compound must be added in the windshield wiper system. Use Ethylene-glycol additives, available at the Massey Ferguson Dealers. The correct ratio in the reservoir must be 70% water and 30% antifreeze.

 **NOTE:**
Do not use more than 30% of antifreeze in the windshield wiper system if the temperature is not below -36° C (-31° F).

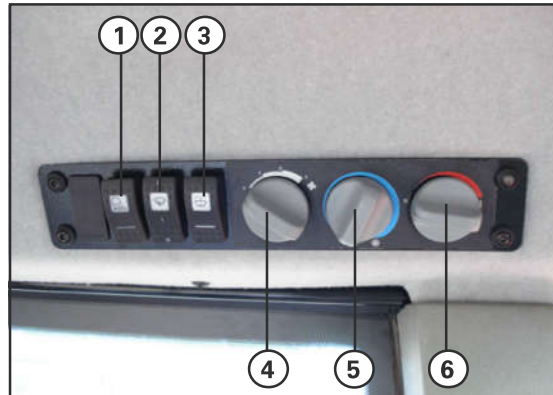


Fig. 100

3

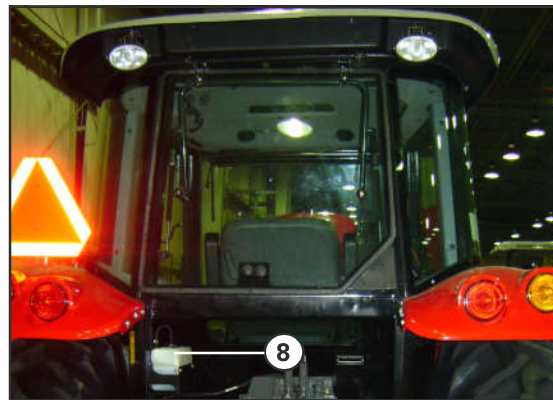


Fig. 101

Ventilation control (4) - 4 positions:

- 0 - Off
- 1 - Recirculation / ventilation
- 2 - Ventilation / medium pressurization
- 3 - Maximum pressurization

Air conditioner control (thermostat) (5)

Adjust the cab interior temperature. Turn the handle to the right side for a refrigerated temperature.

Heating control (6) - Optional

To increase the cab temperature, turn the control button to the right side. The highest temperature are achieved when the engine is working on its normal operational temperature.

To turn on the heating, turn the handle to the left side.

3 - Combination meter and commands

5.3 - Air conditioner and heating operation

Controls

- 1 - Fan button: turns on and allows the adjustment of the pressurization level inside the cab, in 3 speeds. "1, 2 and 3".
- 2 - Thermostat button: adjusts the intensity of cold. By fully turning it on the counterclockwise direction, the air conditioner compressor is turned off.
- 3 - Heating button (Optional) turns on and adjusts the heating. By fully turning it on the counterclockwise direction, the heating is turned off.
- 4 - Directional fins for the air flow that enters into the cab, forced by the fan.
- 5 - Air return register: by opening the register, the renovation of air in the cab is increased,



IMPORTANT:

By closing it, the recirculation of air is increased. It is essential that this operation be performed when facing situations with great concentration of dust.

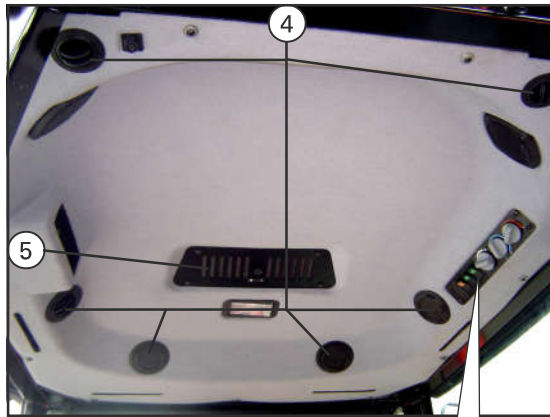


Fig. 102



Fig. 103

Sequence to operate the system:

- a) Turn on air conditioner, turning the fan button (1). At first, leave it in position "3" (maximum pressurization)
- b) Turn the temperature regulator (thermostat button - 2) also to the maximum position.
- c) When cab temperature reaches desired level, turn the thermostat button to an intermediate position.
- d) Change the fan speed by the button (1), if desired.
To operate just the ventilation, turn on only the fan, using the button (1);
- c) Adjust the air flow direction through the directing fins (4). The fin supports can also be turned.



NOTE:

The maximum pressurization for the can, achieved in the positions "2 and 3" in the button (1) is specially important when working in very dusty conditions, as these features prevents the dusty from entering the cab.

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4 - Preparation



1 - Tractor ballasting

1.1 - What is ballasting?

To achieve the optimum performance, the tractor must have the appropriate weight for each kind of operation.

Lack of weight results in.

- Excessive slippage, which causes lack of traction power.
- Increased fuel consumption.
- Increased tyre and mechanical parts wearing in the tractor.

On the other hand, the excess of weight is also harmful:

- Excessive soil compaction
- Larger resistance to the tractor motion and, as a result, increased fuel consumption and wearing for the tractor.

The ballasting consists of adjusting the tractor weight, as necessary. The general rule is to use the least additional weight (ballast) without causing an excessive slippage,

For each kind of soil or ground, there is an optimal slip ratio:

- Asphalt or concrete - 5.0 to 7.0%.
- Hard soil grounds - 7.0 to 12.0%
- Dried and soft grounds - 10.0 to 15.0%
- Loose (ploughed), sandy or muddy ground - 13.0 to 18.0%

A practical way of checking if the slippage ratio is correct is to analyze the format of the trace left by the rear wheels. See table on the right.

There are two ways of ballasting, which can be used in a isolated or combined way: ballasting by weights (counterweights) and/or ballasting by filling the wheels with water.

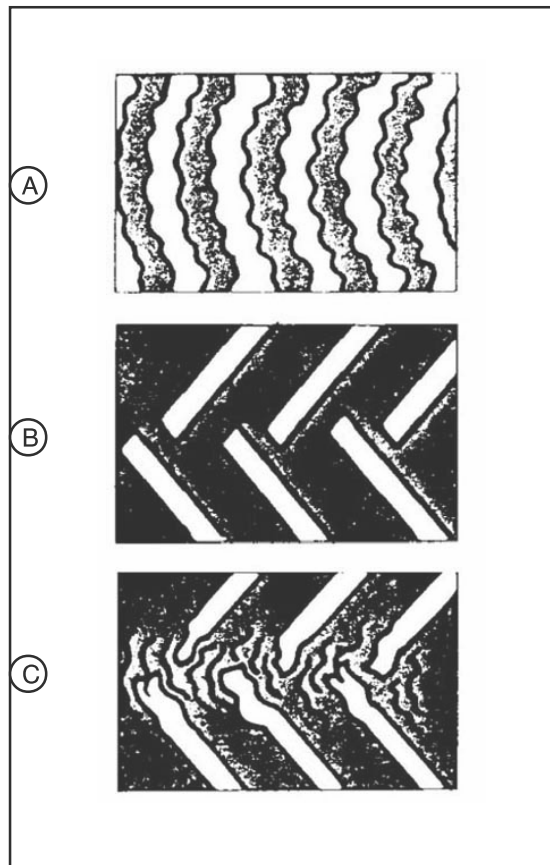


Fig. 104

- A - Tracks on the ground poorly defined. Excessive slippage - increase the amount of ballasting in the tractor.
- B - Clearly defined tracks. Lack of slippage - decrease the ballasting
- C - The ballasting and the slippage will correct when, on the center of the track, there are signs of sliding, and the tracks on the side edges are well defined.

4 - Preparation

Special recommendations

- The total amount of weight put over the front and rear axle can never exceed the maximum allowance recommended for a given axle and wheel set! The excess of weight causes premature wearing and damages to the tyres, and also forces the tractor powertrain and compacts the ground.
- The ballast over the front axle is recommended for:
 - Operations with heavy implements coupled to the hydraulic lifting.
 - Works on leaned grounds, which may raise the tractor.
 - Tractioning of heavy trailers or implements by the traction bar.
- For 4x4 tractors, the ballast must be distributed so that about 40% from the total weight on the tractor, be placed over the front axle, and 60% on the rear axle.
Otherwise, the effectiveness of the traction will be impaired and, in extreme cases, may lead to a premature wearing on the transmission.

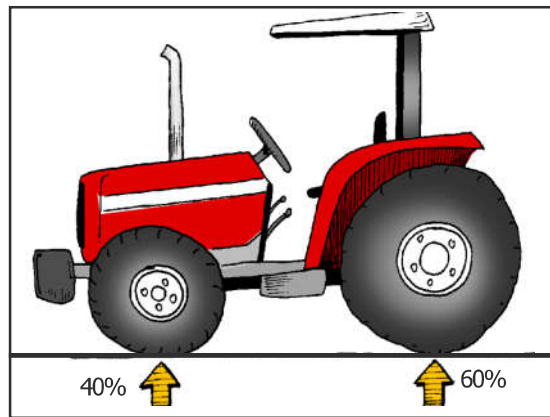


Fig. 105

4

1.2 - Ballasting with counterweights

It can be performed by using metallic discs (1) attached to the front wheels or metallic plates (2) assembled on the tractor front end.

NOTES:

- *Observe all safety measures when handling ballasting wheels and counterweight.*
- *Securely tighten the weight clamping bolts. After a few hours of working, and periodically, fasten the bolts.*

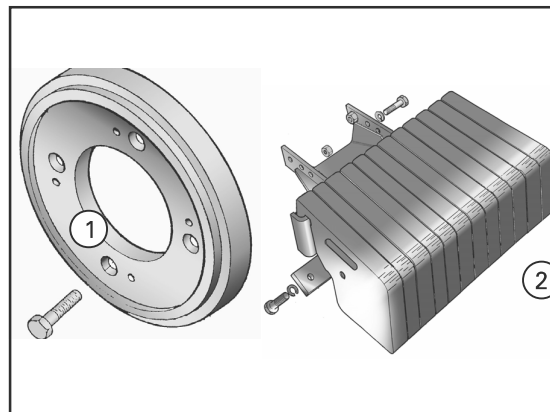


Fig. 106

4 - Preparation

1.3 - Ballasting with water

It consists on introducing water into the wheels, through the calibration valve, using a device (1) which introduces water and allows the exit of air at the same time.

Procedure

- With the tractor levelled, lift the axle where the wheels you want to add the ballast are installed, using appropriate safety stands.
- Turn the wheels, so that the valve stays on the top and remove the valve using a universal pliers.

NOTE: carefully remove the valve and fasten it firmly in order to prevent it from being thrown away.

- Install the device (1) on the valve position, connected to a hose with drinkable water.
- When the tyre volume is about 3/4 (75%) full of water, the excess will be drained through the draining tube on the device (1).



NOTE:

Do not completely fill the tyres with water, as they will loose their flexibility to absorb shocks (impacts) from the ground irregularities - see illustration.

- Remove the device (1), reinstall the valve and calibrate the tyre pressure.

NOTE: apply 30 pounds (psi) of pressure to make sure the tyre bead will be correctly fitted on the rim. Then, allow the excess of pressure to be relieved through the valve until you obtain a pressure around 1-2 pounds above the recommended pressure for work, as specified in section 6 "Maintenance".

Draining the water from the tyre

- Park the tractor in a free area in order to prevent damages from the water jet coming out from the tyre valve.
- Position the tractor wheel with the valve on the rim lower side and remove it firmly and carefully.
- Allow the water to be completely drained and, then, re-calibrate the tyre to the recommended pressure.

Detail of the tyre filling valve with water and elimination of air through the tube (1).

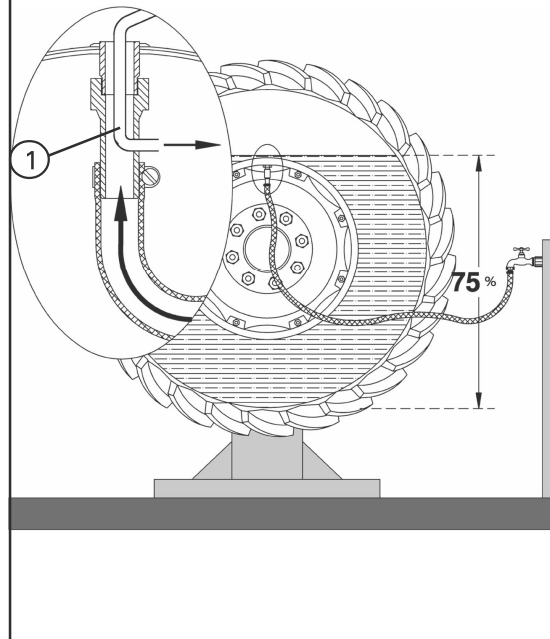


Fig. 107

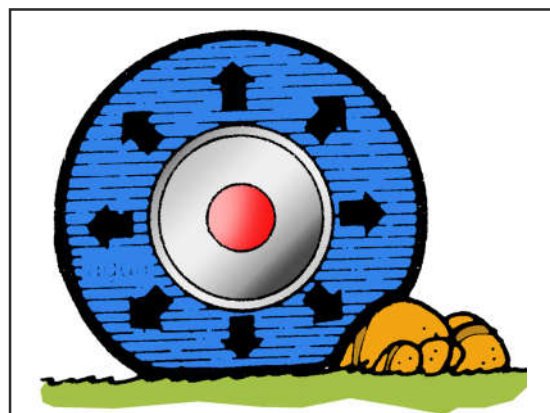


Fig. 108

4 - Preparation

2 - Tractor gauge adjustment

The gauge is the measure between the wheels center and, except for special cases, can be adjusted according to the operational needs.

- Operation type and implement:
- Type of crop
- Type of soil or ground

Examples:

- A - During a pulverization, the gauge must be such as the wheels can pass on the crops lines, in order to reduce to its maximum the smashing of plants
- B - On the plowing, the tractor gauge will establish the cutting width for the the first disc, or moldboard, which must be the same for the other discs.

Procedure for the gauge adjustment:

2.1 - 4 x 2 front axle

If the front axle is a gauge adjustable type, this adjustment is performed through the displacement of the telescopic bar (1), in relation to the gutter (2); To do so, remove the bolts (3 and 4) and move the complete wheel assembly to the desired position.

NOTE: when the axle is equipped with a third bolt (item 5) in both sides, remove them too.

For each hole on the bar (1) the gauge is changed by 50mm, on the corresponding side, what results in a 100mm change on the total front gauge.

NOTES:

- Move the steering bar (6) on the same distance of the main bar (1) displacement in order to keep the correct convergence angle for the wheels. To do so, loosen the clamp or the lock (6a).

See also Section 6, "Maintenance" about the convergence adjustment for the wheels.

- The assembly position for the bars (1) must be equivalent in both sides of the axle.
- The bar (1) must be assembled, at least, in 2 holes in the gutter (2), by using the bolts (3 and 4). If the axles features 3 bolts in each side, store the bolt (5) with the corresponding nut and washer.
- After achieving the correct gauge, fasten the bolts and nuts to the torque specified in Section 6 - "Maintenance".

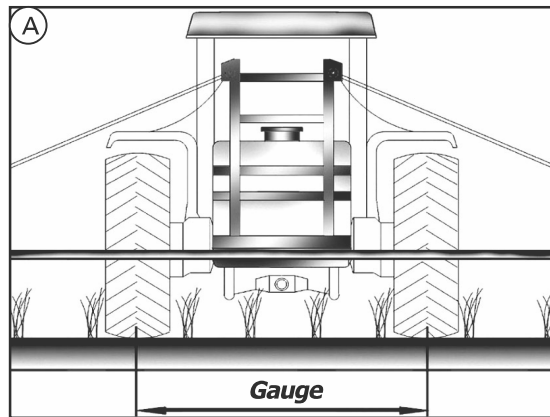


Fig. 109

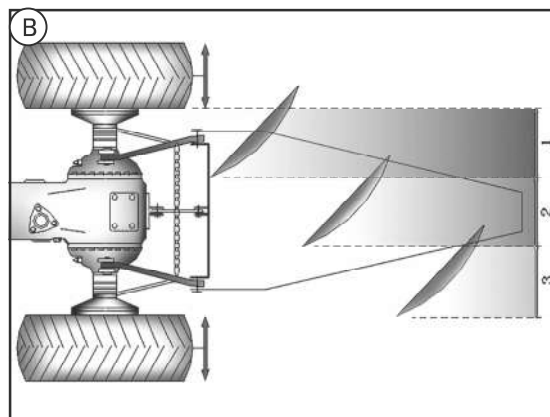


Fig. 110

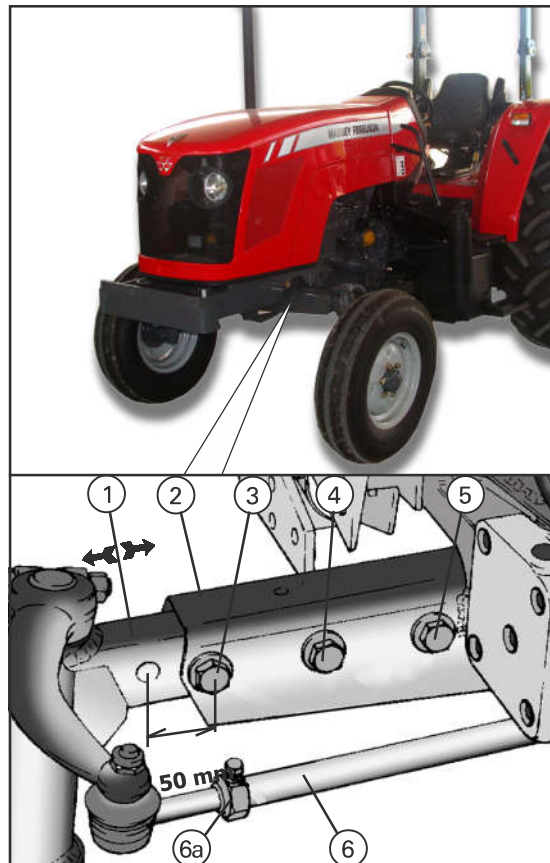


Fig. 111

4 - Preparation

Table I: Front axle gauge 4x2

Arrangement Wheel	MF 425 7.50-16F2	MF 435 to 455 7.50-16F2
A	1300	1390
B	1400	1490
C	1500	1590
D	1600	1690
E	1700	1790
F	1800	1890
G	1900	1990

2.2. Front axle gauge 4x4

A) Rim and reversible disc type

The wheels for these axles are rim and reversible disc type. This systems allows up to 8 different gauge arrangements, according to the chosen assembling scheme for the wheel components.

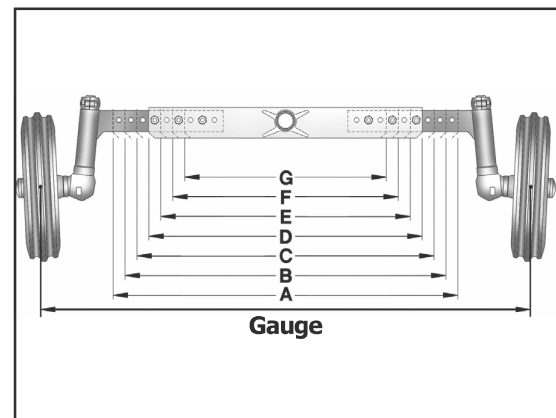


Fig. 112

4 - Preparation

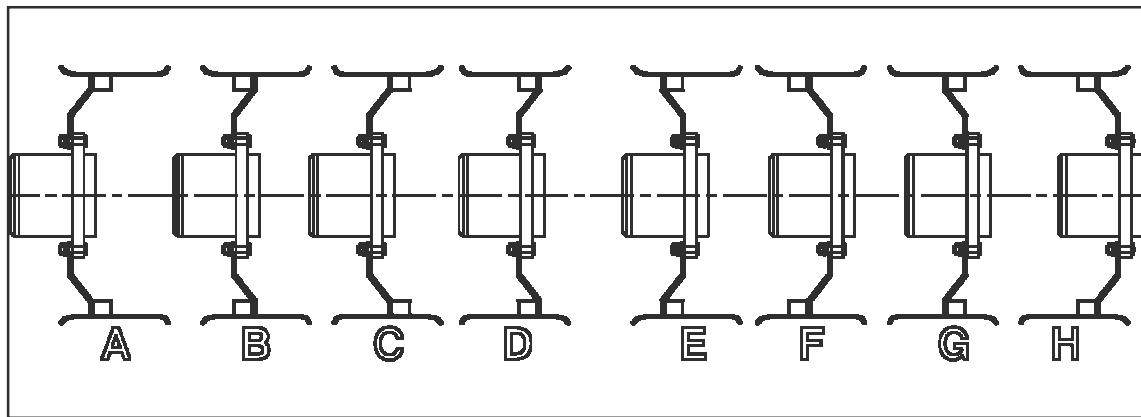


Fig. 113

4

The assembling variations (Arrangements) are as follows:

- Wheel disc position: Concave side facing in (schemes A, B, C and D) or out (schemes E, F, G and H).
- Discs position on the rim fixing stoppers: stoppers inside the disc (schemes A, C, E and G) or outside the disc (schemes B, D, F and H).
- Rim mounting side: larger extension facing in (A, B, E and F) or out (C, D, G and H).

- 1 - Tyre
- 2 - Rim
- 3 - Disc
- 4 - Fixing stopper

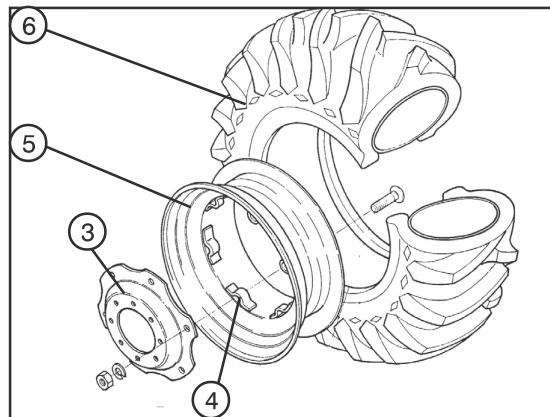


Fig. 114

Instruction to change the gauge:

- Based on the desired gauge (in mm), see Table II to choose the corresponding arrangement, from "A to H". The "A" arrangement allows the minimum gauge, while the "H" arrangement, the maximum gauge.
- Lock the rear wheels and lift the front axle, supporting it on safety stands. **Never use the jack to support the axle!**
- When it is necessary to invert the rims, change the whole wheels set side (left wheel to the right side and vice-versa), in order to prevent the "V" on the jaws from being inverted.
- After the change, fasten the wheel discs fixing nuts to the correct torque and the to the nuts fixing the discs to the rim, along the stoppers. Consult the torque specifications in Section 6 "Maintenance".
- After working a few hours, check the nuts tightening again. Never operate the equipment with loose bolts and nuts.
- It is recommended to check the front wheels convergence after adjusting the gauge, Consult the procedure in Section 6, "Maintenance".
- Based on the wheel set used, some minor arrangements may cause problems, as in close turns a larger tyre may interfere with the pawls in the tractor.
In other situations, decreasing the steering turning angle may be sufficient. However, in this case the tractor turning radius will increase, i.e., it must be necessary a larger space to make tight turns.

4 - Preparation

The wheels steering angle is limited by two stopper bolts (2) - one in each side of the axle.

- a) Loose the locknut (1) and turn the adjusting bolt (2) to the counterclockwise direction to decrease the steering angle, and vice-versa.
The bolt head (2) is the limiting stopper for the steering.
- b) Adjust the 2 bolts evenly, so that during a full steering rotation to either side, the tyres do not interfere with the tractor.
- c) Re-tighten the locknuts (1).

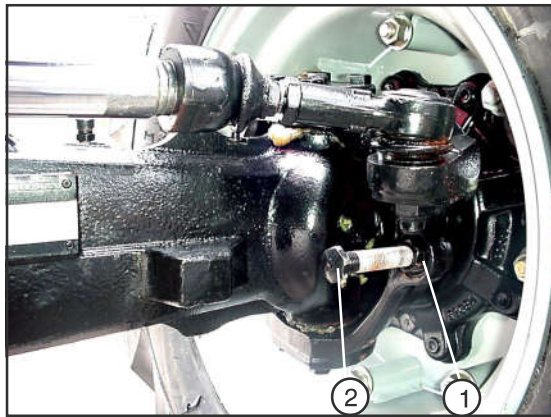


Fig. 115

4

Table II: front axle gauge 4x4 with reversible stamped disc wheel.

MF 425, 435 and 440	A	B	C	D	E	F	G	H
12.4x24R1 - ZF 3035	1433	1543	1445	1555	1605	1715	1617	1727
12.4x24R1 - Ca 20.14	1543	1653	1555	1665	1715	1825	1727	1837
MF 445 and 455	A	B	C	D	E	F	G	H
14.9x24R1 - ZF 3045	1540	1650	1738	1848	1712	1822	1910	2020
14.9x24R1 - Ca 20.18	1670	1780	1868	1978	1842	1952	2040	2150

Depending on the wheels installed, some arrangements may not be possible, or it may require an excessive reduction on the steering angle.

4 - Preparation

B) Narrow Tractors, equipped with 7.00x18 R1 and 8.00x18 R1 wheels and discs welded to the rim.

The adjusting procedure for the gauge on 4x4 axle with this wheel set is identical to the others, as described on item A), except for an eventual reduction on the steering angle.

The only difference is that the wheel central disc is welded to the rim.

So, it can be achieved only 2 gauge arrangements in such case.

X - Smaller Gauge: wheel disc with the concavity facing in.

Y - Larger gauge: wheel disc with the concavity facing out.

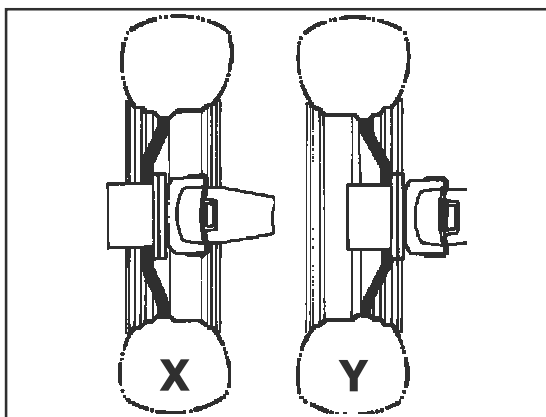


Fig. 116

4

Table III: gauges achieved with "X and Y" arrangements

For ZF axle

Arrangement	Tractors
X	1514 mm
Y	1626 mm

For Carraro axle

Arrangement	Tractors
X	1624 mm
Y	1736 mm

2.3 - Rear axle

The adjusting procedure for the rear axle gauge depends on the wheel set installed.

It can be used 4 different types of rear wheels. Each wheel type can bear a given number of tyres and features an specific system to change the gauge, as described below:

- A - "Rice" type wheel
- B - Rim and reversible disc wheel type
- C - Wheel with self-adjustable gauge - PAVT system
- D - Casted disc wheel

A) "Rice" type wheels

These wheels do not allow gauge adjustment, as the disc is fixed to the rim.

Also, the tyre used for these wheels is larger (for a better floating), which impairs the side inversion for the wheels assembly.

The gauge achieved on tractors equipped with these wheels usually is within 1800-1850 mm range, and also depend on the time of use of the tyres.

During the assembly of these wheels, fasten the discs fixing bolts to the rear axle according to the torque specification in Section 6, "Maintenance".



Fig. 117

4 - Preparation

B) Rim and reversible disc wheel type

The procedure to change the gauge is the same as for the rim and disc type wheels for the front axle.

The arrangement related to smaller gauges (A, B, ...) usually are possible, due to the interference of the wheels with the fenders,

The larger the tyre, the more difficult the arrangements are.

Procedure

- Consult Table IV to choose the arrangement relative to the desired gauge,
- If the wheel assembling side is to be changed, release also the nuts fixing the discs to the axle and change the side of the wheels to prevent the inversion of the wheels pawls.
- Raise the rear axle and chock it securely. Never use the jack to support the axle!
- After the assembly, tighten the nuts to the torques specified in section 6 "Maintenance".

4

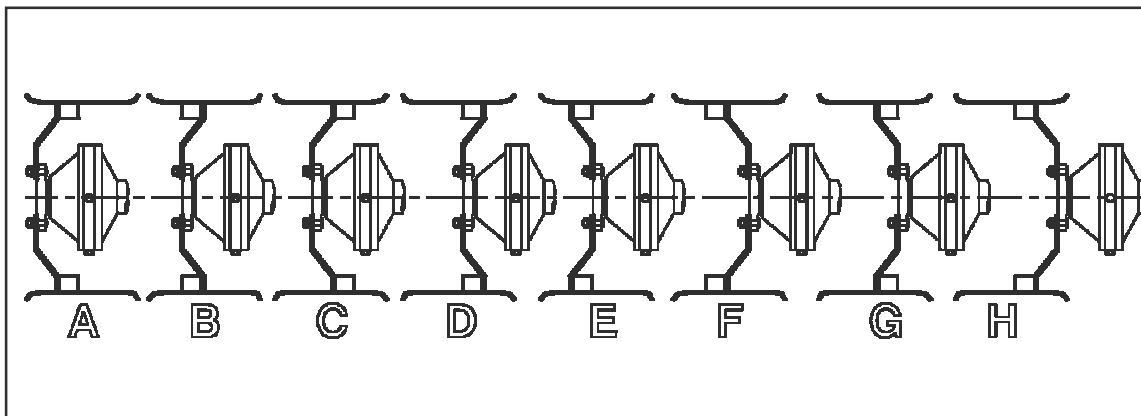


Fig. 118

Table IV: rear axle gauge with reversible stamped disc wheel.

MF 425, 435 and 440 18.4x30R1	A 1451	B 1561	C 1651	D 1761	E 1859	F 1969	G 2059	H 2169
MF 445 and 455 18.4x34R1	A 1425	B 1540	C 1830	D 1940	E 1830	F 1940	G 2230	H 2340

4 - Preparation

C) Rear wheels with PAVT system

It is a “servo-adjustable” system which facilitates the rear gauge change.

It requires the wheel removal just to achieve the maximum gauges, when it necessary to invert the wheel discs.

The discs on these wheels are heavier, which turns them a kind of counterweight.

Possible gauge arrangement for PAVT wheels:

The discs are fixed to the rim by using clips (1) and helicoidal trails (2). In each wheel, there is a master-trail (3) with a number of holes (5). On the master-trail, there are 2 stoppers (4) which position the corresponding clip (1) over the trail.

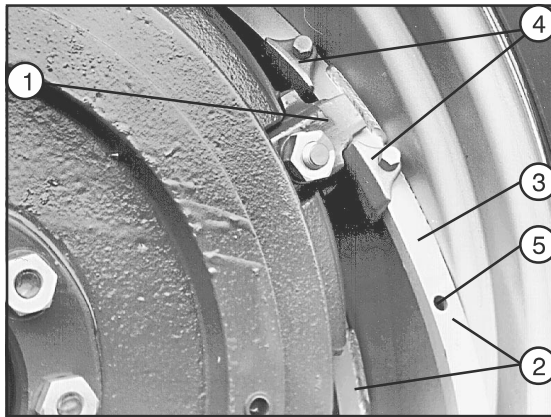


Fig. 119

4

By changing the clip mounting position on the master-trail, the gauge can be varied, due to the helicoidal shape of the trails.

The number of available gauges depends on the amount of holes (5) on the master-trail.

When the maximum or minimum gauge are used, only one stopper is mounted (4) on the master-trail, as the trail end works as a stopper for the other side of the clip.



NOTE:

Observe that, when the discs are inverted, the wheels must be changed to the other side.: right wheel to left side and vice-versa.

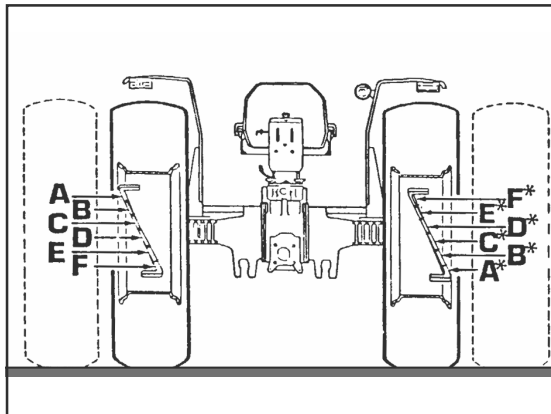


Fig. 120

4 - Preparation

Procedure to change the gauge in PAVT system

- a) Remove the stopper(s) from the master-trail in one wheel.
 - b) Place on stopper in the hole related to the desired gauge - see also the table on the next page;
 - c) Loose the locking nuts from all clips in the wheel.
 - d) Turn the engine on and, with the gear engaged and the opposite wheel locked, control the clips slippage over the trail by the clutch, until it touches the master-trail stopper previously positioned.
 - e) Disengage the gear, stop th engine and place the other stopper on the master-trail.
 - f) Repeat the same procedure for the other wheel.
- * For the "A and F" arrangements, it is used only one stopper, because one side of the clip is directly supported over the master-trail end.
- * If the option is for one of the inverted discs gauges*, first invert the wheel sides and then position the wheels master-trail stoppers as described above. Raise the tractor rear and support it securely.
- * See the tightening torque specifications for PAVT wheels in Section 6 - "Maintenance".

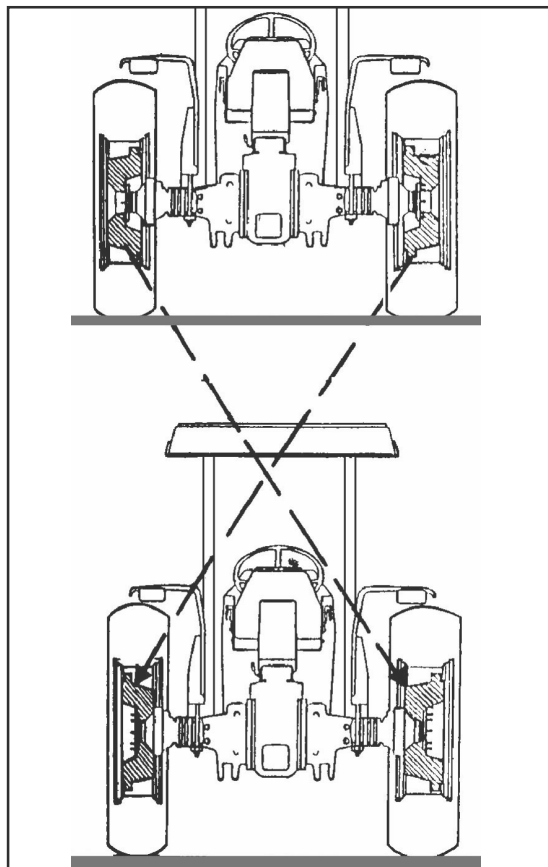


Fig. 121

TRACTOR / DRIVING	ARRANGEMENT / GAUGE											
	With the discs facing inwards						With the discs facing outwards (*)					
	A	B	C	D	E	F	G *	H *	I *	J *	L *	M *
MF 445 and 455 18.4x34R1	1420	1525	1625	1725	1825	1930	1830	1930	2030	2130	2230	2330

*Depending on the tyres driving time, some gauges can not be mounted.

4 - Preparation

D) Casted disc wheel

These wheels have a casted disc, similar to the PAVT system, which allows the counterweight assembly. The wheels usage for this type is for larger tyres to be used in hard ground, i.e., "R1" type claws.

Depending on the tractor and the rear tyres wearing, up to 4 different arrangements can be achieved - "R, S, T and U".

However, due to the large tyres, only one or two gauge variations can be achieved, as indicated in Table V.



Fig. 122

4

Table V: Gauges for the rear axle with casted disc wheels.

MF 445 and 455 Tractors

Driving	Arrangement / gauge			
	R	S	T	U
23.1x30R1	x	1830	x	1875
23.1x30R2	x	x	x	1875

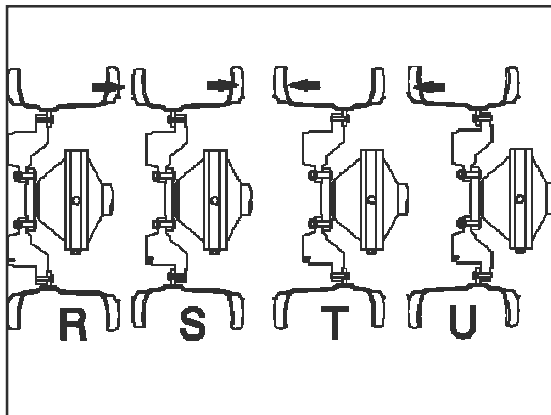


Fig. 123

4 - Preparation

3 - Recommended tyres for your tractor

3.1 - Compatibility between front tyres x rear tyres

It is essential the use of front tyres compatible with the rear tyres for 4x4 tractors.

For these tractors, there is a defined ratio for the tyres diameter which must be kept, otherwise the front traction will loose its effectiveness and mechanical damages may occur. The tyres will also present a premature wearing!

The use of wheel of different diameters, to meet the specific operational requirements, will demand the change of the transmission gear ratio, represented aside. This will require an specialized technical knowledge.

In this case, contact your Dealer.

NOTE: Also, do not mix rice-type wheels (R2) with regular type tyres (R1).

Besides the compatibility between the rear and front axles wheel, observe too the claws wearing level and their correct inflation pressure (See the recommended tyre inflation pressure table in the maintenance section).



Fig. 124

There must not be accentuated differences between the rear wheels wearing and front wheels wearing, as this results on the same consequences from the use of incompatible tyres;

The table below presents the combinations which can be used to choose new tyres for 4x4 tractors.

So, never use tyres of 2 different options. In other words, if you choose type "1" rear tyres, the front tyres must necessarily be type "1" tyres.

Recommended combinations for rear x front wheels.

MF 425

Combination of Wheels MF 425	Front	Rear						290/95 R34 Plate
		7.50-16F2 (6L) Medium hub	8.30-24R1 (6L) Medium hub	9.00-16F2 (6L) Medium hub	12.4-24R1 (6L) Plate	12.4-28 R1 (6L) Plate	14.9-24R1 (6L) Plate	
13.6-38R1 (6L)	Plate	X			X			
14.9-28R1 (6L)	Plate	X	X					
14.9-28R2 (6L)	Plate	X						
15.5-38R1 (8L)	Plate	X			X			
16.9-30R1 (6L)	Plate	X						
18.4-30R1 (8L)	Plate	X			X			
18.4-30R1 (10L)	Plate	X			X			
18.4-30R1 (10L)	PAVT	X			X			
18.4-30R2 (6L)	PAVT	X			X			
18.4-30R2 (6L)	Plate	X			X			
18.4-30R2 (10L)	Plate	X			X			
23.1-26R2 (8L)	Plate			X				X
320/90 R42	Plate						X	
320/90 R50	Plate							X

MF 435

Combination of Wheels MF 435	Front	Rear						290/95 R34 Plate
		7.50-16F2 (6L) Medium hub	8.30-24R1 (6L) Medium hub	9.00-16F2 (6L) Medium hub	12.4-24R1 (6L) Plate	12.4-28 R1 (6L) Plate	14.9-24R1 (6L) Plate	
13.6-38R1 (6L)	Plate	X			X			
14.9-28R1 (6L)	Plate	X	X					
14.9-28R2 (6L)	Plate	X						
15.5-38R1 (8L)	Plate	X			X			
16.9-30R1 (6L)	Plate	X						
18.4-30R1 (8L)	Plate	X			X			
18.4-30R1 (10L)	Plate	X			X			
18.4-30R1 (10L)	PAVT	X			X			
18.4-30R2 (6L)	PAVT	X			X			
18.4-30R2 (6L)	Plate	X			X			
18.4-30R2 (10L)	Plate	X			X			
23.1-26R2 (8L)	Plate			X				X
320/90 R42	Plate						X	
320/90 R50	Plate							X

Example: Simple rear wheels: 320/90 R50, equals to the left side wheel: 290/95 R34.

4 - Preparation

Recommended combinations for rear x front wheels.

MF 440

Combination of Wheels MF 440	Front	Rear						290/95 R34 Plate
		Type of disc/rim	Medium hub 7.50-16F2 (6L)	Medium hub 8.30-24R1 (6L)	Medium hub 9.00-16F2 (6L)	Plate 12.4-24R1 (6L)	Plate 12.4-28 R1 (6L)	
13.6-38R1 (6L)	Plate		X			X		
14.9-28R1 (6L)	Plate		X	X				
14.9-28R2 (6L)	Plate		X					
15.5-38R1 (8L)	Plate		X			X		
16.9-30R1 (6L)	Plate		X					
18.4-30R1 (8L)	Plate		X			X		
18.4-30R1 (10L)	Plate		X			X		
18.4-30R1 (10L)	PAVT		X			X		
18.4-30R2 (6L)	PAVT		X			X		
18.4-30R2 (6L)	Plate		X			X		
18.4-30R2 (10L)	Plate		X			X		
18.4-34R1 (8L)	Plate				X			
18.4-34R1 (8L)	Casted/PAVT				X			
23.1-26R2 (8L)	Plate				X			X
320/90 R42	Plate							
320/90 R50	Plate							X

MF 445

Combination of Wheels MF 445	Front	Rear						290/95 R34 Plate
		Type of disc/rim	Medium hub 7.50-16F2 (6L)	Medium hub 9.00-16F2 (6L)	Medium hub 10.00-16F2 (8L)	Plate 11.2-28R1 (6L)	Plate 14.9-24R1 (6L)	
15.5-38R1 (8L)	Plate		X			X		
18.4-30R1 (8L)	Plate		X			X		
18.4-30R1 (10L)	Plate		X			X		
18.4-30R1 (10L)	PAVT		X			X		
18.4-30R2 (6L)	Plate		X					
18.4-30R2 (6L)	PAVT		X					
18.4-30R2 (10L)	Plate		X					
18.4-34R1 (8L)	Plate			X			X	
18.4-34R1 (8L)	PAVT			X			X	
18.4-34R1 (10L)	Plate			X			X	
18.4-34R1 (10L)	PAVT			X			X	
18.4-34R1 (10L)	Slight casted			X			X	
23.1-26R2 (8L)	Plate			X				X
23.1-30R1 (10L)	Casted				X			X
23.1-30R2 (8L)	Plate							X
23.1-30R2 (8L)	Casted							X
320/90 R50	Plate							X



MF 455

Combination of Wheels MF 455	Front	Rear						290/95 R34 Plate				
		Type of disc/rim	Medium hub 7.50-16F2 (6L)	Medium hub 9.00-16F2 (6L)	Medium hub 9.5L-15F2 (6L)	Medium hub 10.00-16F2 (8L)	Plate 10.00-16F2 (6L)		Plate 11.2-28R1 (6L)	Plate 12.4-24R1 (6L)	Plate 14.9-24R1 (6L)	Plate 14.9-26R1 (6L)
13.6-38R1 (6L)	Slight casted					X		X				
15.5-38R1 (8L)	Slight casted			X		X	X					
15.5-38R1 (8L)	Plate		X			X						
18.4-30R1 (6L)	PAVT			X		X		X				
18.4-30R1 (8L)	Plate		X			X						
18.4-30R1 (10L)	Plate		X			X						
18.4-30R1 (10L)	PAVT		X			X						
18.4-30R2 (6L)	Plate		X									
18.4-30R2 (6L)	PAVT		X									
18.4-30R2 (10L)	Plate		X									
18.4-34R1 (8L)	Plate			X				X				
18.4-34R1 (8L)	PAVT			X				X				
18.4-34R1 (10L)	Plate			X				X				
18.4-34R1 (10L)	Casted/PAVT			X				X				
18.4-34R1 (10L)	Slight casted			X				X				
18.4-34R1 (10L)	PAVT			X		X		X				
18.4-34R1 (10L)	G plate disc			X		X		X				
23.1-26R2 (8L)	Plate		X						X			
23.1-30R1 (10L)	Casted				X					X		
23.1-30R2 (8L)	Plate										X	
23.1-30R2 (8L)	Casted										X	
320/90 R50	Plate											X
Dual wheels												
13.6-38R1 (6L)	Casted							X				

Example: Simple rear wheels: 320/90 R50, equals to the left side wheel: 290/95 R34.

4 - Preparation

3.2 - Operation with dual wheels

The use of dual wheels aims to allow to use of the tractor in poor support ground. like sandy, loose or excessively wet or waterlogged grounds,

Thus, this resource must not be considered as a solution to enhance the traction power in dried, firm ground, in services which requires extreme traction power: this will only generate overload for the powertrain!

When using dual wheels in the tractor, observe the following recommendation:

4

- ✓ For the ballasting, add water only in the inner wheels.
- ✓ The outer tire pressures must be 15% lower than the inner tires. These should be calibrated as shown in the table in section "Maintenance".
- ✓ Wheel fixing nuts tightening torque this procedure requires a more frequent inspection.



Fig. 125

4 - Power Take Off



ATTENTION:

The PTO axle and the implements connect through this shaft may be extremely dangerous; thus, always observe the following instructions:

DO NOT operate the tractor without the PTO cover installed. This cover prevents accidents, and also prevents damages for the grooves.

Before operating, adjusting or working with PTO-driven implements, uncouple the PTO, stop the engine and remove the key from the ignition. DO NOT work under lifted equipments.

Before coupling a PTO-driven equipment and after using it, ALWAYS lift and lower the implement very carefully, using the Positioning control. Also, check for plays, the correct slippage of the PTO axle and its joints.

Make sure the PTO protection is installed.

Make sure all PTO-driven implements are equipped with the correct protection devices, in good working conditions and complying with the current safety standards.

NEVER step on the cardan axle.

Also, never use the traction bar or the implement as a support or step.

NEVER use the cardan axle as a support or step;

NEVER wear loose clothes, which may be trapped in the cardan axle.

Keep yourself away from the cardan axle, at a distance equivalent to your height.

The PTO axle, installed on the tractor rear side, has 6 grooves and a 35mm (1 3/8 in.) diameter, with an annular groove for the implement coupling fixing.

For tractors with double revolution speed (540 and 1000 rpm), an additional shaft is supplied to operate at 1000 rpm.

This axle presents the same features as for the 540 rpm shaft, except for the number of grooves. 21.

Before operating, make sure the axle is correctly installed. To replace the axle, consult the procedures on the next page,

A removable cover (1) protects the grooves and the operator when the axle is not being used.

The protector (2) provides an extra protection for the operator.

4

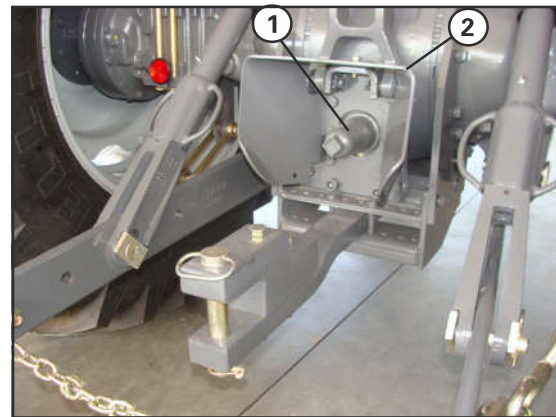


Fig. 126

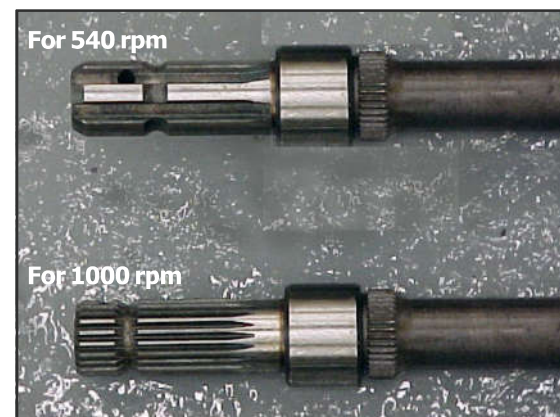


Fig. 127

4 - Preparation

4.1. Clutch stage replacement

NOTE: This procedure is necessary to allow the uncoupling of the 2nd stage in the clutch, which allows the uncoupling of the PTO:

- *Clutch 1st stage:: de-activate the transmission for the wheels.*
- *2nd stage (total travel): keeps the transmission coupled and de-activates the PTO.*

The limiting stopper selects between the 1st and the 2nd stage and is located over the clutch pedal.

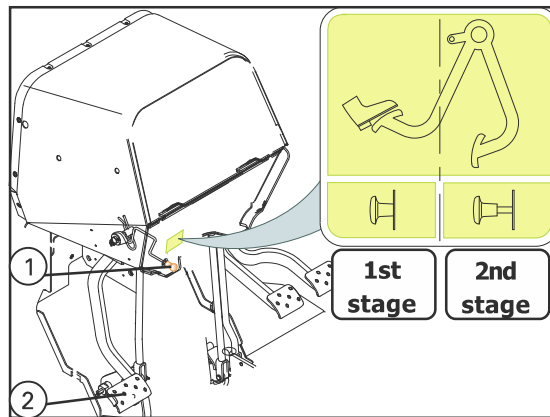


Fig. 128

4

To use the PTO/Deactivate the 2nd stage:

- a) Pull the handle (1) on the limiting stopper for the clutch 2nd stage.
- b) The clutch will be released to use the PTO.

After using the PTO

- a) With the foot not on the clutch pedal (2), push the handle (1) for the limiting stopper of the clutch 2nd stage.
- b) The clutch will be locked for the 2nd stage.

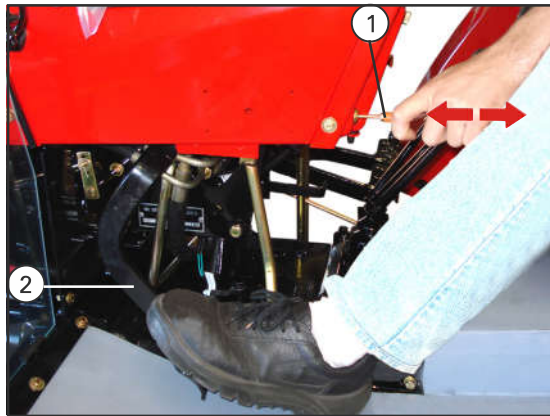


Fig. 129

4.2 - Independent Power Take Off

It is not necessary to use the clutch pedal to operate this system. With the engine working at low rpm, move the IPTO driving lever forward again and, then adjust the engine speed to achieve the desired rpm on the axle, as indicated on the tachometer panel Display. To uncouple it, reduce the engine speed and move the IPTO driving lever backward.



CAUTION!

*Never operate the PTO while the engine speed is above the recommended rpm:
630 rpm for the 6 grooves shaft;
1170 rpm for the 21 grooves shaft;*



Fig. 130

4 - Preparation

4.3 - Output shaft replacement

- a) Position the tractor so that its rear part is higher than the front side. This will prevent oil leakage through the axle housing.
- b) Stop the tractor and engage the parking break.
- c) Remove protection cover (1) from shaft.
- d) Using an appropriate tool, remove the threaded cover (2).
- e) With the help of an universal pliers, compress the snap rings ends (3), releasing the ring from the housing.
- f) Manually, pull the axle out of housing.
- g) Insert the other axle, carefully fitting it on the inner gear grooves.
- h) Mount the snap ring on its respective groove and then install the cover (2).
- i) Apply grease on the cover, after changing the output shaft.



NOTE:

Never operate the tractor if the axle is not installed. Before adjusting or service the PTO-driven equipment, always turn the tractor off and apply the parking brake.

4.4 - Changes on the panel programming

Due to the existence of an electronic system to detect the speed of the power take off axle on the panel, it is necessary to change the whole programming whenever the the shaft is changed.

For that, proceed as follows:

Procedure

- a) Stop the tractor and engage the parking break.
- b) Open the cover to access the fuses (1).
- c) Remove the three bolts (2), turning them on the counterclockwise direction and then remove the cover (3).



NOTE:

There is a lock to perform the closing between the harness and the cover (3). Be careful with the assembly, as the dust and dirt can get on the electronic board and damage it, if this lock is removed.

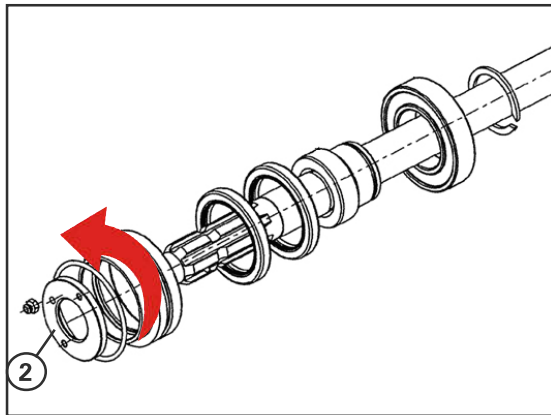


Fig. 131

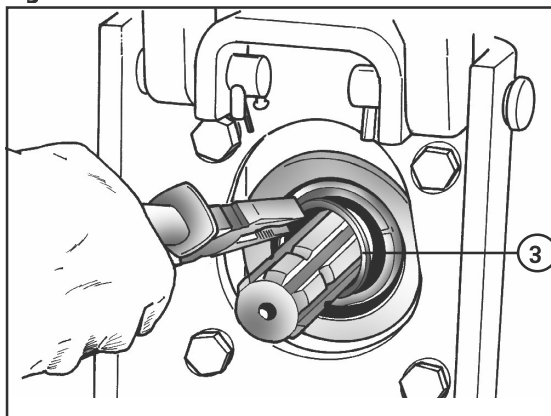


Fig. 132

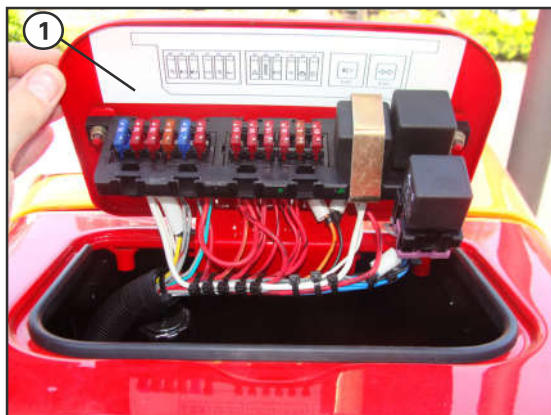


Fig. 133

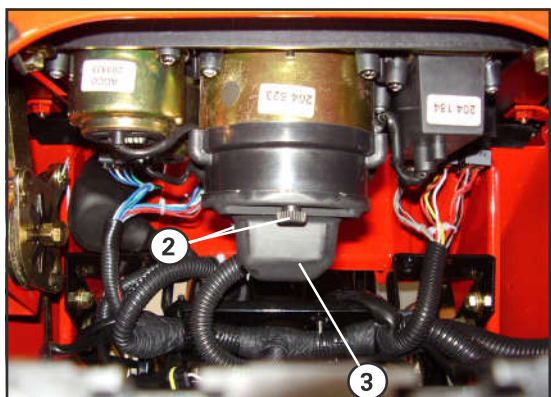


Fig. 134

4

4 - Preparation

- d) Turn the ignition key to the position where the panel lights come on. The tachometer Display must turn on.
- e) Press the PGRI button, located behind the tachometer, as many time as necessary, until the PTO programming value is displayed.
- f) Use the programming values below, according to the application of the power take off.

Programming parameters - 12x4 transmission

540 rev/min	1000 rev/min
PTO 01	PTO 02

Programming parameters - 8x8 transmission

540 rev/min	1000 rev/min
PTO 03	PTO 04

To change the parameter value, move the power take off driving lever (4) as many times as needed to setup the correct value.

- g) Turn the ignition key off so that the new programming will be stored.
- h) Re-install the cover (3) with the locks (2) and fit the panel back on the tractor console.
- i) Start the engine and check the speed displayed on the panel.



NOTE:

Check the speed which is being measured on the power take off. The decal on the speed scale shows the revolutions the engine must be, in order to achieve 540 or 1000 rpm.

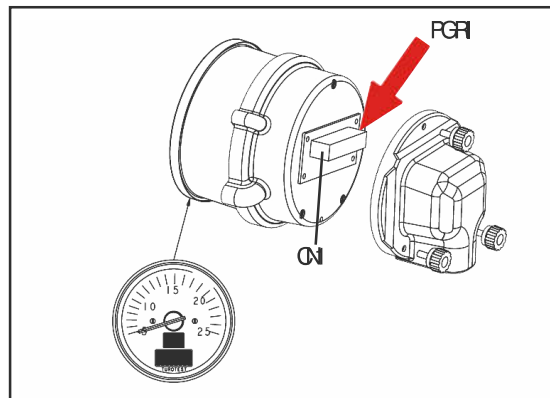


Fig. 135



Fig. 136

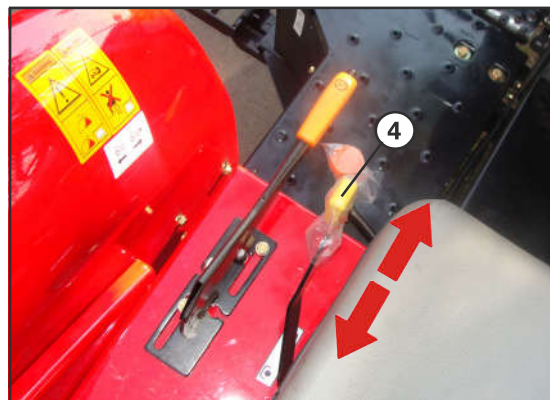


Fig. 137

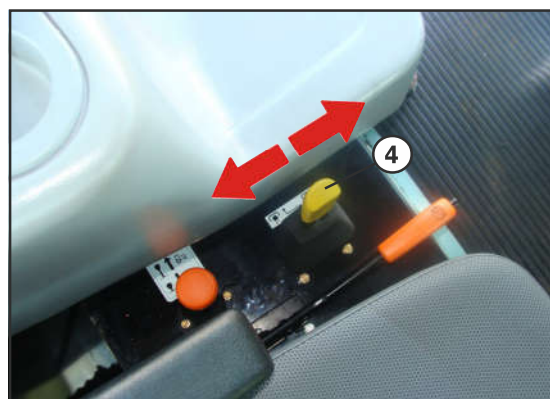


Fig. 138

4

5 - Traction Bar

The Series 200 tractor may be equipped with 3 types of traction bars, as shown below.

All bars, except for the straight one, allow the height adjustment from the ground.

Fig. 108 - Straight bar.

Fig. 109 - HD Bar with step and head

Fig. 110 - Bar with step

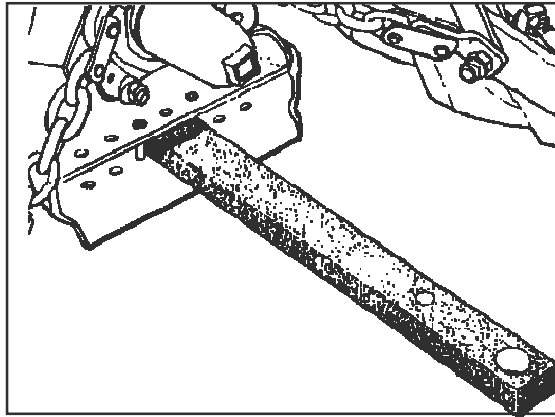


Fig. 139

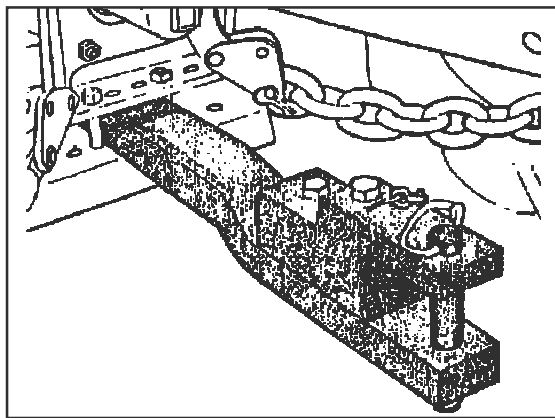


Fig. 140

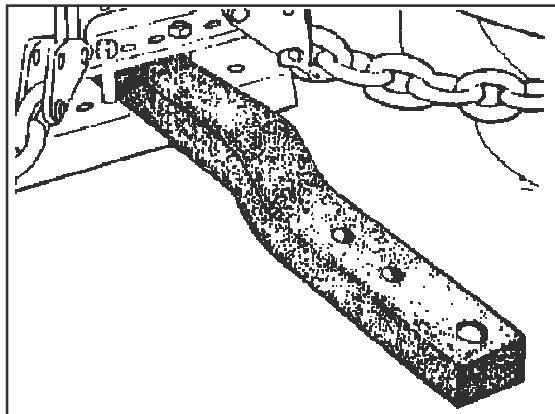


Fig. 141

5.1. Traction bars height change

Straight type bar

Does not allow changes on its height.

Bar with step without head

Allows 2 different heights:

- 1° step upward
- 2° step downward

Bar with step and head

Allow 4 height adjustment position - see illustration.

- 1 - With a step downward and head upward.
- 2 - With a step and head downward .
- 3 - With a step upward and head downward.
- 4 - With a step and head upward .

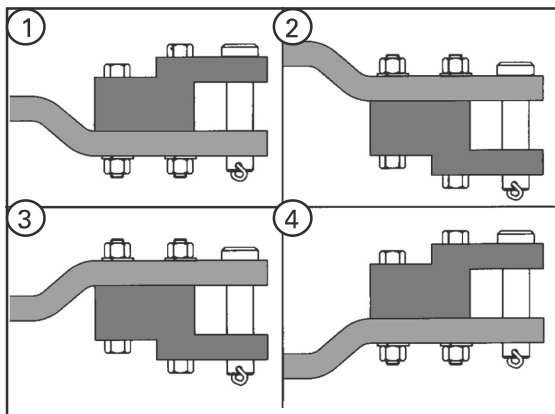


Fig. 142

4 - Preparation

The change on the traction bar height from the ground aims to allow that the the implement or trailer bar be in a parallel position to the ground, in case the implement header has a different height.

When the bar bar is not parallel the ground, two problems may occur:

A - Bar too low: the tractor loses adherence on the rear axle.

B - Bar too high: the tractor loses weight and stiffness on the front axle.

C - Bar (or header) correctly leveled.

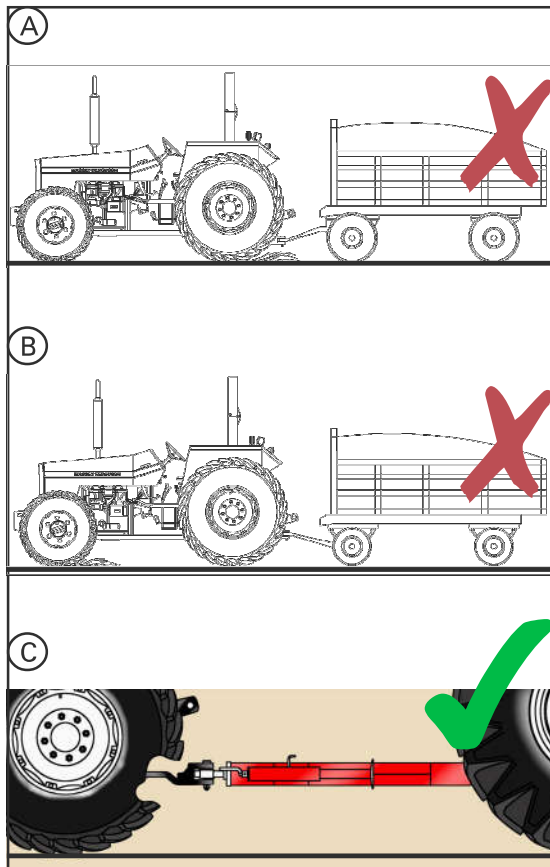


Fig. 143

5.2. Traction bars length change

To make the changes, remove the lock (T) and the pin (P) under the rear housing and move the bar to the desired position.

Then, re-install the pin and the lock.

CAUTION!

In some tractor, instead of a "R" type lock, the locking can be achieved by a small plate fixed by bolts. In either case, always lock the pin correctly!!!!

The length change is necessary in 2 situations:

- 1 - When towing implements or trailers: if the implement header interferes with the claws on the wheel in tight turns, the bar must be extended,

To tow trailers, try to use the bar in its shortest position, due to the weight that acts vertically over the bar and/or due to bar warpage.

- 2 - Operation with double speed PTO / IPTO: keep the distance "A" on the correct length between the PTO shaft end and the pin center, on the traction bar.

See below:

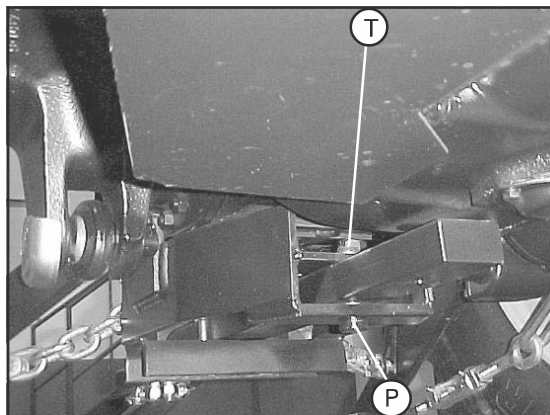


Fig. 144

4 - Preparation

- For PTO with 540 rpm shaft, A = 356 mm (14 in.)
- For PTO with 1000 rpm shaft, A = 486 mm (19 in.)

5.3 - Operation with traction bar.



WARNING!

To tow trailers or implements on public roads, it is recommended the use of a safety chain (1).

The chain must feature a resistance larger than the towed equipment gross weight, in order to keep the control in case of break or damages to the coupling pin, or some other component. After installing the chain, make some maneuvers to check if the equipment adjustment is correct. This adjustment must allow tight turns, but without large radius.

NOTE: The traction bar support may be equipped with a handle to fix the safety chain (1) - see figure below.

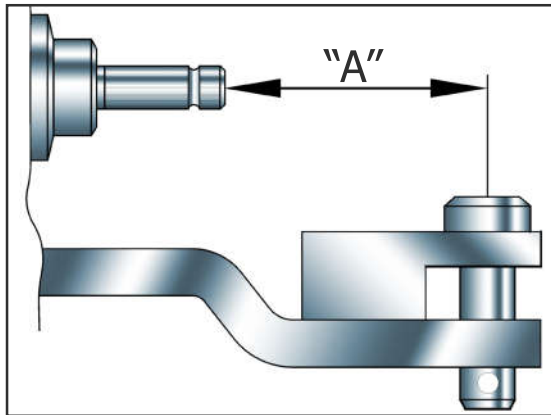


Fig. 145

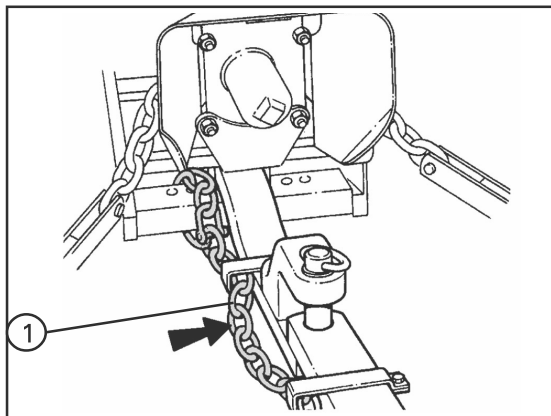


Fig. 146

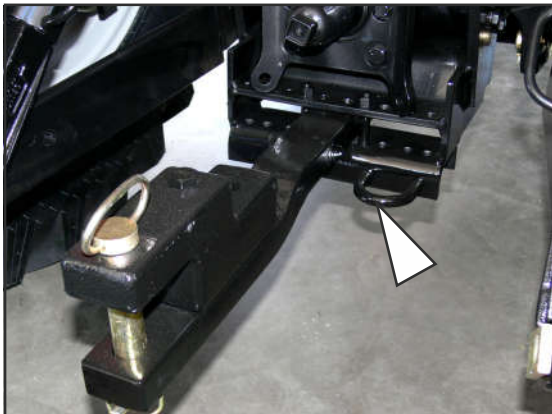


Fig. 147

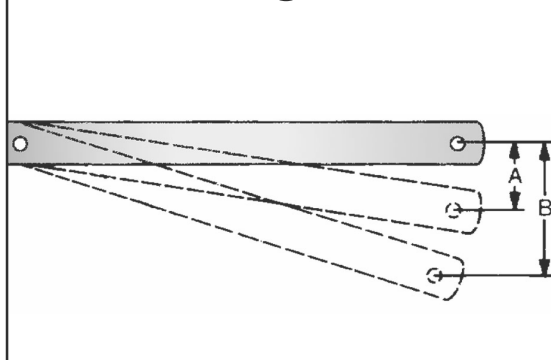


Fig. 148

Bar lateral displacement

In some cases, when operating with implements assembled on the hydraulic lifting and/or operated with the PTO axle, it is necessary to move the bar sideways or remove it from the tractor, in order to avoid interferences with the cardan shaft or implement parts with the traction bar.

Remove one of the pins (2), displace the bar and re-install the pin and the lock.

Bar lateral oscillation

While towing large ground tool, it may be convenient to low the swing bar. To do so, remove the pins (2).

4

4 - Preparation

6 - Protection Structure Against Roll Over (EPCC)

The EPCC is designed to protect the operator in case of a roll-over. The EPCC upper side can be folded to be transported in a truck, or for filed working situation where the height limits its use. When the EPCC is folded, the seat belt **MUST NOT** be used. Pay double attention in such situation. On the folded position, the structure does not provide protection for the operator.

The EPCC must be kept on the vertical position the whole time, unless it is being operated under the situations described above.

Always keep the EPCC in the vertical position and locked. In this case, the seat belt **MUST BE** used and buckled.

If the EPCC is damaged during the operation:

DO NOT Weld, drill holes, fold or disassemble it.

DO NOT - Operate the tractor with a damaged EPCC.

Observe the following point too >

DO NOT - Fix chains, ropes or cable to the structure to tow anything. Use only the traction bar lower part for towing.

DO - Make sure the structure is correctly fixed to the tractor.

DO - Make sure all components are in good condition, in order to obtain the intended protection

DO - Always use only Massey Ferguson original parts to make sure the structure integrity will be kept during its maintenance.



CAUTION:

The following additional precautions must always be carefully observed:

▲ *Use the seat belt the whole time, unless the structure upper part is folded. Adjust the seat belt to a comfortable position.*

▲ *If the tractor rolls-over, grab the steering wheel firmly. Do not try to jump from the tractor. But, if the EPCC is folded, abandon the tractor immediately.*

▲ *Make sure the safety decals are always unobstructed or covered for future reference.*

▲ *A plastic hood installed does not offer any protection against falling objects.*

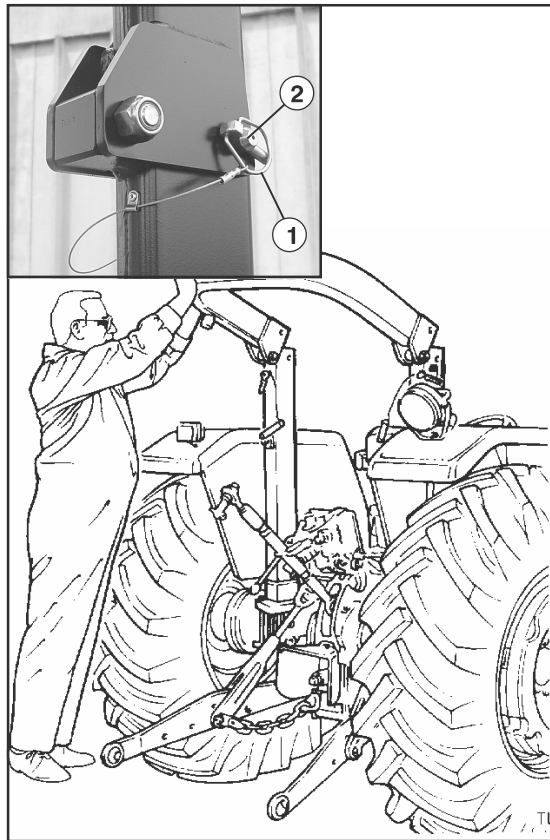


Fig. 149

Procedure to fold the EPCC (If equipped)

To fold or position the EPCC in the vertical position, procedure as follow:

- 1 - Remove the two pins (1).
- 2 - Keep the structure static and remove the locking pins (2).
- 3 - Take extra care (the structure upper part is very heavy) to fold the frame to the rear.
DO NOT allow it to fall freely.
- 4 - Do not allow it to damage other parts on the tractor, like, for instance, rear service lights, 3rd point arm, etc.
- 5 - To adjust the structure to the vertical position, do the procedure in the inverse order, taking care to keep your hands away from articulated parts.

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5 - Operation

5

1 - Before starting

Before starting the engine, consult the maintenance chart and check the items listed in the maintenance every 10 hours or daily.

Then, proceed as follows:

- 1 - Check every system for eventual leaks.
- 2 - Check the brake fluid level.
- 3 - Check the water level in engine cooling system.
- 4 - Check the condition and tension of compressor and fan belts.
- 5 - Check the engine oil level.
- 6 - Check the quantity of fuel in the tanks.
- 7 - Check the tightening of wheel mounting nuts, the correct fastening of hose clamps, connections and electrical connections and operation of panel instrument.
- 8 - Check that all tractor systems are suitable for the job to be done. For example: power take-off shaft (if it is type 1000/540), height and length of the steering rod, remote control, etc. For checking these, see the Preparation Section.
- 9 - In addition to the adjustments in the tractor, you must know how to adjust the implement to be used. For these setups, you must see the the Implement Manual.

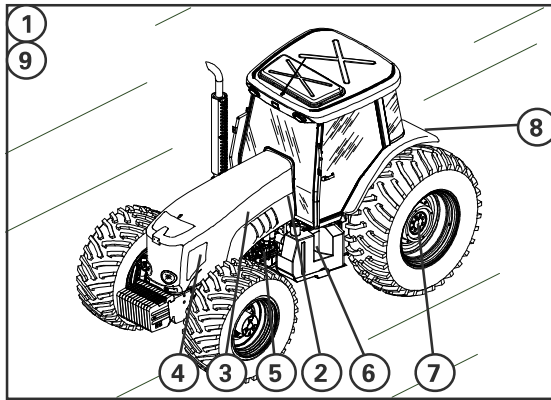



Fig. 150

 **NOTE:**

Always fill the tractor fuel tanks after every working day. Keeping the tank full avoids that, during the night, the air condenses and changes into water inside the tank, that mixed with gas is highly harmful to the injection system.

 **CAUTION:**

Always start the engine with the tractor at a ventilated area, that is, never at closed environment: the exhaust gas can cause suffocation.

If the tractor has not been used for a long period of time, it is convenient to operate the manual bleeding pump several times.

5 - Operation

2 - Before starting the job

The first point to check is if the tractor preparation is suitable for the job to be done.

- 1 - Need to adjust the gauges. Details in the Preparation section in this manual.
- 2 - Ballasting need. Details in the Preparation section in this manual.
- 3 - Power take-off adjustments: replacement of shaft (for IPTO 540 and 1000 rpm only). Details in the Preparation section in this manual.
- 4 - Implement engagement and 3-point hydraulic lifting system. Details in the Operation section in this manual.
- 5 - Remote control preparation and connection. Details in the Operation section in this manual.
- 6 - Steering rod adjustments. Details in the Operation section in this manual.



Fig. 151

5

Electronic systems - ATS

When the tractor is equipped with ATS (AGCO Technology Systems) check:

- 1 - Check operation screen. Details in the equipment manual.
- 2 - Check the GPS signal, trying to identify if the signal will be good during the working period intended. Details in the equipment manual.

NOTE:

The navigation systems depend directly on the quality of signal made available by the satellites around the planet. Thus, the quality variation depends on the atmospheric conditions and the earth rotation movement.

- 3 - Recalibrate the angle of each wheel and marking line daily, this will avoid potential mistakes. Details in the equipment manual.
- 4 - Check that the signal receptors (base station or antenna) are receiving the data correctly. Details in the equipment manual.



Fig. 152

3 - Tractor start and dislocation



ATTENTION!

Read carefully this Manual to get information about all procedures and safety rules (Safety Section). Your life and other people's lives are at stake the moment you start and dislocate the tractor.

Start the engine at well ventilated places, never in closed environments.

- 1 - Follow the procedures mentioned in the previous page.
- 2 - Follow the daily maintenance procedures strictly as recommended in the Periodic Maintenance Chart (Maintenance Section).
- 3 - Periodically, check that the safety start switch operates properly. **The switch prevents starting the tractor with the clutch pedal disengaged to the stroke end.** Check as follows:
 - Stop the engine and disengage the gearbox.
 - Try to start without engaging the clutch. The starter SHALL NOT work, indicating that the switch is working.
- 4 - Make sure there are no people or objects near the tractor.
- 5 - Be correctly positioned on the seat.
- 6 - Check if the parking brake is not engaged.
- 7 - Press the clutch pedal totally and disengage the gearbox.
- 8 - Keeping the clutch pedal pressed, turn the starting key to position "4" (start). As soon as the engine starts running, release the key. It will return to position "2" automatically.
- 9 - Set the manual accelerator to reach around 1200 rpm and let it run for around 1 minute. While it runs, note the indicators and lamps on the panel. Pay attention to eventual abnormal noise. If necessary, stop the tractor immediately and take the necessary measures.
- 10 - Press the clutch pedal completely, disengage the parking brake and select a gear.
- 11 - Lift the implement if engaged.
- 12 - Release the clutch pedal smoothly and move the tractor without submitting it to work load. This must be performed just when the temperature indicator reaches the green range (normal).

- 13 - With the tractor running, increase the rotation and/or shift the gear in order to reach the speed wanted. Consult the instructions about the gear selection, rotation and speeds in this Section.



NOTE:

Never rest the foot on the clutch pedal or brake pedals. This causes wearing on the brake discs, bearings and clutch disc.

5

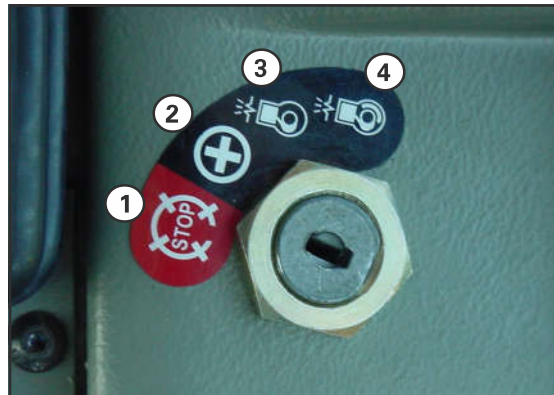


Fig. 153

5 - Operation

3.1 - Influence of the protection system over the tractor operation

Every tractor command and control remain the same. However, observe the following:

- 1 - When turning the starting key to “ignition” position - “3”, the engine must be started within 36 seconds at most. Otherwise, the protection system will cut the pump solenoid current, because the panel warning lamps have already been on for 36 seconds. The protection system “understands” this as abnormality. Thus, if the key remains on for 36 seconds for any reason, turn it off after performing the start procedure normally. Because when turning off the key, the system restarts the time countdown.
- 2 - If the protection system operates, stop the engine.

5

3.2 - Influence of the protection system over the tractor maintenance

The only difference in the maintenance procedures is the fuel system bleeding, more specifically in the high pressure circuit (injection pump and nozzles). The injection pump solenoid needs to remain powered during the procedure to allow the fuel flow and air elimination.

To do so, it is necessary to turn the key to the 2nd position. But, as explained before, 36 seconds after turning on the key and the engine has not started, the protection system cuts the solenoid current.

The solution for that is to turn off the starting key and turn it on again, whenever the solenoid closes.

Repeat this procedure as many times as necessary during the pump and nozzles bleeding process.

So, the injection pump and nozzle bleeding is necessary in special cases only, such as when running out of fuel during the operation or disassembling the high pressure system (tubes, injection pump or nozzles).

The fuel filter bleeding, after replacement, is performed normally, with no need to keep the solenoid pump powered.



Fig. 154



Fig. 155

3.3 - Alternative start resources

Though it is possible to start the engine in two ways, as it will be shown, it is always good to remember that the ideal is to keep the electrical system in perfect conditions, avoiding problems, damages to the tractor and even accidents.

NOTE:

Even using one of the the alternative start resources, the engine will only start if the battery has conditions to keep the injection pump solenoid (1) powered, when equipped, (fuel flow released).

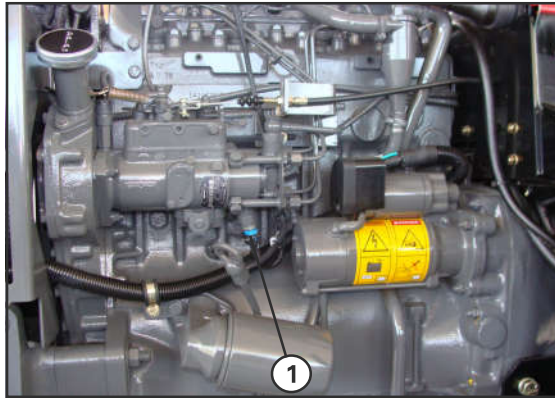


Fig. 156

Using auxiliary battery

When this resource is necessary, do not connect the auxiliary battery cables to the bornes of a weak battery. This can damage the battery and even make it explode.

IMPORTANT:

Use cables with claws with enough capacity for the current used.

Correct procedure

- Connect a cable between the positive bornes (2) of the auxiliary battery and the positive borne (3) of the weak battery (in the tractor);
- Connect the other cable to the negative borne (5) of the auxiliary battery and lean the other end of this cable firmly against a good point of mass (4) - it can be the engine housing or the transmission.

Then, follow the regular start procedure as described previously.

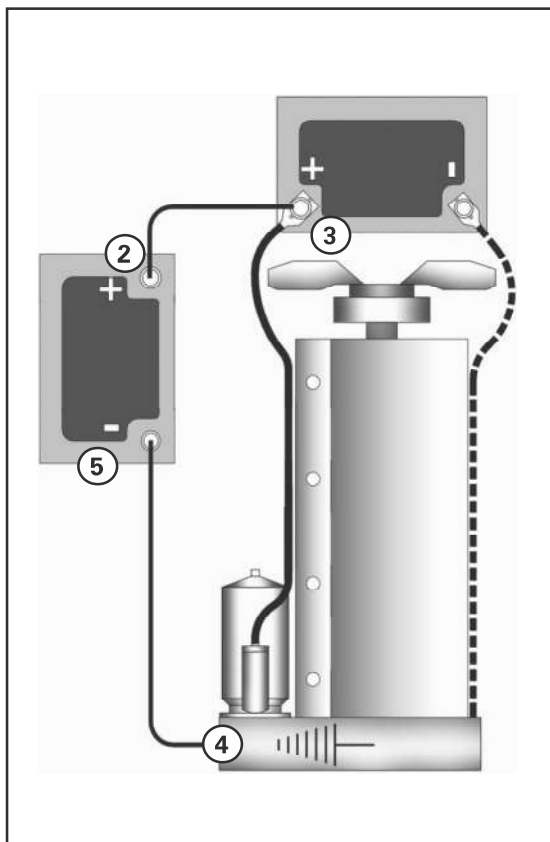


Fig. 157

5

Start by towing

This resource must be used as the last alternative only.

- Select a high gear (from 10th on).
- Set the manual accelerator to half stroke.
- Turn the starting key to 2nd position (ignition).
- Tow the tractor until reaching the speed around 5 km/h.
- Release the clutch. As soon as the engine starts running, stop, engage the parking brake and disengage the gearbox.

5 - Operation

4 - Tractor and engine stopping

- 1 - Stop the tractor, applying the clutch pedal to the stroke end. Then, apply the two brake pedals.
- 2 - Set the accelerator to idle.
- 3 - Set the gearshift levers to neutral and engage the parking brake.
- 4 - Lower the implement to the ground (if engaged).
- 5 - Let the engine idling for 30 seconds to 1 minute, to balance the engine temperature.
Just then start the engine.

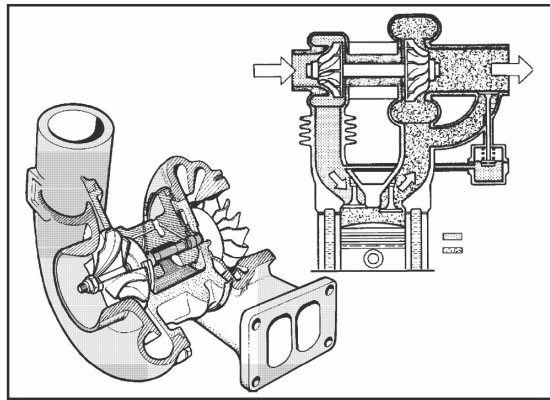


Fig. 158

5

NOTE:

For Turbo engines, failure to observe the rule above will damage the Turbo bearings that, by inertia, keep on spinning in high speed without being lubricated.

Idling for 1 minute will allow that the turbocharger reduce the speed and lower the temperature in a controlled manner.

ATTENTION!

Failure to observe the procedures above will damage the Turbo bearings (2) that, by inertia, keep on spinning in high speed without being lubricated.

Idling for 1 minute will allow that the turbocharger reduce the speed and lower the temperature in a controlled manner.

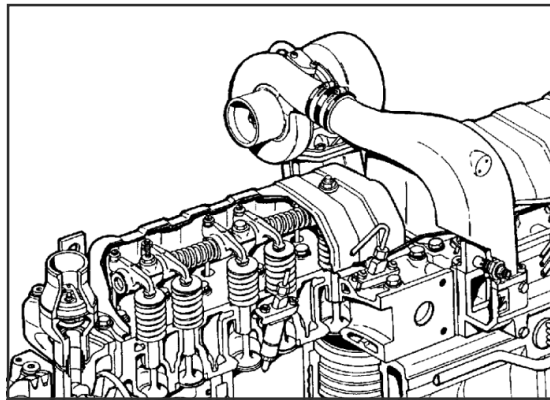


Fig. 159

Emergency Stop

In tractors with solenoid fuel-cut, in case there is an electrical fault and the engine does not stop even turning off the starting key, turn off the power supply (1) of the fuel-cut solenoid of the injection pump.



Fig. 160

5 - Run-in instructions - New engine

Engine run-in

Your Massey Ferguson tractor will have a better performance, bigger yield and bigger saving if in the first 100 hours some special care is taken. It is called the "Run-in" Period. This is the stage when the parts go through an adjustment process.

This adjustment must be done in the best way possible, following some important recommendations:

- 1 - Avoid extended operation in low or high speed with no load on the engine;
- 2 - Do not overload the engine. The overload can be seen when the engine does not respond increasing the speed or when being accelerated;
- 3 - It is important to use the tractor only in field operations. Try to vary the speed and the load during the job;
- 4 - Pay special attention to the indicators and warning lights on the panel. Control the temperature, pressure, engine speed, etc. frequently;
- 5 - Avoid submitting the engine to the maximum load. However, if necessary, do not do so for long periods. Both the lack and the excess of load are harmful;
- 6 - Consult the maintenance chart (Maintenance Section) and follow the procedures strictly.



NOTE:

Failure to follow these recommendations will result in the cylinder sleeve mirroring. As a consequence, this will result in loss of power and excessive consumption of lubricant oil and fuel.

Lubricating oil consumption

During the run-in period it is normal for the engine to present a lubricant consumption slightly above the normal. It happens because the rings, piston and the sleeves have not completed the adjustment to each other.

In case of doubt, consult your dealer.

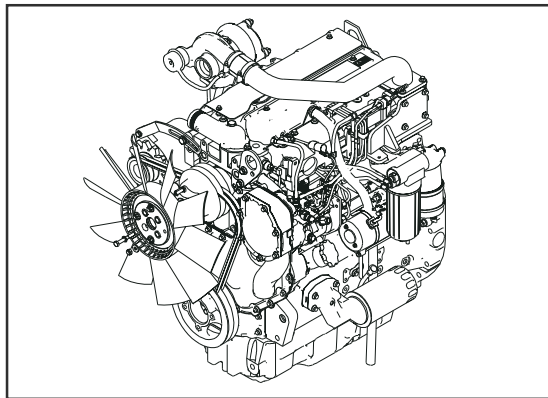


Fig. 161



NOTE:

Besides the special care with the engine, the run-in also involves other cares: a more frequent retightening of nuts, bolts and clamps, the correct settling of clutch discs, fan belt inspection, etc.

5

5 - Operation

6 - Operation under temperatures near 0°C

Recommendations

- 1 - Add an antifreeze product to the radiator water. Observe the proportion recommended by the product manufacturer (see table of products recommended by AGCO do Brasil - Maintenance Section).
- 2 - In winter, add kerosene to the fuel. The proportion recommended is, at most, 10% of the total filling. The kerosene avoids the formation of paraffin that clogs the filters and the fuel piping.
- 3 - Use engine lubricants with the viscosity range suitable for the temperature it will operate. Normally, the classification API-CH SAE15W-40 complies with all requirements. Consult your supplier about it.
- 4 - To avoid problems, always keep the battery charged and the electrical system in good conditions.
- 5 - Keep the radiator cap and the thermostat in good conditions. These items are essential for the cooling system operation (See Maintenance Section for more information).

5

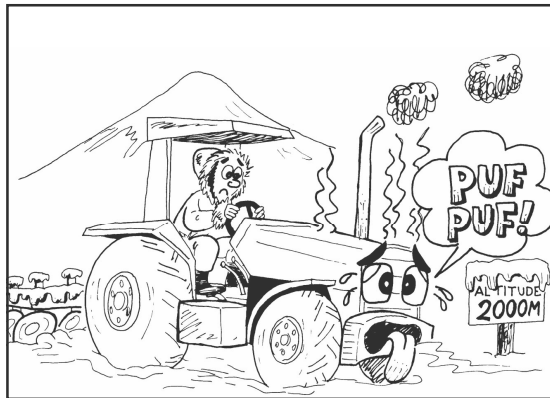


Fig. 162

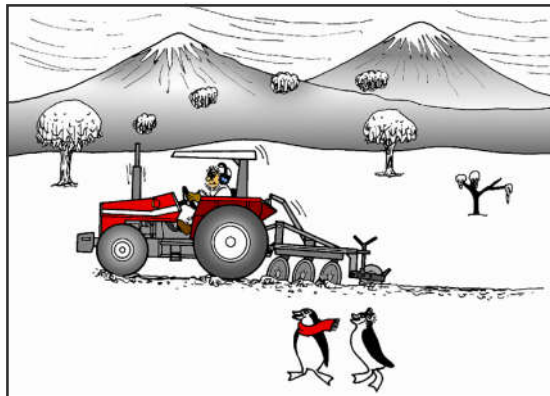


Fig. 163

Turbo engines

The turbocharger consists of two parts: the turbine and the compressor.

The turbocharger receives the atmospheric air through the filter and propels it with higher pressure for the engine cylinders.

For this reason, the Turbo engines practically do not suffer any damages operating in altitudes, because the turbocharger compensates automatically the pressure drop by increasing the rotor speed.

NOTE:

In high altitudes, the Turbo charger does not reduce the performance as mentioned.

However, the cooling problems are the same in relation to the naturally aspired engine; therefore, it should receive the proper care concerning maintenance!

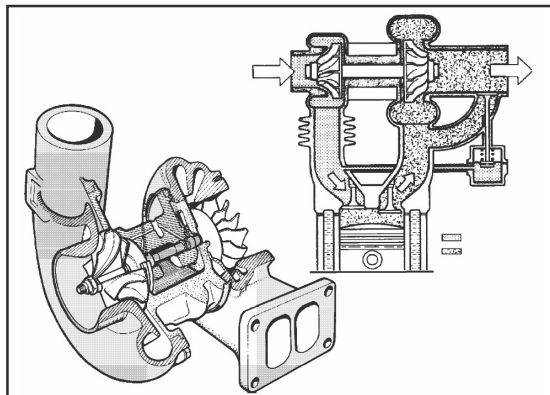


Fig. 164

7 - Operation and usage of front drive

The front drive provides bigger drive efficiency, that is, more traction force is achieved with the same engine power.

The drive must be used in jobs that require traction force, as in soil preparation operations and traction of heavy trailers. Therefore, do not activate the drive when running freely on roads or for light jobs which do not require high traction force.

The differential of front 4x4 shaft includes a mechanism that distributes automatically drive torque (force) to the wheels.

This clearly reduces the slip, with no operator's interference, resulting in more traction force, less wearing on the tires and higher performance of the tractor.

This resource is very important mainly in conditions where the wheel adherence to the soil is not the same on both sides: the wheel with less adherence tends to slip excessively.

In this situation, the torque distribution system exercises a blocking action of up to 45%, enough to reestablish the drive conditions in normal use of tractor.

Front traction drive

The front drive improves the tractor traction conditions a lot.

The tractor is equipped with front drive of mechanical engagement. The front drive must be engaged or disengaged with the tractor stopped. Trying to engage or disengage the front drive with the tractor moving may result in internal damages to the assembly.

To engage the front drive:

Cab tractors - Fig. 148

With the tractor stopped, press the clutch and pull the lever downwards.

To disengage the front drive, always press the clutch pedal, stop the tractor and the lever upwards.

Platform tractors - Fig. 149

With the tractor stopped, press the clutch and pull the lever forward.

To disengage the front drive, always press the clutch pedal, stop the tractor and the lever backwards.

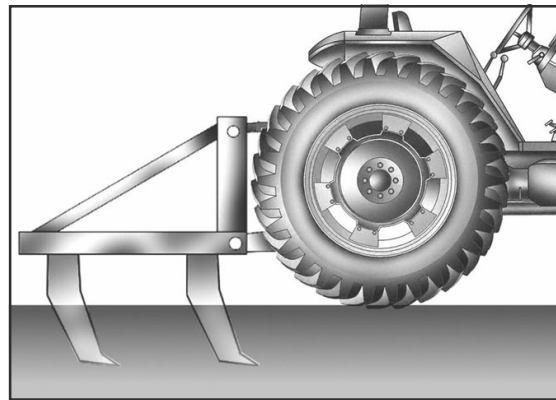


Fig. 165



Fig. 166

5

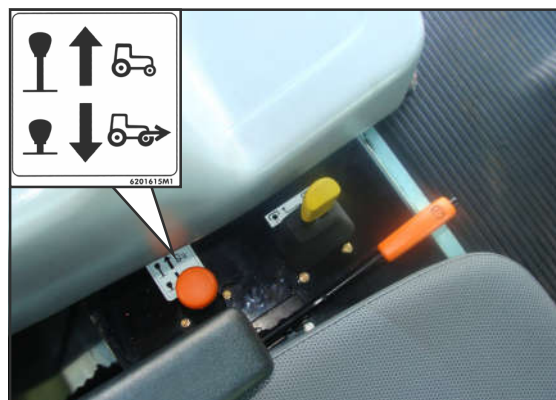


Fig. 167

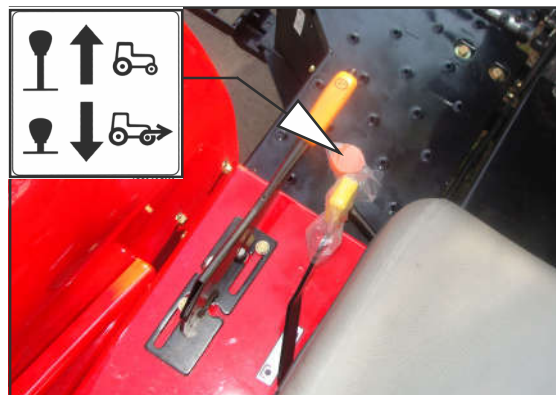


Fig. 168

5 - Operation

8 - Gear selection

In addition to correct preparation and adjustment of tractor and implement, the correct gear selection and engine speed is essential for a good tractor performance and fuel consumption. The speed shall be compatible to type of ground and implement used. Each of the agricultural operations will have an ideal speed. Consult the implement operator manual or any literature that specifies the speed suitable for the type of work to be performed.

The speed reached by each gear is directly proportional to the engine speed. So, there is a speed range for each gear which can be graphically represented to help you select the gear.

There is a decal on the right side of the operator seat which presents the speed ranges for all gears.

Note that there are speed range overlapping between the ranges. The speed overlapping concept is very important for soil preparation. It means. It means that the speed box was developed so that two different gears can have equal speeds during a specific section of the scale.

For example: When there is overload while the tractor is operating in the 4th gear, the speed may be kept by reducing the gear to the 3rd gear and increasing the engine speed, since it does not exceed the maximum power speed of the tractor.

5

8.2 - Selecting the correct range

Select the range that will cause the best fuel consumption without overloading the engine or transmission.

The soil conditions in the same field may vary every few meters; then, select the range the engine runs satisfactorily well with 3/4 for maximum power.

Transmission types

The tractor may be equipped with 3 types of transmission:

8x2 speed transmission

8 speeds forward and 2 speeds backward. This is a sliding transmission.

12x4 speed transmission

12 speeds forward and 4 speeds backward. In the the cabin version, the ranges are selected through two levers, and in the platform version through three levers.

8x8 speed transmission

8 speeds forward and 8 speeds backward. This is a synchronized transmission.

8.1 - Engine and PTO Speed

Selecting the correct engine speed is also important. Generally, every operation should be performed between 1,400 (Maximum torque) and 2,200 rpm (Maximum power).

This range will allow the Power take-off reach 540 or 1000 rpm. The speed will depend on the type of power take-off installed in the tractor (540 or 540 and 1,000). So, always check the decal on the fender.

8.3 - Using the speed table

The following table shows the speed ranges used with the tractors.

A decal with the scale supplied below (table with speed ranges for all gears) is attached on the tractor's fender. Use it together with the tachometer. The speed range table has two basic functions:

- 1 - Check the tractor forward speed, when operating at an area with the speed limited.
- 2 - Establish the correct ratio for each range and engine speed, so that it complies with the need of some implements operated by the PTO. For example: centrifuge machines or sprayers, etc.

NOTE:

Consult the speed table on your tractor to get the correct gear and speed range.

Reading the speed range table

- 1 - The bold horizontal bars represent the dislocation speed range for each gear, between the two engine speeds - 540 rpm and 1800 rpm.
- 2 - To work with the PTO at 540 rpm, at approximately 9.0 km/h, the engine must be at 1900 rpm. The arrows indicate the point where the engine is at 1900 rpm in each speed range. It may be related to road speed in km/h on the top and bottom of the table.
- 3 - The numbers on the left indicate 1st to 6th gears, Reduced gears, 7th to 12th directly from a gearbox of 12/4 speeds.
- 4 - The information in the chart supplies the operation speed ranges; in this case, from 1400 rpm to 2200 rpm. PTO engine speed is from 540 to 1908 rpm.

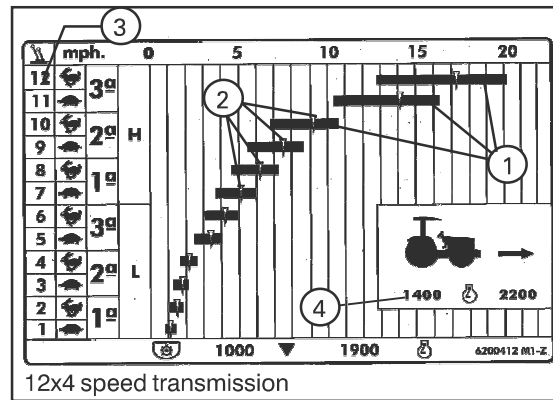


Fig. 169

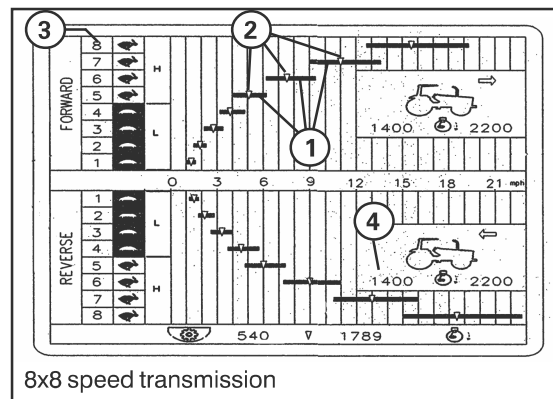


Fig. 170

5 - Operation

9 - 3-point hydraulic lifting adjustments and use

9.1 - Component identification

- A - Lower bars
- B - Levelling arms
- C - 3rd point arm
- D - Beam "C" or control beam
- E - Side stabilizers: chain type or telescopic spindles
- F - Upper arms
- G - External hydraulic cylinders - auxiliary (if equipped).
- H - 3rd point coupling latches
- I - Adjustment grip of levelling arms length and lock

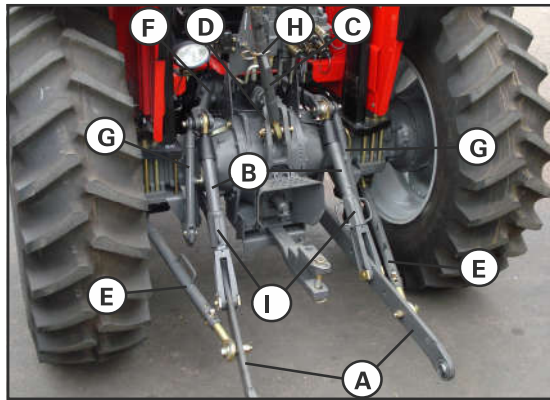


Fig. 171

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CAUTION:

Under no circumstance try to pull or tow anything by the 3rd point arm.

9.2 - Adjustments before the operation

Steering rod judder

The steering rod may be moved laterally due to some implement mounted on the lifting system, or to improve the turning radius for some specific operation.

For that, change the position of the pins (1) as necessary.

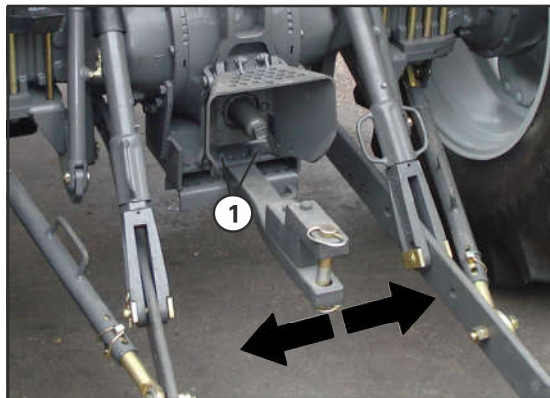


Fig. 172



IMPORTANT:

Always use the pin locks (1).

5 - Operation

Lower bar relative judder

The tractor levelling arms (1) have a lock (2), which can be mounted to allow some judder between the lower bars and, therefore, side levelling of the implement.

Make this adjustment, with the implement disengaged removing the cotter pin (3) and then the pin (4).

Turn the locks (2), reinstall the pins (4) and counter pins (3).

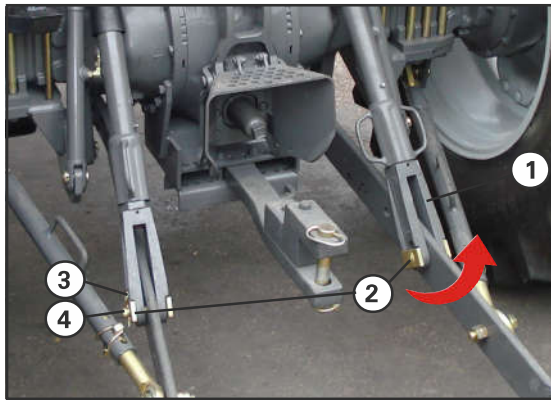


Fig. 173

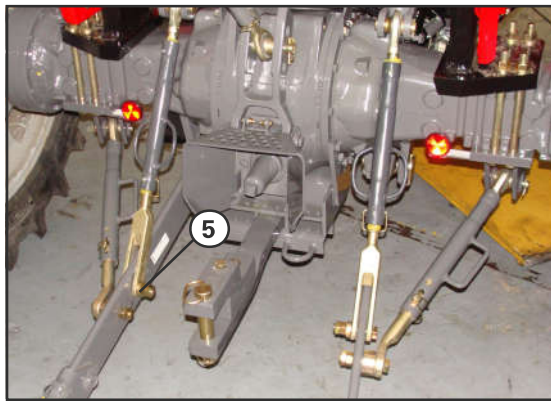


Fig. 174

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Levelling or intermediary arms

The levelling arms allow the side levelling of the implement that can be performed in 2 ways:

- Through a spindle (1) in the left levelling arm or both.
- Crank and levelling box (2), when installed, is used in the right levelling arm only.

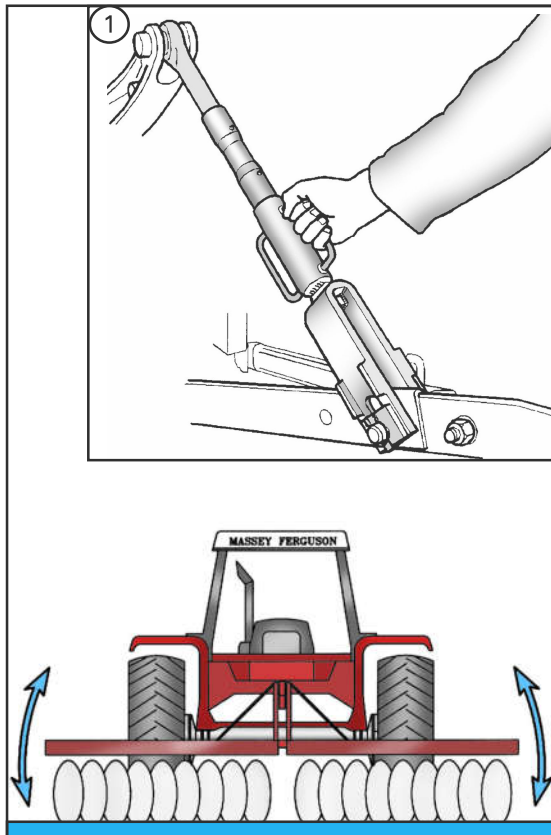


Fig. 175

5 - Operation

3rd point arm

The 3rd point arm allows adjusting the longitudinal alignment of the implement:

by shortening the spindle, the implement front is lowered and/or the rear is lifted;

by stretching the spindle, the opposite happens.

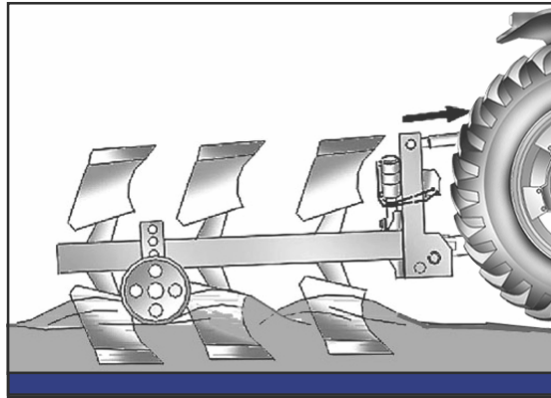


Fig. 176

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Beam "C"

Beam "C" (A) performs an important function in depth control system, both in the Ferguson system and electronic system. But for that, it is necessary to use the *Depth Control (Drive)*.

It is the case for operating with implements for soil preparation, engaged to the 3-point system.

For the correct operation of this system, it is essential that the 3rd point arm is mounted in the correct hole of beam "C" and also in the implement tower, according to the table below. When engaging an implement, follow this guidance.

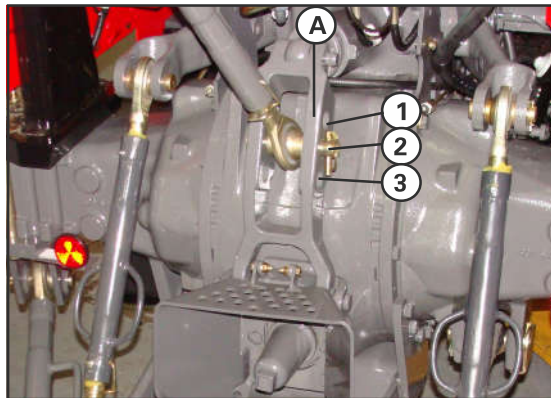


Fig. 177

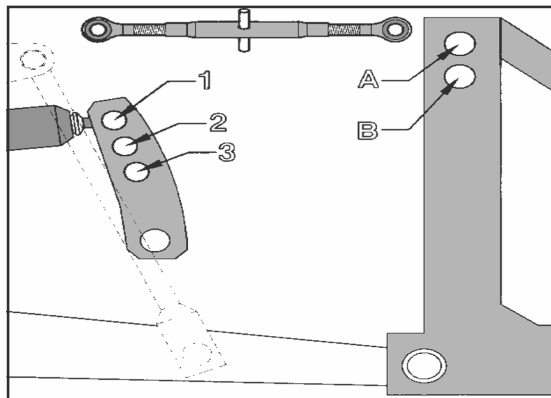


Fig. 178

Hole "1" in beam-C with hole "B" in the implement	Light and smooth soils.
Hole "3" in beam-C with hole "A" in the implement	Hard soils and transportation of implements or loads.
Hole "2" in beam-C with hole "A" and B" in the implement	Soils of medium hardness and other intermediary situations.

Side stabilizers

This function is performed by the side stabilizers (F), which can be the chain (F1) or telescopic (F2) type. When engaging an implement, follow the procedure below, according to the stabilizer type:

Chain stabilizer type (F1)

- a) Lift the implement to half the height.
- b) Turn the spindle (F1) of both stabilizer so that:
 - The implement is centralized in relation to the tractor.
 - There is a small clearance, that is, a side judder of the implement.

Spindle stabilizer type (F2)

- a) Lift the implement to half the height.
 - b) Remove the pin (3) from both stabilizers.
 - c) Force the implement laterally in order to get its alignment (centralization). If necessary, turn the spindle (4) make the pin installation holes match (3).
- To allow a side judder of the implement during the job, install the pins (3) in the oblong holes (6).
 - To keep the implement with no judder, mount the pins (3) in the holes (5).

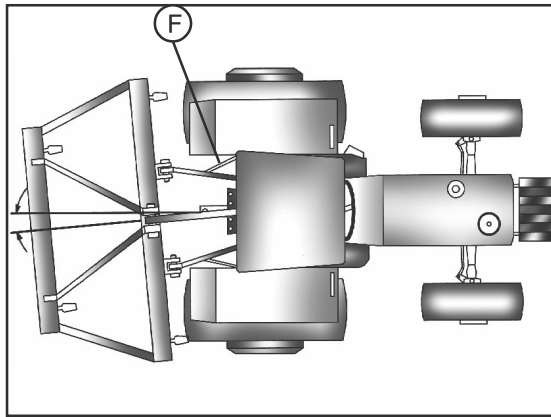


Fig. 179



Fig. 180

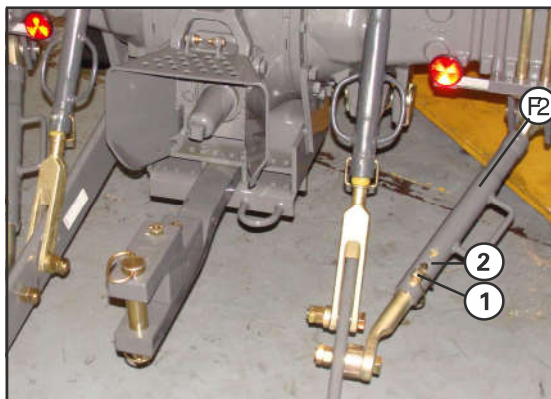


Fig. 181



Fig. 182

5 - Operation

9.3 - Lifting system categories

For the correct engagement of implement and eventual field adjustments, take into account the function of the hydraulic system components described previously.

400Xtra series complies with category II in the lifting system and also some implements of category III. Standard ASAE S217.12. is followed.

Category II

L - Around 550 to 625 mm

L_r - Around 435 mm.

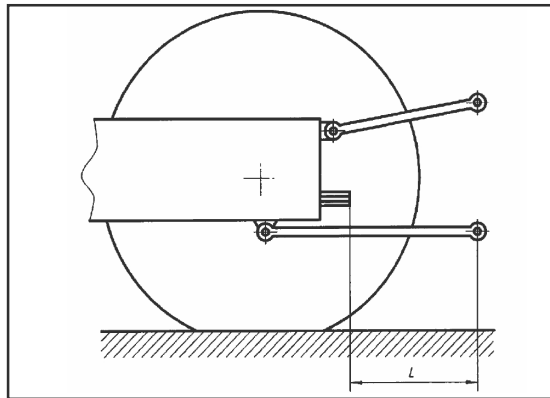


Fig. 183

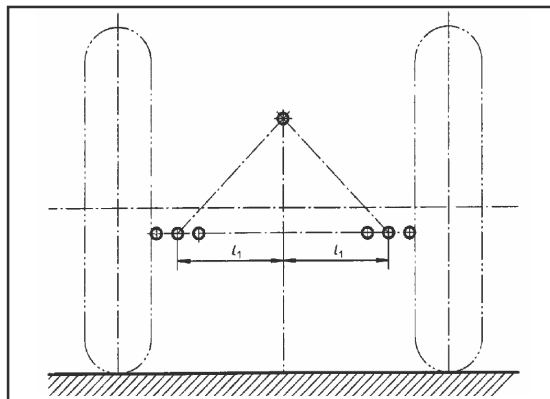


Fig. 184

9.4 - External auxiliary hydraulic cylinders

According to the lifting system capacity, the auxiliary cylinders (H) can be installed (optional), assuring its efficiency.

VIII - Extendable low bars (I - Optional)

The extensions (I) facilitate engaging implements, and should be unlocked in this situation only.

For that, lift the lock (I1) and pull the engagement end with eyelet (I) to the position suitable for engagement. Install the respective pin and after the engagement, move the tractor backwards carefully, until the lock (I1) fits the groove completely (I2).

VIII - Implements, category II

The implements used with the tractors must comply with "Category I I" pattern, that is, dimensions "A and B" must get the closest possible to those shown below:

- Measurement A = 825 mm
- Measurement B = 610 mm

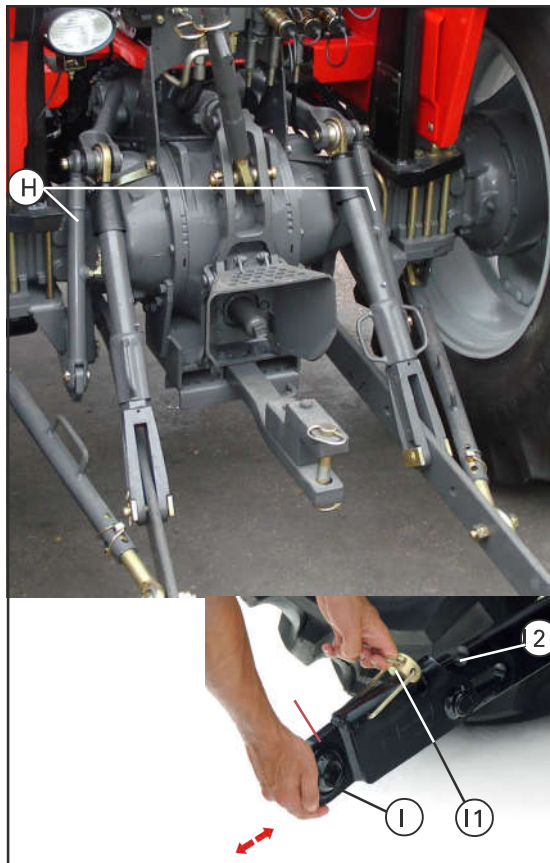


Fig. 185

5 - Operation

9.5 - Procedure to engage and disengage implements

For the correct engagement of implement and eventual field adjustments, take into account the function of the hydraulic system components described previously.

- a) In reverse gear, move toward the implement in aligned manner, till matching the left lower bar pivot with the respective engagement pin of the implement. Install the pin and the respective lock.

To set the height for left lower bar, use just the position lever.

- b) Install the upper arm (3rd point).
- c) Engage the right lower bar. To set the height, turn the levelling box crank or the spindle (according to the model) of right intermediary arm.
- d) If it is necessary to approach or displace the the implement right pin with the eyelet of the right lower bar, turn the spindle of 3rd point arm as necessary.

- e) Install the right side pin and lock.
- f) Lift the implement and adjust the longitudinal alignment through the side stabilizing chains, as described previously.
- g) When achieving the implement centralization in relation to the tractor central line, stretch both chains and turn back one of the spindles half a turn, leaving a small clearance. Then, tighten the 2 locknuts in both spindles.
- h) Engage the cardan (if necessary) to the PTO shaft and install the respective protections.
- i) Lift and lower the implement and check the clearances, alignments and operation.

Disengaging one implement.

- a) **IMPORTANT:** Select a flat, even and stable surface where the engagement operation is also more convenient.
- b) Lower the implement with the Position control. If necessary, support the implement on stands or proper supports, always aiming to facilitate the later engagement.
- c) Stop the engine and apply the parking brake.
- d) Release the upper arm (3rd point), setting all implement weight on the soil.
Remove the 3rd point pin in the tower.
- e) Disconnect the lower engagement bars.
Store the pins and locks in suitable place.
- f) Disconnect the hydraulic hoses - for remote control and cover the ends to protect them from dirt.

- g) Move the tractor forward carefully and just then lift the lower bars.

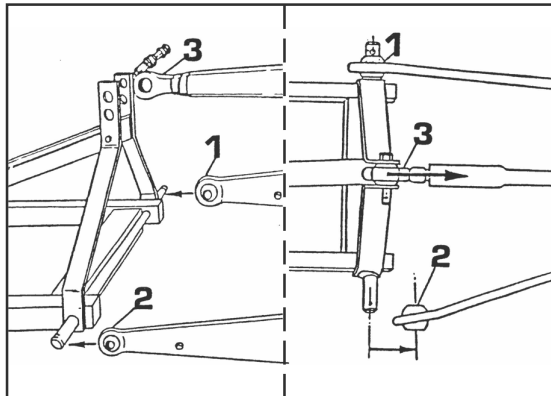


Fig. 186



ATTENTION!

For implement transportation, always use the Position lever set to "transportation" in the hydraulic quadrant. Make sure to have installed the lock of all implement engagement pins in the tractor.



IMPORTANT!

In some cases, it may be necessary to displace the steering rod to one of the sides or remove it to avoid interference with the implement components.

5 - Operation



CAUTION!

When adjusting the implement, take the necessary care:

- Perform the operation on a flat and even surface, since it will facilitate the disengagement.
- Always use the Position control from the hydraulic system.
- If the implement is lifted, always support it on reinforced stands. Never work under it lifted by just the hydraulic or supported by improvised objects such as bricks, concrete blocks and others.
- Do not work under an implement supported by a jack only.

5



NOTE:

In cabin tractors, there is an auxiliary lever (1) for the Position control in the rear part, to facilitate the engagement and disengagement of implements.

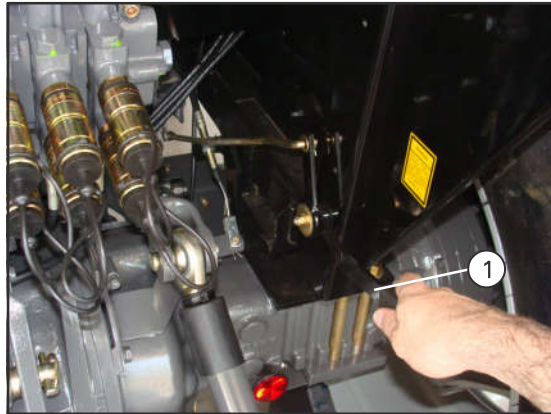


Fig. 187

9.6 - Hydraulic lifting system



WARNING:

Before operating any of the controls specified below, make sure there are no pedestrians near the tractor or implement.

Ferguson hydraulic system connects the tractor and the implement in a single unit, with the implement being controlled hydraulically. This system has the following controls:

Drive control(1)

Operates in the quadrant yellow range (drive) and it is used to control the operation depth of soil implements.

The further the lever is set (“down” position), the bigger the depth achieved by the implement, that is, the deeper it will penetrate the soil. Setting it backwards (“up” position) in the quadrant, the implement will work closer to the surface.

Position control (2)

Operates in the red range (position and transportation) and blue range (constant pumping) of the quadrant.

The red line is used to control the working height of implements that operate above the soil.

The lever must NEVER be set to the blue range (constant pumping position) or else the relief valve in Ferguson hydraulic system will stay permanently open and the hydraulic oil will heat.

A knurled knob locks the adjustable stop in its place, after the working depth and height are achieved.

By setting the lever to the external position, it will automatically select “constant pumping” internally.

Reaction control

The reaction control regulates the descent speed of the lower bars and the implement engaged.

- If the selector is totally down, the reaction will be fast (fast descent speed = hare).
- But if set totally up, the reaction will be slow (tortoise).
- For intermediary adjustments, set the selector in the intermediary of the quadrant.



NOTE:

This control is very sensitive. So, move it slowly, little by little.

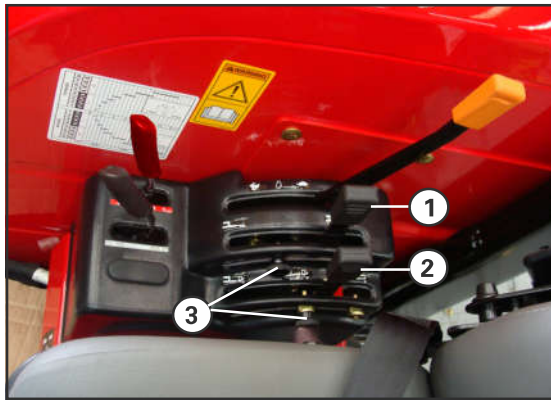


Fig. 188

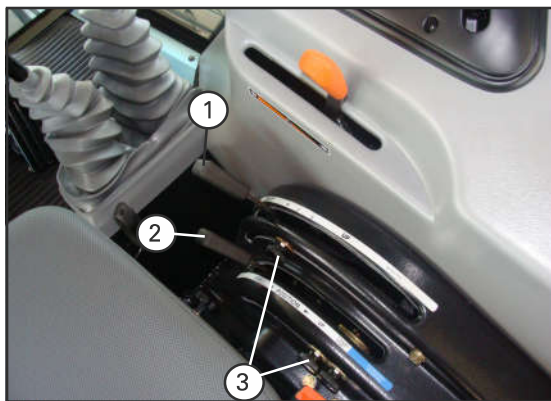


Fig. 189

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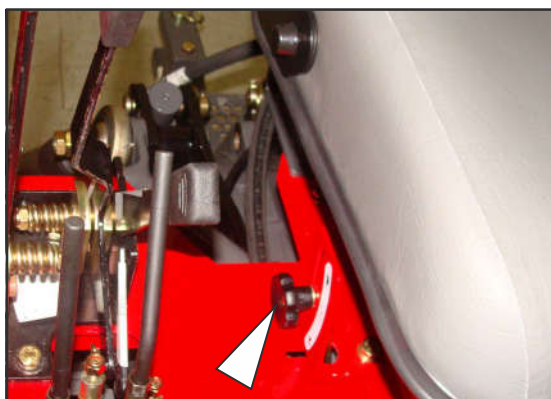


Fig. 190

5 - Operation

Drive control (depth) - external lever - yellow quadrant

Work type

Plow, subsoiling and heavy cultivation.

Position of levers

Position control (2), totally up = “transportation” position. Reaction control in “slow” position.

Operate the hydraulic system through the drive control (1).

Work preparation

Move the drive control lever (1) downwards to lower the implement. It will start penetrating the soil while the tractor moves forward. The more the lever is moved forward, the deeper the implement will penetrate the soil.

5

At work

After reaching the depth wanted, move the adjustable stop (3) back to the lever and lock it with the knurled knob. The depth control lever (1) can be moved to both sides of the stop, so that it is adjusted according to the different soil conditions. Turn the reaction control reverse to “slow” position, but in a position that allows changing to “fast” position when the work is started. If the implement starts moving up and down in disarray, turn the reaction control to “slow” position.

Before finishing the work

When getting to the terrain head, lift the implement moving the drive control lever back to position UP. Restart working, moving the drive control lever forward to the adjustable stop. In some light implements such as cultivators, it may be necessary to move the drive control lever (depth) ahead the stop setting, so that the implement can get in touch with the soil. Once the drive force is generated, then lever cannot be set to the previous setting.

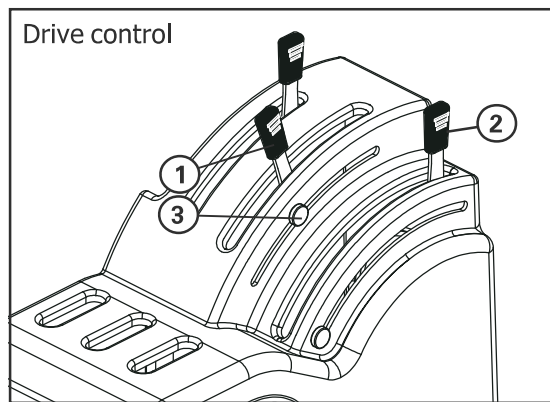


Fig. 191

Position control - internal lever - red sector

Work type

Operations with implements that operate at a constant height above the soil surface. Eg. scythes, machines with centrifugal discs, leveling blades, etc.

Position of levers

Depth control lever (drive), (1) in the “up” position. Reaction control in “slow” position.

Operate the hydraulic system through the position control lever (2).

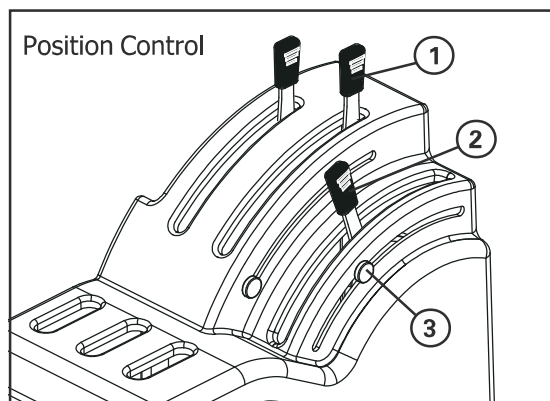


Fig. 192

Position control - continued

Work preparation

Move the position control lever (2) forward to the implement height wanted, above the soil, is achieved. Align the adjustable stop (3) with the position control level.

Turn the reaction control reverse to SLOW, but in a position that allows changing to "fast" position when the work is started.

At work

No additional adjustments will be necessary.

Before finishing the work

Move position control lever (2) to "transportation" position, if necessary. Restart working, moving the position control lever forward to the adjustable stop.

5

Transportation position

Used to transport implements in the 3-point hydraulic in the "up" position.

Position of levers

Depth control lever (drive), (1) in the "up" position. Position control lever (2) set to "transportation" position against the corresponding stop. This procedure will lift the engagement and the implement, keeping them in the lifted position.

Constant pumping - blue selector



IMPORTANT:

NEVER set the lever to the "constant pumping" position, because the hydraulic oil may overheat due the constant opening of relief valve.

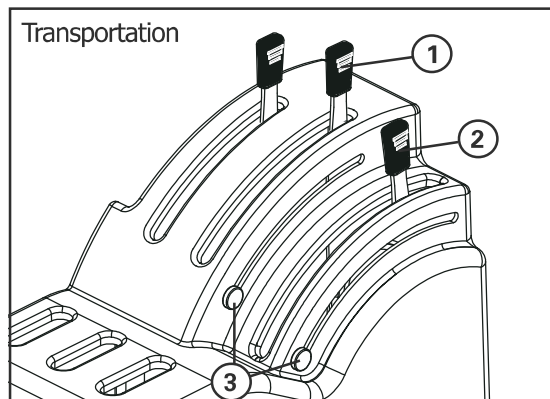


Fig. 193

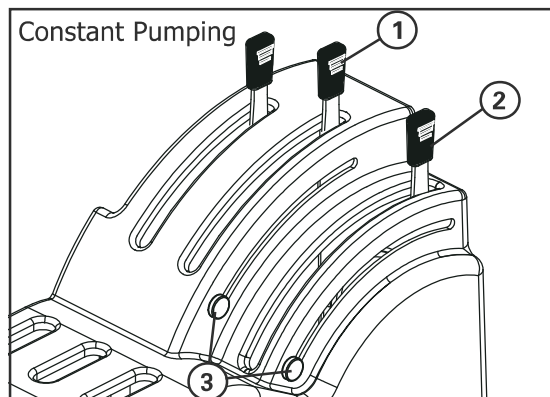


Fig. 194

5 - Operation

10 - Using the remote control

10.1 - Presentation

The remote control is the independent type, normally with 2 or 3 valves, that is, pressure lines.

1 / 2 - Left valve terminals.

3 / 4 - Right valve terminals.

A - Transfer valves: they allow operating both in simple and double action system.

B - Combined flow activating lever (If equipped).

C - Free return gallery plug: used to return the oil to the transmission in the activation of hydraulic engines.

D - Right lever: controls the right hydraulic valve, terminals "3 and 4".

E - Left lever: controls the left hydraulic valve, terminals "1 and 2".

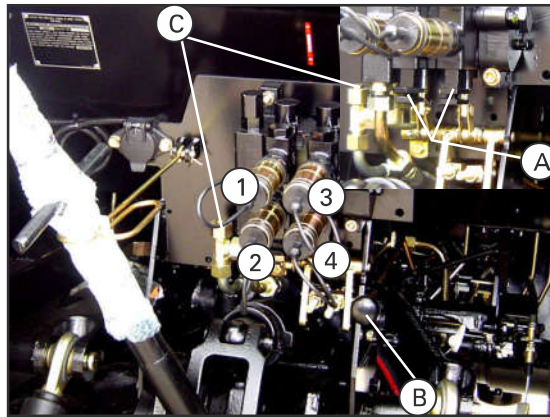


Fig. 195

5

Combined flow (Standard tractors only)

- Move the selection lever (B) to "Combined Flow" position (I). The lever (B) in cabin tractors is located behind the cabin.
- Move the lifting Position lever to "Constant Pumping" position, indicated by the arrow. The pump flow of the hydraulic lifting (II) will be deviated to the remote control, increasing its flow and leaving the lifting system inoperative.

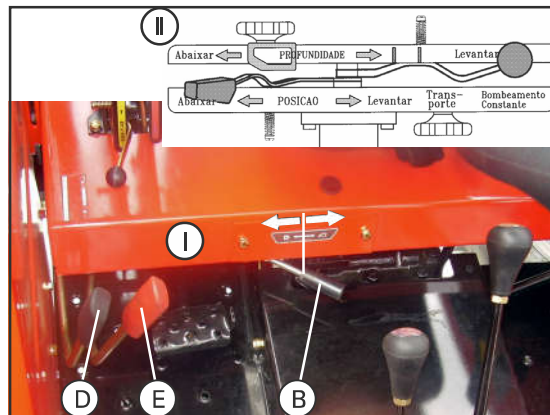


Fig. 196

5 - Operation

Types of valve

There are 5 types of valves available, and the tractor can be equipped with a combination of 2 or 3 of these valves.

- I - Conventional valve: in this type of valve, the lever returns by the action of a spring. It is necessary to keep it held until the cylinder(s) activated reach the position wanted.
- II - “KO” (Kick-out) Valve: in this case, the lever returns automatically when the cylinder(s) activated reach the end of the stroke.
- III - “F” Valve with fluctuation control: the lever in this type of valve has a third position, in which the cylinder(s) activated remain the flow free, allowing the rod to be retracted and extended by an external action, with no restriction.
Command with 3 lines
- IV - Valve specific for hydraulic engines start.
- V - Variable flow valve: allows setting the flow between 0 and 60% of the maximum flow available. This type of valve generally is also used to start hydraulic engines.

Flows and pressures

Consult the technical specifications.

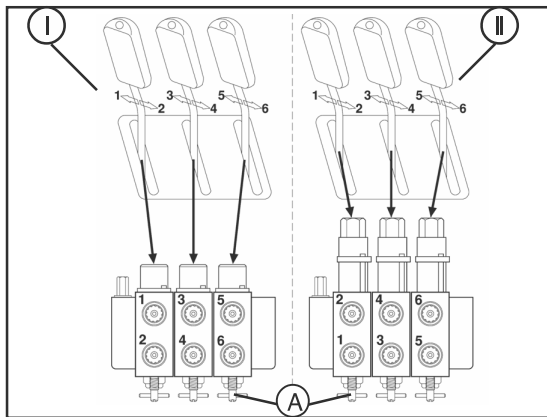


Fig. 197

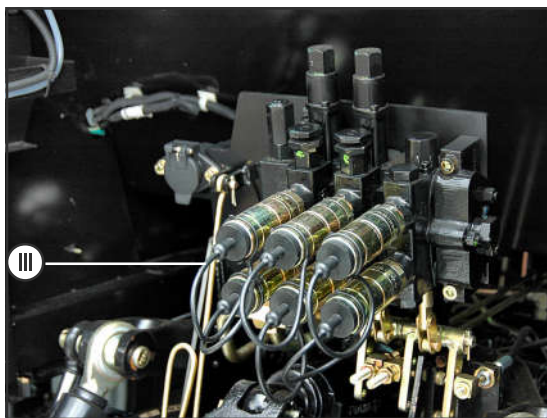


Fig. 198

5

5 - Operation

10.2 - Operating the system

The levers are located to the right of the operator seat.

The left lever (L) controls terminals “1 and 2” on the left side and the right lever (R) controls terminals “3 and 4” on the right side.

- In the conventional valves (lever return through a spring), by moving the lever forward, the upper terminal is pressurized and the lower terminal works as a return. Moving the lever backwards, it happens the opposite.
- In the kick-out valves (automatic return of lever) and in the valves with “fluctuation” control, by moving the lever forward, the lower terminal is pressurized and the upper terminal works as return. Moving the lever backwards, it happens the opposite.

5



REMARKS:

To know what terminal is pressurized for each lever position, check the decals (F), one located near the control levers and the other near the terminals.

The decals list by numbers the lever position and the respective terminal that is pressurized.

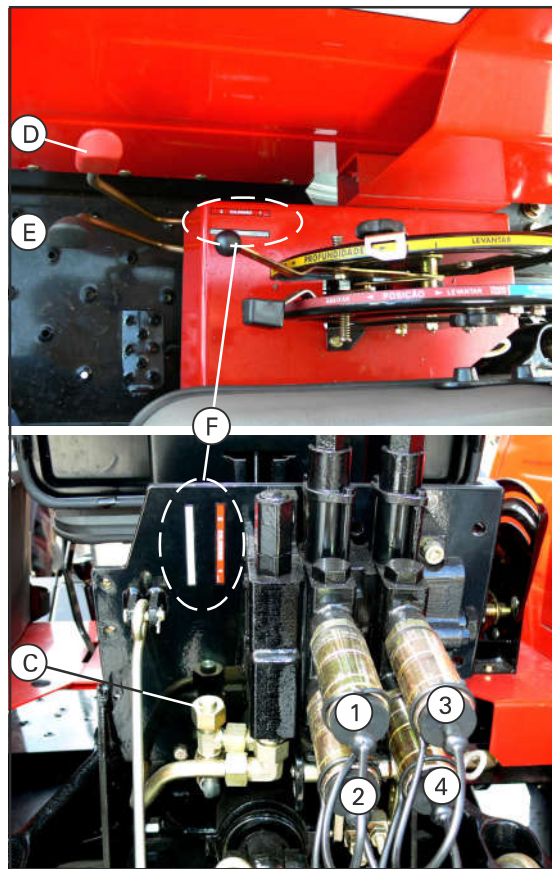


Fig. 199

5 - Operation

Hose connection and disconnection

The “female” terminals consist of quick engagement and disengagement, self-sealing, allowing the “male” terminals of hydraulic hoses be connected and disconnected with no oil loss.

Before connecting the hoses, make sure terminals “1, 2, 3 and 4” and the “male” terminals of hoses are clean.

To connect the implement hose terminals, push them firmly against the tractor terminals.

For disconnection:

- If there is no residual pressure in the hoses, just pull them.
- If the hoses do not detach, it will be necessary to relieve the pressure in the circuit. To do so, stop the engine and move the control levers in the two directions to end of the stroke. Then, pull the hoses.

After being disconnected, install the protective covers (G) to all terminals, remote control and hoses to avoid penetration of dirt.

REMARKS:

If the implement detaches accidentally from the tractor, the hoses will be disconnected with no damages.

Also consult the instructions in the implement Manual on the correct way to activate it with the remote control.

Operating in the Simple and Double Action Mode

In the Standard tractors (with or without cabin), the valve bodies (hydraulic lines) have a transfer valve (A) that allows operating both in simple and double action mode.

Operation of simple effect cylinders

Simple action operations (or simple effect) are those where the hydraulic cylinder exercises force on one direction only, being operated by one hose only. The cylinder return occurs by the weight effect from the load lifted.

To operate the simple effect cylinders, turn the switch knob (A) totally reverse (outwards) and use only the upper coupling mechanisms (1 and/or 3).

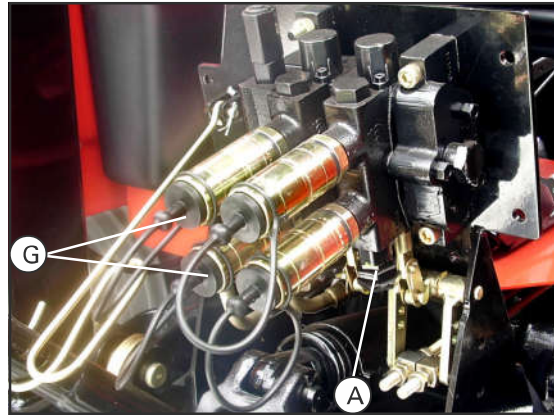


Fig. 200

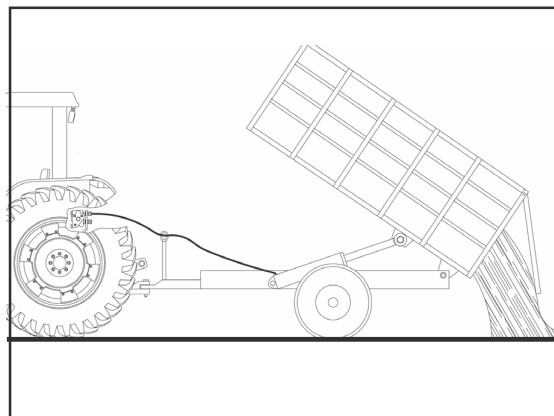


Fig. 201



Fig. 202

Operation - double effect cylinders

In the double action operations (or double effect), the hydraulic cylinder operated exercises force in both directions (retract and extend the rod), being operated by 2 hoses.

To operate double effect cylinders, turn the switch knob (A) totally reverse (inwards) and connect the hose beside the cylinder that makes it extend to the upper terminal(s) (1 and/or 3) and the return hose to the lower terminal(s) (2 and/or 4).

5 - Operation

Operation of hydraulic engines

Although a conventional valve has not been designed specifically for the operation of hydraulic engines, they can be used, if observed the following points:

- 1 - Always connect the engine supply (pressure) to the upper couplers (1 or 3).
- 2 - NEVER connect the engine return to the terminals (1-2 or 3-4). The return must be connected to the plug place (C0, whose gallery send the flow directly to the transmission, with less restriction, avoiding the transmission oil overheating.

Contact your Massey Ferguson dealer, if necessary.

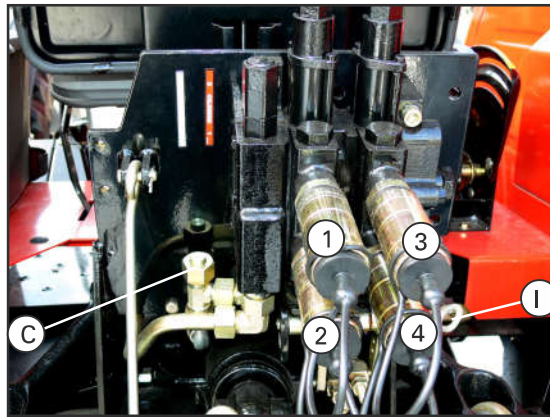


Fig. 203

5



NOTE:

A special valve type to operate hydraulic engines is offered as an option.

10.3 - Remote control operation with variable flow

Follow the same procedure described on the previous item, regarding the lever use and hose connections to the remote control terminals.

Normally, only one of the lines allows the variation of flow. This is done by turning the control (H). forward decreases the flow (up to 0%) and reverse increases the flow, up to the maximum of 60% of the total flow available.

The variable flow valves, normally used for continuous operations, such as hydraulic engines.

For this reason, the lever relative to the variable flow valve has a detection system that keeps it in the position operated regardless the pressure.

For operation, connect the hoses to the terminals (1 and 2), accelerate the engine, move the control lever forward or backward (according to the movement direction wanted) and adjust the flow by the control (H), until the speed wanted is reached for the equipment operated.

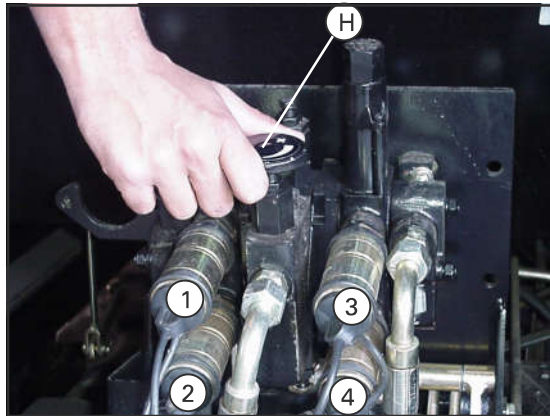


Fig. 204

10.4 - Combined flow

To increase the flow in the remote control system when the lifting system is not being used, the combined flow valve (1) must be operated as follows:

To operate the combine flow:

- 1 - With the engine idling, push the external lever (Depth control) back and move the internal lever (position control) for Transportation, so that the lower arms of the lifting system are completely lifted.
- 2 - Pull the lever (1) to position B: at this moment, the oil flow of the system will be directed to the remote control.

NOTE:

For cabin tractors, the combined flow valve is located to the right of the operator seat.

The lifting system will become inoperative and the remote control flow will increase.

- 3 - Change the lever position (2) to constant pumping (back).

IMPORTANT:

Never set the lever (2) to constant Pumping, before moving the combined flow valve to position (B).

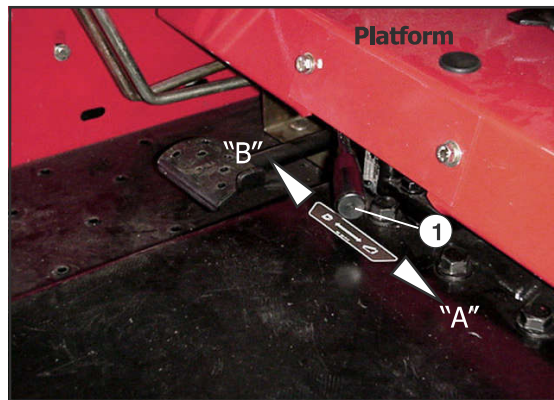


Fig. 205

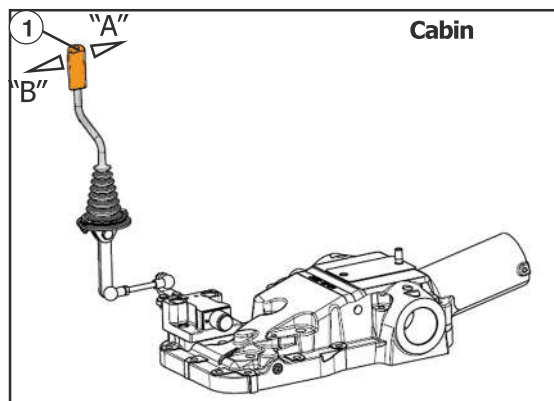


Fig. 206

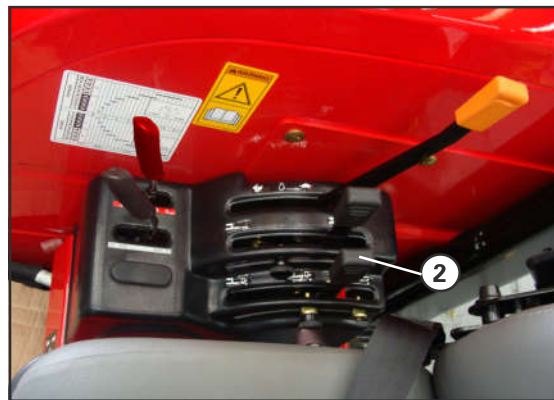


Fig. 207

5 - Operation

10.5 - Implements that use large quantities of oil

Implements equipped with large cylinders, need a larger volume of oil for operation. In this case, follow the procedure described as follows:

- a) Start the engine and after connecting the equipment to the remote control, operate all the cylinders to extend the rods.
- b) With the tractor leveled, check the oil level of transmission/hydraulic system: it must reach the “maximum” mark on the gauge guide (I - Fig. above).
- c) Check the oil level after every operation day.



IMPORTANT:

- 1 - After disengaging the implement and disconnecting the hose, check if there is excess of oil and, if necessary, drain the excess.
- 2 - If the quantity of oil removed from the transmission is excessive, the hydraulic system may be damaged.

5

10.6 - General Recommendations

- Make sure the oil in the implement hydraulic circuit is not contaminated. It can happen when the implement remains inoperative for long periods of time, exposed to bad weather. In this case, drain the oil in the remote cylinder and respective hoses and perform the bleeding (elimination of air).
For the elimination of air from the circuit, generally accelerating the engine is enough to operate the remote control lever(s) in the two directions, several times, till the air is fully eliminated.
- Keep the pressure terminals always protected with plugs (1), to avoid contaminating the oil with dust, what would cause serious damages to the transmission and hydraulic system.
- Before disconnecting the hoses from the terminals, relieve the circuit pressure.
To do so, stop the engine and move the lever to both directions till noticing the remote hydraulic cylinder exercises no force.
- At a later connection, if for any reason, pressure remains in the system, relieve it before trying to connect the hoses. To do so, press the check valve (2) in the hose end against a clean object.

Be careful to avoid a jet of oil!

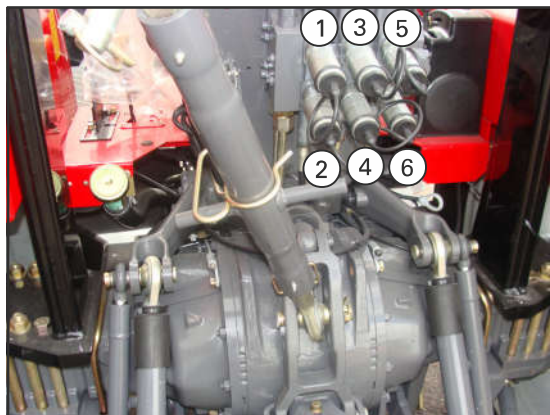


Fig. 208



Fig. 209

11 - Using the brakes



WARNING:

When driving the tractor on roads, the brake pedals must always be joined by the respective locking device, so that its application is uniform and the braking power is maximized. Only unlock the pedals in sharp turns. Make the sharp turns at low speed.



CAUTION!

When getting off the tractor, all brakes must be engaged. ALWAYS.

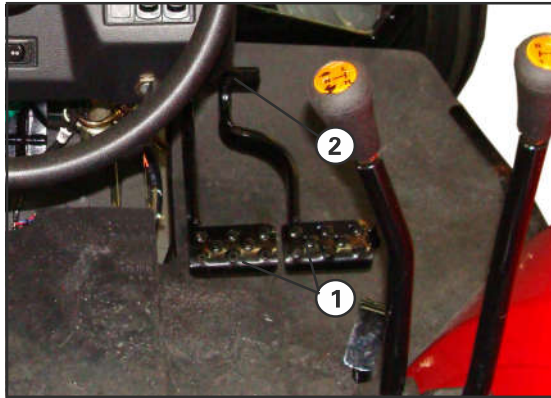


Fig. 210

1. When the tractor is being operated in stationary jobs, even for a short time, the parking brake must always be engaged.
2. The independent brakes (1) can be used to help you in the turns, but always at low speed. Never use just one of the pedals when operating the tractor in high speeds.
3. Parking brake Make sure its totally disengaged before starting driving the tractor.
4. When driving on roads, lock the brake pedals with a locking device (2).

Sharp turns

1. Release the brake pedals lock (2).
2. Apply the brake for the side you want to make the turn or maneuver, for example, if you want to make a turn or maneuver to the right, then you will have to step on the right brake and turn the steering wheel to the same direction.
3. Before driving on the road again, you must lock the brake pedals again.

5 - Operation

12 - Differential blocking



WARNING:

NEVER drive on roads, or at high speed, with the differential blocking engaged. For field operations, use the differential blocking to improve the drive, but disengage it to maneuver at the end of aisles.

If one of the rear wheels starts slipping, to engage the differential blocking:

1. Press the clutch pedal completely.
2. Press the differential blocking pedal with your heel to engage the blocking.
3. Release the clutch pedal slowly, keeping the differential blocking pedal pressed.
4. To disengage the differential blocking, release the respective pedal. If the blocking does not disengage automatically, press the clutch pedal.

5



IMPORTANT:

DO NOT try to activate the differential blocking when one of the wheels is still and the other is spinning fast. DO NOT try to maneuver or make turns with the blocking engaged.

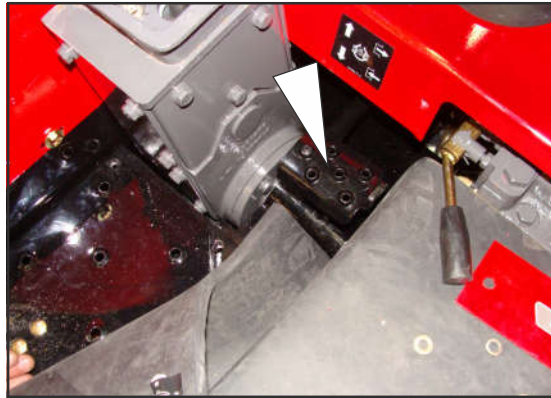


Fig. 211

13 - PTO (Power Take Off)



ATTENTION!

See the procedures for shaft replacement, transmission operation and instrument panel setting to apply the power take-off in Preparation section.

13.1 - Operating the power take-off

With the engine at low speed, pull the lever (1) to position to operate the power take-off shaft.

Then, adjust the engine speed to reach the rated speed of 540 or 1000 rpm.

To turn off the power take-off, set the lever (1) back to position .

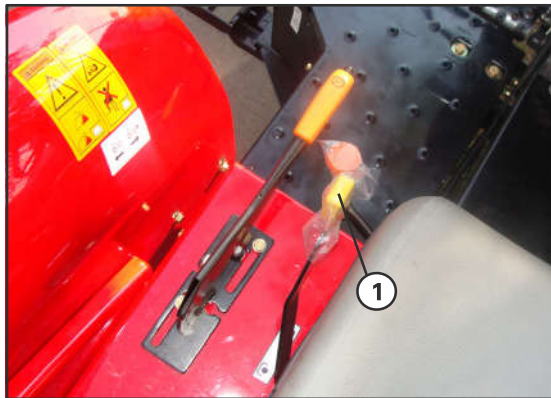


Fig. 212

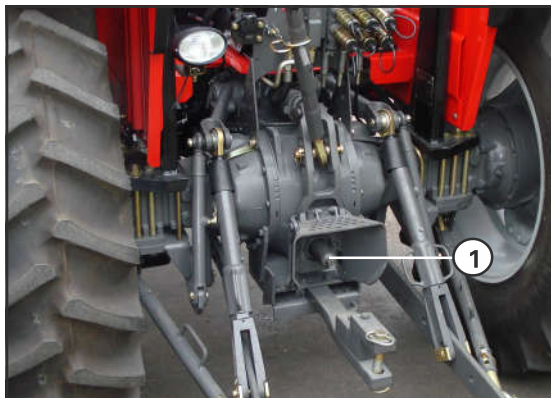


Fig. 213



13.2 - General advice

- ✓ Avoid parking the IPTO with engine at high speed. This will force the hydraulic clutch unnecessarily, making it slip. Reduce the engine speed when operating the IPTO.
- ✓ Whenever the IPTO is not being used, keep the protection cover (1) on the shaft.
- ✓ To operate with the IPTO safely, ask your implement vendor to supply a protection (2) for cardan.
- ✓ During the stationary equipment operation with the IPTO, always keep the parking brake engaged. If necessary, block the wheels with wooden wedges to prevent the tractor from moving.



ATTENTION!

Stop the engine before any setting or repair in the equipment operated by the IPTO.



Fig. 214

5 - Operation

- ✓ When engaging the implement for the first time, make sure the cardan length is properly setup. See the Operator's Manual
 - ✓ When using equipment that require constant power speed and load, more than 90% of the maximum power available at the PTO should be used. The water pumps and electricity generators are examples of equipment that require constant speed and load.
 - ✓ It is not recommended to use the PTO at 540 rpm for applications that require power above 75 hp. Both the output shaft and cardan can be damaged, offering serious risks of accidents with unpredictable consequences. For power above 75 hp use the IPTO at 1000 rpm and the respective shaft.
 - ✓ Always use the position control in the lifting system when operating implements activated by the PTO, except in special cases.
 - ✓ Cardan maximum working angle: refer to the operator's manual. If such information is not found, consider 30° (degrees) as the maximum angle.
- I - In implements mounted on the hydraulic lifting, observe the lifting limit so that the cardan working angle is not exceeded.
- II - In implements towed by the steering rod it can be necessary to turn off the power take-off during the maneuvers.

Cardan length adjustment

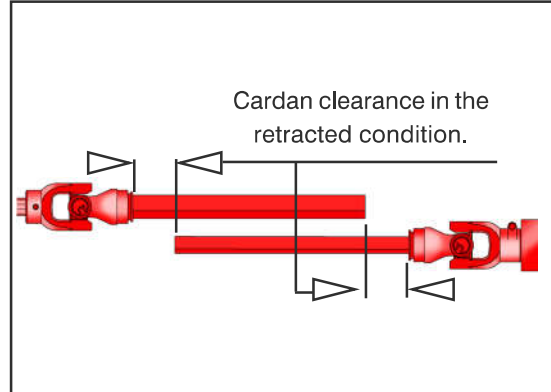


Fig. 215

Cardan maximum angle for implements mounted on the 3-point lifting.

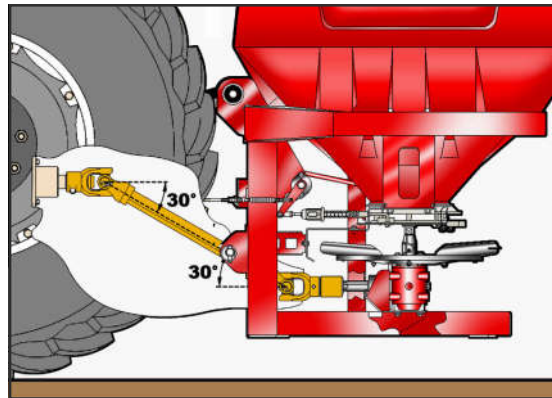


Fig. 216

Cardan maximum angle for towed implements

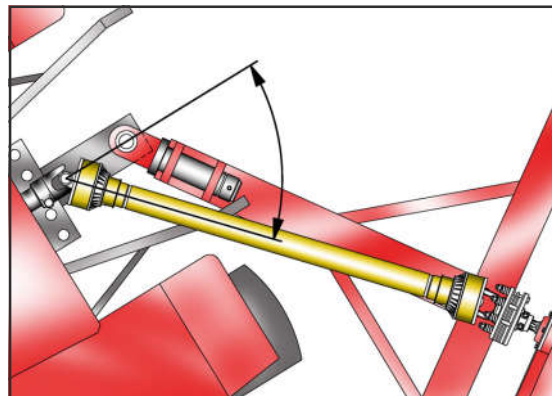


Fig. 217

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6 - Maintenance

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6

1 - Introduction

This Section provides detailed information on the maintenance services required so that your tractor can work perfectly and for a much longer time. If the maintenance services are carried out as indicated, you will certainly guarantee good results. The maintenance services performance in the intervals of time stipulated assure the maximum performance and life to your MF tractor. In addition, it prevents damages and losses of time in decurrence of breakage or premature wearing.

Routine Services

This Section provides complete details on the procedures required to maintain your tractor efficiently working.

it is important to regularly perform a preventive maintenance in the tractor (each 1000 hours). We recommend that all the services are performed by the local Massey Ferguson Dealer, according to the Massey Ferguson Recommended Service Program. It is important to remind that the responsibility for keeping your tractor under good safety and driveability conditions relays on you, the owner.

Perform the maintenance in your tractor in the intervals of time indicated on the following pages. The chart will present the periodicity of each work to be performed.

Always use the recommended lubricating oil.

We recommend the maintenance to be performed in a covered place and at the end of the operation period, once the oil is still hot, making the draining easier.

- ✓ Before using the greaser gun, clean the greasers.
- ✓ Before removing the draining and filling plugs, clean the area around the plug and the cover.
- ✓ Always use a clean container basin for lubricating oil or diesel that will be reused.

Safety in the Maintenance



CAUTION:

When changing the oil, it is important to follow some basic rules on personal hygiene as they are described.

- ✓ Use protective clothing, overalls, PVC gloves, etc.
- ✓ As soon as you finish changing the oil. The dirty cloth must be undressed and washed.
- ✓ The contact with the oil for a long period of time can affect the health, so it is important to follow the instructions above.
- ✓ Do NOT perform the tractor performance with the engine running.
- ✓ Keep the hands, tools and clothes far from any part in movement. Avoid the contact of the skin with the manifold and discharge pipe. They might be hot and burn you.
- ✓ Keep children and domestic animals away from the tractor. Do NOT allow the presence of people near the tractor, except those who are working under your instructions.
- ✓ Do NOT work under the tractor when it is supported only by a jack. Support the tractor on firm and safe stands.

Hour meter

Use the hour meter to perform the maintenance on the tractor at the correct periods.

6 - Maintenance

2 - Maintenance exclusive for the new tractor (up to 100 hours of operation)



IMPORTANT:

This exclusive chart lists the maintenance items to be checked exclusively during the first 100 Hours (New Tractor).

However, the items from the Periodical Maintenance Chart must also be performed.

With 10 hours of service

General

- ▲ Check the EPCC bolts tightening torque.
- ▲ Retighten the wheels mounting nuts.
- ▲ Check if all the safety protections are in their places and with legible decals.

6

With 50 hours of service

Engine, fuel and cooling system

- ▲ Clean the fuel pre-filter element.
- ▲ Check the coolant level.
- ▲ Check the fan, alternator, and air conditioning compressor drive belt conditions.
- ▲ Change the engine oil and filter.

Clutch

- ▲ Check the clutch pedal free play. Adjust it, if necessary.
- ▲ Check the clutch general operation.

With 100 hours of service

Transmission and hydraulic systems

- ▲ Change the oil from the transmission and hydraulic.
- ▲ Change the filter and wash the ISYP pump screen-filter.
- ▲ Clean the section filter.
- ▲ Replace the return filter.
- ▲ Change the oil from the rear final drives.

Brakes

- ▲ Check the brake fluid level. Top it up, if necessary.
- ▲ Check the brake pedals play. Adjust it, if necessary. After that, perform the simultaneous actuation test.
- ▲ Check the brake tubes conditions.
- ▲ Check and adjust the parking brake adjustment.

Front axle and steering

- ▲ Change the oil from the front axle and the final drives.
- ▲ Lubricate the front axle and driving shaft (cardan) universal gaskets with grease.
- ▲ Lubricate the steering pivots.

Cab and air conditioner

- ▲ Check the air conditioning system operation.
- ▲ Check the air conditioner compressor driving belt conditions and tension.
- ▲ Check / clean the air conditioning air filter element(s).

Electrical system and instruments

- ▲ Check the battery conditions.
- ▲ Check the battery connections tightening and the battery attachment.
- ▲ Check all the starter safety switches operation.
- ▲ Check all the indicator lamps, sound alarms and instruments for the correct operation.
- ▲ Check all the lights correct operation and adjustment.

3 - Periodical maintenance chart

The interval of time in hours in the Maintenance Chart must be based on the hours indicated by the tractor hour meter. Use a control booklet to make your tractor maintenance management easier regarding to the correct periods of time.

Tractor top view - Layout of approximate positions of the items

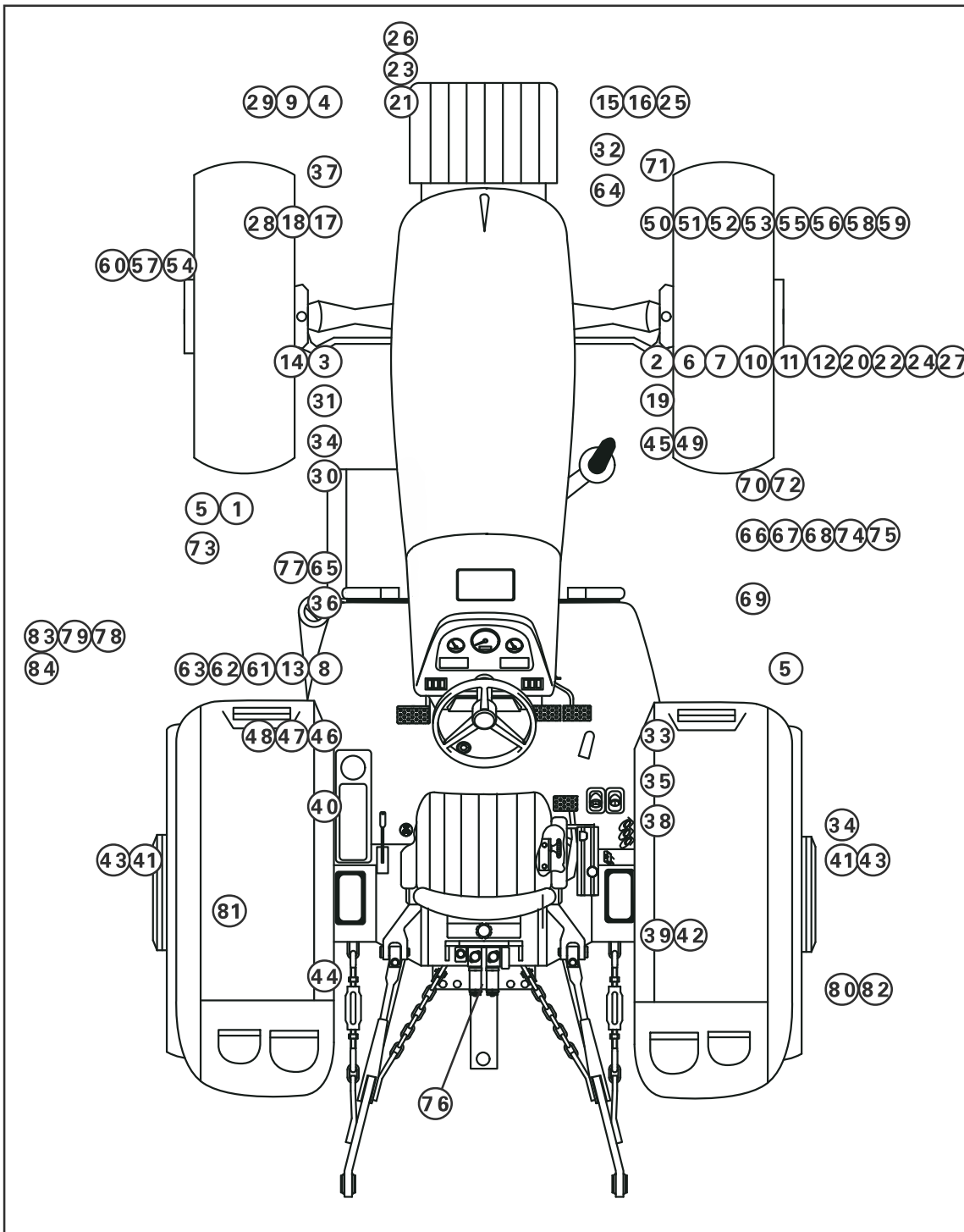


Fig. 218

6 - Maintenance

Regular Maintenance		10hs or daily	50hs or weekly	300 hours	600 hours	900 hours	1200 hours
Position	Engine, fuel, and cooling system						
01	Engine - Clean.	When necessary.					
02	Refill the fuel tanks after every working day.	X					
03	Check the oil level and fill it up if necessary with the recommended oil.	X					
04	Drain water and impurities built up in the filters and sedimenter.	X					
05	V-Belts - Inspect.	X					
06	Check the radiator coolant level and top up if necessary.	X					
07	Clean the main radiator and all the fins in the radiator elements.	X					
08	Release the accumulated dust in filter unloader valve.	X					
09	Check the filter and the air supply system: tightening of dampers, condition of hoses, clogging indicator, turbo components, etc.		X				
10	Check the water pump, alternator and fan belt condition and tension.		X				
11	Change the engine oil filter.			X			
12	Change the engine oil (First change should be performed at 50 hours).			X			
13	Change the fuel filter element.			X			
14	V-Belts -Adjust/Replace.				X		
15	Check the tension of the alternator/fan belt.				X		
16	Battery electrolyte level - Check.				X		
17	Clean the sump breather hose.				X		
18	Check the dampers for tightening and the condition of the cooling and fuel system hoses.				X		
19	Check general engine operation: temperature, pressure, performance.						X
20	Check the play and general condition of the water pump.						X
21	Drain, flush and refill the fuel tanks.						X
22	Change the air filter primary element when the clogging indicator comes on in the panel or every 1000 hours or annually, whichever occurs first.	When the clogging indicator comes on in the panel.					
23	Change the secondary element of the air filter every 3 changes of primary filter, every 1000 hours or annually, whichever occurs first.						X
24	Flush and refill the radiator with coolant suitable for the ambient temperatures expected.						X
25	Starting motor - Inspect.	Every 2000 hours - Dealer					
26	Turbocharger - Inspect.	Every 2000 hours - Dealer					
27	Water pump - Inspect.	Every 2000 hours - Dealer					
28	Alternator belt - Inspect/Adjust/Replace.	Every 3000 hours - Dealer					
29	Inspect the injection nozzles and fuel injection pump.	Every 3000 hours - Dealer					
	Clutch						
30	Check clutch operation - tractor in motion.	X					
31	Check the clutch pedal free travel, if required.		X				
32	Check and adjust the live PTO clutch.						X

6

6 - Maintenance

Regular Maintenance		10hs or daily	50hs or weekly	300 hours	600 hours	900 hours	1200 hours
Position	Transmission, rear axle and hydraulic system						
33	Clean the oil cooler fins.			When necessary			
34	Clean the rear differential breather, fuel system and transmission.	X					
35	Clean the rear axle breather.	X					
36	Check the hydraulic / transmission system oil level.		X				
37	Check the rear final drive oil level.			X			
38	Change the hydraulics oil return filter element.			X			
39	Check the differential lock pedal clearance.				X		
40	Clean the suction filter.				X		
41	Change the transmission and hydraulic system oil.				X		
42	Change the rear final drive oil.				X		
43	Clean the hydraulic linkage pump oil strainer.				X		
44	Retighten the bolts between engine and gearbox and gearbox and rear axle.						X
45	Check and adjust, if necessary, the rear final drive preloading.						X
	Brake						
46	Bleed the brake circuit.			When necessary			
47	Check the brake operation.	X					
48	Check the pedal free travel.		X				
49	Check the parking brake adjustment.		X				
50	Check the brakes and adjust if necessary.			X			
51	Check brake fluid level and top up if necessary.			X			
52	Change the brake fluid.						X
	Front axle and steering						
53	Clean front differential breather.	X					
54	Grease the universal joints in the front axle and drive shaft (front wheel drive).	X					
55	Grease the steering pivots.	X					
56	Check for play in the steering pivots and front wheel hubs.	X					
57	Check the steering system operation (with the engine on or off).	X					
58	Check steering and toe-in adjustment (including tires for wear and damage).			X			
59	Check the oil level in the front axle and final drives.			X			
60	Change the axle and planetary oil.				X		
61	Check the front wheel hub adjustment (two-wheel drive).				X		
62	Check the universal joint condition.						X
	Cab and air conditioning						
63	Clean the condenser.			When necessary			
64	Clean the cab air filter.			When necessary			
65	Clean the air conditioning condenser.			When necessary			
66	Check whether the wiper is working properly and the condition of the wiper arms.	X					
67	Check the compressor belt condition and tension.			X			
68	Check the condition of rubber gasket of doors and windows. Change the gasket if necessary.				X		
69	Replace the air conditioning dryer filter.						X
70	Change the cab air filter element.						X

6

6 - Maintenance

Regular Maintenance		10hs or daily	50hs or weekly	300 hours	600 hours	900 hours	1200 hours
Position	Electrical system and instruments						
71	Check the battery condition.	X					
72	Check for correct operation and adjustment of all lights.	X					
73	Check all indicator lights, sound alarms, and instruments for correct operation.	X					
74	Check all neutral start switches for operation.	X					
75	Check all electronic systems for correct operation.	X					
76	Check all the other electrical devices (e.g.: cab heater / fan / radio, wipers, etc.) for the correct operation.		X				
77	Check battery cables for tightening and battery fastening. Smear terminals with petroleum jelly.			X			
78	Check the battery ground cable and connections.						X
79	Check the condition of the wiring harness and fasteners.						X
80	Check the alternator and starter motor operation.						X
	General						
81	Top up the reservoir with suitable fluid of the cab windshield wipers.	When necessary					
82	Turn on all hydraulic systems and PTO to check operation.	X					
83	Ask the operator if he or she has any doubts or difficulties concerning the operation and correct the	X					
84	Check whether all shields and guards are in place and all safety and information signs are in place, dean and undamaged.	X					
85	Lubricate all points with grease or oil, as specified in the maintenance guide.		X				
86	Check tire pressure.		X				
87	Check the torque of all nuts and bolts in the wheels and rims.		X				
88	Check the tightening torque of the ROPS bolts.						X

6

4 - Greasers

NOTE:
Grease all the pointed mentioned with lithium based grease of good quality, grade NLGI.

Front axle 4x4 (Central)

- 1 - Axle central joint: 2 points.
- 2 - Joints at the edges: 6 points.
- 3 - Half shafts spiders: 2 points.
- 4 - Front traction driving cardan: 3 points.

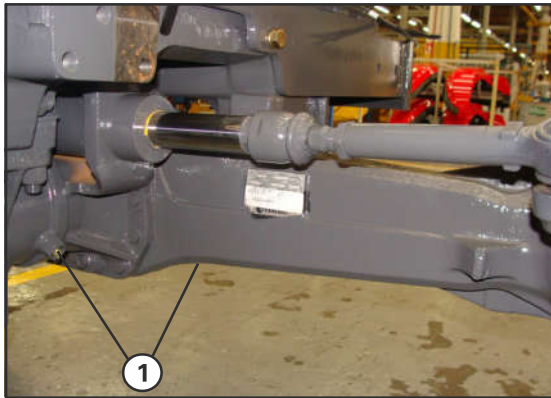


Fig. 219

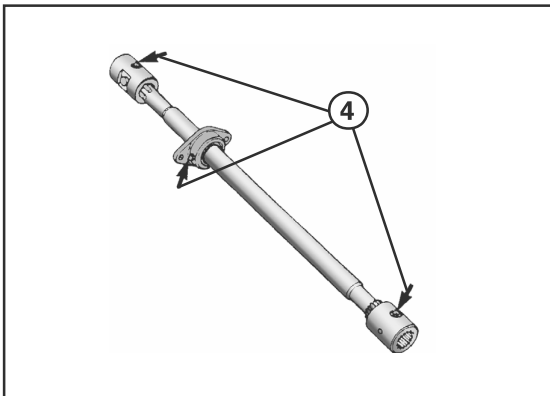


Fig. 220

Front axle 4x4 (Lateral)

- 1 - Axle central joint: 2 points.
- 2 - Joints at the edges: 2 points each tip.
- 3 - Half shafts spiders: 2 points.
- 4 - Front traction driving cardan: 2 points. There is also a bearing in the central support with 1 point).

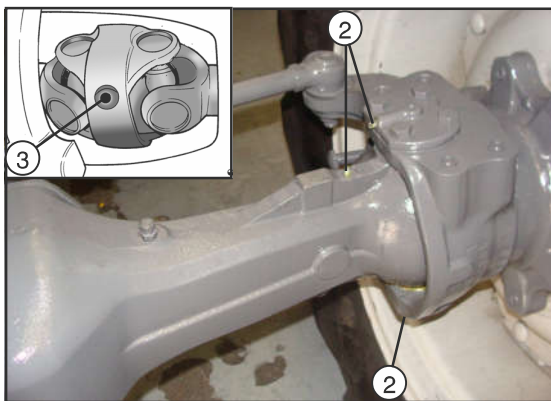


Fig. 221

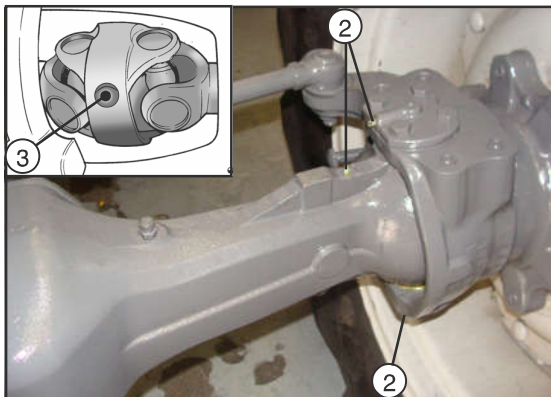


Fig. 222

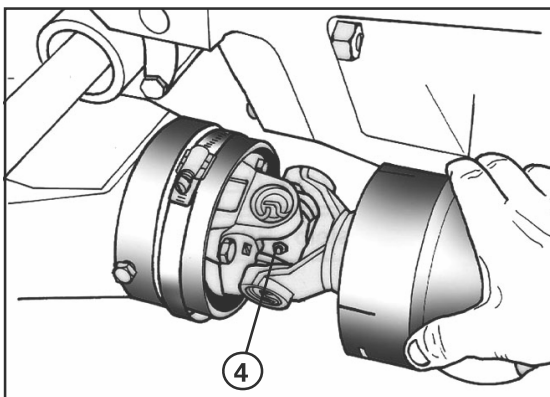


Fig. 223

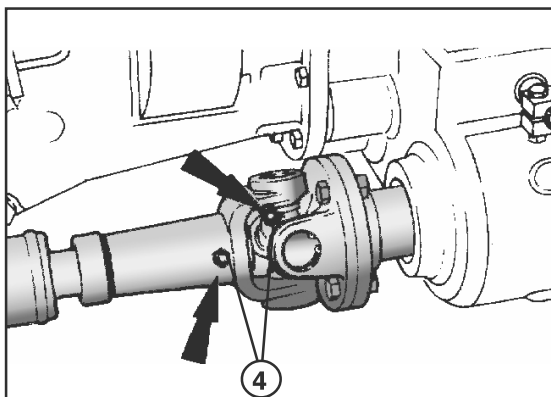


Fig. 224

6 - Maintenance

Front axle (4x2)

- 1 - Front axle central joint 4x2: 1 point.
- 2 - Front axle king pins 4x2: 1 point each side.
- 3 - Axle's wheel hubs 4x2: 1 point each wheel.
- 4 - Steering cylinder 4x2: 2 points.

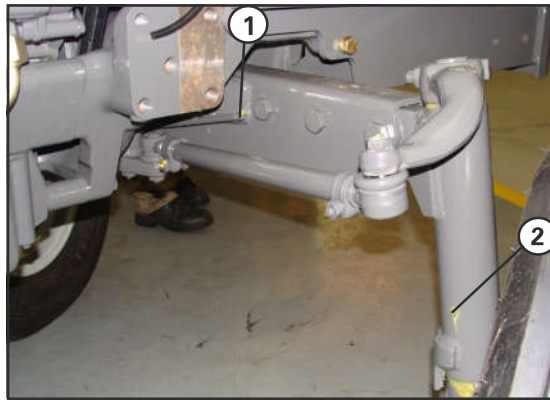


Fig. 225

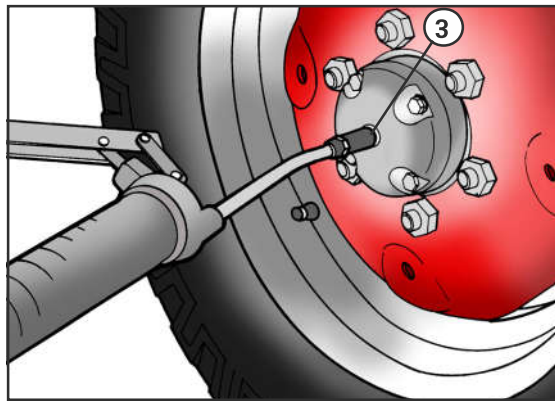


Fig. 226

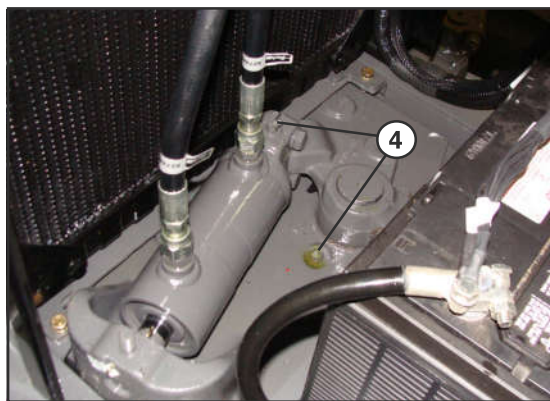


Fig. 227

6

Hydraulic lifting system

- 1 - Leveling or intermediary arms: 1 point.
- 2 - Side stabilizers:
 - Chain type: apply grease or oil directly on the threads.
 - Telescopic type: 1 point each.

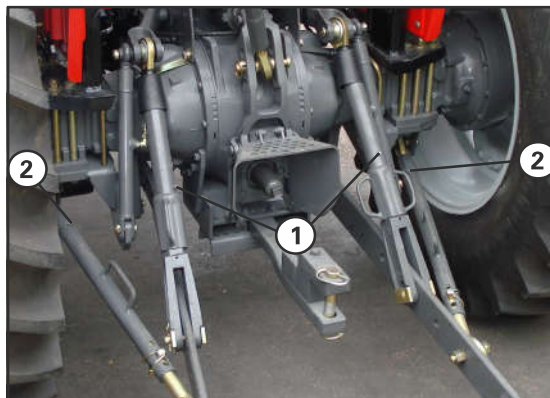


Fig. 228

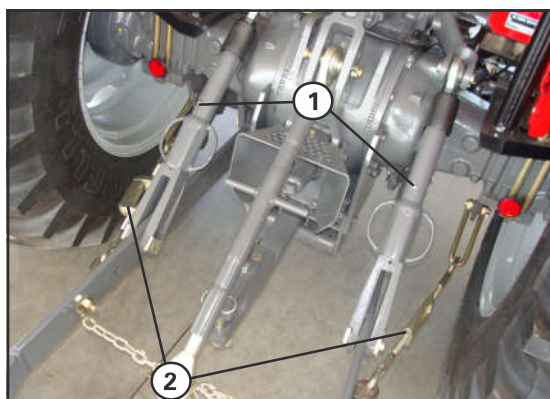


Fig. 229

6 - Maintenance

General points

- 1 - Clutch driving axle: 1 point each side of the tractor.
- 2 - Gearbox's gearshift forks axles: Apply grease with both gearshift levers in neutral position. it will allow the grease to pass through the gearshift forks holes, that will only be aligned in this position.
- 3 - Differential blocking pedal: 2 points.

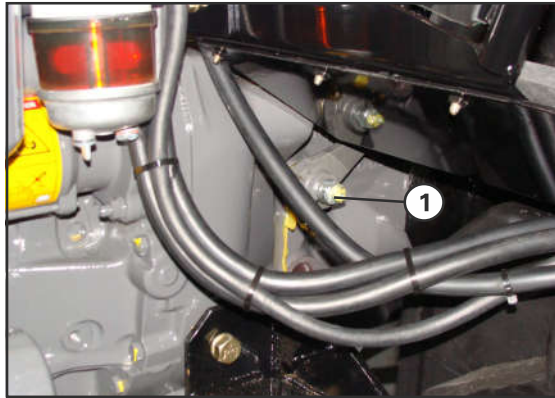


Fig. 230

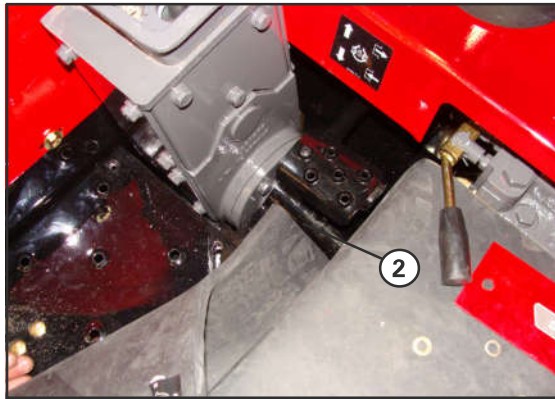


Fig. 231

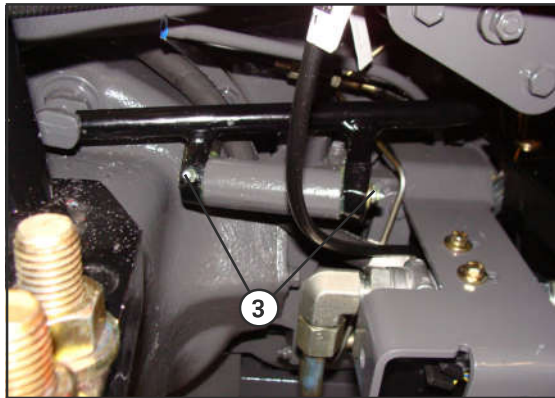


Fig. 232

6 - Maintenance

5 - Lubricants, capacities and recommended additives chart

UNIT	CAPACITY	SPECIFICATION	Factory default
ENGINE	Without filter = 8.5 liters With filter = 9 liters	SAE 15W 40 API CF-4 CCMC D-4 MULTIGRADE	Shell RIMULA R3X 15W40
TRANSMISSION HYDRAULIC SYSTEM REAR AXLE	45 liters	SAE 10W-30 API GL -4/SF - GL-4 MF CMS M 1143	Shell WBF-100 Shell DONAX TD
FINAL DRIVERS	Front: 0.5 liters Rear: 3.0 liters	SAE 90 API GL -5 MIL-L-2105 B	Shell SPIRAX A 90
HYDRAULIC BRAKE	0.3 liters	SAE J-1703 FMVSS116DOT3	Shell BRAKE FLUID
GREASE	According to the need	Lithium grease Type EP NLGI 2	Shell RETINAX WB
OIL FOR PROTECTION AGAINST RUST	As required	ISO 68	Shell TELLUS 68
FUEL	- With plate tank, over the engine: 75,0 - With plastic tank in the transmission left side: 100,0	Diesel oil – with maxi- mum sulphur concentra- tion of 0.5% Biofuel with up to 20% (B20) EN14214 / ASTM D6751	Shell FÓRMULA DIESEL
COOLING SYSTEM	18.4 liters	Water with antifreeze additive ethylene-glycol based.	FLUID FOR RADIATORS Shell
FRONT AXLE	6.0 liters	SAE 90 API GL -5 MIL-L-2105 B	Shell SPIRAX A 90

6

NOTE:

Oils and fluids: the use of lubricants in the equipment represents a thermal-oxidative degradation and contaminants accumulation, which makes the changes necessary. Never discard oils or fluids directly on the environment. Collect them and take to the gas service station where you have bought the product. The oils can be recycled or, in last case, incinerated in

industrial facilities regulated by Law. AGCO do Brasil is not responsible for the destination given to the lubricating oils, coolants and used batteries, it is the owners responsibility to know the environment laws and regulations in force.

6 - Access to the serviceability points

The tractors have tilting hood, which allows an easy access to all the engine's maintenance points.

Opening

Pull the lock (1) and, with both hands, push the hood upward.



CAUTION!

Take care to open and close the hood to prevent crashes or bruises.

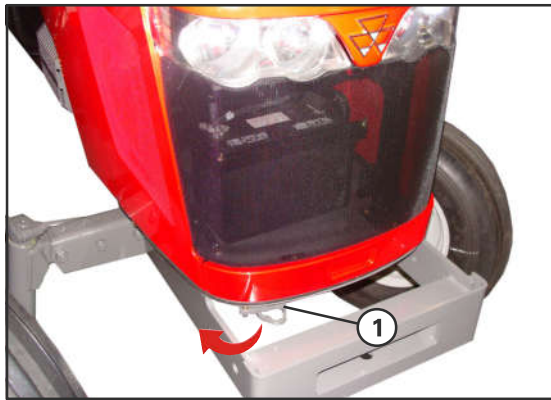


Fig. 233

Safety in the maintenance



CAUTION:

When changing the oil, follow some basic rules for personal hygiene, as listed below:

▲ Before changing the oil, use a proper protection cream on your hands.

✓ Use protective clothing, overalls, PVC gloves, etc.

▲ Wash the dirty oil with water and soap, as soon as you have finished changing the oil. Contaminated clothes must be put apart and washed.

✓ The contact with the dirty oil for a long period of time can affect the health, so it is important to follow the instructions above.

▲ Do not perform the maintenance with the tractor engine running.

▲ Keep your hands, tools and clothes distant from the moveable parts. Avoid the contact of the skin with the intake and exhaust tube. They might be hot, and you can get hurt.

✓ Keep children and domestic animals away from the tractor. Do NOT allow anybody to use the tractor, unless they have the proper training and instructions.

▲ Do NOT work under the tractor using only a jack as support. Place appropriate blocks under the tractor.

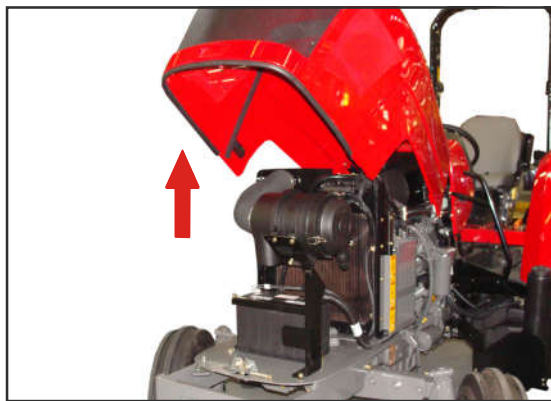


Fig. 234

Environment protection

Polluting sewer, rivers or the soil is illegal. Use authorized waste treatment stations, including the companies that provide the collection of used oil. In doubt, get in touch with the local public agency.

6 - Maintenance

7 - Engine

70.1 - Engine lubrication

A) Checking the lubricating oil level

With the tractor leveled and engine off.

- 1 - With the oil level gauge (1), check that the level must be between the MIN and MAX marks.
- 2 - If the level is below the minimum (MIN) mark, fill it up with the recommended oil through the filler hole (2).

NOTES:

- Never let the oil level neither below the minimum mark nor above the maximum mark on the level gauge.
- Use oil recommended by Massey Ferguson only, according to the table of lubricants in this section.

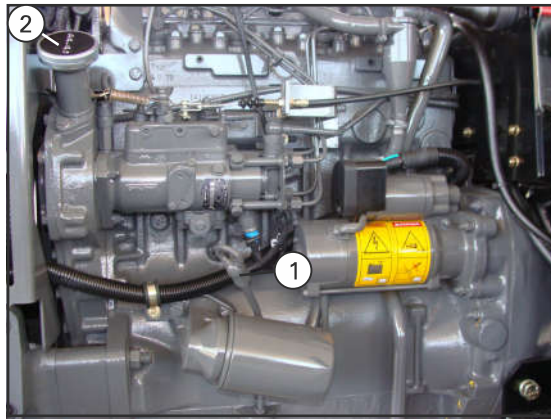


Fig. 235

6

B) Changing the lubricating oil and filter

With the tractor leveled, clean and the engine at normal operating temperature:

- 1 - Drain all the oil through the plug (3).
- 2 - Remove the oil filter (4) and throw it away.
- 3 - After draining the oil completely, reinstall the plug (3), observing the condition of the respective seal ring, if necessary, replace it.
- 4 - Apply a slight layer of clean oil in the new filter sealing ring and install it.
Do not use tools for this procedure because it can deform the filter.
- 5 - Fill the crankcase with the oil recommended on page 6 up to "max" mark on the level gauge (1).
- 6 - Start the engine and do not accelerate it. Pay attention to the warning light for oil pressure which must come off after the start, otherwise, stop the engine.
- 7 - With the engine idling, check if there is leakage by the crankcase filter or drain plug.
Turn the engine OFF and, after some minutes, check the oil level again, filling it up, if necessary.

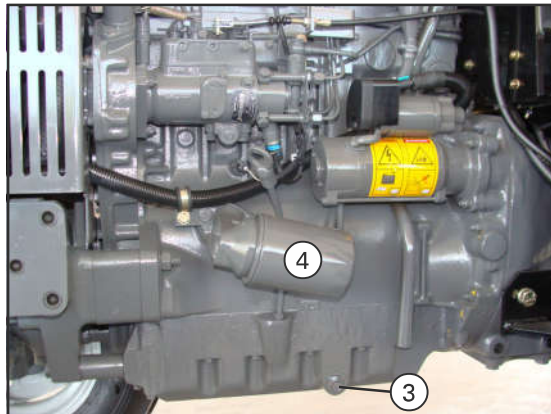


Fig. 236

7.2. Cleaning the crankcase breathing tube

The breathing system prevents the oil from dripping on the ground, by taking it back through the hose (1).

Inside the hose (2), whose end remains open, and also inside the filter (3), oil and dust sediment can form, which damages the engine crankcase ventilation. For that reason, always keep the breathers clean.

Disconnect the hoses (1, 2, and 4).

Loosen the hose (2) internally and also the filter (3). Use diesel or kerosene to clean.

Reinstall the components in the original position, tightening the clamps properly.

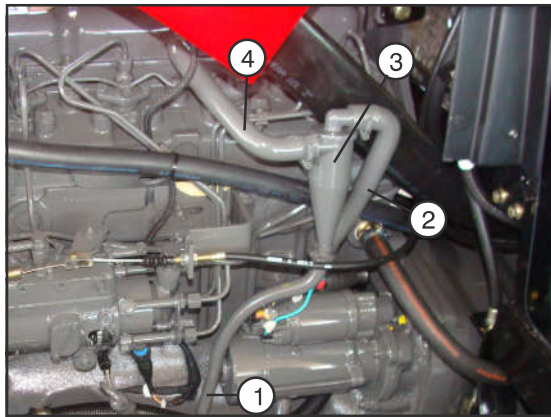


Fig. 237

7.3 - Fuel system - MWM Engine

A) Checking and adjustment of idle speed

The checking and adjustment of the idling speed must be performed with the engine at normal operating temperature.

- 1 - To change the idling speed rotation, turn the bolt (1), loosening before the respective locknut. To increase the rotation, turn the bolt clockwise, and vice-versa.
- 2 - When the ideal rotation is reached, retighten the locknut.

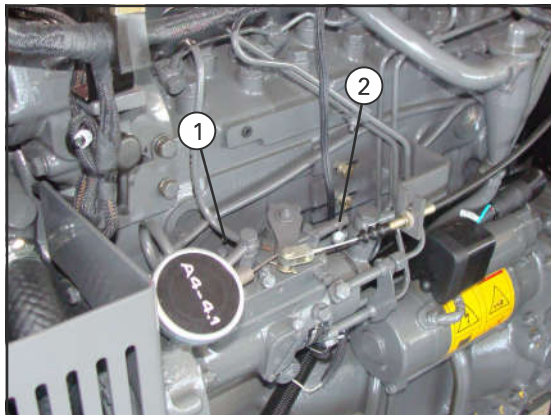


Fig. 238

6



IMPORTANT:

The maximum rotation adjustment (by bolt 2) can only be performed by Massey Ferguson Dealer or by the fuel injection pump Authorized agent. Breaking the seal will void the engine Warranty!

B) Sedimenter and fuel filter draining



NOTE:

Drain the filters daily, before the start, eliminating the water and impurities deposited on the base.

It is highly harmful to let water in the pump and nozzles.

First drain the sedimenter, by loosening the plug (1). When the fuel drains pure, close it manually.

Then, do the same with the lower plug (2) of the filter.

6 - Maintenance

C) Cleaning the sedimenter

- 1 - Remove the central bolt (3).
- 2 - Remove the sedimenter assembly and wash the components in diesel or clean kerosene.
- 3 - Remove the rubber grommets (4).
- 4 - Reinstall the components, observing the correct fitting of seals (4), base (6), central block (5), in addition to the correct bolt tightening (3).

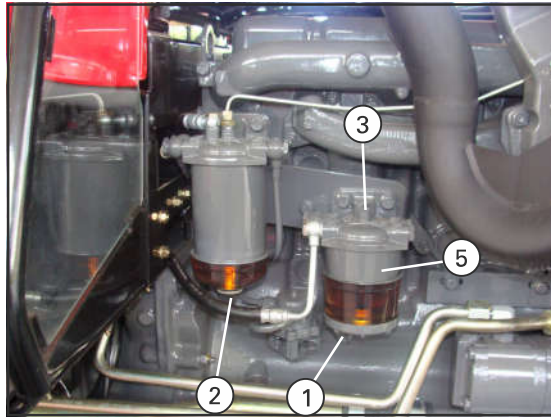


Fig. 239

NOTE:

Never use clothes or shop rags to clean or dry the filtering components. The strands can clog the fuel circuit

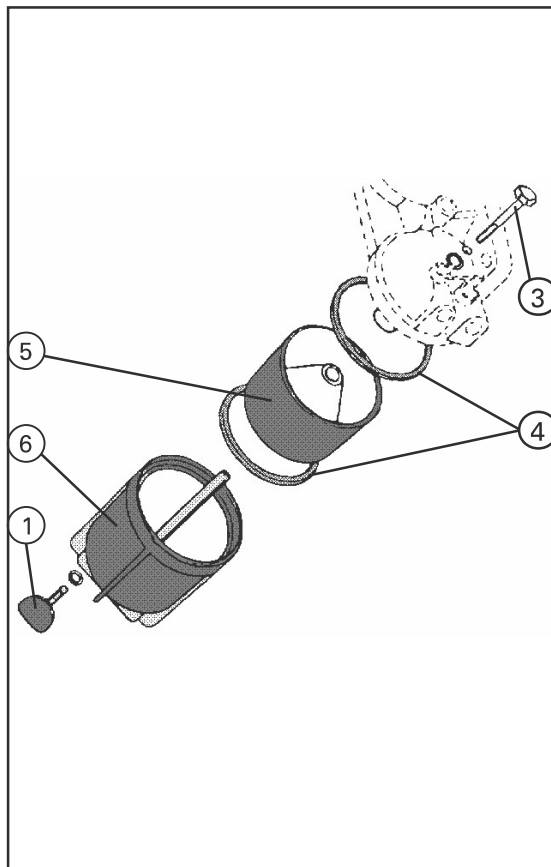


Fig. 240

D) Replacing the filter element.

- 1 - Remove the central bolt (8) and remove the filter element (7), base (9) and the sealing rings (10 and 11).
- 2 - Discharge the filter element (7) and clean the support and the base (9).
- 3 - Reversely, assemble the new and original element, observing the component assembling positions in the figure.
Use new seals (10 and 11) that follow the filter.
- 4 - Tighten the bolt (8) properly, do not overtight.
- 5 - Do the bleeding in the sequence described.

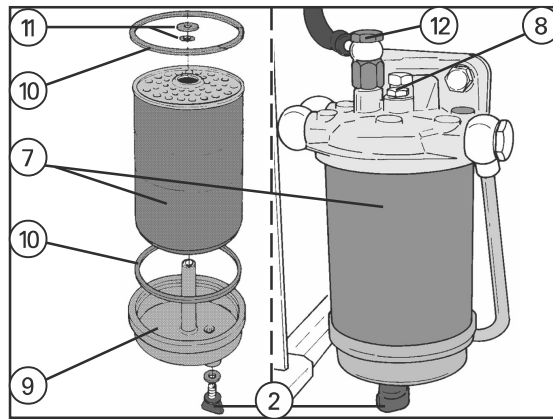


Fig. 241

E) Bleeding of the fuel system

The system bleeding is necessary when:

- I - Cleaning the sedimenter and filter replacement.
- II - The tank is run dry during operation.
- III - Repairs in high pressure circuits that allow the air intake.
- IV - In very cold weather, when there is formation of paraffin in Diesel
- V - After the tractor is not used for a long period.



NOTES:

1 - The bleeding procedure must follow the correct order: sedimenter - filter - injection pump - nozzles.

2 - In situations II, III, IV and V above, it is generally necessary to perform the complete bleeding, that is, up to the pump and nozzles.

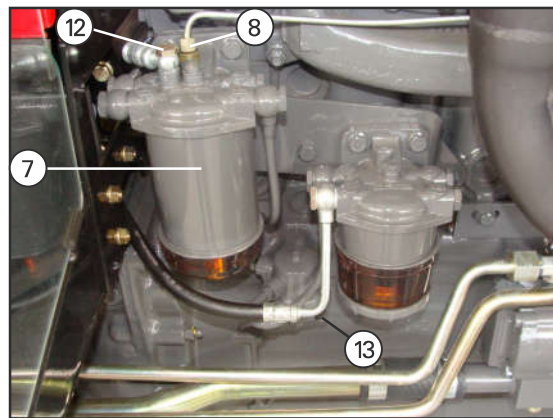


Fig. 242

6

Sedimenter bleeding

The sedimenter has no bleeding plug. Reinstall it so that there is no air intake through the seals or lower draining plug.

When bleeding the filter, the sedimenter is filled with fuel.

Fuel filter bleeding

- a) Loosen the filter connection (12) some turns.
- b) Operate the manual bleeding pump (13) till all air free fuel flows through the connection (12).
- c) Retighten the connection (12).
- d) Start the engine: if after trying 2 or 3 times the engine does not start, bleed the injection pump:

6 - Maintenance

Injection pump bleeding

NOTES:

- As mentioned previously, the injection pump and nozzles normally need bleeding in special situations (II, III, IV and V), mentioned on the previous page.

- Do not start the ignition for more than 10 seconds consecutively! It can cause damages to the start motor and discharge the battery. In the case the engine does not run in this period, repeat the procedure.

If necessary, repeat the filter bleeding procedure.

- 1 - Loosen the plug (14) and ask an assistant to operate the manual bleeding pump (13 - previous figures) till just fuel flows out the plug (14).

Retighten the plug (4), while the manual pumps is being operated.

- 2 - Follow the same procedure with the plug (15).

High-pressure lines

- 3 - Loosen 2 high pressure connections (16) together with the nozzles.
- 4 - Set the manual accelerator to maximum speed.
- 5 - Start the engine, as soon as the engine starts running, retighten the connections (16).
- 6 - Reduce the speed to idle and check for eventual leakages.

NOTE:

If the engine does not start running after 2 attempts within 10 seconds at most, repeat the bleeding procedure and check if there is air intake in the piping or filters.

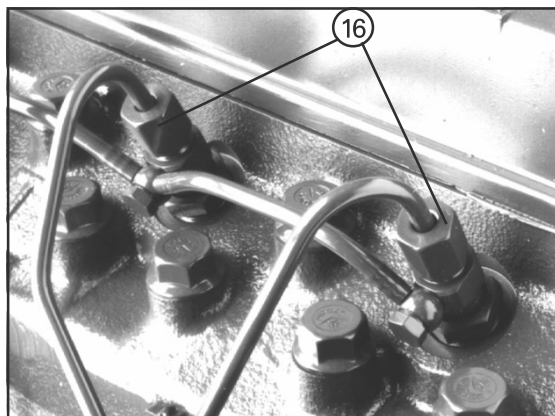


Fig. 245

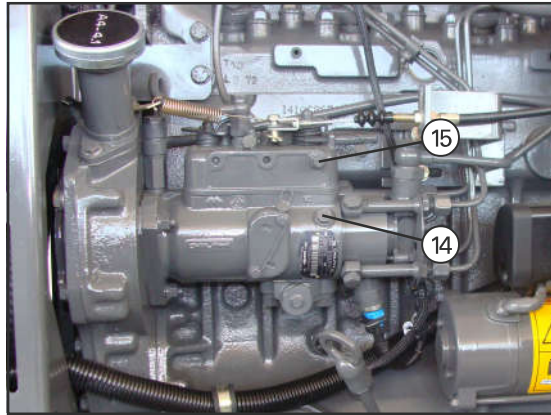


Fig. 243

F) Cleaning the filter-screen of fuel feeding pump.

The cleaning is necessary when there is engine power loss, even after replacing the engine oil and filter.

NOTE:

It is recommended to have the cleaning done by a Massey Ferguson dealer.

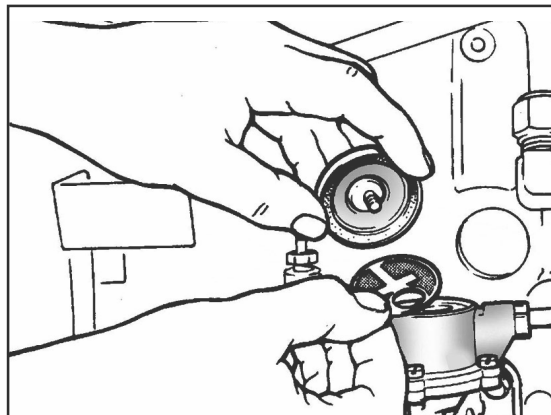


Fig. 244

7.4 - Fuel system - Perkins Engine

A) Checking and adjustment of idle speed

The tractors mounted with low emission engine according to TIER II, legislation to control emissions for agricultural equipment, the idle speed or maximum speed may not be adjusted by the operator.

The idle speed and maximum speed adjustment requires special equipment. The engine warranty can be impaired if the injection pump seals are broken during the warranty period.

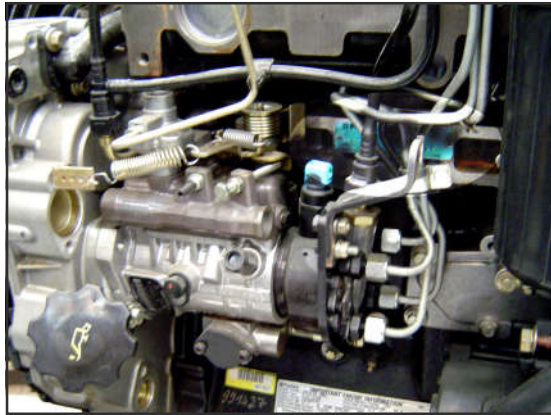


Fig. 246

B) Sedimenter and fuel filter draining

Start by bleeding the sedimenter (1), loosening the respective plug at the base. When pure fuel flows out, close it again.



NOTE:

Drain the prefilter and filter every day before starting the engine to eliminate water and impurities accumulated at the bottom of the prefilter and fuel filter element.

Water entering in the pump and nozzles can be highly harmful, since they are highly Precise components.

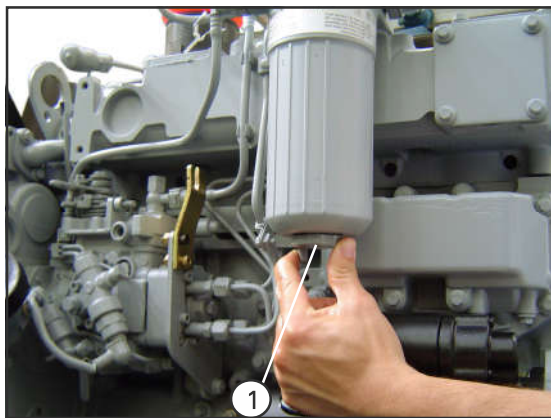


Fig. 247

C) Replacing the fuel filter element

- a) Close the fuel tank tap (2);
- b) Clean the fuel filter area;
- c) Remove the draining plug from filter base and drain all fuel to proper container;
- d) Use a removal belt to remove the filter body (4) and the filter head element;
- e) To remove the element (5) from the filter body (4); press the filter element down, against the pressure spring and turn to the left to release the filter body.
- f) Clean the filter body (4) with diesel or kerosene;
- g) Install the new element (5) in the filter body (4), press the element against the spring and turn it to the right to lock.
- h) Fit the new sealing ring correctly (3) that comes with the filter element, lubricate the sealing face with oil.

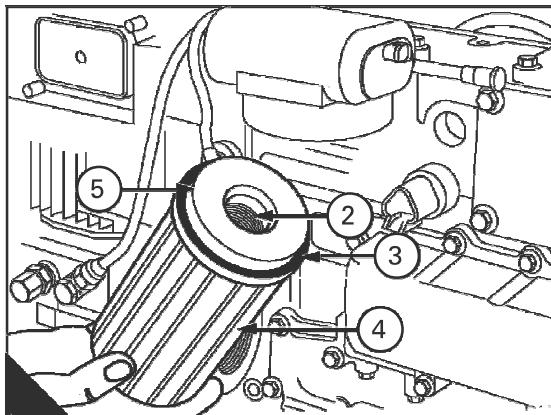


Fig. 248

6 - Maintenance

- i) Reinstall the filter body with the element in the head. Tighten manually, turning 1/8 of turn;
- j) Open the fuel tap (2) again and bleed the system, described as follows.

D) Fuel system bleeding

The system bleeding is necessary when:

- I - When the low pressure piping is disconnected;
- II - Leakage in the low pressure line during the engine running;
- III - When one of the fuel system components, for example, filter element or fuel pump, is installed during the maintenance.
- IV - The tank is run dry during operation;
- V - When the high pressure piping is disconnected.

IMPORTANT:

Do not operate the tractor until the air is eliminated from the fuel injection pump.

After the air elimination, let the engine idle for two minutes.

The injection pump does not eliminate the air automatically, mainly in situations IV and V.

6

To eliminate the air from the fuel system:

- 1 - Remove the protective cover from the nozzles (1);
- 2 - Turn ignition key to position "B" for three minutes, then return to position "A" (off);
- 3 - Loosen the connections (2) of pressure tubes of nozzles;
- 4 - Operate the starter motor till the air-free fuel flows out the connections;
- 5 - Tighten the connections with 30 Nm;
- 6 - Start the engine and check for leakages;
- 7 - Remove the protective cover from the nozzles.

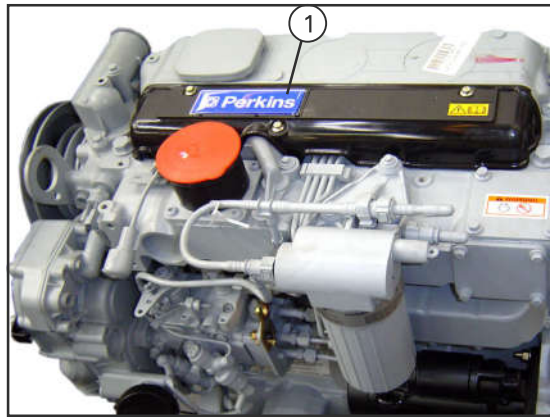


Fig. 249

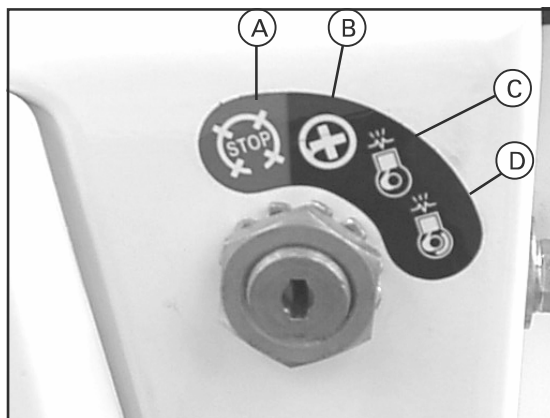


Fig. 250

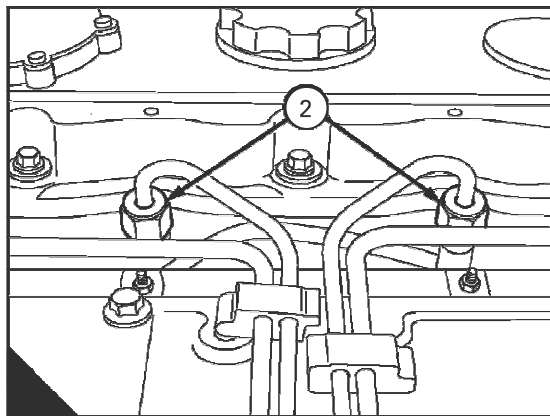


Fig. 251

8 - Maintenance of the air filtering system

The engine life depends mainly on the air filtering. This system has a very important function, since tens of cubic meters of air pass through it per hour, with a lot of impurities.

These impurities, if penetrate into the engine, cause severe and irreversible damages!

8.1 - Access to the air filter

The filter (1) is located in the tractor front side.



Fig. 252

8.2 - Maintenance of the primary element



IMPORTANT:

1 - Do not clean the primary element. When the restriction warning light on the panel is lit, replace the element.

2 - Do not remove the element unless you are going to replace it. This procedure may affect sealing and let impurities enter into the engine.

3 - Periodically test the restriction indicator.

4 - We recommend that you have at least one spare filter element in stock for each element in use. When storing the elements, keep them away from dust, humidity, and rodents. Keep them in their package if you are not going to use them.

5 - The prefilter (if installed) only needs cleaning, according to the needs, with a dry cloth.



Fig. 253

Removing the primary element

- 1 - Loosen the locks (1) and pull the cover (2), removing it.
- 2 - Remove the primary element (3), pulling it and turning it slightly.
- 3 - Clean the housing inner side (4), using dampened cloth, taking care to prevent the dust from reaching the clean air suction line.
- 4 - Carefully pull the open edge of the new element, until it totally fits in the housing.
- 5 - Reinstall the cover (2). Press the dust remover (5), removing its excess.



Fig. 254

6 - Maintenance

8.3 - Maintenance of the secondary element



NOTE:

The secondary element cannot be cleaned either, it must be replaced, according to the maintenance plan in this manual.

- 1 - Remove filter cover
- 2 - Pull out the primary (1) and secondary (2) elements. Change them for new filters.
- 3 - To reinstall, insert the secondary filter inside the primary filter and, then, install it in the housing. Press the primary filter (1) against the housing bottom, to assure it is assembled.
- 4 - To conclude, assemble the cover, closing it with the locks.

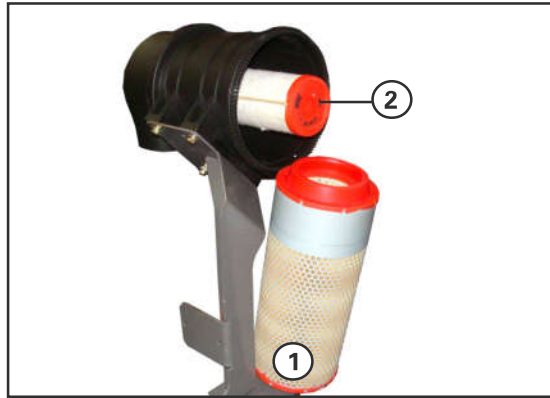


Fig. 255

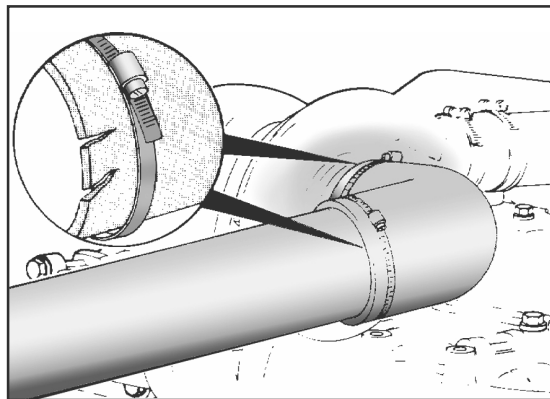


Fig. 256

6

8.4 - Filtered air piping

Carefully check these components for holes, parching, and proper tightening of the clamps.

8.5 - Plastic case for filter elements housing

Check it regularly for damage, such as cracking .

8.6 - Restriction indicator test

Periodically, and/or if you are not certain whether the restriction warning system is working, you can perform the test in a quick and easy way:

- 1 - Open the engine left side cover.
- 2 - Start the engine and let it in idle speed about 1200 rpm.
- 3 - Cover the filter inlet with a smooth and flat plate (2): at this moment, the light (3) must light in the panel. If it does not occur:
 - Check the restriction sensor (1) wiring connection together the air filter.
 - Check if the warning light (3) in the instruments panel is not blown out.
 - Also check if the electrical connections in the panel (connectors and cables).
 - If necessary, check if the dealer.

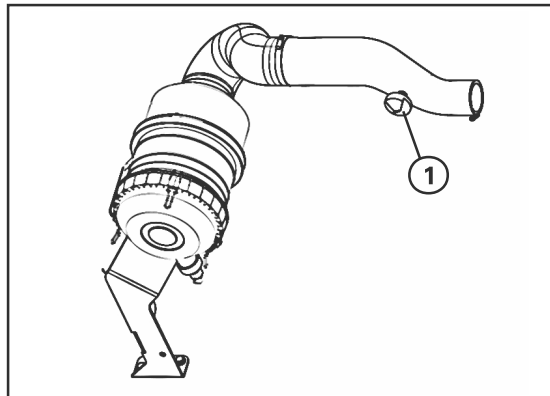


Fig. 257

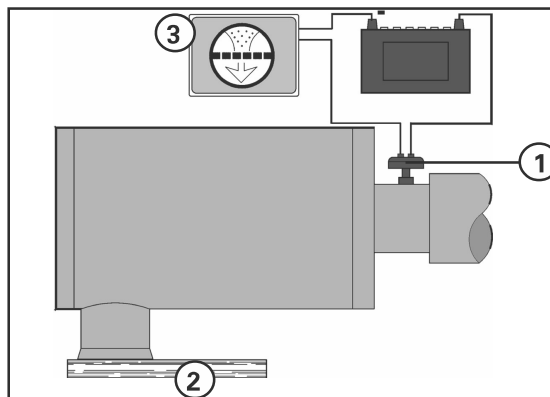


Fig. 258

9 - Maintenance of the cooling system

A) External cleaning of the radiator.

The radiator obstruction (1) causes the engine overheats, even if the water level is correct. Whenever it is necessary, open the frontal grille and remove all the dust accumulated in the water radiator. Then, clean it with a compressed air or water blow. Always try to direct the flow in the reverse direction, that is, from back to front.

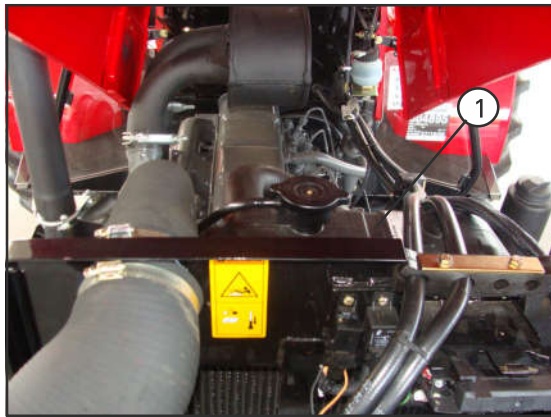


Fig. 259



WARNING!

Do not use water if the engine is hot, the thermal shock can cause cracks in the block or header!

B) Radiator water level:

Check the water level every day before start the work and add water as necessary.

The water level must reach the nozzle upper part. After install the cover (2), the excess will be eliminated through the draining tube (3), which must be checked for clogging or damages.

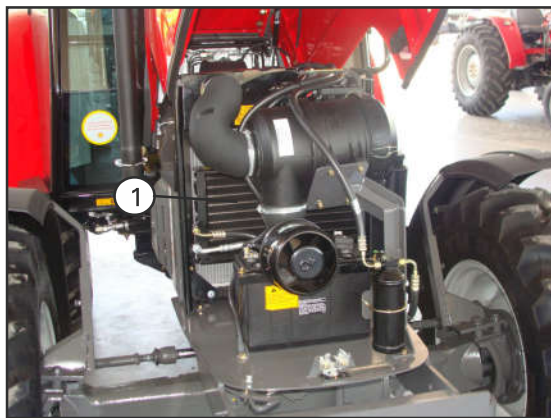


Fig. 260



ATTENTION!

If the engine is hot, remove the cover with the engine running in idling speed. Put cold water slowly in order to avoid thermal shock to the engine.

Release the radiator cover (2) up to the 1st stage to eliminate the pressure. Then, finish removing the cover, wearing gloves or a thick piece of cloth to protect your hands.

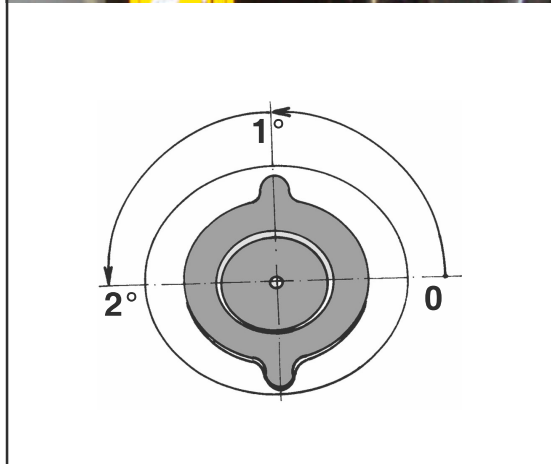
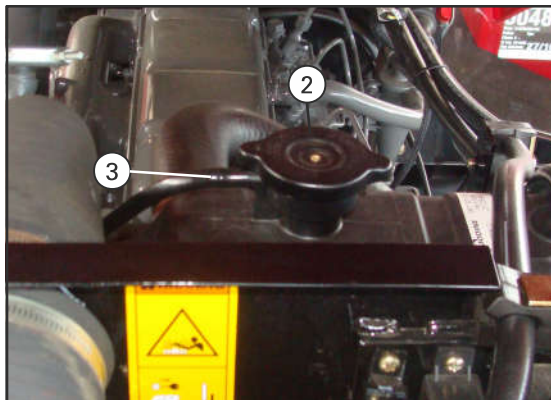


Fig. 261

C) Changing the water and cleaning the system

With the engine in the normal operation temperature and the tractor in a flat place.

- 1 - Remove the radiator cover (2).

6 - Maintenance

- 2- Disconnect the inferior hose (4) releasing the clamp (5) and let the water to drain completely.
- 3- Make clean water to flow through the system, providing a complete cleaning.
- 4- Reinstall the hose, tightening it properly to the clamp.
- 5- Fill the radiator with drinkable water, also using the recommended anticorrosive additive and anti-freezing. The mixture should usually include 33 % of additive, and the remaining with drinkable water, unless otherwise specified

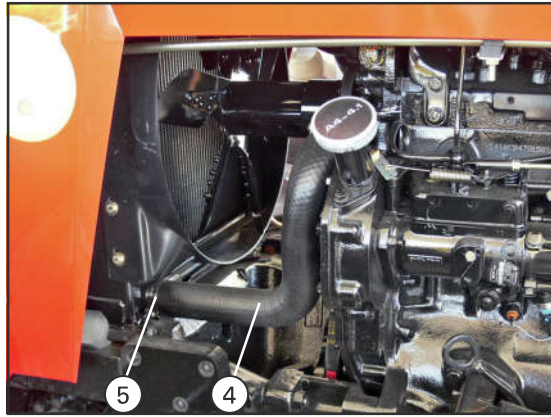


Fig. 262



IMPORTANT:

Do not circulate cold water through the engine block if it is still hot. Wait some minutes before adding water.

Water in high temperature is highly corrosive, oxidizing the engine's internal circulation galleries, generating deposits that prevents the correct cooling.

For this reason, always use anticorrosive additive in the system.

6

D) Maintenance of thermostatic valve and radiator cover

These items are vital for the correct controlling of the engine operation temperature.

The thermostatic valve (6) prevents the engine to work at cold for a longer period of time after the start.

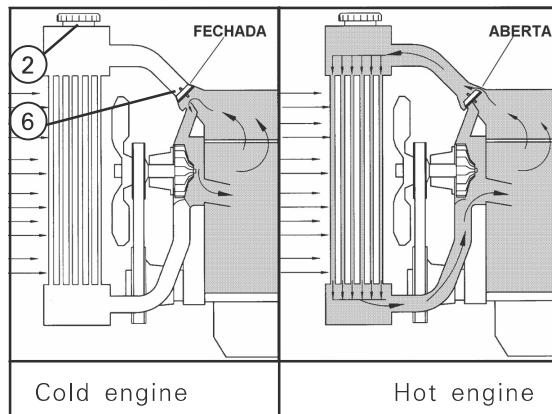


Fig. 263

The radiator cover (2) controls the pressure in the cooling system, preventing the water to boil.

A valve (A) releases the excess of pressure, working as a relief valve.

The smaller valve (B) limits the minimum pressure, preventing the formation of vacuum inside the system when the water cools down.

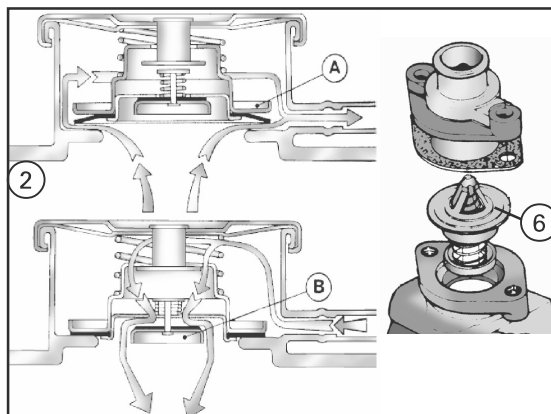


Fig. 264

E) Checking and adjustment of the fan drive belt tension

The tension is correct when, by thumb pressing the drive belt in the longer section, the deflection is of 10 to 15 mm.

To adjust the tension, loosen the nuts from the bolts (1 and 2) and force the alternator until obtain the correct deflection.

Retighten the nuts and check if the drive belt tension remained correct.

If the drive belt presents damages (cracked, hardening, fraying, chipping), replace it. For this, completely release the tension and remove the drive belt.

NOTE: after a working day, check the tension and adjust it, if necessary.



NOTES:

- 1 - Check the condition of radiator hoses and clamps regularly.
- 2 - Do not use components that are not the original Massey Ferguson. The use of "similar" components do not assure the correct temperature control.

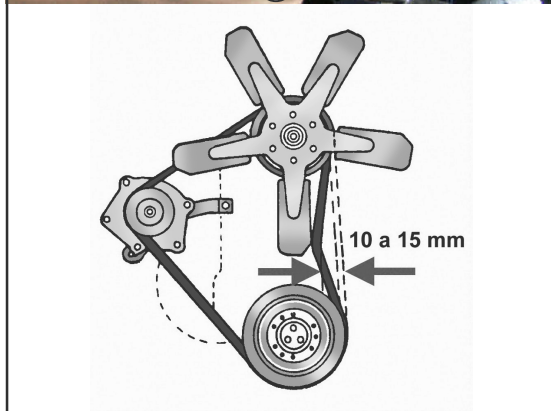
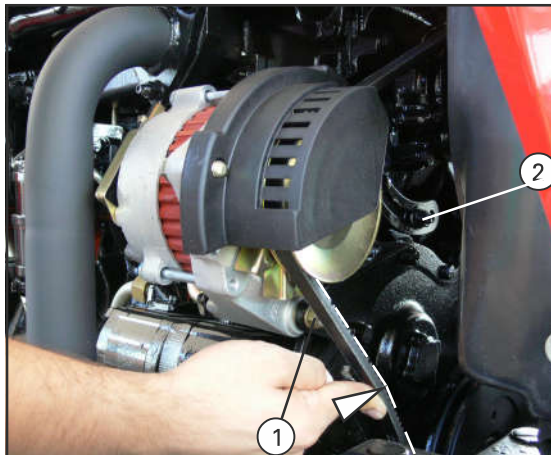


Fig. 265

6 - Maintenance

10 - Maintenance of the Clutch

10.1 - Adjusting the pedal height

The clutch collar suffers constant contact, that is, the pedal does not have any play and does not need of free travel adjustment.

However, with the clutch components wearing, the pedal position is changed.

We recommend to keep the pedal height "X" in:

- 150 to 160 mm

NOTE: In special case of dual-clutch, the pedal must not be very high, otherwise it can damage the complete operation of 2nd stage (the Dependent Power Take off). See next item.

To change the pedal height:

- Remove the pin (1).
- Loosen the locknut (2).
- Position the pedal in the recommended "X" height and, keeping it in its position, turn the terminal (3) to shorten or elongate the tie (4), in order allow the pin (1) installation.
- Reinstall the pin (1) and the respective cotter pin and retighten the locknut (2).

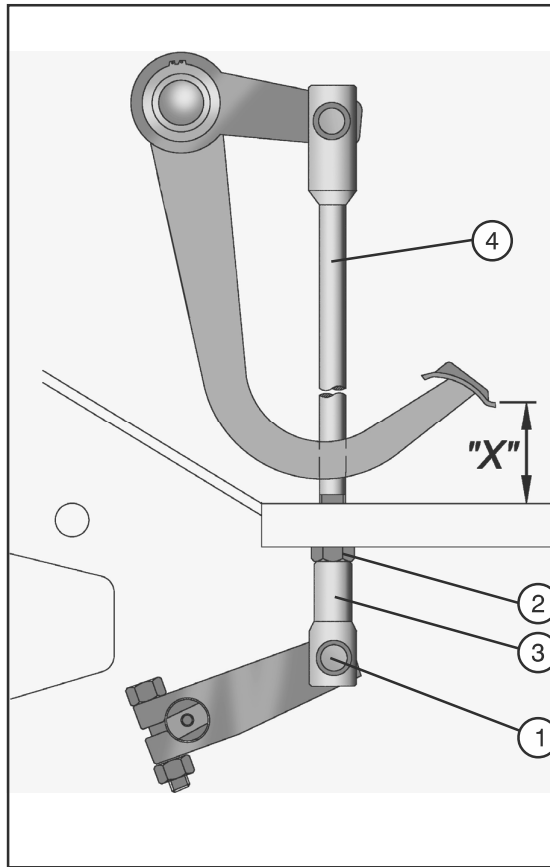


Fig. 266

10.2 - Checking the clutch 2nd stage disengagement



NOTE:

This procedure is only necessary for tractors with dual-clutch and dependent PTO.

The PTO axle non-stop represents a serious safety problem, and it must receive total attention!

In order to allow the PTO operation and disengagement, it is required that the clutch 2nd stage is completely disengaged when pressing the pedal all way the way to the stroke end. It it does not occur, check, by the order:

- The stop (5) is positioned in 2nd stage?

Without stepping the clutch, pull the knob(5) to release the clutch 2nd stage.

See Section Maintenance for more information.

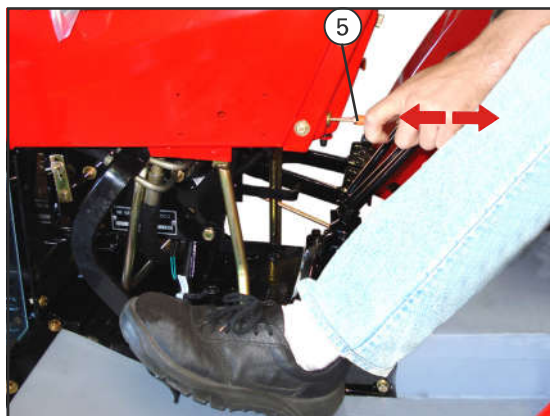


Fig. 267

6 - Maintenance

B) Is the pedal height very low?

If the pedal is very low, the limiting stop will not allow the clutch complete engagement.

Check the pedal play adjustment - previous page.

The figure at the side shows a dual-clutch cross section:

6 - Transmission disk: 1st stage

7 - PTO disk: 2nd stage.

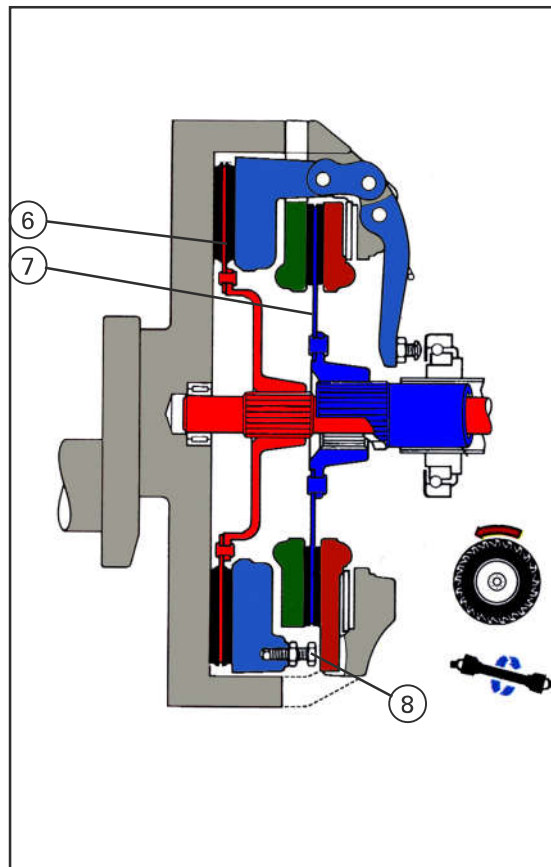


Fig. 268

C) Clutch internal adjustment

If the conditions of items A) and B) are satisfied and the PTO axle does not stop when engaging the pedal up to the end of 2nd stage, check with your MF Dealer to perform internal adjustments.

The secondary grasshoppers (8) must have a play "A" of 1.7 mm

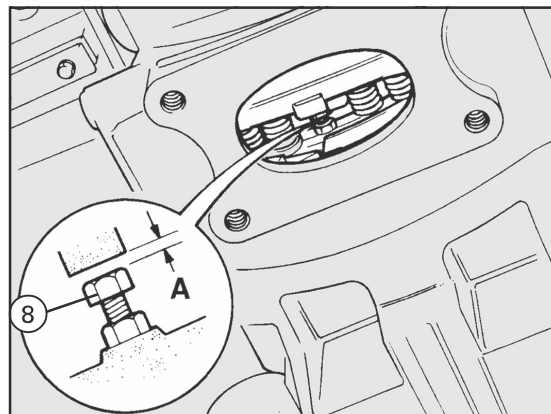


Fig. 269

6

6 - Maintenance

11 - Maintenance of the transmission system

11.1 - Cleaning the breathers

The breather clogging causes excessive pressure in the transmission compartment, which can cause leakages by the retainers.

For that reason, always keep the breathers clean.

1 - Front axle breather 4x4 - Central drive

2 - Front axle breather 4x4 - Side traction

3 - Final drive breather

4 - Transmission breather

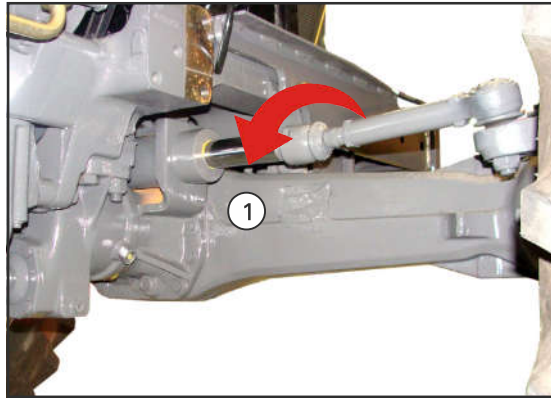


Fig. 270

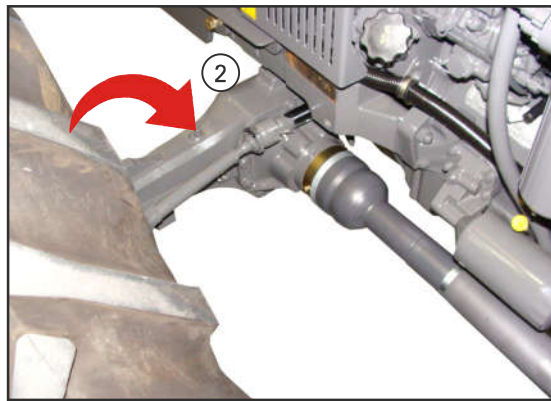


Fig. 272

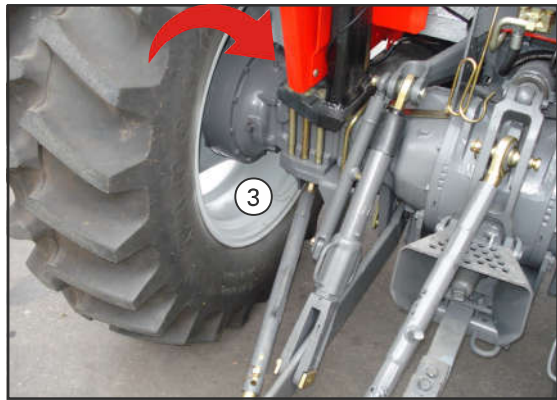


Fig. 271

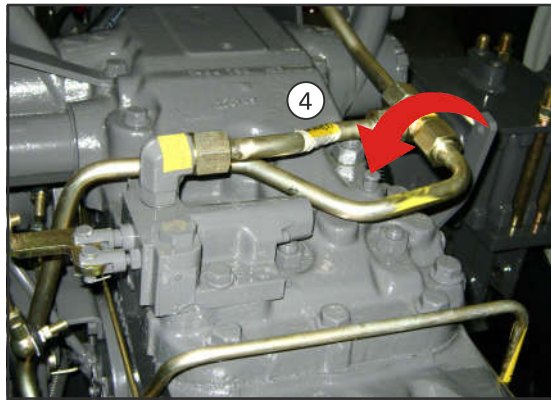


Fig. 273

11.2 - Lubrication of the rear final drives

A) Checking oil level

To check the reducers oil level, with the tractor on a flat place, remove the level and refill plug (1): the level is correct if the oil reaches the edge of the filler plug hole. If necessary, fill it with the recommended oil.

B) Oil change

The tractor must be at the normal operation temperature.

Drain the oil by removing the plugs (1 and 2).

Reinstall the drain plug (2) and fill by the plug hole (1), with the oil recommended on page 6.

Reinstall the plug (1).

Follow the same procedure on the other reducer.

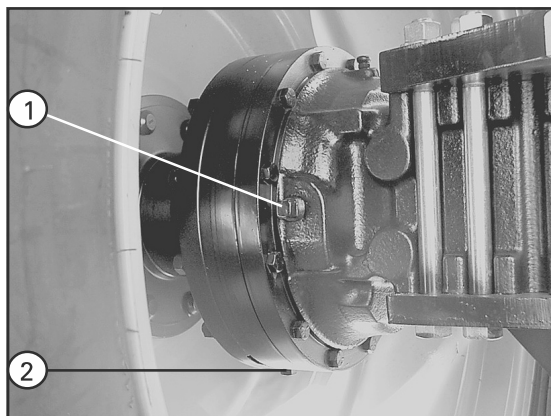


Fig. 274

11.3 - Checking the transmission and hydraulic oil level

With the tractor on a flat place, the level must be between the dipstick (1) maximum and minimum. If necessary, top it up through the nozzle (2 or 3) with the recommended oil.



Fig. 275

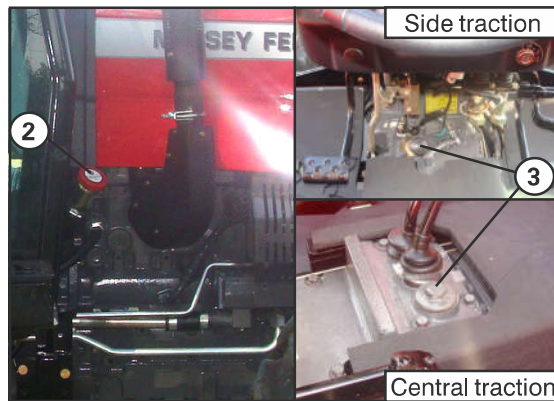


Fig. 276

6

11.4 - Changing the transmission and hydraulic oil

- 1 - Drive the tractor to a location with a proper contention basin in each plug before removing them.
- 2 - Remove the plugs (1 and 2).

NOTE:

In the 4x4 tractors, also remove the draining plug (3) installed in the front axle transfer case.

- 3 - Place the hydraulic control levers in the completely lowered position (DOWN).
- 4 - Remove, clean and reinstall the screen-filter. In addition, change the transmission filter.
- 5 - Change the filtering element.
- 6 - Reinstall the draining plugs. Refill the system through the transmission oil nozzle (2) up to the correct level with the recommended lubricants.
- 7 - After waiting for a period of time enough for the oil to seat, check the level and, if necessary, put more oil and reinstall the filler plug.

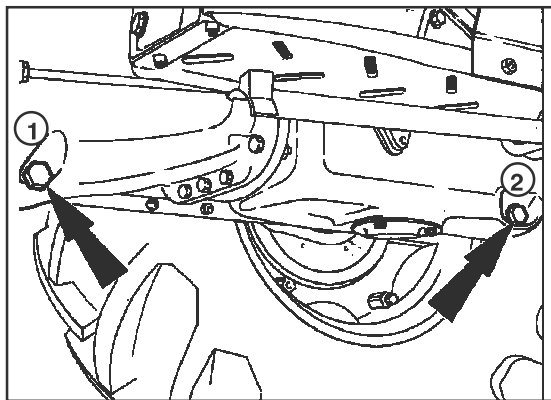


Fig. 277

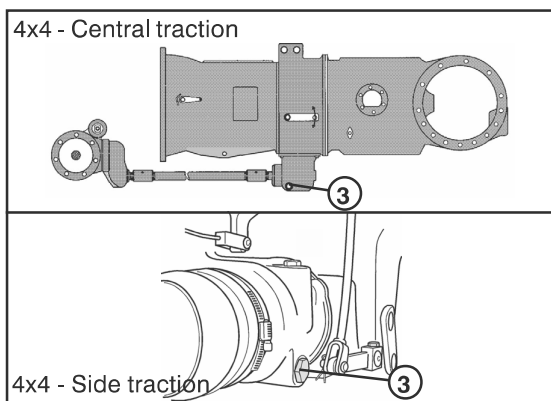


Fig. 278

6 - Maintenance

11.5 - ISYP pump screen-filter

- 1 - Drain the oil by removing the two draining plugs, as described above.
- 2 - Remove the three bolts (2) and washers that attach the cover (3) in the central housing base.
- 3 - Remove the clamp (5), the nut (6), the spring (7), the washer (8) and the "O" ring (9).
- 4 - Remove the screen-filter (10).
- 5 - Clean the screen-filter with a brush and solvent. Remove all the residues particles from the screen-filter material folds.
- 6 - Inspect the screen-filter material, discharge it and replace the screen-filter if it is damaged.
- 7 - Check the screen-filter stud (11) tightening, located in the pump housing.
- 8 - Check if the "O" ring is well fitted in the pump and, then, reinstall the screen-filter (10).
- 9 - Reinstall the "O" ring (9), the washer (8) the spring (7), the nut (6) and the clamp (5).
- 10 - using a new gasket (4), reinstall the cover (3) with the three bolts (2) and washers.
- 11 - Reinstall the two draining plugs and refill the transmission with the oil approved by the factory.

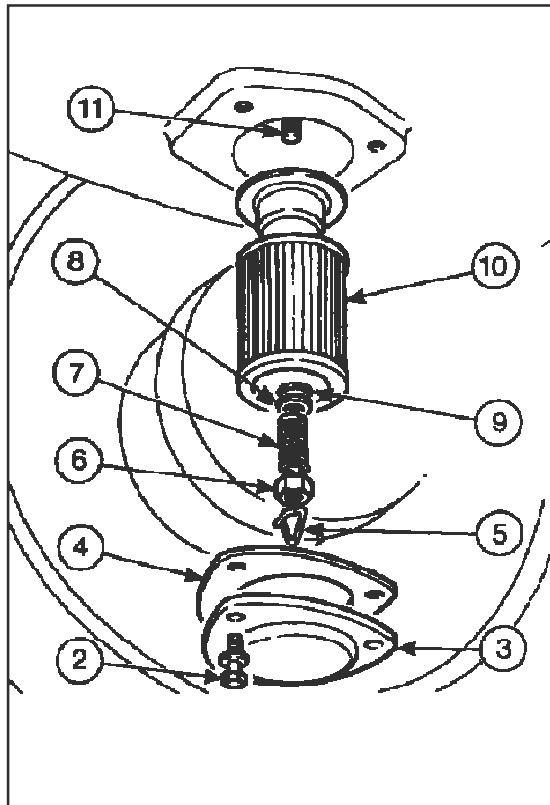


Fig. 279

11.6 - Changing the return filter

The first change must be performed before the first 50 hours of work. After that, the changing must be performed when the warning light (4) lights on in the tractor panel during the operation or according to the maintenance chart - whatever happens first.

Restriction (2) and temperature (3) sensors

The warning light (4) will light on in the tractor panel when the element of the steering return hydraulic filter (1) is excessively restricted, indicating that it must be changed. The warning light for the restriction of the steering return hydraulic filter will also light on when there is a failure.

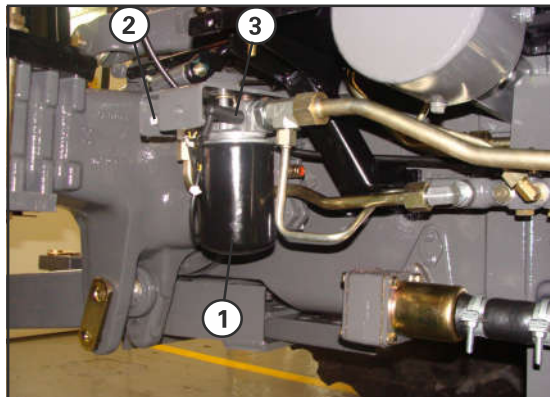


Fig. 280

Procedures to change the return oil filter.

- 1 - Drain the oil from the transmission.
- 2 - Remove the filter (1), turning it to the counterclockwise direction.
- 3 - Apply lubricating oil on the new filter sealing ring and install it manually.
- 4 - Clean the suction filter according to the description below.

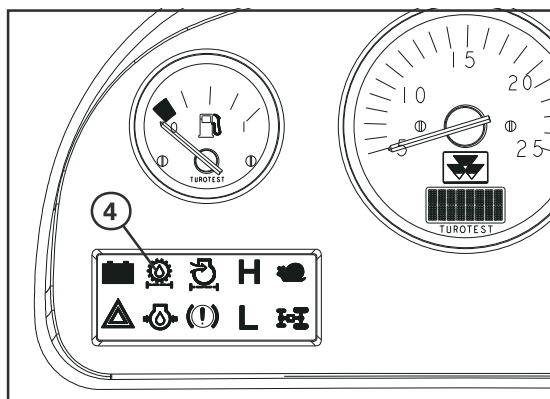


Fig. 281

C) Cleaning of the suction filter

With the oil from the transmission drained and the filter housing clean:

- 1 - Remove the 4 bolts and washers, the cover (6) and the spring (7).
- 2 - Remove the gasket (8), which must be replaced.
- 3 - Pull the screen-filter (9) off the housing.
- 4 - Carefully clean the screen-filter with the brush in diesel oil or kerosene. Remove all the dirty particles hold in the screen.
- 5 - Inspect the filter and replace it if it presents any damages.
- 6 - Reinstall the screen (9) and place the spring (7) correctly.
- 7 - Using a new gasket (8), reinstall the cover (6), with the 4 bolts and washers (5).
- 8 - Reinstall the transmission draining plugs.
- 9 - Refill the transmission with the recommended oil until reach the MAX mark on the dipstick.

Identification of the hydraulic pumps

- A - Steering and lifting system pump (if installed)
- B - Auxiliary remote control system pump.

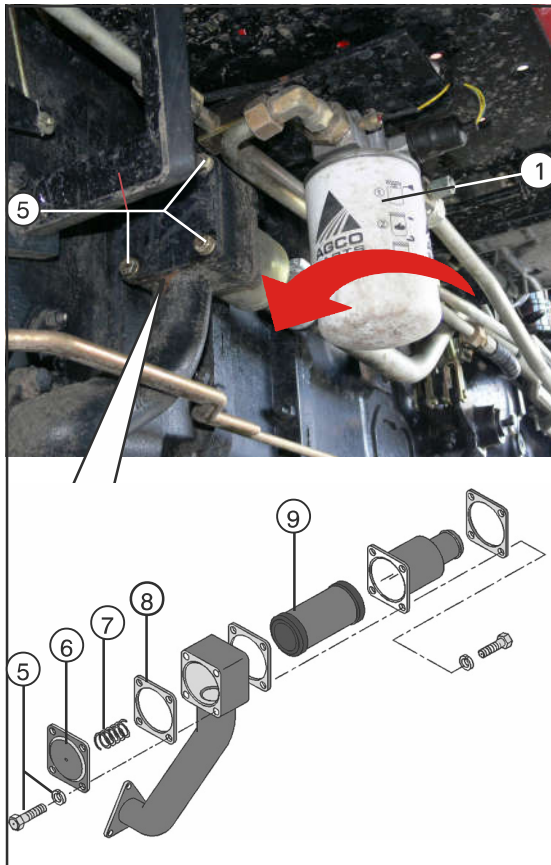


Fig. 282

6

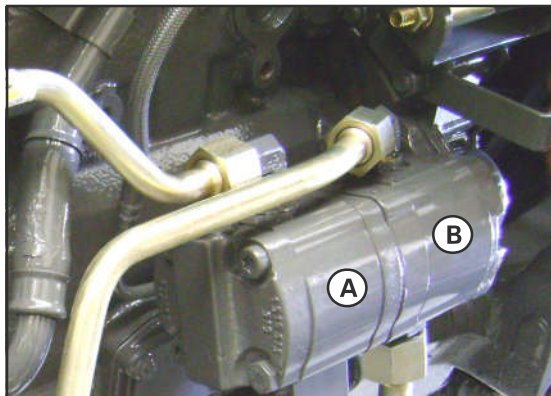


Fig. 283

6 - Maintenance

12 - Maintenance of the rear final drives and rear axle

12.1 - Lubrication of the rear final drives

To check the reducer/planetary oil level, the tractor must be on a flat surface. Then, remove the filler nozzle (1) and the level indicator plug. If necessary, fill it with the recommended oil.

Changing the oil in the rear final drives

With the tractor at normal operating temperature, drain the oil through the plug (2), also remove the plug (1);

Reinstall the plug (2) and refill the final drive through nozzle until reach the maximum mark.

Reinstall the plug (1) and follow the same procedure as for the other final drive.

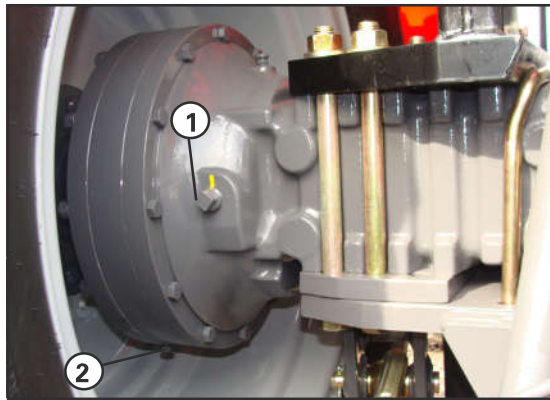


Fig. 284

6

12.2 - Lubrication of the front drives - 4x4

Oil level of the front axle drives

1. With the planetary plug (1) in the position of 3 or 9 hours.
2. Remove the filler/draining plug (1) with a proper Allen driver.
3. The level is correct when the oil reaches the edge of the filler nozzle.
4. If necessary, top it up with the recommended oil - See the page 80.
5. Reinstall the plug, attach it securely.
6. Follow the same procedure on the other wheel planetary.

Changing the oil from the front planetary

With oil at normal operating temperature:

1. Lift the tractor's front side and place the axle over safe stands.
2. Turn the wheel so that the drain/filler plug is at the bottom.
3. Remove the plug (1) and drain all the oil.
4. Turn the wheel so that the plug is in the filling position (position o3 or 9 hours).
5. Refill the planetary with the recommended oil and reinstall the plug, tightening it securely. The level must reach the edge of the filler nozzle.
6. Follow the same procedure on the other wheel planetary.

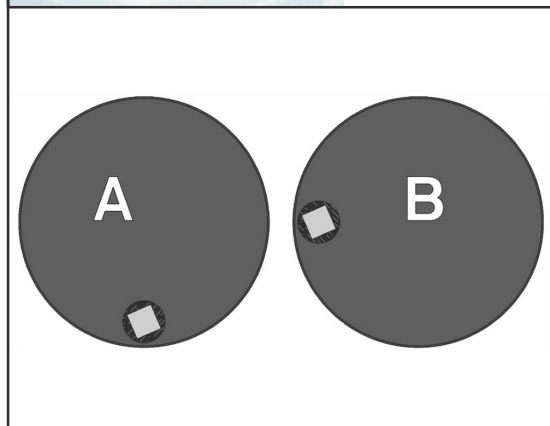
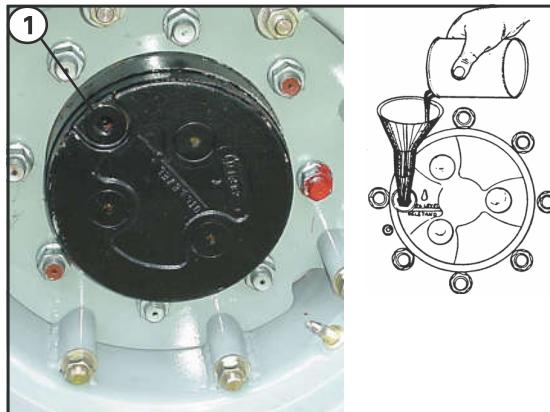


Fig. 285

12.3 - Lubrication of the front carrier - 4x4

Front differential oil level

1. With the tractor on a flat place, remove the differential filler plug (1).
2. The level must reach the edge of the filler nozzle.
3. If it is below this level, top it up with one of the recommended oils.
4. Reinstall the plug (1).

Changing of the front differential oil level (4x4)

With the tractor on a flat surface and the oil at normal operating temperature:

1. Remove the filler plug (1) and the drain plugs (2).
2. Check the plugs seals and replace them if necessary. After the oil has been totally drained, reinstall all the draining plugs (2), retightening them correctly.

 **NOTE:**

The draining plugs have a magnetic part to collect the metallic particles in the oil. Clean the plugs using solvent.

- 3 - Reinstall the draining plugs, tightening them securely and fill up the differential with oil up to the recommended level.
- 4 - Also reinstall the filler plug (1).

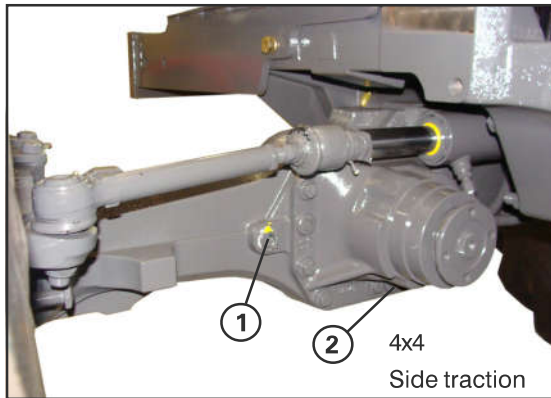


Fig. 286



Fig. 287

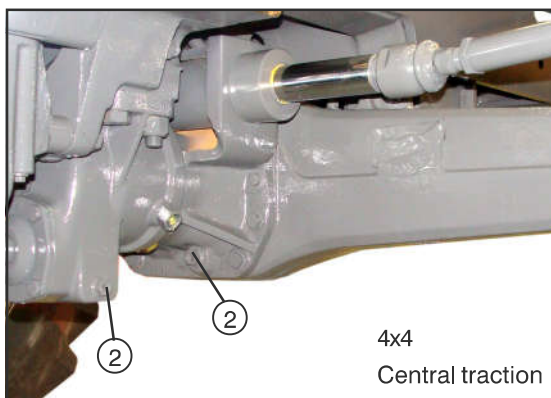


Fig. 288

6 - Maintenance

12.4 - Front hubs - 4x2

If the front hub needs adjustment, proceed as follows:

1. Lift the wheel from the ground and remove the four bolts from the hub cover (1) and the cover.
2. Remove the elastic pin (2) and tighten the castle nut (3) with a torque of 80 Nm (60 feet lbs). Next, loosen the nut until the closest hole to provide the correct fluctuation. Install a new elastic pin.
3. Reinstall the hub cover. Lubricate the hub until clean grease flows out and cover the seals in the wheel rear side.

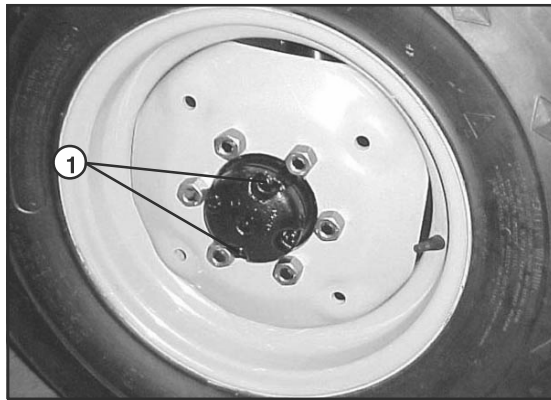


Fig. 289

12.5 - Eliminating the play of the front axle fuse (4x2 tractors)

The play must be eliminated in order to prevent dirty (water and dust) to enter in the axle tube.

- 1 - With the two front wheels supported on the ground, loosen a little the nut(s) (1) from the arms.
- 2 - Use a hammer to slightly beat the arms (2), in order to eliminate the play between the arm and the tube.
- 3 - Retighten the nut(s) (1).

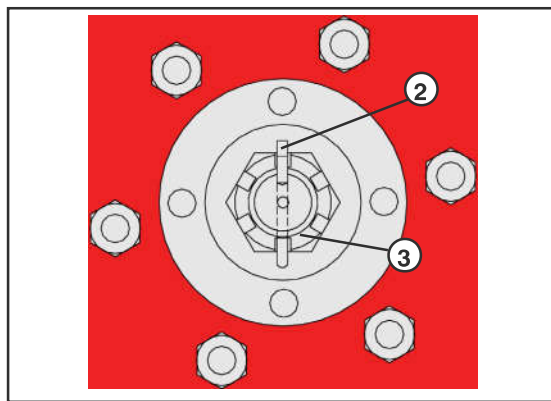


Fig. 290

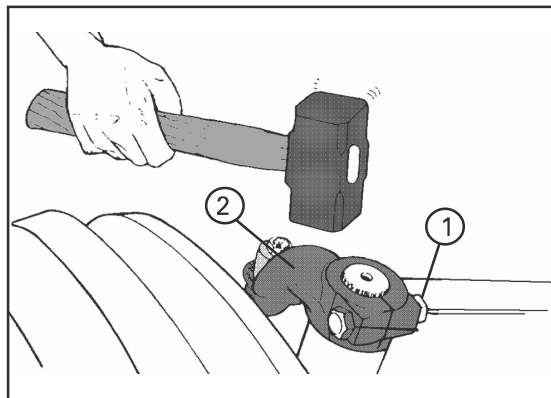


Fig. 291

13 - Front wheels alignment

- Park the tractor in a flat surface and place the wheels turned forward.
- To check the wheels alignment measured in the axle center located in the wheel rim. **The distance "A" must be equal to the distance "B" in the 4x4 axles and between 0.1 and 5 mm (0 - 3/16 in.) higher than the distance "B" in the 4x2 axles.**
- Drive the tractor forward in half turn of the wheel. Check the distance again.

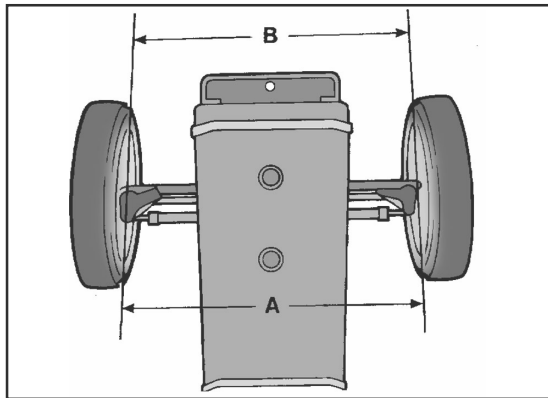


Fig. 292

Adjustment procedure - 4x2 axle

- The distance "A" must be between 0.1 and 5.0 mm (0 and 3/16 in.) higher than the distance "B". If it is different, perform the required adjustments next to the edge of the right-side drive rod.
- Reinstall the tightening bolts (1).
- Adjust the alignment turning the arm (2) according to the needs.
- After the recommended alignment has been performed, reinstall the components in the reverse order, taking care to align the clamp hole (4) horizontally and turned down, in order to allow the bolts to be assembled.
- Check the rubber cowl (3) conditions and replace them, if necessary.

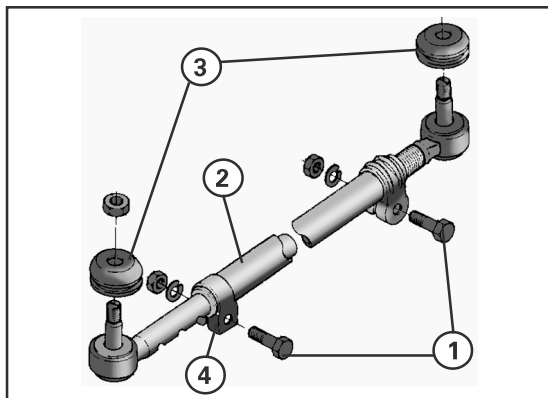


Fig. 293

6

Adjustment - 4x4 axle

The alignment must be as close as possible to **0 mm**, that is, the rear measurement "A" must be equal to the frontal measurement "B".

- If necessary, release the lock nut (1), located at the axle side.
- Turn the rod (2) with the help of an open wrench until the recommended alignment is reached.
- Retighten the lock nut (1).

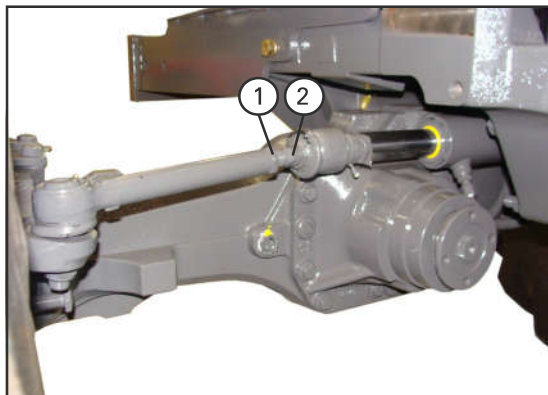


Fig. 294

NOTE:
 Apply Loctite glue to prevent the lock nut to be loosen.
 The alignment adjustment must be performed with the same measurement in both sides (the same number of slots and threads in both rods).

6 - Maintenance

14 - Maintenance of the brakes

14.1 - Bleeding of the brakes hydraulic driving

The brakes have hydraulic drive pedals.

Before adjust the pedals free course, check if the system needs bleeding.

Keep the reservoir with fluid to proper level (1).

Use the recommended brake fluid according to the lubrication chart in this manual. If you have any doubts, check it with the Dealer. The brakes are vital for your safety, the tractor and other people safety.

Bleeding process

- 1 - Complete the level with the recommended brake fluid according to the lubrication chart in this manual.
- 2 - Ask someone to press one of the brake pedals. Perform it individually in each brake pedal.
- 3 - Press the pedal all the way to the end 3 times and keep it pressed.
- 4 - Loosen one of the draining plugs (2), located on the trumpets, in the tractor rear side. Let the fluid to bleed, taking care it does not reach you.
- 5 - Retighten the plug (2).
- 6 - Only now, release the pedal.
- 7 - Repeat the procedures 3 to 6 as many times it is necessary. Usually, a good bleeding is obtained in two steps.

It can be verified when the pedal gets secure, with good operation. If you perform the bleeding and the pedal does not get secure when pressed or, then, when the bleeding need becomes frequent, it will be necessary to replace the master cylinders repair and/or the servo-cylinders.



NOTE:

Take care to not exhaust the fluid in the reservoir during the bleeding, since it would increase the air inflow in the circuit.

- 8 - Follow the same procedure for the other pedal and the respective bleeding plug (2).

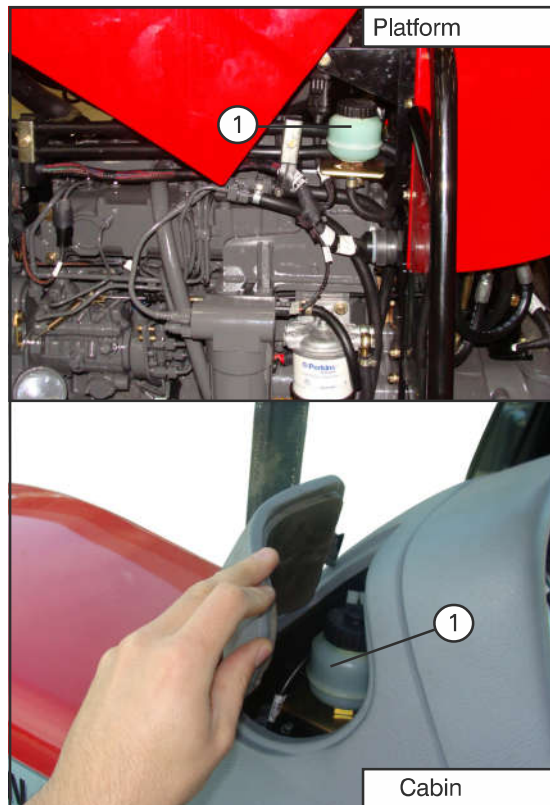


Fig. 295

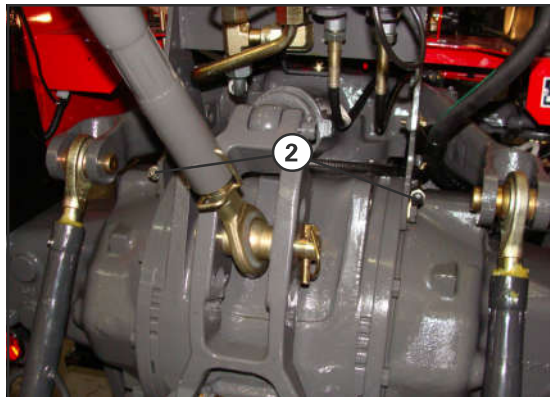


Fig. 296

14.2 - Adjustment of the pedals free travel

After the bleeding, check and adjust, if necessary, the pedals play as follows:

- 1 - Press one of the pedals and, with a ruler, check the its dislocation in relation to the other, which is the play.
- 2 - The play must be of 4 to 5 cm. If it is different, perform the adjustment through the nut (1) existent together the rear axle trumpets.
- 3 - To decrease the pedal play, turn the nut clockwise. To increase the play, turn the nut counter-clockwise.
- 4 - Follow the same procedure for the pedal on the other side.

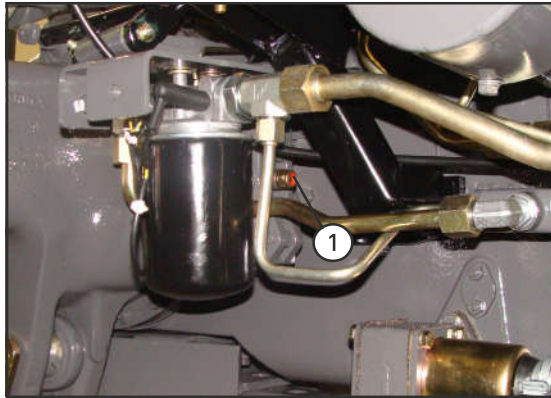


Fig. 297

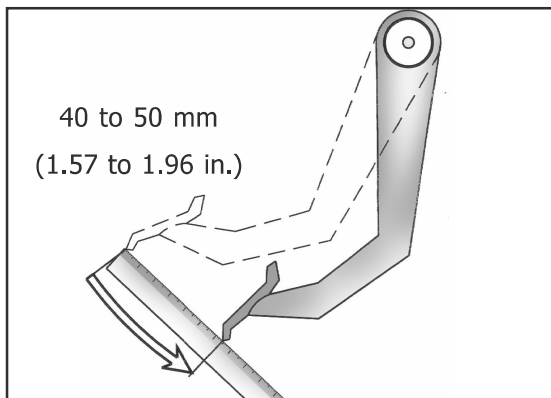


Fig. 298

6

14.3 - Brakes simultaneous test action

After any adjustments on the brakes, perform the final checking for the both pedals operation together, which must be as homogeneous as possible.

When pressing the two pedals, using the locking device, the rear wheels must be simultaneously braked.

If it does not happen, there is always the severe risk for the tractor to be guideless, specially in an intense emergency braking.



CAUTION!

To perform the brakes simultaneous operation test, go to an area that is free of obstacle and far from curious people.

The responsibility for the safety always falls on the tractor driver. If you find difficulties, check with your Dealer.

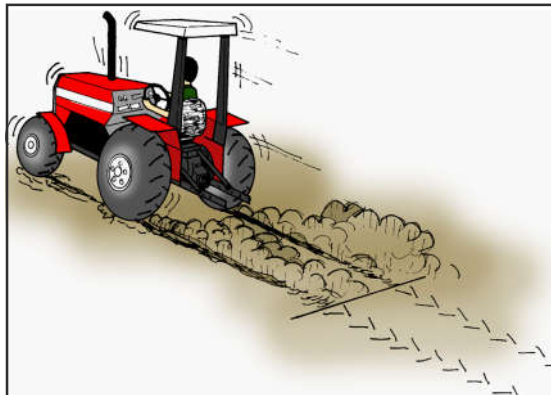


Fig. 299

6 - Maintenance

15 - Electrical system

15.1 - Cares with the hydraulic system



WARNING:

Avoid improvisations when performing repairs in the electrical system. The good operation and the safety of the electrical system, including its components, can be seriously affected by the installation of a non-recommended accessory or by performing the maintenance by personnel that are not trained at the factory.

To avoid damages to the charging system and the alternator, observe the following recommendations:

- ✓ Do not connect or disconnect any circuit with the engine running;
- ✓ Always disconnect the negative cable (1) from the battery before performing any welding in the tractor or implement coupled to it. Follow the same recommendations to install the battery in charge, when assembled in the tractor.
- ✓ Always connect the positive cable first, and then the negative cable.
- ✓ Never perform repairs in the electrical system without disconnecting the battery negative cable first.
- ✓ Never use auxiliary battery in which the rated voltage is higher than the main battery.
- ✓ Never invert the polarity in the connections of the tractor battery or the auxiliary battery for starting.
- ✓ Always connect the negative cable to the negative borne and the positive cable to the positive borne.
- ✓ If the battery needs to be replaced, identify the assembling position and connections to prevent inversions when reinstalling it.
- ✓ In the case of tractors with electronic lifting system, the cares with the electrical system are even higher. If the voltage supplied by the electrical system is not within the limits, the hydraulic lifting is inoperative.

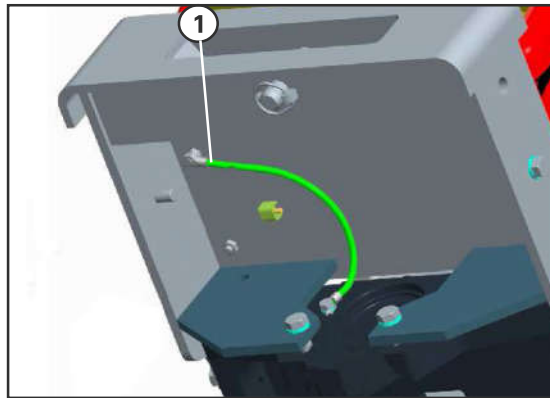


Fig. 300

15.2 - Maintenance of the battery

Checking the electrolyte level

(Except for Maintenance-free batteries)

To check the electrolyte solution level, remove the cover from the vases and introduce a tube until it reaches the plates. Close the tube upper part, lift it and check the height that the liquid reached. The result corresponds to the solution level. The level must be within 1 and 2 cm.

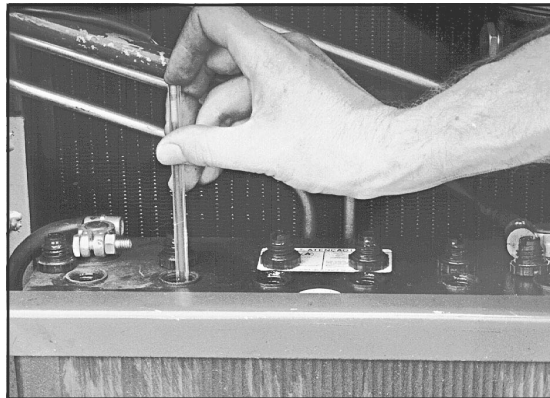


Fig. 301



IMPORTANT:




The acid vapors released by the battery are lethal. Never approximate flame (fire) to illuminate it, since the mentioned vapors are flammable. If the battery "consumes" water in very short periods (60 to 80 working hours), or if it runs out of charge very frequently, send the charging system to be tested (alternator and regulator) and the battery.

6 - Maintenance

Ventilation in the electrolyte level - Batteries with charge indicator

Maintenance-free batteries have a charge indicator embedded in the cover.

According to the color displayed, it informs the current charge level, according to the table below.

Colors	Green	Black	Colorless
			
% charge	Above 65%	Below 65%	Level below the electrolyte
Action	Batteries under test conditions	Check the battery charge before the test. If necessary, recharge it.	Batteries without any conditions to be used.

Cleaning of the battery terminals.

In addition to the solution level, the cleaning is also responsible for the battery life. The foreign deposits accumulated corrodes the painting and the metallic parts in contact or next to the battery.

In addition, they discharge the battery, since they work as conductors. The battery bornes lose the perfect contact with the cables terminals, generating difficulties to conduct the current, resulting in discharge and the battery overheating.

For the cleaning, disconnect the cables. First the negative, and after the positive. Clean the bornes and terminals with a sandpaper and wire brush.

At the assembling, protect them with Vaseline to protect against corrosion. Wash the battery case using hot water and soap. Install the battery again, taking care to not invert the polarity. Cable (+) with terminal (+) and cable (-) with terminal (-).

First, install the cable (+) and after the terminal (-).

Use of auxiliary battery

Take care for not generating sparks and damages to the bornes. For this reason, use cables with good quality, attaching them securely in the battery bornes.

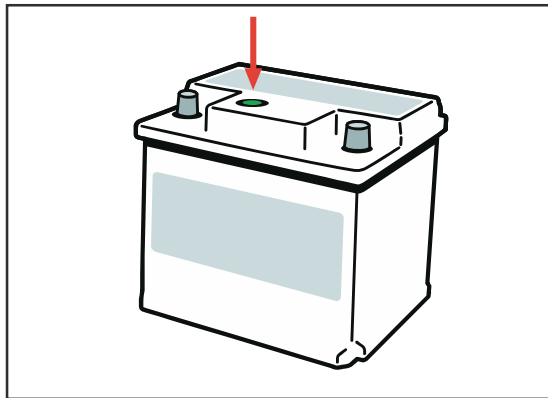


Fig. 302



Fig. 303



CAUTION!

The battery has a sulfuric acid electrolyte. This substance is extremely corrosive and, then, must be handled with much care.

▲ Corrosive substances - keep it out of the reach of children.

s Avoid contact with the eyes and skin, because the battery acid can cause severe irritability. Use protection clothes, gloves and protection glasses.

▲ If the substance get in touch with eyes, wash them thoroughly and look for medical assistance. If it is swallowed, immediately look for medical assistance, showing the product's label.

▲ When charging the battery, perform this in a well ventilated location and ALWAYS turn it of from the power supply before disconnecting the bornes.

▲ NEVER perform the flame test to check the electrolyte level. Always use a voltmeter or hydrometer to check the load and an electrical lamp to check the battery electrolyte level, if necessary.

▲ Check if the battery ventilation plugs are correctly installed. Always remove the negative (-) cable, black color, first.

6 - Maintenance

Recharging the battery

When the battery is discharged, due to a long inactivity period, it must be charged outside the tractor, in a low charging device, that is, the voltage must be equivalent to 10% of the nominal capacity value for the battery.

Example: Battery of 120Ah

Charging current = 120×0.1 (10%) = 12A

The current increased by the alternator (with the battery discharged) can damage it.

Never test the battery for short-circuits between the bornes. In addition to damaging the bornes, there is the risk of the battery to explode.

The use of a densimeter can find with good accuracy the problem of a battery through the solution density. Wide differences of density between the different vases indicate the existence of some problems, such as sulphation or short-circuit in the plates. In this case, a charging test will be required in a specific device.

6

Battery charge test

When the battery is discharged, due to a long inactivity period, it must be charged outside the tractor, in a low charging device.

Procedure

With the engine OFF, the battery charge can be evaluated by the voltage measured in the terminals.

12.7 volts..... Maximum charge

12.4 volts..... Charge at 50 %.

12.0 or less Discharged

Voltage x time for recharge

The time in which the battery must be in the charging process varies due to the voltage applied:

- Between 12.0 and 12.2 V of charge 4.5 hours
- Between 11.8 to 11.99 V or charge ... 7 hours
- Between 11.5 to 11.79 V or charge ... 9 hours
- Between 11.0 to 11.49 V or charge ..11 hours
- Totally discharged 15 hours



NOTE:

Never use charge under voltage above 15 Volts.

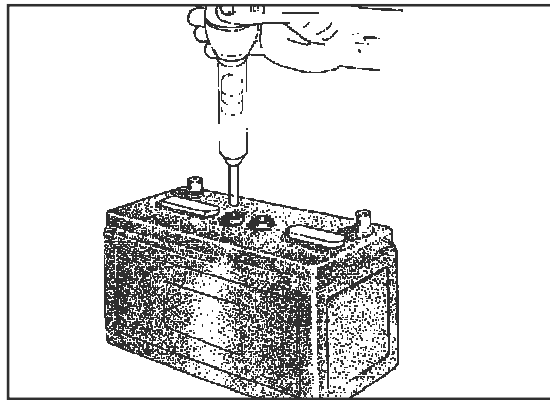


Fig. 304

Cares to be taken in recharging the battery

- Follow carefully all the recharging process.
- Never recharge the battery when the test indicator is bright (batteries with charge indicator).
- Check the battery temperature, it must never exceed 50 °C. If it occurs, stop the recharging until the battery cools down and restart with a reduced recharging regimen.
- Recharging the battery overnight without supervision is not recommended.
- Never disconnect the connection cables with the charger ON.

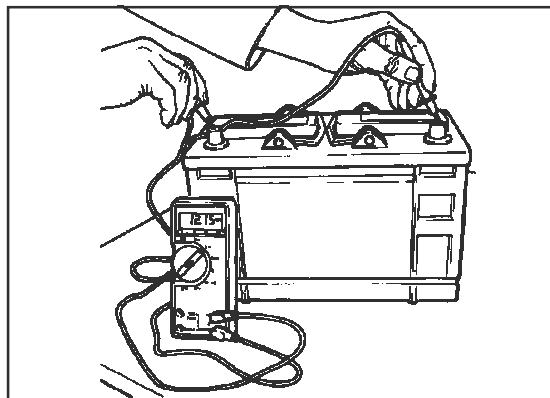


Fig. 305

15.3 - Alternator and fan driving belt



CAUTION:

If the alternator protection is removed while the drive belt tension is checked, it must be securely assembled again before turning the tractor ON again.

A typical example of alternator / fan drive belt is presented. Your tractor can be slightly different in relation to the adjustment point.

Always replace the drive belts if they are worn or damaged.

Change both drive belts of the pair at the same time. To prevent deformation, press the drive belts down with the thumb in the center of the longer free length. With the moderate thumb pressure, the correct drive belt deformation must be of 10 mm (3 / 8 in.)

If a drive belt tension gauge is available, the correct tension is 355 N (35.5 kg). Do NOT allow the tension to be below 220 N (22 kg).

Adjusting the drive belts tension

- 1 - Remove the protection (1).
- 2 - Loosen the nut (2) and also the bolt (3).
- 3 - correct the alternator position looking for the correct tension of the alternator drive belt. Retighten the brackets (2 and 3).
- 4 - Review the drive belt tension to assure it is correct.



NOTE:

If new drive belts are assembled, check/adjust the tension after the first 25 hours of operation.

The illustration at the side is shown without the fan protection only for a better clarification. Do not operate the tractor with that protection removed.

- 5 - Reinstall the protection (1).

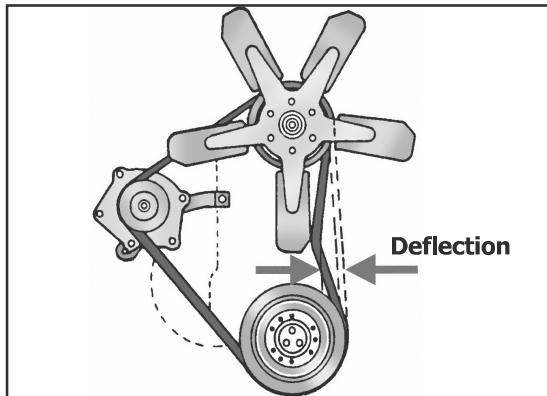


Fig. 306

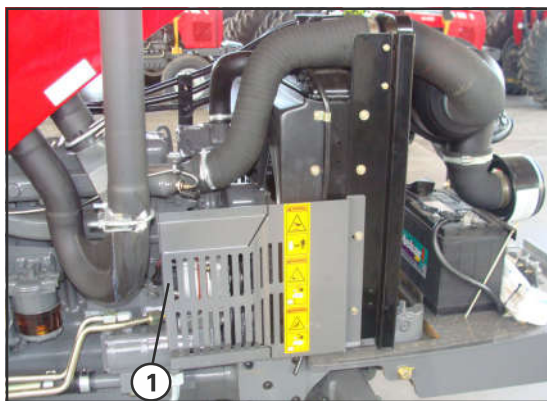


Fig. 307

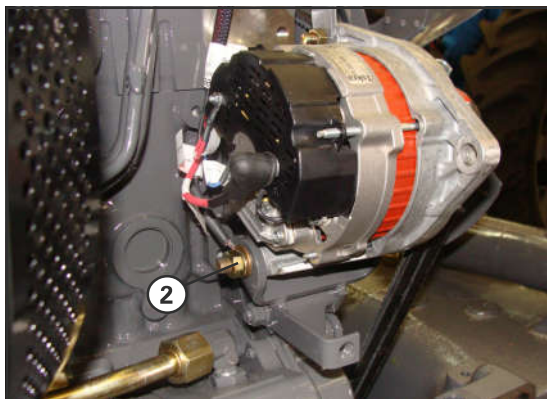


Fig. 308

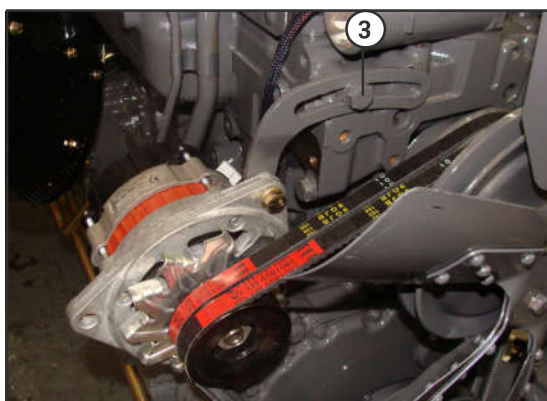


Fig. 309

6 - Maintenance

15.4 - Adjustment of the front headlights

- 1 - Park the tractor turned to the front of a wall at 2 meters of distance. The tractor must be on a plain and levered ground.
- 2 - Draw a horizontal line (1) on the wall equal to the height of the headlights centers (B).
- 3 - Draw two vertical lines equal to the width (C) representing the distance between the headlights centers.
- 4 - Draw a horizontal line (2) according to D, which is the distance of the horizontal line (1) by the equation $(D=B \times 0.1)$.
- 5 - Adjust each headlight individually, covering the opposite headlight and aligning the upper edge of the illuminated zone with the upper part of the line (2), according to the illustration. If necessary, adjust it turning the bolts (3).

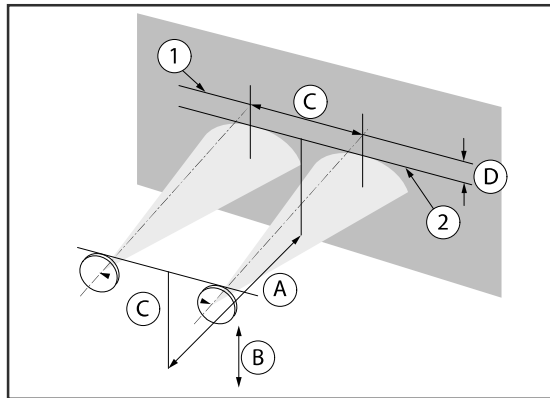


Fig. 310

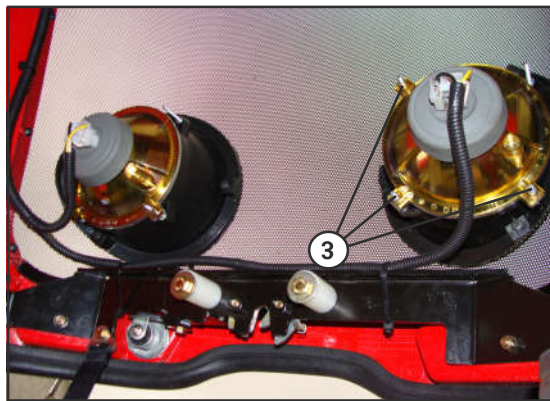


Fig. 311

6



NOTE:

Perform the checking separately. While checking a headlight, cover the other one. Also cover the cabin headlight (if equipped), or the auxiliary headlights, which can make the visibility difficult.

15.5 - Changing the headlights and lamps bulbs

Operating front headlights:

Bulb voltage: 60 watts (Low Beams) and 55 watts (High Beams).

- 1 - Open the front grille.
- 2 - Disconnect the plug (1).
- 3 - Move the rubber protection (2) away.
- 4 - Disengage the clamp (3) to release the socket with the bulb (4).
- 5 - Pull the socket assembly and remove the bulb, pushing it, turning it simultaneously to the counter-clockwise direction and after pulling it.
- 6 - Assemble a new bulb following the reverse procedure.



Fig. 312

6

Rear service headlight (A) bulb, auxiliary lights and the cabin front headlights (B).

Voltage of 55 watts, halogen bulb

NOTE:

This kind of bulb must not be touched with the fingers, since the natural humidity and grease from the skin can blow the bulb. Always use paper or a clean and dry cloth to handle these kinds of bulbs.

- 1 - Turn OFF the key corresponding to the item to be worked.
- 2 - Open the headlight by removing the bolts (1). After, remove the assembly from the cabin interior.
- 3 - Disengage the clamp, releasing socket with the blown lamp, according to the blue arrows.
- 4 - Assemble the new bulb, and do not touch it directly with the fingers, according to the instructions above. After, assemble the set to the cabin. Attach with the bolts (1).



Fig. 313

6 - Maintenance

Circular type service headlamps: voltage 55 watts

- 1 - Open the headlight by removing the bolt (1).
- 2 - Disengage the clamp (2) to release the socket with the bulb (4).
- 3 - Disconnect the plug (3).
- 4 - Move the socket away from the housing and remove the bulb (4) by pulling it.
- 5 - Inversely, assemble the bulb (4), and do not touch it directly with the fingers, according to the instructions above.

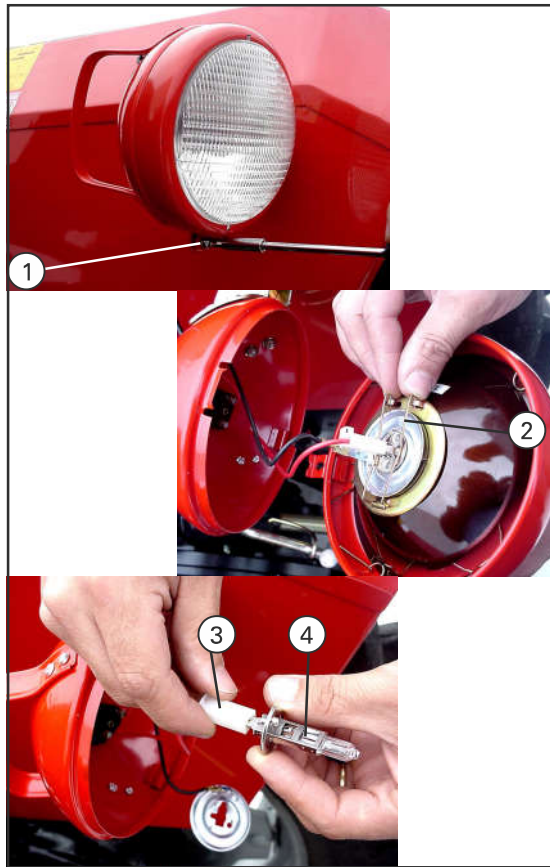


Fig. 314

Front turn signal lamps and Flasher

- 1 - Turn signal lamps (flasher): 21 watts
- 2 - Turn signal lamps: 5 watts

To access these bulbs, remove the 2 bolts from the lens (3).

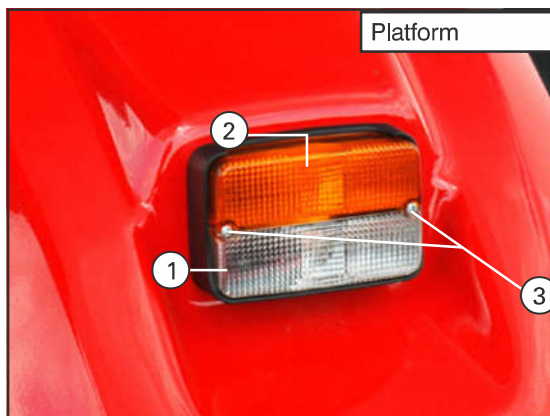


Fig. 315

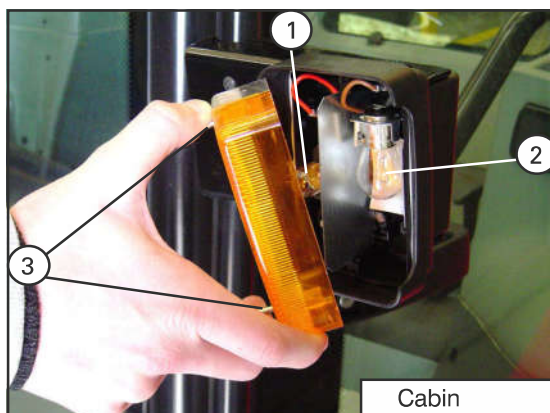


Fig. 316

Turn lights, flashers and brake lights

A - Turn light and brake light: 5 watts

B - turn signal (flasher): 21 watts

- a) Remove the bolts (2) and separate the assembly according to what was shown. force the socket (1 or 2) laterally to disassemble it from the housing.
- b) Remove the bulb by turning it counter-clockwise.
- c) Replace for a new bulb, assuring that it is completely fit after pulling it against the housing.



Fig. 317

6

Cabin interior light (room lamp)

Bulbs voltage = 10 watts

- 1 - Force the lamp assembly (1) down using a screw driver according to what is shown:
- 2 - Remove the reflector (2) and replace the bulb (3).
- 3 - Reinstall the assembly, pushing it up until it completely fits.

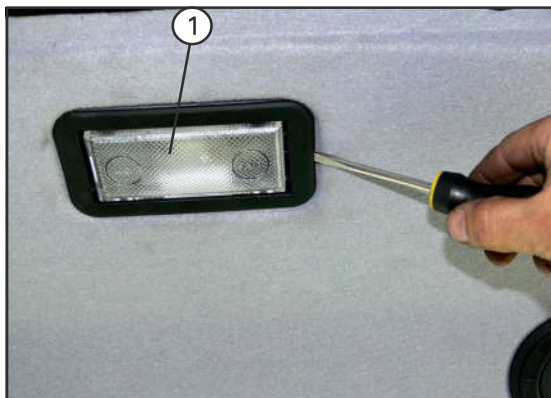


Fig. 318

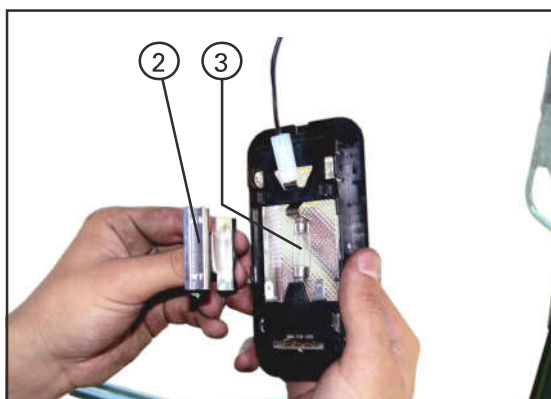


Fig. 319

6 - Maintenance

Panel internal illumination

In the case of some of the instruments from the panel or warning lights do not work, check your Massey Ferguson Dealer.

The panel opening requires special tools and knowledge.

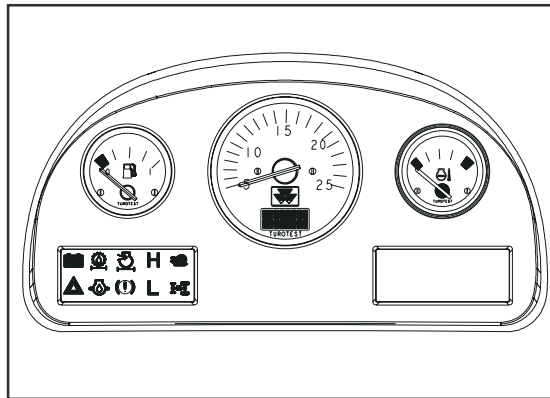


Fig. 320

Sound emission for rear gear

The sound emission system has a horn (1) installed at the side of the transmission, which must be periodically tested for its operation.

If the sound emission for the rear gear engagement does not work, check with your Massey Ferguson Dealer.

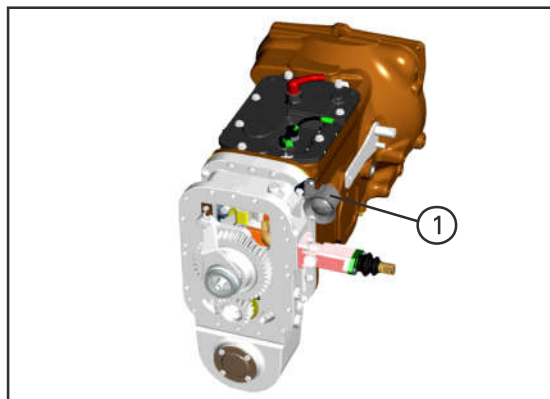


Fig. 321

6

15.6 - Changing the relays and fuses



NOTE:

The lists below include optional items.

ATTENTION!

- Never perform any repairs in the electrical system without disconnecting the battery negative cable first.
- Never improvise using metallic objects or fuses of other capacity.
- If the fuses are frequently blown, check the cause of the problem and never use a fuse with a higher capacity to try preventing it from blowing.

A) Fuses "F" and primary relays "K" (Tractors with cabin and without cabin)

They are located in front of the radiator. To access it, open the frontal grille.

Relays "K":

- K1 Starter relay
- K2 Starter glow plug.

Fuses "F" - Platform Tractors

- 1 PF-01 60A Alternator
- 2 PF-02 60A Illumination
- 3 PF-03 60A Starter glow plug
- 4 PF-04 60A Starter Switch
- 5 Spare
- 6 Spare

Fuses "F" - Cabin Tractors

- 1 PF-01 60A Alternator
- 2 PF-02 60A Alternator
- 3 PF-03 60A Cabin Illumination
- 4 PF-04 60A Cabin Illumination
- 5 PF-05 60A Starter glow plug
- 6 PF-06 60A Engine starting
- 7 Spare
- 8 Spare

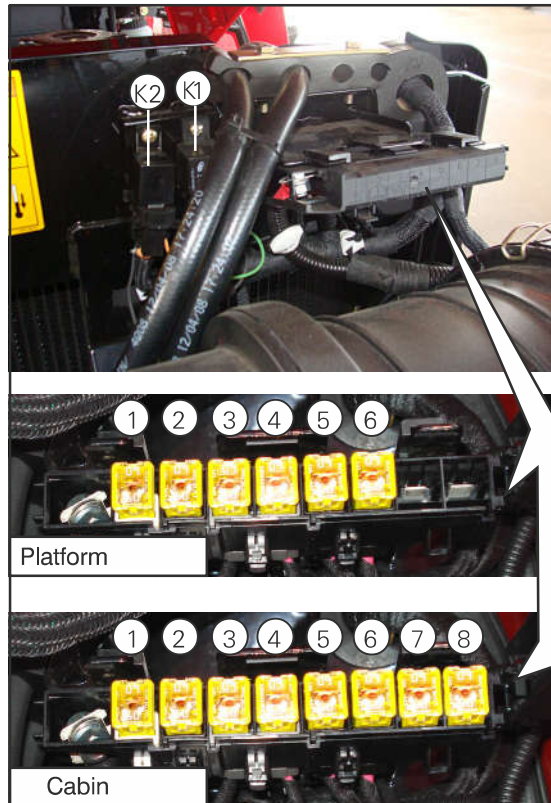


Fig. 322

6 - Maintenance

B) Main fuse box - platform tractors

It is attached in the small hood cover itself, making the access to the fuses and relays easier.

The decal identifies the components function as symbols. Refer to the table below.

Relays "K":

- K1 Engine Starting
- K2 Starter glow plug.
- K3 Headlamp high
- K4 Flasher and alert
- K5 Reverse alarm
- K6 General Headlamp high and low beam

Fuses "F":

- F1 10 A Injection pump solenoid.
- F2 5 A Instrument panel.
- F3 10 A Telemetry
- F4 10 A Starter.
- F5 10 A Parking lamp / Switches H/L
- F6 10 A Warning/ flasher
- F7 10 A Telemetry
- F8 15 A Rear service headlamp / reverse alarm.
- F9 5 A Turn lights and Turn signal lights.
- F10 10 A Front headlights - Low Beam.
- F11 10 A Front headlights - High Beam.
- F12 15 A Auxiliary headlights.

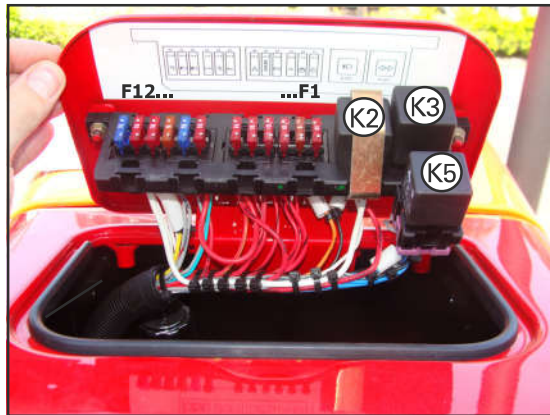


Fig. 323

C) Changing of the relays and fuses - tractors with cabin

Access to the fuse box

- 1 - Turn the locks with a screw driver.
- 2 - Tilt the cover/support (1), obtaining total access to all the fuses "F" and relays "K", concentrated in this point.

Identification of relays "K"

- K1 Engine Starting.
- K2 Glow plug.
- K3 Cab function.
- K4 General headlamp high and low beam.
- K5 Starting auxiliary.
- K6 Reverse alarm.
- K7 Flasher and alert.
- K8 headlamp high.

Identification of fuses "F"

- F1 15 A Cigarette lighter + windshield wiper stop
- F2 10 A Radio + clock + interior light + telemetry
- F3 10 A Hazard flasher + horn
- F4 10 A Instruments panel.
- F5 10 A Injection pump solenoid
- F6 10 A Flasher / brake fluid level / parkig brake.
- F7 10 A Engine Starting/ Switches H/L
- F8 10 A Turn lights and turn signal light.
- F9 10 A Low Beam
- F10 10 A High Beam
- F11 15 A Rotating headlight (beacon)
- F12 10 A Windshield wiper and washer (water squirt) - front
- F13 10 A Front auxiliary headlights
- F14 20 A Air conditioner
- F15 10 A Rear wiper and washer
- F16 10 A Telemetry.
- F17 10 A Rear service headlights
- F18 15 A Outlet for towing

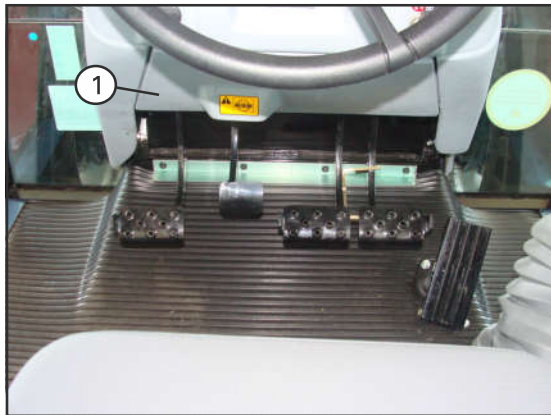


Fig. 324

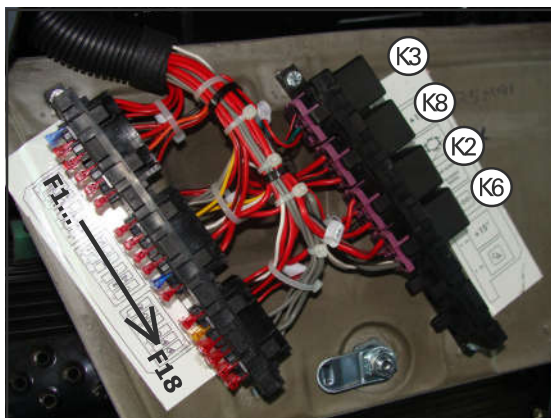


Fig. 325

6 - Maintenance

16 - Air conditioner maintenance



ATTENTION!

Never disconnect the hoses that conduct the coolant from the air conditioner system. This fluid, in contact with the skin, will cause burns. Any kind of maintenance in the air conditioner, not described here, must be performed by a specialized technician. Submit the troubleshooting through the Massey Ferguson Dealer.

16.1 - Condenser cleaning

Whenever an accumulation of dust and other impurities is verified in the condenser fins (1), clean it with compressed air.

the air pressure must not be superior to 7 bar.

- Remove the hood lateral covers.
- Loosen the condenser mounting nut in one of the sides and move the condenser away in relation to the water radiator, to get a better access.
- Clean this side, mount it again and after repeat the operation on the other side of the condenser.

16.2 - Adjustment of the compressor belt tension

The drive belt (2) tension must have the deflection of 10 to 15 mm - see the drawing. Make adjustments if necessary:

- Loosen the nuts of the linking bolts.
- Loosen the positioning nuts and move the compressor (3) up and down to obtain the recommended tension of the drive belt.
- Retighten the 4 nuts and check if the tension remained correct.



NOTE:

Check if the fan and alternator operation drive belts are correct.

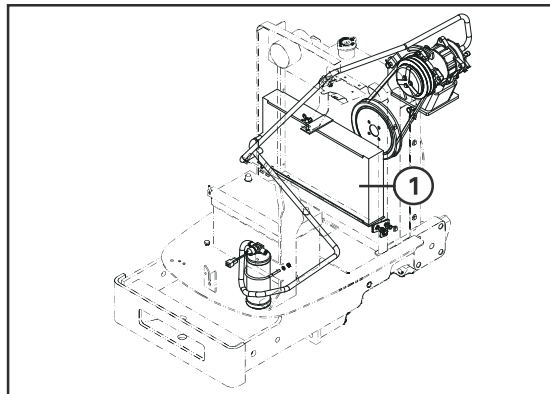


Fig. 326

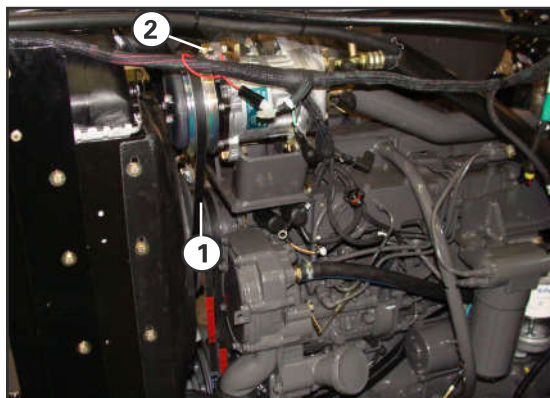


Fig. 327

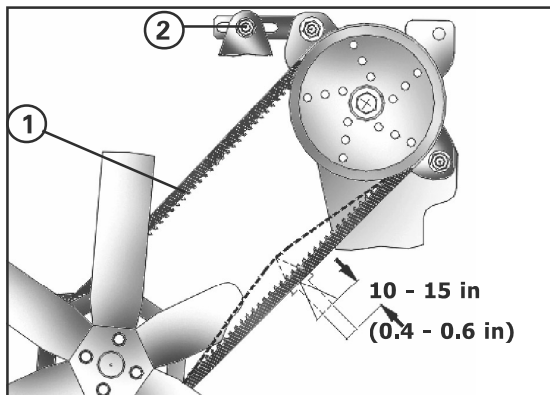


Fig. 328

16.3 - Cleaning of the cabin air renovation filter

- a) Remove the cover (3), turning the knobs (1) according indicated by the arrow.
- b) Remove the filter element (2) - according to hat is shown.
- c) Apply compressed air on the filter element (2), paying attention to the following:
 - ✓ Do not apply a pressure higher than **70 PSI**.
 - ✓ The direction of the air jet must be opposite to the airflow, that is, from inside to outside, considering the mounting position.
- d) Reinstall the element (3), using the reverse order, and reinstall the cover (3).

NOTES:

The cleaning frequency depends on the amount of accumulated dust, and may range between once a week and twice a day.

The filter needs to be changed according to the maintenance plan in this manual. If there are any damages, such as perforation, change it independently from the working hours. Under severe use conditions, it must be changed more frequently.

Do not operate the air conditioner if the air filter is full: this reduces effectiveness, and may cause problems to the system.

The air filter elements must be in perfect conditions: replace it if you find holes, parching or any other abnormalities.

The cabins air filtering system was developed to protect you from dust and, in no hypothesis against chemical products such as insecticide. In this case, take the precautions informed by the respective product.

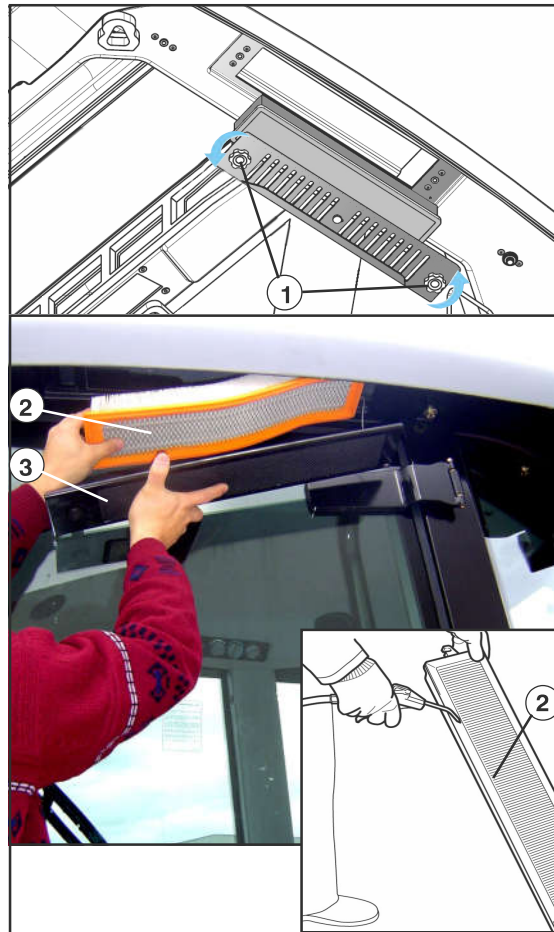


Fig. 329

6 - Maintenance

16.4 - General regular inspection

Perform an inspection on the air conditioner system components:

- # Hoses and connections: check these items for cracks, wear, or holes. Pay special attention to connections, elbows, and crossing through the body and other parts.
- # Wires and their connections.
- # Attachments in general.
- # Compressor drive belt.
- # Always keep the condenser tubes clean. Use compressed air.

16.5 - Refilling the gas (or coolant)

Only use Fluid R-134A.

Coolant fluid refilling must be considered when the air conditioner loses its efficiency.

However, before it, make sure all items are in perfect conditions:

Cleaning of the condenser and the cab air renovation filter, compressor drive belt tension, etc. If the problem persists even after coolant refilling, the compressor might need inspection.

Remember: one of the procedures that extends the life of the compressor is the weekly operation of the cooling system, as recommended in the "Operation" Section, Chapter 12.

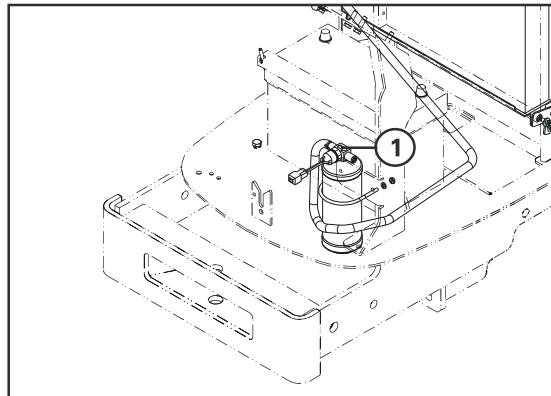


Fig. 330

6

NOTES:

1 - The coolant fluid replacement, as well as filling the loading requires qualified resources and personnel. For these or other services, contact your MF Dealer or a reliable air conditioner specialist.

2 - Never loosen any coolant conducting hose connections. This fluid is highly toxic and requires special techniques and equipment. The release of this gas is harmful to the environment.

6 - Maintenance

17 - Calibration and load of the tires

The correct calibration is the factor that contributes most to the satisfactory performance of the agricultural machines tires. The correct filling pressure can be determined by weighting the loaded axle (for example: the rear axle with the implement in the lifted position) and checking the calibration and load charts for the tires that are being used. The tires load can be calculated to include mounted implements, as well weights and ballasting.

The recommended calibration indexes can only be increased in applications with weighted loads and reduced speeds, such as raised plow and operations in hard surfaces - such as transportation in highways. The loading capacities of the tire load vary according to the speed - heavier loads normally must be transported with lower speeds; as the reduced loads can be transported with higher speeds than those indicated in the following chart.

Double wheels (Only rear wheels)

When using double wheels, the values of load per tire must be reduced. For this, multiply the value found in the chart per 0.88. However, 14 lb/pol² is the minimum pressure to be used in double wheels. The front wheels do not change its calibration when double wheel is used in the rear side.

Determining the tractor weight

With the implement assembled in the 3-points lifting system, dislocate the tractor until a balance and check the weight that is on the rear and front axles, one at a time.

After measuring each axle, divide this value for two. Compare the obtained value in relation to the tires assembled with the chart below, determining the inflation pressure x applied load.



NOTE:

The calibration must be performed with the tires cold and observing the difference between diagonal and radial tires.

Calibration (PSI) x Load capacity (kg)

Dimensions	Pressure kPa (PSI) – Cross-ply tires – Maximum speed of 30 km/h (18,6 mph)																			
	kPa	95	110	125	140	150	165	180	190	210	220	235	250	275	305	330	360	385	415	
	PSI	14	16	18	20	22	24	26	28	30	32	34	36	40	44	48	52	56	60	
7.50-16F2 (6L)							500	528	555	583	610	635	660	705	750					
8.30-24R1 (6L)		480	520	560	595	625	655	685	720	750	780									
9.00-16F2 (6L)							680	720	760	795	830	865	900							
9.5L-15F2 (6L)							749	787	826	875	925									
10.00-16F2 (8L)							795	840	885	925	965	1008	1050	1120	1195					
11.2-28R1 (6L)		775	840	900	960	1015	1070	1115												
12.4-24R1 (6L)		649	712	749	798	848	898	948												
12.4-28 R1 (6L)		775	840	900	960	1015	1070	1115												
13.6-38R1 (14L)		1275	1375	1475	1570	1660														
14.9-24R1 (6L)		1225	1325	1420	1510															
14.9-24R2 (6L)		1225	1325	1420	1510															
14.9-26R1 (6L)		1265	1370	1465	1560															
14.9-28R1 (6L)		1310	1415	1515	1615															
14.9-28R2 (6L)		1310	1415	1515	1615															
15.5-38R1 (8L)		1435	1550	1660	1765	1860	1950	2060												
16.9-30R1 (6L)			1770	1895																
18.4-30R1 (10L)			2120	2275	2420	2555	2685	2815												
18.4-30R1 (6L)			2120																	
18.4-30R1 (8L)			2120	2275	2420															
18.4-30R2 (10L)			2120	2275	2420	2555	2685	2815												
18.4-30R2 (6L)			2120																	
18.4-34R1 (10L)			2250	2415	2564	2715	2855	2990												
18.4-34R1 (8L)			2250	2415	2564															
23.1-26R2 (8L)			2850																	
23.1-30R1 (10L)			3035	3250	3460															
23.1-30R2 (8L)			3035																	
24.5-32R1 (10L)			3465	3710	3950															
Dimensions	Pressure kPa (PSI) – Radial tires – Maximum speed of 40 km/h (24,8 mph)																			
	kPa	70	85	90	105	120	160													
	PSI	10	12	13	15	17	23													
290/95 R34	Load (kg)	2114	2340	2453	2680	3000	3640													
320/90 R42		2720	3000	3140	3420	3860	4800													
320/90 R50		2908	3200	3346	3640	4080	4940													

6

6 - Maintenance

18 - Tightening the wheels mounting nuts

Recommended torques

A) front wheels 4x2

A1 - Disc to the hub (light type) = 8 to 10 kgf.m

A2 - Disc to the hub (medium type) = 12 to 16 kgf.m

A3 - Disc to the hub (heavy type) = 12 to 16 kgf.m

B) Front wheels 4x4 rim type and stamped disc

B1 - Disc to the axle = 25 to 28 kgf.m

B2 - Disc to the rim = 15 to 17 kgf.m



Fig. 331

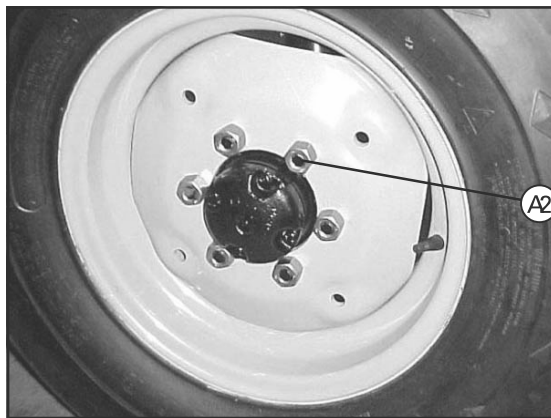


Fig. 332



Fig. 333



Fig. 334

C) Rear wheels

Rim type wheels and stamped disc

C1 - Disc to the axle = 31 to 34 kgf.m

C2 - Disc to the rim = 24 to 28 kgf.m

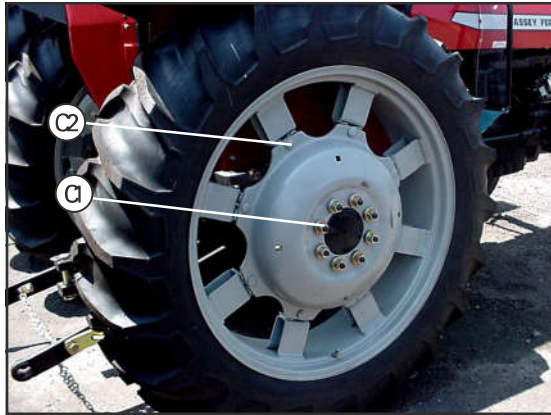


Fig. 335

"Rice" type wheels.

C3 - Wheel to the axle = 30 to 36 kgf.m



Fig. 336

Wheels with casted disc

C4 - Disc to the hub = 36 to 48 kgf.m

C5 - Disc to the rim = 29 to 37 kgf.m



Fig. 337

PAVT type wheels:

C6 - Clamps nuts 25 to 29 kgf.m

C7 - Disc PAVT to the axle = 30 to 36 kgf.m



Fig. 338

6 - Maintenance

19 - Maintenance of the tractor in inoperative periods of time

The activity of an agricultural tractor, in many cases, is very seasonal, that is, there are periods or time in which it works more than 20 hours a day and, in others, it is inactive for several weeks.

During this period, the tractor maintenance requires some cares which are as important as those taken during the activity period.

Basically, the maintenance in this period aims to protect the tractor against the harmful agents such as humidity, hot, cold, impurities, etc.

The ideal conditions for a tractor inactivity are the following:

Tractor cleaning

Before all, perform a complete washing all over the tractor.

6

It sets it free from a large quantity of residues that cause oxidation in the metallic parts, as well as the degradation of non-metallic elements, such as painting, plastic, electrical installation, etc.

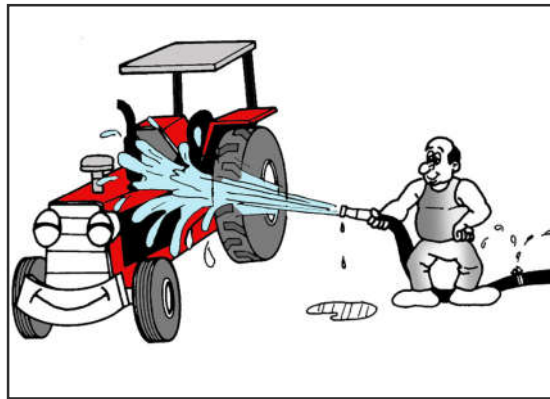


Fig. 339

Tractor storage

It is very important that the tractor is sheltered from the bad weather, in a dry and ventilated place.

Without that there is no maintenance.



Fig. 340

Relief of the load over the tires.

If the inactivity period is longer than 30 days, it is convenient to support the tractor weight over reinforced and safe shims.

Remove water from the tires internal side and calibrate them with a pressure inferior than the recommended for the work.

If the tractor is supported over the tires in only one position for a very long period of time, the tread deformation might occur

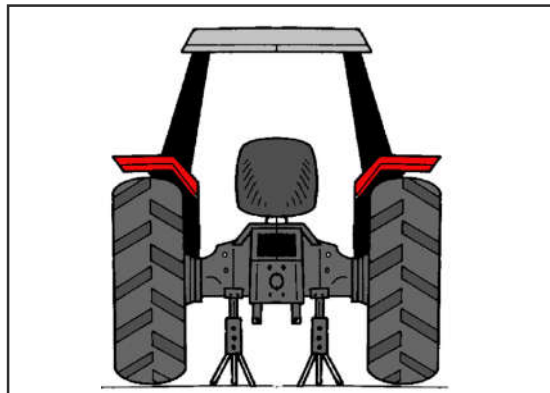


Fig. 341

6 - Maintenance

Closing of the exhaust exit, the air filter and the engine breather tube.

It is important to prevent insects to enter through these points.

Many insects can carry residues used to make nests inside the engine. It might generate harmful consequences.

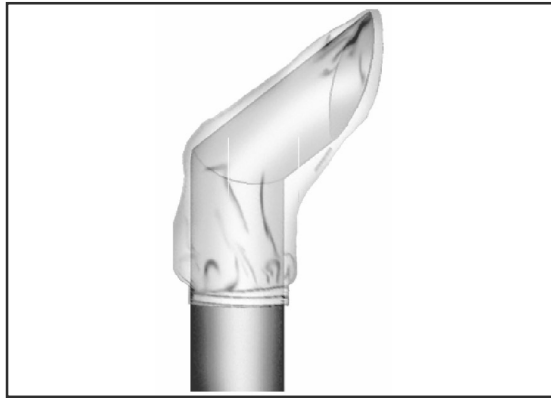


Fig. 342

Clutch operation

In the case of clutches with disc(s) made of organic material, it is convenient to press the clutch pedal all the way to the end of the 1st stage. It avoids the transmission disc to paste in the plate and steering wheel.

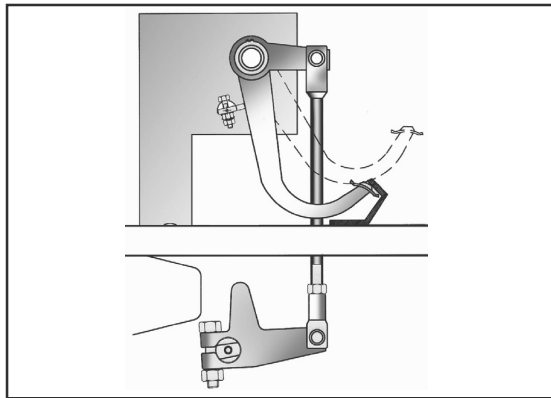


Fig. 343

Filling and lubrication

When deactivating the tractor, completely fill the fuel tanks to prevent the humidity condensation and consequently oxidation inside the tank, as well as damages to the injection system.

If possible fill the tanks with special fuel for injection pump tests. Run the engine with this fuel for some minutes. In addition, perform the lubrication of all the greasers.

Other procedures

- A) Remove the battery from the tractor, clean it perfectly and store it in a dry place, with the correct solution level.

Monthly, submit it to a slow charge, preventing the plates sulphation, which also occurs due to lack of charge. If you leave the battery in the tractor, remove the negative cable and also perform the periodical recharge.

- B) Change the engine oil and, if it is near the period, also of the other systems.
- C) Drain the water from the radiator, perform an internal washing of the system through the hot water flow.

After, refill the system, using the corrosion inhibitor.

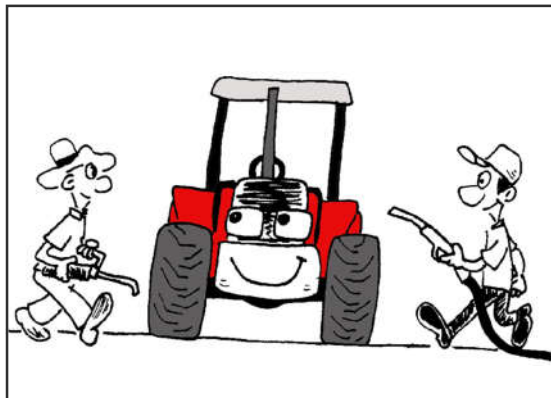


Fig. 344

6

6 - Maintenance

Return to work

- a) Remove the protections from the exhaust, filter and breather-tube used to prevent harmful agents to enter.
- b) Reinstall the battery(s).
- c) Check the operation of the command panel lights.
- d) Perform the tires calibration.
- e) Cut the fuel flow to the engine, releasing the wire together the injection pump solenoid (1) - figure at the side - or let the strangler pulled, according to the model. It allows you to turn the engine without running it, while all the moveable parts will receive lubrication, preventing the early wear due to the absence of oil in the parts.

Operate the starter motor during 10 seconds, at most.

6

- f) Turn the solenoid wire again and start it normally, making sure that the pressure warning light does not light in the panel.

If that light remains lighted on, IMMEDIATELY turn the engine off and check the cause.

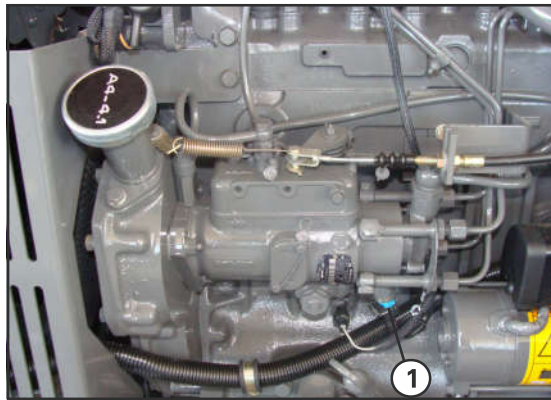


Fig. 345

20 - Analysis of abnormalities, causes and solutions

The following charts can help in the occasions in which you need to diagnosis any problems and decide about the best action to take.

ABNORMALITY	POSSIBLE CAUSES
1 - Engine works at cold:	1a) Engine is with the thermostatic valve locked open. It might be cause due to the non -use of anticorrosive together with the water from the coolant system. <i>Change the valve and the radiator liquid, using anticorrosive additive.</i> 1b) Injection pump pint improperly adjusted. Check with the Dealer.
2 - Engine fails:	2a) Engine stop command <i>Check the injection pump solenoid and its electrical wiring. If necessary, replace the solenoid</i> 2b) Damaged filling pump. <i>Replace the pump.</i> 2c) Air or fuel filter saturated. <i>Replace the fuel filter and clean or replace the air filter.</i> 2d) Air in the fuel system. <i>Bleed the filter.</i> 2e) Clogged ?fuel tank breather. <i>Replace the cover that holds the breather.</i> 2f) Fuel incorrect or with water. <i>Drain the tank and refill with the proper fuel.</i> 2g) Valves play incorrect. <i>Check with the Dealer.</i> 2h) Valves irregular seat. <i>Check with the Dealer.</i> 2i) Engine internal wear. <i>Check with the Dealer.</i> 2j) Broken valves springs. <i>Check with the Dealer.</i>
3 - Constant stops of the engine:	3a) Injection pump solenoid. <i>If necessary, replace the solenoid.</i> 3b) Damaged filling pump. <i>Replace the pump.</i> 3c) Air and/or fuel filter saturated. <i>Replace the fuel filter and clean or replace the air filter.</i> 3d) Air in the fuel system. <i>Bleed the filter.</i> 3e) Clogged ?fuel tank breather. <i>Replace the cover that holds the breather.</i> 3f) Water in the fuel. <i>Drain the tank and the filters. Check fuel origin. Always fill at the end of each working day, avoiding the humidity condensation in the tank during the night.</i> 3g) Clogged oil pan breathing tube. <i>Clean the engine breathing tube.</i>



6 - Maintenance

ABNORMALITY	POSSIBLE CAUSES
4 - Excessive fuel consumption:	4a) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i> 4b) Air or fuel filter saturated. <i>Replace the fuel filter and clean or replace the air filter.</i> 4c) Malfunctioning injection pump or nozzles. <i>Check with the Dealer.</i> 4d) Incorrect injection timing. <i>Check with the Dealer.</i> 4e) Valves play incorrect. <i>Check with the Dealer.</i> 4f) Operation temperature low. <i>See item 1 above.</i> 4g) Incorrect fuel. <i>Drain all the tank and refill it with the proper diesel fuel.</i> 4h) Clogged oil pan breathing tube. <i>Remove the tube and clean it with solvent.</i> 4i) Excessive load in the equipment. <i>Check if the implement is proper to the tractor and/or check if your adjustment is correct.</i>
5 - Excessive lubricating oil consumption:	5a) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i> 5b) Air filter saturated. <i>Clean or change the filter.</i> 5c) Sleeves, rings or valve guides worn out. <i>Check with the Dealer.</i> 5d) Valve rods retainers worn. <i>Check with the Dealer.</i> 5e) Irregular seat of the rings and mirrored sleeves caused by work in improper temperatures, loads or rotations. <i>Check with the Dealer.</i> 5f) Turbine lubrication system leaking. <i>Check with the Dealer.</i>
6 - Internal knocking:	6a) Improper or defective injector. <i>Check with the Dealer.</i> 6b) Incorrect injection timing. <i>Check with the Dealer.</i> 6c) Valves play incorrect. <i>Check with the Dealer.</i> 6d) Incorrect oil level. <i>Fill in the level with the oil recommended in this manual.</i> 6e) Engine flywheel loosen. <i>Check with the Dealer.</i> 6f) Lubricant oil pump. <i>Check with the Dealer.</i> 6g) Engine internal parts worn. <i>Check with the Dealer.</i>
7 - Excessive pressure in the oil pan:	7a) Breather-tube blocked. <i>Remove the tube and clean it with solvent.</i> 7b) Sleeves and rings, guides and valves worn. <i>Check with the Dealer.</i> 7c) Valve rods retainers worn. <i>Check with the Dealer.</i>

6 - Maintenance

ABNORMALITY	POSSIBLE CAUSES
8 - Overheating:	<p>8a) External obstruction of the radiator' radiator core. <i>Perform a general cleaning in the radiator.</i></p> <p>8b) Air filter saturated. <i>Clean or replace the filter external element.</i></p> <p>8c) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i></p> <p>8d) Malfunctioning injection pump or nozzles. <i>Check with the Dealer.</i></p> <p>8e) Incorrect injection timing or the pressure nozzles. <i>Check with the Dealer.</i></p> <p>8g) Thermostatic valve or water pump malfunction or dirty or clogged radiator. <i>Perform a general internal cleaning in the radiator. If the problem persists, check with the Dealer.</i></p> <p>8h) Water level low. <i>Complete the water level in the radiator daily, if necessary.</i></p> <p>8i) Damaged head gasket. <i>Check with the Dealer.</i></p> <p>8j) Excessive load in the equipment. <i>Check if the implement is proper to the tractor and/or check if your adjustment is correct.</i></p> <p>8l) Loose fan drive belts. <i>Adjust belts tension, or replace the belt, if necessary.</i></p> <p>8m) Broken valves springs. <i>Check with the Dealer.</i></p>
9 - Low oil pressure:	<p>9a) Low level of oil in the crankcase <i>Check the level daily, and complete if necessary.</i></p> <p>9b) Oil pump relief valve or pump malfunction. <i>Check with the Dealer.</i></p> <p>9c) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i></p> <p>9d) Marker malfunction. <i>Check with the Dealer.</i></p>
10 - White smoke:	<p>10a) Incorrect fuel. <i>Drain the tank and refill with the proper fuel.</i></p> <p>10b) Operation temperature low. <i>Check the item 1 of this section.</i></p> <p>10c) Water in the fuel. <i>Drain the tank and refill it with the pure and clean fuel.</i></p>
11 - Blue smoke:	<p>11a) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i></p> <p>11b) Injection pump or injector(s) malfunction. <i>Check with the Dealer.</i></p> <p>11c) Sleeves and rings worn. <i>Check with the Dealer.</i></p> <p>11d) Valves guides worn. <i>Check with the Dealer.</i></p> <p>11e) Clogged breathing tube. <i>Remove the breathing tube and clean it.</i></p>

6 - Maintenance

ABNORMALITY	POSSIBLE CAUSES and SOLUTIONS
12 - Black smoke and lack of power:	<p>12a) Injection pump or injector(s) malfunction. <i>Check with the Dealer.</i></p> <p>12b) Incorrect injection timing. <i>Check with the Dealer.</i></p> <p>12c) Operation temperature low. <i>See the item 1 before.</i></p> <p>12d) Incorrect valves play or clogged valve. <i>Check with the Dealer.</i></p> <p>12e) Turbo low pressure (If equipped). <i>Check with the Dealer.</i></p> <p>12f) Damaged filling pump. <i>Change the pump or Check with the Dealer.</i></p> <p>12g) Incorrect fuel. <i>Drain the tank and refill with the proper fuel.</i></p>
13 - Engine does not start:	<p>13a) Battery without any charge or with poorl contact of the terminals or other links. <i>Check the battery maintenance conditions. If necessary, check with an electrician.</i></p> <p>13b) Starter engine or relay defective. <i>Check with the Dealer.</i></p> <p>13c) Lack of fuel. <i>Fill and bleed the fuel filter.</i></p> <p>13d) Air or water in the feeding system. <i>Drain the fuel tank, refill with pure and clean diesel and bleed the system.</i></p> <p>13e) Fuel lines or filters clogged. <i>Replace the filer and bleed.</i> NOTE: In winter, there is the paraffin generation in the fuel, which clogs the system, specially the filter. For this reason, it is recommended to add 5% of pure kerosene in each filling.</p> <p>13f) Injection nozzles extremely dirty or misadjusted. <i>Check with the Dealer.</i></p> <p>13g) Air or fuel filters saturated. <i>Replace the fuel filter and clean or replace the air filter.</i></p> <p>13h) Injector pump solenoid or connections defective. <i>Check this possibility. When turning the ignition key to the first position, you should listen to a small crack noise inside the solenoid. Otherwise, the electrical connection is interrupted or the solenoid is clogged. In this case, replace it.</i></p>
14 - Battery does not reach the load, even when working.	<p>14a) Sulphated or damaged vases due to the lack of maintenance of the solution level, or due to a long inactivity period without any recharge. <i>Send the battery to be tested. If necessary, replace it and provide its maintenance.</i></p> <p>14b) Alternator bushing worn or other internal problem. <i>Check with the Dealer.</i></p> <p>14c) Misadjusted relay. <i>Check with the Dealer.</i></p> <p>14d) "Short-circuit" with the ground of some wire. <i>Try to find the problem. If necessary, check with the Dealer.</i></p> <p>14e) Dirty bornes and terminals. <i>Clean all the components using hot water and, after drying, rub them with a sandpaper.</i></p>

6 - Maintenance

ABNORMALITY	POSSIBLE CAUSES and SOLUTIONS
15 - Fuses and bulbs frequently blow:	<p>15a) "Short-circuit" of some wire with the ground. <i>Try to find the problem. If necessary, check with the Dealer.</i></p> <p>15b) Battery with overload (regulator or alternator misadjusted). <i>Check with the Dealer.</i></p> <p>15c) Use of bulbs or accessories different from the specifications or concentrated in some fuse. <i>Never adapt accessories that are not compatible with the electrical system. Even the proper accessories must be installed by properly trained personnel.</i></p>
16 - Excess of slippage:	<p>16a) Incorrect ballasting or poor distribution between the front and rear axle.</p> <p>16b) Improper or misadjusted implement. <i>Only use implements compatible and adjust them properly. Ask your implement supplier for instructions regarding to the required power and adjustment and operation procedures.</i></p> <p>16c) Tire claws worn. <i>Replace the tires.</i></p> <p>16d) Improper tires. <i>For grounds with poor support (muddy) use tires with high claws (R2). For the high traction services in hard ground, use tires with low claws (R1), with the proper width (tread).</i> <i>NOTE: In addition, the correct tires calibration is also important.</i> Excess of pressure contributes to the slippage occurrence and early wear. Lack of pressure causes the claws breakage.</p>
17 - Gearbox "scratches" the gears:	<p>17a) Use of improper oil. <i>The use of oil with improper degree GL (clutches oil) causes the scratching of the gears even in synchronized gearboxes.</i></p> <p>17b) Wearing of parts such as bearings or incorrect adjustment of the axles longitudinal plays. <i>Check with the Dealer.</i></p> <p>17c) Wearing of the synchronization rings in tractors with synchronized gearbox. <i>Check with the Dealer.</i></p> <p>17d) Incorrect play in the clutch pedal. <i>Adjust the clutch play.</i></p> <p>17e) Incomplete pressure of the clutch pedal. <i>Always step on the pedal all the way until the end of its course.</i></p>

6 - Maintenance



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7 - Technical Specifications



7 - Technical Specifications

1 - Engine

1.1 - General Data	425	435	440	445	455
Brand / model	A4-3.9	A4-4.1	A4-4.1	A4-4.1	1104C-44T
Aspiration	Natural	Natural	Natural	Natural	Turbo
Cycle	4-stroke	4-stroke	4-stroke	4-stroke	4-stroke
Injection type	Direct	Direct	Direct	Direct	Direct
Number of cylinders	4	4	4	4	4
Injection order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Compression ratio	16:1	16:1	16:1	16:1	18,23:1
Capacity (cm ³)	4100	4100	4100	4100	4100
Maximum power - ISO14396					
cv (kW)@2200 rpm	65 (48,5)	75 (55,9)	85 (63,3)	85 (63,3)	100 (74,6)
Maximum torque - ISO14396					
mkgf (Nm)@1400 rpm	24,4 (240)	28,5 (279)	32 (314)	32 (314)	40 (392)
Maximum power - ISO14396					
cv (kW)@2200 rpm	48 (35,8)	56 (41,7)	63 (46,9)	63 (46,9)	74 (55,18)

1.2. Lubrication system

Type Forced, with gear pump (built-in relief valve). Oil filter with integral flow. In 4292, there is a heater exchanger incorporated to the filter holder help the engine cooling.

Maximum system pressure - PSI 60 60 60 60 60

1.3 - Air filtering system

Filtering - type Dry filter with 2 elements (primary and secondary). Equipped with a prefilter and restriction indicator with a warning light on the panel. In tractors without dust remover, there is a valve to release the dust accumulated in the front part of the filter.

Prefilter - Type O4 with optional prefilter optional optional optional -

1.4 - Fuel feeding system

Separating pre-filter Settler Settler Settler Settler -

Fuel filter Element of microporous paper and discardable.

Feeding Pump Tractors 4265, 4275, 4283, 4290 and 4292 have diaphragm feeding pump, operated internally with a lever and a projection in the camshaft. The feeding pump has a knob or lever that allows bleeding the fuel system. Tractors 4291 has an electrical feeding pump.

Injection pump - type Lucas / Delphi, horizontal, rotating type.

1.5 - Cooling system

Type Air / water

Radiator With vertical tubes and horizontal fins

Water pump Centrifuge, pulley and belt operated

Thermostatic valve - type Wax capsule.

Temperature range kept 80 to 98 °C

Radiator cap Limits the cooling system pressure to 7.0 PSI. There is also a depression valve.



7 - Technical Specifications

2 - Electrical system - power and capacity

	425	435	440	445	455
Battery:					
Without cabin.....	100 A	100 A	100 A	100 A	100 A
Alternator:					
Without cabin.....	Iskra - 12 V / 55 A/h				
With cabin	Iskra - 12 V / 120 A/h				
Starter motor	Iskra - 12 V / 3,0 kw				
Instrument internal lighting:	Consisting of light emitting diodes (LEDs)				
Glow plug (cold start aid - optional).....					
	9 A				
Safety start switch.....	Standard in all models, prevents the start when the Reduced and Direct lever is set to neutral.				
Front service headlights (High beam)	60 W				
Front service headlights (Low beam)	55 W				
Rear service headlights	55 W				
Front auxiliary headlights (Standard tractors only)	55 W				
Tail lamp and brake lights	5 W				
Turn signal lamps (If equipped)	21 W				

7

3 - Clutch

3a) Dual Clutch	Used in tractor with Power Take Off - PTO				
Transmission disc diameter*	305	305	330	330	330
PTO disc diameter	254	254	254	254	254
	NOTE: In dual clutch, the PTO disc is the second stage and its diameter is 254 mm. In this case, to operate with the PTO is necessary to adjust the clutch stopper to the 2nd stage.				
3b) Split torque*	Used in tractors with Independent Power Take Off - IPTO The disc diameter is the same as the dual clutch disc.				
Disc material (transmission)	Organic				
Optional	Cerametallic				
Bearing (collar) of all clutches	Constant contact type, unnecessary to adjust the pedal free travel.				
Clutch operation	Mechanical, through pedal and tie rod				

7 - Technical Specifications

4 - Gearbox and creeper - types x application

	425	435	440	445	455
Sliding gears - 8/2 gears	Standard	Standard	Standard	Standard	Standard
8x8 mechanical reversion gearbox, synchronized	Optional	Optional	Optional	Optional	Optional
12/4 gears Synchronized	Optional	Optional	Optional	Optional	Optional
Creeper*	Optional	Optional	Optional	Optional	Optional

5 - Theoretic speeds achieved on the road

(In Km/h - engine in maximum power speed).

Table of theoretic speeds

Model / Version RPM / rear wheels	Gears											
	1 ^a	2 ^a	3 ^a	4 ^a	5 ^a	6 ^a	7 ^a	8 ^a	9 ^a	10 ^a	11 ^a	12 ^a
MF425-435 / 8 V. 2200 / 18.4X30R1	2.30	3.38	6.19	7.60	9.22	13.52	24.78	30.41	—	—	—	—
MF425-435 / 12 V. 2200 / 18.4X30R1	2.64	3.38	3.96	5.07	7.26	9.30	10.80	13.83	16.19	20.74	29.69	38.02
MF 440 / 8 speeds. 2200 / 18.4X30R1	2.62	3.84	7.03	8.63	10.70	15.69	28.77	35.31	—	—	—	—
MF 445 / 12 speeds. 2200 / 18.4X34R1	2.26	2.86	3.39	4.29	6.21	7.86	9.23	11.69	13.85	17.53	25.38	32.13
MF 455 / 12 speeds. 2200 / 18.4X34R1	2.30	2.80	3.40	4.20	6.40	7.80	9.40	11.50	13.80	17.0	26.1	32.1



NOTE:

The table above is for reference only, because the speed achieved by the tractors depend on its specific setting. Thus, always consult the decal fixed on the right side of the operation station (illustration) which contains several specific information for your tractor. See the instructions in section 5 "Operation" about the interpretation of data on the decal.



Fig. 346



7 - Technical Specifications

6 - Rear axle

	425	435	440	445	455
Crown / pinion reduction	3,889:1	3,889:1	3,889:1	3,889:1	3,889:1
Differential lock	Through coupling sleeves: one is fixed in the differential satellite box and the other slides on the right half shaft grooves. The sliding sleeve is operated by a fork which in turn is operated mechanically by a pedal to the right of the operator.				
Final drives reduction	3,143:1	3,143:1	3,143:1	4,8:1	4,8:1

7 - Front axle

4 x 2 axle (all tractors)

Type	In 3 sections, gauge adjustable by a telescopic bar that allows the displacement in relation to the supporting gutter.
Toe-In	0 to 6,35 mm positive (all)
Maximum vertical judder	11° (all)
Camber / Caster	3° 30' / 0° (all)

Specifications common to all 4 x 4 axles, ZF and Carraro:

7

Applications - ZF Axles:

ZF / APL 335 Lateral (Standard tractors)	Yes	Yes	Yes	Yes	No
ZF / APL 3035 Central (Standard tractors)	Yes	Yes	Yes	Yes	Yes
ZF / AS 3045 (Central)	No	No	No	Yes	Yes

Applications - Carraro Axles:

Carraro 20.14 Lateral (Standard tractors)	Yes	Yes	Yes	No	No
Carraro 20.18 Central (Standard tractors)	No	No	No	Yes	Yes
Axle Specifications:	AS 3035	AS 3045	Ca 20.14	Ca 20.18	Ca 20.18
Wheels toe-in	0°				
Maximum steering angle	50° (All)				
List of final drives	6,0:1				
Bevel / gear ratio	Lat Estr = 1,882:1	3,705:1	2,153:1	2,153:1	
.....	Lat Std = 2,158:1				
.....	Central = 3.082:1				

7 - Technical Specifications

8 - Brakes

	425	435	440	445	455
Service	Discs in oil bath, independent action in the rear wheels.				
Drive	Hydraulic				
No. of active discs on each side	04	04	04	04	04
Active disc material	Steel with sintered bronze				
Parking brake	Multi-disc type, in oil bath, mounted on the output shaft for the front traction				
	IMPORTANT: For the parking gear operation with maximum efficiency, the front drive must be engaged. Thus, the brake will operate on the four wheels of the tractor.				

9 - Hydrostatic steering

Hydraulic pumps (gears):	The steering pump is mounted in Tandem with the control pump independent remote control, on the right side of engine - In tractors without remote control, there is just one pump. The oil comes from the transmission.				
Hydrostatic unit	4 ways.				
Oil filtering	As transmission oil is used, the filtering is performed by the respective filter (discardable type). See section 6 "Maintenance".				
Minimum rotation radius (mm):					
Without brake applied					
4x2 - STD	3680	3560	3560	4220	4220
4x4 - STD	4340	4820	4820	4250	4250
With the brake applied					
4x2 - STD	3210	3550	3550	3800	3800
4x4 - STD	3780	3560	3560	3800	3800



10 - Hydraulic lifting system

Type	FERGUSON Category I I				
Operating controls	Position - Depth - Transportation - Reaction and Constant Pumping (A "Constant Pumping" function is used when activating the combined flow, optional resource for the remote control, which consists of transferring the flow of the hydraulic lifting pump to the remote control, increasing its flow).				
Hydraulic cylinder(s)	There is an internal cylinder for all of them, with the option for external auxiliary cylinders. The lifting capacities below, marked with *, indicate the use of external auxiliary cylinders.				
Maximum lifting capacity in kgf, in the pivots	2100	2100 / 2500 *	2100 / 2500 *	2500 / 3200 *	2500 3200
Hydraulic pump	of pistons, ISYP model				
Flow (Liters/min.) / Pressure (kgf/cm ²)	17 or 27** / 210				

* NOTE: Capacity achieved with HD type lifting arms or with external auxiliary cylinders (Optional).

** NOTE: Only when equipped with PTO or IPTO of dual rotation (540 and 1000 rpm), the flow is of 27 liters/min.

7 - Technical Specifications

11 - Remote control

	425	435	440	445	455
Type	Independent				
Number of line / type	1, 2 or 3 / double action, female terminals type - quick connection.				
Maximum flow, without Combined Flow - l/min	42	42	42	42	42
Maximum flow, with Combined Flow on (Optional system)	59 l/min (for tractors with PTO of 540 rpm) and 69 l/min (for tractors with PTO of 540 and 1000 rpm). The combined flow transfers the flow of the hydraulic lifting pump (17 or 27 l/min) to the remote control, increasing its flow). When the Combined Flow is activated, the lifting system becomes inoperative.				
Maximum pressure - kgf/cm ²	150	150	150	150	150
Valve with variable flow (adjustable from 0 to 60% of the total flow)	No	No	No	No	No

12 - PTO (Power Take Off)

Dependent Type (PTO)	It is default for Standard tractors.				
Independent (IPTO)	Optional for Standard tractors and Default for Narrow tractors.				
540 / 1000 rpm Type	Optional, both for Dependent and Independent.				
PTO maximum power - cv @ 2200	57	67	73,0	73,0	85
Engine speed for rated speed of the PTO	This speed depends on the tractor and PTO setting, being available the following options: 1,700 - 1,790 - 1,800 - 1,900 and 2,000 rpm. This information can be found on the speed decal attached on the right side of the operation station.				
Axle rotation direction	Clockwise - rear side view.				
Axle diameter / no. of grooves - all	PTO 540 rpm type = 35/6 - PTO 1000 rpm type = 35/21				

13 - Refill capacity - in liters

Fuel tank(s):					
- MF 4265 to 290 with plate tank, on the engine (version without cabin only):	75,0				
- MF 4265 to 291 with plastic tank on the left of transmission, with and without cabin:	100,0				
engine crankcase - MIN /MAX level.	7,1 / 8,1	8,1 / 9,1	8,1 / 9,1	8,1 / 9,1	9
Cooling system	14,5	14,5	14,5	14,5	14,5
Front axle (4 x 4):	AS 3035	AS 3045	Ca 20.14	Ca 20.18	
Differential	4,7	7,5	5,0	4,5	
Front final drives - each	0,5	0,5	0,7	1,0	
Hydraulic brake	0,3				
Transmission and hydraulic	Varies from 42 to 47 liters according to the tractor model and configuration.				
<i>NOTE: See the table of lubricants recommended in section 6 "Maintenance". Always consider the correct levels through the level gauges! Furthermore, when coupling with implements with remote control, add oil to the transmission as necessary, so that the level is always kept.</i>					
Rear final drives - each	2,0	2,0	2,0	3,0	3,0

14 - Traction Bar

425 435 440 445 455

Bar types available:

- 1st Straight bar (no height adjustment option).
- 2nd Bar with step (2 height adjustment options).
- 3rd HD Bar with step and head (4 height adjustment options).

Side oscillation angle: 22° = for both sides, can work freely to oscillate or hindered by pins.

Length adjustment All bars above allow 2 variations of length adjustment.

15 - Tires

See table in section 4 "Preparation".

16. Cab and air conditioner

- Application Optional, in Standard and Lux versions.
- Condenser Located in front of the water radiator.
- Compressor Belt operated, from the fan pulley.
- Coolant fluid R-134A - 1.7 kg
- Air filtering Paper element located on the left side of the cabin hood.



17 - Tractor dimensions and weights

Tractors without Cabin, Standard

Overall length	425	435	440	445	455
- 4 x 2 - STD	3975	3975	3975	3670	3670
- 4 x 4 - STD	3977	4125	3958	3830	3830
Distance between axles					
- 4 x 2 - STD	2135	2135	2135	2285	2285
- 4 x 4 - STD	2117	4125	2118	2370	2370
Maximum height					
- 4 x 2: STD - on the canopy	2580	2580	2580	2665	2665
- 4 x 4: STD - on the canopy	2580	2580	2580	2665	2665

7 - Technical Specifications

Dimensions - Cabin Tractor MF435

Dimensions in mm

A (distance between axles)	2.270
B (overall length)	4.020
C (height up to the canopy)	2.725
D (height up to the steering wheel)	2.020
E (height up to the exhaust)	2.690
F (front wheel radius)	360
G (front gauge)	1.450
H (overall front width)	1.635
I (rear wheel radius)	690
J (free span)	380
L (rear gauge)	1.580
M (overall rear width)	2.050

Weights:

With ballasting:

- Front axle = 1,409 kg @ 35.2%
- Rear axle = 2,592 kg @ 64.8%
- Overall = 4,001 kg @ 100%

Dimensions - Cabin Tractor MF455

Dimensions in mm

A (distance between axles)	2.480
B (overall length)	4.330
C (height up to the canopy)	2.965
D (height up to the steering wheel) ...	2.110
E (height up to the exhaust)	2.955
F (front wheel radius)	575
G (front gauge)	1.870
H (overall front width)	2.235
I (rear wheel radius)	785
J (free span)	385
L (rear gauge)	1.605
M (overall rear width)	2.100

Weights:

Without ballasting:

- Front axle = 1,641 kg @ 37%
- Rear axle = 2,813 kg @ 63%
- Overall = 4,454 kg @ 100%

With ballasting:

- Front axle = 2,513 kg @ 40.2%
- Rear axle = 3,732 kg @ 59.8%
- Overall = 6,245 kg @ 100%

8 - Accessories

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1 - General items and accessories 3



8 - Accessories

8

1 - Optional items available

- License plate lamp.
- Towing electrical socket.
- Fire extinguisher.
- Radio.
- Clock.
- Rear windshield wiper.
- Roof lamps (4 front - 4 rear - with service lamp).
- Seat with or without armrest, with or without seat belt.
- Rear double wheels.
- Wheel wrench kit for double wheels.
- Lifting arms with quick connector in the lower arms.
- Spindle stabilizers.
- Hydraulic lifting external control.
- Remote control with several configurations.
- IPTO 540/1000 rpm.
- Additional rear weights.
- Support for front weights.
- Front fender.
- Second fuel tank.
- Fuel tank protection.
- Tool kit.
- Greaser.
- Radio installation.
- GPS Receiver.
- Lamp bar.
- Activated charcoal element kit for cabin filter.
- Extra capacity fuel system kit.

2 - Detached items supplied with the tractor

- Tool box.
- Water reservoir.
- Instruction manual kit.



ATTENTION:

The items listed are generic optional items for this series of products; so, there are installation limitations in some models. Consult your Massey Ferguson dealer about the viability and availability of optional items for your tractor.

Operator's Manual
HP | **MF400Xtra**
110-130

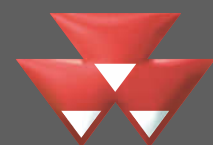
Tractors

Models: MF 460, MF 470 and MF 480

6280531M1 - 02/10



INNOVATION - COMMITMENT - PROXIMITY - VISION - RELIABILITY - LEADERSHIP - SUPPORT - TECHNOLOGY



MASSEY FERGUSON

OPERATOR
INSTRUCTION BOOK
MF 400Xtra

6280531M1

02/10

Tractor models applied:

MF 460, MF 470 and MF 480

Platform versions (Fig. 1) and with cab (Fig. 2)

CONGRATULATION!

You have just acquired a modern, strong, reliable and unique tractor.

The 400Xtra Series tractors are the result of research, improvements and a large experience in industrial and agricultural equipment manufacturing. These tractors were designed to be operated in many different work conditions, showing an excellent performance, low fuel consumption and operational comfort.

Please carefully read this Manual before operating the tractor for the first time and also before performing any maintenance in the equipment. So you will be assuring the best performance and a long working life for your tractor.

At the Technical Delivery, please make sure the Dealer provides you all the necessary information. Besides the Genuine Replacement Parts, appropriate tools and factory trained personnel, only the Authorized Dealer can provide you reliable Technical Services.



Fig. 1



Fig. 2

Operation Manual - MF 400Xtra

Dear Owner

- 1 - Always keep this Manual in perfect conditions and present it to the technician at the Dealer that attended you in order to note all Warranty Maintenance date.
- 2 - Please carefully read Chapter 1 for Safety procedures.
- 3 - The Warranty will only be valid if the tractor's Delivery Certificate is properly registered in AGCO do Brasil Services and Warranty Department.
So, make sure that your Dealer fills out the Delivery Certificate for your tractor.
- 4 - Tractor's Technical Delivery
It will be performed by a professional at your Dealer.
See the booklet attached to this Manual, where general important information of your interest.
 - ✓ Service Instructions.
 - ✓ Delivery Instructions.
 - ✓ Delivery Certificate.
- 5 - Changes in the tractors
Due to its policy of constant improvement for its products, AGCO do Brasil reserves the right to introduce changes and improvements in its products, without incurring in any liability or obligation for previously manufactured products.
In the same way, the content of this Manual is updated until the date of its printing and may be changed without previous notice.
- 6 - Many illustrations in this Manual are shown with covers, protections and components removed for a better comprehension. However, never operate the tractor with these parts removed.
- 7 - Some pictures may contain different details in relation to the ones showed in your tractor, since they have been taken from prototype tractors or tractors configured with accessories not present in your tractor.
- 8 - Massey Ferguson Original Parts
The use of parts other than MF original parts may result in a reduced performance of your your tractor and also affect some other components. AGCO do Brasil will not be liable for any responsibility derived from the usage of non-original parts. In case such non-original parts are used during the Terms of the Warranty, the tractor's Warranty will be voided.
- 9 - Due to the great number of variables in the working conditions, it is not possible for AGCO to contemplate all detailed or definitive instructions on its Publications about the performance or usage methods of its machines, neither AGCO will be responsible for eventual losses or damages arisin from such statements or any misstatement or omissions.
If the tractor is used in abnormal conditions - as working in deep water - consult your Massey Ferguson Dealer for special instructions. Otherwise the Warranty will be voided.
These tractors are designed only for usage in regular agricultural operations (designed usage). Any use other than the above stated will not be AGCO do Brasil responsibility: these are solely the user's responsibility.
- 10 -The accomplishment and the observance, of the usage conditions, maintenance and servicing as stipulated by AGCO do Brasil are the fundamental basis for the "designed usage".
- 11- We do insist that these tractors be operated, maintained and repaired only by personnel familiarized with their respective characteristic and safety rules.
So, we strongly recommend that the Customer contacts the nearest Dealer for any problem or question related to the equipment's maintenance or setup.

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Operation Manual - MF 400Xtra

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1. Safety Instructions



1. Safety Instructions

1 - Introduction

The purpose of this manual is to enable the owner and driver to drive the tractor safely and properly. If the instructions are carefully observed, the tractor will be in operation for many years, following Massey Ferguson's tradition. The configuration and the tractor setup at the Dealer will assure that these operational and service instructions will be correctly understood.

Always contact a Dealer if any part of this Manual is not fully understood. It is essential that these instructions are fully understood and observed.

The daily maintenance must become a routine. Always keep a record of the equipment's service hours.

When requesting new parts, use only MF original parts. MF Dealers network supply original parts and can provide you installation and use instructions. The use of low quality parts can cause severe damages to your equipment.

It is recommended to the customers to purchase service parts only at authorized MF Dealers.

Due to the variation on the operational conditions, it is impossible for the manufactures to make a comprehensive or a definitive statement on its publications related to the performance or ways of use for its equipments, nor be responsible for any damage or losses resulting from such statements, or inaccuracy or omission.

To avoid the possibility of voiding the warranty, consult your MF Dealer about special instructions, if the tractor is to be operated in special conditions, which can be harmful for the equipment (operation in deep waters or swamps, for example). These tractors were designed for use in agricultural applications only (proper use). Any other use will be consider as irregular.

AGCO will not be liable for personal injuries or damages to the equipment resulting from misuse. It will be totally the user's responsibility the consequences for all misuse of the equipment.

The unrestricted commitment and adherence to the operation, services and maintenance requirements, as per specified by AGCO, are considered essential factors for the proper use.

These tractors must be operated and serviced only by qualified personnel, familiarized with the tractor's characteristics and also with the safety rules and regulations (accident prevention).

It is recommended that the customers contact an MF Dealer in case of any after sale problem and for any setup which may be required.

1

1. Safety Instructions

1

2 - General recommendations

Why is safety so important?

- 1 - Accidents can lead to disabling personal injuries or death.
- 2 - Accidents usually impose onerous costs.
- 3 - Accidents can be avoided.

This Manual describes safety procedures and recommendations related to the tractor, however it does not specify the details about the care with the accessory coupled and/or actuated by the tractor. Therefore, see the Manual of the accessory used.

This Section of the Manual aims to point out some basic safety situations related to your tractor, as well as some suggestions about how to avoid risk and accident situations.

Therefore, the user must be provided with all necessary means and orientation available. For each accessory and working situation, there is always a number of care that must be taken, which makes impossible to list all of them in this Manual.

It is impossible for AGCO do Brasil to make a direct control over all use situations, maintenance or service to which the tractor is submitted to. Therefore, it is the user's responsibility to observe the proper practices aiming his/her safety and the tractor integrity, and also the safety of other people or equipment at the same working area.

3 - The Tractor

The tractor is a source of mechanic and hydraulic power.

- The tractor alone has little practical value. Only when used along with an implement or other accessory, it becomes a work unit.
- This Manual has been compiled to cover the safety practices when the tractor is operating under normal conditions.
- This manual does not address the operation instructions relevant to all implements and accessories known that can be installed at the tractor delivery or any other date.
- It is essential that the operator read and understand the manuals of the relevant implements and accessories.

4 - Symbols and Safety Terms

The following symbol means: ATTENTION! BE AWARE! YOU MAY BE IN DANGER!



The symbol for safety alert identifies important safety messages in machines, safety boards, manuals, etc. When you see the symbol, be aware for potential injuries or death. Follow the instructions in the safety message.

Whenever you see one of the words and symbols below, used in this Operator's Manual and decals, you must be pay careful attention to the instructions, once they are directly connected to your personal safety.



WARNING:

Indicates an immediate hazardous situation which, if not avoided, will result in DEATH OR SERIOUS INJURY.



CAUTION!

Indicates a potential immediate hazardous situation which, if not avoided, will result in DEATH OR SERIOUS INJURY.



CAUTION:

Indicates a potential hazardous situation which, if not avoided, may result in minor or moderate injury.

The following words and instructions are not directly related to personal safety, but they are not used by this manual bringing you additional tips about operation and service of this equipment.



IMPORTANT:

they identify special instructions or procedure which, if not carefully observed, can result in damages or destruction to the equipment, the operational process or even to objects nearby.



NOTE:

It indicates additional information about some subject or procedure that will make the operation or repair more convenient or efficient.

1. Safety Instructions

1

5 - Notes to the operator

It is your responsibility to read and understand the Safety Section in this Manual, before using the equipment. You must follow the safety instructions which will guide you step by step during your working journey.

Remember that you are an essential part to make the operation of the machine safe. Good safety practices not only protect you, but also the people near you. Carefully read the safety instructions herein and include them in your safety program.

Remember that this Safety Section was specially designed for this equipment. Follow all usual and habitual safety precautions and, above of all else, REMEMBER THAT YOUR SAFETY DEPENDS ONLY OF YOU. YOU CAN PREVENT ACCIDENTS.

6 - Follow a safety program

6.1 - For a proper operation

For a proper operation of the tractor, it must be operated by qualified and authorized staff. In order to be qualified, you must understand the instructions delivered in this Manual, receive proper training and know the safety standards and rules related to your work. For example, some traffic rules determine that people underage 16 years old are not allow to operate agricultural machines. In other locations, the law determines that only 18-year-old people are allowed. The tractors are part of this category. It is your responsibility to know such rules and obey them.

These regulations include, but they are not limited to, the following instructions for a safe operation:



CAUTION!

The operator must not drink alcoholic drinks or substances that may affect his consciousness or coordination. If the operator is taking prescription drugs or over the counter drugs, he must see a doctor in order to check if his ability to operate the machine may be impaired by such drug.



CAUTION:

If any implement or kit used has a manual, identify if there is other important safety information.

Observe the following instructions:

- DO NOT allow children or people non qualified for the job operate the tractor. Keep people away from the work area.
- Always use the safety belt.
- Whenever possible, avoid operating the tractor near ditches, barriers or holes. Reduce the speed in curves, when going up or down hills or on rough, slippery or muddy surfaces.
- Avoid very steep hills.
- Pay careful attention to where you are going to, mainly at the end of aisles, roads or when operating near trees.
- The instructor's seat must be used for short periods only.
- DO NOT allow children on the instructor's seat.
- DO NOT give ride to anyone on the machine or implement, unless there is a proper instructor's seat.
- The implement must only be coupled to the steering rod or to the coupling points recommended and never above the central line of the rear shaft.
- Operate the tractor slowly and carefully - with no maneuvers, sudden starts or sudden breaking. When the tractor is stopped, engage the parking break. Lower the implement and take the starting key from the ignition.
- DO NOT change or remove any part from the equipment and DO NOT use accessories that are not suitable for the tractor.

1. Safety Instructions

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7 - Protective Structure Against Overturn (PSAO)

The tractor has been mounted with a PSAO (Fig. 3) or cab and a safety belt. PSAO is effective to reduce potential harms or injuries during the overturn if the safety belt is being used correctly. Do not operate the tractor with the PSAO removed.

Before using the tractor, make sure that the PSAO or cab are not damaged, and that they are safely fixed to the tractor and, if the portable type is installed, make sure it is in the extended position and safely locked.

If for any reason, the PSAO has been folded, it must return to the extended position as soon as the conditions allow.

Do not mount additional components to the PSAO or cab, such as chains, ropes or cables with the purpose of pulling something, because it may cause displacement or damages to the PSAO.

Always use the safety belt, adjusting it properly (Fig. 4), except when operating the PSAO retracted. Check the safety belt for damages regularly. Damaged safety belt must be replaced.

The PSAO or cab must be inspected for damages regularly. Any damaged component must be replaced before the tractor is operated. If the PSAO is damaged during an overturn or damaged by the impact from any object that provokes deformation must be replaced. Do not try to repair a damaged PSAO.

NEVER weld or puncture the PSAO or structure of the cab, for any reason, because it may lead to failures and reduction on the protection for the structure.

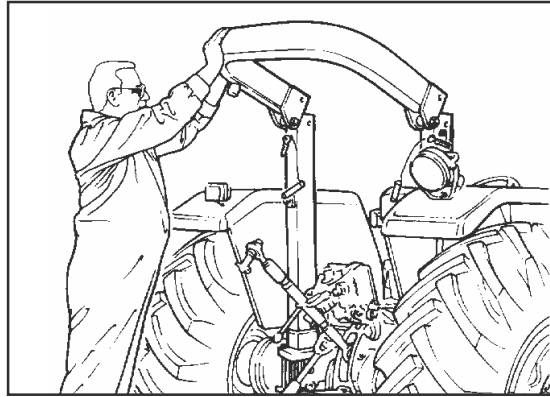


Fig. 3

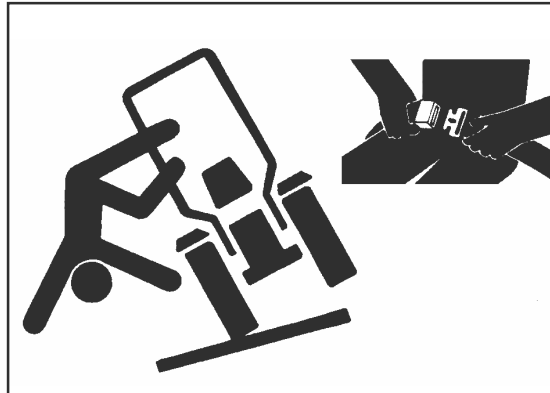


Fig. 4

8 - Preparing for a safe operation

8.1 - Know your equipment

Know your tractor, know how to operate every equipment of your machine and the implements and accessories it uses. Know all functions of all controls, gauges, instruments and commands. Know the rated load capacity, the speed range, the breaking capacity and the steering characteristics of the machine, besides the turning radius and operations clearances. Remember that rain, snow, gravel, soft soil, etc. may affect the tractor operation.

Under bad conditions of operation, drive slower and be more careful. Engage the front drive, if equipped. Study the safety decals for DANGER, WARNING, PRECAUTION or CAUTION located on the tractor, in addition to the information decal.

READ THIS MANUAL BEFORE STARTING THE ENGINE. STUDY IT BEFORE STARTING WORKING (Fig. 5). IF YOU DO NOT UNDERSTAND ANY INFORMATION IN THIS MANUAL, ASK SOMEBODY TO EXPLAIN TO YOU.

This Manual covers all generic safety practices for agricultural tractors. It must always be kept in the tractor. If additional copies of this Manual are required, contact your MF Dealer.

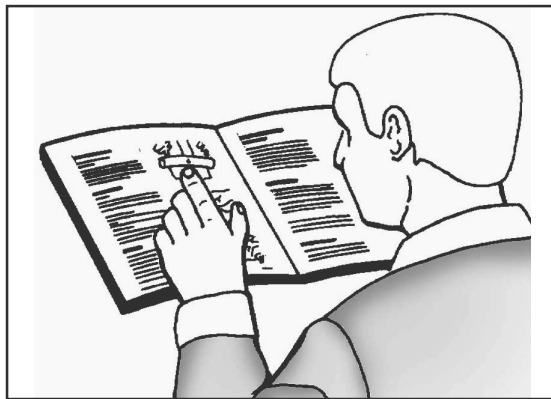


Fig. 5

8.2 - Protect yourself

Use equipments and protective clothing appropriate for your work. 6). Do not take risks.

You will need:

- A protective hard hat.
- Protective goggles or masks.
- Ear protection.
- Respirator or filter mask.
- Special clothing for cold weather.
- Reflective clothing.
- Heavy gloves (neoprene for chemicals or leather for heavy duty).
- Boots.

DO NOT wear loose clothing, jewel, or any other item that might get caught in the controls or other parts in the tractor. Also, tie your hair if it is long.

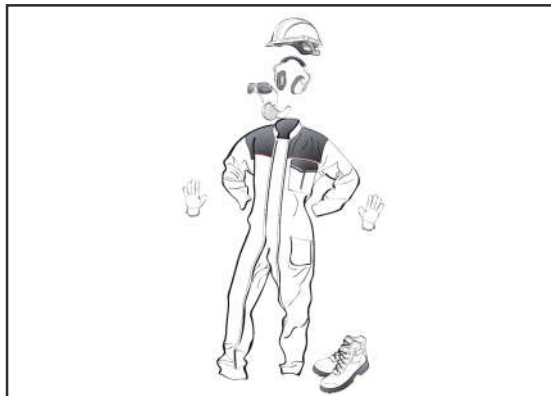


Fig. 6

1. Safety Instructions

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Note the position of fire extinguishers and first aid kits (Fig. 7) and be aware of where to find assistance in case of an emergency. Know your equipment well and know how to use it.

8.3 - Use the safety and protection devices available

Keep all the protection devices in the position and properly attached. Make sure that all protections and covers are properly installed, as specified, and in good conditions.

In order to keep you and other people safe, the tractor must be equipped with:

- Safety belt.
- PTO protection.

According to the type of operation, the tractor may also need:

- Rearview mirror.
- Fire extinguisher.
- Safety triangle, protections, reverse gear alarm, lighting and additional safety decals.

It is very important to know how to use the tractor safety devices. Make sure they are in the position and in good conditions. DO NOT remove or disconnect any safety device.

8.4 - Check the equipment

Before starting your working day, reserve some time to check your equipment and make sure all systems are in good operational conditions.

- DO NOT smoke while refilling the tractor. Keep away from flames (Fig. 8).
- Stop the engine and wait it cools before refilling the tractor.
- Check for damaged, cracked, loose or missing parts. Keep all parts in good condition. Make sure all guards, protections and covers are in place.
- Check the safety belt for damages regularly. If the belt is damaged, it must be replaced.
- Make sure the implements and accessories are correctly installed and that the tractor PTO speed and implement are correct.
- Check the condition and calibration of tires (absence of cuts and bulges). Replace damaged or worn tires. Check if the parking break and pedal are working correctly. Adjust them if necessary.

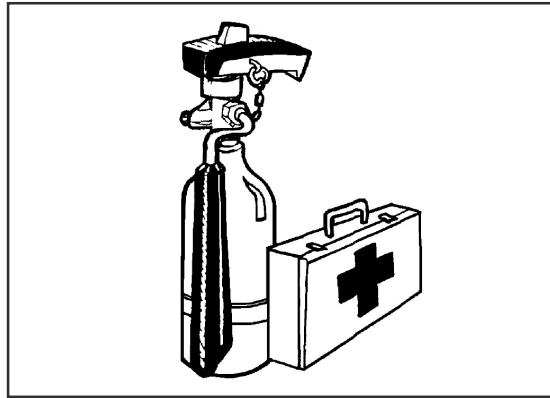


Fig. 7

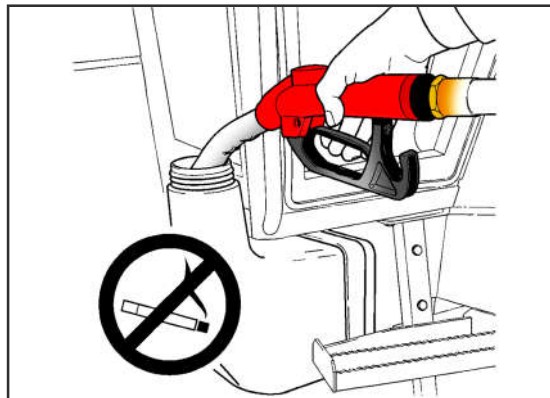


Fig. 8

- Make sure the safety devices of the PTO shaft are locked.
- Make sure that the PTO protection and the shaft protections are in place and working properly.
- Check the hydraulic system of the implement and tractor. Repair or replace damaged or missing parts.

1. Safety Instructions



CAUTION!

Pressurized hydraulic fluid or diesel leak can penetrate in your skin and cause severe personal injuries, blindness or even death. Pressurized fluid leaks may not be visible. Use a carton board or wood to find the leaks. **DO NOT** place your hands directly to the equipment. Always wear protective goggles. If the fluid penetrates in your skin, it must be surgically removed within a few hours by a physician familiarized with such procedure (Fig. 9).

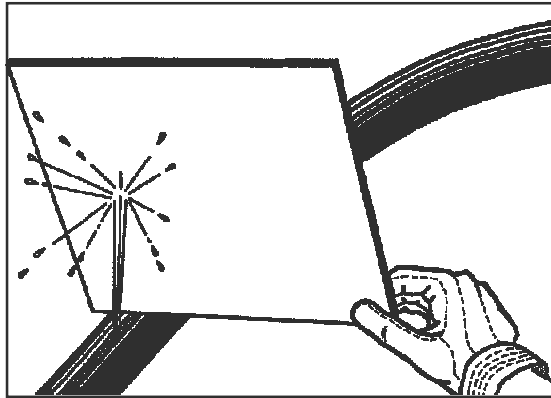


Fig.9

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Before applying pressure to the fuel or the hydraulic system, make sure that all connections are well fit and all tubing, pipes and hoses are in good conditions. Before disconnecting the hydraulic or fuel lines, relieve all pressure. Make sure that all hydraulic lines are correctly installed and without bents.



CAUTION!

The cooling systems accumulate pressure as the engine warms. Before removing the radiator cap, stop the engine and wait the system cool down.

8.5. Tractor cleaning

- Keep the working surfaces and engine compartments clean.
- Before cleaning the machine, always lower the implements to the ground level, set the transmission to neutral, engage the parking brake, stop the engine and remove the starting key from the ignition.
- Clean the steps, the pedals and operator platform. Remove the grease or oil. Clean all dust or mud off. In the winter, remove the snow or ice. Remember: slippery surfaces are dangerous.
- Remove and store the tools, chains or hooks.

8.6 - Protect the environment

It is illegal to pollute sewer, brooks or soil. The waste must be sent to authorized places, away from urban or preservation areas. Furthermore, the dirty oil removed from the tractor must be packed in proper containers before being disposed. If you have any question, see the local authorities.

1. Safety Instructions

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9. Tractor maintenance

- DO NOT make any repair or maintenance service with the engine running or still hot, or with the tractor in operation (Fig. 10).
- Before making adjustments or repair the electric system, disconnect the battery cables: first, disconnect the negative (-) cable.
- To prevent fire or explosions keep flames away from the battery or from the cold start devices. To prevent sparks, that can cause explosions, use jumper cables according to the instructions in this manual.
- When performing repairs or adjustments, it is recommended to contact a Massey Ferguson Dealer so the work can be performed by trained personnel.
- The implement and/or tractor must be placed on wood blocks or proper stands, NEVER on a hydraulic jack.
- Check all nuts and bolts for tightening periodically, mainly the hub wheel nuts and the wheel ring nuts. Fasten them according to the specified torque.



Fig. 10

10 - Start

10.1 - Alert before the start

Before starting the engine, walk around the tractor and the implement coupled. Make sure there is nobody under, on or near the machines. Tell people near the tractor you will start it soon. Do not start the tractor while there are people around the tractor, implements or towed equipment.

Make sure all pedestrians, mainly children, are at a reasonable distance before starting the engine.

10.2 - How to get on and get off the machine safely

Always adopt the “three-point contact” with the machine and keep a front position when getting on it. The three-point contact means both hands and one foot or one hand and two feet in contact with the machine, all the time, when getting on or off it.

Clean your shoes and wash and dry your hands before getting on the machine. Use the handrail. Hold the handrails and always use the stairs or steps when getting on or off the machine.

DO NOT use the control levers as a handrail and never step on the pedal controls when getting on or off the

machine.

DO NOT try to get on or off when the tractor is running. DO NOT jump off the tractor, unless it is an emergency.

10.3 - Safe start



IMPORTANT:

Before starting the engine, make sure there is enough ventilation. DO NOT start the engine in closed environments. The smoke from the engine may cause suffocation.

Always start the engine from the operator seat with all transmission levers in neutral and the PTO lever in neutral.

Make sure all the brake pedals are always locked by the locking device, except when in maneuvers in the field which requires the independent use of brakes. Make sure the brakes are properly regulated, so that both brakes are engaged at the same time.

1. Safety Instructions

Adjust the seat, put on the safety belt, engage the parking brake and set all controls to neutral before starting.



WARNING!

Start the engine with the starting key and always sitting on the operator seat. NEVER try to start the engine by a direct start.

The machine will start engaged if the safety switch circuit is turned. This may cause severe injuries or death if there is someone near the tractor (Fig. 11).



Fig. 11

1

10.4 - Follow the start procedures recommended

Follow the start procedures recommended in the Operation Section in this Manual. Such procedures include normal start, cold start and the usage of boost fluids.

10.5 - Test the controls

After starting the machine, check all meters and lights again. Make sure everything is working properly. If the tractor does not respond correctly when every control is activated, DO NOT use the machine until the problem is solved. Make sure engine start solenoid cover is always in place.

10.6 - Start fluid



CAUTION!

It is very important that you read and follow all the instructions on the ether can before installing the ether base cold start aid in the tractor.

DO NOT use aerosol packages of start fluids in tractors equipped with the reheating system connected to the electrical system. Ether combined with the preheating system may cause explosions, damaging the engine, provoking injury to whoever is handling it or both. Handle the start fluid correctly. The start fluid must only be used when the ether start aid is used as original default equipment or when installed as accessory by the Dealer.

For tractors equipped with glow plugs or preheating system, these pieces of equipment must be removed before installing an ether start device.



Fig. 12

1. Safety Instructions

1

If start fluid aerosol cans or ether start aid is used, the preheating system must be disconnected. Remove the cable from the preheating system unit that is found in the intake manifold. Use isolating tape on the cable end to avoid short circuit.

11 - Safe operation



CAUTION!

An unbalanced tractor can overturn and cause serious accidents.

Make sure the counterweights in the front frame, the wheel weights and wheel ballasts are used according to the manufacturer's recommendations. DO NOT add extra weight to make up for an overloaded tractor. It is recommended to reduce the load. Keep all your limbs inside the operator compartment while operating the tractor.

11.1 - Do the correct movements

Make sure the tractor is ready for the work to be done. Know its rated load capacities and never exceed the numbers. Make sure that the equipment or implement used DO NOT exceed the tractor load capacity. Make sure the tractor PTO and the implement PTO are compatible.

Remember that the tractors normally operate on rough, unpaved or bumpy surfaces. The operating conditions can reduce the weight quantity that you can carry or tow.

11.2 - Safety practices

- Operate the controls carefully. Do not turn the steering or make sudden movements to activate other controls.
- DO NOT get on or off the tractor when it is in operation. Hold the steering wheel with both hands and firmly.
- Make sure there is enough room in all directions, for the tractor and the implement as well.
- DO NOT play with the tractor or equipment. They must be used for the purpose indicated only.

- DO NOT try to activate the controls if you are not on the operator's seat.
- Before getting off the tractor, always disengage the PTO, lower the accessories and the implements to the ground, set the tractor to neutral, engage the parking brake, stop the engine and remove the key from the ignition.

Be alert! If anything breaks down, get loose or fail in the equipment, stop working, inspect the machine and make the necessary repairs before starting the operation again.

Be careful with pedestrians

Be attentive to what is going on around you. DO NOT allow not trained or not qualified operate the tractor. They can cause serious accidents.



WARNING!

DO NOT give ride on the machine or implement (Fig. 13).

DO NOT allow that other people ride the implement or other equipment, such as wagons, except for some cropping equipment which are specially designed for passengers during the cropping operations (not during transportation). There must be some space in such equipment, so such type of transportation can be done safely. DO NOT allow children on the tractor.



Fig. 13

1. Safety Instructions

1

- Make sure you can control both the machine speed and the steering before starting it. Move the machine slowly until everything is working properly. After the start, check the steering angle again - to the right and to the left. Make sure you can move the machine both to the right and to the left and can control de the machine completely. If the differential is blocked, DO NOT operate or maneuver the tractor in high speed until the differential is unlocked.
- DO NOT lift objects that do not fit in the bumper. Purchase the correct equipment.
- DO NOT lift loads over other people.
- Keep people away from the working area. DO NOT allow other people to stay or pass under an implement lifted (Fig. 14).
- If a charger is used, avoid sudden stops, starts or maneuvers, or sudden changes of direction. Keep the loads close to the ground during the transportation.
- NEVER stop (or allow other to stop) in front of, under or behind loaded equipment or or equipment being loaded. DO NOT drive the tractor towards someone standing in front of a fixed object.
- Keep people away from the yokes, couplings, steering rod, lift arms, PTO driving parts, cylinders, belts, pulleys and other moving parts. Keep all protections and guards in their places.

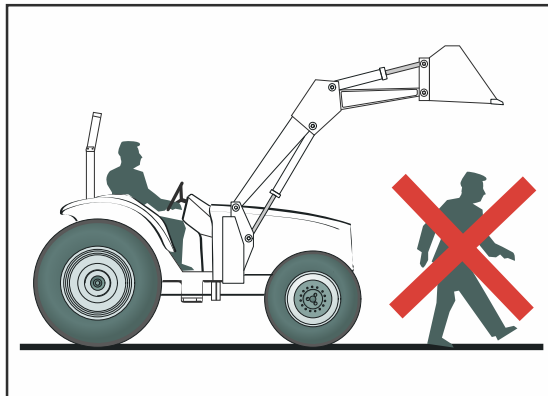


Fig. 14



CAUTION!

DO NOT stand nor allow anyone to stand between the tractor and the implement, unless the engine is off, the parking brake is applied, the transmission is in Neutral and all accessories are lowered to the ground level.

11.3 - Overturn risk

If a tractor equipped with PSAO overturns, hold the steering wheel firmly and DO NOT try to get off the seat until the tractor stops completely and DO NOT leave the operator's seat until the tractor stops completely (Fig. 15). If the cab doors are blocked, leave the tractor through the rear window or roof hatchway.

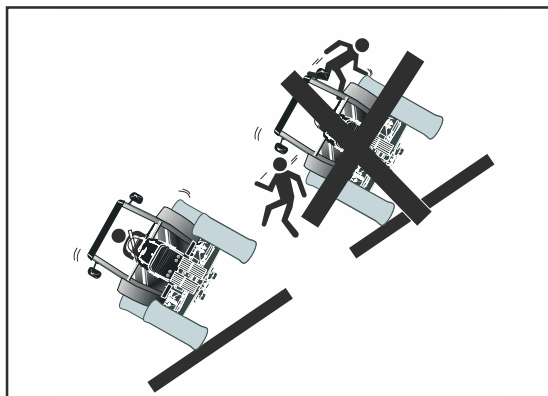


Fig. 15

1. Safety Instructions

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Do not operate near ditches or sand banks. The distance to the obstacle must be equal or bigger than the total height of the subject in question (Fig. 16).

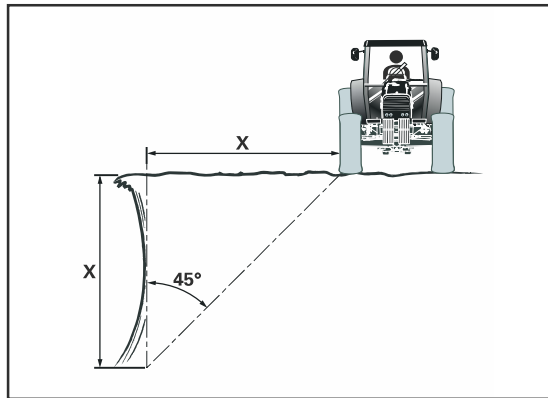


Fig. 16

11.4 - To avoid rear overturn



CAUTION!

Coupling in the rear shaft or any other point above the steering rod can cause rear overturns.

- ✓ DO NOT apply traction to any implement or accessory through the arm of the 3rd point, or any other point on the rear shaft of above. Use steering rods approved by Massey Ferguson only and use a pin with the correct size to lock the steering rod in place.
- ✓ Couplings in high positions can cause rear overturn which can result in serious accidents or death. Couple loads to the steering rod only.
- ✓ Use steering rods with 3-point engagement only when fasteners are used to keep it in the lowered position.
- ✓ Use front counterweights to improve the tractor stability when carrying heavy loads or to counterbalance the weight of a heavy implement at the rear part of the tractor.
- ✓ Start moving the tractor slowly and increase the speed gradually. DO NOT engage the reverse gear or release the clutch fast. If the tractor is coupled to a heavy load or an stationary object, using the clutch improperly can cause overturn.
- ✓ If the tractor front starts rising, reduce the speed and, if necessary, release the clutch.
- ✓ If the tractor gets stuck in mud or snow, DO NOT try to move forward because the rear wheels can skid and the tractor can overturn. Lift any coupled implement and try to MOVE IN REVERSE GEAR. If not possible, tow the tractor using another vehicle.

- ✓ Tractors with or without implements coupled to the rear must be maneuvered and go down slope ground forward.
- ✓ Tractors with front loaders must be maneuvered and go up slope ground forward. Keep the loader as close to the ground as possible.
- ✓ Always keep the tractor engaged when going down hills. DO NOT go down hill with the clutch disengaged and the transmission in neutral.

11.5 - To avoid lateral overturn

- ✓ Adjust the wheel gauge to a wider setting more suitable for the job being done.
- ✓ Lock the brake pedals with the locking device before using the transportation speeds.
- ✓ Reduce the speed to adjust it to the operating conditions. If the tractor is equipped with a front loader, load the bumper and the load to lowest level possible.
- ✓ Use lower speeds when making turns.
- ✓ Do not move loads by traction which are too heavy for the tractor capacity, because the load can fall off the tractor and go down the hill or the tractor may skid and hit the load being towed.

1. Safety Instructions

1

- ✓ Do brake suddenly. Apply the brake smoothly and gradually.
- ✓ On downhill, use the accelerator to reduce the tractor speed and use the same speed range to go up hills. Engage the gear before going down the hill.
- ✓ Engage the four-wheel drive (if equipped). This will cause braking the four wheels.



CAUTION!

DO NOT disengage the clutch or try to shift gears after beginning to go down the hill.

- ✓ It is less probable that the tractor overturns if you just go up or down sloping terrains by avoiding crossing them.
- ✓ Whenever possible avoid sloping terrains. If not possible, avoid holes when going down sloping terrains. Avoid stubs, stones, obstacles and rough areas when going up sloping terrains. Keep the tractor away from the border line when working near ditches and ravines. Avoid ditches, embankments that may fall or come down.
- ✓ When it is necessary to drive on sloping terrains, avoid turning on the top of the ground. Reduce the speed and make a turn with a large open circle. Drive on a straight line on sloping terrains and never cross them. Keep the heavier end of the tractor turned to the top of the ground when going up and going down sloping terrains.
- ✓ When crossing sloping terrains with implement mounted laterally, keep the implement on the slope side. Do not lift the implements. Keep them as close to the ground as possible when going up, going down or crossing sloping terrains.
- ✓ When towing load in transportation speed or in the field, lock the steering rod in the central position and use the safety chain.
- ✓ NEVER use the tractor to gather animals.

11.6 - Generic risks during the operation

- Make sure the PTO protection is installed when the PTO shaft is not in use.
- Before engaging, disengaging, cleaning or adjusting implements activated by the PTO, disengage it, stop the engine, remove the ignition key and make sure the PTO shaft is stopped.
- Make sure all PTO protections are in place and observe all the safety plates (Fig. 17).
- Make sure there is nobody near the machine before starting the PTO. For PTO stationary operations, always put the transmission in neutral, engage the parking brake and put shim on the tractor's and implement's wheels.
- When operating moving equipment by the PTO, DO NOT leave the tractor's seat until the PTO is disengaged, the transmission is in neutral, the parking brake applied and the engine is stopped and the key off the ignition.



Fig. 17

1. Safety Instructions

1

- DO NOT use adaptors, reducers or extensions with the PTO, once those components extended the coupler and universal joint in addition to the protection provided by the PTO.
- The arm of the 3rd point and the leveling arms must not be extended above the point where the threads begin to be displayed.



WARNING!

DO NOT try to disconnect the hydraulic connections or adjust the implement with the engine running or with the PTO activated. Failure to observe those instructions may cause serious injury or death.

- When using chemical substances, follow the manufacturer's instructions for use, storage and the appropriate places for disposal. Also follow the manufacturer's instructions for the applying the substance.
- When operating with little visibility or in the dark, use the tractor's lights for operation in the field and reduce the islocation speed (DO NOT use the service lights when driving on roads, because those lights may be illegal in some locations - except when used as reversing light, because they make the drivers get mixed up.)
- Operate the tractor with wheels in highest gauge setting possible, according to the job being done. To adjust the wheel gauge, consult the Maintenance and Adjustment section.
- Reduce the speed when operating on rough or slippery grounds or when leafage obstruct the view.
- DO NOT make cornering at high speed.

11.7 - Points about ergonomic behavior

- Before starting the operation, adjust the seat for your comfort. Make the adjustment considering the operations to be performed.
- The tractor seat has been evaluated ergonomically to allow the maximum comfort during the maneuvers, but you need to adjust the seat considering your height and position, in relation to the operator.
- Changing positions during the operation in relation to the steering wheel will decrease fatigue. Try to hold the steering wheel with both hands while driving.
- That hand must operate the manual accelerator, like any other lever, with palm facing the tractor center, with the thumb point upwards.
- Try to have a break every 2 hours and make some stretching exercises, as shown below.

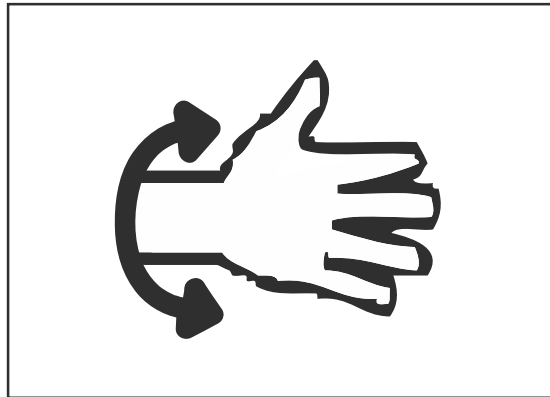


Fig. 18



Fig. 19

12 - Additional implements and equipment



ATTENTION!

The front loader (bumper or forks) must be equipped with a proper restriction device to avoid the load (parcels, fence poles, wiring, etc.) from falling off the arms over the operator's compartment, smashing the driver when the loader is lifted. Misattached object may fall and hurt pedestrians as well.

- Implements mounted on the three point tow and lateral implements make an arch much bigger when the equipment towed is maneuvered. Keep enough space for the maneuvers. Use equipment approved by Massey Ferguson only.
- When using accessories or implement with the tractor, read the Manual of the respective accessory or implement attentively and follow the safety instructions. Use equipment approved by Massey Ferguson only.
- DO NOT overload the accessory or equipment towed. Use proper counterweights to assure the tractor's stability. Couple loads to the steering rod only.
- A safety chain will help you control the equipment towed if they disengage accidentally from the steering rod during the transportation. With the help of proper adaptors, couple the chain to the tractor steering rod support or another place specific for this purpose. Just leave a small play in the safety chain for maneuvers. Use a safety chain with power equal to or higher than the gross weight of the machine towed.
- Tow the implement through the steering rod. The towing by coupling to other places can make the tractor overturn (Fig. 18).

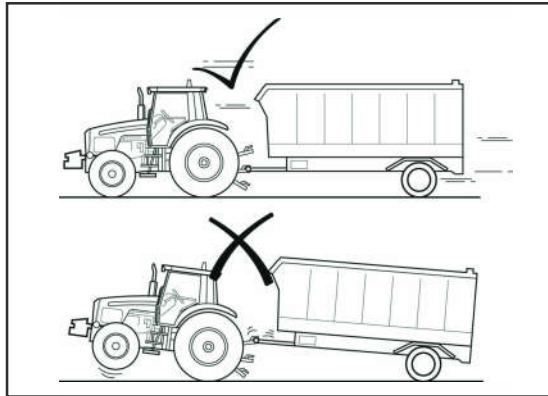


Fig. 20

1

1. Safety Instructions

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12.1 - Towing equipment

Towing equipment has no brakes, do not operate:

- With speeds above 32 km/h (20 mile/h); or
- With speeds below the recommended ones by the manufacturers; or
- When the tow is completely loaded, with weight above 1.5 t (3300 lb) and/or 1.5 times the tow weight.

Towing equipment has brakes, do not operate:

- With speeds above 50 km/h (51.50 km/h); or
- With speeds below the recommended ones by the manufacturers; or
- When the tow is completely loaded, with weight above 4.5 times the towing equipment weight.
- With speeds above 40 km/h (25 mile/h) when the tow is completely loaded, with weight above 3 times the towing equipment weight.



NOTE:

The tractor requires the installation of braking equipment suitable for the tow used.

The stopping distance increases with the speed and weight of the loads towed and on hill and sloping terrains.

Loads towed with or without brakes, which are too heavy for the tractor or towed too quickly, may cause the loss of control over the equipment. Consider the equipment total weight and its load.

13 - Transportation on roads

BEFORE operating the tractor on public roads, some precautions must be taken:

- Know and observe the traffic rules relevant to your machine.
- Lock the brake pedals with the locking device.
- Lift all implement to the transportation position and lock them in this position.
- Set all the implements in the lowest transportation setting.
- Turn off the tractor PTO and disengage the differential lock.
- Make sure all the hazard warning lamps are in place and working.
- Clean all the front and rear traffic lamp reflectors and make sure they are working properly.
- Make sure both the tractor and the implements are equipped with safety triangles for slow vehicles and other marking materials to improve the visibility on the road, if the law requires (Fig. 19).

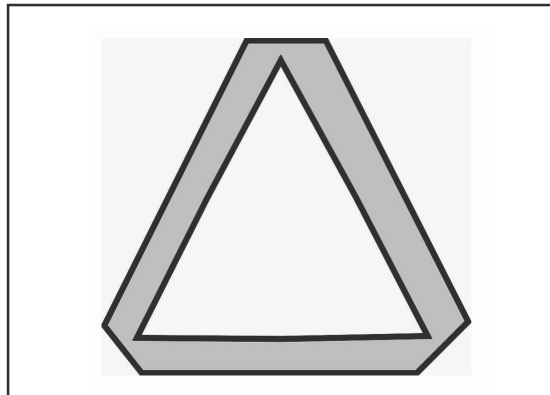


Fig. 21

1. Safety Instructions

1

13.1 - Road rules

When operating the tractor on public roads, some precautions must be taken:



ATTENTION!

NEVER allow people to ride on the equipment towed or mounted.

- Know the tractor route well.
- Use the hazard flasher when driving on roads, day and night, except when forbidden by law.
- Take care when towing loads in transportation speeds, mainly if the equipment towed has NO brakes.
- Observe all local or federal rules regarding the tractor speed.
- Take care when transporting equipment on slippery roads or covered with snow or ice.
- Wait till the vehicle traffic stops to enter the road.
- Take care with intersections or crossroads because they impair the visibility. Reduce the speed till you have a good road visibility.
- DO NOT try to surpass other vehicles in intersections or crossroads.
- Reduce the speed in curves.
- Make the maneuvers and open curves slowly.
- Use signal when you intend to reduce the speed, stop or turn.
- Shift the gear before going up or down sloping terrains.
- Keep the tractor engaged. DO NOT go down hill with the clutch disengaged and the transmission in neutral.
- Do not disturb the traffic of vehicles.
- Drive in the correct lane, keep as close as possible to the curb.
- If the traffic gets heavier behind you, pull over and let the vehicles pass.
- Drive defensively. You must be able to foresee what the other drivers are going to do.
- When towing load, start braking beforehand and reduce the speed gradually.
- Be careful with obstacles such as trees, etc.
- Make sure the load is not covering the hazard lamps or any other lamp.

14 - Safety after operation

Stop the tractor completely, engage the parking brake, turn off the PTO and put all

gear shift levers in neutral, lower the equipment to the ground, turn off the engine and remove the key from the ignition BEFORE leaving the operator seat.



WARNING!

PowerShuttle Control, if installed. Before leaving the seat, it is mandatory to set the PowerShuttle control to NEUTRAL.

Remove the starting key from the ignition if nobody stays in the tractor.

1. Safety Instructions

1

15 - Fuel

15.1 - Storage, handling and cleaning

The fuel purity and cleanness are vital for the good operation of the engine and durability of the injection system.. So, in order to assure the fuel complies with the requirements, follow the recommendations below:

- 1 - Use reservoirs equipped with 2 taps, one on each end. Prefer plastic reservoirs. In case of metallic reservoir, use stainless steel reservoirs or with suitable internal coating, not made of zinc, because it contaminates the fuel, which affects the life of the injection system and engine.
- 2 - Never use galvanized pans, tanks, clocks or tubes, because the coating reacts with diesel producing residues.
- 3 - The drum or reservoir in use must be protected from sun, rain and dust. It should be supported by stands and in the horizontal position, with a light inclination, so that the draining side is around 10 cm higher in relation to the other side. Thus, the water and impurities will be deposited in the bottom, from where they will be drained by the tap of the opposite end.
- 4 - The reservoirs should have a breather, protected from water penetration, located on the higher end.
- 5 - Ideally, it should be used two drums with capacity to store fuel for a week each. After the filling, the oil must rest for 2 or 3 days for depositing the impurities on the bottom. Thus, while one rests, the other is being used.
If bigger tanks are used, there must be a upper cover (1) for cleaning, with a diameter of at least 40 mm.
- 6 - The tank filling point (2) must have easy access and minimum diameter of 65 mm. If there is a tube, it must finish 15 cm from the bottom and equipped with a filter. The cover must be equal to that used in tanks in vehicles.
- 7 - A breather with a minimum diameter of 80 mm, with a protective filter (5) must be installed on the upper part of the tank.
- 8 - The vehicles filling output (3) must be installed in the highest side of the drum at 80 mm from the bottom.

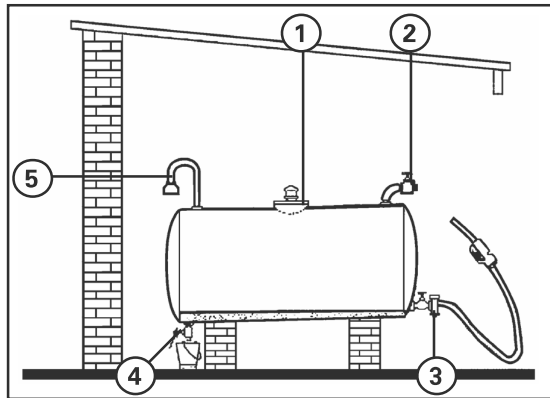


Fig. 22

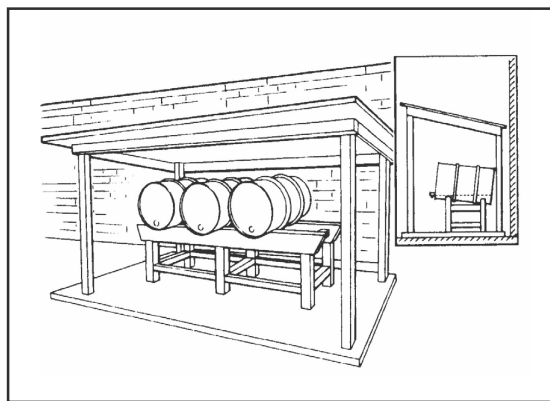



Fig. 23


- 9 - The height must be enough for filling be done by gravity, and the cover for the filling nozzle must allow access for cleaning.
- 10 - The fuel deposited on the lower part if full of impurities and must be drained once a week through the drain (4) installed on the bottom, before refilling the tank. Do not discard this fuel, it can be used for other purposes, such as wash parts, tools, etc.
- 11 - A graded rod can be adapted to the upper cleaning cover (1) to measure the fuel level.
- 12 - The tank must be emptied and clean once a year.
- 13 - To fill the vehicle or transfer diesel to another container, always use a funnel with a thin screen (mesh 80). Always use funnels, containers or pump completely clean. Never use shop cloth or shop rags, because the lint can adhere to the parts and get in contact with the fuel.

1. Safety Instructions

1


- 14 - Fill the tractor always at the end of each work day. This will avoid that, during the night, the moisture inside the tank(s) condensate and turn into water, contaminating the fuel, which when reaching the pump and the nozzles would cause irreparable damages.
- 15 - Before handling fuel, clean the area around the filling cover. If the original cover is lost, replace by another original one. Tight it firmly.
- 16 - The drums must be stored under a protective shelter in order to prevent from entering, and they must have a light inclination to the water to flow out the upper border. The fuel drums must not be stored for long periods.
- 17 - Drums stored without protective shelter must have the plug firmly threaded to prevent water from entering.
- 18 - Under no circumstance add other types of fuel to diesel oil. This increases the risk of fire or explosion. In closed containers, as a fuel tank, this mixture is more explosive than pure gasoline. Mixing diesel with alcohol is not recommended, because it impairs the proper lubrication of fuel injection system.
- 19 - Build the fuel reservoir away from pits, houses or stables. Keep a clean space around the reservoir so that, in case of fire, materials that can help propagate fire are reached.
- 20 - Do not smoke or install electric equipment that produce sparks near the reservoir.
Keep the filling hose under control.
- 21 - Never remove the cover or refill with the engine running or hot.
- 22 - Place visible warnings with the following words:

 **WARNING!**
FLAMMABLE - DO NOT SMOKE

 **IMPORTANT:**
Observe the maintenance procedures to keep the equipment in good conditions.

15.2 - Specifications

Limiting requirements for diesel oil:

-  **NOTE:**
*Diesel oil is not classified as fuel No. 1 (No. 1-D) or No. 2 (No. 2-D).
Fuel Grade No. 1 is recommended for jobs in which the temperature is below 32 °F. Fuel grade No. 2 is recommended for jobs in which the temperature is 32 °F, or above. See the chart for fuel requirements.*
- ✓ To achieve the special conditions of operation, changes of requirements for individual limitations can be agreed between the buyer, the seller and the manufacturer.
 - ✓ For operation in hot weather, the pour point is 10 °F (5.6 °C) below the room temperature where the tractor is going to operate, except when facilities are provided to warm the fuel.
 - ✓ When the pour point specified is lower than 0 °F (-17.8 °C), the viscosity must be 1.8 cSt (32.0 SUS) and at least 90 % shall be pointed out.
 - ✓ In other countries, except USA, other sulphur limits can be applied.
 - ✓ Where the cetane number by method D 613 is not available, method ASTM D 976 - Calculated Cetane Index for Distilled Fuels 2 - can be used as approximation. When there is a discrepancy, Method D 613 is preferred.
 - ✓ Engine that run in low atmospheric temperatures, as well as in high altitudes, may require fuels with high rates of cetane.
 - ✓ Fuels with low index of sulphur may require an additional lubrication agent to protect the injection pump. You must consult the fuel vendor to assure the fuel purchase has the suitable quantity of lubricant.

1. Safety Instructions

1

16 - Parts and lubricants storage

Always keep a stock of replacement parts, such as filters, belts, fuses, lamps, counter-pins, seals and lubricants (Fig. 22). The products must be stored away from acid and corrosive products, in a clean warehouse, moisture and dust free, well ventilated and organized.

Further more, make sure there are no insects which may enter into the filters and destroy them. The filters inner parts are a good environment for certain insects. All the items must remain inside their packages until they are ready for use.

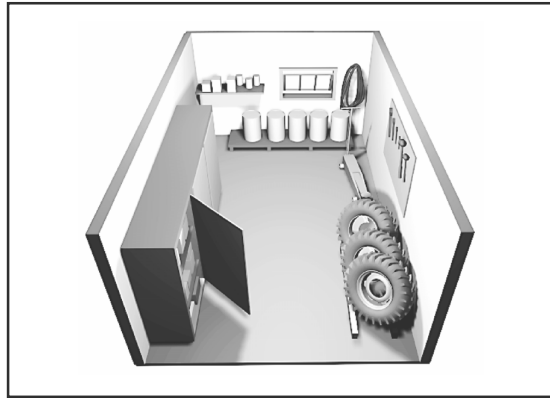


Fig. 24

17 - Quality, Environmental, Safety and Occupational Health Policy

AGCO América do Sul is committed with the development, manufacturing and trading products designed to attend the needs of mechanization in the world's agrobusiness, considering and implementing the most appropriate alternatives, aiming the workers' Security and Health and the Environment preservation.

17.1 - Main guidelines

- 1 - To obtain the profitability necessary for the development of the company's activities and the payment of dividends to stockholders.
- 2 - To obtain customers satisfaction by attending their requirements.
- 3 - Search for employee satisfaction aiming to improve the company's performance.
- 4 - Develop a suppliers and dealers network to attend the company's needs for production and service.
- 5 - Respect the Environment, by developing new activities, products and services, aiming the reduction of natural resources consumption and adopting pollution prevention practices.
- 6 - Prevent the occurrence of personal injuries and occupational diseases, aiming to keep a healthy working environment.
- 7 - Attend applicable legal requirement related to environmental aspects and harms to Safety and Occupational Health and other requirements subscribed by the Company.
- 8 - Assume commitments and be pro-active with internal and external community, developing and strengthening social responsibility actions and keeping permanent communication channels.
- 9 - To manage the Company, searching for a continuous improvement of the efficiency on its Quality System Management, Environment, Safety and Health for the employee.

How to reach the goals?

Betting on the Company partnership with the environment is to assure its existence in the future. Believing in the forementioned statement, AGCO has stipulated its Environmental Policy and the implementation for its consolidation, by the implementation of an Environmental Management system and a Cleaner Production Program.

1. Safety Instructions

1

17.2 - ISO 14000

ISO 14000 (Fig. 23) is a set of environmental management standards defined by the International Standards Organization (ISO). ISO 14000 consists of 6 sets of standards, each dealing with a specific environmental issue. Standard ISO 14001 applies to AGCO, because it deals with environmental management systems.



Fig. 25

17.3 - Environmental Management System

Environmental Management System - EMS (Fig. 24) is a set of procedures for managing a company so as to obtain the best relationship with the environment. This system implementation aims to completely analyze the company's activities, products and services related to their influence on the environment and assume a continuous commitment with the environmental quality.

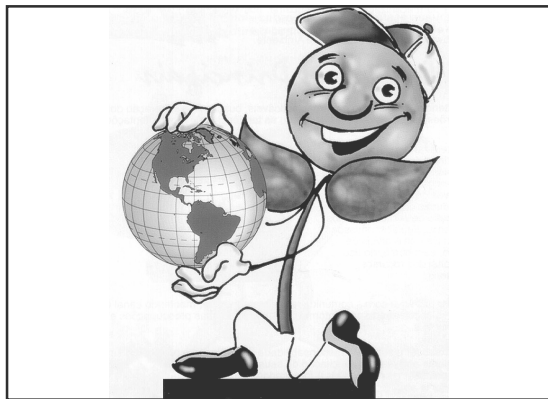


Fig. 26

17.4 - Environmental Issues

Greenhouse effect

This is the increasing of the planet temperature due to the accumulation of carbonic gas (CO_2) and methane gas (CH_4) in the atmosphere. The excess of carbonic gas is generated by industrial process, fossil combustible consumption and forests burning.

"The increased heating in the planet can melt down the polar cap and cause floods".

Reduction in the ozone layer

The Ozone (O_3) acts as a solar filter on the highest layers in the atmosphere, protecting us from the action of hazard rays. Some gases, such as Chlorofluorocarbon (CFC), used in refrigeration industry, destroy the ozone, causing a "hole" on the ozone layer. "As a result, it is estimated that 100,000 people around the world suffer skin cancer each year."

Population explosion

It has been estimated that by the year 2020 we can have more 8 billion people as related to the present population. The majority of these people will live in unsafe conditions, without basic sanitation, education or medical assistance. "Population growth, together with adverse conditions, is creating an unsustainable situation for the planet."

1. Safety Instructions

1

Sustainable development

It is a new type of development, which searches a compatible attending of the human being social and economic needs with the need of preserving the environment and natural resources, in a way to assure the live sustainability in earth.

It is believed that sustainable development is the only way of dealing with poverty, waste, environmental degradation and social problems.

17.5 - Recommendations for owners and users of MF tractors

In face of the ecologic issues previously stated, we have gathered bellow some suggestions, aiming to get your consciousness about these issues that involve the use and maintained of your tractor throughout its life cycle.

- Try to adopt good agricultural practices, which causes minimum impact to the environment;
- Use your tractor with the maximum efficiency possible, correctly adjusting the implements, using proper implements and operating in proper working conditions (gears, engine revolutions, speed..), as exposed in this Manual;
- Take the maximum advantage from your tractor during the longest time possible. It can be achieved by the proper preventive maintenance, as described in Section 5 of this Manual;
- Do *Integrated Plague Management*, which consists in a series of procedures and cropping monitoring, applying agricultural defensives only when necessary and on the correct amount;
- Do not permit fertilizing, seed and defensive wastes, etc; Use the product only on the indicated amount;
- Avoid burnings, adopting a proper culture practice, like, for instance, "straw planting" or Direct Planting.
- Dispose fluids and parts replaced as stated by Law.

Take a look in some examples:

Metals

Metals recycling offers a lot of advantages. Each metric ton of steel recycled represents a saving of 1,140 kg of iron ore, 454 kg of coal, and 18 kg of lime.

Oils and fluids

The use of lubricants in the equipment represents a thermal-oxidative degradation and contaminants accumulation, which makes the changes necessary.

Never discard oils or fluids directly on the environment. Collect them and take to the gas service station where you bought these products. The oils can be refined or, in last case, incinerated in industrial facilities regulated by Law.

Batteries

Left on the wilderness, the batteries cause dramatic effects. So, take your used batteries to the recycling companies or return them to the manufacturer, as they have as obligation to give the batteries the destination regulated by Law.

Tires

The energy generation and rebuilding were the fist way of recycling these items. With improvements in technology, new options arose, such as mixing with asphalt.

Despite of the great number of tire rebuilding at the present, which extends the tires life cycle in 40%, the larger portion of wear tires are sent to landfills, thrown in roads or river edges, or even in the backyards of houses, attracting insects, carriers of disease.

Plastics

The petroleum is the raw material to produce plastic. The plastic, when recycled, spends only 10% of the energy necessary to produce the same amount by the conventional process. Like the glass, the plastic is not biodegradable. Therefore, and due to its growing usage, the recycling of plastic is essential.

Glasses

Glass scraps has several applications, such as: asphalt composition, foam and fiber glass production, novelty jewelry and reflexive inks.

Carton

One ton of recycled carton avoids the cut of 12 trees.

1. Safety Instructions



17.6 - CONAMA Resolution

CONAMA - the Brazilian National Environment Council - in resolution 257, dated June 30, 1999, defines rules and responsibilities related to the disposal and management of used batteries. This Resolution also states that all establishments that distribute or resale these products must be aware of this Resolution, and must be provided with information and advertisement capable of providing guidelines for the final users about their responsibilities in returning used batteries through the establishments that sell and/or provide technical assistance.



DEAR CUSTOMER:

Every consumer or end user is obliged to return used batteries to a point of sale. Do not throw them in the rubbish.



NOTE:

Points of sale are obliged to accept the return of used batteries, to store them adequately, and to return them to the factory for recycling.

17.7 - Risks of the contact with acid solution and with Lead

The acid solution and the lead in the battery, if discarded in the environment, can contaminate the soil, the underground and the waters.

Drinking contaminated water can cause hypertension, anemia, depression, weakness, leg pains and sleepiness.

The contact of acid solution with eyes, can cause chemical conjunctivitis, and with skin, contact dermatitis.

If accidental contact with the eyes or skin occurs, wash the area with running water and call a doctor.

Basic composition: Lead, diluted sulphuric acid and plastic.






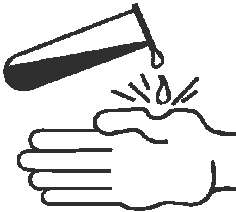
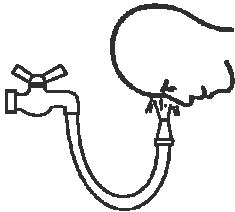
 Lead - Pb	 CAUTION!	 Recyclable	
 PROTECT YOUR EYES: Explosive gases can cause blindness or personal injuries.	 AVOID: Sparks, open flames and smoking. They can cause explosions.	 CORROSIVE: Sulphuric acid Can cause blindness and severe burns. Avoid the contact with cloths too.	 CONTACT WITH EYES OR SKIN: Wash immediately with tap water. IF SWALLOWED: drink a lot of water and seek urgent medical assistance.
KEEP AWAY FROM CHILDREN'S REACH.			
MANDATORY RECYCLING. RETURN YOUR USED BATTERY TO THE RESELLER WHEN REPLACING IT.			

Fig. 27

1. Safety Instructions

1

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2 - Identification and safety decals

Index

1 - Your tractor identification	3
1.1. - Tractor serial number	3
1.2. - Monoblock serial number	3
1.3. - Front axle serial number	3
1.4. - Transmission series	3
1.5. - Injection pump serial number	4
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2 - Description of decals used in your product	5
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2

2 - Identification and safety decals

2

2 - Identification and safety decals

1 - Your tractor identification

The main mechanical assemblies in your tractor are identified by a plate with the Serial N°, which is fixed during the tractor manufacturing. Fill the spaces below with the corresponding serial numbers. Whenever you request replacement parts or technical information from your dealer, please inform these numbers.

1.1. - Tractor serial number

Fig. 28 - Cab tractor

N°: [_____]

Stamped on a plate attached on the cabin rear side (1).

Fig. 29 - Header tractor

N°: [_____]

Located behind the clutch and brake pedals (1).

1.2. - Monoblock serial number

N°: [_____]

Fig. 28 - Cab tractor

N°: [_____]

Stamped on a plate attached on the cabin rear side (1).

Fig. 29 - Header tractor

N°: [_____]

Located behind the clutch and brake pedals (1).

1.3. - Front axle serial number

N°: [_____]

Located in the axle right side (1)(Fig.30).

1.4 - Transmission series

N°: [_____]

Fixed on the gearbox right side (1)(Fig.31).

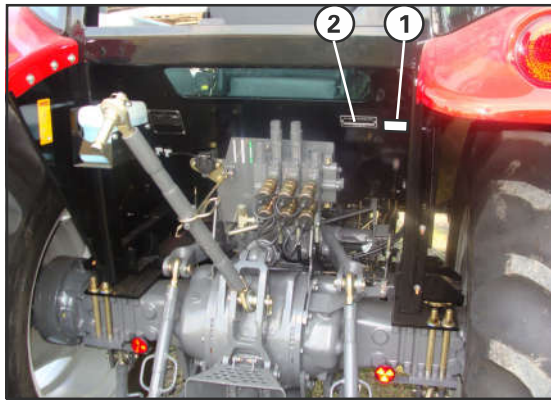


Fig. 28

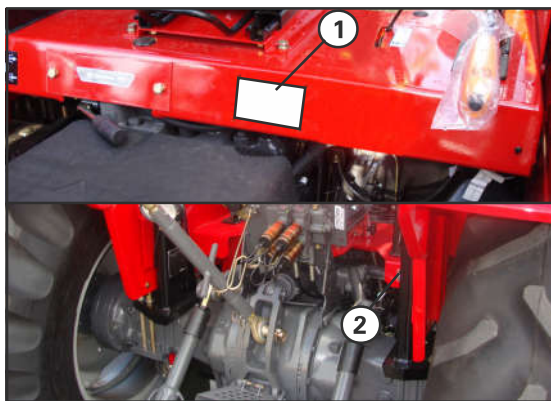


Fig. 29

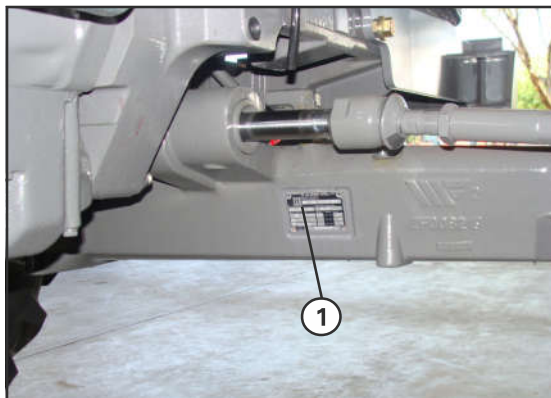


Fig. 30

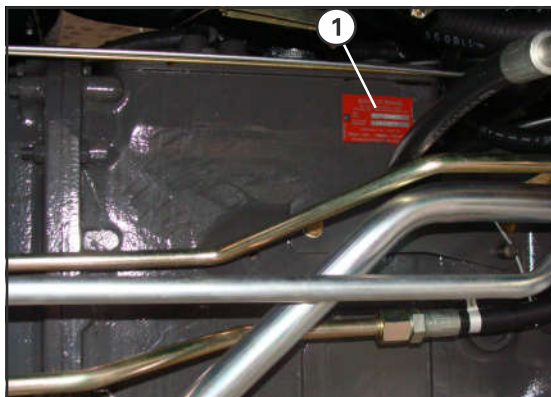


Fig. 31

2

2 - Identification and safety decals

1.5 - Injection pump serial number

N°: [_____]

2

Located in the plate attached on the pump body (Fig.32).

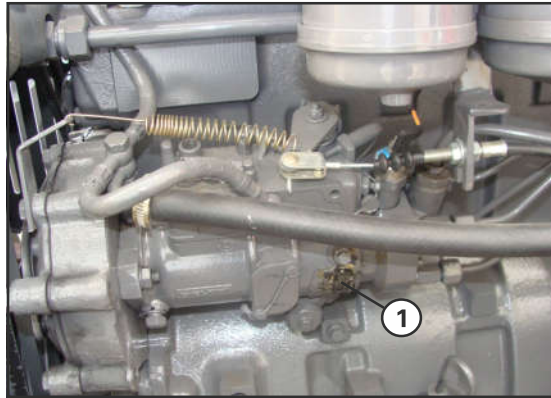


Fig. 32

1.6. - Engine serial number

N°: [_____]

Stamped on the engine block, next to the starter motor (Fig.33).

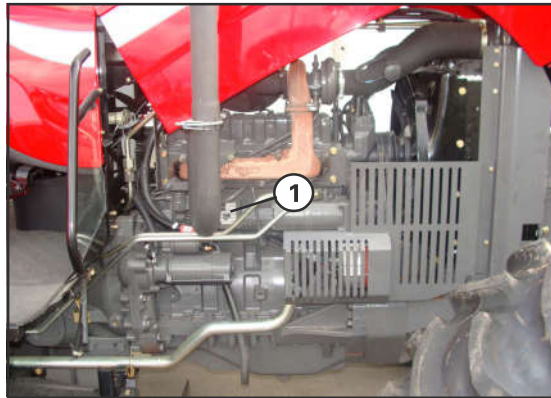


Fig. 33

Your nearest Massey Ferguson Dealer:

Phone: _____

Fax: _____

e-mail: _____

Technical delivery date: _____

End of the warranty: _____

2 - Identification and safety decals

2 - Description of decals used in your product

ATTENTION!:

Do not remove, cover or damage the warning decals in the tractor.

Replace all damaged, missed or illegible decals.

Your Dealer can supply you the decals illustrated below

Located in the fender right side.

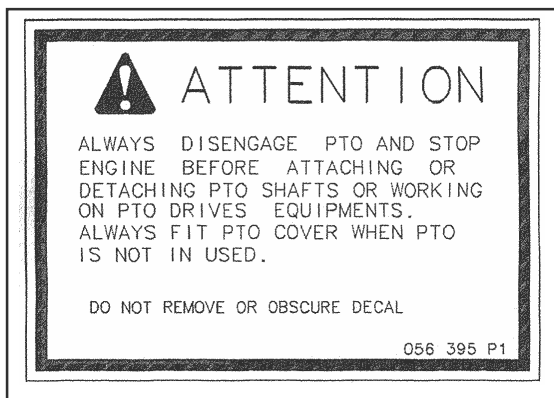


Fig. 34

Located in the cabin's pillar, on the left side

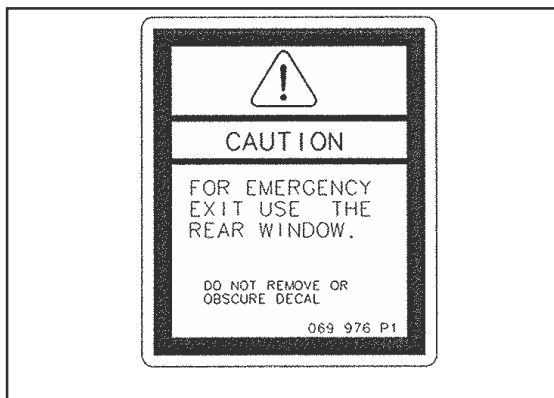
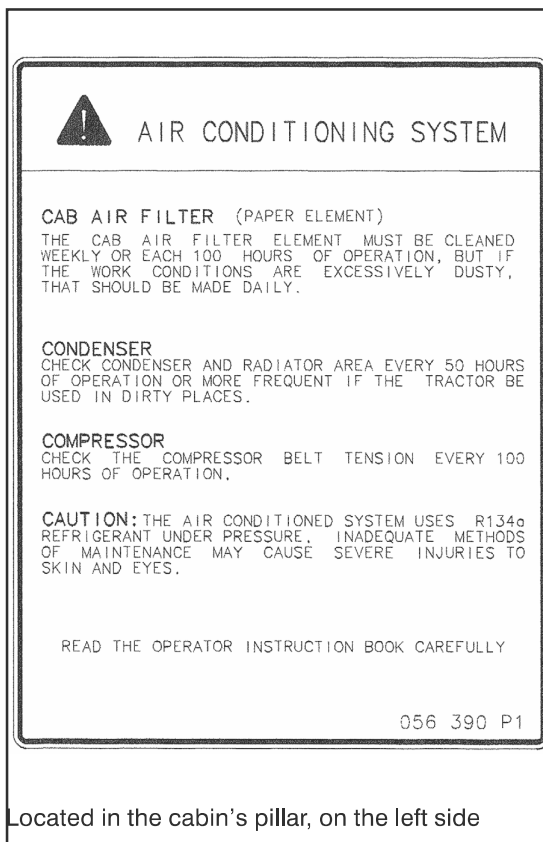
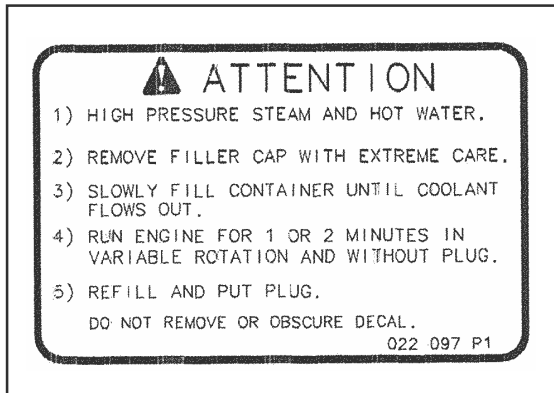


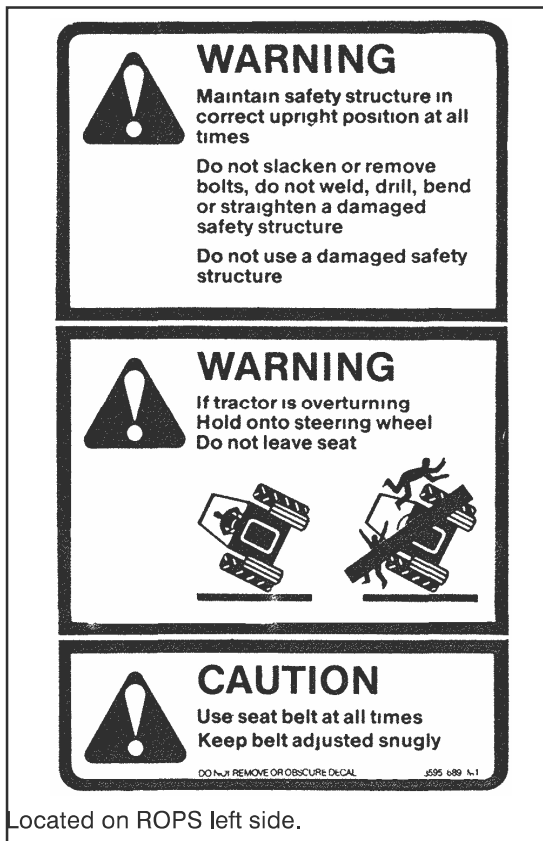
Fig. 36

Located on the hood.



Located in the cabin's pillar, on the left side

Fig. 35



Located on ROPS left side.

Fig. 38

2

2 - Identification and safety decals

Located on the operator's seat - left side.



Fig. 39

This decal warns about the importance of applying the parking brakes when parking the tractor. Otherwise, it may cause the tractor to move involuntarily.

Located on the operator's seat - left side.



Fig. 40

Located in the cabin's rear window.

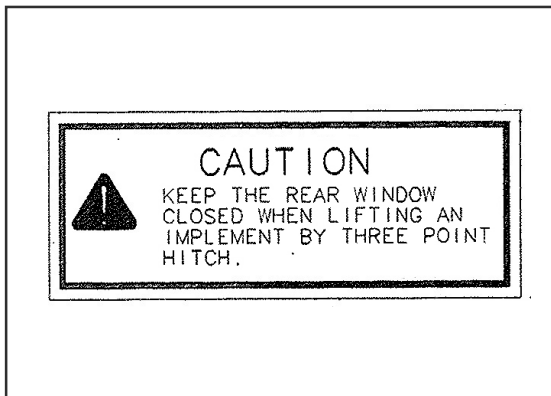


Fig. 41

Located on ROPS left side.

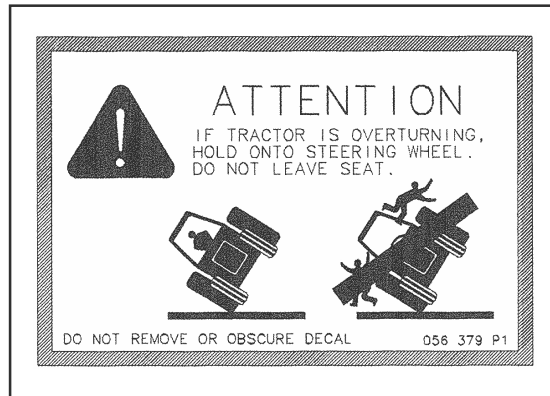


Fig. 42

Located on the traction bar, on the tractor rear side.

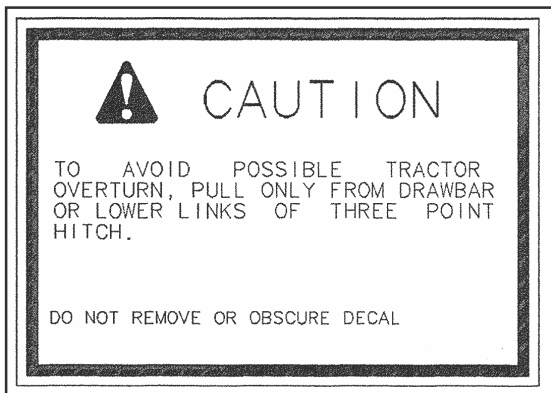


Fig. 43

Located on the battery, in the tractor's right side.

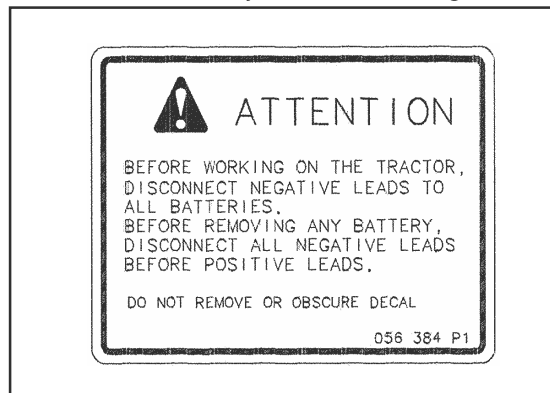


Fig. 44

2 - Identification and safety decals

You will find the decals as shown below. Know their meanings:

- 1 - **Warning!** In case of rolling over, grab the steering wheel and don't jump out the tractor. You certainly must be wearing the seat belt.
- 2 - Caution! Read the manual for the instructions about operation and safety of the tractor.
- 3 - Do not use jumpers or direct start on the starter motor.
- 4 - Disconnect the negative cable of the battery before performing any services on the electrical system.
- 5 - Keep away from moving parts, such as the PTO. Keep all protections and guards in their places and in good conditions.
- 6 - When maneuvering the tractor in order to couple implements, do not allow anyone to stand between the tractor and the equipment. Your assistant must remain at the tractor's side.
- 7 - keep away from hot parts.
- 8 - Keep your hands away from moving parts, such as belts and pulleys, when the tractor is operational. Keep all protections and guards in their places.
- 9 - Keep your hands away from the fan area, while the engine is operating. Keep all protections and guards properly installed.
- 10- Protect your body, specially your face, from hot water and steam from the radiator. Be very careful when removing the cap. First, remove it in 2 steps, in order to release the inner pressure.

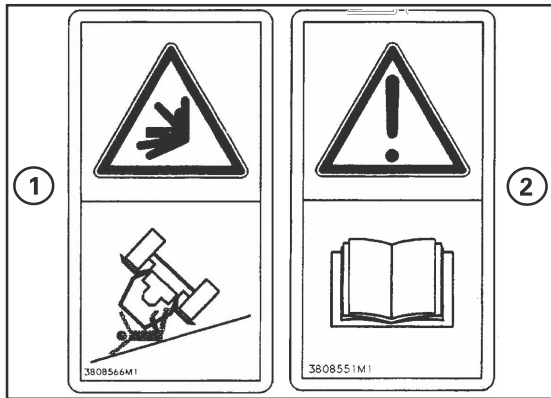


Fig. 45

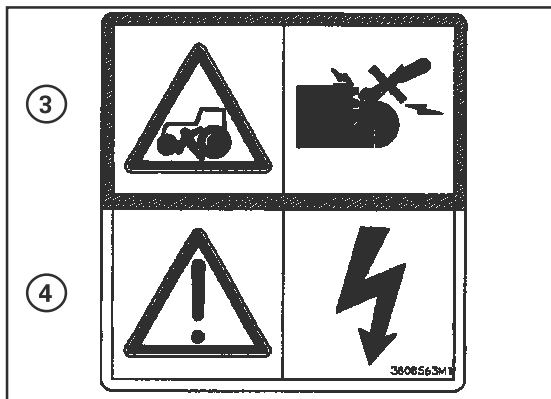


Fig. 46



Fig. 47



Fig. 48

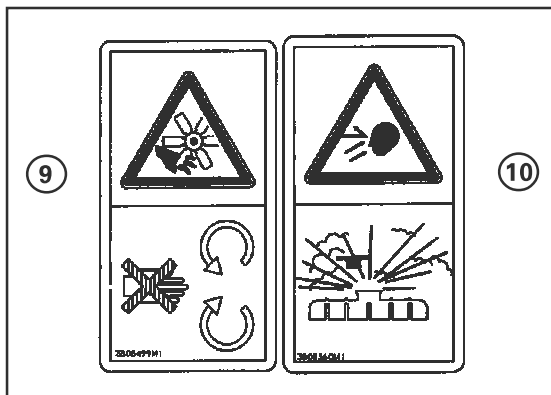


Fig. 49

2

2 - Identification and safety decals

3. Important recommendations

The usage of Personal Protection Equipment (PPE) and also the observance of the equipment limits can prevent accidents.

2

1 - Maximum operational speed

It is recommended not to drive the tractor over 25 mph (40 km/h).

2 - Noise level

Machine with cab: 85 to 86 dBA

Machine with header: 92 dBA

3 - Vibration specifications

These specifications are not available.



Fig. 50

3 - Combination meter and commands

Contents

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3 - Combination meter and command

3

3 - Combination meter and commands

1 - General identification

1.1 - Identification - Cab

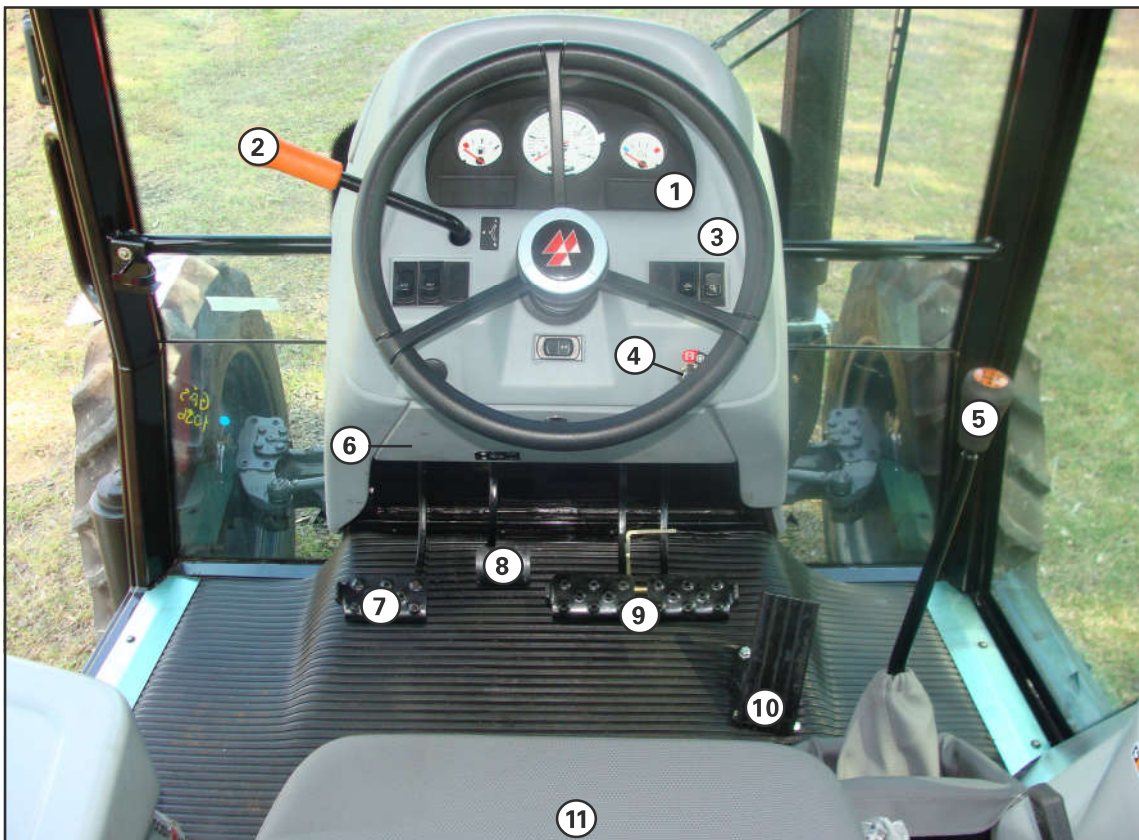


Fig. 52

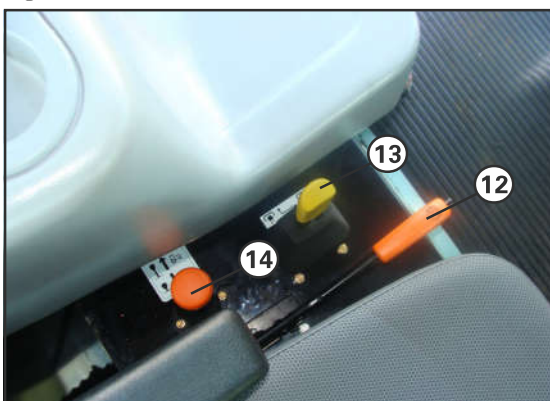


Fig. 53

- 1 - Instrument panel
- 2 - Not applied
- 3 - Electrical controls
- 4 - Ignition key
- 5 - Main gear lever
- 6 - Fuse box
- 7 - Clutch pedal
- 8 - Differential blocking pedal
- 9 - Brake pedals
- 10 - Accelerator pedal
- 11 - Operator's seat and seat belt

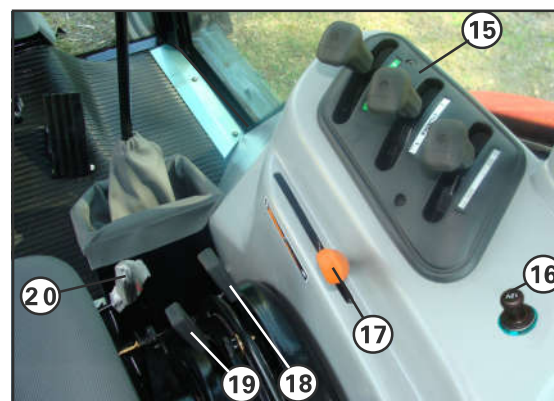


Fig. 54

- 12 - Parking brake lever
- 13 - PTO/IPTO driving lever
- 14 - Front traction driving lever
- 15 - Remote control lever(s) (if equipped)
- 16 - Electric outlet - 12V
- 17 - Manual accelerator
- 18 - Traction control lever / Hydraulic system depth (external)
- 19 - Hydraulic system "Position" control lever (internal)
- 20 - Combined flow selector lever

3 - Combination meter and command

1.2.- Identification - Header

3



Fig. 55

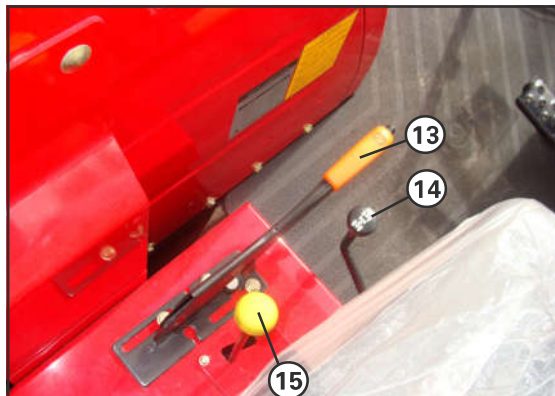


Fig. 56

- 1 - Instrument panel
- 2 - Clutch 2nd stage stopper
- 3 - Clutch pedal
- 4 - Brake pedals
- 5 - Accelerator pedal
- 6 - Main gear lever
- 7 - Speed selector lever (Hare or Tortoise and HorL)
- 8 - Differential blocking pedal
- 9 - Combined flow selector lever
- 10 - Operator's seat and seat belt
- 11 - Fuse box
- 12 - Not applied

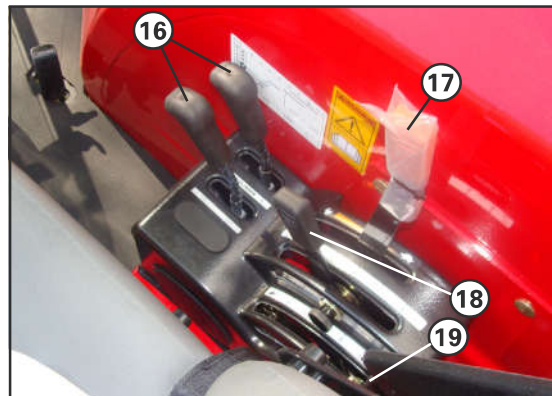


Fig. 57

- 13 - Parking brake lever
- 14 - Front traction driving lever
- 15 - PTO/IPTO driving lever
- 16 - Remote control lever(s) (if equipped)
- 17 - Manual accelerator
- 18 - Traction control lever / Hydraulic system depth (external)
- 19 - Hydraulic system "Position" control lever (internal)

3 - Combination meter and commands

2 - Combination meter and commands description

2.1 - Steering wheel

The tractor is equipped with a hydraulic steering system which provides smooth operation and weight reduction on the steering wheel during the operation. The hydraulic pump delivers oil for the hydrostatic unit which, when operated, supplies oil for the the steering cylinder, and thus turning the wheels.



IMPORTANT:

Do not keep the steering wheel on its lock position. Slightly move it to the opposite side in order to prevent the continuous operation of the relief valve, what would cause the system to overheat.

2.2 - Clutch pedal

When the pedal (1) is depressed, the clutch turns off the power from the engine to the transmission.



IMPORTANT:

Never leave your foot "resting" on the clutch pedal during the operation. This leads to a premature wearing for the bearing and clutch discs.

2.3. Starter motor neutral switch

Located on the transmission, it prevents the engine from being cranked while the gears and groups levers (12x4) are not in Neutral position,



CAUTION!

Under any circumstance the starter motor neutral switch must be neglected, as the tractor may perform unexpected movements.

If the neutral switch fails, replace it for a new one.



Fig. 58

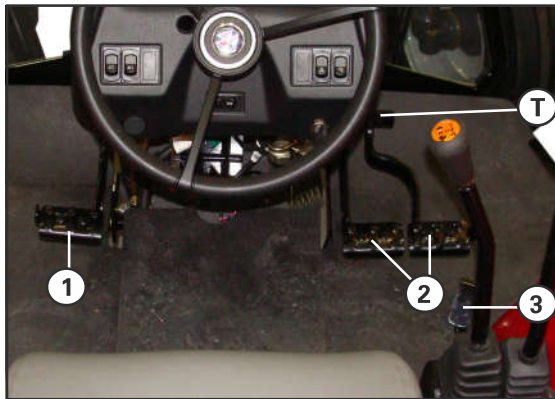


Fig. 59

3

3 - Combination meter and command

2.4 - Brake pedals

The brake (2) has independent action for the rear wheels. It is possible to use the brakes as a help to make tight turns, by applying only the pedal for the desired direction. However, this assistance must only be used when required by the situation.

The excessive use of brakes will reduce the discs working cycle.

3



CAUTION!

When driving in roads, keep tractor brake pedals locked together through the union lock (T). This will assure both wheels will brake at the same time when required.

2.5 - Accelerator pedal

The depressing of the accelerator pedal (3) replaces the setup from the manual accelerator, when the engine speed increases. When the accelerator pedal is released, the engine will return to the speed set by the the manual accelerator.



CAUTION!

When the tractor is operated with the accelerator pedal, the manual accelerator must be in the lower position.

Always use the accelerator pedal when driving in public roads. Avoid sudden variations on the engine speed.

2.6. Differential locking pedal

Whenever the ground conditions lead to a loss of traction on the wheels, this will cause one wheel to turn freely while the other is stationary. In such situation, depress the clutch pedal and the pedal lock (1) and then release the clutch again. The rear wheels are coupled. Uncouple the differential lock before making turns with the tractor.

Usually the pedal unlocking will occur automatically, so the pedal will be free and the traction returns to its normal condition. In case the differential does not unlock, depress the clutch pedal to unlock the differential.



NOTE:

Do not use the lock in turns or while driving downhill: in such cases the assembly will be uncoupled. The unlocking will occur automatically as soon as the wheel are in normal operating conditions.

2.7 - Gear selector lever/Ranges

Only for transmissions with 12x4 speeds, this lever selects the speed range between Hare or Tortoise and High (H) or Low (L).

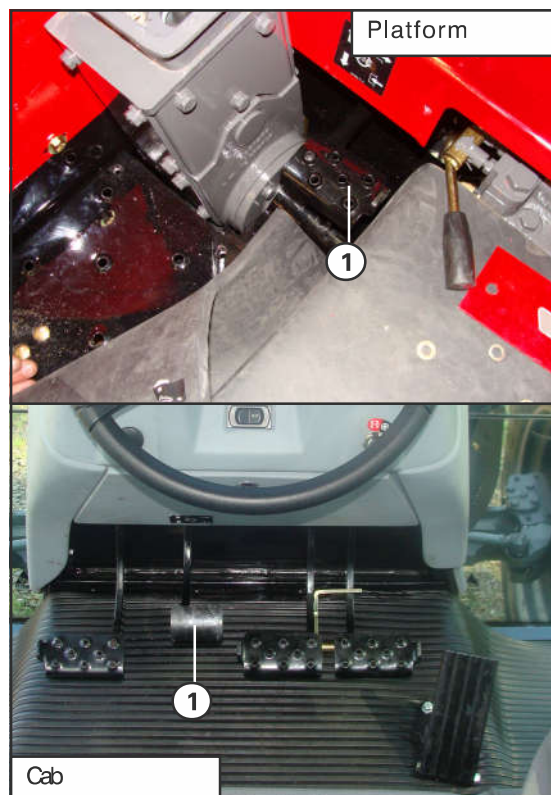


Fig. 60

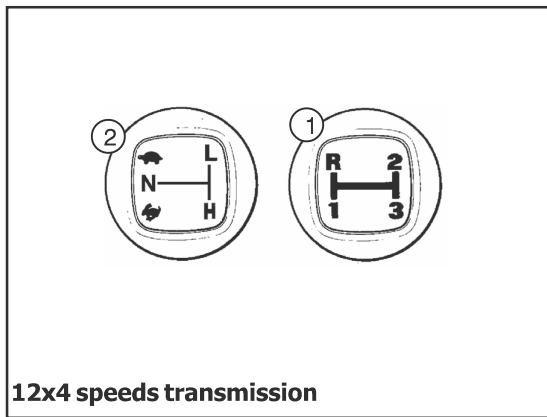
3 - Combination meter and commands

2.8 - Gear selector main lever

- For 12x4 transmission, this lever selects 1st, 2nd, 3rd and 4th gear and reverse - "R".

12x4 speed transmission - Speeds

Forward	Lever (1)	Lever (2)	Lever (2)
1°	1	Tortoise	L
2°	1	Hare	L
3°	2	Tortoise	L
4°	2	Hare	L
5°	3	Tortoise	L
6°	3	Hare	L
7°	1	Tortoise	H
8°	1	Hare	H
9°	2	Tortoise	H
10°	2	Hare	H
11°	3	Tortoise	H
12°	3	Hare	H
Reverse			
1°	R	Tortoise	L
2°	R	Hare	L
3°	R	Tortoise	H
4°	R	Hare	H



12x4 speeds transmission

Fig. 61

3

3 - Combination meter and command

2.9 - Parking brake lever

Apply the parking brake, by pulling the lever upward (1). To safely assist the parking braking applying, you can depress the brake pedal when pulling up the lever,

Release the parking brake, by pulling the lever upward (1), pressing the button (2) and then pushing the lever downward.

3



IMPORTANT:

Do not leave the tractor without applying the parking brake.

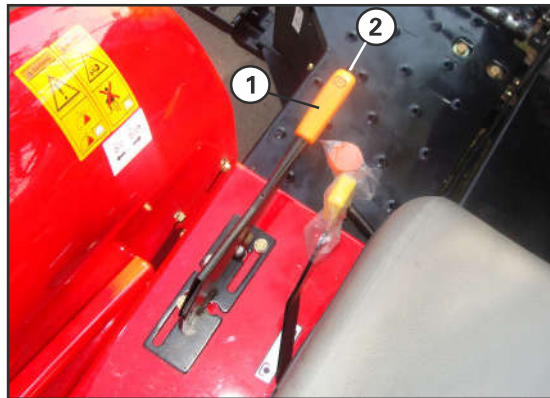


Fig. 62

2.10 - Manual accelerator

This will be used in operations in the field.

To be used during field operations. To increase the engine speed, move the lever (1) forward and to reduce the speed, move the lever backward.

While in operation, keep the engine within the ideal speed range.

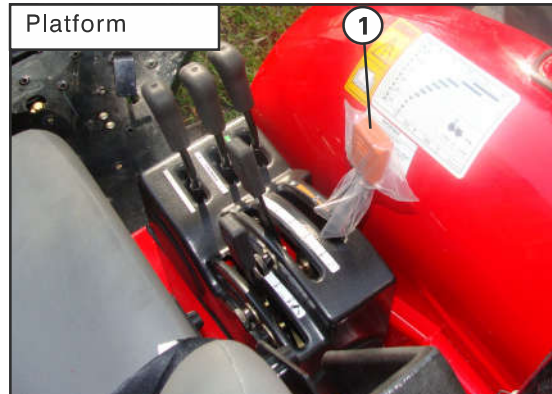


Fig. 63

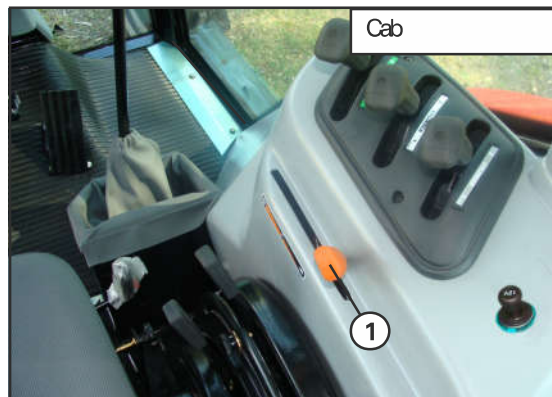


Fig. 64

3 - Combination meter and commands

2.11 - Front traction drive

For operations in the field which demand effort for the traction, apply the auxiliary front traction.



NOTE

DO NOT apply the front traction while driving in roads or in services which do not demand traction power.

Always stop the tractor to apply or turn off the front traction.

- Fig. 65 - For tractor with central front traction, stop the tractor and move the lever forward.
- Fig. 66 - For tractor with front traction and lateral drive and for cab tractors, stop the tractor and push the lever down.

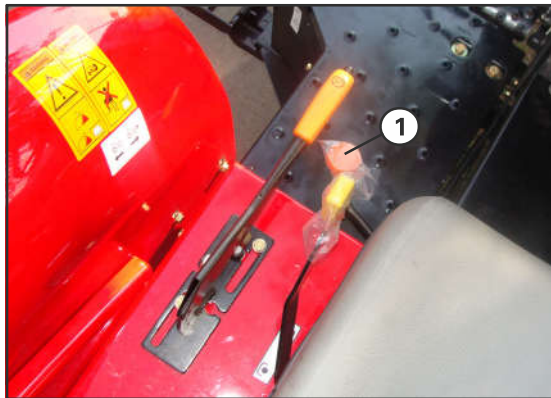


Fig. 65



Fig. 66

2.12 - PTO and IPTO driving lever

To move the PTO lever, pull it to the right side to release it from the off position.

- To apply the IPTO (Independent Power Take Off), reduce the engine speed and pull the lever forward. It is not necessary to apply the clutch in this case.
- For the PTO (Dependent Power Take off), adjust the clutch pedal stopper to the 2nd position, which can be checked by a larger pedal travel. Then, press the clutch pedal to the end of its travel (2nd position), move the lever backwards and slowly release the lever.

Afterwards, adjust the engine speed to reach the speed wanted in the PTO.

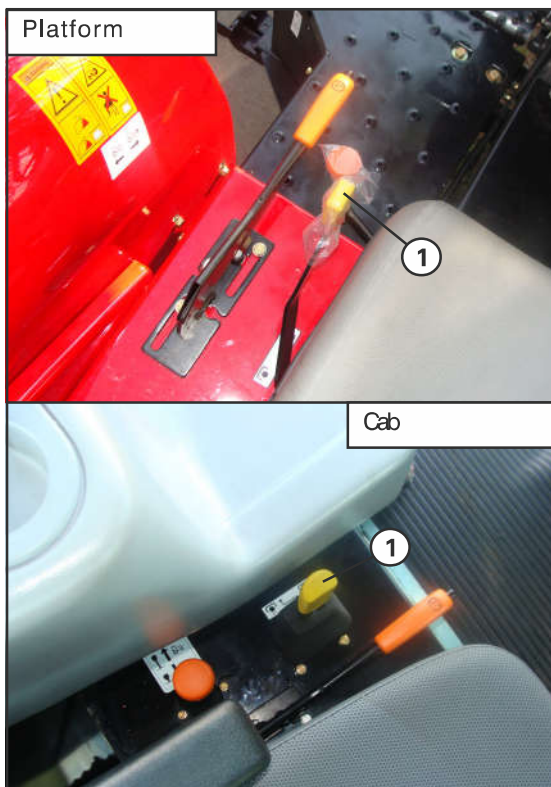


Fig. 67

3 - Combination meter and command

2.13 - Depth control lever (traction)

The lever (1) is used to operate with implements for soil preparation, such as: plower, sub-soilers, furrower, etc. Thus, the system is activated to correct the implement penetration depth, while keeping the traction power within the specified limits.



Fig. 68

2.14. Hydraulic system positioning control lever

This levers (2) must be used to:

- Operate with implements which work above the ground surface, such as: pulverizer, loading platforms, brushcutters, etc.
- Implements coupling
- Transport of implements to the working area or loads (cranes, platforms, etc.)



NOTE

For cab tractors, there is an auxiliary lever (3) for Positioning control at the rear, to facilitate the coupling and uncoupling of implements.



Fig. 69

2.15. Hydraulic system reaction control

Regulates the lowering speeds of the coupled implement.

With the selector fully down, the reaction is fast (fast lowering speed). When the lever is fully up, the reaction is slow,

To achieve intermediate adjustments, leave the selector in the intermediate range on the dial.



Fig. 70

3 - Combination meter and commands

2.16 - Remote control lever(s) (if equipped)

Your tractor cab be equipped with a independent type remote control for one or two lines.

Each lever allows the operation of one cylinder (or a pair of cylinders in parallel) for implements which use remote control.

This is a dual action command, i.e., it allows the extension and retraction of remote hydraulic cylinder(s) rod(s).

There valves for special applications, supplied as optional parts, with variable flow, valves with automatic return lever, valves with floating control, etc.



Fig. 71



Fig. 72

2.17 - Combined flow selector lever

for the cases where an increase of hydraulic fluid flow is necessary for the remote control, and the 3-points lifting system is not used, the combined flow can be activated; in this case, move the combined flow selector lever from the "A" position (Lifting system) to the "B" position ((Auxiliary hydraulic power - High flow). At this moment, the oil flow in the lifting system is redirected to the auxiliary hydraulic system (Remote control). When the Combined Flow is activated, the lifting system becomes inoperant.

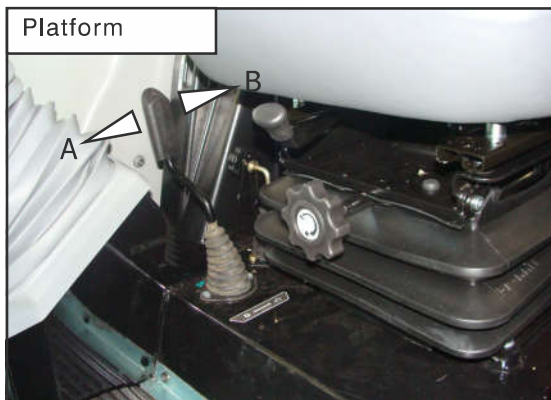


Fig. 73

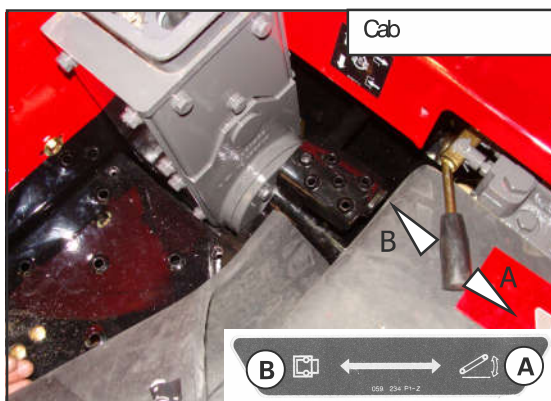


Fig. 74

3

3 - Combination meter and command

2.18 - Seat

The tractor features a Protection Structure Against Roll-over (EPCC) directly assembled on the tractor's rear axle. This structure was designed to supply a protection for the conductor, in case of a roll over. However, for the Protection Structure Against Roll-over (EPCC) to become effective, it is of major importance the use of the seat belt and the conductor must remain seated in case of a roll over.

3

DO NOT WELD, DRILL HOLES, FOLD OR TRY TO FIX DENTS IN THE EPCC. Such procedures will reduce the protection provided by the device.

In case of damages, replace the EPCC.

Adjustment of the seat

Seat (1) - Cab

- A - Adjust the seat forward or backward: Move locking (A) upward.
- B - Seat height hardness adjustment: To do so, turn the handle (B) on the clockwise direction for a stiffer suspension.
- C - Adjust the seat's movement height: Release the bolts (C), located on both sides and on the rear side of the seat back, moving the seat up or down to achieve the desired height. Then re-tighten all bolts.

Seat (2) - Header

- A - Adjust the seat forward or backward: Move the locking lever (A) to the left side.
- B - Seat height hardness adjustment: To do so, turn the handle (B) on the clockwise direction for a stiffer suspension.
- C - Adjust the seat's movement height: Release the bolts (C), located on both sides and on the rear side of the seat back, moving the seat up or down to achieve the desired height. Then re-tighten all bolts.

2.19 - Seat belt adjustments

The retractable type seat belt (1), installed in tractors equipped with EPCC, does not require adjustments. The protection provided by the seat belt is only effective when:

- The seat belt is correctly adjusted.
- The set belt is not twisted nor damaged from rubbing against a sharp edge.
- The buckle is firmly locked.
- There are no loose parts on the belt and on the retractable system.

To fasten, pull the buckle (2) in all its extension and push it against the lock (3): a click and a movement upward on the unlocking orange button indicate the seat belt is fastened.

To release it, press the unlocking button (3) downward.



Fig. 75



Fig. 76



Fig. 77

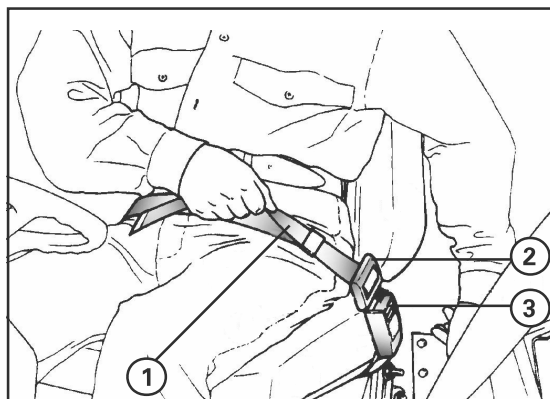


Fig. 78

3 - Combination meter and commands

2.20 - Low vehicle warning

The warning triangle (A) assembly is performed behind the seat, over the remote control valves.

If the adhesive on the warning triangle is missing or needs to be replaced, it can be done at your Massey Ferguson Dealer.

2.21 - Lightening outlet for the trailer

This is a 7-pins electrical outlet (SAE) (B) for the trailer electrical connection. Before use it, make sure the trailer socket is correctly cabled.

Pins identification:

- 1 - Negative (ground) - 31.
- 2 - Not used - 58L
- 3 - Left side turning light - LH
- 4 - Not used - 54
- 5 - Right side turning light - RH
- 6 - Brake lights - 58R
- 7 - Not used - 54G



IMPORTANT:

The tractor is not assembled with auxiliary electrical supply connectors.

DO NOT use electrical supply from the tractor by using auxiliary connectors or cutting the electric harness. This could result in a short circuit and serious personal injury.

Contact your Massey Ferguson Dealer.

Contact your Massey Ferguson Dealer for the correct information about approved equipments and also for the correct installation with the proper fuse.

The use of non approved accessories and fuses with wrong rating may cause damages to the tractor or to the accessory.

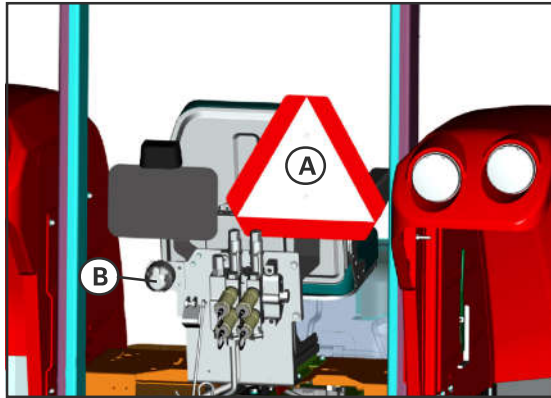


Fig. 79

3

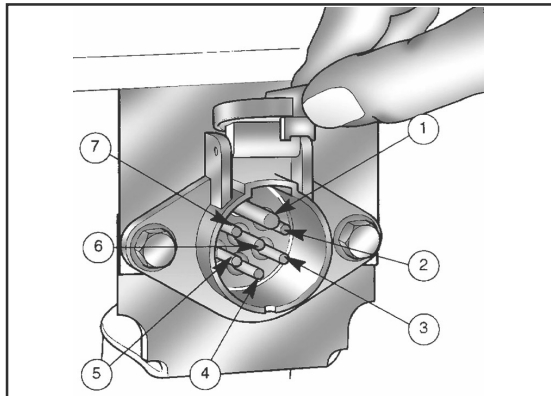


Fig. 80

3 - Combination meter and command

3. Instrument panel and switches

3.1 - Panel overview



Fig. 81

- 1 - Fuel level indicator
- 2 - Tachometer
- 3 - Engine temperature sensor
- 4 - Warning lights
- 5 - Module not used
- 6 - Lighting activation switch.
- 7 - High or Low beam selector switch
- 8 - Module not used
- 9 - Module not used
- 10 - Warning light activation switch
- 11 - Rear headlight activation switch
- 12 - Turn signal activation switch
- 13 - Clutch 2nd stage stopper (If equipped)
- 14 - Starter switch

3 - Combination meter and commands

3.2 - Gauges

Fuel level indicator (1)

Shows the approximate level of fuel in the tank.
From the left to the right side, the needle shows the following instructions:
empty - half full - full. Do not run out of fuel: in this case the fuel system must be bled .

Engine temperature indicator (2)

Shows the engine temperature. The green zone shows the ideal engine temperature. Excessively high or excessively low temperatures can damage the engine. In case of overheating, do not turn the engine off. Reduce the engine speed to minimum rage, until the temperature drops and then turn it off and check the cause for the overheating.



CAUTION!

Wait until the cooling system temperature cools down an only then remove the radiator cap. Use a shop cloth to protect your hands and slowly remove the the cap from the radiator; wait a few seconds in order to allow the pressure to dissipate. Only then remove the radiator cap.

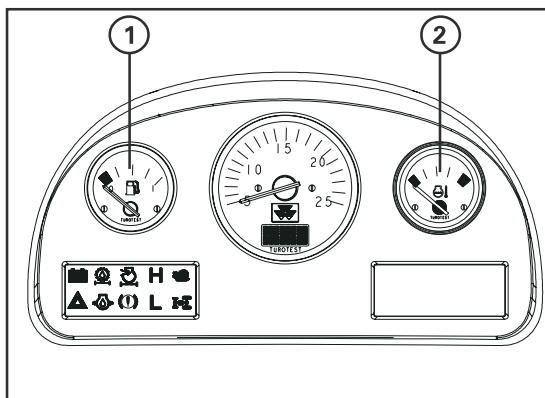


Fig. 82

3.3 - Tachometer

This is comprised by a tachometer (1) which indicates the engine speed in revolutions per minute (rpm) and a display (2), which shows the diagnosis functions, Power Take Off (PTO) speed and amount of working hours.

Each division on the scales equals 100 rpm, i.e., if the needle is under the number 20, the engine speed is 2000 rpm.

The display (2) may show warning messages, as presented on the next page.

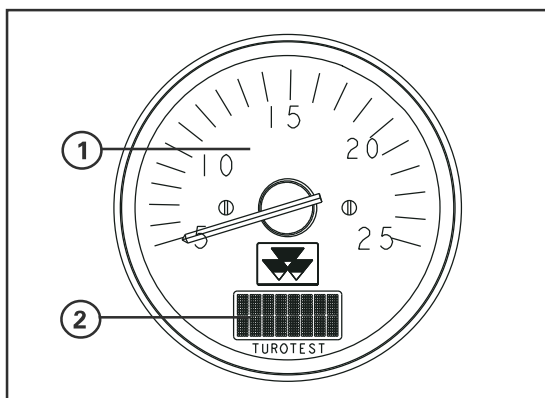


Fig. 83

3 - Combination meter and command

Warning messages on the Display

The prioritization sequence presented informs that the messages are presented on the Display according to the order of importance, when more than one event occur at the same time. Scaling: 1st - Highest priority, 3rd Lowest priority

Description	Priority
CUIDADO!/WARNING!	1st
TDP/PTO:	2°
HOURS / HOURS	3°

3

Description

- CAUTION!/WARNING!/: Indicates that the Power Take Off (PTO) speed presented is above the maximum recommended.
 - 630 RPM from the engine: 540 rpm on the power take off.
 - 1170 RPM from the engine: 1000 rpm on the power take off.
- TDP/PTO: Indicates the instantaneous speed of the power intake shaft.
- HOURS / HOURS: Shows the tractor operation hours.

When the power take off is not activated, usually it will be presented the tractor's operation hours on the Display.



CAUTION!

When the message WARNING is displayed, reduce the engine speed. so that the Power Take Off (PTO) speed stays below the maximum recommended speed, in order to prevent damages and personal injuries.

Adjust the power take off speed.

For tractors set with revolution speed of 540 rpm or 1000 rpm for the power take off, the panel must be adjusted when the shaft is replaced.

The tractors are delivered with a factory configuration to display the revolution according to the shaft installed in the factory.

However, when a 540 rpm shaft is replaced by a 1000 rpm shaft, or vice-versa, the button (p) must be pressed in order to show the correct speed on the display.

See the adjustment procedures in the section Preparation in this Manual.

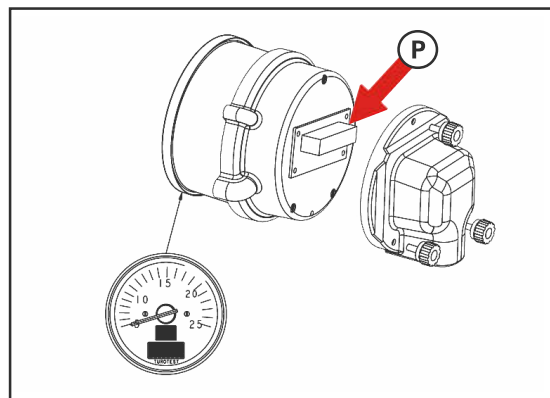


Fig. 84

3 - Combination meter and commands

3.4 - Warning lights

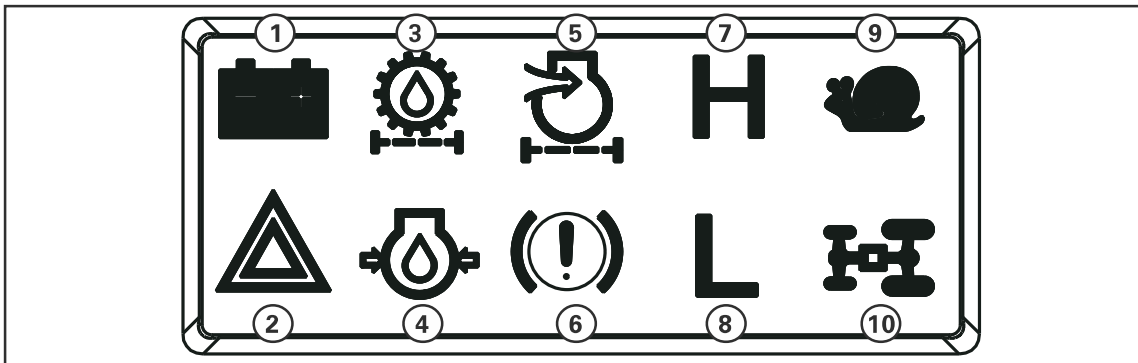


Fig. 85

1 - Battery charge warning light

With the engine operating, this warning light must be off, which means that the battery loading system is correctly operating.

If this light comes on while the engine is operating, check the loading system and the battery.

2 - Main warning light

Simultaneously blinks with the engine oil pressure, transmission oil pressure, battery load or air filter restriction lights.

3 - Transmission oil pressure warning light

If this light comes on while the engine is operating, it means that the transmission lubrication system presents a low pressure, which may lead to irreversible damages to some components on the system. Stop the engine IMMEDIATELY and find the cause.

4 - Engine oil pressure warning light

If this light comes on while the engine is operating, it means that the engine lubrication system identifies a lack of oil pressure. In this case, stop the engine IMMEDIATELY and find the cause.

5 - Air filter blockage warning light

If this light comes on while the engine is operating, it means that the main element (external) and the safety element must be replaced. See Section Maintenance for detailed information.

6 - Brake fluid level warning light and parking brake application warning light.

This light is lit when the brake fluid level is below the minimum required specification and when the parking brake is applied.

7 - High speed range selection warning light

Only cab tractors, with 8x8 or 12x4 transmission are

equipped with this warning light.

8 - Low speed range selection warning light

Only cab tractors, with 8x8 or 12x4 transmission are equipped with this warning light.

9 - Speed reducer activation warning light (if equipped)

This light will only come on when the speed reducer is activated. The speed reducer provides an extra range of low speeds for your tractor.

10 - Not used



NOTES:

When turning the starter switch to the 2nd position "(engine off), all warning lights will be turned on.

After a few seconds, the lights 1, 2, 4 and 6 will be turned off. After the engine starting, the remaining lights will also be turned off.

If, during the engine operation, one of the 1, 3, 4, 5 and 6 warning lights comes on, immediately turn off the engine and check the cause.

In conjunction with the warning lights, the panel also sounds a buzzer when the main warning light (2) blinks for the following reasons:

- Air cleaner restriction.
- The transmission oil filter must be replaced.
- Low pressure on the engine oil pressure
- Engine temperature too high.
- Low battery charge from the alternator.

3 - Combination meter and command

3.5. Electrical controls

1 - Lighting activation switch



NOTE

The starter switch (6) must be on the 2nd position (B).

This switch has 3 positions:

0 - OFF

I - Instrument lights + rear turn lights + side lights + auxiliary headbeams (if fitted) in turn light mode + license plate light (if fitted)

II - Item from the previous position + front headlights in low beam

3

2 - High or Low beam selector switch

By pressing down this switch, the front headbeams turn to high beam and the auxiliary headlights become regular light.

3 - Hazard light switch

To turn on the hazard light, partially press down the switch. To turn it off, press the switch upper part.

Turn the hazard lights on whenever driving on public roads, unless the local traffic regulations do not permit it.

4 - Rear service headlight switch

By pressing down this switch, the rear service headlight is turned on.

5 - Turn indicator switch

Before moving sideways, use the turn lights by operating the switch (5). After the maneuver, it will be necessary to press the switch to the central position (off).



NOTE:

The cab front lights are turned on through the switch fitted on the cab roof, located next to the air conditioner controls.



Fig. 86

6. Starter switch

It has four positions, in sequence, on the clockwise direction:

A - Off. This position turns the engine off.

B - Turns on the warning light system.

C - Turns on the engine pre-heating system for cold starting (if equipped).

D - Activates the starter motor: The PTO drive lever must be on OFF position, the reverse lever (8x8 transmission) and/or the Low-High speed range selection lever must be in the neutral position.

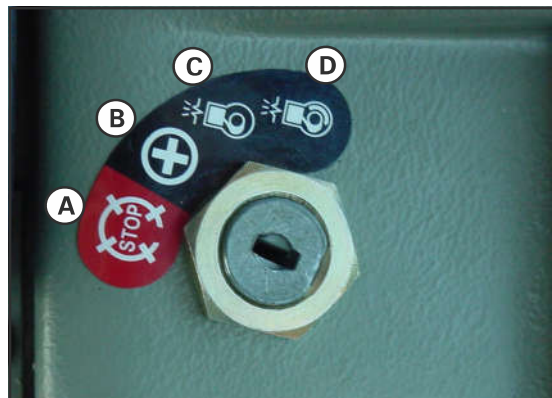


Fig. 87

3 - Combination meter and commands

4 - Identification of headlights and turn lights



NOTE

All lamps are essential items for your safety. Thus, always keep them in perfect operational conditions. Burned lamps must be immediately replaced.

Always observe the current traffic regulations in your area to avoid problems.

4.1 - Cab tractors

- 1 - Front services headlamps
For night works. Turn them on under daylight when driving on public roads.
- 2 - Front headlamps (or traffic headlamps)
- 3 - Front turn lights
- 4 - Front turn signal lamps (flasher)
- 5 - Rear service headlamps
- 6 - License plate light
- 7 - Brake lights
- 8 - Turn lights
- 9 - Rear turn signal lamps (flasher)

3



Fig. 88

3 - Combination meter and command

4.2 - Header tractors

- 1 - Front services headlamps

For night works. Turn them on under daylight when driving on public roads.

- 2 - Front headlamps (or traffic headlamps) (If equipped)
- 3 - Front turn lights
- 4 - Front turn signal lamps (flasher)
- 5 - Rear service headlamps
- 6 - Brake lights
- 7 - Turn lights
- 8 - Rear turn signal lamps (flasher)



NOTE

All lamps are essential items for your safety. Thus, always keep them in perfect operational conditions. Burned lamps must be immediately replaced.

Always observe the current traffic regulations in your area to avoid problems.

3



Fig. 89

3 - Combination meter and commands

5 - Cab and air conditioner

5.1 - General identification

Air outlet (1 and 2)

The air blown by a circular fan is directed to the cab interior through these points. Their opening and angle can be adjusted.

Room lamp (3)

Press the room lamp on, according to the positions indicated:

- Position "0" – (central): The room lamp will be turned on when the cab door is opened and will be turned off when the door is closed.
- Position "1" (ON - completely pressed): The room lamp remains lit.
- Position "2" (OFF - completely pressed): The room lamp remains off.

Space reserved for installation of a radio set (4).

Space reserved for installation of speakers (5).

One at each side, when the radio is installed.

Air flow (6)

Allows the air to circulate in the cab interior through the ventilation system.

Air flow adjustments (7)

By turning the handle to the right side, the air flow in the cab increases, and by turning it to the left side, there will be recirculation of air in the cab. The air flow through a paper filter, located on the roof, will enter into the cab interior.

Sun-visor (8)

The sun visor must be pulled down and can be adjusted, according to the operator's needs.

To return it to the original position, pull the handle (8A).

Rear window (9) and latch (10)

Allows the rear window to be kept open to provide a natural ventilation in the cab interior.

When the window is completely open, it is supported by gas dampers (9A).

Rear transparent panel (11)

Provides a visualization of the traction bar, the Power Take Off shaft and the implement during the tractor operation.

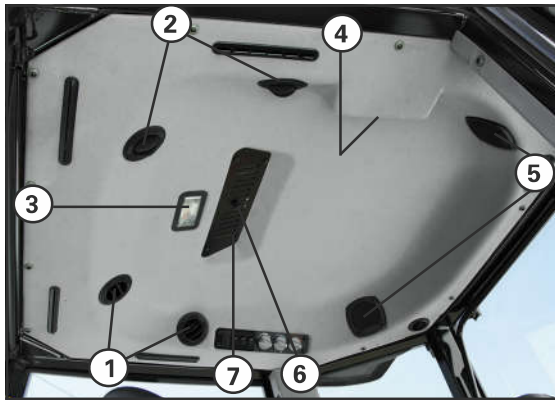


Fig. 90

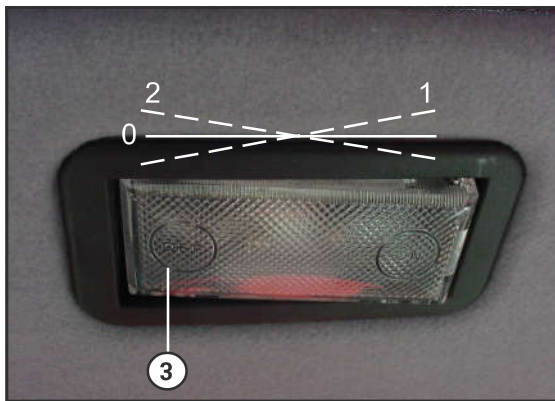


Fig. 91



Fig. 92



Fig. 93

3

3 - Combination meter and command

Side windows (12)

The side windows are pivoted by hinges on the rear edge. To open them, push the lever outward.



Fig. 94

Rearview mirrors (13)

The rearview mirrors can be adjusted. If it is necessary to keep a stand still position, the following procedure must be performed:

- Mirror angle:
Turn the mirror on the vertical shaft, by releasing the bolt (13A). Then, re-tighten it.
- Moving the mirror forward or backward:
Release the bolts (13B) and reposition the mirror structure (mirror + strut), as necessary. Then re-tighten all bolts.

After installed, the from cab to the mirror can also be adjusted through the length adjustment on the mirror strut.



Fig. 95

Carrier (for objects) (14)

They allow the storage of a great number of useful objects in the cab interior.



Fig. 96

Electric outlet (15)

12V Outlet voltage and current between 5-8.5A.



Fig. 97

Ash tray (16)

3 - Combination meter and commands

5.2. Cab controls

Operation switch for the front service light in the cabin (1).

NOTE:
Do not leave the front service lights in the cab turned on for long periods of time when the engine is not operating. This can discharge the battery.

Front wiper switch (2)

This switch has 3 positions: Off, Low and High speed.

Front washer nozzle switch (3)

Press down the switch to activate the nozzle. Keep the switch pressed until the glass is clean.

The nozzle electric motors are protected by thermal relays. So, if there are no obstacles to prevent the wipers from moving, the system will be protected and reset after 5 minutes.

NOTE:
The washer water reservoir (8) for the windshield is located on the cab rear. Keep it within the correct level of water and antifreeze.

Do not use detergents, as these products can damage the wipers rubber and even the electric pump.

Precautions for low temperatures (Cold weather).

The Antifreeze compound must be added in the windshield wiper system. Use Ethylene-glycol additives, available at the Massey Ferguson Dealers. The correct ratio in the reservoir must be 70% water and 30% antifreeze.

NOTE:
Do not use more than 30% of antifreeze in the windshield wiper system if the temperature is not below -36°C (-31°F).

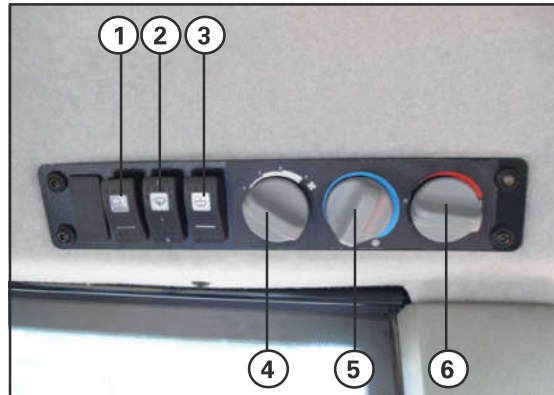


Fig. 98

3



Fig. 99

Ventilation control (4) - 4 positions:

- 0 - Off
- 1 - Recirculation / ventilation
- 2 - Ventilation / medium pressurization
- 3 - Maximum pressurization

Air conditioner control (thermostat) (5)

Adjust the cab interior temperature. Turn the handle to the right side for a refrigerated temperature.

Heating control (6) - Optional

To increase the cab temperature, turn the control button to the right side. The highest temperature are achieved when the engine is working on its normal operational temperature.

To turn on the heating, turn the handle to the left side.

3 - Combination meter and command

5.3 - Air conditioner and heating operation

Controls

- 1 - Fan button: turns on and allows the adjustment of the pressurization level inside the cab, in 3 speeds. "1, 2 and 3".
- 2 - Thermostat button: adjusts the intensity of cold. By fully turning it on the counterclockwise direction, the air conditioner compressor is turned off.
- 3 - Heating button (Optional) turns on and adjusts the heating. By fully turning it on the counterclockwise direction, the heating is turned off.
- 4 - Directional fins for the air flow that enters into the cab, forced by the fan.
- 5 - Air return register: by opening the register, the renovation of air in the cab is increased,



IMPORTANT:

By closing it, the recirculation of air is increased. It is essential that this operation be performed when facing situations with great concentration of dust.

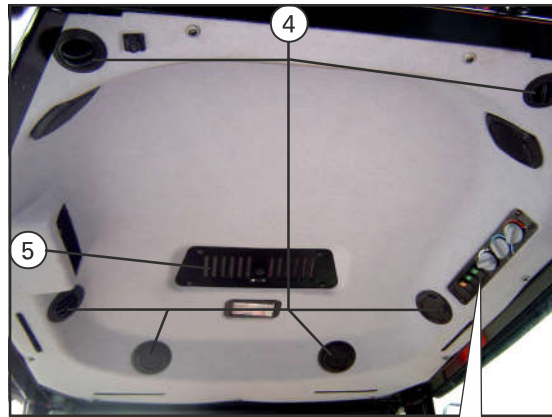


Fig. 100



Fig. 101

Sequence to operate the system:

- a) Turn on air conditioner, turning the fan button (1). At first, leave it in position "3" (maximum pressurization)
- b) Turn the temperature regulator (thermostat button - 2) also to the maximum position.
- c) When cab temperature reaches desired level, turn the thermostat button to an intermediate position.
- d) Change the fan speed by the button (1), if desired.
To operate just the ventilation, turn on only the fan, using the button (1);
- c) Adjust the air flow direction through the directing fins (4). The fin supports can also be turned.



NOTE:

The maximum pressurization for the can, achieved in the positions "2 and 3" in the button (1) is specially important when working in very dusty conditions, as these features prevents the dusty from entering the cab.

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4 - Preparation

4

1 - Tractor ballasting

1.1 - What is ballasting?

To achieve the optimum performance, the tractor must have the appropriate weight for each kind of operation.

Lack of weight results in.

- Excessive slippage, which causes lack of traction power.
- Increased fuel consumption.
- Increased tyre and mechanical parts wearing in the tractor.

On the other hand, the excess of weight is also harmful:

- Excessive soil compaction
- Larger resistance to the tractor motion and, as a result, increased fuel consumption and wearing for the tractor.

The ballasting consists of adjusting the tractor weight, as necessary. The general rule is to use the least additional weight (ballast) without causing an excessive slippage,

For each kind of soil or ground, there is an optimal slip ratio:

- Asphalt or concrete - 5.0 to 7.0%.
- Hard soil grounds - 7.0 to 12.0%
- Dried and soft grounds - 10.0 to 15.0%
- Loose (ploughed), sand or muddy ground - 13.0 to 18.0%

A practical way of checking if the slippage ratio is correct is to analyze the format of the trace left by the rear wheels. See table on the right.

There are two ways of ballasting, which can be used in a isolated or combined way: ballasting by weights (counterweights) and/or ballasting by filling the wheels with water.

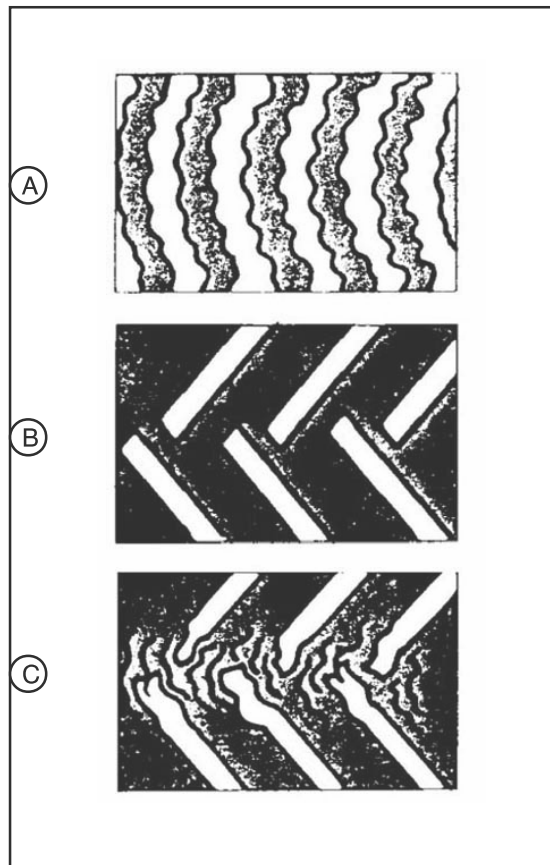


Fig. 102

- A - Tracks on the ground poorly defined. Excessive slippage - increase the amount of ballasting in the tractor.
- B - Clearly defined tracks. Lack of slippage - decrease the ballasting
- C - The ballasting and the slippage will correct when, on the center of the track, there are signs of sliding, and the tracks on the side edges are well defined.

4 - Preparation

Special recommendations

- The total amount of weight put over the front and rear axle can never exceed the maximum allowance recommended for a given axle and wheel set! The excess of weight causes premature wearing and damages to the tyres, and also forces the tractor powertrain and compacts the ground.
- The ballast over the front axle is recommended for:
 - Operations with heavy implements coupled to the hydraulic lifting.
 - Works on leaned grounds, which may raise the tractor.
 - Tractioning of heavy trailers or implements by the traction bar.
- For 4x4 tractors, the ballast must be distributed so that about 40% from the total weight on the tractor, be placed over the front axle, and 60% on the rear axle.
Otherwise, the effectiveness of the traction will be impaired and, in extreme cases, may lead to a premature wearing on the transmission.

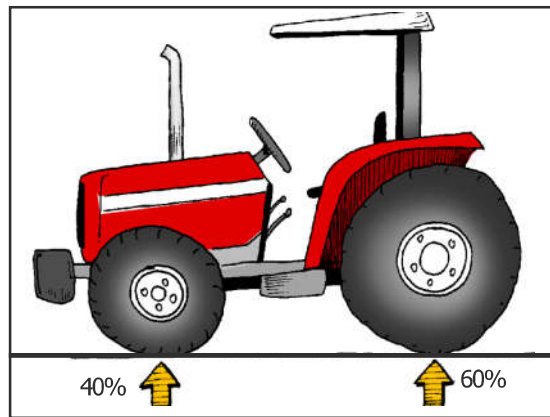


Fig. 103

4

1.2 - Ballasting with counterweights

It can be performed by using metallic discs (1) attached to the front wheels or metallic plates (2) assembled on the tractor front end.

NOTES

- *Observe all safety measures when handling ballasting wheels and counterweight.*
- *Securely tighten the weight clamping bolts. After a few hours of working, and periodically, fasten the bolts.*

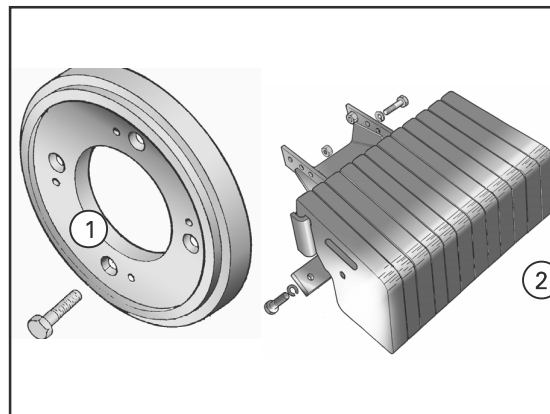


Fig. 104

4 - Preparation

1.3 - Ballasting with water

It consists on introducing water into the wheels, through the calibration valve, using a device (1) which introduces water and allows the exit of air at the same time.

Procedure

- With the tractor levelled, lift the axle where the wheels you want to add the ballast are installed, using appropriate safety stands.
- Turn the wheels, so that the valve stays on the top and remove the valve using a universal pliers.
NOTE: carefully remove the valve and fasten it firmly in order to prevent it from being thrown away.
- Install the device (1) on the valve position, connected to a hose with drinkable water.
- When the tyre volume is about 3/4 (75%) full of water, the excess will be drained through the draining tube on the device (1).

NOTE

Do not completely fill the tyres with water, as they will loose their flexibility to absorb shocks (impacts) from the ground irregularities - see illustration.

- Remove the device (1), reinstall the valve and calibrate the tyre pressure.
NOTE: apply 30 pounds (psi) of pressure to make sure the tyre bead will be correctly fitted on the rim. Then, allow the excess of pressure to be relieved through the valve until you obtain a pressure around 1-2 pounds above the recommended pressure for work, as specified in section 6 "Maintenance".

Draining the water from the tyre

- Park the tractor in a free area in order to prevent damages from the water jet coming out from the tyre valve.
- Position the tractor wheel with the valve on the rim lower side and remove it firmly and carefully.
- Allow the water to be completely drained and, then, re-calibrate the tyre to the recommended pressure.

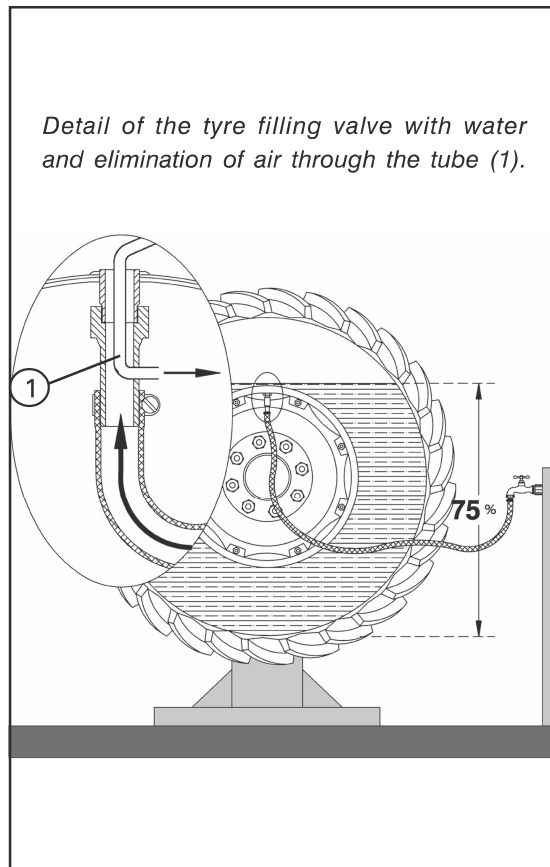


Fig. 105

4

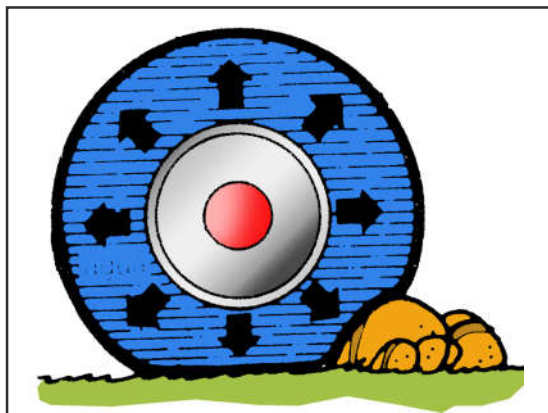


Fig. 109

4 - Preparation

2 - Tractor gauge adjustment

The gauge is the measure between the wheels center and, except for special cases, can be adjusted according to the operational needs.

- Operation type and implement:
- Type of crop
- Type of soil or ground

Examples:

- A - During a pulverization, the gauge must be such as the wheels can pass on the crops lines, in order to reduce to its maximum the smashing of plants
- B - On the plowing, the tractor gauge will establish the cutting width for the the first disc, or moldboard, which must be the same for the other discs.

Procedure for the gauge adjustment:

2.1 - 4 x 2 front axle

If the front axle is a gauge adjustable type, this adjustment is performed through the displacement of the telescopic bar (1), in relation to the gutter (2);

To do so, remove the bolts (3 and 4) and move the complete wheel assembly to the desired position.

NOTE: when the axle is equipped with a third bolt (item 5) in both sides, remove them too.

For each hole on the bar (1) the gauge is changed by 50mm, on the corresponding side, what results in a 100mm change on the total front gauge.

NOTES:

- Move the steering bar (6) on the same distance of the main bar (1) displacement in order to keep the correct convergence angle for the wheels. To do so, loosen the clamp or the lock (6a).
See also Section 6, "Maintenance" about the convergence adjustment for the wheels.
- The assembly position for the bars (1) must be equivalent in both sides of the axle.
- The bar (1) must be assembled, at least, in 2 holes in the gutter (2), by using the bolts (3 and 4). If the axles features 3 bolts in each side, store the bolt (5) with the corresponding nut and washer.
- After achieving the correct gauge, fasten the bolts and nuts to the torque specified in Section 6 - "Maintenance".

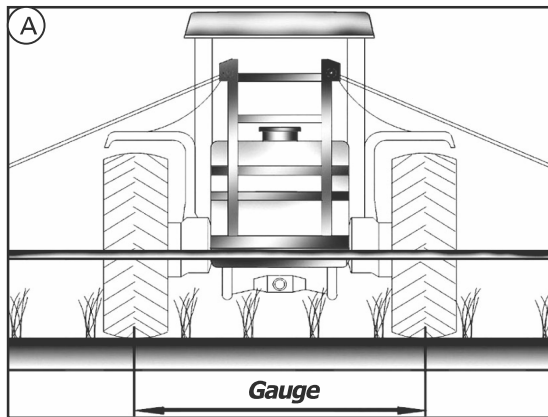


Fig. 107

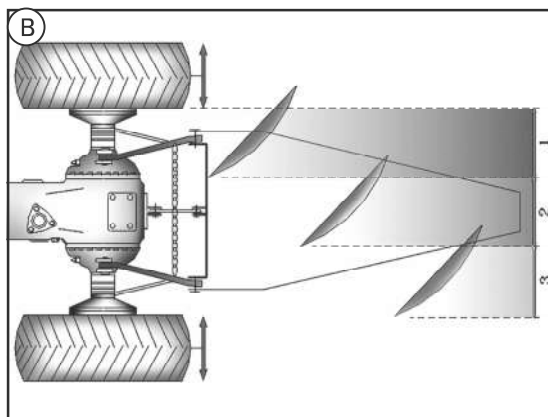


Fig. 108



Fig. 108

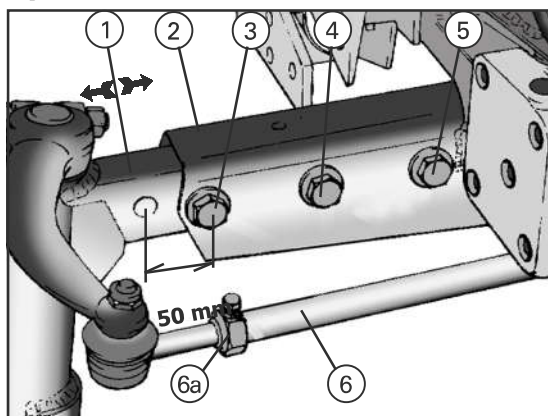


Fig. 109

4 - Preparation

Table I: Front axle gauge 4x2

Arrangement Wheel	MF 460 9.00-16F2
A	1390
B	1490
C	1590
D	1690
E	1790
F	1890
G	1990

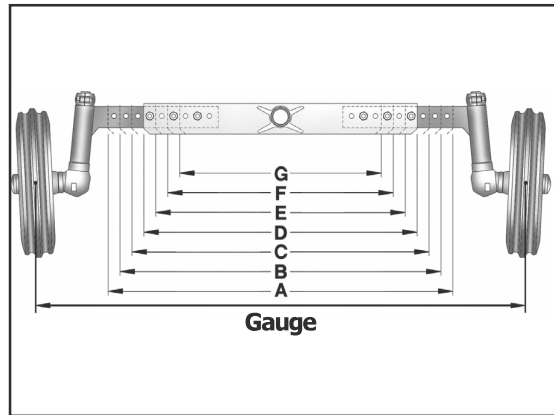


Fig. 110

4

2.2. Front axle gauge 4x4

A) Rim and reversible disc type

The wheels for these axles are rim and reversible disc type. This systems allows up to 8 different gauge arrangements, according to the chosen assembling scheme for the wheel components.

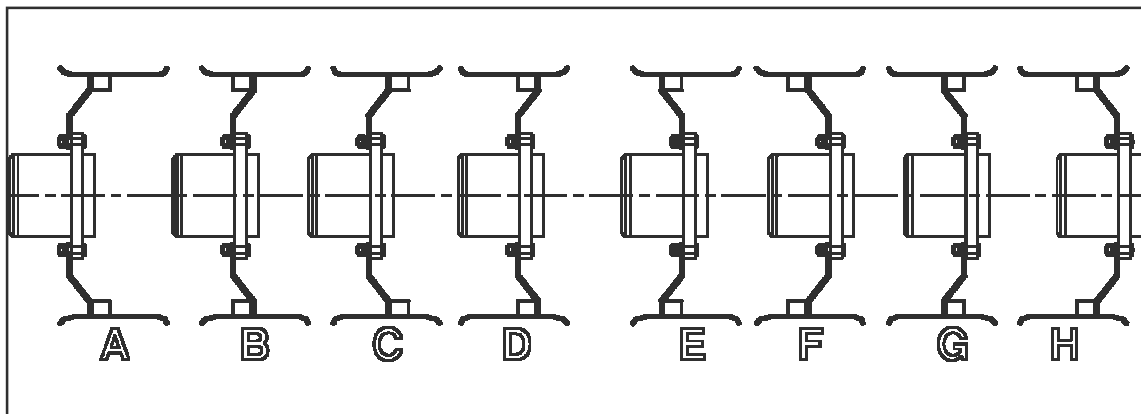


Fig. 111

4 - Preparation

The assembling variations (Arrangements) are as follows:

- Wheel disc position: Concave side facing in (schemes A, B, C and D) or out (schemes E, F, G and H).
- Discs position on the rim fixing stoppers: stoppers inside the disc (schemes A, C, E and G) or outside the disc (schemes B, D, F and H).
- Rim mounting side: larger extension facing in (A, B, E and F) or out (C, D, G and H).

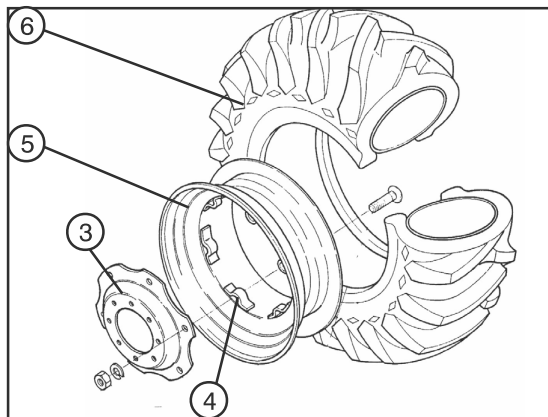


Fig. 112

4

- 1 - Tyre
- 2 - Rim
- 3 - Disc
- 4 - Fixing stopper

Instruction to change the gauge:

- a) Based on the desired gauge (in mm), see Table II to choose the corresponding arrangement, from "A to H". The "A" arrangement allows the minimum gauge, while the "H" arrangement, the maximum gauge.
- b) Lock the rear wheels and lift the front axle, supporting it on safety stands. **Never use the jack to support the axle!**
- c) When it is necessary to invert the rims, change the whole wheels set side (left wheel to the right side and vice-versa), in order to prevent the "V" on the jaws from being inverted.
- d) After the change, fasten the wheel discs fixing nuts to the correct torque and the to the nuts fixing the discs to the rim, along the stoppers. Consult the torque specifications in Section 6 "Maintenance".
- e) After working a few hours, check the nuts tightening again. Never operate the equipment with loose bolts and nuts.
- f) It is recommended to check the front wheels convergence after adjusting the gauge. Consult the procedure in Section 6, "Maintenance".
- g) Based on the wheel set used, some minor arrangements may cause problems, as in close turns a larger tyre may interfere with the pawls in the tractor.

In other situations, decreasing the steering turning angle may be sufficient. However, in this case the tractor turning radius will increase, i.e., it must be necessary a larger space to make tight turns.

4 - Preparation

The wheels steering angle is limited by two stopper bolts (2) - one in each side of the axle.

- a) Loose the locknut (1) and turn the adjusting bolt (2) to the counterclockwise direction to decrease the steering angle, and vice-versa.

The bolt head (2) is the limiting stopper for the steering.

- b) Adjust the 2 bolts evenly, so that during a full steering rotation to either side, the tyres do not interfere with the tractor.
- c) Re-tighten the locknuts (1).

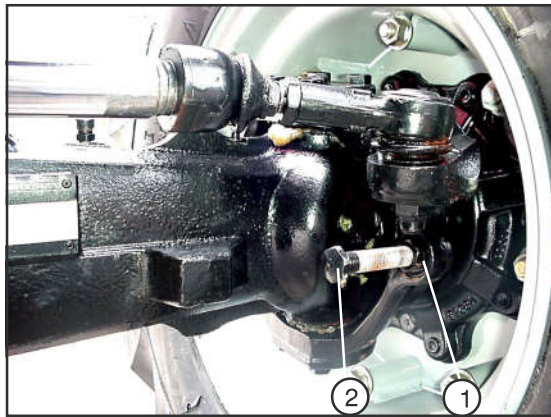


Fig. 113

4

Table II: front axle gauge 4x4 with reversible stamped disc wheel.

MF 460	A	B	C	D	E	F	G	H
14.9x24R1 - ZF 3045	1540	1650	1738	1848	1712	1822	1910	2020
14.9x24R1 - Ca 20.18	1670	1780	1868	1978	1842	1952	2040	2150
MF 470 and 480	A	B	C	D	E	F	G	H
14.9x26R1 - ZF AS 3050	1626	1722	1674	1770	1790	1886	1838	1934
14.9x26R1 - Ca 20.21	1756	1852	1804	1900	1920	2016	1968	2064

Depending on the wheels installed, some arrangements may not be possible, or it may require an excessive reduction on the steering angle.

4 - Preparation

B) Narrow Tractors, equipped with 7.00x18 R1 and 8.00x18 R1 wheels and discs welded to the rim.

The adjusting procedure for the gauge on 4x4 axle with this wheel set is identical to the others, as described on item A), except for an eventual reduction on the steering angle.

The only difference is that the wheel central disc is welded to the rim.

So, it can be achieved only 2 gauge arrangements in such case.

4

X - Smaller Gauge: wheel disc with the concavity facing in.

Y - Larger gauge: wheel disc with the concavity facing out.

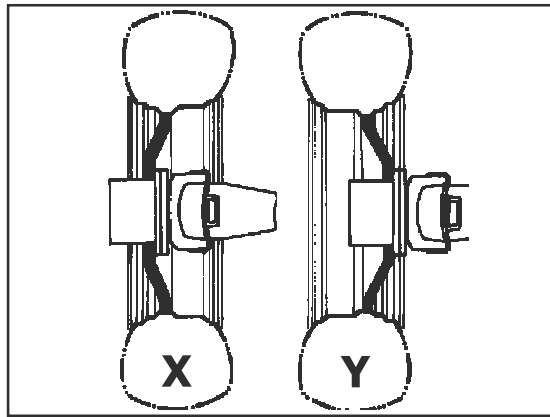


Fig. 114

Table III: gauges achieved with "X and Y" arrangements

For ZF axle

Arrangement	Tractors
X	1514 mm
Y	1626 mm

For Carraro axle

Arrangement	Tractors
X	1624 mm
Y	1736 mm

2.3 - Rear axle

The adjusting procedure for the rear axle gauge depends on the wheel set installed.

It can be used 4 different types of rear wheels. Each wheel type can bear a given number of tyres and features an specific system to change the gauge, as described below:

- A - "Rice" type wheel
- B - Rim and reversible disc wheel type
- C - Wheel with self-adjustable gauge - PAVT system
- D - Casted disc wheel

A) "Rice" type wheels

These wheels do not allow gauge adjustment, as the disc is fixed to the rim.

Also, the tyre used for these wheels is larger (for a better floating), which impairs the side inversion for the wheels assembly.

The gauge achieved on tractors equipped with these wheels usually is within 1800-1850 mm range, and also depend on the time of use of the tyres.

During the assembly of these wheels, fasten the discs fixing bolts to the rear axle according to the torque specification in Section 6, "Maintenance".



Fig. 115

4 - Preparation

B) Rim and reversible disc wheel type

The procedure to change the gauge is the same as for the rim and disc type wheels for the front axle.

The arrangement related to smaller gauges (A, B, ...) usually are possible, due to the interference of the wheels with the fenders,

The larger the tyre, the more difficult the arrangements are.

Procedure

- Consult Table IV to choose the arrangement relative to the desired gauge,
- If the wheel assembling side is to be changed, release also the nuts fixing the discs to the axle and change the side of the wheels to prevent the inversion of the wheels pawls.
- Raise the rear axle and chock it securely. Never use the jack to support the axle!
- After the assembly, tighten the nuts to the torques specified in section 6 "Maintenance".

4

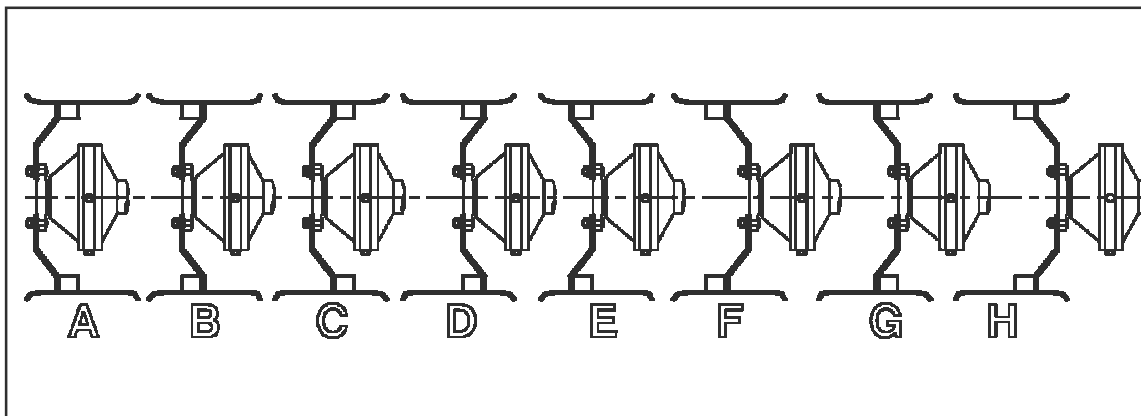


Fig. 116

Table IV: rear axle gauge with reversible stamped disc wheel.

MF 460 18.4x34R1	A 1425	B 1540	C 1830	D 1940	E 1830	F 1940	G 2230	H 2340
MF 470 and 480 18.4x34R1	A 1425	B 1540	C 1830	D 1940	E 1830	F 1940	G 2230	H 2340

4 - Preparation

C) Rear wheels with PAVT system

It is a “servo-adjustable” system which facilitates the rear gauge change.

It requires the wheel removal just to achieve the maximum gauges, when it necessary to invert the wheel discs.

The discs on these wheels are heavier, which turns them a kind of counterweight.

Possible gauge arrangement for PAVT wheels:

The discs are fixed to the rim by using clips (1) and helicoidal trails (2). In each wheel, there is a master-trail (3) with a number of holes (5). On the master-trail, there are 2 stoppers (4) which position the corresponding clip (1) over the trail.

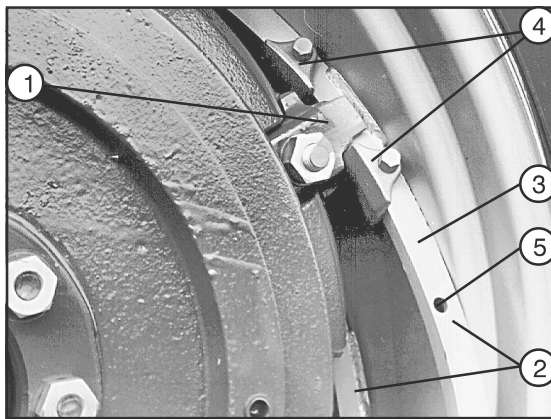


Fig. 117

4

By changing the clip mounting position on the master-trail, the gauge can be varied, due to the helicoidal shape of the trails.

The number of available gauges depends on the amount of holes (5) on the master-trail.

When the maximum or minimum gauge are used, only one stopper is mounted (4) on the master-trail, as the trail end works as a stopper for the other side of the clip.



NOTE:

Observe that, when the discs are inverted, the wheels must be changed to the other side.: right wheel to left side and vice-versa.

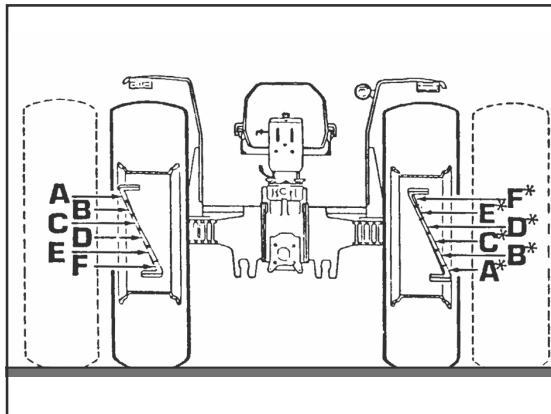


Fig. 118

4 - Preparation

Procedure to change the gauge in PAVT system

- a) Remove the stopper(s) from the master-trail in one wheel.
 - b) Place on stopper in the hole related to the desired gauge - see also the table on the next page;
 - c) Loose the locking nuts from all clips in the wheel.
 - d) Turn the engine on and, with the gear engaged and the opposite wheel locked, control the clips slippage over the trail by the clutch, until it touches the master-trail stopper previously positioned.
 - e) Disengage the gear, stop th engine and place the other stopper on the master-trail.
 - f) Repeat the same procedure for the other wheel.
- * For the "A and F" arrangements, it is used only one stopper, because one side of the clip is directly supported over the master-trail end.
- * If the option is for one of the inverted discs gauges*, first invert the wheel sides and then position the wheels master-trail stoppers as described above. Raise the tractor rear and support it securely.
- * See the tightening torque specifications for PAVT wheels in Section 6 - "Maintenance".

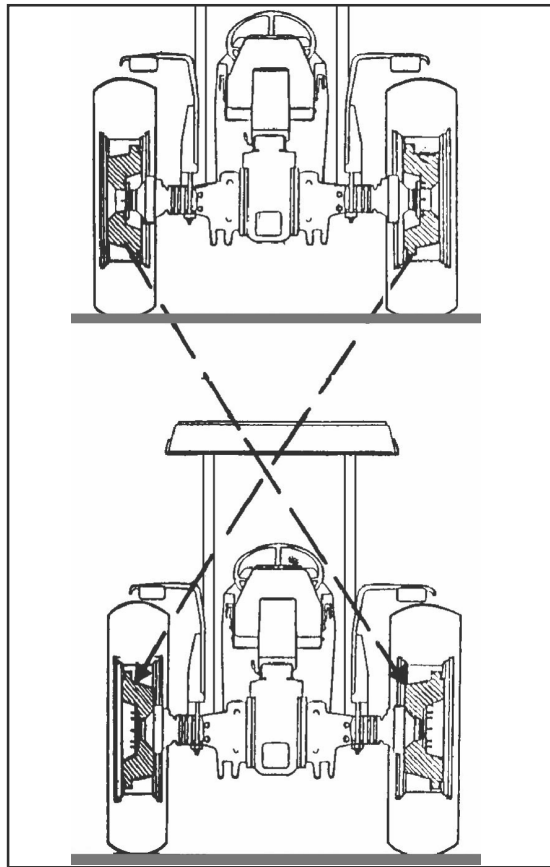


Fig. 119

TRACTOR / DRIVING outwards (*)	ARRANGEMENT / GAUGE											
	With the discs facing inwards						With the discs facing					
	A	B	C	D	E	F	G *	H *	I *	J *	L *	M *
MF 460 18.4x34R1	1420	1525	1625	1725	1825	1930	1830	1930	2030	2130	2230	2330
MF 470 18.4x34R1	1420	1525	1625	1725	1825	1930	1830	1930	2030	2130	2230	2330
MF 480 18.4x34R1	1625	1725	1825	1925	2030	2130	2035	2135	2235	2335	2435	2535

*Depending on the tyres driving time, some gauges can not be mounted.

4 - Preparation

D) Casted disc wheel

These wheels have a casted disc, similar to the PAVT system, which allows the counterweight assembly.

The wheels usage for this type is for larger tyres to be used in hard ground, i.e., "R1" type claws.

Depending on the tractor and the rear tyres wearing, up to 4 different arrangements can be achieved - "R, S, T and U".

However, due to the large tyres, only one or two gauge variations can be achieved, as indicated in Table V.



Fig. 120

4

Table V: Gauges for the rear axle with casted disc wheels

	Arrangement / Gauge			
	R	S	T	U
MF 460-MF470/23.1x30R1	x	1830	x	1875
MF 460-MF470/23.1x30R2	x	x	x	1875
MF480/20.8x38R1	x	1720	1790	1890
MF480/18.4x38R1	x	1685	1790	1895

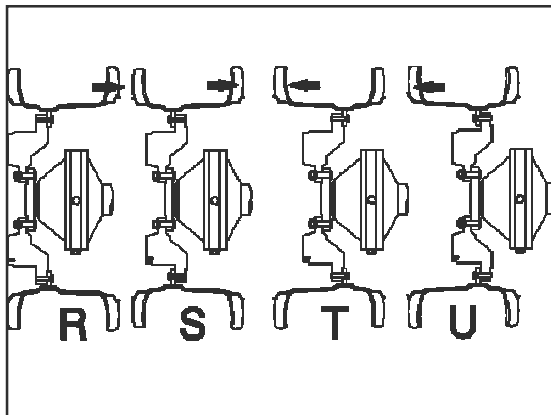


Fig. 121

4 - Preparation

3 - Recommended tyres for your tractor

3.1 - Compatibility between front tyres x rear tyres

It is essential the use of front tyres compatible with the rear tyres for 4x4 tractors.

For these tractors, there is a defined ratio for the tyres diameter which must be kept, otherwise the front traction will lose its effectiveness and mechanical damages may occur. The tyres will also present a premature wearing!

4

The use of wheel of different diameters, to meet the specific operational requirements, will demand the change of the transmission gear ratio, represented aside. This will require an specialized technical knowledge.

In this case, contact your Dealer.

NOTE: Also, do not mix rice-type wheels (R2) with regular type tyres (R1).

Besides the compatibility between the rear and front axles wheel, observe too the claws wearing level and their correct inflation pressure (See the recommended tyre inflation pressure table in the maintenance section).



Fig. 122

There must not be accentuated differences between the rear wheels wearing and front wheels wearing, as this results on the same consequences from the use of incompatible tyres;

The table below presents the combinations which can be used to choose new tyres for 4x4 tractors.

So, never use tyres of 2 different options. In other words, if you choose type "1" rear tyres, the front tyres must necessarily be type "1" tyres.

Recommended combinations for rear x front wheels.

MF 460

Wheel's combinations MF 460	Front wheels	290/95 R34								
		9.00-16F2 (8L)	9.00-16F2 (10L)	10.00-16F2 (8L)	12.4-24R1 (6L)	14.9-24R1 (6L)	14.9-24R2 (6L)	14.9-26R1 (6L)	14.9-28R1 (6L)	14.9-28R2 (6L)
Rear wheels	Disc/Aro types	Middle wheel	Heavy wheel	Middle wheel	Plate	Plate	Plate	Plate	Plate	Plate
13.6-38R1 (14L)	Plate				X					
18.4-34R1 (10L)	Light Cast	X	X		X					
18.4-34R1 (10L)	PAVT	X	X		X					
18.4-38R1 (10L)	Light Cast			X					X	
18.4-38R1 (10L)	PAVT			X		X		X		
20.8-38R1 (10L)	Light Cast			X					X	
23.1-26R2 (8L)	Plate	X	X			X				
23.1-30R1 (10L)	Pressed			X		X	X			
23.1-30R2 (8L)	Plate			X						X
23.1-30R2 (8L)	Pressed			X						X
320/90 R50	Plate									X
Dual Tires										
13.6-38R1 (14L)	Pressed			X						

Example: Simple rear wheels: 320/90 R50, equals to the left side wheel: 290/95 R34.

MF 470

Wheel's combinations MF470	Front wheels	290/95 R34											
		7.50-16F2 (8L)	7.50-18F2 (8L)	9.00-16F2 (10L)	10.00-16F2 (8L)	10.5/80-18 (10L)	13.6-24R1 (Radial)	14.9-24 R1 (8L)	14.9-24R1 (6L)	14.9-28R1 (8L)	14.9-24R1 (Radial)	14.9-28R1 (Radial)	16.9-28 R1 (8L)
Rear wheels	Disc/Aro types	Middle wheel	Heavy wheel	Heavy wheel	Middle wheel	Heavy wheel	Plate	Plate	Plate	Plate	Plate	Plate	Plate
16.9-34R1 (Radial)	Plate	x					x						
18.4-34R1 (10L)	PAVT	x	x						x				
18.4-34R1 (10L)	Light Cast	x	x		x			x	x				
18.4-34R1 (10L)	Light Cast	x	x		x			x	x				
18.4-34R1 (Radial)	Light Cast	x	x								x		
18.4-38R1 (10L)	Light Cast				x					x			
18.4-38R1 (10L)	Light Cast				x	x				x			
18.4-34R1 (Radial)	Light Cast	x	x								x		
18.4-38R1 (Radial)	Light Cast				x							x	
18.4-38R1 (Radial)	Light Cast				x								x
20.8-38R1 (10L)	Light Cast											x	
320/90 R50	Plate												x

4 - Preparation

Recommended combinations for rear x front wheels.

MF 480

Wheel's combinations MF 480	Front wheels	Rear wheels								
		9.00-16F2 (6L)	9.00-16F2 (10L)	10.00-16F2 (8L)	14.9-24R1 (6L)	14.9-24R2 (6L)	14.9-26R1 (6L)	14.9-28R1 (6L)	14.9-28R2 (6L)	
	Disc/Aro types	Middle wheel	Heavy wheel	Middle wheel	Plate	Plate	Plate	Plate	Plate	290/95 R34
18.4-34R1 (10L)	PAVT	X	X	X						
18.4-38R1 (10L)	Light Cast			X			X			
18.4-38R1 (10L)	Heavy Pressed			X			X			
20.8-38R1 (10L)	Light Cast			X				X		
23.1-26R2 (8L)	Plate	X	X			X				
23.1-30R1 (10L)	Pressed			X			X			
23.1-30R2 (8L)	Plate			X						X
23.1-30R2 (8L)	Pressed			X						X
24.5-32R1 (10L)	Pressed							X		
320/90 R50	Plate									X

Example: Simple rear wheels: 320/90 R50, equals to the left side wheel: 290/95 R34.



4 - Preparation

3.2 - Operation with dual wheels

The use of dual wheels aims to allow to use of the tractor in poor support ground. like sandy, loose or excessively wet or waterlogged grounds,

Thus, this resource must not be considered as a solution to enhance the traction power in dried, firm ground, in services which requires extreme traction power: this will only generate overload for the powertrain!

When using dual wheels in the tractor, observe the following recommendation:

4

- ✓ For the ballasting, add water only in the inner wheels.
- ✓ The outer tire pressures must be 15% lower than the inner tires. These should be calibrated as shown in the table in section "Maintenance".
- ✓ Wheel fixing nuts tightening torque this procedure requires a more frequent inspection.



Fig. 123

4 - Power Take Off



ATTENTION:

The PTO axle and the implements connect through this shaft may be extremely dangerous; thus, always observe the following instructions:

DO NOT operate the tractor without the PTO cover installed. This cover prevents accidents, and also prevents damages for the grooves.

Before operating, adjusting or working with PTO-driven implements, uncouple the PTO, stop the engine and remove the key from the ignition. DO NOT work under lifted equipments.

Before coupling a PTO-driven equipment and after using it, ALWAYS lift and lower the implement very carefully, using the Positioning control. Also, check for plays, the correct slippage of the PTO axle and its joints.

Make sure the PTO protection is installed.

Make sure all PTO-driven implements are equipped with the correct protection devices, in good working conditions and complying with the current safety standards.

NEVER step on the cardan axle.

Also, never use the traction bar or the implement as a support or step.

NEVER use the cardan axle as a support or step;

NEVER wear loose clothes, which may be trapped in the cardan axle.

Keep yourself away from the cardan axle, at a distance equivalent to your height.

The PTO axle, installed on the tractor rear side, has 6 grooves and a 35mm (1 3/8 in.) diameter, with an annular groove for the implement coupling fixing.

For tractors with double revolution speed (540 and 1000 rpm), an additional shaft is supplied to operate at 1000 rpm.

This axle presents the same features as for the 540 rpm shaft, except for the number of grooves. 21.

Before operating, make sure the axle is correctly installed. To replace the axle, consult the procedures on the next page,

A removable cover (1) protects the grooves and the operator when the axle is not being used.

The protector (2) provides an extra protection for the operator.

4

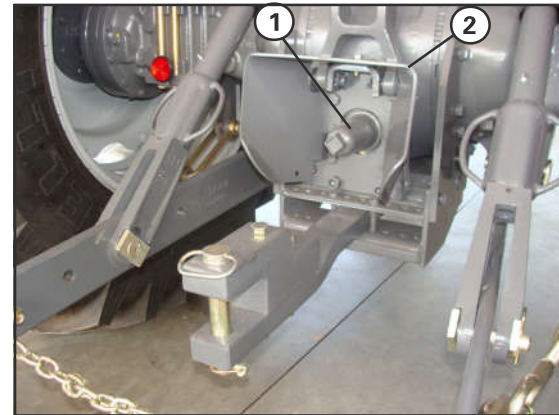


Fig. 124

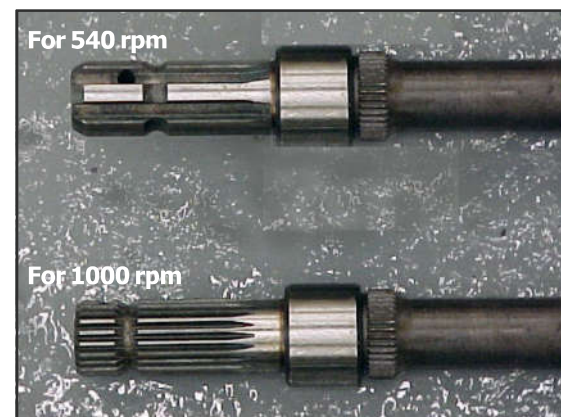


Fig. 125

4 - Preparation

4.1. Clutch stage replacement

NOTE: This procedure is necessary to allow the uncoupling of the 2nd stage in the clutch, which allows the uncoupling of the PTO:

- Clutch 1st stage:: de-activate the transmission for the wheels.
 - 2nd stage (total travel): keeps the transmission coupled and de-activates the PTO.
- The limiting stopper selects between the 1st and the 2nd stage and is located over the clutch pedal.

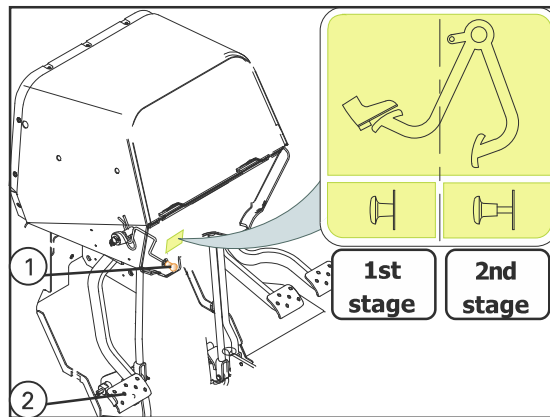


Fig. 126

4

To use the PTO/Deactivate the 2nd stage:

- a) Pull the handle (1) on the limiting stopper for the clutch 2nd stage.
- b) The clutch will be released to use the PTO.

After using the PTO

- a) With the foot not on the clutch pedal (2), push the handle (1) for the limiting stopper of the clutch 2nd stage.
- b) The clutch will be locked for the 2nd stage.

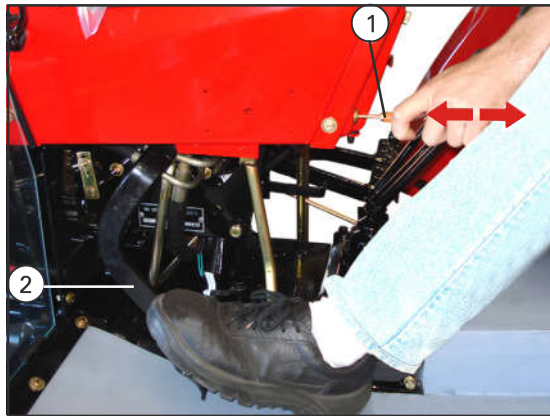


Fig. 127

4.2 - Independent Power Take Off

It is not necessary to use the clutch pedal to operate this system. With the engine working at low rpm, move the IPTO driving lever forward again and, then adjust the engine speed to achieve the desired rpm on the axle, as indicated on the tachometer panel Display. To uncouple it, reduce the engine speed and move the IPTO driving lever backward.



CAUTION!

Never operate the PTO while the engine speed is above the recommended rpm:
630 rpm for the 6 grooves shaft;
1170 rpm for the 21 grooves shaft;



Fig. 128

4 - Preparation

4.3 - Output shaft replacement

- a) Position the tractor so that its rear part is higher than the front side. This will prevent oil leakage through the axle housing.
- b) Stop the tractor and engage the parking break.
- c) Remove protection cover (1) from shaft.
- d) Using an appropriate tool, remove the threaded cover (2).
- e) With the help of an universal pliers, compress the snap rings ends (3), releasing the ring from the housing.
- f) Manually, pull the axle out of housing.
- g) Insert the other axle, carefully fitting it on the inner gear grooves.
- h) Mount the snap ring on its respective groove and then install the cover (2).
- i) Apply grease on the cover, after changing the output shaft.



NOTE

Never operate the tractor if the axle is not installed. Before adjusting or service the PTO-driven equipment, always turn the tractor off and apply the parking brake.

4.4 - Changes on the panel programming

Due to the existence of an electronic system to detect the speed of the power take off axle on the panel, it is necessary to change the whole programming whenever the the shaft is changed.

For that, proceed as follows:

Procedure

- a) Stop the tractor and engage the parking break.
- b) Open the cover to access the fuses (1).
- c) Remove the three bolts (2), turning them on the counterclockwise direction and then remove the cover (3).



NOTE:

There is a lock to perform the closing between the harness and the cover (3). Be careful with the assembly, as the dust and dirt can get on the electronic board and damage it, if this lock is removed.

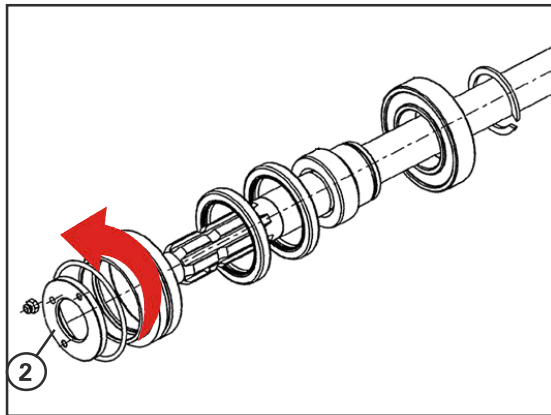


Fig. 129

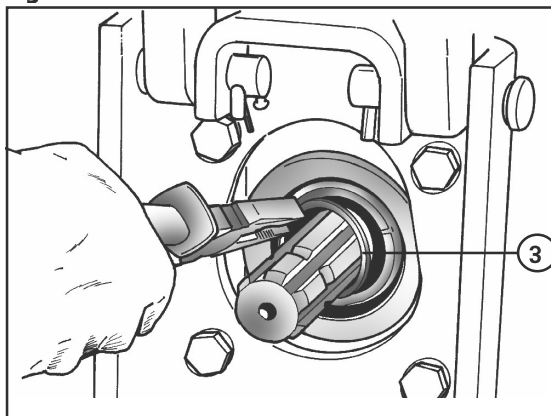


Fig. 130

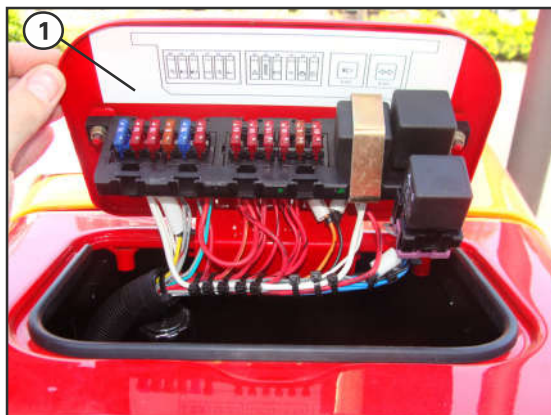


Fig. 131

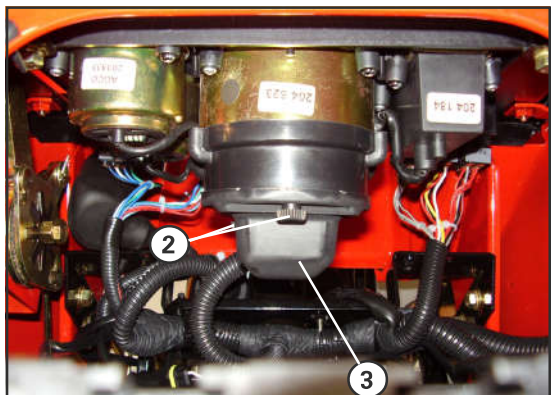


Fig. 132

4

4 - Preparation

- d) Turn the ignition key to the position where the panel lights come on. The tachometer Display must turn on.
- e) Press the PGRI button, located behind the tachometer, as many time as necessary, until the PTO programming value is displayed.
- f) Use the programming values below, according to the application of the power take off.

Programming parameters - 12x4 transmission	
540 rev/min	1000 rev/min
PTO 01	PTO 02

4

To change the parameter value, move the power take off driving lever (4) as many times as needed to setup the correct value.

- g) Turn the ignition key off so that the new programming will be stored.
- h) Re-install the cover (3) with the locks (2) and fit the panel back on the tractor console.
- i) Start the engine and check the speed displayed on the panel.

NOTE

Check the speed which is being measured on the power take off. The decal on the speed scale shows the revolutions the engine must be, in order to achieve 540 or 1000 rpm.

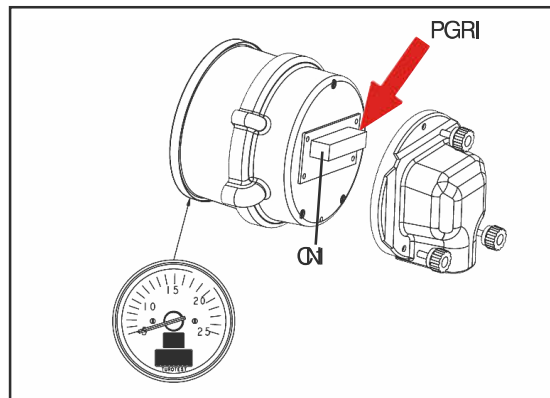


Fig. 133



Fig. 134

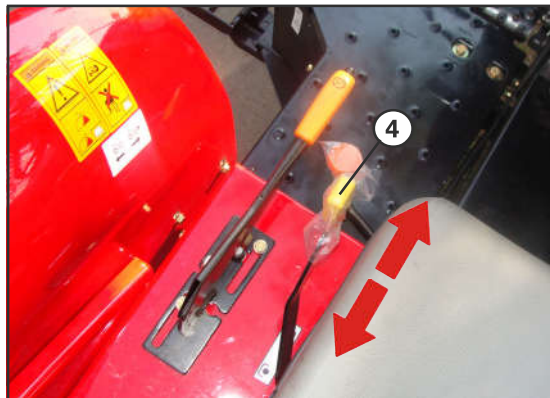


Fig. 135

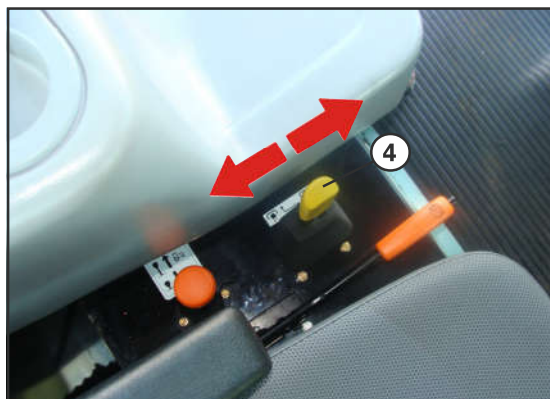


Fig. 136

5 - Traction Bar

The Series 200 tractor may be equipped with 3 types of traction bars, as shown below.

All bars, except for the straight one, allow the height adjustment from the ground.

Fig. 108 - Straight bar.

Fig. 109 - HD Bar with step and head

Fig. 110 - Bar with step

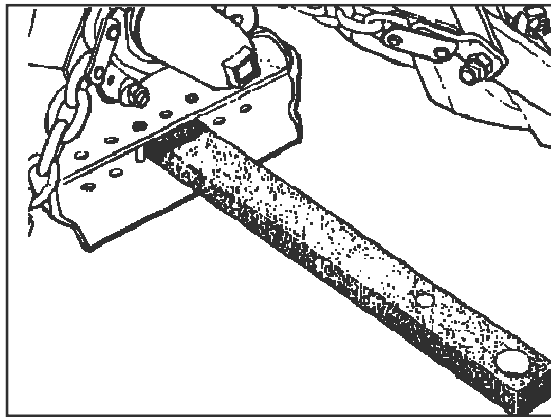


Fig. 137

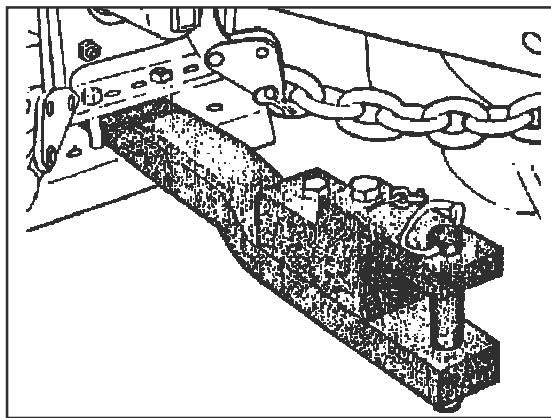


Fig. 138

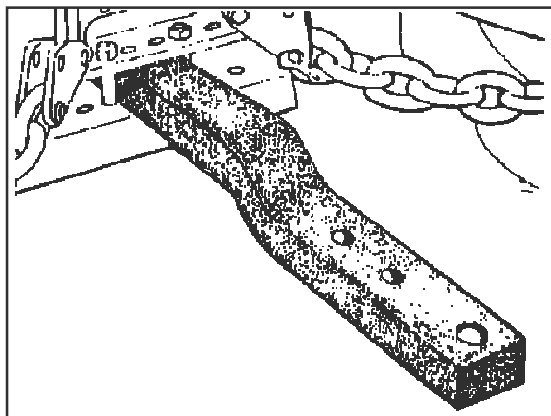


Fig. 139

5.1. Traction bars height change

Straight type bar

Does not allow changes on its height.

Bar with step without head

Allows 2 different heights:

- 1° step upward
- 2° step downward

Bar with step and head

Allow 4 height adjustment position - see illustration.

- 1 - With a step downward and head upward.
- 2 - With a step and head downward .
- 3 - With a step upward and head downward.
- 4 - With a step and head upward .

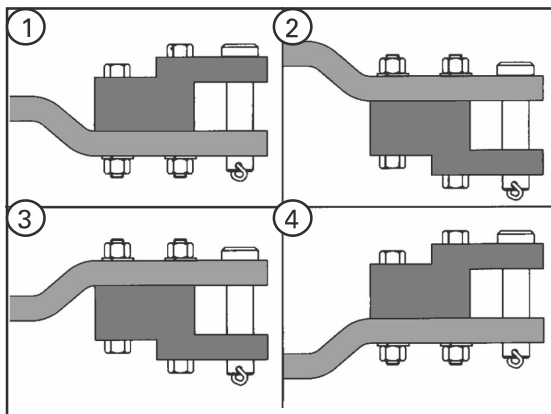


Fig. 140



4 - Preparation

The change on the traction bar height from the ground aims to allow that the the implement or trailer bar be in a parallel position to the ground, in case the implement header has a different height.

When the bar bar is not parallel the ground, two problems may occur:

- A - Bar too low: the tractor loses adherence on the rear axle.
- B - Bar too high: the tractor loses weight and stiffness on the front axle.
- C - Bar (or header) correctly leveled.

4

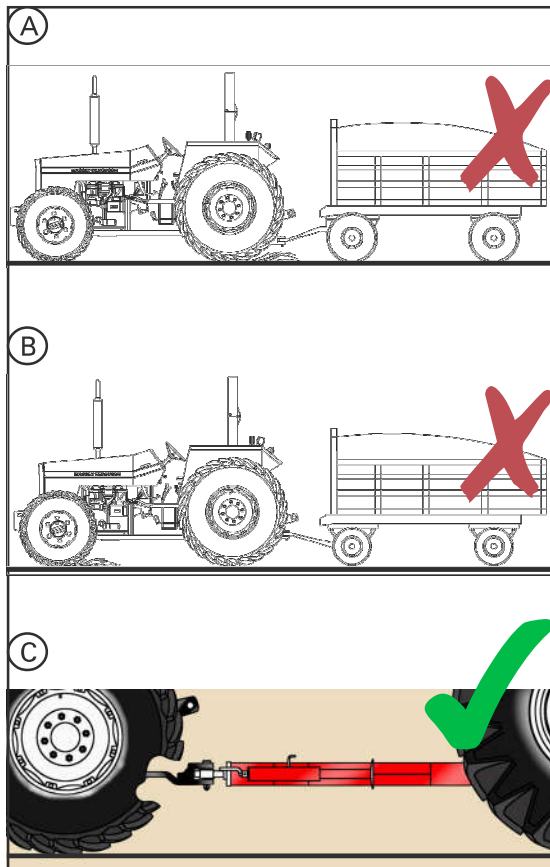


Fig. 141

5.2. Traction bars length change

To make the changes, remove the lock (T) and the pin (P) under the rear housing and move the bar to the desired position.

Then, re-install the pin and the lock.

CAUTION!

In some tractor, instead of a "R" type lock, the locking can be achieved by a small plate fixed by bolts. In either case, always lock the pin correctly!!!!

The length change is necessary in 2 situations:

- 1 - When towing implements or trailers: if the implement header interferes with the claws on the wheel in tight turns, the bar must be extended, To tow trailers, try to use the bar in its shortest position, due to the weight that acts vertically over the bar and/or due to bar warpage.
- 2 - Operation with double speed PTO / IPTO: keep the distance "A" on the correct length between the PTO shaft end and the pin center, on the traction bar.

See below:

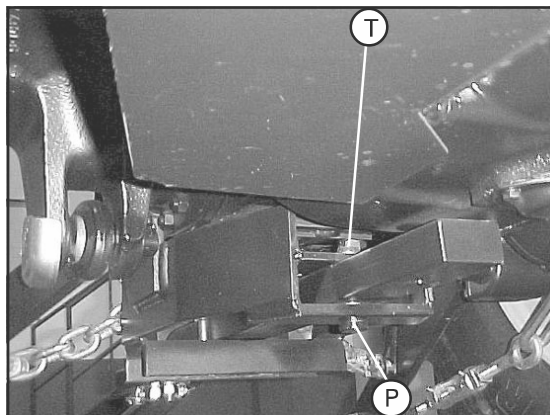


Fig. 14

4 - Preparation

- For PTO with 540 rpm shaft, A = 356 mm (14 in.)
- For PTO with 1000 rpm shaft, A = 486 mm (19 in.)

5.3 - Operation with traction bar.



WARNING!

To tow trailers or implements on public roads, it is recommended the use of a safety chain (1).

The chain must feature a resistance larger than the towed equipment gross weight, in order to keep the control in case of break or damages to the coupling pin, or some other component.

After installing the chain, make some maneuvers to check if the equipment adjustment is correct. This adjustment must allow tight turns, but without large radius.

NOTE: The traction bar support may be equipped with a handle to fix the safety chain (1) - see figure below.

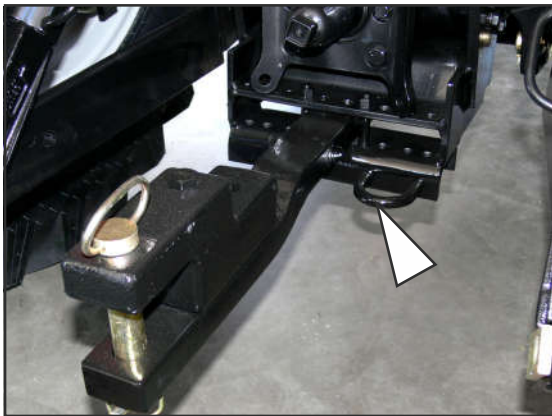


Fig. 145

Bar lateral displacement

In some cases, when operating with implements assembled on the hydraulic lifting and/or operated with the PTO axle, it is necessary to move the bar sideways or remove it from the tractor, in order to avoid interferences with the cardan shaft or implement parts with the traction bar.

Remove one of the pins (2), displace the bar and re-install the pin and the lock.

Bar lateral oscillation

While towing large ground tool, it may be convenient to low the swing bar. To do so, remove the pins (2).

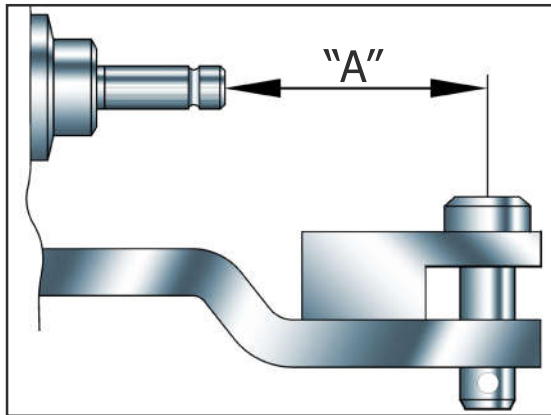


Fig. 143

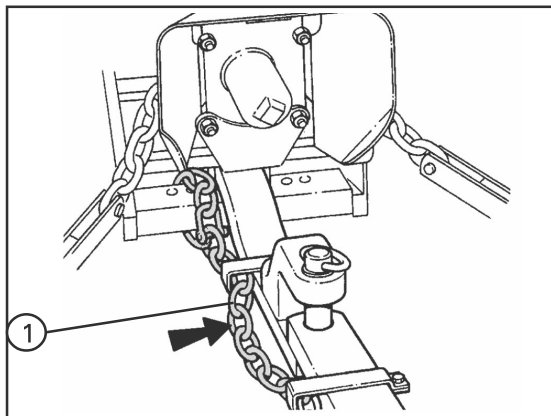


Fig. 144

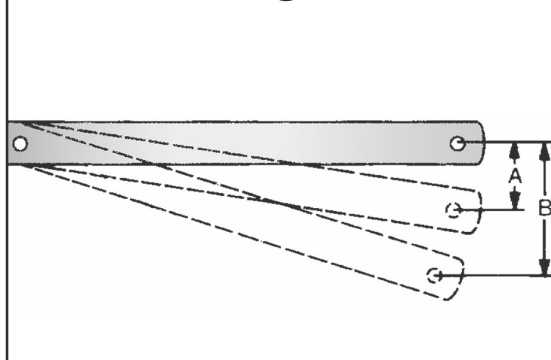


Fig. 146

4

4 - Preparation

6 - Protection Structure Against Roll Over (EPCC)

The EPCC is designed to protect the operator in case of a roll-over. The EPCC upper side can be folded to be transported in a truck, or for field working situation where the height limits its use. When the EPCC is folded, the seat belt **MUST NOT** be used. Pay double attention in such situation. On the folded position, the structure does not provide protection for the operator.

The EPCC must be kept on the vertical position the whole time, unless it is being operated under the situations described above.

Always keep the EPCC in the vertical position and locked. In this case, the seat belt **MUST BE** used and buckled.

If the EPCC is damaged during the operation:

DO NOT Weld, drill holes, fold or disassemble it.

DO NOT - Operate the tractor with a damaged EPCC.

Observe the following point too:

DO NOT - Fix chains, ropes or cable to the structure to tow anything. Use only the traction bar lower part for towing.

DO - Make sure the structure is correctly fixed to the tractor.

DO - Make sure all components are in good condition, in order to obtain the intended protection

DO - Always use only Massey Ferguson original parts to make sure the structure integrity will be kept during its maintenance.



CAUTION:

The following additional precautions must always be carefully observed:

▲ *Use the seat belt the whole time, unless the structure upper part is folded. Adjust the seat belt to a comfortable position.*

▲ *If the tractor rolls-over, grab the steering wheel firmly. Do not try to jump from the tractor. But, if the EPCC is folded, abandon the tractor immediately.*

▲ *Make sure the safety decals are always unobstructed or covered for future reference.*

▲ *A plastic hood installed does not offer any protection against falling objects.*

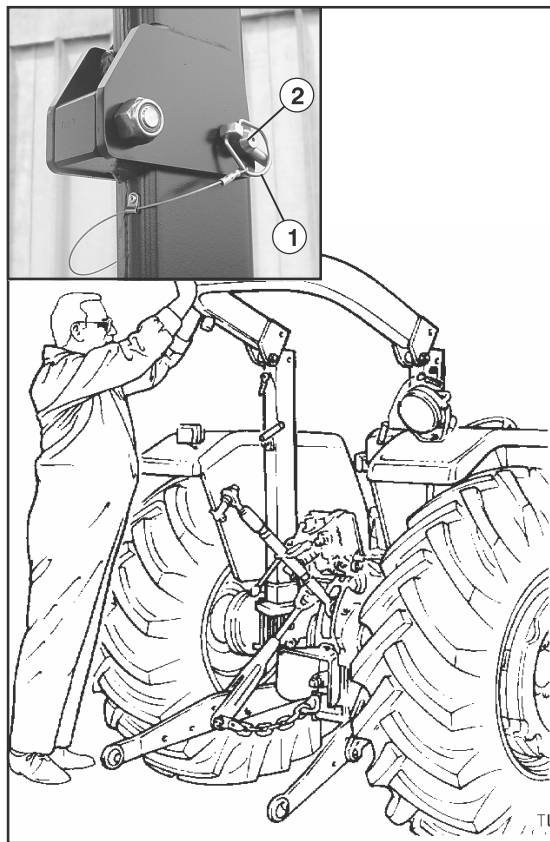


Fig. 147

Procedure to fold the EPCC (If equipped)

To fold or position the EPCC in the vertical position, procedure as follow:

- 1 - Remove the two pins (1).
- 2 - Keep the structure static and remove the locking pins (2).
- 3 - Take extra care (the structure upper part is very heavy) to fold the frame to the rear.
DO NOT allow it to fall freely.
- 4 - Do not allow it to damage other parts on the tractor, like, for instance, rear service lights, 3rd point arm, etc.
- 5 - To adjust the structure to the vertical position, do the procedure in the inverse order, taking care to keep your hands away from articulated parts.

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5 - Operation

5

1 - Before starting

Before starting the engine, consult the maintenance chart and check the items listed in the maintenance every 10 hours or daily.

Then, proceed as follows:

- 1 - Check every system for eventual leaks.
- 2 - Check the brake fluid level.
- 3 - Check the water level in engine cooling system.
- 4 - Check the condition and tension of compressor and fan belts.
- 5 - Check the engine oil level.
- 6 - Check the quantity of fuel in the tanks.
- 7 - Check the tightening of wheel mounting nuts, the correct fastening of hose clamps, connections and electrical connections and operation of panel instrument.
- 8 - Check that all tractor systems are suitable for the job to be done. For example: power take-off shaft (if it is type 1000/540), height and length of the steering rod, remote control, etc. For checking these, see the Preparation Section.
- 9 - In addition to the adjustments in the tractor, you must know how to adjust the implement to be used. For these setups, you must see the the Implement Manual.

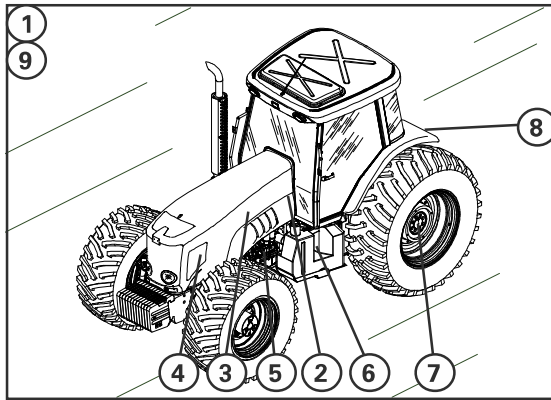


Fig. 149



NOTE

Always fill the tractor fuel tanks after every working day. Keeping the tank full avoids that, during the night, the air condenses and changes into water inside the tank, that mixed with gas is highly harmful to the injection system.



CAUTION:

Always start the engine with the tractor at a ventilated area, that is, never at closed environment: the exhaust gas can cause suffocation.

If the tractor has not been used for a long period of time, it is convenient to operate the manual bleeding pump several times.

5 - Operation

2 - Before starting the job

The first point to check is if the tractor preparation is suitable for the job to be done.

- 1- Need to adjust the gauges. Details in the Preparation section in this manual.
- 2 - Ballasting need. Details in the Preparation section in this manual.
- 3 - Power take-off adjustments: replacement of shaft (for IPTO 540 and 1000 rpm only). Details in the Preparation section in this manual.
- 4 - Implement engagement and 3-point hydraulic lifting system. Details in the Operation section in this manual.
- 5 - Remote control preparation and connection. Details in the Operation section in this manual.
- 6 - Steering rod adjustments. Details in the Operation section in this manual.



Fig. 150

5

Electronic systems - ATS

When the tractor is equipped with ATS (AGCO Technology Systems) check:

- 1- Check operation screen. Details in the equipment manual.
- 2 - Check the GPS signal, trying to identify if the signal will be good during the working period intended. Details in the equipment manual.



NOTE

The navigation systems depend directly on the quality of signal made available by the satellites around the planet. Thus, the quality variation depends on the atmospheric conditions and the earth rotation movement.

- 3 - Recalibrate the angle of each wheel and marking line daily, this will avoid potential mistakes. Details in the equipment manual.
- 4 - Check that the signal receptors (base station or antenna) are receiving the data correctly. Details in the equipment manual.



Fig. 151

3 - Tractor start and dislocation



ATTENTION!

Read carefully this Manual to get information about all procedures and safety rules (Safety Section). Your life and other people's lives are at stake the moment you start and dislocate the tractor.

Start the engine at well ventilated places, never in closed environments.

- 1- Follow the procedures mentioned in the previous page.
- 2- Follow the daily maintenance procedures strictly as recommended in the Periodic Maintenance Chart (Maintenance Section).
- 3- Periodically, check that the safety start switch operates properly. **The switch prevents starting the tractor with the clutch pedal disengaged to the stroke end.** Check as follows:
 - Stop the engine and disengage the gearbox.
 - Try to start without engaging the clutch. The starter SHALL NOT work, indicating that the switch is working.
- 4- Make sure there are no people or objects near the tractor.
- 5- Be correctly positioned on the seat.
- 6- Check if the parking brake is not engaged.
- 7- Press the clutch pedal totally and disengage the gearbox.
- 8- Keeping the clutch pedal pressed, turn the starting key to position "4" (start). As soon as the engine starts running, release the key. It will return to position "2" automatically.
- 9- Set the manual accelerator to reach around 1200 rpm and let it run for around 1 minute. While it runs, note the indicators and lamps on the panel. Pay attention to eventual abnormal noise. If necessary, stop the tractor immediately and take the necessary measures.
- 10- Press the clutch pedal completely, disengage the parking brake and select a gear.

- 11 - Lift the implement if engaged.
- 12 - Release the clutch pedal smoothly and move the tractor without submitting it to work load. This must be performed just when the temperature indicator reaches the green range (normal).
- 13 - With the tractor running, increase the rotation and/or shift the gear in order to reach the speed wanted. Consult the instructions about the gear selection, rotation and speeds in this Section.



NOTE:

Never rest the foot on the clutch pedal or brake pedals. This causes wearing on the brake discs, bearings and clutch disc.

5

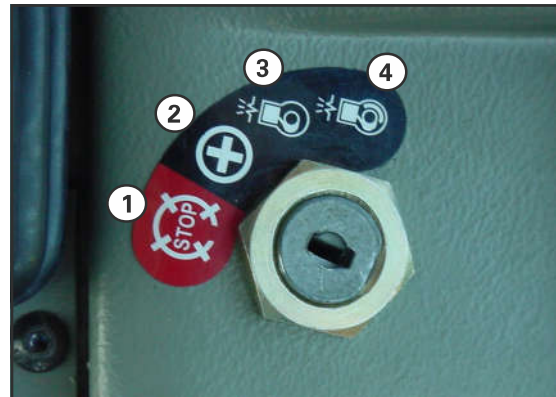


Fig. 152

5 - Operation

3.1 - Influence of the protection system over the tractor operation

Every tractor command and control remain the same. However, observe the following:

- 1- When turning the starting key to "ignition" position - "3", the engine must be started within 36 seconds at most. Otherwise, the protection system will cut the pump solenoid current, because the panel warning lamps have already been on for 36 seconds. The protection system "understands" this as abnormality. Thus, if the key remains on for 36 seconds for any reason, turn it off after performing the start procedure normally. Because when turning off the key, the system restarts the time countdown.
- 2 - If the protection system operates, stop the engine.

5

3.2 - Influence of the protection system over the tractor maintenance

The only difference in the maintenance procedures is the fuel system bleeding, more specifically in the high pressure circuit (injection pump and nozzles). The injection pump solenoid needs to remain powered during the procedure to allow the fuel flow and air elimination.

To do so, it is necessary to turn the key to the 2nd position. But, as explained before, 36 seconds after turning on the key and the engine has not started, the protection system cuts the solenoid current.

The solution for that is to turn off the starting key and turn it on again, whenever the solenoid closes.

Repeat this procedure as many times as necessary during the pump and nozzles bleeding process.

So, the injection pump and nozzle bleeding is necessary in special cases only, such as when running out of fuel during the operation or disassembling the high pressure system (tubes, injection pump or nozzles).

The fuel filter bleeding, after replacement, is performed normally, with no need to keep the solenoid pump powered.

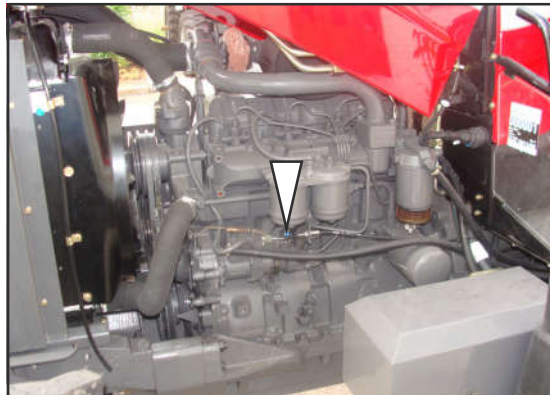


Fig. 153

3.3 - Alternative start resources

Though it is possible to start the engine in two ways, as it will be shown, it is always good to remember that the ideal is to keep the electrical system in perfect conditions, avoiding problems, damages to the tractor and even accidents.

NOTE
Even using one of the the alternative start resources, the engine will only start if the battery has conditions to keep the injection pump solenoid (1) powered, when equipped, (fuel flow released).

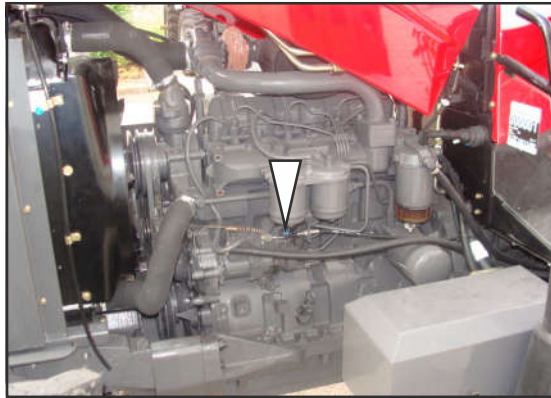


Fig. 154

Using auxiliary battery

When this resource is necessary, do not connect the auxiliary battery cables to the bornes of a weak battery. This can damage the battery and even make it explode.

IMPORTANT:
Use cables with claws with enough capacity for the current used.

Correct procedure

- Connect a cable between the positive bornes (2) of the auxiliary battery and the positive borne (3) of the weak battery (in the tractor);
- Connect the other cable to the negative borne (5) of the auxiliary battery and lean the other end of this cable firmly against a good point of mass (4) - it can be the engine housing or the transmission.

Then, follow the regular start procedure as described previously.

Start by towing

This resource must be used as the last alternative only.

- Select a high gear (from 10th on).
- Set the manual accelerator to half stroke.
- Turn the starting key to 2nd position (ignition).
- Tow the tractor until reaching the speed around 5 km/h
- Release the clutch. As soon as the engine starts running, stop, engage the parking brake and disengage the gearbox.

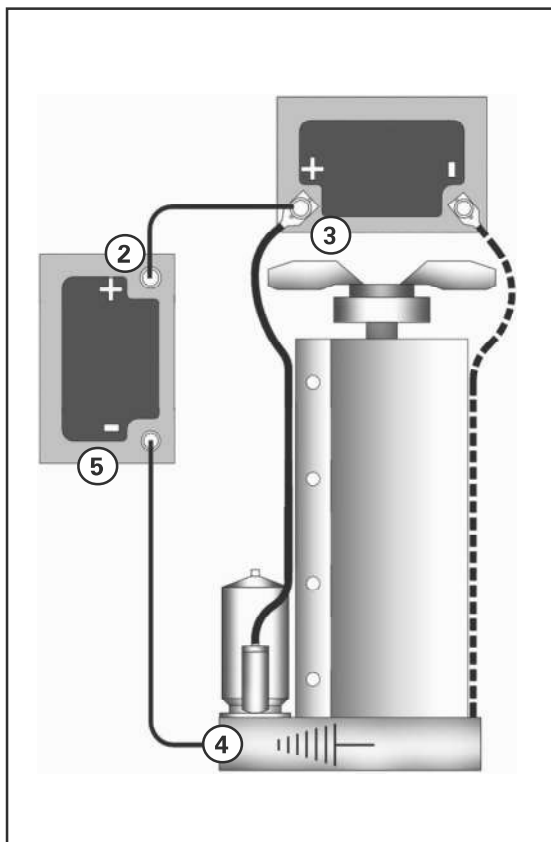


Fig. 155

5 - Operation

4 - Tractor and engine stopping

- 1- Stop the tractor, applying the clutch pedal to the stroke end. Then, apply the two brake pedals.
- 2- Set the accelerator to idle.
- 3- Set the gearshift levers to neutral and engage the parking brake.
- 4- Lower the implement to the ground (if engaged).
- 5- Let the engine idling for 30 seconds to 1 minute, to balance the engine temperature.
Just then start the engine.



NOTE

For Turbo engines, failure to observe the rule above will damage the Turbo bearings that, by inertia, keep on spinning in high speed without being lubricated.

Idling for 1 minute will allow that the turbocharger reduce the speed and lower the temperature in a controlled manner.

5



ATTENTION!

Failure to observe the procedures above will damage the Turbo bearings (2) that, by inertia, keep on spinning in high speed without being lubricated.

Idling for 1 minute will allow that the turbocharger reduce the speed and lower the temperature in a controlled manner.

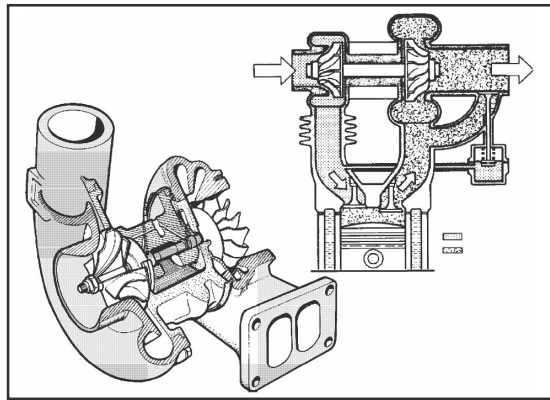


Fig. 156

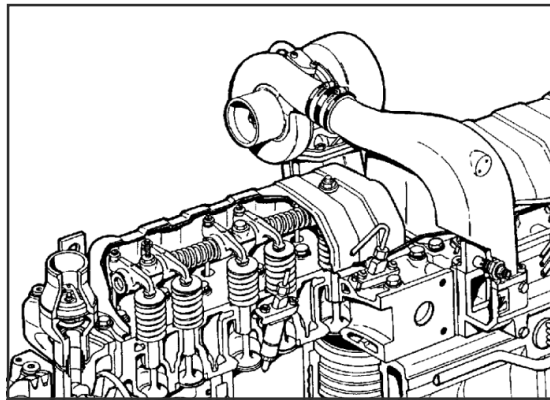


Fig. 157

Emergency Stop

In tractors with solenoid fuel-cut, in case there is an electrical fault and the engine does not stop even turning off the starting key, turn off the power supply (1) of the fuel-cut solenoid of the injection pump.

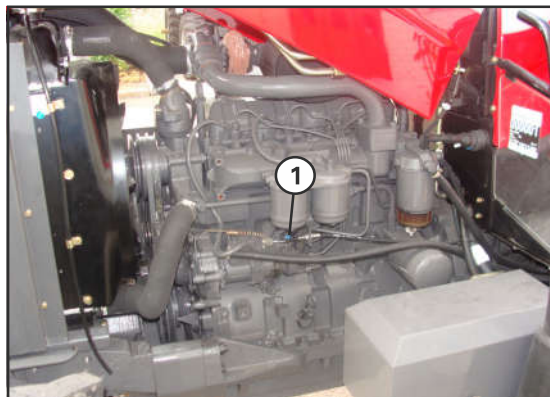


Fig. 158

5 - Run-in instructions - New engine

Engine run-in

Your Massey Ferguson tractor will have a better performance, bigger yield and bigger saving if in the first 100 hours some special care is taken. It is called the "Run-in" Period. This is the stage when the parts go through an adjustment process.

This adjustment must be done in the best way possible, following some important recommendations:

- 1- Avoid extended operation in low or high speed with no load on the engine;
- 2- Do not overload the engine. The overload can be seen when the engine does not respond increasing the speed or when being accelerated;
- 3- It is important to use the tractor only in field operations. Try to vary the speed and the load during the job;
- 4- Pay special attention to the indicators and warning lights on the panel. Control the temperature, pressure, engine speed, etc. frequently;
- 5- Avoid submitting the engine to the maximum load. However, if necessary, do not do so for long periods. Both the lack and the excess of load are harmful;
- 6- Consult the maintenance chart (Maintenance Section) and follow the procedures strictly.



NOTE

Failure to follow these recommendations will result in the cylinder sleeve mirroring. As a consequence, this will result in loss of power and excessive consumption of lubricant oil and fuel.

Lubricating oil consumption

During the run-in period it is normal for the engine to present a lubricant consumption slightly above the normal. It happens because the rings, piston and the sleeves have not completed the adjustment to each other.

In case of doubt, consult your dealer.

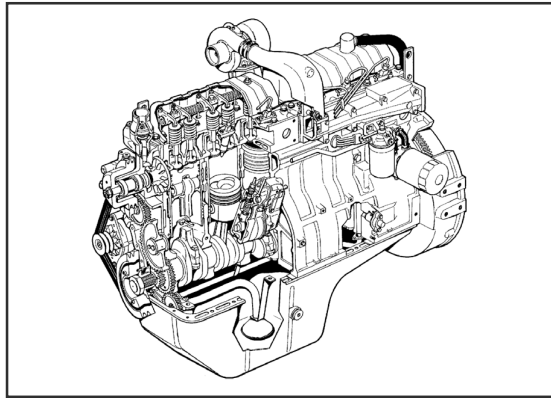


Fig. 159



NOTE

Besides the special care with the engine, the run-in also involves other cares: a more frequent retightening of nuts, bolts and clamps, the correct settling of clutch discs, fan belt inspection, etc.

5

5 - Operation

6 - Operation under temperatures near 0°C

Recommendations

- 1- Add an antifreeze product to the radiator water. Observe the proportion recommended by the product manufacturer (see table of products recommended by AGCO do Brasil - Maintenance Section).
- 2- In winter, add kerosene to the fuel. The proportion recommended is, at most, 10% of the total filling. The kerosene avoids the formation of paraffin that clogs the filters and the fuel piping.
- 3- Use engine lubricants with the viscosity range suitable for the temperature it will operate. Normally, the classification API-CH SAE15W-40 complies with all requirements. Consult your supplier about it.
- 4- To avoid problems, always keep the battery charged and the electrical system in good conditions.
- 5- Keep the radiator cap and the thermostat in good conditions. These items are essential for the cooling system operation (See Maintenance Section for more information).

5

Turbo engines

The turbocharger consist of two parts: the turbine and the compressor.

The turbocharger receives the atmospheric air through the filter and propels it with higher pressure for the engine cylinders.

For this reason, the Turbo engines practically do not suffer any damages operating in altitudes, because the turbocharger compensates automatically the pressure drop by increasing the rotor speed.



NOTE

In high altitudes, the Turbo charger does not reduce the performance as mentioned.

However, the cooling problems are the same in relation to the naturally aspired engine; therefore, it should receive the proper care concerning maintenance!

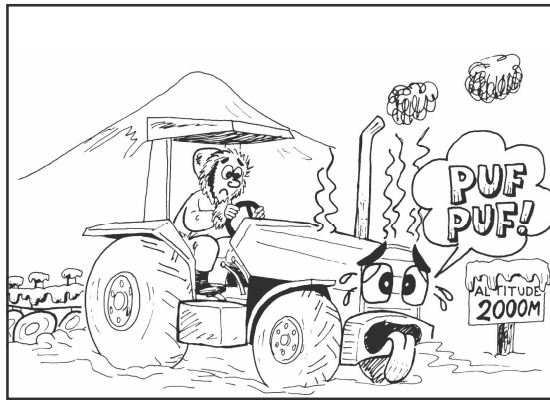


Fig. 160

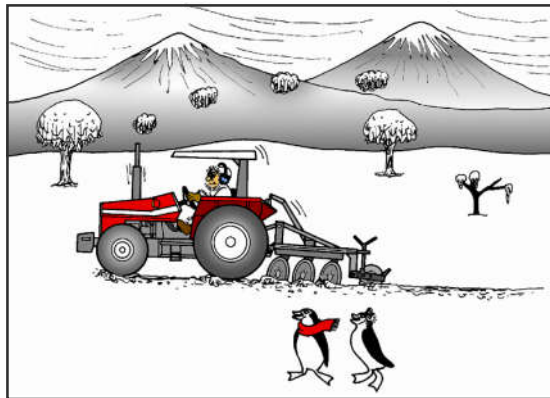


Fig. 161

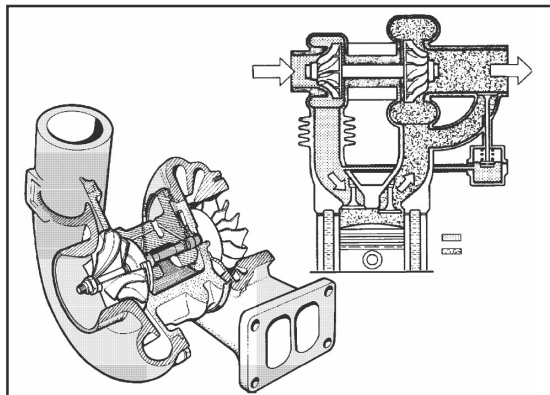


Fig. 162

7 - Operation and usage of front drive

The front drive provides bigger drive efficiency, that is, more traction force is achieved with the same engine power.

The drive must be used in jobs that require traction force, as in soil preparation operations and traction of heavy trailers. Therefore, do not activate the drive when running freely on roads or for light jobs which do not require high traction force.

The differential of front 4x4 shaft includes a mechanism that distributes automatically drive torque (force) to the wheels. This clearly reduces the slip, with no operator's interference, resulting in more traction force, less wearing on the tires and higher performance of the tractor. This resource is very important mainly in conditions where the wheel adherence to the soil is not the same on both sides: the wheel with less adherence tends to slip excessively. In this situation, the torque distribution system exercises a blocking action of up to 45%, enough to reestablish the drive conditions in normal use of tractor.

Front traction drive

The front drive improves the tractor traction conditions a lot.

The tractor is equipped with front drive of mechanical engagement. The front drive must be engaged or disengaged with the tractor stopped. Trying to engage or disengage the front drive with the tractor moving may result in internal damages to the assembly.

To engage the front drive:

Cab tractors - Fig. 148

With the tractor stopped, press the clutch and pull the lever downwards.

To disengage the front drive, always press the clutch pedal, stop the tractor and the lever upwards.

Platform tractors - Fig. 149

With the tractor stopped, press the clutch and pull the lever forward.

To disengage the front drive, always press the clutch pedal, stop the tractor and the lever backwards.

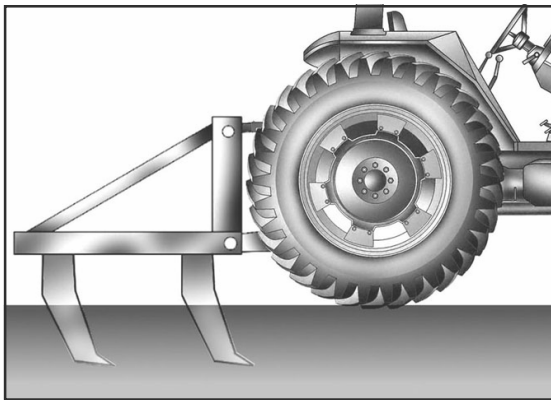


Fig. 163



Fig. 164

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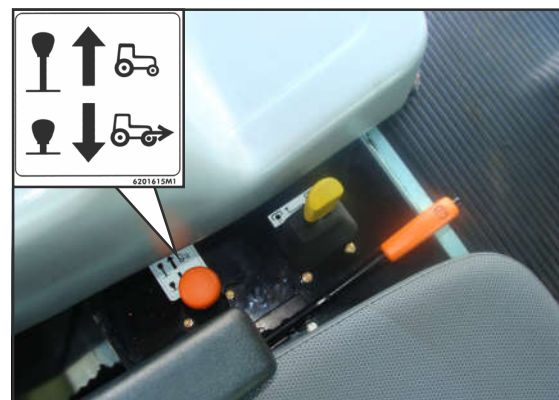


Fig. 165

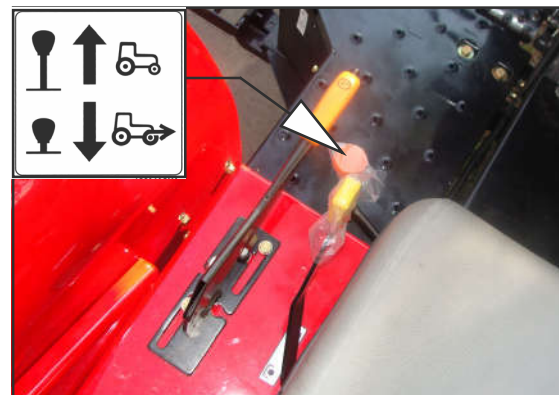


Fig. 166

5 - Operation

8 - Gear selection

In addition to correct preparation and adjustment of tractor and implement, the correct gear selection and engine speed is essential for a good tractor performance and fuel consumption. The speed shall be compatible to type of ground and implement used. Each of the agricultural operations will have an ideal speed. Consult the implement operator manual or any literature that specifies the speed suitable for the type of work to be performed.

The speed reached by each gear is directly proportional to the engine speed. So, there is a speed range for each gear which can be graphically represented to help you select the gear.

There is a decal on the right side of the operator seat which presents the speed ranges for all gears.

5

Note that there are speed range overlapping between the ranges. The speed overlapping concept is very important for soil preparation. It means. It means that the speed box was developed so that two different gears can have equal speeds during a specific section of the scale.

For example: When there is overload while the tractor is operating in the 4th gear, the speed may be kept by reducing the gear to the 3rd gear and increasing the engine speed, since it does not exceed the maximum power speed of the tractor.

8.2 - Selecting the correct range

Select the range that will cause the best fuel consumption without overloading the engine or transmission.

The soil conditions in the same field may vary every few meters; then, select the range the engine runs satisfactorily well with 3/4 for maximum power.

Transmission types

The tractor may be equipped with 1 type of transmission:

12x4 speed transmission

12 speeds forward and 4 speeds backward. In the the cabin version, the ranges are selected through two levers, and in the platform version through three levers.

8.1 - Engine and PTO Speed

Selecting the correct engine speed is also important.

Generally, every operation should be performed between 1,400 (Maximum torque) and 2,200 rpm (Maximum power).

This range will allow the Power take-off reach 540 or 1000 rpm. The speed will depend on the type of power take-off installed in the tractor (540 or 540 and 1,000). So, always check the decal on the fender.

8.3 - Using the speed table

The following table shows the speed ranges used with the tractors.

A decal with the scale supplied below (table with speed ranges for all gears) is attached on the tractor's fender. Use it together with the tachometer. The speed range table has two basic functions:

- 1- Check the tractor forward speed, when operating at an area with the speed limited.
- 2- Establish the correct ratio for each range and engine speed, so that it complies with the need of some implements operated by the PTO. For example: centrifuge machines or sprayers, etc.



NOTE

Consult the speed table on your tractor to get the correct gear and speed range.

Reading the speed range table

- 1- The bold horizontal bars represent the dislocation speed range for each gear, between the two engine speeds - 540 rpm and 1800 rpm.
- 2- To work with the PTO at 540 rpm, at approximately 9.0 km/h, the engine must be at 1900 rpm. The arrows indicate the point where the engine is at 1900 rpm in each speed range. It may be related to road speed in km/h on the top and bottom of the table.
- 3- The numbers on the left indicate 1st to 6th gears, Reduced gears, 7th to 12th directly from a gearbox of 12/4 speeds.
- 4- The information in the chart supplies the operation speed ranges; in this case, from 1400 rpm to 2200 rpm. PTO engine speed is from 540 to 1908 rpm.

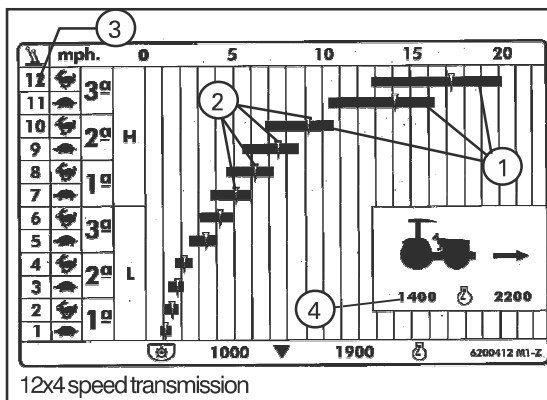


Fig. 167

5 - Operation

9 - 3-point hydraulic lifting adjustments and use

9.1 - Component identification

- A- Lower bars
- B- Levelling arms
- C- 3rd point arm
- D- Beam "C" or control beam
- E- Side stabilizers: chain type or telescopic spindles
- F- Upper arms
- G- External hydraulic cylinders - auxiliary (if equipped).
- H- 3rd point coupling latches
- I- Adjustment grip of levelling arms length and lock

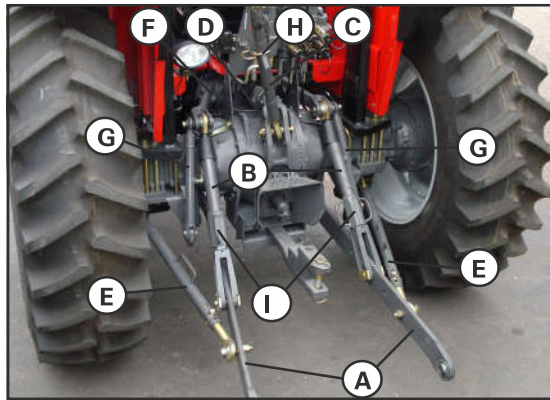


Fig. 168

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CAUTION:

Under no circumstance try to pull or tow anything by the 3rd point arm.

9.2 - Adjustments before the operation

Steering rod judder

The steering rod may be moved laterally due to some implement mounted on the lifting system, or to improve the turning radius for some specific operation.

For that, change the position of the pins (1) as necessary.



IMPORTANT:

Always use the pin locks (1).

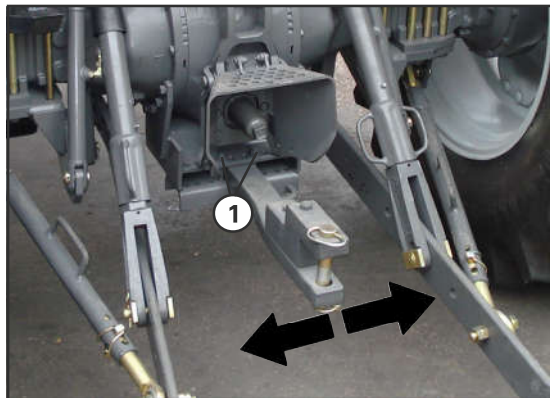


Fig. 169

5 - Operation

Lower bar relative judder

The tractor levelling arms (1) have a lock (2), which can be mounted to allow some judder between the lower bars and, therefore, side levelling of the implement.

Make this adjustment, with the implement disengaged removing the cotter pin (3) and then the pin (4).

Turn the locks (2), reinstall the pins (4) and counter pins (3).

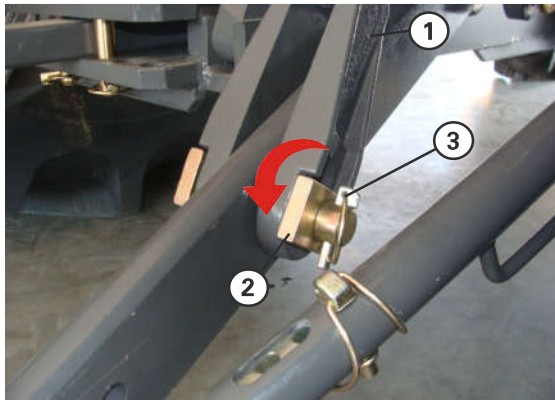


Fig. 170

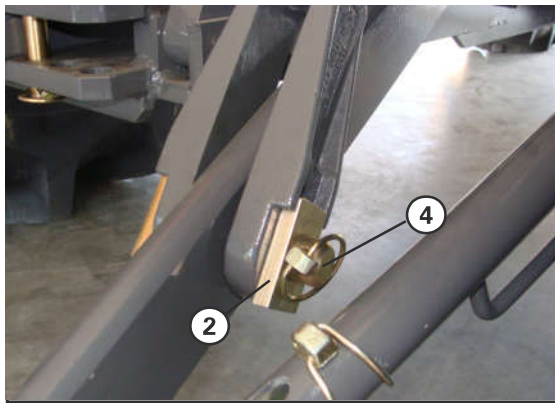


Fig. 171

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Levelling or intermediary arms

The levelling arms allow the side levelling of the implement that can be performed in 2 ways:

- Through a spindle (1) in the left levelling arm or both.
- Crank and levelling box (2), when installed, is used in the right levelling arm only.

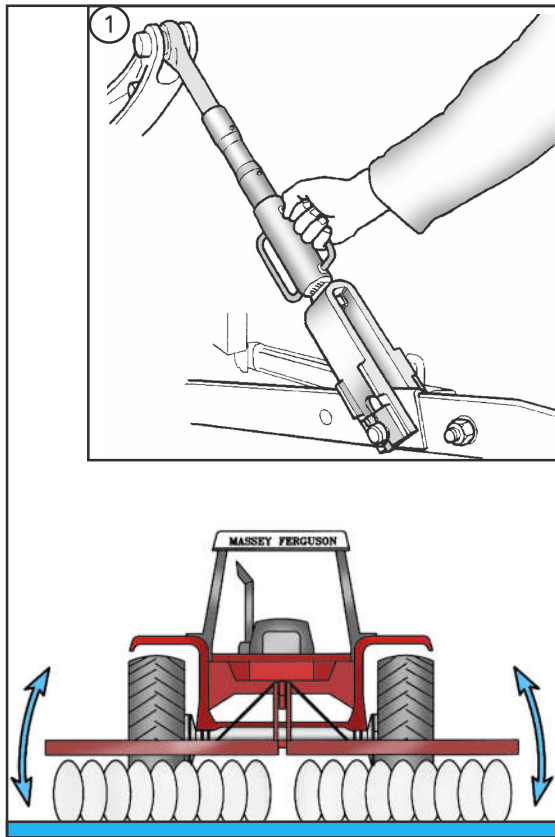


Fig. 172

5 - Operation

3rd point arm

The 3rd point arm allows adjusting the longitudinal alignment of the implement:

by shortening the spindle, the implement front is lowered and/or the rear is lifted;

by stretching the spindle, the opposite happens.

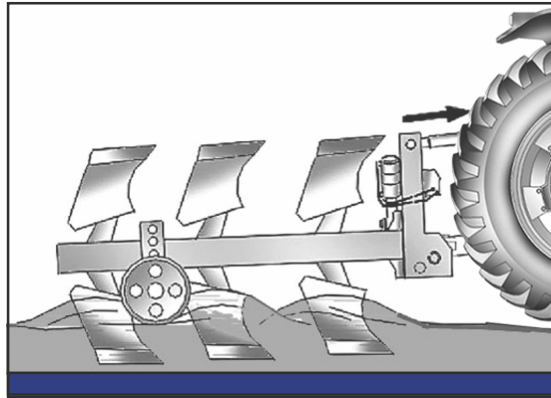


Fig. 173

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Beam "C"

Beam "C" (A) performs an important function in depth control system, both in the Ferguson system and electronic system. But for that, it is necessary to use the *Depth Control (Drive)*. It is the case for operating with implements for soil preparation, engaged to the 3-point system.

For the correct operation of this system, it is essential that the 3rd point arm is mounted in the correct hole of beam "C" and also in the implement tower, according to the table below. When engaging an implement, follow this guidance.

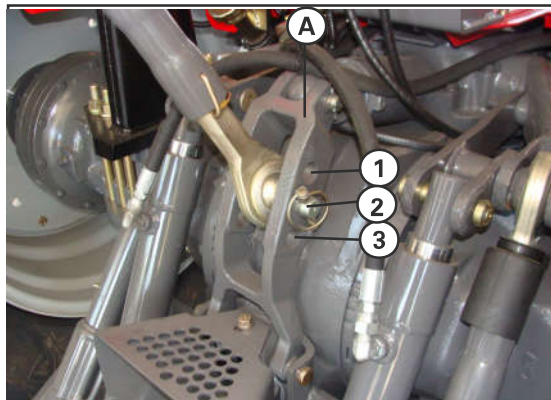


Fig. 174

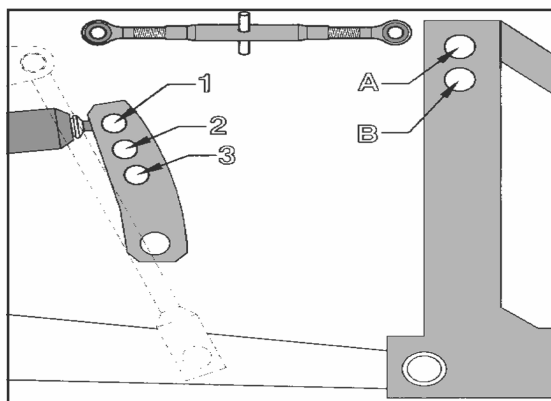


Fig. 175

Hole "1" in beam-C with hole "B" in the implement	Light and smooth soils.
Hole "3" in beam-C with hole "A" in the implement	Hard soils and transportation of implements or loads.
Hole "2" in beam-C with hole "A" and B" in the implement	Soils of medium hardness and other intermediary situations.

5 - Operation

Side stabilizers

This function is performed by the side stabilizers (F), which can be the chain (F1) or telescopic (F2) type.

When engaging an implement, follow the procedure below, according to the stabilizer type:

Chain stabilizer type (F1)

- a) Lift the implement to half the height.
- b) Turn the spindle (F1) of both stabilizer so that:
 - The implement is centralized in relation to the tractor.
 - There is a small clearance, that is, a side judder of the implement.

Spindle stabilizer type (F2)

- a) Lift the implement to half the height.
- b) Remove the pin (3) from both stabilizers.
- c) Force the implement laterally in order to get its alignment (centralization). If necessary, turn the spindle (4) make the pin installation holes match (3).
 - To allow a side judder of the implement during the job, install the pins (3) in the oblong holes (6).
 - To keep the implement with no judder, mount the pins (3) in the holes (5).

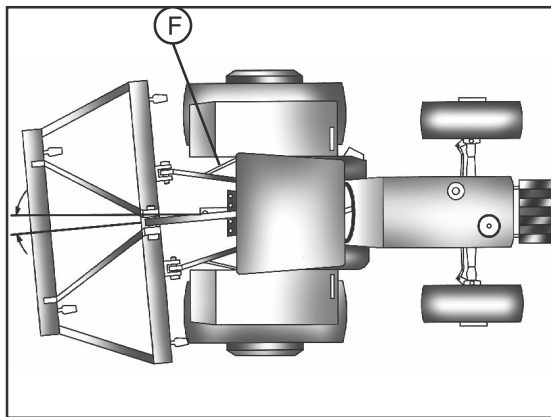


Fig. 176



Fig. 177

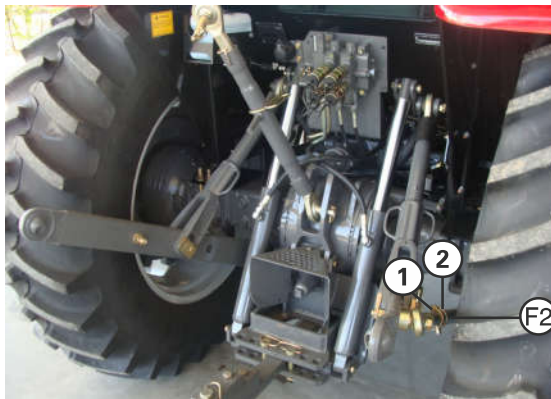


Fig. 178



Fig. 179

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5 - Operation

9.3 - Lifting system categories

For the correct engagement of implement and eventual field adjustments, take into account the function of the hydraulic system components described previously.

4200 series complies with category II in the lifting system and also some implements of category III. Standard ASAE S217.12. is followed.

Category II

L - Around 550 to 625 mm

L_1 - Around 435 mm.

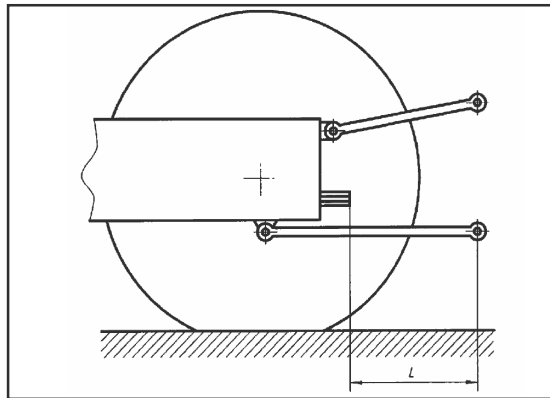


Fig. 180

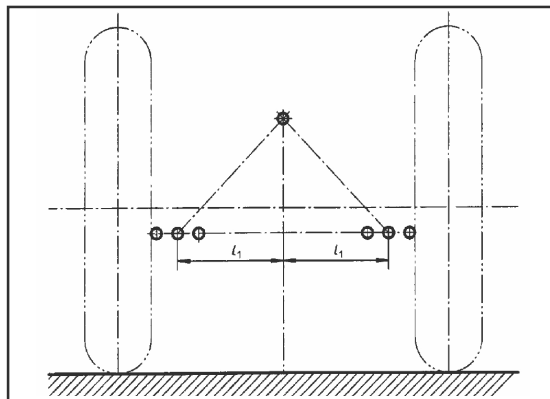


Fig. 181

9.4 - External auxiliary hydraulic cylinders

According to the lifting system capacity, the auxiliary cylinders (H) can be installed (optional), assuring its efficiency.

VIII - Extendable low bars (I - Optional)

The extensions (I) facilitate engaging implements, and should be unlocked in this situation only.

For that, lift the lock (I1) and pull the engagement end with eyelet (I) to the position suitable for engagement. Install the respective pin and after the engagement, move the tractor backwards carefully, until the lock (I1) fits the groove completely (I2).

VIII - Implements, category II

The implements used with the tractors must comply with "Category II" pattern, that is, dimensions "A and B" must get the closest possible to those shown below:

- Measurement A = 825 mm
- Measurement B = 610 mm

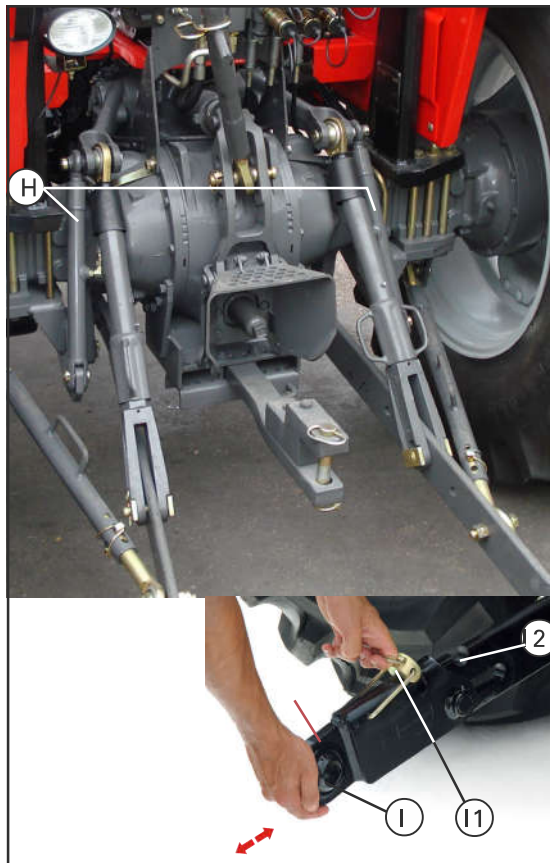


Fig. 182

9.5 - Procedure to engage and disengage implements

For the correct engagement of implement and eventual field adjustments, take into account the function of the hydraulic system components described previously.

- a) In reverse gear, move toward the implement in aligned manner, till matching the left lower bar pivot with the respective engagement pin of the implement. Install the pin and the respective lock.
To set the height for left lower bar, use just the position lever.
- b) Install the upper arm (3rd point).
- c) Engage the right lower bar. To set the height, turn the levelling box crank or the spindle (according to the model) of right intermediary arm.
- d) If it is necessary to approach or displace the the implement right pin with the eyelet of the right lower bar, turn the spindle of 3rd point arm as necessary.
- e) Install the right side pin and lock.
- f) Lift the implement and adjust the longitudinal alignment through the side stabilizing chains, as described previously.
- g) When achieving the implement centralization in relation to the tractor central line, stretch both chains and turn back one of the spindles half a turn, leaving a small clearance. Then, tighten the 2 locknuts in both spindles.
- h) Engage the cardan (if necessary) to the PTO shaft and install the respective protections.
- i) Lift and lower the implement and check the clearances, alignments and operation.

Disengaging one implement.

- a) **IMPORTANT:** Select a flat, even and stable surface where the engagement operation is also more convenient.
- b) Lower the implement with the Position control. If necessary, support the implement on stands or proper supports, always aiming to facilitate the later engagement.
- c) Stop the engine and apply the parking brake.
- d) Release the upper arm (3rd point), setting all implement weight on the soil.
Remove the 3rd point pin in the tower.
- e) Disconnect the lower engagement bars.
Store the pins and locks in suitable place.
- f) Disconnect the hydraulic hoses - for remote control and cover the ends to protect them from dirt.
- g) Move the tractor forward carefully and just then lift the lower bars.

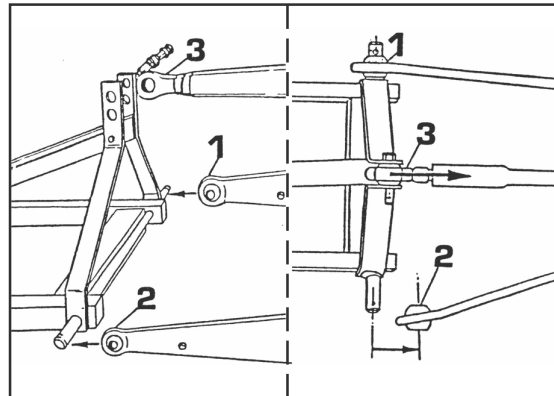


Fig. 183



ATTENTION!

For implement transportation, always use the Position lever set to "transportation" in the hydraulic quadrant. Make sure to have installed the lock of all implement engagement pins in the tractor.



IMPORTANT!

In some cases, it may be necessary to displace the steering rod to one of the sides or remove it to avoid interference with the implement components.

5 - Operation



CAUTION!

When adjusting the implement, take the necessary care:

- Perform the operation on a flat and even surface, since it will facilitate the disengagement.*
- Always use the Position control from the hydraulic system.*
- If the implement is lifted, always support it on reinforced stands. Never work under it lifted by just the hydraulic or supported by improvised objects such as bricks, concrete blocks and others.*
- Do not work under an implement supported by a jack only.*

5



NOTE

In cabin tractors, there is an auxiliary lever (1) for the Position control in the rear part, to facilitate the engagement and disengagement of implements.

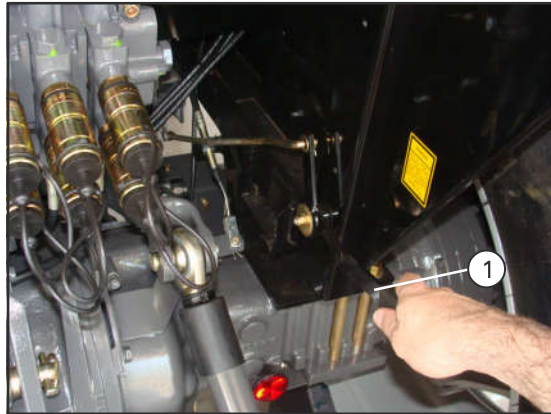


Fig. 184

9.6 - Hydraulic lifting system



WARNING:

Before operating any of the controls specified below, make sure there are no pedestrians near the tractor or implement.

Ferguson hydraulic system connects the tractor and the implement in a single unit, with the implement being controlled hydraulically. This system has the following controls:

Drive control(1)

Operates in the quadrant yellow range (drive) and it is used to control the operation depth of soil implements.

The further the lever is set ("down" position), the bigger the depth achieved by the implement, that is, the deeper it will penetrate the soil. Setting it backwards ("up" position) in the quadrant, the implement will work closer to the surface.

Position control (2)

Operates in the red range (position and transportation) and blue range (constant pumping) of the quadrant.

The red line is used to control the working height of implements that operate above the soil.

The lever must NEVER be set to the blue range (constant pumping position) or else the relief valve in Ferguson hydraulic system will stay permanently open and the hydraulic oil will heat.

A knurled knob locks the adjustable stop in its place, after the working depth and height are achieved.

By setting the lever to the external position, it will automatically select "constant pumping" internally.

Reaction control

The reaction control regulates the descent speed of the lower bars and the implement engaged.

- If the selector is totally down, the reaction will be fast (fast descent speed = hare).
- But if set totally up, the reaction will be slow (tortoise).
- For intermediary adjustments, set the selector in the intermediary of the quadrant.



NOTE:

This control is very sensitive. So, move it slowly, little by little.

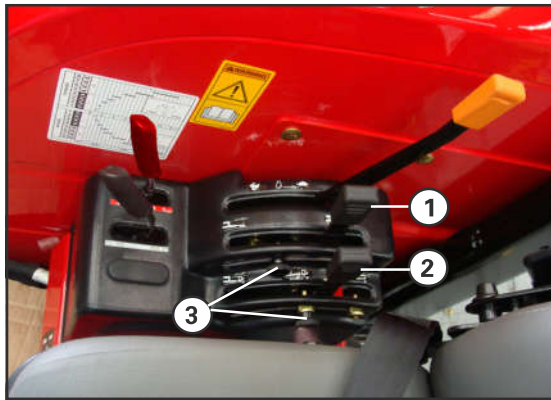


Fig. 185

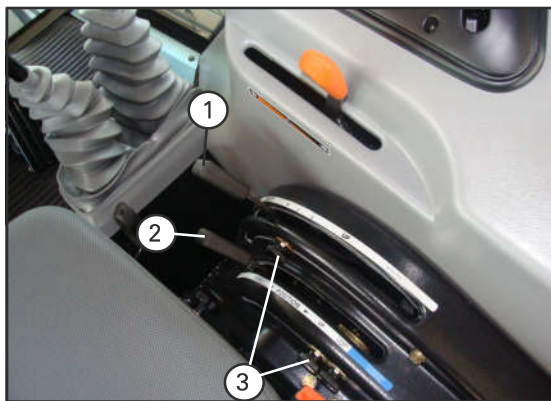


Fig. 186

5



Fig. 187

5 - Operation

Drive control (depth) - external lever - yellow quadrant

Work type

Plow, subsoiling and heavy cultivation.

Position of levers

Position control (2), totally up = "transportation" position.

Reaction control in "slow" position.

Operate the hydraulic system through the drive control (1).

Work preparation

Move the drive control lever (1) downwards to lower the implement. It will start penetrating the soil while the tractor moves forward. The more the lever is moved forward, the deeper the implement will penetrate the soil.

5

At work

After reaching the depth wanted, move the adjustable stop (3) back to the lever and lock it with the knurled knob. The depth control lever (1) can be moved to both sides of the stop, so that it is adjusted according to the different soil conditions. Turn the reaction control reverse to "slow" position, but in a position that allows changing to "fast" position when the work is started. If the implement starts moving up and down in disarray, turn the reaction control to "slow" position.

Before finishing the work

When getting to the terrain head, lift the implement moving the drive control lever back to position UP. Restart working, moving the drive control lever forward to the adjustable stop. In some light implements such as cultivators, it may be necessary to move the drive control lever (depth) ahead the stop setting, so that the implement can get in touch with the soil. Once the drive force is generated, then lever cannot be set to the previous setting.

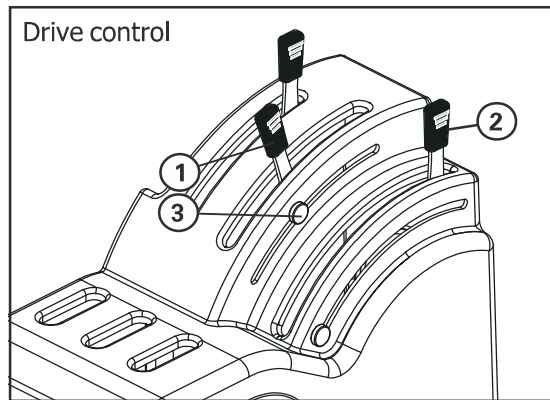


Fig. 188

Position control - internal lever - red sector

Work type

Operations with implements that operate at a constant height above the soil surface. Eg. scythes, machines with centrifugal discs, leveling blades, etc.

Position of levers

Depth control lever (drive), (1) in the "up" position.

Reaction control in "slow" position.

Operate the hydraulic system through the position control lever (2).

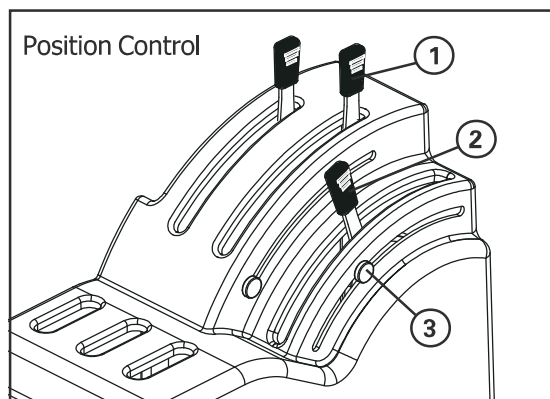


Fig. 189

Position control - continued

Work preparation

Move the position control lever (2) forward to the implement height wanted, above the soil, is achieved.

Align the adjustable stop (3) with the position control lever.

Turn the reaction control reverse to SLOW, but in a position that allows changing to "fast" position when the work is started.

At work

No additional adjustments will be necessary.

Before finishing the work

Move position control lever (2) to "transportation" position, if necessary. Restart working, moving the position control lever forward to the adjustable stop.

5

Transportation position

Used to transport implements in the 3-point hydraulic in the "up" position.

Position of levers

Depth control lever (drive), (1) in the "up" position.

Position control lever (2) set to "transportation" position against the corresponding stop. This procedure will lift the engagement and the implement, keeping them in the lifted position.

Constant pumping - blue selector



IMPORTANT:

NEVER set the lever to the "constant pumping" position, because the hydraulic oil may overheat due the constant opening of relief valve.

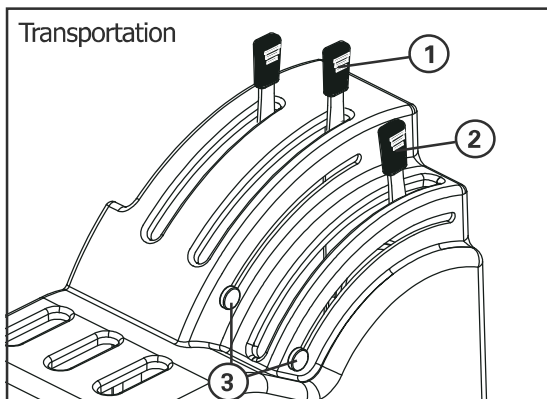


Fig. 190

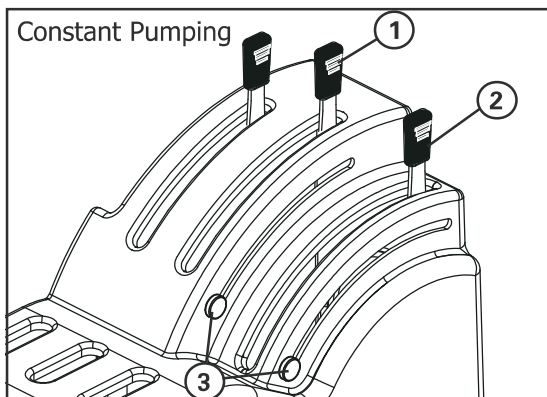


Fig. 191

5 - Operation

10 - Using the remote control

10.1 - Presentation

The remote control is the independent type, normally with 2 or 3 valves, that is, pressure lines.

1 / 2 - Left valve terminals.

3 / 4 - Right valve terminals.

A - Transfer valves: they allow operating both in simple and double action system.

B - Combined flow activating lever (if equipped).

C - Free return gallery plug: used to return the oil to the transmission in the activation of hydraulic engines.

D - Right lever: controls the right hydraulic valve, terminals "3 and 4".

E - Left lever: controls the left hydraulic valve, terminals "1 and 2".

5

Combined flow (Standard tractors only)

- Move the selection lever (B) to "Combined Flow" position (I). The lever (B) in cabin tractors is located behind the cabin.
- Move the lifting Position lever to "Constant Pumping" position, indicated by the arrow. The pump flow of the hydraulic lifting (II) will be deviated to the remote control, increasing its flow and leaving the lifting system inoperative.

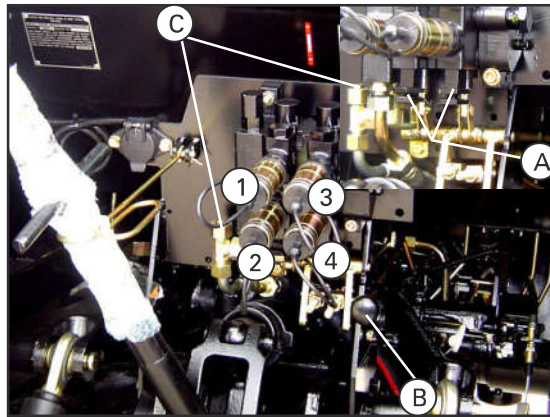


Fig. 192

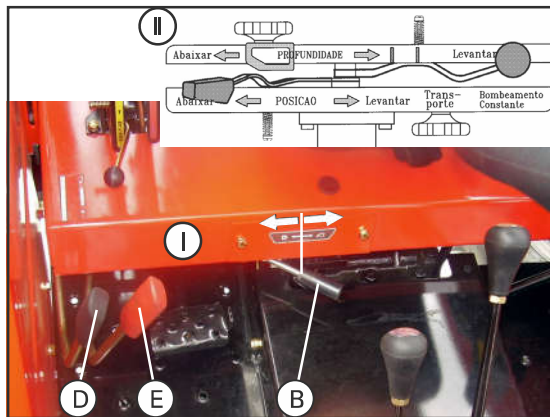


Fig. 193

5 - Operation

Types of valve

There are 5 types of valves available, and the tractor can be equipped with a combination of 2 or 3 of these valves.

- I - Conventional valve: in this type of valve, the lever returns by the action of a spring. It is necessary to keep it held until the cylinder(s) activated reach the position wanted.
- II - "KO" (Kick-out) Valve: in this case, the lever returns automatically when the cylinder(s) activated reach the end of the stroke.
- III - "F" Valve with fluctuation control: the lever in this type of valve has a third position, in which the cylinder(s) activated remain the flow free, allowing the rod to be retracted and extended by an external action, with no restriction.
Command with 3 ines
- IV - Valve specific for hydraulic engines start.
- V - Variable flow valve: allows setting the flow between 0 and 60% of the maximum flow available. This type of valve generally is also used to start hydraulic engines.

Flows and pressures

Consult the technical specifications.

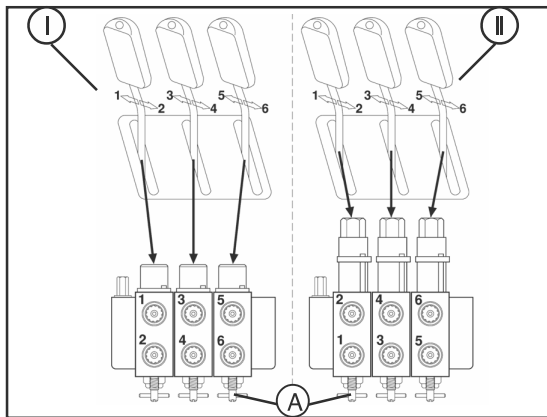


Fig. 194

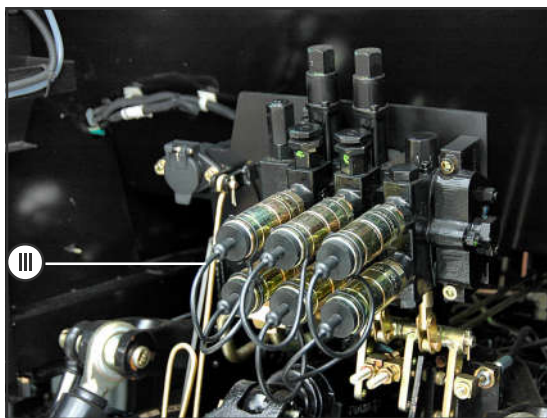


Fig. 195

5

5 - Operation

10.2 - Operating the system

The levers are located to the right of the operator seat.

The left lever (L) controls terminals “1 and 2” on the left side and the right lever (R) controls terminals “3 and 4” on the right side.

- In the conventional valves (lever return through a spring), by moving the lever forward, the upper terminal is pressurized and the lower terminal works as a return. Moving the lever backwards, it happens the opposite.
- In the kick-out valves (automatic return of lever) and in the valves with “fluctuation” control, by moving the lever forward, the lower terminal is pressurized and the upper terminal works as return. Moving the lever backwards, it happens the opposite.

5



REMARKS:

To know what terminal is pressurized for each lever position, check the decals (F), one located near the control levers and the other near the terminals.

The decals list by numbers the lever position and the respective terminal that is pressurized.

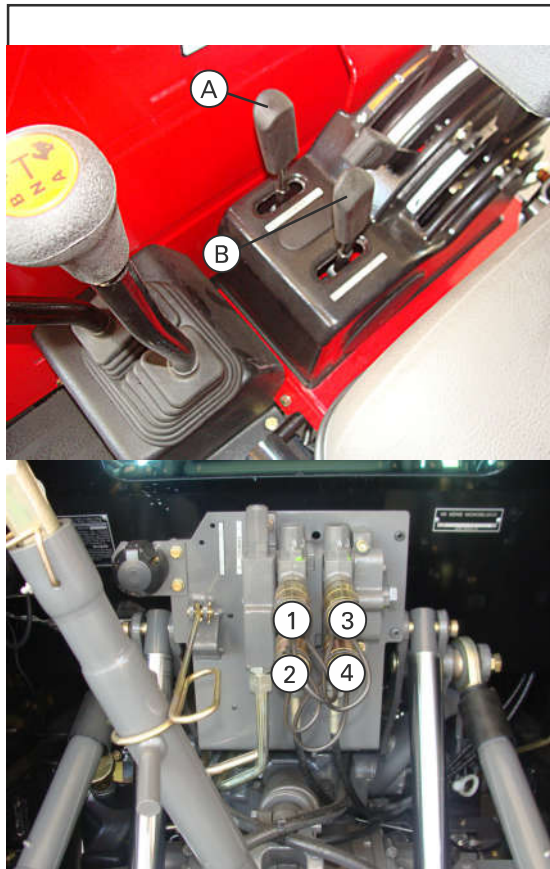


Fig. 196

5 - Operation

Hose connection and disconnection

The “female” terminals consist of quick engagement and disengagement, self-sealing, allowing the “male” terminals of hydraulic hoses be connected and disconnected with no oil loss. Before connecting the hoses, make sure terminals “1, 2, 3 and 4” and the “male” terminals of hoses are clean.

To connect the implement hose terminals, push them firmly against the tractor terminals.

For disconnection:

- If there is no residual pressure in the hoses, just pull them.
- If the hoses do not detach, it will be necessary to relieve the pressure in the circuit. To do so, stop the engine and move the control levers in the two directions to end of the stroke. Then, pull the hoses.

After being disconnected, install the protective covers (G) to all terminals, remote control and hoses to avoid penetration of dirt.



REMARKS:

If the implement detaches accidentally from the tractor, the hoses will be disconnected with no damages.

Also consult the instructions in the implement Manual on the correct way to activate it with the remote control.

Operating in the Simple and Double Action Mode

In the Standard tractors (with or without cabin), the valve bodies (hydraulic lines) have a transfer valve (A) that allows operating both in simple and double action mode.

Operation of simple effect cylinders

Simple action operations (or simple effect) are those where the hydraulic cylinder exercises force on one direction only, being operated by one hose only. The cylinder return occurs by the weight effect from the load lifted.

To operate the simple effect cylinders, turn the switch knob (A) totally reverse (outwards) and use only the upper coupling mechanisms (1 and/or 3).

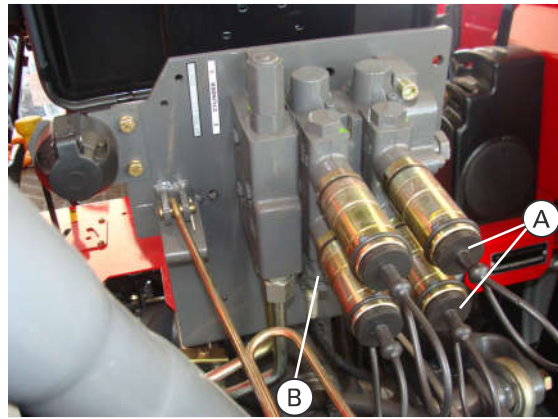


Fig. 197

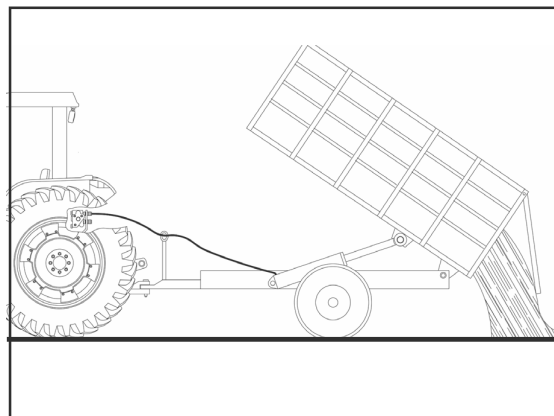


Fig. 198



Fig. 199

Operation - double effect cylinders

In the double action operations (or double effect), the hydraulic cylinder operated exercises force in both directions (retract and extend the rod), being operated by 2 hoses.

To operate double effect cylinders, turn the switch knob (A) totally reverse (inwards) and connect the hose beside the cylinder that makes it extend to the upper terminal(s) (1 and/or 3) and the return hose to the lower terminal(s) (2 and/or 4).

5 - Operation

Operation of hydraulic engines

Although a conventional valve has not been designed specifically for the operation of hydraulic engines, they can be used, if observed the following points:

- 1- Always connect the engine supply (pressure) to the upper couplers (1 or 3).
- 2 - NEVER connect the engine return to the terminals (1-2 or 3-4). The return must be connected to the plug place (C, whose gallery send the flow directly to the transmission, with less restriction, avoiding the transmission oil overheating.

Contact your Massey Ferguson dealer, if necessary.

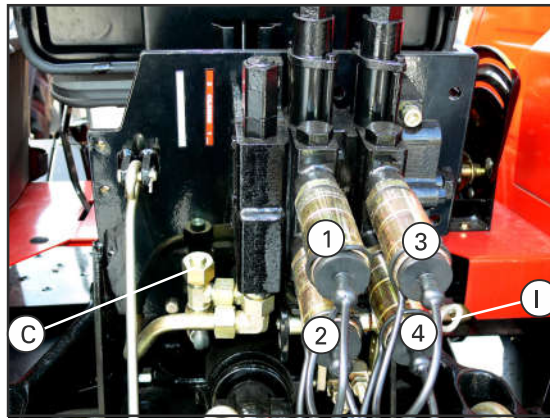


Fig. 200

5



NOTE

A special valve type to operate hydraulic engines is offered as an option.

10.3 -Remote control operation with variable flow

Follow the same procedure described on the previous item, regarding the lever use and hose connections to the remote control terminals.

Normally, only one of the lines allows the variation of flow. This is done by turning the control (H). forward decreases the flow (up to 0%) and reverse increases the flow, up to the maximum of 60% of the total flow available.

The variable flow valves, normally used for continuous operations, such as hydraulic engines.

For this reason, the lever relative to the variable flow valve has a detection system that keeps it in the position operated regardless the pressure.

For operation, connect the hoses to the terminals (1 and 2), accelerate the engine, move the control lever forward or backward (according to the movement direction wanted) and adjust the flow by the control (H), until the speed wanted is reached for the equipment operated.

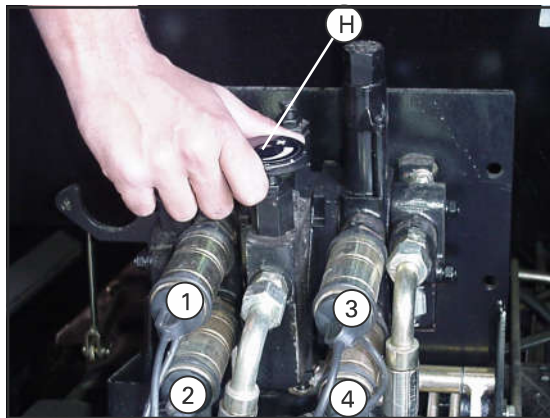


Fig. 201

10.4 - Combined flow

To increase the flow in the remote control system when the lifting system is not being used, the combined flow valve (1) must be operated as follows:

To operate the combine flow:

- 1- With the engine idling, push the external lever (Depth control) back and move the internal lever (position control) for Transportation, so that the lower arms of the lifting system are completely lifted.
- 2- Pull the lever (1) to position B: at this moment, the oil flow of the system will be directed to the remote control.



NOTE

For cabin tractors, the combined flow valve is located to the right of the operator seat.

The lifting system will become inoperative and the remote control flow will increase.

- 3- Change the lever position (2) to constant pumping (back).



IMPORTANT:

Never set the lever (2) to constant Pumping, before moving the combined flow valve to position (B).

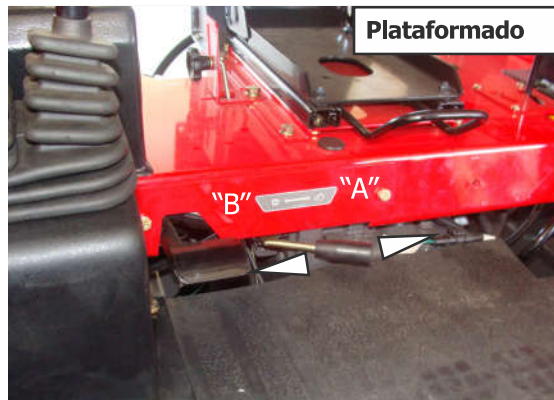


Fig. 202

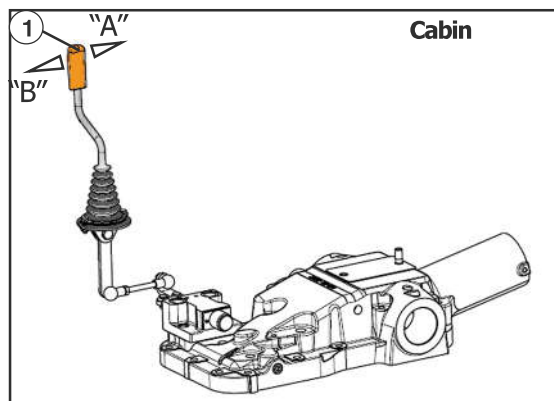


Fig. 203

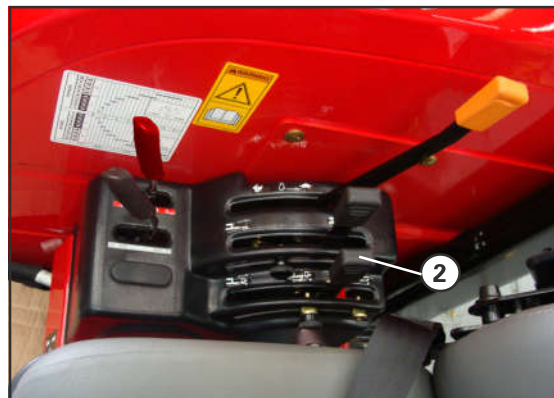


Fig. 204

5 - Operation

10.5 - Implements that use large quantities of oil

Implements equipped with large cylinders, need a larger volume of oil for operation. In this case, follow the procedure described as follows:

- a) Start the engine and after connecting the equipment to the remote control, operate all the cylinders to extend the rods.
- b) With the tractor leveled, check the oil level of transmission/hydraulic system: it must reach the "maximum" mark on the gauge guide (I - Fig. above).
- c) Check the oil level after every operation day.

IMPORTANT:

- 1- After disengaging the implement and disconnecting the hose, check if there is excess of oil and, if necessary, drain the excess.
- 2- If the quantity of oil removed from the transmission is excessive, the hydraulic system may be damaged.

5

10.6 - General Recommendations

- Make sure the oil in the implement hydraulic circuit is not contaminated. It can happen when the implement remains inoperative for long periods of time, exposed to bad weather.
In this case, drain the oil in the remote cylinder and respective hoses and perform the bleeding (elimination of air).
For the elimination of air from the circuit, generally accelerating the engine is enough to operate the remote control lever(s) in the two directions, several times, till the air is fully eliminated.
- Keep the pressure terminals always protected with plugs (1), to avoid contaminating the oil with dust, what would cause serious damages to the transmission and hydraulic system.
- Before disconnecting the hoses from the terminals, relieve the circuit pressure.
To do so, stop the engine and move the lever to both directions till noticing the remote hydraulic cylinder exercises no force.
- At a later connection, if for any reason, pressure remains in the system, relieve it before trying to connect the hoses. To do so, press the check valve (2) in the hose end against a clean object.
Be careful to avoid a jet of oil!

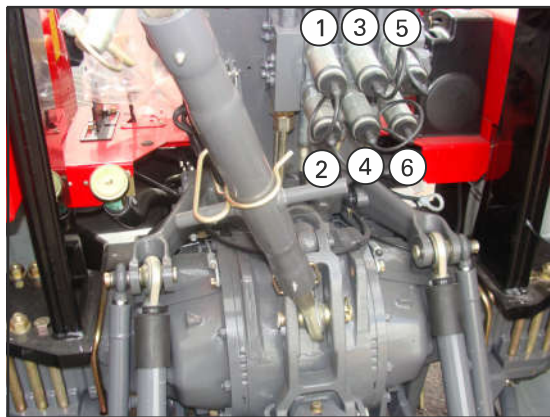


Fig. 205



Fig. 206

11 - Using the brakes



WARNING:

When driving the tractor on roads, the brake pedals must always be joined by the respective locking device, so that its application is uniform and the braking power is maximized. Only unlock the pedals in sharp turns. Make the sharp turns at low speed.



CAUTION!

When getting off the tractor, all brakes must be engaged. ALWAYS.

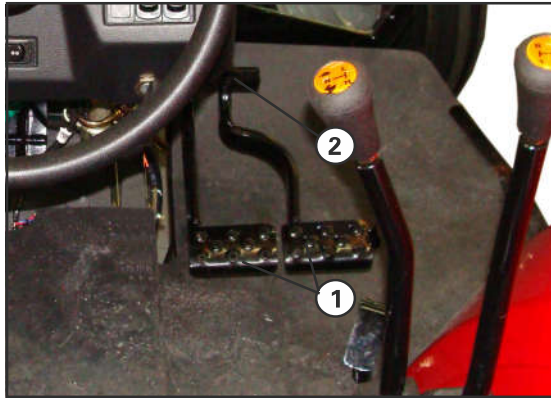


Fig. 207

1. When the tractor is being operated in stationary jobs, even for a short time, the parking brake must always be engaged.
2. The independent brakes (1) can be used to help you in the turns, but always at low speed. Never use just one of the pedals when operating the tractor in high speeds.
3. Parking brake Make sure its totally disengaged before starting driving the tractor.
4. When driving on roads, lock the brake pedals with a locking device (2).

Sharp turns

1. Release the brake pedals lock (2).
2. Apply the brake for the side you want to make the turn or maneuver, for example, if you want to make a turn or maneuver to the right, then you will have to step on the right brake and turn the steering wheel to the same direction.
3. Before driving on the road again, you must lock the brake pedals again.

5 - Operation

12 - Differential blocking



WARNING:

NEVER drive on roads, or at high speed, with the differential blocking engaged. For field operations, use the differential blocking to improve the drive, but disengage it to maneuver at the end of aisles.

If one of the rear wheels starts slipping, to engage the differential blocking:

1. Press the clutch pedal completely.
2. Press the differential blocking pedal with your heel to engage the blocking.
3. Release the clutch pedal slowly, keeping the differential blocking pedal pressed.
4. To disengage the differential blocking, release the respective pedal. If the blocking does not disengage automatically, press the clutch pedal.

5



IMPORTANT:

DO NOT try to activate the differential blocking when one of the wheels is still and the other is spinning fast. DO NOT try to maneuver or make turns with the blocking engaged.

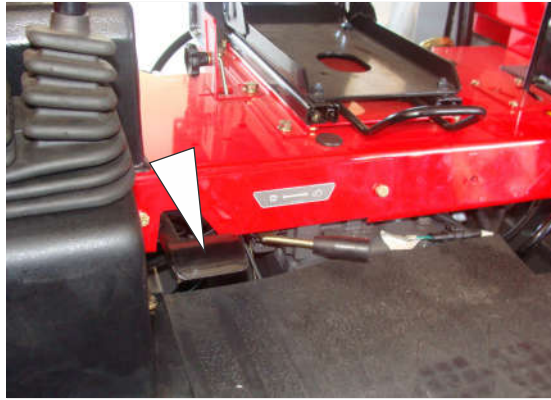


Fig. 208

13 - PTO (Power Take Off)



ATTENTION!

See the procedures for shaft replacement, transmission operation and instrument panel setting to apply the power take-off in Preparation section.

13.1 - Operating the power take-off

With the engine at low speed, pull the lever (1) to position to operate the power take-off shaft.

Then, adjust the engine speed to reach the rated speed of 540 or 1000 rpm.

To turn off the power take-off, set the lever (1) back to position.

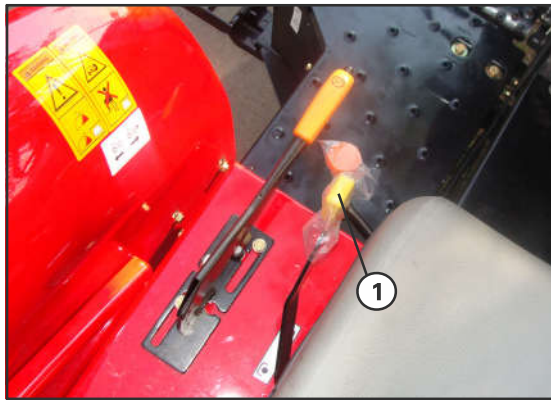


Fig. 209

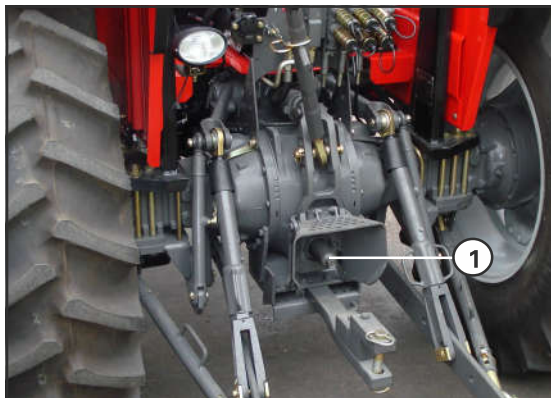


Fig. 210

5

13.2 - General advice

- ✓ Avoid parking the IPTO with engine at high speed. This will force the hydraulic clutch unnecessarily, making it slip. Reduce the engine speed when operating the PTO.
- ✓ Whenever the IPTO is not being used, keep the protection cover (1) on the shaft.
- ✓ To operate with the IPTO safely, ask your implement vendor to supply a protection (2) for cardan.
- ✓ During the stationary equipment operation with the IPTO, always keep the parking brake engaged. If necessary, block the wheels with wooden wedges to prevent the tractor from moving.



ATTENTION!

Stop the engine before any setting or repair in the equipment operated by the IPTO.



Fig. 211

5 - Operation

- ✓ When engaging the implement for the first time, make sure the cardan length is properly setup. See the Operator's Manual
- ✓ When using equipment that require constant power speed and load, more than 90% of the maximum power available at the PTO should be used. The water pumps and electricity generators are examples of equipment that require constant speed and load.
- ✓ It is not recommended to use the PTO at 540 rpm for applications that require power above 75 hp. Both the output shaft and cardan can be damaged, offering serious risks of accidents with unpredictable consequences. For power above 75 hp use the IPTO at 1000 rpm and the respective shaft.
- ✓ Always use the position control in the lifting system when operating implements activated by the PTO, except in special cases.
- ✓ Cardan maximum working angle: refer to the operator's manual. If such information is not found, consider 30° (degrees) as the maximum angle.
 - I - In implements mounted on the hydraulic lifting, observe the lifting limit so that the cardan working angle is not exceeded.
 - II - In implements towed by the steering rod it can be necessary to turn off the power take-off during the maneuvers.

Cardan length adjustment

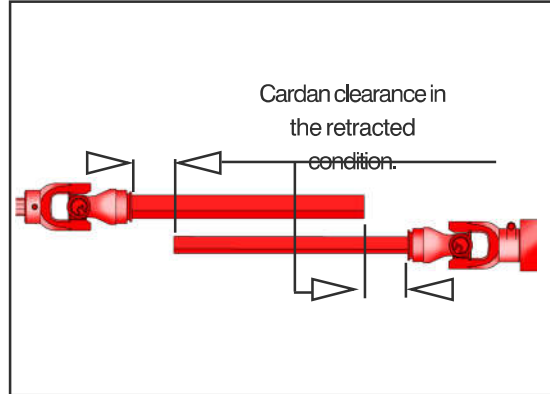


Fig. 212

Cardan maximum angle for implements mounted on the 3-point lifting.

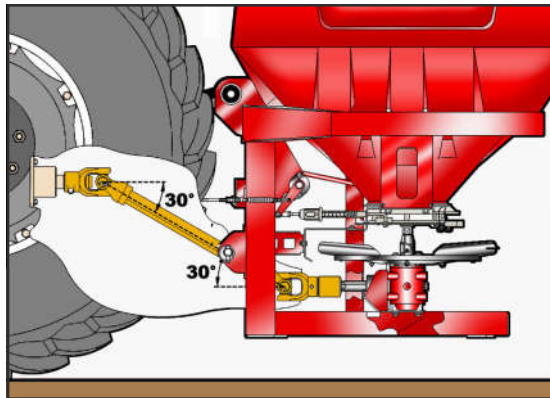


Fig. 213

Cardan maximum angle for towed implements

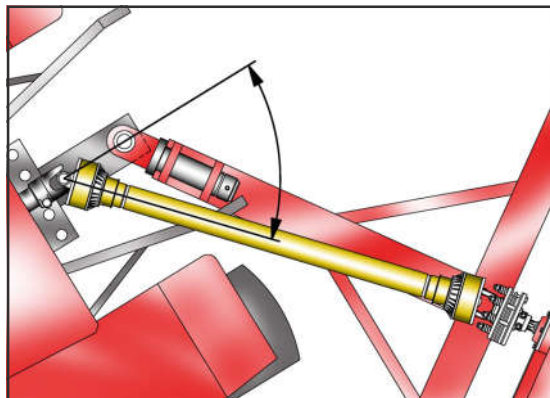


Fig. 214

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6 - Maintenance

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6

1 - Introduction

This Section provides detailed information on the maintenance services required so that your tractor can work perfectly and for a much longer time. If the maintenance services are carried out as indicated, you will certainly guarantee good results. The maintenance services performance in the intervals of time stipulated assure the maximum performance and life to your MF tractor. In addition, it prevents damages and losses of time in decurrence of breakage or premature wearing.

Routine Services

This Section provides complete details on the procedures required to maintain your tractor efficiently working.

It is important to regularly perform a preventive maintenance in the tractor (each 1000 hours). We recommend that all the services are performed by the local Massey Ferguson Dealer, according to the Massey Ferguson Recommended Service Program. It is important to remind that the responsibility for keeping your tractor under good safety and driveability conditions relays on you, the owner.

Perform the maintenance in your tractor in the intervals of time indicated on the following pages. The chart will present the periodicity of each work to be performed.

Always use the recommended lubricating oil.

We recommend the maintenance to be performed in a covered place and at the end of the operation period, once the oil is still hot, making the draining easier.

- ✓ Before using the greaser gun, clean the greasers.
- ✓ Before removing the drain and filler plugs, clean the area around the plug and the cover.
- ✓ Always use a clean container basin for lubricating oil or diesel that will be reused.

Safety in the Maintenance



CAUTION:

When changing the oil, it is important to follow some basic rules on personal hygiene as they are described.

- ✓ Use protective clothing, overalls, PVC gloves, etc.
- ✓ As soon as you finish changing the oil. The dirty cloth must be undressed and washed.
- ✓ The contact with the oil for a long period of time can affect the health, so it is important to follow the instructions above.
- ✓ Do NOT perform the tractor performance with the engine running.
- ✓ Keep the hands, tools and clothes far from any part in movement. Avoid the contact of the skin with the manifold and discharge pipe. They might be hot and burn you.
- ✓ Keep children and domestic animals away from the tractor. Do NOT allow the presence of people near the tractor, except those who are working under your instructions.
- ✓ Do NOT work under the tractor when it is supported only by a jack. Support the tractor on firm and safe stands.

Hour meter

Use the hour meter to perform the maintenance on the tractor at the correct periods.

6 - Maintenance

2 - Maintenance exclusive for the new tractor (up to 100 hours of operation)



IMPORTANT:

This exclusive chart lists the maintenance items to be checked exclusively during the first 100 Hours (New Tractor).

However, the items from the Periodical Maintenance Chart must also be performed.

With 10 hours of service

General

- ▲ Check the EPCC bolts tightening torque.
- ▲ Retighten the wheels mounting nuts.
- ▲ Check if all the safety protections are in their places and with legible decals.

6

With 50 hours of service

Engine, fuel and cooling system

- ▲ Clean the fuel pre-filter element.
- ▲ Check the coolant level.
- ▲ Check the fan, alternator, and air conditioning compressor drive belt conditions.
- ▲ Change the engine oil and filter.

Clutch

- ▲ Check the clutch pedal free play. Adjust it, if necessary.
- ▲ Check the clutch general operation.

Transmission and hydraulic systems

- ▲ Change the hydraulic system / transmission oil.

With 100 hours of service

Transmission and hydraulic systems

- ▲ Change the oil from the transmission and hydraulic.
- ▲ Change the filter and wash the ISYP pump screen-filter.
- ▲ Clean the section filter.
- ▲ Replace the return filter.
- ▲ Change the oil from the rear final drives.

Brakes

- ▲ Check the brake fluid level. Top it up, if necessary.
- ▲ Check the brake pedals play. Adjust it, if necessary. After that, perform the simultaneous actuation test.
- ▲ Check the brake tubes conditions.
- ▲ Check and adjust the parking brake adjustment.

Front axle and steering

- ▲ Change the oil from the front axle and the final drives.
- ▲ Lubricate the front axle and driving shaft (cardan) universal gaskets with grease.
- ▲ Lubricate the steering pivots.

Cab and air conditioner

- ▲ Check the air conditioning system operation.
- ▲ Check the air conditioner compressor driving belt conditions and tension.
- ▲ Check / clean the air conditioning air filter element(s).

Electrical system and instruments

- ▲ Check the battery conditions.
- ▲ Check the battery connections tightening and the battery attachment.
- ▲ Check all the starter safety switches operation.
- ▲ Check all the indicator lamps, sound alarms and instruments for the correct operation.
- ▲ Check all the lights correct operation and adjustment.

3 - Periodical maintenance chart

The interval of time in hours in the Maintenance Chart must be based on the hours indicated by the tractor hour meter. Use a control booklet to make your tractor maintenance management easier regarding to the correct periods of time.

Tractor top view - Layout of approximate positions of the items

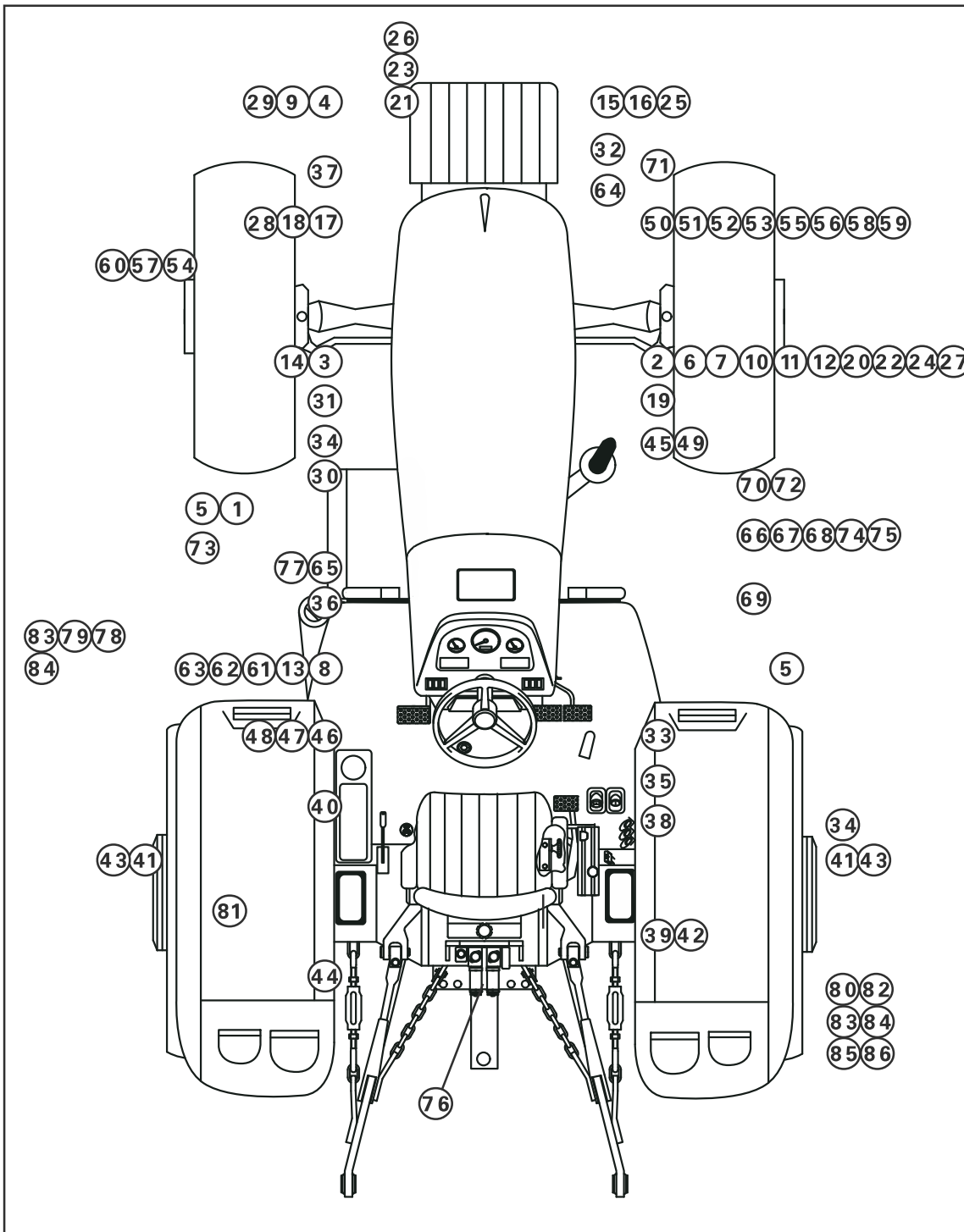


Fig. 215

6 - Maintenance

Regular Maintenance		10hs or daily	50hs or weekly	250 hours	500 hours	750 hours	1200 hours
Position	Engine, fuel, and cooling system						
01	Engine - Clean.	When necessary.					
02	Refill the fuel tanks after every working day.	X					
03	Check the oil level and fill it up if necessary with the recommended oil.	X					
04	Drain water and impurities built up in the filters and sedimenter.	X					
05	V-Belts - Inspect.	X					
06	Check the radiator coolant level and top up if necessary.	X					
07	Clean the main radiator and all the fins in the radiator elements.	X					
08	Release the accumulated dust in filter unloader valve.	X					
09	Check the filter and the air supply system: tightening of dampers, condition of hoses, clogging indicator, turbo components, etc.		X				
10	Check the water pump, alternator and fan belt condition and tension.		X				
11	Change the engine oil filter.			X			
12	Change the engine oil (First change should be performed at 50 hours).			X			
13	Change the fuel filter element.			X			
14	V-Belts -Adjust/Replace.				X		
15	Check the tension of the alternator/fan belt.				X		
16	Battery electrolyte level - Check.				X		
17	Clean the sump breather hose.				X		
18	Check the dampers for tightening and the condition of the cooling and fuel system hoses.				X		
19	Check general engine operation: temperature, pressure, performance.						X
20	Check the play and general condition of the water pump.						X
21	Drain, flush and refill the fuel tanks.						X
22	Change the air filter primary element when the clogging indicator comes on in the panel or every 1000 hours or annually, whichever occurs first.	When the clogging indicator comes on in the panel.					
23	Change the secondary element of the air filter every 3 changes of primary filter, every 1000 hours or annually, whichever occurs first.						X
24	Flush and refill the radiator with coolant suitable for the ambient temperatures expected.						X
25	Starting motor - Inspect.	Every 2000 hours - Dealer					
26	Turbocharger - Inspect.	Every 2000 hours - Dealer					
27	Water pump - Inspect.	Every 2000 hours - Dealer					
28	Alternator belt - Inspect/Adjust/Replace.	Every 3000 hours - Dealer					
29	Inspect the injection nozzles and fuel injection pump.	Every 3000 hours - Dealer					
	Clutch						
30	Check clutch operation - tractor in motion.	X					
31	Check the clutch pedal free travel, if required.		X				
32	Check and adjust the live PTO clutch.						X

6

6 - Maintenance

Regular Maintenance		10hs or daily	50hs or weekly	300 hours	600 hours	900 hours	1200 hours
Position		Transmission, rear axle and hydraulic system					
31	Clean the oil cooler fins.	When necessary					
32	Clean the rear differential breather, fuel system and transmission.	X					
33	Clean the rear axle breather.	X					
34	Check the hydraulic / transmission system oil level.		X				
35	Check the rear final drive oil level.			X			
36	Change the hydraulics oil return filter element.			X			
37	Check the differential lock pedal clearance.				X		
38	Clean the suction filter.				X		
39	Change the transmission and hydraulic system oil.				X		
40	Change the rear final drive oil.				X		
41	Clean the hydraulic linkage pump oil strainer.				X		
42	Retighten the bolts between engine and gearbox and gearbox and rear axle.						X
43	Check and adjust, if necessary, the rear final drive preloading.						X
Brake		When necessary					
44	Bleed the brake circuit.	When necessary					
45	Check the brake operation.	X					
46	Check the pedal free travel.		X				
47	Check the parking brake adjustment.		X				
48	Check the brakes and adjust if necessary.			X			
49	Check brake fluid level and top up if necessary.			X			
50	Change the brake fluid.						X
Front axle and steering		When necessary					
51	Clean front differential breather.	X					
52	Grease the universal joints in the front axle and drive shaft (front wheel drive).	X					
53	Grease the steering pivots.	X					
54	Check for play in the steering pivots and front wheel hubs.	X					
55	Check the steering system operation (with the engine on or off).	X					
56	Check steering and toe-in adjustment (including tires for wear and damage).			X			
57	Check the oil level in the front axle and final drives.			X			
58	Change the axle and planetary oil.				X		
59	Check the front wheel hub adjustment (two-wheel drive).				X		
60	Check the universal joint condition.						X
Cab and air conditioning		When necessary					
61	Clean the cab air filter.	When necessary					
62	Clean the air conditioning condenser.	When necessary					
63	Check whether the wiper is working properly and the condition of the wiper arms.	X					
64	Check the compressor belt condition and tension.			X			
65	Check the condition of rubber gasket of doors and windows. Change the gasket if necessary.				X		
66	Replace the air conditioning dryer filter.						X
67	Change the cab air filter element.						X

6

6 - Maintenance

Regular Maintenance		10hs or daily	50hs or weekly	300 hours	600 hours	900 hours	1200 hours
Position	Electrical system and instruments						
68	Check the battery condition.	X					
69	Check for correct operation and adjustment of all lights.	X					
70	Check all indicator lights, sound alarms, and instruments for correct operation.	X					
71	Check all neutral start switches for operation.	X					
72	Check all electronic systems for correct operation.	X					
73	Check all the other electrical devices (e.g.: cab heater / fan / radio, wipers, etc.) for the correct operation.		X				
74	Check battery cables for tightening and battery fastening. Smear terminals with petroleum jelly.			X			
75	Check the battery ground cable and connections.						X
76	Check the condition of the wiring harness and fasteners.						X
77	Check the alternator and starter motor operation.						X
	General						
78	Top up the reservoir with suitable fluid of the cab windshield wipers.	When necessary					
79	Turn on all hydraulic systems and PTO to check operation.	X					
80	Ask the operator if he or she has any doubts or difficulties concerning the operation and correct the	X					
81	Check whether all shields and guards are in place and all safety and information signs are in place, dean and undamaged.	X					
82	Lubricate all points with grease or oil, as specified in the maintenance guide.		X				
83	Check tire pressure.		X				
84	Check the torque of all nuts and bolts in the wheels and rims.		X				
85	Check the tightening torque of the ROPS bolts.						X

6

4 - Greasers

NOTE
Grease all the pointed mentioned with lithium based grease of good quality, grade NLGI.

Front axle 4x4 (Central)

- 1- Axle central joint: 2 points.
- 2- Joints at the edges: 6 points.
- 3- Half shafts spiders: 2 points.
- 4- Front traction driving cardan: 3 points.

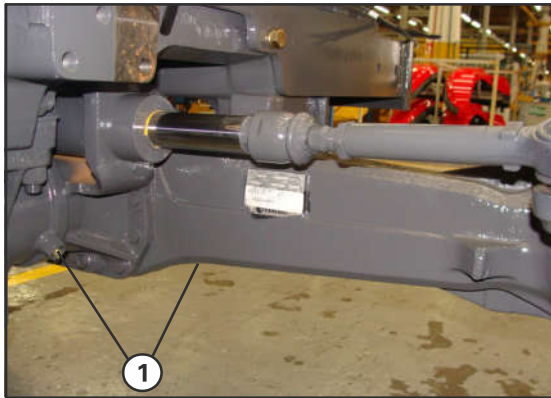


Fig. 216

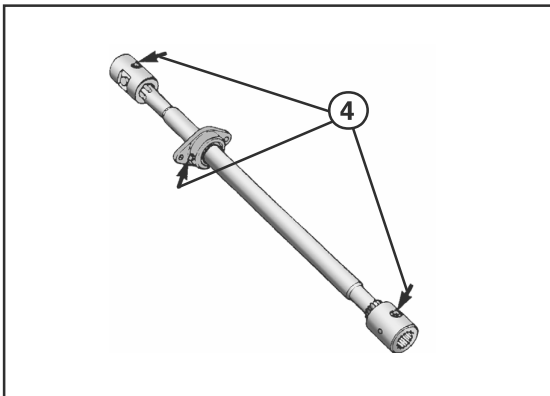


Fig. 217

Front axle 4x4 (Lateral)

- 1- Axle central joint: 2 points.
- 2- Joints at the edges: 2 points each tip.
- 3- Half shafts spiders: 2 points.
- 4- Front traction driving cardan: 2 points. There is also a bearing in the central support with 1 point).

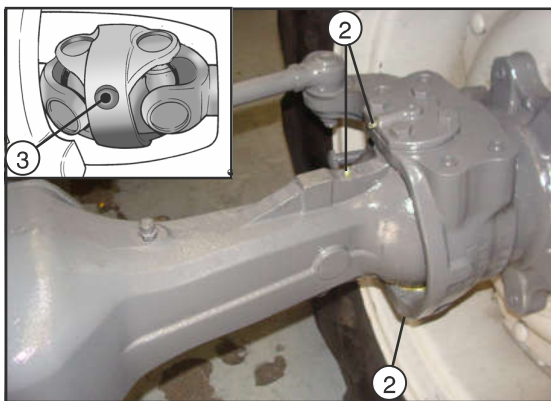


Fig. 218

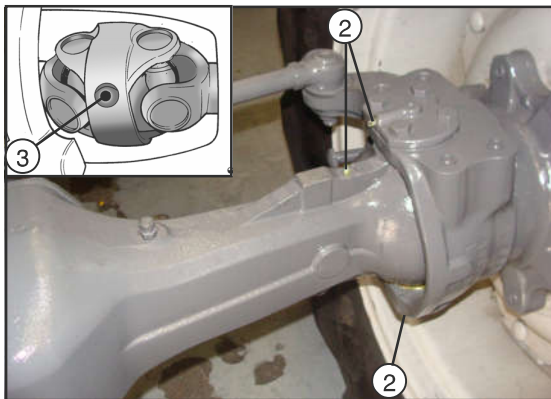


Fig. 219

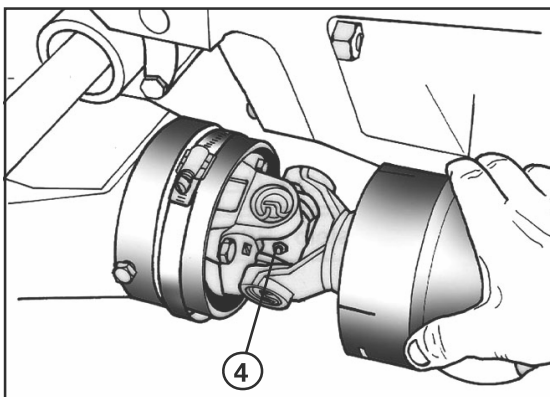


Fig. 220

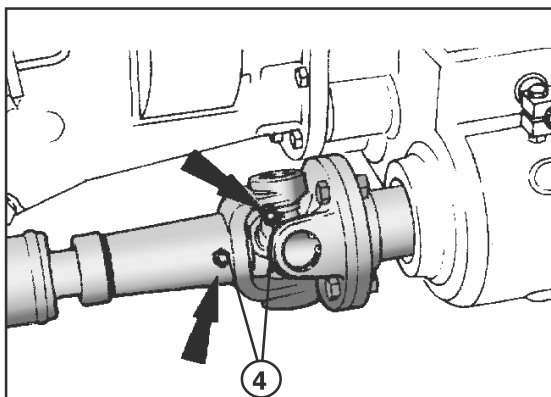


Fig. 221

6 - Maintenance

Front axle (4x2)

- 1- Front axle central joint 4x2: 1 point.
- 2- Front axle king pins 4x2: 1 point each side.
- 3- Axle's wheel hubs 4x2: 1 point each wheel.
- 4- Steering cylinder 4x2: 2 points.



Fig. 222

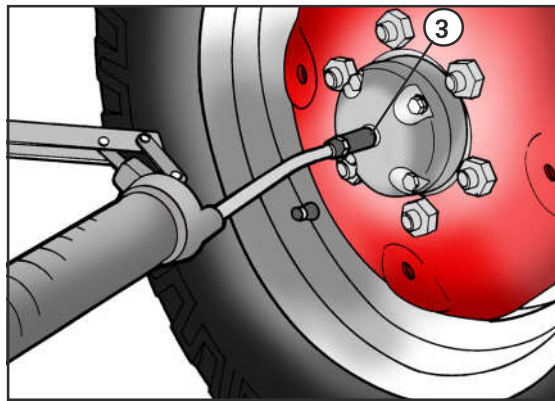


Fig. 223

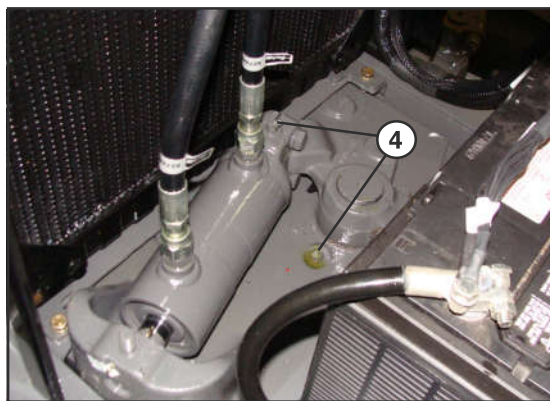


Fig. 224

6

Hydraulic lifting system

- 1 - Leveling or intermediary arms: 1 point.
- 2 - Side stabilizers:
 - Chain type: apply grease or oil directly on the threads.
 - Telescopic type: 1 point each.

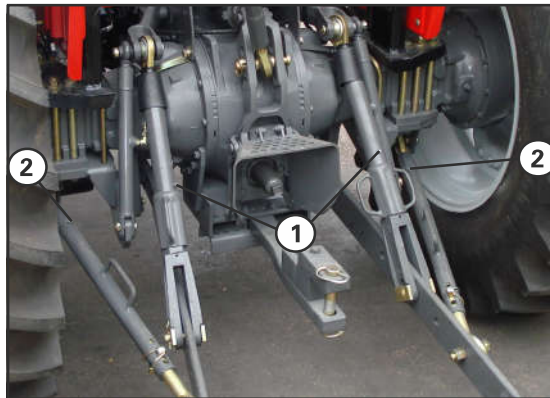


Fig. 225

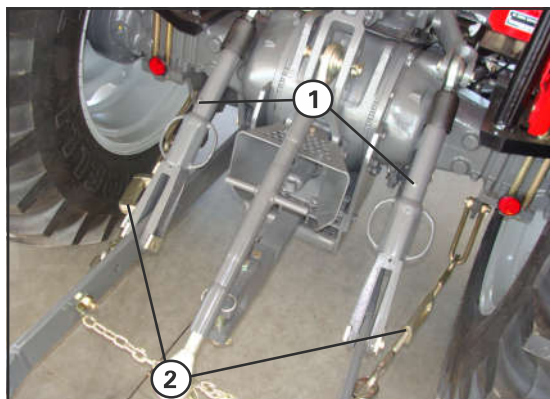


Fig. 226

6 - Maintenance

General points

- 1- Clutch driving axle: 1 point each side of the tractor.
- 2- Gearbox's gearshift forks axes: Apply grease with both gearshift levers in neutral position. It will allow the grease to pass through the gearshift forks holes, that will only be aligned in this position.
- 3- Differential blocking pedal: 2 points.

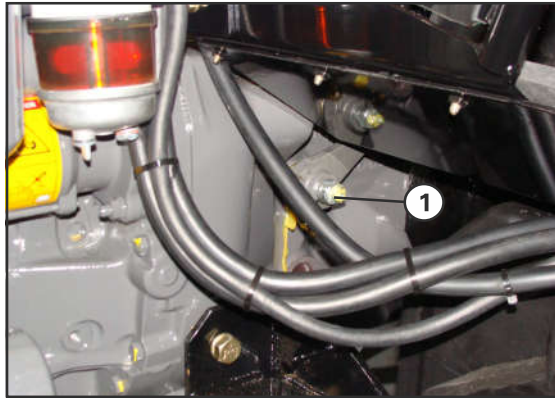


Fig. 227

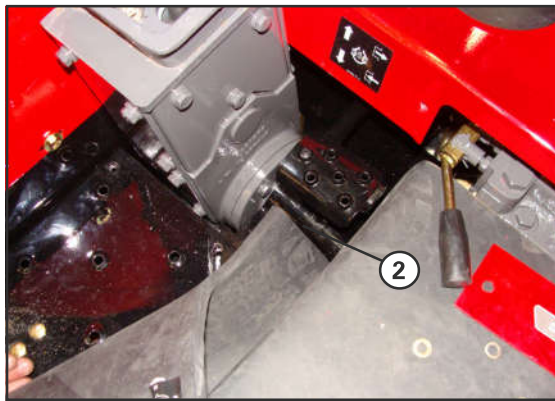


Fig. 228



Fig. 229

6 - Maintenance

5 - Lubricants, capacities and recommended additives chart

UNIT	CAPACITY	SPECIFICATION	Used at factory
ENGINE	Without filter = 8.5 liters With filter = 9 liters	SAE 15W 40 API CF-4 CCMC D-4 MULTIGRADE	Shell RIMULA R3X 15W40
TRANSMISSION HYDRAULIC SYSTEM REAR AXLE	45 liters	SAE 10W-30 API GL -4/SF - GL-4 MFCMS M 1143	Shell WBF-100 Shell DONAX TD
FINAL DRIVERS	Front: 0.5 liters Rear: 3.0 liters	SAE 90 API GL -5 MIL-L-2105 B	Shell SPIRAX A 90
HYDRAULIC BRAKE	0.3 liters	SAE J-1703 FMVSS116DOT3	Shell BRAKE FLUID
GREASE	According to the need	Lithium grease Type EP NLGI 2	Shell RETINAX WB
OIL FOR PROTECTION AGAINST RUST	As required	ISO 68	Shell TELLUS 68
FUEL	- With plate tank, over the engine: 75,0 - With plastic tank in the transmission left side: 100,0	Diesel oil – with maxi- mum sulphur concentra- tion of 0.5% Biofuel with up to 20% (B20) EN14214 / ASTM D6751	Shell FÓRMULA DIESEL
COOLING SYSTEM	18.4 liters	Water with antifreeze additive at ethylene- glycol base.	FLUID FOR RADIATORS Shell
FRONT AXLE	6.0 liters	SAE 90 API GL -5 MIL-L-2105 B	Shell SPIRAX A 90

6

NOTE:

Oils and fluids: the use of lubricants in the equipment represents a thermal-oxidative degradation and contaminants accumulation, which makes the changes necessary. Never discard oils or fluids directly on the environment. Collect them and take to the gas service station where you have bought the product. The oils can be recycled or, in last case, incinerated in industrial facilities regulated by Law. AGCO do Brasil is not responsible for the destination given to the lubricating oils, coolants and used batteries, it is the owners responsibility to know the environment laws and regulations in force.

6 - Access to the serviceability points

The tractors have tilting hood, which allows an easy access to all the engine's maintenance points.

Opening

Pull the lock (1) and, with both hands, push the hood upward.



CAUTION!

Take care to open and close the hood to prevent crashes or bruises.

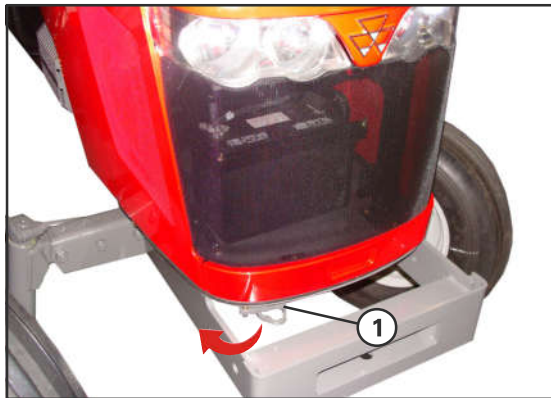


Fig. 230

Safety in the maintenance



CAUTION:

When changing the oil, follow some basic rules for personal hygiene, as listed below:

- ▲ Before changing the oil, use a proper protection cream on your hands.

- ✓ Use protective clothing, overalls, PVC gloves, etc.

- ▲ Wash the dirty oil with water and soap, as soon as you have finished changing the oil. Contaminated clothes must be put apart and washed.

- ✓ The contact with the dirty oil for a long period of time can affect the health, so it is important to follow the instructions above.

- ▲ Do not perform the maintenance with the tractor engine running.

- ▲ Keep your hands, tools and clothes distant from the moveable parts. Avoid the contact of the skin with the intake and exhaust tube. They might be hot, and you can get hurt.

- ✓ Keep children and domestic animals away from the tractor. Do NOT allow anybody to use the tractor, unless they have the proper training and instructions.

- ▲ Do NOT work under the tractor using only a jack as support. Place appropriate blocks under the tractor.

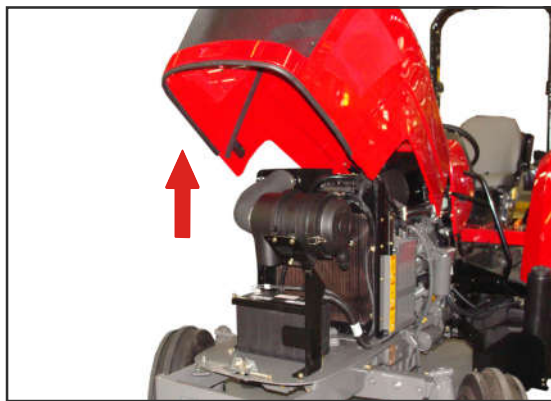


Fig. 231

6

provide the collection of used oil. In doubt, get in touch with the local public agency.

Environment protection

Polluting sewer, rivers or the soil is illegal. Use authorized waste treatment stations, including the companies that

6 - Maintenance

7 - Maintenance of the engine

7.1 - Checking of the oil level



IMPORTANT:

In order to correctly identify the engine oil level, place the tractor in a flat surface with the engine in room temperature.

Check the engine oil level according to the periodical maintenance chart using the dipstick (1).

In order to prevent the oil excessive consumption:

- Do not exceed the MAX mark in the level dipstick;
- Do not refill until the MIN mark is reached in the level dipstick, filling in, if necessary.

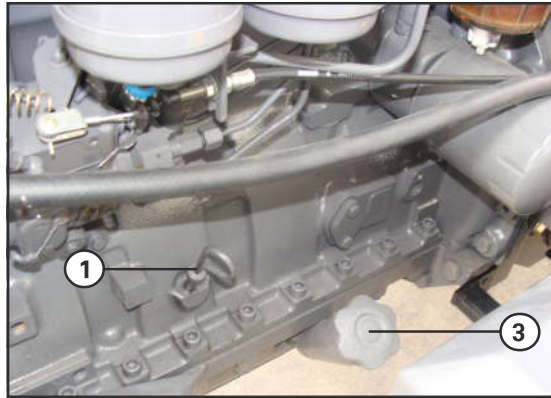


Fig. 232

7.2 - Changing the engine oil

6

With the tractor in a flat surface, proceed with the oil draining while the engine is still hot, after having removed the plug (2) from the engine crankcase.

Reinstall and tighten the drain plug with a torque of 3.5 kgf.m.

Refill with the oil recommended in the lubricating oil up to the MAX mark in the level dipstick (1).

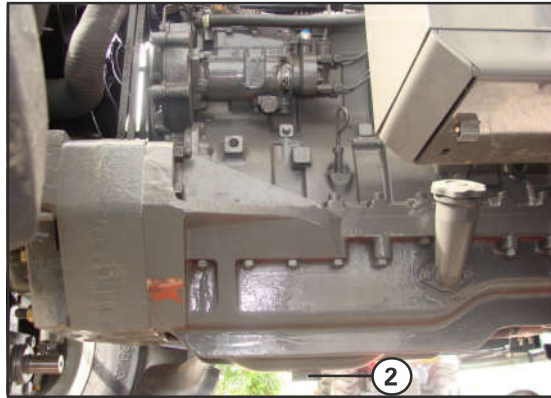


Fig. 233



NOTE

Wait until the oil to seat in the crankcase and, after some minutes, check the oil level again.

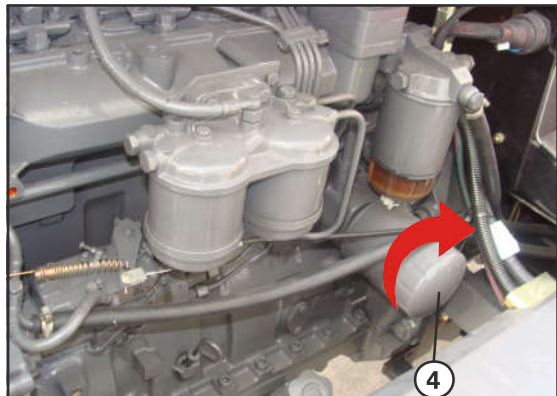


Fig. 234

7.3 - Changing the engine oil filter

- 1- Drain all the oil, removing the plug (2).
- 2- Remove the oil filter (4) and throw it away.
- 3- After the oil is totally drained, reinstall the plug (2). If necessary, replace the plug sealing ring.
- 4- Fill in the new filter with lubricating oil in order to speed up the circuit filling when the engine is started.
- 5- Apply a slight layer of clean oil in the new filter sealing ring and install it manually.
- 6- Fill in the crankcase with the recommended oil up to the "MAX" mark in the dipstick (1), through the nozzle (3);
- 7- Start the engine and, in neutral position, check if there is leakage by the crankcase filter or drain plug. Turn the engine OFF and, after some minutes, check the oil level again.



WARNING:

After changing the oil and the filter, do not move it until the oil pressure light is OFF. To assure that the engine is not going to be started, disconnect the electrical stop control from the fuel injection pump.

7.4 - Cleaning the breathing hose of the crankcase

- 1- Remove the hose (1) loosening the respective clamp together with the engine upper cover.
- 2- Wash them using solvent and compressed air blows (if available) to remove the oil and dust that is accumulated inside the tube, and that can damage the crankcase ventilation.
- 3- reinstall the hose.

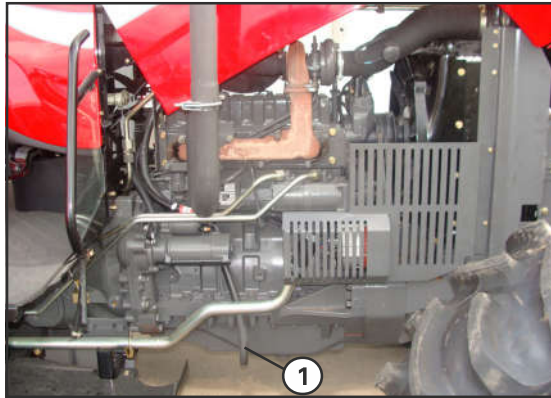


Fig. 235

7.5 - Checking and adjusting the engine idling speed

The checking and adjustment of the idling speed must be performed with the engine with the temperature at normal operation.

For engines with low emission, in compliance with the TIER II (legislation that rules the gases emission level) the idling speed can be adjusted in the same way.

- 1- To change the idling speed rotation, turn the bolt (1), loosening before the respective locknut.
To increase the rotation, turn the bolt clockwise, and vice-versa.
- 2- When the ideal rotation is reached, retighten the locknut.

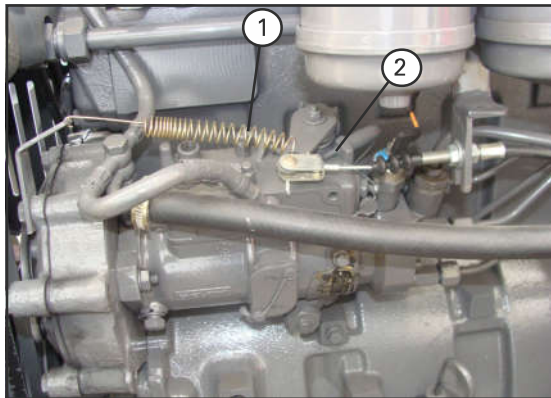


Fig. 236



NOTE

The maximum rotation adjustment (in the bolt 2) can only be performed by the Massey Ferguson Dealer or by a Delphi or Bosch Authorized agent. Breaking the seal will void the engine Warranty!

6 - Maintenance

7.6 - Maintenance of the fuel system

Draining the water from the sedimenter and filters

Drain the prefilter and fuel filter every day before starting the engine to eliminate accumulated water and impurities.



NOTE

Water entering in the pump and nozzles can be highly harmful, since they are highly Precise components.

- 1- Start the draining by the prefilter (or sedimenter), loosen the bolt (1) and after the plug (2) at the base.
- 2- When pure fuel is flowing, retighten the bolt (1) and the plug (2).
- 3- After that, proceed the same way with the fuel filter, loosening only the plug (3).

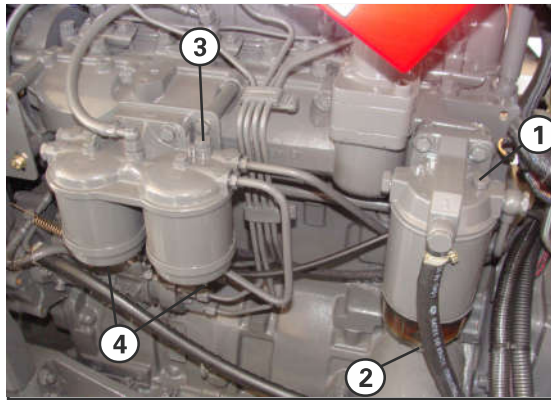


Fig. 237

6

Cleaning the sedimenters

- 1- Open the plug (1). Then, remove the filtering element (2) and the other components.
- 2- Remove the rubber grommets (3)..
- 3- Discharge the filtering element (2) and clean the parts, as well as the support and the base (4).
- 4- Reversely, assemble the new and original elements, observing the components assembling positions in the figure at the side.
Use new seals (3) that follow the filter.

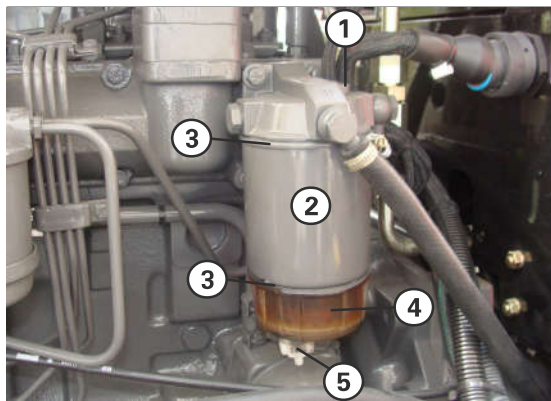


Fig. 238



NOTE

Never use clothes or shop rags to clean or dry the filtering components. The strands can clog the fuel circuit

Changing of the fuel filters

- 1 - Remove the central bolt (1), the filtering element (2) the support and the base (3) and the rubber grommets (4 and 5).
- 2 - Discharge the filtering element (2) and clean the parts, as well as the support and the base (3).
- 3 - Reversely, assemble the new and original elements, observing the components assembling positions in the figure at the side. Use new seals that follow the filter.
- 4 - Tighten the bolt (1), but be careful not to overtighten it.
- 5 - Bleed system.

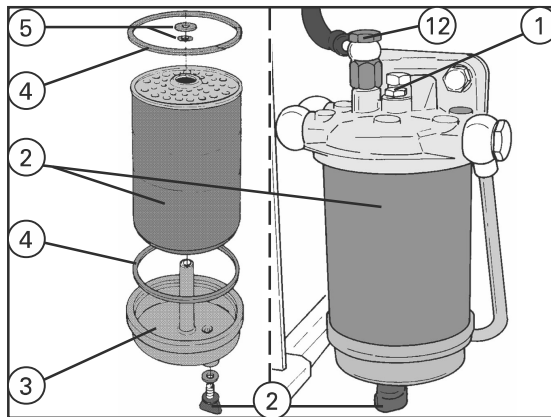


Fig. 239



NOTE:

To prevent water to condensate in the fuel tank, refill it at the end of each working day.

Bleeding of the fuel system

The system bleeding is necessary when:

- ✓ Changing the filters or cleaning the sedimenter;
- ✓ The tank is run dry during the operation;
- ✓ Performing other repairs that allow air entering in the fuel system;
- ✓ After an inactivity period;
- ✓ At a very cold weather, when the starting becomes difficult.

Bleeding of the Fuel filters

- 1 - Open the bleed plug (1).
- 2 - Actuate the manual bleed pump (Fig. 242) until fuel free of air comes out.
- 3 - Tighten the bleed plug.

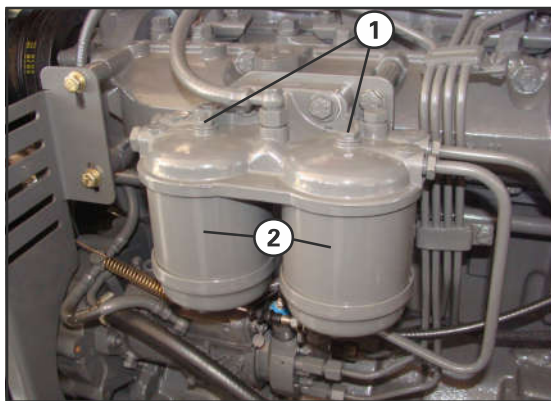


Fig. 240



Fig. 241

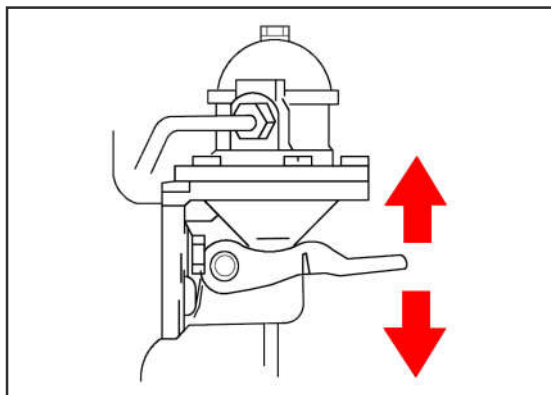


Fig. 242

6 - Maintenance

Injection pump and nozzles (high pressure system)

If the filter bleeding procedure is performed correctly, the injection pump does not need bleeding.

Only start the bleeding manual pump lever some more times (1), without opening any plug in the injection pump and start the engine.

The automatic bleeding system will eliminate the air from the return piping to the tank.

However, in the cases of the tank run dry during the operation, or in the cases of repair in the system's high pressure line, the elimination of the air from the circuit can be long a little more, which required the start to be operated in more than one attempt.

In the case the engine does not run after 2 attempts of, at most, 10 seconds, release the return connection (2) from the injection pump and turn the ignition key to the 2nd position, so that the solenoid can (3) release the flow.

Operate the manual bleeding pump several times and retighten the connection (2).

To conclude, release 2 high pressure connections (4), located together the injection nozzles, and start the starter motor (during 10 seconds at most).

It will eliminate the air in the high pressure piping.

If necessary, repeat the filters bleeding procedure and check if there is no air entering in the piping or filters.

6



NOTE

Do not start the ignition for more than 10 seconds consecutively!

It can cause damages to the start motor and discharge the battery.

In the case the engine does not run in this period, repeat the procedure after some minutes. If necessary, repeat the filter bleeding procedure.

Fuel tank

Drain the fuel tank according to the periodical maintenance chart.

- 1- Empty the tanks completely by removing the plugs (1) in each one of the tanks.
- 2 - To conclude, fill in completely the tanks with the recommended fuel.

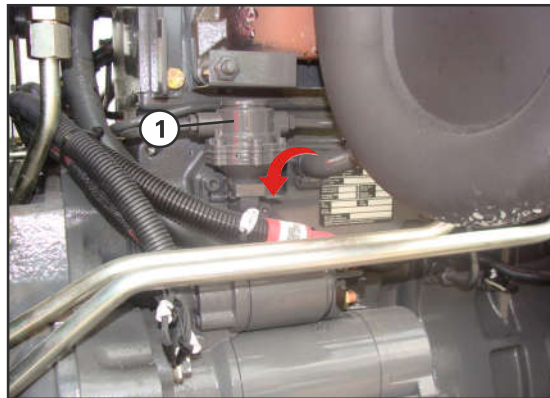


Fig. 243

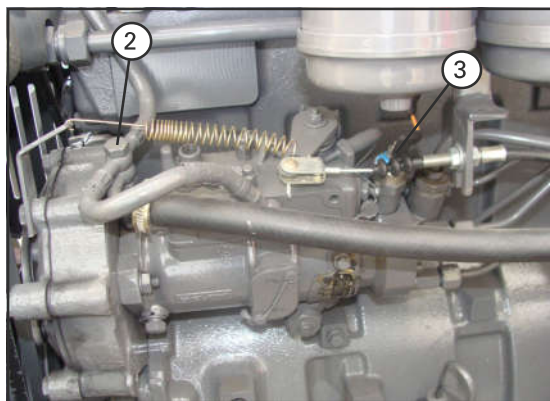


Fig. 236

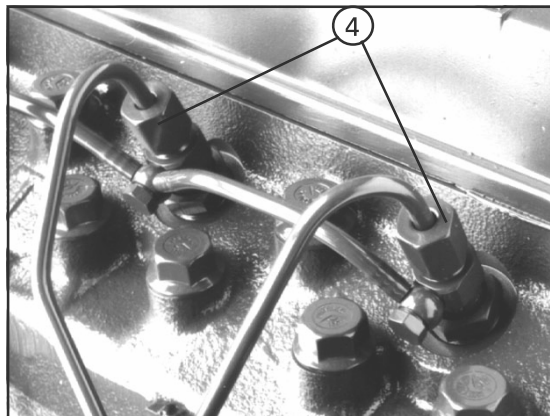


Fig. 245

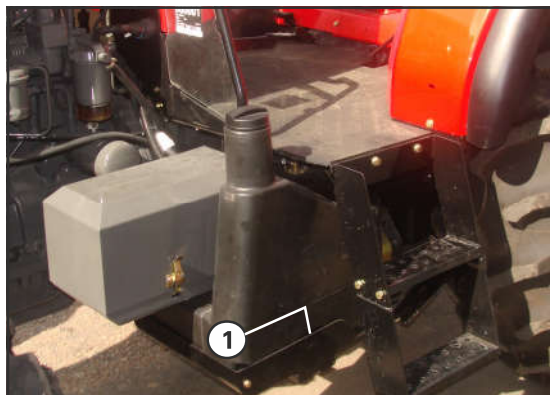


Fig. 246

8 - Maintenance of the air filtering system

The engine life depends mainly on the air filtering. This system has a very important function, since tens of cubic meters of air pass through it per hour, with a lot of impurities. These impurities, if penetrate into the engine, cause severe and irreversible damages!

8.1 - Access to the air filter

The filter (1) is located in the tractor front side.

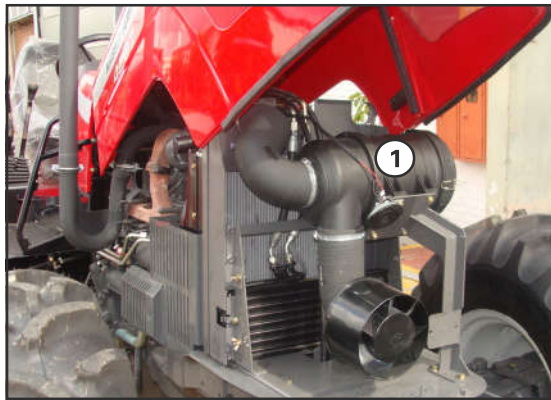


Fig. 247

8.2 - Maintenance of the primary element



IMPORTANT:

1 - Do not clean the primary element. When the restriction warning light on the panel is lit, replace the element.

2 - Do not remove the element unless you are going to replace it. This procedure may affect sealing and let impurities enter into the engine.

3 - Periodically test the restriction indicator.

4 - We recommend that you have at least one spare filter element in stock for each element in use. When storing the elements, keep them away from dust, humidity, and rodents. Keep them in their package if you are not going to use them.

5 - The prefilter (if installed) only needs cleaning, according to the needs, with a dry cloth.

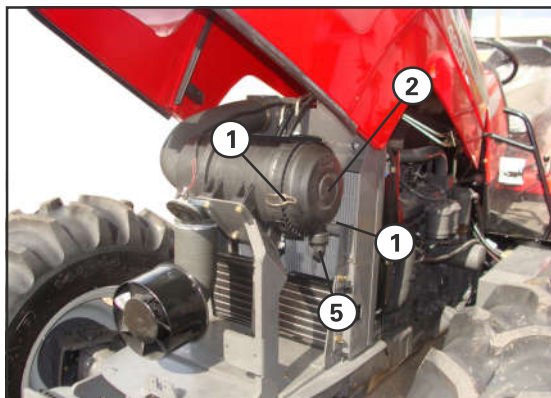


Fig. 248

Removing the primary element

- 1- Loosen the locks (1) and pull the cover (2), removing it.
- 2- Remove the primary element (3), pulling it and turning it slightly.
- 3- Clean the housing inner side (4), using dampened cloth, taking care to prevent the dust from reaching the clean air suction line.
- 4- Carefully pull the open edge of the new element, until it totally fits in the housing.
- 5- Reinstall the cover (2). Press the dust remover (5), removing its excess.



Fig. 249

6 - Maintenance

8.3 - Maintenance of the secondary element



NOTE

The secondary element cannot be cleaned either, it must be replaced, according to the maintenance plan in this manual.

- 1- Remove filter cover
- 2- Pull out the primary (1) and secondary (2) elements. Change them for new filters.
- 3- To reinstall, insert the secondary filter inside the primary filter and, then, install it in the housing. Press the primary filter (1) against the housing bottom, to assure it is assembled.
- 4- To conclude, assemble the cover, closing it with the locks.

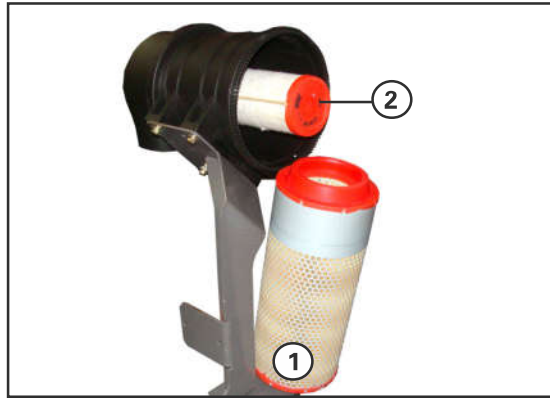


Fig. 250

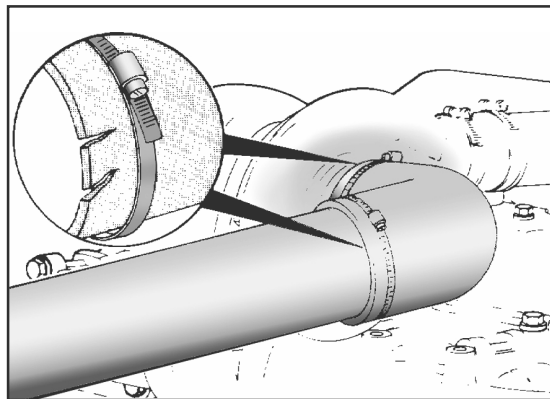


Fig. 251

6

8.4 - Filtered air piping

Carefully check these components for holes, parching, and proper tightening of the clamps.

8.5 - Plastic case for filter elements housing

Check it regularly for damage, such as cracking.

8.6 - Restriction indicator test

Periodically, and/or if you are not certain whether the restriction warning system is working, you can perform the test in a quick and easy way:

- 1- Open the engine left side cover.
- 2- Start the engine and let it in idle speed about 1200 rpm.
- 3- Cover the filter inlet with a smooth and flat plate (2): at this moment, the light (3) must light in the panel. If it does not occur:
 - Check the restriction sensor (1) wiring connection together the air filter.
 - Check if the warning light (3) in the instruments panel is not blown out.
 - Also check if the electrical connections in the panel (connectors and cables).
 - If necessary, check if the dealer.

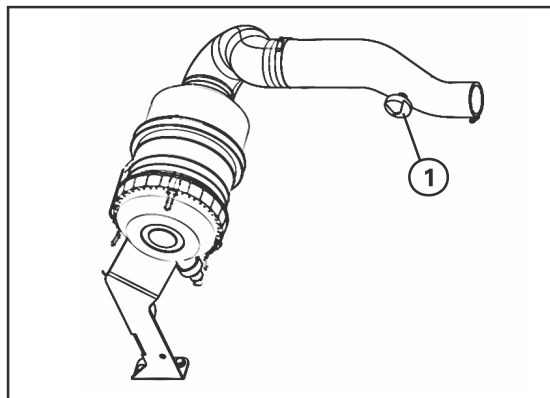


Fig. 252

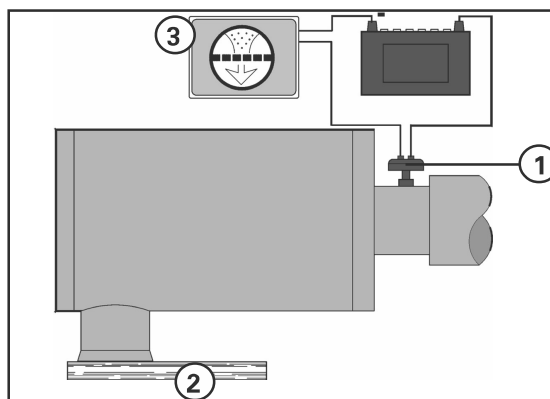


Fig. 253

9 - Maintenance of the cooling system

A) External cleaning of the radiator.

The radiator obstruction (1) causes the engine overheats, even if the water level is correct.

Whenever it is necessary, open the frontal grille and remove all the dust accumulated in the water radiator.

Then, clean it with a compressed air or water blow. Always try to direct the flow in the reverse direction, that is, from back to front.

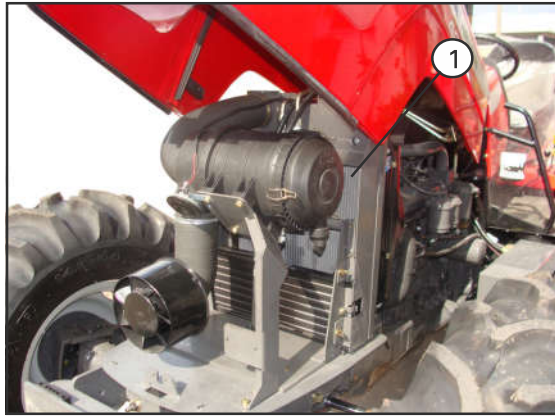


Fig. 254



WARNING!

Do not use water if the engine is hot, the thermal shock can cause cracks in the block or header!

B) Radiator water level:

Check the water level every day before start the work and add water as necessary.

The water level must reach the nozzle upper part. After install the cover (2), the excess will be eliminated through the draining tube (3), which must be checked for clogging or damages.

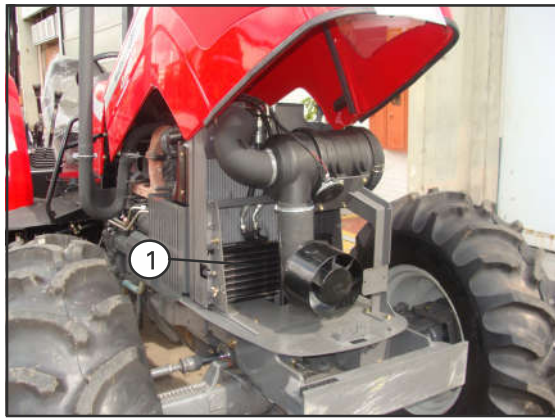


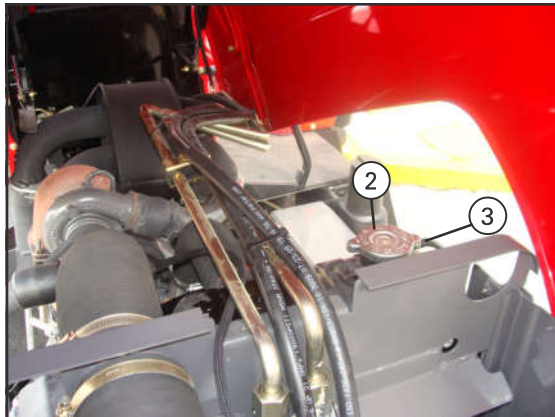
Fig. 255



ATTENTION!

If the engine is hot, remove the cover with the engine running in idling speed. Put cold water slowly in order to avoid thermal shock to the engine.

Release the radiator cover (2) up to the 1st stage to eliminate the pressure. Then, finish removing the cover, wearing gloves or a thick piece of cloth to protect your hands.



C) Changing the water and cleaning the system

With the engine in the normal operation temperature and the tractor in a flat place.

- 1- Remove the radiator cover (2).

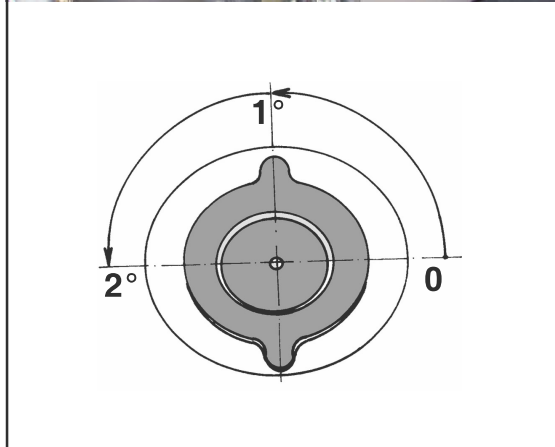


Fig. 256

6 - Maintenance

- 2 - Disconnect the inferior hose (4) releasing the clamp (5) and let the water to drain completely.
- 3 - Make clean water to flow through the system, providing a complete cleaning.
- 4 - Reinstall the hose, tightening it properly to the clamp.
- 5 - Fill the radiator with drinkable water, also using the recommended anticorrosive additive and anti-freezing. The mixture should usually include 33 % of additive, and the remaining with drinkable water, unless otherwise specified



IMPORTANT:

Do not circulate cold water through the engine block if it is still hot. Wait some minutes before adding water.

Water in high temperature is highly corrosive, oxidizing the engine's internal circulation galleries, generating deposits that prevents the correct cooling.

For this reason, always use anticorrosive additive in the system.

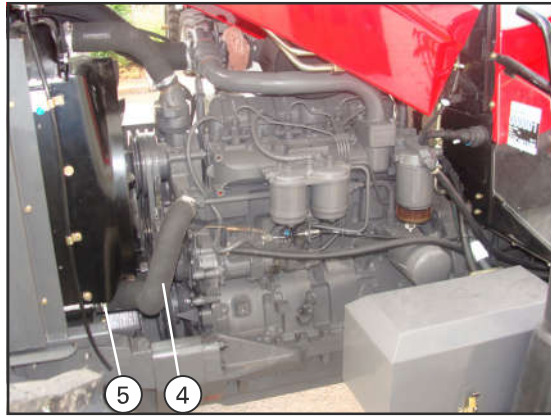


Fig. 257

6

D) Maintenance of thermostatic valve and radiator cover

These items are vital for the correct controlling of the engine operation temperature.

The thermostatic valve (6) prevents the engine to work at cold for a longer period of time after the start.

The radiator cover (2) controls the pressure in the cooling system, preventing the water to boil.

A valve (A) releases the excess of pressure, working as a relief valve.

The smaller valve (B) limits the minimum pressure, preventing the formation of vacuum inside the system when the water cools down.

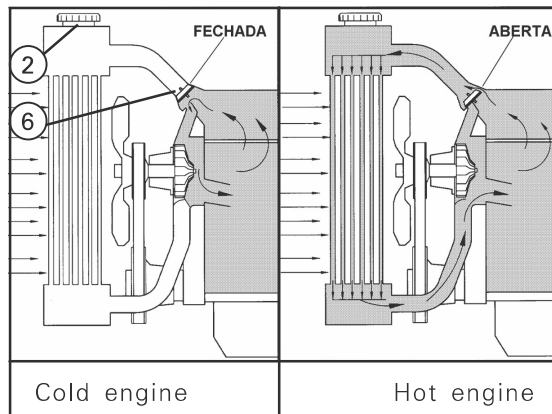


Fig. 258

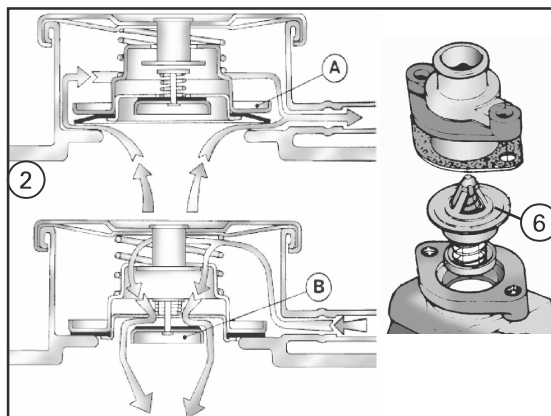


Fig. 259

E) Checking and adjustment of the fan drive belt tension

The tension is correct when, by thumb pressing the drive belt in the longer section, the deflection is of 10 to 15 mm.

To adjust the tension, loosen the nuts from the bolts (1 and 2) and force the alternator until obtain the correct deflection. Retighten the nuts and check if the drive belt tension remained correct.

If the drive belt presents damages (cracked, hardening, fraying, chipping), replace it. For this, completely release the tension and remove the drive belt.

NOTE: after a working day, check the tension and adjust it, if necessary.

NOTES:

- 1- Check the condition of radiator hoses and clamps regularly.
- 2- Do not use components that are not the original Massey Ferguson. The use of "similar" components do not assure the correct temperature control.

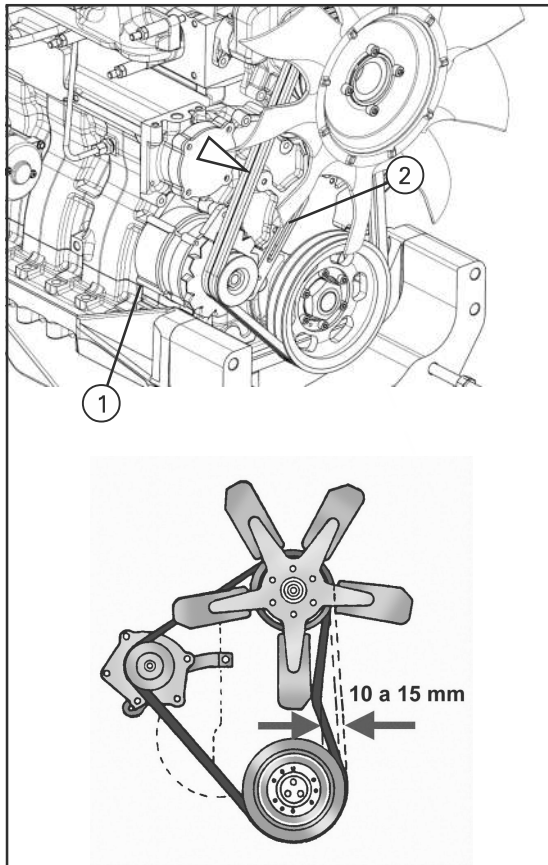


Fig. 260

6 - Maintenance

10 - Maintenance of the Clutch

10.1 - Adjusting the pedal height

The clutch collar suffers constant contact, that is, the pedal does not have any play and does not need of free travel adjustment.

However, with the clutch components wearing, the pedal position is changed.

We recommend to keep the pedal height "X" in:

- 150 to 160 mm

NOTE: In special case of dual-clutch, the pedal must not be very high, otherwise it can damage the complete operation of 2nd stage (the Dependent Power Take off). See the next item.

To change the pedal height:

- Remove the pin (1).
- Loosen the locknut (2).
- Position the pedal in the recommended "X" height and, keeping it in its position, turn the terminal (3) to shorten or elongate the tie (4), in order allow the pin (1) installation.
- Reinstall the pin (1) and the respective cotter pin and retighten the locknut (2).

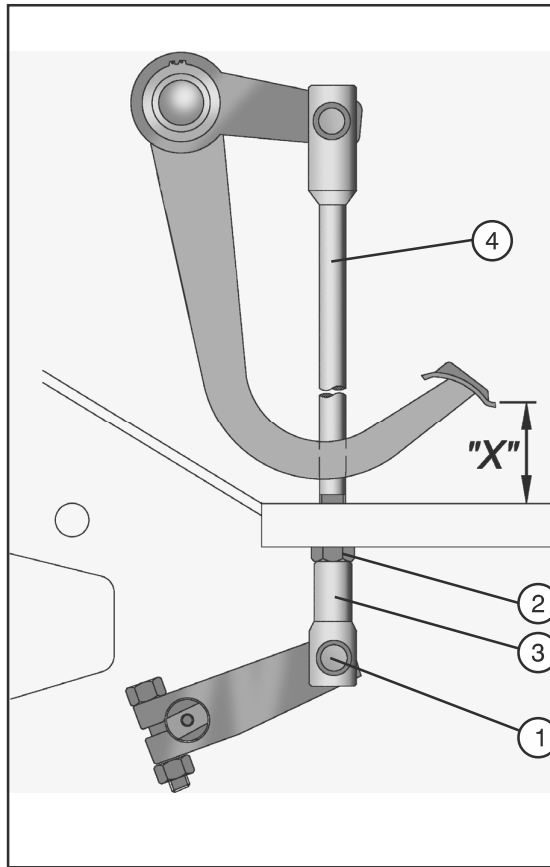


Fig. 261

10.2 - Checking the clutch 2nd stage disengagement



NOTE

This procedure is only necessary for tractors with dual-clutch and dependent PTO.

The PTO axle non-stop represents a serious safety problem, and it must receive total attention!

In order to allow the PTO operation and disengagement, it is required that the clutch 2nd stage is completely disengaged when pressing the pedal all way the way to the stroke end. It it does not occur, check, by the order:

A) The stop (5) is positioned in 2nd stage?

Without stepping the clutch, pull the knob (5) to release the clutch 2nd stage.

See Section Maintenance for more information.

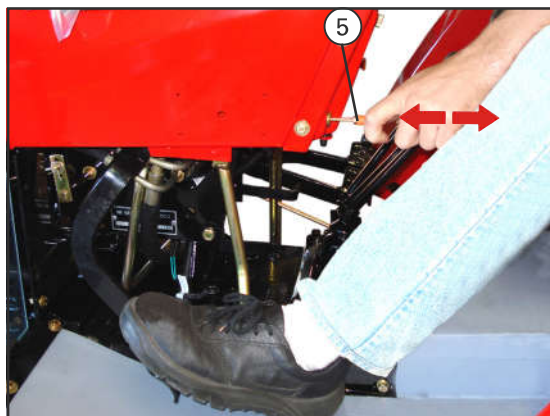


Fig. 262

6 - Maintenance

B) The pedal height is very low?

If the pedal is very low, the limiting stop will not allow the clutch complete engagement.

Check the pedal play adjustment - previous page.

The figure at the side shows a dual-clutch cross section:

6 - Transmission disk: 1st stage

7 - PTO disk: 2nd stage.

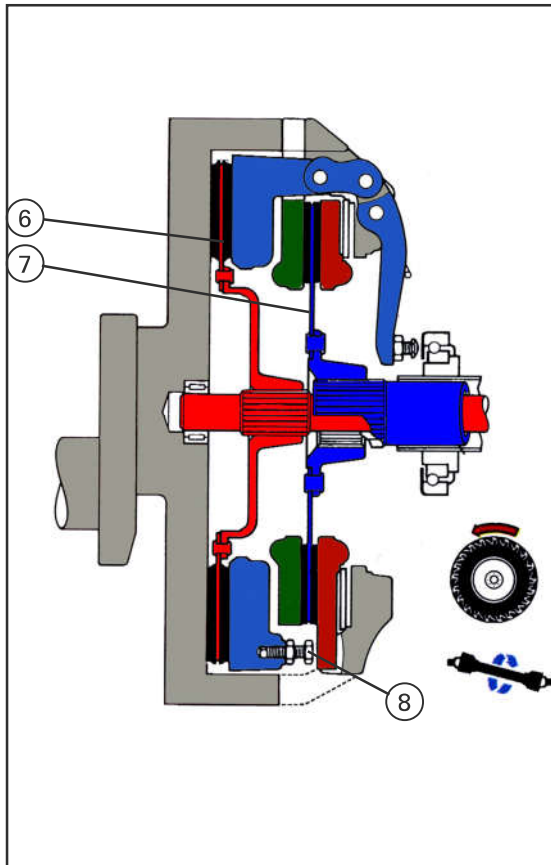


Fig. 263

C) Clutch internal adjustment

If the conditions of items A) and B) are satisfied and the PTO axle does not stop when engaging the pedal up to the end of 2nd stage, check with your MF Dealer to perform internal adjustments.

The secondary grasshoppers (8) must have a play "A" of 1.7 mm

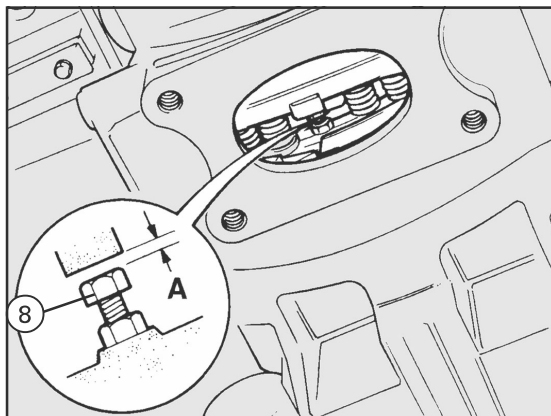


Fig. 264

6

6 - Maintenance

11 - Maintenance of the transmission system

11.1 - Cleaning the breathers

The breather clogging causes excessive pressure in the transmission compartment, which can cause leakages by the retainers.

For that reason, always keep the breathers clean.

- 1 - Front axle breather 4x4 - Central drive
- 2 - Transmission breather
- 3 - Final drive breather

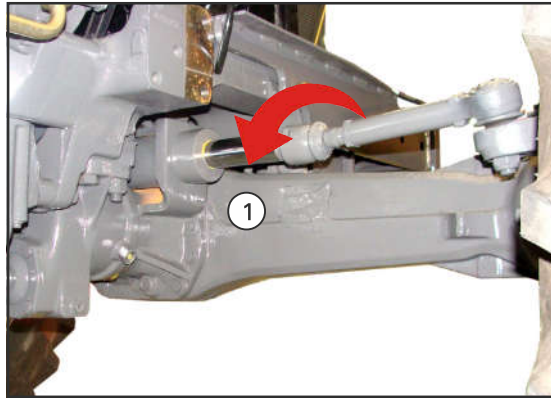


Fig. 265

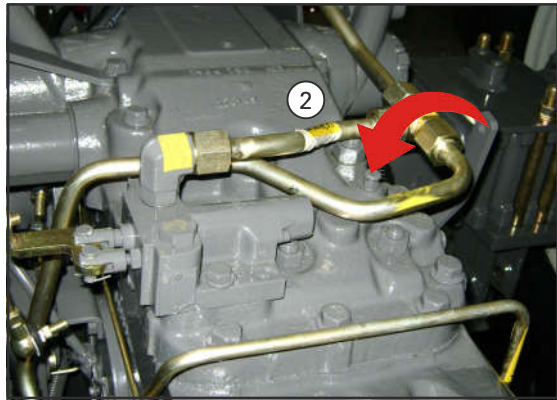


Fig. 266



Fig. 267

11.2 - Lubrication of the rear final drives

A) Checking oil level

To check the reducers oil level, with the tractor on a flat place, remove the level and refill plug (1): the level is correct if the oil reaches the edge of the filling plug hole. If necessary, fill it with the recommended oil.

B) Changing the oil

The tractor must be at the normal operation temperature.

Drain the oil by removing the plugs (1 and 2).

Reinstall the drain plug (2) and fill by the plug hole (1), with the oil recommended on page 6.

Reinstall the plug (1).

Follow the same procedure on the other reducer.

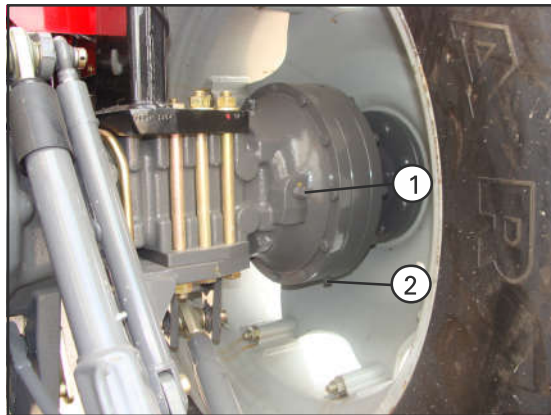


Fig. 268

11.3 - Checking the transmission and hydraulic oil level

With the tractor on a flat place, the level must be between the dipstick (1) maximum and minimum.

If necessary, top it up through the nozzle (2 or 3) with the recommended oil.

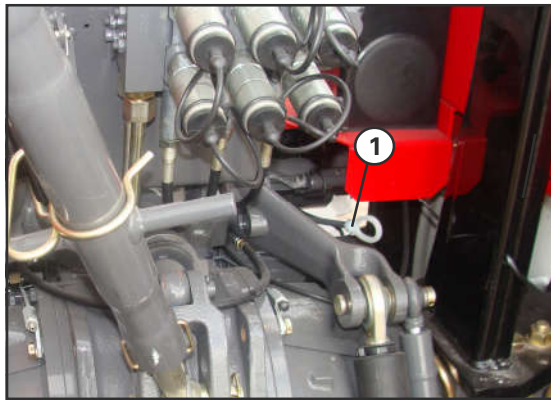


Fig. 269

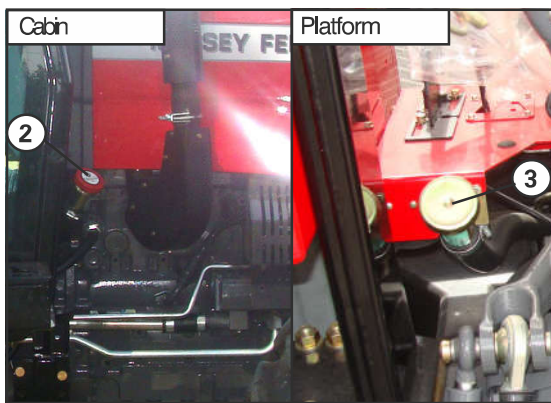


Fig. 270

11.4 - Changing the transmission and hydraulic oil

- 1- Drive the tractor to a location with a proper contention basin in each plug before removing them.
- 2- Remove the plugs (1 and 2).

NOTE

In the 4x4 tractors, also remove the draining plug (3) installed in the front axle transfer case.

- 3- Place the hydraulic control levers in the completely lowered position (DOWN).
- 4- Remove, clean and reinstall the screen-filter. In addition, change the transmission filter.
- 5- Change the filtering element.
- 6- Reinstall the draining plugs. Refill the system through the transmission oil nozzle (2) up to the correct level with the recommended lubricants.
- 7- After waiting for a period of time enough for the oil to seat, check the level and, if necessary, put more oil and reinstall the filling plug.

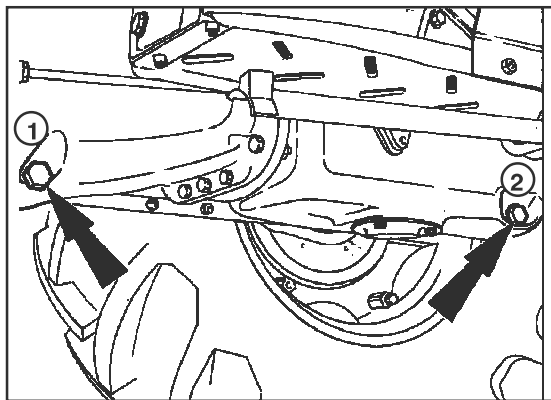


Fig. 271

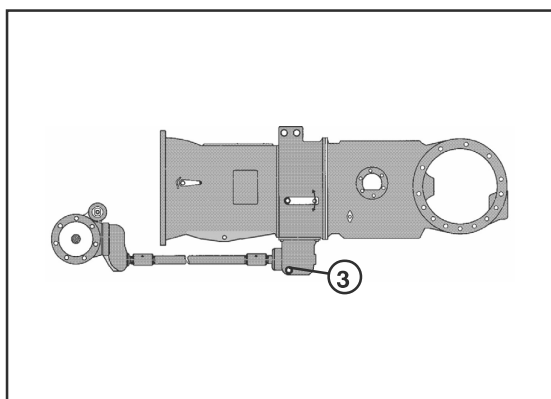


Fig. 272

6 - Maintenance

11.5 - ISYP pump screen-filter

- 1- Drain the oil by removing the two draining plugs, as described above.
- 2- Remove the three bolts (2) and washers that attach the cover (3) in the central housing base.
- 3- Remove the clamp (5), the nut (6), the spring (7), the washer (8) and the "O" ring (9).
- 4- Remove the screen-filter (10).
- 5- Clean the screen-filter with a brush and solvent. Remove all the residues particles from the screen-filter material folds.
- 6- Inspect the screen-filter material, discharge it and replace the screen-filter if it is damaged.
- 7- Check the screen-filter stud (11) tightening, located in the pump housing.
- 8- Check if the "O" ring is well fitted in the pump and, then, reinstall the screen-filter (10).
- 9- Reinstall the "O" ring (9), the washer (8) the spring (7), the nut (6) and the clamp (5).
- 10- using a new gasket (4), reinstall the cover (3) with the three bolts (2) and washers.
- 11- Reinstall the two draining plugs and refill the transmission with the oil approved by the factory.

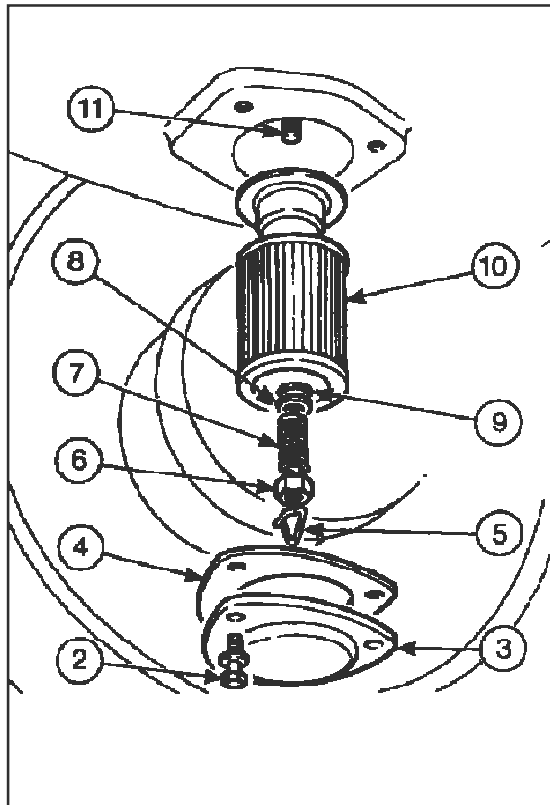


Fig. 273

11.6 - Changing the return filter

The first change must be performed before the first 50 hours of work. After that, the changing must be performed when the warning light (4) lights on in the tractor panel during the operation or according to the maintenance chart - whatever happens first.

Restriction (2) and temperature (3) sensors

The warning light (4) will light on in the tractor panel when the element of the steering return hydraulic filter (1) is excessively restricted, indicating that it must be changed. The warning light for the restriction of the steering return hydraulic filter will also light on when there is a failure.

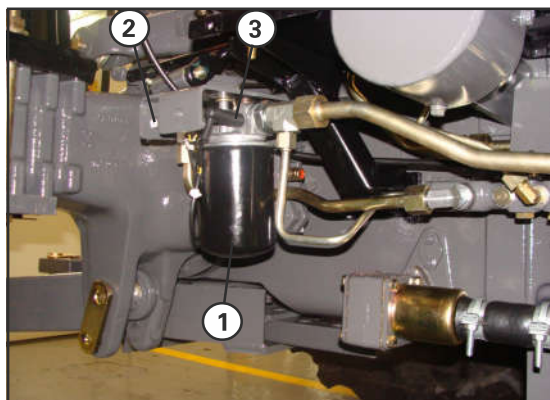


Fig. 274

Procedures to change the return oil filter.

- 1- Drain the oil from the transmission.
- 2- Remove the filter (1), turning it to the counterclockwise direction.
- 3- Apply lubricating oil on the new filter sealing ring and install it manually.
- 4- Clean the suction filter according to the description below.

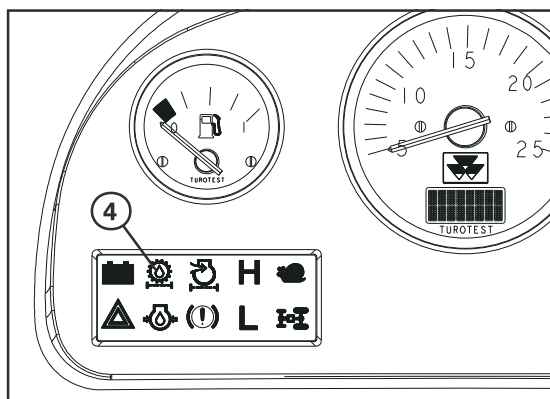


Fig. 275

C) Cleaning of the suction filter

With the oil from the transmission drained and the filter housing clean:

- 1- Remove the 4 bolts and washers, the cover (6) and the spring (7).
- 2- Remove the gasket (8), which must be replaced.
- 3- Pull the screen-filter (9) off the housing.
- 4- Carefully clean the screen-filter with the brush in diesel oil or kerosene. Remove all the dirty particles hold in the screen.
- 5- Inspect the filter and replace it if it presents any damages.
- 6- Reinstall the screen (9) and place the spring (7) correctly.
- 7- Using a new gasket (8), reinstall the cover (6), with the 4 bolts and washers (5).
- 8- Reinstall the transmission draining plugs.
- 9- Refill the transmission with the recommended oil until reach the MAX mark on the dipstick.

Identification of the hydraulic pumps

- A- Steering and lifting system pump (if installed)
- B- Auxiliary remote control system pump.

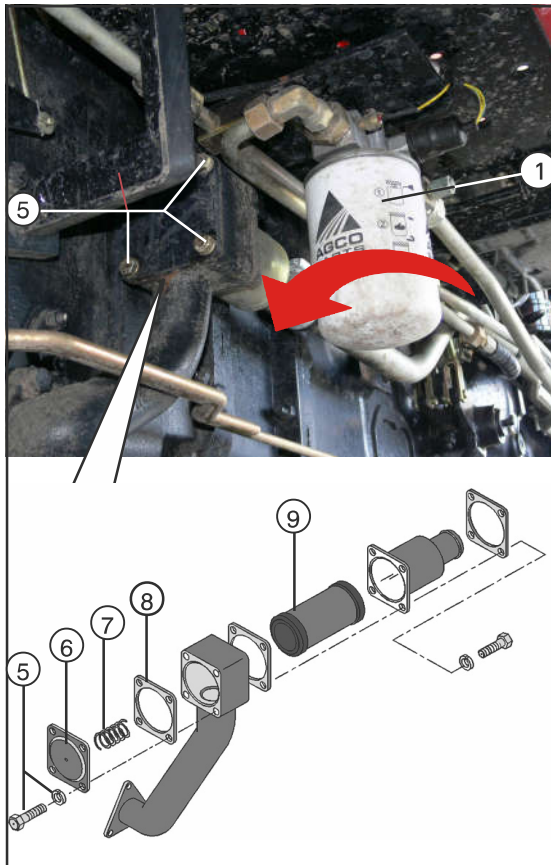


Fig. 276

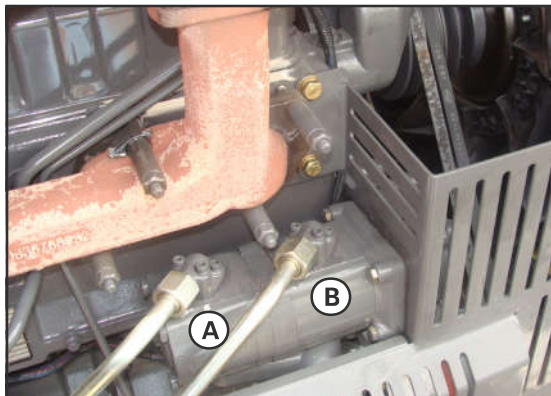


Fig. 277

6 - Maintenance

12 - Maintenance of the rear final drives and rear axle

12.1 - Lubrication of the rear final drives

To check the reducer/planetary oil level, the tractor must be on a flat surface. Then, remove the filler nozzle (1) and the level indicator plug. If necessary, fill it with the recommended oil.

Changing the oil in the rear final drives

With the tractor at normal operating temperature, drain the oil through the plug (2), also remove the plug (1);

Reinstall the plug (2) and refill the final drive through nozzle until reach the maximum mark.

Reinstall the plug (1) and follow the same procedure as for the other final drive.

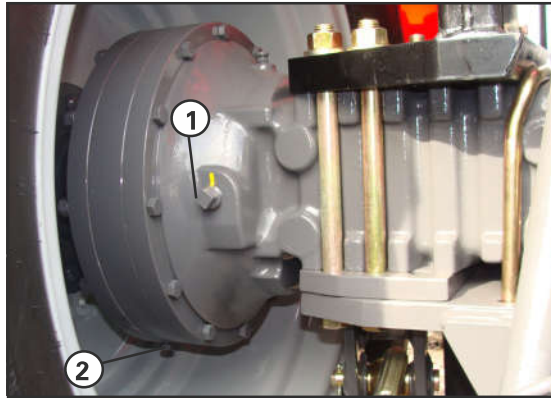


Fig. 278

6

12.2 - Lubrication of the front drives - 4x4

Oil level of the front axle drives

1. With the planetary plug (1) in the position of 3 or 9 hours.
2. Remove the filler/draining plug (1) with a proper Allen driver.
3. The level is correct when the oil reaches the edge of the filler nozzle.
4. If necessary, top it up with the recommended oil - See the page 80.
5. Reinstall the plug, attach it securely.
6. Follow the same procedure on the other wheel planetary.

Changing the oil from the front planetary

With oil at normal operating temperature:

1. Lift the tractor's front side and place the axle over safe stands.
2. Turn the wheel so that the drain/filler plug is at the bottom.
3. Remove the plug (1) and drain all the oil.
4. Turn the wheel so that the plug is in the filling position (position 03 or 9 hours).
5. Refill the planetary with the recommended oil and reinstall the plug, tightening it securely. The level must reach the edge of the filler nozzle.
6. Follow the same procedure on the other wheel planetary.

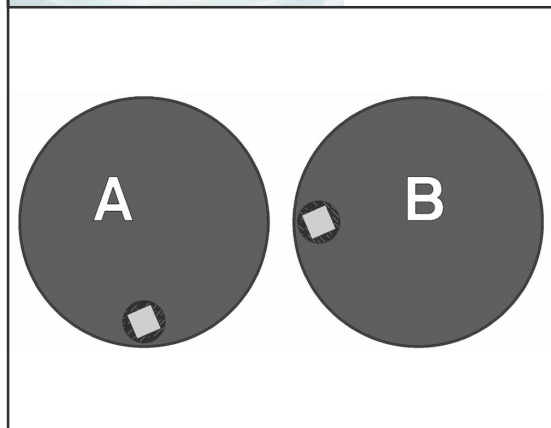
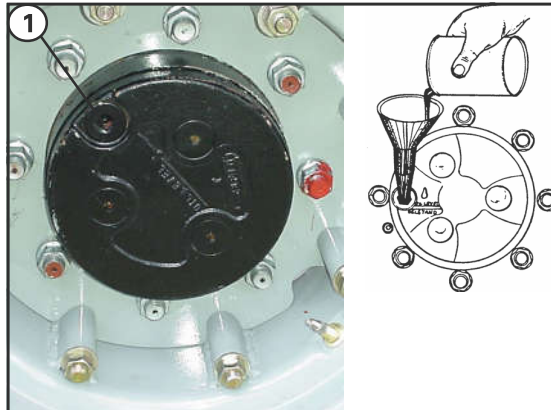


Fig. 279

12.3 - Lubrication of the front carrier - 4x4

Front differential oil level

- 1 With the tractor on a flat place, remove the differential filler plug (1).
- 2 The level must reach the edge of the filler nozzle.
- 3 If it is below this level, top it up with one of the recommended oils.
- 4 Reinstall the plug (1).

Changing of the front differential oil level (4x4)

With the tractor on a flat surface and the oil at normal operating temperature:

- 1 Remove the filling plug (1) and the drain plugs (2).
- 2 Check the plugs seals and replace them if necessary. After the oil has been totally drained, reinstall all the draining plugs (2), retightening them correctly.



NOTE

The draining plugs have a magnetic part to collect the metallic particles in the oil. Clean the plugs using solvent.

- 3- Reinstall the draining plugs, tightening them securely and fill up the differential with oil up to the recommended level.
- 4- Also reinstall the filler plug (1).

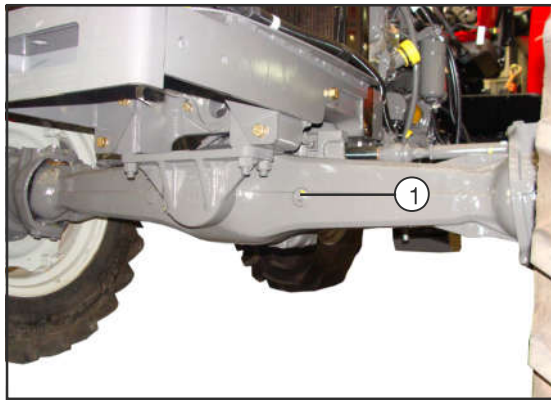


Fig. 280

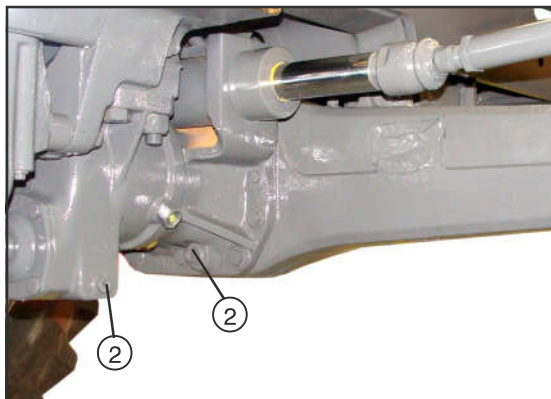


Fig. 281

6 - Maintenance

12.4 - Front hubs - 4x2

If the front hub needs adjustment, proceed as follows:

1. Lift the wheel from the ground and remove the four bolts from the hub cover (1) and the cover.
2. Remove the elastic pin (2) and tighten the castle nut (3) with a torque of 80 Nm (60 feet lbs). Next, loosen the nut until the closest hole to provide the correct fluctuation. Install a new elastic pin.
3. Reinstall the hub cover. Lubricate the hub until clean grease flows out and cover the seals in the wheel rear side.

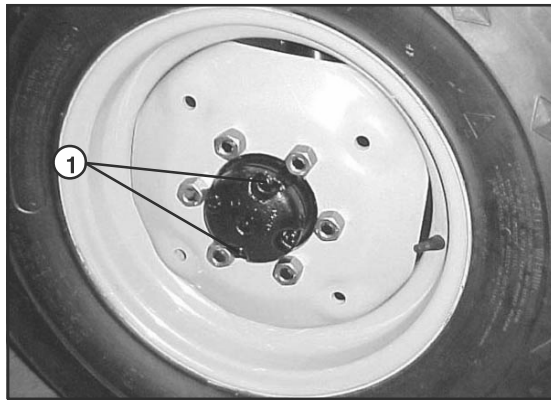


Fig. 281

12.5 - Eliminating the play of the front axle fuse (4x2 tractors)

The play must be eliminated in order to prevent dirty (water and dust) to enter in the axle tube.

- 1- With the two front wheels supported on the ground, loosen a little the nut(s) (1) from the arms.
- 2- Use a hammer to slightly beat the arms (2), in order to eliminate the play between the arm and the tube.
- 3- Retighten the nut(s) (1).

6

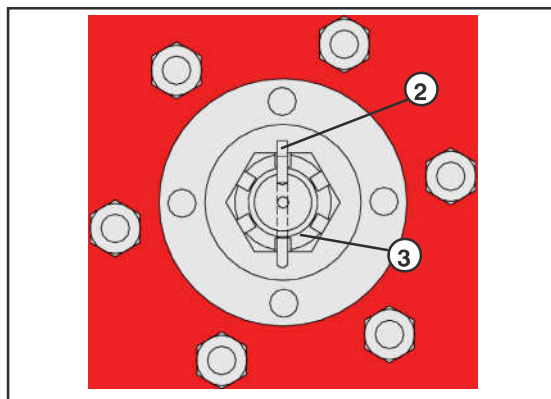


Fig. 282

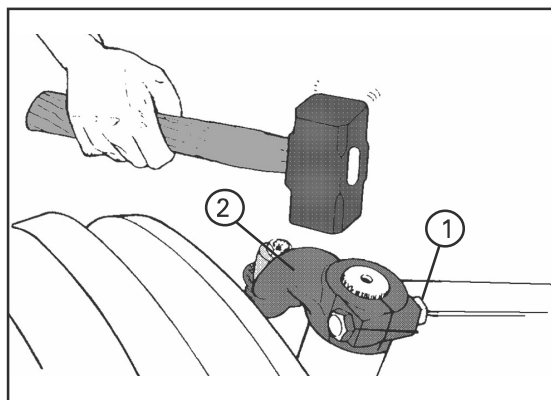


Fig. 283

13 - Front wheels alignment

- Park the tractor in a flat surface and place the wheels turned forward.
- To check the wheels alignment measured in the axle center located in the wheel rim. **The distance "A" must be equal to the distance "B" in the 4x4 axles and between 0.1 and 5 mm (0 - 3/16 pol.) higher than the distance "B" in the 4x2 axles.**
- Drive the tractor forward in half turn of the wheel. Check the distance again.

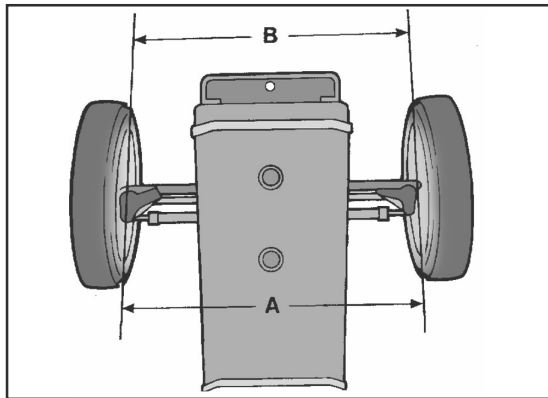


Fig. 284

Adjustment procedure - 4x2 axle

- The distance "A" must be between 0.1 and 5.0 mm (0 and 3/16 pol.) higher than the distance "B". If it is different, perform the required adjustments next to the edge of the right-side drive rod.
- Reinstall the tightening bolts (1).
- Adjust the alignment turning the arm (2) according to the needs.
- After the recommended alignment has been performed, reinstall the components in the reverse order, taking care to align the clamp hole (4) horizontally and turned down, in order to allow the bolts to be assembled.
- Check the rubber cowl (3) conditions and replace them, if necessary.

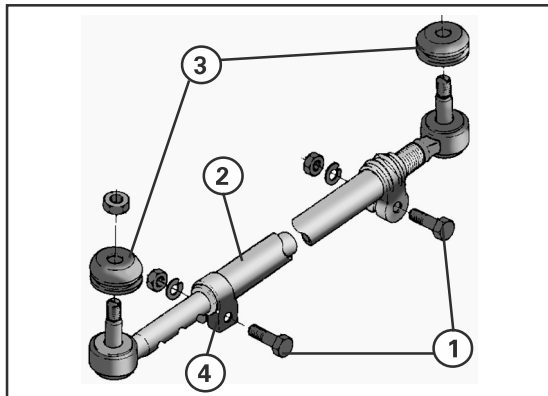


Fig. 285

Adjustment - 4x4 axle

The alignment must be as close as possible to **0 mm**, that is, the rear measurement "A" must be equal to the frontal measurement "B".

- If necessary, release the lock nut (1), located at the axle side.
- Turn the rod (2) with the help of an open wrench until the recommended alignment is reached.
- Retighten the lock nut (1).

NOTE

Apply Loctite glue to prevent the lock nut to be loosen.

The alignment adjustment must be performed with the same measurement in both sides (the same number of slots and threads in both rods).

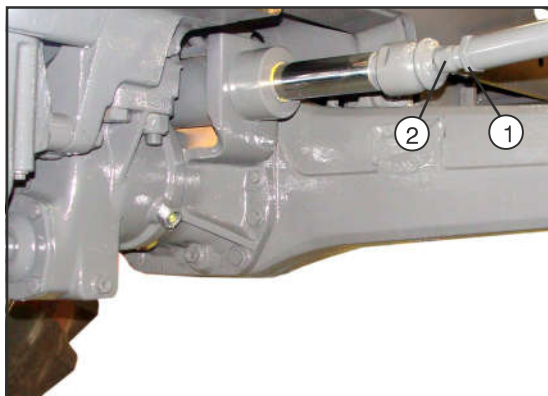


Fig. 286

6 - Maintenance

14 - Maintenance of the brakes

14.1 - Bleeding of the brakes hydraulic driving

The brakes have hydraulic drive pedals.

Before adjust the pedals free course, check if the system needs bleeding.

Keep the reservoir with fluid to proper level (1).

Use the recommended brake fluid according to the lubrication chart in this manual. If you have any doubts, check it with the Dealer. The brakes are vital for your safety, the tractor and other people safety.

Bleeding process

- 1 - Complete the level with the recommended brake fluid according to the lubrication chart in this manual.
- 2 - Ask someone to press one of the brake pedals. Perform it individually in each brake pedal.
- 3 - Press the pedal all the way to the end 3 times and keep it pressed.
- 4 - Loosen one of the draining plugs (2), located on the trumpets, in the tractor rear side. Let the fluid to bleed, taking care it does not reach you.
- 5 - Retighten the plug (2).
- 6 - Only now, release the pedal.
- 7 - Repeat the procedures 3 to 6 as many times it is necessary. Usually, a good bleeding is obtained in two steps.

It can be verified when the pedal gets secure, with good operation. If you perform the bleeding and the pedal does not get secure when pressed or, then, when the bleeding need becomes frequent, it will be necessary to replace the master cylinders repair and/or the servo-cylinders.



NOTE

Take care to not exhaust the fluid in the reservoir during the bleeding, since it would increase the air inflow in the circuit.

- 8 - Follow the same procedure for the other pedal and the respective bleeding plug (2).



Fig. 287

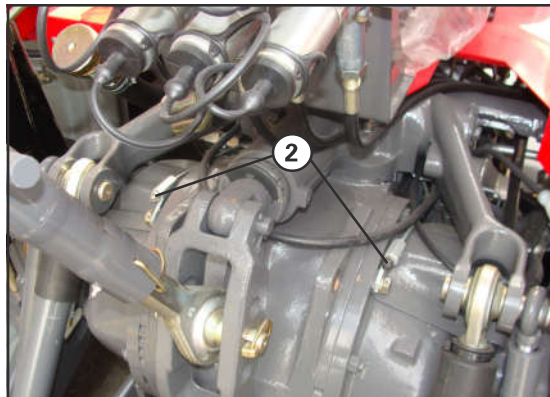


Fig. 288

14.2 - Adjustment of the pedals free travel

After the bleeding, check and adjust, if necessary, the pedals play as follows:

- 1 - Press one of the pedals and, with a ruler, check the its dislocation in relation to the other, which is the play.
- 2 - The play must be of 4 to 5 cm. If it is different, perform the adjustment through the nut (1) existent together the rear axle trumpets.
- 3 - To decrease the pedal play, turn the nut clockwise. To increase the play, turn the nut counter-clockwise.
- 4 - Follow the same procedure for the pedal on the other side.

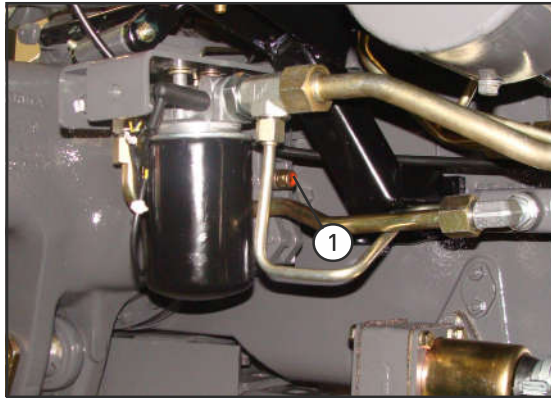


Fig. 289

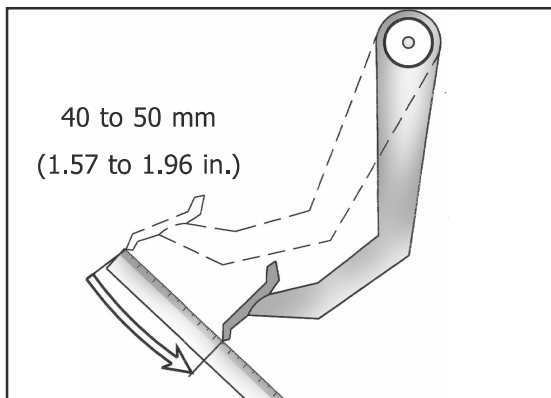


Fig. 290

6

14.3 - Brakes simultaneous test action

After any adjustments on the brakes, perform the final checking for the both pedals operation together, which must be as homogeneous as possible.

When pressing the two pedals, using the locking device, the rear wheels must be simultaneously braked.

If it does not happen, there is always the severe risk for the tractor to be guideless, specially in an intense emergency braking.



CAUTION!

To perform the brakes simultaneous operation test, go to an area that is free of obstacle and far from curious people.

The responsibility for the safety always falls on the tractor driver. If you find difficulties, check with your Dealer.

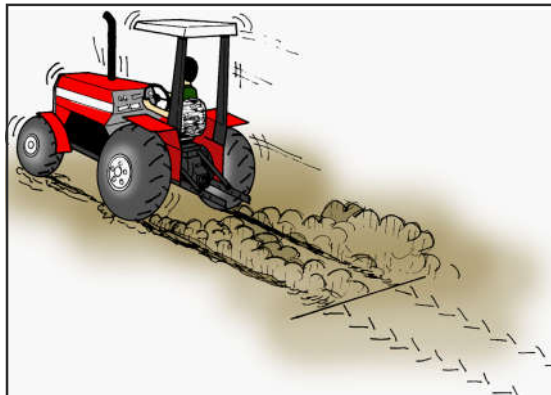


Fig. 291

6 - Maintenance

15 - Electrical system

15.1 - Cares with the hydraulic system



WARNING:

Avoid improvisations when performing repairs in the electrical system. The good operation and the safety of the electrical system, including its components, can be seriously affected by the installation of a non-recommended accessory or by performing the maintenance by personal that are not trained at the factory.

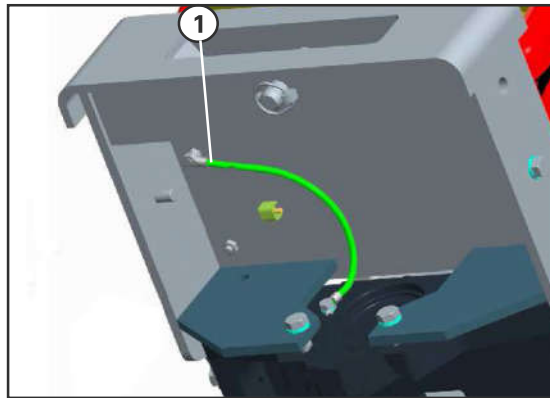


Fig. 292

To avoid damages to the charging system and the alternator, observe the following recommendations:

- ✓ Do not connect or disconnect any circuit with the engine running;
- ✓ Always disconnect the negative cable (1) from the battery before performing any welding in the tractor or implement coupled to it. Follow the same recommendations to install the battery in charge, when assembled in the tractor.
- ✓ Always connect the positive cable first, and then the negative cable.
- ✓ Never perform repairs in the electrical system without disconnecting the battery negative cable first.
- ✓ Never use auxiliary battery in which the rated voltage is higher than the main battery.
- ✓ Never invert the polarity in the connections of the tractor battery or the auxiliary battery for starting.
- ✓ Always connect the negative cable to the negative borne and the positive cable to the positive borne.
- ✓ If the battery needs to be replaced, identify the assembling position and connections to prevent inversions when reinstalling it.
- ✓ In the case of tractors with electronic lifting system, the cares with the electrical system are even higher. If the voltage supplied by the electrical system is not within the limits, the hydraulic lifting is inoperative.

15.2 - Maintenance of the battery

Checking the electrolyte level

(Except for Maintenance-free batteries)

To check the electrolyte solution level, remove the cover from the vases and introduce a tube until it reaches the plates. Close the tube upper part, lift it and check the height that the liquid reached. The result corresponds to the solution level. The level must be within 1 and 2 cm.



IMPORTANT:

The acid vapors released by the battery are lethal. Never approximate flame (fire) to illuminate it, since the mentioned vapors are flammable. If the battery "consumes" water in very short periods (60 to 80 working hours), or if it runs out of charge very frequently, send the charging system to be tested ((alternator and regulator) and the battery.

Access to the battery

The battery is located at the left side of the tractor.

To access it, remove the two locks (1) and after remove the cover (2).

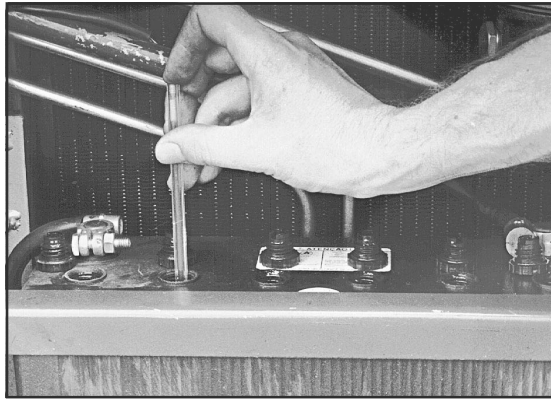


Fig. 293

6

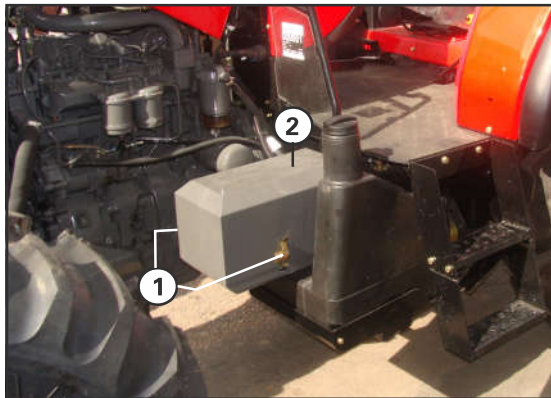


Fig. 294






Fig. 295

6 - Maintenance

Ventilation in the electrolyte level - Batteries with charge indicator

Maintenance-free batteries have a charge indicator embedded in the cover.

According to the color displayed, it informs the current charge level, according to the table below.

Colors	Green	Black	Colorless
			
%charge	Above 65%	Below 65%	Level below the electrolyte
Action	Batteries under test conditions	Check the battery charge before the test. If necessary, recharge it.	Batteries without any conditions to be used.

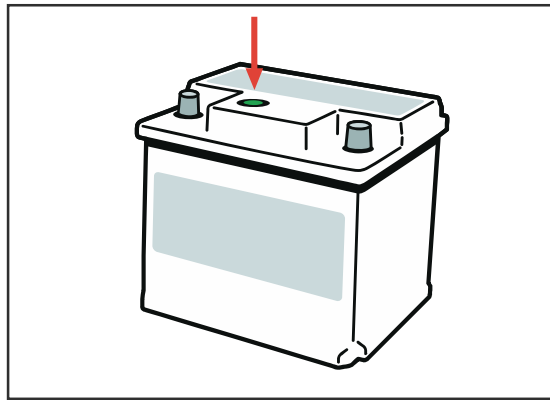


Fig. 296



Fig. 297

6

Cleaning of the battery terminals.

In addition to the solution level, the cleaning is also responsible for the battery life. The foreign deposits accumulated corrodes the painting and the metallic parts in contact or next to the battery.

In addition, they discharge the battery, since they work as conductors. The battery bornes lose the perfect contact with the cables terminals, generating difficulties to conduct the current, resulting in discharge and the battery overheating. For the cleaning, disconnect the cables. First the negative, and after the positive. Clean the bornes and terminals with a sandpaper and wire brush.

At the assembling, protect them with Vaseline to protect against corrosion. Wash the battery case using hot water and soap. Install the battery again, taking care to not invert the polarity. Cable (+) with terminal (+) and cable (-) with terminal (-).

First, install the cable (+) and after the terminal (-).

Use of auxiliary battery

Take care for not generating sparks and damages to the bornes. for this reason, use cables with good quality, attaching them securely in the battery bornes.



CAUTION!

The battery has a sulfuric acid electrolyte. This substance is extremely corrosive and, then, must be handled with much care.

▲ Corrosive substances - keep it out of the reach of children.

s Avoid contact with the eyes and skin, because the battery acid can cause severe irritability. Use protection clothes, gloves and protection glasses.

▲ If the substance get in touch with eyes, wash them thoroughly and look for medical assistance. If it is swallowed, immediately look for medical assistance, showing the product's label.

▲ When charging the battery, perform this in a well ventilated location and ALWAYS turn it off from the power supply before disconnecting the bornes.

▲ NEVER perform the flame test to check the electrolyte level. Always use a voltmeter or hydrometer to check the load and an electrical lamp to check the battery electrolyte level, if necessary.

▲ Check if the battery ventilation plugs are correctly installed. Always remove the negative (-) cable, black color, first.

Recharging the battery

When the battery is discharged, due to a long inactivity period, it must be charged outside the tractor, in a low charging device, that is, the voltage must be equivalent to 10% of the nominal capacity value for the battery.

Example: Battery of 120Ah

Charging current = 120×0.1 (10%) = 12A

The current increased by the alternator (with the battery discharged) can damage it.

Never test the battery for short-circuits between the bornes. In addition to damaging the bornes, there is the risk of the battery to explode.

The use of a densimeter can find with good accuracy the problem of a battery through the solution density.

Wide differences of density between the different vases indicate the existence of some problems, such as sulphation or short-circuit in the plates. In this case, a charging test will be required in a specific device.

Battery charge test

When the battery is discharged, due to a long inactivity period, it must be charged outside the tractor, in a low charging device.

Procedure

With the engine OFF, the battery charge can be evaluated by the voltage measured in the terminals.

12.7 volts Maximum charge

12.4 volts Charge at 50%.

12.0 or less Discharged

Voltage x time for recharge

The time in which the battery must be in the charging process varies due to the voltage applied:

- Between 12.0 and 12.2V of charge 4.5 hours
- Between 11.8 to 11.99V or charge 7 hours
- Between 11.5 to 11.79V or charge 9 hours
- Between 11.0 to 11.49V or charge 11 hours
- Totally discharged 15 hours



NOTE

Never use charge under voltage above 15 Volts.

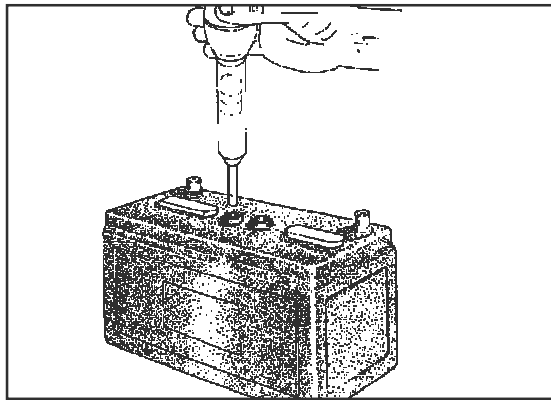


Fig. 298

Cares to be taken in recharging the battery

- Follow carefully all the recharging process.
- Never recharge the battery when the test indicator is bright (batteries with charge indicator).
- Check the battery temperature, it must never exceed 50 °C. If it occurs, stop the recharging until the battery cools down and restart with a reduced recharging regimen.
- Recharging the battery overnight without supervision is not recommended.
- Never disconnect the connection cables with the charger ON.

6

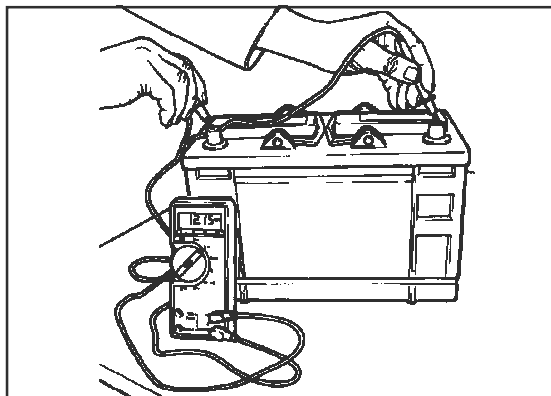


Fig. 299

6 - Maintenance

15.3 - Alternator and fan driving belt



CAUTION

If the alternator protection is removed while the drive belt tension is checked, it must be securely assembled again before turning the tractor ON again.

A typical example of alternator / fan drive belt is presented. Your tractor can be slightly different in relation to the adjustment point.

Always replace the drive belts if they are worn or damaged. Change both drive belts of the pair at the same time.

To prevent deformation, press the drive belts down with the thumb in the center of the longer free length. With the moderate thumb pressure, the correct drive belt deflection must be of 10 mm (3 / 8 in.)

If a drive belt tension gauge is available, the correct tension is 355 N (35.5 kg). Do NOT allow the tension to be below 220 N (22 kg).

6

Adjusting the drive belts tension

- 1- Remove the protection (1).
- 2 - Loosen the nut (2) and also the bolt (3).
- 3 - correct the alternator position looking for the correct tension of the alternator drive belt. Retighten the brackets (2 and 3).
- 4 - Review the drive belt tension to assure it is correct.



NOTE

If new drive belts are assembled, check/adjust the tension after the first 25 hours of operation. The illustration at the side is shown without the fan protection only for a better clarification. Do not operate the tractor with that protection removed.

- 5 - Reinstall the protection (1).

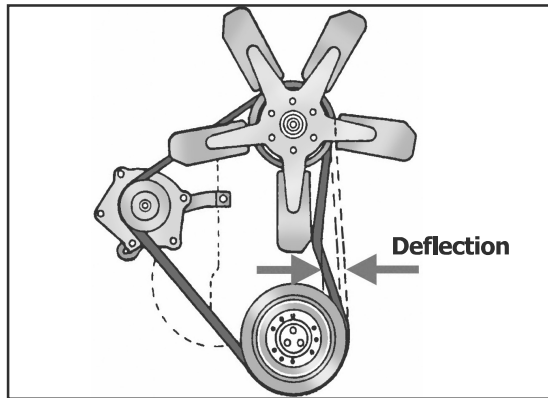


Fig. 300

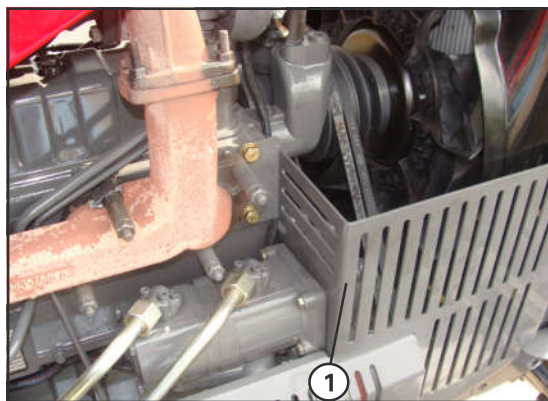


Fig. 301

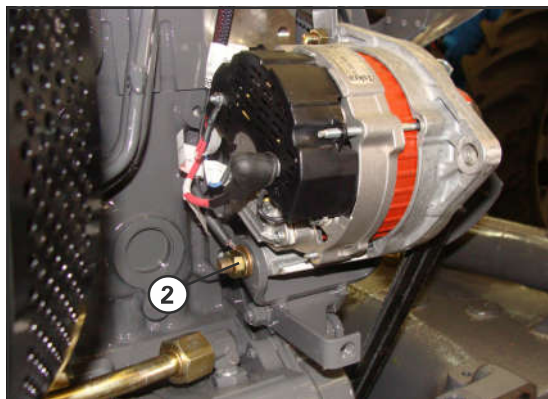


Fig. 302

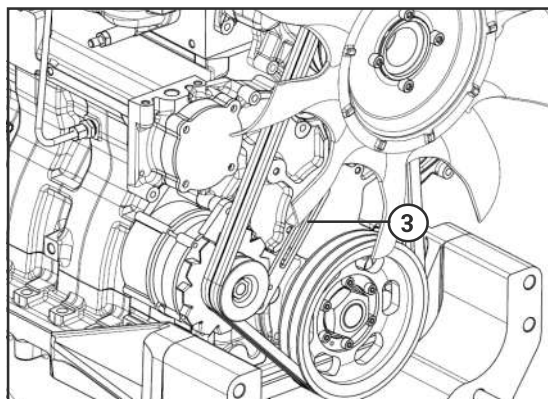


Fig. 303

15.4 - Adjustment of the front headlights

- 1- Park the tractor turned to the front of a wall at 2 meters of distance. The tractor must be on a plain and leveled ground.
- 2- Draw a horizontal line (1) on the wall equal to the height of the headlights centers (B).
- 3- Draw two vertical lines equal to the width (C) representing the distance between the headlights centers.
- 4- Draw a horizontal line (2) according to D, which is the distance of the horizontal line (1) by the equation ($D=B \times 0.1$).
- 5- Adjust each headlight individually, covering the opposite headlight and aligning the upper edge of the illuminated zone with the upper part of the line (2), according to the illustration. If necessary, adjust it turning the bolts (3).

**NOTE**

Perform the checking separately. While checking a headlight, cover the other one. Also cover the cabin headlight (if equipped), or the auxiliary headlights, which can make the visibility difficult.

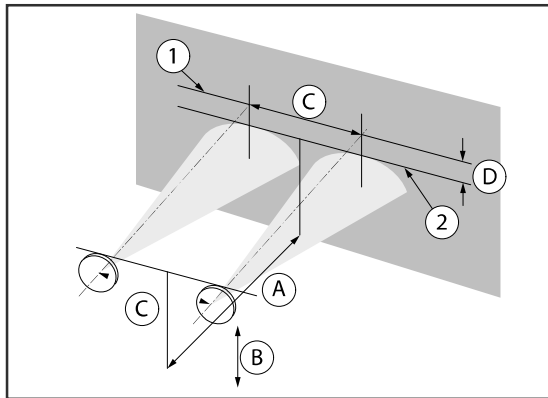


Fig. 304

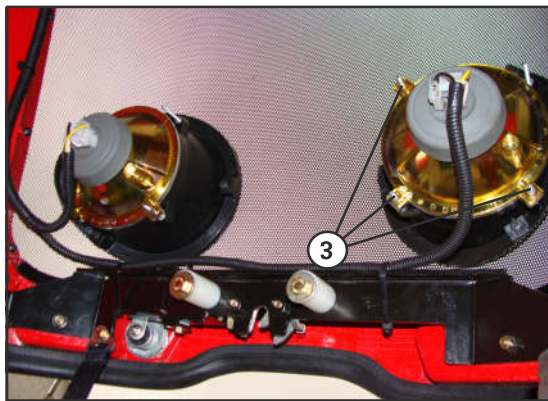


Fig. 305

6 - Maintenance

15.5 - Changing the headlights and lamps bulbs

Operating front headlights:

Bulbs voltage: 60 watts (Low Beams) and 55 watts (High Beams).

- 1 - Open the front grille.
- 2 - Disconnect the plug (1).
- 3 - Move the rubber protection (2) away.
- 4 - Disengage the clamp (3) to release the socket with the bulb (4).
- 5 - Pull the socket assembly and remove the bulb, pushing it, turning it simultaneously to the counter-clockwise direction and after pulling it.
- 6 - Assemble a new bulb following the reverse procedure.



Fig. 306

Rear service headlight (A) bulb, auxiliary lights and the cabin front headlights (B).

Voltage of 55 watts, halogen bulb



NOTE

This kind of bulb must not be touched with the fingers, since the natural humidity and grease from the skin can blow the bulb. Always use paper or a clean and dry cloth to handle these kinds of bulbs.

- 1- Turn OFF the key corresponding to the item to be worked.
- 2 - Open the headlight by removing the bolts (1). After, remove the assembly from the cabin interior.
- 3 - Disengage the clamp, releasing socket with the blown lamp, according to the blue arrows.
- 4 - Assemble the new bulb, and do not touch it directly with the fingers, according to the instructions above. After, assemble the set to the cabin. Attach with the bolts (1).



Fig. 307

6 - Maintenance

Circular type service headlamps: voltage 55 watts

- 1 - Open the headlight by removing the bolt (1).
- 2 - Disengage the clamp (2) to release the socket with the bulb (4).
- 3 - Disconnect the plug (3).
- 4 - Move the socket away from the housing and remove the bulb (4) by pulling it.
- 5 - Inversely, assemble the bulb (4), and do not touch it directly with the fingers, according to the instructions above.

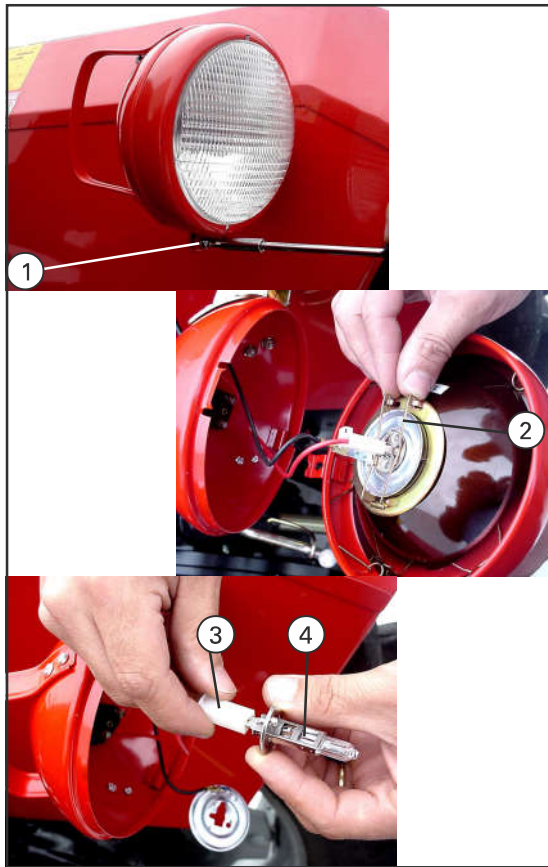


Fig. 308

Front turn signal lamps and Flasher

- 1- Turn signal lamps (flasher): 21 watts
- 2- Turn signal lamps: 5 watts

To access these bulbs, remove the 2 bolts from the lens (3).

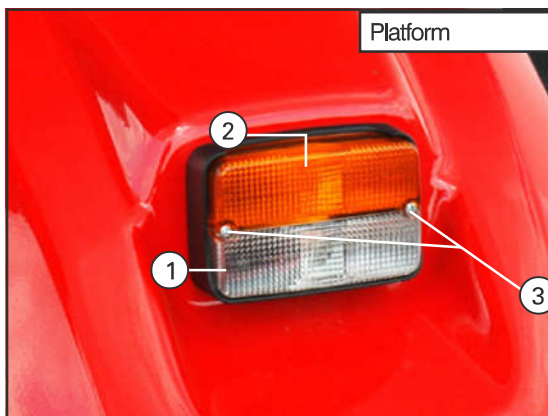


Fig. 309

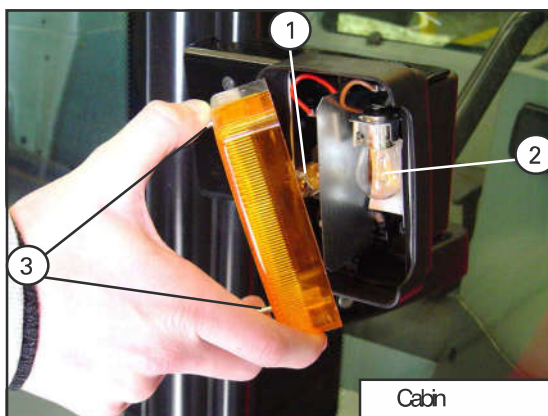


Fig. 310

6

6 - Maintenance

Turn lights, flashers and brake lights

A - Turn light and brake light: 5 watts

B - turn signal (flasher): 21 watts

- a) Remove the bolts (2) and separate the assembly according to what was shown. force the socket (1 or 2) laterally to disassemble it from the housing.
- b) Remove the bulb by turning it counter-clockwise.
- c) Replace for a new bulb, assuring that it is completely fit after pulling it against the housing.



Fig. 311

Cabin interior light (room lamp)

Bulbs voltage = 10 watts

- 1- Force the lamp assembly (1) down using a screw driver according to what is shown:
- 2 - Remove the reflector (2) and replace the bulb (3).
- 3 - Reinstall the assembly, pushing it up until it completely fits.

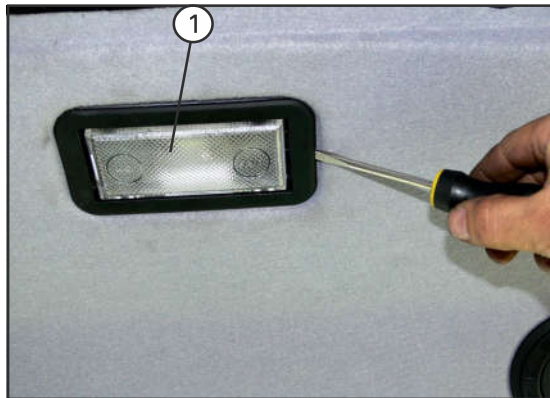


Fig. 312

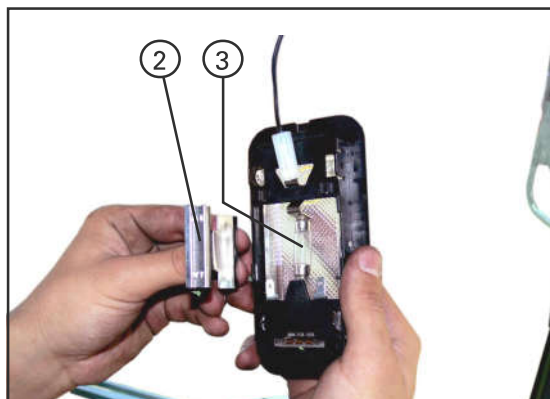


Fig. 313

6 - Maintenance

Panel internal illumination

In the case of some of the instruments from the panel or warning lights do not work, check your Massey Ferguson Dealer.

The panel opening requires special tools and knowledge.

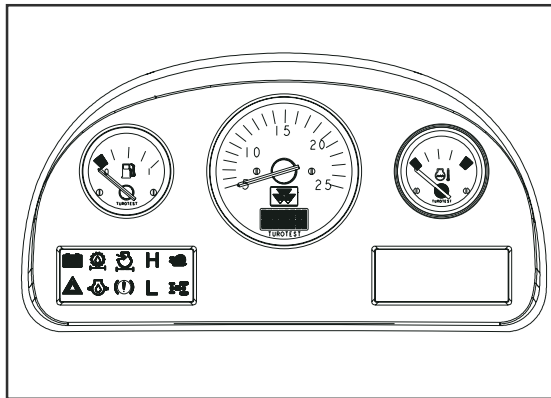


Fig. 314

Sound emission for rear gear

The sound emission system has a horn (1) installed at the side of the transmission, which must be periodically tested for its operation.

If the sound emission for the rear gear engagement does not work, check with your Massey Ferguson Dealer.

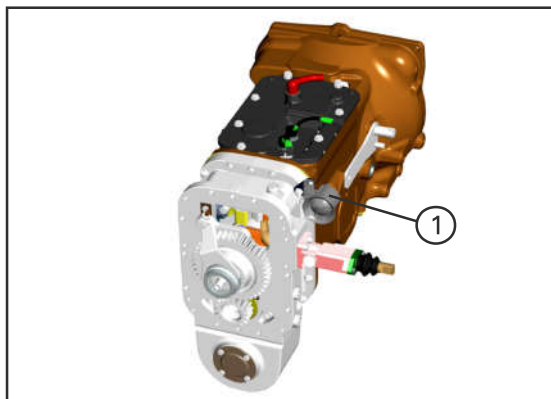


Fig. 315

6

6 - Maintenance

15.6 - Changing the relays and fuses



NOTE:

The lists below include optional items.

ATTENTION!

- Never perform any repairs in the electrical system without disconnecting the battery negative cable first.
- Never improvise using metallic objects or fuses of other capacity.
- If the fuses are frequently blown, check the cause of the problem and never use a fuse with a higher capacity to try preventing it from blowing.

A) Fuses "F" and primary relays "K" (Tractors with cabin and without cabin)

They are located in front of the radiator. To access it, open the frontal grille.

6

Relays "K":

K1 Starter relay

K9 Starter glow plug (If installed together the engine)

Fuses "F" - Platform Tractors

- | | | | |
|---|-------|------|----------------------------------|
| 1 | PF-01 | 60A | Alternator |
| 2 | PF-02 | 60A | Illumination |
| 3 | PF-03 | | Spare |
| 4 | PF-04 | 60A | Engine starting |
| 5 | PF-05 | | Spare |
| 6 | PF-06 | | Spare |
| 9 | PF-09 | 200A | Starter glow plug (If installed) |

Fuses "F" - Cabin Tractors

- | | | | |
|---|-------|------|----------------------------------|
| 1 | PF-01 | 60A | Alternator |
| 2 | PF-02 | 60A | Alternator |
| 3 | PF-03 | 60A | Cabin Illumination |
| 4 | PF-04 | 60A | Cabin Illumination |
| 5 | PF-05 | | Spare |
| 6 | PF-06 | 60A | Engine starting |
| 7 | PF-07 | | Spare |
| 8 | PF-08 | | Spare |
| 9 | PF-09 | 200A | Starter glow plug (If installed) |

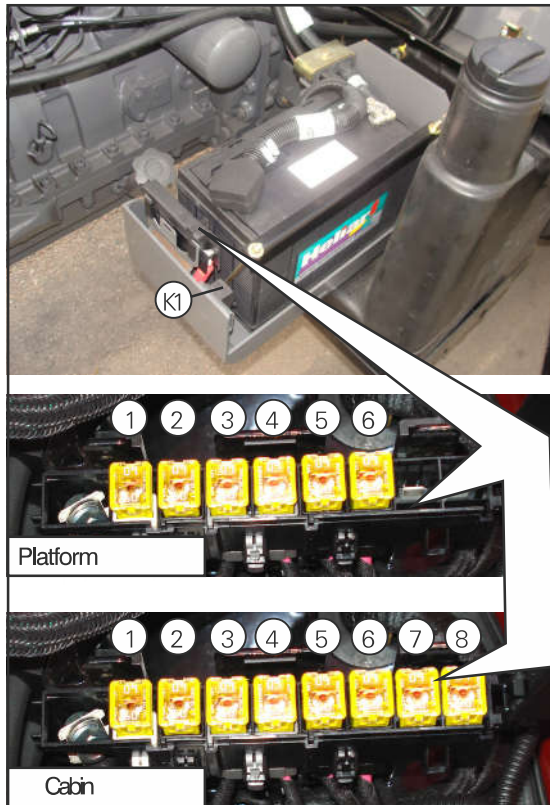


Fig. 316

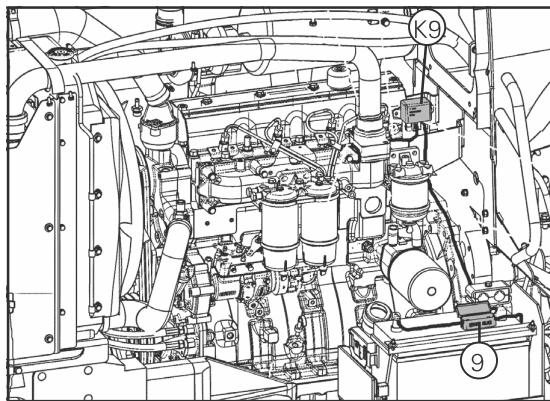


Fig. 317

B) Main fuse box - platform tractors

It is attached in the small hood cover itself, making the access to the fuses and relays easier.

The decal identifies the components function as symbols. Refer to the table below.

Relays "K":

- k1 Engine Starting.
- K2 Starter glow plug.
- K3 Headlamp high.
- k4 Flasher and alert.
- K5 Reverse alarm.
- K6 General Headlamp high and low beam.

Fuses "F":

- F1 10 A Injection pump solenoid.
- F2 5 A Instrument panel.
- F3 10 A Telemetry.
- F4 10 A Starter.
- F5 10 A Parking Lamp / switches H/L.
- F6 10 A Flasher and alert.
- F7 10 A Telemetry.
- F8 15 A Rear service headlamp / reverse alarm.
- F9 5 A Turn lights and Turn signal lights.
- F10 10 A Front headlights - Low Beam.
- F11 10 A Front headlights - High Beam.
- F12 15 A Auxiliary headlights.

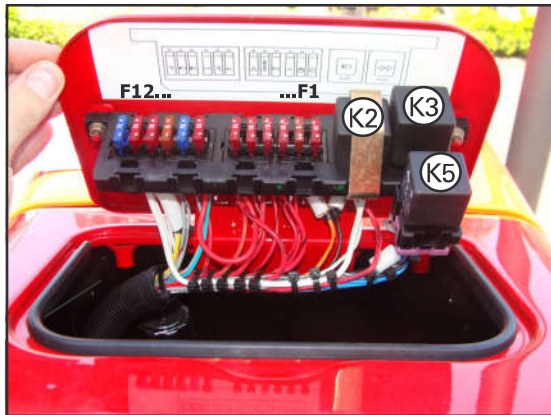


Fig. 318

6 - Maintenance

C) Changing of the relays and fuses - tractors with cabin

Access to the fuse box

- 1 - Turn the locks with a screw driver.
- 2 - Tilt the cover/support (1), obtaining total access to all the fuses "F" and relays "K", concentrated in this point.

Identification of relays "K"

- K1 Engine Starting.
- K2 Starter glow plug.
- K3 Cab function
- K4 General Headlamp high and low beam.
- K5 Starting auxiliary
- K6 Reverse alarm
- K7 Flasher and alert.
- K8 Headlamp high



Fig. 319

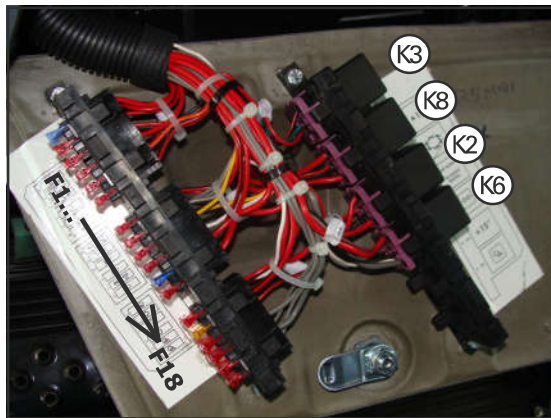


Fig. 320

6

Identification of fuses "F"

- F1 15 A Cigarette lighter + windshield wiper stop
- F2 10 A Radio + clock + interior light + telemetry.
- F3 10 A Hazard flasher + horn
- F4 10 A Instruments panel
- F5 10 A Injection pump solenoid
- F6 10 A Flasher / brake fluid level / parking brake
- F7 10 A Engine Starting / switches H/L.
- F8 10 A Turn lights and Turn signal lights.
- F9 10 A Low Beam
- F10 10 A High Beam
- F11 15 A Rotating headlight (beacon)
- F12 10 A Windshield wiper and washer (water squirt) - front
- F13 10 A Front auxiliary headlights
- F14 20 A Air conditioner
- F15 10 A Rear wiper and washer
- F16 10 A Spare (Telemetry)
- F17 10 A Rear service headlights
- F18 15 A Outlet for towing

16 - Air conditioner maintenance



ATTENTION!

Never disconnect the hoses that conduct the coolant from the air conditioner system. This fluid, in contact with the skin, will cause burns. Any kind of maintenance in the air conditioner, not described here, must be performed by a specialized technician. Submit the troubleshooting through the Massey Ferguson Dealer.

16.1 - Condenser cleaning

Whenever an accumulation of dust and other impurities is verified in the condenser fins (1), clean it with compressed air.

the air pressure must not be superior to 7 bar.

- Remove the hood lateral covers.
- Loosen the condenser mounting nut in one of the sides and move the condenser away in relation to the water radiator, to get a better access.
- Clean this side, mount it again and after repeat the operation on the other side of the condenser.

16.2 - Adjustment of the compressor belt tension

The drive belt (2) tension must have the deflection of 10 to 15 mm - see the drawing. Make adjustments if necessary:

- Loosen the nuts of the linking bolts.
- Loosen the positioning nuts and move the compressor (3) up and down to obtain the recommended tension of the drive belt.
- Retighten the 4 nuts and check if the tension remained correct.



NOTE

Check if the fan and alternator operation drive belts are correct.

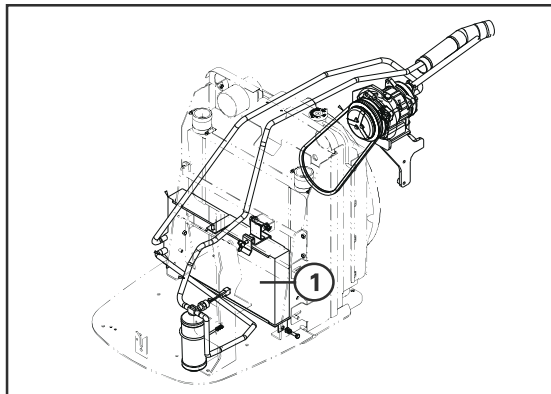


Fig. 321

6

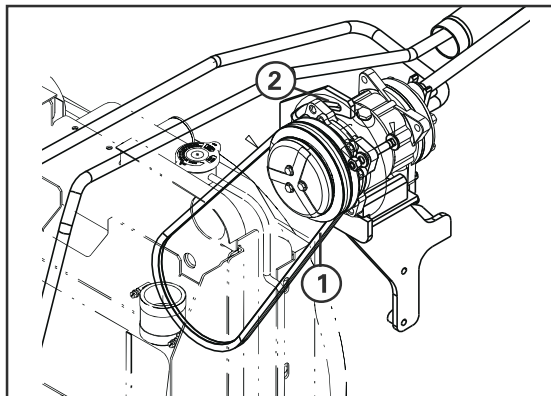


Fig. 322

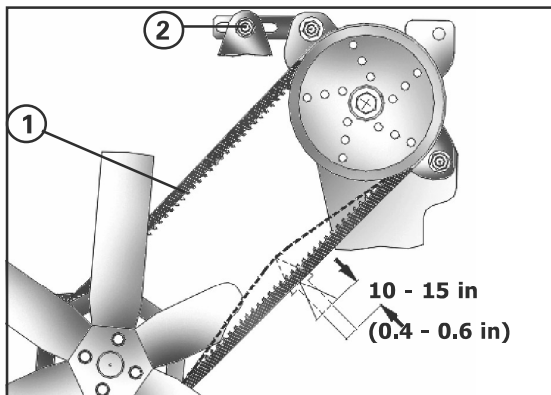


Fig. 323

6 - Maintenance

16.3 - Cleaning of the cabin air renovation filter

- a) Remove the cover (3), turning the knobs (1) according indicated by the arrow.
- b) Remove the filter element (2) - according to hat is shown.
- c) Apply compressed air on the filter element (2), paying attention to the following:
 - ✓ Do not apply a pressure higher than **70 PSI**.
 - ✓ The direction of the air jet must be opposite to the airflow, that is, from inside to outside, considering the mounting position.
- d) Reinstall the element (3), using the reverse order, and reinstall the cover (3).

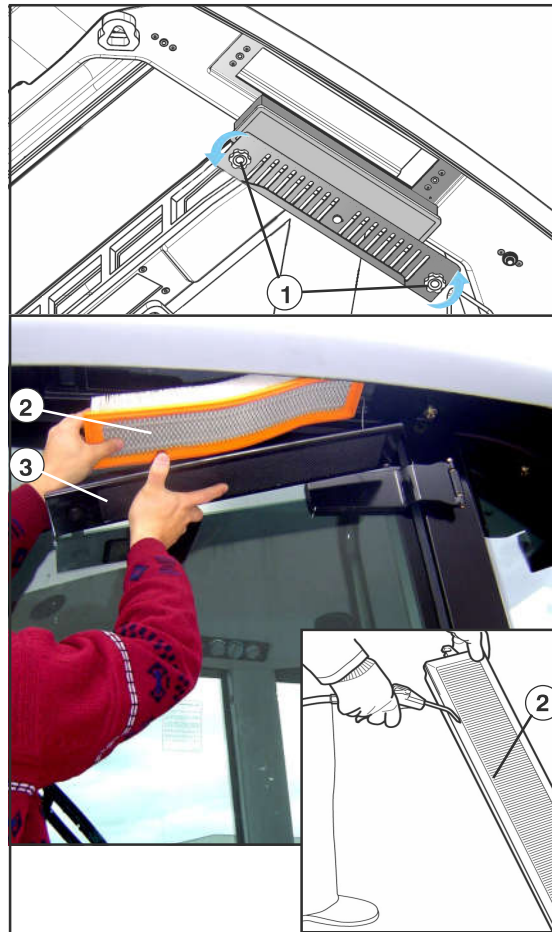


Fig. 324

6

NOTES

The cleaning frequency depends on the amount of accumulated dust, and may range between once a week and twice a day.

The filter needs to be changed according to the maintenance plan in this manual. If there are any damages, such as perforation, change it independently from the working hours. Under severe use conditions, it must be changed more frequently.

Do not operate the air conditioner if the air filter is full: this reduces effectiveness, and may cause problems to the system.

The air filter elements must be in perfect conditions: replace it if you find holes, parching or any other abnormalities.

The cabins air filtering system was developed to protect you from dust and, in no hypothesis against chemical products such as insecticide. In this case, take the precautions informed by the respective product.

16.4 - General regular inspection

Perform an inspection on the air conditioner system components:

- # Hoses and connections: check these items for cracks, wear, or holes. Pay special attention to connections, elbows, and crossing through the body and other parts.
- # Wires and their connections.
- # Attachments in general.
- # Compressor drive belt.
- # Always keep the condenser tubes clean. Use compressed air.

16.5 - Refilling the gas (or coolant)

Only use Fluid R-134A.

Coolant fluid refilling must be considered when the air conditioner loses its efficiency.

However, before it, make sure all items are in perfect conditions:

Cleaning of the condenser and the cab air renovation filter, compressor drive belt tension, etc. If the problem persists even after coolant refilling, the compressor might need inspection.

Remember: one of the procedures that extends the life of the compressor is the weekly operation of the cooling system, as recommended in the "Operation" Section, Chapter 12.

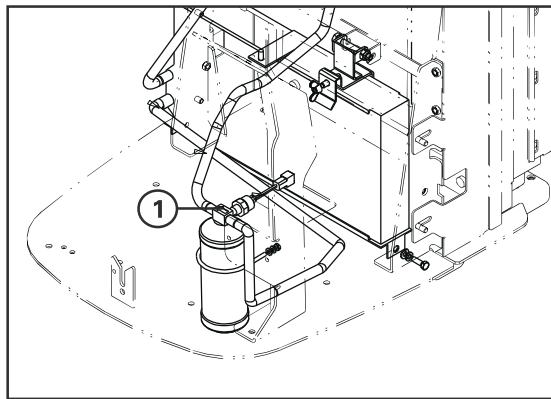


Fig. 325

6

NOTES

1 - The coolant fluid replacement, as well as filling the loading requires qualified resources and personnel. For these or other services, contact your MF Dealer or a reliable air conditioner specialist.

2 - Never loosen any coolant conducting hose connections. This fluid is highly toxic and requires special techniques and equipment. The release of this gas is harmful to the environment.

6 - Maintenance

17 - Calibrating and charge of the tires

The correct calibration is the factor that contributes most to the satisfactory performance of the agricultural machines tires. the correct filling pressure can be determined by weighting the loaded axle (for example: the rear axle with the implement in the lifted position) and checking the calibration and load charts for the tires that are being used. The tires load can be calculated to include mounted implements, as well weights and ballasting.

The recommended calibration indexes can only be increased in applications with weighted loads and reduced speeds, such as raised plow and operations in hard surfaces - such as transportation in highways.

The loading capacities of the tire load vary according to the speed - heavier loads normally must be transported with lower speeds; as the reduced loads can be transported with higher speeds than those indicated in the following chart.

Double wheels (Only rear wheels)

When using double wheels, the values of load per tire must be reduced. For this, multiply the value found in the chart per 0.88. However, 14 lb/pol² is the minimum pressure to be used in double wheels. The front wheels do not change its calibration when double wheel is used in the rear side.

Determining the tractor weight

With the implement assembled in the 3-points lifting system, dislocate the tractor until a balance and check the weight that is on the rear and front axles, one at a time.

After measuring each axle, divide this value for two. Compare the obtained value in relation to the tires assembled with the chart below, determining the inflation pressure x applied load.



NOTE

The calibration must be performed with the tires cold and observing the difference between diagonal and radial tires.

6

Pressure (PSI) x maximum load capacity (kg)

Dimensions	Pressure kPa (PSI) – Cross-ply tires – Maximum speed of 30 km/h (18,6 mph)																			
	kPa	95	110	125	140	150	165	180	190	210	220	235	250	275	305	330	360	385	415	
	PSI	14	16	18	20	22	24	26	28	30	32	34	36	40	44	48	52	56	60	
7.50-16F2 (6L)							500	528	555	583	610	635	660	705	750					
8.30-24R1 (6L)		480	520	560	595	625	655	685	720	750	780									
9.00-16F2 (6L)							680	720	760	795	830	865	900							
9.5L-15F2 (6L)							749	787	826	875	925									
10.00-16F2 (8L)							795	840	885	925	965	1008	1050	1120	1195					
11.2-28R1 (6L)		775	840	900	960	1015	1070	1115												
12.4-24R1 (6L)		649	712	749	798	848	898	948												
12.4-28 R1 (6L)		775	840	900	960	1015	1070	1115												
13.6-38R1 (14L)		1275	1375	1475	1570	1660														
14.9-24R1 (6L)		1225	1325	1420	1510															
14.9-24R2 (6L)		1225	1325	1420	1510															
14.9-26R1 (6L)		1265	1370	1465	1560															
14.9-28R1 (6L)		1310	1415	1515	1615															
14.9-28R2 (6L)		1310	1415	1515	1615															
15.5-38R1 (8L)		1435	1550	1660	1765	1860	1950	2060												
16.9-30R1 (6L)		1770	1895																	
18.4-30R1 (10L)		2120	2275	2420	2555	2685	2815													
18.4-30R1 (6L)		2120																		
18.4-30R1 (8L)		2120	2275	2420																
18.4-30R2 (10L)		2120	2275	2420	2555	2685	2815													
18.4-30R2 (6L)		2120																		
18.4-34R1 (10L)		2250	2415	2564	2715	2855	2990													
18.4-34R1 (8L)		2250	2415	2564																
23.1-26R2 (8L)		2850																		
23.1-30R1 (10L)		3035	3250	3460																
23.1-30R2 (8L)		3035																		
24.5-32R1 (10L)		3465	3710	3950																
Dimensions	Pressure kPa (PSI) – Radial tires – Maximum speed of 40 km/h (24,8 mph)																			
	kPa	70	85	90	105	120	160													
	PSI	10	12	13	15	17	23													
290/95 R34	Load (kg)	2114	2340	2453	2680	3000	3640													
320/90 R42	Load (kg)	2720	3000	3140	3420	3860	4800													
320/90 R50	Load (kg)	2908	3200	3346	3640	4080	4940													

18 - Tightening the wheels mounting nuts

Recommended torques

A) front wheels 4x2

- A1- Disc to the hub (light type) = 8 to 10 kgf.m
- A2- Disc to the hub (medium type) = 12 to 16 kgf.m
- A3- Disc to the hub (heavy type) = 12 to 16 kgf.m

B) Front wheels 4x4 rim type and stamped disc

- B1- Disc to the axle = 25 to 28 kgf.m
- B2- Disc to the rim = 15 to 17 kgf.m



Fig. 326

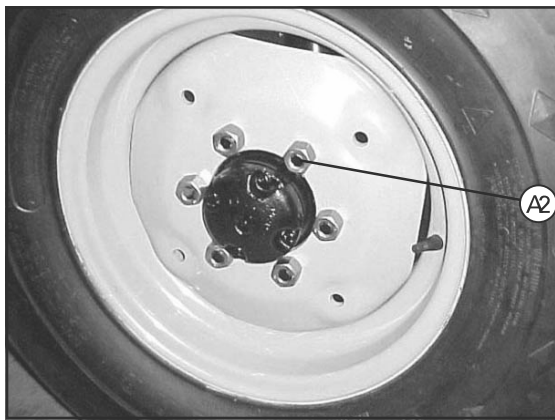


Fig. 327



Fig. 328



Fig. 329

6 - Maintenance

C) Rear wheels

Rim type wheels and stamped disc

C1- Disc to the axle = 31 to 34 kgf.m

C2- Disc to the rim = 24 to 28 kgf.m

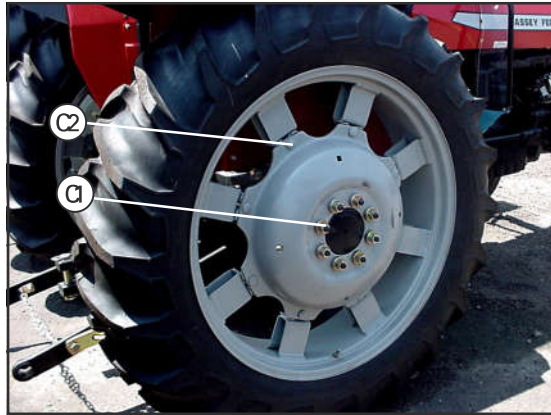


Fig. 330

"Rice" type wheels.

C3- Wheel to the axle = 30 to 36 kgf.m



Fig. 331

Wheels with casted disc

C4- Disc to the hub = 36 to 48 kgf.m

C5- Disc to the rim = 29 to 37 kgf.m



Fig. 332

PAVT type wheels:

C6- Clamps nuts 25 to 29 kgf.m

C7- Disc PAVT to the axle = 30 to 36 kgf.m



Fig. 333

19 - Maintenance of the tractor in inoperative periods of time

The activity of an agricultural tractor, in many cases, is very seasonal, that is, there are periods or time in which it works more than 20 hours a day and, in others, it is inactive for several weeks.

During this period, the tractor maintenance requires some cares which are as important as those taken during the activity period.

Basically, the maintenance in this period aims to protect the tractor against the harmful agents such as humidity, hot, cold, impurities, etc.

The ideal conditions for a tractor inactivity are the following:

Tractor cleaning

Before all, perform a complete washing all over the tractor. It sets it free from a large quantity of residues that cause oxidation in the metallic parts, as well as the degradation of non-metallic elements, such as painting, plastic, electrical installation, etc.

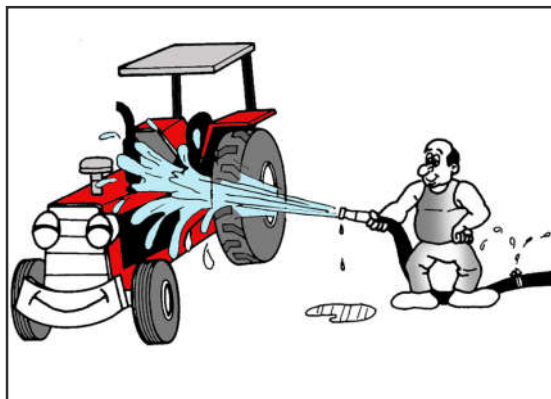


Fig. 334

Tractor storage

It is very important that the tractor is sheltered from the bad weather, in a dry and ventilated place.

Without that there is no maintenance.



Fig. 335

Relief of the load over the tires.

If the inactivity period is longer than 30 days, it is convenient to support the tractor weight over reinforced and safe shims.

Remove water from the tires internal side and calibrate them with a pressure inferior than the recommended for the work.

If the tractor is supported over the tires in only one position for a very long period of time, the tread deformation might occur

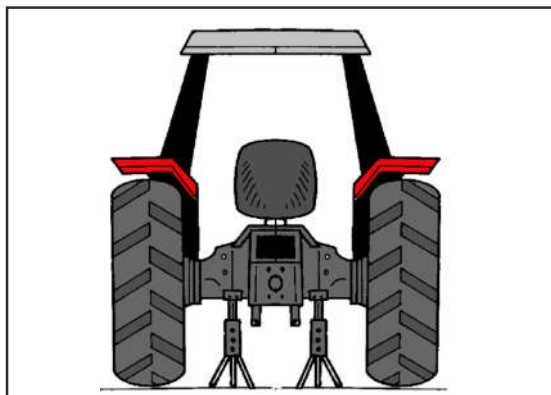


Fig. 336

6 - Maintenance

Closing of the exhaust exit, the air filter and the engine breather tube.

It is important to prevent insects to enter through these points.

Many insects can carry residues used to make nests inside the engine. It might generate harmful consequences.

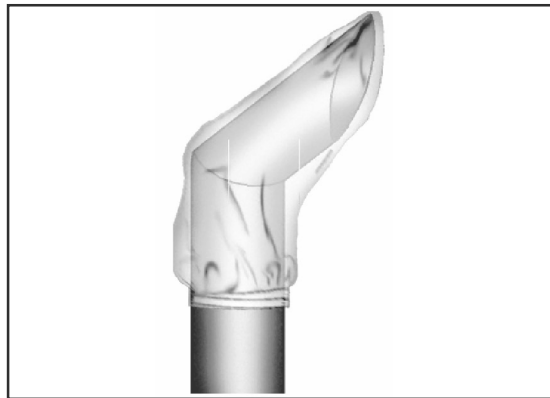


Fig. 337

Clutch operation

In the case of clutches with disc(s) made of organic material, it is convenient to press the clutch pedal all the way to the end of the 1st stage. It avoids the transmission disc to paste in the plate and steering wheel.

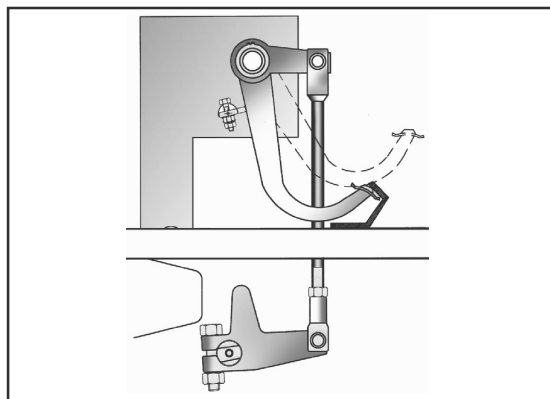


Fig. 338

6

Filling and lubrication

When deactivating the tractor, completely fill the fuel tanks to prevent the humidity condensation and consequently oxidation inside the tank, as well as damages to the injection system.

If possible fill the tanks with special fuel for injection pump tests. Run the engine with this fuel for some minutes. In addition, perform the lubrication of all the greasers.

Other procedures

- A) Remove the battery from the tractor, clean it perfectly and store in a dry place, with the correct solution level.
Monthly, submit it to a slow charge, preventing the plates sulphation, which also occurs due to lack of charge. If you leave the battery in the tractor, remove the negative cable and also perform the periodical recharge.
- B) Change the engine oil and, if it is near the period, also of the other systems.
- C) Drain the water from the radiator, perform an internal washing of the system through the hot water flow.
After, refill the system, using the corrosion inhibitor.

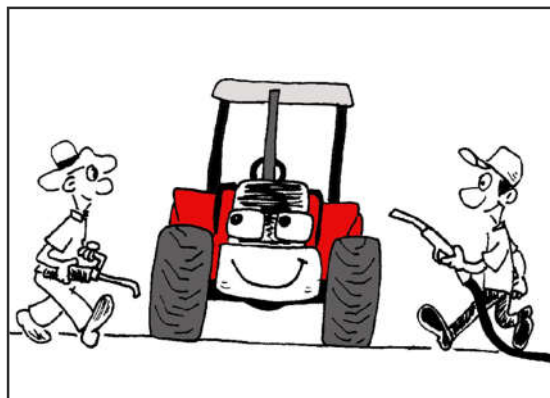


Fig. 339

Return to work

- a) Remove the protections from the exhaust, filter and breather-tube used to prevent harmful agents to enter.
- b) Reinstall the battery(s).
- c) Check the operation of the command panel lights.
- d) Perform the tires calibration.
- e) Cut the fuel flow to the engine, releasing the wire together the injection pump solenoid (1) - figure at the side - or let the strangler pulled, according to the model. It allows you to turn the engine without running it, while all the moveable parts will receive lubrication, preventing the early wear due to the absence of oil in the parts.
Operate the starter motor during 10 seconds, at most.
- f) Turn the solenoid wire again and start it normally, making sure that the pressure warning light does not light in the panel.
If that light remains lighted on, IMMEDIATELY turn the engine off and check the cause.

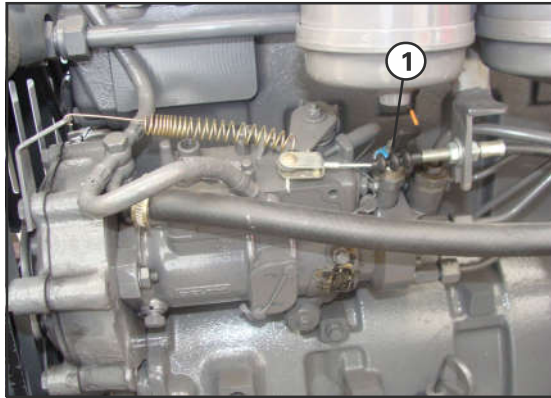


Fig. 340

6 - Maintenance

20 - Analysis of abnormalities, causes and solutions

The following charts can help in the occasions in which you need to diagnosis any problems and decide about the best action to take.

ABNORMALITY	POSSIBLE CAUSES
1- Engine works at cold:	<p>1a) Engine is with the thermostatic valve locked open. It might be cause due to the non-use of anticorrosive together with the water from the coolant system. <i>Change the valve and the radiator liquid, using anticorrosive additive.</i></p> <p>1b) Injection pump pint improperly adjusted. Check with the Dealer.</p>
2 - Engine fails:	<p>2a) Engine stop command <i>Check the injection pump solenoid and its electrical wiring. If necessary, replace the solenoid</i></p> <p>2b) Damaged filling pump. <i>Replace the pump.</i></p> <p>2c) Air or fuel filter saturated. <i>Replace the fuel filter and clean or replace the air filter.</i></p> <p>2d) Air in the fuel system. <i>Bleed the filter.</i></p> <p>2e) Clogged ?fuel tank breather. <i>Replace the cover that holds the breather.</i></p> <p>2f) Fuel incorrect or with water. <i>Drain the tank and refill with the proper fuel.</i></p> <p>2g) Valves play incorrect. <i>Check with the Dealer.</i></p> <p>2h) Valves irregular seat. <i>Check with the Dealer.</i></p> <p>2i) Engine internal wear. <i>Check with the Dealer.</i></p> <p>2j) Broken valves springs. <i>Check with the Dealer.</i></p>
3 - Constant stops of the engine:	<p>3a) Injection pump solenoid. <i>If necessary, replace the solenoid.</i></p> <p>3b) Damaged filling pump. <i>Replace the pump.</i></p> <p>3c) Air and/or fuel filter saturated. <i>Replace the fuel filter and clean or replace the air filter.</i></p> <p>3d) Air in the fuel system. <i>Bleed the filter.</i></p> <p>3e) Clogged ?fuel tank breather. <i>Replace the cover that holds the breather.</i></p> <p>3f) Water in the fuel. <i>Drain the tank and the filters. Check fuel origin. Always fill at the end of each working day, avoiding the humidity condensation in the tank during the night.</i></p> <p>3g) Clogged oil pan breathing tube. <i>Clean the engine breathing tube.</i></p>

6 - Maintenance

ABNORMALITY	POSSIBLE CAUSES
4 - Excessive fuel consumption:	4a) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i> 4b) Air or fuel filter saturated. <i>Replace the fuel filter and clean or replace the air filter.</i> 4c) Malfunctioning injection pump or nozzles. <i>Check with the Dealer.</i> 4d) Incorrect injection timing. <i>Check with the Dealer.</i> 4e) Valves play incorrect. <i>Check with the Dealer.</i> 4f) Operation temperature low. <i>See item 1 above.</i> 4g) Incorrect fuel. <i>Drain all the tank and refill it with the proper diesel fuel.</i> 4h) Clogged oil pan breathing tube. <i>Remove the tube and clean it with solvent.</i> 4i) Excessive load in the equipment. <i>Check if the implement is proper to the tractor and/or check if your adjustment is correct.</i>
5 - Excessive lubricating oil consumption:	5a) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i> 5b) Air filter saturated. <i>Clean or change the filter.</i> 5c) Sleeves, rings or valve guides worn out. <i>Check with the Dealer.</i> 5d) Valve rods retainers worn. <i>Check with the Dealer.</i> 5e) Irregular seat of the rings and mirrored sleeves caused by work in improper temperatures, loads or rotations. <i>Check with the Dealer.</i> 5f) Turbine lubrication system leaking. <i>Check with the Dealer.</i>
6 - Internal knocking:	6a) Improper or defective injector. <i>Check with the Dealer.</i> 6b) Incorrect injection timing. <i>Check with the Dealer.</i> 6c) Valves play incorrect. <i>Check with the Dealer.</i> 6d) Incorrect oil level. <i>Fill in the level with the oil recommended in this manual.</i> 6e) Engine flywheel loosen. <i>Check with the Dealer.</i> 6f) Lubricant oil pump. <i>Check with the Dealer.</i> 6g) Engine internal parts worn. <i>Check with the Dealer.</i>
7 - Excessive pressure in the oil pan:	7a) breather-tube blocked. <i>Remove the tube and clean it with solvent.</i> 7b) Sleeves and rings, guides and valves worn. <i>Check with the Dealer.</i> 7c) Valve rods retainers worn. <i>Check with the Dealer.</i>



6 - Maintenance

ABNORMALITY	POSSIBLE CAUSES
8 - Overheating:	8a) External obstruction of the radiator' radiator core. <i>Perform a general cleaning in the radiator.</i> 8b) Air filter saturated. <i>Clean or replace the filter external element.</i> 8c) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i> 8d) Malfunctioning injection pump or nozzles. <i>Check with the Dealer.</i> 8e) Incorrect injection timing or the pressure nozzles. <i>Check with the Dealer.</i> 8g) Thermostatic valve or water pump malfunction or dirty or clogged radiator. <i>Perform a general internal cleaning in the radiator. If the problem persists, check with the Dealer.</i> 8h) Water level low. <i>Complete the water level in the radiator daily, if necessary.</i> 8i) Damaged head gasket. <i>Check with the Dealer.</i> 8j) Excessive load in the equipment. <i>Check if the implement is proper to the tractor and/or check if your adjustment is correct.</i> 8l) Loose fan drive belts. <i>Adjust belts tension, or replace the belt, if necessary.</i> 8m) Broken valves springs. <i>Check with the Dealer.</i>
9 - Low oil pressure:	9a) Low level of oil in the crankcase <i>Check the level daily, and complete if necessary.</i> 9b) Oil pump relief valve or pump malfunction. <i>Check with the Dealer.</i> 9c) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i> 9d) Marker malfunction. <i>Check with the Dealer.</i>
10 - White smoke:	10a) Incorrect fuel. <i>Drain the tank and refill with the proper fuel.</i> 10b) Operation temperature low. <i>Check the item 1 of this section.</i> 10c) Water in the fuel. <i>Drain the tank and refill it with the pure and clean fuel.</i>
11 - Blue smoke:	11a) Incorrect lubricating oil. <i>Change the oil using one of the recommended in this manual.</i> 11b) Injection pump or injector(s) malfunction. <i>Check with the Dealer.</i> 11c) Sleeves and rings worn. <i>Check with the Dealer.</i> 11d) Valves guides worn. <i>Check with the Dealer.</i> 11e) Clogged breathing tube. <i>Remove the breathing tube and clean it.</i>

6 - Maintenance

ABNORMALITY	POSSIBLE CAUSES and SOLUTIONS
<p>12- Black smoke and lack of power:</p>	<p>12a) Injection pump or injector(s) malfunction. <i>Check with the Dealer.</i></p> <p>12b) Incorrect injection timing. <i>Check with the Dealer.</i></p> <p>12c) Operation temperature low. <i>See the item 1 before.</i></p> <p>12d) Incorrect valves play or clogged valve. <i>Check with the Dealer.</i></p> <p>12e) Turbo low pressure (If equipped). <i>Check with the Dealer.</i></p> <p>12f) Damaged filling pump. <i>Change the pump or Check with the Dealer.</i></p> <p>12g) Incorrect fuel. <i>Drain the tank and refill with the proper fuel.</i></p>
<p>13- Engine does not start:</p>	<p>13a) Battery without any charge or with poor contact of the terminals or other links. <i>Check the battery maintenance conditions. If necessary, check with an electrician.</i></p> <p>13b) Starter engine or relay defective. <i>Check with the Dealer.</i></p> <p>13c) Lack of fuel. <i>Fill and bleed the fuel filter.</i></p> <p>13d) Air or water in the feeding system. <i>Drain the fuel tank, refill with pure and clean diesel and bleed the system.</i></p> <p>13e) Fuel lines or filters clogged. <i>Replace the filter and bleed.</i> NOTE: In winter, there is the paraffin generation in the fuel, which clogs the system, specially the filter. For this reason, it is recommended to add 5% of pure kerosene in each filling.</p> <p>13f) Injection nozzles extremely dirty or misadjusted. <i>Check with the Dealer.</i></p> <p>13g) Air or fuel filters saturated. <i>Replace the fuel filter and clean or replace the air filter.</i></p> <p>13h) Injector pump solenoid or connections defective. <i>Check this possibility. When turning the ignition key to the first position, you should listen to a small crack noise inside the solenoid. Otherwise, the electrical connection is interrupted or the solenoid is clogged. In this case, replace it.</i></p>
<p>14 - Battery does not reach the load, even when working.</p>	<p>14a) Sulphated or damaged vases due to the lack of maintenance of the solution level, or due to a long inactivity period without any recharge. <i>Send the battery to be tested. If necessary, replace it and provide its maintenance.</i></p> <p>14b) Alternator bushing worn or other internal problem. <i>Check with the Dealer.</i></p> <p>14c) Misadjusted relay. <i>Check with the Dealer.</i></p> <p>14d) "Short-circuit" with the ground of some wire. <i>Try to find the problem. If necessary, check if the Dealer.</i></p> <p>14e) Dirty bones and terminals. <i>Clean all the components using hot water and, after drying, rub them with a sandpaper.</i></p>



6 - Maintenance

ABNORMALITY	POSSIBLE CAUSES and SOLUTIONS
15- Fuses and bulbs frequently blow.	<p>15a) "Short-circuit" of some wire with the ground. <i>Try to find the problem. If necessary, check if the Dealer.</i></p> <p>15b) Battery with overload (regulator or alternator misadjusted). <i>Check with the Dealer.</i></p> <p>15c) Use of bulbs or accessories different from the specifications or concentrated in some fuse.</p> <p><i>Never adapt accessories that are not compatible with the electrical system. Even the proper accessories must be installed by properly trained personnel.</i></p>
16- Excess of slippage:	<p>16a) Incorrect ballasting or poor distribution between the front and rear axle.</p> <p>16b) Improper or misadjusted implement. <i>Only use implements compatible and adjust them properly. Ask your implement supplier for instructions regarding to the required power and adjustment and operation procedures.</i></p> <p>16c) Tires claws worn. <i>Replace the tires.</i></p> <p>16d) Improper tires. <i>For grounds with poor support (muddy) use tires with high claws (R2). For the high traction services in hard ground, use tires with low claws (R1), with the proper width (tread).</i></p> <p><i>NOTE: In addition, the correct tires calibration is also important.</i></p> <p>Excess of pressure contributes to the slippage occurrence and early wear.</p> <p>Lack of pressure causes the claws breakage.</p>
17- Gear box "scratches" the gears:	<p>17a) Use of improper oil. <i>The use of oil with improper degree GL (clutches oil) causes the scratching of the gears even in synchronized gearboxes.</i></p> <p>17b) Wearing of parts such as bearings or incorrect adjustment of the axles longitudinal plays. <i>Check with the Dealer.</i></p> <p>17c) Wearing of the synchronization rings in tractors with synchronized gearbox. <i>Check with the Dealer.</i></p> <p>17d) Incorrect play in the clutch pedal. <i>Adjust the clutch play.</i></p> <p>17e) Incomplete pressure of the clutch pedal. <i>Always step on the pedal all the way until the end of its course.</i></p>

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7 - Technical Specifications



7 - Technical Specifications

1 - Engine

1.1 - General characteristics	460	470	480
Brand	AGCO SISU POWER	AGCO SISU POWER	AGCO SISU POWER
Model	420DS/TIER 2	420DS/TIER 2	420DSA/TIER 2
Maximum power - ISO14396			
cv (kW)@2200 rpm	110 (82)	120 (89,4)	130 (97)
Maximum torque - ISO14396			
mkgf (Nm)@1400 rpm	43 (421)	46 (451)	50 (490)
Maximum power - ISO14396			
cv (kW)@2200 rpm	93.5 (69.7)	99,7 (74,3)	113,0 (84,2)
Air intake	Turbo air / air system	Turbo air / air system	Turbo air / air system
Cylinder diameter	108 mm	108mm	108mm
Piston stroke	120 mm	120 mm	120 mm
Number of cylinders / displacement	4/4,400 cm ³	4/4,400 cm ³	4/4,400 cm ³
Injection order	1-2-4-3	1-2-4-3	1-2-4-3
Compression ratio	16,5:1	16,5:1	16,5:1
Engine dry weight	340 kg	340 kg	340 kg

1.2 - Lubrication system

Type Forced, with gear pump body. Oil filter with integral flow.

Heater exchanger Incorporated to filter head, on the left side.

Relief valve Incorporated to block, on the left side.

Quantity of filters 1

Minimum oil pressure Idling = 1 bar (14.5 psi)

Maximum speed = 4 bar (58psi)

1.3 - Cooling system

Radiator With vertical tubes and horizontal fins The system has a surge reservoir for coolant.

Engine coolant Drinkable water + Ethylene-glycol

Surge reservoir cap 0.75 bar (10.5 psi)

Water pump Centrifuge, driven by multi-V belt, self-stretched.

Thermostatic valve(s) - qty. 02

Temperature range kept: 79 to 83° C

1.4 - Air filtering system

Type Dry filter with 2 elements (primary and secondary). The system is equipped with: restriction indicator with warning light on the panel and automatic ejection system for the dust accumulated in the filter.



7 - Technical Specifications

1.5 - Fuel feeding system

Separating pre-filter	Separates the bigger impurities (up to 30 microns) and filters the water in the fuel.
Fuel filters	Fuel filter with parallel filtering of particles (up to 5 microns) and filters the water in the fuel. The separating pre-filters and main filtering element have a draining plug on the bottom. Use it to drain the water.
Feeding Pump	Diaphragm type, mounted on the right side of the engine . It also has a knob to perform the fuel system bleeding.
Fuel injection	pump Delphi, rotary- DP100 - Engine 420DS
Fuel cut	Through the solenoid mounted behind the fuel injection pump which operates directly over its governor.

2 - Electrical system - power and capacity

	460	470	480
Battery:			
Without cabin	100 A	100 A	100 A
Alternator:			
Without cabin	Iskra - 12 V / 55 A/h		
With cabin	Iskra - 12 V / 120 A/h		
Starter motor	Iskra - 12 V / 3.0 kw		
Instrument internal lighting: Consisting of light emitting diodes (LEDs)			
Glow plug (cold start aid - optional)	9 A		
Safety start switch	Standard in all models, prevents the start when the Reduced and Direct lever is set to neutral.		
Front service headlights (High beam)	60 W		
Front service headlights (Low beam)	55 W		
Rear service headlights	55 W		
Front auxiliary headlights (Standard tractors only)	55 W		
Tail lamp and brake lights	5 W		
Turn signal lamps (If equipped)	21 W		

7

3 - Clutch

3a) Dual Clutch	Used in tractor with Power Take Off - PTO		
Transmission disc diameter*	330	330	330
PTO disc diameter	254	254	254
	NOTE: In dual clutch, the PTO disc is the second stage and its diameter is 254 mm. In this case, to operate with the PTO is necessary to adjust the clutch stopper to the 2nd stage.		
3b) Split torque*	Used in tractors with Independent Power Take Off - IPTO The disc diameter is the same as the dual clutch disc.		
Disc material (transmission)	Organic		
Optional	Cerametallic		
Bearing (collar) of all clutches	Constant contact type, unnecessary to adjust the pedal free travel.		
Clutch operation	Mechanical, through pedal and tie rod		

7 - Technical Specifications

4 - Gearbox

Type 12 x 4 synchronized type or Constant Mesch (constant engagement).

Control Through 2 side levers (side shift).

5 - Theoretic speeds achieved on the road

(In Km/h - engine in maximum power speed).

Table of theoretic speeds

Model / Version RPM / rear wheels	Gears											
	1 ^a	2 ^a	3 ^a	4 ^a	5 ^a	6 ^a	7 ^a	8 ^a	9 ^a	10 ^a	11 ^a	12 ^a
MF 460-12 speeds. 2200/23.1X30R1	2.1	2.8	3.6	4.7	6.0	7.7	8.8	11.4	14.7	19.1	24.4	31.6
MF470 2200 / 23.1X30R1	2.40	3.10	4.00	5.20	6.60	8.60	9.90	12.80	16.30	21.20	27.10	35.30
MF480 2200/23.1X30R1	1.90	2.50	3.20	4.20	5.30	6.90	7.90	10.20	13.10	17.00	21.70	28.20



NOTE:

The table above is for reference only, because the speed achieved by the tractors depend on its specific setting. Thus, always consult the decal fixed on the right side of the operation station (illustration) which contains several specific information for your tractor. See the instructions in Operation section about the interpretation of data on the decal.



Fig. 341

7

7 - Technical Specifications

6 - Rear axle

	460	470	480
Crown / pinion reduction	3,889:1		
Differential lock	Through coupling sleeves: one is fixed in the differential satellite box and the other slides on the right half shaft grooves. The sliding sleeve is operated by a fork which in turn is operated mechanically by a pedal to the right of the operator.		
Final drives reduction	4,8:1	6,0:1	6,0:1

7 - Front axle

4 x 2 axle

Type	In 3 sections, gauge adjustable by a telescopic bar that allows the displacement in relation to the supporting gutter.
Toe-In	0 to 6,35 mm positive (all)
Maximum vertical judder	11° (all)
Camber / Caster	3° 30' / 0° (all)

7

Specifications common to all 4 x 4 axles, ZF and Carraro:

List of final drives	6,0:1
Wheels toe-in	0°
Maximum steering angle	50°

4 x 4 Axle - ZF:

Operation / model	Central / AS 3050
Bevel / gear ratio	3,721:1

4 x 4 Axle - CARRARO:

Operation / model	Central / 20,21
Bevel / gear ratio	3,74:1

7 - Technical Specifications

8 - Brakes

	460	470	480
Service	Discs in oil bath, independent action in the rear wheels.		
Drive	Hydraulic		
No. of active discs on each side	04	05	05
Active disc material	Steel with sintered bronze		
Parking brake	Multi-disc type, in oil bath, mounted on the output shaft for the front traction		
	<i>IMPORTANT: For the parking gear operation with maximum efficiency, the front drive must be engaged. Thus, the brake will operate on the four wheels of the tractor.</i>		

9 - Hydrostatic steering

Hydraulic pumps (gears):	The pump that activates the steering, also activates the remote control and a valve of priority type, coupled to the hydrostatic unit, distributes the flow between the 2 systems.		
Hydrostatic unit	4 ways.		
Oil filtering	As transmission oil is used, the filtering is performed by the respective filter (discardable type). See Maintenance section.		
Minimum rotation radius (mm):			
Minimum rotation radius (mm):			
Without brake applied			
4x2 - STD	4530		
4x4 - STD	4710		
With the brake applied			
4x2 - STD	4100		
4x4 - STD	4010	4010	4240



10 - Hydraulic lifting system

Type.....	FERGUSON Category I I		
Operating controls	Position - Depth - Transportation - Reaction and Constant Pumping (A "Constant Pumping" function is used when activating the the combined flow, optional resource for the remote control, which consists of transferring the flow of the hydraulic lifting pump to the remote control, increasing its flow).		
Hydraulic cylinder(s)	There is an internal cylinder for all of them, with the option for external auxiliary cylinders. The lifting capacities below, marked with *, indicate the use of external auxiliary cylinders.		
Maximum lifting capacity in kgf, in the pivots	3200		
Hydraulic pump	of pistons, ISYP model		
Flow (Liters/min.) / Pressure (kgf/cm ²)	17 or 27** / 210		

* NOTE: Capacity achieved with HD type lifting arms or with external auxiliary cylinders (Optional).

** NOTE: Only when equipped with PTO or IPTO of dual rotation (540 and 1000 rpm), the flow is of 27 liters/min.

7 - Technical Specifications

11 - Remote control

	460	470	480
Type.....	Independent		
Number of line / type.....	1, 2 or 3 / double action, female terminals type - quick connection.		
Maximum flow, without Combined Flow - l/min	42	42	42
Maximum flow, with Combined Flow on (Optional system)	59l/min (for tractors with PTO of 540 rpm) and 69 l/min (for tractors with PTO of 540 and 1000 rpm). The combined flow transfers the flow of the hydraulic lift pump (17 or 27 l/min) to the remote control, increasing its flow. When the Combined Flow is activated, the lifting system becomes inoperant.		
Maximum pressure - kgf/cm ²	150	150	150
Valve with variable flow (adjustable from 0 to 60% of the totalflow)	Optional		

12 - PTO (Power Take Off)

Dependent Type (PTO)	It is default for Standard tractors.		
Independent (IPTO)	Optional for Standard tractors and Default for Narrow tractors.		
540 / 1000 rpm Type	Optional, both for Dependent and Independent.		
Engine speed for rated speed of the PTO	This speed depends on the tractor and PTO setting. This information can be found on the speed decal attached on the right side of the operation station.		
Axle rotation direction	Clockwise - rear side view.		
Axle diameter / no. of grooves - all	PTO 540 rpm type = 35/6	PTO 1000 rpm type = 35/21	

7

13 - Refill capacity - in liters

Engine (Without filter/With filter)	12/13	12/13	12/13
Transmission/Hydraulic system/Rear axle	Varies from 42 to 47 liters according to the tractor model and configuration.		
<i>NOTE: See the table of lubricants recommended in Maintenance section. Always consider the correct levels through the level gauges! Furthermore, when coupling with implements with remote control, add oil to the transmission as necessary, so that the level is always kept.</i>			
Front final drives - each	For Carraro axle = 1.0 For ZF axle = 0.5		
Rear final drives - each	3,0	3,0	10
Front axle (4 x 4): Differential	For Carraro axle = 4.5 For ZF axle = 9		
Hydraulic brake	0,3	0,3	0,3
Fuel	Left tank = 85.0 Right tank = 115.0		
Cooling system	24	24	24

7 - Technical Specifications

14 - Traction Bar

Bar types available:

1st Straight bar with step: 2 height options.

2nd Bar with step and head: 4 height options.

Side oscillation angle: 22° = for both sides, can work freely to oscillate or hindered by pins.

Length adjustment All bars above allow 2 variations of length adjustment.

15 - Tires

See table in Preparation section.

16. Cab and air conditioner

Application Optional, in Standard and Lux versions.

Condenser Located in front of the water radiator.

Compressor Belt operated, from the fan pulley.

Coolant fluid R-134A - 1.7 kg

Air filtering Paper element located on the left side of the cabin hood.

17 - Tractor dimensions and weights

Dimensions - Tractors without cabin

	460	470	480
Overall length			
4 x 2 - STD	4560		
4 x 4 - STD	4625		
Distance between axles			
4 x 2 - STD	2710		
4 x 4 - STD	2725		
Maximum height			
4 x 2: STD - on the canopy	2635	2635	2640
4 x 4: STD - on the canopy	2635	2635	2640

Weights - Tractors without cabin

Without ballasting:

4 x 2 - STD	4394	4394	4571
4 x 4 - STD	4834	4834	4884

With ballasting:

4 x 2 - STD	6054	6054	6429
4 x 4 - STD	6894	6894	7324



7 - Technical Specifications

Notes

Lined area for notes, consisting of multiple horizontal lines.



8 - Accessories

Contents

1 - General items and accessories 3



8 - Accessories

8

1 - Optional items available

- License plate lamp.
- Towing electrical socket.
- Fire extinguisher.
- Radio.
- Clock.
- Rear windshield wiper.
- Roof lamps (4 front - 4 rear - with service lamp).
- Seat with or without armrest, with or without seat belt.
- Rear double wheels.
- Wheel wrench kit for double wheels.
- Lifting arms with quick connector in the lower arms.
- Spindle stabilizers.
- Hydraulic lifting external control.
- Remote control with several configurations.
- IPTO 540/1000 rpm.
- Additional rear weights.
- Support for front weights.
- Front fender.
- Second fuel tank.
- Fuel tank protection.
- Tool kit.
- Greaser.
- Radio installation.
- GPS Receiver.
- Lamp bar.
- Activated charcoal element kit for cabin filter.

- Extra capacity fuel system kit.

2 - Detached items supplied with the tractor

- Tool box.
- Water reservoir.
- Instruction manual kit.



ATTENTION:

The items listed are generic optional items for this series of products; so, there are installation limitations in some models. Consult your Massey Ferguson dealer about the viability and availability of optional items for your tractor.

