Mahindra
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Mahindra

TRACTORS

OPERATOR'S MANUAL

2645 SHUTTLE/ SHUTTLE CAB

■ The Mahindra Group ■ Mahindra USA, INC ■ 9020 Jackrabbit Road ■ Houston, Texas 77095 ■ 1-877-449-7771 ■ Mahindrausa.com

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FOREWARD

Thank you for purchasing our tractor. We are confident it will give you many years of reliable Service.

The introduction in this manual sets out the correct manner of operating, maintaining and checking the tractor to ensure long-term durability.

Please ensure the correct operation of the tractor as incorrect operation can cause substantial mechanical damage as well as accidents with associated injuries.

Please note that in some cases differences can exist between this manual and your tractor due to the manufacture's policy of constant product improvement.

In the event that you encounter a problem not covered by this manual please contact your nearest dealer who will assist you in resolving.

WARNING

CALIFORNIA Proposition 65 Warning

The Engine Exhaust from this product contains chemicals known to the state of California to cause cancer,birth defects or other reproductive harm

WARNING SIGNS IN THIS MANUAL

The following warning signs in this manual draw additional attention to items of importance for the safe and correct operation of the tractor.

SIGN	MEANING OF THE SIGN
 Danger	Serious hazard with a very high risk level of either serious injury or death
 Warning	Hazard or unsafe practice that can lead to severe injury or death.
 Caution	Hazard or unsafe practice that can lead to injury or death.
 Important	Instructions for the correct operation of the machine which, if followed, will ensure that it performs at sits best

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication.The right is reserved to make changes at any time without notice.

CONTENTS

TRACTOR IDENTIFICATION

The engine number is stamped on the left hand side of the engine block.

The chassis number is shown on the left hand side of the tractor as shown in the drawing.

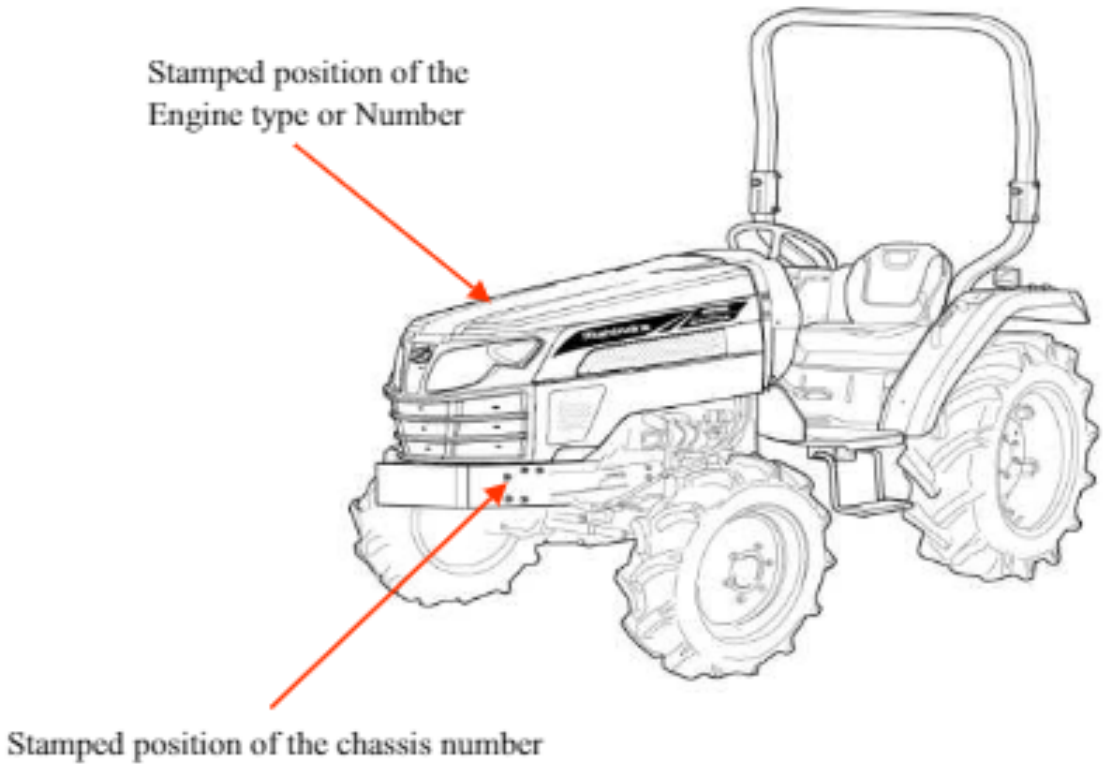


Illustration A

WARRANTY OF THE PRODUCT

The manufacturer warrants this product and full details of the warranty are provided on a separate warranty schedule.

SERVICE

Service is available from any Mahindra dealer in the country.

PARTS

To obtain spare parts please contact your nearest dealer and give him the details listed below.

Tractor model

Tractor serial number

Tractor engine number

Part number and description

Quantity required.

ABOUT THIS MANUAL

This manual has been prepared to assist you in following/adopting the correct procedure for running-in the operation and maintenance of your new Mahindra tractor.

Your tractor has been designed and built to give maximum performance, with good fuel economy and ease of operation under a wide variety of operating conditions.

Prior to delivery, The tractor was carefully inspected, both at the factory and by your Mahindra dealer/distributor, to ensure that it reaches you in optimum condition.

To maintain this condition and ensure trouble free performance, it is important that the routine services, as specified in this manual, are carried out at the recommended intervals.

Read this manual carefully and keep it in a convenient place for future reference.

If at any time you require advice concerning your tractor, do not hesitate to contact your authorized Mahindra dealer/distributor.

He or She has trained personnel, genuine parts and the necessary equipment to undertake all your service requirements.

Mahindra policy is one of continuous improvement, and the right to change prices, specifications or equipment at any time without notice is reserved.

All data given in this book is subject to production variations.

Dimensions & weight are approximate only and the illustrations do not necessarily show tractors in standard condition.

For exact information about any particular tractor, please consult your Mahindra dealer/distributor.

► TRACTOR AN INTRODUCTION

The word, "tractor" was derived from "Traction" which means pulling.
A Tractor is required to pull or haul equipment, implements or trolley which are coupled to the tractor body through suitable linkage.
A tractor can also be used as a prime mover as it has a power outlet source called the Power Take or PTO shaft.

In this book the operating, maintenance and storage instructions for all models of Mahindra tractors have been complied.
This material has been prepared in detail to help you in the better understanding of maintenance and efficient operation of the machine.

If you need any information not given in this manual, or require the services of a trained mechanic, please get in touch with the Mahindra dealer/distributor in your locality.
Dealer/distributors are kept informed of the latest methods of servicing tractors.
They stock genuine spare parts and are backed by the Company's full support.

Through this manual, the use of the terms LEFT, RIGHT, FRONT and REAR must be understood, to avoid any confusion when following the introductions.
The LEFT and RIGHT means the left and right sides of the tractor when facing forward in the driver's Seat.
Reference to the FRONT indicates the radiator end of the tractor, while the REAR, indicates the drawbar end (illustration B)

When spare parts are required, always specify the tractor and engine serial number when ordering these parts. (See illustration A).
This will facilitate faster delivery and help ensure that the correct parts for your particular tractor are received.
The tractor serial number is punched on a plate attached to the left hand side of the engine body (illust. A).
For easy reference, we suggest that you write the number in the space provided in the owner's personal data.

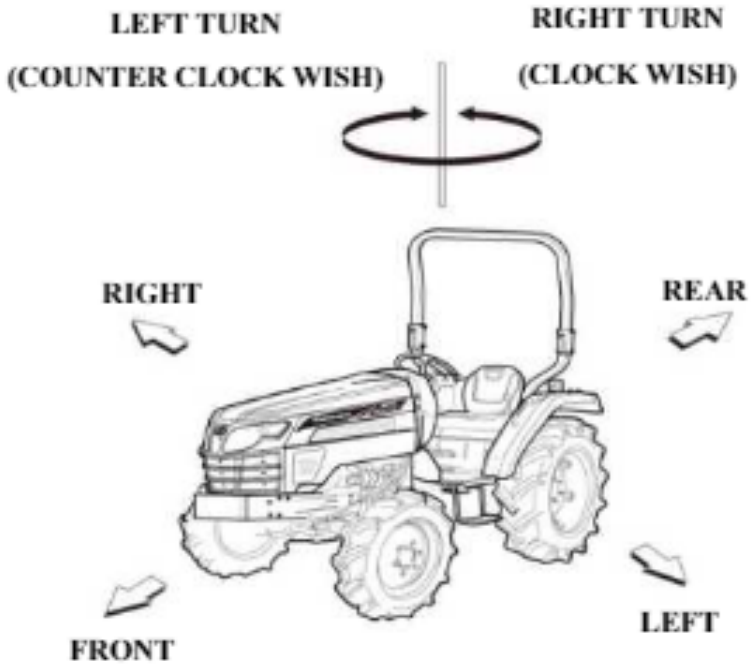


illustration A

(Front, Rear, Left, Right Portion)

► DESCRIPTION

■ General Construction

The transmission case, clutch, clutch housing, engine and front axle support are bolted together to form a rigid unit

■ Front Axle & Wheels

The 4WD front axle is a center-pivot, reverse Eliot type.

The front wheel drive mechanism is incorporated as a part of the axle.

The front wheel drive power is taken from the rear transmission and transmitted to the differential in the front axle where the power is divided into right and left and to the respective final cases.

In the final cases, the transmitted revolution is reduced by the level gears to drive the front wheel.

The 4WD mechanism with level gears provides wider steering and greater durability.

■ Engine

The tractors are fitted with fuel efficient engines with 4 cylinders manufactured by Mahindra.

■ Clutch and Transmission

A single plate dry clutch (8.86″diameter) is used on these tractors.

Tractors with IPTO(Independent Power Take Off) are fitted with hydraulic clutch assy.

The transmission Gear box has Nine forward speeds & three reverse speeds with a high-mid-low select lever.

Presently, Mahindra tractors are fitted with sliding gear and constant mesh type gears.

■ Brakes

Mahindra tractors are provided with independent disc brakes operated by two road travel.

A foot brake lever is fitted for parking.

■ Rear axle & Wheels

These are mounted on ball bearings and enclosed in removable housings which are bolted to the transmission case.

The rim & disc, fitted with rear tires are bolted to the outer flange of rear axle.

■ Hydraulic system & Linkages.

Mahindra tractors are fitted with Live (i.e. system is in operation even when the clutch is disengaged.) independent, system.

Three point linkages can be used for category 1 type of implements.

■ Steering

It consists of hydrostatic power steering system, which has a hydraulic cylinder and tandem type hydraulic pump

■ Electrical System

A 12 Volt Battery is used to activate the engine through the starter motor and the electrical system comprising horn, head lamp, turn signal lamp, taco-meter, hour meter, brake lamp, gauge lamp, hazard lamp, general or alternator, fuse box also from part of the electrical system.

OWNER ASSISTANCE

We at Mahindra and your Mahindra dealer/distributor want you to be completely satisfied with your investment.

Normally any problems with your equipment will be handled by your dealer/distributor's service departments, however, misunderstandings can occur.

If you feel that your problem has not been handled to your satisfaction, we suggest the following.

Contact the owner or General Manager of the dealership, explain the problem, and request assistance.

When additional assistance is needed, your dealer/distributor has direct access to your office.

If you cannot obtain satisfaction by doing this, contact the Mahindra office and provide them with;

- **Your name, address and telephone number**
- **Model and Tractor serial number**
- **Dealer/Distributor Name & Address**
- **Machine purchase date and hours used**
- **Nature of problem**

Before contacting the Mahindra office, be aware that your problem will likely be resolved at the dealership using the dealer's/distributor's facilities, equipment and personnel.

So it is important that your initial contact be with the dealer/distributor.

(ROPS) Roll Over Protective Structures

► ROLL OVER PROTECTIVE STRUCTURES (ROPS)

Mahindra Tractors are equipped with a frame for the protection of operators.
In the case of cab tractors the frame is incorporated in the cab structure.
The objective of the frame or cab structure is to protect the operator in the event of a roll over and they are designed to support the entire weight of the tractor in that event.
Each Mahindra ROPS frame or cab structure is designed and has been tested to meet industry and or government standards.
Included in these tests were all mounting bases and bolts or other fasteners.

DANGER

For ROPS frames to be effective and protect the operator, the seat belt provided must be worn in order to keep operators within the ROPS protected area in the event of a roll over. Failure to use the seat belt can still cause serious injury or death.

On some models the ROPS frame has a fold down feature, which can be used to enter low buildings etc.
Take care when lowering the upper section of the ROPS frame and take extreme care while driving the tractor with the ROPS frame lowered.
Do not wear the seat belt with the ROPS lowered and please remember that the fold down facility is for special circumstances only and must not be lowered for general use.

Use of the tractor with the ROPS lowered can cause fatal injuries.

As the ROPS frame or cab together with the seat belt was designed to meet certain standards, they must be maintained in good order and condition.
To achieve this objective, both the structure and the seat belt should be inspected on a regular basis (every time the tractor is serviced)

In the event that the seat belt is damaged or frayed, it should be replaced and in the event that the ROPS frame or any part of the mounting structure is damaged or cracked, the faulty component must be replaced with a new unit.
Such a unit must meet all of the test criteria of the original unit.
Fitment of an inferior item or items affects the certification of the entire ROPS structure and the effectiveness of the structure in the event of an accident.
Drilling or welding of the ROPS structure is forbidden.

► DAMAGE OF THE ROPS

If the tractor has rolled over or the ROPS has been damaged (such as striking an overhead object during transport), it must be replaced to provide the original protection.

After an accident, check for damages to the 1. ROPS. 2. Seat 3. Seat belt & seat mountings.

Before you operate a tractor, replace all damaged parts.

► DO NOT WELD, DRILL OR STRAIGHTEN THE ROPS

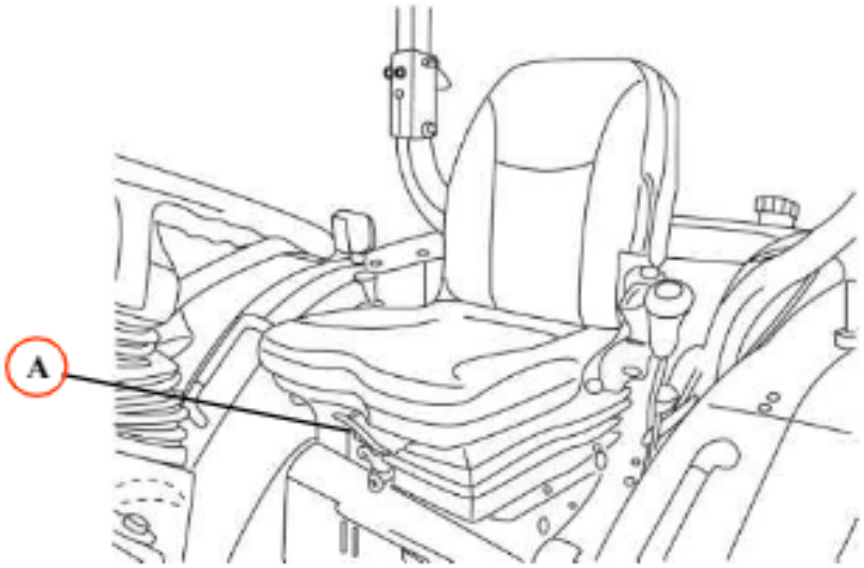
Warning	Never attach chains, or ropes to the ROPS for pulling purposes; this will cause the tractor to tip backwards. Always pull from the tractor drawbar. Be careful when driving through door openings or under low overhead objects. Make sure there is sufficient overhead clearance for the ROPS to avoid fatal injuries.

Warning	If the ROPS is removed or replaced, make certain that the proper hardware is used to replace the ROPS and the recommended torque values are applied to the attaching bolts.

Warning	Always wear your seat belt if the tractor is equipped with ROPS.

How to adjust the Seat

*** Sliding type**



NOTE: Do not use solvents to clean the seat. Use warm water with a little detergent added.

Before operating a tractor it is important to adjust the seat to the most comfortable position & check whether it is properly locked in its position.

Figure 1 identifies the seat fitted to your tractor.

► FOR SLIDING SEAT

■ Sliding Seat type

Lift lever **(A)** and slide the seat to the position you want. Release the lever.

Make sure the seat is locked in position.

Danger	Check whether the seat is properly locked in its position before driving the tractor.

Danger	Always use the seat belt when the ROPS is installed. Do not use the seat belt if a foldable ROPS is down or there is no ROPS. Check the seat belt regularly and replace it if it's frayed or damaged

SAFETY INSTRUCTIONS

RECOGNIZE SAFETY INFORMATION

This symbol means **ATTENTION! YOUR SAFETY IS INVOLVED.** The message that follows the symbol contains important information about safety. Carefully read the message

SIGNAL WORDS.

A signal word—DANGER, WARNING OR CAUTION—is used with a safety alert symbol. DANGER identifies the most serious hazards. Safety signs with the signal words —DANGER OR WARNING—are typically near specific hazards. General precautions are listed on CAUTION safety signs.

DANGER

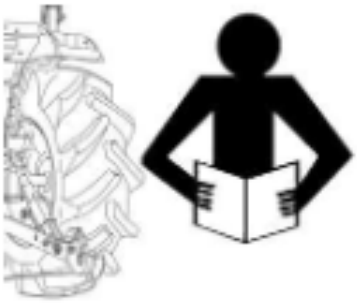
WARNING

CAUTION

READ SAFETY INSTRUCTIONS

Carefully read all safety instructions given in this manual for your safety. Tampering with any of the safety devices can cause serious injuries or death. Keep all safety signs in good condition. Replace missing or damaged safety signs.

Keep your tractor in proper condition and do not allow any unauthorized modifications to be carried out on the tractor, which may impair the function/safety and affect tractor life.



CHILD PROTECTION

Keep children and others away from the tractor while operating.

BEFORE YOU REVERSE

- Look behind the tractor for children.
- Do not let children ride on the tractor or any implement.

USE OF ROPS AND SEAT BELT

The Roll Over Protective Structure(ROPS) has been certified to industry and/or government standards. Any damage or alternation to the ROPS, mounting hard-ware, or seat belt voids the certification and will reduce or eliminate protection for the operator in the event of a roll-over. The ROPS, mounting hardware, and seat belt should be checked after the first 100 hours of tractor use and every 500 hours thereafter for any evidence of damage, wear or cracks. In the event of damage or alteration, the ROPS must be replaced prior to further operation of the tractor.

The seat belt must be worn during machine operation when the machine is equipped with a certified ROPS.

Failure to do so will reduce or eliminate protection for the operator in the event of a roll over.

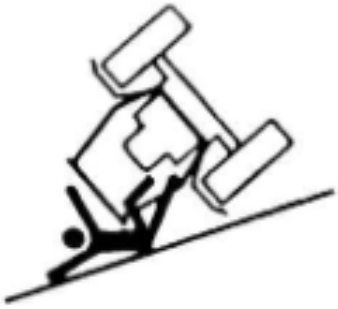
PRECAUTION TO AVOID TIPPING

Do not drive where the tractor could slip or tip.

Stay alert for holes and rocks in the terrain, and other hidden hazards.

Slow down before you make a sharp turn.

Driving forward out of a ditch or mired condition could cause tractor to tip over backward. Back out of these situations if possible

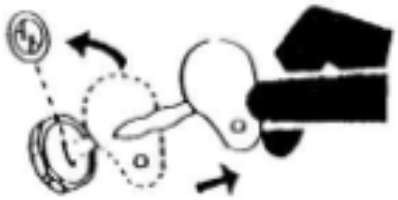


PARK TRACTOR SAFELY

Before working on the tractor ;

Lower all equipment to the ground.

Stop the engine and remove the key



KEEP RIDERS OFF TRACTOR

Do not allow riders on the tractor.

Riders on the tractor are subject to injury such as being struck by foreign objects and being thrown off of the Tractor

HANDLE FUEL SAFELY-AVOID FIRES

Handle fuel with care; it is highly flammable. Do not refuel the tractor while smoking or near open flame or sparks.

Always stop the engine before refueling tractors.

Always keep your tractor clean of accumulated grease, and debris. Always clean up spilled fuel.

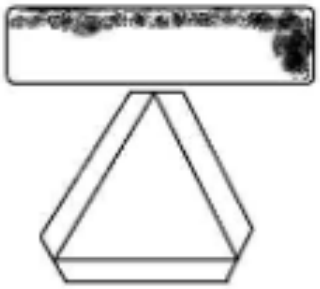
STAY CLEAR OF ROTATING SHAFTS

Entanglement in rotating shafts can cause serious injury or death.

Keep the PTO shield in place at all times.

Wear close fitting clothing. Stop the engine and be sure the PTO drive is stopped before making adjustments, connections, or cleaning out PTO driven equipment.

ALWAYS USE SAFETY LIGHTS AND DEVICES



The use of hazard warning lights and turn signals is recommended when towing equipment on public roads unless prohibited by state or local regulations.

Use the slow moving vehicle (SMV) signs when driving on public roads during both day & night time, unless prohibited by law

PRACTICE SAFE MAINTENANCE

Understand the service procedure before doing work.

Keep the surrounding area of the tractor clean and dry.

Do not attempt to service the tractor when it is in motion.

Keep body parts and clothing away from rotating shafts.

Always lower equipment to the ground. Stop the engine.

Remove the key. Allow the tractor to cool before any repair work is done on it.

Securely support any tractor elements that must be raised for service work.

Keep all parts in good condition and properly installed.

Replace worn or broken parts. Replace damage/missing decals.

Remove any buildup of grease or oil from the tractor.

Disconnect the battery ground cable(−) before making adjustments on electrical systems or welding on the tractor

AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury. Keep hands and body away from pinholes and nozzles, which eject fluids under high pressure. If ANY fluid is injected into the skin, consult your doctor immediately.

PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and open flame away from the top of the battery. Battery gas can explode.

Never check the battery charge by placing a metal object across the poles.

PREVENT ACID BURNS

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, cause holes in clothing and cause blindness if made contact with eyes.

For adequate safety always;

1.Fill batteries in a well-ventilated area.

2.Wear eye protection and acid proof hand gloves.

3. Avoid breathing direct fumes when electrolyte is added.

4. Do not add water to electrolyte as it may splash up causing severe burns.

If you spill acid on yourself;

1.Flush your skin with water.

2.Flush your eyes with water for 10-15 minutes.

Get medical attention immediately.

SERVICE TRACTOR SAFELY

Do not wear a necktie, scarf or loose clothing when you work near moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jeweley to prevent electrical shorts and entanglement in moving parts.

WORK IN VENTILATED AREA

Do not start the tractor in an enclosed building unless the doors & windows are open for proper ventilation, as tractor fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area remove the exhaust fumes by connecting an exhaust pipe extension.

TRACTOR RUNAWAY

1. The tractor can start even if the transmission is engaged causing the tractor to runaway and serious injury to people standing nearby the tractor.
2. For additional safety keep the transmission in neutral, foot brake engaged and the PTO lever disengaged while attending to the Safety Starter Switch or any other work on the tractor.

SAFETY STARTER SWITCH

1. A clutch operated safety switch is provided on all tractors which allows the starting system to become operational only when the clutch pedal is fully pressed.
2. Do not By-pass this safety starter switch or work on it. Only Authorized Dealers are recommended to work on the safety starter switch.
3. On some models, the Safety Starter switch is provided on the transmission High-low shifter lever and the PTO shifter lever. The tractor can be started only if the High-low shifter lever is in neutral position.

Caution

The safety Starter Switch is to be replaced after every 2000 hours/4 years, whichever is earlier

SAFE OPERATION OF YOUR TRACTOR

The manufacturer of your tractor has made every effort to make it as safe as is humanly possible.

Beyond this point it is the responsibility of the operator to avoid accidents and we ask that you read and implement our suggestions for your safety.

Ensure that only trained and competent operators use this tractor and ensure that they are fully conversant with the machine and aware of all it's control and safety features.

Operators should not operate the tractor or associated machinery while tired or untrained.

To avoid accidents please ensure that the operator wears clothing which will not get entangled in the moving parts of the tractor or machine as well as protect him or her from the elements.

When spraying or using chemicals, please ensure that clothing and protective equipment is worn which prevents respiratory or skin problems.

For full details consult the manufacturer of the chemicals.

To avoid lengthy exposure to noise ensure that ear protection is worn.

If adjustment sto the tractor or machinery need to be made ensure the tractor or machine is turned off beforehand.

The use of a certified Roll Over Protection Structure (ROPS) is a must while operating a tractor.

The use of a seat belt is a must while operating a tractor.

In summary, ensure at all times that the safety of the operator and any other worker is paramount.

SAFETY TIPS DURING MAINTENANCE

1. At least on a daily basis check all oil levels, water level in the radiator and electrolyte level in the battery and perform services according to the service schedule.
2. Ensure tire pressures are even and the correct pressure for the job being done is maintained.
3. Check to ensure that all the controls and preventative mechanisms of the tractor and implement work correctly and effectively.
4. Ensure that an adequate set of the correct tools is available for maintenance and minor repairs.
5. Ensure that all service work and repairs are carried out on a flat area with a concrete or similar floor.

   Do not carry out service work on a tractor until it is switched off, the parking brake applied and the wheels chocked.

   Where a tractor is started in a confined area, ensure that the area is well ventilated as exhaust gases are very harmful, and can cause death.
6. Do not work under raised implements.
7. When changing wheels or tires ensure that a suitable wheel stand is placed under the axle prior to removing the wheel and the wheels are chocked.
8. Where guards or shields need to be removed to perform a service or repair, ensure that the guard or shield is correctly reinstalled before starting the tractor.
9. Never refuel near an open flame or with an overheated engine.

   Make sure to turn off the engine before refueling.
10. The cooling system operates under pressure, take care when removing the radiator cap on a hot engine to prevent being scalded by steam or hot water.

    Do not add water to the radiator when the engine is hot.

    Add water to the radiator only after the engine cools down completely.
11. To prevent fires, keep the tractor including the engine clean and free from flammable material and well away from fuels and other flammable material.

► MOUNTING AND DEMOUNTING IMPLEMENTS

(1) Ensure that all mounting and removal of implements is done on safe flat ground.
Ensure no one is between the tractor and implement and to avoid accidental injuries, do not get under the implement.

(2) After mounting the implement, ensure that all sway chains are correctly adjusted and, where PTO shafts are used that the shaft is fitted and secured correctly.

(3) Where heavy implements are used, ensure that the combination is well balanced or use proper ballast to achieve balance.

(4) Before leaving the tractor at any time, lower the implement, stop the PTO shaft where applicable, set the parking brake and switch off the engine.

(5) While operating the implements with the PTO keep all bystanders away from any moving parts and do not attempt to make adjustments while the machine is running.

(6) Only the driver should ride on the tractor with the ROPS frame fitted and with the seat belt properly fastened.

(7) Where young children are present, particular care should be taken and the tractor should not be moved until the whereabouts of all children is known.

(8) Only trained operators should operate the tractor and so taking care to ensure that other workers are not injured.
In particular they should take care during dusty operations, which will reduce visibility substantially.

(9) Never start the tractor unless the transmission is out of gear, the operator is in the seat and all around safety has been checked.

(10) Only operate the tractor seated in the drivers seat and never turn or brake suddenly at high speed as this can cause a roll-over and serious injury or death.

(11) When traveling on a public road ensure that the tractor and driver both meet all laws relating to safety and licensing.
When traveling with wide implements use red flags on the extremities and observe all laws including escort requirements.

(12) When operating under adverse conditions, hilly terrain or on bad ground adjust the speed of the tractor to suit the conditions, safety comes first.
Never drive down hill at high speed or with the transmission in neutral.
Use the braking capacity of the engine as well as the service brakes.
Do not try to change gear going up or down a steep slope, select the correct gear before starting.

(13) Take care when traveling uphill with a heavy implement to ensure that it does not overbalance and tip up the front end.

(14) Never remove or modify the seat belt.

(15) Never remove, modify or repair the ROPS frame.

PLEASE REMEMBER THAT A LITTLE BIT OF EXTRA CARE CAN PREVENT SERIOUS INJURY OR DEATH AND AVOID DAMAGE TO YOUR TRACTOR.

► THE FOLLOWING PRECAUTIONS ARE SUGGESTED TO HELP PREVENT ACCIDENTS.

A careful operator is the best operator.

Most accidents can be avoided by observing certain precautions.

Read and take the following precautions before operating the tractor to prevent accidents.

Tractors should be operated only by those who are responsible and properly trained to do so.

■ The Tractor

1. Read the operator's manual carefully before using the tractor.
   Lack of operating knowledge can lead to accidents.
2. Use an approved rollover bar and seat belt for safe operation.
   The overturning of a tractor without a rollover bar can result in death or injury.
3. **Do not remove the ROPS (Roll Over Protective Structure).**
   Always use the seat belt.
4. A fiberglass canopy does not give any protection.
5. To prevent falls, keep steps and platform clear of mud and oil.
6. Do not permit anyone but the operator to ride on the tractor.
   There is no safe place for extra riders.
7. Replace all missing, illegible or damaged safety signs.
8. **Keep safety signs clean of dirt and grease**.

■ Servicing the Tractor

1.Keep the tractor in good operating condition for your safety.
   An improperly maintained tractor can be hazardous.
2. Stop the engine before performing any service on the tractor.
3. The cooling system operates under pressure, which is controlled by the radiator cap.
   It is dangerous to remove the cap while the system is hot.
   First turn the cap slowly to stop and allow the pressure to escape before removing the cap entirely.
4. **Do not smoke while the refueling the tractor.**
   Keep away any type of open flame.
5. The fuel in the injection system is under high pressure and can penetrate the skin.
   Unqualified persons should not remove or attempt to adjust a pump, injector, nozzle or any part of the fuel injection system.
   Failure to follow these instructions can result in serious injury.
6. **Keep flame or cold weather starting aids away from the battery to prevent fire or explosions.**
7. **Do not modify or alter or permit anyone else to modify or alter this tractor or any of its components or tractor functions**

■ **Operating the tractor**

1. Before starting the tractor, apply the parking brake, place the PTO (Power Take Off) lever in the "OFF" position, the hydraulic control levers in the downward position, the remote control valve levers in the neutral position(if fitted) and the transmission in neutral.
2. Do not start the engine or controls while standing beside the tractor. Always sit in the tractor seat when the engine is running or operating controls.
3. Safety starter switch.

   In order to prevent the accidental starting of the tractor, a safety switch has been provided.

   The starting system of the tractor is connected through this switch, which becomes operative only when the clutch pedal is depressed.

   On some models, the shuttle shifter lever and PTO button should also be in neutral position for completing the starting circuit.

   Do not bypass the safety starter switch.

   Consult your Mahindra Tractor dealer/distributor if the safety- starting switch malfunctions.
4. Avoid accidental contact with the gear shifter lever while the engine is running.

   Unexpected tractor movement can result from such contact.
5. Do not get off or climb around the tractor while it is in motion.
6. Shut off the engine, remove the key and apply the parking brake before getting off the tractor.
7. Do not operate the tractor in an enclosed building without adequate ventilation.

   Exhaust fumes can cause death.
8. Do not park the tractor on a steep slope.
9. **If power steering or Engine ceases to operate, stop the tractor immediately**.
10. Pull only from the swinging draw bar or the lower link drawbar in the down position.

    Use only a drawbar pin that locks in place.

    Pulling from the tractor rear axle carriers or any point above the rear axle may cause the tractor's front end to lift.
11. If the front end of the tractor tends to rise when heavy implements are attached to the three-point linkage, install front end or front wheel weights.

    Do not operate the tractor with a light front end.
12. Always use the hydraulic position control lever when attaching equipment/implements and when transporting equipment.

    Be sure that the hydraulic couplers are properly mounted and will disconnect safely in case of implement accidentally detaches.
13. Do not leave equipment/implements in the raised position.
14. Use the flasher/ turn signal lights and Slow Moving Vehicle (SMV) signs when driving on public roads during both day and night time, unless prohibited by law.
15. Dim tractor lights when meeting a vehicle at night.

    Be sure the lights are adjusted to prevent blinding the eyes of oncoming vehicle operators.
16. Emergency stopping instruction; If the tractor fails to stop even after the application of brakes, shut off the engine(turn off the key switch)

■ Driving the tractor

1. Watch where you are going especially at row ends, on roads, around trees and low hanging obstacles.
2. To avoid upsets, drive the tractor with care and at speeds compatible with safety, especially when operating over rough ground, crossing ditches or slopes, and when turning at corners.
3. Lock the tractor brake pedals together when transporting on roads to provide proper wheel braking.
4. Keep the tractor in the same gear when going downhill as is used when going uphill. Do not coast or free wheel down hills.
5. Any towed vehicle and/or trailer whose total weight exceeds that of the towing tractor, must be equipped with its own brakes for safe operation.
6. When the tractor is stuck or tires are frozen to the ground, back out to prevent upset.
7. Always check the overhead clearance, especially when transporting the tractor.

■ Operating the PTO (Power Take Off)

1. When operating PTO driven equipment, shut off the engine and wait until the PTO stops before getting off the tractor and disconnecting the equipment.
2. Do not wear loose clothing when operating the power take-off or near rotating equipment.
3. When operating stationery PTO driven equipment, always apply the tractor parking brake and block the rear wheels from the front and rear side.
4. To avoid injury, always move down the flip part of the PTO. Do not clean, adjust or service PTO driven equipment when the tractor engine is running.
5. Make sure the PTO master shield is installed at all times and always replace the PTO shield cap when the PTO is not in use.

■ Diesel fuel

1. Keep the equipment clean and properly maintained.
2. Under no circumstances should gasoline, alcohol or blended fuels be added to diesel fuel or explosive hazard. In a closed container, such as a fuel tank, Such blends are more explosive than pure gasoline. DO NOT USE THESE BLENDS.
3. Never remove the fuel cap or refuel the tractor with the engine running.
4. Do not smoke while refueling or when standing near fuel.
5. Maintain control of the fuel filler pipe when filling the tank.
6. Do not fill the fuel tank to capacity. Allow room for expansion.
7. Wipe up spilled fuel immediately.
8. Always tighten the fuel cap securely.
9. If the original fuel tank cap is lost, replace it with a genuine cap. A non approved cap may not be safe.
10. Do not drive equipment near open fire.
11. Never use fuel for cleaning purposes.
12. Arrange fuel purchases so that winter grade fuel is not held over and used in the spring.

N.B: It is suggested that after repairs, if any of the safety decals/signs are peeled/defaced, the same may be replaced immediately in the interest of your safety.

DO'S AND DON'T'S

► DO'S-For Better performance

DO-Ensure that safety shields are in place and in good condition.

DO-Read all operating instructions before commencing to operate the tractor.

DO-Carry out all maintenance tasks without fail.

DO-Keep the air cleaner clean.

DO -Ensure that the correct grade of lubricating oils is used and that they are replenished and changed at the recommended intervals.

DO-Fit new sealing rings when the filter elements are changed.

DO-Watch the oil pressure gauge or warning light and investigate any abnormality immediately.

DO-Keep the radiator filled with clean water and in cold weather use an anti-freeze mixture. Drain the system only in an emergency and fill it before starting the engine.

DO-Ensure that the transmission is in neutral before starting the engine.

DO-Keep all fuel in clean storage and use a filter when filling the tank.

DO-Attend to minor adjustments and repairs as soon as necessity is apparent.

DO-Allow the engine to cool before removing the radiator filler cap and adding water, remove the radiator cap slowly.

DO-Shift into low gear when driving down steeps hills.

DO-Latch the brake pedals together when driving on a highway.

DO-Keep the draft control lever fully down when not in use.

Don'ts-For safe operation

DON'T-Run the engine with the air cleaner disconnected.

DON'T-Start the tractor in an enclosed building unless the doors and windows are open for proper ventilation.

DON'T-Operate the tractor or engine while lubricating or cleaning.

DON'T-Allow the tractor to run out of diesel fuel otherwise it will be necessary to vent the system.

DON'T-Tamper with the fuel injection pump, If the seal is broken the warranty becomes void.

DON'T-Allow the engine to run idle for a long period.

DON'T-Run the engine if it is not firing on all cylinders.

DON'T-Ride the brake or clutch pedal. This will result in the excessive wear of the brake lining, clutch driven member and clutch release bearing.

DON'T-Use the independent brakes for making turns on the highway or at high speeds.

DON'T-Refuel the tractor with the engine running.

DON'T-Mount or dismount from the right side of the tractor.

DON'T-Temper the hydraulic control levers' upper limit stops.

DON'T-Use the draft control lever for the lifting of implements.

DON'T-Start the engine with the PTO engaged.

DON'T-Use the governor Control Lever (Hand throttle) while driving on roads.

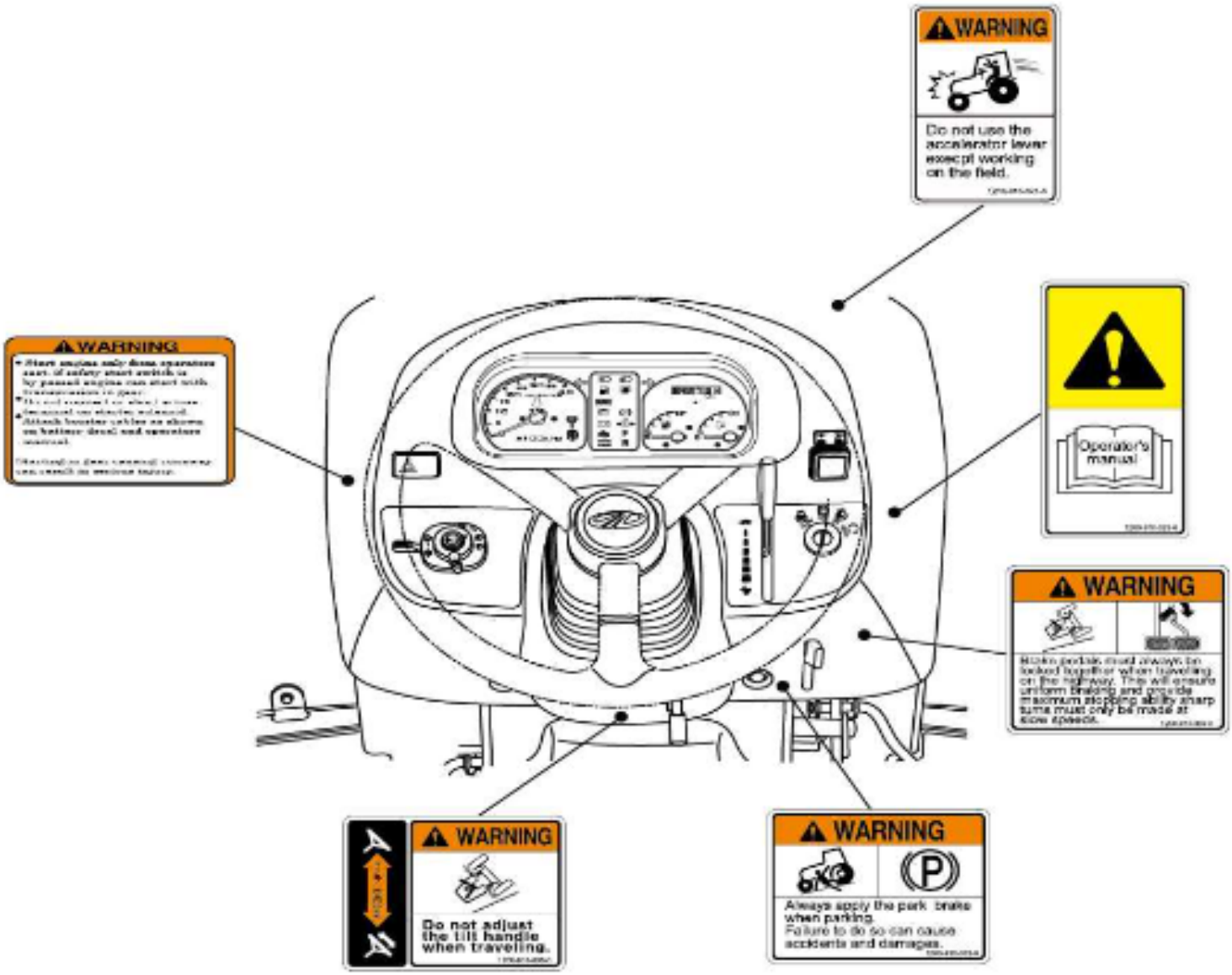
SAFETY SIGNS

► GENERAL SAFETY INFORMATION

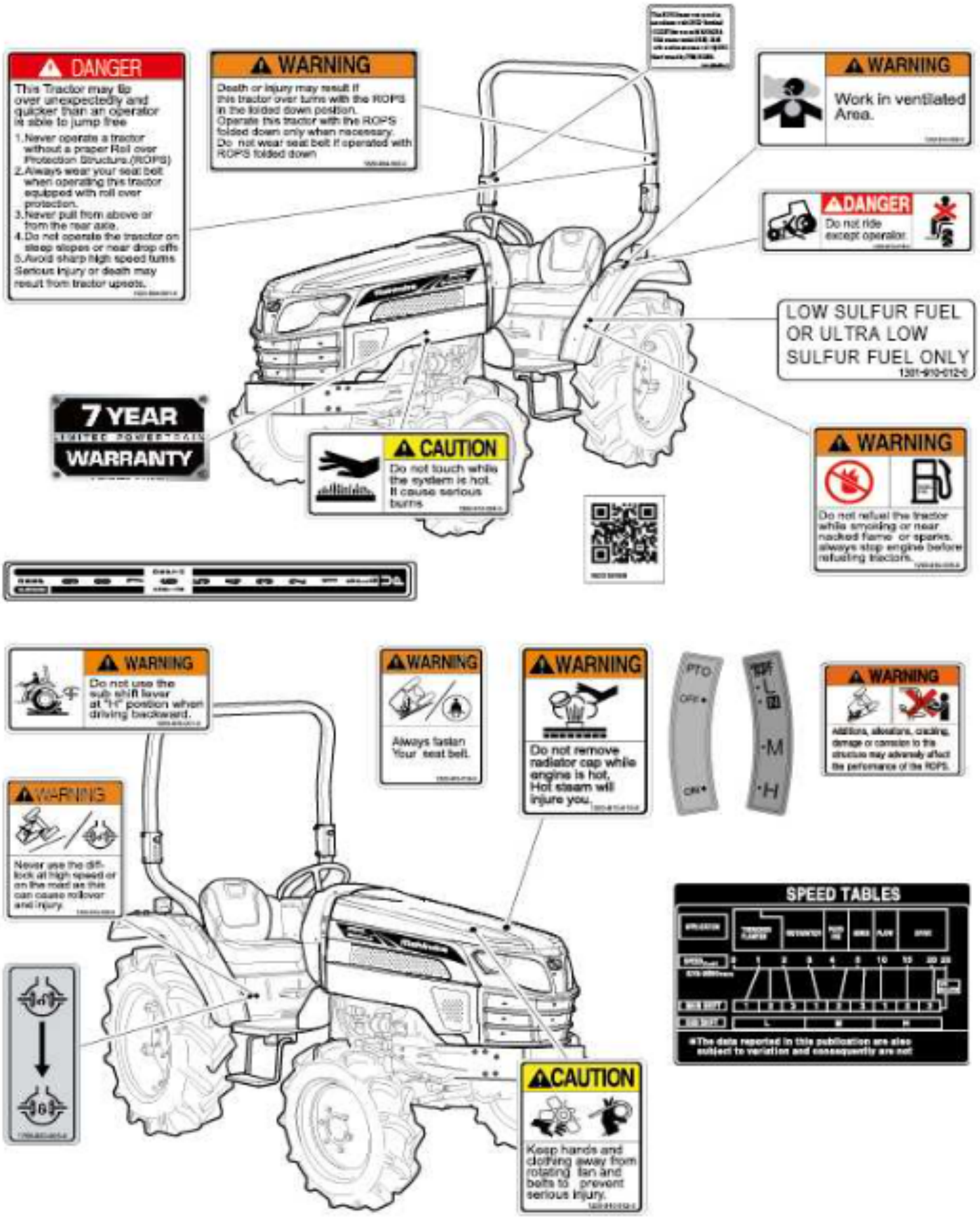
IMPORTANT: This **"General safety Information"** should be kept with the machine at all times as reference data.

Caution	This symbol means **ATTENTION! YOUR SAFETY IS INVOLVED.** The message that follows the symbol contains important information about safety. Follow the recommended precautions and safe operating practice.

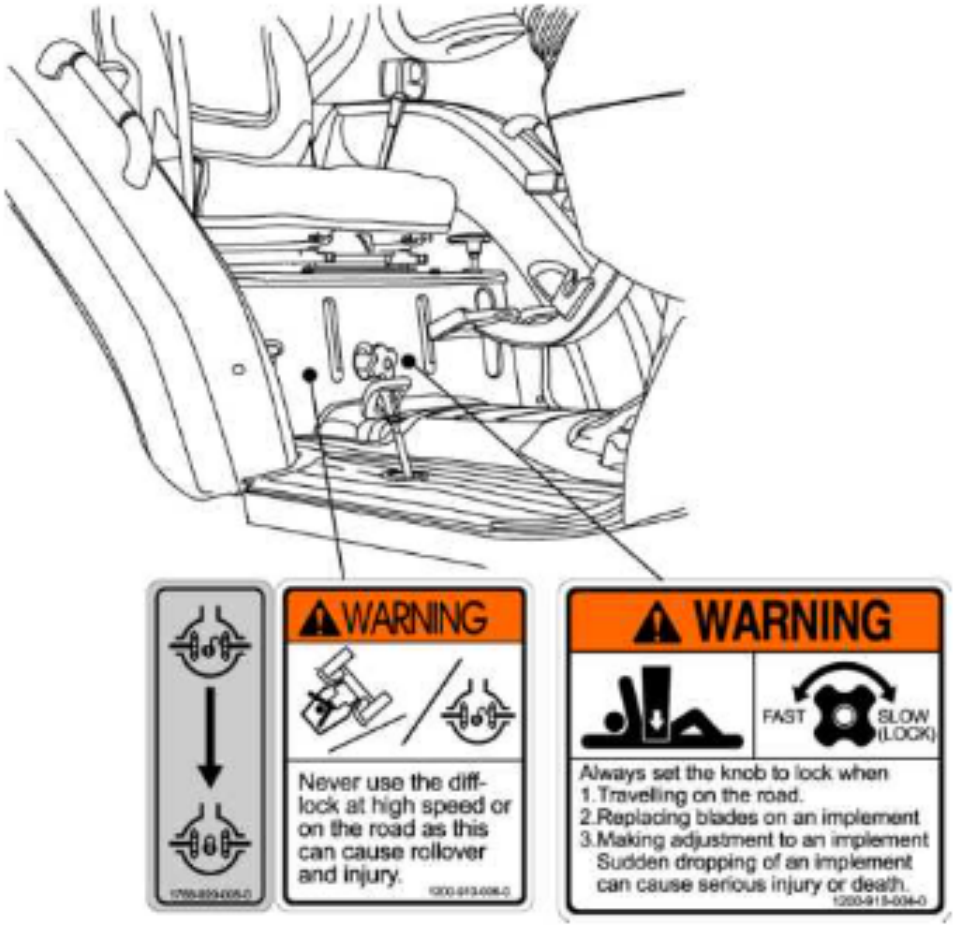
DECALS ON THE DASH COVER

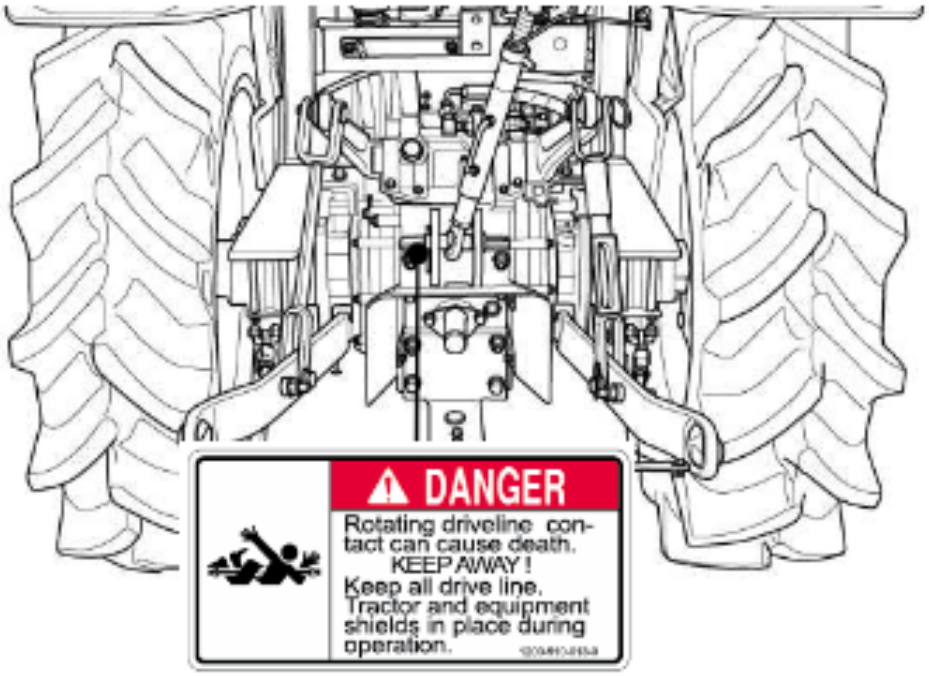


DECALS ON THE CHASSIS



DECALS AROUND THE SEAT





UNIVERSAL SYMBOLS

Some of the universal symbols have been shown below with an indication of their meaning

 Engine speed rev/minX100)	 Pressured-open slowly	 Corrosive substance
 Hours, recorded	 Continuous variable	 "Tortoise" Slow or minimum Setting
 Engine coolant temperature	 Warning	 "Hare" fast or maximum setting
 Fuel level	 Hazard warning	 Transmission oil pressure
 Engine Stop control	 Neutral	 Turn signal
 Lights	 Fan	 Transmission oil temperature
 Horn	 Power take off engaged	 Parking brake
 Engine oil pressure	 Power take off disengaged	 Work lamps
 Air filter	 Lift arm/raise	 Differential lock
 Battery charge	 Lift arm/ lower	 See operator's manual

Section - A

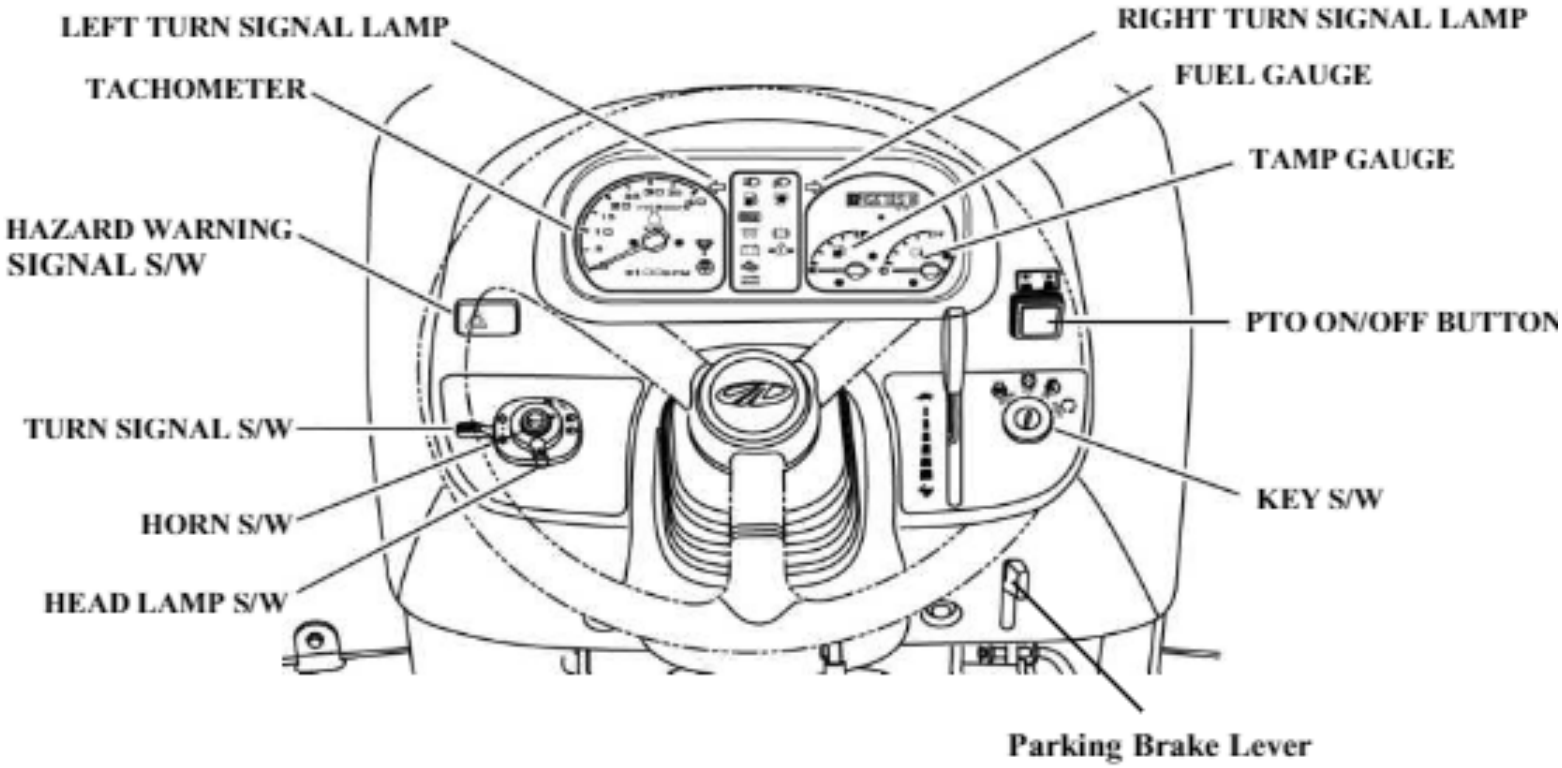
Controls, Instruments And Operations

The following pages in this section detail the location and function of various instruments, switches and controls on your tractor.
Even if you operate other tractors, you should read through this section of the manual and ensure that you are thoroughly familiar with the location and function of all the features of your new tractor.

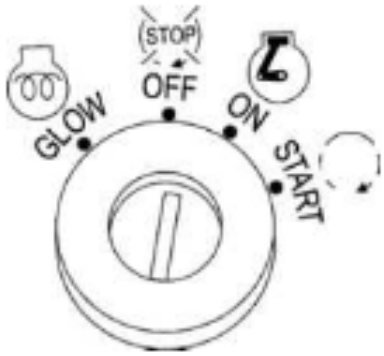
Do not start the engine or attempt to drive or operate the tractor until you are fully accustomed to all the controls.
It is too late to learn once the tractor is moving.
If in doubt about any aspect of the operation of the tractor consult your Mahindra tractor dealer/distributor.

Particular attention should be paid to the recommendations for running the tractor to ensure that your tractor will give the long life and dependable service for which it was intended

► INSTRUMENTS AND SWITCHES



► MAIN SWITCH (KEY SWITCH)



[GLOW] - Glow plugs preheat the combustion chamber

[OFF] - The key can be inserted or removed

[ON] - The electric circuit is on.

[START] - The starter motor is engaged.

When the key is released it will return to the ON position

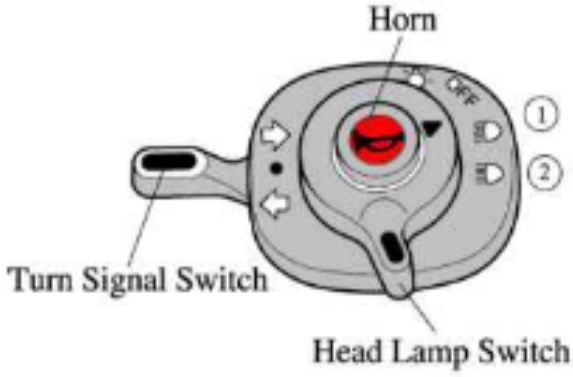
► HEAD LAMP, TURN SIGNAL SWITCH AND HORN

■ HEAD LAMP SWITCH

High and low beams are operated on the main switch

Position ①. Low beam

Position ②. High beam



■ TURN SIGNAL SWITCH

Pull the turn signal lever down to signal a left turn.

Push the turn signal lever up to signal a right turn.

■ HORN

Push the Red button.

► HOUR METER

The hour meter consists of digits with the last digit indicating 1/10th of an hour.

Symbol illuminates when the hour meter is operated.

► TACHOMETER

This meter shows the revolutions of the engine and the PTO shafts as well as the travel speed in top gear.

► FUEL GAUGE

Shows the amount of fuel in the tank when the ignition switch **ON.**

► WATER TEMPERATURE GAUGE

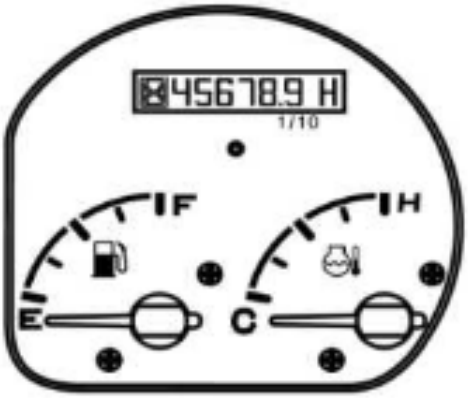
Shows the water temperature with the ignition switch **ON.**

C is low to normal temperature

H is high temperature

If the pointer is in the red H segment the engine is overheating.

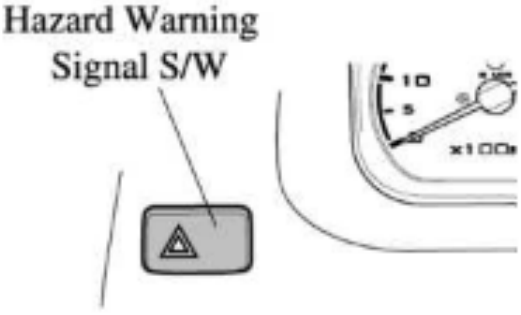
Refer to his book to rectify the problem.



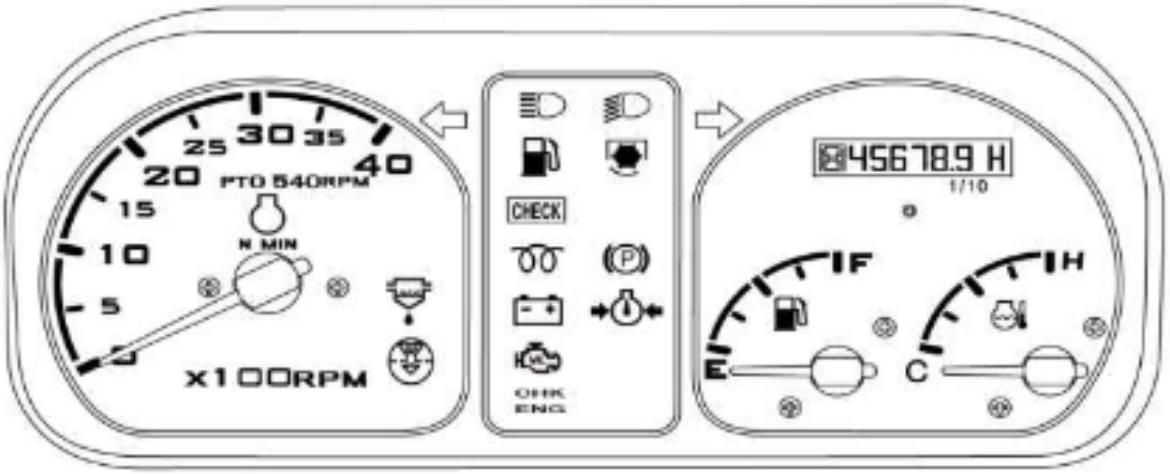
► HAZARD WARNING SIGNAL SWITCH

Push the hazard warning signal once to operate the hazard warning lights. (Left and right turn indicators flash)

Push the hazard warning light switch again to switch off the hazard warning lights.



►WARNING LIGHTS



Charge Lamp

This light will go off as soon as the engine starts to run to indicate that the alternator is charging. (Please note, as a broken fan belt can cause the light to come on, please stop the engine as overheating can occur if not rectified immediately)

Oil Pressure Lamp

This will go out as soon as the engine starts if the oil pressure is correct.

If it comes on while the engine is running, stop the engine and get expert advice.

PTO Monitor Lamp
Shows the revolution of PTO
Refer to monitor lamp on Page 32

High Beam Lamp is operated on the combination switch.

Low Beam Lamp is operated on the combination switch

Glow Signal Lamp indicates preheating

Air cleaner filter contamination indicator

This comes on when the air cleaner is clogged by foreign materials.

When this comes on, open the cover and clean the inside of the cleaner.

Also, blow air through the filter in the direction of intake air to clean it or replace the filter with a new one.

► **PTO MONITOR LAMP**

■ **THE PTO MONITOR LAMP** on the dash panel indicates the state of the PTO shaft.

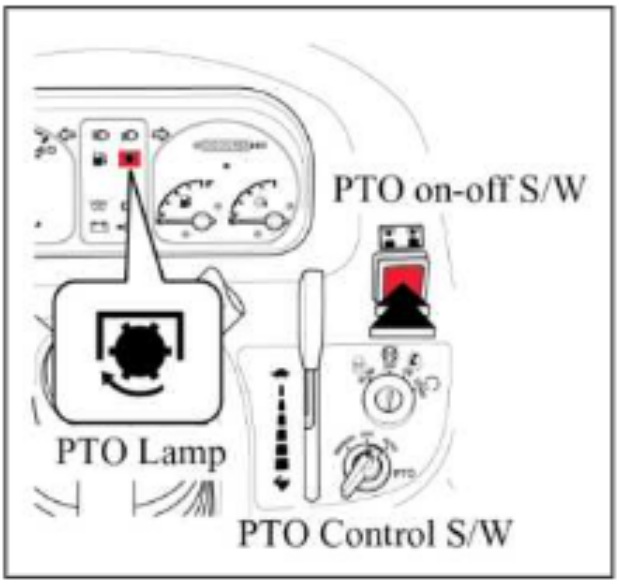
1. If the monitor glows: The PTO is rotating

2. If the monitor is off: The PTO is off

PTO monitor Lamp

1. PTO ON/OFF SWITCH: PTO ON/OFF switch is located on the RHS. on the steering column and can be identified easily with its built in red colored indicator. When the switch is pushed down to start, the PTO indicator glows to indicate that the switch and the PTO are in the ON position,

If the switch is pushed down again the indicator goes off signaling that the PTO is OFF.



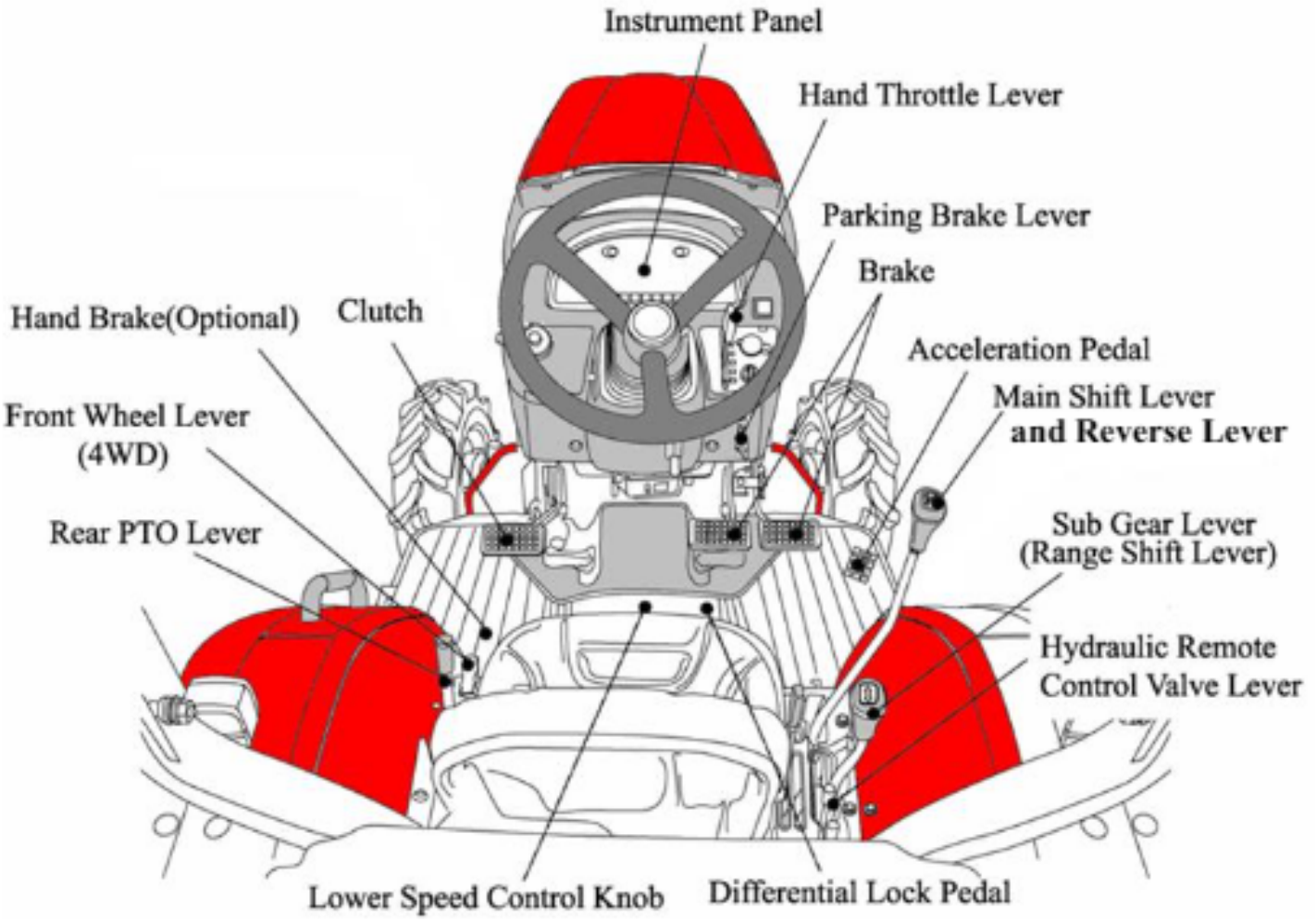
Warning

1. If working on hard soils, pavements with a rotary implement the PTO ON/OFF switch must be put to the OFF position to stop the PTO from rotating .
   If this is not done the rotating blades of the implement will push on the hard ground below and in turn push the tractor toward causing accidents which can lead to serious injuries or death.

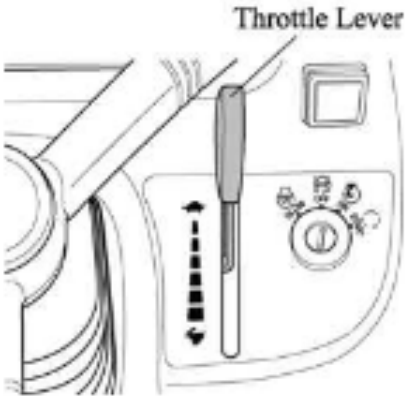
2. Extra precaution must be taken to clear the area of bystanders/onlookers when using PTO driven implements. The rotating blades of the implements can cause serious injuries on contact.

3. In no case should the specified rotating speeds indicated by the implement manufacturer be exceeded as this can lead to serious damage to the tractor/equipment and can lead to serious injuries to persons around.

► TRACTOR CONTROLS



► THROTTLE LEVER (HAND THROTTLE)



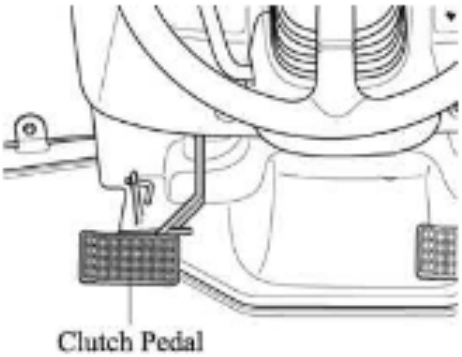
The hand operated throttle lever is located on the RHS of the dash cover.

To increase the engine speed, pull the lever downward.

To decrease the engine speed, push the lever upward.

The lever can be left in any position between idle and maximum as required.

► SPEED CONTROL PEDAL



The Speed Control Pedal is located on the RHS of the Operator floor.

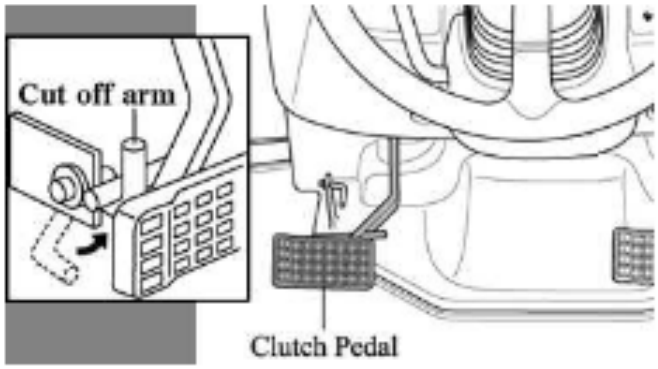
Depress the forward speed control pedal to move forward.

Depress the reverse speed control pedal to move backward.

The speed control pedal will return to neutral position and the tractor will stop when the speed control pedal is released.

► CLUTCH CUT-OFF ARM

For long term storage of the tractor it is possible to latch the clutch in the disengaged position. Push the clutch down and engage the latch to hold it there.



Warning	Do not attempt to start the engine when this arm is being used.

► BRAKE PEDAL

Right and left brake pedals are provided to assist in turning the tractor in the field.

Caution	A connecting latch is provided to connect the right and left brake pedals for high speed or road use. In the interest of safety always use it on the road or at high speed as using one side only can cause rollovers. When servicing the tractor ensure that the adjustment on both sides is the same.

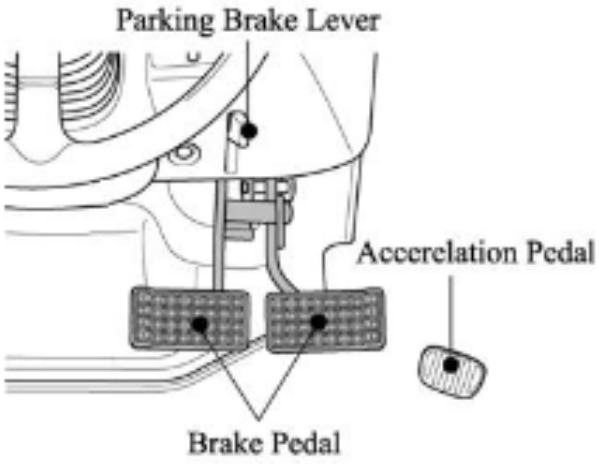
► ACCELERATION PEDAL

This pedal can override a fixed hand throttle setting

► PARKING BRAKE LEVER

Connect the brake pedals , push them down while pulling the park brake up to engage.

Press the parking brake pedal and push the brake pedal to release.



Important	Traveling with the parking brake on will damage the brakes.

► SHUTTLE SHIFT LEVER

This control allows shifting from forward to reverse & reverse to forward. When stationary set the lever to **N** for neutral.

① Push the lever away from the driver engages forward.

② Pulling the lever towards the driver engages reverse.

important	1.Press clutch pedal fully before operating shuttle shift lever. 2.When changing from forward to reverse or back to forward again while in high range make sure the tractor comes to a stop before changing direction. Failure to do so is likely to result in damage to the mechanism and place the driver at risk of injury.

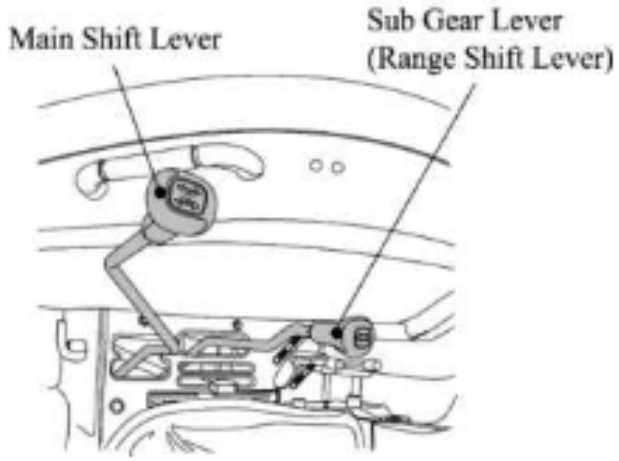
Caution	Operate the shuttle shift only while seated on the tractor. Do not use the shuttle shift lever to start the tractor for towing or traveling uphill, use the clutch instead. Always stop the tractor before getting off.

► MAIN GEAR LEVER

The Main Gear Lever is located on the RHS of the operator.
This lever can be shifted by using the clutch, both when the tractor is stationary or mobile.

► SUB GEAR LEVER (RANGE SHIFT LEVER)

The Main Gear Lever is located on the RHS of the operator.
Operate the sub gear lever using clutch to select the appropriate speed for different applications.



Main gear lever **Sub gear lever (Range Shift lever)**

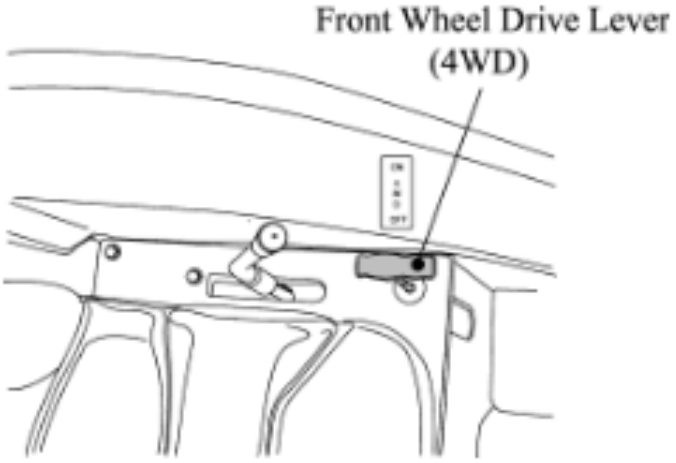
important	Avoid damage! Select the proper speed range and gear for the job. • The machine maybe operated in any gear with engine speeds at 950-2600 rpm. Within these limits, the engine can be placed under varying load operations. • Never overload engine by lugging machine at low idle speeds. • Raise engine speed the match expected loads. If a slight increase engine rpm occurs simultaneously with moving hand throttle lever forward, the engine is not overloaded.

► **FRONT WHEEL DRIVE LEVER (4WD)**

The Differential Lock Pedal is located below the LHS of the Operator.

In the ON position the front wheels are engaged and in the OFF position they are disengaged.

Engage & disengage the front wheel drive with the front wheels in the straight position and at low engine RPM.



Important	Do not use front wheel drive at high speed or on the road as premature wear of components will result.

Important	Always use the clutch when using the front wheel drive lever.

The use of front wheel drive improves traction performance.

► **DRIVER'S SEAT**

To adjust the seat backwards and forwards lift the lever at the front of the seat and set it to the desired position (Please refer to page 10 of how to adjust the seat)

■ **Seat Belt**

-Release the Seat Belt

Press button **C** and Pull the Male Fitting **A** from the Buckle **B**.

-Adjusting the Seat Belt

Make Sure the belt is across your hip and not over your stomach.

To adjust the male fitting **A** :

1. Pull toggle **D** down the strap by the required distance.

a. To make the strap longer, pull end **E** as far as it will go.

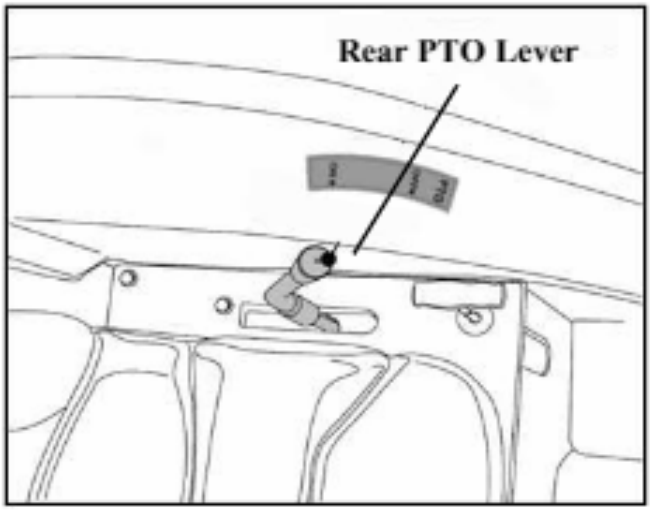
b. To make the strap shorter, pull end **F** as far as it will go.

► PTO SELECTION LEVER

Your tractor is equipped with a 1 Speed PTO to suit a range of applications and conditions.

MODEL	POSITION	ON
2645 Shuttle/ Shuttle Cab	**REAR PTO**	540 rpm

* The rear PTO Lever is located on the LHS of Operator.



Important	Always turn OFF the PTO On/Off switch when engaging or disengaging the PTO lever.

Caution	Do not operate any implement at a higher speed than as specified. When making adjustments to the implement, stop the engine to avoid serious injury. When leaving the tractor, stop the engine, and remove the key. Set the parking brake.

► OPERATING THE HYDRAULICS

The hydraulics are powered with an engine driven hydraulic pump and controlled with a position control lever mounted beside the driver.

► HYDRAULIC POSITION CONTROL LEVER

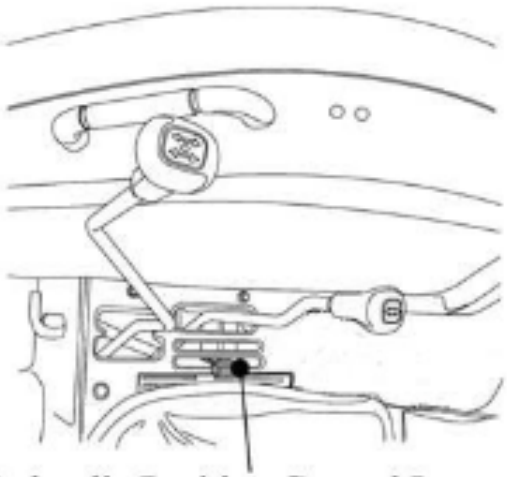
The hydraulic Position Control Lever is located on the RHS of the operator.

Implements can be raised and lowered with the hydraulic position control lever and can be stopped at any position by stopping the lever.

To ensure a consistent working depth the adjustable stop **(A)** can be set to ensure that the implement returns to the same depth every time.

To raise the implement : Pull the lever backward.

To lower the implement : Push the lever forward.



Hydraulic Position Control Lever

Warning	After finishing the work, always lower the implement to the ground and switch off the engine, set the parking brake to avoid injuries and accidents .

► LOWERING SPEED CONTROL KNOB FOR THE 3 POINT HITCH

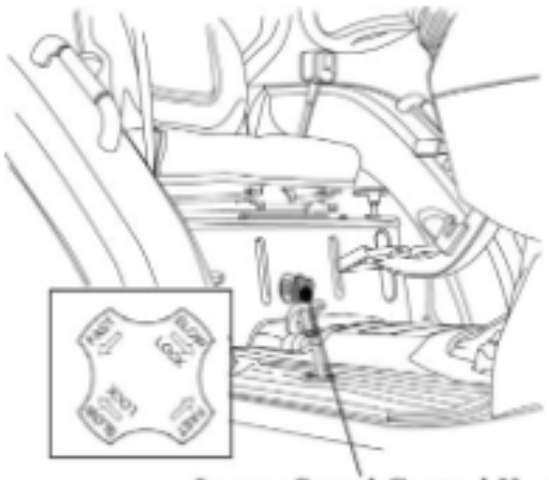
This knob controls the downward speed of the hydraulics three point linkage and is located below the seat.

To slow the downward speed- turn the knob clockwise.

To increase the downward speed, turn the knob counter clock-wise.

To lock, turn the knob clockwise.

Do not over tighten the knob.



Lower Speed Control Knob

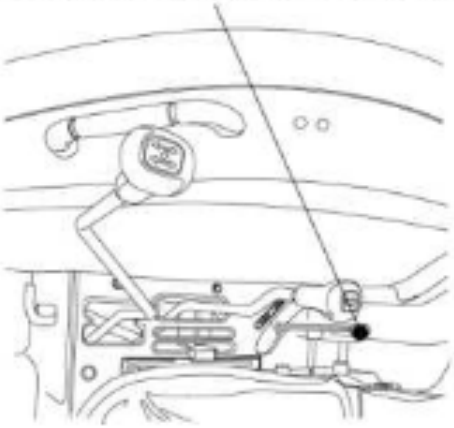
Caution	Always set the knob to lock when 1.Traveling on the road 2.Replacing tires or blades on an implement. 3.Making adjustments to an implement. The sudden dropping of an implement due to hydraulic problems can cause serious injury or death.

► HYDRAULIC REMOTE CONTROL VALVE LEVER – (IF EQUIPED)

The Hydraulic Remote Control Valve Lever is located on the RHS of the operator.

Move the lever up or down and hold.This will raise or lower the implement (Rotavator or Hydraulic plow).

Hydraulic Remote Control Valve Lever



Important:

-Do not hold the lever in the "pull" or "Push" position once the remote cylinder has reached the end of the stroke as this will cause oil to flow through the relief valve. Forcing oil through the relief valve for extended periods will overheat the oil.

-When using the tractor hydraulic system to power a front loader, do not operate the boom and bucket cylinders simultaneously.

► HYDRAULIC REMOTE CONTROL VALVE COUPLER CONNECTING & DISCONNECTING – (IF EQUIPED)

■ Connecting

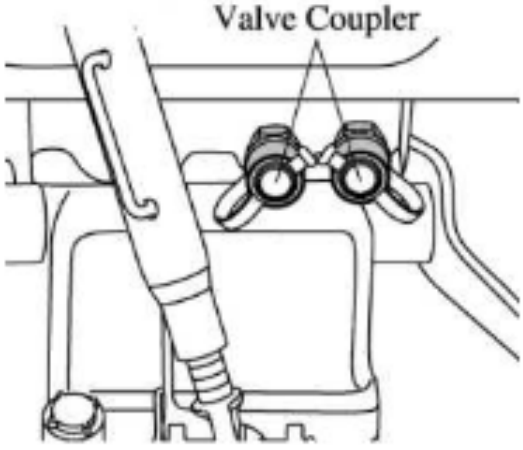
1.Clean both couplers.

2.Remove dust plugs.

3.Insert the implement coupler to the tractor hydraulic coupler.

4.Pull the implement coupler slightly to make sure couplers are firmly connected.

Hydraulic Remote Control Valve Coupler



■ Disconnecting

1.Lower the implement first to the ground to release hydraulic pressure in the hoses.

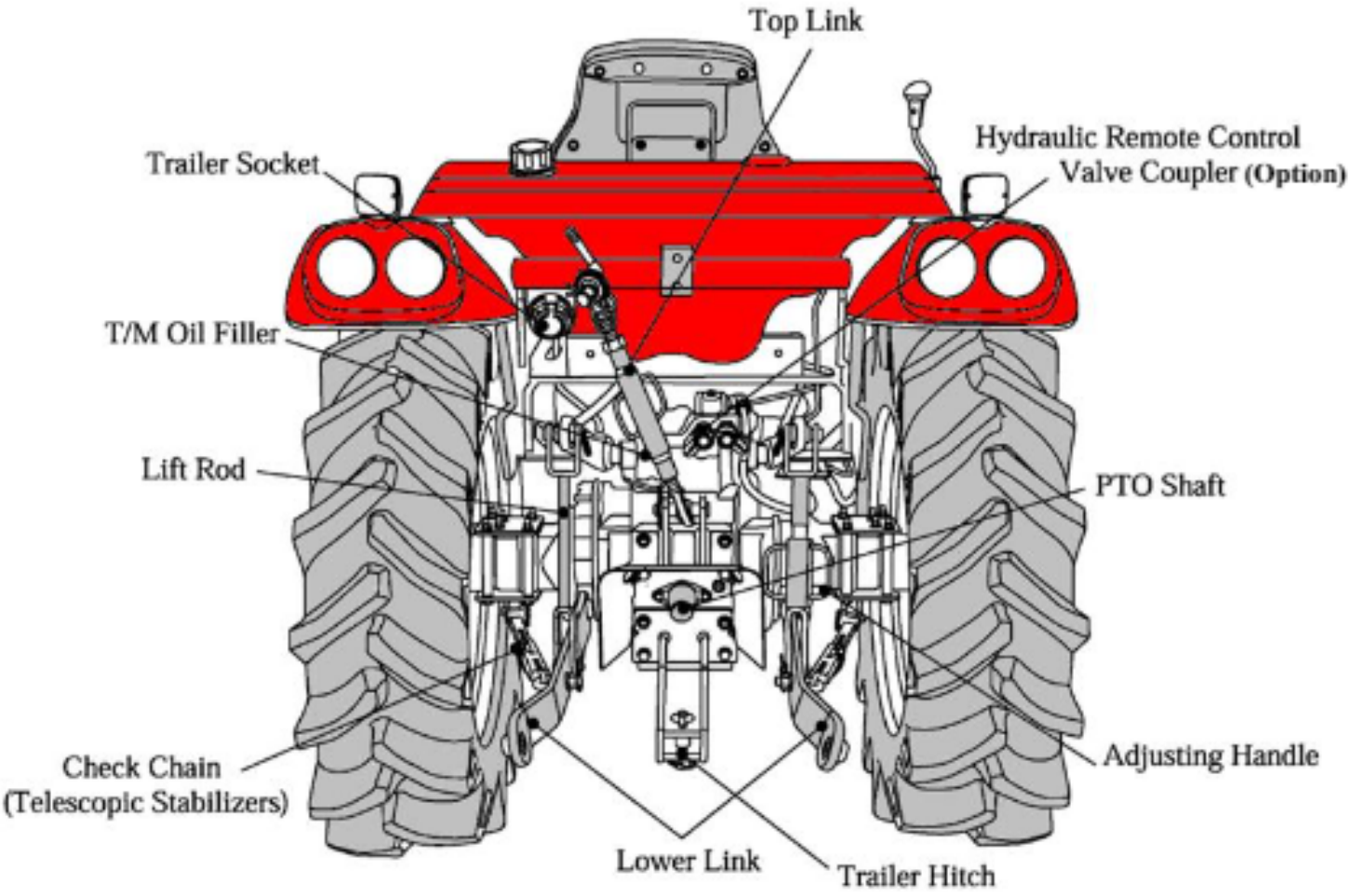
2.Clean the couplers

3.Relieve pressure by moving hydraulic control levers with the engine shut off.

Pull the hose straight from the hydraulic coupler to release it

4.Clean oil and dust from the coupler, then replace the dust plugs.

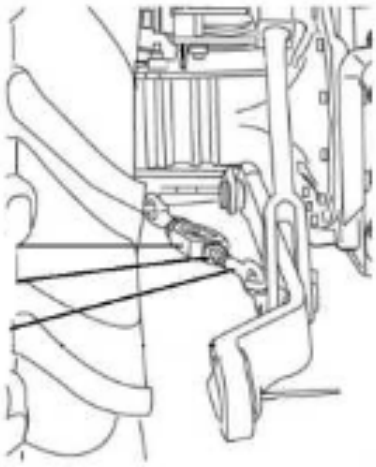
► OPERATING THE 3 POINT LINKAGE (TPL)



► ADJUSTMENT OF THE CHECK CHAIN

To adjust the check chain turn the turnbuckle to lengthen or shorten the chain and tighten the lock nut when the correct adjustment is achieved.

Turn buckle
Fixing Nut
Check chain

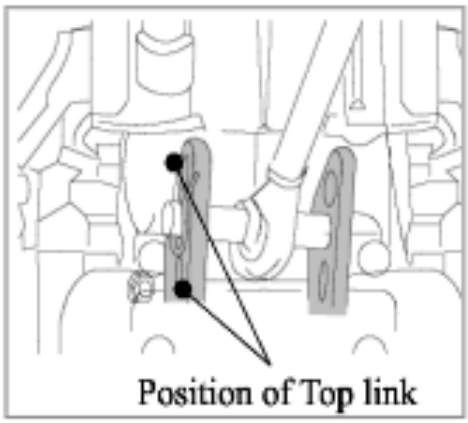


► ADJUSTMENT OF THE TOP LINK

Lengthening or shortening the top link will change the angle of the implement.

The locating hole of the top link varies with the type of implement used.

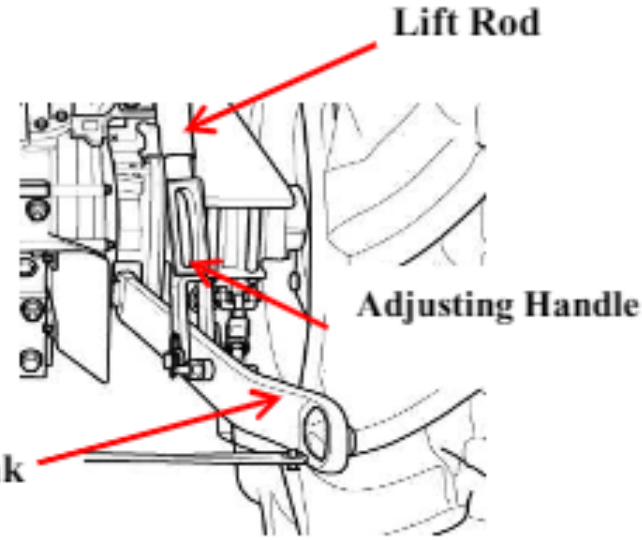
The most common locations are the 2nd and 3rd hole from the top.



► ADJUSTMENT OF THE LIFT ROD

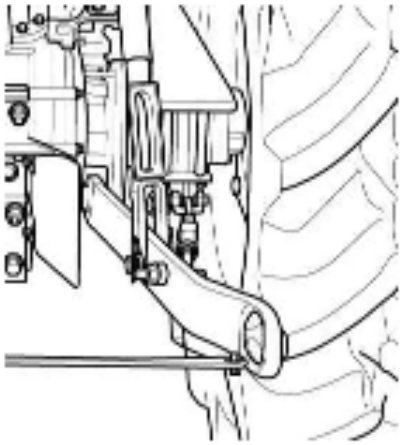
Adjust the length of the lift rod by screwing the Adjusting Handle (Turnbuckle) in or out.

Adjust the length of the lift rod as necessary to set the implement in its working position parallel to the ground.



► ADJUSTMENT OF THE YOKE ROD ON THE LOWER LINK

For different applications, change the position of the Yoke rod on the lower link holes as shown and insert the pin in the direction of the arrow.



Danger	Only use drawbar to tow and keep the 3 point linkage in the raised position when towing with the drawbar. Position can create unbalance causing the tractor to roll-over & result in death or serious injury.

► MOUNTING IMPLEMENT

If the PTO is used, remove the safety cover from PTO shaft.

Adjust the yoke rod on the lower links to suit the implement in use.

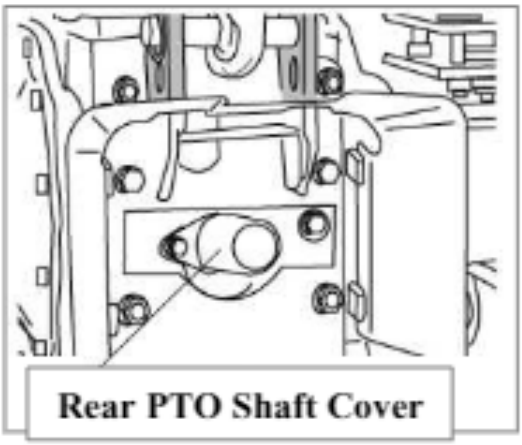
Attach the left lower link, then attach the right lower link using the adjusting handle on the leveling box if required.

Attach the top link.

Attach the PTO shaft to the tractor if used, making sure that it is locked in place.

Adjust the check chains to suit the implement and tighten the locknuts.

To remove an implement reverses the procedure



Rear PTO Shaft Cover

Caution	Do not attach a PTO shaft with the engine running and ensure all safety shields are in place.

DRIVING THE TRACTOR

► STARTING THE ENGINE

Before starting the engine carry out the pre-operational checks as set out on page 16.

(1) Sit on the driver seat.
(2) Apply the footbrake.
(3) Put the hydraulic lever in the down position.
(4) Push down the clutch to activate the safety-starting switch.
(5) Put the main gear lever in neutral
(6) Insert the ignition key and turn it on
(7) Ensure that the warning lights are working
(8) Always turn the ignition key to left for a moment & release it.
The automatic heater will start working as will be indicated by a light on the instrument panel .
As the lamp goes off turn the key to the start position to start the engine.
(9) Ensure that all the warning lights are off with the engine running.

Important	Never turn the key to the start position while the engine is running as this can cause serious damage to the starter and engine flywheel. Only engage the starter for a period of not more than 10 seconds. If the engine does not start, rest the starter for about 20 seconds and try again for a maximum of 10 seconds. If the engine does not start after repeated attempts, refer to the fault tracing guide.

Important	Especially in cold weather, always allow the tractor to idle for a while to warm up & build up sufficient oil pressure to ensure normal operating temperature for a longer engine life.

► STOPPING THE ENGINE

-After light work let the engine idle for a while and than turn the key off.

Important	After long or heavy work allow the engine to idle for 5- 10 minutes and than turn the key off.

► WARMING UP

When starting the engine, allow it to warm up to operating temperature by allowing it to idle 5-10 minutes to ensure full lubrication and operating temperature.

Failure to do so can shorten engine life substantially.

► WARMING UP IN COLD WEATHER

Cold weather will change the viscosity of the oil, resulting in a reduced oil pumping capacity, which can cause damage to the engine if it is not warmed up correctly.

It also causes problems with the hydraulic system and the synchromesh in the transmission.

Correct times for warming up are:

Temperature	Time for warming up
Above 50°F	5~10 min.
50°F~ 32°F	10~20 min.
32°F~14°F	20~30 min.
14°F~-4°F	30~40 min.
Below –4°F	Over 40 min.

 Important	Ensure the handbrake (Foot brake) is on during the warming period. **Failure to warm up correctly can result in problems.**

When the engine is warm, push down the clutch and engage the main and auxiliary gear levers to the required position.

Push down on the brake pedals and release the handbrake.

Increase the engine revolutions and let out the clutch smoothly.

Only change gears with the main gear lever while moving and ensure that this is done with the full use of the clutch.

► STORING ENGINE IN OPERABLE CONDITIONS FOR 3 MONTHS OR MORE

When the engine is not operated during storage periods of three months or more, internal engine parts can rust and lose oil film.

As a result, the engine can seize when it is started after storage.

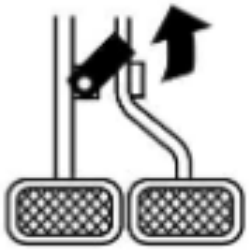
To prevent such rust, the engine must be operated periodically during storage.

Caution	Do not "ride" the clutch to control speed, use a lower gear. Do not travel with your foot on the clutch pedal.

Danger	Always connect the brake pedals when traveling on the road. Never tow anything except with the drawbar. Do not tow loads which are too large for the tractor's capacity to brake effectively especially in hilly terrain. Take special care when towing large or wide implements. Do not carry passengers. At all times observe local legislation and road rules.

► TIGHT TURNS IN THE FIELD

Disconnect the latch connecting the left and right brake pedals to allow the use of individual pedals.
To make a tight turn use both the steering wheel and the brake pedal at the same time.
For a left turns use the left pedal and right turns the right pedal.



Caution	Perform tight turns only at a slow safe speed. Doing so at a high speed can cause rollovers and very serious injury or death.

► NORMAL BRAKING AND PARKING

Let the engine come back to idle and at the same time push in the clutch and brake simultaneously.
When the tractor has come to a halt, lower any implement to the ground, and put the main gear in neutral.
Apply the parking brake, stop the engine, and remove the key.

Caution	Always apply the parking brake when parking. Failure to do so can cause accidents and damage. As an extra precaution when parking on a slope, chock the rear wheels.

► UPHILL STARTS ON A STEEP SLOPE

With the pedals connected together push down on the brake pedals and push down the clutch.

Set all gear levers to low and the throttle to medium engine speed.

Release the clutch and as it engages release the brake pedals.

Adjust the throttle to the required speed.

► DRIVING DOWNHILL

Use the engine's ability to brake when traveling downhill.

Never rely on the brakes only and never travel downhill with the gears in neutral.

Warning	When operating in hilly terrain the risk of rollover is increased substantially, please drive with extra care. When towing trailers in hilly terrain ensure that they are equipped with brakes, use a lower gear to get maximum engine braking and do not change gears on a down hill run

► OPERATION OF THE DIFF LOCK

While the diff lock is a very useful feature, care should be taken in its use as misuse can lead to dangerous situations.

The diff lock should only be used in situations where traction is lost on one of the rear wheels.

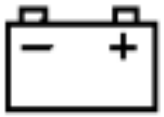
Warning	Use low engine revolutions when using the diff lock. If the diff lock does not release after removing the foot from the pedal use the left and right brake pedals in turn to release it. Do not try to engage or use the diff lock on tight turns as serious damage can result.

► CHECK DURING DRIVING

Constantly monitor the warning lights on the dash and if any come on, stop the tractor to determine the cause.

If the oil pressure light comes on check the oil level first of all.

If the oil level is OK ask a qualified dealer to check the reason for the light coming on.



If the alternator warning light comes on check all connections and ensure that the fan belt is not broken.

If all connections and the fan belt are intact consult your dealer to determine the cause of the problem.

► **FUEL GAUGE**

To avoid excessive condensation in the fuel tank refill at the end of each day's work and ensure during the day that it does not drop to a low enough level where the fuel system will require bleeding to expel air in the system after refilling the tank.

► **ENGINE COOLING WATER**

If the gauge indicates that the engine is running hot, stop the tractor and check the coolant in the radiator.

Danger	Allow the engine to cool down before opening the radiator as serious burns may result due to hot steam & boiling water.

Also check to ensure that the fins in the radiator core are not clogged or that the tractor has a broken or stretched fan belt.

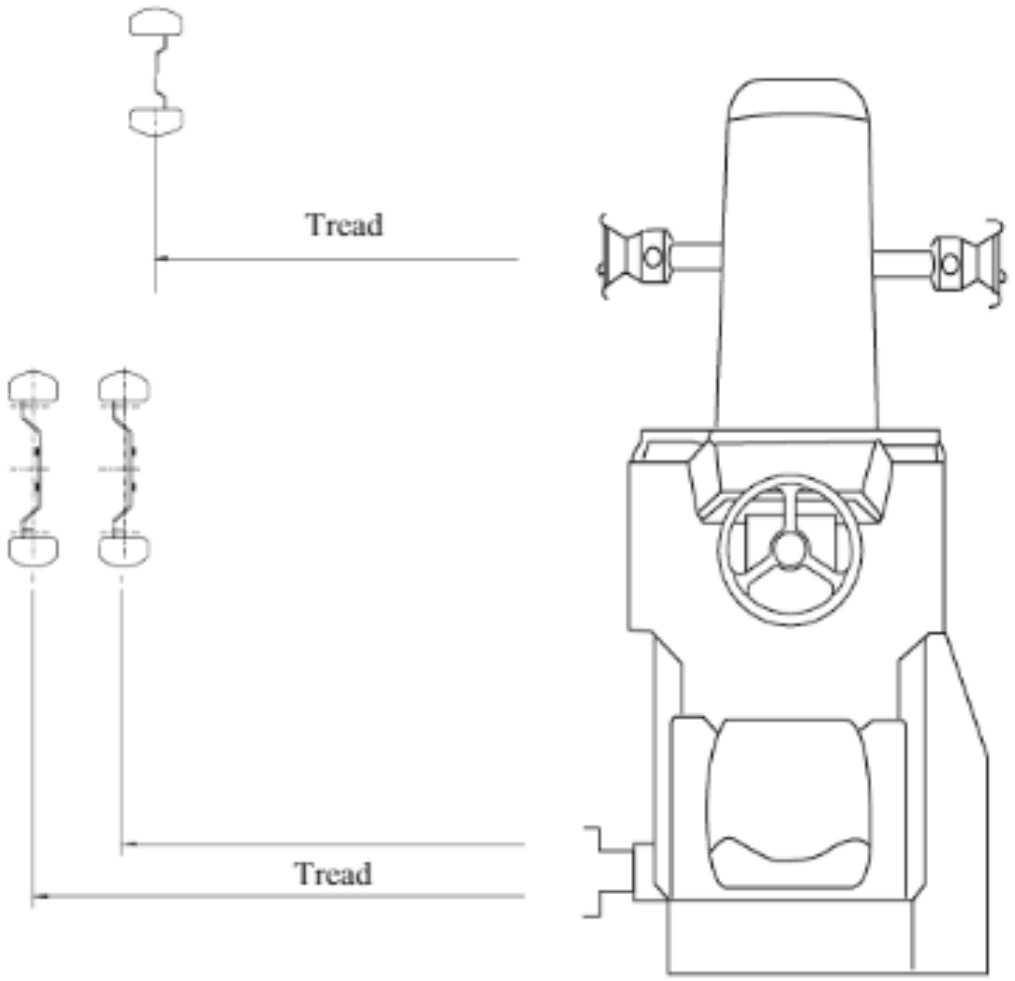
Caution	When traveling on public or farm roads connect both brake pedals and allow for the weight of any mounted implement to ensure that the unit is not unbalanced. Also allow for the width when passing other road users. Where fitted, use the hazard lights provided. Strictly follow the local traffic regulations.

Caution	When operating near others with an implement attached, take particular care to allow for the width of the implement and avoid accidents.

► TRACK ADJUSTMENT

As 2645Shuttle/ Shuttle Cab models of Mahindra are front wheel assist the front track can be set in 1 position.

The rear track can be set in positions as illustrated.



(*) Marking is STANDARD

TYPE	DIVISION	TYRE	TREAD
AG	FRONT	8.0-16	19inch(1170mm)
	REAR	12.4-24	42.94inch(1090mm)
IND	FRONT	10-16.5	53.13inch(1349.5mm)
	REAR	43X16.00-20	48.06inch(1220mm)

Lubrication

&

Maintenance

This section gives the full details of the service procedures necessary to maintain your tractor at peak efficiency while the lubrication and maintenance chart provides a ready reference to these requirements.

► PRE-START CHECKS

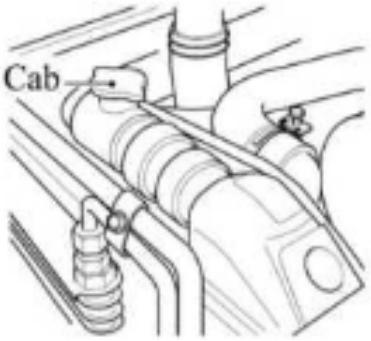
To avoid problems it is recommended that a range of checks be carried out daily before starting the tractor.

For full details of the items and frequency please refer to the tables on page 53,54 and 55.

► ENGINE COOLANT

Remove the radiator cap and ensure that the coolant is up to the filler neck and that it is clean with the correct anti-freeze or anti corrosion inhibitor in it.

If the coolant is a rusty color, drain the system completely and refill with the correct mixture of water and anti-freeze or corrosion inhibitor.

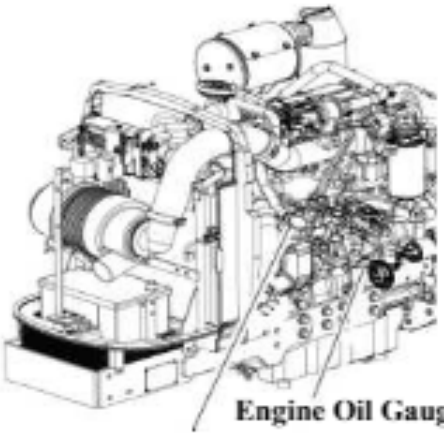


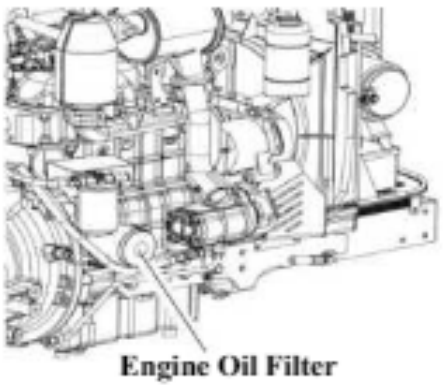
► ENGINE OIL

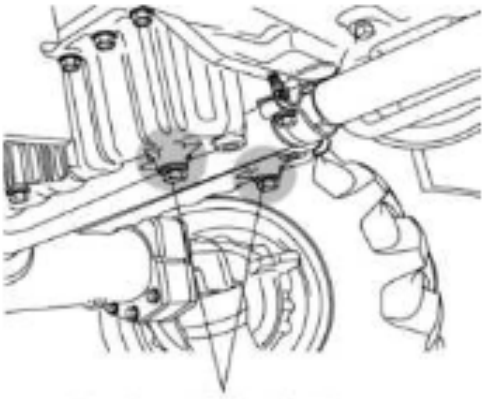
Pull out the stick, wipe it and dip it in the oil sump.

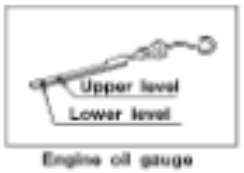
Ensure that oil level is between the upper and lower marks near the upper mark.

If it's too low add oil, but never after the 100 hrs of service interval.





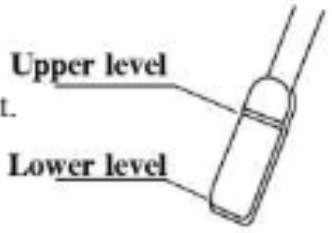




Engine oil gauge

Important	Do not overfill the crankcase with oil.

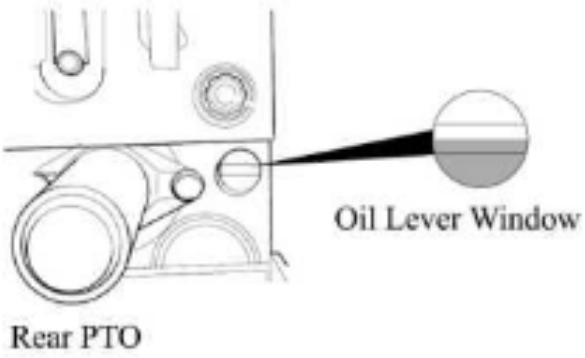
► TRANSMISSION OIL

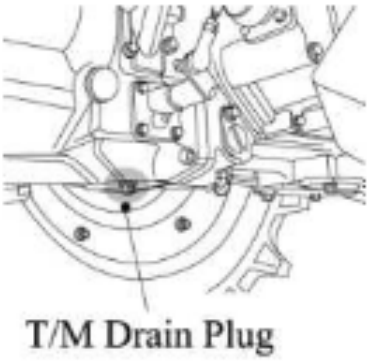


Check the level with the dipstick on top of the transmission in the rear of the seat.

If the level is low add oil through the filler hole.

Caution	Always ensure that you use the correct oil for topping off or oil changes



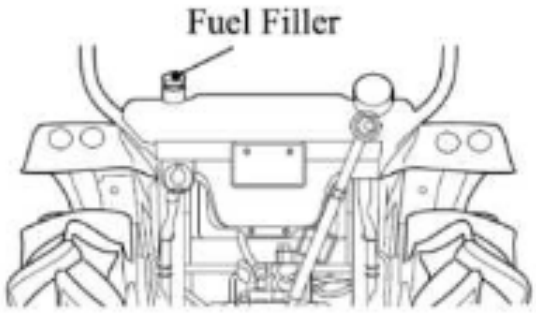


► FUEL

The Fuel Filler is located on the rear of the seat.

Use the fuel gauge to check the fuel level and top off if it's too low.

It is a good practice to refill the tank immediately after use to avoid condensation

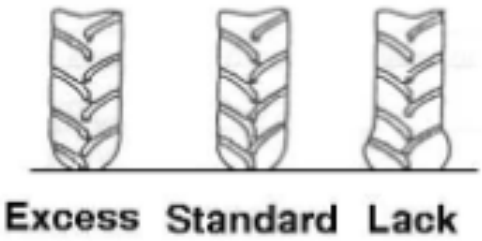


► TIRE PRESSURE

The air pressure used in the tires has a direct bearing on the life of the tire and its performance in the field.

Ensure that the tire pressures are correct and in accordance with the table on page 48.

To make a visual judgment see the drawing on the right.



Important	It is strongly recommended that tire pressures are checked with a proper gauge only & visual inspections are relied upon.

Danger	Excess tire pressure can cause accidents!

► **STEERING**

Ensure that the steering wheel does not have excessive free play.

► **BRAKE**

Ensure that the left and right brakes are adjusted correctly so they operate simultaneously.

The correct free play on the brake is 1.18-1.57 in (30~40 mm).

► **CLUTCH**

Ensure that the clutch is adjusted correctly.

Correct free play on the clutch pedal is 0.78-1.18 in (20~30mm).

Caution	Incorrect clutch adjustment can cause excessive wear and reduced tractor performance.

► **ELECTRICAL**

Check the operation of all gauges, switches, horn, lights and indicators.

► **INSTALLING LOADER**

1.Connect the P port of the loader control valve to the line on the tractor marked P(from the PTO valve)

2.Connect the T port on the loader control valve to the line on the tractor marked T.

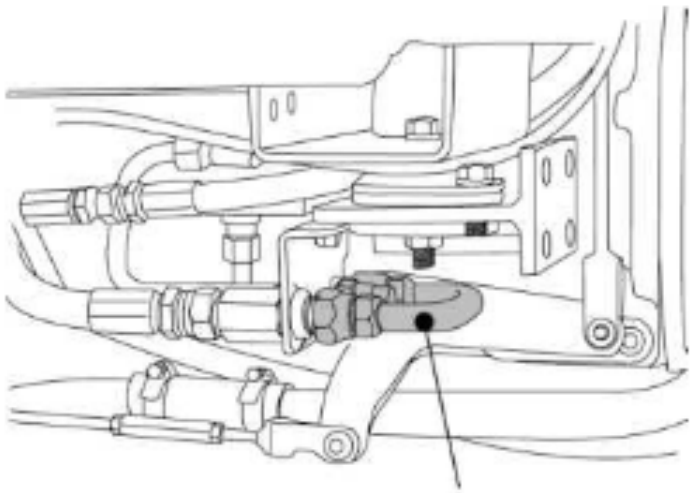
3.Connect the remaining line from the control valve to the line on the tractor marked P1

(to the transmission housing).

► **DETACHING THE LOADER (LOADER CONNECTING PORT)**

1.Detach the hydraulic hoses of the loader.

2.Assemble the cap (PF1/2) with pipe comp (PF1/2).



Loader Connecting Port

MAINTENANCE AND ADJUSTMENT SCHEDULE

► Periodical check and service table

○ Check, Top-up or adjust ● Replace
△ Clean or wash ★ Consult the service Dealer

Division	Item	Daily	Service interval(hour meter,mark)												Frequency	Comment
			50	100	150	200	250	300	350	400	450	500	550	600		
Engine	Engine oil	○	●			●			●			●			Every 150hours or 12months after first 50hours	To correct level on the dipstick
	Air cleaner			△		△		△		△		△		●	Clean every 100 hours	
	Radiator coolant	○													Check daily top off if required	See page 61.
	Radiator	○													Check daily for damages leakage	
	Fuel	○													Everyday and before work	Fill tank
	Fuel filter	○	●	○	△	○	△	○	●	○	△	○	△	○	Every 300 hours or 12months	
	Fan belt	○													Check daily	See page 65.
	Battery			○		○		○		○		○		○	Check daily	
	Oil filter		●		●		●		●		●		●		Change with engine oil	
	Loose nuts and bolts	○													Check daily	Tighten
	Radiator hose clamp	○														Tighten if required

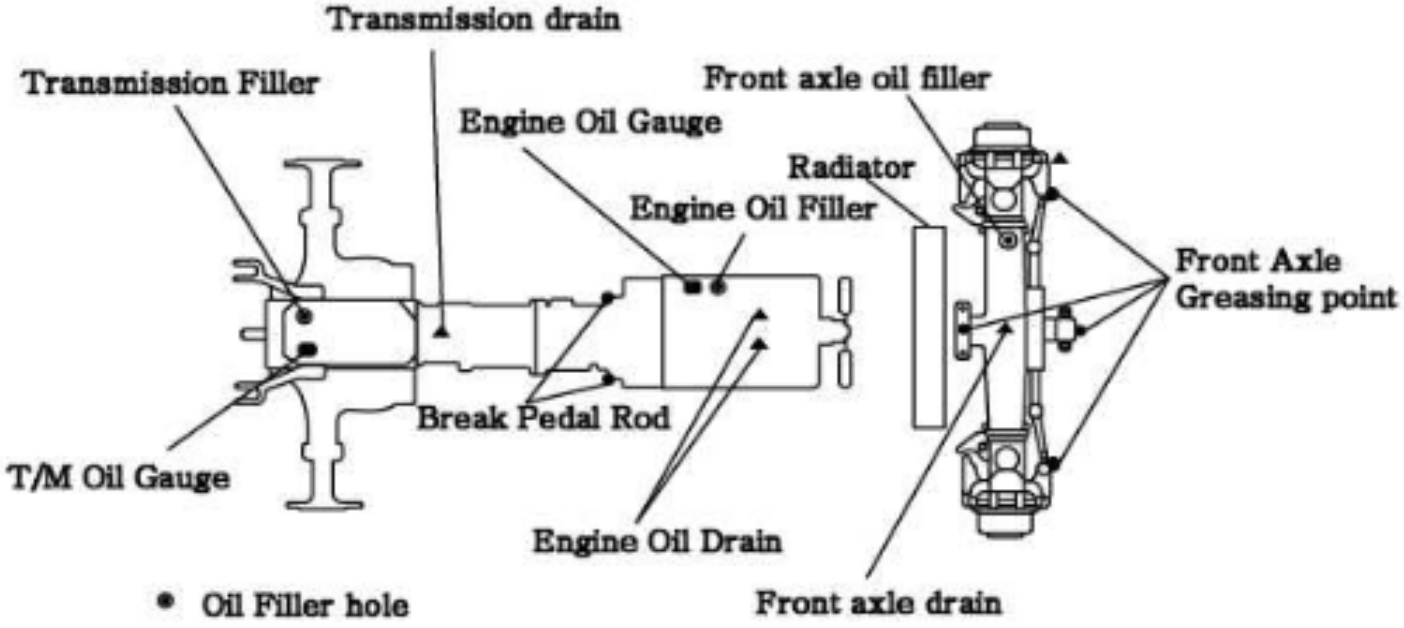
Caution

These intervals are for operation under normal conditions and need to be reviewed under severe conditions to a greater frequency.

Division	Item	Daily	Service interval(hour meter,mark)												Comment
			50	100	150	200	250	300	350	400	450	500	550	600	
Chassis	Trans mission oil	○	●					★					●		every 500hours or 12months after first 50hours
	Free play of clutch pedal	○													(0.78-1.18in)
	Free play of brake pedal	○													(1.18-1.57)
	State of both brake pedals	○													Adjust so that both operate simultaneously and brake at the same time
	Operation of each lever	○													Check daily
	Free play of steering wheel	○													Check daily
	Toe-in							★						★	Check every 300hours
	Grease in front wheel hub							○						○	Grease every 300hours
	Grease each nipple		○	○	○	○	○	○	○	○	○	○	○	○	Replenish every 50 hours (everyday in dusty conditions)
	Check the steering wheel joint	○						○						○	Adjust every 300hours
	Wheel nut fastening torque	○													Tighten if loose Front : 1600~1800 kgf-cm (116~130ft-lbs) Rear : 1600~1800kgf-cm (116 ~ 130 ft-lbs)

Division	Item	Daily	Service interval(hour meter,mark)												Comment
			50	100	150	200	250	300	350	400	450	500	550	600	
Chassis	Adjustment of the throttle pedal							○						○	
	Operation of the instrument	○													Check daily
	Hydraulic oil filter							★					●		
	4WD front axle housing oil		●		○		○		○		○		●		Check after every 100hours. Replace every 500hours after 50hours
	Rubber pipes		○		○		○		○		○		○		Check after every 100 hours

► FILLING DIAGRAM & CAPACITY TABLE



- ● Oil Filler hole
- • Greasing point
- ▲ Drains
- ■ Window

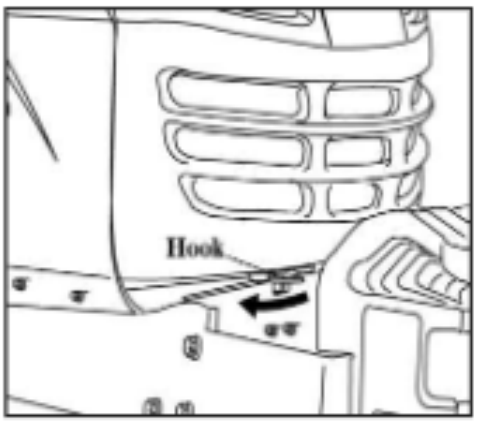
No.	Filling point	Fillings	Quantity Liter (gal)
	MODEL		2645Shuttle/ Shuttle Cab
1	RADIATOR	Fresh clean water(L.L.C) with an antifreeze, mixed in ratio of minimum 50%	7ℓ (1.85 US gal)
2	ENGINE	API : CJ-4 grade Above:25°C(77°F)…SAE30 or 10W-30 0°C to 25°C(32°F to 77°F)…SAE20 or 10W30 Below 0°C(32°F)…SAE 10W or 10W-30 MAHINDRA HEAVY DUTY SAE 15W-40	7.5 ℓ (1.98US gal)
3	TRANSMISSION CASE	(API GL-4Grade) SAE 80W/90 MAHINDRA UNIVERSAL TRACTOR FLUID	35ℓ(9.25 US gal)
4	FRONT AXLE	(API GL-4Grade) SAE 80W/90 MAHINDRA UNIVERSAL TRACTOR FLUID	8.2ℓ(2.17US gal)
5	FINAL DRIVE CASE(B)	(API GL-4Grade) SAE 80W/90 MAHINDRA UNIVERSAL TRACTOR FLUID	
6	BALL JOINT	Grease	As required
7	FUEL TANK	Diesel fuel	34ℓ(9.0 US gal)

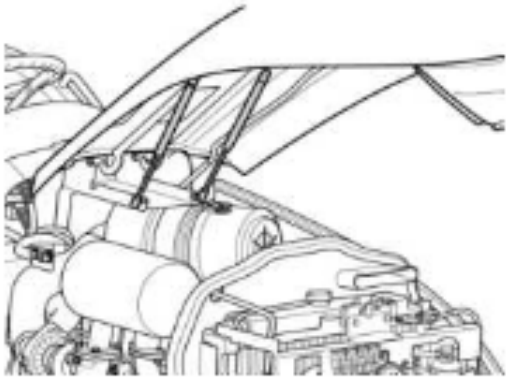
► **RECOMMENDED TRANSMISSION OIL**

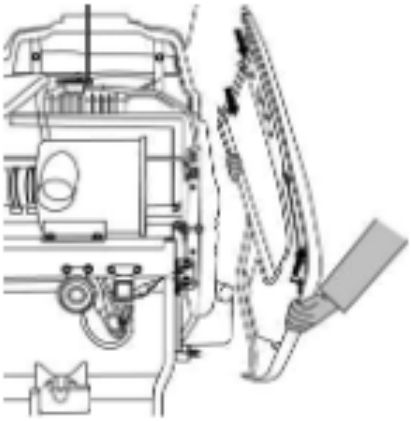
①MAHINDRA UNIVERSAL TRACTOR FLUID

► **OPENING METHOD OF EACH COVER**

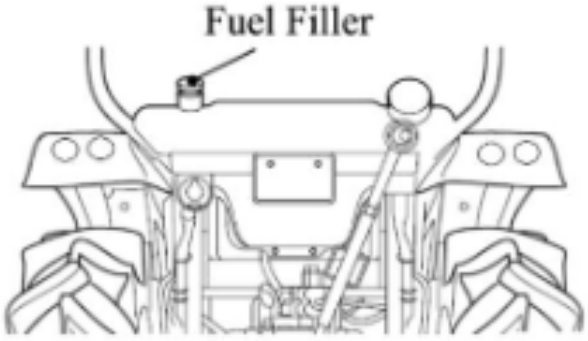
► **OPENING METHOD OF FAN COVER**







With the hood up ,the hook release lever can be removed by pull the hook.



► **FUEL**

Use clean diesel fuel only .

Important	As diesel fuel equipment is susceptible to contamination by dust or water, ensure that all dust and water is kept well away from the fuel tank.

► BLEEDING THE FUEL SYSTEM (① Main Fuel Filter)

1. Raise the engine cover.

2. Make sure there is fuel in the fuel tank.

3. Press the hand primary pump

4. Rerease the Fuel connector.

5. Using the starter key, turn the engine until air free fuel flows from the main fuel Filter to the fuel injection pump.

6. Close the connector on the main fuel Filter.

7. The engine is now ready to start.

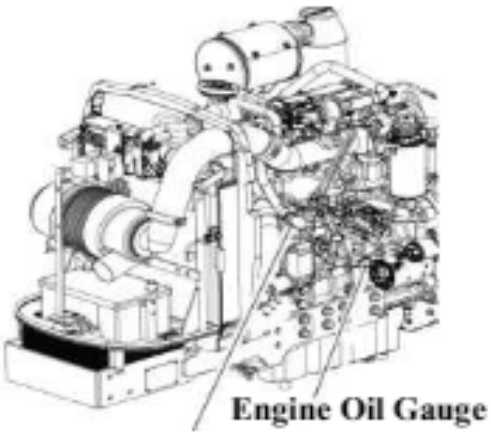
If the engine runs smoothly for a short time and then begins to run roughly, leave it at idle until it runs smoothly.

Important	Never use petrol, thinners or any other similar flammable material to clean the fuel filter.

► CHANGING THE OILS IN THE TRACTOR

Always use quality oils for engine or transmission oil

Refer to the table on page 60 and 61 for the change frequency.



► CHANGING ENGINE OIL

Park the tractor on a level surface, shut-off the engine and remove the sump plug & drain oil.

Replace and check the sump plug and refill the engine with oil to the correct level on the Dipstick (approx. 1.98 gal)

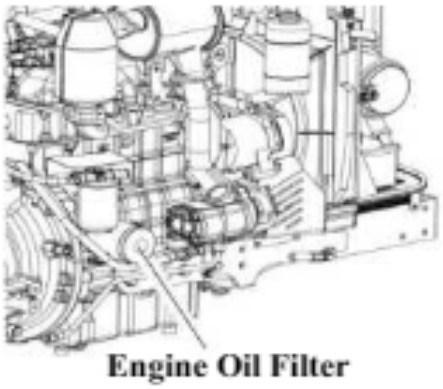
The grade of oil to be used will depend on the ambient temperature. (API CJ-4 grade)

The tractor is shipped from the factory with 15W/40.

For summer use over 77°F use SAE 30

For temperatures between 32°F-77°F use SAE20 or 15W/40.

For temperatures below 32°F use SAE 10W.



Important	When changing the oil always change the filter. Always use the same oil, as using different oils or specifications can cause damage. Dispose of the old oil as per local regulations.

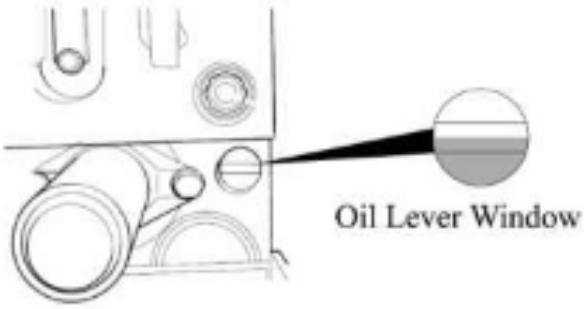
► CHANGING THE TRANSMISSION OIL

1. Allow the transmission oil to cool.

2. Remove the drain plug from bottom of the transmission and drain the oil.

3. Replace and check the drain plug.

4. Refill the transmission to the correct level on the dipstick with new oil : Qty 35ℓ(9.25 US gal)



Important	Always use the same grade and specified oil as replacements. Dispose off the old oil as per local regulations.

► CHANGING OIL IN THE FRONT AXLE

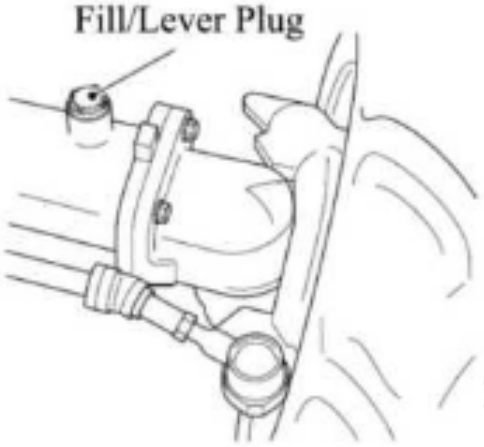
1. Drain the oil from the center diff plug and the drain plug in each drive.

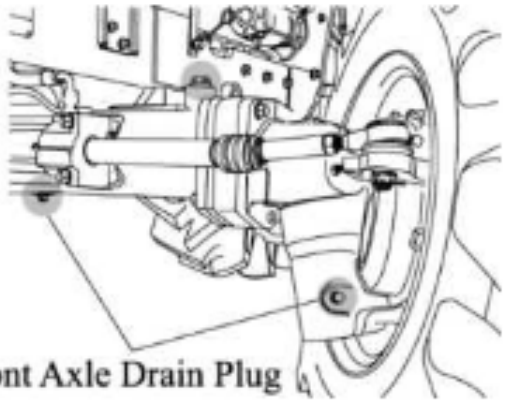
2. Replace and tighten all drain plugs.

3. Remove the Fill/Lever plugs from each final drive to vent air from the final drives.

4. Remove the dip stick from the filter hole and fill with Front axle oil capacity 8.2ℓ (2.17 US gal) and allow time for the oil to drain into the final drives.

5. Check the oil level with the dipstick and replace the Fill/Lever Plugs on both final drives and tighten





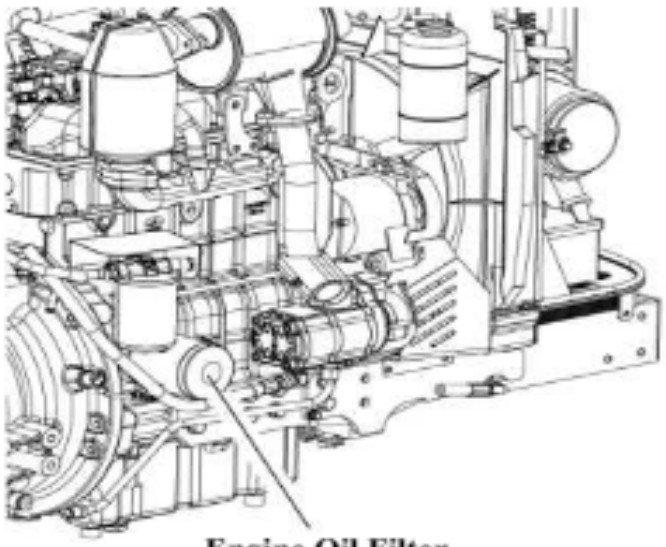
Important	Some operators have found that when they fill up with the correct amount of oil, the level on the dipstick is too high due to the fact that it takes a while for the oil to run into the final drives. Opening the Vent plugs helps to speed this up.

► CLEANING AND CHANGING FILTERS

► ENGINE OIL FILTER

Using a filter wrench, turn the filter counterclockwise to remove it.

Lightly smear the rubber seal on the new filter with oil to ensure, turn it clockwise until the seal contacts the base and then turn it another 2/3 turn to tighten it.

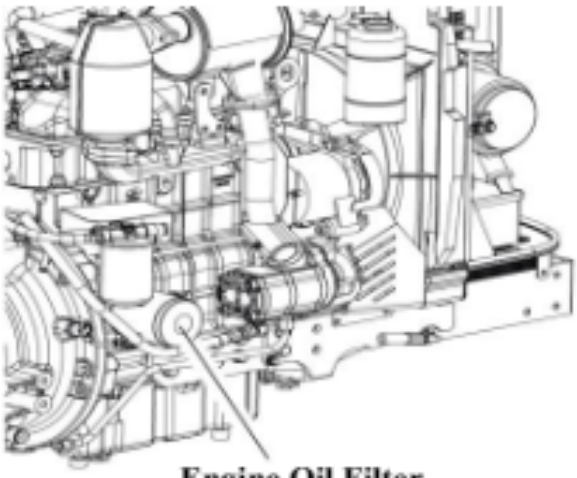


Engine Oil Filter

► HYDRAULIC OIL FILTER AND ENGINE OIL FILTER CARTRIDGE

Remove the filter with a filter wrench.

To replace, apply oil or grease on the seal, fit by hand until the seal contacts bare, then turn it a 2/3rd turn further to tighten and check for leaks.



Engine Oil Filter

► CHANGING THE COOLANT

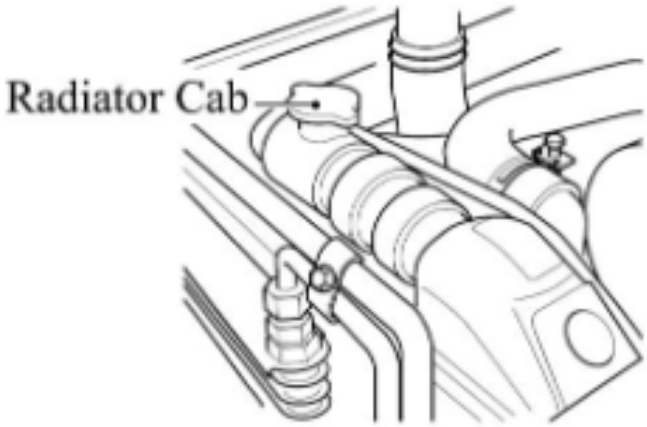
(1) Open the tap in front of the gear pump to drain the coolant.

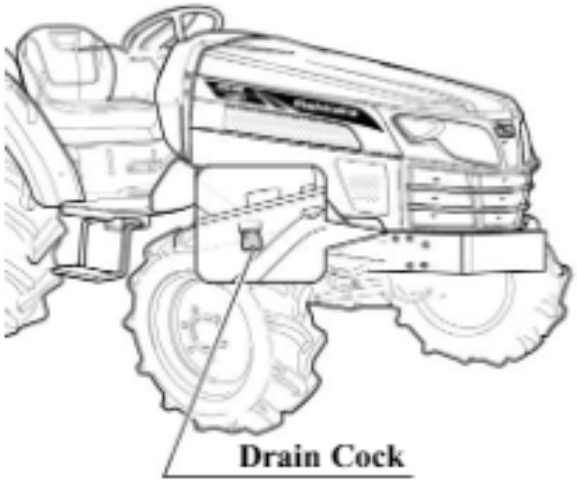
(2) Open the radiator at the same time.

(3) To give a thorough clean, run a hose into the radiator and flush it out.

(4) Close the tap and refill the radiator with a coolant mixture of water and corrosion inhibitor or anti freeze.

(5) Start the engine and allow it to run for approx, 5 minutes, check the water level again and top off if required.





Drain Cock

Caution	Do not remove the radiator cap on a hot engine. Allow the engine to cool down and then turn the cap slowly to ensure, that there is no excessive pressure in the radiator.

Caution	Serious burns can result from the contents of pressurized, hot radiators. Allow the engine to cool down completely before opening the radiator.

► ANTI FREEZE

Frozen cooling water can damage the engine.

Before replacing the anti freeze solution flush the radiator.

Mix the anti freeze solution in accordance with the instructions applicable to the brand of anti freeze and the local climate.

Replace the solution in the radiator.

In the case of the loss of solution due to evaporation or overflow, replace with the original mixture ratio.

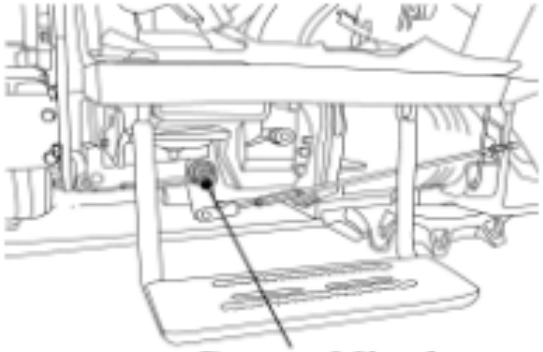
Important	Water or air under high pressure can distort the cooling fins on the radiator and Reduce their efficiency.

► GREASING THE TRACTOR

Grease the tractor according to the service schedule. (page 54)

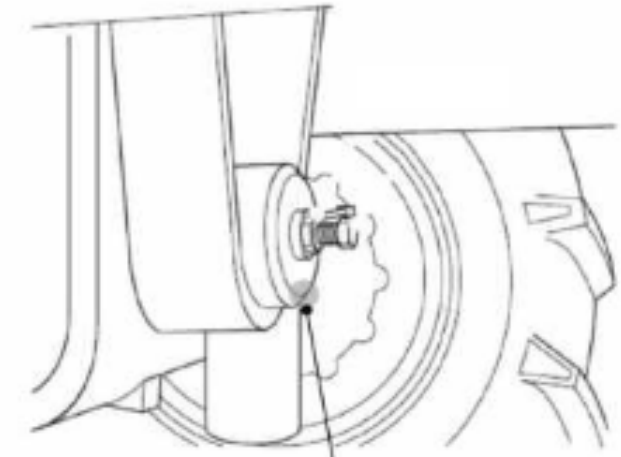
Ensure that grease nipples are cleaned well before any attempt is made to grease them.

*** Brake Pedal Rod**



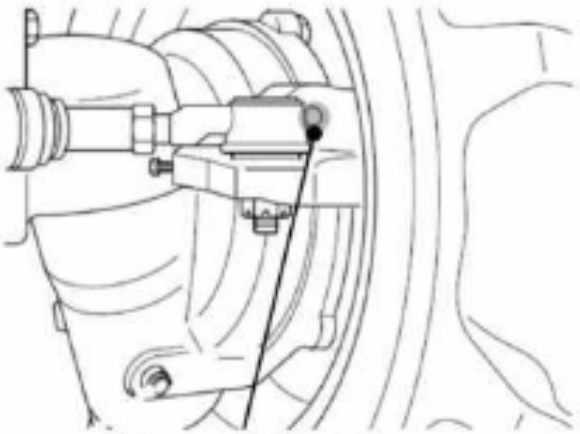
Grease Nipple

*** Pivot Metal**



Grease Nipple

*** Front Axle Ball Joint**



Grease Nipple

► GAP ADJUSTMENT

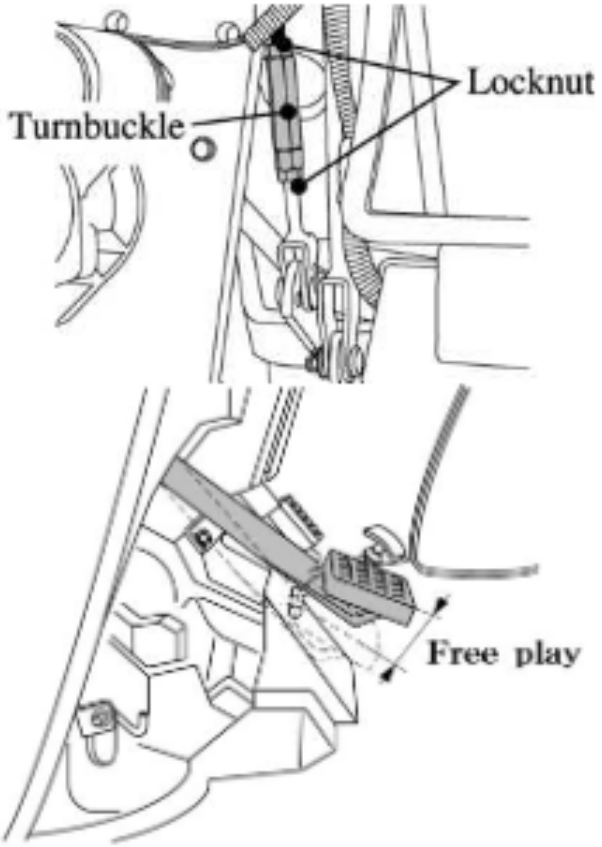
► ADJUSTING THE CLUTCH

Using the clutch over a period of time will increase the free play.

The correct free play of the pedal is 0.78~1.18 in

To adjust, loosen the locknut on the turnbuckle and adjust.

Check the adjustment and tighten the locknut if the free play is correct.



► ADJUSTING THE BRAKES

As is the case with the clutch, use of the brakes will change the pedal free play and the balance between the right and left pedal.

The correct pedal free play is 1.18~ 1.57 in.

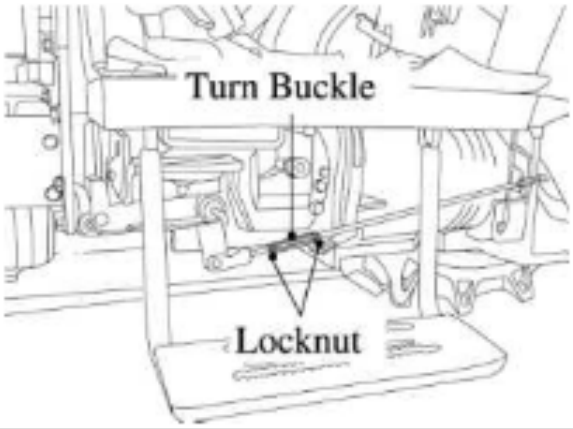
■ Adjusting Method

Loosen the locknuts to adjust the brake.

Turn the turnbuckle counterclockwise to increases the free play, or turn the turnbuckle clockwise to decreases.

Tighten the locknut and confirm to fix the nuts.

Check that the free play is correct and the same on both pedals to ensure even braking.



Caution	An uneven adjustment of the left and right pedal will result in one sided braking when the pedals are connected and can cause serious accidents, especially at high speeds. Double check to ensure that free play is the same on both pedals

► ADJUSTING THE THROTTLE LEVER

If this level is either loose or difficult to move please consult your dealer for rectification of the problem.

► ADJUSTING TOE-IN

If the toe-in adjustment is incorrect it can cause the severe shaking of both the steering wheel and the entire tractor.

The correct toe in is 0.08~0.24in.

We recommend that this adjustment is made by the dealer.

► CHECKING THE BATTERY

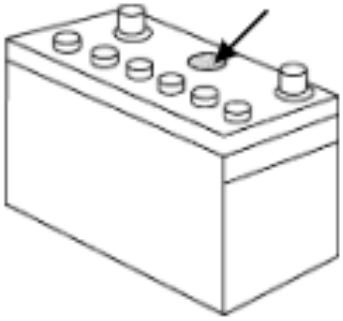
Check the Indicator

Green color – Good condition

Black color – Charging necessary

White color – Replace battery

Indicator condition



Important	Low electrolyte levels can cause premature battery failure and corrosion.

Caution	Electrolyte contains acid and can cause serious burns. Any spillage on skin should be washed off by running water immediately.

► BATTERY MAINTENANCE

Low temperatures will affect the performance of batteries so take particular care of it in winter.

For the long-term storage of the tractor, remove the battery and keep it in a cool dry room.

If it is on the tractor while stored, disconnect the negative terminal.

Batteries will self discharge if left for a period of time without use.

To keep them in good condition charge them once a month in summer and every second month in winter.

When replacing the original battery, ensure that the replacement battery is the same size.

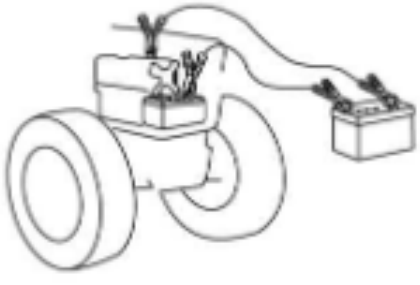
Failure to do so can cause problems with the electrical circuit.

► BATTERY CHARGING

-A boost charge is only for emergencies. It will partially charge the battery at a high rate and in a short time.

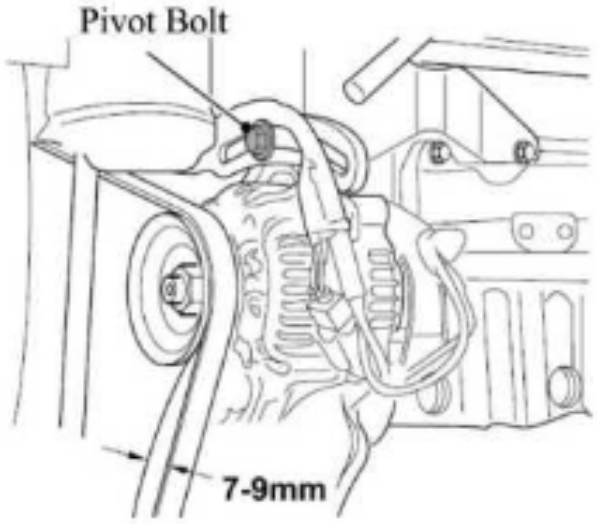
-When using a boost-charged battery, it is necessary to recharge the battery as early as possible.

Failure to do this will shorten the battery's service life.



Caution	Always disconnect the negative terminal first when removing the battery and always connect the positive terminal first when fitting the battery. When connecting the battery leads make sure not to reverse the polarity. Quick charging will reduce battery life. Disconnect the terminals prior to charging the battery to avoid damage to the circuit and electrical instruments.

► FAN BELT ADJUSTMENT



1.Loosen the alternator pivot bolt.

2.Move the alternator in order to increase or decrease the belt tension.

Tighten the alternator pivot bolt and the link bolt to 22 N.m (16 lb ft)

► SERVICING THE AIR CLEANER

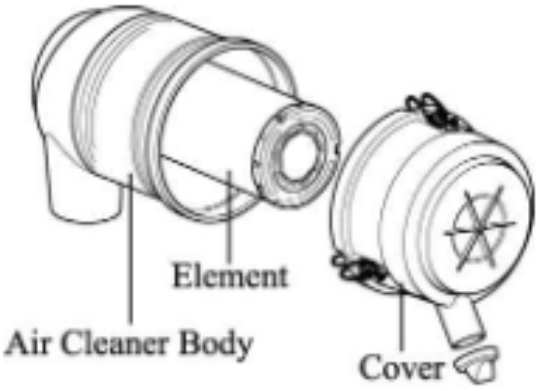
■ Cleaning the Air Cleaner Dust Valve

Check that the dust valve is not blocked.

Inspect the rubber flaps for cuts and nicks and check that the rubber has not perished. Renew if necessary.

To remove dust from the dust valve, squeeze it between thumb and fingers.

Wipe around the dust valve to removedust collected on the outside.



■ Cleaning/ Changing the Element

Release the three clips on the air cleaner end cover and Remove the element.

Remove dust by blowing compressed air through the element.

Check the element for damage, if necessary, change the elements.

Check all hoses for condition and tightness.

Important	Never beat the element on a stone or concrete floor/wall to clean it. Check all connections and hoses especially on the clean side of the air cleaner to ensure no dusty air can enter the engine. Check the element for flaws by putting a light inside the element. When reassembling, make sure all surfaces seal correctly to keep dust out. When working in dusty conditions increase the service frequency.

► Replace the element after cleaning it 5 times or if it is damaged.

► CHECKING HOSES AND LINES

The fuel lines, radiator hoses, hydraulic and rubber hoses are consumables, which deteriorate by age and use.

Check them regularly and replace if faulty.

Caution	Damaged fuel lines leak and cause fires. Damaged radiator hoses can cause hot water burns and in severe cases seize the engine.

► CHECKING THE WIRING HARNESS AND FUSES

Loose wires make inferior connections and damaged wires can cause short circuits, fires, burnt wiring or reduce the efficiency of the components.

Replace or repair any faulty wiring or insulation.

If a fuse burns out again after it has been replaced, do not replace it with wire or a high capacity fuse, find the cause and rectify it or get an auto electrician to do so.

Where insulation is chafed or peeled off, recover the area with a good quality insulation tape. Where wiring comes out of it's fitting, replace it correctly with the standard fitting.

Important	Incorrect wiring or fuses can cause fires to both the tractor and surrounding area so get the dealer to check it annually. Likewise, fuel pipes and wiring age with use. Ask your dealer to check it at least once every 2 years and replace as required

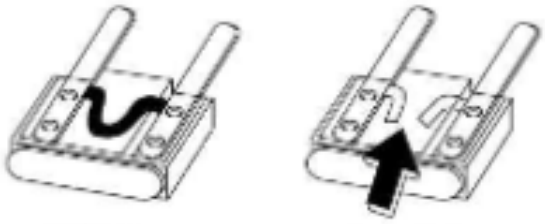
► REPLACING FUSES

The circuit has 8 blade type fuses in its wiring circuit (See diagram on page 90).

When a fuse has blown replace it with one of the same value.

Using a large capacity fuse or wire burns out the wiring system

Use fuse tongs to replace fuses.



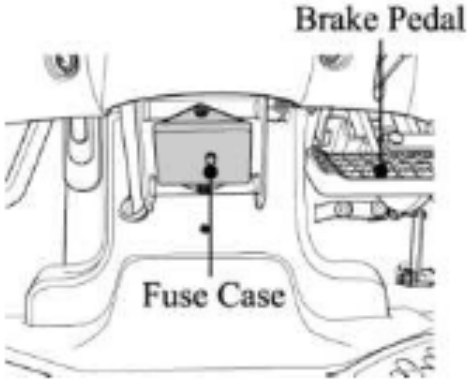
► MAIN FUSES

The wiring harness is equipped with 3 main fuses whose function is to preserve the wiring.

However, when a main fuse blows the entire circuit is dead.

Always check the reason & rectify before replacing with a fuse of the same value.

To indicate that the fuse is blown it will be discolored.



Important	Always check the reason for a blown fuse otherwise the new fuse is also likely to blow. **NEVER EVER USE WIRE** in a place of correct grade fuse.

► SERVICE PRIOR TO DAILY AND SHORT TERM STORAGE.

Wash the tractor and keep it clean.

Fill the tank to avoid condensation and rust.

Lower any attached implement to the ground before parking the tractor.

For long-term storage consult your dealer

For daily or short term storage

Clean the tractor and remove all dirt from field work.

Fill the fuel tank to avoid condensation and rust.

Lower the implement to the ground.

Keep it in a machinery shed or, if not available cover the unit if left outside.

In very cold conditions it is advisable to remove the battery and keep it inside in a warm environment. This will ensure effective starting when the tractor is required.

When the outside temperature is below 32°F, replace the antifreeze completely or drain the coolant to protect the engine from damage from frozen coolant.

 Important	When washing the tractor ensure that the water does not get near electrical components or the oil filter points. To prevent short circuits remove the ignition key. Do not wash the tractor when the engine is running.

Long-term storage

When the tractor will not be used for a long time carry out the cleaning as for short term storage.

Drain the oil and replace it with new oil.

Run the engine for approx. 5 min. to ensure that it has new oil throughout the engine.

Drain the coolant from the radiator and remove the ignition key.

Attach a tag to both the key and the steering wheel saying "No coolant".

Lubricate all grease and oil points on the tractor.

Check the pressures and add a small amount of extra pressure.

Lower any implement to the ground or store in a shady dry place.

Disconnect the clutch by using the clutch disconnecting arm.

Place a piece of wood under each tire to preserve the tire.

 Important	After refilling the engine with coolant, run the engine for approx. 5-10 min. at 1500-2000rpm every month as a corrosion prevention measure. Either remove the battery or the negative terminal as mouse damage to wiring can cause short circuits and fires. Remove the ignition key and store it in a safe place.

<u>Re-use after long term storage.</u>

Carry out a full check of all oils and coolant.

Refit the battery and run the engine at idle for 30 min. to ensure optimum engine life.

CABIN

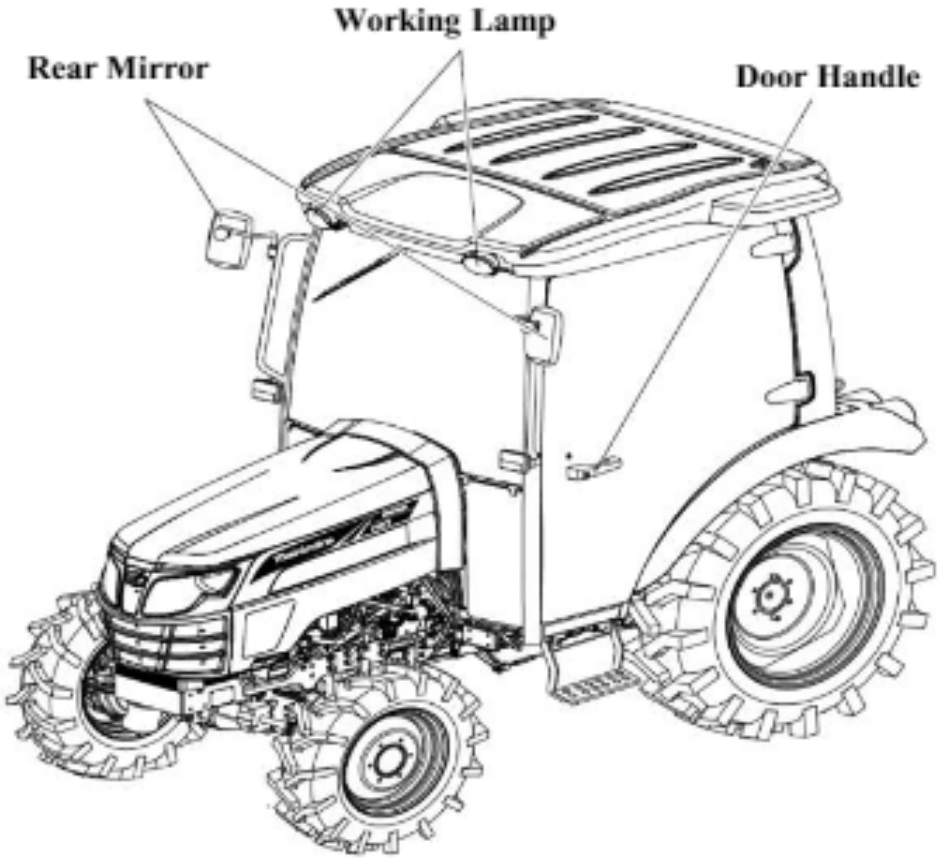
The cab fully conforms to the international standard as far as safety and soundproofing are concerned.

It can be provided with ventilation, heating and air-conditioning systems.

It is available in the following version.:

- Cab with ventilation and heating systems
- Cab with ventilation, heating and air-conditioning systems.

⚠	The cab is in full conformity with the international standards as to the cab's soundproofing. Be very careful when operating in small spaces and always protect your ears whenever other working equipment is generating dangerous noise levels.



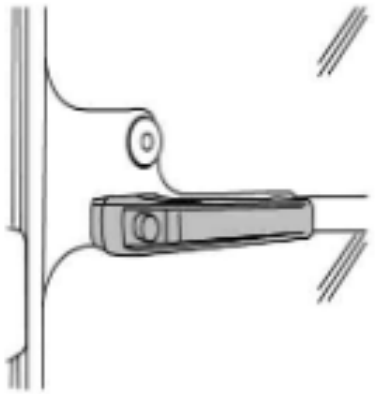
Caution	Remember that steering, braking and operational performances are highly influenced by the implements mounted, the trailers transported and the ballasts applied to the tractor.

Caution	When transporting heavy loads (exceeding the weight of the tractor) reduce the speed under 15 Km/h..

Caution	All the implements mounted onto the tractor must be safely secured.

Caution	Be very careful during implement hitching and unhitching operations. When using implement supports, be sure they are suitable and sufficiently strong.

► INSTRUMENT AND RELATED PARTS

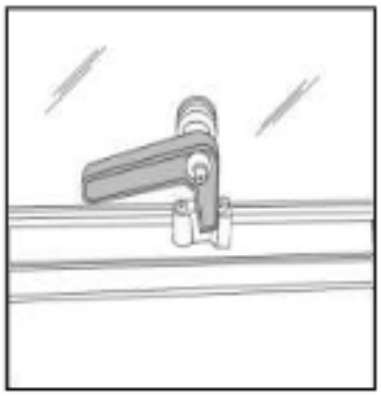


■ Doors:

The doors are provided with key locks.

To open from the outside, when unlocked, depress the push button.

To open from inside, push the lever downwards.



■ Rear Window:

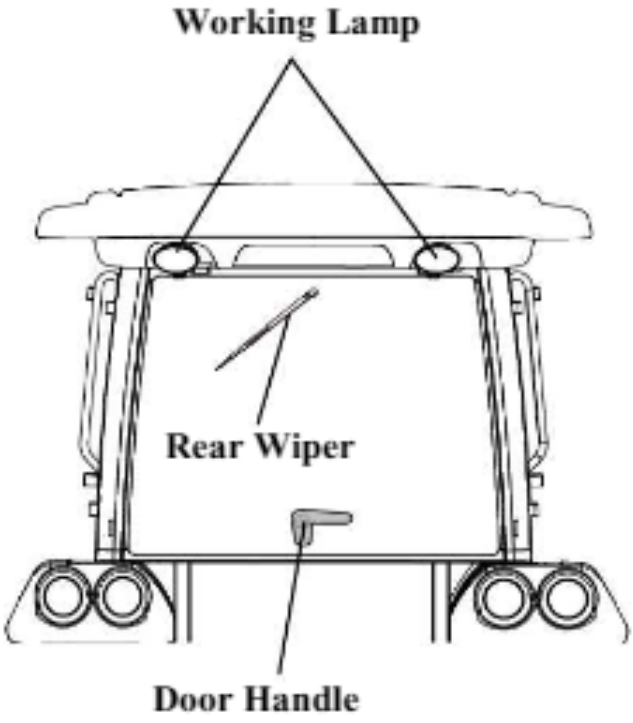
The rear window is fitted with a central handle for opening.

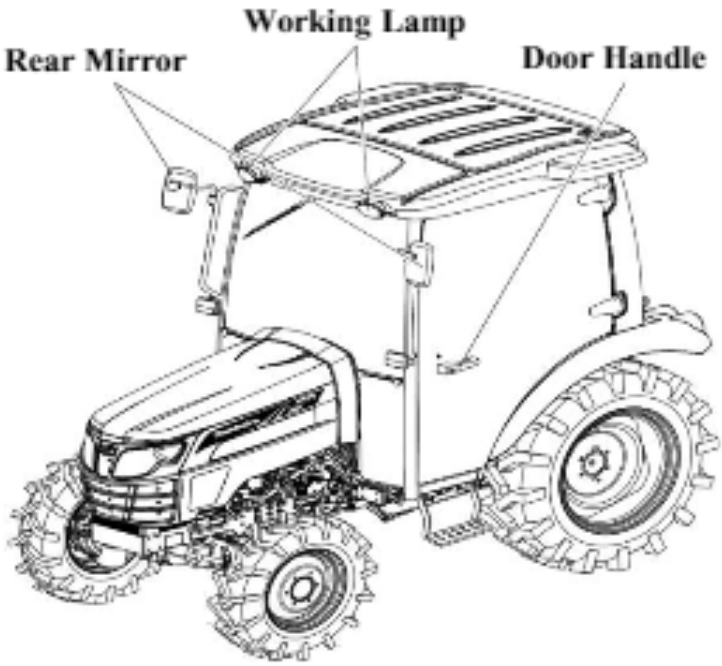
When opened it is held in place by two dampers.

■ **Working lamps (front and rear) :**

The working lamps are located on the cab roof (two in the front and two in the rear) .

They are switched on by means of the special switches on the roof console





■ **Rearview mirrors.**:

The cab is provided with rearview mirrors on both sides.

They can be adjusted and folded, whenever necessary, to avoid interference with external obstacles.

The mirrors have a telescopic arm to allow positioning for maximum convenience by the user.

Remember that mirrors must always be positioned in compliance with road traffic regulations when driving on a public highway.

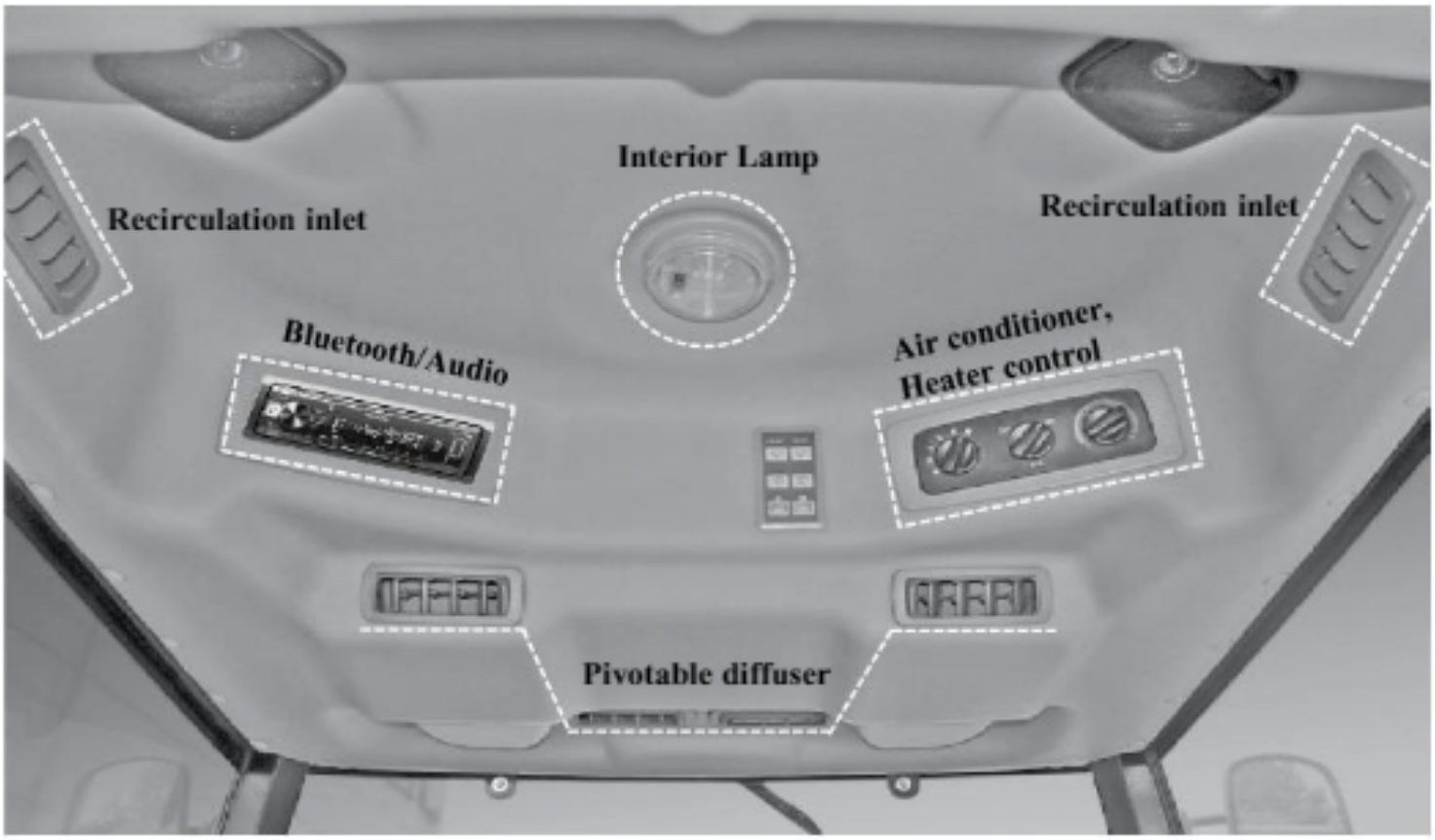
■ **Cab Ceiling:**

The ceiling is padded with insulation material to block heat radiation into the cab and keep the temperature down when working in very sunny areas.

The cab platform is covered with a "firm grip" carpet in the most commonly used areas.

It is recommended to keep this carpet clear of earth, mud, etc, so that the operator may get on and off the tractor in full safety.

► **How to Controls the Cabin**



■ **Ventilation**

The ventilation unit is housed in the cab ceiling.

To switch it on and adjust it, turn the electrical fan switch to the desired speed.

The cab becomes slightly pressurized when the ventilation system is in operation, so that fresh air can enter only by way of the filter installed in the rear section of the cab roof.

The fan switch can be operated only after the ignition key is inserted.

The air flow can be regulated and directed by suitably positioning the air diffusers.

Air can be taken in fresh from outside or recycled from within the cab by way of the relative side inlets.

■ **Re-circulation inlets fully closed**:

Air is taken in entirely from outside the cab through the rear grille and filtered through a paper element positioned behind the grille.

N.B-it is very important that the air diffusers never be completed closed so as to allow for a steady air flow.

To obtain a greater pressurization inside the cab, it is necessary to take in air from the outside, therefore the inside air recirculation grille should be fully closed.

■ **Working lamp switch**

The front and rear working lights are ON when the button is pushed.

The instrument cluster illuminates when the work light indicator lamp is on.

■ **Wiper control switch**

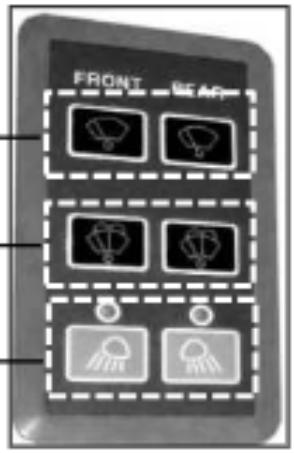
- Switch ON

The Wiper switch is ON when the top button is pushed.

The Washer switch is ON when the Mid-button is pushed.

- Switch OFF

Once again push the buttons.



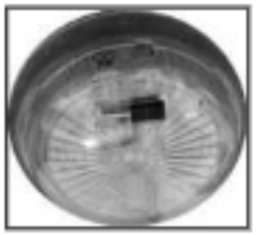
■ **Windscreen Washer tank**

Check the level of windscreen washer fluid in the plastic reservoir located at the Real of the cab.

During winter, it is advisable to add a suitable antifreeze or methyl alcohol to the windscreen washer fluid.

■ **Interior Lamp**

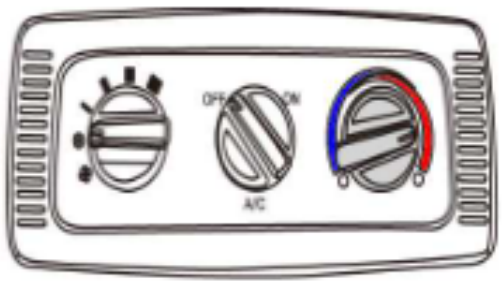
Push the button to light on and push it again to light off.



ON ⟷ OFF

■ Blower control switch

Three position rocker switch



Blower Control Switch

■ Temperature control

Set temperature control as required fully clockwise for maximum cool and fully counterclockwise for heat.

Temperature control

■ Air conditioner switch

To operate the air conditioner the blower must be on the blower speed temperature control and all vents must be adjusted to

obtain the best cooling for the ambient temperature and dust conditions.

Under normal operating conditions, and with the windows and doors closed, temperatures in the cab of 6℃ to 15 ℃ (10 ℉ to 25 ℉)

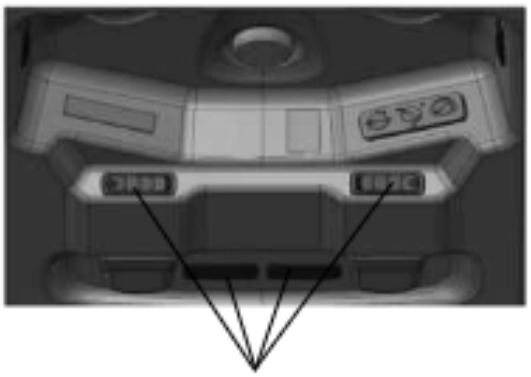
less than the ambient temperature will occur. When operating the air conditioner system, the moisture level is decreased.

NOTE:

1) During cold weather, with ambient temperature above 0 ℃ (32 ℉) operate the air conditioner at least once per month for a period of 10 to 15 minutes.
   This will lubricate the seals to prevent them becoming brittle and help prevent the loss of refrigerant from the system.
2) The system is equipped with an environmentally safe refrigerant, R134a.
   Never recharge the air conditioning system with refrigerant other than R134a as this will result in loss of cooling and permanent damage to all air conditioning components

■ Circulation diffuser

With the circulation vent set in any position outside air will still be pulled into the cab.



Circulation diffuser

■ Heating System

General description

The heater is switched on and adjusted by rotating the control knob at the roof console, then switching on the blower and setting the selector to the preferred speed .

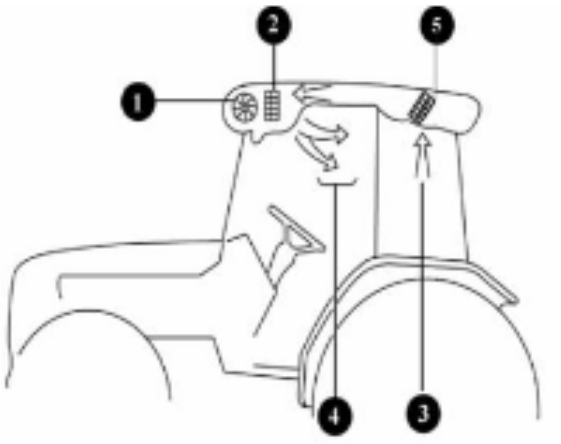
To warm the cab up quickly, the knob should be rotated fully clockwise and the blower set to speed 3.

The screen is demisted or defrosted by air directed through a slot vent .

For defrost or fast demist, all other vents should be closed off.

IMPORTANT:
Ventilation is provided by a single blower unit serving both the heating system and the air conditioning system.
After reaching the desired temperature adjust the system to suit your needs.

NOTE: For ideal system operation, the engine must run at 1000 rpm



Warning	Before starting the engine, make sure the system is off (by turning off the ventilation fan) so as not to overload the battery. After the system is at full power for a long period of time, never turn it off suddenly but let it first idle for about 20 seconds.

1. Speed heating fan 2. Electric resistances 3. Recirculation inlets 4. Pivotal air diffuser 5. Air filter

► SYSTEM CONFIGURATION

The heating system consists of two units:

1. An electric heater and blower unit installed behind the roof console.
2. A power supplying set, consisting of an auxiliary alternator located at the front of the engine and driven by a belt directly linked to the engine pulley.

   If the air does not come out from the diffusers right away as soon as the system is started, turn off immediately and identify the fault.

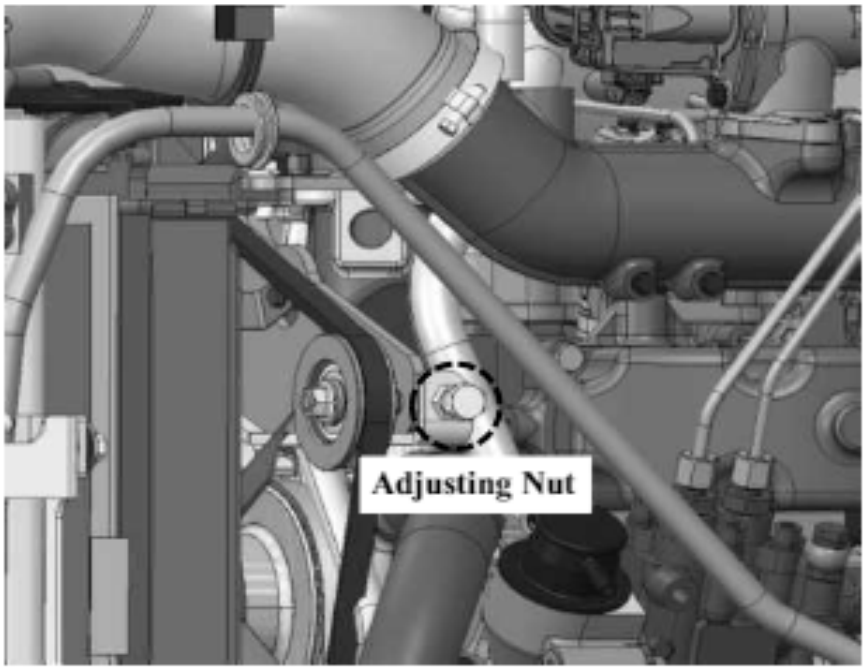
N.B-Never turn on the heating system when working in dusty environments.

► COMPRESSOR BELT ADJUSTMENT

Check the compressor belt tension regularly and adjust if required.

The correct tension is when the center of the belt is pushed with a finger and it moves in approx. 10 mm (0.39 in) as shown in the picture.

To adjust the belt, loosen or tighten the nut as shown in the picture.

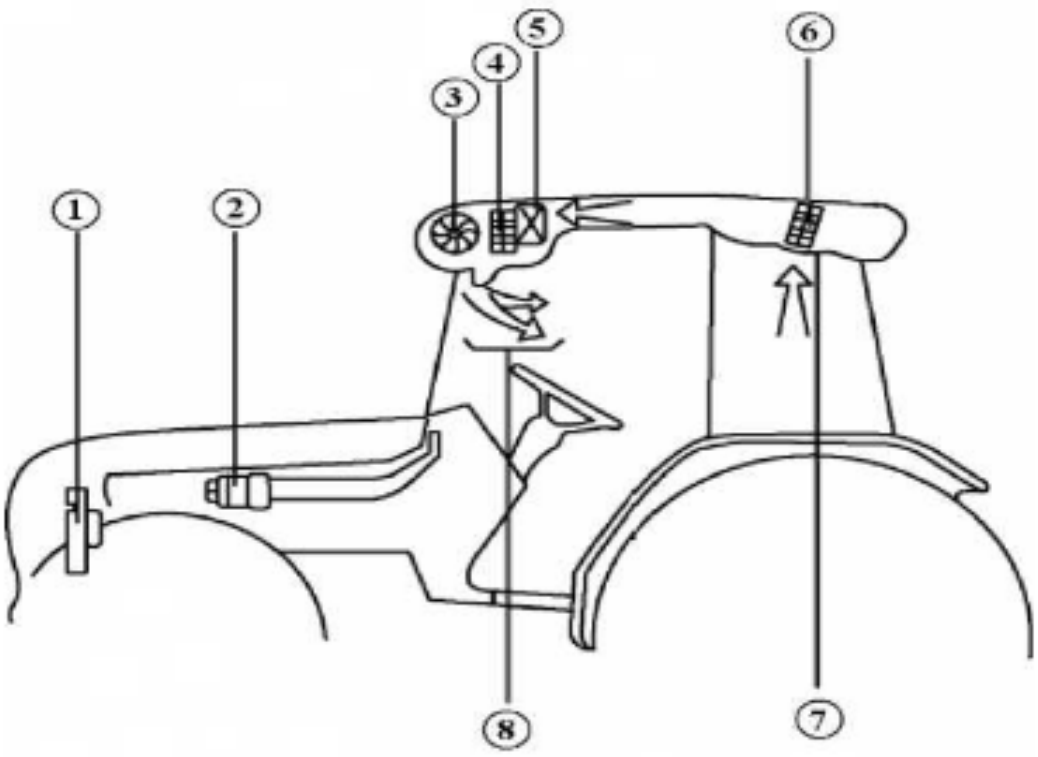


► AIR CONDITIONING SYSTEM

The system is designed to ensure optimum temperature inside the cab and maximum comfort and safety for the operator.

However, it is advisable to consult our specialized workshops whenever repairs or adjustments need to be performed.

Do not approach the system with open flames, as any escape from the circuit may produce a lethal gas.



1.Alternator 2.Compressor 3.Speed fan 4.Electric resistance

5. Evaporator 6.Air filter 7.Recirculation inlets 8.Pivotal air diffusers

1. Checking the air conditioning system.

① Economic friendly refrigerant : R134a 450g.

The presence of air and water in the system could jeopardize its efficiency.

-The air is uselessly compressed by the compressor and no cooling effect is produced.

-Moisture has a tendency to obstruct prevent cooling efficiency.

② Check belt tension; when finger pressure is applied to the mid-point between both pulleys.

③ Condenser fins must always be duly clean using water or an air set.

2. Checking the air conditioning system charge

(1) Check the refrigerant charge.

A. Run the engine at 1500rpm

B. Set the air conditioning system at the coldest for 5 minutes.

C. Check sight glass for clear sight or cloudy.

Caution	If the air conditioning system is operated without being charged, The lubrication in the compressor can cause damage.

■ Radio, CD player (Option)

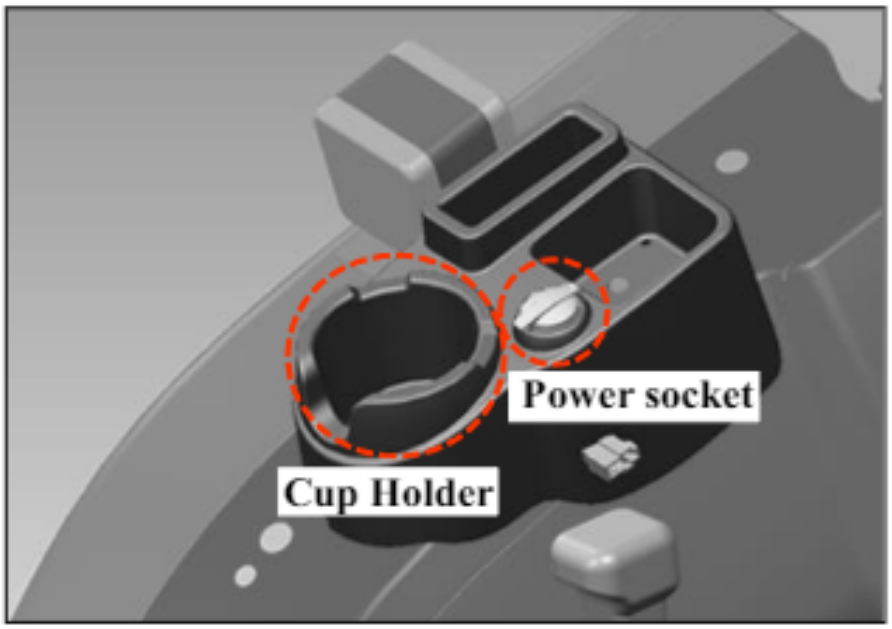
For operation refer to the Radio, CD player manufacturer's instructions.

■ Cup Holder

For bottles and personal belongings.

■ 12-V socket

It is possible to use a 12-V 120-W accessory by connecting it to the power socket.



Specifications

The specifications on the following pages are given for your information and guidance.
For further information concerning your tractor and equipment, consult your authorized Mahindra dealer/distributor.

Mahindra policy is one of continuous improvement and the right to change prices, specifications or equipment at any time without notice is reserved.
All data given in this book is subject to production variations.
Dimensions and weights are approximate only and the illustrations do not necessary show tractors in standard condition.
For exact information about any particular tractor, please consult your Mahindra authorized dealer/distributor.

SPECIFICATIONS

Model: 2645Shuttle/ Shuttle Cab

ENGINE

Four strokes, Indirect injection, water-cooled Diesel Engine.

Model	: CE - 45
No. of cylinders	: 4
Displacement (cc)	: 2,732
Bore (in/ mm)	: 3.5/ 88.9
Stroke (in/ mm)	: 4.33/ 110
Compression Ratio	: 18.7 ± 0.7:1
Horse Power kW/HP	: 33.1/ 45
Rated Speed	: 2,600
High idle rpm	: 2,800
Low idle rpm	: 1,000
Fuel injection Type	: Common Rail
Cylinder sleeve	: Wet
Air Cleaner	: Dry Filter element, paper element filtering type.
Exhaust Muffler	: Horizontal Round.
Firing order	: 1-3-4-2
Accelerator	: Hand & Foot Accelerator

ELECTRICAL STARTING AND LIGHTING

Battery Capacity	: 12V 80AH
Starter	: Solenoid Engaged. Key Start with safety , starter switch
Alternator	:12V 90A
Instrumentation	: Hour meter, Tachometer Fuel Gauge. Water Temperature Gauge Warming Lights
Lighting	: Head lights, Turn Signal Indicator Lamp, Rear Parking, Brake Lamp Tail Lamp

CLUTCH

Type	: Dry single plate
Outer dia. x Inner dia.	: 8.86 X 5.9″

TRANSMISSION

Type	: synchro mesh
No. of gears	: 12 forward speeds 12 reverse speeds with high-low selector lever

STEERING

Type	: Hydraulic power (Power steering)

POWER TAKE OFF

Mid mounted	: 6 straight spline
Diameter	: 1⅜ in.
Standard PTO	: 1st - 540/2,650 engine rpm

BRAKES

Foot operated, independent with provision of inter lock for simultaneous operation.

A foot brake is fitted for parking.

Inner dia.	: 6.30 in (160 mm)
Outer dia.	: 8.23 in (210 mm)
Number of lining	: 4 each side
Total brake thickness	: 1.96 in

► MAIN SPECIFICATIONS

MODEL		2645Shuttle/ Shuttle Cab
Engine	Maker	Mahindra
	Model	CE – 45
	Type	Water cooled 4 cycle 4 cylinder diesel
	Out put (kW/rpm)	33.1/ 2,600rpm
	Number of Cylinder	4
	Displacement (cc)	2,732
	Bore and Stroke (in/ mm)	3.5/ 88.9 X 4.33/ 110
	Compression ratio	18.7
	Firing order	1-3-4-2
	Injection pump	Direct
	Lubrication type	Forced circulation
	Cooling system	Water cooled, Forced circulation
	Coolant capacity	7ℓ(1.85 US gal)
	Air cleaner	Dry Dual Element
	Muffler	Horizontal
	Fuel	Diesel fuel
	Fuel Tank capacity	34ℓ(9.0 US gal)
Electrical	Battery	12V 80AH
	Starting system	Starter motor with pre-heater
	Starter Capacity	2.2kW
	Alternator	12V 90A
Drive Train	Transmission	Hydraulic, + Mechanical 3 range gear with constant-mesh
	MFWD(4WD)	Standard
	Differential lock	Bevel gears with diff-Lock
	Brakes	Wet disc brake, mechanical
	Steering	Hydraulic

MODEL			2645 Shuttle/ Shuttle Cab
Clutch	Main		Dry single disc
	PTO		Multiple wet disk
Dimensions	Overall length(in/mm)		1,165 (2,960)
	Overall width (in/mm)		537.4(1,365)
	Overall Height (in/mm)		956.7(2,430)
	Wheel base (in/mm) (Distance between shafts)		691(1,755)
	Min. Ground Clearance (in/mm)		140(355)
	Ag Tire(R1)	Front	8.0-16
		Rear	12.4-24
	Industrial(R4)	Front	10-16.5
		Rear	43x16.00-20
	Axle type	Front	Center pin
		Rear	Central axle

Implement	Operation	Hydraulic
	Mounting method	3-Point hitch
	Drawing method	Trailer hitch
	3-Point hitch category	Category 1
	Hydraulic-control	Position

Traveling Speed : Km/hour			
MODEL		**2645Shuttle/ 2645 Shuttle Cab**	
Range shift	**Main shift**	**Forward**	**Reverse**
L	**1**	0.85	0.78
	2	1.17	1.06
	3	1.51	1.37
	4	2.08	1.90
M	**1**	2.70	2.45
	2	3.70	3.36
	3	4.76	4.32
	4	6.58	5.97
H	**1**	8.62	7.82
	2	11.83	10.73
	3	15.21	13.80
	4	21.01	19.05

* The specifications are subject to change for improvement without notice.

FUEL SAVING TIPS

To save fuel & oil in your tractor, the following things should always be kept in mind.

A) Air cleaning system

1) Clean the air cleaner regularly so that dust does not settle down.
2) For every 50 hours & everyday in sandy/dusty conditions.

(a) Clean the air cleaner filter element with compressed air.
(b) If the rubber ring is cut or expanded then change it with an appropriate one.
Fix the rubber at the proper location & check for leakages if any.
(c) If air is leaking through the hose connection, check & rectify other leakages, too.

Note: If the air cleaning system is not properly maintained, it will lead to the early wear of piston rings & sleeves.
This will lead to problems like the loss of engine power, excessive oil consumption and/or fuel consumption.

B) Engine

1) Put the engine oil on load after the engine is heated & the water temperature gauge indicates the needle to be in the green zone.
2) If excessive black smoke is visible, then the paper element of the air cleaner, fuel injection pump or nozzles should be checked.
3) Do not run the engine without load for more than 2 minutes.
It is better to stop the engine rather than run it idle. This will help in save of fuel.

C) Clutch & Brakes.

1) Do not reduce the power of the engine by depressing the clutch halfway.
Instead use low gear.
2) If the tractor has to be stopped for a long period, it is advisable to bring the transmission in neutral position & release the clutch pedal.
3) Do not over ride the clutch or brake pedals.
4) While coming down from a slope, reduce the engine throttle & use low gear.
Do not depend only on the brakes for stoppage.

D) Fuel system

1) Always use filtered diesel for the fuel system
2) At the end of the day's working, it is preferable to fill the diesel tank so that it may prevent condensation.
3) Change the filter, if the system gets choked.
Do not change both the filters at the same time.
If the above directives are not adhered to, the fuel injection pump & injection nozzle will lose their life early.
Also, it will lead to excessive black smoke & excessive diesel consumption.

E) Engine system

1) Always use the recommended grade of oil.

2) Everyday before starting the engine, check the oil level with a dipstick & refill between the minimum & maximum levels.

3) Change the engine oil, replace filter & "O" ring, as & when required.

F) Cooling system

1) Check the fan belt tension regularly. Adjust, if required.

2) Check the coolant level in the radiator fins: always clean.

3)Replace the radiator cap with a genuine cap only, if required.

4) Do not remove the thermostat but replace it with a new one, if required.

5) Do not change the radiator water often.

Note:

1) Always stop any fuel or oil leakages.

2) Carry out the regular maintenance, failure to do so might increase the fuel consumption by 25%.

3) Carry out the torque of cylinder head bolt & adjustment of valve clearance regularly. Consult your dealer for this.

4) Check the tire pressure & inflate as recommended.

5) Always buy genuine spares from the authorized dealer/distributor.

6) Always carry out the service of the tractor by your authorized dealer/distributor.

For any other information, contact your nearest Authorized Dealer/Distributor.

FAULT TRACING

	SYMPTOM	CAUSE	REMEDY
Engine	Turning the main switch will not operate the starter	Clutch not pushed in Battery flat Switch faulty PTO switch ON	Push the clutch in Charge or replace the battery Contact dealer to repair or replace OFF the PTO switch
	Starter operates but not enough to turn the engine	Low battery Bad earth Thick oil	Charge the battery Clean the earth lead and tighten Drain and replace with correct oil
	Starter operates OK but does not start the engine	Air in fuel system Clogged fuel filter No fuel being supplied Glow plug disconnected or not working	Bleed the system Clean or replace both filters Fill tank or turn tap on Contact dealer for repair.
	Engine revolutions are irregular	Air in the fuel system Faulty injector Fuel pipe leak	Bleed the system Contact dealer for repair.
	The engine stops at low revolution	Poor fuel injection Faulty injection pump Wrong valve clearance Wrong idle setting Faulty injector	Contact dealer for repair Contact dealer for repair Contact dealer for repair Contact dealer for repair Contact dealer for repair
	The engine stops suddenly	Lack of fuel Faulty injectors Seized engine due to lack of oil, the wrong oil or lack of coolant	Fill the tank and bleed the fuel system Contact dealer for repair
	The engine overheats	Lack of coolant Broken or misadjusted fan belt Clogged air filter element Clogged radiator Low oil	Refill with coolant Adjust or replace Clean or replace air filter Clean the core Replace the oil to correct grade

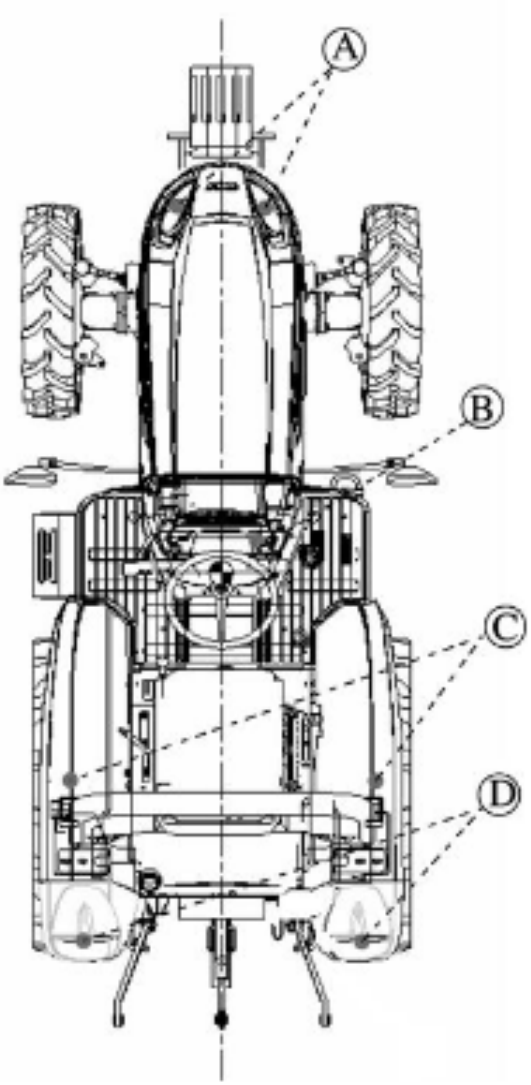
	SYMPTOM	CAUSE	REMEDY
Engine	White smoke from the exhaust	Oil level too high Shortage of or faulty fuel	Reduce to correct quantity Contact dealer for repair
	Reduced performance of the engine	The injectors are clogged, carbon coated and sticking Low compression Leaking valve seat Incorrect valve gap Faulty timing Fuel shortage Clogged air cleaner	Contact dealer for repair Contact dealer for repair Contact dealer for repair Contact dealer for repair Contact dealer for repair Fill the tank and check fuel quality Clean the element
	Oil warning light comes on with the engine running	Low oil level Wrong oil Faulty light or switch Clogged oil filter	Fill to correct level Change to correct oil Replace faulty part Contact dealer for repair
	Alternator light comes on with the engine running	Wiring fault Faulty alternator Low water level or faulty battery Broken or loose fan belt	Contact dealer for repair Contact dealer for repair Top off or replace Replace or adjust

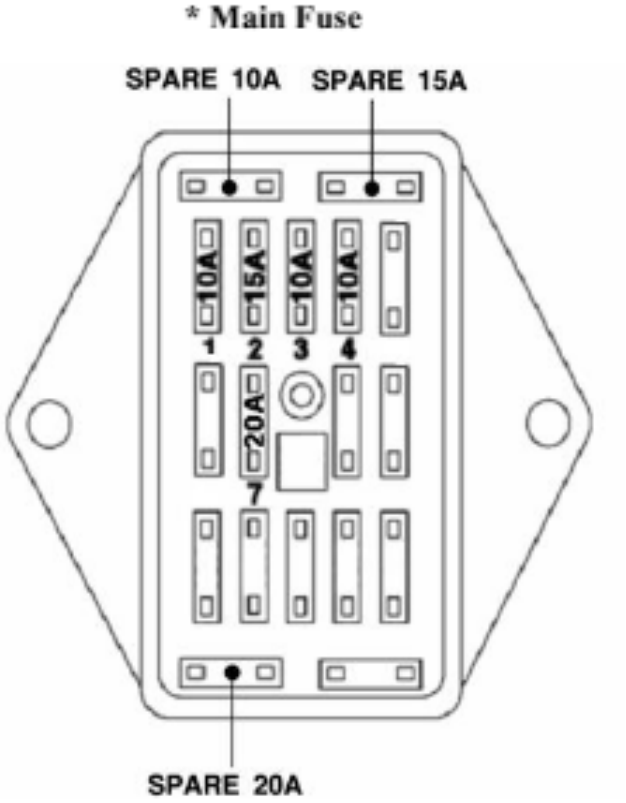
	SYMPTOM	CAUSE	REMEDY
Clutch	The clutch slips	Incorrect adjustment	Adjust to correct free play
		Worn or burnt lining	Contact dealer for repair
	The clutch does not disengage	Incorrect adjustment Rusty clutch lining	Adjust to correct free play Contact dealer for repair
Brake	Brake not working	Incorrect free play Worn or burnt lining left and right gap different	Adjust to correct free play Contact dealer for repair Equalize
	Brake pedal not returning	Faulty return spring Lack of grease on the joints	Replace spring Remove rust and lubricate with grease
Hydraulic system	Hydraulics are not lifting	Engine revs. too low Lack of transmission Oil Air leaking in from a pipe Clogged suction filter Faulty pump Faulty hydraulic valve Faulty cylinder	Increase engine revs. Top off the oil to the correct level Repair or replace pipe or replace O ring on joint and tighten Clean and change oil Contact dealer for repair Contact dealer for repair Contact dealer for repair
	Oil leak from pipe	Loose pipe joint Cracked pipe	Tighten joint Replace or repair pipe
	When lifting the relief valve whistles	The stopper has slipped down	Adjust the stopper
For any other hydraulic problems please consult your dealer who has the correct equipment to diagnose and repair the system			

	SYMPTOM	CAUSE	REMEDY
Steering	Steering wheel shaking	Wrong toe-in Unequal tire pressure Loose component	Adjust toe-in Inflate both to correct pressure Tighten or replace if worn
	Excessive play in the steering	Worn steering shaft Worn components	Contact dealer for repair Contact dealer for repair
Electric instruments	Flat battery	Faulty wiring Faulty alternator Faulty regulator Broken or loose fan belt	Repair,reconnect or tighten as needed Contact dealer for repair Contact dealer for repair Replace or adjust
	Before anything else, check the electrolyte level of the battery and the connections. Top off it required and clean and retighten the terminal		
	Dim head lights	Low battery Faulty wiring	Charge or replace Repair or replace as needed
	Headlights not working	Blown bulb Blown fuse Faulty contact	Replace bulb Replace fuse Repair or replace and check the earth
	Horn not working	Faulty horn button Faulty wiring Faulty horn	Replace button Repair or replace Replace
	Indicator not working	Blown bulb Faulty flasher unit Faulty wiring	Replace bulb Replace unit Repair or replace

► Drawing for fixing position of the fuse

► Wiring diagram of the electric instrument





A	Head lamp	12V/55W/60W
B	Meta panel Light (Instrument)	12V/3.4W
C	Turn Signal Lamp	12V/21W
	Tail Lamp)	21/5W
D	Stop Lamp	21/5W
	Turn Signal Lamp	12V/21W

1	Panel	10A
2	Light / Horn	15A
3	Turn Signal Lamp	10A
4	Stop / Tail Lamp	10A
7	Connector	20A

TRACTOR HISTORY CARD

DATE	JOB CARD NO.	NATURE OF DEFECT	PARTS REPLACEMENT	W/CLAIM NO. AND DATE	REMARKS

SERVICE RECORD

DATE	TRACTOR HOURS	NATURE/TYPE OF REPAIR/SERVICE CARRIED OUT

DAILY OPERATION LOG

DATE	JOB DONE	MACHINE HOURS		FUEL CONSUMPTION	ENGINE OIL TOPPED UP	REMARKS
		START	END			

PART REPLACEMENT RECORD

DATE	PART DESCRIPTION	Q'TY	COST	DATE	PART DESCRIPTION	Q'TY	COST

2645Shuttle/ 2645 Shuttle Cab

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