

Be the **ONE***

LS TRACTOR OPERATOR'S MANUAL

MT225E • MT225HE



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.

CONTENTS



1. General Notices for Safety

1-1. Note to the owner – General information	1-1
(1) Before using the tractor	1-3
(2) Manual scope and required training level	1-5
(3) Metric and Imperial units abbreviations	1-7
(4) Product Identification Number (PIN)	1-9
(5) Operator's manual storage	1-11
(6) Tractor orientation	1-12
1-2. Safety Precautions (Read this for safety before using)	
(1) Notices before using the tractor	1-13
(2) Notices when starting Engine	1-17
(3) Notices while operating/using the tractor	1-18
(4) Notices when connecting Implement	1-20
(5) Notices when towing the tractor	1-21
(6) Notices when transporting the tractor	1-21
(7) Notices when servicing the tractor after work	1-22
(8) Notices when handling Diesel Fuel	1-23
(9) Notices when leaving the tractor	1-24
(10) Notices relating to Toxic substances	1-24
(11) Tractor stability	1-25
(12) Ecology and the environment	1-28
(13) Symbols	1-30
(14) Safety Decals	1-31
(15) Instructional Decals	1-37
1-3. Long-term storage	
(1) Preparation for storage	1-41
(2) Check & Maintenance during storage	1-42
(3) Preparation for Reuse	1-43



2. Instruction for Safe Operation

(1) The name of each part	2-1
2-1. Boarding and Exiting the tractor	
(1) Boarding the tractor	2-2
(2) Driver's seat	2-3
(3) Seat adjustment	2-4
(4) Seat belt	2-4
(5) Exiting the tractor	2-5

CONTENTS

2-2. Safety Device

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



3. Instruments and Controls

3-1. Instrument panel and Front controls

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

3-2. Left / Right-hand controls

(1) Main gear shift lever ·····	3-19
(2) Differential lock pedal ·····	3-19
(3) Work light switch (if fitted) ·····	3-20
(4) Range gear shift lever ·····	3-20
(5) Four wheel driver lever (4WD) ·····	3-21
(6) Middle PTO lever (if fitted) ·····	3-21

3-3. Hydraulic System

(1) Safety precautions ·····	3-22
(2) Steering system ·····	3-23
(3) Hydraulic lift Control ·····	3-24
(4) Remote control lever and Quick coupler (if fitted) ·····	3-26
(5) Joystick lever (if fitted) ·····	3-27
(6) Hydraulic System Diagram ·····	3-28

CONTENTS



4. Operation and Work

4-1. How to handle new tractor

- (1) Check points ······ 4-1
- (2) Notices in handling new tractor (Engine brake-in procedure) ······ 4-1

4-2. Engine start and stop

- (1) Engine start ······ 4-2
- (2) Start in cold weather ······ 4-4
- (3) Engine stop ······ 4-5

4-3. How to drive and stop

- (1) Transmission Warm-up in cold weather ······ 4-6
- (2) How to drive ······ 4-7
- (3) Changing speed ······ 4-9
- (4) Emergency Stop ······ 4-10
- (5) Stopping tractor ······ 4-11
- (6) Parking ······ 4-12

4-4. Transport on public roads

- (1) Safety rules when driving tractor on the roads ······ 4-13
- (2) Light operation ······ 4-14
- (3) 7-Pole connector (optional) ······ 4-15
- (4) Notices when towing the tractor ······ 4-16
- (5) Notices when transporting the tractor ······ 4-18

4-5. Field Operations

- (1) Rear 3-point linkage ······ 4-19
- (2) Power take-off (PTO) operation ······ 4-23
- (3) Hitch and Drawbar (optional) ······ 4-26
- (4) Technically maximum permissible mass ······ 4-27
- (5) Tires and Load capacity ······ 4-28
- (6) Adjusting Wheel tracks and tire replacement ······ 4-29
- (7) Using Front-end loader (if fitted) ······ 4-32
- (8) Adjusting Steering angle ······ 4-35
- (9) Recommended Maximum Specification of Implements ······ 4-36
- (10) Ballasting Weights (optional) ······ 4-37

4-6. Driving Speed ······ 4-40

CONTENTS



5. Lubrication and Maintenance

5-1. General information	5-1
(1) Tightening Torque for normal assembly	5-2
(2) Standard torque data for hydraulics	5-4
(3) General specification - Diesel fuel	5-7
(4) Biodiesel fuel	5-8
(5) Refueling the tractor	5-10
(6) Change engine coolant to Organic Acid Technology (OAT) coolant	5-11
(7) Access for maintenance	5-12
5-2. Maintenance Chart	5-13
5-3. Lubricants and Capacity	5-17
5-4. First 50 hour check	5-18
5-5. When the warning indicator lights	
(1) Engine oil pressure indicator	5-19
(2) Battery charging indicator	5-19
5-6. Check before starting (Daily check)	
(1) Engine oil	5-20
(2) Fuel tank	5-21
(3) Instrument panel & Indicators	5-21
(4) Turn signal lights, Lights and Horn	5-22
(5) Engine coolant	5-23
(6) Air cleaner (Dry type)	5-23
(7) Cleaning of Radiator and Radiator screen	5-24
(8) Tire air pressure & damage	5-24
(9) Tightening state of bolts and nuts of each part	5-25
(10) Adjustment of Clutch pedal play (Mechanical type)	5-26
(11) Adjustment of brake pedal play	5-27
(12) Adjusting HST control linkage (HST type)	5-28
(13) Checking Fuel filter element	5-29
5-7. Every 50 hour check	
(1) Lubricating grease nipple	5-30
(2) Cleaning of Radiator and Radiator screen	5-30
(3) Checking Transmission oil	5-31
(4) Checking Front axle oil	5-31
(5) Battery check	5-31
(6) Air cleaner (Dry type)	5-31
(7) Hydraulic hoses and Leakage	5-32
5-8. Every 100 hour check	
(1) Checking and adding Engine oil	5-33

CONTENTS

5-9. Every 250 hour check

- (1) Replacing Engine oil and Filter 5-34
- (2) Replacing Hydraulic oil filter 5-35
- (3) Tension adjustment of Engine belt 5-36
- (4) Toe-in 5-36
- (5) Cleaning fuel tank 5-37

5-10. Every 500 hour check

- (1) Changing Front axle oil 5-38
- (2) Changing Transmission oil 5-38
- (3) Replacing Fuel filter element 5-39
- (4) Replacing Air cleaner element (Dry type) 5-39
- (5) Adjusting Engine valve clearance 5-40
- (6) Checking Nozzle injection pressure 5-40

5-11. Every 2-year check

- (1) Replacing Engine coolant 5-41

5-12. General maintenance (When required)

- (1) Air-bleeding from Fuel system 5-44
- (2) Fuse & Main fuse 5-47
- (3) Battery handling and Notices 5-49
- (4) Alternator and drive belt - Check 5-53
- (5) Tail/brake light bulb and turn signal light bulb- Replace 5-54
- (6) Headlight bulb - Replace 5-56
- (7) Touch-up paint color 5-57

5-13. Troubleshooting 5-58

5-14. Engine manufacturer's warranty 5-64



6. Dimension and Specification 6-1

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	<p>► 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.</p>
---	---

◆ 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

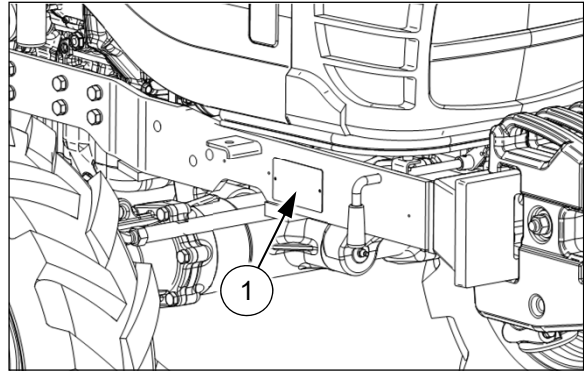
Acronym	Definition
DEF	Diesel Exhaust Fluid
DPF	Diesel Particle Filter
ISO	International Organization for Standardization
MSDS	Material Safety Data Sheet
NOx	Nitrogen Oxide
PPE	Personal Protective Equipment
SCR	Selective Catalytic Reduction
ULSD	Ultra Low Sulfur Diesel
%	Percent
<	Less than
>	Greater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

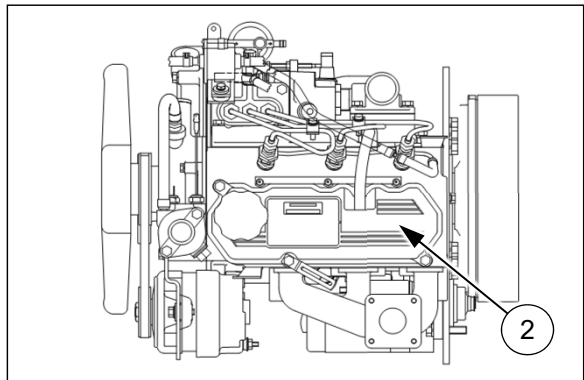
① Product Identification Number (PIN) plate

- The tractor PIN Plate① is located on the right-hand side of the engine frame.
- This may vary depending on the market.



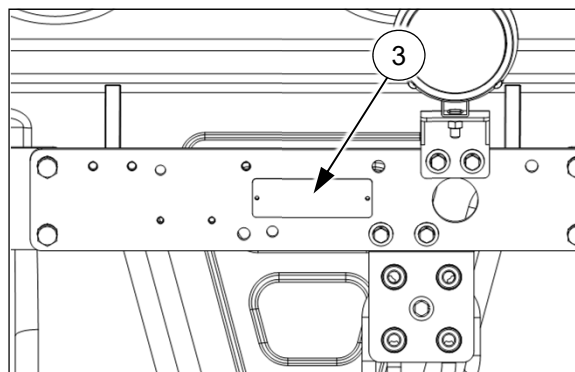
② Engine Product Identification Number (PIN) plate

- 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)

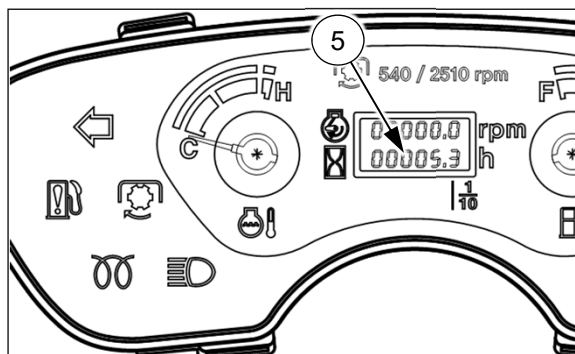
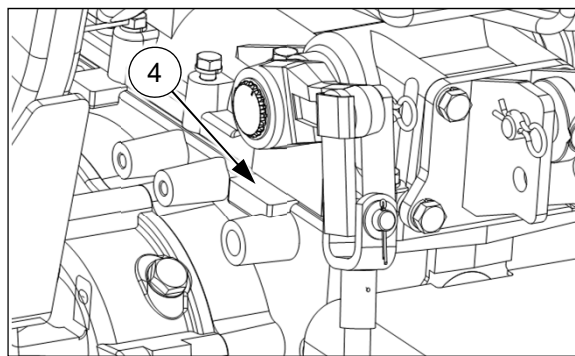
- The Roll Over Protective Structure (ROPS) PIN plate③ is located on the rear ROPS connector plate.
- The ROPS PIN plate may vary depending on the market or ROPS type.



O 40250720	NAME	G38RF	
	S/N	STRUCTURE TESTED	
	TYPE	G-Model	ASAE S478 JUN00
	MAKE	LS Mtron Ltd. Made In Korea	

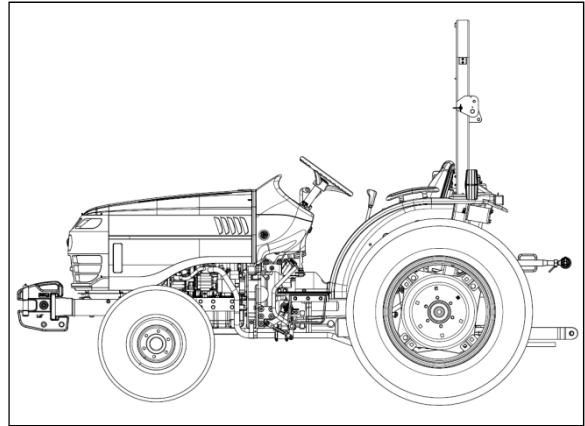
④ TM number and Running hours

- In case of requesting service or parts from your dealer, dealer may need TM number④ and/or running hours⑤ displayed on the instrument panel.



(5) Operator's manual storage

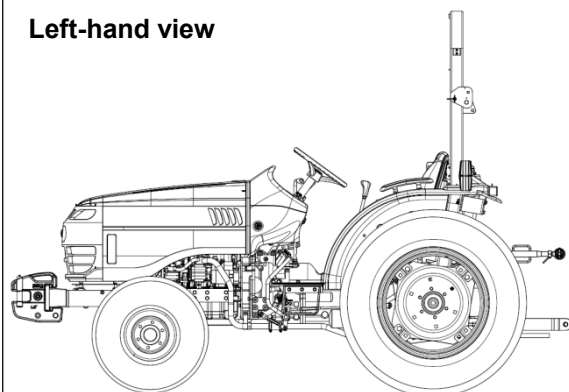
- The operator's manual must be stored in a secure place prior to operation and it must be kept available for use by all operators.



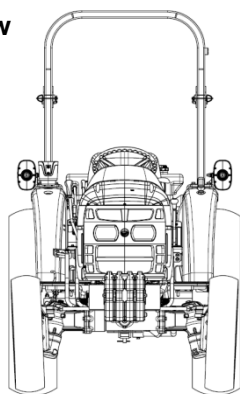
(6) Tractor orientation

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

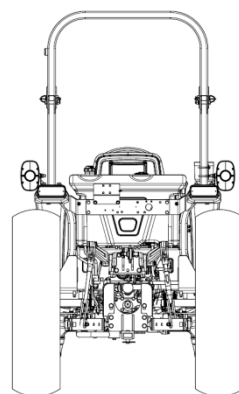
Left-hand view



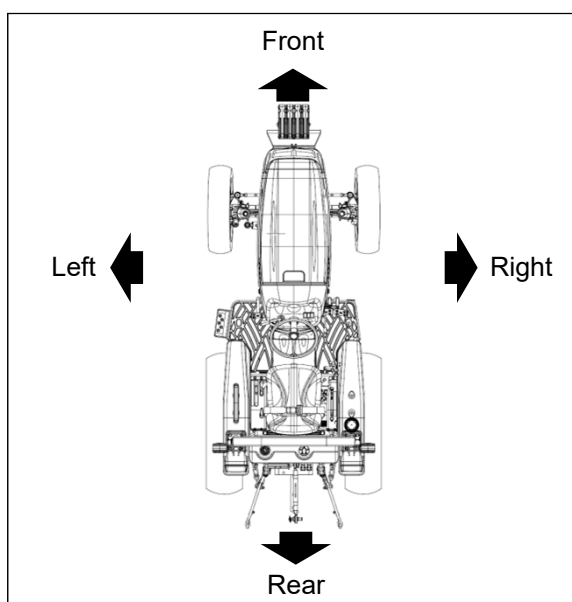
Front view



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

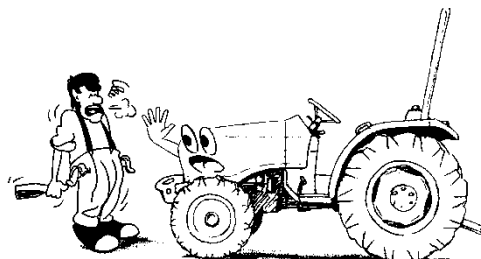
- **For Safety operation** : Before using this tractor, read carefully and understand this operator's manual and operator's manual of the mounted or trailed machinery on this tractor, and strictly follow the instructions outlined in the operator's manuals.



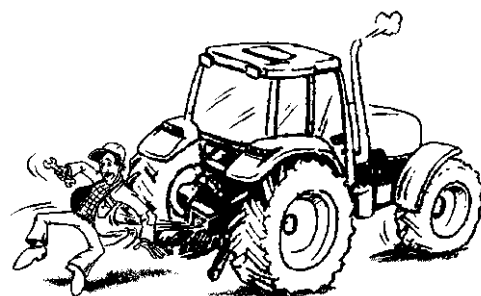
Read Operator's Manual carefully.

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.*


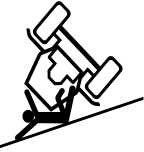
- **Lamps** : Do not modify the lamps or change the bulb capacity arbitrarily.



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	<p>► 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.</p>
	<p>► In case of an accident, fire, tip or roll-over, the following MUST be performed by a qualified technician before operating the tractor again.</p> <ul style="list-style-type: none"> - 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. <p>► DO NOT attach any device to the Protective Structure for pulling purposes.</p> <p>► 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.</p>

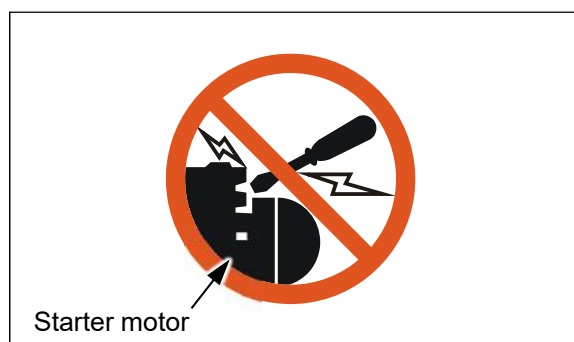
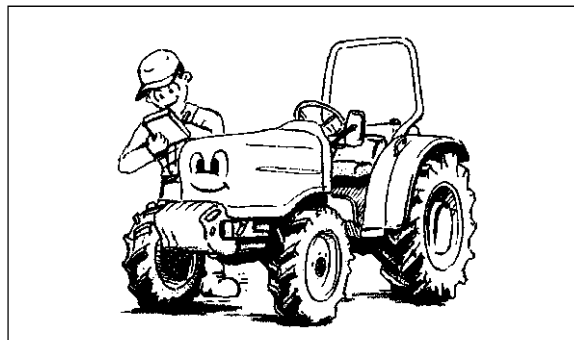
- **Level of protection of the FOPS (Falling Objects Protective Structure) :**
 - **For roll-bar model**, it does **NOT** offer any protection against falling objects. It is recommended to use a certified FOPS structure when working with front-end loaders.
- **Level of protection against hazardous substances :**
 - **For roll-bar model**, it 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.

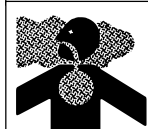
- **Level of protection of the OPS (Operators Protection Structure) :** This tractor does **NOT** provide protection against
 - falling objects, such as branches, logs or tree limbs, low hanging wires in the forest, orchard or construction area.
 - toppling trees, primarily in case a rear-mounted tree 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 lever in NEUTRAL and especially check if parking brake is applied.
- Lower the implements on the ground.
- Ensure that rear view mirrors and the other mirrors (if fitted) are adjusted correctly, and check the operation of the headlights and other lights.
- For driver's safety, to prevent an unintentional start, movement and operation, several and various start-safety interlock devices may be equipped on your tractor. And, these installation may need to do correct operation and follow the procedure strictly. Read carefully chapter 4-2, “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.





 Warning

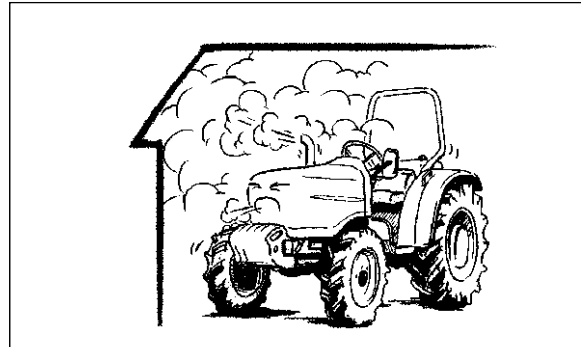


► Do not start the engine in a closed area. The poisonous exhaust gas can cause fatal damage to the driver or persons around.

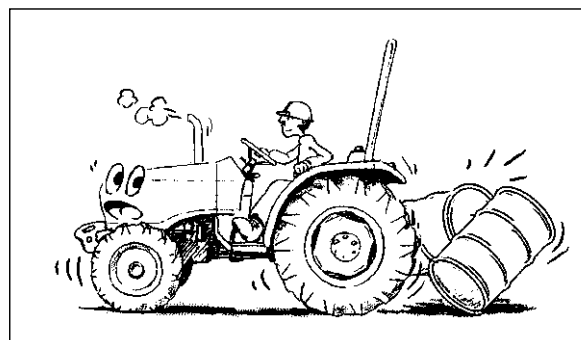
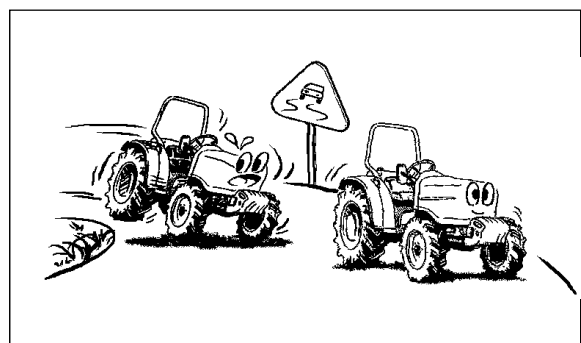
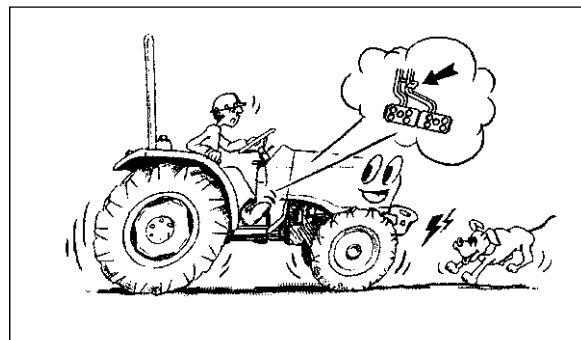
(3) Notices while operating/using the tractor

● Ventilation

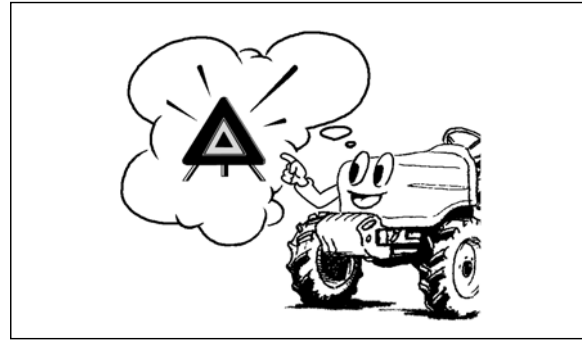
 Warning	<p>► It is very dangerous to work in a closed area. The poisonous exhaust gas may cause serious damage to the human body. If you should work in this area, make sure to ventilate well and put on the protective mask.</p>
	



- **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.

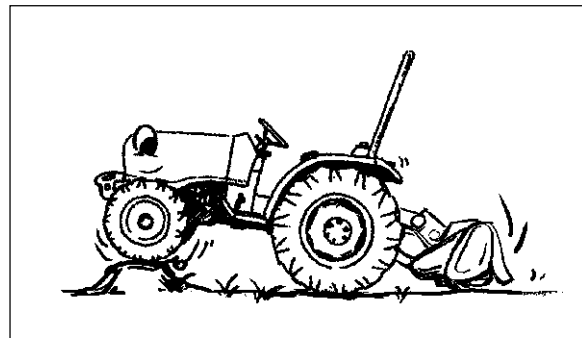


- If you can not drive the tractor due to a failure, move the tractor to a safe place and install troubled vehicle (safety tripod).
(Day : backward 100m (328 ft)
Night : backward 200m (656 ft))

- 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.

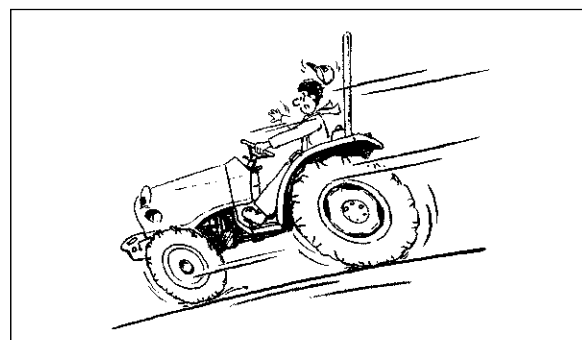
- When connecting the implements to the front/rear of the tractor, install the proper additional weights in the rear/front of the tractor to keep the balance of the tractor.



- 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)*



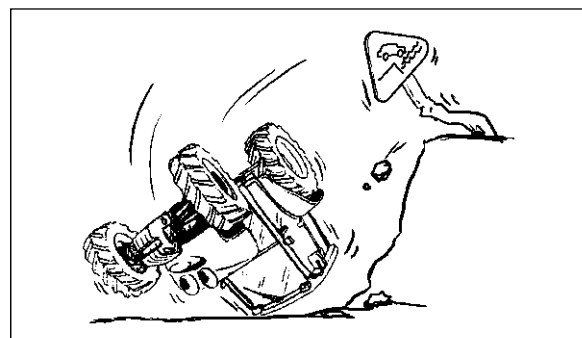
- To climb a steep slope, drive tractor slowly in reverse up the slope rather than forward. It is much safer.

- 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.

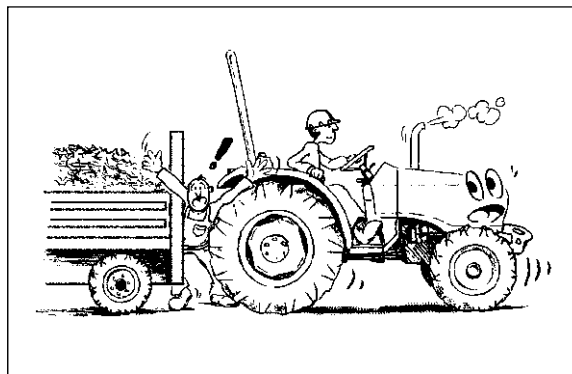
- When working, wear the protection equipment and tighten the seat belt.





- If the authorized passenger seat are not installed, keep riders off.



(4) Notices when connecting Implement

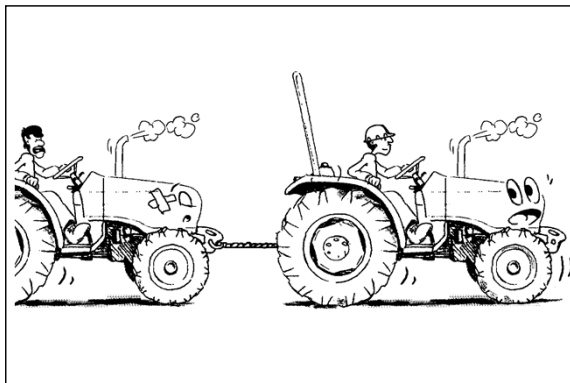
- Attach or detach the implement on wide and level ground.
- Do not use the tractor in combination with equipment arbitrary, without having consulted the specific operator's manual provided with the equipment.
- You have to stay clear from the three-point linkage when controlling it. Do not stay between 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	<ul style="list-style-type: none"> ▶ 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  	<ul style="list-style-type: none"> ▶ 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.

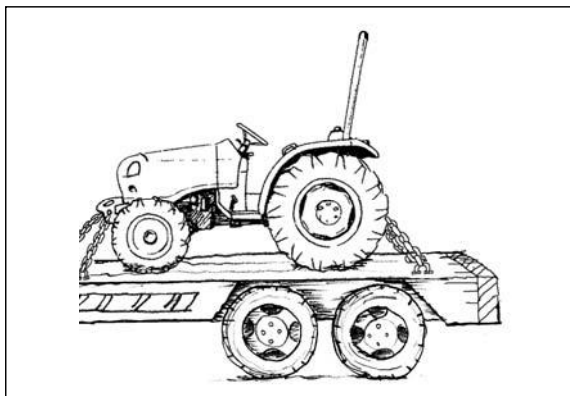
(5) Notices when towing the tractor

- 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.

(7) Notices when servicing the tractor after work

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

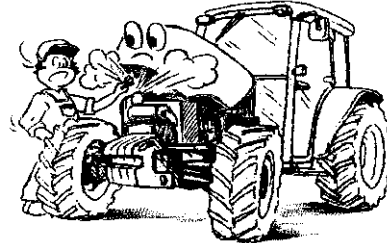
- DO NOT pour water into the radiator or engine when engine is hot. The engine or radiator may crack.



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

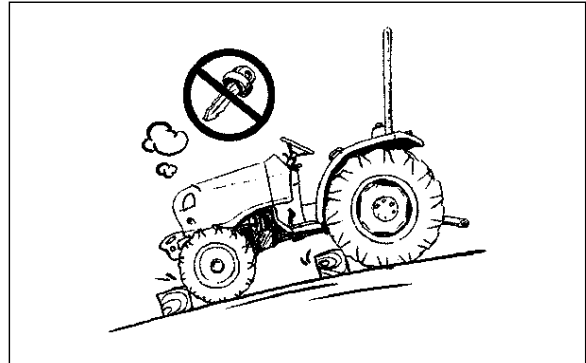
- *Before handling diesel fuel, refer to the chapter 5-1-(3), 5-1-(5) in this manual.*
- *Before handling Bio-diesel, refer to the chapter 5-1-(4) in this manual.*




 Warning	<p>Fire hazard!</p> <p>► When handling diesel fuel, observe the following precautions:</p> <ol style="list-style-type: none"> 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. <p>Failure to comply could result in death or serious injury.</p>
--	--

(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	<p>► If it is necessary to park your tractor on a slope, furthermore with a 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.</p> <p>- Mechanical: downhill ⇒ Reverse 1gear / uphill ⇒ Forward 1gear</p> <p>- HST type : Engage the lowest gear of the range gear shift lever.</p>
--	--

(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	<p>► Driving hazard!</p> <p>To prevent tractor instability, ALWAYS consider and follow the tractor stability requirements in this manual.</p> <p>Failure to comply could result in death or serious injury.</p>
---	--

The following procedure describes the requirements for tractor stability and how to calculate the required front-mounted and rear-mounted ballast.

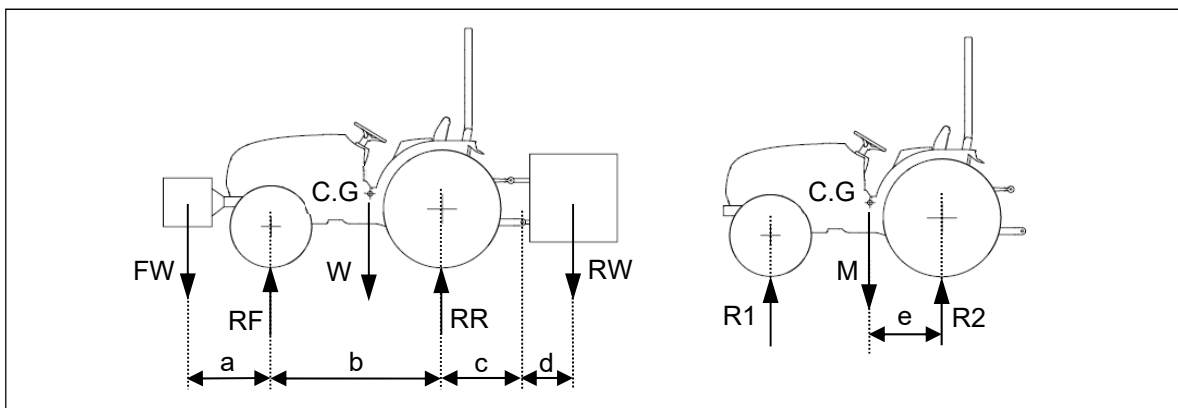
For additional ballast information, also refer to the ballast recommendations in this manual.

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	<p>► Roll-over hazard!</p> <p>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.</p> <p>Failure to comply could result in death or serious injury.</p>
---	--

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

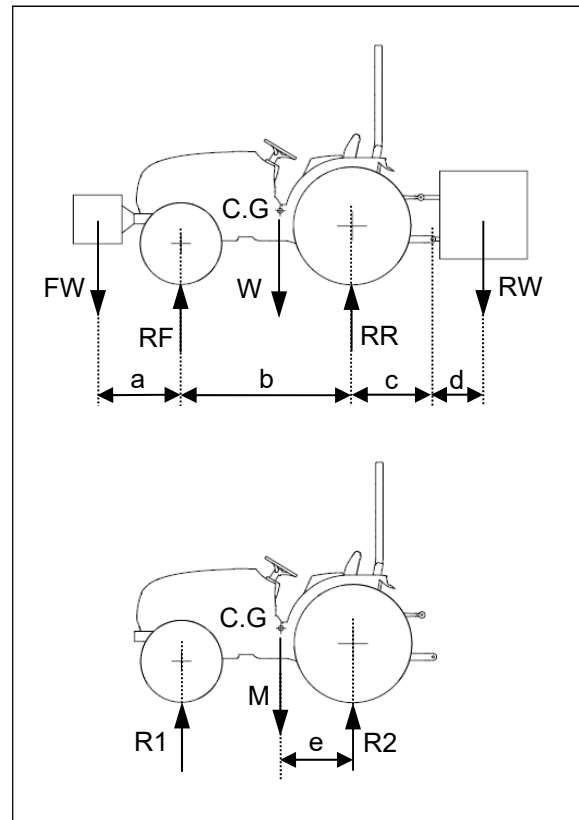
0.2	Minimum ratio: actual axle load of laden front axle/ mass of the unladen tractor	Legal requirement
0.45	Minimum ratio: actual axle load of laden rear axle/ mass of the unladen tractor	Legal requirement

Required front ballast

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

Required rear ballast

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



Axle load limits

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

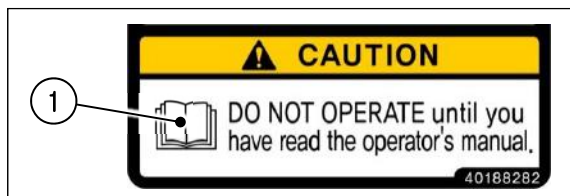
The followings show the symbols and its meaning used for the tractor.


	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		Light switch
	Hydraulic oil pressure		Quick turn (optional)		Side lights
	Engine oil pressure		Cruise drive (optional)		Headlights (Low beam)
	Engine preheat		Cruise drive release (optional)		Headlights (High beam)
	Parking brake		Position control (Up)		Work light
	Emergency lights		Position control (Down)		horn
	Engine start		Draft control (Deep)		Window wiper
	Engine stop		Draft control (Shallow)		Window wiper / Washer (front)
	PTO stop		Cylinder rod (shorten)		Window wiper / Washer (rear)
	PTO in operation		Cylinder rod (extend)		Unlatched brake pedal (optional)
	Differential lock device		Cylinder rod (floating)		Engine warning
	DPF regeneration		DPF temperature		DPF inhibited

(14) Safety Decals

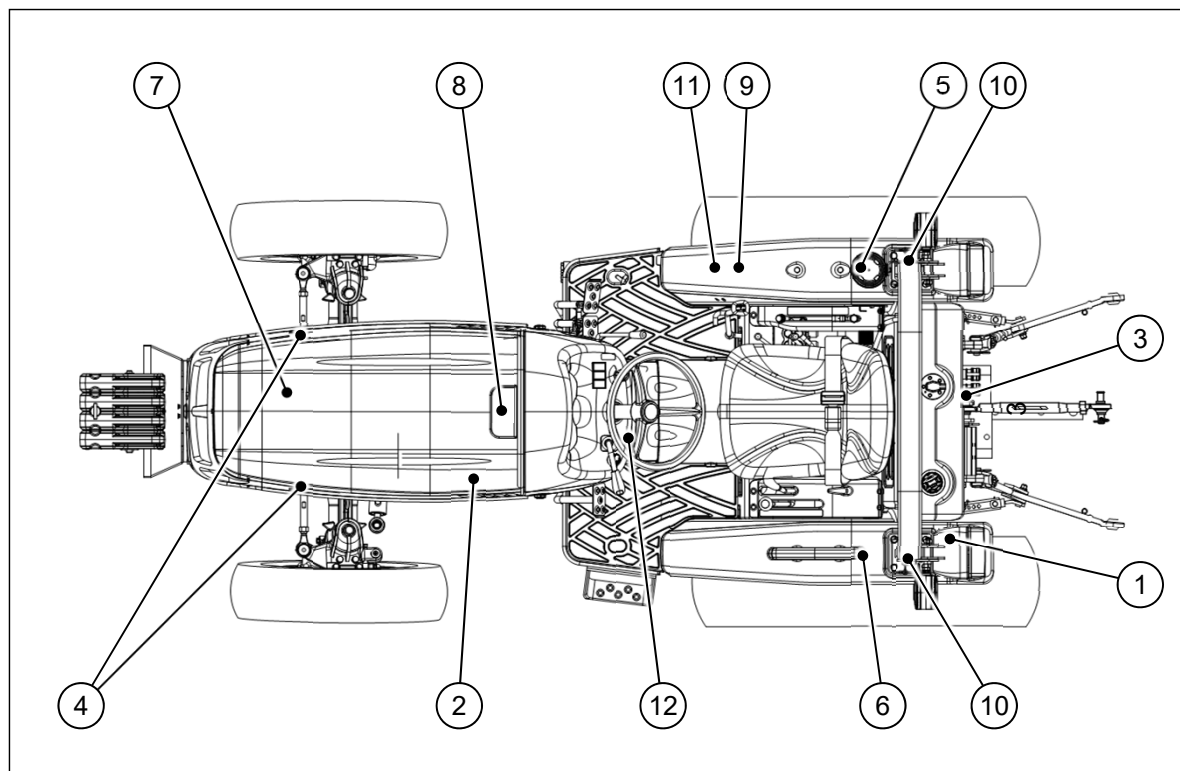
① Handling and Maintenance of Safety Decals

- 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	<ul style="list-style-type: none"> ▶ The instructions described on the safety decals are very important for the safety of the operator and workers around. If ignored, it may cause the death or serious injury. ▶ If the decals are dirty, wash them with soap water and wipe with soft rags. Do not use the thinner, acetone, or other harsh chemicals as it may erase the instructions. ▶ If the decal is detached or damaged, replace it with a new one on original position. ▶ When cleaning the tractor with pressurized water, the decals can be detached. ▶ If a decal is on a part that is replaced, make sure the decal is attached on the new part.
---	---

② Safety Decals and Attaching position



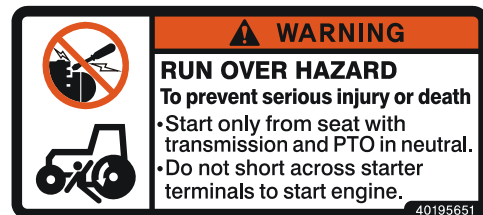
1. Location : On top of the rear mud guard, near the fuel cap

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



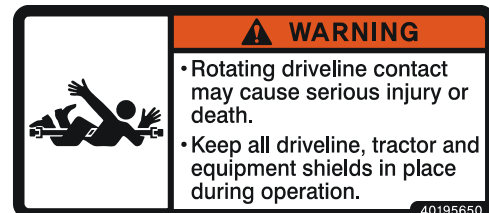
2. Location : On the left-hand side of the engine frame, near the starter motor.

- 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 the 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



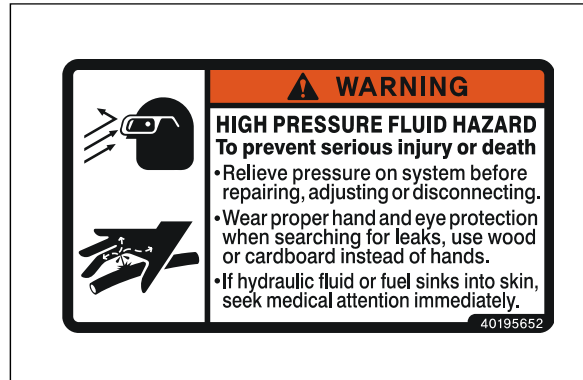
4. Location : On the left/right-hand side of the engine radiator.

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



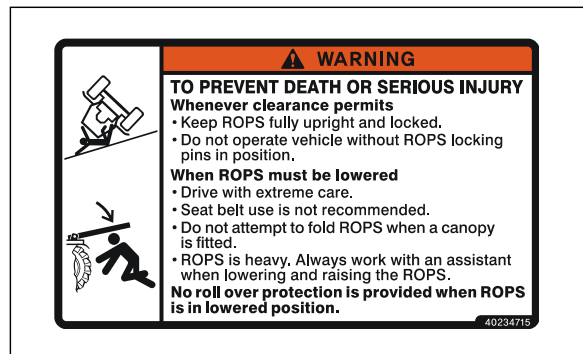
5. Location : On top of the right-hand fender.

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



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

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



7. Location : On top of the engine radiator, near 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 : Under the hood, in the middle of the firewall.

- 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 top 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.

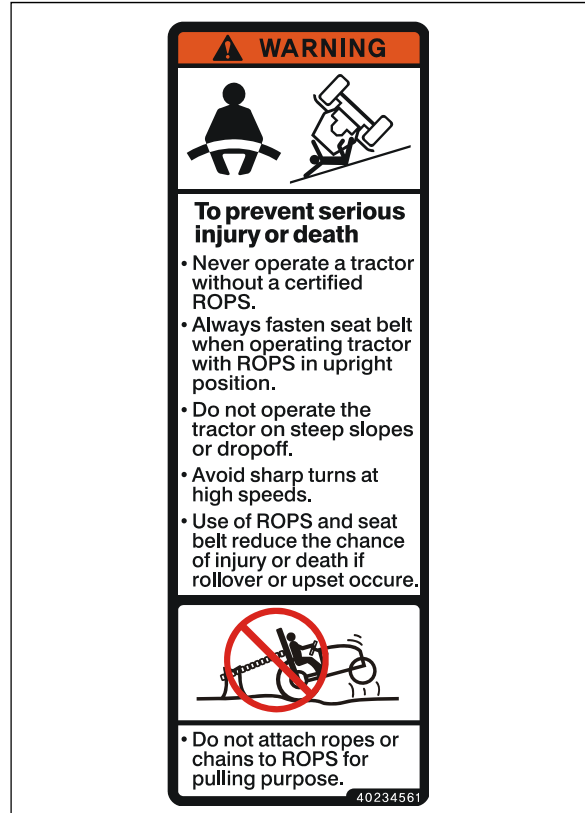
② WARNING

- 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	
<ul style="list-style-type: none">• 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	
<ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• Always use a seat belt when you operate the tractor.• Do not use a seat belt when operating with folding ROPS in lowered position.
	<ul style="list-style-type: none">• Engine exhaust fumes can cause death or sickness.• Always try to work in a well ventilated area.
	<ul style="list-style-type: none">• 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	

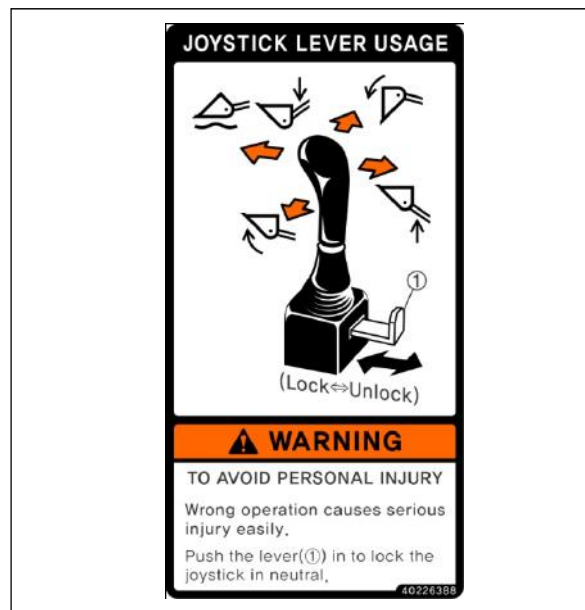
10. Location : On the left/right-hand side of the ROPS frame.

- 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 top of the right-hand fender. (optional)

- JOYSTICK LEVER USAGE.
- TO AVOID PERSONAL INJURY; Wrong operation causes serious injury easily. Push the lever(1) in to lock the joystick in neutral.
- Failure to comply could result in death or serious injury.
- Part number : 40226388



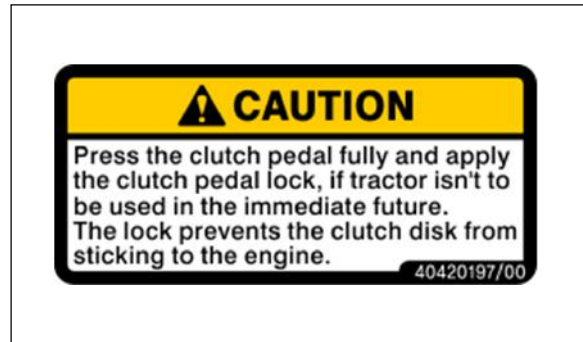
12. Location: On the left-hand side of the instrument cover.

- CAUTION;

Press the clutch pedal fully and apply the clutch pedal lock, if tractor isn't to be used in the immediate future. The lock prevents the clutch disk from sticking to the engine.

- Failure to comply could result in sticking of the clutch disk.

- Part No. : 40420197



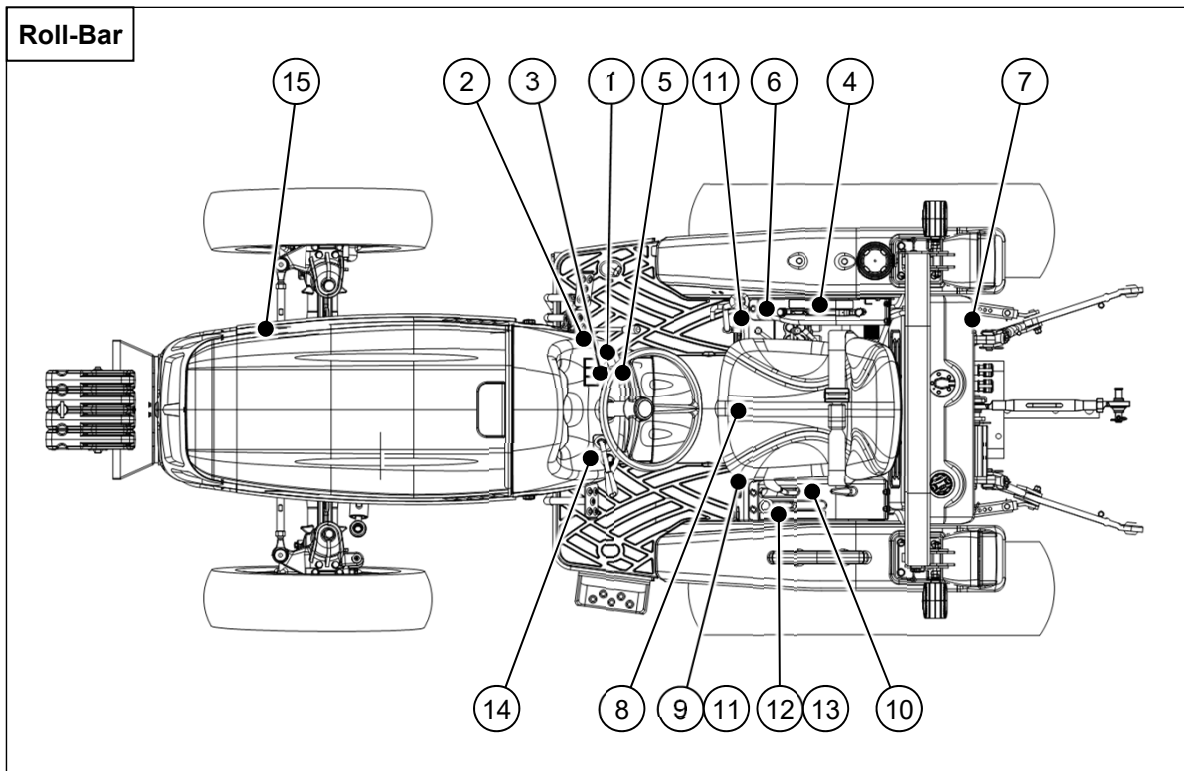
(15) Instructional Decals

① Instructional Decals and Attaching position – Roll-bar model

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.



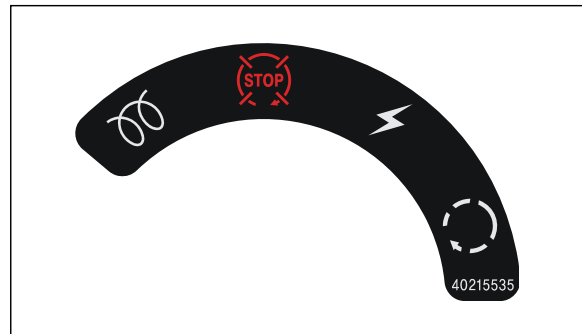
1. Location: On the right-hand side of the instrument cover.

- Throttle lever.
- Part No. : 40232389



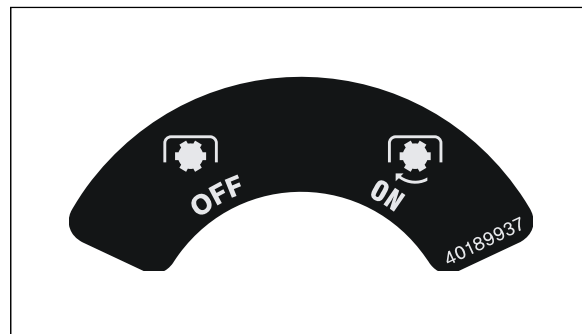
2. Location: On the right-hand rear side of the body panel cover under the instrument panel.

- Key switch.
- Part No. : 40215535



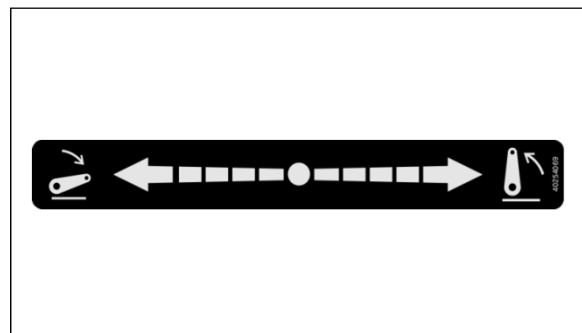
3. Location: On the right-hand side of the instrument cover.

- PTO switch.
- Part No. : 40189937



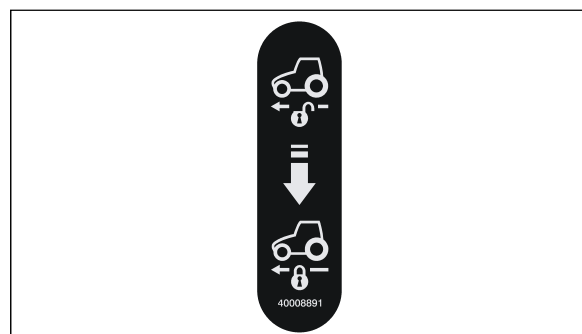
4. . Location: On the right-hand side lever guide.

- Hydraulic lift control (position control lever)
- Part No. : 40254069



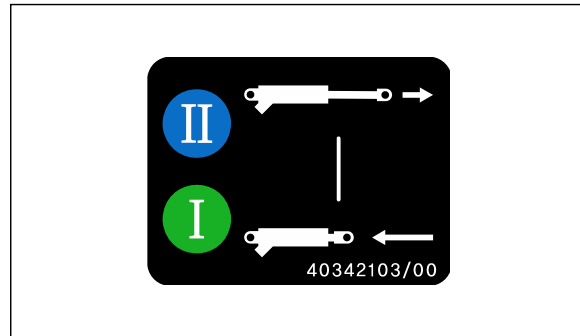
5. Location: On the right-hand side of the lower instrument cover.

- Cruise control lever
- HST models only
- Part No. : 40008891



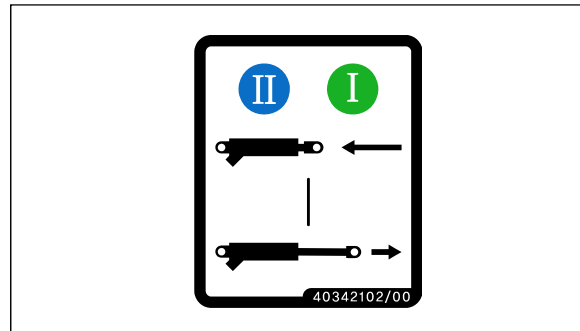
6. Location: On the front side of the right-hand lever guide.

- Remote control lever.
- Part No.: 40342103
- It may vary depending on the market.(optional)



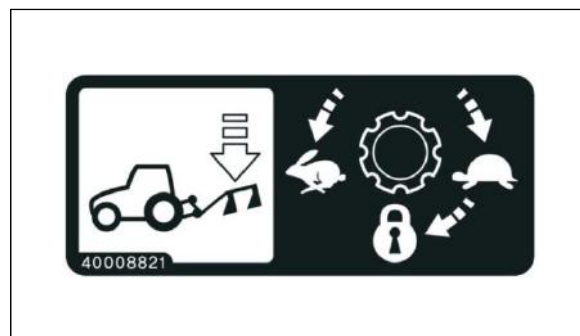
7. Location: On the rear ROPS connector frame for roll-bar models.

- Remote valve quick couplers
- Part No. : 40342102
- It may vary depending on the market.(optional)



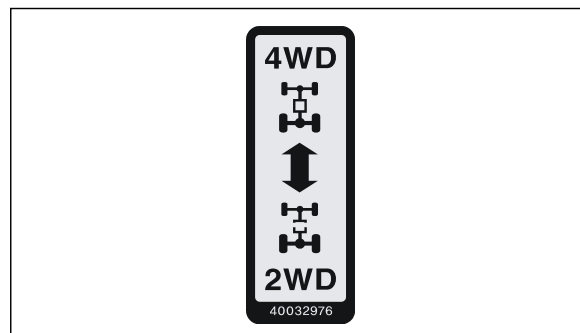
8. Location: below the driver's seat.

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



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

- Four wheel drive. (4WD lever)
- Part No. : 40032976



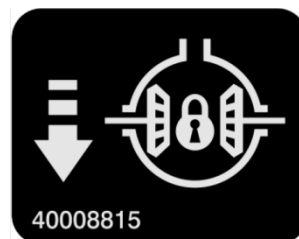
10. Location: On the left-hand lever guide near the Middle PTO lever.

- Middle PTO lever.
- Part No. : 40354732
- It may vary depending on the market. (optional)



11. Location: Right-hand side below the driver's seat for mechanical models. Left-hand side below the driver's seat for HST models.

- Differential lock pedal
- Part No. : 40008815



12. Location: on the left-hand lever guide.

- Range gear shift lever
- Part No. : 40252478 (Mechanical models only)



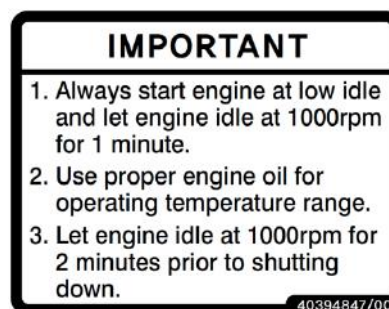
13. Location: on the left-hand lever guide.

- Range gear shift lever
- Part No. : 40276753 (HST models only)



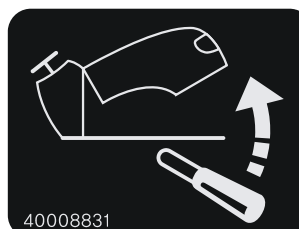
14. Location: On the left-hand side of the instrument cover.

- Start and stop of the turbocharger engine
- Part No. : 40394847



15. Location: On the right-hand side of the engine frame.

- Hood opening lever
- Part No. : 40008831



1-3. Long-term storage

(1) Preparation for storage

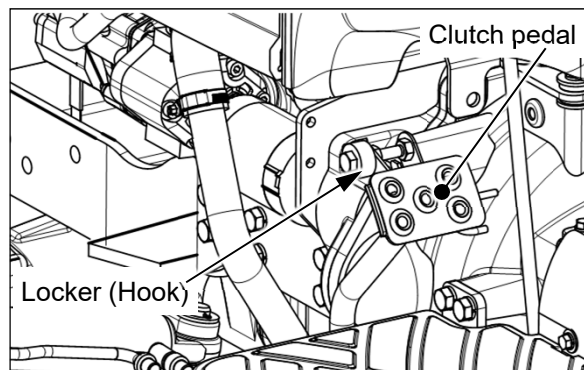
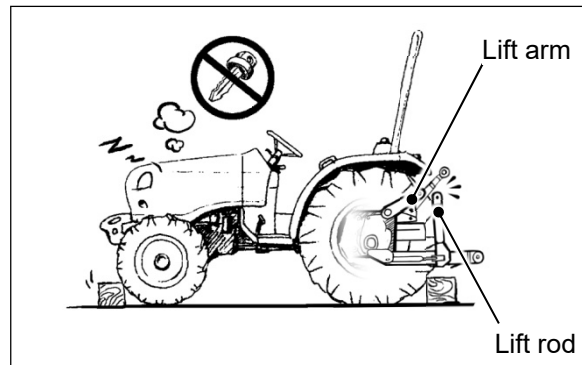
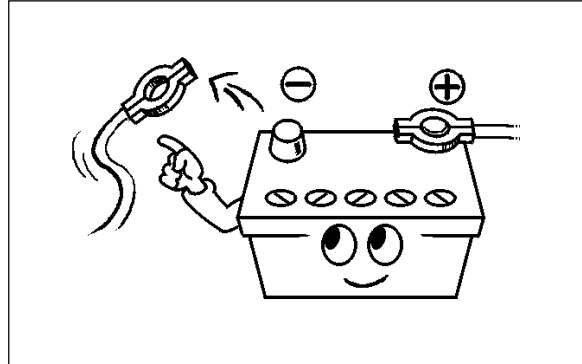
※ Wash your tractor cleanly and follow the procedure as below.

- 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 internal cylinder.
- Depress clutch pedal fully and apply the clutch pedal locker. This locker prevent clutch disk from sticking to engine. (Synchro-shuttle model only)




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

 Warning	<p>► When restarting engine at the end of long-term storage, follow the instructions of the “Preparation for Reuse” as below.</p>
---	---

(2) Check & Maintenance during storage

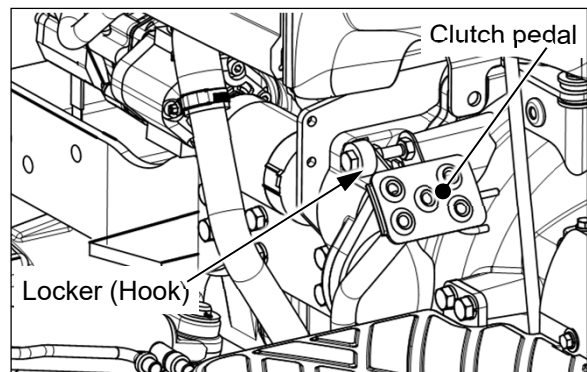
- Apply grease or lubricant oil regularly to the non-painted parts.
- Check the leakage of fuel, oil and coolant. If necessary, repair the damaged part.
- Check if the tire air pressure is normal.
- **Start the engine periodically for about 15 minutes, at least once a month** for circulation and lubrication in the fuel system and engine. This may vary depending on the engine, fuel system, fuel type and so on. Consult your authorized local dealer.
- The battery should be charged about once a month not to be discharged entirely.

 Caution	<p>► 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.</p> <ul style="list-style-type: none"> - 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. <p>► When removing and storing battery, select dry and cool place out of reach of children.</p>
---	--

(3) Preparation for Reuse

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

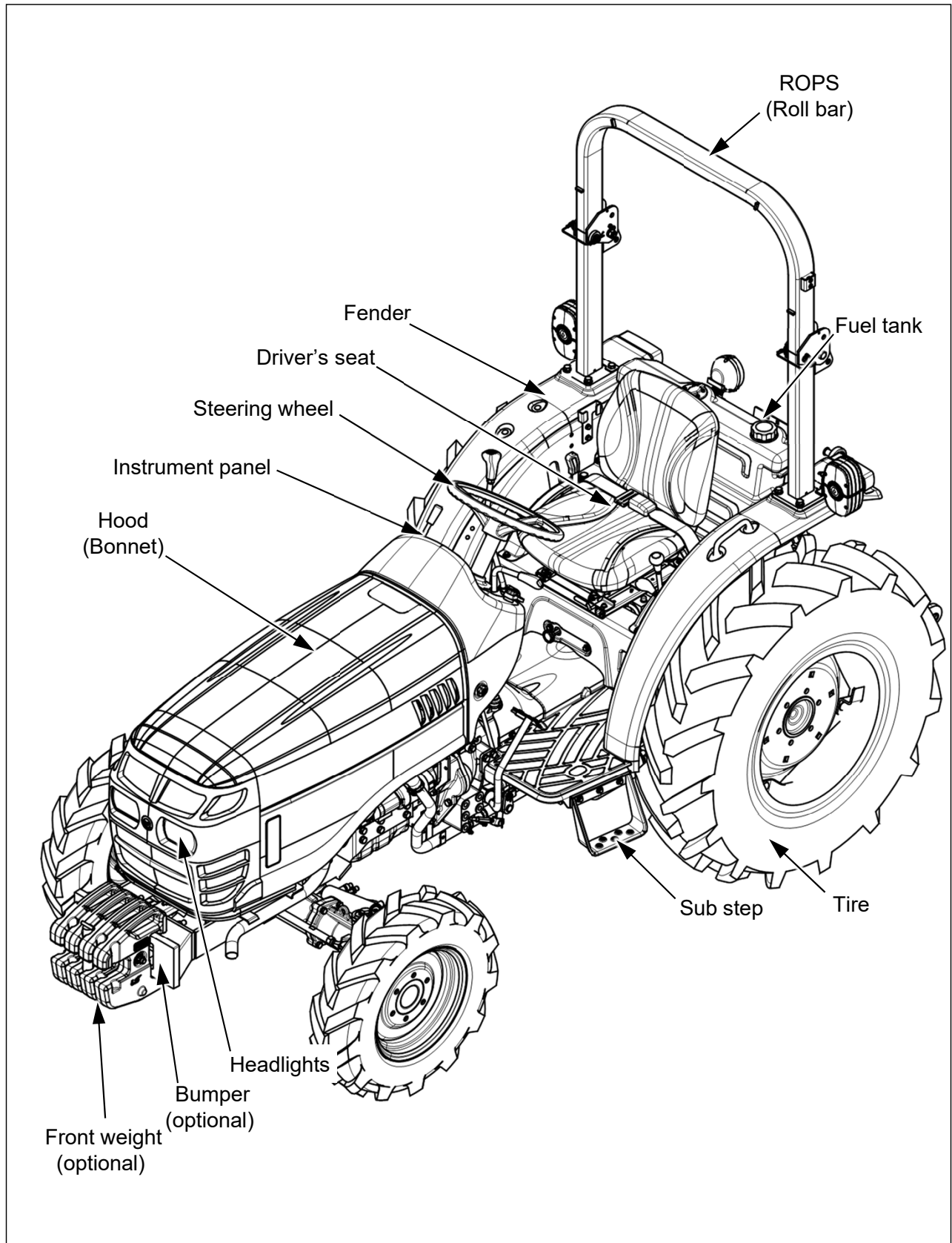
- Inflate the tires to the recommended pressures and remove the blocking.
- Check the damaged part or loosen part.
- Check the leakage of fuel, coolant, engine oil, transmission and front axle oil.
- Check the level and density of the engine coolant.
- Check the level of engine, transmission, rear and 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

① Roll-Bar type

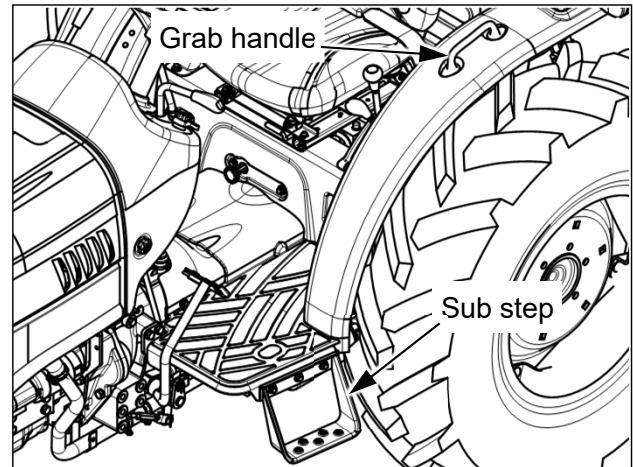



2-1. Boarding and Exiting the tractor

(1) Boarding the tractor

① Roll-Bar type

- Whenever possible, use the left-hand side step for boarding.
- When boarding the tractor, use the sub-step, grab handle and steering wheel 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	<ul style="list-style-type: none">▶ Operator's condition : The persons such as patients, drunks, people on drugs, etc. are never allowed to operate this tractor. Only well educated operators can use the tractor after learning the usage of controls for moving, stopping, turning and other operating.▶ Do not grasp the gear levers when entering the cabin from the right-hand side.
---	--

(2) Driver's seat

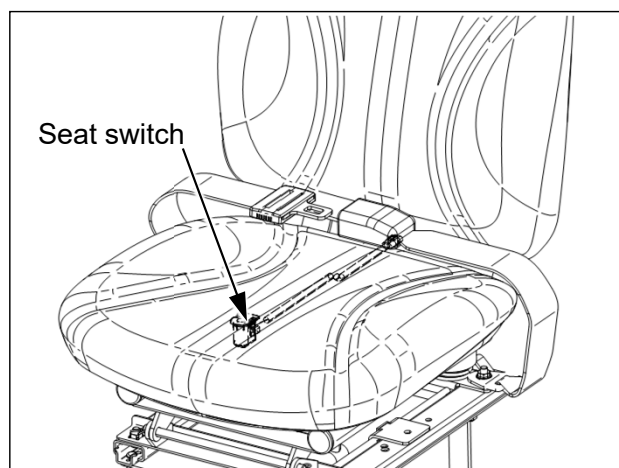
- At the lower end of the seat, there is a switch to detect that operator is sitting in the driver's seat.

- **If the operator gets up from the seat while engine is running**, the engine will stop automatically for safety in case of ;
 - ① getting up from the seat for more than 2 seconds with HST pedal NOT in neutral position.

② the HST pedal is in NEUTRAL and rear PTO is engaged without applying parking brake.

③ the Middle PTO lever (optional) is engaged.

- Before leaving the driver's seat,
 - turn the PTO switch to the "OFF" position.
 - place the middle PTO lever (optional) in the "OFF" position.
 - apply the parking brake.




warning

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

(3) Seat adjustment

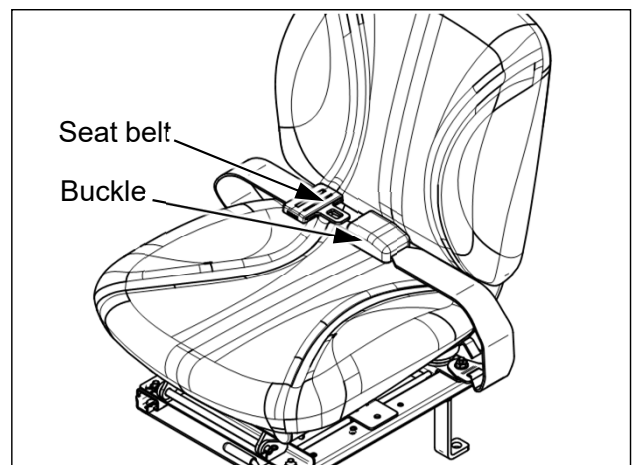
- Before operating the tractor, adjust the position of driver's seat according to body size and length.
- Seat F/R adjustment lever
 - 1) After sitting on driver's seat, lift the seat F/R adjustment lever up to release the lock.
 - 2) Move the driver's seat forward or backward according to driver's body length.
 - 3) Release the seat F/R adjustment lever and ensure that seat is locked in place.
- Keep the released seat belt on the seat belt rest after working.
- To prevent the driver's seat from weathering, raise the driver's seat forward.





 warning	<ul style="list-style-type: none"> ▶ DO NOT put your hand under the driver's seat while sitting. It may cause a injury by seat suspension. ▶ DO NOT adjust the seat position while driving.
--	---

(4) Seat belt

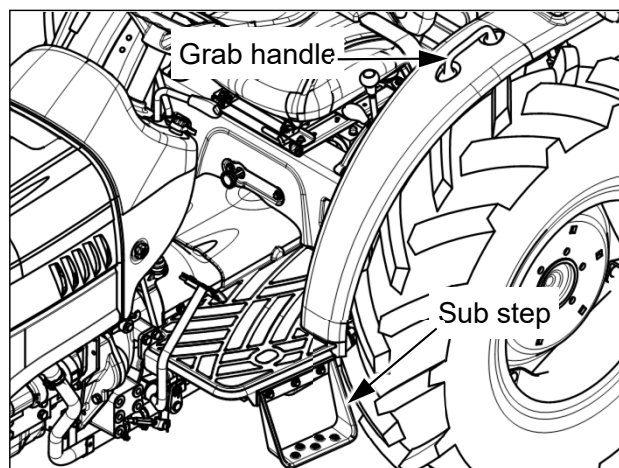
- Always wear the seat belt before operating the tractor and adjust the belt to fit the operator.
 1. Insert the seat belt end into the buckle until a "click" indicates it is properly engaged.
 2. To remove the seat belt from the buckle, press the red release button on the buckle.
- Check the seat belt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



 Warning 	<ul style="list-style-type: none"> ▶ If not wearing the seat belt, it may cause serious injury in case of an accident. <ul style="list-style-type: none"> - During operation, it must be required to wear seat belt with a cab or roll-bar installed. - After wearing the seat belt, adjust the belt to fit your body. ▶ If the roll-bar is folded down or removed, do not wear the seat belt.
--	---

(5) Exiting the tractor

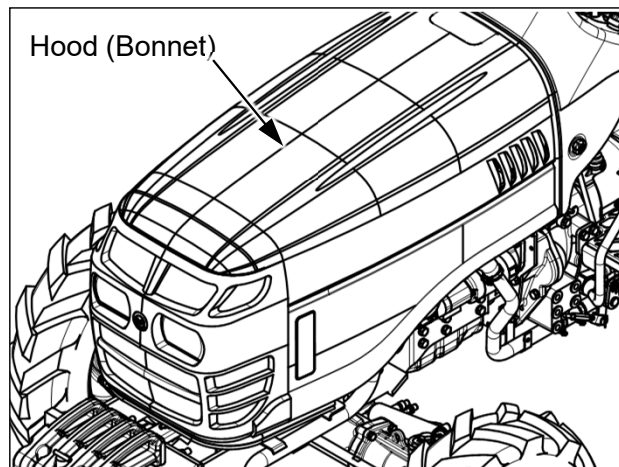
- Whenever possible, use the left-hand side step for exiting.
- When exiting the tractor, use the sub-step, grab handle and steering wheel on the left fender.
- Do not jump up/down for your safety. *Jumping on/off the tractor could cause an injury. Always face the tractor, use the handrails and steps, 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.*
- Remove the starter key before leaving the tractor.



2-2. Safety Device

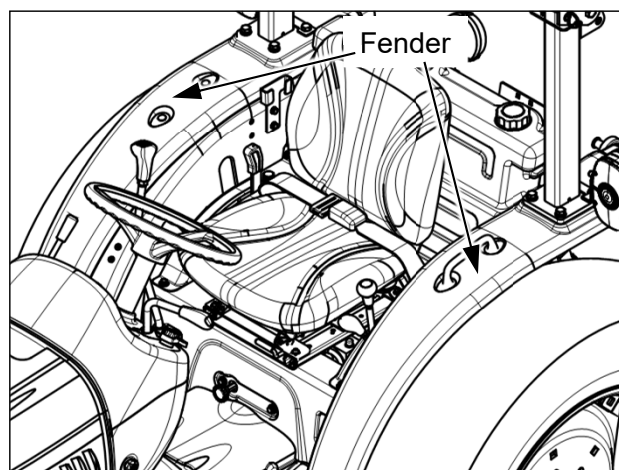
(1) Hood (Bonnet)

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



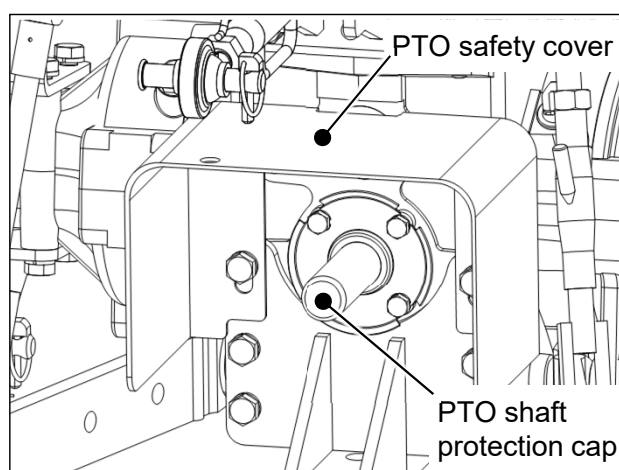
(2) Fender

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



(3) PTO safety cover and protection cap

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



Warning

► If you contact the rotating shaft, it may cause a severe injury.

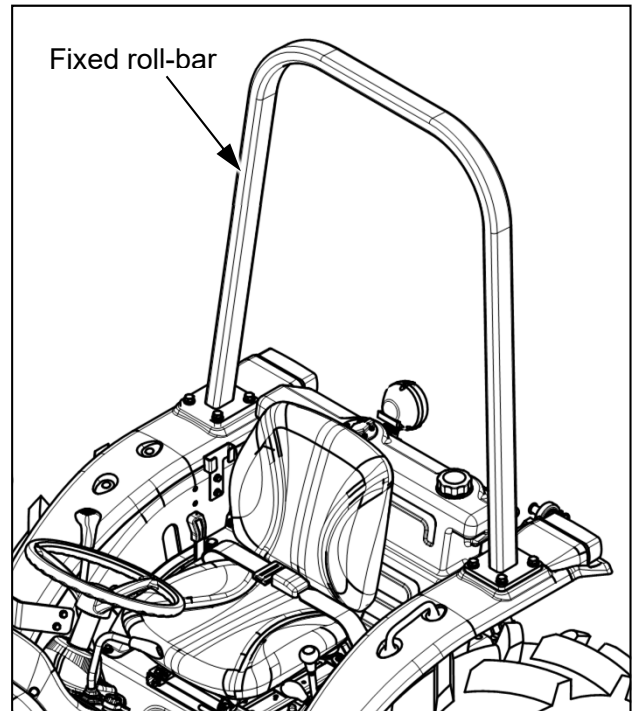


- DO NOT touch the rotating shaft.
- DO NOT remove the safety cover.
- Avoid loose clothes that can easily be rolled up in the rotating shaft.

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

① Fixed roll-bar type

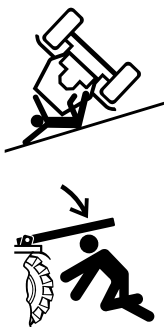
- The Roll-Over Protective Structure (ROPS) is integrated and certified structure for driver's safety. This structure will reduce the risk of serious injury or death when being over-turned.
- DO NOT remove, modify or repair the roll-bar arbitrary. The welding, bending, drilling, grinding, or cutting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



Warning

Roll-over hazard!

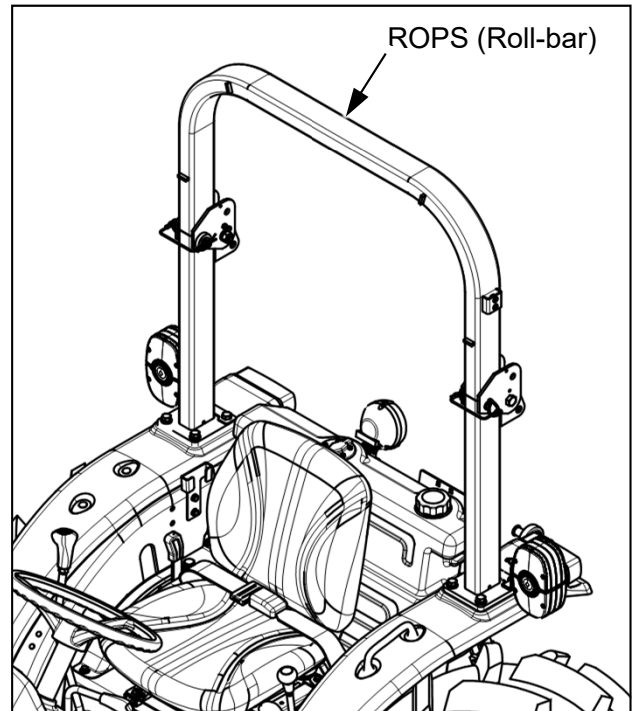
Failure to comply could result in death or serious injury.



- ▶ 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 removing/installing the roll-over protective structure(ROPS).
 - If the upper frame is removed, it does not provide any roll-over protection. Do not operate the vehicle with the upper frame removed as a standard operating mode. Re-install 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 handling the ROPS by its own weight. If possible, do cooperate with other people for the removing/installing.
 - Do not wear seatbelt when the ROPS upper frame is removed.

② Foldable roll-bar type

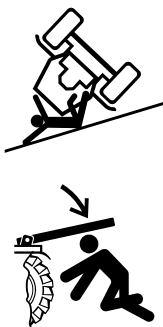
- The Roll-Over Protective Structure (ROPS) is integrated and certified structure for driver's safety. This structure will reduce the risk of serious injury or death when being over-turned.
- DO NOT remove, modify or repair the ROPS arbitrary. The welding, bending, drilling, grinding, or cutting of any part of the ROPS, it can weaken the 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!

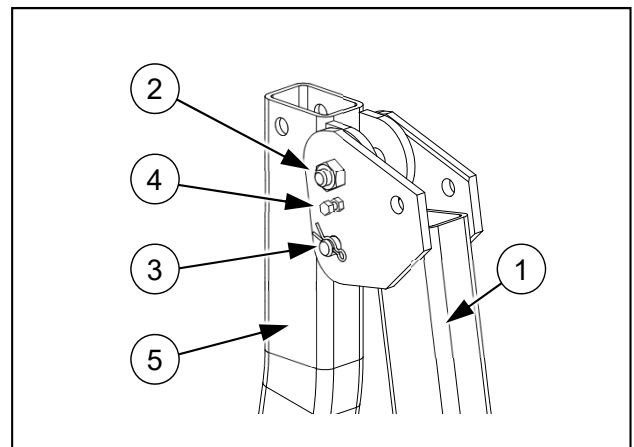
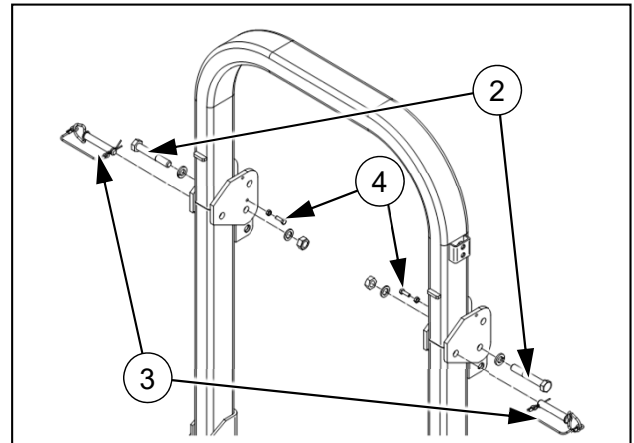
Failure to comply could result in death or serious injury.



- ▶ 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. Loosen the bolts②, ④ and nuts on both sides. It is not necessary to remove them completely.
 2. Remove the pins③ on both sides and fold the upper frame backward. Be careful of the possibility that your body might be hurt by sudden folding due to its own weight.
 3. Set the holes of the frame ① and ⑤ in line, and insert the pins③ into the hole and apply the snap pins.
 4. Fasten the bolts② ④ and nuts on both sides tightly.
- When standing up the upper frame, follow the same procedure reversely.

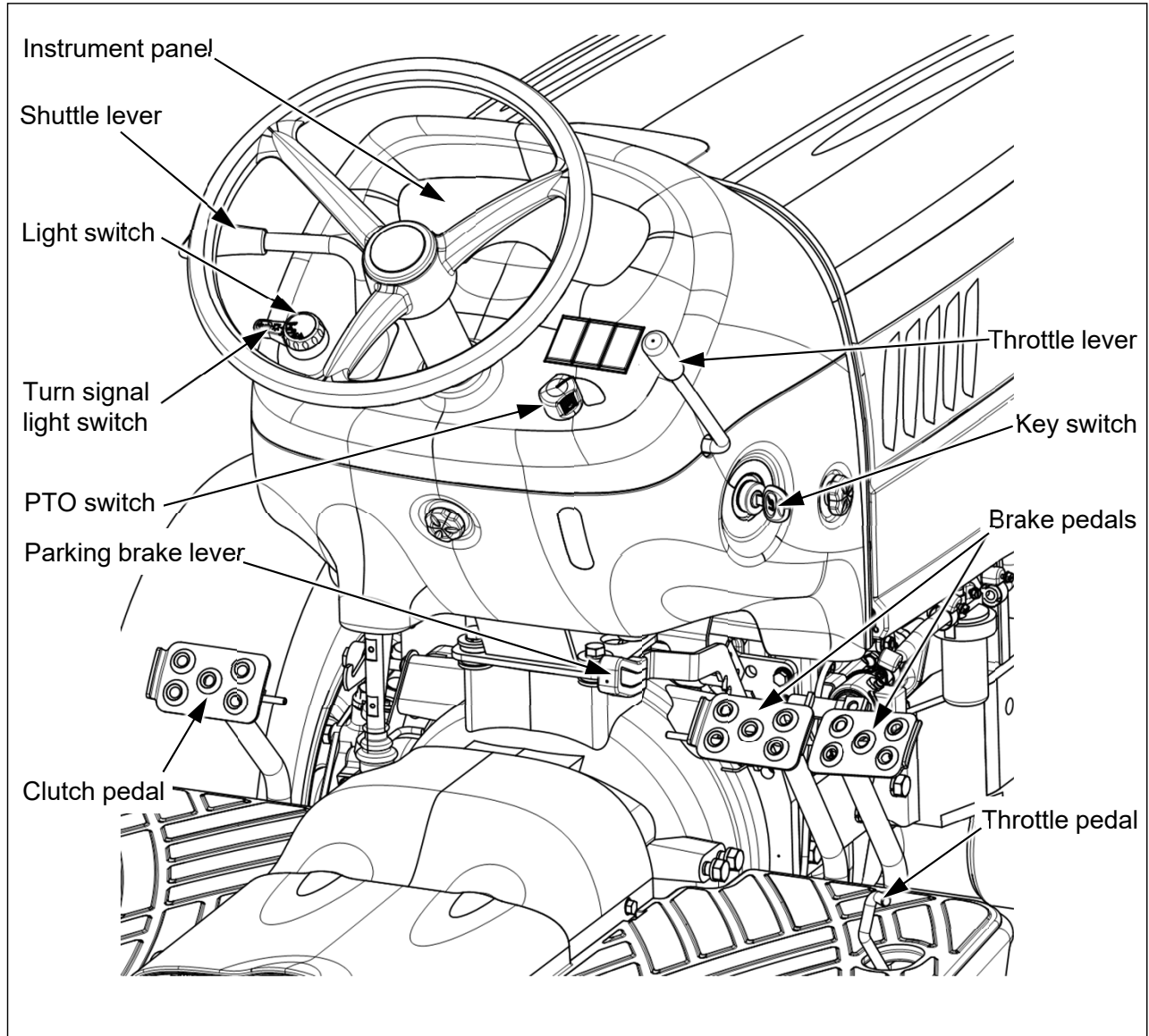


3. Instruments and Controls

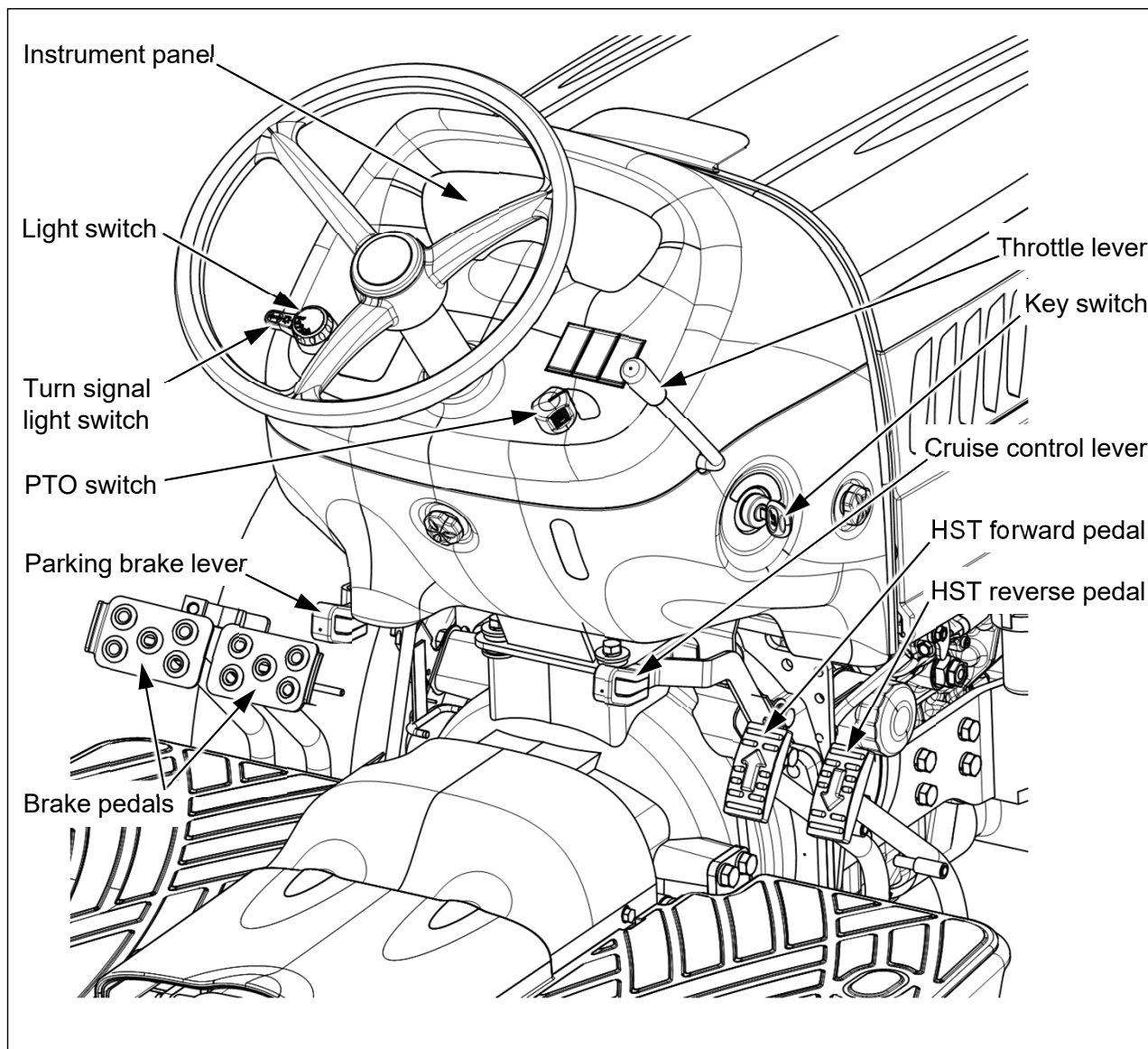
3-1. Instrument panel and Front controls

Important to owner, read carefully

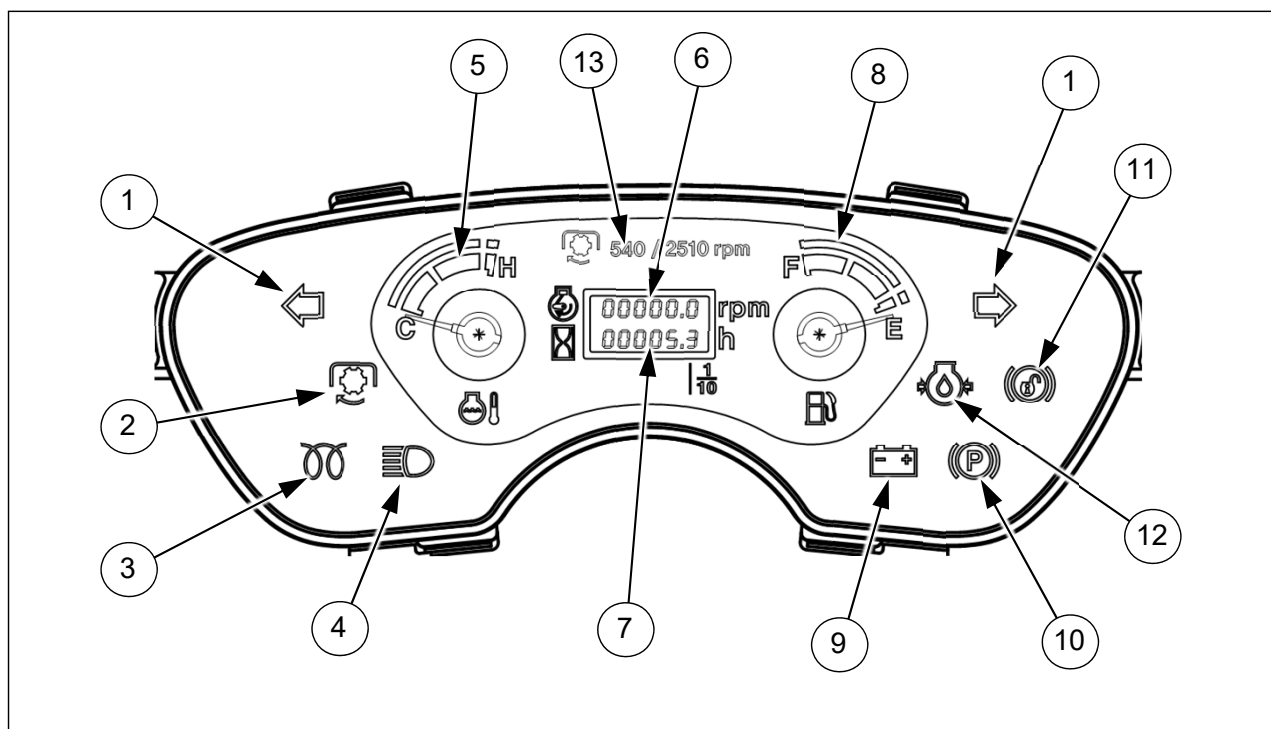
Mechanical type



HST type



(1) Instrument panel



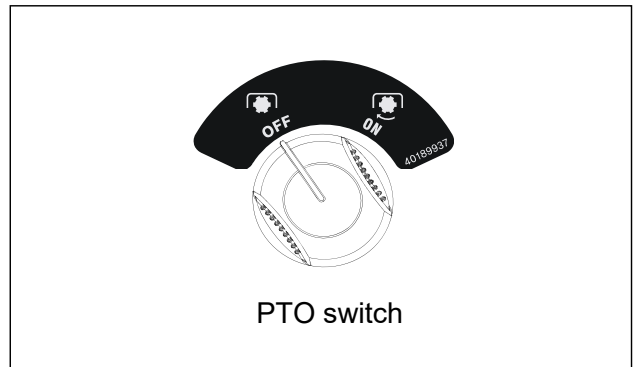
- | | |
|--|--|
| 1 Turn signal indicator (Left / Right) | 7 Hour meter |
| 2 PTO operation indicator | 8 Fuel level gauge |
| 3 Cold start aid indicator | 9 Battery charging indicator |
| 4 High beam indicator | 10 Parking brake indicator |
| 5 Engine coolant temperature gauge | 11 Brake pedals not latched indicator (Not used) |
| 6 Tachometer | 12 Engine oil pressure indicator |
| | 13 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 will rotate and this indicator will be turned on.

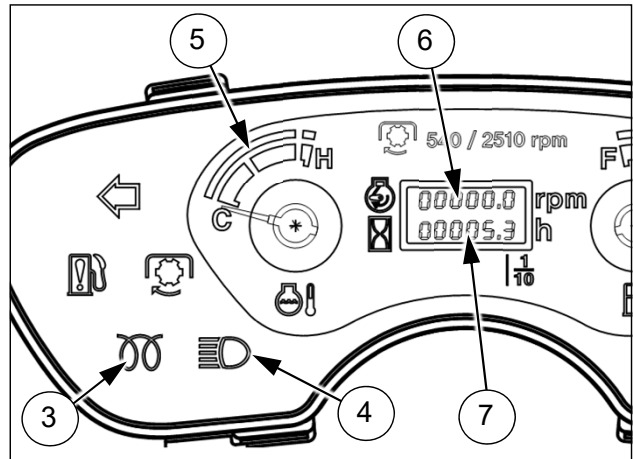


3 Cold start aid indicator

- 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 the 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 engine coolant temperature 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 5-11-(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 so far. (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 will be turned on when turning the key switch to “ON” position, and will be turned 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

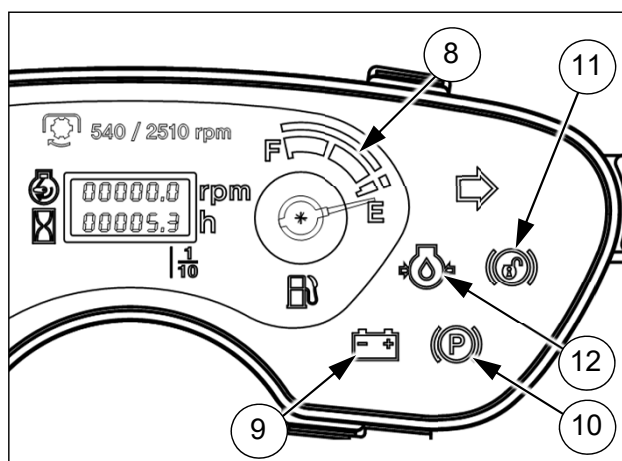
- This indicator will be ON when pressing brake pedal.

11 Brake pedals not latched indicator (Not used)

- This indicator is not used in this model.

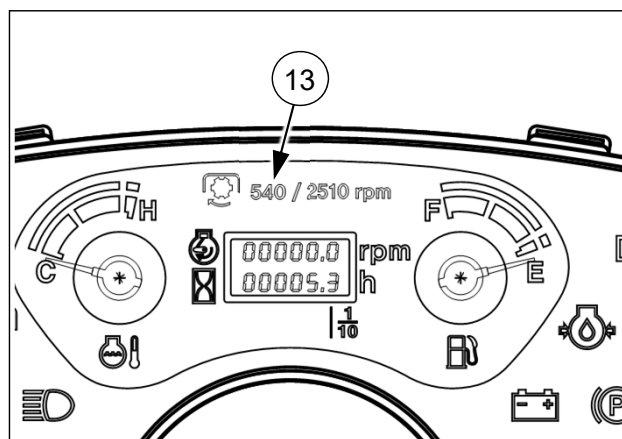
12 Engine oil pressure indicator

- 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.



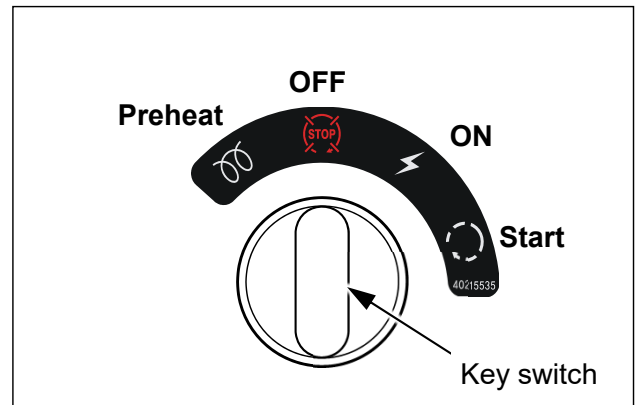
13 PTO speed indicator

- 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

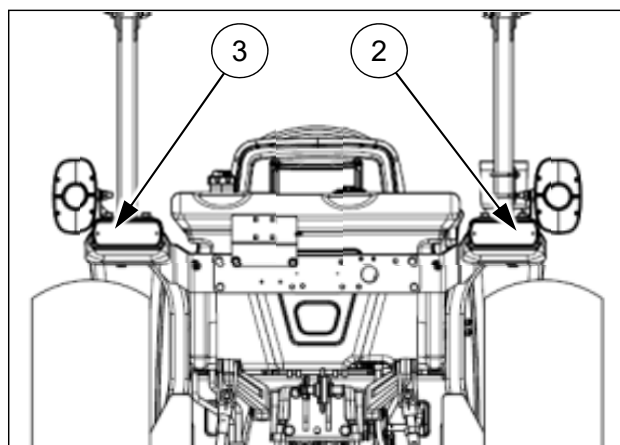
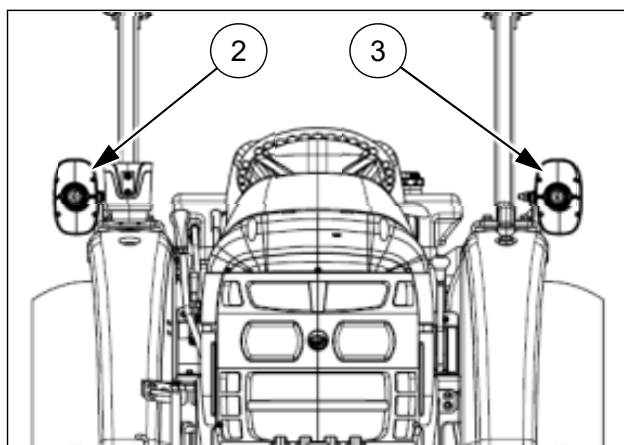
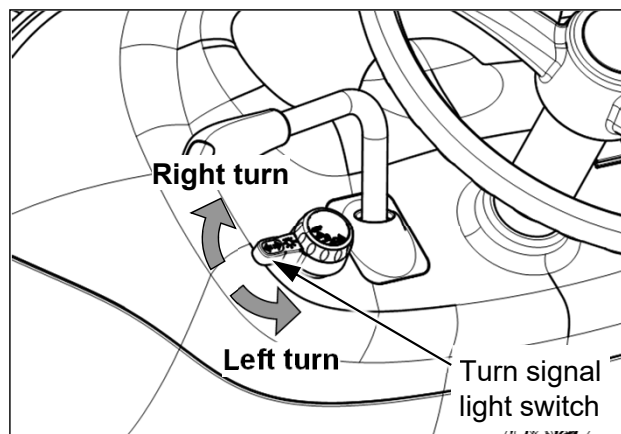
- **“Preheat”** – Engine glow (Cold start aid)
- **“OFF”** - power off (engine stop)
- **“ON”** - power on & automatic glow
- **“Start”** - engine start
- As soon as the engine starts, turn the ignition key to ON position immediately. If not, it may cause damage to the starter motor.



	Caution	<p>► 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.</p> <p>► If the tractor is not in use, the ignition key should be removed.</p>
--	---------	---

(3) 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 light② will blink.
 - If turning the switch counter-clockwise, the left turn signal light③ 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.



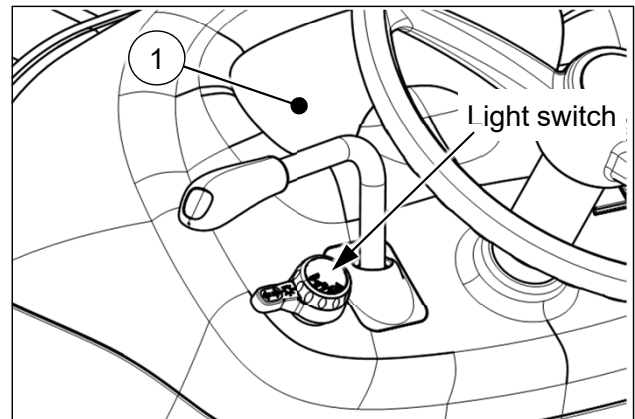
Caution

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

(4) Light switch

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

- ① Instrument panel lights.
- ② Hazard warning lights.
- ③ Side lights
- ④ Tail lights.
- ⑤ Headlights.



- **OFF** – Instrument panel and all lights are OFF.



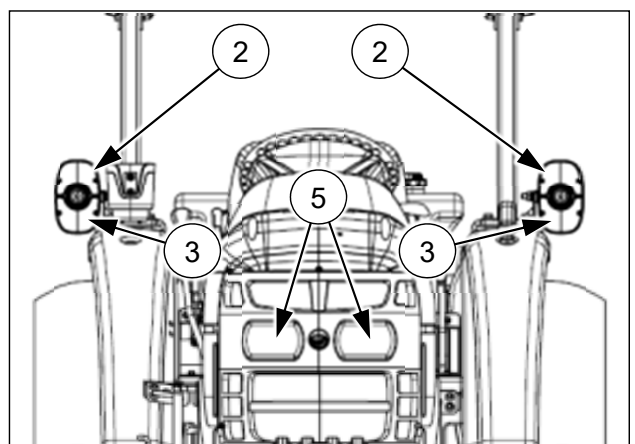
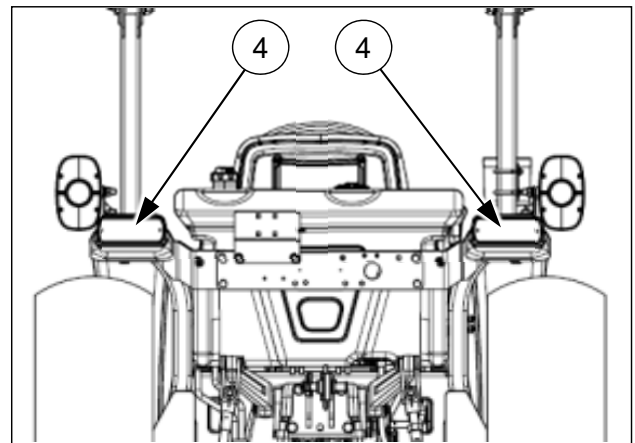
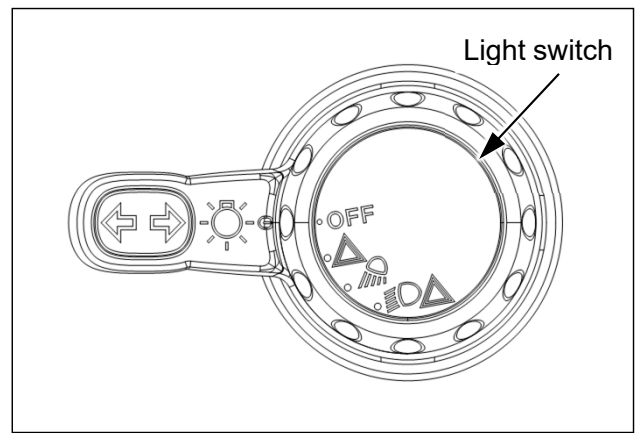
- Instrument panel, sidelights and hazard warning lights are turned on.



- Instrument panel, sidelights and headlights (high beam) are turned on. (use when working)



- Instrument panel, sidelights, headlights (low beam) and hazard warning lights are turned on. (use when driving)

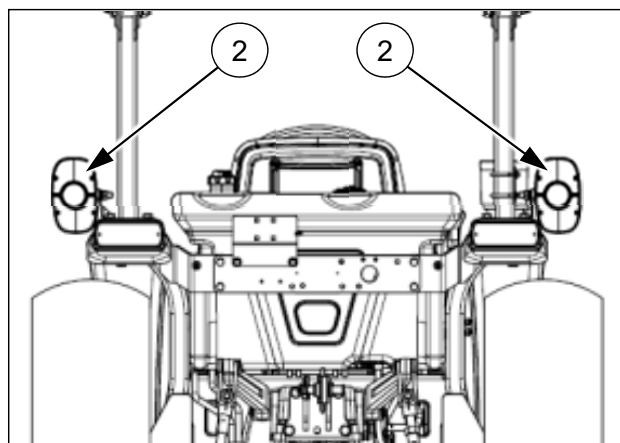
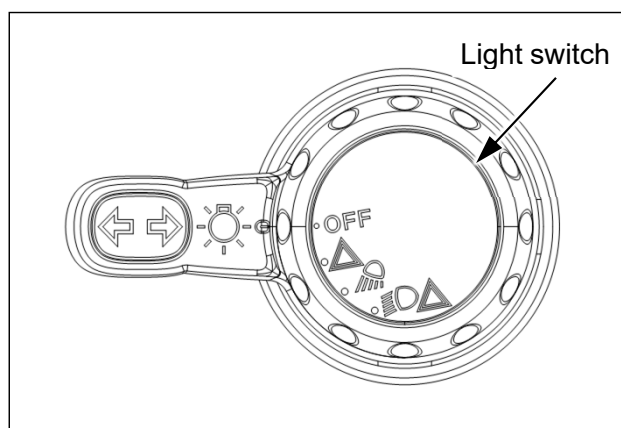
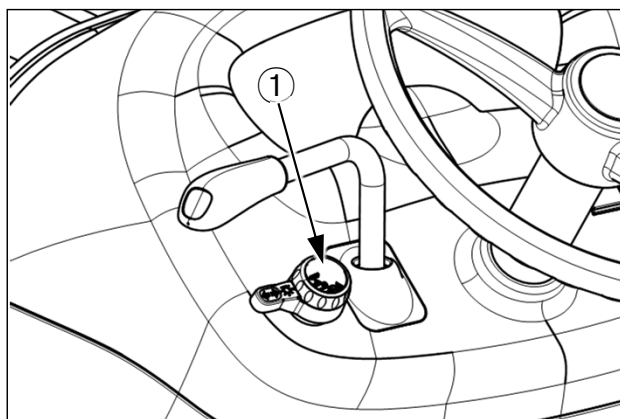



Caution

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

(5) Hazard warning light switch

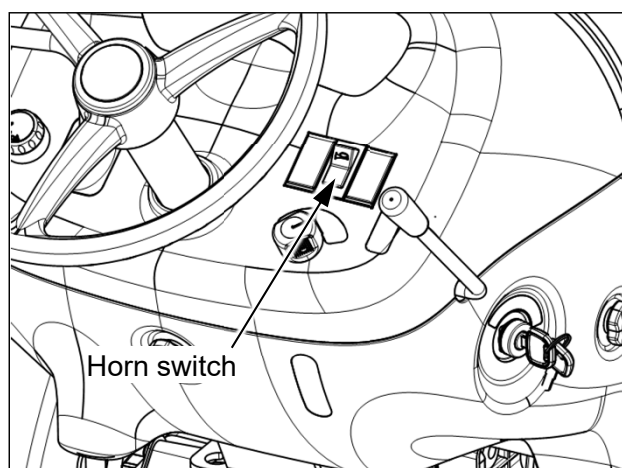
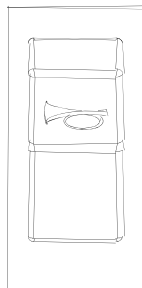
- This is used to warn other vehicles in case of emergency status.
- This function is integrated to the light switch for USA market.
- If turning the light switch① once clockwise, all turn signal lights② are blinked.
- When turning the light switch to “**Low beam**” position, the hazard warning light is automatically turned on.
- Use this hazard warning light switch in emergency situations according to your local traffic regulation.
- 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	<p>► If using the hazard warning lights for a long time while the engine is stopped, the battery can be discharged due to high electrical power consumption.</p>
<p>Notice</p>	<p>► The hazard warning lights can be turned on regardless of the key switch position.</p>

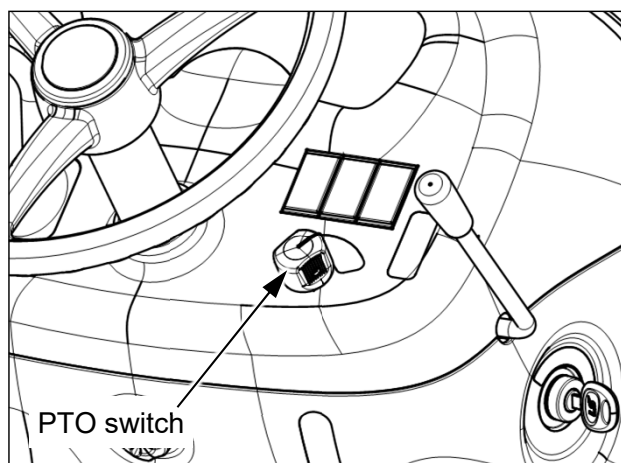
(6) Horn switch (if fitted)

- Press the upper side(symbol part) of the switch for sounding off the horn.



(7) PTO switch (Independent PTO)

- The engine starts only when the PTO switch is placed in “OFF” position for safety.
 - After starting engine, you must comply with the following instructions about the PTO operation.
1. Check the safety conditions around the implement.
 2. Place the PTO gear lever(if fitted) to the suitable position for your work condition.
 3. Place the PTO switch to “ON” position. The PTO shaft will rotate and the PTO operation indicator on the instrument panel will be turned on.
 4. If you want to stop the PTO shaft temporarily while operating, push the PTO switch to “OFF” position.

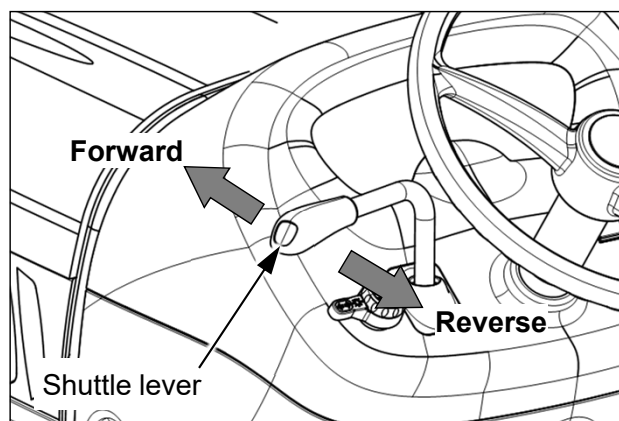


Warning

- ▶ Before attaching, detaching or checking the PTO driven equipment, always place the PTO switch in “OFF” position, and PTO gear lever(if fitted) in neutral position.
- ▶ Even if depressing the clutch pedal or lifting up the 3-point linkage to the upper limit, the PTO shaft will not be stopped. Pay attention to the surroundings to prevent an accident.
- ▶ Do not engage the PTO clutch at high engine speed. Sudden engagement can cause damage to the implement and PTO clutch. Engage the PTO at low idle rpm, and then raise the engine speed up.

(8) Shuttle lever (Mechanical synchro-shuttle)

- This is used to select the Forward or Reverse.
- **Forward** : Push the lever forward.
- **Reverse** : Pull the lever backward.
- Before reversing the tractor, lower the engine speed and check the safety conditions behind the tractor.
- Before starting engine, be sure to place the shuttle lever in neutral position.

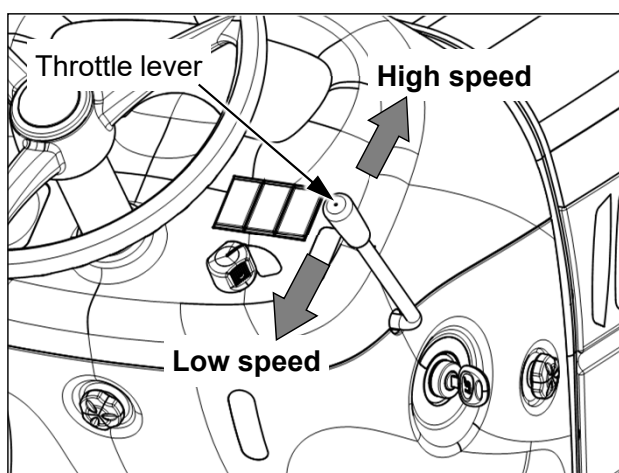


Caution

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

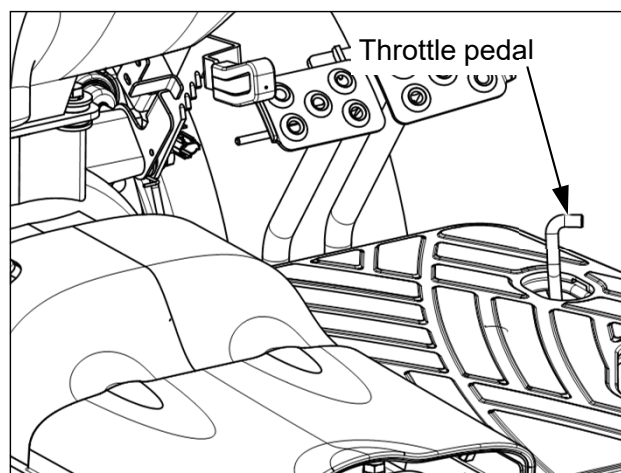
(9) Throttle lever

- This lever is used to control engine speed.
 - Pull it backward for **Low** speed.
 - Push it forward for **High** speed.
- For Mechanical models, the throttle lever must be used only for work field. When driving on the road, place the throttle lever on the low speed position, and use the throttle pedal.



(10) Throttle pedal (Mechanical)

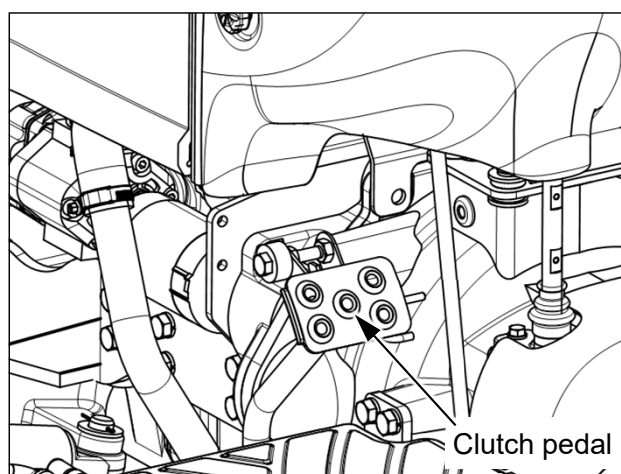
- This pedal is used to control engine speed while running on the road.
- When using the throttle pedal, the throttle lever must be placed on the low speed position.



(11) Clutch pedal (Mechanical)

- This is used to engage or disengage the main transmission clutch for starting engine and shifting transmission gear.
- Depress the clutch pedal quickly and fully, and release it slowly.
- Even if depressing the clutch pedal, PTO shaft can not be stopped. To stop the PTO shaft, turn off the PTO switch.

Refer to the chapter 3-1-(7), "PTO switch" in this manual.

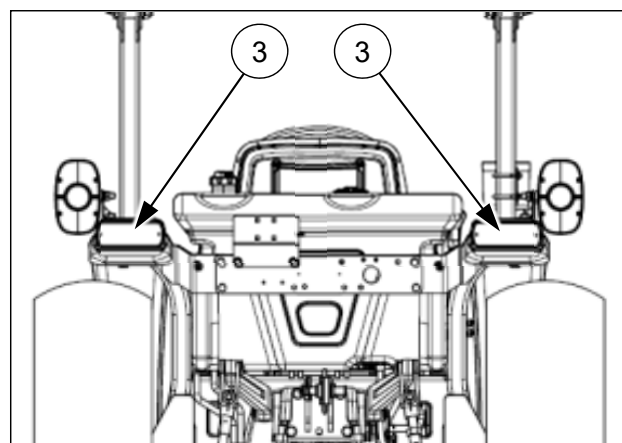
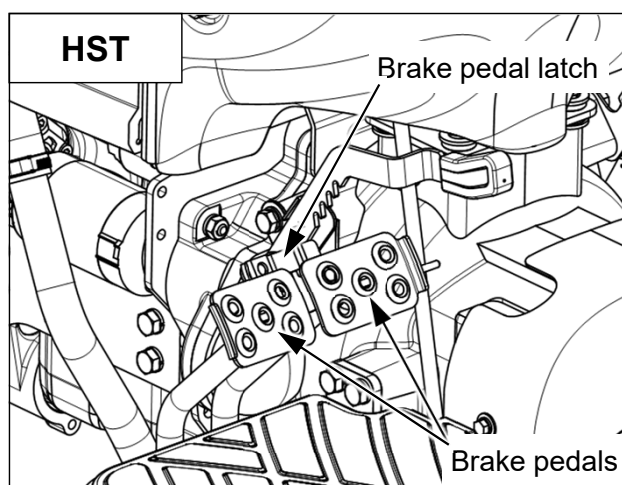
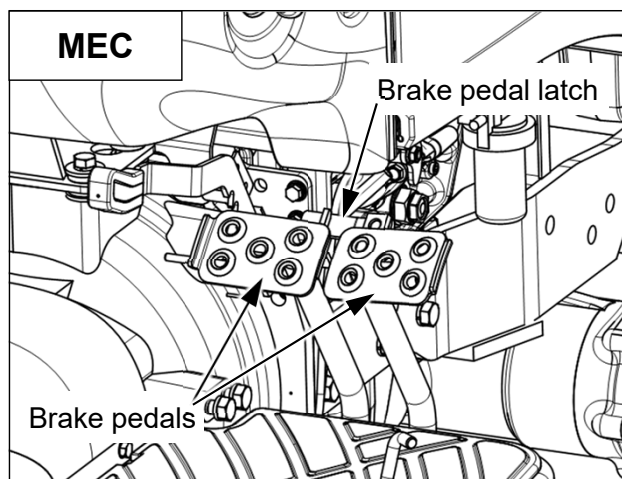


Caution

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

(12) Brake pedals

- The brake pedals of your tractor can be operated independently after disconnecting the brake pedal latch. The left/right brake pedals transmit braking force on each wheel.
- When stopping the tractor, press both brake pedals together.
- To reduce the turning radius in the work field, remove 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 lights^③ will illuminate when the brake pedal is depressed and the key switch is “ON” position.

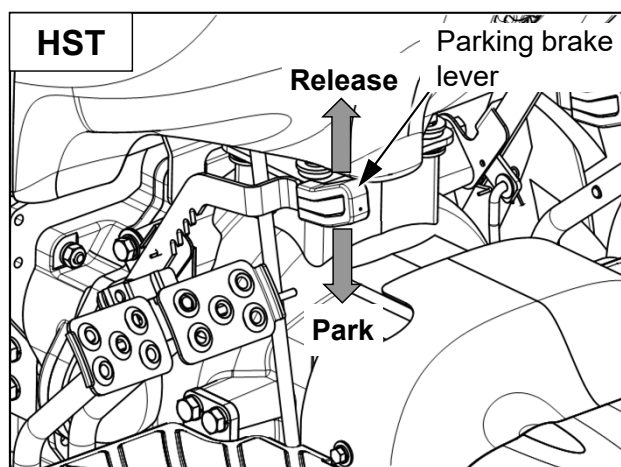
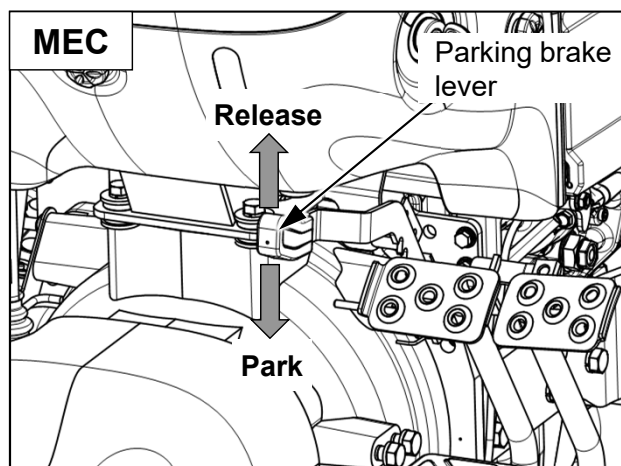


Caution

- ▶ When driving on the road, engage the left/right brake pedal with the latch.
- If pressing one-side brake pedal while driving, the tractor may turnover.
- ▶ DO NOT ride your foot on the brake pedal while driving. It may cause a failure of the brake device.

(13) Parking brake lever

- Connect the brake pedals each other with the brake pedal latch.
- Push down the parking brake lever after pressing down the brake pedals and check that serrated part is engaged to left brake pedal.
- Release the brake pedals slowly with checking the slippage of the tractor.
- To release the parking brake, just press down the brake pedals little harder and check if the parking brake lever returns to its original position by spring.

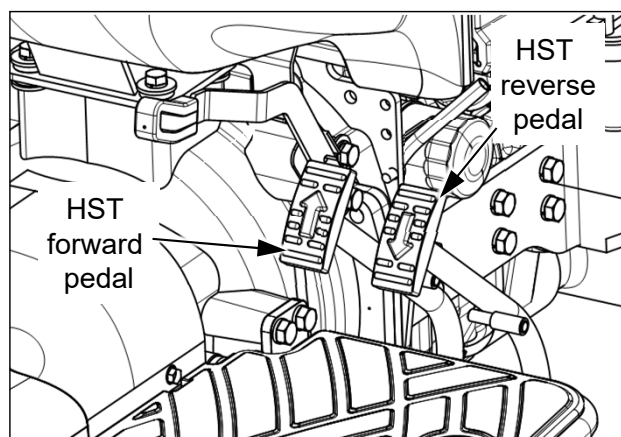



Caution

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

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

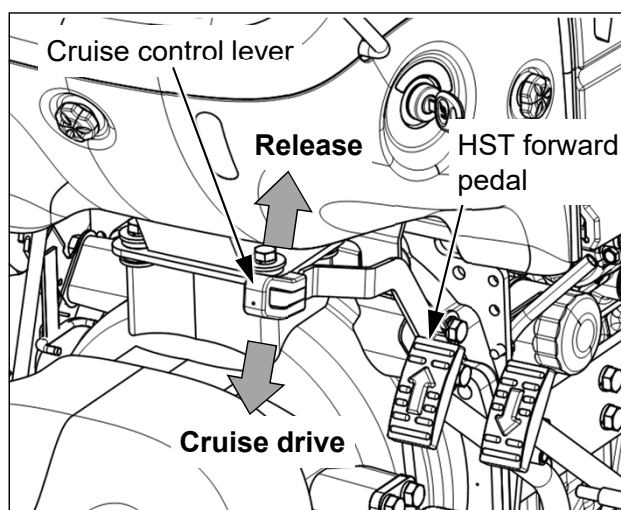
- Press down the HST forward pedal slowly in order to move the tractor forward.
- If releasing the pedal, it returns back to the neutral position and tractor will stop.
- The deeper the pedal is pressed down, the faster the tractor will drive.
- The HST reverse pedal is worked in the same way of the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




 warning	<ul style="list-style-type: none"> ▶ 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.
---	---

(15) Cruise control lever (HST Type)

- For cruise control drive, push down the cruise control lever with pressing the HST forward pedal. And then, the HST pedal will be fixed at that position and the driving speed of the tractor will be maintained constantly.
- To exit the cruise control 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 quitted.

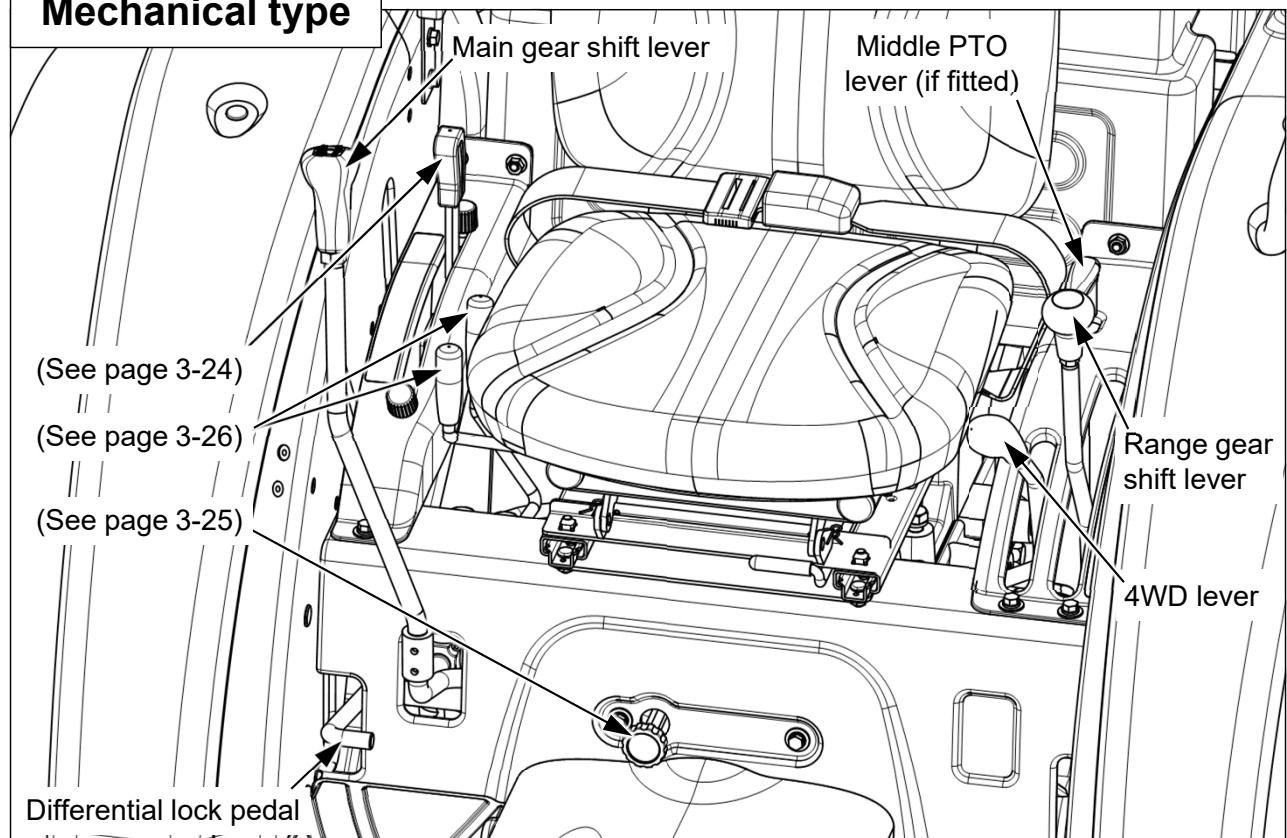


 warning	<ul style="list-style-type: none"> ▶ During the cruise control drive, do not press down the HST reverse pedal to exit the cruise control drive or to reverse the tractor. After exiting the cruise control drive, use the HST reverse pedal. ▶ DO NOT try to move the cruise control lever in order to exit the cruise control drive. It may cause a failure of the cruise control linkage system.
---	--

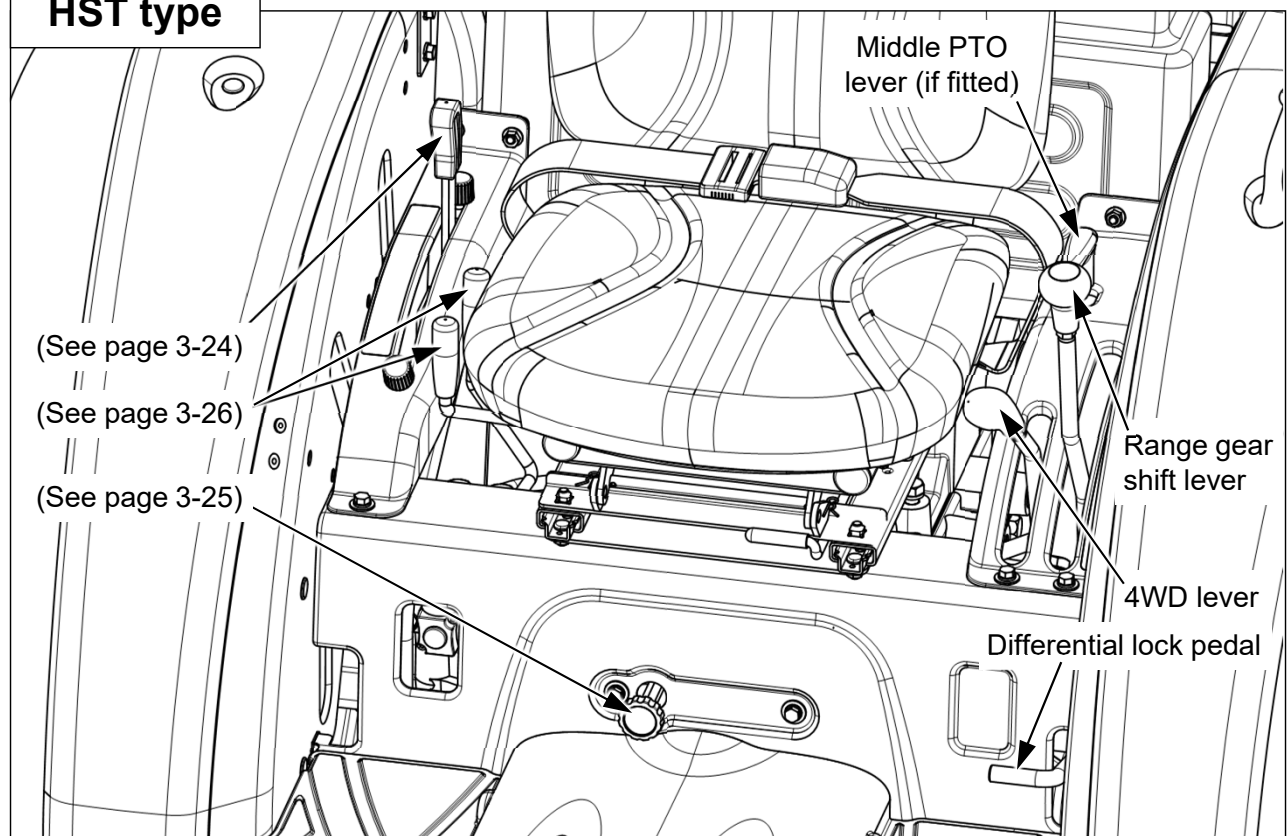
3-2. Left / Right-hand controls

Important to owner, read carefully

Mechanical type



HST type

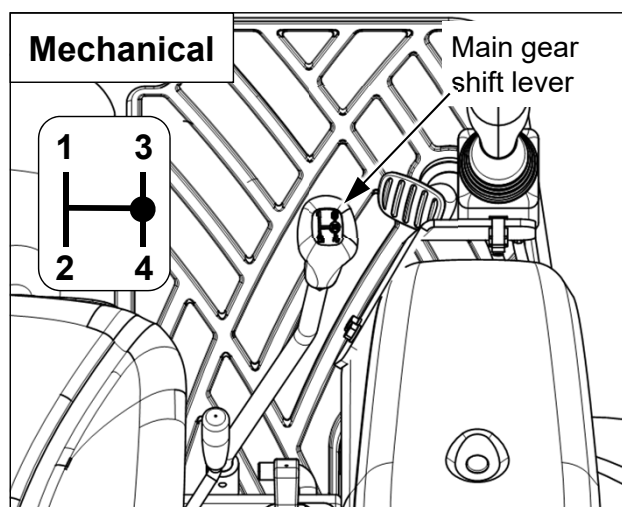


(1) Main gear shift lever

(Mechanical)

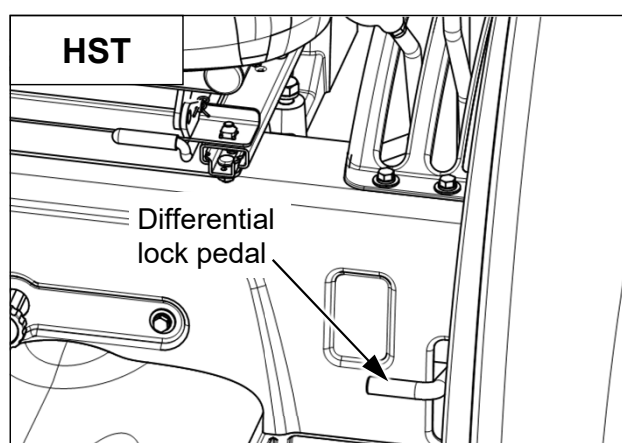
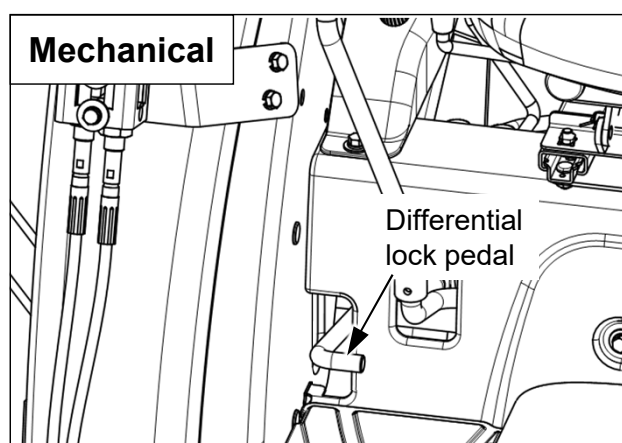
- Four speed gear shift and neutral position is available.
- The main gear shift lever can be operated while driving after depressing the clutch pedal. It is not necessary to stop the tractor completely due to the synchromesh gears.


Notice	<p>► Operate the main gear shift lever by correct “H” pattern. If operated diagonally, it may cause a failure.</p>
--------	--



(2) Differential lock pedal

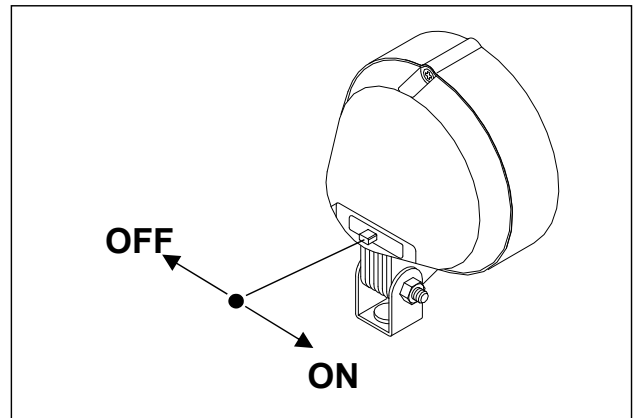
- When the rear wheel is slipping and the tractor can not move forward, stop the tractor and press down the differential lock pedal.
- Differential lock is effective for working on a slippery ground.
- If engaged, both rear wheels will rotate at equal speed. So, It can disturb the steering operation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



 Warning	<p>► Do not turn the tractor with pressing the differential lock pedal.</p> <p>► Do not use this differential lock pedal while driving on public road.</p> <p>► Do not engage the differential lock when one wheel is spinning.</p>
---	---

(3) Work light switch (if fitted)

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



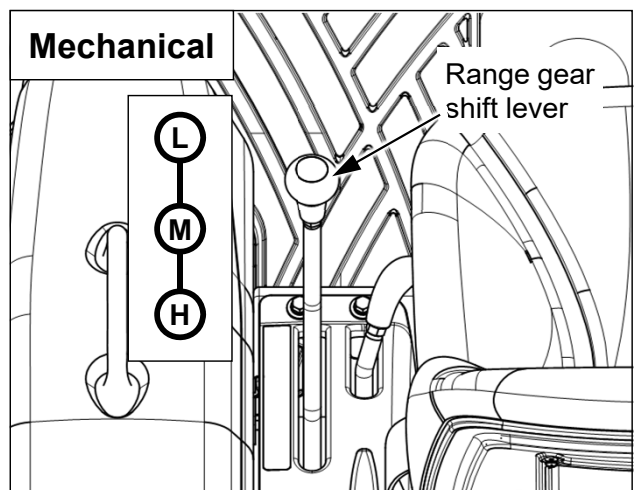
Caution

- ▶ 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) Range gear shift lever

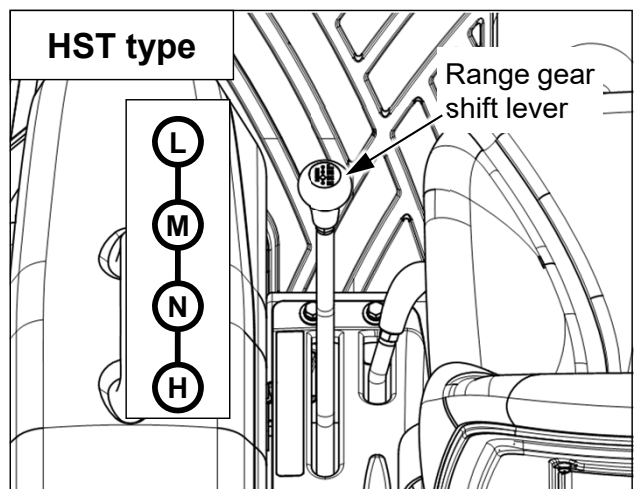
① Mechanical type

- Three speed gear shift is available.
- Before operating the range gear shift lever, press down the clutch pedal, brake pedals and stop the tractor completely.



② HST type

- Three speed gear shift and NEUTRAL position is available.
- Before operating the range gear shift lever, release the HST pedal to return to the neutral position and press down the brake pedals, and stop the tractor completely.

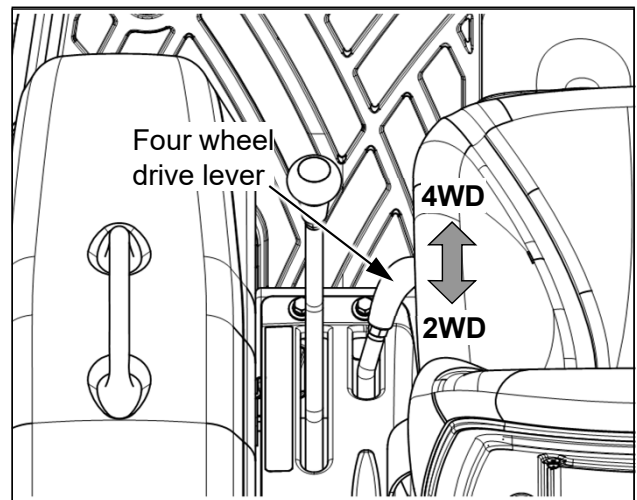


Notice

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

(5) Four wheel drive lever (4WD)

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

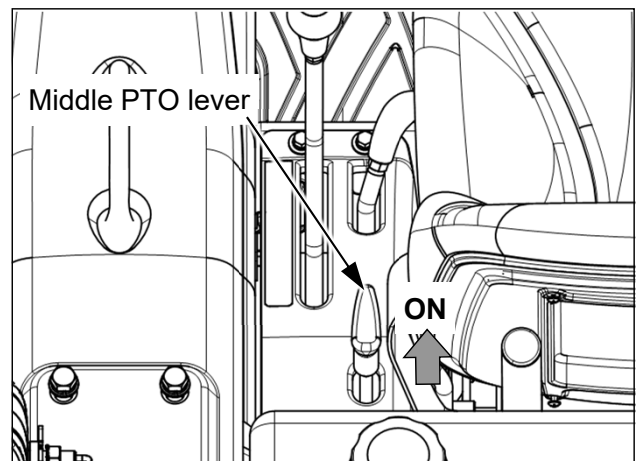


Caution

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

(6) Middle PTO lever (if fitted)



- This lever is used to engage/disengage the middle PTO gear (optional).
- Before operating the middle PTO lever, place the PTO switch in “OFF” position and wait until the PTO shaft is stopped completely.
- Pull the middle PTO lever upward to engage the middle PTO gear.
- *For further information of the middle PTO shaft, see chapter 4-5-(2) in this manual.*



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 	<ul style="list-style-type: none">▶ 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.
---	--

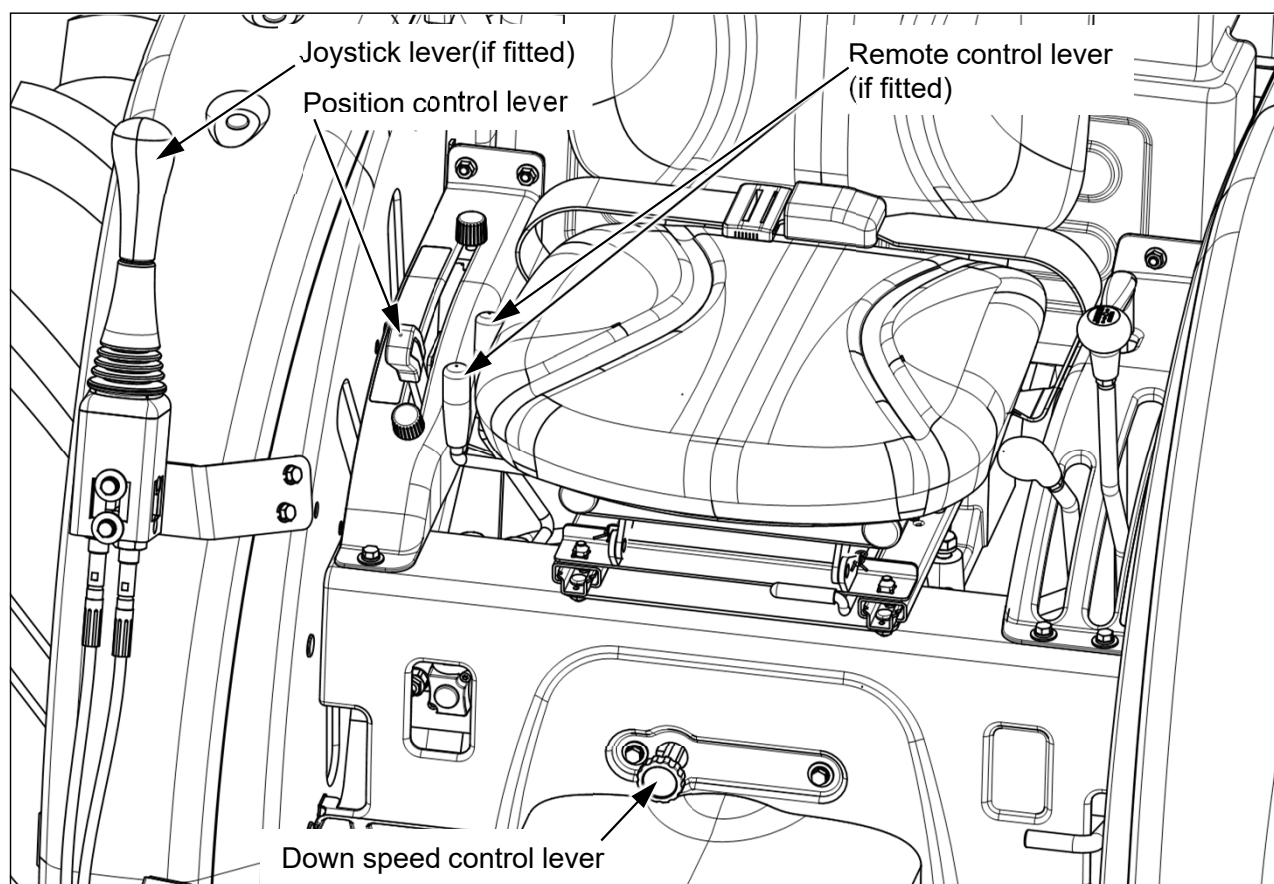
(2) Steering system

- 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 will 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	<ul style="list-style-type: none">▶ 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.
--------	---

(3) Hydraulic lift Control (Mechanical Hydraulic Lift, MHL)

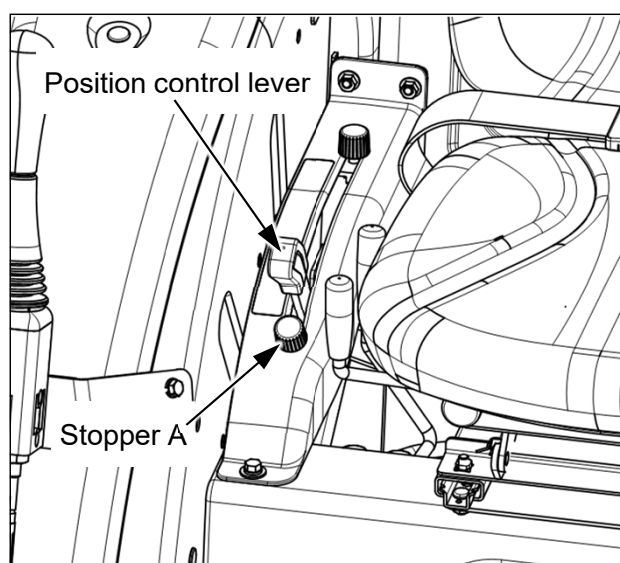
- The hydraulic lift system is operated by the position control lever.



① Position control

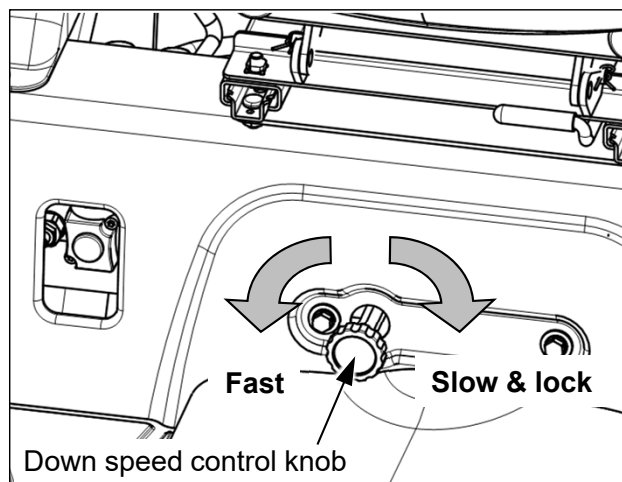
- This mode sets the position of implements freely by position control lever operation. Generally, this mode is used for tiller, fertilizer distributor, mower, rake etc. In this case, operate the lever as follows.

1. Push the position control lever forward and let the implement down by its own weight.
2. Move up the lever to the desired position, the rear implement will be located on the position corresponding to the lever position.
3. If necessary, fix the lowest position of the lever with the stopper A at the desired position.



② Down speed control knob

- It is use to adjust the down speed of the 3-point linkage. Turn the down-speed control knob to the right direction 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 will 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.

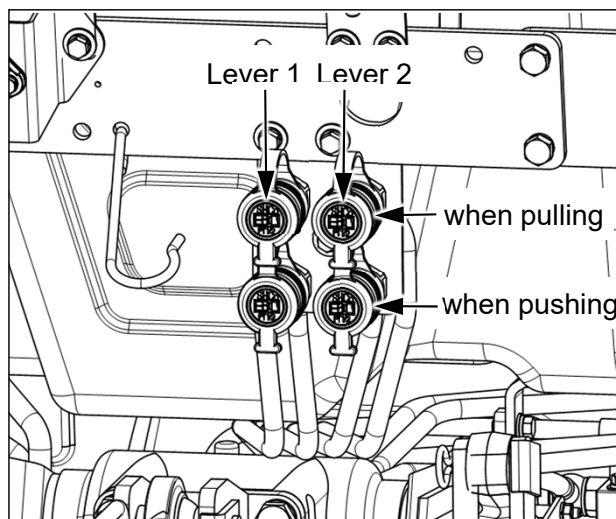
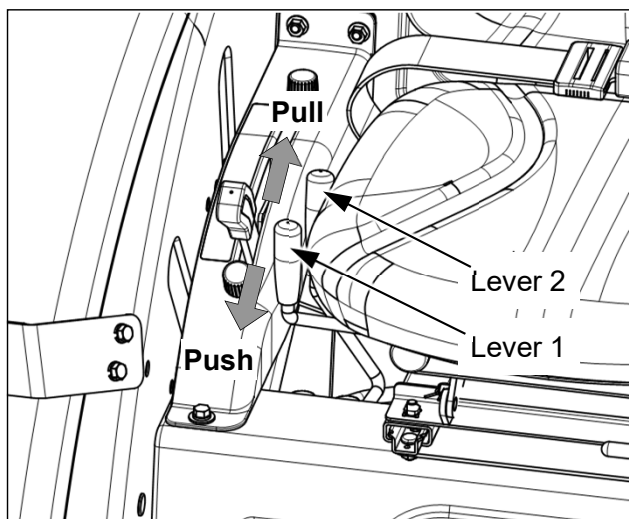


Warning

- ▶ 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) Remote control lever and Quick coupler (optional)

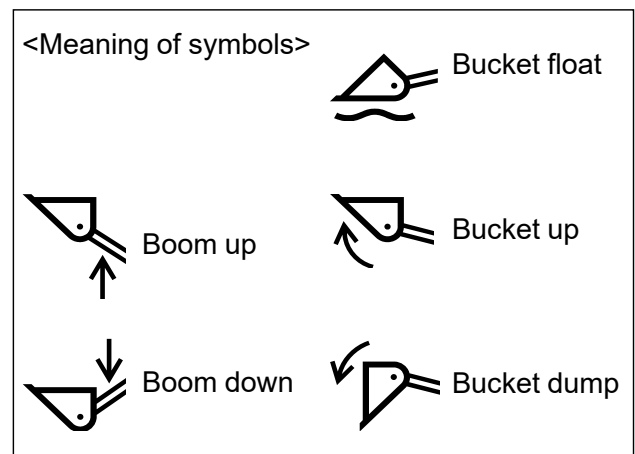
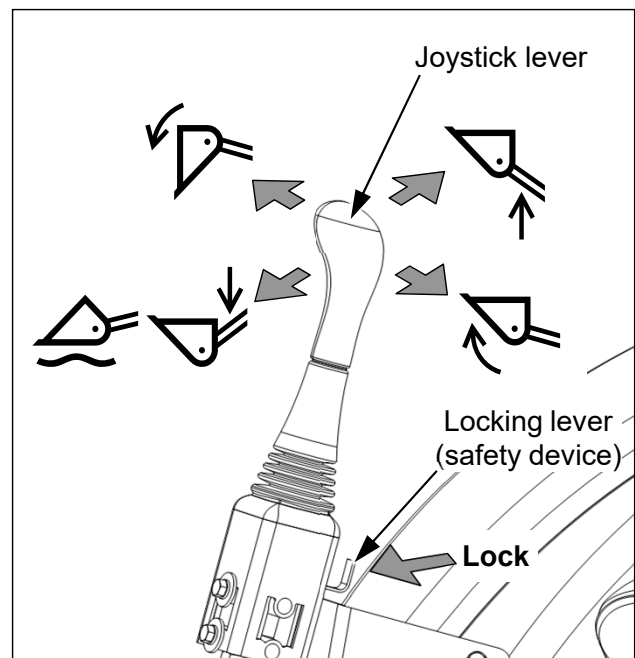
- The remote control levers are used to operate the hydraulic cylinder(s) and/or motor(s) of the implement attached to the tractor.
- If you **pull** the remote control lever(s) **backward**, and the hydraulic pressure works **to the upper couplers** of the related lever(s), and the **lower coupler(s) is connected to the oil tank**.
- Each lever of the parallel circuit remote control valve can be operated respectively, and when operating the levers at the same time, a quick coupler under less pressure begins to work first.
- After connecting and preliminary operating the hydraulic equipment, check again the transmission oil level of the tractor.
- Depending on the remote control valve type, a set of spring-return type lever(s), detent type lever(s) or combinations may be installed on your tractor. (optional)
 - **Spring-return type**: When releasing the lever(s) after operating fully, the lever(s) will return to the neutral position automatically.
 - **Detent type**: When releasing the lever(s) after operating fully, the lever(s) is fixed on the working position. In this case, you must move the lever to the neutral position manually after operating. *If leaving this lever on, it may cause an over-heat and serious damage of the hydraulic system.*



<p>Warning</p>	<ul style="list-style-type: none"> ▶ 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 personal 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.
<p>Caution</p>	<ul style="list-style-type: none"> ▶ When connecting a high volumetric capacity cylinder to the remote control system, lower the implement to the ground, and check if the transmission oil level is marked between "Min" and "Max" scale on the oil gauge. If necessary, add new oil.

(5) Joystick lever (if fitted)

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

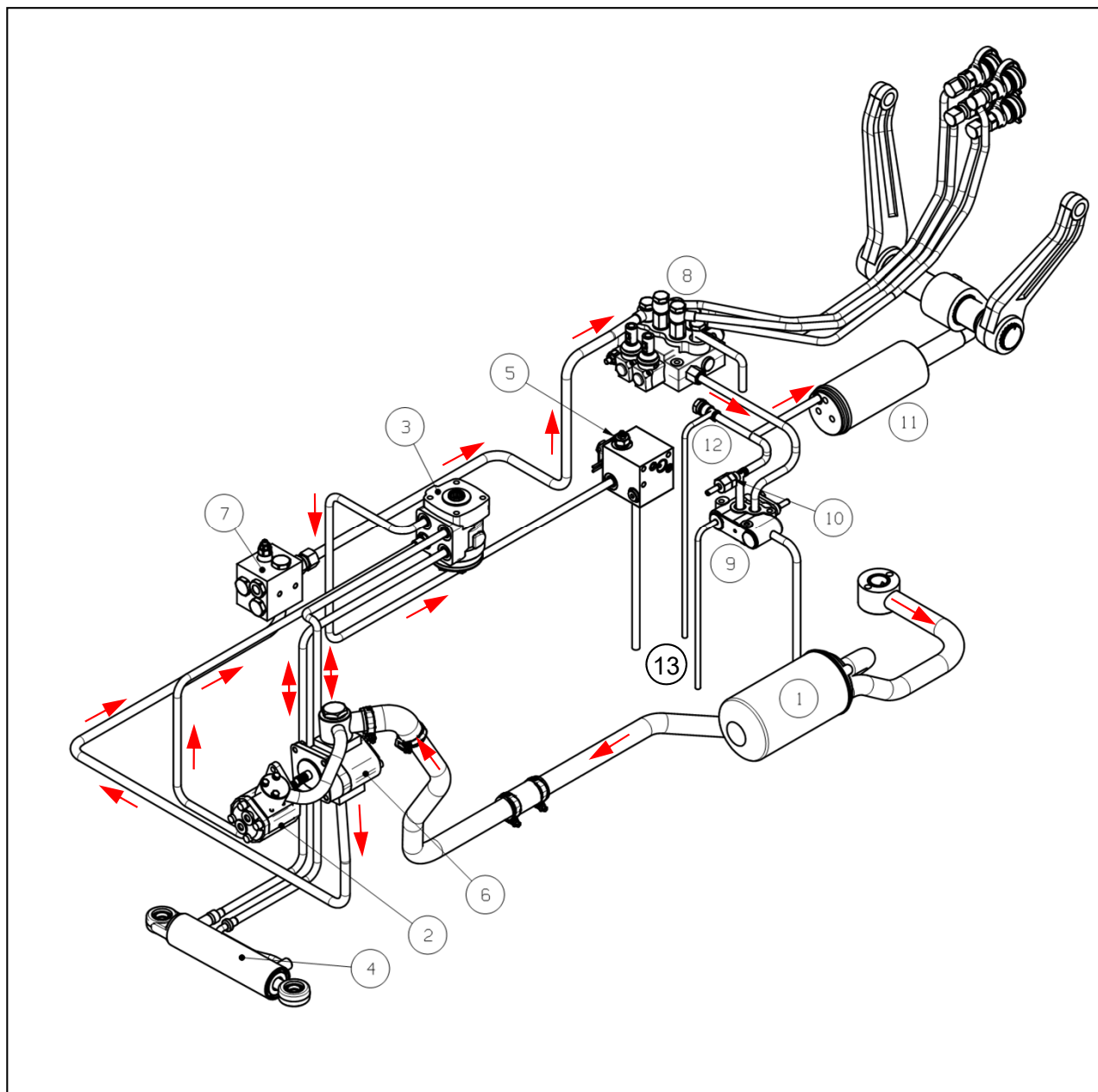


Warning

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

(6) Hydraulic System Diagram

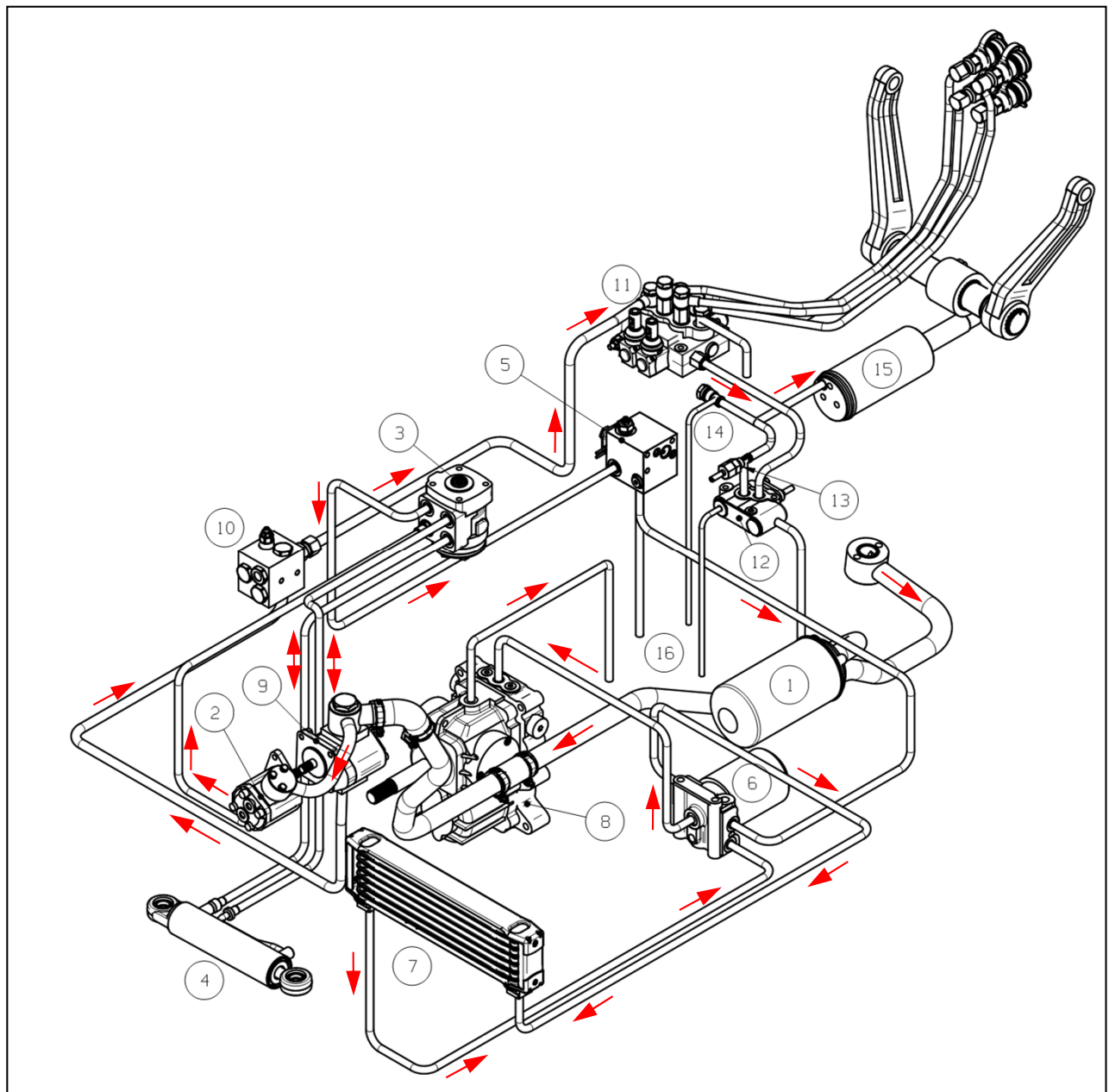
Mechanical type



1. Hydraulic oil filter
2. Steering pump
3. Steering unit
4. Steering cylinder
5. Independent PTO valve
6. Hydraulic lift pump
7. Front outlet valve or
Front loader valve (optional)

8. Remote control valve (optional)
9. Hydraulic lift control valve
10. Down speed control valve
11. Hydraulic lift cylinder
12. Safety valve
13. Oil tank (Transmission)

HST



- | | |
|--------------------------|--|
| 1. Hydraulic filter | 10. Front outlet valve or
Front loader valve (optional) |
| 2. Steering pump | 11. Remote control valve (optional) |
| 3. Steering unit | 12. Hydraulic lift control valve |
| 4. Steering cylinder | 13. Down speed control valve |
| 5. Independent PTO valve | 14. Safety valve |
| 6. HST filter | 15. Hydraulic lift cylinder |
| 7. Oil cooler | 16. Oil tank |
| 8. HST unit | |
| 9. Hydraulic lift pump | |

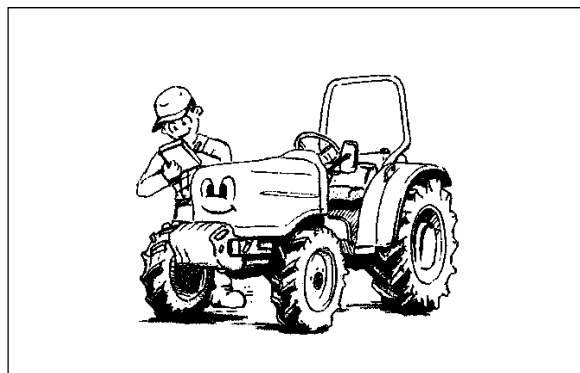
4. Operation and Work

4-1. How to handle new tractor

(1) Check points

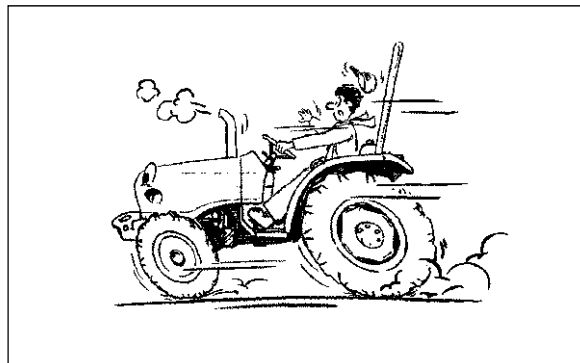
※ For new tractor, the followings must be checked once again even though there was sufficient quality management, inspection, regulating of each part in the factory.

- 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?


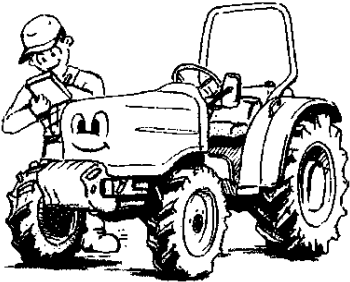


(2) Notices in handling new tractor (Engine brake-in procedure)

- To get the best performance, comply with the followings.
 - DO NOT start or stop the tractor suddenly.
 - DO NOT operate heavily 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	<ul style="list-style-type: none"> ▶ Check each part before starting engine. ▶ Check if there are any other people around before starting. ▶ Place all the transmission gear levers and switches in NEUTRAL or "OFF" position. 	
---	---	--

(1) Engine start

Mechanical type

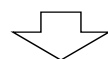
1. Sit in driver's seat and apply parking brake



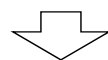
2. Place main gear shift, range gear shift lever, shuttle lever in **NEUTRAL** and PTO switch in "**OFF**" position.



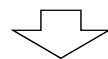
3. Pull the throttle lever to the low speed position.



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



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



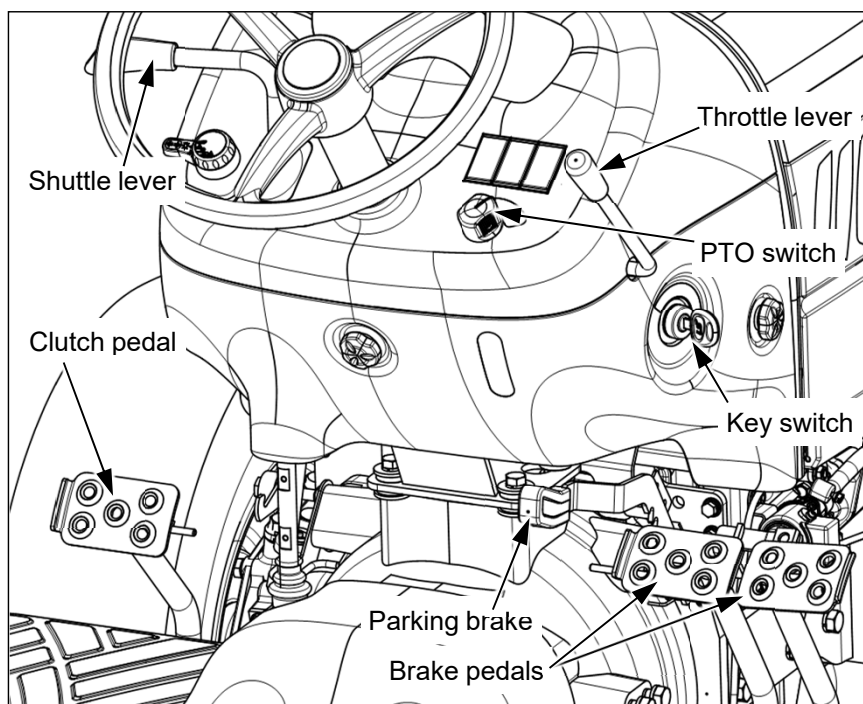
6. Depress clutch pedal fully and turn key switch to "**START**" position. As soon as the engine starts, release the key switch to "ON" position.


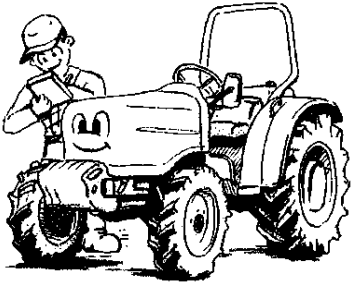


7. Check if the battery charging indicator and engine oil pressure indicator are OFF after starting engine. If not, stop the engine immediately and check the problem.



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



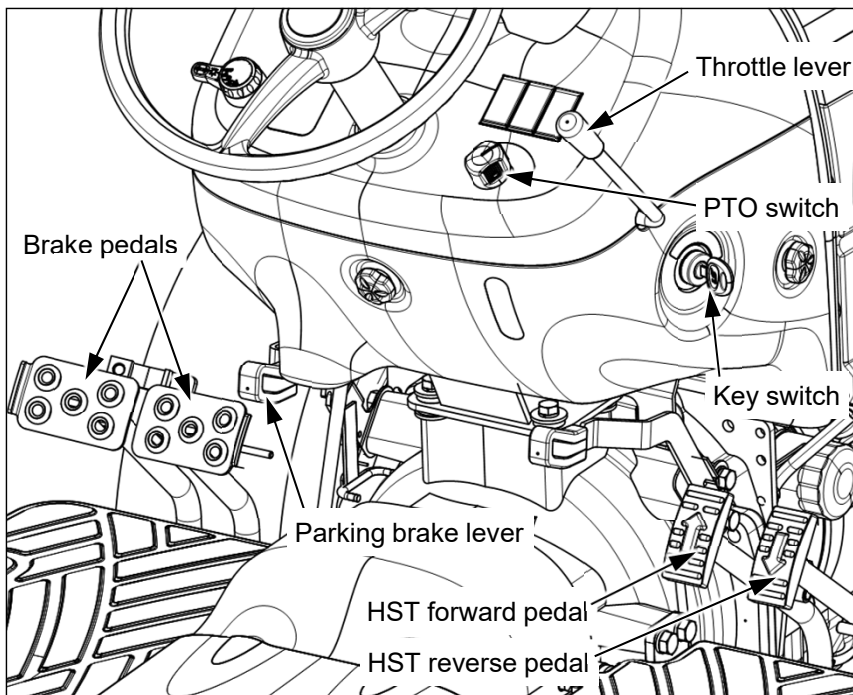
 Caution	<ul style="list-style-type: none"> ▶ Check each part before starting engine. ▶ Check if there are any other people around before starting. ▶ Place all the transmission gear levers and switches in NEUTRAL or "OFF" position. 	
---	---	--

HST type

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

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

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






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


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

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

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

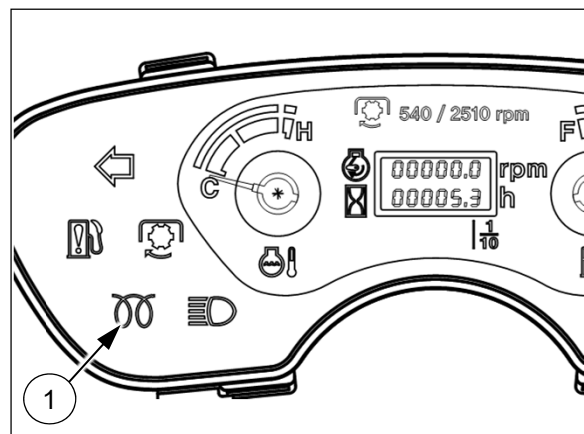
6. Turn key switch to "**START**" position. As soon as the engine starts, release the key switch to "**ON**" position.


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

 Caution	<p>▶ To start the engine,</p> <ul style="list-style-type: none"> - be sure to depress the clutch pedal fully, place the shuttle lever in neutral position, and put PTO switch in "OFF" position. (Mechanical models) - be sure to release the HST pedal in neutral position, put PTO switch to "OFF" position (HST models) <p>If not, the engine can not start even if turning the key switch to "START" position.</p> <p>▶ DO NOT operate the starter motor more than 10 seconds. If the engine does not start, wait for 1~2 minutes before restarting.</p> <p>▶ When the engine is running, DO NOT turn the key switch to "START" position. It may cause a failure of the starter motor.</p> <p>▶ 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.</p>
--	---

(2) Start in cold weather

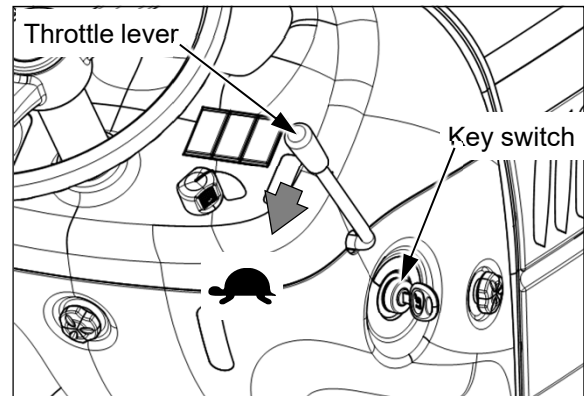
- Pull the throttle lever to the low idle position.
- Start the engine after operating the cold start aid indicator(1) sufficiently.
- If the engine runs rough, press the throttle pedal down 2~3 times for a while. (Mechanical type)
- If the engine runs smoothly, carry out warm-up for 5~10 minutes at 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	<p>▶ 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.</p> <p>▶ Allowing engine to idle for a long time will waste fuel and cause a build up of carbon.</p>
--	---

(3) Engine Stop

- Place all the transmission gear levers or switches in the “NEUTRAL” or “OFF” position.
- Pull the throttle lever backward to reduce the engine speed and place the key switch on “OFF” position to stop the engine.
- Remove the ignition key after stopping engine.



Notice

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

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.

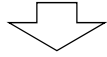
Ambient Temperature	Recommended Warm-Up Time
Above 0 °C (32 °F)	Minimum of 5 minutes
0 – -10 °C (32 – 14 °F)	5 to 10 minutes
-10 – -20 °C (14 – -4 °F)	10 to 15 minutes
Below -20 °C (-4 °F)	More than 15 minutes

 Warning	<p>► Unexpected movement!</p> <p>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.</p> <p>Failure to comply could result in death or serious injury.</p>
---	---

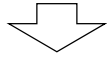
(2) How to drive

Mechanical type

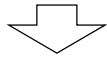
1. Lift up all the implements (front/middle/rear) from the ground after starting engine.



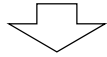
2. Place the throttle lever to the low speed position.



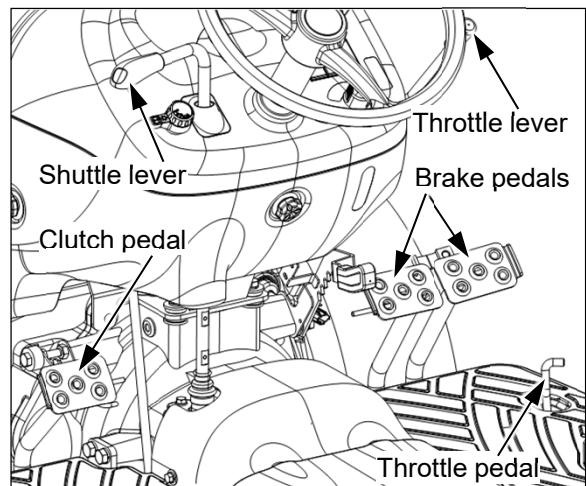
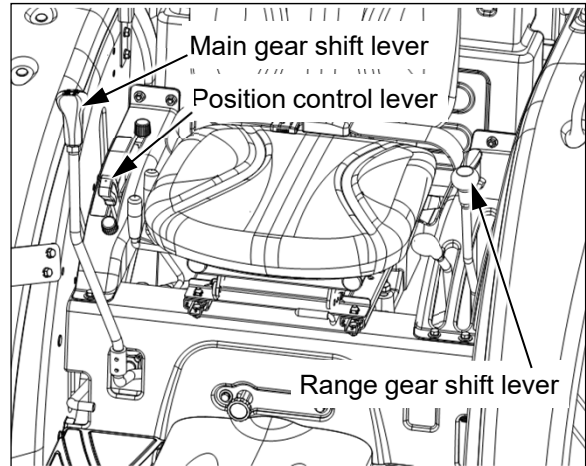
3. Depress clutch pedal fully and place all the transmission gear levers (main, range, shuttle lever) on a suitable position.



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



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

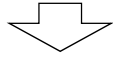


Notice

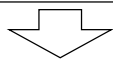
► Release the clutch pedal slowly. If releasing the clutch pedal suddenly, the gear life can be reduced and it may cause a sudden start.

HST type

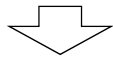
1. Pull the position control lever backward to lift the implement up after starting engine.



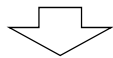
2. Set engine speed more than 1500 rev/min.



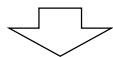
3. Place the range gear shift lever on a suitable position.



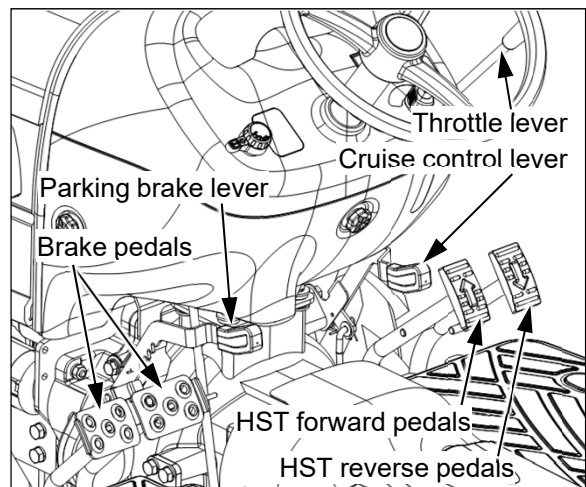
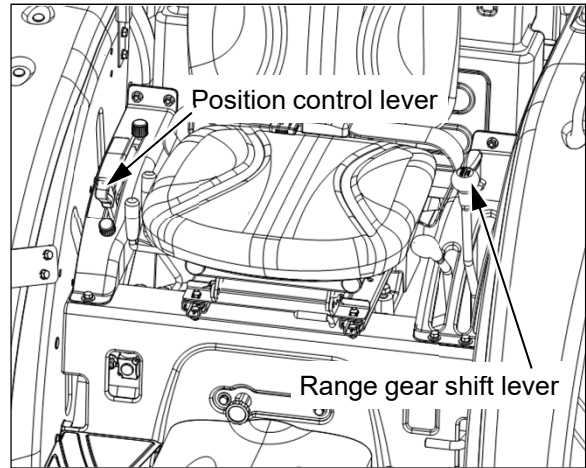
4. Press the brake pedals and release the parking brake.



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



6. To enter the cruise control mode, move the cruise control lever downward 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.



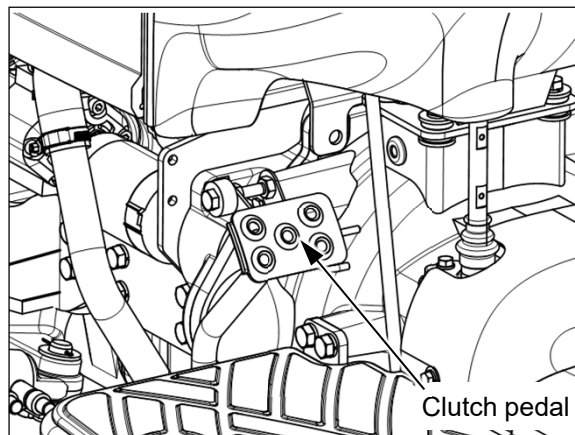
Caution

- ▶ If pressing the brake pedals or HST forward pedal deeper, the cruise control drive will be stopped.
- ▶ For HST models, there is a switch on the driver's seat to control the engine cut-off system for driver's safety. If you leave the driver's seat without safety measures, the engine will be stopped automatically. *(For the details, see chapter 2-1-(2))*
- ▶ When driving or working with a HST model, run the engine at 1500 rev/min or higher to maintain the hydraulic system stable.
- ▶ Operate the HST forward/reverse pedal slowly to prevent a sudden start or stop.

(3) Changing speed

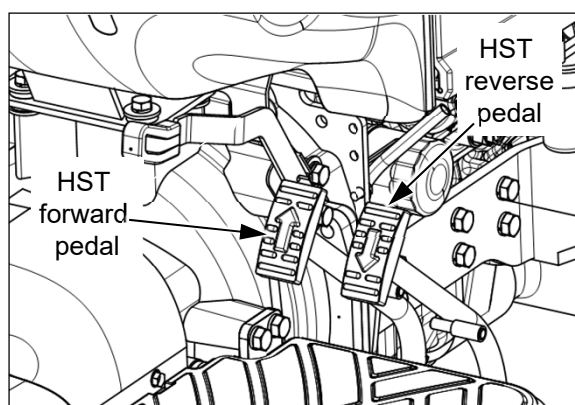
Mechanical type

- Depress the clutch pedal fully and operate all the shift levers correctly.
- Before operating all the transmission gear levers including main gear shift lever, press down the clutch pedal, brake pedals, and stop the tractor completely.
- Set driving speed properly depending on the road conditions.



HST type

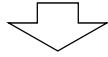
- Move the throttle lever forward to increase the driving speed.
- Press down the HST pedal slightly or fully to control the driving speed.
- Before operating the range gear shift lever, release the HST pedal, press down the brake pedals, and stop the tractor completely.
- Set driving speed properly depending on the road conditions.



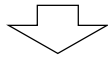
(4) Emergency Stop

Mechanical type

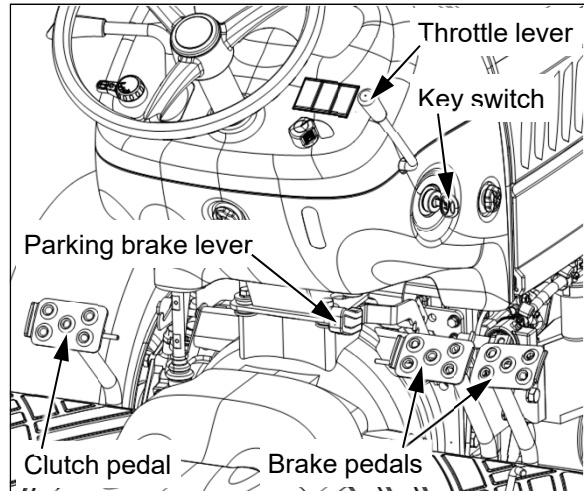
1. Press the clutch pedal and brake pedals at the same time to stop the tractor. Turn off the key switch.



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

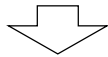


3. Apply the parking brake.

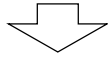


HST type

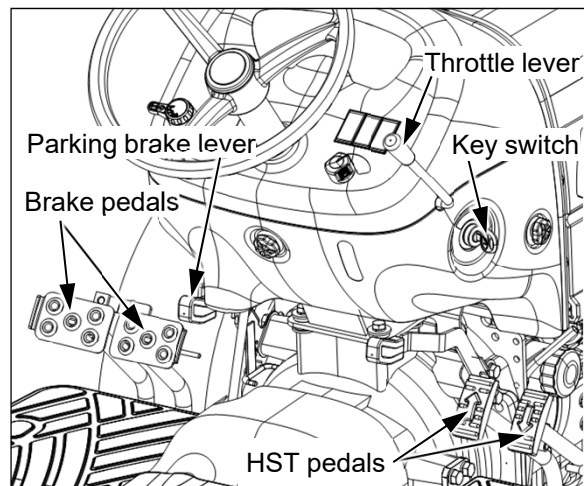
1. Release the HST pedal and press down the brake pedals immediately. Turn off the key switch.



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



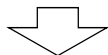
3. Apply the parking brake.



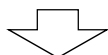
(5) Stopping tractor

Mechanical type

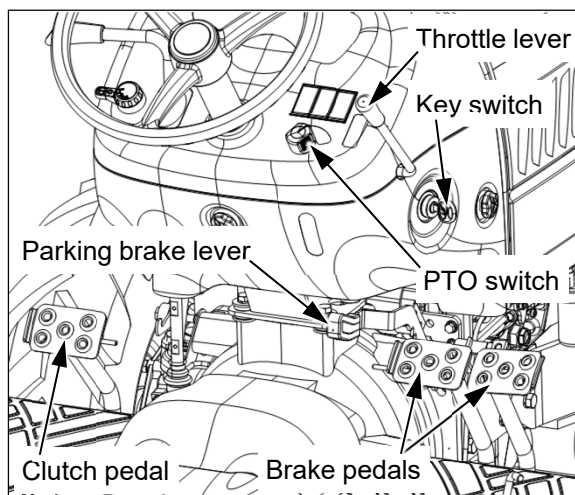
1. Depress the clutch pedal and brake pedals. Pull the throttle lever to "Low" speed position. Place all the transmission gear levers in neutral position and put PTO switch in "OFF" position.



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



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



HST Type

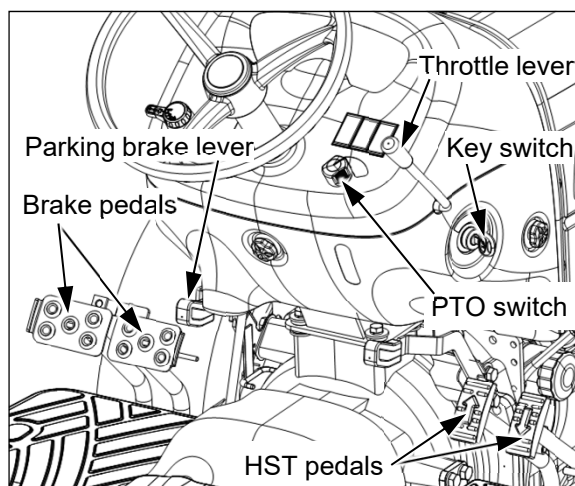
1. Release the HST pedal slowly and pull the throttle lever to "Low" speed position. Place all the transmission gear levers in neutral position and put PTO switch in "OFF" position.



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



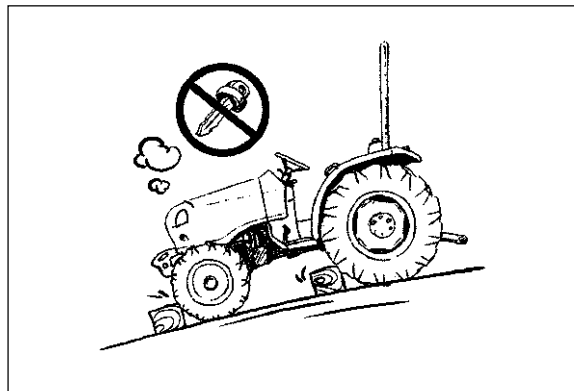
3. Apply the parking brake and release the brake pedals slowly.



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



Caution

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

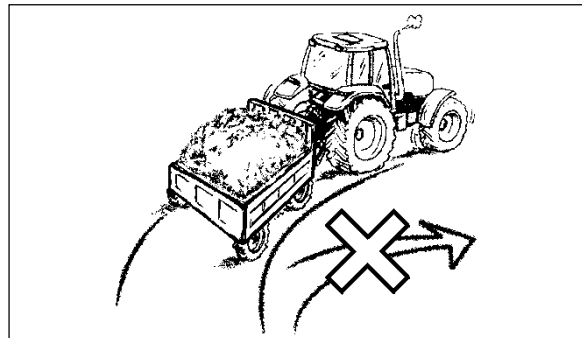
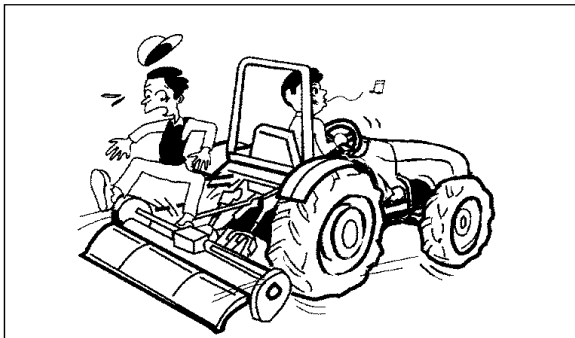
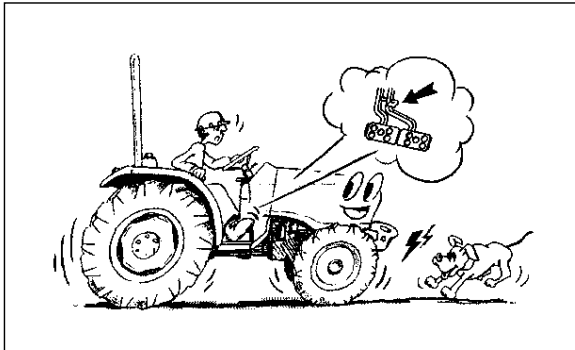
- **Mechanical** : downhill ⇒ reverse 1 gear / uphill ⇒ forward 1 gear.

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

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 3/4 rising position of the full stroke and select an appropriate driving speed before entering the unpaved road.



Caution

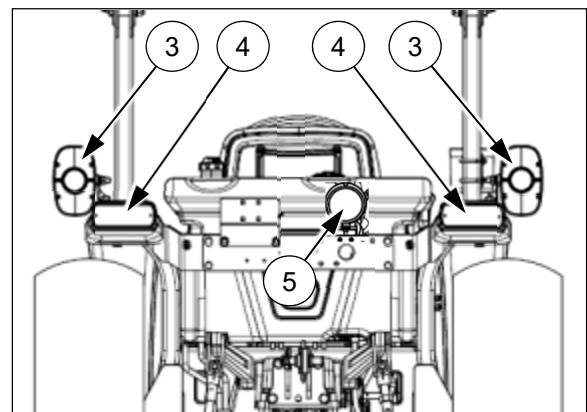
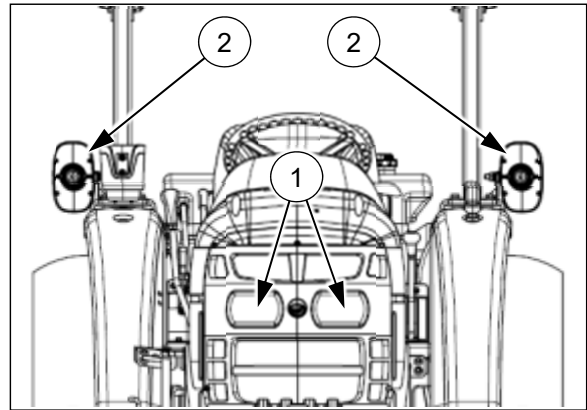
- ▶ Connect the left/right brake pedals with the brake pedal latch before driving.
- ▶ Avoid a sudden start, sudden brake and sharp turning.
- ▶ DO NOT allow people on the tractor or other implement.
- ▶ DO NOT place baggage on the tractor or other implement.
- ▶ Place the PTO gear lever in neutral position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

(2) Light operation



- Roll-bar model

- Your tractor is equipped with the following lights.

- ① Headlights
- ② Side lights, Front turn signal lights and Hazard warning lights
- ③ Rear turn signal lights and Hazard warning lights
- ④ Tail lights and Brake lights
- ⑤ Rear work lights (optional)
- ⑥ Grille work lights – Not applicable



- Use the hazard warning lights and headlights (low beam) when you are traveling on public roads day or night. (North America only)
- 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.*

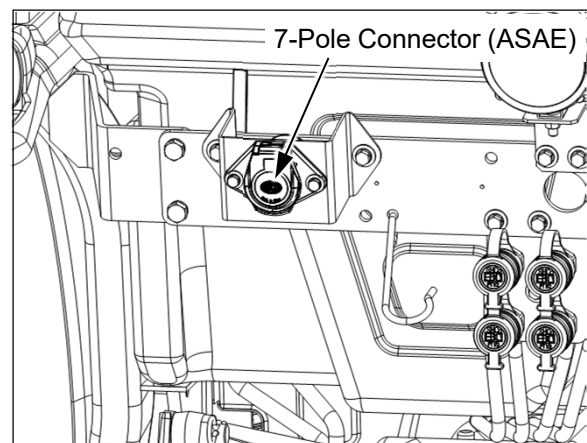
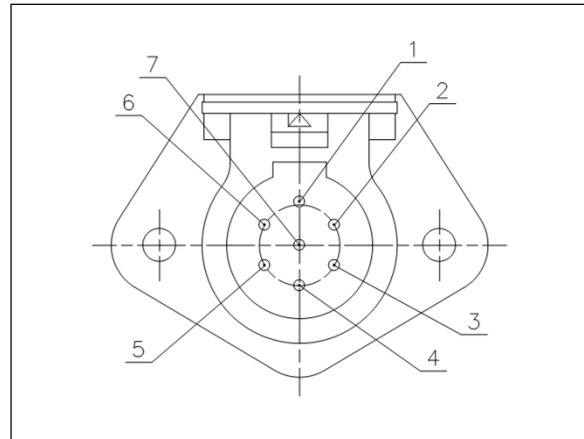
 Warning	<ul style="list-style-type: none"> ▶ Modified lamps or change bulb capacity may cause a traffic accident by disturbing approaching driver's views. ▶ If the lamp is blown out, replace it immediately with a genuine part. In case of driving at night, it may cause a traffic accident.
 Caution	<ul style="list-style-type: none"> ▶ 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;

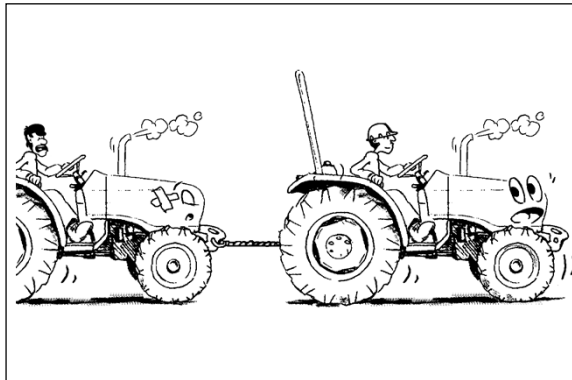
- **ASAE Version**




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.



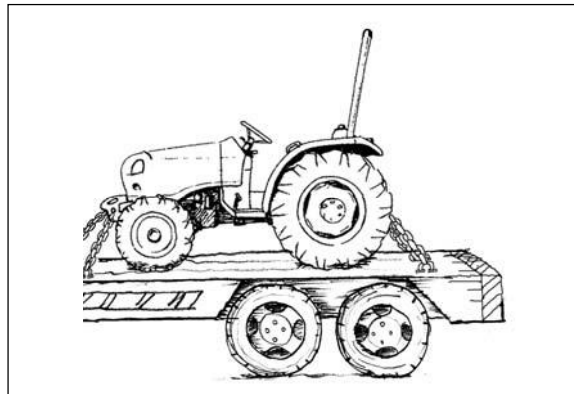
 Warning	<p>► Unexpected machine movement!</p> <p>Never attempt to start the machine by towing. The machine could start unexpectedly.</p> <p>Failure to comply could result in death or serious injury.</p>
 Warning	<p>► Transport hazard!</p> <p>Do not tow the machine on public roads. Towing could cause a safety hazard for other vehicles using the roadway.</p> <p>Failure to comply could result in death or serious injury.</p>
 Warning	<p>► Hazard to bystanders!</p> <p>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.</p> <p>Failure to comply could result in death or serious injury.</p>
<p>Notice</p>	<p>► 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.</p>


- 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.

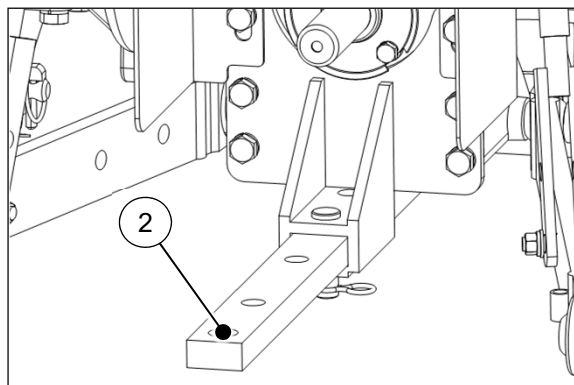
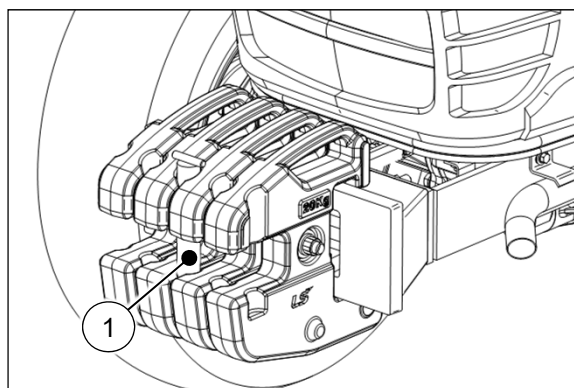
(5) Notices when transporting the tractor

- 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.



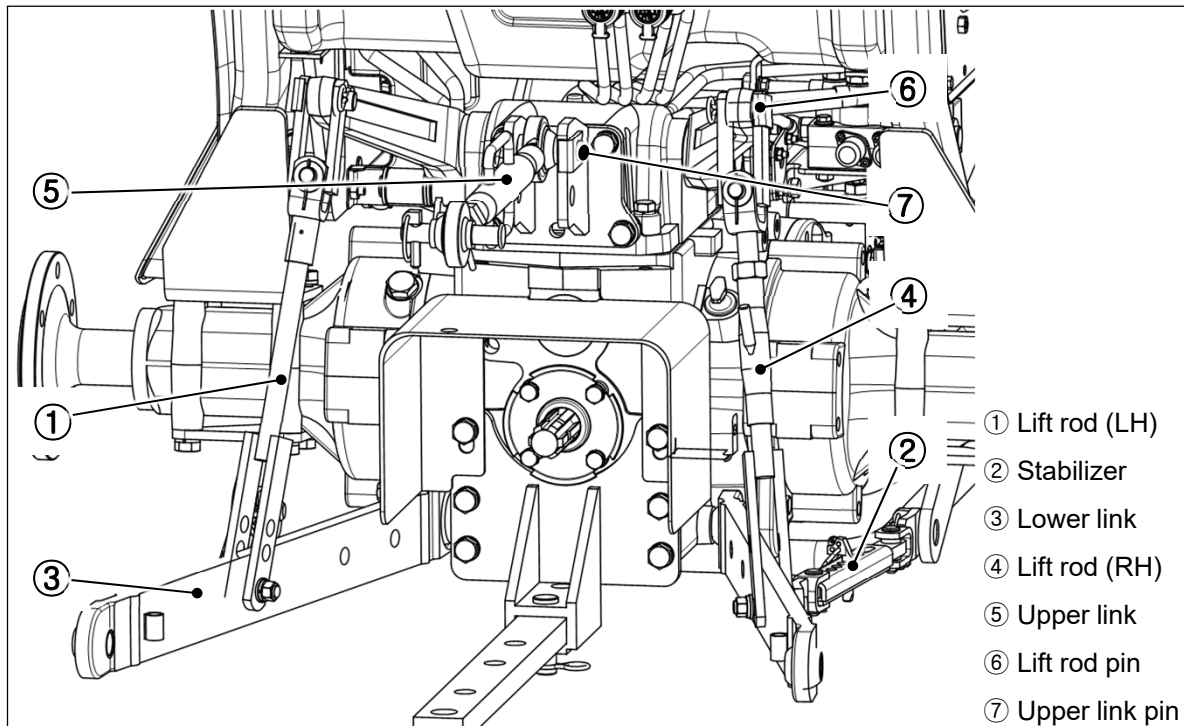
 Caution	<ul style="list-style-type: none"> ▶ When fixing the tractor, do not hook or connect chains to the 4WD shaft, steering cylinder, tie-rod or front axle. These can be damaged by the chain or excessive strain. ▶ In case of turbocharger engine (where fitted), cover the exhaust outlet to protect that the turbocharger does not rotate by air without lubrication.
--	---

- 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 of the front ballast weights or bumper. (optional)
 - Secure the rear of the tractor at the rear drawbar or hitch②. (optional)




4-5. Field Operations

(1) Rear 3-point linkage

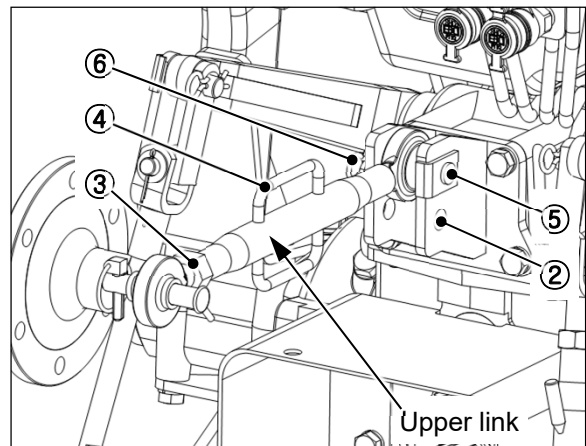



- When attaching a rear implement, comply with the followings.
 1. Set the rear implement upright on a level surface and approach the implement in reverse.
 2. Stop the tractor on a adaptable attaching position and apply the parking brake.
 3. Connect lower link(3) to the implement and insert the lock 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).
 6. When detaching the implement, comply with the same procedure in reverse.

 Warning	<ul style="list-style-type: none"> ▶ Before attaching/detaching an implement, place the PTO switch in “OFF” position and the PTO gear lever (if fitted) in neutral position, and apply the parking brake. ▶ When attaching/detaching an implement, be sure to assemble and tighten the connecting parts correctly. ▶ If your tractor is used to tow heavy loads, always use an approved drawbar or hitch to avoid a tipping, turnover and personal injury. Never connect the loads to the 3-point linkage, rear axle, or other parts. ▶ Never connect an implement that requires more power than capacity of your tractor. ▶ Never stand between implement and tractor when connecting implement. ▶ Do not change the pressure set of the relief valve arbitrarily to increase the lift capacity of the 3-point linkage. It can cause fatal damage to the hydraulic system.
--	---

① Upper link installation and adjustment

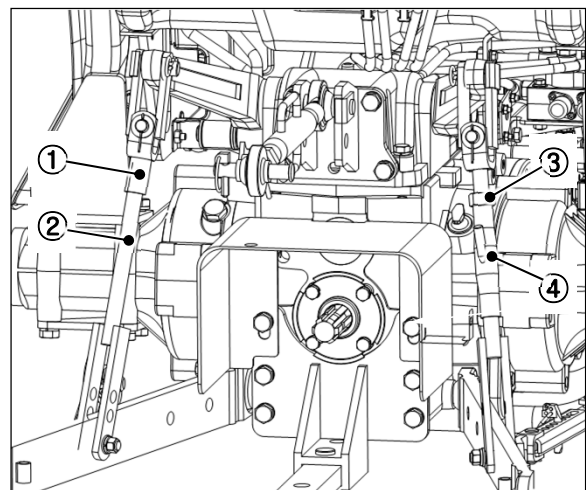
- Select a suitable attaching hole(2) on the top link bracket depending on the implement.
- Adjust the length of the upper link by turning the handle(4) after releasing the locking nut (3).
- Fasten the locking nut (3) after adjusting the length.
- **Adjustment range: 430~654mm (16.9~25.7 in)**




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

② Adjustment of lift-rod (Left/Right)

- For lift rod (LH), detach the upper side from the lift arm and adjust the length by turning the upper side(1).
- **-Adjustment range: 492~502mm (19.4~19.8 in)**
- For lift rod (RH), turn the handle(4) to the right to shorten the rod. If turning it to the left, the rod is elongated. After adjustment, tighten the locking nut(3).
- **-Adjustment range: 445~538mm (17.5~21.2 in)**
- If assembling the lower link to the upper hole of the lift rod, it can additionally shorten the length by 63mm(2.5 in).

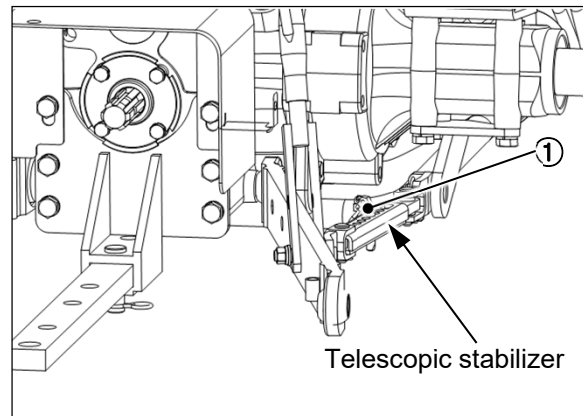


 Caution	<p>► Do not adjust the length of the lift-rod over the maximum limit. It may cause fatal injury or death by falling object.</p>
--	---

③ Adjustment of stabilizer (optional)

- Telescopic type

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

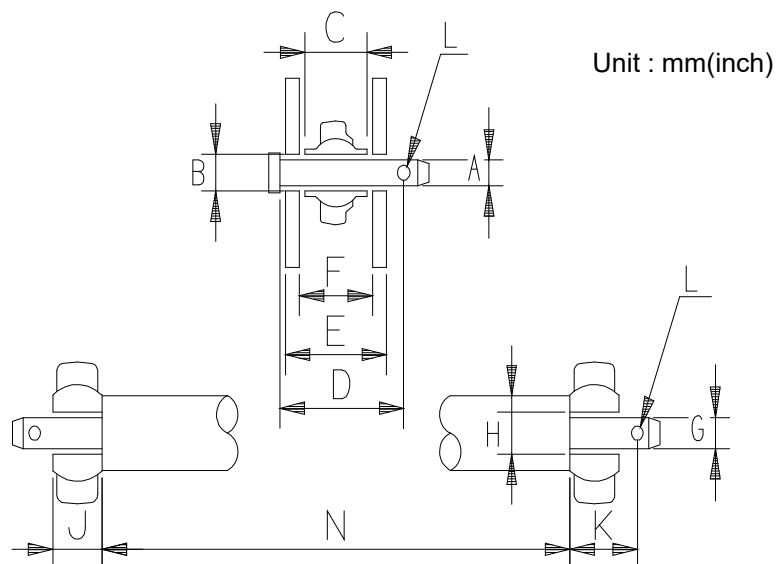


Notice

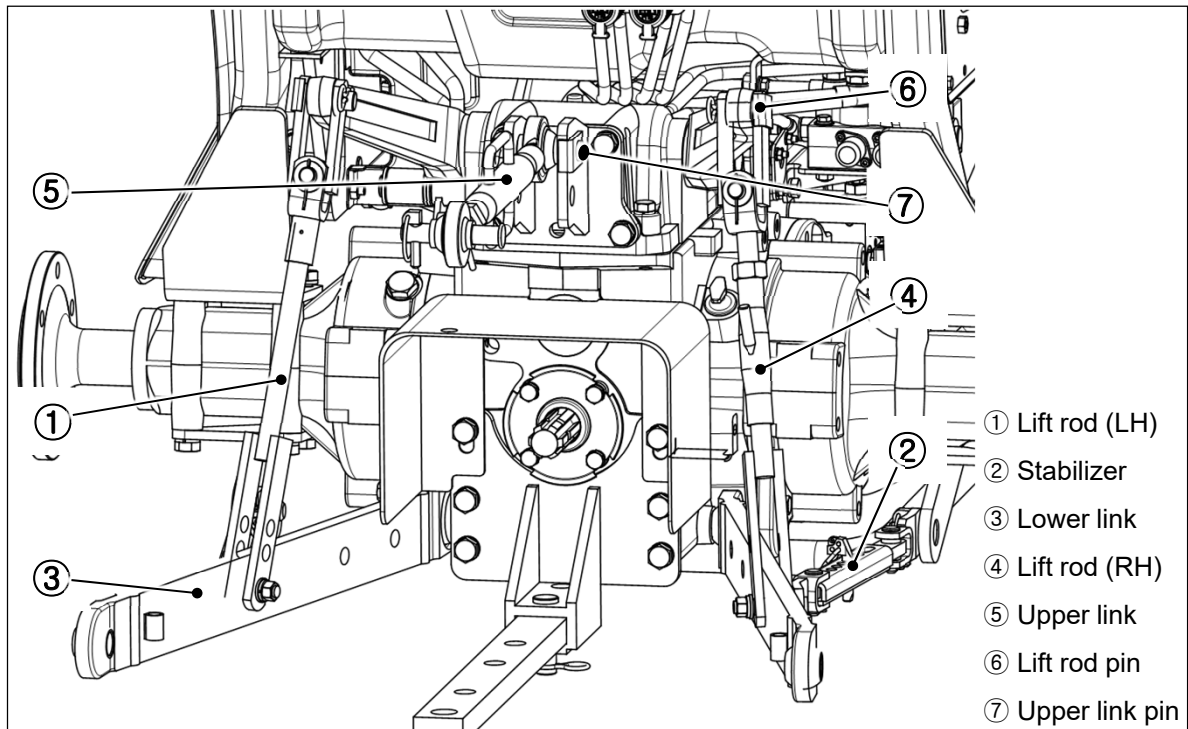
► When adjusting the stabilizer's length, set the implement's lateral swinging clearance to be 20~40mm. (0.8~1.6 in.)

④ Reference of Implement installation part


	A	B	C (MAX)	D (MIN)	E (MAX)	F (MIN)	G	H	J	K	L	N
CAT.1	19 (0.74)	19.3 (0.75)	44 (1.73)	76 (2.99)	69 (2.71)	44.5 (1.75)	22 (0.86)	22.4 (0.88)	35 (1.38)	39 (1.53)	12 (0.47)	683 (26.8)

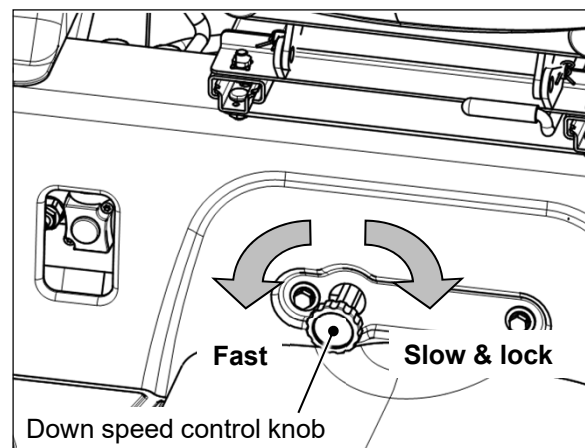


⑤ Handling of the 3-point linkage



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

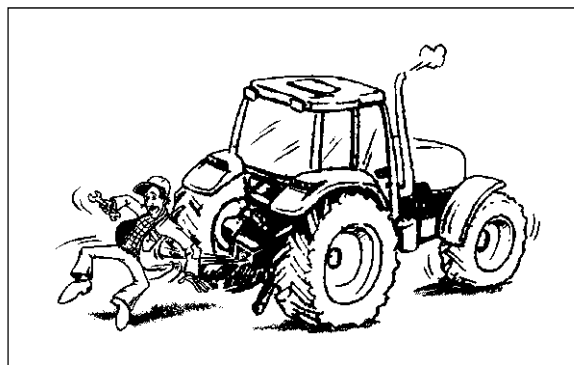
 Caution	<p>► The parts of 3-point linkage are very heavy. When handling them, take care not to get injury. PLEASE BE CAREFULL !</p>
--	---



(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

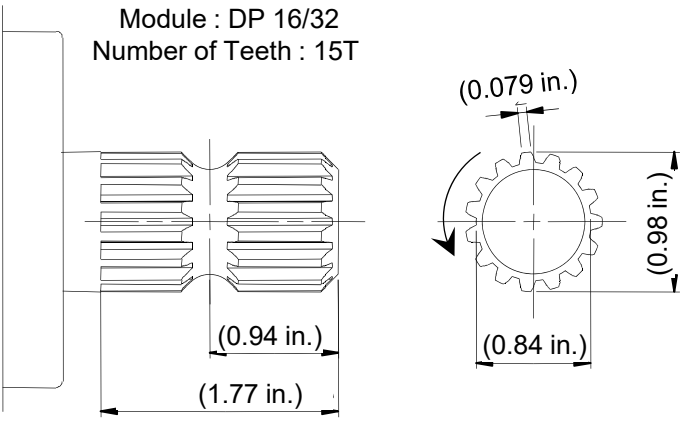
- Check the specification of the rear PTO shaft before attaching an implement. The spline teeth may be different depending on the market.

- Spline Teeth: 6T (Where fitted)

Rear PTO gear(s)	1
PTO / Engine speed	540 / 2509 rpm
Rotation direction	Clockwise (When looking at PTO shaft end)
Shaft dimension (Unit : inch)	

③ Specification and dimension of middle PTO shaft

- Spline Teeth: 15T (Where fitted)

MID PTO	1 speed gear (15T)
PTO / Engine speed	2000 / 2545 rpm
Rotation direction	Counter clockwise (When looking at PTO shaft end)
Shaft dimension (Unit : inch)	<p>Module : DP 16/32 Number of Teeth : 15T</p> 

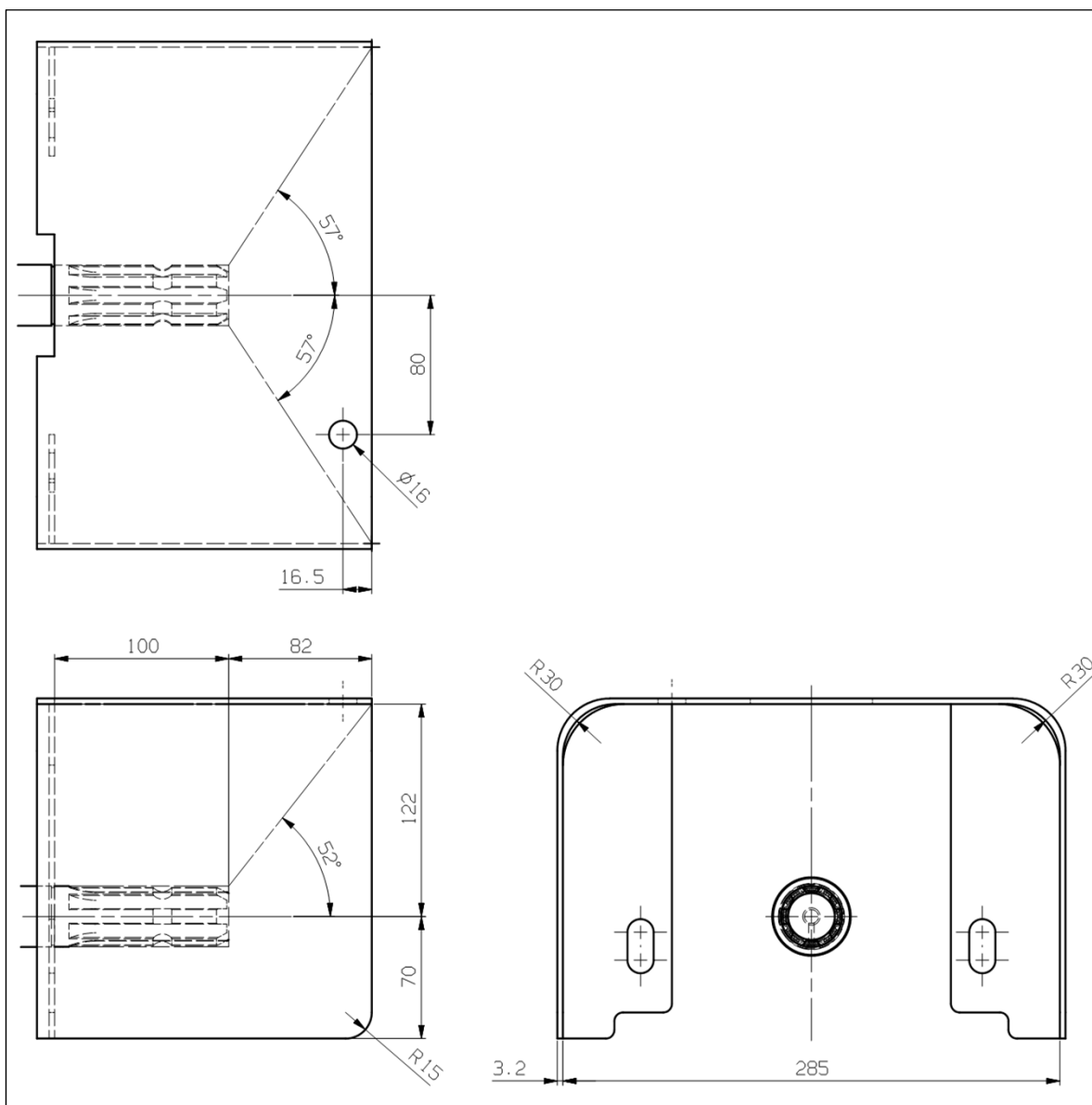
④ Attaching power take-off(PTO) drive shaft

- 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 Hitch

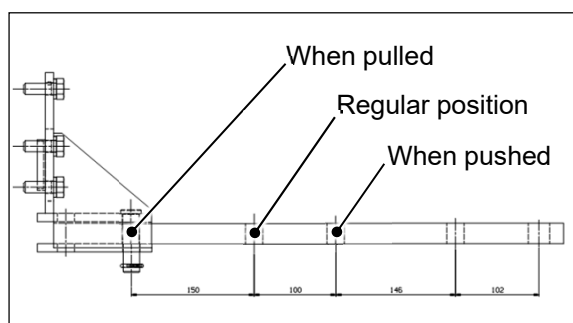
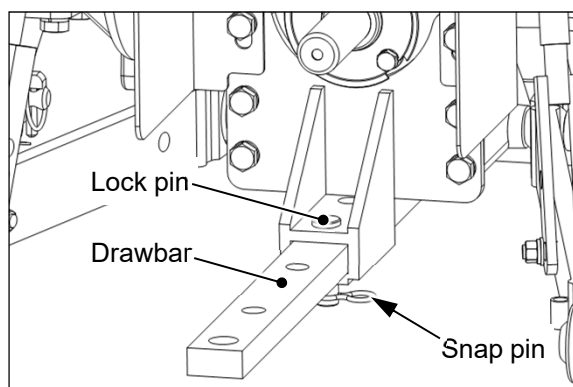
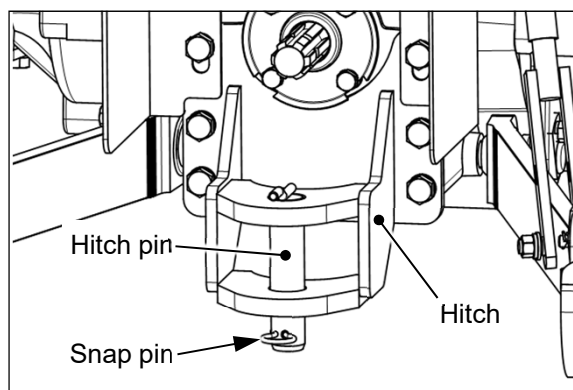
- Vertical load : 900kg (1984 lb)
- Horizontal load : 3600kg (7937 lb)

② 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 firmly.
- Vertical load : 350kg (772 lb) (When pulled)
450kg (992 lb) (When pushed)
- Horizontal load : 2800kg (6173 lb)

③ 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.



	Hitch	Drawbar
Unbraked towable mass	N/A	N/A
Inertia-braked towable mass	3380kg (7452 lb)	2800kg (6173 lb)
Hydraulic & Pneumatic braked towable mass	N/A	N/A

	Caution	<ul style="list-style-type: none"> ▶ 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.
--	----------------	--


(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	2283kg (5033 lb)	It depends on the load capacity of the tires. (See next chapter)
Front axle (*)	1163kg (2564 lb)	
Rear axle	1755kg (3869 lb)	

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

- **Restrict operation** : In case that driving speed of the tractor does not exceed 8km/h (5 mph) and standard front/rear wheel tracks (*refer to the chapter 4-5-(6), “Adjusting wheel track and tire replacement” in this manual*) are applied, the intermittent maximum permissible load of the front axle can be **1995kg (4398 lb)**. But, it is restricted by the load capacity of the tires.


 Caution	<ul style="list-style-type: none"> ▶ 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.
---	--

(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	7-14 (4PR) 73 A6	1.8 (180 KPa, 26 psi)	370 (816 lb)	740 (1631 lb)	2283 (5033 lb)
2	11.2-24 8PR 115 A6	2.4 (240 KPa, 35 psi)	1235 (2723 lb)	1755 (3869 lb)	
1	7-16 4PR 76 A6	1.8 (180 KPa, 26 psi)	405 (893 lb)	810 (1786 lb)	2283 (5033 lb)
2	12.4-24 8PR 120 A6 (522)	1.6 (160 KPa, 23 psi)	1445 (3186 lb)	1755 (3869 lb)	
1	7.00-12 6PR 83 A6 (AG)	2.5 (250 KPa, 36 psi)	487 (1074 lb)	974 (2147 lb)	2283 (5033 lb)
2	320/70R24 116 A8 (AG)	1.9 (190 KPa, 27 psi)	1250 (2756 lb)	1755 (3869 lb)	
1	25x8.50-14NHS 4PR	3.1 (310 KPa, 44 psi)	599 (1321 lb)	1120 (2469 lb)	2283 (5033 lb)
2	41x14.00-20NHS 4PR	1.7 (170 KPa, 24 psi)	1395 (3075 lb)	1755 (3869 lb)	
1	300/65-12 110 A8	3.4 (340 KPa, 48 psi)	1060 (2337 lb)	1120 (2469 lb)	2283 (5033 lb)
2	425/70-18 143 B	3.5 (350 KPa, 50 psi)	2725 (6008 lb)	1755 (3869 lb)	
1	240/60R12 89 A8	2.4 (240 KPa, 35 psi)	580 (1279 lb)	1120 (2469 lb)	2283 (5033 lb)
2	320/70R20 113 A8	1.6 (160 KPa, 23 psi)	1150 (2535 lb)	1755 (3869 lb)	

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

 Caution	<p>► Do not exceed the maximum permissible mass(Total/Front/Rear) declared by manufacturer. Overloaded operation may invalidate the warranty. <i>For further information, refer to the chapter 4-5-(4) in this manual.</i></p> <p>► If the front/rear tires have enough load capacity, the permissible mass on each axle can be restricted by the maximum permissible mass of the front/rear axle.</p>
--	--

(6) Adjusting Wheel tracks and tire replacement

① Front wheel

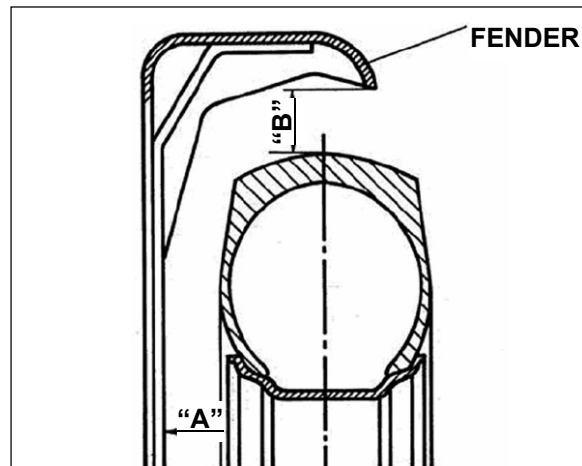
- The rim and disk assembly of the front wheel is not adjustable type. *See next page for the details.*
- If the front wheels are replaced, check the clearances between tires and tractor body case by case. If necessary, the steering angle must be adjusted. (*See chapter 4-5-(8) in this manual.*)


② Rear wheel

- When altering rear wheel track or replacing the rear wheels, check the radial and lateral clearances between rear tires and tractor chassis as below.
 - **A : 15mm (0.6 in) (Minimum)**
 - **B : 30mm (1.2 in) (Minimum)**
- When refitting the wheels or/and rim disk, tighten the bolts and nuts to the following torques then check periodically as the instructions of chapter 5 in this manual.

- ① Rim-disk nuts (M16) : 220 ~ 270 N.m
(163 ~ 199 lbf.ft)
- ② Wheel nuts (M16) : 216 ~ 245 N.m
(159 ~ 181 lbf.ft)

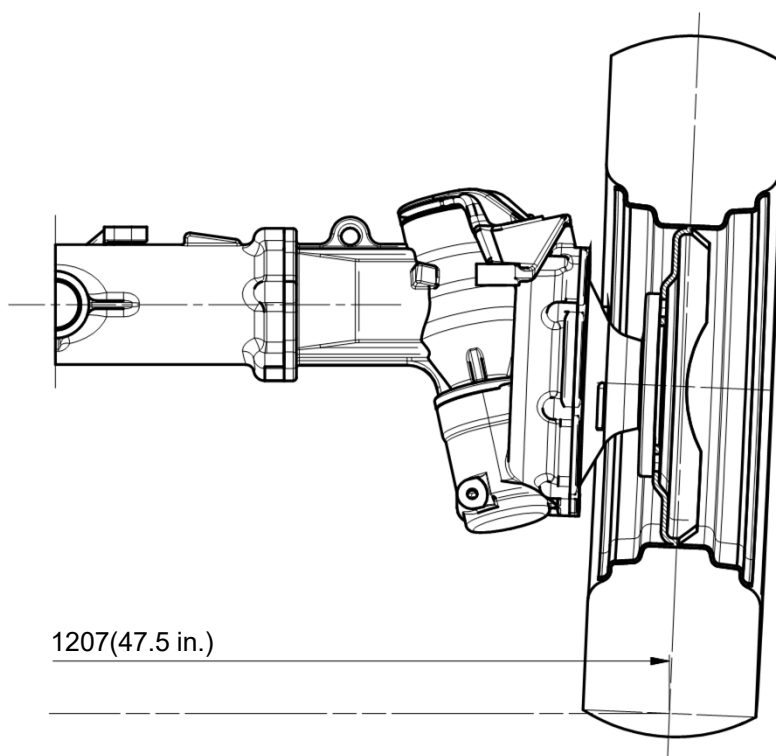
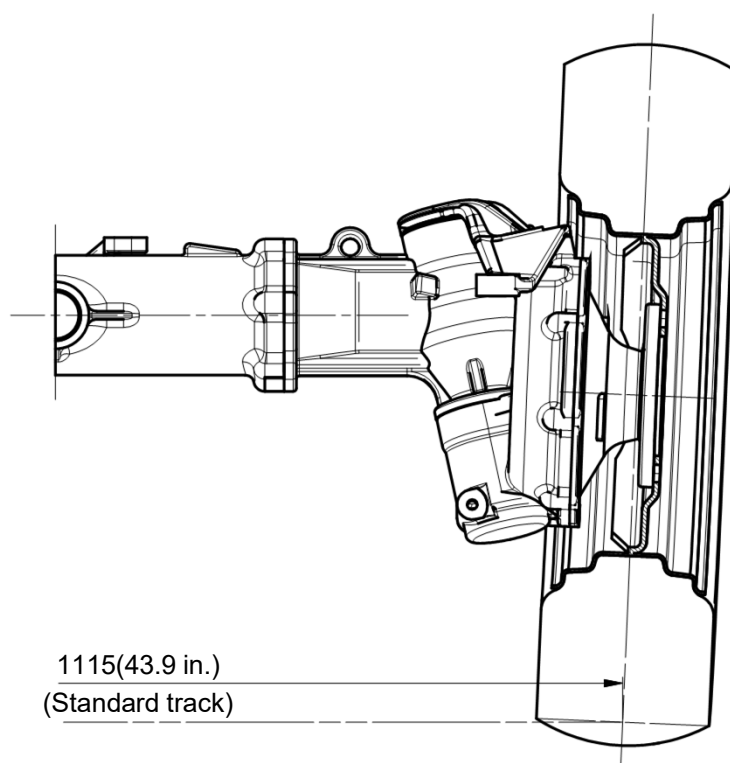
- The track widths in the following pages are only for specific wheels (7-14 4PR / 11.2-24 8PR) and may vary by depending on tire size.



 Warning	<ul style="list-style-type: none">▶ 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	<ul style="list-style-type: none">▶ When adjusting the wheel track, pay attention to the direction of tire lugs. For agricultural tires, 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.

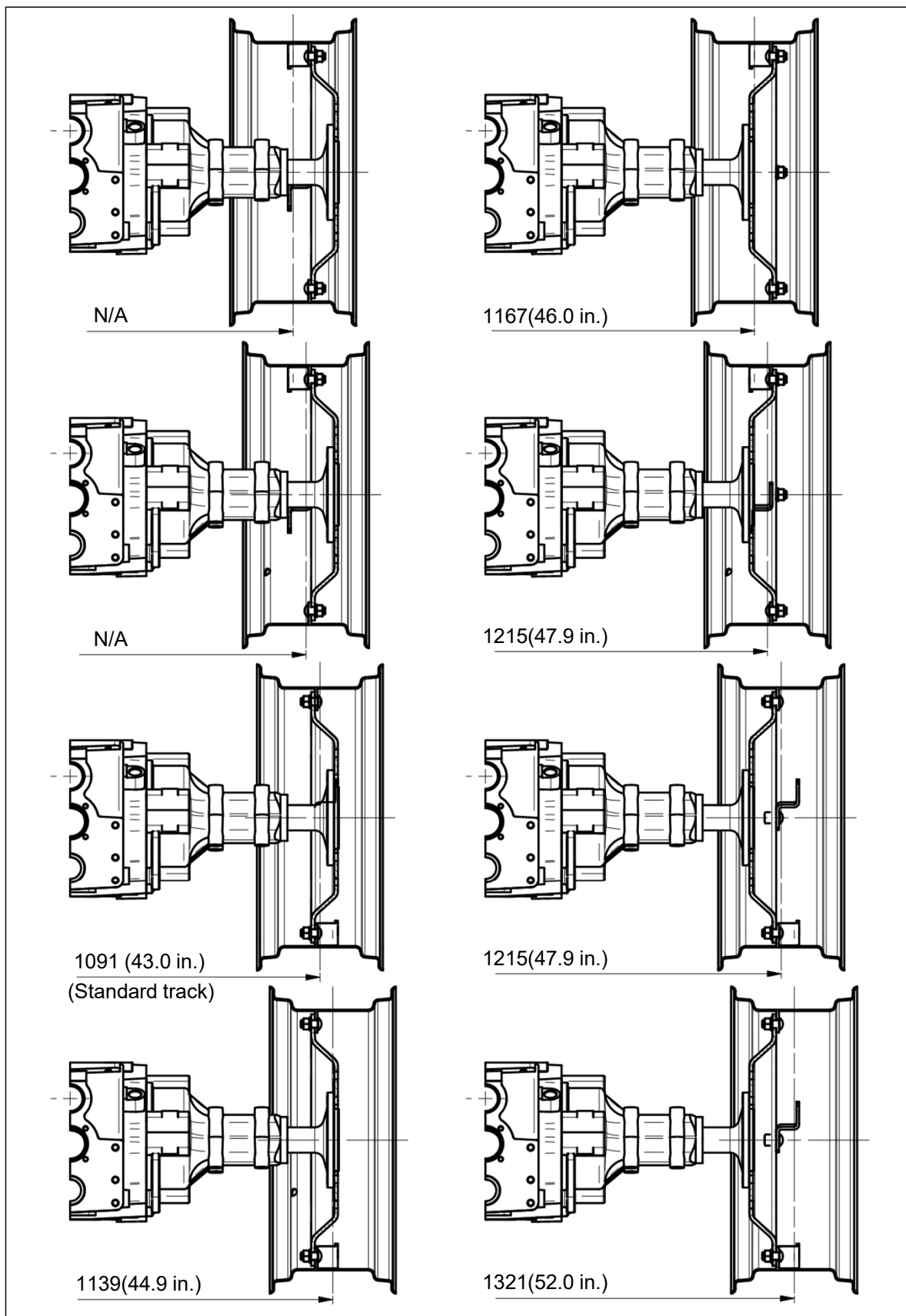
① Front wheel track – 7-14 4PR with rim & disk (W5x14)

Unit : mm (inch)



② Rear wheel track - 11.2-24 8PR with rim & disk (W10x24)

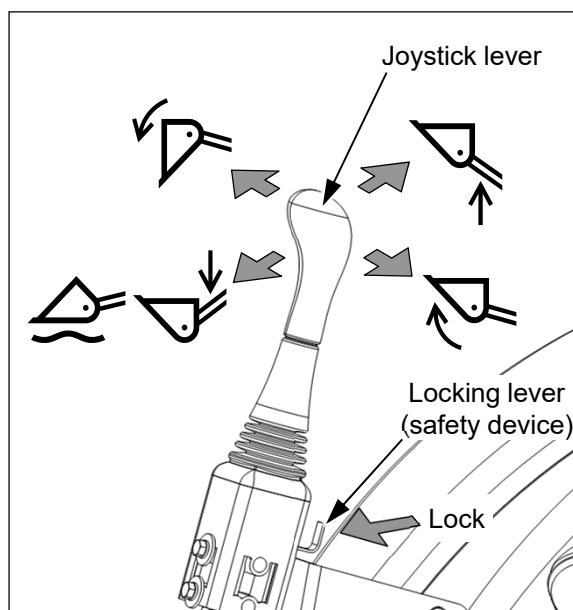
Unit : mm (inch)



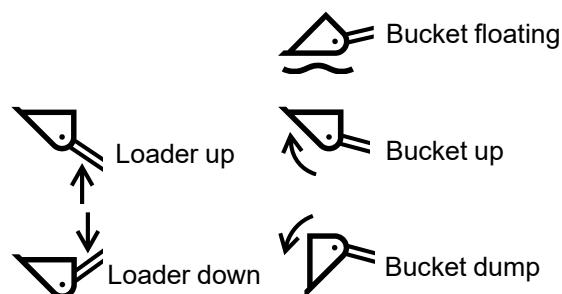
(7) Using Front-end loader (optional)


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.



<Meaning of Symbols>



 Warning	<p>TO AVOID PERSONAL INJURY !</p> <ul style="list-style-type: none"> ▶ After using the front-end loader, push the locking lever to the lock position. ▶ When leaving the tractor, lower down the front-end loader on the ground. ▶ Do not lift the front-end loader to a height from which objects may fall or roll onto the driver. ▶ Use always the correct attachment (grab forks, buckets.. etc.) for the specific task to perform and ensure that the load is securely kept in place.
--	---



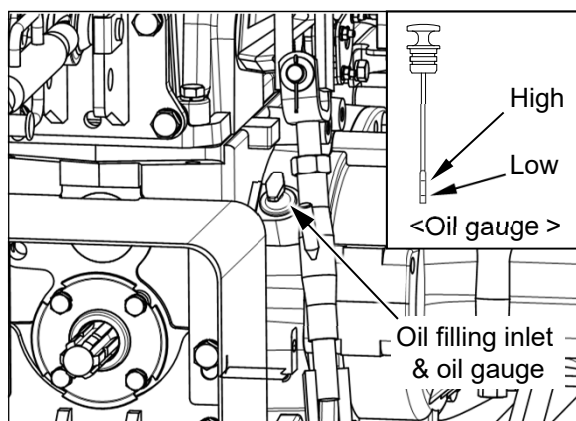
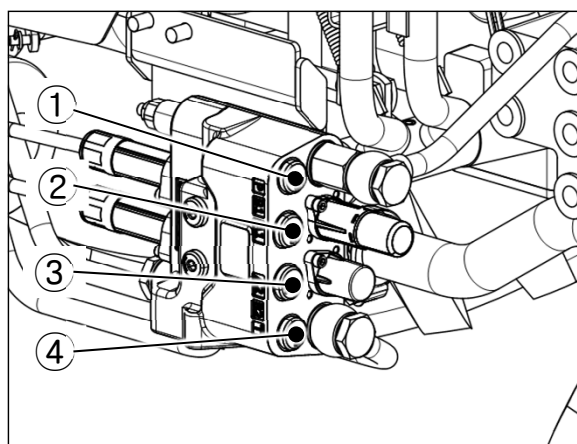
Caution

PRE-OPERATION CHECK, REAR BALLAST !

- For tractor stability and operator's safety, rear ballast should be added to the rear of the tractor in the form of implements as counter weight like Back Hoe, Rotary Tiller, etc. The amount of rear ballast will be depend on the application.

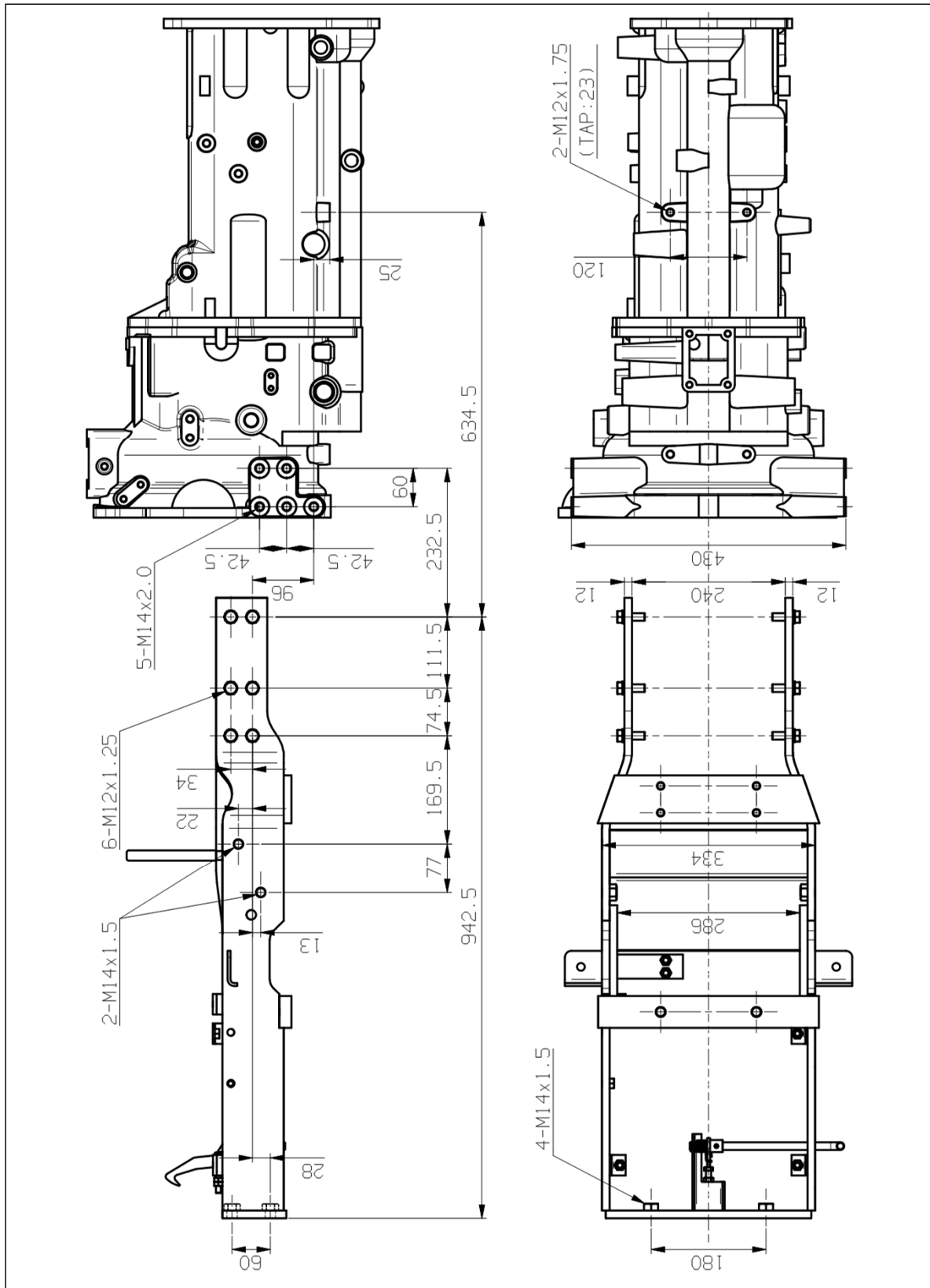
② Connection of hydraulic hoses

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



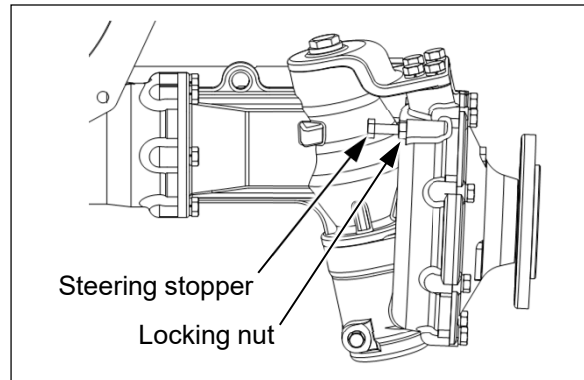
③ Attaching points for Front-end loader

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



(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.
--------	--

(9) Recommended Maximum Specification of Implements

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

No.	Implements	Specification	MT225 / MT225HE
1	Trailer	Total weight	See chapter 4-5-(3) in this manual.
2	Mid mower	Max cutting width	1676 mm (66 in.)
3	Rear mounted mower	Max cutting width	1676 mm (66 in.)
4	Flail Mower	Max cutting width	1524 mm (60 in.)
5	Sickle Bar	Max cutting width	1676 mm (66 in.)
6	Rear mounted Sprayer	Total weight (Sprayer+Liquid)	250 kg (551 lb)
7	Pull type Sprayer	Total weight	See chapter 4-5-(3) in this manual.
8	Rotary Tiller	Max tilling width	1520 mm (59 in)
9	Furrow Plow	Max tilling width	1520 mm (59 in)
10	Bottom Plow	Maximum size	1110 mm (43 in.)
11	Disk harrow (pull type)	Max harrowing width	-
12	Chisel Plow	Maximum width	1400 mm (54 in)
13	Front grader	Max working width	1660 mm (65 in.)
14	Rear blade	Max working width	1524 mm (60 in.)
15	Front loader	Max lift capacity (Bucket pivot point)	743 kg (1638 lb)
16	Landscape Rake	Max working width	1524mm (60 in.)
17	Box blade	Max working width	1400 mm (55 in.)
18	Backhoe	Max weight (W/O Bucket)	470 kg (1036 lbs)
19	Snow Blade	Max. width	1524 mm (60 in.)
20	Snow Blower	Max. working width	1524 mm (60 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

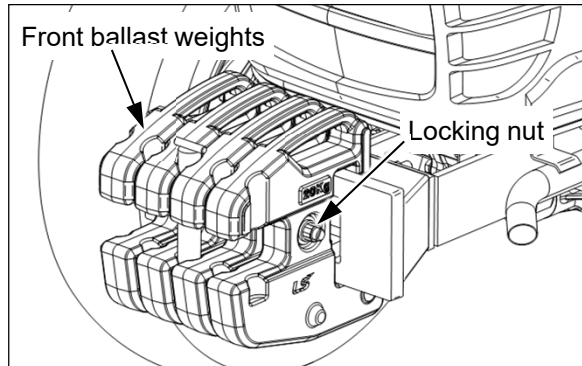
The weighting limitations that follow are limitations only. They do not imply that the tractor should be weighted to attain the weights given. Use only enough weight to obtain good performance.

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) :

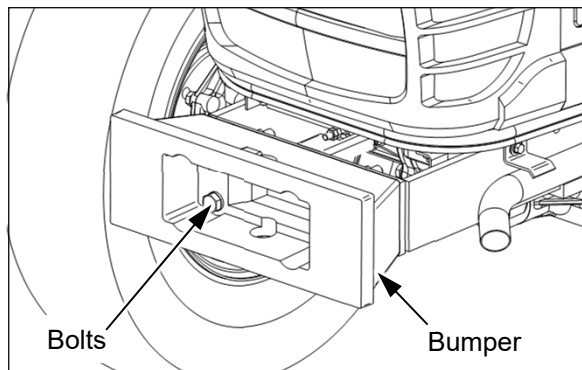
20kg x 4ea = 80kg



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

Bumper weight (kg) : 21kg

- 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.

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.

4-6. Driving speed

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

Mechanical Type

Front tire : 7-14 4PR, Rear tire : 11.2-24 8PR

Range gear	L				M				H			
Main gear	1	2	3	4	1	2	3	4	1	2	3	4
Forward	1.13 (0.71)	1.66 (1.03)	2.15 (1.34)	2.65 (1.65)	3.11 (1.93)	4.53 (2.81)	5.88 (3.65)	7.25 (4.50)	9.50 (5.90)	13.86 (8.61)	17.97 (11.17)	22.16 (13.77)
Reverse	1.09 (0.68)	1.58 (0.98)	2.05 (1.27)	2.53 (1.57)	2.95 (1.83)	4.31 (2.68)	5.59 (3.47)	6.89 (4.28)	9.04 (5.62)	13.18 (8.19)	17.10 (10.62)	21.09 (13.10)

Note) Engine rated speed : 2500 rev/min, Dynamic load radius : 525.5mm (20.7 in.)

HST Type

Front tire : 7-14 4PR, Rear tire : 11.2-24 8PR

Range gear	L	M	H
Forward	0~4.63 (0~2.88)	0~9.47 (0~5.89)	0~21.34 (0~13.26)
Reverse	0~4.63 (0~2.88)	0~9.47 (0~5.89)	0~21.34 (0~13.26)

Note) Engine rated speed : 2500 rev/min, Dynamic load radius : 525.5mm (20.7 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	<p>► Avoid injury!</p> <ol style="list-style-type: none">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. <p>Failure to comply could result in death or serious injury.</p>
 Warning	<p>► Entanglement hazard!</p> <p>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.</p>
 Warning	<p>► Illustrations in this manual may show protective shielding open or removed to better illustrate a particular feature or adjustment.</p> <p>Replace all shields before operating the tractor. Failure to comply could result in death or serious injury.</p>

- 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.

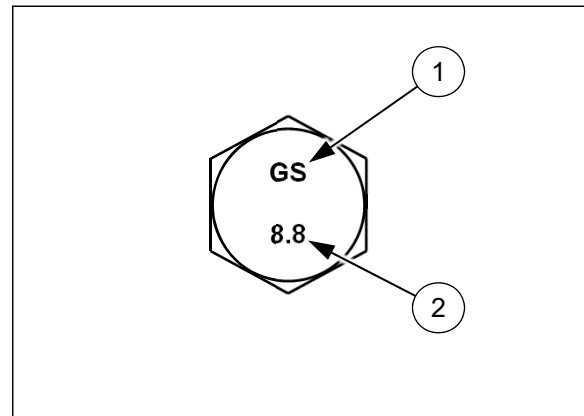
Strength class marks		
4T	8T	10.9T
		

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



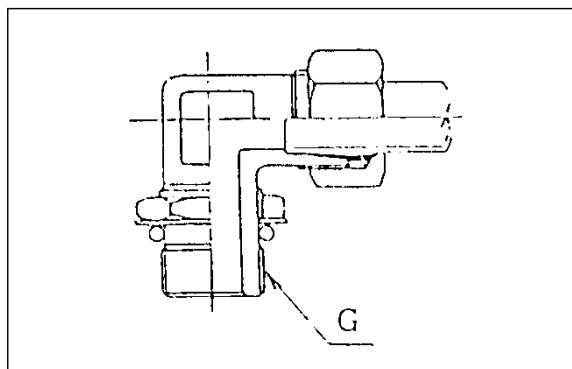
(2) Standard torque data for hydraulics

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.

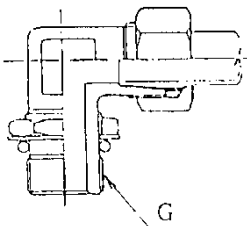
NOTICE: Do not over tighten and distort the metal backup washer.

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.

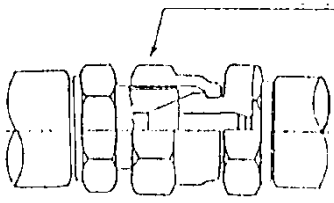


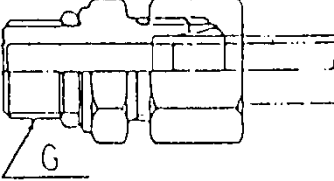
Standard torque data for hydraulic tubes and fittings

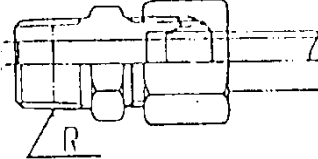
NOTICE: These torques are recommended for hydraulic tubes of your tractor. When assemble the hydraulic lines, refer to the following torques on each application. Before installing and torquing pipe fittings, Clean the threads and faces.

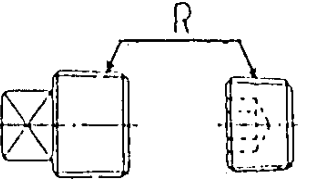
Thread	Torque		Figure	Remarks
	N · m	{kgf · m}		
G 1/4	49~69	5~6		1. Materials of threaded hole: Cast or steel.
G 3/8	59~69	6~7		
G 1/2	78~88	8~9		

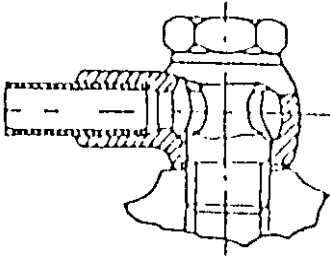
Pipe spec.		Pre-torque		Tightening torque		Figure	Remarks
Outer dia.	Thickness	N · m	{kgf · m}	N · m	{kgf · m}		
8	1~1.5	29~34	3~3.5	29~34	3~3.5		
10	1~1.5	29~39	3~4	34~49	3~3.5		
12	1~2.5	44~59	4.5~6	49~69	5~7		
15	1~2.5	69~98	7~10	88~118	9~12		
18	1.5~2	118~147	12~15	146~167	15~17		
20	2~3	147~177	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

Fatty Acid Methyl Ester Biodiesel (Biodiesel Fuel) consists of a family of fuels derived from vegetable oils treated with methyl esters.

NOTICE: Biodiesel Fuel blends are approved for your engine only if they comply with **EN14214** Specification Standards or **ASTM D6751**.

NOTICE: It is imperative that you check which blend is approved for your engine with your authorized local dealer. Be aware that the use of Biodiesel Fuel that does not comply with the Standards mentioned above could lead to severe damage to the engine and fuel system of your tractor. The use of fuels that are not approved may void manufacturer warranty coverage.

Biodiesel approved blend

The use of biodiesel blends meeting Specification Standards ASTM 6751 or EN14214 are approved for your engine **up to B5 (5% blend ratio)**. It is highly recommended to use biodiesel fuel from accredited suppliers to maintain quality and consistency of the fuel.

Biodiesel Fuel Usage Conditions

NOTICE: The Biodiesel Fuel must meet the fuel Specification mentioned above.

Biodiesel Fuel must be purchased from a trusted supplier that understands the product and maintains good fuel quality. Biodiesel Fuel must be pre-blended by the supplier. Mixing Biodiesel Fuels on-site can result incorrect mixture that can lead to problems with both engine and fuel system.

Engine performance is affected by the use of Biodiesel Fuel. There may be up to **12%** reduction in power or torque depending on the blend used.

NOTICE: DO NOT modify the engine and/or injection pump settings to recover the reduced performance.

The reduced power must be accepted if using any Biodiesel Fuel blend.

Some modification may be required to allow your engine to run Biodiesel Fuel. Consult your dealer for complete information on these modifications.

Biodiesel Fuel has a higher cloud point than Diesel Fuel.

NOTICE: The use of high Biodiesel Fuel blends are not recommended in cold weather conditions.

With Biodiesel Fuels, it may be necessary to change the engine oil, engine oil filter and fuel filter elements more frequently than with Diesel Fuels. Biodiesel Fuel can remove rust and particles from the inside of on-site fuel storage tanks that would normally adhere to the sides of the tank. Like particle deposits that commonly occur with Diesel Fuel, these particles can become trapped by the tractor fuel filters, causing blockage and shortening filter life. In cold weather, this is more likely to happen. Consult your authorized local dealer for information on cold weather operation and proper maintenance intervals when using any Biodiesel Fuel blend.

When handling Biodiesel Fuel, care must be taken not to allow water into the fuel supply. Biodiesel Fuel will actually attract moisture from the atmosphere.

Fuel tanks must be kept as full as possible to limit the amount of air and water vapors in them. It may be necessary to drain the fuel filter water tap more frequently.

Potential oxidation and stability could be a problem with the fuel stored in the tractor.

NOTICE: *Tractor must not be stored for more than three months with Biodiesel Fuel blends in the fuel system.*

If long storage periods are necessary, the engine must run on Diesel Fuel for 20 hours to flush the Biodiesel Fuel out of the engine fuel system prior to storage.



NOTICE: *Biodiesel Fuel must not be stored in on-site storage tanks for more than three months.*

Any spillage of Biodiesel Fuel must be cleaned up immediately before it can cause damage to the environment and the paint finish of the tractor.

Before using Biodiesel Fuel blends you should consult with your dealer to receive full information about the approved blend for your tractor and any detailed conditions of its usage.

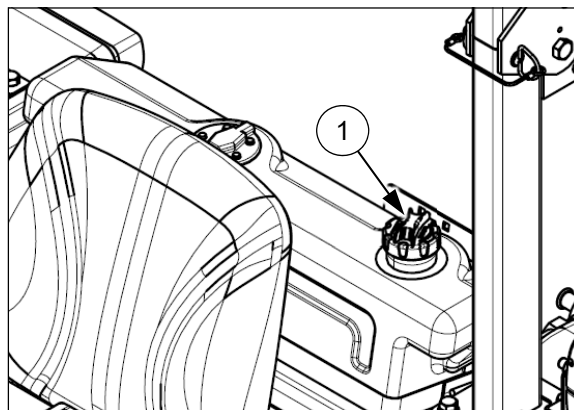
NOTICE: *Be aware that not fulfilling the requirements and conditions of Biodiesel Fuel usage will void your tractor's Warranty coverage.*

(5) Refueling the tractor

 Warning	Fire hazard!
	<p>► When handling diesel fuel, observe the following precautions:</p> <ol style="list-style-type: none">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. <p>Failure to comply could result in death or serious injury.</p>

- The fuel tank filler cap① is installed as shown in the right-hand 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 Capacity" 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.

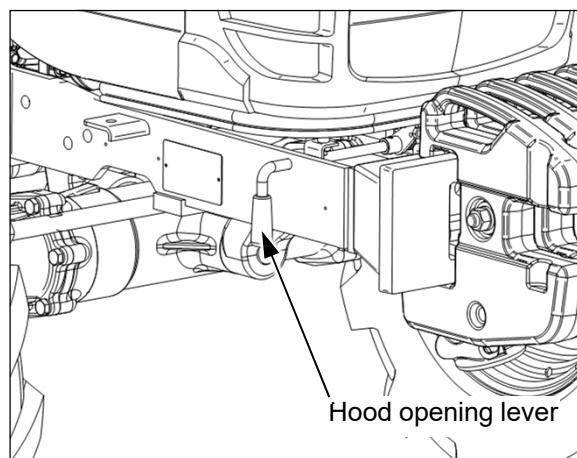
Organic Acid Technology (OAT) coolant:

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 and a gas cylinder is attached to provide easy access to the engine for check and maintenance.
- To open the hood, turn the hood opening lever counter-clockwise and lift the hood up.
- To close the hood, pull the hood and push it down to the locking position slightly.

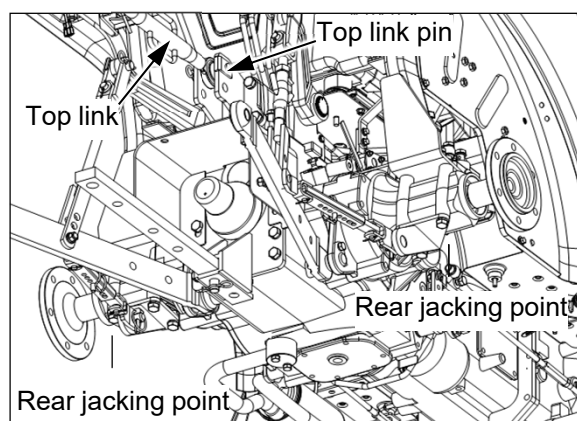
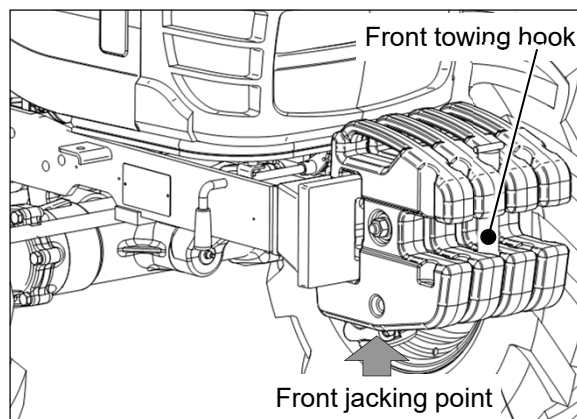


Caution

- ▶ 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.

② Jacking points

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

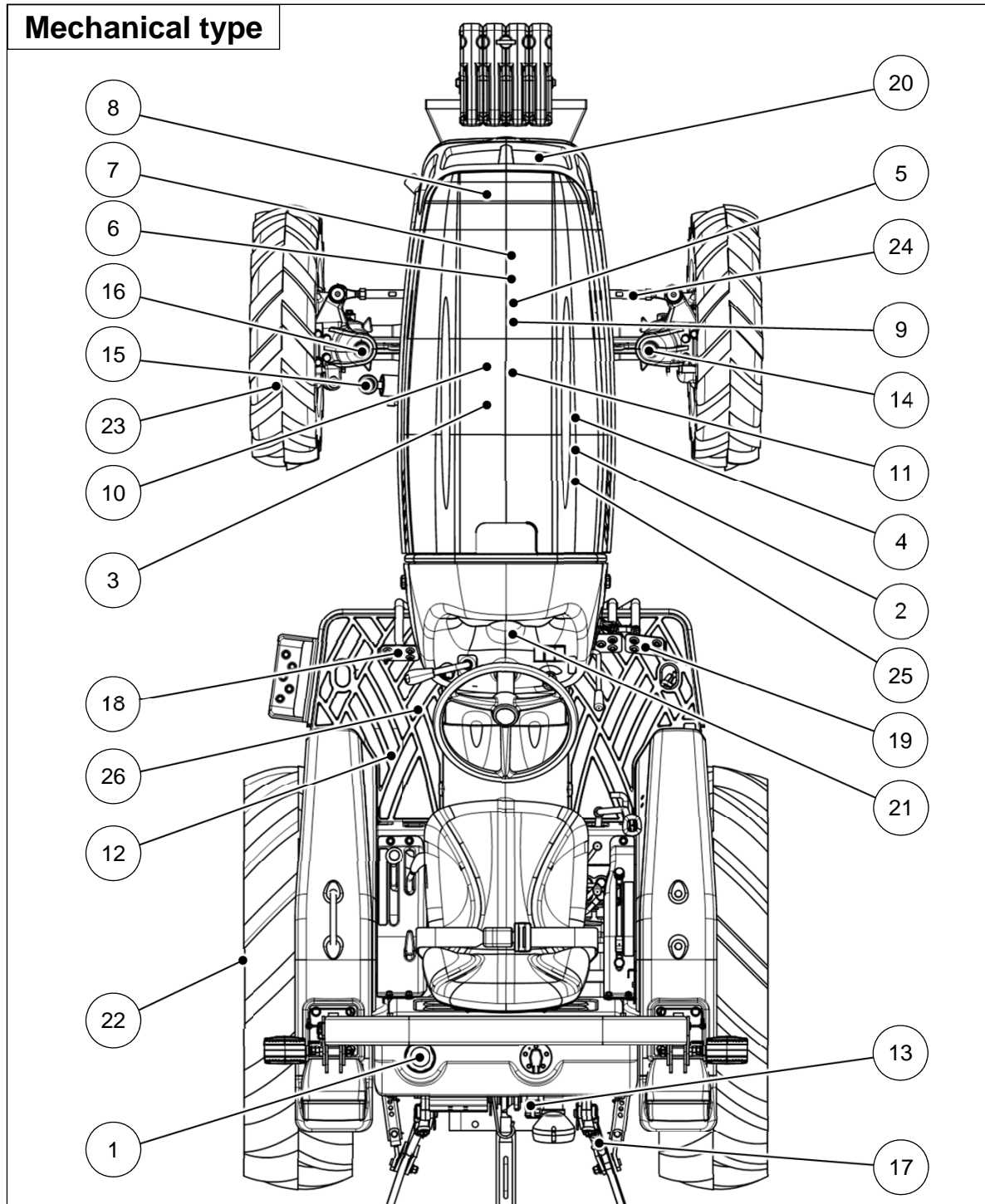


Caution

- ▶ 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.

5-2. Maintenance chart

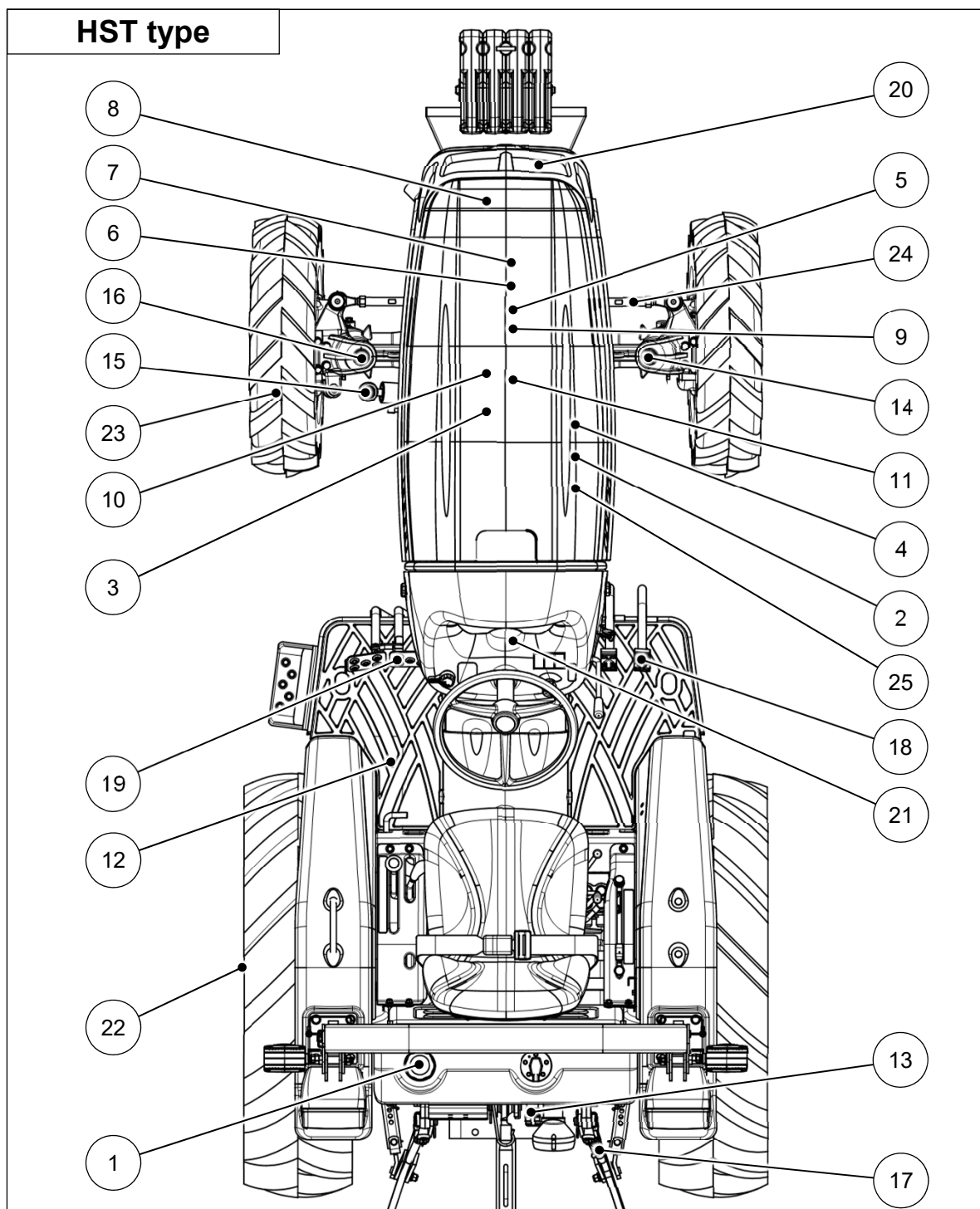
- Periodic maintenance not only extends the service life of the tractor but also serves to ensure safe operation. **The maintenance chart shows the standard service intervals. If you notice any abnormal symptoms, make sure to carry out the inspection and maintenance work, regardless of recommended service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



No.	Checking Parts	Page No.	Check period (Every ---- (hr))					
			Daily	50	100	250	500	2-year
1	Fuel tank	5-21, 5-36	▲			■		
2	Fuel filter	5-29, 5-39	▲				●	
3	Engine oil	5-18, 20, 33, 34	▲	★	▲	●		
4	Engine oil filter	5-18, 5-34		★		●		
5	Engine coolant	5-23, 5-41	▲					●
6	Radiator screen	5-24, 5-30	▲	■				
7	Air cleaner	5-23, 5-31, 5-39	▲	■			●	
8	Battery	5-31		▲				
9	Fan belt tension	5-18, 5-36		▲ (First)		▲		
10	Valve clearance	5-40					▲	
11	Nozzle injection pressure	5-40					▲	
12	Hydraulic oil filter	5-18, 5-35		★		●		
13	Transmission oil	5-31, 5-38		▲			●	
14	Front axle oil	5-31, 5-38		▲			●	
15	Steering cylinder	5-30		▲				
16	Front axle holder & Steering arm	5-30		▲				
17	3-Point linkage	5-30		▲				
18	Clutch pedal play	5-26	▲					
19	Brake pedal play	5-27	▲					
20	Turn signal lights, Lights, Horn	5-22	▲					
21	Instrument panel & Indicators	5-21	▲					
22	Bolts and Nuts retighten	5-25	▲					
23	Tire air pressure	5-24	▲					
24	Toe-in	5-36				▲		
25	Hydraulic hoses	5-32		▲				
26	Clutch lever shaft	5-30		▲				

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

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



No.	Checking Parts	Page No.	Check period (Every ---- (hr))					
			Daily	50	100	250	500	2-year
1	Fuel tank	5-21, 5-36	▲			■		
2	Fuel filter	5-29, 5-39	▲				●	
3	Engine oil	5-18, 20, 33, 34	▲	★	▲	●		
4	Engine oil filter	5-18, 5-34		★		●		
5	Engine coolant	5-23, 5-41	▲					●
6	Radiator screen	5-24, 5-30	▲	■				
7	Air cleaner	5-23, 5-31, 5-39	▲	■			●	
8	Battery	5-31		▲				
9	Fan belt tension	5-18, 5-36		▲ (First)		▲		
10	Valve clearance	5-40					▲	
11	Nozzle injection pressure	5-40					▲	
12	Hyd. oil filter & HST filter	5-18, 5-35		★		●		
13	Transmission oil	5-31, 5-38		▲			●	
14	Front axle oil	5-31, 5-38		▲			●	
15	Steering cylinder	5-30		▲				
16	Front axle holder & Steering arm	5-30		▲				
17	3-Point linkage	5-30		▲				
18	HST pedal neutral state	5-28	▲					
19	Brake pedal play	5-27	▲					
20	Turn signal lights, Lights, Horn	5-22	▲					
21	Instrument panel & Indicators	5-21	▲					
22	Bolts and Nuts retighten	5-25	▲					
23	Tire air pressure	5-24	▲					
24	Toe-in	5-36				▲		
25	Hydraulic hoses	5-32		▲				

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

5-3. Lubricants and Capacity

Lubricants	Capacity	International Standard	Recommended products
Engine coolant	4.9 L (1.3 U.S.gals.)	ASTM D6210	Soft water (50%) + Anti-freeze (50%)
Fuel	28 L (7.4 U.S.gals.)	ASTM D975 No.2	Ultra low sulfur diesel fuel
Engine oil	4.2 L (1.1 U.S.gals.)	API CF-4 or CH-4	KIXX DL (Manufacturer : GS Caltex)
Transmission oil (common use for hydraulic lift and steering system)	32 L (8.5 U.S.gals.)	API GL4 ISO VG 32/46	LSTH400G (Manufacturer : GS Caltex)
Front axle oil	6.5 L (1.7 U.S.gals.)	API GL4 SAE 80W	EPK 80W90 (Manufacturer : S-OIL TOTAL Co. Ltd.)
Grease (Front axle holder, Steering cylinder pin, 3-point linkage, etc.)	Proper amount	NLGI 2	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	<div> <div>SAE 5W-20</div> <div>SAE 10W-30</div> <div>SAE 15W-40</div> </div>										

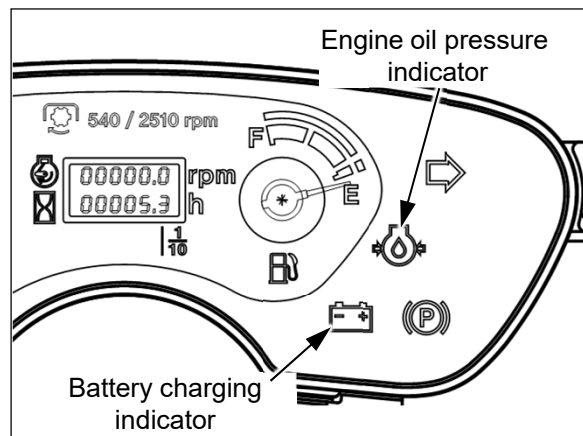
5-4. First 50 hour check

- After using first 50 hours, contact your authorized local dealer for maintenance if possible.
 - Replace engine oil & engine oil filter. (⇒ Refer to Every 250 hour check, See *page 5-34*)
 - Replace hydraulic oil filter. (⇒ Refer to Every 250 hour check, See *page 5-35*)
 - Check transmission / rear axle / hydraulics oil level.
 - Check front axle oil level.
 - Check and adjust parking brake.
 - Check torque of exhaust manifold bolts.
 - Check and adjust V-belts and tension.
 - Tighten all cooling system hose connections.
 - Check torque of safety cab or frame mounting bolts.
 - Check torque of front end weight clamp bolts. (Where fitted)
 - Check torque of wheel bolts and nuts.
 - Check tire pressures and condition.
 - Clean radiator, oil cooler and A/C condenser cores.(Where fitted)
 - Check radiator coolant level and specific gravity.
 - Check clutch pedal free play. (Mechanical synchro-shuttle models)
 - Check brake adjustment and pedal equalization.
 - Lubricate all grease fittings.
 - Neutral start switches operative.

5-5. When the warning indicator lights

(1) Engine oil pressure indicator

- This indicator will be turned on when turning the key switch from “OFF” to “ON” position. After starting engine, this indicator has to be turned off.
- If this indicator turns on while the engine is running, STOP THE ENGINE IMMEDIATELY.
- Check the engine oil level first, and if necessary, add new engine oil and recheck the indicator.
- If the engine oil level is normal, it means that there is a problem on the lubrication system, contact your authorized local dealer for check.

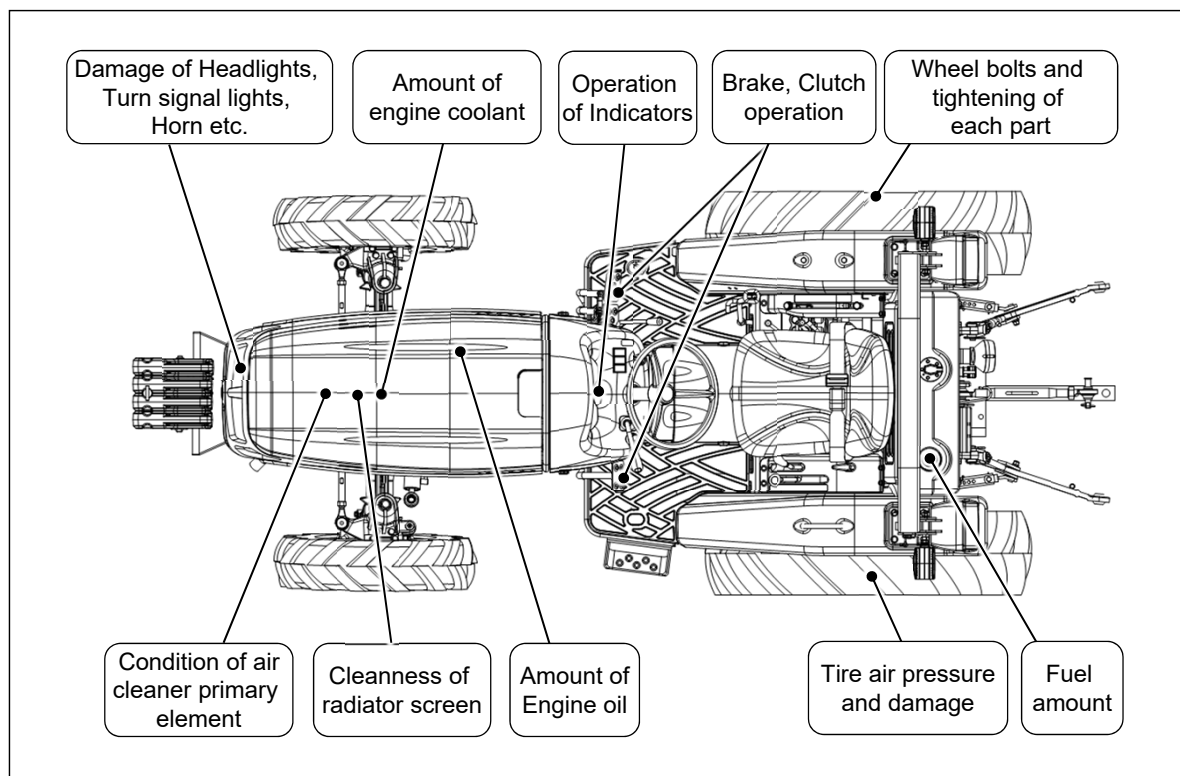


(2) Battery charging indicator

- This indicator will be turned on when turning the key switch from “OFF” to “ON” position. After starting engine, this indicator has to be turned off.
- If this indicator turns on while engine is running, it means that there is a problem on the electric charging system.
- If the problem is not cleared, stop the engine and contact your authorized local dealer for check.

5-6. Check before starting (Daily check)

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



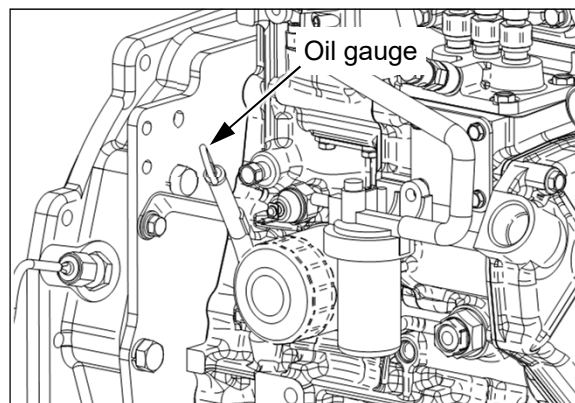
(1) Engine oil

- **Oil specification and capacity :**

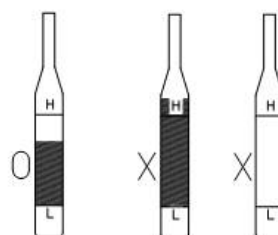
See chapter 5-3, "Lubricants and Capacity" or the last page in this manual.

- **Checking engine oil level**

- Check the engine oil level before starting engine or at 5 minutes later after stopping engine.
- Check if the oil level is between MAX and MIN marks of the oil gauge. If necessary, add new oil.
- It must only be checked while the engine is stopped.
- If your engine is operated in dusty/dirty condition, the service interval must be shorter than normal condition.
- Must replace the engine oil and engine oil filter after the first 50 hours of use.



Engine oil gauge



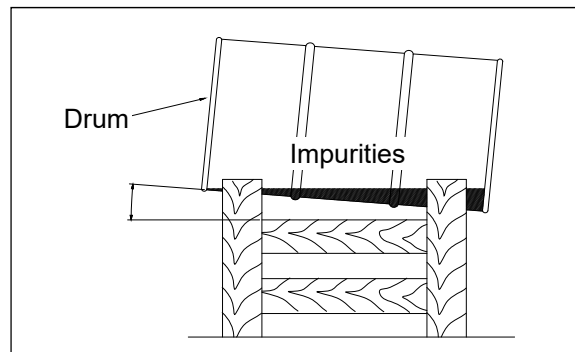
(2) Fuel tank

① Fuel specification and capacity :

- See chapter 5-3, “Lubricants and Capacity” or the last page in this manual.

② Storing Fuel

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



③ Using diesel for winter

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

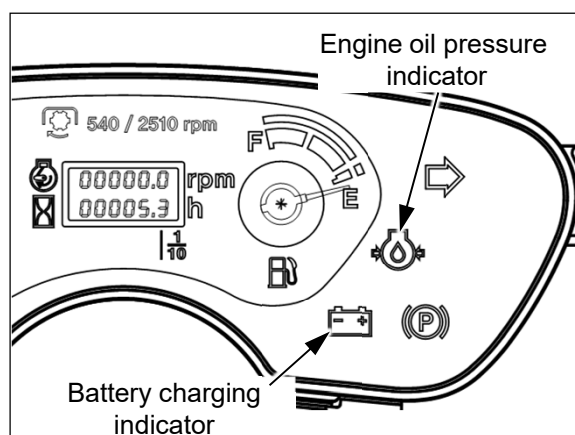
④ Checking fuel level

- 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, the humidity in the fuel tank is condensed, and may be mixed with the fuel.
--------	--

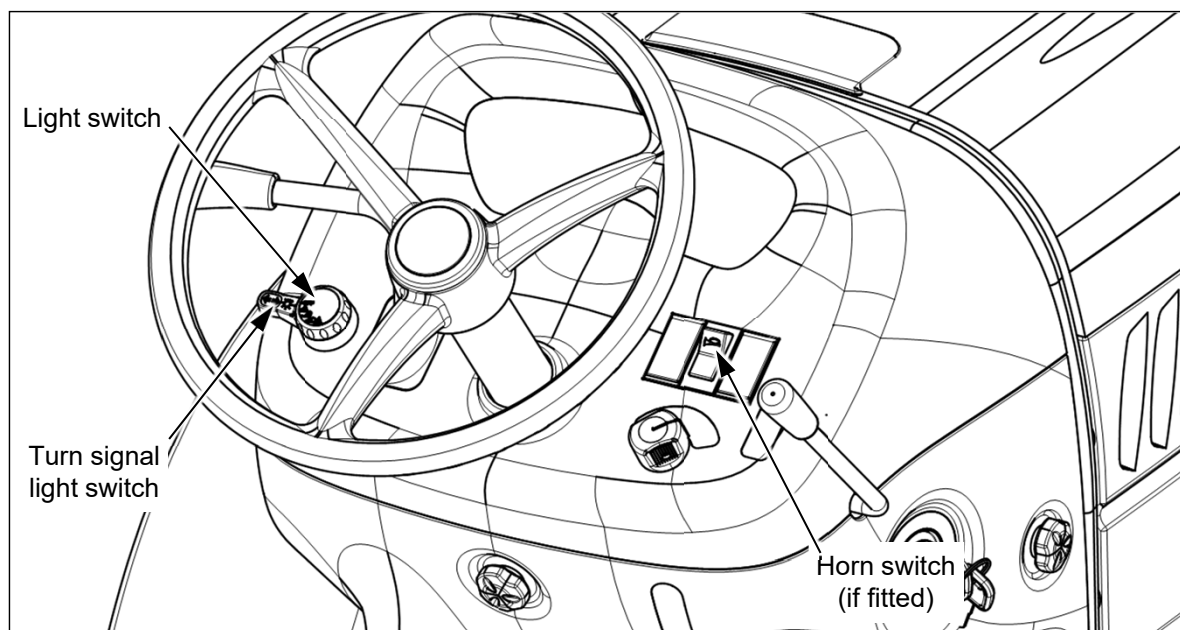
(3) Instrument panel & Indicators

- 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 5-5, “When the warning indicator lights” 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 any of these lights are not turned on when operating the switch, check the problem as followings.
 1. Check the related fuse in the fuse box. See *chapter 5-12-(2), "Fuse & Main fuse" in this manual.*
 2. Check the light bulb. If damaged, replace it with a rated new one. See *below table and refer to the chapter 5-12-(5), 5-12-(6) in this manual.*

Illumination lights	Light bulb specification
Head lights (Low beam / High beam)	12V 55W / 60W
Turn signal lights (front)	12V 21W
Side lights(front)	12V 10W
Turn signal lights (rear)	12V 10W
Brake lights / Tail lights(rear)	12V 21W / 5W
Work lights	27W (Roll-bar)
Indoor light	N/A
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

- Before opening the radiator cap, cool down the engine coolant sufficiently.
- See chapter 5-11-(1), "Replacement of engine coolant" in this manual. (See page 5-41)

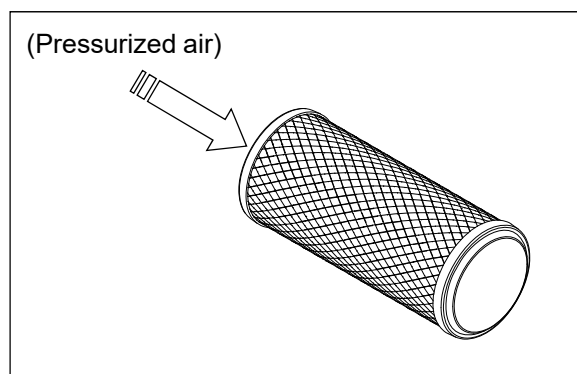
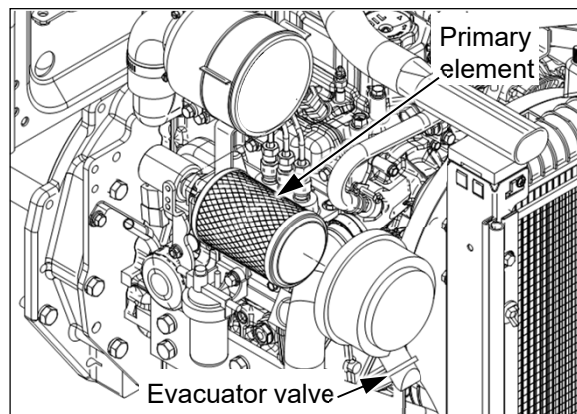
(6) Air cleaner (Dry type)

① Cleaning filter element

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

Notice	<ul style="list-style-type: none">▶ Do not tap the element on a hard place when cleaning.▶ If the element is cracked, change it with new one.
--------	--

- If the dust is not removed by tapping, use 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.



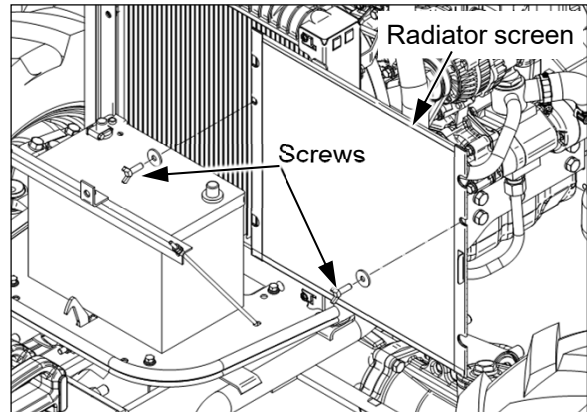
Notice	<ul style="list-style-type: none">▶ Do not assemble a wet filter element.▶ Do not dry the wet filter element by using compressed air. It may cause damage to the filter element.▶ Do not start the engine or close the hood if the filter element is not assembled.
--------	---

② Assembling filter element

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

(7) Cleaning of Radiator and Radiator screen

- Inspect the radiator and radiator screen for these items on a daily basis: Damaged fins, corrosion, dirt, grease, insects, leaves, oil, and other debris. Clean the radiator and radiator screen, if necessary.
- To access the radiator and radiator screen, remove the knobs and pull out the radiator screen in the right figure.
- When cleaning the radiator with water, let the water flow from the fan side.
- When cleaning the radiator, check and clean the TM oil cooler(if fitted) together.



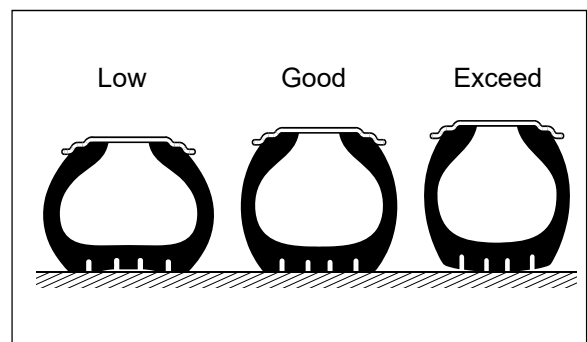
Caution

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

(8) Tire air pressure and damage

① Check

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




Caution

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

② Standard air pressure - See chapter 4-5-(5), "Tires and Load capacity" in this manual.

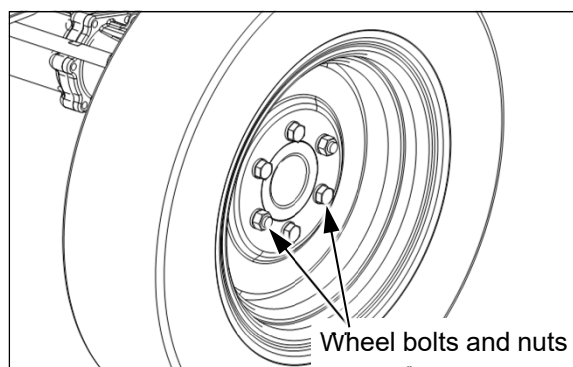
(9) Tightening state of bolts and nuts of each part

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

 Warning	<p>► Roll-over hazard!</p> <p>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.</p> <p>Failure to comply could result in death or serious injury.</p>
---	---

Tighten the wheel bolts and/or nuts to the specified torque any time you remove the wheel assembly from the machine or loosen the wheel bolts or nuts.

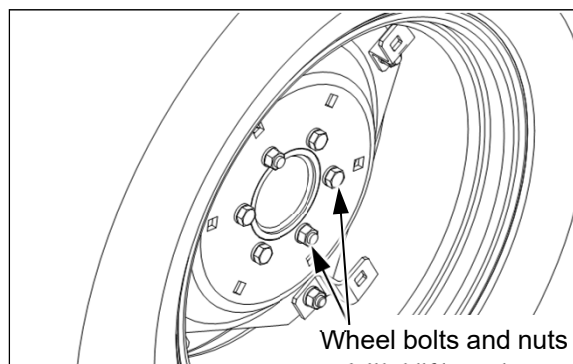
Front Wheel Torque: M16x1.5P
1800~2000 kgf.cm
(177~196N.m, 130~145 lb.ft)



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

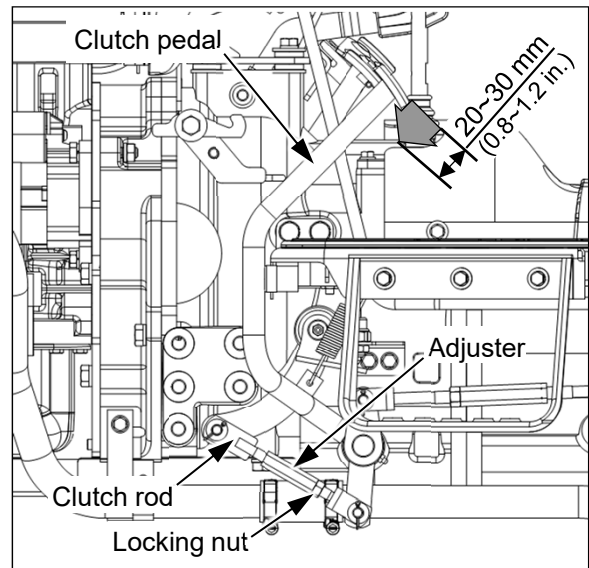
NOTICE: Check and tighten wheel bolts and/or nuts to proper torque specifications after the following hours of use:

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



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

- Check the distance of the clutch pedal play.
- **Normal distance: 20~30mm (0.8~1.2 in.)**
If the distance of the pedal play is over the normal distance, adjust it as below.
 1. Loosen the locking nut(s) and turn the adjuster to the left/right-hand direction.
 2. If the adjuster is tightened, the pedal play will be decreased, and if loosened, it will be increased.
 3. After adjusting the pedal play, tighten the locking nut(s).
 4. Check if the clutch is disengaged completely.



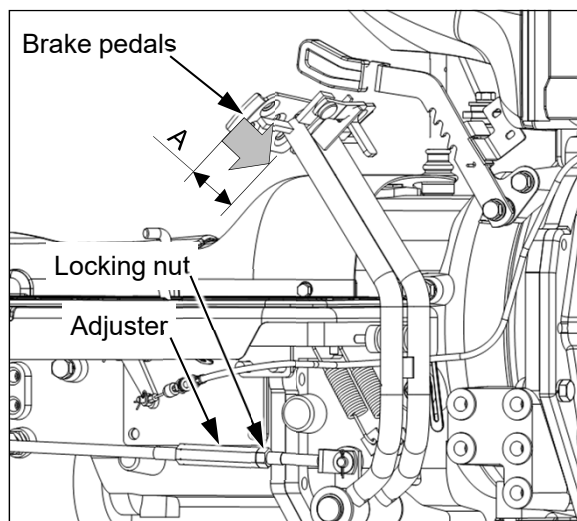
(11) Adjustment of Brake pedal play

- Check the distance of the brake pedal play (A).

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

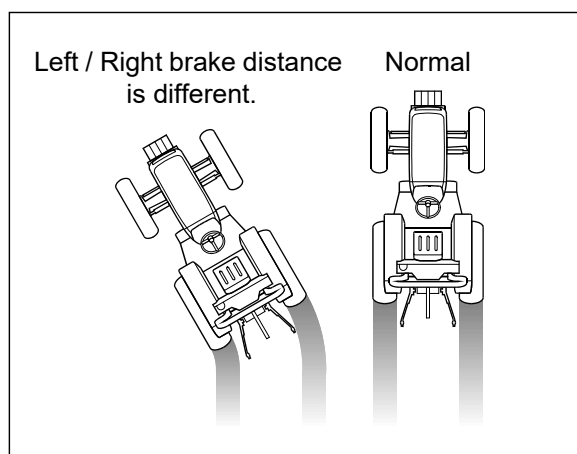
If the pedal play distance is over the normal distance, adjust it as below.

1. Loosen the locking nut(s) of the brake rod and turn the 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 nut(s).
4. Check if the brake distances of the left and right brakes are same as below.



- **Checking the brake distance**

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

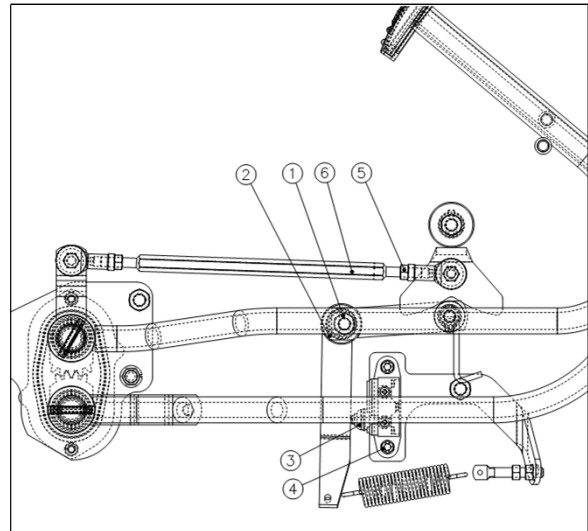


(12) Adjusting HST control linkage (HST type)

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

● Adjustment of NEUTRAL setting of the HST control.

1. Stop tractor on a flat ground and stop the engine.
2. Lift the rear wheels of the tractor off the ground sufficiently by using a hoist. If there is no hoist, use a suitable device to lift the tractor safely.
For tractor weight, refer to the chapter 6, "Dimension and Specification" in this manual.
3. Place the 4WD lever to 2WD position and apply the wheel chock to the front wheels. It is necessary for the tractor not to move when the engine starts.
4. After loosening bolt(1) in half, adjust the height of forward pedal and reverse pedal to be same by turning shaft(2) to the left/right little by little. After adjusting, tighten the bolt(1).



5. Start the engine after checking that HST neutral switch is pressed by the linkage.
6. Loosen locking nut(5) and turn HST rod(6) slightly to the left or right with checking that rear axle does not rotate anymore. Tighten the locking nut(5).
7. Check if HST neutral switch(3) is pressed or not. If the switch is not pressed, loosen bolt(4) and adjust the position of HST neutral switch(3).

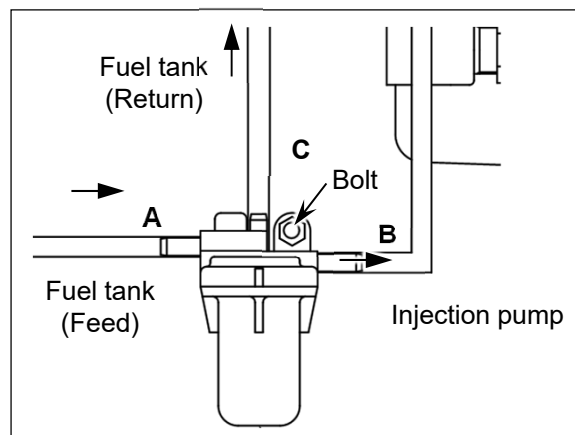



Caution

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

(13) Checking Fuel filter element

- Before starting engine, check the fuel filter element visually if some water is in the fuel filter or not.
- This filter is installed on the right-hand side of your engine.
- If some water exists in the fuel filter, you can find a layer through the transparent bowl. If necessary, drain the water from fuel filter.



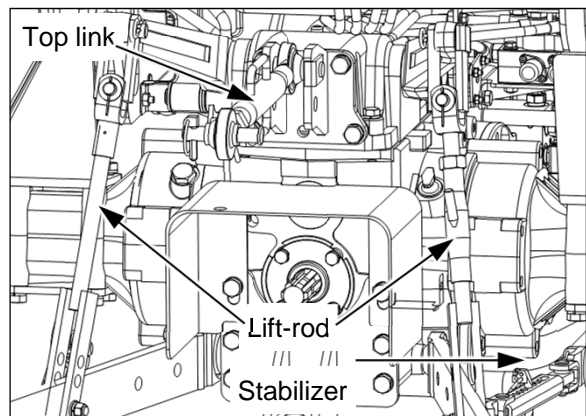
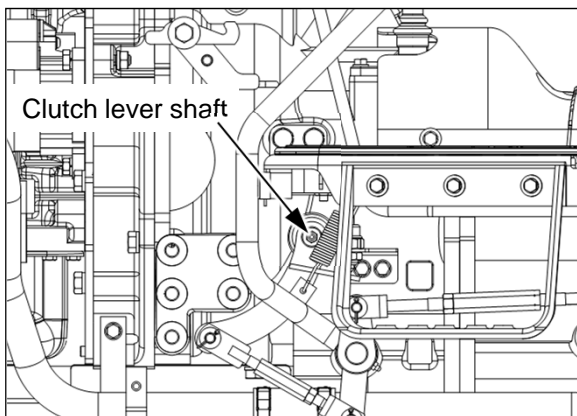
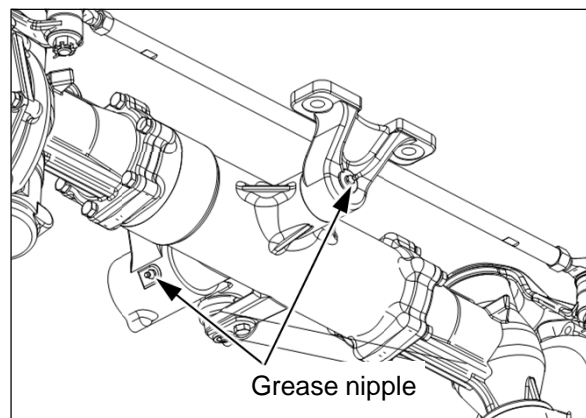
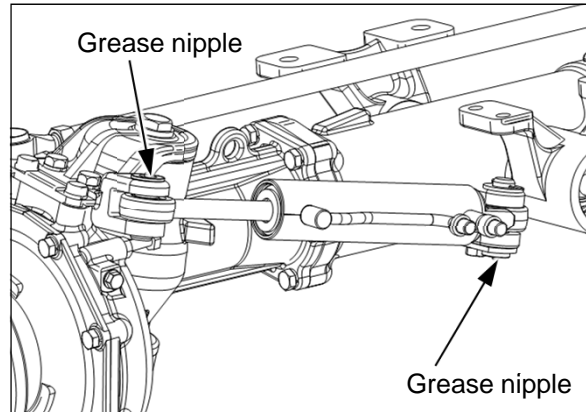
 Caution	<ul style="list-style-type: none">▶ Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover disconnected fuel system component. Do not fill the new filter with fuel. Invisible fine contaminants can enter the injection pump and it may cause damage to the fuel injection system.▶ Do not throw the exhausted waste fuel to any place. The waste fuel must be disposed according to the environment laws.
---	--

5-6. Every 50 hour check

(1) Lubricating grease nipple

- Steering cylinder pins.
- Front axle pivot.
- Thread or sliding parts on 3-point linkage.
- Clutch lever shaft (Both sides for Mechanical models)

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.

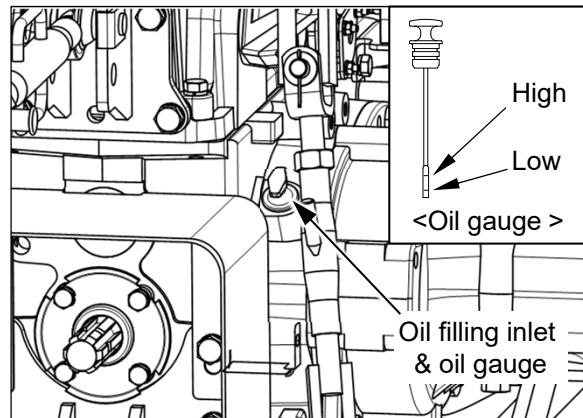


(2) Cleaning of Radiator and Radiator screen

- See chapter 5-6-(7) in this manual. (See page 5-24)

(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 low and high marks 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.*

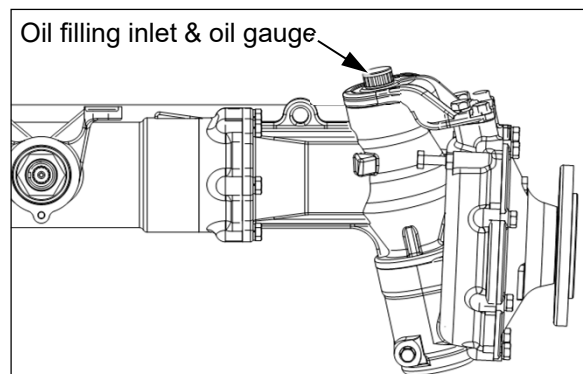


Caution

► 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 (4WD)

- Stop the tractor on a level surface and apply the parking brake and lower the implements to the ground.
- Unscrew the oil gauge and check if the oil level is between low and high marks.
- If necessary, add new oil into the oil filling inlet. (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), "Batter handling and Notices" in this manual. (See page 5-49)*

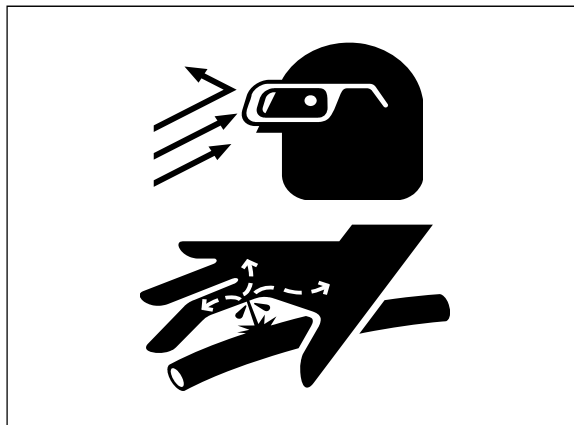
(6) Air cleaner (Dry type)

- *Refer to the chapter 5-6-(6) in this manual. (See page 5-23)*

(7) Hydraulic hoses and Leakage

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

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



5-8. Every 100 hour check

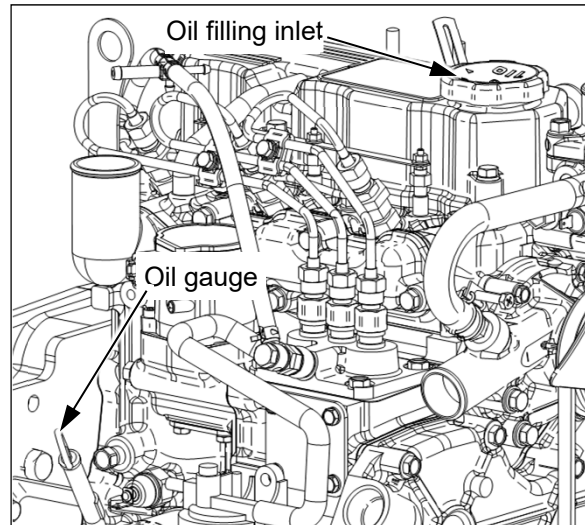
(1) Checking and adding Engine oil

- **Oil specification and capacity:**

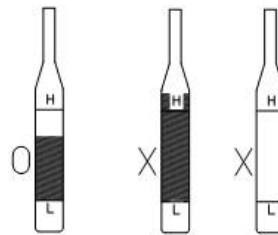
See chapter 5-3, "Lubricants and Capacity" or the last page in this manual.

- **Checking engine oil level**

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



Engine oil gauge



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

5-9. Every 250 hour check

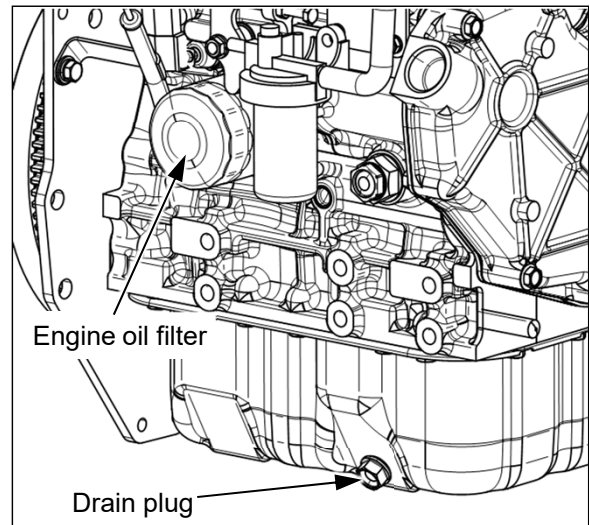
(1) Replacing Engine oil and Filter

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.

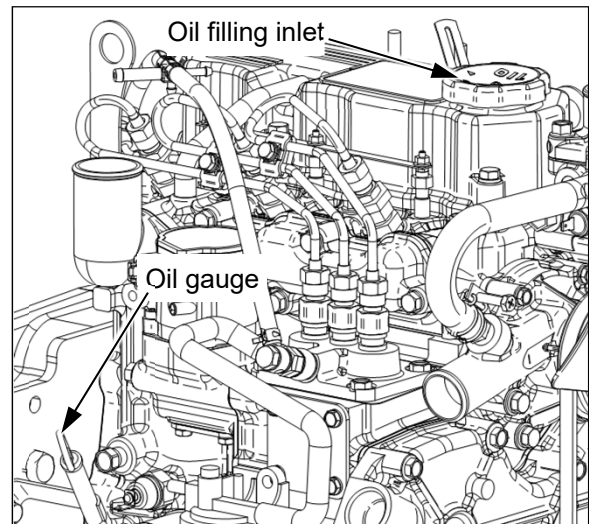
Notice

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



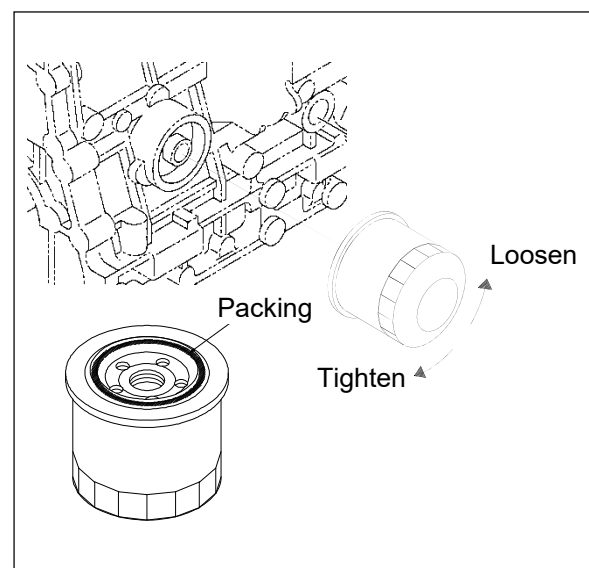
② Replace Engine oil filter

- 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 local dealer.



③ Fill Engine oil

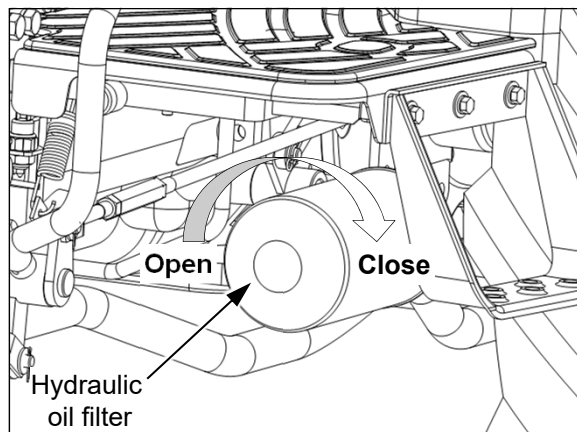
- Tighten all the drain plugs. (Tightening torque : 40 ± 5 N.m) (29.5 ± 5 lbs-ft)
- Add new engine oil and check if the oil level is between MIN and MAX marks on the oil gauge.
- For oil specification, see chapter 5-3, "Lubricants and Capacity" or the last page in this manual.
- Check any leakage of 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

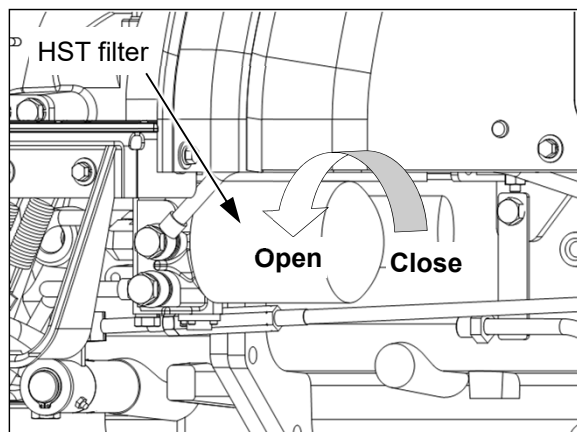
① Hydraulic oil filter (Main)



- Park the tractor on a level surface, apply the parking brake, lower the implements, stop the engine and cool down the tractor sufficiently.
- This filter is attached under the left-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

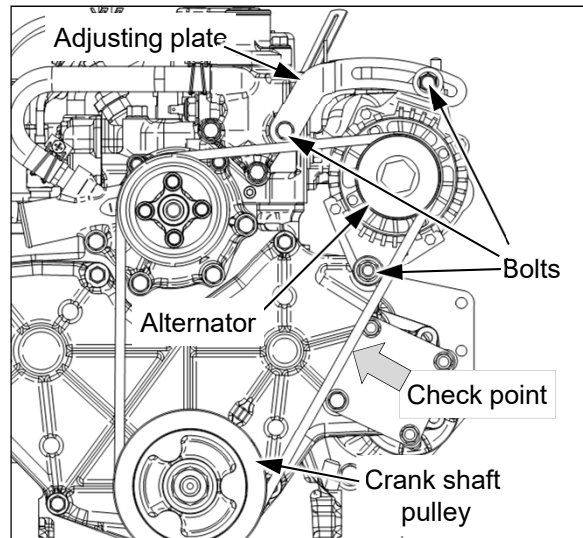
- This filter is attached under the left-hand floor of the HST models.
- Replace the HST filter according to the same procedure of the hydraulic oil filter.



 Warning	<p>► Be sure to stop the engine before loosening the oil filter.</p>
	<p>► If the filter or oil is very hot, it may cause serious burns. After cooling down the tractor sufficiently, replace the filters.</p> <p>► 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.</p>

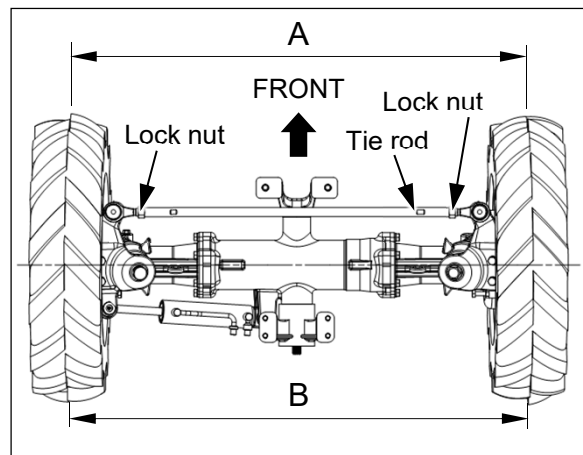
(3) Tension adjustment of Engine belt

- If the fan belt tension exceeds the normal value, adjust the tension as below.
 - Belt tension : crank shaft pulley ~ alternator pulley
 - **Normal: approx. 10~12mm (0.4~0.5 in)**
(When pressed by 98N (22 lb.f))
- When adjusting the belt tension,
 1. Loosen two bolts of alternator and a hinge bolt of the 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 belt tension is normal, tighten the other bolts.



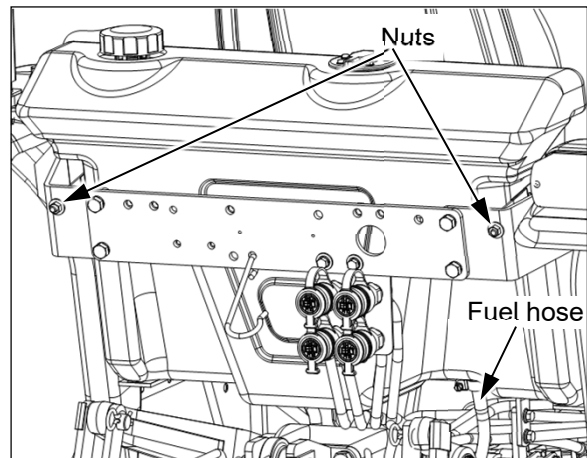
(4) Toe-in

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



(5) Cleaning fuel tank

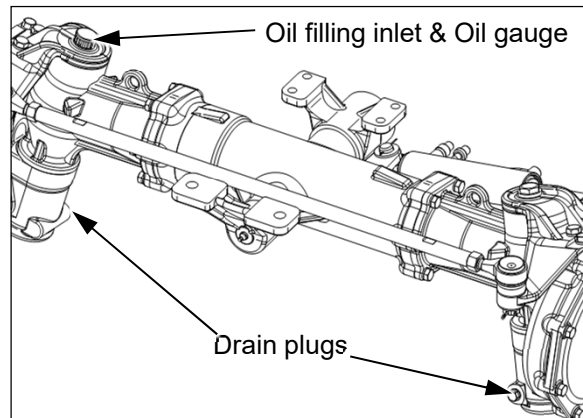
- The contaminants like dusts, water and sediments in the fuel tank will cause to malfunction of the fuel injection system.
- Clean the fuel tank periodically.
- Remove the fuel hose and fuel tank band in front of the fuel tank after loosening nuts and fuel hose clamp as shown in the right figure.
- Use clean diesel or approved detergent by manufacturer to clean inside the fuel tank.



5-10. Every 500 hour check

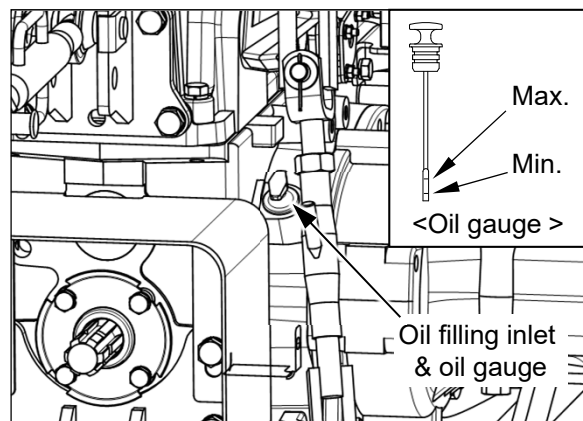
(1) Changing Front axle oil (4WD)


- 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.
- Tighten 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.*

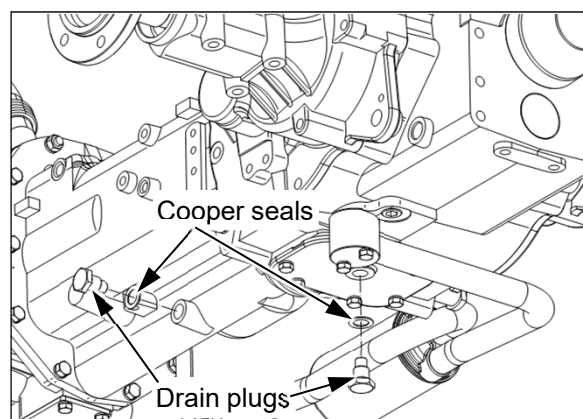


(2) Changing Transmission oil

- 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 plugs.
- Set a clean container under the drain plugs and remove the drain plugs under the transmission and drain the oil completely.
- Clean metal chips and sludge stuck to the drain plugs and tighten drain plugs again with new seals.
- 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.*

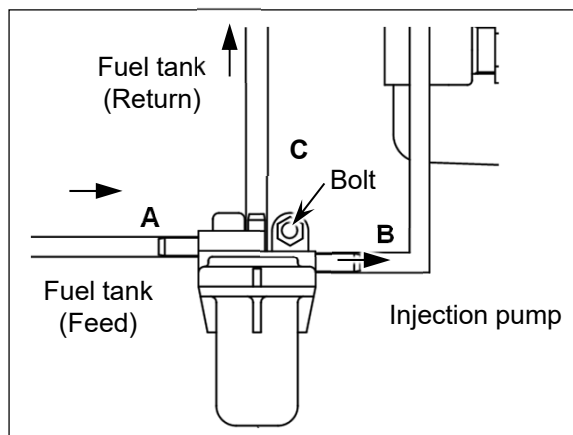


 Caution	<p>► Contaminated oil may reduce the durability of the transmission and it can cause a failure of the hydraulic system. Clean around the oil filling inlet and then pull the oil gauge.</p>
--	---



(3) Replacing Fuel filter element

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

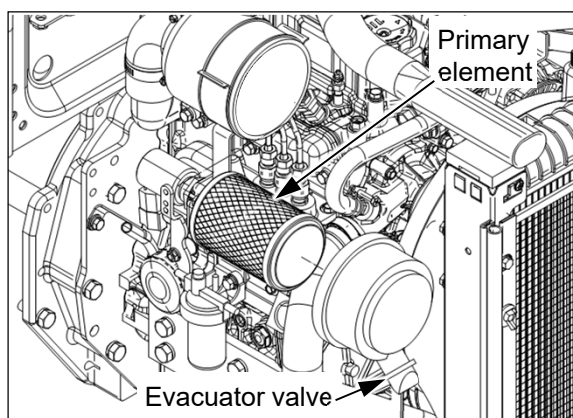


Caution

- 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.
- Do not throw the exhausted waste fuel to any place. The waste fuel must be disposed according to the environment laws.

(4) Replacing Air cleaner element (Dry type)

- Remove the cover and pull the primary element straight out, ensuring the safety filter element(if fitted) remains in place.
- Clean the inside of the air cleaner housing using a clean damp cloth, being careful not to damage the safety element(if fitted).
- 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, change it with a new one.
- Insert the filter element deeply into the filter housing.
- Remove the dust of the evacuator valve and clean the inside of the cover.
- Assemble the cover with the evacuator valve facing downwards.



Notice

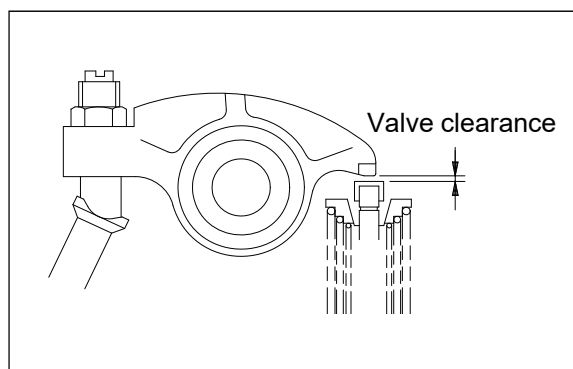
- Do not start the engine or close the hood if the filter element is not assembled..


(5) Adjusting Engine valve clearance


- Ask your authorized local dealer to check the valve clearance.

Normal clearance: 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	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ 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.
--	--

(6) Checking Nozzle injection pressure

- Contact your authorized local dealer for check.

Normal injection pressure : 13.7 MPa (1987 psi)

 Warning	<ul style="list-style-type: none"> ▶ 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.
--	--

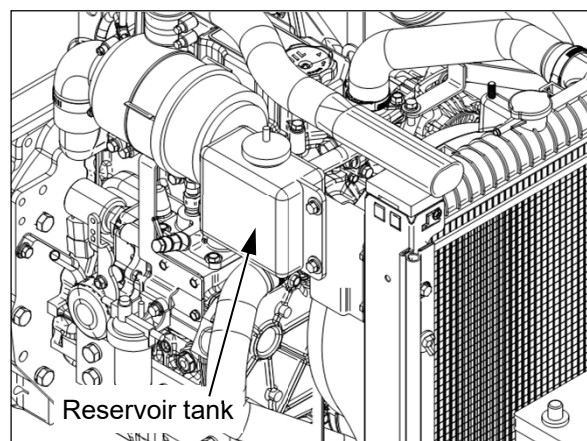
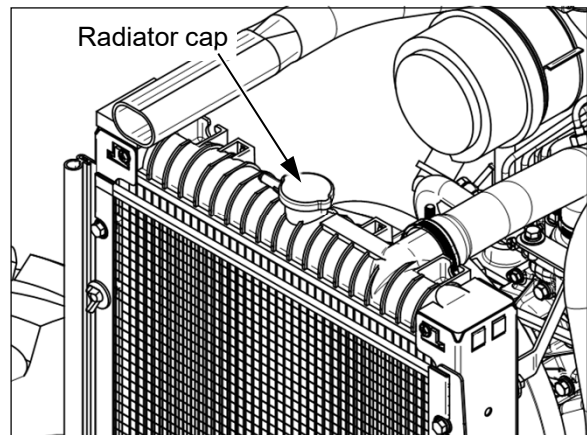
 Caution	<ul style="list-style-type: none"> ▶ Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over disconnected fuel system component. ▶ If a fuel injector is suspected of operating outside of normal parameters, it should be removed by a qualified technician. The suspect fuel injector should be taken to an authorized agent for inspection.
--	--

5-11. Every 2-year check

(1) Replacing Engine coolant

① Check

- Stop the engine and allow the engine to cool down. Loosen the radiator cap slowly in order to relieve any pressure. Remove the radiator cap.
- Check if the coolant of the radiator and 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.



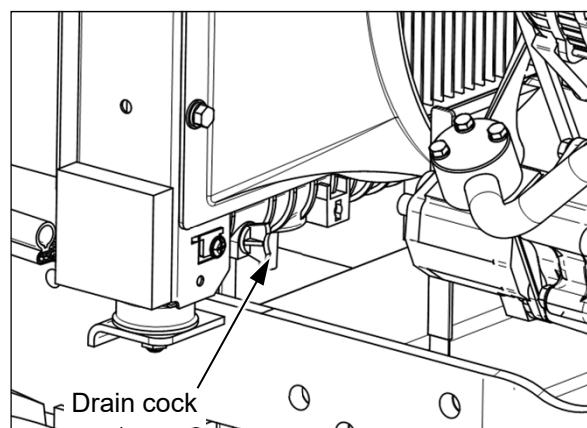
⚠ Warning

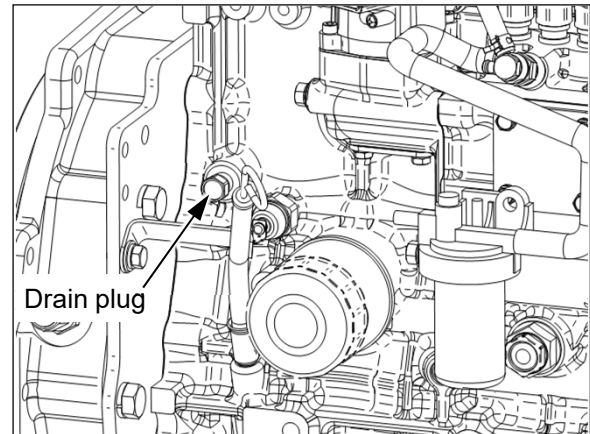
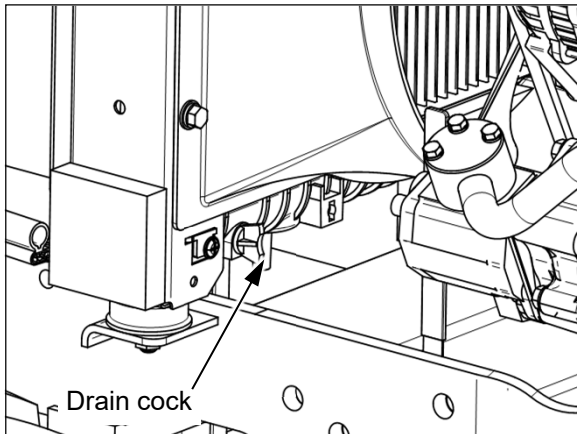



- **Pressurized System:** When opening the radiator cap, be careful of the escaping hot water or steam. Hot coolant can cause serious burns. To open the radiator cap, stop the engine and wait until the cooling system components are cool down. Loosen the radiator cap slowly in order to relieve the pressure.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

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	<ul style="list-style-type: none"> ▶ Care must be taken to ensure that fluids are contained during performance of inspection and maintenance of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids. ▶ Dispose of all fluids according to Local regulations and mandates. ▶ Keep all parts clean from contaminants. Contaminants may cause rapid wear and shortened component life.
--	---

③ Flush

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

 Caution	<ul style="list-style-type: none"> ▶ 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.

※ 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.

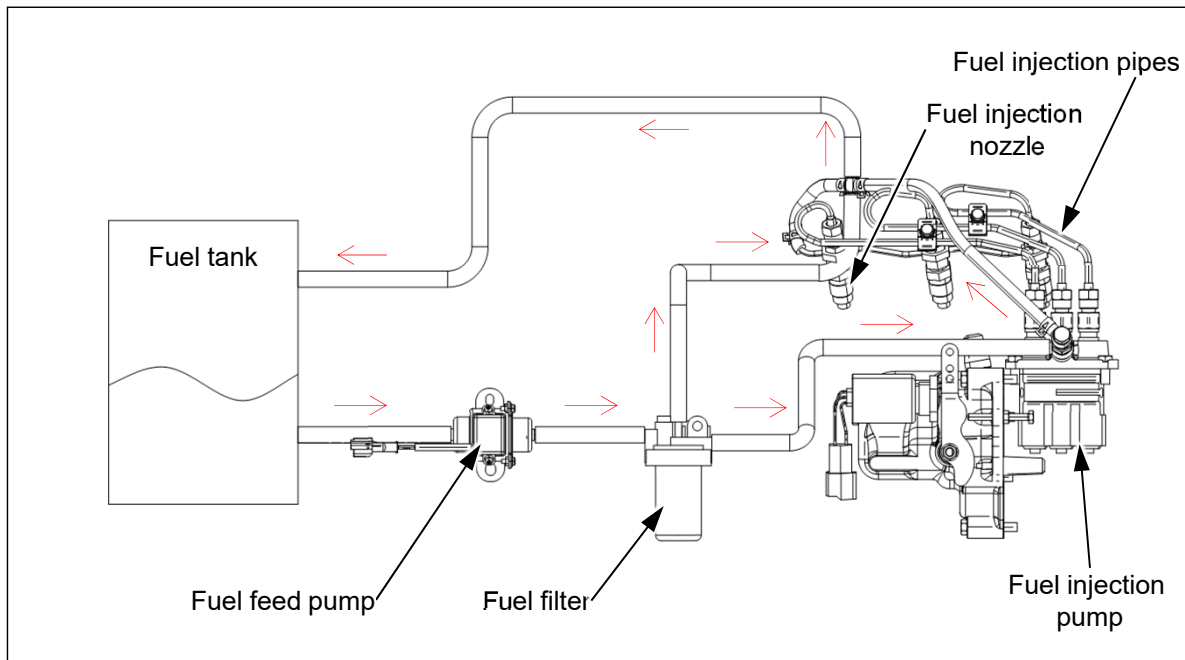
Anti-freeze (%)	Freezing point °C (°F)	Boiling point °C (°F)	Remark
40	-24 (-11)	106 (223)	
50	-37 (-35)	108 (226)	
60	-52 (-62)	111 (232)	




- 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.


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.

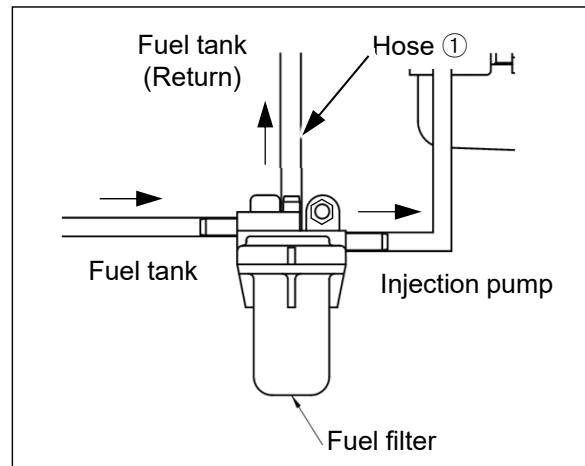


 Danger	► HIGH PRESSURE FUEL. When the engine is running, do not loosen the fuel injection pipes to bleed air from the fuel system.
 Warning	► Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the key switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.
 Caution	► Do not adjust or modify the fuel injection system arbitrary. It can cause a serious fault related to engine performance and increase of excessive exhaust emissions. ► 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.
Notice	► When changing the fuel filter only, it is not necessary to bleed air from the fuel injection pipes.

 Caution	<ul style="list-style-type: none"> ► 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.
---	--

① Air-bleeding from Fuel Filter

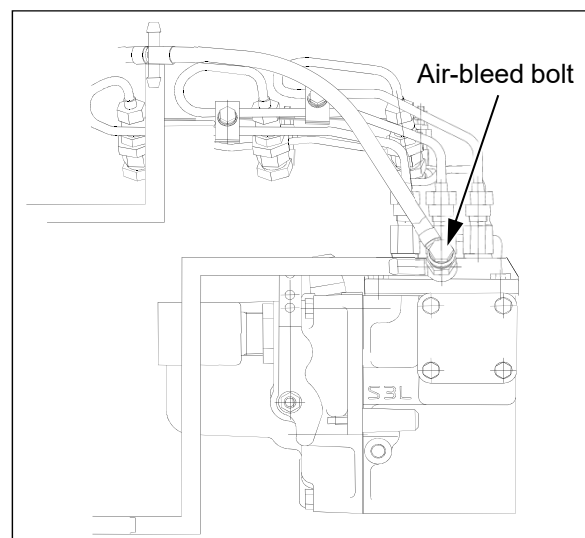
1. Disconnect the fuel hose ① from the fuel filter for a while.
2. If the bubble dose not come out from the filter, the Air-bleeding is completed,
3. Connect the hose to the filter again.



② Air-bleeding from Fuel Injection pump

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

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



③ Bleeding the injector lines



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.

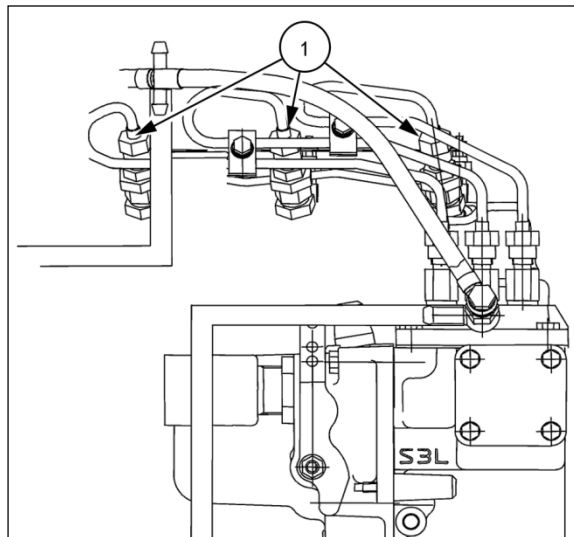
Bleed the injector lines if:

- 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 fittings **(1)** 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 **24~29 N·m (18~21 lb ft)**.

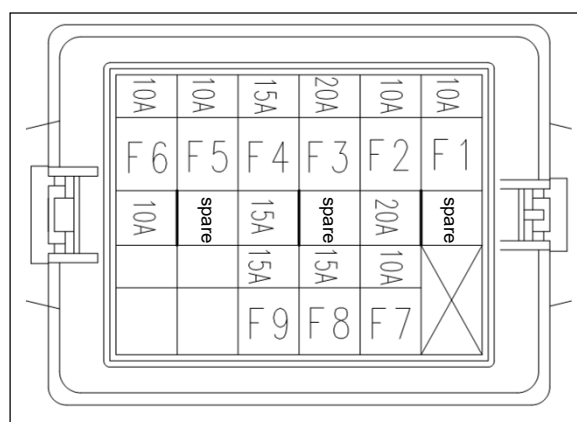
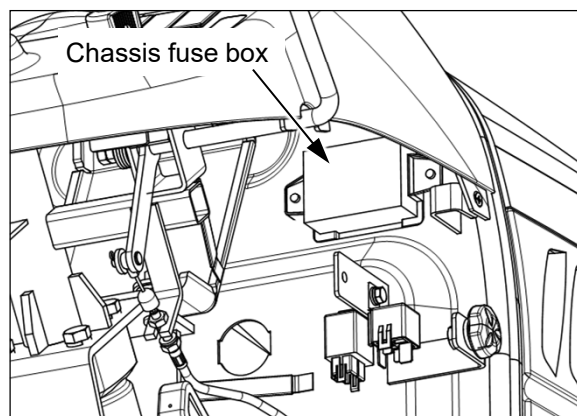
NOTICE: If air is not purged from the system, repeat the above procedures. Do not crank the engine continuously for more than thirty seconds, as this may cause starting motor failure.



(2) Fuse & Main fuse

① Fuse check and replacement

- Chassis fuse box is installed inside front console in the right figure. Loosen the knobs and remove the rear cover for maintenance.
- How to replace the fuse.
 1. Remove the fuse box cover.
 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.

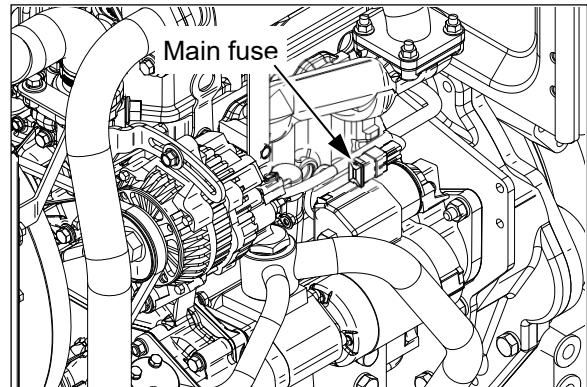


Fuse	Capacity	Circuit
F1	10A	Engine stop, Alternator, HST relay (if fitted)
F2	10A	Instrument panel, horn, glow relay
F3	20A	Headlights, brake lights, side lights
F4	15A	Work lights
F5	10A	PTO
F6	10A	Controller (if fitted)
F7	10A	Spare
F8	15A	Turn signal lights
F9	15A	Hazard warning lights

Caution	<p>► 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.</p>
	<p>► 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.</p>

② Main fuse (SLOW BLOW FUSE) check and replacement

- Main fuse is attached to the engine harness of the left-hand side of the engine.
- If main fuse is damaged, remove it from the wiring harness and replace with a genuine part.
- **Rated Capacity: 40A**



Caution

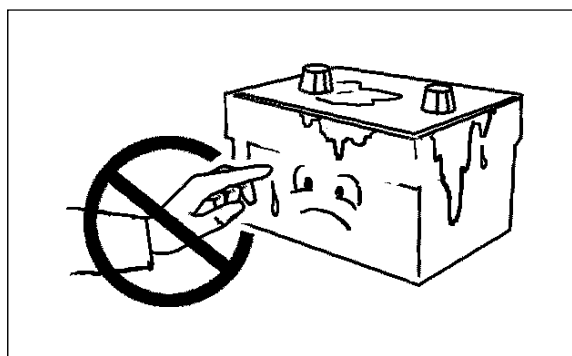
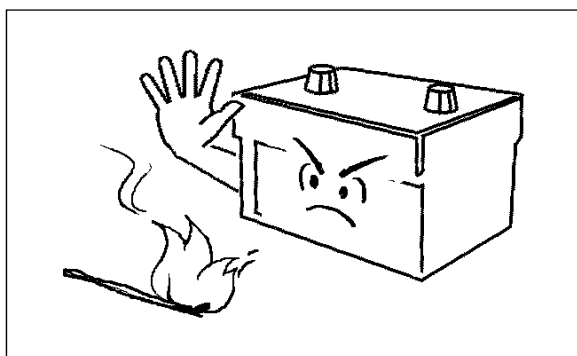
- ▶ The main fuse is an important part to protect the electric system and components. If it is often burn out, contact your authorized local dealer to check the problem.
- ▶ Do not use a substitute instead of the rated genuine fuse. Do not connect electric wires to the battery terminals directly. It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

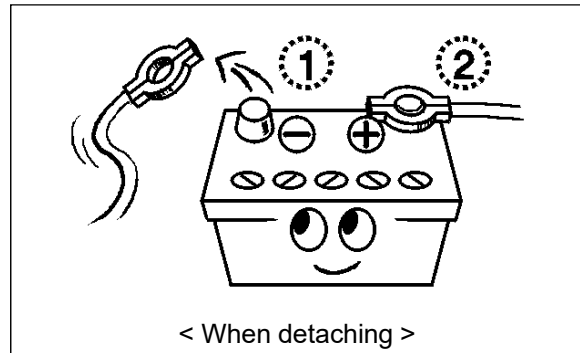
- Indicator(if fitted) on the top of the battery displays the battery state. If the indicator color is;
 - **GREEN** : Normal state.
If the engine does not start despite of green color, contact your authorized dealer.
 - **CLEAN** : Low charging state – charge the battery.
 - **WHITE or RED** : Replace 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.



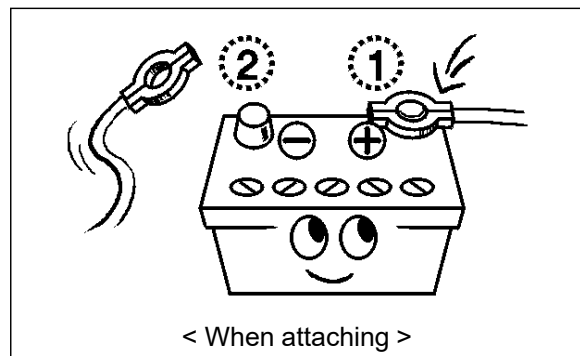
 Caution	<p>► The gas generated from the battery is explosive. Comply with the following instructions.</p>
	<ul style="list-style-type: none"> - Keep cigarettes, sparks and flames away from the battery. Use a flashlight to check battery electrolyte level or indicator. - Never check battery charge by placing 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.
	<p>► Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, clothing and can cause blindness if splashed into the eyes.</p> <ul style="list-style-type: none"> - 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.
	<p>► Charge the battery in an area with good ventilation and DO NOT charge a frozen battery.</p> <p>► Replace the old battery with a same capacity genuine product.</p>





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.

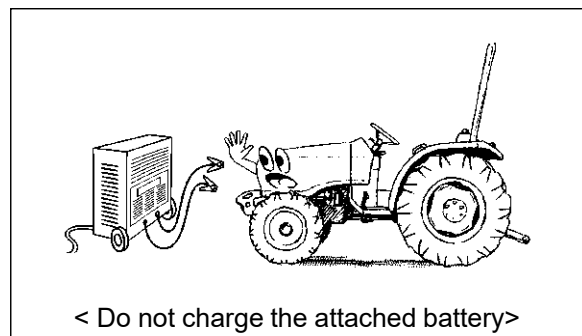
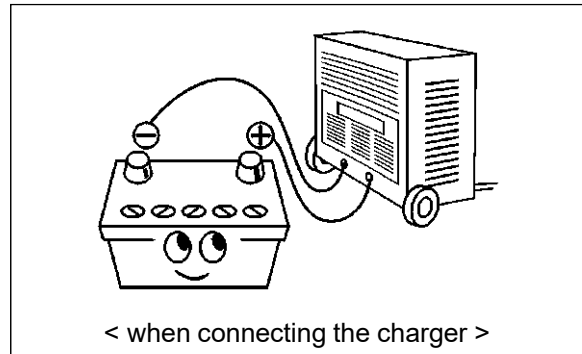


 Caution	<p>▶ Stop engine and apply parking brake and remove the ignition key before replacing the battery.</p>
	<p>▶ Put on eye protection and globes to protect human body from poisonous sulfuric acid before handling the battery.</p>
	<p>▶ Always remove grounded (-) battery clamp first and assemble it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

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.



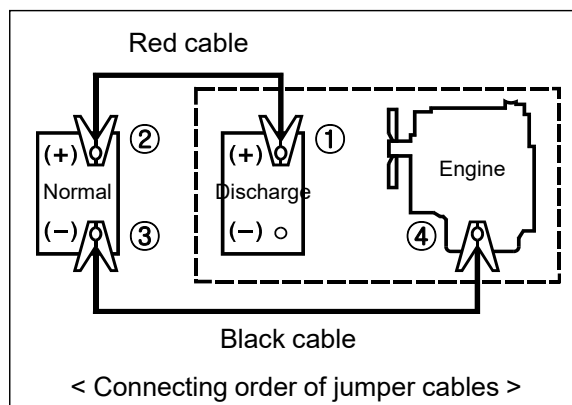
<p>! Caution</p>	<p>▶ Put on eye protection and gloves to protect human body from poisonous sulfuric acid before handling the battery .</p>
	<p>▶ Always remove grounded (-) battery clamp first and assemble it last. If not, it can cause explosion by spark.</p> <p>▶ Keep all flames and sparks away and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

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

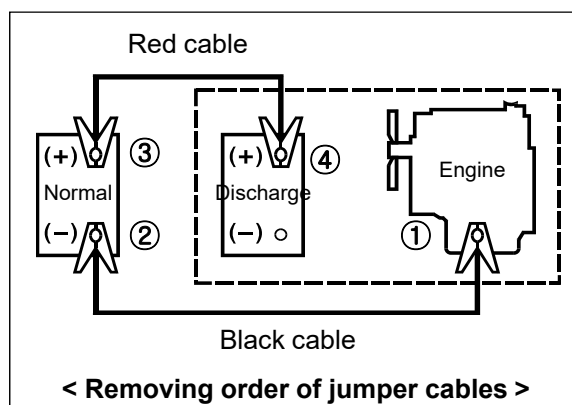
- Check followings before connecting the cables.
 - Is the spring of clamp normal?
 - Is the cable and clamp cut-off?
- 1. Stop engine, apply parking brake and remove the ignition key.
- 2. Connect two (+) terminals of both batteries with red cable. (tractor battery-①, auxiliary battery-②)
- 3. Connect 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.



<div data-bbox="229 1039 373 1093" data-label="Image"></div> <div data-bbox="229 1102 373 1214" data-label="Image"></div>	<p>► 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.</p> <p>► Keep all flames and sparks away and DO NOT smoke while charging the battery.</p>
---	--

② Removing Jumper cables

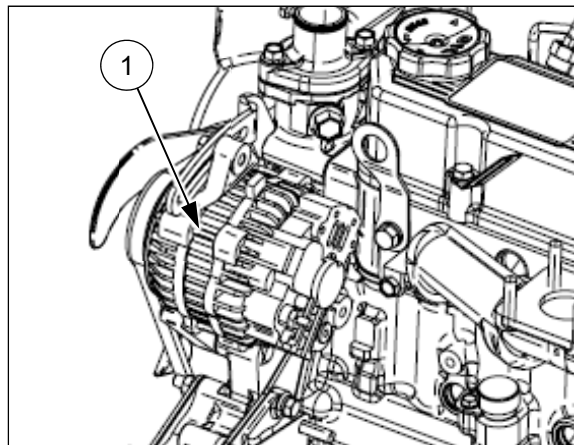
- Remove jumper cables as referring to the right figure, "Removing order of jumper cables".



<div data-bbox="245 1800 347 1845" data-label="Text"> <p>Notice</p> </div>	<p>► 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.</p>
--	---

(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 5-36.
- Required alternator periodical maintenance:
 - Belt adjustment
 - Inspect alternator terminals
 - Clean alternator cooling fan fins



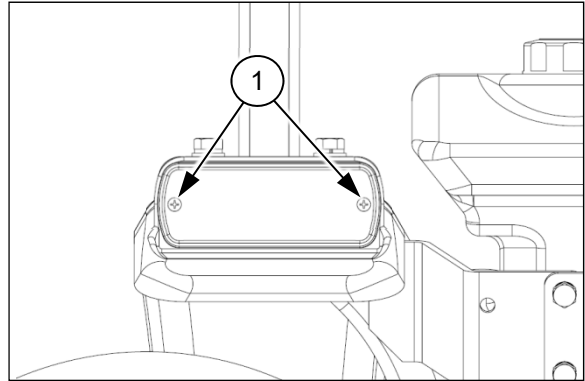
- When working on or checking the alternator, adhere to following precautions. If not, alternator damage may occur:
 - Do not UNDER ANY CIRCUMSTANCES short the field terminal of the alternator to ground.
 - Do not disconnect the alternator output lead or battery cables while the alternator is operating.
 - 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) Tail/brake light bulb and turn signal light bulb- Replace

① Tail/brake light bulb and rear turn signal light bulb replacement

1. Remove the two screws① retaining the taillight lens and remove the lens.

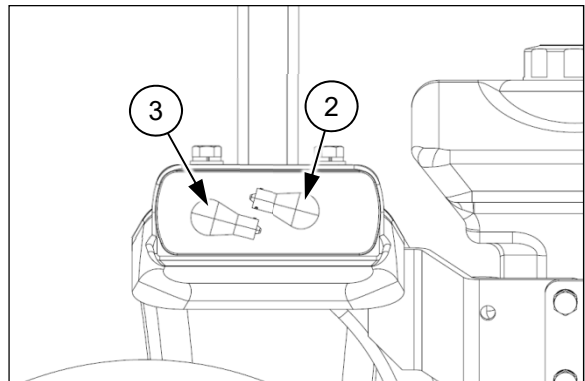


2. Push in on the tail/brake light bulb② or turn signal light bulb③ and rotate counter-clockwise in the socket to remove the old bulb.

3. Insert the new bulb into the socket and turn the bulb in a clockwise direction until tightened.

4. Install lenses and retaining screws.

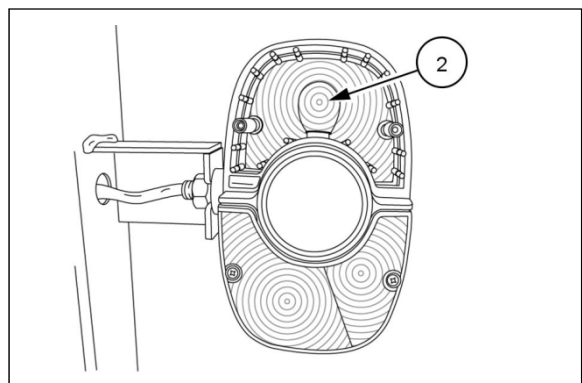
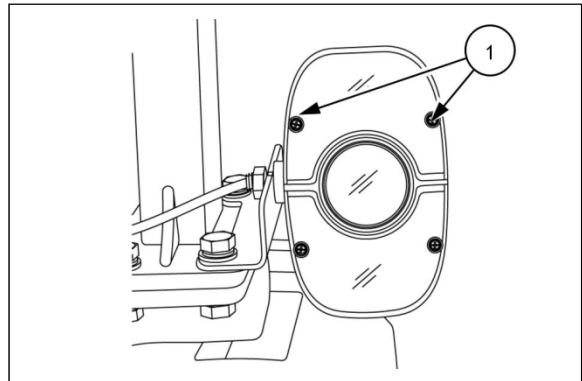
NOTE: For about bulb specification, refer to the chapter 5-6-(4) in this manual.



② Front turn signal light bulb - replacement

1. Remove the two screws① retaining the turn signal light lens and remove the lens.
2. Push in on the turn signal light bulb② and rotate bulb counter-clockwise in the socket to remove the old bulb.
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 5-6-(4) in this manual.

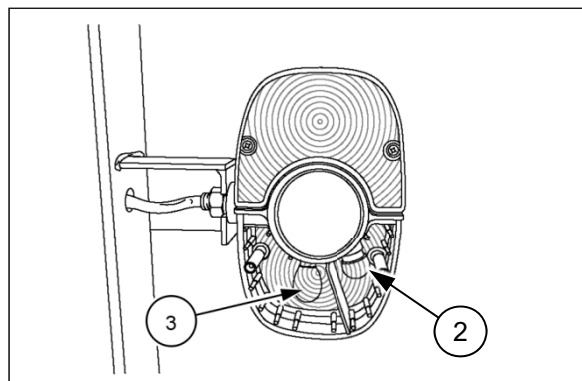
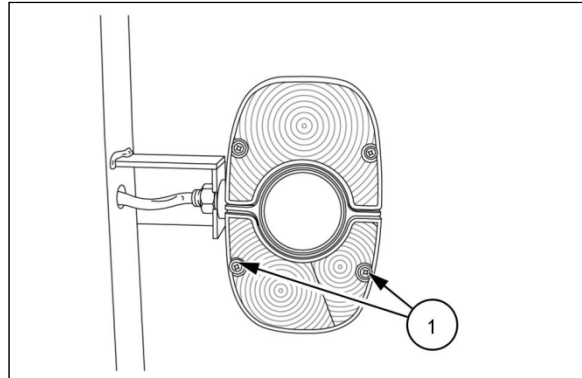


③ Side light bulb - bulb replacement

1. Remove the two screws① retaining the taillight lens and remove the lens.
2. Push in on the side light bulb② and rotate counter-clockwise in the socket to remove the old bulb.
3. Insert the new bulb into the socket and turn the bulb in a clockwise direction until tightened.

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

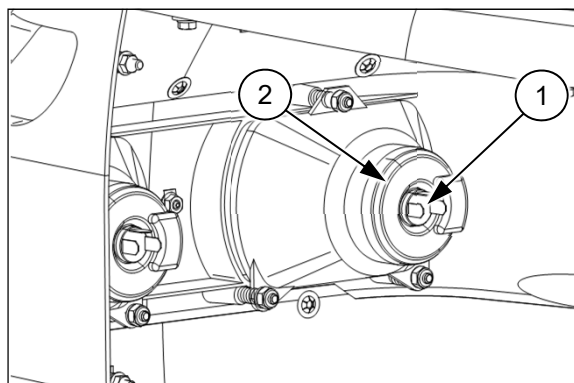
NOTE: Tail light bulb③ may be not available, depending on the market.




(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. Pull out the socket② and release the retaining spring from the housing with retaining the bulb.
 4. Replace the bulb with a new one and install the retaining spring locked in place.
 5. Reinstall the socket② into the housing and harness connector.



NOTE: For about bulb specification, refer to the chapter 5-6-(4) in this manual.


 Caution	<ul style="list-style-type: none">▶ 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.
---	--

(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
Sky Blue	Hood, Fenders	10B 4/10
Dark Gray N3	Left/Right-hand lever guide, Instrument covers	N3
White Ivory	Wheels	5Y 8.5/2
Black	Transmission case, Front axle	N1.0

5-13. Troubleshooting

 Warning	<p>► To avoid injury due to sudden start, apply parking brake and place the transmission gear in NEUTRAL position before checking and repairing.</p>
--	--

System	Faults	Possible causes	Solutions
Engine	The start motor does not turn when turning the key switch.	<ul style="list-style-type: none"> ▲ Start safety switch is not contacted ▲ PTO switch is not on "OFF" position ▲ Discharge of battery ▲ Terminal loosened ▲ Key switch failure ▲ Start motor failure 	<ul style="list-style-type: none"> ▲ 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.	<ul style="list-style-type: none"> ▲ 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 	<ul style="list-style-type: none"> ▲ 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.	<ul style="list-style-type: none"> ▲ Air in fuel system ▲ Fuel filter clogged ▲ Injection nozzle clogged ▲ Fuel leakage ▲ Irregular fuel injection 	<ul style="list-style-type: none"> ▲ Bleed air ▲ Clean or replace the filter ▲ Repair or replace ▲ Repair ▲ Repair
	Engine turns more than maximum speed.	<ul style="list-style-type: none"> ▲ Impurities in governor 	<ul style="list-style-type: none"> ▲ Repair
	Engine stops suddenly during operation.	<ul style="list-style-type: none"> ▲ Fuel shortage ▲ Fault of nozzle ▲ moving parts failure due to bad lubrication 	<ul style="list-style-type: none"> ▲ Add fuel and bleed air ▲ Repair or replace ▲ Repair
	Engine stops at low rpm.	<ul style="list-style-type: none"> ▲ Fault of injection pump ▲ Valve gap is not correct ▲ Poor nozzle pressure 	<ul style="list-style-type: none"> ▲ Repair ▲ Adjust the gap ▲ Repair

System	Faults	Possible causes	Solutions
Engine	Engine overheat	<ul style="list-style-type: none"> ▲ Lack of engine coolant ▲ Bad fan belt tension or broken ▲ Dirt attached to the radiator 	<ul style="list-style-type: none"> ▲ Supplement ▲ Adjust belt tension or replace ▲ Clean
	The color of exhausted smoke is white.	<ul style="list-style-type: none"> ▲ Air cleaner clogged ▲ Engine oil exceeded ▲ Lack of fuel supply 	<ul style="list-style-type: none"> ▲ Wash element ▲ Adjust in proper level ▲ Repair
	The color of exhausted smoke is black.	<ul style="list-style-type: none"> ▲ Bad quality of fuel ▲ Oversupply of fuel ▲ Fault of nozzle 	<ul style="list-style-type: none"> ▲ Use good quality fuel ▲ Repair ▲ Repair
	Engine power is low.	<ul style="list-style-type: none"> ▲ Injection nozzle clogged ▲ Carbon piled to valve seat ▲ Bad adjustment of valve gap ▲ Bad injection timing ▲ Lack of fuel supply ▲ Air cleaner clogged 	<ul style="list-style-type: none"> ▲ Repair ▲ Repair ▲ Repair ▲ Repair ▲ Check fuel system ▲ Clean or replace
	Engine oil pressure indicator is ON during operation.	<ul style="list-style-type: none"> ▲ Lack of engine oil ▲ Low viscosity of engine oil ▲ Warning light switch error ▲ Fault of oil pump ▲ Oil filter element is clogged 	<ul style="list-style-type: none"> ▲ Supplement ▲ Replace the proper oil viscosity ▲ Replace ▲ Repair ▲ Replace element
	Battery charging indicator is ON during operation	<ul style="list-style-type: none"> ▲ Abnormal wiring ▲ Fault of alternator ▲ Fault of battery ▲ Bad fan belt tension or broken 	<ul style="list-style-type: none"> ▲ Check battery terminals and ground, repair ▲ Repair or replace ▲ Replace ▲ Adjust belt tension or replace
	Electronic control errors.	<ul style="list-style-type: none"> ▲ Fault of electric sensors or wire harness or ECU. 	<ul style="list-style-type: none"> ▲ Contact your authorized local dealer.
Clutch	Clutch is slipped.	<ul style="list-style-type: none"> ▲ Wrong clutch pedal play ▲ Friction lining worn or broken 	<ul style="list-style-type: none"> ▲ Adjust ▲ Replace
	Clutch does not cut-off.	<ul style="list-style-type: none"> ▲ Lining damaged ▲ Wrong clutch pedal play 	<ul style="list-style-type: none"> ▲ Repair or replace ▲ Adjust

System	Faults	Possible causes	Solutions
Brake	Brake does not work or only one side works.	<ul style="list-style-type: none"> ▲ Wrong brake pedal play ▲ Lining worn or broken ▲ Left/right pedal play is different 	<ul style="list-style-type: none"> ▲ Adjust ▲ Replace ▲ Adjust
	After brake pedal working, it does not return.	<ul style="list-style-type: none"> ▲ Return spring damaged ▲ Lack of grease in shaft parts 	<ul style="list-style-type: none"> ▲ Replace the spring ▲ Remove the rust, apply grease
Hydraulic lift system	The linkage does not move up.	<ul style="list-style-type: none"> ▲ Lack of transmission oil ▲ Air in the suction pipe ▲ Hydraulic filter clogged ▲ Hydraulic pump failure ▲ Control valve failure ▲ Cylinder or cylinder related parts broken 	<ul style="list-style-type: none"> ▲ 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	<ul style="list-style-type: none"> ▲ Connecting part loosened ▲ Oil seal damaged ▲ Pipe cracked 	<ul style="list-style-type: none"> ▲ Tighten ▲ Replace ▲ Replace
	If lever is placed on the raising position, relief valve sounds off.	<ul style="list-style-type: none"> ▲ Upper limit of position control lever is changed 	<ul style="list-style-type: none"> ▲ Adjust the upper limit
	The linkage does not move down.	<ul style="list-style-type: none"> ▲ Down speed control valve locked ▲ Control valve failure ▲ Cylinder damaged ▲ Lift shaft moving part damaged 	<ul style="list-style-type: none"> ▲ 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.	<ul style="list-style-type: none"> ▲ 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 	<ul style="list-style-type: none"> ▲ Repair or replace ▲ Repair or replace ▲ Repair ▲ Repair or replace
	Hard to operate the steering wheel.	<ul style="list-style-type: none"> ▲ Steering unit <ul style="list-style-type: none"> - Steering unit spline and column spline does not aligned - Spool and sleeve damaged by foreign material - Excessive tightening torque of end cap bolt ▲ Pump <ul style="list-style-type: none"> - Low speed - Wearing, failure ▲ Relief valve <ul style="list-style-type: none"> - Valve spool clogged - Setting pressure too low 	<ul style="list-style-type: none"> ▲ <ul style="list-style-type: none"> - Check mounted condition of steering unit and column - Replace - Apply regular torque ▲ <ul style="list-style-type: none"> - Adjust RPM or Repair - Repair or replace ▲ <ul style="list-style-type: none"> - Repair or replace - Reset or adjust
	Cylinder does not work smoothly as steering wheel movement	<ul style="list-style-type: none"> ▲ Air in steering line if not used for a long time ▲ Air in suction pipe ▲ Piston seal damaged 	<ul style="list-style-type: none"> ▲ Bleed air ▲ Repair ▲ Replace
	Steering wheel turns to the opposite direction.	<ul style="list-style-type: none"> ▲ Bad assembly of steering gear ▲ Bad assembly of steering hose 	<ul style="list-style-type: none"> ▲ Repair ▲ Repair
	Oil leakage of steering pump, steering unit, cylinder and fittings	<ul style="list-style-type: none"> ▲ Seal damaged 	<ul style="list-style-type: none"> ▲ Replace seal
	Abnormal noise	<ul style="list-style-type: none"> ▲ Lack of oil ▲ Exceeding resistance of suction line ▲ Air in system 	<ul style="list-style-type: none"> ▲ Aid oil ▲ Replace filter ▲ Bleed air

System	Faults	Possible causes	Solutions
HST	When operating HST pedal, tractor dose not start.	<ul style="list-style-type: none"> ▲ 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 	<ul style="list-style-type: none"> ▲ 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.	<ul style="list-style-type: none"> ▲ Neutral position of HST pedal is changed. ▲ HST pedal linkage damaged ▲ HST arm bolt loosened 	<ul style="list-style-type: none"> ▲ Adjust neutral position ▲ Replace damaged part ▲ Fasten the bolt with adhesive
	HST power is too low	<ul style="list-style-type: none"> ▲ Oil shortage ▲ Air in HST circuit ▲ Transmission oil temperature is too high. ▲ HST moving part worn ▲ HST filter clogged 	<ul style="list-style-type: none"> ▲ 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	<ul style="list-style-type: none"> ▲ Engine speed is too low ▲ Oil temperature is too low ▲ Hydraulic oil filter clogged ▲ Oil shortage 	<ul style="list-style-type: none"> ▲ 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	<ul style="list-style-type: none"> ▲ Abnormal wiring ▲ Alternator failure ▲ Lack of fan belt tension or broken ▲ Abnormal battery 	<ul style="list-style-type: none"> ▲ Check the tightening state of terminals and ground ▲ Repair or replace ▲ Adjust fan belt tension or replace ▲ Replace
	Headlight is dark.	<ul style="list-style-type: none"> ▲ Battery capacity is low ▲ Bad wiring and contact 	<ul style="list-style-type: none"> ▲ Charge or replace ▲ Check and repair
	Headlight is not ON.	<ul style="list-style-type: none"> ▲ Light bulb cut-off ▲ Fuse blown 	<ul style="list-style-type: none"> ▲ Replace ▲ Check the cause, and replace it
	Horn does not sound.	<ul style="list-style-type: none"> ▲ Switch failure ▲ Abnormal wiring ▲ Horn failure 	<ul style="list-style-type: none"> ▲ Replace ▲ Repair ▲ Replace
	Turn signal light does not work.	<ul style="list-style-type: none"> ▲ Light bulb cut-off ▲ Bad connection ▲ Fuse blown 	<ul style="list-style-type: none"> ▲ Replace ▲ Tighten terminals ▲ Check the cause, and replace it
	Cold start aid indicator is not ON.	<ul style="list-style-type: none"> ▲ Relay and timer damaged ▲ Bad connection of preheat plug wiring 	<ul style="list-style-type: none"> ▲ Replace ▲ Check and tighten
	Other illuminating light or indicator is not ON.	<ul style="list-style-type: none"> ▲ Fuse blown ▲ Light bulb cut-off 	<ul style="list-style-type: none"> ▲ 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, Mitsubishi Heavy Industries Engine & Turbocharger Ltd.(MHIET)

But, the warranty periods of LS Tractor always prevail over the ones mentioned on the attachment by engine manufacturer, Mitsubishi Heavy Industries Engine & Turbocharger Ltd.(MHIET)

Emission Warranty

The following warranty applies to the engines that have been certified to the emission regulation of the U.S. Environmental Protection Agency.

Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. warrants to the ultimate purchaser and each subsequent purchaser that **the new non-road, stationary and emergency stationary engine**, including all parts of its emission-control system, meets two conditions:

1. It is designed, built, and equipped so it conforms at the time of sale to the ultimate purchaser with applicable regulation of the U.S. Environmental Protection Agency. If the vehicle in which the engine is installed is registered **in the state of California, a separate California emission regulation also applies.**
2. It is free from defects in materials and workmanship that may keep it from meeting these requirements.

Warranty Period

The emission warranty period is shown below.

However, if Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.'s standard warranty period is longer than the emission warranty period, the emission warranty period extends to same as Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.'s standard warranty period.

Below warranty period shall begin on the date **the new non-road, stationary and emergency stationary engine** is delivered to the ultimate purchaser.

If your engine is certified as . . .	And its maximum power is . . .	And its rated speed is . . .	Then its warranty period is . . . (whichever comes first.)	
			hours	years
Variable speed or constant speed	kW < 19	Any speed	1500	2
Constant speed	19 ≤ kW < 37	3000 rpm or higher	1500	2
Constant speed	19 ≤ kW < 37	Less than 3000 rpm	3000	5
Variable speed	19 ≤ kW < 37	Any speed	3000	5
Variable speed or constant speed	37 ≤ kW	Any speed	3000	5

- Attachment

Warranty Parts

Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. warrants the parts which will increase the emission of pollutants when they become defective.

The followings are examples.

I All the engine parts relating to the systems below are included in the exhaust-gas related components:

1. Air-induction system
2. Fuel system
3. Ignition system
4. Exhaust gas recirculation systems

II The parts below are also included in the exhaust-gas related components:

1. After-treatment devices
2. Crankcase ventilation valves
3. Sensors
4. Electronic control units

III The parts below also included in the evaporative emission gas related components:

1. Fuel tank
2. Fuel cap
3. Fuel Line
4. Fuel Line Fittings
5. Clamps*
6. Pressure Relief Valves*
7. Control Valves*
8. Control Solenoids*
9. Electric Controls*
10. Vacuum Control Diaphragms*
11. Control Cables*
12. Control Linkages*
13. Purge Valves
14. Vapor Hoses
15. Liquid/Vapor Separator
16. Carbon canister
17. Canister Mounting Brackets
18. Carburetor Purge Port Connector

* Parts related to evaporation-emission-gas control system

Owner's Responsibility

*The owner of the engine is responsible for the performance of the required maintenance listed in this operation manual.

*In accordance with **40 CFR 1068.115**, Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. makes no warranties if the operator caused the problem through improper maintenance or use.

California Emission Control Warranty Statement: your Warranty Rights and Obligations

IMPORTANT

The following warranty applies to the engines that have been certified the emission regulation of **the California Air Resources Board (CARB)**.

The California Air Resources Board (CARB) is pleased to explain the emission control system warranty on your **2017** or later engine. In California, **new off-road engines** must be designed, built, and equipped to meet the State's stringent anti-smog standards. Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

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

Where a warrantable condition exists, Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. will repair your **off-road engine** at no cost to you including diagnosis, parts, and labor.

Manufacturer's warranty coverage

The **2017** and later **off-road engines** are warranted for the warranty period (**Same as warranty period of EPA Emission Warranty in this manual**). If any emission-related part on your engine is defective, the part will be repaired or replaced by Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.

Warranty coverage

- (a) The warranty period shall begin on the date the engine or equipment is delivered to an ultimate purchaser. The use of alternate fuels shall not void the warranties on any engine certified to use such fuel.
- (b) Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. of each **off-road compression-ignition engine** shall warrant to the ultimate purchaser and each subsequent purchaser of the engine registered **in the state of California** that the engine is:
 - (1) Designed, built and equipped so as to conform with all applicable regulations adopted by the Air Resources Board pursuant to its authority **in Chapters 1 and 2, Part 5, Division 26** of the Health and Safety Code; and.
 - (2) Free from defects in materials and workmanship which cause the failure of a warranted part to be identical in all material respects to the parts as described in Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.'s application for certification for a period of **5 years or 3,000 hours** of operation, whichever occurs first, for all engines rated at **19kW** and greater, except as noted below. In the absence of a device to measure hours of use, the engine shall be warranted for a period of **5 years**. For all engines rated less than **19 kW**, and for constant-speed engines rated under **37 kW** with rated speeds higher than or equal to 3,000 min⁻¹, the period of **2 years or 1,500 hours** of operation, whichever occurs first, shall apply. In the absence of a device to measure hours of use, the engine shall be warranted for a period of **2 years**.
- (c) The warranty on emission-related parts shall be interpreted as follows:
 - (1) Any warranted part which is not scheduled for replacement as required maintenance in the written instructions required by Subsection (e) shall be warranted for the warranty period defined in Subsection (b) (2). If any such part fails during the period of warranty coverage, it shall be repaired or replaced by Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. according to Subsection (4) below. Any such part repaired or replaced under the war-ranty shall be warranted for the remaining warranty period.
 - (2) Any warranted part which is scheduled only for regular inspection in the written instructions required by Sub-

- Attachment

section (e) shall be warranted for the warranty period defined in Subsection (b) (2). A statement in such written instructions to the effect of "repair or replace as necessary" shall not reduce the period of warranty coverage. Any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.

- (3) Any warranted part which is scheduled for replacement as required maintenance in the written instructions required in Subsection (e) shall be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part shall be repaired or replaced by Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. according to Subsection (4) below. Any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.
 - (4) Repair or replacement of any warranted part under the warranty provisions of this article shall be performed at no charge to the owner at a warranty station.
 - (5) Notwithstanding the provisions of Subsection (4) above, warranty services or repairs shall be provided at all Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. distribution centers that are franchised to service the subject engines.
 - (6) The owner shall not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station.
 - (7) Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. shall be liable for damages to other engine components proximately caused by failure under warranty of any warranted part.
 - (8) Throughout the engine's warranty period defined in Subsection (b) (2), Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. shall maintain a supply of warranted parts sufficient to meet the expected demand for such parts.
 - (9) Any replacement part, as defined in Section 1900(b) (13), Title 13, may be used in the performance of any maintenance or repairs and must be provided without charge to the owner. It is not necessary for replacement parts to be the same brand or by the same manufacturer as the original part sold with the engine. Such use shall not reduce the warranty obligations of Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.
 - (10) Add-on or modified parts, as defined in Section 1900(b)(1) and (b)(10), Title 13, that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts shall be grounds for disallowing a warranty claim made in accordance with this article. Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. shall not be liable under this article to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.
 - (11) The Executive Officer may request and, in such case, Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. shall provide, any documents which describe that Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.'s warranty procedures or policies.
- (d) Warranted parts list.
- (1) Fuel metering system.
 - (A) Fuel injection system.
 - (B) Air/fuel ratio feedback and control system.
 - (C) Cold start enrichment system.
 - (2) Air induction system
 - (A) Controlled hot air intake system.
 - (B) Intake manifold.
 - (C) Heat riser valve and assembly.
 - (D) Turbocharger/supercharger systems.
 - (E) Charged air cooling systems.
 - (3) Exhaust gas recirculation (EGR) system
 - (A) EGR valve body, and carburetor spacer if applicable.

- (B) EGR rate feedback and control system.
- (4) Air injection system
 - (A) Air pump or pulse valve.
 - (B) Valves affecting distribution of flow.
 - (C) Distribution manifold.
- (5) Catalyst or thermal reactor system
 - (A) Catalytic converter.
 - (B) Thermal reactor.
 - (C) Exhaust manifold.
- (6) Particulate controls
 - (A) Traps, filters, precipitators, and any other devices used to capture particulate emissions.
 - (B) Regenerators, oxidizers, fuel additive devices, and any other device used to regenerate or aid in the re-generation of the particulate control device.
 - (C) Control device enclosures and manifolding.
 - (D) Smoke puff limiters.
- (7) Advances oxides of nitrogen (NOx) controls
 - (A) Nox absorbers.
 - (B) Lean NOx catalysts.
 - (C) Selective catalyst reduction.
 - (D) Reductant (urea/fuel) containers/dispensing systems.
- (8) Positive crankcase ventilation (PCV) system
 - (A) PCV valve.
 - (B) Oil filler cap.
- (9) Miscellaneous items used in above systems
 - (A) Vacuum, temperature, and time sensitive valves and switches.
 - (B) Electronic control units, sensors, solenoids, and wiring harnesses.
 - (C) Hoses, belts, connectors, assemblies, clamps, fittings, tubing, sealing gaskets or devices, and mounting hardware.
 - (D) Pulleys, belts and idlers.
 - (E) Emission control information labels.
 - (F) Any other part with the primary purpose of reducing emissions or that can increase emissions during failure without significantly degrading engine performance.
- (e) Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. shall furnish with each new engine written instructions for the maintenance and use of the engine by the owner.

- Attachment

Owner's Warranty Responsibilities

*As the off-road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. recommends that you retain all receipts covering maintenance on your off-road engine, but Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

*As the off-road engine owner, you should, however, be aware that our company may deny you warranty coverage if your off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

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

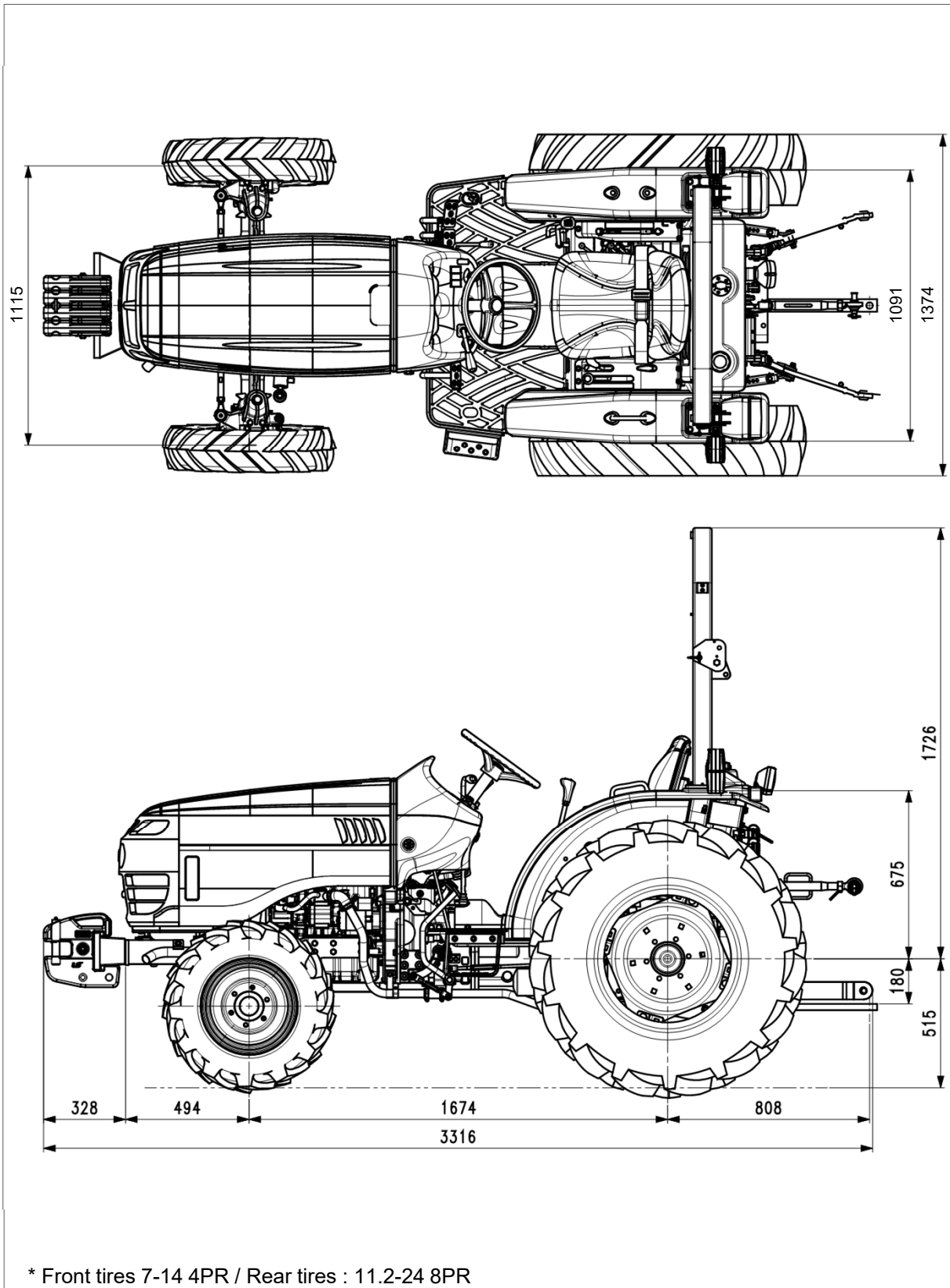
*You are responsible for initiating the warranty process. The ARB suggests that you present your off-road engine to a Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. dealer or distributor dealer as soon as problem exists. The warranty repairs should be completed by the dealer or distributor as expeditiously as possible.

If you have any questions regarding your warranty rights and responsibilities, you should contact Mitsubishi Turbocharger and Engine America, Inc. at **1-630-268-0750**.

6. Dimension and Specification

– 4WD model

(Unit : mm)



		MT225E	MT225HE
WEIGHT	Roll-bar type	1104kg (2434 lb)	1120kg (2469 lb)
	Cabin type	N/A	N/A
	Bumper	21kg (46.3 lb) (optional)	
	Front weight	20kg (44.1 lb) x 4EA (optional)	
ENGINE	Model	S3L2-W462GTA	
	Type	Indirect, Swirl Chamber	
	No. of cylinder	3	
	Diameter x stroke	78 x 92mm (3.07x3.62 in.)	
	Displacement	1,318cc (80.4 in³)	
	Compression ratio	22.0 : 1	
	Engine speed	985±15~2700±25 rev/min(Engine only) But, idle rpm is adjusted to reduced the vibration level as follow 1000~1100 rev/min(HST) / 1200~1300 rev/min(MEC)	
	Maximum torque	76.3N.m / 2000rev/min	
	Engine rated power	18.4kW / 2500 rev/min	
FUEL INJECTION PUMP	Type	IN-LINE pump; ND-PFR, Electronic governor	
	Fuel filter	Replaceable element type	
	Injection order	1-3-2	
LUBRICATION SYSTEM	Type	Forced circulation	
	Pump	Trochoid gear pump	
	Filter	Replaceable cartridge type	
COOLING SYSTEM	Pump	Centrifugal type	
	Temperature control	Thermostat	
	Air cleaner	Dry	
TRANSMISSION	Type	F12xR12 Mechanical	Hydrostatic (HST)
	Main clutch	Dry single clutch	N/A
	Forward / Reverse	Synchro-shuttle lever	HST pedals
	Differential lock	Mechanical pedal type	Mechanical pedal type

		MT225E	MT225HE
REAR PTO	Type	Independent rear PTO / MID PTO(optional)	
	No. of speed	1 speed gear	
	PTO / Engine	540 rpm / 2509 rpm	
HYDRAULIC LIFT	3 Point linkage	CAT1	
	Draft load detection	N/A	
	Lowering speed control and cylinder fixing device	Down speed control valve	
	Pump	Gear pump type, Engine drive	
	Rated flow	30.0LPM (7.9GPM)	
	System pressure	16.7MPa (2418psi)	
	Lift capacity	Lower link end	820 kgf (1808 lbf)
		24" behind lift point	650 kgf (1433 lbf)
REMOTE CONTROL	No. of spool	Double acting , Spring return type (optional)	
	No. of Q/coupler	N/A / 2EA / 4EA (optional)	
	F/Loader coupler	Front outlet valve	
STEERING SYSTEM	Type	Hydrostatic	
	Oil	Transmission oil	
	Min. turning radius (without brake)	3.2m (10.5 ft)	
	Min. turning radius (with brake)	2.8m (9.2 ft)	
	Max. steering angle	48°	
	No. of steering turns	3.7 (right) / 2.9 (left) turns (lock to lock)	
	Rated flow	17.5 LPM (4.6 GPM)	
	System pressure	11.8MPa (1707 psi)	

			MT225E	MT225HE
ALTERNAT OR	Rated output		12V - 50A	
	Voltage control		Built-in (IC type)	
BATTERY	Voltage		12V	
	Capacity		80AH	
START MOTOR	Output power		12V, 1.6kW	
	Operation		Solenoid type	
LIGHTS	Headlights (Low / High beam)		12V 55W / 60W	
	Turn signal lights / Side lights (front)		12V 21W / 10W	
	Turn signal lights (rear)		12V 10W	
	Stop light / Taillight (rear)		12V 21W / 5W	
	Work light		27W(on the rear roll-bar, optional)	
OTHERS	Instrument lights		LED	
	Indoor light (CAB)		N/A	
	Instrument & indicator lights		LED	
	Cold start aid		Glow plug	
STD. AGRI. TIRE	Front		7-14 (4PR)	
	Rear		11.2-24 (8PR)	
WHEEL TRACK ADJUSTMENT	Front	Tracks	2	
		Dimension	1115~1207mm (43.9~47.5 in.)	
	Rear	Tracks	6	
		Dimension	1091~1321mm (43.0~52.0 in.)	
** These specifications are only general product information about standard model. Actual data may vary depending on the various optional product, and also can be changed at any time to improve the product qualification without any prior notification **				

Lubricants and Capacity

Lubricants	Capacity	International Standard	Recommended products
Engine coolant	4.9 L (1.3 U.S.gals.)	ASTM D6210	Soft water (50%) + Anti-freeze (50%)
Fuel	28 L (7.4 U.S.gals.)	ASTM D975 No.2	Ultra low sulfur diesel fuel
Engine oil	4.2 L (1.1 U.S.gals.)	API CF-4 or CG-4	KIXX DL (Manufacturer : GS Caltex)
Transmission oil (common use for hydraulic lift and steering system)	32 L (8.5 U.S.gals.)	API GL4 ISO VG 32/46	LSTH400G (Manufacturer : GS Caltex)
Front axle oil	6.5 L (1.7 U.S.gals.)	API GL4 SAE 80W	EPK 80W90 (Manufacturer : S-OIL TOTAL Co. Ltd.)
Grease (Front axle holder, Steering cylinder pin, 3-point linkage, etc.)	Proper amount	NLGI 2	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										



LS Tractor USA LLC.

PO Box 70, Battleboro, NC 27809

Tel : 252-984-0700

Fax : 252-984-0701

www.lstractor.com

www.lstractorusa.com