



LS TRACTOR

LS TRACTOR OPERATOR'S MANUAL

MT345E • MT345HE • MT350E • MT350HE



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OPERATOR'S MANUAL

MT3E-SERIES

LS TRACTOR



CALIFORNIA

PROPOSITION 65 WARNING



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

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

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

WASH YOUR HANDS AFTER HANDLING.

FEDERAL and CALIFORNIA EMISSION CONTROL SYSTEM WARRANTY STATEMENT

YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board (CARB), U.S. Environmental Protection Agency (EPA), and LS Mtron Ltd. (LS Mtron) are pleased to explain the emission control system warranty on your 2019 model year engine. New engines must be designed, built and equipped to meet stringent anti-smog standards. LS Mtron 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 or usage of your engine. Additional conditions and responsibilities are further outlined below. Where a warrantable condition exists, LS Mtron will repair your engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S LIMITED WARRANTY COVERAGE:

LS Mtron warrants to the original owner, and to each subsequent owner of a new diesel engine, that the emission control system of your engine:

1. Was designed, built and equipped so as to conform at the time of sale with all applicable regulations of CARB and EPA.
2. Is free from defects in material and workmanship which will cause such engine to fail to conform with applicable regulations for the following warranty period:
 - For engines rated at or above 19 kW (25 HP): five (5) years or 3,000 hours of operation, whichever occurs first.

The warranty period shall begin:

- On the date the equipment is first delivered to the first retail purchaser, or;
- If the equipment is placed in service for demonstration purposes prior to sale at retail, on the date the engine is first placed in service.

The emission control systems of your new LS Mtron engine were designed, built and tested using genuine LS Mtron parts, and the engine is certified as being in conformity with CARB and EPA emission control regulations. Accordingly, it is recommended that any replacement parts used for maintenance, repair, or replacement of emission control systems must be LS Mtron parts. Any replacement part may be used in the performance of any maintenance or repairs and will be provided without charge to the owner, although LS Mtron recommends that the owner obtain assurance that such parts are warranted by their manufacturer and LS Mtron to be equivalent to genuine LS Mtron parts. Such use shall not reduce the warranty obligations of LS Mtron, provided they are warranted to be equivalent to genuine LS Mtron parts.

Any warranted part which is not scheduled for replacement as required maintenance shall be warranted for the warranty period defined above. If any such part fails during the period of warranty coverage, and provided that there has been no abuse, neglect or improper maintenance or usage of your engine, it will be repaired or replaced under warranty. Any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.

Any warranted part which is scheduled only for regular inspection in the written instructions shall be warranted for the warranty period defined above, provided that there has been no abuse, neglect or improper maintenance or usage of your engine. A statement in the written instructions to the effect of "repair or replace as necessary" shall not reduce the period of warranty coverage. Any such part repaired or replaced under warranty shall be warranted for the remaining warranty period.

Any warranted part which is scheduled for replacement as required maintenance shall be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part shall be repaired or replaced by LS Mtron under warranty, provided that there has been no abuse, neglect or improper maintenance or usage of your engine. Any such part repaired or replaced under warranty shall be warranted for the remainder of the period prior to the first scheduled replacement point for the part.

LS Mtron provides warranty services or repairs at all manufacturer distribution centers (warranty stations) that are franchised to service the subject engines. Please see the Customer Assistance section of this statement for help in locating such service centers. Repair or replacement of any warranted part under warranty shall be performed at no charge to the owner at a warranty station.

The owner will not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station.

LS Mtron is liable for damages to other engine components proximately caused by a failure under warranty of any warranted part.

LS Mtron is required by California regulations to maintain a supply of warranted parts sufficient to meet the expected demand for such parts during the warranty period for the engines covered by this warranty.

OWNER'S WARRANTY RESPONSIBILITIES:

This engine is designed to operate on ultra low sulfur diesel fuel only. Use of any other fuel may result in this engine no longer operating in compliance with CARB or EPA's emissions requirements.

The purchaser is responsible for initiating the warranty process. You must present the engine to a LS Mtron dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

Use of any add-on or modified parts that are not exempted from anti-tampering laws by CARB or EPA may reduce or eliminate your warranty coverage. The use of any non-exempted add-on or modified parts shall be grounds for disallowing a warranty claim. LS Mtron is not liable for failures of warranted parts caused by the use of a non-exempted add-on or modified part.

The emissions control parts covered by this Limited Emission Control System Warranty are listed under "What is covered by the Limited Emission Control System Warranty." You are

responsible for the performance of all scheduled maintenance or repairs on your new LS Mtron engine. LS Mtron may deny a warranty claim if failure to perform maintenance results in the failure of a warranted part. Receipts covering the performance of regular maintenance should be retained in the event of questions arise concerning maintenance. The receipts should be transferred to each subsequent owner of the equipment with the emission warranted engines.

Customer Assistance

In the event that you do not receive the warranty service to which you believe you are entitled under the Limited Emission Control Systems Warranty, you should contact LS Mtron at the address below for assistance. If you need additional assistance or information concerning the Limited Emission Control System Warranty, contact:

- | | |
|--|---|
| 1. LS Mtron Ltd.
886, Gwahak-Ro, Bongdong-Eup
Wanju-gun, Jeollabuk-Do, Korea
Phone: 82-63-279-5824
Fax: 82-63-279-5933 | 2. LS Tractor USA LLC
Ricky Mark
Service Department
6900 Corporation Parkway
Battleboro, NC 27809
Phone: 1-252-984-0700
Fax: 1-252-984-0701 |
| 3. Big B Sales, Inc.
Travis Bowlin
674 Hwy 8,
Sicily Island, LA 71368
Phone: 1-318-389-5349
Fax: 1-318-389-5181 | 4. Lane Tractor Sales
Michael Lane
7980 Hwy 99 East;
Los Molinos, CA 96055
Phone: 1-530-384-1016
Fax: 1-530-384-0305 |

What is not covered by the Limited Emission Control System Warranty

This warranty does not cover:

1. Malfunctions in any part caused by any of the following: misuse, abuse, improper adjustments, modifications, alteration, tampering, disconnection, improper or inadequate maintenance, or use of fuels not recommended for the engine as described in the Maintenance Manual.
2. Damage resulting from accident, acts of nature or other events beyond the control of LS Mtron.
3. The replacement of expendable maintenance items such as exhaust system, filters, hoses, belts, oil, thermostat, and coolant made in connection with scheduled maintenance services once these parts have been replaced.
4. Replacement items which are not genuine LS Mtron parts or not authorized by LS Mtron.
5. Loss of time, inconvenience, loss of use of equipment, engine or commercial loss.

What is covered by the Limited Emission Control System Warranty

The following is a list of systems and parts that are considered a part of the Emission Control System and are covered by the Limited Emission Control System Warranty for engines which were built to conform to CARB and EPA regulations:

IMPORTANT! This may not include expendable maintenance items such as nozzle assemblies and rubber flanges. Emission related parts requiring scheduled maintenance are warranted until their first scheduled replacement point only.

This Limited Emission Control System Warranty applies to the following emission control parts:

- (1) Fuel System
 - (A) Fuel injection pump.
 - (B) Fuel Injectors.
- (2) Air Induction System
 - (A) Intake manifold.
 - (B) Turbocharger
 - (C) Air Control Valve
 - (D) Exhaust Manifold
- (3) Exhaust Gas Recirculation (EGR) System
 - (A) EGR valve body
- (4) Aftertreatment Devices
 - (A) DOC
 - (B) DPF
- (5) Positive Crankcase Ventilation (PCV) System.
 - (A) PCV Valve.
 - (B) Oil Filler Cap.
- (6) Miscellaneous items Used in Above Systems
 - (A) Vacuum, temperature, and time sensitive valves and switches.
 - (B) Electronic control units, sensors, solenoids, and wiring harnesses.
 - (C) Hoses, belts, connectors, assemblies, clamps, fittings, tubing, sealing gaskets or devices, and mounting hardware.
 - (D) Pulleys, belts and idlers.
 - (E) Emission Control Information Labels.
 - (F) Any other part with the primary purpose of reducing emissions or that can increase emissions during failure without significantly degrading engine performance.

CONTENTS



1. General Notices for Safety

1-1. Before using the tractor 1-1

1-2. Safety Precautions (Read this for safety before using)

- (1) Notices before using the tractor 1-4
- (2) Notices when starting Engine 1-7
- (3) Notices while operating/using the tractor 1-8
- (4) Notices when connecting Implement 1-10
- (5) Notices when towing the tractor 1-11
- (6) Notices when transporting the tractor 1-11
- (7) Notices when servicing the tractor after work 1-12
- (8) Notices when handling Diesel Fuel 1-13
- (9) Notices when leaving the tractor 1-14
- (10) Notice relating to Toxic substances 1-14

1-3. Long-term storage

- (1) Preparation for storage 1-15
- (2) Check & Maintenance during storage 1-16
- (3) Preparation for Reuse 1-16

1-4. Notices for “Use & Disposal” related to the environment 1-17

1-5. Symbols 1-18

1-6. Safety Decals

- (1) Handling and Maintenance of Safety Decals 1-19
- (2) Safety Decals and attaching position 1-19



2. Instruction for Safe Operation

(1) The name of each part 2-1

2-1. Boarding and Exiting the tractor

- (1) Boarding the tractor 2-2
- (2) Driver's seat (HST type) 2-3
- (3) Seat adjustment 2-4
- (4) Seat belt 2-4
- (7) Exiting the tractor 2-5

2-2. Safety device

- (1) Hood (Bonnet) 2-6
- (2) Fender 2-6
- (3) PTO Safety cover and protection cap 2-6
- (4) Roll-Over Protective Structure (ROPS) 2-7

CONTENTS



3. Instruments and Controls

3-1. Instrument Panel and Front controls

(1) Instrument panel	3-3
(2) Key switch	3-8
(3) Turn signal light switch	3-8
(4) Light switch	3-8
(5) Horn switch	3-9
(6) Hazard warning light switch	3-9
(7) Grille work light switch	3-9
(8) DPF switch	3-10
(9) PTO switch	3-15
(10) PTO mode switch	3-15
(11) Shuttle lever (Mechanical)	3-16
(12) Throttle lever	3-16
(13) Throttle pedal (Mechanical)	3-16
(14) Clutch pedal (Mechanical)	3-17
(15) Brake pedals	3-17
(16) Cruise control switch (HST type)	3-18
(17) HST forward/reverse pedal (HST type)	3-18
(18) Parking brake lever	3-22

3-2. Left / Right-hand controls

(1) Main gear shift lever (Mechanical)	3-20
(2) Range gear shift lever	3-21
(3) Differential lock pedal	3-22
(4) Work light switch	3-23
(5) Four wheel drive lever (4WD)	3-23

3-3. Hydraulic system

(1) Safety precautions	3-24
(2) Steering system	3-25
(3) Hydraulic lift Control (MHL)	3-26
(4) Remote control levers and Quick couplers (optional)	3-28
(5) Joystick lever (if fitted)	3-29
(6) Hydraulic System Diagram	3-30

CONTENTS



4. Operation and Work

4-1. Engine start and stop

- (1) Engine start 4-1
- (2) Start in cold weather 4-3
- (3) Engine stop 4-4

4-2. How to Drive and Stop

- (1) How to drive 4-5
- (2) Changing speed 4-7
- (3) Emergency Stop 4-8
- (4) Stopping tractor 4-9
- (5) Driving tractor on the road 4-10
- (6) Parking 4-11
- (7) Handling the Turbocharger (if fitted) 4-11

4-3. How to handle new tractor

- (1) Check points 4-12
- (2) Notices in handling new Tractor 4-12

4-4. Attaching Implement

- (1) 3-point linkage 4-13
- (2) Power take-off (PTO) shaft 4-17
- (3) Hitch and Drawbar (optional) 4-19
- (4) 7-Pole connector (optional) 4-20
- (5) Technically maximum permissible mass 4-21
- (6) Tires and Load capacity 4-22
- (7) Adjusting Wheel tracks and tire replacement 4-23
- (8) Using Front-end loader (if fitted) 4-24
- (9) Adjusting Steering angle 4-27
- (10) Recommended maximum specification of implements 4-28

4-5. Driving Speed 4-29

CONTENTS



5. Lubrication and Maintenance

5-1. Access for maintenance	5-1
5-2. Maintenance chart	5-2
5-3. Lubricants and Capacity	5-6
5-4. First 50 hour check	5-7
5-5. When the warning indicator lights	
(1) Drain water from Fuel filter	5-8
5-6. Check before starting (Daily check)	
(1) Engine oil	5-9
(2) Fuel tank	5-10
(3) Instrument panel & Indicators	5-10
(4) Turn signal lights, Lights and Horn	5-11
(5) Engine coolant	5-12
(6) Air cleaner (Dry type)	5-12
(7) Cleaning of Radiator and Radiator screen	5-13
(8) Tire air pressure & damage	5-13
(9) Tightening state of bolts and nuts of each part	5-14
(10) Adjustment of Clutch pedal play (Mechanical type)	5-14
(11) Adjustment of brake pedal play	5-15
(12) Adjusting HST control linkage (HST type)	5-16
5-7. Every 50 hour check	
(1) Lubricating grease nipple	5-17
(2) Cleaning of Radiator and Radiator screen	5-17
(3) Checking Transmission oil	5-18
(4) Checking Front axle oil	5-18
(5) Battery check	5-18
(6) Air cleaner (Dry type)	5-18
(7) Hydraulic hoses and Leakage	5-19
5-8. Every 100 hour check	
(1) Replacing Engine oil and Filter	5-20
5-9. Every 300 hour check	
(1) Replacing Engine oil and Filter	5-21
(2) Replacing Hydraulic oil filter	5-22
(3) Tension adjustment of Engine belt	5-23
(4) Toe-in	5-24
(5) Cleaning fuel tank	5-24

CONTENTS

5-10. Every 500 hour check

- (1) Changing Front axle oil 5-25
- (2) Changing Transmission oil 5-25
- (3) Replacing Fuel filter cartridge 5-26
- (4) Replacing Air cleaner element (Dry type) 5-26

5-11. Every 1000hr or 1-year check

- (1) Adjusting Engine valve clearance 5-27
- (2) Checking Nozzle injection pressure 5-27

5-12. Every 1500hr or 2-year check

- (1) Replacing Engine coolant 5-28
- (2) Cleaning Emission related parts 5-31

5-13. Every 3000hr check

- (1) Cleaning Emission related parts 5-32

5-14. General maintenance (When required)

- (1) Air-bleeding from Fuel system 5-33
- (2) Fuse & Main fuse 5-35
- (3) Battery handling and Notices 5-37

5-15. Troubleshooting 5-41



6. Dimension & Specification 6-1

1. General Notices for Safety

1-1. Before using the tractor



※ **Must read and understand this operator's manual carefully and always refer to information and prescriptions outlined in this manual to prevent all potential health and safety risks.**

◆ General information for intended use

- Your tractor is designed and manufactured to pull, to carry, to supply the power a variety of mounted or towed equipment **for agriculture**. Do not use the product for other purposes than intended by the manufacturer and outlined in this manual. Do not use this tractor for light/heavy forestry applications.
- Do not use the product beyond its **limits of terrain gradient** and stability than outlined in this manual. Using the tractor beyond these limits may cause a overturning accident.
- Do not use the tractor on higher speeds than allowed by the load of the tractor and road condition. Always choose **a suitable driving speed** to maintain the stability of the tractor.
- Do not use the tractor **near or on soft verges** of canals and brooks or banks and verges that are undermined by rodents. The tractor may sink sideways and roll-over.
- Do not use the tractor on brittle bridge heads and poor bridge floors. These constructions may collapse and cause overturning of the tractor. **Always check out the condition and carrying capacity of bridges and ramps** prior to engage.
- **Do not use the tractor without wearing the seat belt and Roll-Over Protective Structure (ROPS)** during operations where roll-over or tip-over hazards exist. The ROPS will only be fully effective when the driver remains attached to his/her seat.
- Do not use equipment mounted on the tractor which is not **correctly matching and firmly fixed**. Such equipment may increase the risk for roll-over and hit the tractor when coming loose.
- Do not use the tractor in combination with equipment arbitrary, without **having consulted the specific operator's manual provided with the equipment**. This manual alone cannot provide you with all the information about safety operation of the combination.
- Do not use the tractor beyond its **limits of dynamic stability**. High speed, abrupt maneuvers, and fast and short cornering will increase the risk of roll-over.
- Do not use the tractor for **overloaded pulling work**, in cases where you don't know if the load will yield, for instance when pulling stumps. The tractor may flip over when the stump is not yielding.
- Be extremely cautious when working with the tractor **on forage silos without lateral concrete walls**. A wide track setting may improve the lateral stability of the tractor.
- Be cautious that the **center of gravity of the tractor may increase** when the front-end loader is loaded or the three-point linkage are raised. In these conditions, the tractor may roll-over earlier than expected.
- **Do not step down from the tractor without shutting down the PTO, shifting the transmission to neutral and applying the parking brake.**
- **Never remove or modify or change** the driver's protection device or safety device arbitrary

- You must take the necessary precautions to always be **aware of the possible presence of bystanders**, certainly when maneuvering in confined areas. Keep people away from the tractor during work. Pay the necessary attention while operating next to public roads or footpaths. Thrown objects can get projected outside the field and hit unprotected people like bikers or pedestrians. Wait until it is clear of bystanders.
- Do not violate the **local traffic rules** related to public roads and highways.
- **Do not allow riders** on the tractor; do not allow people standing on the access way or step to the cab when the tractor is moving. Your view to the left will be obstructed and a rider risks to fall from the tractor during unforeseen or abrupt movements.
- **This tractor has only one operator station** and is a one man operated vehicle. Other people on or around the tractor during normal operation are not allowed.
- Always stay clear from implements operating area and especially **do not stand between tractor and trailed vehicle either three-point linkage when operating lift controls**; ensure no bystanders are near these operating areas.
- This tractor may be equipped with a number of sensors to control safety functions. **Do not attempt to bypass any function** on the tractor. You will be exposed to serious hazards, and moreover, the behavior of the tractor may become unpredictable.
- The manufacturer will not be responsible for the damage or safety problems caused by maintenance or repair with non-genuine parts. It must be requested to **use the genuine parts**.
- When cleaning the tractor by using high pressurized water, **do not inject water directly to the electronic parts, wiring, air intake pipe, hot engine or muffler** inside the bonnet.
- Maintenance and repair of the tractor is performed by **skilled technical experts with the proper tools** authorized by the manufacturer.
- For damage or accidents caused by misuse or operation in violation of these rules, the manufacturer and its distributors **will not have any responsibility and warranty**.
- **Keep this operator's manual** for future reference at hand (on the tractor).

◆ Safety Mark Description

- In the places where the cautions in usage are required, the marks such as **"DANGER"**, **"WARNING"**, **"CAUTION"** are found.
- You should comply with the description marked on the decals attached on the product or the contents marked with safety mark in this Operator's Manual.



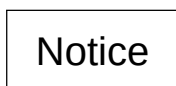
Danger - This indicates a fatal dangerous situation that may cause a serious injury or death if not avoided.



Warning - This indicates a potential dangerous situation that may cause a serious injury or death if not avoided.



Caution - This indicates a potential dangerous situation that may cause a light injury or damage to the properties if not avoided.



Notice - This indicates the instructions for right use for the safety of persons or products.

◆ Product Identification

Your tractor has a exclusive chassis number and engine number marked with product serial number tag to identify the product. (See Fig.1-1)

In case of requesting service or parts from your dealer, dealer will need chassis serial number, engine serial number, TM number and also running hours displayed on the instrument panel. (See Fig. 1-3)

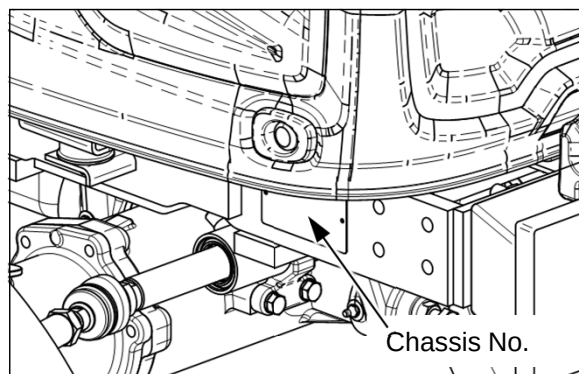


Fig.1-1

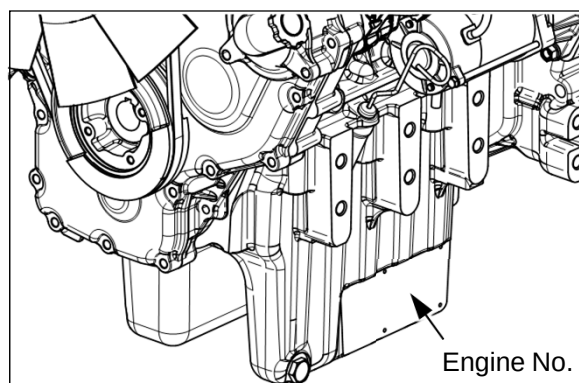


Fig.1-2

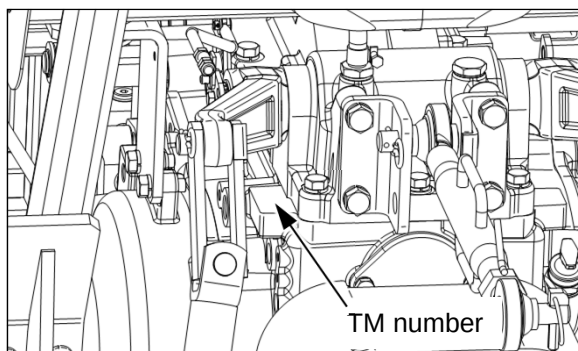


Fig.1-4

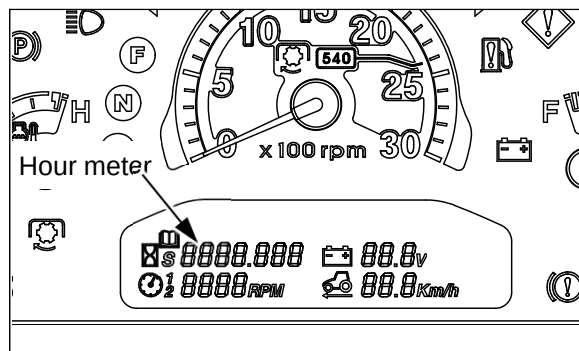
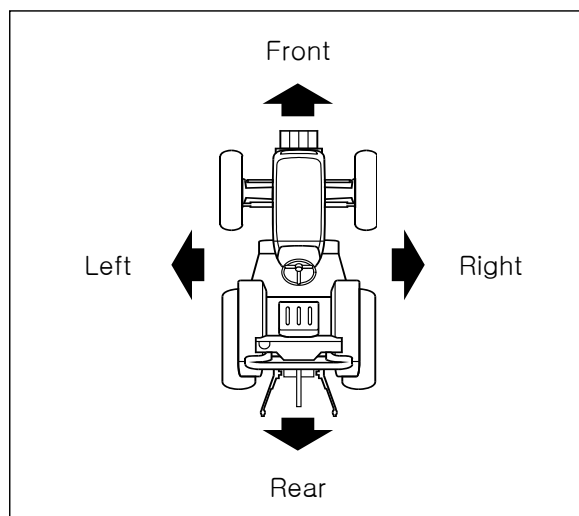


Fig.1-3

◆ Terminology

When reading this Operator's Manual, refer to the right figure for the discrimination of the front/ rear/ left/ right direction.



1-2. Safety Precautions - read this for safety before using.

(1) Notices before using the tractor

- **For Safety operation** : Before using this tractor, read carefully and understand this operator's manual and operator's manual of the mounted or trailed machinery on this tractor, and strictly follow the instructions outlined in the operator's manuals.

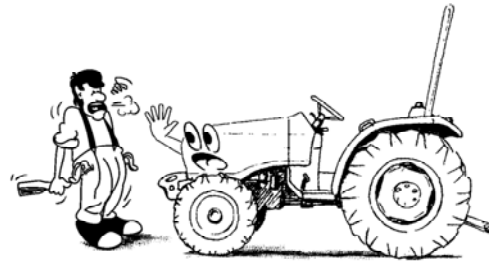


Read Operator's Manual carefully.

Especially, special cares must be taken for using the tractor in the places where the safety signs such as Danger, Warning, Caution etc. are marked. (See page 1-2)

- **Safety Decals** : For right use and personal safety of the operator, the safety decals are attached to the parts related with safety operation. Before using the tractor, comply with the safety instructions. (For further information, refer to the chapter 1-6-(1)(2). "Safety Decals" in this manual.)

- **Operator's condition** : The persons such as patients, drunks, people on drugs, etc. are never allowed to operate this tractor. Only educated operators can use the tractor after learning the usage of controls for moving, stopping, turning and other operating.



- **Suitable Clothes & Protect Entanglement** : When checking or operating the tractor, wear tight fitting clothes and safety equipment instead of loose or long clothes. Also, slippers, high heel shoes are not suitable for operation. Wear the low shoes or work shoes or boots.



► Do not approach the rotating shaft such as PTO shaft or cooling fan, especially, with loose clothing and long clothes. The entanglement in rotating shaft can cause serious injury or death.

► Stop the engine and be sure PTO shaft is stopped before getting near it.

- **Keep Riders off** : Riders on the tractor or implements obstruct the operator's view and can be thrown off the tractor. It can cause a serious injury or death. Riders should not be carried on the tractor at any time.



► Additional seat (where fitted) is used for driver training or instruction. Do not permit anyone to ride on the tractor.

- **Protect Children** : Pay special attention to children (or a child) while using the tractor or during storage.

- Make sure children keep a safe distance from the tractor and all implements before using the tractor. Be alert to the presence of children.
- Do not let children or an untrained person operate the tractor.
- Do not allow children to approach the tractor while the engine is running.
- When parking the tractor, remove the ignition key and lower implements to the ground for children's safety.



Warning

- ▶ As children are very curious, they may do unexpected movements or actions. Special care must be taken when operating tractor or equipment.

- **Periodical Check** : "Lubrication and Maintenance" must be performed periodically. If necessary, do it immediately and if not, it may cause a failure, reduction of product life or physical injury.

** Periodic Lubrication and Maintenance*

Fuel, Oil, Filter, Air cleaner, Battery, Belt, Cable, Grease, Pedals such as clutch and brake pedal, Tire air pressure, Wheel bolts, Toe-in, Electrical wirings, other items related to safety.

- **Genuine Parts** : When replacing parts, you must use "Genuine Parts" of LS tractor. Contact your authorized local dealer. If not, it may cause a failure, reduction of product life or serious injury.

- **Restrict Maintenance** : If repairing or changing some components or settings arbitrary, the performance of the tractor can NOT be guaranteed, and may void the warranty. And also, maintenance of the heavy weighted parts without special tools may cause serious injury. These works have to be treated by well-educated and skilled service experts.
If required to check or repair the tractor due to such a trouble, or having any question about your tractor, contact your authorized local dealer.

** The items that are not allowed to be modified or removed arbitrarily by user are as below :*

- Protection structures such as PTO cover, Guards, Safety frame(Roll-bar), Cab, etc.
- Engine components, Fuel injection control and setting, etc.
- Automatic control equipment, Lamps, Transmission, Hydraulic valve and pressure settings.
- Other parts that detail and where complicated adjustments are needed.

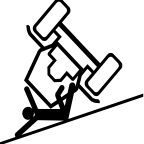
- **Lamps** : Do not modify the lamps or change the bulb capacity arbitrarily.



Warning

- ▶ Modified lamps or change bulb capacity may cause the traffic accident by disturbing approaching driver's views.
- ▶ If the lamp is blown out, replace it immediately with a genuine part. In case of driving at night, it may cause a traffic accident.

- **Protective Structures** : For the operator's safety, various protective structures, i.e. Bonnet (Hood), Fan cover, PTO safety cover, PTO shaft protection cap, Roll-bar or another Roll-over Protective Structure, etc are attached on the tractor. If these structures are modified or removed by user arbitrarily, it may cause serious accident. Such behaviors are prohibited strictly.

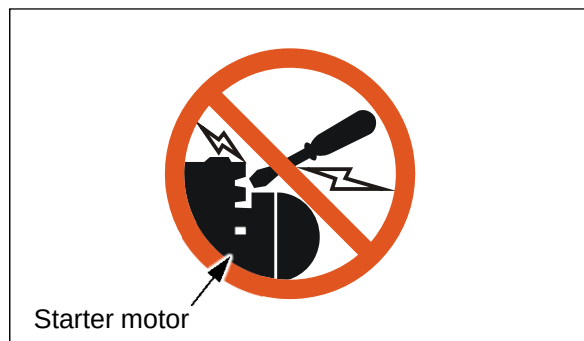
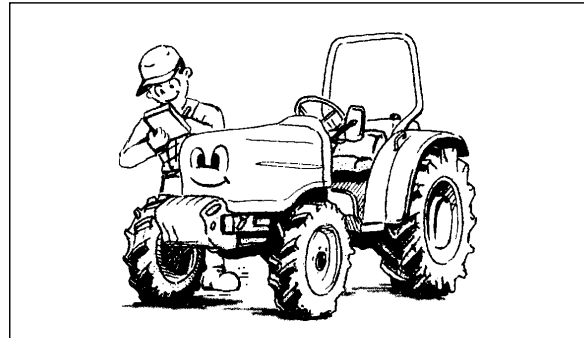
 Warning	► The Protective Structure and interconnecting components are a certified system. Any damage, fire, corrosion or modification will weaken the structure and reduce your protection. If this occurs, the Protective Structure MUST be replaced with a new one. Contact your authorized local dealer for Protective Structure inspection and replacement.
	► In case of an accident, fire, tip or roll-over, the following MUST be performed by a qualified technician before operating the tractor again. - The Protective Structure MUST be replaced. - The mounting or suspension for the Protective Structure , operator seat and suspension, seat belt and mounting components and wiring within the operator's protective system MUST be carefully inspected for damage. - All damaged parts MUST be replaced. ► DO NOT attach any device to the Protective Structure for pulling purposes. ► DO NOT weld, drill holes, attempt to straighten or repair the protective structure. The modification can reduce the structural integrity of the structure which can cause death or serious injury in the event of fire, tip, roll over, collision or accident and void the warranty.

- **Level of protection of the FOPS (Falling Objects Protective Structure)** : This tractor does **NOT** provide protection against falling objects according to OECD code 10 standard. It is recommended to use a certified FOPS structure when working with front-end loaders.
- **Level of protection against hazardous substances** : This tractor does **NOT** provide protection against hazardous substances. Do not use the tractor with crop sprayers in hazardous area.
- **Level of protection of the OPS (Operators Protection Structure)** : This tractor does **NOT** provide protection against
 - low hanging wires and branches in the forest, orchard or construction area, etc.
 - toppling trees, primarily in case a rear-mounted tree grab-crane is mounted at the rear of the tractor.
 - penetrating objects in the operator's enclosure, primarily in case a winch is mounted at the rear of the tractor.
 - potential risks by using any optional equipment that might be available to deal with those hazards.

NEVER enter or operate these hazardous area without certified Operator Protective Structure installed.

(2) Notices when starting Engine

- Check each part with reference of “5. Lubrication and Maintenance” in this manual. If necessary, repair or replace it immediately. **Especially, check if safety protection structures or covers are attached originally and the bolts and nuts are tightened well.**
- Before starting, **check again if there are other workers or children around the tractor and implements and keep a safe distance.**
- Start engine and operate the tractor **after sitting on the driver’s seat** with a correctly fastened seat belt.
- Place the shuttle lever, transmission gear lever in NEUTRAL and especially check if parking brake is applied.
- Lower the implements on the ground.
- Ensure that rear view mirrors and the other mirrors (if fitted) are adjusted correctly, and check the operation of the headlights and other lights.
- For driver’s safety, to prevent an unintentional start, movement and operation, several and various start-safety interlock devices may be equipped on your tractor. And, these installation may need to do correct operation and follow the procedure strictly. Read carefully chapter 4-1, “Engine start and stop” in this manual before trying to start engine.
- Do not short across the starter motor terminals to start engine. It may cause a sudden start and serious injury or death.
- Keep maintenance tools away from engine after check and repair.



► Do not start the engine in a closed area. The poisonous exhaust gas can cause fatal damage to the driver or persons around.

(3) Notices while operating/using the tractor

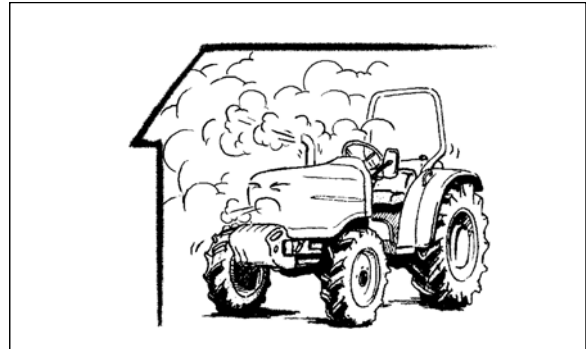
● Ventilation



Warning

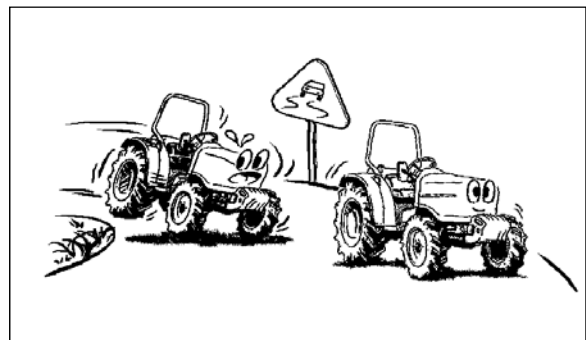
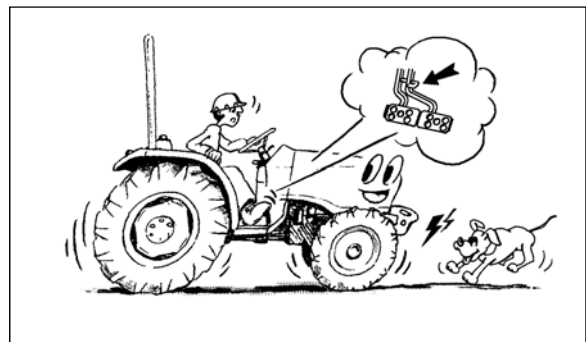


► It is very dangerous to work in a closed area. The poisonous exhaust gas may cause serious damage to the human body. If you should work in this area, make sure to ventilate well and put on the protective mask.

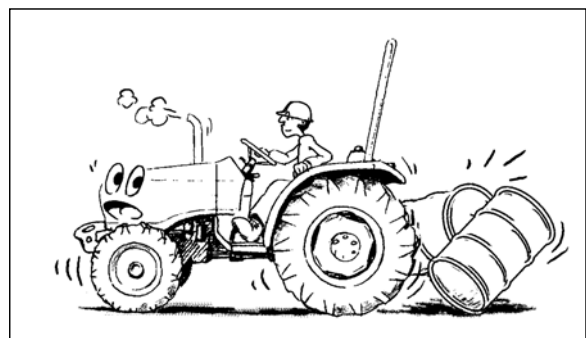


- **Noise and Vibration** : When working between buildings or in confined spaces, the sound pressure level can be increased. Wear suitable ear protectors in high noise level conditions. When working with equipment in the field, vibration intensity from equipment may be increased. To reduce the harm to the body, take a rest periodically.

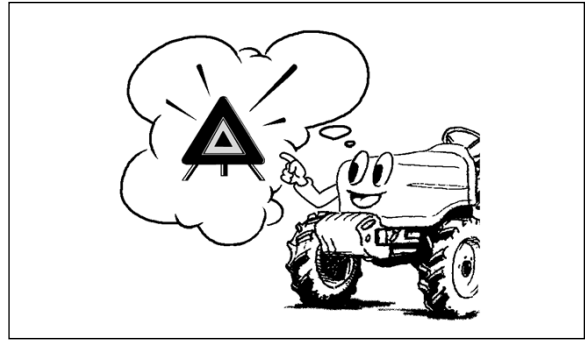
- Connect left and right brake pedal(s) while driving on the road. (if fitted)
- DO NOT use differential lock device while driving on the road or turning in the field.
- DO NOT ride your foot on the brake pedal(s) or clutch pedal.
- Do not jump up/down while tractor is moving. When getting on/off the tractor, use the grab rail and sub step to prevent falls.
- Lower the driving speed enough before turning a sharp curve. Especially, when you drive the tractor with implements, make the turning radius wider.
- DO NOT start or stop the tractor suddenly. Engage the clutch and brake softly. If not, front wheels can be lifted up and it is very dangerous.
- While working, clean regularly mud and debris around the front/rear wheels and axles.



- When driving the tractor in reverse, lower the engine speed. Make sure to check if there is any obstacle or person in the rear.
- DO NOT permit other people and especially children approach within working area while operating tractor and equipment.

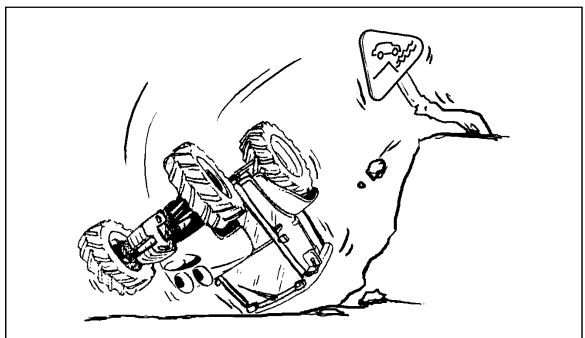
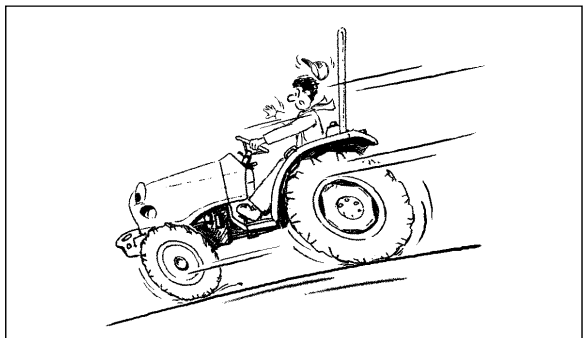
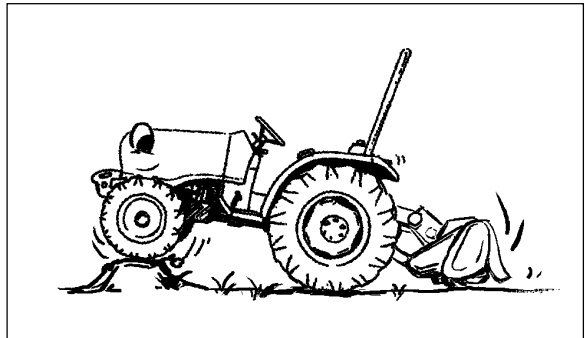


- Obey the traffic rules while driving on public roads. Do not exceed the local legal speed limit. Use a beacon or slow moving vehicle (SMV) to indicate that the vehicle is slow moving.
- If you can not drive the tractor due to a failure, move the tractor to a safe place and install troubled vehicle (safety tripod).
(Day : backward 100m (328 ft)
Night : backward 200m (656 ft))



- Do not overuse the fuel, oil, etc and pay attention not to contact the skin directly. Generally, these materials contain harmful materials to the human body. When you work in a area where hazardous chemicals are sprayed, check the cabin filter (if fitted) and replace the filter with suitable one for the purpose being used. To protect the body completely from these harmful materials, wear a safe protection equipment such as mask, and clean the body after working.

- When crossing a high ridge, let down the implement and go straight across the ridge at low speed.
- When connecting the implements to the front/rear of the tractor, install the proper additional weights in the rear/front of the tractor to keep the balance of the tractor.
- On a downhill, operate the throttle pedal and brake pedal slowly and DO NOT drive while the transmission gear is in NEUTRAL.
- When working with a front/rear implement, be careful not to touch the overhead power lines and lightning strikes.
- To climb a steep slope, drive tractor slowly in reverse up the slope rather than forward. It is much safer.
- When turning tractor on a slope, the tractor can be overturned easily. Pay attention to the steering operation.
- When working at the edge of steep slope, especially, when using heavy attached implements, take special care about a turn-over.
- When working, wear the protection equipment and tighten the seat belt.
- If the authorized passenger seat are not installed, keep riders off.



(4) Notices when connecting Implement

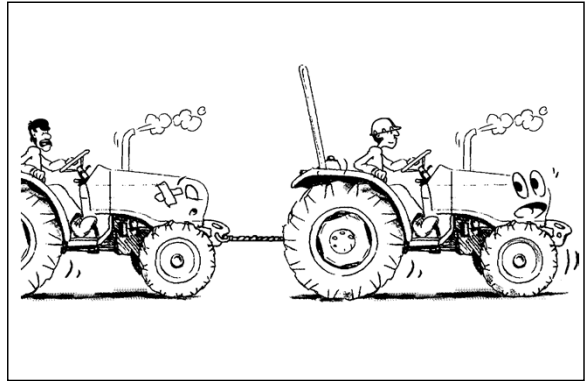
- Attach or detach the implement on wide and level ground.
- Do not use the tractor in combination with equipment arbitrary, without having consulted the specific operator's manual provided with the equipment.
- You have to stay clear from the three-point linkage when controlling it. Do not stay between tractor and implement.
- Do not stay between tractor and trailed vehicle for connecting/disconnecting or checking it. Trailed vehicle may roll down or tractor can move reverse.
- When towing the trailed vehicle, use only hitch or drawbar. Do not tow by connecting with any other structures.
- When connecting heavy implements, apply the parking brake and use the wheel chock.
- Do not attach over-weighted implement.



 Caution	▶ When connecting or disconnecting hydraulic coupler, lower implement on the ground, turn off engine and check if the pressure of hydraulic line is released. ▶ When installing the implement having big hydraulic cylinders or lines, check oil level in tractor transmission housing after installing the implements.
 Warning  	▶ Before connecting or checking the implement, put PTO switch to OFF and place PTO gear lever in NEUTRAL position. ▶ When attaching or detaching the implement, make sure to fix the implement and tighten the three point hitch pins correctly. If not, the serious troubles and injury can occur during the operation. ▶ If heavy loaded trailer is connected to 3-point linkage or any structure, it can cause turnover or failure and serious injury. Make sure to use towing hitch or authorized draw bar.

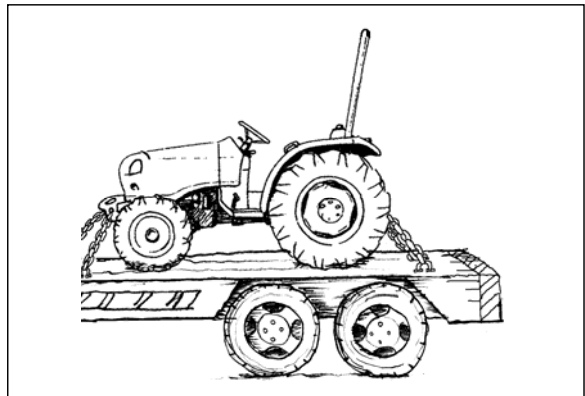
(5) Notices when towing the tractor

- If your tractor needs to be towed for a short distance, use the hitch (or drawbar) or front towing hook. Do not connect to other structures such as rear axle, ROPS, front axle, steering components for towing.
- Tractor can be steered for a short distance without engine running, but it will be hard to turn the steering wheel. If possible, run the engine for steering and lubrication.
- When being towed, disengage the 4WD, differential lock, parking brake and place all gear shift levers in neutral position.
- Check the horizontal and vertical permissible load of the hitch (or drawbar) before towing. The load is different with trailer brake, and stopping distance increases with speed and weight of towed loads and slope. Make sure you consider the total weight of the equipment and its load. (See chapter 4-4-(3), "Hitch and Drawbar" in this manual.)
- Drive slowly when towing extremely heavy loads.
- Do not tow trailers that are not fitted with an independent braking system.



(6) Notices when transporting the tractor

- When transporting the tractor by truck, trailer, etc, use suitable equipment or facilities to load or unload the tractor.
- Fix the tractor tightly to the vehicle with heavy-duty straps or chains.
- When fixing the rear of the tractor, use the hitch or hitch support.
- When fixing the front of the tractor, use the towing hook.
- When driving on public roads, the transporting vehicle must have signs and lights required by local regulation to avoid collision with a vehicle.

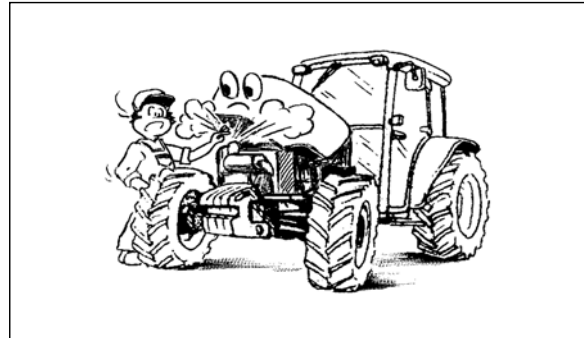


 Caution	▶ When fixing the tractor, do not hook or connect chains to the 4WD shaft, steering cylinder, tie-rod or front axle. These can be damaged by the chain or excessive strain. ▶ In case of turbocharger engine (where fitted), cover the exhaust outlet to protect that the turbocharger does not rotate by air without lubrication.
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(7) Notices when servicing the tractor after work

- Check and maintenance must be performed after **stopping the engine** and **cooling down the engine sufficiently**.
- DO NOT pour water into the radiator or engine when engine is hot. The engine or radiator may crack.

 Warning	► When opening radiator cap, hot cooling water or steam may explode. Remove the cap using a thick rag or glove to prevent serious burns.
	



- Remove all mud and debris from the tractor after working. Especially check the engine area and exhaust system.
- Before checking or repairing hydraulic system and fuel system, make sure the **engine is stopped, and all the transmission gears are in neutral, and lower the implements to the ground**. The leaks of pressurized fluid can cause a fatal physical injury. If injured by leaking fluid, get medical attention immediately.

 Warning	► Before removing hydraulic pipes or hoses and other parts, make sure to check that hydraulic pressure is relieved completely. The leaks of pressurized oil can cause a fatal physical injury. ► Use proper protection equipments, before servicing hydraulic system. ► Before connecting or disconnecting the hydraulic quick coupler, lower the implements to the ground, and check that hydraulic pressure is relieved.
	

- **Keep an approved fire extinguisher and First-aid-kit** on your tractor.
- To prevent fire or explosion, keep flames or sparks away from battery. Do not grind, smoke, or weld near a battery. *For further information, see chapter 5-14-(3), "Battery handling and Notices".*

 Warning	► Always remove grounded (-) battery clamp first and assemble it last. If not, It can cause an explosion by spark. ► The gas generated from the battery is explosive. Keep cigarettes, sparks and flames away from battery. Never check battery charge by placing a metal object across the terminals. ► Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, clothing and can cause blindness if splashed into eyes. Do not touch the battery or liquid by bare hand without gloves or any protection. If electrolyte is splashed into eyes, flush immediately with clean water for at least 20 minutes and get medical attention. ► Do not short circuit the battery posts with metal items. ► Battery post, terminals and related accessories contain lead and lead compounds. MUST WASH YOUR HANDS AFTER HANDLING.
	

- Do not attempt to **remove or unfasten the air conditioning components arbitrary**. There is a possible to be severely frostbitten or injured by escaping refrigerant. Contact your authorized local dealer to work air conditioning systems.
- Before servicing the tractor, attach a “**DO NOT OPERATE**” warning tag to the tractor in an area that will be visible.
- **Keep the area used for servicing the tractor clean and dry**. Wet or oily floors are slippery. It can be dangerous when working with electrical equipment.
- Electric sensors, switches, harness, involving engine control unit(if fitted) is very sensitive and delicate. Strictly **prohibit injecting water, mechanical impulse and any kind of welding on engine**.
- When lifting heavy parts like engine, axle, tire etc., make sure to **check the lifting facilities have enough strength and capacity**.

○ DO NOT OPERATE Reason : _____ Signed by : _____ Tel : _____	○ DO NOT OPERATE See other side
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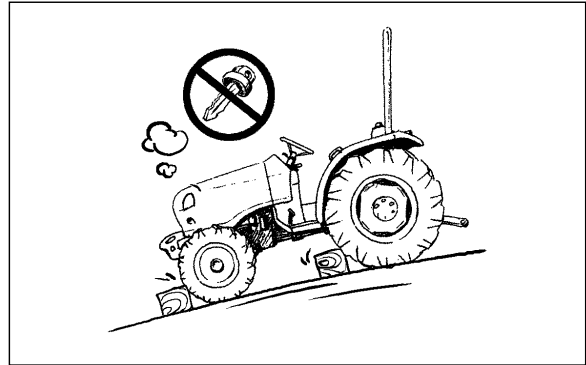
(8) Notices when handling Diesel Fuel

- Do not mix gasoline, alcohol or blended fuels to diesel fuel. These mixtures are explosive in fuel tank.
- Never remove the fuel cap or refuel with the engine running or hot.
- **Do not smoke while refueling the tractor. Keep any type of flame away.**
- Maintain control of the fuel filler nozzle when filling the fuel tank.
- Do not fill the fuel tank to capacity. Fill only to the bottom of the filler neck to allow room for expansion.
- Wipe up spilled fuel immediately and always tighten the fuel tank cap securely.
- If the original fuel tank cap is lost, replace it with an approved one.
- Never use fuel for cleaning purposes.
- Arrange fuel purchases so that summer grade fuels are not held over and used in the winter.
- Before operating with Bio-Diesel, contact your authorized local dealer for information relating to the use and storage of Bio-Diesel.



(9) Notices when leaving the tractor

- Stop the tractor on level ground.
- Place the transmission gear in neutral and put PTO switch to OFF position.
- Lower the mounted implements on the ground.
- Apply the parking brake.
- Stop the engine and remove the ignition key.
- Before you leave the operator's station, wait for engine and all moving parts to stop.
- Have to apply the wheel chock when parking the tractor on a slope unavoidably.



 Caution	► When parking the tractor on a slope unavoidably while attaching the loaded equipment, the tractor may move even if the parking brake is applied. Apply the wheel chock and low speed transmission gear as follow. - . Mechanical : downhill ⇒ Reverse 1gear / uphill ⇒ Forward 1gear - . HST type : Lowest gear
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(10) Notices relating to Toxic substances



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

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.
- Battery post, terminals and related accessories contain lead and lead compounds.
- When handling engine oil, diesel fuel, anti-freeze solution and other chemical substances, wear protective clothes, mask and gloves.
- For more information, go to www.P65warnings.ca.gov/diesel

WASH YOUR HANDS AFTER HANDLING.

1-3. Long-term storage

(1) Preparation for storage

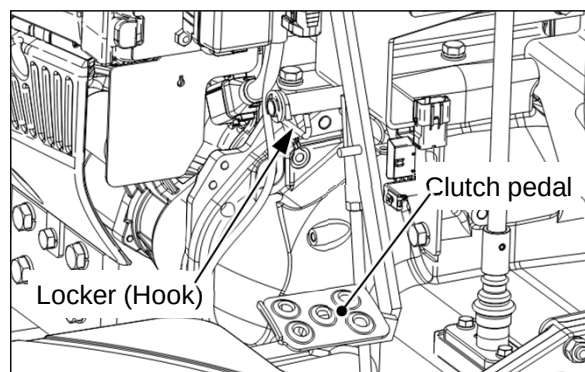
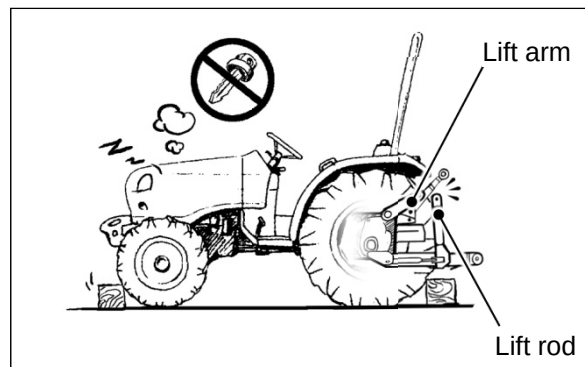
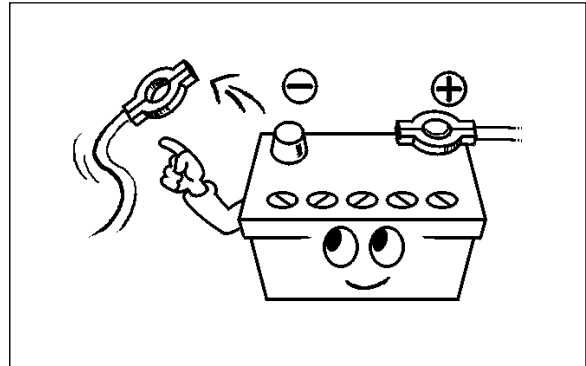
※ Wash the tractor cleanly and follow the procedure as below.

- Apply grease or lubricant oil or spray paint to the non-painted metal to avoid corrosion. Keep the tractor in a covered, dry and well-ventilated place.

Temperature : 10°C ~ 35°C (50°F ~ 95°F)

Humidity : 45% ~ 70%

- Place all controls, including electrical switches, in neutral position and apply the wheel chocks to the tires and disengage the parking brake.
- Check the lubricant level of each parts and if the engine oil has exceeded 100 hours of work, change the oil and run the engine for 5 minutes at idle rpm.
- Drain engine coolant completely. If the engine coolant is anti-freeze solution, it is not necessary to drain but check its density.
- Fill the fuel tank full with fuel.
- Loosen all drive belts and clean the air cleaner.
- Loosen the rubber plug (if fitted) under the clutch chamber to drain water.
- Remove the battery, clean the cover and smear the terminals with grease. Place the battery in a ventilated place not less than 10°C (50°F) and away from direct sunlight.
- Remove the lift-rod and place the lift-arm to the highest position to lubricate the internal cylinder.
- Depress clutch pedal fully and apply the clutch pedal locker. This locker prevent clutch disk from sticking to engine. (Mechanical only)



- If possible, fit stands or other suitable supports under the axles to raise the wheel off the ground. And let the air out of the tires. If not, check the tire pressure from time to time.
- Remove the ignition key.
- Cover the tractor with a non-water-proof cover.
- If the implements are attached, lower the implements on a support off the ground.

 Warning	► When restarting engine at the end of long-term storage, follow the instructions of the “Preparation for Reuse” as below.
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(2) Check & Maintenance during storage

- Apply grease or lubricant oil regularly to the non-painted parts.
- Check the leakage of fuel, oil and coolant. If necessary, repair the damaged part.
- Check if the tire air pressure is normal.
- **Start engine periodically, at least every 6 month** for circulation and lubrication in fuel system.
- The battery should be charged about once a month not to be discharged entirely.

 Caution	► As the electrolyte of battery is sulfuric acid, it emits the explosive and poisonous gas. It is strong enough to burn skin, clothing and can cause blindness if splashed into eyes. - Keep the sparks and flames and cigarettes away from the battery. - When handling the battery, wear safety glasses to protect the eyes. - If the electrolyte contacts the eyes and skin, wash with water immediately and go to see a doctor. ► When removing and storing battery, select dry and cool place out of reach of children.
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(3) Preparation for Reuse

※ When using first after long-term storage, check each part as below.

- Check the damaged part or loosen part.
- Check the leakage of fuel, coolant, engine oil, transmission and front axle oil.
- Check the level and density of the engine coolant.
- Check the level of engine, transmission, rear and front axle oil, and fuel.
(For further information, refer to the chapter 5, “Lubrication and Maintenance” in this manual.)
- Check all drive belts carefully, paying particular attention to the point where the straight run of the belt starts to bend around the pulley. Check the vee groove in the pulley for corrosion.
- Electric system check
 - Is there any open circuit or any other problem in the wiring?
 - Is there any problem of the instruments?
 - Is the charging state of the battery sufficient?
- Start engine, and check the engine oil pressure indicator and battery charging indicator in the instrument panel. These indicators have to be turned off while engine is running.
- Run the engine at a fast idling speed (suggest 1000/1500 rpm) until normal operating temperature is registered, and check the surroundings for oil, fuel and coolant leakage.

1-4. Notices for "Use & Disposal" related to the environment

Soil, air and water are essential elements for human life. To contribute to environment preservation of the Earth, we are trying to minimize the environment pollution necessitated by general business activity such as product design, manufacturing, distribution, etc.

Several substances and products derived from chemical and petrochemical products are major portion of environment pollution and must be disposed of according to environment laws or related regulations, and common sense.

We'd like to notify the following items for "Use & Disposal" related to environment preservation.

1. **Avoid the overload work** after reading the operator's Manual.

Overload work may reduce the life of the product as well as the unburned exhaust gas occurred during overload work becomes the major cause of air pollution.

2. When you replace various oils (engine, transmission, anti-freeze solution) directly, **do not throw the exhausted waste oil to any place.**

This may pollute the soil and water seriously and also is prohibited legally. If violating, you would be responsible for that by civil or criminal case. The waste oil must be disposed according to the environment laws.

3. Use the product according to the operator's Manual and if the life of product ended, do not throw away (or dispose) to any place. The rust water or oil coming from the disposed product may cause the pollution of soil or water. Thus, **the wasted product must be disposed lawfully**, contact your authorized local dealer nearby.

4. Modern lubricants contain additives. **Do not burn the disposed oil or fuel** in conventional heating systems.

5. When you drain or fill the fuel, lubricants oil and coolants, do not left to be absorbed into the ground. They must be collected and disposed in a suitable manner.

6. **Do not adjust the setting of the fuel delivery system.** This will alter the emission of exhaust fumes.

1-5. Symbols

The followings show the symbols and its meaning used for the tractor.

	Refer to operator's Manual.		Gear Neutral		Low speed
	Caution!		Forward/Rearward		High speed
	Battery charging		Forward		Engine speed control (throttle)
	Fuel level		Backward		Engine speed control (throttle)
	Fuel filter		4WD connection		Turn signal light
	Engine coolant temperature		4WD disconnection		Light switch
	Transmission oil pressure		Quick turn (optional)		Side lights
	Engine oil pressure		Cruise drive (optional)		Headlights (downward)
	Diesel engine preheat		Cruise drive release (optional)		Headlights (upward)
	Parking brake		Position control (Up)		Work light
	Emergency lights		Position control (Down)		horn
	Engine start		Draft control (Deep)		Window wiper
	Engine stop		Draft control (Shallow)		Window wiper / Washer (front)
	PTO stop		Cylinder rod (shorten)		Window wiper / Washer (rear)
	PTO in operation		Cylinder rod (extend)		Unlatched brake pedal(optional)
	Differential lock device		Cylinder rod (floating)		Engine warning
	DPF regeneration		DPF temperature		DPF inhibited

1-6. Safety Decals

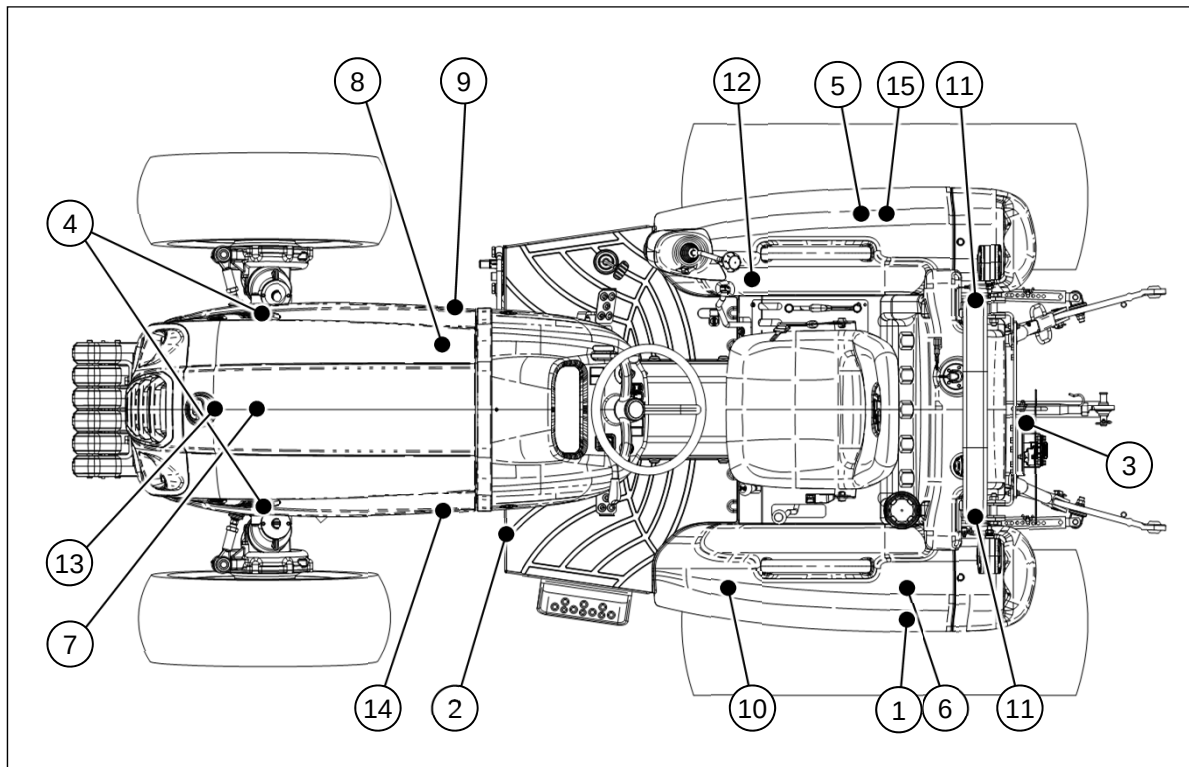
(1) Handling and Maintenance of Safety Decals

- For intended use and personal safety of the operator, the safety decals (labels) are attached to the parts related with safety operation.
- Before operating or maintenance of the tractor, check the position and read the instructions carefully.
- If you find “Read Operator’s Manual” symbol (1) in the decals, refer to the appropriate page of the operator’s manual for further information regarding operation, adjustment and maintenance.



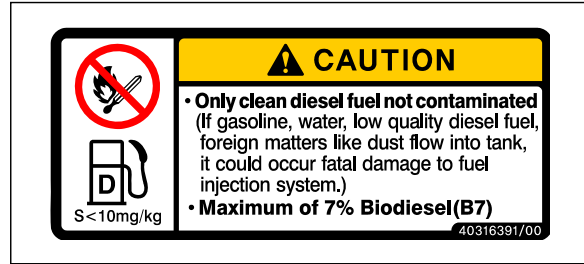
 Caution	▶ The instructions described on the safety decals are very important for the safety of the operator and workers around. If ignored, it may cause the death or serious injury. ▶ If the decals are dirty, wash them with soap water and wipe with soft rags. Do not use the thinner, acetone, or other harsh chemicals as it may erase the instructions. ▶ If the decal is detached or damaged, replace it with a new one on original position. ▶ When cleaning the tractor with pressurized water, the decals can be detached. ▶ If a decal is on a part that is replaced, make sure the decal is attached on the new part.
---	---

(2) Safety Decals and Attaching position



1. Location : On top of the left-hand fender.

- Only clean diesel fuel not contaminated.
- Ultra low sulfur diesel ($S < 10\text{mg/kg}$).
- Do not smoke while refueling and keep any type of flame away.
- Maximum of 7% biodiesel(B7)
- Part No. : 40316391



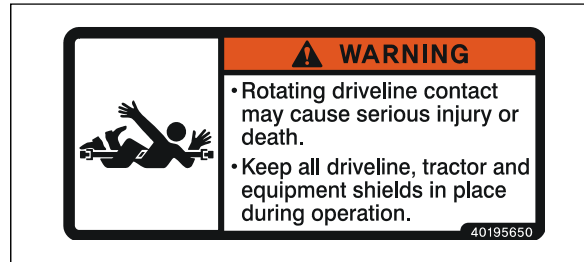
2. Location : On the front side of the left-hand step floor.

- RUN OVER HAZARD
- To prevent serious injury or death;
 - Start only from seat with transmission and PTO in neutral.
 - DO NOT short across starter terminals to start engine.
- Part No. : 40195651



3. Location : On top of rear PTO guard.

- Rotating driveline contact may cause serious injury or death.
- Keep all driveline, tractor and equipment shields in place during operation.
- Part No. : 40195650



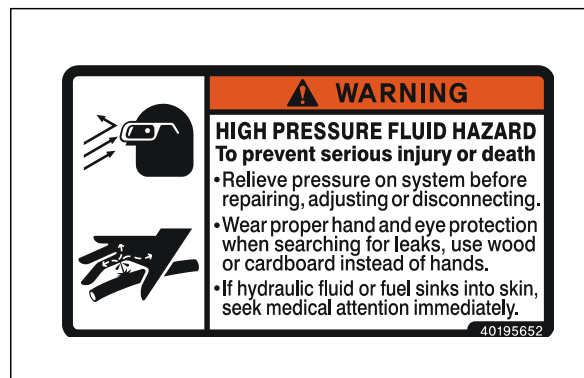
4. Location : On the left/right-hand side of the radiator.

- Keep hands clothing away from the rotating fan and belts.
- Contact with moving parts may cause loss of fingers or a hand.
- Failure to comply could result in death or serious injury.
- Part No. : 40239638



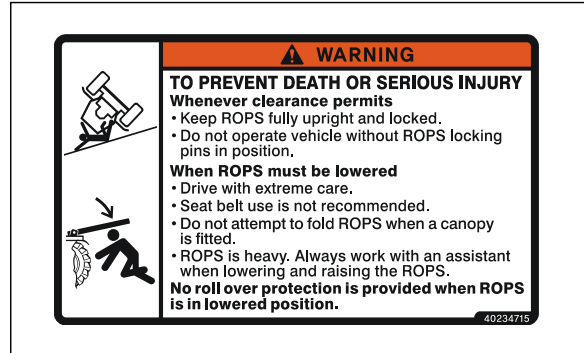
5. Location : On top of the right-hand fender.

- HIGH PRESSURE FLUID HAZARD
- To prevent serious injury or death;
 - Relieve pressure on system before repairing, adjusting or disconnecting.
 - Wear proper hand and eye protection when searching for leaks, use wood or cardboard instead of hands.
 - If hydraulic fluid or fuel sinks into skin, seek medical attention immediately.
- Part No. : 40195652



6. Location : On top of the left-hand fender.

- TO PREVENT DEATH OR SERIOUS INJURY;
- Keep Roll-over Protective Structure fully upright and locked.
- Do not operate vehicle without ROPS locking pins in position.
- When ROPS must be lowered :
 - Drive with extreme care.
 - Seat belt use is not recommended.
 - Do not attempt to fold ROPS when a canopy is fitted.
 - ROPS is heavy. Always work with an assistant when lowering or raising the ROPS.
- No roll-over protection is provided when ROPS is in lowered position.
- Part No. : 40234715



7. Location : On the front side of the radiator baffle.

- TO PREVENT DEATH OR SERIOUS INJURY;
- High pressure steam and hot water. Remove filler cap with extreme care.
- Failure to comply could result in death or serious injury.
- Part No. : 40297729



8. Location : On the right-hand side of the engine DPF support.

- TO PREVENT SERIOUS INJURY OR DEATH;
- Beware hot part. Keep clear of muffler to avoid injury.
- Failure to comply could result in serious injury.
- Part No. : 40239636



9. Location : On the right-hand side of the hood cover.

- TO PREVENT SERIOUS INJURY OR DEATH;
- During the DPF regeneration process, the exhaust stack and surrounding hood area becomes extremely hot.
- Park the tractor away from highly flammable materials and person.
- Failure to comply could result in serious injury.
- Part No. : 40342880



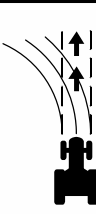
10. Location : On the front side of the left-hand fender.

① CAUTION

- PTO selector & lever must be in "OFF" position to start engine.
- Do not operate on hard surfaces with 4WD engaged.

② WARNING

- TO PREVENT SERIOUS INJURY OR DEATH;
- After first hour of operation and daily thereafter, check front and rear wheel lug nuts and bolts for proper torque.
- PTO - keep hands, feet and clothing away from PTO & other moving parts.
- Disengage PTO and shut off engine before servicing tractor or implements, or attaching / detaching implements.
- Keep all safety shields in place for your protection.
- Pull only from approved drawbar or lower links of 3-point hitch at horizontal position or below.
- Lock tractor brake pedals together for travel on roads or highways.
- Always apply parking brake and shift transmission to neutral before dismounting.
- Always use a seat belt when you operate the tractor.
- Allow no riders on tractor or implements.
- Do not use a seat belt when operating with folding ROPS in lowered position.
- Engine exhaust fumes can cause death or sickness. Always try to work in a ventilated area.
- Disengage the differential lock when turning the tractor. Always disengage the differential lock when driving on roads.
- Depress on or both brake pedals to disengage the differential lock.
- Failure to comply could result in death or serious injury.
- Part No. : 40360330

 CAUTION	
• PTO selector & lever must be in "OFF" position to start engine. • Do not operate on hard surfaces with 4WD engaged.	
 WARNING	
To prevent serious injury or death • After first hour of operation and daily thereafter, check front and rear wheel lug nuts and bolts for proper torque. • PTO-keep hands, feet and clothing away from PTO & other moving parts. • Disengage PTO and shut off engine before servicing tractor or implements or attaching or detaching implements. • Keep all safety shields in place for your protection. • Pull only from approved drawbar or lower links of 3-point hitch at horizontal position or below. • Lock tractor brake pedals together for travel on roads or highways. • Always apply parking brake and shift transmission to neutral before dismounting. • Allow no riders on tractor or implements.	
	To prevent serious injury or death • Always use a seat belt when you operate the tractor. • Do not use a seat belt when operating with folding ROPS in lowered position.
	• Engine exhaust fumes can cause death or sickness. • Always try to work in a well ventilated area.
	• Disengage the differential lock when turning the tractor. • Always disengage the differential lock when driving on roads. • Depress one or both brake pedals to disengage the differential lock.
40360330/00	

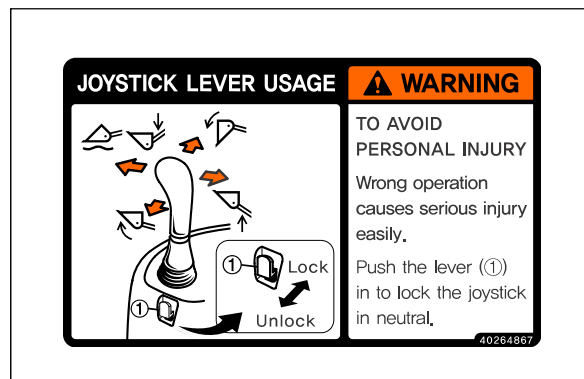
11. Location : On the left/right-hand side of the ROPS frame.

- TO PREVENT SERIOUS INJURY OR DEATH;
- Never operate a tractor without a certified ROPS.
- Always fasten seat belt when operating tractor with ROPS in upright position.
- Do not operate the tractor on steep slopes or drop-off.
- Avoid sharp turns at high speeds.
- Use of ROPS and seat belt reduce the chance of injury or death in roll-over or upset occur.
- Do not attach ropes or chains to ROPS for pulling purpose.
- Failure to comply could result in death or serious injury.
- Part No. : 40234561



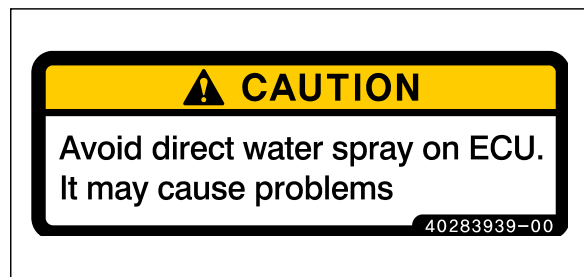
12. Location : On the right-hand fender (optional)

- JOYSTICK LEVER USAGE.
- TO AVOID PERSONAL INJURY;
- Wrong operation causes serious injury easily.
- Push the lever(1) in to lock the joystick in neutral.
- Failure to comply could result in death or serious injury.
- Part number : 40264867



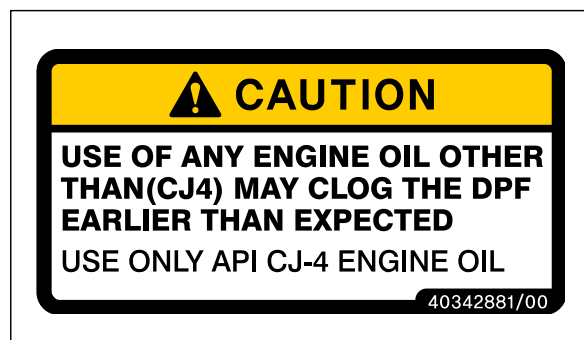
13. Location : On top of ECU cover inside the hood.

- CAUTION;
- Avoid direct water spray on ECU. It may cause problems.
- Failure to comply could result in malfunction of ECU.
- Part No. : 40283939



14. Location : On the left-hand side of the hood cover.

- CAUTION;
- Use of any engine oil other than CJ-4 may clog the DPF earlier than expected.
- Use only API CJ-4 engine oil.
- Failure to comply could result in malfunction of DPF.
- Part No. : 40342881



15. Location : On top of the right-hand fender .

- CAUTION;

Periodically, the DPF will require the regeneration. This is an automatic function unless inhibited by operator.

1) Automatic : The DPF regeneration lamp will illuminate indicating the regeneration is needed. If the operator does not inhibit the regeneration, the DPF temperature will also come on and the engine control unit will automatically begin the regeneration.

NOTE : Under light or no load conditions, increase the engine RPMs above 2,200rpm when possible.

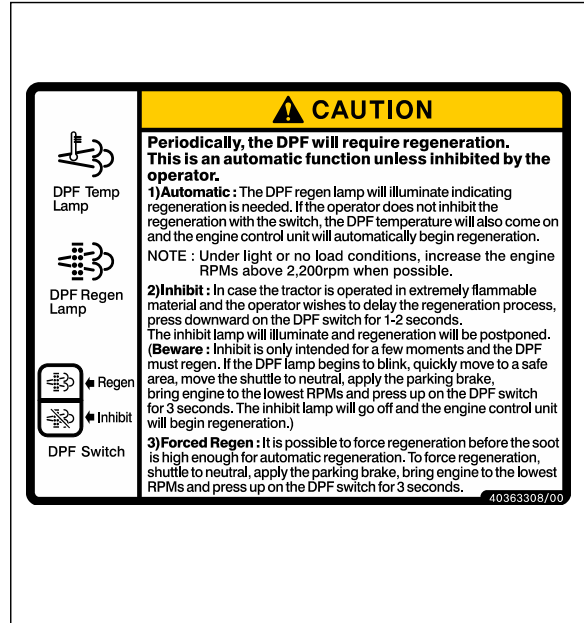
2) Inhibit : In case the tractor is operated in extremely flammable materials, and the operator wishes to delay the regeneration process, press downward on the DPF switch for 1~2 seconds. The inhibit lamp will illuminate and the regeneration will be postponed.

(Beware : Inhibit is only intended for a few moments and the DPF must be regenerated. If the DPF lamp begins to blink, quickly move to a safe area, move the shuttle to neutral, apply the parking brake, bring engine to the lowest RPMs and press up on the DPF switch for 3 seconds. The inhibit lamp will go off and the engine control unit will begin the regeneration.)

3) Forced Regeneration : It is possible to force the regeneration before the shoot is highly enough for automatic regeneration. To force the regeneration, shuttle to neutral, apply the parking brake, bring engine to the lowest RPMs and press up on the DPF switch for 3 seconds.

- Failure to comply could result in malfunction of DPF.

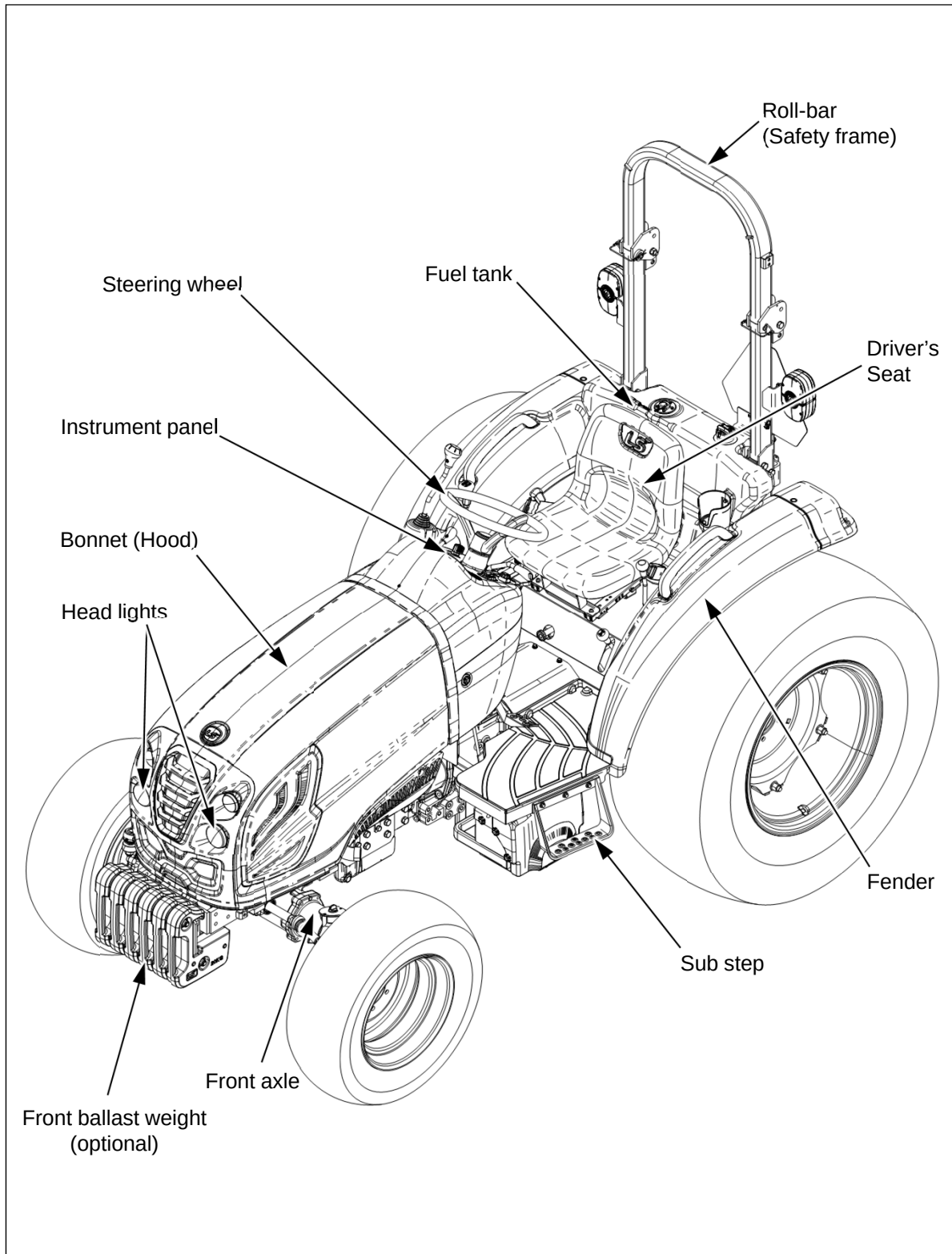
- Part No. : 40363308



2. Instruction for Safe Operation

(1) The name of each part

- Roll-Bar type

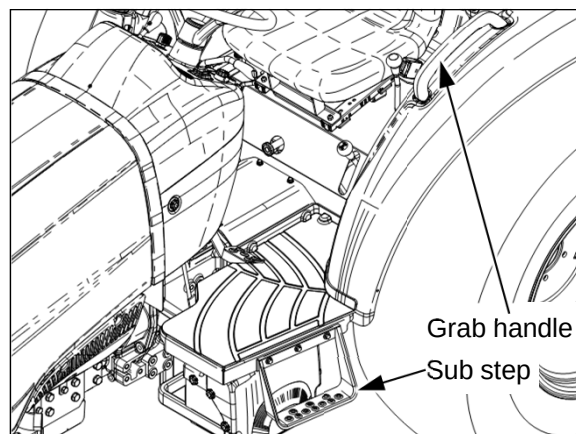


2-1. Boarding and Exiting the tractor

(1) Boarding the tractor

- Roll-Bar type

- Whenever possible, use the left-hand side step for entering.
- When boarding the tractor, use the sub-step, steering wheel and grab handle on the right fender.
- Do not jump up/down for your safety.

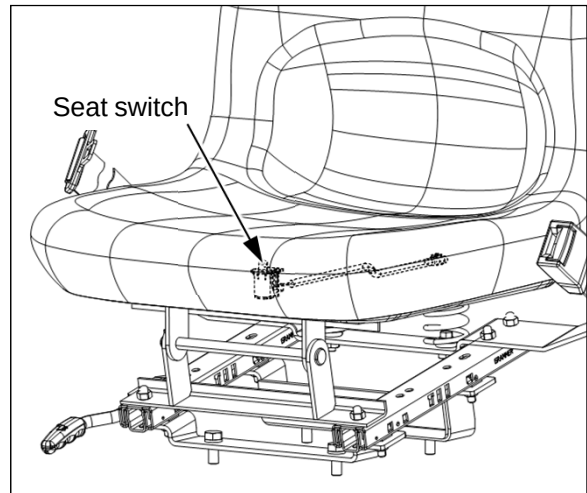


Caution

- ▶ **Operator's condition** : The persons such as patients, drunks, people on drugs, etc. are never allowed to operate this tractor.
Only well educated operators can use the tractor after learning the usage of controls for moving, stopping, turning and other operating.
- ▶ ***Do not grasp the gear levers when entering the driver's station from the right-hand side.***

(2) Driver's seat (HST type)

- At the lower end of the seat, there is a switch to detect that operator is sitting in seat.
- **If the operator gets up from the seat while engine is running**, the engine will stop automatically for safety in case of ;
 - ① getting up from the seat for more than 2 seconds with HST pedal NOT in neutral position.
 - ② the HST pedal is in NEUTRAL and rear PTO is engaged without applying the parking brake.
 - ③ the Middle PTO lever (optional) is engaged.
- Before leaving the driver's seat, turn the PTO switch to "OFF" and place the Middle PTO lever (if fitted) on "OFF" position, and apply the parking brake.

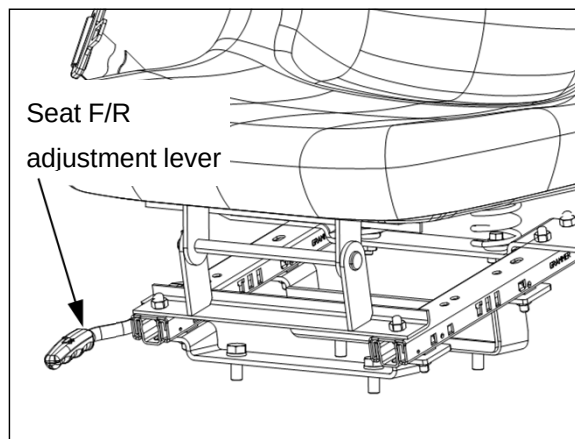


warning

- Do not arbitrarily remove the seat switch. When replacing the seat, make sure to check if the seat switch is correctly in place. If not, the engine can not be started.

(3) Seat adjustment

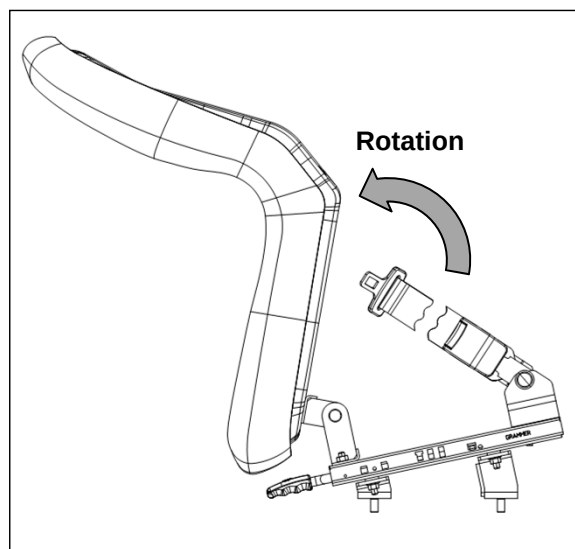
- Before operating the tractor, adjust the position of driver's seat according to body size and length.
- Seat F/R adjustment lever
- 1) After sitting on driver's seat, move the seat F/R adjustment lever outside to release the lock.
- 2) Move the driver's seat forward or backward depending on driver's body length.
- 3) Release the seat F/R adjustment lever and check the seat is locked.



! warning

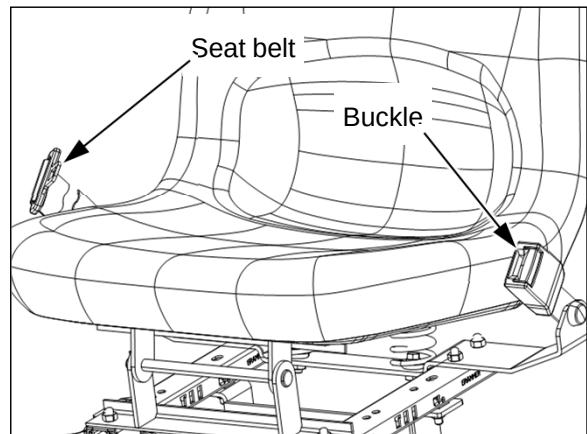
- ▶ DO NOT put your hand under the seat while sitting. It may cause a injury by seat suspension.
- ▶ DO NOT adjust the seat position while driving.

- When storing the vehicle outdoors, turn over the driver's seat forward for weathering protection.



(4) Seat belt

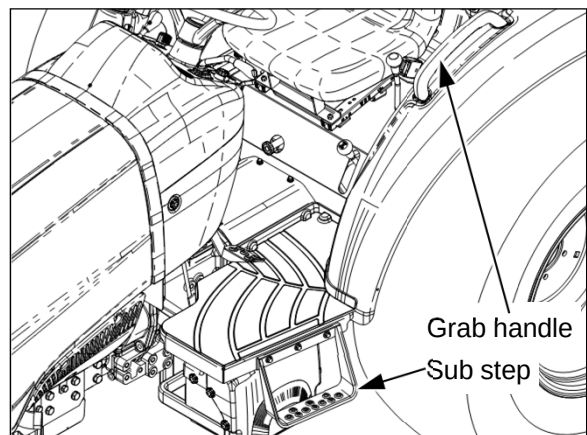
- Always wear the seat belt before operating the tractor and adjust the belt to fit the operator.
 1. Insert the seat belt end into the buckle until a “click” indicates it is properly engaged.
 2. To remove the seat belt from the buckle, press the red release button on the buckle.
- Check the seat belt regularly. If damaged or frayed, replace it with a new one.



 Warning	▶ If not wearing the seat belt, it may cause serious injury in case of accident. - During operation, it must be required to wear seat belt with safety frame installed. - After wearing the seat belt, adjust the belt to fit the operator. ▶ If safety frame is folded down for roll-bar models, do not wear the seat belt.
	

(5) Exiting the tractor

- Whenever possible, use the left-hand side step for exiting.
- When exiting the tractor, use the sub-step, steering wheel and grab handle on the right fender.
- Do not jump up/down for your safety.
- Remove the starter key before leaving the tractor.

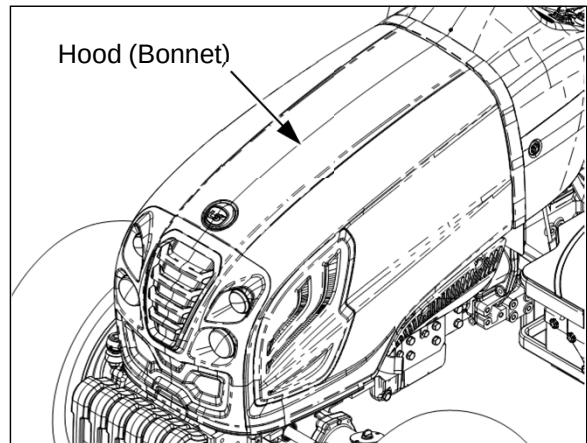


 Caution	▶ Do not grasp the transmission gear levers when entering/exiting the driver's station.
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2-2. Safety device

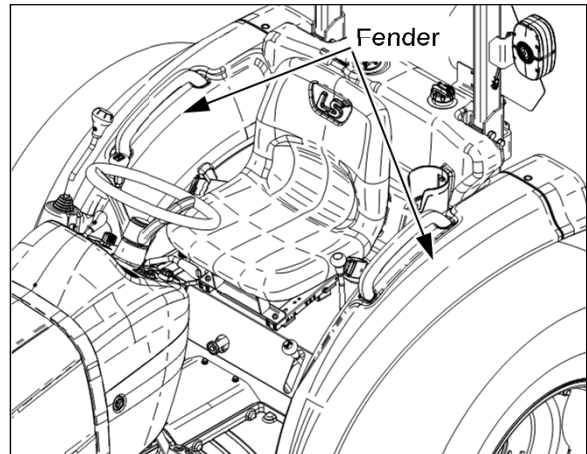
(1) Hood (Bonnet)

- Hood is a protection device to prevent an unintended access to the rotating parts around engine; cooling fan, fan belt and rotating shaft and pulley.
- Do not remove and modify the hood.



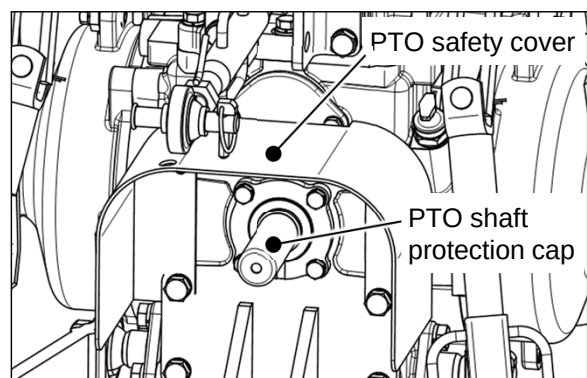
(2) Fender

- Fender is a protection device to prevent an unintended access to the rear tires and to prevent mud from irrupting to the driver.
- Do not remove and modify the fender.



(3) PTO safety cover and protection cap

- PTO safety cover is a protection device to prevent an unintended access to the PTO shaft and to prevent an accident causing by the rotating drive shaft.
- Do not remove the PTO safety cover. If the PTO safety cover or protection cap is damaged or removed, replace it with a genuine part.
- Do not step on the PTO safety cover.
- After using the PTO shaft, apply grease and insert the PTO shaft protection cap.



Warning

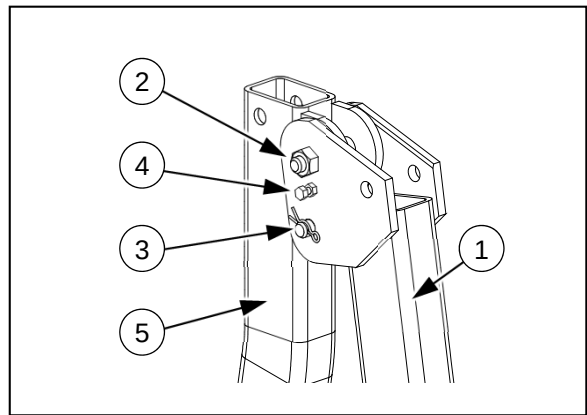
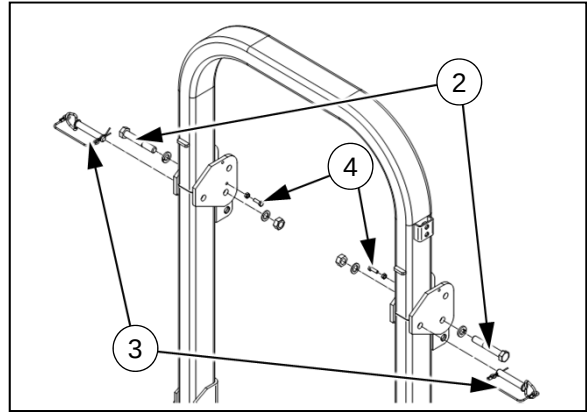


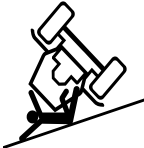
- If you contact the rotating shaft, it may cause a severe injury.
- DO NOT try to touch the rotating shafts.
 - DO NOT remove the protection covers.
 - Avoid loose clothes that can easily be rolled up in the rotating shaft.

(4) Roll-Over Protective Structure (ROPS) (optional)

– Foldable roll-bar type

- The Roll-Over Protective Structure (ROPS) is integrated and certified structure for driver's safety. This structure will reduce the risk of serious injury or death when being over-turned.
- DO NOT remove, modify or repair the roll-bar arbitrary. The welding, bending, drilling, grinding, or cutting of any part of the roll-bar, it can weaken the protective structure.
- If the roll-bar is loosened or removed for any reason, make sure that all parts reinstalled correctly before operating the tractor.
- How to fold the upper frame of the roll-bar.
 1. Loosen the bolts②, ④ and nuts on both sides. It is not necessary to remove them completely.
 2. Remove the pins③ on both sides and fold the upper frame backward. Be careful of the possibility that your body might be hurt by sudden folding due to its own weight.
 3. Set the holes of the frame ① and ⑤ in line, and insert the pins③ into the hole and apply the snap pins.
 4. Fasten the bolts② ④ and nuts on both sides tightly.
- When standing up the upper frame, follow the same procedure reversely.



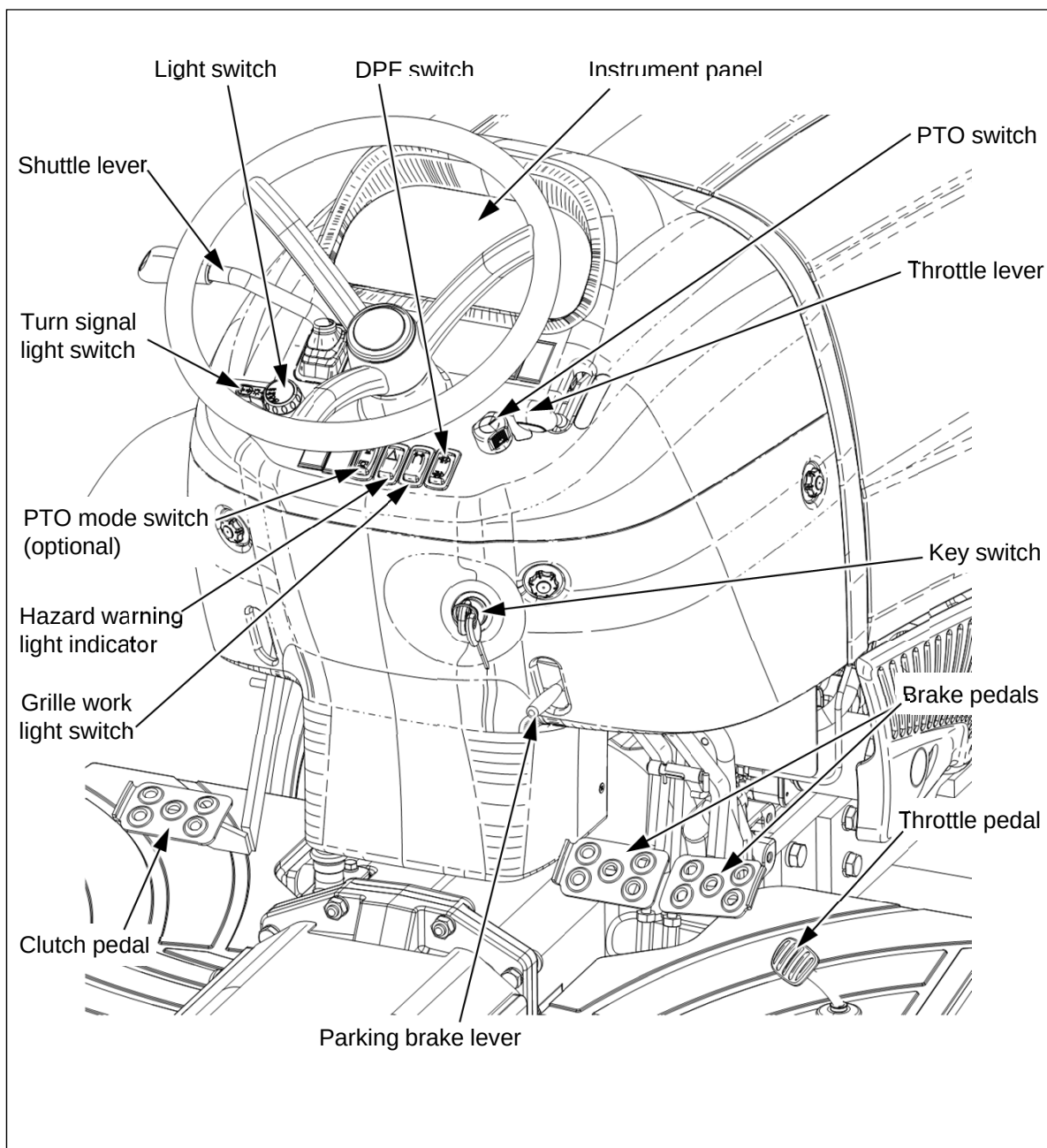
 Warning	► For driver's safety, do not change, modify or disassemble the roll-bar (ROPS) arbitrarily. If the roll-bar is damaged or deformed, contact your authorized local dealer to replace it with a new one.
	► Unless the roll-bar is installed correctly, it may cause serious injury or death when being overturned. Be sure to stand up the roll-bar and assemble the pins, bolts and nuts correctly. ► In case of folding/standing up the upper frame of the roll-bar for any reason; - Do cooperate with other people. Be careful of the possibility that your body might be hurt by the heavy weight of the roll-bar. - Do not wear seatbelt when the roll-bar is folded down. - Do stand up the roll-bar again as soon as the work is finished.

3. Instruments and Controls

3-1. Instrument panel and Front controls

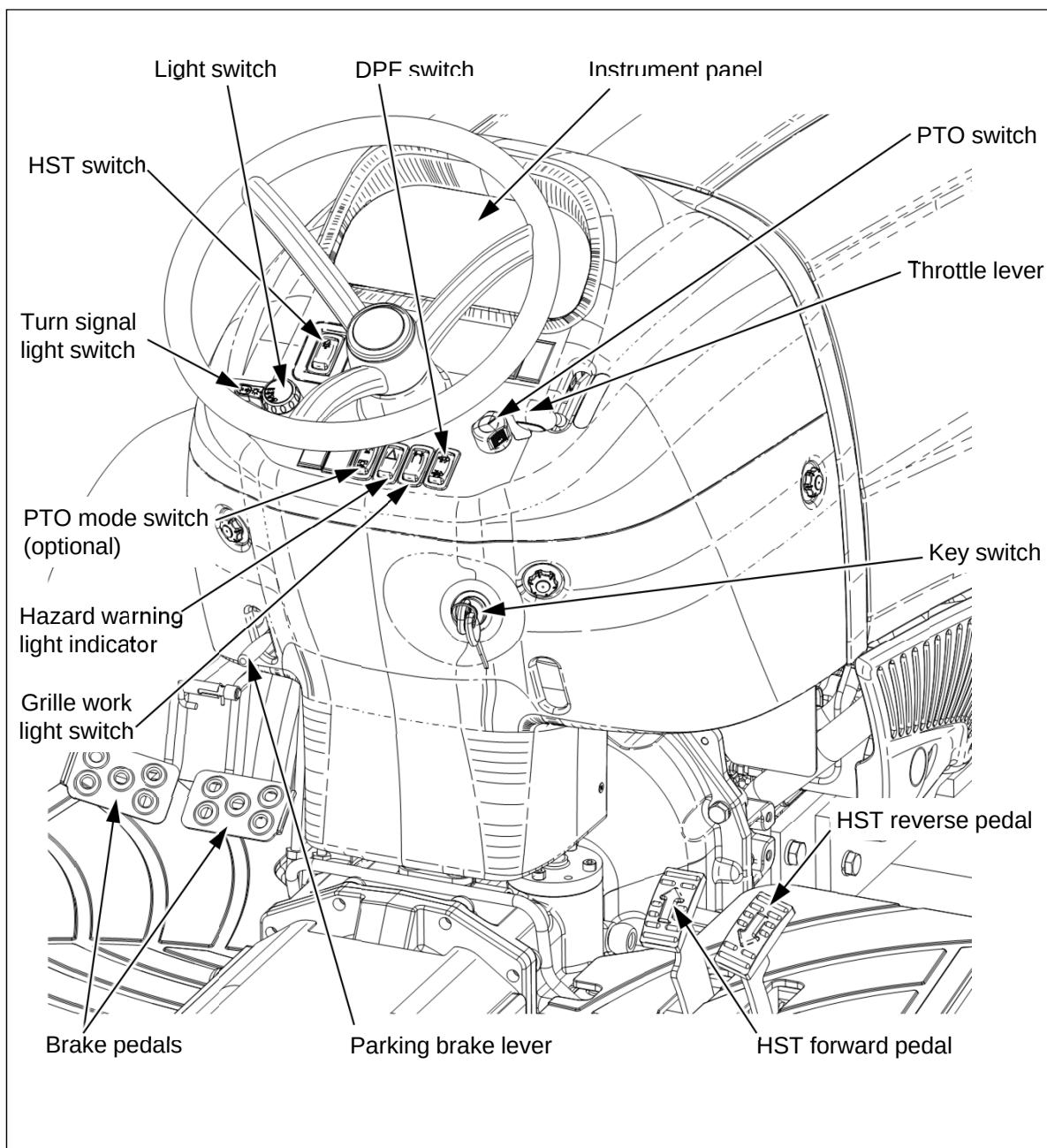
Important to owner, read carefully

Mechanical type

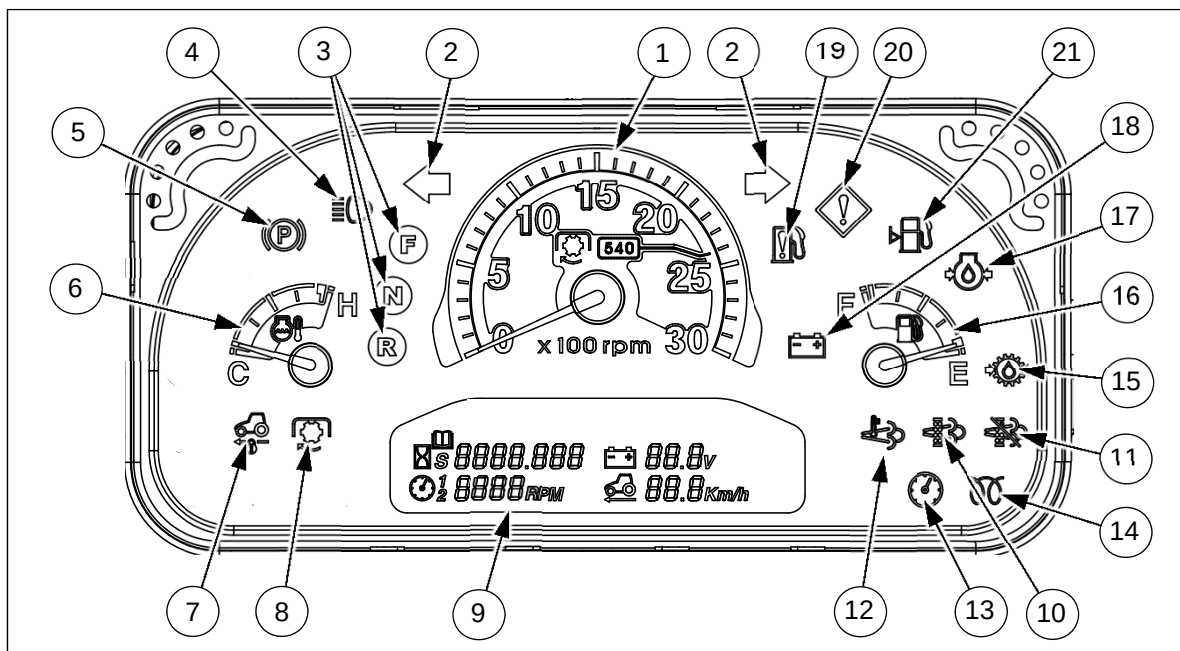


Important to owner, read carefully

HST type



(1) Instrument panel



- | | |
|--|--|
| ① Tachometer | ⑪ DPF inhibited regeneration indicator |
| ② Turn signal indicators(Left/Right) | ⑫ DPF temperature indicator |
| ③ Forward-reverse indicator(Not used) | ⑬ ESC mode indicator(Not used) |
| ④ High beam indicator | ⑭ Cold start aid indicator |
| ⑤ Parking brake indicator | ⑮ Hydraulic oil pressure indicator(Not used) |
| ⑥ Engine coolant temperature gauge | ⑯ Fuel level gauge |
| ⑦ Cruise control drive indicator(HST type) | ⑰ Engine oil pressure indicator |
| ⑧ PTO operation indicator | ⑱ Battery charging warning indicator |
| ⑨ LCD display | ⑲ Fuel filter warning indicator |
| ⑩ DPF Regeneration indicator | ⑳ Vehicle control error warning indicator |
| | ㉑ Low fuel level warning indicator |

1 Tachometer

- The tachometer shows the engine revolutions per minute ("30" means 3000rpm).

2 Turn signal indicators (Left/Right)

- When turning the turn signal light switch to the left/right direction, the front and rear turn signal lights shall blink. At this time, this indicator shall blink simultaneously.

3 Forward-reverse indicator (Not used)

4 High beam indicator

- When turning on the high beam of the headlamp, this indicator shall be turned on.

5 Parking brake indicator

- This indicator shall be ON when applying the parking brake.

6 Engine coolant temperature gauge

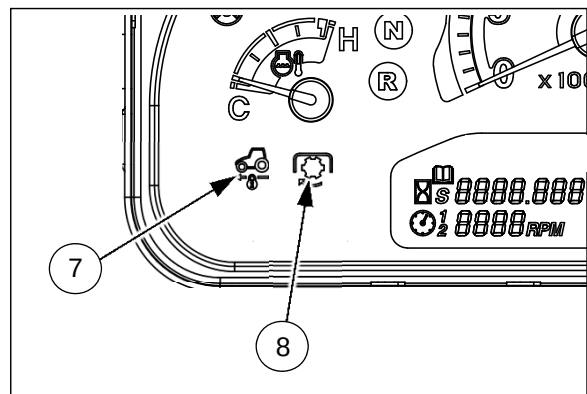
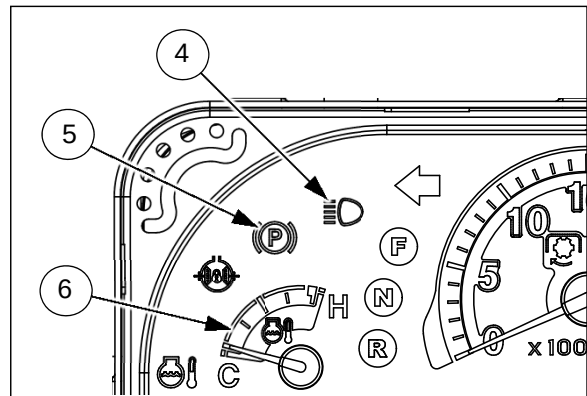
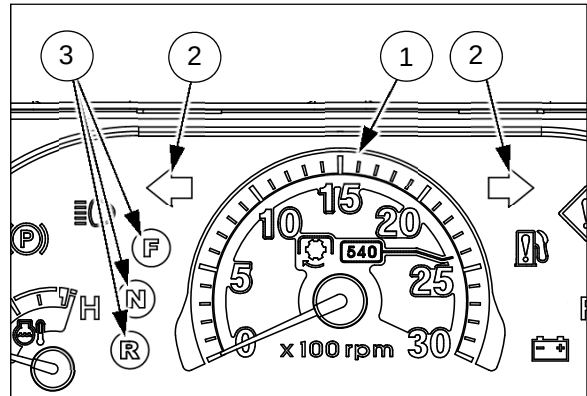
- This gauge indicates the engine coolant temperature during the operation.
- The closer the needle approaches "H" mark, the higher the engine coolant temperature is.
- The coolant is very hot. When checking the coolant, comply with the instructions of the chapter 5-12- (1). "Replacing Engine coolant" in this manual.

7 Cruise control drive indicator (HST only)

- When operating cruise control switch on the front console, this indicator shall be ON.

8 PTO operation indicator

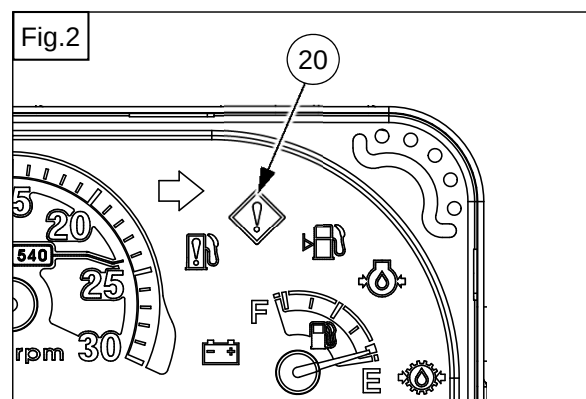
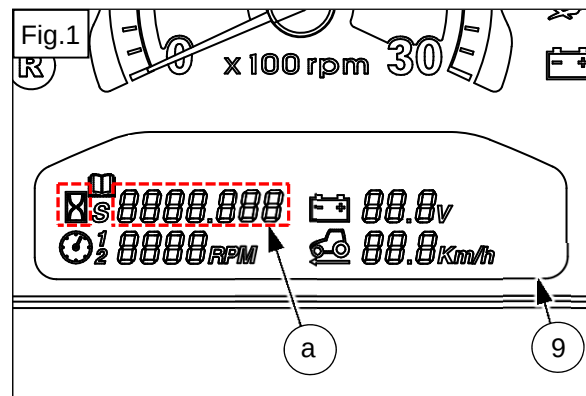
- This indicator shall be ON when the PTO switch is placed on "ON" position, and the rear PTO is working.



9 LCD display

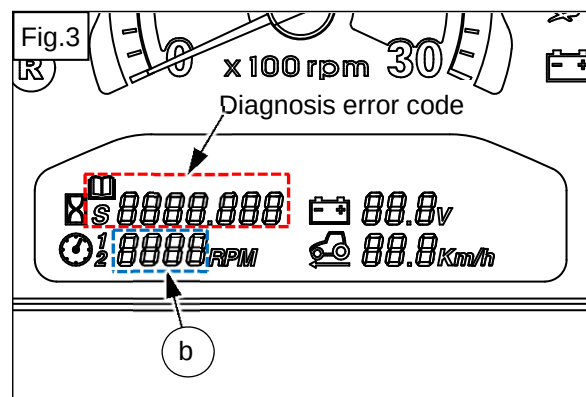
a. Hour meter & Engine diagnosis error code

- If any of errors does not exist on tier-4 engine control, in normal operation condition, accumulated operation hours shall be displayed
- If the display shows "0019.1", it means the tractor has been operated for 19.1hours so far (19 hours and 6 minutes).
- If any of errors related to the engine control occurs, Engine diagnosis error codes and hour meter shall be displayed by turns with the vehicle control error warning light (20) as shown [Fig2].
- At this time, after escaping from the emergency area, contact your authorized local dealer for check.



b. FMI code

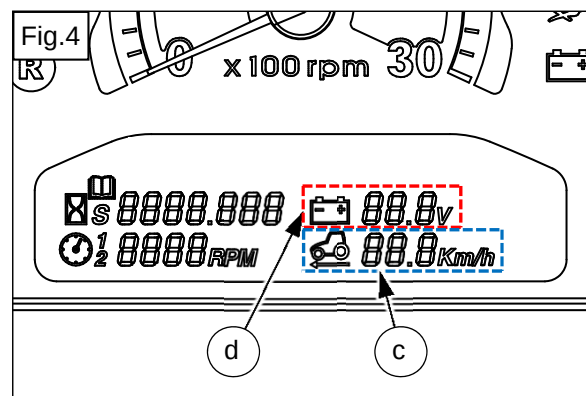
- If any of errors related to the engine control occurs, FMI code to be able to know the error type or pattern shall be displayed by turns additionally with the engine diagnosis error codes as shown [Fig.3].



c. Speedometer (Not used)

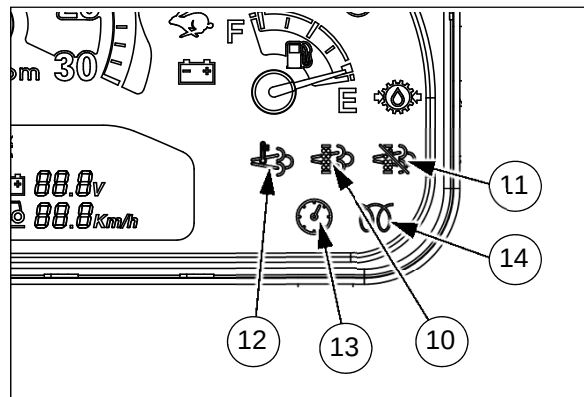
d. Battery voltage

- Available current battery voltage is displayed.



10 DPF Regeneration indicator

- When the regeneration process in the DPF is working, this indicator shall be turned on with continuous light. It is not a failure but normal operation.
- **If this indicator is blinking, it means that the soot is over accumulated in the DPF. Comply with the instructions of the chapter 3-1-(8), “DPF switch” in this manual.**
- For further information about this indicator, See page 3-12.



11 DPF inhibited regeneration indicator

- When the DPF switch is pressed to **Inhibited regeneration mode**, this indicator shall be ON and the regeneration of the DPF shall be halted.

12 DPF temperature indicator

- When the regeneration process in the DPF is working and the DPF temperature is over the designated temperature, this indicator shall be turned on with continuous light.

13 ESC mode indicator (Not used)

14 Cold start aid indicator

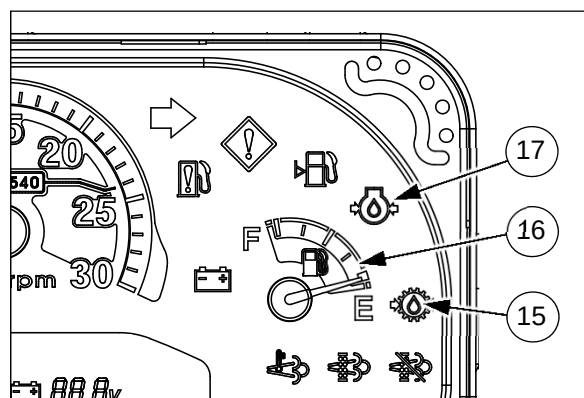
- When the cold start aid device is working, this indicator shall be turned on. After the indicator is turned off, start the engine.

15 Hydraulic oil pressure indicator (Not used)

16 Fuel level gauge

- This gauge indicates the remaining amount of fuel. If the needle indicates “E”, fill the fuel tank immediately.

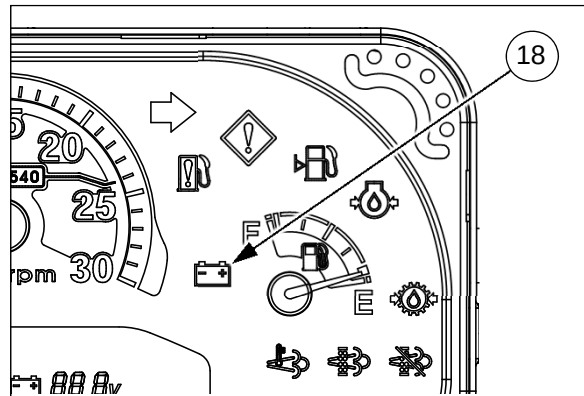
17 Engine oil pressure indicator



- This indicator shall be turned on when turning the key switch to “ON” position, and it shall be turned off after the engine starts. If not, stop the engine immediately, and check the engine lubrication system, engine oil level, engine oil pressure and so on.
- If it's not cleared, contact your authorized dealer to check the problem.

18 Battery charging warning indicator

- This indicator shall be turned on when turning the key switch to "ON" position, and it shall be turned off after the engine starts.
- If not, contact your authorized local dealer for checking the electrical charging system.



19 Fuel filter warning indicator

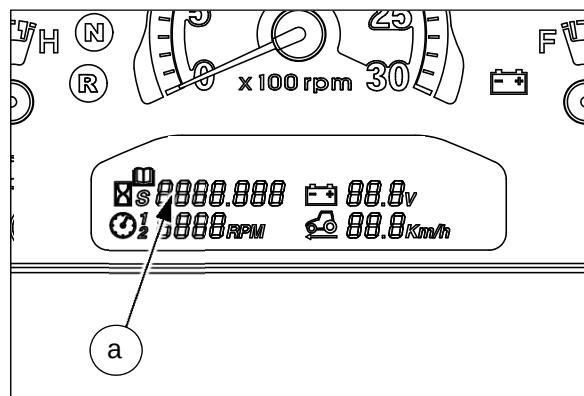
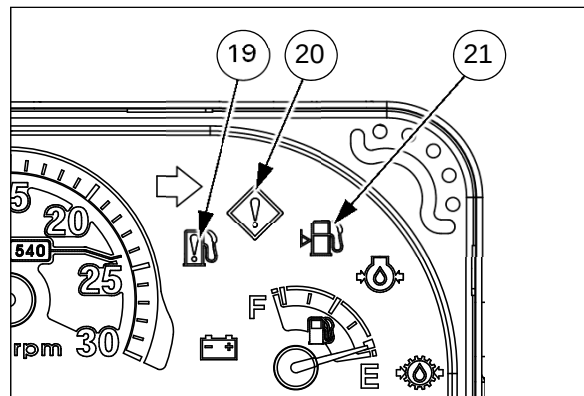
- When there is excess water in the fuel filter, this indicator shall be ON.
- Remove the water in the fuel filter.
(See chapter 5-5 in this manual.)

20 Vehicle control error warning indicator

- If there is any of significant errors on the engine and vehicle control, this indicator shall be turned on and blinking with engine error diagnosis codes(a).
- At this time, after escaping from emergency area, contact your authorized local dealer for check.

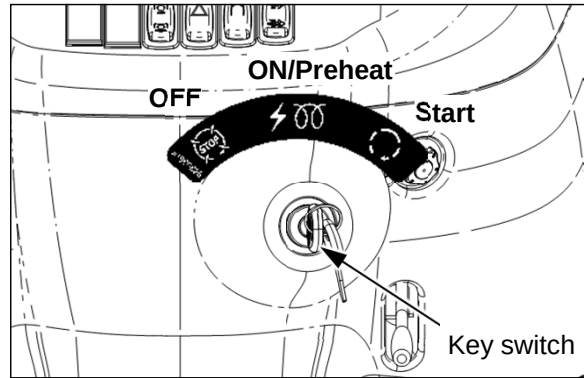
21 Low fuel level warning indicator

- When the fuel level in the fuel tank is below the minimum level, this indicator shall be turned on.
- If this indicator turns on, fill the fuel tank immediately with fuel.



(2) Key switch

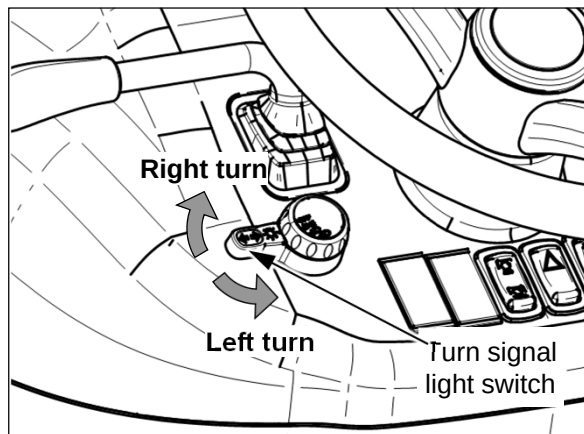
- **OFF** - power off (engine stop)
- **ON/Preheat** - power on & automatic glow
- **Start** - engine start
- As soon as the engine starts, turn the ignition key to "ON" position immediately. If not, it may cause damage to the starter motor.



	► Because a safety switch for start-up has to be engaged, turn the key switch after depressing clutch pedal fully. ► If the tractor is not in use, the ignition key should be removed.
--	--

(3) Turn signal light switch

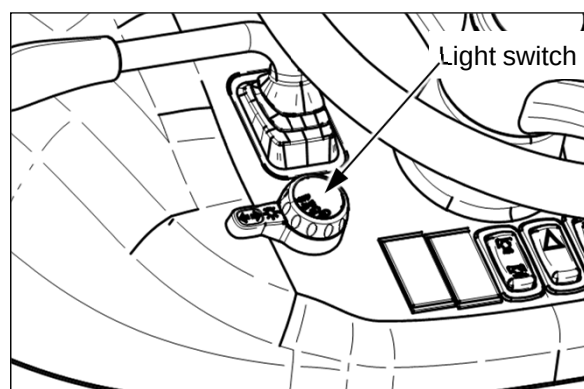
- This switch is used to give information to other vehicles when turning to the left or right.
- If turning the switch to clockwise, the right turn signal lights are blinking.
-If turning the switch to counter-clockwise, the left turn signal lights are blinking.



	► When driving on the road, operate the turn signal lights to inform other vehicles before changing your direction.
--	--

(4) Light switch

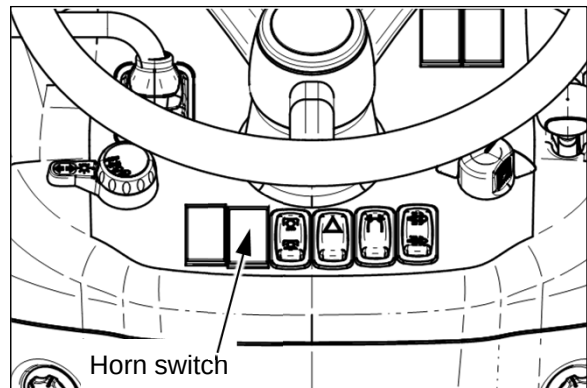
- **OFF** - Instrument panel and lights are OFF.
- ☰☐☑ - Instrument light and side lights are ON.
- ☰☐D - Instrument light, side lights and head lights(low beam) are ON.
- ☰☐D - Instrument light, side lights and head lights(high beam) are ON.



	► When passing with other vehicles in the opposite lane at night, turn the headlights to low beam not to disturb oncoming cars.
--	--

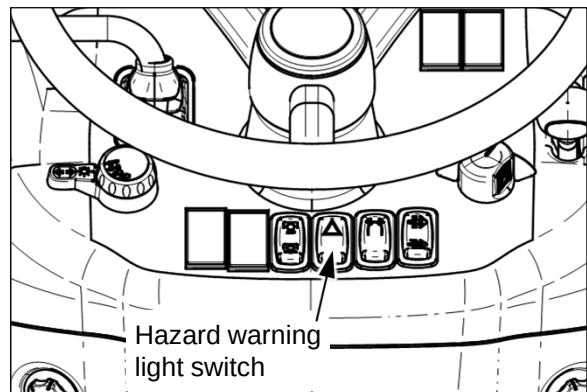
(5) Horn switch (if fitted)

- Press the upper side (symbol part) of the switch (if fitted) for sounding off the horn.
- It is not applicable in this model.



(6) Hazard warning light switch

- This is used to warn other vehicles in case of emergency status.
- If pressing the upper side (symbol part) of the triangle switch, all turn signal lights (front/rear, left/right) shall blink.

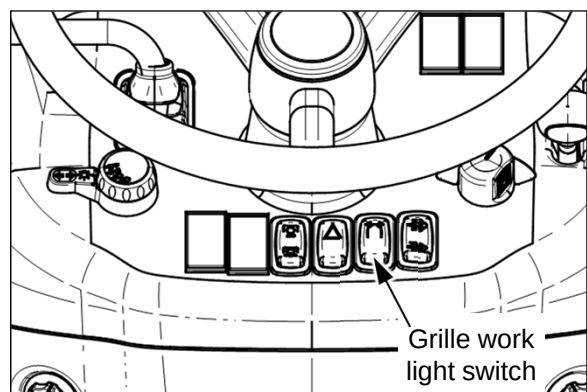


Notice	► If using the hazard warning lights for a long time while the engine is stopped, the battery can be discharged due to high electrical power consumption.
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(7) Grille work light switch

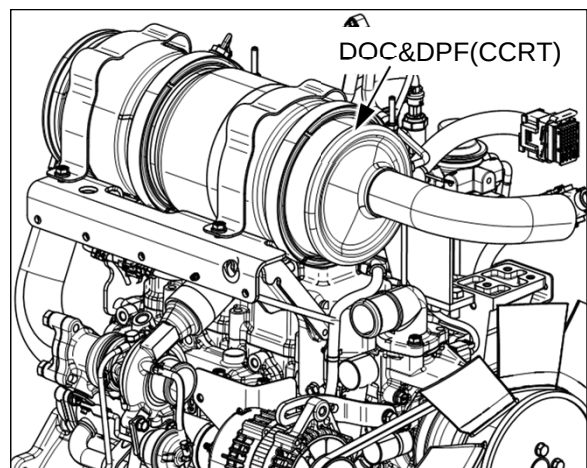
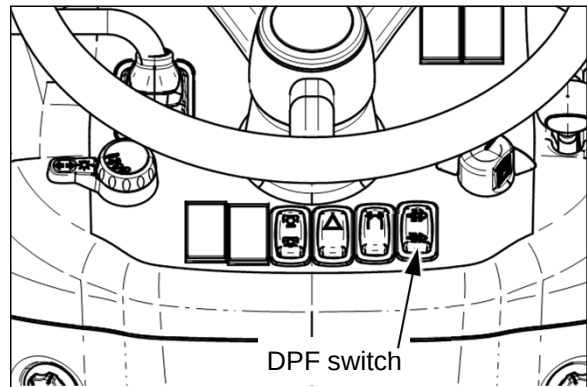
- This is used to turn on/off the work lights of the front grille.
- **ON** - Press the upper side of the switch.
- **OFF** - Press the lower side of the switch.

 Caution	► When driving on the road at night, do not let the work lights stay ON. It may cause a disturbance to the driver of the oncoming car.
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(8) DPF switch

- This switch is used to select the Regeneration mode or the Inhibited regeneration mode.
 - **Regeneration mode** : If the soot is loaded over the designated level and the engine is warmed up enough, the DPF regeneration shall be processed automatically by ECU.
 - **Inhibited regeneration mode** : The regeneration mode is disabled manually until operator inputs the signal for exiting this mode.



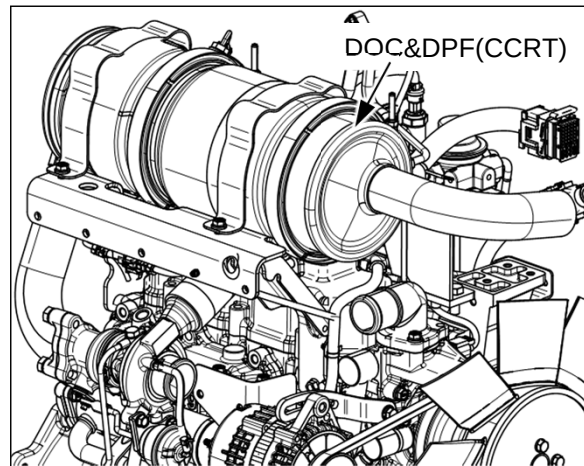
① Definitions of system components and operation

- The following terms will define the system components and operational modes.

System components and operation	Definition
Diesel Oxidation Catalyst (DOC)	a catalytic converter that reduces emission element such as hydrocarbons, carbon monoxide and unburned fuel.
Diesel Particulate Filter (DPF)	a filter that captures soot from the engine exhaust
Regeneration	This is the process of burning/cleaning of the soot that is contained in the DPF.
Inhibited regeneration	The regeneration process is disabled by the use of the DPF switch.

② DOC&DPF(CCRT)

- The Diesel Oxidation Catalyst (DOC) and the Diesel Particulate Filter (DPF) is to reduce engine exhaust hydrocarbons, carbon monoxide and other toxic gases. This system converts exhaust emissions to harmless carbon dioxide and water. The DPF also traps Particular Matter (PM)
- To meet Tier 4 emission regulations, the CCRT(Catalyzed continuous regenerating trap) integrated with DOC and DPF combination is installed on your engine.
- It is very important to read this operator's manual and understand the safe operation of your tractor. If you have any questions in the operation of this emission system, please contact an authorized local LS tractor dealer.



 Caution	► Burn hazard ! During the Diesel Particulate Filter (DPF) regeneration process, the exhaust stack and fixed hood area becomes extremely hot. Allow area to cool before servicing or working near the exhaust system components. Failure to comply could result in minor or moderate injury.
---	--

 Warning	► Fire hazard! During the Diesel Particulate Filter (DPF) forced regeneration process, the exhaust stack and fixed hood area becomes extremely hot. Park the machine outside and away from combustible or highly flammable material. Failure to comply could result in death or serious injury.
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③ Fuel and engine lubrication oil specification

- Fuel specification
Use only Ultra low sulfur diesel fuel (S15) in your tractor.

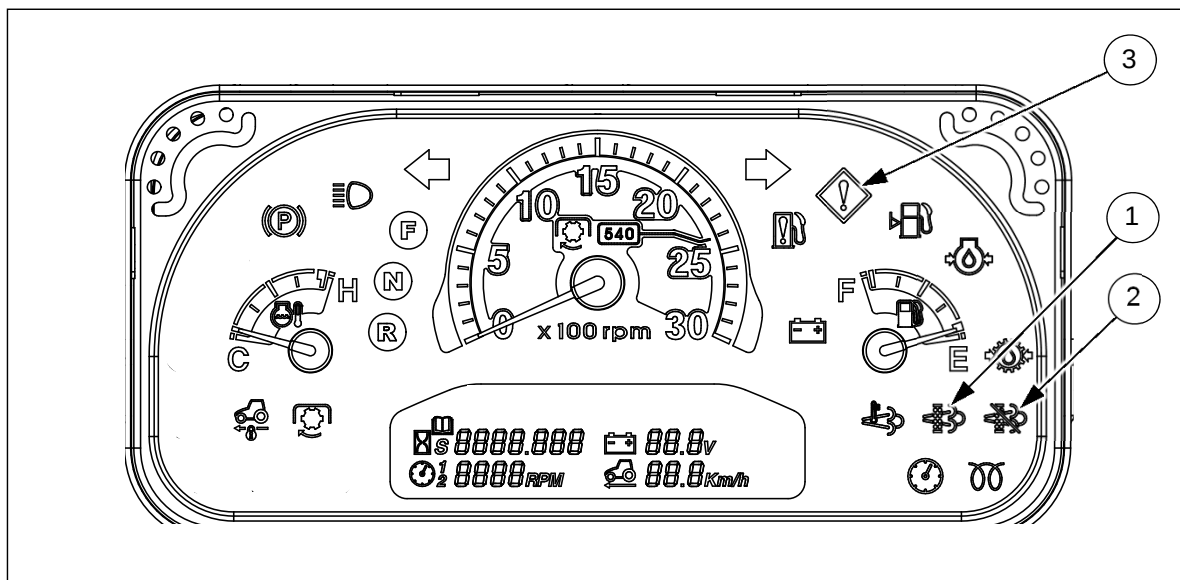
NOTICE	► Use of diesel fuel other than Ultra low sulfur fuel may adversely affect the engine and the DPF performance.
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- Engine oil specification
Use only DPF compatible (CJ-4) oil in your tractor engine.

NOTICE	► Use of any engine oil other than (CJ-4) may clog the DPF earlier than expected and fuel usage may increase.
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④ Indicator illumination on instrument panel

- The indicators related to the DPF regeneration have several illumination figures and its meanings as follows. Read carefully and keep in mind the instructions well.



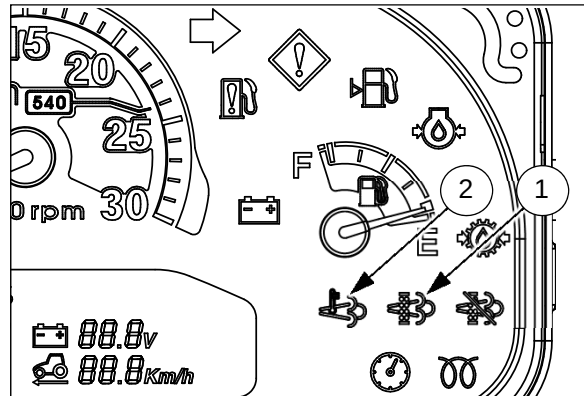
Indicators	figures	Possible cause	Symptom & Actions	Remarks
1. DPF regeneration indicator	Continuous ON	When the regeneration is processing.	- Normal state	 +  ON ON
	BLINK(1sec)	When the soot's rate is over 120%	- Press and hold the upper side of the DPF switch over three second for regeneration.	 BLINK (1sec)
	BLINK(0.5sec) + Engine error warning indicator(3)	When the soot's rate is over 150%	Engine power reduction. HAVE TO contact your authorized local dealer for check.	 +  BLINK (0.5sec) ON
2. DPF inhibited regeneration indicator	Continuous ON	When the Inhibited regeneration mode is working	DPF regeneration is delayed or stopped.	 ON

⑤ Regeneration mode

- In this mode, the operator does not have to take any actions, the system is activated automatically by the engine electronic controller.

NOTE : The regeneration is the normal operating mode.

- The regeneration shall be activated by ECU ;
 - When soot's rate reaches **100% or more**.
 - When the engine is **warmed up enough**.
 - When the **DPF switch is not pressed to the Inhibited regeneration mode**.



NOTE : Regeneration shall be lasted for **approximately 15 to 25 minutes**.

- During the regeneration, the DPF regeneration indicator(1) and DPF temperature indicator(2) shall be turned on.
- In case of turning off the engine while the regeneration is processing, the regeneration is to resume again when restarting the engine.

NOTICE	► If engine is turned off during the regeneration, soot will not be completely burned and may increase fuel consumption. KEY-OFF during regeneration mode is not recommendable because too short operation won't finish regeneration mode, So, we recommend to users to operate until all indicator lights are turned off without Key switch OFF.
 Warning	► Fire hazard! During the Diesel Particulate Filter(DPF) regeneration process, the exhaust stack and fixed hood area becomes extremely hot. Park the machine outside and away from combustible or highly flammable material. Failure to comply could result in death or serious injury.

⑥ Inhibited regeneration mode

NOTICE : Only use this mode when regeneration needs to be delayed or stopped because of an operation condition that may risk a fire hazard due to high exhaust temperatures during regeneration.

NOTE : Even if the DPF regeneration indicator(1) is ON during the regeneration process, the inhibited regeneration mode can be set.

The regeneration mode can be delayed or stopped by the use of the DPF switch(3) that is located on the left-hand side of the dash.

To set the inhibited regeneration mode :

1. Press down the lower side(B) of the DPF switch(3). And then DPF inhibited regeneration indicator(2) shall be turned on.

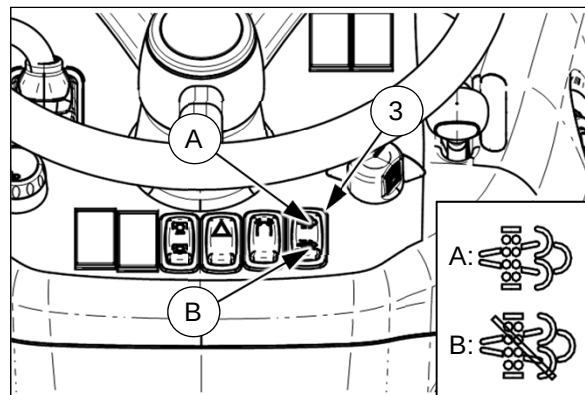
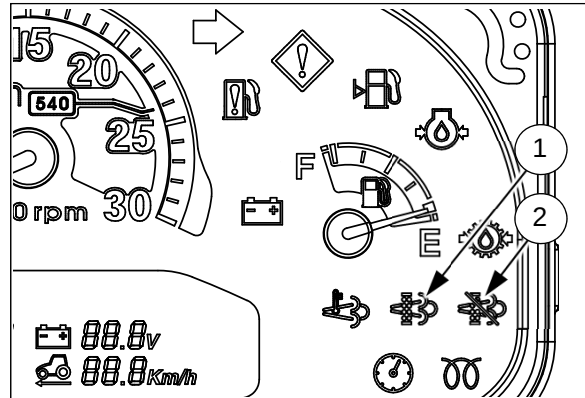
NOTICE : When tractor arrives at a safe regeneration location, press again the lower side(B) of the DPF switch to exit the Inhibited regeneration mode.

If not, excessive soot in the DPF may overload the emission system and result in a reduction of engine power.

To exit the Inhibited regeneration mode (To go to the regeneration mode) :

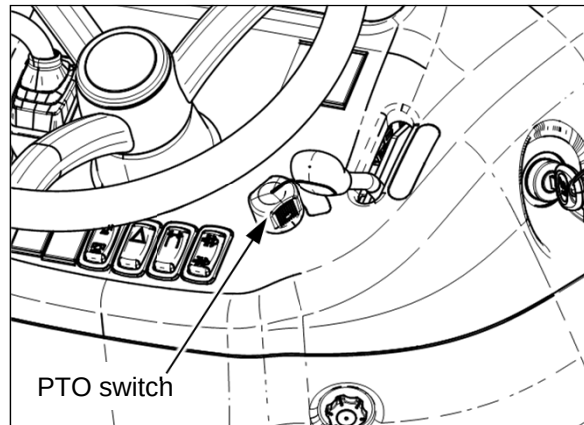
1. Press down the lower side(B) of the DPF switch(3) again for only exiting the inhibited regeneration mode.
2. Press and hold the upper side(A) of the DPF switch(3) for over one second to exit the Inhibited regeneration mode and to execute the regeneration mode.
3. When inhibited regeneration mode has been exited, the DPF inhibited regeneration indicator (4) shall be turned off.

NOTE: If the tractor is shut off during the inhibited mode, when restarting the tractor, the regeneration system will return to the regeneration mode.



(9) PTO switch

- The engine starts only when the PTO switch is placed in “OFF” position for safety.
 - After starting the engine, you must comply with the following instructions.
1. Check the safety conditions around the implement.
 2. Place the PTO gear lever(if fitted) to the desired position.
 3. Press the PTO mode switch (if fitted) to “**MANUAL**” or “**AUTO**” position. Refer to the following chapter.
 4. Turn the PTO switch to “ON” position to operate the PTO shaft. When the PTO shaft begins to rotate, the PTO operation indicator on the instrument panel shall be turned on.
 5. If you want to stop the PTO shaft temporarily, push the PTO switch to “OFF” position.

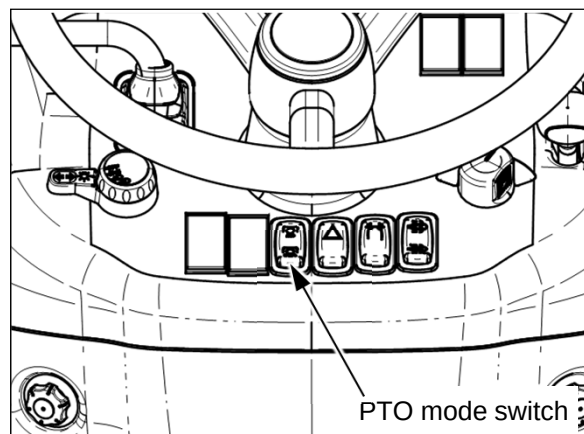


Warning

- ▶ Before attaching, detaching or checking the PTO driven equipment, always place the PTO switch in “OFF” position, and PTO gear lever (if fitted) in neutral position.
- ▶ If the PTO mode switch is placed in **MANUAL** position, the PTO shaft rotates always regardless of the clutch pedal. To stop the PTO shaft, turn off the PTO switch. Pay attention to the surroundings to prevent an accident.
- ▶ Do not engage the PTO clutch at high engine speed. Sudden engagement can cause damage to the implement and PTO clutch. Engage the PTO at low idle rpm, and then raise the engine speed up.

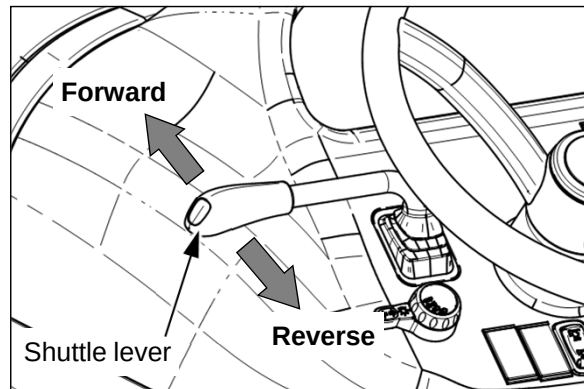
(10) PTO mode switch (optional)

- It is used to select “**AUTO**” or “**MANUAL**” mode related to the PTO operation.
- When the PTO mode switch is placed on;
 - **MANUAL**: The PTO shaft will rotate regardless of the clutch pedal.
 - **AUTO**: If pressing the clutch pedal, the PTO shaft will be stopped.



(11) Shuttle lever (Mechanical synchro-shuttle)

- This is used to select the Forward or Reverse.
- **Forward** : Push the lever forward.
Reverse : Pull the lever backward.
- Before reversing the tractor, lower the engine speed and check the safety conditions behind the tractor.

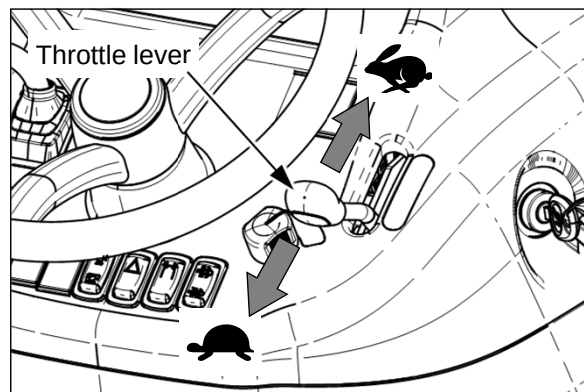


Caution

► The synchro-shuttle shift lever allows any forward range or reverse to be shifted while the tractor is moving slowly. However, the clutch must be disengaged and engaged by means of clutch pedal. Make sure to depress clutch pedal fully and release it gradually to take up load smoothly, but sudden gear shifting may cause transmission damage. It is recommended to stop the tractor before operating the shuttle lever.

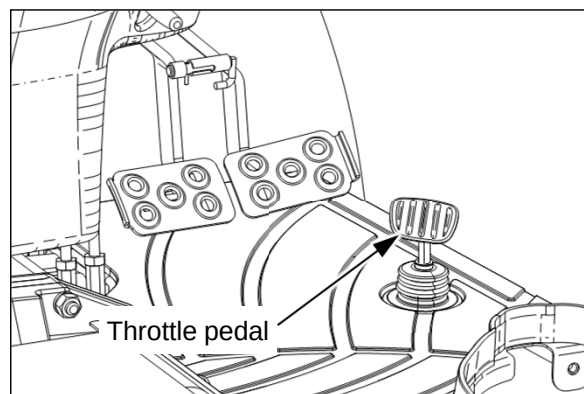
(12) Throttle lever

- This lever is used to control engine speed.
 - Pull it backward for **Low** speed,
 - Push it forward for **High** speed.
- For mechanical models, this throttle lever must be used only for work field. When driving on the road, place the throttle lever to the low speed position, and use the throttle pedal.
- For HST models, An electronic control sensor is attached on this lever. If there is an error related to this sensor while the engine is running, the engine speed shall be fixed to 1500 rev/min, so called LIMP HOME mode. Contact your authorized local dealer.



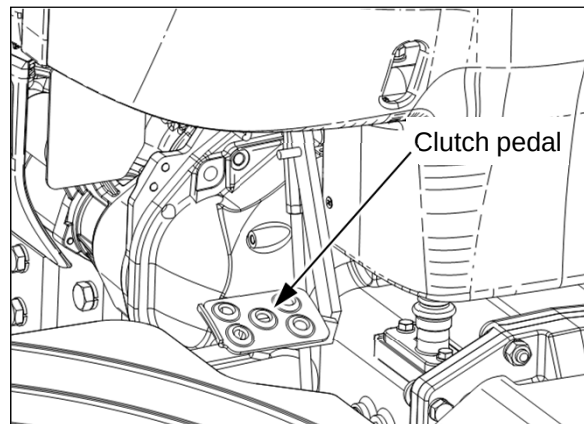
(13) Throttle pedal (Mechanical)

- This pedal is used to control engine speed when running on the road.
- When using the Throttle pedal, the throttle lever must be placed on the **Low** speed position.
- An electronic control sensor is attached on this pedal. If there is an error related to this sensor while the engine is running, the engine speed shall be fixed to 1500 rev/min, so called LIMP HOME mode. Contact your authorized local dealer.



(14) Clutch pedal (Mechanical)

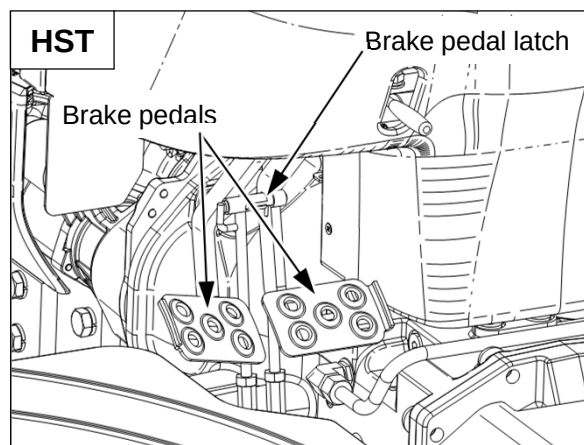
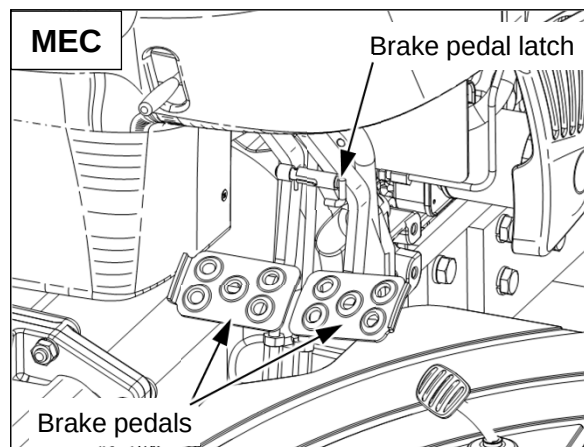
- This is used to engage or disengage the main transmission clutch for starting engine or shifting transmission gears.
- Depress the clutch pedal quickly and fully, and release it slowly.
- When depressing the clutch pedal, if the PTO mode switch is placed on the **MANUAL** position, the PTO shaft will NOT stop, if the switch is placed on the **AUTO** position, the PTO shaft will be stopped.



 Caution	▶ DO NOT ride your foot on the clutch pedal while driving. ▶ As a start safety switch is installed for the operator's safety, depress the clutch pedal fully for starting engine.
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(15) Brake pedals

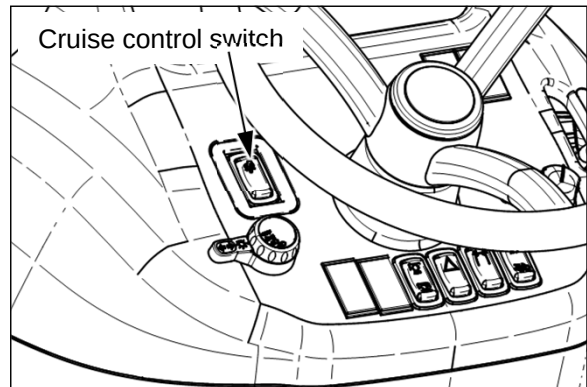
- The brake pedals of your tractor can be operated independently after disconnecting the brake pedal latch. The left/right brake pedals transmit braking force on each wheel.
- When stopping the tractor, press both brake pedals together.
- To reduce the turning radius in the work field, release the brake pedal latch, and press only the left/right pedal firmly.
- DO NOT press one-side brake pedal while differential lock is engaged. It may cause damage or a failure of the axles.



 Caution	▶ When driving on the road, engage the left/right brake pedal with the latch. - If pressing one-side brake pedal while driving, the tractor may turnover. ▶ DO NOT ride your foot on the brake pedals while driving.
---	--

(16) Cruise control switch (HST type)

- This switch is used to set / release the cruise control for HST type tractor.
 - **Cruise** : Press the **upper side** of the switch while driving forward.
 - **Release** : Press the **lower side** of the switch to stop the cruise control drive.
- To stop the cruise drive, press down the both brake pedals or lower side of the cruise control switch. The forward pedal returns to the neutral position and the cruise drive shall be disengaged.

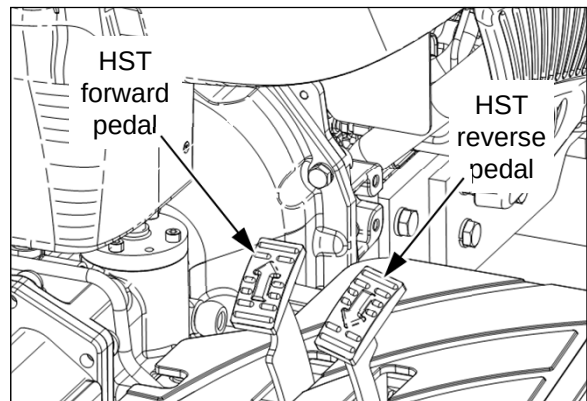


Caution

- ▶ DO NOT press the one-side brake pedal during the cruise drive. You have to connect the left and right brake pedal with the brake pedal latch before driving in order to avoid a possible accident.
- ▶ Do not operate the cruise control switch while driving backward.

(17) HST forward / reverse pedal (HST type)

- Press down the HST forward pedal slowly in order to move the tractor forward and if releasing the pedal, it returns back to the neutral position, and the tractor stops.
- The HST reverse pedal is operated in the same way as the HST forward pedal.

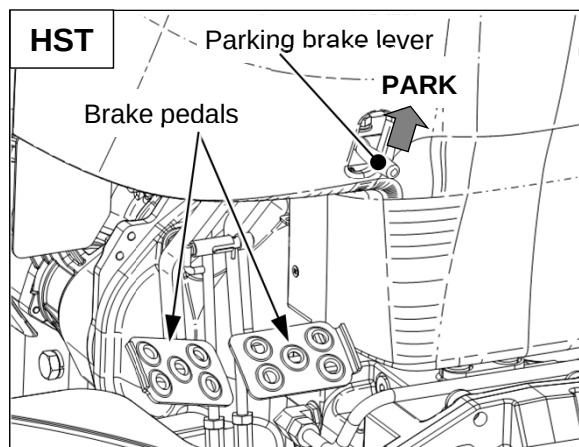
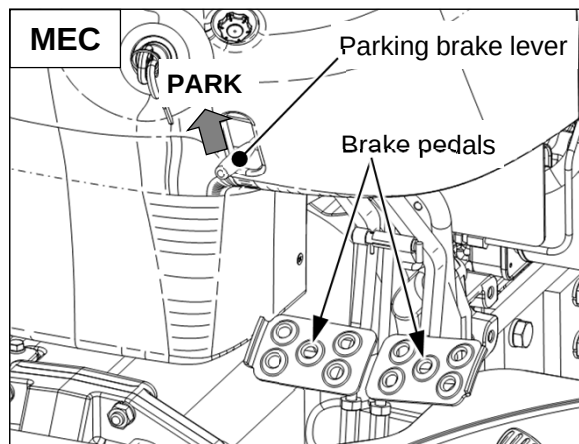


Warning

- ▶ Press down the brake pedal to prevent stopping distance from being extended when driving in high speed .
- ▶ DO NOT operate the HST pedal hastily. It may cause a shock to you.

(18) Parking brake lever

- This lever is used to apply the parking brake.
- Pull it upward with pressing down the brake pedals after locking the brake pedals each other with the brake pedal latch. Release the brake pedals slowly with checking slippage of the tractor.
- To disengage the parking brake, pressing down the brake pedals little harder, and push the lever downward.



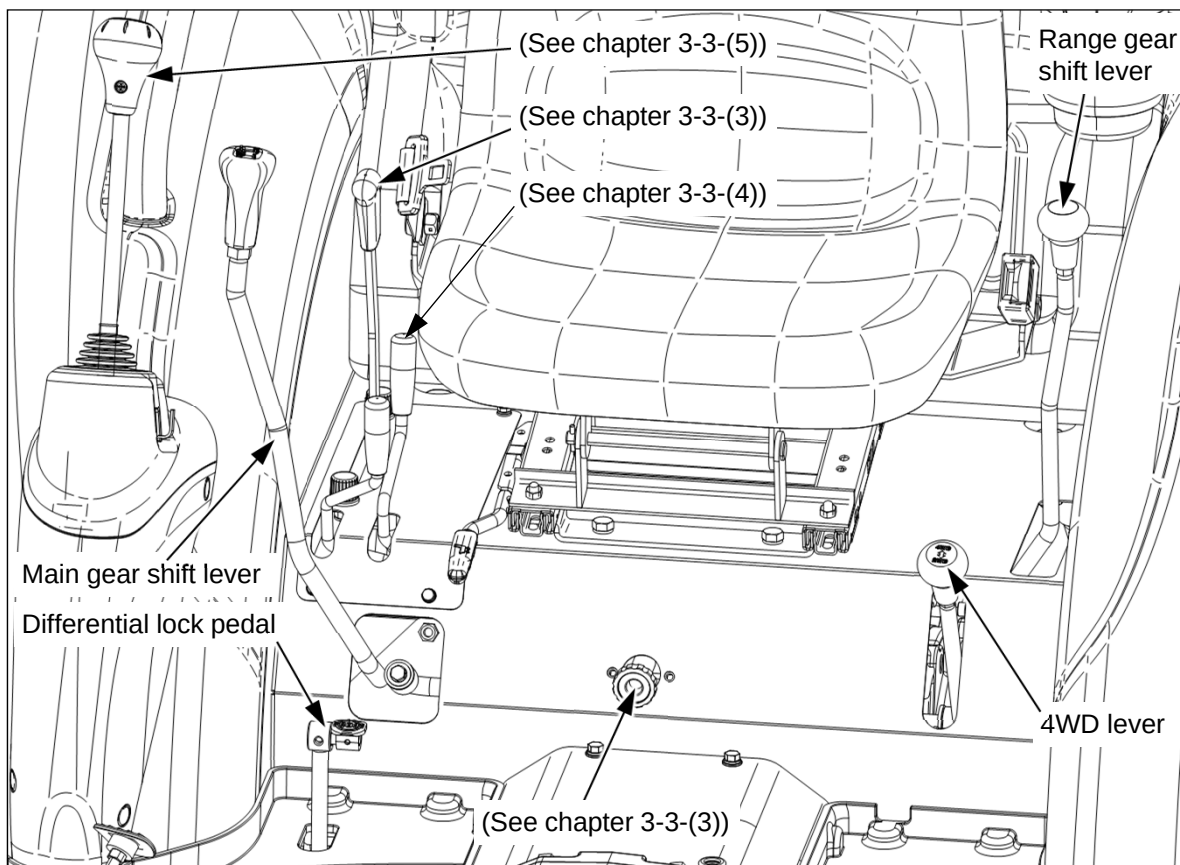
Caution

► DO NOT drive the tractor with the parking brake engaged. It may cause damage of the brake or parking brake system.

3-2. Left / Right-hand controls

Important to owner, read carefully

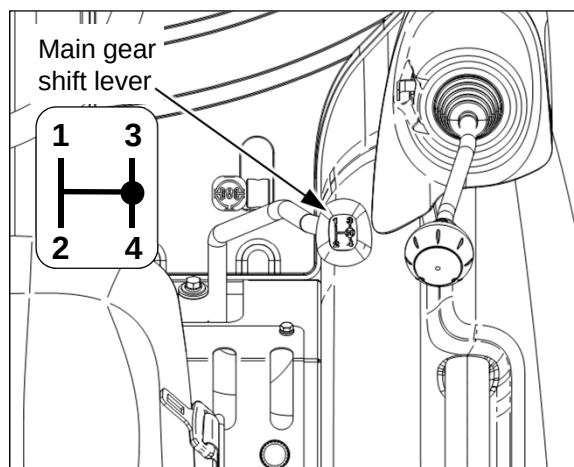
Mechanical type



(1) Main gear shift lever (Mechanical)

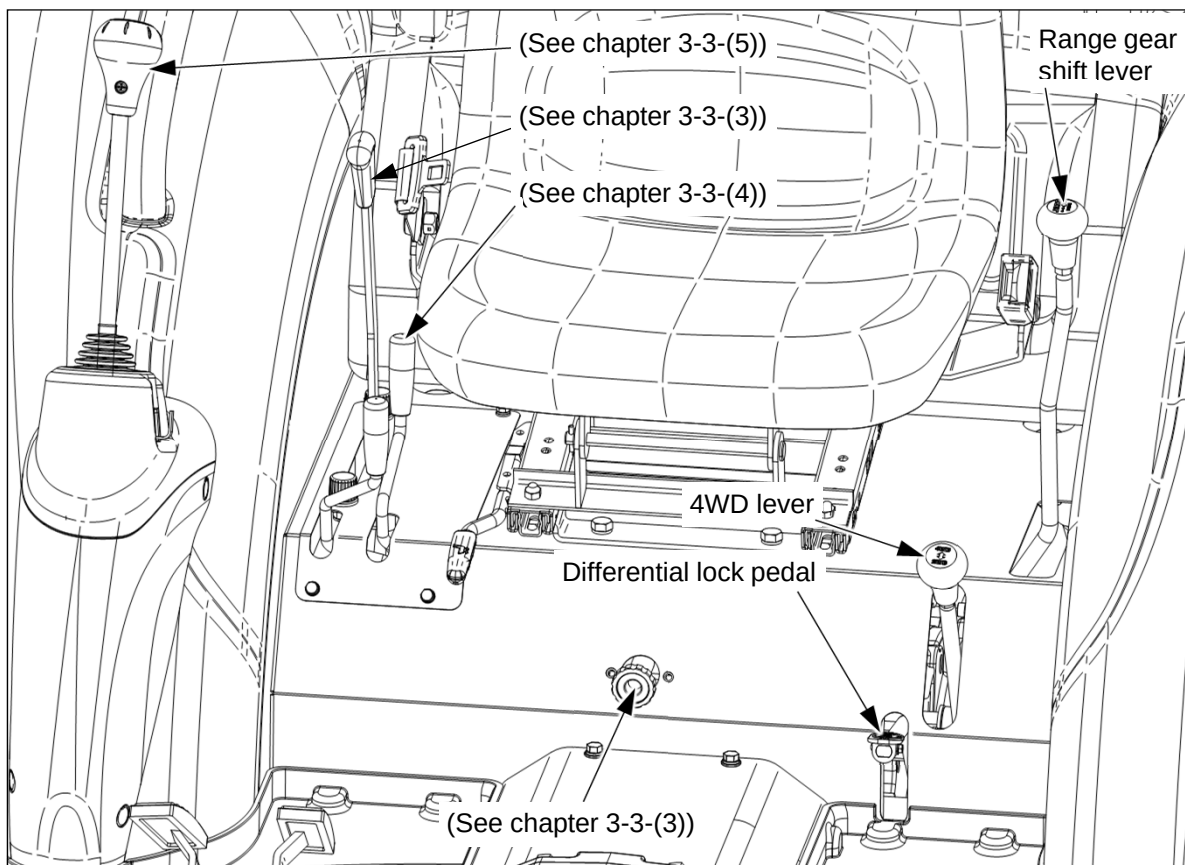
- Four speed gear shift and neutral position is available.
- Before shifting the main gear shift lever,
 - *press down the clutch pedal and brake pedals.*
 - *stop the vehicle completely.*
- Operate the main gear shift lever by correct **H** pattern. If operated diagonally, it may cause a failure.

 Caution	► The main gear shift lever can NOT be shifted while driving. Operate the lever after stopping the vehicle completely.
--	---



Important to owner, read carefully

HST type

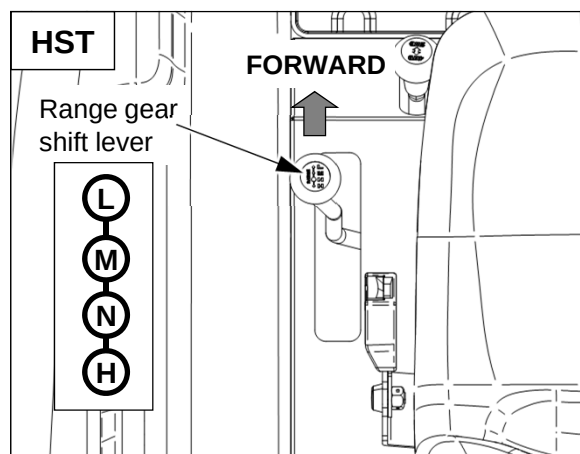


(2) Range gear shift lever

① HST type

- Three speed gear and neutral shift is available.
- Before operating the range gear shift lever,
 - release the HST pedal and press down the brake pedals.
 - stop the vehicle completely.
- Operate the range gear shift lever correctly. If operated diagonally, it may cause a failure.

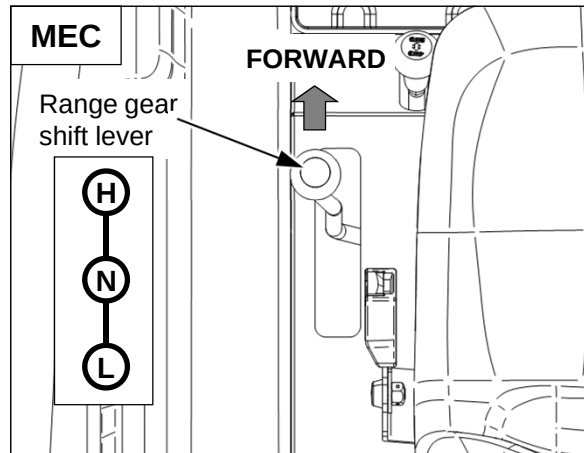
 Caution	► The range gear shift lever can NOT be shifted while driving. Operate the lever after stopping the vehicle completely.
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② Mechanical type

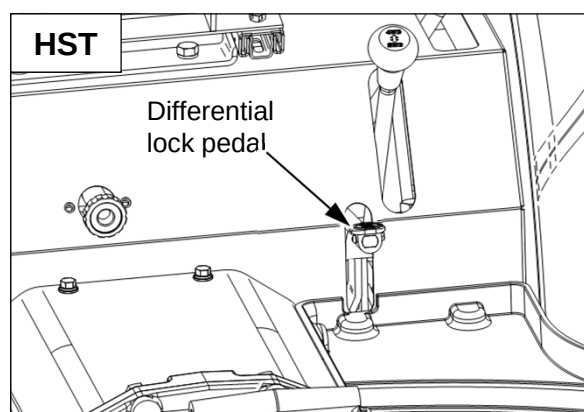
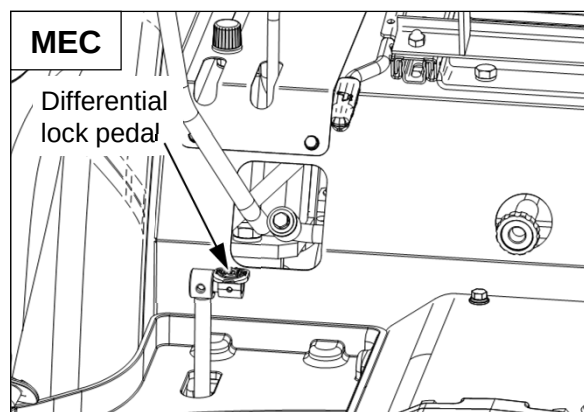
- Two speed gear and neutral shift is available.
- Before operating the range gear shift lever,
 - *press down the clutch pedal and brake pedals.*
 - *stop the vehicle completely.*
- Operate the range gear shift lever correctly. If operated diagonally, it may cause a failure.

 Caution	► The range gear shift lever can NOT be shifted while driving. Operate the lever after stopping the vehicle completely.
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(3) Differential lock pedal

- When the rear wheel is slipping and the tractor can not move forward, stop the tractor and press down the differential lock pedal.
- The differential lock is effective for working on the slippery ground.
- If engaged, both rear wheels will rotate at equal speed. So, It can disturb the steering operation.
- Take your foot off the pedal to release the differential lock. If the differential force is reduced to some extend, the lock is released automatically.
- If the differential lock does not disengaged (i.e. the turning radius is larger than normal condition and the turning is not smooth), depress the clutch pedal and/or press the left/right one-side brake pedal slightly for a second each other.
- This pedal is installed on the step floor, but the location is;
 - on the right-hand side for mechanical model
 - on the left-hand side for HST model.

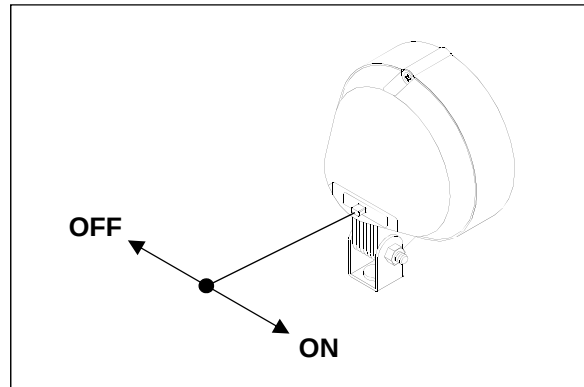


 Warning	► Do not turn the tractor with pressing the differential lock pedal. ► Do not use this differential lock pedal while driving on public road. ► Do not engage the differential lock when one wheel is spinning.
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(4) Work light switch

- Rear work light

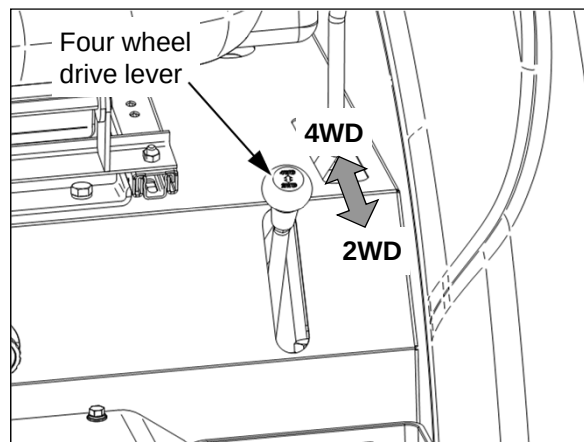
- The rear work light has a switch on its back. To turn on/off the rear work light, operate the switch as the right figure.



 Caution	► When driving on the road at night, do not let the rear work light(s) stay ON. It may cause a disturbance to the driver of the following cars.
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(5) Four wheel drive lever (4WD)

- This lever is used to engage/disengage the four wheel drive (4WD). Pull it backward for engaging 4WD and push it forward to engage the 2WD.
- Before operating the 4WD lever,
 - press down the clutch pedal (if fitted) and brake pedals.
 - stop the tractor completely.
- 4WD is very effective in the following cases.
 - When increasing the towing power for heavy work.
 - In case of working in sandy soil.
 - To prevent tractor from spinning in wet land.



 Caution	► When driving on public road, disengage the 4WD. If not, it may cause damage of transmission drive line and serious accident. After working in the field, select the 2WD. ► While driving the tractor at high speed with the 4WD engaged, sharp steering may cause an accident. ► The 4WD lever can NOT be shifted while driving. Operate the lever after stopping the vehicle completely.
--	--

3-3. Hydraulic system

(1) Safety precautions

- Hydraulic oil leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury, comply with the instruction as below.
 - Relieve all pressure before disconnecting hydraulic lines.
 - Before applying pressure, make sure all connections are tight and components are in good condition.
 - Never use your hand to check for suspected leaks under pressure.
 - If injured by leaking fluid, get medical attention immediately.
- The hydraulic hoses and fittings on your tractor meet engineering specifications for the particular function. When replacing damaged parts, use only manufacture authorized service parts.
- Care in hydraulic hose installation is a must:
 - Make sure pressure is relieved before starting installation procedure.
 - DO NOT kink or twist a hose, failure may occur. Properly route the hose.
 - Have a certified hydraulic technician install the hose.
 - Remove air from the hydraulic system after installing any hydraulic component.
- Periodically check hydraulic system for leaks or damaged parts - kinked, crushed, flattened, hard blistered, heat cracked, charred, twisted, soft or loose covered hoses and fittings.
- DO NOT pull or apply external forces to the hose. The hose may fail and cause injury.
- Keep all persons away from the working area. If a hose fails, mechanisms controlled by fluid power can become hazardous. Lifted mechanisms can fall to the ground, steering system may fail, etc.
- Stay clear of a pressurized hose assembly that has blown apart. Hose fittings can be thrown off at high speed and a loose hose can whip around with great force.
- Hydraulic oil can reach high temperatures. Allow fluid to cool before servicing the system.
- Vibration can reduce hose service life. Make sure all retaining clamps and/or devices are secured.
- Environmental conditions can cause hose and fittings to deteriorate. Inspect hydraulic hoses periodically. Replace worn or damaged hoses and fittings.
- Before checking or repairing the hydraulic system, make sure the engine is stopped, and all the transmission gears are in neutral, and lower the implements to the ground.

 Warning	▶ Before removing hydraulic pipes or hoses and other parts, make sure to check that hydraulic pressure is relieved completely. The leaks of pressurized oil can cause a fatal physical injury.
	▶ Use proper protection equipment, before servicing the hydraulic system. ▶ Before connecting or disconnecting the hydraulic quick couplers, lower the implements to the ground, and check if the hydraulic pressure is relieved.

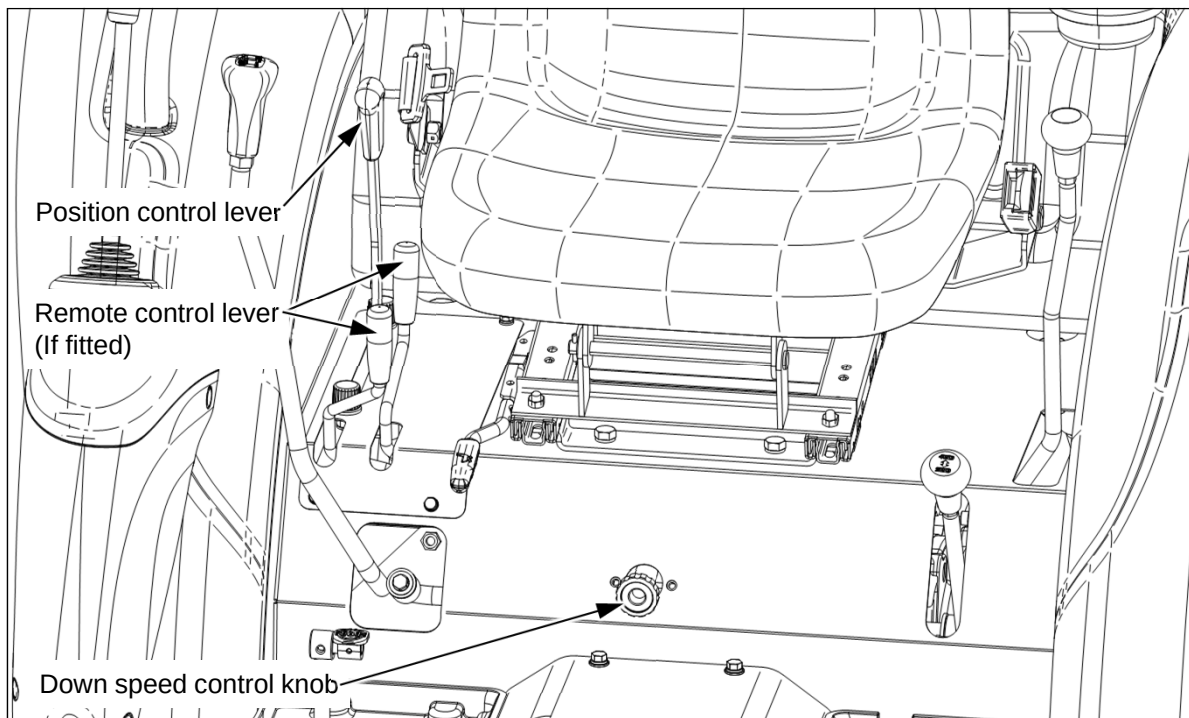
(2) Steering system

- The hydraulic steering system controlled by fluid power provides you more convenience to operate the steering wheel.
- Notices when using the steering system.
 1. If there is too much of a load in front-end loader bucket, it could be difficult to operate the steering wheel. In this case, it is necessary to reduce the size of the load.
 2. Do not operate the tractor unnecessarily in a state of fully steered front wheels for a long time. As unnecessary hydraulic force is applied to the steering linkage, it may cause damage to the steering system and excessive increase of the hydraulic oil temperature which may cause reduction of the product life or a failure of the hydraulic and steering system. Especially, DO NOT operate the steering wheel excessively when a front wheel is mired in a ditch. The rim and disk of the wheel could be damaged or deformed.
 3. If an abnormal noise sounds off when operating the steering wheel, this may mean that there is some air in the steering components or lines. In this case, turn the steering wheel to the left and right direction fully about 2~3 times. It will exhaust the air and the abnormal noise shall disappear. If it's not cleared, contact your authorized local dealer for check.
 4. When starting the engine in cold weather, an abnormal noise may occur. In this case, warm up the tractor before using in order to reduce the oil viscosity.

Notice	▶ When the engine is stopped, the steering wheel becomes hard to turn. But this does not mean a failure. It can be only used in an emergency state. ▶ When releasing the steering wheel after steering operation while driving, the steering wheel does not return to neutral position automatically.
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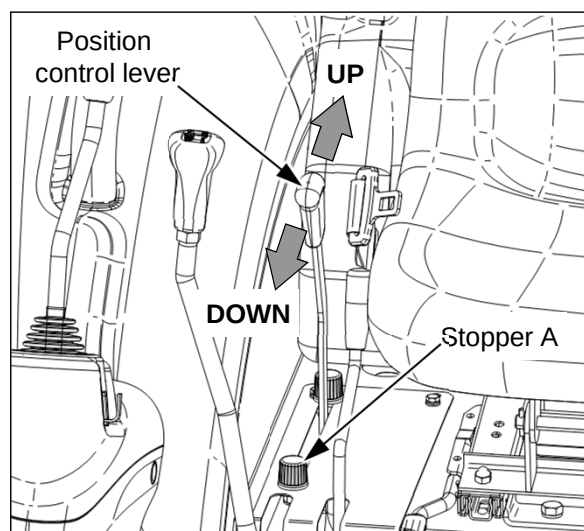
(3) Hydraulic lift Control (Mechanical Hydraulic Lift, MHL)

- The hydraulic lift system is operated by the position control lever as below.



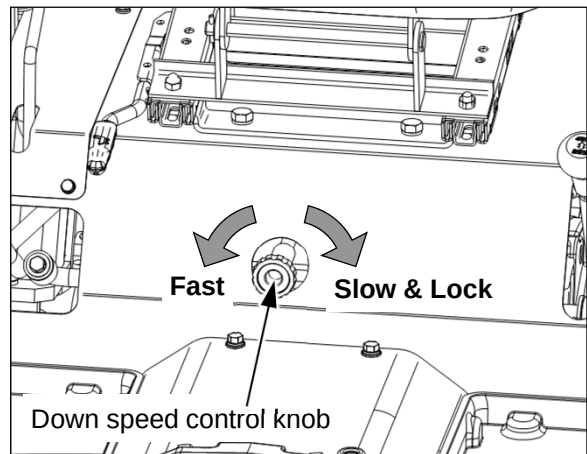
① Position control

- To set the position (height) of the rear implement, move the position control lever up/down during the engine is running. Generally, this lever is used for tiller, fertilizer distributor, mower, rake and other rear implements.
1. Push the position control lever forward and let the implement down by its own weight.
 2. Move up the lever to desired position, the rear implement shall be located on the position corresponding to the lever position.
 3. If necessary, fix the lowest position of the lever with the stopper A at the desired position.



② Down speed control knob

- It is use to adjust the down speed of the 3-point linkage. Turn the down-speed control knob to the right direction for slower down speed, and to the left direction for faster down speed.
- If turning the knob right direction fully, the implement shall be fixed and even if lowering down the position control lever, the implement does not let down.
 - Tiller: Slow in down speed
 - Plough: Fast in down speed
- When working in hard ground, slow down the down speed to avoid the bounding of the implements.

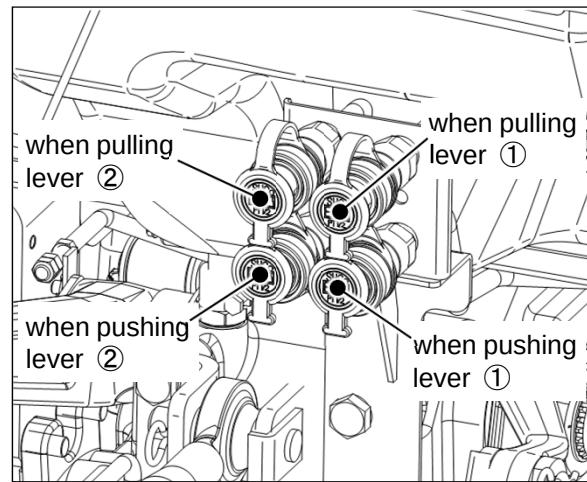
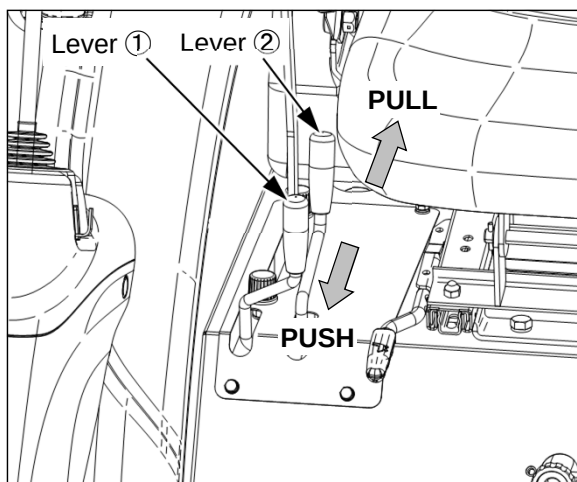


Warning

- ▶ When driving on the road, replacing tiller blades or removing grass around the tiller blades, turn the down-speed control knob clockwise slightly to lock.
- ▶ The knob rotates about two revolutions. Do not over-tighten the knob. It may cause damage to the control valve and connection parts.

(4) Remote control levers and Quick couplers (optional)

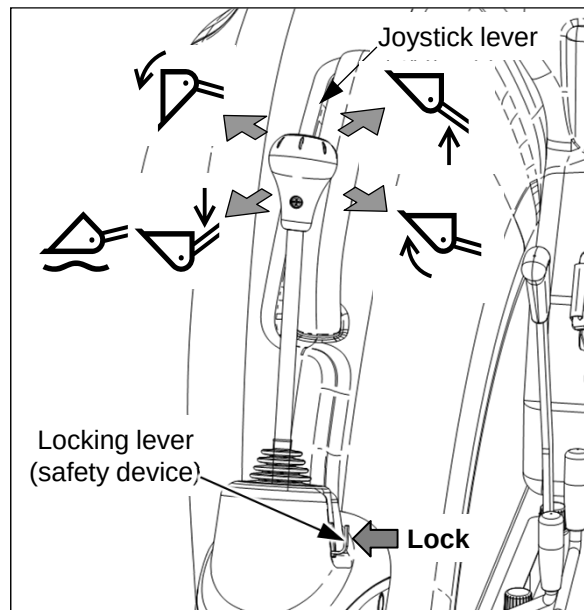
- These levers, Lever ① and Lever ② (if fitted) in the below figure are used to operate the hydraulic cylinder and/or motor of the implement attached to the tractor.
- Depending on the optional specification, below figures can be little bit different from your vehicle.
- Each lever of the parallel circuit remote control valve can be operated simultaneously, and when operating the levers at the same time, the remote cylinder under less pressure shall begin to work first.
- After connecting and preliminary operating the hydraulic equipment, check again the transmission oil level of the tractor.
- When pushing the remote control lever forward, and the hydraulic pressure can be delivered to the lower couplers of the related lever and upper couplers shall be connected to the drain.
- When releasing the remote control lever, it will be returned to neutral position by spring.



 Warning	► Before removing hydraulic pipes or hoses and other parts, make sure to check that hydraulic pressure is relieved completely. The leaks of pressurized oil can cause a fatal physical injury.
	► Use proper protection equipment, before servicing the hydraulic system. ► Before connecting or disconnecting the hydraulic quick couplers, lower the implements to the ground, and check that hydraulic pressure is relieved completely.

(5) Joystick lever (if fitted)

- Multi-functional joystick lever helps to operate the front-end loader comfortably.
- The joystick lever can be operated basically in four directions as shown in the right figure.
- If you move the joystick lever diagonally, loader and bucket cylinders shall be operated at the same time. In this case, the light loaded cylinder may be moved first.
- If you want to float the bucket along the ground, lower the front-end loader and push forward the joystick lever to the float position.
- After finishing work, pull the lever and place it to the neutral position.
- Locking lever shown in the right figure is used to lock the joystick lever.
 - Pull from the joystick: Unlock
 - Push to the joystick : Lock
- For further information, See chapter 4-4-(8), "Using Front-end loader" in this manual.



<Meaning of symbols>	
	Loader up
	Loader down
	Bucket floating
	Bucket up
	Bucket dump

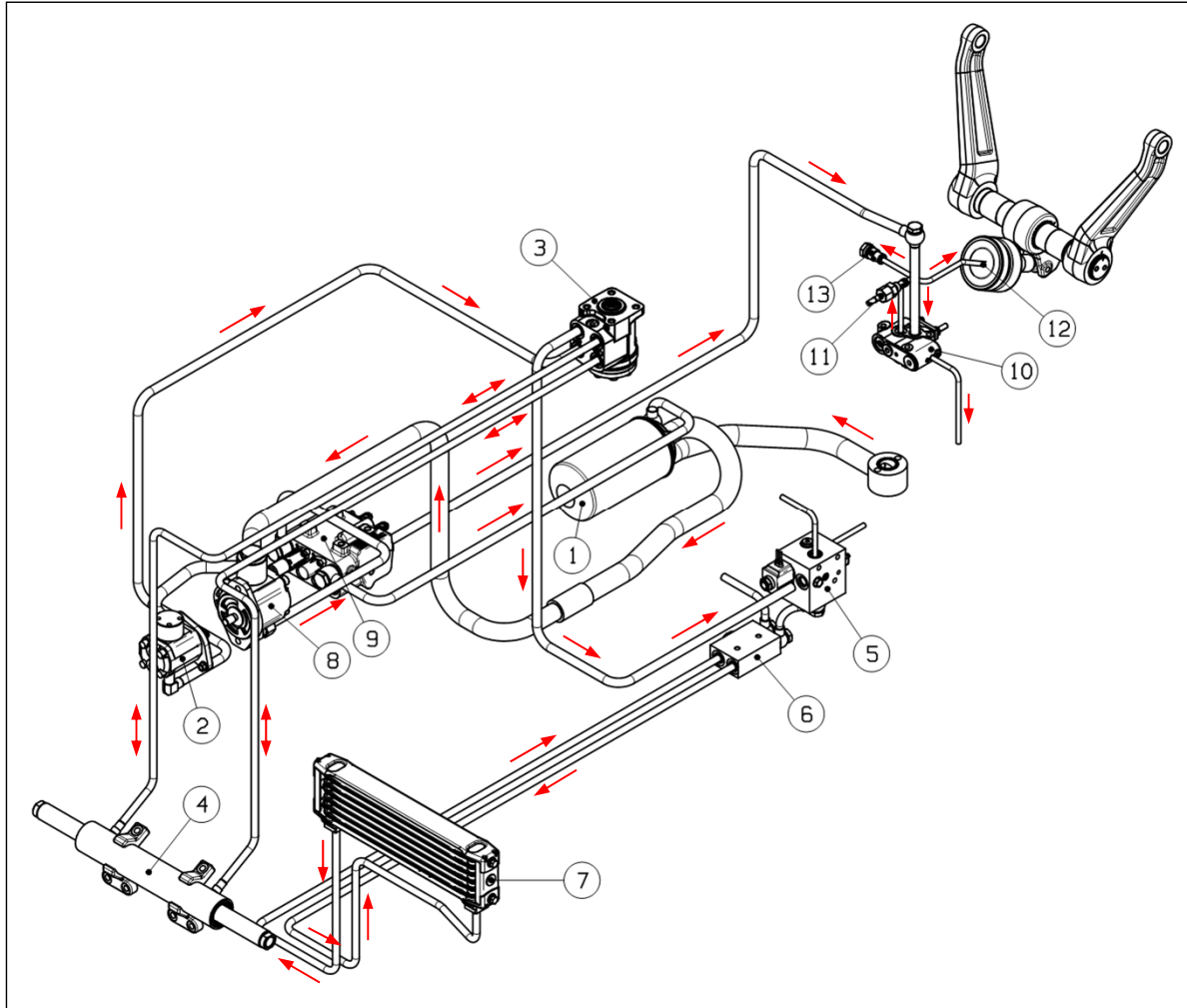


Warning

► To prevent an accident, lock the joystick lever with the locking lever when not in use.

(6) Hydraulic System Diagram

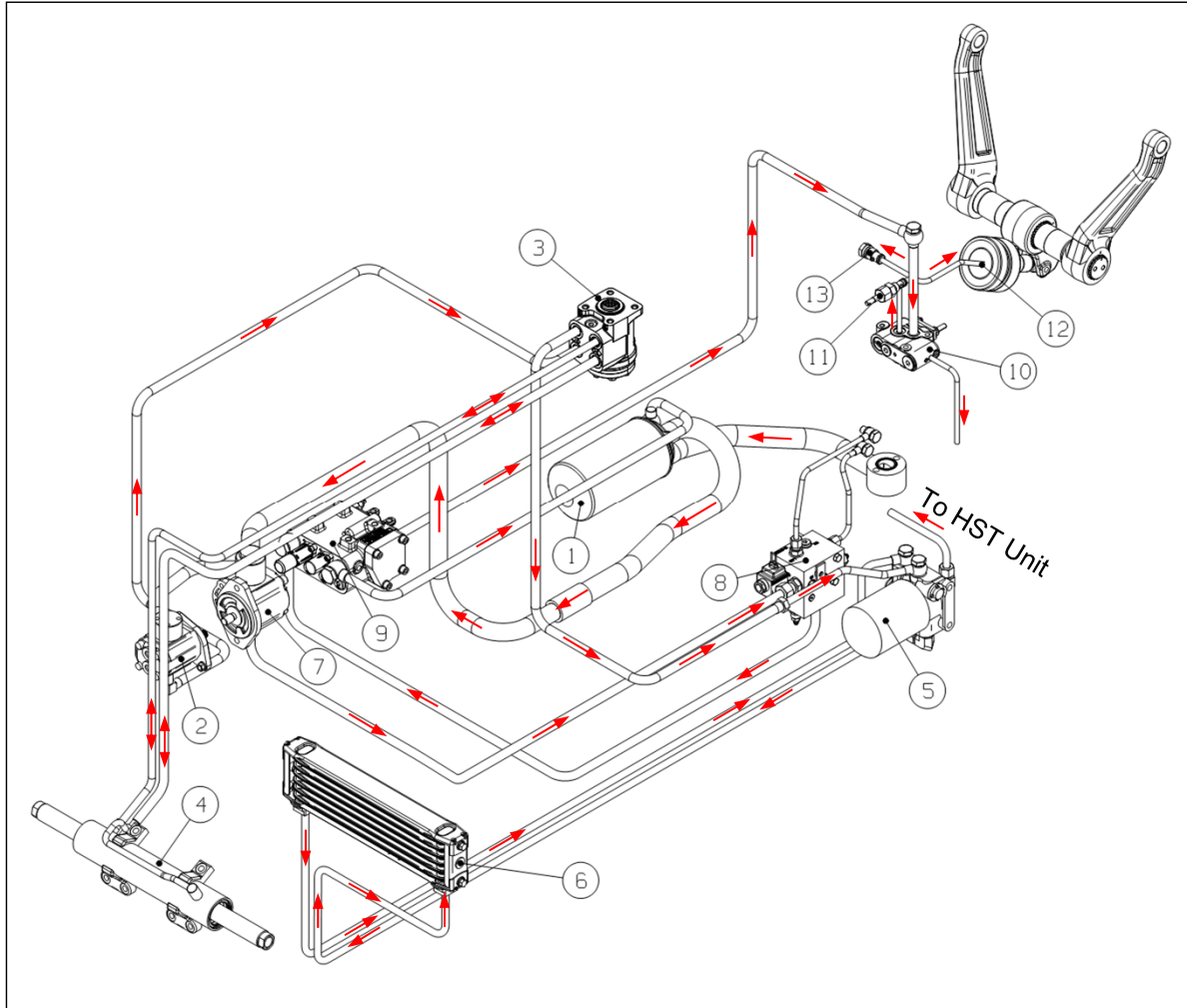
Mechanical models



1. Hydraulic oil filter
2. Steering pump
3. Steering unit
4. Steering cylinder
5. Independent PTO valve
6. Oil cooler valve
7. Oil cooler

8. Hydraulic lift pump
9. Front loader valve
10. Hydraulic lift control valve
11. Down speed control valve
12. Hydraulic lift cylinder
13. Safety valve

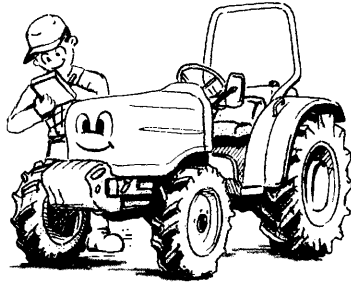
HST models



- | | |
|-------------------------|----------------------------------|
| 1. Hydraulic oil filter | 7. Hydraulic lift pump |
| 2. Steering pump | 8. Independent PTO valve |
| 3. Steering unit | 9. Front loader valve |
| 4. Steering cylinder | 10. Hydraulic lift control valve |
| 5. HST filter | 11. Down speed control valve |
| 6. Oil cooler | 12. Hydraulic lift cylinder |
| | 13. Safety valve |

4. Operation and Work

4-1. Engine start and stop



Caution

- ▶ Check each part before starting engine.
- ▶ Check if there's anyone close to the tractor before starting.
- ▶ Place all the gear levers and switches in **NEUTRAL** or **OFF** position.

(1) Engine start

Mechanical type

1. Sit in driver's seat and apply parking brake



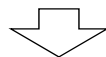
2. Place main gear shift, range gear shift lever, shuttle lever in **NEUTRAL** and PTO switch in "**OFF**" position.



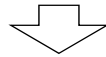
3. Pull the throttle lever to the low speed position.



4. Turn key switch to "**ON**" position and check if the battery charging indicator, engine oil pressure indicator and cold start aid indicator are ON.



5. Wait until the cold start aid indicator is OFF. (about 10 seconds)



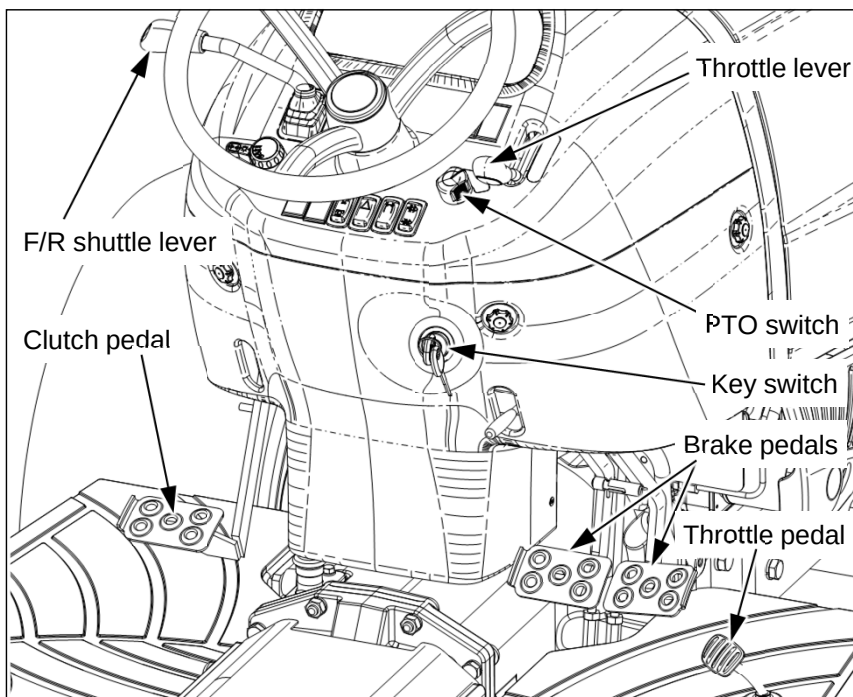
6. Depress clutch pedal fully and turn key switch to "**START**" position. As soon as the engine starts, release the key switch to "**ON**" position.

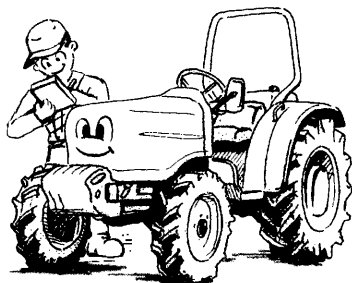


7. Check if the battery charging indicator and engine oil pressure indicator are OFF after starting engine. If not, stop the engine immediately and check the problem.



8. Run the engine for a few minutes to allow engine oil and transmission oil to warm up.





- ▶ Check each part before starting engine.
- ▶ Check if there's anyone close to the tractor before starting.
- ▶ Place all the gear levers and switches in **NEUTRAL** or **OFF** position.

HST type

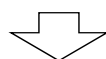
1. Sit in driver's seat and apply parking brake



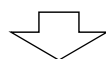
2. Place the range gear shift lever and HST forward/reverse pedal in **NEUTRAL**, and PTO switch in **OFF**.



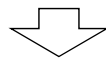
3. Pull the throttle lever to the low speed position.



4. Turn key switch to "ON" position and check if the battery charging indicator, engine oil pressure indicator and cold start aid indicator are ON.



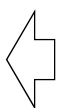
5. Wait until the cold start aid indicator is OFF. (about 10 seconds)



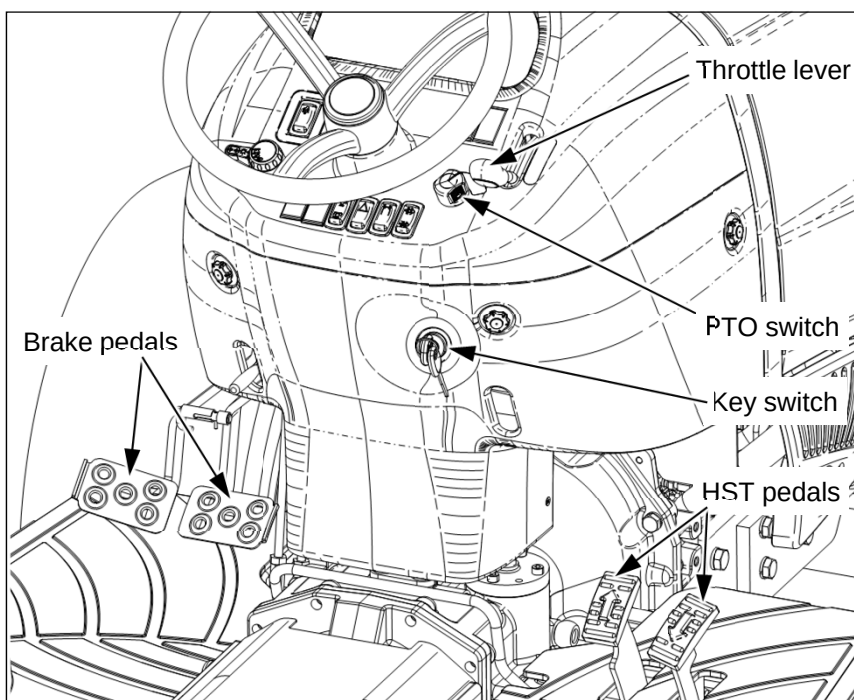
6. Turn key switch to "START" position. As soon as the engine starts, release the key switch to "ON" position.



7. Check if the battery charging indicator and engine oil pressure indicator are OFF after starting engine. If not, stop the engine immediately and check the problem.



8. Run the engine for a few minutes to allow engine oil and transmission oil to warm up.



 Warning	► Only start engine outdoors or in a well ventilated place, as the engine exhaust fumes may cause sickness or death. .
 	► To avoid an explosion, never use starting fluid to start the engine. ► Start the engine only from the driver's seat with placing all the transmission gear levers in neutral position. ► DO NOT start the engine by shorting across the terminals of the starter motor. If the engine starts, the tractor can be moved suddenly.

 Caution	► If the clutch pedal is not depressed fully or PTO switch is not "OFF", the engine can not start even if turning the key switch to "START" position. (for mechanical models) ► If the HST pedal is not in neutral position, PTO switch is not "OFF" or operator does not sit on the driver's seat, the engine can not start even if turning the key switch to "START" position. (for HST models) ► DO NOT operate the starter motor more than 10 seconds. If the engine does not start, wait for 1~2 minutes before restarting. ► When the engine is running, DO NOT turn the key switch to "START" position. It may cause a failure of the starter motor. ► In cold weather, be sure to warm-up the engine sufficiently. If using the tractor suddenly in cold weather, the engine life can be reduced.
--	--

(2) Start in cold weather

- Pull the throttle lever to the low idle position.
- Start the engine after the cold start aid indicator is turned off according to the right table.
- After starting engine, carry out warm-up for 5~10 minutes at low idle position.
- Use the engine oil for winter in cold weather. Refer to "Lubricants and Capacity" at the end of this manual.
- Use the diesel for winter when it is very cold weather. It is much easier to start the engine.

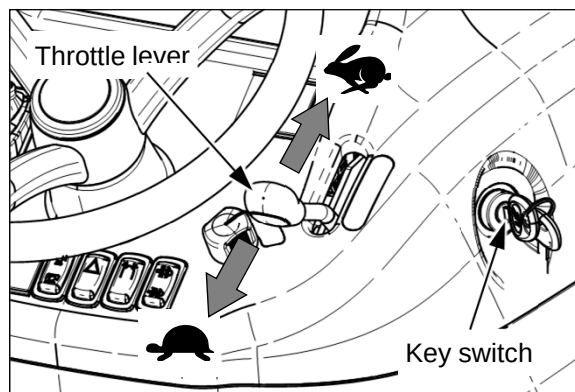
Coolant Temp.	Preheat time(s)
60 °C (140 °F)	0
40 °C (104 °F)	0
30 °C (86 °F)	0
20 °C (68 °F)	8
10 °C (50 °F)	15
0 °C (32 °F)	18
-10 °C (14 °F)	25
-20 °C (-4 °F)	30
-30 °C (-13 °F)	40

 Caution	► Safety Interlock ! When ambient temperature is lower than 0 °C, the engine speed will not be increased over 1400 rpm for about maximum 1 minute. But, it is normal operation to prevent an engine failure in cold weather.
--	---

Notice	▶ When storing tractor in cold weather, the battery must be removed and stored in a cool, dry place that is not frozen away from children. ▶ Allowing engine to idle for a long time will waste fuel and cause a build up of carbon.
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(3) Engine Stop

- Pull the throttle lever backward to reduce the engine speed and place the key switch on “OFF” position to stop the engine.
- Remove the ignition key after stopping engine.



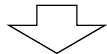
Notice	▶ To stop the engine after finishing heavy work, run the engine for about 2 minutes at low idle position. If you stop the engine suddenly, the engine life could be reduced.
--------	--

4-2. How to drive and stop

(1) How to drive

Mechanical type

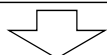
1. Lift up all the implements(front/middle/rear) from the ground after starting engine.



2. Place the throttle lever to the low speed position.



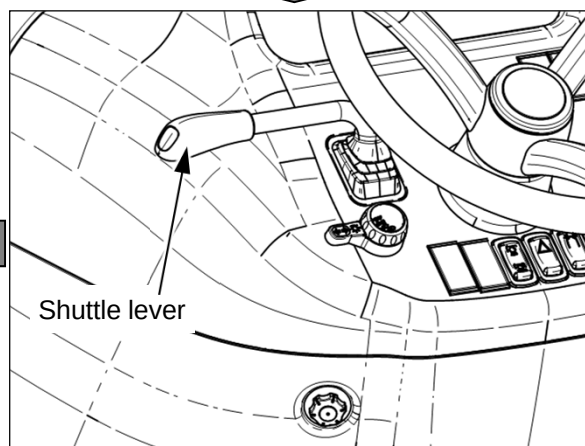
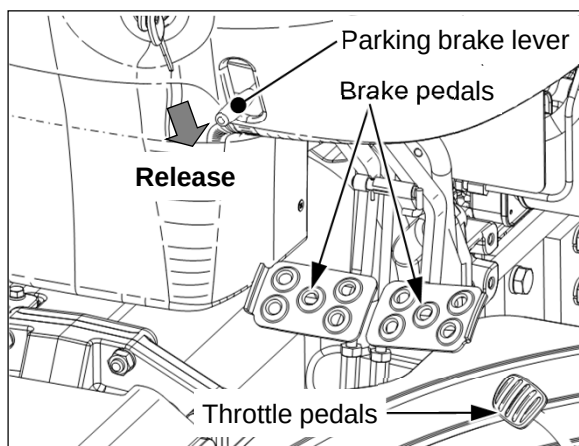
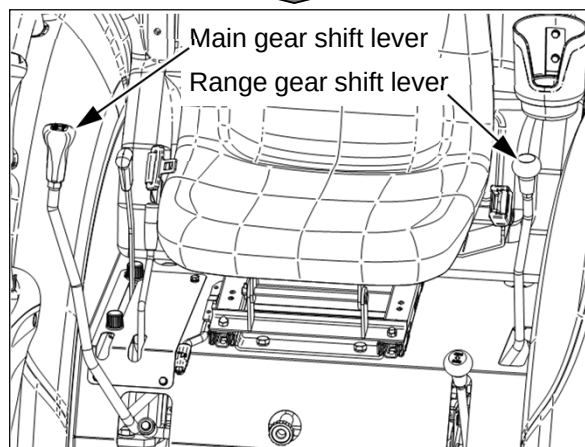
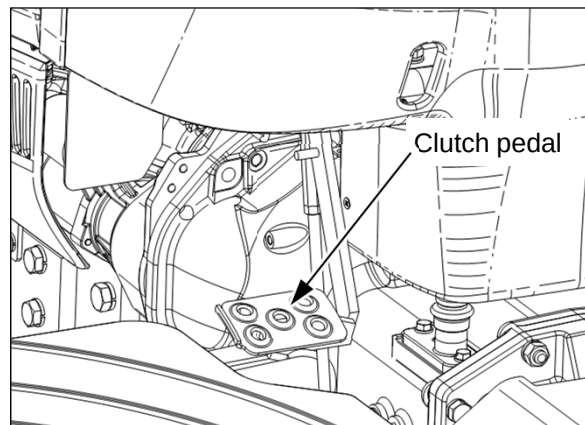
3. Press clutch pedal fully and place all the transmission gear levers (main, range, shuttle lever) on a suitable position.



4. After pressing down brake pedals, release the parking brake lever.



5. Release clutch pedal slowly with pressing down the throttle pedal slowly.

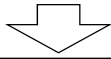


Notice

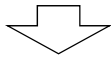
► Release the clutch pedal slowly. If not, the transmission gear life shall be reduced and it may cause a sudden start.

HST type

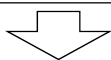
1. Lift up all the implements (front/middle/rear) from the ground after starting engine.



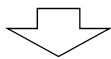
2. Set the engine speed more than 1500 rev/min.



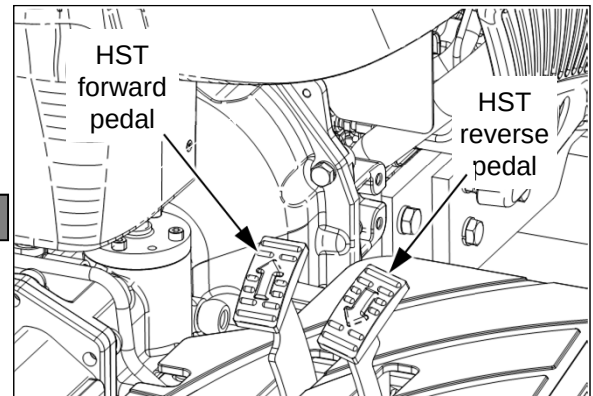
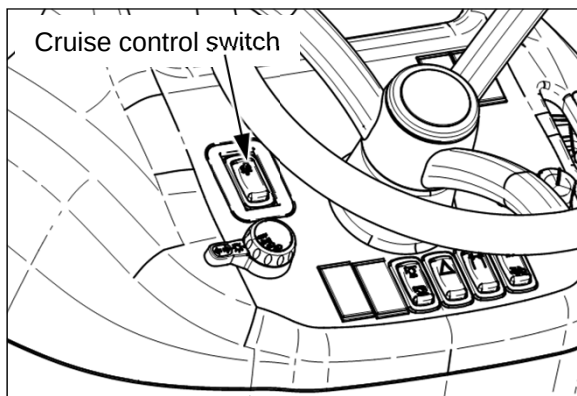
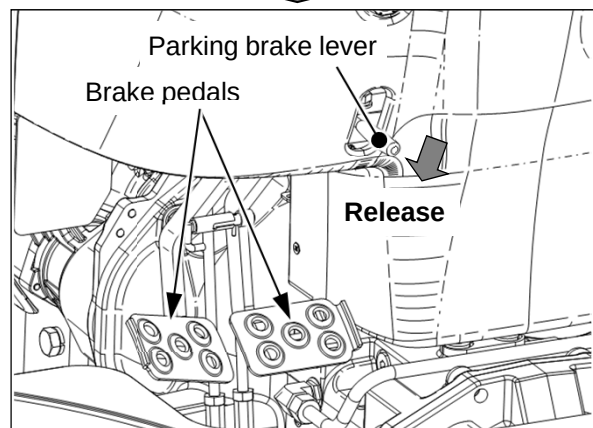
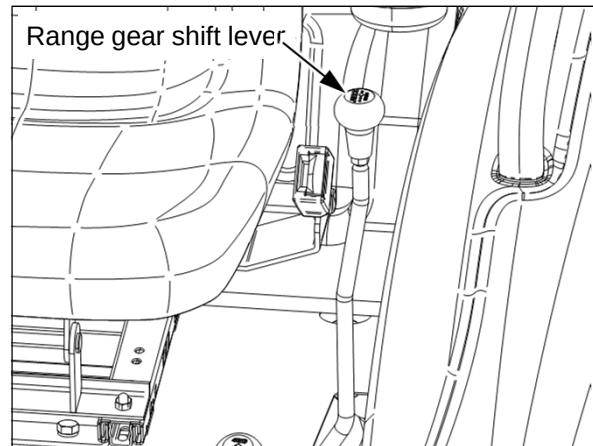
3. Press down the brake pedals and place the range gear shift lever on a suitable position.



4. After pressing down brake pedals, release the parking brake lever.



5. Press the HST forward/reverse pedal down slowly. If necessary, press down the cruise control switch for constant forward speed.



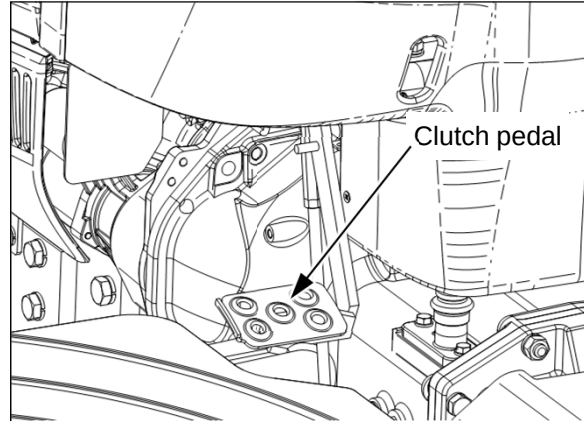
Caution

- ▶ If pressing down the brake pedals or the lower side of the cruise control switch, the cruise control drive shall be stopped.
- ▶ For HST model, there is a switch on the driver's seat to control engine cut-off for driver's safety. If the operator leaves the driver's seat without safety measures, the engine shall be stopped automatically. *(For further information, see chapter 2-1-(2)).*
- ▶ When driving or working with a HST model, operate it more than 1500 rev/min.
- ▶ Press the HST forward/reverse pedal slowly. If pressing these pedals hastily, the tractor might start suddenly.

(2) Changing speed

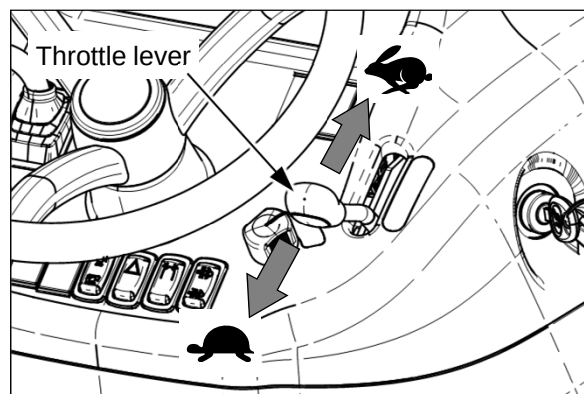
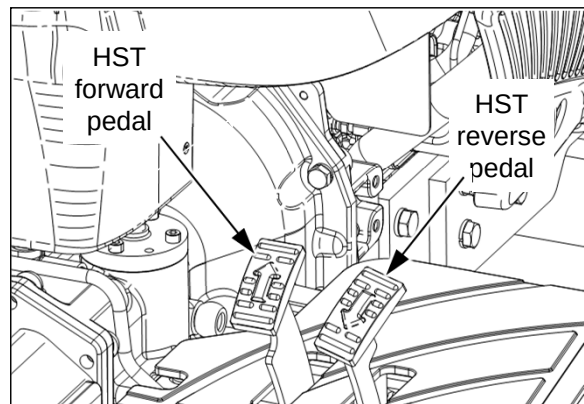
Mechanical type

- Depress the clutch pedal fully and operate all the shift levers correctly. For about operating method of the control levers and pedals, see chapter 3 in this manual.
- *Before shifting the main gear shift lever, range gear shift lever or 4WD lever,*
 - *press down the clutch pedal and brake pedals.*
 - *stop the tractor completely.*
- Set an appropriate driving speed according to the road conditions.



HST type

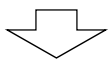
- For about operating method of the control levers and pedals, see chapter 3 in this manual.
- The driving speed of the HST models is controlled by the HST pedals depending on the displacement of the pedals.
- Set the engine speed properly with throttle lever. The driving speed is changed proportionally depending on the displacement of the lever.
- *Before shifting the range gear shift lever or 4WD lever,*
 - *release the HST pedals to be returned to the neutral position.*
 - *press down the brake pedals and stop the tractor completely.*
- Set an appropriate driving speed according to the road conditions.



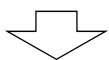
(3) Emergency Stop

Mechanical type

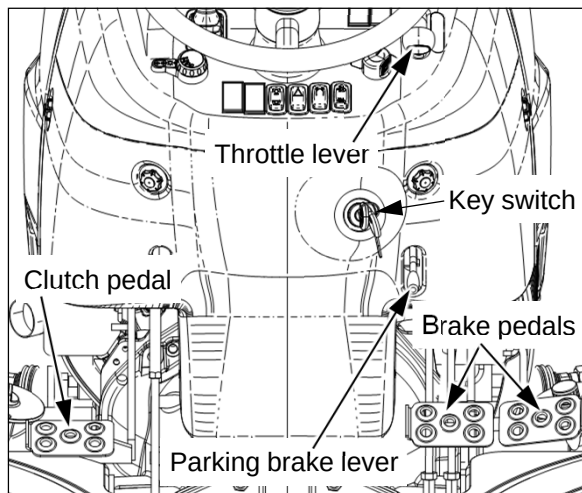
1. Press the clutch pedal and brake pedals at the same time to stop the tractor. Turn off the key switch.



2. DO NOT release the clutch pedal until all moving parts have stopped.

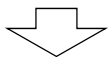


3. Apply parking brake.

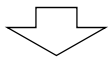


HST type

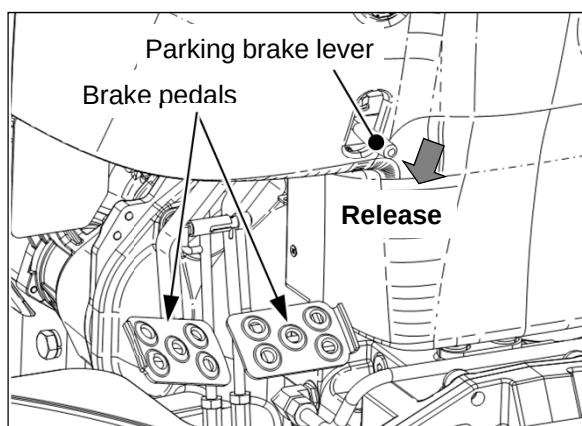
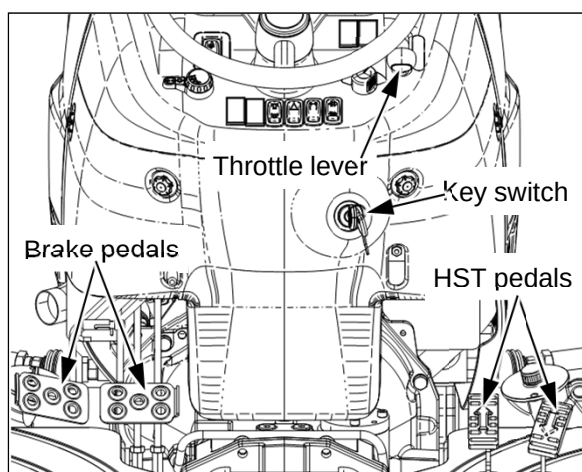
1. Release the HST forward/reverse pedal and press the brake pedals immediately.



2. Pull throttle lever backward to decrease the engine speed and turn OFF the key switch.



3. Apply parking brake.



(4) Stopping tractor

Mechanical type

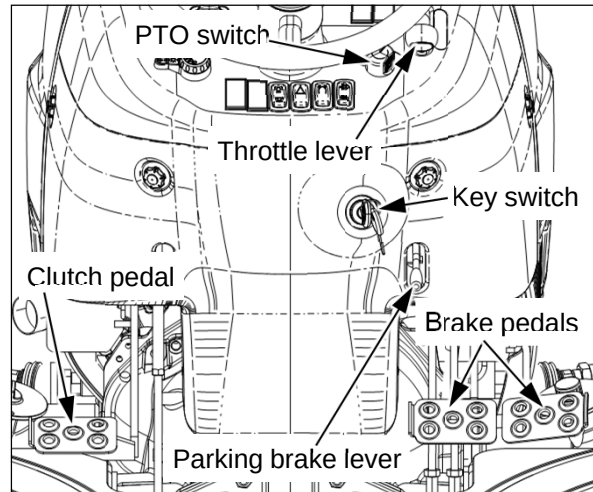
1. Press the clutch and brake pedals. Pull the throttle lever to "Low speed" position. Place the shuttle lever, main gear shift lever in NEUTRAL and PTO switch to "OFF" position.



2. Lower the implements to the ground and turn key switch to "OFF" position.



3. Apply parking brake and release the brake pedals and clutch pedal slowly.



HST Type

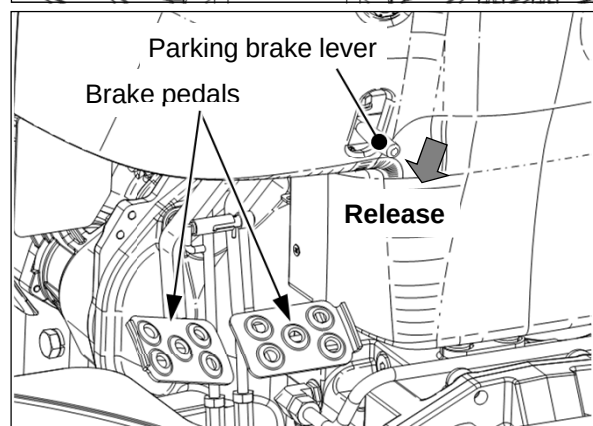
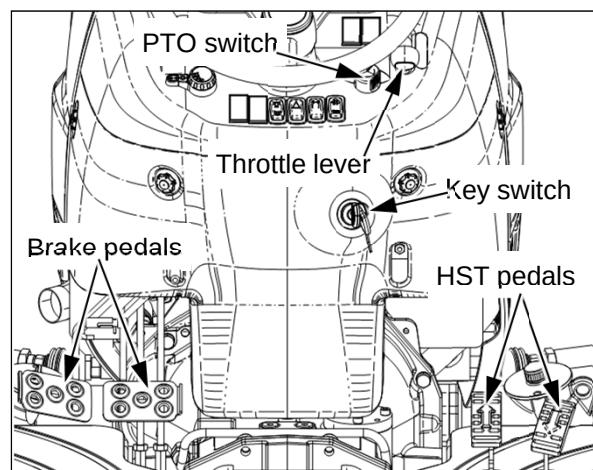
1. Release the HST forward/reverse pedal slowly. Pull the throttle lever to "Low" speed position. Place the range gear shift lever in NEUTRAL and PTO switch to "OFF" position.



2. Lower the implements to the ground and turn key switch to "OFF" position..



3. Apply parking brake and release the brake pedals slowly.

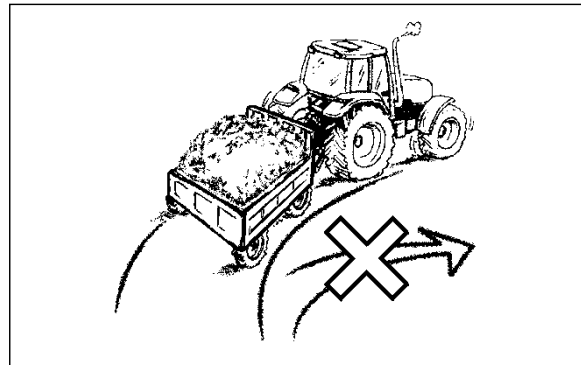
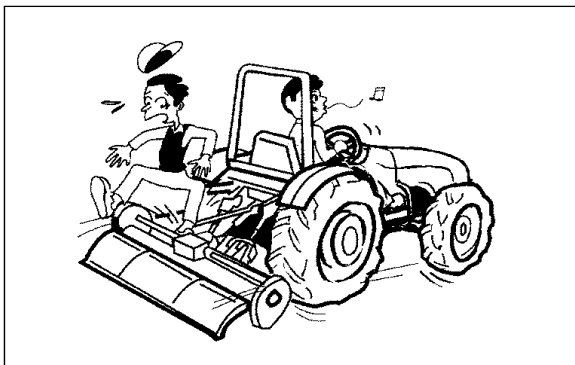
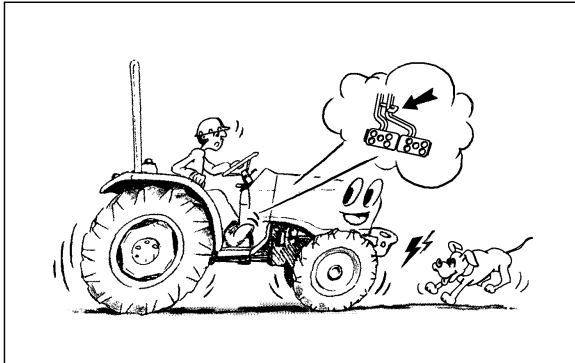


Caution

- ▶ DO NOT depart from the tractor with the transmission gear placed in NEUTRAL and the parking brake is not applied. The tractor may roll down. Apply the parking brake at all times before leaving the tractor.
- ▶ Remove the ignition key always after stopping engine.

(5) Driving tractor on the road

- When facing downhill, DO NOT place the transmission gear lever in neutral position.
- When driving the tractor on an unpaved road with a heavy rear implement on the 3-point linkage, do not drive fast and do not lift up the implement to the highest position. The hydraulic lift system may be damaged by vibration and impact. In this case, place the position control lever on the 3/4 rising position of the full stroke and select an appropriate driving speed before entering the unpaved road.



 Caution	▶ Connect the left/right brake pedals with brake pedal latch before driving. (if fitted) ▶ Avoid a sudden start, sudden brake and sudden turning. ▶ DO NOT allow people on the tractor or on other implements. ▶ DO NOT place the baggage on the tractor or implement. ▶ Place PTO gear lever in neutral position and put the PTO switch in "OFF" position. ▶ DO NOT use the differential lock pedal and front wheel drive(4WD). ▶ When traveling with implement on the rear 3-point linkage, tighten stabilizers to avoid lateral movement. ▶ When traveling with implements, turn slowly by wide turning radius. ▶ While traveling, do not ride your foot on the clutch pedal(if fitted) or brake pedal(s). ▶ While traveling, do not operate any implement such as tiller, loader and etc.
---	--

(6) Parking

- Stop the tractor on a level surface, not a slope.
- Disengage PTO and place all the transmission shift levers in NEUTRAL position.
- Lower the mounted implements on the ground.
- Apply parking brake.
- Stop engine and remove ignition key.
- Before you leave the operator's station, wait for engine and all moving parts to stop.
- Apply wheel chocks to the wheels when parking the tractor on a slope unavoidably.



Caution

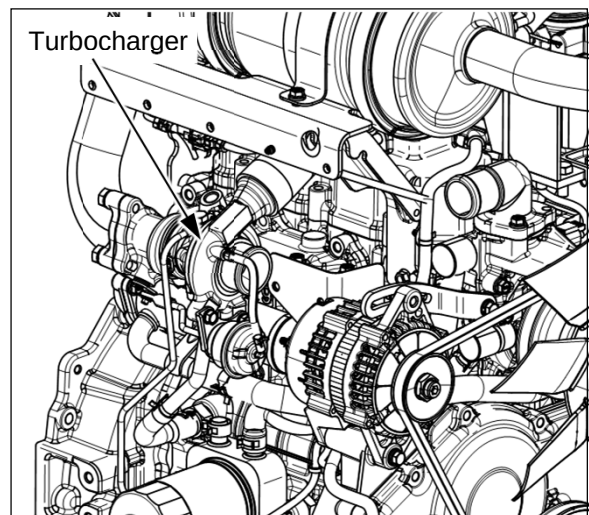
► If it is necessary to park the tractor on a slope, furthermore with loaded trailer, the tractor may roll down, even though the parking brake is applied. In this case, apply all the gears in lowest speed and apply wheel chocks or blocks to the all tires.

- **Mechanical:** downhill ⇒ reverse 1 gear / uphill ⇒ forward 1 gear.

- **HST type:** Apply the lowest gear of the range gear lever.

(7) Handling the Turbocharger (if fitted)

- Before accelerating or working the tractor fitted with the turbocharger, allow the engine to idle at 1000 rpm for about 1 minute to ensure that the turbocharger is correctly lubricated.
- Before stopping engine fitted with the turbocharger, allow the engine to idle at low rpm for about 2 minutes. This allows the turbocharger and manifold to cool, preventing deformation of the components.
- After stopping engine fitted with the turbocharger, cover the exhaust tail pipe to prevent the turbocharger rotating in the wind, resulting in possible damage to the bearings. The turbocharger turbine must be prevented from rotating freely with the engine off, as the shaft bearings will not be lubricated.



4-3. How to handle new tractor

(1) Check points

※ For new tractor, the following must be checked once again even though there was sufficient quality management, inspection, regulating of each part in the factory.

- Appearance check
 - Is there any damage while transporting?
- Engine cooling system check
 - Is there anti-freeze solution in the radiator?
 - And any leakage?
- Fuel system check
 - Is there any leakage of fuel in the fuel system?
- Oil level check
 - Is there optimal oil amount in each part ?
- Electric system check
 - Is there any cut-off or any other problem in the wiring?
 - Is there any problem to operate the instruments?
 - Is the state of battery charging sufficient?



(2) Notices in handling new tractor

- To get the best performance, comply with the following.

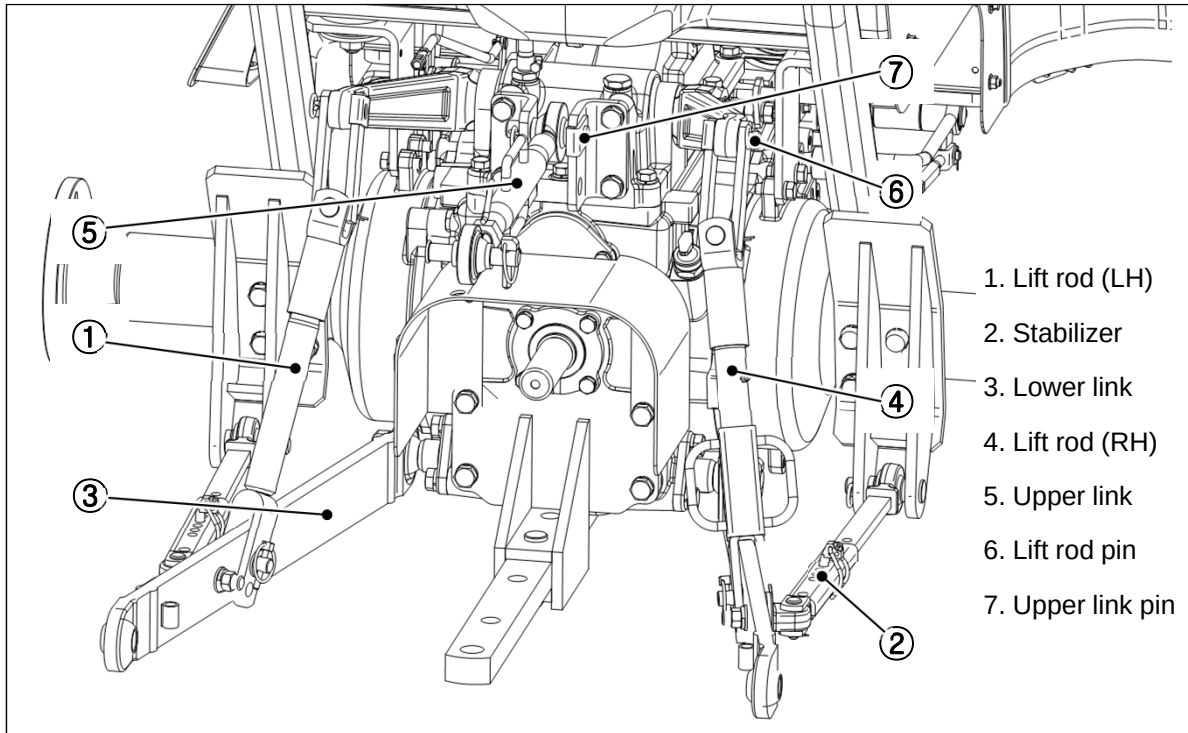
- DO NOT start or stop the tractor suddenly.
- DO NOT carry out heavy loaded work and DO NOT increase the engine rpm to high speed suddenly.
- Despite warm temperature outside, carry out warming up the engine for approximately 5 minutes at 1500 rev/min



- After using first 50 hours,
 - Replace the engine oil filter and hydraulic oil filters after first 50 hours of work, and check each part of your tractor as reference of chapter 5. "Lubrication and Maintenance" (See chapter 5-4 in this manual.)
 - If possible, contact your authorized local dealer for "First 50 hour check".

4-4. Attaching Equipment

(1) 3-point linkage

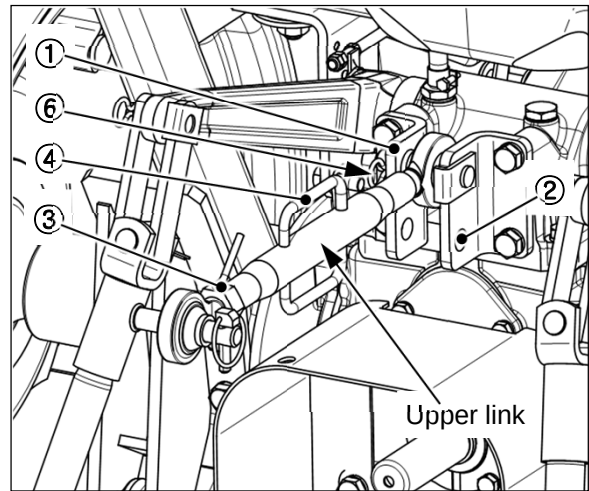


- When attaching a rear implement, comply with the followings.
 1. Set the rear implement upright on a level surface and approach the implement in reverse.
 2. Stop the tractor on a adaptable attaching position and apply the parking brake.
 3. Connect lower link(3) to the implement and insert the lock pin firmly. (left, right)
 4. Connect upper link(5) to the implement and insert the lock pin firmly. Wide adjustable range of the upper link provides you easier attachment.
 5. Fix the implement firmly with stabilizer(2).(left, right).

! Warning	► Before attaching/detaching implement, place PTO switch in OFF position, and apply the parking brake.
	► When attaching/detaching implement, make sure to assemble and tighten the connecting parts correctly. ► If the tractor is used to tow heavy loads, always use the approved drawbar or hitch to avoid injury. Never connect to lower link or upper link of 3-point linkage. If not, it may cause tipping or turnover. ► DO NOT connect the implements that require larger power than can be generated by your tractor. ► Never stand between implement and tractor when connecting implement. ► DO NOT change the setting pressure of the relief valve arbitrarily to increase the lift capacity of the 3-point linkage. It can cause fatal damage to the hydraulic system.

① Upper link installation and adjustment

- Select a suitable attaching hole on the top link bracket(1) depending on the rear implement.
- Adjust the length of the upper link with turning the handle(4) after loosening locking nut(3).
- After adjusting, fasten the locking nut(3).
- **Adjustment range: 430~654mm (16.9~25.7 in.)**

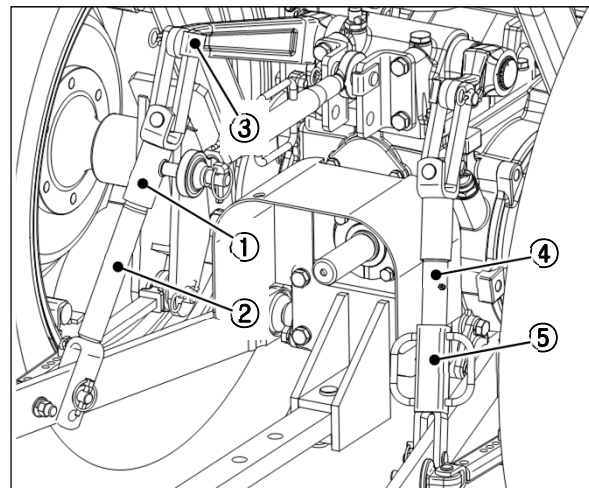


 Caution	► Do not adjust the length of the upper link over the maximum limit. It may cause fatal injury or death by falling object.
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Notice	► Insert snap-pin(6) firmly to prevent the upper link pin(5) from being escaped.
----------------------	---

② Adjustment of the lift rod's length (Left/ Right)

- For lift rod (LH), remove lift-rod pin(3) and detach the upper side from the lift arm and adjust the length by turning the upper side (1).
- Adjustment range : 480~530mm (18.9~20.9 in.)
- For lift rod (RH), lift up the handle(5) and turn it to the clockwise to reduce the rod. Otherwise, the lift-rod is extracted.
After the adjustment, push down the handle(5) and fix it firmly.
- Adjustment range : 450~565mm (17.7~22.2 in.)

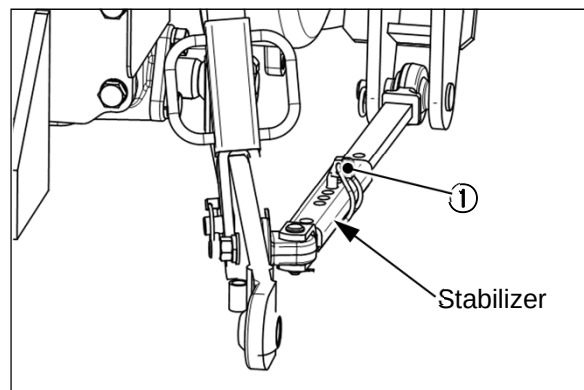


 Caution	► Do not adjust the length of the lift-rod over the maximum limit. It may cause fatal injury or death by falling object.
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③ Adjustment of stabilizer

① Telescopic type

- Pull up the link pin(1) and find a adaptable hole with adjusting the stabilizer's length.
- Insert the link pin(1) into the hole and let it tightened firmly by locking spring.



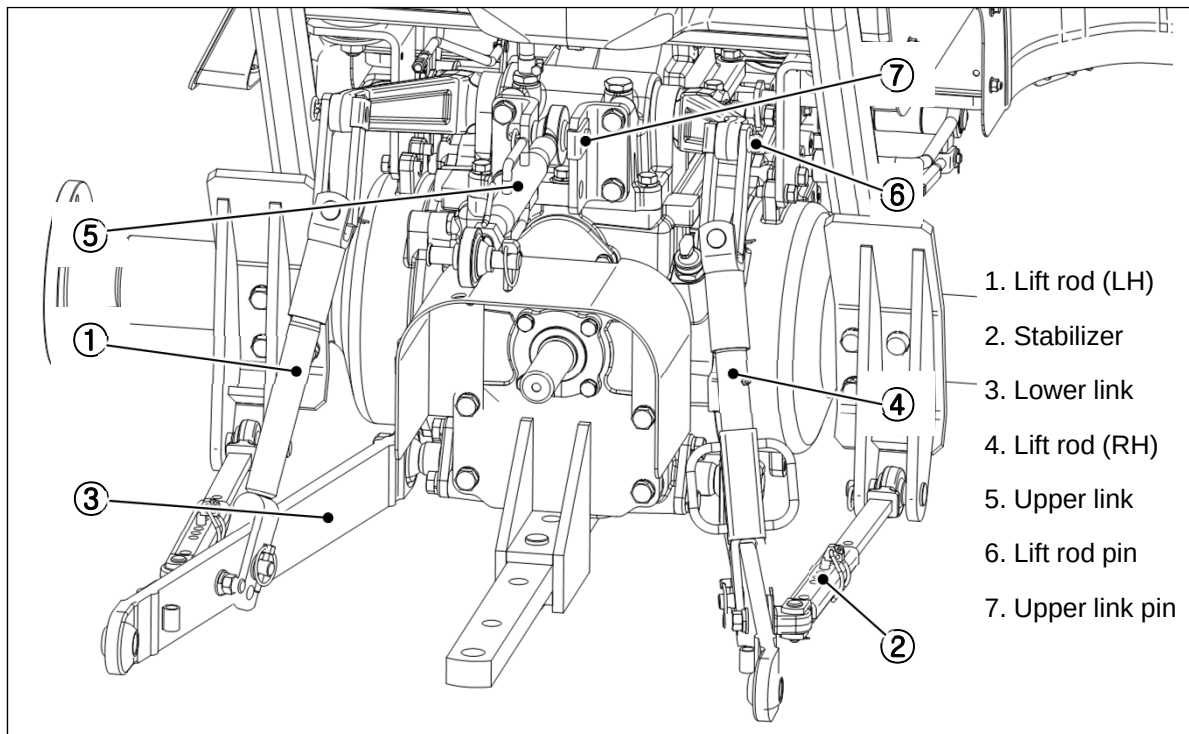
Notice	► When adjusting the stabilizer's length, set the lateral swinging clearance of the implement to be 20~40mm. (0.8~1.6 in.)
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④ Reference of Implement installation part

	A	B	C (Max)	D (Min)	E (Max)	F (Min)	G	H	J	K	L	N
CAT.1	19 (0.74)	19.3 (0.75)	44 (1.73)	76 (2.99)	69 (2.71)	44.5 (1.75)	22 (0.86)	22.4 (0.88)	35 (1.53)	39 (1.53)	12 (0.47)	683 (26.8)

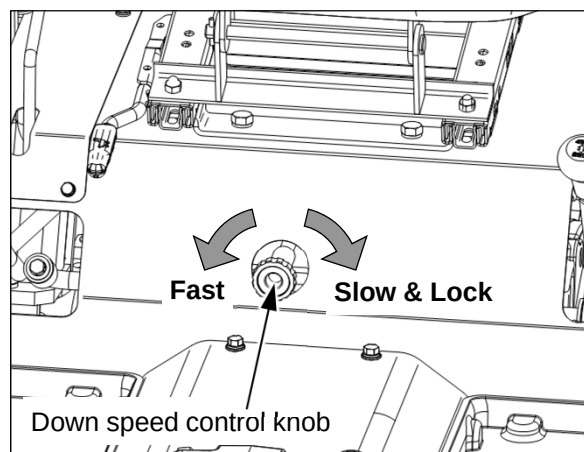
Unit : mm
(unit : inch)

⑤ Handling of the 3-point linkage



- When driving the tractor without attached implement, comply with the followings;
 1. Connect upper link(5) to the fixing hook installed in front of the upper link.
 2. Connect stabilizer(2) to the lower link(3) to avoid the lateral movement of the lower link.
 3. Connect the lower link strap(optional) to the both lower links(3). (if fitted, chain type stabilizer only)
- If the 3-point linkage is not necessary, remove it as follow.
 1. Remove upper link pin(7), and detach the upper link(5).
 2. Detach the rear side of the stabilizer(2) from the lower link(3) while holding the lower link tightly not to fall down.
 3. Remove lift rod (LH), lift rod (RH) and stabilizer(2) step by step.
 4. Remove lower link(3) carefully not to get hurt due to its own weight.
- When using hitch/drawbar, or driving on the road, lift up the 3-point linkage and fix it by turning the down speed control knob to the locking position.

 Caution	► The parts of 3-point linkage are very heavy. When handling them, take care not to get injury. PLEASE BE CAREFULL !
--	---



(2) Power take-off (PTO) shaft

① Safety precautions

- When PTO shaft is rotating, NEVER APPROACH the shaft.
- Check if PTO shield is attached correctly. If the shield is removed or damaged, replace it with a new one.
- **Suitable Clothes & Protect Entanglement :**
When checking or attaching implement to the PTO shaft, wear tight fitting clothes and safety equipment instead of loose or long clothes. Also, slippers, high heel shoes are not suitable. Wear the suitable clothes.

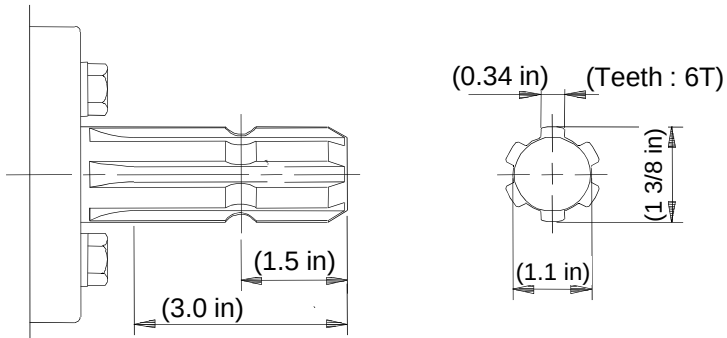


 Warning	► Do not approach the rotating shaft such as PTO shaft or cooling fan, especially, with loose and long clothes. The entanglement in rotating shaft can cause serious injury or death. Stop the engine and be sure to check that the PTO shaft has been stopped completely before getting near it.
	

② Specification and dimension of rear PTO shaft

- Check the specification of the rear PTO shaft before attaching implement. The spline teeth may be different depending on the market as followings.

- Spline Teeth : 6T (Where fitted)

PTO gear(s)	1
PTO / Engine speed	540 / 2409 rpm
Rotation direction	Clockwise (When looking at PTO shaft end)
Shaft dimension (Unit : inch)	

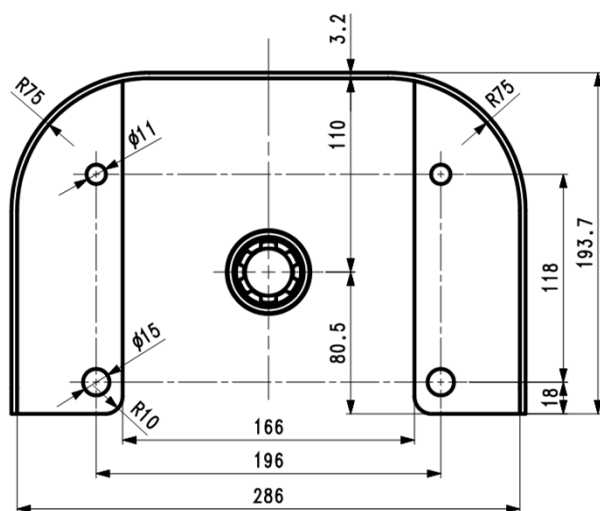
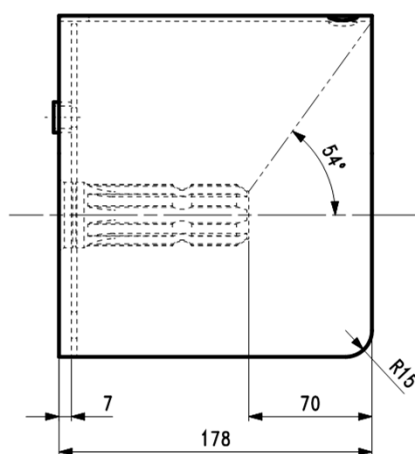
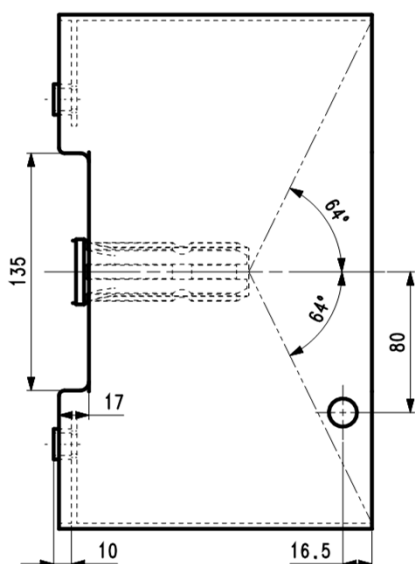
③ Attaching power take-off(PTO) drive shaft

- When connecting PTO drive shaft to the PTO shaft and implement, make sure to check that the locking pin of the PTO drive shaft is locked in place.
- When attaching PTO drive shaft, refer to the drawings as below for safety clearance zone.
- After installing implement(s), check the followings according to the position of the 3-point linkage.
 - check the articulation angle of the PTO drive shaft and rotating noise is suitable.
 - check the interference with PTO safety cover and other structure.
 - check the effective engaging length of the PTO drive shaft.



Caution

► The steep inclination of the PTO drive shaft makes a loud noise and cause a failure of the PTO driveline. When working in the field, do not lift up the rear implement over the manufacture's limitation **that the maximum articulation angle of the PTO drive shaft is 18 degree when the PTO drive shaft is rotating.**

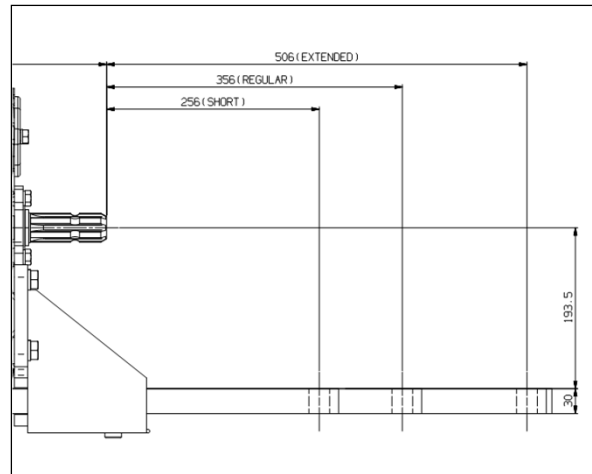
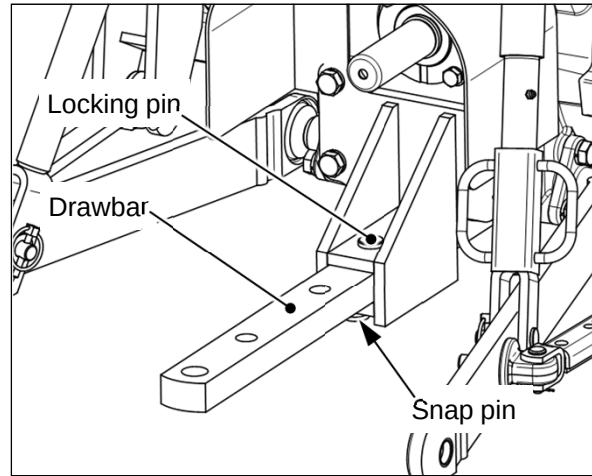


(3) Hitch and Drawbar (optional)

- When attaching towed equipment, use the hitch or drawbar. DO NOT use the 3-point linkage or other parts. If so, the tractor could turnover.
- When attaching/detaching towed equipment, be sure to check the pins locked in place correctly.
- DO NOT exceed the maximum permissible vertical and horizontal load of the couplings.

① Drawbar

- It is used to tow the equipment having 2 axles.
- It is available to adjust the length of the drawbar after removing snap pin and locking pin in the right figure. After adjusting, assemble the pins firmly.
- Vertical load :
350kg (772 lb) (at regular position)
450kg (992 lb) (at short position)
Horizontal load : 2800kg (6173 lb)



② Technically permissible maximum towable mass(es)

- The maximum permissible towable mass is depending on the brake system type on the towed equipment as below. Check the brake system of your towed equipment.

	Drawbar w/clevis
Unbraked towable mass	N/A
Inertia-braked towable mass	2800kg (6173 lb)
Hydraulic & Pneumatic braked towable mass	N/A

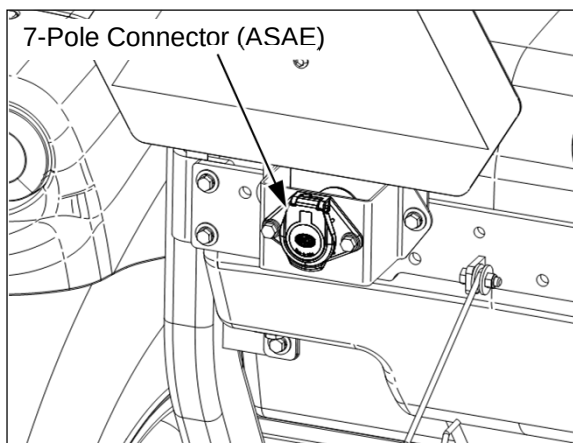
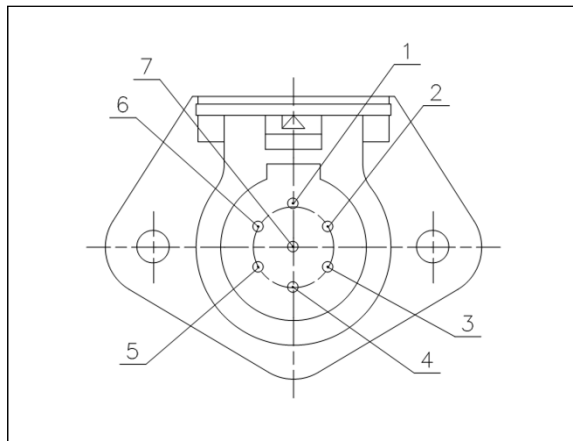
Caution	▶ Use always the drawbar or hitch for pulling work. DO NOT use the 3-point linkage, rear axle or other parts. If so, the tractor could be overturned. ▶ When attaching/detaching towed equipment, apply the parking brake and stop the engine before applying the locking pins manually. ▶ Before transporting equipment on public roads, make sure you comply with your local traffic regulation.
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(4) 7-Pole connector (optional)

- One of the standard 7-pole trailer connectors is provided and is mounted at the rear of the tractor. The connections of the 7-pole connector (viewed from the rear of the tractor) are as follows;

- **ASAE Version**

Pin No.	Function
1	Ground (Earth)
2	Working light
3	Left turn signal light
4	Brake light
5	Right turn signal light
6	License number plate light
7	Auxiliary



(5) Technically maximum permissible mass

- When working with front loader or rear heavy loaded attachments installed to the 3-point linkage, install ballast weights on the counter-part axle to maintain the front and rear weight balance of the tractor. If not, front or rear axle can be strained by the overloaded weight.
- When working with the front loader, place the attached rear weight to the highest position and turn the down speed control knob to the "lock" position.
- **DO NOT exceed the total maximum permissible mass and/or permissible maximum mass on each axle** declared by manufacturer as below, **even if the load capacity of the tire is sufficient.**
- **If the load capacity of the tires is lower than maximum permissible mass on each axle**, the maximum mass on each axle must be loaded **under the load capacity of the tire.**

Check the load capacity of the tires.

	All models	Remarks
Technically total maximum permissible mass	2922kg (6442 lb)	It depends on the load capacity of the tires. (See next page)
Front axle (*)	1320kg (2910 lb)	
Rear axle	2105kg (4641 lb)	

* includes front mounted equipment or loader in the raised position but without load in the bucket.

- **Restrict operation:** In case that driving speed of the tractor does not exceed 8km/h (5 mph) and standard front/rear wheel tracks (*refer to the chapter 4-4-(7), "Adjusting wheel track and tire replacement" in this manual*) are applied, the intermittent maximum permissible load of the front axle can be 1995kg (4398 lb). But, it is restricted by the load capacity of the tires. (*See next page*)

 Caution	▶ Maximum permissible mass is measured with only the front or rear wheels on the scales inclusive of ballasts and with mounted equipment in the raised position. ▶ Do not exceed the maximum permissible mass above and/or the load capacity of the tires. Overloaded operation may invalidate the warranty. ▶ DO NOT change the setting pressure of the relief valve arbitrarily to increase the lift capacity of the front loader or 3-point linkage. It can cause fatal damage to the hydraulic system and front axle.
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(6) Tires and Load capacity

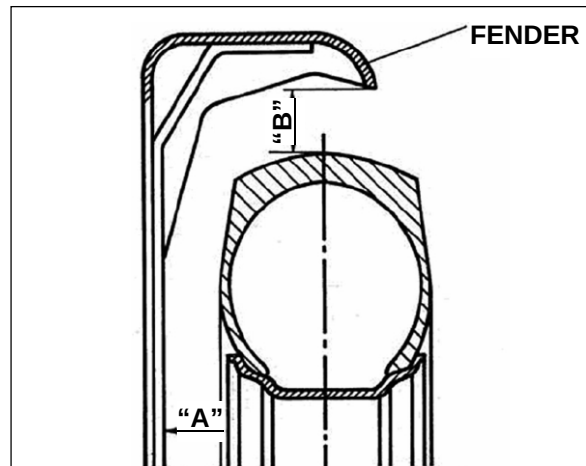
- For safe operation and secure the reliability of the driveline, use only approved tire combination and manage the specified tire air pressure regularly as below table. If using an unapproved tire combination or unsuitable tire air pressure, it may cause failure of the front/rear axle and reduce the reliability of the driveline.

Axle No. (*)	Tires	Standard air pressure (kg/cm ²)	Load rating per tire (kg)	Max. mass per axle (kg)	Maximum mass (kg)
1	10-16.5 6PR HS610 R-4	3.2 (325 KPa, 46 psi)	1610 (3549 lb)	1320 (2910 lb)	2922 (6442 lb)
2	17.5L-24 6PR 132 A6 R-4	1.4 (140 KPa, 20 psi)	2000 (4410 lb)	2105 (4641 lb)	
1	8.3-16 6PR R-1	2.4 (240 KPa, 34 psi)	544 (1200 lb)	1088 (2400 lb)	2922 (6442 lb)
2	14.9-24 8PR R-1	1.8 (180 KPa, 26 psi)	1596 (3520 lb)	2105 (4641 lb)	
1	29x12.50-15 R-3	1.4 (140 KPa, 20 psi)	598 (1320 lb)	1197 (2640 lb)	2922 (6442 lb)
2	44x18.00-20 R-3	1.4 (140 KPa, 20 psi)	1551 (3420 lb)	2105 (4641 lb)	

(*) 1 : Front axle, 2 : Rear axle

(7) Adjusting Wheel tracks and tire replacement

- If the front wheel track is adjusted, check the clearances between tires and tractor body case by case. If necessary, the steering angle must be adjusted.
(refer to the chapter 4-4-(9) "Adjusting steering angle" in this manual.)
- When adjusting rear wheel track, check the radial and lateral clearance between rear tire and tractor chassis as below.
 - A : 40mm (1.6 in) (Minimum)
 - B : 60mm (2.4 in) (Minimum)
- Depending on rim or disk type, the front and rear wheel tracks may vary. For the details, contact your authorized local dealer.



① Front wheel track

- 10-16.5 6PR with rim & disk (W8.25x16.5) – Not available
- Standard track : 1244mm(49.0 in.)

② Rear wheel track

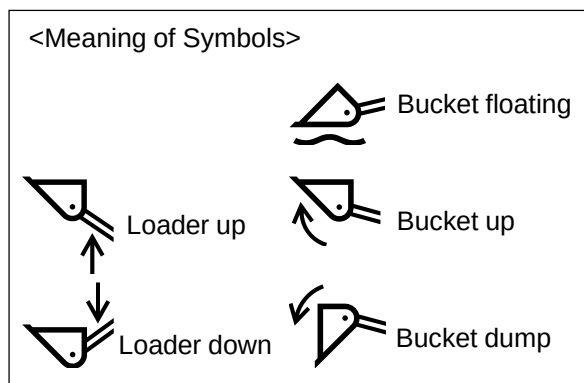
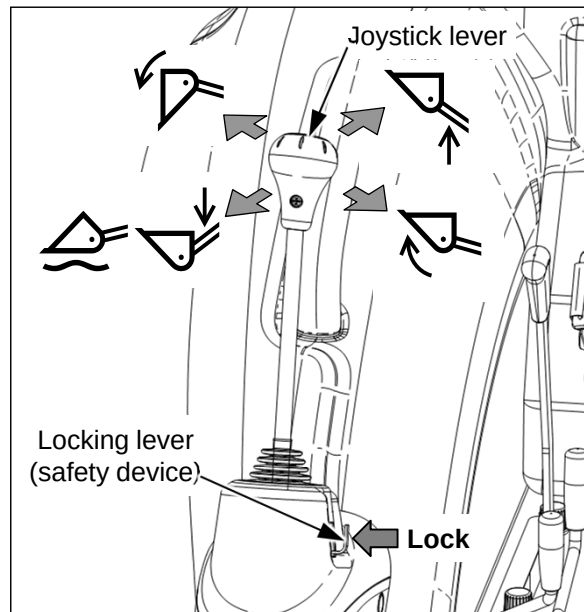
- 17.5L-24 6PR with rim & disk (W15x24) – Not available
- Standard track : 1326mm(52.2 in.)

 Warning	▶ The tractor wheels are very heavy, PLEASE BE CAREFUL. ▶ When removing the wheels, proceed with extreme caution, use a suitable hoist and specific equipment to move heavy parts.
Notice	▶ When adjusting the wheel track, pay attention to the direction of tire lugs. If it shows "Λ" shape when looked behind, it is correct. ▶ Actual settings may vary depending on the brand of the rim and type of tire.

(8) Using Front-end loader (optional)

① Safety precautions

- If attaching a non-approved front-end loader or heavy front-mounted implement, engine block or front axle can be damaged or broken. Contact your authorized local dealer.
- DO NOT attach any non-approved front-mounted implement by manufacturer. If it is ignored, and any warranty is not effective no longer.
- If an approved front-end loader is attached, multi-functional joystick lever in the right figure can provide you more convenient operation.
- When operating the tractor with front-end loader, The center of gravity of the tractor may be higher, and the stability of the vehicle may be worse than unattached vehicle.
 - DO NOT drive fast on a traffic load. The rolling or tipping of the tractor can be happened easily.
 - When loading/unloading the bucket on a slope, move the tractor straight against the slope.
 - DO NOT try to approach a stiff slope.
 - Attach the rear ballast on the 3-point linkage or rear wheels(if applicable) to prevent overload of the front axle and to improve the stability of the vehicle.
- When working with front-end loader, the front visibility of the tractor may be worse than unattached vehicle. Have to observe people and other vehicles around the tractor.
- DO NOT allow people under the front-end loader while lifted.
- DO NOT allow people on the bucket.

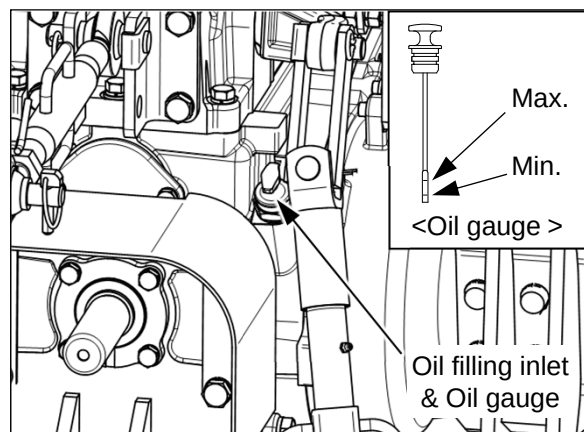
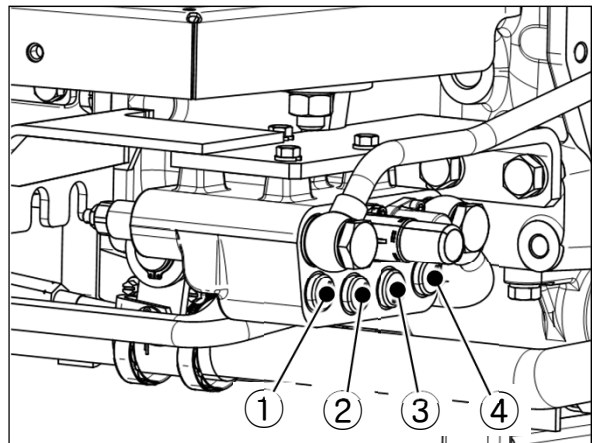


 Warning	TO AVOID PERSONAL INJURY ! ▶ After using the front-end loader, push the locking lever to the lock position. ▶ When leaving the tractor, lower down the front-end loader on the ground. ▶ Do not lift the front-end loader to a height from which objects may fall or roll onto the driver. ▶ Use always the correct attachment (grab forks, buckets.. etc.) for the specific task to perform and ensure that the load is securely kept in place.
--	---

 Caution	PRE-OPERATION CHECK, REAR BALLAST ! ► For tractor stability and operator's safety, rear ballast should be added to the rear of the tractor in the form of implements as counter weight like Back Hoe, Rotary Tiller, etc. The amount of rear ballast will be depend on the application.
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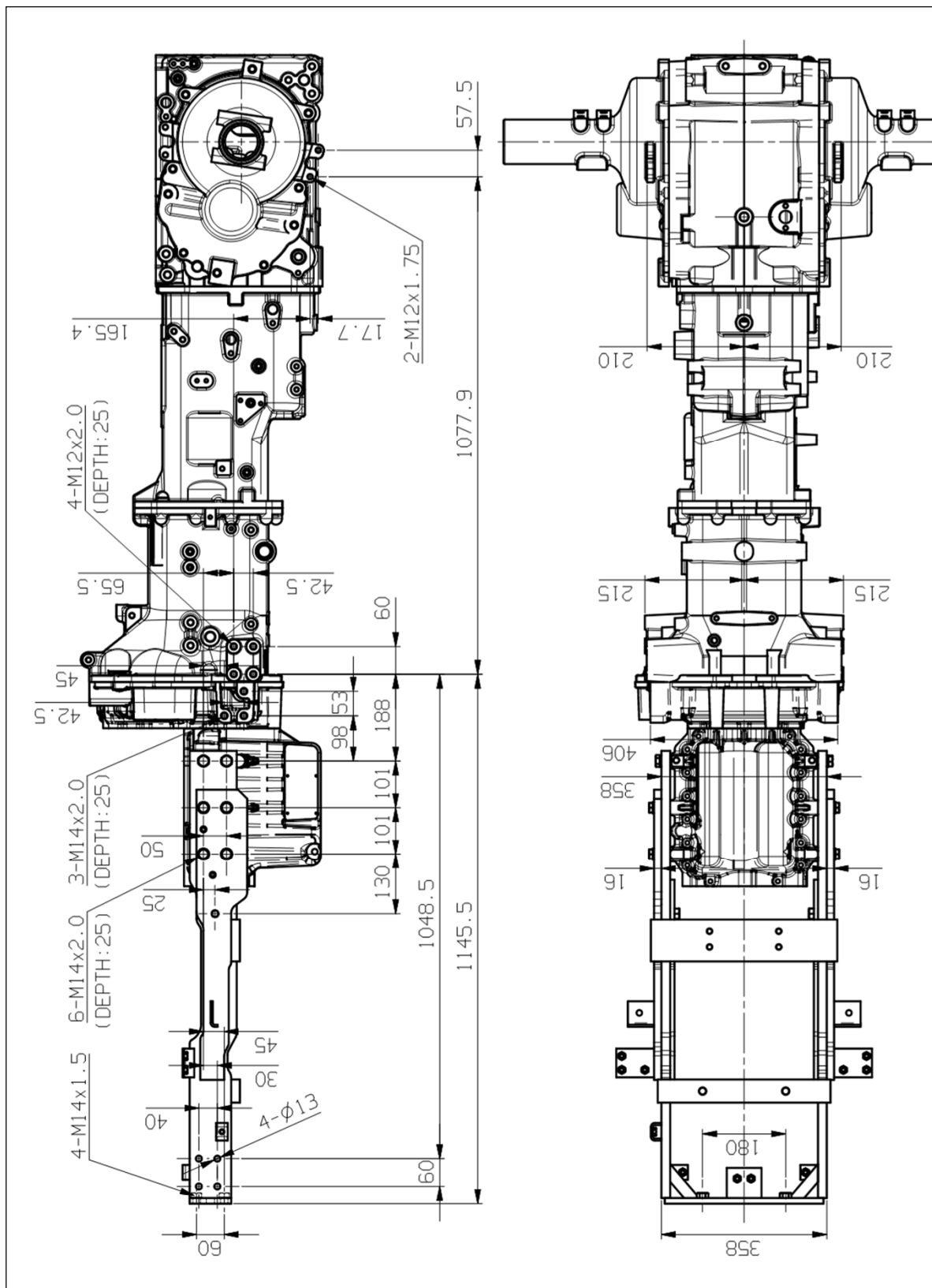
② Connection of hydraulic hoses

- Refer to the following instruction for hydraulic hoses connection.
- Boom lowering – outlet 1
Boom lifting ----- outlet 2
Bucket lifting ----- outlet 4
Bucket dump ----- outlet 3
- The thread specification of outlet ports is PF 3/8. Use suitable quick couplers for hose connection. If possible, contact your authorized local dealer.
- After connecting the hoses, start the engine and check the leakage of the hydraulic lines.
- Operate 2~3 times fully all the hydraulic actuators on a newly attached front implement to exhaust air from the system.
- After lowering the front implement, check if the transmission oil level is marked between “Min” and “Max” scale on the oil gauge. If necessary, add new oil.



③ Attaching points for Front-end loader

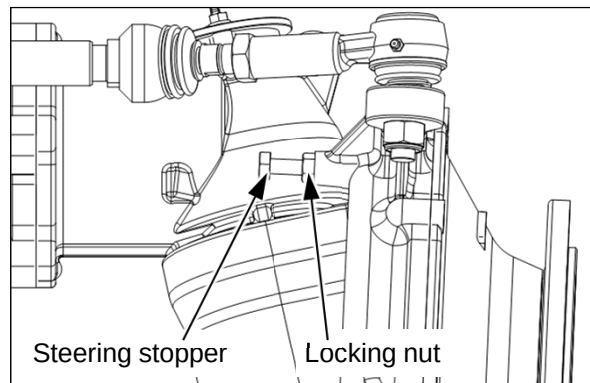
- When attaching the front-end loader, refer to the drawings as below.



(9) Adjusting Steering Angle

- The steering angle must be checked or adjusted in case of;
 - If the front wheel track is adjusted.
 - When the front tires are replaced with new one having bigger diameter or width.
 - When installing a front implement such as front-end loader.
- Comply with the following instructions.

- 1) Loosen the locking nuts on both sides.
- 2) Connect the front hook of the tractor to the suitable hoist by using a specified wire. And, lift up the front axle off the ground sufficiently.
- 3) Lift up one side of the front axle fully and turn the steering wheel to the left and right with checking that the clearances between tires and other parts are **over 20mm (0.8 in.) at least.**
- 4) At this time, set each steering stopper of the both sides to be contacted with the cast. Check all the possible interferences by combinations of the steering and oscillation of the front axle.
- 5) Tighten the locking nuts of the both sides.



Notice	► DO NOT shorten the length of the steering stopper rather than factory condition. If the stopper does not contact to the cast at maximum steering condition, it can cause damage to the steering cylinders and linkage.
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(10) Recommended Maximum Specification of Implements

- When attaching implements to the tractor, refer to the following specifications recommended as maximum capacity of each implement. DO NOT attach bigger implements than these specifications. For other implements, contact your authorized local dealer.

No.	Implements	Specification	MT345E/MT345HE	MT350E/MT350HE
1	Trailer	Max vertical load	See chapter 4-4-(3) in this manual	
2	Mid mower	Max cutting width	1829 mm (72 in.)	←
3	Rear mounted mower	Max cutting width	1829 mm (72 in.)	←
4	Flail Mower	Max cutting width	1880 mm (74 in.)	←
5	Sickle Bar	Max cutting width	1900 mm (74 in.)	←
6	Rear mounted Sprayer	Total weight	500 kg (1102 lb.)	←
7	Pull type Sprayer	Total weight	See chapter 4-4-(3) in this manual	
8	Rotary Tiller	Max tilling width	1880 mm (74.0 in.)	←
9	Furrow Plow	Max tilling width	1700 mm (67.0 in.)	←
10	Bottom Plow	Maximum size	1350 mm (53.0 in.)	←
11	Disk harrow (pull type)	Max working width	1880 mm (74.0 in.)	←
12	Chisel Plow	Max working width	1500 mm (59.0 in.)	←
13	Front grader	Max working width	1880 mm (74 in.)	←
14	Rear blade	Max working width	1880 mm (74 in.)	←
15	Front loader	Max lift capacity (Bucket pivot point)	1013 kg (2229 lb)	←
16	Landscape Rake	Max working width	2134 mm (84 in.)	←
17	Box blade	Max working width	1829 mm (72 in.)	←
18	Backhoe	Max weight (W/O Bucket)	485 kg (1069 lb)	←
19	Snow Blade	Max. width	1829 mm (72 in.)	←
20	Snow Blower	Max. working width	1829 mm (72 in.)	←

4-5. Driving speed

- The driving speed of the tractor or the revolution speed of the PTO shaft has to be selected appropriately depending on the type of work, tires or ground conditions. For safety, operate the tractor at a suitable speed.
- **Driving speed (unit : Km/h -> Mile/h)**

Mechanical Type

- Front tires : 10-16.5 6PR / Rear tires : 17.5L-24 6PR

Range gear	LOW				HIGH			
Main gear	1	2	3	4	1	2	3	4
Forward (km/h)	2.2	2.7	4.5	6.8	8.1	10.0	16.3	25.0
(mph)	(1.4)	(1.7)	(2.8)	(4.2)	(5.0)	(6.2)	(10.1)	(15.5)
Reverse (km/h)	2.3	2.9	4.7	7.2	8.5	10.4	17.1	26.1
(mph)	(1.4)	(1.8)	(2.9)	(4.5)	(5.3)	(6.4)	(10.6)	(16.2)

Note) Engine rated speed: 2600 rev/min, Dynamic load radius: 586mm (23.1 in.)

HST Type

- Front tires : 10-16.5 6PR / Rear tires : 17.5L-24 6PR

Range gear	L	M	H
Forward, km/h (mph)	0~5.0 (0~3.11)	0~12.5 (0~7.75)	0~25.4 (0~15.79)
Reverse, km/h (mph)	0~5.0 (0~3.11)	0~12.5 (0~7.75)	0~25.4 (0~15.79)

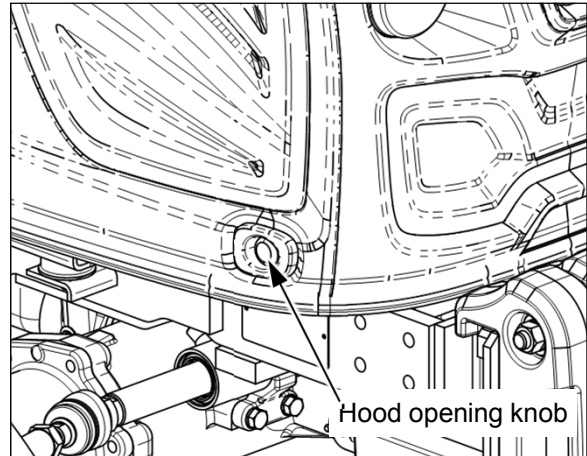
Note) Engine rated speed: 2600 rev/min, Dynamic load radius: 586mm (23.1 in.)

5. Lubrication and Maintenance

5-1. Access for maintenance

① Opening Hood

- For safety, the hood must be closed and correctly latched before operating the tractor.
- The hood is hinged at the rear and a gas cylinder is attached to provide easy access to the engine for check and maintenance.
- To open the hood, push the hood opening knob and lift the hood up.
- To close the hood, pull the hood and push it down to the locking position slightly.

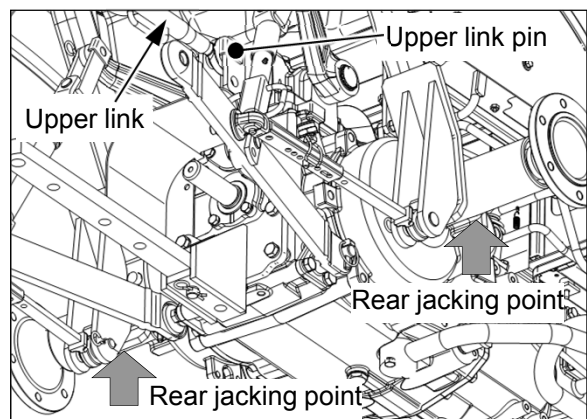
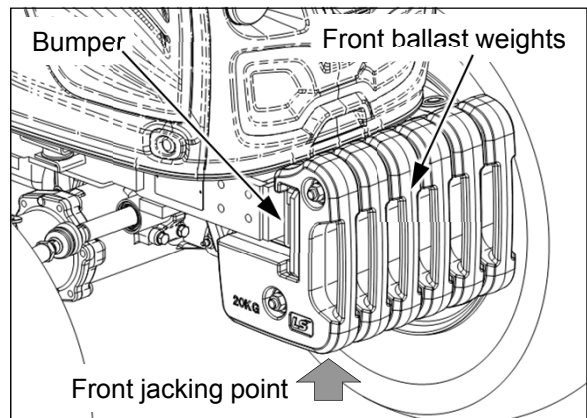


Caution

- ▶ After the engine has stopped completely, you have to open the hood for checking.
- ▶ If you open the hood while the engine is running, it can cause serious damage by intended or unintended access to the rotating shaft, pulley, V-belt, cooling fan of the engine or engine application parts. PLEASE BE CAREFUL.

② Jacking points

- The jacking points for maintenance is depending on serviced parts case by case. Do not hesitate to contact your authorized dealer for asking.
- Do not use the front axle assembly or steering linkage and cylinder for jacking point. These components have some rotating pivots and/or does not have enough structural strength.
- For general maintenance, use a flat surface under the engine frame end or bumper for jacking point, and additionally connect the front towing hook to the hoist for safety.
- For rear jacking points, two flat surfaces under the rear axle housing is recommended, and additionally use the top-link bracket and its pin for lifting point after removing the upper link.

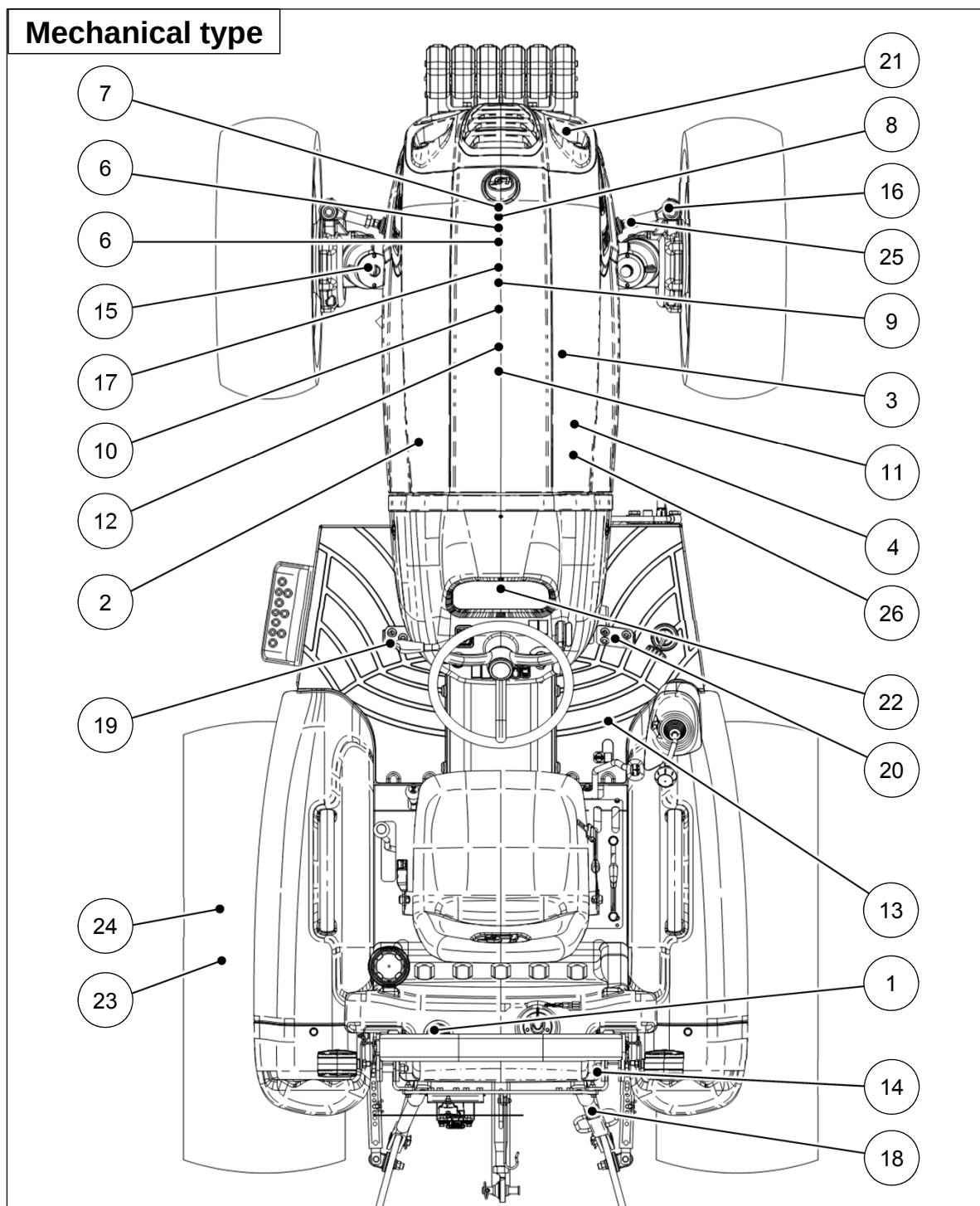


Caution

- ▶ When lifting the rear of the tractor, apply chocks to the slots between front axle and engine frame symmetrically to prevent the front axle from rolling.

5-2. Maintenance chart

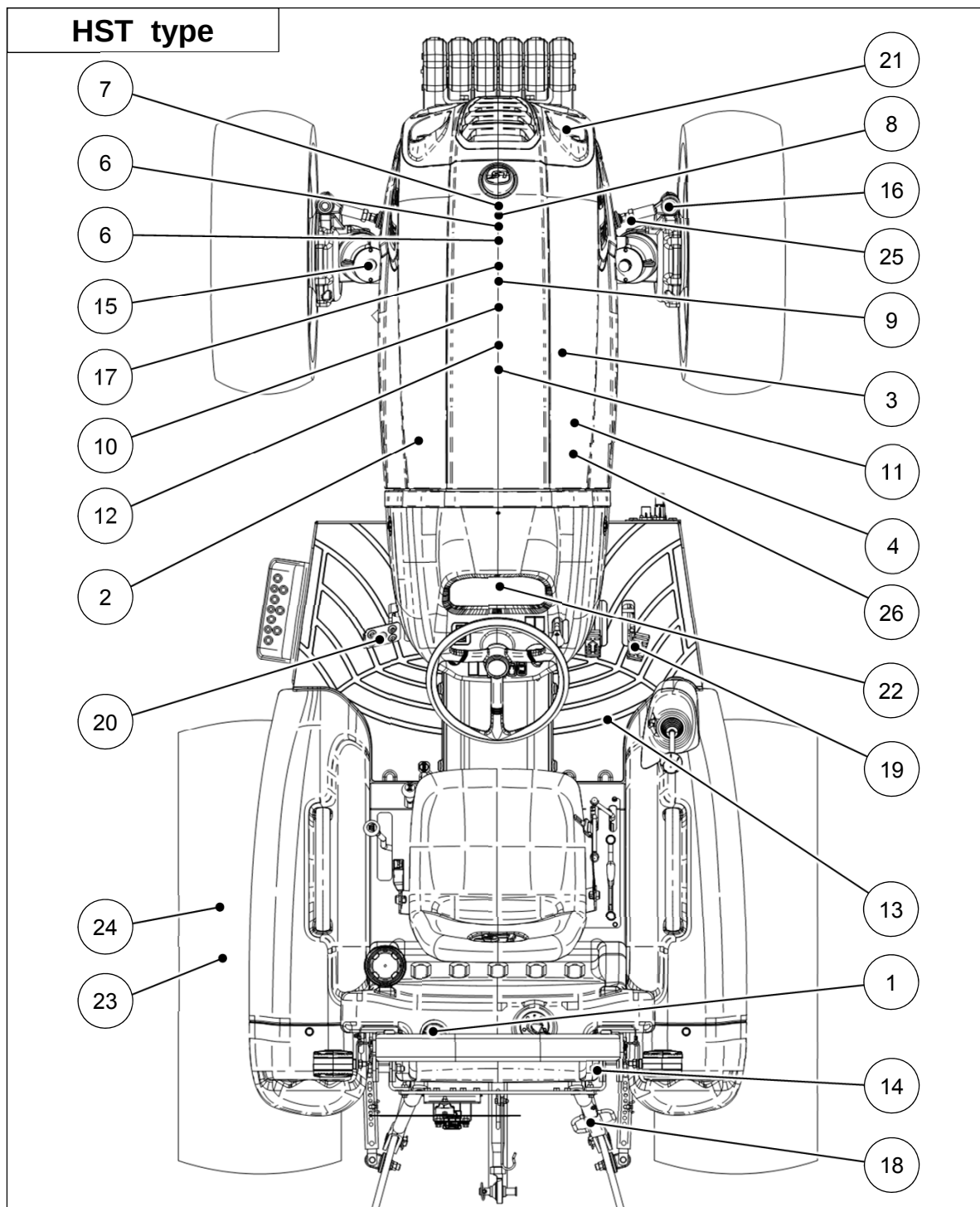
- Periodic maintenance not only extends the service life of the tractor but also serves to ensure safe operation. **The maintenance chart shows the standard service intervals. If you notice any abnormal symptoms, make sure to carry out the inspection and maintenance work, regardless of recommended service intervals in this maintenance chart.**
- Appropriate service intervals vary depending on the usage and operating conditions. In extreme dusty/dirty environments, the service intervals have to be shorter than normal condition.



No.	Checking Parts	Page No.	Check period (Every ---- (hr))							
			Daily	50	100	300	500	1000 or 1-yr	1500 or 2-yr	3000
1	Fuel tank	5-10, 5-24	▲			■				
2	Fuel filter	5-8, 5-26		■			●			
3	Engine oil	5-7, 9, 20, 21	▲	★	▲	●				
4	Engine oil filter	5-7, 5-21		★		●				
5	Engine coolant	5-12, 5-28	▲						●	
6	Radiator screen	5-13, 5-17	▲	■						
7	Air cleaner	5-12, 5-18, 5-26	▲	■			●			
8	Battery	5-18		▲						
9	Fan belt tension	5-7, 5-23		▲ (First)		▲				
10	Valve clearance	5-27						▲		
11	EGR Cooler, PCV, Injector Tips	5-31							■	
12	Fuel injector, DOC&DPF, Turbocharger, ECU, etc	5-32								■
13	Hydraulic oil filter	5-7, 5-22		★		●				
14	Transmission oil	5-18, 5-25		▲			●			
15	Front axle oil	5-18, 5-25		▲			●			
16	Steering cylinder	5-17		▲						
17	Front axle holder & Steering arm	5-17		▲						
18	3-Point linkage	5-17		▲						
19	Clutch pedal play	5-14	▲							
20	Brake pedal play	5-15	▲							
21	Turn signal lights, Lights, Horn	5-11	▲							
22	Instrument panel & Indicators	5-10	▲							
23	Bolts and Nuts retighten	5-14	▲							
24	Tire air pressure	5-13	▲							
25	Toe-in	5-24				▲				
26	Hydraulic hoses	5-19		▲						

★ First Replacement ● Replacement ▲ Check, Adjustment and Supply ■ Clean up

- Periodic maintenance not only extends the service life of the tractor but also serves to ensure safe operation. **The maintenance chart shows the standard service intervals. If you notice any abnormal symptoms, make sure to carry out the inspection and maintenance work, regardless of recommended service intervals in this maintenance chart.**
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No.	Checking Parts	Page No.	Check period (Every ---- (hr))							
			Daily	50	100	300	500	1000 or 1-yr	1500 or 2-yr	3000
1	Fuel tank	5-10, 5-24	▲			■				
2	Fuel filter	5-8, 5-26		■			●			
3	Engine oil	5-7, 9, 20, 21	▲	★	▲	●				
4	Engine oil filter	5-7, 5-21		★		●				
5	Engine coolant	5-12, 5-28	▲						●	
6	Radiator screen	5-13, 5-17	▲	■						
7	Air cleaner	5-12, 5-18, 5-26	▲	■			●			
8	Battery	5-18		▲						
9	Fan belt tension	5-7, 5-23		▲ (First)		▲				
10	Valve clearance	5-27						▲		
11	EGR Cooler, PCV, Injector Tips	5-31							■	
12	Fuel injector, DOC&DPF, Turbocharger, ECU, etc	5-32								■
13	Hyd. oil filter & HST filter	5-7, 5-22		★		●				
14	Transmission oil	5-18, 5-25		▲			●			
15	Front axle oil	5-18, 5-25		▲			●			
16	Steering cylinder	5-17		▲						
17	Front axle holder & Steering arm	5-17		▲						
18	3-Point linkage	5-17		▲						
19	HST pedal neutral state	5-16	▲							
20	Brake pedal play	5-15	▲							
21	Turn signal lights, Lights, Horn	5-11	▲							
22	Instrument panel & Indicators	5-10	▲							
23	Bolts and Nuts retighten	5-14	▲							
24	Tire air pressure	5-13	▲							
25	Toe-in	5-24				▲				
26	Hydraulic hoses	5-19		▲						

★ First Replacement ● Replacement ▲ Check, Adjustment and Supply ■ Clean up

5-3. Lubricants and Capacity

Lubricants	Capacity	International Standard	Recommended products
Engine coolant	8.7 L (2.3 U.S.gals.)	ASTM D6210	Soft water (50%) + Anti-freeze (50%)
Fuel	52 L (13.7 U.S.gals.)	ASTM D975 No.2	Ultra low sulfur diesel fuel
Engine oil	5.7 L (1.5 U.S.gals.)	API CJ-4	KIXX DL (Manufacturer : GS Caltex)
Transmission oil (common use for hydraulic lift and steering system)	37 L (9.8 U.S.gals.)	API GL4 ISO VG 32/46	LSTH400G (LS Tractor T/M & Hyd. oil) (Manufacturer : GS Caltex)
Front axle oil	6 L(Kingpin case)+ 3 L(Gear case)= 9 L (2.4 U.S.gals.)	API GL4 SAE 80W	EPK 80W90 (Manufacturer : S-OIL TOTAL Co. Ltd.)
Grease (Front axle holder, Steering cylinder pin, 3-point linkage, etc.)	Proper amount	NLGI 2	CALTEX MAHWAK Multi purpose or CALTEX MAHWAK All purpose

RECOMMENDED ENGINE OIL VISCOSITIES

The correct engine oil viscosity grade is dependent upon ambient temperature. Refer to the below chart when selecting engine oil for your tractor.

In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable. Contact your authorized local dealer.

Ambient Temperature °C(°F)	-30 (-22)	-25 (-13)	-20 (-4)	-15 (5)	-10 (14)	-5 (23)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Oil Viscosity											

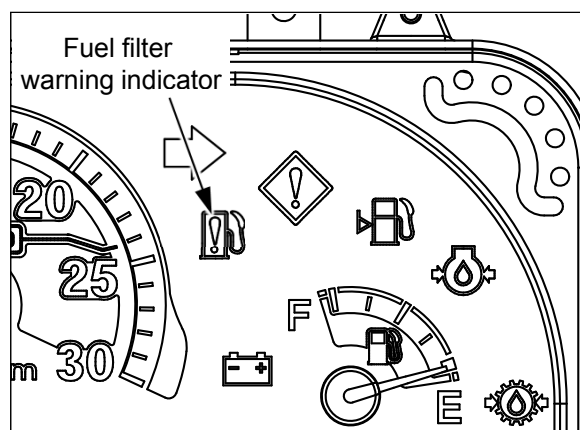
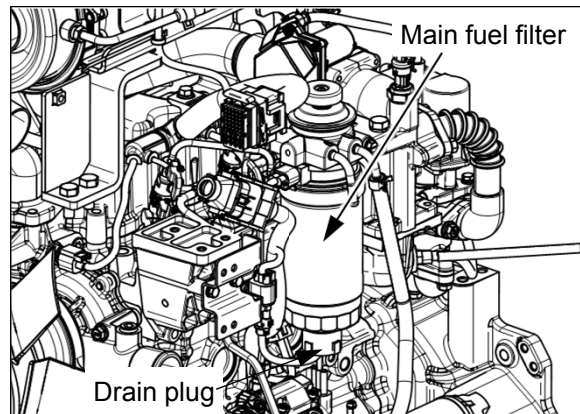
5-4. First 50 hour check

- After using first 50 hours, contact your authorized dealer for maintenance if possible.
 - Replace engine oil & engine oil filter. (⇒ Refer to Every 300 hour check. *See page 5-21*)
 - Replace hydraulic oil filter. (⇒ Refer to Every 300 hour check., *See page 5-22*)
 - Check transmission / rear axle / hydraulics oil level.
 - Check front axle oil level.
 - Check and adjust parking brake.
 - Check torque of exhaust manifold bolts.
 - Check and adjust V-belts and tension.
 - Tighten all cooling system hose connections.
 - Check torque of safety cab or frame mounting bolts.
 - Check torque of front end weight clamp bolts. (Where fitted)
 - Check torque of wheel bolts and nuts.
 - Check tire pressures and condition.
 - Clean radiator, oil cooler and A/C condenser cores. (Where fitted)
 - Check radiator coolant level and specific gravity.
 - Check clutch pedal free play. (Mechanical synchro-shuttle models)
 - Check brake adjustment and pedal equalization.
 - Lubricate all grease fittings.
 - Neutral start switches operative.

5-5. When the warning indicator lights

(1) Drain water from Fuel filter

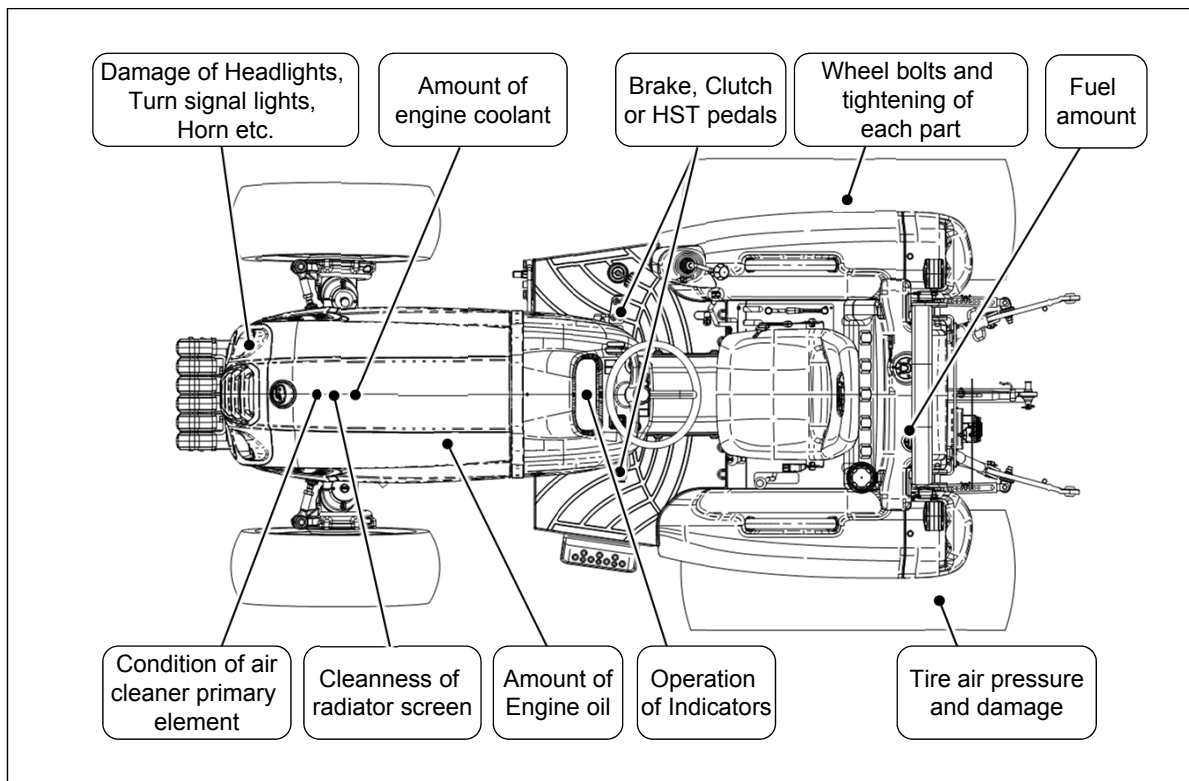
1. Loosen the drain plug and drain water inside of the filter. (Approx. 150cc(9.1 in³))
2. Tighten the drain plug and bleed the air from the fuel filter. (See page 5-31)



 Warning	► Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the key switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.
 Caution	► Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover disconnected fuel system component. Do not fill the new filter with fuel. Invisible fine contaminants can enter the injection pump and it may cause damage to the fuel injection system.
 Caution	► Do not throw the exhausted waste fuel to any place. This may pollute the soil and water seriously and also is prohibited legally. If violating, you would be responsible for that by civil or criminal case. The waste oil must be disposed according to the environment laws.

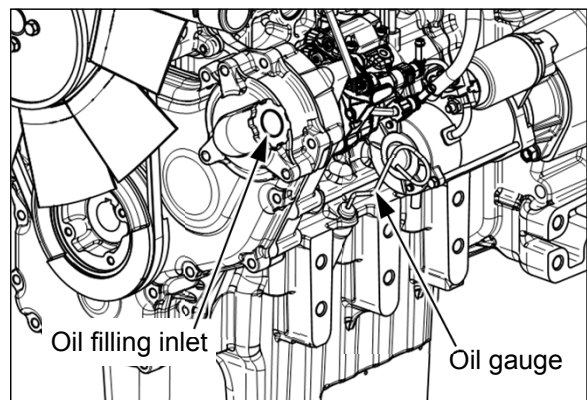
5-6. Check before starting (Daily check)

- Check the following check points before using to avoid a failure.

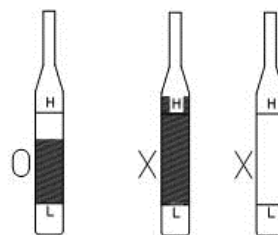


(1) Engine oil

- **Oil specification and capacity :**
See chapter 5-3, "Lubricants and Capacity" or the last page in this manual.
- **Checking engine oil level**
 - Check the engine oil level before starting engine or at 5 minutes later after stopping engine.
 - Check if the oil level is between MAX and MIN marks of the oil gauge. If necessary, add new oil.
 - It must only be checked while the engine is stopped.
 - If your engine is operated in dusty/dirty condition, the service interval must be shorter than normal condition.
 - Must replace the engine oil and engine oil filter after the first 50 hours of use.



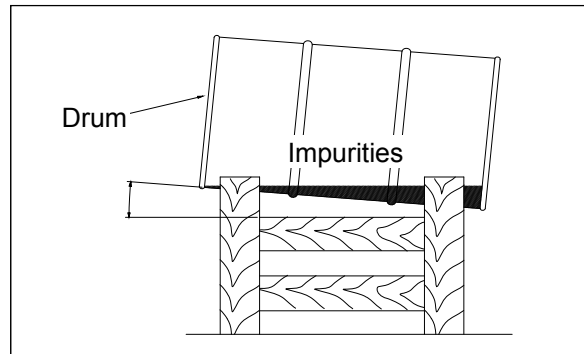
Engine oil gauge



(2) Fuel tank

① Using Diesel fuel

- **Use Ultra low sulfur diesel, below 15 ppm.**
 - ASTM D975-08a Grade 2
 - EN590 : 2009 Diesel fuel
 - BS2869 : 2006 Class A2
 - You can use the Bio diesel fuel up to 7% (EN590 2009, ASTM D975)
- If contaminants like water or dusts are mixed in the fuel, it may cause a severe damage to the engine. The fuel storage facility must be equipped as shown in the figure. If possible, fill the tank at the gas station.



② Using diesel for winter

- General diesel fuel tends to generate paraffin dregs in winter time which may cause a bad engine start. Thus, it is recommended to use specially winterized diesel in winter time.
- If the ambient temperature is below -15°C (5°F), it is advised to mix diesel with kerosene as shown in the right table.

Temp.	$\geq -15^{\circ}\text{C}$ (5°F)	$\leq -15^{\circ}\text{C}$ (5°F)
Fuel	100% Diesel fuel for winter	20% kerosene added

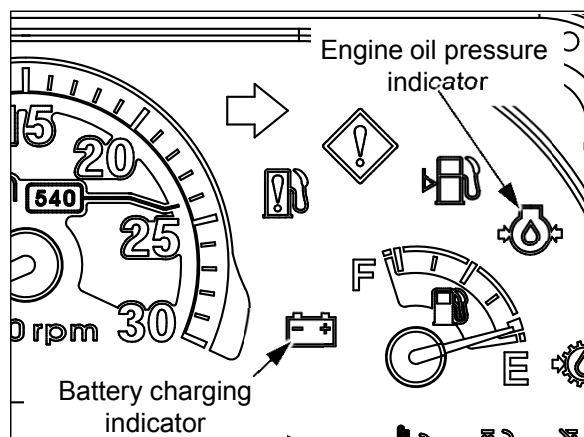
③ Checking fuel level

- Check the fuel gauge and if it's not sufficient, fill the fuel tank with fuel.
- **Capacity :** See chapter 5-3, "Lubricants and Capacity" or the last page in this manual.

Notice	► After finishing work, fill the fuel tank fully. As the temperature drops down, the humidity in fuel tank is condensed, and may be mixed with the fuel.
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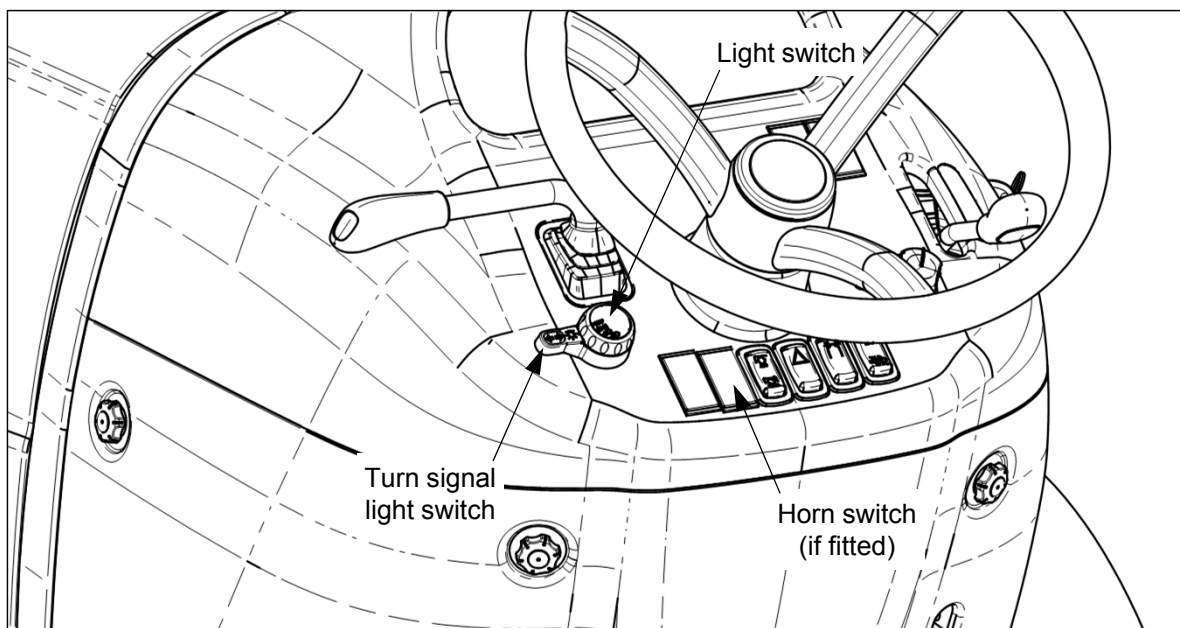
(3) Instrument panel & Indicators

- Check if the indicators are normally turned on/off before starting engine or while operating frequently and periodically.
- If the **engine oil pressure indicator** and **battery charging indicator** are turned on while the engine is running, stop the engine immediately and check the engine lubrication system and battery charging system. If possible, contact your authorized dealer for check.
- For further information about indicators, refer to the chapter 3-1-(1) in this manual.



(4) Turn signal lights, Lights and Horn

- Check the operational status of the headlights, turn signal lights, horn and other illuminating lights.



- If any of these lights are not turned on when operating the switch, check the problem as followings.

1. Check the related fuse in the fuse box.
2. Check the light bulb. If necessary, replace it with a new one as below.

Illuminating Lights	Light bulb specification
Head lights (Low beam / High beam)	12V 55W / 60W
Turn signal lights (front)	12V 21W
Side lights (front)	N/A
Turn signal lights (rear)	12V 21W
Brake lights / Tail lights (rear)	12V 21W / 5W
Work lights	12V 27W (Grille) / 27W (Roll-bar, optional)
Indoor light	N/A
Instrument panel & indicators	LED

Notice	► Use the bulb of rated capacity. If using an improper bulb arbitrary, it may cause a failure of the electric system.
--------	---

(5) Engine coolant

- Before opening the radiator cap, cool down the engine coolant sufficiently.
- See chapter 5-12-(1), "Replacement of engine coolant" in this manual. (See page 5-28)

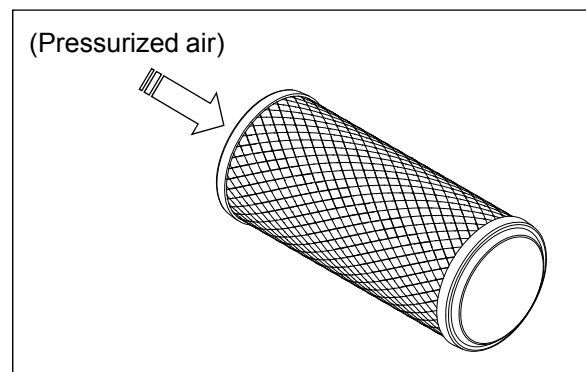
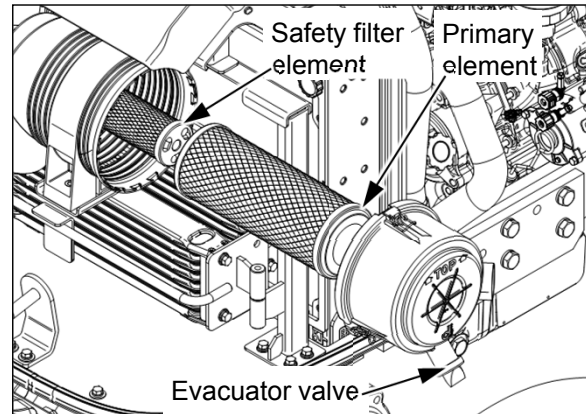
(6) Air cleaner (Dry type)

① Cleaning filter element

- Remove the cover and pull the primary element straight out, ensuring the safety filter element remains in place.
- When cleaning the element in the working field, tap the element by hand to remove the dust.

Notice	▶ Do not tap the element on a hard place when cleaning. ▶ If the element is cracked, change it with new one.
--------	---

- If the dust is not removed by tapping, use compressed air (less than 500kPa (5bar; 72psi)) from inside to outside as shown in the right figure to remove the dust and dirt. And clean inside the filter element with a clean damp cloth.



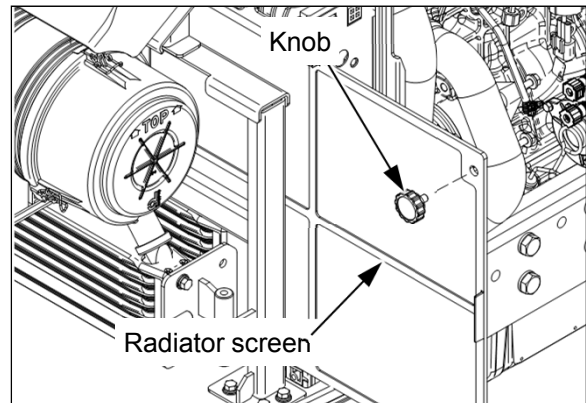
Notice	▶ Do not assemble a wet filter element. ▶ Do not dry the wet filter element with compressed air. It may cause damage to the filter element. ▶ Do not start the engine or close the hood if the filter element is not assembled.
--------	---

② Assembling filter element

- Clean the inside of the air cleaner housing using a clean damp cloth, being careful not to damage the safety element.
- Check if there is damage inside the filter element by using a light. If there is tiny cracks or small holes in the filter element or the gasket is damaged, replace it with a new one.
- Insert the filter element deeply into the filter housing.
- Remove the dust of the evacuator valve and clean the inside of the cover.
- Assemble the cover with the evacuator valve facing downwards.

(7) Cleaning of Radiator and Radiator screen

- Inspect the radiator and radiator screen for these items on a daily basis: Damaged fins, corrosion, dirt, grease, insects, leaves, oil, and other debris. Clean the radiator and radiator screen, if necessary.
- To access the radiator and radiator screen, remove the knob(s) and pull out the radiator screen.
- When cleaning the radiator with water, let the water flow from the fan side.
- When cleaning the radiator, check and clean the other heat exchangers (if fitted) around it.



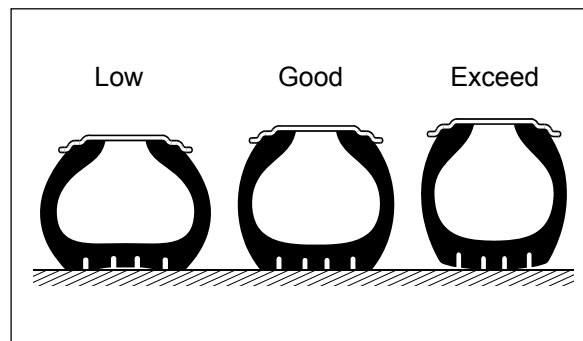
Caution

- ▶ The dust and dirt, other debris, and damaged fins can cause that cooling efficiency of the radiator is reduced and the engine can be overheated.
- ▶ Clean the radiator only after stopping engine.
- ▶ If cleaning with water, take care not to spray water to the electric and electronic parts. If possible, DO NOT USE WATER.

(8) Tire air pressure and damage

① Check

- Check the tire air pressure and damage of the tires on a daily basis. Always manage the correct pressure of the front/rear tires, and if the tires are damaged, change them with new one.
- Ensure the tire air pressures are not lower than the designated values, to prevent;
 - blown tires;
 - bead wear;
 - internal damage;
 - irregular wear and short service life.
- Do not over-inflate the tires, as this may cause to damage in the event of impact and, in extreme conditions, the rim and disk may be deformed or the tires may burst.



Caution

- ▶ Do not assemble/disassemble the tires arbitrarily. Only qualified service personnel should perform this maintenance in a tire repair center equipped with special tools.
- ▶ When checking tire air pressure, keep the body away from the valve mechanism or cap. Tire air pressure vary depending on the load weighing on the axles.

② Standard air pressure - See chapter 4-4-(6), "Tires and Load capacity" in this manual.

(9) Tightening state of bolts and nuts of each part

- Check if the bolts or nuts of each part are loosened. If necessary, tighten it again as referring to the following table.
- Especially, check the bolts and nuts of the tires before starting engine, if necessary, tighten them.

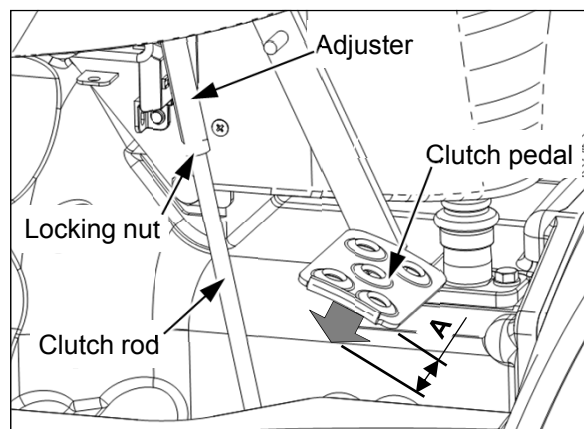
※ Tightening torques for general maintenance

	Strength classification								
	4T			8T			10.9T		
									
	N.m	kgf.m	lbf.ft	N.m	kgf.m	lbf.ft	N.m	kgf.m	lbf.ft
M6	4.9~6.9	0.5~0.7	3.6~5.1	11.8~13.7	1.2~1.4	8.7~10.1	14.7~16.7	1.5~1.7	10.8~12.3
M8	11.8~16.7	1.2~1.7	8.7~12.3	29.4~34.3	3.0~3.5	21.7~25.3	36.3~41.2	3.7~4.2	26.8~30.4
M10	20.6~29.4	2.1~3.0	15.2~21.7	49.0~53.9	5.0~5.5	36.2~39.8	72.6~82.4	7.4~8.4	53.5~60.8
M12	44.1~53.9	4.5~5.5	32.5~39.8	93.2~108	9.5~11.0	68.7~79.6	123~137	12.5~14.0	90.4~101
M14	63.7~78.5	6.5~8.0	47.0~57.9	132~147	13.5~15.0	97.6~108	206~226	21.0~23.0	152~166
M16	88.3~108	9.0~11.0	65.1~79.6	177~196	18.0~20.0	130~145	314~343	32.0~35.0	231~253
M18	118~137	12.0~14.0	86.8~101	245~275	25.0~28.0	180~203	441~471	45.0~48.0	325~347

(10) Adjustment of Clutch pedal play (Mechanical type)

- **Normal distance (A) : 10~20mm (0.4~0.8 in.)**
If the pedal play distance of the clutch pedal is outside the normal distance, adjust it as below.

1. Loosen locking nut and turn adjuster to the left/right direction.
2. If the adjuster is tightened, the pedal play shall be decreased, and if loosened, it shall be increased.
3. After adjusting the pedal play, tighten the locking nut.
4. Check if the clutch is disengaged completely.

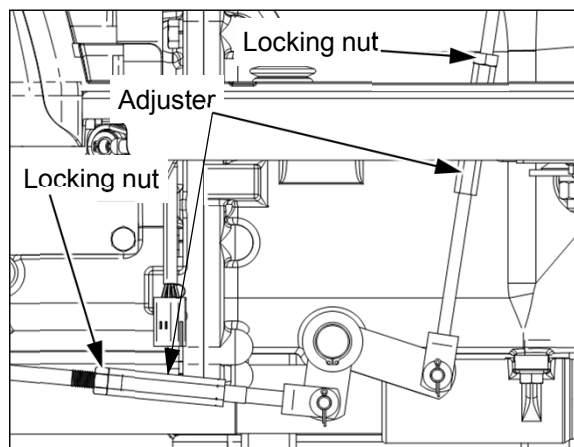


(11) Adjustment of Brake pedal play

- **Normal distance: 50~60mm. (2.0~2.4 in.)**

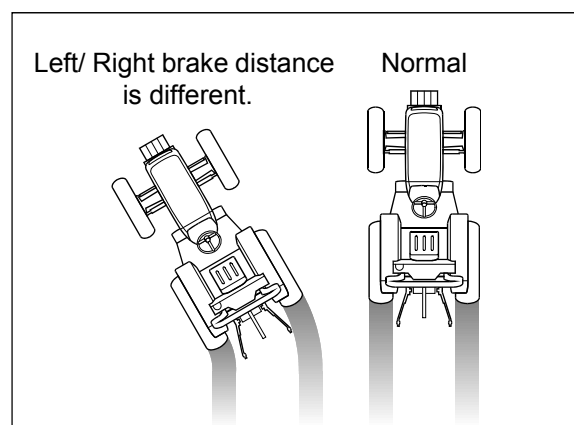
If the pedal play distance of the brake pedals is over the normal distance, adjust it as below.

1. Loosen the locking nut and turn adjuster to the left/right direction.
2. If the brake rod is tightened, the pedal play shall be reduced, and if loosened, it shall be increased.
3. After adjusting the pedal play, tighten the locking nut.
4. Check if the brake distance of the left and right brake is same as below.



- **Checking the brake distance**

1. Connect the left and right brake pedal with the brake pedal latch.
2. Check the skid marks of the tires or stability of the tractor while driving at a suitable speed.
3. If the brake distance is different as shown in the right figure, adjust the pedal play again.
4. If the vehicle is turned to the left-hand side when checking the braking distance, loosen the left-hand brake rod or tighten the right-hand brake rod with checking the brake pedal play distance.

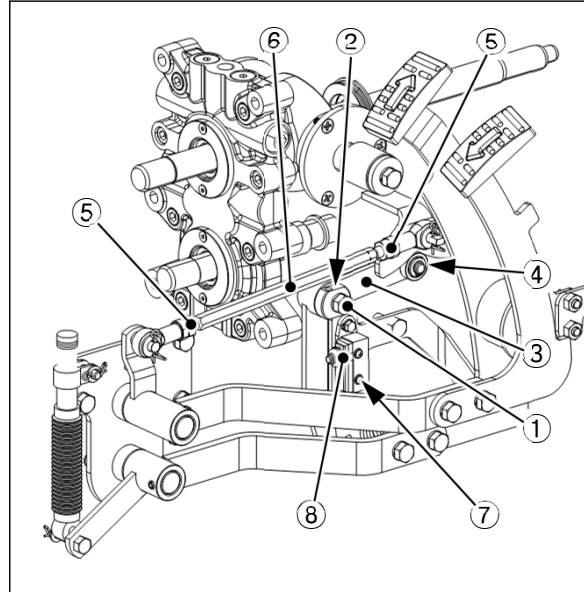


(12) Adjusting HST control linkage (HST type)

- Run engine and place the range gear shift lever in the lowest speed position.
- Check if the HST tractor stops by taking the foot off from the HST pedal while driving. If the tractor does not stop, stop the tractor by using the brake pedals. And, adjust the neutral position of the HST as below.

● Adjustment of NEUTRAL set of the HST control.

1. Stop tractor on a flat ground and stop the engine.
2. Lift the rear wheels of the tractor off the ground sufficiently by using a hoist. If there is no hoist, use the suitable device can lift the tractor safely. For tractor weight, refer to the chapter 6. "Dimension and Specification" in this manual.
3. Place the 4WD lever to 2WD position and apply the wheel chocks to the front wheels. It is necessary for the tractor not to move when the engine starts.
4. Start the engine.
5. After loosening bolt(1) slightly, adjust the neutral arm (3) with turning the shaft(2) to the left/right direction little by little so that the roller(4) contacts to the HST cam when the tractor has to be stopped. After adjusting, tighten the bolt(1).
6. If necessary, after loosening locking nuts(5) slightly, turn HST rod(6) clockwise/counter-clockwise to adjust the position of the forward and reverse pedal to be same height. After adjusting the position, tighten the locking nuts(5).
7. Check if the HST neutral switch(8) is pressed by the linkage or not. If the switch is not pressed, loosen the locking screw(7) and adjust the position of the HST neutral switch(8).



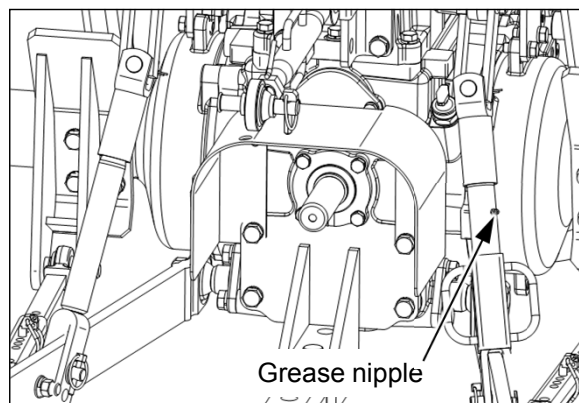
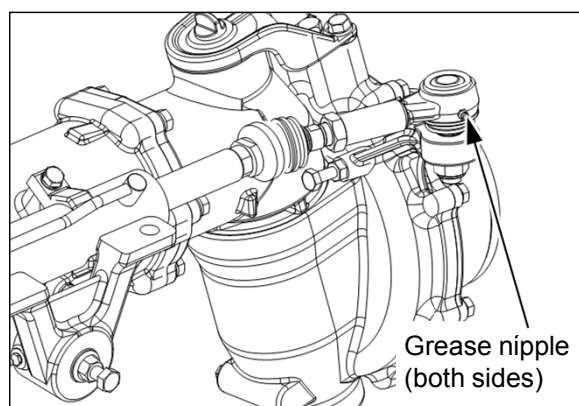
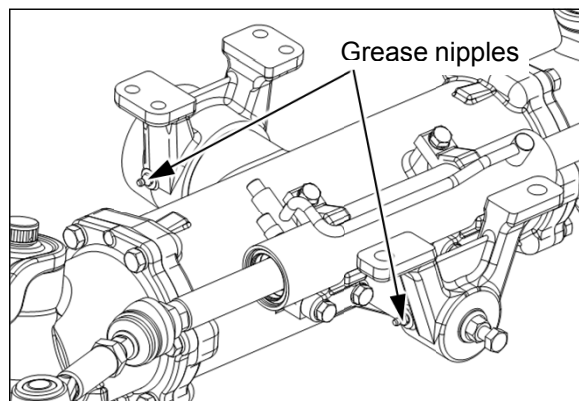
Caution

- When lifting the rear of the tractor, the tractor may incline to the left or right by oscillating angle of the front axle. Insert suitable chocks between the front axle and engine frame tightly.

5-7. Every 50 hour check

(1) Lubricating grease nipple

- Steering cylinder pins (LH/RH)
- Front axle holder & Steering arm (LH/RH)
- 3-point linkage

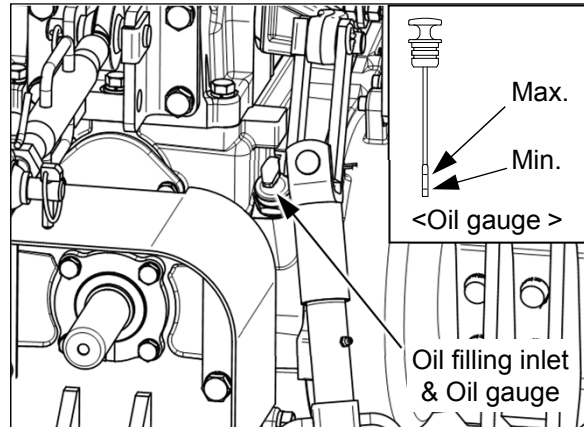


(2) Cleaning of Radiator and Radiator screen

- See chapter 5-6-(7) in this manual (See page 5-13).

(3) Checking Transmission oil

- Stop the tractor on a level surface and apply the parking brake and lower the implements to the ground.
- Clean around oil filling inlet and pull the gauge straight out.
- If the oil level is between “Min” and “Max” marks of the oil gauge, it means ‘Proper amount’.
- For oil specification, see chapter 5-3, “Lubricants and Capacity” or the last page in this manual.

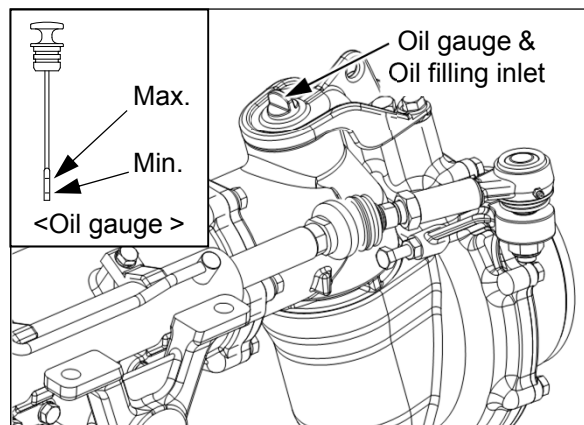


Caution

► The contaminated oil may reduce the durability of the power drive line and it can cause failure of the transmission and hydraulic system. Clean around oil filling inlet before opening the oil gauge.

(4) Checking Front axle oil

- Stop the tractor on a level surface and apply the parking brake and lower the implements to the ground.
- Clean around the oil gauge and unscrew the oil gauge. Clean oil on the oil gauge and reinstall it.
- Unscrew the oil gauge and check if the oil level is between “Min” and “Max” marks of the oil gauge. If necessary, add new oil.
- Assemble the oil gauge.
- For oil specification, see chapter 5-3, “Lubricants and Capacity” or the last page in this manual.



Caution

► The contaminated oil may reduce the durability of the power drive line and it can cause failure of the transmission and hydraulic system. Clean around oil filling inlet before opening the oil gauge.

(5) Battery check

- Refer to the chapter 5-14-(3), “Batter handling and Notices” in this manual. (See page 5-37)

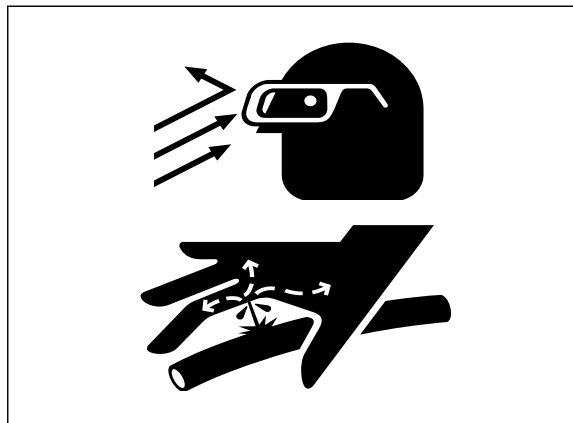
(6) Air cleaner (Dry type)

- Refer to the chapter 5-6-(6) in this manual (See page 5-12).

(7) Hydraulic hoses and Leakage

- Stop the engine and place all the transmission gears in neutral and lower down the implement to the ground.
- Periodically check the hydraulic system for leaks or damaged parts - kinked, crushed, flattened, hard blistered, heat cracked, charred, twisted, soft or loose covered hoses and fittings.
- Before removing hydraulic components, make sure to check that the hydraulic pressure is relieved completely. The leaks of pressurized oil can cause a fatal physical injury.

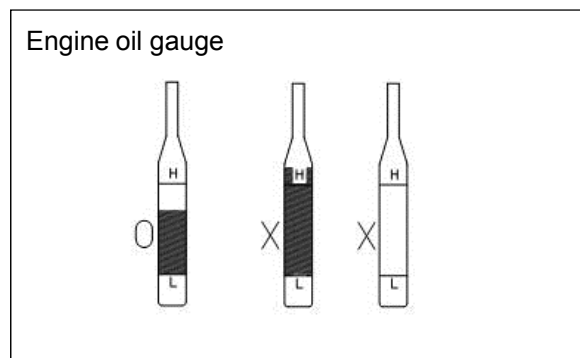
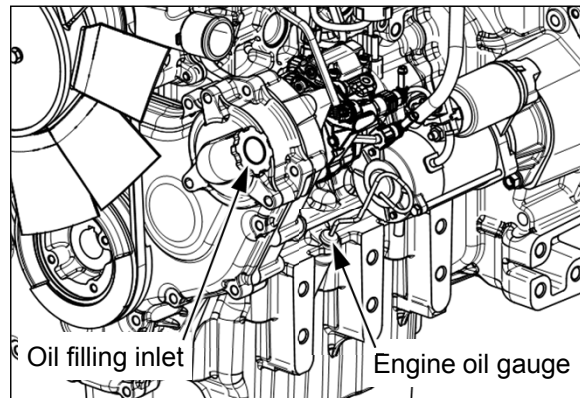
For further information, see chapter, "3-3. Hydraulic system" in this manual.



5-8. Every 100 hour check

(1) Checking and adding Engine oil

- **Oil specification and capacity:**
See chapter 5-3, "Lubricants and Capacity" or the last page in this manual.
- **Checking engine oil level**
 - Check and add the engine oil **every 100 hours of operation**.
 - Check it before starting engine or at 5 minutes later after stopping engine.
 - It must only be checked while the engine is stopped.
 - Check if the oil level is between MAX and MIN marks of the engine oil gauge. **If the engine oil level is under the minimum mark, add new engine oil up to the maximum mark as much as possible.**
 - If your engine is operated in dusty/dirty condition, the service interval must be shorter than normal condition.



Caution

- The amount of engine oil consumed may vary depending on the operating conditions. Check the amount of engine oil regularly and if necessary add new engine oil. Otherwise, the engine can be stuck or broken by engine oil shortage.

5-9. Every 300 hour check

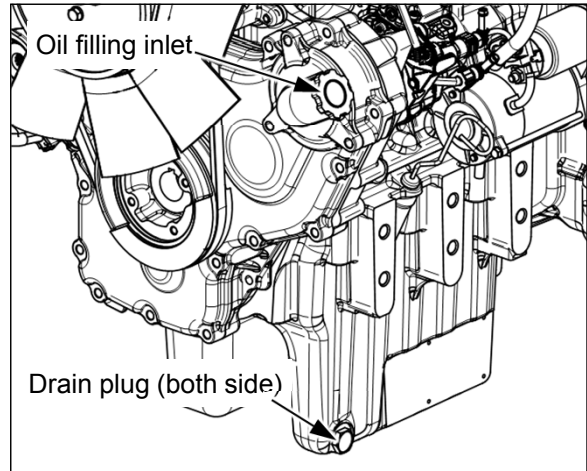
(1) Replacing Engine oil and Filter

① Drain Engine oil

- Run the engine for a few minutes to warm oil.
- Park the tractor on a level surface.
- Remove both LH and RH drain plugs of oil pan and drain the oil completely.

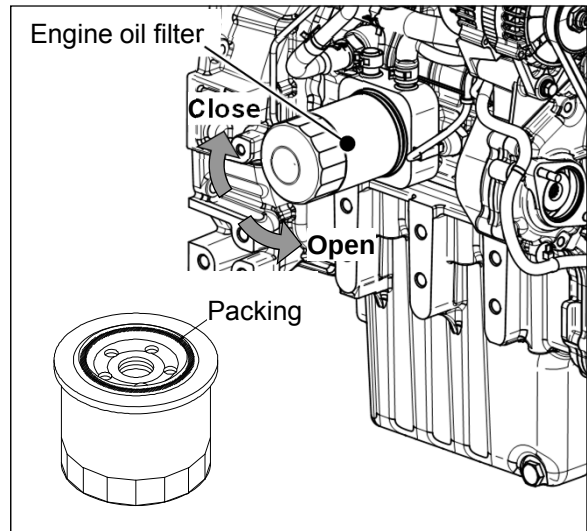
Notice

► When engine oil is warm, the impurities can be drained completely.



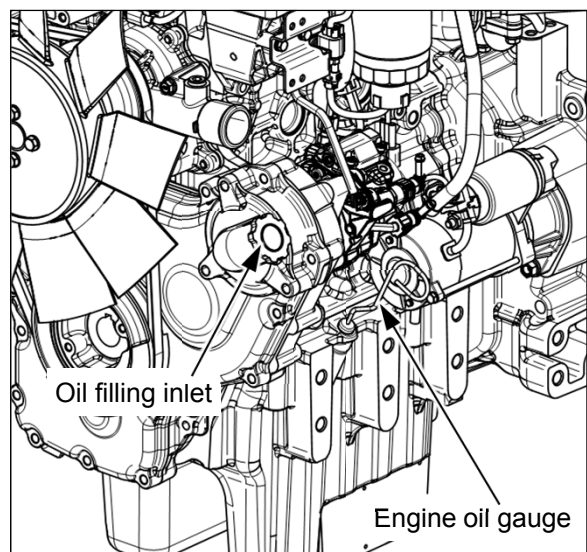
② Replace Engine oil filter

- Clean carefully around the filter.
- Coat clean engine oil on the packing of the new filter and check the packing is placed well in the groove.
- Turn the oil filter counter-clockwise to remove it with a filter wrench.
- Turn the new filter clockwise to assemble it until the packing makes contact with the mounting surface. Tighten 3/4 to 1 turn more after the contact.
- If finding considerable metal powders stuck to the used filter element, contact your authorized local dealer.



③ Fill Engine oil

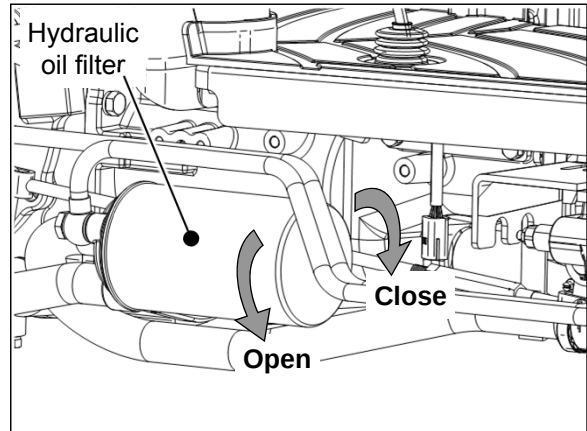
- Tighten the drain plugs. (Tightening torque: 40 ± 5 N.m) (29.5 ± 5 lbs-ft)
- Add new engine oil and check it the oil level is between "MIN" and "MAX" marks on the gauge.
- For oil specification, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.
- Check any leakage of the engine while running for several minutes at low idle rpm.
- Stop the engine. After about 5~10 minutes later, check again if the oil level is between "MIN" and "MAX" marks. Reinstall the oil gauge.



(2) Replacing Hydraulic Oil Filter

① Hydraulic oil filter (Main)

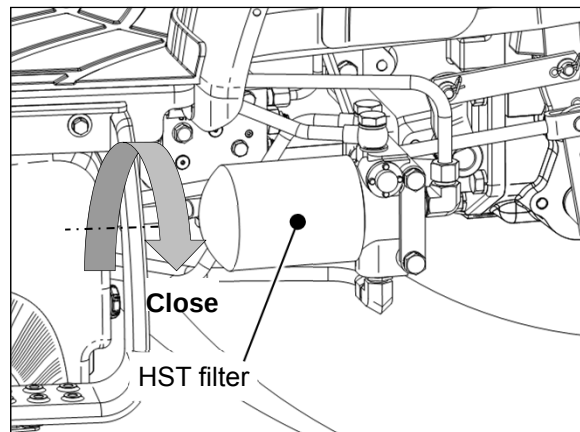
- Stop the tractor on a level surface and apply parking brake and lower implements. Stop the engine and cool down the tractor sufficiently.
- This filter is attached under the right-hand floor.
- Carefully clean around the filter and set a clean container under the filter.
- Coat clean hydraulic oil on the packing of new filter and check the packing is placed well in the groove.
- Turn the oil filter counter-clockwise to remove it with a filter wrench.
- Turn the new filter clockwise to assemble it until the packing makes contact with the mounting surface. Tighten the filter 3/4 to 1 turn more after the contact.
- Run the engine at low idle rpm and check any leakage.
- Check the oil level. If necessary, add new oil. *For oil specification, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.*



 Warning	► Be sure to stop the engine before loosening the oil filter.
	► If the filter or oil is very hot, it may cause serious burns. After cooling down the tractor sufficiently, replace the filters.
 Caution	► Do not throw the exhausted waste oil to any place. This may pollute the soil and water seriously and also is prohibited legally. If violating, you would be responsible for that by civil or criminal case. The waste oil must be disposed according to the environment laws.

② HST filter (HST model only)

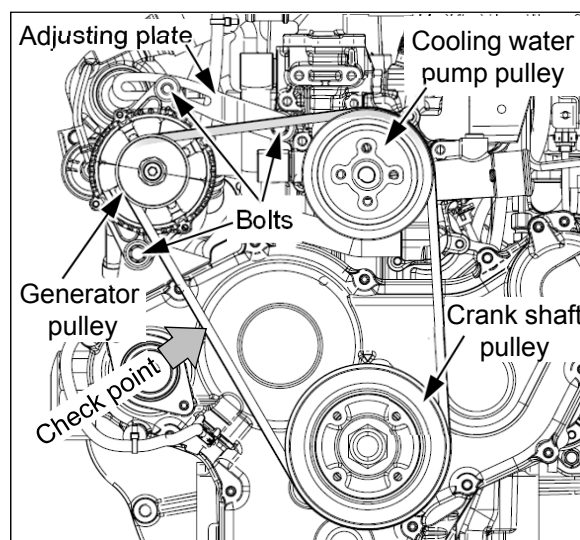
- The HST filter is located under the left-hand step floor.
- Replace the HST filter according to the same procedure of the hydraulic oil filter.



	Warning
	▶ Be sure to stop the engine before loosening the oil filter. ▶ If the filter or oil is very hot, it may cause serious burns. After cooling down the tractor sufficiently, replace the filters.
	Caution ▶ Do not throw the exhausted waste oil to any place. This may pollute the soil and water seriously and also is prohibited legally. If violating, you would be responsible for that by civil or criminal case. The waste oil must be disposed according to the environment laws.

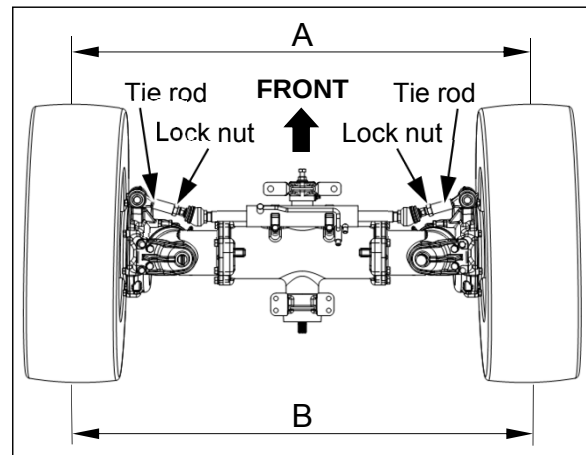
(3) Tension adjustment of Engine belt

- If the fan belt tension exceeds the normal value, adjust the tension as below.
 - Belt tension: crank shaft pulley ~ alternator pulley
 - **Normal: approx. 10~15mm (0.4~0.6 in)**
(if pressed by 98N (22 lb.f))
- When adjusting the belt tension,
 1. Loosen two bolts of the alternator and a hinge bolt of the adjusting plate. Insert a bar between crank case and alternator, and pull the bar to apply tension to the belt.
 2. With proper tension, tighten the upper bolt of the alternator.
 3. If the fan belt tension is normal, tighten the other bolts.



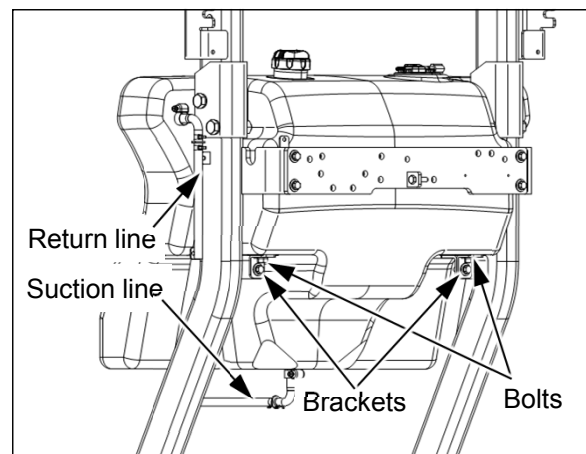
(4) Toe-in

- Check the toe-in of the front wheels and if necessary, adjust it as follows.
Normal value (B-A) = 0~5 mm (0~0.2 in.)
- Unscrew the lock nuts of the tie-rod.
- If you turn the tie-rod clockwise at the right hand side, the toe-in shall be increased.
- After checking that the toe-in is correct, tighten the lock nuts.



(5) Cleaning fuel tank

- The contaminants like dusts, water and sediments in fuel tank shall cause to malfunction of the fuel injection system.
- Clean fuel tank periodically.
- The fuel tank is very heavy. Cooperate with other people to lift up/down the fuel tank.
- Use clean diesel or approved detergent by manufacturer to clean inside the fuel tank.
- When disassembling the fuel tank, comply with following procedure.



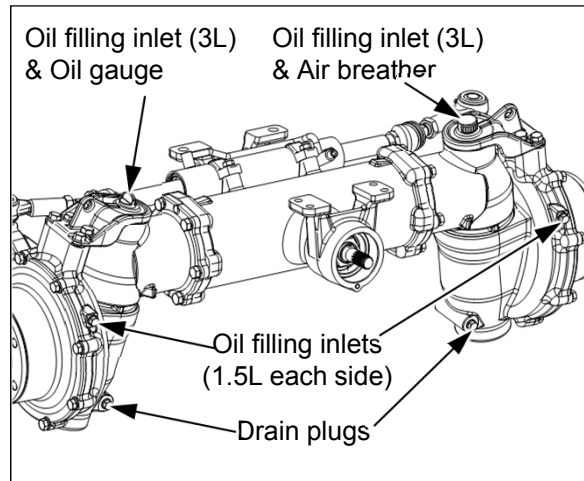
1. Flip over the driver's seat forward.
 2. Disconnect the two fuel lines (suction/return line) and plug the fuel hoses not to spill the diesel fuel.
 3. Loosen the locking bolts brackets completely.
 4. Tilt the fuel tank and lift it up.
- When assembling the fuel tank, comply with the disassembling procedure in reverse.

 Caution	▶ Cover the spilt fuel with a rag so that it does not flow to other components. ▶ Do not throw the exhausted waste fuel to any place. This may pollute the soil and water seriously and also is prohibited legally. If violating, you would be responsible for that by civil or criminal case. The waste oil must be disposed according to the environment laws.
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5-10. Every 500 hour check

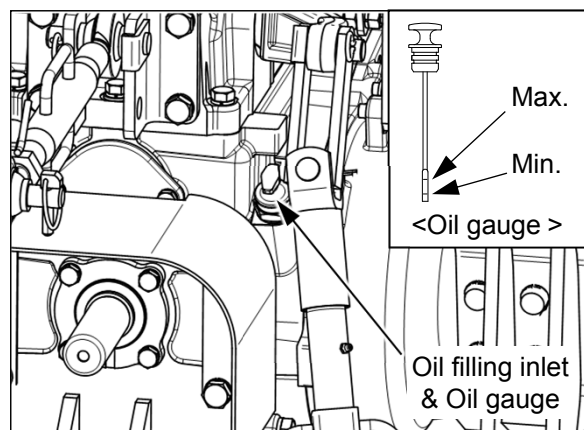
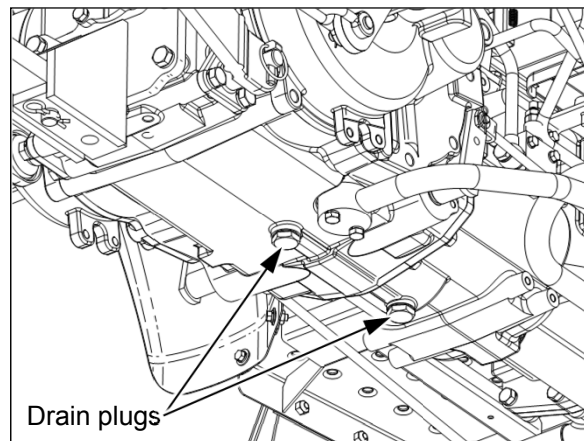
(1) Changing Front axle oil

- Stop the tractor on a level surface and apply parking brake. Clean around oil filling inlet and drain plugs.
- Remove the left/right drain plugs and oil filling inlets to drain the oil completely.
- Tighten the drain plugs again to the original position.
- Add new oil into the oil filling inlets.
- kingpin case (3L), gear case (1.5L) each side.
- After about 5 ~10 minutes later, re-check the oil level and tighten the oil filling inlet plugs.
- *For oil specification, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.*



(2) Changing Transmission oil

- Stop tractor on a level surface and apply parking brake. Run engine for several minutes to warm oil and lower implements and stop the engine.
- Clean around the oil filling inlet and drain plugs.
- Set a clean container under drain plugs and remove them under the transmission and drain the oil completely.
- Clean metal sludge stuck to the drain plugs and tighten the drain plugs again with copper washer.
- Add new oil until the oil level is between MIN and MAX mark of the oil gauge.
- *For oil specification, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.*

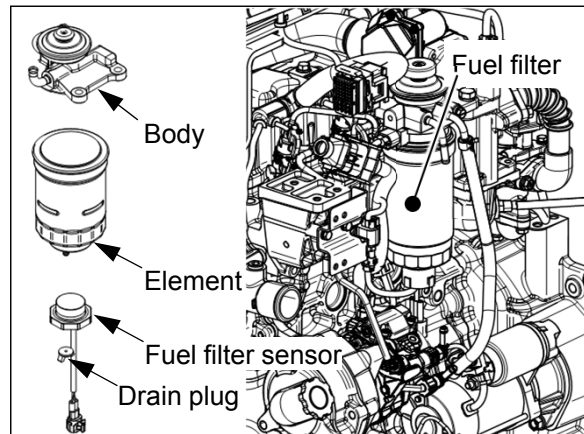


Caution

► Contaminated oil may reduce the durability of the transmission and it can cause a failure of the hydraulic system. Clean around the oil filling inlet and then pull the oil gauge.

(3) Replacing Fuel filter cartridge

- Loosen drain plug and drain fuel in the filter.
- Disconnect electric wire of the fuel filter sensor.
- Remove element from the body.
- Remove fuel filter sensor from the element and assemble it to the new element.
- Attach new element to the body.
- Connect electric wire of the fuel filter sensor.
- Tighten the drain plug and bleed the air from the fuel filter. See chapter 5-14-(1), "Air-bleeding from fuel system" in this manual.

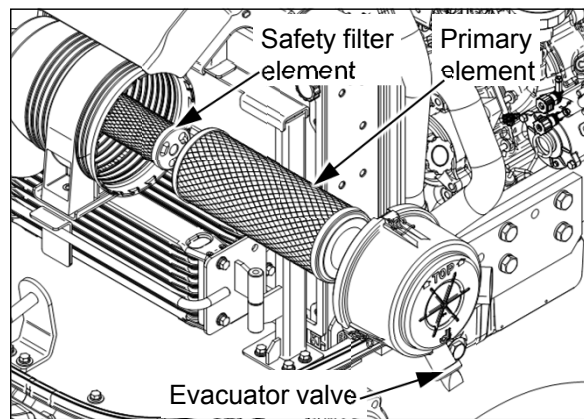


Warning	► Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the key switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.
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Caution	► Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover disconnected fuel system component. Do not fill the new filter with fuel. Invisible fine contaminants can enter the injection pump and it may cause damage to the fuel injection system.
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(4) Replacing Air cleaner element (Dry type)

- Remove the cover and pull the primary element straight out, ensuring the safety filter element remains in place.
- Clean the inside of the air cleaner housing using a clean damp cloth, being careful not to damage the safety element.
- Check if there is damage inside the filter element by using a light. If finding tiny cracks or small holes in the filter element or the gasket is damaged, change it with a new one.
- Insert the filter element deeply into the filter housing.
- Remove the dust of the evacuator valve and clean the inside of the cover.
- Assemble the cover with the evacuator valve facing downwards.

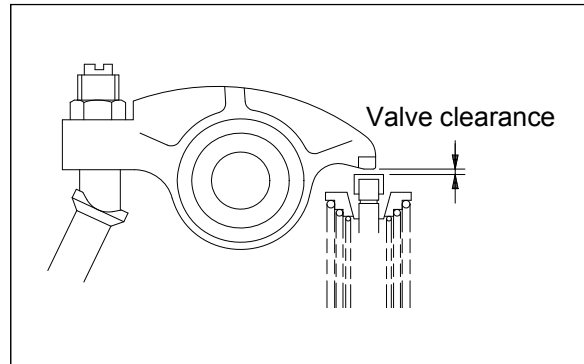


Notice	► Do not start the engine or close the hood if the filter element is not assembled..
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5-11. Every 1000hr or 1-year check

(1) Adjusting Engine valve clearance

- Contact your authorized dealer to check the valve clearance.
Normal: 0.25mm (0.0098 in)
If the gap is large, the valves can make a loud tapping noise and if the gap is too small, the engine output power may be reduced due to leakage of compressed air.



 Warning	▶ Ensure that the engine can not be started while this maintenance is being performed. To help prevent possible injury, do not use the starting motor to turn the flywheel. ▶ Hot engine components can cause burns. Allow additional time for the engine to cool before measuring/adjusting valve lash clearance.
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 Caution	▶ Only qualified service personnel should perform this maintenance. Contact your authorized local dealer for this maintenance. Operation of engines with incorrect valve lash can reduce engine efficiency, and also reduce engine component life.
--	--

(2) Checking Nozzle injection pressure

- Contact your authorized local dealer for check.
Normal injection pressure (Common rail): 180MPa (26100 psi)

 Warning	▶ Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. ▶ Work carefully around an engine that is running. Engine parts that are hot, or parts that are moving, can cause personal injury. ▶ Make sure that you wear eye protection at all times during testing. When fuel injection nozzles are tested, the high pressure test fluid can pierce the skin and cause serious injury to the operator. Always keep the tip of the fuel injection nozzle pointed away from the operator and into the fuel collector and extension.
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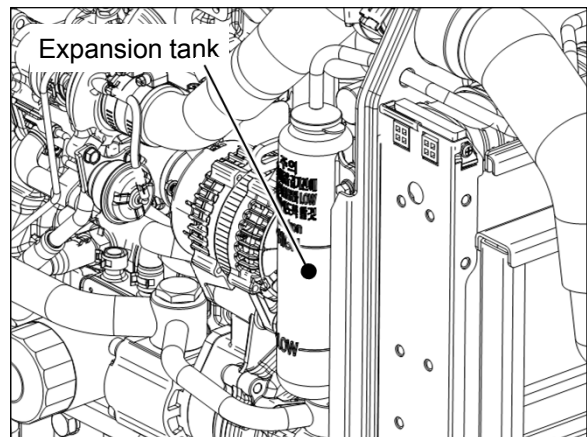
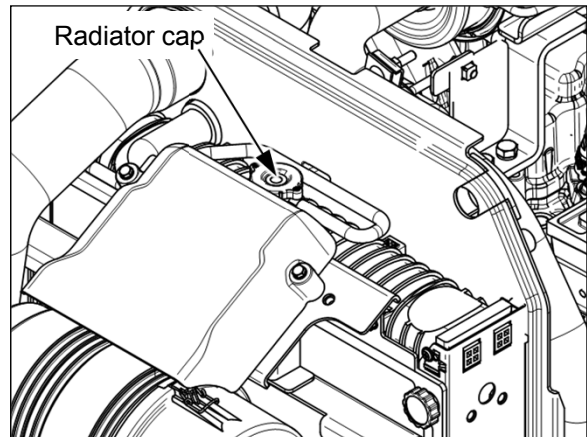
 Caution	▶ Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over disconnected fuel system component. ▶ If a fuel injector is suspected of operating outside of normal parameters, it should be removed by a qualified technician. The suspect fuel injector should be taken to an authorized agent for inspection.
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5-12. Every 1500hr or 2-year check

(1) Replacing Engine coolant

① Check

- Stop the engine and allow the engine to cool down. Loosen the radiator cap slowly in order to relieve any pressure. Remove the radiator cap.
- Check if the coolant of the radiator and expansion tank is insufficient or not on a daily basis. Check if the coolant level of the expansion tank is between “Min” and “Max” marks.
- If necessary, add new engine coolant.
- Do not open the radiator cap except to check the coolant or change it.



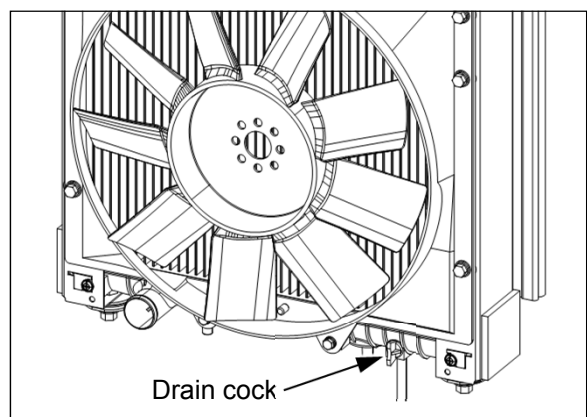
⚠ Warning

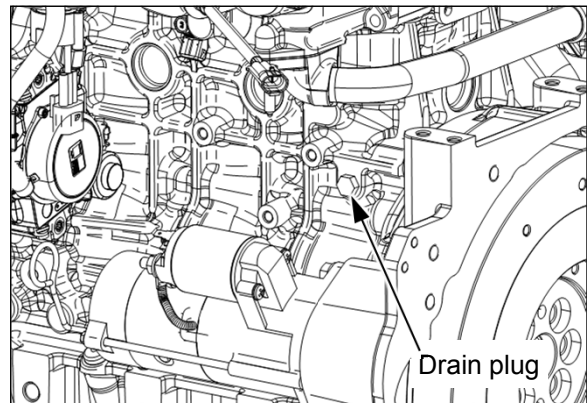
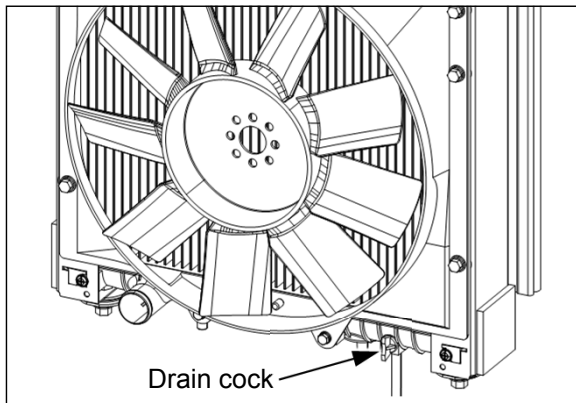


- ▶ **Pressurized System:** When opening the radiator cap, be careful of the escaping hot water or steam. Hot coolant can cause serious burns. To open the radiator cap, stop the engine and wait until the cooling system components are cool down. Loosen the radiator cap slowly in order to relieve the pressure.
- ▶ Wear the protection globes or cover the radiator cap with a rag before opening the radiator cap.

② Drain

- Stop the engine and allow the engine to cool down. Loosen the radiator cap slowly in order to relieve any pressure. Remove the radiator cap.
- Set a suitable clean container under radiator drain cock and drain plug on the engine.
- Open the drain cock and remove the drain plug on the engine and radiator.
- Allow the coolant to drain completely.





 Caution	▶ Care must be taken to ensure that fluids are contained during performance of inspection and maintenance of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids. ▶ Dispose of all fluids according to Local regulations and mandates. ▶ Keep all parts clean from contaminants. Contaminants may cause rapid wear and shortened component life.
--	---

③ Flush

- Flush the cooling system 2~3 times with clean water in order to remove any debris.
- Close the drain cock and install the drain plug on the engine and radiator.
- Fill the cooling system with clean water. Install the radiator cap.
- Start and run the engine at low idle until the temperature reaches 49 to 66 °C (120 to 150 °F).
- Stop the engine and allow the engine to cool. Loosen the radiator cap slowly in order to relieve any pressure. Remove the radiator cap. Open the drain cock or remove the drain plug on the engine and radiator. Allow the water to drain.

 Caution	▶ Do not fill the cooling system faster than 5 L (1.3 US gal.) per minute to avoid air locks. Cooling system air locks may result in engine damage.
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④ Fill

- Close the drain cock and install the drain plug on the engine and radiator.
- Fill the cooling system with the designated coolant. Do not install the radiator cap. *For coolant specification and capacity, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.*
- Start and run the engine at low idle. Increase the engine rpm to high idle. Run the engine at high idle for one minute in order to purge the air from the cavities of the engine block. Stop the engine.
- Check the coolant level. Maintain the coolant level within 13mm (0.5 in.) below the bottom of the pipe for filling. Maintain the coolant level in the expansion tank at the correct level.
- Clean the radiator cap. Inspect the gasket that is on the radiator cap. If the gasket is damaged, install a new radiator cap.
- Start the engine. Inspect the cooling system for leaks and for correct operating temperature.
- Use the coolant with anti-freeze solution in cold weather.
- Anti-freeze solution is filled up from the factory. After first winter, change the coolant to remove the debris or corrosion.



Caution

- Do not fill the cooling system faster than 5 L (1.3 US gal.) per minute to avoid air locks. Cooling system air locks may result in engine damage.

※ Anti-freeze

- The amount of anti-freeze in the coolant must be determined on the ambient temperature. If the amount of anti-freeze in the coolant is low, the coolant can be frozen and the engine and radiator may be damaged.
- Mix the water and anti-freeze with 40%~60% according to operating condition as below table and fill radiator and engine the mixture after checking the volume and capacity.

Anti-freeze (%)	Freezing point °C (°F)	Boiling point °C (°F)	Remark
40	-24 (-11)	106 (223)	
50	-37 (-35)	108 (226)	
60	-52 (-62)	111 (232)	

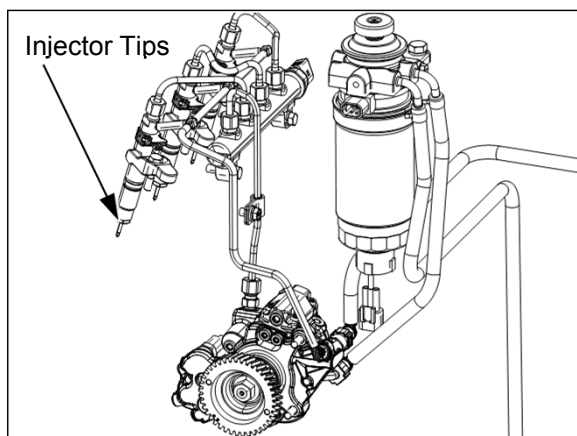
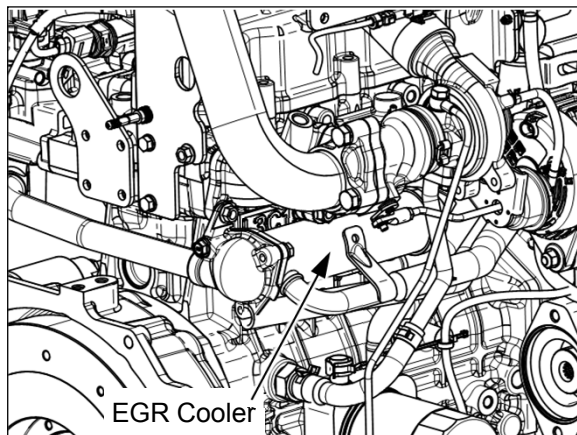
- If possible, always use the anti-freeze solution. If not, change the coolant with anti-freeze solution before winter time.
- Run the engine for about 5 minutes after filling anti-freeze to mix it with water well.

(2) Cleaning Emission related parts

- The following items are major engine emission related parts. These items are checked and cleaned periodically. But it is performed by special engine service experts. Contact your authorized local dealer for check.

-. EGR Cooler

-. Injector Tips

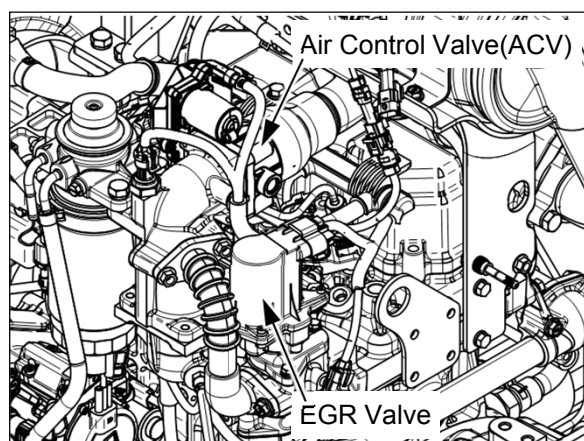
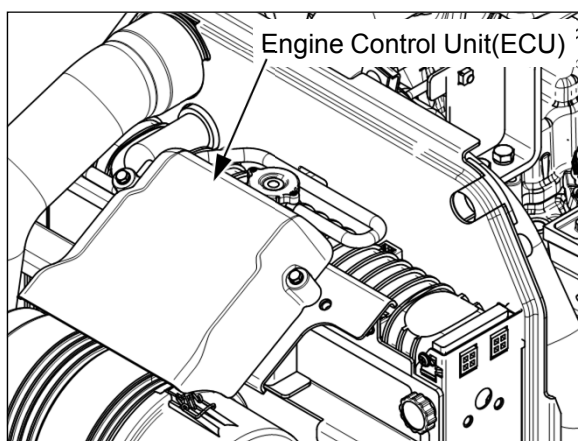
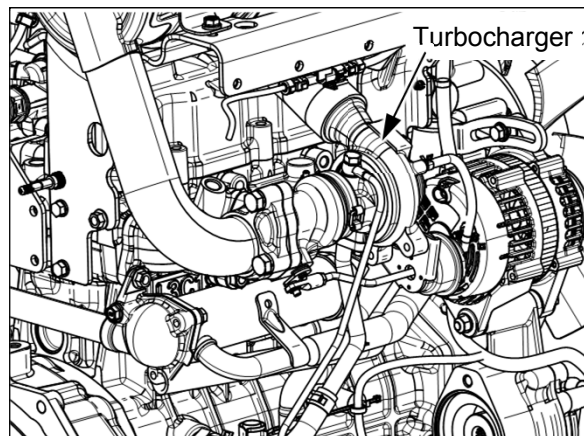
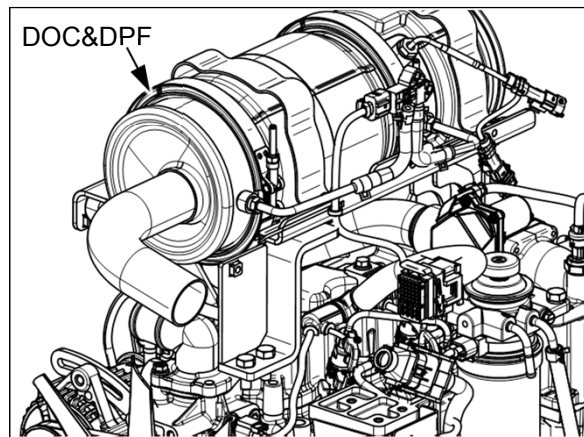


5-13. Every 3000hr check

(1) Cleaning Emission related parts

- The following items are major engine emission related parts. These items are checked and cleaned periodically. But it is performed by special engine service experts. Contact your authorized local dealer for check.

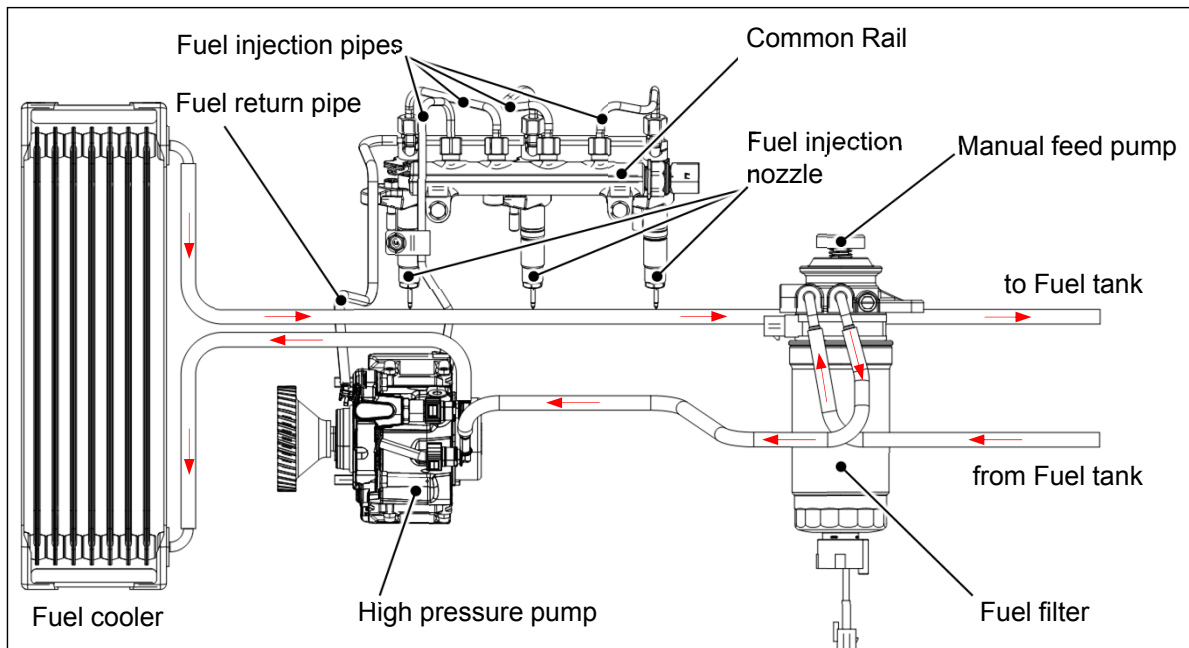
- Fuel injector
- DOC&DPF
- Turbocharger
- ECU
- EGR valve
- Sensors
- Air Control Valve (ACV)



5-14. General maintenance (When required)

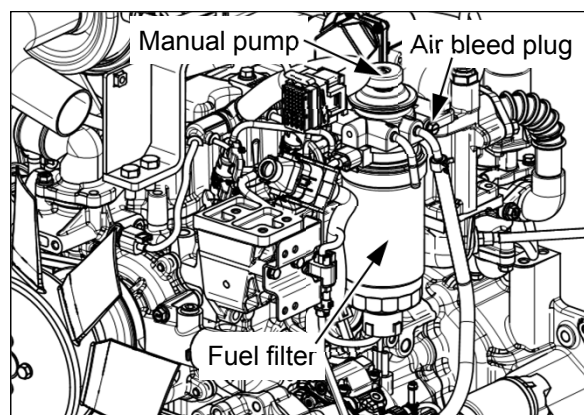
(1) Air-bleeding from Fuel system

- Air in the fuel system may cause weak fuel injection or a failure of the engine start or stop. To prevent such a failure, bleed the air from the fuel system.



 Danger	► HIGH PRESSURE FUEL. When the engine is running, do not loosen the fuel injection pipes to bleed air from the fuel system.
 Caution	► Do not adjust or modify the fuel injection system arbitrary. It can cause a serious fault related to engine performance and increase of excessive exhaust emissions.
Notice	► When changing the fuel filter only, it is not necessary to bleed air from the fuel injection pipes.

- After replacing fuel filter, bleed the air in the fuel system.
1. Press down the manual feed pump several times.
 2. Unscrew the air bleed plug installed on the fuel filter flange. After bleeding the air bubbles, tighten the air bleed plug slightly.
 3. Repeat the procedure 1 and 2 until there is no more fuel containing air bubbles.

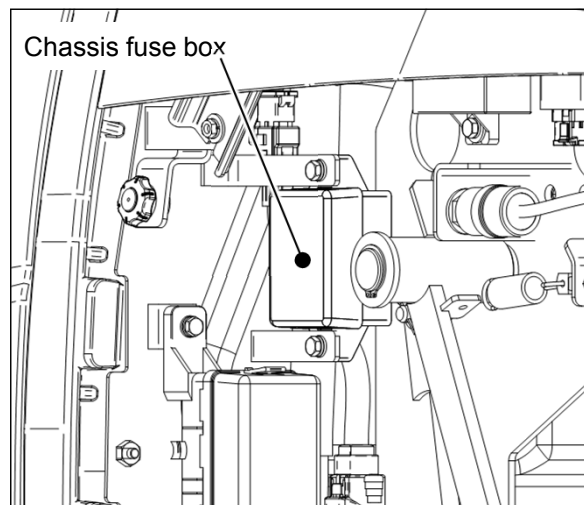


 Warning	▶ Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the key switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.
 Caution	▶ Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover disconnected fuel system component. Do not fill the new filter with fuel. Invisible fine contaminants can enter the injection pump and it may cause damage to the fuel injection system.
 Caution	▶ Cover the bleeding fuel with a rag so that it does not flow into other components. ▶ Do not throw the exhausted waste fuel to any place. This may pollute the soil and water seriously and also is prohibited legally. If violating, you would be responsible for that by civil or criminal case. The waste oil must be disposed according to the environment laws.

(2) Fuse & Main fuse

① Fuse check and replacement

- How to change the fuse
 1. Remove the fuse box cover.
 2. Check each fuse and remove the damaged one.
 3. Replace it with a new one of the same capacity as the damaged one.
- Chassis fuse box is installed under the front console cover.
- The capacity and function of each fuse is described on the fuse box cover.



20A 전조등 HEAD LAMP	예비	SPARE	
10A 릴레이혼 RELAY, HORN	10A		
5A 전자제어장치 ECU	예비	SPARE	5A 엔진컨트롤 ENGINE CONTROL
10A 방향지시등 TURN SIGNAL	10A		10A 엔진센서 ENGINE SENSOR
15A 유압밸브 SOLENOID VALVE	15A		10A 비상등 HAZARD LAMP
15A 작업등 WORK LAMP	예비	SPARE	5A ECU전원 ECU MAIN POWER
10A 컨트롤러 CONTROLLER	20A		

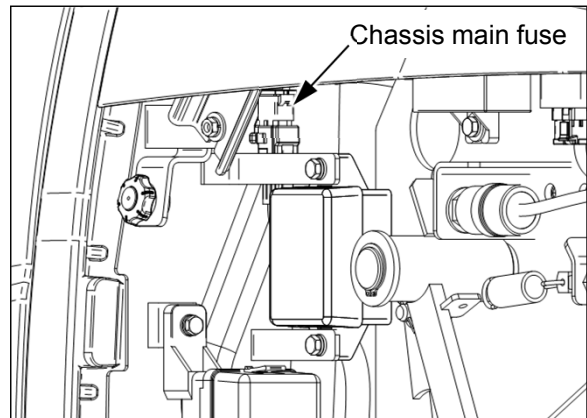
< Chassis fuse box >



- ▶ If the same function fuse is damaged repeatedly, contact your authorized local dealer for check instead of using a substitute such as wire or aluminum foil.
- ▶ If using the substitute instead of the rated capacity fuse, it may cause a fire which results in damage of the tractor or personal injury.

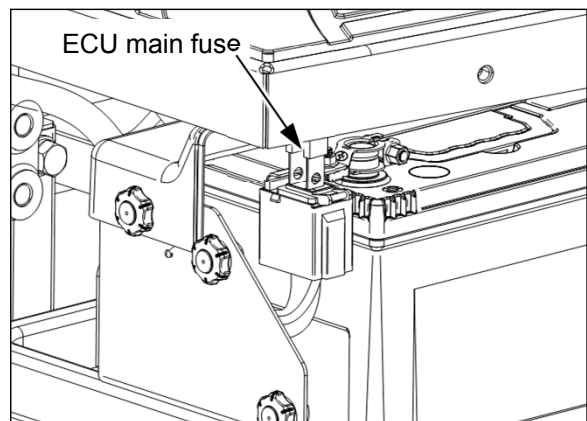
② Chassis main fuse

- Chassis main fuse is attached to the left-hand main harness.
- Pull out the chassis main fuse. If necessary, replace it with a genuine part.
Rated capacity : 50 A
- The chassis main fuse is an important part to protect the electric system of the driver station and lights. If damaged, check if there is a trouble in the electric system. Contact your authorized local dealer for check.



③ ECU main fuse

- ECU main fuse is installed to the battery cable (+).
- Remove the cover and pull out the ECU main fuse. If necessary, replace it with a genuine part.
Rated capacity : 50 A
- The ECU main fuse is an important part to protect the ECU electric circuit. If damaged, check if there is a trouble in the electric system. Contact your authorized local dealer for check.



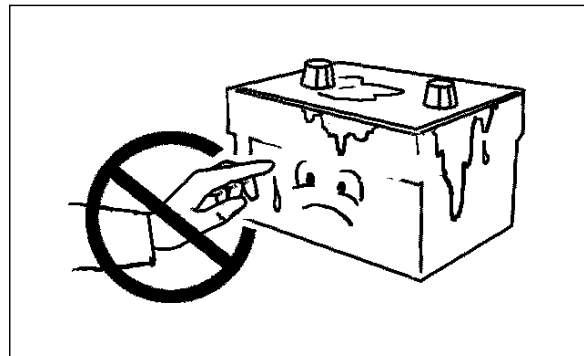
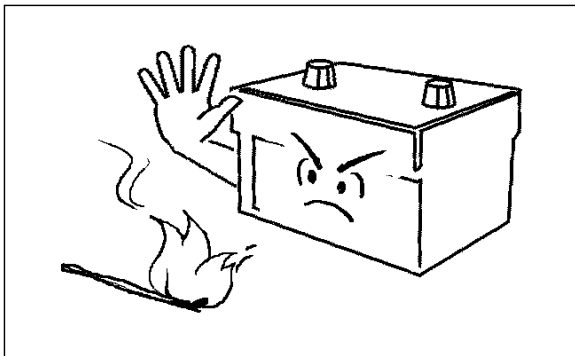
 Caution	▶ The main fuse is an important part to protect the electric system and components. If it is often burn out, contact your authorized local dealer to check the problem. ▶ Do not use a substitute instead of the rated genuine fuse. Do not connect electric wires to the battery terminals directly. It may cause a fire and serious injury.
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(3) Battery handling and Notices

- ※ **Battery fluid (Electrolyte) is a solution of water and sulfuric acid. It makes poisonous gas which is very harmful to eyes, skin and clothing. And also this gas is explosive. Read the following instructions thoroughly before handling the battery.**

① Battery check

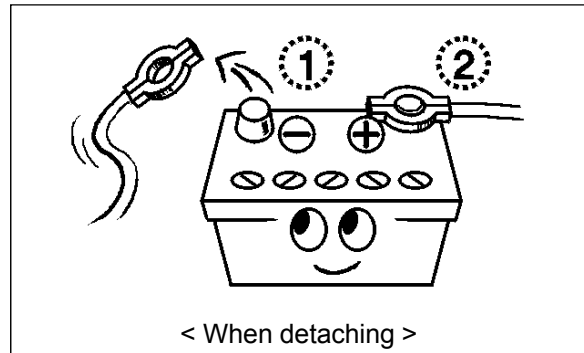
- Indicator(if fitted) on the top of the battery displays the battery state. If the indicator color is;
 - **GREEN** : Normal state.
If the engine does not start despite of green color, contact your authorized dealer.
 - **CLEAN** : Low charging state – charge the battery.
 - **WHITE or RED** : Replace the battery with a new one after checking the vehicle.
- If the terminals of battery harness are loosened, tighten it completely.
If the terminals of battery are corroded, clean it with warm water and apply grease.



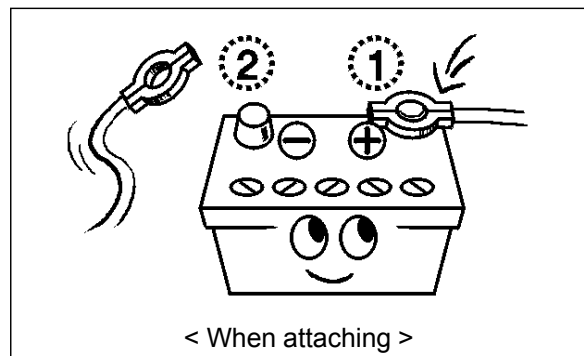
 Caution   	▶ The gas generated from the battery is explosive. Comply with the following instructions. - Keep cigarettes, sparks and flames away from the battery. Use a flashlight to check battery electrolyte level or indicator. - Never check battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer. - Always remove grounded (-) battery clamp first and assemble it last. If not, it can cause explosion by spark. ▶ Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, clothing and can cause blindness if splashed into the eyes. - Never disassemble the battery. - Do not touch the battery or liquid by bare hand without gloves or any protection. - Flush eyes with clean water for about 20 minutes if the electrolyte is splashed into the eyes, and get medical attention immediately. ▶ Charge the battery in an area with good ventilation and DO NOT charge a frozen battery. ▶ Replace it with LS tractor genuine products or the battery with the same capacity.
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② Notices in attaching/detaching the battery

- When detaching battery, remove the negative(-) terminal from the battery first.
If not, when metal object is contacted between positive(+) terminal and the body, it may cause the dangerous spark.



- When attaching the battery, the positive (+) terminal must be attached first and the negative (-) terminal must be connected last.

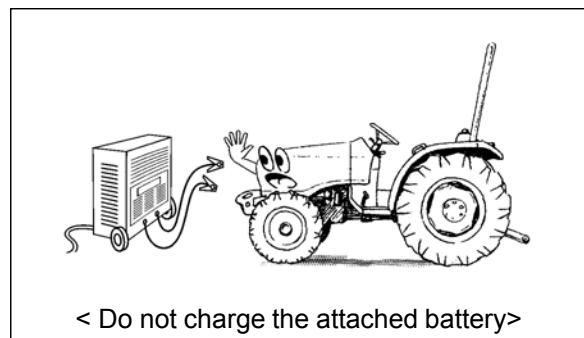
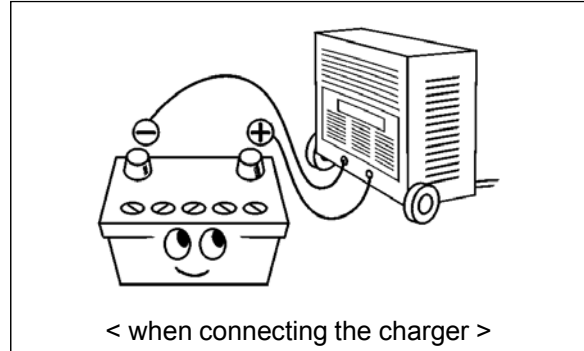


 Caution	▶ Stop engine and apply parking brake and remove the ignition key before replacing the battery.
	▶ Put on eye protection and globes to protect human body from poisonous sulfuric acid before handling the battery.
	▶ Always remove grounded (-) battery clamp first and assemble it last. If not, it can cause an explosion by spark.
	▶ Keep all flames and sparks away and DO NOT smoke while charge the battery. ▶ Replaced old battery must be disposed of in a suitable manner, according to the national legislation or local regulations. Contact your authorized dealer. ▶ Replace it with LS tractor genuine products or the battery with the same capacity.

③ Notices in charging the battery using separate charger

- As the battery fluid makes poisonous gas which can explode during the charging, comply with the following instructions.

1. Detach battery from the tractor.
2. Wait until the battery is warmed to room temperature.
3. Connect the cable of charger to the (+), (-) terminal of the battery correctly.
 - Connect (+) charger cable to (+) battery terminal. : Red color
 - Connect (-) charger cable to (-) battery terminal. : Black color
4. Plug in charger cord.
5. Charge battery with a "SLOW CHARGE".
6. Check the charging current and temperature of electrolyte during the charging.
7. Unplug charge cord and remove charger cables.
8. Attach battery to the tractor.



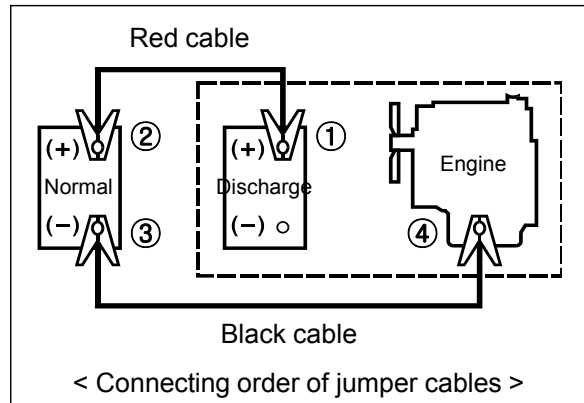
 Caution	▶ Put on eye protection and gloves to protect human body from poisonous sulfuric acid before handling the battery .
	▶ Always remove grounded (-) battery clamp first and assemble it last. If not, it can cause explosion by spark. ▶ Keep all flames and sparks away and DO NOT smoke while charging the battery.
	▶ Detach battery from the tractor before charging. DO NOT charge directly while the battery is attached to the tractor. ▶ Turn off or unplug the charger cord, before connecting or disconnecting the charger cable to or from the battery.
	▶ Charge the battery in an area with good ventilation. ▶ Do not charge the frozen battery. ▶ Use the rated 12V-5A charger. ▶ Never check battery charge by placing a metal object across the terminals.

④ How to use jumper cables

※ If the battery which is attached to the tractor is discharged and needs to connect a auxiliary battery, follow the instructions as below.

③ Connecting Jumper cables

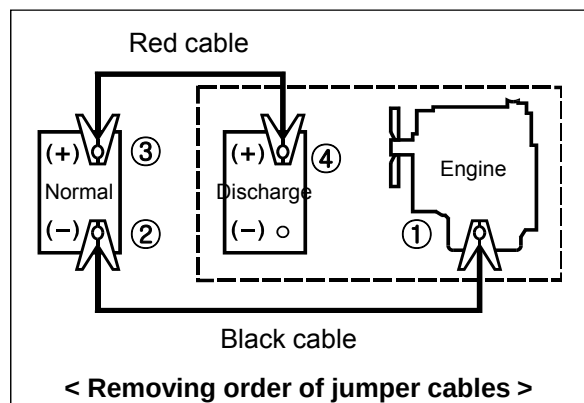
- Check followings before connecting the cables.
 - Is the spring of clamp normal?
 - Is the cable and clamp cut-off?
- 1. Stop engine, apply parking brake and remove the ignition key.
- 2. Connect two (+) terminals of both batteries with red cable. (tractor battery-①, auxiliary battery-②)
- 3. Connect one end of black cable to (-) terminal(③) of auxiliary battery and the other end to engine block desired to start (④).
- 4. Start engine. If the engine does not start, check the electrolyte level of each battery.



 Caution	▶ The gas generated from the battery can be exploded by spark. DO NOT connect the negative(-) cable of auxiliary battery to the negative (-) terminal of tractor battery. Make sure to connect to the engine block. ▶ Keep all flames and sparks away and DO NOT smoke while charging the battery.
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③ Removing Jumper cables

- Remove jumper cables as referring to the right figure, "Removing order of jumper cables".



Notice	▶ Pay attention not to change the (+) and (-) pole. If not, it may cause a failure of electric circuit or the damage of wire and even the polarity of battery can be changed at over-discharged state.
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5-15. Troubleshooting

 Warning	► To avoid injury due to sudden start, apply parking brake and place the transmission gear in NEUTRAL position before checking and repairing.
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System	Faults	Possible causes	Solutions
Engine	The start motor does not turn when turning the key switch.	▲ Start safety switch is not contacted ▲ PTO switch is not on "OFF" position ▲ Discharge of battery ▲ Terminal loosened ▲ Key switch failure ▲ Start motor failure	▲ Depress the clutch pedal fully ▲ Place PTO switch on "OFF" position ▲ Charge or replace ▲ Tighten ▲ Repair or replace ▲ Repair or replace
	The start motor turns but the engine does not start.	▲ The battery is weak ▲ bad ground ▲ Improper viscosity of engine oil ▲ Air in fuel system ▲ Fuel filter clogged ▲ Error in engine body ▲ Fuel cock closed	▲ Charge or replace ▲ Tighten the ground ▲ Replace the oil with proper viscosity ▲ Bleed the air ▲ Wash or replace the filter ▲ Repair ▲ Open the cock
	Engine revolution is irregular.	▲ Air in fuel system ▲ Fuel filter clogged ▲ Injection nozzle clogged ▲ Fuel leakage ▲ Irregular fuel injection	▲ Bleed air ▲ Clean or replace the filter ▲ Repair or replace ▲ Repair ▲ Repair
	Engine turns more than maximum speed.	▲ Impurities in governor	▲ Repair
	Engine stops suddenly during operation.	▲ Fuel shortage ▲ Fault of nozzle ▲ moving parts failure due to bad lubrication	▲ Add fuel and bleed air ▲ Repair or replace ▲ Repair
	Engine stops at low rpm.	▲ Fault of High pressure pump ▲ Valve gap is not correct ▲ Poor nozzle pressure	▲ Repair ▲ Adjust the gap ▲ Repair

System	Faults	Possible causes	Solutions
Engine	Engine overheat	▲ Lack of engine coolant ▲ Bad fan belt tension or broken ▲ Dirt attached to the radiator	▲ Supplement ▲ Adjust belt tension or replace ▲ Clean
	The color of exhausted smoke is white.	▲ Air cleaner clogged ▲ Engine oil exceeded ▲ Lack of fuel supply	▲ Wash element ▲ Adjust in proper level ▲ Repair
	The color of exhausted smoke is black.	▲ Bad quality of fuel ▲ Oversupply of fuel ▲ Fault of nozzle	▲ Use good quality fuel ▲ Repair ▲ Repair
	Engine power is low.	▲ Injection nozzle clogged ▲ Carbon piled to valve seat ▲ Bad adjustment of valve gap ▲ Bad injection timing ▲ Lack of fuel supply ▲ Air cleaner clogged	▲ Repair ▲ Repair ▲ Repair ▲ Repair ▲ Check fuel system ▲ Clean or replace
	Engine oil pressure indicator is ON during operation.	▲ Lack of engine oil ▲ Low viscosity of engine oil ▲ Warning light switch error ▲ Fault of oil pump ▲ Oil filter element is clogged	▲ Supplement ▲ Replace the proper oil viscosity ▲ Replace ▲ Repair ▲ Replace element
	Battery charging indicator is ON during operation	▲ Abnormal wiring ▲ Fault of alternator ▲ Fault of battery ▲ Bad fan belt tension or broken	▲ Check battery terminals and ground, repair ▲ Repair or replace ▲ Replace ▲ Adjust belt tension or replace
	Electronic control errors.	Fault of electric sensors or wire harness or ECU	▲ Contact your authorized local dealer.
Clutch	Clutch is slipped.	▲ Wrong clutch pedal play ▲ Friction lining worn or broken	▲ Adjust ▲ Replace
	Clutch does not cut-off.	▲ Lining damaged ▲ Wrong clutch pedal play	▲ Repair or replace ▲ Adjust

System	Faults	Possible causes	Solutions
Brake	Brake does not work or only one side works.	▲ Wrong brake pedal play ▲ Lining worn or broken ▲ Left/right pedal play is different	▲ Adjust ▲ Replace ▲ Adjust
	After brake pedal working, it does not return.	▲ Return spring damaged ▲ Lack of grease in shaft parts	▲ Replace the spring ▲ Remove the rust, apply grease
Hydraulic System	Lift arm does not raise.	▲ Lack of transmission oil ▲ Air in the suction pipe ▲ Hydraulic filter clogged ▲ Hydraulic pump failure ▲ Control valve failure ▲ Cylinder or cylinder related parts broken	▲ Add oil ▲ Tighten the filter or replace seal of connecting parts ▲ Clean the filter or replace ▲ Repair or replace ▲ Repair or replace ▲ Repair or replace
	Oil leakage	▲ Connecting part loosened ▲ Oil seal damaged ▲ Pipe cracked	▲ Tighten ▲ Replace ▲ Replace
	If lever is placed on the raising position, and relief valve sound off.	▲ Upper limit of position control lever is changed	▲ Adjust the upper limit
	Lift arm does not lower	▲ Down speed control valve locked ▲ Control valve failure ▲ Cylinder damaged ▲ Lift shaft turning part damaged	▲ Turn the knob counter-clockwise ▲ Repair or replace ▲ Replace ▲ Repair or replace

System	Faults	Possible causes	Solutions
Steering System	Hydraulic steering system does not work.	▲ Pump worn or part damaged ▲ Steering unit damaged or worn ▲ Oil leakage by steering cylinder piston seal damaged or worn ▲ Oil leakage by pipe damage	▲ Repair or replace ▲ Repair or replace ▲ Repair ▲ Repair or replace
	Hard to operate the steering wheel.	▲ Steering unit - Steering unit spline and column spline is not aligned - Spool and sleeve damaged by foreign material - Excessive tightening torque of end cap bolt ▲ Pump - Low speed - Wearing or failure ▲ Relief valve - Valve spool clogged - Setting pressure too low	▲ - Check mounted condition of steering unit and column - Replace - Apply regular torque ▲ - Adjust RPM or Repair - Repair or replace ▲ - Repair or replace - Reset or adjust
	Cylinder does not work smoothly as steering wheel movement	▲ Air in steering line if not used for a long time ▲ Air in suction pipe ▲ Piston seal damaged	▲ Bleed air ▲ Repair ▲ Replace
	Steering wheel turns to the opposite direction.	▲ bad assembly of steering gear ▲ bad assembly of steering hose	▲ Repair ▲ Repair
	Oil leakage of steering pump, steering unit, cylinder and fittings	▲ Seal damaged	▲ Replace seal
	Abnormal noise	▲ Lack of oil ▲ Exceeding resistance of suction line ▲ Air in system	▲ Aid oil ▲ Replace filter or repair pump ▲ Bleed air

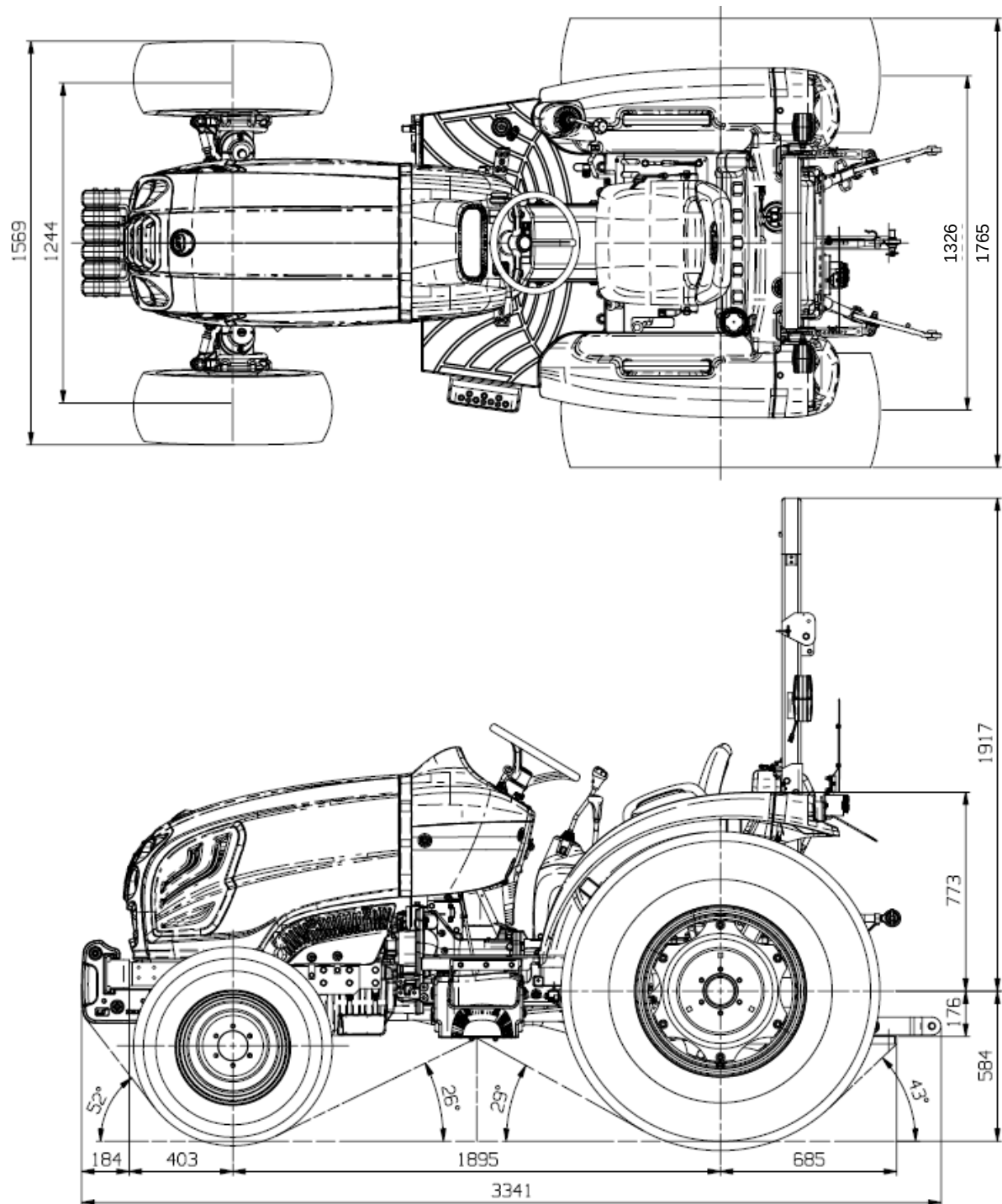
System	Faults	Possible causes	Solutions
HST	When operating HST pedal, tractor dose not start.	▲ Low pressure relief set is too low ▲ High pressure relief set is too low ▲ HST charger valve fault ▲ Filter clogged ▲ Pump worn or part damaged ▲ HST moving part worn or damaged	▲ Check and repair ▲ Check and repair ▲ Replace ▲ Replace filter ▲ Repair or replace ▲ Repair or replace after check the circuit
	Tractor is still moving despite pedal being in neutral position on HST pedal.	▲ Neutral position of HST pedal is changed. ▲ HST pedal linkage damaged ▲ HST arm bolt loosened	▲ Adjust neutral position ▲ Replace damaged part ▲ Fasten the bolt with adhesive
	HST power is too low	▲ Oil shortage ▲ Air in HST circuit ▲ Transmission oil temperature is too high. ▲ HST moving part worn ▲ HST filter clogged	▲ Add oil ▲ Check and repair the hydraulic suction line. ▲ Stop engine to cool the oil, and restart ▲ Repair or replace ▲ Replace the filter
	Abnormal noise	▲ Engine speed is too low ▲ Oil temperature is too low ▲ Hydraulic oil filter clogged ▲ Oil shortage	▲ Set engine rpm over 1500 rev/min ▲ Run engine to warm up the oil. ▲ Replace the filter ▲ Add oil

System	Faults	Possible causes	Solutions
Electric System	Battery is not charge	▲ Abnormal wiring ▲ Alternator failure ▲ Lack of fan belt tension or broken ▲ Abnormal battery	▲ Check the tightening state of terminal and ground ▲ Repair or replace ▲ Adjust fan belt tension or replace ▲ Replace
	Headlight is dark.	▲ Battery capacity is low ▲ Bad wiring and contact	▲ Charge or replace ▲ Check and repair
	Headlight does not ON.	▲ Light bulb cut-off ▲ Fuse blown	▲ Replace ▲ Check the cause, and replace
	Horn does not sound.	▲ Switch failure ▲ Abnormal wiring ▲ Horn failure	▲ Replace ▲ Repair ▲ Replace
	Turn signal Light does not work.	▲ Light bulb cut-off ▲ Bad connection ▲ Fuse blown	▲ Replace ▲ Tighten terminals ▲ Check the cause, and replace it
	Cold start aid indicator does not ON. (option)	▲ Relay or timer damaged ▲ Bad connection of preheat plug wiring	▲ Replace ▲ Check and tighten
	Other illuminating and indicator does not ON.	▲ Fuse blown ▲ Light bulb cut-off	▲ After removing the cause, and replace ▲ Replace

6. Dimension and Specification

- Roll-bar type

(Unit : mm)



* Front tires : 10-16.5 6PR / Rear tires : 17.5L-24 6PR

		MT345E/MT345HE	MT350E/MT350HE
WEIGHT	Roll-bar	1689kg(3724 lb)	1661kg(3662 lb)
	CABIN	N/A	
	Bumper	10.5kg (23.1 lb) (optional)	
	Front weight	20kg (44.1 lb) x 6EA (optional)	
ENGINE	Model	L3C19-T3	L3C19-T2
	Type	4-stroke, vertical, water cooling, CRDI	
	No. of cylinder	3	
	Diameter x stroke	88x103 (3.46x4.06 in)	
	Displacement	1879cc (114.7 in ³)	
	Compression ratio	17 : 1	
	Engine speed	850 ~ 2800 rpm	
	Maximum torque	150 N.m@1600	167 N.m@1600
	Rated power	33.5 kW@2600	37.3 kW@2600
FUEL INJECTION SYSTEM	Type	Delphi CRDI (Common Rail Direct Injection)	
	Fuel filter	Replaceable cartridge type	
	Injection order	1-3-2	
LUBRICATION SYSTEM	Type	Forced circulation	
	Pump	Trochoid gear pump	
	Filter	Replaceable cartridge type	
COOLING SYSTEM	Pump	Centrifugal type	
	Temperature control	Thermostat	
	Air cleaner	Dry	
TRANSMISSION	Type	F8xR8 Mechanical / HST	
	Main clutch	Dry single clutch for Mechanical only	
	Forward / Reverse	Synchro-shuttle type for Mechanical / HST pedals	
	Differential lock	Mechanical pedal type	

			MT345E/MT345HE	MT350E/MT350HE
PTO	Type		Independent PTO with wet disk clutch	
	No. of speed		1 speed gear	
	PTO / Engine		540 rpm / 2409 rpm	
HYDRAULIC LIFT	3 Point linkage		CAT.1	
	Draft load detection		N/A	
	Lowering speed control and cylinder fixing device		Down speed control valve	
	Pump		Gear pump type, Engine drive	
	Rated flow		31.2LPM (8.2GPM)	
	System pressure		17.5MPa (2538psi)	
	Lift capacity	Lower link end	1320 kgf (2910 lbf)	
		24” behind lift point	1100 kgf (2425 lbf)	
REMOTE CONTROL	Type		N/A	
	No. of Q/coupler		N/A	
	F/Loader coupler		Joystick loader valve	
STEERING SYSTEM	Type		Hydrostatic	
	Oil		Transmission oil	
	Min. turning radius (with brake)		2.9m (9.5 ft)	
	Max. steering angle		50°	
	No. of steering turns		3.7 turns (lock to lock)	
	Oil flow		18.2LPM (4.8GPM)	
	System pressure		12.8MPa (1849 psi)	

			MT345E/MT345HE	MT350E/MT350HE
ALTERNAT OR	Rated output		12V - 70A	
	Voltage control		Built-in (IC type)	
BATTERY	Voltage		12V	
	Capacity		80AH	
START MOTOR	Output power		12V, 2.2kW	
	Operation		Solenoid	
LIGHTS	Headlights (Low / High beam)		12V 55W / 60W	
	Turn signal lights (front)		12V 21W	
	Side lights (front)		N/A	
	Turn signal lights (rear)		12V 21W	
	Stop light / Taillight (rear)		12V 21W / 5W	
	Work lights		12V 27W (Grille) / 27W (Roll-bar, optional)	
	Indoor light		N/A	
	Instrument & indicator lights		LED	
	Cold start aid		Glow plug	
STD. AGRI. TIRE	(Front / Rear) Agri. Industrial Turf		8.3-16 6PR R-1 / 14.9-24 8PR R-1 10-16.5 6PR R-4 / 17.5L-24 6PR R-4 29x12.50-15 R-3 / 44x18.00-20 R-3 (For further details, see chapter 4-4-(6))	
WHEEL TRACK ADJUSTMENT	Front	Track(s)	Fixed track	
		Dimension	1244mm (49.0 in.)	
	Rear	Track(s)	Fixed track	
		Dimension	1326mm (52.2 in.)	
** These specifications are only general product information about standard model. Actual data may vary depending on the various optional product, and also can be changed at any time to improve the product qualification without any prior notification **				

Lubricants and Capacity

Lubricants	Capacity	International Standard	Recommended products
Engine coolant	8.7 L (2.3 U.S.gals.)	ASTM D6210	Soft water (50%) + Anti-freeze (50%)
Fuel	52 L (13.7 U.S.gals.)	ASTM D975 No.2	Ultra low sulfur diesel fuel
Engine oil	5.7 L (1.5 U.S.gals.)	API CJ-4	KIXX DL (Manufacturer : GS Caltex)
Transmission oil (common use for hydraulic lift and steering system)	37 L (9.8 U.S.gals.)	API GL4 ISO VG 32/46	LSTH400G (LS Tractor T/M & Hyd. oil) (Manufacturer : GS Caltex)
Front axle oil	6 L(Kingpin case)+ 3 L(Gear case)= 9 L (2.4 U.S.gals.)	API GL4 SAE 80W	EPK 80W90 (Manufacturer : S-OIL TOTAL Co. Ltd.)
Grease (Front axle holder, Steering cylinder pin, 3-point linkage, etc.)	Proper amount	NLGI 2	CALTEX MAHWAK Multi purpose or CALTEX MAHWAK All purpose

RECOMMENDED ENGINE OIL VISCOSITIES

The correct engine oil viscosity grade is dependent upon ambient temperature. Refer to the below chart when selecting engine oil for your tractor.

In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable. Contact your authorized local dealer.

Ambient Temperature °C(°F)	-30 (-22)	-25 (-13)	-20 (-4)	-15 (5)	-10 (14)	-5 (23)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Oil Viscosity											