



LS TRACTOR

LS TRACTOR OPERATOR'S MANUAL

MT2 25s



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OPERATOR'S MANUAL

MT2-SERIES

LS TRACTOR



CALIFORNIA

PROPOSITION 65 WARNING



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

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

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

WASH YOUR HANDS AFTER HANDLING.

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1. General Notices for Safety

1-1. Note to the owner – General information

Operator's manual

Please have all operators read this manual carefully and keep this manual available for ready reference. Read this manual to make sure that you have a complete understanding of how to operate this tractor safely, correctly, and for the most effective performance of the tractor.

NOTE: This operator's manual may be available in other languages; see your authorized local dealer for ordering.

This manual contains important information concerning the adjustment and maintenance of your new equipment.

NOTE: Some images of the tractor in this manual may differ slightly in some detail. Any variations will be similar enough for you to understand the information or instructions.

Throughout this operator's manual, references to the right-hand and left-hand sides of the tractor are determined by facing the forward operating direction of travel.



This is the safety alert symbol. The safety alert symbol alerts you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

 Warning	► Illustrations in this manual may show protective shielding open or removed to better illustrate a particular feature or adjustment. Replace all shields before operating the tractor. Failure to comply could result in death or serious injury.
---	---

◆ 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.



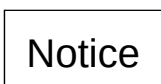
Danger - This indicates a fatal dangerous situation that may cause a serious injury or death if not avoided.



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.

Your authorized local dealer and service

Your authorized local dealer has performed a pre-delivery setup, inspection, and testing to make sure that your tractor operates at its best performance level.

Your authorized local dealer will instruct you in the general operation of your new equipment. Your dealer's staff of factory-trained service technicians will be glad to answer any questions that may arise regarding the operation of your tractor.

Your authorized local dealer carries a complete line of genuine service parts. These parts are manufactured and carefully inspected to ensure high quality and accurate fitting of any necessary replacement parts. Be prepared to give your dealer the model and product identification number of your new equipment when ordering parts. Locate these numbers now and record them below. Refer to the 'General Information' section of this manual for the location of the model and product identification numbers of your tractor.

ATTENTION: *The engine and fuel system on your tractor is designed and built to government emission standards. Tampering by dealer, customers, operators, and end users is strictly prohibited by law. Failure to comply could result in government fines, rework charges, invalid warranty, legal action, and possible confiscation of the tractor until rework to original condition is completed. Engine service and/or repairs must be done by a certified technician only!*

Improvements

We are continually striving to improve its products. We reserve the right to make improvements or changes when improvements or changes become practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

(1) Before using the tractor



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

◆ General information for intended use

- Your tractor is designed and manufactured to pull, to carry, to supply the power a variety of mounted or towed equipment **for agriculture**. Do not use the product for other purposes than intended by the manufacturer and outlined in this manual. Do not use this tractor for light/heavy forestry applications.
- Do not use the product beyond its **limits of terrain gradient** and stability than outlined in this manual. Using the tractor beyond these limits may cause a overturning accident.
- Do not use the tractor on higher speeds than allowed by the load of the tractor and road condition. Always choose **a suitable driving speed** to maintain the stability of the tractor.
- Do not use the tractor **near or on soft verges** of canals and brooks or banks and verges that are undermined by rodents. The tractor may sink sideways and roll-over.
- Do not use the tractor on brittle bridge heads and poor bridge floors. These constructions may collapse and cause overturning of the tractor. **Always check out the condition and carrying capacity of bridges and ramps** prior to engage.
- **Do not use the tractor without wearing the seat belt and Roll-Over Protective Structure (ROPS)** during operations where roll-over or tip-over hazards exist. The ROPS will only be fully effective when the driver remains attached to his/her seat.
- Do not use equipment mounted on the tractor which is not **correctly matching and firmly fixed**. Such equipment may increase the risk for roll-over and hit the tractor when coming loose.
- Do not use the tractor in combination with equipment arbitrary, without **having consulted the specific operator's manual provided with the equipment**. This manual alone cannot provide you with all the information about safety operation of the combination.
- Do not use the tractor beyond its **limits of dynamic stability**. High speed, abrupt maneuvers, and fast and short cornering will increase the risk of roll-over.
- Do not use the tractor for **overloaded pulling work**, in cases where you don't know if the load will yield, for instance when pulling stumps. The tractor may flip over when the stump is not yielding.
- Be extremely cautious when working with the tractor **on forage silos without lateral concrete walls**. A wide track setting may improve the lateral stability of the tractor.
- Be cautious that the **center of gravity of the tractor may increase** when the front-end loader is loaded or the three-point linkage are raised. In these conditions, the tractor may roll-over earlier than expected.
- **Do not step down from the tractor without shutting down the PTO, shifting the transmission to neutral and applying the parking brake.**

- **Never remove or modify or change** the driver's protection device or safety device arbitrary.
Any unauthorized modifications made to this tractor can have serious consequences. Consult an authorized dealer on changes, additions, or modifications that may be required for this tractor. Do not make any unauthorized modifications.
- You must take the necessary precautions to always be **aware of the possible presence of bystanders**, certainly when maneuvering in confined areas. Keep people away from the tractor during work. Pay the necessary attention while operating next to public roads or footpaths. Thrown objects can get projected outside the field and hit unprotected people like bikers or pedestrians. Wait until it is clear of bystanders.
- Do not violate the **local traffic rules** related to public roads and highways.
- **Do not allow riders** on the tractor; do not allow people standing on the access way or step to the cab when the tractor is moving. Your view to the left will be obstructed and a rider risks to fall from the tractor during unforeseen or abrupt movements.
- **This tractor has only one operator station** and is a one man operated vehicle. Other people on or around the tractor during normal operation are not allowed.
- Always stay clear from implements operating area and especially **do not stand between tractor and trailed vehicle either three-point linkage when operating lift controls**; ensure no bystanders are near these operating areas.
- This tractor may be equipped with a number of sensors to control safety functions. **Do not attempt to bypass any function** on the tractor. You will be exposed to serious hazards, and moreover, the behavior of the tractor may become unpredictable.
- The manufacturer will not be responsible for the damage or safety problems caused by maintenance or repair with non-genuine parts. It must be requested to **use the genuine parts**.
- When cleaning the tractor by using high pressurized water, **do not inject water directly to the electronic parts, wiring, air intake pipe, hot engine or muffler** inside the bonnet.
- Maintenance and repair of the tractor is performed by **skilled technical experts with the proper tools** authorized by the manufacturer.
- Pay attention to **overhead power lines and hanging obstacles**. High voltage lines may require significant clearance for safety.
- Do not operate the tractor during an **electrical storm. (Lightening strikes)**
- For damage or accidents caused by misuse or operation in violation of these rules, the manufacturer and its distributors **will not have any responsibility and warranty**.
- **Keep this operator's manual** for future reference at hand (on the tractor).

(2) Manual scope and required training level

Introduction to this manual

This manual gives information about the use of your tractor as intended and under the conditions foreseen by manufacturer during normal operation, routine service, and maintenance.

This manual does not contain all the information that relates to periodic service, conversions, and repairs that only trained service personnel can perform. Some of these activities may require appropriate facilities, technical skills, and/or tools that manufacturer does not supply with the tractor.

The manual contains the chapters as shown on the Contents pages.

Normal operation

Normal operation consists of the use of this tractor for the purpose manufacturer intends by an operator that:

- Is familiar with the tractor and any mounted equipment or towed equipment.
- Complies with the information on operation and safe practices as specified by manufacturer in this manual and by the signs on the tractor.

Normal operation includes:

- Preparation and storage of the tractor.
- Addition and removal of ballast.
- Connection and disconnection of mounted equipment and/or towed equipment.
- Adjustment and configuration of the tractor and equipment for the specific conditions of the job site, field, and/or crop.
- Movement of components into and out of working positions.

Routine service and maintenance

Routine service and maintenance consists of the daily activities necessary to maintain the proper tractor function. The operator must:

- Be familiar with the tractor characteristics.
- Comply with the information on routine service and safe practices as specified by manufacturer in this manual and by the signs on the tractor.

Routine service can include:

- Fueling
- Cleaning
- Washing
- Topping up fluid levels
- Greasing
- Replacing consumable items such as light bulbs

Periodic service, conversions, and repairs

Periodic service consists of activities that are necessary to maintain the expected life of your tractor. These activities have defined intervals.

Trained service personnel familiar with the tractor characteristics must perform these activities at the defined intervals. Trained service personnel must comply with the information on periodic service and safe practices as partly specified by manufacturer in this manual and/or other company literature.

Periodic service includes:

- Oil change service for the engine, hydraulic circuits, or transmission.
- Periodic exchange of other substances or components as required.

Conversion activities rebuild your tractor in a configuration that is appropriate for a specific job site, crop, and/or soil conditions (e.g., installation of dual wheels). Conversion activities must be done:

- By trained service personnel familiar with the tractor characteristics.
- By trained service personnel that comply with the information on conversion as partly specified by manufacturer in this manual, assembly instructions, and/or other company literature.

Repair activities restore proper function to your tractor after a failure or degradation of performance. Dismantling activities occur during the scrapping and/or dismantling of the tractor.

Trained service personnel familiar with the tractor characteristics must perform these activities. Trained service personnel must comply with the information for repair as specified by manufacturer in the service manual.

Before you operate

Read this manual before you start the engine or operate this tractor. Contact your authorized local dealer if:

- You do not understand any information in this manual.
- You need more information.
- You need assistance.

All persons training to operate, or who will operate this tractor should be old enough to possess a valid local vehicle operating permit (or meet other applicable local age requirements). These persons must demonstrate the ability to operate and service the tractor in a correct and safe manner.

(3) Metric and Imperial units abbreviations

	Metric unit		Imperial unit	
	Name	Symbol	Name	Symbol
Area	Square meter	m ²	Square foot	ft ²
	Square centimeter	cm ²	Square inch	in ²
	Square millimeter	mm ²	Square inch	in ²
Electricity	ampere	A	ampere	A
	volt	V	volt	V
Force	kilonewton	kN	pound	lb
	newton	N	pound	lb
Frequency	megahertz	MHz	megahertz	MHz
	Kilohertz	KHz	Kilohertz	KHz
	hertz	Hz	hertz	Hz
Rotational frequency	Revolution per minute	rpm	Revolution per minute	rpm
Length	kilometer	Km	mile	mi
	meter	m	foot	ft
	centimeter	cm	inch	in
	millimeter	mm	inch	in
Mass	kilogram	kg	pound	lb
	gram	g	ounce	oz
Power	kilowatt	kW	horsepower	Hp or ps
	watt	W	Btu per hour Btu per minute	Btu/hr Btu/min
Pressure or stress (Force per area)	kilopascal	kPa	Pound per square inch	psi
	megapascal	MPa	Pound per square inch	psi
	bar	bar	Pound per square inch	psi
	Kilogram per square centimeter	Kg/cm ²	Pound per square inch	psi
Temperature	Degrees Celsius	°C	Degrees Fahrenheit	°F

	Metric unit		Imperial unit	
	Name	Symbol	Name	Symbol
Time	hour	hr	hour	hr
	minute	min	minute	min
	second	s	second	s
Torque	Newton meter	N.m	Pound foot	lb.ft
	Kilogram meter	Kg.m	Pound foot	lb.ft
Velocity	kilometer per hour	km/h	mile per hour	mph
	meter per second	m/s	foot per second	ft/s
Volume	Cubic meter	m ³	Cubic yard	yd ³
	liter	L	Cubic inch	in ³
	liter	L	US gallon	US gal
	cc	cc	Cubic inch	in ³
Volume per time (flow rate)	Liter per minute	L/min	US gallon per minute	US gal/min
Sound pressure level	decibel	dB	decibel	dB

Glossary

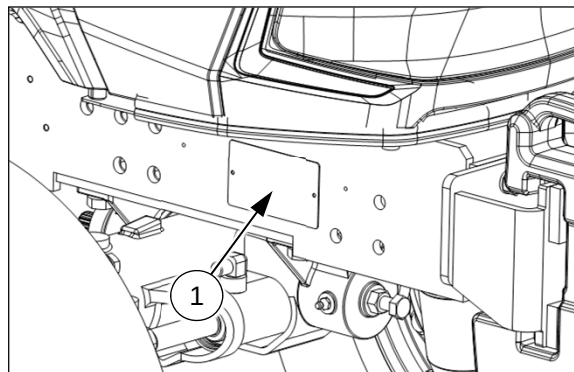
Acronym	Definition
DEF	Diesel Exhaust Fluid
DPF	Diesel Particle Filter
ISO	International Organization for Standardization
MSDS	Material Safety Data Sheet
NOx	Nitrogen Oxide
PPE	Personal Protective Equipment
SCR	Selective Catalytic Reduction
ULSD	Ultra Low Sulfur Diesel
%	Percent
<	Less than
>	Greater than

(4) Product Identification Number (PIN)

The tractor and major components are identified with Product Identification Number (PIN) plates. You should supply the PIN plate data to your authorized local dealer when requesting parts or service, and also to identify the tractor in case of theft.

① Product Identification Number (PIN) plate

- The tractor PIN Plate① is located on the right-hand side of the frame.

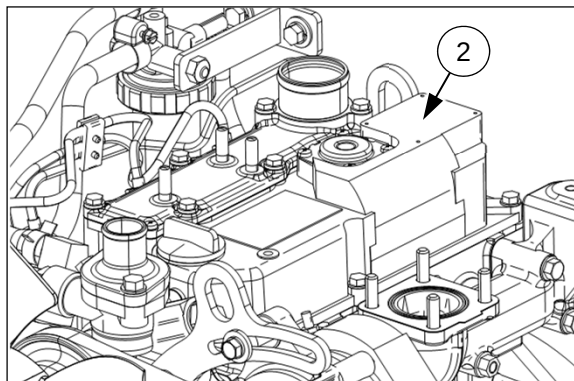


LS LS Mtron Ltd.	
TRACTOR MODEL	
CHASSIS NO.	
ENGINE NO.	
TRANSMISSION NO.	
778, Yongam-ri, Bongdong-eup, Wanju-gun, Jeonbuk 565-904, KOREA / Tel (+82-63) 279-5114	

40202834

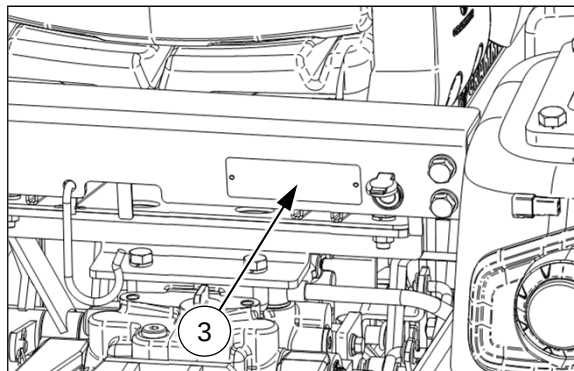
② Engine Product Identification Number (PIN) plate

- The engine PIN plate② is located on the rearward end of the engine valve cover.



③ Roll Over Protective Structure (ROPS) Product Identification Number (PIN)

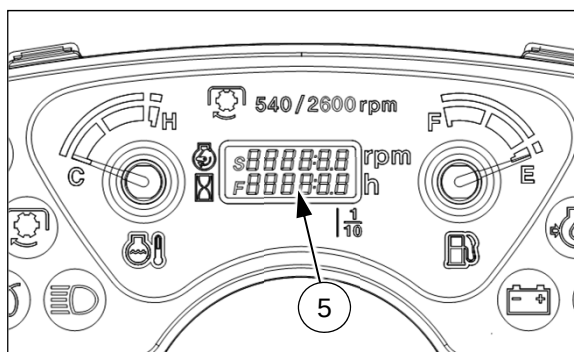
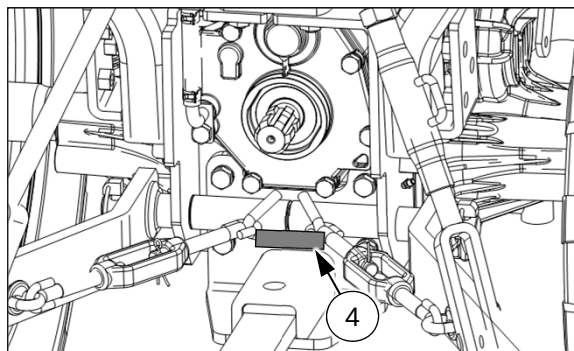
- The Roll Over Protective Structure (ROPS) PIN plate③ is located on the ROPS cross bracket.
- Location of ROPS PIN plate③
- on the right-hand side of the ROPS frame.



PROTECTION STRUCTURE	Roll Bar	TYPE	MT2_RF
S/N			
TRACTOR TYPE	MT2-SERIES	ASAE	
TRACTOR/ROPS MAKE	LS Mtron Ltd. Made In Korea	S478.1 FEB 2012	

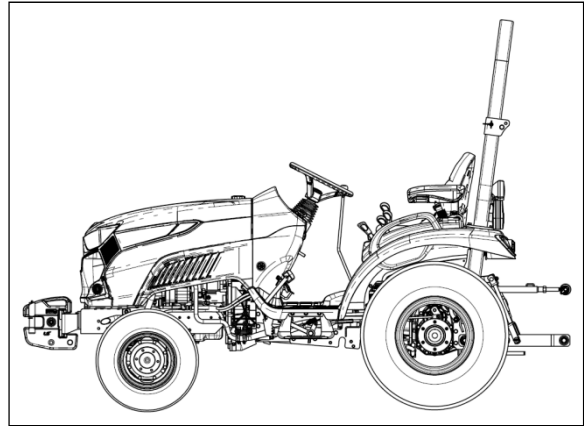
④ TM number and Running hours

- In case of requesting service or parts from your dealer, dealer may need TM number④ and/or running hours⑤ displayed on the instrument panel.
- The TM number④ is marked on the rear transmission case in front of the drawbar.



(5) Operator's manual storage

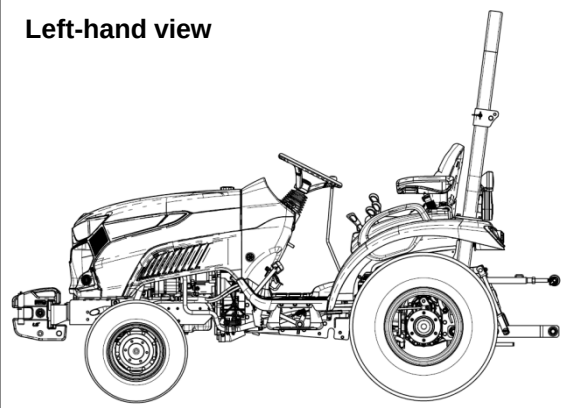
The operator's manual must be stored in a secure place prior to operation and it must be kept available for use by all operators.



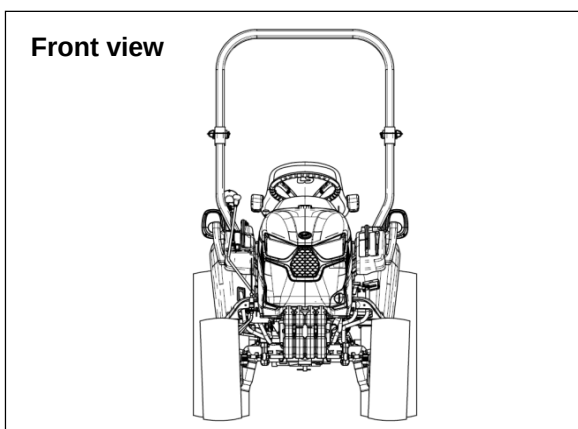
(6) Tractor orientation

NOTE: On this equipment, left-hand and right-hand are determined by standing behind the unit, looking in the direction of travel.

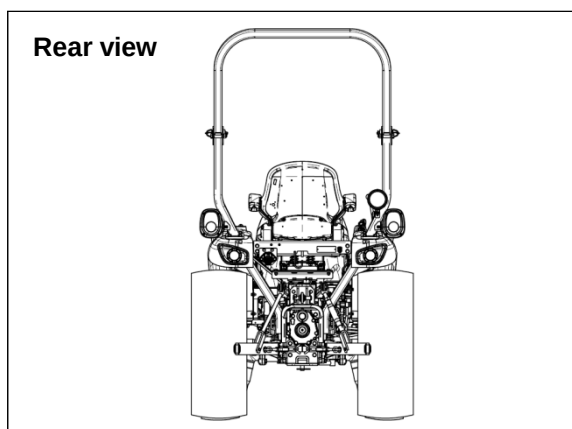
Left-hand view



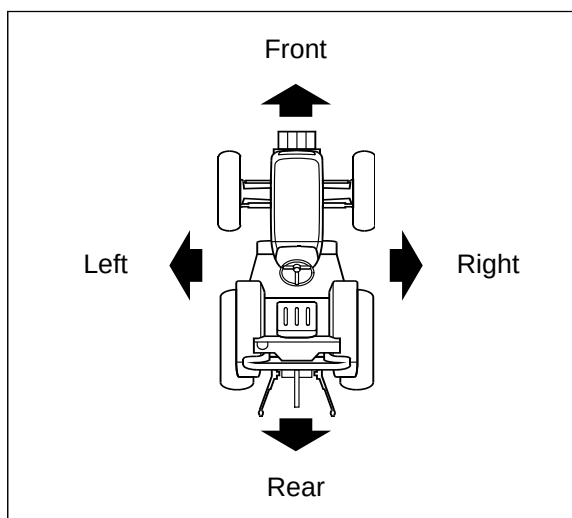
Front view



Rear view



When reading this Operator's Manual, refer to the right figure for the discrimination of the directions.



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

(1) Notices before using the tractor

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

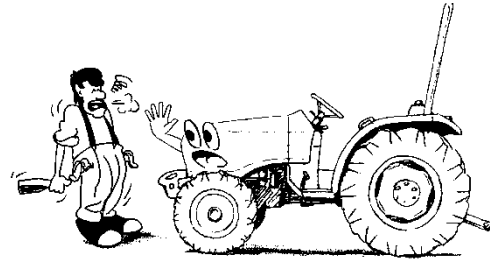


Read Operator's Manual carefully.

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

- **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 the chapter 1-2-(14). "Safety Decals" in this manual.)

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



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



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

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

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



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

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



Warning

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

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

** Periodic Lubrication and Maintenance*

Fuel, Oil, Filter, Air cleaner, Battery, Belt, Cable, Grease, Pedals such as clutch(Mechanical models only) 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 the tractor. Contact your authorized local dealer. If not, it may cause a failure, reduction of product life or serious injury.
- **Restrict Maintenance** : If repairing or changing some components or settings arbitrary, the performance of the tractor can NOT be guaranteed, and may void the warranty. And also, maintenance of the heavy weighted parts without special tools may cause serious injury. These works have to be treated by well-educated and skilled service experts.
If required to check or repair the tractor due to such a trouble, or having any question about your tractor, contact your authorized local dealer.

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

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

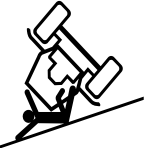
- **Lamps** : Do not modify the lamps or change the bulb capacity arbitrarily.



Warning

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

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

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

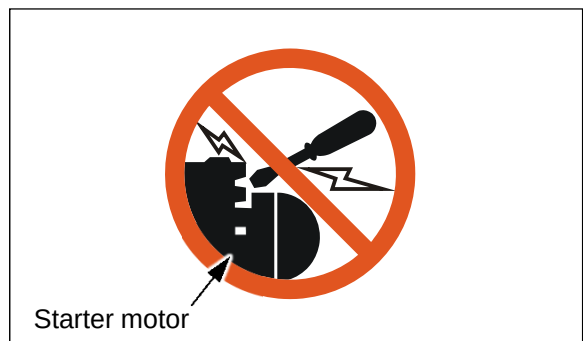
- **Level of protection of the FOPS (Falling Objects Protective Structure):** This tractor does **NOT** provide any protection against falling objects according to OECD code 10 standard. It is recommended to use a certified FOPS structure when working with front-end loaders.
- **Level of protection against hazardous substances:** This tractor does **NOT** provide any protection against hazardous substances. Do not use the tractor with crop sprayers in hazardous area. When using an agricultural tractor with crop sprayers, the following hazards exist:
 - Risks due to spraying hazardous substances with a tractor (fitted with a cab or not).
 - Risks related to entering or exiting the cab(if fitted) during the application of hazardous substances.
 - Risks related to the possible contamination of the operating environment.
 - Risks related to cleaning the cab and maintaining the air filters (if fitted).

For protection against hazardous dust, aerosols, and vapors, see the instructions provided by the chemical agent supplier, the sprayer manufacturer, and the basic rules contained in this manual. Always use the Personal Protective Equipment (PPE) and any other special devices as instructed by the chemical supplier's instructions during spraying operations.
- **Level of protection of the OPS (Operators Protection Structure) :** This tractor does **NOT** provide any protection against
 - falling objects, such as branches, logs or tree limbs, low hanging wires in the forest, orchard or construction area.
 - toppling trees, primarily in case a rear-mounted tree grab-crane is mounted at the rear of the tractor.
 - penetrating objects in the operator's enclosure, primarily in case a winch is mounted at the rear of the tractor.
 - steep slope or rough terrain working conditions.
 - potential risks by using any optional equipment that might be available to deal with those hazards.

Your tractor is **NOT EQUIPPED FOR FORESTRY APPLICATIONS. NEVER enter or operate these hazardous area without certified Operator Protective Structure installed.**

(2) Notices when starting Engine

- Check each part with reference of “5. Lubrication and Maintenance” in this manual. If necessary, repair or replace it immediately. **Especially, check if safety protection structures or covers are attached originally and the bolts and nuts are tightened well.**
- Before starting, **check again if there are other workers or children around the tractor and implements and keep a safe distance.**
- Start engine and operate the tractor **after sitting on the driver's seat** with a securely fastened seat belt.
- Place the shuttle lever, transmission gear levers in NEUTRAL and especially check if parking brake is applied.
- Lower the implements on the ground.
- Ensure that rear view mirrors and the other mirrors (if fitted) are adjusted correctly, and check the operation of the headlights and other lights.
- For driver's safety, to prevent an unintentional start, movement and operation, several and various start-safety interlock devices may be equipped on your tractor. And, these installation may need to do correct operation and follow the procedure strictly. Read carefully chapter 4-2, “Engine start and stop” in this manual before trying to start engine.
- Do not short across the starter motor terminals to start engine. It may cause a sudden start and serious injury or death.

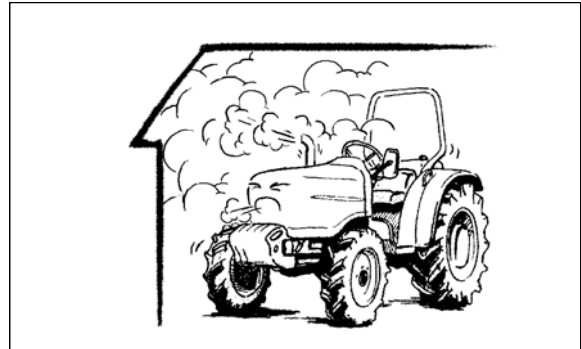


- Do not start the engine in a closed area. The poisonous exhaust gas can cause fatal damage to the driver or persons around.

(3) Notices while operating/using the tractor

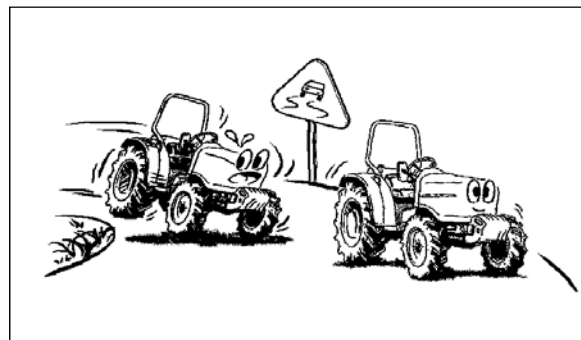
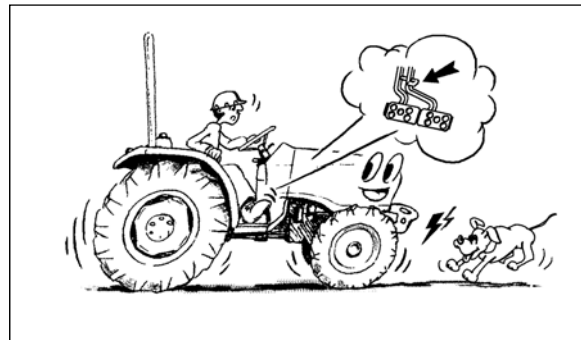
● Ventilation

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

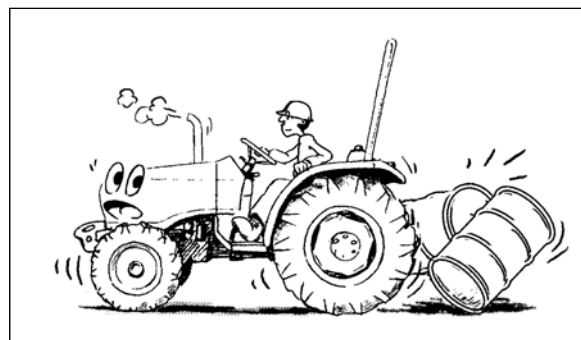


- **Noise and Vibration** : When working between buildings or in confined spaces, the sound pressure level can be increased. Wear suitable ear protectors in high noise level conditions. When working with equipment in the field, vibration intensity from equipment may be increased. To reduce the harm to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

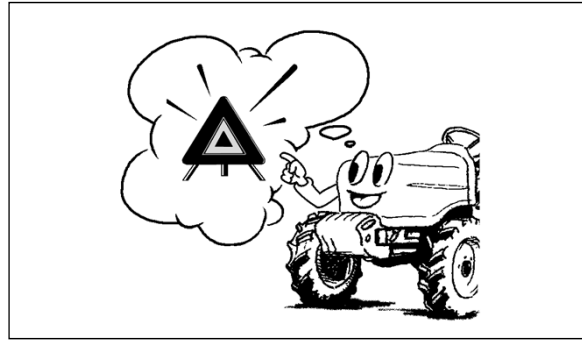
- Connect left and right brake pedal(s) while driving on the road. (if fitted)
- DO NOT use differential lock device while driving on the road or turning in the field.
- DO NOT ride your foot on the brake pedal(s) or clutch pedal.
- Do not jump up/down while tractor is moving. When getting on/off the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



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

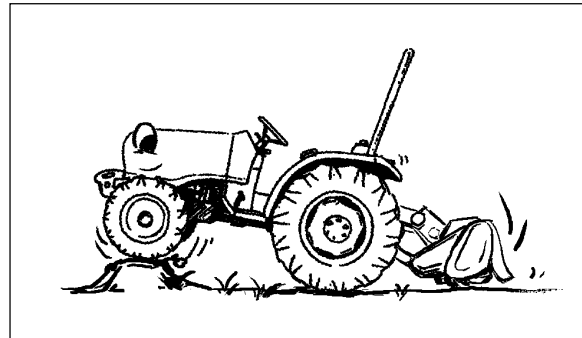


- Obey the traffic rules while driving on public roads. Do not exceed the local legal speed limit. Use a beacon or slow moving vehicle (SMV) to indicate that the vehicle is slow moving.
- If you can not drive the tractor due to a failure, move the tractor to a safe place and install troubled vehicle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

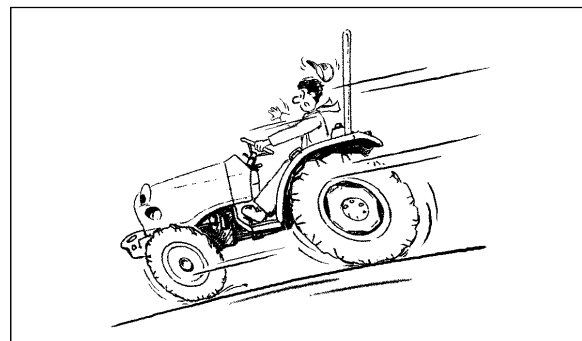


- Do not overuse the fuel, oil, etc and pay attention not to contact the skin directly. Generally, these materials contain harmful materials to the human body. When you work in a area where hazardous chemicals are sprayed, check the cabin filter (if fitted) and replace the filter with suitable one for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

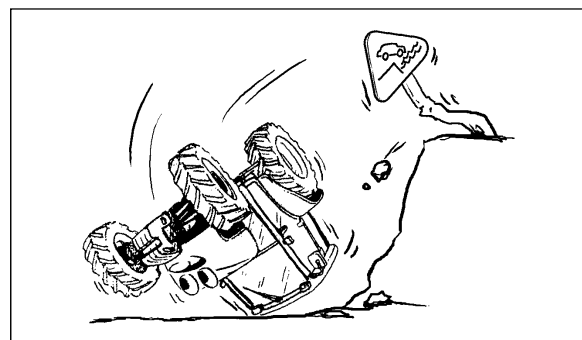
- When connecting the implements to the front/rear of the tractor, install the proper additional weights in the rear/front of the tractor to keep the balance of the tractor.
- On a downhill, operate the throttle pedal and brake pedal slowly and DO NOT drive while the transmission gear is in NEUTRAL.
- *When working with a front/rear implement, be careful not to touch the overhead power lines and hanging obstacles.*



- *Do not operate the tractor during an electrical storm. (Lightening strikes)*

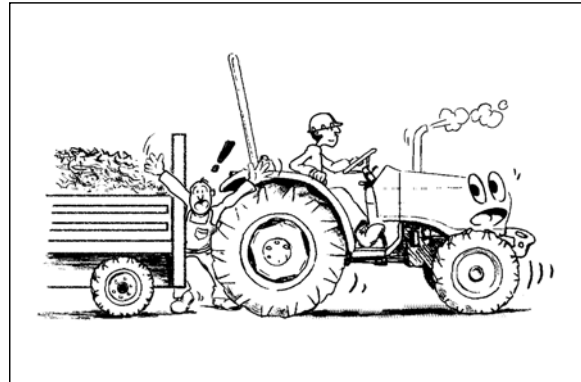


- To climb a steep slope, drive tractor slowly in reverse up the slope rather than forward. It is much safer.
- When turning tractor on a slope, the tractor can be overturned easily. Pay attention to the steering operation.
- When working at the edge of steep slope, especially, when using heavy attached implements, take special care about a turn-over.
- When working, wear the protection equipment and tighten the seat belt.
- If the authorized passenger seat are not installed, keep riders off.



(4) Notices when connecting Implement

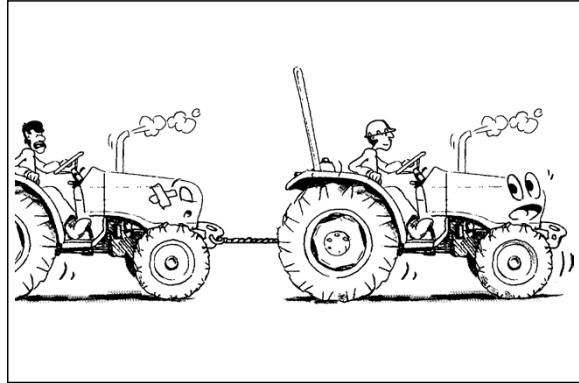
- Attach or detach the implement on wide and level ground.
- Do not use the tractor in combination with equipment arbitrary, without having consulted the specific operator's manual provided with the equipment.
- You have to stay clear from the three-point linkage when controlling it. Do not stay between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



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

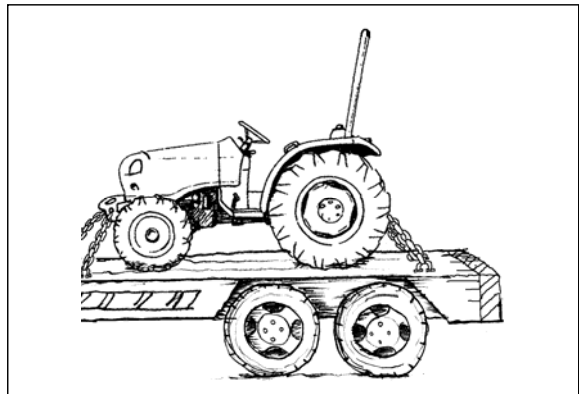
(5) Notices when towing the tractor

- If your tractor needs to be towed for a short distance, use the hitch (or drawbar) or front towing hook. Do not connect to other structures such as rear axle, ROPS, front axle, steering components for towing.
- Your tractor can be steered for a short distance without engine running, but it will be hard to turn the steering wheel. If possible, run the engine for steering and lubrication.
- When being towed, disengage the 4WD, differential lock, parking brake and place all gear shift levers in neutral position.
- Check the horizontal and vertical permissible load of the hitch (or drawbar) before towing. The load is different with trailer brake, and stopping distance increases with speed and weight of towed loads and slope. Make sure you consider the total weight of the equipment and its load. (See chapter 4-5-(3). "Hitch and Drawbar" in this manual.)
- Drive slowly when towing extremely heavy loads.
- Do not tow trailers that are not fitted with an independent braking system.



(6) Notices when transporting the tractor

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



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

- Check and maintenance must be performed after **stopping the engine** and **cooling down the engine sufficiently**.

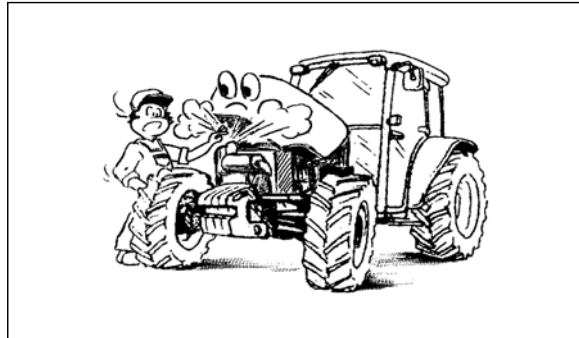
- DO NOT pour water into the radiator or engine when engine is hot. The engine or radiator may crack.



Warning



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



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



Warning



► Before removing hydraulic pipes or hoses and other parts, make sure to check that hydraulic pressure is relieved completely. The leaks of pressurized oil can cause a fatal physical injury.

► Use proper protection equipment, before servicing hydraulic system.

► Before connecting or disconnecting the hydraulic quick coupler, lower the implements to the ground, and check that hydraulic pressure is relieved.

- **Keep an approved fire extinguisher and First-aid-kit** on your tractor.
- **To prevent an fire or explosion of the battery**, keep any type of flames or sparks away from battery. Do not grind, smoke, or weld near a battery. Do not short circuit the terminals with metal objects. *For further information, see chapter 5-12-(3), "Battery handling and Notices" in this manual.*



Warning



► **Always remove grounded (-) battery clamp first and assemble it last.**

► **Sulfuric acid in battery electrolyte is poisonous.** It is strong enough to burn skin, clothing and can cause blindness if splashed into eyes

► Battery post, terminals and related accessories contain **lead and lead compounds**. **MUST WASH YOUR HANDS AFTER HANDLING.**

- Do not attempt to **remove or unfasten the air conditioning components(if fitted) arbitrary**. There is a possible to be severely frostbitten or injured by escaping refrigerant. Contact your authorized local dealer to work air conditioning systems.
- **Keep the area used for servicing the tractor clean and dry**. Wet or oily floors are slippery. It can be dangerous when working with electrical equipment.
- When lifting heavy parts like engine, axle, tires etc., make sure to **check the lifting facilities have enough strength and capacity**.

- Before servicing the tractor, attach a “**DO NOT OPERATE**” warning tag to the tractor in an area that will be visible.
- Electric sensors, switches, harness, involving engine control unit(if fitted) is very sensitive and delicate. Strictly **prohibit injecting water, mechanical impulse and any kind of welding on engine.**

○	○
DO NOT OPERATE	DO NOT OPERATE
Reason : _____	See other side
Signed by : _____	
Tel : _____	

- *When assembling, operating, or servicing the tractor, wear protective clothing and any Personal Protective Equipment (PPE) necessary for the particular procedure. The necessary PPE may include: - Protective shoes, Eye and/or face protection, Hard hat, Heavy gloves, Filter mask, Hearing protection.*
- *When tractor maintenance requires you to work at heights:*
 - *Correctly use tractor steps, ladders, and/or hand holds.*
 - *Do not stand on tractor areas that are not designed as steps or platforms.*
 - *When necessary, use an appropriate ladder to reach components such as mirrors, rotating beacons, or air filters.*
 - *Never use steps, ladders, and/or hand holds when the tractor is in motion.*
 - *Do not use the tractor as a lift, ladder, or platform for working at heights.*
- *If you do not understand a maintenance procedure, or doubt your ability to perform a maintenance procedure correctly, see your authorized dealer.*

(8) Notices when handling Diesel Fuel

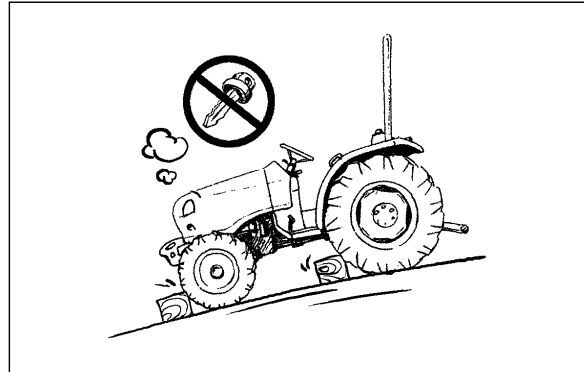
- *Before handling diesel fuel, refer to the chapter 5-1-(3), 5-1-(5) in this manual.*
- *Before handling Bio-diesel, refer to the chapter 5-1-(4) in this manual.*



 Warning	Fire hazard! ► When handling diesel fuel, observe the following precautions: 1. Do not smoke. Keep any type of flame away. 2. Never fill the tank when the engine is running. 3. Wipe up spilled fuel immediately. Always tighten the fuel tank cap securely. Failure to comply could result in death or serious injury.
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(9) Notices when leaving the tractor

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



 Caution	► If it is necessary to park the tractor on a slope, furthermore with loaded trailer, the tractor may roll down even if the parking brake is applied. In this case, additionally apply the lowest transmission gear and apply wheel chocks or blocks to the all tires. - . Mechanical : downhill ⇒ Reverse 1gear / uphill ⇒ Forward 1gear - . HST type : Apply the lowest gear of the range gear lever.
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(10) Notices relating to Toxic substances



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

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

WASH YOUR HANDS AFTER HANDLING.

(11) Tractor stability

 Warning	► Driving hazard! To prevent tractor instability, ALWAYS consider and follow the tractor stability requirements in this manual. Failure to comply could result in death or serious injury.
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The following procedure describes the requirements for tractor stability and how to calculate the required front-mounted and rear-mounted ballast.

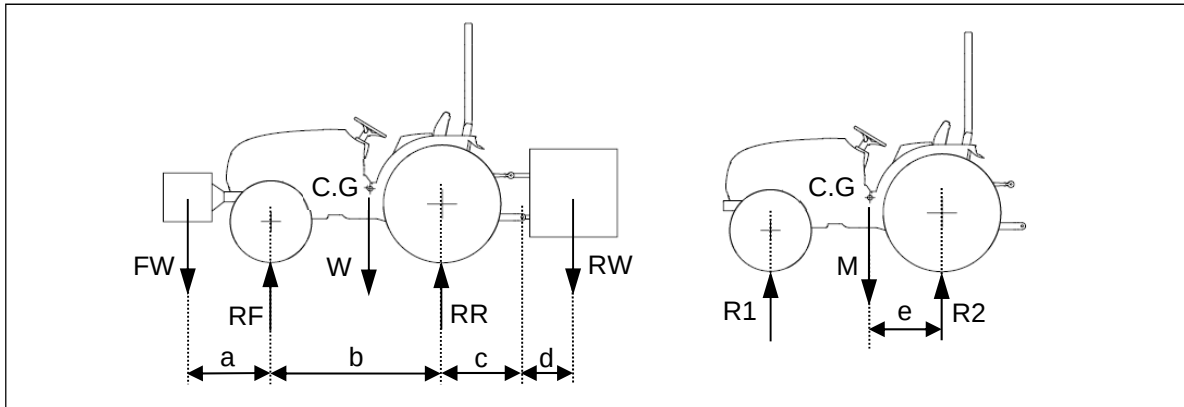
For additional ballast information, also refer to the ballast recommendations in this manual.

For the maximum permitted operating weights, refer to the vehicle weights in this manual.

The following procedure and calculation is based on a tractor on even ground.

 Warning	► Roll-over hazard! ALWAYS be aware of the effect of inclines and steep hills on tractor stability. Operating, handling, and braking performance may be affected. Adjust ballast and driving speed accordingly to ensure stable and accurate steering, and to ensure the required brake performance in critical situations. Failure to comply could result in death or serious injury.
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Necessary data to evaluate stability



		To get this value refer to:
M	Mass of the unladen tractor = Tractor with standard equipment, minimum fuel, no weights or liquid ballast, no operator, and single wheel equipment	See chapter 6 in this manual.
R1	Front axle load of unladen tractor	See chapter 6
R2	Rear axle load of unladen tractor	See chapter 6
a	Distance, Center of gravity of front load to front axle center	Manual of the equipment or your measurement
b	Wheelbase	See chapter 6
c	Distance, rear axle center to lower hitch point of three-point linkage	See chapter 6 or your measurement
d	Distance, Center of gravity of rear load to lower hitch point of three-point linkage	Manual of the equipment or your measurement
e	Distance, rear axle center to center of gravity of mass of the unladen tractor (M)	Calculate using formula on the following pages
FW	Mass of front-mounted equipment or front-mounted ballast	Manual of the equipment or your measurement
RW	Mass of rear-mounted equipment or rear-mounted ballast	Manual of the equipment or to measurement
Wmax	Maximum permissible mass of the laden tractor	See chapter 4-5-(4)
RFmax	Maximum permissible front axle load	See chapter 4-5-(4)
RRmax	Maximum permissible rear axle load	See chapter 4-5-(4)

1. Equipment weight together with its filling must be added to laden values (seed drills, fertilizer spreaders, etc.).
2. Ballasting weight in the center of the front or rear tires, either solid or liquid, must be added to R1, R2, and M.
3. In case of an unbalanced trailer, the value c is the distance between the center of the rear axle and the hitching point, the value d is 0, and RW is the vertical load of the trailer on the hitch.

Constant parameters

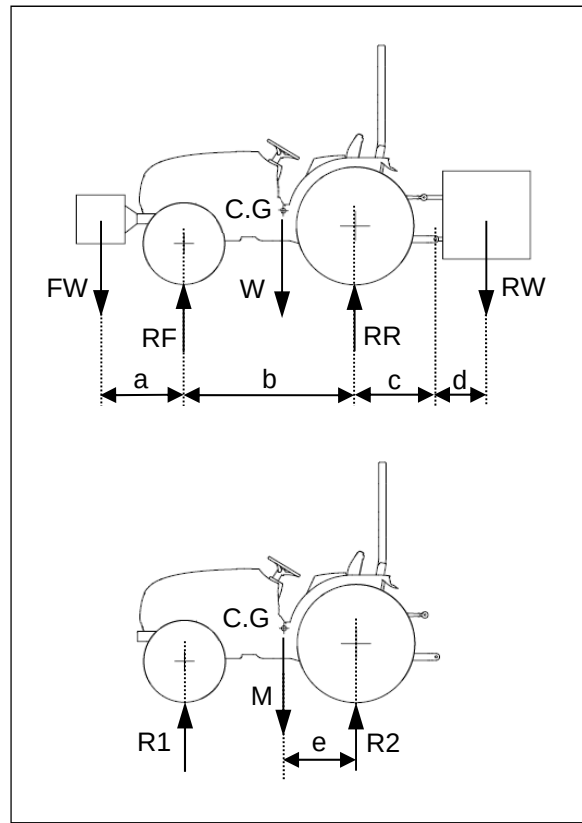
0.2	Minimum ratio: actual axle load of laden front axle/ mass of the unladen tractor	Legal requirement
0.45	Minimum ratio: actual axle load of laden rear axle/ mass of the unladen tractor	Legal requirement

Required front ballast

To calculate	
FWr	Ballast required at the front when carrying a load RW at the rear
CALCULATION OF FWr	
$M * e = R1 * b$	
$e = (R1 * b) / M$	
$RW * (c + d) - (M * e) + (RF * b) = FWr * (a + b)$	
$RF > 0.2 * M$ RF value must be higher than $0.2 * M$	
$FWr > [RW * (c + d - (R1 * b) + (0.2 * M * b))] / (a + b)$	

Required rear ballast

To calculate	
RWr	Ballast required at the rear when carrying a load FW at the front
CALCULATION OF RWr	
$M * b (b - e) = R2 * b$	
$FW * a - M * (b - e) + (RR * b) = RWr * (b + c + d)$	
$RW * (c + d) - (M * e) + (RF * b) = FWr * (a + b)$	
$RR > 0.45 * M$ RR value must be higher than $0.45 * M$	
$RWr > [(FW * a) - (R2 * b) + (0.45 * M * b)] / (b + c + d)$	



Axle load limits

To calculate:	
RF	$RF < RF_{max}$
RR	$RR < RR_{max}$
W	$W < W_{max}$
CALCULATION OF RF	
$(RF * B) - FW * (A + B) - (M * E) + RW * (C + D)$	
$RF = [FW * (A + B) + (R1 * B) - RW * (C + D)] / B < RF_{max}$	
CALCULATION OF W	
$W = FW + M + RW < W_{max}$	
CALCULATION OF RR	
$R2T = W - RF < RR_{max}$	

(12) Ecology and the environment

Soil, air and water is 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.

Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation.

Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances.

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 oil, transmission oil, brake oil, and anti-freeze solution) directly, **do not throw the exhausted waste oil to any place.**

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

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

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

5. When you replace the fuel, lubricants oil and coolants, avoid spillage and do not allow to be absorbed into the ground. Do not mix drained brake fluids or fuels with lubricants. They must be collected safely 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. Do not increase the pressure in a pressurized circuit as this may lead to a component failure.

7. Do not open the air-conditioning system yourself. It contains gases that should not be released into the atmosphere. Your authorized local dealer or air-conditioning specialist has a special extractor for this purpose and can recharge the system properly.

8. Repair any leaks or defects in the engine cooling system or hydraulic system immediately.

9. In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. We strongly recommend that you return all used batteries to a authorized local dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.



(13) Symbols

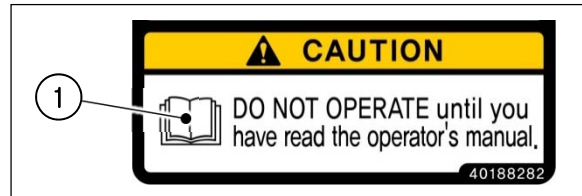
The followings show the symbols and its meaning used for the tractor.

	Refer to Operator's manual.		Gear Neutral		Low speed
	Caution!		Forward/Reverse		High speed
	Battery charging		Forward		Engine speed control (throttle)
	Fuel level		Reverse		Engine speed control (throttle)
	Fuel filter		4WD engage		Turn signal light
	Engine coolant temperature		4WD disengage		Direction indicating light
	Hydraulic oil pressure		Quick turn (Optional)		Light switch
	Engine oil pressure		Cruise drive (Optional)		Side lights
	Engine preheat		Cruise drive release (optional)		Headlights (Low beam)
	Parking brake		Position control (Up)		Headlights (High beam)
	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)		Unlatched brake pedal (optional)

(14) Safety Decals

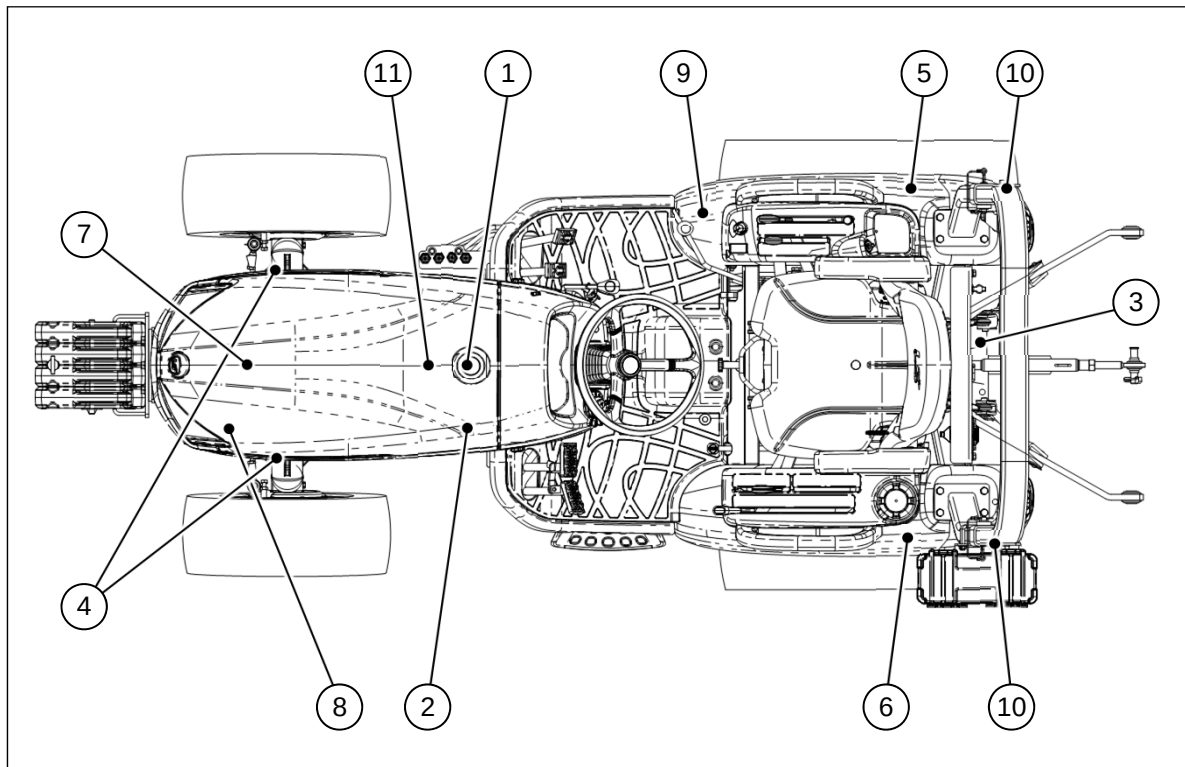
① Handling and Maintenance of Safety Decals

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



 Caution	▶ The instructions described on the safety decals are very important for the safety of the operator and workers around. If ignored, it may cause the death or serious injury. ▶ If the decals are dirty, wash them with soap water and wipe with soft rags. Do not use the thinner, acetone, or other harsh chemicals as it may erase the instructions. ▶ If the decal is detached or damaged, replace it with a new one on original position. ▶ When cleaning the tractor with pressurized water, the decals can be detached. ▶ If a decal is on a part that is replaced, make sure the decal is attached on the new part.
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② Safety Decals and Attaching position



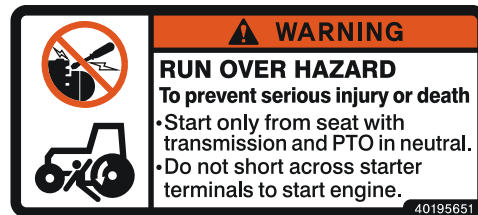
1. Location: On top of the Fuel Cap

- Ultra low sulfur diesel fuel only.
- Do not smoke while refueling and keep any type of flame away.
- Part No. : 40241059



2. Location: On the left-hand side of the engine frame, at the rear of the frame.

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



3. Location: On top of rear PTO guard.

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



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

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



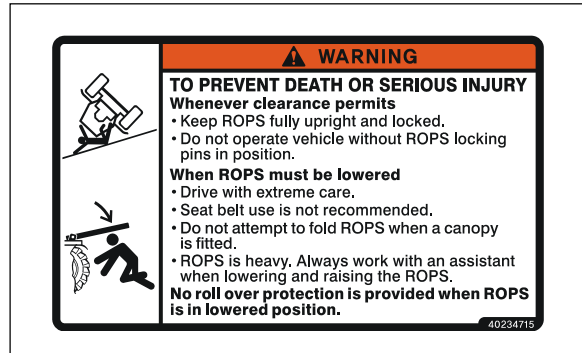
5. Location: On the rear side of the right-hand fender.

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



6. Location: On the rear side of the left-hand fender

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



7. Location: On the radiator fan shroud, at the rear of the radiator cap.

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



8. Location: On the left-hand front side of the engine frame.

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



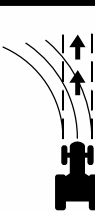
9. Location: On the front side of the right-hand fender.

① CAUTION

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

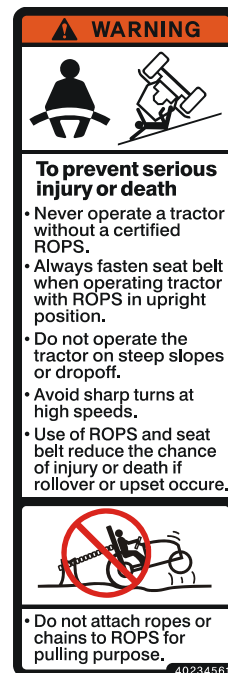
② WARNING

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

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

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

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



11. Location : On the heat insulation plate inside the hood.

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



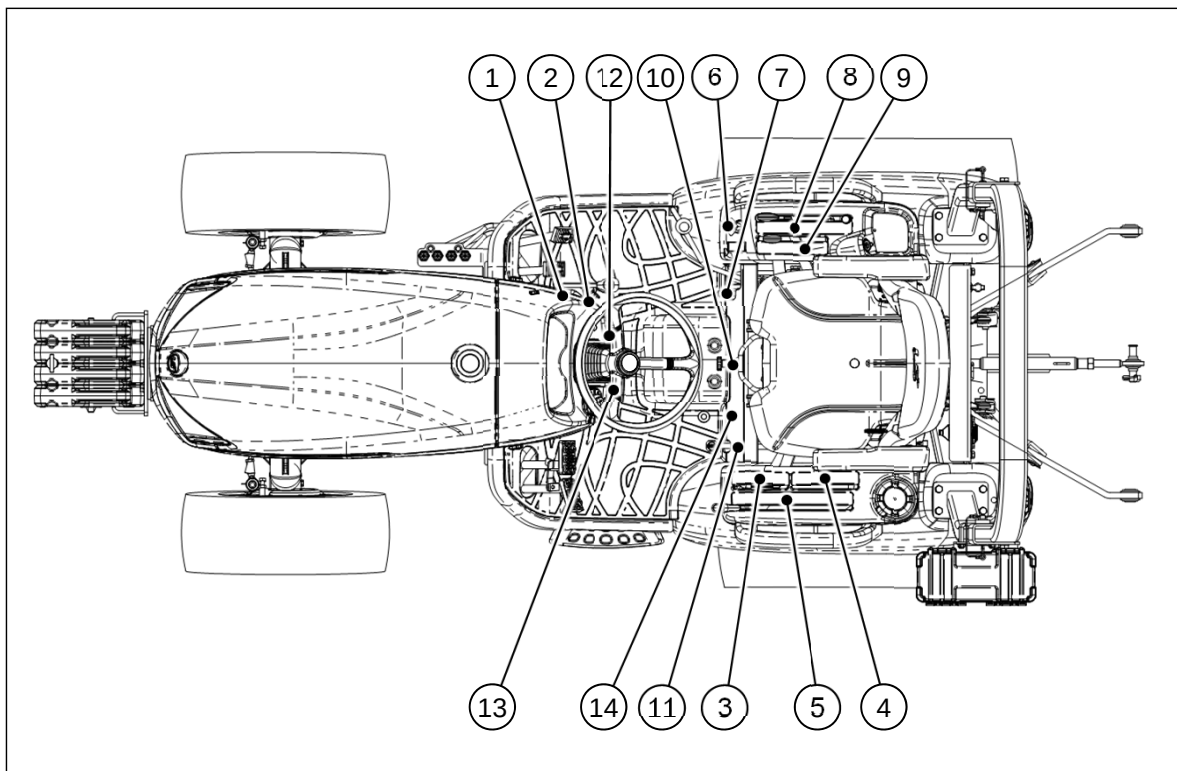
(15) Instructional Decals

① Instructional Decals and Attaching position - HST models

The following instructional signs are placed on your tractor as a guide for your safety and for those working with you. Walk around the tractor and note the content and location of these instructional signs before operating your tractor.

Keep instructional signs clean and legible. Clean instructional signs with a soft cloth, water, and a gentle detergent. Do not use solvent, gasoline, or other harsh chemicals. Solvents, gasoline, and other harsh chemicals may damage or remove instructional signs.

Replace all instructional signs that are damaged, missing, painted over, or illegible. If an instructional sign is on a part that is replaced, make sure the instructional sign is installed on the new part. See your authorized local dealer for replacement instructional signs.



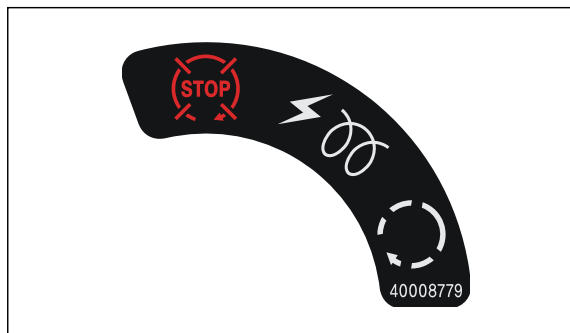
1. Location: On top of the right-hand side of the instrument panel.

- Throttle lever.
- Part No. : 40233965



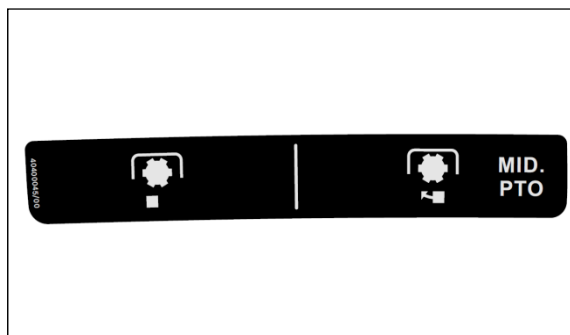
2. Location: On the rear side of the body panel cover under the instrument panel.

- Key switch.
- Part No. : 40008779



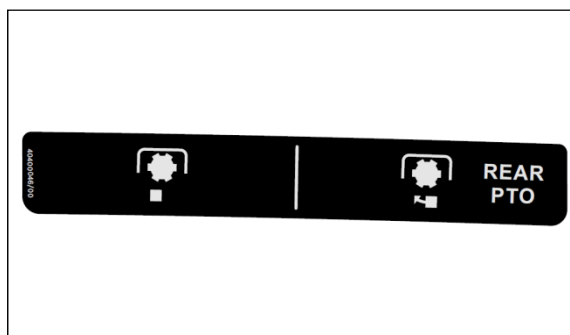
3. Location: On the left-hand lever guide.

- Middle PTO lever.
- Part No. : 40400045



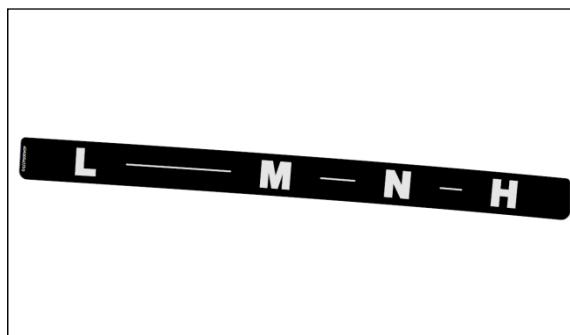
4. Location: On the left-hand lever guide.

- Rear PTO lever.
- Part No. : 40400046



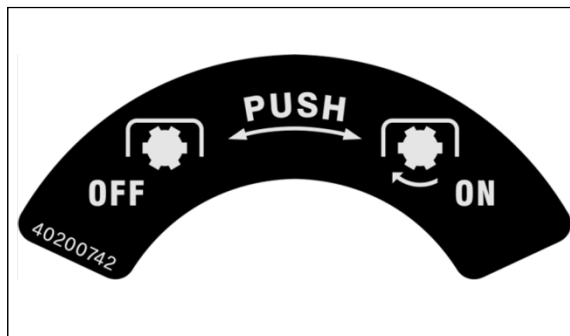
5. Location: On the left-hand lever guide.

- Range gear shift lever.
- Part No. : 40400047



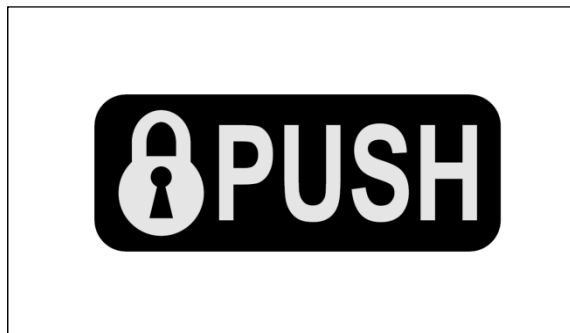
6. Location: On the right-hand side lever guide.

- PTO switch.
- Part No. : 40200742
- HST models only.



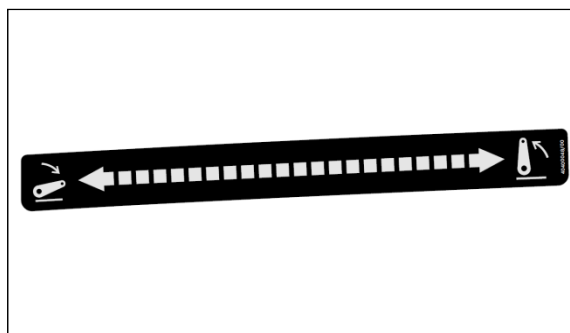
7. Location: on the right-hand side below the driver's seat.

- Joystick & locking lever.
- Part No. : 40384350



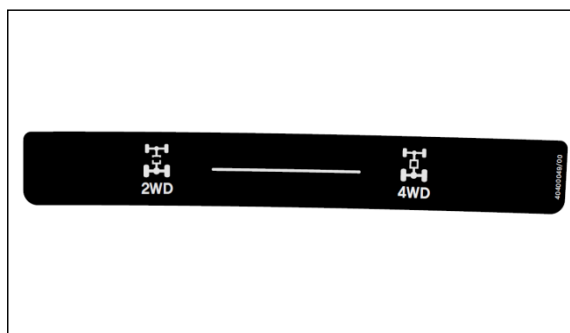
8. Location: On the right-hand lever guide.

- Hydraulic lift control (position control lever)
- Part No. : 40400048



9. Location: On the right-hand lever guide.

- 4WD lever. (Four Wheel Drive lever)
- Part No. : 40400049



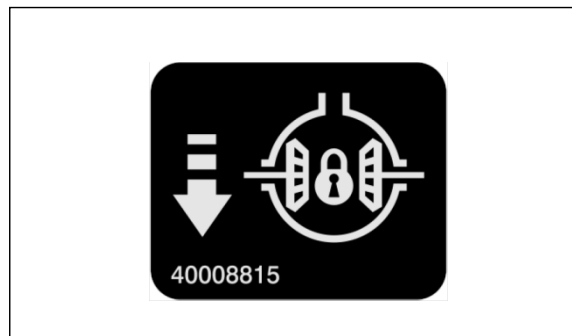
10. Location: below the driver's seat.

- Hydraulic lift control. (down speed control valve)
- Part No. : 40008821



11. Location: on the left-hand side below the driver's seat.

- Differential lock pedal
- Part No. : 40008815



12. Location: On the rear side of the body panel cover under the instrument panel.

- HST cruise control lever.
- Part No. : 40215219
- HST models only.



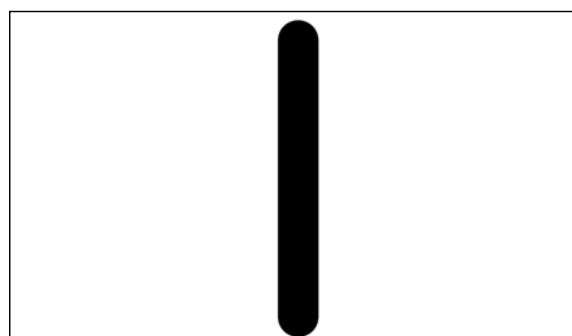
13. Location: On the rear side of the body panel cover under the instrument panel.

- Parking brake lever.
- Part No. : 40236789



14. Location: on the left-hand side below the driver's seat.

- Mid mower height adjustment lever.
- Part No. : 40422940



1-3. Long-term storage

(1) Preparation for storage

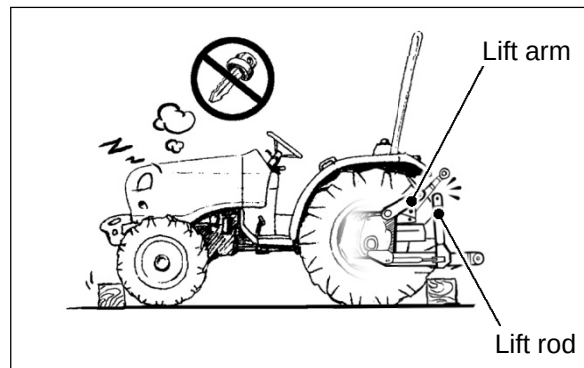
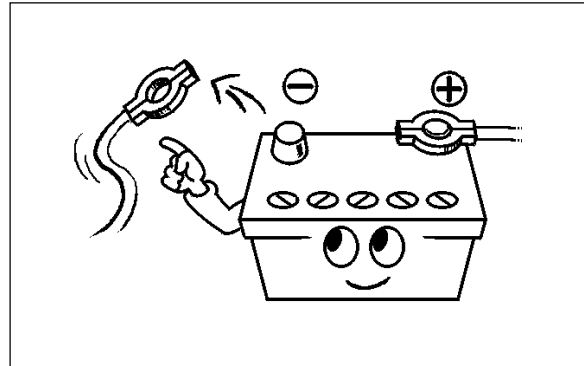
※ Wash your tractor cleanly and follow the procedure as below.

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

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

Humidity : 45% ~ 70%

- Place all controls, including electrical switches, in neutral position and apply the wheel chocks to the tires and disengage the parking brake.
- Check the lubricant level of each parts and if the engine oil has exceeded 100 hours of work, change the oil and run the engine for 5 minutes at idle rpm.
- Drain engine coolant completely. If the engine coolant is anti-freeze solution, it is not necessary to drain but check its density.
- Fill the fuel tank full with fuel.
- Loosen all drive belts and clean the air cleaner.
- Loosen the rubber plug (if fitted) under the clutch chamber to drain water.
- Remove the battery, clean the cover and smear the terminals with grease. Place the battery in a ventilated place not less than 10°C (50°F) and away from direct sunlight.
- Remove the lift-rod and place the lift-arm to the highest position to lubricate the lift cylinder.
- If possible, fit stands or other suitable supports under the axles to raise the wheel off the ground. And let the air out of the tires. If not, check the tire pressure from time to time.
- Remove the ignition key.
- Cover the tractor with a non-water-proof cover.
- If the implements are attached, lower the implements on a support off the ground.



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

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

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

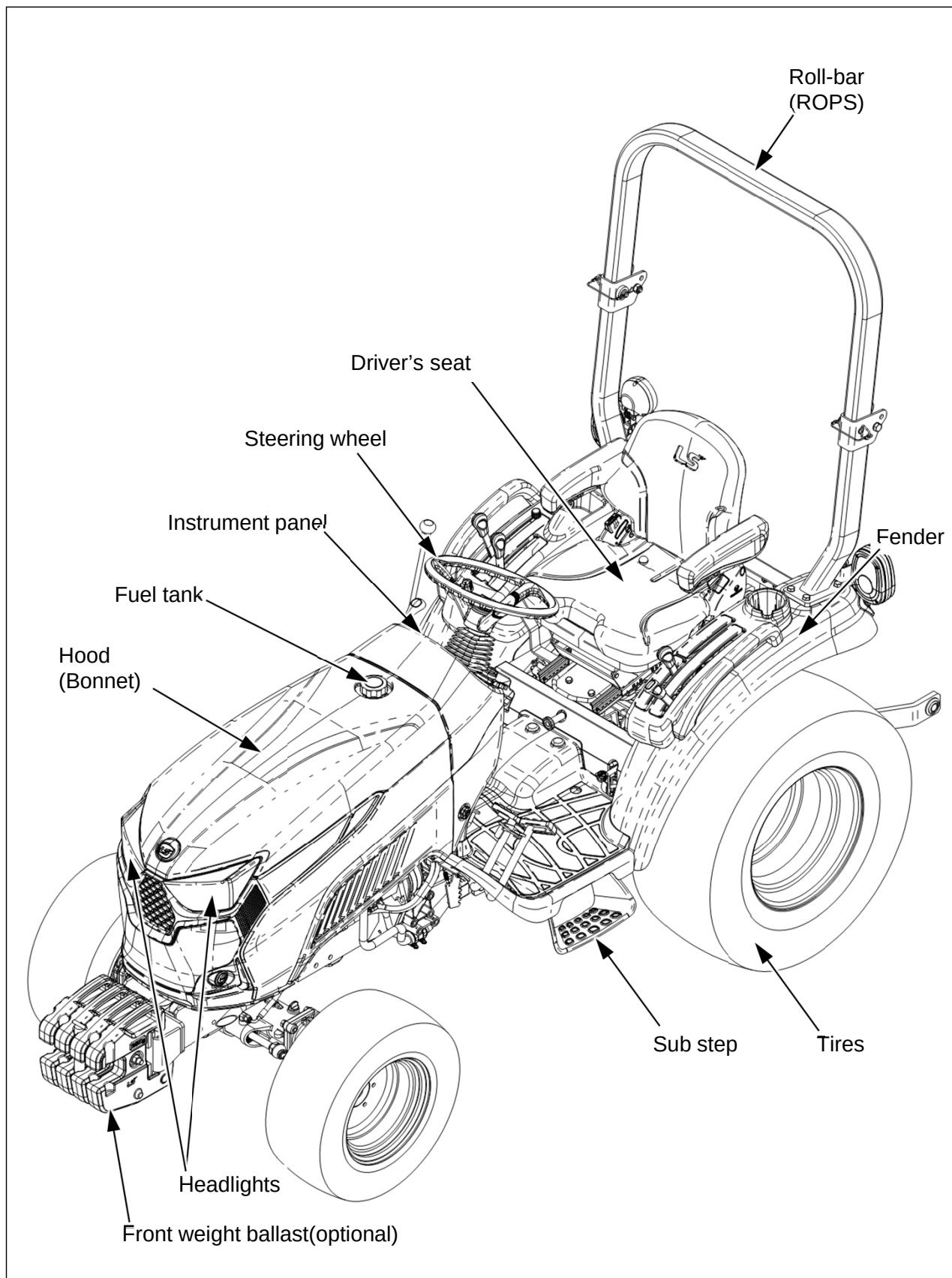
※ When using first after long-term storage, check each part as below.

- Inflate the tires to the recommended pressures and remove the blocking.
- Check the damaged part or loosen part.
- Check the leakage of fuel, coolant, engine oil, transmission and front axle oil.
- Check the level and density of the engine coolant.
- Check the level of engine, transmission, rear and front axle oil, and fuel.
(For further information, refer to the chapter 5, "Lubrication and Maintenance" in this manual.)
- Check all drive belts carefully, paying particular attention to the point where the straight run of the belt starts to bend around the pulley. Check the vee groove in the pulley for corrosion.
- Electric system check
 - Is there any open circuit or any other problem in the wiring?
 - Is there any problem of the instruments?
 - Is the charging state of the battery sufficient?
- Depress the clutch pedal and disengage the clutch pedal locker. (Mechanical transmission models only)
- Start the engine and allow it to idle a few minutes. Ensure the engine is receiving lubrication and each control is functioning correctly.
- Run the engine at a fast idling speed (suggest 1000/1500 rpm) until normal operating temperature is registered, and check the surroundings for oil, fuel and coolant leakage.
- Drive the tractor without a load and check if the tractor is operating satisfactorily.

2. Instruction for Safe Operation

(1) The name of each part

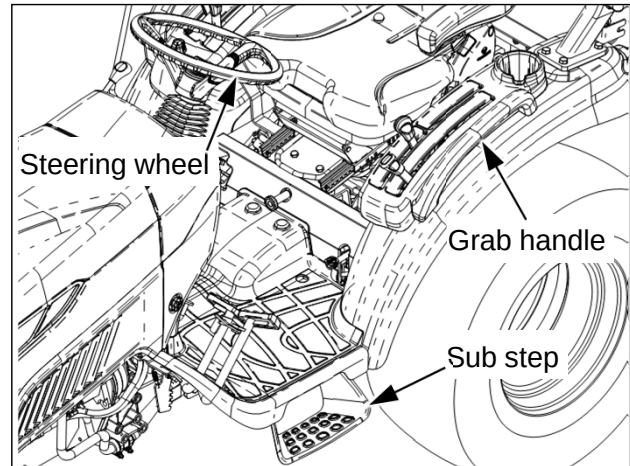
- HST type



2-1. Boarding and Exiting the tractor

(1) Boarding the tractor

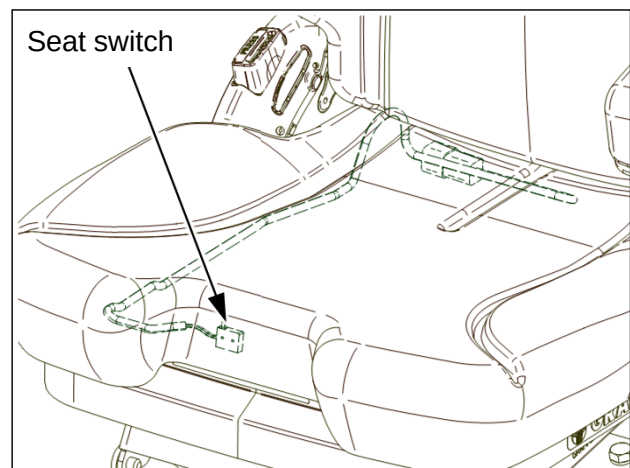
- Whenever possible, use the left-hand side step for entering. When boarding the tractor, use the step, steering wheel and grab handle on the left fender. Do not jump up/down for your safety.
- *Jumping on/off the tractor could cause an injury. Always face the tractor, use the handrails and steps, and get on/off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.*



 Caution	▶ Operator's condition : The persons such as patients, drunks, people on drugs, etc. are never allowed to operate this tractor. Only well educated operators can use the tractor after learning the usage of controls for moving, stopping, turning and other operating. ▶ Do not grasp/press the gear levers/pedals when entering/exiting the tractor.
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(2) Driver's seat switch

- At the lower part of the driver's seat, there is a sensor to detect the presence of the operator.
- If the operator gets up from the seat while engine is running, the engine will stop automatically for safety in case of that;
 - the HST pedal is NOT in neutral position.
 - the HST pedal is in neutral position and the MID PTO gear is engaged.
- Before leaving the driver's seat, turn off the PTO switch, place the rear PTO lever, middle PTO lever in neutral position, and apply the parking brake.



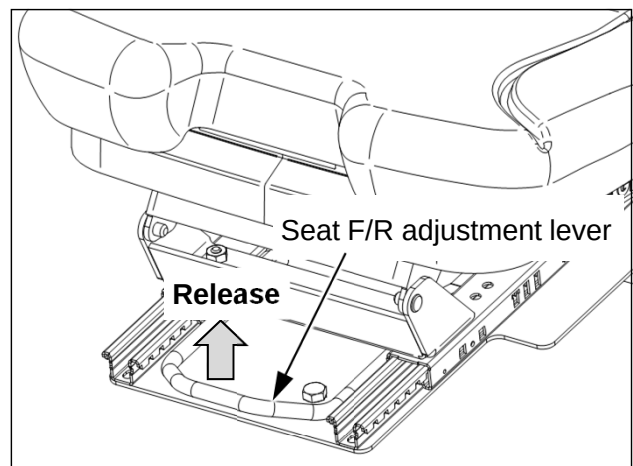
 warning	▶ DO NOT arbitrarily remove the seat switch. If it is necessary to replace the seat, the seat switch must be replaced together. If not, the engine does not start.
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(3) Seat adjustment

- Before operating the tractor, adjust the driver's seat position according to body size and length.

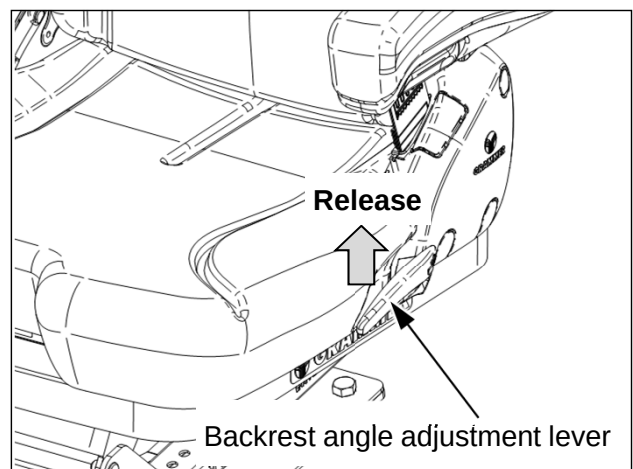
① Seat F/R adjustment lever

- 1) After sitting on driver's seat, move the seat adjustment lever upward 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.



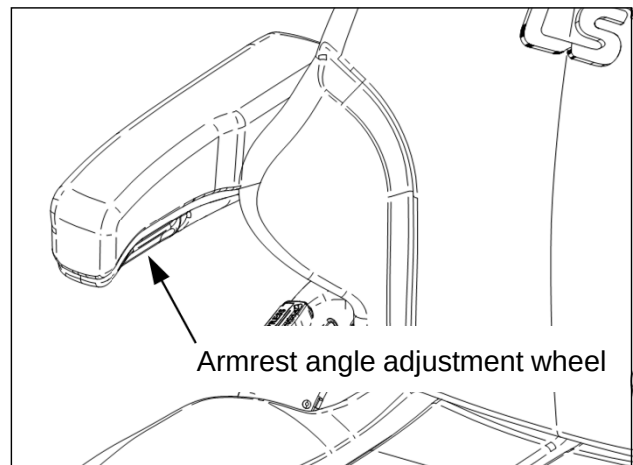
② Backrest angle adjustment lever

- It is used to adjust the backrest angle.
- Lift up the lever to release the backrest lock and adjust the backrest angle with the lever pulled up.
- After adjusting, release the lever and check the backrest locked in place.



③ Armrest angle adjustment wheel

- It is used to adjust the armrest angle.
- Rotate the wheel inside to lower the armrest.
- Rotate the wheel outside to lift the armrest.

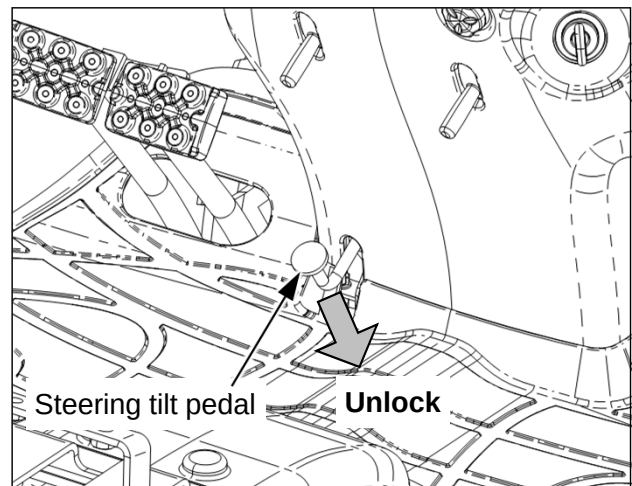


warning

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

(4) Steering tilt pedal

- Press down the steering tilt pedal to release the steering column and tilt the steering wheel to the desired position.
- Release the pedal to lock the steering column in place, and check to make sure column does not move forward and backward.
- You must operate the steering tilt pedal only when the tractor has stopped completely.

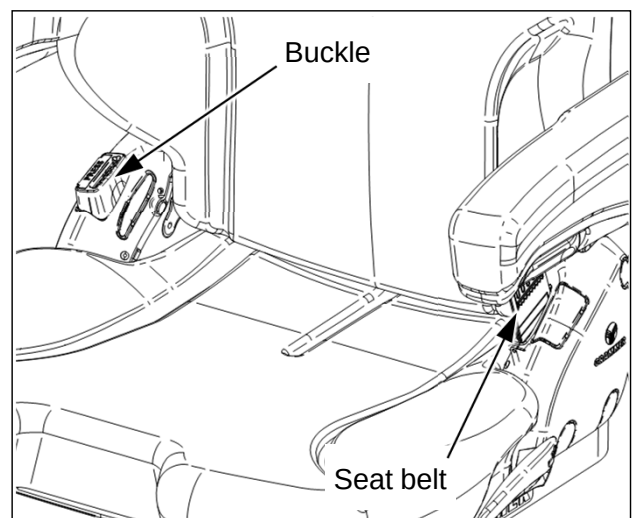


Warning

► DO NOT adjust the steering column while driving. It may cause a serious accident.

(5) 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.

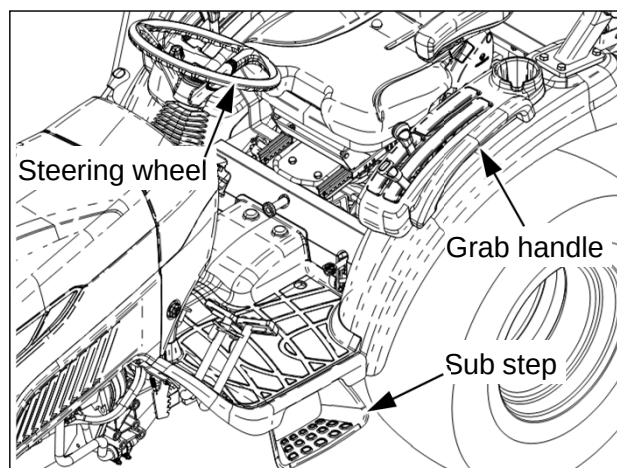
During operation, it must be required to wear seat belt with a cab or safety frame installed. After wearing the seat belt, adjust the belt to fit the operator.



► If the roll-bar is folded down or removed, do not wear the seat belt.

(6) Exiting the tractor

- Whenever possible, use the left-hand side step for entering/exiting. When exiting the tractor, use the step, steering wheel and grab handle on the left fender. Do not jump up/down for your safety.
- *Jumping on/off the tractor could cause an injury. Always face the tractor, use the handrails and steps, and get on/off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.*
- In an emergency state, you can use the right-hand side step for exiting.
- Stop the engine and remove the ignition key before leaving tractor.

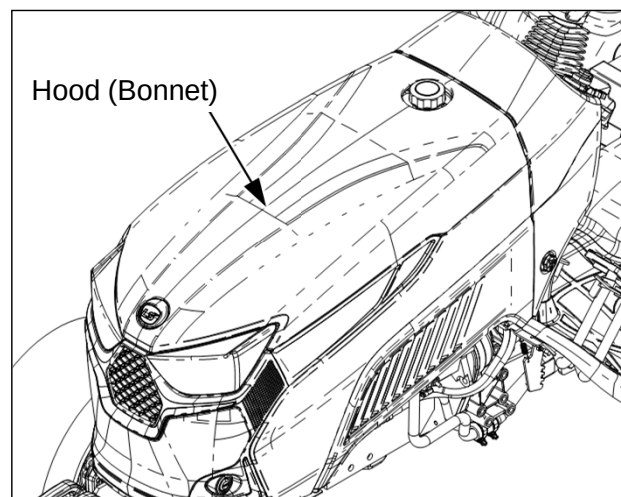


 Caution	▶ Do not press the control pedals when entering/exiting the driver's seat. ▶ Do not grasp the gear levers when entering/exiting the driver's seat.
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2-2. Safety Device

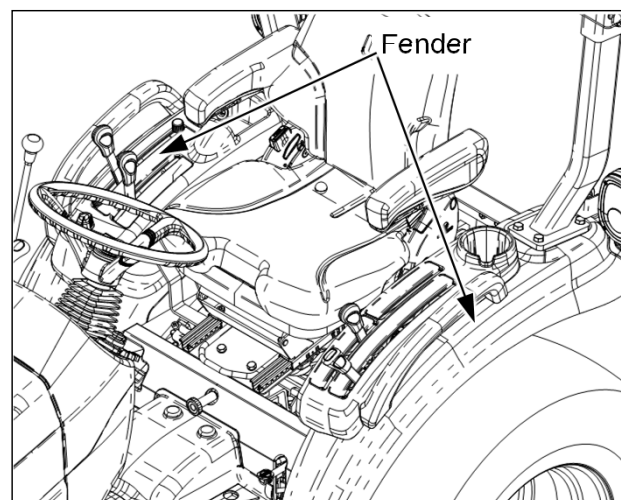
(1) Hood (Bonnet)

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



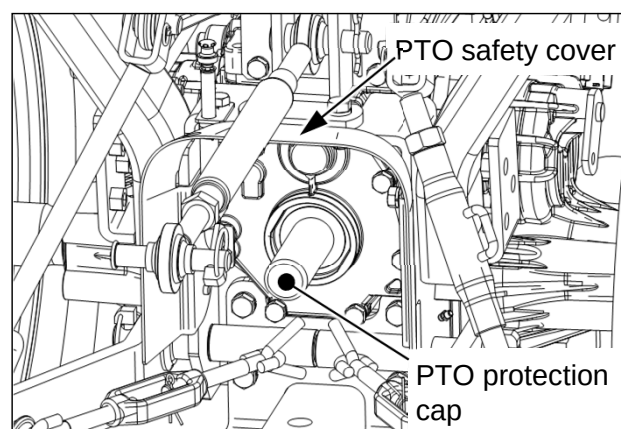
(2) Fender

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



(3) PTO safety cover and protection cap

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



Warning

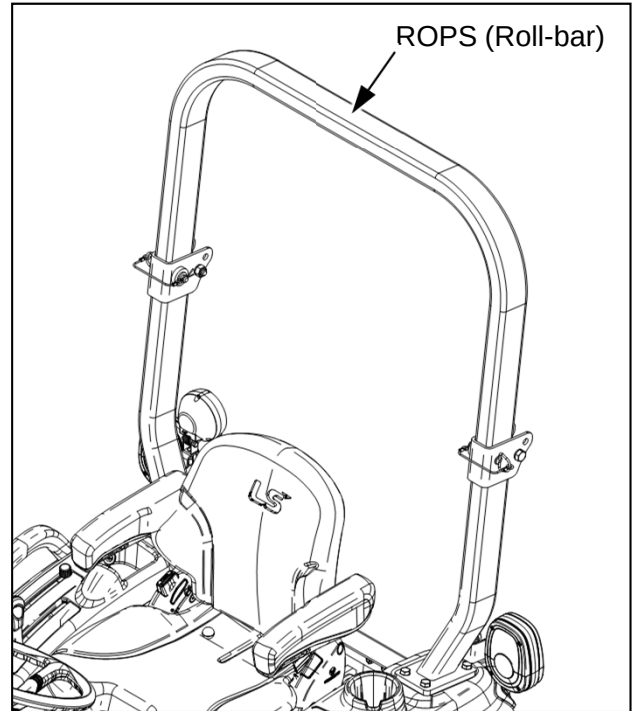


- ▶ If you contact the rotating shaft, it may cause a serious injury.
 - DO NOT touch shaft which is rotating.
 - DO NOT remove the safety cover.
 - Avoid loose clothes that can easily be rolled up in the revolving shaft.

(4) Roll-Over Protective Structure (ROPS)

① Rear foldable roll-bar type

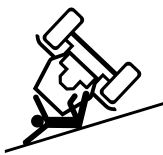
- The Roll-Over Protective Structure (ROPS) is integrated and certified structure for driver's safety. This structure will reduce the risk of serious injury or death when being over-turned.
- DO NOT remove, modify or repair the ROPS arbitrary. The welding, bending, drilling, grinding, or cutting of any part of the ROPS, it can weaken the protective structure.
- If the ROPS is loosened or removed for any reason, make sure that all parts reinstalled correctly before operating the tractor.



Warning

Roll-over hazard!

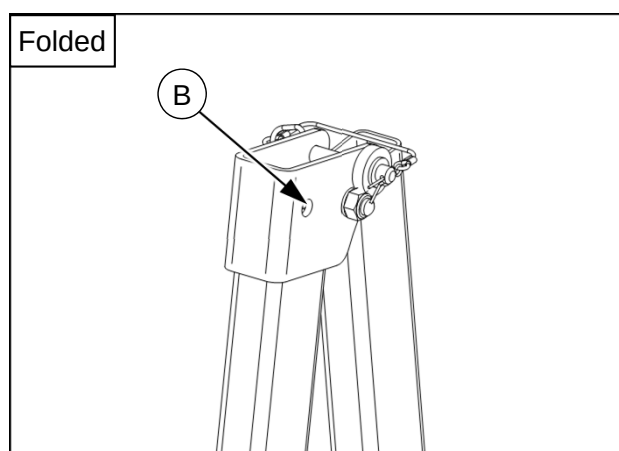
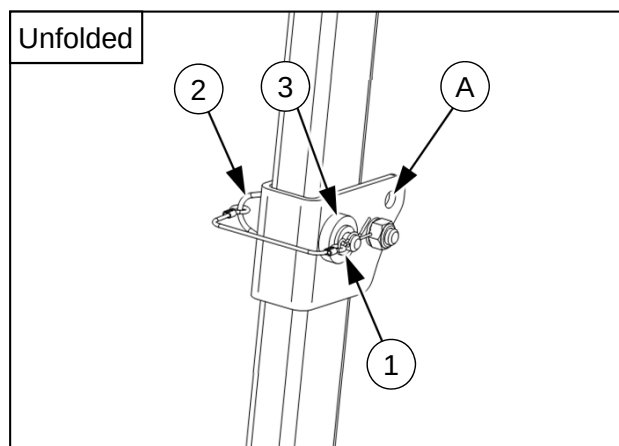
Failure to comply could result in death or serious injury.



- ▶ Do not modify or remove the Roll-Over Protective Structure(ROPS) arbitrarily for safety. Unless the ROPS is applied correctly, it may cause a serious accident or death when being overturned.
- ▶ Be sure to stand up the Roll-Over Protective Structure(ROPS) and check the bolts, pins and nuts correctly kept in place.
- ▶ Always wear the seat belt when operating the vehicle with the ROPS in the upright position.
- ▶ Do not connect chains or ropes to the ROPS for pulling purposes, as the vehicle could tip over.
- ▶ When driving through door openings or under low overhead objects, make sure there is sufficient clearance for the ROPS.
- ▶ In case of folding/standing the roll-over protective structure(ROPS).
 - A folded ROPS does not provide roll-over protection. Do not operate the vehicle with the ROPS folded as a standard operating mode. Do stand up the ROPS immediately as soon as the low clearance work is finished.
 - The ROPS is a heavy assembly. Be careful not to be injured by sudden folding, which might occur when folding or standing up the ROPS by its own weight. If possible, do cooperate with other people for the folding/standing.
 - Do not wear seatbelt when the ROPS is folded down.

- **How to fold the upper frame of the roll-bar.**

1. Pull out the snap pins① and remove the grommets③ on both sides.
 2. Hold the upper frame tightly and remove the locking pins② on both sides.
 3. Fold the upper frame reward.
 4. Insert the locking pins② into the hole “A” and assemble the grommets and snap pins.
- When standing up the upper frame, follow the same procedure reversely. Assemble the locking pins② into the hole “B” after standing up the upper frame.

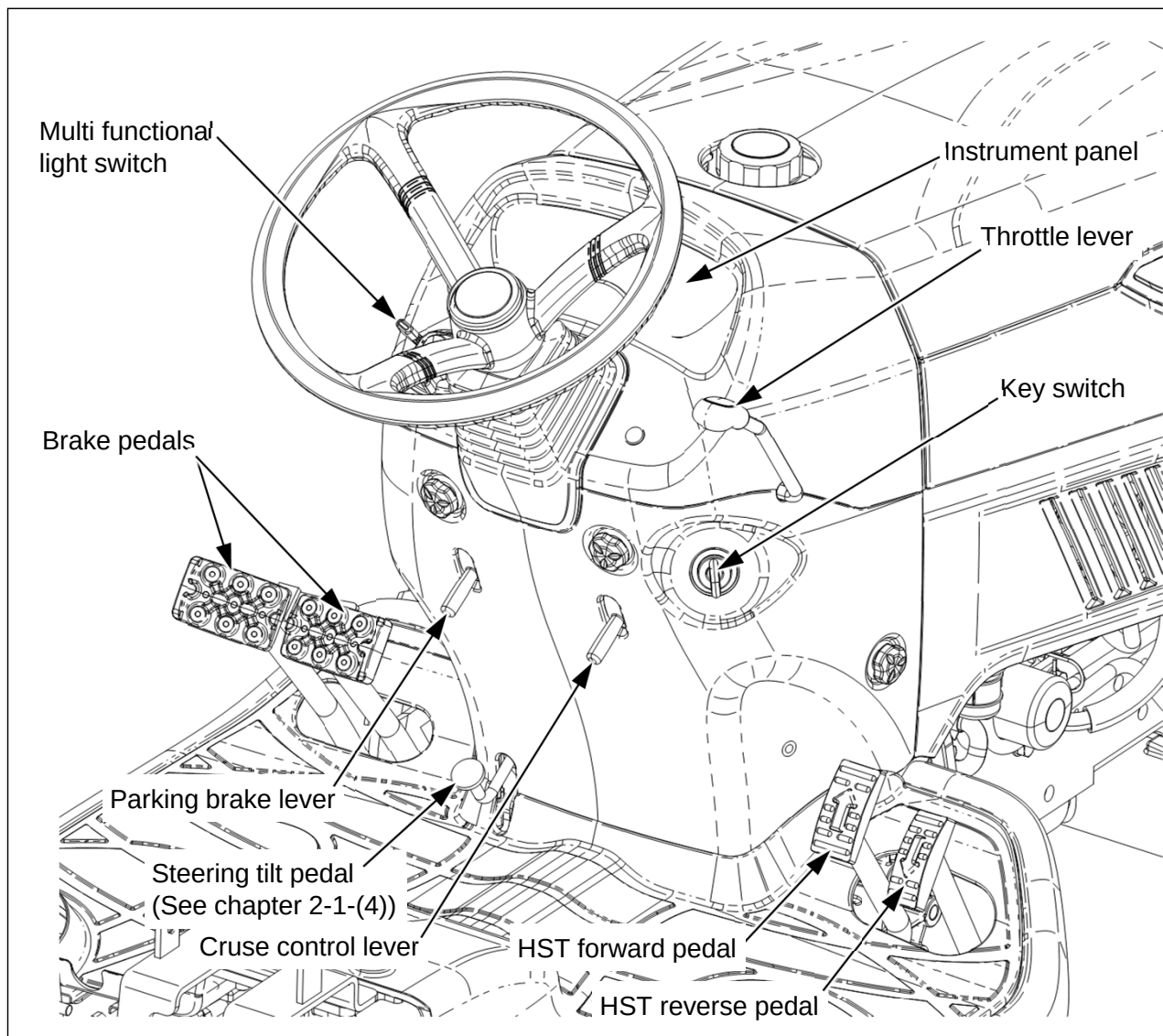


3. Instruments and Controls

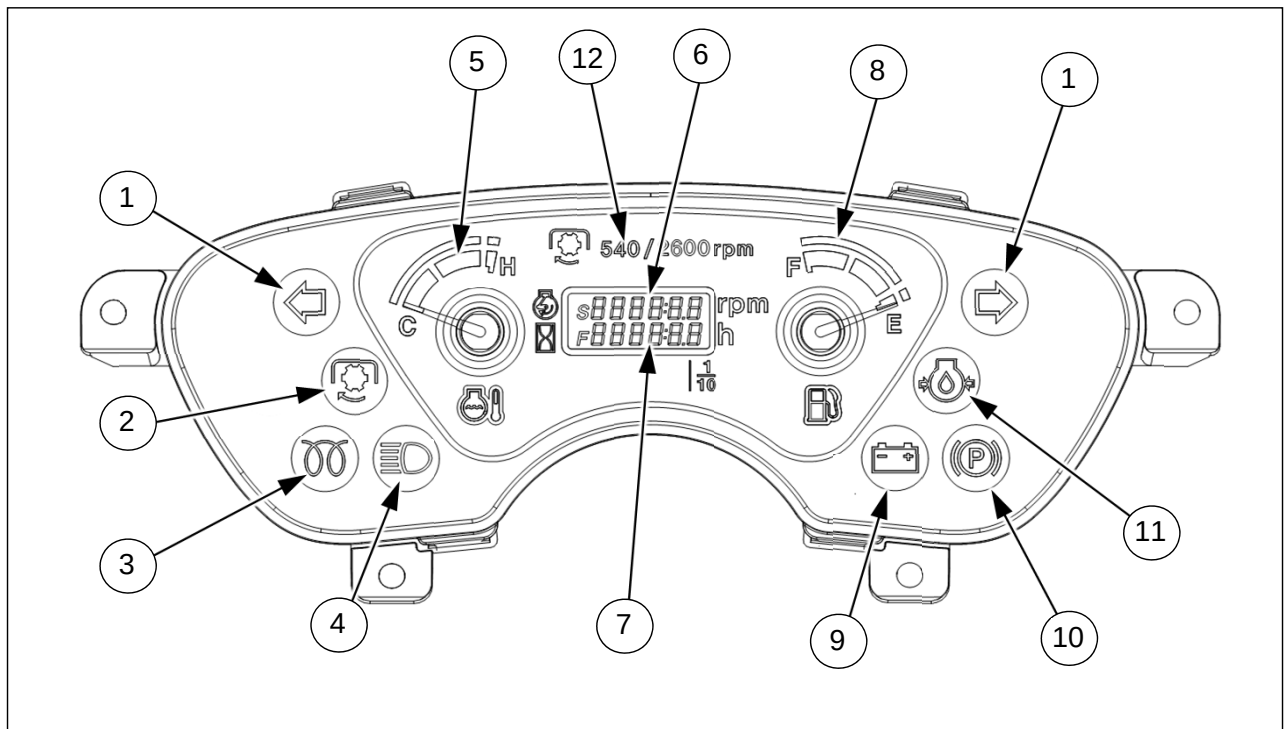
3-1. Instrument panel and Front controls

Important to owner, read carefully

HST type



(1) Instrument panel



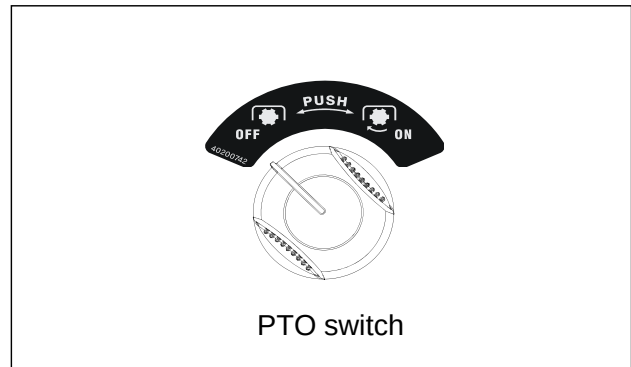
- | | |
|--|----------------------------------|
| 1 Turn signal indicator (Left / Right) | 7 Hour meter |
| 2 PTO operation indicator | 8 Fuel level gauge |
| 3 Cold start aid indicator | 9 Battery charging indicator |
| 4 High beam indicator | 10 Parking brake indicator |
| 5 Engine coolant temperature gauge | 11 Engine oil pressure indicator |
| 6 Tachometer | 12 PTO speed indicator |

1 Turn signal indicator and Hazard warning light indicator

- When turning the turn signal light switch to the left/right direction, the left/right turn signal lights and this indicator will blink simultaneously. The key switch has to be in the ON or START positions.
- When turning on the hazard warning light switch, all the turn signal lights will blink simultaneously regardless of the key switch position. Use the hazard warning light switch while driving on public roads, day or night.

2 PTO operation indicator

- When turning PTO switch ON while the engine is running and PTO lever (if fitted) is engaged, the PTO shaft shall rotate and this indicator shall be turned on.

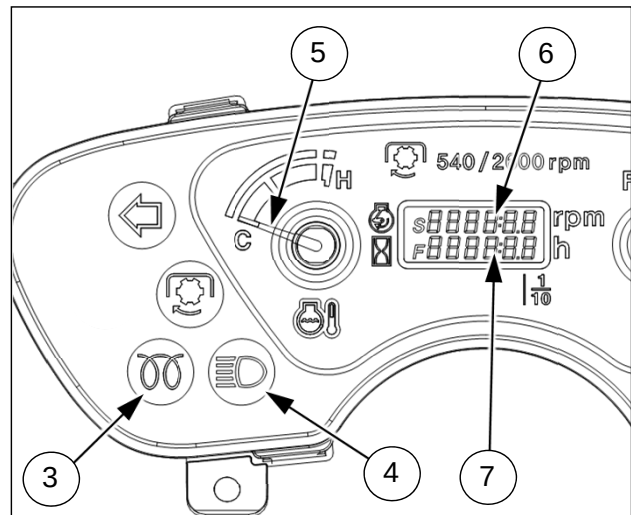


3 Cold start aid indicator

- When turning start-key switch to “Preheat” position, this indicator will be turned on. It remains lit for as long as key switch is in the “Preheat” position, during which time the glow plugs are heating the combustion chambers.
- When turning start-key switch to “Start” position, this indicator will be turned on as well.

4 High beam indicator

- When turning the light switch to “HIGH BEAM” position, the high beam of the front headlights and this indicator will be turned on.



5 Engine coolant temperature gauge

- This gauge indicates the engine coolant temperature during operation.
- It activates when the operator turns the key switch to the ON position. The gauge will register cold with the key switch in the OFF position.
- The closer the needle approaches “H” mark, the higher the temperature of engine coolant is.
- If the needle of engine coolant temperature gauge indicates red zone, Stop the engine immediately and check the engine cooling system. (coolant, radiator screen, fan belt, ...)
- The radiator and coolant is very hot. When checking the coolant level, comply with the instructions of the chapter 5-10-(1), “Replacement of Engine coolant” in this manual.

6 Tachometer

- It registers engine Revolutions Per Minute (RPM). The display will return to zero when the engine is not running.

7 Hourmeter

- It records the hours that your tractor has been operated regardless of the engine RPM. Use the hourmeter as a guide to determine hourly service and maintenance intervals.
- The number 0005.3 in hourmeter shows that the tractor has been used for 5.3 hours. (5 hours and 18 minutes).

8 Fuel level gauge

- This gauge indicates the remaining amount of fuel. If the needle indicates "E", fill the fuel tank immediately.
- The gauge activates when the key switch is in the ON position. It will register "empty" with the key switch in the OFF position.

9 Battery charging indicator

- This indicator shall be ON when turning the key switch to ON position, and shall be OFF after starting engine.
- If this bulb becomes lit during operation, it indicates that the charging system is not operating normally. Contact your authorized local dealer for checking the electrical charging system.

10 Parking brake indicator

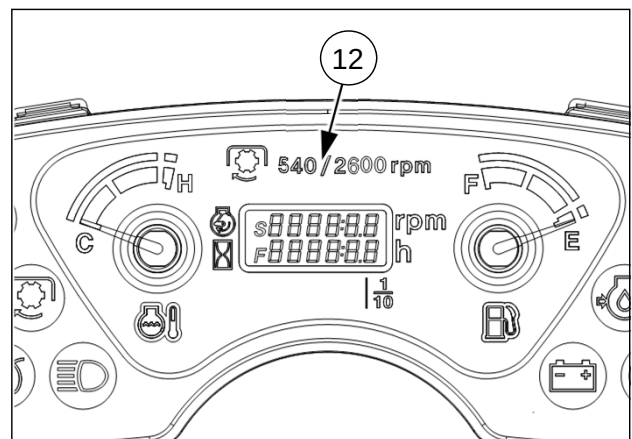
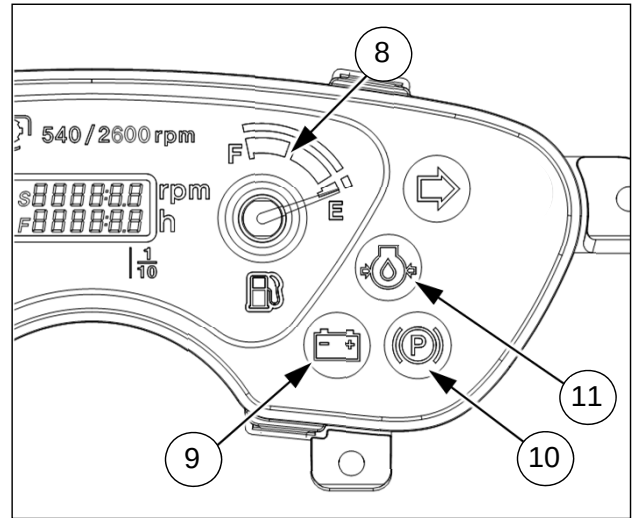
- This indicator shall be ON when pressing brake pedal.

11 Engine oil pressure indicator

- The light indicates oil pressure only and goes out when sufficient oil pressure is present at the oil sender.
- This indicator will be turned on when turning the key switch to "ON" position, and it will be turned off after starting engine.
- If this indicator is turned on during operation, stop the engine immediately and contact your authorized local dealer for checking the engine lubrication system.

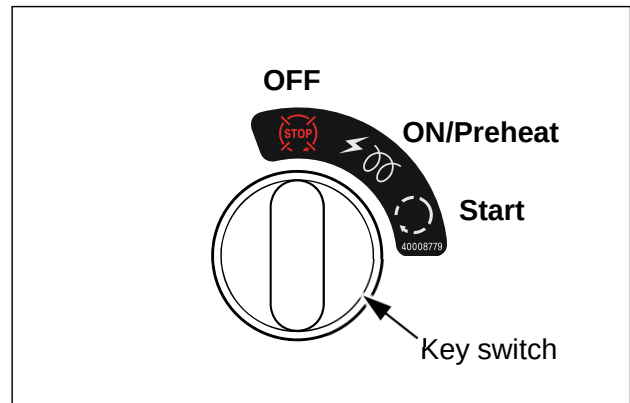
12 PTO speed indicator

- It determined by the engine speed indicated on the tachometer. The tachometer reading of 2430 RPM indicates 540 RPM rear PTO speed.
- If the tachometer registers higher than 2430 RPM for rear PTO operation, reduce the engine speed when this dangerous over speed conditions exists. *For middle PTO operation, see chapter 4-5-(2) in this manual.*



(2) Key switch

- “OFF” – Engine stops, Power off
- “ON/Preheat” – Power on & Automatic preheat
- “Start” – Engine start up
- As soon as the engine starts, turn the ignition key to “ON” position immediately. If not, it may cause damage to the starter motor.

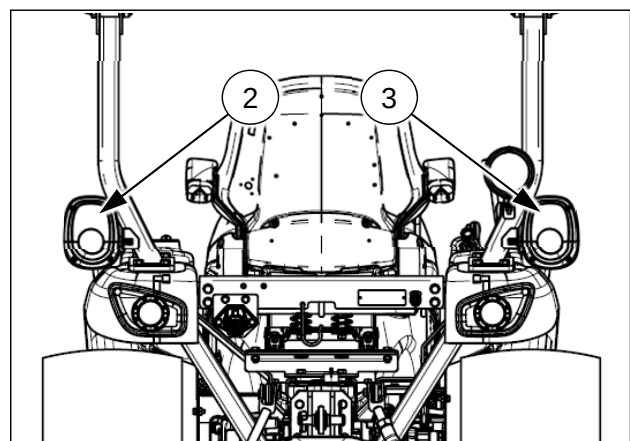
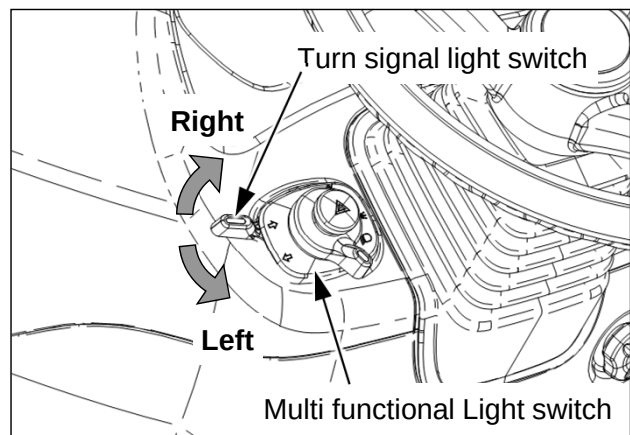


 Caution	► Because a safety switch for start-up has to be engaged, put PTO switch to “OFF” position and depress clutch pedal(If fitted) fully and then turn the key switch to “Start” position. See chapter 4-2-(1), “Engine Start” in this manual. ► If the tractor is not in use, the ignition key should be removed.
--	--

(3) Multi-functional light switch

① Turn signal light switch

- This switch is used to give information to other vehicles when turning to the left or right.
- When the key switch is placed “ON” position,
 - If turning the switch clockwise, the right turn signal light③ will blink.
 - If turning the switch counter-clockwise, the left turn signal light② will blink.
- If the hazard warning lights are operated at the same time when the turn signal is activated, the hazard warning light for the opposite side of turning direction will stop flashing and illuminate continuously.

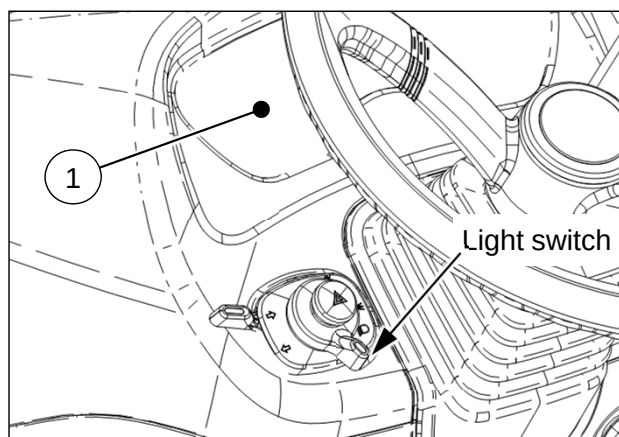


 Caution	► When driving on the road, operate the turn signal lights to inform other vehicles before changing your direction.
--	--

② Light switch

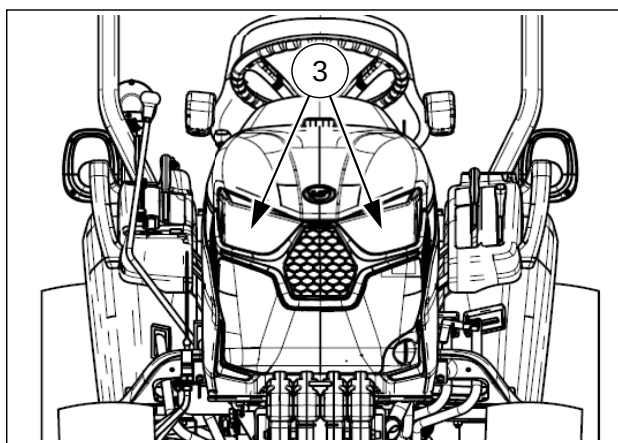
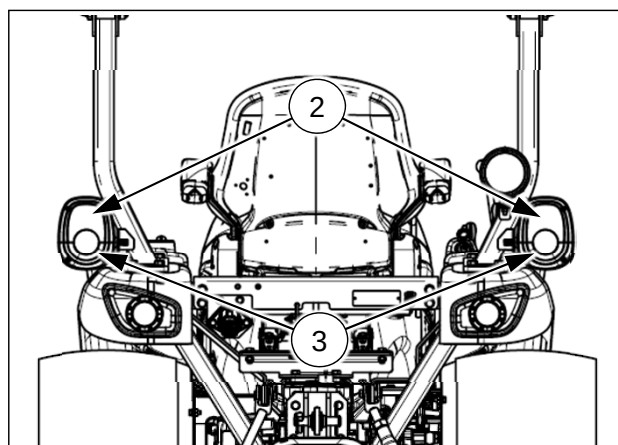
- The light switch is used to turn on/off the following lights.

- ① Instrument panel lights.
- ② Side lights.
- ③ Headlights.



- This switch has three functions as follows.

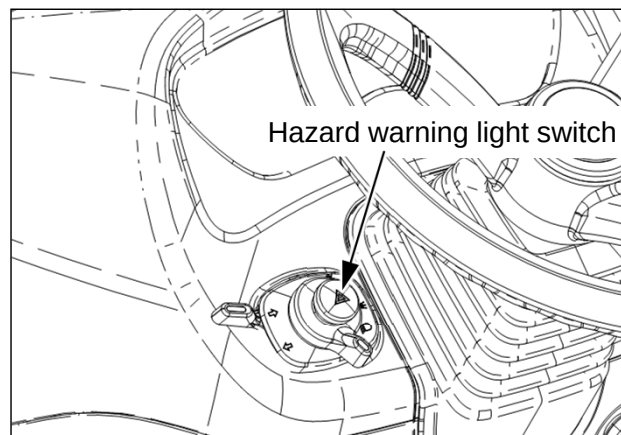
- – Instrument panel and all the lights are turned off.
- ≡D< – Instrument panel and sidelights are turned on.
- ≡D – Instrument panel, sidelights and headlights(low beam) are turned on.



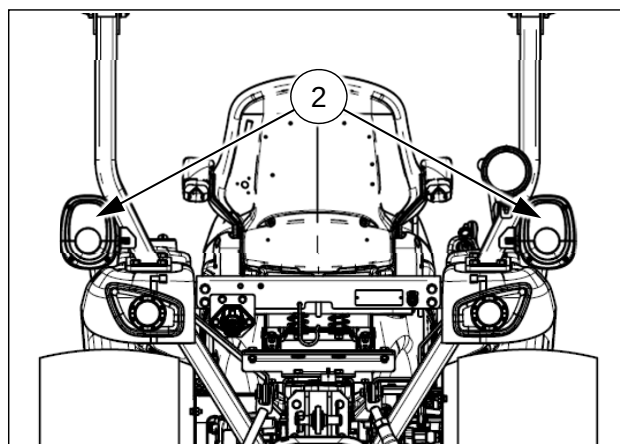
 Caution	► When passing with other vehicles in the opposite lane at night, turn the headlights to low beam not to disturb oncoming cars.
--	--

③ Hazard warning light switch

- This is used to warn other vehicles in case of emergency state.
- This function is integrated to the multi-functional light switch.
- If pressing down the hazard warning light switch, all the turn signal lights② will blink.



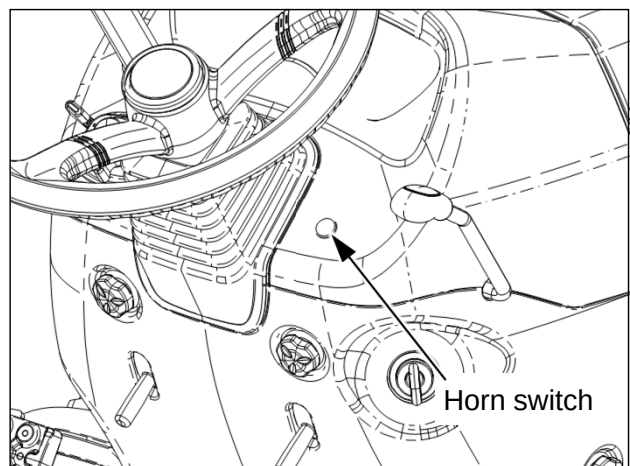
- If the hazard warning lights are operated at the same time when the turn signal is activated, the hazard warning light for the opposite side of turning direction will stop flashing and illuminate continuously.



 Caution	► If using the hazard warning lights for a long time while the engine is stopped, the battery can be discharged completely due to high electrical power consumption.
Notice	► The hazard warning lights can be turned on regardless of the key switch position.

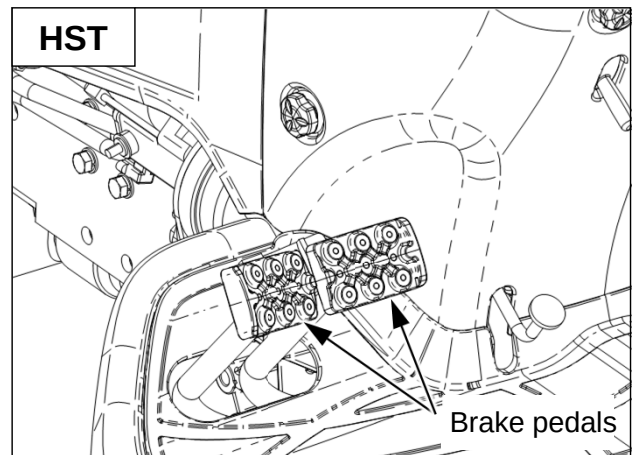
(4) Horn switch (if fitted)

- Press down the switch for sounding off the horn.

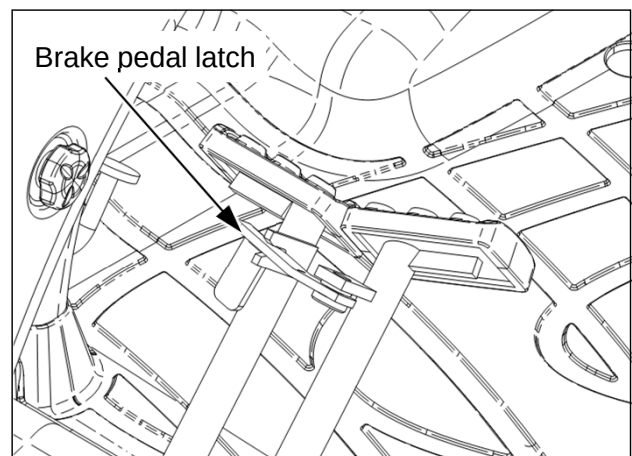


(5) Brake pedals

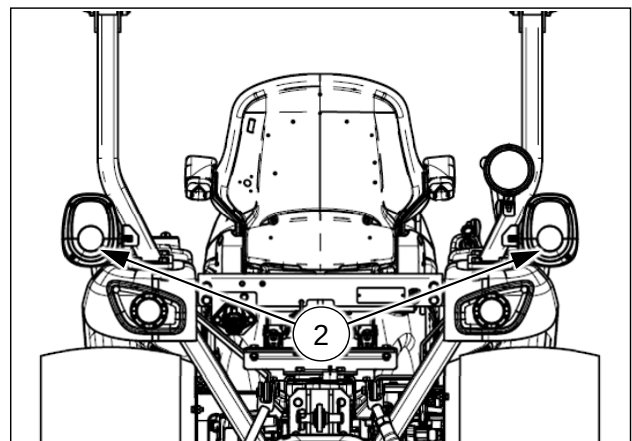
- This pedal is used to stop the tractor in an emergency status.
- In a normal operational status, the tractor shall be stopped when releasing the HST pedals.
- If the 4WD is disengaged, the braking force is only applied on the rear wheels.
- The brake pedals are installed on the left-hand side of the step floor.



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



- The brake lights② will illuminate when the brake pedal is depressed and the key switch in the "ON" position.



Caution

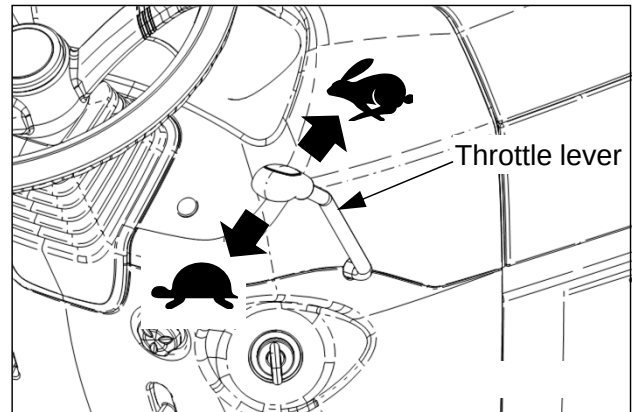
- ▶ For HST model, when releasing HST pedal, the pedal shall be return to neutral position and the HST brake begins to work. But, press down the brake pedal additionally in an emergency state.
- ▶ DO NOT ride your foot on the brake pedal while driving. If so, it may cause a failure of the brake device.

(6) Throttle lever

- It is used to set or change the engine speed.

Low speed: Pull It backward

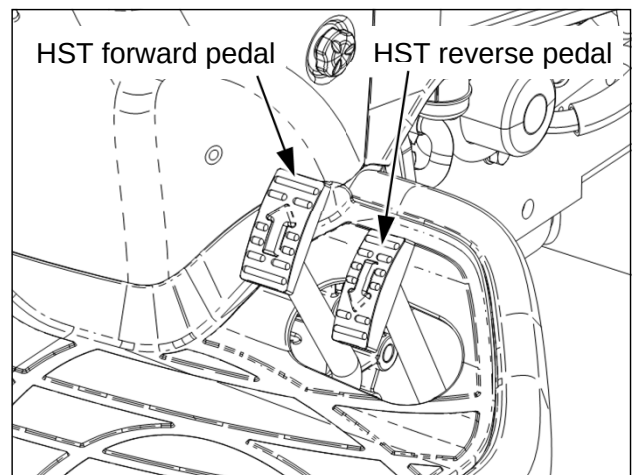
High speed: Push it forward.



Notice	► Set the engine speed over 1500 rev/min for stability of hydraulic system while driving or working. (HST models only)
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(7) HST forward / reverse pedal (HST type)

- Press down the HST forward pedal slowly in order to move the tractor forward.
- If releasing the HST pedal, it returns back to the neutral position and tractor will be stopped.
- The deeper the pedal is pressed down, the faster the tractor shall drive.
- The HST reverse pedal is worked in the same way of the HST forward pedal operation.

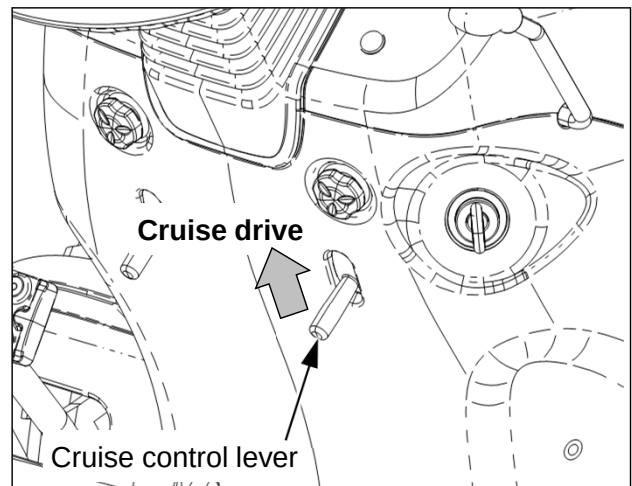


warning

- ▶ When releasing the HST pedal while driving in high speed, the braking distance can be extended depending on the load conditions. At this time, press down the brake pedal(s) to stop the tractor.
- ▶ DO NOT operate the HST pedal hastily. It may cause a shock to you.

(8) Cruise control lever (HST type)

- For cruise control drive, lift up the cruise control lever in the state of pressing the HST forward pedal. And then, the HST pedal shall be fixed at that position and the driving speed will be maintained constantly.
- To exit the cruise drive;
 - 1) Press down the brake pedal or
 - 2) Press down the HST forward pedal little more.And then, The HST forward pedal returns to the neutral position and the cruise control drive will be stopped.

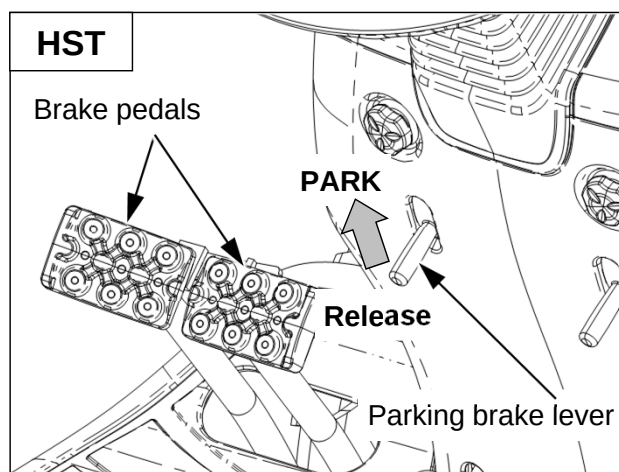


warning

- ▶ During the cruise control drive, do not press down the HST reverse pedal to exit the cruise control drive or to reverse the tractor. After stopping the cruise control drive, press down the HST reverse pedal.
- ▶ DO NOT try to move the cruise control lever in order to stop the cruise control drive. It may cause a failure of the cruise control linkage system.

(9) Parking brake lever

- To apply the parking brake, press down the brake pedal(s), and lift the parking brake lever upward to engage the parking brake ratchet.
- Release the brake pedal(s) slowly with checking slippage of the tractor.
- To release the parking brake, press the brake pedal(s) little bit harder, and then the parking brake lever shall be released by spring.



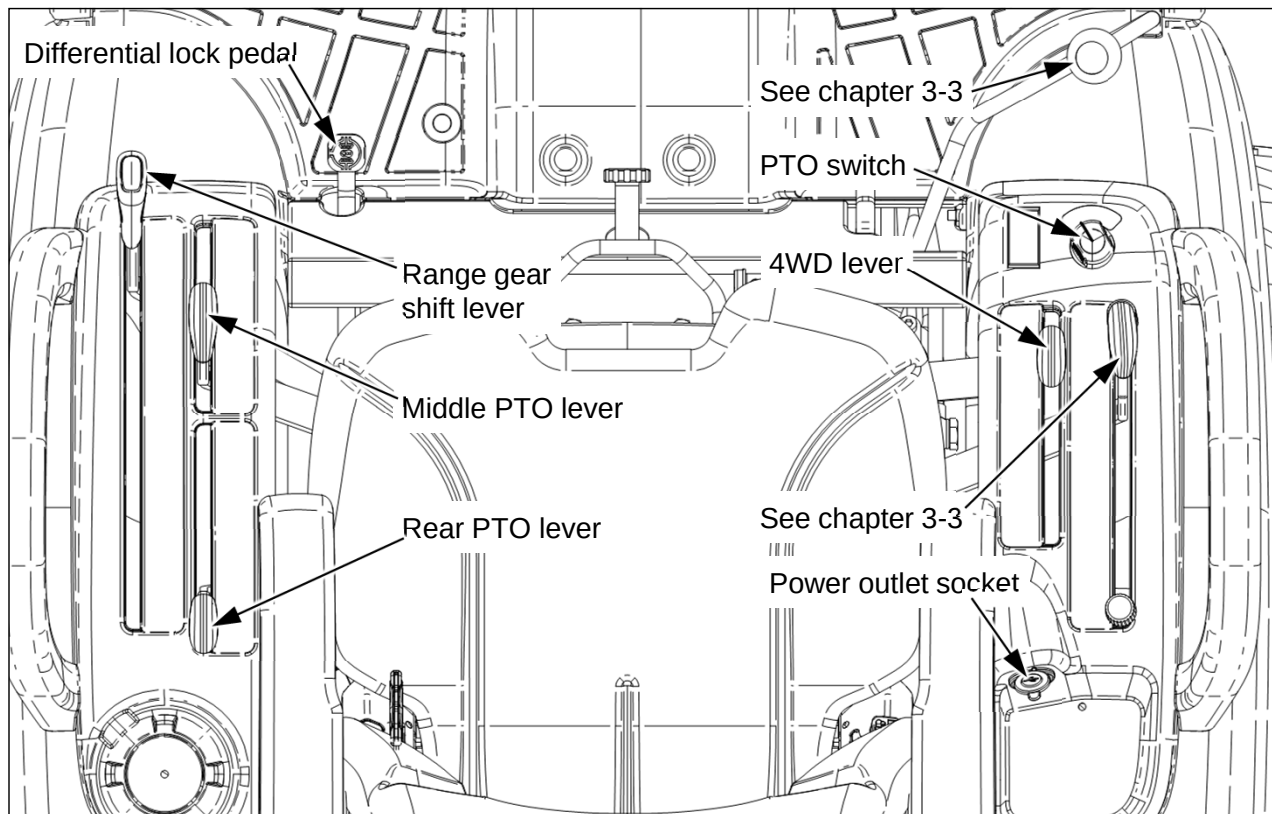
Caution

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

3-2. Left / Right-hand side Levers and Pedals

Important to owner, read carefully.

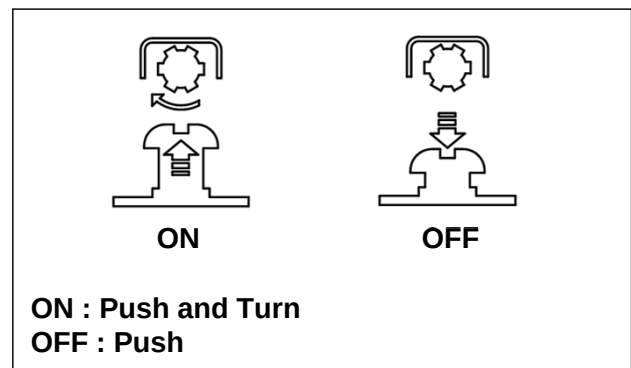
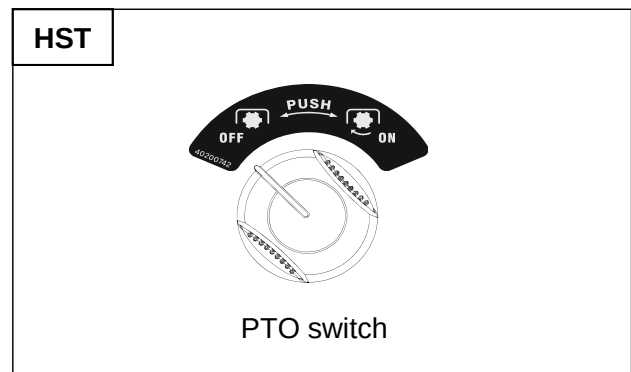
HST type



(1) PTO switch

- **To operate the electro-hydraulic PTO**, comply with the instructions as below.

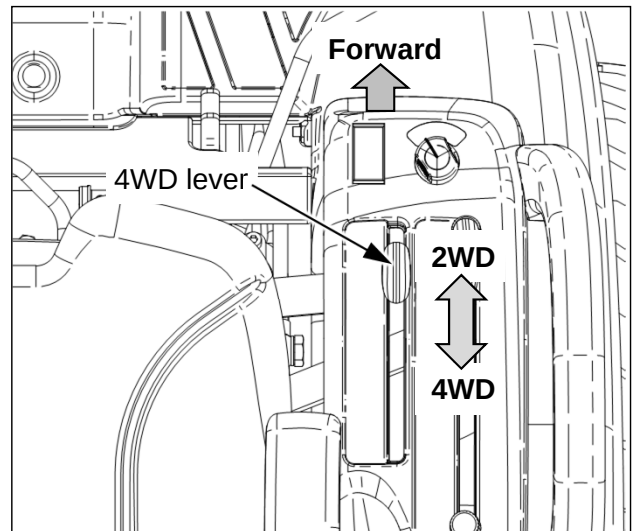
1. Sit in driver's seat correctly and start engine.
2. Place the PTO select lever to the desired position..
3. Put the PTO switch to "ON" to rotate the PTO shaft.
4. To stop the PTO temporarily, push down the PTO switch and then the switch will automatically return to "OFF" position.
5. Before shifting the PTO select lever, make sure to push down the PTO switch in "OFF" position.



 Warning	▶ To start the engine, the PTO switch must be placed in "OFF" position. ▶ Before connecting or checking the implement, place PTO switch in "OFF" position. ▶ The PTO shaft rotates even if the tractor moves backward. Pay attention to the surroundings to prevent an accident. ▶ Do not engage the PTO clutch with the engine running at high speed. Sudden engagement can cause damage to the implement and PTO clutch. Engage the PTO at low idle rpm, and then raise the engine speed up.
--	---

(2) 4WD lever

- This lever is used to engage/disengage the four wheel drive (4WD).
- Before operating the 4WD lever, release the HST pedal, press down the brake pedal and stop the tractor completely.
- Pull the lever rearward to engage the 4WD and push the lever forward 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

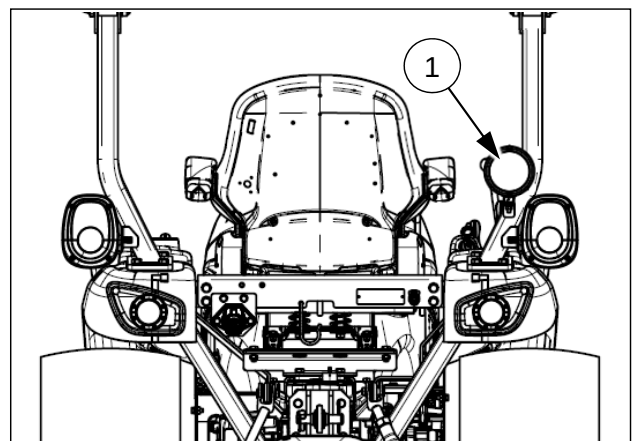


Caution

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

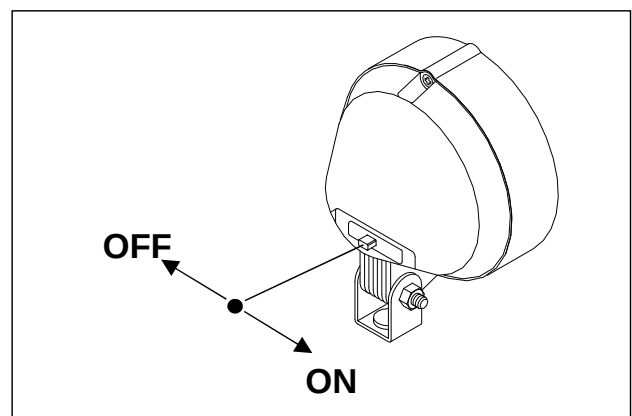
(3) Rear work light switch

- There is a switch to turn on/off the rear work light ①.
- Operate the switch on its back as the right figure.



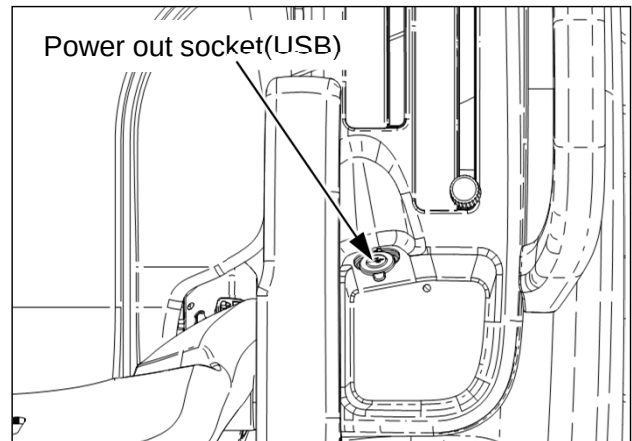
Caution

- ▶ 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.



(4) Electrical power outlet socket (USB)

- This is used to charge or supply the electric power to the electric USB device like as cellular phone.
- This is installed on the rear side of the right-hand lever guide
- Electric outlet power:
5V 1.0 ampere and 5V 2.1 ampere.

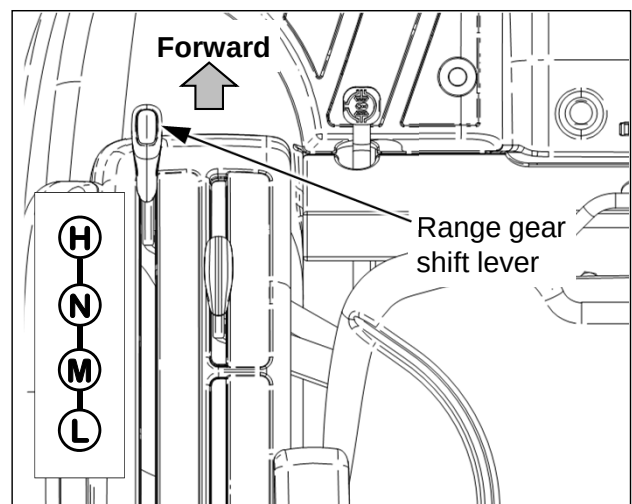


Notice

► Before connecting the USB device, check the current capacity.

(5) Range gear shift lever

- Three speed range gears and neutral position is available.
- The shifting position of the range gear shift lever is in the order of high speed to neutral to medium speed to low speed from the front side as shown in the right figure.
- Before operating the range gear shift lever, press down the brake pedal and stop the tractor completely.

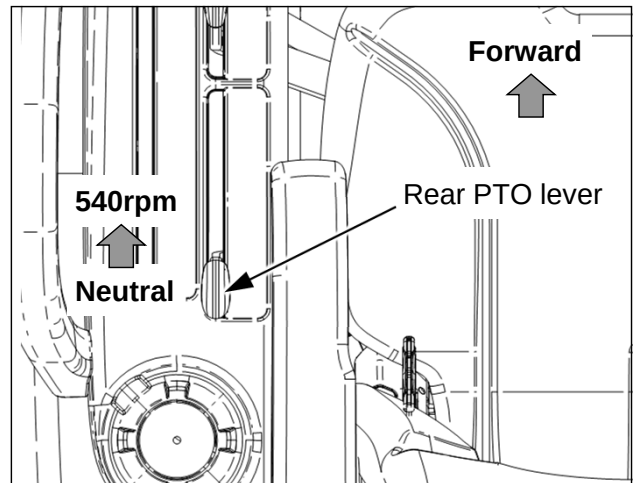


Notice

► Operate the range gear shift lever by correct "I" pattern. If operated diagonally, it may cause a failure.

(6) Rear PTO lever

- It is used to engage/disengage the rear PTO gear. 540 RPM gear and neutral position is available.
- Before operating the rear PTO lever, depress the clutch pedal and put PTO switch to “OFF” position, and stop the PTO shaft completely.
- Push the rear PTO lever forward to engage the 540 RPM gear, and pull the lever rearward to disengage the rear PTO.
- *For further information about the PTO shaft, see chapter 4-5-(2) in this manual.*

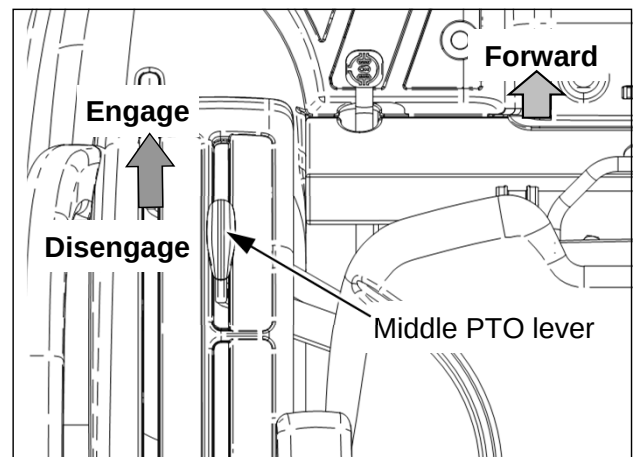


Notice

- ▶ Operate the PTO gear lever by correct “I” pattern. If operated diagonally, it may cause a failure.
- ▶ If the PTO gear lever is not engaged smoothly, shift the lever again after lifting up the implement from the ground to align the drive shaft.

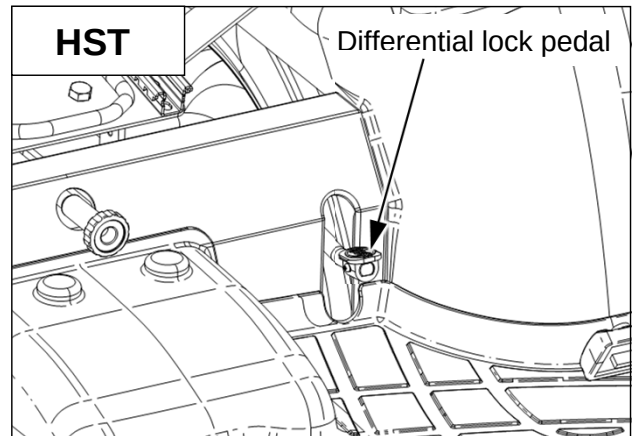
(7) Middle PTO lever

- It is used to engage/disengage the middle PTO gear.
- Before operating the middle PTO lever, put PTO switch to “OFF” position and stop the PTO shaft completely.
- Push the middle PTO lever forward to engage the middle PTO gear, and pull the lever rearward to disengage the middle PTO gear.
- *For further information about the PTO shaft, see chapter 4-5-(2) in this manual.*



(8) Differential lock pedal

- If the tractor cannot go forward as one side rear wheel is slipping, stop the tractor and press down the differential lock pedal.
- The differential lock is effective for working on a slippery ground.
- If the differential lock is engaged, both rear wheels will rotate at equal speed. So, It can disturb the steering operation and you cannot turn smoothly.
- Take your foot off the pedal to release the differential lock. If the differential traction force is reduced to some extend, the differential lock is released automatically.
- If the differential lock does not disengaged automatically, i.e., the turning radius is larger than normal condition and the turning is not smooth, turn the steering wheel left and right after stopping the tractor.



Warning

- ▶ Do not turn the tractor while the differential lock is engaged.
- ▶ Do not use this differential lock while driving on public roads.
- ▶ Stop or drive slow the tractor before engaging the differential lock.

3-3. Hydraulic system

(1) Safety precautions

- Hydraulic oil leaking under pressure can penetrate skin and cause infection or other injury. To prevent personal injury, comply with the instructions as below.
 - Relieve all pressure before disconnecting hydraulic lines.
 - Before applying pressure, make sure all connections are tight and components are in good condition.
 - Never use your hand to check for suspected leaks under pressure.
 - If injured by leaking fluid, get medical attention immediately.
- The hydraulic hoses and fittings on your tractor meet engineering specifications for the particular function. When replacing damaged parts, use only manufacture authorized service parts.
- Care in hydraulic hose installation is a must:
 - Make sure pressure is relieved before starting installation procedure.
 - DO NOT kink or twist a hose, failure may occur. Properly route the hose.
 - Have a certified hydraulic technician install the hose.
 - Remove air from the hydraulic system after installing any hydraulic component.
- Periodically check hydraulic system for leaks or damaged parts - kinked, crushed, flattened, hard blistered, heat cracked, charred, twisted, soft or loose covered hoses and fittings.
- DO NOT pull or apply external forces to the hose. The hose may fail and cause injury.
- Keep all persons away from the working area. If a hose fails, mechanisms controlled by fluid power can become hazardous. Lifted mechanisms can fall to the ground, steering system may fail, etc.
- Stay clear of a pressurized hose assembly that has blown apart. Hose fittings can be thrown off at high speed and a loose hose can whip around with great force.
- Hydraulic oil can reach high temperatures. *Wait for all components to cool before you perform any maintenance or adjustment operation. Do not handle any service fluid (engine coolant, engine oil, hydraulic oil, etc.) at temperatures that exceed 50 °C (122 °F). Allow fluids to cool.*
- Vibration can reduce hose service life. Make sure all retaining clamps and/or devices are secured.
- Environmental conditions can cause hose and fittings to deteriorate. *You must periodically inspect the hydraulic hoses. See the Maintenance chapter for general inspection precautions. The hoses do not require any operator-performed maintenance. Always see your authorized local dealer for hydraulic hose repair or replacement.* Replace worn or damaged hoses and fittings.
- Before checking or repairing the hydraulic system, make sure the engine is stopped, and all the transmission gears are in neutral, and lower the implements to the ground.

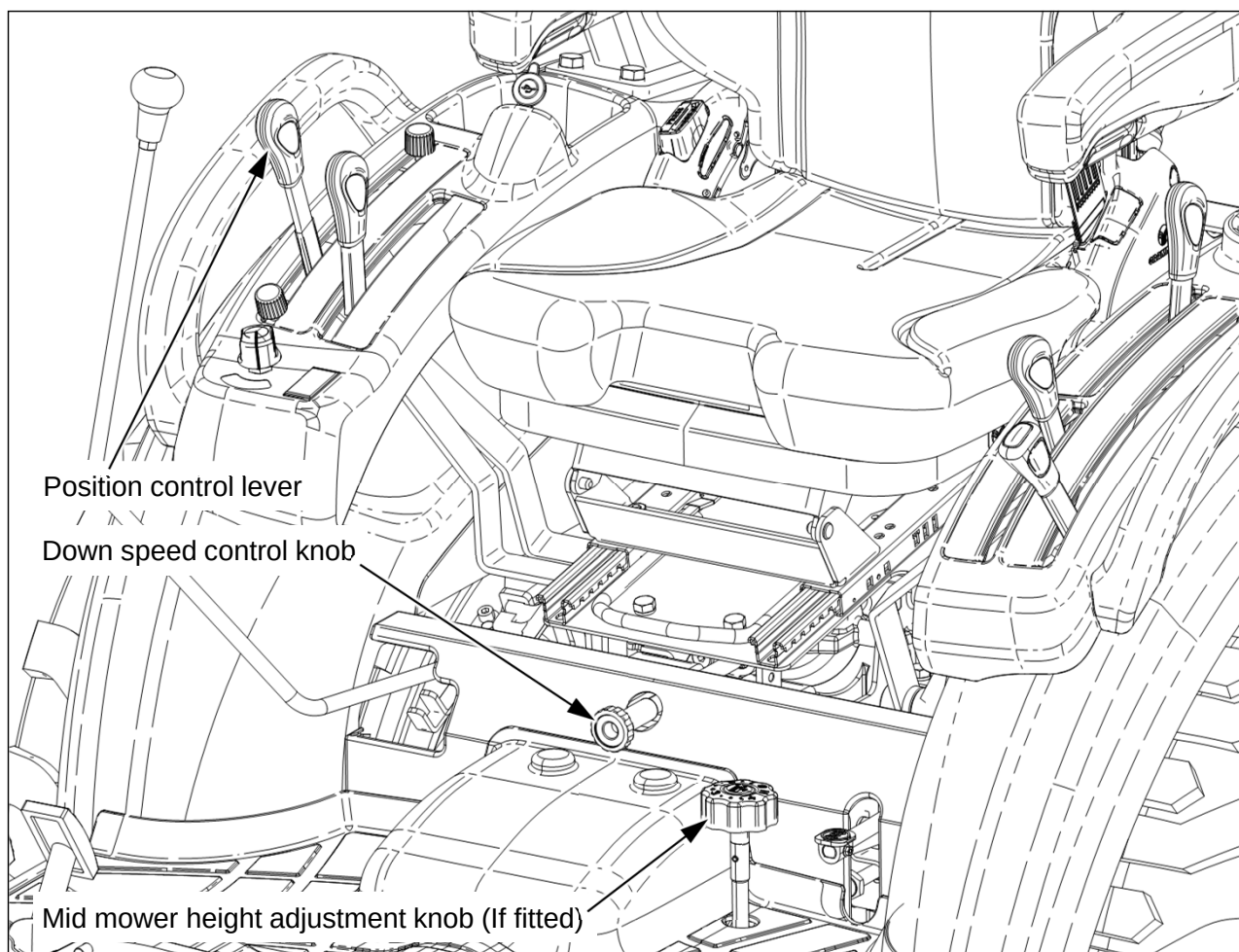
 Warning	▶ Before removing hydraulic pipes or hoses and other parts, make sure to check that hydraulic pressure is relieved completely. The leaks of pressurized oil can cause a fatal physical injury.
	▶ Use proper protection equipment, before servicing the hydraulic system. ▶ Before connecting or disconnecting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

(2) Steering system

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

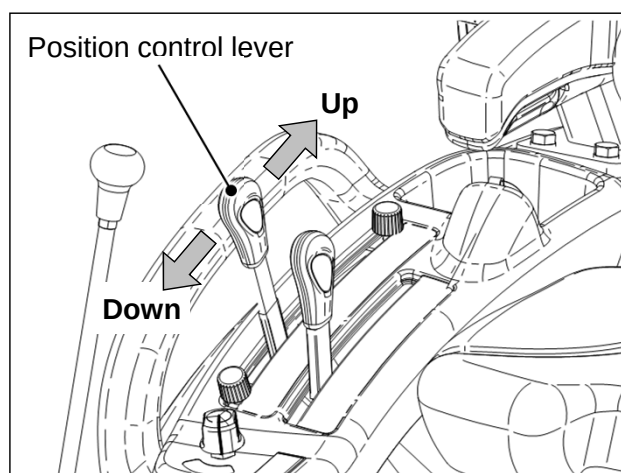
Notice	▶ When the engine is stopped, the steering wheel becomes hard to turn. But this does not mean a failure. It can be only used in an emergency state. ▶ When releasing the steering wheel after steering operation while driving, the steering wheel does not return to neutral position automatically.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



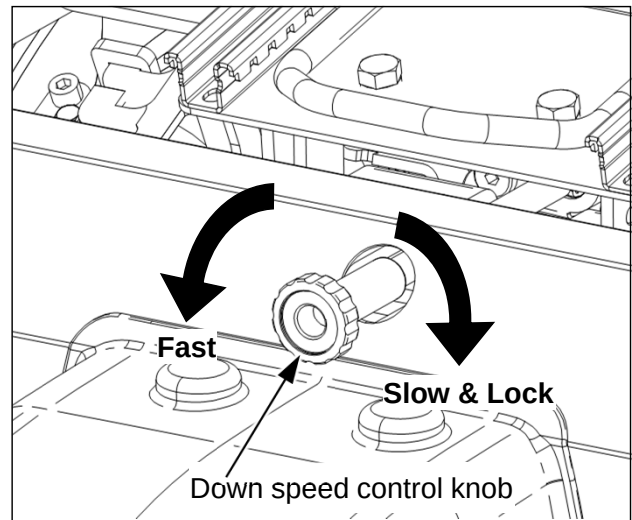
① Position control

- The 3-point linkage can go up/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 speed. If it does not raised at the low rpm, increase the engine speed.
 3. If releasing position control lever, the lever goes to neutral automatically and the 3-point linkage shall be stopped.



② Down speed control knob

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

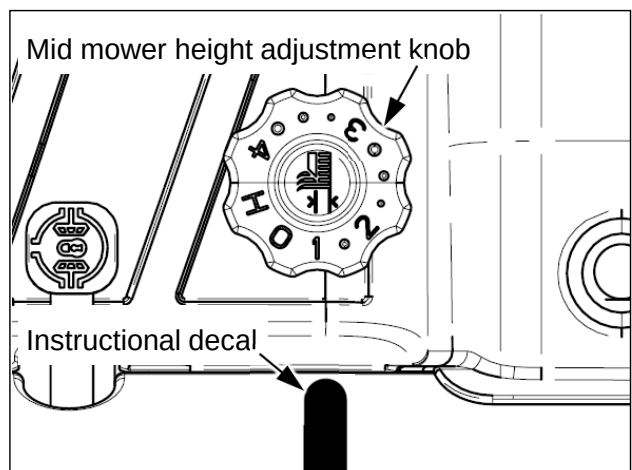
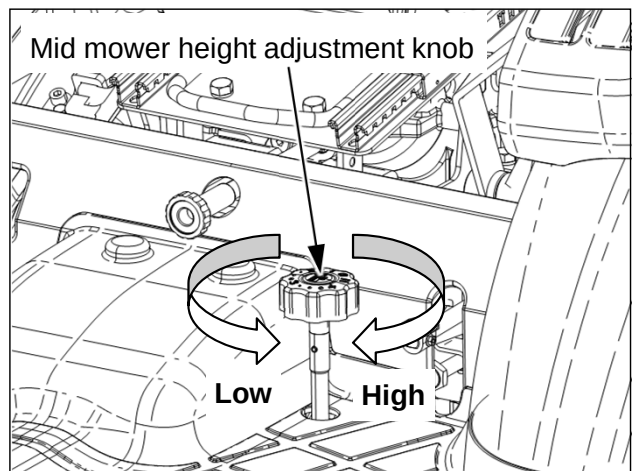


Warning

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

(4) Mid mower height adjustment knob (If fitted)

- This is used to adjust the height of the mid mower while working.
- At first, lift up the rear 3-point linkage and mid mower.
- If rotating the knob counter-clockwise, the height of the mid mower will be lowered, and otherwise, the height will be lifted. The height will be adjusted by several steps from "O" to "H".
- When rotating the knob, refer to the numbers or marks on top of the knob indicated by an instructional decal to estimate the height of the mid mower.
- Lower down the rear 3-point linkage and mid mower.

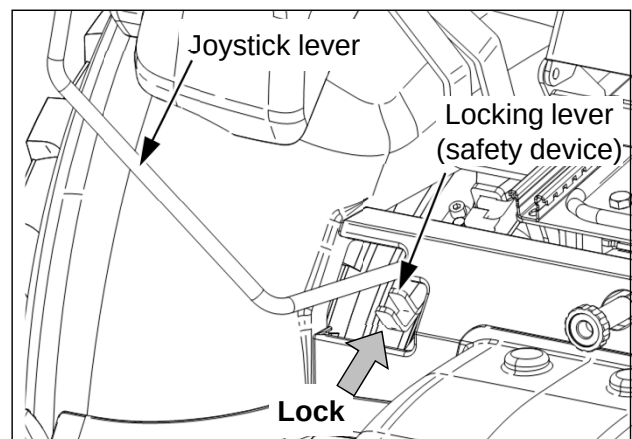
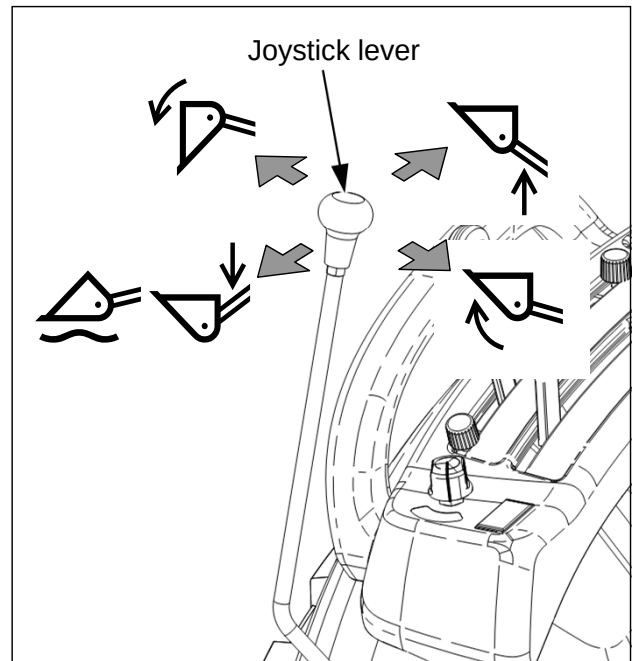


Notice

- ▶ Do not try to turn the mid mower height adjustment knob clockwise without lifting the position control lever.

(5) Joystick lever

- Multi-functional joystick lever helps to operate the front loader comfortably.
- The joystick lever can be operated basically in four directions as shown in the right figure.
- If you move the joystick lever diagonally, loader and bucket shall be operated at the same time. In this case, the light loaded cylinder may be moved first.
- If you want to float the bucket along the ground, lower the front-end loader and push forward the joystick lever to the floating position.
- After finishing work, pull the lever and place it in neutral position.
- Locking lever as shown in the right figure is used to lock the joystick lever.
 - Pull from the joystick : Unlock
 - Push to the joystick : Lock
- For further information, See chapter 4-5 –(7), “Using Front-end loader” in this manual.

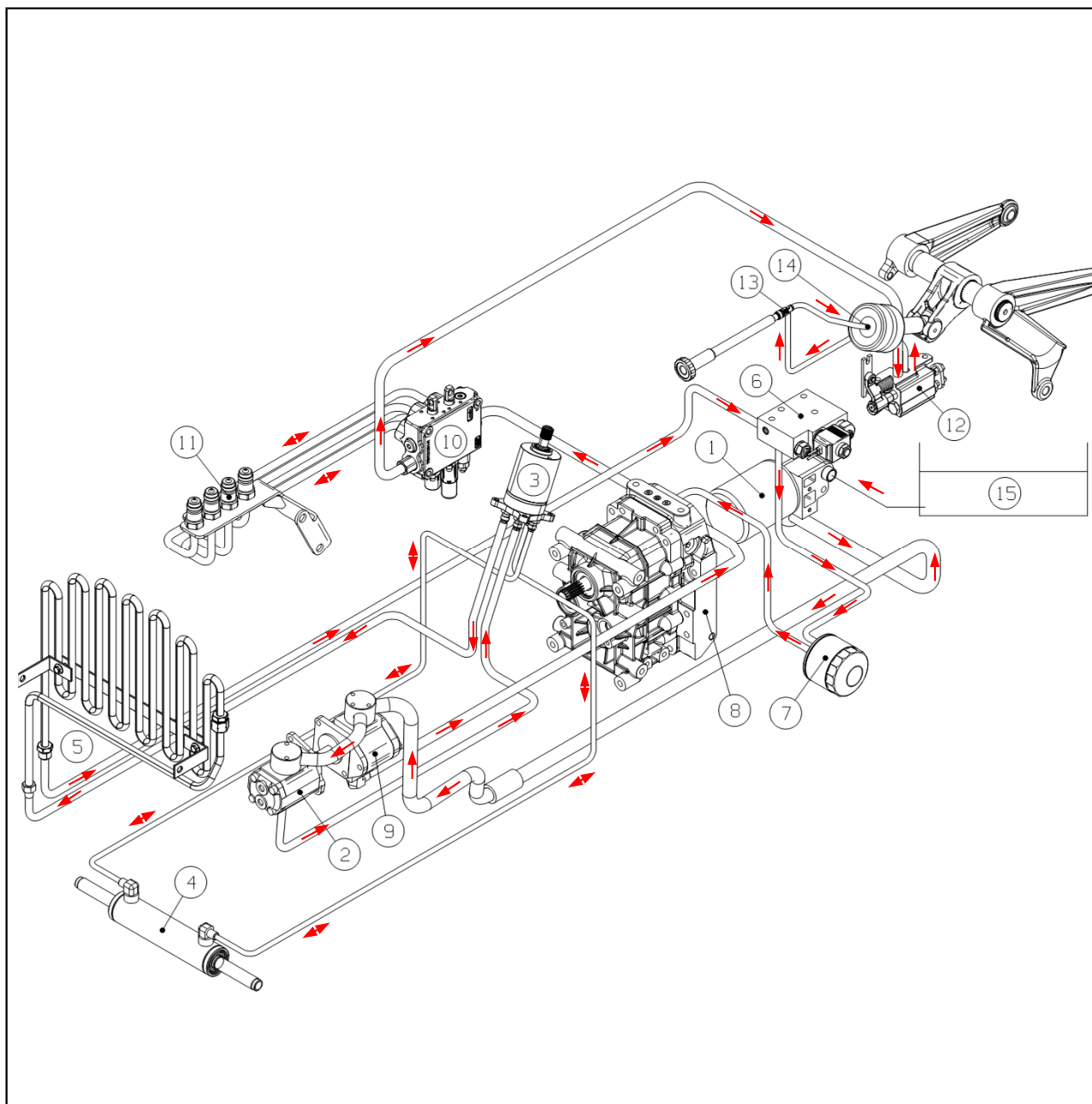


<Meaning of symbols>	
	Loader up
	Loader down
	Bucket floating
	Bucket up
	Bucket dump

	Warning	▶ Before removing hydraulic pipes or hoses and other parts, make sure to check that hydraulic pressure is relieved completely. The leaks of pressurized oil can cause a fatal physical injury.
		▶ Use proper protection equipment, before servicing the hydraulic system. ▶ Before connecting or disconnecting the hydraulic quick couplers, lower the implements to the ground, and check that the hydraulic pressure is relieved.
	Warning	▶ To prevent an accident, push and lock the locking lever when you do not use the joystick lever.

(6) Hydraulic System Diagram

HST type



- | | |
|----------------------------|----------------------------------|
| 1. Hydraulic oil filter | 9. Hydraulic lift pump |
| 2. Hydraulic steering pump | 10. Front loader valve |
| 3. Steering unit | 11. Quick couplers |
| 4. Steering cylinder | 12. Hydraulic lift control valve |
| 5. TM oil cooler | 13. Down speed control valve |
| 6. PTO valve | 14. Hydraulic lift cylinder |
| 7. HST filter | 15. Oil tank (Transmission case) |
| 8. HST unit | |

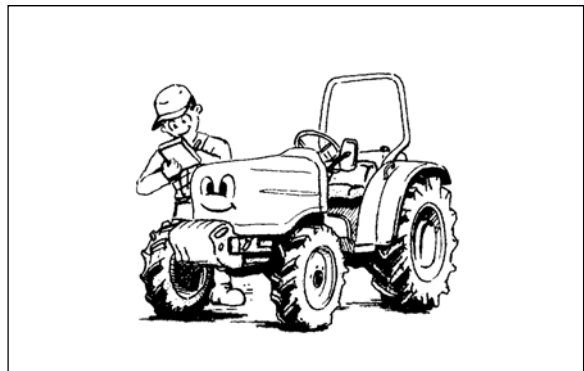
4. Operation and Work

4-1. 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 (Engine brake-in procedure)

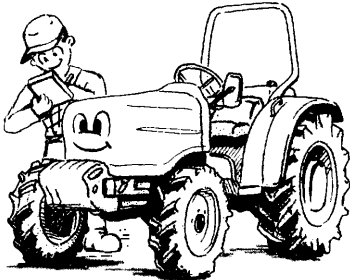
- To get the best performance, comply with the followings.

- DO NOT start or stop the tractor suddenly.
- DO NOT operate heavy loaded work and do not increase the engine rpm to high speed suddenly.
- Despite warm ambient temperature, warm up the engine for about 5 minutes at low idle rpm.
- Use the lower gear ratios when pulling heavy loads and avoid continuous operation at constant engine speeds. You will save fuel and minimize engine wear by selecting the correct gear ratio for a particular operation



- Avoid prolonged operation at either high or low engine speeds without a load on the engine.
- Check the instruments frequently and keep the radiator and oil reservoirs filled to recommended levels. Daily checks include the engine oil level, radiator coolant, and air cleaner.
- After using the first 50 hours, be sure to perform the maintenance items listed in the maintenance schedule. *Refer to the chapter 5-4, "First 50 hour check" in this manual.* If possible, contact your authorized local dealer for "First 50 hour check".

4-2. Engine Start and Stop

 Caution	▶ Check each part before starting the engine. ▶ Check if there is some other people around before starting. ▶ Place all the levers and switches in NEUTRAL or OFF position.	
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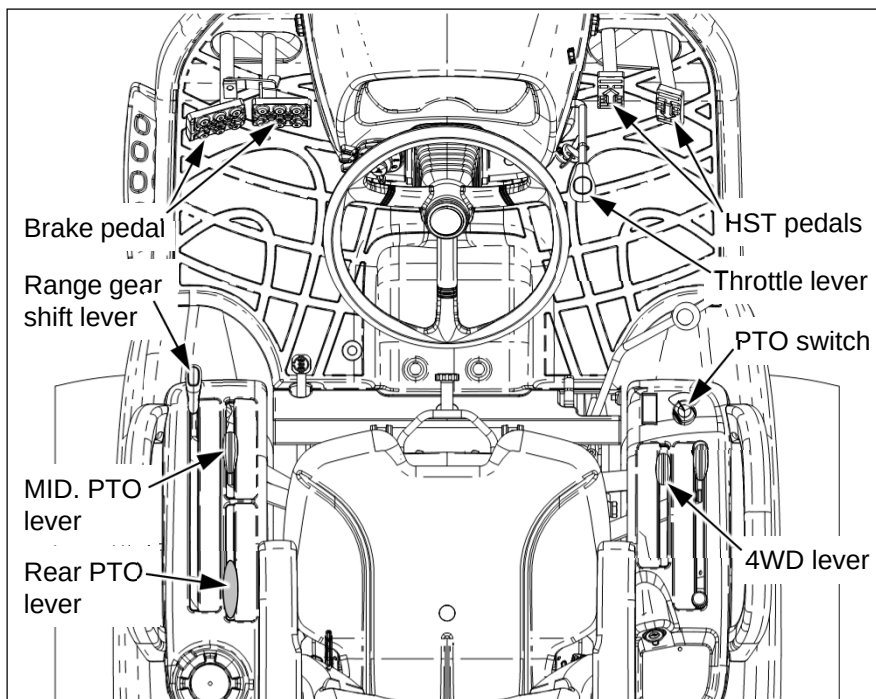
(1) Engine start

HST type

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

2. Place the HST pedal, range gear shift lever in **NEUTRAL** position. Put PTO switch in "**OFF**" position and place the rear/MID PTO lever in neutral position.

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



4. Turn key switch to "**ON**" position and check if the battery charging indicator and engine oil pressure indicator are turned on.

5. Wait until the cold start aid indicator is turned off. (for about 10 seconds)

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

7. Check if the engine oil pressure indicator and battery charging indicator are OFF. If any of these indicators are ON, stop the engine and check the problem.

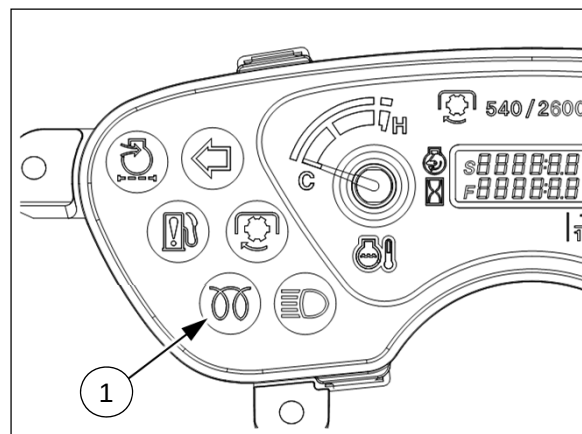
6. Turn the key switch to "Start" position. As soon as the engine starts, release the key switch to "ON" position

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

 Caution	► To start the engine, comply with the followings. If not, the engine can not start even if turning the key switch to "Start" position. - put PTO switch to "OFF" position. - release the HST pedal in neutral position. (HST models only) - place the rear/MID. PTO lever in neutral position. ► DO NOT operate the starter motor more than 10 seconds. If the engine does not start, wait for 1~2 minutes before restarting. ► When the engine is running, DO NOT turn the key switch to "START" position. It may cause a failure of the starter motor. ► In cold weather, be sure to warm up the engine sufficiently. If using the tractor suddenly in cold weather, the engine life can be reduced.
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(2) Start in cold weather

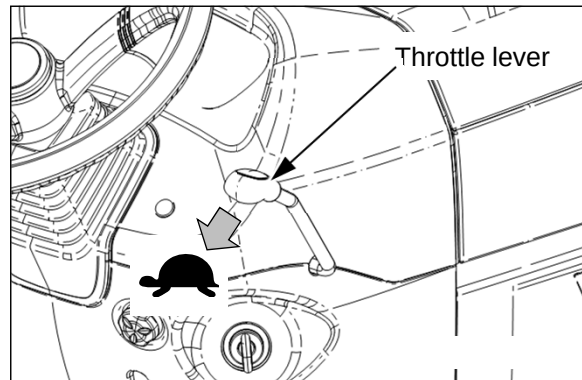
- Pull the throttle lever to the low idle position.
- Start the engine after operating the cold start aid indicator① sufficiently.
- If the engine runs smoothly, carry out warm-up for 5~10 minutes at low idle position.
- Use the engine oil for winter in cold weather.
Refer to the chapter 5-3, "Lubricants and Capacity" or the last page in this manual.
- Use the diesel for winter when it is very cold weather. It is much easier to start the engine.



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

- Pull the throttle lever backward to reduce the engine speed and turn the key switch to “OFF” position. The engine shall be stopped.
- Remove the ignition key after stopping engine.



Notice	► To stop the engine after finishing heavy work, run the engine for about 2 minutes at the low idle rpm. If you stop the engine suddenly, the engine life could be reduced.
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4-3. How to drive and stop

(1) Transmission Warm-up in cold weather

The tractor hydraulic oil also serves as the tractor transmission fluid. During cold weather operation, the hydraulic oil viscosity increases. This increase in oil viscosity restricts the oil's ability to flow and lubricate in the transmission and hydraulic circuits. The cold oil can result in abnormal noises and slower operation times due to the increased oil viscosity.

NOTE: A warm up time at **50%** rated engine speed is recommended to assure proper vehicle functionality, transmission lubrication and operation.

NOTE: Do not operate the tractor under full load condition until the hydraulic oil is sufficiently warmed up.

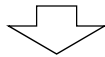
Ambient Temperature	Recommended Warm-Up Time
Above 0 °C (32 °F)	Minimum of 5 minutes
0 – -10 °C (32 – 14 °F)	5 to 10 minutes
-10 – -20 °C (14 – -4 °F)	10 to 15 minutes
Below -20 °C (-4 °F)	More than 15 minutes

 Warning	► Unexpected movement! During the warm-up operation, do the following: Engage the parking brake, set all shift levers to their NEUTRAL positions, and place the Power Take-Off (PTO) switch in the OFF position. Failure to comply could result in death or serious injury.
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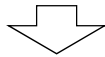
(2) How to drive

HST type

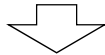
1. Lift up all the implements (front/middle/rear) from the ground after starting engine



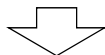
2. Set the engine speed more than 1500 rev/min.



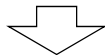
3. Place the range gear shift lever on a suitable position.



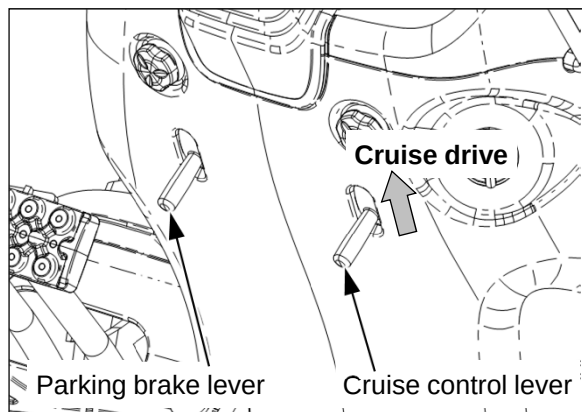
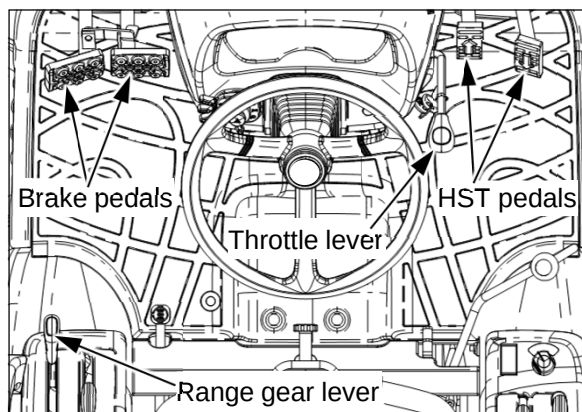
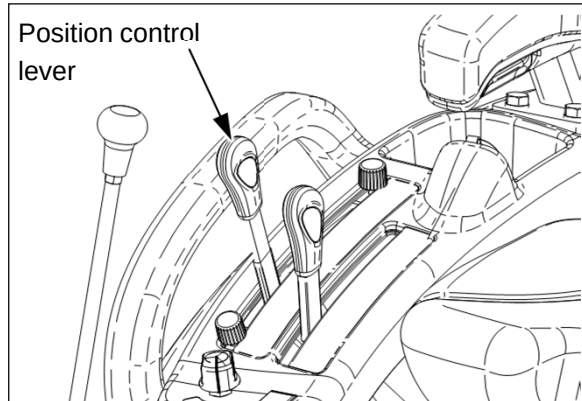
4. After pressing down the brake pedals, release the parking brake.



5. Press the HST pedal down slowly to move the tractor.



6. To enter the cruise control mode, move the cruise control lever upward while driving forward. To exit the mode, press down the brake pedals or HST forward pedal deeper once, the cruise control drive will be quitted. Do not push down the cruise control lever to quit the cruise drive mode. It may cause a failure of the cruise linkage system.



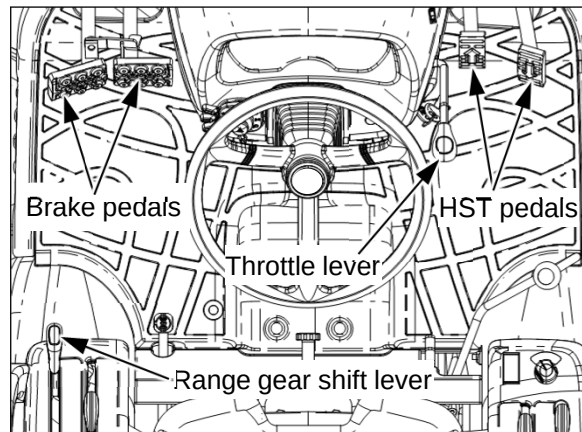
Caution

- For driver's safety, if the operator leaves the driver's seat without safety measures, the engine shall be stopped automatically. *For further information, see chapter 2-1-(2) in this manual.*
- When driving or working with the HST model, operate it more than 1500 rev/min for stability of the hydraulic system.
- Press down the HST pedals slowly to prevent a sudden start of the tractor.

(3) Changing speed

HST type

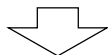
- Move the throttle lever forward to increase the driving speed.
- Press down the HST pedal slightly or fully to control the driving speed.
- Set an appropriate driving speed according to the road conditions with the range gear shift lever.
- Before operating the range gear shift lever, release the HST pedal to return to the neutral position, press down the brake pedals, and stop the tractor completely.



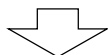
(4) Emergency Stop

HST type

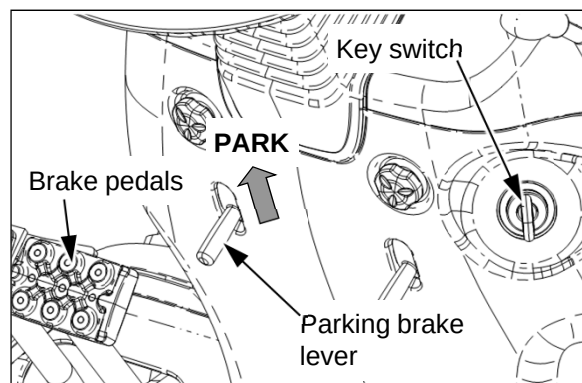
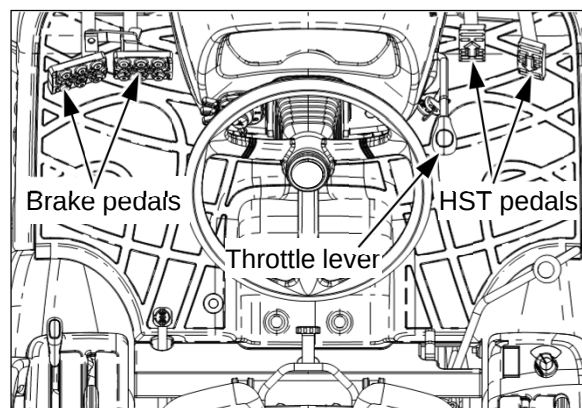
1. Release the HST pedal and press down the brake pedals immediately. Turn off the key switch.



2. Do not press down the HST pedal before the engine has been stopped completely.



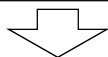
3. Apply the parking brake after pressing brake pedals.



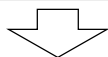
(5) Stopping tractor

HST Type

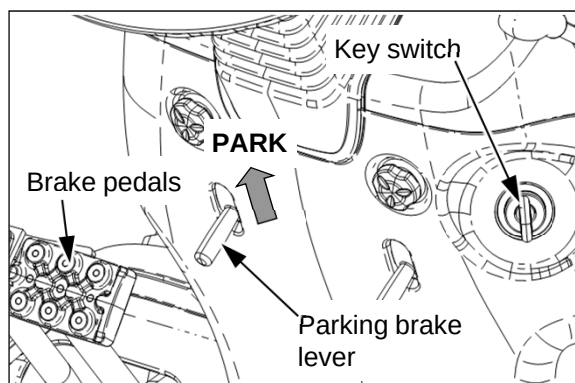
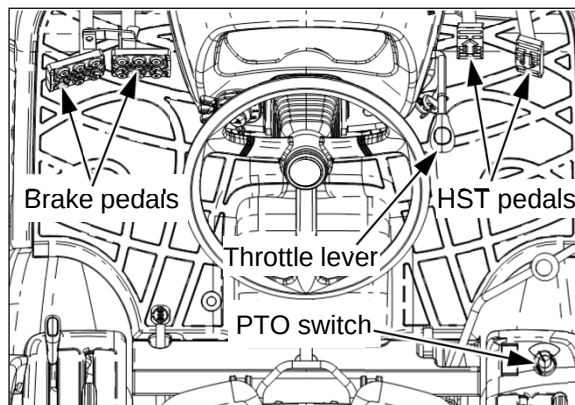
1. Release the HST pedal slowly and pull the throttle lever to "Low" speed position. Place all the transmission gear levers in neutral position and put PTO switch in "OFF" position.



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



3. Apply the parking brake after pressing brake pedals, and release the brake pedals slowly.

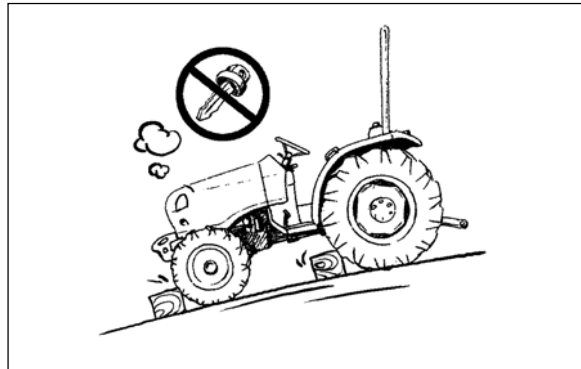


Caution

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

(6) Parking

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



Caution

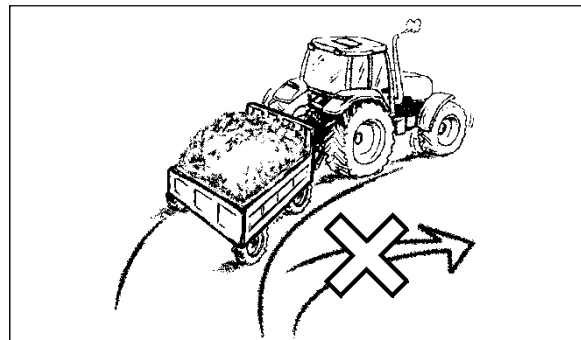
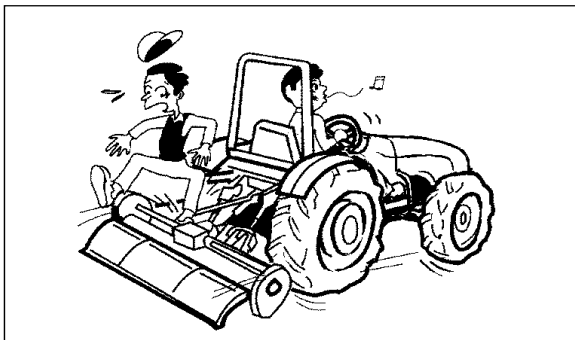
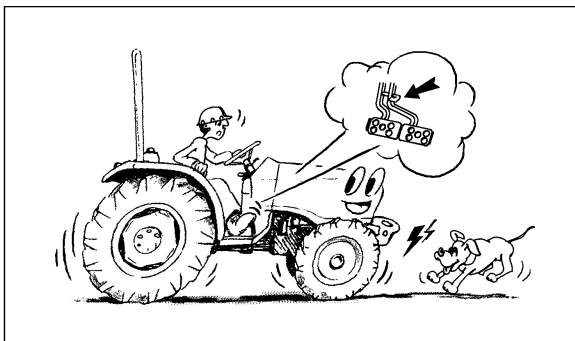
► If it is necessary to park the tractor on a slope, furthermore with loaded trailer, the tractor may roll down, even though the parking brake is applied. In this case, apply all the gears in lowest speed and apply wheel chocks or blocks to the all tires.

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

4-4. Transport on public roads

(1) Safety rules when driving tractor on the roads

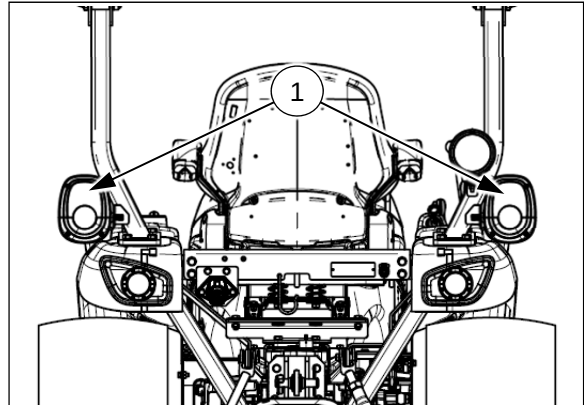
- When facing downhill, DO NOT place the transmission gear lever in neutral position.
- When driving the tractor on an unpaved road with a heavy rear implement on the 3-point linkage, do not drive fast and do not lift up the implement to the highest position. The hydraulic lift system may be damaged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



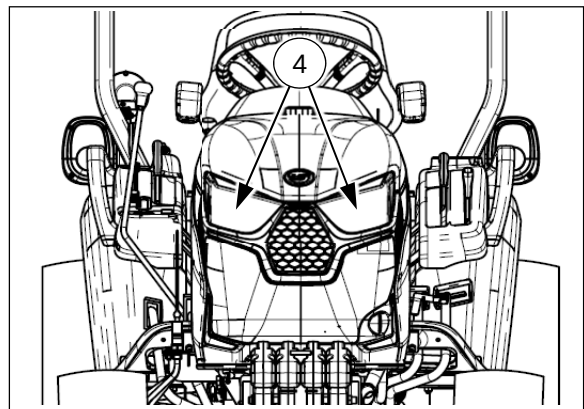
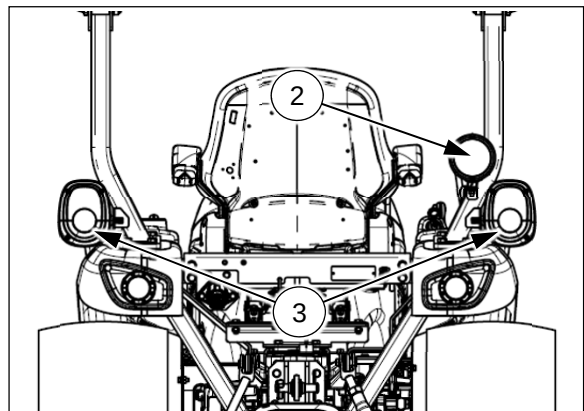
 Caution	▶ Avoid a sudden start, sudden brake and sharp turn. ▶ DO NOT allow people on the tractor or other implements. ▶ DO NOT place the baggage on the tractor or implement. ▶ Place the rear/MID PTO lever in neutral position and put PTO switch in "OFF" position. ▶ DO NOT use the differential lock and disengage the four wheel drive(4WD). ▶ When traveling with implement on the rear 3-point linkage, tighten the stabilizer to avoid lateral movement. ▶ When traveling with implements, turn slowly by wide turning radius. ▶ While traveling on public roads, do not ride your foot on the brake pedal. ▶ While traveling on public roads, do not operate any implement such as tiller, loader etc.
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(2) Light operation

- Your tractor is equipped with the following lights.
- ① Turn signal lights and Hazard warning lights
- ② Rear work light②(optional) mounted behind the Roll Over Protective Structure (ROPS).
- ③ Tail lights and brake lights
- ④ Headlights



- Use the hazard warning lights and headlights (low beam) when you are traveling on public roads day or night.
- Do not modify the lamps or change the bulb capacity arbitrarily.
- When driving the tractor on public roads, operate the lights according to your local traffic regulations.
- *For the details about light operation, refer to the chapter 3 in this manual.*



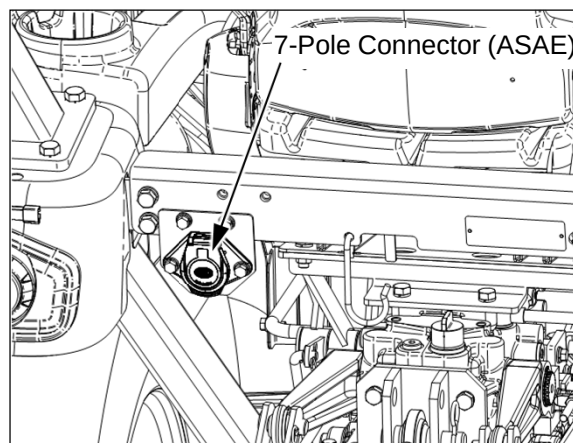
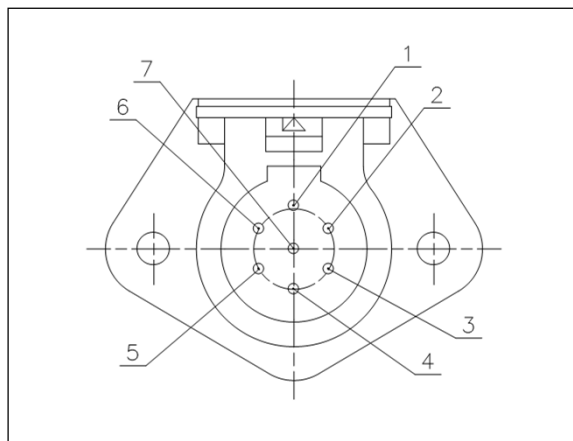
 Warning	▶ Modified lamps or change bulb capacity may cause a traffic accident by disturbing approaching driver's views. ▶ If the lamp is blown out, replace it immediately with a genuine part. In case of driving at night, it may cause a traffic accident.
 Caution	▶ If using the hazard warning lights for a long time while the engine is stopped, the battery can be discharged completely due to high electrical power consumption.

(3) 7-Pole connector (optional)

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

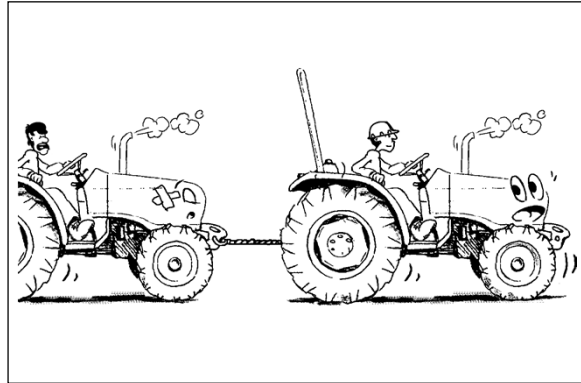
- **ASAE Version**

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



(4) Notices when towing the tractor

- If your tractor needs to be towed for a short distance, use the hitch (or drawbar) or front towing hook. Do not connect to other structures such as rear axle, ROPS, front axle, steering components for towing. These components could be damaged by the chain or by excessive strain.
- Your tractor can be steered for a short distance without engine running, but it will be hard to turn the steering wheel. If possible, run the engine for steering and lubrication.
- When being towed, disengage the 4WD, differential lock, parking brake and place all gear shift levers in neutral position.
- Check the horizontal and vertical permissible load of the hitch (or drawbar) before towing. The load is different with trailer brake, and stopping distance increases with speed and weight of towed loads and slope. Make sure you consider the total weight of the equipment and its load. (See chapter 4-5-(3). "Hitch and Drawbar" in this manual.)
- Drive slowly when towing extremely heavy loads.
- Do not tow trailers that are not fitted with an independent braking system.



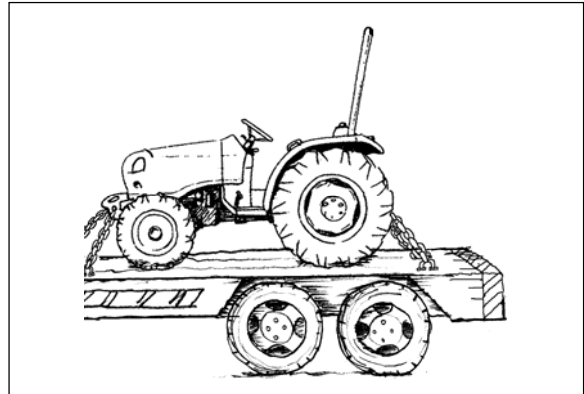
 Warning	► Unexpected machine movement! Never attempt to start the machine by towing. The machine could start unexpectedly. Failure to comply could result in death or serious injury.
 Warning	► Transport hazard! Do not tow the machine on public roads. Towing could cause a safety hazard for other vehicles using the roadway. Failure to comply could result in death or serious injury.
 Warning	► Hazard to bystanders! Do not use cables or rope to tow the machine. If the cable or rope breaks or slips, it may whip back with enough force to cause serious injury. When using a chain, attach the chain with the hook's open side facing UP. If the hook slips, it will drop down instead of flying up. Failure to comply could result in death or serious injury.
Notice	► If it is necessary to tow the tractor, all gear levers must be moved to the neutral position before stopping the engine otherwise damage to transmission components may occur during towing.

- Use a strong chain when towing the tractor. Tow the tractor from the rear using only the drawbar. Tow the tractor from the front using the tow pin in the front weights or front support. Have an operator steer and brake the tractor. If possible, run the engine to provide lubrication to the transmission and power steering.
- Place the transmission gearshift levers in neutral, disengaged the front wheel drive, differential lock and park brake to tow the tractor. Do not exceed **20 km/h (12 mph)**.

NOTE: The tractor should only be towed a short distance, such as out of a building. Do not tow on roadways or as a method of transport.

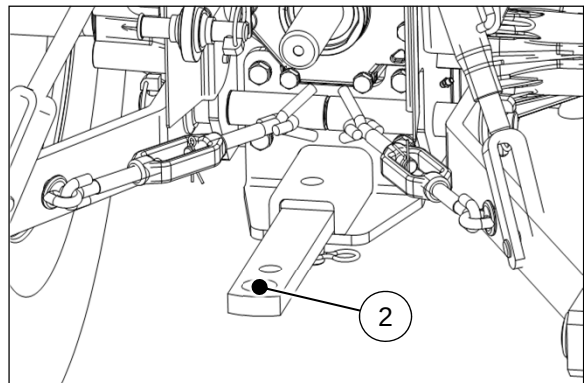
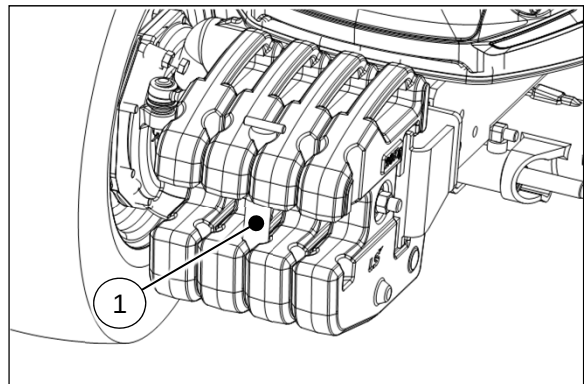
(5) Notices when transporting the tractor

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



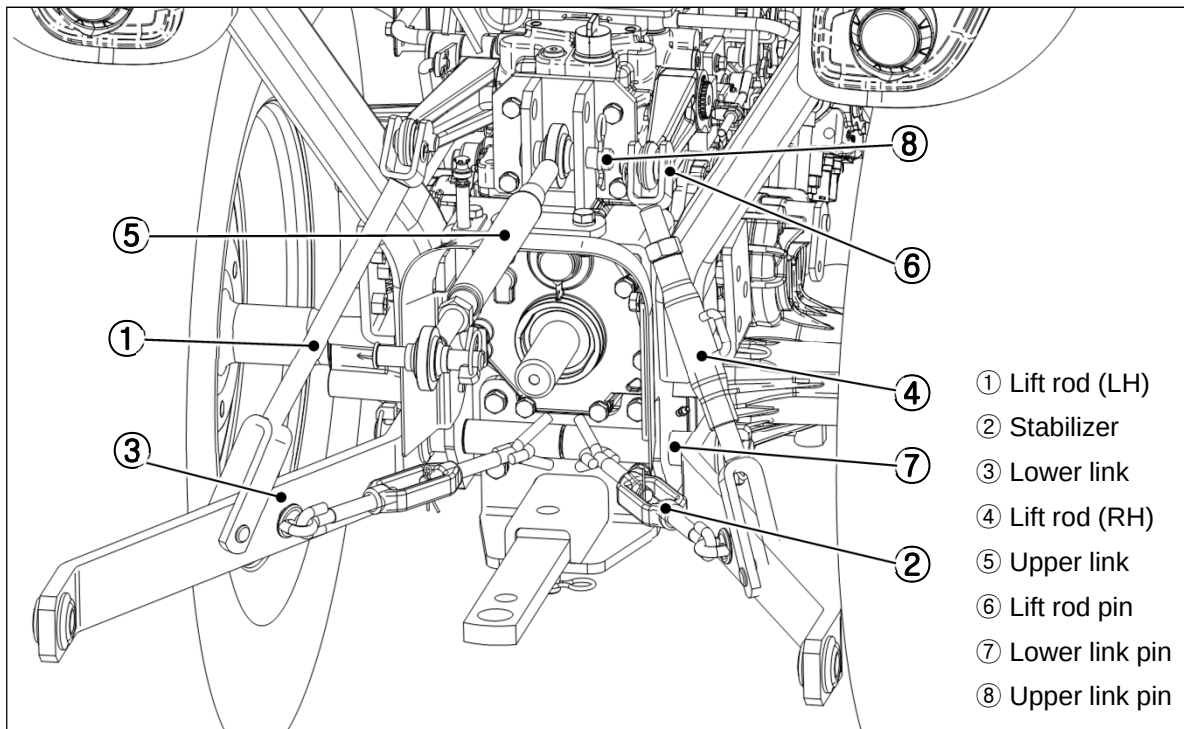
 Caution	▶ When fixing the tractor, do not hook or connect chains to the 4WD shaft, steering cylinder, tie-rod or front axle. These can be damaged by the chain or excessive strain. ▶ In case of turbocharger engine (where fitted), cover the exhaust outlet to protect that the turbocharger does not rotate by air without lubrication.
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- Transport the tractor with all four wheels on a flatbed trailer or truck. Secure the tractor as follows:
 - Secure the front of the tractor at the front towing hook①. (optional)
 - Secure the rear of the tractor at the rear drawbar or hitch②. (optional)



4-5. Field Operations

(1) Rear 3-point linkage

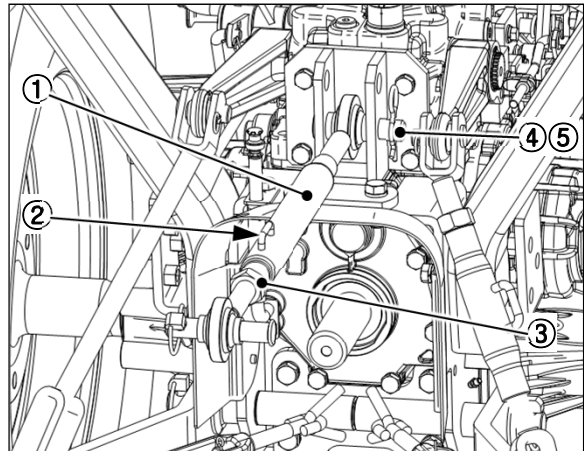


- When attaching a rear implement, comply with the followings.
 1. Set the rear implement upright on a level surface and approach the implement in reverse.
 2. Stop the tractor on a adaptable attaching position and apply the parking brake.
 3. Connect lower link(3) to the implement and insert the lock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

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

① Upper link installation and adjustment

- Adjust the length of the upper link① depending on the implements.
- To adjust the length of the upper link, loosen the lock nut③ and turn the grip② left or right.
- Fasten the lock nut③ after adjusting the length.
- **Adjustment range: 400~750mm (15.7~29.5 in.)**



Caution

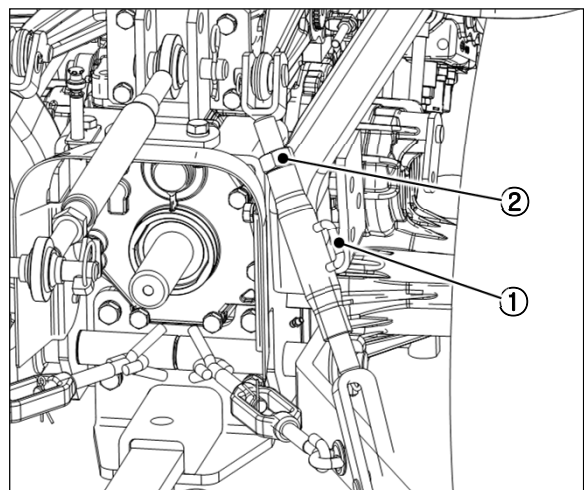
► Do not adjust the length of the upper link over the maximum limit. It may cause fatal injury or death by falling object.

Notice

► Insert the snap-pin⑤ firmly to prevent the upper link pin④ from being escaped.

② Adjustment of the lift rod's length

- The Lift rod (RH) can be adjusted by loosening the lock-nut②, and turning the grip①.
- After adjusting the length, tighten the lock-nut② again.
- **Adjustment range: 348~461mm (13.7~18.1 in.)**

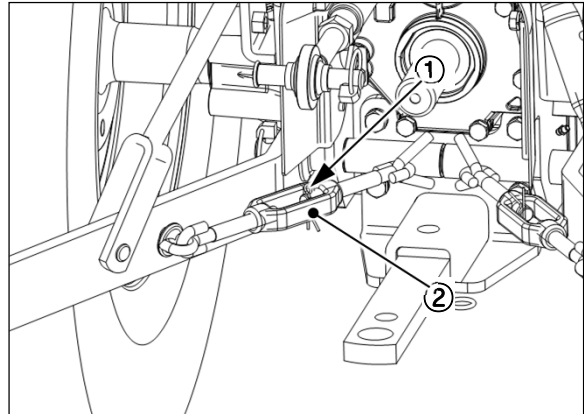


Caution

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

③ Adjustment of stabilizer's length

- The length of the stabilizer can be adjusted by turning the handle② , after removing the snap pin①.
- After adjusting the length, insert the snap pin① again.



Notice

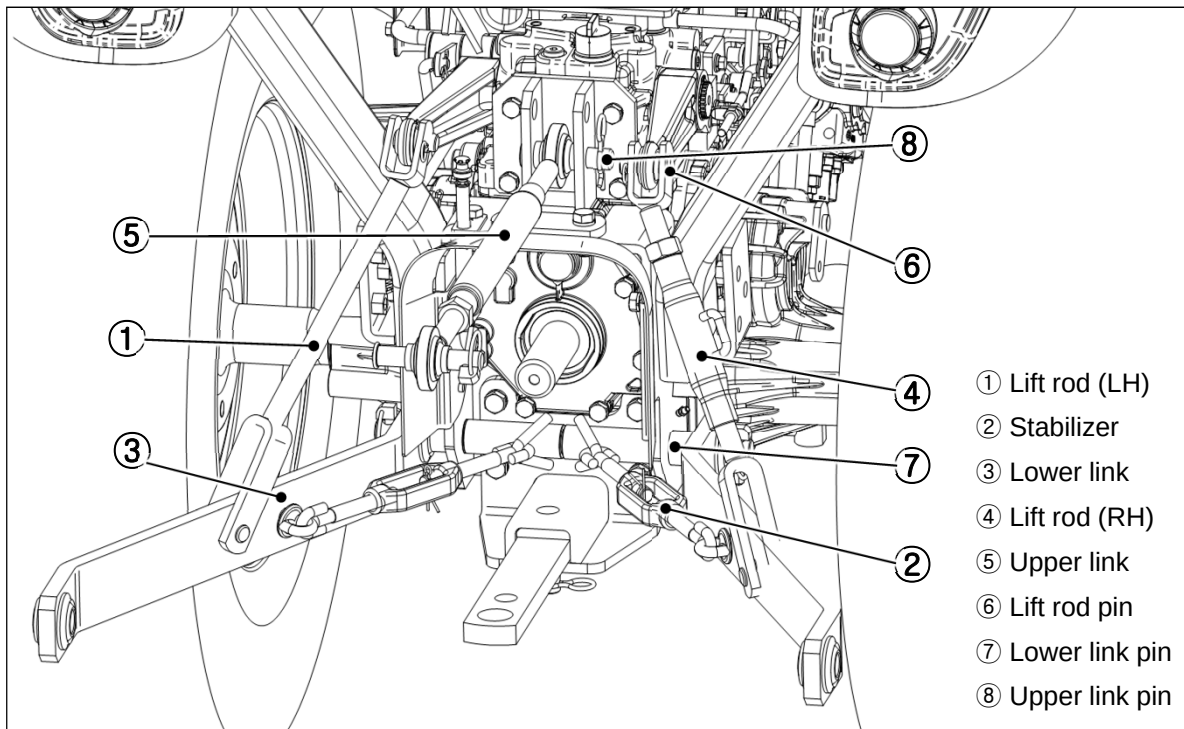
► When adjusting the stabilizer's length, set the implement's lateral swinging clearance to be 20~40mm. (0.8~1.6 in.)

④ Reference of Implement installation part

	A	B	C (MAX)	D (MIN)	E (MAX)	F (MIN)	G	H	J	K	L	N
CAT1	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 (1.38)	39 (1.53)	12 (0.47)	683 (26.8)

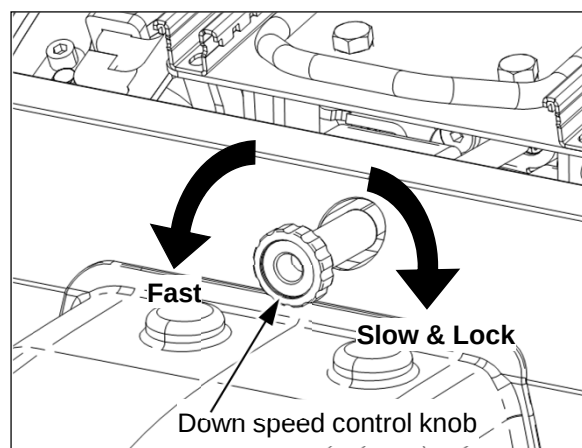
Unit : mm(inch)

⑤ Handling of the 3-point linkage



- When driving the tractor without attached implement, comply with the followings.
 1. Fix upper link ⑤ into the fixing hook installed in front of the upper link.
 2. Connect stabilizer ② to the lower link ③ to avoid lateral movement of the lower link.
- If the 3-point linkage is not necessary, 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 the lower link tightly.
And, put down the lower link.
 3. Remove the lift rod pins ⑥ and detach the lift rod (LH) and lift rod (RH).
 4. Detach the lower link ③ and stabilizer ② after removing the lower link pin ⑦.
- When using hitch/drawbar, or driving on road, lift up the 3-point linkage and fix it by turning the down speed control knob to the locking position.

 Caution	► The parts of 3-point linkage are very heavy. When handling them, take care not to get injury. PLEASE BE CAREFULL !
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(2) Power take-off (PTO) operation

① Safety precautions

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

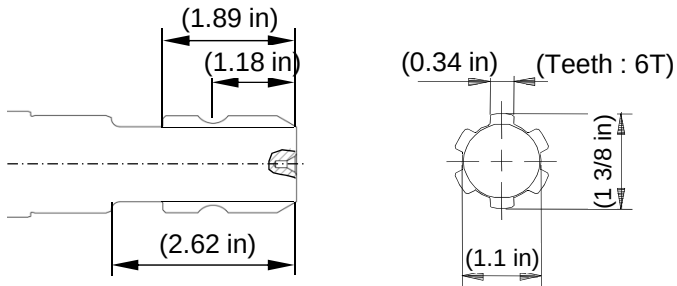


 Warning	► Do not approach the rotating shaft such as PTO shaft or cooling fan, especially, with loose and long clothes. The entanglement in rotating shaft can cause serious injury or death. Stop the engine and be sure check that the PTO shaft has stopped completely before getting near it.
	

② Specification and Dimension of Rear PTO shaft

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

- Spline Teeth: 6T (Where fitted)

Rear PTO	1 speed gear (6T)
PTO / Engine speed	540 / 2580 rpm
Rotation direction	Clockwise (When looking at PTO shaft end)
Shaft dimension (Unit : inch)	 The technical drawing shows a side view of the PTO shaft with dimensions: (1.89 in) for the top flange width, (1.18 in) for the shaft diameter, and (2.62 in) for the bottom flange width. To the right is a cross-section of the 6T spline, showing a pitch diameter of (0.34 in), a major diameter of (1 3/8 in), and a minor diameter of (1.1 in). The text '(Teeth : 6T)' is also present.

③ Specification and Dimension of Middle PTO shaft

- Spline Teeth: 15T (Where fitted)

MID PTO	1 speed gear (15T)
PTO / Engine speed	2500 / 2647 rpm
Rotation direction	Counter clockwise (When looking at PTO shaft end)
Shaft dimension (Unit : inch)	Module : DP 16/32 Number of Teeth : 15T

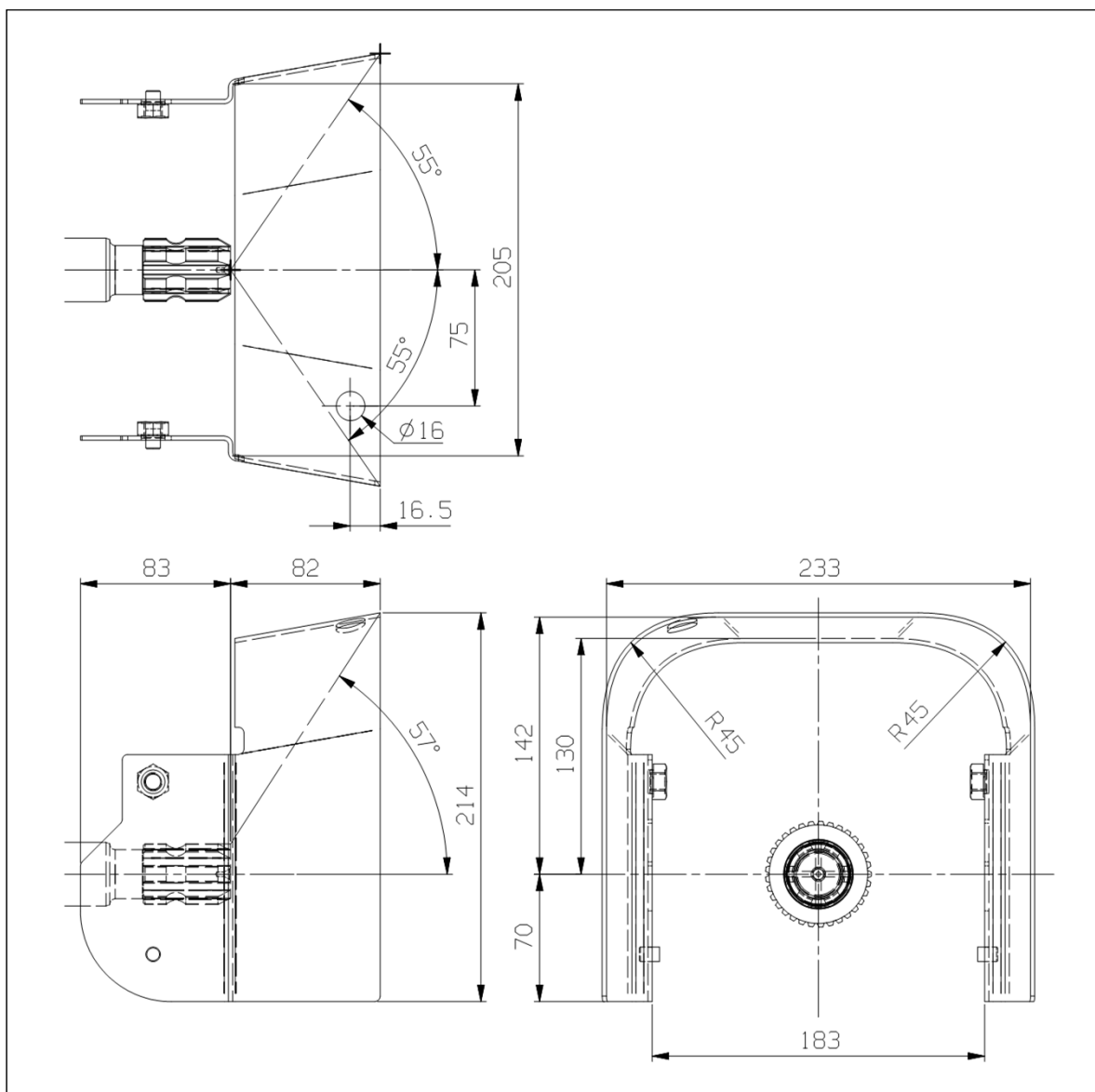
④ Attaching power take-off(PTO) drive shaft

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



Caution

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

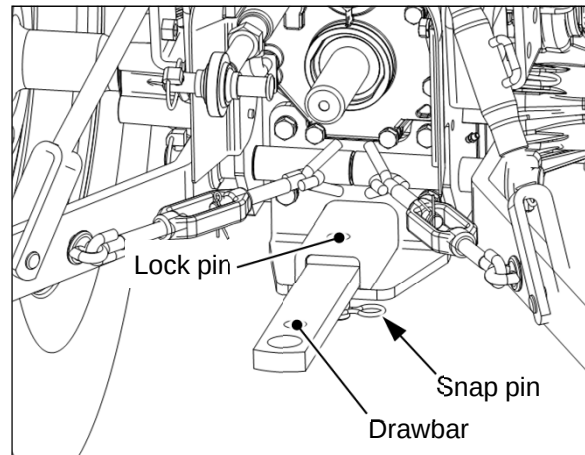


(3) Hitch and Drawbar (optional)

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

① Drawbar

- It is used to tow the equipment having 2 axles.
- It is available to adjust the length of the draw bar 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 : 300kg (661lb) – Regular position.
(Extend position is not available.)
- Horizontal load : 1000kg (2204 lb)



② Technically permissible maximum towable mass(es)

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

	Drawbar
Unbraked towable mass	N/A
Inertia-braked towable mass	1000kg (2204 lb)
Hydraulic & Pneumatic braked towable mass	N/A

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

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

	All models	Remarks
Technically total maximum permissible mass	1400kg (3086 lb)	It depends on the load capacity of the tires. (See next page)
Front axle (*)	830kg (1830 lb)	
Rear axle	980kg (2161 lb)	

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

- **Restrict operation** : In case that driving speed of the tractor does not exceed 6km/h (3.7 mph) and standard front/rear wheel tracks (*refer to the chapter 4-5-(6), “Adjusting wheel track and tire replacement” in this manual*) are applied, the intermittent maximum permissible load of the front axle can be **1200kg (2646 lb)**. But, it is restricted by 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 equipment in the raised position. ▶ Do not exceed the maximum permissible mass above and the load capacity of the tires. Overloaded operation may invalidate the warranty. ▶ DO NOT change the setting pressure of the relief valve arbitrarily to increase the lift capacity of the front loader or 3-point linkage. It can cause fatal damage to the hydraulic system and front axle.
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(5) Tires and Load capacity

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

Axle No. (*)	Tires	Standard air pressure (kg/cm ²)	Load rating per tire (kg)	Max. mass per axle (kg)	Maximum mass (kg)
1	205/65-12 4PR HS612	2.5 (250 KPa, 36 psi)	667 (1470 lb)	830 (1830 lb)	1400 (3086 lb)
2	305/70-16.5 6PR HS612	2.8 (280 KPa, 41 psi)	1915 (4222 lb)	980 (2161 lb)	
1	23x8.50-12 84 A4 (TURF)	1.6 (160 KPa, 22 psi)	505 (1113 lb)	830 (1830 lb)	1400 (3086 lb)
2	320/65-16.5 110 B (TURF)	2.1 (210 KPa, 31 psi)	1061 (2339 lb)	980 (2161 lb)	
1	22x8.50-12 4PR OTR (TURF)	1.5 (150 KPa, 22 psi)	500 (1102 lb)	830 (1830 lb)	1400 (3086 lb)
2	31x15.50-15 10PR OTR (TURF)	4.1 (410 KPa, 60 psi)	1920 (4233 lb)	980 (2161 lb)	
1	7-12 6PR HS458	2.3 (230 KPa, 33 psi)	390 (860 lb)	780 (1720lb)	1400 (3086 lb)
2	11.2-16 6PR HS458	2.2 (220 KPa, 31 psi)	755 (1664 lb)	980 (2161 lb)	

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

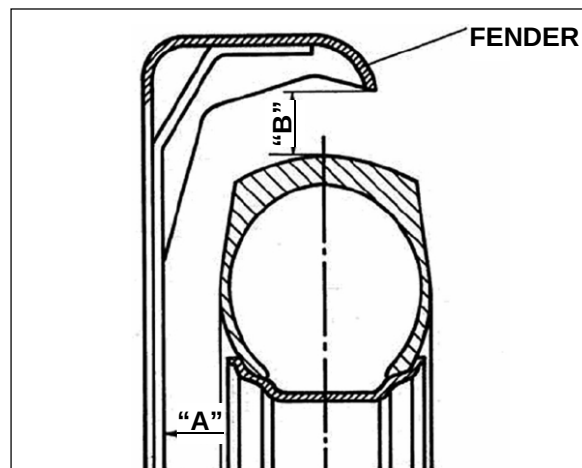
(6) Adjusting Wheel tracks and Tire replacement

① Front wheel

- The rim and disk assembly of the front wheel is not adjustable type.
- If the front wheels are replaced, check the clearances between tires and tractor body case by case. If necessary, the steering angle must be adjusted. (See chapter 4-5-(8) in this manual.)

② Rear wheel

- When changing the rear wheels, 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)



③ Standard track

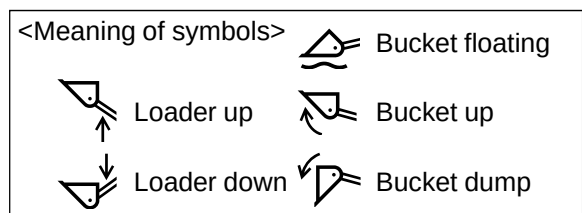
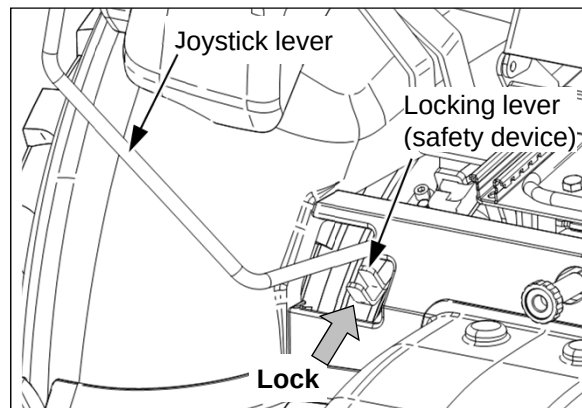
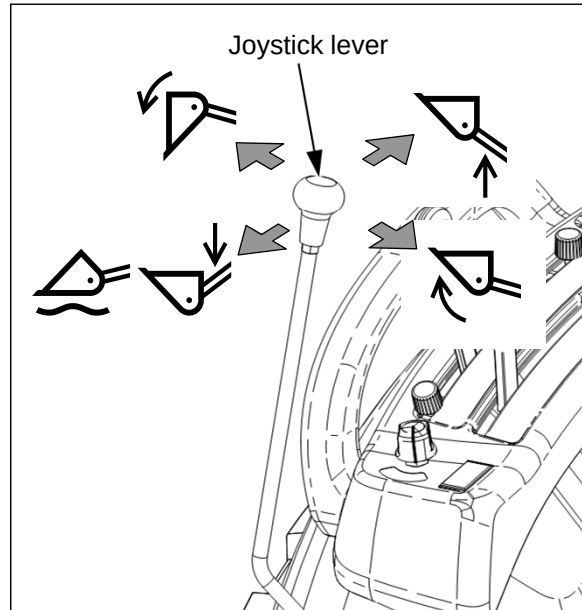
- Standard wheel track for this model as below.
(when applying front tires: 23x8.50-12, rear tires: 12-16.5)
 - Front wheel track: 915mm
 - Rear wheel track: 930mm

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

(7) Using Front-end loader (optional)

① Safety precautions

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

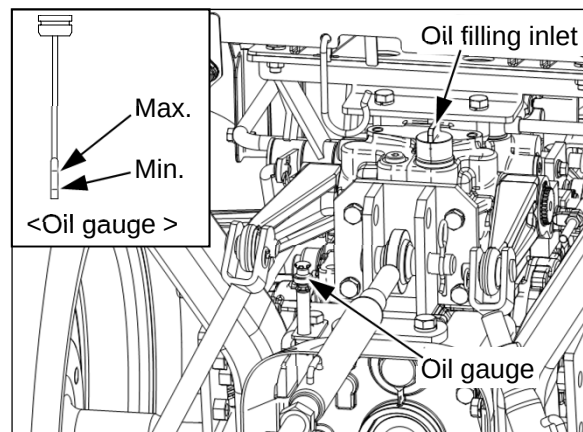


 Warning	TO AVOID PERSONAL INJURY ! ▶ After using the front-end loader, push the locking lever to the lock position. ▶ When leaving the tractor, lower down the front-end loader on the ground. ▶ Do not lift the front-end loader to a height from which objects may fall or roll onto the driver. ▶ Use always the correct attachment (grab forks, buckets.. etc.) for the specific task to perform and ensure that the load is securely kept in place.
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 Caution	PRE-OPERATION CHECK, REAR BALLAST ! ► For tractor stability and operator's safety, rear ballast should be added to the rear of the tractor in the form of implements as counter weight like Back Hoe, Rotary Tiller, etc. The amount of rear ballast will be depend on the application.
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② Connection of hydraulic hoses

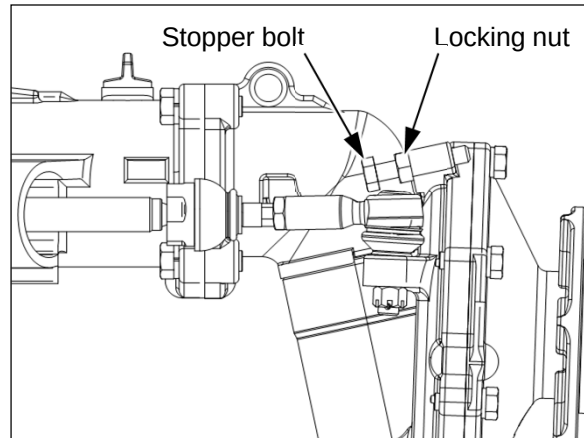
- To install the front-end loader and connect its hydraulic lines, contact your authorized local dealer.
- After connecting the hoses, start the engine and check the leakage of the hydraulic lines.
- Operate 2~3 times fully all the hydraulic actuators on a newly attached front implement to exhaust air from the system.
- After lowering the front implement, check if the transmission oil level is marked between "Min" and "Max" scale on the oil gauge. If necessary, add new oil.



(8) Adjusting Steering Angle

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

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



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

- When attaching implements to the tractor, refer to the followings recommended as maximum specification of each implement. DO NOT attach a bigger implement than this specification. For other implements, contact your authorized dealer.

No.	Implements	Specification	MT2 25s
1	Trailer	Max vertical load	See chapter 4-5-(3) in this manual
2	Mid mower	Max cutting width	1524 mm (60 in.)
3	Rear mounted mower	Max cutting width	1524 mm (60 in.)
4	Flail Mower	Max cutting width	1524 mm (60 in.)
5	Sickle Bar	Max cutting width	1524 mm (60 in.)
6	Rear mounted Sprayer	Total weight	150 kg (331 lb.)
7	Pull type Sprayer	Total weight	See chapter 4-5-(3) in this manual
8	Rotary Tiller	Max tilling width	1280 mm (50 in.)
9	Furrow Plow	Max tilling width	-
10	Bottom Plow	Maximum size	1100 mm (43 in.)
11	Disk harrow (pull type)	Max working width	-
12	Chisel Plow	Max working width	-
13	Front grader	Max working width	1400 mm (55 in.)
14	Rear blade	Max working width	1372 mm (54 in.)
15	Front loader	Max lift capacity (Bucket pivot point)	529 kg (1166 lb)
16	Landscape Rake	Max working width	1524 mm (60 in.)
17	Box blade	Max working width	1280 mm (50 in.)
18	Backhoe	Max weight (W/O Bucket)	321 kg (708 lb)
19	Snow Blade	Max. working width	1370 mm (54 in.)
20	Snow Blower	Max. working width	1370 mm (54 in.)

(10) Ballasting weights (optional)

Tractor ballasting

For sufficient traction and maximum performance in heavy draft operations, and to counterbalance rear-mounted equipment, weight should be added to the tractor in the form of liquid ballast, cast iron weights, or a combination of both. Only enough weight should be added to provide good traction and stability. Adding more weight than is needed results in unnecessary soil compaction, increased rolling resistance, and higher fuel consumption.

NOTE: When adding weight to the tractor, verify the tire pressure is correct. See chapter **4-5-(5), "Tires and load capacity"** in this manual for tire pressures and permissible loads.

Front end ballast may be required for stability and steering control when weight is transferred from the front wheels to the rear wheels as an implement is raised by the tractor three-point hitch.

Use the following as a general guide:

- Ballast the tractor (less implement) so that approximately one-third of the tractor weight is on the front wheels. For optimum traction, tractors equipped with 4WD should be ballasted so that **40 – 45%** of machine weight is on the front wheels.
- When a rear mounted implement is raised to the transport position, the front wheel reaction should be at least **20%** of tractor weight.
- Add additional front end ballast as required for stability during operation and transport. Tractor front end ballast may not always maintain satisfactory stability if the tractor is operated at high speed on rough terrain. Reduce tractor speed and exercise caution under these conditions.
- When using front-mounted equipment, add weight to the rear axle to maintain good traction and stability. Front-mounted equipment varies in weight. Refer to equipment manual for ballasting.

Weighting limitations

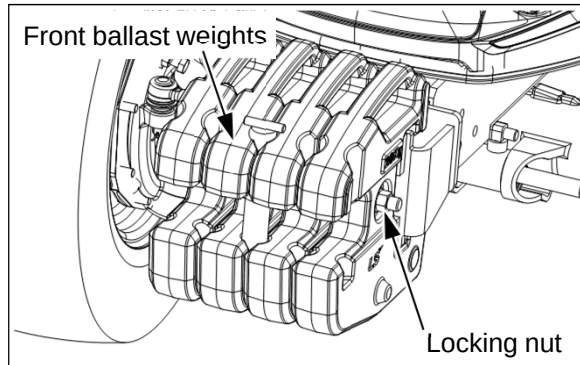
The weighting limitations that follow are limitations only. They do not imply that the tractor should be weighted to attain the weights given. Use only enough weight to obtain good performance.

① Front ballasting weights (optional)

- It is used to balance the front/rear weight of the tractor.
- To remove the front ballast weights, unscrew the locking nut of the front ballast weights and disassemble the weight plates one by one.

Front ballast weight (kg) :

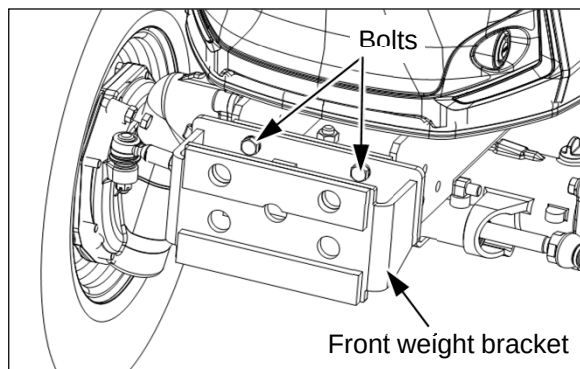
20kg x 4ea = **80kg**



- To remove the bumper, connect the bumper to the suitable hoist and unscrew the five bolts as shown in the right figure.

Bumper weight (kg) : **7.4kg**

- When assembling the ballast weights, comply with the reverse procedure of the disassembly.
- For additional ballast weights and adjustment methods, contact your authorized local dealer.



 Warning	Heavy parts! ► The ballast weights are very heavy. When removing/attaching the ballast weights, please be careful and use a suitable hoist and specific equipment to move the heavy parts. Failure to comply could result in death or serious injury.
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② Rear ballasting weights (optional)

Rear wheel weights (Optional)

NOTE: Rear wheel weights are not available.

Rear ballast weights on the 3-point linkage

- To mount the ballast weights on the rear of the tractor, an additional weight bracket must be installed on the rear three-point hitch.
- Contact your authorized local dealer for the bracket.
- If you hard to get the bracket, you can use a equivalent weight rear implement as the ballasting weight.

 Warning	Heavy parts! ► The ballast weights are very heavy. When removing/attaching the ballast weights, please be careful and use a suitable hoist and specific equipment to move the heavy parts. Failure to comply could result in death or serious injury.
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4-6. Driving speed

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

HST Type

Range gear	L	M	H
Forward	0 ~ 6.3 Km/h (0 ~ 3.91 mph)	0 ~ 9.9 Km/h (0 ~ 6.15 mph)	0 ~ 20.7 Km/h (0 ~ 12.86 mph)
Reverse	0 ~ 4.1 Km/h (0 ~ 2.55 mph)	0 ~ 6.6 Km/h (0 ~ 4.10 mph)	0 ~ 13.6 Km/h (0 ~ 8.45 mph)

Note) Engine maximum speed: 2950 rev/min, Dynamic load radius: 408mm (16.1 in).

5. Lubrication and Maintenance

5-1. General information

- Adequate lubrication and maintenance on a regular schedule is vital to maintaining your equipment. To ensure long service and efficient operation, follow the lubrication and maintenance schedules outlined in this manual. The use of proper fuels, oils, grease and filters, as well as keeping the systems clean, will also extend tractor and component life.

NOTICE: While any company can perform necessary maintenance or repairs on your equipment, we strongly recommends that you use only authorized local dealers and products that meet the given specifications. Improperly or incorrectly performed maintenance and repair voids the equipment warranty and may affect service intervals.

NOTICE: Always use genuine replacement parts, oils and filters to ensure proper operation, filtration of engine and hydraulic systems. See your authorized local dealer for additional oil quantities. Regular lubrication is the best insurance against delays and repairs. Proper lubrication will extend tractor life. Refer to the following charts for lubricants and service intervals.

NOTICE: Failure to complete the required maintenance at the recommended intervals can cause unnecessary downtime.

- The intervals listed in the Lubrication Chart are guidelines to be used when operating in normal conditions. Adjust the intervals for operating in adverse environmental and working conditions. The intervals should be shortened for sandy, dusty and extremely hot operating conditions.

 Warning	► Avoid injury! 1. Disengage all drives. 2. Engage parking brake. 3. Lower all attachments to the ground, or raise and engage all safety locks. 4. Shut off engine. 5. Remove key from key switch. 6. Wait for all tractor movement to stop. Failure to comply could result in death or serious injury.
 Warning	► Entanglement hazard! Disengage the Power Take-Off (PTO), turn off the engine, and remove the key. Wait for all movement to stop before leaving the operator's position. Never adjust, lubricate, clean, or unplug tractor with the engine running. Failure to comply could result in death or serious injury.
 Warning	► Illustrations in this manual may show protective shielding open or removed to better illustrate a particular feature or adjustment. Replace all shields before operating the tractor. Failure to comply could result in death or serious injury.

- Always clean the area around dipsticks, fill caps, and check plugs when checking fluid levels. Failure to clean these areas may allow contamination to enter the system. Drain, flush and refill the system any time you suspect it is contaminated.

(1) Tightening Torque for normal assembly

- Check if the bolts or nuts of each part are loosened. If necessary, tighten it again as referring to the following table. For additional hardware, contact your authorized local dealer.

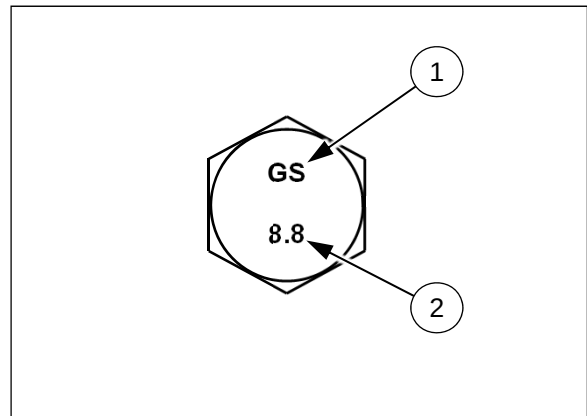
Strength class marks		
4T	8T	10.9T
		

Spec.	Tool (mm)	Strength	Hardware tightening torque (kg.cm)		
			Re-use	Permanent	Maximum
M8 X 1.25	12	8.8	202	243	268
		10.9	290	348	394
		12.9	339	407	460
M10 X 1.25	17	8.8	434	521	576
		10.9	621	746	845
		12.9	727	872	987
M12 X 1.25	19	8.8	769	922	1019
		10.9	1100	1320	1496
		12.9	1286	1543	1748
M12 X 1.75	19	8.8	695	835	922
		10.9	996	1195	1354
		12.9	1164	1397	1582
M14 X 1.5	24	8.8	1209	1451	1603
		10.9	1731	2077	2354
		12.9	2023	2428	2749
M16 X 1.5	24	8.8	1832	2198	2429
		10.9	2622	3147	3567
		12.9	3065	3679	4166
M18X 1.5	27	8.8	2764	3317	3648
		10.9	3821	4585	5198
		12.9	4467	5360	6070
M20 X 1.5	30	8.8	3861	4633	5095
		10.9	5337	6405	7260
		12.9	6240	7488	8479
M22 X 1.5	32	8.8	5163	6195	6812
		10.9	7136	8564	9708
		12.9	8343	10011	11337
M24 X 2	36	8.8	6552	7862	8646
		10.9	9057	10869	12320
		12.9	10588	12706	14389
M30 X 2	46	8.8	13365	16038	17636
		10.9	18475	22170	25131
		12.9	21598	25917	29350

Identification markings

Metric hex bolt head

1. Manufacturer's identification
2. Property class



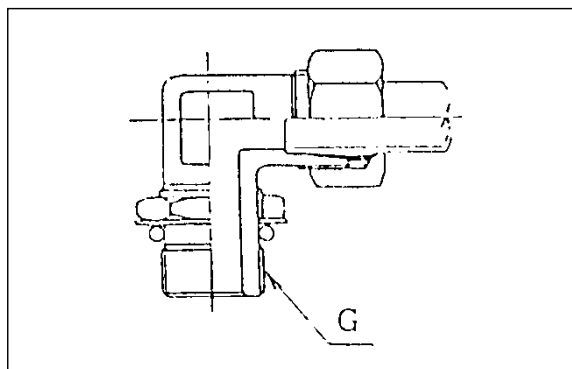
(2) Standard torque data for hydraulics

Installation of adjustable fittings in straight thread O-ring bosses

1. Lubricate the O-ring by coating it with a light oil or petroleum.
2. Install the O-ring in the groove adjacent to the metal backup washer which is assembled at the extreme end of the groove.
3. Install the fitting into the straight thread boss until the metal backup washer contacts the face of the boss.

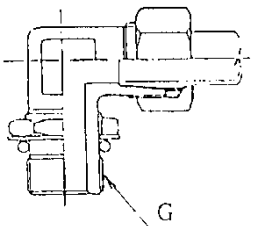
NOTICE: Do not over tighten and distort the metal backup washer.

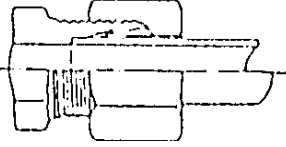
4. Position the fitting by turning out (counterclockwise) up to a maximum of one turn.
5. Holding the pad of the fitting with a wrench, tighten the locknut and washer against the face of the boss.

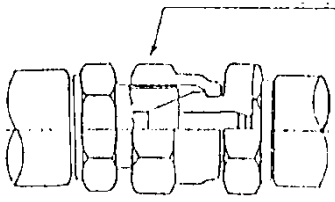


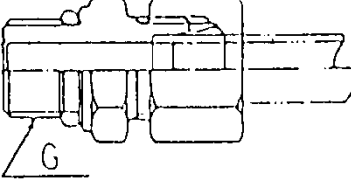
Standard torque data for hydraulic tubes and fittings

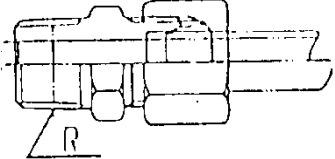
NOTICE: These torques are recommended for hydraulic tubes of your tractor. When assemble the hydraulic lines, refer to the following torques on each application. Before installing and torquing pipe fittings, Clean the threads and faces.

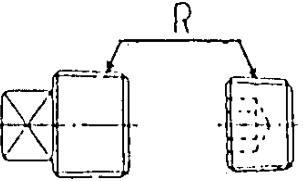
Thread	Torque		Figure	Remarks
	N · m	{kgf · m}		
G 1/4	49~69	5~6		1. Materials of threaded hole: Cast or steel.
G 3/8	59~69	6~7		
G 1/2	78~88	8~9		

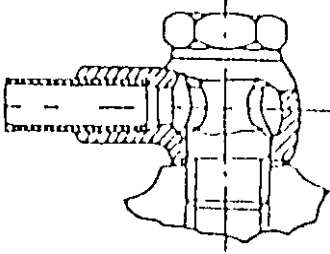
Pipe spec.		Pre-torque		Tightening torque		Figure	Remarks
Outer dia.	Thickness	N · m	{kgf · m}	N · m	{kgf · m}		
8	1~1.5	29~34	3~3.5	29~34	3~3.5		Pipe material: OST
10	1~1.5	29~39	3~4	34~49	3~3.5		
12	1~2.5	44~59	4.5~6	49~69	5~7		
15	1~2.5	69~98	7~10	88~118	9~12		
18	1.5~2	118~147	12~15	146~167	15~17		
20	2~3	147~177	15~18	167~206	17~21		
22	2	177~206	18~21	196~235	20~24		
27.2	2.8	323~343	33~35	343~373	35~38		SGP

Thread	Torque		Figure	Remarks
	N · m	{kgf · m}		
G 1/8	15	1.5		
G 1/4	25	2.6		
G 3/8	49	5		
G 1/2	59	6		
G 3/4	118	12		

Thread	Torque		Figure	Remarks
	N · m	{kgf · m}		
G 1/8	20~25	2~2.5		1. Materials of threaded hole: Cast or steel.
G 1/4	39~49	4~5		
G 3/8	49~59	5~6		
G 1/2	59~69	6~7		
G 3/4	118~127	12~13		

Thread	Torque		Figure	Remarks
	N · m	{kgf · m}		
G 1/8	15	1.5		1. Apply seal tape before assembling 2. Threaded hole: Taper or parallel steel or cast
G 1/4	25	2.6		
G 3/8	49	5		
G 1/2	59	6		

Thread	Torque		Figure	Remarks
	N · m	{kgf · m}		
G 1/8	15	1.5		1. Apply seal tape before assembling 2. Threaded hole: Taper or parallel steel or cast
G 1/4	25	2.6		
G 3/8	49	5		
G 1/2	59	6		
G 3/4	118	12		

Thread	Holes	Torque		Figure	Remarks
		N · m	{kgf · m}		
G 1/4	2	39~44	4.0~4.5		1. Materials of threaded hole: Cast or steel. 2. Assemble with packing washers. 3. Holes: Number of holes on the same section plane.
G 3/8	2	47~54	4.8~5.5		
	4	39~44	4.0~4.5		
G 1/2	4	47~54	4.8~5.5		
G 3/4	4	59~69	6.0~7.0		
M 12	2	20~27	2.0~2.8		
M 14	2	34~39	3.5~4.0		
	4	29~34	3.0~3.5		
M 16	2	49~59	5.0~6.0		
	4	39~44	4.0~4.5		

(3) General specification - Diesel fuel

- Only use diesel fuel that conforms to “**Lubricants and Capacity**” in this manual or equivalent in your engine. Do not use any other low grade diesel fuel.

NOTICE: *Use of other low grade diesel fuels will result in loss of engine power, high fuel consumption, and damage to the exhaust after-treatment system (if equipped).*

NOTE: *When operating the tractor in very cold climates, the use of winter blended fuel is permitted for a short period of time. See your fuel supplier for winter fuel requirements in your area.*

Fuel conditioner

- Diesel fuel conditioner is available from your authorized local dealer. Instructions for the use of the fuel conditioner is on the container.
- The use of diesel fuel conditioner will:
 - Clean fuel injectors, valves, and manifolds for increased service life.
 - Disperse insoluble gummy deposits that form in the fuel system.
 - Separate moisture from the fuel.
 - Stabilize fuel in storage.

NOTICE: *Use only manufacturer approved biocide additives to prevent damage to the exhaust after-treatment system (if equipped).*

(4) Biodiesel fuel

1. General Description of Biodiesel

(a) Biodiesel is a renewable, oxygenated fuel made from agricultural and renewable resources such as soybeans or rapeseeds. Biodiesel is a fuel comprised of methyl or ethyl ester-based oxygenates of long chain fatty acids derived from the transesterification of vegetable oils, animal fats, and cooking oils. It contains no petroleum-based diesel fuel but can be blended at any level with petroleum-based diesel fuel. In case it is not blended with petroleum-based diesel fuel such biodiesel is referred to as "B100", which means that it consists of 100% (pure) biodiesel. However, most common biodiesel is blended with conventional (petroleum-based) diesel fuel. The percentage of the blend can be identified by its name. For example, B7 consisting of 7% biodiesel and 93% conventional petroleum-based diesel fuel and B20 consisting 20% biodiesel and 80% conventional diesel fuel. Raw pressed vegetable oils are not consider to be biodiesel.

(b) Advantages of Biodiesel:

- Biodiesel produces less visible smoke and a lower amount of particulate matter.
- Biodiesel is biodegradable and nontoxic.
- Biodiesel is safer than conventional diesel fuel because of its higher flash point.

Following the increased interest in the reduction of emissions and the reduction of the use of petroleum distillate based fuels; many governments and regulating bodies encourage the use of biodiesel.

(c) Disadvantages of Biodiesel:

Concentrations that are higher than 7% of biodiesel (higher than B7) can have an adverse affect on the engine's performance, its integrity and/or durability. The risk of problems occurring in the engine increases as the level of biodiesel blend increases. The following negative affects are exemplary and typical for the usage of high concentrated biodiesel blends:

- Biodiesel can accelerate the oxidation of Aluminum, Brass, Bronze, Copper and Zinc.
- Biodiesel damages and finally seeps through certain seals, gaskets, hoses, glues and plastics.
- Certain natural rubbers, nitride and butyl rubbers will become harder and more brittle as degradation proceeds when used with biodiesel.
- The deteriorated biodiesel creates deposits in the engines.
- Due to its natural characteristic, biodiesel will decrease the engine output by approximately 2 percent (in case of B20) comparing to conventional (petroleum-based) diesel fuel.
- The fuel consumption ratio will increase by approximately 3 percent (in case of B20) comparing to conventional diesel fuel.

2. Approved Engines

(a) The engine used in this model can be operated with biodiesel of concentrations up to B20. In case of using biodiesel fuel up to B7 concentrations, no special preparations have to be made, and the original operating conditions and service intervals are applied as stated in this manual. In case of running this engine with biodiesel of concentrations above B7 up to B20, the required operating conditions have to be observed. (See below No. 4)

3. Approved Fuel

- (a) In case of using biodiesel (only concentrations up to B20) fuel should comply with the below recommended standards. However, raw pressed vegetable oils are not considered to be biodiesel and are not acceptable for use as fuel in any concentration in this engine.
- En14214 (European standard) and/or ASTM D6751 (American standard). In North America, biodiesel and biodiesel blends must be purchased from the BQ-9000 accredited producers and BQ-9000 certified distributors.
- (b) If the concentration is B7 or lower, it does not require any special preparations or operating conditions. However, please strictly follow the standard operating conditions included in this manual.

4. Conditions for the Operation with Biodiesel (above B7 through B20)

- (a) The original service interval of the below stated services as indicated in this manual should be halved:
- *Replacement interval of the engine oil filter, engine oil and the fuel filter.*
 - *Cleaning interval of the water separator.*
 - *Draining interval of the fuel tank.*
- (b) Have the fuel injector inspected and cleaned every 1000 hours. *It is strongly recommended to replace the fuel hoses after 2000 operating hours or 2 years* whichever comes first same as conventional diesel fuel used.
- (c) Replacement of the following parts before using the recommended biodiesel: (only for the operation with biodiesel above B10 through B20)
- *O-ring for the water separator (if fitted)*
- (d) Please use only biodiesel fuel that is appropriate to the intended operation environment of the engines. This especially applies if the operating ambient temperature falls below 0 degree centigrade.
- (e) In particular, operation with biodiesel requires daily maintenance as follows:
- Please daily check the engine oil level. If the oil level rises above the oil level of the previous day, the engine oil needs to be immediately replaced.
 - Please daily check the water level of the water separator, If the water level rises above the "max" indicator, an immediate drain of the water separator is required.
- (f) *Biodiesel blends up to B20 can only be used for a limited time of up to 3 months of the date of biodiesel manufacture.* Therefore biodiesel needs to be used at latest within 2 months from the time of filling the tank or within 3 months from the time of production by the fuel supplier, whichever comes first.
- (g) Before a long-term storage without operating the engine, the biodiesel needs to be drained out completely and the engine has to be run for 30 minutes with conventional diesel fuel.

(5) Refueling the tractor

 Warning	Fire hazard! ► When handling diesel fuel, observe the following precautions: 1. Do not smoke. Keep any type of flame away. 2. Never fill the tank when the engine is running. 3. Wipe up spilled fuel immediately. Always tighten the fuel tank cap securely. Failure to comply could result in death or serious injury.
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- The fuel tank filler cap① is located in rear engine hood area of the tractor as shown in the right figure. Observe the following:

1. Before removing the cap, wipe all dust and dirt from around the cap to prevent debris from falling into the tank while filling.

2. Use an approved fuel container and check the inside of the container periodically for cleanliness.

For fuel tank capacity, see chapter 5-3, "Lubricants and Capacities" or the last page in this manual.

3. If there is no filter on the storage tank or fuel container, filter the fuel through a 100-mesh or finer screen when filling the tractor fuel tank.

4. Keep the tractor tank as full as possible (without filling to capacity) to minimize condensation. Fill to the bottom of the filler neck to allow room for expansion.

NOTE: *It is a good practice to fill the fuel tank at the end of each day, as this will reduce overnight condensation.*

NOTE: *The fuel cap is a vented-type. Use only an approved replacement cap to prevent fuel system-related problems.*

- Do not mix gasoline, alcohol or blended fuels to diesel fuel. These mixtures are explosive in fuel tank.

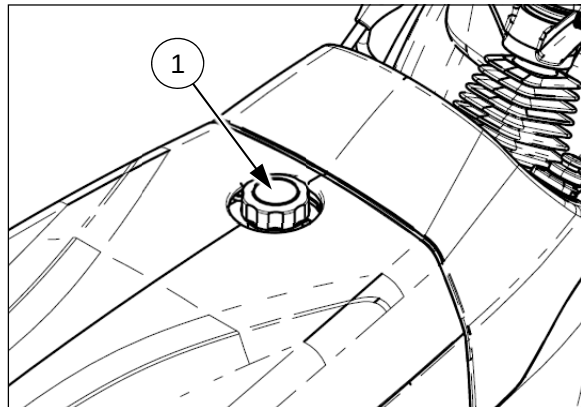
- Never remove the fuel cap or refuel with the engine running or hot.

- Maintain control of the fuel filler nozzle when filling the fuel tank.

- Never use fuel for cleaning purposes.

- Arrange fuel purchases so that summer grade fuels are not held over and used in the winter.

- *Before handling Bio-diesel, refer to the chapter 5-1-(4) in this manual.*



(6) Change engine coolant to Organic Acid Technology (OAT) coolant

- Depending on the date of manufacture or engine type, your cooling system may be equipped with conventional ethylene glycol coolant or an Organic Acid Technology (OAT) coolant solution. You can easily identify **OAT coolant solution** by its yellow color. You should never mix the coolant types.
- But, the use of OAT coolant solution for your model has not yet been approved by the engine manufacturer. ***We strongly recommend not to use OAT coolant solution.***

NOTICE: NEVER mix OAT coolant with conventional ethylene glycol coolant.

Definitions

Conventional coolant:

A coolant that relies on inorganic inhibitors such as silicates, nitrites, and phosphates for corrosion and cavitation protection.

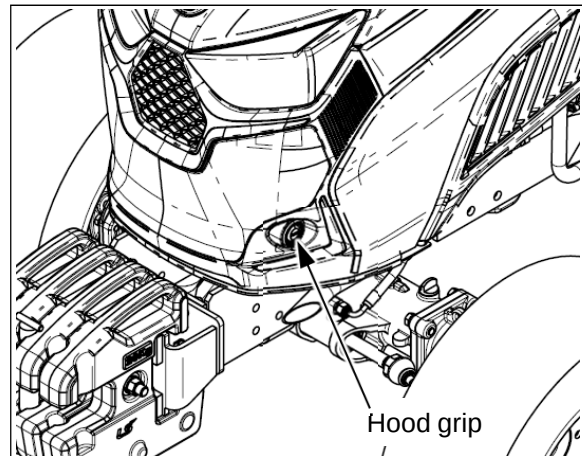
Organic Acid Technology (OAT) coolant:

A coolant that relies on inhibitors such as organic acid salts for corrosion and cavitation protection.

(7). Access for maintenance

① Opening Hood

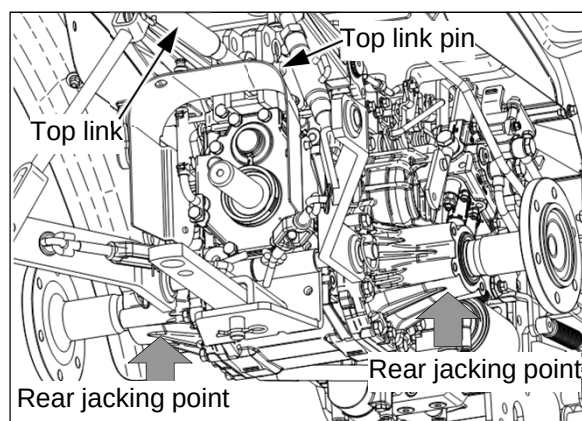
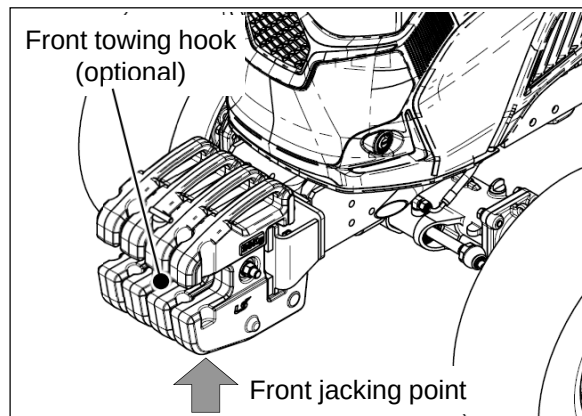
- For safety, the hood must be closed and correctly latched before operating the tractor.
- The hood is hinged at the rear one bar is attached inside to support the hood for easy access to the engine.
- To open the hood, push the hood opening button and lift up the hood.
- To close the hood, pull down the hood and push it down to the locking position slightly.



 Caution	► Before opening the hood, you have to stop the engine completely. ► If you open the hood while the engine is running, it can cause serious damage by intended or unintended access to the rotating shaft, pulley, V-belt, cooling fan of the engine or engine application parts. PLEASE BE CAREFUL.
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② Jacking points

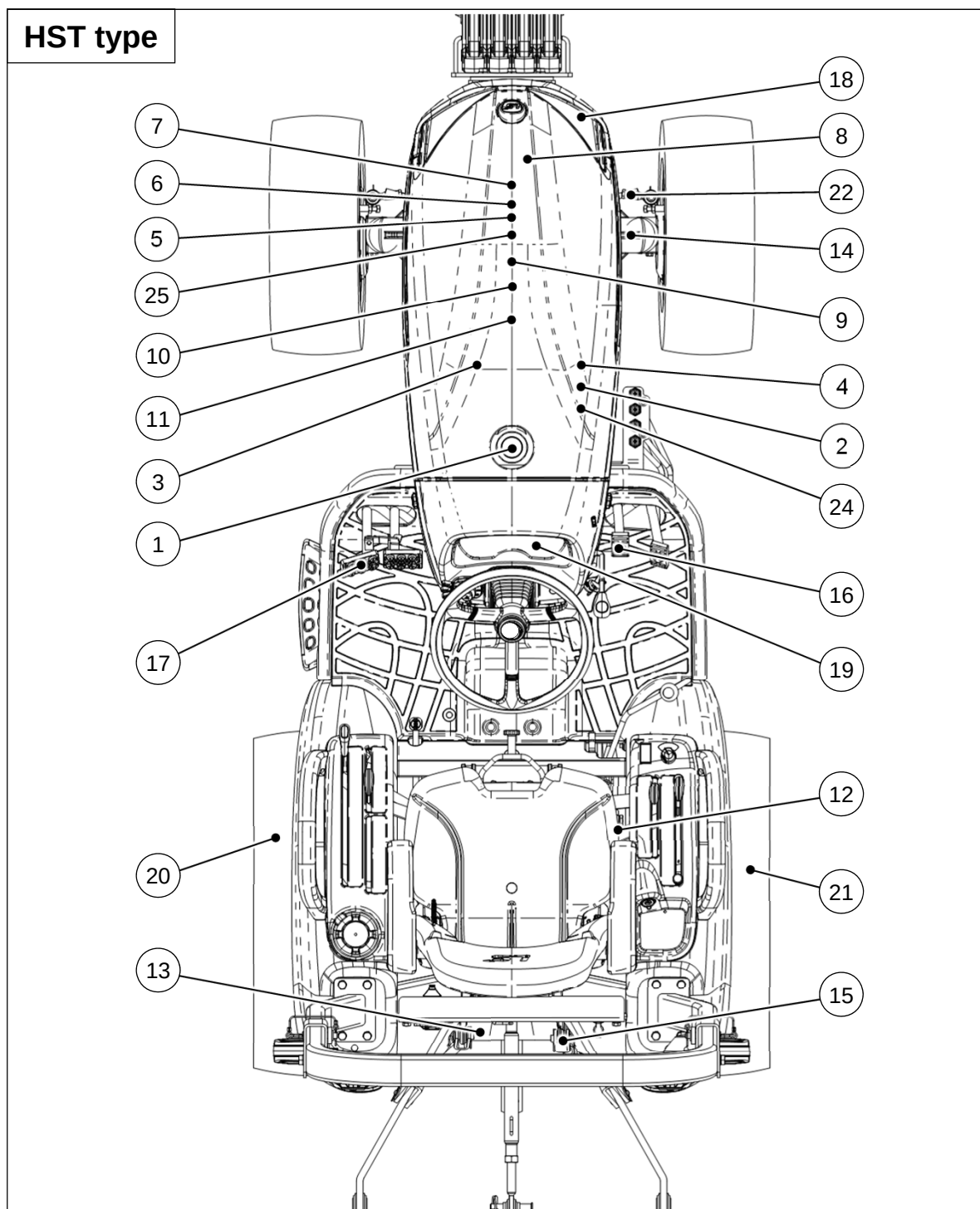
- The jacking points for maintenance is depending on serviced parts case by case. Do not hesitate to contact your authorized dealer for asking.
- Do not use the front axle assembly or steering linkage and cylinder for jacking point. These components have some rotating pivots and/or does not have enough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



 Caution	► When lifting the rear of the tractor, apply chocks to the slots between front axle and engine frame symmetrically to prevent the tractor from rolling.
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5-2. Maintenance Chart

- Periodic maintenance not only extends the service life of the tractor but also serves to ensure safe operation. **The maintenance chart shows the standard service intervals. If you notice any abnormal symptoms, make sure to carry out the inspection and maintenance work, regardless of recommended service intervals in this maintenance chart.**
- Appropriate service intervals vary depending on the usage and operating conditions. Contact your authorized dealer for the most appropriate service intervals of your local work conditions.



HST type

No.	Checking Parts	Page No.	Check period (Every ____ hr)						
			Daily	50	250	500	1000	2000 or 2-yr	3000
1	Fuel tank	5-18, 5-33	▲		■				
2	Fuel filter, Water separator	5-25, 5-35	▲			●			
3	Engine oil	5-16, 5-17, 5-29	▲	★	●				
4	Engine oil filter	5-16, 5-29		★	●				
5	Engine coolant	5-20, 5-37	▲					●	
6	Radiator screen	5-21, 5-26	▲	■					
7	Air cleaner	5-20, 5-28, 5-31	▲	■	●				
8	Battery	5-28		▲					
9	Fan belt tension	5-16, 5-31		▲ (First)	▲				
10	Valve clearance	5-36					▲		
11	Nozzle injection pressure	5-36					▲		
12	Hydraulic& HST oil filter	5-16, 5-30		★	●				
13	Transmission oil	5-27, 5-34		▲		●			
14	Front axle oil	5-27, 5-34		▲		●			
15	3-Point linkage	5-26		▲					
16	HST pedal neutral	5-24	▲						
17	Brake pedal play	5-23	▲						
18	Turn signal lights, Lights, Horn	5-19	▲						
19	Instrument panel & Indicators	5-18	▲						
20	Bolts and Nuts	5-22	▲						
21	Tire air pressure	5-21	▲						
22	Toe-in	5-32			▲				
23	Hydraulic hoses	5-28		▲					
24	Inspect ECU and sensors	5-41							▲
25	Fuel and coolant hoses	5-40						▲	

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

5-3. Lubricants and Capacity

Lubricants	Capacity	International standard	Recommended products
Engine coolant	3.3L (0.9U.S.gals)	ASTM D6210	Soft water (50%) + Anti-freeze (50%)
Fuel	25L (6.6U.S.gals)	ASTM D975 No.2 or EN 590	Ultra low sulfur diesel
Engine oil	2.9L (0.8U.S.gals)	API CF-4 or CI-4	KIXX DL (Maker : GS Caltex)
Transmission oil (common use for hydraulic lift and steering system)	17L (4.5U.S.gals)	API GL4 ISO VG 32/46	LSTH400G (Maker : GS Caltex)
Front axle oil	3.0L (0.8U.S.gals)	API GL4 SAE 80W	EPK 80W90 (Maker : S-OIL TOTAL co. Ltd.)
Grease (Front axle holder, 3-point linkage, etc)	Proper amount	NLGI 2	MAHWAK Multi purpose or MAHWAK All purpose (Caltex)

RECOMMENDED ENGINE OIL VISCOSITIES

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

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

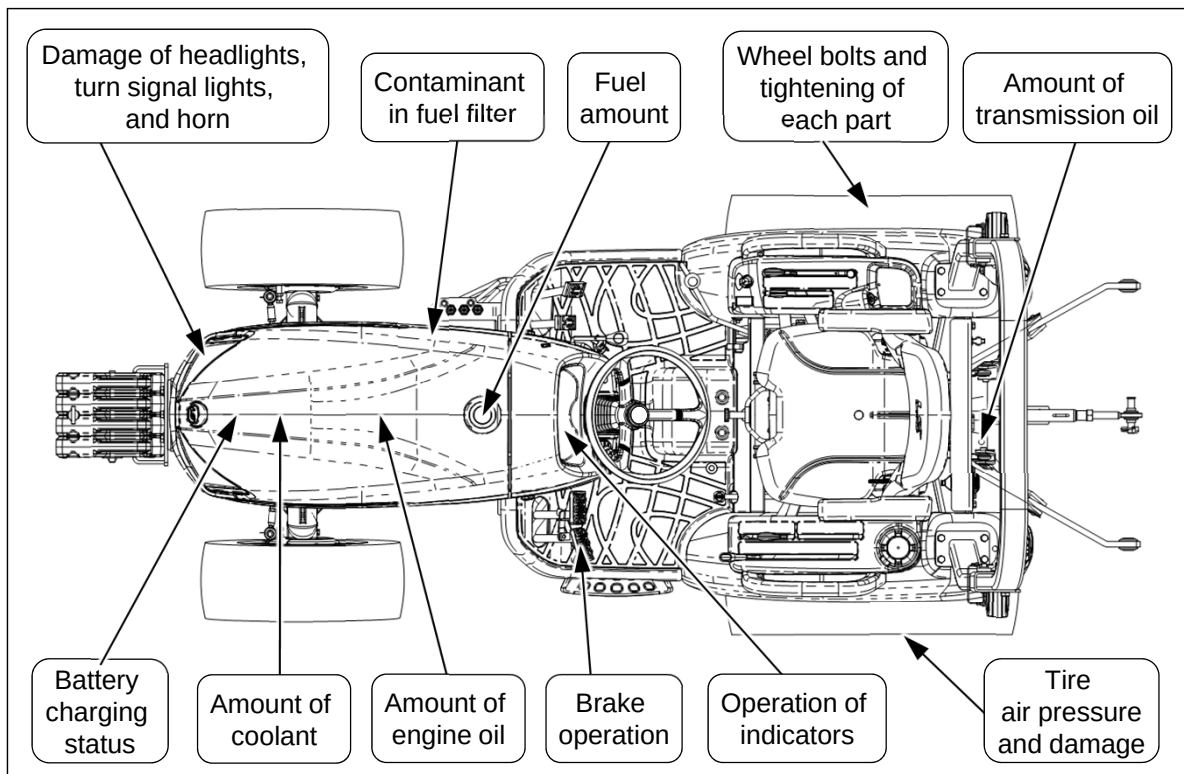
Ambient Temperature °C(°F)	-30 (-22)	-25 (-13)	-20 (-4)	-15 (5)	-10 (14)	-5 (23)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Oil Viscosity	SAE 5W-20										
	SAE 10W-30										
	SAE 15W-40										

5-4. First 50 hour check

- After using first 50 hours, contact your authorized local dealer for maintenance if possible.
 - Replace engine oil and engine oil filter. (⇒ Refer to Every 250 hour check. *See page 5-29*)
 - Replace hydraulic and HST oil filter. (⇒ Refer to Every 250 hour check. *See page 5-30*)
 - 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. (⇒ Refer to Every 250 hour check. *See page 5-31*)
 - Tighten all cooling system hose connections
 - Check torque of safety cab or frame mounting bolts
 - Check torque of front end weight clamp bolts (if fitted)
 - Check torque of wheel bolts and nuts
 - Check tire pressures and condition
 - Clean radiator, oil cooler and A/C condenser cores (if fitted)
 - Check radiator coolant level and specific gravity
 - Check clutch pedal free play (Mechanical synchro-shuttle models)
 - Check brake adjustment and pedal equalization
 - Lubricate all grease fittings
 - Neutral start switches operative

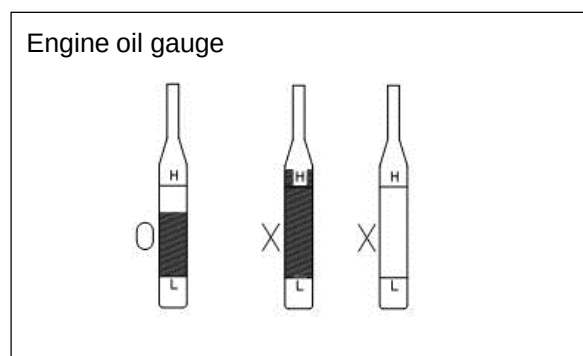
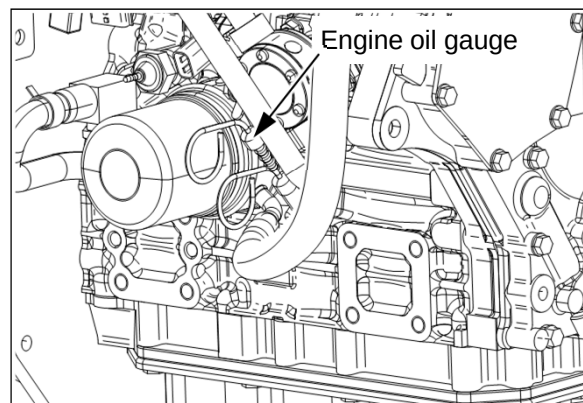
5-5. Checking before Starting (Daily check)

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



(1) Engine oil

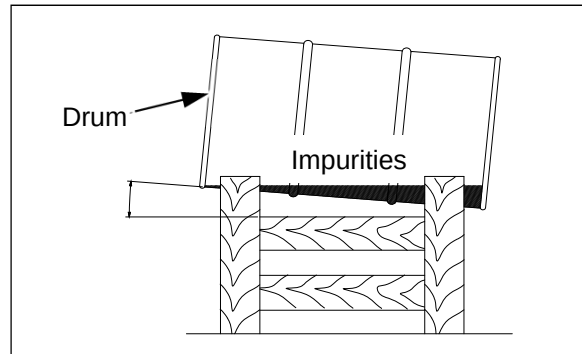
- **Oil specification and capacity :**
See chapter 5-3, "Lubricants and Capacity" or the last page in this manual.
- **Checking engine oil level**
 - Check the engine oil level before starting engine or at 5 minutes later after stopping engine.
 - Check if the oil level is between MAX and MIN marks of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



(2) Fuel tank

① Fuel and Fuel tank Capacity:

- See chapter 5-3, "Lubricants and Capacity" or the last page in this manual.
- If contaminants like water or dusts are mixed in the fuel, it may cause a severe damage to the engine. The fuel storage facility must be equipped as shown in the right figure. If possible, fill the tank at the gas station with fuel.



② Using Diesel for winter

- General diesel fuel tends to generate paraffin dregs in winter time which may cause a bad engine start. Thus, it is recommended to use 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

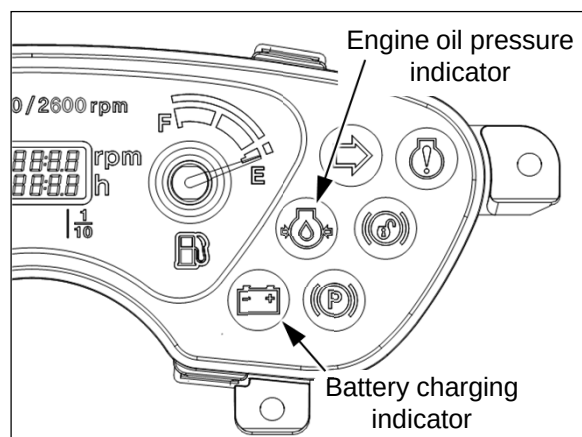
③ Checking Fuel level and filling the tank

- Check the fuel gauge of the tractor fuel tank and if it's not sufficient, fill the fuel tank with diesel fuel. For further information about diesel fuel, see chapter 5-1-(3), 5-1-(4), 5-1-(5) in this manual.

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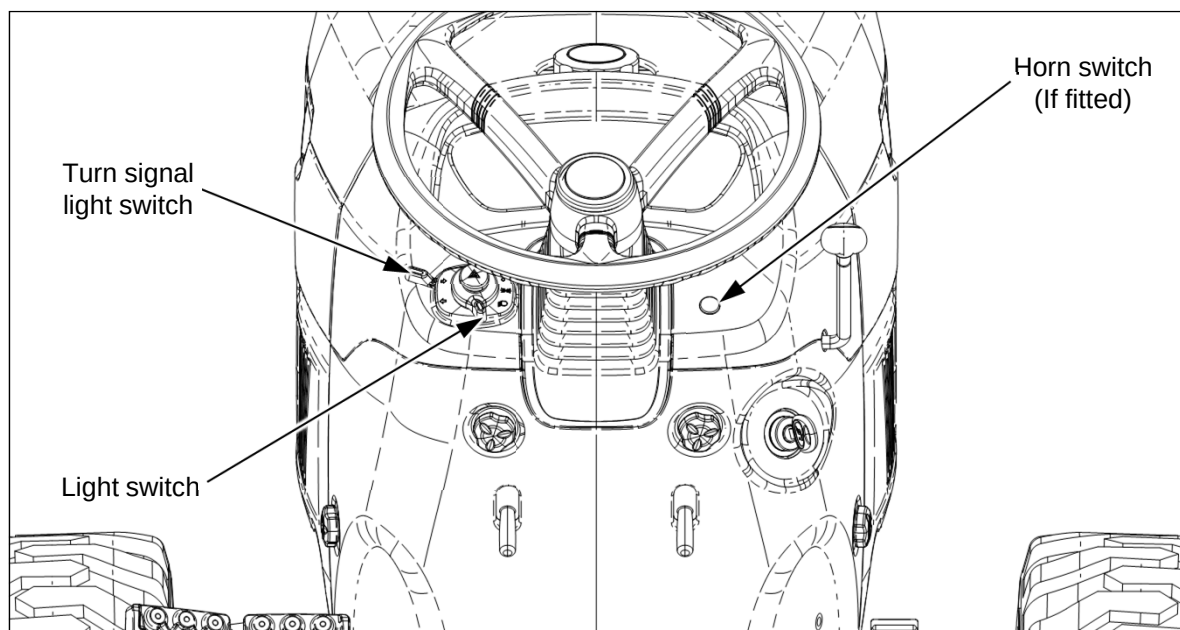
(3) Instrument panel & Indicators

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



(4) Turn signal lights, Lights and Horn

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



- If the light is OFF suddenly when operating the switch, check the problems as followings.
 1. Check the related fuse in the fuse box.
 2. Check the light bulb. If necessary, replace it with a new one. *See below table and refer to the chapter 5-12-(5), 5-12-(6) in this manual.*

illuminating Lights	Light bulb specification
Headlights (Low beam / High beam)	12V 35W / N/A
Turn signal lights (front / rear)	12V 21W
Side lights (front / rear)	N/A
Stop lights / Taillights (rear)	12V 21W / 5W
Work light(s) (optional)	12V 27W (Roll-bar)
Instrument panel lights and indicators	LED

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

(5) Engine coolant

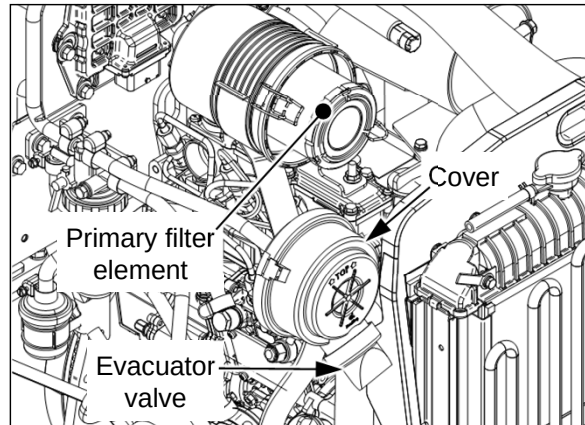
- See chapter 5-10-(1), "Replacement of Engine coolant " in this manual. (See page 5-37)

(6) Air cleaner (Dry type)

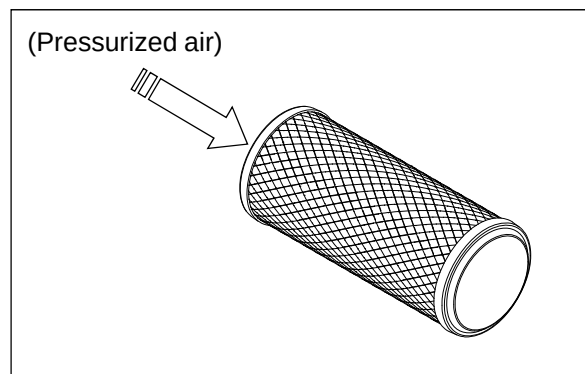
① Cleaning filter element

- Remove the cover and pull out the primary filter element straight out in the right figure.
- 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 the compressed air {less than 500kPa (5bar, 72psi)} from inside to outside as shown in the right figure to remove the dust and dirt. And clean inside the filter element with a clean damp cloth.



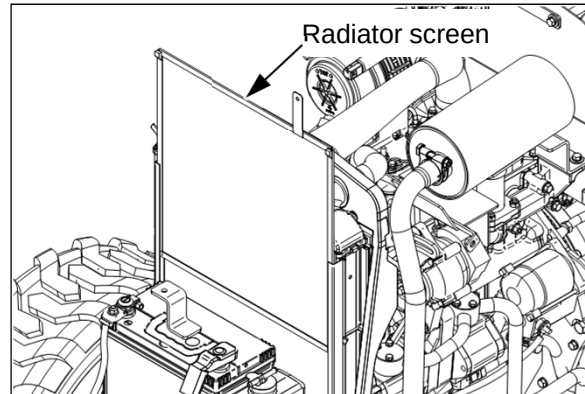
Notice	▶ Do not assemble a wet filter element. ▶ Do not dry the wet filter element by using compressed air. It may cause damage to the filter element. ▶ Do not start the engine or close the hood if the filter element is not assembled.
--------	---

② Assembling filter element

- Clean the inside of the air cleaner housing using a clean damp cloth.
- Check if there is damage inside the filter element by using a light. If there is a tiny crack or small hole in the filter element or the gasket is damaged, replace it with a new one.
- Insert the filter element deeply into the filter housing.
- Remove the dust of the evacuator valve and clean the inside of the cover.
- Assemble the cover with the evacuator valve facing downwards.

(7) Cleaning of Radiator and Radiator screen

- Inspect the radiator and radiator screen for these items on a daily basis: Damaged fins, corrosion, dirt, grease, insects, leaves, oil, and other debris. Clean the radiator and radiator screen, if necessary.
- To access the radiator and radiator screen, pull the radiator screen upward as shown in the right figure.
- When cleaning the radiator with water, let the water flow from the fan side.

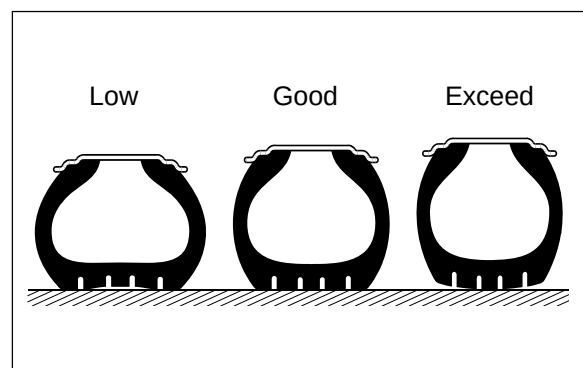


 Caution	▶ The dust and dirt, other debris, and damaged fins can cause that cooling efficiency of the radiator is reduced and the engine can be overheated. ▶ Clean the radiator only after stopping engine. ▶ If cleaning with water, take care not to spray water to the electric or electronic parts. If possible,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

(8) Tire air pressure and damage

① Check

- Check the tire air pressure and damage of the tires on a daily basis. Always manage the correct pressure of the front/rear tires, and if the tires are damaged, replace them with new one.
- Ensure the tire air 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 cause to damage in the event of impact and, in extreme conditions, the rim and disk may be deformed or the tires may burst.



 Caution	▶ Do not assemble/disassemble the tires arbitrarily. Only qualified service personnel should perform this maintenance in a tire repair center equipped with special tools. ▶ When checking tire air pressure, keep the body away from the valve mechanism or cap. Tire air pressure vary depending on the load weighing on the axles.
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- ② **Standard air pressure** - See chapter 4-5-(5), "Tires and Load capacity" in this manual.

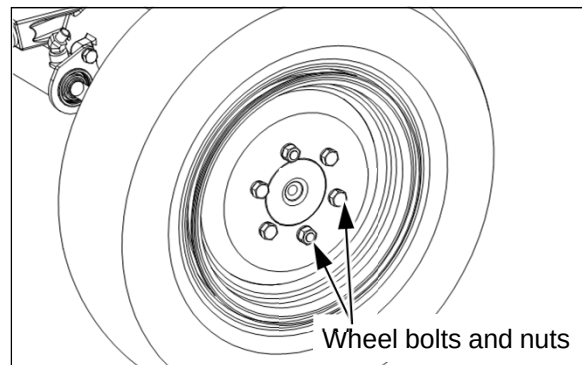
(9) Tightening state of bolts and nuts of each part

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

 Warning	► Roll-over hazard! Never operate the machine with a loose wheel rim or disc. Always tighten nuts and/or bolts to the specified torque value and at the recommended intervals. Failure to comply could result in death or serious injury.
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Tighten the wheel bolts and nuts to the specified torque any time you remove the wheel assembly from the machine or loosen the wheel bolts or nuts.

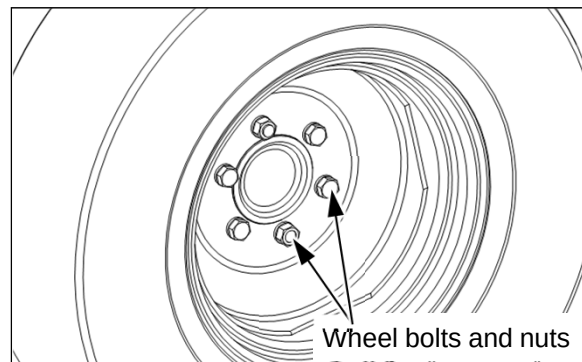
Front Wheel Torque: M12x1.25P
950~1100 kgf.cm
(93~108 N.m, 69~80 lb.ft)



Rear Wheel Torque: M16x1.5P
1800~2000 kgf.cm
(177~196N.m, 130~145 lb.ft)

NOTICE: Check and tighten wheel bolts and nuts to proper torque specifications after the following hours of use:

- First 5 hours
- First 50 hours
- Every 300 hours



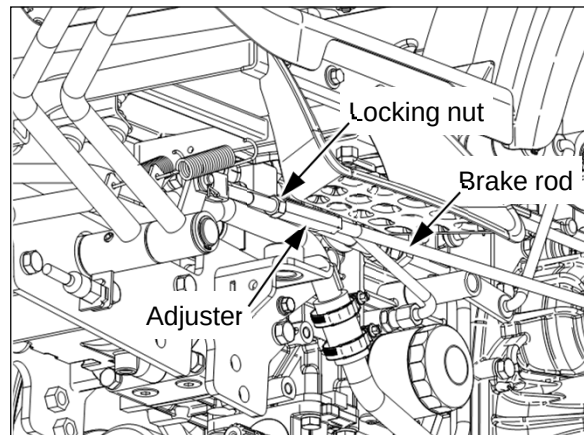
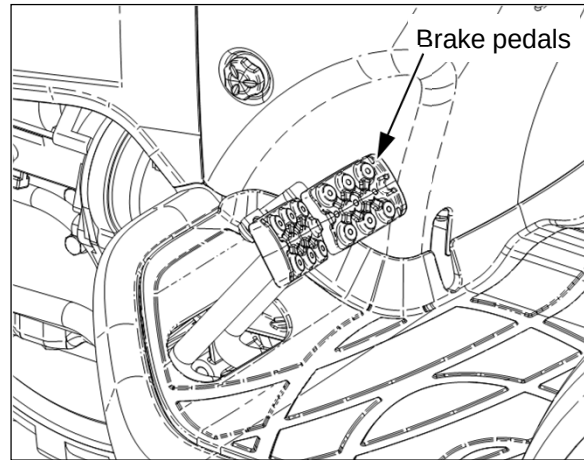
(10) Adjustment of Brake pedal play

- Check the distance of the brake pedal play.
- If the brake pedal play is larger than normal distance, the performance of the brake and parking brake system can be decreased. If it is smaller than normal distance, the transmission oil temperature is increased abnormally because of the operation with the brake disks are engaged, and it may cause damage to the packing in the transmission.

- **Normal distance: 35~50mm (1.4~2.0 in)**

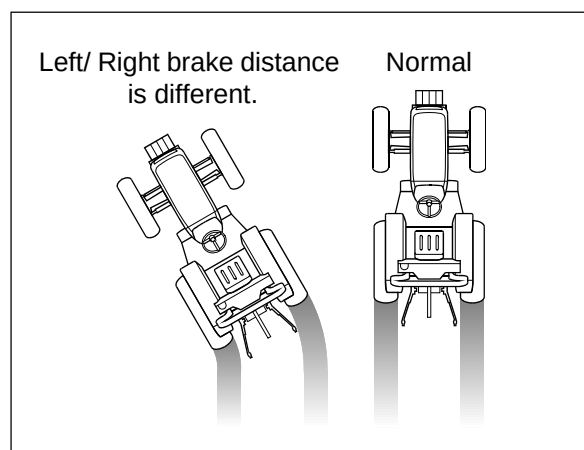
If the brake pedal play distance is more or less than normal distance, adjust it as below.

1. Loosen locking nuts of the left-hand brake rod and turn adjuster to the left/right-hand direction.
2. If the brake rod is tightened, the pedal play will be decreased, and if loosened, it will be increased.
3. After adjusting the pedal play, tighten the locking nuts.
4. Adjust the right-hand brake rod in the same way.
5. Check if the brake distances of the left and right brakes are same as below.



- Checking the brake distance.

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

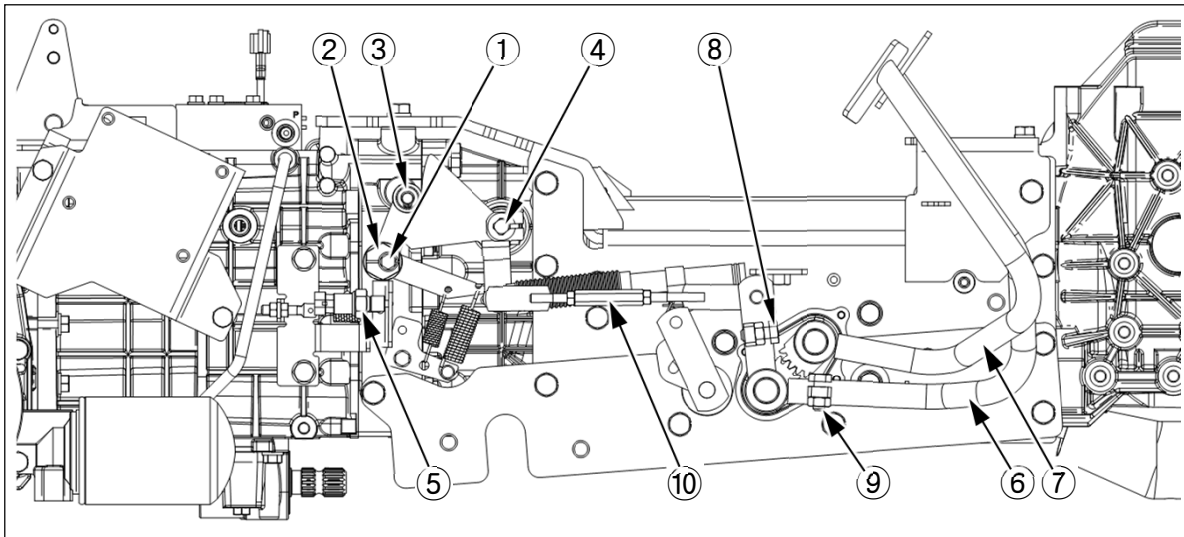


(11) Adjusting HST control linkage (HST type)

- Check if the HST tractor stops when taking off your foot from the HST pedal while driving the tractor in “Low speed” of the range gear shift lever. If the tractor does not stop and moves slowly, stop the tractor with using the brake pedals. To adjust the neutral position of the HST models, contract your authorized local dealer and comply with the following instructions.

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

1. Stop tractor on a level ground and stop the engine.
2. Lift the rear wheel of the tractor off the ground sufficiently by using a hoist. If there is no hoist, use a suitable device can lift the tractor safely. *For tractor weight, refer to chapter “Dimension and Specification” in this manual.*
3. Place the 4WD lever to “2WD” position and apply wheel chocks to the front wheels. It is necessary for the tractor not to move forward when the engine starts.
4. Start the engine and place the range gear shift lever in “Low speed” position.
5. After loosening locking bolt① slightly, turn the shaft② to the left/right-hand direction little by little to get the neutral position of the HST linkage by the roller③. After adjusting, tighten the locking bolt①.
6. Check if the HST forward pedal⑥ and HST reverse pedal⑦ are aligned as shown in the below figure. If necessary, rearrange the pedal position with adjusting the rod⑩, and reset the forward pedal stopper⑧ and reverse pedal stopper⑨.
7. Check if the neutral switch⑤ is pressed enough for starting engine.
8. After restarting the engine, check the neutral status of the HST linkage again.



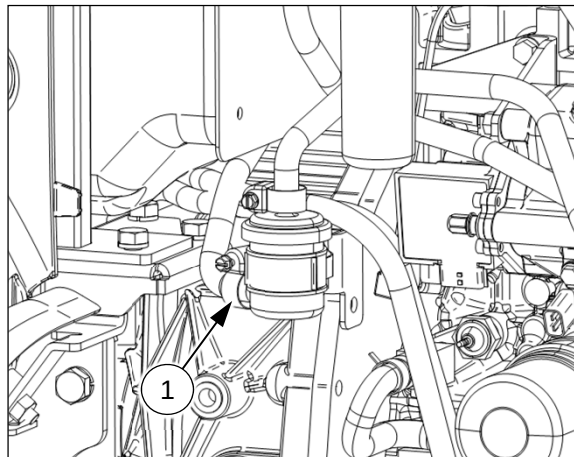
- ▶ When adjusting, DO NOT get close to the rotating parts. It may cause a serious injury.
- ▶ When lifting the rear of the tractor, the tractor may incline to the left or right by oscillating angle of the front axle. Insert suitable chocks between front axle and engine frame tightly.

(12) Fuel filter water separator – Check and Drain

- Check water in the fuel filter water separator on a daily basis. If necessary, drain the water as followings.

NOTE: *There is not a fuel shutoff valve on the fuel tank. To stop the fuel flow from the fuel tank, remove the fuel inlet hose at the fuel filter base and plug it, or clamp the fuel hose to stop the fuel flow.*

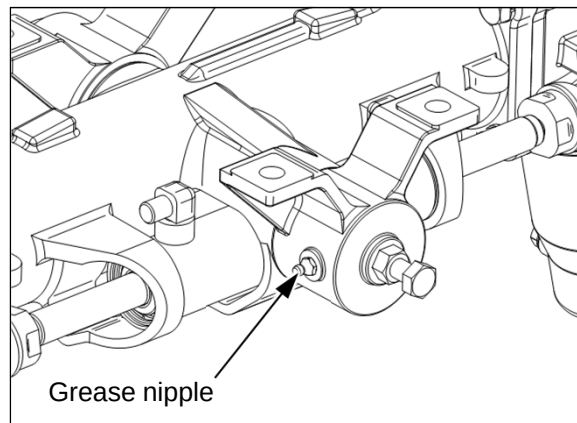
1. Make sure there is adequate fuel in the fuel tank and close off or plug the fuel inlet hose to the fuel filter.
2. Loosen the hose clamp① and disconnect the fuel hose.
3. Open the fuel inlet hose and let fuel flow until all of the water has been removed and only fuel flows from the filter base.
4. Install the fuel hose and bleed the system as outlined in chapter 5-12-(1), “Air- bleeding from Fuel system” in this manual.



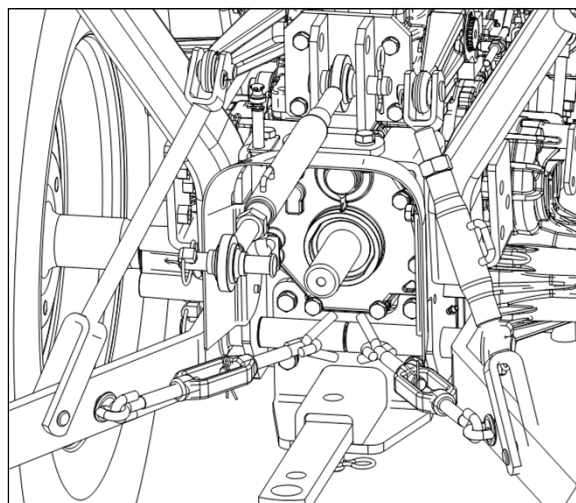
5-6. Every 50 hour check

(1) Lubricating grease

- Front axle holder
- 3-point linkage. Lubricate grease on the threads, pin-connection parts and other sliding or moving parts.



1. Wipe dirt from fittings before greasing.
2. Use a grease gun containing clean high grade of grease.
For grease specification, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.
3. Pump fresh grease into fitting to adequately lubricate the component and force out any contamination from the grease passage.
4. Wipe off excess grease.

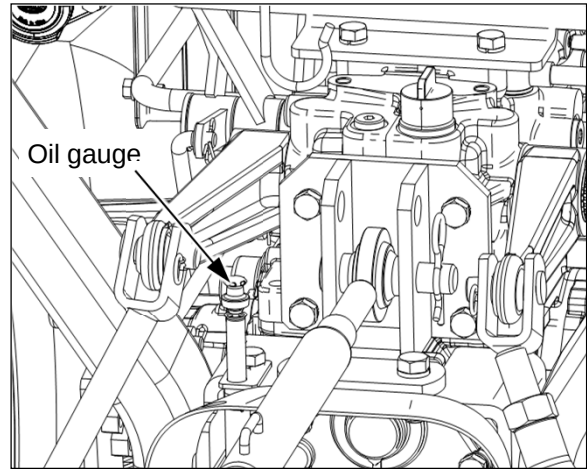


(2) Cleaning of Radiator and Radiator screen

- See chapter 5-5-(7) in this manual. (See page 5-21)

(3) Checking Transmission oil

- Stop the tractor on a level surface and apply the parking brake and lower the implements to the ground.
- Clean around the oil filling inlet and pull the gauge straight out.
- Check If the oil level is between MAX and MIN of the oil gauge. If necessary, add new oil.
- *For oil specification, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.*

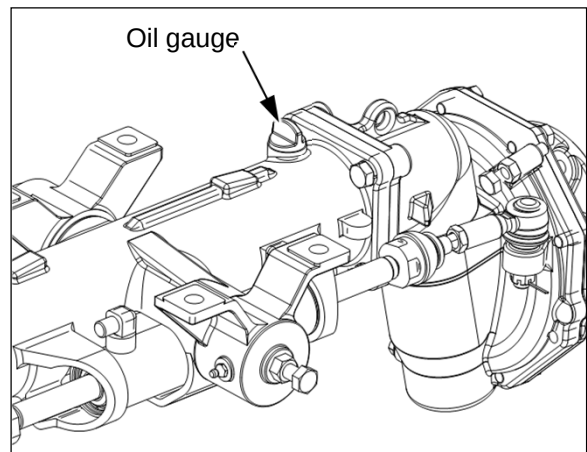


Caution

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

(4) Checking Front axle oil

- Stop the tractor on a level surface and apply the parking brake and lower the implements to the ground.
- Unscrew the oil gauge and pull it up.
- Check If the oil level is between maximum and minimum marks of the oil gauge.
- If necessary, add new oil into the oil filling port. (after 5~10 minutes later, check it again)
- *For oil specification, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.*



Caution

- ▶ The contaminated oil may reduce the durability of the power drive line and it can cause failure of the front axle. Clean around the oil filling inlet before opening the gauge.

(5) Battery check

- Refer to the chapter 5-12-(3). "Battery handling and Notices" in this manual. (See page 5-47)

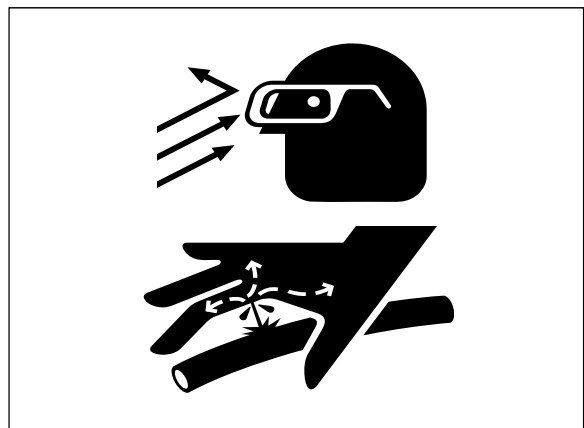
(6) Air cleaner (Dry type)

- Refer to the chapter 5-5-(6) in this manual. (See page 5-20)

(7) Hydraulic hoses and Leakage

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

For further information, refer to the chapter 3-3, "Hydraulic system" in this manual.



5-7. Every 250 hour check

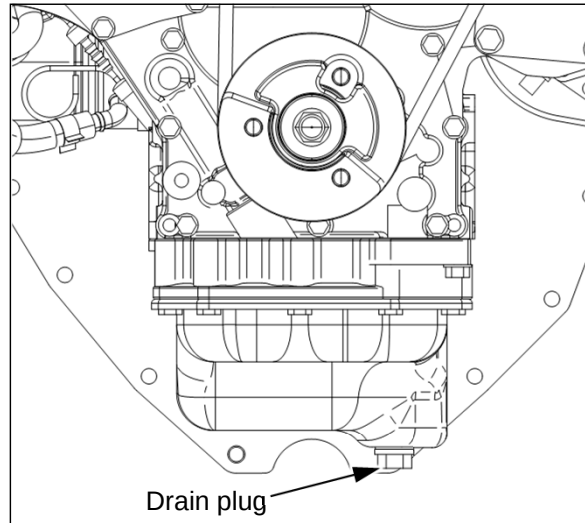
(1) Replacing Engine oil and Filter

① Drain Engine oil

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

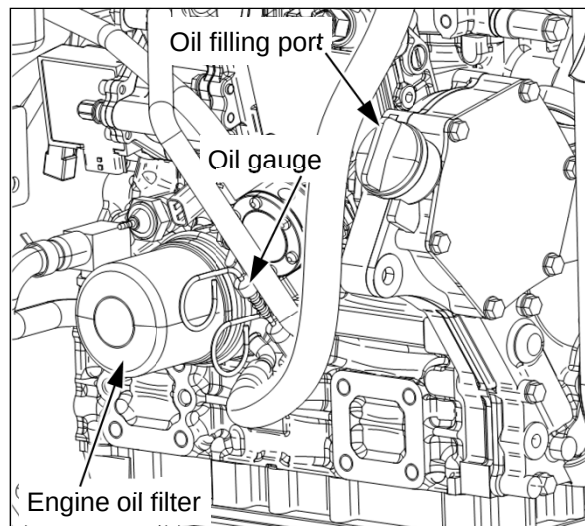
Notice

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



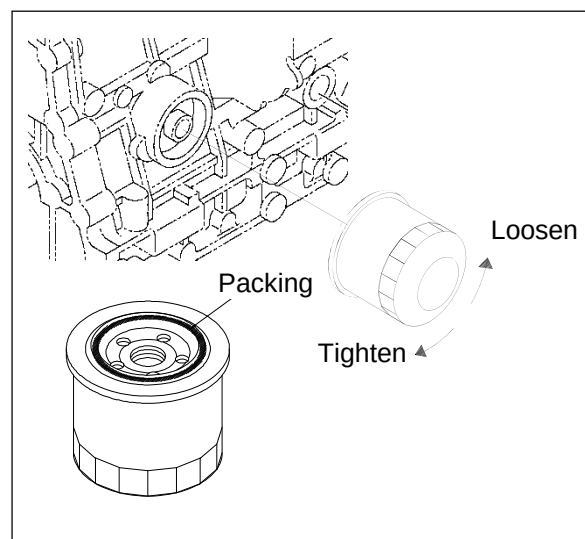
② Replace Engine oil filter

- Clean carefully around the filter.
- Coat clean engine oil on the packing of new filter and check the packing is placed well in the groove.
- Turn the oil filter counter-clockwise to remove it with a filter wrench.
- Turn the new filter clockwise to assemble it until the packing makes contact with the mounting surface. Tighten $\frac{3}{4}$ to 1 turn more after packing contact.
- If the metal is attached to the element of oil filter to be disassembled, contact your authorized dealer.



③ Fill Engine oil

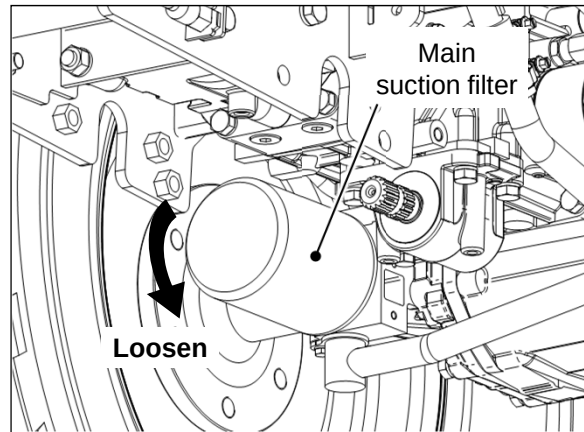
- Tighten the drain plugs. (Tightening torque : 40 ± 5 N.m) (29.5 ± 5 lbs-ft)
- Add new engine oil and check if the oil level is between MIN and MAX marks on the oil gauge.
- For oil specification, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.
- Check any leakage of the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



(2) Replacing Hydraulic Oil Filter

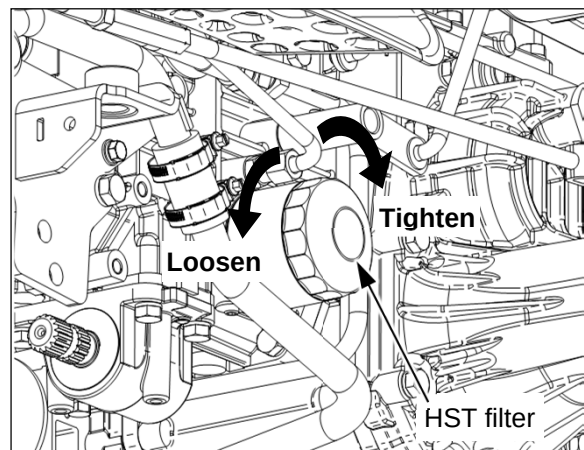
① Main suction filter

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



② HST filter (HST only)

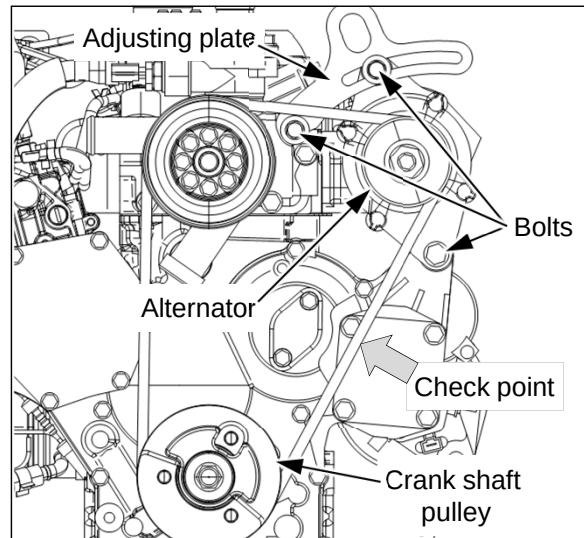
- This filter is attached on the rear side under the left-hand floor of the HST models.
- Replace the HST filter according to the same procedure of the Main suction filter.



 Warning	▶ 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. ▶ 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.
	

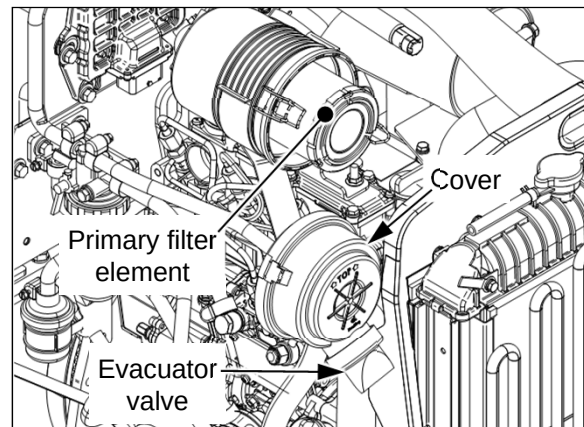
(3) Tension adjustment of Fan belt

- If the fan belt tension exceeds the normal value, adjust the tension as below.
 - Belt tension: crank shaft pulley ~ alternator pulley
 - **Normal: approx. 10~12mm (0.4~0.5 in.)**
(When pressed by 98N (22 lb))
- When adjusting the belt tension,
 1. Loosen two bolts of alternator and a hinge bolt of adjusting plate slightly.
 2. Insert a bar between crank case and alternator, and pull the bar to apply tension to the belt.
 3. With proper tension, tighten the upper bolt of the alternator.
 4. If the fan belt tension is normal, tighten the other bolts.
- Check the condition of fan belt for of cracking or fraying. If wear is indicated, replace it with a new one.



(4) Replacing Air cleaner element (Dry type)

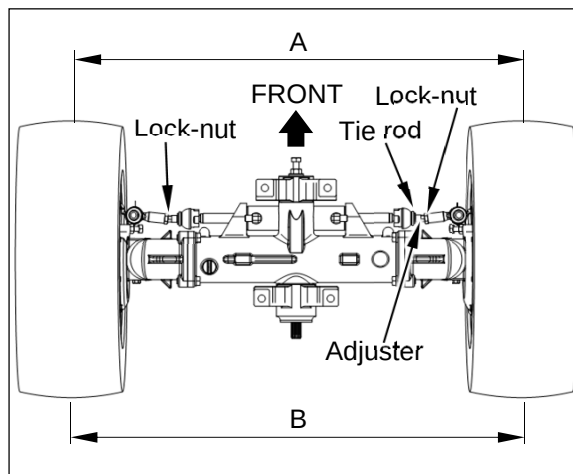
- Remove the cover and pull out the primary filter element straight out.
- Clean the inside of the air cleaner housing using a clean damp cloth.
- Check if there is damage inside the filter element by using a light. If finding a tiny crack or small hole in the filter element or the gasket is damaged, replace it with a new one.
- Insert the filter element deeply into the filter housing.
- Remove the dust of the evacuator valve and clean the inside of the cover.
- Assemble the cover with the evacuator valve facing downwards.



Notice	► Do not start the engine or close the hood if the filter element is not assembled..
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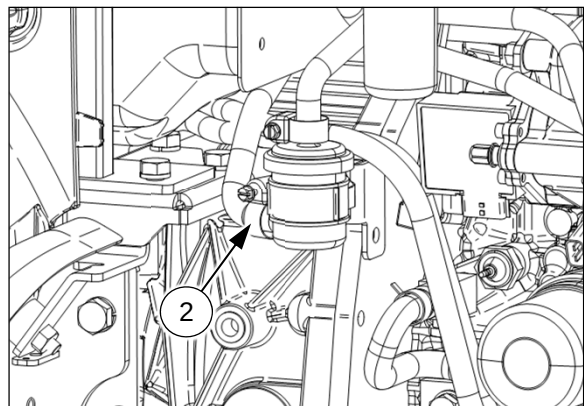
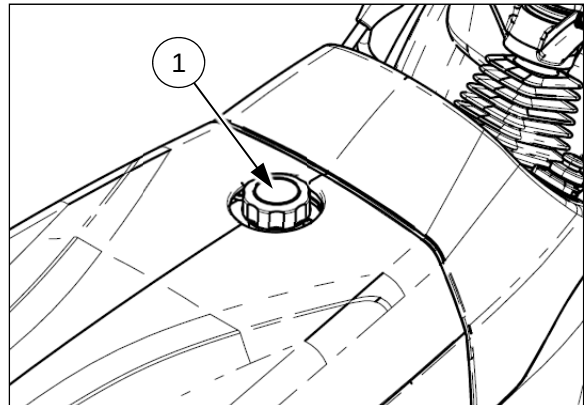
(5) Toe-in

- Check the toe-in of the front wheels and if necessary, adjust it as follows.
Normal value(B-A): 0~8 mm (0~0.3 in.)
- Loosen lock-nuts of the tie-rod (both side).
- Fix steering cylinder and turn adjuster counter-clockwise, the toe-in shall be increased.
- Turn adjuster of the other side to the same displacement.
- After adjusting the toe-in, tighten the lock-nuts.
- If possible, Contact your authorized local dealer.



(6) Drain Fuel tank

- The contaminants like dusts, water and sediments in fuel tank shall cause to malfunction of the fuel injection system.
- Drain fuel tank periodically.
- Place an approved container under the diesel fuel tank to collect the contaminants.
- Remove the fuel cap①.
- Loosen the hose clamp② into the fuel pre-filter and disconnect the hose to drain the contaminants (water, dirt, etc.) from the bottom of the tank.
- Drain the tank until clean diesel fuel with no water or dirt flows out. Reinstall the fuel hose and clamp② firmly.
- Reinstall the fuel cap①.
- Check for fuel leaks.

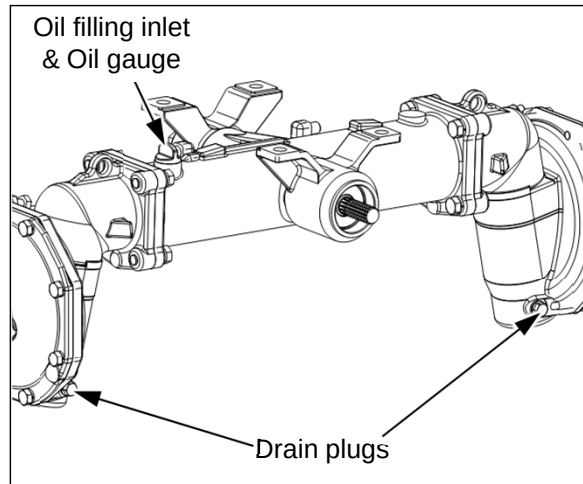


 Danger	Fire and Explosion Hazard ! ▶ Diesel fuel is flammable and explosive under certain conditions. ▶ When you remove any fuel system component to perform maintenance (such as changing the fuel filter), place an approved container under the opening to catch the fuel. ▶ Never use a shop rag to catch the fuel. Vapors from the rag are flammable and explosive. ▶ Wipe up any spills immediately. ▶ Wear eye protection. The fuel system is under pressure and fuel could spray out when you remove any fuel system component. ▶ Failure to comply will result in death or serious injury.
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5-8. Every 500 hour check

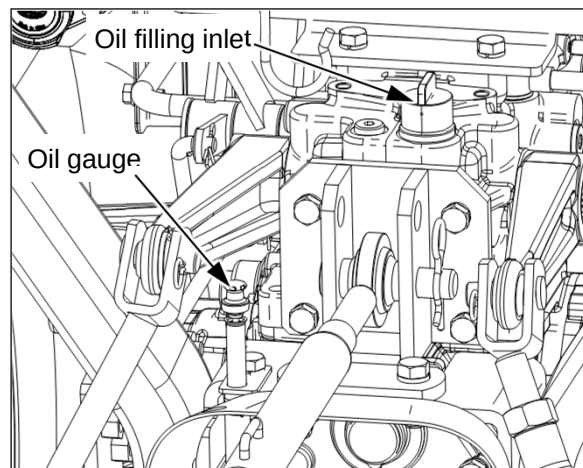
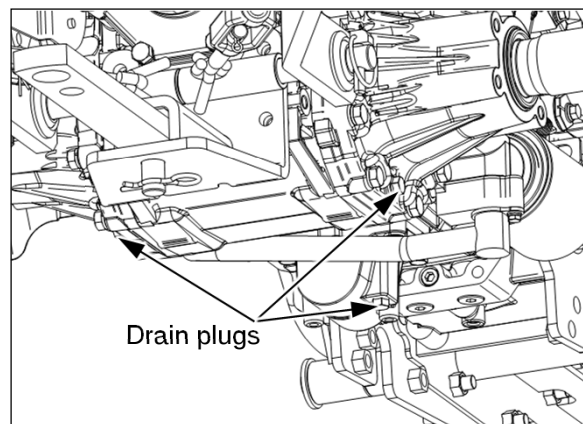
(1) Changing Front axle oil

- Stop tractor on a level surface and apply parking brake. Clean around oil filling inlet and drain plugs.
- Set a clean container under the drain plugs and Remove both LH and RH drain plugs and oil gauge to drain the oil completely.
- Assemble the drain plugs with new seals.
- Add new oil into the oil filling inlet with checking if the oil level is between “MIN” and “MAX” marks of the oil gauge.
- After 5~10 minutes later, recheck the oil level and tighten the oil gauge.
- *For oil specification, see chapter 5-3, “Lubricants and Capacity” or the last page in this manual.*



(2) Changing Transmission oil

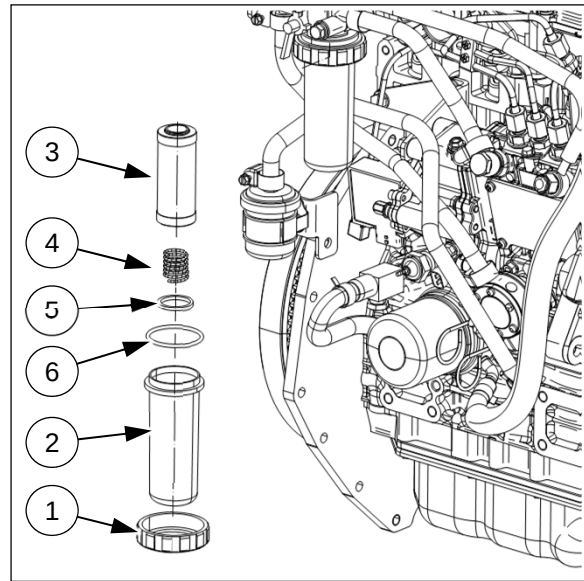
- Stop tractor on a level surface and apply parking brake. Run engine for several minutes to warm oil and lower implements and stop the engine.
- Clean around the oil filling inlet and drain plug(s).
- Set a clean container under the drain plug(s) and remove the drain plug(s) under the transmission and drain the oil completely.
- Clean metal chips and sludge stuck to the drain plug(s) and tighten the drain plug(s) again with new seal(s).
- Add new oil until the oil level is between “Min” and “Max” marks of the oil gauge.
- *For oil specification, see chapter 5-3, “Lubricants and Capacity” or the last page in this manual.*



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

(3) Replacing Fuel filter cartridge

1. Stop and cool down the engine and apply parking brake.
2. Clean around the fuel filter and set a clean container under the fuel filter.
3. Turn the fuel shutoff valve to "Close" position.
4. Loosening the ring-nut① and pull down the bowl ②.
5. Replace the filter element③ with a new one.
6. Assemble the filter element and bowl assembly. Be sure to check the retaining spring④, float ⑤, and seal⑥ locked in place.
7. Tighten the ring-nut①.
8. Bleed the system as outlined *in chapter 5-12-(1), "Air- bleeding from Fuel system" in this manual.*



 Caution	► Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover disconnected fuel system component. Do not fill the new filter with fuel. Invisible fine contaminants can enter the injection pump and it may cause damage to the fuel injection system.
 Caution	► Do not throw the exhausted waste fuel to any place. This may pollute the soil and water seriously and also is prohibited legally. If violating, you would be responsible for that by civil or criminal case. The waste fuel must be disposed according to the environment laws.

5-9. Every 1000 hour check

(1) Adjusting Engine Valve clearance

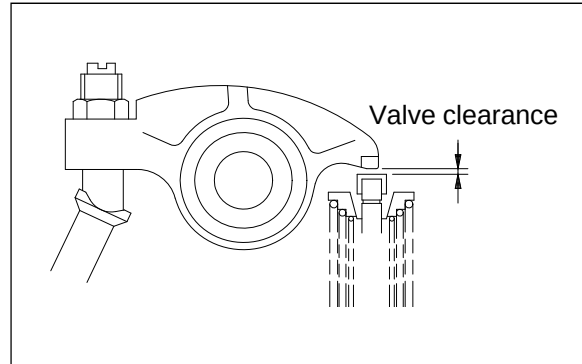
- Contact your authorized dealer to check the valve clearance.

Normal clearance:

Intake: 0.15mm (0.0059 in)

Exhaust: 0.25mm (0.0098 in)

If the gap is large, the valves can make a loud tapping noise and if the gap is too small, the engine output power may be reduced due to leakage of compressed air.



 Warning	▶ Ensure that the engine can not be started while this maintenance is being performed. To help prevent possible injury, do not use the starting motor to turn the flywheel. ▶ Hot engine components can cause burns. Allow additional time for the engine to cool before measuring/adjusting valve lash clearance.
--	---

 Caution	▶ Only qualified service personnel should perform this maintenance. Contact your authorized local dealer for this maintenance. Operation of engines with incorrect valve lash can reduce engine efficiency, and also reduce engine component life.
--	--

(2) Checking Nozzle injection pressure

- Contact your authorized local dealer for check.

Nozzle injection pressure: 12.3~13.3 MPa (1784~1929 psi)

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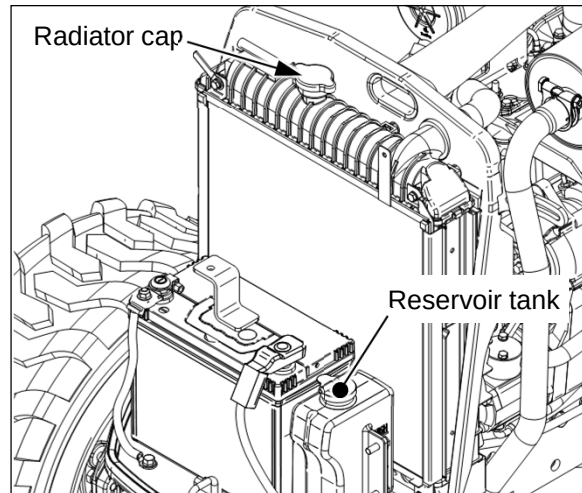
 Caution	▶ Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over disconnected fuel system component. ▶ If a fuel injector is suspected of operating outside of normal parameters, it should be removed by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

5-10. Every 2000 hour or 2-year check

(1) Replacement of engine coolant

① Check

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



⚠ Warning



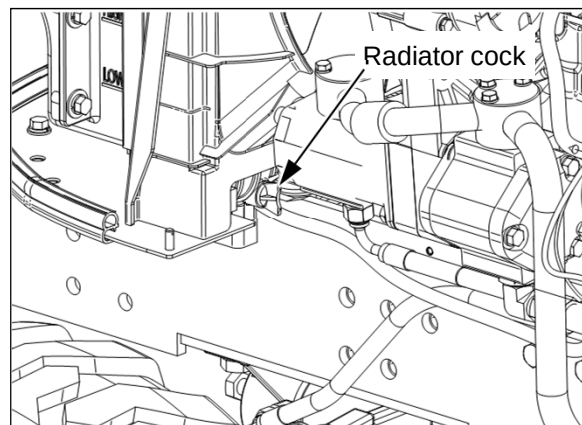
- **Pressurized System:** When opening the radiator cap, be careful of the escaping hot water or steam. Hot coolant can cause serious burns. To open the radiator cap, stop the engine and wait until the cooling system components are cool down. Loosen the radiator cap slowly in order to relieve the pressure.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

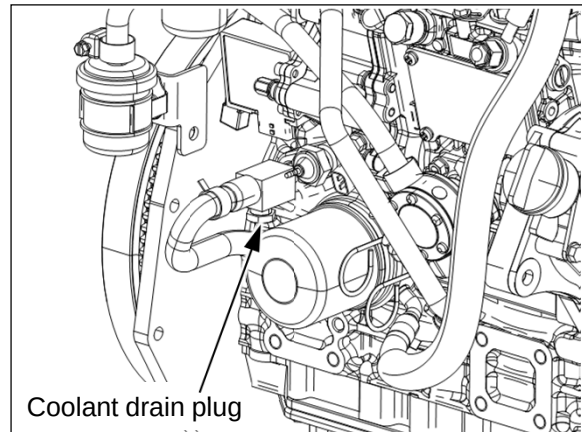
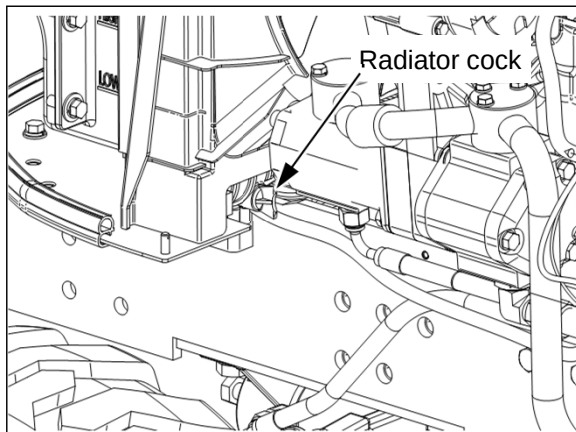
⚠ Caution

- *NEVER mix OAT coolant with conventional coolant. For further information about OAT, see chapter 5-1-(6) in this manual.*

② Drain

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





 Caution	▶ Care must be taken to ensure that fluids are contained during performance of inspection and maintenance of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids. ▶ Dispose of all fluids according to Local regulations and mandates. ▶ Keep all parts clean from contaminants. Contaminants may cause rapid wear and shortened component life.
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③ Flush

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

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

④ Fill

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

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

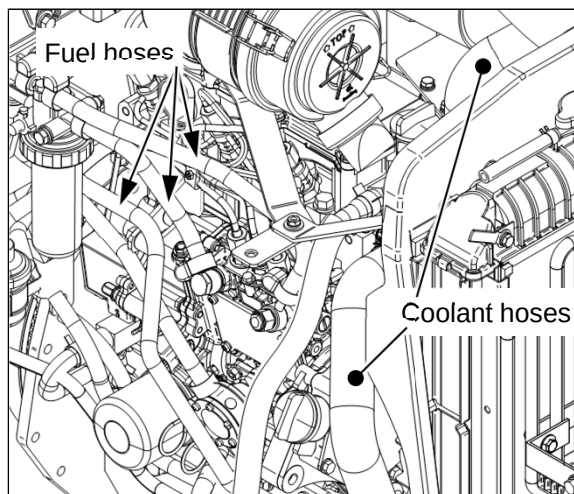
- The amount of anti-freeze in the coolant must be determined on the ambient temperature. If the amount of anti-freeze in the coolant is low, the coolant can be frozen and the engine and radiator may be damaged.
- Mix the water and anti-freeze with 40%~60% according to operating condition as below table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

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

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

(2) Fuel and Coolant hoses

- Regularly check the fuel system and engine coolant system hoses.
- If they are cracked or degraded, replace them.
- Replace the hoses at least every two years.

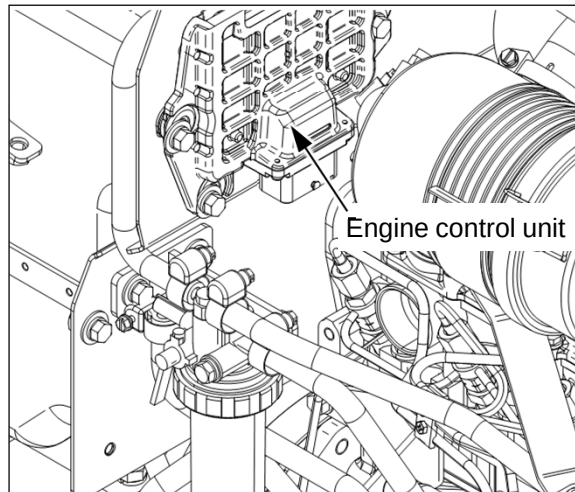


 Caution	▶ Follow the guidelines of the EPA or other governmental agencies for the proper disposal of hazardous materials such as engine oil, diesel fuel and engine coolant. Consult the local authorities or reclamation facility. ▶ Never dispose of hazardous materials irresponsibly by dumping them into a sewer, on the ground, or into ground, water or waterways.
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5-11. Every 3000 hour check

(1) Inspect ECU and Sensors

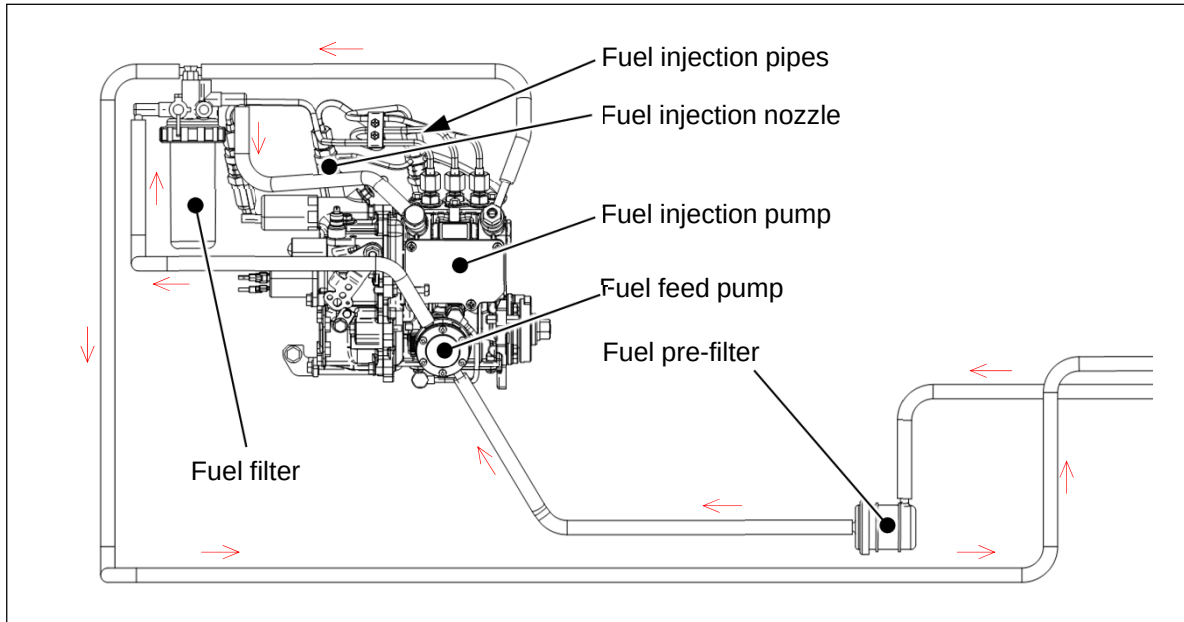
- Inspect the appearance and wirings of the ECU and related sensors and actuators.
- Check the occurrence status and error history of the engine failure lamp and warning lamps on the control panel. If necessary, a more detailed check-up can be done using a diagnosis tool. For detailed check-up, always contact your authorized local dealer.



5-12. General maintenance (When required)

(1) Air-bleeding from Fuel system

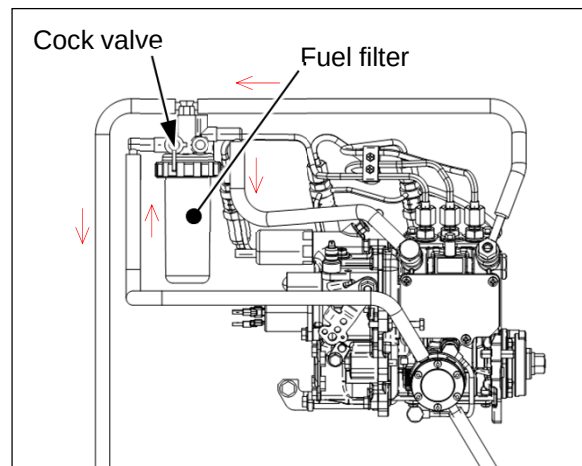
- Air in the fuel system may cause weak fuel injection or a failure of the engine start or stop. To prevent such a failure, bleed the air from the fuel system.



 Danger	► HIGH PRESSURE FUEL. When the engine is running, do not loosen the fuel injection pipes to bleed air from the fuel system.
 Warning	► Do not adjust or modify the fuel injection system arbitrary. This will alter the emission of exhaust fumes and engine performance.
Notice	► When changing the fuel filter only, it is not necessary to bleed air from the fuel injection pipes.

① Air-bleeding from Fuel Filter

1. When replacing the fuel filter element, open the cock valve and turn key switch to ON position.
2. Wait for about 10~15 seconds, and then the air-bleeding shall be completed.



② Bleeding the injector lines (if necessary)

 Warning	► Escaping fluid! Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately. Failure to comply could result in death or serious injury.
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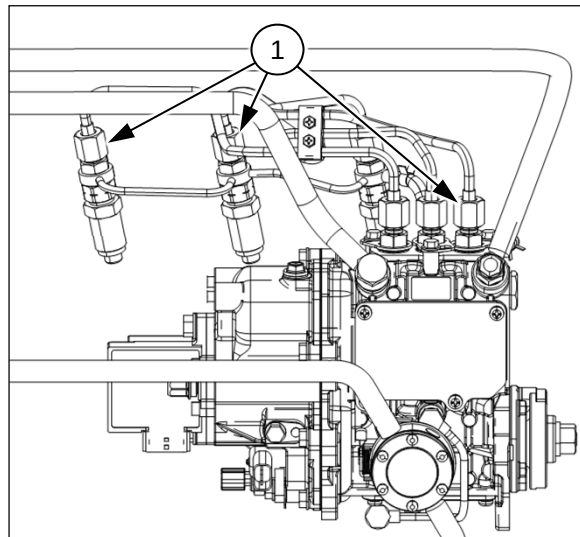
Bleed the injector lines if:

- The tractor has run out of fuel.
- New injectors have been installed.
- The injection pump has been removed for service repairs.

To bleed the injector lines:

1. Loosen the injector line fittings① at the injectors.
2. Move the hand throttle control lever to its wide open position.
3. Crank the engine until air-free fuel flows from each connection, then tighten the fittings to **29~34 N·m (22~25 lb ft)**.

NOTICE: If air is not purged from the system, repeat the above procedures. Do not crank the engine continuously for more than thirty seconds, as this may cause starting motor failure.

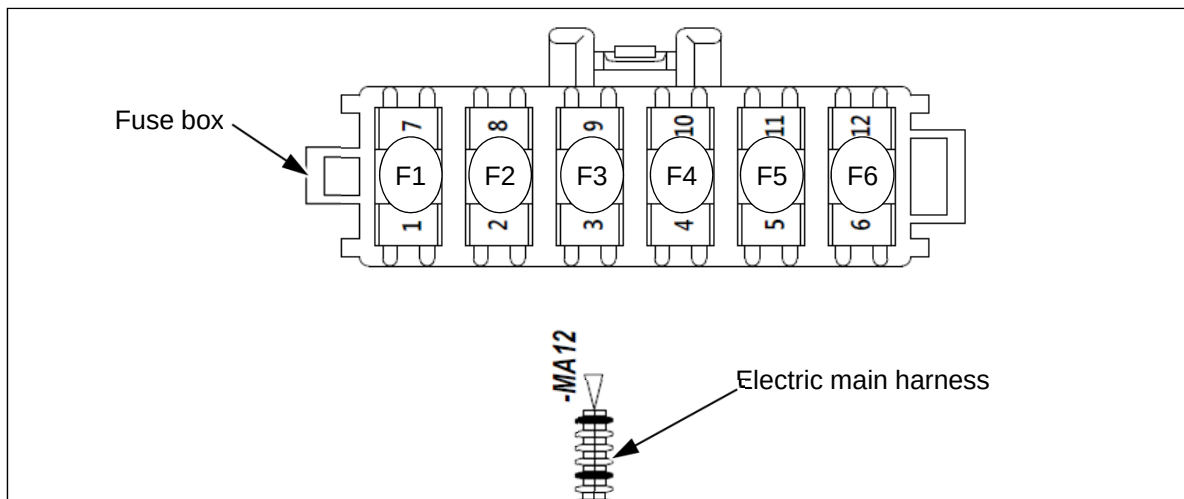
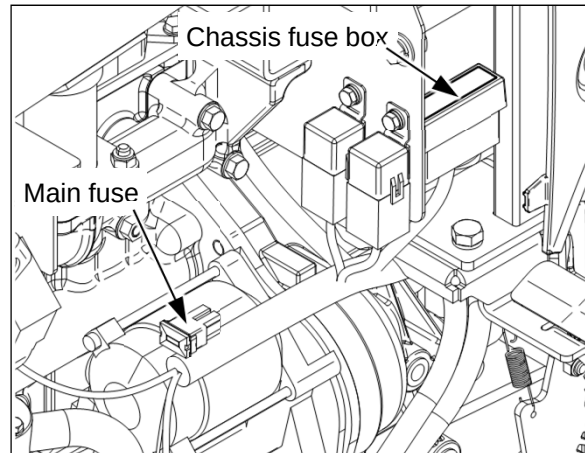


 Warning	▶ Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the key switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.
 Caution	▶ Do not allow dirt to enter the fuel system. Thoroughly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

(2) Fuse & Main fuse

① Fuse check and replacement

- Chassis fuse box is installed on the main electric wiring harness on the left-hand side of the engine as shown in the right figure.
- How to replace the fuse.
 1. Remove the fuse box cover (if fitted).
 2. Check each fuse and remove the damaged one.
 3. Replace it with a new one such as a damaged one.
- The capacity and function of each fuse is described on the fuse box cover.

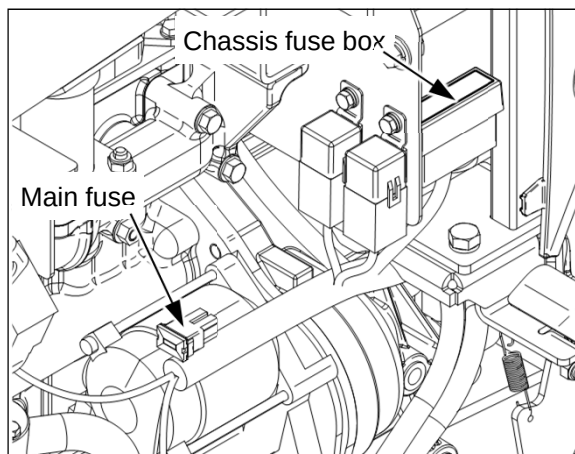


Fuse Location		Fuse capacity	Circuit
HST	F1	15A	ECU
	F2	10A	Controller / Switch
	F3	10A	Work / Brake / Turn signal lamps
	F4	15A	PTO / Power socket
	F5	10A	ECU / Rack actuator
	F6	15A	Hazard warning lights

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

② Main fuse (SLOW BLOW FUSE) check and replacement

- The main fuse is attached to the engine harness of the left-hand side of the engine.
- If the main fuse is damaged, remove it from the wiring harness and replace it with a genuine part.
- **Rated Capacity: 60A**



Caution

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

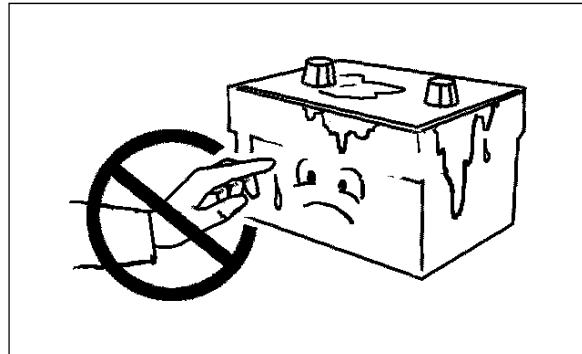
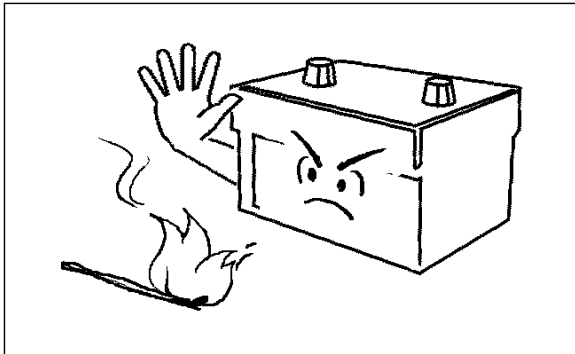
(3) Battery handling and Notices

※ **Battery fluid (Electrolyte) is a solution of water and sulfuric acid. It makes poisonous gas which is very harmful to eyes, skin and clothing. And also this gas is explosive.**

Read the following instructions thoroughly before handling the battery.

① Battery check

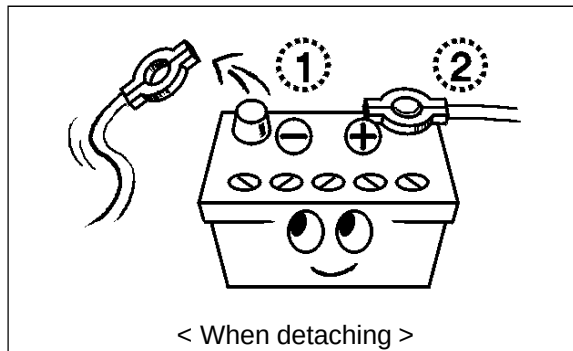
- Indicator(if fitted) on the top of the battery displays the battery state. If the indicator color is;
 - **GREEN** : Normal state.
If the engine does not start despite of green color, contact your authorized local dealer.
 - **CLEAN** : Low charging state – charge the battery.
 - **WHITE or RED** :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



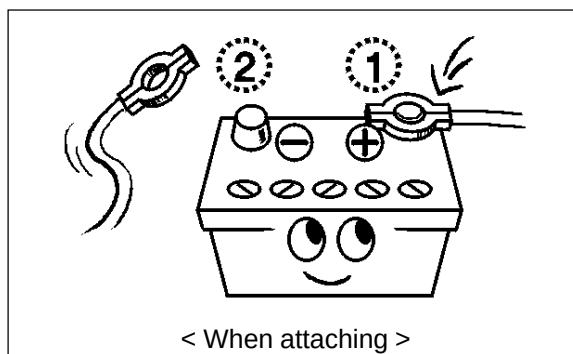
 Caution   	▶ The gas generated from the battery is explosive. Comply with the following instructions. - Keep cigarettes, sparks and flames away from the battery. Use a flashlight to check battery electrolyte level or indicator. - Never check battery charge by placing a metal object across the terminals.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

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



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

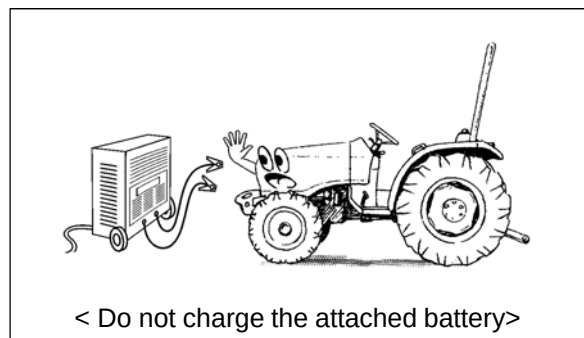
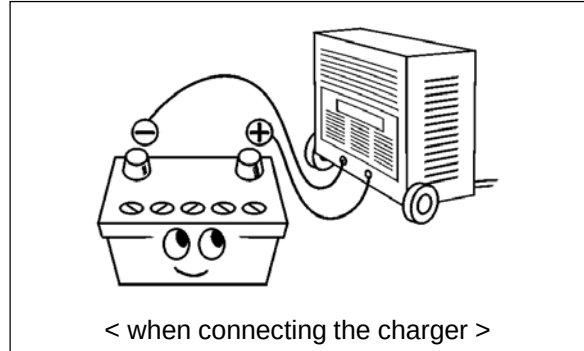


 Caution	▶ Stop engine and apply parking brake and remove the ignition key before replacing the battery.
	▶ Put on eye protection and globes to protect human body from poisonous sulfuric acid before handling the battery. .
	▶ Always remove grounded (-) battery clamp first and assemble it last. If not,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

③ Notices in charging the battery using separate charger

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

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



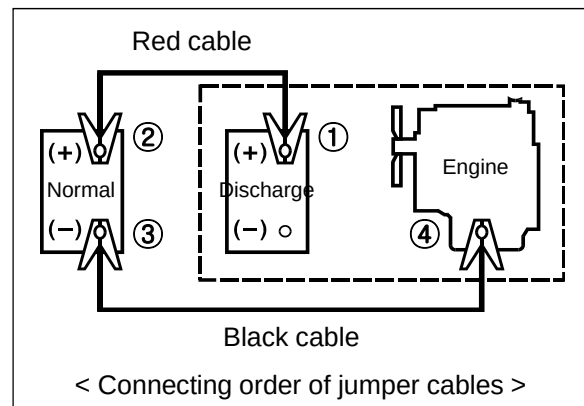
 Caution	▶ Put on eye protection and gloves to protect human body from poisonous sulfuric acid before handling the battery .
	▶ Always remove grounded (-) battery clamp first and assemble it last. If not, it can cause explosion by spark. ▶ Keep all flames and sparks away and DO NOT smoke while charging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

④ How to use jumper cables

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

① Connecting Jumper cables

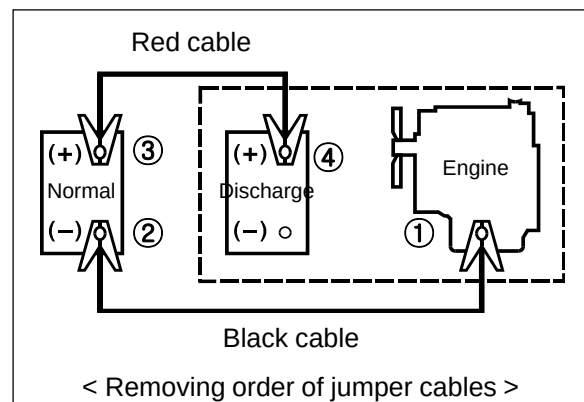
- Check followings before connecting the cables.
 - Is the spring of clamp normal?
 - Is the cable and clamp cut-off?
- 1. Stop engine, apply parking brake and remove the ignition key.
- 2. Connect two (+) terminals of both batteries with red cable.
(tractor battery-①, auxiliary battery-②)
- 3. Connect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



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

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.
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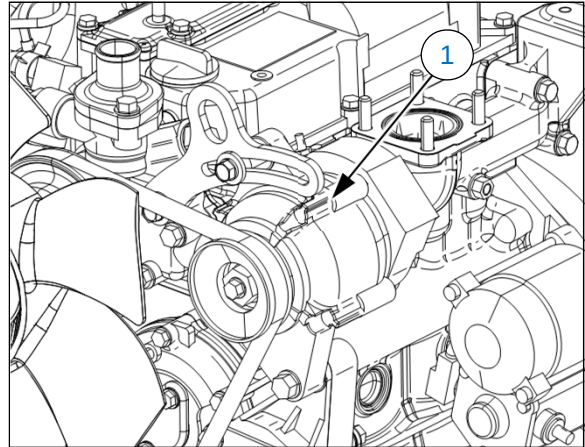
(4) Alternator and drive belt - Check

- The tractor alternator① is belt-driven from the engine crankshaft pulley. It is important that belt slippage does not occur, or the charging system will be affected.

To adjust the fan belt, see page 5-31.

- Required alternator periodical maintenance:

- Belt adjustment
- Inspect alternator terminals
- Clean alternator cooling fan fins



- When working on or checking the alternator, adhere to following precautions or alternator damage may occur:

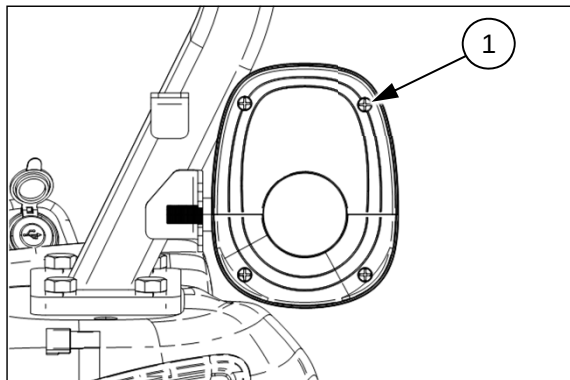
- Do not UNDER ANY CIRCUMSTANCES short the field terminal of the alternator to ground.
- Do not disconnect the alternator output lead or battery cables while the alternator is operating.
- Do not remove the alternator from the tractor without first disconnecting the negative (-) battery cable. When removing the battery, disconnect the negative (-) cable first.
- To install a battery, MAKE SURE that the positive (+) cable is connected first and that the negative terminal is connected to ground. Reverse polarity will destroy the rectifier diodes in the alternator.

NOTE: *If the battery charge warning indicator illuminates, indicating that the alternator is not charging the battery, check the fan belt and the wiring connections. If these items are in satisfactory condition and the warning light continues to indicate no charge, contact your authorized local dealer.*

(5) Turn signal light bulb - Replace

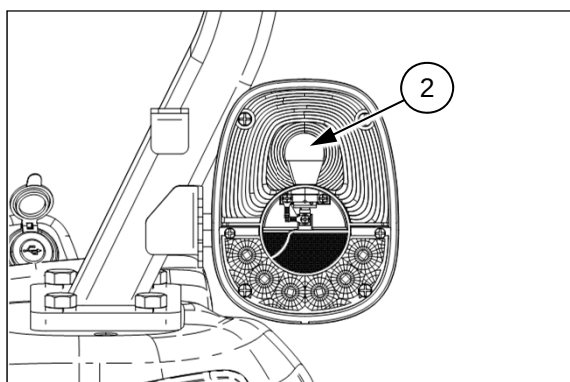
① Turn signal light bulb replacement

1. Remove the four screws① retaining the turn signal light lenses and remove the lenses.



2. Push in on the bulb② and rotate bulb counter-clockwise in socket to remove.
3. Insert the new bulb into the socket and turn it clockwise until the bulb locks into place.
4. Install lenses and retaining screws.

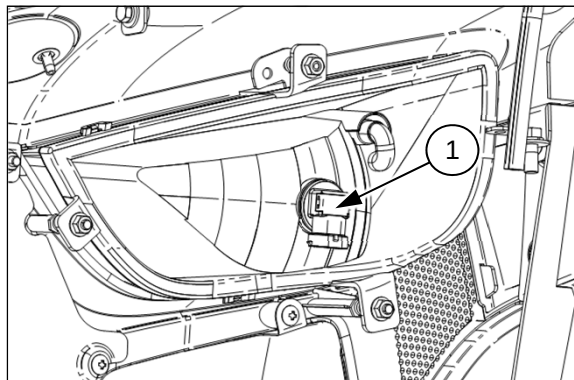
NOTE: For about bulb specification, refer to the chapter 5-5-(4) in this manual.



(6) Headlight bulb - Replace

① Headlight bulb

- If a headlight bulb① fails to operate, the bulb must be replaced as below.
1. Open the tractor hood.
 2. Remove the harness connector.
 3. Rotate the bulb① counter-clockwise a quarter turn and remove the bulb from the housing.
 4. Insert a new bulb into the socket and turn 1/4 turn clockwise to secure.
 5. Reinstall the harness connector.



NOTE: For about bulb specification, refer to the chapter 5-5-(4) in this manual.

 Caution	▶ Be careful not to touch the bulb with bare fingers. Oil from the fingers can shorten the life of bulb. Use protective cloth or glove when installing bulb. ▶ Bulb and surroundings are very hot while working. Be careful not to touch the bulb with bare fingers. It may cause a burn of your hand. Before servicing the bulb, turn off the light and cool down the bulb.
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(7) Touch-up paint color

- The following color specifications are recommended for touch-up paint repairs.
- You must use acryl urethane paint.

Color	Parts	Munsell number or Spec.
Sky Blue	Hood, Fenders	10B 4/10
LS Gray (N3.0)	Instrument covers	N3.0
White Ivory	Wheels	5Y 8.5/2
Black	Transmission case, Front axle	N1.0

5-13. Troubleshooting

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

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

System	Faults	Possible causes	Solutions
Brake	Brake does not work or only one side works.	▲ Wrong brake pedal play ▲ Lining worn or broken ▲ Left/right pedal play is different	▲ Adjust ▲ Replace ▲ Adjust
	After brake pedal working, it does not return.	▲ Return spring damaged ▲ Lack of grease in shaft parts	▲ Replace the spring ▲ Remove the rust, apply grease
Hydraulic 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

5-14. Engine manufacturer's warranty

The following attachment shows warranty terms and conditions for the engine by manufacturer, YANMAR.

But, the warranty periods of LS Tractor always prevail over the ones mentioned on the attachment by engine manufacturer, YANMAR.

- Attachment

YANMAR LIMITED WARRANTY

What is Covered by this Warranty?

YANMAR warrants to the original retail purchaser that a new YANMAR TNM and TNV series indirect injection engines will be free from defects in material and/or workmanship for the duration of the warranty period.

Note: YANMAR engines may be equipped with external components including, but not limited to: wiring harnesses, electrical devices, control panels, radiators, air filters, fuel filters, and/or exhaust systems that are supplied and/or installed by manufacturers other than YANMAR. For warranty information on such external components, please contact the machine or component manufacturer directly or see your authorized YANMAR dealer or distributor.

This warranty is provided in lieu of all other warranties, express or implied. YANMAR specifically disclaims any implied warranties of merchantability or fitness for a particular purpose, except where such disclaimer is prohibited by law. If such disclaimer is prohibited by law, then implied warranties shall be limited in duration to the life of the expressed warranty.

How Long is the Warranty Period?

The YANMAR standard limited warranty period runs for a period of **twenty-four (24) months or two-thousand (2000) engine operation hours**, whichever occurs first. An extended limited warranty of thirty-six (36) months or three thousand (3000) engine operating hours, whichever occurs first, is provided for these specific parts only: the cylinder block, cylinder head, crankshaft forging, connecting rods, flywheel, flywheel housing, camshaft, timing gear, and gear case. The warranty period for both the standard limited warranty and the extended limited warranty (by duration or operation hours) begins on the date of delivery to the original retail purchaser and is valid only until the applicable warranted duration has passed or the operation hours are exceeded, whichever comes first.

What the Engine Owner must Do:

If you believe your YANMAR engine has experienced a failure due to a defect in material and/or workmanship, you must contact an authorized YANMAR industrial engine dealer or distributor within thirty (30) days of discovering the failure. You must provide proof of ownership of the engine, proof of the date of the engine purchase and delivery, and documentation of the engine operation hours. Acceptable forms of proof of delivery date include, but are not limited to: the original warranty registration or sales receipts or other documents maintained in the ordinary course of business by YANMAR dealers and/or distributors, indicating the date of delivery of the YANMAR product to the original retail purchaser. This information is necessary to establish whether the YANMAR product is still within the warranty period. Thus, YANMAR strongly recommends you register your engine as soon as possible after purchase in order to facilitate any future warranty matters.

You are responsible for the transportation of the engine to and from the repair location as designated by YANMAR.

- Attachment

YANMAR Limited Warranty - continued

To Locate an Authorized YANMAR Industrial Engine Dealer or Distributor:

You can locate your nearest authorized YANMAR industrial engine dealer or distributor by visiting the YANMAR CO., LTD. website at:

<https://www.yanmar.com/global/> (The English language page will be displayed.)

- “Click” on “Dealer Locator” in the website heading to view the “Dealer Locator” menu.
- Choose the Country from the pull down menu.
- Choose the Product Category from the pull down menu.
- “Click” on “Search” to browse YANMAR dealer or distributor.

You may also contact YANMAR by clicking on “Contact” icon in the website heading and typing in your question or comment.

What YANMAR will Do:

YANMAR warrants to the original retail purchaser of a new YANMAR engine that YANMAR will make such repairs and/or replacements at YANMAR’s option, of any parts(s) of the YANMAR product covered by this warranty found to be defective in material and/or workmanship. Such repairs and/or replacements will be made at a location designated by YANMAR at no cost to the purchaser for parts or labor.

What is not Covered by this Warranty?

This warranty does not cover parts affected by or damaged by any reason other than defective materials or workmanship including, but not limited to, accident, misuse, abuse, “Acts of God”, neglect, improper installation, improper maintenance, improper storage, the use of unsuitable attachments or parts, the use of contaminated fuels, the use of fuels, oils, lubricants, or fluids other than those recommended in your YANMAR Operation Manual, unauthorized alterations or modifications, ordinary wear and tear, and rust or corrosion. This warranty does not cover the cost of parts and/or labor required to perform normal/scheduled maintenance on your YANMAR engine. This warranty does not cover consumable parts such as, but not limited to, filters, belts, hoses, fuel injector nozzles, lubricants and cleaning fluids. This warranty does not cover the cost of shipping the product to or from the warranty repair facility.

- Attachment

YANMAR Limited Warranty - continued

Warranty Limitations:

The foregoing is YANMAR's only obligation to you and your exclusive remedy for breach of warranty. Failure to follow the requirements for submitting a claim under this warranty may result in a waiver of all claims for damages and other relief. **In no event shall YANMAR or any authorized industrial engine dealer or distributor be liable for incidental, special or consequential damages.** Such consequential damages may include, but not be limited to, loss of revenue, loan payments, cost of rental of substitute equipment, insurance coverage, storage, lodging, transportation, fuel, mileage, and telephone costs. The limitations in this warranty apply regardless of whether your claims are based on breach of contract, tort (including negligence and strict liability) or any other theory. Any action arising hereunder must be brought within one (1) year after the cause of action accrues or it shall be barred. Some states and countries do not allow certain limitations on warranties or for breach of warranties. **This warranty gives you specific legal rights, and you may also have other rights which vary from state to state and country to country.** Limitations set forth in this paragraph shall not apply to the extent that they are prohibited by law.

Warranty Modifications:

Except as modified in writing and signed by the parties, this warranty is and shall remain the complete and exclusive agreement between the parties with respect to warranties, superseding all prior agreements, written and oral, and all other communications between the parties relating to warranties. **No person or entity is authorized to give any other warranty or to assume any other obligation on behalf of YANMAR, either orally or in writing.**

Questions:

If you have any questions or concerns regarding this warranty, please call or write to the nearest authorized YANMAR industrial engine dealer/distributor or other authorized facility.

- Attachment

YANMAR CO., LTD. LIMITED EMISSION CONTROL SYSTEM WARRANTY - USA ONLY

Your Warranty Rights and Obligations:

■ California

The California Air Resources Board (CARB), the Environmental Protection Agency (EPA) and YANMAR CO., LTD. hereafter referred to as YANMAR, are pleased to explain the **emission control system warranty** on your industrial compression-ignition engine. In California, 2013 MY and subsequent model years off-road compression-ignition engines must be designed, built and equipped to meet the state's stringent anti-smog standards. In all states, 1998 and later non-road compression-ignition engines must be designed, built and equipped to meet the United States EPA emissions standards. YANMAR warrants the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system, Electronic Control Unit, Exhaust Gas Recirculation (EGR) system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, YANMAR will repair your non-road compression-ignition engine at no charge to you including diagnosis, parts and labor.

Manufacturer's Warranty Period:

The model year 1998 or later certified and labeled non-road compression-ignition engines are warranted for the periods listed below. If any emission-related part on your engine is found to be defective during the applicable warranty period, the part will be replaced by YANMAR.

If your engine is certified as	And its maximum power is	And its rated speed is	Then its warranty period is
Variable speed or constant speed	kW < 19	Any speed	1,500 hours or two (2) years whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of two (2) years.
Constant speed	19 ≤ kW < 37	3,000 rpm or higher	1,500 hours or two (2) years whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of two (2) years.
Constant speed	19 ≤ kW < 37	Less than 3,000 rpm	3,000 hours or five (5) years whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of five (5) years.
Variable speed	19 ≤ kW < 37	Any speed	3,000 hours or five (5) years whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of five (5) years.
Variable speed or constant speed	kW ≥ 37	Any speed	3,000 hours or five (5) years whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of five (5) years.

- Attachment

Limited Emission Control System Warranty - USA Only - continued

Warranty Coverage:

This warranty is transferable to each subsequent purchaser for the duration of the warranty period. YANMAR recommends that repair or replacement of any warranted part will be performed at an authorized YANMAR dealer.

Warranted parts not scheduled for replacement as required maintenance in the operation manual shall be warranted for the warranty period. Warranted parts scheduled for replacement as required maintenance in the operation manual are warranted for the period of time prior to the first scheduled replacement. Any part repaired or replaced under warranty shall be warranted for the remaining warranty period.

During the warranty period, YANMAR is liable for damages to other engine components caused by the failure of any warranted part during the warranty period.

Any replacement part which is functionally identical to the original equipment part in all respects may be used in the maintenance or repair of your engine, and shall not reduce YANMAR's warranty obligations. Add-on or modified parts that are not exempted may not be used. The use of any non-exempted add-on or modified parts shall be grounds for disallowing a warranty.

Warranted Parts:

This warranty covers engine components that are a part of the emission control system of the engine as delivered by YANMAR to the original retail purchaser. Such components may include the following:

- Fuel injection system
- Electronic control system
- Cold start enrichment system
- Intake manifold
- Turbocharger systems
- Exhaust manifold
- EGR system
- Positive crankcase ventilation system
- Hoses, belts, connectors and assemblies associated with emission control systems

Since emissions-related parts may vary slightly between models, certain models may not contain all of these parts and other models may contain the functional equivalents.

- Attachment

Limited Emission Control System Warranty - USA Only - continued

Exclusions:

Failures other than those arising from defects in material and/or workmanship are not covered by this warranty. The warranty does not extend to the following: malfunctions caused by abuse, misuse, improper adjustment, modification, alteration, tampering, disconnection, improper or inadequate maintenance or use of non-recommended fuels and lubricating oils; accident-caused damage, and replacement of expendable items made in connection with scheduled maintenance. YANMAR disclaims any responsibility for incidental or consequential damages such as loss of time, inconvenience, loss of use of equipment/engine or commercial loss.

Owner's Warranty Responsibilities:

As the engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. YANMAR recommends that you retain all documentation, including receipts, covering maintenance on your non-road compression-ignition engine, but YANMAR cannot deny warranty solely for the lack of receipts, or for your failure to ensure the performance of all scheduled maintenance.

YANMAR may deny your warranty coverage of your non-road compression-ignition engine if a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

Your engine is designed to operate on diesel fuel only. Use of any other fuel may result in your engine no longer operating in compliance with applicable emissions requirements.

You are responsible for initiating the warranty process. You are responsible for presenting your engine to an authorized YANMAR dealer or distributor as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible. If you have any questions regarding your warranty rights and responsibilities, or would like information on the nearest YANMAR dealer or authorized service center, you should contact YANMAR America Corporation.

Website: <https://www.yanmar.com>

E-mail: CS_support@yanmar.com

Toll free telephone number: 1-800-872-2867, 1-855-416-7091

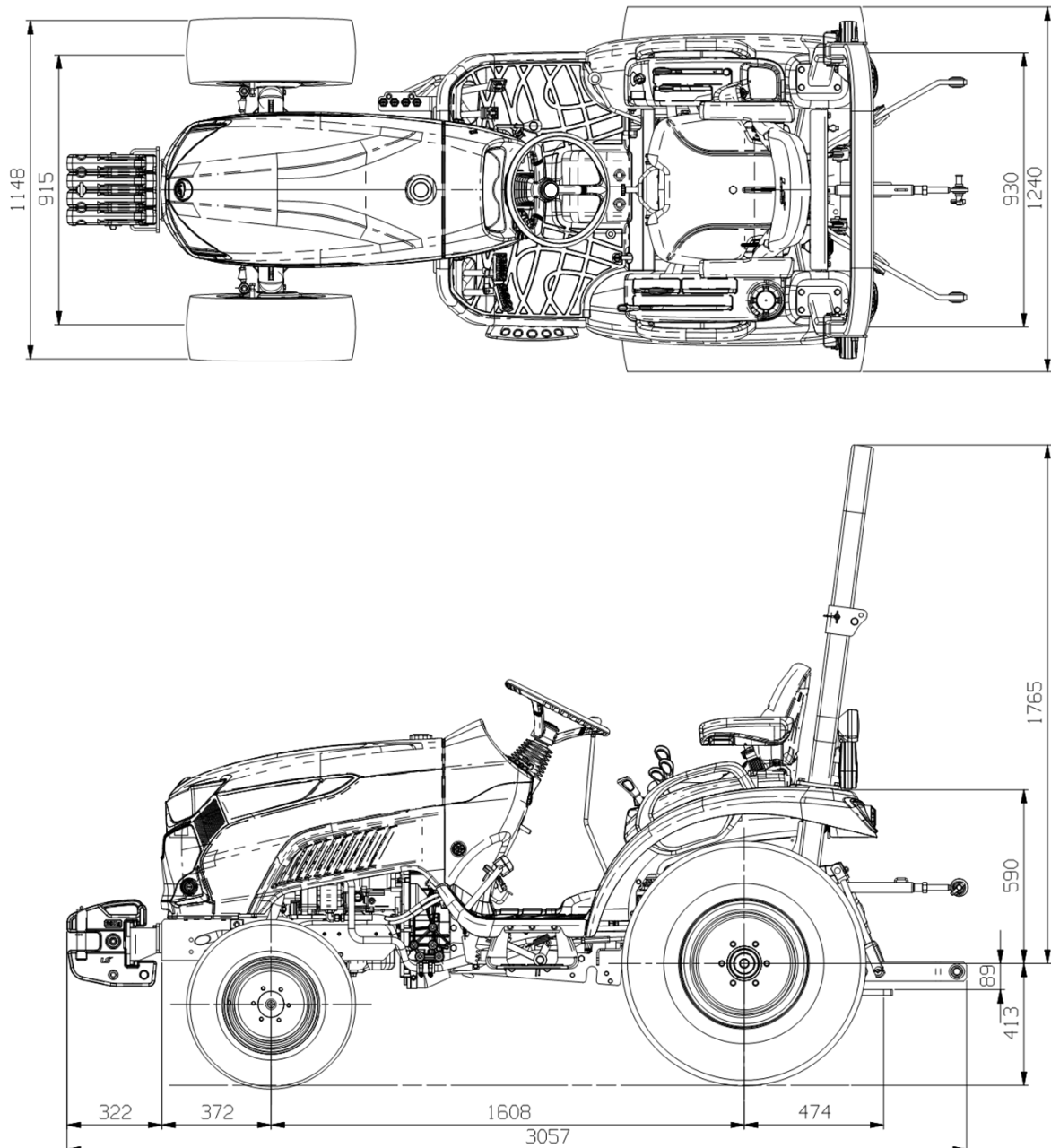
What the Emergency Stationary Type Engine Owner must Do:

The engines for emergency stationary type generators certified by Federal Law (40 CFR Part60) are limited to emergency use only, and the operation for maintenance checks and verification test for functions is required. The total operating hours for maintenance and verification test for functions should not exceed 100 hours per year. However, there is no limitation on the operating hours for emergency use. Keep a log of the number of hours the engine is operated for both emergency use and non-emergency use. Also, note the reason for the operation.

6. Dimension and Specification

- HST Type rear foldable roll-bar

(Unit : mm)



* When applying front tires: 205/65-12 R-4, rear tires: 305/70-16.5 R-4

		MT2 25s
WEIGHT	Mechanical Type	N/A
	HST Type	801kg (1766 lb)
	Weight distribution	Front : Rear = 0.43 : 0.57
	Bumper/Front weight	7.4kg / 20kgx4EA (optional)
ENGINE	Model	3TNV80F-ZK
	Type	Indirect, Swirl Chamber
	No. of cylinder	3
	Diameter x stroke	80 x 84mm (3.15x3.31 in.)
	Displacement	1,267cc (77.3 in³)
	Engine speed	1350~2950 rev/min
	Maximum torque	72 N.m / 1900 rev/min
	Engine rated power	18.4 kW / 2800 rev/min
FUEL INJECTION PUMP	Type	IN-LINE pump
	Speed regulation	Electronic type
	Fuel filter	Replaceable cartridge type
	Injection order	1-3-2
LUBRICATION SYSTEM	Type	Forced lubrication type
	Pump	Trochoid gear pump
	Filter	Replaceable cartridge type
COOLING SYSTEM	Pump	Centrifugal Type
	Temperature control	Thermostat
	Air cleaner	Dry
TRANSMISSION	Type	HST with 3-speed range gear
	Main clutch	N/A
	Forward / Reverse	HST pedal(s)
	Differential lock	Mechanical pedal type

			MT2 25s
PTO	Type		Electro-hydraulic rear PTO / MID PTO
	No. of speed		1- speed gear with neutral
	PTO / Engine		540 rev/min / 2580 rev/min (Rear PTO) 2500 rev/min / 2647 rev/min (MID. PTO)
HYDRAULICLIFT	3 Point linkage		CAT1
	Draft load detection		N/A
	Lowering speed control & fixing device		Down speed control valve
	Pump		Engine drive
	Rated flow		21.1 LPM (5.6 GPM)
	System pressure		15.0 MPa (2176 psi)
	Lift capacity	Lower link end	850 kgf (1896 lbf)
		24" behind lift point	600 kgf (1323 lbf)
REMOTE CONTROL	Type		N/A for rear remote couplers
	No. of Q/coupler		N/A for rear remote couplers
	F/Loader coupler		Loader valve with extension couplers (optional)
STEERING SYSTEM	Type		Hydrostatic
	Oil		Transmission oil (common use)
	Min. turning radius (with brake)		2.5 m (8.2 ft)
	Max. steering angle		54°
	No. of steering turns		3.0 turns (lock to lock)
	Rated flow		14.1 LPM (3.7 GPM)
	System pressure		12 MPa (1740 psi)

			MT2 25s
ALTERNATOR	Rated output		12V-50A
	Voltage control		Built-in alternator (IC-type)
BATTERY	Voltage		12V
	Capacity		45AH
START MOTOR	Output power		12V - 1.6KW
	Operation		Electric solenoid Type
LIGHTS	Headlights (Low / High beam)		12V 35W / N/A
	Turn signal lights (front / rear)		12V 21W
	Side lights (front / rear)		N/A
	Stop lights / Taillights (rear)		12V 21W / 5W
	Work light (optional)		12V 27W (Roll-bar)
OTHERS	Instrument lights		LED
	Indoor light (CAB)		N/A
	Instrument indicator		LED
	Cold start aid		Glow Plug
STD. AGR. TIRE	Front		205/65-12 4PR
	Rear		305/70-16.5 6PR
WHEEL TRACK ADJUSTMENT	Front	Tracks	1 - Fixed track
		Dimension	915mm
	Rear	Tracks	1 - Fixed track
		Dimension	930mm
** These specifications are only general product information about standard model. Actual data may vary depending on the various optional product, and also can be changed at any time to improve the product qualification without any prior notification **			

Lubricants and Capacity

Lubricants	Capacity	International standard	Recommended products
Engine coolant	3.3L (0.9U.S.gals)	ASTM D6210	Soft water (50%) + Anti-freeze (50%)
Fuel	25L (6.6U.S.gals)	ASTM D975 No.2 or EN 590	Ultra low sulfur diesel
Engine oil	2.9L (0.8U.S.gals)	API CF-4 or CI-4	KIXX DL (Maker : GS Caltex)
Transmission oil (common use for hydraulic lift and steering system)	17L (4.5U.S.gals)	API GL4 ISO VG 32/46	LSTH400G (Maker : GS Caltex)
Front axle oil	3.0L (0.8U.S.gals)	API GL4 SAE 80W	EPK 80W90 (Maker : S-OIL TOTAL co. Ltd.)
Grease (Front axle holder, 3-point linkage, etc)	Proper amount	NLGI 2	MAHWAK Multi purpose or MAHWAK All purpose (Caltex)

RECOMMENDED ENGINE OIL VISCOSITIES

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

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

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