Mahindra TRACTORS

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Operator's Manual

'10' Series

4010 HST

The Mahindra Group ▪ Mahindra USA, Inc. ▪ 9020 Jackrabbit Road ▪ Houston, Texas 77041 ▪ 1-877-499-7771 ▪ www.mahindrausa.com

Mahindra

TRACTORS
OPERATOR'S MANUAL
4010 HST

■ Mahindra USA, Inc. ■ 5203 Aeropark Drive ■ Houston, TX 77032 ■ (281) 449-7771 ■ www.mahindrausa.com

DAEDONG

Off-Road compression-Ignition Engine
Emission Control System Warranty statement

EMISSION RELATED SYSTEM DEFECT WARRANTY

The warranty period shall begin on the date the engine or equipment is delivered to an ultimate purchaser.

Daedong-USA INC.warrants to the ultimate purchaser and each subsequent purchaser of certified off- road compression-ignition engine(powering off-road machines and equipment),that such engine is;

1) Designed,built,and equipped so as to confirm with all applicable regulations adopted by the United States Environmental Protection Agency and the California Air Resource Board.
2) Free from defects in materials and workmanship which cause the failure of a warranted part to be identical in all material respects to the part as described in the engine manufacturer's

   application for certification for period of five years or 3000 hours of operation, whichever occurs first , for all engines rated at 19 kw and greater, except as noted below. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years. For all engines rated less than 19 kw, and for constant speed engine rated under 37 kw with rated speeds higher than or equal to 3000 rpm, the period of two years or 1500 hours of operation, whichever occurs first, shall apply. In the absence of a device to measure hours of use, the engine shall be warranted for a period of two years.

If a warranted part fails because of a defect during the terms of this warranty,Daedong-USA will repair or replace it at any authorized Daedong-USA dealer.Any other parts damaged by the failure of a warranted part will also be repaired or replaced.The repair and/or replacement will be made at no charge to the owner for parts,labor and diagnosis.Any such part repaired or replaced under the warranty shall be warranted for the remaining warranty periods.

This warranty covers the following emission-related parts and components.
-Fuel Injection pump
-Nozzle Assembly
-Injection pipe
-Turbocharger (if equipped)
-Intake,Exhaust manifold

If failure of one of these components results in failure of another part,both will be covered by this warranty. Any replacement part may be used for maintenance or repairs,The owner should ensure that such parts are equivalent in design and durability to Daedong genuine parts.
Use of non-genuine Daedong parts does not invalidate the warranty.However Daedong-USA INC. is not liable for parts,which are not genuine Daedong parts.

RESPONSIBILITY AND LIMITATIONS.

These warranties are subject to the following;

DAEDONG-USA INC.RESPONSIBILITIES.

During the emission warranty period,if a defect in material or workmanship of a warranted parts or component is found.Daedong-USA INC.will provide;

-New,remanuctured,or repaired parts and/or components required to correct the defect.
Items replaced under this warranty become the property of Daedong-USA INC.

-Labor,during normal working hours,required to make the warranty repair.
This includes diagnosis and labor to remove and install the engine,if necessary.

Owner's Warranty Responsibilities.

As the Daedong-USA INC.off-road compression-ignition engine owner,you are responsible for the performance of the required maintenance listed in your Owner's Manual.
Daedong-USA INC.recommends that you retain all receipts covering maintenance on you Daedong engine but Daedong-USA INC.cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.However,if the lack of required maintenance was the reason for the repair,then the claim will be denied.

You are responsible for presenting your Daedong engine to a Daedong-USA INC.dealer as soon as a problem exists.The warranty repairs should be completed in a reasonable amount of time,not to exceed 30 days.

As the Daedong engine owner,you should also be aware that Daedong-USA INC.may deny you warranty coverage if your Daedong engine or parts has failed due to abuse,neglect,improper maintenance or unapproved modifications.if you have any questions regarding your warranty rights and responsibilities, you should contact Daedong-USA INC.
Division at 1801 Quality Drive(Tel.No;1-252-291-6111)

LIMITATION

The emission control system defects warranty and the emission control system performance warranty shall not apply to:

-malfunctions in any part directly caused by abuse,misuse,modification,improper adjustment except those done by a dealership during warranty service work,alterations,tempering connections,improper or inadequate maintenance,neglect or use of leaded diesel or other fuels not recommended in the owner's Manual.
-Damage resulting from accident or an Act of God.
-Failure that are a direct result of a lack of performance of required emission control maintenance as outlined in your Owner' Manual.
-Parts or accessories used in applications for which they were not designed or not approved for use on the engine by Daedong-USA INC.
-Parts not supplied by Daedong-USA INC. or damage to other parts caused directly by non-Daedong parts or non-equivalent parts.
-The charge for diagnostic labor which does not lead to the determination that a warrantable condition exists.
- Daedong-USA INC. is not responsible for incidental or consequential damages such as downtime or loss-use of engine powered equipment.
-Although you purchase the equipment on which Daedong engine is mounted, if the equipment is not manufactured by Daedong, you will make contact with purchasing dealer.

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Daedong-USA, INC. are pleased to explain the emission control system warranty on your 2004 and later engine. In California, new off-road engines must be designed, built, and equipped to meet the State's stringent anti-smog standards. Daedong-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, Daedong-USA, INC. will repair your off-road compression ignition engine at no cost to you including diagnosis, parts, and labor.

MANUFACTURER'S WARRANTY COVERAGE;

The 2003 and later off-road compression-ignition engines;

For all engines rated under 19 kW and for constant speed engines rated under 37 kW with rated speeds greater than or equal to 3,000 rpm, the warranty period is 1,500 hours or 2 years of use, whichever first occurs, after date of delivery to initial owner.
For all other engines rated at or above 19 kW, the warranty period is 3,000 hours or 5 years of use, whichever first occurs, after date of delivery to the initial owner. If any emission-related part on your engine is defective, the part will be repaired or replaced by Daedong-USA, INC.

OWNER'S WARRANTY RESPONSIBILITIES;
—As the off-road compression ignition engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. Daedong-USA, INC. recommends that you retain all receipts covering maintenance on your off road compression ignition engine, but Daedong-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 compression ignition engine owner, you should however be aware that Daedong-USA, INC. may deny you warranty coverage if your off-road compression ignition engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

— Your engine is designed to operate on 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. The CARB suggests that you present your off-road compression ignition engine to a Daedong-USA, INC. dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

— If you have any questions regarding your warranty rights and responsibilities, you should contact Daedong-USA, INC. at 1801 Quality Drive (Tel.No ; 1-252-291-6111)

— Although you purchase the equipment on which Daedong engine is mounted, if the equipment is not manufactured by Daedong, you will make contact with purchasing dealer.

MAINTENANCE RECOMMENDATION

Some Daedong-USA, INC off-road compression ignition engines are certified by the United States Environmental Protection Agency and California Air Resource Board to comply with smoke and gaseous emission standards prescribed by federal laws at the time of maintenance.

The engine is certified if it has a special certification label. A Daedong engine dealer can also inform you if the engine is certified.

Efficiency of emission control and engine performance depends on adherence to proper operation and maintenance recommendations and use of recommended fuels and lubricating oils. It is recommended that major adjustments and repair be made by your authorized Daedong engine dealer.

Various chemical fuel additives, which claim to reduce visible smoke, are available commercially. Although additives have been used by individuals to solve some isolated smoke problems in the field,they are not recommended for general use. Federal smoke regulations require that engines be certified without smoke depressants.

The corrective step taken immediately on discovery of worn parts, which may affect emission levels, will help assure proper operation of emission control system. The use of genuine Daedong parts recommended. Suppliers of non-Daedong parts must assure the owner that the use of such parts will not adversely affect emission levels.

Regular maintenance intervals, along with special emphasis on the following items, are necessary to keep exhaust emissions within acceptable limit for the useful life of the engine.

Refer to the maintenance intervals. If the engine is operation under severe conditions, adjust the maintenance exhaust emissions within acceptable limit for the useful life of the engine.

The following is an explanation of maintenance for emission-related components.

See the Maintenance schedule for specific interval for the following items.

FUEL INJECTION PUMP OR NOZZLES – Fuel injection pumps or nozzles are subject to tip wear as a result to fuel contamination. This damage can cause an increase in fuel consumption,the engine to emit black smoke misfire or run rough. Inspect, test, and replace if necessary.
Fuel injection pumps can be tested by an authorized Daedong engine dealer.

TURBOCHARGER – Check for any unusual sound or vibration in the turbocharger. Inspect inlet and exhaust piping and connections. Check bearing condition and perform maintenance as described in the Maintenance Schedule.

Slow engine response and low power may indicate a need for adjustment or repair.
Your Daedong engine dealer is equipped with the necessary tools, personnel, and perform this service.

Owner is encouraged to keep adequate maintenance records, but the absence of such, in and of itself, will not invalidate the warranty.

The machine or equipment owner may perform routine maintenance, repairs and other non warranty work or have it done at any repair facility. Such non-warranty work need not be performed at a designated warranty station in order for the warranty to remain in force.

CUSTOMER ASSISTANCE – EMISSION CONTROL SYSTEM WARRANTY;

Daedong-USA INC. aims to ensure that the Emission Control Systems Warranty is properly administrated. In the event that you do not receive the warranty service to which you believe you are entitled under the Emission Control System Warranty, call or write.

Daedong-USA, INC.
at 1801 Quality Drive
Tel. No ; 1-252-291-6111
Fax. No ; 1-252-291-9161

-Authorized dealers are recommended for major maintenance and repair work as they are staffed with trained personnel, proper tools and are aware of the latest maintenance methods and procedures. Owners and others who desire to perform their own work should purchase a Service Manual and obtain current information from their Daedong engine dealer .

-In case of purchasing the equipment on which Daedong engine is mounted, if the equipment is not manufactured by Daedong, the equipment owner will make contact with purchasing dealer.

FOREWARD

Thank you very much for purchasing our tractor, which, we feel sure, will give you many years of troubling the service.
The introduction in this manual set out the correct manner of operating, maintaining and checking the tractor to ensure long-term durability.
Please ensure correct operation of the tractor as incorrect operation can cause substantial mechanical damage as well as cause accidents with the associated injuries.
Please note that in some cases differences can exist between this manual and your tractor due to the manufacture's policy of constant product improvement.
In the event that you strike a problem not covered by this manual please contact your nearest dealer who will assist you in resolving your problem.

WARNING

CALIFORNIA Proposition 65 Warning

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

WARNING SIGNS IN THIS MANUAL

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

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

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

CONTENTS

TRACTOR IDENTIFICATION

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

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

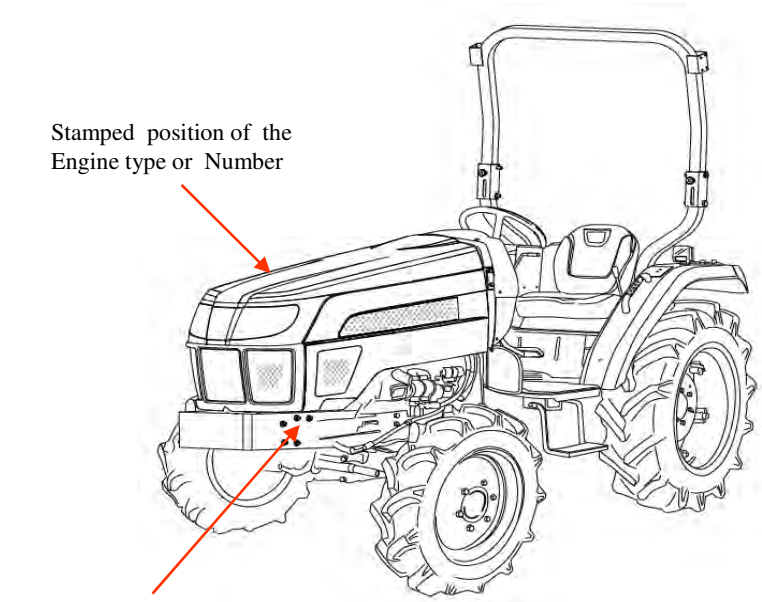


Illustration A

WARRANTY OF THE PRODUCT.

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

SERVICE.

Service is available from any Mahindra dealer in the country.

PARTS.

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

Tractor model

Tractor serial number

Tractor engine number

Part number and description

Quantity required.

ABOUT THIS MANUAL

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

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

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

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

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

If at any time you require advice concerning your Tractor, do not hesitate to contact your Authorized Mahindra dealer/Distributor.

He has trained personnel, genuine parts and necessary equipments to undertake all your service requirements.

Mahindra 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/Distributor.

► TRACTOR AN INTRODUCTION

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

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

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

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

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

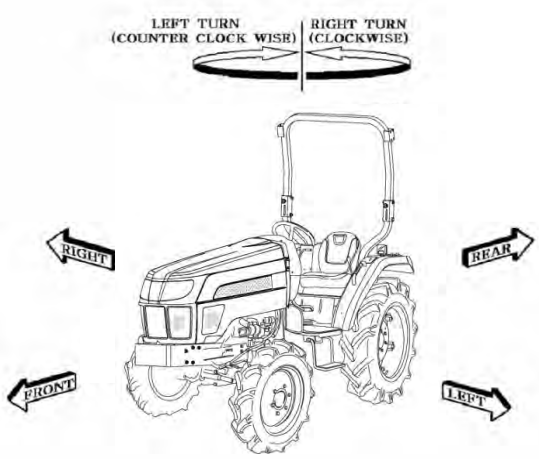


illustration A

(Front, Rear,Left,Right Portion)

► DESCRIPTION

■ General construction

The transmission case, Engine and Front Axle Support are bolted together to form a rigid unit.

■ Front Axle & Wheels

The 4WD front axle is a center-pivot, reverse Eliot type. The front wheel drive mechanism is incorporated as a part of the axle.

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

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

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

■ Engine

The tractors are fitted with fuel efficient engine with 4 cylinders manufactured by Daedong

■ Transmission with HST (Hydrostatic Transmission)

The Tractor is fitted HST with 3 Range and can be selected Speed range by HIGH-LOW selector lever. The Tractor has Two pedals for forward/reverse control . Tractor with Independent Power Take Off is fitted with electro-hydraulic Clutch Assy. The Rear PTO and Mid PTO can be operated both or separately by a lever.

■ Brakes

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

A foot brake lever is fitted for parking.

■ Rear axle & Wheels

This is mounted on ball bearings and is enclosed in removable housing which are bolted to the transmission case. The rim & Disc fitted with Rear tires are bolted to the outer flange of Rear Axle.

■ Hydraulic system & Linkages.

Mahindra Tractors are fitted with Live (i.e. system is in operation) independent, very touch of hydraulic System. Three point Linkages can be used for category 1 type of implements.

■ Steering

It consists of Hydrostatic Power steering system, which has a hydraulic cylinder and single type hydraulic pump

■ Electrical System

A 12 Volt Battery is used to activate the Engine through the Starter Motor and the Electrical system comprising Horn, Head Lamp, Turn signal lamp, Taco-meter, Hour meter, Brake lamp, Gauge lamp, Hazard Lamp. General or Alternator, Fuse box also from part of the Electrical system.

OWNER ASSISTANCE

We at Mahindra and your Mahindra Dealer/Distributor wants you to be completely satisfied with your investment.
Normally any problems with your equipment will be handled by your Dealer/Distributor's Service Departments, however, misunderstanding can occur.
If you feel that your problem has not been handled to your satisfaction, we suggest the following.

Contact the owner or General Manager of the Dealership, explain the problem, and request assistance.
When additional assistance is needed, Your Dealer/Distributor has direct access to your office.
If you cannot obtain satisfaction by doing this, contact the Mahindra. Office and provide them with;

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

Before contacting Mahindra office, be aware that your problem will likely to be resolved in the Dealership using the Dealer's/Distributor's facilities, equipment and personnel.
So it is important that your initial contact be with the Dealer/Distributor.

(ROPS) Roll Over Protective Structures

► ROLL OVER PROTECTIVE STRUCTURES (ROPS)

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

DANGER

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

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

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

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

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

► DAMAGE OF THE ROPS

If the tractor has rolled over or the ROPS has damaged (such as striking an overhead object during transport), It must be replaced to provide the original protection. After an accident, check for damages to the 1.ROPS.2.Seat 3.seat belt & seat mountings. Before you operate a Tractor, replace all damaged parts.

► DO NOT WELD, DRILL OR STRAIGHTEN THE ROPS

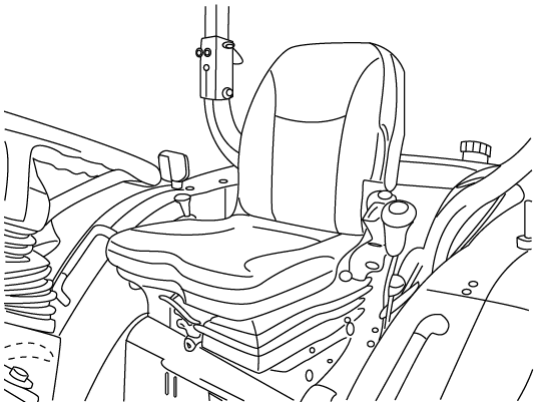
Warning	Never attach chains, ropes to the ROPS for pulling purposes; this will cause the Tractor to tip backwards. Always pull from the Tractor drawbar. Be careful when driving through door opening or under low overhead objects. Make sure there is sufficient overhead clearance for the ROPS fatal injuries

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

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

How to adjust the Seat

*** Sliding type**



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

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

Figure 1 identifies the seat fitted to your Tractor.

► FOR SLIDING SEAT

■ Sliding Seat type

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

Make sure the seat is locked in position.

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

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

SAFETY INSTRUCTIONS

RECOGNIZE SAFETY INFORMATION

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

SIGNAL WORDS.

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

DANGER

WARNING

CAUTION

READ SAFETY INSTRUCTION

Carefully read all safety instructions given in this manual for your safety. Tempering 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.

PROTECTION CHILDREN

Keep children and others away from the Tractor while operating.

BEFORE YOU REVERSE

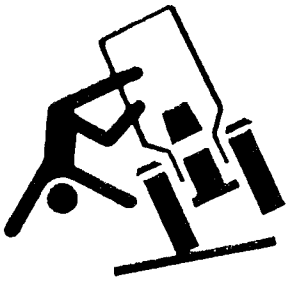
- Look behind Tractor for children.
- Do not let children to ride on Tractor or any implement.

USE OF ROPS AND SEAT BELT

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

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

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



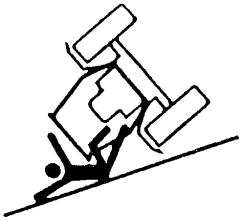
PRECAUTION TO AVOID TIPPING

Do not drive where the Tractor could slip or tip.

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

Slow down before you make a sharp turn.

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

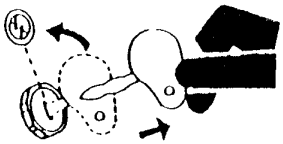


PARK TRACTOR SAFELY

Before working on the Tractor ;

Lower all equipment to the ground.

Stop the engine and remove the key



KEEP RIDERS OFF TRACTOR

Do not allow riders on the Tractor.

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

HANDLE FUEL SAFELY-AVOID FIRES

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

Always stop engine before refueling Tractors.

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

STAY CLEAR OF ROTATING SHAFTS

Entanglement in rotating shaft can cause serious injury or death.

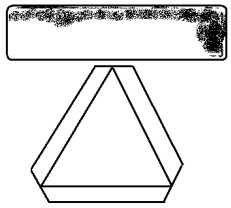
Keep PTO shield in place at all times.

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

ALWAYS USE SAFETY LIGHTS AND DEVICES

Use of hazard warning lights and turn signals are recommended when towing equipment 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



PRACTICE SAFE MAINTENANCE

Understand service procedure before doing work.

Keep the surrounding area of the Tractor clean and 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 caused on it.

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

Keep all parts in good condition and properly installed.

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

Remove any buildup of grease or oil from the Tractor.

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

AVOID HIGH-PRESSURE FLUIDS

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

PREVENT BATTERY EXPLOSIONS

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

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

PREVENT ACID BURNS

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, cause holes in clothing and cause blindness if found entry into eyes.

For adequate safety always;

1.Fill batteries in a well-ventilated area.

2.Wear eye protection and acid proof hand gloves

3. Avoid breathing direct fumes when electrolyte is added.

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

If you spill acid on yourself;

1.Flush your skin with water.

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

Get medical attention immediately.

SERVICE TRACTOR SAFELY

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

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

WORK IN VENTILATED AREA

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

TRACTOR RUNAWAY

1. The tractor can start even if the transmission is engaged position causing Tractor to runaway and serious injury to the people standing nearby the tractor.
2. For additional safety keep the pull to stop knob (fuel shut off control) in fully pulled out position. Transmission in neutral position, Foot brake engaged and PTO lever in disengaged position while attending to Safety Starter Switch or any other work on Tractor.

SAFETY STARTER SWITCH

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

Caution

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

SAFE OPERATION OF YOUR TRACTOR

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

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

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

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

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

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

For full details consult the manufacturer of the chemicals.

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

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

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

Use of seat belt is a must while operating a tractor.

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

SAFETY TIPS DURING MAINTENANCE

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

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

   Where a tractor is started in a confined area, ensure that the area is well ventilated as exhaust gases are very harmful, and can cause death.
6. Do not work under raised implements.
7. When changing wheels or tires ensure that a suitable wheel stand is placed under the axle prior to removing the wheel and the wheels are chocked.
8. Where guards or shields need to be removed to perform a service or repair, ensure that the guard or shield is correctly reinstalled before starting the Tractor.
9. Never refuel near an open flame or with an overheated engine. Ensure to turn off Engine before refueling.
10. The cooling system operates under pressure, take care when removing the Radiator cap on a hot engine to prevent being scalded by steam or hot water.

    Do not add water in the radiator

    when the engine is hot.

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

► MOUNTING AND DEMOUNTING IMPLEMENTS

(1)Ensure that all mounting and removal of implements is done on safe flat ground. Ensure no one is between the Tractor and implement and do not get under the implement to avoid accidental injuries.
(2) After mounting the implement, ensure that all sway chains are correctly adjusted and, where PTO shafts are used that the shaft is fitted and secured correctly.
(3) Where heavy implements are used, ensure that the combination is well balanced or use proper ballast to achieve balance.
(4) Before leaving the tractor at any time, lower the implement, stop the PTO shaft where applicable, set the parking brake and switch off the engine.
(5) While operating the implements with the PTO keep all bystanders away from any moving parts and do not attempt to make adjustments while the machine is running.
(6) Only the driver should ride on the Tractor with the ROPS frame fitted and with the seat belt properly fastened.
(7) Where young children are present, particular care should be taken and the tractor should not be moved until the whereabouts of all children is known.
(8) Only trained operators should operate the Tractor and so taking care to ensure that other workers are not injured. In particular they should take care during dusty operations, which will reduce visibility substantially.
(9) Never start the tractor unless the transmission is out of gear, the operator is in the seat and all round safety has been checked.
(10) Only operate the tractor seated in the drivers seat and never turn or brake suddenly at high speed as this can cause a roll-over and serious injury or death.
(11) When traveling on a public road ensure that the tractor and driver both meet all laws relating to safety and licensing. When traveling with wide implements use red flags on the extremities and observe all legal including escort requirements**.**
(12) When operating under adverse conditions, hilly terrain or on bad ground adjust the speed of the tractor to suit the conditions, safety comes first. Never drive down hill at high speed or with the transmission in neutral. Use of the braking capacity of the engine as well as the service brakes. Do not try to change gear going up or down a steep slope, select the correct gear before starting.
(13) Take care when traveling uphill with a heavy implement to ensure that it does not overbalance and tip up the front end.
(14) Never remove or modify the seat belt.
(15) Never remove, modify or repair the ROPS frame.

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

► THE FOLLOWING PRECAUTIONS ARE SUGGESTED TO HELP PREVENT ACCIDENTS.

A careful operator is the best operator.

Most accidents can be avoided by observing certain precautions .

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

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

■ The Tractor

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

■ Servicing the Tractor

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

■ **Operating the tractor**

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

   In order to prevent the accidental starting of the tractor, a safety switch has been provided. The starting system of the tractor is connected through this switch, which becomes operative only when the master brake pedal is depressed. On some models shuttle shifter lever and PTO button should also be in neutral position for completing the starting circuit. **Do not bypass the safety starter switch**. Consult your Mahindra Tractor Dealer/Distributor if safety- starting switch malfunctions.
4. Avoid accidental contact with the gear shifter lever while the engine is running. Unexpected Tractor movement can result from such contact.
5. Do not get off or climb the tractor while it is in motion.
6. Shut off the engine, remove the key and apply the parking brake before getting off the tractor.
7. Do not operate the tractor in an enclosed building without adequate ventilation. Exhaust fumes can cause death.
8. Do not park the tractor on a steep slope.
9. **If power steering or Engine seizes to operate, stop the tractor immediately**.
10. Pull only from the swinging draw bar or the lower link drawbar in the down position. Use only a drawbar pin that locks in place. Pulling from the tractor rear axle carriers or any point above the rear axle may cause the Tractor's front end to lift.
11. If the front end of the tractor tends to rise when heavy implements are attached to the three-point linkage, install front end or front wheel weights. Do not operate the tractor with a light front end.
12. Always use hydraulic position control lever when attaching equipments/implement and when transporting equipment. Be sure that the hydraulic couplers are properly mounted and will disconnect safely in case of accidental detachment of implement.
13. Do not leave equipment/implement in the raised position.
14. Use the flasher/ Turn signal lights and Slow Moving Vehicle (SMV) signs when driving on public roads during both day and night time, unless prohibited by law.
15. Dim tractor lights when meeting a vehicle at night. Be sure the lights are adjusted to prevent the blinding on the eyes of coming vehicle operator.
16. Emergency stopping instruction; If tractor fails to stop even after application of brakes, Pull the knob of fuel shut off control rod.

■ **Driving the tractor**

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

■ **Operating the PTO (Power Take Off)**

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

■ **Diesel fuel**

1. Keep the equipment clean and properly maintained.
2. Under no circumstances should gasoline, alcohol or blended fuels be added to diesel 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.
3. Never remove the fuel cap or refuel the tractor with the engine running.
4. Do not smoke while refueling or when standing near fuel.
5. Maintain control of the fuel filler pipe when filling the tank.
6. Do not fill the fuel tank to capacity. Allow room for expansion.
7. Wipe up spilled fuel immediately.
8. Always tighten the fuel cap securely.
9. If the original fuel tank cap is lost, replace it with genuine cap. A none approved cap may not be safe.
10. Do not drive equipment near open fire.
11. Never use fuel for cleaning purpose.
12. Arrange fuel purchases so that winter grade fuel are not held over and used in the spring.

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

DO'S AND DON'T'S

► DO'S-For Better performance

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

DO-Read all operating instructions before commencing to operate Tractor.

DO-Carry out all maintenance tasks without fail.

DO-Keep the air cleaner clean.

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

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

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

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

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

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

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

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

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

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

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

Don'ts-For safe operation

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

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

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

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

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

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

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

DON'T-Ride the brake or master brake pedal. This will result in excessive wear of the brake lining.

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

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

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

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

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

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

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

DON'T-Move the hydraulic levers rearward.

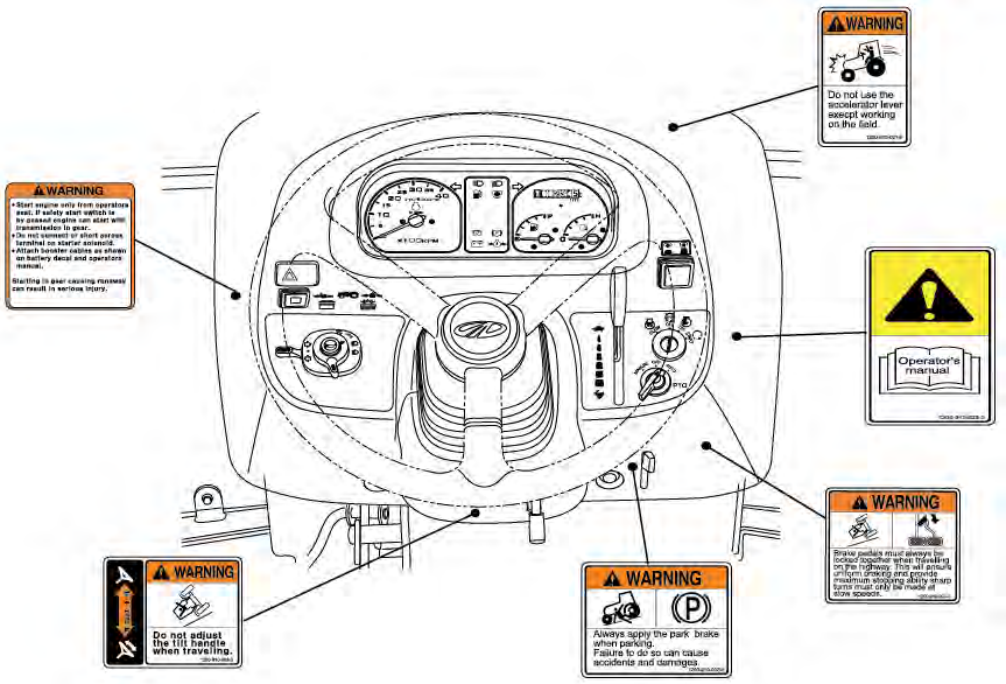
SAFETY SIGNS

► GENERAL SAFETY INFORMATION

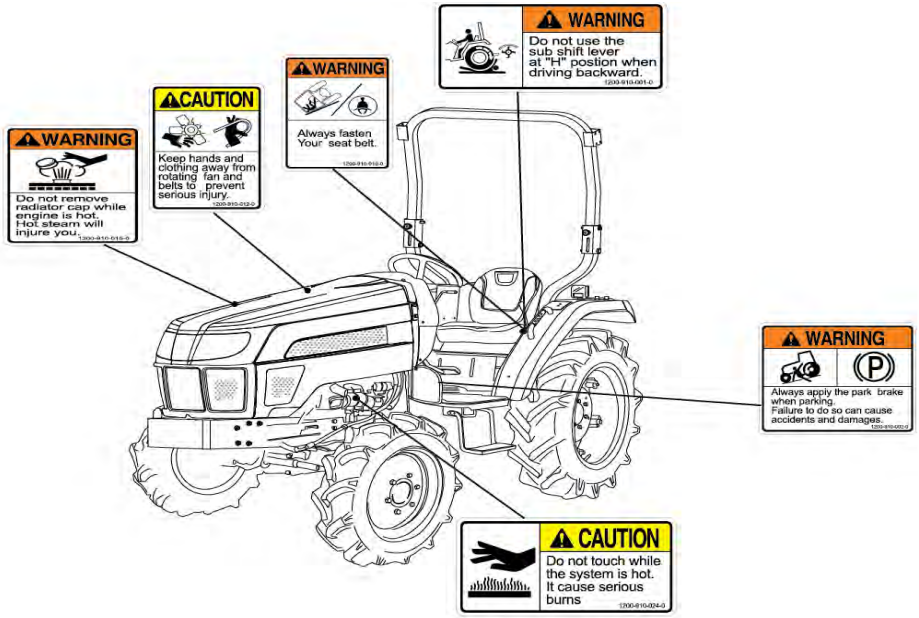
IMPORTANT: This **"General safety Information"** should be kept with the machine at all times as reference data.

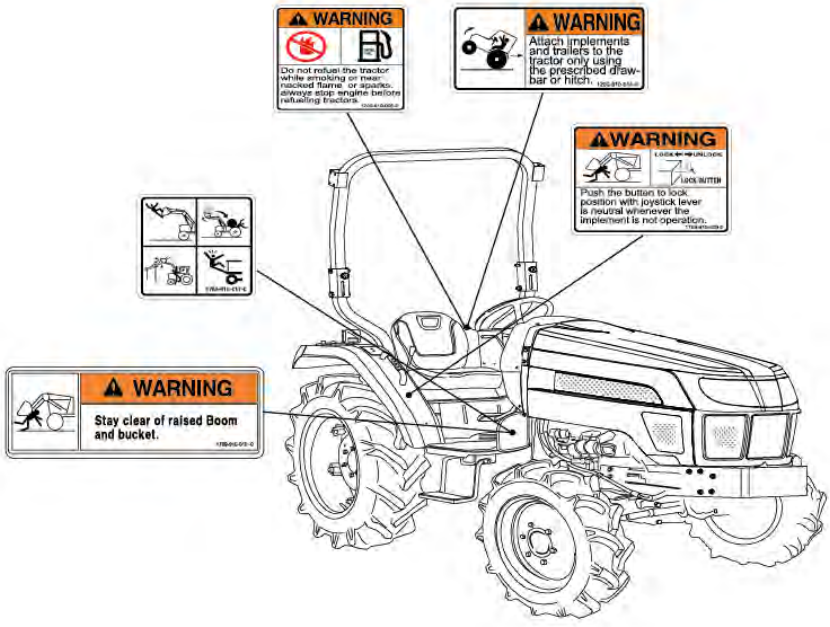
⚠	This symbol means **ATTENTION! YOUR SAFETY IS INVOLVED**. The message that follows the symbol contains important information about safety. Follow recommended precautions and safe operating practice.

DECALS ON THE DASH COVER

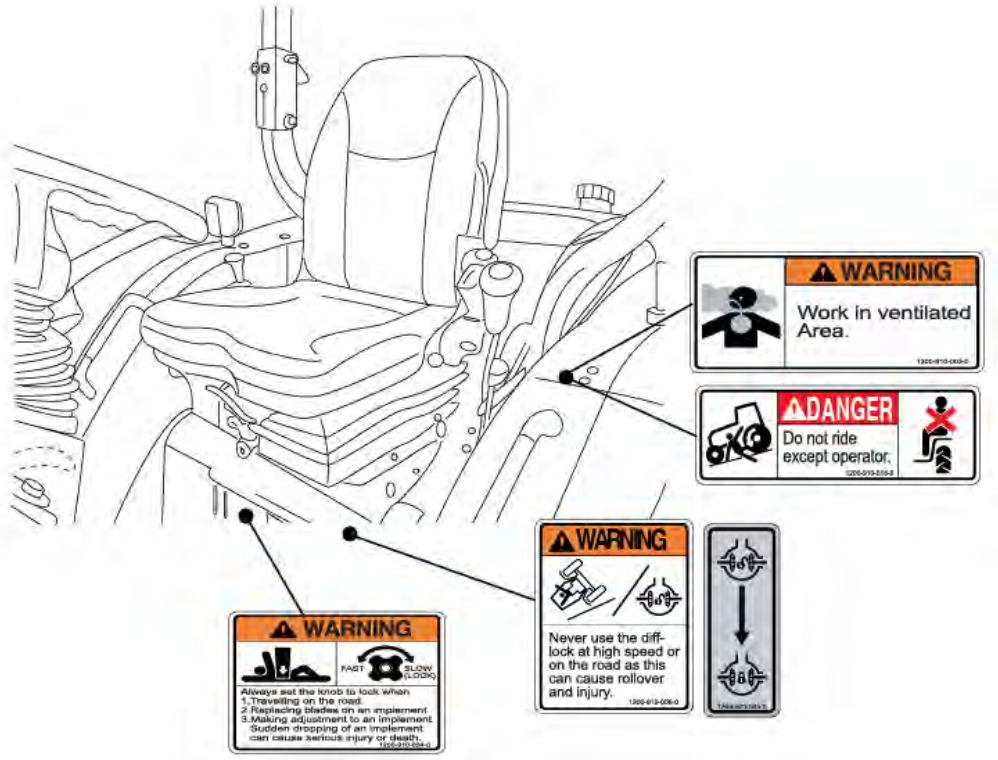


DECALS ON THE CHASSIS





DECALS AROUND THE SEAT



UNIVERSAL SYMBOLS

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

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

Section - A

Controls, Instruments And Operations

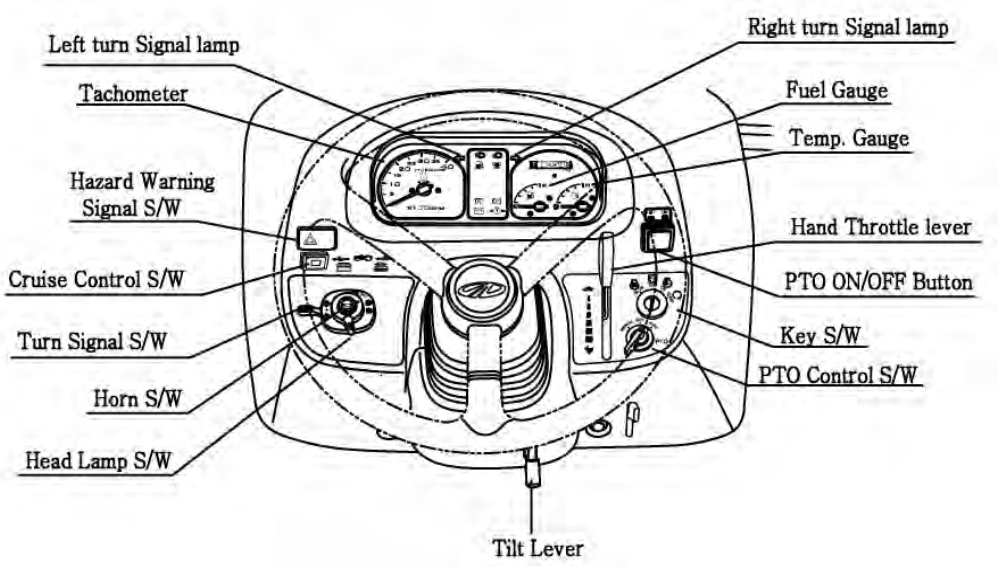
The following pages in this section detail the location and function of various instruments, switches and controls on your Tractor. Even if you operate other Tractors, you should read through this section of the manual and ensure that you are thoroughly familiar with the location and function of all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

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

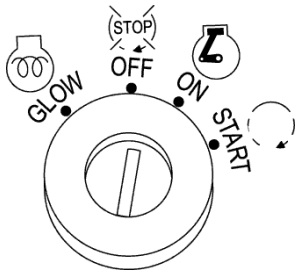
Particular attention should be paid to the recommendations for running-in to ensure that your tractor will give long life and dependable service for which it was intended

DESCRIPTION OF TRACTOR CONTROLS

► INSTRUMENT AND SWITCHES



► MAIN SWITCH (KEY SWITCH)



[OFF] - The key can be inserted or removed

[ON] - The electric circuit is on.

[GLOW] - Glow plugs preheat the combustion chamber

[START] - The starter motor is engaged.

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

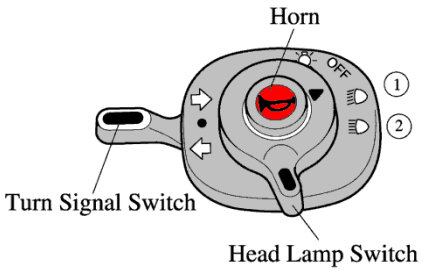
► HEAD LAMP, TURN SIGNAL SWITCH AND HORN

■ HEAD LAMP SWITCH

High and low beam are operated On the main switch

Position ①. Low beam

Position ②. High beam



■ TURN SIGNAL SWITCH

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

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

■ HORN

Push the Red button.

► **HOUR METER**

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

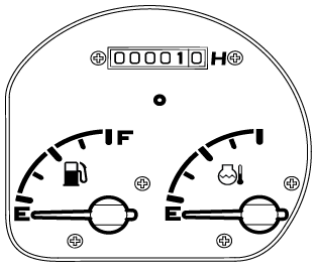
Symbol Illuminates when Hour meter is operated.

► **TACHOMETER**

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

► **FUEL GAUGE**

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



► **WATER TEMPERATURE GAUGE**

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

C is low to normal temperature

H is high temperature

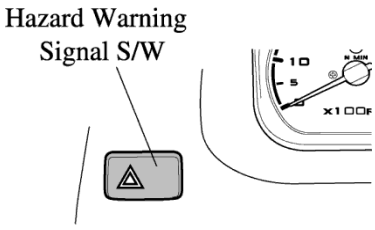
If the pointer is in the red H segment the engine is overheating.

Refer this book to rectify the problem.

► **HAZARD WARNING SIGNAL SWITCH**

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

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

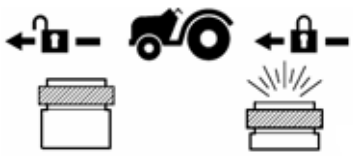


► **CRUISE CONTROL SWITCH**

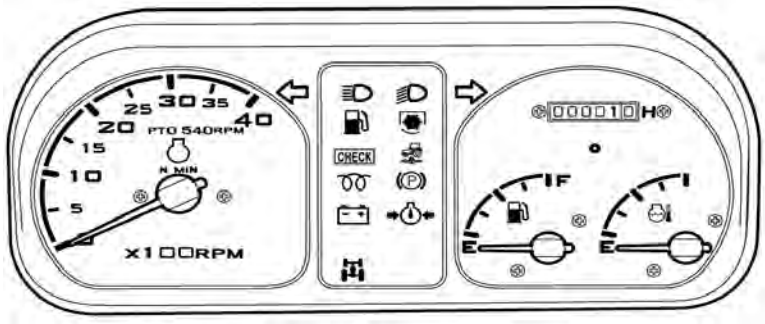
Push this switch once to engage the cruise control.

The switch illuminates (in addition to the cruise control indicator lamp on the instrument panel) when the cruise control is engaged.

Push this switch again to disengage the cruise control.



►**WARNING LIGHTS**



Charge lamp

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

Oil pressure lamp

Will go out as soon as the engine starts if the oil pressure is correct. If it comes on while the engine is running, stop the engine and get expert advice**.**

PTO monitor Lamp
Shows the revolution of PTO
Refer to monitor lamp on Page 38.

Fuel Level : If it comes on while the engine is running, Fill the tank with fuel.

High beam lamp is operated on the combination switch.

Low beam lamp is operated on the combination switch

Parking brake lamp is operated when footbrake is engaged.

Glow signal Lamp indicates preheating

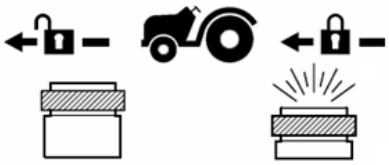
4WD drive lamp is operated on when front-wheel drive is engaged.

Check lamp is operated when the key switch is set to ON position and a safety start condition is not satisfied.

Cruise Control Lamp is operated on when cruise control is engaged.

► **CRUISE CONTROL LMAP**

■ **Engaging Cruise Control**



DO NOT engage cruise control when reversing.
Engage the cruise control as follows:
– Depress the forward speed control pedal until the required speed is achieved.
– Press the cruise control switch to engage cruise control.
– Release the forward speed control pedal.

■ **Disengaging Cruise Control**

To disengage the cruise control you can either press the cruise control switch or depress the Master brake pedal.

► **PTO MONITOR LAMP**

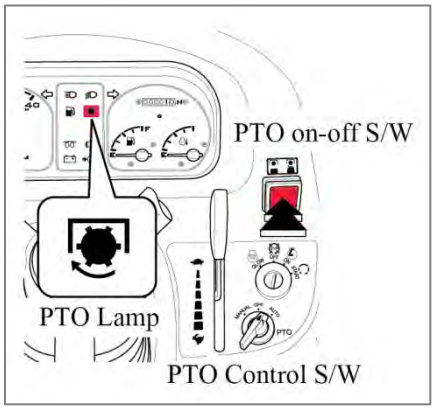
■ **THE PTO MONITOR LAMP** on the dash panel indicates the state of the PTO shaft.

1. If the monitor glows: The PTO is rotating
2. If the monitor is off: The PTO is off
3. If the monitor blinks: The PTO is presently stationary but will instantly start rotating when implements lowered.

PTO monitor Lamp

Two switches operate the independent PTO.

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



2. PTO Control SWITCH: This switch is located near the starting key location on the dash panel. There are three positions marked for this switch.

■ **OFF** at the center
■ **MANUAL** at the left
■ **AUTO AT THE RIGHT.**

The PTO shaft will not rotate if either of the two switches is in OFF position.

The following table explains how the PTO operates at the two different (Manual & Auto) positions of the PTO Control switch with the PTO ON/OFF switch in the on position.

PTO ON/OFF SWITCH	PTO CONTROL SWITCH	HYDRAULIC POSITION CONTROL LEVER.	PTO MONITOR LAMP ON THE DASH PANEL	PTO SHAFT
On	**Manual** Mode	Either raised or lowered	Glows	Rotates
On	**Auto** Mode	Either raised or lowered	Blinks	Stationary
On	**Auto** Mode	Raised	Blinks	Stationary
On	**Auto** Mode	Lowered	Glows	Rotates

■ From the table above we learn about the safety features of the PTO. When the monitor on the dash panel is blinking it indicates to the operator that the PTO is in the on position but temporarily not rotating because the implement is lifted off the ground
The PTO will start rotating instantaneously when the implement is lowered to the ground.

■ The operator must use this blinking signal to clear the area around the tractor off bystanders/onlookers as the rotating blades of certain implements can accidentally cause injuries to the persons standing near the tractor.

■ The stopping of the PTO when the implement is lifted off the ground with the position control prevents the damage to the implement or the PTO shaft.

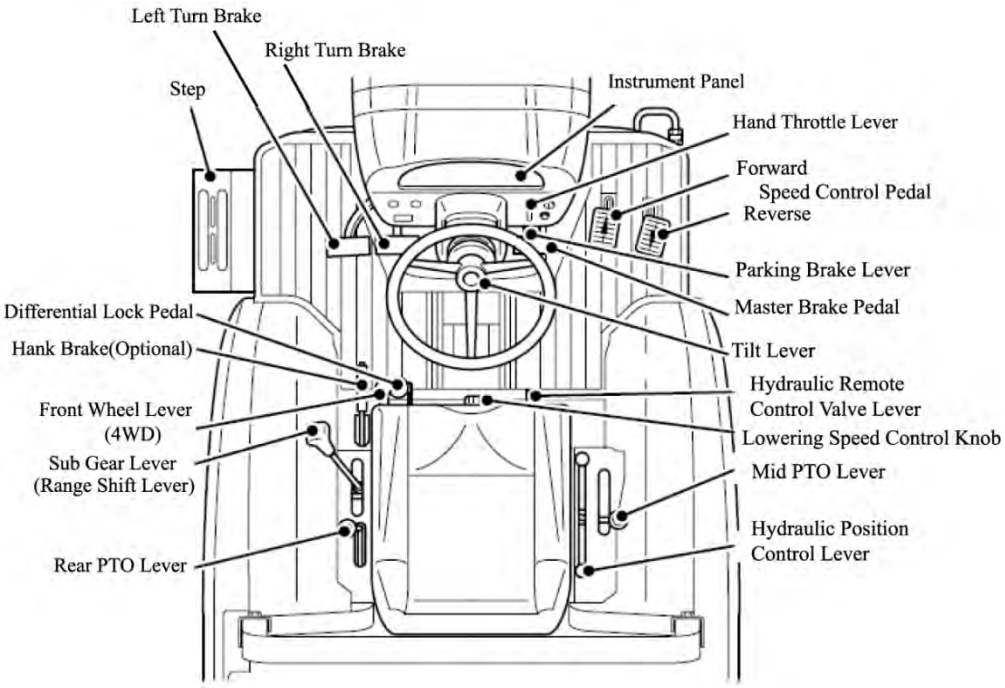
Warning

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

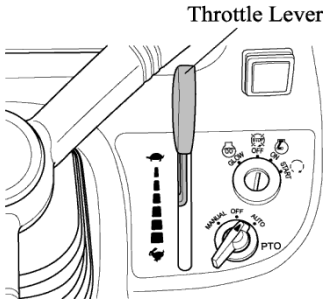
2. Extra precaution must be taken to clear the area of bystanders/onlookers when using PTO driven implements. The rotating blades of the implements can cause serious injuries on contact. The warning that is indicated by the blinking PTO monitor is to make the operator aware that the PTO is in on position and will instantly start rotating if the implement is lowered.

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

► TRACTOR CONTROLS



► THROTTLE LEVER (HAND THROTTLE)



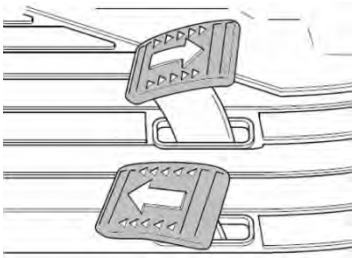
The hand operated throttle lever is located on the RHS of the Dash cover.

To increase the engine speed, Pull the lever downward.

To decrease the engine speed, Push the lever upward.

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

► SPEED CONTROL PEDAL



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

Depress the forward speed control pedal to move forward.

Depress the reverse speed control pedal to move backward.

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

important	Do not change from forward to backward or backward to forward suddenly in high range. Sudden change may result in damage of mechanism and place the operator at risk of injury.

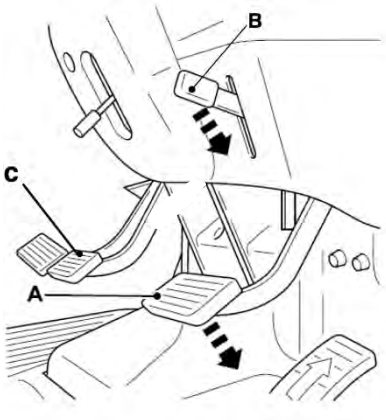
► MASTER BRAKE PEDAL (A)

The master brake pedal is located on the RHS of the operator.

It is used for two functions.

- To stop the tractor

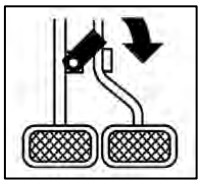
- To release cruise control



► PARKING BRAKE LEVER (B)

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

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



► TURN BRAKE PEDAL (C)

■ Tight Turns in the field

To make a tight turn at low speed, use both the steering wheel and the turn brake pedal at the same time.

For left turn, use the left turn brake pedal and for right turn, use the right turn brake pedal.

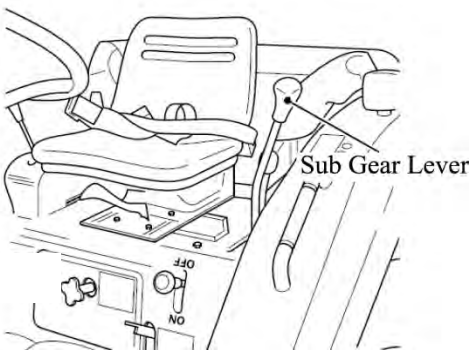
Caution	Perform tight turns only at a slow safe speed. Doing so at a high speed can cause rollovers and very serious injury or death.

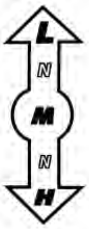
Caution	A connecting latch is provided to connect the right and left brake pedals for high speed or road use. In the interest of safety always use it on the road or at high speed as using one side only can cause rollovers. When servicing the tractor ensure that the adjustment on both sides in the same.

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

► SUB GEAR LEVER (RANGE SHIFT LEVER)

The Sub Gear Lever is located on the LHS of the operator. Operate the sub gear lever during neutral position of the forward and reverse pedal to select the appropriate speed for different applications.





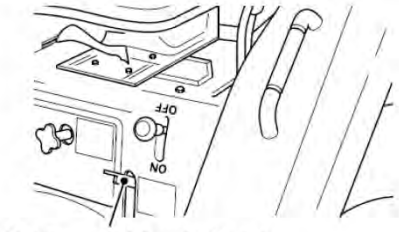
SUB GEAR LEVER (RANGE SHIFT LEVER)

► DIFFRENTIAL LOCK PEDAL

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

In case of wheel slippage use the diff-lock by pushing down on the diff lock pedal.

To release it remove the foot from the pedal.



Differential Lock Pedal

Danger	Tractor will be difficult to turn if the Diff-lock is engaged, ensure the lock is disengaged before turning the steering wheel.

Danger	Tractor will be difficult to turn if the Diff-lock is engaged, ensure the lock is disengaged before turning the steering wheel.

important	Do not use high engine RPM when engaging Diff lock If the diff lock does not release after removing the foot from the diff lock pedal alternatively brake with the left and right brake until it gets released.

► **FRONT WHEEL DRIVE LEVER (4WD)**

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

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

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

Front Wheel Driver Lever
(4WD Lever)

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

important	Always stop the machine when using the front wheel drive lever.

Use of front wheel drive improves traction performance.

► **DRIVER'S SEAT**

To adjust the seat backwards and forwards lift the lever at the front of the seat and set it to the desired position (Please refer to page 17 of how to adjust the seat)

■ **Operating the Safety Switch**

If you do not sit the your seat when you operate the Tractor, Engine will turn off.

■ **Seat Belt**

-Release the Seat Belt

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

-**Adjusting the Seat Belt**

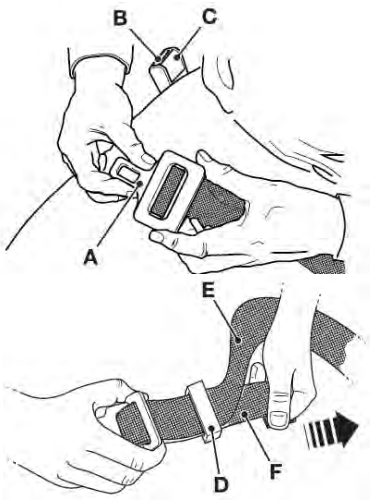
Make Sure the belt is across your hip and not over your stomach.

To adjust the male fitting **A** :

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

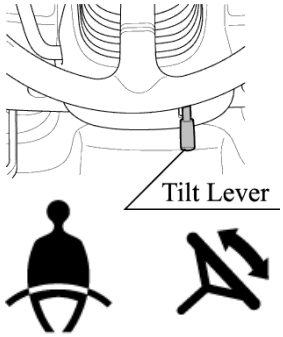
a. To make the strap longer, pull end **E** as far as it will go.

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



► **TILT LEVER**

To adjust the inclination of the steering wheel with a 3 stages and set it to the desired position.

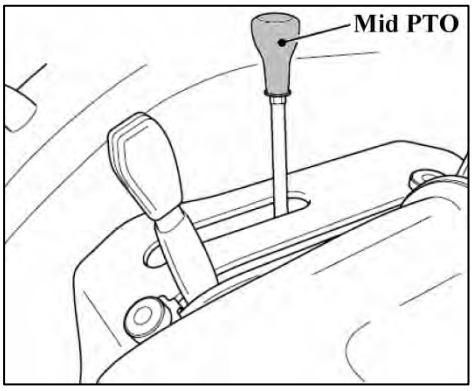


Danger	Ensure that the tilt lever has locked before moving the tractor.

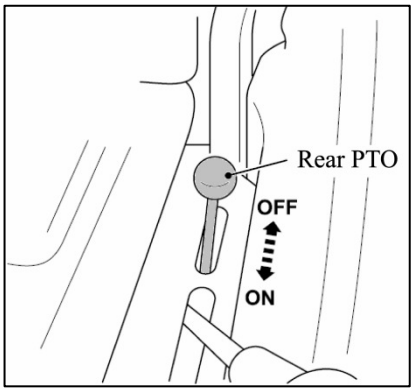
► **PTO SELECTION LEVER**

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

MODEL	POSITION	ON	OFF
4010HST	**MID PTO**	2000 rpm	-
	REAR PTO	540 rpm	-



* **Mid PTO** Lever is located on the RHS of Operator.



* **Rear PTO** Lever is located on the LHS of Operator.

important	Always stop the machine when engaging or disengaging the PTO or changing PTO speed. Let the PTO driven implement come to a complete stop before changing.

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

► OPERATING THE HYDRAULICS

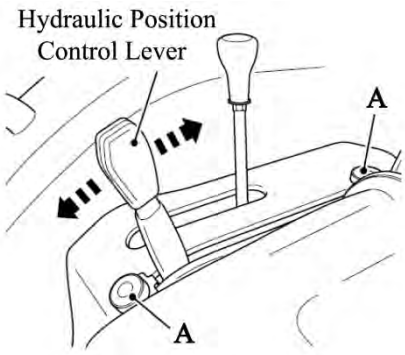
The hydraulics are powered with an engine driven hydraulic pump and controlled with a position control lever mounted beside the driver.

► HYDRAULIC POSITION CONTROL LEVER

Hydraulic Position Control Lever is located on the RHS of operator.

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

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



To raise the implement : Pull the lever backward.

To lower the implement : Push the lever forward.

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

► LOWERING SPEED CONTROL KNOB FOR THE 3 POINT HITCH

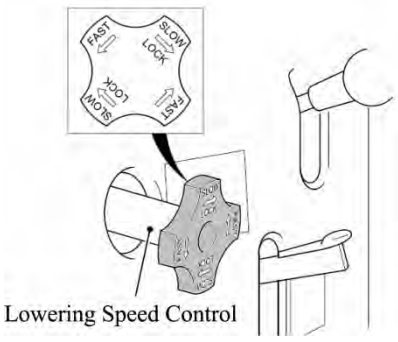
This knob controls the downward speed of the hydraulics three point linkage and is located below the Seat.

To slow the downward speed- Turn the knob clockwise.

To increase the downward speed, turn the knob anticlockwise.

To lock the knob clockwise.

Do not over tighten the knob.

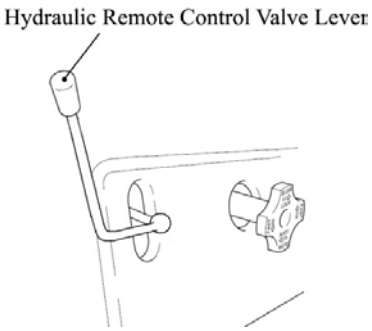


Caution	Always set the knob to lock when 1.Traveling on the road 2.Replacing tires or blades on an implement. 3.Making adjustments to an implement. Sudden dropping of an implement due to hydraulic problems can cause serious injury or death.

► HYDRAULIC REMOTE CONTROL VALVE LEVER (IF EQUIPED)

The Hydraulic Remote Control Valve Lever is located below the RHS of the Operator

Move the lever up or down and hold. This will raise or lower the implement



Important:

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

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

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

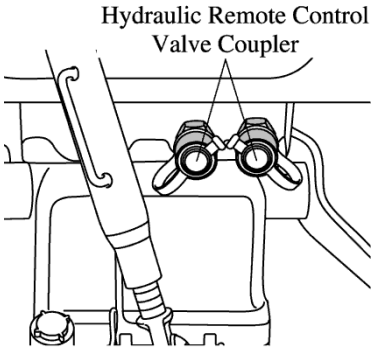
■ Connecting

1.Clean both couplers.

2.Remove dust plugs.

3.Insert the implement coupler to the tractor hydraulic coupler

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



■ Disconnecting

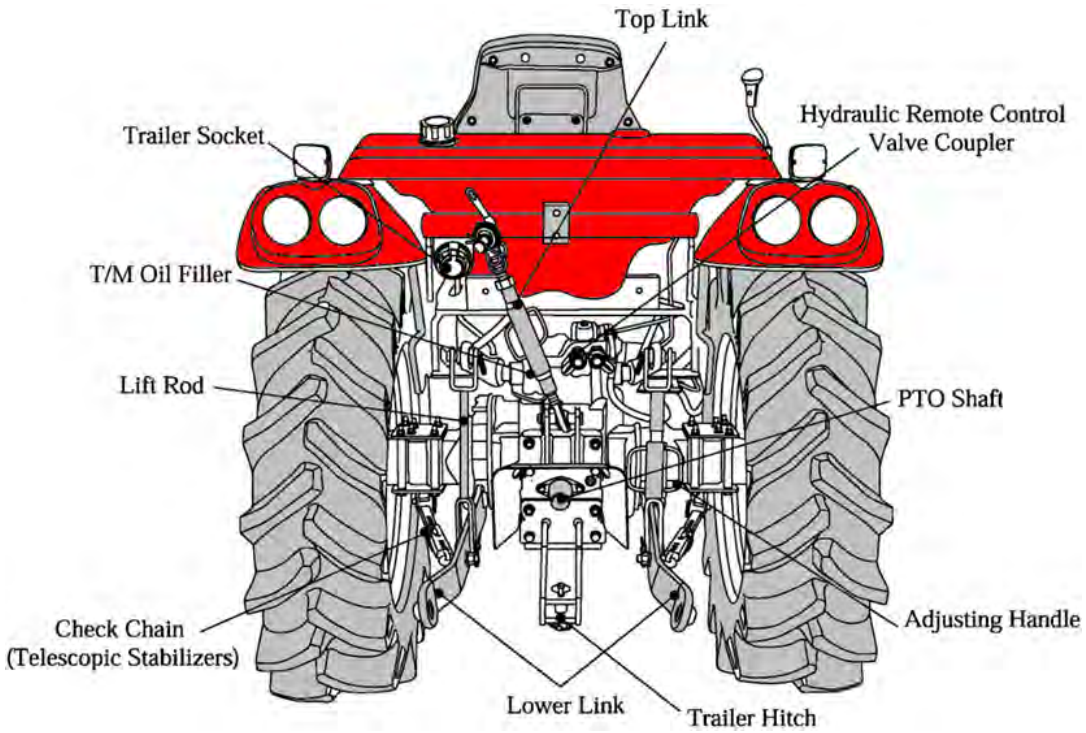
1.Lower the implement first to the ground to release hydraulic pressure in the hoses.

2.Clean the couplers

3.Relieve pressure by moving hydraulic control levers with engine shut off. Pull the hose straight from the hydraulic coupler to release it

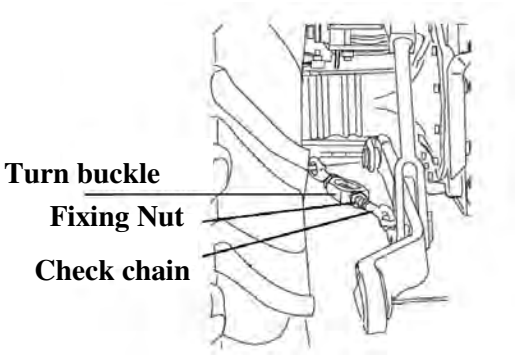
4.Clean oil and dust from the coupler, then replace the dust plugs.

► **OPERATING THE 3 POINT LINKAGE (TPL)**



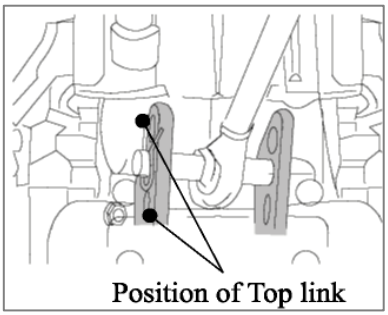
► **ADJUSTMENT OF THE CHECK CHAIN**

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



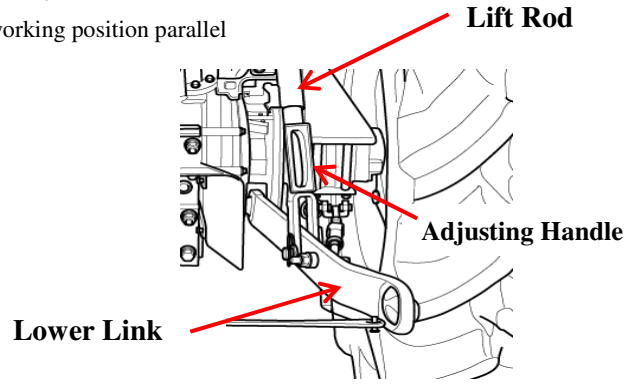
► **ADJUSTMENT OF THE TOP LINK**

Lengthening or shortening the top link will change the angle of the implement. The locating hole of the top link varies with the type of implement used. The most common locations are the 2nd and 3rd hole from the top.



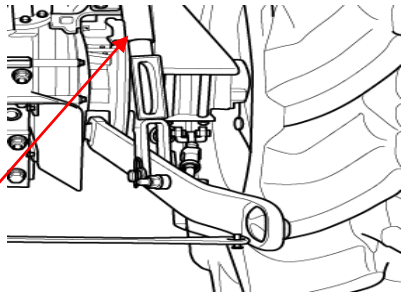
► **ADJUSTMENT OF THE LIFT ROD**

Adjust the length of the lift rod by screwing the Adjusting Handle (Turnbuckle) in or out. Adjust the length of the lift rod as necessary to set the implement in its working position parallel to the ground.



► **ADJUSTMENT OF THE YOKE ROD ON THE LOWER LINK**

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

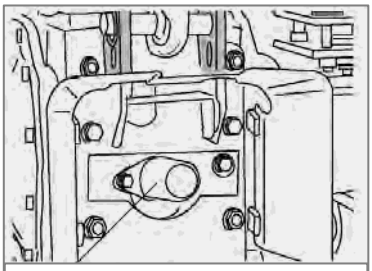


Danger	Only use drawbar to tow and keep the 3 point linkage in raised position when toeing with the drawbar. Position can create unbalance causing the Tractor to roll-over & Result the death or serious injury.

► **MOUNTING IMPLEMENT**

If the PTO is used, remove the safety cover off the PTO shaft. Adjust the yoke rod on the lower links to suit the implement in use. Attach the left lower link, then attach the right lower link using the adjusting handle on the leveling box if required. Attach the top link. Attach the PTO shaft to the tractor if used, making sure that it is locked in place.

Adjust the check chains to suit the implement and tighten the locknuts. To remove an implement reverses the procedure



Rear PTO Shaft Cover

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

DRIVING THE TRACTOR

► STARTING THE ENGINE

Before starting the engine carry out the pre-operational checks as set out on page 26.

(1) Sit on the driver seat

(2) Apply the footbrake.

(3) Put the hydraulic lever in the down position.

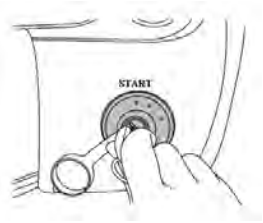
(4) Press down the master brake pedal to activate the safety-starting switch.

(5) Put the main gear lever in neutral

(6) Insert the ignition key and turn it on

(7) Ensure that the warning lights are working

(8) Always turn the ignition key to left for a moment & release it.
The automatic heater will start working as will be indicated by a light on the instrument panel .As the lamp goes off turn the key to the start position to start the engine.



(9) Ensure that all the warning lights are off with the engine running.

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

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

► STOPPING THE ENGINE

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

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

► WARMING UP

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

Failure to do so can shorten engine life substantially.

► WARMING UP IN COLD WEATHER

Cold weather will change the viscosity of the oil, resulting in a reduced oil pumping capacity, which can cause damage to the engine if it is not warmed up correctly. It also causes problems with the hydraulic system and the synchromesh in the transmission.

Correct times for warming up are:

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

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

When the engine is warm up engage the range gear levers to the required position.

Push down on the brake pedals and release the handbrake.

Increase the engine revolutions and press down the forward or reverse pedal smoothly.

► STORING ENGINE IN OPERABLE CONDITION FOR 3 MONTHS OR MORE

When the engine is not operated during storage of three months or more, internal engine parts can rust and lose oil film. As a result, the engine can seize when it is started after storage.

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

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

► TIGHT TURNS IN THE FIELD

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

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

► NORMAL BRAKING AND PARKING

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

Illustration

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

► UPHILL STARTS ON A STEEP SLOPE

With the pedals connected together press down the brake pedals.

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

Release the brake pedals and press down the forward pedal.

Adjust the throttle to the required speed.

► DRIVING DOWNHILL

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

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

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

► OPERATION OF THE DIFF LOCK

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

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

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

► CHECK DURING DRIVING

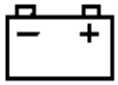
Constantly monitor the warning lights on the dash and if any comes on stop the tractor to determine the cause.

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

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

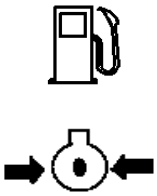
If the alternator warning light comes on check all connections and ensure that the fan belt is not broken.

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



► **FUEL GAUGE**

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

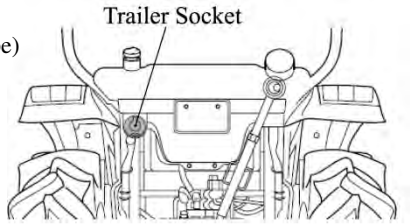


► **ENGINE COOLING WATER**

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

► **TRAILER SOCKET** (Seven Terminal Electrical Socket type)

Trailer Socket is located on the Left of the Rear Side.
To operate the Electrical systems of implements, trailer lighting, warning lamp etc.



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

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

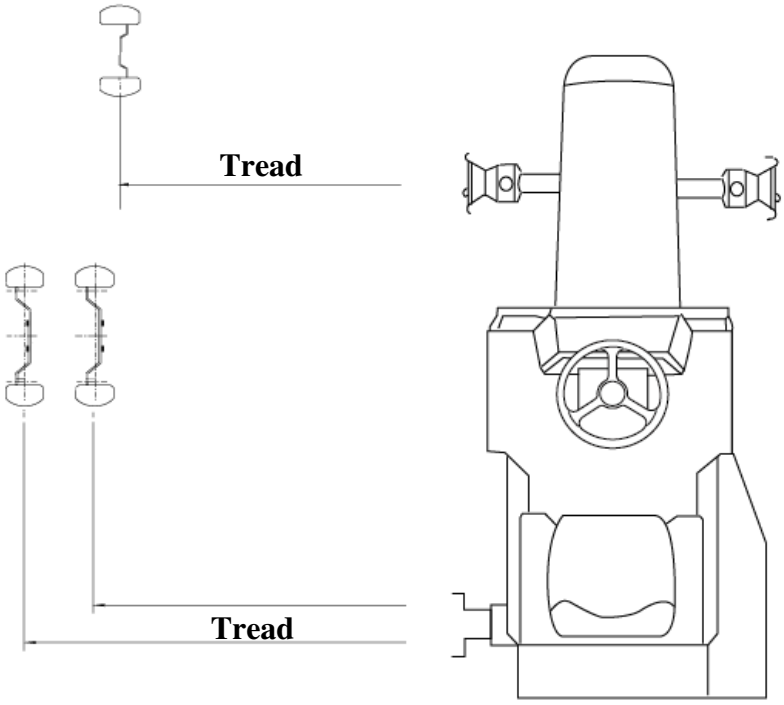
Caution	When traveling on public or farm roads connect both brake pedals and allow for the weight of any mounted implement to ensure that the unit is not unbalanced. Also allow for the width when passing other road users. Where fitted use the hazard lights provided. Strictly follow the local traffic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

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

► **TRACK ADJUSTMENT**

As 4010HST models of Mahindra are front wheel assist the front track can be set in 1 position.

The rear track can be set in positions as illustrated.



(*) Marking is STANDARD

TYPE	DIVISION	TYRE	TREAD
AG	FRONT	8.0-16	46.19inch (1170mm)
	REAR	12.4-24	42.94inch (1090mm)
IND	FRONT	10-16.5	53.13inch (1349.5mm)
	REAR	43x16.00-20	48.06inch(1220mm)

Section-B

Lubrication

&

Maintenance

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

► PRE-START CHECKS

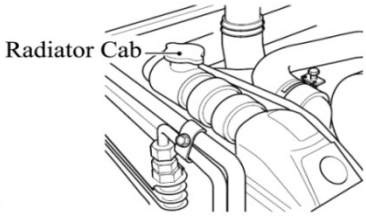
To avoid problems it is recommended that a range of checks be carried out daily before starting the tractor.

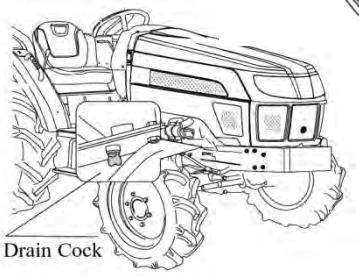
For full details of the items and frequency please refer to the tables on page 60,61 and 62.

► ENGINE COOLANT

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

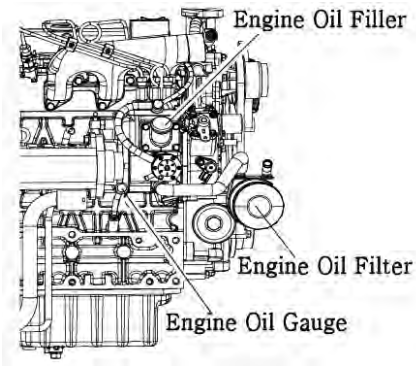
If the coolant is a rusty color, drain the system completely and refill with the correct mixture of water and anti-freeze or corrosion inhibitor.

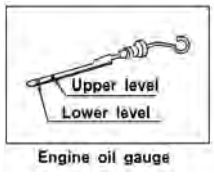




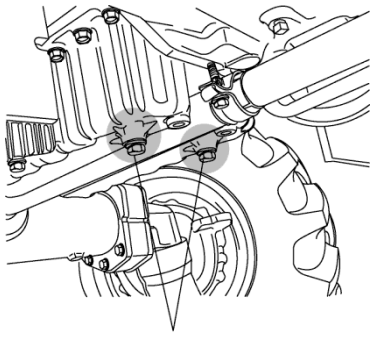
► ENGINE OIL

Pull out the stick, wipe it and dip in the oil sump. Ensure that oil level is between the upper and lower mark near the upper mark. If too low add oil, but never excess 100hrs of service interval





Engine oil gauge

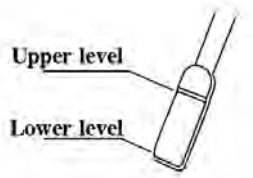

Engine oil drain Plug

important	Do not overfill the crankcase with oil.

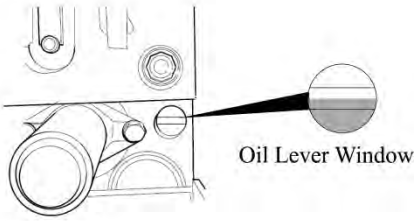
► **TRANSMISSION OIL**

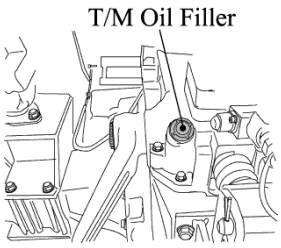
Check the level with the dipstick on top of the transmission in rear of the seat.

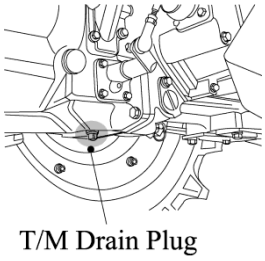
If the level is low add oil through the filler hole.



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





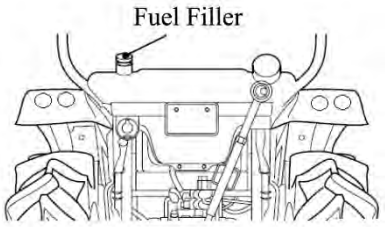


► **FUEL**

The Fuel Filler is located on the Rear of the Seat.

Use the fuel gauge to check the fuel level and top up if too low.

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

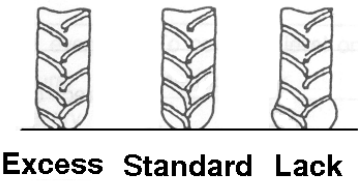


► **TYRE PRESSURE**

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

Ensure that the tire pressures are correct and in accordance with the table on page 55.

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



important	It is strongly recommended that tire pressures are checked with a proper gauge only & visual inspections are relied upon.
Danger	Excess tire pressure can cause accidents!

► **STEERING**

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

► **BRAKE**

Ensure that the left and right brakes are adjusted correctly so they operate simultaneously. The correct free play on the brake is 1.18-1.57 in (30~40 mm).

► **ELECTRICAL**

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

► **INSTALLING LOADER**

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

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

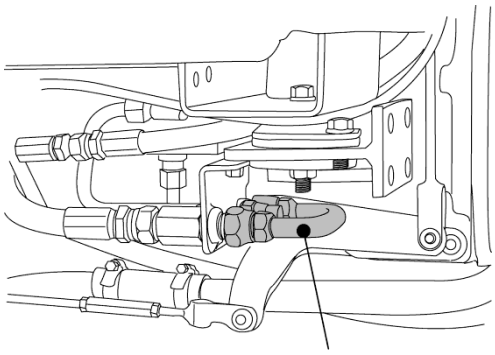
3.Connect the remaining line from the control valve to the line on the tractor marked P1

(to the transmission housing)

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

1.Detach the hydraulic hoses of loader

2.Assemble the cap (PF3/8) with pipe comp (PF3/8).



Loader Connecting Port

MAINTENANCE AND ADJUSTMENT SCHEDULE

► Periodical check and service table

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

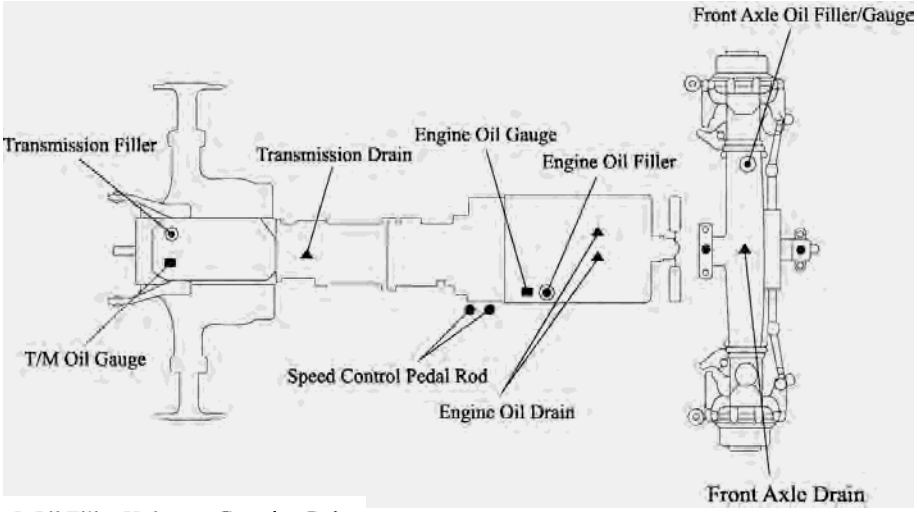
Division	Item	Daily	Service interval(hour meter,mark)												Frequency	Comment
			50	100	150	200	250	300	350	400	450	500	550	600		
Engine	Engine oil	○	●			●			●			●			Every 150 hours or 12months after first 50hours	To correct level on the dipstick
	Air cleaner			△		△		△		△		△		●	Clean every 100 hours	
	Radiator coolant	○													Check daily top up if required	See page 68.
	Radiator	○													Check daily for damages leakage	
	Fuel	○													Everyday and before work	Fill tank
	Fuel filter	○	●	○	△	○	△	○	●	○	△	○	△	○	Every 300 hours or 12months	
	Fan belt	○													Check daily	See page 72.
	Battery			○		○		○		○		○		○	Check daily	
	Oil filter		●			●			●			●			Every 150 hours or 12months after first 50 hours	
	Loose nuts and bolts	○													Check daily	Tighten
	Radiator hose clamp	○														Tighten if required

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

Division	Item	Daily	Service interval(hour meter,mark)												Frequency	Comment
			50	100	150	200	250	300	350	400	450	500	550	600		
Chassis	Trans mission oil	○	●					★					●		Every 500 hours or 12months after first 50 hours	
	Free play of brake pedal	○													Check daily	
	State of both brake pedals	○													Check daily	
	Operation of each lever	○													Check daily	
	Free play of steering wheel	○													Check daily	About 50mm (1.97 in) on circumstance
	Toe-in							★						★	Check after every 300 hours	0 to 4mm (0~0.157in)
	Grease in front wheel hub							○						○	Grease every 300hours	
	Grease each nipple		○	○	○	○	○	○	○	○	○	○	○	○	Replenish every 50 hours (everyday in dusty conditions)	
	Check the steering wheel joint	○						○						○	Adjust every 300 hours	
	Wheel nut fastening torque	○													Check daily	Tighten if loose Front : 116-130(ft-1bs) Rear : 268-282 (ft-1bs)

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

► FILLING DIAGRAM & CAPACITY TABLE



⊙ Oil Filler Hole ● Greasing Points
▲ Drains ■ Windows

No.	Filling point	Fillings	Quantity Liter (gal.)
	MODEL		4010 HST
1	RADIATOR	Fresh clean Water(L.L.C) with an antifreeze, mixed in ratio of minimum 50%	7ℓ(1.85 US gal)
2	ENGINE	API : CD/CE grades Above:25°C(77°F)…SAE30 or 10W-30 0°C to 25°C(32°F to 77°F)…SAE20 or 10W30 Below 0°C(32°F)…SAE 10W or 10W-30 MAHINDRA HEAVY DUTY SAE 15W-40	5 ℓ (1.32 US gal)
3	TRANSMISSION CASE	See next page *	35ℓ(9.25 US gal)
4	FRONT AXLE	(API GL-4 Grades)Gear oil #80 or #90 MAHINDRA EP GEAR OIL SAE 80W-90	8.2ℓ(2.166US gal)
5	FINAL DRIVE CASE(B)	(API GL-4 Grades) Gear oil #80 or #90 MAHINDRA UNIVERSAL TRACTOR FLUID	
6	BALL JOINT	Grease	As required
7	FUEL TANK	Diesel fuel	33ℓ(8.717 US gal)

► **RECOMMENDED TRANSMISSION OIL**

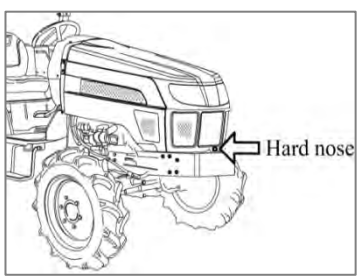
① RPM Tractor Hydraulic Fluid or Textron TDH Premium (CALTEX)

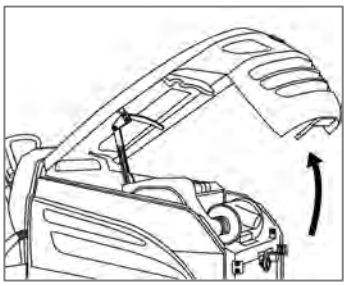
② TDH Oil or TDH Oil special (TEXACO)

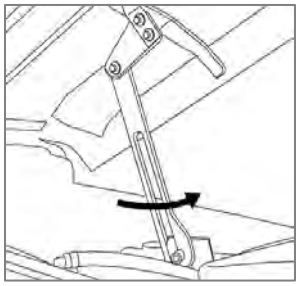
③ Chevron 1000THF (CHEVRON)

► **OPENING METHOD OF EACH COVER**

► **OPENING METHOD OF FAN COVER**

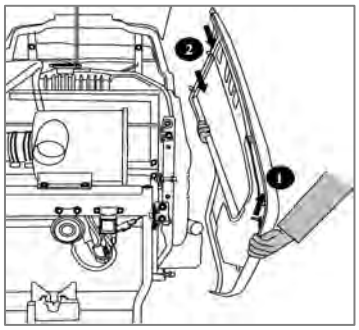






guide hook lock

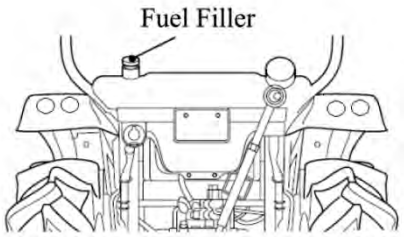
Pull the lower center lever of the front grille counter clock wise, pull the lower edges of hood panel upward, and pull the whole panel forward till guide hook lock is hooked to groove.



▶ Opening the Side cover

To open, grasp the side cover, Pull the forward panel upward to separate from guide support pin (1).

And pull the side panel forward again,



► **FUEL**

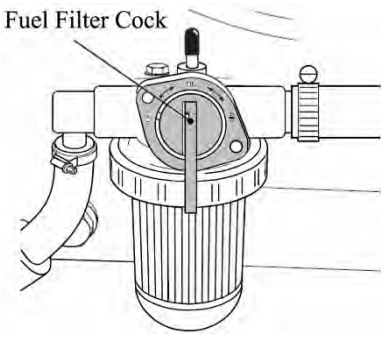
Use clean diesel fuel only .

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

► BLEEDING THE FUEL SYSTEM (① Fuel Filter)-

1. Raise the engine cover.
2. Make sure there is fuel in the fuel tank.
3. Make sure the fuel cock on the fuel filter is set to ON.
4. Open the fuel cock on the fuel injection pump.
5. Using the starter key, turn the engine until air free fuel flows from the fuel cock on the fuel injection pump.
6. Close the fuel cock on the fuel injection pump.
7. The engine is now ready to start. If the engine runs smoothly for a short time and then begins to run roughly, leave at idle until it runs smoothly.

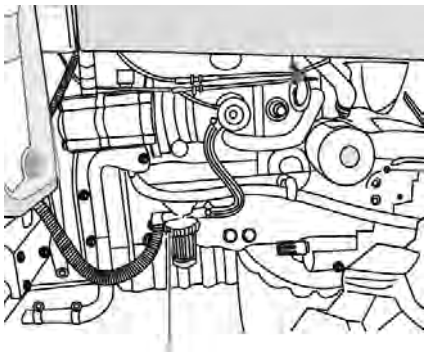
①



► BLEEDING THE FUEL SYSTEM (② Fuel Filter)

1. Close the fuel cock.
2. Remove the fuel filter element.
3. Wash the fuel filter element in clean diesel fuel. If necessary, replace it.
4. Fit cleaned or new fuel filter element
5. Open the fuel cock.
6. Bleed the fuel system

②



Fuel Filter Element

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

► CHANGING THE OILS IN THE TRACTOR

Always use quality oils as engine or transmission oil

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

► CHANGING ENGINE OIL

Park tractor on level surface, shut-off engine. Remove sump plug & drain oil. Replace and check the sump plug and refill he engine with oil to the correct level on the dipstick (approx. 1.85 gal)

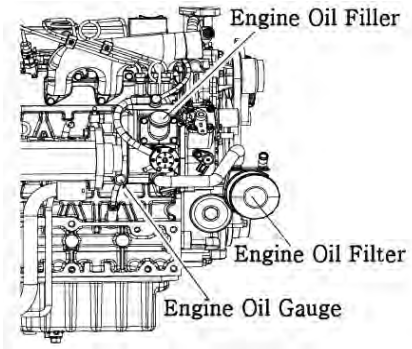
The grade of oil to be used will depend on the ambient temperature.

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

For summer use over 77˚F use SAE 30

For temperatures from 32˚F-77˚F use SAE20 or 15W/40.

For temperatures below 32˚F use SAE 10W.



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

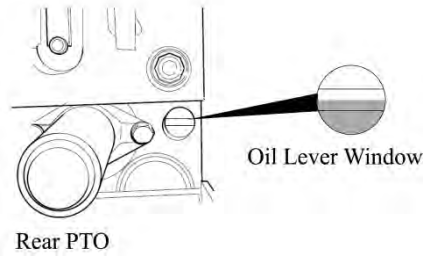
► CHANGING THE TRANSMISSION OIL

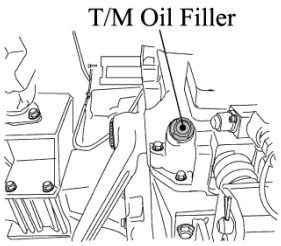
1. Allow the transmission oil to cool.

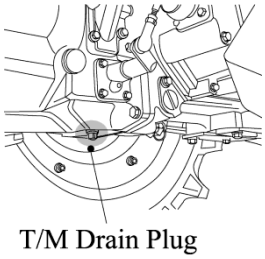
2. Remove the drain plug from bottom of the transmission and drain the oil.

3. Replace and check the drain plug.

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







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

► **CHANGING OIL IN THE FRONT AXLE**

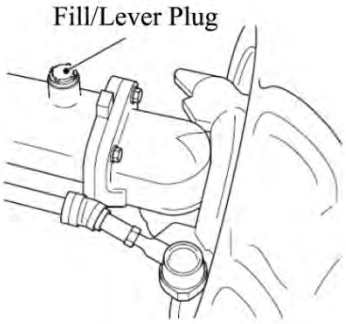
1. Drain the oil from the center diff plug and the drain plug in each drive.

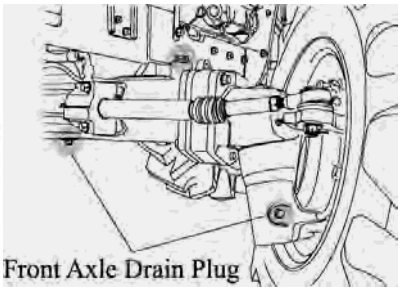
2. Replace and tighten all drain plugs.

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

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

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





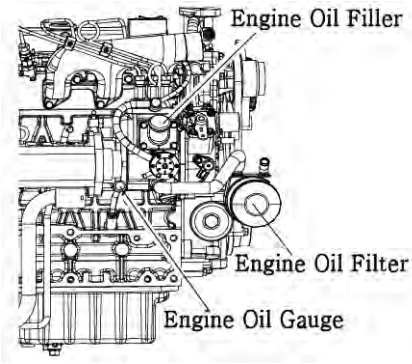
important	Some operators have found that when they fill with the correct amount of oil and dip it,the oil level on the dipstick is too high due to the fact that it takes a while for the oil to run into the final drives. Opening the Vent plugs helps to speed this up.

► **CLEANING AND CHANGING FILTERS**

► **ENGINE OIL FILTER**

Using a filter wrench turn the filter anti clockwise to remove it.

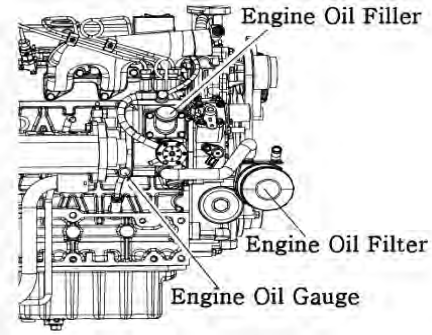
Lightly smear the rubber seal on the new filter with oil to ensure, turn it clockwise until the seal contacts the base and then turn it another 2/3 turn to tighten it.



► HYDRAULIC OIL FILTER AND ENGINE OIL FILTER CARTRIDGE

Remove the filter with a filter wrench.

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



► CHANGING THE COOLANT

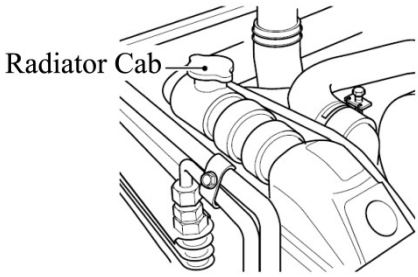
(1) Open the tap in front of the gear pump to drain the coolant.

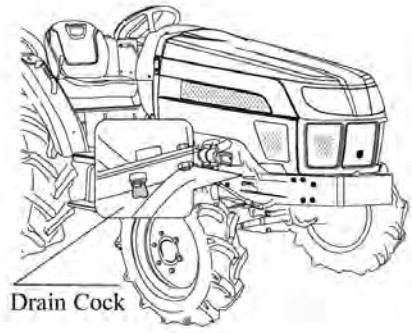
(2) Open the radiator cap at the same time.

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

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

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





Caution	Do not remove the radiator cap on a hot engine. Allow the engine to cool down and then turn the cap slowly to ensure, that there is no excessive pressure in the radiator.
Caution	Serious burns, can result from the contents of pressurized, hot radiators. Allow the engine to cool down completely before opening radiator cap.

► ANTI FREEZE

Frozen cooling water can damage the engine.

Before replacing the anti freeze solution flush the radiator.

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

Replace the solution in the radiator.

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

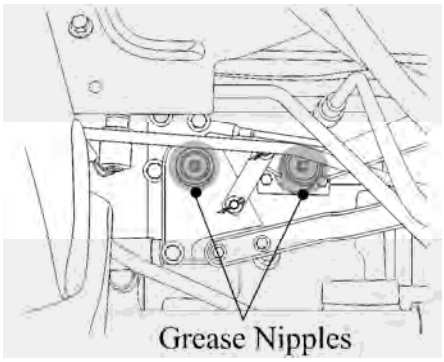
important	Water or air under high pressure can distort the cooling fins on the radiator and reduce its efficiency**.**

► GREASING THE TRACTOR

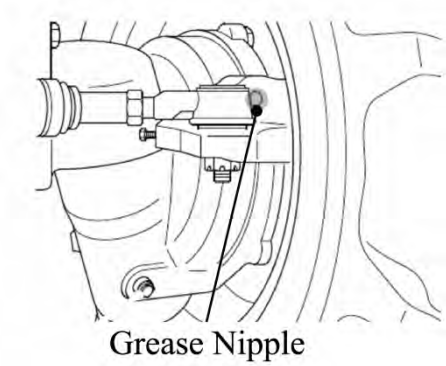
Grease the tractor according to the service schedule (page 61)

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

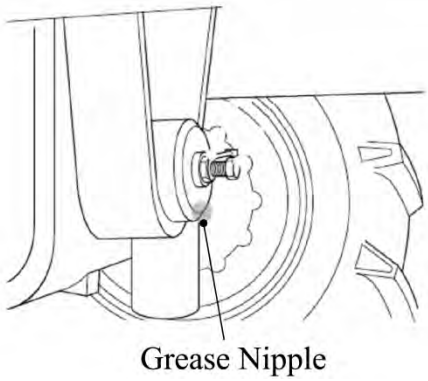
*** Speed Control Pedal Rod**



*** Front Axle Ball Joint**



*** Pivot Metal**

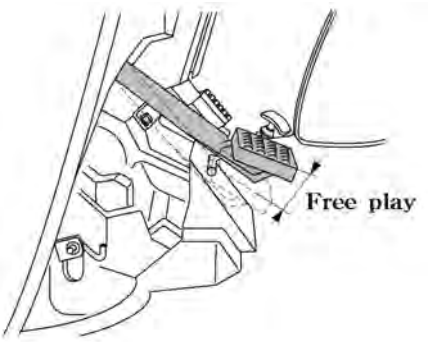


► GAP ADJUSTMENT

► ADJUSTING THE BRAKES

Use of the brakes will change the pedal free play and the balance between right and left pedal.

The correct pedal free play is 1.18~ 1.57 in



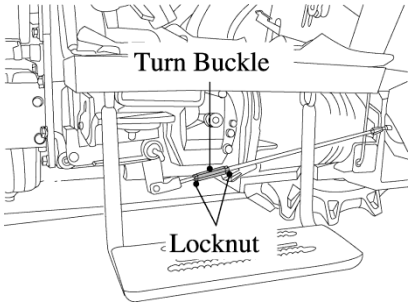
■ Adjusting Method

Loosen the locknuts to adjust the brake.

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

Tighten the locknut and confirm to fix the Nuts.

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



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

► ADJUSTING THE THROTTLE LEVER

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

► ADJUSTING TOE-IN

If the toe-in adjustment is incorrect it can cause severe shaking of both the steering wheel and the entire tractor. The correct toe in is 0.08~0.24in.

We recommend that this adjustment is made by the dealer.

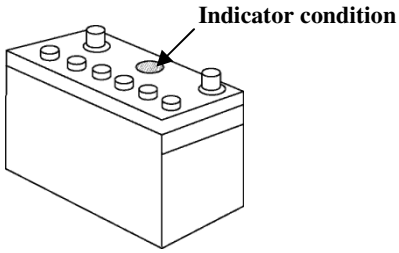
► CHECKING THE BATTERY

Check the Indicator condition

Green color – Good condition

Black color – Charging necessary

White color – Replace battery



important	Low electrolyte levels can cause premature battery failure and corrosion.
Caution	Electrolyte contains acid and can cause serious burns. Any spillage on skin should be washed off by running water immediately.

► BATTERY MAINTENANCE

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

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

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

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

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

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

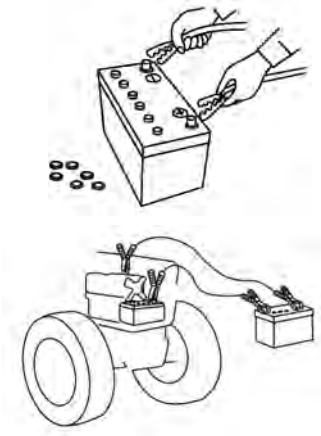
Failure to do so can cause problems with the electrical circuit.

► BATTERY CHARGING

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

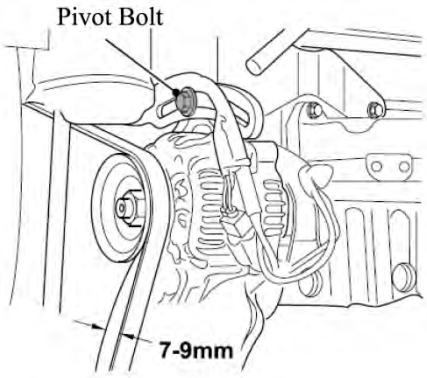
-When using a boost-charged battery,It is necessary to recharge the battery as early as possible.

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



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

► FAN BELT ADJUSTMENT



1.Loosen the alternator pivot bolt.

2.Move the alternator in order to increase or decrease the belt tension.Tighten the alternator pivot bolt and the link bolt to 22 N.m (16 lb ft)

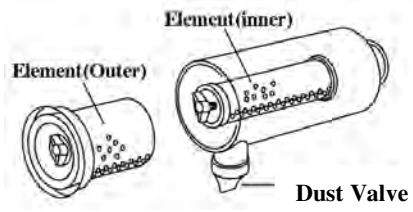
► SERVICING THE AIR CLEANER

■ Cleaning the Air Cleaner Dust Valve

Check that the Dust Valve is not blocked.

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

To remove dust from the dust valve, squeeze it between thumb and fingers. Wipe around the dust valve to remove dust collected on the outside.



■ Cleaning/Changing the Element

Release the two clips on the Air Cleaner end cover and Remove the element.

Remove dust by blowing compressed air through the element.

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

Check all hoses for condition and tightness.

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

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

► CHECKING HOSES AND LINES

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

Check them regularly and replace if faulty.

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

► CHECKING THE WIRING HARNESS AND FUSES

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

Replace or repair any faulty wiring or insulation.

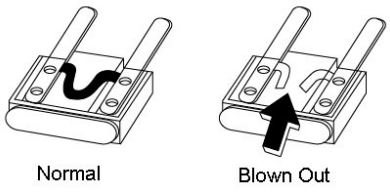
If a fuse burns out again after it has been replaced, do not replace it with wire or a high capacity fuse, find the cause and rectify it or get an auto electrician to do so.

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

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

► REPLACING FUSES

The circuit has 8 blade type fuses in its wiring circuit
(See diagram on page 86)
When a fuse has blown replace it with one of the same value.
Using a large capacity fuse or wire burn out the wiring system.
Use fuse tongs to replace fuses



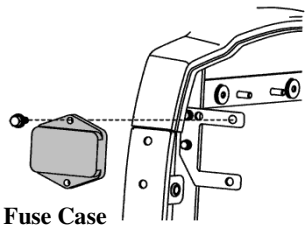
► MAIN FUSES

The wiring harness is equipped with 3 main fuses who's function is to preserve the wiring.

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

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

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



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

► SERVICE PRIOR TO DAILY AND SHORT TERMS STORAGE.

Wash the tractor and keep it clean.

Fill the tank to avoid condensation and rust.

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

For long-term storage consult your dealer

For daily or short term storage

Clean the tractor and remove all dirt from field work.

Fill the fuel tank to avoid condensation and rust.

Lower the implement to the ground..

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

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

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

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

Long-term storage.

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

Drain the oil and replace with new oil.

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

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

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

Lubricate all grease and oil points on the tractor.

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

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

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

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

Re-use after long term storage.

Carry out a full check of all oils and coolant.

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

Section - C

Specifications

The specifications on the following pages are given for your information and guidance.
For further information concerning your Tractor and equipment, consult your Authorized Mahindra Dealer/Distributor.

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

SPECIFICATIONS

Model: 4010 HST

ENGINE

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

Model : 3B183LW (DAEDONG)

No. of cylinders	: 3
Displacement	: 1,826cm^3
Bore	: 87 mm (3.43 in)
Stroke	: 102.4 mm (4.03 in)
Compression Ratio	: 22:1
Horse Power (HP) (Manufacturing rating)	: 38/ 2700rpm
Rated Speed	: 2,600 rpm
High idle rpm	: 2800 rpm
Low idle rpm	: 1000 rpm
Fuel injection pump	: Indirect
Cylinder sleeve	: Dry
Air Cleaner	: Dry Filter element, paper element filtering
Firing order	: 1-2-3
Exhaust Muffler	: Horizontal Round.
Accelerator	: Hand Accelerator

ELECTRICAL STARTING AND LIGHTING

Battery Capacity	: 12V 80AH
Starter	: Solenoid Engaged. Key Start with Safety , starter switch
Alternator	:12V 50A
Instrumentation	: Hour meter, Tacometer Fuel gauge. Water Temperature Gauge. Warming Lights.
Lighting:	: Head lights, Turn Signal Indicator Lamp, Rear Parking, Brake Lamp Tail Lamp

CLUTCH

Type : Damper

TRANSMISSION

Type	: synchro mesh
No. of gears	: 3 Speed forward, 3 Speed reverse with high and low selection lever with HST unit

STEERING

Type : Hydraulic power (Power steering)

POWER TAKE OFF

Mid mounted	: 6 splines
Rear mounted	: 6 splines
Diameter	: 1⅜ in.
Standard PTO	: Rear -540/2,775 engine rpm Mid – 2000rpm

BRAKES

Foot operated, independent with provision of inter lock for simultaneous operation.
A foot brake is fitted for parking.

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

HYDRAULIC SYSTEM

3 Point linkage : Category 1
(Adjustable outside check chains)

► **MAIN SPECIFICATIONS**

MODEL		4010 HST
Engine	**Maker**	DAEDONG
	Model	3B183LW
	Type	Water cooled 4 cycle 4 cylinder diesel
	Out put (HP/rpm)	4010 HST – 38HP / 2600rpm
	Number of Cylinder	3
	Displacement (cm^3)	1,826 cm^3
	Bore and Stroke	4010 HST - 87 mm X 102.4 mm
	Compression ratio	4010 HST – 22:1
	Firing order	1-2-3
	Injection pump	indirect
	Lubrication type	Forced circulation
	Cooling system	Water cooled, Forced circulation
	Coolant capacity	7ℓ (1.85 US gal)
	Air cleaner	Dry Dual Element
	Muffler	Horizontal
	Fuel	Diesel fuel
	Fuel Tank capacity	34ℓ (9.0 US gal)
Electrical	**Battery**	12V80AH
	Starting system	Starter motor with pre-heater
	Starter Capacity	2.0KW
Drive Train	**Alternator**	12V 50A
	Transmission	Hydraulic, + Mechanical 3 range gear with constant-mesh
	MFWD(4WD)	Standard
	Differential lock	Bevel gears with diff-Lock
	Brakes	Wet disc brake, mechanical
	Steering	hydraulic

MODEL			4010 HST
Clutch	Main		Damper
	PTO		Multiple wet disk
Dimensions	Overall length(mm)		3030 (119.3”)
	Overall width (mm)		1520 (59.8”)
	Overall Height (mm)		2400 (94.5”)
	Wheel base (mm) (Distance between shafts)		1680 (66.1”)
	Min. Ground Clearance (mm)		323 (12.8”)
	R1	Front	8.0-16
		Rear	12.4-24
	R4	Front	10-16.5
		Rear	43x16.00-20
	Axle type	Front	Center pin
		Rear	Central axle

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

FUEL SAVING TIPS

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

A) Air cleaning system

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

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

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

B) Engine

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

C) Brakes.

1) If the Tractor has to be stopped for a long period, it is advisable to bring the transmission in neutral position.
2) Do not over ride the brake pedals.
3) While coming down from a slope, reduce the engine throttle & use low gear. Do not depend only on the brakes for stoppage.

D) Fuel system

1) Always use filtered diesel for the fuel system
2) At the end of the day's working, it is preferable to fill the diesel tank so that it may prevent condensation.
3) Change the filter, if the system gets choked. Do not change both the filters at the same time.

If the above directives are not adhered to, the fuel injection pump & injection nozzle will lose its life early. Also, it will lead to excessive black smoke & excessive diesel consumption.

E) Engine system

1) Always use recommended grade of oil.

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

3) Charge the engine oil, Replace filter & “O” ring, as & when required.

F) Cooling system

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

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

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

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

5) Do not change the radiator water often.

Note:

1) Always stop any fuel or oil leakages.

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

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

4) Check the tire pressure & inflate, as recommended.

5) Always buy genuine spares from the authorized Dealer/Distributor.

6) Always carry out the service of the Tractor by your authorized Dealer/Distributor.

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

FAULT TRACKING

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

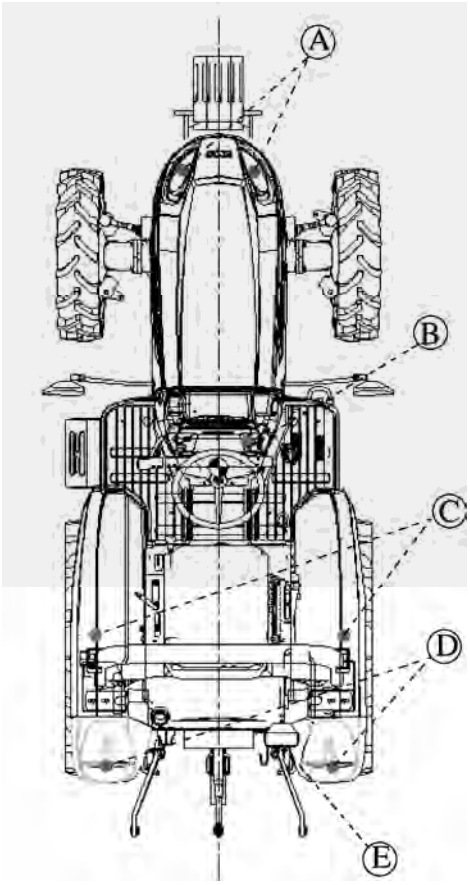
	SYMPTOM	CAUSE	REMEDY
Engine	White smoking from the exhaust	Oil level too high Shortage of or faulty fuel	Reduce to correct quantity Contact dealer for repair
	Reduced performance of the engine	The injectors are clogged, carbon coated and sticking Low compression Leaking valve seat Incorrect valve gap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

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

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

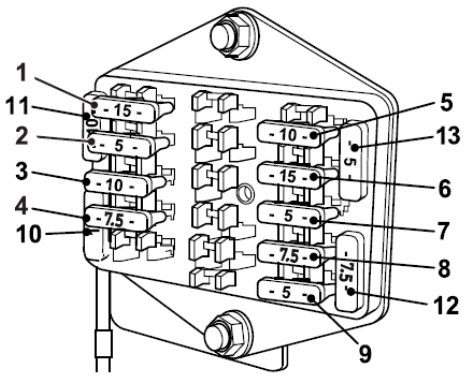
► Drawing for fixing position of the fuse

► Wiring diagram of the electric instrument



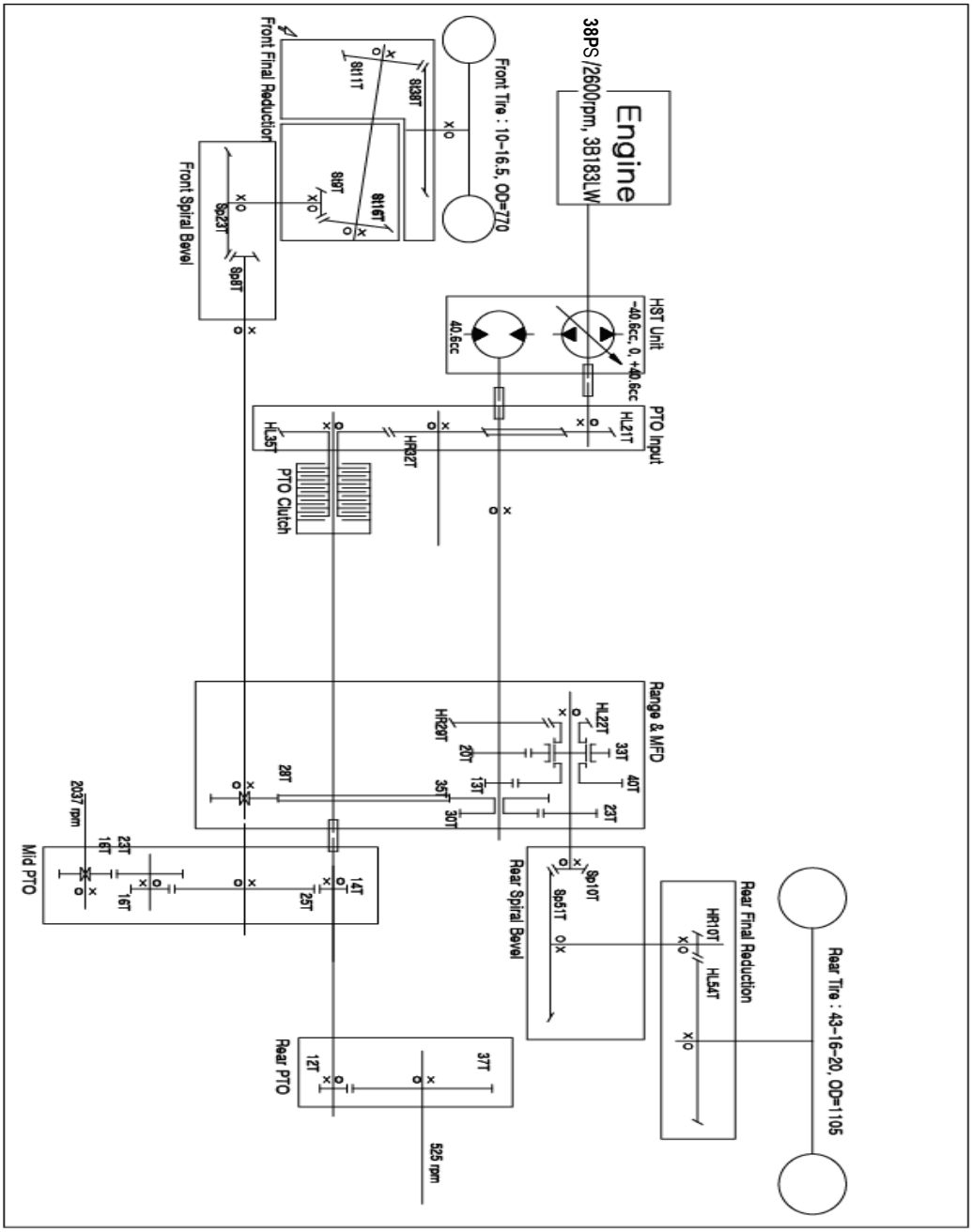
A	Head lamp	12V/55W/60W
B	Meta panel Light (Instrument)	12V/3.4W
C	Turn Signal Lamp	12V/21W
	Tail Lamp)	21/5W
D	Stop Lamp	21/5W
	Turn Signal Lamp	12V/21W
E	Working Lamp	12V/25W

*** Main Fuse**



1	Light / Horn	15A
2	Panel	5A
3	Turn Signal Lamp	10A
4	Working Light	7.5A
5	Hazard	10A
6	Coupler	15A
7	Controller Glow Timer	5A
8	PTO, Cruise, Engine Stop	7.5A
9	Stop Lamp	5A
10	Spare	-
11	Spare	-
12	Spare	-
13	Spare	-

◎ POWER TRAIN



TRACTOR HISTORY CARD

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

SERVICE RECORD

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

DAILY OPERATION LOG

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

PART REPLACEMENT RECORD

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

4010 HST

Operator's Manual for Tractors

Code No.

1265-940-001-0

Printed on December. 2011

1st Edition

Mahindra
TRACTORS

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4010 Gear / HST

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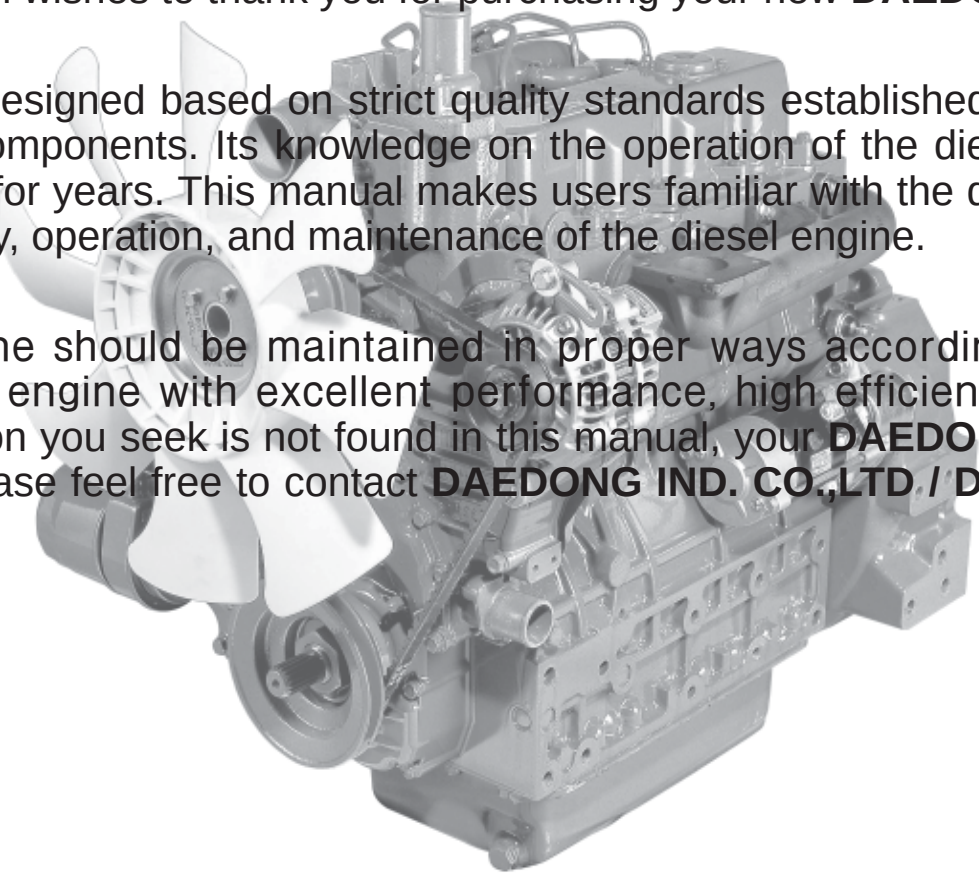
FORWARD

DAEDONG Corporation wishes to thank you for purchasing your new **DAEDONG** diesel engine.

This Diesel engine is designed based on strict quality standards established by the unit assuring quality of **DAEDONG** genuine components. Its knowledge on the operation of the diesel engine is based on faithful services and reliability for years. This manual makes users familiar with the diesel engine and provides useful information on safety, operation, and maintenance of the diesel engine.

In addition, this engine should be maintained in proper ways according to the Owner's Manual in order to operate the engine with excellent performance, high efficiency, economy, and long-term usage. If the information you seek is not found in this manual, your **DAEDONG** diesel engine dealer will be happy to help you. Please feel free to contact **DAEDONG IND. CO.,LTD / DAEDONG-USA, INC**. with your questions/concerns.



‹ NOTE ›

- Make sure to read this manual carefully and keep it handy for future reference.
- When leasing or transferring this tractor, deliver this manual together with the tractor.
- The specifications in this manual are subject to change without notice.

SAFETY AND VEHICLE DAMAGE WARNING

This manual includes information titled as **WARNING, CAUTION, IMPORTANT** and **NOTE**. These titles indicate the following:

 **WARNING**	**This indicates that a condition may result in harm, serious injury or death to you or other persons if the warning is not heeded. Follow the advice provided with the warning.**
 **CAUTION**	**This indicates that a condition may result in damage to your vehicle or its equipment if the caution is not heeded. Follow the advice provided with the caution.**
 **IMPORTANT**	**This mark indicates emphasis on notable characteristics of working procedures, and information about technology for easier operation.**
 **NOTE**	**This indicates that interesting or helpful information is being provided.**

QUALITY POLICY

We, a company that exclusively designs, produces, and sells diesel engines, do our best to secure stability and reliability of products to satisfy customers fully.

Additionally, in order to provide products that satisfy our customers, we strive to understand clearly the requirements of our customers from the design to service stages so we can build a quality management system. We then require that all employees understand and implement the system. Furthermore, we will improve the quality management system continuously to satisfy requirements of ISO9001, 2000/KS A9001, and 2001 and observe national and international laws and regulations in the manufacturing process.

At the same time, we will set and achieve additional mid- and long-term quality goals internally. Our chief of quality assurance unit has responsibility and authority from the CEO for periodically examining the effective operation of the quality management system to take actions for any discrepancy.

ENVIRONMENTAL POLICY

DAEDONG is a company that exclusively designs, produces, and sells agri-machineries and industrial diesel engines. We have minimized environmental pollutants produced while providing products or services. That means our all managerial activities are operated in an "environment-friendly" system by saving resources and observing internal standards, including requirements of environmental regulations and ISO 14001;1996.

We will achieve environmental goals based on policies that contribute to the protection of the environment by improving related regulations continuously. We publish those policies to the public and interested parties and examine periodically whether the environment management system is understood by all employees and implemented effectively, taking actions to correct any discrepancy.

PRODUCT SAFETY AND MANAGEMENT POLICIES

We design, manufacture, and provide safe products with no defects that give satisfaction to customers, and at the same time, provide the best services. To achieve this goal, all of our employees understand the product safety and management policies fully and try to exceed the level required by national or international regulations or standards.

Our chief of service unit has responsibility and authority from the CEO for periodically examining the effective operation of product safety and management policies and taking actions to correct any discrepancies.

SAFETY AND HEALTH POLICY

We, a company that exclusively designs, manufactures, and sells diesel engines, inspect in advance any harmful or hazardous ’components during the manufacturing process to prevent any accident related to safety. We will operate the system by implementing a safety and management system to make a workplace with “no disasters” and observing internal standards including the requirements of health regulations and OHSAS18001;1999 to achieve additional safety and health goals internally.

We publish those policies to all employees and interested parties and examine periodically whether all employees understand and implement effectively the safety and health management system, taking actions to correct any discrepancies.

NOTICE ON ENVIRONMENTAL "USAGE AND DISPOSAL"

We, a company that exclusively designs, manufactures, and sells diesel engines, minimize environmental pollutants generated by our operations, and all managerial activities are operated in environment-friendly ways based on saving resources. All of our employees observe environmental regulations and related standards. To contribute to the protection of the global environment, we measure environmental performance periodically and make the information available to customers and interested parties. We establish and achieve environmental goals internally to secure the transparency of environment management.

In addition, we set guidelines on "usage and disposal' for our customers to protect the environment.

1. Customers using this product should read this manual carefully and avoid any overloaded work. Overloaded work may reduce the service life of products, and emissions combusted incompletely due to overloaded work are a major cause of air pollution, which is the environment of the earth where we breathe.

2. When you replace the used engine oil with new oil, don’t dispose of the used oil in just any place which can cause great soil or water pollution. Please bring the used oil to our local distributor to be disposed lawfully.

3. Use the product with proper operation, and if the service life of the product ends, don't leave or dispose it in just any place.Products left out or disposed improperly by customers generate rust or oil, which may pollute soil or water. Therefore, when disposing out-of-service products, never fail to let authorized "collectors for used wasted agri-machineries" collect them to dispose lawfully.

SECTION

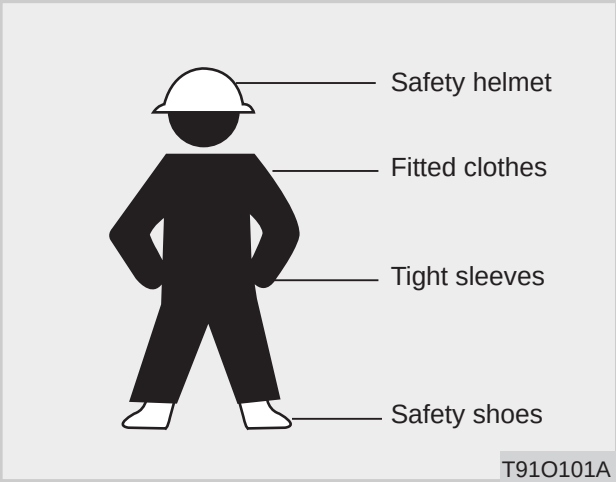
PRECAUTION BEFORE OPERATION

The following contents describe the safety cautions, categorized into **DANGER** and **WARNING**. Before the initial operation, read this manual carefully for your safety. The safety precautions described in this chapter are applied overall to diesel engines. Be sure to observe these regulations as well as the descriptions in the manual text.

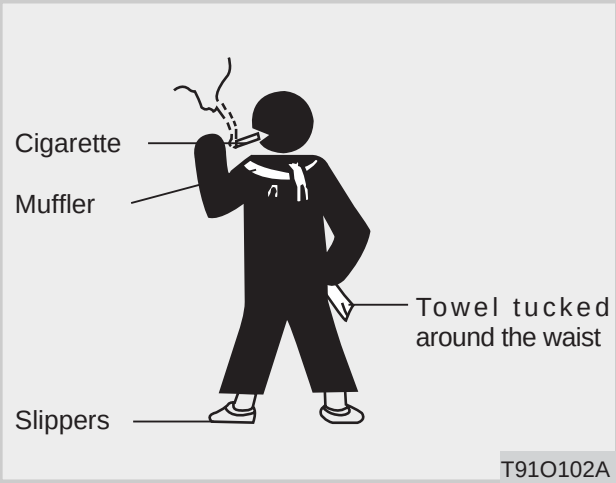
The following should never be allowed to operate this machine. An unexpected accident can occur.

- Those under the influence of alcohol
- Pregnant woman who is ready to deliver
- Those under 16
- Inexperienced operator
- Those who are fatigued, sick, or under the influence of medicine; others who are not qualified for any reasons to operate this machine

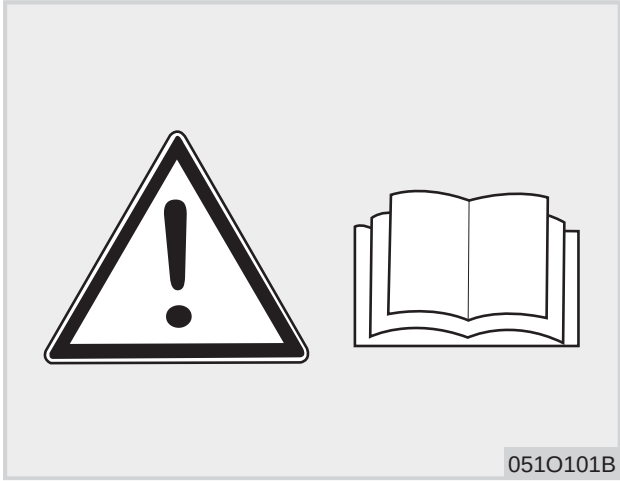
Do not operate the machine while fatigued. Take a rest if necessary.



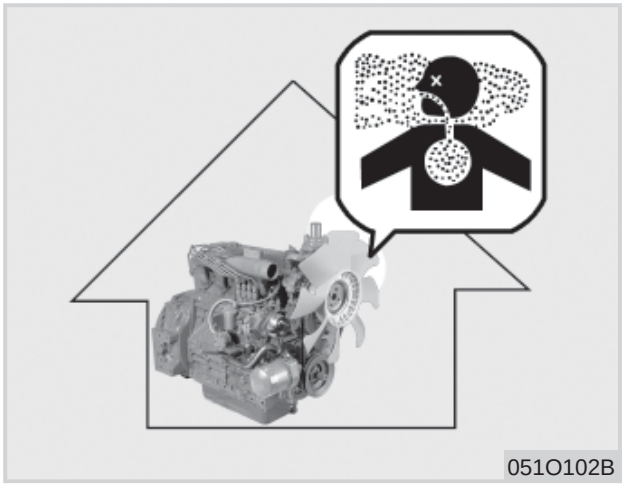
Please wear appropriate working clothes.

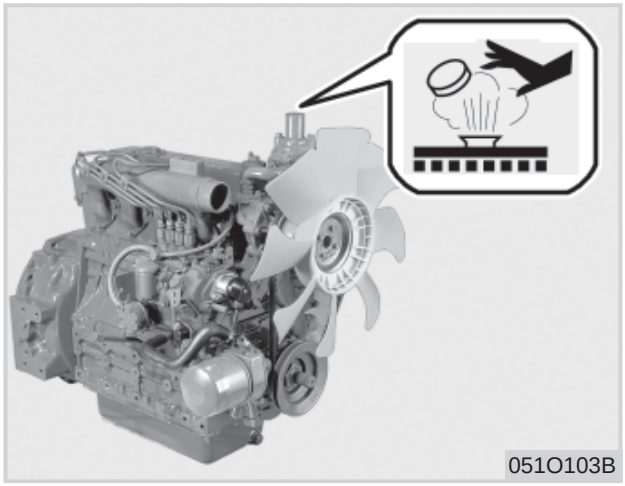


You may be entangled in moving parts or slip on the machine due to the above-mentioned clothing, which may cause serious injuries.



1. Thoroughly read and understand this manual before operating the engine. Contact your **DAEDONG** dealer if you have any questions.
2. It is the owner's responsibility to train other operators before they use this engine. All operators should read and understand this manual.

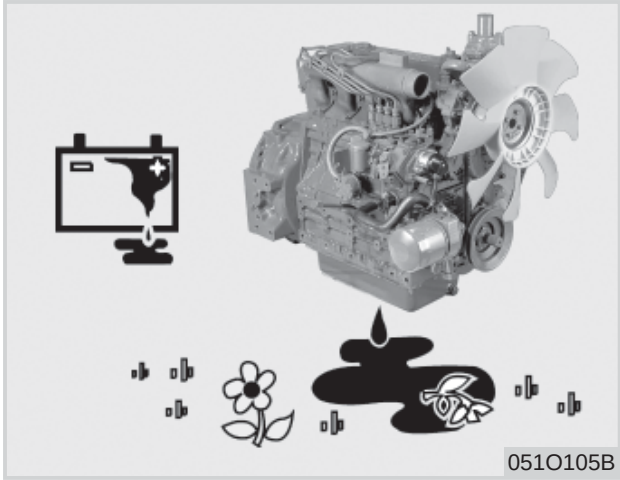




3. Exhaust fumes are poisonous and can cause illness, brain injury, or even death due to lack of oxygen. Therefore, operate the engine where there is good ventilation and there are no people or cattle.
4. Don't operate diesel engines in a place where may be combustible vapors. Responsibility for operating the engine safely in dangerous places must be assumed by the machine managers and workers
5. Use diesel fuel only. Never mix gasoline or alcohol with diesel fuel. Fuel mixtures will damage the engine and may cause an explosion.
6. Confirm that the engine is stopped when repairing the machine, performing maintenance work, or refilling the fuel. Don't open the caps of the radiator or auxiliary tank while operating the engine or just after the engine is stopped. If opened, hot water is ejected, which may cause burning injuries to people around. Open the radiator cap 10 minutes after the engine is stopped.
7. Make sure that all drains and caps are tightly closed and all fluid levels are correct before starting. Always check for leaks and ensure that any loose parts are repaired before operating the engine. Loose parts are the operator's responsibility and may cause damage or injury if ignored. Loose parts are the operator's responsibility and may cause damage or injury if ignored.

8. When separating or dissembling connecting pipes, joints, or related parts, remove the pressure from the systems for air, engine oils, or coolants. When removing a component in a pressurized system, be careful of the pressure. For example, do not use your hand to check pressure leakage. There may be damages due to oil or fuel with high pressure.

9. If you always replace bolts with new ones when assembling, be sure to use bolts of same or corresponding type. Even if you are forced to use bolts of different types, don't use bolts of lower grade than the current ones.



10. To prevent injury and equipment damage when servicing the engine; always use the proper tools, know how to use them correctly and keep them in good condition. Wear eye protection.
11. Dispose of all fluids and hazardous materials in accordance with local environmental regulations and common sense. Never drain oils, coolants or fuels onto the ground. Do not place fluids, filters or batteries in with

household wastes. Determine the appropriate disposal method before removing hazardous materials from the engine.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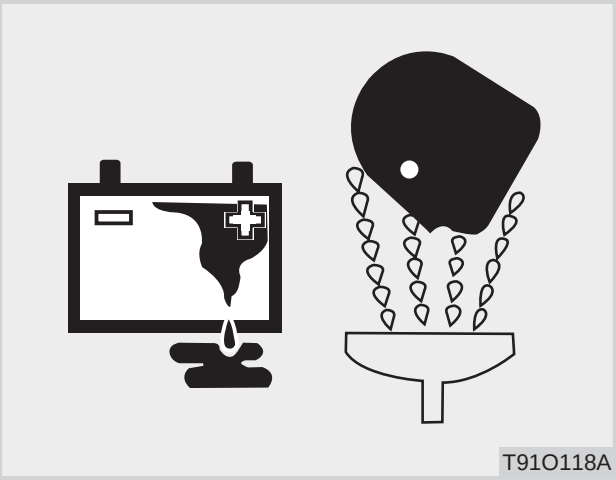
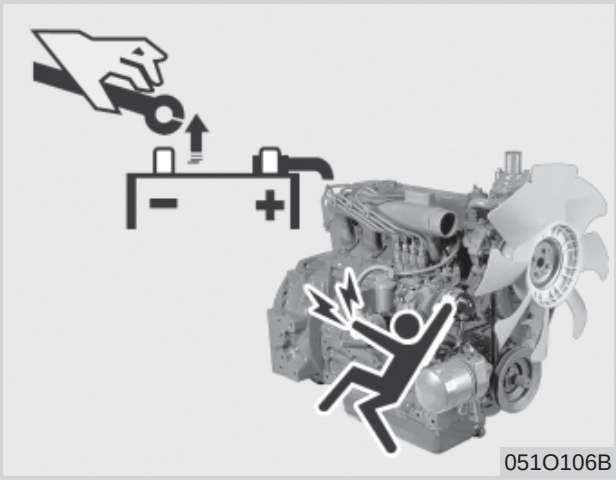
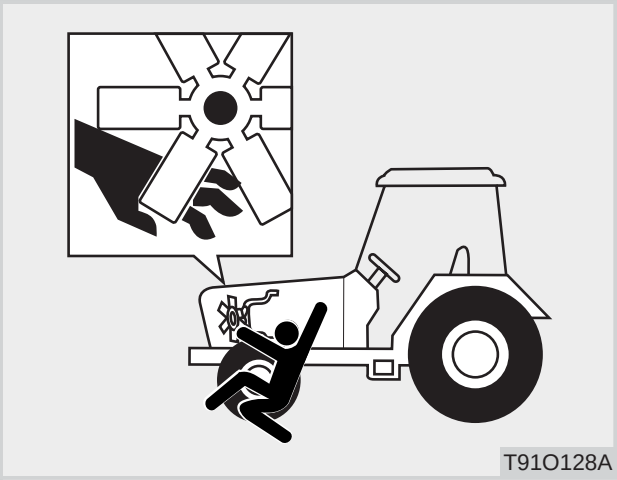

T91O118A

12. When checking the battery, keep flammable items, such as lighter, cigarette, etc., away from the machine.
13. Hydrogen gas from batteries may cause an explosion, which may cause injuries or damages.
14. Do not allow the battery fluid to contact your skin and clothing. In case of acid contact with eye, skin, or tools, rinse thoroughly with water. Get medical attention immediately if acid contacts your eye or is swallowed. The battery has acid that can burn your skin, eyes, or clothing.

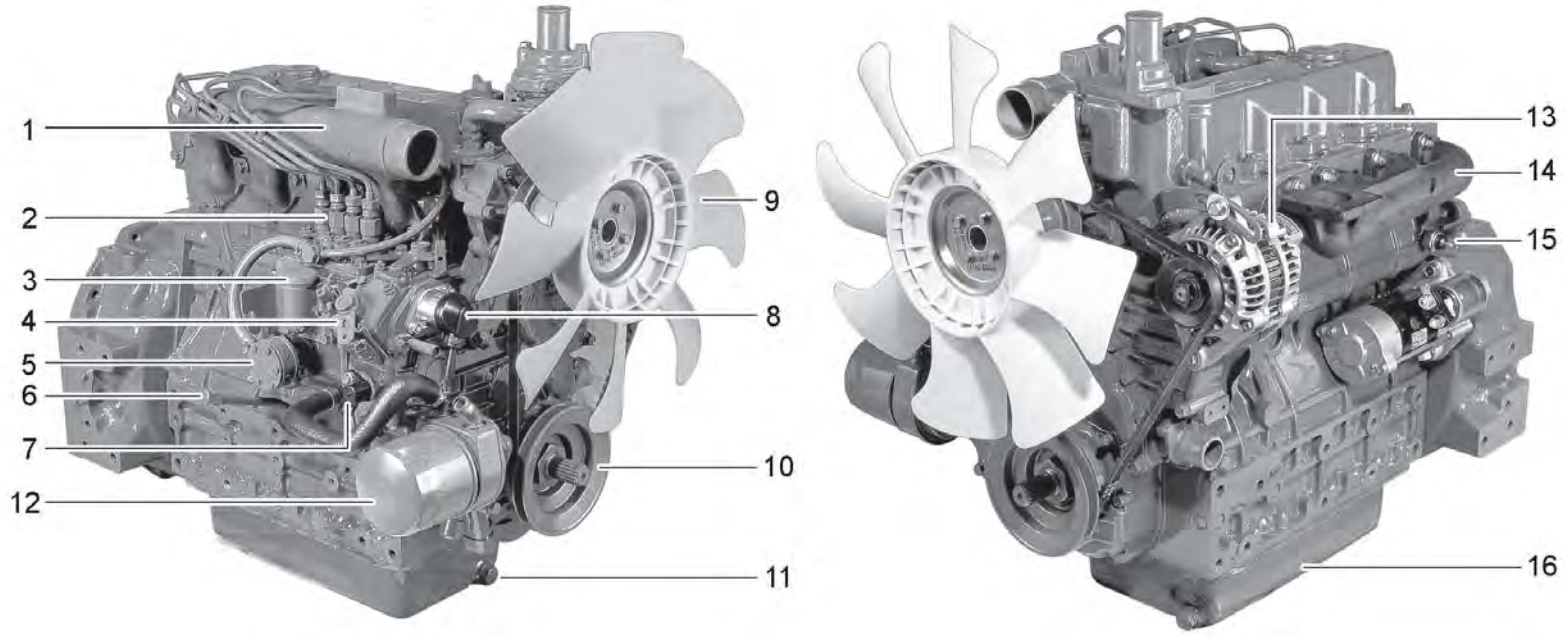


15. When disconnecting the cable from battery terminals, start with the negative terminal first. When connecting the cable, start with the positive (+) terminal. Doing so can cause a short circuit which leads to skin burning or fire.
    - Use only a recommended battery.
    - Do not mix the positive and negative battery cables.



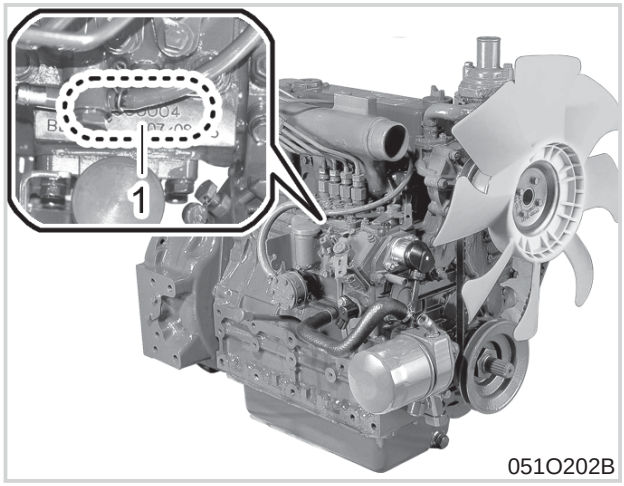
16. The cover and other parts removed for inspection and repair should be installed again after the work is done. You can be trapped or entangled into the engine system and get injured.

EXTERIOR VIEW



(1) Intake Manifold
(2) Fuel Injection Pump
(3) Oil Fill Cap
(4) Speed Control Lever
(5) Fuel Feed Pump
(6) Oil Level Dipstick
(7) Electronic Pick-up Sensor
(8) Engine Stop Solenoid
(9) Cooling Fan
(10) Fan Drive Pulley
(11) Oil Pan
(12) Oil Filter Catridge
(13) Alternator
(14) Exhaust Manifold
(15) Oil Pressure Switch
(16) Oil Drain Plug

SERVICING



(1) Engine Serial Number

Your dealer is interested in your new tractor and has the desire to help you get the most value from it. After reading this manual thoroughly, you will find that you can do some of the regular maintenance yourself.

The engine serial number is stamped on the mounting surface of the injection pump.

Should your engine require parts or service, please contact your local **DAEDONG** dealer. Your dealer will need the following information in order to assist you.

1. Engine make, model number and serial number.
2. Names and code numbers of parts to be ordered.
3. Make and model number of the machine in which the engine is installed.

3

PRE-START ENGINE CHECKS

Always check the engine and make sure it is ready for safe operation before starting – See page 4-2 for details.

IMPORTANT

- **Before installing the engine, be sure that the equipment is on firm, level ground.**
- **Do not run the engine on gradients.**
- **Never use starting fluid or gasoline in the air intake. Engine damage will result, and an explosion may occur.**

STARTING AND STOPPING THE ENGINE

STARTING

1. Set the fuel cock to the “ON” or “OPEN” position. (Only for this engine with engine filters)
2. Set the speed control lever at about half throttle.
3. Insert the key into the starter switch, and turn it to "ON" position. Keep the position until the preheat indicator goes off.
   ① Verify that the oil pressure and charge lights are on.
   ② The engine may be started without preheat in normal temperature (above 15°C), but with preheat for 15 or 10 seconds in cold temperature (-23°C)(Provided it may be varied according to the installed condition of the engine.).
4. Turn the key to the “START” position to engage the starter motor. Release the key immediately as the engine starts.
5. Verify that the oil pressure and charge lights are now off. If either light is on, stop the engine immediately and see page 3-4 for troubleshooting instructions.
6. Run at a moderate speed until the engine reaches a normal operating temperature before doing work.
7. The oil pressure light should remain off during operation. If the light comes on, stop the engine immediately to avoid the possibility of severe engine damage, and check the following:
   - Correct oil level.
   - Verify that the engine contains clean oil of the proper viscosity.
   - Check for faulty wiring.

⚠ CAUTION

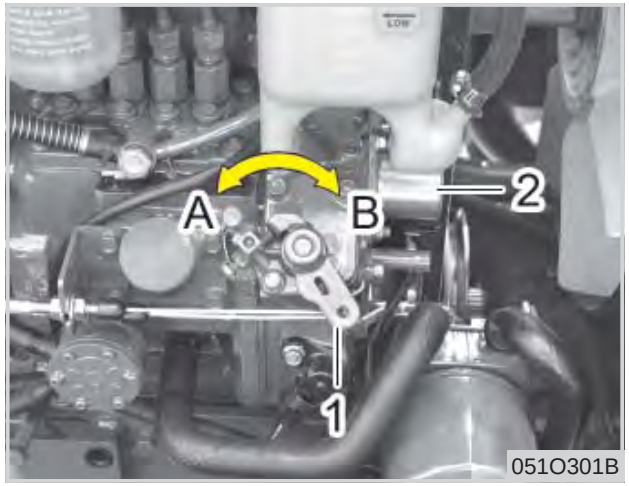
To avoid personal injury :

- **Keep children or non-essential bystanders away from the engine while it is running.**

IMPORTANT

- **Do not turn the starter switch to “START” while the engine is running.**
- **If the engine does not start in 10 seconds, wait 30 seconds and repeat the starting sequence. Never run the starter motor continuously for more than 20 seconds.**
- **Always warm up the engine before working. Using a cold engine will shorten its life.**
- **If the temperature may be lower below -15°C (5°F), separate the battery from the machine, and keep it indoors. Then use it when starting the engine.**

STOPPING



(1) SPEED CONTROL LEVER
(2) ENGINE STOP SOLENOIDE
(A) "IDLING" (B) "OPERATION"

1. Disengage any load from the engine. Return the speed control lever to the “IDLE” position.
2. Turn the starter switch to “OFF” and remove the key. Return the engine stop solenoide to the “START” position for the next start.

CHECK DURING OPERATION

While operating the engine, keep checking whether all parts of the engine are operating smoothly and properly.

COOLING SYSTEM

If steam or coolant is escaping from the overflow tube; stop the engine, allow it to cool, and check the following and correct as needed.

1. Check for cooling system leaks.
2. Check for obstructions that block cooling air.
3. Clean any dirt or debris from the radiator core (fins & tubes).
4. Check and adjust the fan belt tension.
5. Ensure that the system is filled to the correct coolant level with the proper mix of anti-freeze and water.
6. Check the radiator cap for proper type and condition.

⚠CAUTION

To avoid personal injury :

- **DO NOT remove the radiator cap or the coolant reserve tank cap while the engine is hot. Pressurized steam or coolant will escape and cause serious injury to you and any bystanders. Open the cap at least 10 minutes after the engine is stopped.**

OIL PRESSURE LAMP

The oil pressure lamp comes on when the oil pressure drops below a safe level. If the lamp comes on during operation. If the lamp is on while the engine is operated at or above 1,000 rpm, immediately stop the engine and check the following items.

1. Check the engine oil level (page 5-4)

FUEL

The fuel tank should never be allowed to become completely empty. An empty tank will allow air into the fuel system; and the engine will not operate without bleeding the fuel system.

EXHAUST SMOKE

The engine exhaust should be colorless during normal operation within the rated output of the engine. Continuous dark emissions or smoke may indicate improper usage or an engine malfunction.

STOP THE ENGINE IMMEDIATELY:

1. If the engine speed suddenly changes.
2. If there is an unusual noise.
3. If the engine exhausts suddenly darkens.
4. If the oil pressure or temperature light come on.

REVERSED ENGINE ROTATION AND REMEDIES

While not common, it is possible for a diesel engine to run backwards. The engine will lose lubrication and be severely damaged if allowed to run in this condition. Shut the engine down immediately.

HOW TO TELL WHEN THE ENGINE RUNS BACKWARDS

1. Oil pressure will drop suddenly. The oil pressure light will come on.
2. The sound of the engine will change. Exhaust gases will come out of the air intake.
3. A loud knocking sound will be heard.

REMEDIES

1. Stop the engine immediately using the engine stop lever.
2. Check the air cleaner and rubber parts of the air intake system for damage. Replace as needed.

4

DAILY CHECKS

Regular maintenance is an important factor in preventing downtime and accidents. Always make the following checks before operating the engine.

NOTE

- **All service and maintenance should be done on a firm, level surface.**

ITEM		PAGE
Parts which had trouble in previous operation		–
By walking around the machine	Oil or water leaks	5-7
	Engine oil level and contamination	5-4
	Amount of fuel	5-4
	Amount of coolant	5-8
	Dust in air cleaner	5-12
	Damaged parts and loosened bolts and nuts	–
By starting the engine	Color of exhaust fumes	3-4
	Unusual engine noise	3-5

BREAK-IN

During the engine break-in period, the following actions are critical to engine performance and life.

1. Change engine oil and oil filter after first 50 hours of operation (See pages 6-3 to 6-4).
2. In cold weather, always allow the engine to warm up before using.

SERVICE INTERVALS

NO.	CHECK ITEM		RUN HOUR								RUN AGE		SINCE THAN	PAGE
			50	100	150	200	300	400	600	800	1YR	2YR		
1	Engine oil	Change	⦿		○								Every 150 Hr	5-5
2	Engine oil filter	Replace	⦿										Every 150 Hr	5-6
3	Engine starting system	Check	○										Every 50 Hr	-
4	Tightening torque	Check	○										Every 50 Hr	-
5	Battery	Check		○									Every 100 Hr	5-12
6	Aircleaner element	Clean		○									Every 100 Hr	5-12
		Replace									○		Every 1 Year	5-12
7	Fuel filter element(Oil and water seperate)	Clean		○									Every 100 Hr	5-4
		Replace						○					Every 400 Hr	5-4
8	Fan belt	Adjust		○									Every 100 Hr	5-14
9	Radiator hose and clamp	Check							○				Every 600 Hr	5-9
		Change										○	Every 2 Year	5-10
10	Fuel line	Check		○									Every 100 Hr	5-2
		Replace										○	Every 2 Year	5-2
11	Intake air line	Check				○							Every 200 Hr	-
		Replace										○	Every 2 Year	-
12	Engine valve clearance	Adjust								○			Every 800 Hr	-
13	Cooling system	Flush										○	Every 2 Year	-
14	Coolant(Anti-freeze)	Replace										○	Every 2 Year	5-11
15	Fuel airbleeding	Check											Service as required	-
16	Radiator screen	Clean											Daily	-

NOTE

- The items marked ⦿ must be done after the first 50 hours of operation. The fuel injection pump, nozzle, alternator, starter, compressor, gear pump and hydraulic valve should be checked and repaired only by **KIOTI** Dealer/Distributor. If they are serviced by an unqualified person, the vehicle's safety cannot be guaranteed any longer since changes made may not conform to **KIOTI** requirements.

5

FUEL

Use Diesel Fuel No.2.

⚠ CAUTION

To avoid serious injury:

- **Do not mix gasoline or alcohol with diesel fuel. This mixture may damage the engine and can cause an explosion.**
- **Stop the engine while refueling to avoid fire or explosion. Avoid open flames and sparks while refueling.**

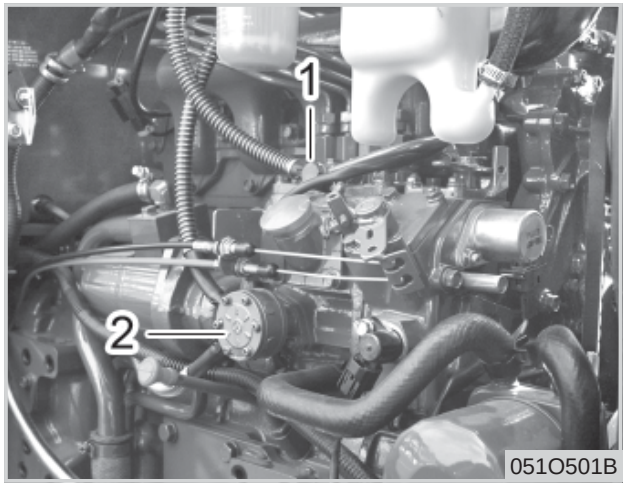
FUEL LEVEL CHECK AND REFUELING

1. Always refuel before the fuel level reaches “EMPTY”.
2. Use diesel fuel only. Other fuels and fuel mixtures will degrade performance and may damage the engine. Use the correct grade of diesel fuel for the ambient temperature.

IMPORTANT

- **Always use clean fuel. Use a strainer if necessary.**
- **Do not let the fuel tank run empty.**
- **Clean up fuel spills promptly and properly to eliminate a fire hazard.**

CHECKING THE FUEL LINES



(1) Air vent cock *(2) Fuel pump*

⚠ CAUTION

To avoid serious injury:

- **always stop the engine and allow it to cool before servicing the fuel system. Repair fuel leaks promptly to avoid fire or explosion.**

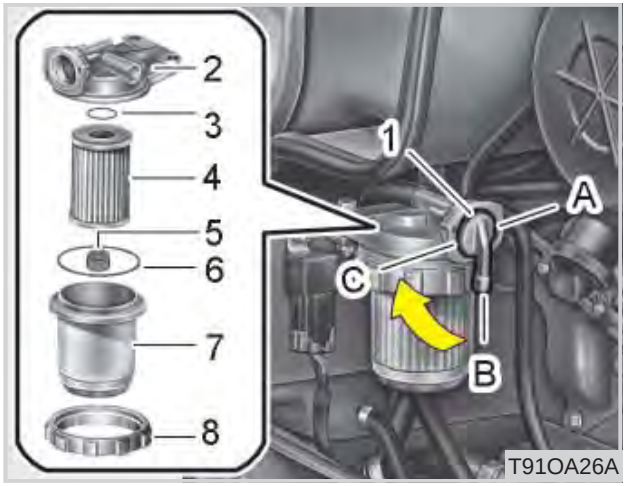
REPLACING THE FUEL FILTER

Check the fuel lines after every 100 hours of operation.

1. Check and tighten all hose clamps.
2. Check and replace rubber fuel lines and clamps as needed. Replace hoses and clamps every 2 years regardless of engine usage.
3. Bleed air from the fuel system after service.

IMPORTANT

- **Plug ends of open fuel lines during service to prevent dirt and other contaminants from entering and damaging the fuel system.**



(1) Fuel cock
(2) Fuel filter container
(3) O-ring
(4) Filter element
(5) Spring
(6) O-ring
(7) Filter container
(8) Screw ring
(A) Close
(B) Open
(C) Bleeder

1. Replace the fuel filter cartridge every 400 hours.
2. Apply a thin layer of fuel oil on the gasket. Install and hand-tighten.

IMPORTANT

- **Replacing the fuel filter periodically will significantly reduce injection pump and fuel injector wear.**

ENGINE OIL

For your own safety and maximum service life of the machine, make a thorough daily inspection before starting the engine.

⚠ CAUTION

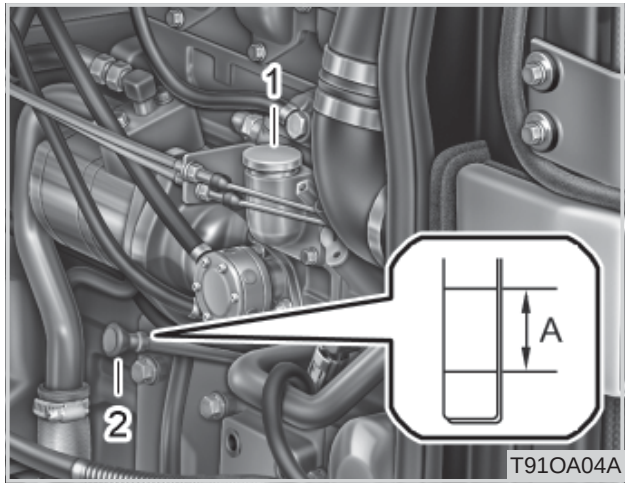
To avoid personal injury:

- **Be sure to check and service the tractor on a flat place with the engine stopped and the parking brake "ON".**

WALK AROUND INSPECTION

Look around and under the tractor for such items as loose bolts, trash build-up, oil or coolant leaks, or broken or worn parts.

CHECKING ENGINE OIL LEVEL



(1) Oil Inlet (2) Oil gauge
(A) Oil level is acceptable within this range.

⊕ IMPORTANT

- **When using oil of a different brand or viscosity from the previous one, remove all of the old oil. Never mix two different types of oil.**
- **Do not start the engine if the amount of oil is insufficient.**

⚠ CAUTION

To avoid personal injury:

- **Be sure to stop the engine before checking the oil level.**

1. Park the machine on a flat surface.
2. Check the engine oil before starting the engine or wait 5 minutes or more after the engine has stopped.
3. To check the oil level, draw out the dipstick, wipe it clean, replace it, and draw it out again.

   Check to see that the oil level is between the two notches. If the level is too low, add new oil to the prescribed level at the oil inlet.

4. Engine oil quantity

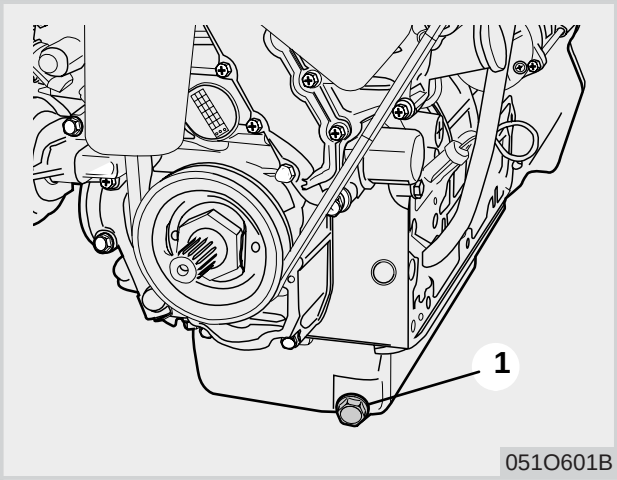
Model	Quantity	Model	Quantity
3C093LWS 3C100LWS	3.2 ℓ	3C093LWG 3C100LWG	3.8 ℓ
3A139LW 3A150LW 3A165LW	5.8 ℓ	3B183LW	5.5 ℓ
4A200LW 4A220LW	8.0 ℓ	4B243LW	7.7 ℓ
4A200TLW	8.3 ℓ	4A220TLW	8.3 ℓ

5. Use SAE 15W40 oil or equivalent.
6. Always drain the oil completely when changing. Never mix different oils or engine damage may result.

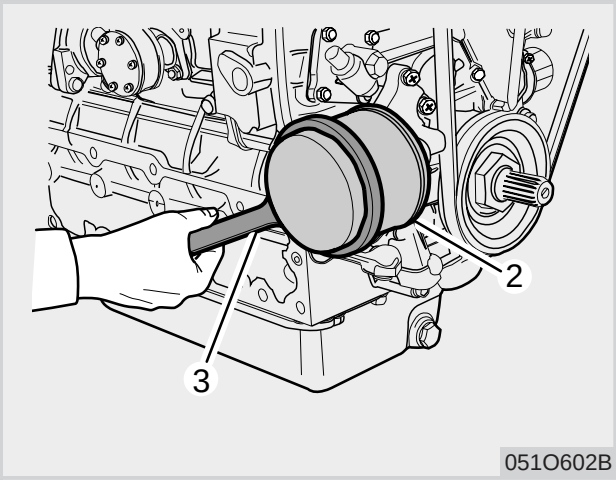
CHANGING ENGINE OIL

1. Change the oil after the first 50 hours of operation.
2. Remove the drain plug from the oil pan and allow all of the oil to drain. Draining the oil will be easier when the engine is slightly warm.
3. Ensure that the oil level on the dipstick is at the upper mark.
4. Change the oil after every 150 hours of operation thereafter.

REPLACING THE OIL FILTER



(1) Oil Drain Plug



(2) Oil Filter
(3) Remove wiht filter wrench(Hand-tighten only)

1. Replace oil filter with at least every other oil change.
2. Remove the filter using a filter wrench.
3. Apply a thin layer of clean oil to the gasket on the new filter.
4. Screw the new filter on. Hand-tighten only. If the gasket contacts with the sealed place, fasten it with hands. If you fasten it with wrenches, the fastening force may be greater than necessary.
5. The level of engine oil is lowered when replacing cartridges. So, check whether any oil leakage is in sealed places when operating the engine for a while, and then check the oil level. If necessary, replenish oil.

NOTE

- Swipe off any engine oil stained on the machine.

RADIATOR (OPTIONAL)

Radiators must be handled and installed properly to avoid coolant leaks. It should be a daily routine to check the engine coolant level. Check it before each use while the engine is cold.

⚠ WARNING

To avoid personal injury:

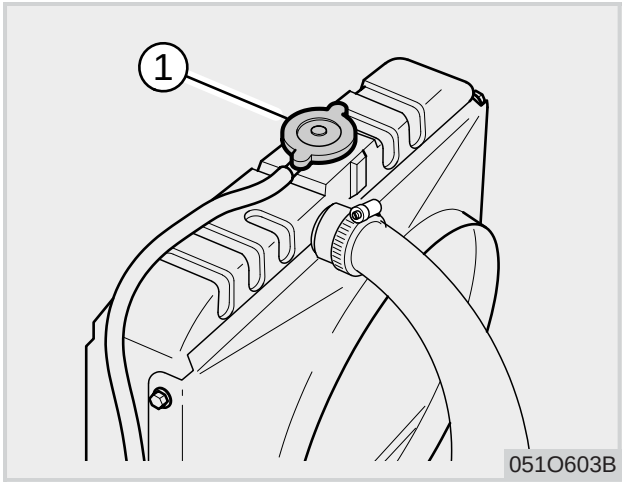
- ***Do not remove the radiator cap or coolant reserve tank cap while the engine is hot. Escaping steam or coolant will cause serious injury to you or any bystanders. Always check the engine coolant level when the engine is cold.***

⚠ CAUTION

To avoid personal injury:

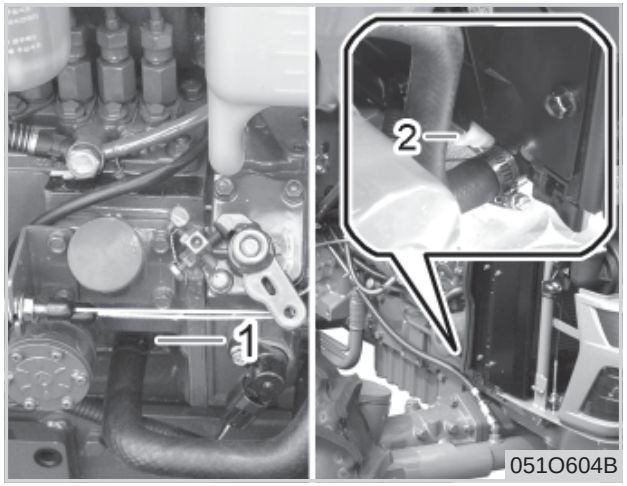
- **always stop the engine and allow it to cool before changing the coolant or performing any other cooling system service.**

CHECKING LEVEL,ADDING AND CHANGING COOLANT



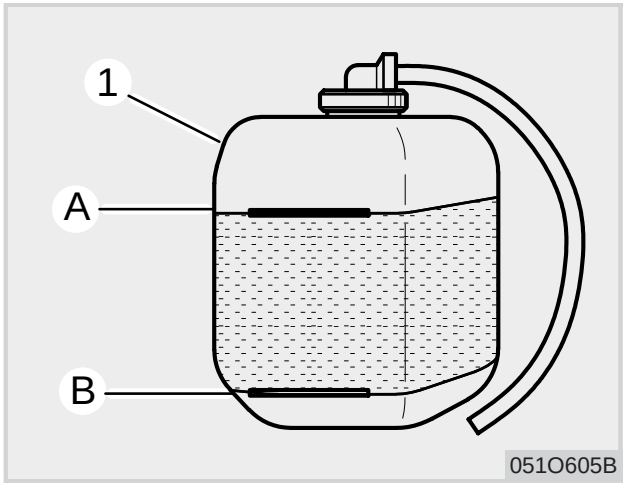
(1) Pressure Cap

1. Without a reserve tank, remove the radiator cap while the engine is cold. The coolant level should be just below the filler neck.
2. If equipped with reserve (expansion) tank, the coolant level should be between “FULL” and “LOW”.



(1) Coolant Drain Plug
(2) Coolant Drain Cock

3. If necessary, add the proper mix of pure water and anti-freeze. Cooling system drain cocks are located at the bottom of the radiator and on the side of the engine. They must be closed securely during operation. (If there is any leakage, refer to pages 5-9.)



(1) Coolant Reserve Tank
(A) Full (B) Low

IMPORTANT

- **Do not use dirty water or seawater for coolant.**
- **Check radiator cap condition and tighten securely after service.**
- **Do not overfill the reserve tank, if equipped.**
- **When coolant is added, start the engine and check again before it gets hot. It may require additional coolant.**

CHANGING COOLANT

1. To discharge coolants, always open plugs for discharge that are located on the side of the crank case and lower part of radiator, and open the radiator cap, too.

   You cannot discharge coolant fully when the cap is closed. (To discharge coolant from reservoir tank, separate the overflow pipe from the radiator cap.)

2. COOLANT QUANTITY

Model	Quantity	Model	Quantity
3C093LW 3C100LW	1.6ℓ	4A200LW	3.9ℓ
3A150LW	3.3ℓ	4A200TLW	4.0ℓ
3A139LW	3.3ℓ	4A220LW	3.6ℓ
3A165LW	2.8ℓ	4A220TLW	3.8ℓ
3B183LW	3.0ℓ	4B243LW	3.9ℓ

※ The coolant mentioned above is applied only for the engine.

3. A radiator cap that is loose or has a damaged seal will result in coolant loss and may cause overheating.
4. Coolant(Radiator cleaner and antifreeze).

Season	Coolant
Summer	Pure water and radiator cleaner
Winter (When temperature drops below 0 (32° F)or all season	Pure water and anti-freeze (Refer to P5-10)

IF COOLANT OVERFLOW PERSISTS:

1. Clean dirt and debris from the radiator guard, if equipped, and the radiator core (fins and tubes) to ensure that cooling air flow is not obstructed.
2. Check and adjust the fan belt (see page 5-14).
3. If a cooling system blockage is suspected, drain and flush the cooling system with a suitable radiator cleaner. Refill with fresh coolant. If a blockage persists, contact your dealer or professional radiator service.

CHECKING RADIATOR HOSES

1. Inspect radiator hoses every 6 months or 200 operating hours; whichever comes first.
   - Check for leaks and repair or re place promptly. Tighten hose clamps regularly.
   - Hoses that are cracked, swol len or brittle must be re placed as failure is eminent. Hose fail ure will result in engine over heating and possible injury.
2. Replace cooling system hoses every 2 years. New hose clamps should always be used when replacing hoses.

CLEANING THE RADIATOR CORE

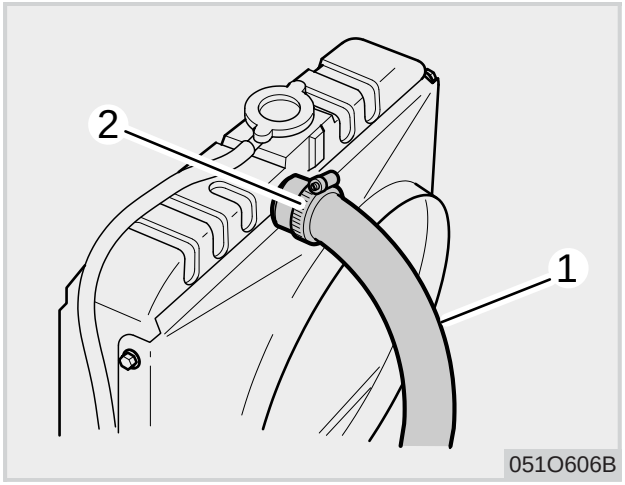
Flush the radiator core with fresh water to remove external dirt and debris. Cleaning should only be done when the system is cold.

IF ENGINE OVERHEATING OCCURS

If the coolant is overheated to around or above boiling point, follow instructions below. If a warning buzzer or lamp is turned on, follow instructions below.

1. Safely stop the machine. Remove any load from the engine and reduce the engine speed to idle.
2. Allow the engine to idle for 5 minutes before shutting it down.
3. After shutdown, allow the engine to cool before troubleshooting and repair. Stay away from an overheated engine until it cools as steam or hot coolant may escape violently without warning.
4. After shutdown, allow the engine to cool before troubleshooting and repair. Stay away from an overheated engine until it cools as steam or hot coolant may escape violently without warning.
5. After the engine cools, consult the "Troubleshooting" section of this manual to determine the cause. Make repairs and adjustments as required.

CLEANING THE RADIATOR



(1) Radiator Hose (2) Hose Clamp

Clean the cooling system every 500 hours or as needed. Cleaning may be required more often in severe service conditions. Always clean the system when replacing the engine coolant.

IMPORTANT

- **Use water only to clean the radiator core. Never use tools or any other hard object that will damage fins and tubes. Leaks or degraded performance will likely occur.**

ANTI-FREEZE

Freezing temperatures can quickly and severely damage the engine if the cooling system is unprotected. Use antifreeze when temperatures fall below 32°F (0°C).

1. Only use permanent anti-freeze in this engine.
2. Completely drain and flush the cooling system with clean water before adding anti-freeze.
3. Mix the proper amounts of anti-freeze and pure water in accordance with SAE J1034 and SAE J814C based on the expected ambient temperature.
4. Mix the anti-freeze and water before pouring it in the cooling system.

IMPORTANT

- **The coolant mixture should not exceed 50% anti-freeze by volume.**

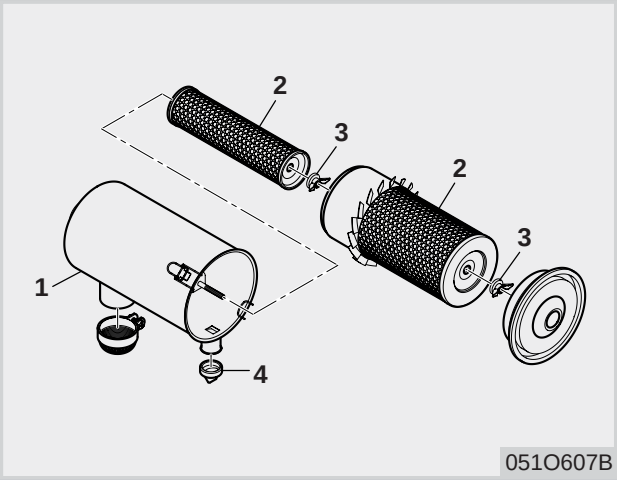
Anti-freeze Vol%)	Freezing Point		Boiling Point	
	°C	°F	°C	°F
40	-24	-12	106	222
50	-37	-34	108	226

*At 760 mmHg pressure (atmospheric), a higher boiling point is obtained by using a radiator pressure cap which permits the development of pressure within the cooling system.

NOTE

- This data is the industry standard for a typical ethylene glycol based antifreeze. These volumes of anti-freeze, when mixed with pure water, will reduce the freezing point of the coolant mixture as shown.
- When adding coolant during daily service, use only water or anti-freeze mixed with water to ensure that the mix ratio stays at or below 50% anti-freeze.
- Keep unused anti-freeze in a clean, tightly sealed container.
- Do not use radiator cleaning agents when anti-freeze has been added to the cooling water. (Anti-freeze contains an anti-corrosive agent, which will react with the radiator cleaning agent forming sludge which will affect the engine parts.)

AIR CLEANER (OPTIONAL)



(1) Aircleaner Body
(2) Element
(3) Wing-Head Bolt
(4) Evacuator Valve

1. Never use oil in a dry-element type air filter.
2. Squeeze the evacuator valve open to ensure that larger dust particles are expelled from the air cleaner body (canister) – at least weekly; daily under dusty conditions.
3. Wipe the inside of the air cleaner body with a clean cloth when servicing the air cleaner.
4. Dust can be cleaned from the filter element with compressed air. Always blow from the inside out, and never use air pressure greater than 100 PSI.
5. Oily or extremely dirty filters may be cleaned by soaking the element in a detergent for 15 minutes. Rinse thoroughly and allow to air dry completely. Inspect the element for damage before reinstalling.
6. Replace the element yearly or after 6 cleanings.

IMPORTANT

- **Ensure that the wing nut for the filter element is tight. A loose element or loose cover will allow dust ingestion that can severely damage the engine. Always check air intake clamps for tightness.**

BATTERY (OPTIONAL)

⚠ CAUTION

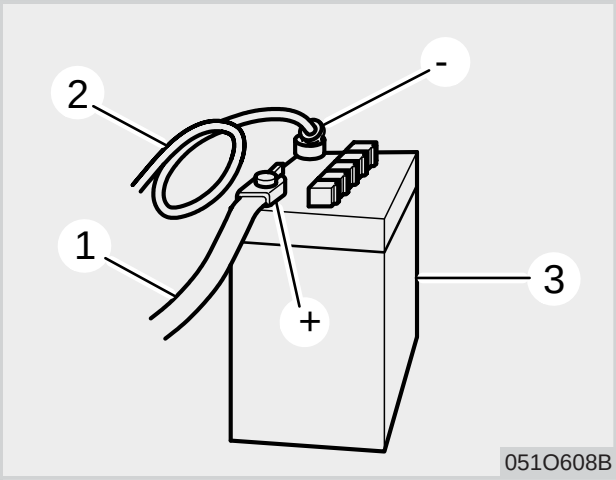
To avoid personal injury:

- **Avoid contact with battery electrolyte. Sulfuric acid will burn the skin and destroy clothing. If contact occurs, flush thoroughly with clean water. Wear eye protection.**

The battery may be damaged due to improper treatment. Please charge the battery fully with the proper method.

1. Keep the battery fully charged to avoid downtime.
2. Check the electrolyte level during routine service. Add distilled water when the level is low. Do not overfill. Flush any spillage with clean water to prevent injury or equipment damage.
3. When recharging the battery, connect the charger and the battery with positive to positive and negative to negative.

4. When charging the battery, always follow the charger manufacturer's instructions. Be careful to observe the correct polarity to prevent battery damage or possible explosion.

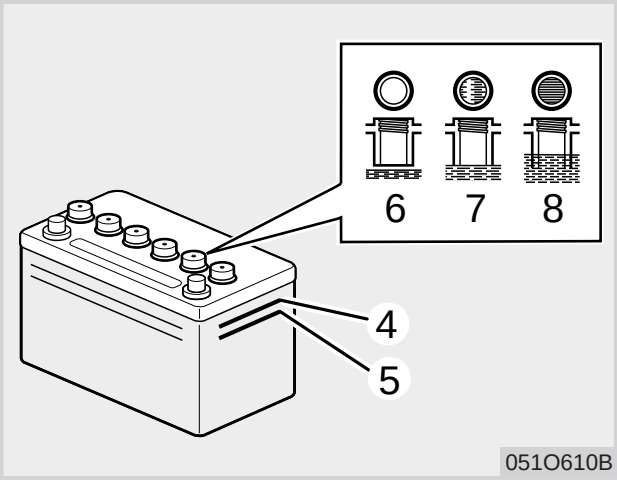


(1) Larger Red Cable(+)
(2) Ground Cable(-)
(3) Battery Case

IMPORTANT

- **Always observe the correct polarity. Attaching cables to the wrong terminals will cause system damage and possibly injury.**
- **To prevent a short circuit that may cause injury, always remove the negative (ground) cable first and reconnect it last.**
- **Never remove a battery cable while the engine is running. Charging system damage may result.**

LONG-TERM STORAGE



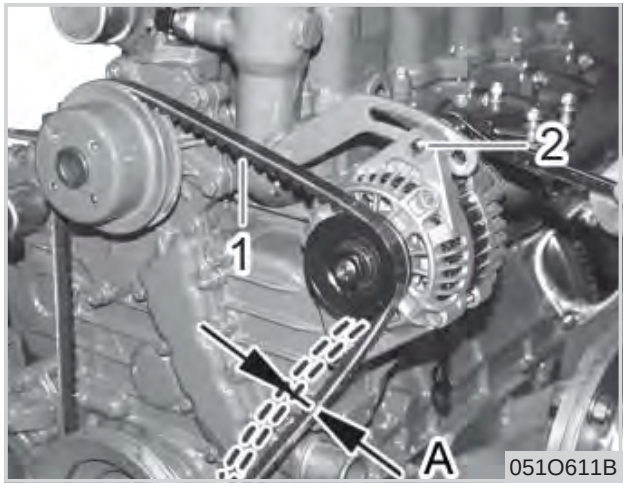
(4) Hightest Level
(5) Lowevst Level
(6) Lowevst Level
(7) Plug
(8) Hightest Level

1. Before long-term engine storage:
   - Remove the battery.
   - Add electrolyte, fully charge the battery, and readjust the electrolyte level, if necessary.
   - Store the battery in a dry, dark place.
   - Do not store on the ground or a concrete surface.
2. Batteries will discharge even when not in use. During long periods of inactivity, recharge regularly to maintain readiness and battery life.

FAN BELT
BELT TENSION AND WEAR

Low belt tension can result in engine overheating and insufficient battery charging. The correct tension can be determined by applying a 22 lb(10 kgf). load at mid-span (Point A). The resulting belt deflection should be 0.28 to 0.35 inches.

BELT TENSION ADJUSTING



(1) Fan Belt
(2) Bolt, Nut
(A) 7~9mm

Loosen both bolts that attach the alternator. Move the alternator to adjust belt tension. Retighten the bolts and nut after adjustment.

LONG-TERM ENGINE STORAGE

Clean the machine when storing the engine for several months or more.

1. Open the drain cocks and remove the radiator cap to drain all of the coolant from the engine and radiator. Leave the drain cocks open. Label the engine with a reminder that there is no coolant in the engine. If the temperature gets lower than 0°C (32°F), coolant gets frozen. In such conditions, be sure to discharge the coolant from the engine.
2. Drain the engine oil and replace with clean oil. Run the engine for 5 minutes.
3. Repair any leaks. Ensure that all bolts and screws are tight.
4. Separate the battery from the machine, check the electrolytes, and recharge the battery. The battery should be kept in a dry place without direct sunlight.
5. Run the engine every 2 to 3 months with no load for 5 minutes.

If the engine is not run for a period of more than 5 months, apply engine oil liberally to valve guides and valve stem seals before starting.

ENGINE IS HARD TO START

Possible causes	Actions
Fuel is cloudy or fuel flow is restricted	• Check fuel tank and fuel filter. • Remove water, dirt, or other debris. • Filter out fuel, and replace the filter if contaminated.
Air or water in fuel system	• Fuel pump is not working properly due to air in the fuel filter or injection line. Loosen the fuel cap nut and check carefully to obtain proper fuel injection pressure. • Loosen the air vent screw from the fuel filter and fuel injection pump and bleed all air from the fuel system.
Thick carbon deposit at injection nozzle inlet	• Water or dirt in fuel. Clean the injection nozzle and check the nozzle inject for damage. • Check that the nozzle is working properly. Install new nozzle if necessary.
Incorrect valve clearance	• Adjust the valve clearance (with the engine cold). Intake ; 0.15mm Exhaust ; 0.15mm - 3C093LWS/3C093LWG/3C100LWS Intake ; 0.25mm Exhaust ; 0.30mm - 3A139LWS/3A150LWS/3A150LWG/3A165LWS/ 3B183LWS/4A200LWS/4A220LWS/4A220LWG/ 4B243LWS Intake ; 0.20mm Exhaust ; 0.20mm - 4A200TLWS/4A220TLWS
Leaks from valve	• Polish the valve.
Incorrect fuel injection timing	• Adjust the injection timing. • Injection timing: BTDC 12°(sub port) BTDC 18˚- 3C093LWS/3C100LWS/3A139LWS/3A150LWS/3A150LWG/3A165LWS/ 3B183LWS/4A200LWS/4A220LWS/4A220LWG BTDC 24˚- 3C093LWG BTDC 22˚(CTD, main) - 4B243LWS BTDC 12˚(sub port) - 4A200TLWS/4A220TLWS

Possible causes	Actions
Engine oil is cloudy and engine runs slowly in cold weather	• Change to correct oil grade depending on the weather (temperature).
Low compression	• Defective valve or excessively worn ring, piston, and liner will result in low compression. • Replace it with new one.
Battery discharged, or engine is not running	• Replace the battery. • Remove battery from the tractor and keep it in an indoor environment in cold weather. Install the battery when you use the tractor.

THE ENGINE MUST BE STOPPED IMMEDIATELY

Possible causes	Actions
Insufficient fuel	• Drain and replace with proper fuel. • Check whether there is air or leakage in the fuel system.
Faulty nozzle	• Replace new part as required.
Moving parts overheating due to poor oil and insufficient oil	• Check the level of engine oil with oil gauge. • Check the lubrication system. • When replacing engine oil, the element of the oil filter should be replaced. • Check if the bearing clearance meets the specification.

ENGINE LACKS POWER

Possible causes	Actions
Carbon deposit at injection nozzle inlet	• Clean the inlet and needle valve carefully not to damage the nozzle inlet. • Check the nozzle. Replace with a new nozzle if necessary.
Leaks from valve due to low compression	• Defective valve or excessively worn ring, piston, and liner will result in low compression. Replace it with a new one. • Polish the valve.
Lack of the fuel	• Check the feul system.
Moving parts overheating	• Check the lubrication system. • Check if the oil filter is working properly. • Filter screen or element with debris will degrade the lubricant cleaning screen. Replace the element. • Check the injection timing • Proper injection timing (crank angle before top dead center) BTDC 18˚- 3C093LWS/3C100LWS/3A139LWS/3A150LWS/3A150LWG/ 3A165LWS/3B183LWS/4A200LWS/4A220LWS/4A220LWG BTDC 24˚- 3C093LWG BTDC 22˚(CTD, main) - 4B243LWS BTDC 12˚(sub port) - 4A200TLWS/4A220TLWS
In correct valve adjustment	• Check and adjust valve clearance when the engine is cold. Intake ; 0.15mm Exhaust ; 0.15mm - 3C093LWS/3C093LWG/3C100LWS Intake ; 0.25mm Exhaust ; 0.30mm - 3A139LWS/3A150LWS/3A150LWG/3A165LWS/ 3B183LWS/4A200LWS/4A220LWS/4A220LWG/ 4B243LWS Intake ; 0.20mm Exhaust ; 0.20mm - 4A200TLWS/4A220TLWS
Air cleaner contamination	• Clean or replace the element every 100hours of operation.

Possible causes	Actions
Poor pressure of the feul injuction	• Adjust to proper pressure 150 ~ 160Kgf/cm^2 (14.7 ~ 15.7MPa, 2133 ~ 2276psi)
Fuel injection pump wear	• Avoid using poor quality fuel. This will result in pump wear. Use NO.2 diesel only • Check the injection pump and valve assembly. Replace as required.

ABNORMAL EXHAUST FUME COLOR

Possible causes	Actions
Poor fuel governor system	• Consult with a dealer for repair.
Poor fuel quality	• Select good quality fuel. Use the diesel oil only.
Poor nozzle	• Replace with a new nozzle if necessary.
Unstable burn	• Poor spraying, improper injection timing, abnormal injection system, poor valve adjust ment, or compression leakage, poor compression, etc. Check and repair.

SUDDEN ENGINE STOP

Possible causes	Actions
Engine speed suddenly changes	• Check the fuel system and injection timing.
Unusual sound occurs	• Check all moving parts.
Exhaust smoke or dark emissions appear	• Check the fuel injection system. Especially, check the nozzle.
Overheating the bearing	• Check for lubricating system leaks
Oil pressure warning light comes on	• Check the lubrication system. • Check if the engine bearing clearance meets the specification. • Check the oil pressure relief valve • Check the oil pressure switch • Check the filter base gasket.

ENGINE OVERHEATS

Possible causes	Actions
Low coolant level	• Check for and repair leaks. Add coolant.
Loose or broken fan belt	• Adjust or replace belt as required.
Low oil level	• Add water or replace coolant to achieve proper mix.
Anti-freeze concentration too high	• Clean dirt and debris from radiator core and radiator guard.
Cooling air obstructed	• Flush and clean system. Replace parts as required.
Cooling system dirty or corroded	• Flush and clean system. Replace parts as required.
Defective radiator cap	• Replace defective cap.
Faulty thermostat	• Check and replace thermostat nd replace, if necessary.
Defective temperature gauge or sending unit	• Calibrate using thermometer and replace, if necessary.
Engine overload	• Reduce load.
Leaking head gasket	• Replace head gasket.
Fuel injection timing	• Check and adjust timing.
Unsuitable fuel	• Replace fuel with the clean fuel of the proper type and grade.

NOTE

- If the engine does not start or run properly, refer to the following charts to determine the cause and identify corrective actions.
- If the cause cannot be determined, contact your DAEDONG dealer for assistance.

7

SPECIFICATIONS

DESCRIPTION	UNIT	3C093LWS	3C093LWG	3C100LWS	3A139LWS
POWER(Gross)	HP (kw)	19 (14.2)	21 (15.7)	22 (16.4)	28 (20.9)
Rated revolution	rpm	2,800	3,600	2,800	2,600
Maximum bare speed	rpm	3,000	3,690	3,000	2,800
Minimun bare idling speed	rpm	1,050	1,050	1,050	1,000
Type		Vertical, water cooled, 4-cycle diesel engine			
Number of cylnders		3			
Total displacement	cc (cu)	927 (56.6)	927 (56.6)	1,007 (61.5)	1,393 (84.9)
Turbocharger		-	-	-	-
Bore and stroke	mm (in)	Ø 75x70 (2.95x2.76)	Ø 75x70 (2.95x2.76)	Ø 75x76 (2.95x2.99)	Ø 80x92.4 (3.15x3.6)
Method of Combustion		Vortex chamber			
Compression ratio		22:1	22:1	21:1	22:1
Injection timing		BTDC 18°	BTDC 24°	BTDC 18°	BTDC 18°
Injection order		1-2-3			
Injection pressure	kPa (kgf/㎠)	14710-15690kPa (150~160kgf/㎠)			
Intake, exhaust clearance	mm	Intake: 0.15 Exhaust: 0.15			Intake: 0.25 Exhaust: 0.30
Direction of rotating		Counter-clockwise (view from flywheel side)			

DESCRIPTION	UNIT	3A150LWS	3A150LWG	3A165LWS	3B183LWS (4010)
POWER(Gross)	HP (kw)	30 (22.4)	21 (15.7)	34 (25.4)	38 (28.3)
Rated revolution	rpm	2,600	1,800	2,600	2,600
Maximum bare speed	rpm	2,800	1,850	2,800	2,800
Minimun bare idling speed	rpm	1,000	-	1,000	1,000
Type		Vertical, water cooled, 4-cycle diesel engine			
Number of cylnders		3			
Total displacement	cc (cu)	1,500 (91.5)	927 (56.6)	1,647 (100.5)	1,826 (111.4)
Turbocharger		-	-	-	-
Bore and stroke	mm (in)	Ø 83x92.4 (3.3x3.6)	Ø 83x92.4 (3.3x3.6)	Ø 87x92.4 (3.4x3.6)	Ø 102.4x92.4 (4.0x3.6)
Method of Combustion		Vortex chamber			
Compression ratio		21.7:1			22:1
Injection timing		BTDC 18°			
Injection order		1-2-3			
Injection pressure	kPa (kgf/㎠)	14710-15690kPa (150~160kgf/㎠)			
Intake, exhaust clearance	mm	Intake: 0.25 Exhaust: 0.30			
Direction of rotating		Counter-clockwise (view from flywheel side)			

DESCRIPTION	UNIT	4A200LWS	4A220LWS	4A220LWG	4B243LWS (5010)
POWER(Gross)	HP (kw)	41 (30.6)	45 (33.6)	29 (21.6)	49 (36.5)
Rated revolution	rpm	2,600	2,600	1,800	2,600
Maximum bare speed	rpm	2,800	2,800	1,850	2,800
Minimun bare idling speed	rpm	1,000	1,000	-	1,000
Type		Vertical, water cooled, 4-cycle diesel engine			
Number of cylnders		4			
Total displacement	cc (cu)	1,999 (122.0)	2,197 (134.1)	2,197 (134.1)	2,435 (148.6)
Turbocharger		-	-	-	-
Bore and stroke	mm (in)	Ø 83x92.4 (3.3x3.6)	Ø 87x92.4 (3.4x3.6)	Ø 87x92.4 (3.4x3.6)	Ø 102.4x92.4 (4.0x3.6)
Method of Combustion		Vortex chamber			
Compression ratio		21.7:1			22:1
Injection timing		BTDC 18°			BTDC 22°(CTM, main)
Injection order		1-3-4-2			
Injection pressure	kPa (kgf/㎠)	14710-15690kPa (150~160kgf/㎠)			
Intake, exhaust clearance	mm	Intake: 0.25 Exhaust: 0.30			
Direction of rotating		Counter-clockwise (view from flywheel side)			

DESCRIPTION	UNIT	4A200TLWS	4A220TLWS
POWER(Gross)	HP (kw)	50 (37.3)	54 (40.3)
Rated revolution	rpm	2,600	2,600
Maximum bare speed	rpm	2,800	2,800
Minimun bare idling speed	rpm	1,000	1,000
Type		Vertical, water cooled, 4-cycle diesel engine	
Number of cylnders		4	
Total displacement	cc (cu)	1,999 (122.0)	2,197 (134.1)
Turbocharger		Turbo	
Bore and stroke	mm (in)	Ø 83x92.4 (3.3x3.6)	Ø 87x92.4 (3.4x3.6)
Method of Combustion		Vortex chamber	
Compression ratio		21.8:1	21.1:1
Injection timing		BTDC 12° (sub port)	
Injection order		1-3-4-2	
Injection pressure	kPa (kgf/㎠)	14710-15690kPa (150~160kgf/㎠)	
Intake, exhaust clearance	mm	Intake: 0.20 Exhaust: 0.20	
Direction of rotating		Counter-clockwise (view from flywheel side)	

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