Mahindra
Rise.

OPERATOR'S MANUAL

5145/5155 - 4WD

TIER - 4 FINAL

Part number: 000000301 4IM

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Mahindra USA, Inc • 9020 Jackrabbit Road, Suite 600 • Houston, Texas 77095 • 1 877 449 7771

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TIER - 4 FINAL

OPEN STATION

Mahindra USA, Inc • 9020 Jackrabbit Road, Suite 600 • Houston, Texas 77095 • 1 877 449 7771

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1. GENERAL INFORMATION

1.1 Note to owner

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

Read this manual carefully and keep it in a convenient place for future reference. This manual has been prepared in detail to help you in better understanding of maintenance and efficient operation of the tractor. Failure to do so could result in personal injury or equipment damage.

If at any time you require advice concerning your tractor or if you need any information not given in this manual, do not hesitate to contact your authorized Mahindra dealers. Your Mahindra dealer are kept informed of the latest methods for servicing tractors, has trained technicians, they stock genuine Mahindra parts and necessary equipments to undertake all your service requirements.

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; 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.

We have enclosed a page on new tractor inspection sheets. The first sheet is the dealer's copy and should be removed by the dealer after the inspection has been carried out. The second sheet is your copy of the inspection performed. Ensure that you and the dealer sign both copies.

1.2 Owner assistance

We at Mahindra USA Inc. and your Mahindra dealer want you to be completely satisfied with your investment. Normally any problems with your equipment will be handled by your dealer's service department. 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. Your dealer has direct access to the Mahindra office. If you cannot obtain satisfaction through your dealer; contact the Mahindra USA Inc. office (1-877-449-7771) and provide the following: (See 1.3 Owner's personal data on page no.1-2)

- Your name, address and telephone number
- Tractor model and tractor serial number
- Dealer's name and address
- Tractor purchase date and hours used
- Nature of problem

Before contacting Mahindra USA Inc office, be aware that your problem is likely to be resolved at your retail Mahindra dealership by dealer personnel. So, it is important that your initial contact be with your retail Mahindra dealer.

1.3 Owner's personal data

Name :

Address :

Telephone No. :

TRACTOR DETAILS
Model :
Tractor serial number :
Date of purchase :
Expiration of warranty :

NEAREST AUTHORIZED DEALER
Name :
Address :
Telephone no. :
Fax no. :

1.4 Improvements

Mahindra USA Inc's. policy is one of continuous improvement, and the right to change prices, specifications or equipments 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.

1.5 Engine tampering statement

NOTICE: The fuel system and engine on your machine are designed and built to government emissions standards.

Tampering by dealers, customers, operators and users is strictly prohibited by law. Failure to comply could result in government fines, rework charges, invalid warranty, legal action and possible confiscation of the machine until rework to original condition is completed. Engine service and/or repairs must be done by a certified technician only.

1.6 Introduction

Tractor

The word, 'Tractor' has been derived from 'traction' which means pulling. A tractor is required to pull or haul an equipment, implement or trailer, which are coupled to the tractor chassis through suitable linkage. A tractor can also be used as a prime mover as it has a power outlet source which is also called Power Take Off or PTO shaft.

Throughout this manual, the use of the terms LEFT, RIGHT, FRONT and REAR must be understood, to avoid any confusion when following the instructions. The LEFT and RIGHT means 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.

Fig.1

General construction

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

Engine

This tractor is fitted with fuel-efficient US EPA and CARB certified Mahindra DI-45 & DI-55 engine. This engine has 4 cylinders, naturally aspirated (45 Hp) & turbocharged (55 Hp) with high pressure common rail injection system.

Front axle & wheels

This is a live front axle, with drop down bevel gear reduction. Front wheels are directly mounted on the axle.

Power steering

The power steering system consists of a hydrostatic steering unit (HSU), hydraulic cylinder and tandem pump mounted on engine. Rear section of tandem pump supplies oil to this system. Oil for steering system is common with transmission oil.

Clutch

Tractor is fitted with dual clutch to engage/disengage drive to transmission. For Independent PTO a separate lever with release mechanism is provided.

Transmission

The Transmission is combination type where in the speed shifting is of synchro shift type whereas the range shifting is of constant mesh type. Forward reverse shifting is with synchro shift.

The speed gear shifting arrangement is provided on right hand side of operator's seat. Speed gears can be operated in 5 (1, 2, 3, 4 & N) modes.

The range gear shifting arrangement is provided on left hand side of operator's seat. Range gears can be operated in 4 (L M H & N) modes.

Rear axle & wheels

The rear axle is mounted on bearings and is enclosed in a removable housing which is bolted to the transmission case. The rim & disc, fitted with rear tires, are bolted to the outer flange of rear axle. The Rear track adjustment is provided on the rims.

Oil immersed brakes

There are oil immersed brakes with four friction discs on either side of tractor. The actuating disc is centrally located between two pairs of brake discs. The two drive plates are sandwiched between two pairs each side. Entire brake assembly is housed in the brake housing which is an integral part of transmission housing. Brake pedal and cables actuate brake.

A parking brake lever is fitted on left hand side of operator's seat.

Hydraulic system

The tractor is fitted with fully "Open Center" hydraulic system, using a pump driven directly from the engine. It is able to operate the three point linkage and auxiliary valve entirely independent of any clutch movement when changing gear or operating the power take-off.

The oil reservoir is common with that of transmission.

Three point linkages

Three point linkage is available in cat-I & cat-II implements. For ease of implement attachment, the tractor is equipped with telescopic lower links.

Electrical system

A 12V, 96 Ah, 925 CCA battery is used to crank the engine with starter motor.

The electrical system contains halogen headlamps, rear work lamp, tail lamps, turn indicators, brakes lamps, and flashing warning lamps, instrument cluster, alternator, starter motor, fuse boxes, 12V power socket, etc.

Safety

To start engine follow below points:

- PTO lever should be in disengaged condition
- Clutch should be in fully pressed condition
- Speed lever should be in neutral position

Sheet metal

Hood, front grille & panel, fenders and brackets including floor panels etc. are constructed of sheet metal. After undergoing thorough chemical reaction, it is first primed & then painted.

1.7 Intended use

Your tractor is designed and made to pull, carry and power a variety of mounted or towed equipment, although within some physical limits. The working speed and performance may depend on various factors, such as weather and terrain conditions. Though the tractor is designed to perform in combination with a variety of equipment, there may be a number of combinations of the above parameters for which there is severe degradation of performance of the tractor and/or its mounted or trailed equipment. If you notice degradation of performance, contact your dealer for assistance; he may have useful information for improvements, or a kit may be available to enhance the performance.

Please carefully read and consider the following precautions:

- Do not use the tractor for purposes other than those intended by the manufacturer and outlined in this manual.
- Do not use the tractor at higher speeds than those allowed by the load and the environment. A wet surface or other low adherence conditions may increase the braking distance or result in vehicle instability. Always adapt your

traveling speed according to the load of the vehicle and the characteristics of the road.

- Do not use the tractor near or on soft verges of canals and brooks or banks and verges that are undermined by rodents. The tractor may sink sideways and roll over.
- Do not use the tractor on unstable crossings or bridges and/or on soft surfaces or ones that are not strong enough. These constructions may collapse and cause roll-over of the tractor. Always inspect the condition and carrying capacity of bridges and ramps before crossing.
- Do not use equipment mounted on the tractor which is not correctly matching and firmly fixed. The use of implements or accessories that have not been approved or are not correctly connected may increase the risk of roll-over of the tractor if they come loose. Ensure that the dimensions of the three-point linkage interface of both the tractor and the equipment comply with the categories defined in ISO 730. Ensure that the dimensions and speed of the PTO shaft on the tractors match those of the equipment.
- Do not use the tractor in combination with equipment without having consulted the Operator's Manual provided with the equipment. The tractor is a universal tool to carry, tow and drive a variety of equipment. This manual alone cannot provide you with all the information required for the safe operation of the combination.
- Do not use the tractor for pulling work, in cases where you do not know whether the load will yield, for instance when pulling stumps; the tractor may flip over when the stump is not yielding.
- Be cautious that the center of gravity of the tractor may change when loads on the front-end loader or the three-point linkage are raised. In these conditions, the tractor may roll over earlier than expected.
- Do not step down from the tractor without shutting down the engine, the PTO, lowering the implement, shifting the transmission to neutral and applying the parking brake, unless continued PTO operation is required for some equipment, such as pumps or woodchippers. Other equipment, engaged and driven by the tractor will have no means to stop the power transmission, other than the PTO clutch of the tractor.
- You must take the necessary precautions (E.g. assistance) to always be aware of the possible presence of bystanders, especially when maneuvering in confined areas, such as the farmyard and sheds. Keep people away from the tractor during work. Ask bystanders to leave the field. There is not only the risk of being run over by the tractor, but objects ejected by some equipment mounted on the tractor, such as a rotary mower, may cause harm. Stones may be thrown further than the mowed crop. Pay necessary attention while operating next to public roads or footpaths. Thrown objects can be projected outside the field and hit unprotected people such as cyclists or pedestrians. Wait to cut the edge of the field till it is clear of bystanders.
- Always stay clear from the implements operating area and especially do not stand between the tractor and the implement or the trailed vehicle when operating lift controls; ensure no bystanders are near these operating areas.
- Your tractor may be equipped with a number of sensors to control safety functions. Tripping these sensors will result in a limited function of tractor. Do not attempt to bypass any function on the tractor. You will be exposed to serious hazards, and moreover, the behavior of the tractor may become unpredictable.
- The tractor has only one operator station and this is a one man operated vehicle. There is no need for other people on or around the tractor during normal operation. Do not allow riders on the tractor; do not allow people to stand near or on the step when the tractor is moving.

1.8 Environmental safety

Soil, air and water are essential elements for agriculture and for life in general. If local legislation does not control the treatment of certain substances, the production of which is necessitated by advanced technologies, products derived from chemical and petrochemical products must be used and disposed.

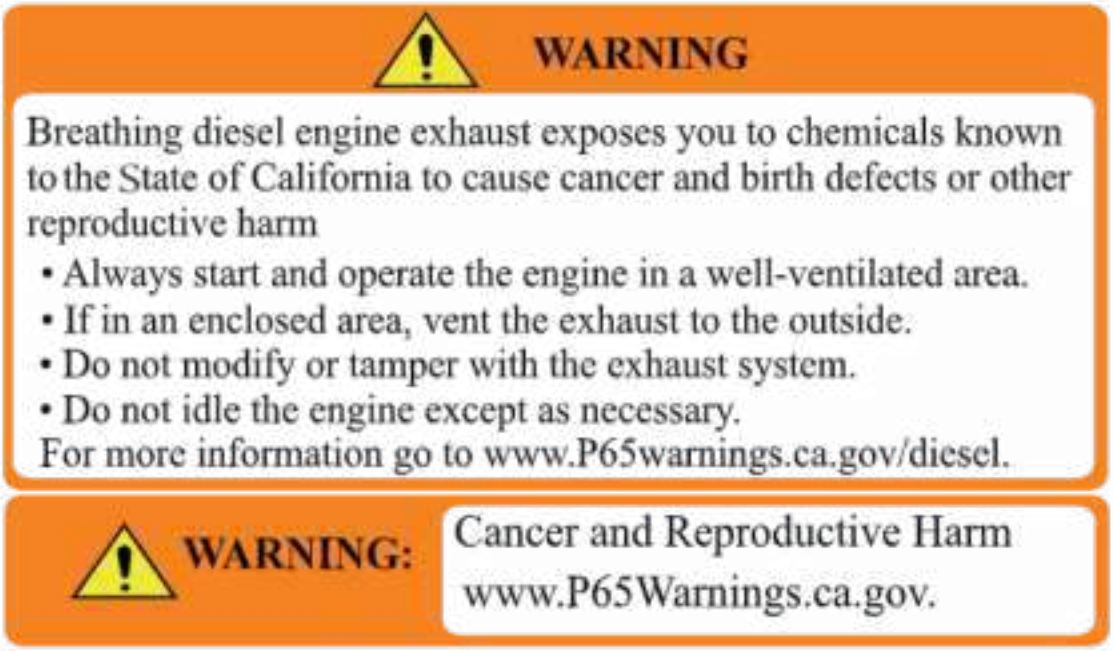
The following recommendations may be of help:

- Follow National, state and local laws, regulations or ordinances governing the handling or disposal of waste fluids, (E.g.: oil, fuel, coolant) filters, batteries and other substances or parts.
- Burning of flammable fluids or components in other than specially designed incinerators may be prohibited by law and could result in exposure to harmful fumes or ashes.
- Ask your dealer or supplier for lubricants, oils, fuels, antifreeze, detergents, etc. for information on the effects of these products on humans and the environment and for instructions concerning their use, storage and disposal. In many cases, local agricultural consultants will be able to provide assistance.

Suggestions

- Avoid using unsuitable, pressurized filling systems or fuel cans when filling tanks, as these may cause considerable spillage and leakage of liquids.
- As a general rule, do not allow liquid fuels, lubricants, acids, solvents, etc., to come into contact with the skin. The majority of these products contain substances that are potential health hazards.
- Modern lubricants contain additives. Do not burn contaminated fuel oils and/or oils used in conventional heating systems.
- Avoid spillage when transferring used engine cooling liquids, engine and common oil transmission and hydraulic brake fluids, etc. Never mix used brake oil with fuel oil, or fuel oil with lubricants. Store safely until suitable disposal can be arranged according to national legislation or local regulations.
- Modern anti-freeze liquids and solutions, e.g. antifreeze and other additives, must not be left to be absorbed into the ground, but must be collected and disposed of in a suitable manner.
- Any leakage or defect in the engine cooling or hydraulic systems must be repaired immediately.
- Do not increase the pressure in pressurized systems, as this may cause component parts to burst.
- Do not adjust the setting of the fuel delivery system as this will alter the emission of exhaust fumes.

1.9 Proposition 65 (P65) sticker information - California



1.10 Mahindra Emissions Control Warranty Policy

CALIFORNIA AND FEDERAL EMISSION CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board, U.S. Environmental Protection Agency ("EPA") and MAHINDRA USA, Inc. are pleased to explain the emission control system warranty on your heavy-duty off-road engines. In California ("the State") and US EPA regulated applications, new heavy-duty off-road engines must be designed, built and equipped to meet the State's and U.S EPA's stringent anti-smog standards. MAHINDRA USA, Inc. must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, MAHINDRA USA, Inc. will repair your heavy-duty off-road engine at no cost to you including diagnosis, parts and labor. If inspection by a certified Mahindra service center reveals that the failure is not a result of a defect in material or workmanship, the purchaser will be responsible for all costs of exploratory dismantling and diagnosis.

MANUFACTURER'S WARRANTY COVERAGE:

The heavy-duty off-road engines are warranted for the periods listed below. If any emission-related part on your engine is defective, the part will be repaired or replaced by MAHINDRA USA, Inc.

All Compression Ignition Engines	
Engine Power	Age or Use
kW < 19 (hp < 25)	2 years or 1,500 hours
kW ≥ 19 (hp ≥ 25)	5 years or 3,000 hours

OWNER'S WARRANTY RESPONSIBILITIES:

- As the off-road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. MAHINDRA USA, Inc. recommends that you retain all receipts covering maintenance on your off-road engine, but MAHINDRA USA, Inc. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- As the off-road engine owner, you should however be aware that MAHINDRA USA, Inc. may deny you warranty coverage if your off-road engine or a part has failed due to misuse, abuse, vandalism, neglect, improper, accident, submersion, improper maintenance or unapproved modifications.
- Your engine is designed to operate on Ultra Low Sulfur Diesel fuel only. Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements.
- You are responsible for initiating the warranty process. You must present your off-road engine to a MAHINDRA USA, Inc. dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible, not to exceed 30 days.
- You may choose any qualified repair shop or person to maintain, replace, or repair emission control devices and systems with original or equivalent replacement parts. However, warranty, recall and all other services paid for by MAHINDRA USA, Inc. must be performed at an authorized MAHINDRA USA, Inc. service center.

If you have any questions regarding your warranty rights and responsibilities, you should contact MAHINDRA USA, Inc. toll free at 1-(877)449-7771 or go to Mahindra's website below:

https://www.mahindrausa.com/contact-email-tractors-utvs-farming-equipment-dealership-contact-us.

COVERAGE:

Parts/components that are scheduled to be replaced as part of the required maintenance schedule will be covered under the warranty provisions for a period of time up to the first scheduled replacement point for the subject parts/ components. Subsequent damage to other engine components as a direct result of a warrantable failure of an exhaust emission control system part / component will be covered under the warranty provisions described herein.

MAHINDRA USA, Inc. will repair or replace emission control system parts, components and sub-assemblies found to be defective with respect to materials or workmanship at no cost to you including engine exhaust system related diagnosis, labor and parts. The choice and responsibility of the decision to repair or replace an emission control system defect will be solely that of MAHINDRA USA, Inc. Emission control system parts/ components covered by the Federal and California

Emission Control Systems Limited Warranty are listed below (if equipped):

1) Air-Induction System
   a) Intake Manifold
   b) Turbocharger System
   c) Charge Air Cooling System (Intercooler)
2) Catalyst or Thermal Reactor System
   a) Catalytic converter
   b) Exhaust manifold
3) Fuel Injection System
   a) Fuel Supply Pump (Common Rail System)
   b) Injector
   c) Injection Pipe
   d) Common Rail
   e) Smoke Puff Limiter
   f) Speed Timer
   g) Cold Advance Timer
   h) Injection Pump
4) Electronic Control System
   a) ECU
   b) Engine Speed / Timing Sensor
   c) Accelerator Position Sensor
   d) Coolant Temperature Sensor
   e) Atmospheric Pressure Sensor
   f) Intake Pressure Sensor
   g) Intake Manifold Temperature Sensor
   h) Intake Air Flow Sensor
   i) Common Rail Pressure Sensor
5) Exhaust Gas Recirculation System
   a) EGR Valve
   b) EGR Cooler
   c) EGR Valve Opening Rate Sensor
6) Particulate Controls
   a) Any device used to capture particulate emissions.
   b) Any device used in the regeneration of the particulate control device.
   c) Control Device Enclosures and Manifolds
   d) Differential Pressure Sensor

7) Advanced Oxides of Nitrogen (NOx) Controls
   a) Selective Catalytic Reduction (SCR) Catalyst
   b) Reductant (urea) Containers
   c) Dispensing Systems
   d) NOx Sensor
   e) SCR Temperature Sensor
   f) Any Sensor for Diesel Exhaust Fluid
8) Miscellaneous Items
   a) Closed Breather System
   b) Hoses, Clamps, Fittings, Tubing; (whose failure affects exhaust emissions)
   c) Gaskets, Seals
   d) Mahindra supplied engine Wiring Harnesses
   e) Mahindra supplied engine Elec. Connectors
   f) Air Cleaner Element*, Fuel Filter Element*
   g) Emission Control Information Labels

   * Until the first scheduled replacement point.

1.11 Universal symbols

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

1.12 Tractor identification plates

Serial numbers identify the tractor and its main components. The identification data must be supplied by the dealer for requests for spare parts or service operations. Identification data is of fundamental importance in the event of theft of the tractor. The location of the various identification data is shown below.

Tractor serial number

The tractor serial number can be identified by a plate riveted on the left hand side of rear floor panel.

Fig. 1

Engine serial number

Engine serial number is punched on the right side of the engine.

Fig. 2

ROPS identification number

ROPS serial number plate is riveted on the right hand side mounting structure.

Fig. 3

Front axle identification number

Front axle serial number is punched on the center beam housing.

Fig. 4

1.13 Tractor overview

1.13.1 Component identification

Fig. 1

Component identification:

1. Right hand side fender
2. Battery
3. Hood/Engine
4. Roll over protection system (ROPS)
5. Operator's seat
6. Cup holder
7. Handrail
8. Left hand side fender
9. Footstep
10. Fuel tank
11. Front axle

1.13.2 Left hand & right hand side view of engine

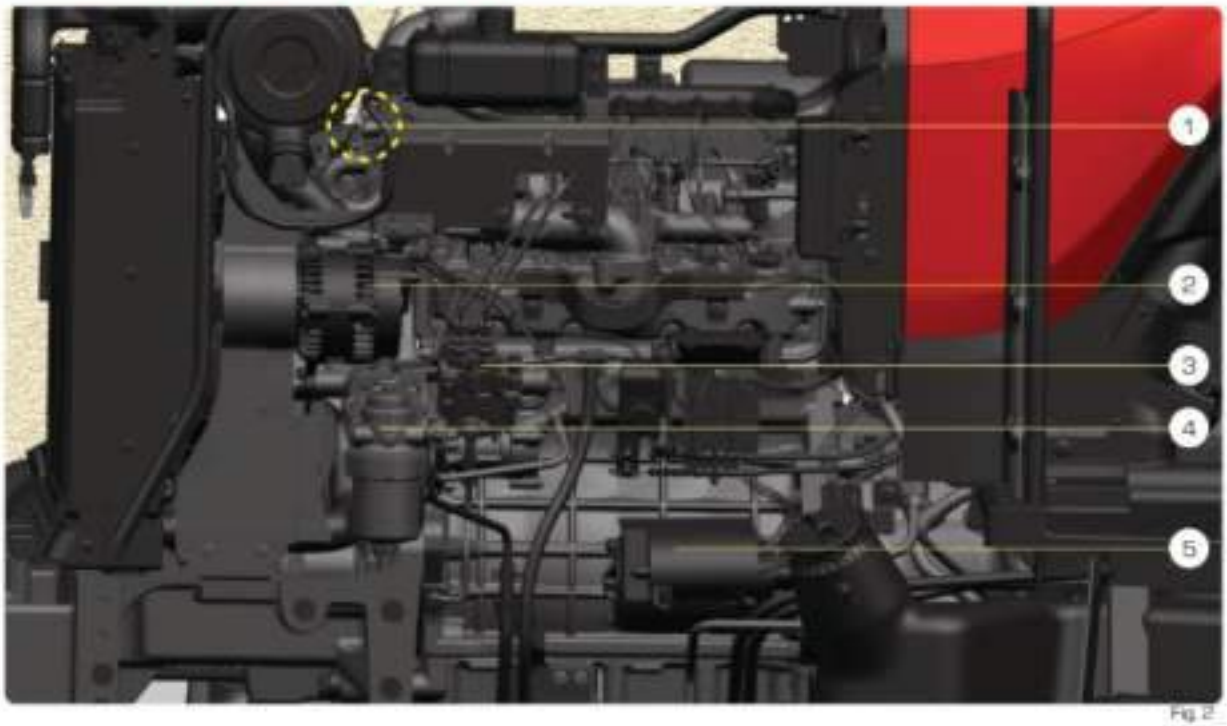


Fig 2

Left hand side view : 1. EGR cooler 2. Alternator 3. Fuel injection pump 4. Fuel filter 5. Starter motor

Fig 3

Right hand side view : 6. Turbo charger (55Hp) 7. DOC 8. Muffler (UHM) 9. Hydraulic tandem pump 10. Engine oil filling cap 11. Engine oil dipstick 12. Engine oil cooler (55Hp) 13. Engine oil filter

1.13.3 Lamps overview

Fig. 4

Front view :

1. Right hand side turn lamp and flashing warning lamp
2. Right hand side head lamp
3. Left hand side turn lamp and flashing warning lamp.
4. Left hand side head lamp

Fig. 5

Rear view :

1. Left hand side turn lamp and flashing warning lamp
2. Left hand side reflex reflector
3. Left hand side rear tail lamp and brake lamp
4. Right hand side turn lamp and flashing warning lamp
5. Right hand side reflex reflector
6. Right hand side rear tail lamp and brake lamp
7. Rear work lamp

2. SAFETY INFORMATION

2.1 Safety rules & signal words

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.

In this manual and on machine decals, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

Fig. 1

Signal words

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury. The color associated with DANGER is RED.

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

Fig. 2

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

NOTICE: Notice indicates a situation which, if not avoided, could result in machine or property damage.

In this manual you will find the signal word NOTICE followed by special instructions to prevent machine or property damage.

NOTE: Note indicates additional information which clarifies steps, procedures, or other information in this manual. In this manual you will find the word NOTE followed by additional information about a step, procedure, or other information in the manual. The word NOTE is not intended to address personal safety or property damage.

2.2 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.

Fig 3

2.3 Safety for children

Tragedy can occur if the operator is not alert to the presence of children. Children generally are attracted to machines and the work they do.

1. Never assume that children will remain where you last saw them.
2. Keep children out of the work area and under the watchful eye of another responsible adult.
3. Be alert and shut your machine down if children enter the work area.
4. Never carry children on your machine. There is no safe place for them to ride. They may fall off and be run over or interfere with your control of the machine.
5. Never allow children to operate the machine even under adult supervision.
6. Never allow children to play on the machine or on the implement.
7. Use extra caution when backing up. Look behind and down to make sure area is clear before moving.
8. When parking your machine if at all possible park on a firm, flat and level surface; do not park on a slope. Set the parking brake, lower the implements to the ground, remove the key from the ignition.

Fig 4

2.4 Precautions 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.

Fig 5

2.5 Park tractor safely

Before parking the tractor:

Lower all equipments to the ground, shift transmission in neutral. Engage the parking brake. STOP the engine and remove the key.

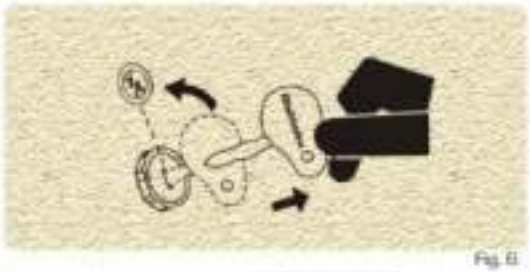


Fig 6

2.6 Keep riders off tractor

Do not allow riders on the tractor.

Riders on tractors are subject to injury such as being struck by foreign objects and being thrown off from the tractor.

Fig. 7

2.7 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 engine before refueling tractors.

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

Fig. 8

2.8 Stay clear of rotating shafts

Entanglement in rotating shaft can cause serious injury or death.

Keep PTO shields in place at all times.

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

Fig. 9

2.9 Always use safety lights and devices

Use of flashing warning lamp and turn signals are recommended when driving the tractor on public roads unless prohibited by state or local regulations.

Use slow moving vehicle (SMV) sign when driving on public road during both day & night time, unless prohibited by law.

2.10 Slow moving vehicle emblem (SMV)

Observe the following precautions when operating the tractor on road.

1. Slow Moving Vehicle (A) emblem affixed on back side of operator seat and ensure clean and visible.
2. If towed or rear-mounted equipment obstructs this emblem, install SMV emblem on equipment.

Image shown for reference

Fig. 10

2.11 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 jewelry to prevent electrical shorts and entanglement in moving parts.

Never work on the tires with improper equipment or without the necessary experience. Incorrect tire fitments may put your safety at risk.

2.12 Practice safe maintenance

Understand service procedure before doing work. Keep the surrounding area of the tractor clean & dry.

Do not attempt to service tractor when it is in motion. Keep body and clothing away from rotating shafts. Always lower equipment to the ground. Stop the engine. Remove the key. Allow tractor to cool before any work/repair is performed on it.

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

Keep all parts in good condition and properly installed. Replace worn or broken parts. Replace damaged or missing decals. Remove any buildup of grease or oil from the tractor.

Disconnect the battery ground cable (-VE) before making adjustments on electrical systems on tractor.

Fig. 11

2.13 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 it contacts the eye.

These are maintenance free batteries.

Fig. 12

2.14 Prevent battery explosions

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

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

Fig. 13

2.15 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. Do not operate auxiliary valve when terminal pipes are open.

If any fluid is injected into the skin. Consult your doctor immediately.

Fig. 14

2.16 Work in ventilated area

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

Fig. 15

2.17 Tractor runaway

Avoid possible injury or death from possible runaway. Do not start the engine by shorting across electrical circuit.

Never start engine while standing on ground. Start engine only from operator's seat with all drive line controls in neutral, all PTO controls in the disengaged/neutral position, hydraulic valves in the neutral position and hitch controls in the lower position.

For additional safety, keep the engine ignition key in OFF position, transmission in neutral position, parking brake engaged, PTO lever in disengaged/neutral position while servicing the tractor.

2.18 Overhead protection

This tractor does not have any protection from overhead falling objects. Do not use this tractor in an application where there is a risk of falling objects striking the operator.

Fig. 16

2.19 Sunlight protection

To protect the operator from the sun light, it is recommended to use the canopy.

Fig. 17

2.20 Hearing protection

It is recommended to use hearing protection while tractor is in operation.

Fig. 18

2.21 Precautions while using loader

When using a loader, be conscious of bucket location at all times, particularly when raising a loader with bucket rolled back.

NOTE: Tractor shown in safety instructions for reference only.

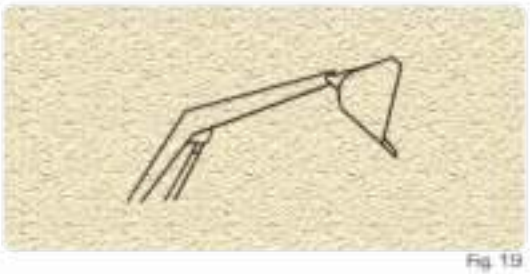


Fig. 19

2.22 Roll over protective structure (ROPS)

Mahindra USA Inc. Tractors are fitted with a frame for the protection of tractor operator to minimize serious operator injury resulting from accidental roll over. These frames, known as ROPS, form a safety zone within which the operator is offered some protection in the event that the tractor turns over. It is necessary that the tractor operator fasten the seat belt around him/her to be protected by the ROPS.

The ROPS has been certified to industry and/or government standards. Any damage or alteration to the ROPS, mounting hardware or seat belt voids the certification and will reduce or eliminate protection for the operator, in the event of a roll-over.

The seat belt must be worn during machine operation when it is equipped with a certified ROPS. Failure to do so will reduce or eliminate protection of the operator in the event of a roll-over.

The mounting structure and fasteners forming the mounting connection with the tractor are part of the ROPS.

Fig. 20

ROPS maintenance and inspection

The ROPS, mounting hardware and seat belt should be checked after the first 100 hrs. of machine operation 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 machine.

Substitution of mounting hardware, seat belt etc. with components not equal to or superior to the original certified components will void the certification and will reduce or eliminate protection for the operator in the event of a roll-over.

Operating foldable ROPS

⚠WARNING

WHEN IMPROPERLY OPERATED, A TRACTOR CAN ROLL OVER. FOR LOW CLEARANCE STORAGE ONLY, THE ROLL BAR MAY BE FOLDED. NO PROTECTION IS PROVIDED WHEN THE TRACTOR IS OPERATED WITH THE ROLL BAR IN THE FOLDED POSITION. ALWAYS RAISE THE ROLL BAR IMMEDIATELY AFTER LOW CLEARANCE STORAGE. ALWAYS USE THE SEAT BELT WHEN THE ROLL BAR IS RAISED. SEAT BELTS SAVE LIVES WHEN THEY ARE USED. DO NOT USE THE SEAT BELT WHEN THE ROLL BAR IS LOWERED.

⚠CAUTION

TO AVOID INJURY WHEN RAISING OR FOLDING THE ROPS

- THE SAFETY FRAME IS HEAVY. HAVE OTHERS ASSIST WITH RAISING OR FOLDING THE ROPS.
- DO NOT STAND BENEATH THE ROPS WHEN RAISING OR FOLDING.
- THE ROPS CAN FOLD ABRUPTLY BY ITS WEIGHT WHEN THE LOCKING PINS ARE REMOVED.
- ALWAYS RAISE OR FOLD THE ROPS FROM A STABLE POSITION AT THE REAR OF THE TRACTOR.
- HOLD THE TOP OF THE ROPS SECURELY WHEN RAISING OR FOLDING.
- REINSTALL AND LOCK ALL ROPS PINS.

To fold-down ROPS crossbar (A):

1. Loosen the knob (D).
2. Remove quick-lock pins (B) and headed pins (C) along with washers.
3. Turn the crossbar (A) of ROPS. ROPS has two folded positions that are determined by reinserting the pins.
4. Reinstall pins (C and B) into its position on ROPS.
5. Tighten jam nuts on knobs (D).

To raise ROPS in operating position:

1. Remove quick-lock pins (B) and headed pins (C).
2. Loosen the knob (D).
3. Turn to raise the crossbar (A) of ROPS.
4. Install pins (C) and quick-lock pins (B).
5. Tighten the knob (D).

Fig. 21

A - ROPS crossbar
B - Quick-lock pins
C - Headed pins
D - Knob

While the tractor is in compact shipping and storage position follow the below instructions:

- Lower the 3 point hitch
- Secure the position control lever upper stopper against the back of the lever to prevent inadvertent movement of the lever.
- Raise the ROPS to the vertical (field position) or horizontal (low height application) positions before raising the three point hitch.

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 4. Rear lamps. Before you operate a tractor, replace all damaged parts.

⚠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.

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.

ALWAYS WEAR YOUR SEAT BELT IF THE TRACTOR IS EQUIPPED WITH A ROPS.

2.23 Hazardous chemicals

Exposure to or contact with hazardous chemical substances can cause serious injuries. The fluids, lubricants, paints, adhesives, coolants, etc. required for the machine's operation can be harmful. In addition, they can attract domestic animals and people creating dangerous situations for health.

The materials safety data sheets (MSDS) provide information on the chemical substances contained in a product, on the methods of safe storage and handling and on the first aid procedures to follow should such a product get accidentally spilled.

Before doing any maintenance work, read the materials safety data sheets (MSDS) for each single lubricant, liquid, etc. used on the machine. The information given on the sheets signals the associated risks and enables carrying out the maintenance work safely. To perform maintenance work, follow the information given on the MSDS sheets, the information provided by the manufacturer on the containers of the products and the information given in this manual.

Dispose of all the fluids, filters and containers in an environment friendly manner, respecting the current regulations and laws on the subject of environmental protection. For correct information on disposal, contact your local differentiated waste collection center or your dealer.

Store fluids and filters according to the local regulations and laws. To store chemical or petrochemical substances, use appropriate containers only.

Keep the batteries out of the reach of children or of other unauthorized people. Further precautions are necessary for the applied chemical substances. Before using chemical substances, ask the producer or retailer for detailed information.

2.24 Mounting and dismounting

Mount and dismount the machine only from the left hand side of the tractor.

Do not jump off from the machine.

Make sure that steps and platforms remain clean and clear of debris and foreign substances. Injury may result from slippery surfaces.

Face the machine when you mount and dismount the machine.

⚠CAUTION

PREVENT FALLS BY FACING THE MACHINE WHEN MOUNTING AND DISMOUNTING MAINTAIN CONTACT WITH STEPS, HANDHOLDS, AND HANDRAILS. USE EXTRA CARE WHEN MUD, SNOW, OR MOISTURE PRESENT SLIPPERY CONDITIONS. KEEP STEPS CLEAN AND FREE OF GREASE OR OIL. NEVER JUMP WHEN EXITING MACHINE. NEVER MOUNT OR DISMOUNT A MOVING MACHINE.

2.25 Electrical storm safety

Do not operate machine during an electrical storm.

If you are on the ground during an electrical storm, stay away from machinery and equipment. Seek shelter in a permanent, protected structure.

2.26 Transporting Tractor safely

A disabled tractor is best transported on a flatbed carrier. Use chains to secure the tractor to the carrier. The axles and tractor frame are suitable attachment points. Before transporting the tractor on a low-loader truck or flatbed rail wagon, make sure that the hood is secured over the tractor engine.

2.27 Wheels and tires

Make sure that tires are correctly inflated. Do not exceed any recommended load or pressure. Tires are heavy. Handling tires without proper equipment could cause death or serious injury.

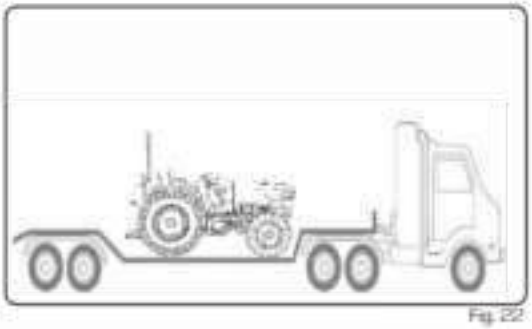


Fig.22

Never weld on a wheel with a tire installed. Always remove the tire completely from the wheel prior to welding. Always have a qualified tire technician service the tires and wheels. If a tire has lost all pressure, take the tire and wheel to a tire shop or your dealer for service. Explosive separation of the tire can cause serious injury.

DO NOT weld to a wheel or rim until the tire is completely removed. Inflated tires can generate a gas mixture with the air that can be ignited by high temperatures from welding procedures performed on the wheel or rim. Removing the air or loosening the tire on the rim (breaking the bead) will NOT eliminate the hazard. This condition can exist whether tires are inflated or deflated. The tire MUST be completely removed from the wheel or rim prior to welding the wheel or rim.

2.28 Driving on public roads and general transportation safety

Comply with local laws and regulations.

Use appropriate lighting to meet local regulations. Make sure that the SMV emblem is visible.

Make sure that the brake pedal latch is engaged. You must lock brake pedals together for road travel.

2.29 Utility safety

When digging or using ground-engaging equipment, be aware of buried cables and other services. Contact your local utilities or authorities, as appropriate, to determine the locations of services.

Make sure that the machine has sufficient clearance to pass in all directions. Pay special attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety. Contact local authorities or utilities to obtain safe clearance distances from high voltage power lines. Retract raised or extended components, if necessary.

Remove or lower radio antennas or other accessories. Should a contact between the machine and an electric power source occur, the following precautions must be taken:

- Stop the tractor movement immediately.
- Apply the parking brake, stop the engine, and remove the key.
- Check if you can safely leave the tractor or your actual position without contact with electrical wires. If not, stay in your position and call for help. If you can leave your position without touching lines, jump clear of the tractor to make sure that you do not make contact with the ground and the tractor at the same time.
- Do not permit anyone to touch the tractor until power has been shut off to the power lines.

2.30 Recommended jacking points

⚠WARNING

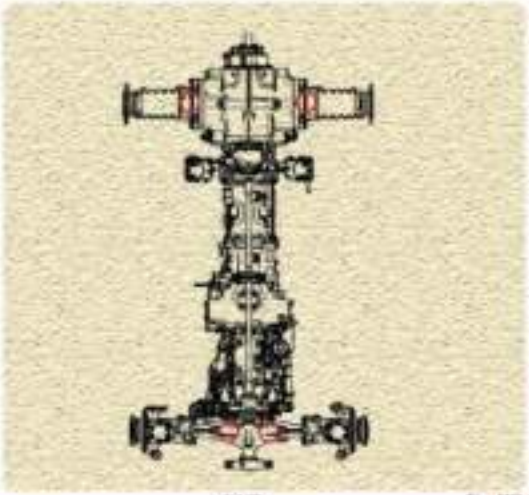
EQUIPMENT FAILURE COULD CAUSE ACCIDENT OR INJURY

ONLY USE RIGGING EQUIPMENT THAT HAS THE CAPACITY TO LIFT THE LOADS THAT YOU ARE MOVING. ALWAYS CHECK THE RIGGING EQUIPMENT EACH DAY FOR DAMAGED OR MISSING PARTS. MAKE SURE OTHER WORKERS OR BYSTANDERS ARE NOT UNDER THE LOAD WHILE IT IS MOVING.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

- Take the tractor on a level and concrete surface before jacking.
- Place the jack to the transmission end on the rear of the tractor or to the front axle carrier part.
- For the safety of the lifting operation, pay attention to the precautions.
- Jack capacity shall be suitable for the tractor weight.

To lift the tractor, use only the points shown in the figure.
ALWAYS raise only the back or the front, NEVER raise both together.
ALWAYS put chocks in front or behind the wheels of the axle that is not to be lifted.



4WD Fig.23

⚠WARNING

JACK STANDS CAN SLIP OR FALL OVER. DROPPING, TIPPING, OR SLIPPING OF MACHINE OR ITS COMPONENTS IS POSSIBLE.

DO NOT WORK UNDER A VEHICLE SUPPORTED BY JACK STANDS ONLY. PARK MACHINE ON A LEVEL SURFACE. BLOCK WHEELS. SUPPORT MACHINE WITH SAFETY STANDS.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

2.31 General precautions

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. The tractor should be operated only by those who are responsible and instructed 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. To prevent falls, keep steps and platform cleared of mud, oil and debris.
3. Do not permit anyone but the operator to ride on the tractor. There is no safe place for extra riders.
4. Replace all missing, illegible or damaged safety signs.
5. Keep safety signs clean of dirt and grease.

2.32 Driving concerns

1. Watch where you are going especially at row ends, on roads, around trees and low hanging obstacles.
2. To avoid rollover, 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 used on 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 roll over.
7. Always check overhead clearance, especially when transporting the tractor.
8. Do not engage 4WD engagement lever while the tractor is in motion.
9. The "balancing" of the braking system should be checked every week, or whenever the tractor is taken on the road after working extensively or when one brake is used more often than the other. If this precaution is not taken an accident may occur.
10. Use extra caution when 4WD is used on slopes. Compared to 2WD, a front wheel drive maintains traction on steeper slopes increasing the possibility of tip over.
11. When driving on wet, icy or graveled surfaces, reduce speed and be sure tractor is properly ballasted to avoid skidding and loss of steering control. For best control, engage front wheel drive.

2.33 Starting on steep slope

1. Depress the brake pedals.
2. Depress the clutch pedal to disengage the clutch.
3. Place each shift lever in the low speed position.
4. Set the engine at the mid speed with the throttle lever.
5. Release the clutch pedal slowly and keep it de-pressed halfway.
6. Release the brake pedal slowly at the same time.
7. Pull the throttle lever again to accelerate the engine. Then, release the brake and clutch pedals together to start off.

2.34 Tips for driving on slope

1. Set the speed shift lever in the low speed position on a slope to prevent the engine from stopping.
2. Keep the driving speed low on a downhill road.
3. Do not set the speed shift lever in the neutral position and depress the clutch pedal on a downhill road.
4. It is recommended to use 4WD while driving on slope.
5. When operating on steep slopes, check the fuel level frequently and maintain fuel levels above 1/4 tank.
6. Engine oil quantity should be above minimum level before start of operation

2.35 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 tractor.
3. The engine cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Allow the engine coolant temperature to cool down for approx. 30 min. First turn the cap slowly to first stop and allow the pressure to escape before removing the cap entirely.
4. The fuel in injection system is under high pressure and can penetrate the skin. Unqualified/untrained persons should not remove or attempt to adjust fuel injection pump, injector, nozzle or any part of the fuel injection system. Failure to follow these instructions can result in serious injury.
5. Do not alter or permit anyone else to modify or alter this tractor or any of its components or functions.
6. Ensure all electrical connections are secure and clean.
7. Ensure that no connection in the charging circuit, including battery, is broken while engine is running.
8. Observe correct polarity when refitting the battery or when using a slave battery to start the engine.
9. Do not short the alternator output terminals to check it's working.

2.36 Cleaning the tractor

Reduce corrosion from road salt and sea salt. Promptly wash equipment transported by truck during winter conditions. Avoid malfunction or damage to electrical and electronic components like Harness, sensors, fuse box and relays. Do not direct high-pressure spray at electronic or electrical components and connectors, bearings, hydraulic seals, fuel injection pumps, or other sensitive components. Reduce water pressure to wash sensitive components.

Avoid water penetration behind seals, electric & electronic connectors, harness, sensors, fuse box and relays and similar components.

Avoid discoloration of machine paint. Do not use strong soaps, chemical detergents, or cleaning agents that contain acids, caustics, or abrasives. Do not allow cleaning agents to dry on machine. Promptly rinse machine after washing with a cleaning agent.

Use a top-to-bottom wash sequence. Wash behind panels and in hidden areas where salt can accumulate during transport.

If a cleaning agent is used, the agent must be the correct concentration. Do not allow cleaning agent to dry on machine, promptly rinse from top to bottom.

Incorrect detergent, excessive concentration, a delay in rinsing, or incomplete rinsing can discolor paint.

2.37 Using high pressure washers

High-pressure washers are a very effective means of cleaning the tractor. To avoid damage to the tractor, do not go closer than 1m (39 in.). Spray at an angle between 45° and 90° when cleaning sealing surfaces, seals and decals.

Do not, under any circumstances, spray or wash components (e.g. the engine) with cold water when hot. Do not use rotary nozzles or water at temperatures over 122°F (50°C), and do not aim at seals. Keep the water jet moving at all times. Cooling units and electronic/electrical equipment must not be cleaned with high-pressure washers. Follow the instructions in the high-pressure washer operator's manual and manuals of attached equipment.

Fig.214

2.38 Safety decals

Safety signs are intended for your safety and for those working with you. Please take this Manual and walk around your tractor, noting the location of the decals and their significance. Review the decals and operating instructions detailed in this manual with the machine operators. Clean decals and keep legible - do not use solvent, gasoline or other harsh chemicals to clean decals. Replace all worn, damaged or missing decals. If a decal is on a part that is replaced, make sure new part has the decal.

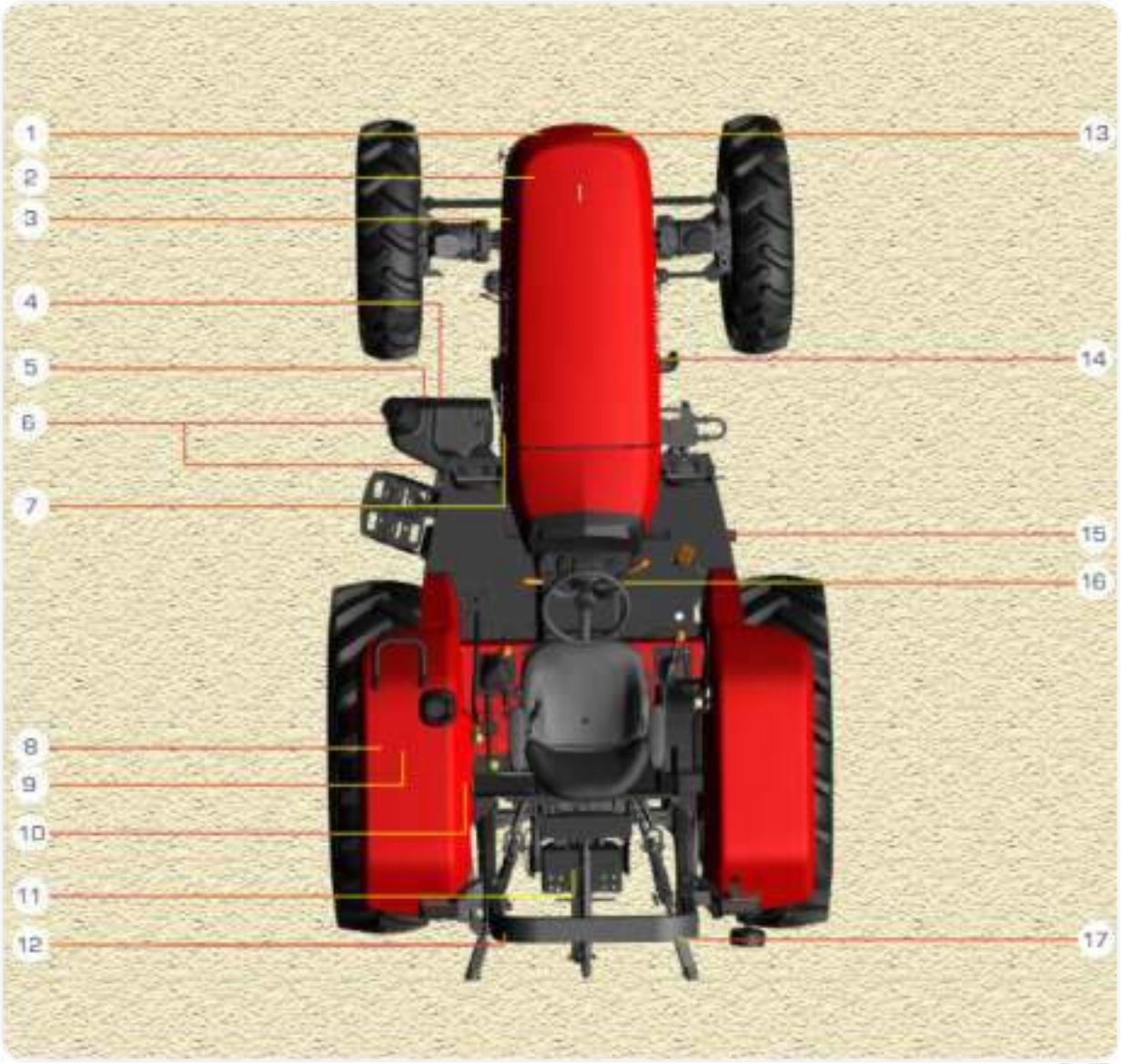


Fig 25

1. Location: Radiator top plate sealing assembly

WARNING

TO AVOID SERIOUS INJURY FROM SCALDING

- Allow the engine to cool before removing radiator cap.

2. Location: Air cleaner top side

WARNING

TO AVOID SERIOUS INJURY FROM EXPLOSION

- This tractor is equipped with intake air heater as starting aid.
- Do not inject ether or gasoline in air intake as starting aid.

3. Location: Left and right hand side of fan guard

WARNING

TO AVOID SERIOUS INJURY FROM ROTATING PARTS

- Keep hands and clothing away from rotating fan and belts.

4. Location: On fuel tank shield

DANGER

TO AVOID SERIOUS INJURY OR DEATH FROM TRACTOR RUNAWAY

- Do not start engine by shorting across starter solenoids terminals or bypassing the safety switch. Machine may start in gear and move if normal starting circuitry is bypassed.
- Start engine only from operator's seat with transmission in neutral and PTO OFF.
- NEVER START ENGINE WHILE STANDING ON THE GROUND.

5. Location: Fuel tank shield

WARNING

TO AVOID SERIOUS INJURY FROM FIRE

- Do not refuel the tractor while smoking or near open flames or sparks.
- Always stop the engine before refueling tractor
- Fill diesel fuel only

6. Location: Fuel tank

CAUTION

TO AVOID INJURY FROM FALL

- Do not use as a step

7. Location: Left hand side scuttle side panel

WARNING

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.

WARNING: Cancer and Reproductive Harm-

www.P65warnings.ca.gov.

8. Location: Left hand side fender

WARNING

TO AVOID SERIOUS INJURY OR DEATH FROM TRACTOR RUNAWAY

- Park on level ground whenever possible. If parking on a slope position tractor across the slope.
- Always engage park brake.
- Place all gear shift levers in neutral.

- Lower all attached equipment to the ground.
- Stop the engine and remove the key if leaving the tractor unattended.
- Wait for all equipment movement to stop before servicing or cleaning equipment.

9. Location: Left hand side fender

CAUTION

BEFORE STARTING ENGINE:

- Read and understand Operator's Manual for safety information and operating instructions. Do not allow others to operate the tractor without reading the Operator's Manual.
- Read and understand all tractor and equipment safety signs.
- Verify that all guards, shields, and safety devices are in place and operational.
- Clear the area around the tractor and attached equipment of any bystanders.

STARTING THE TRACTOR:

- Start engine only from operator's seat with all drive line controls in neutral, all PTO controls in the off position, hydraulic valves in the neutral position and hitch controls in the lower position.
- Work in ventilated area when engine is running.

OPERATION:

- Never allow riders on tractor or equipment.
- With ROPS in raised position, always buckle seat belt.
- Only operate controls from the operator station, never attempt to operate controls from the ground or from behind the tractor.
- Never work under raised equipment. Lower equipment to the ground. Shut-off tractor engine and refer to the equipment Operator's Manual for proper service, maintenance, and repair instructions.

ROAD TRANSPORT:

- Couple brake pedals together for road transport.
- Never use the differential lock during road transport.
- Use flashing warning lamps and keep SMV emblem visible when operating on public roads.

10. Location: Left hand fender side

WARNING

TO AVOID SERIOUS INJURY FROM FLYING OBJECTS:

- Do not exceed tractor engine speed over 2000 rpm when operating PTO in the 540E speed.

11. Location: Top of PTO shield cover

WARNING

TO AVOID SERIOUS INJURY OR DEATH FROM PTO ENTANGLEMENT

- Keep PTO shield in place at all times. Do not operate with unshielded PTO.
- Keep hands, feet and loose clothing away from PTO and other moving parts.
- To stop PTO shaft rotation, disengage PTO and shift 540/540E PTO lever to neutral position and shut-off engine.
- For trailing PTO driven implements, set drawbar position as instructed in Operator's Manual to avoid drive shift separation.

WARNING

TO AVOID SERIOUS INJURY OR DEATH FROM PTO REAR OVERTURN

- Attach pulled or towed loads to the drawbar only.
- Use the 3-point hitch only with equipment designed for 3-point hitch usage.

* Above illustrated stickers may vary with the actual tractor model.

12. Location: ROPS right hand side

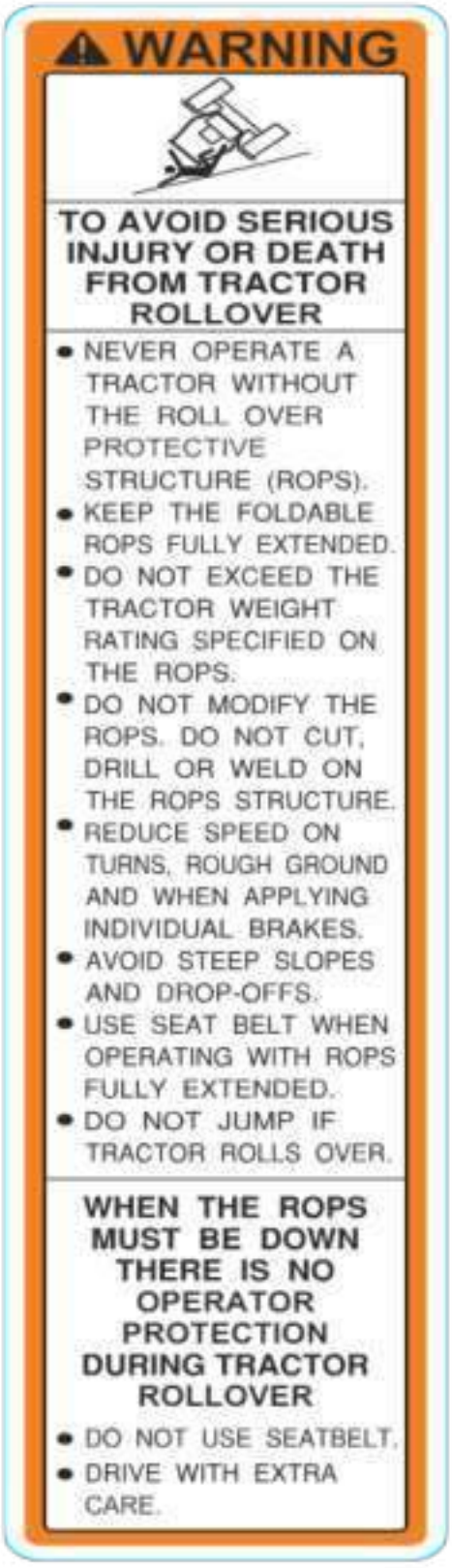
WARNING

TO AVOID PERSONAL INJURY FROM THE TRACTOR ROLLOVER

- Never operate a tractor without the Roll Over Protective Structure (ROPS).
- Keep the foldable ROPS fully extended.
- Do not exceed the tractor weight rating specified on the ROPS.
- Do not modify the ROPS. Do not cut, drill or weld on the ROPS structure.
- Reduce speed on turns, rough ground and when applying individual brakes.
- Avoid steep slopes and drop-offs.
- Use seat belt when operating with ROPS fully extended.
- Do not jump if tractor rolls over.

WHEN THE ROPS MUST BE DOWN THERE IS NO OPERATOR PROTECTION DURING TRACTOR ROLLOVER

- DO NOT use seatbelt.
- Drive with extra care.



13. Location: Center front of air intake duct

Ether sticker

14. Location: Right hand side of hood panel

CAUTION

TO AVOID INJURY FROM BURNING

- Do not touch muffler

15. Location: Battery guard

DANGER

TO AVOID SERIOUS INJURY FROM BATTERY EXPLOSION

- Blindness can result from battery explosion
- Keep sparks or open flames away from the battery
- Do not jump start.
- Burns can result from battery acid.
- In case of contact flush immediately with water.

16. Location: Front of right hand side fender

CAUTION

TO AVOID INJURY FROM FALL

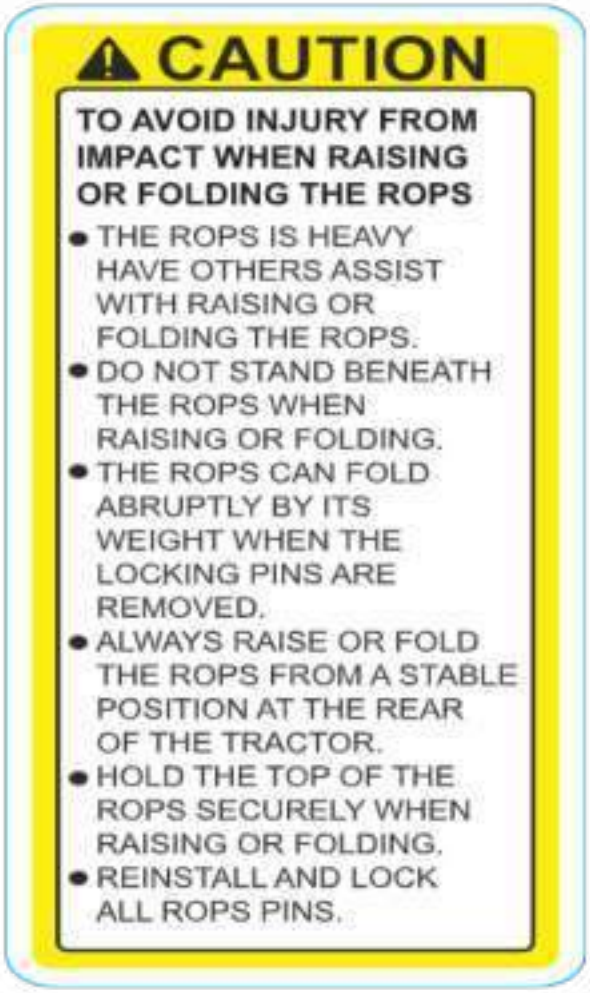
- Do not attempt to enter or exit operator platform

17. Location: ROPS right hand side

CAUTION

TO AVOID INJURY FROM IMPACT WHEN RAISING OR FOLDING THE ROPS

- The ROPS is heavy. Have others assist with raising or folding the ROPS.
- Do not stand beneath the ROPS when raising or folding.
- The ROPS can fold abruptly by its weight when the locking pins are removed.
- Always raise or fold the ROPS from a stable position at the rear of the tractor.
- Hold the top of the ROPS securely when raising or folding.
- Reinstall and lock all ROPS pins.



2.39 Instruction decals

Please take this Manual and walk around your tractor; noting the location of the decals and their significance. Review the decals and operating instructions detailed in this manual with the machine operators. Clean decals and keep legible - do not use solvent, gasoline or other harsh chemicals to clean decals. Replace all worn, damaged or missing decals. If a decal is on a part that is replaced, make sure new part has the decal.

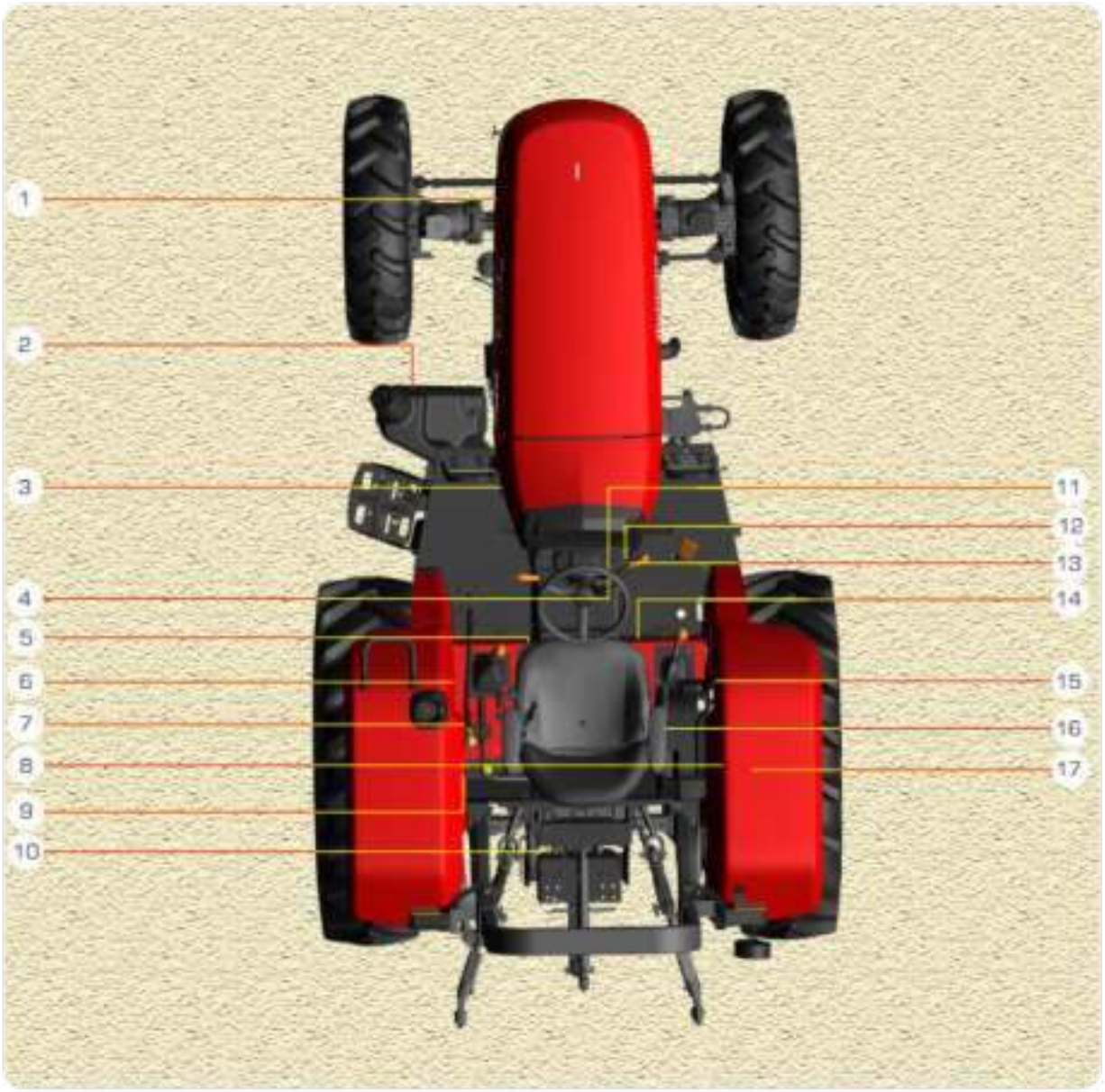
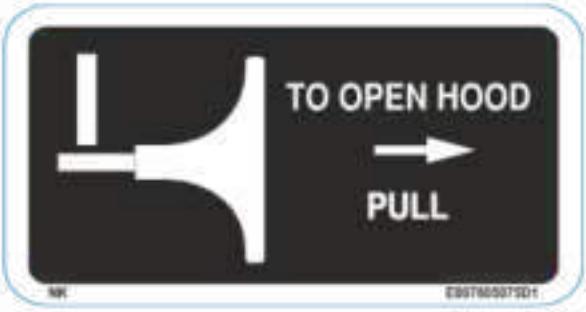


Fig 26

1. Location: Left hand side of front axle support

To open hood pull the lever



2. Location: Fuel tank

Ultra low sulfur diesel only

3. Location: Left hand side lower scuttle panel

INSTRUCTION

During long term storage, the clutch pedal should be in the fully disengaged position and the clutch stopper locked.

4. Location: Cluster bezel right hand side

INSTRUCTION

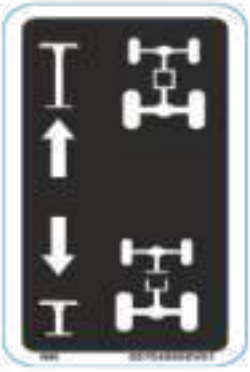
TO START THE ENGINE FOLLOW THESE POINTS

- PTO lever should be in disengaged condition
- Clutch should be in fully pressed condition
- Speed transmission shift lever to be in neutral position.

5. Location: Left front of operator station deck

4WD DRIVE INSTRUCTION

- Lift the lever upwards to engage the drive to front wheels
- Press the lever downwards to disengage the drive



6. Location: Left hand side fender

PTO CLUTCH INSTRUCTION

7. Location: Left hand side fender

PARKING BRAKE INSTRUCTION

TO ENGAGE

Press push button (A) & pull level upwards

TO DISENGAGE

Press push button (A) & release the lever downwards

8. Location: Right hand side fender

INSTRUCTION

With the foldable ROPS in the compact shipping and storage position, do not move the hitch position control lever in the raise direction to avoid possible ROPS damage.

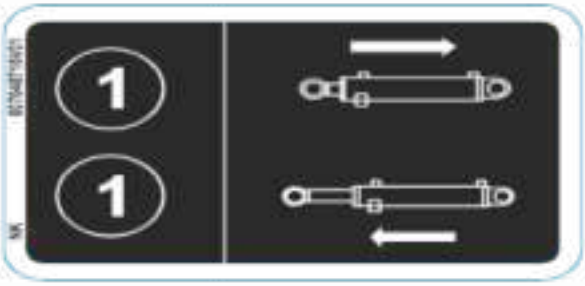
9. Location: Left hand side fender

PTO ENGAGEMENT INSTRUCTION

PTO will not be operable in case of neutral position.

10. Location: Toolbox rear left hand side

AUXILIARY VALVE STICKER



11. Location: Scuttle console bottom side

TILT STEERING INSTRUCTION

12. Location: Cluster bezel right hand top side

SPEED SETTING INSTRUCTION

Tortoise slow or minimum setting

Hare fast or maximum setting

13. Location: Right hand console top side

IGNITION KEY INSTRUCTION

3-way rotary switch

A. OFF

B. **IGNITION**: This position gives a readiness to the electrical circuit for operating electrical loads.

C. **START**: Turning the key to this position activates the starting circuit for starting the engine. When released, the key springs back to ignition position.

14. Location: Right front of operator station deck

DIFFERENTIAL LOCK INSTRUCTION

The differential allows the drive wheels to rotate at different speeds when the tractor in bad field conditions.

15. Location: Right hand side fender console side

AUXILIARY VALVE INSTRUCTION

It will give information on Auxiliary valve operation in 3 positions

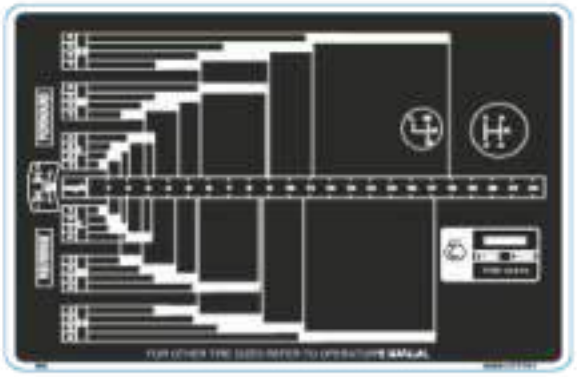
- Lower
- Neutral
- Raise

16. Location: Position control lever quadrant

POSITION CONTROL (PC) INSTRUCTION

17. Location: Right hand fender top side (4WD)

SPEED CHART INFORMATION



* Above illustrated stickers may vary with the actual tractor model

3. CONTROLS AND INSTRUMENTS

3.1 Controls, instruments & 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 operation of the tractor consult your Mahindra USA Inc. tractor dealer.

This section explains briefly the operation of instruments, and controls. Full details wherever necessary will be found in forthcoming chapters at relevant operating sections.

⚠CAUTION

TO FACILITATE EXPLANATIONS, SOME ILLUSTRATIONS IN THIS MANUAL SHOW PANELS OR COVERS IN REMOVED CONDITION. NEVER USE THE TRACTOR WITHOUT ANY OF THE PANELS OR GUARDS IN PLACE.

⚠WARNING

THE OPERATOR MUST BE THOROUGHLY ACQUAINTED WITH THE LOCATION AND USE OF ALL INSTRUMENTS AND CONTROLS REGARDLESS OF EXPERIENCE.

THE OPERATOR MUST READ THIS SECTION CAREFULLY BEFORE ATTEMPTING TO OPERATE THE TRACTOR.

Instrument cluster Fig. 1

Operator controls - front Fig. 2

Operator controls - left hand side & right hand side Fig. 3

Switches Fig. 4

3.2 Operator seat

The operator seat can be adjusted for position (fore/aft), and weight of operator. These adjustments are to be done prior to starting the engine.

Adjusting seat position

1. Sit on the operator seat.
2. Lift the lever (A) upwards & slide the seat forward or rearward to desired position.
3. Release lever (A) to lock seat in position. Ensure that all controls can be accessed easily.

Weight adjustment

To achieve optimum seat suspension, turn the knob (B) till the weight indicator registers your approximate weight on indicator.

Seat shown for reference only Fig. 1

⚠CAUTION

ATTEMPTING TO ADJUST THE SEAT WHILE DRIVING THE TRACTOR MAY CAUSE THE OPERATOR TO LOSE CONTROL OF THE TRACTOR.

Using seat belt

Use a seat belt when you operate with roll over protective structure (ROPS) to minimize chance of injury from an accident such as an overturn. Do not jump if machine tips.

Fasten seat belt

1. Pull belt end (C) across operator lap.
2. Install tab into buckle (D). A click will be heard when the tab locks into the buckle.

Release seat belt

Press red button (E). The seat belt will automatically retract.

Seat shown for reference only Fig. 2

⚠WARNING

DO NOT USE SEAT BELT IF OPERATING THE TRACTOR WHILE ROPS IN FOLDED POSITION.

3.3 Operator's forward controls

3.3.1 Switches

1. Ignition key switch

This is a key operated 3-way rotary switch located on right hand side of cluster bezel. It operates in clockwise direction and the positions are as follows:

A. OFF

B. **IGNITION**: This position gives a readiness to the electrical circuit for operating electrical loads.

C. **START**: Turning the key to this position activates the starting circuit for starting the engine. When released, the key springs back to ignition position.

NOTE: Once the engine started do not turn the key to this position again, this will lead to damage the starter motor.

Fig. 1

2. Combination switch

This is multi-functional switch mounted to right hand side of steering column on cluster bezel. It consists of following operation switches. See Fig.2

A. Horn (center)

B. Light switch

C. Turn signal

Fig. 2

2A. Horn

This is push button switch. Pressing this switch will enable the horn and releasing it will disable the horn. See Fig.3

2B. Light Switch

This is 4 position rotary switch. The operations are as follows:

1. Off
2. Illuminates tail lamps
3. Illuminates low beam of head lamp & tail lamps
4. Illuminate high beam of head lamp & tail lamps

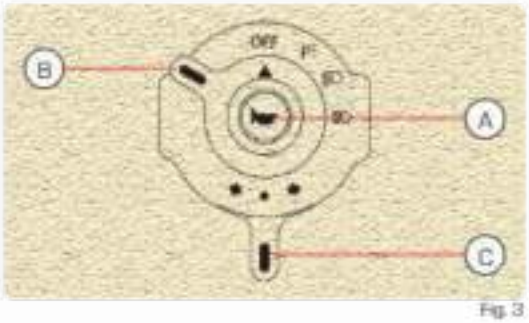


Fig. 3

2C. Turn signal switch

This is 3 position rotary switch. The vertical position of the knob. See Fig.3

Center	: OFF
Left hand side	: Operates left turn signal lamp
Right hand side	: Operates right turn signal lamp

3. Work lamp switch (D)

This is a 2-way rotary switch located on the left hand side of the steering on cluster bezel. See Fig.4

- Off
- Work lamp

Fig. 4

4. Flashing warning lamp switch (E)

This is push type switch located on left hand side of the scuttle extension cover. The operations are as follows. See Fig.5

ON Position - Operates left and right turn signal lamp simultaneously. This operation can be performed even if the key switch is in OFF position.

Fig. 5

5. 12V Power socket

This is a power socket which provides 12V supply. This can be used for charging mobile phones.

NOTE: Maximum power rating: 10A

⚠WARNING

THIS SOCKET IS ONLY PROVIDED FOR MOBILE PHONE CHARGING APPLICATION.


Fig. 7

6. Trip hour reset button

This is located on cluster bezel and is used to reset the trip hour meter as and when required. This can be done by continuously pressing the button more than 2 seconds.


Fig. 8

7. Seven pin socket

It is used to provide electrical supply for any trailer which is attached at the rear.

The seven pins have the following functions.

Pin no	Function
1	Ground
2	No function
3	Left turn indicator
4	Brake signal
5	Right turn indicator
6	Park illumination
7	Ignition supply

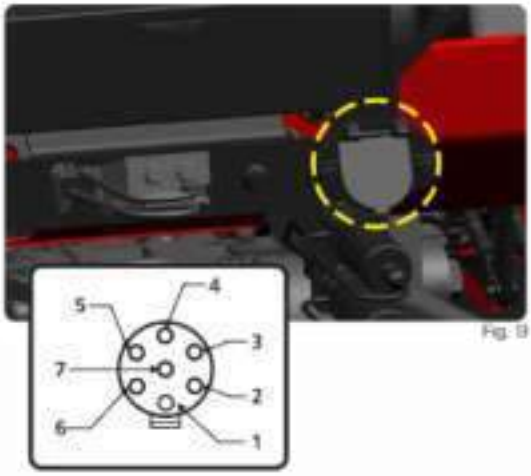


Fig. 9

8. Fuse box

A. The Main fuse box is located under the hood, left side to the engine. To access the fuse box, open the hood.

B. The 2nd fuse box is located under the hood, left side to the engine near accelerator pedal sensor. To access the fuse box, open the hood.

C. The 3rd fuse box is located behind the battery box.

⚠WARNING

ALWAYS REPLACE FUSE WITH CORRECT RATING. FAILING TO DO THIS WILL DAMAGE THE WIRING HARNESS.

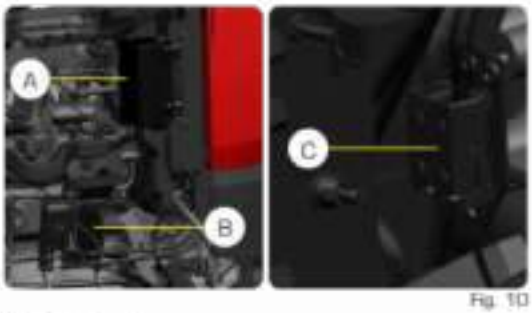


Fig. 10

A. Main fuse box

B. 2nd fuse box (Near accelerator pedal sensor)

C. 3rd fuse box (Behind the battery box)

Fuse ratings chart

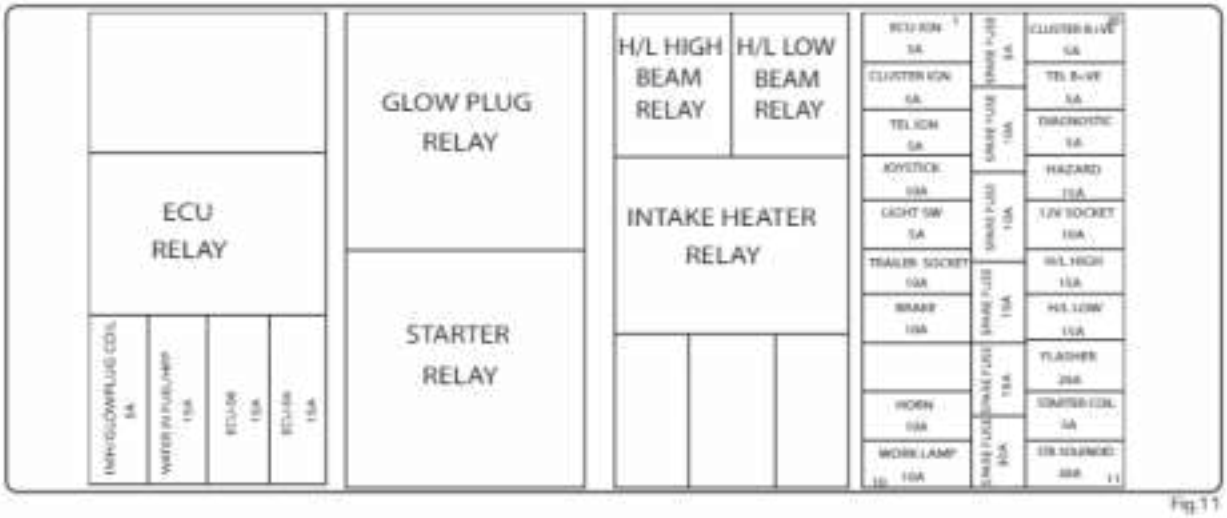


Fig.11

9. Beeper output provision

The beeper will beep at different rate during following conditions.

Priority	Description	Beeps/min
1	High temperature warning	60
2	Engine low oil pressure	50
3	Battery charging indicator	30
4	Air filter clog	10
5	Service reminder	30
6	Park brake	60

3.3.2 Instrument cluster

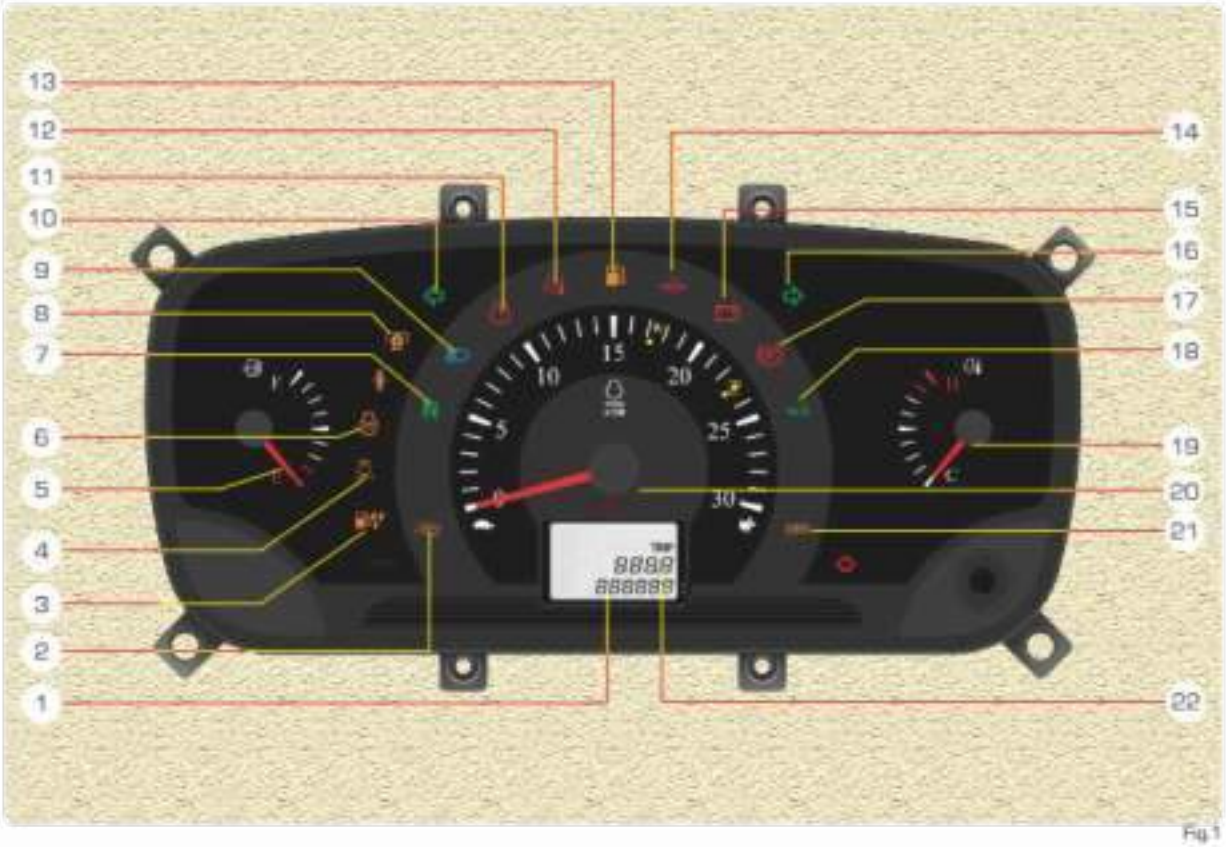


Fig.1

Instrument cluster

The instrument cluster is a descriptive unit that gives the user various indications about the working of the tractor and its various features. It consists of the following.

1. Tractor run hour counter
2. Service reminder indicator
3. Water in fuel indicator
4. Air filter clogging indicator
5. Fuel level gauge
6. Engine manifold heater indicator
7. Speed shift lever neutral position
8. PTO engage indicator
9. High beam indicator
10. Left hand side turn indicator
11. Malfunction indicator lamp (MIL) indicator
12. High temperature warning indicator
13. Low fuel indicator
14. Low oil pressure indicator
15. Battery charging indicator
16. Right hand side turn indicator
17. Parking brake indicator
18. 4WD indicator
19. Engine coolant temperature gauge
20. Tachometer (RPM meter)
21. Check engine indicator
22. Trip hour counter

1. Tractor run hour counter

This is an LCD hour counter located under the tachometer. It is operated when the engine is running. Hour counter displays the cumulative engine running hours. The run hour is calculated in real time, i.e. 60 minutes of tractor run is calculated as 1 hour only.

2. Service reminder indicator

This is an amber color LED and glows continuously when the service of tractor is due. This function is set for first 50th hour and thereafter for every 350th hour of engine running. The operator is thus indicated for general service due. Resetting can be done by authorized Mahindra dealer as soon as the general service is done. Buzzer will sound at the rate of 30 beeps per min.

Service reminder reset logic:

Once service is due, service reminder indication turns ON.

To reset follow below steps (applicable only when service reminder is activated):

i. Turn ON the ignition (engine should be OFF)

ii. Press and hold trip reset switch for ≥ 20(±1) & ≤ 30(±1) sec.

iii. Service reminder indicator starts blinking, release the trip switch. Blinking rate shall be 1sec ON and 1sec OFF. It shall blink for 5 times.

iv. Press the trip with and release (short press within 1 sec)

v. Service reminder indicator switches OFF.

Note: If switch is pressed <20 sec or >30 sec, it shall not enter in service reminder reset cycle & service reminder should not blink.

After completion of step-ii, short press should be done within blinking state of service.

3. Water in fuel indicator

This is an amber LED and glows continuously when water is accumulated in the fuel filter. The operator has to drain the water by opening the sensor in fuel filter.

NOTICE : Fuel Injection equipment life will be affected and warranty for the same will be void if the water is not drained. After draining the water tighten the sensor as recommended by Mahindra service.

4. Air filter clogging indicator

This is an amber LED and glows continuously when air filter is clogged.

This gives an indication to the customer that the air filter needs to be cleaned for proper functioning. Buzzer will sound at the rate of 10 beeps per min.

NOTICE : Improper maintenance of air filter will lead to inferior engine performance and turbocharger associated failures. Will void air induction system warranty.

5. Fuel level gauge

The fuel level gauge is displayed on the left side of rpm meter when viewed from the operator's seat. It indicates quantity of fuel available in the fuel tank. The indication is divided into 9 stages. The red zone indicates that the fuel level is less and the tractor should be refueled for uninterrupted run.

6. Engine manifold heater indicator

This is an amber LED which glows continuously to define time period of activation of heater element. This telltale activation time will be dependent on ambient temperature.

Whenever the ignition key is turned ON, this telltale will be continuously ON for period of max 60 sec (actual will vary based on ambient temperature) & turn OFF automatically. Operator to start the tractors only after this telltale switch OFF.

After engine started running, this telltale will be again ON continuously for period of Max 160 sec (actual will very based on ambient temperature) & turn OFF automatically.

NOTE : Engine runs at higher than idle rpm (up to 1400 rpm) during cold start operations and drops gradually to the normal idling speed (1000 rpm) until coolant temperature reaches to 68°F (20°C).

7. Speed shift lever neutral position

This is an green LED and glows continuously when speed lever is in neutral position.

8. PTO engaged indicator

This is amber LED indication for PTO. This indicates when PTO is in ON position.

9. High beam indicator

This is a blue LED and glows continuously when head lamps are operated in high beam.

10. Left hand side turn indicator

This indicator will glow in green LED. Left hand side turn indicator is provided to indicate the direction of turning towards left hand side. A blinking left hand side turn indicator implies that the left hand side turn signal indicator of tractor at the same time right hand side turn indicator will glows continuously.

Flash rate of turn signal increases a minimum of 20 flashes per minute as compared to flashing warning lamps. Turn signal flash rate is 80-105 counts per minute.

11. Malfunction indicator lamp (MIL) indicator

This indicator will glow in red LED when the engine is facing any issue with emission related components like EGR.

A malfunction in the electronic control system (ECU) is indicated by a continuously "glowing" or "blinking" indicator, even post cranking of the engine. In such an event, get the problem rectified by an authorized Mahindra dealer.

12. High temperature warning indicator

This indicator will glow in red LED and is located on top of tachometer. It will glow continuously when temperature of coolant rises above 230°F (110°C). The pointer of temperature gauge will lie in the red band under such condition and also to warn the operator, the buzzer will sound continuously at the rate of 60 beeps per minute while the high temperature warning indicator is illuminated (Occurs only when the engine is running).

⚠WARNING

CONTINUED OPERATION OF ENGINE DESPITE THE HIGH TEMPERATURE WARNING INDICATOR GLOWING MAY LEAD TO ENGINE SEIZURE.

13. Low fuel indicator

This is an amber LED and glows when fuel in tank is lower than optimum level.

14. Low oil pressure indicator

This is red LED which glows when the engine is operating at low oil pressure to warn the operator.

With ignition key in the on position and engine running, if this indicator is illuminated, the buzzer will sound for 60 seconds at the rate of 50 beeps per minute. After every 30 minute of operation, if the ignition is on and engine is running, if the indicator is still illuminated the buzzer will again sound for 60 seconds at the rate of 50 beeps per minute until the low pressure is resolved.

⚠WARNING

CONTINUED OPERATION OF ENGINE DESPITE THE LOW PRESSURE WARNING INDICATOR GLOWING MAY LEAD TO ENGINE SEIZURE.

15. Battery charging indicator

This is red LED which glows when the alternator is not generating voltage to warn the operator.

With ignition key in the on position and engine running, if this indicator is illuminated, the buzzer will sound for 60 seconds

at the rate of 30 beeps per minute. After every 30 minute of operation, if the ignition is on and engine is running, if the indicator is still illuminated the buzzer will again sound for 60 seconds at the rate of 30 beeps per minute until the low charge condition is resolved.

16. Right hand side turn indicator

This indicator will glow in green LED. Right hand side turn indicator is provided to indicate the direction of turning towards right hand side. A blinking right hand side turn indicator implies that the right hand side turn signal indicator of tractor is ON and at the same time left hand side turn indicator will glows continuously.

Flash rate of turn signal increases a minimum of 20 flashes per minute as compared to flashing warning lamps. Turn signal flash rate is 80-105 counts per minute.

17. Parking brake indicator

This is a red LED and glows when the parking brake is applied.

Buzzer will sound continuously when park brake is engaged and when speed lever is not in neutral position.

Buzzer will sound continuously at the rate of 60 beeps per minute.

18. 4WD indicator

This is a green LED and glows when 4WD is engaged. This LED will glow only in 4WD tractor version.

19. Engine coolant temperature gauge

The temperature gauge is displayed on the right side of instrument panel when viewed from the driver's seat. This gauge indicates coolant temperature of the engine.

When the pointer is on the red line indicating the engine coolant temperature is high, the buzzer will sound continuously at the rate of 60 beeps per minute while the high temperature warning indicator is illuminated (Occurs only when the engine is running).

Identify the cause by running the engine at low idle rpm for some time before switching OFF.

Further engine operation should be done only after elimination of the problem.

High temperature indication will blink at 30 cycles per minute when above 230°F and switch off when below 226.4°F.

High temperature buzzer will sound at 60 beeps per minute when above 230°F and switch off when below 226.4°F.

20. Tachometer (RPM Meter)

This gives the number of revolutions per minute of the engine. To arrive at the RPM value at any given point of time, multiply the pointer reading by 100.

Example: if the reading shows 15, the actual engine RPM value = 15 x 100 = 1500

21. Check engine indicator

This indicator will glow when the malfunction other than emission, such as sensor failures would be indicated by a continuously "GLOWING" or "BLINKING" indicator, even past CRANKING of the engine. In such event, get the problem rectified by an authorized Mahindra Dealer.

22. Trip hour counter

This is an LCD hour counter located under the tachometer.

It is operated when the engine is running. Trip hour counter displays the running hours for the particular trip. The run hour is calculated in real time, i.e. 60 minutes of tractor run is calculated as 1 hour only. After 999.9 hours is completed, the count restarts from zero.

The blinking of the symbol indicates that the run time is counted on real time.

3.3.3 Tilt steering

The steering can be tilted towards or away from the operator as per the need and convenience of operator and is recommended to be done in tractor parked condition.

Tilt steering adjustment

1. Park the tractor safely.
2. Press the tilt steering pedal by foot.
3. Tilt the steering wheel to desired position. Gas spring is provided to hold the steering as per the operator convenient.
4. Release foot pressure on the pedal.

Fig. 2

⚠WARNING

ATTEMPTING TO ADJUST THE STEERING WHEEL WHILE DRIVING THE TRACTOR MAY CAUSE THE OPERATOR TO LOSE CONTROL OF THE TRACTOR.

LOCK THE STEERING WHEEL IN POSITION BEFORE DRIVING THE TRACTOR.

3.3.4 Hand throttle operation

Use the hand throttle lever to set a constant engine speed for stationary operation or for field operation wherever desired.

Increasing engine speed : Pull throttle lever towards operator.

Decreasing engine speed : Push throttle lever away from the operator as indicated in the sticker on the cluster bezel right hand top side.

Constant speed setting : Certain operations may require a particular engine speed. This can be achieved by adjusting the hand throttle lever in a position where you get the desired engine speed.

Fig. 3

3.3.5 Foot throttle operation

When tractor operation requires repeated speed change, use the foot throttle pedal to temporarily increase engine speed above hand throttle setting. We recommend to keep the hand throttle at minimum and use foot throttle when driving on road.

A. Set the hand throttle lever at desired rpm.

B. Depress foot throttle pedal to increase engine rpm.

C. Release foot throttle pedal to decrease engine rpm to achieve the previous engine speed set by hand throttle lever.

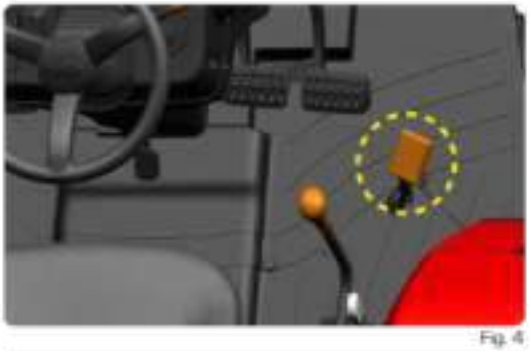


Fig. 4

3.3.6 Brake pedals

Two independent brake pedals are provided for left hand side and right hand side wheel braking to enable sharp turns during field operations.

- To make a sharp turn to the left, depress left hand side brake pedal (A).
- To make a sharp turn to the right, depress right hand side brake pedal (B).

The brakes can be latched together to act simultaneously by means of brake pedal latch (C) as follows.

1. Rotate brake pedal latch (C) until it locks into right hand side brake pedal (B).
2. Depress any of the brake pedal to slow or stop the tractor.
3. When brakes are applied with brake pedals latched together, the tractor should stop in a straight line. Check and adjust brake settings if the tractor is dragged to either side on applying brakes.

NOTE: The hand throttle lever should be brought to low idle rpm position before applying brakes.

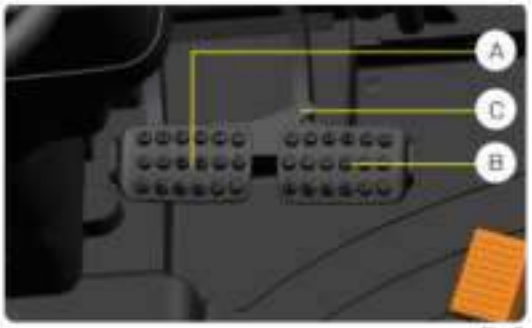


Fig. 5

⚠CAUTION

USING UNLATCHED BRAKES TO STOP THE TRACTOR AT HIGH SPEEDS MAY CAUSE ACCIDENTAL TURNING OR TIPPING.

LATCH BRAKE PEDALS TOGETHER WHILE ON ROAD TRAVEL. SLOW DOWN BEFORE MAKING A TURN.

DO NOT APPLY INDEPENDENT BRAKES WHILE AN ATTACHMENT IS ENGAGED WITH THE GROUND. THIS CAN CAUSE DAMAGE TO THE ATTACHMENT, THREE POINT LINKAGE OF TRACTOR AND MAY ALSO RESULT IN TIPPING OF THE TRACTOR.

3.3.7 Clutch pedal

Tractor is fitted with suspended pedal to engage/ disengage drive to transmission.

Clutch transmits drive to transmission and is operated by clutch pedal.

Depressing the clutch pedal fully disengages the drive to gear box for selection of different speeds.

Fig 6

⚠CAUTION

RESTING THE FOOT ON THE CLUTCH PEDAL WHILE DRIVING REDUCES LIFE OF THE CLUTCH.

DO NOT USE THE CLUTCH PEDAL TO HOLD THE VEHICLE OR WHILE DRIVING ON AN UPHILL PATH. USE THE PARKING BRAKE INSTEAD.

AVOID USE OF PARTIAL CLUTCH FREQUENTLY.

3.3.8 F-N-R shuttle lever

This is a 3 way lever. It operates by front and forth direction and the operations are as follows.

Center : Neutral position

Forward : Vehicle move in forward direction

Rearward : Vehicle move in reverse direction

The lever can be engaged as follows.

1. The F-N-R lever cannot be shifted from neutral to either forward or reverse without depressing the clutch pedal.
2. The F-N-R lever can be shifted to neutral from forward or reverse without depressing the clutch pedal.

Fig 7

3.4 Operator's left side controls

3.4.1 Range shift lever

This lever is located on left hand side of operator's seat. This lever has four positions as follows:

1. High – for high speed range
2. Medium – for intermediate speed range
3. Low – for low speed range
4. Neutral

This lever enables 3 different range options for every speed gear selection. The lever can be engaged as follows.

1. Depress clutch pedal and stop tractor motion completely.
2. Choose H, M or L speed range to match work application.
3. Release clutch pedal gradually.

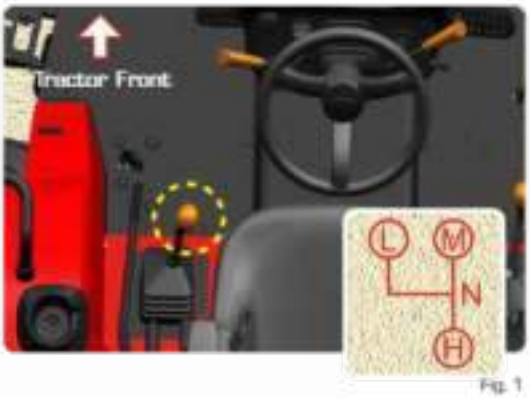


Fig. 1

⚠WARNING

NEVER SHIFT RANGE LEVER WHILE THE TRACTOR IS IN MOTION.

3.4.2 Parking brake

The parking brake lever is provided at the left hand side of the operator's seat on the rear platform.

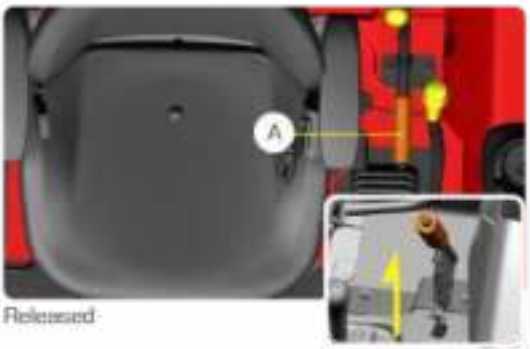
To engage the parking brake press the push button and pull the lever upwards fully. Parking brake indicator on instrument cluster will glow when the parking brake is applied.

Buzzer will sound continuously when park brake is engaged and when speed transmission lever is not shifted to neutral.

To release the parking brake, pull the lever upwards slightly, press the locking button (A) and push the lever downwards. Parking brake indicator on instrument cluster will glow if you are driving with an incorrectly released parking brake.

Always ensure to unlock parking brake before driving the tractor.

Brake pedals should be pressed, while releasing the parking brake.



Released

Applied Fig. 2

⚠WARNING

DRIVING WITH PARKING BRAKE IN ENGAGED CONDITION, EVEN IF IT IS SET PARTIALLY, CAN OVERHEAT OR DAMAGE THE BRAKES AND WILL RESULT IN POOR BRAKING.

⚠CAUTION

ALWAYS ENGAGE THE PARKING BRAKE WHEN THE TRACTOR IS LEFT UNATTENDED.

3.4.3 PTO selection lever (540 & 540E)

This tractor is equipped with dual PTO option, namely 540 and 540E which is an economy position.

The PTO lever has three positions 540, neutral and 540E.

To select required PTO rpm, shift the lever and put it in required position.

PTO will not be operable in case of neutral position.

540 position

With 540 position selected and the engine running at 2285 RPM, the PTO shaft will rotate at 540 RPM.

540E position

With 540E position selected and the engine running at 1721 RPM, the PTO shaft will rotate at 540 RPM.

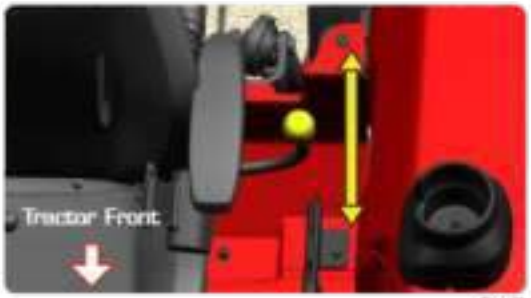


Fig. 3

NOTE : The clutch may require replacement due to normal wear, if loss of power to PTO shaft is observed when PTO selection lever is engaged. Contact your local Mahindra dealer should identify & rectify the issue.

⚠WARNING

THE FREE PLAY OF THE PTO CLUTCH IS PRESET AT FACTORY. IT IS NOT RECOMMENDED TO ADJUST THE SAME THROUGH PTO CLUTCH LINKAGE.

WHEN PTO DRIVE IS NOT IN USE KEEP THE PTO SELECTION LEVER IN NEUTRAL POSITION.

FIRMLY APPLY THE PARKING BRAKES, PLACE ALL GEAR SHIFT LEVERS IN NEUTRAL BEFORE OPERATING ANY STATIONARY PTO EQUIPMENT. DO NOT APPROACH OR WORK ON THE PTO SHAFT OR EQUIPMENT WHILE THE PTO IS IN MOTION. SHUT-OFF ENGINE AND THE PTO AND WAIT FOR ALL MOVEMENT TO STOP BEFORE WORKING ON THE PTO OR EQUIPMENT.

3.4.4 Power Take Off (PTO) lever

This lever is located on left hand side of operator's seat. This lever has two positions as follows:

1. Engage – Move lever forward for engaging the PTO
2. Disengage – Move lever backwards (Rear side) for disengaging the PTO

Note: Before starting of tractor always ensure that PTO is in disengaged position.

Fig. 4

3.4.5 Cup holder

A cup holder is located at the left hand side of the operator's seat on the left hand side fender. It is designed for holding cup or drink cans.

Fig. 5

3.4.6 4WD engagement lever

This lever is located on left hand side of operator's seat. It is used to engage or disengage the drive to front wheels and is recommended to be done with tractor in stand still condition.

1. Depress clutch pedal and stop the tractor motion completely.
2. Lift the lever upwards to engage the drive to front wheels.
3. Press the lever downwards to disengage the drive.

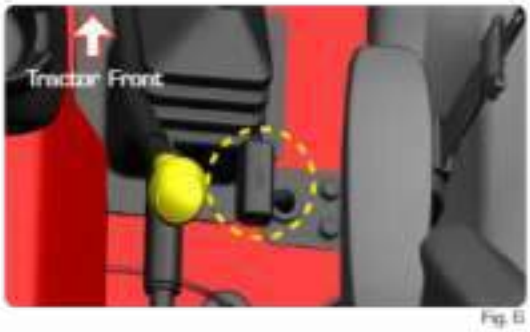


Fig. 0

⚠WARNING

DO NOT ENGAGE OR DISENGAGE THE 4WD LEVER WHILE THE TRACTOR IS IN MOTION.

3.5 Operator's right side controls

3.5.1 Speed shift lever

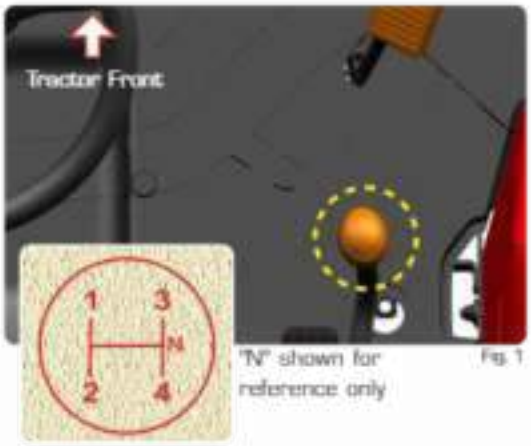
This lever is located on right hand side of operator's seat. This lever has five positions including Neutral. This lever enables 4 different speed options within a particular "Range Gear" selection. The road speed increases in higher gears.

- Depress clutch pedal completely.
- Choose any one gear to match work application.
- Release clutch pedal gradually.

These gears can be shifted on-the-go.

Refer chart for road speed of tractor in different positions.

Refer: 9. Specifications section page no. 9.4



"N" shown for reference only
Fig. 1

3.5.2 Differential lock pedal

This pedal is located on the right hand side of the operator's seat on rear floor. The differential allows the drive wheels to rotate at different speeds when the tractor in bad field conditions.

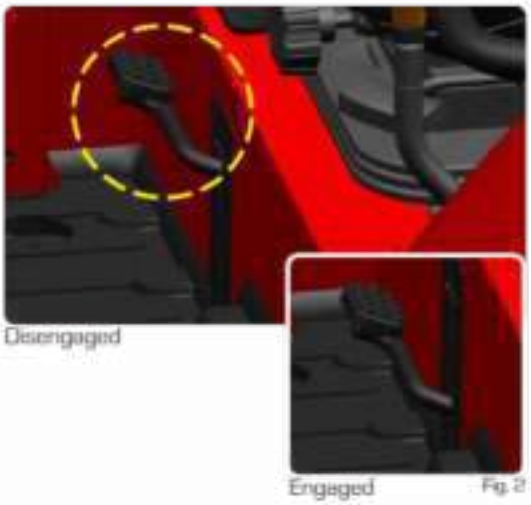
The differential has a locking device, controlled by a foot pedal. It is advisable to lock the differential in the following situations:

- When ploughing, to prevent the wheel that is not in the furrow from slipping.
- When one of the drive wheels is on uneven, muddy or slippery ground and tends to slip.

Differential lock is designed for occasional use. Do not attempt to lock differential while,

- Tractor is in high speed.
- Turning the tractor.

Releasing the pedal pressure disengages the differential lock.


Disengaged

Engaged
Fig. 2

⚠DANGER

STEERING IS DIFFICULT WITH THE DIFFERENTIAL LOCK ENGAGED. AN ACCIDENT COULD RESULT.

DURING FIELD OPERATION, USE THE DIFFERENTIAL LOCK FOR TRACTION IMPROVEMENT BUT RELEASE FOR TURNING AT ROW END. DO NOT DRIVE AT HIGH SPEEDS OR ON ROADS WITH THE DIFFERENTIAL LOCK ENGAGED. FAILURE TO COMPLY WILL RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

ATTEMPTING TO TURN THE TRACTOR WHILE DIFFERENTIAL LOCK IS ENGAGED MAY RESULT IN DAMAGE TO TRANSMISSION.

4. OPERATING INSTRUCTIONS

4.1 Primary operating safety rules

The use of this Operator's Manual is to provide the user with information and practical instructions.
Read the Operator's Manual carefully before using the tractor. This is particularly important if the tractor is to be used correctly as it contains all the information required on the layout and use of the tractor controls.
Even if you already have experience in using other tractor; this manual must be studied carefully and thoroughly.

⚠WARNING

MAKE SURE THERE IS PROPER VENTILATION BEFORE STARTING THE ENGINE.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

READ AND UNDERSTAND OPERATOR'S MANUAL FOR SAFETY INFORMATION AND OPERATING INSTRUCTIONS. DO NOT ALLOW OTHERS TO OPERATE THE TRACTOR WITHOUT READING THE OPERATOR'S MANUAL.

READ AND UNDERSTAND ALL TRACTOR AND EQUIPMENT SAFETY SIGNS. VERIFY THAT ALL GUARDS, SHIELDS, AND SAFETY DEVICES ARE IN PLACE AND OPERATIONAL.

CLEAR THE AREA AROUND THE TRACTOR AND ATTACHED EQUIPMENT OF ANY BYSTANDERS.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

START ENGINE ONLY FROM OPERATOR'S SEAT WITH ALL DRIVE LINE CONTROLS IN NEUTRAL, ALL PTO CONTROLS IN THE OFF POSITION, HYDRAULIC VALVES IN THE NEUTRAL POSITION AND HITCH CONTROLS IN THE LOWER POSITION.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

BEFORE STARTING THE ENGINE, MAKE SURE YOU ARE FULLY AWARE OF THE LOCATION AND THE FUNCTION OF EACH CONTROL.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.

MAKE SURE THAT EVERY OPERATOR:

- IS INSTRUCTED IN THE SAFE AND PROPER USE OF THIS MACHINE.
- READS AND UNDERSTANDS THE OPERATOR'S MANUAL FOR THIS MACHINE.
- READS AND UNDERSTANDS ALL SAFETY SIGNS ON THE MACHINE.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

4.2 Hood

4.2.1 Opening the hood

The hood is hinged at the rear side and opens away from the operator as follows,

1. Pull the lever (A). The hood will unlock.
2. Lift the hood upwards by hand. Two gas springs (B) provided inside will assist in minimizing the effort for lifting and holding the hood at specified angle.

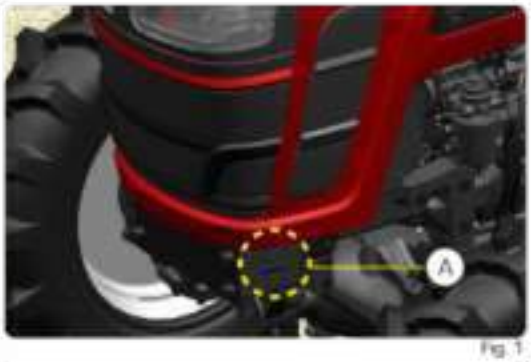


Fig.1

4.2.2 Closing the hood

Pull the hood strap (C) to bring the hood downwards and press downwards until it locks.

Fig.2

4.3 Before starting the tractor

1. Clean the tractor.
2. Ensure the external lights are clean.
3. Make all prestart checks according to preventive maintenance schedule.
4. Check coolant level in reservoir tank & oil level in engine, transmission and steering.
5. Check fuel level.
6. Ensure all the tires are properly inflated as per the load conditions.
7. For operator's maximum comfort, adjust seat suspension as per the operator's weight. Also adjust seat position forward or rearward as per operator's convenience to operate all controls and switches.
8. If necessary, ballast the tractor.
9. Adjust wheel tread, if necessary.
10. Adjust stabilizer and 3 point linkage.
11. Ensure all sensor and harness connections are secured properly.
12. Battery should be in charged condition, no loose contact at starter motor and battery terminals.
13. Hydraulics or PTO load should be disengaged to avoid load on starter motor during starting.

14. Clean battery terminals if corroded.

15. For purpose of safety, check that all covers are correctly in position before starting the engine or using the tractor.

⚠WARNING

DO NOT USE STARTING FLUID. TRACTOR IS EQUIPPED WITH INTAKE MANIFOLD HEATER.

4.4 Starting the tractor

1. Move the controls as under :

- PTO lever should be in disengaged condition
- Clutch should be in fully pressed condition
- Speed transmission shift lever should be in neutral position
- Position control (PC) lever should be in lowermost position.
- Auxiliary lever should be in neutral position.

2. Turn the key to ON position and observe self test function of instrument cluster.

3. Turn the starter key in clockwise to engage the starter and hold in this position till the engine fires. When released, the key springs back to the ON position.

4. Idle the Engine for 1 to 2 minutes before driving it. If required, warm-up the engine at suitable speed. For faster warm-up, raise the engine speed to approx. 2000 RPM.

NOTE :

1. Starting logic is defined with speed transmission lever in Neutral, PTO lever in disengaged position, and clutch pedal fully depressed condition.

⚠WARNING

THE ENGINE SHOULD NOT BE PUT UNDER FULL LOAD IMMEDIATELY AFTER START.

DO NOT ACCELERATE THE ENGINE RAPIDLY.

NEVER PUSH OR TOW THE TRACTOR TO START THE ENGINE. DOING SO MAY OVER STRESS THE DRIVE TRAIN.

DO NOT CRANK THE STARTER CONTINUOUSLY FOR MORE THAN 10 SEC. TO AVOID STARTER MOTOR FAILURE.

DON'T OPERATE THE ENGINE IN LOW IDLE SPEED FOR MORE THAN 15 MIN. DOING SO WILL AFFECT THE PERFORMANCE OF THE TURBOCHARGER (If equipped).

DON'T TURN THE IGNITION KEY TO START POSITION WHILE ENGINE IS RUNNING. DOING SO MIGHT DAMAGE THE STARTER MOTOR.

NOTE: It is normal for the engine to be louder and have bluish-white exhaust smoke during engine warm-up. The amount of smoke depends on the temperature of air entering the engine. In cold weather, idle the engine and warm-up for 5 minutes at approx. 2000 rpm before loading.

4.5 Starting in low outside temperature

4.5.1 Winter care

The intake manifold heater element (A) is provided in engine intake manifold to aid the engine starting during cold weather [for temperatures below 68°F (20°C)].

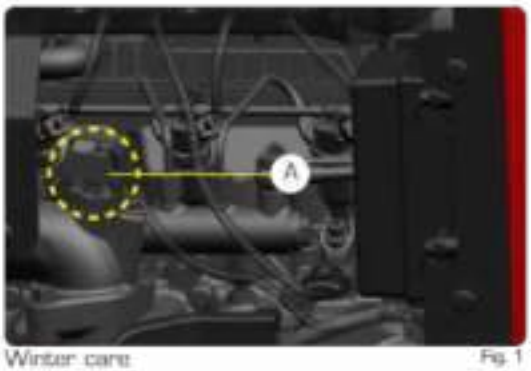
When the key is turned to "ON" position, the element is activated. The heater indicator in the instrument cluster indicates the heater element operation. Based on the prevailing ambient cold temperature, the heater operating duration is adjusted automatically. The element continues to heat the air in the intake manifold for some specific duration.

Follow the below procedure during the cold weather starts:

1. Turn the key to "ON" position and wait till the heater indicator is put-off .
2. Crank the engine when the heater indicator is put-off.

NOTE : Engine runs at higher low idle RPM (Up to 1400 RPM) and drops gradually to the normal idling speed (1000 RPM) at cold ambient temperature.

The heater indicator glows for some specific duration after starting the engine, depending on the ambient temperature.



Winter care Fig. 1

4.5.2 Coolant heater (Optional fitments)

The engine is equipped with intake manifold heater for easy startability in cold conditions. Coolant heater is to be used for cold ambient condition below -10°C. Tractor is equipped with provision for fitment of coolant heater (optional fitment).

A coolant heater is available as a DIA kit (optional fitment). Contact your nearest Mahindra dealer for further details on installation and maintenance of coolant heater.

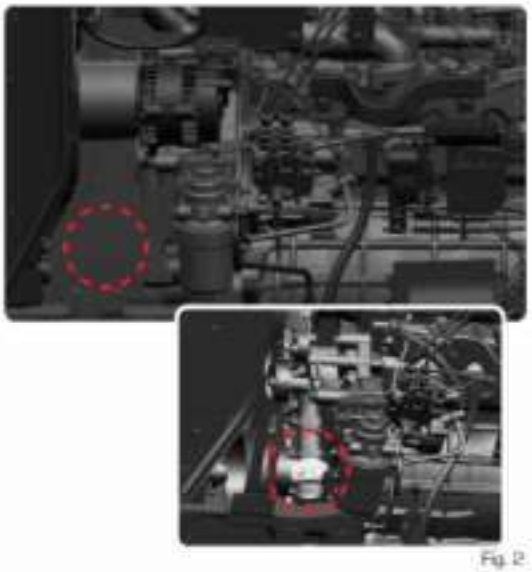


Fig. 2

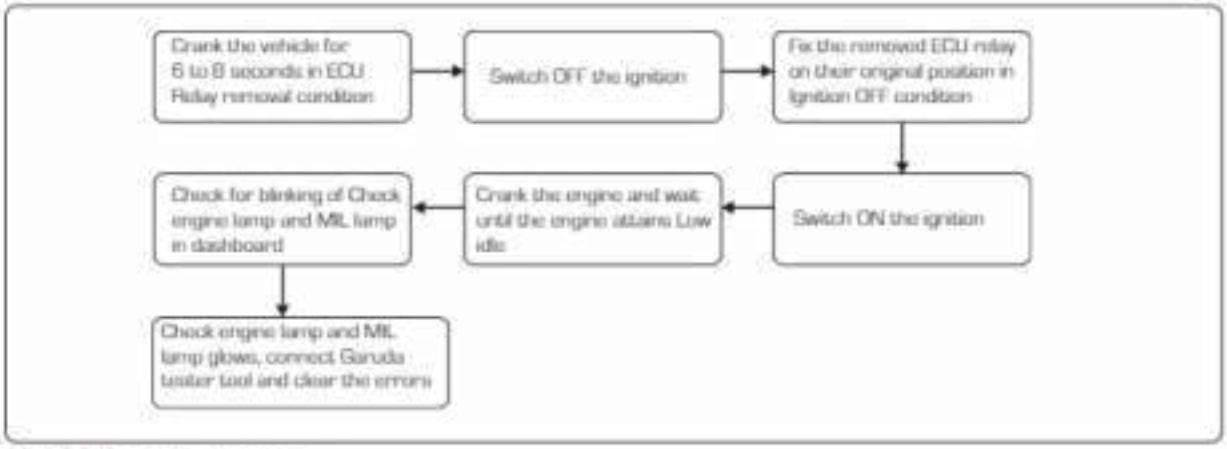
4.6 Dead cranking procedure

- Switch Off ignition key and wait for one minute to cool the engine.
- Locate the fuse box location and remove the fuse box cover (A)
- Remove the ECU relay (B) as shown in Fig.2.
- Make sure the battery 100% charged and terminals intact properly.

Fig. 1

Fig. 2

Follow the below sequence to do cranking:



4.7 Driving the tractor

With the engine running and the clutch in disengaged position, engage F-N-R shuttle lever, speed lever and the range lever to their appropriate desired positions. Disengage the parking brake. Slowly release the clutch and tractor will start moving.

During field operations, assistance in making sharp turns can be gained by applying pressure to the independent foot brake pedal of the side to which the turn is to be made.

The brakes can be latched together to act simultaneously by means of the brake pedal latch.

IMPORTANT: If the engine stalls while operating under load, restart engine immediately to prevent abnormal heat built up in engine.

⚠WARNING

ALWAYS LATCH THE BRAKE PEDALS TOGETHER WHEN TRACTOR IS NOT BEING USED IN FIELD.

DO NOT ATTEMPT TO START THE ENGINE WHILE STANDING BESIDE THE TRACTOR, BECAUSE SERIOUS INJURY OR DEATH COULD OCCUR. ALWAYS SIT ON THE OPERATOR'S SEAT.

4.7.1 Operational instructions

1. Before starting the tractor ensure parking brake is engaged, place the PTO lever in OFF position, PC lever in lowered position, auxiliary control levers in neutral position, transmission levers in neutral and clutch pedal to be pressed.
2. Do not apply load on tractor at low engine RPM. Always apply heavy loads at increased engine speeds.
3. Do not start the engine or operate controls while standing beside the tractor. Always sit on the tractor seat when starting the engine or operating controls.
4. Avoid accidental contact with the gear shifter lever while the engine is running. Unexpected tractor movement can result from such contact and may cause accident.
5. Do not get off or attempt to climb on the tractor while it is in motion.
6. Shut off the engine, PTO lever in disengaged position, lower implements to ground and apply the parking brake before getting off the tractor.
7. Do not operate 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 ceases to operate, stop the tractor immediately.
10. Pull only from the swinging drawbar or the lower link 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 and the tractor to turnover.
11. Always use hydraulic position control lever when attaching equipment/implements and when transporting equipment. Be sure that the hydraulic couplers are properly mounted and disconnect safely in case of accidental detachment of implement.
12. Do not leave equipment/implements in the raised position.
13. Use the flashing warning lamp and slow moving vehicle (SMV) signs when driving on public roads during both day and at night time, unless prohibited by law.
14. Dim tractor head lamps (use low beam) when meeting a vehicle at night. Be sure the head lamps are adjusted to prevent blinding on the eyes of oncoming vehicle operator.
15. **Emergency stopping instruction:** If tractor fails to stop even after application of brakes, shut off the engine while the tractor is in gear and clutch engaged.

4.8 Stopping the engine

1. Run the engine at idle for 1 to 2 minutes to ensure that the turbo unit speed is decreased and the unit is lubricated properly.
2. Apply the parking brake and turn the key to "OFF" position.

5. WORKING OPERATIONS

5.1 Hydraulics

5.1.1 Position control - operation

Quadrant assembly

This system incorporates a position control. PC lever within easy reach of the operator.

⚠WARNING

THE OPERATOR MUST BE THOROUGHLY ACQUAINTED WITH THE LOCATION AND USE OF ALL CONTROLS REGARDLESS OF EXPERIENCE, MUST READ THIS SECTION CAREFULLY BEFORE ATTEMPTING TO OPERATE THE TRACTOR.

Position control

This PC lever (A) controls the lifting and lowering of all implements used on the three point linkage.

1. Moving the PC lever forward will lower the implement.
2. Moving the PC lever rearward will raise the implement.
3. There are to be two stoppers on the PC slot. The stopper at the bottom (C) sets working depth and the stopper at the top (B) is to limit lift height.

PC lever (A) should be used for the following applications:

1. Transport of implements and turn around at the end of the field.
2. Constant depth of implements on level terrain and for non-ground engaging implements such as spreaders or sprayers. Place the PC lever at desired depth.

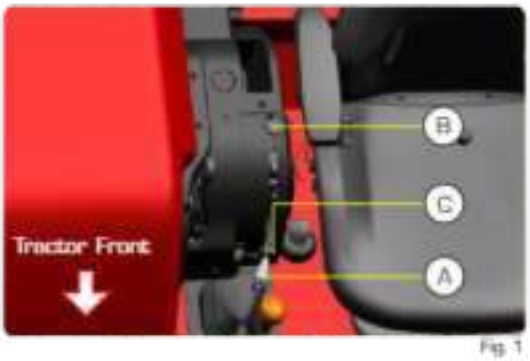


Fig. 1

Setting the position control

Depth setting:

1. Move the PC lever (A) back to the upper limit and allow the implement to lift fully.
2. Move the PC lever (A) forward until the implement has reached the desired working depth.
3. Set the lower stopper (C) against the PC lever.

Whenever the PC lever is returned to the front position, the implement will return to the same preset depth.

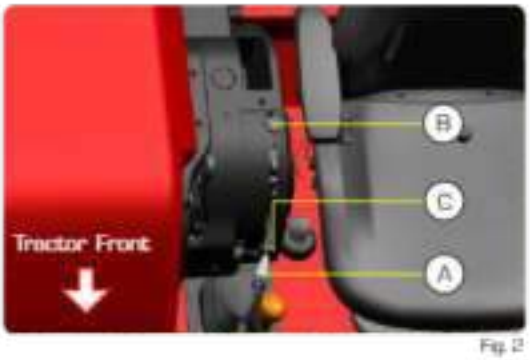


Fig. 2

Height setting:

1. Move the PC lever (A) to the desired height.
2. Set the upper stopper (B) against the PC lever.
3. Stopper (B) can be adjusted by moving forward or rearwards by loosening the knob to adjust the height.

5.1.2 Lowering control valve

The hydraulic system is equipped with lowering control valve to control the three point hitch drop rate. The adjustment knob is located on the operator station platform between the seat and RH console.

The three point linkage drops faster than usual when a heavy implement is attached. The function of the lowering control valve is to slow the three point linkage drop rate to prevent implement damage.

Turn the lowering valve knob (A) counterclockwise to increase the three point linkage rate of drop.

Turn the lowering valve knob (A) clockwise to slow the three point linkage rate of drop.

When lowering control valve knob is fully screwed in, implement will not lower down even the if the position control lever is fully down.

The lowering control valve should be used to prevent inadvertent lowering of an implement during road transport.

Fig.3

⚠CAUTION

EXCESSIVE RATE OF DROP MAY CAUSE IMPLEMENT DAMAGE OR PERSONAL INJURY.

5.1.3 Auxiliary valve

The hydraulic system is equipped with one lever operated auxiliary valve as standard equipment. A second auxiliary valve can be installed as optional fitment.

Each valve has three positions as follows:

a. Lower (L)

b. Neutral (N)

c. Raise (R)

The lever returns to neutral position from lower or raise position when the implement cylinder is fully retracted or extended.

Keep the lever in the neutral position when the auxiliary valve is not in use.

NOTE: Additional auxiliary lever and latch kit can be fitted as optional fitment for selected implements such as backhoe or log splitter. Contact nearest Mahindra Dealer for procurement and installation.

A. Auxiliary valve

Fig.4

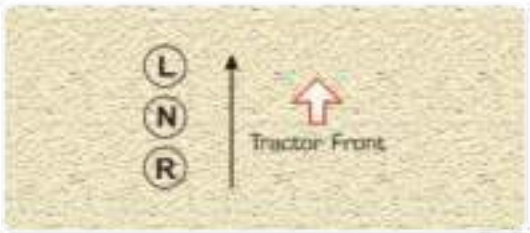


Fig.5

⚠WARNING

THE HYDRAULIC SYSTEM ON THIS TRACTOR IS AN OPEN CENTER SYSTEM. IT IS NOT RECOMMENDED TO USE CONTINUOUS FLOW HYDRAULIC MOTORS. FAILURE TO FOLLOW THIS RECOMMENDATION WILL CAUSE SERIOUS DAMAGE TO TRACTOR HYDRAULIC SYSTEM DUE TO OVERHEATING. CONSULT YOUR MAHINDRA DEALER.

5.2 Three point linkage

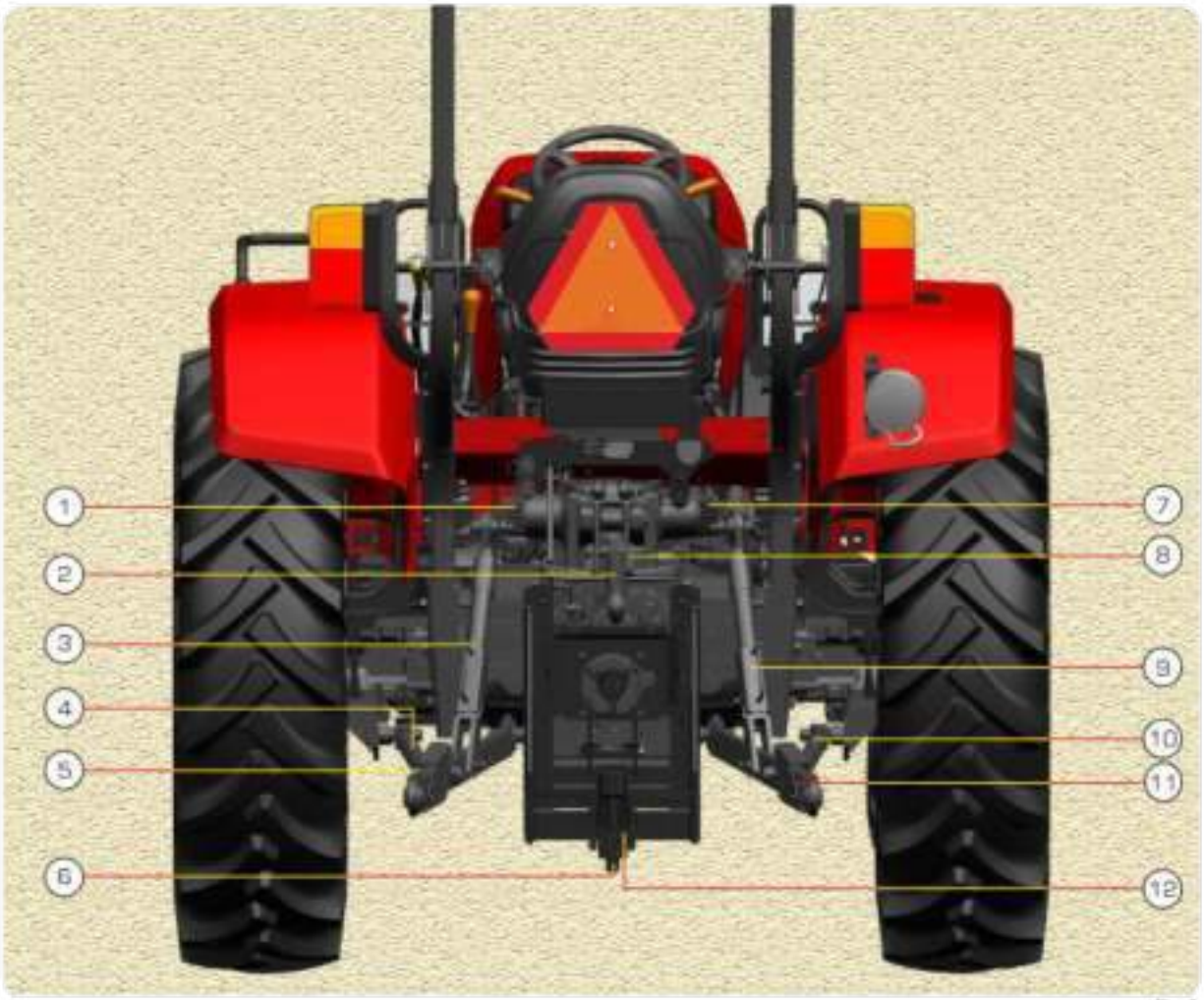


Fig. 1

Three point linkage

1. Lift arm left hand side
2. Top link
3. Adjustable lift rod left hand side
4. Stabilizer left hand side
5. Lower link left hand side
6. Towing pin
7. Lift arm right hand side
8. Top link crank
9. Adjustable lift rod right hand side
10. Stabilizer right hand side
11. Lower link right hand side
12. Drawbar

5.2.1 Top link

It is used to attach the implement and control its inclination front-to-rear with respect to ground. The distance between its two ball-joints can be increased or decreased by rotating the turn-buckle as follows.

1. Loosen the lock plate (A).
2. Clockwise rotation of turn buckle will decrease the distance.
3. Anticlockwise rotation will increase the distance.
4. Tighten the lock plate (A) after desired adjustment.

Link is available with adaptability of cat-I & Cat-II implements.

Fig. 2

5.2.2 Telescopic lower links

Telescopic lower links are provided for ease of hitching the implement as follows.

1. Slowly back tractor into position to align the lower links with implement pins.
2. Park tractor safely.
3. Press the bracket (B) in lower link and pull link (C) to extend as needed.
4. Connect lower links to the implement. Sit on operator's seat and start engine.
5. Back tractor until each lock lever snaps and secures each lower link in the lock position.

Lower links are available with adaptability of cat-I & Cat-II implements.

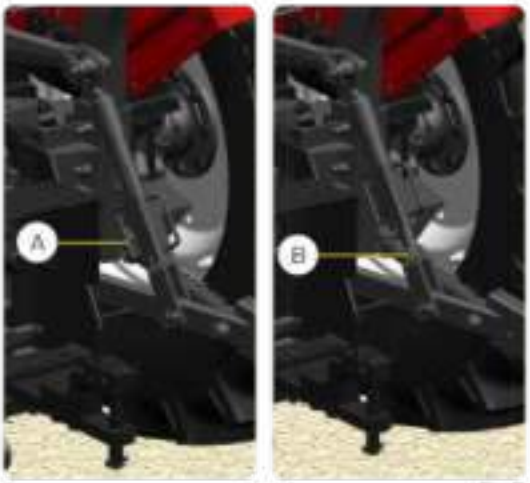
Fig. 3

Fig. 4

5.2.3 Adjustable lift rods

Use turn handle (A) on the adjustable lift rods left hand side and right hand side to raise or lower the telescopic lower link for side-to-side leveling of implement with respect to ground.

1. Raise lift rod rotate handle (A) out of locking tab (B).
2. Rotate handle (A) anticlockwise to raise the lower link or clockwise for lowering.
3. After adjustment, make sure to engage handle (A) with locking tab (B). Always transport the implement with turn handle in this position.



Locked Unlocked Fig. 5

5.2.4 Telescopic stabilizers

These are provided for adjustment of width between two lower links according to varying implement spans.

These enable to keep the implement in either Fixed or Sway position.

Placing the locating pin in (C) position shall keep the stabilizer and implement in "Fixed" position.

Placing the locating pin in (D) position shall keep the stabilizer and implement in "Sway" position.

We recommend to use the fixed position while transporting the implement.

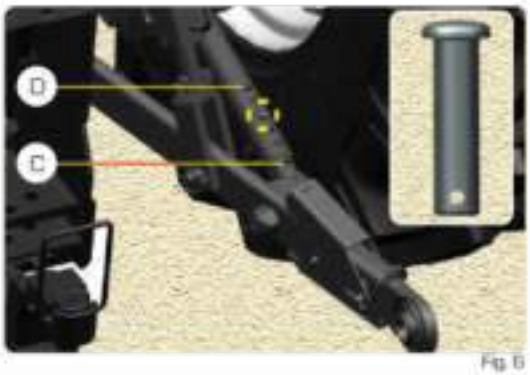


Fig. 6

5.3 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 disconnect the equipment.
2. Do not wear loose clothing when operating the PTO or near rotating equipment.
3. When operating stationary PTO driven equipment, always apply the tractor parking brake and block the rear wheels from front and rear side if necessary.
4. To avoid injury, always move down flip part of PTO shield (E). 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 shaft cap (F) when the PTO is not in use.

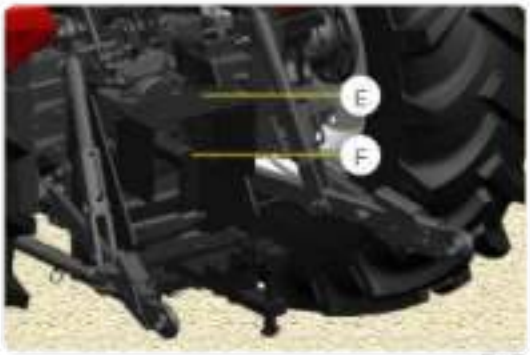


Fig. 7

5.4 Drawbar

5.4.1 Swinging drawbar

Tractor is equipped with a drawbar for connecting to pull behind implements. It can swing from side to side and can be adjusted fore and aft. It can be set at various positions.

The distance between end of PTO shaft and implement/ attachment pin hole can be set at two positions.

There is an optional fitment drawbar is available with a third extended position for selected implements.

Certain heavy equipment such as a loaded single axle trailer can place excessive strain on the drawbar. Strain is greatly increased by rough road and high speed. Static vertical load on drawbar should not exceed as stated in chart.

The drawbar can also be offset from the center on both sides. See your implement operator's manual for drawbar positions.

The drawbar must be locked in center position when:

1. Operating a drawbar pulled PTO driven implement.
2. Towing implements/trailers on road or field.

5.4.2 Adjusting drawbar length

1. Remove lynch pin (A).
2. Pull drawbar clevis pin (B).
3. Slide drawbar to desired position.
4. Insert the drawbar pin (B) in hole of drawbar.
5. Lock the drawbar pin (B) in position with lynch pin (A).

5.4.3 Using swinging drawbar

1. Remove "R" pin (D) of both sway pins (C).
2. Remove both sway pins (C).
3. Shift to next holes as desired.
4. Insert the "R" pins after re-insertion of both pins (C).
5. See your implement operator's manual for drawbar positions.

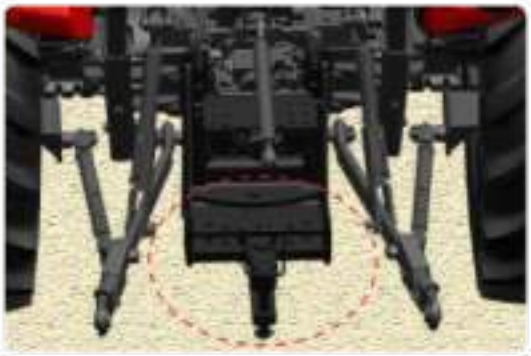


Fig.1

⚠WARNING

- REAR ROLL-OVER CAN RESULT IF PULLING FROM WRONG LOCATION ON TRACTOR. HITCH ONLY TO DRAWBAR.
  USE THREE POINT HITCH ONLY WITH IMPLEMENTS DESIGNED FOR ITS USE, NOT AS A DRAWBAR.
- TRY TO BALANCE THE LOAD PRIMARILY ON THE IMPLEMENT WHEELS. AVOID OVERLOADING THE DRAWBAR. ENGAGE THE CLUTCH SMOOTHLY, AVOID JERKING AND USE BRAKES CAUTIOUSLY TO AVOID JACKKNIFING.

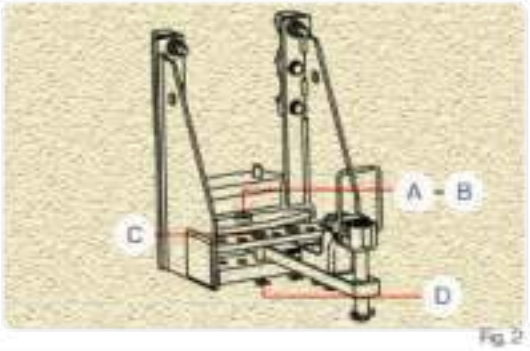


Fig.2

Information on static vertical loads		
Calculation of static vertical load (Ref : ASAE S482 Dec 98)	Regular	Extended
Maximum static vertical load (Kg)	682	580
Maximum static vertical load (lbs)	1504	1279

5.5 Wheels and tires

5.5.1 Pneumatic tires

Adding liquid weight

Tractor tire can be 70% filled with liquid as follows.

1. Raise the wheel. Rotate the tire until the valve, stem is at 1o'clock position.
2. Remove the valve core housing and screw on the adapter.
3. Force liquid into the tire from a tank placed at least five feet higher than the tractor tire or by using a compressor and pressure tank filled with water.
4. When the liquid has reached the required level, remove the adapter, screw in the valve core and inflate to the recommended pressure.

Where ambient temperatures are likely to fall below freezing point use calcium chloride solution, consult your local tire dealer for available liquid ballast options.

The instructions and recommendation shown below should be followed in order to secure maximum life and efficient service from pneumatic tires.

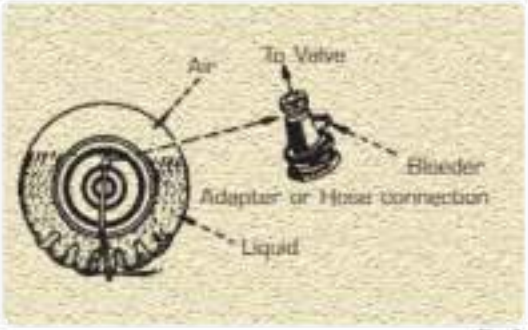


Fig. 1

⚠WARNING

DO NOT LEAVE TIRE PRESSURE LOW AS LOW TIRE PRESSURE CAUSES ABNORMAL AND PREMATURE WEAR BY CAUSING THE TIRE TOUCH THE GROUND FROM THE SHOULDERS ESPECIALLY IN HARD GROUNDS.

5.5.2 Inflation

Keep tires properly inflated to the pressure as shown in the Chart below. Under inflation will damage tire cord and may cause the tire to slip on the rim and tear out the tube valve stem. Over inflation results in excessive slippage, causing rapid tire wear. Air pressure should be checked once a week with an accurate low pressure gauge having one pound graduations. Air pressure should not be allowed to drop or exceed the recommendations.

Always see that the tire valve caps are in place and screwed tight. The caps prevent loss of air through the valve core. Further, they prevent debris from entering and damaging the valve core and air chamber in the tires.

Inflating or servicing tires can be dangerous. Whenever possible, trained personnel should be called in to service or install tires. In any event to avoid the possibility of serious or fatal injury, follow the safety precautions below:

- Upon receiving your tractor, check the air pressure in the tires and re-check every 50 hours or weekly.
- When checking tire pressures, inspect the tires for damaged tread and side walls. Neglected damage will lead to early tire failure.
- Inflation pressure affects the amount of weight that a tire may carry. Do not over or under inflate the tires.
- Never attempt tire repairs on a public road or highway.
- Do not inflate a steering tire above the manufacturer's maximum pressure shown on the tire or beyond the maximum shown in the tire pressure and load Chart A-1 if tire is not marked with the maximum pressure.
- Never inflate a traction tire (front tire on a four wheel drive tractor or any rear tire) over 35 psi (2.4 bar). If the bead does not seat on the rim by the time this pressure is reached, deflate the tire, re-lubricate the bead with a soap/water solution and re-inflate. Do not use oil or grease. Inflation beyond 35 psi with unseated beads may break the bead or rim with explosive force sufficient to cause a serious injury.
- After seating the beads, adjust inflation pressure to the recommended operating pressure.
- Do not re-inflate a tire that has been run flat or seriously under-inflated until it has been inspected for damage by a qualified person.
- Torque wheel to axle nuts to specification after re-installing the wheel. Check nut tightness daily until torque stabilizes.

- Ensure the jack is placed on a firm, level surface.
- Ensure the jack has adequate capacity to lift your tractor.
- Use jack stands or other suitable blocking to support the tractor while repairing tires.
- Do not put any part of your body under the tractor or start the engine while the tractor is on the jack.
- Never hit a tire or rim with a hammer.
- Ensure the rim is clean and free of rust or damage. Do not weld, braze, repair or use a damaged rim.
- Do not inflate a tire unless the rim is mounted on the tractor or is secured so that it will not move if the tire or rim should suddenly fail.
- When fitting a new or repaired tire, use a clip on valve adaptor with a remote gauge that allows the operator to stand clear of the tire while inflating it. Use a safety cage, if available.

Exceptions (Rear tires only)

When plowing with a molded plow, the left hand or land wheel should be inflated to 2 psi. lesser than right hand or furrow wheel.

Chart A-1

TIRE LOAD RATING : 4WD					
	Tire size	Tire type	Tire SLR Inch.	Tire cap. lb. @psi	Rolling circle Inch.
Rear	14.9 x 28	Agricultural	24.95	3200@20	162.34
	16.9 x 24	Industrial	23	4938@22	150.71
Front	9.5 x 20	Agricultural	17.35	1649@30	112.31
	10.5/80-18	Industrial	16.67	3840@54	107.75

5.5.3 Care of tires

Cuts in tires should be repaired immediately. If neglected, it will decrease the tire life. Avoid stumps, stones, deep ruts and other hazards. Keep tires free from oil and grease as both destroy rubber. After using the tractor for spraying, wash off any chemicals that may be left on the tractor and tires.

5.5.4 Tire protection during storage

When not in use the tractor should be stored where the tires are protected from light. Before storing the tractor clean the tires thoroughly. If it is not jacked up, the tires should be inflated at regular intervals. Before putting the tractor in service, always inflate tires to the correct operating pressures.

Do not load tires beyond their rated capacity.

5.5.5 Mounting tires on the rim

After mounting a new or old tire on the rim, inflate it to recommended psi. Inflate the tire until the tire bead takes proper seat on the wheel rim. Then deflate or inflate tire to correct operating pressure.

Torque wheel/axle hardware

Operating the tractor with a loose rim, wheel, hub, or axle can be dangerous and can cause accident.

Tighten the hardware to specified torque periodically.

Check all hardware frequently and keep it torqued.

NOTE: Follow checking procedure when a new tractor is first used, or wheels have been off.

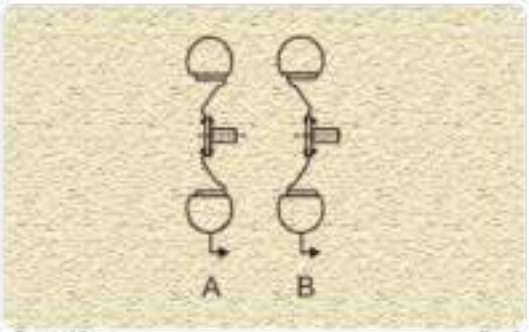
1. Drive the tractor for approximately 100m to 150m, and tighten hardware to specified torque before placing it under any load.
2. Check hardware after working two hours and again after eight hours.

5.6 Wheel tread adjustment

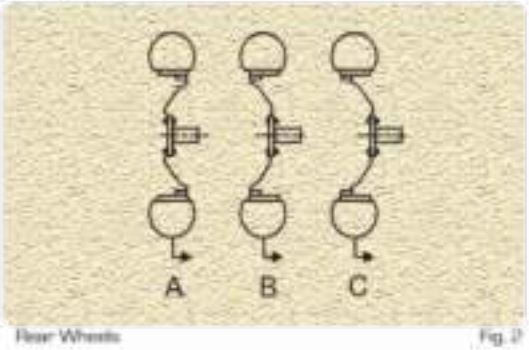
Setting of various offset combinations can result in adjustment of the Front/Rear wheel tread.

IMPORTANT:

An arrow is marked on the sidewall of the tire, which must always point in the direction of forward rotation to obtain maximum traction.



Front Wheels Fig. 1



Rear Wheels Fig. 2

The wheel tread obtained with front & rear tire size is as follows:

TREAD ADJUSTMENT				
	Tire combination	A Inch (mm)	B Inch (mm)	C Inch (mm)
AG	Front wheels 9.5-20 6 PR	Std - 53.5 in (1359 mm)	55.4 in (1408 mm)	NA
	Rear wheels 14.9-28 6 PR	Std - 61.2 in (1555 mm)	57.6 in (1464 mm)	65.6 in (1667 mm)
IND	Front wheels 10.5/80-18 10 PR	55.6 in (1412 mm)	Std - 53.5 in (1358 mm)	NA
	Rear wheels 16.9-24 136A8	Std - 61.2 in (1555 mm)	NA	65.6 (1667 mm)

Tire combination: - 9.5-20/ 14.9-28 (4WD- AG)		
Front	Rear	Remarks
53.5	61.2	Standard track. Suitable for agri, loader, backhoe applications
53.5	65.6	Suitable for agri, loader, backhoe applications
53.5	57.6	Suitable for agri applications
55.4	57.6	Suitable for agri applications
55.4	61.2	Suitable for agri, loader, backhoe applications
55.4	65.6	Suitable for agri, loader, backhoe applications

Tire combination: - 10.5 80-18/ 16.9-24 (4WD- IND)		
Front	Rear	Remarks
53.5	61.2	Standard track. Suitable for loader, backhoe applications
53.5	65.6	Suitable for loader, backhoe applications
55.6	61.2	Suitable for loader, backhoe applications
55.6	65.6	Suitable for loader, backhoe applications

5.7 Diesel fuel

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

NOTE: It is suggested that after repairs if any of the safety decal/sign is peeled/damaged, the same must be replaced immediately in interest of your safety.

5.8 Do's & Don'ts

Do's - For better performance

- Ensure that all safety shields are in place and in good condition.
- Read all operating instructions before commencing to operate tractor.
- Ensure all lights are in OFF position before starting the tractor.
- Carry out all maintenance tasks without fail.
- Keep the air cleaner clean.
- Ensure that the correct grade of lubricating oils are used and that they are replenished and changed at the recommended intervals.
- Watch the oil pressure warning light and investigate any abnormality immediately.
- Keep the radiator filled with clean anti-freeze mixture. Drain the system only if necessary and fill before starting the engine.
- Ensure that the transmission is in neutral before starting the engine.
- Keep fuel in clean storage and use a filter when filling the tank.
- Attend to minor adjustments and repairs as soon as necessity is apparent.
- Allow the engine to cool before removing the radiator cap and remove the radiator cap slowly.
- Shift into low gear when driving downhill.
- Latch the brake pedals together when driving on a road or highway.
- Keep position control lever fully down when not in use.
- Visit dealer for adjustment on injector pressure.
- Slow down the engine speed before shifting the F-N-R shuttle lever.
- Keep the auxiliary valve lever/levers in neutral (N) when not in use.
- Replace both clutch and brake cables after 1000 hours of tractor operation.
- Idle the engine for 1 to 2 minutes after starting and before stopping the engine.

Don'ts - For safe operation

- Do not run the engine without the air cleaner.
- Do not start the tractor in high idle.
- Do not start the tractor in an enclosed building unless the doors and windows are open for proper ventilation.
- Do not operate the tractor or engine while lubricating or cleaning.
- Do not allow the tractor to run out of diesel fuel otherwise it will be necessary to bleed the system.
- Do not tamper with fuel, EGR, DOC or any other emission systems. It may cause engine to derate as per legal inducement requirements since it may affect emissions.
- Do not allow the engine to run idle for a long period.
- Do not run the engine if it is not firing on all cylinders.
- Do not ride the brake pedal. This will result in excessive wear of the brake linings.
- Do not use the independent brakes for making turns on the road or highway or at high speeds.
- Do not refuel the tractor with the engine running.
- Do not use the hand accelerator while driving on roads. It is recommended to use while operating in field.
- Do not run cold engine at full throttle.
- Do not run the tractor on road with 4WD engaged above 10 mph.
- Do not operate F-N-R shuttle lever while tractor is in motion beyond 6.2 mph speed.
- Do not run the tractor if the power steering system is damaged. In this condition, contact the dealer.
- Do not park the tractor on a gradient with transmission gear engaged and with no parking brake.

DO'S - For sensors

- Check for any dust entry, terminal corrosion and breakage of terminals.
- Check for water entry in the connectors.
- Ensure the connectors are properly connected. Any unused pin in the counter-connector should be blocked.
- Connector cable has to be secured to the bracket provided with cable tie.

Don'ts - For sensors

- Do not damage the tip of the sensor during mounting.
- Do not hammer the sensor while fitting. The sensor is mounted by pushing it into place.
- Make sure that no particles are inside the electrical connectors & sensors before connecting the plug.
- Do not try to open the cover of the connector with a screwdriver.
- Do not wrap the cable tight around the electronic unit.
- Do not pull at connector cable while removing connector.
- Do not knot the cable of connector/sensor.
- Do not carry the sensor by holding the connector cable.
- Do not drop any sensor.
- The sensor harness should not touch any hot surface of vehicle.
- Avoid short-circuit with battery terminals to avoid flow of high current to ECU.

6. TRANSPORT OPERATIONS

6.1 Transporting tractor on a trailer

A disabled tractor is best transported on a flatbed carrier. Use chains to secure the tractor to the carrier. The axles and tractor frame are suitable attachment points. Before transporting the tractor on a low-loader truck or flatbed rail wagon, make sure that the hood is secured over the tractor engine.

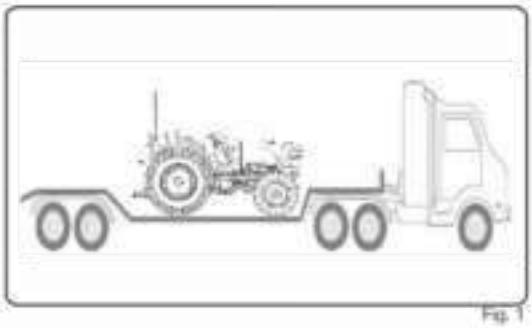


Fig.1

6.2 Towing the tractor

⚠WARNING

TRACTORS WITH PRESSURE LUBRICATED DRIVE LINE COMPONENTS SHOULD NOT BE TOWED WHEN ENGINE IS DISABLED.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

THE OPERATOR MUST BE THE ONLY PERSON ON THE MACHINE WHEN TOWING. MAKE SURE THAT NOBODY ELSE IS ON THE MACHINE OR WITHIN ITS WORKING RANGE.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

ALWAYS USE THE PROPER TOWING EQUIPMENT TO FREE A STUCK MACHINE.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

DO NOT USE CHAIN, CABLE, OR ROPE TO PULL THE MACHINE. IF THE CHAIN, CABLE, OR ROPE BREAKS OR SLIPS, IT MAY WHIP WITH GREAT FORCE. USE ONLY RIGID DRAWBAR OR TOW BARS TO PULL YOUR MACHINE.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

1. Hitch the towed load only to the drawbar. Lock the drawbar and pin in place.
2. Before descending a hill, shift to a gear low enough to control tractor travel speed without having to use the brake pedals to brake the tractor and installed attachments.
3. Try to balance the load primarily on the implement wheels. Engage the clutch smoothly, avoid jerking and use brakes cautiously to avoid jackknifing.
4. Use 3 point hitch only with implements designed for its use, not as a drawbar.

7. MAINTENANCE

7.1 General information

7.1.1 General safety instructions

⚠DANGER

IMPROPER OPERATION OR SERVICE OF THIS MACHINE CAN RESULT IN AN ACCIDENT.

DO NOT OPERATE THIS MACHINE OR PERFORM ANY LUBRICATION, MAINTENANCE, OR REPAIR ON IT UNTIL YOU HAVE READ AND UNDERSTOOD THE OPERATION, LUBRICATION, MAINTENANCE, AND REPAIR INFORMATION.

FAILURE TO COMPLY WILL RESULT IN DEATH OR SERIOUS INJURY.

⚠DANGER

IMPROPER OPERATION OR SERVICE OF THIS MACHINE CAN RESULT IN AN ACCIDENT.

ANY UNAUTHORIZED MODIFICATIONS MADE TO THIS MACHINE CAN HAVE SERIOUS CONSEQUENCES. CONSULT AN AUTHORIZED DEALER ON CHANGES, ADDITIONS, OR MODIFICATIONS THAT MAY BE REQUIRED FOR THIS MACHINE. DO NOT MAKE ANY UNAUTHORIZED MODIFICATIONS.

FAILURE TO COMPLY WILL RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

ALWAYS DO THE FOLLOWING BEFORE LUBRICATING, MAINTAINING, OR SERVICING THE MACHINE.

1. DISENGAGE ALL DRIVES.
2. ENGAGE PARKING BRAKE.
3. LOWER ALL ATTACHMENTS TO THE GROUND.
4. SHUT OFF ENGINE.
5. REMOVE KEY FROM KEY SWITCH.
7. WAIT FOR ALL MACHINE MOVEMENT TO STOP.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

ALWAYS PERFORM ALL SERVICE PROCEDURES PUNCTUALLY AT THE INTERVALS STATED IN THIS MANUAL. THIS ENSURES OPTIMUM PERFORMANCE LEVELS AND MAXIMUM SAFETY DURING MACHINE OPERATION.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

IMPROPER OPERATION OR SERVICE OF THIS MACHINE CAN RESULT IN AN ACCIDENT.

IF YOU DO NOT UNDERSTAND A MAINTENANCE PROCEDURE, OR DOUBT YOUR ABILITY TO PERFORM A MAINTENANCE PROCEDURE CORRECTLY, SEE YOUR AUTHORIZED DEALER.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

PERSONAL PROTECTIVE EQUIPMENT IS REQUIRED.

WHEN ASSEMBLING, OPERATING, OR SERVICING THE MACHINE, WEAR PROTECTIVE CLOTHING AND PPE NECESSARY FOR THE PARTICULAR PROCEDURE. SOME PPE THAT MAY BE NECESSARY INCLUDES PROTECTIVE SHOES, EYE AND/OR FACE PROTECTION, HARD HAT, HEAVY GLOVES, FILTER MASK, AND HEARING PROTECTION.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

INSTALL ALL COVERS, PANELS, AND GUARDS AFTER SERVICING OR CLEANING THE MACHINE. NEVER OPERATE THE MACHINE WITH COVERS, PANELS, OR GUARDS REMOVED.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠WARNING

AFTER INSTALLATION OR SERVICE, MAKE SURE YOU REMOVE ALL TOOLS FROM THE MACHINE.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

7.1.2 Introduction

This section gives full details of the maintenance procedures required to keep the tractor in conditions of maximum efficiency. The lubrication and maintenance table provides rapid reference for this purpose.

Maintenance frequency

The service intervals at set times, apply when the tractor is used under normal and not harsh conditions.

Shortening the interval from one job to the next is particularly recommended for the following parts:

- Radiator cores (use in particularly dusty places)
- Greasable components (use in particularly muddy places)

7.1.3 Environmental Protection

Always bear in mind the rules of environmental protection before servicing this machine and before disposing of old fluids, lubricants and filters.

- Never pour oil or fluids onto the ground, into the drainage system or into containers that do not have a seal
- Dispose of all old fluids, lubricants and filters in compliance with the local laws
- For any further information, please contact your local differentiated waste collection center or your dealer

When it is necessary to refill the fuel tank, or top up or change the oil, never forget to place a container under the component to collect any spillage.

The products mentioned are pollutants and we must therefore prevent them from contaminating the environment in which we live.

7.1.4 Preventing system contamination

To avoid contamination when changing oil, filters, etc, always clean the area around the fill points, inspection and drain plugs, dipsticks and filters.

To prevent dirt entering, clean the lubricating nipples before lubrication.

Wipe excess grease from the fitting after greasing.

7.2 Engine cooling system

To ensure an even temperature within the engine, the cylinder head, EGR, lubricating oil (55HP) and cylinder walls of the engine are water cooled. This water is in turn cooled in the radiator. The water is circulated from the radiator to the engine and back through the radiator by means of a water pump.

7.2.1 Radiator

The radiator consists of a cluster of hollow tubes enshrined into a number of fins and enclosed at both ends via a top tank and a bottom tank.

Air sucked by fan passes through the radiator fins thereby cooling the coolant flowing through radiator tubes.

The fins should be kept clear of mud or dirt accumulation. Over heating may be caused by bent or clogged radiator fins. If the spaces between the radiator fins become clogged, clean them with compressed air or water blown from engine side.

7.2.2 Radiator cap

A pressurized radiator cap is provided which is set at 1.3 psi (0.9 kg/cm^2) pressure. This cap ensures better cooling and avoid loss of coolant due to evaporation. It also reduces corrosion in engine sleeve & crankcase, hence it is strongly recommended that the engine should not be run without radiator cap. Also ensure that rubber gasket is intact & perfectly sealing the system pressure.

7.2.3 Reservoir tank

When the engine is in operation, certain amount of coolant passes out of the radiator overflow pipe. This coolant is not allowed to escape into the atmosphere and is captured into a reservoir tank.

When the engine is not operating and the coolant cools down, certain amount of coolant comes back into the radiator from reservoir tank. The reservoir tank thus helps to prevent loss of coolant.

7.2.4 Thermostat

This device prevents coolant circulating through the radiator until the engine reaches its operating temperature. With the thermostat closed, the coolant circulates only through the engine block.

It is important that if the thermostat is defective, do not attempt to repair it, replace with new. When installing a new thermostat, ensure the valve is facing upward.

The thermostat operating temperature is 180°F (82°C).

Fig. 1

⚠WARNING

WHEN STRAIGHTENING BENT FINS BE CAREFUL NOT TO DAMAGE THE TUBES OR TO BREAK THE BOND BETWEEN THE FINS AND TUBES.

⚠WARNING

THE COOLING SYSTEM OPERATES UNDER PRESSURE.

- IT IS DANGEROUS TO REMOVE THE RADIATOR CAP WHILE THE SYSTEM IS HOT.
- ALWAYS TURN THE CAP SLOWLY TO THE FIRST STOP, AND ALLOW PRESSURE TO ESCAPE BEFORE REMOVING THE CAP COMPLETELY.

⚠WARNING

DO NOT RUN THE ENGINE WHEN THE COOLING SYSTEM IS EMPTY, AND DO NOT ADD COLD COOLANT OR COLD ANTIFREEZE SOLUTION IF THE ENGINE IS HOT.

THE COOLANT LEVEL IN RESERVOIR TANK SHOULD BE MAINTAINED BETWEEN THE MIN. AND MAX LEVEL MARK.

⚠WARNING

DO NOT RUN THE ENGINE WITHOUT THERMOSTAT VALVE.

7.2.5 Water pump

The water pump is equipped with a sealed bearing. Adjusting or greasing will not be necessary.

7.2.6 Hose connections

Check periodically to ensure all the connections are in good order and the clips are tight. A leaking connection results in loss of coolant and thus engine efficiency.

When using antifreeze in the cooling system, it is absolutely essential to have efficient connection so check these and should there be any doubt as to their serviceability, renew.

7.2.7 Fan and fan belts

A plastic fan is mounted on water pump and is driven via fan belt by the main drive pulley. While the engine is in operation, the fan sucks air through the radiator core.

Slippage of belt on pulley can cause overheating. The fan belts shall always be dry and free from oil or grease. Incorrect belt tension results in its rapid wear.

Main drive pulley is assembled on a roller bearing mounted shaft.

7.2.8 Draining the coolant system

Two drain plugs must be opened. One is on left hand side on crankcase (45 & 55Hp), Oil cooler pipe on right hand side (55 Hp) and one on radiator bottom tank. To speed up draining, remove the radiator cap. Ensure that the drains are not clogged. Apply thread sealant while refitting drain plug.

Cleaning out dirt and sludge

Drain cooling system as directed above. Fill the cooling system with a solution of 1.0 Kg. of ordinary baking soda to 8.0 liters (2.11 US Gallons) of water.

Do not replace the radiator cap. Operate the engine until the coolant is hot. Drain, flush with clean water and refill with a rust inhibitor or anti-freeze solution.

NOTE: Grease specification: Mahindra Pro RED (or equivalent grease only to be used for greasing). Excessive greasing not recommended for bearings.

7.2.9 Adding coolant to the system

Allow the engine to cool if it is hot.

1. Open the hood.
2. Remove the radiator cap.
3. Fill the radiator from fill neck (B) with clean coolant up to a level approx. 2" below the radiator neck.
4. Start the engine and let it idle to remove air from the system. Coolant level in radiator will reduce.
5. Slowly pour coolant into the radiator till the coolant level in radiator does not go down further.
6. Refit the radiator cap and shut down the engine.
7. Remove the reservoir tank cap.
8. Fill coolant in reservoir tank from fill neck (A) up to the max level mark.

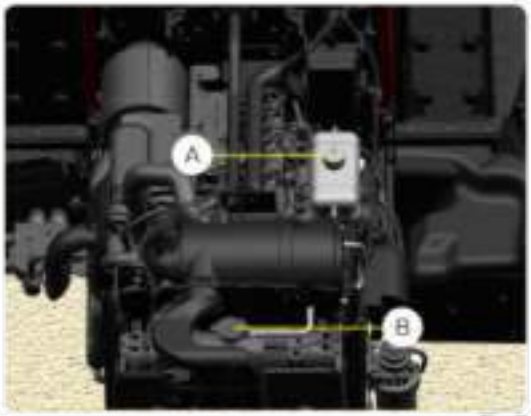


Fig. 2

9. Refit the reservoir tank cap.

10. Shut down the engine.

11. Close the hood.

Ensure that the filler cap is clean and free of dirt particles before replacing.

7.2.10 Cooling system protection

A common cause of the engine overheating is a rust clogged cooling system. Rust causes overheating by interfering with circulation and cooling. The tractors are filled with a mixture of new low silicate antifreeze (50% - antifreeze - 50% distilled water) with a rust inhibitor in it. Fill up to the mark given.

Use of approved supple mental corrosion inhibitor along with ethylene glycol will add increased rust prevention, reduce scale formation, minimize cylinder wall erosion & reduce foaming or tendency to foam.

Antifreeze : There are numerous antifreeze products marketed today. Diesel engines are adversely affected by the additives added to protect the aluminum surfaces. Antifreeze suitable for diesel engines conforms to an industry recognized standards which limits silicates to 0.1%. Once silica-gel has formed it is very difficult and costly to remove.

Low silicate antifreeze is available throughout the United States.

NOTE:

% Anti Freeze / % Water	50/50
Freeze protection	-34°F -36.67°C
Boil over protection	+265°F 129°C

(With 13 psi (0.91kg/cm²) radiator cap)

Recommended change period : 1 year or whenever the radiator water is drained.

7.2.11 Trash guard for radiator (A)

A wire mesh trash guard (A) is provided, at the front of the radiator which restricts trash and other coarse particles from entering into radiator fins. It thus prolongs the duration between cleanings of radiator.

To clean trash guard, open the hood.

Hold the spring loaded stopper (B) up and then slide the trash guard (A) away from the tractor. Clean it thoroughly.

Re-assemble the trash guard after cleaning.

NOTE : Extra care while operating in CHAFFY conditions.

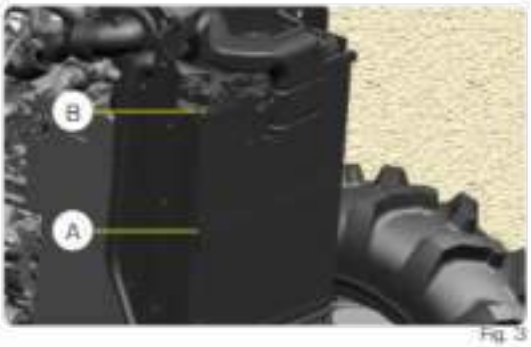


Fig. 3

7.3 Air intake system

7.3.1 Air cleaner

The important function of the air cleaner is to filter the air entering into combustion chamber so that no dust or chaff etc. enters the engine to cause abrasion and excessive wear. Thus it is most important that the air cleaner should have regular maintenance to continually and efficiently protect the engine from dust and other harmful substances.

The air cleaner comprises of the following parts:

Fig. 1

7.3.2 Body air-cleaner

This serves as the main frame for housing all parts associated with the air cleaner system.

7.3.3 Dust collector bowl (D)

It collects the dust and releases it automatically.

The following are the service instructions for the air cleaner assembly :

1. Check functioning of auto unloader of the dust collector regularly.
2. Paper element of air cleaner should be cleaned with compressed air, every 300 hrs. or earlier if required.
3. Paper element of air cleaner should be replaced after every 750 hrs. or even earlier if required.
4. Safety cartridge should be replaced after every 3 replacement of primary filter or 2700 hrs. or even earlier if required.
5. Assemble the air cleaner and refit the same on the Tractor ensuring all joints to be leak-proof.
6. After ensuring all fittings to be OK., start the Tractor.

Fig. 2

7.3.4 Cyclopack or built-in pre-cleaner

The coarse dust particles are separated by the curved blades of the cyclopack (A) and get collected in the dust collector.

Fig. 3

7.3.5 Paper element filter

Paper element filter (B) screens the fine impurities. This has to be cleaned by compressed air during every service or earlier if required. The filter should be replaced after every 750 hrs. or earlier if required.

7.3.6 Safety cartridge

Safety cartridge (C) fits inside the paper element filter. It is a safeguard against uncontrolled dust entry into engine due to paper filter element rupture and also when the paper element is removed for cleaning.

Fig. 4

NOTE : During every service of dry type air cleaner, the paper element should be cleaned with compressed air directed from inside to outside. Even after this if the element is found choked, replace it with a new one. Do not use dirty or damaged paper element as the impure air may severely reduce the engine performance/life.

7.3.7 Hose and clamps

Check hose clamps and ensure the clamp tightening torque should be 6 - 6.5Nm.

7.3.8 Radiator flushing procedure

- The cooling system should be thoroughly flushed and cleaned.
- Take the hoses and thermostat OFF, check the water pump, and remove the heater hoses. Only this way can you look into the system visually and inspect it for corrosion, etc.
- Some of flushes, which always done manually, take up to 1 hour. When the system is being flushed, only clear water should be evident when the flow is checked.
- All bypass hoses, other hoses, the heater core, thermostat housing, water pump, and heater control valves should be cleaned and checked.
- Start with a very clean system before introducing fresh coolant.
- All contaminents must be removed.
- If the contaminated coolant remains in the system (if the flush is improper) then the newly installed radiator will fail instantly/or running after few hrs. So always check for contaminated coolant before installing a new radiator.
- This is the only way to guarantee that the coolant will not break down due to imbedded particles.
- There is no substitute for a good flush. In the long run, this will save time and new coolant system related parts such as replacement radiators that would still fail if contaminates remain in the system.

7.4 Emission control system (ECS)

The tractor engine is equipped with the following emission control systems:

1. Positive Crankcase Ventilation (PCV) system
2. Exhaust Gas Recirculation (EGR) system
3. Diesel Oxidation Catalyst (DOC)
4. Under Hood Muffler (UHM)
5. Turbocharger system (55 HP)

Emission control Information

A sticker having important engine information is fitted on the top of valve train system of the engine.

XXXX - Year of Manufacture

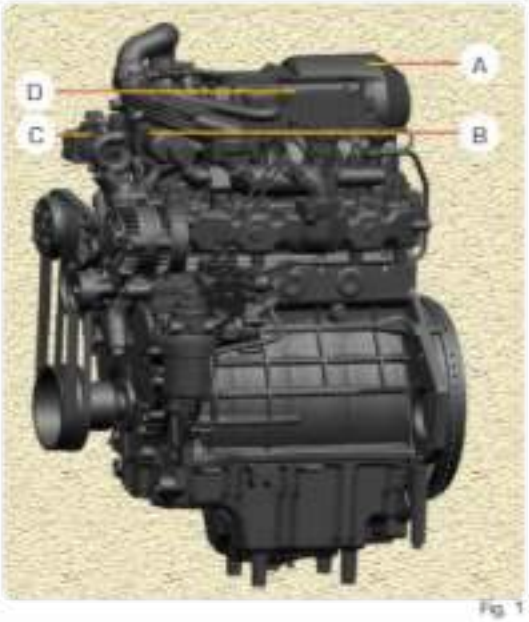
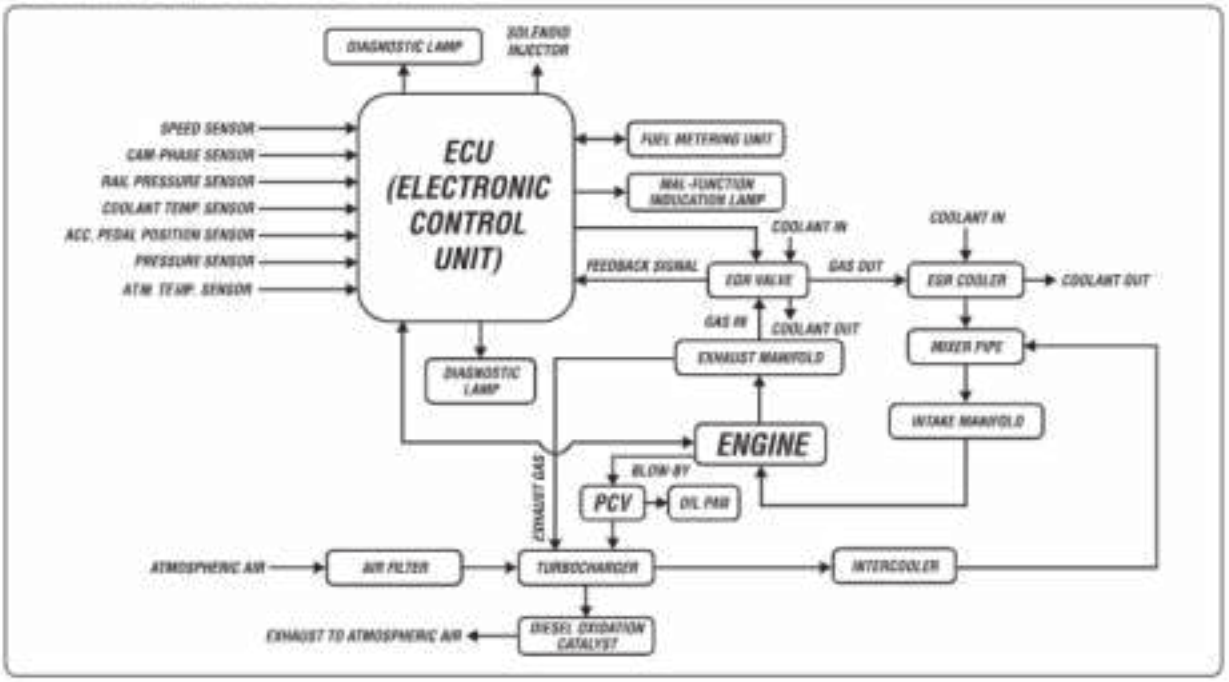


Fig. 1

A. Diesel Oxidation Catalyst (DOC)
B. EGR Cooler
C. EGR Valve
D. PCV

The schematic layout of the ECS is as follows :



7.4.1 Positive Crankcase Ventilation (PCV) system

The tractor engine is equipped with a closed type crankcase ventilation system using a oil separator. This separates the oil efficiently from the engine blow-by gases through a high performance media, maintains the crankcase pressure within acceptable safe limits. The maintenance of the PCV system essentially involves replacing the oil separator filter media. The oil filter media must be replaced after 1500 operating hours as indicated in the service schedule for continued performance of the engine.

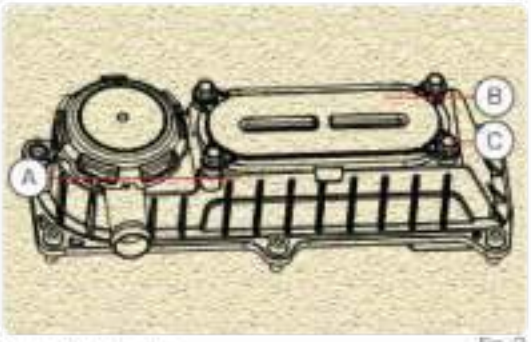


Fig. 2

A. PCV Housing
B. Filter Element
C. Bolt

Removing the oil separator

1. Remove the filter element (B) by loosening 4 nos. of bolts (C) using proper tool.
2. Pull the filter element (B) upwards and dispose of as per local waste regulations.

Assembly the oil separator

1. Clean the housing, cover and sealing surfaces.
2. Remove protection caps from new filter element.
3. Slide the new oil separator element into the housing (A) with a new element.
4. Use bolts (C) and apply torque of 4 - 5 N-m

⚠WARNING

IMPROPER MAINTENANCE OF PCV MAY CAUSE

1. HIGHER BLOW-BY
2. OIL THROW THROUGH TURBOCHARGER
3. ENGINE OVERRUN (OVER-SPEEDING OF TRACTOR)
4. INFERIOR ENGINE PERFORMANCE

7.4.2 Exhaust Gas Recirculation (EGR) system

The EGR system employed is a high pressure loop EGR with a cooler in the circuit, to maintain optimized gas temperatures.

EGR system is designed to send measured quantity of exhaust gas into the engine cylinder under various engine operating conditions. This is achieved by opening the EGR valve to a pre-determined level through ECU. Exhaust gas is made to pass through EGR cooler which is cooled by engine coolant to reduce the gas temperature. EGR gas enters the intake system through EGR mixer pipe fitted in the engine intake system.

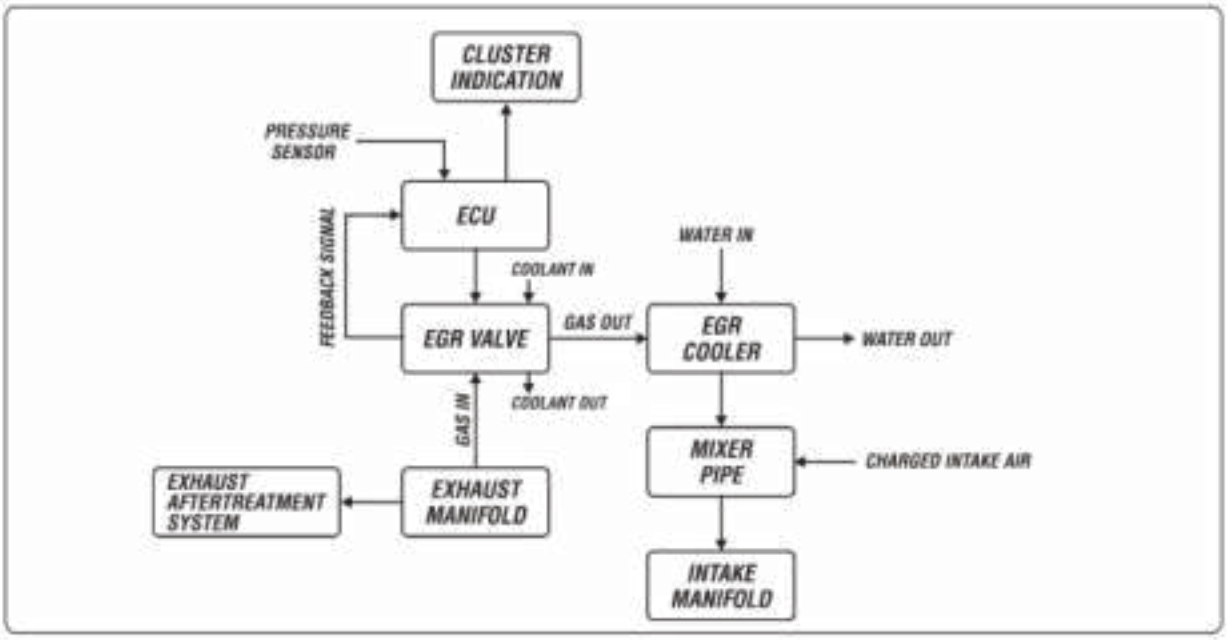
Periodic inspection and tightening of mounting hardware is typically appropriate.

A faulty EGR system is noticed by,

- Black smoke
- Reduction in engine power output
- Abnormal vehicle vibration
- MIL in cluster blinks continuously more than two minutes.

If you observe the above conditions in your tractor, please immediately consult a Mahindra authorized dealer/service center and get the problem rectified.

NOTE: Check the EGR system regularly to ensure that it's electrical, pipe and hose connections are proper and damage free and free from external soiling and leakages.



7.4.3 Diesel Oxidation Catalyst (DOC)

A diesel oxidation catalyst (DOC) is a flow through device that consists of a canister containing a honeycomb-like structure or substrate. The substrate has a large surface area that is coated with an active catalyst layer. This layer contains a small, well dispersed amount of precious metals. As the exhaust gases traverse the catalyst, carbon monoxide, gaseous hydrocarbons and liquid hydrocarbon particles (unburned fuel and oil) are oxidized, thereby reducing harmful emissions.

It is a part of the exhaust system and it is fitted next to the turbocharger in this system.

⚠CAUTION

THE DOC MAY BE DAMAGED BY EXCESSIVE FUEL OR OIL CONSUMPTION OR A POORLY MAINTAINED ENGINE.

ALWAYS USE RECOMMENDED FUEL AND LUBRICATING OIL FOR YOUR ENGINE.

EXHAUST SYSTEM OPERATES AT HIGH TEMPERATURE. WAIT UNTIL THE TEMPERATURE COOLS DOWN TO CARRY OUT ANY MAINTENANCE WORK IN THE EXHAUST SYSTEM OR NEARBY AREA.

NEVER OPERATE THE TRACTOR WITHOUT THE DOC.

NEVER OPERATE THE TRACTOR WITH IMPROPERLY FITTED OR PHYSICALLY DAMAGED DOC.

NEVER LET THE WATER, OIL, FUEL, WD40 (CLEANING AGENT) AND OTHER HIGHLY IN-FLAMMABLE AGENT INTO THE EXHAUST SYSTEM WHICH MAY DAMAGE THE EXHAUST SYSTEM.

SERVICE YOUR VEHICLE PERIODICALLY AS RECOMMENDED.

7.4.4 Under Hood Muffler (UHM)

An Under-Hood Muffler (UHM) is an emission control device which reduces exhaust noise by absorption. It is a part of the exhaust system which can be found fitted next to the DOC.

7.5 Fuel system

7.5.1 Using proper fuel

Use proper diesel fuel to help prevent decreased engine performance and increased exhaust emissions. Failure to follow the fuel requirements listed below can void your engine warranty.

It is recommended to use diesel fuel specified to ASTM D-975 D2 S15, EN 590 (ULSD- 15 PPM S levels)

NOTE: Engine to be run with diesel fuel only. (No bio diesel)

7.5.2 Clean diesel fuel

Diesel Fuel should be poured so that no sediment can enter the tractor fuel tank whilst it is being filled. Fuel storage facilities should allow for the periodic removal of sediment from the bottom of the storage tank.

The Diesel fuel filters will remove any sediment still present in the fuel and ensure that the fuel reaching the injection pump and injectors is free of impurities. The fuel filter should be serviced regularly to ensure maximum engine performance & reliability.

7.5.3 Bleeding the CR fuel injection system

In case the low and high-pressure circuit of CRS get filled with air, re-start can be problematic.

To facilitate re-start after filter change or after driving tank empty, it is necessary to use the hand primer (A) in order to fill the CRS low pressure circuit with fuel.

The air should be completely bled, so that the tractor operates satisfactorily. Loosen air bleeding screw (B) on fuel filter and push hand primer (A) down till you get the flow of fuel free of air from air bleeding screw. Re-tighten the screw (B).

Disconnect the fuel pump back flow hose to the fuel tank. Then push the hand primer (A) until the fuel comes out from the fuel pump back flow and the resistance encountered by activating the hand primer is big enough. Then connect the fuel pump back flow hose.

7.5.4 Fuel tank and fuel pipes

Fill the tank each time the tractor finishes the days work. This prevents condensation inside the fuel tank. Check regularly to ensure all fuel pipe unions are tight and in good order. Ensure that vent hole provided on fuel tank cap is not choked. Water or dirt settled in the bottom of fuel tank should be drained periodically, before starting the engine by loosening the drain plug until clean diesel flows.

⚠CAUTION

ESCAPING HYDRAULIC DIESEL FLUID UNDER PRESSURE CAN PENETRATE THE SKIN CAUSING SERIOUS INJURY.

DO NOT USE YOUR HAND TO CHECK FOR LEAKS. USE PIECE OF CARDBOARD OR PAPER TO SEARCH FOR LEAKS.

STOP ENGINE AND RELIEVE PRESSURE BEFORE CONNECTING OR DISCONNECTING LINES. TIGHTEN ALL CONNECTIONS BEFORE PRESSURIZING LINES.

IF ANY FLUID IS INJECTED INTO THE SKIN OBTAIN MEDICAL ATTENTION IMMEDIATELY OR ELSE, SERIOUS INJURY MAY RESULT.

Fig. 1

⇦ Tractor front

A. Hand primer

B. Screw

7.5.5 Fuel filter

This filter provides clean, moisture free fuel for the injection process. A hand primer is provided to manually remove excess air from the fuel filter and fuel lines.

Major components:

- Hand primer
- Air bleeding screw
- Fuel filter

Fuel enters the filter at inlet (F) and flows through the filter element separating water its contents before flowing through outlets (E) to the fuel injection pump.

Since water and contaminents settle at the bottom of the sediment bowl, a drain plug (i.e. Adapter cum water sensor) is provided.

Drain water from the fuel filter when water level indicator in instrument cluster glows on.

To drain water from fuel filter, unscrew the water sensor in anticlockwise direction by hand. Rotate only 1 to 2 turns by hand. Place a small tray to collect water or water and diesel emulsion. Tighten water sensor by rotating clockwise. Tightening torque 1.4 to 1.6 Nm or hand tighten and fix connector (C).

Fig. 2

Tractor front

A. Hand primer
B. Filter
C. Connector
D. Header
E. Outlet
F. Inlet

NOTE : Drain water once in a week or whenever the water level indicator on dashboard glows "ON" continuously, if water contamination is excessive. Continued operation after indication in cluster will lead to inferior engine performance/reduced power.

7.5.6 Servicing the fuel filter

1. It is recommended to replace the fuel filter every 350 hrs.
2. To remove filter, detach the water in fuel sensor. Remove the filter (B) from header (D).
3. Check O-rings of fuel filter for any crack/damage. Smear oil on the new O-rings before installation.
4. Assemble the new filter. Do not over tighten.
5. Clean water sensor to remove sludge & re-tighten to filter.
6. Prime the system and bleed the filter. Tighten the bleeding screw.

NOTE : Replace fuel filter at the recommended period or whenever it gets clogged. Discard the old filter and do not repair or clean the filter. Always fit the spin-on filter dry.

⚠CAUTION

NOT TO DO ANY SELF-SERVICE/REPAIR OF FUEL SYSTEM (REMOVAL OF FUEL LINES, FILTER ETC) BY OPERATOR AND IT SHOULD BE DONE IN SERVICE CENTER ONLY.

7.6 Lubrication system

7.6.1 Oil level check

Check engine oil before starting the engine.

1. Remove dipstick gauge (A) provided on the right hand side of the crankcase.
2. Oil level should be between the two marks provided on the dipstick.

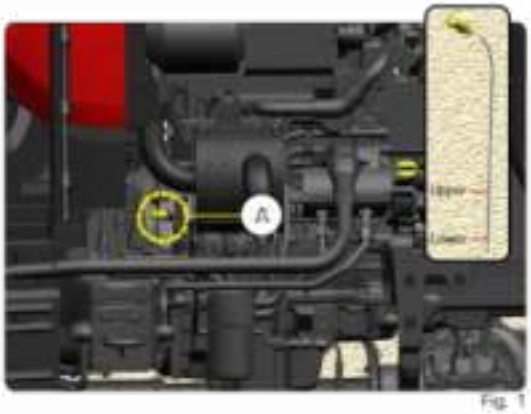


Fig. 1

7.6.2 Engine oil change

Change engine oil as per routine service schedule given in this manual. See CAPACITIES on page no 9-4.

1. Ensure that the engine is stopped before changing oil.
2. Remove the drain plug provided at bottom of oil sump.
3. Allow the oil to drain at least for five minutes. All the oil can be drained out when engine is still warm.
4. Now reinstall the drain plug (B).
5. Remove the oil filler cap (C) in the front cover to expose the oil filler neck.
6. Refill the oil sump slowly by recommended grade of oil (15W40-CJ4).
7. Clean and place the oil filler cap again.

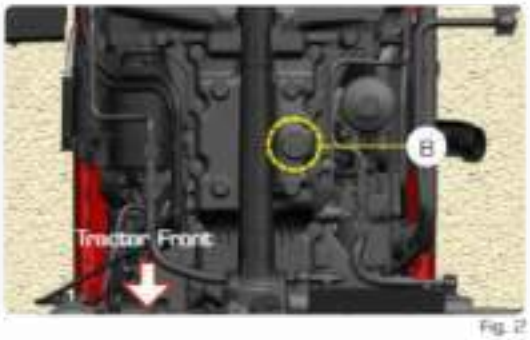


Fig. 2

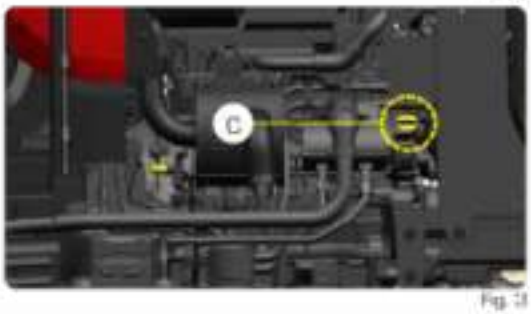


Fig. 3

7.6.3 Engine oil filter

The life of engine and turbocharger depends upon clean oil being circulated to its bearings. In the normal course of engine operation, lubricating oil undergoes changes which produce harmful by-products. The purpose of the oil filter is to separate and remove dirt and other injurious foreign materials from the oil and prevent these from being circulated in the engine.

The engine oil filter (D) should be replaced as per routine service schedule given in this manual or whenever engine oil is changed.

Fig. 4

7.6.4 Changing oil filter

1. Ensure that engine is stopped before changing filter.
2. Remove the lubrication oil filter guard.
3. Unscrew the oil filter.
4. Prime the new oil filter with clean oil.
5. Screw the new filter to the adapter.
6. Move the hand and foot throttle to engine "Idle" position.
7. Start the engine, check the oil pressure gauge in cluster to see whether the lubricating oil is circulating through the engine.
8. Inspect the oil filter for oil leaks.

NOTE :

- Engine oil and filter element must be changed after initial 50 hrs. of operation in new tractor or whenever major overhaul of engine is carried out and subsequently after every 350 hrs. or 1 year, whichever is earlier.
- To avoid delays, we recommend that you carry extra filter elements on hand so that replacements can be made at the correct time. The filter is located on the right-hand side of the crankcase.
- Filling oil consumes time. Allow sufficient time for the oil to settle down in crankcase.
- Dispose the used oil properly.

⚠CAUTION

DO NOT DRAIN THE OIL WHEN THE ENGINE IS HOT. WAIT FOR THE ENGINE TO COOL.

⚠WARNING

STOP THE ENGINE IMMEDIATELY IF OIL PRESSURE IS NOT RECORDED WITHIN 10 SECONDS OF ENGINE STARTING OR LEAKAGE IS OBSERVED. GET THE CAUSE IDENTIFIED AND RECTIFIED BEFORE PROCEEDING FURTHER.

7.6.5 Turbocharger (55 HP)

Check the turbocharger lubrication lines periodically as follows.

1. Move the hand and foot throttle to engine "Idle" position.
2. Inspect the engine oil filter for oil leaks through oil supply and drain line.
3. Stop the engine immediately if leakage or abnormal sound is observed. Get the cause identified and rectified before proceeding further.

Fig. 5

7.7 Electrical system

7.7.1 Battery maintenance cleaning

Battery terminals must be kept clean and tight. The cable terminals will corrode and interfere with battery performance unless regularly checked. A light smear of petroleum jelly on the terminal posts and connections will help to resist corrosion.

Occasionally remove the connections and clean the terminal posts with wire wool or emery cloth, smear with petroleum jelly and reassemble.

Wash the battery top with warm water and soda. Ensure that none of this solution gets into the battery cells. Finally rinse with plain water. The vent holes in the filler caps should be open at all times.

7.7.2 Servicing

If the battery shows need of charging it must be given immediate attention. Keeping the battery fully charged not only preserve its life but makes itself available for instant use when needed.

When replacing the battery, earth cable must be connected to the negative (-ve) terminal and the battery cover secured in its correct position.

Do not, under any circumstances, allow an electric spark or open flame near the battery, during or immediately after charging. Do not lay steel tools across the terminals, as this may result in a spark or a short circuit which could cause an explosion. Be careful to avoid spilling electrolyte on hands or clothing.

IMPORTANT :

During long storage (more than a week) of the vehicle without operation, battery quick release negative terminal to be disconnected to avoid battery draining. Failing to do will induce problem in starting and also reduce the life of battery.

7.7.3 Effect of low temperatures

Battery capacity is greatly reduced in cold condition which has a decided numbing effect on the electrochemical action of the battery. Taking 100% of cranking power at 80°F then at 32°F, only 65% and 0°F only 40% cranking power is available.

If your tractor is not to be operated for some time during winter months, it is advisable to remove the battery and store in a dry place where the temperature will not fall below freezing point.

Maintaining the electrical system in good working order will enable the alternator to provide the current, necessary to keep battery fully charged thus ensuring maximum efficiency of the electrical devices.

Ensure that the terminals are clamped tight and the battery is securely fastened down in the battery tray. Do not over tighten.

⚠CAUTION

BEFORE WORKING ON ANY PART OF THE ELECTRICAL SYSTEM DISCONNECT THE BATTERY +VE CABLE. DO NOT RECONNECT THIS CABLE TILL ALL ELECTRICAL WORK COMPLETED. THIS WILL PREVENT SHORT CIRCUITS AND DAMAGE TO ELECTRICAL UNITS.

ELECTRIC STORAGE BATTERIES GIVE OFF A HIGHLY INFLAMMABLE GAS WHEN CHARGING AND CONTINUE TO DO SO SOME TIME AFTER RECEIVING A STEADY CHARGE

NOTE : Contact 'Exide' dealer for warranty.

Website : www.exideworld.com

7.7.4 Alternator

Following checks of alternator charging system will avoid many problems that might otherwise develop.

1. Check belt tension. Refer your service manual for proper belt tension.
2. Keep pulley nut tight.
3. Check alternator terminals and cable connections for good condition, secure fastening and freedom from corrosion.
4. Check battery cables and connections for good condition, secure fastening and freedom from corrosion.
5. Check electrolyte level in battery. If battery will not take adequate charge, or is otherwise unsatisfactory replace battery.
6. Check the alternator fuse intact or not.

⚠WARNING

WHEN THE ALTERNATOR IS CHARGING THE BATTERY, AN EXPLOSIVE GAS IS PRODUCED INSIDE THE BATTERY. THEREFORE ALWAYS CHECK THE ELECTROLYTE LEVEL WITH THE ENGINE STOPPED. DO NOT USE AN EXPOSED FLAME AND DO NOT SMOKE WHILE CHECKING THE BATTERY.

NOTE:

- Alternator maintenance should be done by authorized dealer.
- A slack belt will not drive the alternator, and therefore the battery will not be charged.

7.7.5 Charging circuit

When battery be in a low state of charge, which will be shown by lack of power when starting, poor lights and may be due to either alternator not charging or giving lower intermittent output, then proceed as below:

1. Check battery charging indicator when the engine is running steadily at working speed.
2. If the battery charging indicator glows, have the equipment checked by your Mahindra tractor dealer.
3. Inspect alternator drive belt and change if necessary.
4. Examine the charging and field circuit wiring, tighten any loose connections, replace any broken cables, pay particular attention to the connections.
5. Check the alternator fuse intact or not.

⚠WARNING

TO AVOID DAMAGE TO ALTERNATOR CHARGING SYSTEM, SERVICE PRECAUTIONS SHOULD BE OBSERVED AS FOLLOWS,

1. NEVER MAKE OR BREAK ANY OF THE CHARGING CIRCUIT CONNECTIONS, INCLUDING THE BATTERY WHEN ENGINE IS RUNNING.
2. NEVER SHORT ANY OF THE CHARGING COMPONENTS TO GROUND.
3. DO NOT USE A JUMPER BATTERY OF HIGHER THAN 12 VOLTS.

ALWAYS DISCONNECT THE BATTERY BEFORE CARRYING OUT ARC WELDING ON THE TRACTOR OR ANY IMPLEMENT ATTACHED TO THE TRACTOR.

7.8 Hydraulic and transmission

7.8.1 Adding hydraulic and transmission oil

Change transmission & hydraulic oil at every 1100 hrs. of operation. While changing the complete oil of transmission, oil has to be filled in rear housing. See CAPACITIES on page no 9-4.

Check the level of oil in the transmission & hydraulic reservoir as follows:

1. Keep the tractor on level ground.
2. Oil level should be visible between marks on dipstick.
3. Fill oil if required by removing the filler cap (A).
4. Fill specified grade oil only.

Fig. 1

7.8.2 Hydraulic and transmission suction oil filter

Change hydraulics and transmission oil filter (B) initially at 50 hrs. and subsequently at every 350 hrs. of operation.

These spin-on type filters are located behind the tire on right hand side of the tractor. Remove old spin-on filters.

NOTE: The hydraulic and transmission filter resembles the engine oil filter though it differs in construction and usage. Hence these are not interchangeable.

Fig. 2

7.8.3 Hydraulic and transmission strainer

⚠DANGER

BE VERY CAREFUL TO AVOID CONTACT WITH HOT FLUIDS. IF FLUID IS EXTREMELY HOT, ALLOW IT TO COOL TO A MODERATELY WARM TEMPERATURE BEFORE PROCEEDING.

FAILURE TO COMPLY COULD RESULT IN DEATH OR SERIOUS INJURY.

Clean suction strainer during every oil change. The suction strainer is located inside the rear housing and can be removed as follows:

1. Drain the transmission oil as stated in 7.8.4.
2. Remove the suction hose guard.
3. Remove the end cover plate (A) by unscrewing three bolts (B).
4. Pull the suction strainer (C) out from housing.
5. Clean the strainer in clean diesel fuel, using a soft brush, then blow dry with compressed air.
6. Refit the suction strainer and cover plate. Refit the suction hose guard.

For service/replacement of strainer contact your Mahindra dealer.

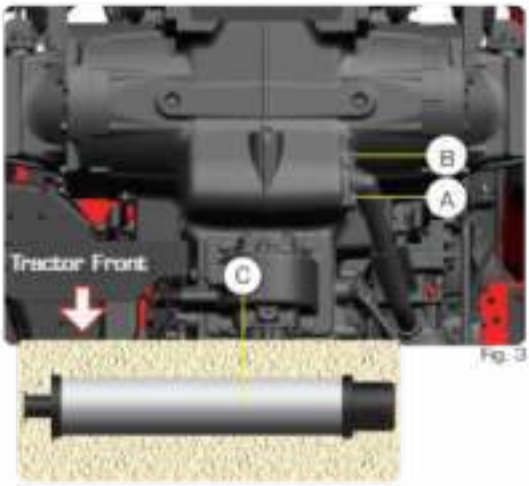


Fig. 3

7.8.4 Transmission oil drain

4WD

Park the tractor on a level surface. Take necessary precautions before draining the oil.

Keep the oil container below the drain plugs to collect oil and after draining dispose oil with extra care. Refer 7.1.3 Environmental Protection for disposal of drained oil.

To drain the complete transmission oil, remove all the 6 drain plugs, 1 each on clutch housing, speed housing, drop box and 3 on rear housing.

A - Rear housing drain plugs

B - Drop box drain plug (4WD)

C - Speed housing drain plug

D - Clutch housing drain plug

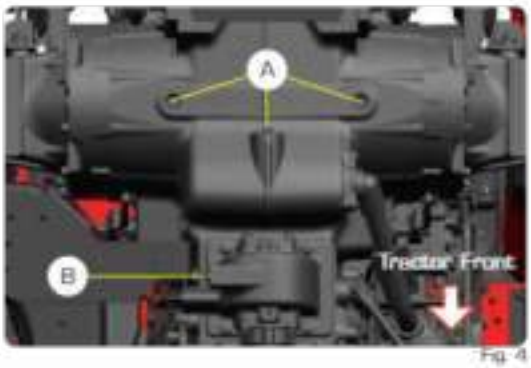


Fig. 4

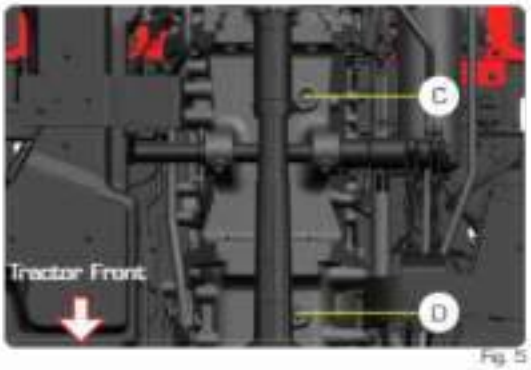


Fig. 5

7.9 Power steering system

7.9.1 Tips for maintaining the power steering system

1. Maintain correct inflation of front tires.
2. Always use a puller to remove the steering wheel. Do not use a hammer, torch or crowbar.
3. Investigate and immediately correct if any play, rattle, shimmy, or other unusual condition in the steering system.
4. Do not attempt to weld any broken steering component. Replace the component with original part only.
5. Do not cold straighten, hot straighten or bend any steering part.
6. Prevent dirt or other foreign matter from entering the hydraulic system. Clean off around filler caps before checking oil level.
7. Investigate and correct any external leakage in the steering system.

7.10 Front axle

4WD

7.10.1 Axle oil change

Draining

To drain the oil completely, partially unscrew the fill plug/dipstick (A) to release possible pressure. Remove all the 3 drain plugs (B) (1 at center beam and 1 each at hub section) and drain oil from the axle.

Refer 7.1.3 Environmental Protection for disposal of drained oil.

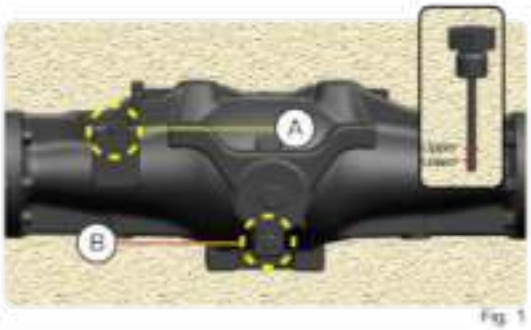


Fig. 1

Oil filling

Fill the oil through the center beam fill plug/dipstick (A), at the same time plugs at both (LH &RH) swivel housing top (C) should be open.

Axle should be in horizontal position while draining and filling. Wait to allow the oil to flow through the entire axle. Check the level of the oil with help of filling plug/dipstick (A) only and fill to the specified level if necessary. See CAPACITIES on page no 9-4.

Tighten the plugs to specific torque after filling.

Fig. 2

7.10.2 Front axle - front wheel "TOE-IN" check

In the event of tie rod setting being interfered with, it is necessary to adjust the TOE-IN. Before measuring and adjusting the TOE-IN, ensure the front wheels are in the straight ahead position and the front axle is not tilted.

After adjusting the front wheel tread and with all connections secured, the front wheel Toe-in shall be as follows.

Measure the distance between the outer edges of the wheel rims at the same height as the centerline of the axle. Mark the point measured and turn the wheels half revolution so that the marked points are at the rear. Measure again the distance between these two points and this distance must be the same as measured before without variance. To adjust the TOE-IN shorten or extend the tie rod clockwise or anti-clockwise.


Fig. 3

7.11 Check and adjust brake pedal free play

Measure free play of pedal stroke (A). Ensure free play is within specified limits. If free play is not within specified limits, adjust brake linkage by rotating telescopic link. see Service manual for adjustment procedure.

Free play of brake pedal should be between 1.96 in (50 mm) to 2.16 in (55 mm).

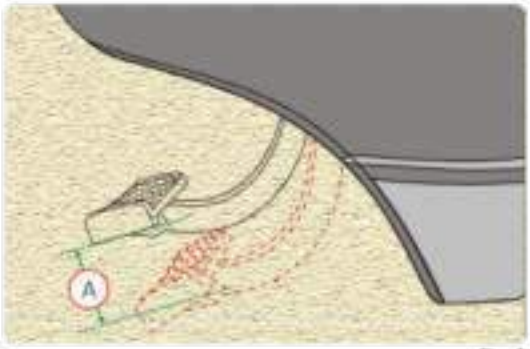


Fig. 1

7.12 Parking brake adjustment/settings

If parking brake is not effective, adjust linkages to get desired adjustment for effective braking.

- Loosen nuts (B) & (C)
- Adjust the cable left or right to required braking
- Tighten nuts (B) & (C) after adjustment
- Complete park brake locking should occur in 6-7 clicks when applying the park brake.

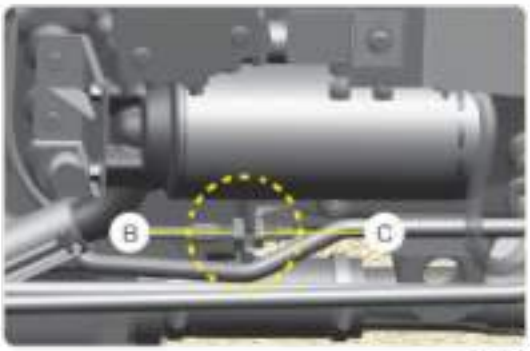


Fig. 1

7.13 Check and adjust clutch pedal free play

Measure free play of pedal stroke (A). Ensure free play is within specified limits. If free play is not within specified limits, adjust clutch linkage as shown below.

- Loosen both the Jam nuts (B) (Top & Bottom).
- Adjust the turn buckle (C) by spanner
- Turn the yoke anticlockwise (from eyesight view) to decrease play and clockwise to increase play.

Free play of clutch pedal should be between 1.38 to 1.57 inch (35 to 40 mm).

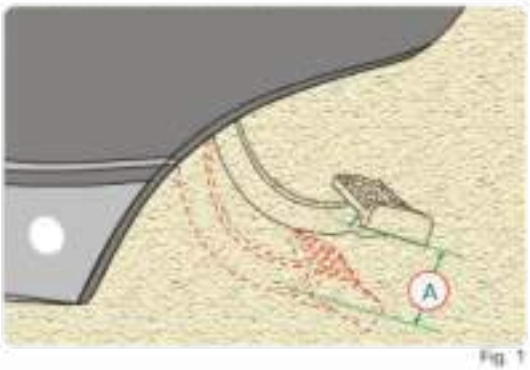


Fig. 1

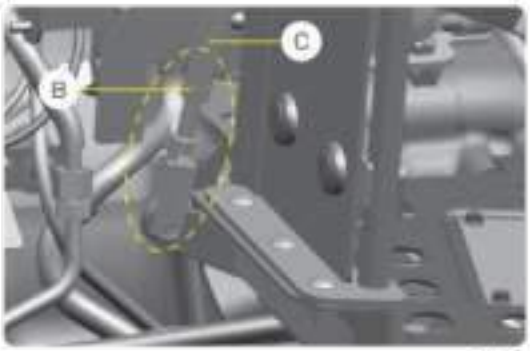


Fig. 2

7.14 Lubricants

7.14.1 Lubricants general

Mahindra recommendation of oil is based on the trials done under specific test conditions. Actual performance of oil may vary in extremely severe environment or operating condition. Hence, ensure oil change as recommended in normal condition and in extremely arduous conditions, it is necessary to reduce the change periods. It is detrimental to use a lubricant for more than the specified period.

7.14.2 Lubricants storage

Oils used for the tractor should be protected from exposure to dust, water contamination and ensure used oil disposal as per environmental/regulatory requirements.

7.14.3 Alternate lubricants

Conditions in certain locations may warrant usage of other lubricants are recommended in the manual. In such cases, the alternates may be used provided they meet the minimum performance levels specified.

7.14.4 Mixing of lubricants

It is generally advised not to mix different brands or types of oil considering the compatibility issues.

7.15 Lubrication oil

7.15.1 Engine oil

Refer oil specification chart for oil viscosity grade at different range of ambient temperature.

Recommended oils

- Mahindra Heavy Duty SAE 15W-40 CK-4 (above 5°F)

7.15.2 Transmission, hydraulics and oil immersed brakes

Use specific Tractor Transmission Fluids which are recommended for oil immersed brake application.

Recommended oils

- Mahindra Universal Tractor Fluid

Check with Mahindra service engineer for suitability of any other oils before using.

For implements/loader attachments, use only the recommended oils. Do not mix different brand of oils as it may cause performance deterioration especially at lower ambient temperature.

7.15.3 Chassis lubricant (CL)

Lithium or lithium complex type grease with extreme pressure (EP) additive is recommended. Depending on the expected ambient temperature range during the operation, use grease as mentioned below.

Recommended grease

- Mahindra Pro Red Lithium/Moly Grease (above 5°F)

7.15.4 Front axle oil

Refer oil specification chart for oil viscosity grade at different range of ambient temperature.

Recommended grease

- Mahindra Super Synthetic Gear Oil SAE 75W-90 (above -13°F)

7.15.5 Oil specifications chart (Table A)

Sr. No.	Application	Capacity Gallon / Liter	Ambient temperature	
			above 5°F	below 5°F and above -13°F
1.	Crankcase	2.11 / 7.98	API CJ-4 (or) CK-4, SAE 15W-40	API CJ-4 (or) CK-4, SAE 5W-30
2.	Transmission & hydraulics	11.62 / 44 (4WD)	SAE 80W - Tractor transmission hydraulic oil	
3.	Lubrication fittings	As required	Mineral grease NLGI 2 grade	Synthetic grease NLGI 2 grade
4.	Front Axle	2.19 / 8.3	GL-5, SAE 80W-90	GL-5, SAE 75W-90

7.16 Special bolt torques

Special bolt torques	Nm	Lbs. ft.
Bolt for swinging drawbar mounting	220 - 260	162 - 192
Nut rear axle	90 - 110	66.3 - 81.1
Drain plug for engine oil pan	60 - 70	44.2 - 51.6
Bolt fender mounting	75 - 85	55.3 - 62.6
Nut for front axle support	200 - 225	148 - 167
Nut steering wheel	50 - 55	37 - 41
Nut rear wheel	250 - 290	185 - 214
Nut rear wheel rim / disc	198 - 278	146 - 205
Bolt front wheel 4WD	160 - 170	118 - 125.3
Nut lock spiral pinion bevel shaft	180 - 200	132 - 162
Drop box drain plug	60 - 70	44.2 - 51.6
Transmission drain plugs	60 - 70	44.2 - 51.6
Clevis mounting bolt	305 - 350	225 - 258

7.17 Storage

7.17.1 Tractor storage

If the tractor is not in frequent use, make sure the battery connections are removed & installed properly.

However, if the tractor is to be out of service for extended period, it should be stored in a dry place. Leaving the tractor exposed to weather will shorten its life considerably.

When placing the tractor in storage for longer period, follow the instructions given below:

1. Wash down and carry out the regular cleaning procedures.
2. Do not drain off the engine cooling system. During winter period, make sure to maintain coolant & water level.
3. Remove the hose between air filter housing outlet and intake manifold of the engine and spray approved rust preventive oil through the air intake while the engine is being running.
4. Check lubricating oil from the crankcase sump and fill if required up to the mark.
5. Completely lubricate the tractor in accordance with the lubrication chart.
6. Keep the clutch disengaged. Disconnect the hydraulic accessories.
7. Lower any implement to the ground or store in a shady dry place and cover exhaust pipe.
8. Jack the tractor so that the tires are clear off the ground. If this is not possible, check tire pressures regularly and keep inflated to recommended pressures. Rotate wheels periodically to prevent them from standing on the same place for long periods.
9. After checking coolant level & refilling the engine with the coolant (if require), run the engine for approx. 5-10 Min. at 1500-2000 rpm every month as a corrosion prevention measure.
10. Remove batteries and store in a cool dry place, keep topped up and fully charged.
11. Remove the ignition key and store in a safe place.

7.17.2 Using the tractor after storage

1. Check tire air pressure and inflate, if necessary.
2. Jack the tractor up and remove the support blocks from under the front and rear axles.
3. Install the battery. Be sure it is fully charged.
4. Check the fan, water pump and alternator belt tension.
5. Check the radiator coolant level and if it is near to service schedule then flush it and refill with new coolant.
6. Drain the oil from engine and oil filter and fill the crankcase with specified oil & replace oil filter.
7. Remove the extra plugs, if any fitted on the engine.
8. Service air cleaner.
9. If the tractor is being used after long storage, carry out a full check of all oils and coolant.
10. Run the engine at idle for 20 min. to ensure optimum engine life.
11. Open all the doors and windows or move the tractor out of storage room, to avoid danger from exhaust fumes. Then start the engine and run it at 1500 rpm to ensure that the lubricant attains operating temperature and reaches all points. Observe all gauges and be sure they are functioning properly and reading normal. Ensure there is no evidence of oil or water leakage. Now run the engine at low idle rpm for 1 minute and shut off the engine. Remove the ignition key and apply the parking brake.

8. TROUBLESHOOTING

8.1 Precautions for CRDI engines

Potential issue/Failure mode	Causes	Precautions/Solutions
Injector rattling/sticky/blocked.	Contaminated fuel causing deposition of very fine residue/dirt inside injectors having fine tolerances.	1. Efficient fuel filtration system with water separator and indicator. 2. Customer & dealer education on importance of quality of fuel for CRDI Engines. 3. Maintain and change the fuel filter regularly according to the manufacturer's recommendations. 4. When changing the fuel filter it is beneficial to empty the old filters contents into a clean container and inspect for evidence of water and foreign debris.
Reduced power & increased fuel consumption of engine.	When the injector becomes dirty, the full ignition detonation of the fuel results in less power & more fuel consumption.	
Poor fuel economy and/or bluish white smoke at idle.	Nozzle erosion causing seepage of fuel.	
Engine not starting due to water ingress/Engine Misfiring/Wiring harness cut/Shorting of wiring harness.	1. Rainwater entry into harness. 2. Water ingress in puddling operation. 3. Electrical wiring harness tampering is done in the field for doing all extra connections. 4. Solenoid coil windings short.	1. Ensure that the filler cap seal is in good condition and all fuel lines and connections to the tank are in good condition and tight. 2. Wiring harness tampering should be mandatorily avoided & to be linked with warranty acceptance/rejection criteria. 3. All the wiring harness couplers should be made water sealed & all Dealers to be instructed & trained for proper assembly, removal & replacement of electrical connectors & couplers. 4. Proper enclosures should be designed to avoid exposure of electrical sensors.
ECU - Electronic Control Unit failures.	1. Vibrations. 2. Handling/tampering.	1. Mounting with AVMs to be explored. 2. No accessibility to user/customer for loosening. 3. Keep fuel hose clamps tight and ensure anti vibration clamps on injector lines are tight, with the rubber insulators in the correct position. 4. Battery ground connections should be tight and properly torqued. 5. ECU should be removed while performing any welding operation on tractor.

If any trouble is experienced, make sure of the cause before attempting to make any adjustments. Before making any adjustments make note of the previous setting, in case, the new adjustment is not effective.

PROBABLE CAUSE/PROBLEM	POSSIBLE REMEDY
8.2 Engine	
Engine fails to crank adequately to start	
Defective key switch	Inspect for faulty cables and terminals. Replace key switch if necessary.
Battery too low to turn engine	Charge or install new battery.
Faulty sensors	*
Improper sensor connection	Check the electrical connection to the sensors.
Faulty CR fuel injection system functioning	*
Engine oil too heavy	Drain oil and refill with correct grade.
Internal seizure	*
Starter motor inoperative	Inspect cables and terminals. Check for tightness of mounting screw. Inspect brushes for wear or damage and commutator for dirt, wear or damage.
No fuel	Check fuel tank & low pressure line for kinks.
Cold weather	Use cold weather starting aids for starting the vehicle.
Water, dirt, or air in fuel system	Drain, flush, fill and bleed system.
Clogged fuel filter	Replace filter element.
Dirty or faulty injectors	*
Engine cranks adequately but fails to start	
Faulty CR fuel injection system functioning	*
Faulty sensors	*
Improper sensor connection	Check the electrical connection to the sensors.
Water in fuel	Drain system, clean and refill with proper fuel.
Fuel system clogged	Check through and remove blockage.
Batteries discharged	Charge or replace.
Lack of compression	*
Intake or exhaust system clogged	Service air cleaner and check air intake for restriction. Clean exhaust system.
Lubricating oil of wrong viscosity	Drain and refill with proper lubricant - (refer to lubricant specification).
Loss of power	
Faulty CR fuel injection system functioning	*
Engine overloaded	Reduce load or shift to lower gear.
Restriction or leakage in the air intake system	Check the air intake system & rectify.
Restriction or leakage in the exhaust system	Check the exhaust system & rectify.
Restriction in fuel supply	Check the kinking of fuel lines in the system. Also clean the fuel lines.
Water in the fuel	Drain and clean fuel system.

* See Mahindra Tractor Dealer

PROBABLE CAUSE/PROBLEM	POSSIBLE REMEDY
Faulty actuators & sensors	Check for loose connection & take the corrective action in case of failure*
Air lock in fuel system	Check vent hole in tank filler cap.
Faulty valve action	*
Clogged fuel filter	Replace filter element & bleed the fuel system.
Lack of engine compression	*
Engine overheating	*
Clutch plate slippage	*
Brakes dragging	Check brake linkages for free movement & adjust free play.
Dirty or faulty injectors	*
Turbocharger malfunctioning	*
Faulty EGR system functioning	*
Engine misfires	
Restriction in engine air supply	Check air cleaning system.
Air lock in fuel system	Vent air from fuel system.
Poor compression	*
Sticking valves	*
Faulty CR fuel injection system functioning	*
Vent in fuel tank cap obstructed	Clean cap in solvent. Blow dry.
Low coolant temperature	*
Clogged fuel filter	Replace filter element.
Water, dirt, or air in fuel system	Drain, flush, fill and bleed system.
Dirty or faulty injectors	*
Faulty sensors	*
Engine does not idle properly	
Low idle rpm too less	*
Restriction in fuel delivery	Inspect fuel system. Clean out fuel lines.
Injection nozzles defective	*
Faulty CR fuel injection system functioning	*
Poor compression	*
Sticking valves	*
Accelerator pedal sensor malfunctioning	*
PCV filter clogged	Replace PCV filter.
Engine operates unevenly and vibrates	
Valve and spring assembly inoperative	*
Faulty CR fuel injection system functioning	*
Injection nozzles defective	*
Faulty EGR system functioning	*
Faulty intake throttle valve functioning	*

* See Mahindra Tractor Dealer

PROBABLE CAUSE/PROBLEM	POSSIBLE REMEDY
Faulty air mass sensor	*
PCV filter clogged	Replace PCV filter
Engine knocks	
One or more cylinders misfiring	Refer ENGINE MISFIRES.
Loose main or connecting rod bearing	*
Injection nozzles defective	*
Insufficient oil	Add oil.
Low coolant temperature	Remove and check thermostat.
Faulty CR fuel injection system functioning	*
Faulty actuators & sensors	Check for loose connection & take the corrective action. If case of failure*
Excessive oil consumption	
Improper oil selection	Use proper viscosity oil
Piston rings worn, broken, stuck or not staggered	*
Oil level in crankcase too high	Maintain correct oil level.
Oil leaking	Rectify the leakage.
Sump drain plug loose or worn	Tighten or replace.
Overheating	Refer to ENGINE OVERHEATS.
PCV system clogged	Check for blockage or shrinkage in the PCV system hoses & rectify it. Check the filter element & replace it if required.
Engine operating temperature too low	Check the thermostat opening temperature.
Restricted turbocharger drain pipe	Check & rectify it.
Turbocharger malfunctioning	Refer turbocharger troubleshooting.
Engine overheats	
Faulty heat indicator	Replace.
Cooling system clogged	Clean out radiator and engine
Fan and water pump belt slipping	Check tension and replace belt if required.
Insufficient oil	Maintain proper oil level.
Defective thermostat	*
Water pump defective	*
Faulty CR fuel injection system functioning	*
Faulty intake & exhaust valve action	*
Clutch plate slippage	*
Brakes dragging	Check brake linkages for free movement and adjust free pedal play.
Engine overloaded	Select gear according to load.
Low coolant level	Fill cooling system to proper level; check radiator, coolant recovery tank, and hoses for loose connections or leaks.
Faulty radiator cap	Have service person check.
Dirty radiator core or grille screens	Remove all trash.
Faulty radiator cowl	Check the cowl for gap between cowl & radiator. Check for any breakage & replace it.

* See Mahindra Tractor Dealer

PROBABLE CAUSE/PROBLEM	POSSIBLE REMEDY
Lubricating oil pressure too high or too low	
Defective oil pressure indicator	Replace recommended oil pressure indicators
Wrong viscosity, diluted or insufficient oil	Refer to LUBRICANT SPECIFICATIONS. Select correct grade of oil, drain fill crankcase with oil of proper viscosity and quality.
Broken, loose or plugged oil lines	Replace, clean and tighten./*
Low oil level in the crankcase	Add oil and check for oil leakage, also refer to lubrication guide and engine and chassis. Lubricant specifications.
Defective or dirty oil pressure regulating valve	Refer : Excessive Oil consumption also/ *
Oil pump strainer clogged or pump not working	*
Worn bearings	*
Clogged oil filter	Change filter element.
Clogged oil cooler	Change the oil cooler.
Defective oil pump	*
Excessive smoke	
Air cleaner pipe clogged	Remove, check and clean.
Improper grade of fuel/oil	Drain off and replace with correct grade of fuel/oil.
Worn pistons, rings and/or sleeves	*
Air-cleaner clogged/Paper element choked	Remove and clean. If defective, replace paper element.
Faulty intake & exhaust valve action	*
Faulty CR fuel injection system functioning	*
Engine overloaded with respect to gear selection	Select gear according to load.
Engine emits white smoke	
Improper type of fuel	Use proper fuel.
Low engine temperature	Warm engine to normal operating temperature.
Defective thermostat	Remove and check thermostat.
Restriction/choking of fuel lines	Clean lines, replace filter element if required.
Faulty CR fuel injection system functioning	*
Faulty sensors	*
Engine emits blue smoke	
Air leak between compressor & intake manifold	Check and rectify.
Air leak between intake manifold & engine	Check and rectify.
Foreign object in exhaust manifold (from engine)	*
Restricted turbocharger oil drain line	Check and rectify.
Turbocharger malfunctioning	*
Faulty CR fuel injection system functioning	*
PCV system clogged	Check for blockage or shrinkage in the PCV system hoses & rectify it. Check the filter element & replace it if required.

* See Mahindra Tractor Dealer

PROBABLE CAUSE/PROBLEM	POSSIBLE REMEDY
Engine emits black or gray exhaust smoke	
Improper type of fuel	Use proper fuel.
Clogged or dirty air cleaner	Service air cleaner.
Engine overloaded	Reduce load or shift to a lower gear.
Injection nozzles dirty	*
Restriction or leakage in the air intake system	Check and rectify.
Foreign object in exhaust manifold (from engine)	*
Restriction or leakage in the exhaust system	Check and rectify.
Faulty EGR system functioning	*
Turbocharger malfunctioning	Refer TURBOCHARGER troubleshooting
Excessive fuel consumption	
Faulty intake & exhaust valve actions	*
Fuel leaks	Tighten or replace fuel lines.
Engine overloaded	Select the gear with respect to load, speed, & soil condition.
Engine not operating at proper temperature	Check cooling system and thermostat.
Air cleaner clogged	Service the air cleaner.
Incorrect viscosity or quantity of lubricating oil	Refer to LUBRICANT SPECIFICATIONS. Keep oil up to the correct level.
Faulty CR fuel injection system functioning	*
Incorrect tire pressure	Inflate/deflate up to recommended pressure to avoid wheel slippage and improper tire wear.
Improper type of fuel	Use proper fuel.
Faulty injectors	*
Turbocharger (55 HP)	
Turbocharger noisy	
Restriction or leakage in the air intake system	Check and rectify.
Foreign object in exhaust manifold (from engine)	*
Restriction or leakage in the exhaust system	Check and rectify.
Excessive dirt build up on compressor wheel and/or diffuser vanes	*
Turbocharger bearing defective	*
Foreign body damage on compressor or turbine	*
Insufficient oil supply to turbocharger	*
Turbocharger compressor/turbine wheel defective	*
Oil leak from compressor seal/turbine seal	
Restricted compressor intake duct	Check and rectify. /*
Foreign object in exhaust manifold (from engine)	Check and rectify. /*
Restricted exhaust system	Check and rectify.
Restricted turbocharger oil drain line	Check and rectify.
Turbocharger bearing housing sludged or coked	*
Excessive dirt build up on compressor wheel and/or diffuser vanes	*
Turbocharger bearing defective	*
Higher crankcase pressure	Check PCV element & replace if required

* See Mahendra Tractor Dealer

PROBABLE CAUSE/PROBLEM	POSSIBLE REMEDY
8.3 Hydraulics	
No lifting or slow lifting	
Less/no oil in system	Check & fill oil to correct level.
Suction filter clogged	Clean filter replace damaged.
Hydraulic pump has lost its efficiency	Get the pump replaced.
Control valve defective	*
Control linkage defective	*
System overloaded	Reduce load on system.
Hydraulic oil too cold	Allow oil to warm.
Screen clogged	Clean or replace screen.
Hydraulic lift arms lifting without lever operation	
Control valve/linkage defects	*
System overheating	
Air in the system	Locate the source of air entry and seal it.
Water in the system	Drain oil & refill.
Restriction in suction delivery pipes	Clean and refit.
Relief valve continuously blowing	Check linkage & upper limit stop. /*
Control valve defects	*
Lift arms will not hold	
Control valve defective	*
8.4 Brakes	
Does not hold or slips	Adjust brakes or change linings if needed. Linings oil soaked; check bull pinion shaft oil seal. /*
Drag or uneven	Adjust brakes.
Return spring broken	Replace.
Will not release	Release hand-brake. Check brake shaft for seizure.
8.5 Transmission	
Hard to shift gears	Use correct viscosity lubricant. /*
Shifter fork or lever defective	Replace. /*
Gears slipping out of mesh	*
Excessive noise	Check oil level, use proper viscosity lubricant. /*
Damaged parts	*
Noisy gear shifting	Adjust clutch pedal play. /*
8.6 Rear wheels	
Do not turn	Release brake lock. Transmission, differential or clutch faulty. *
Engine clutch drags	*

* See Mahindra Tractor Dealer

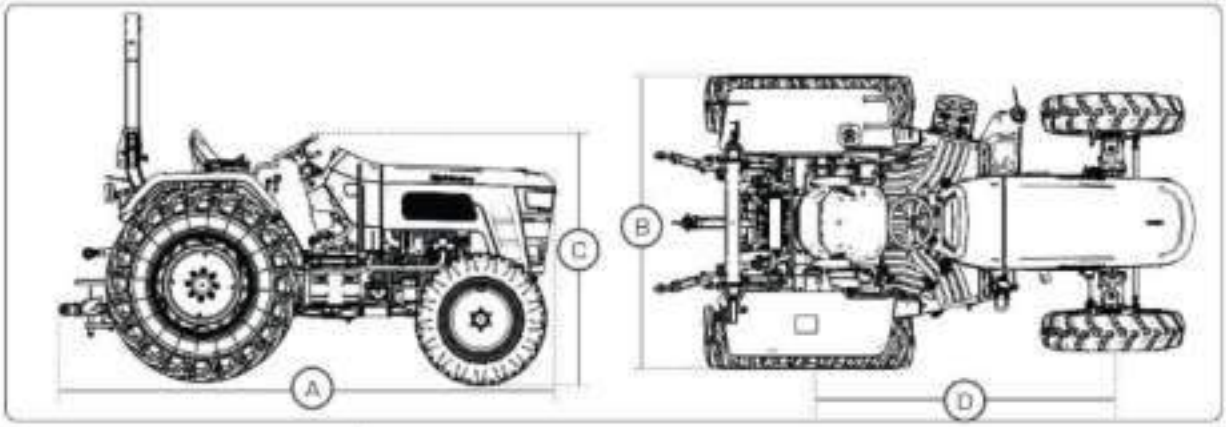
PROBABLE CAUSE/PROBLEM	POSSIBLE REMEDY
8.7 Electrical	
Battery does not charge	
Loose or corroded connections	Clean and tighten connections.
Sulfated or worn-out battery	Check electrolyte level and specific gravity.
Loose or defective fan belt	Check belt tension & replace if required.
Low engine speed	Increase speed.
Alternator malfunctioning	*
Charging fuse blown off	Replace the fusie
Charging system indicator glows with engine running	
Defective battery	Check electrolyte level and specific gravity.
Defective alternator	Have your Mahindra dealer check alternator.
Loose defective fan belt	Check belt tension & replace if required.
Alternator fuse blown off	Replace Fusie.
Starter inoperative	
Loose or corroded connections	Clean and tighten loose connections.
Low battery output	Check electrolyte level and specific gravity.
PTO engaged	Disengage PTO.
Loose connection of battery cable and solenoid	Tighten properly
Starter cranks slowly	
Low battery output	Check electrolyte level and specific gravity.
Crankcase oil too heavy	Use proper viscosity oil.
Loose or corroded connections	Clean and tighten loose connections.
No lights	
Fuse blown	Replace fuse.
Loose wiring or improper connections causing malfunctioning	Check wiring to see that all connections are clean and tight.
Lights burn dim	Re-charge battery, tighten cable terminals, check lamps, clean contacts.

* See Mahindra Tractor Dealer

PROBABLE CAUSE/PROBLEM	POSSIBLE REMEDY
8.8 Power steering	
Steering wander	Check the size of tires. Check tire pressure.
	Check for loose or worn steering linkage parts.
	Check wheel bearings for wear.
	Check front wheel alignment.
No recovery for open cylinder unit	Check tire pressure.
	Check for tightness of front axle kingpins.
	Check for alignment of steering column.
Shimmy	Check for proper mounting of tires.
	Check steering linkages for loosener's, improper adjustment, wear and rectify accordingly.
	Check for air in hydraulic system and bleed.
High steering effort in one direction	Check if the vehicle is overloaded.
	Check for correct hydraulic system pressure.
	Check if the flow plate value is stuck due to excessive heat in the system.
	Check for correct size tires.
	Check for vehicle overloading.
	Check the hydraulic fluid level.
	Check for correct flow pressure of the pump.
	Check if the steering linkages are binding.
	Check for restriction in fluid return line.
Lost motion (Lash) at the steering wheel	Check for firmness of steering wheel on column.
	Check for components of the steering linkages.
	Check for tightness of flow unit at mounting.
	Check for air in the hydraulic system & bleed it.
Excessive heat	Check for correct size of hose.
	Check for the centering of control unit.
	Check for excessive fluid flow.

* See Mahindra Tractor Dealer

9. SPECIFICATIONS



	45 & 55HP
DIMENSIONS (STANDARD)	
Length overall (A)	3445 ± 25 mm
Width overall setting (B)	1941 ± 25 mm (Ag), 2009 ± 25 mm (Ind)
Height overall (C)	1540 ± 25 mm
Wheel base (D)	1980 ± 10 mm
Min ground clearance (Below the swinging drawbar)	430 ± 10 mm
OPERATING WEIGHT (APPROX.)	
Basic tractor including fuel, oil coolant, hydraulic system, three point linkage, transmission, PTO, lighting and wheel sizes without ROPS & seat.	
WEIGHT DISTRIBUTION	
Weight (Kg)	2536 & 2551
TIRES	
Front (standard)	**4WD**: Ag 9.5 x 20, 6 PR Ind 10.5/80x18, 10 PR
Rear (standard)	**4WD**: Ag 14.9 x 28, 6 PR Ind 16.9 X 24, 136A8
TURNING RADIUS (Minimum)	
With brakes (M)	3.3 ± 0.15
Without brakes (M)	3.9 ± 0.1

	45 HP-4WD	55 HP-4WD
ENGINE		
Four stroke, water cooled, CRDI, turbo charged diesel engine, comply with US EPA TIER-4 final and CARB norms		
Model	DH 45	DH55
No. of cylinders	4	
Displacement (CC)	2732	
Bore (MM)	88.9	
Stroke (MM)	110	
Compression ratio	18.7:1	
Max. engine HP (Manufacturing rating)	45 HP (± 5%) at rated RPM	55 HP (± 5%) at rated RPM
Rated speed (rpm)	2300 ± 50	
Max. torque @ rpm (Nm)	163 @ 1400 - 1600	196 @ 1400 - 1600
Torque @ rated speed (Nm)	141 @ 2300	170 @ 2300
High Idle speed (rpm)	2500 ± 50	
Low Idle speed (rpm)	1000 ± 50	
Fuel injection pump	Common rail system - BOSCH	
Cylinder sleeve	Wet, replaceable	
Air cleaner	Dry Type 6 in.	
Winter care	Diesel oxidation catalyst, Under hood muffler side out tail pipe	
Exhaust system	DOC, UHM side out tail pipe	
Firing order	1 - 3 - 4 - 2	
Accelerator	Mechanical lever type: Hand accelerator on right hand side of the steering column & Foot operated accelerator right hand side on floor panel	
ELECTRICAL		
Battery	12 V, 96 Ah, ≥925 CCA	
Starter type, rating & power	12 V, 3.6 kW pre-engaged solenoid type, key start with interlock safety neutral switch	
Alternator	12 V, 90 A Internal fan alternator	
Instrumentation gauges	RPM gauge, fuel gauge & temperature gauge	
Indicators	**LED based indication** : High beam, high temperature, battery charge warning, parking brake, low oil pressure, left turn, right turn indicator, air clog indicator, neutral, service reminder, intake manifold heater, water in fuel, check engine, MIL, low fuel, 4WD, air heater indicator (only provision provided) and PTO engagement indicators **LCD based indication:** Hour meter, trip hour meter	
Switches	Starter, Flashing warning lamp switch, clutch, brake, work lamp, neutral, oil pressure switch, Panel mounted combination switch : Horn, park light, high & low beam switch, left hand & right hand side turn indicator switches	
Electrical system for CRDI & sensors	C55 ECU & supportive sensors & actuators Engine speed, rail pressure, water temperature, boost pressure, phase, acc pedal, ambient temperature, water in fuel, air clog sensors	
EGR system	EEGR (Electrical exhaust gas recirculation)	

	45 HP 4WD	55 HP 4WD
CLUTCH		
Main Clutch	Dry type frictional, dual clutch - 11 inch	
PTO Clutch	Dry type frictional, dual clutch - PTO 11 inch	
TRANSMISSION		
Gearbox type	Synchro mesh (Speed gears) Synchro shuttle	
No. of speed	12 forward & 12 reverse with shuttle shift, high, low & medium selection lever	
STEERING		
Hydrostatic power steering common oil for hydraulics, transmission & power steering		
POWER TAKE OFF		
Type	2 speed PTO rear mounted 6 splines 540 & 540E	
PTO. HP	540 : 38 ± 5% HP	540 : 47 ± 5% HP
PTO rpm @ rated rpm	543.6	
PTO operation	Lever operated	
BRAKES		
OIB brakes foot operated, independently with provision of interlock for simultaneous operation. Cable type hand brake is fitted for parking.		
Type	Oil immersed brakes	
Disc diameter (in.)	7 in. OD (177.8 mm)	
4WD FRONT AXLE		
Make & model	Mahindra & Mahindra axle	
Flange to flange front wheel mounting distance	55.9 in. (4WD)	
HYDRAULIC SYSTEM		
Fully live hydraulics with position, with isolator & response control valve, adjustable lift rods at both ends		
Lift capacity at hitch/frame (Kg ± 10%)	1700 kg (3747 lbs)	
Maximum pressure (with auxiliary valve)	190 -197 bar (2755 - 2856.5 psi)	
Hydraulic pump output	33 lpm (8.71 gpm)	
Steering pump output	17.5 lpm (4.62 gpm)	
Three point linkage	Cat-I & Cat-II with telescopic lower link .	
Features	QDC - Quick Disconnect Couplers	
OPTIONAL FITMENTS (DIA KITS)		
Optional fitments (DIA kits)	Front tow hook, extended drawbar, coolant heater, 2nd spool aux valve and auxiliary lever latch	
OPERATOR STATION		
	Open station	
	45 HP 4WD & 55 HP 4WD	

CAPACITIES		
	US Gallons	Liters
Fuel tank	16.77 (Reserve 1 + Unused volume 0.79)	63.5 ± 1.5 (Reserve 3.8+ Unused volume 3)
Cooling system	3.17	12
Engine oil	2.11	8
Transmission	4WD - 11.62	44
Front axle (4WD)	2.19	8.3
SPEED CHART		
Speed chart with Independent PTO transmission in mph for standard AG - (14.9 x 28) tire as per rolling radius 0.647m & IND - (16.9 x 24) tire as per rolling radius 0.606m at 2300 rpm		
Tractor road speed in different positions of F-N-R shuttle, range and speed levers.		

4WD

Gears	Forward (mph)		Reverse (mph)	
	Tire size (Ag) (14.9 x 28)	Tire size (Ind) (16.9 x 24)	Tire size (Ag) (14.9 x 28)	Tire size (Ind) (16.9 x 24)
L1	1.1	1.03	1.05	0.99
L2	1.76	1.65	1.69	1.58
L3	2.18	2.04	2.09	1.96
L4	3.49	3.27	3.34	3.13
M1	2.99	2.8	2.87	2.69
M2	4.79	4.48	4.59	4.3
M3	5.93	5.56	5.69	5.33
M4	9.49	8.88	9.1	8.52
H1	6.01	5.63	5.76	5.4
H2	9.61	9	9.23	8.64
H3	11.92	11.16	11.43	10.71
H4	19.06	17.85	18.29	17.13

TRACTOR HISTORY CARD

Date	Job	Card no.	Nature of defect	Parts replaced	W/Claim No. and Date	Remarks

SERVICE RECORD

Date	Tractor hours	Nature/type of repair/service carried out

PART REPLACEMENT RECORD

Date	Part description	Qty	Cost	Date	Part description	Qty	Cost

DAILY OPERATING LOG

Date	Job done	Machine hours		Fuel consumed	Engine oil topped up	Remarks
		Start	End			

DAILY OPERATING LOG

Date	Job done	Machine hours		Fuel consumed	Engine oil topped up	Remarks
		Start	End			

Precautions to be taken for tractor storage

Sr. No.	Activity	Objective	Every 15 days	Every 45 days	More than 45 days
1	a) First start the engine & allow it to idle for 2 to 3 minutes.	Lubrication to internal parts of the Engine.	✓		
	b) Then run the tractor for 10 minutes from once place to another place at 1800 to 2000 rpm.	Lubrication to internal parts of the Transmission.	✓		
		Charging of the battery.	✓		
		Splashing of fuel from inside of the fuel tank.	✓		
2	Operate all electrical such as switches, flasher, lamps, horn.	To avoid malfunctioning due to oxidation of the contacts.	✓		
3	Drain the water inside the fuel tank using drain plug.	To avoid algae/rust formation & subsequent chocking of the fuel lines.		✓	
4	Raise the lift arms of hydraulics to their full raised position & lock the hydraulic system using the isolating valve on right hand side of control valve.	This raised position will fill the cylinder & protect it's walls from corrosion.		✓	
5	Apply anti-oxidant spray on the battery /alternator/starter motor terminals.	To avoid oxidation of terminals.		✓	
6	Clean sheet metal & chassis with dry cloth.	To avoid accumulation dust which may result into deterioration of paint quality.		✓	
7	Keep the tractor with parking brake disengaged.	To avoid locking of the brakes.			*
8	De-clutching : Place spacers between clutch pedal & foot plate to keep clutch plate free.	To avoid sticking of the clutch plate & subsequent damage.			*
9	Masking (with tape) of all the openings (Such as air cleaner, fuel tank cap, silencer, breathers of engine/brakes/ transmission/hydraulic unit).	To avoid rusting due to moisture entry.			*
10	Disconnect battery terminals.	To avoid discharge of the battery.			*

✓ Indicates activity to be carried out at these intervals.

* To be done whenever tractor is not in use for a long period of time i.e. more than 45 days.

NOTES

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ABBREVIATIONS

Abbreviations	Definitions
2WD	2 Wheel Drive
4WD	4 Wheel Drive
API	American Petroleum Institute
ASTM	American Society For Testing And Materials, USA
PTO	Power Take Off
RH/LH	Right Hand & Left Hand Side
ROPS	Roll-Over Protective Structures
RPM	Revolutions Per Minute
SAE	Society Of Automotive Engineers, USA
SMV	Slow Moving Vehicle
ECS	Emission Control System
PCV	Positive Crankcase Ventilation
EGR	Exhaust Gas Recirculation
DOC	Diesel Oxidation Catalyst
ISO	International Organization For Standardization
CHK	Check Engine Lamp
MIL	Malfunction Indicator Lamp
MSDS	Material Safety Data Sheet
ULSD	Ultra Low Sulfur Diesel
UTTO	Universal Tractor Transmission Oil
NLGI	National Lubricating Grease Institute
OIB	Oil Immersed Brakes
LPM	Liters Per Minute
GPM	Gallons Per Minute
EEGR	Electrical exhaust gas recirculation
SUPTO	Single Lever Independent Power Take Off
IPTO	Independent Power Take Off
PC	Position Control
HSU	Hydrostatic Steering Unit
PSI	Pounds per Square Inch
EP	Extreme Pressure