



<https://truckmanualshub.com/>

LS TRACTOR

OPERATOR'S MANUAL

J-SERIES

www.lstractor.com

LS TRACTOR

INNOVATIVE
TECHNOLOGY
PARTNER

LS TRACTOR OPERATOR'S MANUAL

J2020H • J2030H



LS Tractor USA LLC.

PO Box 70, Battleboro, NC 27809

Tel : 252-984-0700

Fax : 252-984-0701

www.lstractor.com

www.lstractorusa.com

P/NO	52105107
DATE	20110501



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	1-3
(2) Notices when starting Engine	1-5
(3) Notices while operating/using the tractor	1-6
(4) Notices when connecting Implement	1-8
(5) Notices when towing the tractor	1-8
(6) Notices when transporting the tractor	1-9
(7) Notices when parking tractor	1-9
(8) Notices when checking tractor after work	1-10
(9) Notices when handling Diesel Fuel	1-11
(10) Operator Protective Structure (OPS)	1-11
1-3. Long-term storage	
(1) Preparation for storage	1-12
(2) Check & Maintenance during storage	1-13
(3) Preparation for Reuse	1-13
1-4. Notices for “Use & Disposal” related to Environment Preservation	1-14
1-5. Symbols	1-15
1-6. Safety Decals	
(1) Handling and Maintenance of Safety Decals	1-16
(2) Safety Decals and attaching position	1-16



2. The Name of Each Part

(1) HST Type	2-1
--------------	-----



3. Instruments and Controls

3-1. Instrument Panel and Switches	
(1) The name of each part	3-1
(2) Key switch	3-1
(3) Cold start aid indicator	3-1
(4) Tachometer and Hour meter	3-2
(5) Engine coolant temperature gauge	3-2
(6) Fuel level gauge	3-2
(7) Turn signal light switch	3-3
(8) Engine oil pressure indicator	3-3

Contents

(9) Battery charging indicator	3-3
(10) Light switch	3-4
(11) Horn switch	3-4
(12) Hazard warning light switch	3-5
(13) Work light switch	3-5
(14) PTO operation indicator	3-6
(15) PTO switch	3-6
(16) Parking brake indicator	3-6

3-2. Operating Levers and Pedals

(1) Throttle lever	3-7
(2) Brake pedal	3-8
(3) Parking brake lever	3-8
(4) Range gear shift lever	3-8
(5) PTO gear lever (if fitted)	3-9
(6) 4WD lever	3-9
(7) Differential lock pedal	3-10
(8) HST forward/ reverse pedal (HST type)	3-10
(9) HST neutral switch	3-11
(11) Cruise control lever (HST type)	3-11
(10) Driver's seat (HST type)	3-12
(12) Seat adjustment	3-12

3-3. Hydraulic System

(1) Steering system	3-13
(2) Hydraulic lift Control	3-14
(3) Down speed control knob	3-14
(4) Remote control lever and Quick coupler	3-15
(5) Hydraulic System Diagram	3-16

3-4. Safety Device

(1) Seat belt	3-17
(2) Foldable Safety frame (R.O.P.S. type)	3-17



4. Operation and Work

4-1. Engine start and stop

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

Contents

4-2. How to Drive and how to Stop

(1) How to drive	4-3
(2) Changing speed	4-4
(3) Emergency Stop	4-4
(4) Stopping tractor	4-5
(5) Driving tractor on the road	4-6
(6) Parking	4-7

4-3. How to handle new tractor

(1) Check points	4-8
(2) Notices in handling new Tractor	4-8

4-4. Attaching Implement

(1) 3-point linkage	4-9
(2) Upper link installation and adjustment	4-10
(3) Adjustment of Lift rod's length	4-10
(4) Adjustment of Stabilizer's length	4-10
(5) Reference of Implement installation part	4-11
(6) Reference of PTO shaft	4-11
(7) PTO Safety cover and protection cap	4-12
(8) Hitch and Drawbar	4-13
(9) 7-Pole connector (option)	4-14
(10) Technically maximum permissible mass	4-15
(11) Adjusting Wheel tracks and tire replacement	4-16
(12) Tires and Load capacity	4-16
(13) Adjusting Steering angle	4-17

4-5. Driving Speed 4-18



5. Lubrication and Maintenance

5-1. Checking of Each Part

(1) Checking Parts	5-1
(2) Maintenance Table	5-2

5-2. Lubricants and Capacity 5-3

5-3. Access for maintenance 5-4

5-4. First 50 hour check 5-4

5-5. Checking Before Starting (Daily check)

(1) Engine oil	5-5
(2) Fuel tank	5-6

Contents

(3) Instrument panel & Indicators	5-6
(4) Turn signal lights, Lights, Horn	5-7
(5) Engine coolant	5-7
(6) Air cleaner (Dry type)	5-8
(7) Cleaning of Radiator and Radiator screen	5-9
(8) Tires air pressure and damage	5-9
(9) Tightening state of Bolts and Nuts of each part	5-10
(10) Adjustment of Brake pedal play	5-10
(11) Adjusting HST control linkage (HST type)	5-11
5-6. Every 50 hour check	
(1) Lubricating grease	5-12
(2) Checking Transmission oil	5-12
(3) Checking Front axle oil	5-13
(4) Battery check	5-13
(5) Air cleaner (Dry type)	5-13
(6) Cleaning of Radiator and Radiator screen	5-13
5-7. Every 300 hour check	
(1) Replacing Engine oil and Filter	5-14
(2) Replacing Hydraulic oil Filter	5-15
(3) Replacing Fuel filter cartridge	5-16
(4) Replacing Air cleaner element (Dry type)	5-16
(5) Tension adjustment of Fan belt	5-17
(6) Toe-in	5-17
5-8. Every 600 hour check	
(1) Changing Front axle oil	5-18
(2) Changing Transmission oil	5-18
(3) Replacement of Engine Coolant	5-19
(4) Adjusting Engine Valve clearance	5-20
(5) Checking Nozzle injection pressure	5-20
5-9. General maintenance (When required)	
(1) Air-bleeding from Fuel system	5-21
(2) Fuse & Main fuse	5-23
(3) Battery handling and Notices	5-25
5-10. Troubleshooting	5-29



6. Dimension and Specification

6-1

1. General Notices for Safety

1-1. Before using the tractor



✱ **Read this Operator's manual carefully, before using the tractor, to understand fully.**

◆ General information for right use

- Your tractor is designed and manufactured to be **used for agriculture**. Do not use the product for improper purpose out of the intention of manufacturer, and follow the safety instructions provided by this Operator's manual.
- Especially, read Chapter 1 "**General Notices for Safety**" thoroughly and **never modify or change** the driver's protection device or safety device without permission, **never use tractor without safety** devices or operate in violation of traffic rules, etc. (Do not remove seat belt or safety frame (Roll bar) or PTO shield)
- After using first 50hours, perform "**First 50 hour check**" and periodic regular check. (See page 5-4)
- 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 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 the miss use or operation in violation of these rules, the manufacturer 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..



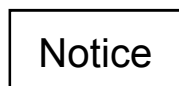
Danger – This indicates a fatal dangerous situation that may cause a serious injury or death if not avoided.



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, and also running hours displayed on the instrument panel. (See Fig. 1-3)

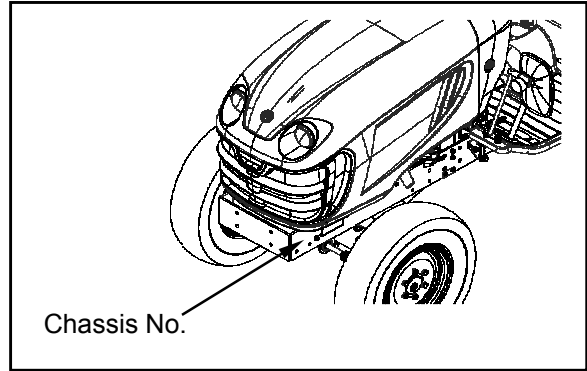


Fig.1-1

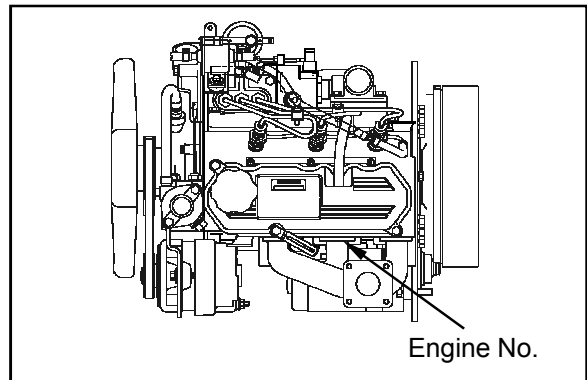


Fig.1-2

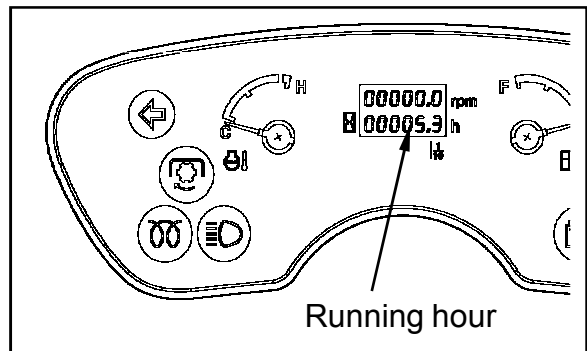
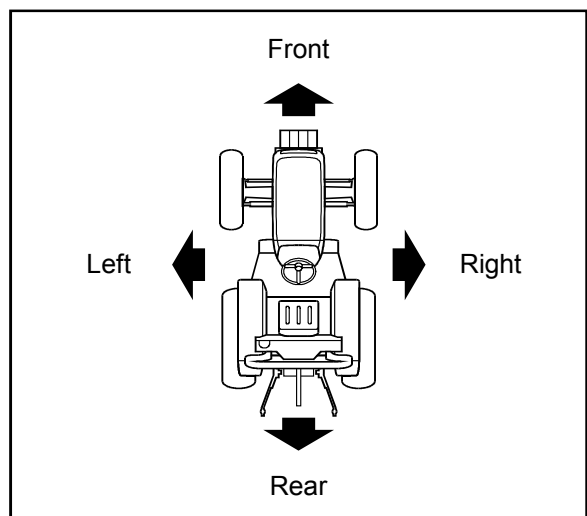


Fig.1-3

◆ Terminology

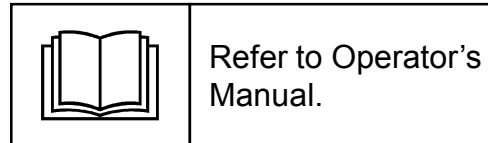
When reading this Operator's Manual, refer to the right figure for the discrimination of the front/ rear/ left/ right direction.



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

(1) Notices before using

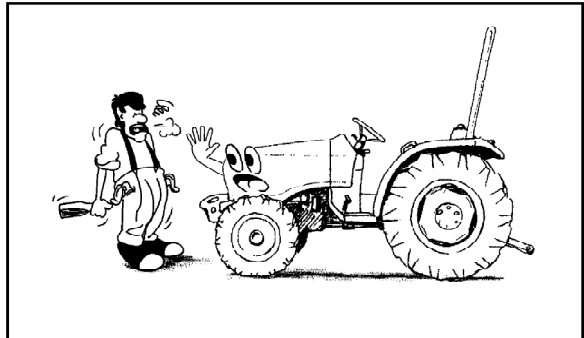
- **For Safety Instruction** : Before using the tractor, read this Operator's Manual carefully and understand the instructions fully for the safety prevention and right usage of the tractor and then use the tractor safely according to the instructions.



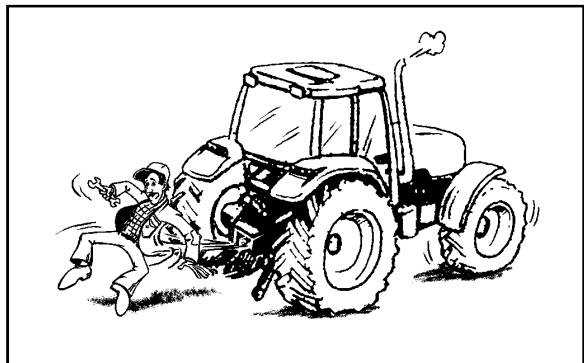
Especially, special cares must be taken for using the tractor in the places where the safety signs such as Danger, Warning, Caution etc. are marked. (For further information, See page 1-1)

- **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 "1-6 Safety Decals", See page 1-16)

- **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.



	Warning	▶ 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.

	Warning	▶ Additional seat (if 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 the 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 dealer. If not, it may cause a reduction of product life, failure and serious injury.
- **Restrict Maintenance** : If you repair or change some components and 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 can cause serious injury. If it is required to check or repair the tractor due to trouble, or if you have any questions for the usage or operation of the tractor, contact your authorized dealer.
 - * The items that are not allowed to be modified or changed or removed arbitrarily by user are below :
 - Protection structures such as PTO cover, Guards, Safety frame (Roll Bar), Cabin, 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.

 Warning	▶ Skilled professional technology is needed for the repair. ▶ For detail maintenance or repair, contact your authorized dealer.
---	--

- **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.
---	--

- **Safety Structure** : For the safety of the driver, various protection structures are attached on the tractor. If these structures are changed or detached by user arbitrarily, it may cause serious accident. Such behaviors are prohibited strictly.

 Warning	▶ Do not disassemble or drill the Bonnet (Hood), Fan cover, PTO cover, PTO shaft cover, Safety frame (Roll Bar) or Cabin etc. or do not modify other structures by welding arbitrarily. It may cause the loss of original function of the structures and serious injury may occur, and may void warranty. ▶ If the protections or safety devices are broken, replace them immediately. If not, it can cause a accident or serious injury.
---	---

(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 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** correctly with seat belt fastened.
- 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
- Put PTO switch to “OFF” position. If the PTO switch is “INDEP” or “MANUAL”, the engine can NOT be started. (See Fig.1-4)
- Depress the clutch pedal fully (if fitted). If not, the start safety switch is not contacted enough and the engine can NOT start.

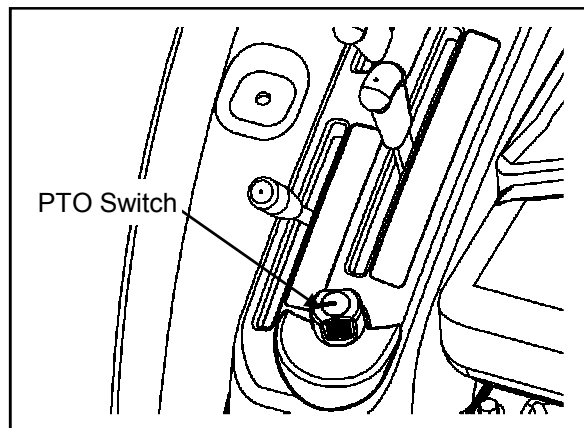
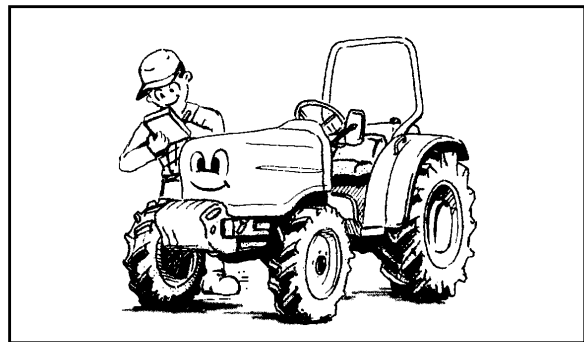
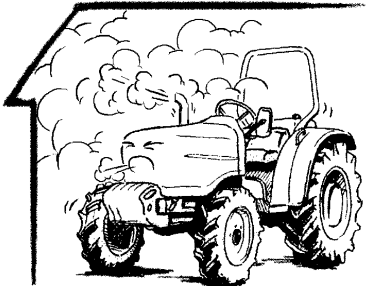


Fig.1-4

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

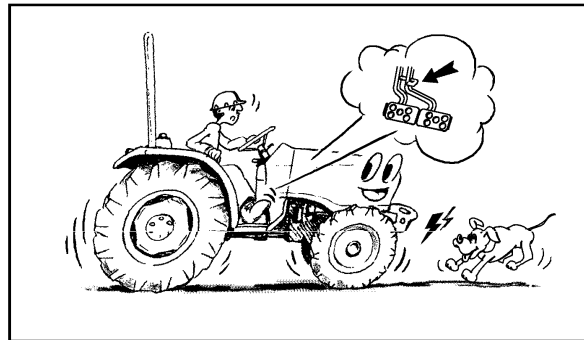
(3) Notices while operating/using the tractor

● Ventilation

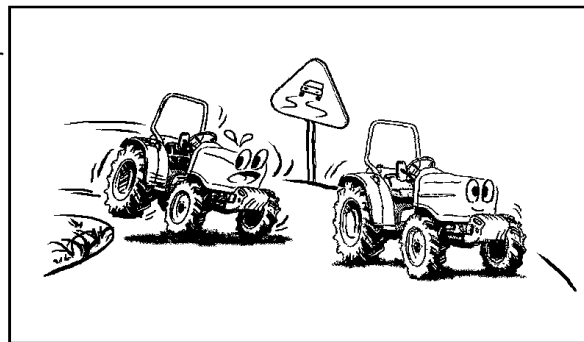
 Warning	► It is very dangerous to work in a closed area. The poisonous exhaust gas may cause serious damage to the human body. If you should work in this area, make sure to ventilate well and put on the protective mask.	
		

- **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 may intensity from the equipment may be increased. To reduce the harm to the body, take a rest periodically.

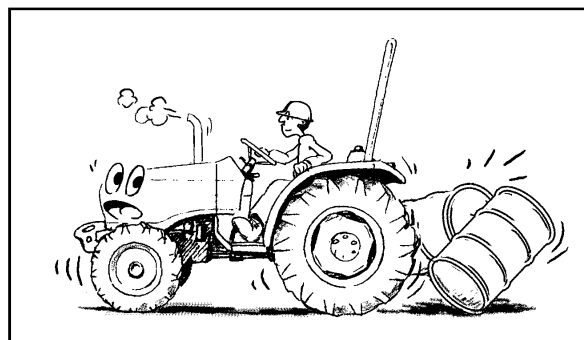
- Connect left and right brake pedals while driving on the road. (if fitted)
- DO NOT use differential lock device while driving on the road or turning in the field.
- DO NOT ride your foot on the brake pedal or clutch pedal.



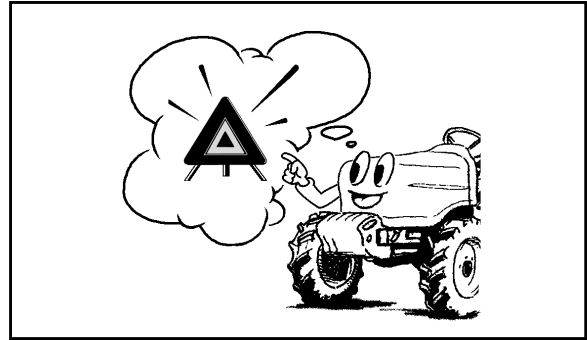
- Lower the driving speed enough before turning a sharp curve. Especially, when you drive the tractor with implements, make the turning radius wider.
- DO NOT start or stop the tractor suddenly. Engage the clutch and brake softly. If not, front wheels can be lifted up and it is very dangerous.
- Do not jump up and down while tractor is moving. When getting off or on the tractor, use the grip or handrail and sub step to prevent falls.



- 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.

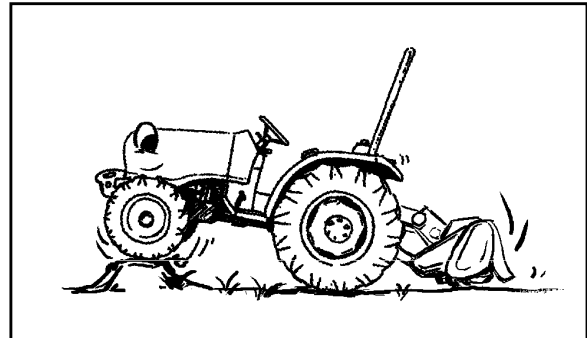


- Obey the traffic rules while driving on public roads.
Do not exceed the local legal speed limit.
Use a sign beacon or slow moving vehicle (SMV) to indicate that the vehicle is slow moving.
- If you can not drive the tractor due to a failure, move the tractor to a safe place and install troubled vehicle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

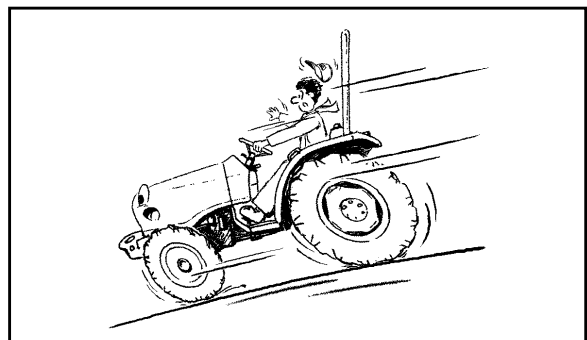


- Do not overuse the fuel, oil, etc and pay attention not to contact the skin directly. Generally, these materials contain harmful materials to the human body. When you work in a area where hazardous chemicals are sprayed, check the cabin filter (if fitted) and replace the filter with suitable one for 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.

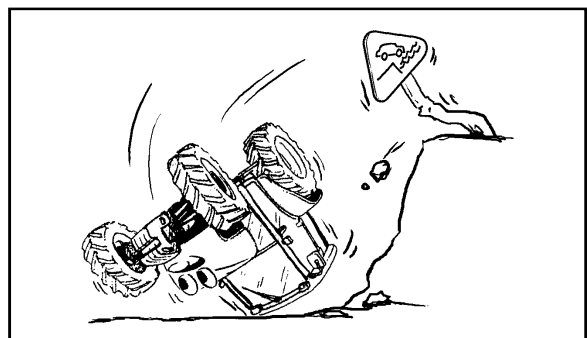
- When crossing a high ridge, let down the implement and go straight across the ridge at low speed.
- When connecting the implements to the front/rear of the tractor, install the proper additional weights in the rear/front of the tractor to keep the balance of the tractor.



- On a downhill, operate the throttle pedal and brake pedal slowly and DO NOT drive while the transmission gear is in NEUTRAL.
- To climb a steep slope, drive tractor slowly in reverse up the slope rather than forward. It is much safer.
- When turning the tractor on a slope, pay attention to safety especially.

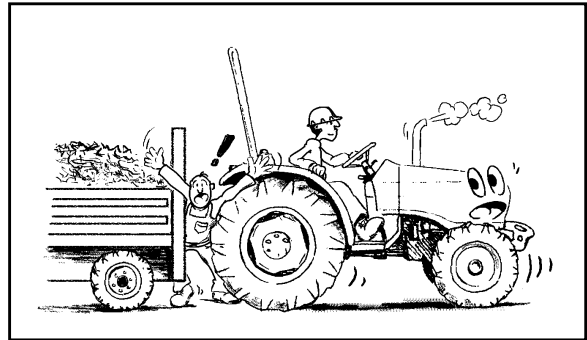


- When working at the edge of steep slope, take special care about a turn-over.
- When working, wear the protection equipment and tighten the seat belt.
- If the authorized passenger seat are not installed, keep riders off.



(4) Notices when connecting Implement

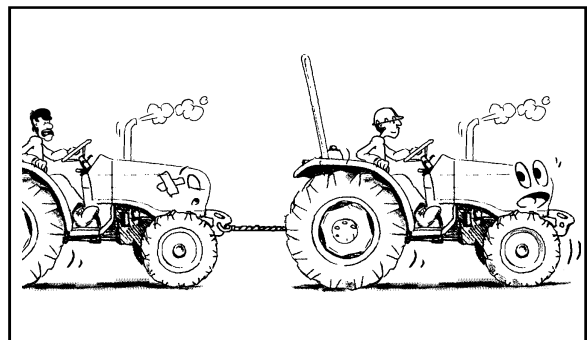
- Attach or detach the implement on wide and level ground.
- Do not stand between tractor and implement.
- Use hitch or drawbar for towing. Do not tow by connecting with any other structures.
- When connecting heavy implements, apply the parking brake and use the wheel chock.
- Do not attach over-weighted 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.

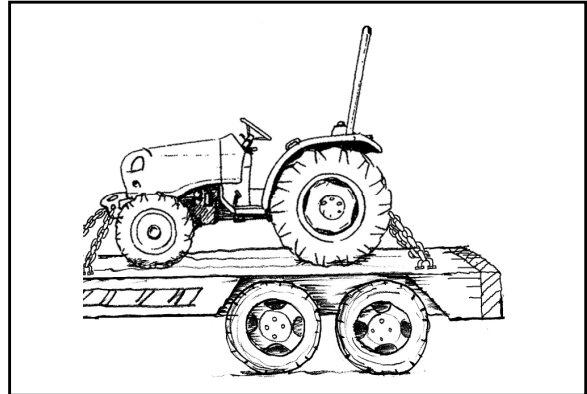
(5) Notices when towing the tractor

- If 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. Refer to "3-2. Operating levers and pedals". (See page 3-7)
- 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 page 4-13)



(6) Notices when transporting the tractor

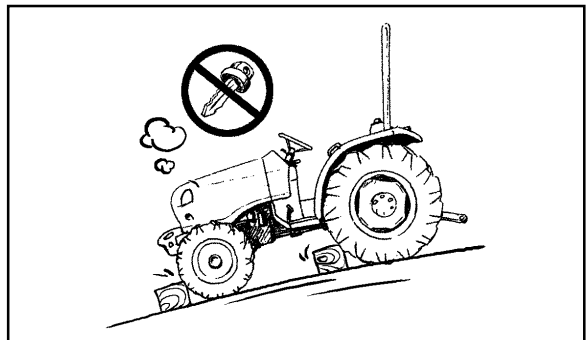
- When transporting the tractor by truck, trailer, etc, use suitable equipment or facilities to load or unload the tractor.
- Fix the tractor tightly to the vehicle with heavy-duty straps or chains.
- When fixing the rear of the tractor, use the hitch or hitch support.
- When fixing the front of the 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 (if fitted), cover the exhaust outlet to protect that the turbocharger does not rotate by air without lubrication.
--	---

(7) Notices when parking tractor

- Stop the tractor on level ground. Place the transmission gear in neutral.
- Put PTO switch to "OFF" and lower implements to the ground.
- Stop the engine and remove the ignition key.
- Apply the parking brake.
- Have to apply the wheel chock on a slope.

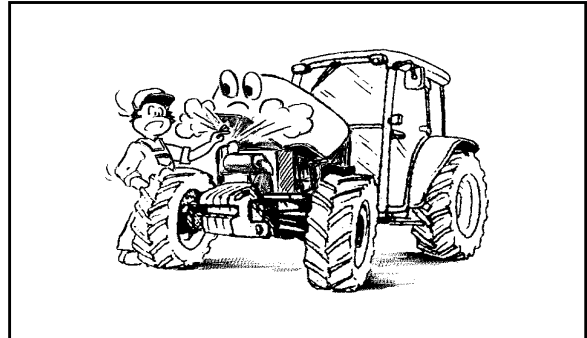


 Caution	▶ When parking on a slope while attaching the loaded equipment, the tractor may move even if the parking brake is applied. Apply the wheel chock and low speed transmission gear as follow. - . Mechanical : downhill ⇒ Reverse 1gear / uphill ⇒ Forward 1gear - . HST type : Lowest gear
---	--

(8) Notices when checking tractor after work

- The 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 the engine is hot. The engine or radiator may crack.

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



- When checking or repairing the hydraulic system or fuel system, high pressurized oil or fuel may cause a severe injury.
Make sure the engine is stopped, and all the transmission gears are in NEUTRAL, and lower the implements to the ground, and move once the remote control lever to each direction to release the hydraulic system pressure.

 Warning	▶ Before removing hydraulic pipe or hose and other parts, check if the system pressure is removed. The leakage of pressurized oil can cause a fatal physical injury. Use the proper protection equipment.
	▶ When connecting or disconnecting the hydraulic quick coupler, lower the implements to the ground after checking that hydraulic pressure is released.

- Never fill the fuel tank while the engine is running or the engine is hot. And never smoke or have flames around fuel tank.
- Keep the fire distinguisher near.
- When maintaining the electric system, remove the ground clamp of battery ("-" terminal). To prevent fire or explosion, keep flames or sparks away from battery.

 Caution	▶ Always remove grounded (-) battery clamp first and assemble it last. If not, It can cause an explosion by spark. (for further information, <i>see page 5-25</i>)
--	---

- 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 dealer to work air conditioning systems.

(9) 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 or when standing near fuel. 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.

(10) Operator Protective Structure (OPS)

 Warning	▶ Your tractor is equipped with an Operator Protective Structure (OPS), such as ; Safety frame (Roll Over Protective Structure (ROPS)) or Falling object Protective Structure (FOPS) or Cabin with ROPS (Roll Bar). ▶ This structure is a special safety structure for agricultural tractor that used for the protection of the operator to minimize the possibility of serious injury. This structure does not guarantee full protection against all working conditions, i.e. falling objects, low hanging wires and branches in the forest, orchard or construction area, etc. NEVER enter or operate these hazardous area without certified Operator Protective Structure installed. ▶ 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 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.
---	--

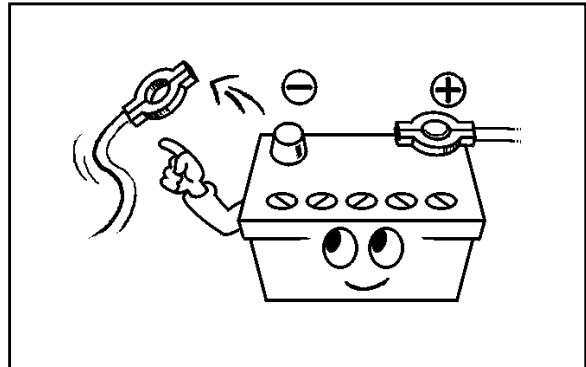


1-3. Long-term storage

(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 chock to the tires and disengage the parking brake.

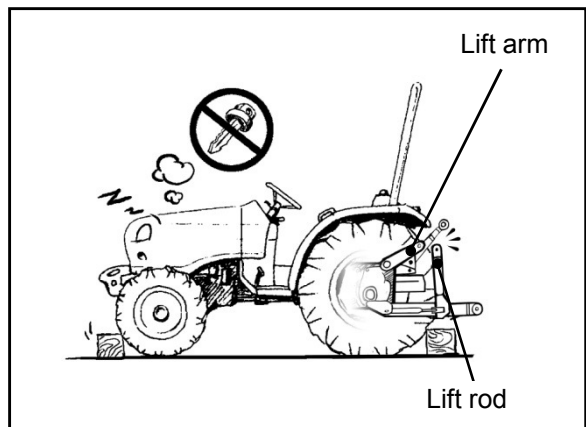
- Check the lubricant capacity of each part and if the engine oil has exceeded 100 hours of work, change the oil and run the engine for 5 minutes at idle rpm.

- Drain the engine coolant completely. If the engine coolant is anti-freeze solution, it is not necessary to drain but check its concentration.

- 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.

- 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 lift rod and place the lift arm to the highest position to protect the cylinder.

- 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 the engine at the end of long-term storage, follow the instructions of "Preparation for Reuse". (See next page)

(2) Check & Maintenance during storage

- Apply grease or lubricant oil to non-painted metal to avoid corrosion.
- Check the leakage of fuel, oil and coolant. If necessary, repair the damaged part.
- The battery should be charged about once a month not to be discharged entirely.
- Check the tire air pressure and maintain the proper pressure.

 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. (※ For further information, refer to the section of "Battery handling and Notices", See page 5-25) ▶ When removing and storing battery, select dry and cool place out of reach of children.
---	--

(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 section "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 then check the engine oil pressure indicator and battery charging indicator. Run the engine at a fast idling speed (suggest 1000/1500 rpm) until normal operating temperature is resistered, and check for oil, fuel and coolant leakage. (For further information, See page 4-1)

1-4. Notices for "Use & Disposal" related to Environment preservation

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 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 User'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		Direction indicating light
	Transmission oil pressure		Quick turn (Optional)		Light switch
	Engine oil pressure		Cruise drive (Optional)		Side lights
	Diesel engine preheat		Cruise drive release (optional)		Headlights (downward)
	Parking brake		Position control (Up)		Headlights (upward)
	Emergency lights		Position control (Down)		Work light
	Engine start		Draft control (Deep)		horn
	Engine stop		Draft control (Shallow)		Window wiper
	PTO stop		Cylinder rod (shorten)		Window wiper / Washer (front)
	PTO in operation		Cylinder rod (extend)		Window wiper / Washer (rear)
	Differential lock device		Cylinder rod (floating)		One side brake light (option)

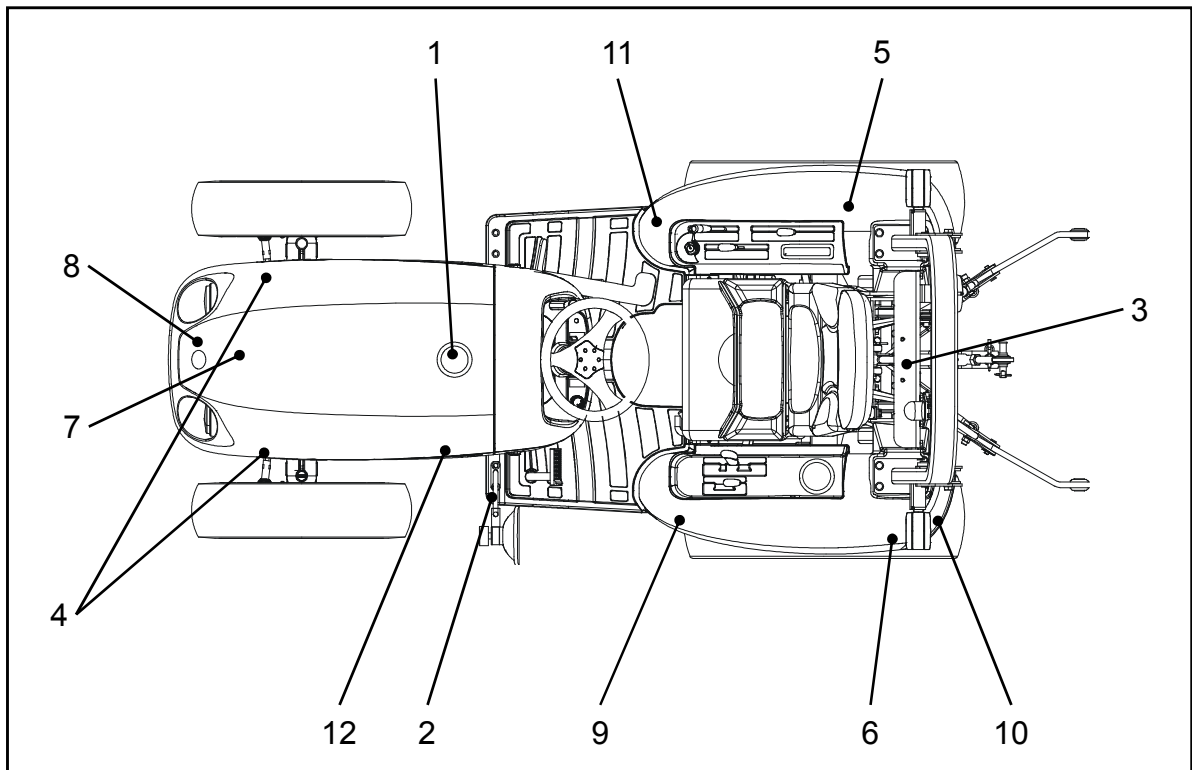
1-6. Safety Decals

(1) Handling and Maintenance of Safety Decals

- For right 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 parts, check the position and read the instructions carefully.

 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 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. ▶ When replacing the part which decal is attached, replace the decal together.
---	---

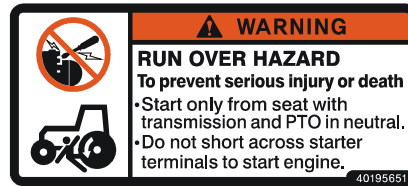
(2) Safety Decals and Attaching position



1. Position : Fuel tank cap



2. Position : Beside starter motor



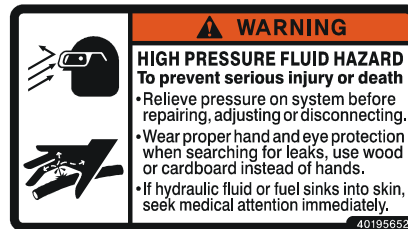
3. Position : PTO cover



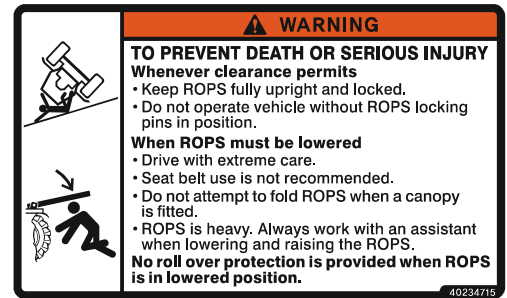
4. Position : Beside cooling fan



5. Position : Fender



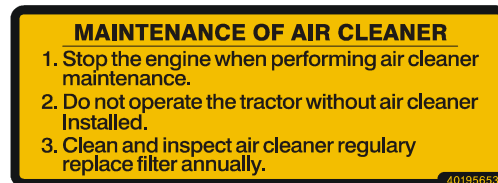
6. Position : Fender



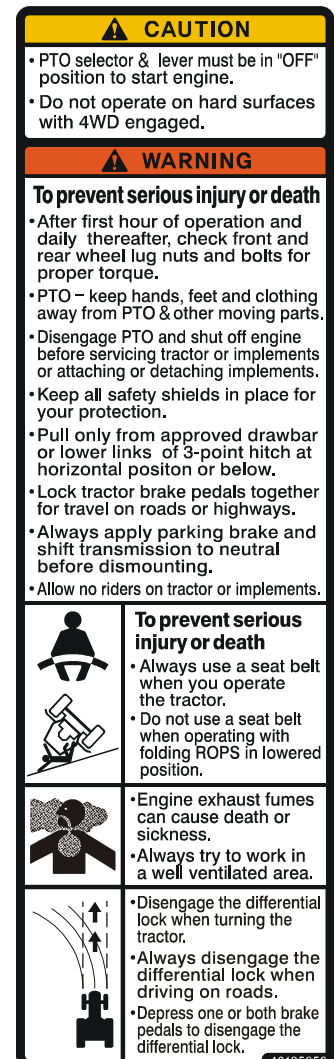
7. Position : Radiator



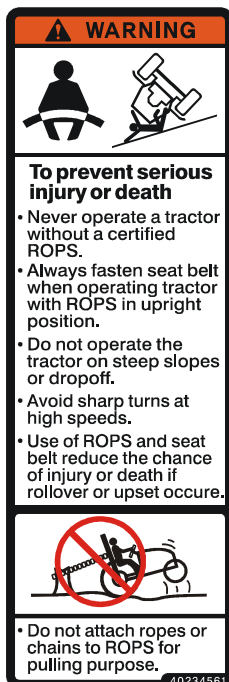
8. Position : Air cleaner



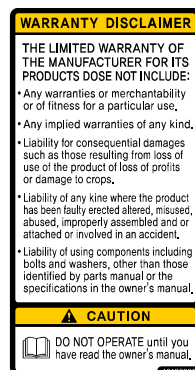
9. Position : Body panel



10. Position : Safety frame



11. Position : Fender

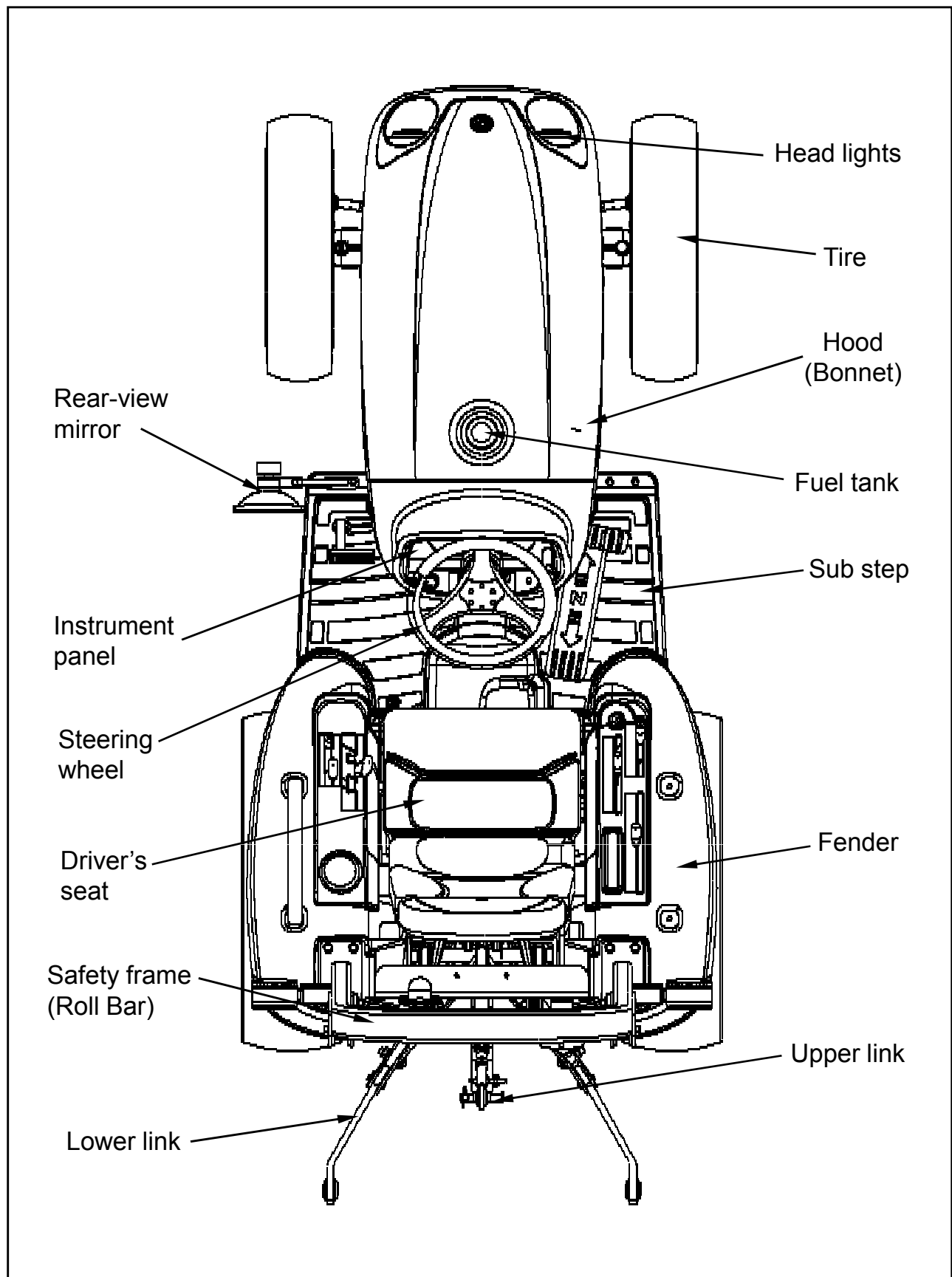


12. Position : Beside muffler



2. The Name of Each Part

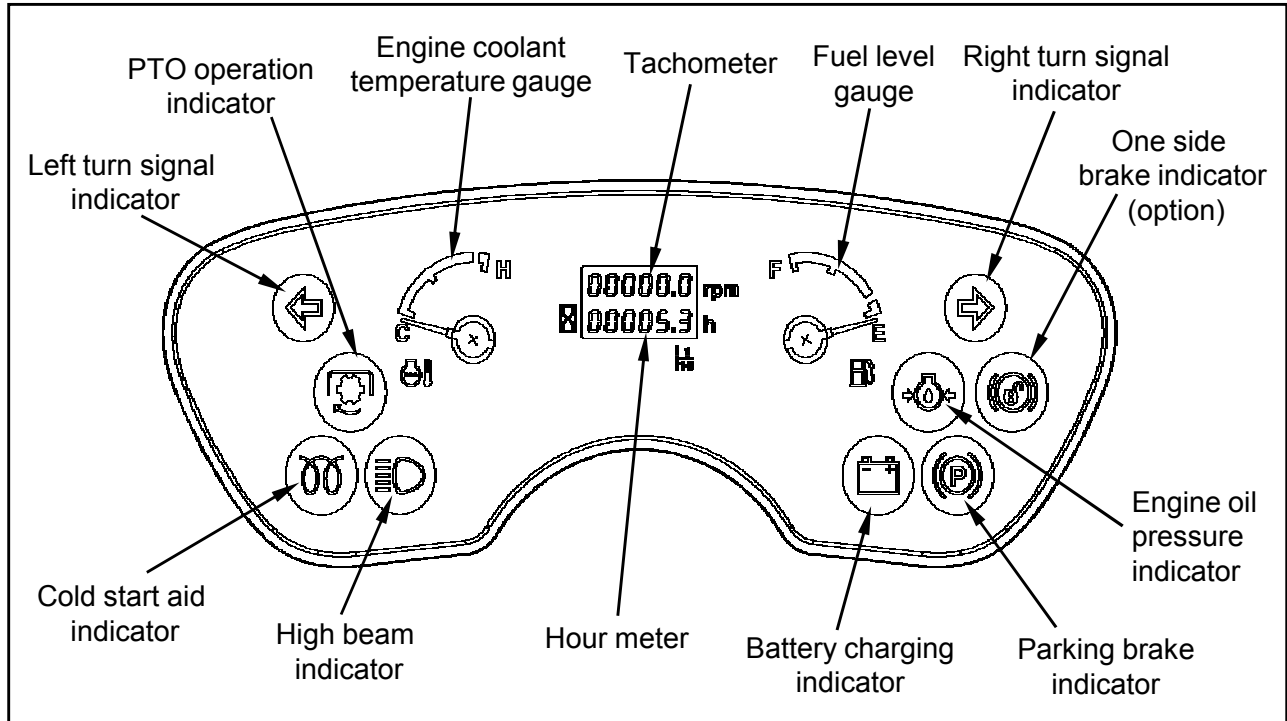
(1) HST type



3. Instruments and Controls

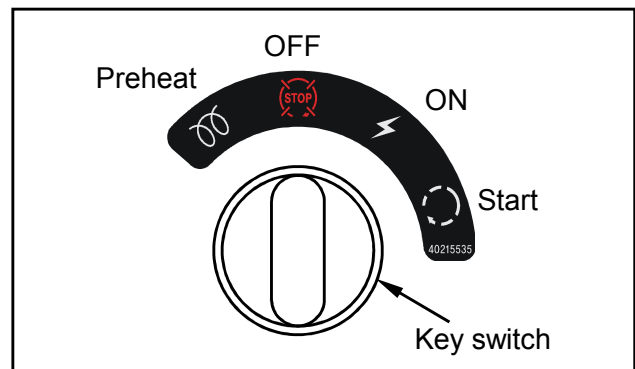
3-1. Instrument panel and Switches

(1) The name of each part



(2) Key switch

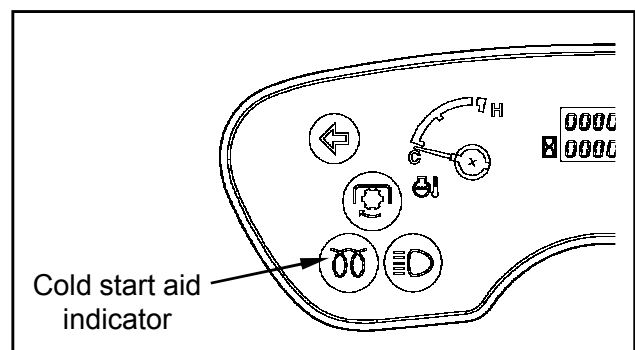
- "Preheat" – Preheat (Cold start aid)
- "OFF" – Engine stops, Power off
- "ON" – Power on
- "Start" – Engine start up



	Caution ▶ As soon as engine starts, turn the ignition key to "ON" position immediately. If not, it may cause damage to starter motor. ▶ If the tractor is not in use, the ignition key should be removed.
--	--

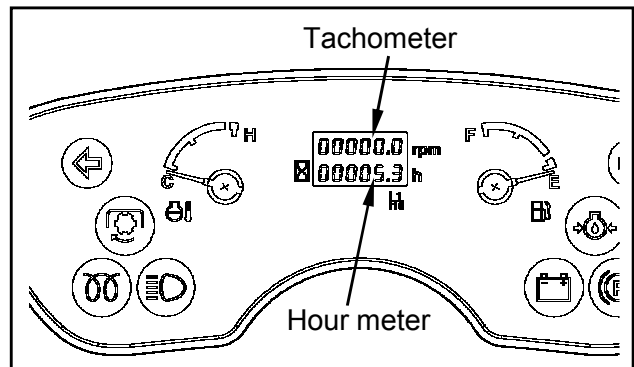
(3) Cold start aid indicator

- If key switch is turned to "Preheat", this indicator shall be "ON".
- If key switch is at the "Start" position, this indicator shall be "ON" as well.



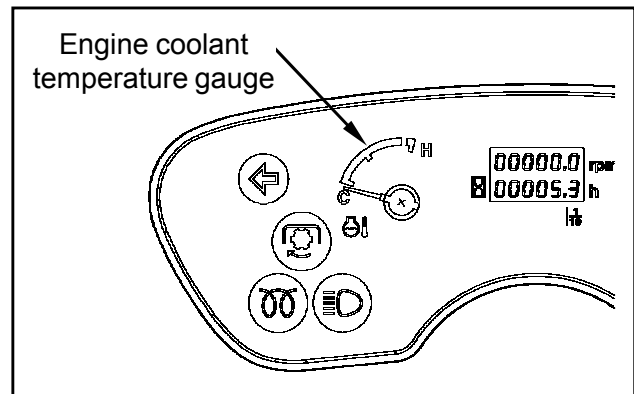
(4) Tachometer and Hour meter

- Tachometer shows the engine revolutions per minute.
- The number 0005.3 in Hour meter shows that the tractor has been used for 5.3hours (5hours and 18minutes).



(5) Engine coolant temperature gauge

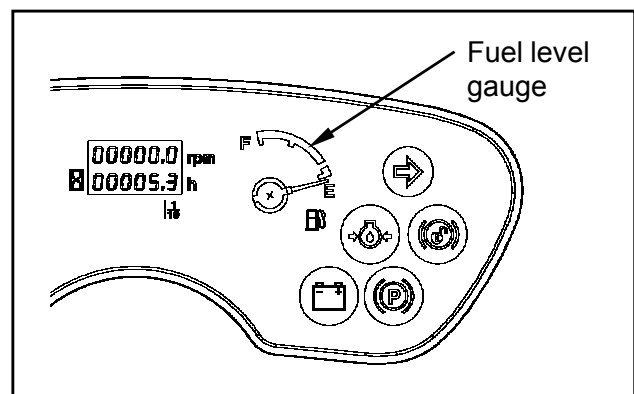
- This gauge indicates the temperature of coolant during operation.
- The closer the needle approaches “H”, the higher the temperature of engine coolant is.



 Caution	► If the needle of engine coolant temperature gauge indicates red zone, - Stop the engine immediately and check the coolant level after engine cools down. If necessary, add coolant. - Clean the radiator screen if dry grass etc. are attached. - If the trouble is repeated, contact your authorized dealer for check.
 Warning 	► The radiator is very hot. When opening the radiator cap, It may cause a danger of a burn due to the escape of hot coolant or steam. ► After the coolant is cooled down sufficiently, open the radiator cap with protective gloves and clothing.

(6) Fuel level gauge

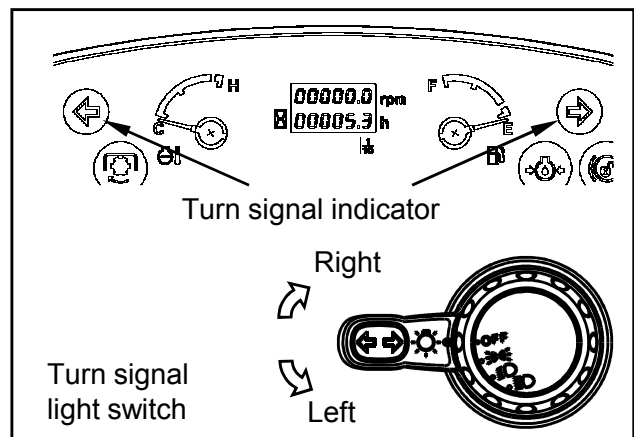
- This gauge indicates the remaining amount of fuel.
- If the needle indicates “E”, fill the fuel tank immediately.



(7) Turn signal light switch

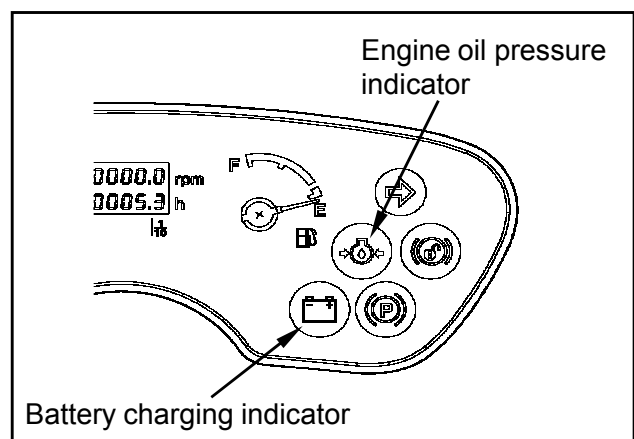
- It is used when turning to the right or the left.
- If this switch is operated, turn signal lights of the selected direction and turn signal indicator in the Instrument panel shall be flashed simultaneously.

Notice	► Turn the signal light on when changing the lane to inform other cars.
--------	---



(8) Engine oil pressure indicator

- When key switch is "ON" while engine is stop, this indicator has to be turned on. After engine starts, this indicator has to be turned off. If not, stop the engine immediately and check the engine oil level.
- If this indicator is not OFF even though the amount of engine oil is normal, contact your authorized dealer for check.



(9) Battery charging indicator

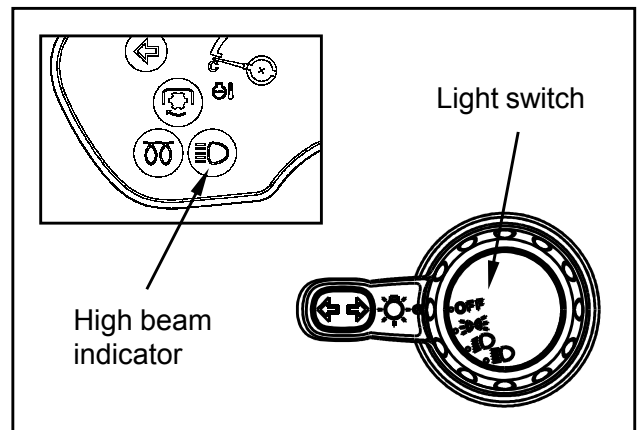
- If the indicator is 'ON' while the engine stops, this means 'Normal'.
- If the indicator is 'ON' while the engine is running, this means there is trouble in the charging system. In this case, contact your authorized dealer for check and repair.

Caution	► If the engine oil pressure indicator or battery charging indicator is ON while the engine is running, contact your authorized dealer for check. ► Check these indicators every time when the engine starts.
----------------	---

(10) Light switch

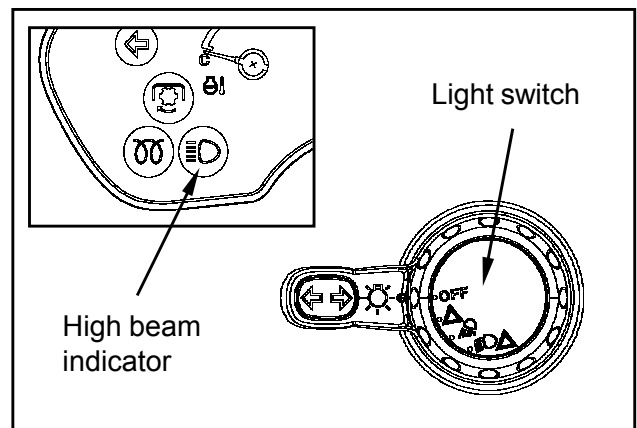
① EU version

- OFF – Instrument panel and all lights are OFF.
- ☰☐☐ – Instrument panel and sidelights are ON.
- ☰☐D – Instrument panel, sidelights, and headlights (low beam) are ON.
- ☰☐D – Instrument panel, sidelights, headlights (high beam) are ON.
- ☰☐D – High beam indicator on the instrument panel is ON.



② U.S.A version

- OFF – Instrument panel and all lights are OFF.
- ☰☐☐ – Instrument panel, sidelights and hazard warning lights are ON.
- ☰☐D – Instrument panel, sidelights and headlights (high beam) are ON. (use when working)
- ☰☐D☐ – Instrument panel, sidelights, headlights (low beam) and hazard warning lights are ON. (use when driving)

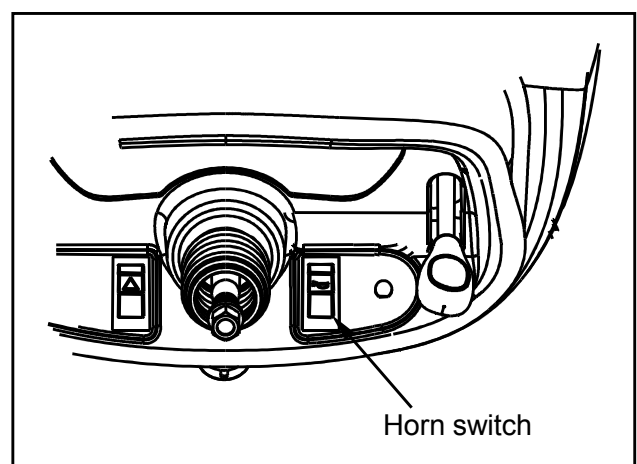
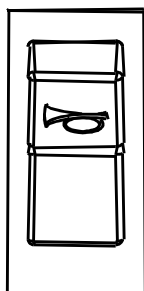


Caution

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

(11) Horn switch

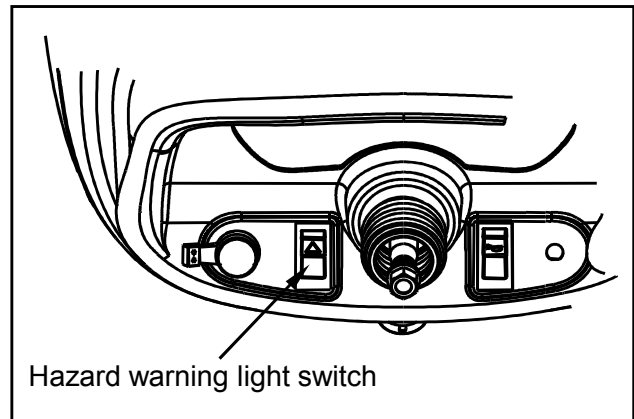
- If you press the horn switch, horn sounds.



(12) Hazard warning light switch

① EU version

- This is used to warn other drivers to pay attention to emergency status. If you press the triangle switch, all turn signal lights and indicators shall be blinking.

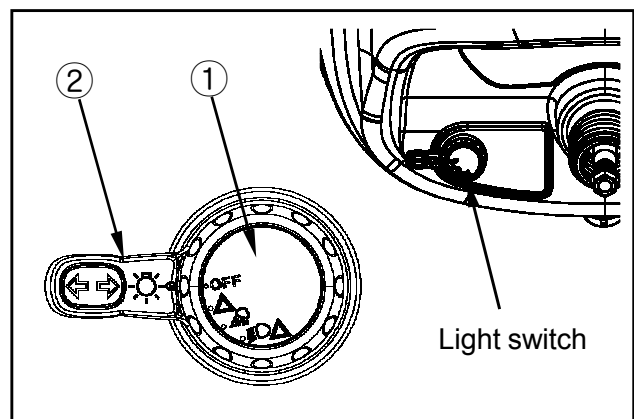


Notice

- If you use the hazard warning lights for a long time, it may cause a increase of electrical consumption. Do not use the hazard warning lights for a long time.

② U.S.A version

- By turning the switch ① once to the clockwise, all turn signal lights are blinked.
- This is used to warn other drivers to pay attention to emergency status.
- Hazard warning light is automatically on by turning on the driving light.
(Low beam)

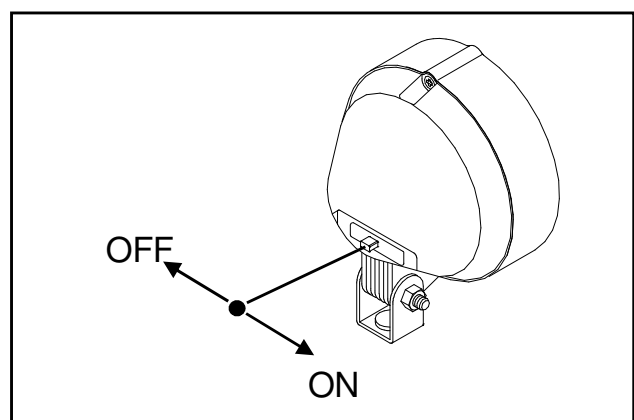


Notice

- If you use the hazard warning lights for a long time, it may cause a increase of electrical consumption. Do not use the hazard warning lights for a long time.

(13) Work light switch

- There is a switch to turn on the rear work light.
- ON – place the switch to the right direction and the work light shall be ON.
- OFF – place the switch to the left direction and the work light shall be OFF.



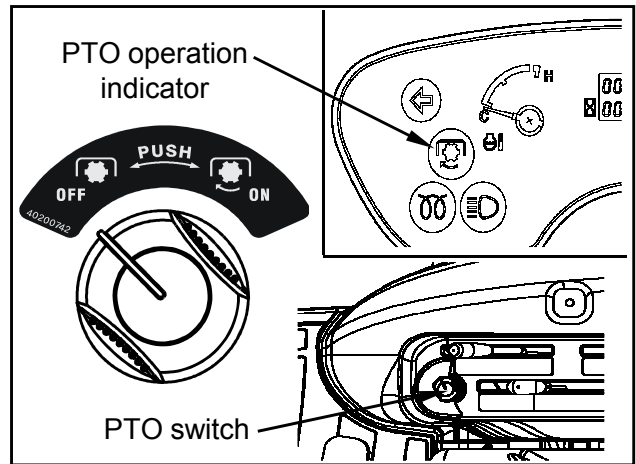
Caution

- When driving on the road at night, do not let the rear work light stay “ON”. It may cause a disturbance to the driver of the following car.

(14) PTO operation indicator

- If the PTO switch is “ON”, this indicator shall be “ON”
- if the PTO switch is “OFF”, this indicator shall be “OFF”.

For further information, See page 3-9.



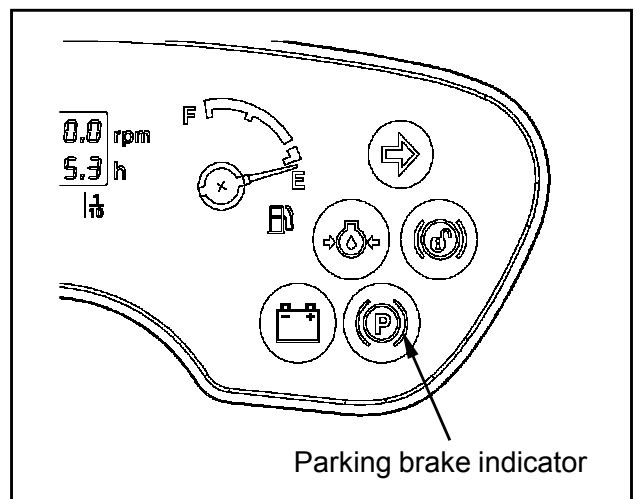
(15) PTO switch

- To operate the independent PTO, comply with the instruction as below.
 1. Place the PTO select lever to desired position.
 2. Put the PTO switch to “ON” to operate the PTO.
 3. If you want to stop the PTO temporarily, put the PTO switch in “OFF” position.
 4. To change the PTO gear, make sure the PTO switch in “OFF” position.

 Warning	▶ To start engine, the PTO switch must be placed in “OFF” position. ▶ Before connecting or checking the implement, - place PTO switch in “OFF” position. - place PTO gear in “Neutral” position. ▶ If the PTO mode switch is placed in “Manual” position (if fitted) or the switch is NOT attached, PTO rotates even if the tractor moves backward. Pay attention to the surroundings to prevent a accident. ▶ Do not engage the PTO with the engine running at high speed. Sudden engagement can cause damage to some implement and tractor. Engage PTO at low RPM, and then raise engine speed to rated RPM.
--	---

(16) Parking brake indicator

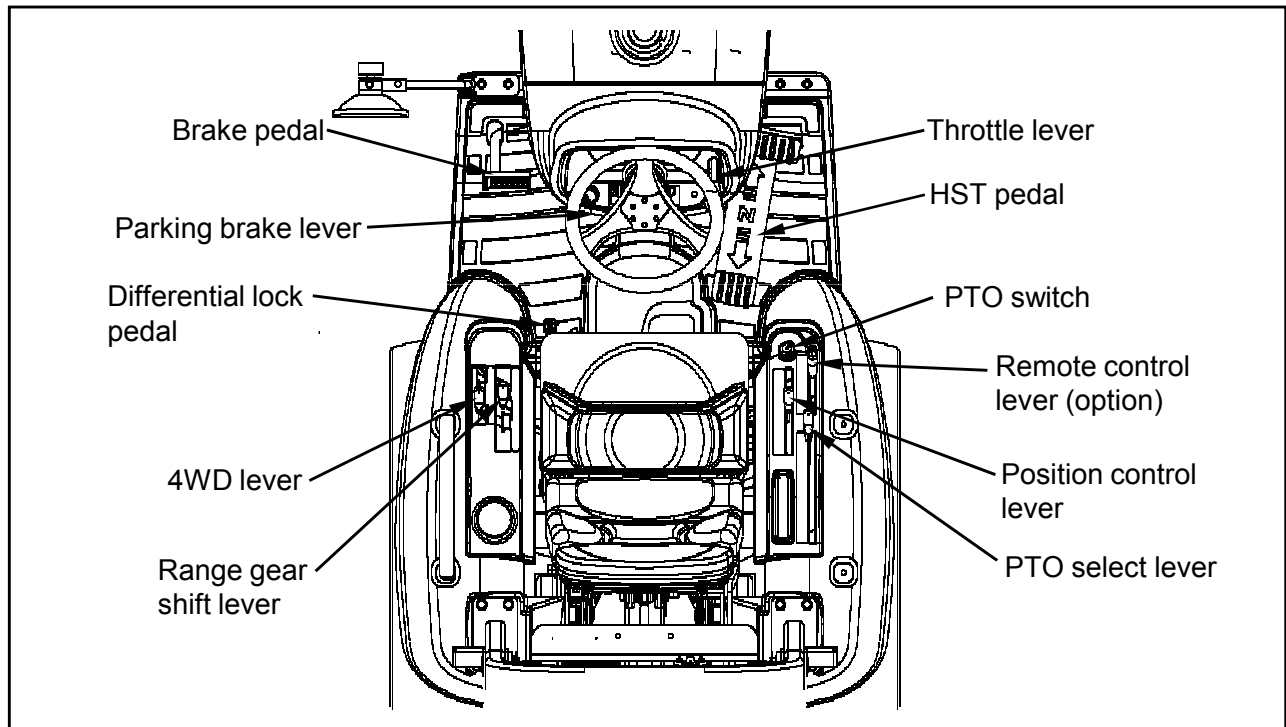
- This indicator will be ON when applying the parking brake. (See page 3-8)



3-2. Operating Levers and Pedals

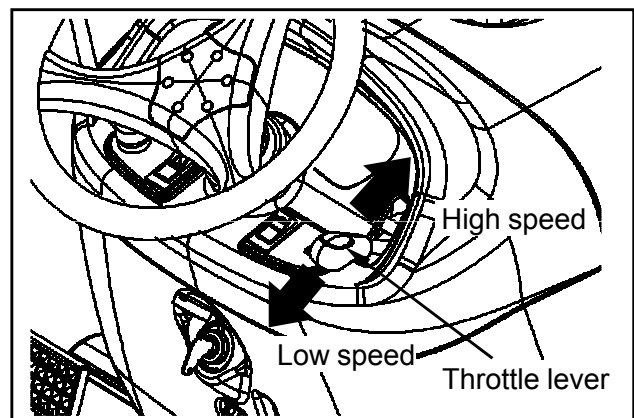
Important to owner, read carefully.

Mechanical type



(1) Throttle lever

- If you pull the lever backward, it means 'low speed' and if push it forward, it means 'high speed'.



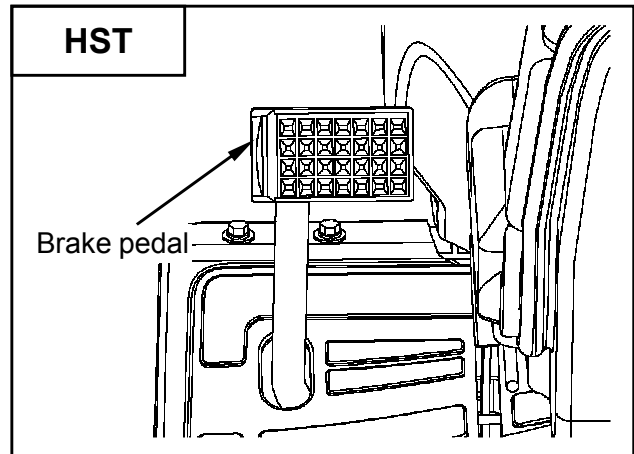
HST type

Notice

- Set the engine speed over the 1500 rev/min for stability of hydraulic system while driving and working after engine starts.

(2) Brake pedal

- For mechanical type transmission, the clutch pedal must be depressed with brake pedal to stop the tractor completely.
- If 4WD is disengaged, the brake force is only applied on rear wheels.
- Brake pedal is located as below.
(Mechanical Type : Right side,
HST Type : Left side)

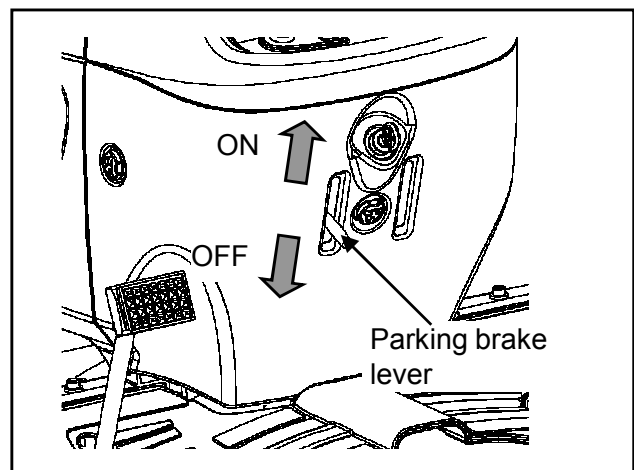


Caution

- ▶ The brake pedal must be pressed to stop the tractor suddenly while driving fast, in spite of applying HST emergency brake.
- ▶ DO NOT ride your foot on the brake pedal while driving the tractor. If so, it may cause failure of brake device.

(3) Parking brake lever

- Pull the parking brake lever to engage the parking brake while pressing the brake pedal.
- Release the brake pedal slowly to check slippage of the tractor.
- To release the parking brake, press the brake pedal, and push the parking brake lever forward.



Caution

- ▶ DO NOT drive the tractor while the parking brake is engaged. It may cause damage of brake or parking brake device.

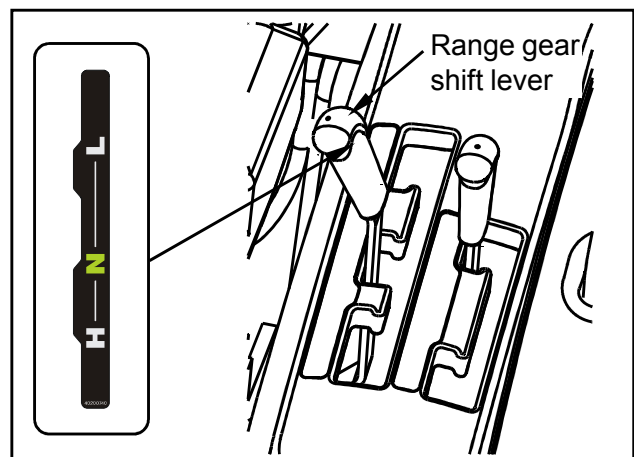
(4) Range gear shift lever

- Low speed, neutral and high speed is available.



Caution

- ▶ Range gear shift lever should only be used after the tractor is completely stopped. If not, it may cause a failure of transmission.

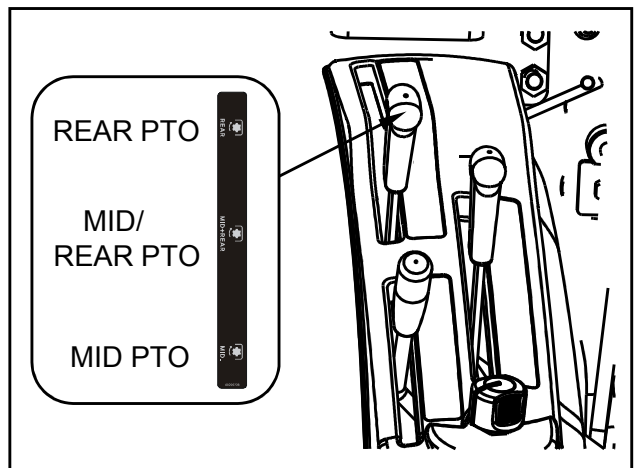


(5) PTO gear lever (if fitted)

- PTO gear lever can choose M/PTO, M/PTO+REAR, and REAR PTO.

REAR PTO : 540 rev/min (Engine : 2603 rev/min)

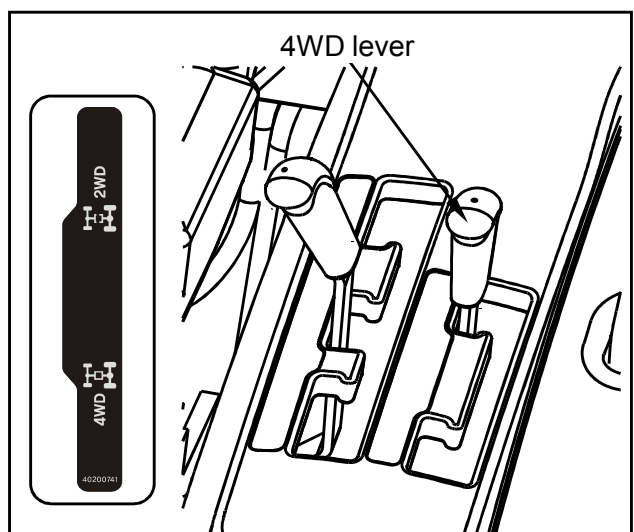
MID PTO : 2000 rev/min (Engine : 2700 rev/min)



 Caution	▶ After placing PTO switch in “OFF” and PTO shaft has stopped completely, place the lever to desired position. ▶ If the PTO select lever is NOT engaged smoothly, lift up and down on implement to align the drive shaft.
---	--

(6) 4WD lever

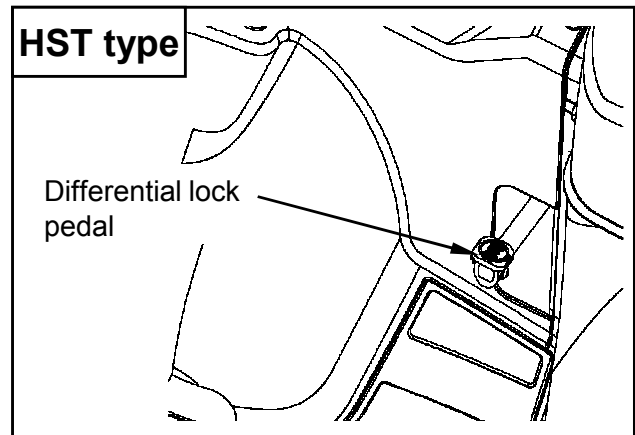
- Stop the tractor completely before operating the 4WD lever.
- Push the lever forward to drive front wheels and pull the lever to disengage the 4WD.
- Four wheel drive (4WD) is effective for the followings.
 - when traction is needed in plow ground.
 - when working on slippery ground.
 - when working with tiller on hard ground.
 - When crossing a ridge



 Caution	▶ When driving on the road, disengage the 4WD. If not, it may cause damage of drive line and serious accident. After working, before coming out from the field, select 2WD. ▶ When driving the tractor at high speed while the 4WD is engaged, sharp steering may cause a accident.
---	--

(7) Differential lock pedal

- If the tractor cannot go forward as one side rear wheels are slipping, press the differential lock pedal.
- Differential lock is effective for working on slippery ground and working with a plough.
- If engaged, both rear wheels will rotate at equal speed. So, It disturbs steering operation and you cannot turn.

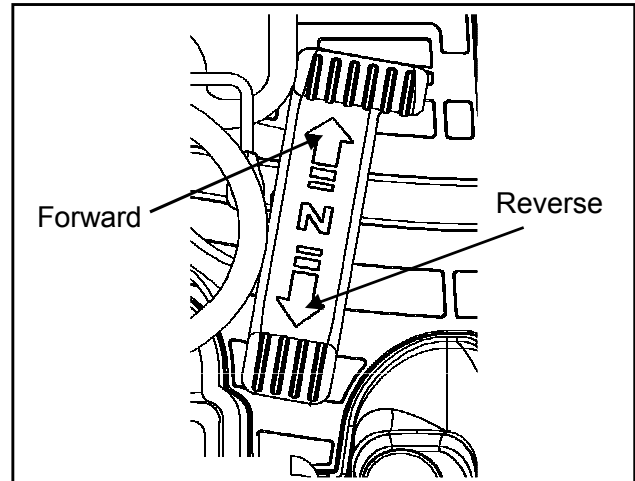


- Take your foot off the pedal to release the differential lock. If the traction is equalized, the differential lock is released automatically.
- If the differential lock does not disengage, depress one side brake pedal slightly for a second, and then the other.

 Warning	▶ Do not turn the tractor while the differential lock is engaged. ▶ Do not use the differential lock while driving on the road. ▶ Stop or slow the tractor before engaging the differential lock.
--	---

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

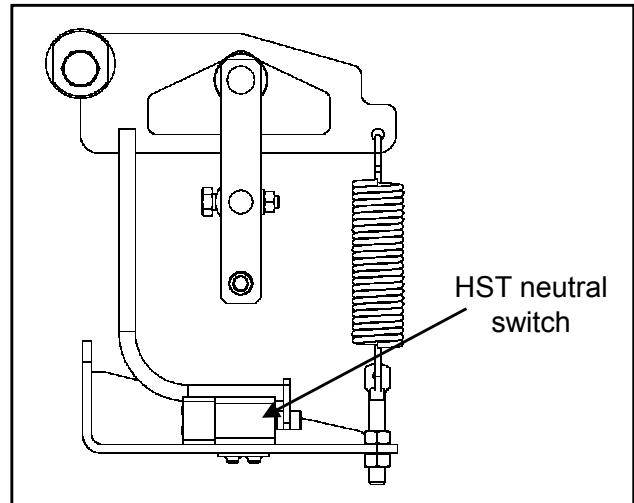
- Press HST pedal forward to drive the tractor forward.
- Remove foot from the pedal to stop the tractor. As the pedal returns to neutral, the tractor will be stopped.
- The tractor speed is depending on the HST pedal stroke.
- The reverse operation as the same as the forward.



 Warning	▶ Press the brake pedal to stop the tractor at high speed. Because even if the HST pedal becomes neutral, it takes long distance to stop the tractor at high speed. ▶ Do not suddenly press the HST pedal to avoid the impact of starting.
--	---

(9) HST neutral switch (HST type)

- It is located under the HST pedal, and the switch can only be pressed while the pedal is at neutral.
- If this switch is not pressed, the engine can not start.
- This is a start safety switch to prevent the sudden starting of the tractor when engine starts.

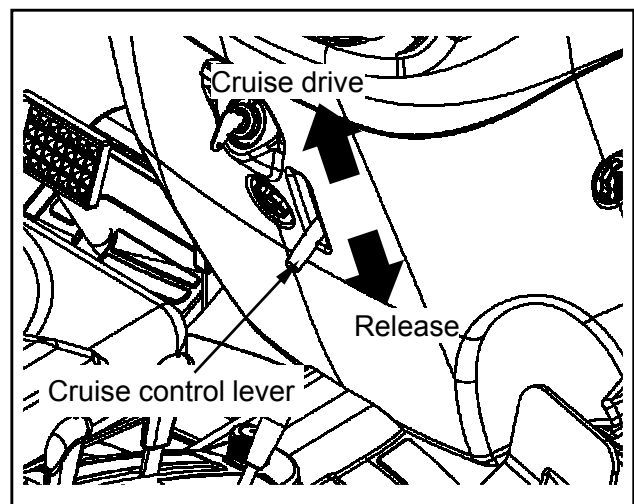


! warning

- ▶ Do not arbitrarily remove the switch. It may cause the accident.
- ▶ When the engine does NOT start or neutral set of the HST pedal is adjusted, check the switch is pressed when the HST pedal is in neutral position

(10) Cruise control lever (HST Type)

- For cruise drive, lift the cruise control lever up in the state of pressing the HST pedal forward. And then, the HST pedal shall be fixed and the tractor can drive forward with constant speed.
- To quit the cruise drive ;
 - 1) Press the brake pedal down or
 - 2) Press the HST pedal forward little more.And then, The HST pedal returns to the neutral position and the cruise drive shall be quitted.



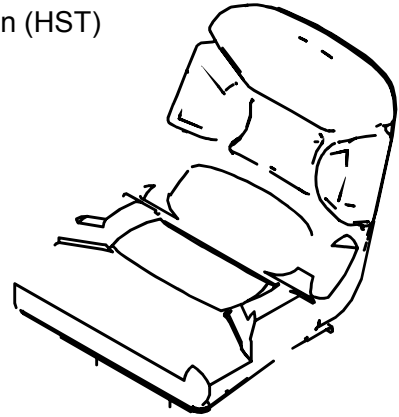
! warning

- ▶ During the cruise drive, pressing the HST pedal backward to release the cruise drive or to reverse the tractor is NOT available. After quitting the cruise drive as above described, press the HST pedal backward.
- ▶ DO NOT try to move the cruise control lever down to quit the cruise drive. It may cause the failure of the cruise control linkage system.

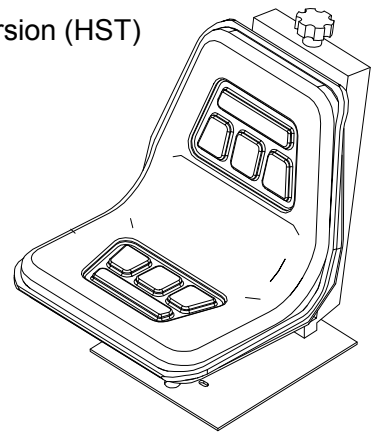
(11) Driver's seat (HST type)

- 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 ;
 - getting up from the seat for more than 2 seconds with HST pedal NOT in neutral position.
 - the HST pedal is in NEUTRAL and rear PTO is engaged without applying the parking brake.
 - the PTO select lever is on "MID" or "REAR/MID" position.
- Before leaving the driver's seat, turn the PTO switch "OFF" and place the PTO select lever on "REAR" position, and apply the parking brake.

USA version (HST)



European version (HST)

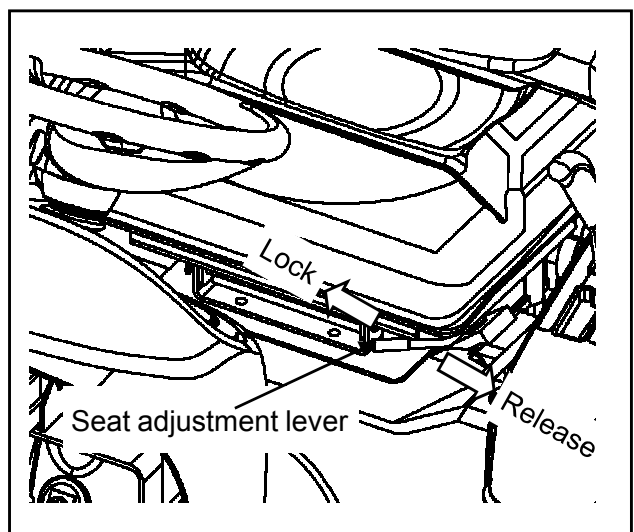


!warning

► DO NOT arbitrarily remove the seat switch. If it is necessary to replace the seat the seat switch has to be replaced together. If not, the engine does not start.

(12) Seat adjustment

- Before operating the tractor, adjust the driver's seat position according to body size and length.
 - 1) After sitting on driver's seat, move the seat adjustment lever upward or left side to release the lock.
 - 2) Move the driver's seat forward or backward depending on driver's body length.
 - 3) Release the seat adjustment lever and check the seat is locked.
- Adjust the seat suspension to fit the weight of operator (if fitted).



!warning

► DO NOT put your hand under the seat while sitting. It may cause a serious injury by seat suspension.

3-3. Hydraulic system

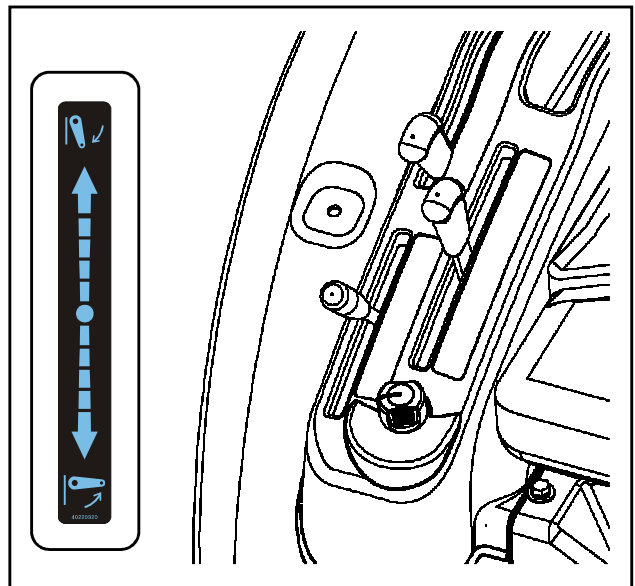
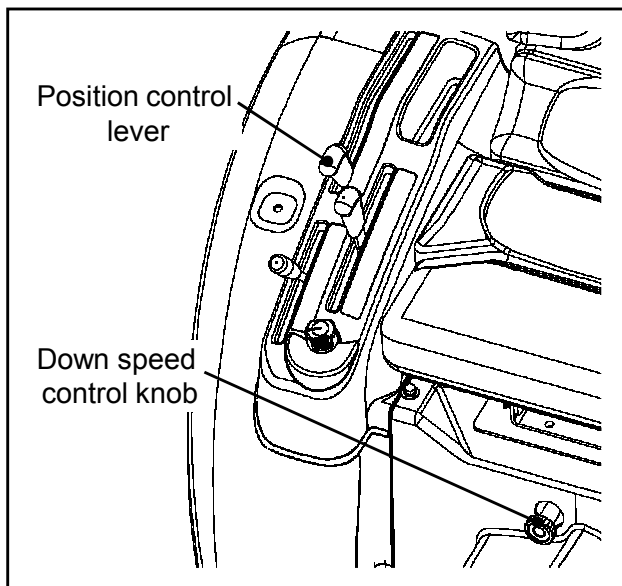
(1) Steering system

- As the steering system of your tractor has a hydraulic pump, valve and etc., it provides you more convenience to operate the steering wheel. And the non-load reaction system was applied to avoid the moving of the steering wheel by the impact of the front wheels on rough ground.
- Notices when using the steering system.
 1. If there is too much of a load in front loader bucket, it could be difficult to operate the steering wheel. In this case, reduce the size of the load.
 2. After turning the steering wheel fully, do not turn the steering wheel to the same direction again. As the unnecessary force is applied, this could damage to the steering system. Especially, DO NOT operate the steering wheel by force if the front wheel mired in the ditch. In this case, the rim could be affected and damaged.
 3. If it sounds abnormal when operating the steering wheel, this means that there is some air in the steering components and line. In this case, turn the steering wheel to the left and right fully and hold it for about 5 seconds, and the air should bleed out and if abnormal noise does not stop. If it's not cleared, contact your authorized dealer for repair.
 4. When starting engine in cold weather, a abnormal noise may be occur. In this case, warm up the tractor before using to reduce the oil viscosity.
 5. If you use the tractor for a long time while turning the steering wheel fully, the oil temperature will increase which may cause the reduction of the product life or the failure of hydraulic and steering system.

Notice	▶ If the engine stops, the operation of steering wheel becomes hard to turn and causes steering not to work. But this does not mean a failure. ▶ If you turn the steering wheel while driving, the steering wheel does not return back automatically.
--------	---

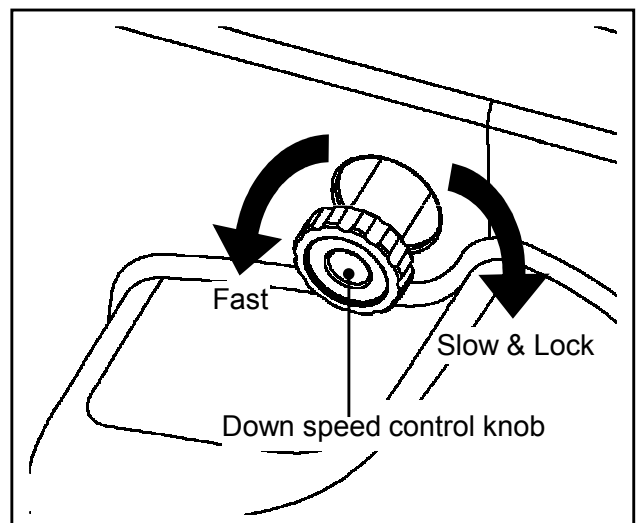
(2) Hydraulic lift control

- The 3-point linkage can go up and down by using the position control lever as below.
 1. Push the position control lever forward, the 3-point linkage goes down.
 2. Pull the position control lever backward, the 3-point linkage goes up. The raising speed is depend on the engine rpm. If it does not raised at the low rpm, increase the engine speed.
 3. If you let the lever go free, the lever goes to neutral automatically and the 3-point linkage shall be stopped.



(3) Down speed control knob

- Turn the knob to the clockwise to lower the implement slowly and to the counter-clockwise to rise speed faster. If turning clockwise fully, the implement is 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.

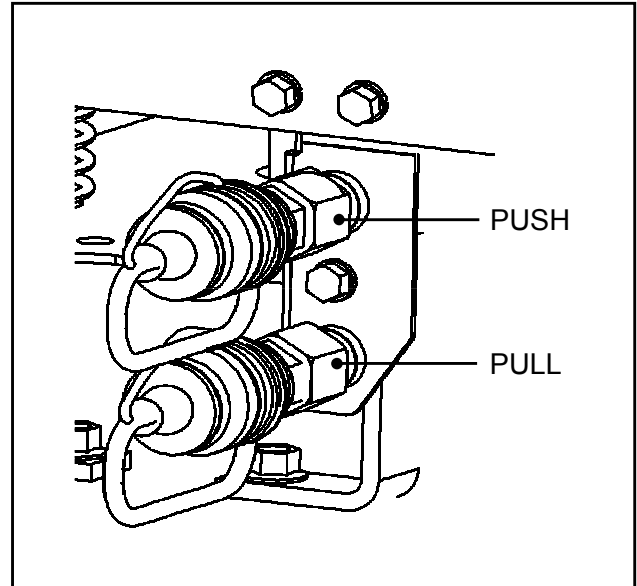
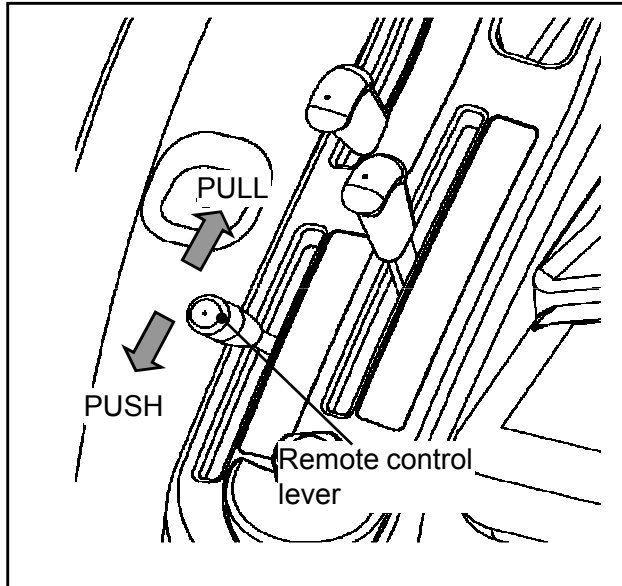


Warning

- ▶ When driving on the road, turn right the down speed control knob slightly to lock.
- ▶ When changing the blades of tiller or removing grass, stop the engine and turn the down speed control knob to right slightly to lock. (The knob will be rotated about two revolutions.)

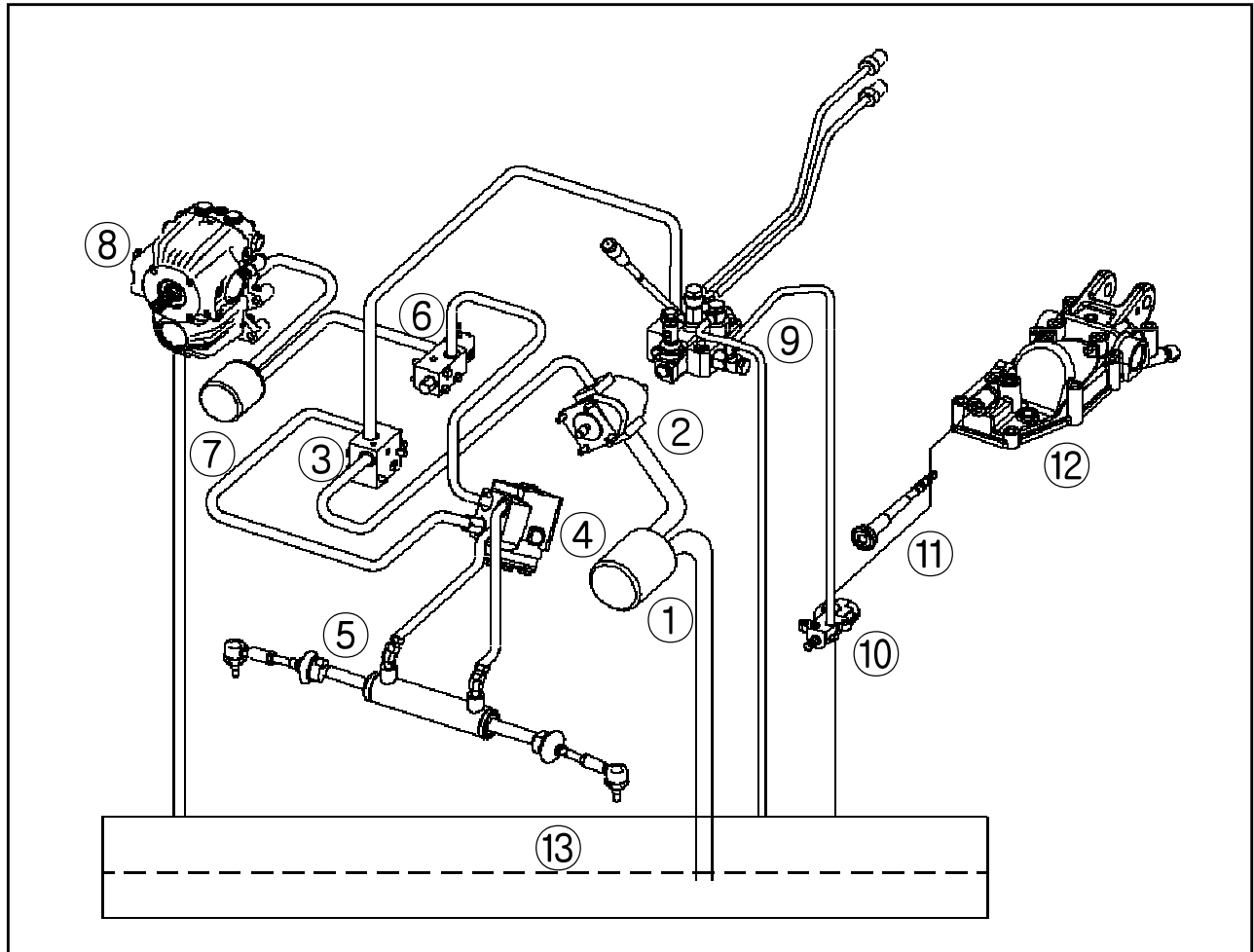
(4) Remote control lever and Quick coupler (option)

- ※ This is used to operate the implement (i.e. Dump trailer, Hydraulic conversion plough, etc) attached to the tractor by the hydraulic pressure.
- If you push the remote control lever forward, the hydraulic pressure works to the upper coupler, and the lower coupler is connected to the drain.



(5) Hydraulic System Diagram

HST type



1. Hydraulic oil filter

2. Hydraulic pump

3. Priority valve

4. Steering unit

5. Steering cylinder

6. Independent PTO valve

7. HST filter

8. HST unit

9. Remote control valve (option)

10. Hydraulic lift control valve

11. Down speed control valve

12. Hydraulic cylinder & housing

13. Oil tank (Transmission case)

3-4. Safety Device

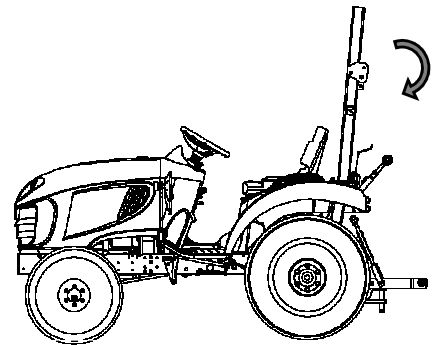
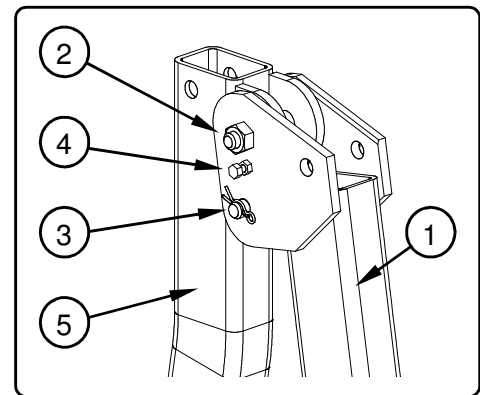
(1) Seat belt

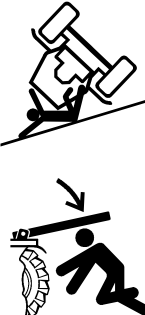
- Always wear the seat belt before operating the tractor and adjust the belt to fit the operator.
 1. Insert the seat belt end into the buckle until a 'click' indicates it is properly engaged.
 2. To remove the seat belt from the buckle, press the red release button on the buckle.
- Check the seat belt 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 a cab or safety frame installed. After wearing the seat belt, adjust the belt to fit the operator. ▶ If safety frame is folded down for frame model, do not wear the seat belt.

(2) Foldable Safety frame (R.O.P.S type)

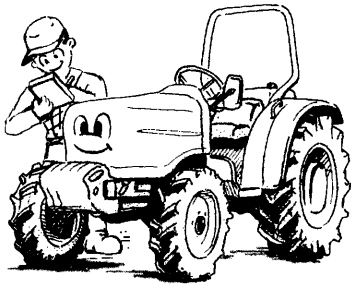
- How to fold the Safety frame.
 1. Loosen the safety frame bolts ② ④ and nuts (both sides) loosely. (Do not unfasten it completely)
 2. Remove the pins ③ on the both side and fold the safety frame backward.
 - Be careful of the possibility that your head, hand and shoulder might be hurt by sudden folding result from the weight of the safety frame.
 3. Set the holes of the frame ① and ⑤ in line, and put the pins ③ into the hole to fix the safety frame and apply the snap pin.
 4. Fasten the bolts ② ④ and nuts (both sides) tightly.
- When standing the safety frame up, follow the same procedure.



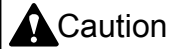
 Warning	▶ Do not change or disassemble the safety frame arbitrarily for safety.
	▶ Unless the safety frame is applied correctly, it may cause a serious accident on tractor when being overturned. - Be sure to stand the safety frame up completely and assemble the bolts, pins and nuts in correctly. ▶ In case of folding the safety frame. - Do cooperate with more than 2 people when folding or standing up the safety frame as it's heavy. - Be careful not to be injured by sudden folding, which might occur when folding or standing up the safety frame, results from its weight. - Do not wear seatbelt when the safety frame is folded down. - Do stand the safety frame up again as soon as the work is finished.

4. Operation and Work

4-1. Engine start and stop



(1) Engine start



Caution

- ▶ Check each part before starting the engine.
- ▶ Check if there's anyone close to the tractor before starting.
- ▶ Place the lever and switch in "Neutral" or "OFF" position.
- ▶ Start the engine by sitting on the driver's seat after setting the PTO switch in "OFF" and the HST pedal in "Neutral".

HST type

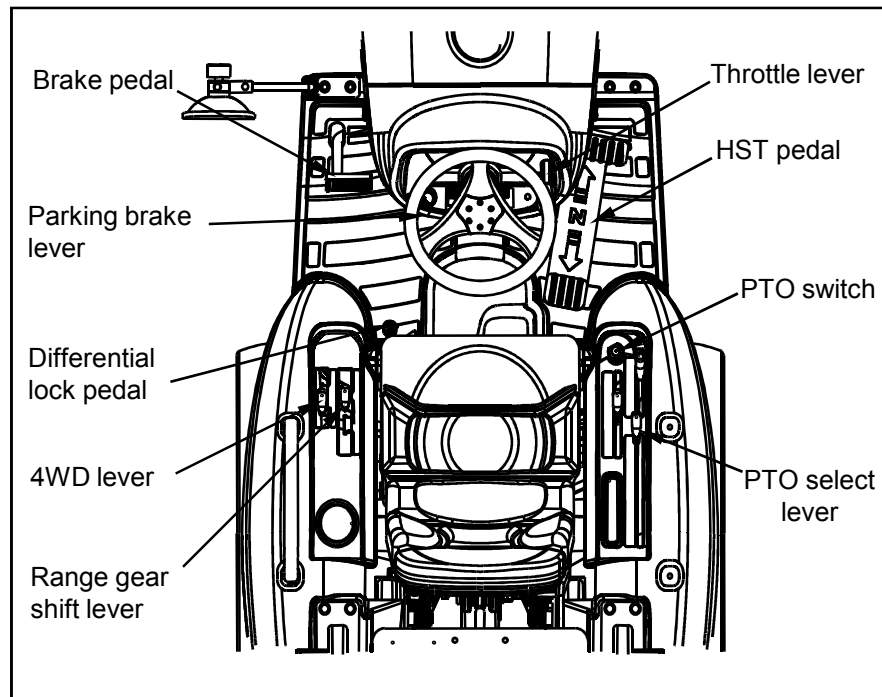
1. Sit in the parking brake lever.



2. Place the range gear shift lever in Neutral, and PTO switch in "OFF".



3. Push the throttle lever forward to middle position of full throttle.



4. Turn the key switch to "Preheat" for 10 seconds, and check if the preheating indicator is "ON".



5. Check PTO switch and HST pedal is set in "Neutral", and turn the key switch to "Start". As soon as the engine starts, release the key switch to the "ON" position.



7. Run engine a few minutes to allow engine oil and transmission oil to warm up.



6. Check if engine oil pressure indicator, battery charging indicator is OFF. If these are not go "OFF", stop the engine and check the problem.

 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 engine. ► Start the engine ONLY from the driver's seat with depressing clutch pedal fully (for mechanical type) and placing all the transmission gear shift levers in "Neutral". ► DO NOT start the engine by shorting across the terminals of start motor. If the engine starts and the tractor moves suddenly, it may cause a serious injury or death.

 Caution	► If HST pedal is not in "Neutral" or PTO switch is not "OFF", the engine does not start even if turning the key switch to "Start" position. ► Do not operate start motor more than 10 seconds. If 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 the failure of start motor. ► In the cold weather, carry out the warming up. If you use the tractor in the state that the engine does not reach the normal temperature, the engine life shall be reduced.
--	--

(2) Start in cold weather

- Push the throttle lever to the middle position of full throttle.
- Start the engine after cold start aid indicator goes OFF. (If fitted)
- If engine runs rough, push the throttle pedal down 2~3 times for a while. (Mechanical type)
- If engine runs smoothly, carry out warming up for 5~10 minutes at 1500 rpm.
- 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 engine.

 Caution	► When storing the tractor in the cold weather, the battery must be removed and stored in a cool and dry place where it is warm and is isolated from the children. ► Allowing engine to idle for a long time will waste fuel and cause a build up of carbon.
--	--

(3) Engine stop

- Pull the throttle lever backward to reduce the engine speed and turn the key switch to "OFF" position. The engine shall be stopped.

 Caution	► When stopping the engine after heavy work, run the engine for 1~2 minutes at low speed. If you stop the engine suddenly, the engine life could be shortened.
--	---

4-2. How to drive and how to stop

(1) How to drive

HST type

1. Pull the position control lever to lift the implement up after starting engine



2. Set engine speed at 1500 rev/min.



3. Place the range shift lever in desired position.



4. Press the brake pedal and release the parking brake.



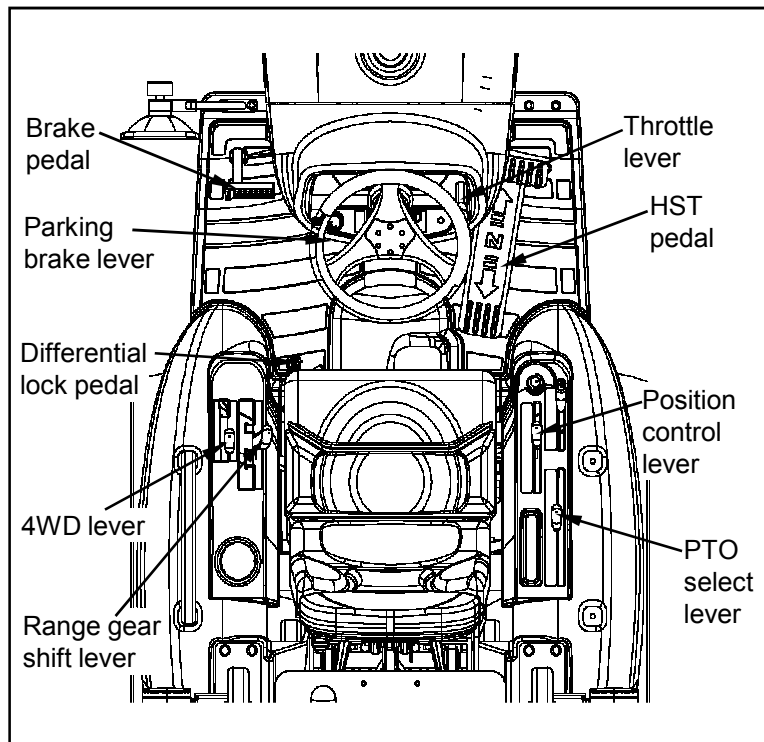
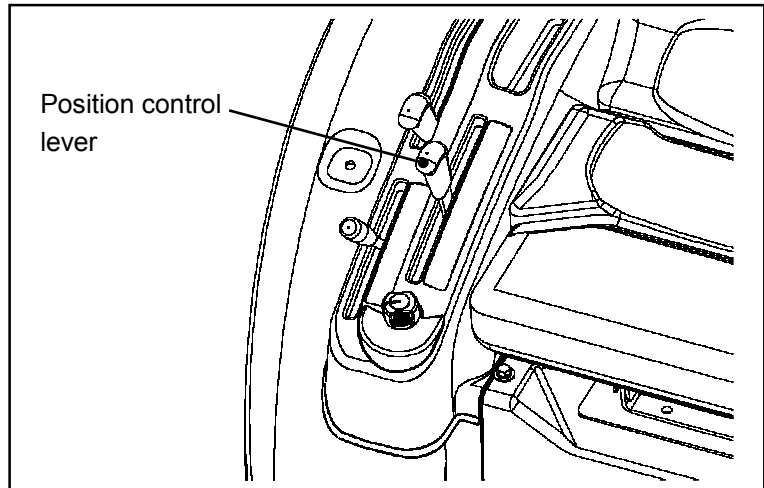
5. Press the HST pedal slowly forward or backward to move the tractor.



6. If you pull the cruise control lever up, the tractor will move at constant speed.



7. If you press brake pedal or push down cruise control lever, the cruise control mode shall be released.



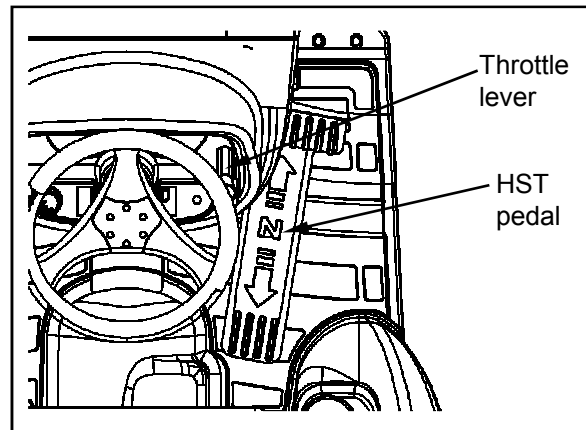
Notice

- ▶ For HST model, there is a switch to control engine cut-off for driver's safety. If the operator leaves the driver's seat without proper action for safety, the engine shall be stop automatically. (For further information about seat, see page 3-12)
- ▶ When you drive HST type tractor, run the engine speed more than 1500 rev/min for stability of hydraulic system.
- ▶ Press the HST pedal forward or backward slowly to prevent the sudden start of the tractor.

(2) Changing speed

HST type

- Just depressing the HST pedal forward or backward makes it possible to travel forward and in reverse. Moving (forward/reverse), neutral and changing speed can be controlled by the pedal.
- The range gear shift lever must be operated in the neutral state of the pedal, and after tractor has stopped completely.
- Set driving speed properly depending on the road condition.



(3) Emergency Stop

HST type

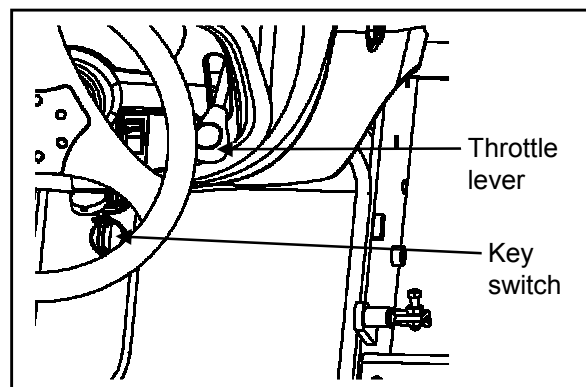
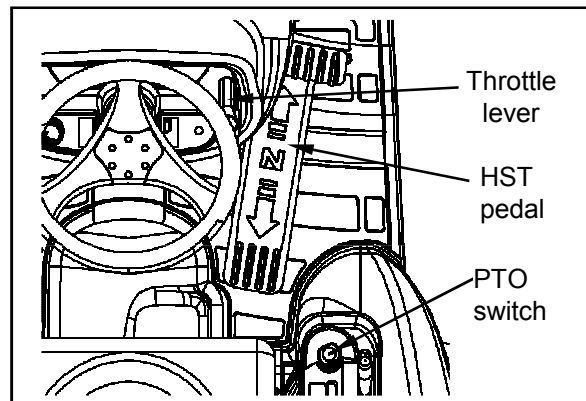
1. Take a foot off from the HST pedal and press the brake pedal at the same time.



2. Turn the key switch to "OFF" position.
Do not press the HST pedal before the engine STOPS completely.



3. Apply the parking brake.



(4) Stopping tractor

HST Type

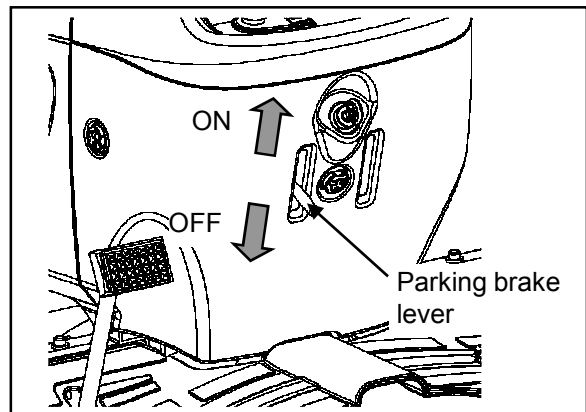
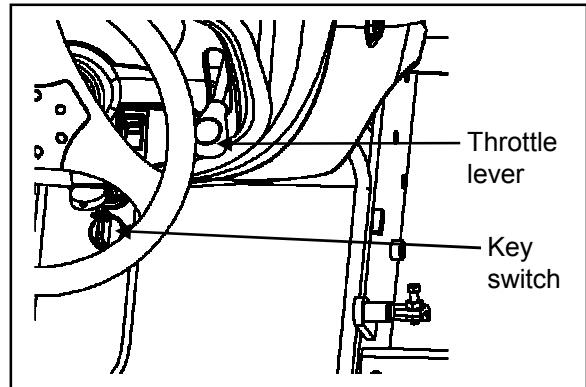
1. Take a foot off from the HST pedal, and press the brake pedal.
Place the range gear shift lever in "Neutral" and PTO switch to "OFF".



2. Pull throttle lever backward to lower the engine speed.
Turn the key switch to "OFF" position.



3. Engage the parking brake lever, then take foot off from the brake pedal.

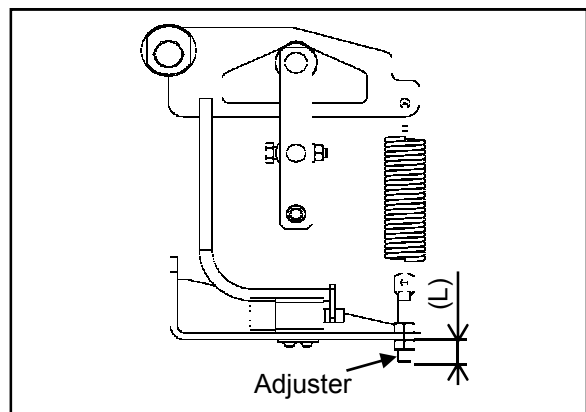


Caution

▶ DO NOT keep apart from the tractor in the state that the transmission gear is placed in 'Neutral' and the parking brake is not applied. In 'Neutral' position, the wheel may roll.
Apply the parking brake at all times before leaving the tractor.

● If you release the HST pedal to "Neutral", the tractor shall be stopped without pressing the brake pedal. It is an additional brake function of Hydro-Static Transmission (HST). The following table shows approximately braking distance of the HST. The braking distance can be changed by adjusting spring tension of the HST pedal linkage.

● As the reference dimension (L) of the adjuster as shown in the right figure is increased, the braking distance shall be reduced, but the braking shock transmitted to the operator can be increased.

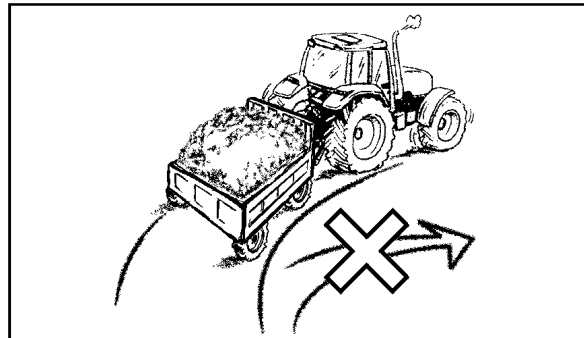
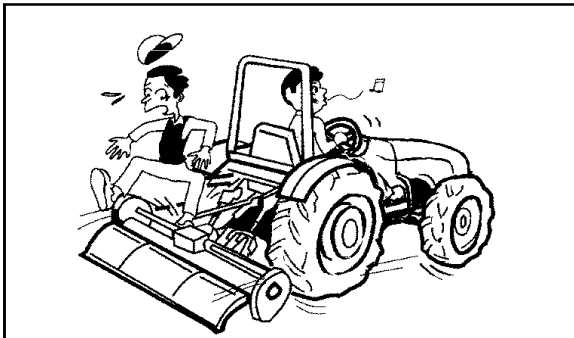
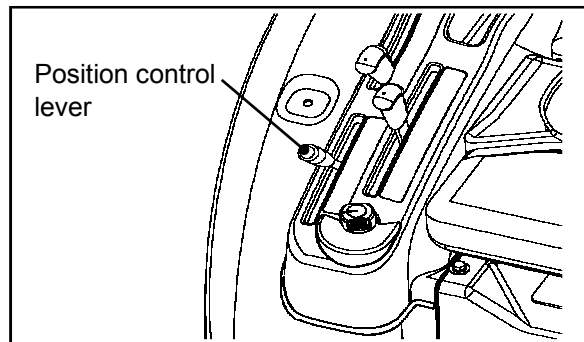
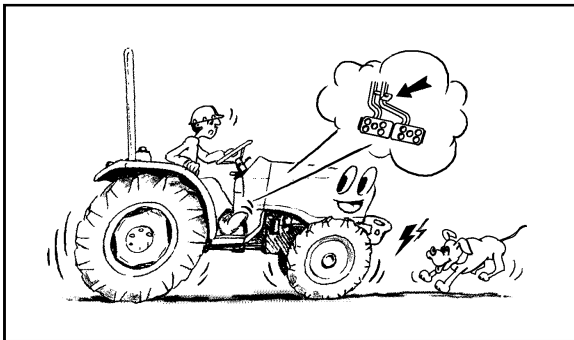


Reference dimension (L)	Range gear stage	Braking distance
20mm (0.79 in)	LOW	within 1m (3.3 ft)
	HIGH	2~4m (6.6~13.1 ft)

 Caution	▶ DO NOT too tighten the tension of the HST neutral spring. It makes an excessive braking shock due to disturb the safety operation. ▶ The additional braking function of the HST does NOT always provide constant braking distance of the tractor. Press the brake pedal always to stop the tractor.
--	--

(5) Driving tractor on the road

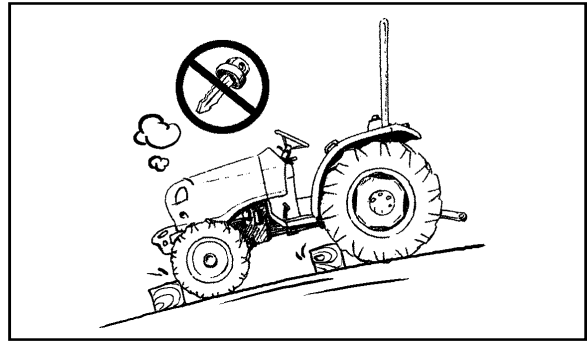
- When facing downhill, DO NOT place the gear lever in “Neutral” position.
- When driving the tractor on a unpaved road by attaching an implement to 3-point linkage, place the gear lever to low speed and DO NOT lift the implement up to the highest position. When the tractor bumps an obstacle, it may cause the jolting of implement and the failure of hydraulic system.
(In this case, place the position control lever on $\frac{3}{4}$ rising position of full stroke for safety.)



 Caution	● Connect the left/right brake pedal with brake pedal connecting pin before driving (if fitted). ● Avoid a sudden start, sudden brake and sharp turns. ● 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 (if fitted) in “Neutral” position and put the PTO switch in “OFF” position. ● Do not use the differential lock and four wheel drive (2WD use only). ● When traveling with implement on rear 3-point linkage, tighten the stabilizer to avoid lateral movement. ● When traveling with implements installed, turn slowly by wide turning radius. ● While traveling, DO NOT ride your foot on the clutch pedal (if fitted) or brake pedal. ● While traveling, DO NOT operate any implements such as tiller, loader, etc.
--	---

(6) Parking

- Stop the tractor on a level surface, not on a slope.
- Disengage PTO and place all the transmission shift lever in NEUTRAL position and apply the parking brake.
- Stop engine and remove ignition key.
- Before you leave the operator's station, wait for engine and all moving parts to stop.



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 the gear in low speed and apply the chocks or blocks to all the tire.

- Mechanical : downward slope $\Rightarrow$ reverse 1 gear / upward slope $\Rightarrow$ forward 1 gear.
- HST Type : place the range gear shift lever to the lowest speed.

4-3. How to handle new tractor

(1) Check points

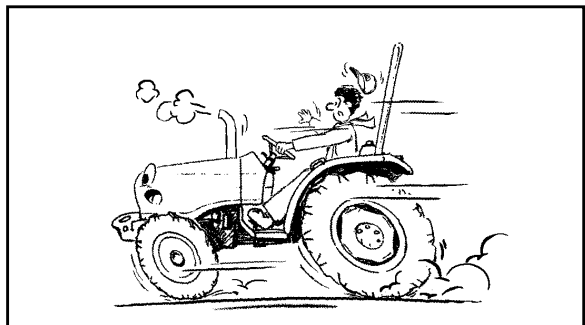
※ For new tractor, the followings must be checked once again even though there was sufficient quality management, inspection, regulating of each part in the factory.

- 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 instructions.

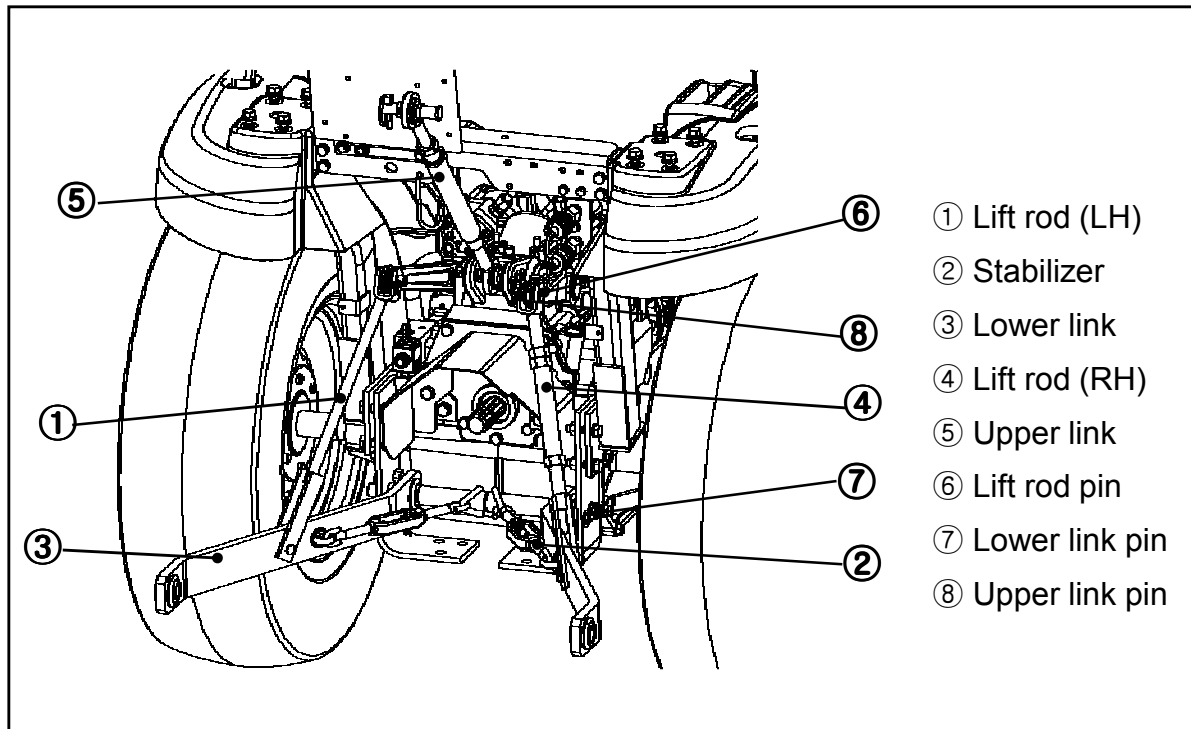
- DO NOT start or stop the tractor suddenly.
- DO NOT carry out heavy loaded work and DO NOT increase the engine rpm to high speed suddenly.
- Despite warm temperature outside, carry out warming up the engine for approximately 5 minutes at 1500 rev/min



- 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 page 5-1.)
 - If possible, contact your authorized dealer for "First 50 hour check".

4-4. Attaching Implement

(1) 3-point linkage

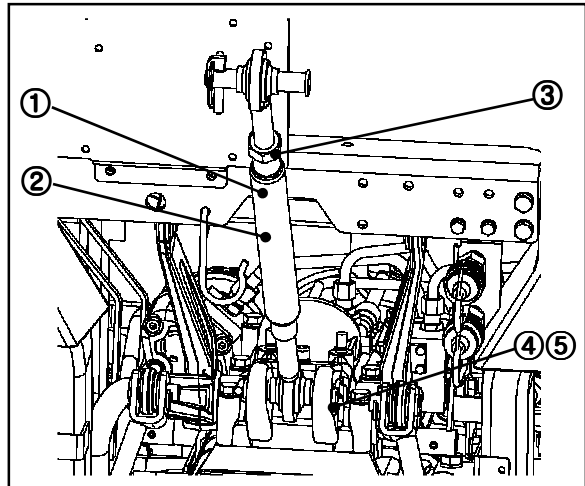


- When driving the tractor without attaching implement, comply with the followings.
 1. Fix upper link ⑤ into the fixing hook.
 2. Connect stabilizer ② to the lower link ③ to avoid lateral movement of the lower link.
- If 3-point linkage is not necessary, raise 3-point linkage to maximum height and fix it by turning the down speed control knob or remove it as follow.
 1. Remove upper link pin ⑧, and detach the upper link ⑤.
 2. Detach fixing parts between lift rod ①,④ and lower link ③ while holding lower link tightly.
And, put down the lower link.
 3. Remove the lift rod pin ⑥ and detach lift rod (LH) and lift rod (RH).
 4. Detach the lower link ③ and stabilizer ② after removing the lower link pin ⑦.

 Warning	▶ Before attaching/detaching the implement, place PTO switch in "OFF" and PTO gear lever (if fitted) in "Neutral" position and apply parking brake lever. ▶ When attaching/detaching the 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 implements that require more power than can be generated by your tractor. ▶ Never stand between implement and tractor when backing up.
--	--

(2) Upper link installation and adjustment

- Adjust the upper link ① depending on the implements.
- Length of the upper link ① can be adjusted by turning the grip ②.
- Fasten the lock nut ③.
- Adjusting range : 15.7 ~ 29.5 inch.

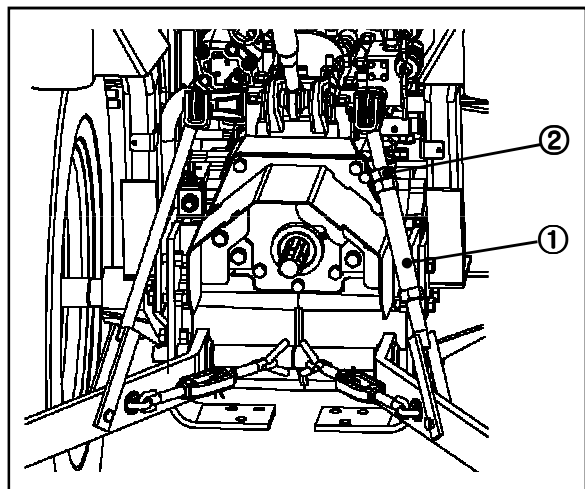


Notice

- ▶ Insert the snap-pin ⑤ correctly to prevent the upper link pin ④ from being detached.

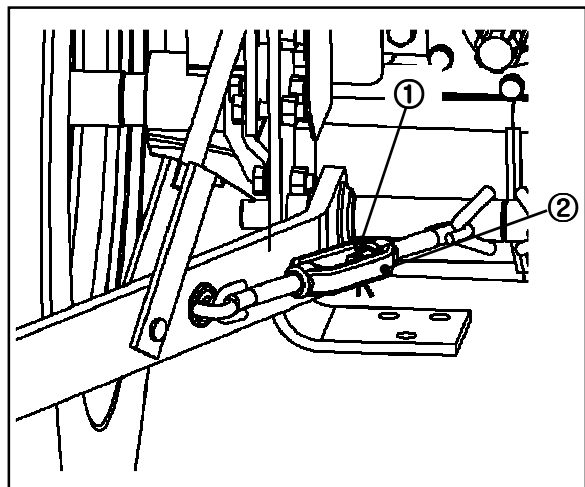
(3) Adjustment of the lift rod's length

- Lift rod (RH) can be adjusted by loosening the lock-nut ② and turning the body ①.
- After adjusting, tighten the lock-nut ② again.



(4) Adjustment of stabilizer's length

- The length of the stabilizer can be adjusted by turning the handle ② after removing the fixing-pin ①.
- After adjusting, insert the fixing-pin ① again.



Notice

- ▶ Adjust the clearance of lateral shaking of the implement to be within 20~40mm (0.79~1.57 in).

(5) Reference of Implement installation part

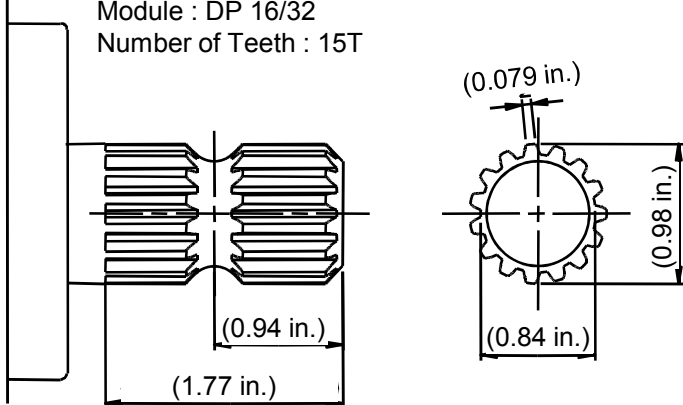
	A	B	C (Max)	D (Min)	E (Max)	F (Min)	G	H	J	K	L	N
CAT.1	19 (0.74)	19.3 (0.75)	44 (1.73)	76 (2.99)	69 (2.71)	44.5 (1.75)	22 (0.86)	22.4 (0.88)	35 (1.53)	39 (1.53)	4.5 (0.18)	683 (26.8)

Unit : mm
(unit : inch)

(6) Reference of PTO shaft

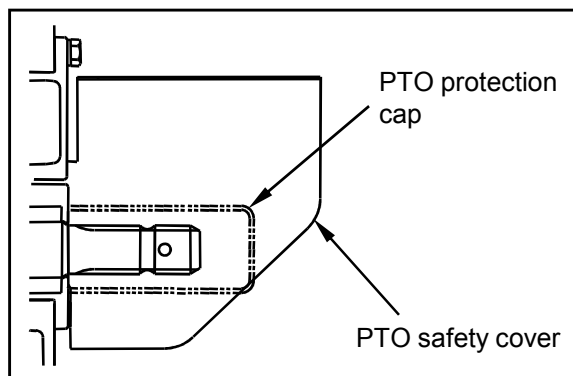
Rear PTO gear stage	1
Rear PTO speed / Engine speed	540 / 2603 rev/min

Revolution Direction	Clockwise (view from end of PTO shaft.)
Ground Clearance	519(20.4 in) (Tire radius:408mm(16.1 in))
Shaft dimension (unit : inch)	

MID. PTO gear stage	1
MID. PTO speed / Engine speed	2000 / 2660 rev/min
Revolution Direction	Clockwise (view from end of PTO shaft.)
Ground Clearance	403(15.9 in) (Tire radius:408mm(16.1 in))
Shaft dimension (unit : inch)	Module : DP 16/32 Number of Teeth : 15T 

(7) PTO safety cover and protection cap

- Attach the PTO safety cover always.
- When PTO is not used, apply grease and insert the PTO protection cap.



Warning	► If you contact the rotating shaft, it may cause a serious injury.
	- DO NOT touch shaft which is rotating. - DO NOT remove the safety cover. - Avoid loose clothes that can easily be rolled up in the revolving shaft.

(8) Hitch and Drawbar (option)

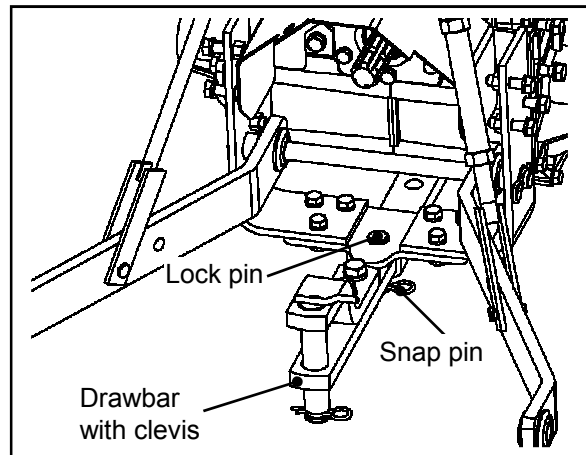
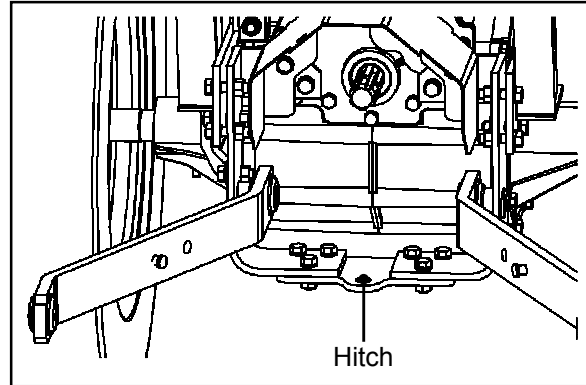
- When attaching towing equipments, use the hitch or drawbar. DO NOT use the 3-point linkage or other parts. If so, the tractor could turnover.
- When attaching towing equipments, do not exceed the maximum permissible vertical and horizontal loads.

① Hitch

- Vertical load : 400kg (882lbs)
- Horizontal load : 1600kg (3527lbs)

② Drawbar (option) – with/without clevis

- It is used to tow the equipments having 2 axles.
- It is available to adjust the length of draw bar (telescopic type) after removing snap pin and lock pin in the right figure. After adjusting the length, assemble the pins correctly.
- Insert the hitch pin and snap pin correctly after attaching/detaching the equipment.
- Vertical load : 250kg (551lbs) – long position
400kg (882lbs) – short position
- Horizontal load : 1600kg (3527lbs)



Caution

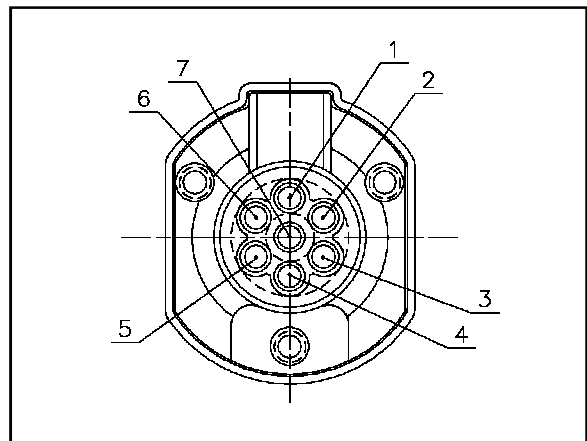
- ▶ Pulling from the tractor rear axle or any point above the axle may cause the tractor to overturn. Use always the drawbar or hitch for pulling work.
- ▶ Do not tow equipment without brakes, weighing more than twice the tractor weight.
- ▶ When locking the hitch or drawbar with pin after aligning to the towing equipment, apply the parking brake and stop the engine.
- ▶ Before transporting equipment on public roads, make sure you comply with your local traffic regulation.

(9) 7-Pole connector (option)

- The 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;

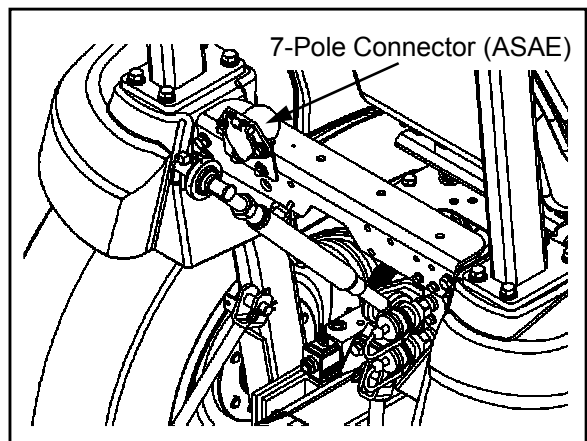
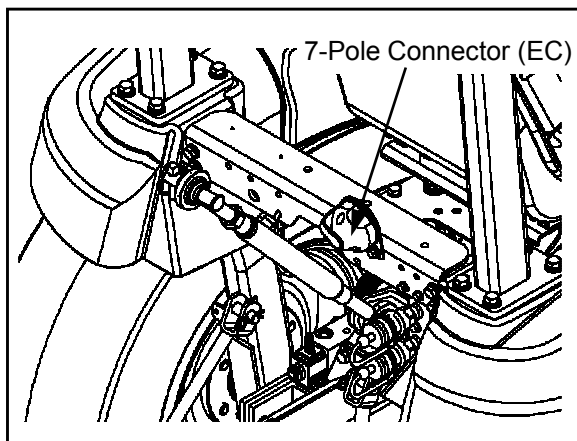
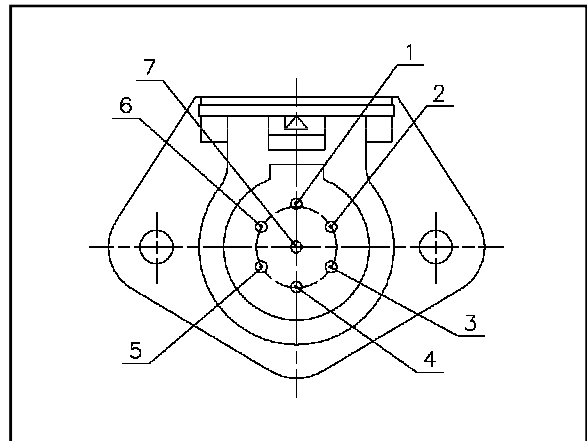
● EC Version

Pin No.	Function
1	Left turn signal light
2	NA
3	Ground (Earth)
4	Right turn signal light
5	Side light
6	Brake light
7	Side light



● 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



(10) 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.

	All models	Remarks
Technically total maximum permissible mass	1608kg (3545 lb)	without consideration of the load capacity of the tires
Front axle (*)	608kg (1340 lb)	
Rear axle	1000kg (2205 lb)	

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

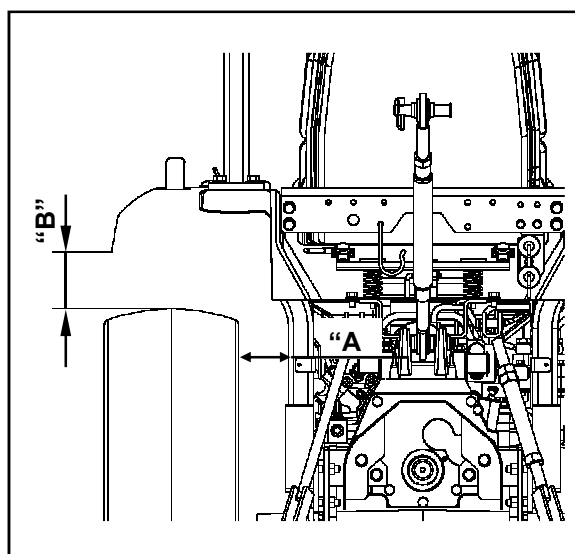
- **Restrict operation** : In case of driving speed does not exceed 8km/h (5 mph) and standard front/rear wheel track (*See next page*), Intermittent maximum permissible load of the front axle can be ;

1200kg (2646 lb) for all models - without consideration of the load capacity of the tires.

 Caution	▶ Maximum permissible mass is measured with only the front or rear wheels on the scales inclusive of ballasts and with mounted equipments in the raised position. ▶ Do not exceed the maximum permissible mass above. Overloaded condition may invalidate the warranty and may exceed the load rating of the tires. ▶ If the load capacity of the tire is lower than maximum permissible mass of the front axle, the maximum load on the front axle meets the load capacity of the tire. (<i>See page 4-16</i>) ▶ 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.
--	---

(11) Adjusting Wheel tracks and tire replacement

- If the front wheel track is adjusted, check the clearance between tires and tractor body case by case. If necessary, the steering angle must be adjusted as following page.
- When adjusting rear wheel track, check the radial and lateral clearance between rear tire and tractor chassis as below.
 - **A : 15mm (0.6 in) (Minimum)**
 - **B : 30mm (1.2 in) (Minimum)**



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.
--------	--

(12) Tires and Load capacity

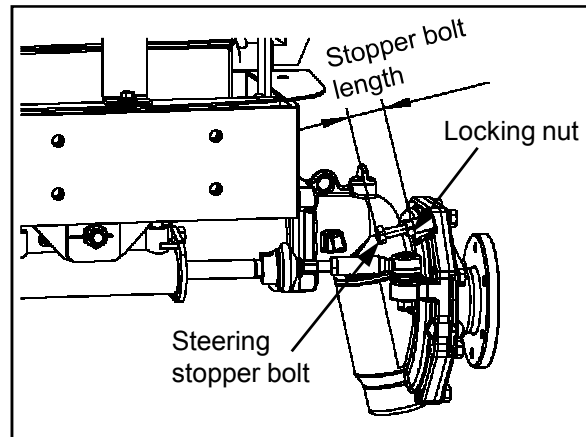
Axle No. (*)	Tires	Standard tire air pressure (kg/cm ²)	Load capacity (x2) (kg)
1	6.0-12 4PR	1.8 (180 KPa, 26 psi)	650 (1433 lb)
2	9.5-16 6PR	2.2 (216 KPa, 32 psi)	1262 (2782 lb)
Optional Tire			
1	23x8.5-12 4PR	2.5 (245 KPa, 36 psi)	1334 (2941 lb)
2	12-16.5 6PR	2.8 (275 KPa, 41 psi)	3828 (8439 lb)
1	23x8.5-12 4PR	1.6 (157 KPa, 23 psi)	1012 (2231 lb)
2	33x12.5-16.5 4PR	2.1 (206 KPa, 31 psi)	2092 (4612 lb)
1	18x8.50-8 4PR	1.5 (147 KPa, 21 psi)	450 (992 lb)
2	26x12.0-12 4PR	1.4 (137 KPa, 20 psi)	640 (1411 lb)
1	6.0-12 4PR	1.8 (180 KPa, 26 psi)	325 (717 lb)
2	300/65 R18	2.5 (245 KPa, 36 psi)	1250 (2756 lb)

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

(13) Adjusting Steering angle

- If the front wheel track is adjusted or front tires are replaced with new tires having bigger diameter or width, or one of the front equipments is attached, the steering angle must be adjusted as below.

- 1) Loosen the locking nut on both sides.
- 2) Connect the front hook of the tractor to the crane by using 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 tire and other parts are over 20mm (0.79 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 each side.



Notice	► DO NOT shorten the length of the steering stopper rather than factory condition. If the stopper does not contact at maximum steering condition, it can damage the steering cylinder or tie-rod.
--------	--

4-5. Driving speed

- The driving speed of tractor or the revolution speed of PTO depends on the work, tire and ground condition. For safety, operate the tractor at suitable speed.
- Table of driving speed (unit : Km/h -> Mile/h)

<i>HST Type</i>

J2020H / J2030H

Range gear stage	L	H
Forward	0 ~ 6.8 Km/h (0 ~ 4.3 mph)	0 ~ 15.7 Km/h (0 ~ 9.8 mph)
Reverse	0 ~ 5 Km/h (0 ~ 3.1 mph)	0 ~ 12 Km/h (0 ~ 7.5 mph)

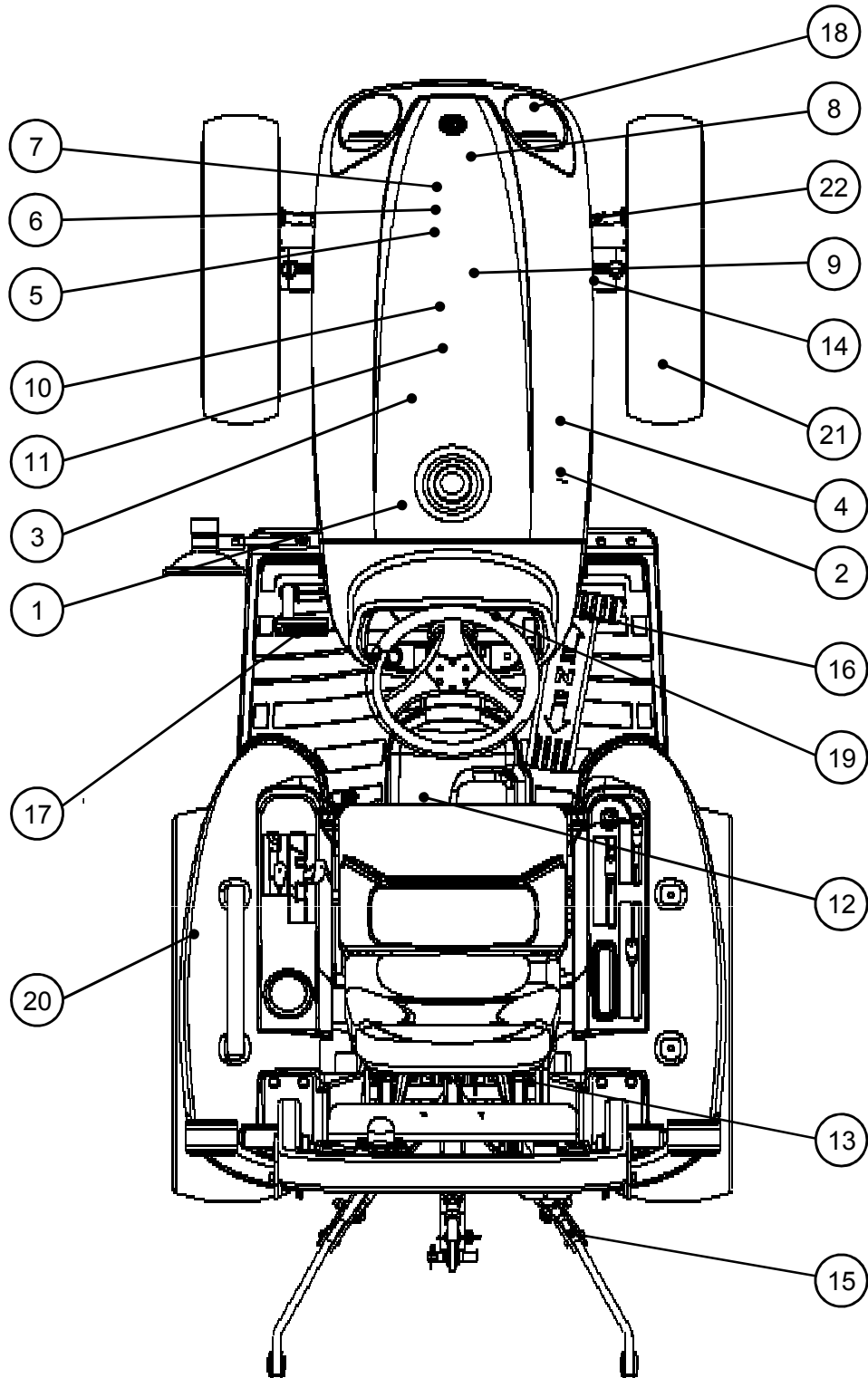
Note) Engine speed : 2700 rev/min, Dynamic load radius : 408mm (16.1 in).

5. Lubrication and Maintenance

5-1. Checking of Each Part

(1) Checking parts

Mechanical type



(2) Maintenance Table

HST type

	Checking Part	Type & Spec.	Capacity & Dimension	Check Period (Hours)				
				Daily	50	300	600	1200
1	Fuel tank	See page 5-3	25 ℓ (6.60 U.S. gals)	▲				
2	Fuel filter	Element				●		
3	Engine oil	See page 5-3	4.2 ℓ (1.10 U.S. gals)	▲		●		
4	Engine oil filter	Cartridge			★	●		
5	Engine coolant	See page 5-3	3.8 ℓ (1.00 U.S. gals)	▲			●	
6	Radiator screen			▲	■			
7	Air cleaner	Dry		▲	■	●		
8	Battery				▲			
9	Fan belt tension		10~12 mm (0.39~0.47 in)			▲		
10	Valve clearance		0.25 mm (0.0098 in)				▲	
11	Nozzle injection pressure		14.7 MPa (2132 psi)				▲	
12	Hydraulic filter	Cartridge	See page 5-15		★	●		
			HST filter		★	●		
13	Transmission oil	See page 5-3	20 ℓ (5.28 U.S. gals)		▲		●	
14	Front axle oil	See page 5-3	3 ℓ (0.79 U.S. gals)		▲		●	
15	3-point linkage	Grease	Proper amount		▲			
16	HST pedal Neutral state			▲				
17	Break pedal play			▲				
18	Turn lights, Lights, Horn			▲				
19	Instrument panel & Indicators			▲				
20	Bolts and Nuts			▲				
21	Tire air pressure			▲				
22	Toe-in		0~8 mm (0~0.31 in)			▲		

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

5-2. Lubricants and Capacity

Lubricants	Capacity	International standard	Recommended products
Engine coolant (Radiator)	3.8L (1.00 U.S. gals)	ASTM D5216	Soft water (50%) + Anti-freeze (50%)
Fuel	25L (6.60 U.S. gals)	ASTM D975 No.2	Low sulfuric diesel fuel
Engine oil (crank case)	4.2L (1.10 U.S. gals)	API CF-4 or CG-4 Winter : SAE 10W/30 Summer : SAE 20W/40 Spring/ Fall: SAE 15W/40, SAE 20	GS Caltex RPM Dello 200
Transmission oil (common use for hydraulic lift and steering system)	20L (5.28 U.S. gals)	API GL4 ISO VG 32/46	LSTH400 Manufacturer : S-OIL TOTAL co. Ltd.
Front axle oil	3L (0.79 U.S. gals)	API GL4 SAE 80W	EPK 80W90 Manufacturer : S-OIL TOTAL co. Ltd.
Grease (Front axle holder, 3-point linkage, etc)	Proper amount	NLGI 2	Caltex MAHWAK Multi Purpose or Caltex MAHWAK All Purpose

RECOMMENDED OIL VISCOSITIES

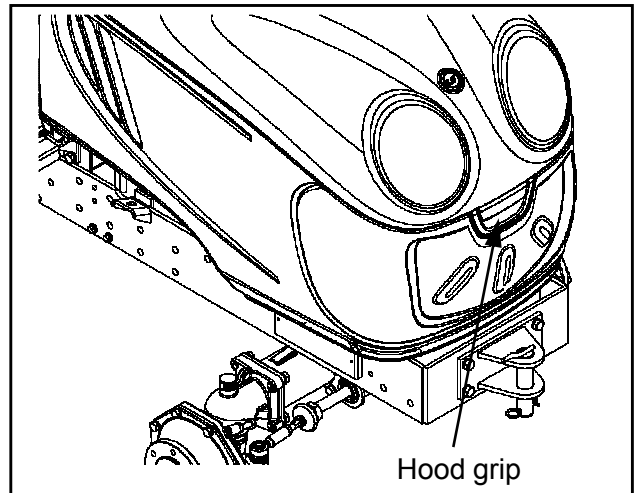
The correct engine oil viscosity grade is dependent upon ambient temperature. Refer to the chart below when selecting oil for your tractor engine.

In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable ; such as the use of SAE 5W 30 in extreme low temperatures or SAE 50 in extreme high temperatures.

Starting 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											

5-3. Access for maintenance

- For safety, the hood must be closed and correctly latched before operating the tractor.
- The hood is hinged at the rear one bar is attached inside to support the hood for easy access to the engine.
- To open the hood, pull the hood grip and lift the hood up and place the supporting bar to lock position.
- To close the hood, move the supporting bar to unlock position and lay down the hood and push it down to lock position slightly.
- Check that the hood is properly closed.



Caution

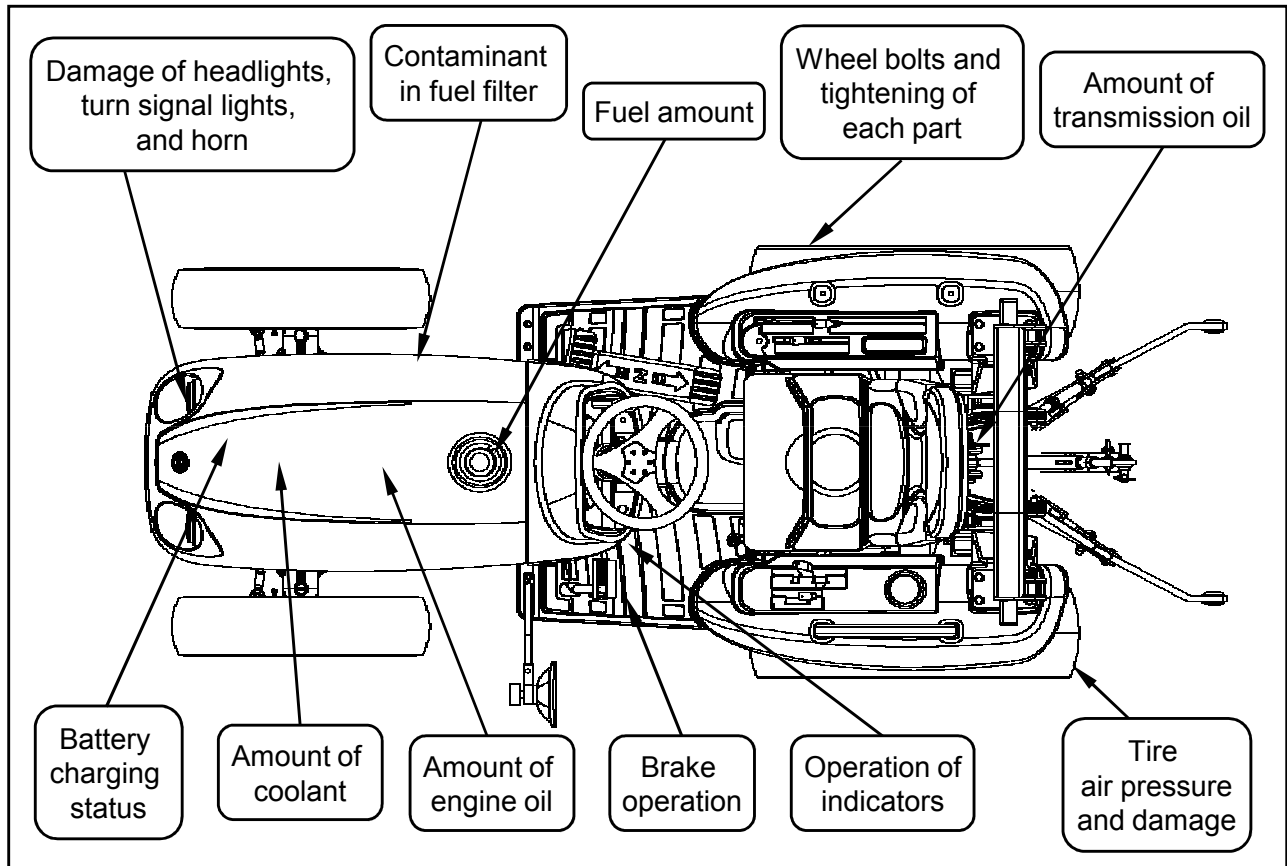
- ▶ After the engine has stopped completely, you have to open the hood for check.
- ▶ If you open the hood while the engine is running, it can cause serious damage by the intended or unintended access to rotating shaft, pulley, V-belt, cooling fan of the engine or engine application parts. BE CAREFUL.

5-4. First 50 hour check

- After using first 50 hours, contact your authorized dealer for maintenance if possible.
 - Replace engine oil filter. (⇒ Refer to Every 300 hour check. *See page 5-14*)
 - Replace hydraulic oil filter. (⇒ Refer to Every 300 hour check. *See page 5-15*)
 - 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
 - Check brake adjustment and pedal equalization
 - Lubricate all grease fittings
 - Neutral start switches operative

5-5. Checking Before Starting (Daily check)

- Before starting engine, check the followings carefully to avoid any failure or damage.

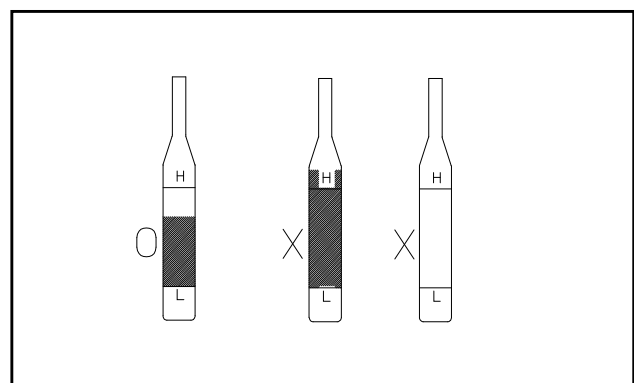


(1) Engine oil

- Oil Capacity : 4.2 ℓ (1.11 U.S. gals)**
- Using Engine oil**
 - Diesel engine oil ; API CF-4 or CG-4 class.
 - Select Engine oil depending on the temperature as shown in the table.

Season	Temperature	Lubricant No.
Winter	0℃ ~ -20℃ (32°F ~ -4°F)	SAE 10W/30
Spring, Fall	0℃ ~ 20℃ (32°F ~ 68°F)	SAE 15W/40, SAE20
Summer	Above 20℃ (Above 68°F)	SAE 20W/40

- Checking oil level**
 - Check it before starting engine or at 5 minutes later after stopping engine.
 - If the oil is between “Max” and “Min” scale of oil gauge, it means “proper amount”.
 - It must only be done while engine is “STOP”.

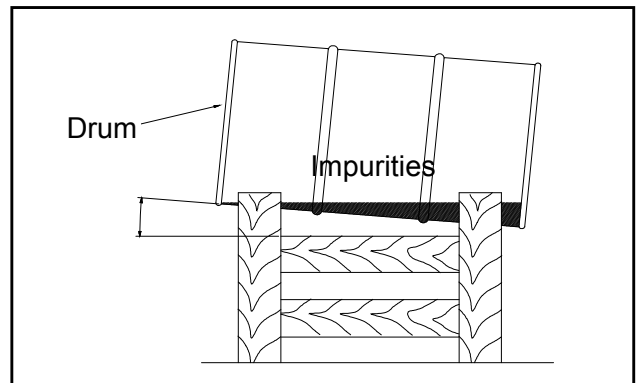


(2) Fuel tank

① Tank Capacity : 25 ℓ (6.69 U.S. gals)

② Using Fuel

- Use low sulfuric diesel.
- If contaminants like water or dusts are mixed in the fuel, it may cause a severe damage to the engine. To fill the tank, the fuel storage facility must be equipped as shown in the figure. If possible, fill the tank at the gas station.



③ 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 diesel for winter 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.	Above -15°C (5°F)	Below -15°C (5°F)
Fuel	100% Wintertime-Diesel	Add 20% Kerosene

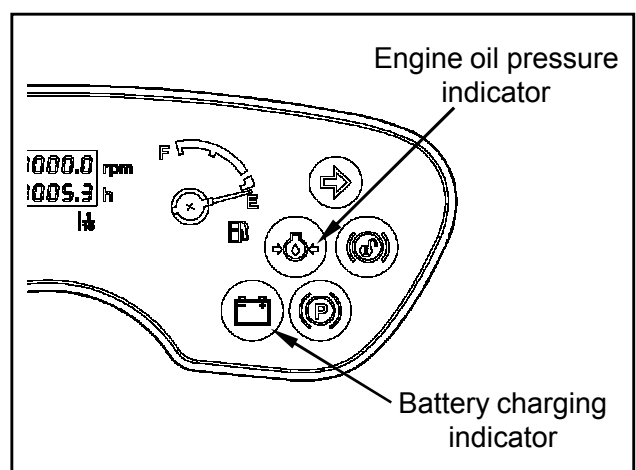
④ Checking Fuel level

- Check the fuel gauge and if it's not sufficient, fill the fuel tank with fuel.

Notice	► If the engine stops after finishing work, fill the tank fully. As the temperature drops down, the humidity in the fuel tank is condensed and may mix with the fuel.
--------	---

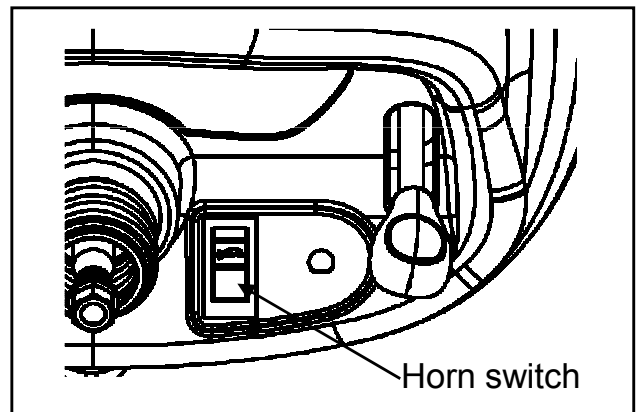
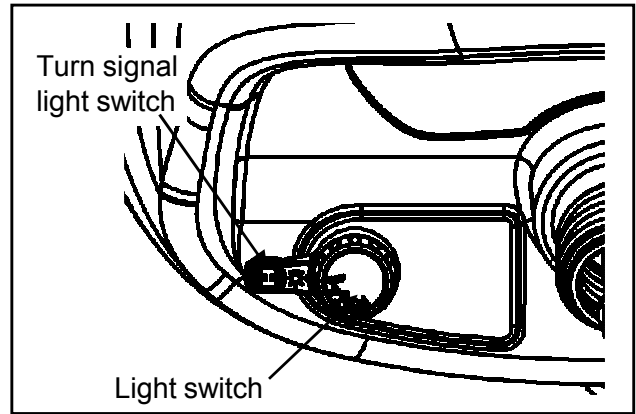
(3) Instrument panel & Indicators

- Turn the key switch to "ON" position and check if the Engine oil pressure indicator and Battery charging indicator are ON.
- If the indicators are not "OFF" after starting engine, contact your authorized dealer for check.



(4) Turn signal lights, Lights, Horn

- Check the operation of lights, turn signal lights and horn
- If the light is OFF suddenly when operating the switch, check the problem as followings.
 1. Check the corresponding fuse in the fuse box.
 2. Check the light bulb. If necessary, replace it by a new one as referring to below.



Illuminating Lights	Light bulb specification
Headlights (Low beam / High beam)	12V 60W / 55W
Turn signal lights (Rear)	12V 21W
Stop lights / Tail lights	12V 21W / 12V 5W
Work light	12V 23W
Instrument panel lights	LED
Turn signal indicators and other indicators	LED

Notice	▶ Use the bulb of rated capacity. ▶ In case of using the improper bulb, it may cause a failure of the electric system.
--------	---

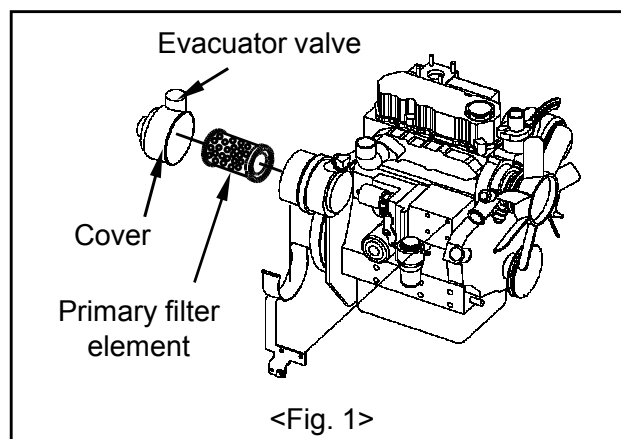
(5) Engine coolant

- Refer to "Replacement of Engine coolant" (See page 5-19)

(6) Air cleaner (Dry type)

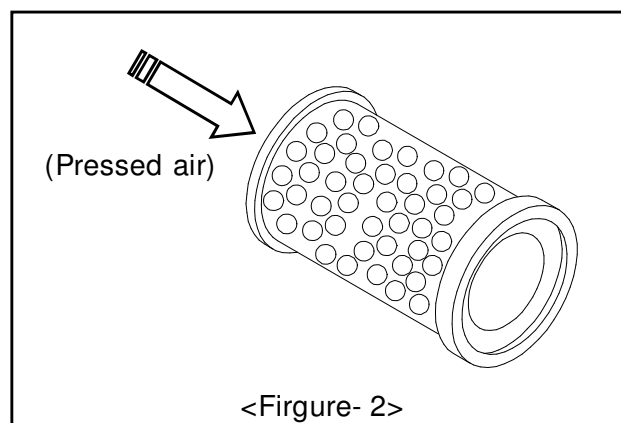
① Cleaning filter element

- Remove the cover and pull out the primary filter element straight out. (Fig. 1)
- 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 it. ▶ if the element is cracked, change it with a 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 "Fig. 2" to remove the dust and foreign materials. 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 by using the compressed air. ▶ Do not start the engine if air filter element is not assembled.
--------	--

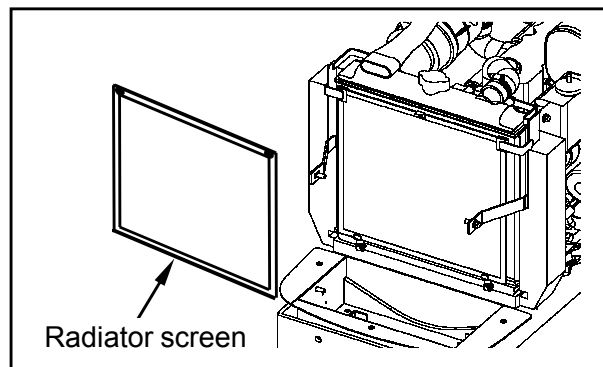
② Assembling filter element

- Clean the inside of the air cleaner housing using a clean damp cloth.
- Check if there is damage inside filter element by using a light. If there is tiny crack or small hole in the filter element or the gasket is damaged, replace it with a new one.
- Insert the filter element by pushing it 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 placed downward.

Notice	▶ DO NOT start the engine or close the hood if the filter element is not assembled.
--------	---

(7) Cleaning of Radiator and Radiator screen

- Remove the dust or dry grass stuck to the radiator or radiator screen daily.
- When cleaning the radiator with water, let water flow from the fan side.

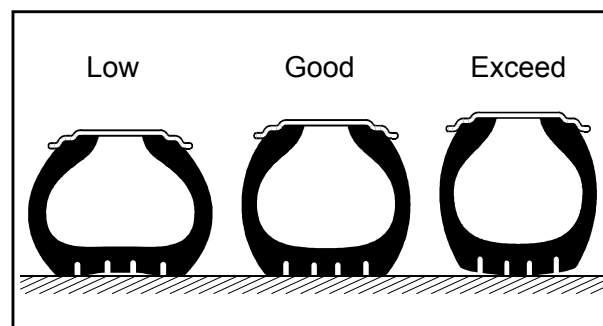


	Caution	▶ If there are lots of foreign materials such as dry grass stuck to the radiator screen, the cooling efficiency will be reduced and the engine can be overheated. ▶ Clean the radiator only while the engine is stopped.
--	---------	---

(8) Tire air pressure and damage

① Check

- Check the air pressure or the damage of the tires daily. Always use the correct pressure for each axle, and If the tire is damaged, change it with a new one.
- Ensure tire pressures are not lower than the correct values, to prevent ;
 - blown tires;
 - bead wear;
 - internal damage;
 - irregular wear and short service life
- Do not over-inflate the tires, as this may lead to damage in the event of impact and, in extreme conditions, the tire rim may be deformed or the tire may burst.



	Caution	▶ It is not allowed to remove/attach or change the tire arbitrarily. Carry out the work in the tire repair center equipped with a expert and special safety tools. ▶ When checking tire pressures, keep the body away from the valve mechanism or cap. ▶ The tire pressures vary depending on the load weighing on the axles.
--	---------	---

② Standard air pressure – for further information, see page 4-16

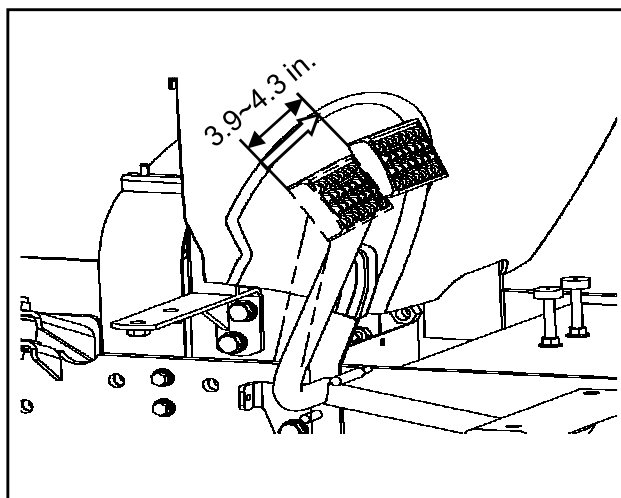
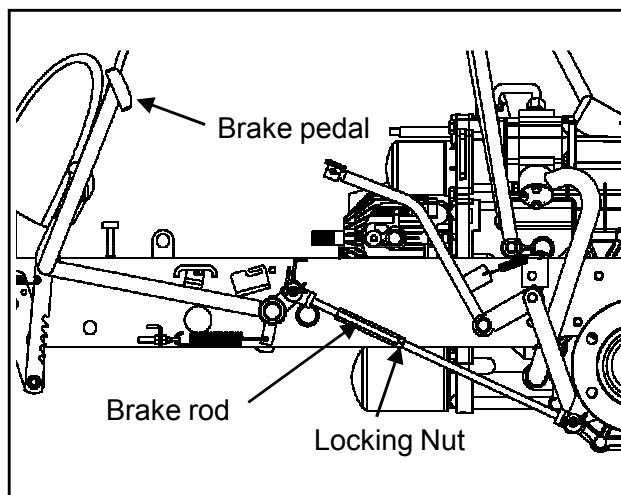
Type			Air pressure	Type			Air pressure
For Farming	Front	6.0-12(4PR)	26 psi	Rear	9.5-16(6PR)		32 psi
For Industrial	Front	23X8.5-12(4PR)	36 psi	Rear	12X16.5(6PR)		41 psi
For Grass	Front	23X8.5-12(4PR)	23 psi	Rear	33X12.5X16.5(4PR)		31 psi

(9) Tightening state of Bolts and Nuts of each part

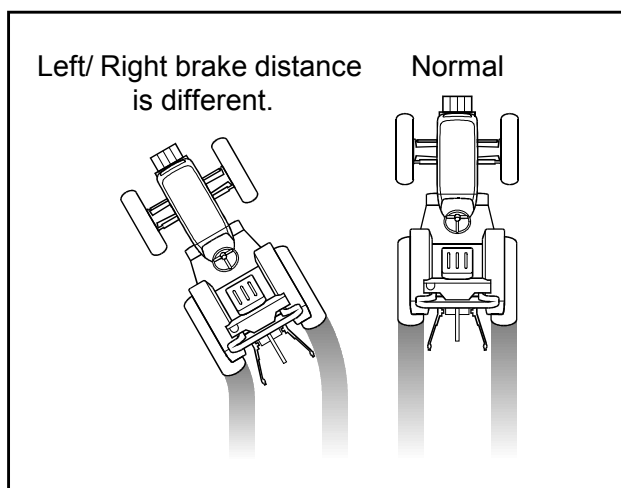
- Check if the bolt or nut of each part is loosened and If loosened, tighten it again.
- Check the bolts and nuts of tires before starting engine.

(10) Adjustment of Brake pedal play

- Check the distance of brake pedal play.
- **Normal distance : 100~110mm (3.9~4.3 in)**
If the distance is more than 110mm (4.3 in), adjust it as below.
 1. Loosen locking nut of the left side first and turn brake rod to adjust.
 2. If brake rod is tightened, the distance shall be reduced, and if brake rod is loosened, the distance shall be increased.
 3. After adjusting distance, tighten the locking nut.
 4. Adjust the brake rod of the right side as the same way.
 5. Check if the brake distance is normal as below.



- Checking brake distance.
 1. Check the skid mark of tire or balance of tractor while driving at a normal speed.
 2. If the brake distance is different as shown in right figure, adjust the brake rod again.
 3. Tighten the brake rod of the opposite side against the inclination a little until the brake distance is normal.

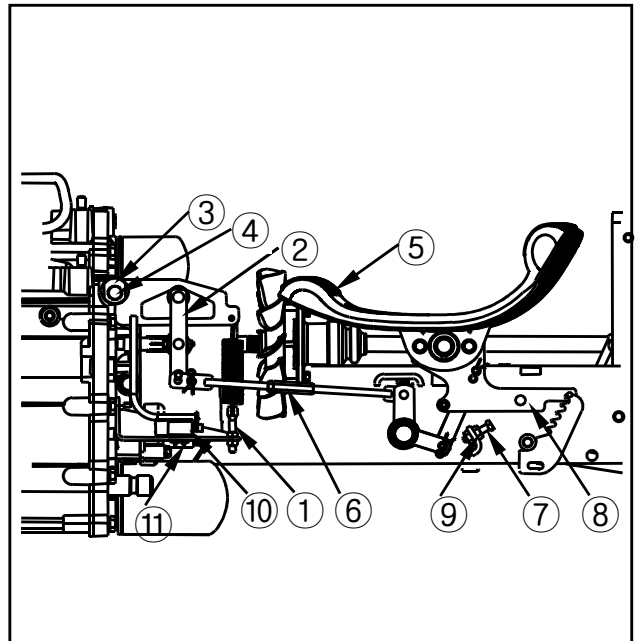


(11) Adjusting HST control linkage (HST type)

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

● Adjustment of “NEUTRAL” position of the HST control.

1. Stop tractor on a flat ground and stop the engine.
2. Lift the rear wheel of the tractor off the ground sufficiently by using a crane. If there is no crane, use the suitable device can lift the tractor safely. For tractor weight, refer to “6. Dimension and Specification”. (See page 6-5)
3. Place the 4WD lever to “2WD” and apply wheel chock to the front wheels. It is necessary for the tractor not to move when engine starts.
4. Set the HST pedal⑤ horizontally by adjusting the rod⑥ and check the HST pedal is smoothly returned to NEUTRAL. if not in full reverse operation, shorten the rod⑥ a little. Loosen the locking nut⑨ and adjust the stop bolt⑦ to be touched to the HST pedal stopper⑧ after the HST pedal is fully operated to forward.
5. After checking that neutral switch⑩ is pressed enough, start engine.
6. Loosen locking bolt④ slightly and find out the “NEUTRAL” position by turning shaft③, and then tighten the locking bolt ④.
7. After restarting engine, check the neutral position again.

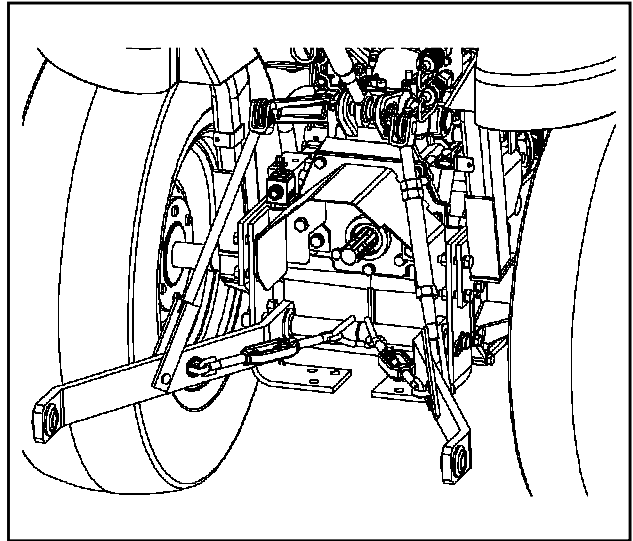


 Caution	▶ When adjusting, DO NOT get close to the cooling fan. It may cause the serious injury. ▶ When lifting the rear of the tractor, The tractor may incline to the left or right by oscillating angle of the front axle. Insert the chock between front axle and engine frame tightly.
--	--

5-6. Every 50 hour check

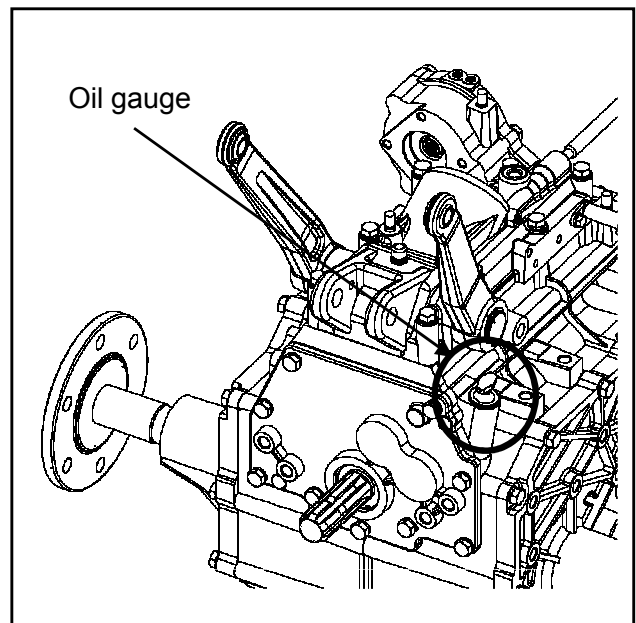
(1) Lubricating grease

- Threads, pin-connection parts and other sliding or moving parts.



(2) Checking Transmission oil

- Stop the engine on level surface and apply the parking brake and lower implements to the ground.
- Clean around oil filling port and pull the gauge straight out.
- If oil level is between “H” and “L” of oil gauge, it means ‘Proper amount’.
- For oil specification, refer to “Lubricants and capacity” at end of this chapter. (See page 5-3)

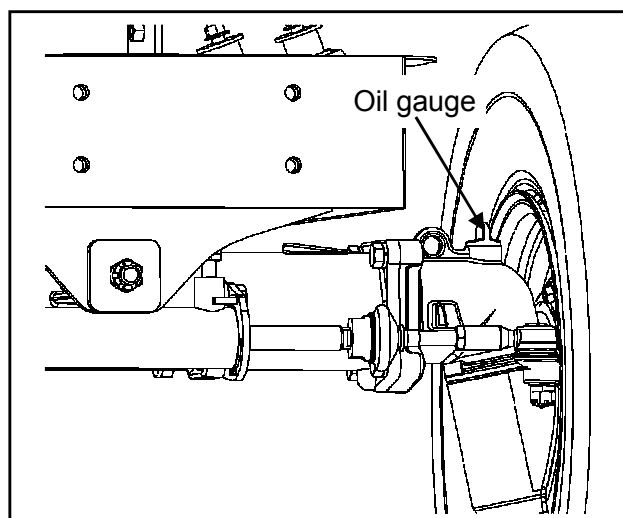


Caution

- ▶ The contaminated oil may reduce the durability of transmission and cause the failure of hydraulic system. Clean around oil filling port and then open the cap.

(3) Checking Front axle oil

- Turn the oil gauge counter-clockwise and pull it up.
- If the oil level in the gauge scale is in between the maximum and minimum, it means “Proper amount”.
- If necessary, add new oil into the oil filling port.
(after 5~10 minutes later, check the oil level again)
- For oil specification, refer to “Lubricants and Capacity” at end of this chapter.
(See page 5-3)



(4) Battery check

- Refer to “Batter handling and Notices” (See page 5-25)

(5) Air cleaner (Dry type)

- (See page 5-8)

(6) Cleaning of Radiator and Radiator screen

- (See page 5-9)

5-7. Every 300 hour check

(1) Replacing Engine oil and Filter

① Drain Engine oil

- Run engine for a few minutes to warm oil.
- Park the tractor on a level surface.
- Remove drain plug 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

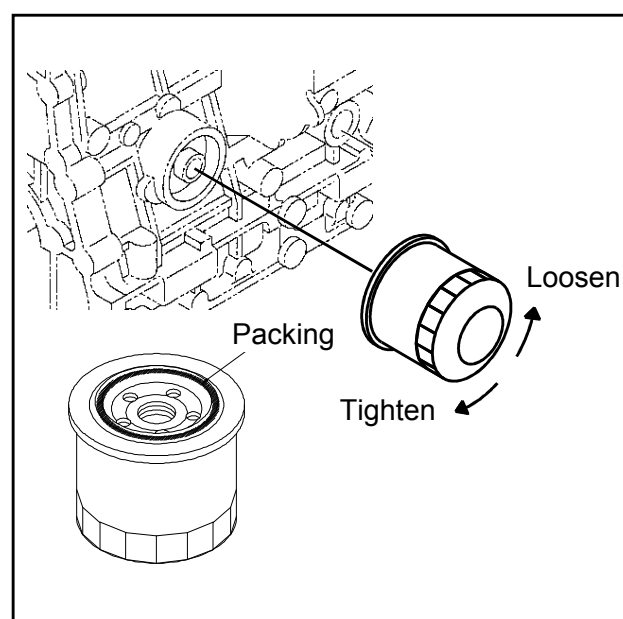
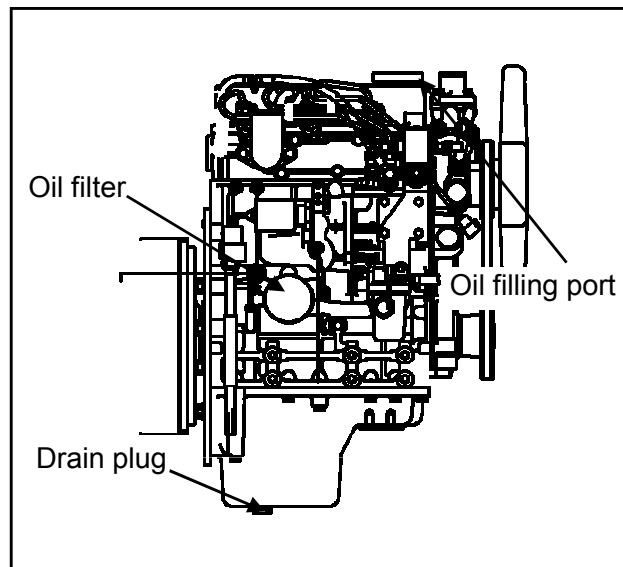
- Carefully clean around the filter.
- Coat clean engine oil on the packing of new filter and check the packing is placed well in the groove.
- Turn the oil filter counter-clockwise to remove with filter wrench.
- Turn the new filter clockwise until the packing makes contact with the mounting surface. Tighten $\frac{3}{4}$ to 1 turn more after packing contact.

③ Fill Engine oil

- Tighten the drain plugs.
- Fill the engine oil as its capacity and check the oil level is between "MIN" and "MAX".

Engine oil capacity : 4.2 L (1.11 U.S. gals)

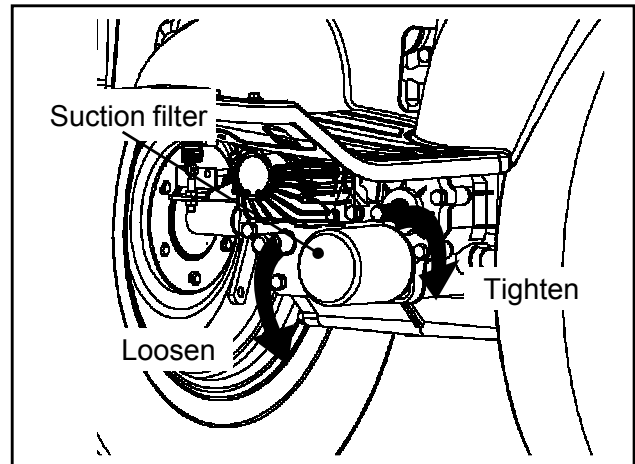
- Check any leakage of the engine while running the engine for several minutes at idle rpm.
- Stop the engine. After several minutes later, check again the oil level is between "MIN" and "MAX".
- Install the oil gauge.



(2) Replacing Hydraulic Oil Filter

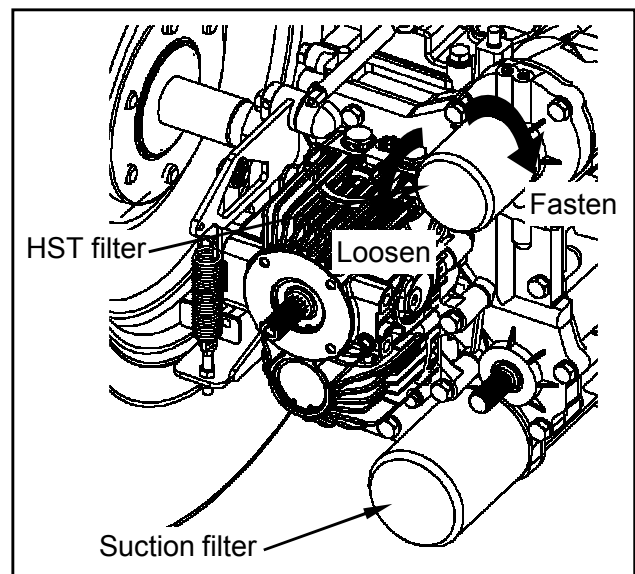
① Suction filter

- Park tractor on level surface and engage parking brake and lower implements and stop the engine and cool down the tractor sufficiently.
- 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 with filter wrench.
- Turn the new filter clockwise to assemble until the packing makes contact with the mounting surface. Tighten $\frac{3}{4}$ to 1 turn more after packing contact.
- Run the engine at idle and check any leakage.
- Check the oil level. If necessary, add new oil.



② HST filter

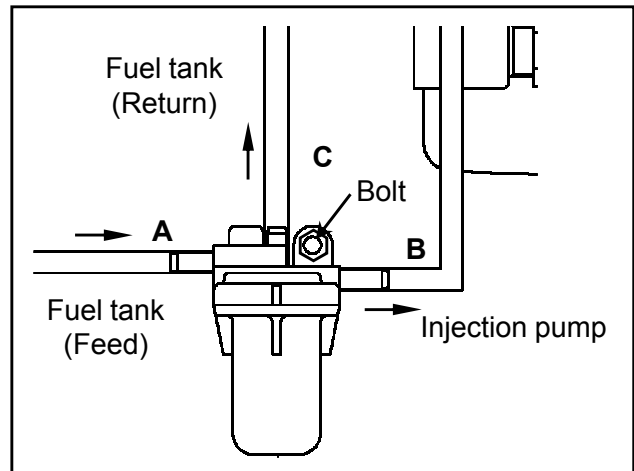
- Replace the HST filter according to the same procedure of suction filter.



- ▶ Make 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 filter.

(3) Replacing Fuel filter cartridge

1. Stop engine and apply parking brake. Set container under the fuel filter.
Prepare the plug to block the fuel hoses.
2. Disconnect hose-A first, and plug the hose.
3. Disconnect hose-B and C with the same method.
4. Remove the bolt from the filter.
5. Replace the fuel filter with a new one.
6. Connect the hose B, C and A step by step and tighten the bolt.
7. Disconnect hose "C" for a seconds to bleed the air, and connect it again.
8. Check any leakage around fuel filter.

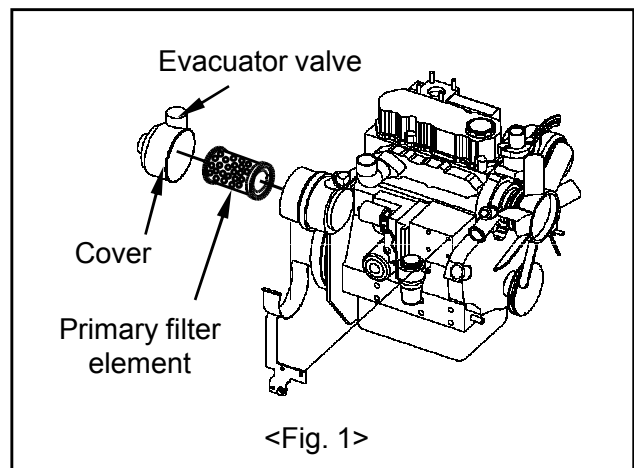


Caution

► Do not fill the new filter with fuel. The invisible fine foreign materials enter the injection pump and it may cause damage to the fuel injection system.

(4) Replacing Air cleaner element (Dry type)

- Remove the cover and pull out the primary filter element straight out. (Fig. 1)
- Clean the inside of the air cleaner housing using a clean damp cloth.
- Check if there is damage inside filter element by using a light. If there is tiny crack or small hole in the filter element or the gasket is damaged, replace it with a new one.
- Insert the filter element by pushing it 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 placed downward.

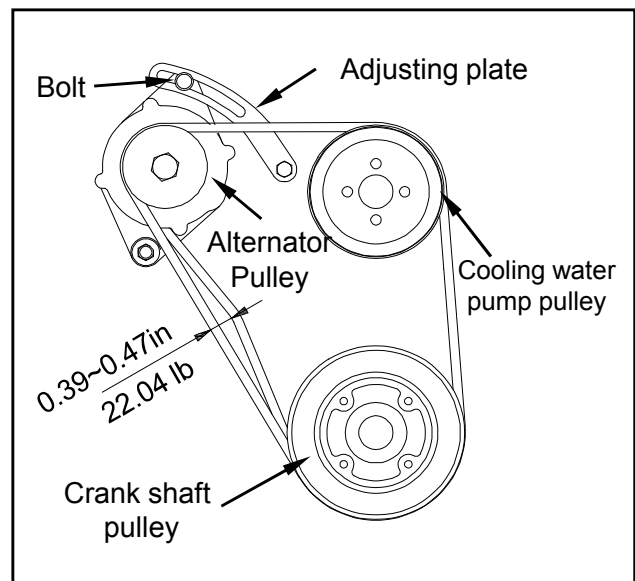


Notice

► Do not start the engine or close the hood if the filter element is not assembled..

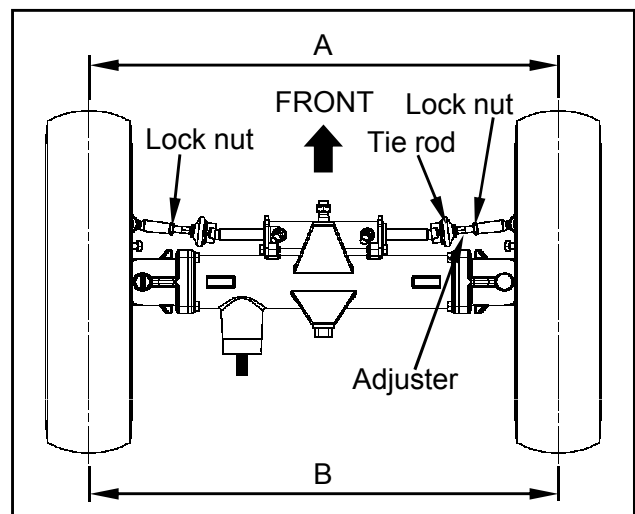
(5) Tension adjustment of Fan belt

- Check the tension of fan belt. if it is not suitable to standard value, loosen the tension bolt and adjust the tension.
 - Belt tension : Crank shaft pulley ~ Alternator pulley
 - Standard : **Appx. 0.39~0.47 in** (When pressed by 98N (22.04 lb))
- When adjusting the tension,
 1. loosen two locking bolts of alternator and bolt of adjusting plate slightly
 2. Tighten or loose the tension bolt to apply the standard tension to the belt.
 3. Tighten the locking bolts of alternator and adjusting plate.



(6) Toe-in

- Check Toe-in of the front wheel and if needed, adjust it as below.
Normal value : $B - A = 0 \sim 3 \text{ mm}$ (0~0.31 in.)
- Loosen lock nut of the tie-rod (both side).
- Fix steering cylinder and turn adjuster counter-clockwise, the toe-in ("B-A") shall be increased.
- Turn adjuster of the other side to the same displacement.
- After adjusting Toe-in, tighten the lock-nuts.
- If possible, Contact your authorized dealer.

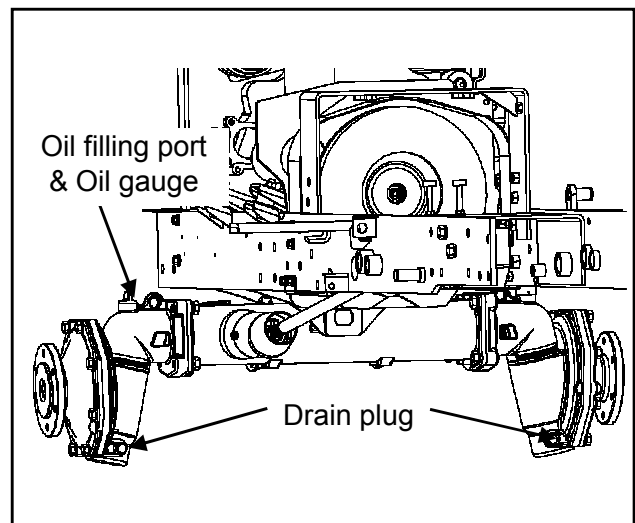


5-8. Every 600 hour check

(1) Changing Front axle oil

- Remove left/right drain plug and drain oil completely.
- Assemble the plug again.
- Add new oil into the oil filling port with checking the oil level.
- After 5~10 minutes later, check the oil level again and tighten the oil gauge.

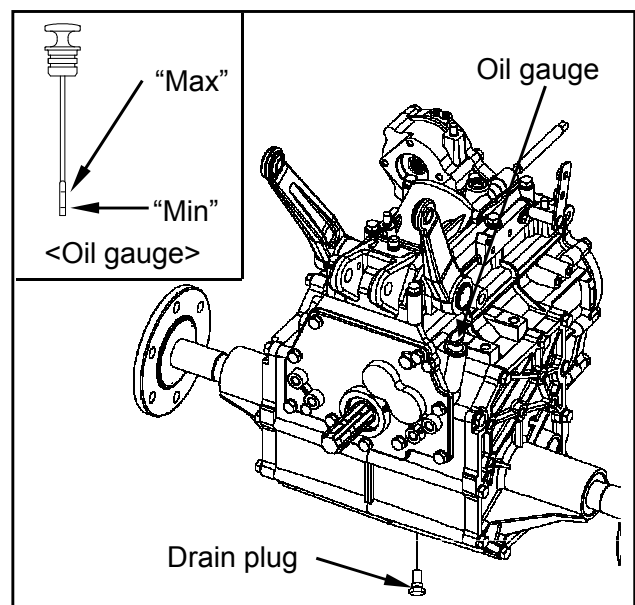
Oil capacity : 3 L (0.79 U.S. gals)



(2) Changing Transmission oil

- Park tractor on level surface and apply parking brake.
Run engine for several minutes to warm oil and lower implements and stop the engine.
- Set container under the drain plug and remove drain plug under the transmission and drain oil completely.
- Clean iron chip stuck to the drain plug and tighten drain plug again.
- Add new oil until the oil level is between "Min" and "Max" of the oil gauge.

Oil capacity : 20 L (5.28 U.S. gals)



- The contaminated oil may reduce the durability of transmission and cause the failure of hydraulic system.
Clean around oil filling port, and then pull oil gauge.

(3) Replacement of Engine Coolant

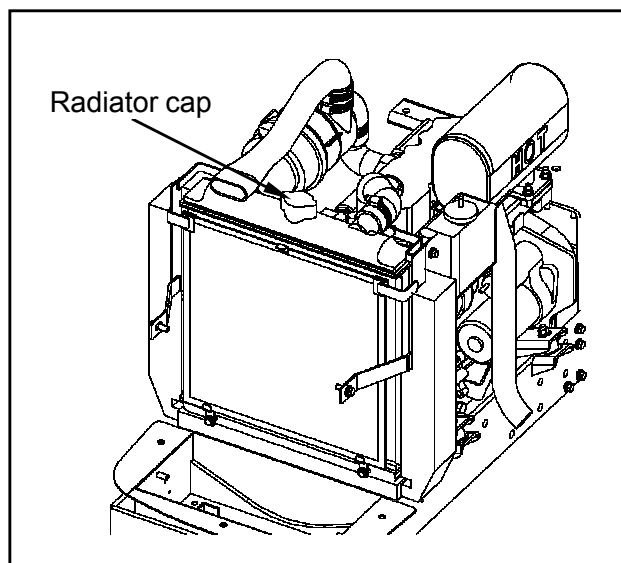
① Capacity : 3.8 ℓ (1.00 U.S. gals)

② Check

- Check the coolant of radiator and expansion tank whether it is insufficient or not.
- Do not open the radiator cap except to check or change it.

③ Supplement

- Supply the clean soft water to the coolant. If not, the radiator shall be corroded or rust shall be generated.



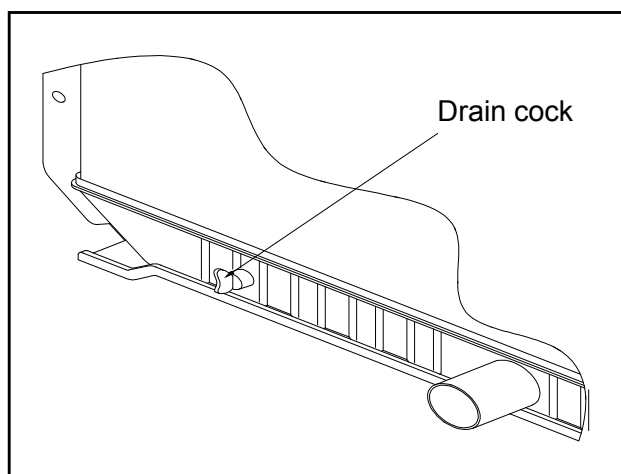
Warning



- ▶ When opening the radiator cap, be careful of the escaping hot water or steam.
- ▶ Cool down the coolant sufficiently before opening.

④ Replacing coolant

- The drain cock must be loosened only when the engine is cooled down.
- Loosen the drain cock under the radiator to drain the coolant in the engine and radiator.
- Before supplying the coolant, wash out the radiator with clean water 2~3 times.
- Apply the overflow tube and supply the coolant up to the inlet of radiator. Fill up the expansion tank with coolant above the "MIN". Change 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 foreign materials.



⑤ Anti-freeze solution

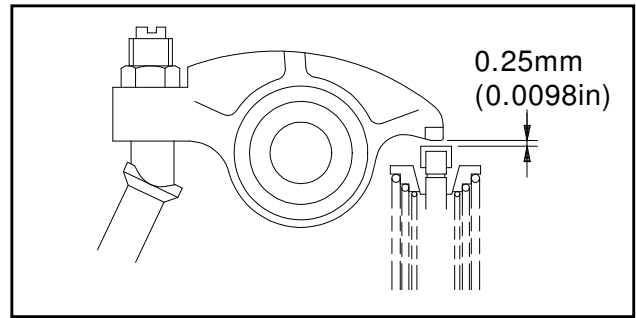
- The amount of anti-freeze in the coolant must be determined on the ambient temperature. If the amount of anti-freeze in the coolant is low, the coolant can be frozen and the engine and radiator may be damaged.
- Use anti-freeze solution always. if not, change the coolant with anti-freeze solution before winter time.
(Drain port : Radiator – drain cock, Engine – engine coolant drain plug)
- Run the engine for 5 minutes after injecting the anti-freeze to mix it with water well.

(4) Adjusting Engine Valve clearance

- Contact your authorized dealer to check the valve clearance.

Valve clearance : 0.25mm (0.0098 in)

If the gap is big, the noise increase and if the gap is small, the engine power can be low.



(5) Checking Nozzle injection pressure

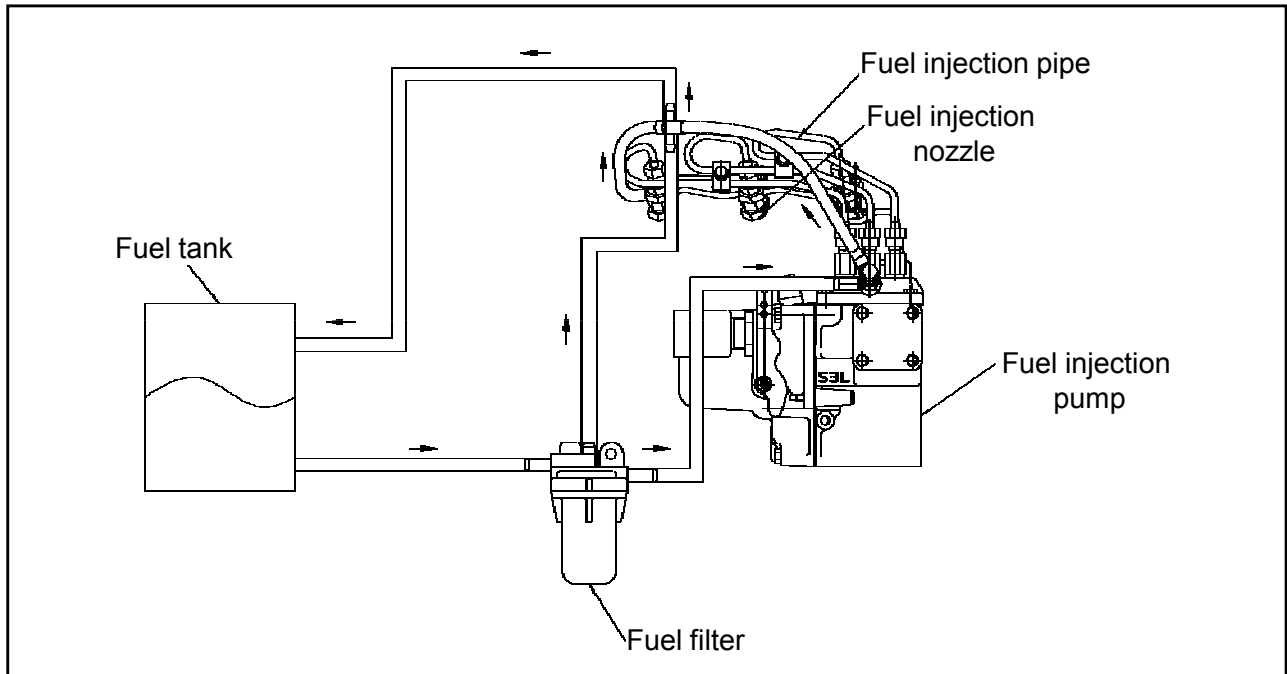
- Contact your authorized dealer.

Nozzle injection pressure : 14.7 MPa (2132 psi)

5-9. General maintenance (When required)

(1) Air-bleeding from Fuel system

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

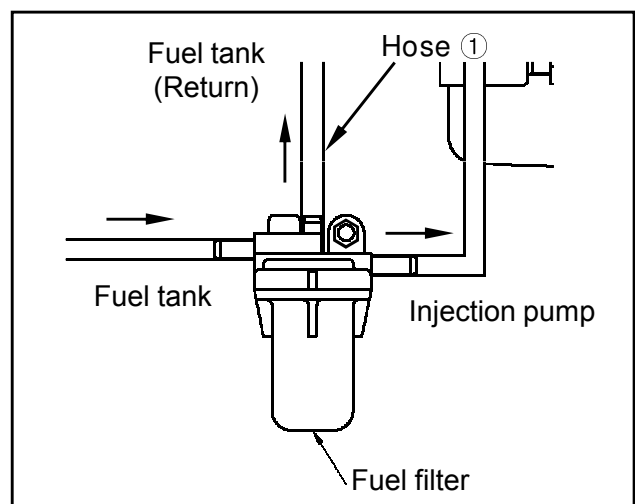


Notice

- ▶ When replacing fuel filter only, air-bleeding from fuel injection pipe is not necessary.

① Air-bleeding from Fuel Filter

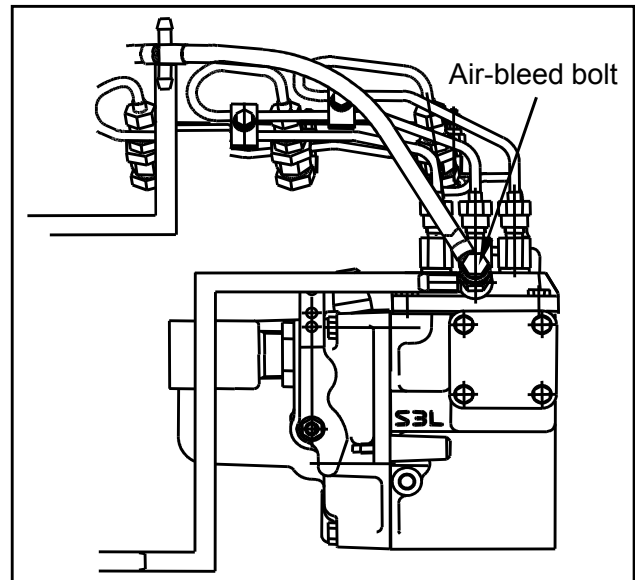
1. Disconnect the fuel hose ① from the fuel filter for a while.
2. If the bubble dose not come out from the filter, the Air-bleeding is completed, connect the hose to the filter again.



② Air-bleeding from Fuel Injection pump

1. Turn key switch to "ON" position.
2. Loosen the Air-bleed bolt.
3. After clean fuel without bubble comes out from the Air-bleed bolt, turn key switch to "OFF" position. And tighten the Air-bleed bolt again.

Tightening torque : 8 N.m (5.9 lb-ft)



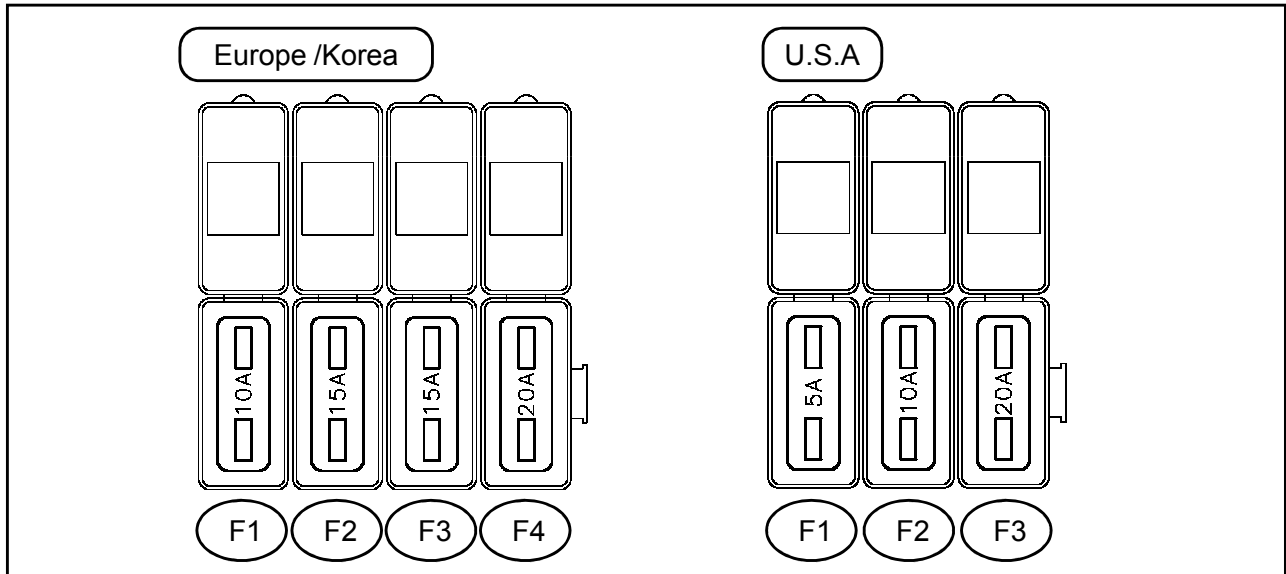
Notice

► Cover the bleeding fuel with a rag so that it does not flow to other components.

(2) Fuse & Main fuse

① Fuse check and replacement

- How to replace the fuse
 1. Remove the cover of fuse box.
 2. Check each fuse and remove the damaged fuse.
 3. Replace the new one same as damaged one.
- Capacity and function of each fuse is described in the cover of fuse box.

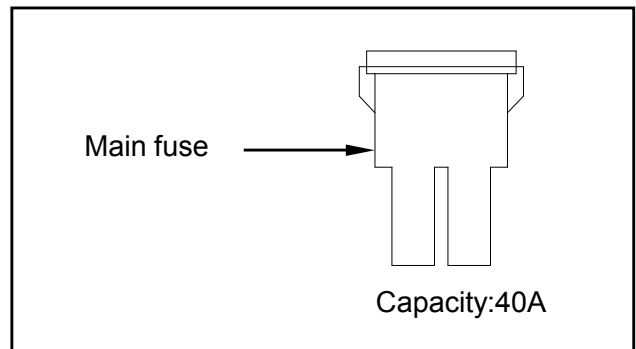


Fuse Location		Fuse Capacity	Circuit
Europe / Korea	F1	10A	Emergency lights
	F2	15A	Instrument panel, PTO, Engine stop, Horn
	F3	15A	Headlights
	F4	20A	Brake lights, Side lights, Turn signal lights, Work light
USA	F1	5A	Work Light, Turn signal lights
	F2	10A	Instrument panel, PTO, Engine stop, Horn
	F3	20A	Emergency lights, Headlights

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

② Main fuse (SLOW BLOW FUSE) check and replacement

- The main fuse is attached to the electric wiring of left side of the engine.
- If the main fuse is damaged, remove it from the wiring and replace with a genuine part.
- As the main fuse is a device to protect the electric system and wiring, check if there is trouble in the electric system. Contact your authorized dealer for check.



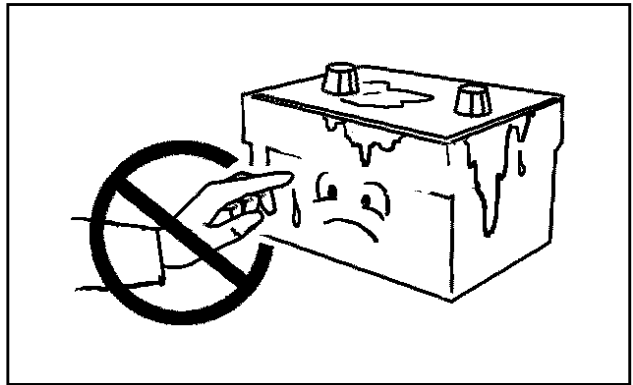
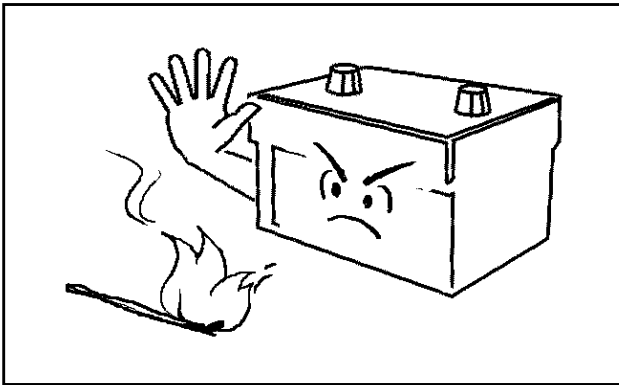
Notice	▶ If the main Fuse is cut off repeatedly, contact your authorized dealer to check the problem. ▶ If using the alternatives instead of the rated capacity fuse, it may cause fire which results in the damage of tractor or injury. ▶ Do not connect the electric wire to terminals of battery directly. It may cause a fire by spark.
--------	---

(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

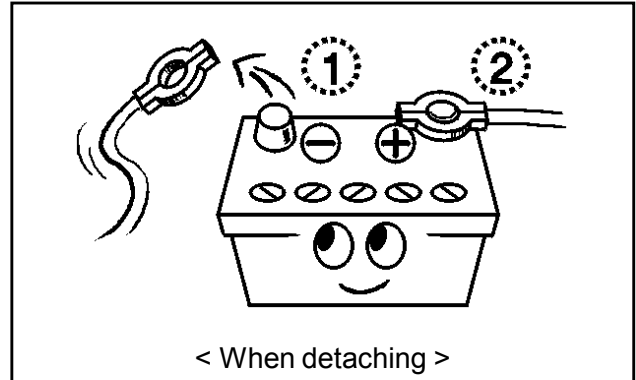
- Indicator on the top of the battery displays the battery state. If the indicator color is
 - **“Green”** : Normal state.
If the engine does not start despite of green color, contact your authorized dealer.
 - **“Clean”** : Low charging state – charge the battery.
 - **“White” or “Red”** : replace the 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.



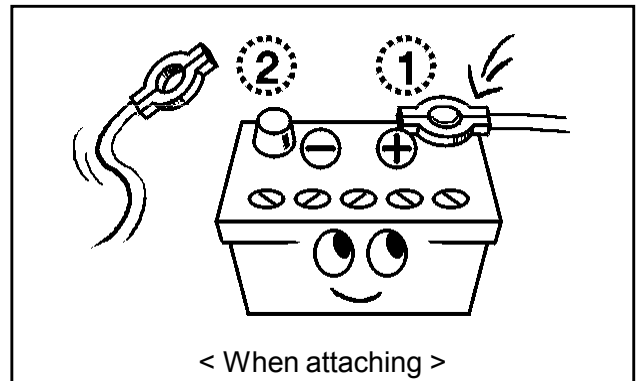
 Caution 	▶ The gas generated from the battery is explosive. comply with following instructions. - Keep cigarettes, sparks and flames away from battery. Use a flashlight to check battery electrolyte level or indicator. - Never check battery charge by placing a metal object across the terminals. Use a 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 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. 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.
---	---

② Notices in attaching/detaching the battery

- When detaching the 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.

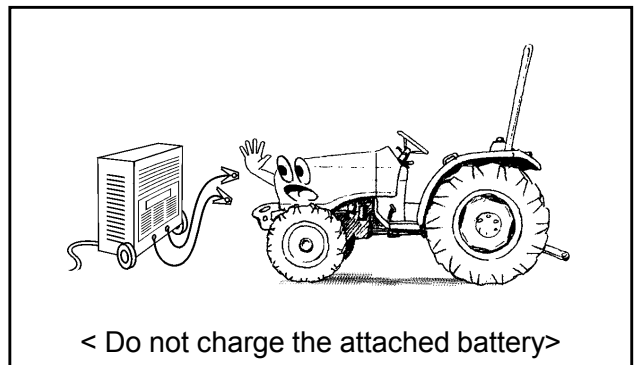
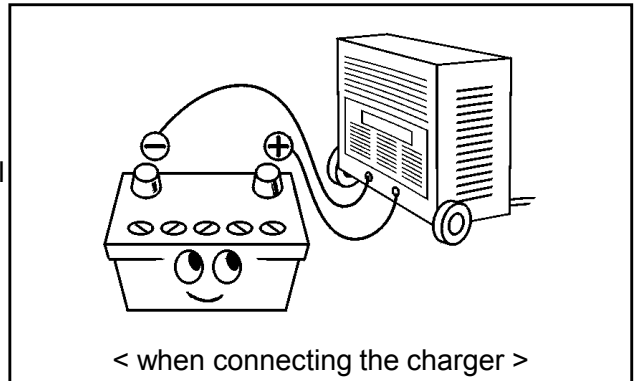


! Caution   	▶ Stop engine and apply parking brake and remove the ignition key before replacing the battery. ▶ Put on eye protection and globes to protect human body from poisonous sulfuric acid before handling the battery . ▶ Always remove grounded (-) battery clamp first and assemble it last. If not, It can cause an explosion by spark. ▶ Keep all flames and sparks away and DO NOT smoke while you 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" setting.
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.



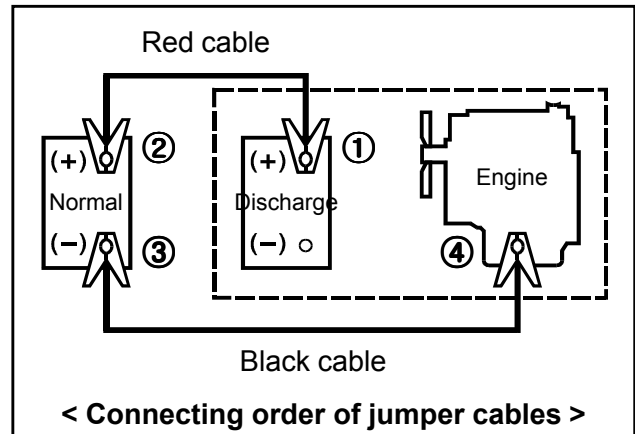
	▶ Put on eye protection and gloves to protect human body from poisonous sulfuric acid before handling the battery .
	▶ Always remove grounded (-) battery clamp first and assemble it last. If not, It can cause explosion by spark.
	▶ Keep all flames and sparks away and DO NOT smoke while you charge battery.
	▶ 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.

① Connecting Jumper cables

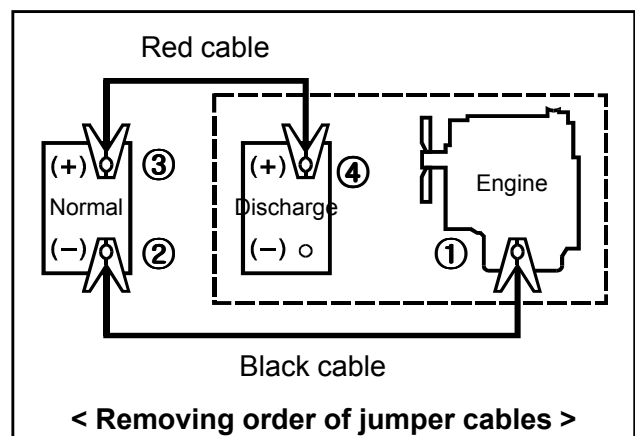
- Check followings before connecting the cables.
 - is the spring of clamp normal?
 - Is the cable and clamp cut-off?
- 1. Stop engine, apply parking brake and remove the ignition key.
- 2. Connect two (+) terminals of both batteries. with red cable.
(tractor battery-①, auxiliary battery-②)
- 3. Connect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



	▶ The gas generated from the battery can be exploded by spark.
	▶ The negative(-) cable of auxiliary battery must be connected to the engine block, not to the tractor battery. ▶ Keep all flames and sparks away and DO NOT smoke while you charge battery.

② 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.
---------------	---

5-10. Troubleshooting

 Warning	► To avoid injury due to sudden start, apply parking brake and place the transmission gear in “Neutral”.
--	---

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 in “OFF” position. ▲ Discharge of battery ▲ Terminal loosened ▲ Key switch failure ▲ Start motor failure	▲ Depress clutch pedal fully ▲ Place PTO switch in “OFF” position ▲ Charge or replace ▲ Tighten the terminal ▲ Repair or replace ▲ Repair or replace
	The start motor turns but the engine does not start.	▲ The battery is weak. ▲ Bad grounding ▲ 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 ▲ Clean 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

System	Faults	Possible causes	Solutions
Engine	Engine stops at low speed revolution.	▲ Fault of injection pump ▲ Valve gap is not correct ▲ Poor nozzle pressure	▲ Repair ▲ Adjust the gap ▲ Repair
	Engine overheat	▲ Lack of coolant ▲ Bad fan belt tension or broken ▲ Dirt attached to the radiator	▲ Supplement ▲ Adjust belt tension or replace ▲ Wash
	The color of exhausted smoke is white.	▲ Air cleaner clogged ▲ Engine oil exceeded ▲ Lack of fuel supply	▲ Clean element or replace ▲ Adjust in proper level ▲ Repair
	The color of exhausted smoke is black.	▲ Bad quality of fuel ▲ Over fuel supply ▲ 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 ▲ Pressure switch error ▲ Fault of oil pump ▲ Engine oil filter clogged	▲ Supplement ▲ Replace the proper oil viscosity ▲ Replace ▲ Repair ▲ Replace the filter
	Battery charging indicator is ON during operation	▲ Bad electrical connection ▲ Fault of alternator ▲ Fault of battery ▲ Bad fan belt tension or broken	▲ Check battery terminals, ground, and repair ▲ Repair or replace ▲ Replace ▲ Adjust belt tension or replace
Clutch	Clutch is slipped.	▲ Wrong adjustment of clutch pedal play ▲ Friction lining worn or broken	▲ Adjust the pedal play correctly ▲ Replace
	Clutch does not cut-off.	▲ Lining damaged ▲ Clutch pedal play exceeded	▲ Repair or replace ▲ Adjust the pedal play

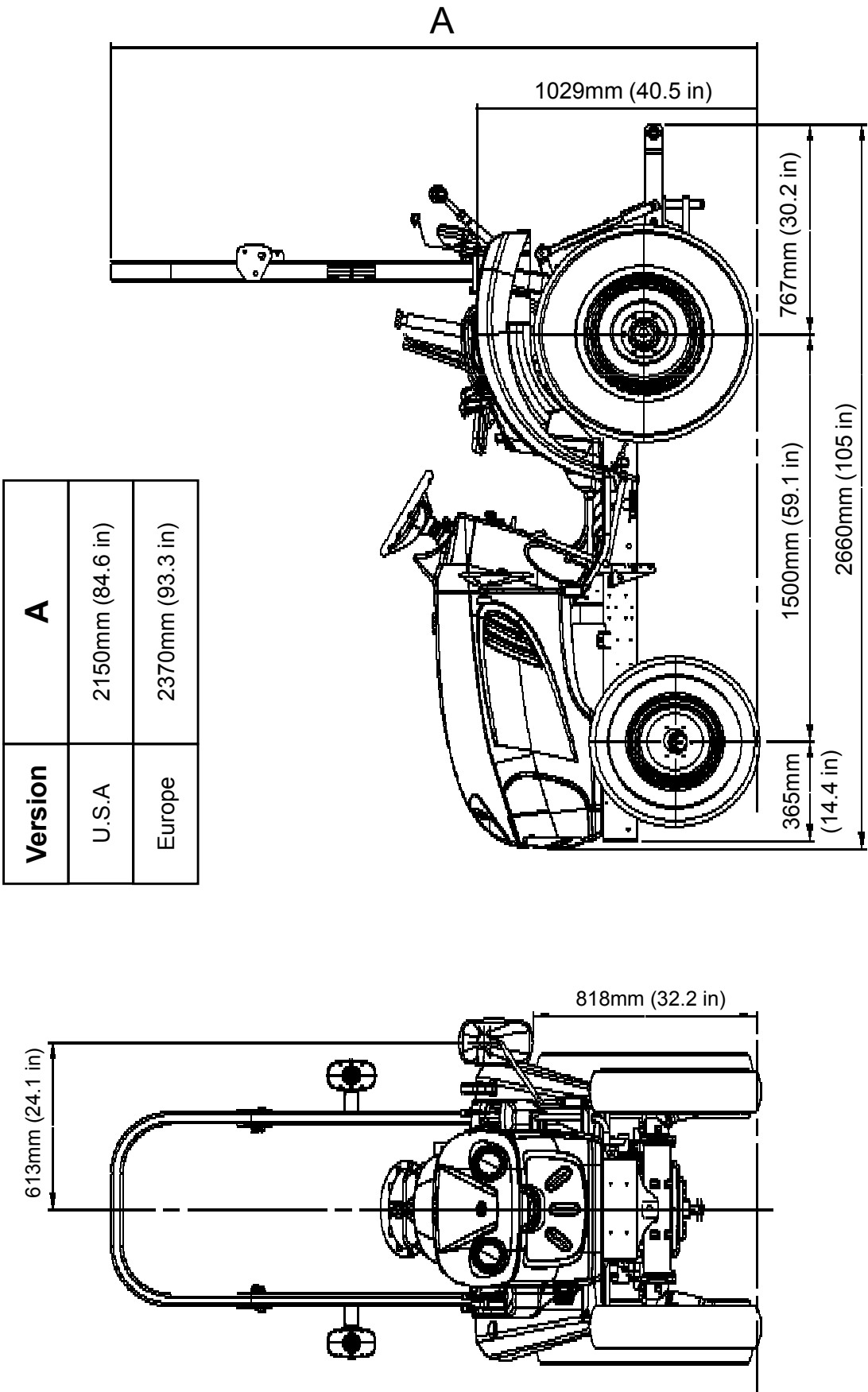
System	Faults	Possible causes	Solutions
Brake	Brake does not work or only one side works.	▲ Wrong brake pedal play. ▲ Lining worn or broken ▲ Left/right pedal play is different	▲ Adjust ▲ Replace ▲ Adjust
	After brake pedal working, it does not return.	▲ Return spring damaged ▲ Lack of grease in shaft parts	▲ Replace the spring ▲ Remove the rust, apply grease
Hydraulic lift system	The linkage does not move up.	▲ 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 part ▲ 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, relief valve sounds off.	▲ Upper limit of position control lever is changed	▲ Adjust the upper limit
	The linkage does not move down.	▲ Down speed control valve locked ▲ Control valve failure ▲ Cylinder damaged ▲ Lift shaft moving part damaged	▲ Turn the knob counter-clockwise ▲ Repair or replace ▲ Replace ▲ Repair or replace

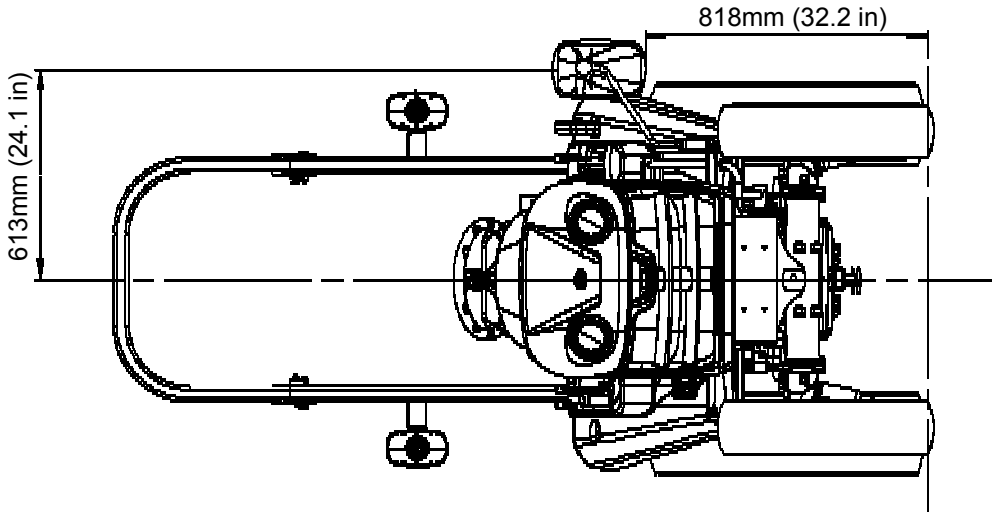
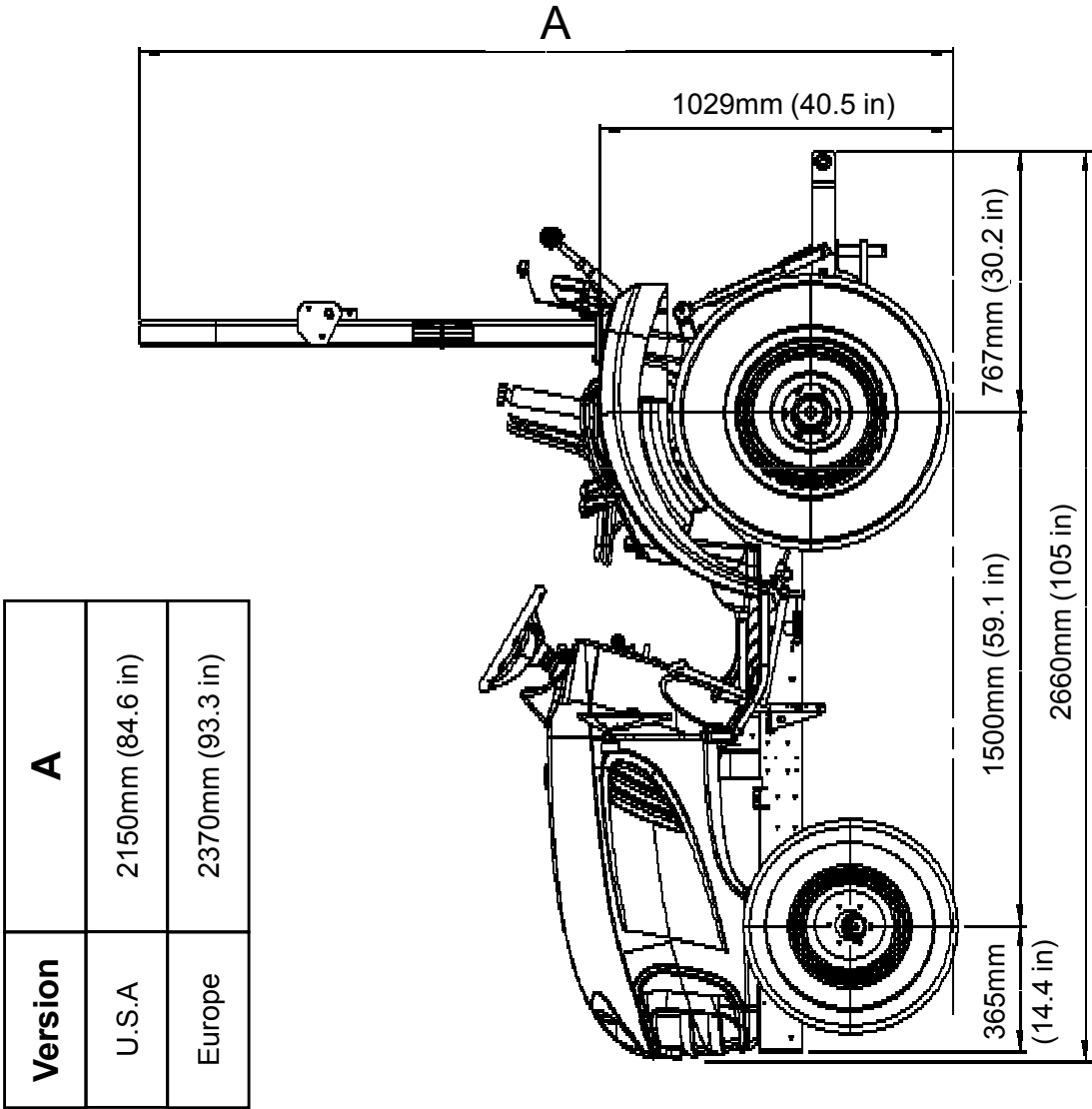
System	Faults	Possible causes	Solutions
Steering System	Hydraulic steering system does not work.	▲ Pump worn or part damaged ▲ Steering unit damaged or worn ▲ Oil leakage by steering cylinder piston seal damaged or worn ▲ Oil leakage by pipe damage	▲ Repair or replace ▲ Repair or replace ▲ Repair ▲ Repair or replace
	Hard to operate the steering wheel.	▲ Steering unit - Steering unit spline and column spline does not aligned - Spool and sleeve damaged by foreign material - Excessive tightening torque of end cap bolt ▲ Pump - Low speed - Wearing, 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 ▲ Bleed air

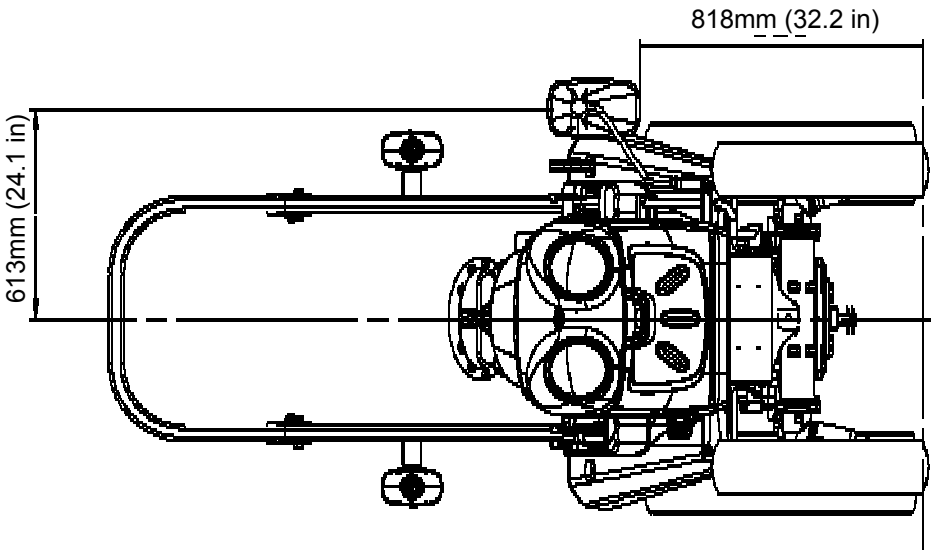
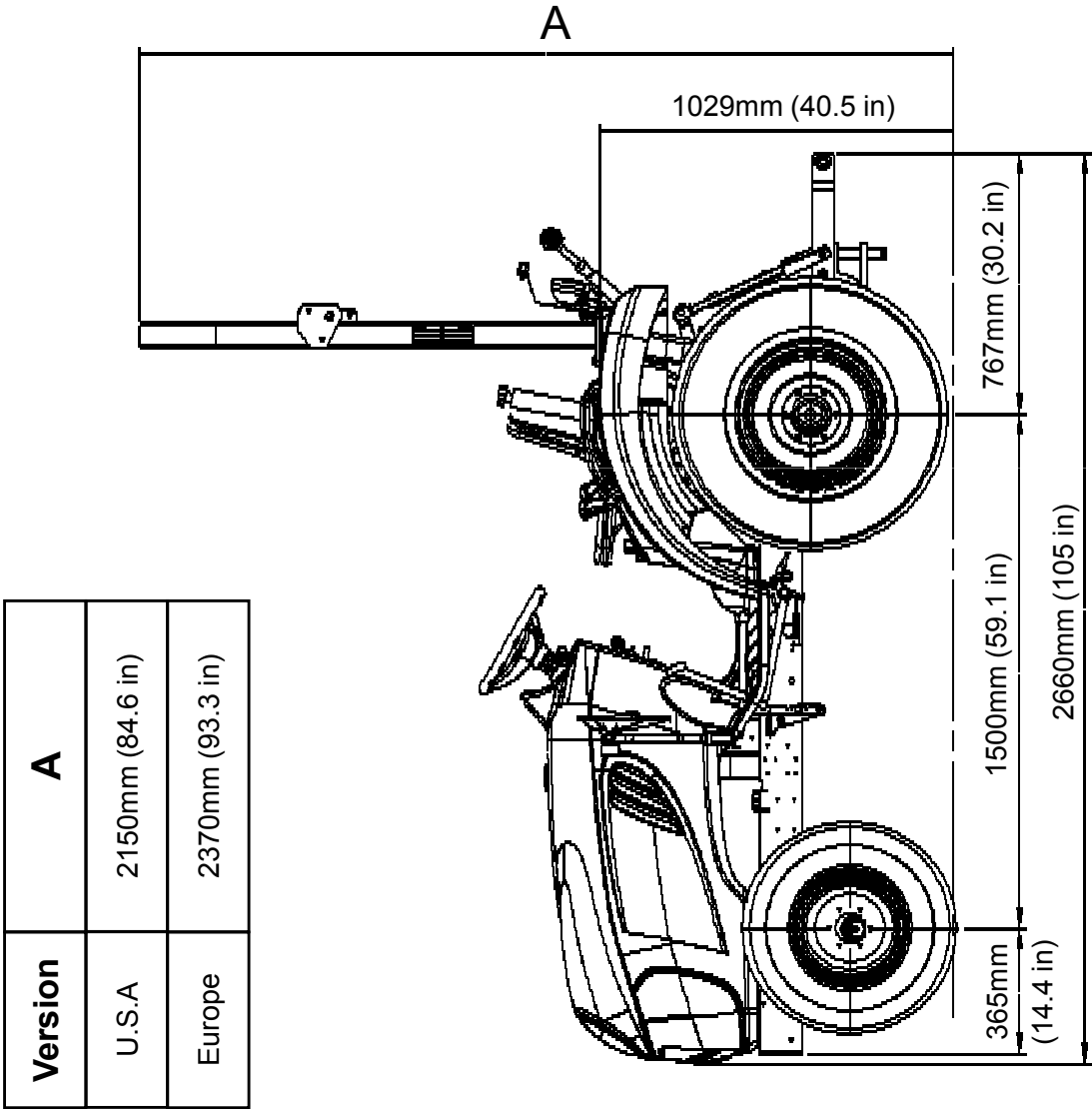
System	Faults	Possible causes	Solutions
HST	When operating HST pedal, tractor dose not start.	▲ Low pressure relief set is too low ▲ High pressure relief set is too low ▲ HST charger valve fault ▲ Filter clogged ▲ Pump worn or part damaged ▲ HST moving part worn or damaged	▲ Check and repair ▲ Check and repair ▲ Replace ▲ Replace filter ▲ Repair or replace ▲ Repair or replace after check the circuit.
	Tractor is still moving despite pedal bring 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

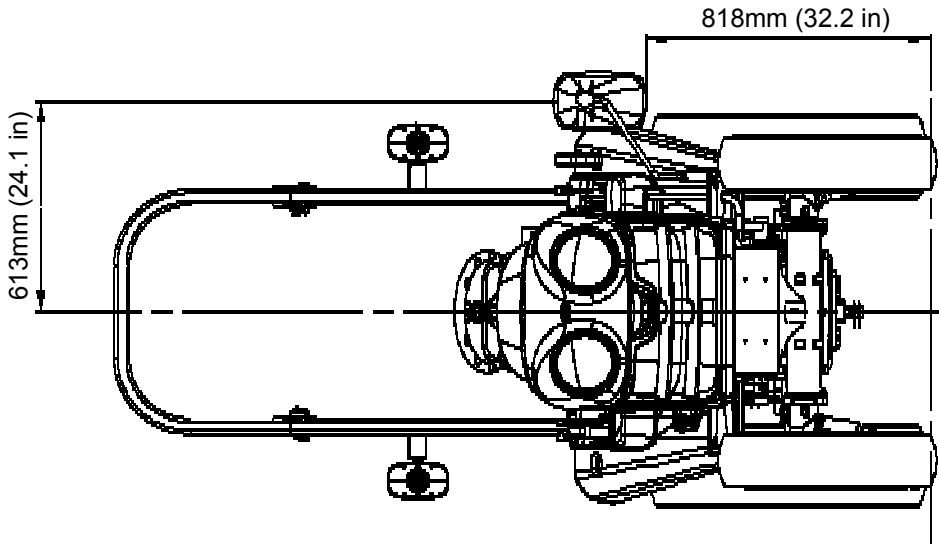
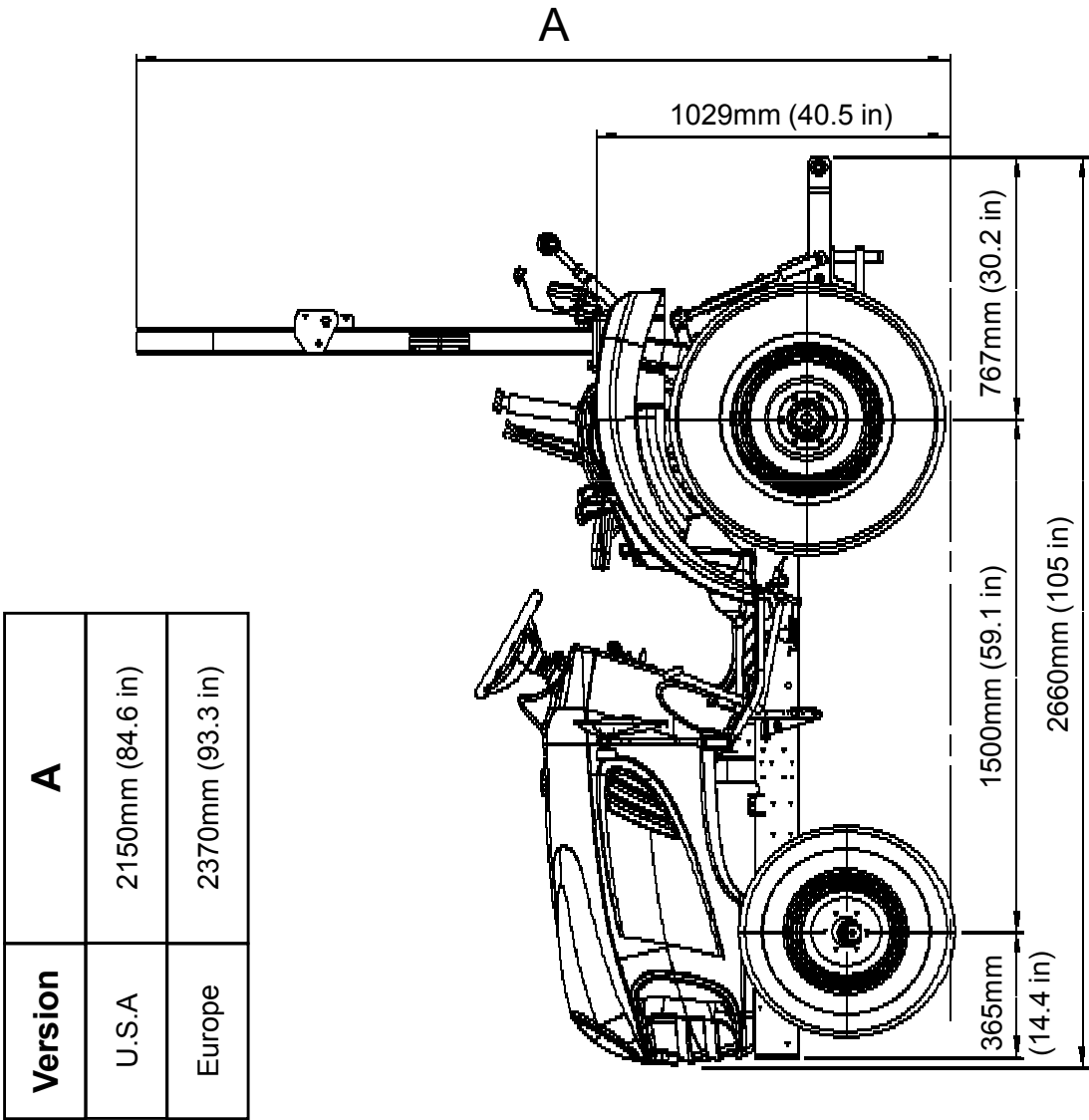
System	Faults	Possible causes	Solutions
Electric System	Battery does not charge	▲ Abnormal wiring ▲ Alternator failure ▲ Lack of fan belt tension or broken ▲ Abnormal battery	▲ Check the tightening state of terminals and ground ▲ Repair or replace ▲ Adjust fan belt tension or replace ▲ Replace
	Headlight is dark.	▲ Battery capacity is low ▲ Bad wiring and contact	▲ Charge or replace ▲ Check and repair
	Headlight is not ON.	▲ Light bulb cut-off ▲ Fuse blown	▲ Replace ▲ Check the cause, and replace it
	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 is not ON.	▲ Relay and timer damaged ▲ Bad connection of preheat plug wiring	▲ Replace ▲ Check and tighten
	Other illuminating light or indicator is not ON.	▲ Fuse blown ▲ Light bulb cut-off	▲ Check the cause, and replace it ▲ Replace

6. Dimension and Specification









		J2020H	J2030H
WEIGHT	Mechanical Type	-	-
	HST Type	720kg (1587 lb)	730kg (1609 lb)
	Bumper	N/A	
	Front weight	N/A	
ENGINE	Model	S3L	S3L2
	Type	Indirect, Swirl Chamber	
	No. of cylinder	3	
	Diameter x stroke	78 x 78.5mm (3.07x3.09 in.)	78 x 92mm (3.07 x 3.62 in)
	Displacement	1,125cc (68.65 in ³)	1,318cc (80.43 in ³)
	Rated speed	2700 rev/min	
	Maximum speed	2900 rev/min	
	Engine rated power	23PS / 2700 rev/min	27PS / 2700 rev/min
FUEL INJECTION PUMP	Type	IN-LINE	
	Speed regulation	Centrifugal	
	Fuel filter	Cartridge type	
	Air cleaner	Dry	
	Injection order	1-3-2	
LUBRICATION SYSTEM	Type	Forced Lubrication System	
	Pump	Gear pump Type	
	Filter	Cartridge type	
COOLING SYSTEM	Pump	Centrifugal Type	
	Temperature control	Thermostat	
CLUTCH	Type (MAIN / PTO)	N/A / Wet Multiple Disk	
	Operation (MAIN / PTO)	N/A / Electro hydraulic	
	Return system (MAIN / PTO)	N/A Coil spring	

			J2020H	J2030H
TRANSMISSION	Forward / Reverse		HST Pedal	
	Gear type	Main gear	HST	
		Range gear	Spur	
		Creeper gear	N/A	
	Gear stage	Main gear	-	
		Range gear	2	
		Creeper gear	N/A	
DIFFERENTIAL LOCK	Gear type		Spiral Bevel	
	Operation		Mechanical Type	
PTO	Type		Independent rear PTO / MID PTO	
	No. of speed		1	
	PTO / Engine		540 rev/min / 2603 rev/min (Rear) 2000 rev/min / 2660 rev/min (MID)	
HYDRAULIC LIFT	3 Point linkage		CAT1	
	Draft load detection		N/A	
	Lowering speed control and cylinder fixing device		Lock Valve	
	Pump		Gear Type	
	Rated flow		16LPM (4.2 GPM)	
	System pressure		14.7 MPa (2132 psi)	
	Lift capacity	Lower link end	650 kgf (1433 lbf)	
		24" behind lift point	480 kgf (1058 lbf)	
REMOTE CONTROL	No. of spool		1 (option)	
	Valve operation mode		Double-acting	
	No. of Quick coupler		2 (option)	
	Aux. Valve for front loader		N/A	

		J2020H	J2030H
STEERING SYSTEM	Wheel position	Center	
	Type	Hydraulic	
	Min. turning radius (w/brake)	2.5 m (8.2 ft)	
	Max. steering angle	47° / 41°	
	No. of steering turns	3 turns from stop to stop	
	Oil	Transmission Oil	
ALTERNATOR	Rated output	12V-50A	
	Voltage control	Built-in (IC-type)	
BATTERY	Voltage	12V	
	Capacity	36AH	
START MOTOR	Output power	12-2.0KW	
	Operation	Solenoid Type	
LIGHTS	Headlights (Upper / Lower)	12V 60W / 55W	
	Turn signal lights Sid lights (front)	12V 5W	
	Turn signal lights (rear)	12V 21W	
	Stop light / Taillight (rear)	12V 21W	
	Work light	12V 23W	
OTHERS	Instrument lights	LED	
	Indoor light (CAB)	N/A	
	Instrument indicator light	LED	
	Cold start aid	Glow Plug	

			J2020H	J2030H
OTHERS	Instrument lights		LED	
	Indoor light (CAB)		N/A	
	Instrument indicator light		LED	
	Cold start aid		Glow Plug	
STD. AGR. TIRE	Front		6-12 (4PR)	6-12 (4PR)
	Rear		9.5-16 (6PR)	9.5-16 (6PR)
WHEEL TRACK ADJUSTMENT	Front	Stage	N/A	
		Range	N/A	
	Rear	Stage	N/A	
		Range	N/A	

** These specifications are only general product information and can be changed to improve the product qualification without any prior notification **

Lubricants and Capacity

Lubricants	Capacity	International standard	Recommended products
Engine coolant (Radiator)	3.8L (1.00 U.S. gals)	ASTM D5216	Soft water (50%) + Anti-freeze (50%)
Fuel	25L (6.60 U.S. gals)	ASTM D975 No.2	Low sulfuric diesel fuel
Engine oil (crank case)	4.2L (1.10 U.S. gals)	API CF-4 or CG-4 Winter : SAE 10W/30 Summer : SAE 20W/40 Spring/ Fall: SAE 15W/40, SAE 20	GS Caltex RPM Dello 200
Transmission oil (common use for hydraulic lift and steering system)	20L (5.28 U.S. gals)	API GL4 ISO VG 32/46	LSTH400 Manufacturer : S-OIL TOTAL co. Ltd.
Front axle oil	3L (0.79 U.S. gals)	API GL4 SAE 80W	EPK 80W90 Manufacturer : S-OIL TOTAL co. Ltd.
Grease (Front axle holder, 3-point linkage, etc)	Proper amount	NLGI 2	Caltex MAHWAK Multi Purpose or Caltex MAHWAK All Purpose

RECOMMENDED OIL VISCOSITIES

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

In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable ; such as the use of SAE 5W 30 in extreme low temperatures or SAE 50 in extreme high temperatures.

Starting 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	SAE 5W-20 SAE 10W-30 SAE 15W-40										