OPERATION MANUAL

SUB-COMPACT TRACTOR
COMPACT TRACTOR

SA Series

(Tractor Serial Number 400001 -)

SA221

SA324

SA424

YANMAR

CALIFORNIA

Proposition 65 WARNING

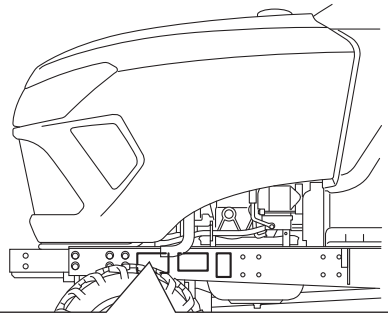
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

IMPORTANT

Pursuant to California Public Resources Code Section 4442.6
WARNING - Operation of This Equipment May Create Sparks That Can Start Fires Around Dry Vegetation. A Spark Arrestor May be Required. The Operator Should Contact Local Fire Agencies For Laws or Regulations Relating to Fire Prevention Requirements.

1A8250-65390

NOTE
The following decal is applicable only for SA221/SA324/SA424.



Operator's Record

Owner's Name	
Owner's Address	
Owner's Phone Number	
Dealer/Seller Name	
Dealer/Seller Address	
Dealer/Seller Phone Number	

INTRODUCTION

Welcome to the World of Yanmar Tractor

Thank you for purchasing Yanmar tractor product that has been designed and manufactured based on the Yanmar state-of-the-art technology and rich expertise in developing and manufacturing products.

Handle the tractor correctly by following the instructions in the *Operation Manual* so that the tractor will provide long years of reliable and predictable service.

The *Operation Manual* constitutes an indispensable part of the Yanmar tractor product. Always keep the *Operation Manual* readily accessible.

Carefully study the *Operation Manual* to get familiar with the instructions and informations contained in the *Operation Manual*. The instructions and informations are helpful in using the tractor correctly and safely, avoiding personal injury and other accidents during operation and servicing of the tractor. When using any implement together with the tractor, also carefully study the *Operation Manual* of the implement so that the operator can use the implement safely, correctly and efficiently.

The *Operation Manual* is organized with sections arranged in a particular order so that the operator can better understand the safety messages and the controls on the tractor to help the operator operate the tractor correctly and safely. The *Operation Manual* will also help the operator answer questions about operation and servicing.

The tractor shown in the *Operation Manual* may somewhat differ from the actual tractor. The *Operation Manual* will still assist the operator in understanding the instructions associated with the tractor. Before delivery of the tractor, your Yanmar Tractor dealer has performed a pre-delivery check to ensure that the tractor can long remain problem free.

All information, descriptions, specifications, drawings, illustrations, and pictures in this manual are based on the latest information available at the time this manual was published. Yanmar reserves the right to make changes at any time without prior notice.

PICTOGRAPHS

To help assist the operator in operating the tractor, various easy-to-understand pictographs have been developed and are used throughout this manual. They are listed below together with their meanings.


Safety alert symbol

<Instrument panel>


Turn signal


Fuel level


Revolutions Per Minute (rpm)


Engine coolant warning light

Engine speed


Hour meter


Engine oil pressure


Alternator/battery charging light

<Starter key switch>


Engine start


Engine run


Engine shut-off


Preheating

<Lights>


Turn signal


Headlight


Headlight low

<Lights>


Hazard warning light

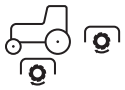
<Levers and knobs>


Power Take Off (PTO) OFF position


Power Take Off (PTO) ON position


Slow


Fast


Position for moving the Mid- and Rear Power Take Off (PTO) at the same time


Position for moving only the Rear Power Take Off (PTO)


Position control raised position


Position control lowered position


Hydraulic flow control/stop


Lock/unlock

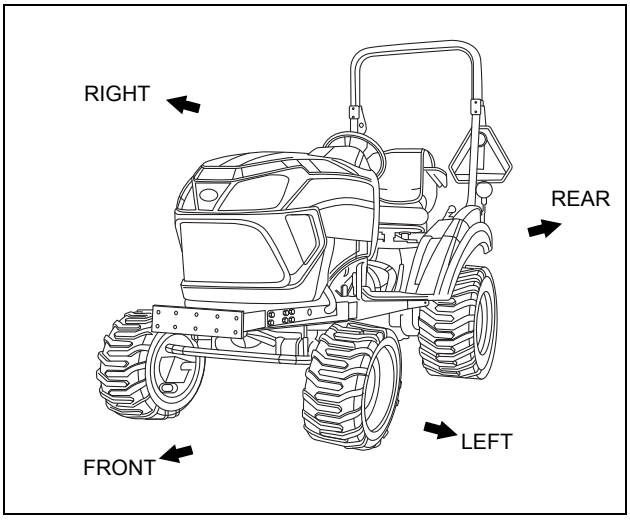

4-wheel drive on


2-wheel drive on

1. SAFETY PRECAUTIONS

1. About the Operation Manual

The *Operation Manual* presents messages that help the operator remain aware of potential hazards and possible tractor damage in operating and servicing the tractor. Carefully study all of the information in the *Operation Manual* so that the operator can avoid personal injury or property damage.



NOTE

- Unless otherwise stated, the expressions right hand side, left hand side, front side and rear side, used throughout the *Operation Manual* are relative to the operator's position.

2. Safety Alert Symbols

The safety alert symbol appears with most safety statements. The safety alert symbol means attention, become alert, the operator's safety is involved! Please read and strictly observe the message that follows the safety alert symbol.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, *will* result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, *could* result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates a situation which can cause damage to the tractor, personal property and/or the environment or cause the equipment to operate improperly.

IMPORTANT: Means that implement or property damage could occur if instructions are ignored.

NOTE: Provides useful information.

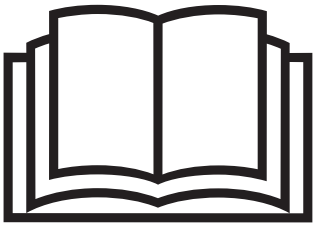
WARNING: READ AND FOLLOW ALL INSTRUCTIONS IN THE *OPERATION MANUAL* BEFORE ATTEMPTING TO OPERATE THE TRACTOR. FAILURE TO COMPLY WITH THE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

WARNING: The engine exhaust, some of its constituents and certain tractor components contain or emit chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

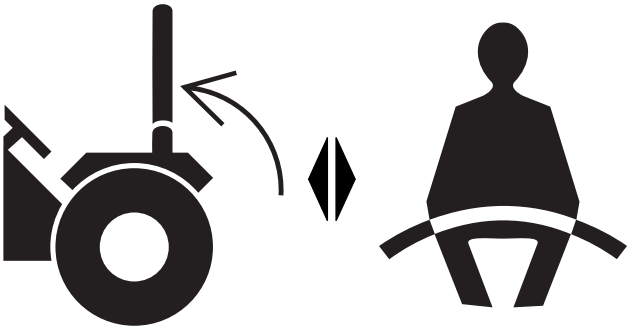
DANGER: The tractor is built to be operated according to the rules for safe operation in the *Operation Manual*. As with any type of power equipment, carelessness or error on the part of the operator can result in serious injury. To help prevent accidents, read and take the following precautions before operating the tractor. Failure to observe the following safety instructions could result in serious injury or death.

3. Precautions Before Operating the Tractor

1. Understand the performance and limitations of the tractor. Carefully study the *Operation Manual* and learn the instructions in the *Operation Manual* before operating or servicing the tractor. Keep the *Operation Manual* in an easily accessible place.



2. Strictly follow the statements given in the safety decals attached to the tractor.
3. Do not operate the tractor without the Roll-Over Protective Structure (ROPS).
   Keep the retractable seatbelt fastened while operating the tractor with the Roll-Over Protective Structure (ROPS). The preceding practice will reduce the possibility of injury or death in the event of roll over accident.
   If the Roll-Over Protective Structure (ROPS) has been removed for any reason, ensure to install all the associated parts before operating the tractor. Do not alter the Roll-Over Protective Structure (ROPS). The altered Roll-Over Protective Structure (ROPS) may fail to provide the designed protection. Replace the damaged Roll-Over Protective Structure (ROPS) immediately. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.
   The Roll-Over Protective Structure (ROPS) may be temporarily folded when absolutely necessary for areas with height limitations. Do not wear the retractable seatbelt when the Roll Over Protective Structure (ROPS) is in the folded position. For operator safety, always keep the Roll-Over Protective Structure (ROPS) installed in the tractor.
   NEVER alter or repair the Roll-Over Protective Structure (ROPS). Welding, bending, drilling, grinding or cutting may weaken the Roll-Over Protective Structure (ROPS). Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance. The seat is included in the safety zone by ROPS. When replacing the seat, use Yanmar genuine parts.
4. Use the retractable seatbelt while operating the tractor with the Roll-Over Protective Structure (ROPS) in the upright position in the tractor. Check the retractable seatbelt for any damage. Replace the damaged retractable seatbelt immediately. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance. Do not modify, disassemble or attempt to repair the seat belt.



5. Check overhead clearance carefully before driving under power lines, wires, bridges or low hanging tree branches, before entering or leaving buildings, or in any other situation where the operator and/or Roll-Over Protective Structure (ROPS) may be struck, which could result in serious injury.
6. Make sure that the usual operator and any other person who will operate the tractor studies the *Operation Manual* before operation. Know the controls and how to stop the tractor quickly.
7. Make sure that any person or obstacle is not under or around the tractor before and during operation. Make sure to maintain sufficient overhead clearance above the tractor.
8. Do not operate the tractor and/or implement installed on the tractor while under the influence of alcohol, drugs, medicine or controlled substance/s or when not fit to operate the tractor.
9. During operation and when performing service work:
   - Wear close-fitting clothing.
   - Do not wear loose-fitting clothes, jewelry, baggy or torn clothing.
   - When any of the preceding items is caught by a moving part of the tractor, an accident can happen.
   - Do not wear cut-off pants or shorts which do not provide protection against flying debris.
   - Do not under any circumstances operate the tractor with bare feet.
   - Do not wear sandals or sneakers.

- Wear additional protection including non-slip safety boots or shoes, protective goggles and gloves, etc., as appropriate or required by applicable local laws and regulations.
- Wear ear protection in a noisy environment to prevent hearing damage and to reduce operator fatigue.

10. Avoid allowing passenger/s on any portion of the tractor.
11. Always remain seated in the operator seat while operating the tractor.
12. Make sure that the brakes and other mechanical components are properly adjusted and do not have excessive wear.
    - Immediately replace all excessively worn out or damaged components.
    - At regular intervals, check that all nuts, bolts and screws are properly tightened. (For details, see "Chapter 13. MAINTENANCE" on page 13-1).
13. Always keep the tractor clean. Dust, grease or grass clippings accumulated on the tractor can lead to fire accidents or personal injury.

14. Use the handholds and running board step when getting on and off the tractor to help prevent accidental falls. Keep the running board step clear of mud and debris.
15. Only use the implements that satisfy the requirements in the *Operation Manual* or are approved by your Yanmar tractor dealer. (For details, see "Chapter 4. IMPLEMENT CAPACITIES" on page 4-1).
16. When using front, mid- or rear mounted implements, install an appropriate weight/s to the front or rear of the tractor to prevent upsetting the tractor. When using the mid-implement, the operator may use front and rear weights. If the operator choose to use the loader, mount an implement or weight to the 3-point hitch in order to stabilize the tractor. Observe the instructions about safety in the *Operation Manual* for the implement to be used.
17. Remember that a narrower tire tread width can lead to greater possibility of upsetting the balance of the tractor. To positively stabilize the tractor, select a maximum possible tire tread width appropriate for the intended application. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.
18. Do not under any circumstances modify the tractor. Modification can deteriorate the performance and/or safety of the tractor, possibly leading to personal injury or property damage.
19. Do not attempt to adjust the low or high idle speed limit screw. Adjusting the low or high idle speed limit screw may impair the safety and performance of the tractor and shorten the life of the tractor.

4. Safe Practices for Operating the Tractor

1. Start the Tractor

1. Remain seated in the operator seat when starting the engine or actuating the levers or controls. Do not start the engine or operate controls while standing beside the tractor.
2. Before starting the engine, ensure that all the levers are in the N (neutral) positions, the parking brake is engaged securely, and Power Take Off (PTO) switch is in the OFF position.
3. Always keep the retractable seatbelt fastened around the operator's waist whenever the Roll-Over Protective Structure (ROPS) is installed on the tractor.
4. If the tractor is started where there is a height limitation, immediately after exiting from low height structure return the Roll Over Protective Structure (ROPS) and fasten the retractable seatbelt.
5. Start the engine of the tractor only by using the starter key switch. Avoid starting the engine by short circuiting across the starter solenoid terminals with a jumper wire, or by bypassing the safety start switch. This defeats the safety interlock circuit and the tractor may begin to move and/or the Power Take Off (PTO) shafts may begin to rotate, possibly leading to personal injury or property damage.
6. Avoid running or idling the engine in a confined area that is poorly ventilated or not ventilated at all. The engine emits carbon monoxide gas that is colorless, odorless and can cause death.

7. Before operation, check that all the safety features are functioning correctly. Never tamper with safety devices. Check the proper operation regularly. Contact YOUR LOCAL YANMAR TRACTOR DEALER for safety devices malfunction.
8. Avoid accidental contact with control pedals while the engine is running, as this can cause unexpected movement of the tractor.
9. Always attend to the running tractor.

2. Work with the Tractor

1. Make sure that all the covers and guards are in position. Replace any missing or damaged covers immediately.
2. Before turning or during traveling on a rough terrain, or before stopping, decrease the tractor speed in order to prevent upsetting.
3. Use extra caution during operating over rough ground, when crossing ditches or operating on slopes and when turning corners.
4. Stay clear of ditches, potholes, embankments or ponds. The incident of upsetting the tractor can occur more on soft or wet ground. Before entering an area covered with tall grass, inspect the area to detect any obstacles.
5. The operator should always pay attention for blind corners, trees and other object that can obstruct the operator's vision. The operator should always remain alert when approaching the row of trees or any obstacle.
6. When two or more people are working in one area, always keep in good communication between each other.
7. Do not under any circumstances get on or off the moving tractor.
8. When driving at night, ensure that all necessary lights are illuminated.
9. When driving, do not shift the range gear. Always shift the range gear when the tractor is completely stopped.

3. Stop the Tractor

The procedures of stopping the tractor are as follows:

1. Reduce the engine speed.
2. Release the forward and reverse drive pedal completely.
3. Depress the brake pedal to stop the tractor.

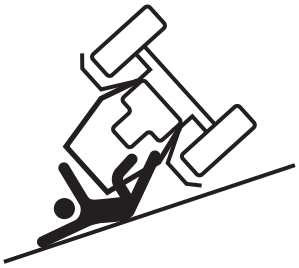
4. Considerations for Safety of a Child

Tragic accidents can occur if the operator is not alert to the presence of a child. A child is often attracted to the tractor. A child does not understand the dangers. Never assume a child will remain where the operator last saw the child.

1. Keep a child out of the operating area and under the watchful care of an adult other than the operator.
2. Be alert if a child enters the work area, stop the tractor immediately.
3. Never allow a child to ride on the tractor. The child can fall off and be seriously injured or interfere with safe tractor operation.
4. Never allow a child under 16 years old to operate the tractor. A child, 16 years old and under should only operate the tractor under close parental supervision and proper instruction.
5. Be extremely careful when backing the tractor. Before and during backing, look back and downward. A child may be in the path.
6. Use extra care when approaching blind corners, shrubs, trees or other objects that may obscure the operator’s vision of a child or other hazard.
7. Never allow a child to play on the tractor or implement.
8. Keep a child away from hot or running engine. The child may suffer burns.

5. Operate the Tractor on Slopes

On a slope, the tractor is less stable and more prone to tip over, possibly leading to serious injury or death. Remain very cautious while the tractor is on any slope.



DO:

- Operate up and down slopes, not across.
- Remove obstacles such as rocks, limbs, etc.
- Watch for potholes, ruts or bumps. Uneven terrain can overturn the tractor. Tall grass can hide such obstacles.
- Place the transmission in the low range when climbing or descending slopes. Always keep the tractor in gear when going down slopes to take advantage of engine braking action.
- Keep all movement on the slopes slow and gradual. Do not make sudden changes in speed or direction. Rapid engagement or braking can cause the front of the tractor to lift and rapidly tip over backwards which can cause serious injury.
- Avoid starting or stopping on a slope. If tires lose traction, push down Power Take Off (PTO) switch to OFF position and proceed slowly straight down the slope.
- To avoid tipping or turn over, move backward up a steep slope. If backing on the slope is difficult, do not attempt to continue. Avoid an extremely steep slope.
- When moving forward to get out from a ditch, deep mud or when traveling on a steep slope, the risk of the tractor tipping or turn over backward is high. Always move backward to get out from these situations. In the 4-wheel drive mode, special caution is needed to avoid potential tipover when traveling up and down slope site conditions.
- To improve stability on a slope, select the widest possible tire tread width. Observe the instructions for appropriate weighting.
- Do not operate on wet grass. Tires may lose traction on slopes even though the brakes are functioning properly.
- Keep away from drop-offs, ditches or embankments during mowing. The mower could suddenly turn over if a wheel goes over the edge of a cliff, ditch or if an edge caves in.

⚠ WARNING

- **Keep away from slopes steeper than 15 degrees. See page 8-17 "Operate on Slopes and Rough Terrain" for the details.**
- **Before approaching a slope, select an appropriate speed setting. Make sure to run the tractor at a lower speed on slopes. Never attempt to shift gears on a slope. The tractor can suddenly go downhill out of control. Avoid increasing and decreasing the tractor speed rapidly.**
- **Do not move the range shift lever in the N (neutral) position when on a slope.**
- **When climbing or descending a slope, do not shift the range shift lever. Shifting the range shift lever into the N (neutral) position can result in loss of control of the tractor.**
- **Starting the tractor with the front end uphill can cause the front wheels to jump off the ground and this situation poses an extreme danger. To avoid this problem, run the engine at a lower speed, and gently start the tractor.**
- **Avoid parking the tractor on a slope. If parking on a slope is unavoidable, chock all the tires safely and securely and engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.**

6. Travel on a Road

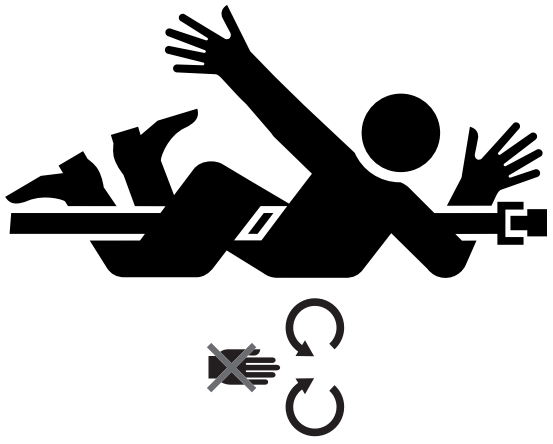
1. Disengagement of the 4-wheel drive is recommended.
2. Remember that the braking characteristics differ between the 2-wheel drive and 4-wheel drive modes. Be aware of the current drive mode and use carefully.
3. Before turning, always slow down the tractor. High speed turn may cause the tractor to tip over.
4. When traveling on a road, ensure that the Slow Moving Vehicle (SMV) emblem is on the rear of tractor and is clearly visible. Use the hazard lights and turn signal lights as required by the currently effective local laws or regulations.
5. Strictly observe all the currently effective local traffic and safety laws and regulations.
6. Turn ON the headlights as required by the currently effective local laws or regulations.
7. Always travel at a speed that allows the operator to maintain control of the tractor.
8. While traveling on a road, do not turn the steering wheel suddenly. Such an action can lead to loss in the stability of the tractor and can cause an extremely dangerous situation.
9. While on a road, do not attempt to operate an implement. During transportation, place the 3-point hitch control lever in the raised position and lock the 3-point hitch control lever with the position stop knob. Do not fully close the hydraulic flow control/stop knob to hold an implement in the raised position while the tractor is traveling with the implements. The preceding action can cause damage to the hydraulic lift circuit.
10. Use safety lights and devices at night because slow moving tractors on public road are hard to see.

7. Safe Practices for Parking the Tractor

1. Push down Power Take Off (PTO) switch to OFF position, lower the implements to the ground, move the range shift lever to N (neutral) position, engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3, shut off the engine and remove the key.
2. Before leaving the tractor, ensure that the tractor is completely stopped.
3. Avoid parking the tractor on a steep slope. Rather, park on solid and level ground whenever possible. If parking on a slope is unavoidable, park the tractor across the slope and lower the implement to the ground and chock all the tires safely and securely.

8. Operate the Power Take Off (PTO)

1. Before connecting/disconnecting, adjusting, cleaning or servicing Power Take Off (PTO) driven implement, ensure that all the moving components are not moving.
2. Make sure that Power Take Off (PTO) shaft cap is always in place. Replace Power Take Off (PTO) shaft cap only when the shaft is not moving.
3. Before installing or operating the Power Take Off (PTO) driven implement, carefully study the *Operation Manual* of the implement and the safety decals on the implement.
4. When installing stationary Power Take Off (PTO) driven implements, ensure to engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3, chock all the tires safely and securely. Avoid approaching or accessing any rotating component.



9. Use the 3-Point Hitch

1. Use the 3-point hitch only in conjunction with the implement that is specifically designed for use with the 3-point hitch.
2. Before using the 3-point hitch mounted implement, the appropriate weight may need to be installed on the front of the tractor.
3. While on a road, do not attempt to operate an implement.
   <SA221>
   During transportation, place the 3-point hitch control lever in neutral position with its implements raised and hydraulic flow control/stop knob closed.
   <SA324/424>
   During transportation, place the 3-point hitch control lever in the raised position and lock the 3-point hitch control lever with the position stop knob.
   Do not fully close the hydraulic flow control/stop knob to hold an implement in the raised position while the tractor is traveling with the implement. The preceding action can cause damage to the hydraulic lift circuit.

10. Roll-Over Protective Structure (ROPS) Precautions

The tractor is equipped with a Roll-Over Protective Structure (ROPS) which must be maintained in a fully functional condition. Check overhead clearance carefully before driving under power lines, wires, bridges or low hanging branches, before entering or leaving buildings, or in any other situation where the operator and/or Roll-Over Protective Structure (ROPS) can be struck, which can result in serious injury.

1. Always keep the Roll-Over Protective Structure (ROPS) in its original condition.
2. Replace the Roll-Over Protective Structure (ROPS) whenever the Roll-Over Protective Structure (ROPS) has been damaged. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.
3. Never attach ropes, chains or cables to the Roll-Over Protective Structure (ROPS) for pulling purposes.
4. Although the Roll-Over Protective Structure (ROPS) provides the maximum protection possible, always take necessary precautions.

1. [4 Post Roll Over Protective Structure (ROPS) for SA424]

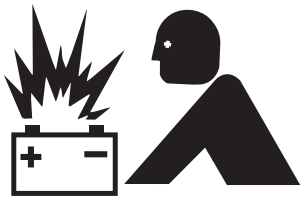
1. This 4 Post Roll Over Protective Structure (ROPS) is designed to be used on Yanmar original equipped parts and under proper operation. Any modification to the front loader and tractor frame including, but not limited to, the conditions listed below are prohibited.
   - Installing a non-Yanmar brand front loader
   - Attaching non-Yanmar brand bucket beyond the capacity
   - Removing the front loader mounting bracket
2. Do not loose the bolts of front loader mounting bracket when the 4 post Roll Over Protective Structure (ROPS) is installed.
   If these bolts are found to be loose, Re-tighten them under specified torque immediately.

11. Safe Practices for Servicing the Tractor

Before starting any service work, park the tractor on solid and level ground, engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3, lower the implement to the ground, move the range shift lever to N (neutral) position, push down Power Take Off (PTO) switch to OFF position, shut off the engine and remove the key. Only trained adults should service the tractor. Understand the instructions in the Operation Manual before servicing.

1. Always keep a first aid kit and a fire extinguisher readily available.
2. Before accessing the engine, muffler, radiator and radiator cap or other possibly hot components, wait until the tractor has fully cooled down.
3. Keep the tractor and the attachments free of grass, leaves or other debris build-up.

4. Use extreme care in handling diesel fuels. Diesel fuels are extremely flammable and the vapors are explosive. Use only a container approved by the local effective law.
5. Close fuel shut-off valve before servicing the fuel system.
6. Make sure to shut off and cool the engine before refueling. After refueling, replace fuel filler cap securely and wipe off any spilled diesel fuel before starting the engine as the diesel fuel may cause a fire or explosion.
7. Do not smoke while refueling. Keep any spark or open flame away from the fuel tank.
8. Never refuel the tractor indoors because diesel fuel vapors will accumulate in the area.
9. Never store the fuel container or tractor indoor where there is an open flame or spark, such as a gas water heater, space heater or furnace.
10. Do not smoke while working around the battery. Keep any sparks or open flame away from the battery. The battery emits hydrogen and oxygen gasses, in particular during recharging and can pose a hazard of explosion.



11. Prior to “jump starting” a tractor that has fully depleted battery, read and follow all the instructions in “Chapter 15. SERVICE THE ELECTRICAL SYSTEM” on page 15-1.
12. Add coolant or water to the reserve tank, not to the radiator (For details, see “Check the Cooling System” on page 14-8).

13. Before working on or around electrical components, disconnect the negative (–) battery terminal first.
14. To prevent a spark occurring from short circuit, disconnect the negative (–) battery terminal first and reconnect last.

15. The operator must not mount a tire onto a rim. Only qualified person must mount tire onto a rim.
16. Always keep the tires at the correct tire air pressure level. Avoid exceeding the recommended tire air pressure specified in the *Operation Manual*.

17. Wheel bolts must be tightened to specified torque using the proper procedure anytime it is loosened.
18. Keep the tractor securely supported while changing the wheels or adjusting the tire tread width. Make sure to tighten the wheel bolts to the specified tightening torque.
19. Avoid working under any hydraulically supported devices. Such devices can leak, suddenly settle down, or be accidentally lowered. If working beneath the tractor or an implement is unavoidable, ensure to use a stand or lift apparatus with the capacity of more than 3 tons.
20. High pressure hydraulic fluid when released can penetrate human skin, possibly leading to serious personal injury. Before disconnecting any hydraulic line, fully release the internal pressure. Before exerting a pressure to the hydraulic system, ensure that all connections are tight and all the lines, pipes and hoses are free from fractures/fissures or any other damage.
21. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.
22. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

23. Check brake operation frequently. Adjust and service as required.
24. Keep all bolts and nuts tightened, make sure the tractor and the attachment is in safe working condition.
25. Avoid changing the engine governor settings or overspeed the engine. Excessive engine speeds are dangerous.
26. Observe proper waste disposal laws and regulations. Prior to disposal, determine the proper method to dispose of waste from your local Environmental Protection Agency. Recycling centers are established to properly dispose of materials in an environmentally safe fashion.
27. Use container approved by the effective law when draining fluids. Avoid using food or beverage containers that can mislead someone into drinking from food or beverage containers. Properly dispose of the containers immediately following the draining of fluids.
28. Observe your local Environmental Protection Agency regulations when disposing of oil, fuel, coolant, brake fluids, filters, batteries, tires and other harmful waste.
29. Yanmar does not recommend the use of a pressure washer or garden hose to clean the tractor. Electrical components, spindles, pulleys, bearings or the engine can be damaged. The use of water will result in shortened life and reduce serviceability.

WARNING: THE OWNER/OPERATOR RESPONSIBILITY: Restrict the use of the tractor to persons who read, understand and follow the warnings and instructions in the *Operation Manual* and on the tractor.

12. Replace the Rubber Product/s, such as Hydraulic Hose, Fuel Hoses, Power Steering Hoses, Radiator Hoses and Air Intake Hose for Every 2 Years

The rubber product/s has/have a deteriorative character. The deteriorated rubber product/s may cause defects and damages such as fluid leakage, loss control of the tractor during operation, fire, burn injury.

13. Use a Spark Arrestor

The engine in this machine is not equipped with a spark arrestor muffler. The California Public Resources Code, section 4442.5 provides as follows: No person shall sell, offer for sale, lease, or rent to any person any internal combustion engine subject to Section 4442 or 4443, and not subject to Section 13005 of the Health and safety Code, unless the person provides a written notice to the purchaser or bailee, at the time of sale or at the time of entering into the lease or rental contract, stating that it is a violation of Section 4442 or 4443 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land unless the engine is equipped with a spark arrestor, as defined in Section 4442, maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire pursuant to Section 4443. Cal. Pub. Res. Code 4442.5.
Other states or jurisdictions may have similar laws. A spark arrestor for your machine may be available from your authorized dealer. An installed spark arrestor must be maintained in good working order by the operator.

14. Understand the Tractor Safety Decals

■ Safety Alert Symbols

The tractor safety decals illustrated in this section are provided in critical areas on the tractor so that people including the operator can remain always aware of potential hazards.
The tractor safety decals contain the safety alert symbols and words. DANGER and WARNING reflect the most serious hazards.
The *Operation Manual* also contains special safety messages that explain potential hazards about which the operator must remain cautious. The messages are presented together with the word CAUTION and the safety alert symbol.

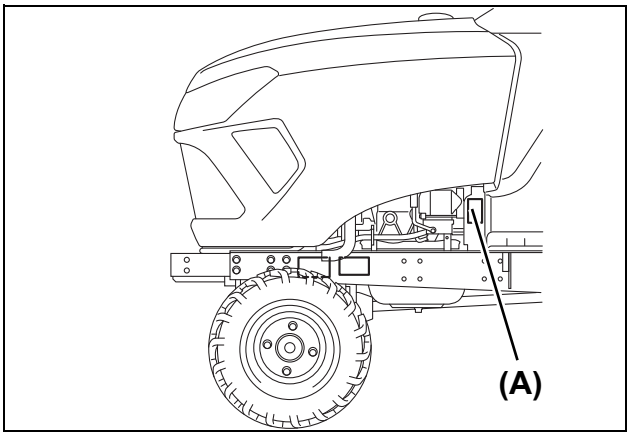
■ Care of Safety Decals

1. Always keep all the safety decals clean and clearly legible.
2. Clean the safety decals with soap and water, wipe dry with clean soft cloth.
3. Replace damaged or missing safety decals with new decals available from YOUR LOCAL YANMAR TRACTOR DEALER.
4. If a component having a safety decals is replaced with a new decal, ensure that the new decal is on the same location as of the old component.
5. Affix a new safety decals flat on a clean and dry surface, squeezing out trapped air.

(A) 1A8330-65300

⚠ DANGER

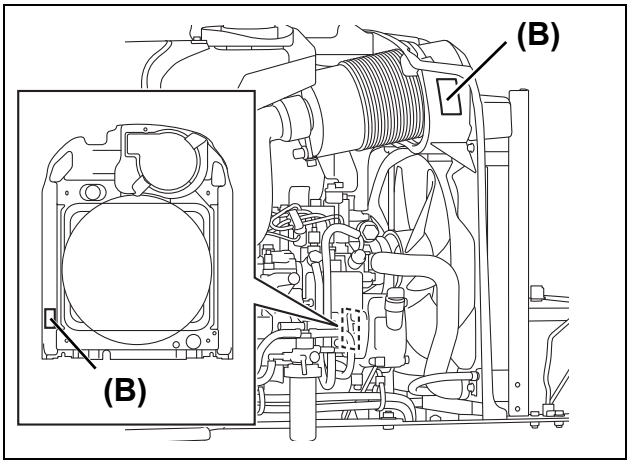
TO AVOID INJURY OR DEATH:
- **Do not start engine by shorting across starter terminals or bypassing safety start switch.**
- **Start engine only from seat with transmission and PTO OFF.**



(B) 1A7874-65400

⚠ WARNING

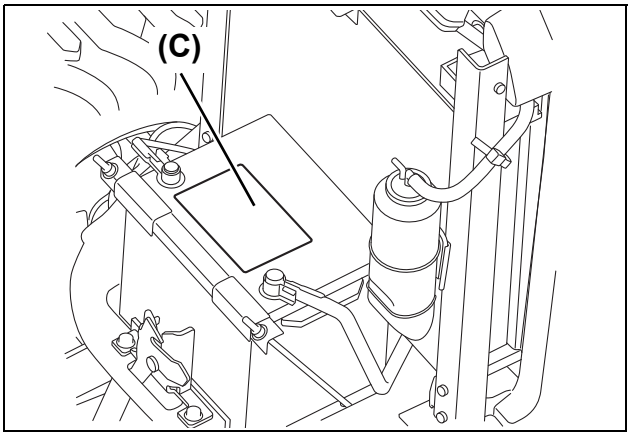
STAY CLEAR OF ENGINE FAN AND FAN BELT



(C) 1A8160-51521

⚠ DANGER

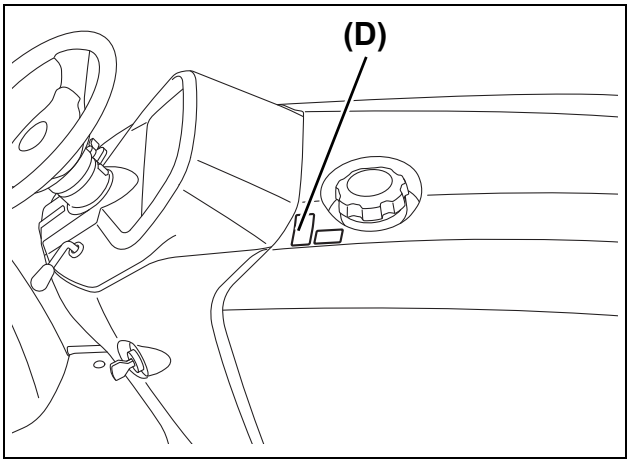
- **SHIELD EYES. EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY.**
- **NO SPARKS, FLAMES, SMOKING.**
- **SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS.**
- **FLUSH EYES IMMEDIATELY WITH WATER. GET MEDICAL HELP FAST.**
- **KEEP OUT OF REACH OF CHILDREN. DO NOT TIP. DO NOT OPEN BATTERY!**



(D) 1A8330-65930

⚠ WARNING

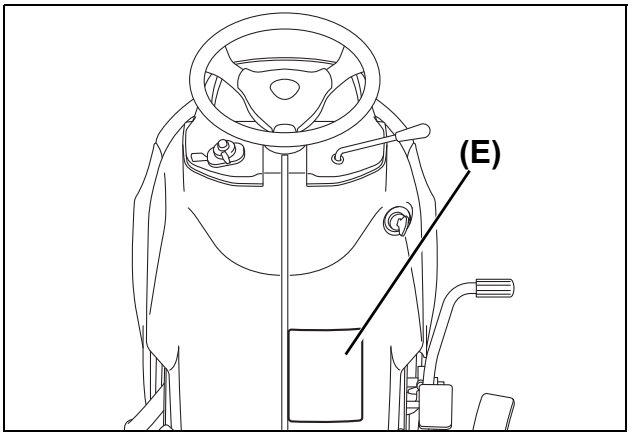
1. **Use extreme care in handling diesel fuels. Diesel fuels are extremely flammable and the vapors are explosive. Use only a container approved by the local effective law.**
2. **Make sure to shut off the engine before refueling. After refueling, replace fuel filler cap securely and wipe off any spilled diesel fuel before starting the engine as the diesel fuel may cause a fire or explosion.**
3. **Do not smoke while refueling. Keep any spark or open flame away from the fuel tank.**
4. **Never refuel the tractor indoors because diesel fuel vapors will accumulate in the area.**
5. **Never store the fuel container or tractor indoor where there is an open flame or spark, such as a gas water heater, space heater or furnace.**



(E) 1A8330-65320

⚠ CAUTION

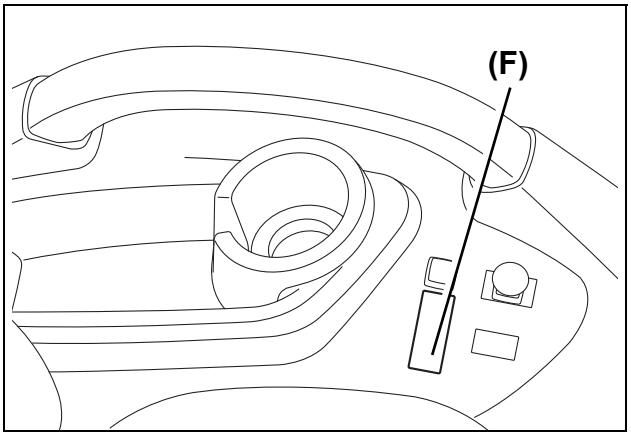
1. Do not operate the machine without guards, shields, and safety device in place.
2. Hitch towed loads only to drawbar to avoid rearward upset.
3. Make certain every person is clear of machine before starting engine.
4. Do not allow anyone except operator to ride on the tractor.
5. Keep hands, feet and clothing away from power-driven parts.
6. Use seat belt. Extend belt completely from retractor before adjusting to fit.
7. Reduce speed when turning or operating around hazards, on rough ground steep slopes.
8. Do not allow operation of the machine by untrained persons.
9. Before dismounting from or servicing the machine, be sure to - - -
   - Park on level ground.
   - Stop the engine.
   - Wait for all movements to stop.
   - Lower all implements to the ground.
   - Set the parking brake.
   - Remove the key.
10. Securely support tractor and implements before working underneath.
11. Abide by traffic regulations of each region when traveling public roads.
12. Start engine only from seated position with PTO disengaged and brakes engaged.

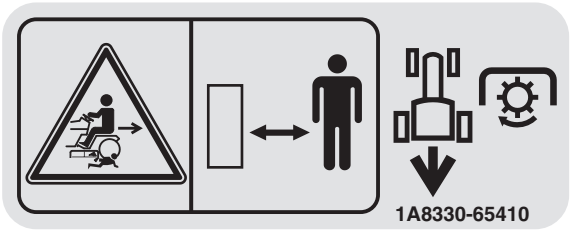


(F) 1A8330-65410

⚠ WARNING

Only use PTO in reverse when there are no children or others around

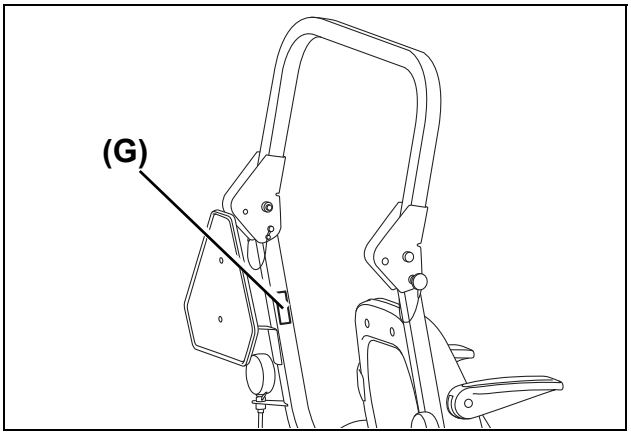




(G) 1A8330-65950

⚠ WARNING

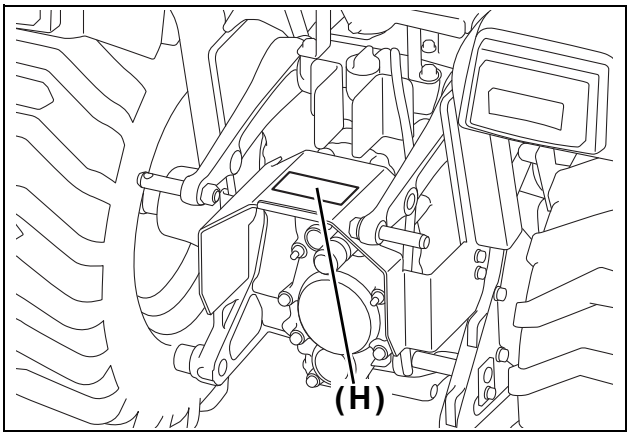
- **This structure's protective capability may be impaired by structural damage, overturn, or alteration. If any of these conditions occur, this structure must be replaced.**
- **Keep the retractable seatbelt fastened while operating the tractor with the Roll-Over Protective Structure (ROPS) in the unfolded "up" position.**
  - **the preceding practice reduces the possibility of injury or death in the event of a roll over accident**
- **Always lock ROPS in upright position unless it must be folded down to allow operation underneath trees and bushes.**



(H) 1A8330-65620

⚠ WARNING

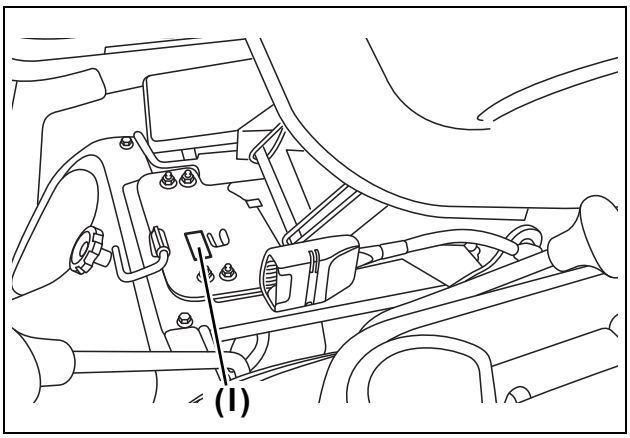
AVOID INJURY FROM PTO
- **Keep all shields in place.**
- **Keep hands, feet and clothing away.**
- **Operate only with 540 RPM.**



(I) 1A8330-65970 (Optional Swivel Seat Bracket)

⚠ WARNING

AVOID INJURY FROM SWIVEL SEAT BRACKET.
- **Never reach into the crushing area when folding down the swivel seat bracket.**
- **Hold the handle and operator seat when operating the swivel seat bracket.**



2. SERVICE THE TRACTOR

Your Yanmar tractor dealer is committed to provide reliable and quality services to the tractor. Through the preceding services, the full performance potential of the tractor can be realized.

After carefully studying the contents of the *Operation Manual*, the tractor owner/operator can perform certain regular maintenance work.

- Exercise caution so as not to injure the operator and other persons.
- Do not attempt to do work that is beyond the owner/operator capability and knowledge.

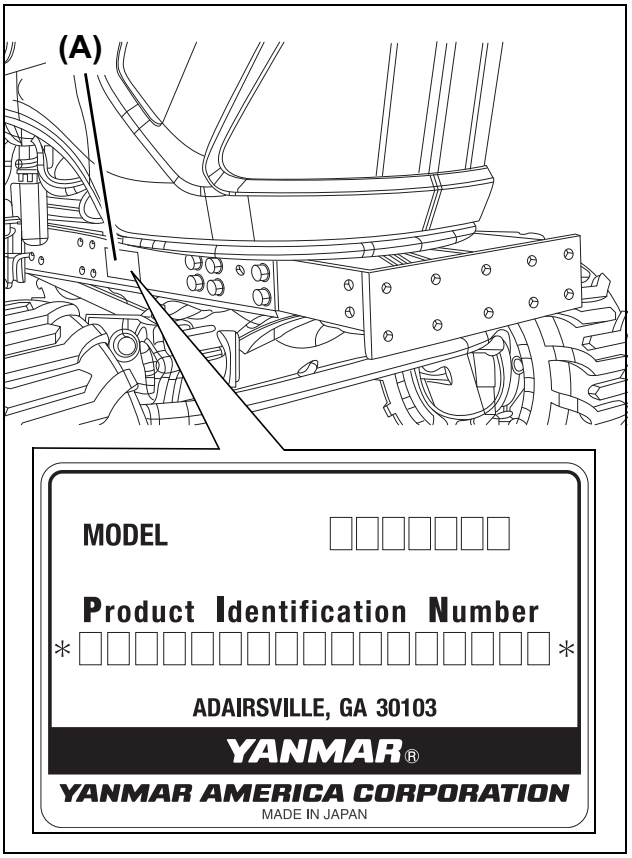
When in doubt, always consult YOUR LOCAL YANMAR TRACTOR DEALER.

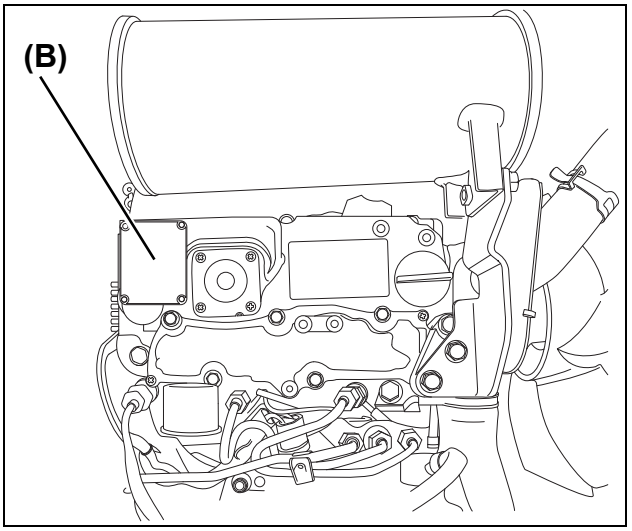
For information about servicing, contact YOUR LOCAL YANMAR TRACTOR DEALER.

For new parts and components and major service work, contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

When ordering a part or component, always provide the serial numbers of the following to YOUR LOCAL YANMAR TRACTOR DEALER:

- Tractor
- Engine
- Roll-Over Protective Structure (ROPS)



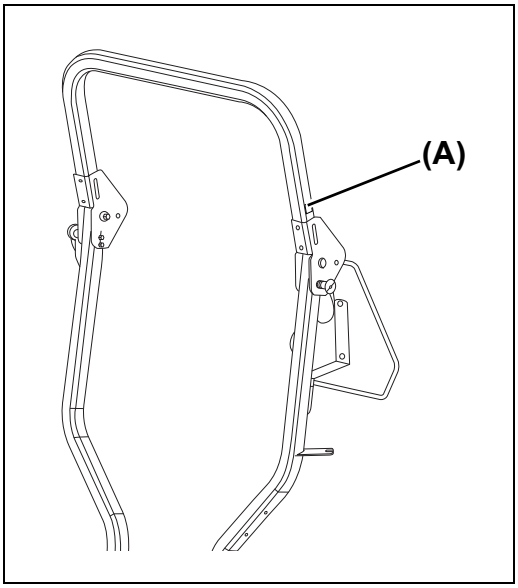


(A) Tractor identification plate with tractor serial number
(B) Engine serial number

After accepting delivery of the tractor, immediately find the serial numbers and enter the numbers into the following table.

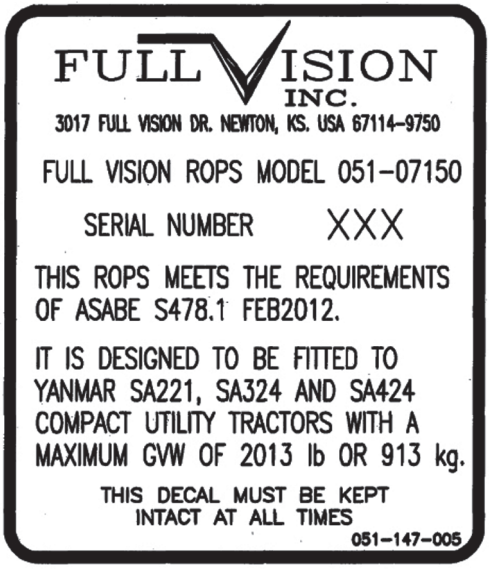
- The information in the table must come in handy, if for some reason, the serial numbers on the tractor are covered, erased or become illegible.

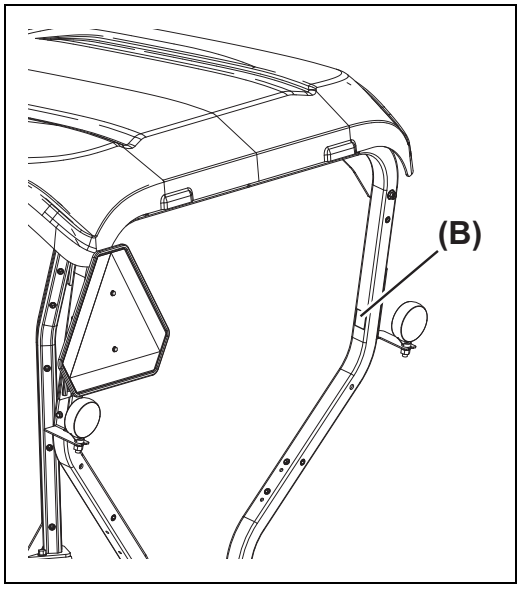
	Type	Serial No.
Tractor		
Engine		
Roll-Over Protective Structure (ROPS)		
Date of Purchase		
Name of Dealer		

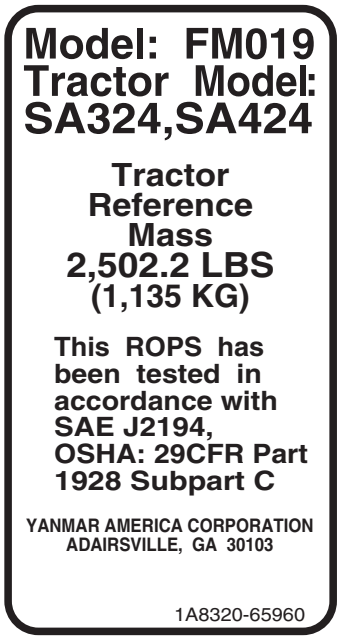


(A) Roll-Over Protective Structure (ROPS) serial number

[4 Post Roll Over Protective Structure (ROPS) for SA424]
(B) 4 Post Roll Over Protective Structure (ROPS) Serial Label







■ EMISSION SYSTEM WARRANTY

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

Your Warranty Rights and Obligations:

The California Air Resources Board (CARB), the United State Environmental Protection Agency (EPA) and YANMAR CO., LTD. hereafter referred to as YANMAR, are pleased to explain the **emission control system warranty** on your 2018, 2019, or 2020 model year industrial compression-ignition engine.
California-certified, new off-road compression-ignition engines must be designed, built and equipped to meet the State's stringent anti-smog standards. In the remaining forty nine (49) states, new non-road compression-ignition engines must be designed, built and equipped to meet the United States EPA emissions standards. YANMAR 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, the air induction system, the electronic control system, EGR (Exhaust Gas Recirculation) system and the diesel particulate filter system. Also included may be hoses, belts, connectors and other emission-related assemblies.

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

Manufacturer's Warranty Period:

2018, 2019, or 2020 model year off-road compression-ignition engines are warranted for the periods listed below. If any emission-related part on your engine is found to be defective during the applicable warranty period, the part will be repaired or replaced by YANMAR.

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

Warranty Coverage:

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

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

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

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

Warranted Parts:

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

(A) Fuel injection system (including Altitude compensation system)
(B) Cold start enrichment system
(C) Intake manifold and Air intake throttle valve
(D) Turbocharger systems
(E) Exhaust manifold
(F) Positive crankcase ventilation system
(G) Charge Air Cooling systems
(H) Exhaust Gas Recirculation (EGR) systems
(I) Electronic Control units, sensors, solenoids and wiring harnesses used in above systems
(J) Hoses, belts, connectors and assemblies used in above systems
(K) Emission Control Information Labels

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

Exclusions:

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

Owner's Warranty Responsibilities:

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

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

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

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

Website: https://www.yanmar.com
E-mail: CS_support@yanmar.com
Toll free telephone number: 1-800-872-2867, 1-855-416-7091

What the Emergency Stationary Type Engine Owner must Do:

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

3. SPECIFICATIONS

1. Specifications Table

Model			SA221	SA324	SA424
Power Take Off (PTO) Power hp (kW)			15.6 (11.6)	18.1 (13.5)	18.1 (13.5)
Engine	Maker		YANMAR		
	Model		3TNM74F	3TNV80F	3TNV80F
	Type		4 Cycle Inline, Water-Cooled Diesel		
	Number of Cylinders		3	3	3
	Bore and Stroke in. (mm)		2.92 × 3.03 (74 × 77)	3.15 × 3.30 (80 × 84)	3.15 × 3.30 (80 × 84)
	Total Displacement cu. in. (L)		60.6 (0.993)	77.2 (1.266)	77.2 (1.266)
	Gross Power: EPA Regulation hp (kW)		21.5 (16.0)	23.9 (17.8)	23.9 (17.8)
	Net Power hp (kW)		—	—	—
	Rated Revolution rpm		3200	3200	3200
	Maximum Torque ft•lbs (N•m)		39.4 (53.5)	45.7 (62.0)	45.7 (62.0)
	Battery		540CCA	540 CCA	540 CCA
	Fuel		Diesel Fuel		
Capacities	Fuel Tank US gal (L)		6.1 (23)		
	Engine Oil US qt. (L)		3.1 (2.9)	3.6 (3.4)	
	Engine Coolant US qt. (L)		3.0 (2.8)		
	Transmission Oil US gal (L)		4.1 (15.5)		
	Front-axle Oil US gal (L)		0.8 (3.0)		
Dimensions	Overall Length (with 3-Point Hitch) in. (mm)		102.1 (2594)	105.8 (2688)	
	Overall Width (with R4 Tires) in. (mm)		47.3 (1200)	54.6 (1387)	54.1 (1373)
	Overall Height (with Roll-Over Protective Structure (ROPS), R4 Tires) in. (mm)		82.3 (2090)	85.9 (2180)	87.2 (2215)
	Overall Height (with Folded ROPS, R4 Tires) in. (mm)		66.3 (1683)	70.4 (1789)	71.8 (1824)
	Overall Height (with R4 Tires) (Top of Steering Wheel) in. (mm)		51.1 (1299)	55.3 (1405)	56.7 (1440)
	Wheel Base in. (mm)		57.9 (1470)	63.0 (1600)	
	Min. Ground Clearance (with R4 Tires) in. (mm)		6.4 (163)	8.5 (215)	9.8 (249)
	Tread (with R4)	Front in. (mm)	35.2 (894)	37.8 (960)	
		Rear in. (mm)	35.2 (894)	42.5 (1080)	40.5 (1028)
Dimensions (with 4 Post ROPS and R4 Tires)	Overall Length (with 3-Point Hitch) in. (mm)		—	—	105.8 (2688)
	Overall Width (with R4 Tires) in. (mm)		—	—	54.4 (1382)
	Overall Height (with Roll-Over Protective structure, R4 Tires and Canopy) in. (mm)		—	—	83.1 (2112)
Weight (with Roll-Over Protective Structure (ROPS) and R4 Tires) lb. (kg)			1537 (697)	1715 (778)	1830 (830)

Weight (with 4 Post ROPS, R4 Tires and canopy) lb. (kg)				—	—	1989 (902)
Traveling System	Tire	Ag (R1)	Front	—		
			Rear	—		
		Turf (R3)	Front	18 x 8.50-10 4PR	23 x 8.50-12 4PR	23 x 8.50-12 4PR
			Rear	26 x 12.0-12 4PR	33 x 12.5-16.5 4PR	36 x 13.50-15 4PR
		Industrial (R4)	Front	18 x 8.50-10 6PR	23 x 8.50-12 4PR	23 x 8.50-12 4PR
			Rear	26 x 12.0-12 4PR	12-16.5 6PR	14-17.5 4PR
	Clutch			—		
	Steering			Hydrostatic Power		
	Transmission			Hydrostatic Transmission	Hydrostatic Transmission, 2 Range Speeds	
	Drive			Selected 4WD		
	Brake			Wet Disk		
	Minimum Turning Radius ft. (m)			7.87 (2.4)	8.53 (2.6)	
Hydraulic Unit	Hydraulic Control System			Select Control, Open Center	Position Control, Open Center	
	Pump Capacity (main) US gal/min. (L/min)			4.3 (16.1)		
	Pump Capacity (steering) US gal/min (L/min)			3.7 (14.1)		
	3-Point Hitch			Limited Category 1		
	Max. Lift Force	Lift Point lb. (kg)		—		
		24 in. Behind Lift Point lb. (kg)		660 (300)	1209 (548)	
	System Pressure psi (MPa)			1891 (13.0)	2429 (16.7)	
Power Take Off (PTO)	Type			Hydraulic Clutch		
	Rear	Shaft size		35 mm OD, 6 Splines.		
		Type		Independent		
		Speed/Engine rpm		540/3120 (554/3200)	540/3120 (554/3200)	540/3120 (554/3200)
	Mid	Shaft size		SAE 16/32, 15-Splines.		
		Type		Independent		
		Speed/Engine rpm		2000/3111 (2057/3200)	2000/3111 (2057/3200)	2000/3111 (2057/3200)

2. Traveling Speeds (Reference)

Model		Forward	Reverse
		mph (km/h)	mph (km/h)
SA221	—	0-8.6 (0-13.8)	0-6.3 (0-10.0)
SA324	Lo	0-5.9 (0-9.4)	0-4.1 (0-6.6)
	Hi	0-12.3 (0-19.6)	0-8.5 (0-13.7)
SA424	Lo	0-6.3 (0-10.0)	0-4.3 (0-7.0)
	Hi	0-13.1 (0-21.0)	0-9.1 (0-14.7)

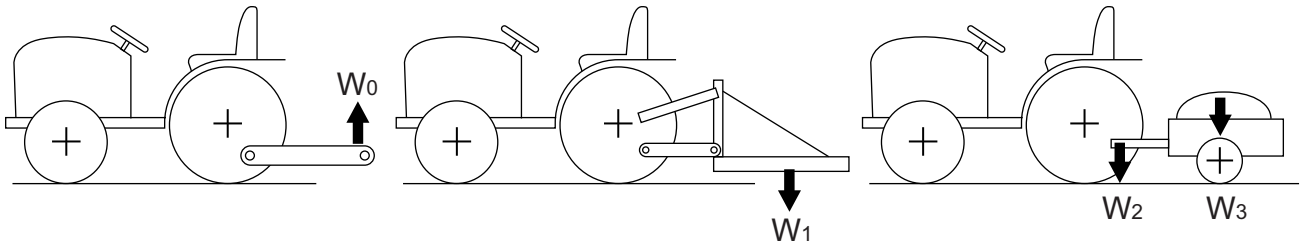
4. IMPLEMENT CAPACITIES

- Prior to delivery, the tractor is subjected to the load tests described below.
- The tests are designed to ensure the tractor performs safely and to specification when subjected to various loads and stresses.
- Only genuine implements approved by Yanmar should be used.

IMPORTANT

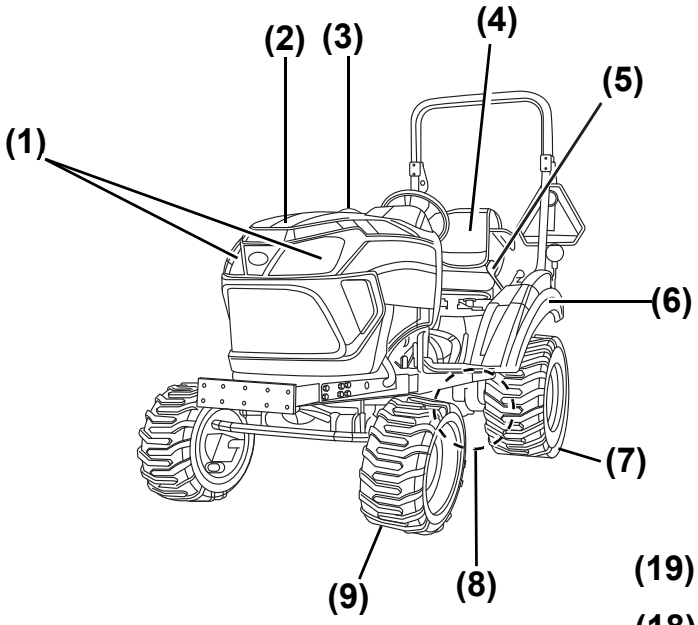
- Use only implements approved by YOUR LOCAL YANMAR TRACTOR DEALER.
- All implements used must conform to the approved specifications, per below.
- Implements that do not conform to the approved specifications below are unapproved.
- Using unapproved implements can result in malfunction, failure and damage to the tractor.
- Using unapproved implements can also increase the possibility of injury to the operator or other people.
- The Yanmar warranty does not cover any malfunction or failure that results from the use of an unapproved implement.
- Only Yanmar approved front loader and backhoe can be used.

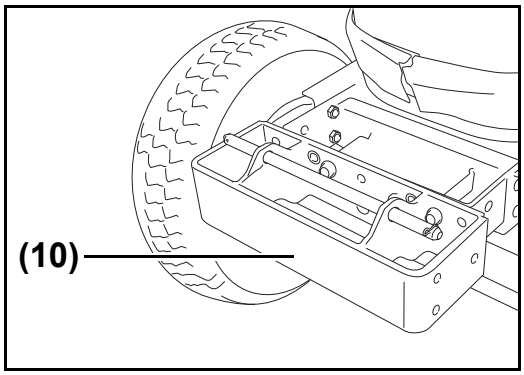
	Lower Link End Maximum Lifting Capacity	24 in. Behind Lift Point Maximum Lifting Capacity	Maximum Drawbar Load	Trailer Loading Weight Maximum Capacity
	W_0	W_1	W_2	W_3
lb.	SA221: 1146 SA324/424: 1512	SA221: 661 SA324/424: 1208	SA221: 406 SA324/424: 728	SA221: 1653 SA324/424: 2205
kg	SA221: 520 SA324/424: 686	SA221: 300 SA324/424: 548	SA221: 184 SA324/424: 330	SA221: 750 SA324/424: 1000

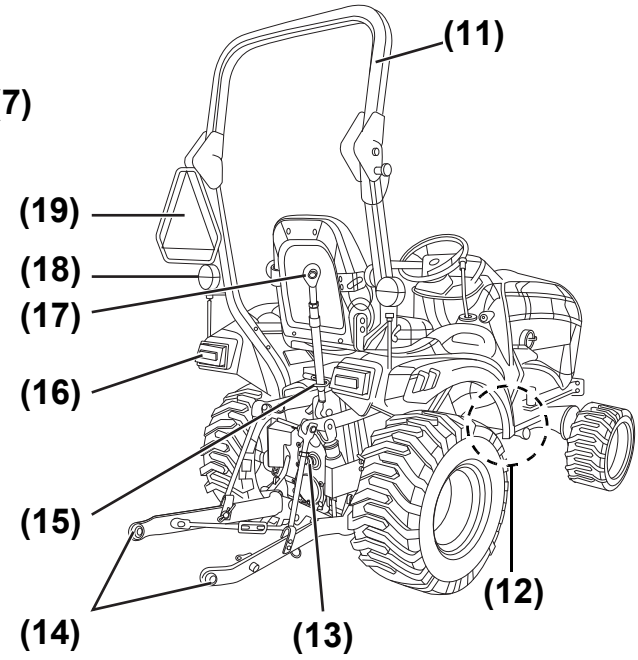


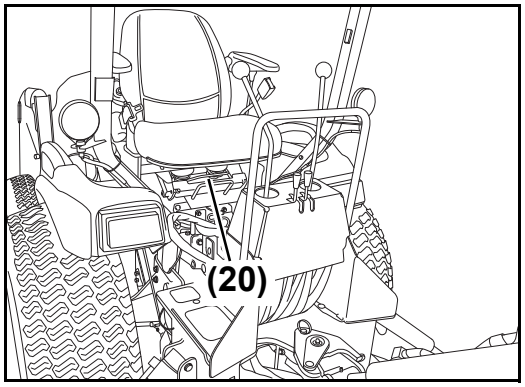
5. NAMES AND FUNCTIONS OF COMPONENTS

1. Overview

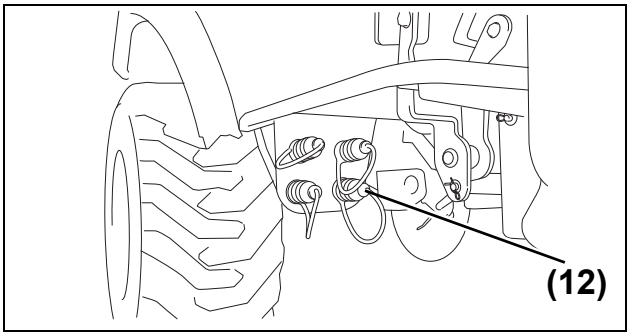




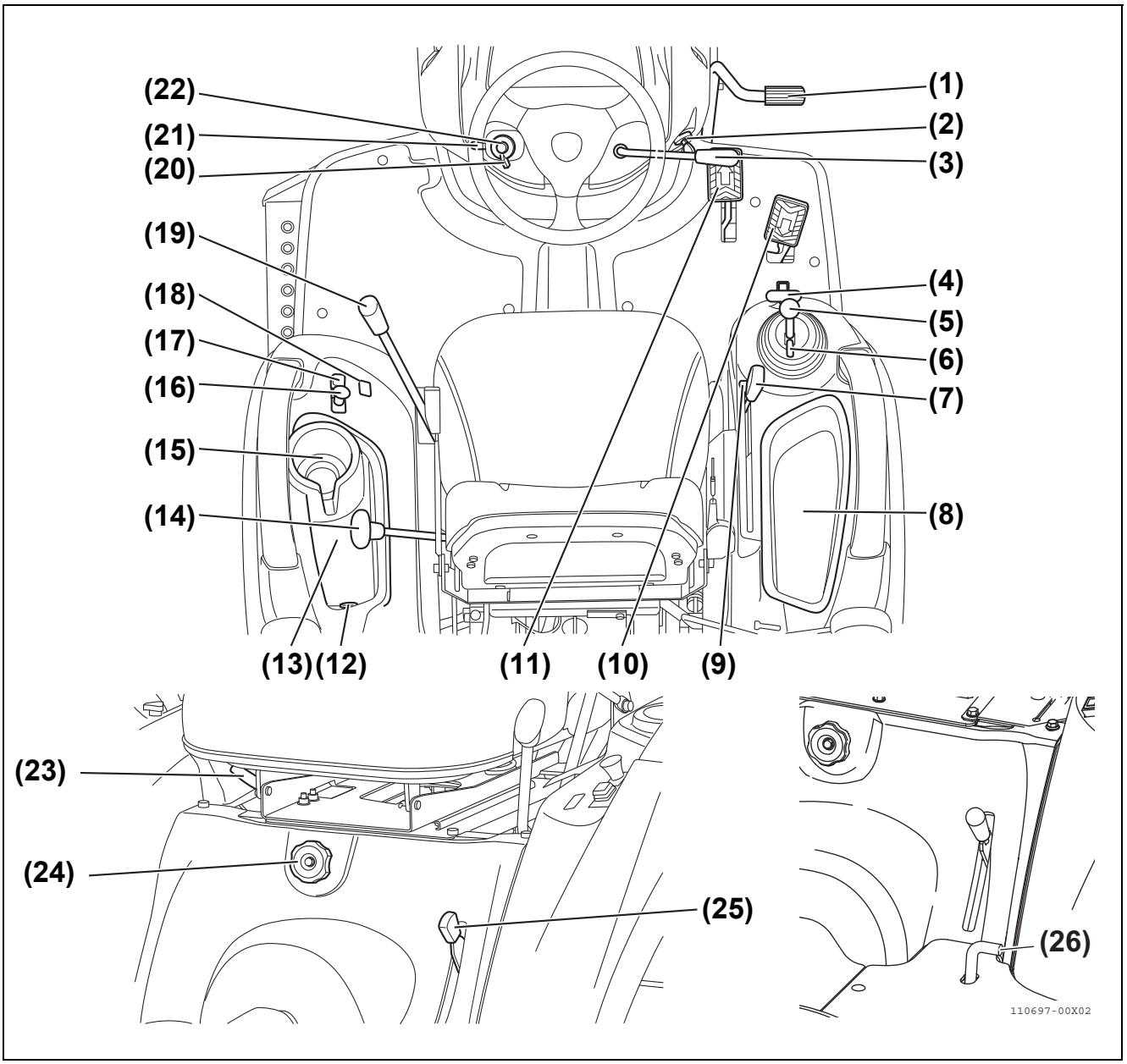




(1) Headlights
(2) Hood
(3) Fuel filter cap
(4) Operator seat
(5) Retractable seatbelt
(6) Fender
(7) Rear tires
(8) Mid-Power Take Off (PTO) shaft
(9) Front tires
(10) Front weight hitch (Option)
(11) Roll-Over Protective Structure (ROPS)
(12) Hydraulic quick couplers
(13) Rear-Power Take Off (PTO) shaft
(14) Lower links
(15) Top link hook
(16) Tail lights
(17) Top link
(18) Turn signal/Hazard lights
(19) Slow Moving Vehicle (SMV) emblem
(20) Swivel Seat Bracket (Option)



2. Operator Station Controls



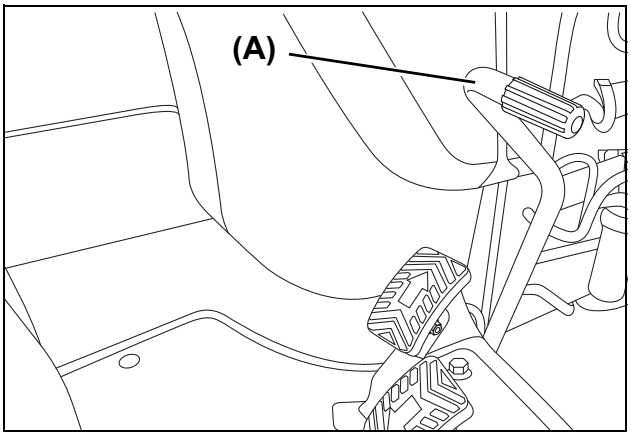
(1) Brake pedal
(2) Starter key switch
(3) Throttle control lever
(4) Parking brake lock lever and Parking brake lock holder
(5) Implement control lever
(6) Implement control lock lever
(7) 3-point hitch control lever
(8) Console box (right)
(9) Position stop knob (SA324/424)
(10) Reverse drive pedal
(11) Forward drive pedal
(12) 12V outlet (Option)
(13) Console box (left)
(14) Mid-/Rear Power Take Off (PTO) select lever
(15) Cup holder
(16) Power Take Off (PTO) switch
(17) Reverse override switch
(18) Cruise control switch (Option)
(19) Range shift lever (SA324/424)
(20) Headlight switch
(21) Turn signal switch
(22) Hazard lights button switch
(23) Operator seat forward and backward lever
(24) Hydraulic flow control/stop knob
(25) 2WD/4WD lever
(26) Differential lock pedal
(Standard SA324/424, Option SA221)

■ Function of Components

(1) Brake pedal

Reduce the speed and stop the tractor.

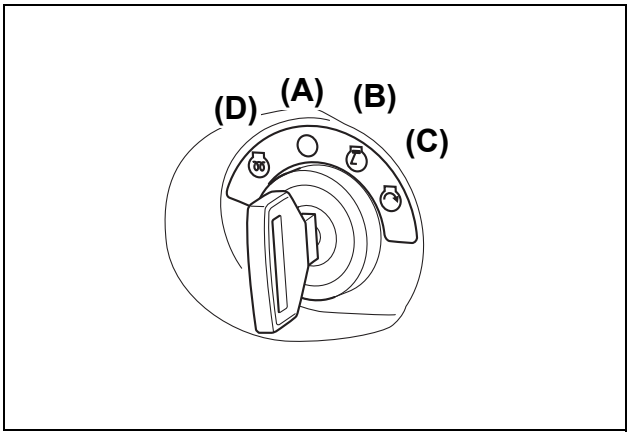
(A) Brake pedal



(2) Starter key switch

Start and/or shut off the engine.

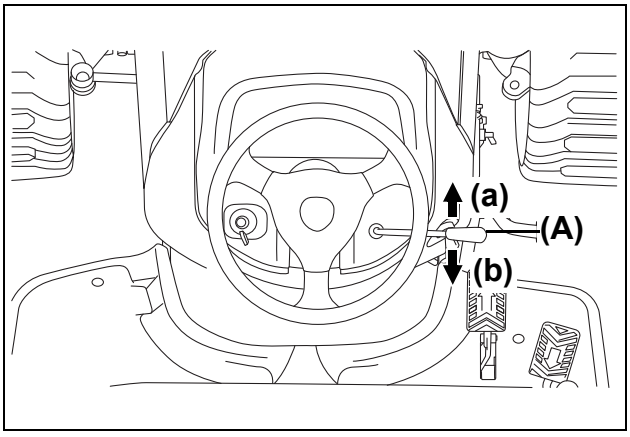
(A) OFF position
(B) ON position
(C) START position
(D) Preheating position



(3) Throttle control lever

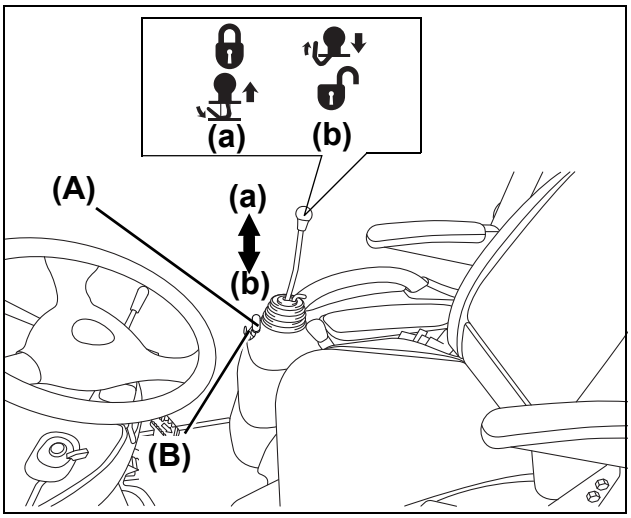
Increases or decreases the engine speed Revolutions Per Minute (rpm) rate.

(A) Throttle control lever
(a) Increase the engine speed Revolutions Per Minute (rpm)
(b) Decrease the engine speed Revolutions Per Minute (rpm)



(4) Parking brake lock lever and Parking brake lock holder

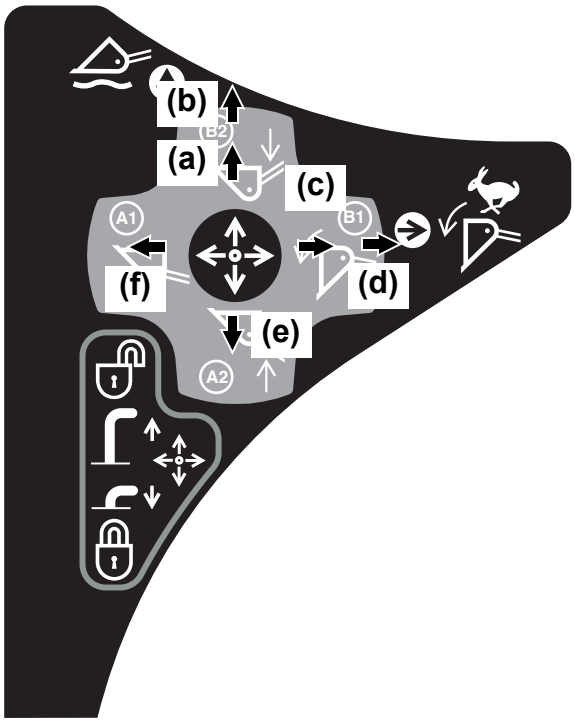
Engage the parking brake.



(A) Parking brake lock lever
(B) Parking brake lock holder
(a) Lock
(b) Unlock

(5) Implement control lever

Control the loader.



(a) Lower
(b) "Float"
(c) Dump
(d) Dump faster
(e) Raise
(f) Curl

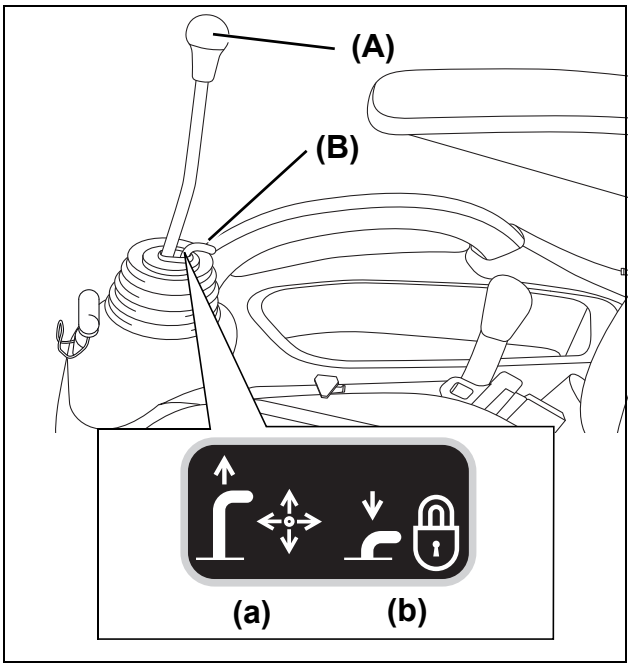
NOTE

- When the implement control lever is released, the implement control lever returns to the N (neutral) position.

(6) Implement control lock lever

Lock the implement control lever to the N (neutral) position.

(A) Implement control lever
(B) Implement control lever lock



IMPORTANT

- Avoid operating the implement control lever when the implement control lever is locked.
- To confirm that the implement control lever has been locked with the implement control lever lock:
  - move the implement control lever with a light force to ensure that the lever is securely locked.

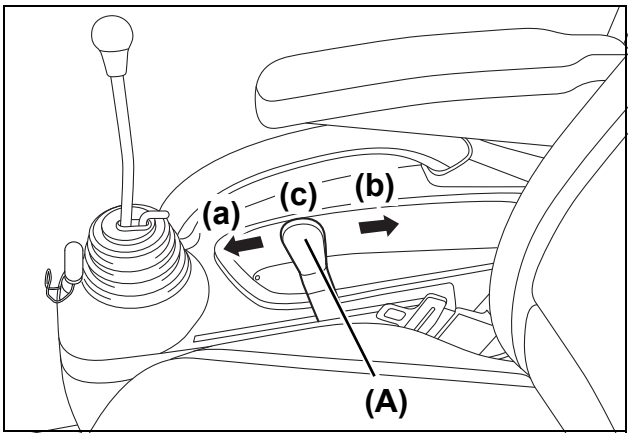
(a) To unlock the implement control lever:
Pull up the implement control lever lock.
(b) To lock the implement control lever:
Push down the implement control lever lock when the implement control lever is in the N (neutral) position.

(7) 3-point hitch control lever

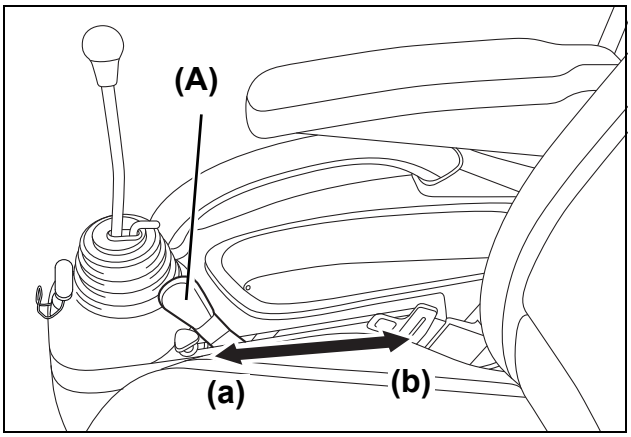
Control the height of the lower links.

(A) 3-point hitch control lever
(a) Move the 3-point hitch control lever forward to lower the implement.
(b) Move the 3-point hitch control lever backward to raise the implement.
(c) Neutral (SA221)

<SA221>



<SA324/424>

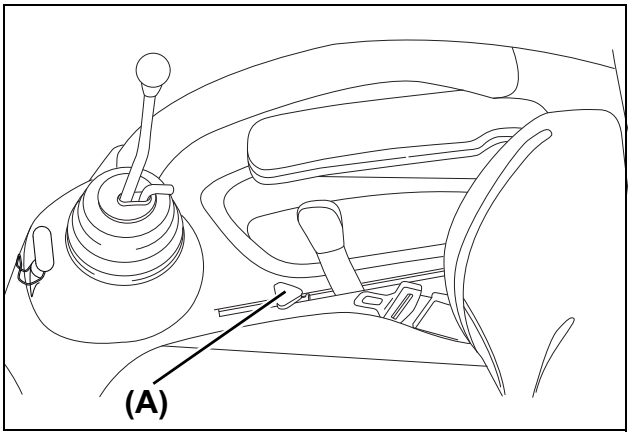


(8) Console box (right)

(9) Position stop knob (SA324/424)

Hold the 3-point hitch control lever to a specific position.

(A) Position stop knob

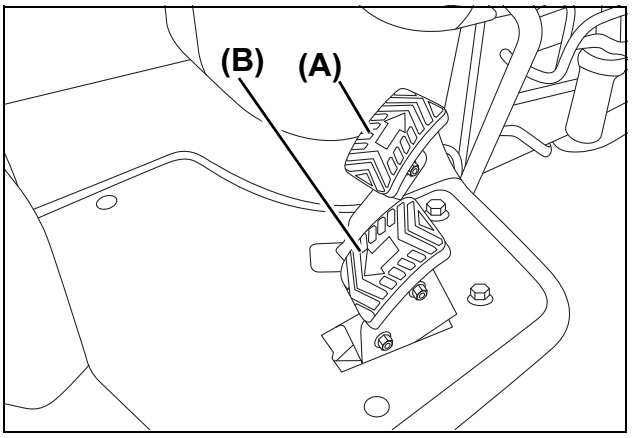


(10)Reverse drive pedal

(11)Forward drive pedal

The tractor accelerated speed depends on how far the forward drive pedal or the reverse drive pedal is depressed.

(A) Forward drive pedal
(B) Reverse drive pedal



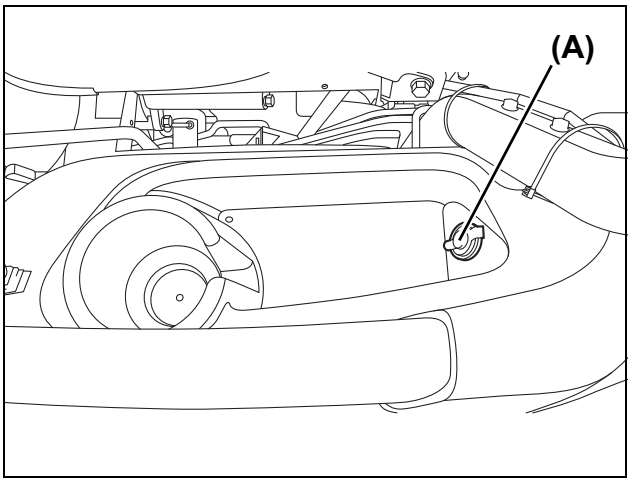
IMPORTANT

- When the forward and reverse drive pedal is released, the transmission will automatically return to the N (neutral) position.

(12)12V DC outlet (Option)

Outlet used for 12V DC supply.

(A) 12V DC outlet



NOTE

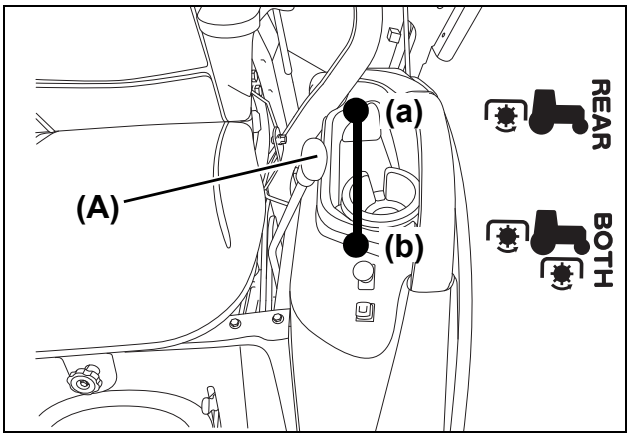
- Avoid using the 12V DC outlet as cigarette lighter.

(13)Console box (left)

(14)Mid-/Rear Power Take Off (PTO) select lever

Select the Mid- or Rear Power Take Off (PTO) depending on the implement in used.

(A) Mid-/Rear Power Take Off (PTO) select lever
(a) Operating the Rear Power Take Off (PTO) only
(b) Operating the Mid-Power Take Off (PTO) and the Rear Power Take Off (PTO) simultaneously

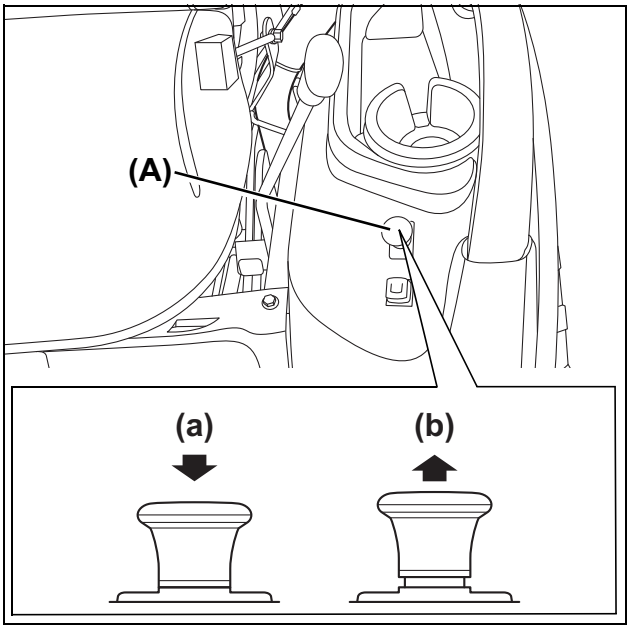


(15)Cup holder

(16)Power Take Off (PTO) switch

Turn ON or OFF the Power Take Off (PTO).

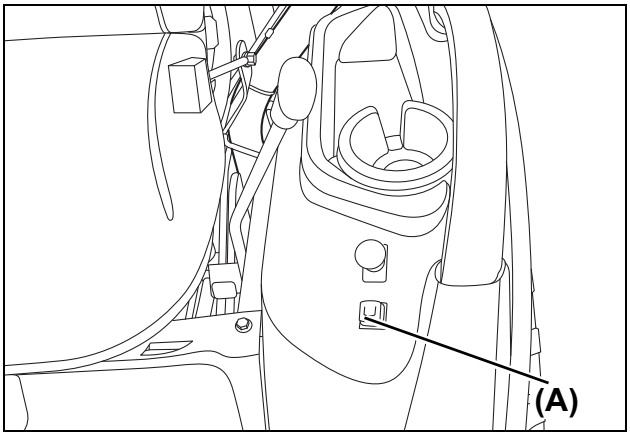
(A) Power Take Off (PTO) switch
(a) OFF position
(b) ON position



(17)Reverse override switch

Reversing the tractor stops the Mid-Power Take Off (PTO) and the Rear Power Take Off (PTO). Use the reverse override switch to operate the Power Take Off (PTO) while reversing the tractor.

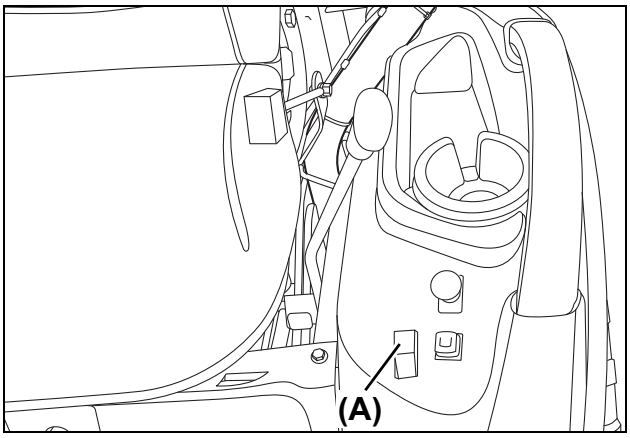
(A) Reverse override switch



(18)Cruise control switch (Option)

Regulates forward speed of the tractor at a preset speed.

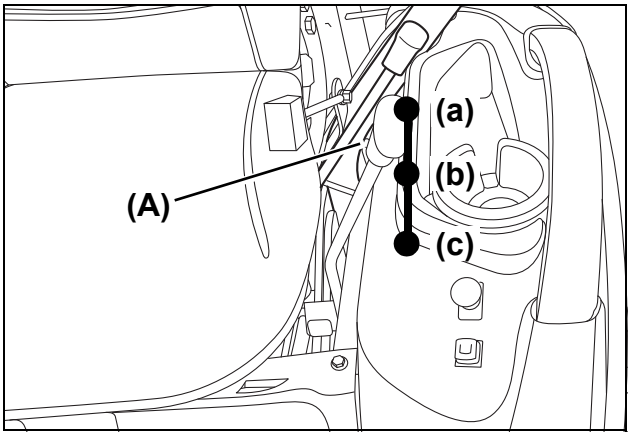
(A) Cruise control switch



(19)Range shift lever (SA324/424)

Change the range Shift setting.

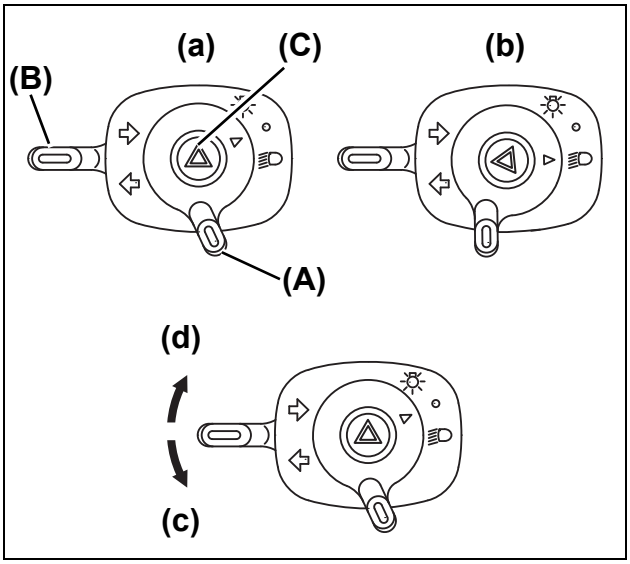
(A) Range shift lever
(a) L (Low): Used for heavy load operation. Low traveling speed.
(b) N (Neutral)
(c) H (High): Used for light load operation. High traveling speed.



(20)Headlight switch

Turn the headlights switch to the following positions and functions below.

(A) Headlights switch
(B) Turn signal switch
(C) Red button hazard light switch
(a) OFF
(b) Headlights ON
(c) Left turn signal
(d) Right turn signal



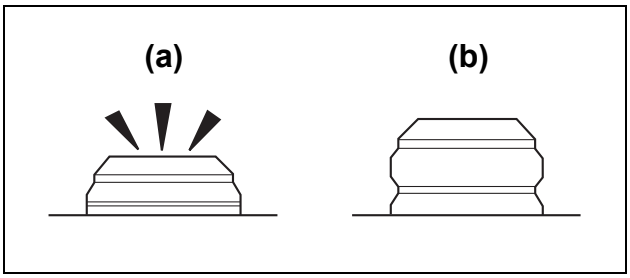
(21)Turn signal switch

Turn the turn signal switch clockwise to signal a right turn. Turn the turn signal switch counterclockwise to signal a left turn. The tail lights illuminates while the turn signal lights flashes.

(22)Hazard lights button switch

Turn ON or OFF the hazard lights.

(a) ON
(b) OFF



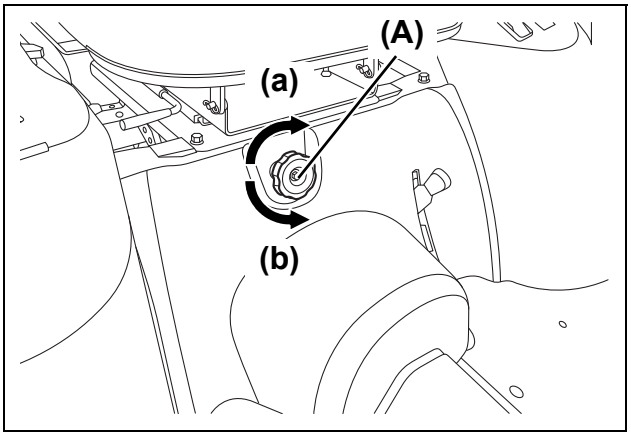
(23)Operator seat forward and backward lever

For details, see “Adjust the Operator Seat” on page 7-2.

(24)Hydraulic flow control/stop knob

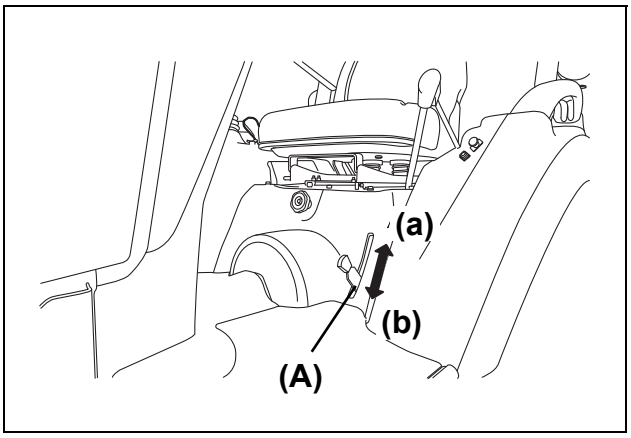
Increases/decreases and closes/opens the hydraulic circulation of the 3-point hitch.

(A) Hydraulic flow control/stop knob
(a) Close-stop
(b) Open



(25)2WD/4WD lever

Engages or disengages the 4-wheel drive.



(A) 2WD/4WD lever
(a) Disengage position
(b) Engage position

⚠ WARNING

- **Always exercise extreme caution while operating the tractor on slopes.**
- **Enable the 4-wheel drive in order to increase traction as necessary.**
- **While the 4-wheel drive can improve access to terrain with dangerous slopes, the danger of tipping over is still present.**

IMPORTANT

- Always disengage the 4-wheel drive during driving on a paved surface.
- Engage to the 4-wheel drive only as required to prevent premature wear on the front tires.
- Avoid under any circumstances using tire chains on the tractor's front wheels, because the tire chains can be thrown against the tractor and cause damage.

(26)Differential Lock Pedal for SA324/424 (Option for SA221)

⚠ WARNING

- **To prevent tipping of the tractor:**
  - **do not attempt to turn with the differential lock engaged**
  - **do not engage the differential lock while the tractor is traveling at a high speed**

IMPORTANT

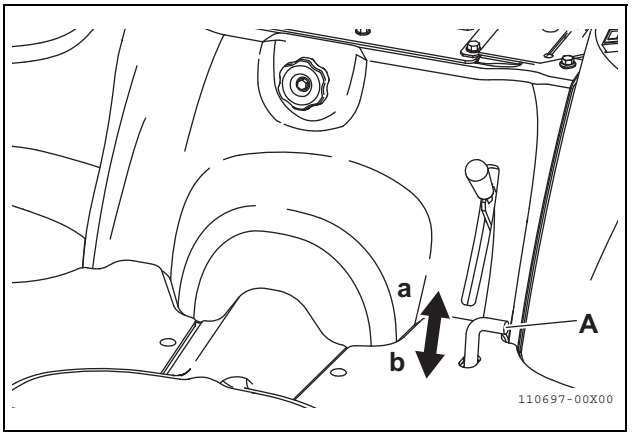
- If differential lock does not disengage after removing foot from the differential lock pedal:
  - Change turning direction side to side while driving slowly.
    Travel direction can also be changed between forward and reverse to make differential lock disengage.
    These actions equalize the traction force on the differential.
  - Then release the differential lock pedal.
- To prevent damage to the differential gears, Never use the differential lock while traveling at high speed.
- The differential lock is designed to be used for short durations.
- Prolonged use can damage the differential gears.

NOTE

- Engaging the differential lock:
  - locks the right and left rear axles.
  - the right and left rear axles simultaneously rotate at the same speed.
  - the preceding action allows the tractor to develop maximum traction force.

When rear wheels begin to slip:
Engage the differential lock to gain greater traction.

<Engage the differential lock>
1. Stop the tractor.
2. Drive the tractor at a very slow speed.
3. Depress the differential lock pedal.



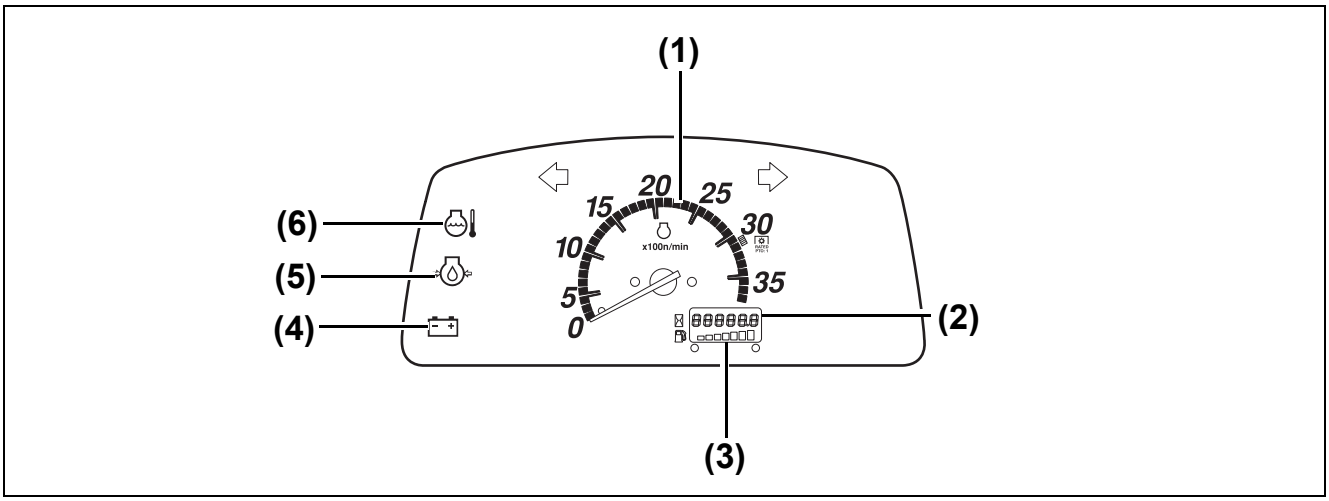
(A) Differential lock pedal
(a) Disengage position
(b) Engage position

<Disengage the differential lock>
1. Release the differential lock pedal completely.

IMPORTANT

- Always decrease the travel speed when using the differential lock.

3. Instrument Panel, Switches and Hand Controls



(1) Tachometer

Indicates the current engine speed in increments of 100 Revolutions Per Minute (rpm).

(2) Hour meter

Indicate the total accumulated operating hours.

(3) Fuel gauge

Indicates how much fuel is in the fuel tank while the starter key switch is in the ON and START position.

(4) Alternator/battery charging light

Illuminates when:

- The starter key switch is in the ON position and the engine is not running.
- The alternator/battery charging circuit is out of order.

IMPORTANT

- While the engine is running, an illuminated alternator/battery charging light indicates the power generated by the alternator is too low.
  - fully push the throttle control lever forward
  - increase the engine speed
- If the light still remains illuminated:
  - immediately shut down the engine
  - contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance

(5) Engine oil pressure warning light

The engine oil pressure warning light remains illuminated when:

- The starter key switch is in the ON position and the engine is not running.
- The engine oil pressure is abnormal.

IMPORTANT

- While the engine is running, an illuminated engine oil pressure warning light indicates the engine oil pressure is too low.
  - immediately shut down the engine
  - contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance

(6) Coolant temperature warning light

The light illuminates when the current coolant temperature in the engine is too high.

IMPORTANT

- Decrease the load on the tractor:
  - when the coolant temperature warning light illuminates
- To lower the coolant temperature:
  - idle the engine until the coolant temperature warning light turns off
  - shut off the engine
  - allow the engine to cool down
- After the preceding actions, check the following:
  - the coolant level in the radiator and in the reserve tank is adequate
  - the radiator and radiator screen are free from dust deposits
  - the alternator/fan belt tension is correct

For details, see “Chapter 14. PERIODIC SERVICE” on page 14-1.

- If the coolant temperature warning light illuminates again:
  - shut down the engine
  - immediately contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance

6. PRE-OPERATION CHECK

1. Pre-Operation Check

1. Check the tractor for damage, excessive wear, cracks, missing parts, leaks, exposed wiring and any other problems.
2. Check the joints and connections for tight fit.
3. Make sure all the lights illuminates and functions correctly.
4. Make sure all the safety alert decals are in correct positions.
5. Correct any problem detected.
6. Contact YOUR LOCAL YANMAR TRACTOR DEALER for problems that cannot be solved.

Avoid operating the tractor when a problem has been indicated.

2. Precautions before Operation

1. Always be aware of the performance limitations of the tractor.
2. Operate only within the limitations.
3. When operating the tractor, always maintain a “SAFETY FIRST!” approach.

3. Routine Check

1. Check the safety features.
2. Check the tire air pressure.
3. Make sure the remaining diesel fuel is sufficient for the intended operation.
4. Check the engine oil level.
5. Check the transmission hydraulic oil level.
6. Check the coolant level.
7. Remove grass clippings and debris from the tractor.
8. Clean the air filter element.
9. Check any liquid leaks such as engine oil, transmission oil, front axle oil, coolant and fuel.
10. Check the radiator for possible blockage.
11. Check the retractable seatbelt for any problem/s.
12. Check Roll-Over Protective Structure (ROPS) for any problem/s.
13. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

4. Prevent Damage to Plastic Surfaces and Painted Surfaces

1. To prevent scratches and discolorations on the surfaces:
   - Wipe the tractor only after thoroughly washing the surfaces.
2. Chemical substances such as pesticides can damage the plastic surfaces and painted surfaces.
   - Avoid spraying chemical substances on and near the tractor.
3. Avoid spilling diesel fuel onto the tractor.
   - Diesel fuel can damage the plastic surfaces and painted surfaces.
   - Immediately wipe off spilled diesel fuel.

7. OPERATE THE ENGINE

⚠ WARNING

Always run or idle the engine in a well ventilated area:
- **To prevent serious illness or death, caused by the colorless and odorless carbon monoxide emitted by the engine.**

- Always remain seated on the operator seat when:
  - starting the engine
  - operating the levers and controls
- Before starting the engine, always ensure:
  - release the forward and reverse drive pedal to N (neutral) position
  - range shift lever is in the N (neutral) position (SA324/424)
  - the parking brake lock is engaged
  - Power Take Off (PTO) switch in the OFF position
- Always keep the retractable seatbelt fastened:
  - whenever the Roll-Over Protective Structure (ROPS) is the upright position and locked securely.
- Start the engine only with the starter key switch.
  - avoid starting the engine by short circuiting across the starter solenoid terminals with a jumper wire
  - by bypassing the safety start switch
- Before operation, ensure all the safety features are functioning correctly. Make corrections as necessary.

1. Start the Engine

⚠ WARNING

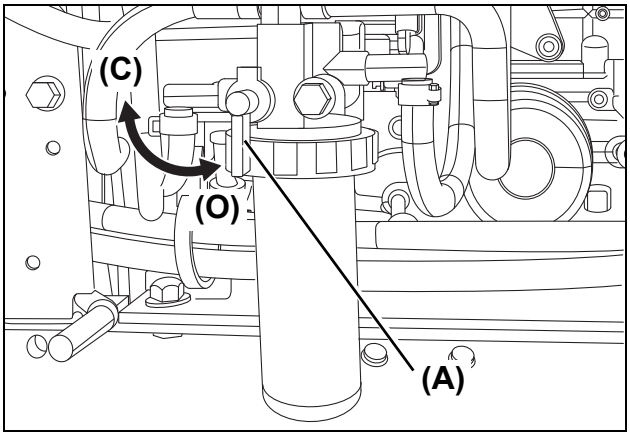
- **Always observe the following precautions when starting the engine.**
  - **before starting and during running the engine:**
    - **always drive the tractor outside or to a well ventilated area**
    - **to prevent serious illness or death caused by the carbon monoxide contained in the exhaust of the engine**
- **To prevent explosions, always use only diesel fuel to start the engine.**
- **To prevent injury or death from a runaway tractor:**
  - **avoid starting the engine by short circuiting across the starter solenoid terminals with a jumper wire**
  - **the tractor starts in gear and begins to move when the normal circuitry is bypassed**
- **When starting the engine:**
  - **always remain seated on the operator seat**
  - **release the forward and reverse drive pedal to N (neutral) position**
  - **range shift lever is in the N (neutral) position (SA324/424)**
  - **the parking brake lock is engaged**
  - **Power Take Off (PTO) switch in the OFF position**
  - **do not under any circumstances attempt to start the engine while the operator is still on the ground**

NOTE

- When the temperature is below 40°F (5°C), for details, see "10. Turn the starter key switch to the preheating position to energize the glow plug and preheat the engine" on page 7-6.

1. Open/Close the Fuel Shut-Off Valve

1. To open the fuel shut-off valve: Turn the fuel shut-off valve to the ON (open) position.
2. To close the fuel shut-off valve: Turn the fuel shut-off valve to the OFF (closed) position.



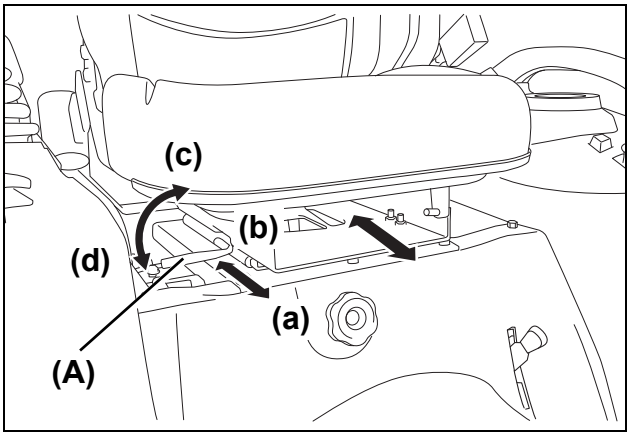
(A) Fuel shut-off valve
(O) ON (open) position
(C) OFF (closed) position

2. Get on the Tractor

1. Always use the step located on the left side of the tractor to climb on the tractor.
2. Sit on the operator seat.

3. Adjust the Operator Seat

1. Sit on the operator seat.
2. Operator seat forward and backward lever.
   - Move the operator seat forward and backward lever to set the optimal position.



(A) Operator seat forward and backward lever
(a) Toward the front
(b) Toward the rear
(c) Unlock
(d) Lock

IMPORTANT

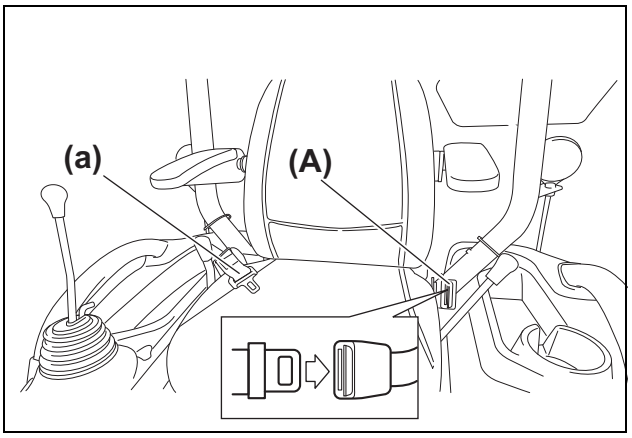
- After adjusting the operator seat position, always ensure that the operator seat is securely locked in place.

4. Fasten the Retractable Seatbelt

⚠ WARNING

- **Always keep the retractable seatbelt fastened while operating the tractor with the Roll-Over Protective Structure (ROPS) in the upright position.**
- **The preceding action reduces the possibility of injury or death in the event of an accident such as an overturn or roll over.**
- **Do not under any circumstances use the retractable seatbelt when operating the tractor:**
  - **with the Roll-Over Protective Structure (ROPS) in the folded position.**

1. Pull out the retractable seatbelt from the retracted position located on the right side of the operator seat.
2. Fasten the retractable seatbelt to the buckle located on the left side of the operator seat



(A) Buckle
(a) Retractable seatbelt

NOTE

- Do not twist the retractable seatbelt.

3. Adjust the retractable seatbelt to the suitable length.

NOTE

- Release the retractable seatbelt by pressing the retractable seatbelt quick release button.

⚠ CAUTION

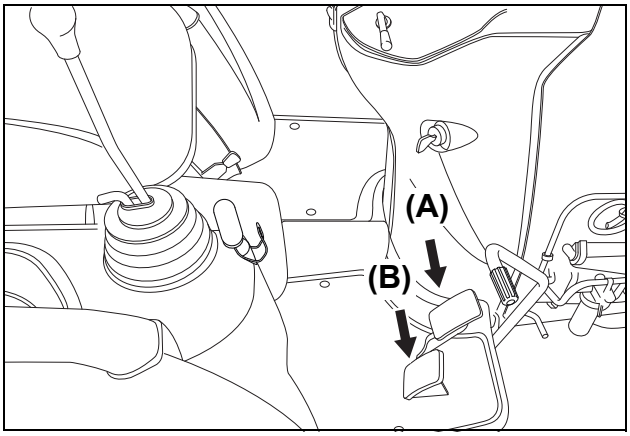
- **Hold the retractable seatbelt with the right hand when pressing the retractable seatbelt quick release button.**
- **The retractable seatbelt flies to the right which is highly dangerous.**

⚠ WARNING

- **Positioning the retractable seatbelt far away from the operator's abdominal area can be dangerous in the event of an accident.**
- **Always ensure the retractable seatbelt is in the lowest possible position relative to the operator's abdominal area.**
- **The retractable seatbelt must be used only by the operator.**
- **Do not under any circumstances use the retractable seatbelt for two or more persons.**
- **Do not under any circumstances use the retractable seatbelt to hold an object to the operator's body.**

5. Release the forward and reverse drive pedal to the N (neutral) position

1. Remove foot from the forward and reverse drive pedal.



(A) Forward drive pedal
(B) Reverse drive pedal

NOTE

- While the parking brake is engaged, the forward and reverse drive pedal is locked to the N (neutral) position.

6. Lock and Set the Parking Brake

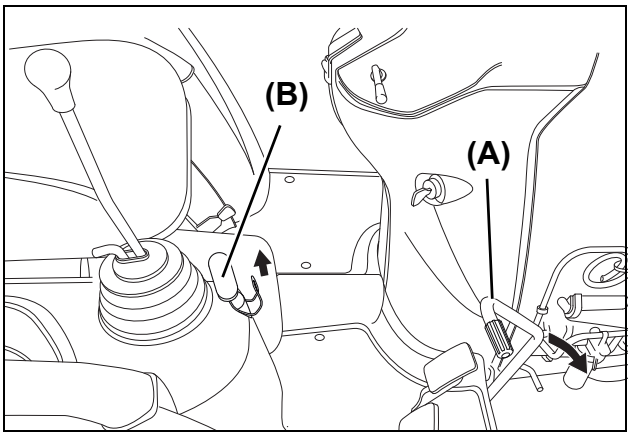
⚠ WARNING

- **When engaging the parking brake:**
  - **Confirm that the parking brake lock holder is securely applied and the parking brake lock lever is locked.**

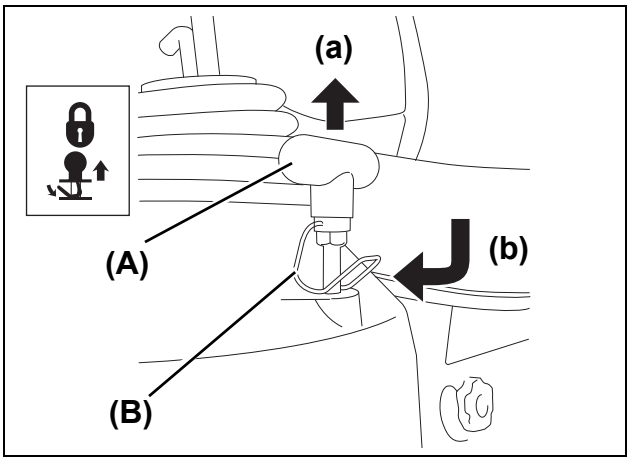
IMPORTANT

- Periodically clean and apply oil to prevent dust or rust that could interfere with proper operation.

1. Depress the brake pedal fully.
2. While depressing the brake pedals fully, pull up the parking brake lock lever and set the parking brake lock holder to lock securely.
3. Remove the foot from the brake pedal.
4. Make sure the parking brake is securely locked.



(A) Brake pedal
(B) Parking brake lock lever



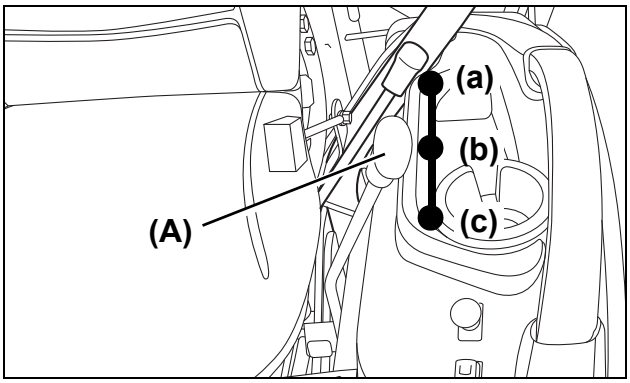
(A) Parking brake lock lever
(B) Parking brake lock holder
(a) Upward: Lock the brake pedal.
(b) Push backward: Parking brake lock holder can be applied as indicated by arrow. Refer to figure.

IMPORTANT: Avoid damage!

- Avoid depressing the forward and reverse drive pedal while the parking brake is engaged.

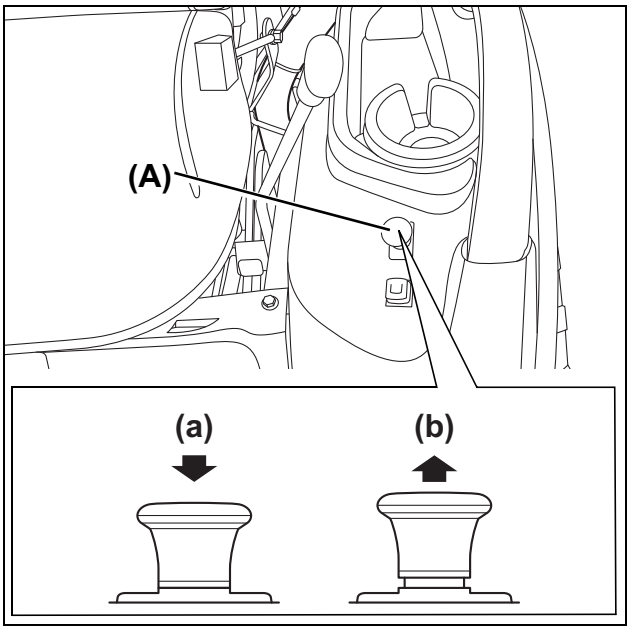
7. Perform the Rest of the Operations

1. Move the range shift lever to the neutral position. (SA324/424)



(A) Range shift lever (SA324/424)
(c) N (Neutral position)

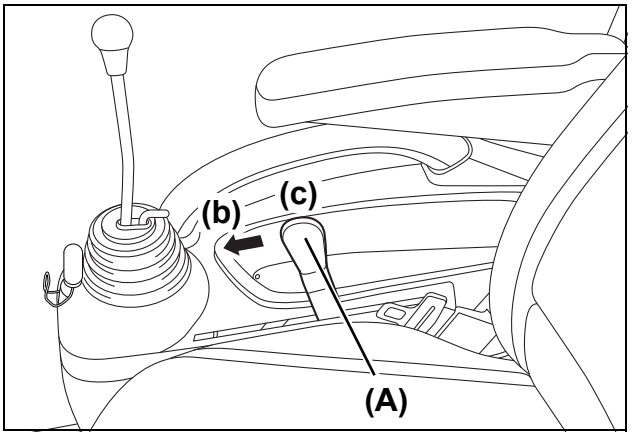
2. Push down the Power Take Off (PTO) switch to OFF position.



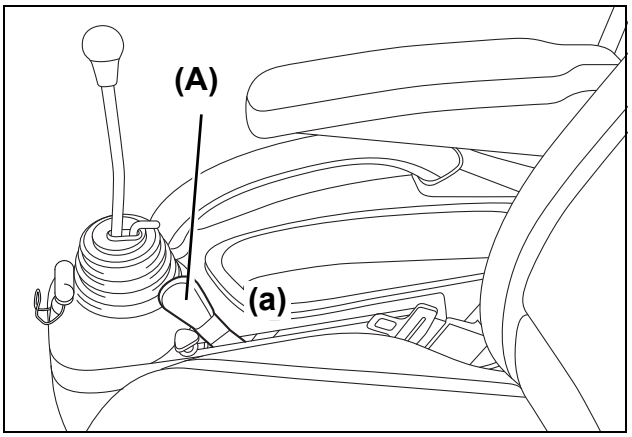
(A) Power Take Off (PTO) switch
(a) OFF position
(b) ON position

3. Push the 3-point hitch control lever forward to the lowest position and lower the mid- or rear mounted implements to the ground.

<SA221>



<SA324/424>

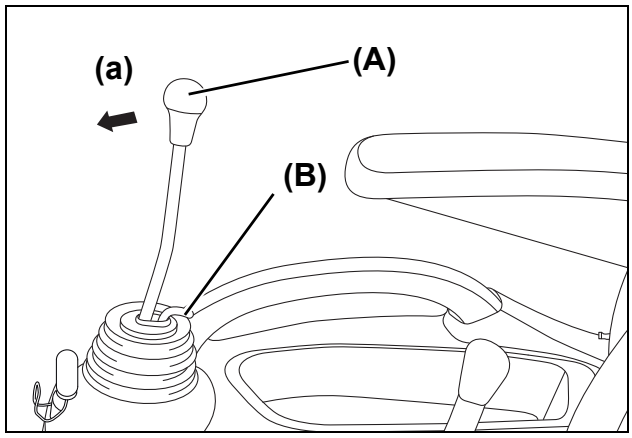


(A) 3-point hitch control/cutting height adjustment lever
(a) Lowest position (SA324/424)
(b) Lower position (SA221)
(c) Neutral (SA221)

NOTE

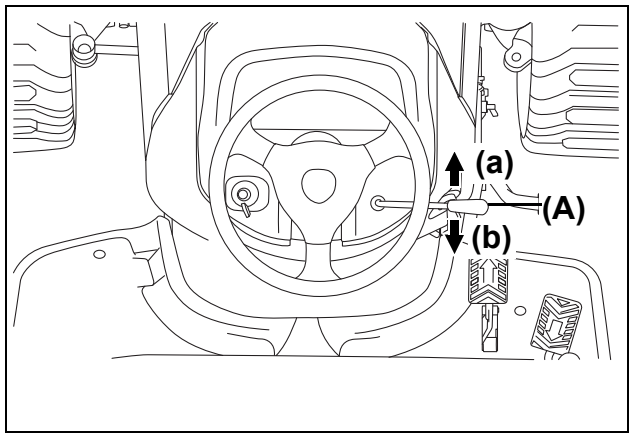
- Use the implement control lever to lower any attached implements to the ground.

4. Use the implement control lever to lower the implements to the ground and lock to the N (neutral) position.



(A) Implement control lever
(B) Implement control lever lock
(a) Lower the implement to the ground

5. Push the throttle control lever forward from the slow idle position to the 1/3 to 1/2 fast positions.



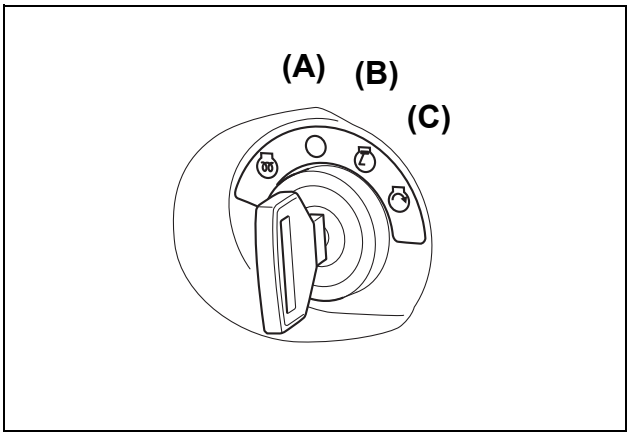
(A) Throttle control lever
(a) Push the throttle control lever forward, to increase the engine speed.
(b) Pull the throttle control lever backward, to decrease the engine speed.

8. Insert the Key into the Starter Key Switch and Turn the Key to the ON Position

OFF position:
The engine does not run.

ON position:
The engine oil pressure warning light and the alternator/battery charging light illuminates.

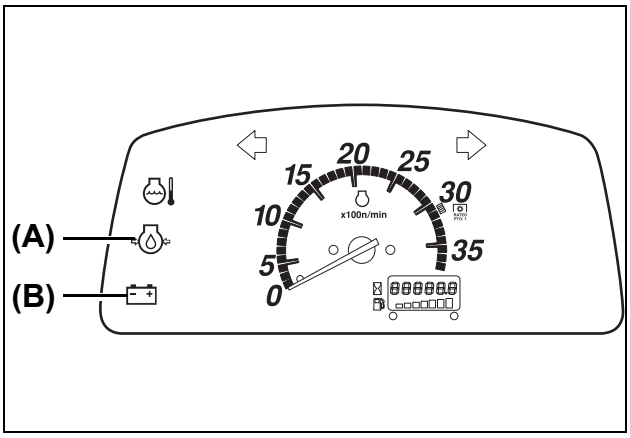
START position:
- The starter turns the flywheel to run the engine.
- The engine begins to run.
- Once the engine is running, release the starter key switch.



(A) OFF position
(B) ON position
(C) START position

9. Check the Lights on the Instrument Panel

After the starter key switch is turned to the ON position:
- The engine oil pressure warning light illuminates.
- The alternator/battery charging light illuminates.



(A) Engine oil pressure warning light
(B) Alternator/Battery charging light

NOTE
- The engine oil pressure light turns OFF within 5 seconds after the engine has started.
- The alternator/battery charging light turns OFF within 10 seconds after the engine is started.

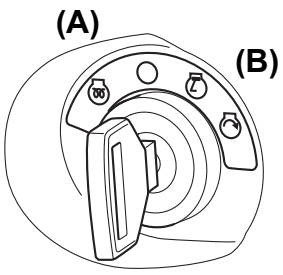
IMPORTANT

- If the engine oil pressure light fails to turn OFF within 5 seconds after the engine is started:
  - shut off the engine and check for the cause
- If no specific cause is detected, but a problem still persists:
  - contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance

NOTE

- If the key is released before the engine started:
  - wait until both the starter and engine stop rotating before trying to start the tractor again

10. Turn the starter key switch to the preheating position to energize the glow plug and preheat the engine



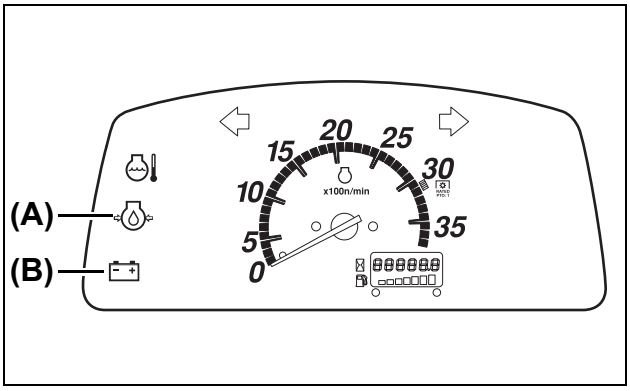
(A) Preheating position
(B) START position

Preheating time should be determined according to the ambient temperature. For details, see the table below.

Ambient Temperature (°F (°C))	Preheating Time (sec.)
Over 32 (0)	2 to 3
Below 32 (0)	4

NOTE

- While the starter key switch is in the preheating position. The engine oil pressure warning light and the alternator/battery charging light illuminates.



(A) Engine oil pressure warning light
(B) Alternator/Battery charging light

11. Turn and hold the starter key switch to the START position

NOTE

- Once the engine is running, release the starter key switch.
- If the key is released before the engine started:
  - wait until both the starter and engine stop rotating before trying to start the tractor again

IMPORTANT: Avoid damage!

- Continuous activation of the starter for more than 15 seconds can damage the starter.
- If the engine fails to start within 15 seconds, discontinue activating the starter.
- Wait for 2 minutes before trying to restart the engine.
- After the engine has started, warm up the engine for 5 minutes at 2000 to 2400 min^{-1} (rpm) without any load.

12.Warm Up the Engine in Cold Weather

1. In cold weather, warm up the engine for longer than 5 minutes so the hydraulic system can operate at peak performance.
2. Warm up for a period as specified in the table below.

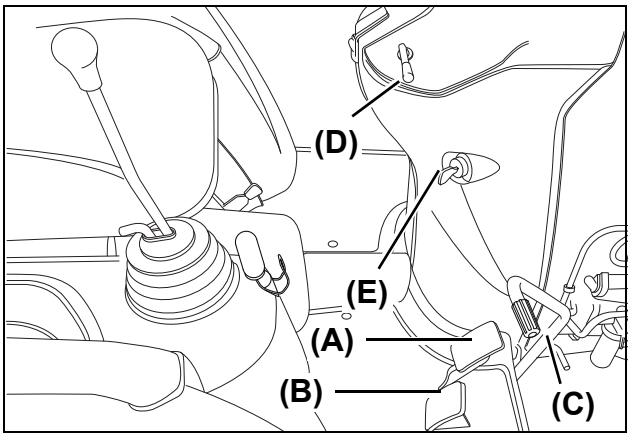
Temperature (°F (°C))	Warming-up Time (min.)
Over 32 (0)	At least 5
32 to 14 (0 to –10)	5 to 10
14 to –4 (–10 to –20)	10 to 15
Below –4 (–20)	More than 15

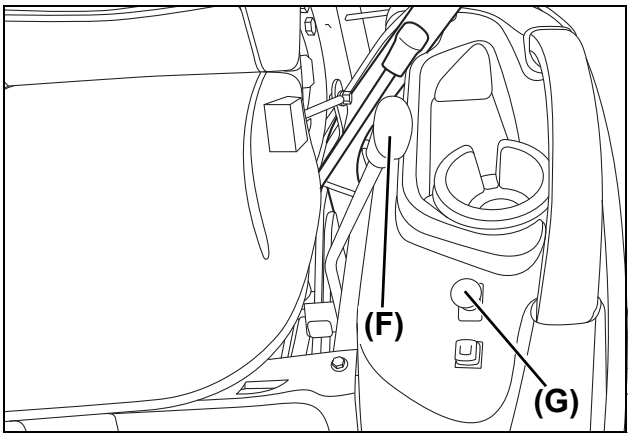
NOTE

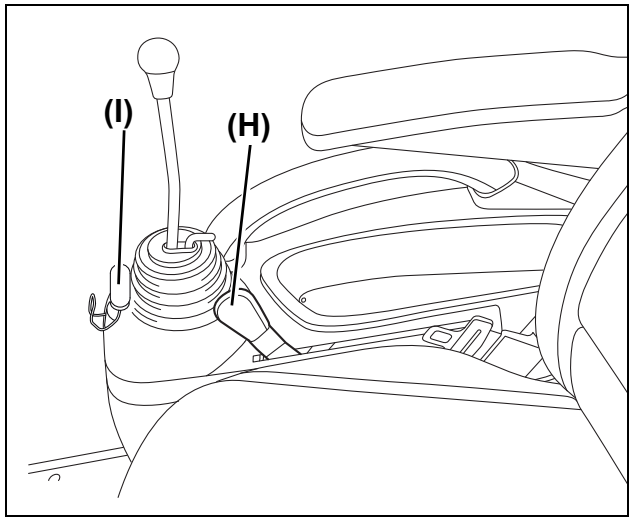
- The engine may run slightly louder and emit pale blue exhaust during warm up.
  - the preceding state is normal
  - the amount of pale blue exhaust varies depending on the ambient temperature
- Idling the engine for a long time wastes fuel and causes carbon accumulation in the engine.

2. Shut Off the Engine

1. Shut off the engine by:
   - Release the forward and reverse drive pedal fully.
   - Depress brake pedal.
2. Move the range shift lever to the N (neutral) position. (SA324/424)
3. Push down Power Take Off (PTO) switch to (OFF) position.







(A) Forward drive pedal
(B) Reverse drive pedal
(C) Brake pedal
(D) Throttle control lever
(E) Key switch
(F) Range shift lever (SA324/424)
(G) Power Take OFF (PTO) switch
(H) 3-point hitch control lever
(I) Parking brake lock lever

4. Push the 3-point hitch control lever forward to lower any implements to the ground.

NOTE

- Use the implement control lever to lower any implements to the ground.

IMPORTANT

- To prevent injury and property damage:
  - always lock the parking brake securely
  - make sure that the engine is not running
- The tractor wheels are free to move when the range shift lever is in the N (neutral) position.

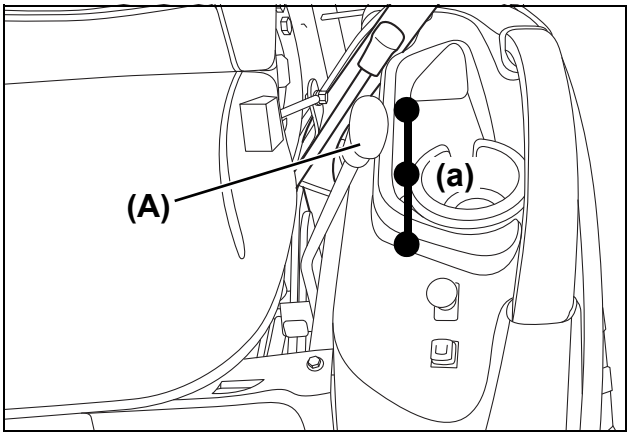
5. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.
6. Pull the throttle control lever backward to the slow idle position.
7. Idle the engine at least 2 minutes.
8. Turn the starter key switch to the OFF position.
9. Remove the key from the starter key switch.
10. Before leaving the operator seat, ensure the engine and all moving parts have stopped.

3. Restart a Stalled Engine

IMPORTANT: Avoid engine damage!

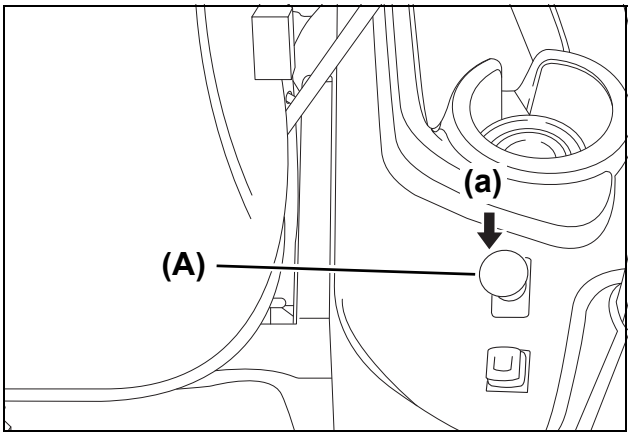
- If the engine stalls while operating under load, immediately restart the engine to prevent over-heating of the engine.

1. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.
2. Move the range shift lever to the N (neutral) position. (SA324/424)



(A) Range shift lever
(a) N (Neutral position)

3. Operator must be properly seated on the operator seat.
4. Push down Power Take Off (PTO) switch to OFF position.



(A) Power Take Off (PTO) switch
(a) OFF position

5. Start the engine.
6. Continue with normal operation.
7. Set the engine to idle speed for 1 or 2 minutes before stopping.

8. OPERATE THE TRACTOR

⚠ WARNING

Do not under any circumstances attach a load to the axle housing.

Always decrease the tractor speed before turning:

- **During traveling on a rough terrain.**
- **Before stopping to prevent the tractor from overturning.**

Stay clear of ditches, potholes, embankments and ponds.

- **The tractor can more easily overturn or rollover in soft and wet ground.**
- **Before entering an area covered with tall grass, walk and inspect the area to detect any obstacles.**
- **Remove potentially dangerous obstacles before driving.**

Always watch where the tractor is going.

- **Be alert and exercise extra caution while driving towards an area.**
- **Where the next section is difficult to see, e.g., blind corners, row of trees, or any similar situations.**

When two or more people are working in one area:

- **Regularly communicate and watch each other.**
- **Make sure all persons and implements in the area do not impede or cause injury to each other.**

Always ensure the tractor is at a complete stop before attempting to get on or off.

Accident Hazard

- A child does not understand the principles of danger, nor comprehend imminent dangers and is often attracted to and approach the tractor.
- Do not under any circumstances assume a child remain where last seen.

- Always keep a child out of the work area. Make sure a responsible person other than the operator is carefully supervising the child.

- If any child enters the current work area, immediately stop the tractor.

- Do not under any circumstances allow a child to ride on the moving tractor. The child can tamper with the controls, fall off and be run over by the tractor.

- Do not under any circumstances allow a child to operate the tractor.

- Do not under any circumstances allow a child to play on the tractor or implements.

- Be extremely careful when backing the tractor. Before and during backing, constantly look backward, sideways and downward to ensure no child is behind the tractor.

1. Operate a New Tractor

The service life of the tractor is determined by how well the tractor is operated and maintained.

Prior to delivery, the tractor has been fully tested to ensure that the tractor is operating normally. The manner the tractor is operated during the breaking-in period greatly affects the effective life of the tractor.

To bring about optimal tractor performance and to achieve the longest tractor life, various parts of the tractor have to be properly broken-in.

The following practices must be observed.
- Operate the tractor at low speeds for the first 50 operating hours.
- Avoid heavy operations and loads.
- Always start and brake the tractor slowly.
- In cold weather, always fully warm up the engine before operating the tractor.
- Avoid under any circumstances running the engine at a speed higher than needed.
- On rough roads or terrains, drive at low speeds.

NOTE
- The preceding practices should also be adopted for all tractors regardless of age to prevent premature tractor breakages and accidents.

■ Change the lubricating oil for the new tractor

The quality of the lubricating oil in any new tractor is very important. Parts not fully broken-in may not yet perfectly fit with each other.

Small metal shavings can be created during operation of a new tractor. The shavings can lead to premature wear or damage to tractor parts.

Yanmar recommends changing the lubricating oil earlier than the standard oil change schedule.

For the recommended oil change schedule, for details, see "Chapter 13. MAINTENANCE" on page 13-1.

2. Raise and Lower the Roll-Over Protective Structure (ROPS)

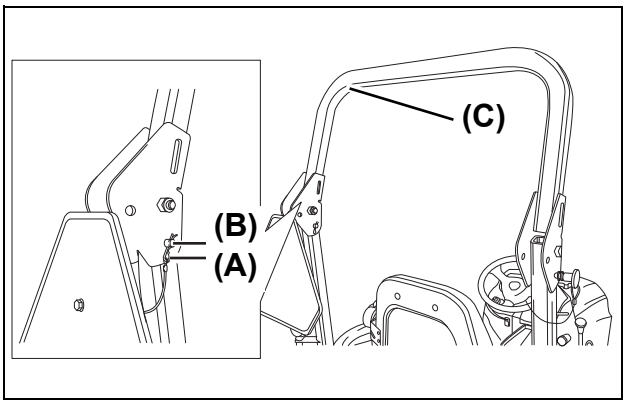
⚠ WARNING

- **Always operate the tractor with the Roll-Over Protective Structure (ROPS) in the unfolded "up" position.**
  - **unless folding the structure is absolutely necessary.**
- **Keep the retractable seatbelt fastened while operating the tractor with the Roll-Over Protective Structure (ROPS) in the unfolded "up" position.**
  - **the preceding practice reduces the possibility of injury or death in the event of a roll over accident**
- **If the Roll-Over Protective Structure (ROPS) is not installed (taken off for some reason), always install the structure before operating the tractor.**
- **Always keep the Roll-Over Protective Structure (ROPS) on its original condition. An alteration can impair the protective capacity of the structure.**
- **Immediately replace a damaged Roll-Over Protective Structure (ROPS). Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.**
- **Do not under any circumstances use the retractable seatbelt:**
  - **while the Roll-Over Protective Structure (ROPS) is in the folded "down" position**
  - **while the tractor does not have a Roll-Over Protective Structure (ROPS)**

■ Lower (folded "down") the Roll-Over Protective Structure (ROPS)

The Roll-Over Protective Structure (ROPS) can be folded down only by approximately 90 degrees.

1. Pull out the hairpin clip from each of the insert pins located on both sides of the Roll-Over Protective Structure (ROPS).
2. Pull out the insert pins from both sides of the Roll-Over Protective Structure (ROPS).

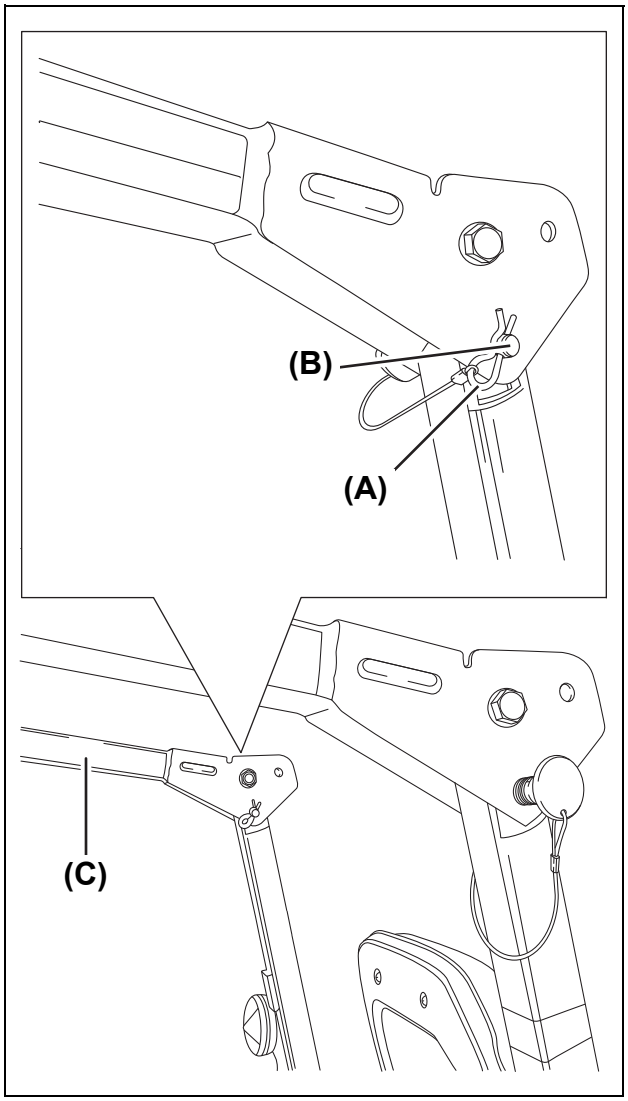


(A) Hairpin clip
(B) Insert pin
(C) Top bar of the Roll-Over Protective Structure (ROPS)

3. Lower (folded "down") the Roll-Over Protective Structure (ROPS).
4. Retaining holes are located on both sides of the lowered Roll-Over Protective Structure (ROPS). Install the insert pins into the holes.
5. Hole is found at the end of the insert pin. Install the hairpin clip into the hole.
6. To secure the play-absorbing vibration-insulating rubber block, pull the upper bolt to the near side and insert the pins.

■ Raise (unfolded "up") the Roll-Over Protective Structure (ROPS)

1. Pull out the hairpin clip from each of the insert pins located on both sides of the Roll-Over Protective Structure (ROPS).
2. Pull out the insert pins from both sides of the Roll-Over Protective Structure (ROPS).
3. Raise (unfolded "up") the Roll-Over Protective Structure (ROPS).
4. Retaining holes are located on both sides of the Roll-Over Protective Structure (ROPS) in the unfolded "up" position. Install the insert pins into the holes.
5. Insert pin jam hole is located at the end of the insert pin. Install the hairpin clip into the holes.
6. To secure the play-absorbing vibration-insulating rubber block, pull the upper bolt to the near side and insert the pins.



(A) Hairpin clip
(B) Insert pin
(C) Top bar of the Roll-Over Protective Structure (ROPS)

3. Operate the Tractor

⚠ WARNING

- **Before starting or operating the tractor, always ensure there is no bystander or obstacle.**
- **Push down Power Take Off (PTO) switch to OFF position.**
- **Raise any implements.**

IMPORTANT

- To prevent damage to the transmission, stop the tractor completely before operating the:
  - range shift lever (SA324/424)
  - 2WD/4WD lever

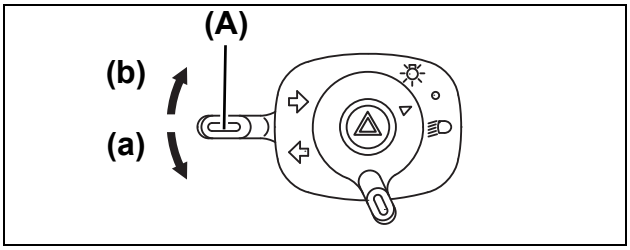
1. Sit on the operator seat

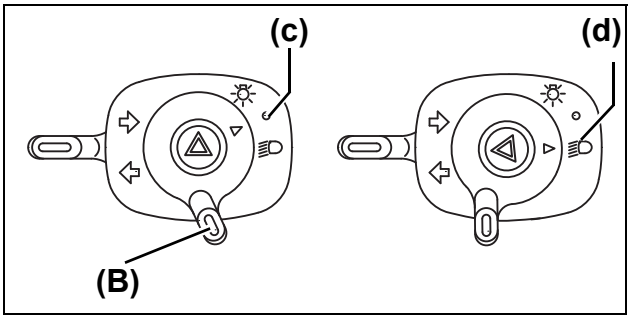
Regarding how to adjust operator seat position, for details, see "3. Adjust the Operator Seat" on page 7-2.

Regarding how to fasten the retractable seatbelt, for details, see "4. Fasten the Retractable Seatbelt" on page 7-2.

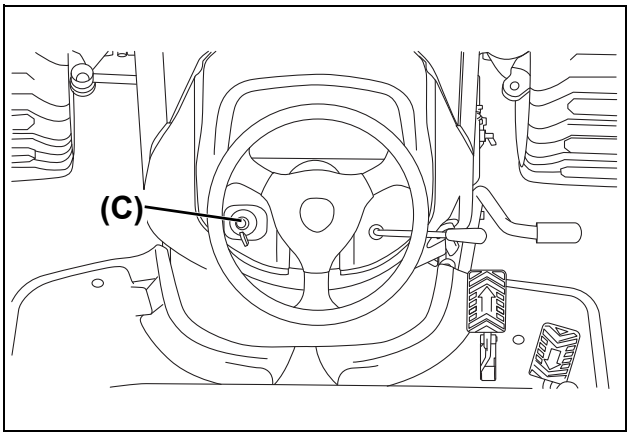
2. Use the headlights turn signal switch and hazard lights button switch

Regarding how to use the headlights turn signal switch and hazard lights button switch for details, see "(20) Headlight switch" on page 5-8, "(21) Turn signal switch" on page 5-8 and "(22) Hazard lights button switch" on page 5-9.





(A) Turn signal switch
(B) Headlights switch
(a) Left turn signal
(b) Right turn signal
(c) OFF
(d) Headlights ON



(C) Hazard lights button switch

3. Start the engine

Regarding on how to start the engine, for details, see "Chapter 7. OPERATE THE ENGINE" on page 7-1.

4. Warm Up Transmission Hydraulic Oil in a Cold Weather Situation

⚠ WARNING

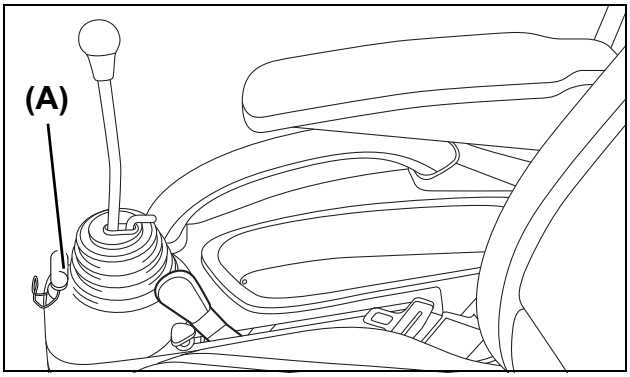
Before warming up the engine, ensure:

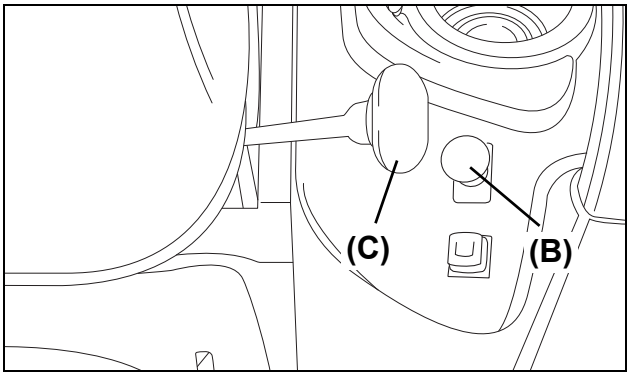
- **The parking brake lock lever is locked.**
- **All the levers in the N (neutral) positions.**
- **Power Take Off (PTO) switch is in the OFF position.**

1. Warm up for 5 minutes after starting the engine.
2. Operate any implement on the tractor only after warming up the engine.

3. Using the implements while the engine is still cold (or not fully warmed up), problems such as seizure, breakage or premature wear can occur.
4. The engine oil is distributed through out the engine during warming up.
5. The hydraulic oil also functions as the transmission oil.
6. In cold weather, the cold oil has a higher viscosity, making oil circulation sluggish.
   - The hydraulic pressure does not smoothly rise after engine start up.
   - The preceding action can cause a problem with the hydraulic system.
7. To prevent the preceding problem:
   - Pre-warm the engine at about 50% of the rated Revolutions Per Minute (rpm) for a period of time, as specified in the table below:

Ambient Temperature (°F (°C))	Required warm-up time (min.)
Over 14 (-10)	Approximately 5
5 to 14 (-15 to -10)	5 to 10
-4 to 5 (-20 to -15)	10 to 20
Lower than -4 (-20)	Longer than 20





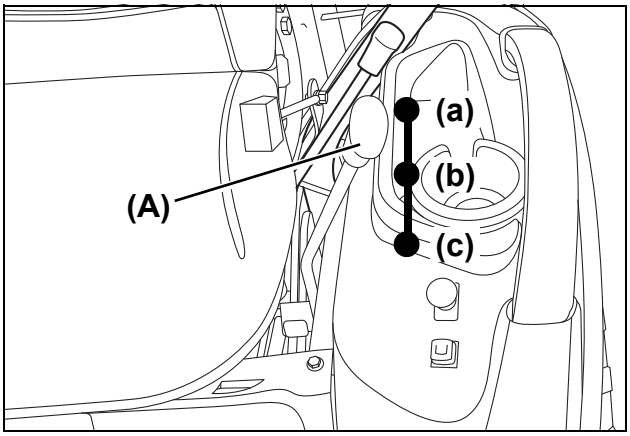
(A) Parking brake lock lever
(B) Power Take Off (PTO) switch
(C) Range shift lever

IMPORTANT

- Warm up the engine of the tractor before operating any implements.

5. Select travel speed

■ Range Shift Lever (SA324/424)

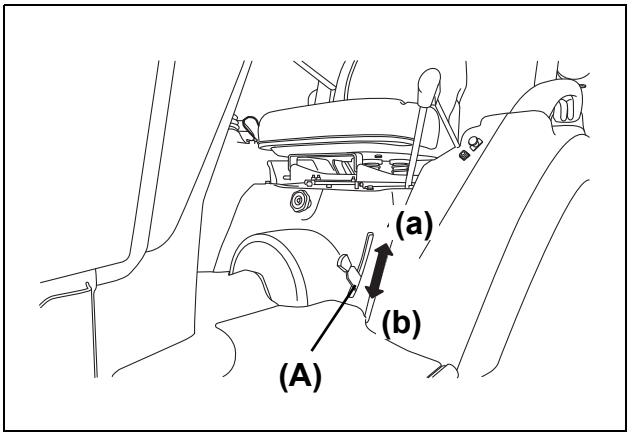


(A) Range shift lever
(a) L (Low): Used for heavy load operation. Low traveling speed.
(b) N: Neutral
(c) H (High): Used for light load operation. High traveling speed.

IMPORTANT

- To prevent overloading the engine, always select the appropriate gear and engine speed for the job.
  - use a higher gear and lower engine speed for work involving a light load
  - use a lower gear and higher engine speed for work involving a heavy load

■ 2WD/4WD Lever



(A) 2WD/4WD lever
(a) Disengage position
(b) Engage position

IMPORTANT

- Always disengage the 4-wheel drive during driving on a paved surface.
- Engage to the 4-wheel drive only as required to prevent premature wear on the front tires.
- Avoid under any circumstances using tire chains on the tractor's front wheels, because the tire chains can be thrown against the tractor and cause damage.

NOTE

- Before operating the 2WD/4WD lever:
  - make sure the tractor has completely stopped
- The load on the tractor may have to be reduced before changing from the 4-wheel drive to 2-wheel drive.

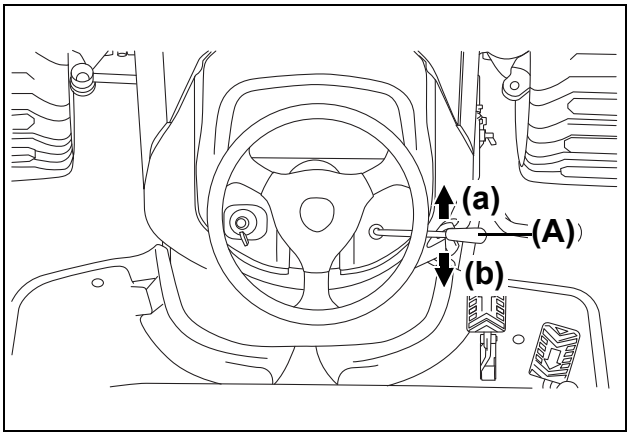
■ Tips on the 4-Wheel Drive

- To make sure proper performance under all types of working conditions, maintain the maximum acceptable tire air pressure in the front tires.
- Disengage the 4-wheel drive while transporting the tractor.
- Disengaging the 4-wheel drive increases the service life of the front tires.

6. Adjust the throttle control lever to reach the target speed

■ Throttle Control Lever

Use the throttle control lever to increase, decrease or maintain the current engine speed.



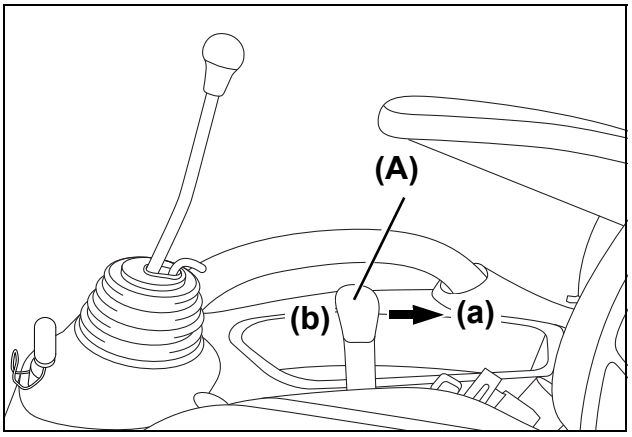
(A) Throttle control lever
(a) Increase the engine speed Revolutions Per Minute (rpm)
(b) Decrease the engine speed Revolutions Per Minute (rpm)

7. Raise the implement

■ 3-Point Hitch Control Lever

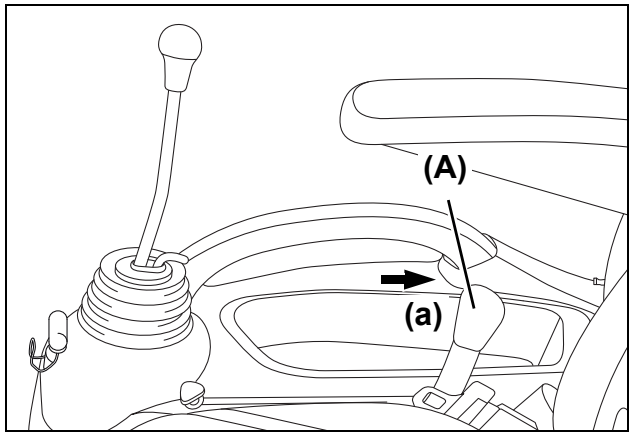
- Pull the 3-point hitch control lever backward.
- Move any attached implements to the raised position.

<SA221>



(A) 3-point hitch control lever
(a) Raised position
(b) Neutral (SA221)

<SA324/424>



(A) 3-point hitch control lever
(a) Raised position

NOTE

●Use the implement control lever to move any attached implements to the raised position.

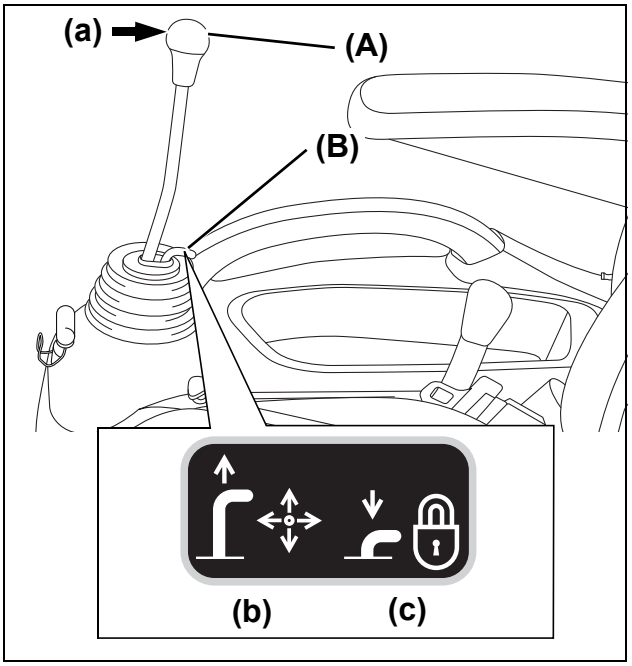
■ Implement Control Lever Lock

IMPORTANT

●Avoid operating the implement control lever when the implement control lever is locked.

●To confirm that the implement control lever (A) has been locked with the implement control lever lock (B):

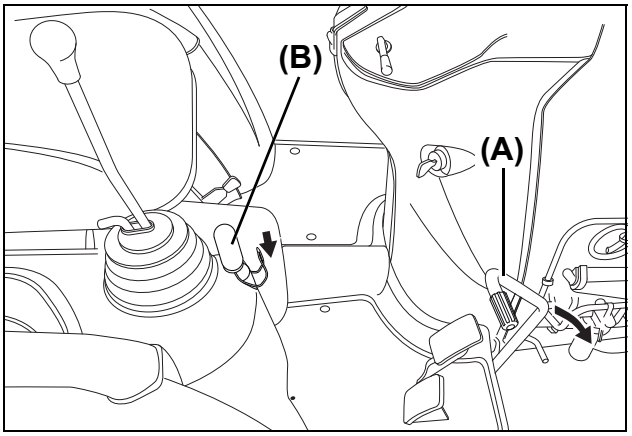
- move the implement control lever with a light force to ensure that the implement control lever is securely locked



(A) Implement control lever
(B) Implement control lever lock
(a) Raising the implement
(b) Pull up the implement control lever lock to unlock the implement control lever
(c) Push down the implement control lever lock to lock the implement control lever

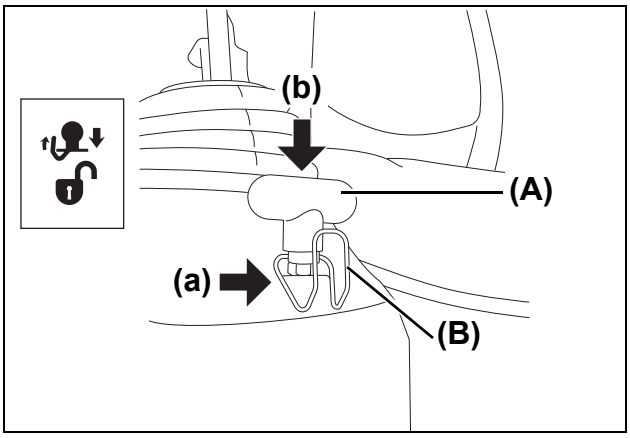
8. Disengage the parking brake

1. Further depress the brake pedal.



(A) Brake pedal
(B) Parking brake lock lever

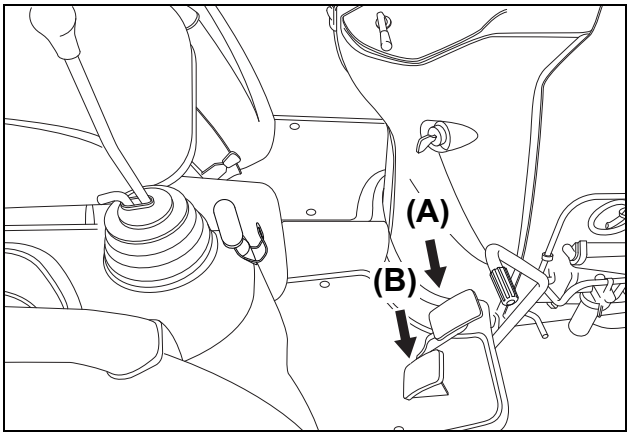
2. Pull the parking brake lock holder forward to release it then parking brake lock lever downward to unlock the brake pedal.



(A) Parking brake lock lever
(B) Parking brake lock holder
(a) Pull forward: Parking brake lock holder is released as indicated by arrow. Refer to figure.
(b) Downward: Unlock the brake pedal.

3. Release the brake pedal. Make sure that the brake pedal is unlocked.

9. Depress slowly the forward and reverse drive pedal



(A) Forward drive pedal
(B) Reverse drive pedal

IMPORTANT

- When the forward and reverse drive pedal is released, the transmission will automatically return to the N (neutral) position.

4. Stop the Tractor

⚠ WARNING

Avoid injury!

- **Slow down before making a turn.**

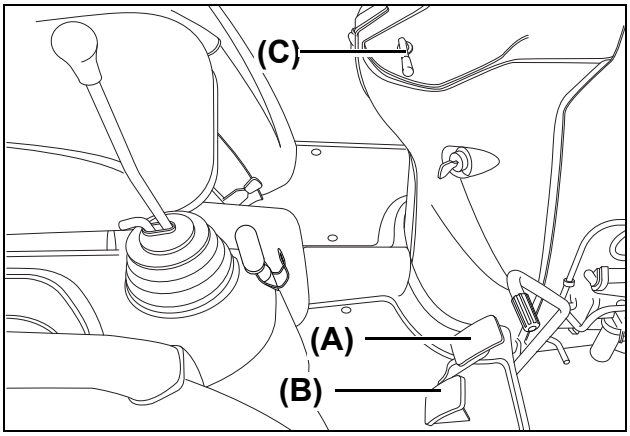
■ Stop Procedure

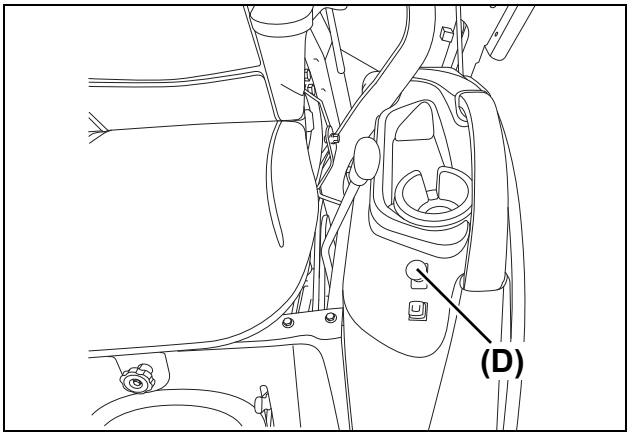
1. Push down the Power Take Off (PTO) switch to OFF position.
2. Slow down the engine.
3. Make sure that the forward and reverse drive pedal is released completely.
4. Depress the brake pedal to stop the tractor.
5. Move the range shift lever to the N (neutral) position. (SA324/424)
6. Push the 3-point hitch control lever forward to lower any implements to the ground.

⚠ WARNING

- **To prevent injury or property damage:**
  - **always lock the parking brake when the range shift lever is in the N (neutral) position**
  - **whether the engine is running or stopped**
  - **the tractor's wheels are free to move when the range shift lever is in the N (neutral) position**

7. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.
8. Turn the starter key switch to OFF position.





(A) Forward drive pedal
(B) Reverse drive pedal
(C) Throttle control lever
(D) Power Take Off (PTO) switch

IMPORTANT

- Leave the operator seat only after ensuring the engine and other components has completely stopped rotating.

■ Stop in an Emergency

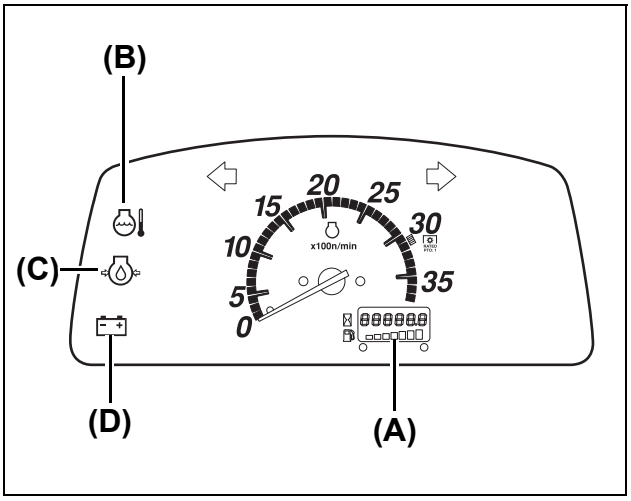
1. Make sure that the forward and reverse drive pedal is in released position.
2. Depress the brake pedal fully.
3. Turn the starter key switch to the OFF position.
4. Keep the brake pedal pressed until all the moving parts has completely stopped.
5. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.

5. Check While Driving

■ Shut down the engine immediately when any of the following occurs.

- The engine slows down or accelerates suddenly.
- Unusual noise comes from the tractor.
- Dark smoke comes out from the exhaust pipe.

Regularly check the following while driving to ensure that all parts are functioning normally.



(A) Fuel gauge
(B) Engine coolant warning light

IMPORTANT

- If any warning light illuminates while in operation:
  - immediately shut down the engine
  - detect the cause according to the procedure given below
- Never attempt to move or start the tractor while any warning light remains illuminated.

(C) Engine oil pressure warning light

The engine oil pressure warning light remains illuminated when:

- The starter key switch is in the ON position and the engine is not running.
- The engine oil pressure is abnormal.

For details, see "Check the Engine Oil Level" on page 14-4.

IMPORTANT

- While the engine is running, an illuminated engine oil pressure warning light indicates the engine oil pressure is too low.
  - immediately shut down the engine
  - contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance

(D) Alternator/Battery charging light
Illuminates when:

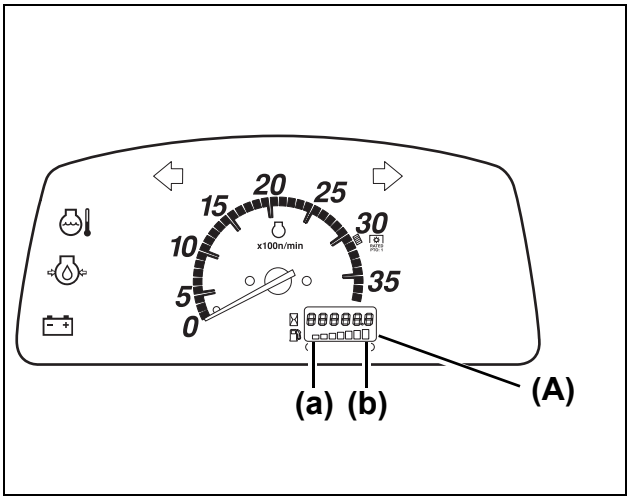
- The starter key switch is in the ON position and the engine is not running.
- The alternator/battery charging circuit is out of order.

IMPORTANT

- While the engine is running, an illuminated alternator/battery charging light indicates the power generated by the alternator is too low.
  - fully push the throttle control lever forward
  - increase the engine speed
- If the light still remains illuminated:
  - immediately shut down the engine
  - contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance

■ Fuel gauge

Indicates how much fuel is in the fuel tank.



(A) Fuel gauge
(a) Empty
(b) Full

⚠ WARNING

Avoid injury!
Remember that the fuel vapor is explosive and flammable:

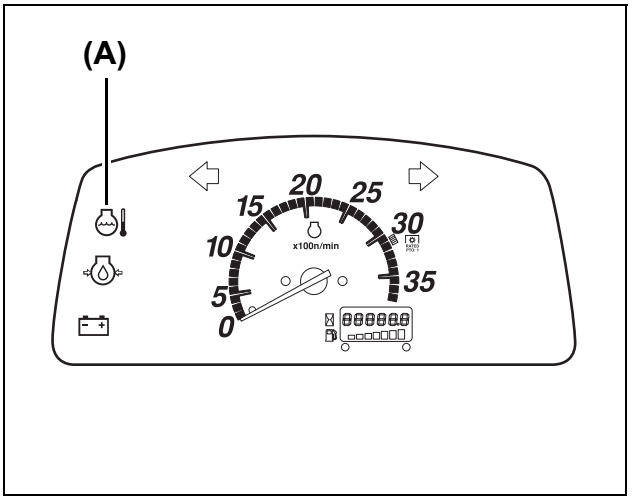
- **Shut off the engine before refilling the fuel tank.**
- **Never smoke while handling fuel.**
- **Keep the fuel away from an open flame or sparks.**
- **Refuel on outdoors or in a well ventilated area.**
- **Immediately wipe away any spilled fuel.**
- **To prevent static electric discharge:**
  - **use a clean and approved non-metal fuel container**
  - **use a clean and approved plastic funnel that has no metallic screen mesh or filter**

IMPORTANT

- Never allow the fuel tank to become completely empty.
- Flashing minimum segment is the sign to refill the fuel tank.
- Air may enter the fuel system and bleeding of the whole fuel system may be necessary.
- For details, see “Check and Refill the Fuel Tank” on page 14-3.

■ Coolant temperature warning light

The coolant temperature warning light illuminates when the current coolant temperature in the engine is too high.



(A) Engine coolant warning light

IMPORTANT

- ●Decrease the load on the tractor:
  - when the coolant temperature warning light illuminates
- ●To lower the coolant temperature:
  - idle the engine until the coolant temperature warning light turns off
  - shut off the engine
  - allow the engine to cool down
- ●After the preceding actions, check the following:
  - the coolant level in the radiator and in the reserve tank are adequate
  - the radiator and radiator screen are free from dust deposits
  - the alternator/fan belt tension is correct
- ●For details, see “Chapter 14. PERIODIC SERVICE” on page 14-1.
- ●If the coolant temperature warning light illuminates again:
  - shut down the engine
  - immediately contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance

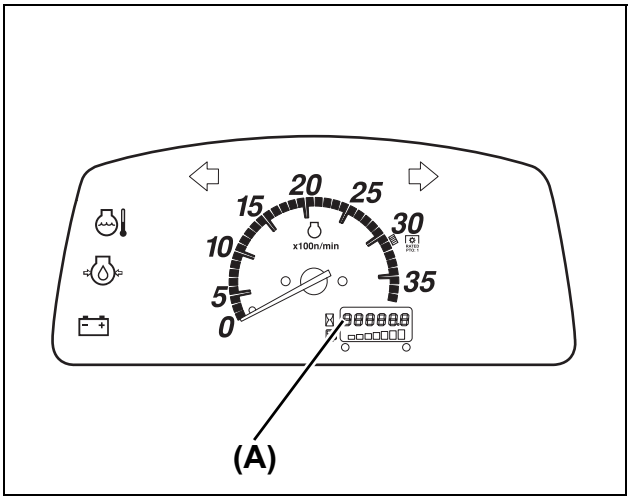
⚠ WARNING

Avoid injury!

- **●Before checking always allow the radiator to cool down:**
  - **the radiator is hot and can cause burns**
  - **the build up pressure in the cooling system can cause the coolant to spray out explosively during removal of the radiator cap**
- **●Always shut off the engine.**
- **●Allow the engine to cool down.**
- **●Remove the radiator cap only when:**
  - **the radiator and the engine are sufficiently cooled down that can be touched with bare hands**
- **●When removing the radiator cap, always:**
  - **loosen the radiator cap to the first stop**
  - **the preceding action releases excessive pressure on the radiator**
  - **fully remove the radiator cap once the pressure has been released completely**
- **●For tractors equipped with a coolant reserve tank:**
  - **add coolant or water to reserve tank, not to the radiator**

■ Hour Meter

Indicate the total accumulated operating hours.



(A) Hour meter

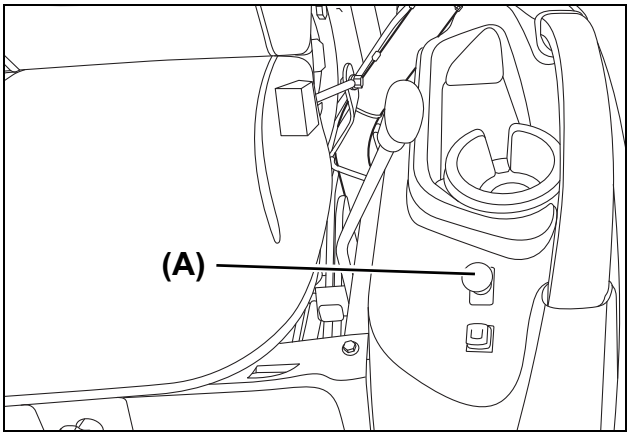
6. Use the Brake

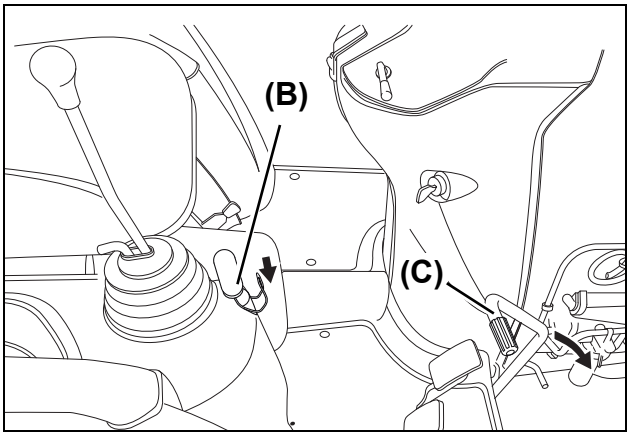
■ Engage the Parking Brake

⚠ WARNING

- **●Before leaving the tractor unattended:**
  - **always engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3**
  - **always remove the key from the starter key switch**
- **●The preceding practice prevents a child and other people from attempting to drive or operate the tractor.**

1. Pull down the Power Take Off (PTO) switch to OFF position.
2. Depress the brake pedal fully.
3. Pull the parking brake lock lever upward.
4. Remove the foot from the brake pedal.
5. Make sure the parking brake is securely locked.





(A) Power Take Off (PTO) switch
(B) Parking brake lock lever
(C) Brake pedal

⚠ WARNING

●Always park the tractor on a solid and level ground. If parking on a slope is unavoidable:
- **chock all the tires safely and securely**
- **engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3**

■ Disengage the Parking Brake

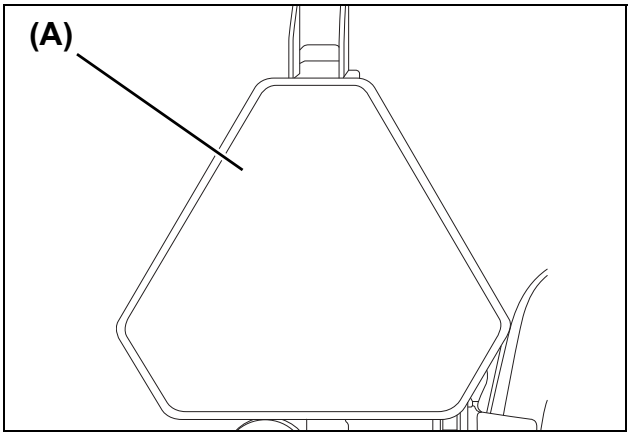
1. Depress the brake pedal fully.
2. Push the parking brake lever downward to unlock the parking brake.
3. Release the brake pedal. Make sure that the brake pedal is unlocked.

7. Practices for Safe Operation

1. Drive the Tractor on Roads

⚠ WARNING

Exercise due caution when driving the tractor on roads. Follow the following instructions.
●Turn on the hazard lights.
●Before operating the tractor on a road, become familiar with the relevant state or local regulations in effect.
●Always have an implement safety lighting kit available from YOUR LOCAL YANMAR TRACTOR DEALER.
●Use the turn signal lights during turning.
●Always keep the Slow Moving Vehicle (SMV) emblem on the original position.
●Perform the following precautions:
- **always ensure the Slow Moving Vehicle (SMV) emblem and hazard lights are clean and clearly visible**
- **always ensure that the Slow Moving Vehicle (SMV) emblem is visible while a rear mounted implement is mounted**



(A) Typical example of installed Slow Moving Vehicle (SMV) emblem

1. Turn the hazard lights and headlights ON, unless prohibited by law.
2. Slowly drive the tractor to be able to control the tractor at all times.
3. Slow down when:
   - Traveling on slopes and rough roads.
   - Executing sharp turns.
   - Transporting a heavy rear mounted implement.

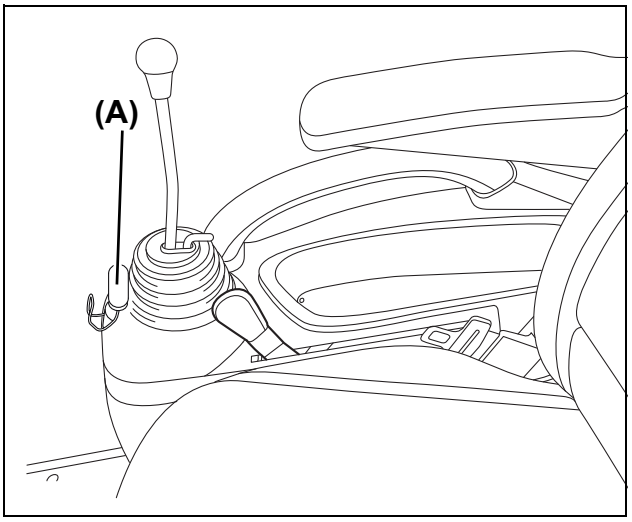
4. Disengage the 4-wheel drive to prevent excessive tire wear.
5. Do not under any circumstances coast downhill.
6. Check whether the 4-wheel drive is engaged.
7. The braking characteristics differ between the 2-wheel drive and 4-wheel drive. Always be aware of the current drive mode and drive accordingly.
8. Always slow down before turning. High speed turns can cause the tractor to tip over.
9. Always ensure the Slow Moving Vehicle (SMV) emblem is on the tractor and is clearly visible.
10. Strictly observe all the currently effective local traffic and safety laws and regulations.
11. Always travel at a speed such that the tractor can be controlled and is stable.
12. While traveling on roads, avoid sudden turning of the steering wheel. The preceding action makes the tractor unstable resulting in an extremely dangerous situation.
13. While on the road, avoid under any circumstances operate an implement.
14. While driving on a road with an implement attached to the 3-point hitch:
    - Set the 3-point hitch control lever to the raised position.
    - Lock the 3-point hitch control lever with the position stop knob.
    - During the use of hydraulic flow control/stop knob to raise the implements:
      - avoid fully closing hydraulic flow control/stop knob that may damage the hydraulic lift circuit
15. When driving the tractor on roads, travel slower than 10 mph (16 km/h).

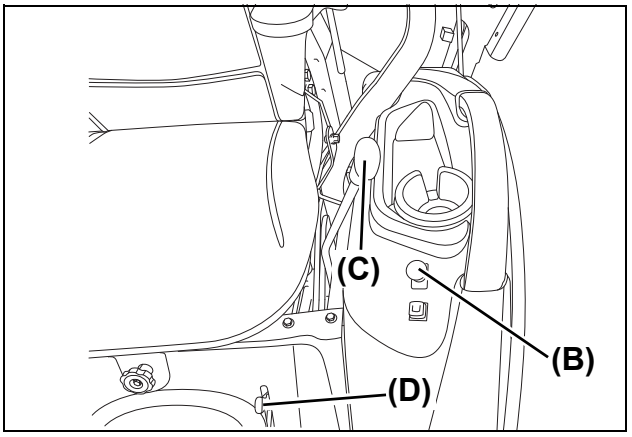
■ Push or Tow the Tractor (SA221)

⚠ WARNING

- **When towing the tractor:**
  - **travel slower than 10 mph (16 km/h)**
  - **always have another person sit on the tractor to allow independent operation of the steering and brakes when required**

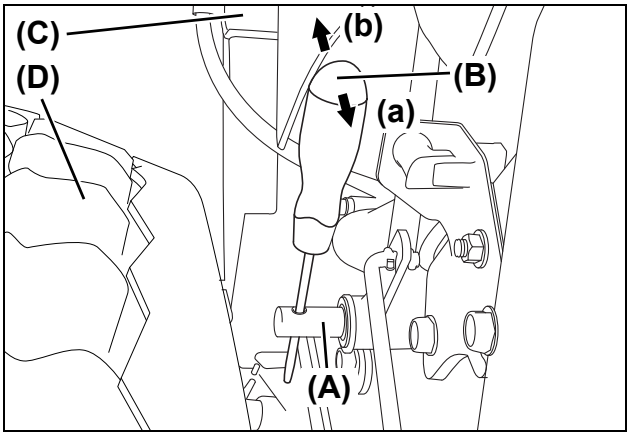
1. Push down Power Take Off (PTO) switch to OFF position.
2. Disengage the parking brake.
3. Disengage the 4-wheel drive.





(A) Parking brake lock lever
(B) Power Take Off (PTO) switch
(C) Mid-/Rear Power Take Off (PTO) select lever
(D) 2WD/4WD lever

4. Insert the screw driver into the hole of the shaft at the joint of Mid-/Rear Power Take Off (PTO) select lever under the left fender.



NOTE

● This illustration shows from rear side.

(A) Shaft at the joint of Mid-/Rear Power Take Off (PTO) select lever
(B) Screw Driver
(C) Left Fender
(D) Rear Left tire
(a) Pulling the screw driver backward to the neutral gear position.
(b) Pushing the screw driver forward to the in gear position.

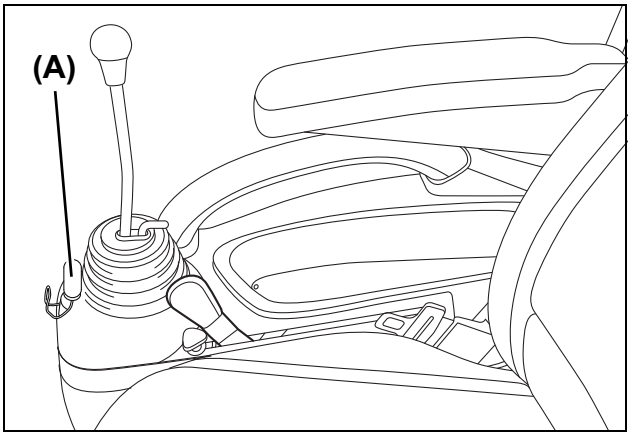
5. Pull the screw driver backward until the shaft can rotate clockwise (backward).
6. Make sure that the tractor can be moved by hand and take the screw driver off the hole.
7. After pushing or towing the tractor, return the shaft to the original position pushing the screw driver forward until the shaft can rotate counterclockwise (forward).

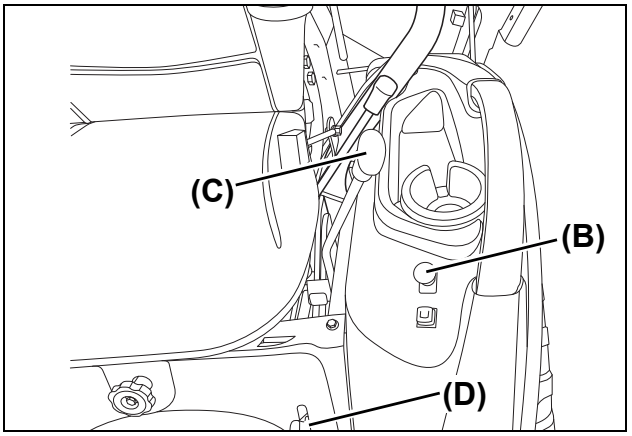
■ Push or Tow the Tractor (SA324/424)

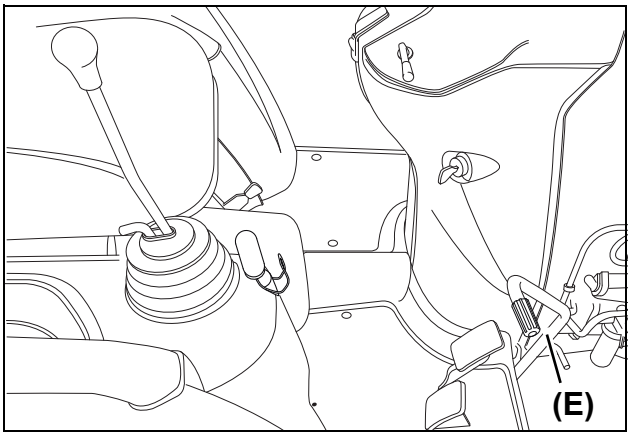
⚠ WARNING

● **When towing the tractor:**
- **travel slower than 10 mph (16 km/h)**
- **always have another person sit on the tractor to allow independent operation of the steering and brakes when required**

1. Push down Power Take Off (PTO) switch to OFF position.
2. Disengage the parking brake.
3. Move the range shift lever to N (neutral) position.
4. Disengage the 4-wheel drive.







(A) Parking brake lock lever
(B) Power Take Off (PTO) switch
(C) Range shift lever (SA324/424)
(D) 2WD/4WD lever
(E) Brake pedal

■ Allowable Loads When Towing with the Tractor

⚠ WARNING

- **When towing, the distance required to stop the tractor proportionally increases with the:**
  - **tractor speed**
  - **weight of the load being towed**
  - **angle of a slope**
- **Towing loads too heavy for the tractor:**
  - **can result in loss of control of the tractor**
  - **regardless of whether the load itself has brakes or not**
- **Towing at excessively high speed can result in loss of control of the tractor.**
- **Before towing, always ensure that the tractor has the capability to handle the total weight of all equipment and loads.**

Always comply with the recommended maximum road speeds or local speed limits:

- When towing equipment, travel at a speed of less than 9.3 mph (15 km/h).
- Make sure the tractor has the capability to tow the equipment and loads. For details, see "Chapter 4. IMPLEMENT CAPACITIES".

⚠ CAUTION

- **Make sure the tractor is heavy and powerful enough for the load being towed.**
- **Make sure the tractor has sufficient braking power for the load being towed.**
- **If the load exceeds the recommended weight ratio:**
  - **add weight to the tractor**
  - **lighten the load**
  - **get a heavier tractor**
- **Exercise caution when towing loads:**
  - **on difficult surface**
  - **when turning**
  - **on a slope**

⚠ WARNING

Avoid injury!

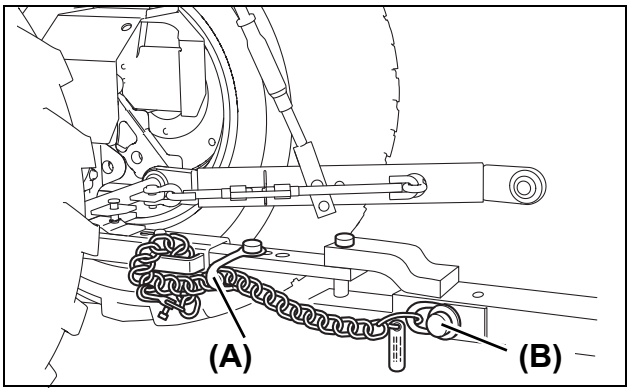
- **If the towed equipment is not equipped with brakes:**
  - **travel slower than 9.3 mph (15 km/h)**
  - **tow loads weighing less than 1.5 times the tractor weight**
- **Even if the towed equipment is equipped with brakes:**
  - **travel slower than 18.6 mph (30 km/h)**
  - **tow loads weighing less than 4.5 times the tractor weight**

1. Hitch the load to the drawbar.
2. Lock the drawbar and pin in place.

NOTE

- Always use the drawbar to tow a load.
- Do not under any circumstances attach a load to the axle housing or any other location besides the drawbar.

3. Attach a safety chain between the tractor drawbar support and the load.



(A) Intermediate support
(B) Towed implement attachment point

4. Always allow enough slack in the safety chain to enable turning.

NOTE

- On a slope:
  - make sure the gear is low enough to allow the operator to control the speed of the tractor without having to use the brake pedals

2. Transport the Tractor on a Trailer

The following instructions are limited to a practice recommended for transporting the tractor correctly alone and with loader on a trailer.

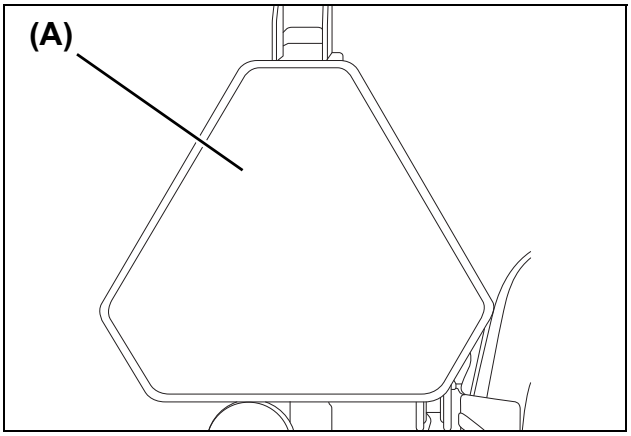
⚠ WARNING

To prevent serious personal injury or death:
- **Always follow the cautions below.**
- **Make sure to raise and center the boom, close the dipperstick, curl the bucket and lock the boom and swing before attempting to transport the tractor.**
- **Use chains and chain binders to tie down the tractor and loader securely to the trailer or truck.**
- **Exercise extreme care during loading or unloading the tractor to or from a trailer or truck.**
- **Turn the fuel shut-off valve to the OFF (closed) position.**

NOTE
- Use a heavy duty trailer to transport the tractor.

1. Drive the tractor forward onto the trailer.
2. Lower any implement onto the trailer deck.
3. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.
4. Shut off the engine.
5. Remove the key from the starter key switch.
6. Turn the fuel shut-off valve to the OFF (closed) position.
7. Tie down the tractor to the trailer with heavy duty straps, chains or cables. Direct both front and rear straps down and outward from the tractor.

IMPORTANT
- The trailer must have signs and lights as required by law.
- When transporting the tractor on a trailer, the Slow Moving Vehicle (SMV) emblem may have to be removed to comply with local laws. For details, contact YOUR LOCAL YANMAR TRACTOR DEALER.



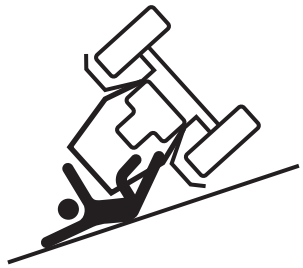
(A) Typical example of installed Slow Moving Vehicle (SMV) emblem

3. Operate on Slopes and Rough Terrain

⚠ WARNING

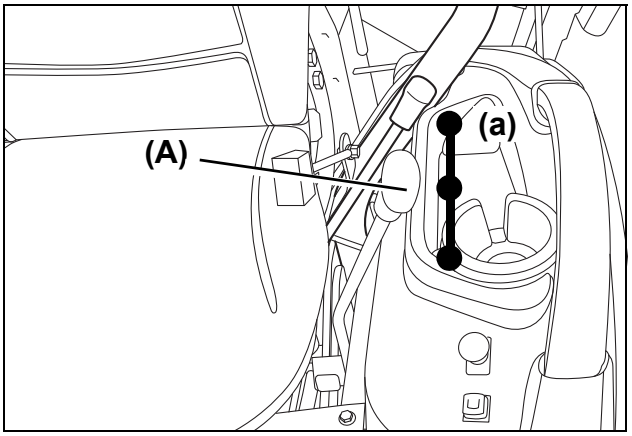
Be extremely cautious when driving the tractor on a slope and rough terrain.
Observe the following precautions.

- **Before driving the tractor on a slope or a rough terrain, engage the 4-wheel drive for the following purposes:**
  - **to increase traction**
  - **to greatly assists in climbing steep slopes**
  - **to improve braking power on sloped, frozen, wet or graveled surfaces**
  - **always be aware that the danger of tipping over is still present**
- **Add weight to the tractor as necessary.**
- **Drive at a lower speed to prevent skidding and loss of steering control.**
- **Keep away from slopes steeper than 15 degrees.**
- **Avoid parking the tractor perpendicular to the slope.**
- **Avoid turning or changing travel directions on a slope.**
- **Before approaching a slope, select an appropriate speed setting.**
- **Make sure to travel at a lower speed when on a slope.**
- **Avoid shifting the range shift lever while traveling on a slope. The preceding action can make the tractor uncontrollable and suddenly roll down the hill.**
- **Do not move the range shift lever in N (neutral) position when on the slope:**
  - **the preceding action can make the tractor uncontrollable and suddenly roll down the hill**
- **Sudden operating the tractor on an uphill slope can cause the front wheels to lift off the ground and result in an extremely dangerous situation.**
- **To prevent the preceding danger:**
  - **run the engine at a lower speed**
  - **slowly start the tractor**



- **Avoid parking the tractor perpendicular to a slope.**
  - **if parking on a slope is unavoidable, chock all the tires safely and securely and engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3**
- **On a slope, the tractor is unstable and more prone to severe injury or even death. Always be alert.**
- **Avoid traveling backward, up and down on a slope to prevent tipping over.**
- **Keep away from ditch or deep mud to avoid the risk of the tractor tipping over.**
- **Always drive slowly on any slope. Avoid under any circumstances sudden change of speeds or directions.**
- **For increased stability of the tractor on slope:**
  - **follow the instructions for proper weighting**
  - **for details, see "Chapter 12. TIRES, WHEELS AND WEIGHTS" on page 12-1**

1. Before approaching a slope, set the range shift lever to the slow position. (SA324/424)

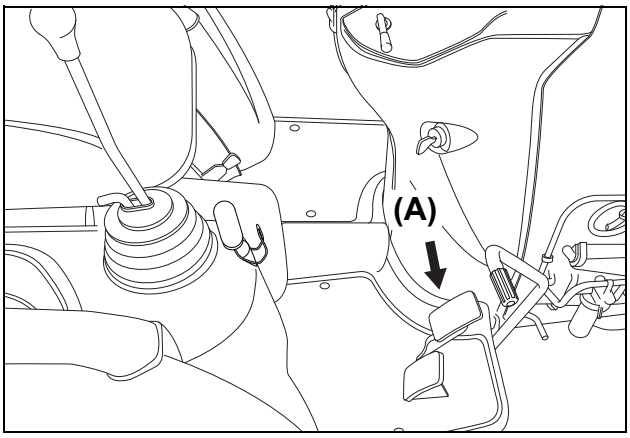


(A) Range shift lever
(a) L (Low position)

2. Depress slowly the forward drive pedal to start moving.

IMPORTANT

●Always slowly drive the tractor on a slope.



(A) Forward drive pedal

3. ALWAYS travel slowly on a slope.
4. Drive the tractor according to the type of a slope, as indicated below:

■ Uphill and Downhill Slopes

●Start slowly.
●Make sure the range gear is in a slow gear.
●Run the engine at a lower speed.

■ Steep Downhill Slope

●Move the range shift lever to the lower speed position before going a downhill slope.
  • the preceding action sets the level of engine brake
●Select the range shift lever position suitable for the steepness of a slope.

⚠ WARNING

Avoid injury!

●When backing up a slope, keep the tractor parallel with the inclination of the slope.

4. About the Power Steering

⚠ WARNING

Avoid injury!

●The tractor equipped with power steering.
  • the steering wheel can turn with minimum force while the engine is running
●Avoid abrupt turning of the steering wheel, especially while traveling on paved roads.

1. The power steering only function when the engine is running.
2. When the engine is running at slow speed, the operator may need to exert a slightly greater force to turn the steering wheel.
3. The preceding state is normal.

IMPORTANT

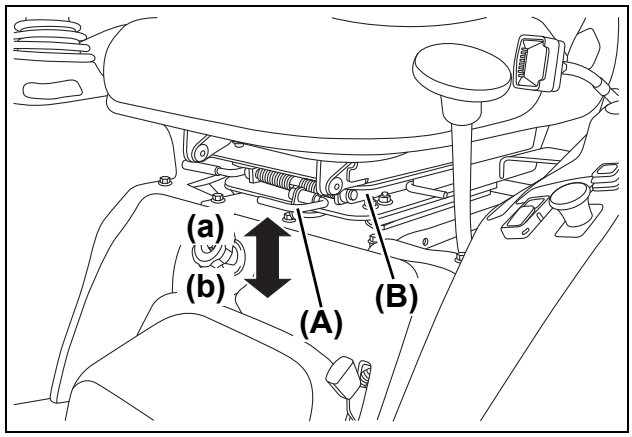
●Fully turning the steering wheel causes the relief valve to trip. An audible signal is emitted.
  • the preceding state can be ignored only for a short duration
●Do not under any circumstances keep the steering wheel fully turned for an extended period of time.
●As much as possible, avoid turning the steering wheel while the tractor is not moving.
●Avoid turning the steering wheel of the tractor while the engine is shut off, unless while towing the tractor.
  • the preceding action can damage the steering valve, tires and rims

5. Rotation of Swivel Seat Bracket (Option)

IMPORTANT

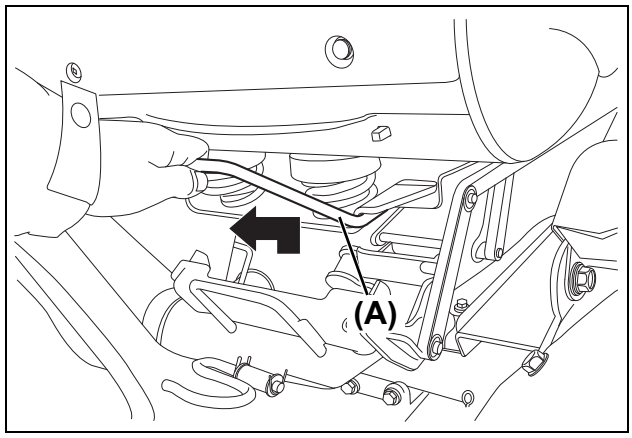
- Swivel seat bracket has already been installed if the backhoe is mounted from the factory.
- Exit the tractor when rotating the swivel seat bracket.
- Operator must rotate the operator seat with swivel seat bracket to opposite side when operating the backhoe.

1. Pull up the lock release lever of the swivel seat bracket upward to unlock.



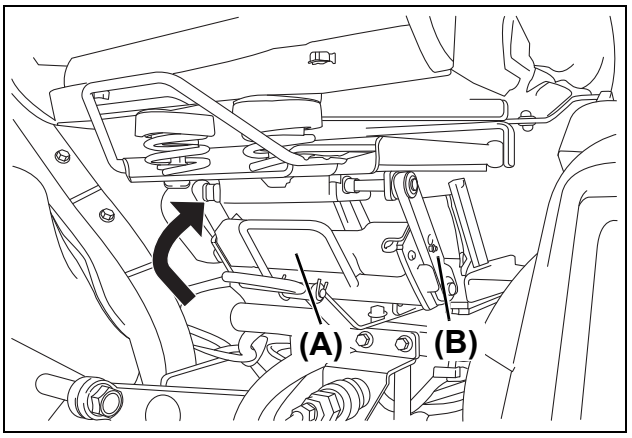
(A) Lock release lever of swivel seat bracket
(B) Swivel seat bracket
(a) Upward: Unlock the swivel seat bracket
(b) Downward: Lock the swivel seat bracket

2. Pull up the rear handle of the swivel seat bracket.



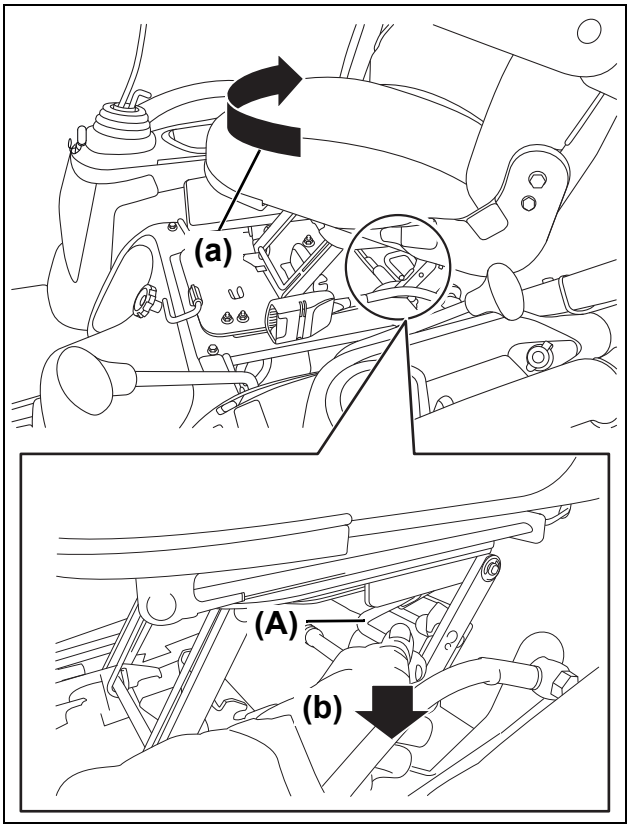
(A) Rear handle of the swivel seat bracket

3. Make sure the rear latch of the swivel seat bracket is locked onto the swivel seat bracket stay.



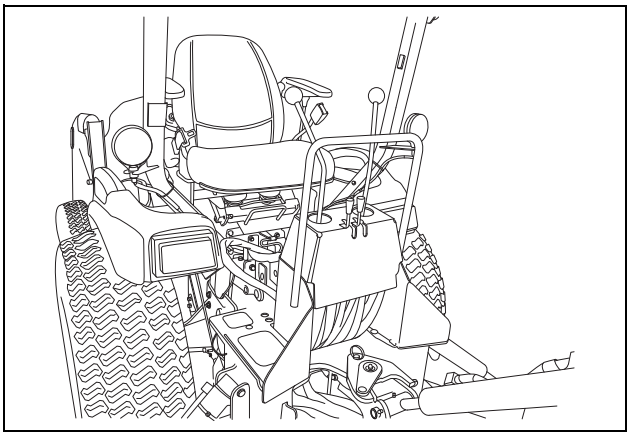
(A) Rear latch of the swivel seat bracket
(B) Swivel seat bracket stay

4. Push down and hold the swivel release handle and rotate the seat clockwise.

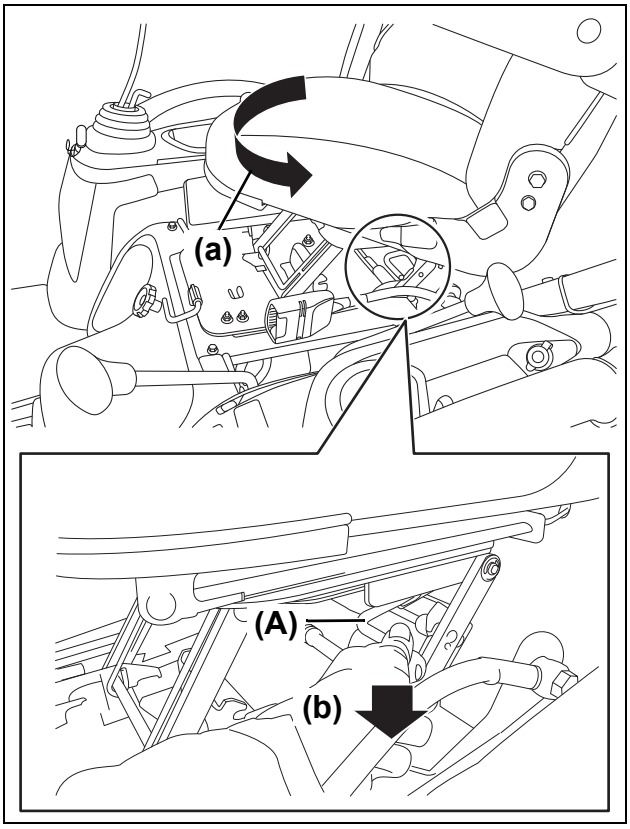


(A) Swivel Release Handle of the swivel seat bracket
(a) Operator seat can be rotated as indicated by arrow. Refer to figure.
(b) Downward: Unlock the swivel seat bracket rotation.

5. Now the swivel seat bracket is ready for backhoe operation.

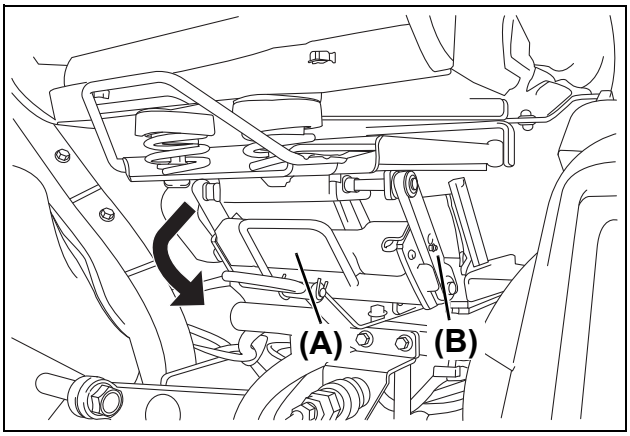


6. When returning the swivel seat bracket into original position: first, push down and hold the swivel release handle and rotate the seat to opposite side.



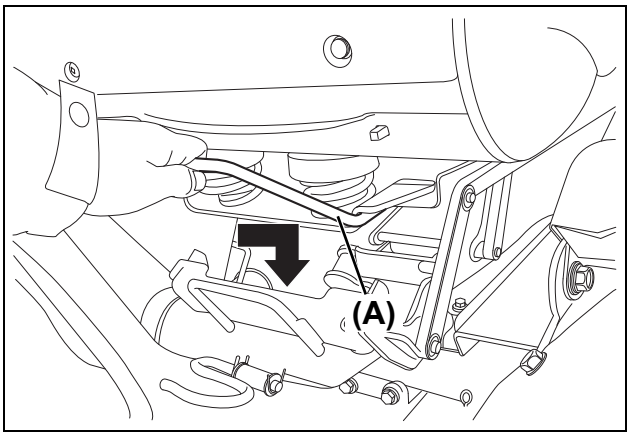
(A) Swivel Release Handle of the swivel seat bracket
(a) Operator seat can be rotated as indicated by arrow. Refer to figure.
(b) Downward: Unlock the swivel seat bracket rotation.

7. Make sure the rear latch of the swivel seat bracket is unlocked from the swivel seat bracket stay.



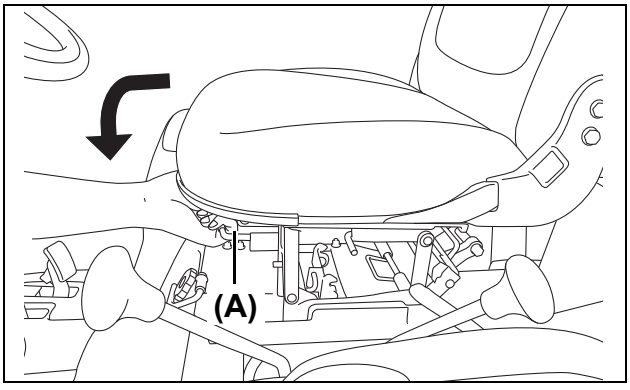
(A) Rear latch of the swivel seat bracket
(B) Swivel seat bracket stay

8. Hold and push down the rear handle of the swivel seat bracket.



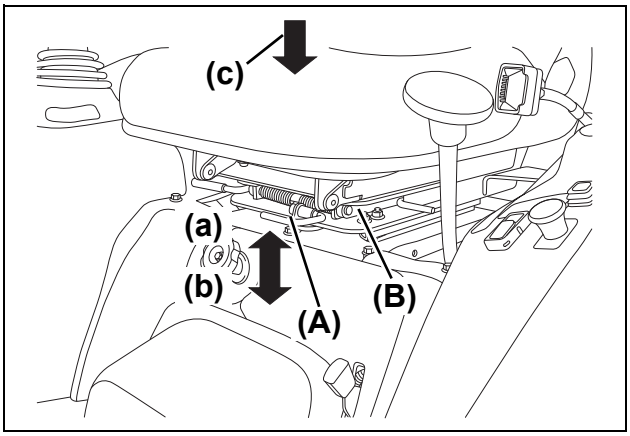
(A) Rear handle of the swivel seat bracket

NOTE
- If the swivel seat assembly is equipped with a front handle, use the front handle to assist in lowering the seat to avoid personal injury.



(A) Front handle of the swivel seat bracket

9. Push down on the center of the seat while pulling down on the lock release lever.



(A) Lock release lever of swivel seat bracket
(B) Swivel seat bracket
(a) Upward: Unlock the swivel seat bracket
(b) Downward: Lock the swivel seat bracket
(c) Push down on the center of the seat.

6. Differential Lock Pedal for SA324/424 (Option for SA221)

⚠ WARNING

- **To prevent tipping of the tractor:**
  - **do not attempt to turn with the differential lock engaged**
  - **do not engage the differential lock while the tractor is traveling at a high speed**

IMPORTANT

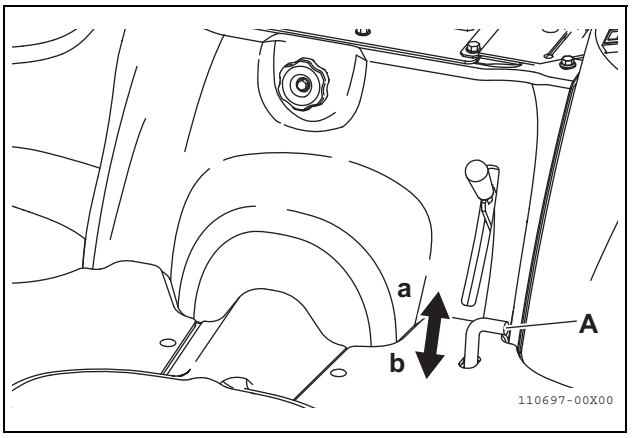
- If differential lock does not disengage after removing foot from the differential lock pedal:
  - Change turning direction side to side while driving slowly.
    Travel direction can also be changed between forward and reverse to make differential lock disengage.
    These actions equalize the traction force on the differential.
  - Then release the differential lock pedal.
- To prevent damage to the differential gears, Never use the differential lock while traveling at high speed.
- The differential lock is designed to be used for short durations.
- Prolonged use can damage the differential gears.

NOTE

- Engaging the differential lock:
  - locks the right and left rear axles.
  - the right and left rear axles simultaneously rotate at the same speed.
  - the preceding action allows the tractor to develop maximum traction force.

When rear wheels begin to slip:
Engage the differential lock to gain greater traction.

<Engage the differential lock>
1. Stop the tractor.
2. Drive the tractor at a very slow speed.
3. Depress the differential lock pedal.



(A) Differential lock pedal
(a) Disengage position
(b) Engage position

<Disengage the differential lock>
1. Release the differential lock pedal completely.

IMPORTANT

- Always decrease the travel speed when using the differential lock.

9. POWER TAKE OFF (PTO) SYSTEM

⚠ WARNING

Avoid injury!

- **Before connecting, disconnecting, adjusting, cleaning or servicing any Power Take Off (PTO) driven implement:**
  - **always ensure all moving components have completely stopped rotating**

- **Always ensure Power Take Off (PTO) shaft shield is installed while the Power Take Off (PTO) is not in use.**

- **Before attempting to replace the Power Take Off (PTO) shaft cap:**
  - **always wait until the shaft has completely stopped moving**

- **Before installing or operating any Power Take Off (PTO) driven implements:**
  - **always follow Power Take Off (PTO) driven implement *Operation Manual*, safety decals and instructions**

- **Always engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3 and chock all the tires safely and securely.**

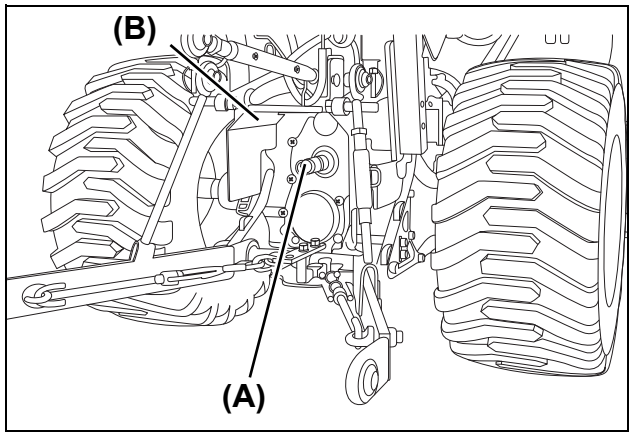
- **Avoid approaching or touching any rotating component.**

1. Operate the Power Take Off (PTO) System

⚠ WARNING

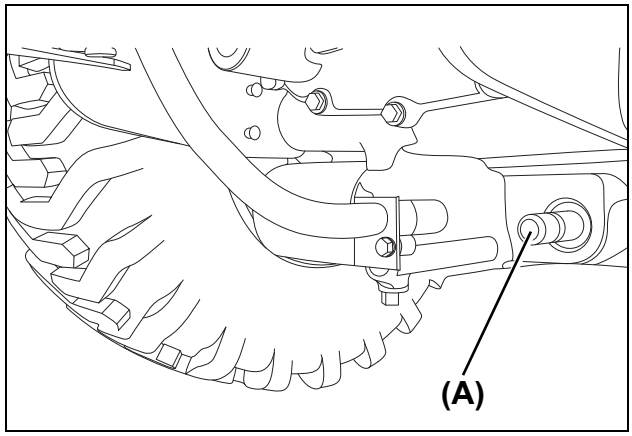
- **Before connecting, disconnecting, adjusting or cleaning any Power Take Off (PTO) driven implement:**
  - **push down Power Take Off (PTO) switch to OFF position**
  - **shut off the engine**
  - **make sure all rotating component have stopped**
- **Avoid approaching rotating drivelines.**
- **Entanglement with a rotating driveline can lead to serious injury or even death.**
- **Keep away from rotating driveline.**
- **Keep clothing away from rotating driveline.**
- **Make sure all shields and guards are in position and are correctly installed.**
- **Do not run the engine at 3450 Revolutions Per Minute (rpm) or more while Power Take Off (PTO) switch is in the ON position.**

■ Rear Power Take Off (PTO)



(A) Rear Power Take Off (PTO) shaft
(B) Power Take Off (PTO) shield

■ Mid-Power Take Off (PTO)

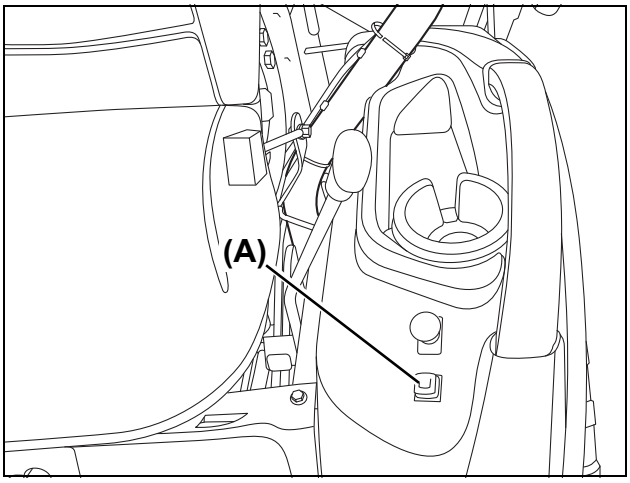


(A) Mid-Power Take Off (PTO) shaft

■ Engage Power Take Off (PTO) (with the operator on the operator seat)

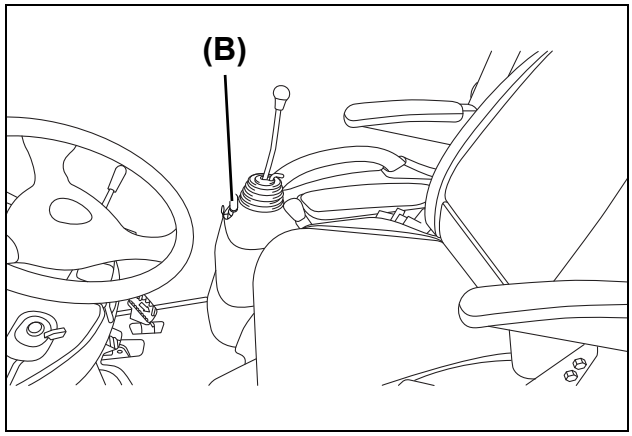
NOTE

- Do not stop the engine while Power Take Off (PTO) switch is in the ON position.
- When the operator leaves the operator seat while the engine is running (with Power Take Off (PTO) engaged):
  - the safety interlock system shuts down the engine
  - the system also stops all operations on the tractor
- When the Mid-/rear Power Take Off (PTO) select lever is shifted to front (both Mid and Rear PTO engagement) position, reversing the tractor stops the Mid-Power Take Off (PTO) and the Rear Power Take Off (PTO). At this time, even though the reverse drive pedal is released and the forward drive pedal is depressed, the Mid-Power Take Off (PTO) and the Rear Power Take Off (PTO) still stop. Disengaging and re-engaging the Power Take Off (PTO) switch activates the Power Take Off (PTO) function.
- Use the reverse override switch to operate the Power Take Off (PTO) while reversing the tractor.



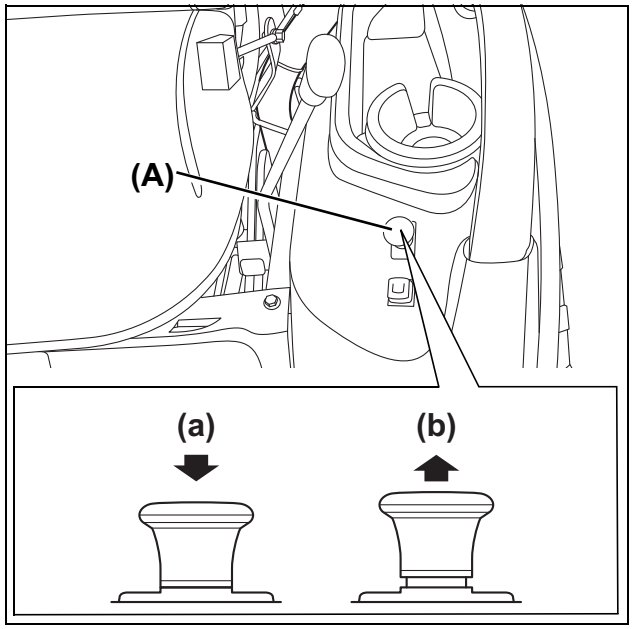
(A) Reverse override switch

1. Sit on the operator seat.
2. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.



(B) Parking brake lock lever

3. Push down the Power Take Off (PTO) switch to OFF position.



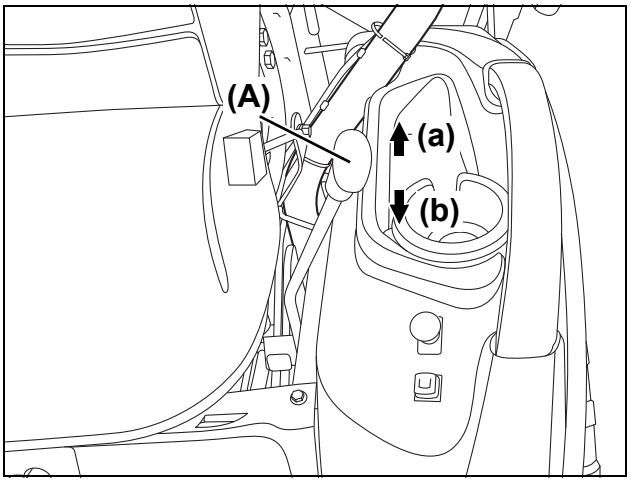
(A) Power Take Off (PTO) switch
(a) OFF position
(b) ON position

4. Start the engine.
5. Adjust the engine speed to 1500 Revolutions Per Minute (rpm) or lower.

IMPORTANT

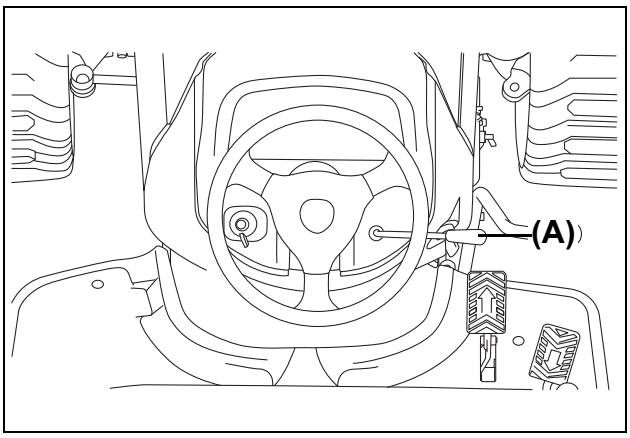
- Make sure to reduce the engine speed before pulling up the Power Take Off (PTO) switch to ON position to reduce any shock at the time of using the Power Take Off (PTO).

6. Move the Mid-/Rear Power Take Off (PTO) select lever according to the implement/s to be used.



(A) Mid-/Rear Power Take Off (PTO) select lever
(a) Operating the Rear Power Take Off (PTO) only
(b) Operating the Mid-Power Take Off (PTO) and the Rear Power Take Off (PTO) simultaneously

7. Pull up the Power Take Off (PTO) switch to ON position.
8. Move the throttle control lever to adjust the engine speed suitable for operation.



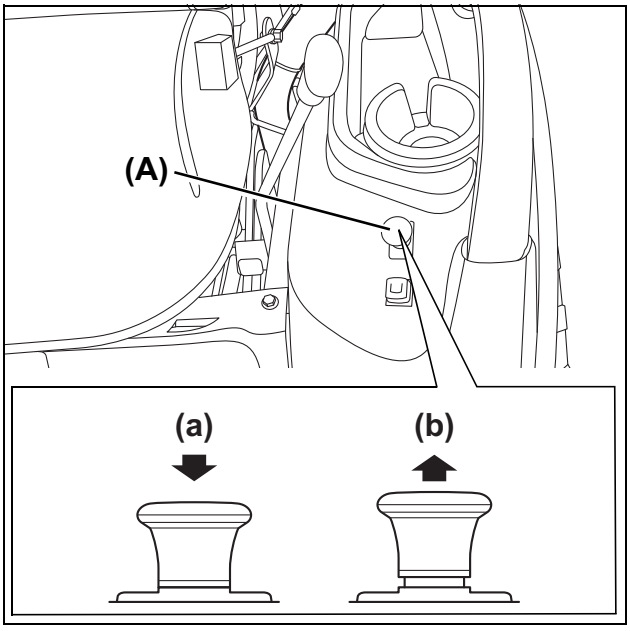
(A) Throttle control lever

NOTE

- When the engine speed is 3111 Revolutions Per Minute (rpm), the Mid-Power Take Off (PTO) rotates at approximately 2000 Revolutions Per Minute (rpm).
- When the engine speed is 3120 Revolutions Per Minute (rpm), the Rear Power Take Off (PTO) rotates at approximately 540 Revolutions Per Minute (rpm).

■ Disengage Power Take Off (PTO) (with the operator on the operator seat)

1. Idle the engine speed.
2. Push down Power Take Off (PTO) switch to OFF position.



(A) Power Take Off (PTO) switch
(a) OFF position
(b) ON position

2. Install an Implement to Power Take Off (PTO) Driveline

⚠ WARNING

Avoid injury!

- **Before installation of an implement to Power Take off (PTO) driveline,**
  - **make sure that the tractor is stopped**
  - **make sure that Power Take Off (PTO) switch is in the OFF position**

IMPORTANT

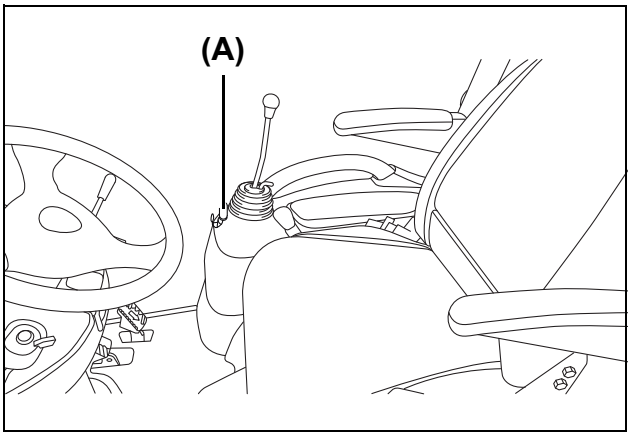
- Observe the driveline manufacturer installation instructions for:
  - driveline mounting angle
  - length of the overlaps on the driveline shafts
- An incorrectly installed implement can promote wear of the driveline and/or damage the tractor.

NOTE

- To operate the Mid-/Power Take Off (PTO). The operator must be sitting on the operation seat.

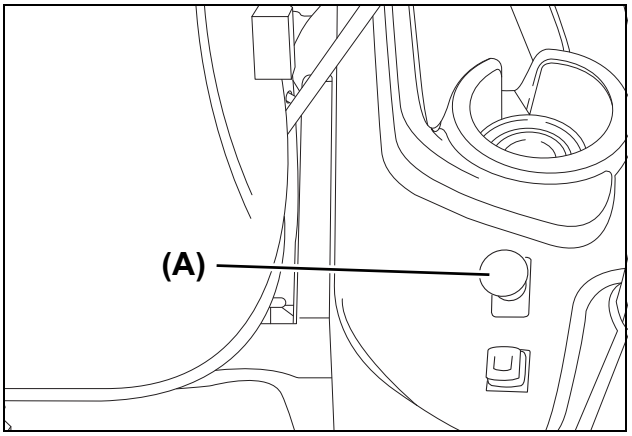
Use Power Take Off (PTO) with the operator out of the operator seat.

1. Park the tractor safely and securely.
   • For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.



(A) Parking brake lock lever

4. Move the range shift lever to the N (neutral) position (SA324/424) and Power Take Off (PTO) switch to OFF position.
5. Sit on the operator seat.
6. Start the engine.
7. Pull up Power Take Off (PTO) switch to ON position.



(A) Power Take Off (PTO) switch

3. Use the Power Take Off (PTO) Safely

⚠ WARNING

- **Stay clear of rotating drivelines.**
- **Before approaching the driveline:**
  - **push down Power Take Off (PTO) switch to OFF position**
  - **shut down the engine**
  - **make sure all rotating components have stopped**
- **Entanglement with a rotating driveline can lead to serious injury or even death.**
- **Keep away from rotating driveline.**
- **Keep clothing away from rotating driveline.**
- **Make sure all shields and guards are in position and are correctly installed and used.**

4. Operate the Power Take Off (PTO) while the Tractor is Traveling in the Reverse Direction (Reverse Override Function)

⚠ WARNING

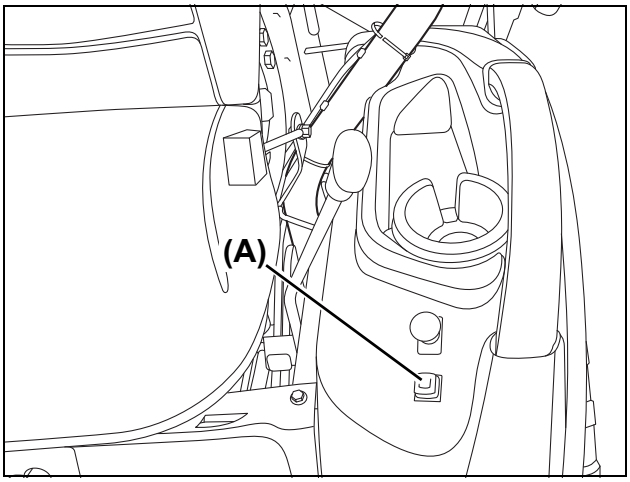
Avoid injury!

- **Always be extremely careful when backing up the tractor.**
- **Always clear the surrounding area of the tractor from bystander/s and obstacle/s before starting to back up.**
- **While backing up, always watch for bystander/s and obstacle/s along the way.**

NOTE

- Reversing the tractor stops the Mid-Power Take Off (PTO) and the Rear Power Take Off (PTO).
- Use the reverse override switch to operate the Power Take Off (PTO) while reversing the tractor.
- When the reverse override function is deactivated and the forward drive pedal is depressed, the Mid-Power Take Off (PTO) and the Rear Power Take Off (PTO) can be operated without disengaging and re-engaging the Power Take Off (PTO) switch.

1. Pull up the Power Take Off (PTO) switch to ON position.
2. Push down the reverse override switch to ON position.
3. Depress slowly the reverse drive pedal while pushing down the reverse override switch.
4. The switch light illuminates.
5. Release the reverse override switch.
6. The reverse override switch is activated and the Mid-Power Take Off (PTO) and the Rear Power Take Off (PTO) can be operated during reverse movement.
7. Releasing the reverse drive pedal. The reverse override switch is turned off and reverse override function become deactivated.



(A) Reverse override switch

⚠ CAUTION

- **Once the reverse override switch is activated, the reverse override function is deactivated when the reverse drive pedal is released.**

10. 3-POINT HITCH AND DRAWBAR

⚠ WARNING

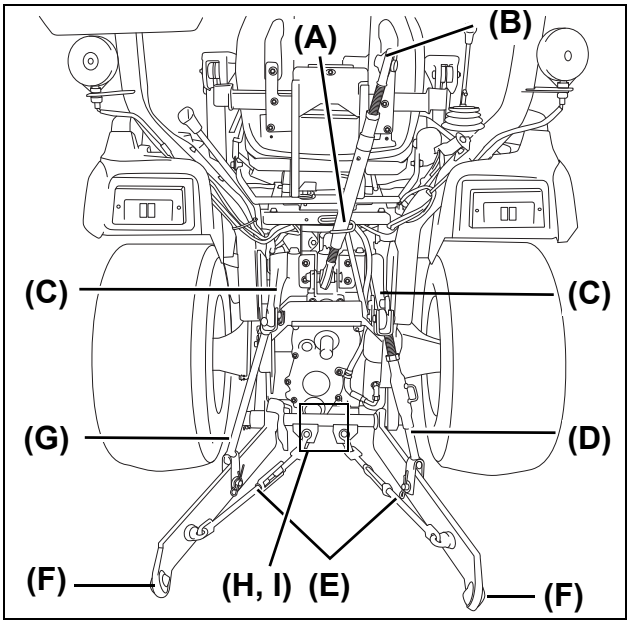
- **When there is a 3-point hitch-mounted implement:**
  - **always install an appropriate weight to the front of the tractor**

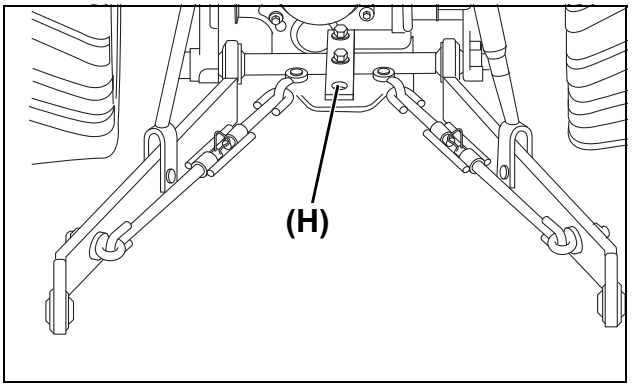
- **During transportation:**
  - **place the 3-point hitch control lever in the raised position**
  - **lock the 3-point hitch control lever with the position stop knob for the 3-point hitch control lever**

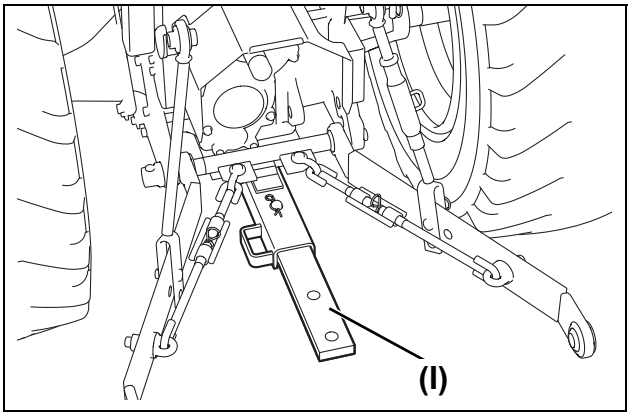
- **Do not fully close the hydraulic flow control/ stop knob in order to keep any implements in the raised position while the tractor is traveling.**
  - **completely closing the hydraulic flow control/stop knob can damage the hydraulic lift circuit**

- **Only use implements that are designed for use with the 3-point hitch.**
- **Always use approved implements with the 3-point hitch.**
- **Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.**

1. 3-Point Hitch







(A) Top link hook
(B) Top link
(C) Left arm, Right arm
(D) Lift Link right
(E) Check chain (adjustable)
(F) Lower links
(G) Lift Link (non-adjustable) (left)
(H) Hitch Hole (SA221)
(I) Drawbar (SA324/424)

■ Use the 3-Point Hitch Control Lever

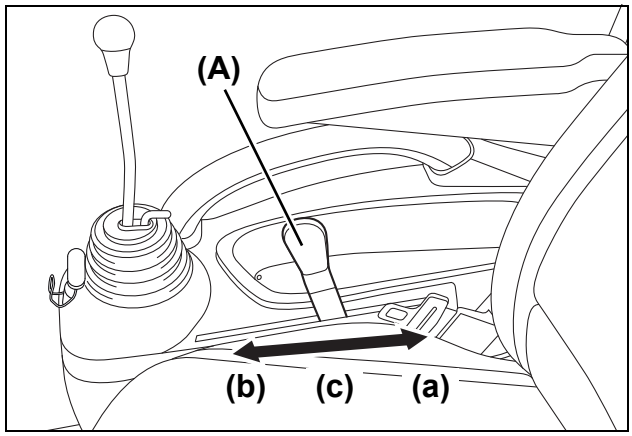
NOTE
- The 3-point hitch delivered with the tractor is a Category 1.

1. Use the 3-point hitch control lever to raise and lower the implement attached to the 3-point hitch.

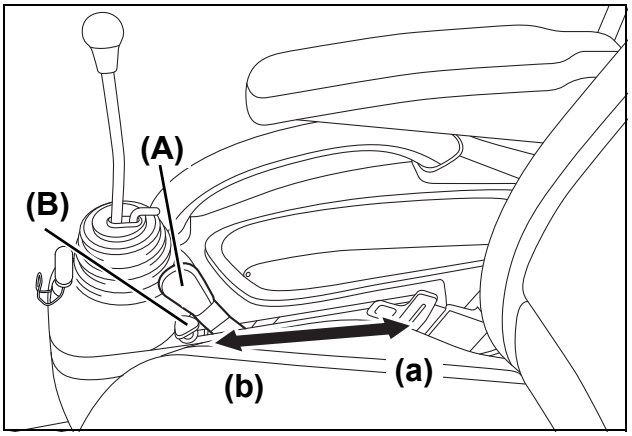
NOTE
- The 3-point hitch control lever is labeled 1 to 9.
- The numbers:
  - for reference purposes only
  - does not indicate any exact height position for the implement that is attached to the 3-point hitch
- The lower the number, the closer the lower links is to the ground.

2. Adjust the position stop knob to set the desired lowest position of the implement from the ground.

<SA221>



<SA324/424>



(A) 3-point hitch control lever
(B) Position stop knob
(a) Moving the 3-point hitch control lever backward raises the implement.
(b) Moving the 3-point hitch control lever forward lowers the implement.
(c) Neutral (SA221)

■ Use the Position Stop Knob

NOTE

Use the position stop knob to:
- Limit the downward movement of the lower links.
- Set a minimum distance between the attached implements and the ground.

1. Operate the attached implement.
2. Use the 3-point hitch control lever to establish the desired working height (distance from the ground) of the implement.
3. Loosen the position stop knob.
4. Move the position stop knob rearwards until position stop knob stops against the 3-point hitch control lever.
5. Tighten the position stop knob to fix on that particular position.
   - Every time the 3-point hitch control lever stops against the position stop knob, the implement is lowered to the established working height.

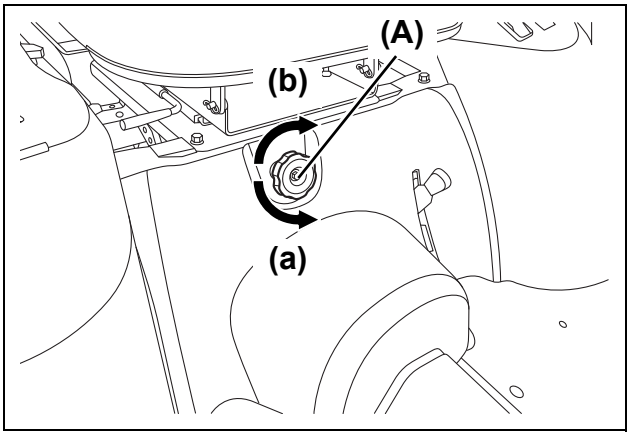
■ Hydraulic Flow Control/Stop Knob

⚠ WARNING

- **Lowering the 3-point hitch too fast can lead to accident or tractor failure.**
- **Adjust the hydraulic flow control/stop knob:**
  - **the time for lowering the implement from the highest position to the lowest position, is 2 seconds or longer**
- **Do not attempt to operate an implement on a road.**
- **While the tractor is traveling:**
  - **keep the 3-point hitch control lever in the raised position**
  - **lock the 3-point hitch control lever with the position stop knob**
  - **do not fully close the hydraulic flow control/stop knob**
  - **closing the hydraulic flow control/stop knob can cause damage to the hydraulic lift circuit**
- **During maintenance:**
  - **do not use the hydraulic flow control/stop knob as a means to keep the implements raised**
  - **loss of hydraulic pressure may cause the implement to suddenly drop**
  - **set the implement on solid blocks, or remove the implement before starting any maintenance**
- **The hydraulic flow control/stop knob determines the speed at which the lower link is lowered.**

IMPORTANT: Avoid damage!

- Avoid attaching a heavy load to the 3-point hitch when traveling on rough terrain.
  - the hydraulic system may be damaged
- Do not operate the 3-point hitch control lever when the hydraulic flow control/stop knob is closed.
  - the preceding action can cause the transmission hydraulic oil to overheat



(A) Hydraulic flow control/stop knob

(a) Knob turned counterclockwise:
- *increases the rate of drop speed*
- *unlocks the hydraulic lift*

(b) Knob turned clockwise:
- *decreases the rate of drop speed*

Knob turned clockwise until the knob stops turning:
- *locks the hydraulic lift*

■ Use the Lower Links (and Top Link as Needed)

⚠ WARNING

Avoid injury!

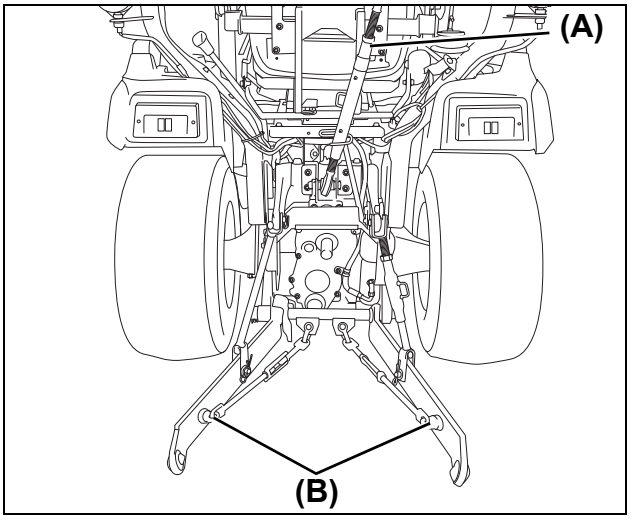
- **Always be extremely careful when backing up the tractor.**
- **Always clear the surrounding area of the tractor from bystander/s and obstacle/s before starting to back up.**
- **While backing up, always watch for bystander/s and obstacle/s along the way.**
- **Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3 before getting in between the tractor and the implements to be installed or removed.**
- **Check for any interference between the implement and the tractor and/or driveline separation:**
  - **whenever a Power Take Off (PTO) driven implement is installed to the 3-point hitch**

1. Slowly back up the tractor into a position where the lower links are aligned with the implement lift brackets.
2. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
3. Chock all the tires safely and securely.

NOTE

- Always remove the drawbar to prevent interference with the implements to be mounted.

4. Connect the lower links to the implement.
5. As necessary, unhook the top link from the top link hook, and connect to the implement.
6. Use lynch pin to secure the implement.



(A) Top link
(B) Lower links

NOTE

- Whenever the top link is not used, always place the top link in the top link hook.

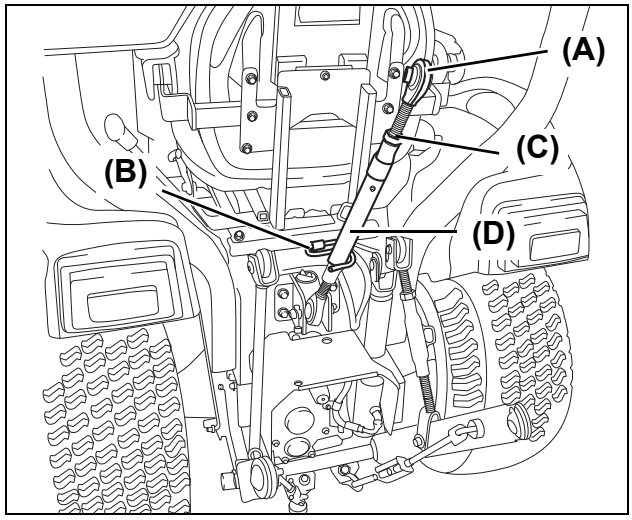
■ Level the Implement Front to Rear

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Chock all the tires safely and securely.

NOTE

- Always place the top link in the top link hook when the 3- point hitch is not in use.

3. Relieve the tension on the top link by lowering the implement to the ground.
4. Loosen the locknut.
   Rotate the top link body to lengthen or shorten the top link, as required.



(A) Top link
(B) Top link hook
(C) Locknut
(D) Top link body

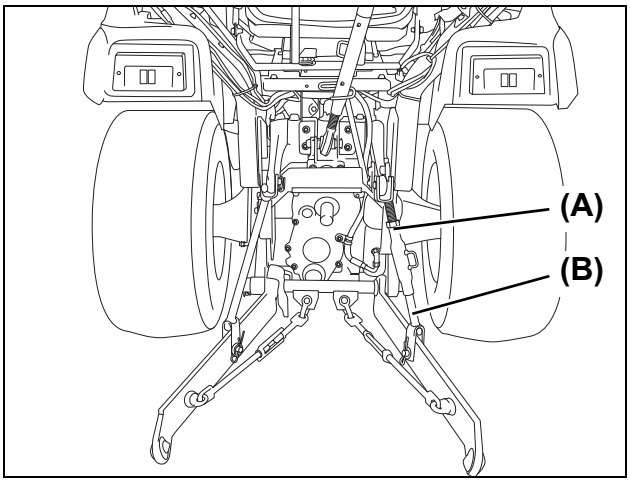
IMPORTANT: Avoid damage!

- Avoid over turning the top link body all the way to the end, the preceding action can damage the threads.

5. Raise the implement.
   Check if the desired levelness is attained. Re-adjust the top link as necessary.
6. Once the desired levelness is attained, tighten the locknut.

■ Level the Implement Side to Side

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Chock all the tires safely and securely.
3. Lower the implement to the ground.
4. Loosen the locknut located on the lift link right.
5. Rotate the body of the lift link right to raise or lower the lower link.
   Do the preceding action until the desired levelness of the implement is attained.
6. Tighten the locknut.



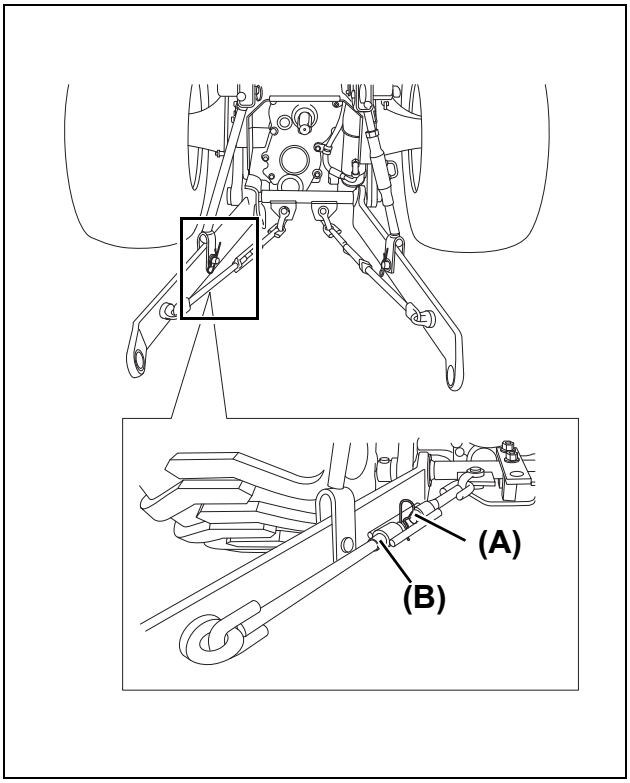
(A) Locknut
(B) Lift link right

■ Adjust the Check Chain

NOTE

- Check the procedure for adjusting the check chain in the *Operation Manual* for the implement.
- Once the check chain has been properly adjusted, side sway of the implement can be controlled by the position of the links.

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Chock all the tires safely and securely.
3. Lower the implement to the ground.
4. Remove the hairpin clip.
5. Rotate the turnbuckle to adjust the length of the check chain.
6. Install the hairpin clip.



(A) Hairpin clip
(B) Turnbuckle

■ Install 3-point hitch onto the tractor with backhoe mount bracket (Option)

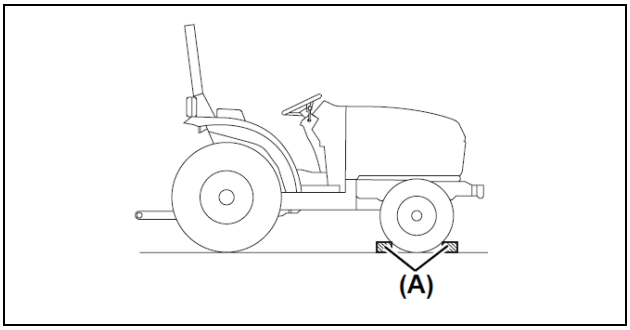
⚠ WARNING

Only trained adults should service the tractor. Understand the instructions in the Operation Manual before servicing.

IMPORTANT:

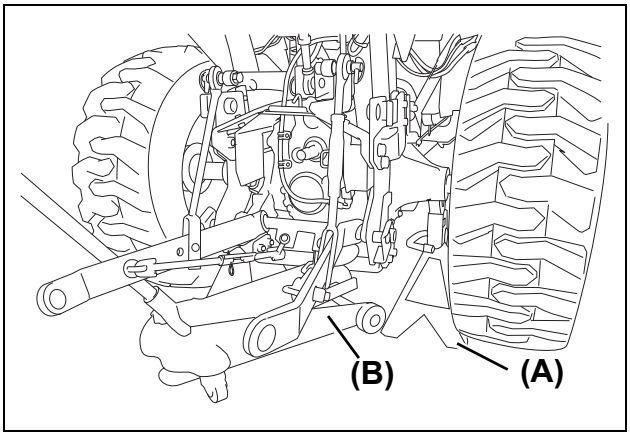
- Backhoe mount bracket has already been installed if the backhoe is mounted from the factory.
- If backhoe is detached and install any another rear implements needed to be lifted, 3-point hitch is needed to be installed.

1. Engage the parking brake securely.
2. Park the tractor safely and securely, and place chocks (A) around the front wheels (4 pcs. / in total).



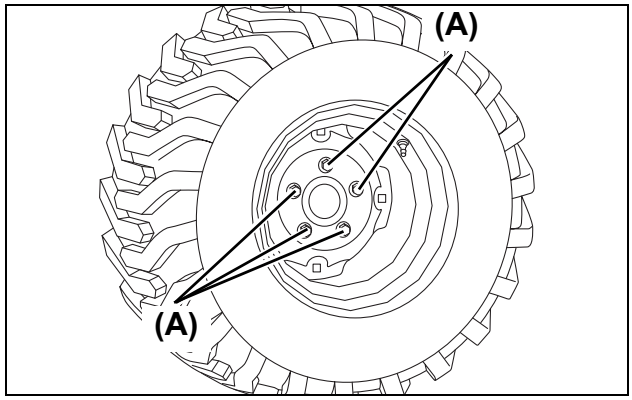
(A) Chocks

3. Install jack stands under the both rear axle of the tractor.



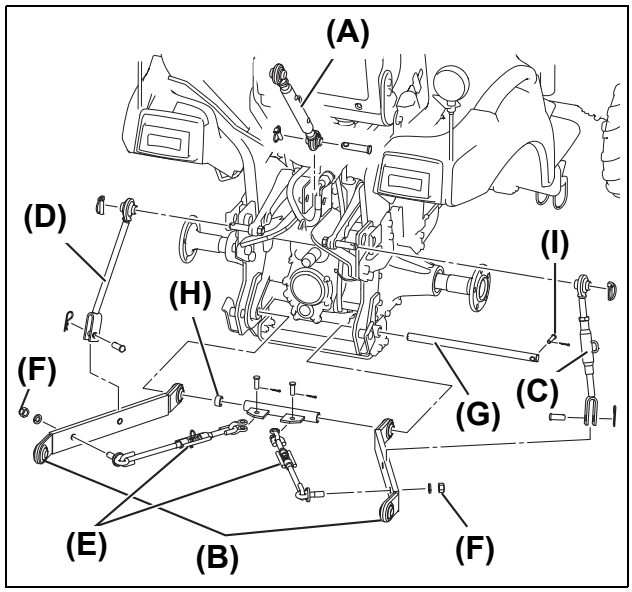
(A) Jack stands
(B) Lift jack

4. Remove the rear tires from the tractor.



(A) Loosen Bolts
(SA221: 5 pcs SA324/424: 6 pcs)

5. Install top link and lower link onto the tractor.



(A) Top link
(B) Lower links
(C) Lift Rod (Right)
(D) Lift Rod (Left)
(E) Check Chains
(F) Check Chains Nut (2 PCS)
(G) Hinge Pin
(H) Spacer
(I) Parallel Pin

IMPORTANT:

- Hinge Pin (G), a clevis pin and a cotter pin which has already been used on the tractor are used when installing 3-Point hitch kit.
- Install Hinge Pin (G) from righthand side of frame as shown in figure 5. Please note that Cotter Pin (I) should be installed to Hinge Pin (G) on the righthand side of frame.
- When attaching the lift links onto the lower links for SA324/424, position holes are needed to be confirmed. (See "2. Adjust Lift Capacity and Height (SA324/424)" on page 10-8 for detail.

6. Tighten the nuts of check chains (2 PCS) to the torque of 123~152 ft·lbs (167~206 N·m).
7. Install the rear tires from the tractor.

Model	Tightening Torque ft·lbs (N·m)	
SA221	R3	108~127 (146.4 to 172.2)
	R4	108~127 (146.4 to 172.2)
SA324	R3	108~127 (146.4 to 172.2)
	R4	108~127 (146.4 to 172.2)
SA424	R3	108~127 (146.4 to 172.2)
	R4	108~127 (146.4 to 172.2)

- Tighten the rear wheel bolts in a crisscross sequence.

8. Adjust the check chains.

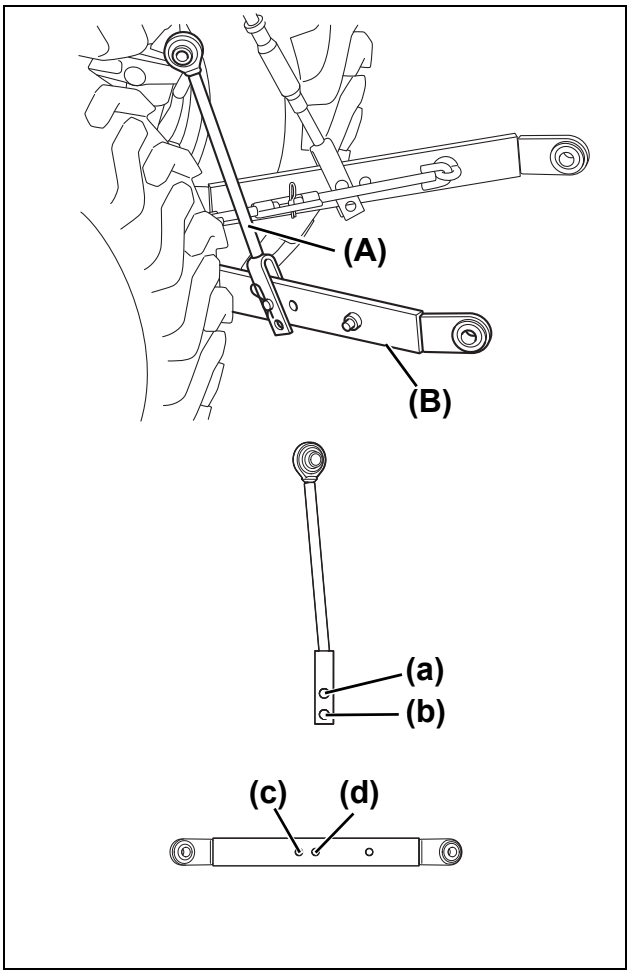
*For detail, see "Adjust the Check Chain" on page 10-6.

■ 3-Point Hitch Kit Contents

Parts No.	Name	Qty		Remarks
		SA221	SA324/424	
1A8330-71110	LINK ASSY	1	1	Top Link
1A8330-71120	PIN	1	1	Clevis Pin for Top Link
1A8330-71130	PIN ASSY	3	3	Lynch Pin
1A8320-72100	LINK ASSY, LIFT R	—	1	Lift Link (Right)
1A8330-72100	LINK ASSY, LIFT R	1	—	
1A8330-72150	PIN	2	2	Clevis Pin
1A8330-72170	PIN, 16	2	2	Hairpin Clip
1A8320-72300	LINK ASSY, LIFT L	—	1	Lift Link (Left)
1A8330-72300	LINK ASSY, LIFT L	1	—	
1A8330-73120	SPACER	1	1	Spacer
1A8320-73500	LINK ASSY, LOWER	—	2	Lower Link
1A8330-73500	LINK ASSY, LOWER	2	—	Lower Link
1A8330-74100	CHAIN KIT, CHECK	2	2	Check Chain
1A8330-74160	PIN	2	2	Clevis Pin for Check Chain
1A8330-74550	CHAIN ASSY	1	1	Check Chain Stay
22417-200300	PIN, 2.0 X 30	2	2	Cotter Pin
26736-160002	NUT 16	2	2	Nut for Check Chain
22217-160000	WASHER 16	2	2	Washer for Check Chain

2. Adjust Lift Capacity and Height (SA324/424)

Lower links and lift links each have two different positions that can be used to change lift capacity and height capacity. Tractor is shipped from factory with lift link in upper position (a) and lower link in front position (c). This position will provide maximum lift height. Adjusting to lower hole on lift link (b) and rear hole on lower link (d) will provide maximum lift capacity. Adjust links as necessary for your implement. Both left and right links are used in same positions.



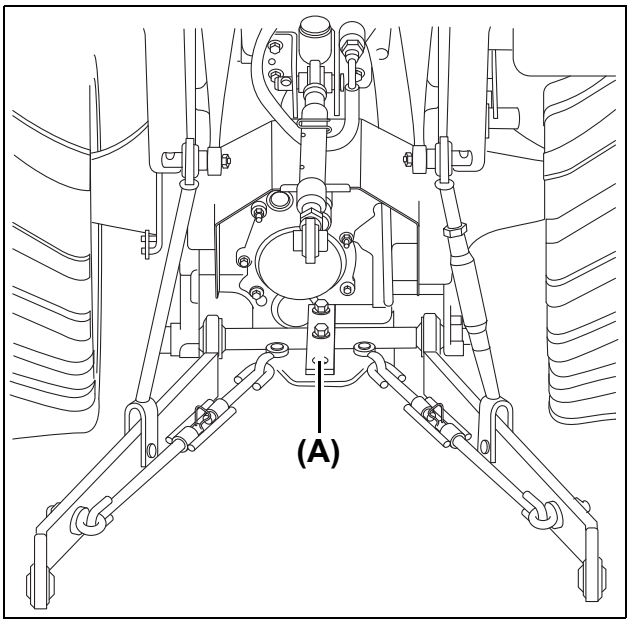
(A) Lift Link
(B) Lower Link
(a) Upper position on Lift Link
(b) Lower position on Lift Link
(c) Front position on Lower Link
(d) Rear position on Lower Link

■ Hitch Hole (SA221)

⚠ WARNING

Avoid injury!

- **Always use the hitch hole to attach a trailer or towed implement.**
- **Attempting to attach a trailer or towed implement at the top link or rear axle can cause the tractor to tip over.**
- **Only use the hitch hole that is provided with the tractor.**
  - **avoid installing or using a floating type or any other type of the hitch**
- **Always hitch loads being towed to the hitch.**
  - **the preceding action prevents the tractor from tipping over rearward**
- **The hitch hole should only be used for towing light loads. (Maximum towing load: 1102 lb. (500 kg).**
- **For maximum allowable weight to be towed, see "Chapter 4. IMPLEMENT CAPACITIES".**
- **If you cannot back up a slope with a towed load, the slope is too steep to operate on with the towed load. Reduce the towed load or do not operate.**
- **Do not turn sharply. Use additional caution when turning or operating under adverse surface conditions. Use care when reversing.**



(A) Hitch hole

3. Drawbar (SA324/424)

⚠ WARNING

Avoid injury!

- **Always use the drawbar to attach a trailer or towed implement.**
- **Attempting to attach a trailer or towed implement at the top link or rear axle can cause the tractor to tip over.**
- **Only use the drawbar that is provided with the tractor.**
  - **avoid installing or using a floating type or any other type of the drawbar**
- **Always hitch loads being towed to the drawbar.**
  - **the preceding action prevents the tractor from tipping over rearward**
- **Avoid attaching a longer drawbar.**
  - **the preceding action can damage the attached section**
  - **the same action can cause the implement to become disconnected**
  - **If you cannot back up a slope with a towed load, the slope is too steep to operate on with the towed load. Reduce the towed load or do not operate.**
  - **Do not turn sharply. Use additional caution when turning or operating under adverse surface conditions. Use care when reversing.**

NOTE

- The tractor comes equipped with a stationary drawbar.
- Always remove the drawbar before attaching any 3-point hitch implement.

■ Maximum Drawbar Loads

IMPORTANT

- Make sure that the static vertical load on the drawbar does not exceed the maximum recommendations.
- Always travel slowly when towing heavy loads.

⚠ CAUTION

- **Certain heavy equipment, such as a loaded single axle trailer, can place excessive strain on the drawbar.**
- **Such strain is also greatly increased by speed and rough ground.**

1. Avoid attaching very heavy equipment (e.g., a loaded single axle trailer) that exerts excessive strain on the drawbar.
2. Avoid exceeding the maximum vertical load of
   SA221: 406 lb. (184 kg)
   SA324/424: 728 lb. (330 kg)
   on the drawbar.
   See "4. IMPLEMENT CAPACITIES" on page 4-1 for detail.
3. The strain is greatly increased by high speed and rough ground.

■ Deploy/Stow the Drawbar

IMPORTANT

- Make sure that the drawbar is removed before using the Power Take Off (PTO) driven/drawn implement.

NOTE

- The drawbar is equipped with 3 operation adjusting holes.
- Use the holes to adjust the drawbar length.

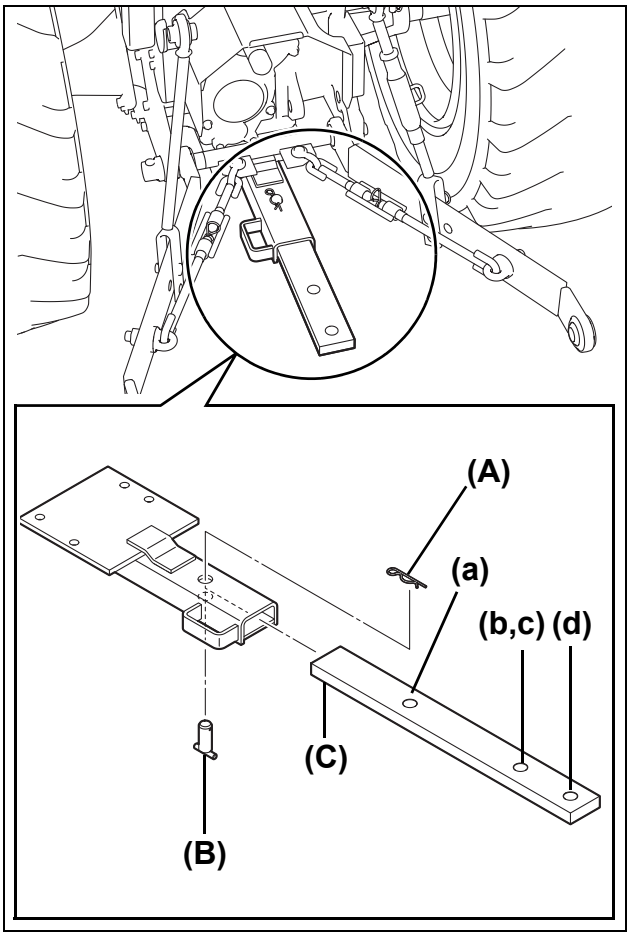
1. Remove the hairpin clip.
2. Remove the pin.
3. Align the hole (a) of the drawbar with the drawbar bracket to set the drawbar length.

NOTE

To secure the drawbar in the stowed position while Power Take Off (PTO) driven implement is not used:

- Remove the ring and pin.
- Slide in the drawbar until the positioning hole (b) is align with the hole in the drawbar bracket.
- Install the ring and pin.

4. Install the ring and hairpin clip to secure the drawbar to the drawbar bracket.



(A) Hairpin clip
(B) Pin
(C) Drawbar
(a) Hole for attaching the drawbar in the operating state (deployed position).
(b) Hole used when the drawbar is stowed in the tractor (do not use this hole for drawbar in the operating state).
(c) Hole for attaching an implement.
(d) Hole for most pulled away position.

■ Remove Drawbar

1. Remove the hairpin clip.
2. Remove the pin.
3. Remove the drawbar.
4. Install the pin to the drawbar.
5. Install the hairpin clip.
6. Keep the drawbar to the storage area.

4. Use the Safety Chain

⚠ WARNING

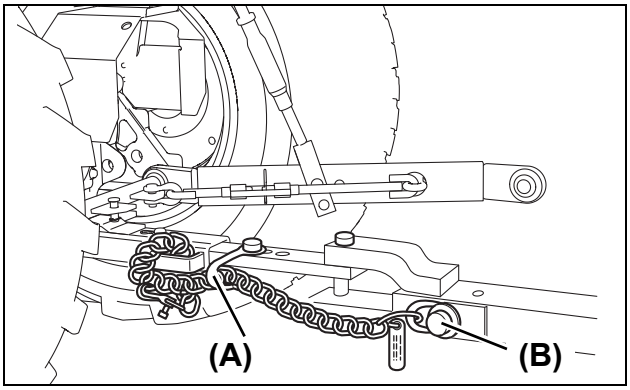
Avoid injury!

- **Always hitch loads being towed to the drawbar.**
- **The preceding action prevents the tractor from tipping over to the rear.**
- **Never use the safety chain alone to tow a load.**

IMPORTANT

- Always secure the towed implement to the drawbar.
  - the safety chain is only intended to control the towed implement if the towed implement is accidentally disconnected from the drawbar
- Always use a chain whose strength is rated greater than the gross weight of the towed implement.
- Always replace or repair the safety chain if any of the chain link/s or connector/s is/are broken, elongated or damaged.

1. Use the appropriate adapter parts to connect the safety chain to the tractor drawbar support and to the towed implement.
   - Allow enough slack in the safety chain to enable turning.
2. As necessary, mount additional intermediate support for the safety chain on the drawbar to eliminate excessive slack.
   - Remove and store the safety chain when not in use.



(A) Intermediate support
(B) Towed implement attachment point

IMPORTANT

- For safety purposes, ensure that any implements or trailer towed by the tractor drawbar is equipped with a safety chain.
  - the chain holds the implement when the implement is accidentally disconnected from the tractor
- Make sure that the tensile strength of the chain is greater than the weight of the implement, or that of the fully loaded trailer.
- A chain shackle whose strength is the same or is greater than that of the safety chain can be added to the tractor drawbar bracket where the safety chain (of the implement or trailer) can be connected.
- For additional safety, install a chain shackle to the drawbar bracket.

11. HYDRAULIC SYSTEM

⚠ WARNING

- **Always completely release the internal hydraulic pressure before disconnecting a hydraulic line.**
- **Always ensure that all connections are securely tightened.**
- **Always ensure that all hydraulic lines, pipes and hoses are free from wear and/or damage.**

1. 3-Point Hitch Control System

IMPORTANT

- Avoid operating the 3-point hitch control lever before the engine has been sufficiently warmed up.
- Operating the 3-point hitch control lever while the engine has not yet been sufficiently warmed up:
  - can damage the hydraulic system
  - can result in the complete failure of the hydraulic system
- If abnormal noise occurs after the 3-point hitch has been raised, incorrect adjustment or failure of the hydraulic system are possible causes.
  - immediately stop the operation
  - contact YOUR LOCAL YANMAR TRACTOR DEALER to check and repair the tractor

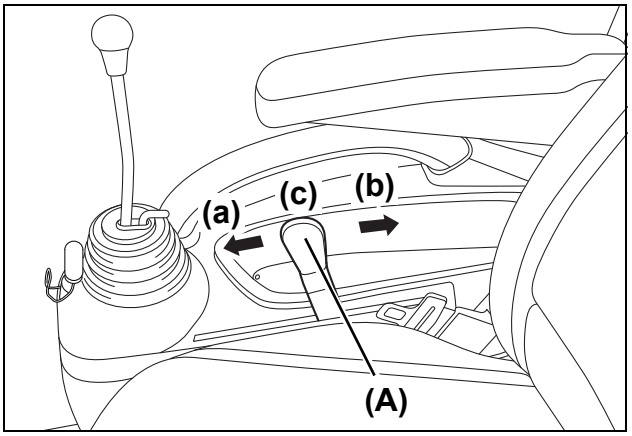
■ Use the 3-Point Hitch Control Lever

NOTE

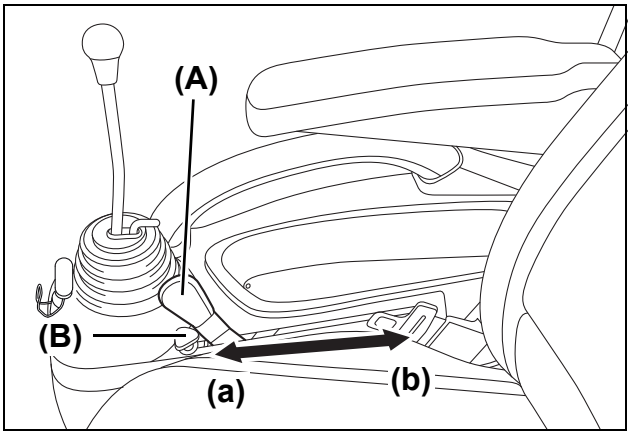
- The 3-point hitch delivered with the tractor is a Category 1.

1. Use the 3-point hitch control lever to raise and lower the implement that is attached to the 3-point hitch.

<SA221>



<SA324/424>



(A) 3-point hitch control lever
(B) Position stop knob (SA324/424)
(a) Moving the 3-point hitch control lever forward lowers the implement.
(b) Moving the 3-point hitch control lever backward raises the implement.
(c) Neutral (SA221)

NOTE

- The 3-point hitch control lever is labeled 1 to 6.
- The numbers:
  - for reference purposes only
  - do not indicate any exact height position for the implement that is attached to the 3-point hitch
- The lower the number, the closer the lower links is to the ground.

2. Adjust the position stop knob to set the implement to the lowest possible height.

■ Use the Position Stop Knob

NOTE

Use the position stop knob to:

- Limit the downward movement of the lower links.
- Set a minimum distance between the attached implements and the ground.

1. Operate the attached implement.
2. Use the 3-point hitch control lever to establish the desired working height (distance from the ground) of the implement.
3. Loosen the position stop knob.
4. Move the position stop knob rearwards until position stop knob stops against the 3-point hitch control lever.
5. Tighten the position stop knob to fix on that particular position.
   - Every time the 3-point hitch control lever stops against the position stop knob, the implement is lowered to the established working height.

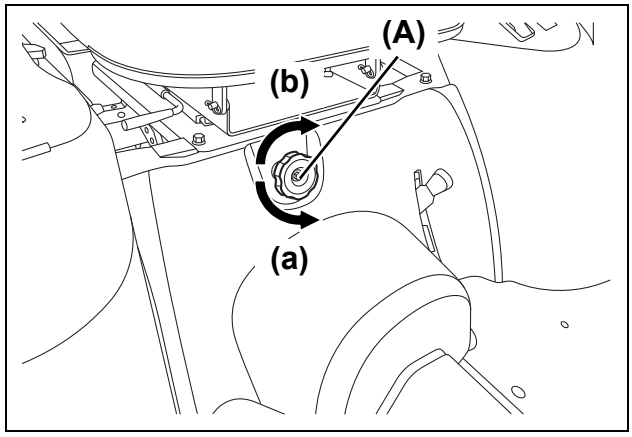
■ Hydraulic Flow Control/Stop Knob

⚠ WARNING

- **Lowering the 3-point hitch too fast can lead to accident or tractor failure.**
- **Adjust the hydraulic flow control/stop knob:**
  - **the time for lowering the implement from the highest position to the lowest position, is 2 seconds or longer**
- **Do not attempt to operate an implement on a road.**
- **While the tractor is traveling:**
  - **keep the 3-point hitch control lever in the raised position**
  - **lock the 3-point hitch control lever with the position stop knob**
  - **do not fully close the hydraulic flow control/stop knob**
  - **closing the hydraulic flow control/stop knob can cause damage to the hydraulic lift circuit**
- **During maintenance:**
  - **do not use the hydraulic flow control/stop knob as a means to keep the implements raised**
  - **loss of hydraulic pressure may cause the implement to suddenly drop**
  - **set the implement on solid blocks, or remove the implement before starting any maintenance**
- **The hydraulic flow control/stop knob determines the speed at which the lower link is lowered.**

IMPORTANT: Avoid damage!

- Avoid attaching a heavy load to the 3-point hitch when traveling on rough terrain.
  - the hydraulic system may be damaged
- Do not operate the 3-point hitch control lever when the hydraulic flow control/stop knob is closed.
  - the preceding action can cause the transmission hydraulic oil to overheat



(A) Hydraulic flow control/stop knob
(a) Knob turned counterclockwise:
- *increases the rate of drop speed*
- *unlocks the hydraulic lift*

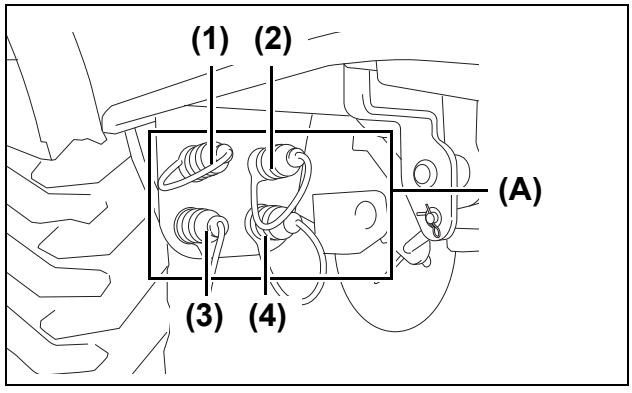
(b) Knob turned clockwise:
- *decreases the rate of drop speed*

Knob turned clockwise until the knob stops turning:
- *locks the hydraulic lift*

2. Operate the Implement Control Valve

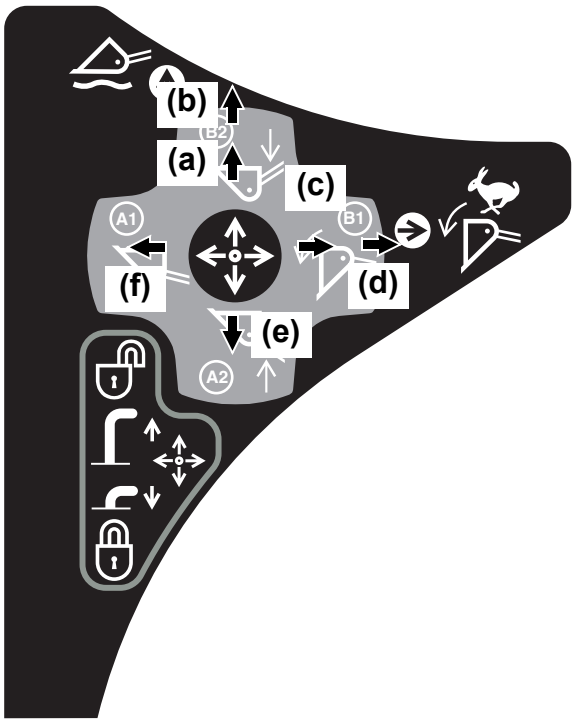
■ Implement Control Lever

1. Use the implement control lever to operate the optional mounted implements.
2. There are 4 hydraulic quick couplers (color coded by the rubber plugs).
   - The hydraulic quick couplers are located under the right foot deck.
   - The hydraulic quick couplers are used to connect the tractor's hydraulics to the implement's hydraulic cylinders.
3. Use the hydraulic quick couplers in pairs: 1 & 3 and 2 & 4.



(A) Hydraulic quick couplers
(1) Yellow
(2) Blue
(3) Green
(4) Red

4. After the hydraulic quick couplers and hydraulic lines have been connected, the attached implement moves in a direction opposite to the expected direction:
   - Interchange the hydraulic line connections between couplers 1 & 3.
   - Interchange the hydraulic line connections between couplers 2 & 4.



(a) Lower
(b) "Float"
(c) Dump
(d) Dump faster
(e) Raise
(f) Curl

IMPORTANT

- Avoid interchanging the hydraulic lines between coupler 1 and coupler 3. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.
- Avoid interchanging hydraulic lines between coupler 2 and coupler 4. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.
- When the hydraulic quick couplers are not used, always leave the color coded rubber plugs inserted to the hydraulic quick couplers.
  - the preceding action prevents damage and contamination of the female hydraulic quick couplers

IMPORTANT: Avoid damage!

- When the hydraulic quick couplers are not used, always leave the color coded rubber plugs inserted to the hydraulic quick couplers.
  - the preceding action prevents damage and contamination of the female hydraulic quick couplers

NOTE

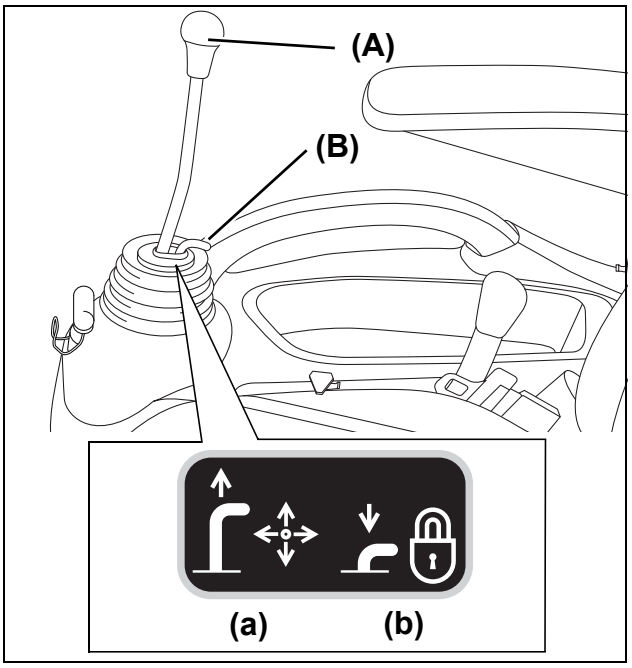
- The implement control valve has a float position.
- When the implement control valve is in the float position, the implement that is lowered to the operating positions follow the ground contour.
  - to use the float position, push the implement control lever forward beyond the valve detent position

NOTE

- Read the *Operation Manual* and installed label on the tractor side regarding the different implement control lever positions.
- When the lever is at any corner position, the boom and bucket cylinders are simultaneously operated.
- Unnumbered position (Raise & Rollback) is not recommended for scooping purpose because an insufficient lift force is obtained.

■ Implement Control Lever Lock

1. Use the Implement control lever lock to lock the implement control lever to the N (neutral) position.
2. To lock the implement control lever:
   - Push down the implement control lever lock.
3. To unlock the implement control lever:
   - Pull up the Implement control lever lock.



(A) Implement control lever
(B) Implement control lever lock
(a) For unlocking the implement control lever: Pull up the implement control lever lock.
(b) For locking the implement control lever: Push down the implement control lever lock when the implement control lever is in its N (neutral) position.

IMPORTANT

- Avoid operating the implement control lever when the implement control lever is locked.
- To confirm that the implement control lever (A) has been locked with the implement control lever lock (B):
  - move the implement control lever with a light force to ensure that the lever is securely locked

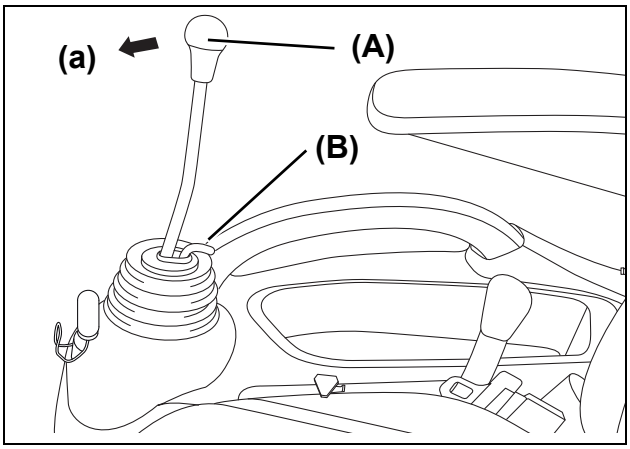
■ Connect the Implement Hydraulic Hoses

⚠ WARNING

Avoid injury!

- **Avoid connecting the hoses to the hydraulic quick couplers before the hydraulic system pressure has been fully relieved.**
- **When checking for leaks, run a piece of cardboard or wood block along the hydraulic lines and connections.**
- **Avoid getting in contact with high pressure transmission hydraulic oil.**
  - **pressurized transmission hydraulic oil can: penetrate the skin and other body parts cause serious injury**
- **Immediately see a doctor if transmission hydraulic oil penetrates the skin or other body parts.**
  - **transmission hydraulic oil must be surgically removed**
  - **gangrene may develop**

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Chock all the tires safely and securely.
3. Fully relieve the hydraulic pressure:
   - By moving the implement control lever forward, backward, right and left several times.
4. For the procedure on connecting the hydraulic hoses to the hydraulic quick couplers, read the implement *Operation Manual*.



(A) Implement control lever
(B) Implement control lever lock
(a) Lower the implement to the ground

NOTE

- Insert the rubber plug into an unused coupler.

12. TIRES, WHEELS AND WEIGHTS

⚠ WARNING

- **Avoid mounting a tire on a rim by an unauthorized person.**
- **Always have an authorized professional with the proper equipment mount the tire on the rim.**
- **Never weld or heat a wheel and fire assembly.**

- **Always inflate tires to the correct tire air pressure.**
- **Avoid exceeding the recommended tire air pressure specified in the *Operation Manual*.**

- **Always keep the tractor securely supported while:**
  - **changing the wheels**
  - **adjusting the tire tread width**

- **Always keep the wheel bolts tightened to the specified torque.**
- **Avoid operating the tractor with loose wheels, rims, weights and axles.**

1. Tires

⚠ WARNING

Avoid injury!

- **Avoid mounting a tire on a rim by an unauthorized person.**
- **Always have an authorized professional with the proper equipment mount the tire on the rim.**
- **Always inflate tires to the correct tire air pressure.**
- **Avoid exceeding the recommended tire air pressure specified in the *Operation Manual*.**

IMPORTANT

- Only use the tires approved by Yanmar tractor dealers.
- Always install the same tires types in the front wheels and the rear wheels (e.g., R3 front and R3 rear, or R4 front and R4 rear).

Model	Tire Size			Tire Air Pressure PSI (MPa)
SA221	Front	R3	18 x 8.50-10 4PR	22 (0.15)
	Rear		26 x 12.0-12 4PR	20 (0.14)
	Front	R4	18 x 8.50-10 6PR	22 (0.15)
	Rear		26 x 12.0-12 4PR	20 (0.14)
SA324	Front	R3	23 x 8.50-12 4PR	22 (0.15)
	Rear		33 x 12.5-16.5 4PR	35 (0.24)
	Front	R4	23 x 8.50-12 4PR	35 (0.24)
	Rear		12-16.5 6PR	50 (0.34)
SA424	Front	R3	23 x 8.50-12 4PR	22 (0.15)
	Rear		36 x 13.50-15 4PR	20 (0.14)
	Front	R4	23 x 8.50-12 4PR	35 (0.24)
	Rear		14-17.5 4PR	30 (0.21)

- 3 tire sizes are provided for the front wheels.
- Another 3 tire sizes are provided for the rear wheels.
- The recommended tire air pressures for these tires are as specified in the table above.
- The tire air pressure gradually decreases as the tires are used and as time elapses.
- Check the tire air pressure before starting the day's operation.

- When the tire air pressure is low, inflate the tires to the recommended tire air pressures.
- If the tire air pressures rapidly and significantly decrease though the tires are correctly inflated every day, immediately contact YOUR LOCAL YANMAR TRACTOR DEALER to inspect the problem tire/s and to replace the tire/s if necessary.

NOTE
- While a loader is mounted to the tractor, always set the front tire air pressure to the maximum recommended tire air pressure.
- The above also applies while the tractor is fitted with a full load of front weights.
- Do not use dual tires.

2. Adjust the Wheels

⚠ WARNING

Avoid injury!
- **Before working under the tractor or an implement, always lower to the ground all attached implement.**
- **During work under the tractor or an implement, always use proper and rigid lifting devices with the capacity of more than 3 tons.**
- **Always support the implement using fixed stands or any suitable blocking devices with a capacity of more than 3 tons.**
- **While servicing or adjusting the tractor and implement, avoid using the hydraulic system to keep the tractor and implement in the position.**
- **Avoid operating the tractor with loose wheels, rims, weights and axles.**
- **Avoid changing the specific adjustment settings for each tire size.**

■ Check the Wheel Bolt Tightening Torque

⚠ WARNING

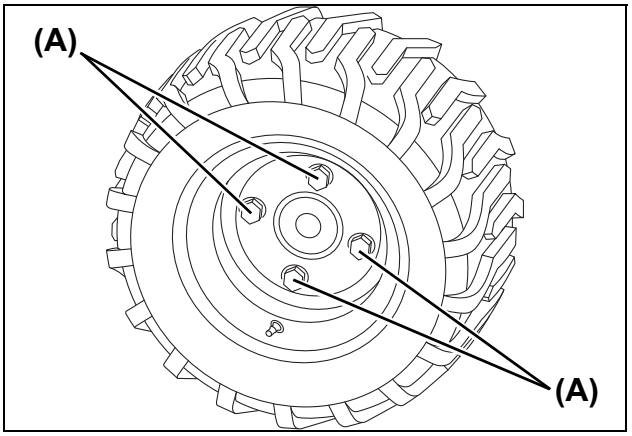
Avoid injury!
- **Before operating the tractor, check that there are no loose rims, hubs, wheel bolts and/or axles.**
- **The preceding action promotes tractor stability.**
  - **reduces the possibility of the tractor tipping over**
- **Tighten all the wheel bolts after every 4 hours of operation.**
- **Repeat tightening until the proper torque values of the wheel bolts are constantly maintained.**
- **Perform the preceding procedure when any wheel bolt/s is/are loosen.**
- **Make sure to maintain the tightness of the wheel bolts according to the recommended maintenance intervals.**

Tighten the wheel bolts as follows:

Front Wheel

Model		Tightening Torque ft·lbs (N·m)
SA221	R3	126.9~140.1 (172 to 190)
	R4	126.9~140.1 (172 to 190)
SA324	R3	126.9~140.1 (172 to 190)
	R4	126.9~140.1 (172 to 190)
SA424	R3	126.9~140.1 (172 to 190)
	R4	126.9~140.1 (172 to 190)

- Tighten the front wheel bolts in a crisscross sequence.

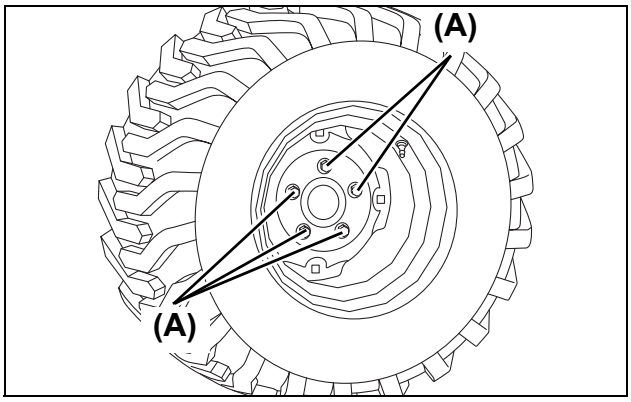


(A) Front wheel bolts (4PCS)

Rear Wheel

Model		Tightening Torque N·m (ft·lbs)
SA221	R3	79.7~93.7 (108 to 127)
	R4	79.7~93.7 (108 to 127)
SA324	R3	79.7~93.7 (108 to 127)
	R4	79.7~93.7 (108 to 127)
SA424	R3	79.7~93.7 (108 to 127)
	R4	79.7~93.7 (108 to 127)

- Tighten the rear wheel bolts in a crisscross sequence.



(A) Rear wheel bolts
(SA221: 5PCS SA324/424: 6PCS)

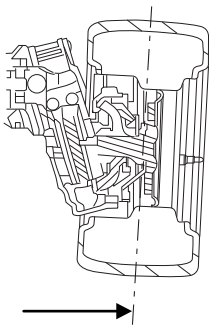
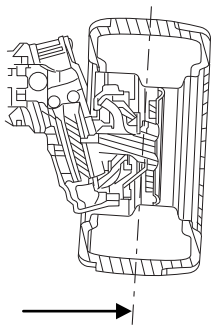
■ Select the Front Tire Rolling Direction

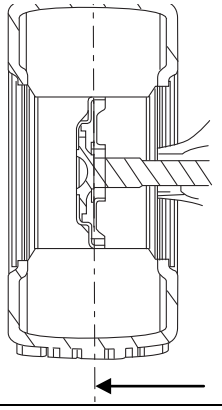
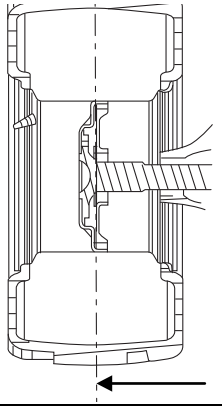
⚠ WARNING

Avoid injury!

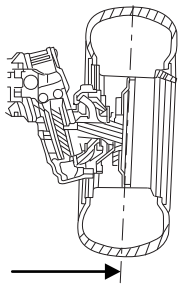
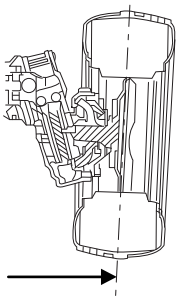
- **Wheels are heavy or difficult to handle during removal.**
- **Be very careful when attempting to remove wheels from the tractor.**
- **Use a safe lifting device with a capacity of more than 3 tons.**
- **Securely support the tractor with rigid stands or jack stands with a capacity of more than 3 tons.**
- **Make sure to chock all the tires safely and securely which are still in contact with the ground.**
- **The preceding procedure prevents the tractor from rolling.**
- **Directional type tires, such as bar tires, have directional arrows on the sidewall.**
- **Install the tires with the directional arrows pointing in the rolling direction.**
- **If the tractor is mostly used for loader operations, periodically reverse the tread pattern direction.**
  - **the preceding procedure increases the tire life and improves traction when reversing from dirt piles**

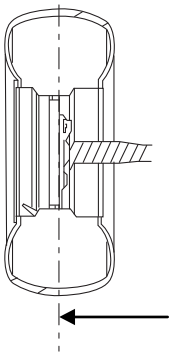
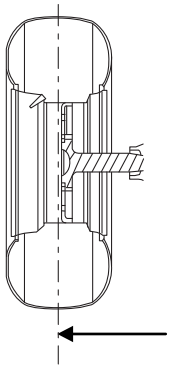
Tire Tread (SA221)

		Front	
		Front R3 (18 × 8.50-10)	Front R4 (18 × 8.50-10)
Wheel pattern			
Tread	in. (mm)	35.2 (894)	35.2 (894)
Ply		4	6

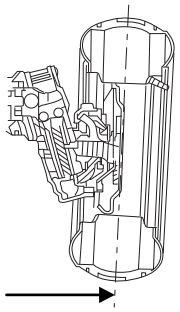
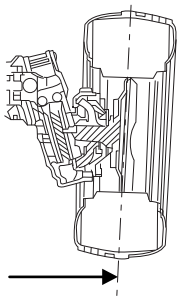
		Rear	
		Rear R3 (26 × 12.0-12)	Rear R4 (26 × 12.0-12)
Wheel pattern			
Tread	in. (mm)	35.2 (894)	35.2 (894)
Ply		4	4

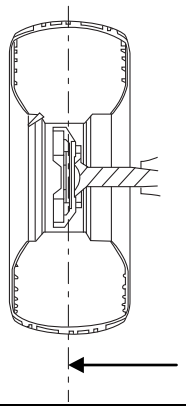
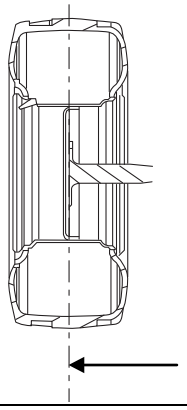
Tire Tread (SA324)

		Front	
		Front R3 (23 × 8.50-12)	Front R4 (23 × 8.50-12)
Wheel pattern			
Tread	in. (mm)	37.8 (960)	37.8 (960)
Ply		4	4

		Rear	
		Rear R3 (33 × 12.5-16.5)	Rear R4 (12-16.5)
Wheel pattern			
Tread	in. (mm)	42.4 (1079)	42.5 (1080)
Ply		4	6

Tire Tread (SA424)

		Front	
		Front R3 (23 x 8.50-12)	Front R4 (23 × 8.50-12)
Wheel pattern			
Tread	in. (mm)	36.5 (926)	37.8 (960)
Ply		4	4

		Rear	
		Rear R3 (36 x 13.50-15)	Rear R4 (14-17.5)
Wheel pattern			
Tread	in. (mm)	42.4 (1079)	40.4 (1028)
Ply		4	4

3. Remove/Install the Wheels

⚠ WARNING

Avoid injury!

- **Wheels are heavy or difficult to handle during removal.**
- **Be very careful when attempting to remove wheels from the tractor.**
- **Use a safe lifting device with a capacity of more than 3 tons.**
- **Securely support the tractor with rigid stands or jack stands with a capacity of more than 3 tons.**
- **Make sure to chock all the tires safely and securely which are still in contact with the ground.**
- **The preceding procedure prevents the tractor from rolling.**

4. Weights (Option)

IMPORTANT

- Find and read the maximum load information embossed into the sidewall of each tire.
- Make sure that tires are not subjected to loads that exceed the information.
- If the maximum weight shown on the chart is not enough to ensure safety, reduce the load or use higher tire ply rating.
- Remove the weights from the tractor when no longer needed.
- Always avoid adding weight when performing continuous and full power operations at a speed of above 4.4 mph (7 km/h).
- The preceding practice:
  - prevents excessive soil compaction
  - prevents resistance to wheel rotation
  - extends the drive train life

⚠ WARNING

Avoid injury!

- **If there is a danger that the tractor becomes unstable when implement is used, add weight on the tractor.**
- **The preceding precaution is particularly necessary when an implement is raised.**
- **Always drive slowly over rough terrain, regardless of how much weight is used.**
- **Implement and tractor components are heavy.**
- **Always use proper lifting devices with a capacity of more than 3 tons.**
- **Always have assistance from another person when installing or removing any implement.**
- **Exercise the preceding caution while installing or removing components of the tractor.**

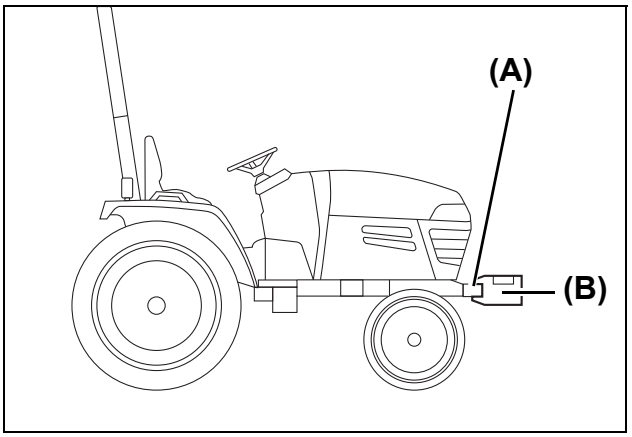
■ Select the Appropriate Amount of Front Weight

Model	Maximum Load Per Front Tire			
	Tire Size		Ply Rating	Capacity lb. (kg)
SA221	R3	18 x 8.50-10	4	795 (361)
	R4	18 x 8.50-10	6	1115 (506)
SA324	R3	23 x 8.50-12	4	1115 (506)
	R4	23 x 8.50-12	4	1470 (667)
SA424	R3	23 x 8.50-12	4	1113 (506)
	R4	23 x 8.50-12	4	1470 (667)

- Heavy pulling can cause the front wheels to lift off the ground.
- Heavy rear mounted implement can cause the front wheels to lift off the ground.
- As required, add weight to the front end of the tractor to make the tractor stable.
- Add just enough weight to prevent the tractor from tipping over.
- Make sure that steering control is still maintained.
- Make sure to remove all weights when no longer required.
- Use the chart above to determine the maximum load capacity of each front tire, at maximum allowed tire air pressure.

■ Front Weights (option)

As necessary; (optional) front weights can be installed on the front weight mounting bracket.



(A) Mounting bracket (option)
(B) Front weights (option)

NOTE

- The front weight mounting bracket is optional parts as well as weights.
- The maximum of 44 lb. (20 kg) × 5 pieces front weights can be mounted.
- Any model utilizing backhoe requires a mounted front loader during operation.

■ Select the Appropriate Amount of Rear Weight

- Operation of front mounted implement such as a loader can cause the rear wheels to lift off the ground.
- As required, add weight to the rear end of the tractor to make the tractor stable.
- Use of the optional rear ballast is best suited for the loader operations.
- Make sure to remove all weights when no longer required.
- Use the chart below to determine the maximum load capacity of each rear tire at maximum inflation.

⚠ WARNING

Avoid injury!

- **Always use a lower load on the tires than the indicated maximum capacity.**
- **Always keep the amount of rear weight within the limits indicated below.**

Model	Maximum Load Per Rear Tire			
	Tire Size		Ply Rating	Capacity lb. (kg)
SA221	R3	26 x 12.0-12	4	810 (367)
	R4	26 x 12.0-12	4	1875 (851)
SA324	R3	33 x 12.5-16.5	4	2305 (1046)
	R4	12-16.5	6	4796 (2180)
SA424	R3	36 x 13.50-15	4	2596 (1180)
	R4	14-17.5	4	4820 (2186)

For information regarding the rear weight, for details, see "Use Liquid Weight for the Tires" on page 12-10.

■ Use the Optional Rear Ballast

Optional rear ballast for carrying weights on the 3-point hitch is available from YOUR LOCAL YANMAR TRACTOR DEALER.

The amount of weight needed in the rear ballast for the proper operation of a front mounted implement can be found on the *Operation Manual*.

⚠ WARNING

Avoid injury!

- **Use of the optional rear ballast is recommended.**
- **The preceding action improves the stability of the loader.**
- **Use weight as per the recommendation contained in the loader *Operation Manual.***

IMPORTANT

- Always put a lower load on the tires than the indicated maximum capacity.

■ Use Liquid Weight for the Tires

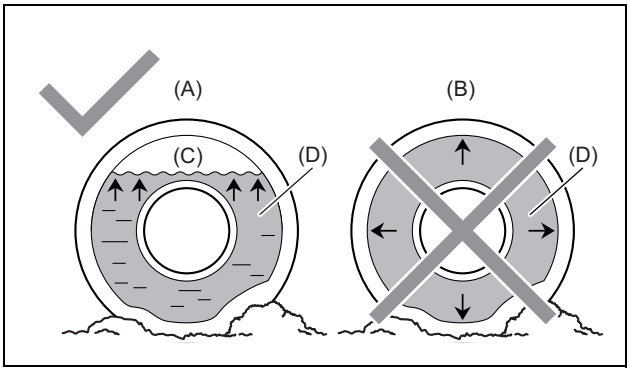
⚠ WARNING

Avoid injury!

- **Installation of tire liquid weight requires special equipment and training.**
- **An exploding tire can lead to injury.**
- **Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.**

IMPORTANT

- Always use a lower load on the tires than the indicated maximum capacity.
- Always fill the tire with the liquid above the rim level to prevent corrosion:
  - avoid exceeding 75% of the tire's internal space
- The preceding condition:
  - the tire is less capable of absorbing shock
  - the tire has a shorter useful lifetime
- The density range between liquid weight materials and mixture ratio is about 10-12 lbs/gallon.



(A) Correct: 75% full: The remaining air can be compressed like a cushion.
(B) Incorrect: 100% full: Water cannot be compressed.
(C) Air
(D) Water ballast solution

13. MAINTENANCE

●For each of the checkpoints listed below, check and service at the intervals indicated in the table.
●For the inspection and maintenance procedures, for details, see "Chapter 14. PERIODIC SERVICE" on page 14-1.

1. Maintenance Check List

No.	Topic		Time	Service Intervals																After purchase	
						Hours															
				Daily	If Necessary	50	100	150	200	250	300	350	400	450	500	550	600	800	1000	1 year	2 years
1	Engine Oil Level	Check	Daily	✔																	
2	Transmission Hydraulic Oil Level	Check	Daily	✔																	
3	Tire Air Pressure	Check	Daily	✔																	
4	Front Grille and Side Screen	Check	Daily	✔																	
5	Fuel Tank	Check	Daily	✔																	
		Refill																			
6	Rubber Dust Unloading Valve	Clean	Daily	✔																	
7	Radiator Hose and Clamp	Check	Daily	✔																	
		Replace	Every 2 years																		✔
8	Radiator Cooling Screen	Clean	Daily	✔																	
9	Safety Systems	Check	Daily	✔																	
10	Radiator Cooling Fins	Clean	Daily	✔																	
11	Cooling System	Check	Daily	✔																	
		Flush	Every 2 years or after 1000hr																✔		✔
12	Coolant	Change	Every 2 years or after 1000hr																✔		✔
13	Fuel Line	Check	Daily	✔																	
		Replace	Every 2 years																		✔
14	Power Steering Line	Check	Daily	✔																	
		Replace	Every 2 years or if necessary		✔																✔
15	Retractable Seatbelt	Check	Daily	✔																	
		Replace	If necessary		✔																
16	Roll-Over Protective Structure (ROPS)	Check	Daily	✔																	
		Replace	If necessary		✔																
17	Headlights, Hazard Lights, and all other lights (lights and/or bulbs).	Check	Daily	✔																	
		Replace	If necessary		✔																
18	Alternator/fan Belt	Inspect	Daily	✔																	
		Adjust	Every 50hr or if necessary		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		
		Replace	If necessary		✔																
19	Air Cleaner Element	Clean	Every 100hr or if necessary		✔		✔		✔		✔		✔		✔		✔	✔	✔		
		Replace	Every 1 year or if necessary		✔															✔	✔
20	Hydraulic hose	Replace	Every 2 years or if necessary		✔																✔

No.	Topic		Time	Service Intervals																	After purchase	
						Hours																
				Daily	If Necessary	50	100	150	200	250	300	350	400	450	500	550	600	800	1000	1 year	2 years
21	Fuses	Check	Daily	✔																	
		Replace	If necessary		✔																
22	Battery Condition	Check	Daily	✔																	
23	Battery	Replace	If necessary		✔																✔
24	Fuel Filter	Replace	Every 500hr or if necessary		✔										✔				✔		
25	Fuel/Water Separator	Check	Every 50hr or if necessary		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		
		Clean	Every 100hr or if necessary		✔		✔		✔		✔		✔		✔		✔	✔	✔		
		Replace	Every 100hr or if necessary		✔		✔		✔		✔		✔		✔		✔	✔	✔		
26	Wheel Bolt Tightening Torque	Check	Daily	✔																	
27	Engine Oil	Change	50/200hr and every 200hr after			✔			✔				✔				✔	✔	✔		
28	Engine Oil Filter	Replace	50/200hr and every 200hr after			✔			✔				✔				✔	✔	✔		
29	Transmission Hydraulic Oil	Change	50/300hr and every 300hr after			✔					✔						✔				
30	Transmission Hydraulic Oil Filter	Replace	50/300hr and every 300hr after			✔					✔						✔				
31	HST Hydraulic Oil Filter	Replace	50/300hr and every 300hr after			✔					✔						✔				
32	Grease fittings	-	Every 50hr after			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		
32	Front Axle Pivot	Check	Every 50hr			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		
33	Air Intake Hoses and Clamps	Check	50/200hr and every 200hr after			✔			✔				✔				✔	✔	✔		
		Replace	Every 2 years or if necessary		✔																✔
34	Front Axle Gear Oil	Check	Every 50hr			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		
		Change	Every 500hr												✔				✔		
35	Brake	Check	Daily	✔																	
		Adjust	Every 500hr												✔				✔		
		Replace	If necessary		✔																
36	Engine Valve Clearance	Adjust	Every 1000hr																✔		
37	Fuel Injection Pump	Check	Every 1000hr																✔		
38	Fuel Injection Nozzle	Check	Every 1000hr																✔		
39	Thermostat	Replace	Every 2 years or 2000hr after																		✔

For assistance in periodic maintenance procedures, contact YOUR LOCAL YANMAR TRACTOR DEALER.

2. Diesel Fuel Specifications

In consistency with other global diesel engine manufacturers and diesel fuel injection equipment manufacturers, Yanmar encourages the development of renewable compression ignition fuels and wishes to clarify our position on the use of biodiesel fuels in Yanmar Industrial Engines.

In United States, non-mineral oil based fuel resources such as RME (Rapeseed Methyl Ester) and SOME (Soybean Methyl Ester), collectively known as FAME (Fatty Acid Methyl Esters), are being used as extenders for mineral oil derived diesel fuels.

After Yanmar conducted the applicability evaluation, Yanmar approves the use of B7 (up to 7% FAME) Diesel which shall not exceed a blend of 7% (by volume) of FAME with 93% (by volume) of approved mineral oil derived diesel fuel in Yanmar Industrial Engines.

Yanmar's limited warranty conditions in case certain engines manufactured by Yanmar are operated with B7 Diesel are as follows:

1. Yanmar accepts the use of B7 Diesel only on the conditions that:
   - B7 Diesel must comply with "the American Standard ASTM D-6751 and ASTM D-7467(for Oxidation stability)" if you and/or your clients are located in the US.
   - Replacement of the following parts before using the recommended biodiesel:
     - 1A7880-04250 Hose Kit, Fuel
2. Please purchase B7 Diesel only from recognized and authorized diesel fuel suppliers.
3. Please use only B7 Diesel including methanol as the above relevant regulations state; otherwise, it may cause corrosion in aluminum and zinc fuel injection equipment components.
4. Please use only B7 Diesel contained certain water level as the above relevant regulations state; otherwise, it may cause fuel filters plugged and also may increase bacterial growth.
5. Please use only B7 Diesel with low viscosity at high temperatures; otherwise, it may cause problems on fuel delivery, injection pump seizures and poor injection nozzle spray atomization.
6. Please check the engine oil level daily. If the oil level rises above the oil level of the previous day, the engine oil needs to be immediately replaced.
7. Please check and confirm the quality of B7 Diesel and other fuel tanks before you will start to use it. Please keep daily maintenance during the use of B7 Diesel and do not forget to regularly flush the fuel system and fuel storage containers. You may only use B7 Diesel at least within two (2) months from the time of filling the tank or three (3) months from the time of production by the said fuel suppliers, whichever comes first.

Yanmar does not warrant and is not responsible for any problems caused by the use of the deteriorated B7 Diesel or by the use of the B7 Diesel which do not comply with the above relevant regulations.

3. Lubricants

No.	Locations		Capacities				Lubricants	
			UNIT	SA221	SA324	SA424		
1	Fuel		L	23.0			No.2-D diesel fuel No.1-D diesel fuel if temperature is below 14°F (-10°C)	
			US gal	6.1				
2	Coolant		L	2.8			High Quality Permanent Type Antifreeze (Ethylene Glycol with corrosion and rust inhibitor chemicals) Coolant Mixture Ratio Distilled Water 50%: Antifreeze 50%	
			US qt.	3.0				
3	Engine crankcase (with filter)		L	2.9	3.4	3.4	API Service Classifications CD or higher SAE 10W-30, SAE 10W-40 or SAE 15W-40	
			US qt.	3.1	3.6	3.6		
4	Transmission hydraulic oil		L	15.5			Hydraulic/Transmission Fluid (TF 500A)	
			US gal	4.1				
5	Front axle gear oil		L	3.0			SAE 80W-90 gear oil	
			US qt.	3.2				
6	Greasing	Tie rod	No. of greasing point	2			Until grease overflows	NLGI GRADE No.2
		Brake pedal	No. of greasing point	1			Until grease overflows	NLGI GRADE No.2
		HST pedal	No. of greasing point	1			Until grease overflows	NLGI GRADE No.2

(Specifications and design are subject to change without prior notice for improvement.)

***NOTE**

- Immediately after purchasing the tractor:
  - adjust the coolant mixture ratio of the coolant and water to suite the local climate
  - the preceding practice assists in making the tractor function efficiently
- The coolant can remain unchanged for a period of 2 years:
  - if during the period the tractor is operated for less than 1200 hours
  - if the tractor is operated for more than 1200 hours during the period, the coolant has to be replaced during flushing of the system
- After pouring the coolant, run the engine for a short period to mix the two fluids thoroughly.

4. Replacement Parts

■ Technical Document

For a copy of the Illustrated Parts List or the Technical Manual of the tractor, contact YOUR LOCAL YANMAR TRACTOR DEALER.

■ Parts

●Use Yanmar lubricants available from YOUR LOCAL YANMAR TRACTOR DEALER.

NOTE

● Only use the Yanmar genuine parts. Non-genuine parts can cause serious damage and accidents.

When ordering a part, tell YOUR LOCAL YANMAR TRACTOR DEALER the tractor serial number and engine serial number. For details, see "Chapter 2. SERVICE THE TRACTOR" on page 2-1.

Part Numbers

Item	Part Number		
	SA221	SA324	SA424
Engine Oil Filter	119305-35170		
Transmission Hydraulic Oil Filter	198119-48310		
HST Oil Filter	198167-24900		
Air Cleaner Outer Filter	1A8330-05110		
Fuel Filter Element	119810-55650		
Alternator Belt	25152-003500	25152-003600	25152-003600
5 Amp Fuse	198535-52110		
10 Amp Fuse	198535-52120		
15 Amp Fuse	198535-52130		
25 Amp Fuse	1A7450-52180		
60 Amp Slow Blow Fuse	1A7000-52820		
80 Amp Slow Blow Fuse	198153-51700		
Battery	1A8160-51500		
Headlights Bulb	1A8070-53110		
Turn Signal Lights Bulb / Tail Lights Bulb	1A7880-53430 / 1A8335-53610		
Warning Lamp Bulb	1A7335-53610		

14. PERIODIC SERVICE

⚠ WARNING

Explosion Hazard

- **Never smoke around the battery.**
- **Never smoke during refueling.**
- **Keep sparks and open flames away from the battery and the fuel tank.**
- **The battery emits hydrogen and oxygen during recharging and can pose a serious hazard.**

- **Never work under any hydraulically supported devices which can settle down, suddenly leak or be accidentally lowered.**
- **Always support the tractor securely with rugged jack stands or other suitable lifting device with the capacity of more than 3 tons.**
- **Always allow the tractor to fully cool down before accessing the:**
  - **engine, muffler, radiator and hot components**

- **Always park the tractor on a solid and level ground.**
- **Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.**
- **Push down Power Take Off (PTO) switch to OFF position.**
- **Lower all the implement to the ground.**
- **Move the range shift lever to N (neutral) position.**
- **Shut off the engine.**
- **Remove the key from the starter key switch before starting any maintenance work.**
- **Chock all the tires safely and securely.**

■ Service the Tractor

IMPORTANT

- Service and maintain the tractor more frequently if the tractor is used in severe conditions.
- Engine components and parts can get dirty or deteriorate on the following condition:
  - the tractor is operated in extreme heat
  - dusty locations
  - severe operating conditions
- The engine oil deteriorates earlier than expected on the following conditions:
  - the tractor is constantly operated at slow or low engine speeds
  - the tractor is used frequently for short durations
  - for details, see "1. Maintenance Check List " on page 13-1

■ Warranty and Repair of the Engine

NOTE

- The maintenance, inspection, repair and replacement services on the engine emission control devices and systems:
  - can be performed at the owner's expense by any qualified off road engine repair shop or mechanic
  - warranty repairs must be executed by an authorized Yanmar tractor dealer

⚠ WARNING

NEVER inhale the engine exhaust gas.

- **Read the DANGER, WARNING and CAUTION statements on the safety alert decals on the tractor.**
- **Before starting the engine:**
  - **remain seated on the operator seat**
  - **move the range shift lever to the N (neutral) position**
  - **push down Power Take Off (PTO) switch to OFF position**
  - **never attempt to start the engine while the operator is still on the ground**
- **Engine exhaust gas contains carbon monoxide.**
  - **if inhaled, the engine exhaust gas can cause severe poisoning or even death**
- **Always perform the safety checks in a well ventilated area.**
- **When working in an enclosed area, always expel the engine exhaust gas to an outdoor area.**
  - **connect one end of an extension pipe to the engine exhaust pipe**
  - **set the other end outside of the work area**
- **Allow fresh outside air to flow into an enclosed work area to remove the engine exhaust gas from the area.**

1. Open/Close the Hood

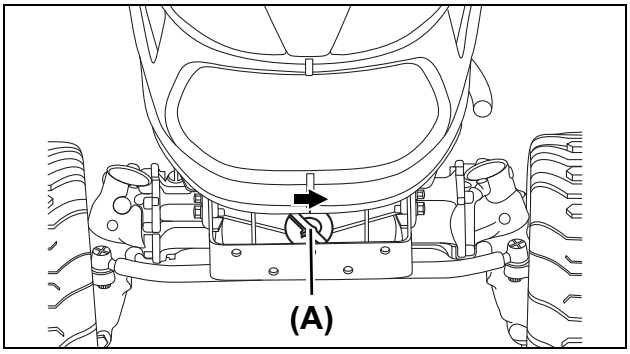
⚠ WARNING

Avoid injury!

- **Avoid opening the hood while the engine is running.**
- **Avoid touching any hot components, e.g., the muffler and the exhaust pipe.**

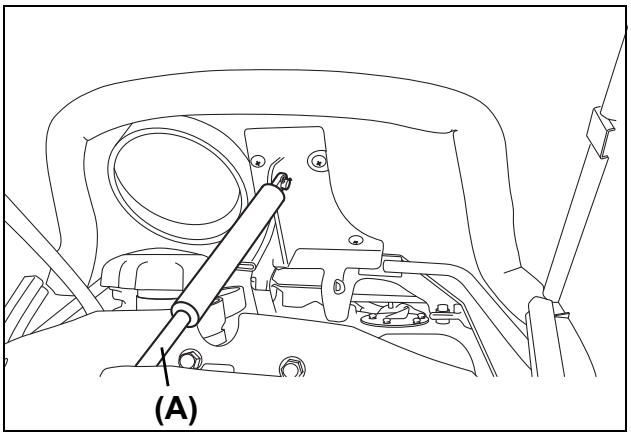
■ Open the Hood

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Push the hood release lever rightward to unlatch the hood lock.



(A) Hood release lever

3. Lift up the hood with both hands.
   - The hood support is automatically set when the hood is fully raised.



(A) Hood support

■ Close the Hood

1. Gradually lower on hood with both hands.
2. Firmly press downward on upper front portion of the hood.
   • Until the hood latch locks the hood in the closed position.
3. Try to lift the hood to verify the hood latch has securely locked.

⚠ CAUTION

●When closing the hood, avoid getting finger/s trapped in the hood or hood support.

2. Daily Checks

■ Check and Refill the Fuel Tank

⚠ WARNING

Avoid injury!
Remember that the fuel vapor is explosive and flammable:

- **Shut off and cool the engine before refilling the fuel tank.**
- **Never smoke while handling fuel.**
- **Keep the fuel away from an open flame or sparks.**
- **Keep the fuel dispenser nozzle in contact with the rim of the fuel tank or container opening at all times until the fueling is complete. Do not use a nozzle lock-open device.**
- **Refuel on outdoors or in a well ventilated area.**
- **Refuel on the ground.**
- **Immediately wipe away any spilled fuel. Never overfill fuel tank. Tighten the fuel filler cap securely after refilling.**
- **To prevent static electric discharge:**
  - **use a clean and approved non-metal fuel container**
  - **use a clean and approved plastic funnel that has no metallic screen mesh or filter**

IMPORTANT

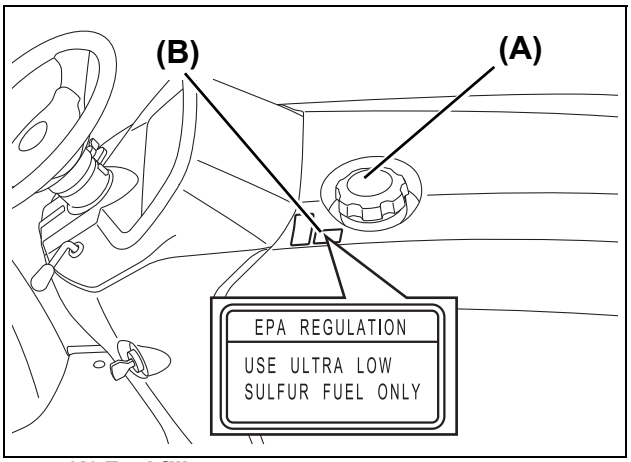
- Dirt and water in the fuel can damage the engine.
- Remove dirt and debris from the fuel tank opening.
- Use a clean, fresh, and no additive fuel.
- At the end of each day's operation:
  - fill the fuel tank to prevent condensation from occurring in the fuel tank
  - the preceding procedure prevents freezing of the fuel during cold weather
- To fill the fuel tank or container:
  - use a non-metallic funnel that has a plastic mesh strainer
- The fuel tank is vented through the fuel filler cap. Replace the fuel filler cap with an approved vented cap as needed.
- Add a fuel conditioner when:
  - storing diesel fuel for a long period of time
  - there is a slow turnover of fuel

1. Park the tractor safely and securely.
   • For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Turn the starter key switch to ON position.
   • by observing the fuel gauge on the instrument panel
   • if the reading on the fuel gauge is 1/4 or less
3. Turn the starter key switch to the OFF position.
4. Chock all the tires safely and securely.
5. Allow the engine to cool down for several minutes.
6. Remove the fuel filler cap.
7. Fill the fuel tank with fresh fuel.

IMPORTANT

- Never overfill the fuel tank.

8. Install the fuel filler cap.



(A) Fuel filler cap
(B) EPA regulation label 1A8250-65650

■ Check the Engine Oil Level

IMPORTANT
- ●Always check the engine oil level daily.
  - • insufficient or no engine oil can cause serious engine problems
- ●Always check the engine oil level before commencing operations.
- ●Always check the engine oil level only while the engine is cold and not running.
- ●Always maintain the engine oil level between the lower and the upper mark.

IMPORTANT
- ●Before adding the engine oil, always:
  - • shut off the engine
  - • allow the engine to cool down for several minutes

NOTE
- ●Make sure that the engine is cold before checking the engine oil level.

1. Park the tractor safely and securely.
   - • For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.

NOTE
- ●During the checking of the engine oil level:
  - • dirt and dust can enter the engine
- ●Clean the area around the dipstick before removing the dipstick.

6. Remove the dipstick.
7. Clean the dipstick with a clean rag.
8. Insert the dipstick completely.
9. Remove the dipstick again.
10. Read the engine oil level on the dipstick.
11. The engine oil level must be between the upper and lower marks on the dipstick.

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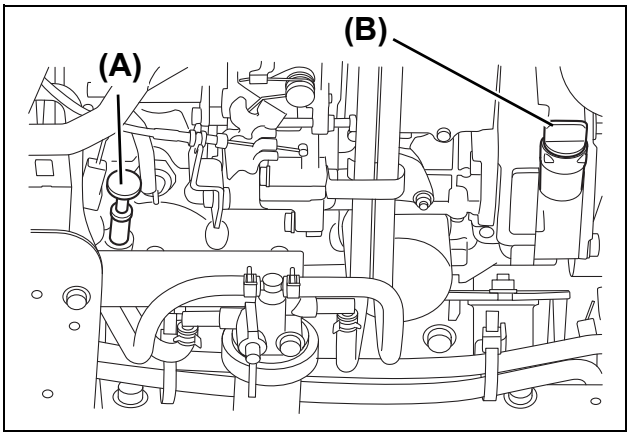

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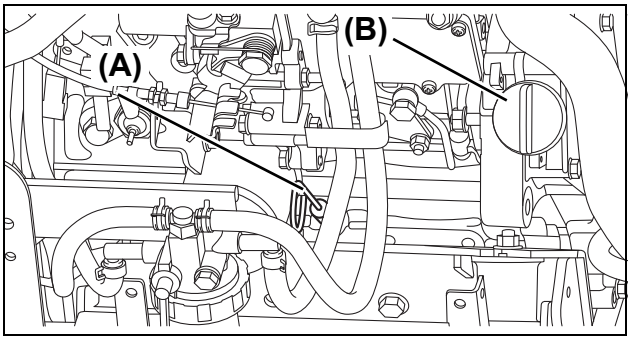

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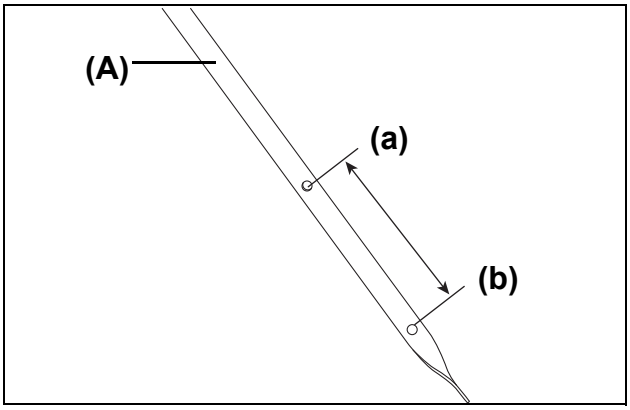

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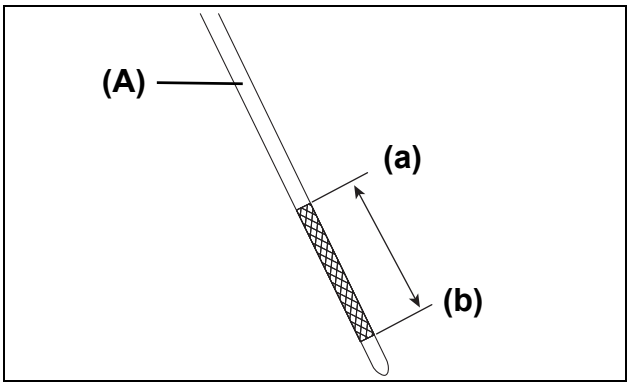


(A) Dipstick
(B) Engine oil filler cap
(a) Upper mark
(b) Lower mark

NOTE

If the engine oil level is low:

- Remove the engine oil filler cap.
- Add the specified engine oil until the engine oil level is in the operating range on the dipstick.

NOTICE

- Avoid overfilling the engine with engine oil.

12. If the engine oil exceeds the upper mark level on the dipstick:
    - Drain the engine oil to a proper level.
13. Insert the dipstick to check the engine oil level.
14. Lower the hood.

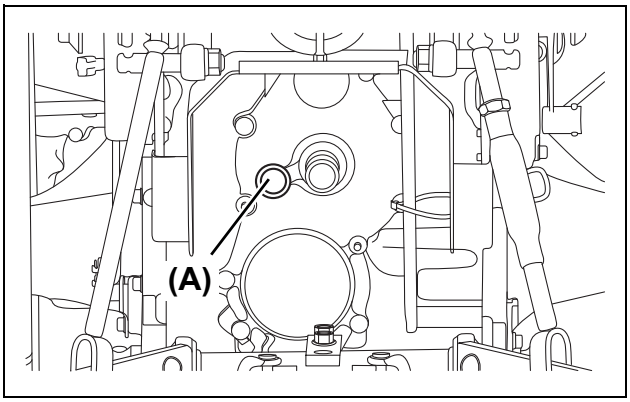
■ Inspect the Transmission Hydraulic Oil Level

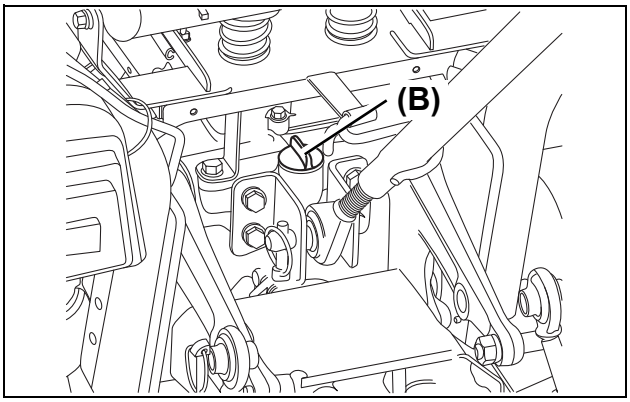
1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.

IMPORTANT

- Before removing transmission hydraulic oil filler cap, carefully clean the area around the transmission hydraulic oil filler cap.
- The preceding action prevents dirt and other contaminants from entering the transmission.
- Avoid overfilling the transmission with transmission hydraulic oil.

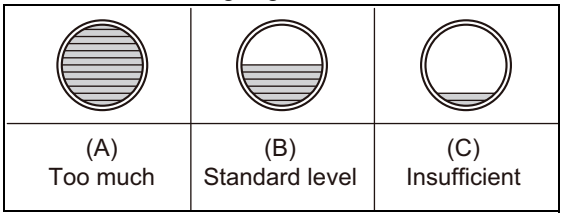
5. Read the transmission hydraulic oil gauge window on the rear side of the transmission case.
   - The transmission hydraulic oil level should be in the middle of gauge window.
6. When the transmission hydraulic oil level is on the lower mark:
   - Clean the area around the transmission hydraulic oil filler cap.
   - Remove the transmission hydraulic oil filler cap from the transmission housing.
   - Add transmission hydraulic oil to the appropriate transmission hydraulic oil level.
7. Install and tighten the transmission hydraulic oil filler cap.





(A) Gauge window
(B) Transmission hydraulic oil filler cap

- How to view the gauge window



(A) Too much	(B) Standard level	(C) Insufficient

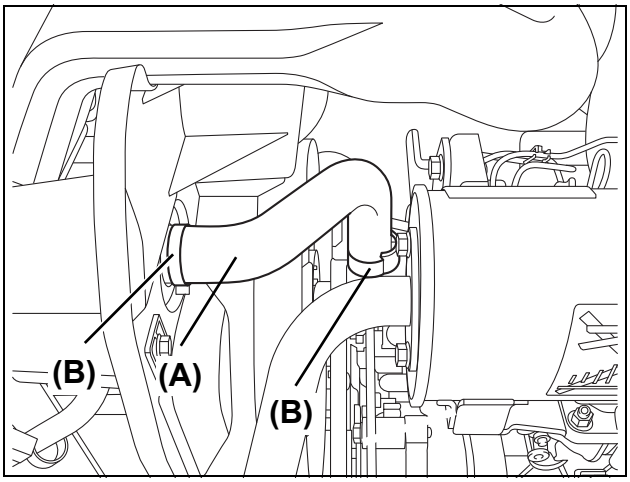
■ Clean the Radiator Hoses and Clamps

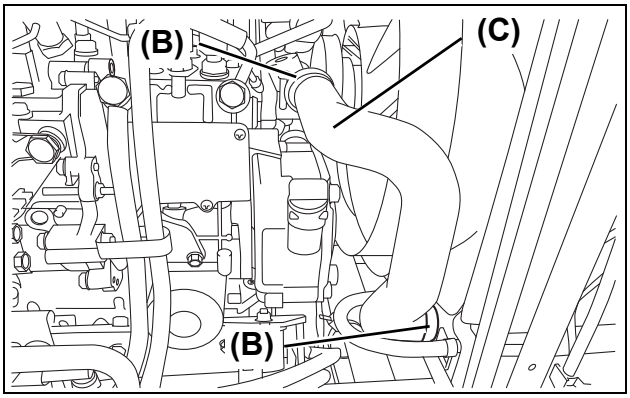
1. Park the tractor safely and securely.
   • For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.

NOTE

- ●Visually check the hoses for damages and cracks.
- ●Squeeze the hoses to check for evidences of deterioration.
- ●The hoses must not be too hard, brittle, too soft or swollen.
- ●Replace the damaged hose/s.

6. Check the upper and the lower radiator hoses for any damages and cracks.
7. Replace any damaged hoses.
8. Check for loosen hose clamps.
9. Replace as necessary.
10. Lower the hood.





(A) Upper radiator hose
(B) Hose clamps
(C) Lower radiator hose

■ Clean the Radiator Cooling Screen

⚠ CAUTION

- ●**ALWAYS stop the engine and remove the key from the starter key switch before cleaning the radiator cooling fins and the radiator cooling screen.**

⚠ WARNING

Compressed air can explosively spray debris and dirt over a wide area:

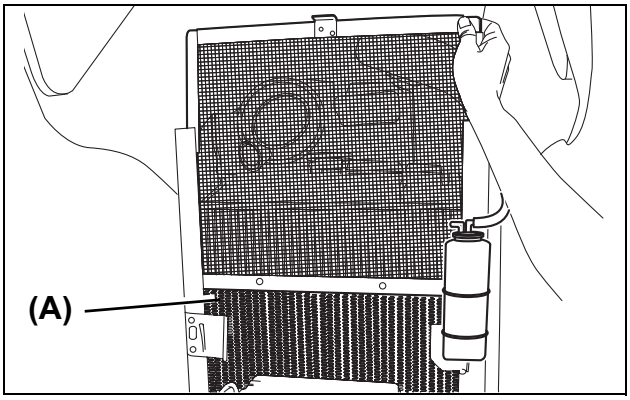
- ●**Make sure there are no bystander/s near the tractor.**
- ●**While using compressed air for cleaning, always wear protective goggles.**
- ●**Reduce compressed air pressure to 30 psi (210 kPa).**

IMPORTANT

- ●Keep the radiator cooling screen clean:
  - • make sure adequate air inflow is present
  - • prevent the engine from overheating

1. Park the tractor safely and securely.
   • For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.

5. Raise the hood.
6. Pull out the radiator cooling screen.
7. Remove straw and dust attached from the radiator cooling screen.



(A) Radiator cooling screen

■ Clean the Radiator Cooling Fins

⚠ CAUTION

●ALWAYS stop the engine and remove the key from the starter key switch before cleaning the radiator cooling fins and the radiator cooling screen.

⚠ WARNING

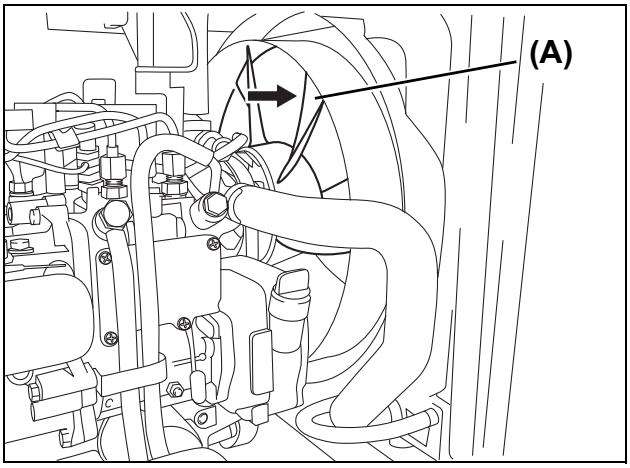
Compressed air can explosively spray debris and dirt over a wide area:
● Make sure there are no bystander/s near the tractor.
●While using compressed air for cleaning, always wear protective goggles.
●Reduce compressed air pressure to 30 psi (210 kPa).

IMPORTANT: Avoid damage!
●To prevent overheating:
- keep the radiator cooling fins clean

●When cleaning the radiator cooling fins:
- avoid using pressure washers, which can damage the radiator cooling fins

●Prevent the radiator cooling fins from bending:
- avoid spraying compressed air directly into the radiator cooling fins

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Clean the radiator cooling fins from all dirt and debris:
   - From rear to front direction of the radiator.
   - Use low pressure, compressed air or water.
   - During the preceding procedure, maintain maximum distance to the engine.
7. Install the radiator cooling screen.
8. Install the air intake hose.

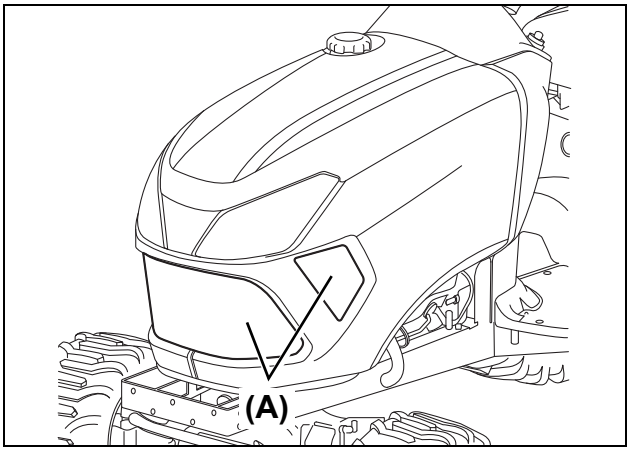


(A) Rear to front direction

■ Clean the Front Grille Screen

IMPORTANT: Avoid damage!
- To prevent the engine from overheating.
- To ensure adequate air inflow.

1. Check the front grille screen for dirt, grass clippings and debris.
2. Clean the front grille screen with a brush or cloth.



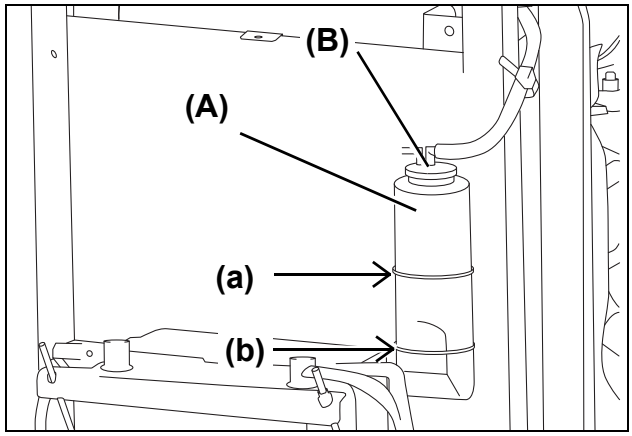
(A) Front grille screen

■ Check the Cooling System

⚠ WARNING

Avoid injury!
- **Before checking always allow the radiator to cool down:**
  - **the radiator is hot and can cause burns**
  - **the build up pressure in the cooling system can cause the coolant to spray out explosively during removal of the radiator cap**
- **Always shut off the engine.**
- **Allow the engine to cool down.**
- **Remove the radiator cap only when:**
  - **the radiator and the engine are sufficiently cooled down that can be touched with bare hands**
- **When removing the radiator cap, always:**
  - **loosen the radiator cap to the first stop**
  - **the preceding action releases excessive pressure on the radiator**
  - **fully remove the radiator cap once the pressure has been released completely**
- **For tractors equipped with a coolant reserve tank:**
  - **add coolant or water to reserve tank, not to the radiator**

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Check the coolant level of the reserve tank:
   - If the engine is warm, the coolant level must be between the full line and the low line.
   - If the engine is cold, the coolant level must be at the low line on the reserve tank.

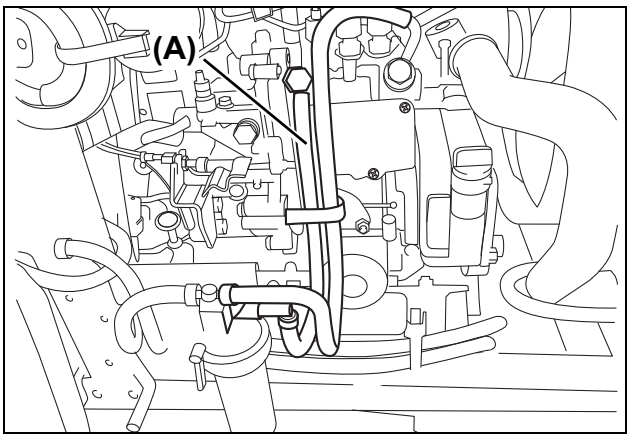


(A) Reserve tank
(B) Reserve tank cap
(a) FULL line
(b) LOW line

7. When necessary, remove the reserve tank cap and add coolant.
8. Add a pre-diluted coolant with an antifreeze water ratio that suits the local climate.
   - Contact YOUR LOCAL YANMAR TRACTOR DEALER for more details.
   - Use High Quality Permanent Type Antifreeze (Ethylene Glycol with corrosion and rust inhibitor chemicals).
9. Install the reserve tank cap.
10. Lower the hood.
11. Confirm that the hood latch locked securely.

■ Check the Fuel Line

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Check the fuel rubber hoses for any leaks or damages.



(A) Fuel line

■ Inspection Procedure for the Safety System

⚠ WARNING

NEVER inhale the engine exhaust gas.

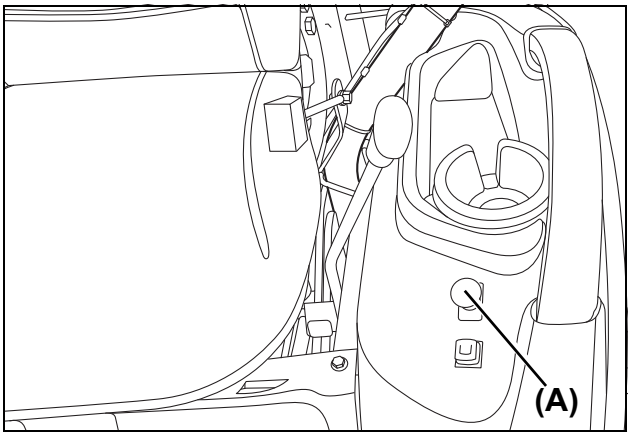
- **Read the DANGER, WARNING and CAUTION statements on the safety alert decals on the tractor.**
- **Before starting the engine:**
  - **remain seated on the operator seat**
  - **release the forward and reverse drive pedal to N (neutral) position**
  - **always move the range shift lever to the N (neutral) position**
  - **push down Power Take Off (PTO) switch to OFF position**
  - **never attempt to start the engine while the operator is still on the ground**
- **Engine exhaust gas contains carbon monoxide.**
  - **if inhaled, the engine exhaust gas can cause severe poisoning or even death**
- **Always perform the safety checks in a well ventilated area.**
- **When working in an enclosed area, always expel the engine exhaust gas to an outdoor area.**
  - **connect one end of an extension pipe to the engine exhaust pipe**
  - **set the other end outside of the work area**
- **Allow fresh outside air to flow into an enclosed work area to remove the engine exhaust gas from the area.**

Before operating the tractor, ALWAYS:
- Get familiarized with the operation of the tractor.
- Perform the safety checks on the tractor's safety interlock system.

If a problem is detected on the safety interlock system:
- Do not attempt to operate the tractor.
- Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

1. Power Take Off (PTO) Switch

1. Sit on the operator seat.
2. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.
3. Release the forward and reverse drive pedal to N (neutral) position.
4. Pull up Power Take Off (PTO) switch to ON position.
5. Turn the starter key switch to the START position.



(A) Power Take Off (PTO) switch

NOTE
- The engine must not crank when Power Take Off (PTO) switch is in ON position.

6. Confirm that the starter motor does not operate.
7. Push down Power Take Off (PTO) switch to OFF position.
8. Activate the starter motor to start the engine.

NOTE

● The engine starting combination as shown on the chart below.

	PARKING	FORWARD/REVERSE PEDAL-N	PTO (N)
START	○	○	○

2. Parking Brake Safety Switch

1. Sit on the operator seat.
2. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.
3. Release the forward and reverse drive pedal to N (neutral) position.
4. Push down Power Take Off (PTO) switch to OFF position.
5. Disengage the parking brake.
6. Turn the starter key switch to START position.

NOTE

●The engine must not crank when the parking brake is disengaged.

7. Turn the key to the OFF position.
8. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.
9. Turn the starter key switch to START position.

NOTE

●The engine must crank when the parking brake is engaged.

3. Forward and Reverse Drive Pedal Switch

1. Sit on the operator seat.
2. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.
3. Release the forward and reverse drive pedal to N (neutral) position.
4. Push down Power Take Off (PTO) switch to OFF position.
5. Turn the starter key switch to START position to run the engine.
6. Pull up the Power Take Off (PTO) switch to ON position.
7. Move the Mid-/Rear Power Take Off (PTO) select lever to front (both Mid and Rear PTO engagement) position.
8. Disengage the parking brake.
9. Depress the reverse drive pedal.
10. Make sure that the Power Take Off (PTO) is not running.

4. Power Take Off (PTO)/Parking Brake/ Seat Switch Interface

1. Sit on the operator seat.
2. Engage the parking brake securely, for details, see "6. Lock and Set the Parking Brake" on page 7-3.
3. Release the forward and reverse drive pedal to N (neutral) position.
4. Push down Power Take Off (PTO) switch to OFF position.
5. Turn the starter key switch to START position.

NOTE

●The engine must crank.

6. Move the Mid-/Rear Power Take Off (PTO) select lever to front (both Mid and Rear PTO engagement) position.
7. Pull up Power Take Off (PTO) switch to ON position.
8. Slightly rise up from the operator seat to remove weight from the operator seat.

IMPORTANT

●Do not dismount from the tractor.

9. Make sure that the engine stop running after about one second.

IMPORTANT

- When checking above procedure, park the tractor on solid and level ground. Make sure that the tractor does not move even if parking brake is disengaged.

10. Move the Mid-/rear Power Take Off (PTO) select lever to rear position.

IMPORTANT

- Do not dismount from the tractor.

11. Slightly rise up from the operator seat to remove weight from the operator seat.
12. Confirm that Power Take Off (PTO) continues to operate.
13. Sit on the operator seat.
14. Disengage the parking brake.
15. Slightly rise up from the operator seat to remove weight from the operator seat.

IMPORTANT

- Do not dismount from the tractor.

16. Make sure that the engine is shut down.
17. Push down Power Take Off (PTO) switch to OFF position.
18. Slightly rise up from the operator seat to remove weight from the operator seat.

IMPORTANT

- Do not dismount from the tractor.

19. Confirm that Power Take Off (PTO) continues to operate.
20. Sit on the operator seat.
21. Turn the starter key switch to OFF position.

■ Check the Retractable Seatbelt

1. Before operating the tractor:
   - Always ensure that all the retractable seatbelt mounting hardwares are in good working condition.
2. Replace any damaged hardware.

■ Check the Roll-Over Protective Structure (ROPS)

1. Before operating the tractor:
   - Always ensure that the Roll-Over Protective Structure (ROPS) mounting hardwares are in correct working condition.
2. If any damage hardware is detected:
   - Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Check the Wheel Bolt Tightening Torque

Service Intervals

- Regular intervals: Before daily operation.
- After adjusting the tire tread width and after replacing the tires:
  - after 1 hour of operation
  - every 4 hours after that until appropriate tightening torque values are reached and maintained

For more information on maintenance work on the wheel bolt tightening torque, for details, see "Check the Wheel Bolt Tightening Torque" on page 12-2.

■ Check the Tire Air Pressure

⚠ WARNING

Avoid injury!
Improperly maintained tires and rim parts can cause explosive separation of the wheels.

- **Mounting and dismounting of the tires into and from the rim must be performed by an authorized person using proper equipment.**
- **Avoid inflating the tires above the recommended tire air pressure.**
- **Avoid standing in front of or over a tire assembly during inflation.**
- **Always use a clip-on chuck and extension hose long enough for the tire to be inflated from a safe distance.**
- **Avoid attempting to weld or apply heat into a rim and tire assembly.**
  - **welding can structurally weaken or deform the rim**
  - **heat can cause an increase in tire air pressure and result in an explosion**

IMPORTANT

- When checking tire air pressure of liquid filled tires:
  - rotate the tire placing the valve stem on top position
  - the preceding practice prevents the liquid from escaping through the valve stem
- To prevent tire damage:
  - always inflate the tires to less than the maximum tire air pressure shown on the tire sidewall

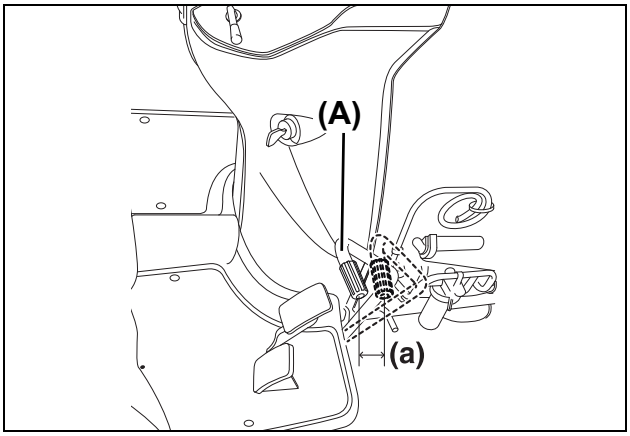
1. Inspect the tires for fissures or any other damages.
2. Use a tire gauge to check the tire air pressure.
3. Adjust the tires to the standard tire air pressure. (For details, see "1. Tires" on page 12-1.)

■ Check the Power Steering Line

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Check at the lower part and underneath the tractor.
6. Check for leaks and damages on the power steering lines and hoses.

■ Check the brake

1. Park the tractor safely and securely.
   - For details, see "Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Check all the tires safely and securely.
4. Engage the parking brake. For details, see "6. Lock and Set the Parking Brake" on page 7-3.
5. Confirm that the parking brake lock holder is surely applied and the parking brake lock lever is locked securely.
6. Periodically clean and apply oil to prevent dust or rust that could interfere with proper operation.
7. Disengage the parking brake.



(A) Brake pedal
(a) 2.9±0.1 in (73±3 mm)

8. Check the free play of the brake pedal.
   - The brake pedal free play must be within 2.9±0.1 in (73±3 mm)
9. If the brake pedal is necessary to be adjusted, contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Check and Clean the Electrical System

⚠ WARNING

To avoid personal injury:

- **Always replace damaged wires or connections immediately and tighten any loose terminal or connector.**
- **Loose or damaged wires, terminals or connectors can result to:**
  - **poor performance of the tractor**
  - **damage to electrical components**
  - **shortens battery life**
  - **short circuit which consequently can pose a fire hazard**
- **Never use a fuse with a larger capacity than the recommended.**
- **Do not attempt to bypass the fuse system which could result to:**
  - **personal injury**
  - **damage to electrical components**
  - **pose a fire hazard**
- **Make sure plug and unplug any wiring connection that is protected by a waterproof plug and ensure that the connection is sealed securely and are properly after assembly.**
- **Regularly clean around the battery, all electrical wiring, the engine and the exhaust system before attempting to start or operate the tractor.**
- **Any accumulated dirt, fuel, grease or other deposits poses a fire hazard.**

IMPORTANT

- Never allow high pressure water sprayed directly to the battery, wiring, terminals, connectors, electrical components or the instrumental panel.
- Doing so can cause an electrical malfunction.

Regularly check the following points:

1. Wiring harness clamps:
   - Replace as necessary.
2. Wiring insulation:
   - Replace if cracked or damaged.
3. Connectors and terminals:
   - Tighten if loose.
   - Clean if contaminated.
   - Replace if damaged or discolored.
4. Instrument panel:
   - Make sure all switches and gauges are operating correctly.
   - Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Check the Hydraulic Hoses

⚠ WARNING

Avoid injury!

- **Avoid connecting the hoses to the hydraulic quick couplers before the hydraulic system pressure has been fully relieved.**
- **When checking for leaks, run a piece of cardboard or wood block along the hydraulic lines and connections.**
- **Avoid getting in contact with high pressure transmission hydraulic oil.**
  - **pressurized transmission hydraulic oil can:**
    - **penetrate the skin and other body parts**
    - **cause serious injury**
- **Immediately see a doctor if transmission hydraulic oil penetrates the skin or other body parts.**
  - **transmission hydraulic oil must be surgically removed**
  - **gangrene may develop**

- Check the conditions of the hydraulic hoses. Replace as necessary.
- Check for transmission hydraulic oil leakage.
- Check for loose bolts.

3. Check and Replace as Necessary

■ Inspect the Alternator/fan Belt

- Perform a visual inspection on the alternator/fan belt.
- Check for loose alternator/fan belt tension or damaged alternator/fan belt.

For more information on maintenance work on the alternator/fan belt, for detail, see "Service the Alternator/Fan Belt" on page 14-17.

■ Check and Replace the Battery

For details, see "1. Battery" on page 15-1.

■ Check the Fuses

For details, see "2. Fuses" on page 15-4.

■ Check the Light Bulbs

For details, see "3. Bulb" on page 15-5.

■ Check and Drain the Fuel/Water Separator

For details, see "Check the Fuel/Water Separator" on page 14-16.

4. First 50 Hours

■ Change the Engine Oil

For the maintenance work, see “Change the Engine Oil and Replace Engine Oil Filter” on page 14-22.

■ Replace the Engine Oil Filter

For the maintenance work, see “Change the Engine Oil and Replace Engine Oil Filter” on page 14-22.

■ Change the Transmission Hydraulic Oil

For the maintenance work, see “Change the Transmission Hydraulic Oil, Replace the Transmission Hydraulic Oil Filter and HST Hydraulic Oil Filter” on page 14-24.

■ Replace the Transmission Hydraulic Oil Filter and HST Hydraulic Oil Filter

For the maintenance work, see “Change the Transmission Hydraulic Oil, Replace the Transmission Hydraulic Oil Filter and HST Hydraulic Oil Filter” on page 14-24.

5. Every 50 Hours

■ Check the Front Axle Gear Oil Level

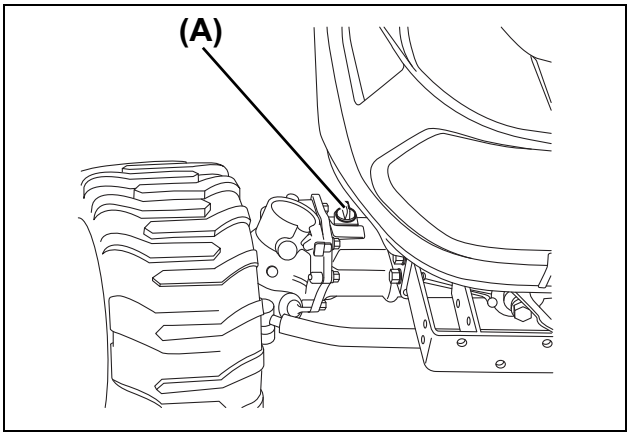
IMPORTANT

●Before checking the front axle gear oil level, allow the front axle gear oil to settle for 1 hour until the current front axle gear oil level can be accurately read on the dipstick. Recheck the front axle gear oil level after operating the tractor for several hours.

1. Park the tractor safely and securely.
   • For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Make the front axle gear oil settle for at least 1 hour.

NOTE

●Clean the area around the oil cap/dipstick before removing the oil cap/dipstick.



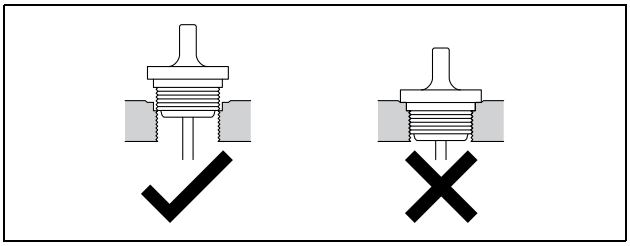
(A) Oil cap

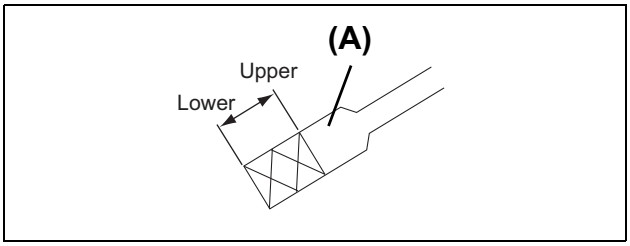
6. Loosen and remove the dipstick located on the right side of the front axle.
7. Use a clean rag to wipe the front axle gear oil from the dipstick.
8. Insert the dipstick into the hole without tightening.
9. Remove the dipstick again.
10. Check the front axle gear oil level on the dipstick.
11. The front axle gear oil level must be between the upper and lower marks on the dipstick.

IMPORTANT

●When the front axle gear oil level is low:
  • add SAE 80W-90 gear oil through the fill opening until the front axle gear oil level is appropriate

(A) Dipstick
(a) Upper mark
(b) Lower mark





12.Install and tighten the dipstick.
13.Operate the tractor for several hours.
14.Check the front axle gear oil level again.

■ Check the Fuel/Water Separator

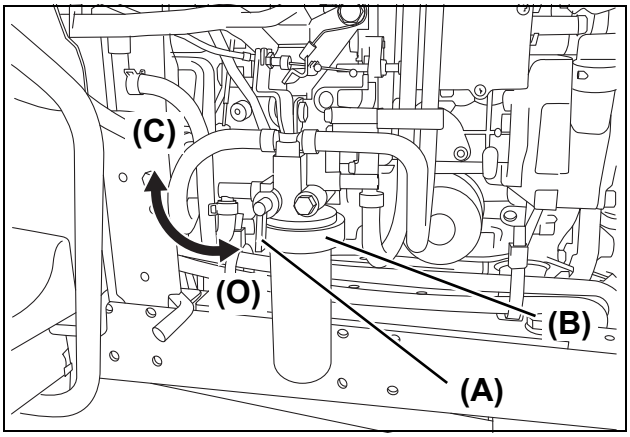
(Drain the Fuel/Water Separator)

⚠ WARNING

Avoid injury!
Remember that diesel fuel vapor is explosive and flammable:
- **Never smoke while handling diesel fuel.**
- **Keep the diesel fuel away from open flame or sparks.**
- **Before performing maintenance, shut off the engine and allow the engine to cool down.**
- **Work in a well ventilated area.**
- **Immediately wipe away any spilled diesel fuel.**

NOTE
- Change the fuel filter if the fuel in the tank runs out while the engine is running.

1. Park the tractor safely and securely.
   • For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Turn the fuel shut-off valve to the OFF (closed) position.



(A) Fuel shut-off valve
(B) Sediment bowl locking collar
(O) ON (open) position
(C) OFF (closed) position

6. Turn the sediment bowl locking collar counterclockwise to unlock the sediment bowl.
7. Pull down the sediment bowl to remove from the separator body.
8. Remove the water and/or sediment found in the sediment bowl.

NOTE
- Dispose the water and sediment together with diesel fuel in the sediment bowl properly following effective local law.

9. Clean the sediment bowl with diesel fuel.
10. Install the sediment bowl.
11. Turn the sediment bowl locking collar clockwise lock position.
12. Turn the fuel shut-off valve to the ON (open) position.

NOTE
- The fuel system is self bleeding.

13. Turn the starter key switch to START position. Allow any trapped air to be bled from the fuel system. If necessary, contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

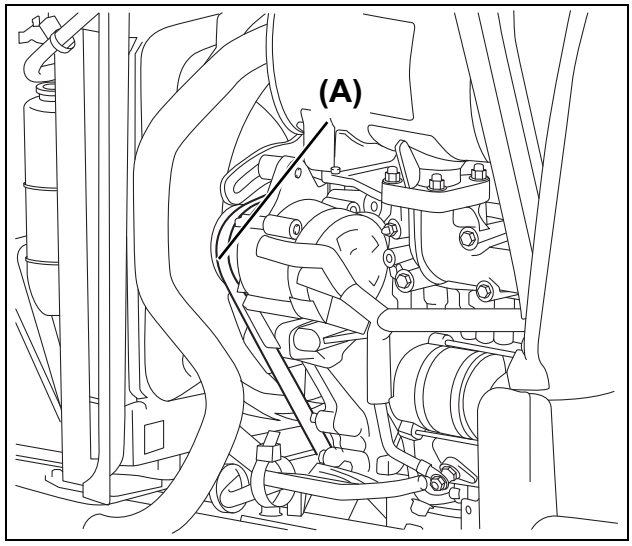
■ Service the Alternator/Fan Belt

⚠ WARNING

Avoid injury!
- **Fingers or loose clothing can get entangled with rotating parts.**
- **Before performing maintenance, shut off the engine.**
- **Allow all the moving parts to completely stop.**

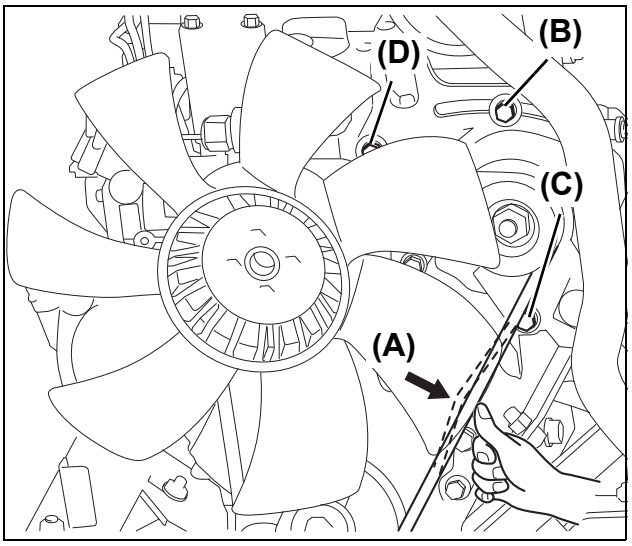
1. Check the Alternator/Fan Belt Tension

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.



(A) Alternator/fan belt

6. Using the thumb, gently apply pressure to the midpoint of the alternator/fan belt between the pulleys.
7. Check whether the alternator/fan belt deflects inward by approximately 0.4 to 0.6 in. (10 to 15 mm).
8. If the deflection is not as specified, adjust the tension of the alternator/fan belt.



(A) 0.4 to 0.6 in. (10 to 15 mm)
(B) Adjusting bolt
(C) Mounting bolt
(D) Fixing bolt

NOTE
- The above illustration shows 221.

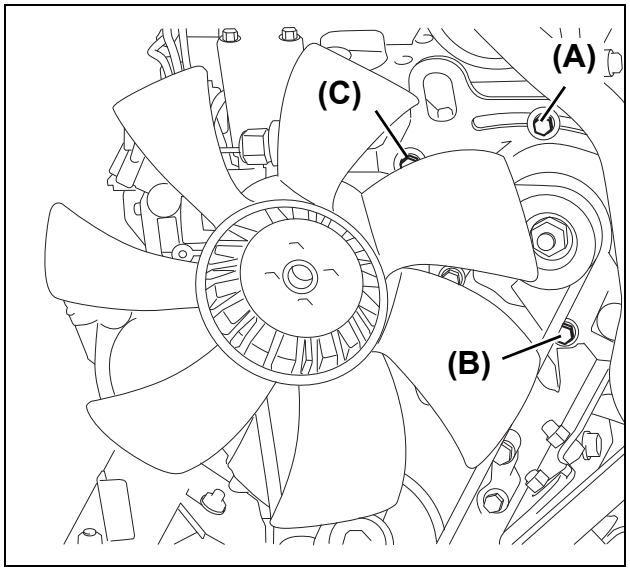
2. Adjust the Alternator/Fan Belt Tension

1. Loosen the adjusting bolt.
2. Loosen the mounting bolt.
3. Loosen the fixing bolt.
4. Exert an outward pressure on the alternator housing to attain the correct tension.
5. Tighten the adjusting bolt, and the mounting bolt, in that order.
6. Check the alternator/fan belt tension.
7. Tighten the fixing bolt.
8. Lower the hood.
9. Confirm that the hood latch locked securely.

3. Replace the Alternator/Fan Belt

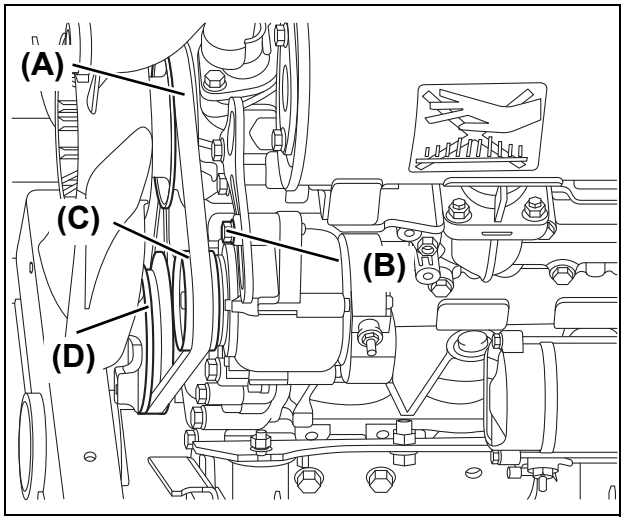
NOTE
- Replace an excessively worn out, damaged or elongated alternator/fan belt with a new alternator/fan belt.

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Loosen the adjusting bolt.
7. Loosen the mounting bolt.
8. Loosen the fixing bolt.



(A) Adjusting bolt
(B) Mounting bolt
(C) Fixing bolt

9. Apply an inward pressure to the alternator housing.
10. Remove the alternator/fan belt from the alternator sheave, fan sheave and crankshaft sheave.
11. Route the defective alternator/fan belt over the fan and remove the alternator/fan belt.
12. Install a new alternator/fan belt over the fan and onto the sheaves.
13. Exert an outward pressure to the alternator housing to attain the correct tension.
14. Tighten the adjusting bolt and the mounting bolt, in that order.
15. Check the alternator/fan belt tension.
16. Tighten the fixing bolt.
17. Lower the hood.
18. Confirm that the hood latch locked securely.



(A) Fan sheave
(B) Adjusting bolt
(C) Alternator sheave
(D) Crankshaft sheave

■ Grease Fittings

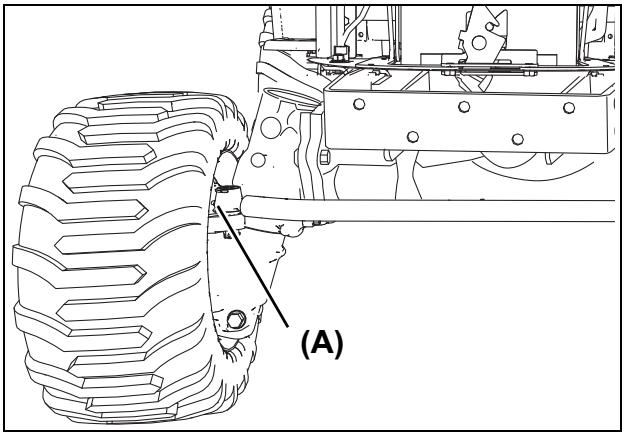
IMPORTANT
- Use the recommended greases by Yanmar.
  - the preceding procedure prevents premature wear or failure of the parts and components
- The recommended greases by Yanmar perform efficiently in an average ambient temperature range from -20 to +275 °F (-29 to +135 °C).
- When intending to operate the tractor outside the preceding temperature range:
  - contact YOUR LOCAL YANMAR TRACTOR DEALER for the applicable special purpose greases

(General all purpose grease NLGI grade No. 2)

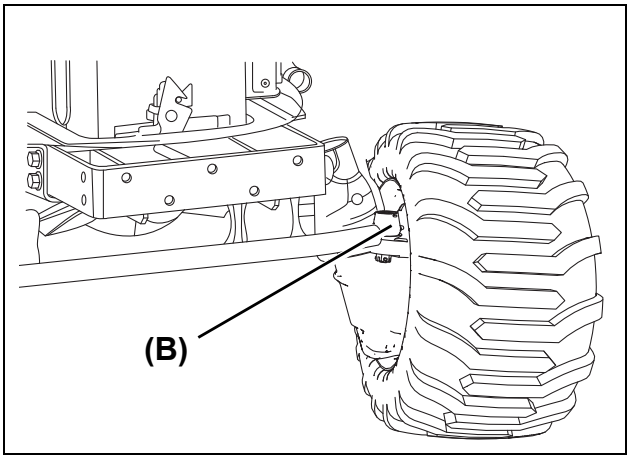
1. Lubricate the Grease Fittings on the Tie Rod

Extremely Wet or Muddy Conditions
Lubricate the grease fittings once every 10 operating hours or once a day.

All Other Conditions
Lubricate the grease fittings once every 50 operating hours.



(A) Right tie rod end (grease fitting)

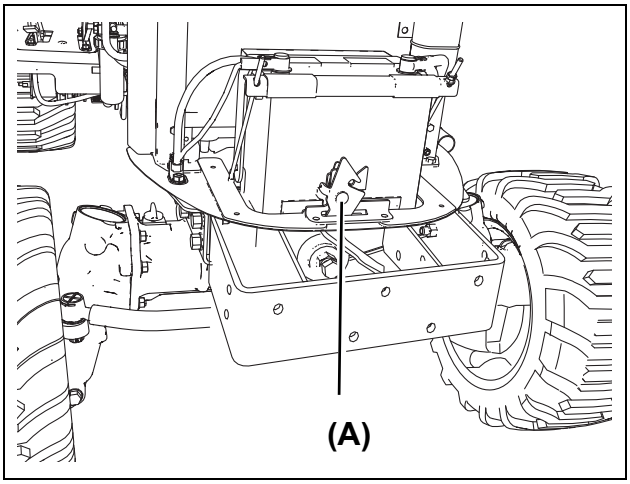


(B) Left tie rod end (grease fitting)

2. Lubricate the Hood Latch

Lubricate the hood latch with SUPER LUBE ® lubricants once every 50 operating hours.

SUPER LUBE ® is a registered trademark of Synco Chemical Corp ®.



(A) Hood latch

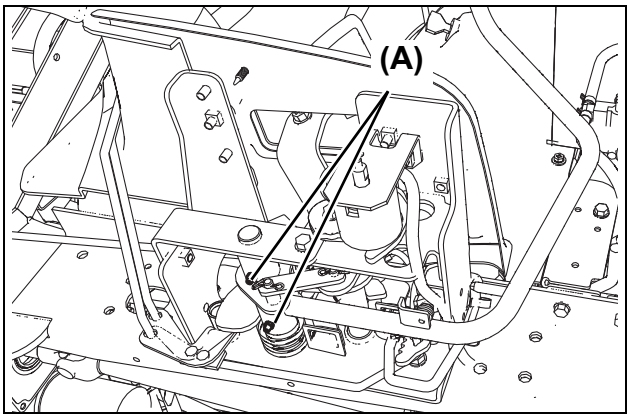
3. Lubricate the Grease Fittings on the Drive Pedal Rod End

Extremely Wet or Muddy Conditions

Lubricate the grease fittings once every 10 operating hours or once a day.

All Other Conditions

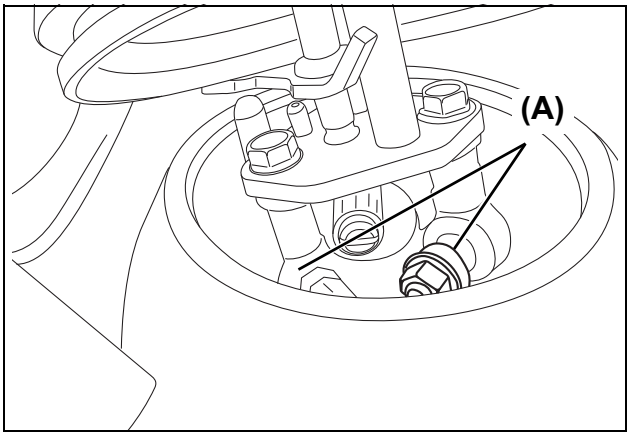
Lubricate the grease fittings once every 50 operating hours.



(A) Forward and reverse drive pedal rod end

4. Lubricate the Implement Control Lever Linkage

Lubricate the implement control lever linkage with SUPER LUBE ® lubricants.

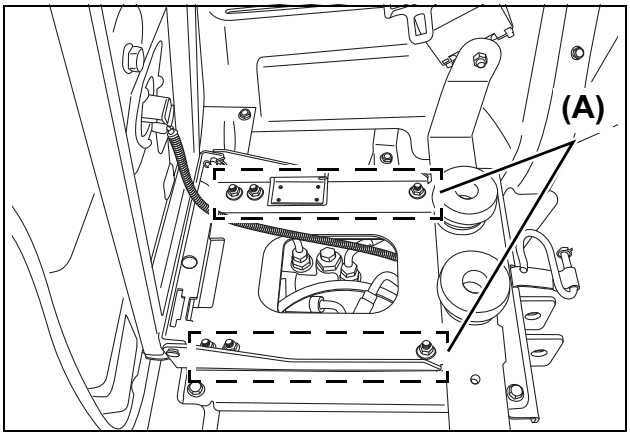


(A) Implement control lever linkage

5. Lubricate the Operator Seat Slide Rails

Lubricate the operator seat slide rails with SUPER LUBE ® lubricants once every 50 operating hours. SUPER LUBE ® is a registered trademark of Synco Chemical Corp ®.

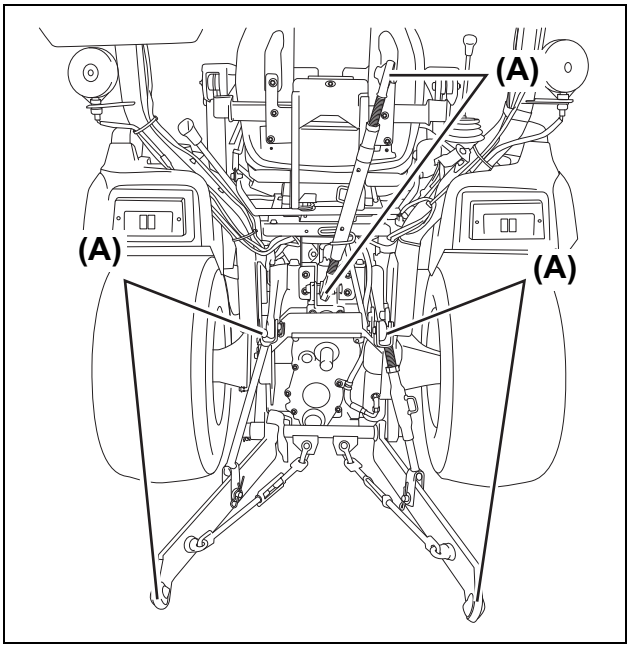
1. Lift up the operator seat.
2. Lubricate the operator seat slide rails with SUPER LUBE ® lubricants.
3. Lower the operator seat.



(A) Operator seat slide rails

6. Lubricate the 3-Point Hitch

Lubricate the ball joints with SUPER LUBE ® lubricants once every 50 operating hours. SUPER LUBE ® is a registered trademark of Synco Chemical Corp ®.



(A) Ball joints (6 pieces)

6. Every 100 Hours

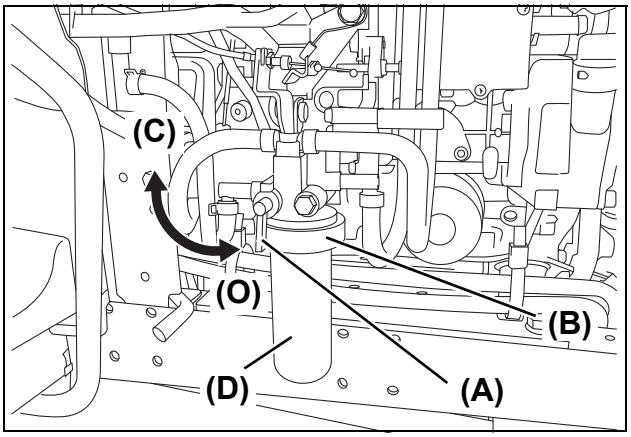
■ Clean the Fuel/Water Separator and Replace the Fuel Filter

⚠ WARNING

Avoid injury!
Remember that diesel fuel vapor is explosive and flammable:
- **Never smoke while handling diesel fuel.**
- **Keep the diesel fuel away from open flame or sparks.**
- **Before performing maintenance, shut off the engine and allow the engine to cool down.**
- **Work in a well ventilated area.**
- **Immediately wipe away any spilled diesel fuel.**

NOTE
- Change the fuel filter if the fuel in the tank runs out while the engine is running.

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Turn the fuel shut-off valve to the OFF (closed) position.



(A) Fuel shut-off valve
(B) Sediment bowl locking collar
(C) OFF (closed) position
(D) Sediment Bowl

6. Turn the sediment bowl locking collar counterclockwise to unlock the sediment bowl.

7. Pull down the sediment bowl to remove from the separator body.
8. Remove the fuel filter from the sediment bowl. Dispose of the fuel filter properly following effective local law.
9. Remove the water and/or sediment found in the sediment bowl.

NOTE

●Dispose the water and sediment together with diesel fuel in the sediment bowl properly following effective local law.

10. Clean the sediment bowl with diesel oil.
11. Instal the fuel filter.
12. Install the sediment bowl.
13. Turn the sediment bowl locking collar clockwise lock position.
14. Turn the fuel shut-off valve to the ON (open) position.

NOTE

●The fuel system is self bleeding by turning the starter key switch to "ON" position.

15. Turn the starter key switch to START position. Allow any trapped air to be bled from the fuel system. If necessary, contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Service the Air Cleaner Element

⚠ WARNING

Avoid injury!
Remember that diesel fuel vapor is explosive and flammable:

- **Touching hot surfaces can burn skin.**
- **If the engine has been running for some time, the engine components are hot including all internal fluids.**
- **Before performing maintenance or working near the engine and engine parts:**
  - **allow the engine to cool down**
  - **always wear protective goggles and protective clothing**

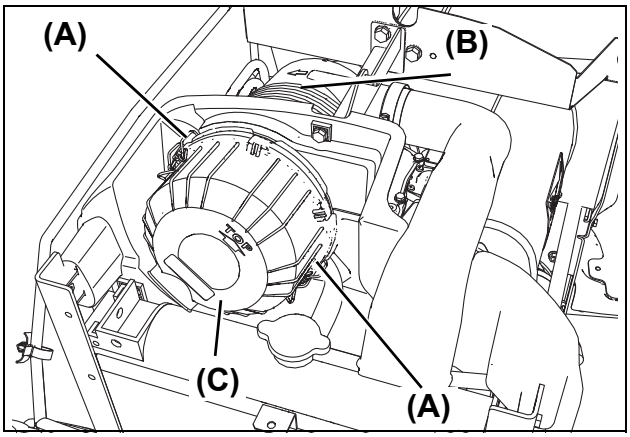
IMPORTANT

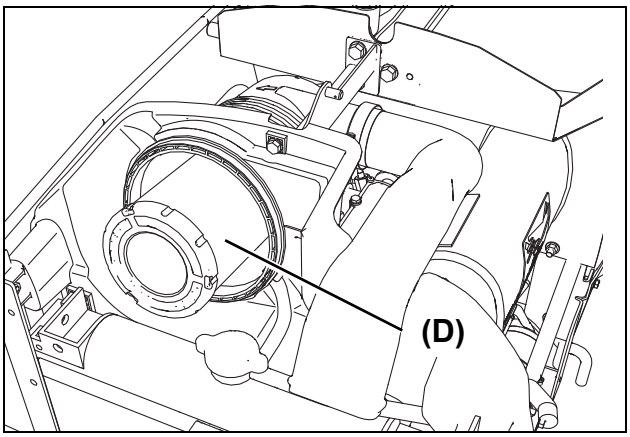
A damaged air cleaner element can fail to prevent dirt, dust and other contaminants from entering the engine.

●Always replace a contaminated, damaged and cracked filter seal.

1. Service the Air Filter

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Release the two latch hooks.
   - The latch hooks secures the air cleaner canister cover to the air cleaner canister.

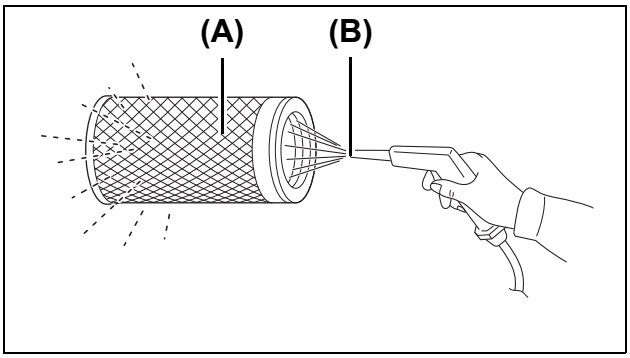




(A) Latch hook
(B) Air cleaner canister
(C) Air cleaner canister cover
(D) Air filter

7. Unhook the latch hooks from the air cleaner canister.

8. Remove the air cleaner canister cover.
9. Remove the air filter.
10. Clean the air filter using the procedure below.
    - When dust is found on the air filter:
      - apply compressed air from inside the element to blow away the dust
      - keep the compressed air pressure below 30 psi (205 kPa)
    - If carbon or oil deposits are found on the air filter:
      - immerse the air filter in detergent for 15 minutes
      - wash the air filter several times in water
      - rinse in clean water and allow to dry
      - once the air filter is fully dry, inspect the interior using a light to check for any damage



(A) Air filter
(B) Compressed air

NOTE
- Replace the air filter with a new one if the air filter is damaged, excessively dirty or oily.

11. Clean the inside of the air cleaner canister.
12. Clean the inside of air cleaner canister cover.
13. Install the air filter.
14. Install the air cleaner canister cover.

NOTE
- For the correct installation, follow the instruction molded onto the air cleaner canister cover.

15. Hook the two latch hooks onto the air cleaner canister.
16. Push the top of the latch hooks inward toward the air cleaner canister cover.
    - To lock the latch hooks.
    - To secure the air cleaner canister cover.

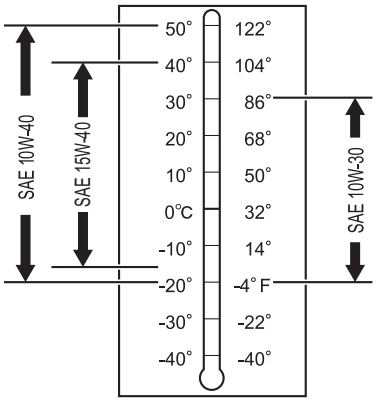
NOTE
- Replace the air filter at least once a year.

7. Every 200 Hours

■ Engine Oil

Use engine oil with a viscosity that is appropriate for use within the air temperature range:
- Wherein the tractor is scheduled to operate until the next engine oil change.

The following oils are recommended:



Engine Crankcase

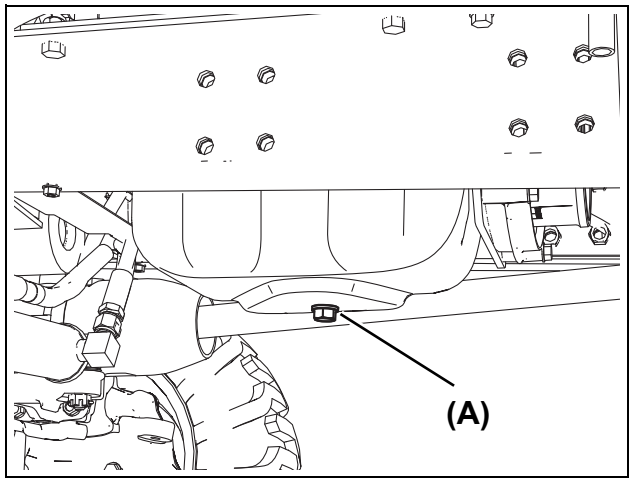
Capacity	Lubricant
Approximately 3.1 US qt. (2.9 L) (SA221) 3.6 US qt. (3.4 L) (SA324/424)	API Service Classifications CD or higher SAE 10W-30, SAE 10W-40 or SAE 15W-40

■ Change the Engine Oil and Replace Engine Oil Filter

IMPORTANT
Change the engine oil more frequently if the tractor is used in extremely demanding conditions such as the following:
- Extremely dusty conditions.
- Frequent slow speed operation.
- Frequent short trips.

1. Run the engine to warm up the engine oil.
2. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
3. Shut off the engine.
4. Chock all the tires safely and securely.
5. Allow the engine to cool down for several minutes.
6. Raise the hood.

7. Place an oil pan underneath the engine oil drain plug.



(A) Engine oil drain plug

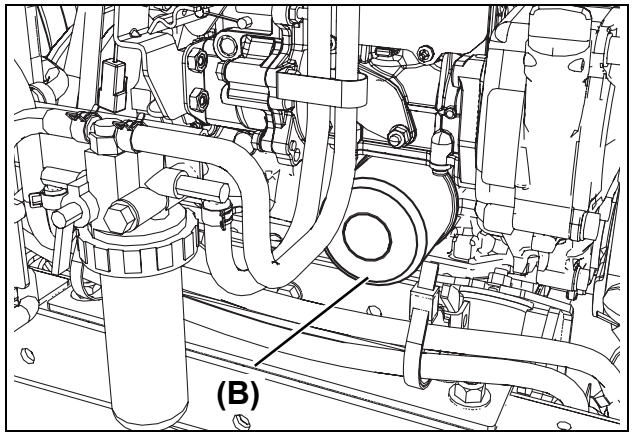
⚠ CAUTION

While draining oil that is still hot:

- **Stay clear of the hot oil and other engine parts in order to avoid getting burned.**

8. Remove the engine oil drain plug by turning counterclockwise.
9. Allow the engine oil to drain completely from the engine.
10. Wipe away the dirt and dust surrounding the engine oil filter.

<SA221>



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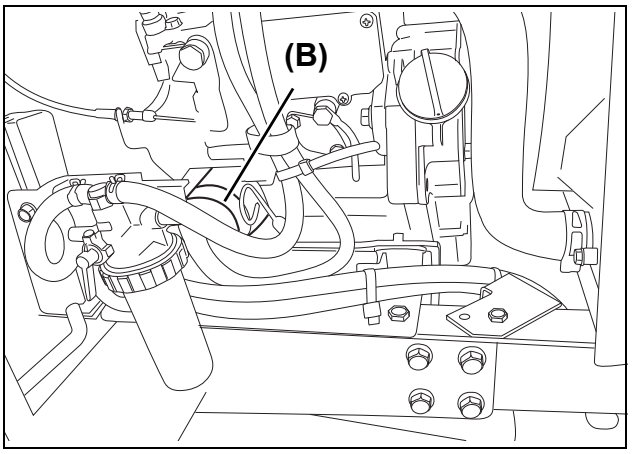


(B) Engine oil filter

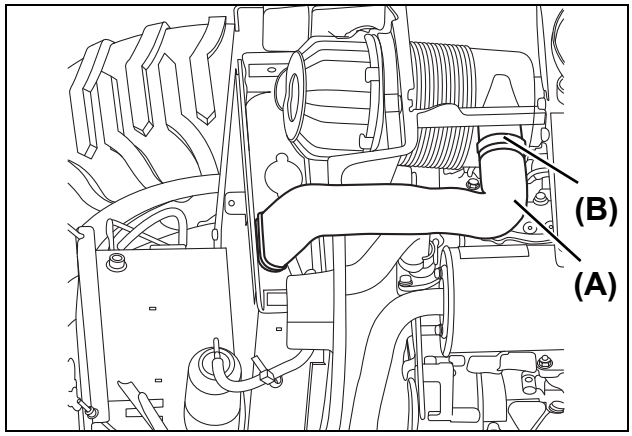
NOTE

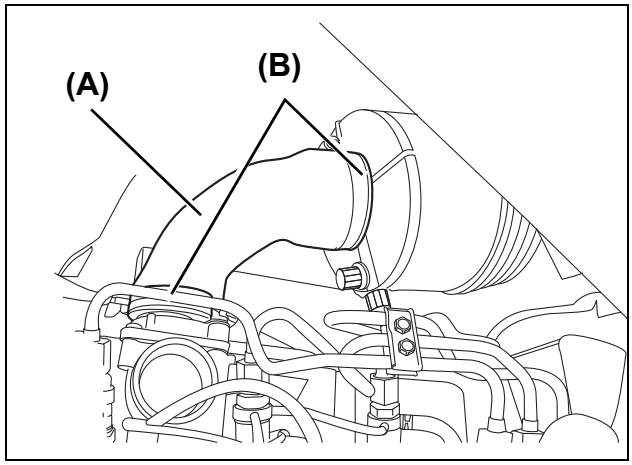
- Carefully clean the area around the dipstick before removing the dipstick.

11. Remove the engine oil filter by turning counterclockwise.
12. Clean the area around engine oil filter mounting base.
13. Apply a small amount of clean engine oil into the gasket of the new engine oil filter.
14. Install the new engine oil filter by turning clockwise:
    - Until the gasket is seated against the engine oil filter base.
    - Turn the engine oil filter an additional half turn.
15. Install the engine oil drain plug. Avoid over tightening.
16. Remove the engine oil filler cap.
17. Pour an approximately 3.1 US qt. (2.9 L) (SA221) or 3.6 US qt. (3.4 L) (SA324/424)of engine oil.
18. Install the engine oil filler cap.
19. Start and run the engine at idle to check for any leaks.
20. Shut off the engine. Repair any leaks before operating the tractor.
21. The engine oil level must be between the upper and lower marks on the dipstick. Add engine oil as necessary.
22. Lower the hood.

■ Check the Air Intake Hoses and Hose Clamps

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood to access the air intake hoses and the hose clamps.
6. Make sure that the air intake hoses and the hose clamps are in good condition.
7. Check the hose clamps for looseness.
8. Lower the hood.





(A) Air intake hose
(B) Hose clamps

NOTE
- The illustration of the tractor shown does not have hood.
- Above illustration shows SA324/424.

8. Every 300 Hours

■ Transmission Hydraulic Oil

IMPORTANT
- Always use a Hydraulic/Transmission Fluid for the transmission hydraulic oil.

Transmission

Capacity	Lubricant
Approximately 4.1 US gal (15.5 L)	Hydraulic/Transmission Fluid

■ Change the Transmission Hydraulic Oil, Replace the Transmission Hydraulic Oil Filter and HST Hydraulic Oil Filter

⚠ WARNING
- **Touching any hot surfaces can burn the skin.**
- **If the engine has been running for some time, the engine components, including all internal fluids are hot:**
  - **always allow the engine to cool down before performing maintenance or working near the engine and engine parts**

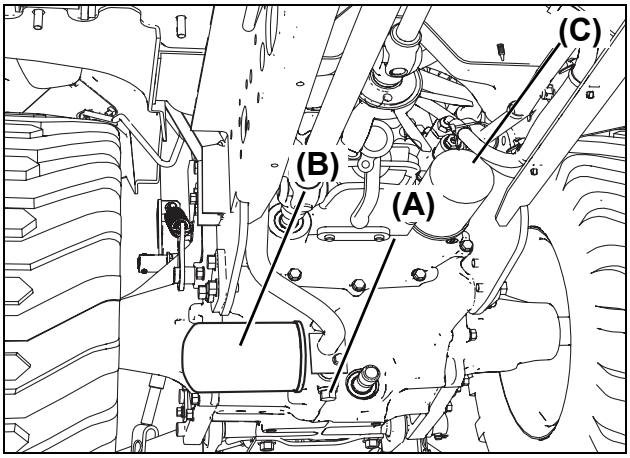
IMPORTANT
- More frequent maintenance can be required under severe or abnormal conditions.
- Always keep the transmission hydraulic oil filler cap in place.
- Remove the transmission hydraulic oil filler cap only as necessary:
  - the preceding practice prevents the transmission hydraulic oil from becoming contaminated
  - a contaminated transmission hydraulic oil can cause damage to or failure of the transmission
- Avoid operating the tractor immediately after the transmission hydraulic oil is changed.
- After the transmission hydraulic oil is changed, run the engine at medium speed for a few minutes, to prevent damage to the transmission.

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Run the engine to warm up the transmission hydraulic oil.
3. Shut off the engine.
4. Chock all the tires safely and securely.
5. Allow the engine to cool down for several minutes.

IMPORTANT

- Take the preceding information into consideration while draining the transmission hydraulic oil.

6. Place an oil pan underneath the transmission drain plug. Remove the drain plug and allow the transmission hydraulic oil to drain completely.
7. Install the drain plug. Tighten accordingly.
8. Place an oil pan underneath the transmission hydraulic oil filter.
9. Remove the transmission hydraulic oil filter by turning counterclockwise using a filter wrench.
10. Apply a small amount of clean transmission hydraulic oil into the gasket of the new transmission hydraulic oil filter.
11. Fill the transmission hydraulic oil filter with the designated type of transmission hydraulic oil to about 1/3 to 1/2 full.
12. Install the new transmission hydraulic oil filter by turning clockwise.
    - Continue turning until the gasket is seated against the transmission hydraulic oil filter base.
    - Turn the transmission hydraulic oil filter an additional of approximately 1/2 turn.



(A) Transmission drain plug
(B) Transmission hydraulic oil filter
(C) HST hydraulic oil filter

IMPORTANT

- To prevent dirt and other contaminants from entering the transmission:
  - carefully clean the area around the transmission hydraulic oil filler cap prior to removal
  - avoid overfilling the transmission
  - oil expands during operation and can overflow

13. Remove the transmission hydraulic oil cap.
14. Add approximately 4.1 US gal (15.5 L) of transmission hydraulic oil through the transmission hydraulic oil opening.
15. Install the transmission hydraulic oil cap.
    - Start the engine.
    - Check for leaks around the transmission hydraulic oil filter base and the drain plug.
    - Using the gauge window, check the transmission hydraulic oil level is in the correct operating range. Add transmission hydraulic oil as necessary.

9. Every 500 Hours

■ Adjust the Brake

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Change the Front Axle Gear Oil

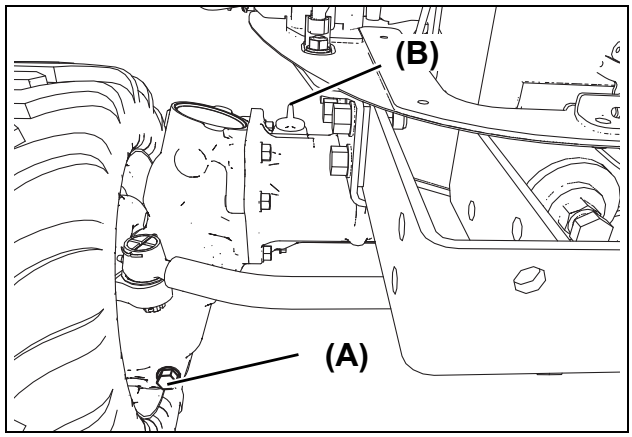
IMPORTANT

- Always use SAE 80W-90 gear oil for the front axle.

Front Axle Gear Oil

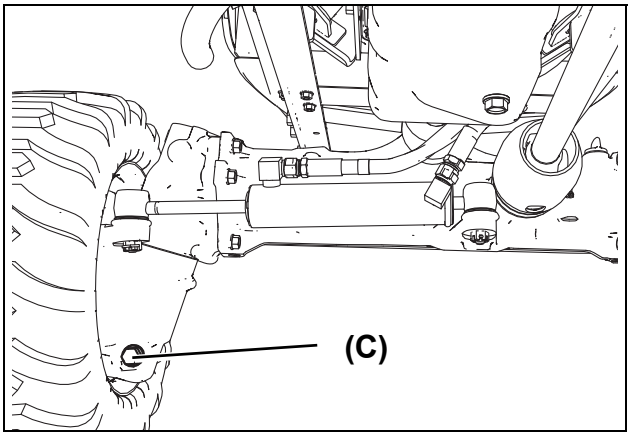
Capacity	Lubricant
Approximately 3.2 US qt. (3.0 L)	SAE 80W-90 gear oil

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Remove the oil cap located on the right side of the front axle.
6. Place an oil pan underneath the drain plugs on both sides of front axle.
   - Remove the drain plugs.
   - Allow the front axle gear oil to drain completely.



NOTE

- This illustration shown from front side.



NOTE

- This illustration shown from rear side.

(A) Axle drain plug (Right)
(B) Oil cap
(C) Axle drain plug (Left)

7. Once the front axle gear oil is completely drained:
   - Install and tighten all the drain plugs.
8. Pour approximately 3.2 US qt. (3.0 L) of SAE 80W-90 gear oil through the fill hole.
9. Look into the oil refilling hole and confirm the top of the front axle drive shaft shows up from the surface of the front axle oil.
10. Insert the oil cap to the fill hole.

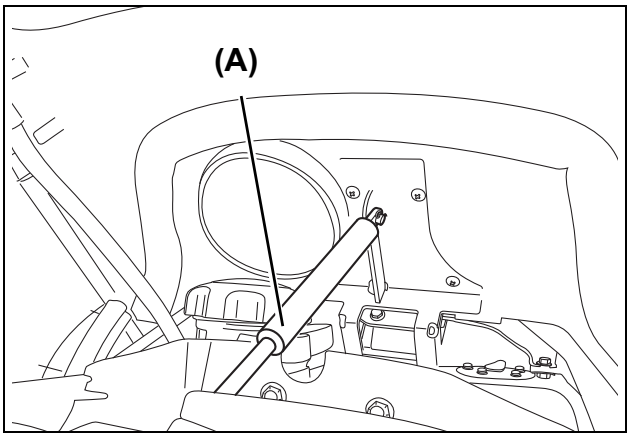
■ Replace the Fuel Filter

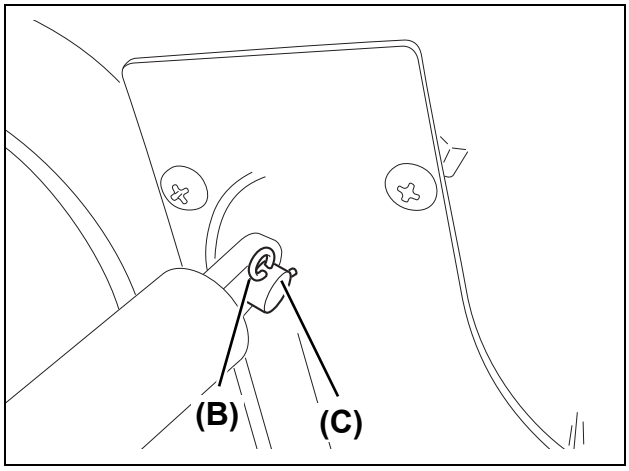
⚠ WARNING

Avoid injury!
Remember that diesel fuel vapor is explosive and flammable:
- **Never smoke while handling diesel fuel.**
- **Keep the diesel fuel away from open flame or sparks.**
- **Before performing maintenance, shut off the engine and allow the engine to cool down.**
- **Work in a well ventilated area.**
  - **immediately wipe away any spilled diesel fuel**

NOTE
- Check whether the fuel filter is clogged of debris or contaminated by water.
- Replace the fuel filter.

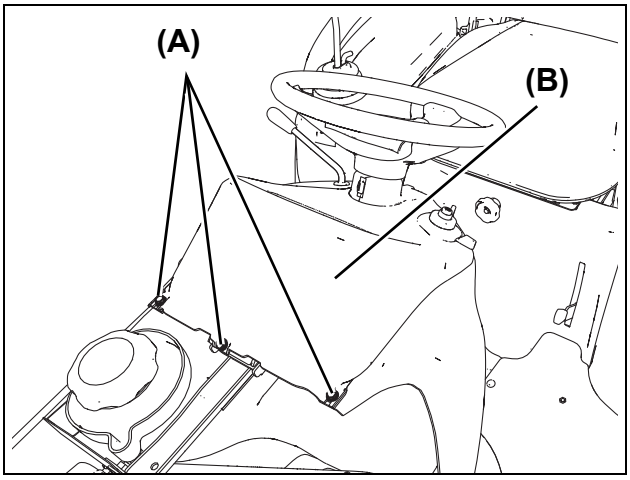
1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Remove the hairpin clip from the clevis pin at the end of the gas spring.
7. Remove the clevis pin from the end of the gas spring and take the gas spring off the hood.
8. Remove the hood from the tractor.





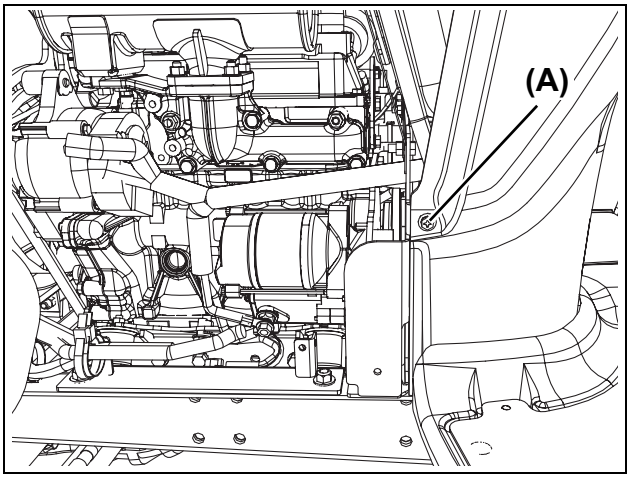
(A) Gas spring
(B) Hairpin clip
(C) Clevis pin

9. Remove the three bolts from the top dashboard cover.



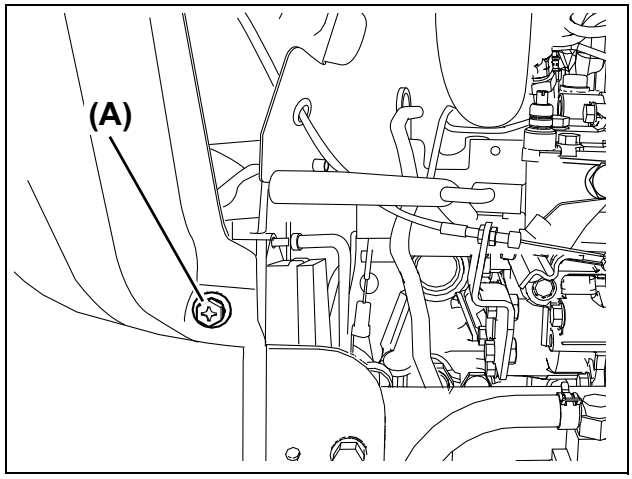
(A) Tightening bolts
(B) Top dashboard cover

10. Remove the bolt from the left dashboard cover.



(A) Tightening bolt

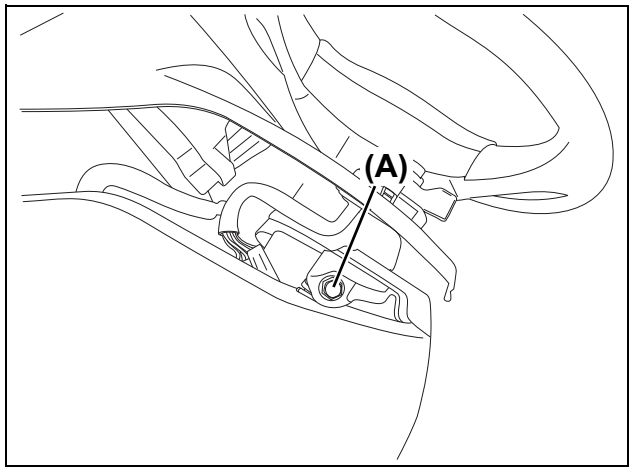
11.Remove the bolt from the right dashboard cover.



(A) Tightening bolt

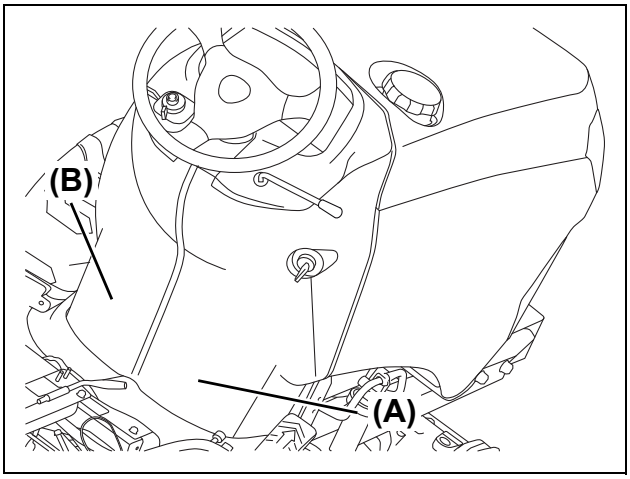
12.Lift the top dashboard cover up to make space to access the bolt of steering column.

13.Remove the bolt of left side of the steering column.



(A) Tightening bolt

14.Remove the right and left dashboard cover.



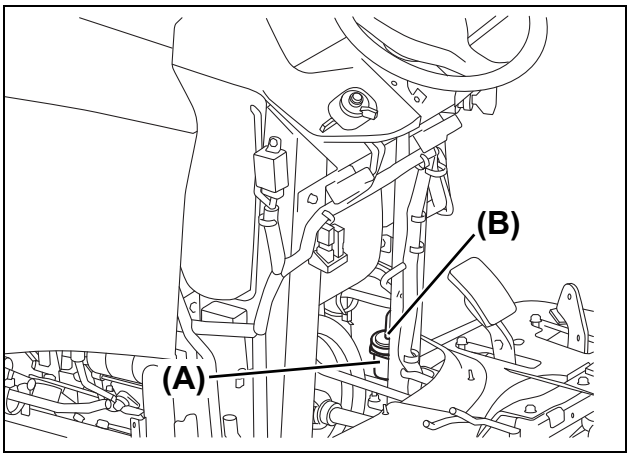
(A) Right dashboard cover
(B) Left dashboard cover

15.Remove the fuel filter from the clamp.
16.Place an oil pan underneath the fuel filter.
17.Disconnect the fuel hoses from the fuel filter.
18.Insert plugs to the fuel hoses.
19.Install the new fuel filter.

NOTE
- Dispose the old fuel filter properly following the effective local law.

20.Install the fuel hoses to the new fuel filter.
21.Fit the fuel filter in the clamp.

NOTE
When replacing the fuel filter:
- Turn the fuel shut-off valve to OFF (closed) position.



(A) Clamp
(B) Fuel filter

22. Install the right dashboard cover.
23. Tighten the four bolts of steering column.
24. Tighten the two bolts of right/left dashboard cover.
25. Tighten the three bolts of top dashboard cover.
26. Install the clevis pin and hairpin clip at the end of the gas spring.
27. Lower the hood.

10. Every 1000 Hours

■ Service the Cooling System

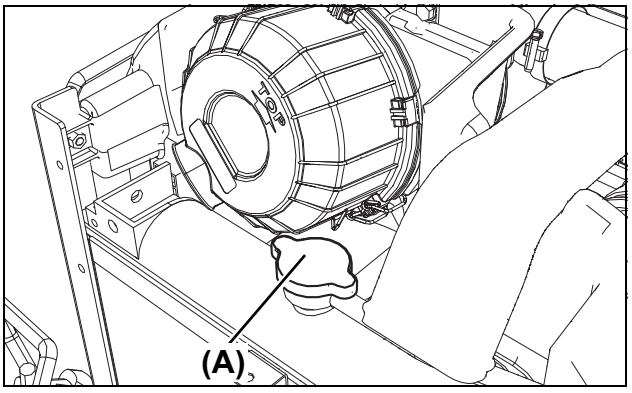
⚠ WARNING

Avoid injury!

- **Always allow the radiator to cool down:**
  - **the radiator is hot and can cause burns**
  - **the build up pressure in the cooling system can cause the coolant to spray out explosively during removal of the radiator cap**
- **Always shut off the engine.**
- **Allow the engine to cool down.**
- **Remove the radiator cap only when:**
  - **the radiator and the engine are sufficiently cooled down that can be touched with bare hands**
- **When removing the radiator cap, always:**
  - **loosen the radiator cap to the first stop**
  - **the preceding action releases excessive pressure on the radiator**
  - **fully remove the radiator cap once the pressure has been released completely**
- **Add coolant or water to reserve tank, not to the radiator, for details, see "Check the Cooling System" on page 14-8.**

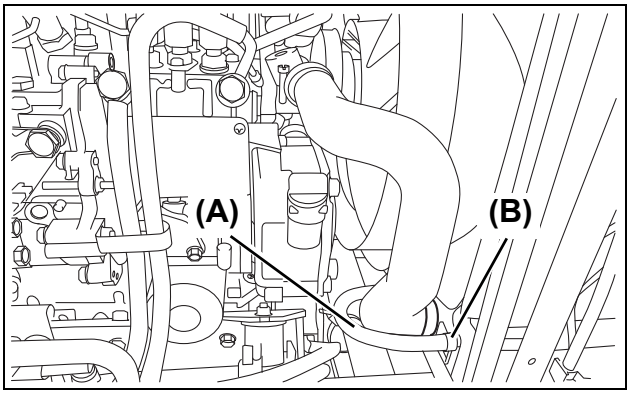
1. Drain the Cooling System

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Remove the radiator cap to reduce the pressure in the radiator certainly.
   - Loosen the radiator cap to the first stop.
     - the preceding action releases excessive pressure on the radiator
   - Fully remove the radiator cap once the pressure has been released completely.
7. Place a drain pan underneath the radiator drain hose.



(A) Radiator cap

8. Pull out the drain hose from the radiator outward.
9. Pull out the drain hose clip and the plug from the drain hose.
10. Immediately drain the flushing/cooling liquid.
    - The preceding practice prevents rust and dirt from settling down.
    - Make sure to avoid touching and getting in contact with hot engine components and hot internal fluids.
11. Install the plug and the drain hose clip to the radiator drain hose.
12. Put the end of drain hose under the radiator.



(A) Radiator drain hose
(B) Drain hose clip

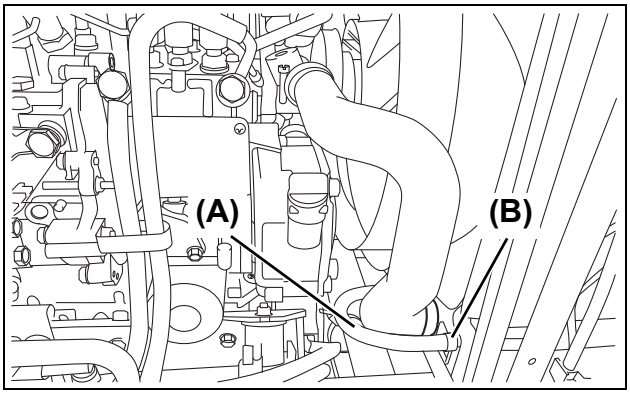
2. Flush the Cooling System

1. Fill the cooling system with water and common flushing/cooling liquid.
   • Follow the manufacturer's instructions.
2. Install and tighten the radiator cap.
3. Start and run the engine until the operating temperature is reached.

⚠ WARNING

Avoid injury!
- **Touching hot surfaces can burn skin.**
- **If the engine has been running for some time, the engine components are hot including all internal fluids.**
- **Before performing maintenance or working near the engine and engine parts:**
  - **allow the engine to cool down**
  - **always wear protective goggles and protective clothing**

4. Shut off the engine.
5. Place a drain pan underneath the radiator drain hose.



(A) Radiator drain hose
(B) Drain hose clip

6. Pull out the drain hose from the radiator outward.
7. Pull out the drain hose clip and the plug from the drain hose.
8. Immediately drain the flushing/cooling liquid.
   • The preceding practice prevents rust and dirt from settling down.
   • Make sure to avoid touching and getting in contact with hot engine components and hot internal fluids.
9. Install the plug and the drain hose clip to the radiator drain hose.
10. Put the end of drain hose under the radiator.

3. Fill the Cooling System

IMPORTANT
- Use correct coolant mixture to prevent damage to the cooling system.
- Avoid operating the engine with plain water in the cooling system.
- Always use a pre-diluted coolant, with an antifreeze water mixture ratio that suits the local climate.
- Allow the engine to cool down first before pouring the coolant.

NOTE

When adding coolant to the cooling system:
- Use of High Quality Permanent Type Antifreeze (Ethylene Glycol with corrosion and rust inhibitor chemicals) is recommended.
- For the correct mixture ratio, read the manufacturer's direction on the coolant container.

1. Allow the radiator to cool down.

2. Fill the cooling system with approximately 3.0 US qt. (2.8 L) of coolant.
3. Install and tighten the radiator cap.
4. Start and run the engine until the operating temperature is reached.
5. Shut off the engine.
6. Check the reserve tank coolant level.
7. Add coolant as necessary.
8. Lower the hood.

■ Recommended Engine Coolant

The Following Coolant is Recommended

- High Quality Permanent Type Antifreeze (Ethylene Glycol with corrosion and rust inhibitor chemicals).
- Before using the coolant:
  - read and understand the instructions and data on the coolant's container
  - make sure that the coolant is suitable for the engine
- Immediately after purchasing the tractor:
  - make sure that the blend ratio of the coolant is in accordance with the climate of the work area
  - the preceding practice contributes to make the entire tractor system function normally
- Replace the coolant in the following cases:
  - after 1000 hours of operation or 2 years whichever comes first
  - the cooling system is flushed

Follow the instructions on the antifreeze container or contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

- Avoid exceeding the maximum dilution ratio for the coolant.
- Exceeding the preceding ratio can jeopardize the effectiveness of the coolant.

11. Every 1 Year

■ Replace the Air Cleaner Element

For the maintenance work, see “Service the Air Cleaner Element” on page 14-21.

12. Every 2 Years or 2000 Hours

■ Replace the Thermostat

Contact YOUR LOCAL YANMAR TRACTOR DEALER.

13. General Maintenance

⚠ WARNING

Avoid injury!

- **The rubber product/s has/have a deteriorative character. The deteriorated rubber product/s may cause defects and damages such as fluid leakage, loss control of the tractor during operation, fire, burn injury.**

NOTE

- Replace the air cleaner element at least once a year.
- Replace the coolant once every 2 years or 1000 hours.
- Replace the radiator hoses at least once every 2 years.
- Replace the fuel hoses at least once every 2 years.
- Replace the air intake hose at least once every 2 years.
- Replace the power steering hoses at least once every 2 years.

15. SERVICE THE ELECTRICAL SYSTEM

⚠ WARNING

Avoid injury!

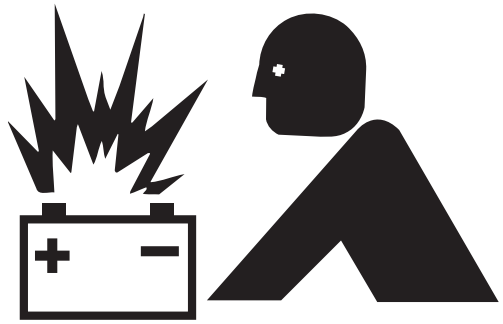
- **Read "Chapter 1. SAFETY PRECAUTIONS".**
- **Read the DANGER, WARNING AND CAUTION statements on the safety alert decals on the tractor.**
- **To prevent poisoning from engine exhaust fumes, always operate the engine in a well ventilated area.**
- **Always remain seated on the operator seat.**
- **Avoid bystander/s near the tractor.**
- **Before starting the engine, always move the range shift lever to the N (neutral) position.**
- **Push down Power Take Off (PTO) switch to OFF position.**

1. Battery

- The battery posts, terminals and associated accessories contain lead and lead compounds that are known to the State of California to cause cancer and reproductive harm.
- After handling the battery, wash the hands thoroughly.

■ Service the Battery Safely

⚠ WARNING



Avoid injury!

- **The battery electrolyte contains sulfuric acid that is poisonous and can cause serious burns.**
- **Wear protective goggles and gloves.**
- **Avoid getting the skin in contact with the battery electrolyte.**
- **If the battery electrolyte comes into contact with the skin:**
  - **immediately flush with plenty of water**
  - **seek medical attention as necessary**
- **If electrolyte is accidentally swallowed, immediately seek medical attention.**
- **If the electrolyte gets in the eyes:**
  - **immediately flush with running water for 15-30 minutes**
  - **seek medical attention**
- **Battery can emit flammable/explosive gasses.**
- **Use extreme caution when handling batteries.**
- **Keep cigarette and other flames far away from the battery.**
- **Avoid placing any metal piece across the battery posts.**
- **Disconnect the negative (–) battery terminal first during removal of batteries.**
- **Connect the positive (+) battery terminal first during installation of batteries.**

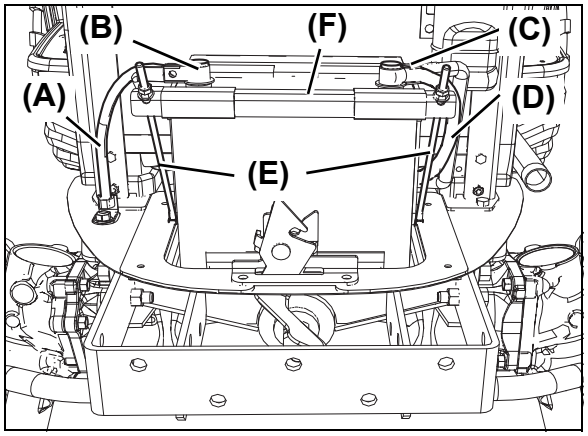
NOTICE

- Always observe environment protection laws.
- Dispose of (possibly) hazardous materials in accordance with the guidelines of the Environmental Protection Agency (EPA) and other relevant governmental bodies.
- The hazardous materials in the tractor include:
  - engine oil
  - diesel fuel
  - transmission hydraulic oil
  - battery
  - coolant
  - front axle gear oil
- Exercise good judgment in deciding what is and what is not hazardous.
- Dispose hazardous materials only in waste disposal facilities designated by local authorities.
- Never dispose the hazardous wastes in inappropriate locations, e.g., sewer, ground, groundwater, waterways.
- Failure to follow these instructions can adversely impact the environment and can be unlawful.

■ Inspect the Battery

1. The battery that comes with the new tractor is a maintenance free design.
2. Avoid adding electrolyte.
3. Avoid recharging the battery.
4. Measure the voltage on the battery across the positive (+) and negative (–) posts while the engine is shut off.
5. If the reading is 11V or lower, replace the battery with a new one.

■ Remove and Install the Battery



(A) Negative (–) cable
(B) Negative (–) terminal
(C) Positive (+) terminal red cover
(D) Positive (+) cable
(E) Threaded rods
(F) Bracket

1. Remove the Battery

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Disconnect the negative (–) battery terminal.
7. Remove the nuts, washer faced nuts, the threaded rods and the bracket.
8. Pull out the battery slightly to access the disconnection of the positive (+) terminal.
9. Pull up the positive (+) terminal red cover.
10. Disconnect the positive (+) battery terminal.
11. Remove the battery.

2. Install the Battery

1. Install the battery onto the tractor.
2. Connect the positive (+) battery terminal.
3. Push down the positive (+) terminal red cover.
   - Make sure that the positive (+) battery terminal is covered completely.
4. Check that the battery is properly seated against the backstop.
5. Position the threaded rods and the bracket on each side of the battery.

6. Tighten the washer faced nuts and the nuts on each threaded rods.
7. Avoid over tightening the washer faced nuts and the nuts.
8. Connect the negative (–) battery terminal.
9. Apply petroleum jelly or silicon spray to the battery terminals to protect the terminals against corrosion.
10. Lower the hood.

■ Clean the Battery and Terminals

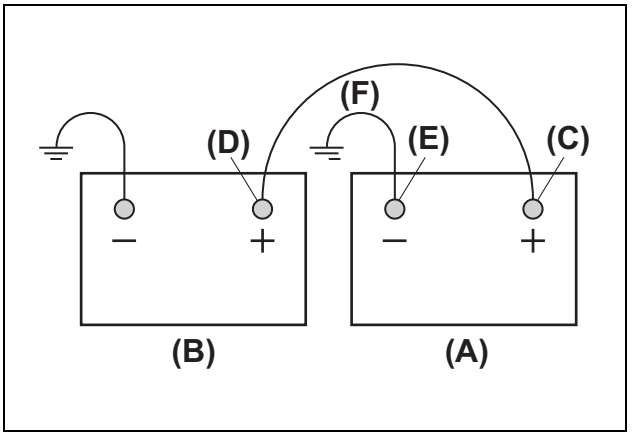
1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Remove the battery.
   - For details, see "15. SERVICE THE ELECTRICAL SYSTEM" on page 15-1.
7. Dissolve four tablespoons of baking soda in 4 qt. (3.8L) of water to prepare a solution.
   - Use the solution to wash the battery.
   - Be very careful to prevent the solution to enter the battery cells.
8. Rinse the battery with water and allow to dry.
9. Clean the terminals and battery cable ends with a wire brush to remove corrosion.
10. Apply petroleum jelly or silicon spray to the battery terminals to protect against corrosion.
11. Install the battery.
    - For details, see "15. SERVICE THE ELECTRICAL SYSTEM" on page 15-1.

■ Use a Booster Battery

⚠ WARNING

Avoid injury!

- **Never attempt to jump start a frozen battery.**
- **Warm the battery to 60 °F (16 °C) first.**
- **Never connect the negative (–) booster cable to the negative (–) battery terminal of the discharged battery.**
- **Connect the negative (–) booster cable to an appropriate grounding point other than the discharged battery.**
- **The battery may emit flammable gases.**
- **Gases explodes, as the gas gets in contact with spark or open flame.**
- **Do not smoke or have an open flame near the battery.**



(A) Booster battery
(B) Battery on a disabled tractor
(C) Positive (+) post of booster battery
(D) Positive (+) battery terminal on a disabled tractor
(E) Negative (–) post of booster battery
(F) Other end of negative (–) booster cable

1. Park the abled tractor close enough besides the disabled tractor.
2. Raise the hood of the disabled and abled tractors.
3. Connect one end of the positive (+) booster cable to the positive (+) post of booster battery.
4. Connect the other end of positive (+) booster cable to the positive (+) battery terminal on the disabled tractor.
5. Connect one end of the negative (–) booster cable to the negative (–) post of booster battery.
6. Connect the other end of the negative (–) booster cable to the engine block of the disabled tractor.
7. Start the engine of the abled tractor.

8. Start the engine of the disabled tractor.
9. Run the engine of both disabled and abled tractors for several minutes.
10. Check the alternator/battery charging light of the disabled tractor.

IMPORTANT

- If alternator/battery charging light illuminates:
  - shut off the engine of the disabled tractor
  - contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance

11. Carefully disconnect the booster cables:
    - Perform the disconnection of the booster cables from the abled and disabled tractors by doing the reverse of the preceding procedure.
    - Make sure to disconnect the negative (–) booster cable first before the positive (+) booster cable.
12. Keep running the engine of the disabled tractor for not less than 10 min.

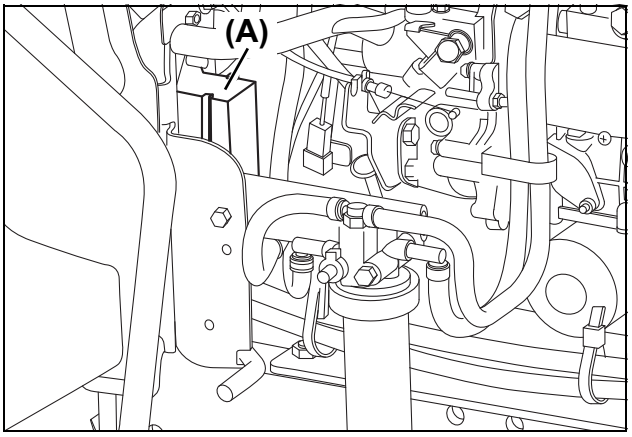
2. Fuses

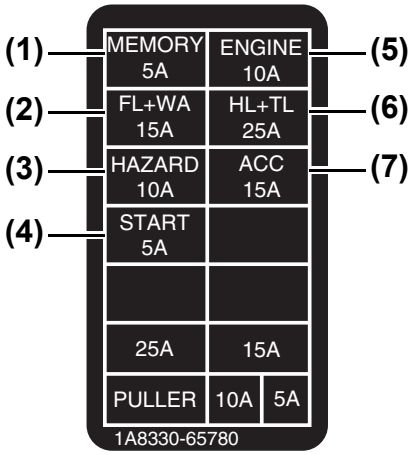
IMPORTANT

- Use of a fuse other than a correctly rated one can damage the electrical system.
- Replace blown fuse with a new fuse of the same ampere rating only after fixing the problem.

■ Replace the Accessory Fuses

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Grip both ends of the fuse holder cover and remove the cover.
7. Locate the fuses, refer to the illustration shown.
8. Remove the blown fuse from the socket.
9. Check and fix the problem of the blown fuse.
10. Insert the new fuse into the socket.
11. Install the fuse holder cover.
12. Lower the hood.





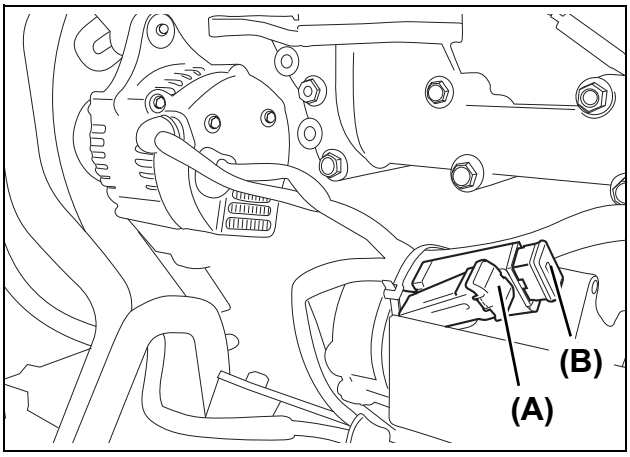
(A) Fuse holder cover
(1) Memory fuse: 5A
(2) Fuel pump/Warning light fuse: 15A
(3) Hazard fuse: 10A
(4) Starter fuse: 5A
(5) Engine Fuse: 10A
(6) Head light/Tail light fuse: 25A
(7) Accessories fuse: 15A

■ Check the Alternator Fuse and the Main Fuse

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.
6. Locate the fuses, refer to the illustration shown.
7. Check the fuses.

IMPORTANT

- The alternator fuse and the main fuse are slow blow type.
- When any of the fuses is blown, contact YOUR LOCAL YANMAR TRACTOR DEALER.



(A) Alternator fuse: 60A
(B) Main fuse: 80A

3. Bulb

IMPORTANT

- Replace blown bulbs with new Yanmar genuine spare bulb only.

■ Replace the Headlights Bulb

IMPORTANT

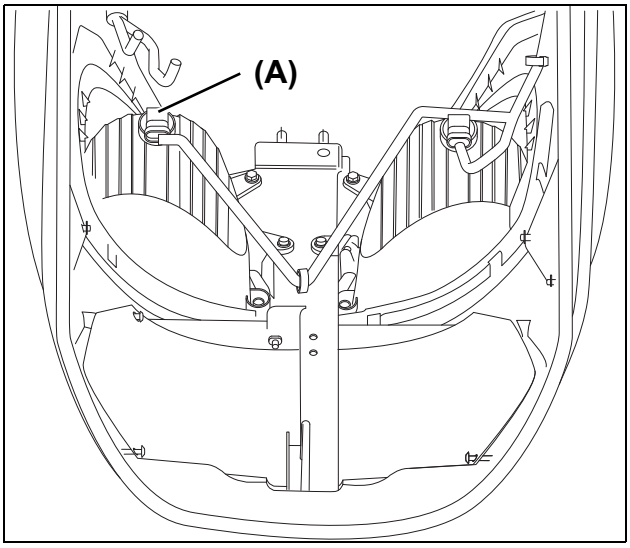
- Keep bare fingers away from the headlights bulb.
- While inspecting or replacing the headlights bulb, use gloves or a piece of cloth to handle the headlights bulb.

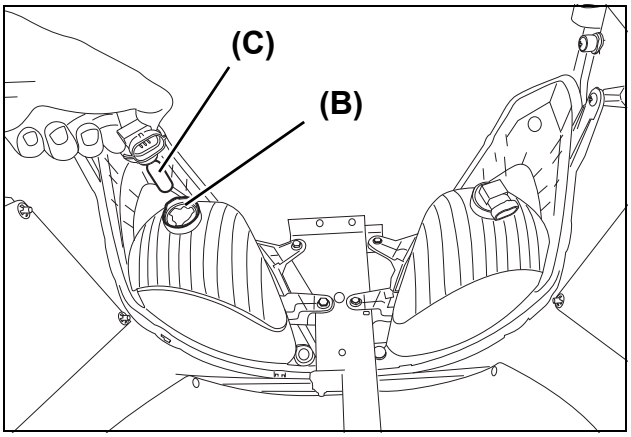
1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Remove the key.
6. Raise the hood.
7. Disconnect the wire harness connector.
8. Unlock the retaining ring.

⚠ WARNING

- **The halogen light bulb contains compressed gas. If the glass has been scratched or dropped, the bulb may shatter. Wear protective goggles and handle the bulb carefully when replacing halogen light bulb.**

9. Remove the headlights bulb from the socket.
10. Insert the new headlights bulb into the socket.
11. Lock the retaining ring.
12. Connect the wire harness connector to the headlights bulb.
13. Turn the starter key switch to ON position.
14. Turn on headlights switch.
15. Make sure the headlight bulbs are functioning.
16. Lower the hood.

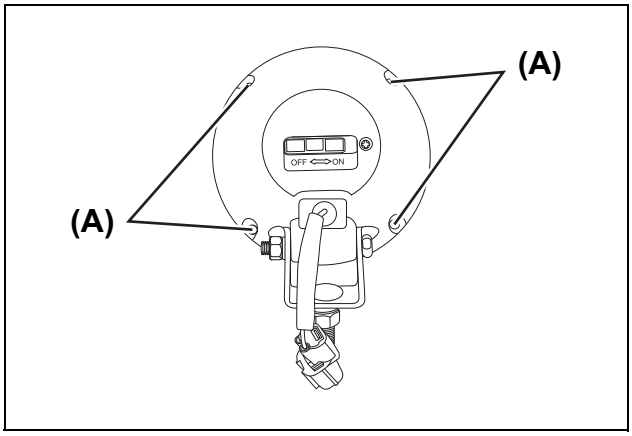


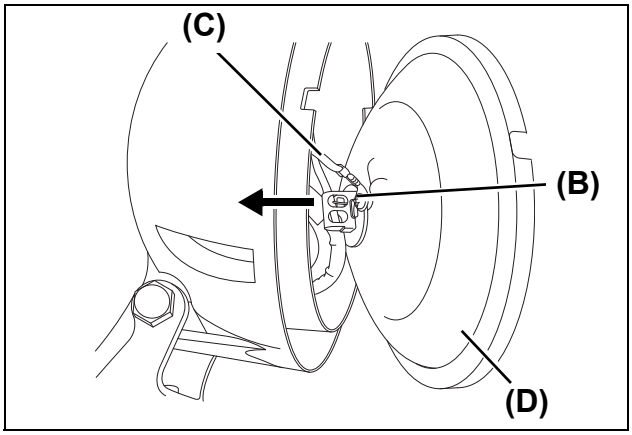


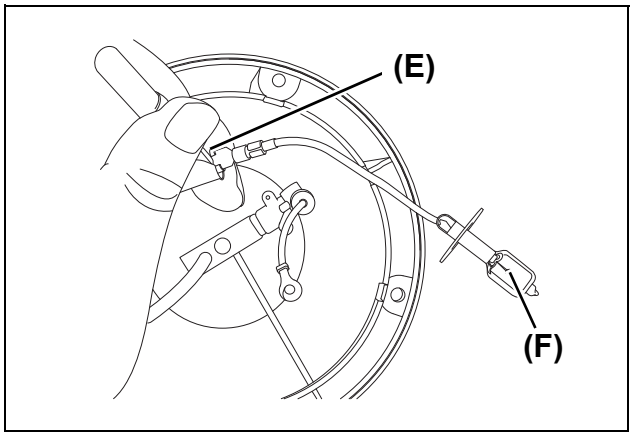
(A) Connector
(B) Retaining ring
(C) Headlights bulb

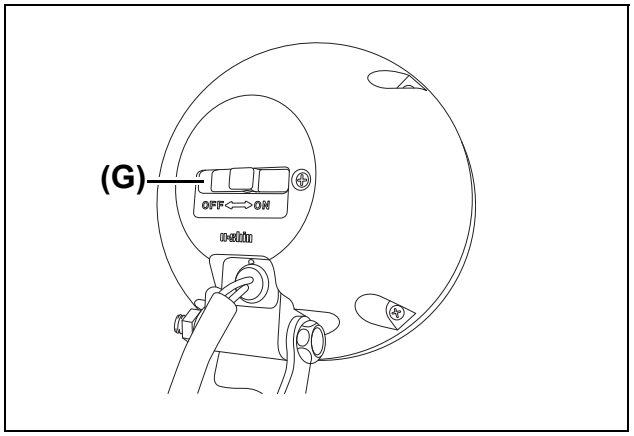
■ Replace the Work Lights Bulb (Option)

1. Replace the Work Lights Bulb.
   • For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Remove the key.
6. Remove the four screws from the rear side of the work lights case.
7. Remove the screw from the behind side of work lights bulb and take off the cable.
8. Pull out the work lights bulb from the mirror case.
9. Disconnect the connector of work lights bulb.
10. Connect the new work lights bulb to the connector.
11. Insert the work lights bulb into the mirror case.
12. Tighten the screw with the cable.
13. Set the mirror case on the work lights case.
14. Tighten the four screws on the work lights case.
15. Make sure the switch at backside of work lights is turned on.
16. Turn the starter key switch to ON position.
17. Make sure the work light bulbs are functioning.









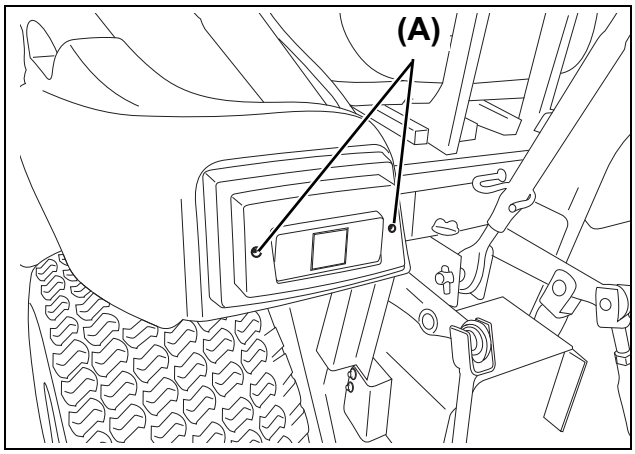
(A) Work lights assembly four screws
(B) Screw
(C) Cable
(D) Mirror case
(E) Connector
(F) Work lights bulb
(G) Work lights switch

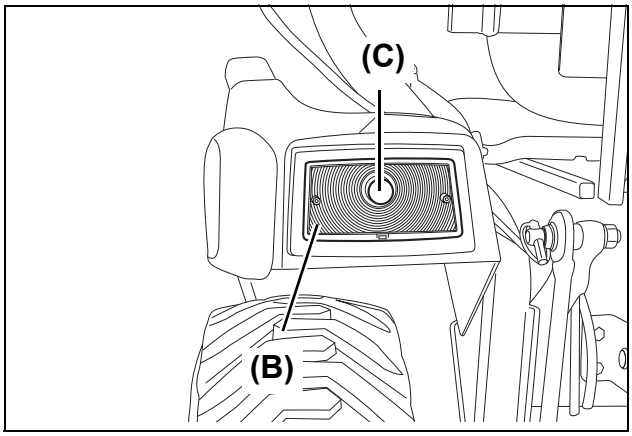
■ Replace the Tail Lights Bulb

NOTE
● The tail lights can be serviced after removing the rear lens assembly.

1. Park the tractor safely and securely.
   • For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Remove the key.

6. Remove the two screws and lens from the tail lights housing.
7. Push down and rotate the tail lights bulb counterclockwise to remove the tail lights bulb.
8. Push the new tail lights bulb into the socket and rotate tail lights bulb clockwise to lock position.
9. Turn the starter key switch to ON position.
10. Turn on tail lights switch.
11. Make sure the tail lights bulbs are functioning.
12. Install the lens and screws.



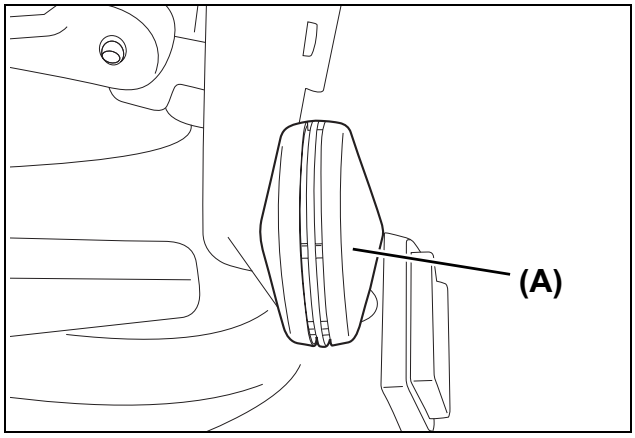


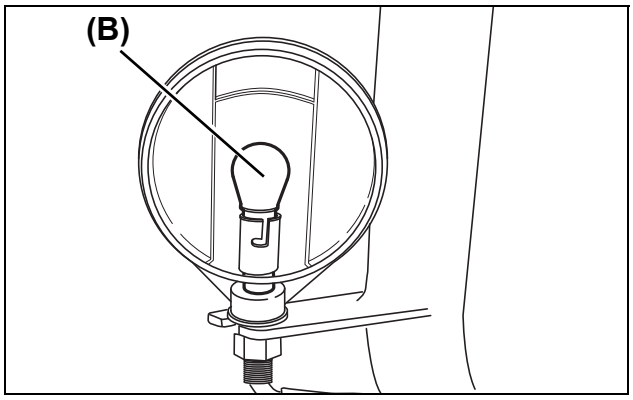
(A) Screw
(B) Lens
(C) Tail lights bulb

■ Replace the Turn Signal/Hazard Lights Bulb

NOTE
- Service the turn signal/hazard lights, after removing the front or rear lenses.

1. Park the tractor safely and securely.
   - For details, see "7. Safe Practices for Parking the Tractor" on page 1-7.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Remove the key.
6. Insert a flat screw driver into the slot at the side of the lens and turn slowly to remove the lens.
   - Perform the preceding procedure to the other lens.





(A) Lens
(B) Bulb

7. Push the turn signal/hazard lights bulb down and rotate to remove.
8. Insert the new turn signal/hazard lights bulb into the socket and rotate to lock position.
9. Turn the starter key switch to ON position.
10. Turn on turn signal/hazard lights switch.
11. Make sure the turn signal/hazard lights are functioning.
12. Install the lenses.

4. Headlights

■ Adjust the Headlights

1. The headlights are not adjustable.
2. If headlights adjustment is required, contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

16. STORE THE TRACTOR

1. Safe Practices for Storage

⚠ WARNING

- **Remember that vapor from diesel fuel is explosive and flammable.**
- **The exhaust from the engine contains carbon monoxide that can lead to carbon monoxide poisoning, possibly causing serious illness or even death. To avoid the danger of poisoning from the exhaust gas, never run the engine in a closed area that is not correctly ventilated.**
- **Never wash the tractor while the engine is running.**
- **Run the engine as short as possible when moving the tractor to and from the place of storage.**
- **If the fuel tank is filled with fuel, never store the tractor in an area where fuel vapor can come into contact with open flame or spark.**
- **Before storing the tractor indoor, allow the engine to cool off.**
- **Always shut off fuel when storing or transporting machine.**
- **Do not store machine near an open flame or source of ignition, such as a water heater or furnace.**

1. Prepare the Tractor for Storage

- If the tractor is to be stored for an extended period, follow the procedure described below.
- The objective of the procedure is to ensure that the tractor is ready for operation when needed again.

1. Repair any worn out or damaged parts.
2. Replace parts as necessary.
3. Tighten any loose bolts and nuts.
4. Repair scratched or chipped metal surfaces to prevent rusting.
5. Remove grass clippings and debris from the tractor.
6. Clean below the platform.
7. Remove grass clippings and debris from inside the chute and bagger.
8. Remove all attached weight and ballast from the tractor.
9. Wash the tractor and apply wax to the metal and plastic surfaces.
10. Run the tractor for 5 minutes to dry the alternator/ fan belt and pulleys.
11. Apply a light coat of clean engine oil to pivots and wear points to prevent rusting.
12. Lubricate the grease fittings.
13. Completely remove the liquid weights from the rear tires.
14. Check the tire air pressure. Adjust the tire air pressure slightly higher than specified.
15. Change the engine oil and run the engine for about 5 minutes to circulate the engine oil throughout the entire engine block and the internal moving parts.
16. Lower any implement to the ground.
17. Apply grease to the exposed areas on the hydraulic cylinder piston rods.

2. Prepare the Fuel and Engine for Storage

■ Fuel

1. If stabilized fuel was used:
   - Fully fill the fuel tank with stabilized fuel.

NOTE

- Fill the fuel tank.
- The preceding action:
  - decreases the amount of air remaining in the fuel tank
  - prevent deterioration of the fuel in the fuel tank

2. If stabilized fuel is not used.
   - Park the tractor safely and securely in a well ventilated place.
   - Chock all the tires safely and securely.

NOTE

- Use up all the fuel in the fuel tank when the tractor is operated for the last time in the current season.

3. Run the engine until all the fuel in the fuel tank is used up.
4. Turn the starter key switch to the OFF position.

IMPORTANT

- In degraded fuel:
  - varnish may be created
  - may clog the fuel injector components
  - adversely affect engine performance
- Mix a stabilizer into fresh fuel before filling the fuel tank.

5. Mix fresh fuel and fuel stabilizer in a separate container.
   - Observe the stabilizer manufacturer's instructions for mixing.
6. Fill the fuel tank with the stabilized fuel.
7. Run the engine for several minutes to allow the fuel stabilizer mixture to be circulated through the fuel system.

■ Engine

If the tractor is to be stored for longer than 60 days, prepare the engine for storage.

1. Change the engine oil and engine oil filter while the engine is still warm.
2. Clean the air filter as necessary.
3. Remove dust and debris from the engine air intake screen.
4. Clean the engine and engine compartment.
5. Remove the battery.
6. Clean the battery and battery posts.
7. Check the electrolyte level.
8. Turn the fuel shut-off valve to OFF (closed) position.
9. Store the battery in a cool, dry, dark place.
   - The temperature of the place must not become low enough to freeze the electrolyte in battery.
10. Store the tractor in a dry and safe place.
11. If the tractor is stored outdoors, protect the tractor with a waterproof cover.
12. Jack up the tractor and place blocks under the front and rear axles to lift the tires off the ground.
13. Do not expose the tires to direct sunlight or extremely high temperature.

2. Prepare the Stored Tractor for Operation

1. Check the tire air pressure. As necessary, refill with compressed air.
2. Check the levels of engine oil, transmission hydraulic oil and coolant.
3. Check the battery electrolyte level.
4. Make sure the battery has required voltage (12V).
5. Install the battery.
6. Check the alternator/fan belt tension.
7. Lubricate all the grease fittings.
8. Turn the fuel shut-off valve to ON (open) position.
9. Run the engine for 5 minutes to allow the oil to be fully distributed throughout the entire engine.
10. After stopping the engine, walk around the tractor and check for any evidence of oil or other leakage.
11. Make sure all the shields, guards or deflectors are in place.

17. TROUBLESHOOTING

1. How to Use the Troubleshooting Table

The troubleshooting table given below is quick reference for solving common problems.
If any fault, failure or a problem requiring repair work is found, contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

1. Engine

<table>
<tr><th>The problem is:</th><th>The possible cause(s) are:</th><th>Remedy:</th></tr>
<tr><td>The engine is hard to start or does not start at all</td><td>1. A problem in the electrical</td><td>1. Electrical system
• Check whether the battery is fully charged.
• charge the battery
• Check whether the fuse/s is/are blown.
• make sure the electric harnesses are not faulty and replace the blown fuse/s
• Check for loose or corroded the battery terminals and battery cables.
• tighten the loose battery terminals
• clean the corroded battery terminals and battery cables
• Check whether the start relay is faulty.
• replace start relay
• Check whether the starter key switch is faulty.
• contact YOUR LOCAL YANMAR TRACTOR DEALER
• Check whether the starter is faulty.
• contact YOUR LOCAL YANMAR TRACTOR DEALER
• Check whether the glow plug is faulty.
• contact YOUR LOCAL YANMAR TRACTOR DEALER
• Check whether the interface combination functions correctly.
 

• contact YOUR LOCAL YANMAR TRACTOR DEALER</td></tr>
</table>

The problem is:	The possible cause(s) are:	Remedy:
	2. A problem in the fuel	2. Fuel system • Check whether the fuel shut-off valve is OFF (closed) position. • turn the fuel shut-off valve to ON (open) position • Check whether the fuel level is sufficient. • add specified fuel • Check whether the specification of the fuel used is correct. • use the correct fuel specification • Check whether there is water in the sediment bowl. • remove the water and clean the sediment bowl • Check whether the fuel filter is clogged. • replace the fuel filter • Check whether air is present in the fuel system. • bleed air from the fuel system • Check whether there is leak or bent in the fuel line. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the fuel injection pump is out of timing. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the fuel nozzles are faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	3. A problem in the cooling	3. Cooling system • Check whether the air intake system is clogged. • clean the air intake system
	4. A problem in the lubrication	4. Lubrication system • Check whether the engine oil viscosity is high. • replace engine oil with the specified viscosity • Check whether the crankcase ventilation tube is clogged. • clean the crankcase ventilation tube
	5. A problem in the engine mechanical	5. Engine mechanical system • Check whether the engine idle speed is too low. • adjust engine idle speed • Check whether the valve clearance is correct. • contact YOUR LOCAL YANMAR TRACTOR DEALER

The problem is:	The possible cause(s) are:	Remedy:
The engine runs roughly or stalls frequently	1. A problem in the electrical	1. Electrical system • Check whether the battery is fully charged. • charge the battery • Check for loose or corroded the battery terminals and battery cables. • tighten the loose battery terminals • clean the corroded battery terminals and battery cables
	2. A problem in the fuel	2. Fuel system • Check whether the fuel level is sufficient. • add specified fuel • Check whether the used fuel specification is correct. • use correct fuel specification • Check whether there is water in the sediment bowl. • remove the water and clean the sediment bowl • Check whether the fuel filter is clogged. • replace the fuel filter • Check whether air is present in the fuel system. • bleed air from the fuel system • Check whether there is leak or bent in the fuel line. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the fuel injection pump is out of timing. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	3. A problem in the cooling	3. Cooling system • Check whether the air intake system is clogged. • clean the air intake system • Check whether coolant temperature is too low. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	4. A problem in the engine mechanical	4. Engine mechanical system • Check whether the engine idle speed is too low. • adjust engine idle speed. • Check whether the valve clearance is correct. • contact YOUR LOCAL YANMAR TRACTOR DEALER

The problem is:	The possible cause(s) are:	Remedy:
The engine has no power	1. A problem in the fuel	1. Fuel system • Check whether the specification of the fuel used is correct. • use correct fuel specification • Check whether there is water in the sediment bowl. • remove the water and clean the sediment bowl • Check whether the fuel filter is clogged. • replace the fuel filter • Check whether air is present in the fuel system. • bleed air from the fuel system • Check whether the fuel injection pump is out of timing. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the fuel nozzles are faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the cooling	2. Cooling system • Check whether the air intake for radiator is clogged. • clean the air intake for radiator • Check whether the engine is overheating. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the coolant temperature is too low. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	3. A problem in the lubrication	3. Lubrication system • Check whether the engine oil viscosity is high. • replace engine oil with the specified viscosity • Check for a clogged in the crankcase ventilation tube. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	4. A problem in the engine mechanical	4. Engine mechanical system • Check whether the valve clearance is correct. • contact YOUR LOCAL YANMAR TRACTOR DEALER

The problem is:	The possible cause(s) are:	Remedy:
The engine has overheated	1. A problem in the cooling	1. Cooling system • Check whether the air intake system is clogged. • clean the air intake system • Check whether the coolant level is low. • add coolant • Check whether the grille, radiator screen or radiator cooling fins are dirty. • clean the radiator grille, radiator screen and radiator fins • Check whether the cooling system needs flushing. • flush the cooling system • Check whether radiator cap and thermostat is/are faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the engine mechanical	2. Engine mechanical system • Check whether the alternator/fan belt is loose or faulty. • adjust or replace the alternator/fan belt
There is a knocking sound coming from the engine	1. A problem in the fuel	1. Fuel system • Check whether the specification of the fuel used is correct. • use correct fuel specification • Check whether there is water in the sediment bowl. • remove the water and clean the sediment bowl • Check whether the fuel injection pump is out of timing. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the fuel nozzles are faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the cooling	2. Cooling system • Check whether the coolant temperature is too low. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the engine is overheating. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	3. A problem in the lubrication	3. Lubricant system • Check whether the engine oil level is low. • add engine oil • Check whether the engine oil viscosity is low. • replace engine oil with the specified viscosity
	4. A problem in the engine mechanical	4. Engine mechanical system • Check whether the valve clearance is correct. • contact YOUR LOCAL YANMAR TRACTOR DEALER

The problem is:	The possible cause(s) are:	Remedy:
The engine is consuming a lot of fuel	1. A problem in the fuel	1. Fuel system • Check whether the specification of the fuel used is correct. • use correct fuel specification • Check whether the fuel system has a leak. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the fuel injection pump is out of timing. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the fuel nozzles are faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the cooling	2. Cooling system • Check whether the air intake for radiator is clogged. • clean the air intake for radiator
	3. A problem in the lubrication	3. Lubricant system • Check whether the engine oil viscosity is high. • replace engine oil with the specified viscosity
	4. A problem in the engine mechanical	4. Engine mechanical system • Check whether the valve clearance is correct. • contact YOUR LOCAL YANMAR TRACTOR DEALER
The oil pressure is low	1. A problem in the lubrication	1. Lubrication system • Check whether the engine oil level is low. • add engine oil • Check whether the engine oil viscosity is high. • replace engine oil with the specified viscosity
The engine is consuming a lot of engine oil	1. A problem in the lubrication	1. Lubrication system • Check whether there is/are oil leak/s. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the engine mechanical	2. Engine mechanical system • Check whether the valve clearance is correct. • contact YOUR LOCAL YANMAR TRACTOR DEALER

The problem is:	The possible cause(s) are:	Remedy:
There is white smoke coming from the engine	1. A problem in the fuel	1. Fuel system • Check whether the fuel injection pump is out of timing. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the cooling	2. Cooling system • Check whether the coolant temperature is too low. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	3. A problem in the lubrication	3. Lubrication system • Check whether the engine oil level is over filled. • drain the engine oil to the specified level
	4. A problem in the engine mechanical	4. Engine mechanical system • Check whether the valve clearance is correct. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the pistons ring is worn out. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the compression pressure is too low. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the cylinder liner are damage. • contact YOUR LOCAL YANMAR TRACTOR DEALER

The problem is:	The possible cause(s) are:	Remedy:
There is black smoke coming from the engine	1. A problem in the fuel	1. Fuel system • Check whether the specification of the fuel used is correct. • use correct fuel specification • Check whether the air filter is clogged. • replace the air filter • Check whether there is water in the sediment bowl. • remove the water and clean the sediment bowl • Check whether the fuel nozzles are faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the fuel injection pump is out of timing. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the cooling	2. Cooling system • Check whether the air intake system is clogged. • clean the air intake system
	3. A problem in the lubrication	3. Lubrication system • Check whether the engine oil level is correct. • drain the engine oil to the specified level
	4. A problem in the engine mechanical	4.Engine mechanical system • Check whether the valve clearance is correct. • contact YOUR LOCAL YANMAR TRACTOR DEALER

2. Electrical System

The problem is:	The possible cause(s) are:	Remedy:
The Alternator/ Battery Charging Light remains illuminated even though the engine is running	1. A problem in the charging system	1. Charging systems • Check whether the alternator/fan belt is loose or faulty. • adjust or replace the alternator/fan belt • Check whether the fuse/s is/are blown. • replace the blown fuses • Check whether the alternator is faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the battery	2. Battery • Check whether the battery is faulty. • replace the battery
	3. A problem in the engine mechanical	3. Engine mechanical system • Check whether the engine idle speed is too low. • adjust engine idle speed

The problem is:	The possible cause(s) are:	Remedy:
The starter does not turn	1. A problem in the starter	1. Starter • Check whether the fuse/s is/are blown. • replace the blown fuse/s • Check whether the starter key switch or the starter is/are faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the battery	2. Battery • Check for loose or corroded the battery terminals and battery cables. • tighten the loose battery terminals • clean the corroded battery terminals and battery cables • Check whether the battery is faulty. • replace the battery
	3. A problem in the electrical	3. Electrical system • Check whether the interface combination functions correctly.  • contact YOUR LOCAL YANMAR TRACTOR DEALER
The starter turns too slowly	1. A problem in the starter	1. Starter • Check whether the starter is faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the battery	2. Battery • Check for loose or corroded the battery terminals and battery cables. • tighten the loose battery terminals • clean the corroded battery terminals and battery cables • Check whether the battery voltage is not lower than 12V. • replace the battery • Check whether the battery is faulty. • replace the battery
	3. A problem in the lubrication	3. Lubrication system • Check whether the engine oil viscosity is high. • replace engine oil with the specified viscosity

3. Brakes

The problem is:	The possible cause(s) are:	Remedy:
The rear brakes are not working correctly	1. A problem in the brake	1. Brake system • Check whether the brakes are adjusted correctly. • adjust the brakes correctly • Check whether the brake linkage is worn out or damaged. • contact YOUR LOCAL YANMAR TRACTOR DEALER • Check whether the brake disk is worn out or damage. • contact YOUR LOCAL YANMAR TRACTOR DEALER

4. Steering

The problem is:	The possible cause(s) are:	Remedy:
The steering is not working	1. A problem in the steering	1. Steering • Check whether the transmission hydraulic oil level is low. • add transmission hydraulic oil • Check whether the wheel spindles are damaged. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the steering cylinder	2. Steering cylinder • Check whether the steering linkage requires lubrication. • lubricate the steering linkage • Check for excessive play in the steering. • contact YOUR LOCAL YANMAR TRACTOR DEALER

5. Body and Machinery

The problem is:	The possible cause(s) are:	Remedy:
There is excessive vibration	1. A problem in the engine	1. Engine • Check whether the idle speed is too slow. • adjust the idle speed
	2. A problem in the transmission	2. Transmission • Check whether the drive shaft is worn out. • contact YOUR LOCAL YANMAR TRACTOR DEALER
The engine is running, but the tractor does not move	1. A problem in the hydrostatic transmission (HST)	1. Hydrostatic transmission (HST) • Check whether the hydrostatic transmission is faulty. • contact YOUR LOCAL YANMAR TRACTOR DEALER
	2. A problem in the brake	2. Brake system • Check whether the brakes are adjusted correctly. • adjust the brakes correctly

The problem is:	The possible cause(s) are:	Remedy:
The 3-point hitch does not rise	1. A problem in the transmission hydraulic oil	1. Transmission hydraulic oil • Check whether the transmission hydraulic oil level is too low. • add transmission hydraulic oil
	2. A problem in the transmission hydraulic oil flow	2. Transmission hydraulic oil flow • Check whether the transmission hydraulic flow control/stop knob has been closed (OFF). • open the hydraulic flow control/stop knob • Check whether an excessive load is being placed on the 3-point hitch. • reduce the 3-point hitch load • Check whether the transmission hydraulic oil filter is clogged. • replace the transmission hydraulic oil filter
The 3-point hitch lowers too slowly or does not lower at all	1. A problem in the hydraulic flow control/ stop valve	1. Hydraulic flow control/stop valve • Check whether the hydraulic flow control/stop knob has been closed (OFF). • open the hydraulic flow control/stop knob on the specified rate • Check whether the rate of drop is set too slow. • set the hydraulic flow control/stop knob to the specified rate
	2. A problem in the transmission hydraulic oil	2. Transmission hydraulic oil • Check whether the transmission hydraulic oil level is too low. • add transmission hydraulic oil
The 3-point hitch lowers too quickly	1. A problem in the hydraulic flow control/ stop valve	1. Hydraulic flow control/stop valve • Check whether the rate of drop is set too fast. • adjust hydraulic flow control/stop knob to specified rate
	2. A problem on loads	2. Loads • Check whether an excessive load is being placed on the hitch. • reduce excessive load

18. SA221/324/424 Attachment List

Model Name	Description	Application		
		SA221	SA324	SA424
Loader				
YL110-SAP	YL110 Front Loader with Bucket and Standard Grille Guard	●	N/A	N/A
YL210-SAP	YL210 Front Loader with Bucket and Standard Grille Guard	N/A	●	●
PFQ100	Pallet fork	●	●	●
Mid Mount Mower				
M60-SAP	M60-SA Mid Mount Mower Deck	●	●	●
MLKIT-SA22P	Linkage Kit for M60-SA on SA221	●	N/A	N/A
MLKIT-SA32P	Linkage Kit for M60-SA on SA324/424	N/A	●	●
M60F-SA	M60F-SA Fabricated Mid Mount Mower Deck	N/A	●	●
MLFKIT-SA32P	Linkage Kit for M60F-SA on SA324/424	N/A	●	●
Backhoe and Bucket				
B65A-SAP-KIT	Curved Boom Backhoe, 6.5' (with backhoe mount, swivel seat kit, PBK65-SA power beyond kit)	●	●	●
PBK65-SAP	Power Beyond Kit	●	●	●
BBUCKET09-YAN	9" Bucket, B65 SA	●	●	●
BBUCKET12-YAN	12" Bucket, B65 SA	●	●	●
BBUCKET16-YAN	16" Bucket, B65 SA	N/A	●	●
THUMB-B65P	Thumb Kit, B65 SA Mechanical	N/A	●	●
Front Mount Attachments				
FHKIT-SA22P	Front Hitch Kit for SA221	●	N/A	N/A
FHKIT-SA32P	Front Hitch Kit for SA324/424	N/A	●	●
ANGLEKIT-SA	Angle Kit for SA	●	●	●
FBSX66	66" Front Blade	●	●	●
FBR60	60" Broom	●	●	●
SB52H	52" Snow Blower (hydro chute)	●	●	●
DLKIT-SA22P	Front PTO Kit for SA221	●	N/A	N/A
DLKIT-SA32P	Front PTO Kit for SA324/424	N/A	●	●
Accessories				
SFCAB2-SA221P	Soft Cab Kit	●	N/A	N/A
SFCAB2-SAP	Soft Cab Kit	N/A	●	●
SS200-SAP	Sunshade for ROPS	●	●	●
WLKIT-SAP	Worklight for ROPS	●	●	●
WLKITG-SAP	Worklight for Deluxe Grill Guard	●	●	●
GGUARD-SAP	Deluxe Grill Guard	●	●	●
TBKIT-SAP	Tool Box	●	●	●
FW44LBSD	44lb Weight, Front	●	●	●
FWBKTD-SA	Bracket, Front Weight	●	●	●
REARRV-SAP	Rear Remote Valve Kit	●	●	●
CC2KIT-SAP	Cruise Control KIT	●	●	●
12VOUTLET-SA	12V Outlet Kit	●	●	●

Model Name	Description	Application		
		SA221	SA324	SA424
BALLASTB200	Ballast Box, Rear	●	N/A	N/A
BALLASTB400	Ballast Box, Rear	N/A	●	●
DLPKIT-SAP	Differential Lock Kit	●	N/A	N/A
TIREKTF-SA221P	Turf Tire Kit for SA221	●	N/A	N/A
TIREKTF-SA324P	Turf Tire Kit for SA324	N/A	●	N/A
TIREKTF-SA424P	Turf Tire Kit for SA424	N/A	N/A	●
TIREKIND-SA221P	Industrial Tire Kit for SA221	●	N/A	N/A
TIREKIND-SA324P	Industrial Tire Kit for SA324	N/A	●	N/A
TIREKIND-SA424P	Industrial Tire Kit for SA424	N/A	N/A	●
1A8160-51550	Dry Battery	●	●	●
1A8330-57210	Heater, Radiator hose	●	N/A	N/A
119E21-95010	Engine block heater	N/A	●	●
FRAKIT-SAP	SA221/324/424 French Operation Manual	●	●	●
FRAKIT-YL110	YL110/210 French Operation Manual	●	●	●
0A041-ES0071	SA221/324/424 Spanish Operation Manual	●	●	●
0A052-S00900	YL110/210 Spanish Operation Manual	●	●	●

* This list is as of January 2018. Additional attachments may be announced later.

19. INDEX

NOTE

■**Yanmar America Corporation**
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YANMAR AGRIBUSINESS CO., LTD.

https://www.yanmar.com

OPERATION MANUAL

SA221/SA324/SA424

YANMAR

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