OPERATION MANUAL

SUB-COMPACT TRACTOR
COMPACT TRACTOR

SA

SA221

SA424

en Original instructions

YANMAR

In case of exporting this product and providing the related technical material to non-residents in Japan or residents overseas, it is required to comply with the export and trade control laws and regulations of Japan and other relevant countries.
Please be sure to follow the necessary procedure.

INTRODUCTION

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 information contained in the *Operation Manual*. The instructions and information 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.

Consult your YANMAR tractor dealer when you have a question, or need equipment related to the use of your tractor.

INTENDED USE

This machine is designed solely for use in customary agricultural or similar operations.
Use in any other way is considered as contrary to the intended use.
Compliance with and strict adherence to the conditions of operation, service, and repair as specified by the manufacturer, also constitute essential elements of the intended use.

This machine should be operated, serviced, and repaired only by persons who are familiar with its particular characteristics and who are acquainted with the relevant safety procedures.

Accident prevention regulations, all other generally recognized regulations on safety and occupational medicine, and all road traffic regulations must be observed at all times.

Any arbitrary modifications carried out to this machine may relieve the manufacturer of liability for any resulting damage or injury.

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.

SAFETY ALERT SYMBOLS

■ Safety-alert symbol

This is the safety-alert symbol. When you see this symbol on your tractor or in this manual, be alert to the possibility of personal injury and carefully read the messages that follow.

■ Signal words

The signal words "DANGER", "WARNING", and "CAUTION" are used with the safety-alert symbol.

DANGER — **"DANGER" indicates an imminently hazardous situation which, if not avoided, *will* result in death or serious injury.**

WARNING — **"WARNING" indicates a potentially hazardous situation which, if not avoided, *could* result in death or serious injury.**

CAUTION — **"CAUTION" indicates a potentially hazardous situation which, if not avoided, *could* result in minor or moderate injury. It is also used to alert against unsafe practices.**

■ Service instructions

IMPORTANT

"IMPORTANT" calls attention to instructions which must be followed precisely to avoid damaging the product, process, or its surroundings.

NOTE

"NOTE" presents supplementary information.

Direction

Right-hand and Left-hand sides of the tractor are determined by facing in the direction of the tractor forward travel.

Improvement

Sometimes parts are changed to improve or upgrade the features of the tractor, or for other reasons. Therefore, the parts shown in this manual may not apply to your tractor.

Notice

All data are subject to change without prior warning. Some illustrations and photographs may show optional accessories.

PICTOGRAPHS

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


Safety alert symbol

<Instrument panel>


Fuel level


Revolutions Per Minute (rpm)


Engine coolant temperature


Alternator/Battery charging condition


Parking brake


Engine oil pressure


Power Take Off (PTO)


Tell-tale indicator

<Lights>


Turn signal


Headlight and low beam


Headlight, sidelight and rear worklight


Hazard warning lights


Work lights (For CAB type)

<Starter key switch>


Engine start


Engine run


Engine shut-off


Glow


ACC (For CAB type)

<Levers and knobs>


Power Take Off (PTO) OFF position


Power Take Off (PTO) ON position


Mid-/Rear Power Take Off (PTO) position


Rear Power Take Off (PTO) position


Parking brake lever


Slow


Fast


Position control raised position


Position control lowered position


Hydraulic flow control/stop


Differential lock


Washer tank (For CAB type)


Wiper (For CAB type)


Heating fan (For CAB type)

NOTE

- Signs and symbols conform to “ISO” standards and “EU” directives.

ABBREVIATION LIST

Abbreviations	Definitions
2WD	2 Wheel Drive
4WD	4 Wheel Drive
EGR	Exhaust Gas Recirculation
HST	Hydrostatic Transmission
PTO	Power Take Off
ROPS	Roll- Over Protective Structure
SCV	Selective Control Valve
m/s	Meter Per Second
rpm	Revolutions Per Minute
EN	European Norm
DIN	Deutsche Industries Normen
BS	British Standard
ISO	International Organization for Standardization
MIL	Military specifications and standard
SAE	Society of Automotive Engineers
ASTM	American Society for Testing and Materials

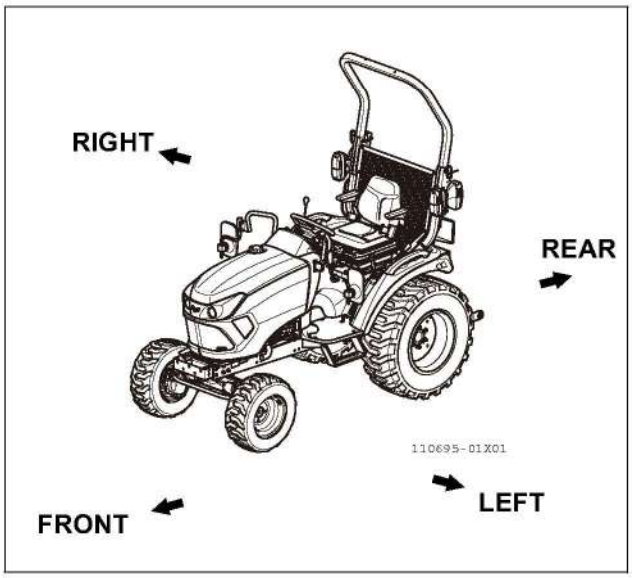
1. SAFETY PRECAUTIONS

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.

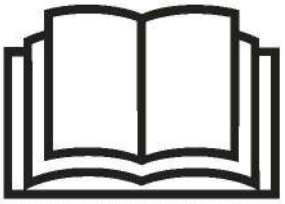
NOTE

- 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. 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.
   Do not operate the tractor with the mounted or trailed machinery or trailer unless all instructions in the Operation Manual have been followed.

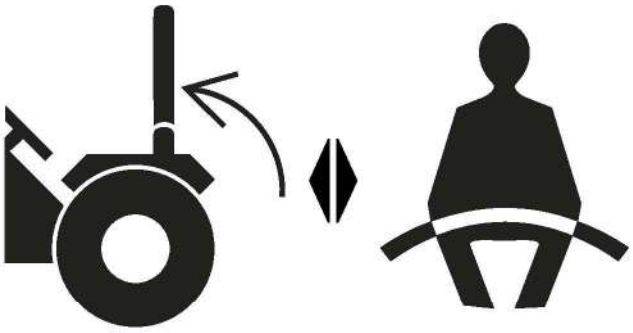


2. Strictly follow the statements given in the DANGER, WARNING and CAUTION safety decals attached to the tractor.
3. Do not operate the tractor with the Roll-Over Protective Structure (ROPS) in the folded "down" position if ROPS is foldable type.
   Keep the seatbelt fastened while operating the tractor with the CAB or Roll-Over Protective Structure (ROPS) in the unfolded "up" position if ROPS is foldable type. 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) or CAB 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) or CAB. The altered Roll-Over Protective Structure (ROPS) or CAB may fail to provide the designed protection.
   Replace the damaged Roll-Over Protective Structure (ROPS) or CAB immediately. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.
   The Roll-Over Protective Structure (ROPS) may be temporarily folded down when absolutely necessary for areas with height limitations if ROPS is foldable type. Remember that when the Roll-Over Protective Structure (ROPS) is in the "down" position, the Roll-Over Protective Structure (ROPS) does not provide operator protection and the seatbelt should not be worn.
   For operator safety, always keep the Roll-Over Protective Structure (ROPS) in the unfolded "up" position and locked securely if ROPS is foldable type.
   NEVER alter or repair the Roll-Over Protective Structure (ROPS) or CAB. Welding, bending, drilling, grinding, or cutting may weaken the Roll-Over Protective Structure (ROPS) or CAB.

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

4. Always fasten the seatbelt while operating the tractor with CAB or the Roll-Over Protective Structure (ROPS) in the unfolded "up" position if ROPS is foldable type. Check the seatbelt for any damage. Replace the damaged seatbelt immediately. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance. Do not use the seatbelt if the Roll-Over Protective Structure (ROPS) is in the folded "down" position if ROPS is foldable type or the tractor does not have the Roll-Over Protective Structure (ROPS).



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) or CAB 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. **NEVER** allow 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.
20. Be careful to the doors, steps and handles when entering the cabin.
21. Do not operate the tractor during thunderstorms. Lightning strikes can cause severe injury or even death.
    Be extremely careful when operating the tractor in close vicinity of suspended power lines. Always be sure that the tractor will not touch the power lines. It can cause severe injury or even death.
22. Do not work with ROPS type when there is a possibility of objects falling from above.

3. Safe Practices for Operating the Tractor

■ 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) position, the parking brake is engaged securely, and Power Take Off (PTO) switch is in the OFF position.
3. Always keep the seatbelt fastened around the operator's waist within CAB or whenever the Roll-Over Protective Structure (ROPS) is in the unfolded "up" position and locked securely if ROPS is foldable type.
4. If the tractor is started where there is a height limitation, immediately return the Roll-Over Protective Structure (ROPS) to the unfolded "up" position and locked securely and fasten the seatbelt if ROPS is foldable type.
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.

■ Work with the Tractor

1. Tow an implement only with the drawbar. Avoid hitching via the axle housing. The tractor can upset its balance, leading to serious injury or death. Make sure the drawbar pin is locked in place.
2. Any towed implement or attachment should not exceed the towing capacity of the tractor as laid out in the specifications. If a braking is fitted to the implement or the attachment, the braking system should be operational from the tractor.
3. Make sure that all the covers and guards are in position. Replace any missing or damaged covers immediately.
4. Stay clear from the area between tractor and trailed vehicle.
5. Before turning or during traveling on a rough terrain, or before stopping, decrease the tractor speed in order to prevent upsetting.
6. Use extra caution during operating over rough ground, when crossing ditches or operating on slopes and when turning corners.
7. Avoid turning with the differential lock engaged. Attempting to turn the tractor while the differential lock is engaged can lead to a roll over.

8. 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.
9. 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.
10. When two or more people are working in one area, always keep in good communication between each other.
11. Do not under any circumstances get on or off the moving tractor.
12. When driving at night, ensure that all necessary lights are illuminated.
13. When driving, do not shift the range gear. Always shift the range gear when the tractor is completely stopped.
14. Avoiding the falling objects.
    Be careful when handling large or heavy objects, as there is a danger of the tractor rolling over, or of the object falling off the loader boom onto the operator.
    - Never lift a large object with an attachment that may allow the object to roll back onto the operator.
    - Do not carry large objects that can fall out of loader bucket into operator's station.
    - Do not carry transport or move round or square bales with the bucket attachment.
    - Never lift loader higher than necessary to clear ground.
    - Move slowly and carefully. Avoid rough terrain.

    Front loader attachment points are provided. Never mount loader that is not approved for the YANMAR tractor.
    Consult your local YANMAR tractor dealer.

15. 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

■ Stop the Tractor

The procedures of stopping the tractor are as follows:

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

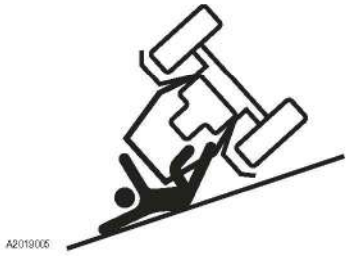
■ Considerations for Safety of a Child

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.

4. 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 tractor in low range and engage the 4-wheel drive 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 upset, 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 upsetting backward is high. Always move backward to get out from these situations. In the 4-wheel drive mode, special caution is needed to avoid false confidence in the tractor's ability to climb slopes.
- 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.

DO NOT:

- 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

- **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 "Lock and Set the Parking Brake" on page 7-4.**

5. 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, use the hazard lights and turn signal lights as required by the currently effective local laws or regulations.

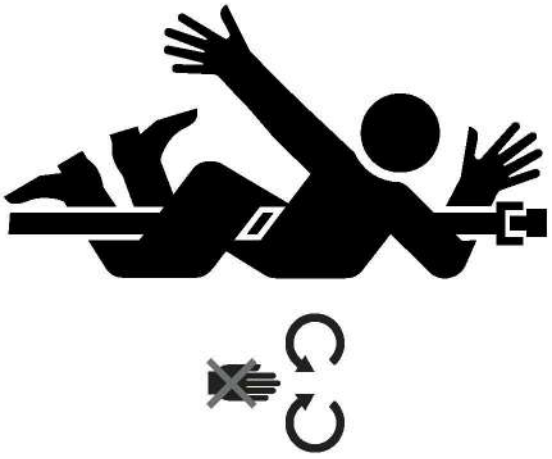
5. Strictly observe all the currently effective local traffic and safety laws and regulations.
6. Turn ON the headlights as required by the currently effective local laws or regulations.
7. Always travel at a speed that allows the operator to maintain control of the tractor.
8. **NEVER** engage the differential lock while traveling on a road. It may cause the operator to lose control of the tractor.
9. 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.
10. 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.
11. The tractor should be checked by an authorised person to ensure that the tractor has the correct equipment that meet local regulations for the tractor to be used on public roads.
12. Use safety lights and devices at night because slow moving tractors on public road are hard to see.

6. Safe Practices for Parking the Tractor

1. Before leaving the tractor, ensure that the tractor is completely stopped.
2. Push down Power Take Off (PTO) switch to OFF position, **ALWAYS** lower all implements and attachments to the ground, move all the levers to N (neutral) position, engage the parking brake securely, for details, see "Lock and Set the Parking Brake" on page 7-4, shut off the engine and remove the key.
3. Avoid parking the tractor on a 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.

7. Operate the Power Take Off (PTO)

1. Before connecting/disconnecting, adjusting, cleaning or servicing Power Take Off (PTO) driven implement, ensure that the engine is not running and 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 "Lock and Set the Parking Brake" on page 7-4, chock all the tires safely and securely. Avoid approaching or accessing any rotating component.

8. 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.
   <SA424>
   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.
4. Do not operate the 3-point hitch control lever etc. from the back of the tractor.

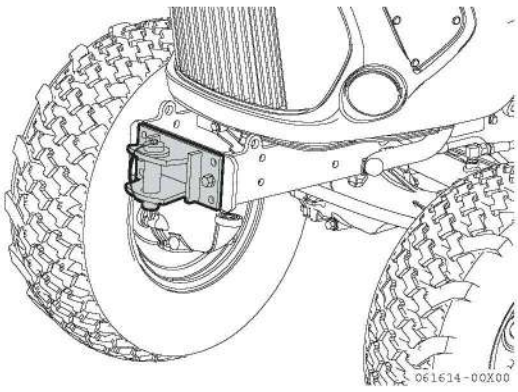
9. Roll-Over Protective Structure (ROPS) and CAB Precautions

The tractor is equipped with a Roll-Over Protective Structure (ROPS) or CAB 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) or CAB can be struck, which can result in serious injury.

1. Always keep the Roll-Over Protective Structure (ROPS) or CAB on its original condition.
2. Replace the Roll-Over Protective Structure (ROPS) or CAB whenever the Roll-Over Protective Structure (ROPS) or CAB 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) or CAB for pulling purposes.
4. Although the Roll-Over Protective Structure (ROPS) or CAB provides the operator protection in accordance with the regulations and relevant standards at the time of manufacture, **ALWAYS** take the necessary precautions.

10. Use the Front Hitch

Be sure to use the front hitch of the tractor for towing tractor. And only for towing the tractor!



11. Safe Practices for Servicing the Tractor

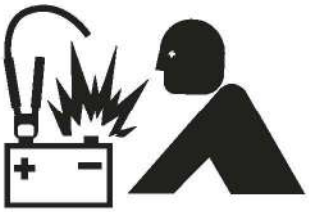
Before starting any service work, park the tractor on solid and level ground, engage the parking brake securely, for details, see "Lock and Set the Parking Brake" on page 7-4, lower the implement to the ground, move all the levers to N (neutral) position, push down Power Take Off (PTO) switch to OFF 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 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 14-10).

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 2.7 metric tons (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 Hoses for Every 2 Years

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

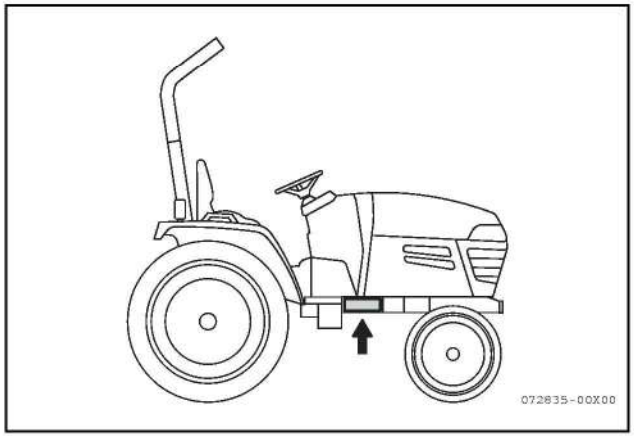
13. This tractor is not designed for forest industry, quarry or mining use, nor designed for use with crop spraying equipment

14. Safe Operation of Implements and Attachments

The operator must read thoroughly and carefully all manuals for any implements and attachments including but not limited to front end loaders paying particular attention to the safety portion of these manuals that will be used in conjunction with the tractor.
The mounting points for fitting a front loader must be approved and released by the respective manufacturers.

NOTE

- These above - mentioned examples for safety precautions are not intended to be exhaustive lists, but only as indications of the type of information that may be included.



Front loader bracket fixing position

15. Understand the Tractor Safety Decals

■ Safety Alert Symbol

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 words DANGER, WARNING and CAUTION together with the safety alert symbol. DANGER and WARNING stand for 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.

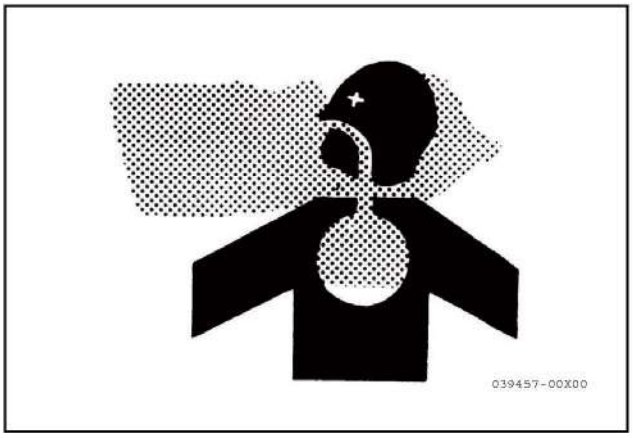
■ Care of DANGER, WARNING and CAUTION Decals

1. Always keep all the DANGER, WARNING and CAUTION decals clean and clearly legible.
2. Clean the DANGER, WARNING and CAUTION decals with soap and water, wipe dry with clean soft cloth.
3. Replace damaged or missing DANGER, WARNING and CAUTION decals with new decals available from YOUR LOCAL YANMAR TRACTOR DEALER.
4. If a component having a DANGER, WARNING and CAUTION 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 DANGER, WARNING and CAUTION decals flat on a clean and dry surface, squeezing out trapped air.

16. Handle agricultural chemicals safely

■ Handle agricultural chemicals safely

Chemicals used in agricultural applications such as fungicides, herbicides, insecticides, pesticides, rodenticides, and fertilizers can be harmful to your health or the environment if not used carefully. Always follow all label directions for effective, safe, and legal use of agricultural chemicals.



■ Reduce risk of exposure and injury

- Wear appropriate personal protective equipment as recommended by the chemical manufacturer. In the absence of manufacturer's instructions, follow these general guidelines:
  - Chemicals labeled "**Danger**": Most toxic. Generally require use of goggles, respirator, gloves, and skin protection.
  - Chemicals labeled "**Warning**": Less toxic. Generally require use of goggles, gloves, and skin protections.
  - Chemicals labeled "**Caution**": Least toxic. Generally require use of gloves and skin protection.
- Avoid inhaling vapor, aerosol or dust.
- Always have soap, water, and towel available when working with chemicals. If chemical contacts skin, hands, or face, wash immediately with soap and water. If chemical gets into eyes, flush immediately with water.
- Wash hands and face after using chemicals and before eating, drinking, smoking, or urination.
- Do not smoke or eat while applying chemicals.
- After handling chemicals, always bathe or shower and change clothes. Wash clothing before wearing again.
- Seek medical attention immediately if illness occurs during or shortly after use of chemicals.
- Keep chemicals in original containers. Do not transfer chemicals to unmarked containers or to containers used for food or drink.
- Store chemicals in a secure, locked area away from human or livestock food. Keep children away.
- Always dispose of containers properly Triple rinse empty containers and puncture or crush containers and dispose of properly.
- Dispose of filter with hazardous pesticide according to published regulations or directives.

- For the training and education of an agricultural chemical, refer to the instruction manual for that agricultural chemicals.

■ Avoid Contact with Agricultural Chemicals

This enclosed cab does not protect against inhaling vapor, aerosol or dust.
The tractor shall not be used under conditions requiring protection against hazardous substances.

- When operating in an environment where pesticides are present, wear a long-sleeved shirt, long-legged pants, shoes, and socks.
- If pesticide use instructions require respiratory protection, wear an appropriate respirator inside the cab.
- Wear personal protective equipment as required by the pesticide use instructions when must be cleaned, enclosed cab:
  - into a treated area
  - to work with contaminated application equipment such as nozzles which must be cleaned, changed or redirected
  - to become involved with mixing and loading activities
- Before re-entering the cab, remove protective equipment and store either outside the cab in a closed box or some other type of sealable container or inside the cab in a pesticide resistant container, such as a plastic bag.
- Clean your shoes or boots to remove soil or other contaminated particles prior to entering the cab.

■ Clean vehicle of hazardous pesticides

During application of hazardous pesticides, pesticide residue can build up on the inside or outside of the vehicle. Clean vehicle according to use instructions of hazardous pesticides.

When exposed to hazardous pesticides, clean exterior and interior of vehicle daily to keep free of the accumulation of visible dirt and contamination.

- Sweep or vacuum the floor of cab.
- Clean headliners and inside cowlings of cab.
- Wash entire exterior of vehicle.
- Dispose of any wash water with hazardous concentrations of active or non- active ingredients according to published regulations or directives.

17. Cab classification according to EN15695-1

■ Handle agricultural chemicals safely

Cab classification according to EN 15695-1 provides information on the effective of protection against harmful substances offered by the cab.
Categories 1 to 4 are used for classification and specified on a label inside the cab.
Replace label if missing or damaged. See your YANMAR dealer.

(A) Cab classification according to EN 15695-1

Category 1- The cab does not offer any protection against substances which are harmful to health.
Category 2- The cab offers protection against solid airborne particles such as dust, but not against aerosols and vapors.
Category3- The cab offers protection against dust and aerosols (liquid airborne substances such as spray), but not against vapors.
Category4- The cab offers protection against dust, aerosols and vapors.

Before working in an environment containing hazardous substances, i.e. when using pesticides, check whether the cab offers sufficient protection. Refer to the product data sheets of the spraying liquid manufacturer specifying the category required for the cab.

An example of the hazards and precautions identified by a tractor manufacturer is given in the list below:

- Study the tractor and implements
- Protect operator safely
- Before operating
- Start the engine safely
- Operate the tractor safely
- Avoid tipping over
- Stay clear of the PTO
- Traveling
- Transportation
- Towing
- Tow tractor
- Park the tractor safely
- Maintenance and service
- Storage
- Handle agricultural chemicals safely

⚠ CAUTION

Refer to product data sheets and product identification of the crop protection chemicals. These contain important information on how to avoid hazards.

The following requirements must be met to offer best protection:

1. All seals (on door, windows and roof) in good condition
2. Doors, windows and roof closed
3. Grommets for cables in the cab sealed properly
4. Fan ON
5. Cab air filters in good condition

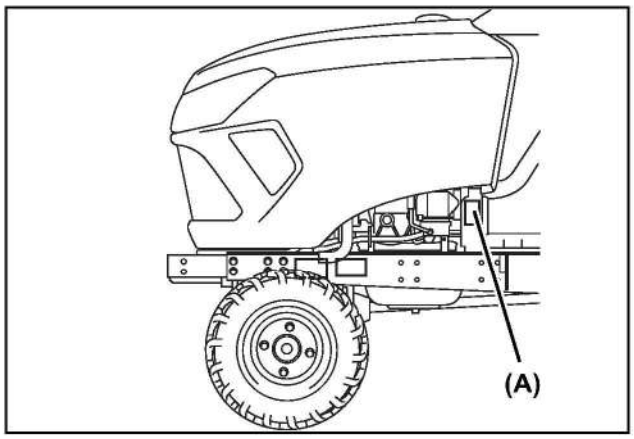
These examples are not intended to be exhaustive lists, but only as indications of the type of information that may be included.

(A) 1A8330-65300

⚠ DANGER

TO AVOID INJURY OR DEATH:

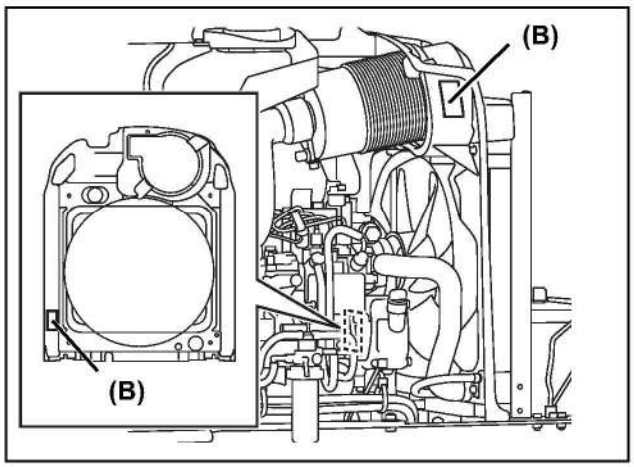
- **Do not start engine by shorting across starter terminals or bypassing safety start switch.**
- **Start engine only from seat with transmission and PTO OFF.**

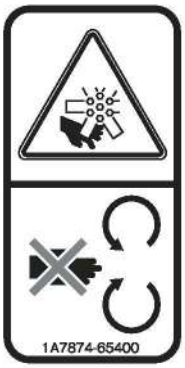


(B) 1A7874-65400

⚠ WARNING

STAY CLEAR OF ENGINE FAN AND FAN BELT

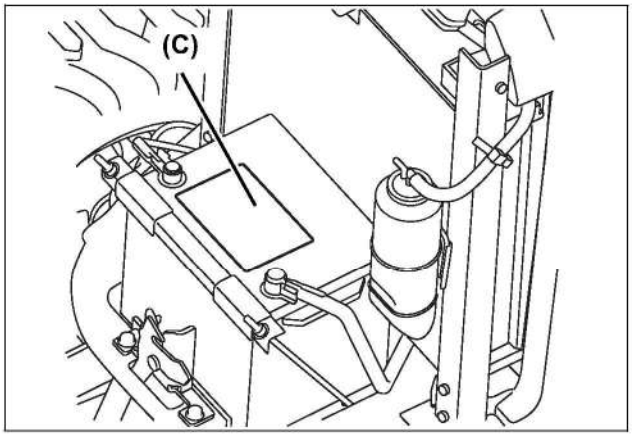




(C) 1A8160-51521

⚠ DANGER

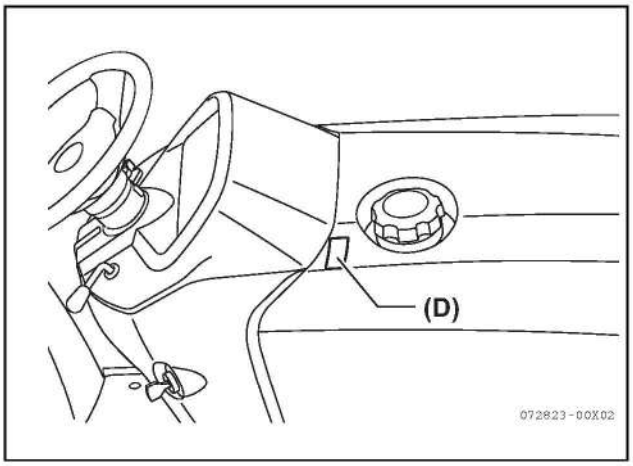
- SHIELD EYES. EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY.
- NO SPARKS, FLAMES, SMOKING.
- SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS.
- FLUSH EYES IMMEDIATELY WITH WATER. GET MEDICAL HELP FAST.
- KEEP OUT OF REACH OF CHILDREN. DO NOT TIP. DO NOT OPEN BATTERY!



(D) 1A8330-65930

⚠ WARNING

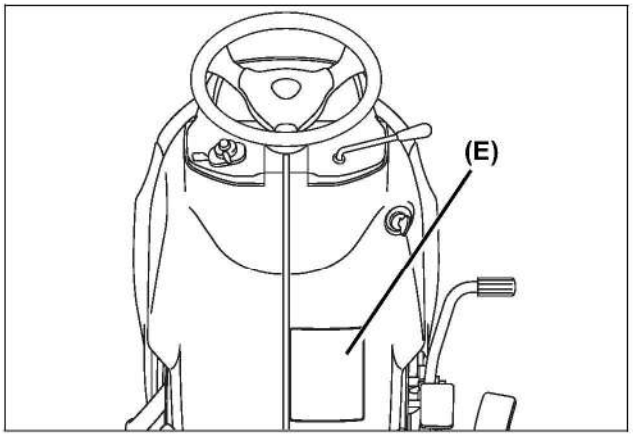
1. Use extreme care in handling diesel fuels. Diesel fuels are extremely flammable and the vapors are explosive. Use only a container approved by the local effective law.
2. Make sure to shut off the engine before refueling. After refueling, replace fuel filler cap securely and wipe off any spilled diesel 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

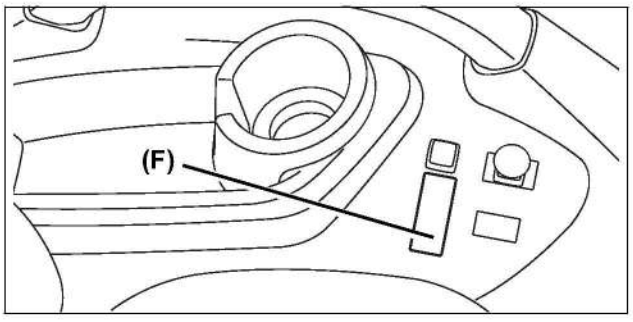
1. Do not operate the machine without guards, shields, and safety device in place.
2. Hitch towed loads only to drawbar to avoid rearward upset.
3. Make certain every person is clear of machine before starting engine.
4. Do not allow anyone except operator to ride on the tractor.
5. Keep hands, feet 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.

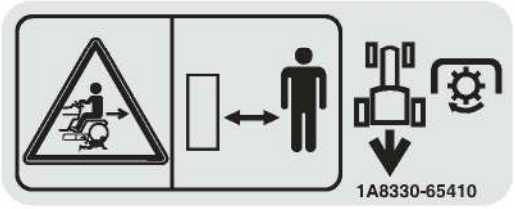


(F) 1A8330-65410

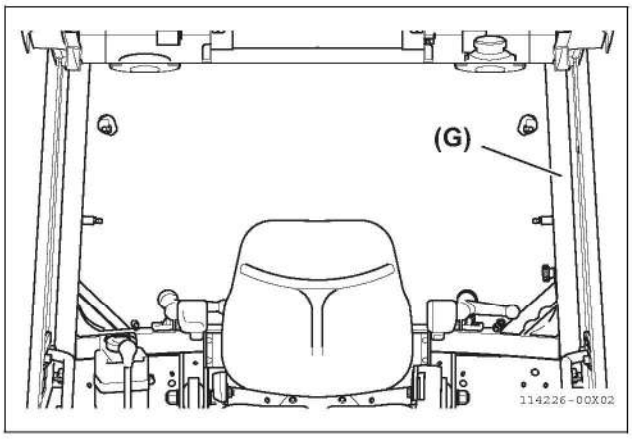
⚠ WARNING

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





(G) 198280-65950 (CAB only)/
1A8330-65950 (ROPS only)



(CAB only)

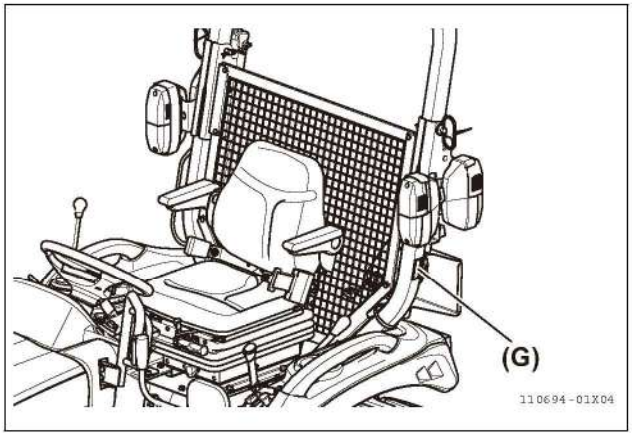
⚠ WARNING

Always fasten seatbelt while operating the tractor.

(ROPS only)

⚠ WARNING

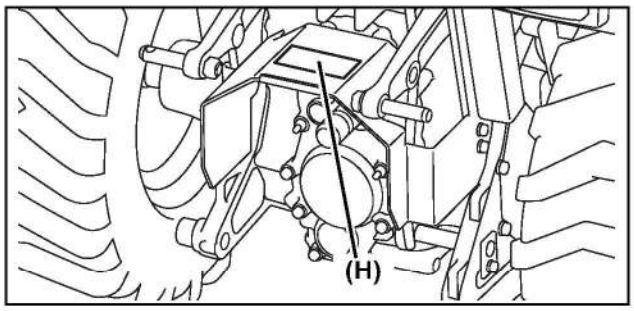
- **This structure's protective capability may be impaired by structural damage, overturn, or alteration. If any of these conditions occur, this structure must be replaced.**
- **Keep the seatbelt fastened while operating the tractor with the Roll-Over Protective Structure (ROPS) in the unfolded "up" position if ROPS is foldable type.**
  - **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 if ROPS is foldable type.**



(H) 1A8330-65620

⚠ WARNING

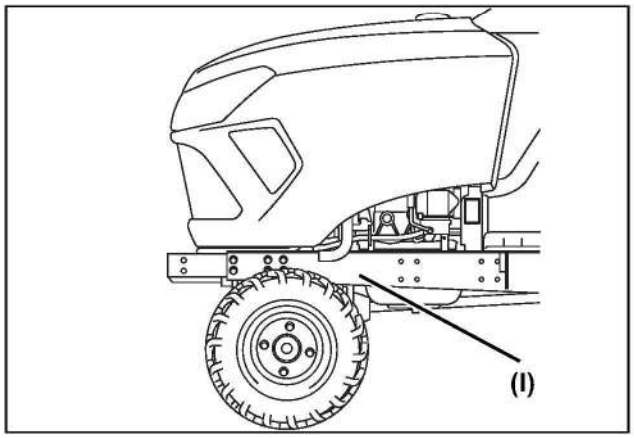
AVOID INJURY FROM PTO
- **Keep all shields in place.**
- **Keep hands, feet and clothing away.**
- **Operate only with 540 min^{-1} (rpm).**

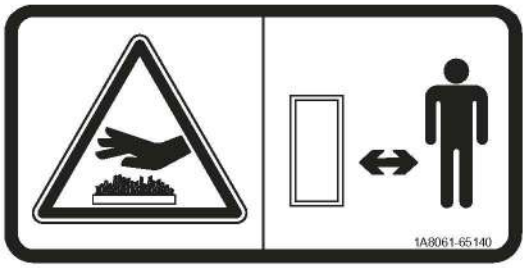


(I) 1A8061-65140

⚠ CAUTION

Stay clear of hot surface.
Do not touch hot surface like exhaust muffler, etc.

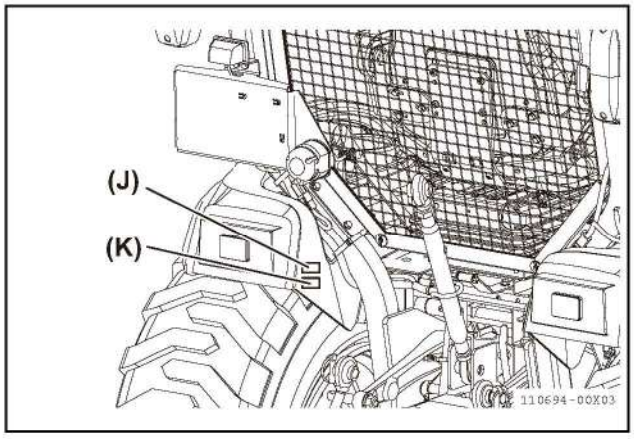


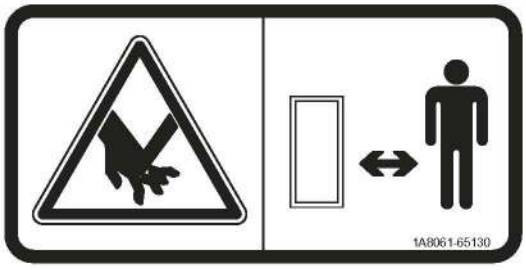


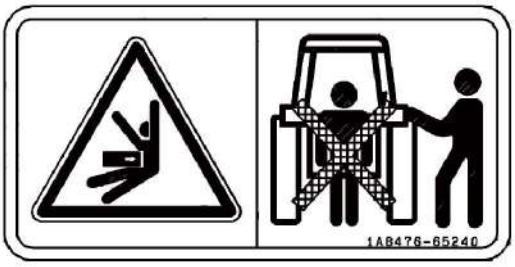
(J) 1A8061-65130
(K) 1A8476-65240

⚠ WARNING

- Stay clear of moving parts area as long as tractor engine is running with PTO connected.
- Stay clear of the back of the tractor.







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.

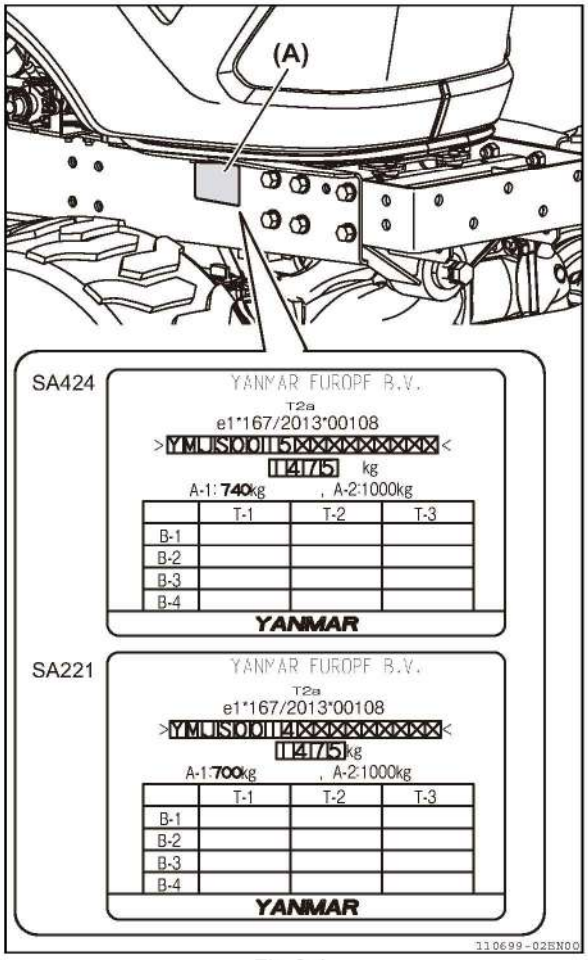


Fig 2-1

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

- Tractor (Fig 2-1)
- Engine (Fig 2-2)
- Roll-Over Protective Structure (ROPS) (Fig 2-3)
- CAB

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

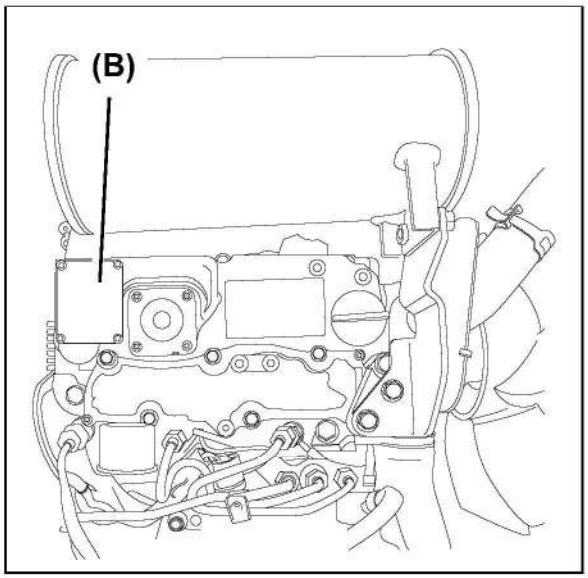


Fig 2-2

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.

Table 2-1

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

(ROPS only)

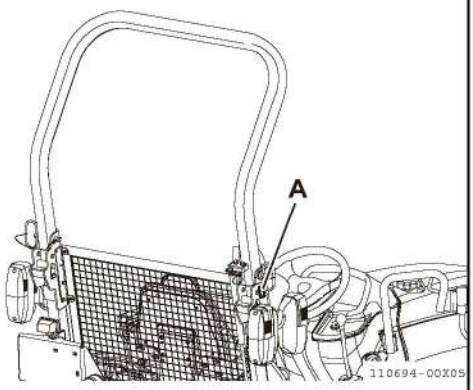


Fig 2-3

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

Fig 2-4

(B) CAB serial number (CAB only)
(C) OECD approval label (CAB only)

(CAB only)

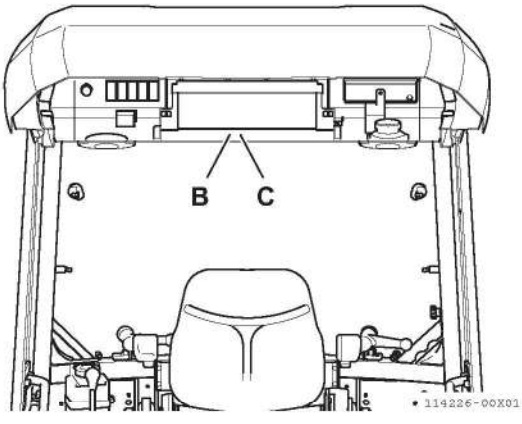


Fig 2-5

3. SPECIFICATIONS

1. Specifications Table

Table 3-1

Model				SA221 (CAB)	SA424 (CAB)
Power Take Off (PTO) Power hp			(kW)	11.0	14.2
Engine	Maker			YANMAR	
	Model			3TNM72-DRE	3TNV76-UDRE
	Type			4 Cycle Inline, Water-Cooled Diesel	
	Number of Cylinders			3	
	Bore and Stroke		(mm)	72 × 74	76 × 82
	Total Displacement		(L)	0.903	1.115
	Gross Power		(kW)	—	
	Net Power hp		(kW)	14.2	17.6
	Rated Revolution		(min^{-1} (rpm))	3000	
	Maximum Torque		(N•m)	52.6	65.0
	Battery			510 CCA	
	Fuel			Diesel Fuel	
	CO_2 emission		g/kWh	1048 (Test cycle: NRSC)	932 (Test cycle: NRSC)
Capacities	Fuel Tank		(L)	23	
	Engine Oil		(L)	2.9	3.4
	Engine Coolant		(L)	3.3	
	Transmission Oil		(L)	15.5	
	Front-axle Oil		(L)	3.0	
Dimensions	Overall Length (with 3-Point Hitch)		(mm)	2699	2804
	Overall Width (with R4 Tires)		(mm)	1200	1435
	Overall Height (with CAB, R4 Tires)		(mm)	2060	2195
	Overall Height (with R4 Tires) (Top of Steering Wheel)		(mm)	1299	1440
	Wheel Base		(mm)	1470	1600
	Min. Ground Clearance (with R4 Tires)		(mm)	140	249
	Tread (with R4)	Front	(mm)	894	960
		Rear	(mm)	894	1080
Weight (with CAB and R4 Tires)			(kg)	954	1078

Traveling System	Tire	Ag (R1)	Front	—	
			Rear	—	
		Turf (R3)	Front	18 x 8.50-10 4PR	23 x 8.50-12 4PR
			Rear	26 x 12.00-12 4PR	36 x 13.50-15 4PR
		Industrial (R4)	Front	18 x 8.50-10 6PR	23 x 8.50-12 6PR
			Rear	26 x 12.00-12 4PR	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 (m)			2.4	2.6
Hydraulic Unit	Hydraulic Control System			Select Control, Open Center	Position Control, Open Center
	Pump Capacity (main) (L/min)			15.1	
	Pump Capacity (steering) (L/min)			13.2	
	3-Point Hitch			Limited Category 1	
	Max. Lift Force	Lift Point (kg)		—	
		610 mm Behind Lift Point (kg)		300	548
	System Pressure (MPa)			13.0	16.7
Power Take Off (PTO)	Type			Hydraulic Clutch	
	Rear	Shaft size		35 mm OD, 6 Splines.	
		Type		Independent	
		Speed/Engine (min^{-1} (rpm))		540/3120	
	Mid	Shaft size		SAE 16/32, 15-Splines.	
		Type		Independent	
		Speed/Engine (min^{-1} (rpm))		2000/3111	

All data are subject to change without notice.

Table 3-2

Model					SA221 (ROPS)	SA424 (ROPS)
Power Take Off (PTO) Power hp				(kW)	11.0	14.2
Engine	Maker				YANMAR	
	Model				3TNM72-DRE	3TNV76-UDRE
	Type				4 Cycle Inline, Water-Cooled Diesel	
	Number of Cylinders				3	
	Bore and Stroke			(mm)	72 × 74	76 × 82
	Total Displacement			(L)	0.903	1.115
	Gross Power			(kW)	—	
	Net Power hp			(kW)	14.2	17.6
	Rated Revolution			(min^{-1} (rpm))	3000	
	Maximum Torque			(N•m)	52.6	65.0
	Battery				510 CCA	
	Fuel				Diesel Fuel	
	CO_2 emission			g/kWh	1048 (Test cycle: NRSC)	932 (Test cycle: NRSC)
Capacities	Fuel Tank			(L)	23	
	Engine Oil			(L)	2.9	3.4
	Engine Coolant			(L)	2.8	
	Transmission Oil			(L)	15.5	
	Front-axle Oil			(L)	3.0	
Dimensions	Overall Length (with 3-Point Hitch)			(mm)	2699	2804
	Overall Width (with R4 Tires)			(mm)	1200	1435
	Overall Height (with Roll-Over Protective Structure (ROPS), R4 Tires)			(mm)	2295	2434
	Overall Height (with R4 Tires) (Top of Steering Wheel)			(mm)	1299	1440
	Wheel Base			(mm)	1470	1600
	Min. Ground Clearance (with R4 Tires)			(mm)	140	249
	Tread (with R4)	Front		(mm)	894	960
		Rear		(mm)	894	1080
Weight (with Roll-Over Protective Structure (ROPS) and R4 Tires)				(kg)	744	868
Traveling System	Tire	Ag (R1)	Front		—	
			Rear		—	
		Turf (R3)	Front		18 x 8.50-10 4PR	23 x 8.50-12 4PR
			Rear		26 x 12.00-12 4PR	36 x 13.50-15 4PR
		Industrial (R4)	Front		18 x 8.50-10 6PR	23 x 8.50-12 6PR
			Rear		26 x 12.00-12 4PR	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			(m)	2.4	2.6

Hydraulic Unit	Hydraulic Control System			Select Control, Open Center	Position Control, Open Center
	Pump Capacity (main)		(L/min)	15.1	
	Pump Capacity (steering)		(L/min)	13.2	
	3-Point Hitch			Limited Category 1	
	Max. Lift Force	Lift Point	(kg)	—	
		610 mm Behind Lift Point	(kg)	300	548
	System Pressure		(MPa)	13.0	16.7
Power Take Off (PTO)	Type			Hydraulic Clutch	
	Rear	Shaft size		35 mm OD, 6 Splines.	
		Type		Independent	
		Speed/Engine	(min^{-1} (rpm))	540/3120	
	Mid	Shaft size		SAE 16/32, 15-Splines.	
		Type		Independent	
		Speed/Engine	(min^{-1} (rpm))	2000/3111	

All data are subject to change without notice.

Table 3-3

Model				SA424/SA221
Noise	COMMISSION DELEGATED REGULATION (EU) No 1322/2014 Annex XIII	Noise at the operator's ear	ROPS	86 dB(A)
			CAB Closed cabin	86 dB(A)
			CAB Opened cabin	86 dB(A)
Vibration	COMMISSION DELEGATED REGULATION (EU) No 1322/2014 Annex XIV	Vibration acceleration (aws)		Cobo M200 Mech suspension 1.22 m/s^2 1.06 m/s^2
		Light driver (59 kg)		
		Heavy driver (98 kg)		

2. Traveling Speeds (Reference)

Table 3-4

Model		Forward	Reverse
		(km/h)	(km/h)
SA221	—	0-12.9	0-9.4
SA424	Lo	0-9.4	0-6.6
	Hi	0-19.7	0-13.8

4. IMPLEMENT CAPACITIES

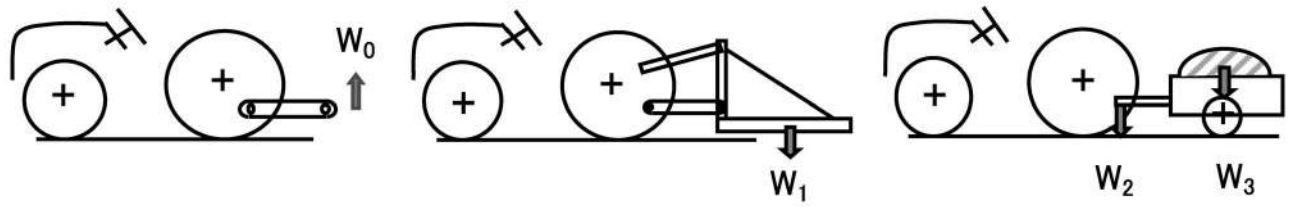
- Prior to delivery, the tractor is subjected to the load tests described below.
- The tests are designed to ensure the tractor performs safely and to specification when subjected to various loads and stresses.
- Authentic implements approved by Yanmar are used.

IMPORTANT

- Use only implements approved by YOUR LOCAL YANMAR TRACTOR DEALER.
- All implements used must conform to the approved specifications, per below.
- Using unapproved implements can result in malfunction, failure and damage to the tractor.
- The preceding action 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.

Table 4-1

Unit	610 mm Behind Lift Point Maximum Lifting Capacity	Implement Weight and Size	Trailer Loading Weight Maximum Capacity	
	W_0	W_1	W_3	
kg	SA221: 300 SA424: 548	As specified in the list shown in the following	Unbraked	700
			Inertia Braked	1600
			Power Assisted	-



NOTE

- Consult your local YANMAR tractor dealer for more details.
- This tractor is not suitable for use in the Forestry industry or for the use with “Crop spraying equipment”.
- Remark NOT to overload a single axle, NOT to exceed the maximum vehicle weight and always to have at least 20% front axle load and 30% rear axle load.

Table 4-2

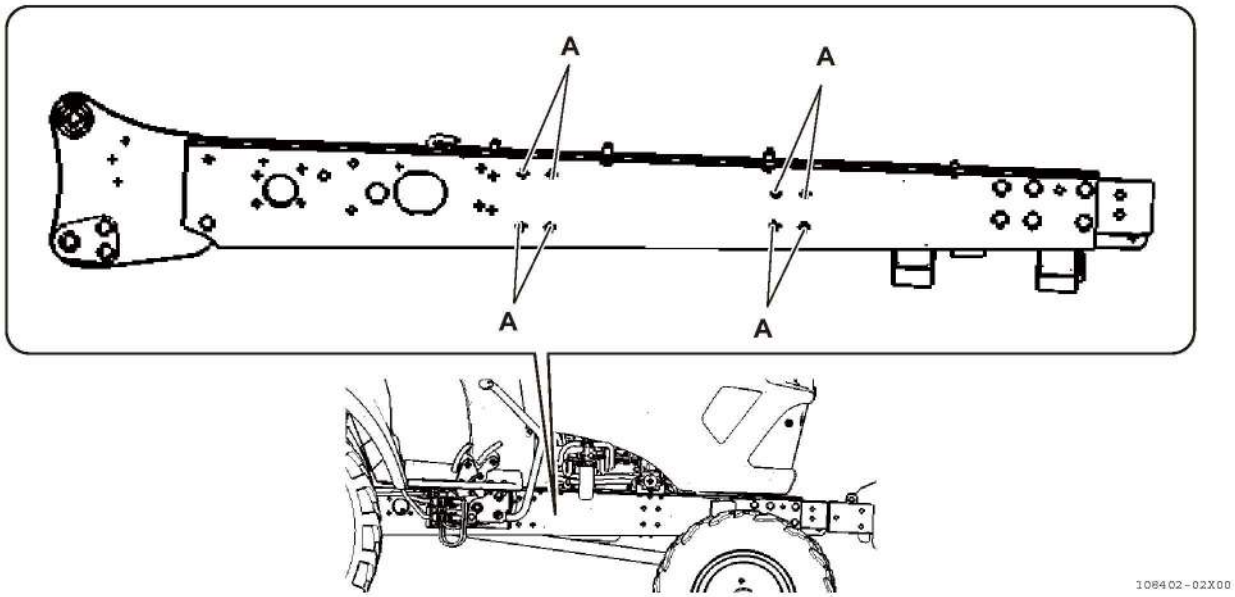
MAXIMUM PERMISSIBLE LOAD				
Model	SA221		SA424	
	CAB	ROPS	CAB	ROPS
Total permissible mass	1700 kg	1475 kg	1740 kg	1475 kg
Permissible front load	700 kg		740 kg	
Permissible rear load	1000 kg		1000 kg	

Front axle load shall never be less than 20%
Rear axle load shall never be less than 30%

Table 4-3

Implement		Description	Unit	Maximum Amount	
				SA221	SA424
Mower	Rotary-Cutter	Cutting Width	mm	1066	1524
		Weight	kg	159	244
	Finish Mower	Cutting Width	mm	1372	1524
		Weight	kg	182	228
	Mid-Mount	Cutting Width	mm	152	152
		Weight	kg	109	109
Rotary Tiller		Tilling Width	mm	1118	1524
		Weight	kg	183	215
Box Scraper		Cutting Width	mm	1219	1524
		Weight	kg	129	233
Rear Blade		Cutting Width	mm	1400	1600
		Weight	kg	123	160
Landscape Rake		Cutting Width	mm	1524	1524
		Weight	kg	80	80
Loader		Lift Capacity (at Pivot)	kg	375	545
		Overhang (Pivot ~ Front Tire Center)	mm	674	795
		Weight (without Bucket)	kg	134	165
		Oil Pressure	MPa	13.0	16.7

Mounting point for front loader

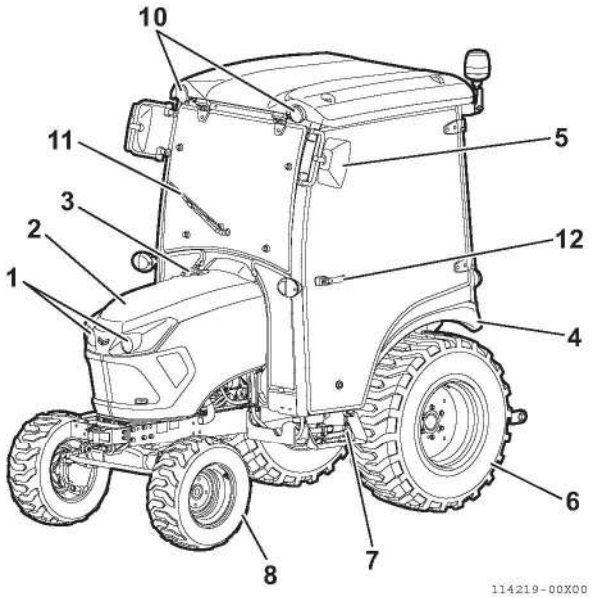


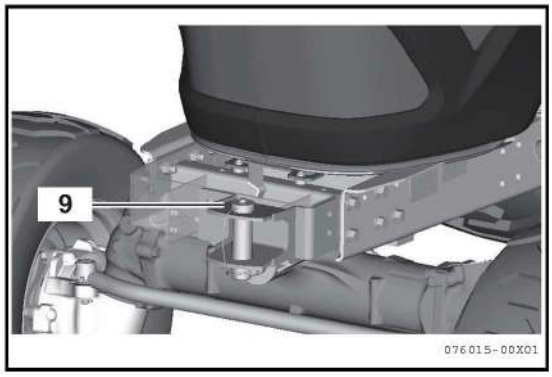
(A)Mounting point for front loader (Both side)

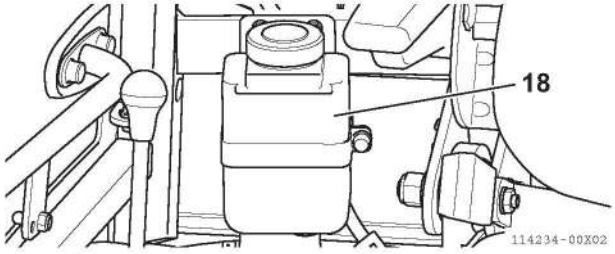
5. NAMES AND FUNCTIONS OF COMPONENTS

1. Overview

■ Names of Main Components (CAB type)







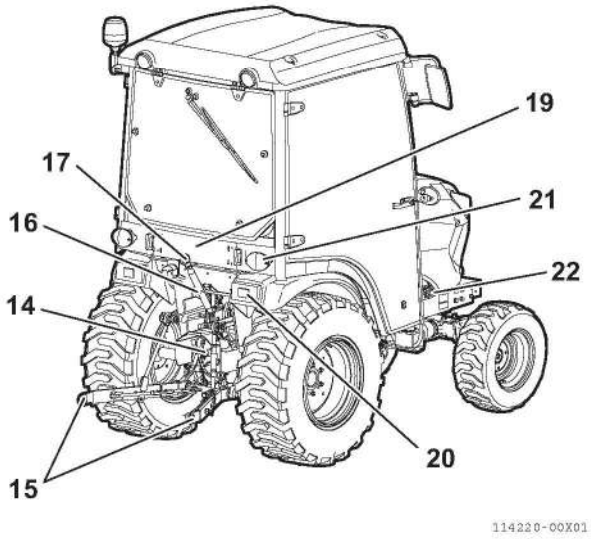
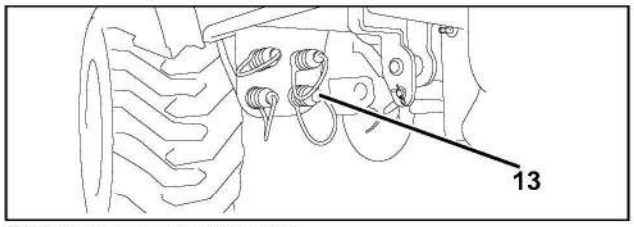
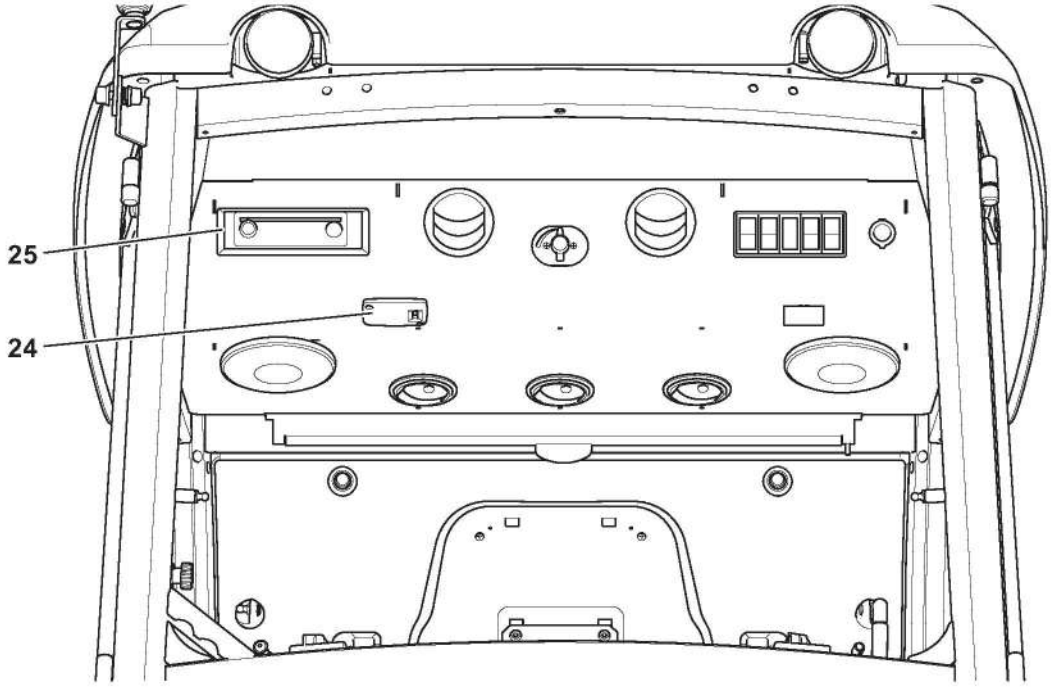


Fig 5-1

(1) Headlights
(2) Hood
(3) Fuel filler cap
(4) Fender
(5) Rear view mirror
(6) Rear tires
(7) Mid-Power Take Off (PTO) shaft
(8) Front tires
(9) Front hitch
(10) Work lights
(11) Windshield wipers
(12) Handle
(13) Hydraulic quick couplers
(14) Rear-Power Take Off (PTO) shaft
(15) Lower links
(16) Top link hook
(17) Top link
(18) Window washer tank
(19) License plate attaching stay
(20) Reflector
(21) Combination lights (Turn signal/hazard lights)



(22) Battery cut-off switch



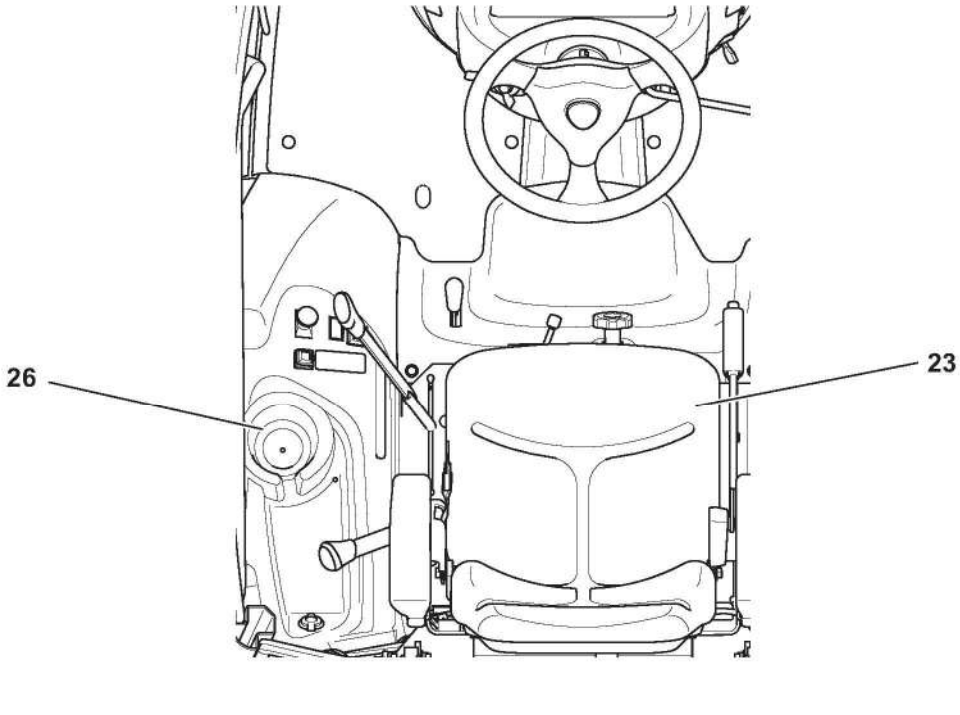


Fig 5-2

(23) Operator seat
(24) Room lamp
(25) Radio KIT
(26) Cup holder

NOTE
Use right/left door or rear window to escape when an emergency. Refer to page 5-3

■ CAB emergency exits

Pull up the door opening lever to open the two doors to exit when an emergency.

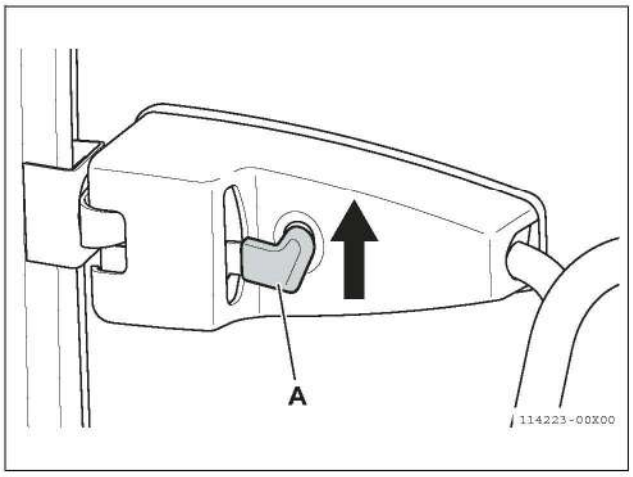


Fig 5-3

(A) Door opening lever

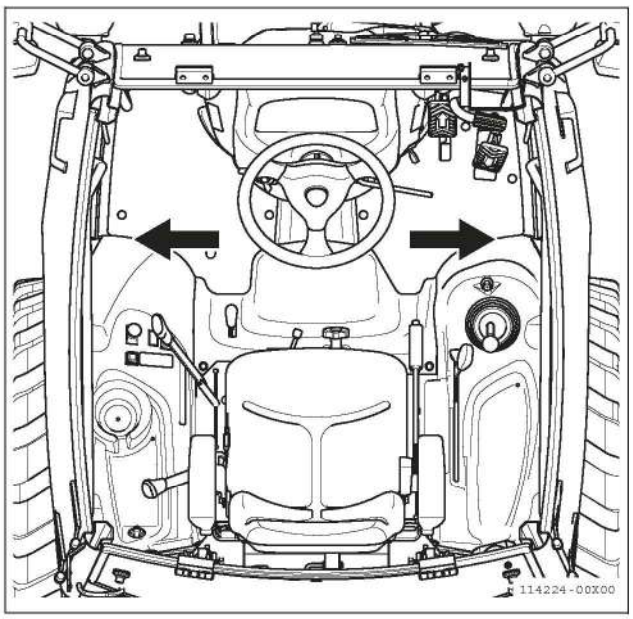


Fig 5-4

You can also exit from the rear window by turning the rear window lock lever to the "Unlock" side and pushing the rear window upwards.

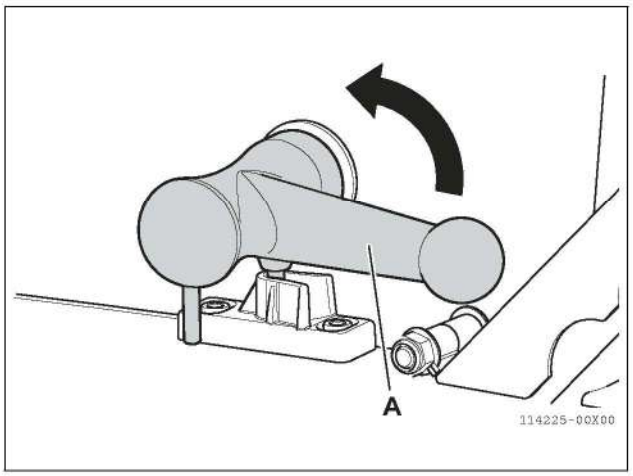


Fig 5-5

(A) Rear window lock lever

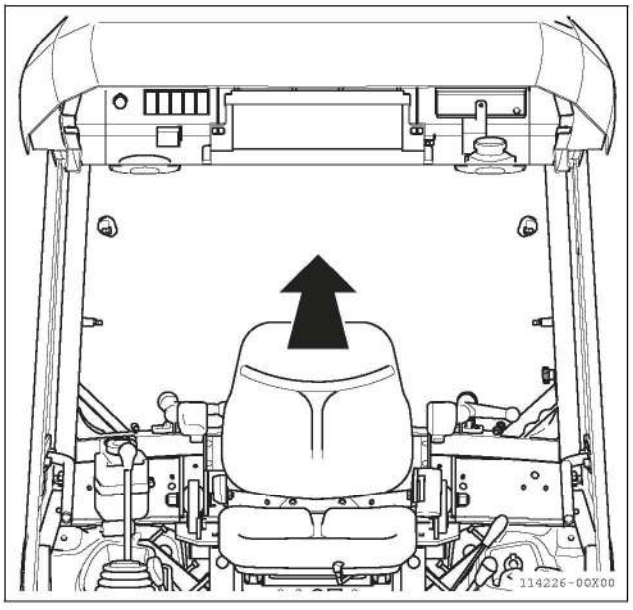


Fig 5-6

■ CAB

⚠ CAUTION

- **Please be gentle when handling glass. The glass may break and cause injury.**

Handle

Used for opening the door from the outside.
The door will unlock and open by pulling the handle.

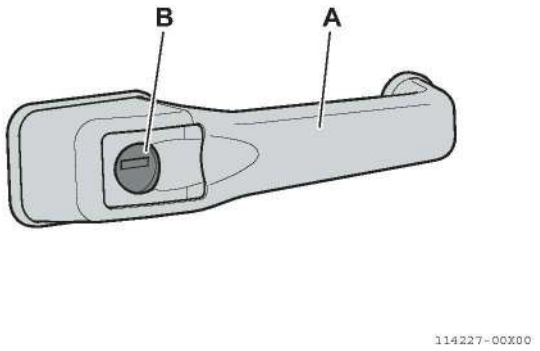


Fig 5-7

(A) Handle
(B) Key cylinder

Insert the key to the key cylinder located under the handle, and turn it clockwise to lock or anti-clockwise to unlock.

IMPORTANT

- Do not lean or hang on the handle or apply excessive weight to the handle.
- Water may enter into the CAB through the key cylinder. Please be careful at car wash.

Door opening/closing lever

Used for opening the door from the inside.

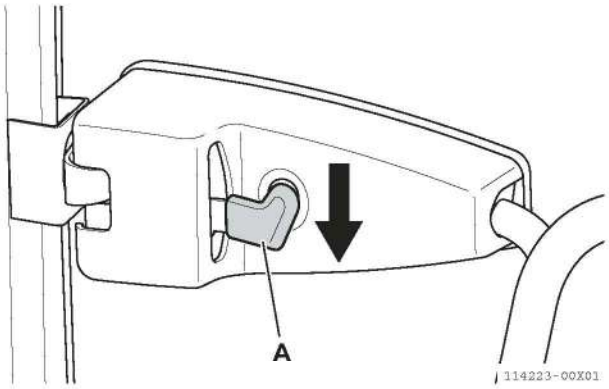


Fig 5-8

(A) Door opening lever

Pushing down the door opening lever, the door will open.

Rear window lock lever

⚠ CAUTION

- **Do not place your hand or arm between the backrest and the rear part of the CAB. You may get injured between the backrest and the rear window lock lever.**

For opening and closing the rear window.
It will open by turning the rear window lock lever to the "Unlock" side and pushing the rear window upwards.

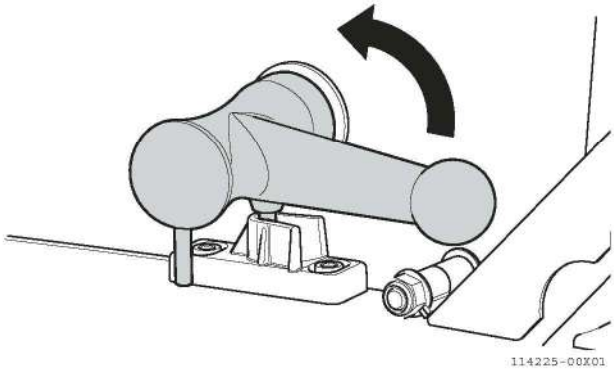


Fig 5-9

IMPORTANT

- Even when the upper position dial setting is at the lowest position, if the attachment is at the uppermost position, the rear window may not be able to open, or the window may interfere with the attachment when it is open. (Manure spreaders such as broadcaster, or ridging machine, roll balers, etc.) If you are using such attachments, please keep the rear window closed.
- Also after you finish working and leave the tractor, always close the rear window. If the CAB gets soaked from rain or the like, it may cause damage.
- Do not travel on public road with the rear window opened.

Front window lock lever

For opening and closing the front window.

It will open by turning the front window lock lever (right and left) to the "Unlock" side and pushing the rear window upwards.

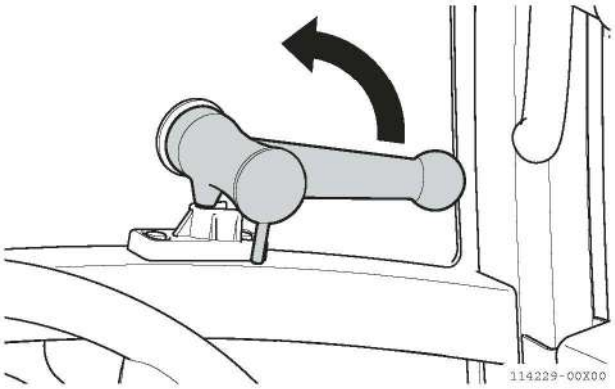


Fig 5-10 Front window lock lever (right)

IMPORTANT

- Also after you finish working and leave the tractor, always close the front window. If the CAB gets soaked from rain or the like, it may cause damage.
- Do not travel on public road with the front window opened.

Room lamp

For turning on and off the room lamp.

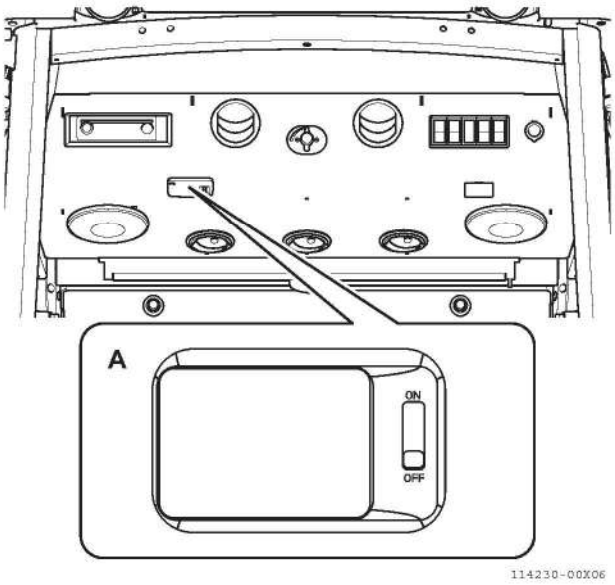


Fig 5-11

(A) Room lamp

ON… The room lamp turns on.

Middle…The room lamp will turn on when the door is opened.

OFF… The room lamp turns off.

IMPORTANT

- When leaving the tractor, always place the room lamp switch to OFF position. The battery may discharge.

Radio KIT

It is located on the upper left side of the operator's seat.

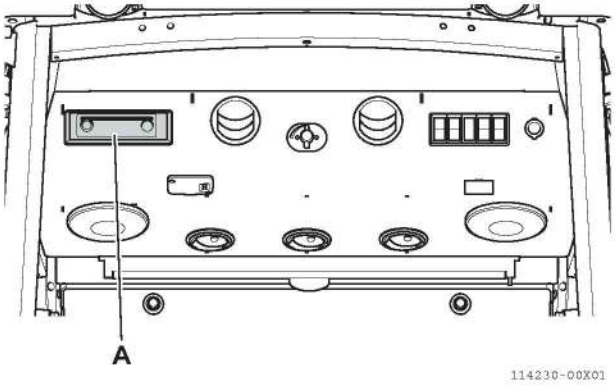


Fig 5-12

(A) Radio KIT

■ Heater

The wind direction can be adjusted with the vents.

Operating part

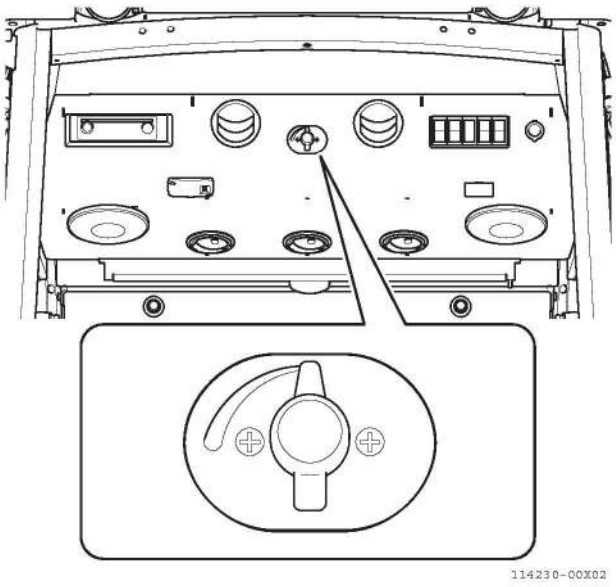


Fig 5-13

Vents

Wind direction can be changed. You can close the vent at closed position.

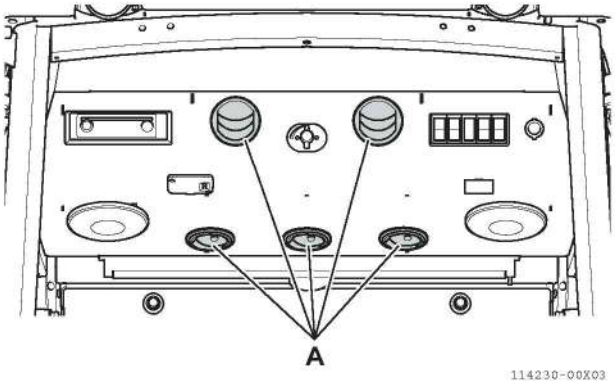


Fig 5-14

(A) Vents

NOTE

- The lower part of the drawing is the front of the tractor.

Names and functions of the operating part

Temperature adjusting dial

For adjusting the temperature.

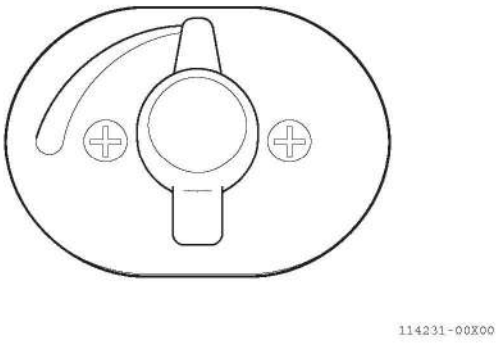
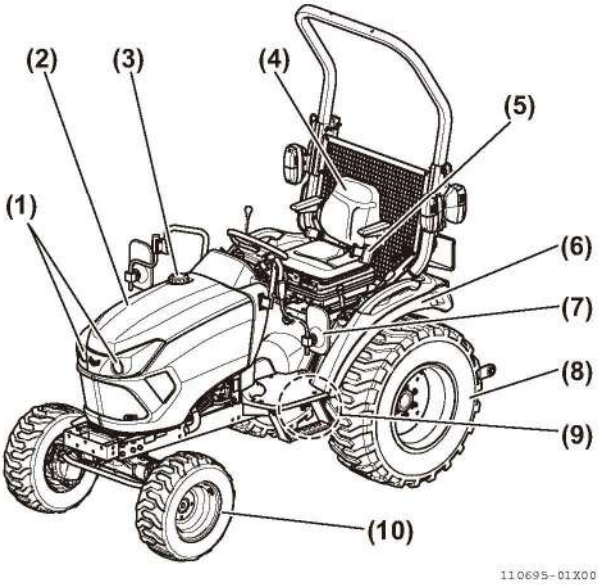
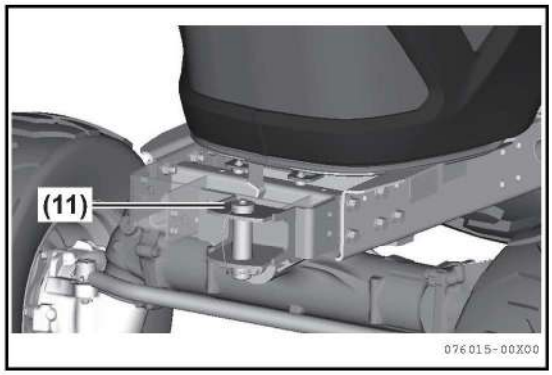


Fig 5-15

Turn to the right	Temperature drops.
Turn to the left	Temperature rises.

■ Names of Main Components (ROPS type)





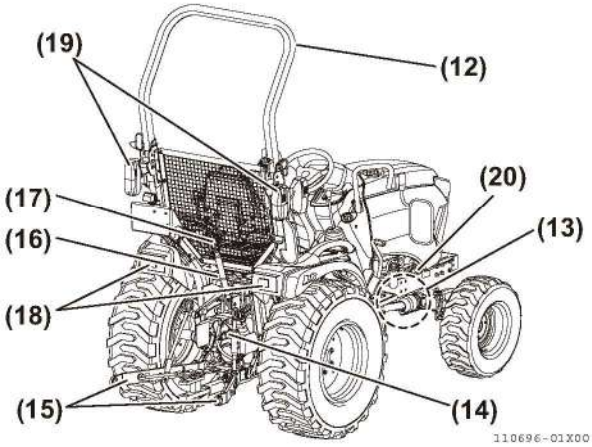
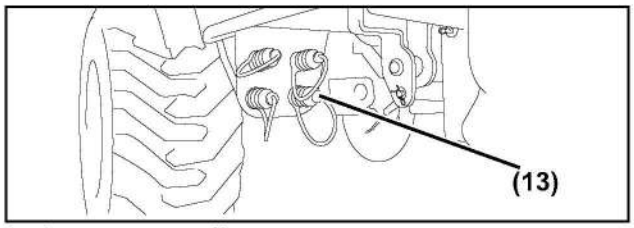


Fig 5-16

(1) Headlights
(2) Hood
(3) Fuel filler cap
(4) Operator seat
(5) Seatbelt
(6) Fender
(7) Rear view mirror
(8) Rear tires
(9) Mid-Power Take Off (PTO) shaft
(10) Front tires
(11) Front hitch
(12) Roll-Over Protective Structure (ROPS)
(13) Hydraulic quick couplers
(14) Rear-Power Take Off (PTO) shaft
(15) Lower links
(16) Top link hook
(17) Top link
(18) Reflector
(19) Combination lights (Turn signal/hazard lights)



(20) Battery cut-off switch

2. Operator Station Controls

■ Names of Components

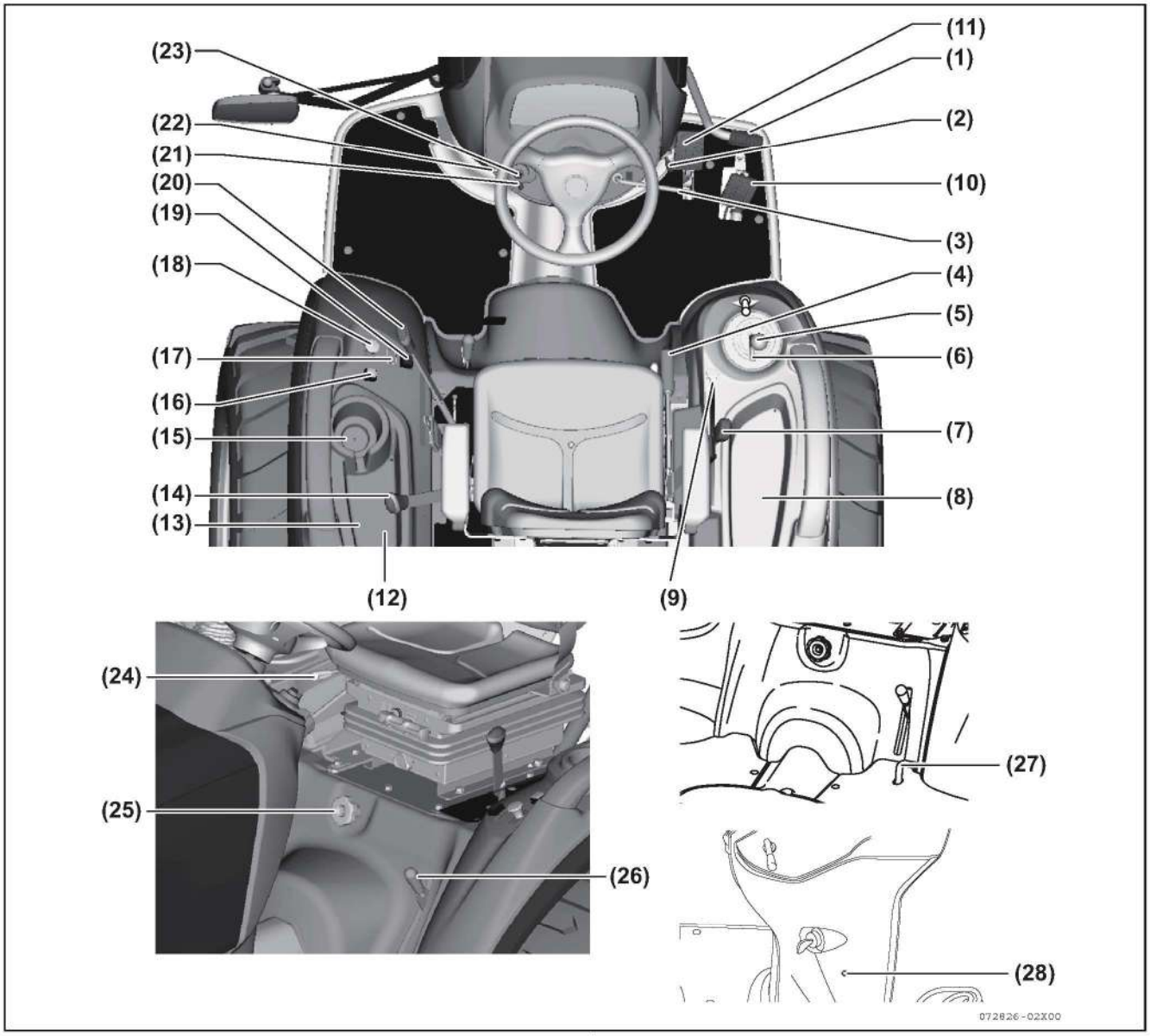


Fig 5-17

(1) Brake pedal
(2) Starter key switch
(3) Throttle control lever
(4) Parking brake lever
(5) Implement control lever
(6) Implement control lever lock
(7) 3-point hitch control lever
(8) Console box (right)
(9) Position stop knob (SA424)
(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) Reverse override switch
(17) Cruise control switch (Option)
(18) Power Take Off (PTO) switch
(19) Hazard lights button switch
(20) Range shift lever (SA424)
(21) Headlight switch
(22) Turn signal switch
(23) Horn
(24) Operator seat forward and backward lever
(25) Hydraulic flow control/stop knob
(26) 2WD/4WD lever
(27) Differential lock pedal (SA424)
(28) Operator presence warning lamp

■ Function of Components

(1) Brake pedal (Fig 5-18, A)

Reduce the speed and stop the tractor.

(A) Brake pedal

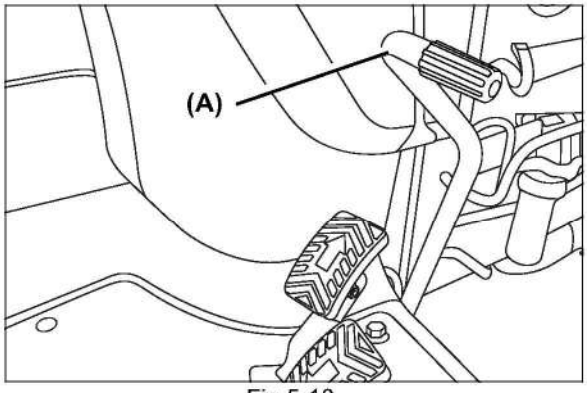


Fig 5-18

(2) Starter key switch (Fig 5-19)

Start and/or shut off the engine.

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

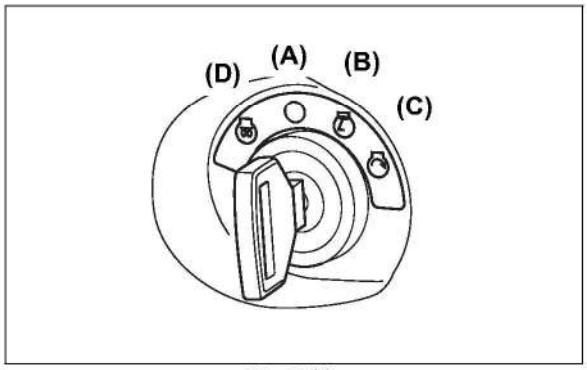


Fig 5-19

(3) Throttle control lever (Fig 5-20)

Increases or decreases the engine speed (min^{-1} (rpm)) rate.

(A) Throttle control lever

(a) Push forward to increase the engine speed (min^{-1} (rpm))

(b) Pull backward to decrease the engine speed (min^{-1} (rpm))

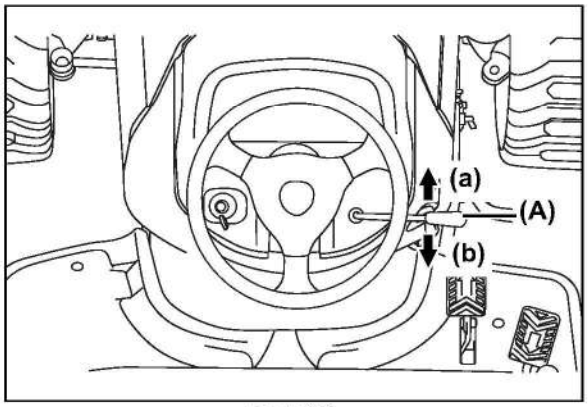


Fig 5-20

(4) Parking brake lever (Fig 5-21)

Engage the parking brake.

(A) Parking brake lever
(a) Lock
(b) Unlock

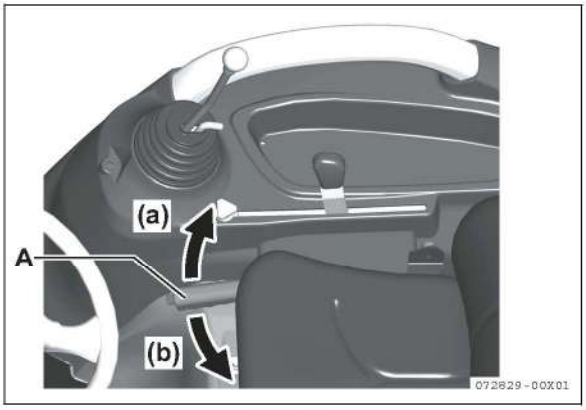


Fig 5-21

(5) Implement control lever (Fig 5-22)

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.

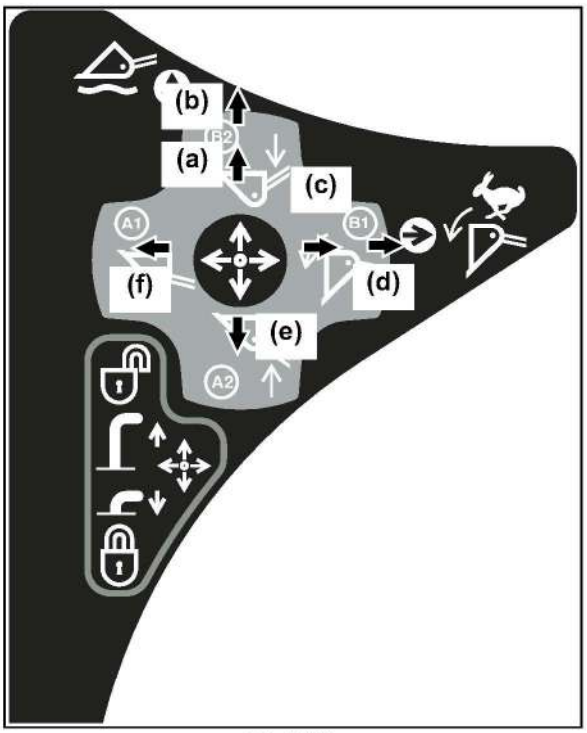


Fig 5-22

(6) Implement control lock lever (Fig 5-23)

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.

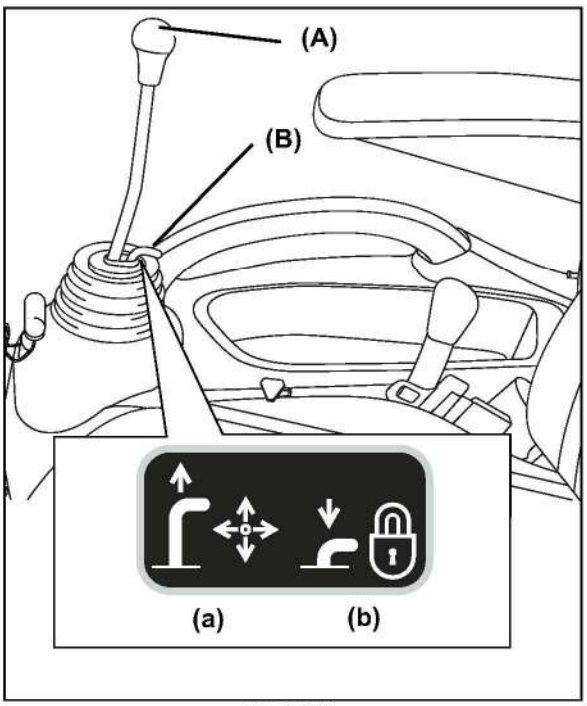


Fig 5-23

(7) 3-point hitch control lever (Fig 5-24, Fig 5-25)

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>

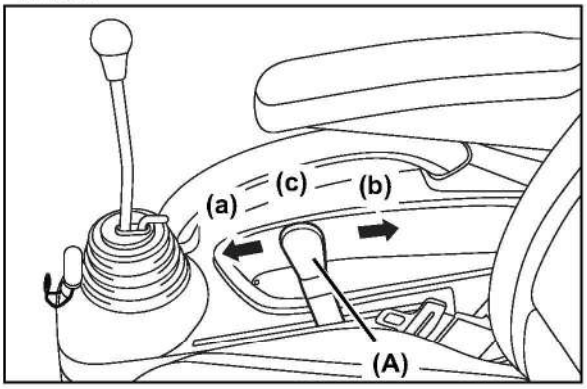


Fig 5-24

<SA424>

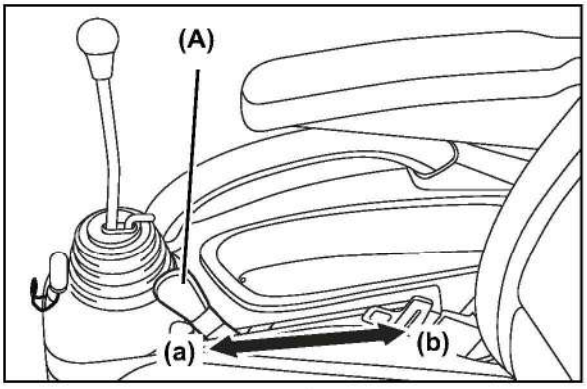


Fig 5-25

(8) Console box (right)

(9) Position stop knob (SA424) (Fig 5-26)

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

(A) Position stop knob

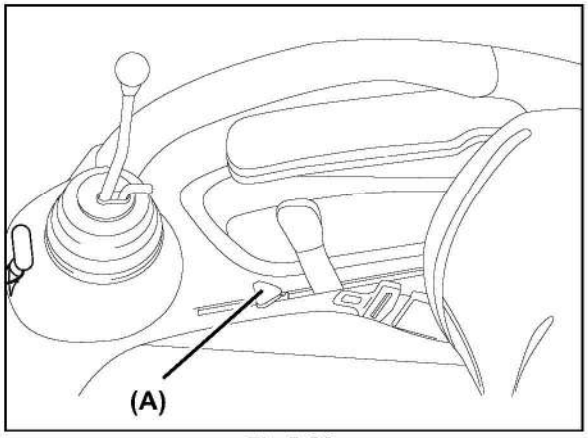


Fig 5-26

(10) Reverse drive pedal (Fig 5-27)

(11) Forward drive pedal (Fig 5-27)

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.

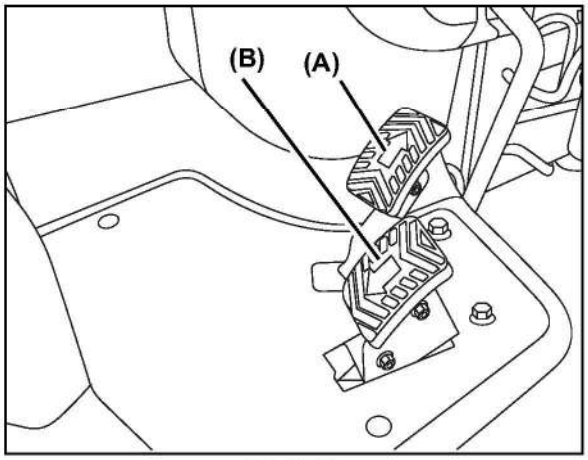


Fig 5-27

(12) 12V DC outlet (Option) (Fig 5-28)

Outlet used for 12V DC supply.

(A) 12V DC outlet

NOTE

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

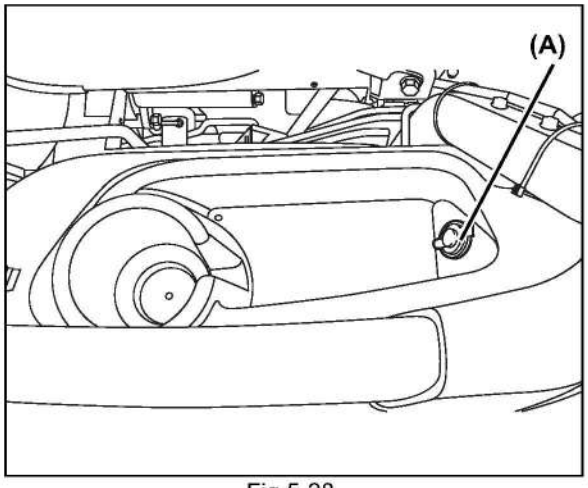


Fig 5-28

(13) Console box (left)

(14) Mid-/Rear Power Take Off (PTO) select lever (Fig 5-29)

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

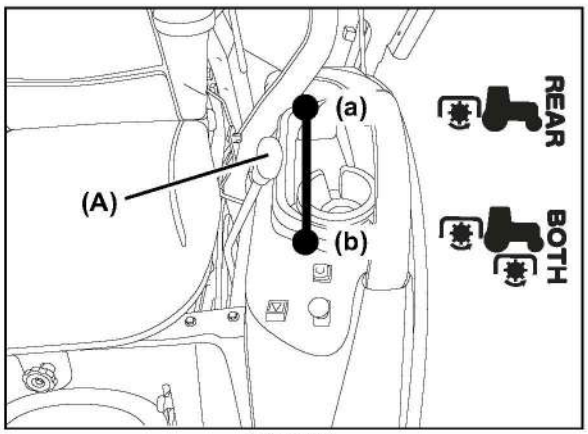


Fig 5-29

(15) Cup holder

(16) Reverse override switch (Fig 5-30)

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

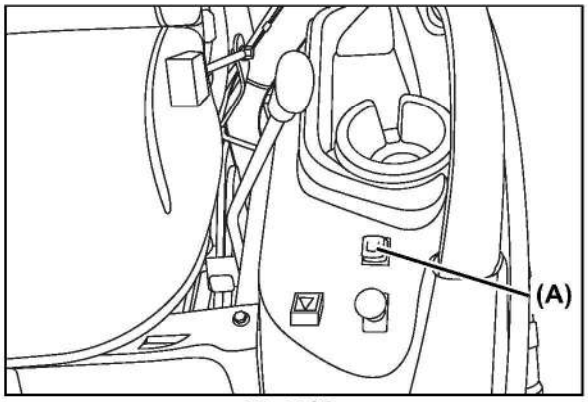


Fig 5-30

(17) Power Take Off (PTO) switch (Fig 5-31)

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

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

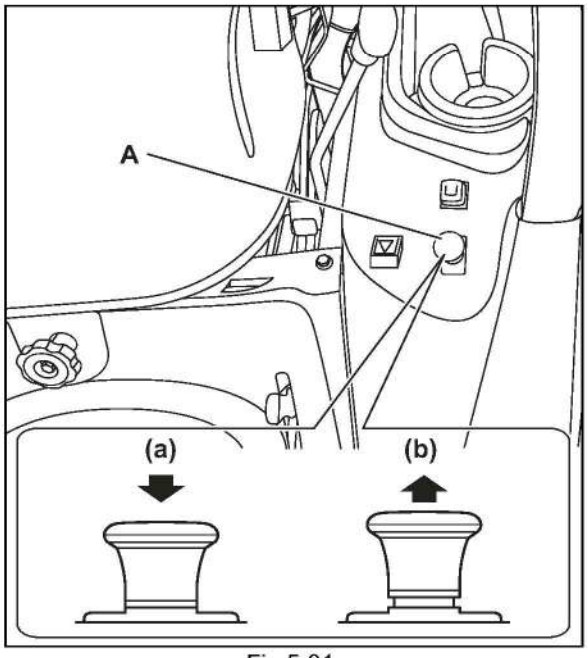


Fig 5-31

(18) Cruise control switch (Option) (Fig 5-32)

Regulates forward speed of the tractor at a preset speed.

(A) Cruise control switch

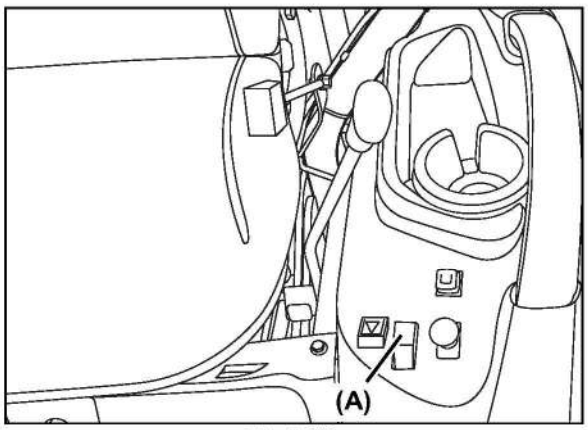


Fig 5-32

(19) Range shift lever (SA424) (Fig 5-33)

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.

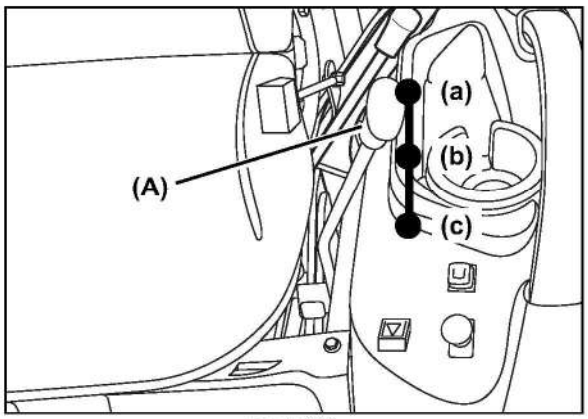


Fig 5-33

(20) Headlight switch (Fig 5-34, A)

(21) Horn switch (Fig 5-34, C)

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

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

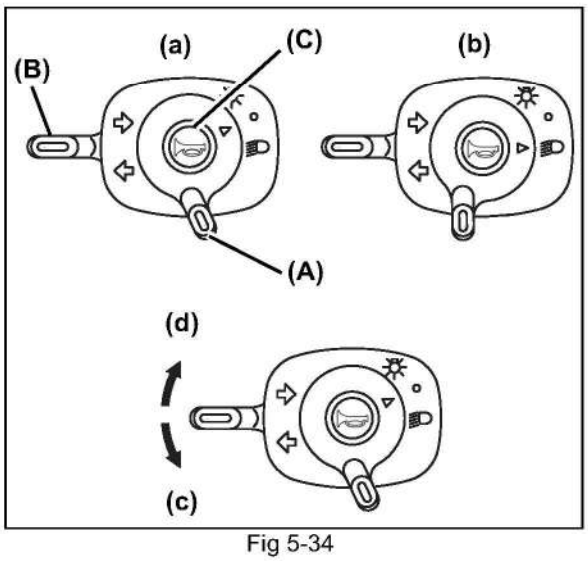


Fig 5-34

(22) Turn signal switch (Fig 5-34, B)

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.

(23) Hazard lights button switch (Fig 5-35)

Turn ON or OFF the hazard lights.

(A) Hazard lights button switch
(a) ON
(b) OFF

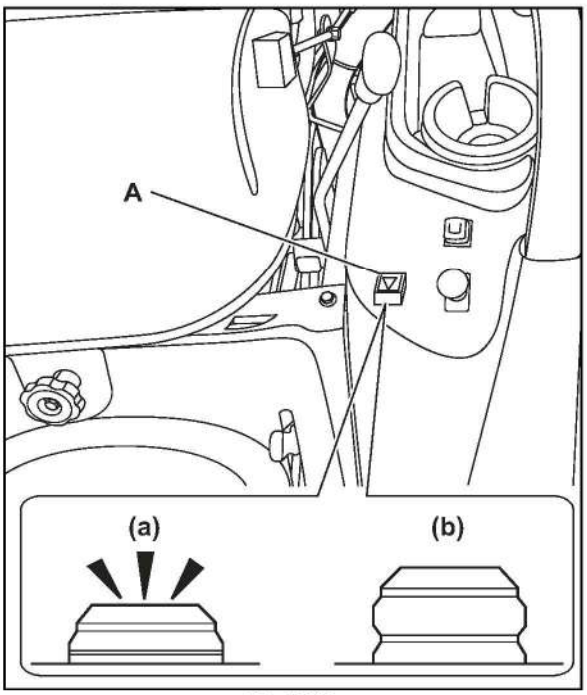


Fig 5-35

(24) Operator seat forward and backward lever

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

(25) Hydraulic flow control/stop knob (Fig 5-36)

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

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

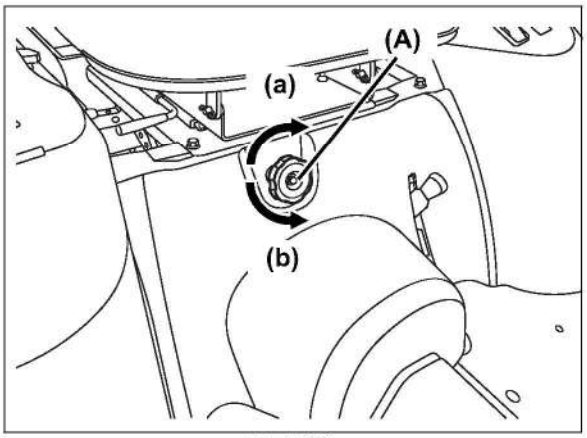


Fig 5-36

(26) 2WD/4WD lever (Fig 5-37)

Engages or disengages the 4-wheel drive.

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

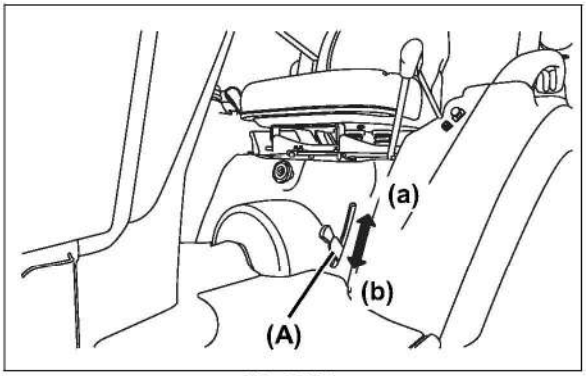


Fig 5-37

⚠ 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.

(27) Differential lock pedal (SA424) (Fig 5-38)

Engages or disengages the differential lock.

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

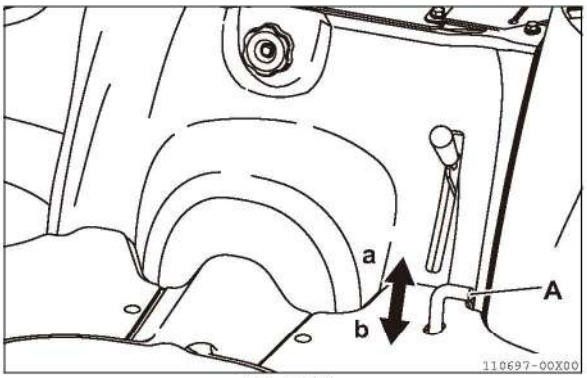


Fig 5-38

⚠ 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.

(28) Operator presence warning lamp (Fig 5-39)

This tractor has the operator presence control function to make alarm with the operator presence warning lamp blinking in case that operator gets up from seat without applying parking brake.

For details, see “5. Operator presence warning” on page 8-10.

(A) Operator presence warning lamp

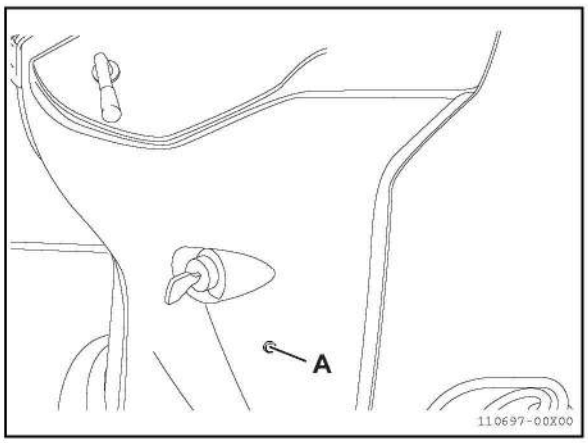


Fig 5-39

3. Instrument Panel, Switches and Hand Controls

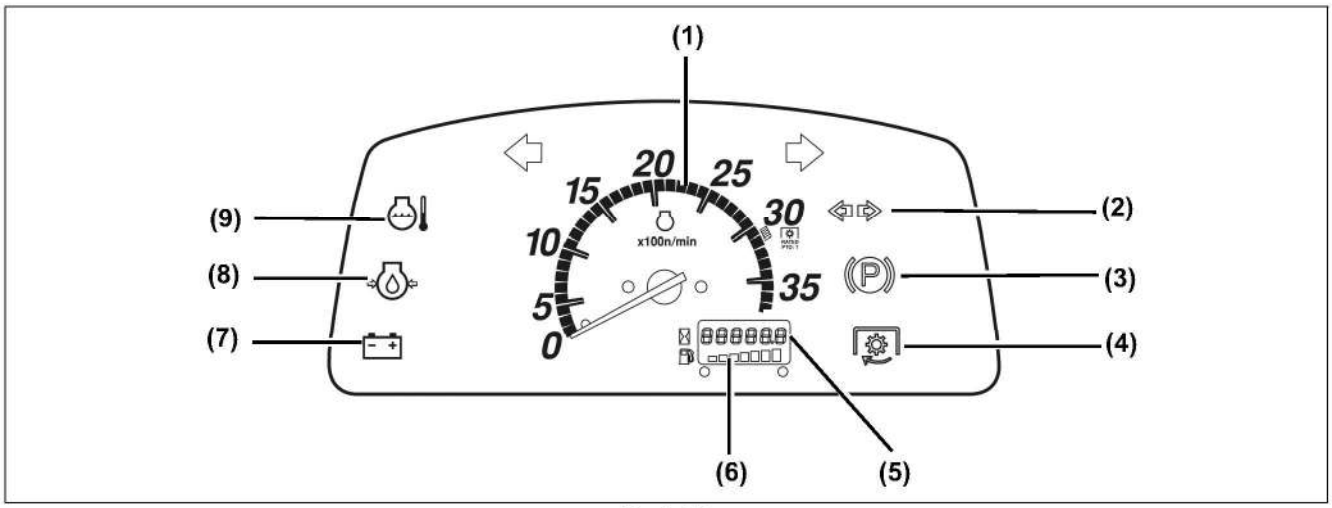


Fig 5-40

(1) Tachometer

Indicates the current engine speed in increments of 100 min^{-1} (rpm).

(2) Tell-tale indicator lamp

The Tell-tale indicator lamp will flash light when the turn-signal lamps of the trailer is not glow, if a tractor is equipped to draw a trailer.

(3) Parking brake indicator lamp

The parking brake lamp will turn on when the parking brake is engaged and the ignition switch is on.

(4) Power Take Off (PTO) indicator light

Power Take Off (PTO) indicator light illuminates when Power Take Off (PTO) switch is in the ON position.

(5) Hour meter

Indicate the total accumulated operating hours.

(6) Fuel gauge

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

(7) 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

(8) 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

(9) 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 can not 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 Checks

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 seatbelt for any problem/s.
12. Check Roll-Over Protective Structure (ROPS) or CAB 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 (SA424)
  - the parking brake lock is engaged
  - Power Take Off (PTO) switch in the OFF position
- Always keep the seatbelt fastened:
  - whenever the Roll-Over Protective Structure (ROPS) is in the unfolded “up” position and locked securely if ROPS is foldable type
- 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 with the transmission in the N (neutral) position**
  - **release the forward and reverse drive pedal to N (neutral) position**
  - **range shift lever is in the N (neutral) position (SA424)**
  - **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**
- **Be careful to the doors, steps and handles when entering the cabin.**

NOTE

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

■ Open/Close the Fuel Shut-Off Valve

1. To open the fuel shut-off valve (Fig 7-1, A): Turn the fuel shut-off valve to the ON (open) position. (Fig 7-1, O)
2. To close the fuel shut-off valve: Turn the fuel shut-off valve to the OFF (closed) position. (Fig 7-1, C)

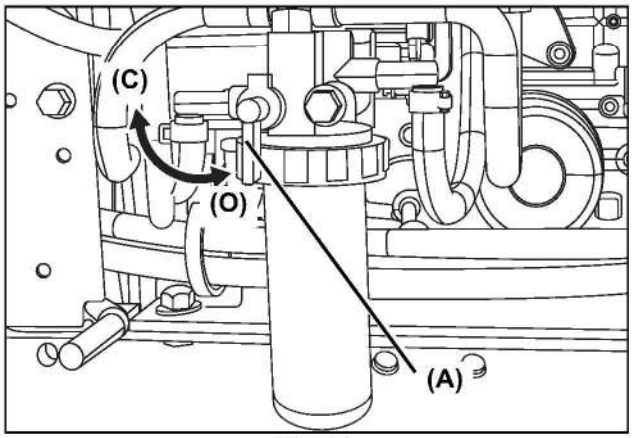


Fig 7-1

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

■ Get on the Tractor

<Three points of contact>
Whenever you climb on or out of your tractor, use three points of contact.
Three points of contact...When three of your four limbs are always in contact with the tractor,

- Two feet and one hand to step into or out of the tractor.
- Two hands and one foot to step into or out of the tractor.

If you are carrying something, put it into the tractor before climbing in.

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

■ Adjust the Operator Seat

1. Sit on the operator seat.
2. Adjust to each operator's personal preference; there are three available seat adjustments:

- Forward/backward adjustment lever
  Move the forward/backward adjustment lever to set the optimal position.
  The operator seat can be adjusted to 14 different positions in 12 mm increments.
  Unlock the forward/backward adjustment lever to set a position that is the most suitable for driving.

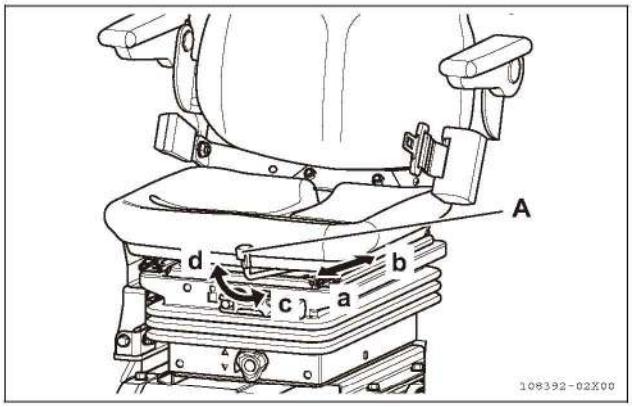


Fig 7-2

(A) Forward/backward adjustment lever
(a) Toward the front
(b) Toward the rear
(c) Lock
(d) Unlock

- Weight adjustment knob
  While seated, turn weight adjustment knob to adjust the stiffness of the seat suspension.
- Height adjustment knob
  While seated, turn height adjustment knob to adjust to preferred height.

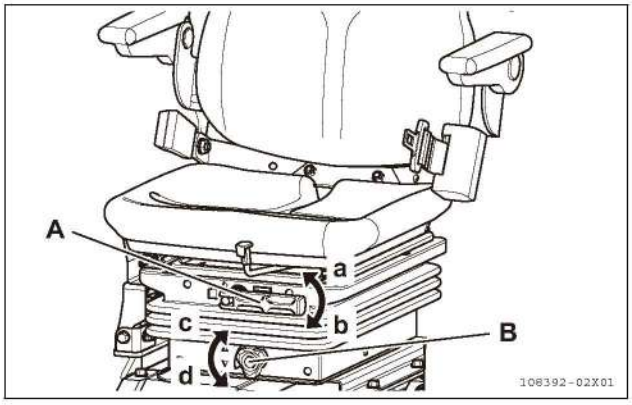


Fig 7-3

(A) Weight adjustment knob
(B) Height adjustment knob
(a) To increase tension
(b) To decrease tension
(c) High
(d) Low

■ Fasten the Seatbelt

⚠ WARNING

- **Always keep the seatbelt fastened:**
  - **while operating the tractor with the Roll-Over Protective Structure (ROPS) in the unfolded "up" position if ROPS is foldable type**
- **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 seatbelt when operating the tractor:**
  - **without the Roll-Over Protective Structure (ROPS)**
  - **with the Roll-Over Protective Structure (ROPS) in the folded "down" position if ROPS is foldable type**

1. Fasten the seatbelt to the buckle located on the left side of the operator seat.

NOTE

- Do not twist the seatbelt.

2. Adjust the seatbelt to the suitable length.

NOTE

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

⚠ CAUTION

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

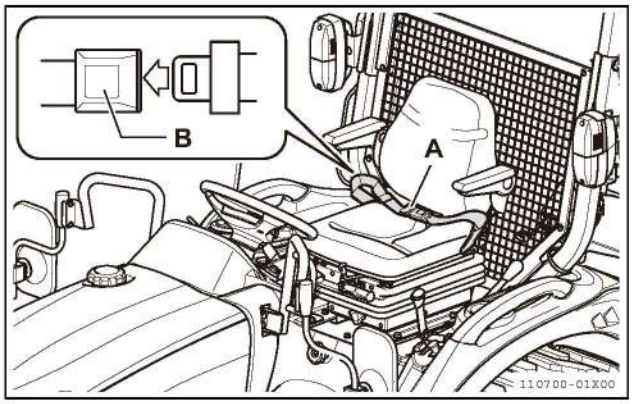


Fig 7-4

(A) Seatbelt
(B) Buckle

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

1. Remove foot from the forward and reverse drive pedal. (Fig 7-5)

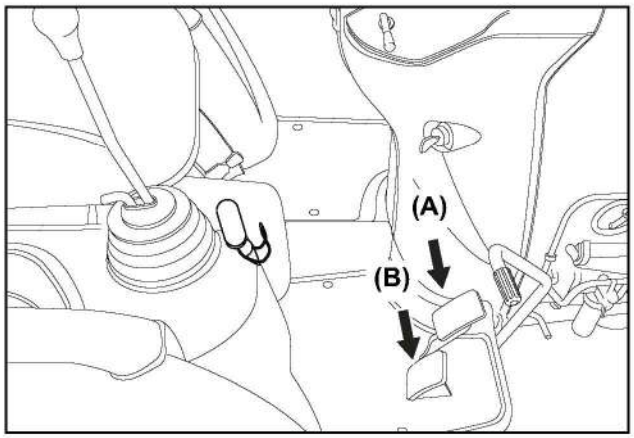


Fig 7-5

(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.

■ Lock and Set the Parking Brake

⚠ WARNING

- **When engaging the parking brake:**
  - **Confirm that the parking brake lever is locked.**

IMPORTANT

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

1. Pull the parking brake lever upward.

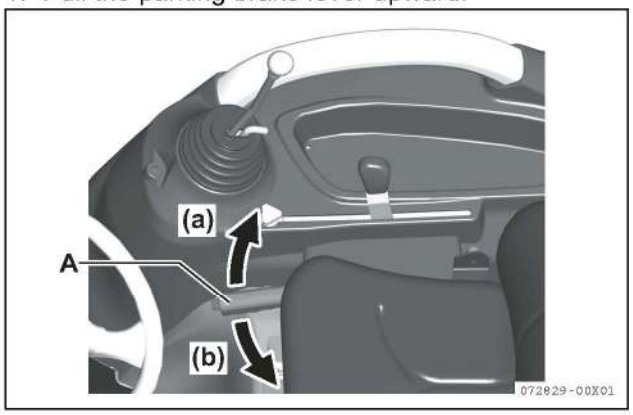


Fig 7-6

(A) Parking brake lever
(a) Lock
(b) Unlock

IMPORTANT

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

■ Perform the Rest of the Operations

1. Move the range shift lever (Fig 7-7) to the N (neutral) position. (SA424)

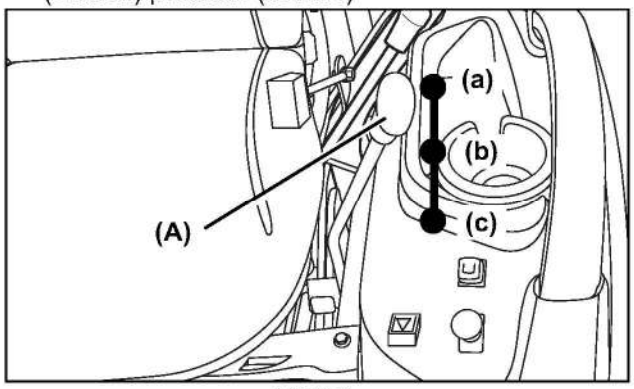


Fig 7-7

(A) Range shift lever (SA424)
(c) N (Neutral position)

2. Push down the Power Take Off (PTO) switch to OFF position. (Fig 7-8)

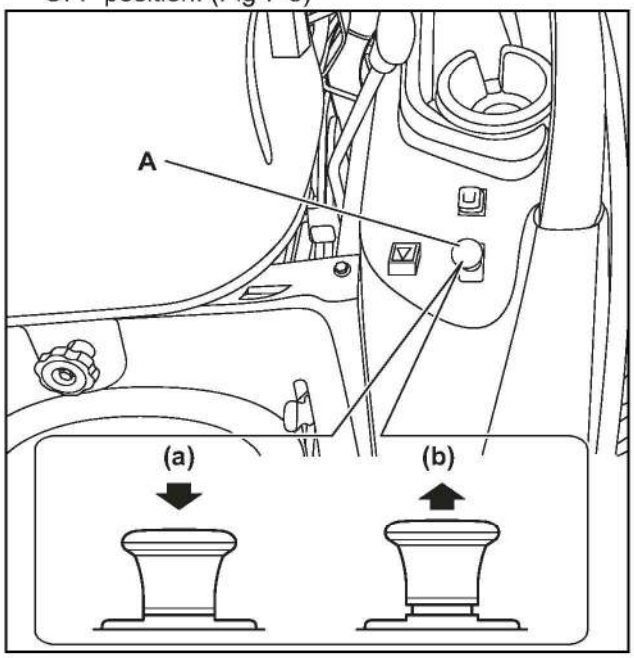


Fig 7-8

(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. (Fig 7-9, Fig 7-10)

<SA221>

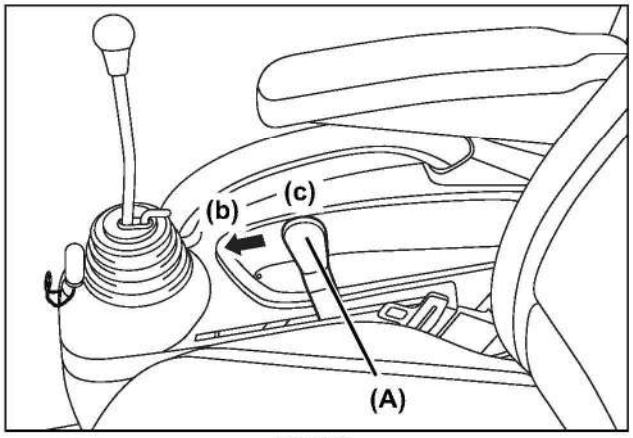


Fig 7-9

<SA424>

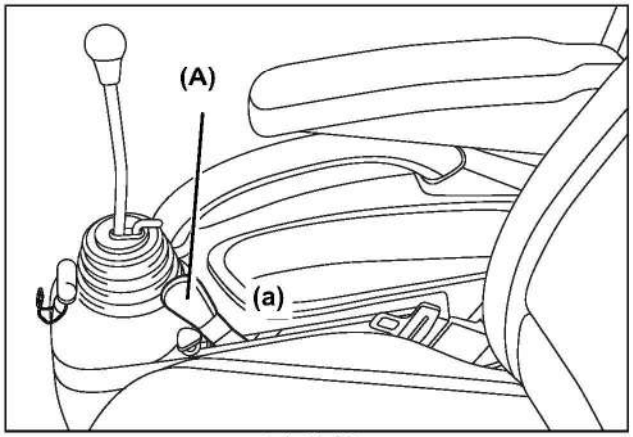


Fig 7-10

(A) 3-point hitch control/cutting height adjustment lever
(a) Lowest position (SA424)
(b) Lower position (SA221)
(c) Neutral (SA221)

IMPORTANT

- Move the 3-point hitch control lever to the lowest position, otherwise the engine does not start. (SA424)
- Move the 3-point hitch control lever to the neutral position, otherwise the engine does not start. (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. (Fig 7-11)

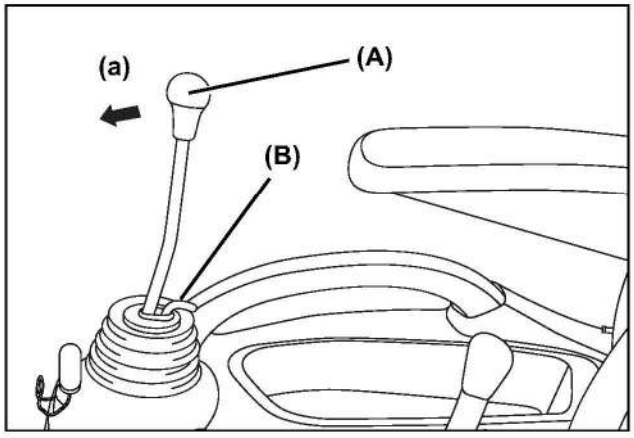


Fig 7-11

(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. (Fig 7-12)

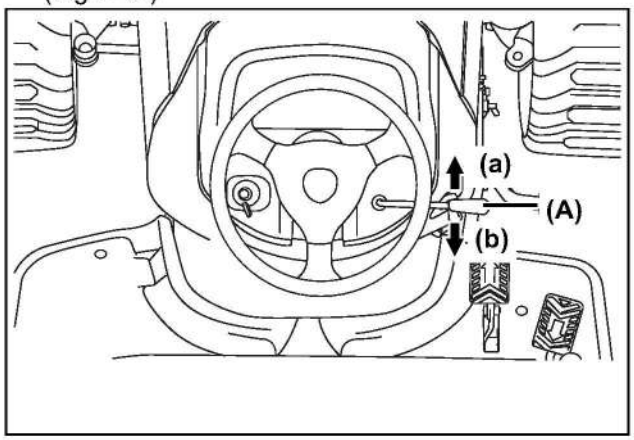


Fig 7-12

(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.

■ Insert the Key into the Starter Key Switch and Turn the Key to the ON Position

OFF position (Fig 7-13, A):
The engine does not run.

ON position (Fig 7-13, B):
The engine oil pressure warning light and the alternator/battery charging light illuminates.

START position (Fig 7-13, C):
- The starter turns the flywheel to run the engine.
- The engine begins to run.
- Once the engine is running, release the starter key switch.

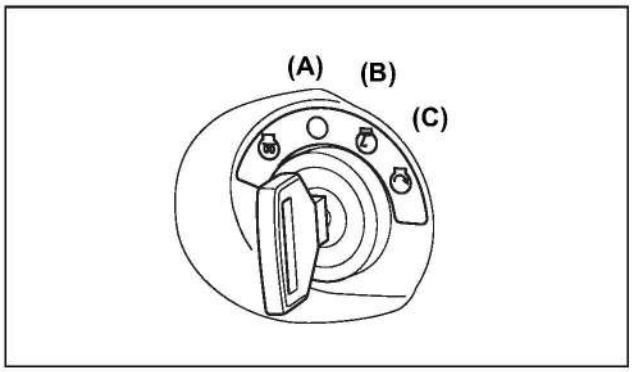


Fig 7-13

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

■ 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. (Fig 7-14, A)
- The alternator/battery charging light illuminates. (Fig 7-14, B)

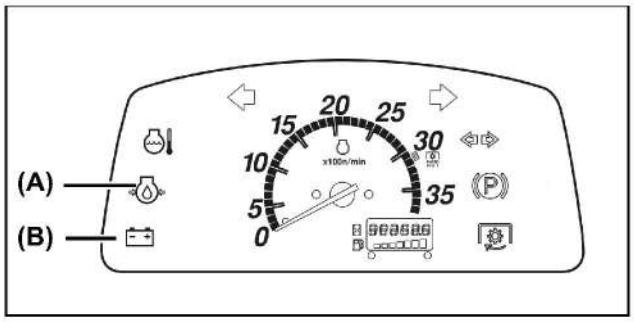


Fig 7-14

(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.
- 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
- 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

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

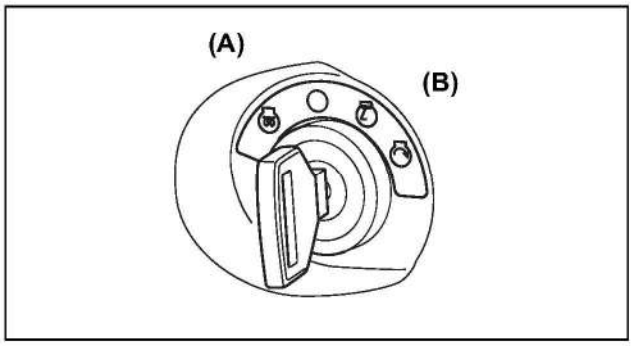


Fig 7-15

(A) Preheating position
(B) START position

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

Table 7-1

Ambient Temperature (°C (°F))	Preheating Time (sec.)
Over 0 (32)	2 to 3
Below 0 (32)	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. (Fig 7-16)

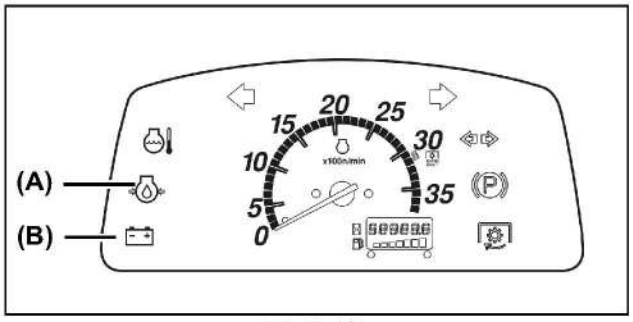


Fig 7-16

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

■ 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
- 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.

■ Starting condition of the engine

The following conditions must be satisfied in order to start the engine. If you miss any of them, the engine will not start.

Key switch	START
Forward/reverse drive pedal	"N" (Neutral)
PTO switch	OFF
3 point hitch control lever	Lowest position (SA424) "N" (Neutral) (SA221)
Seat switch	ON (sitting position)

NOTE
- When starting the engine, if the attachment is raised, lower the attachment to the lowermost position and start the engine.

■ 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.

Table 7-2

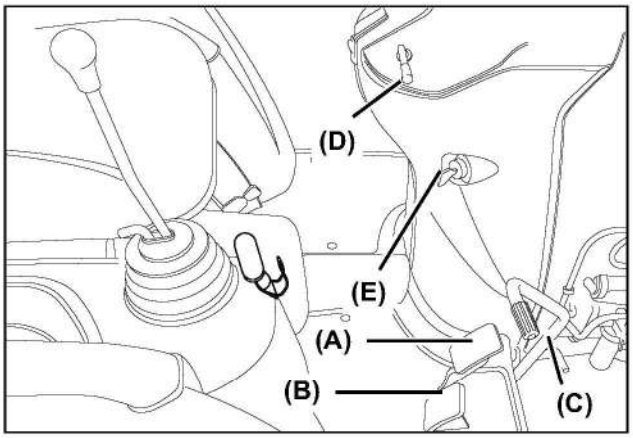
Temperature (°C (°F))	Warming-up Time (min.)
Over 0 (32)	At least 5
0 to -10 (32 to 14)	5 to 10
-10 to -20 (14 to -4)	10 to 15
Below -20 (-4)	More than 15

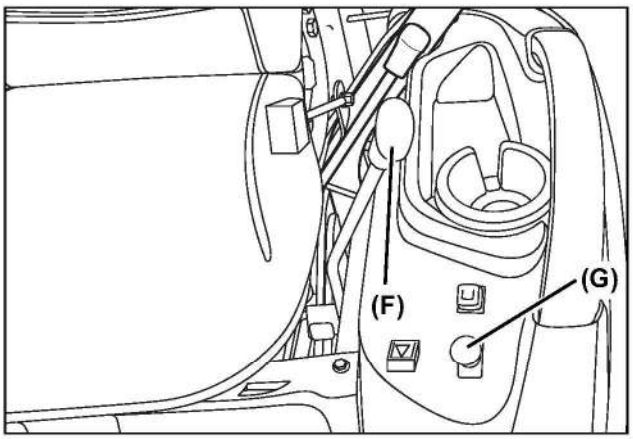
NOTE

- 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. (Fig 7-17, A, B)
   - Depress brake pedal. (Fig 7-17, C)
2. Move the range shift lever (Fig 7-17, F) to the N (neutral) position (SA424).
3. Push down Power Take Off (PTO) switch (Fig 7-17, G) to (OFF) position.





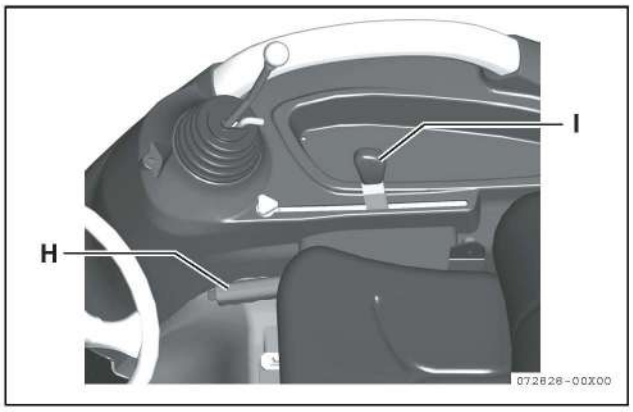


Fig 7-17

(A) Forward drive pedal
(B) Reverse drive pedal
(C) Brake pedal
(D) Throttle control lever
(E) Key switch
(F) Range shift lever (SA424)
(G) Power Take OFF (PTO) switch
(H) Parking brake lever
(I) 3-point hitch control 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 "Lock and Set the Parking Brake" on page 7-4.
6. Pull the throttle control lever (Fig 7-17, D) backward to the slow idle position.
7. Idle the engine at least 2 minutes.
8. Turn the starter key switch (Fig 7-17, E) 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 overheating of the engine.

1. Engage the parking brake securely, for details, see "Lock and Set the Parking Brake" on page 7-4.
2. Move the range shift lever (Fig 7-18, A) to the N (neutral) position. (SA424)

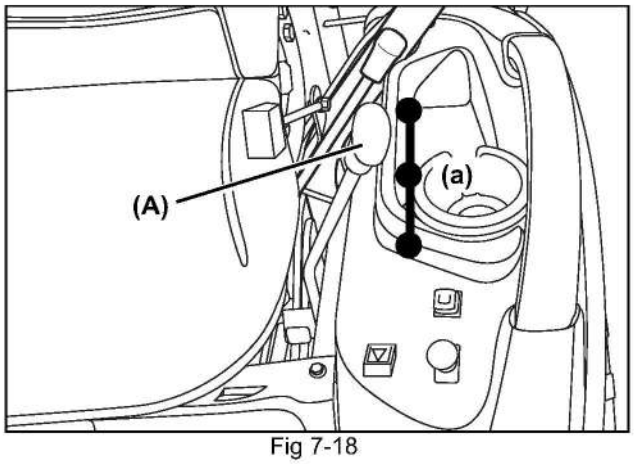


Fig 7-18

(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 (Fig 7-19, A) to OFF position.

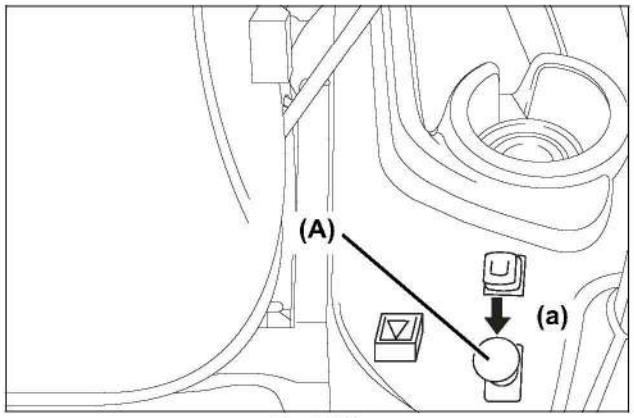


Fig 7-19

(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.

4. Emergency exits

Pull up the door opening lever to open the two doors to exit when an emergency.

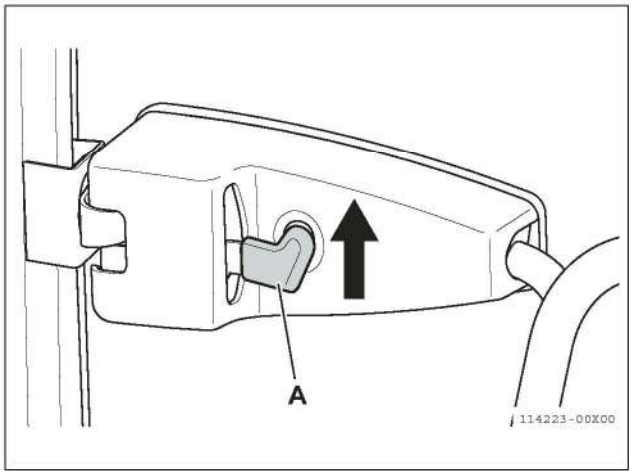


Fig 7-20

(A) Door opening lever

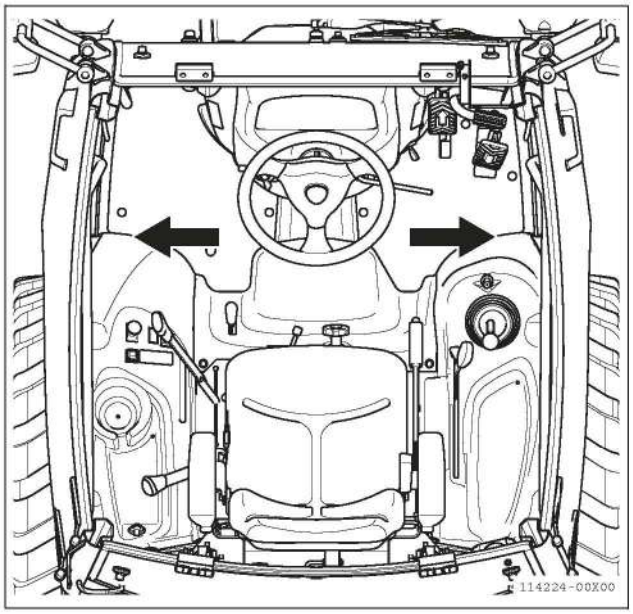


Fig 7-21

You can also exit from the rear window by turning the rear window lock lever to the "Unlock" side and pushing the rear window upwards.

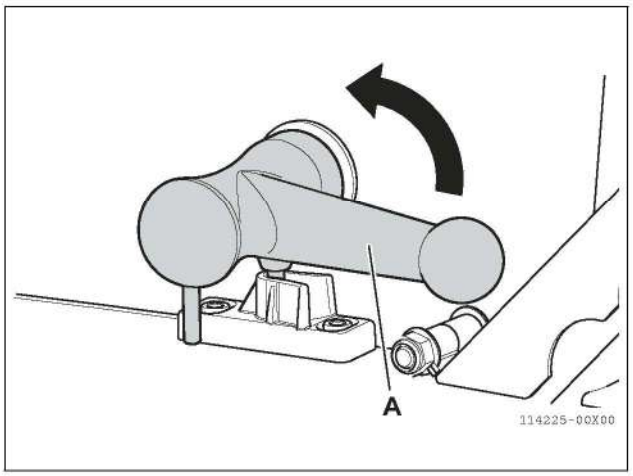


Fig 7-22

(A) Rear window lock lever

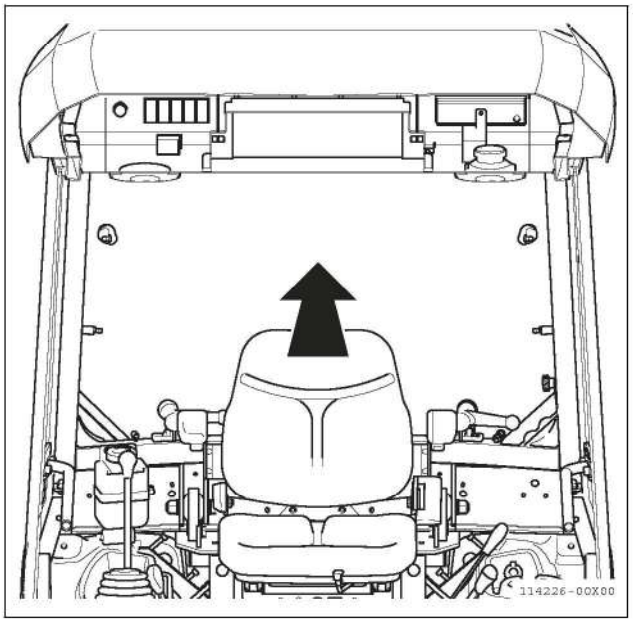


Fig 7-23

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.**

Do not attempt to turn tractor with the differential lock engaged.

- **Attempting to turn the tractor while the differential lock is engaged can lead to the tractor overturning.**

Stay clear of ditches, holes, 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, e.g., during operation in a low clearance area**
- **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)**

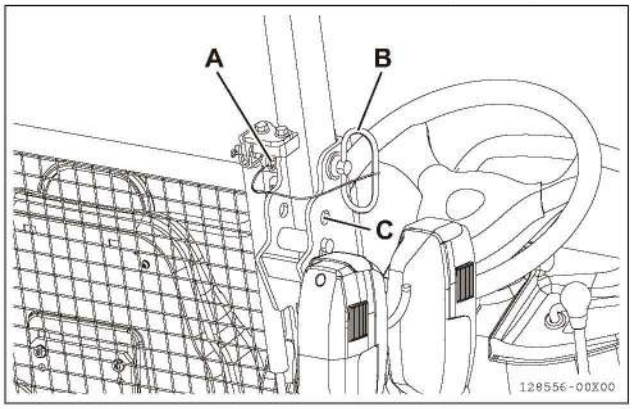
IMPORTANT

- Follow the step on page 8-3 and 8-4 when lowering/raising the Roll-Over Protective Structure (ROPS).

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

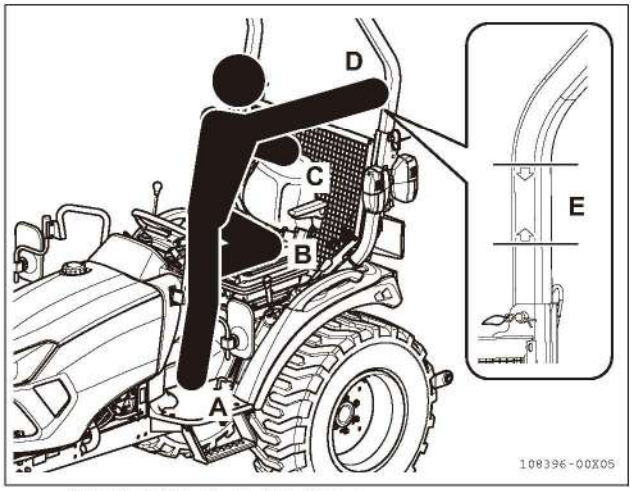
The Roll-Over Protective Structure (ROPS) can be folded down only by approximately 90 degrees.

1. Pull out the retaining pin from each of the position lock pins located on both sides of the Roll-Over Protective Structure (ROPS).
2. Pull out the position lock pins from both sides of the Roll-Over Protective Structure (ROPS).



(A) Retaining pin
(B) Position lock pin
(C) Position lock hole (down position)

3. Stand at the seat side and follow the illustration to lower (folded "down") the Roll-Over Protective Structure (ROPS).
   (Secure three-point support and perform folding operation.)

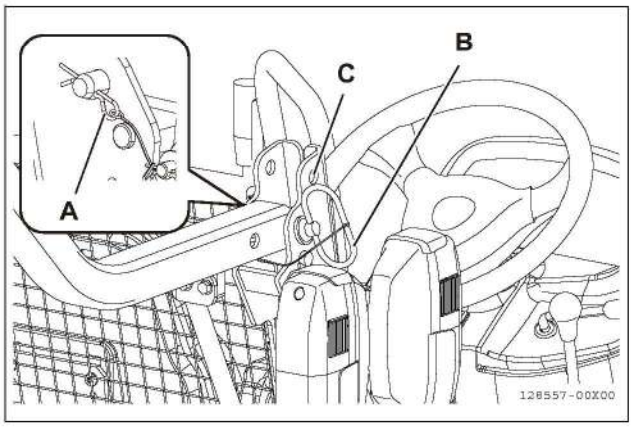


(A) Right foot on the floor
(B) Left knee on the seat
(C) Left hand on the backrest
(D) Right hand to lowering/raising the Roll-Over Protective Structure (ROPS)
(E) Grasp the area between the arrows

4. Position lock holes are located on both sides of the lowered Roll-Over Protective Structure (ROPS). Install the position lock pins into the holes.
5. Hole is found at the end of the position lock pin. Install the retaining pin 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.

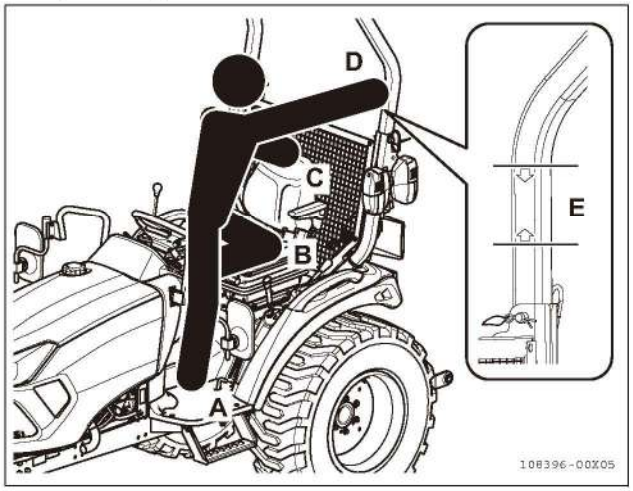
■ Raise (unfolded "up") the Roll-Over Protective Structure (ROPS)

1. Pull out the retaining pin from each of the position lock pins located on both sides of the Roll-Over Protective Structure (ROPS).
2. Pull out the position lock pins from both sides of the Roll-Over Protective Structure (ROPS).



(A) Retaining pin
(B) Position lock pin
(C) Position lock hole (up position)

3. Stand at the seat side and follow the illustration to raise (unfolded "up") the Roll-Over Protective Structure (ROPS).
   (Secure three-point support and perform folding operation.)



(A) Right foot on the floor
(B) Left knee on the seat
(C) Left hand on the backrest
(D) Right hand to lowering/raising the Roll-Over Protective Structure (ROPS)
(E) Grasp the area between the arrows

4. Position lock holes are located on both sides of the lowered Roll-Over Protective Structure (ROPS). Install the position lock pins into the holes.
5. Hole is found at the end of the position lock pin. Install the retaining pin 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.

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 (SA424)
  - 2WD/4WD lever

■ Sit on the operator seat

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

Regarding how to fasten the seatbelt, for details, see "Fasten the Seatbelt" on page 7-3.

■ 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 (Fig 5-34, A)" on page 5-14, "(22) Turn signal switch (Fig 5-34, B) on page 5-14" and "(23) Hazard lights button switch (Fig 5-35)" on page 5-15.

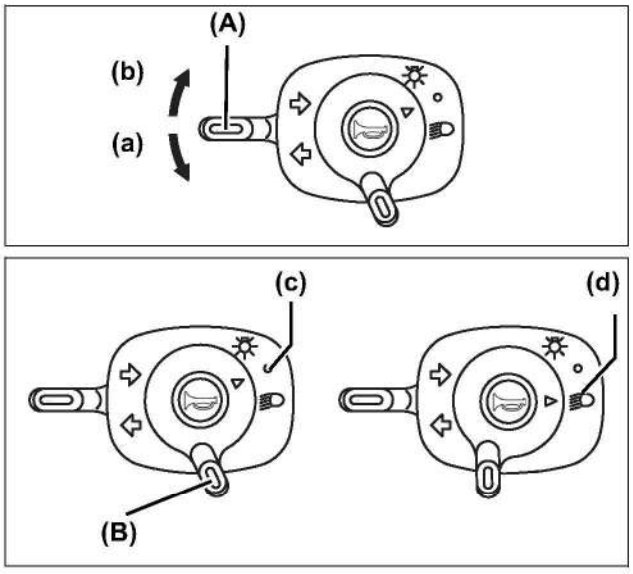


Fig 8-1

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

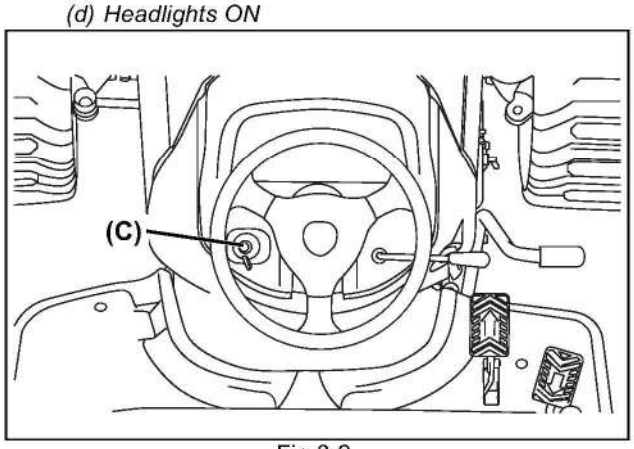


Fig 8-2

(C) Hazard lights button switch

■ Start the engine

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

■ Warm Up Transmission Hydraulic Oil in a Cold Weather Situation

⚠ WARNING

Before warming up the engine, ensure:

- **The parking brake 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 min^{-1} (rpm) for a period of time, as specified in the table below:

Table 8-1

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

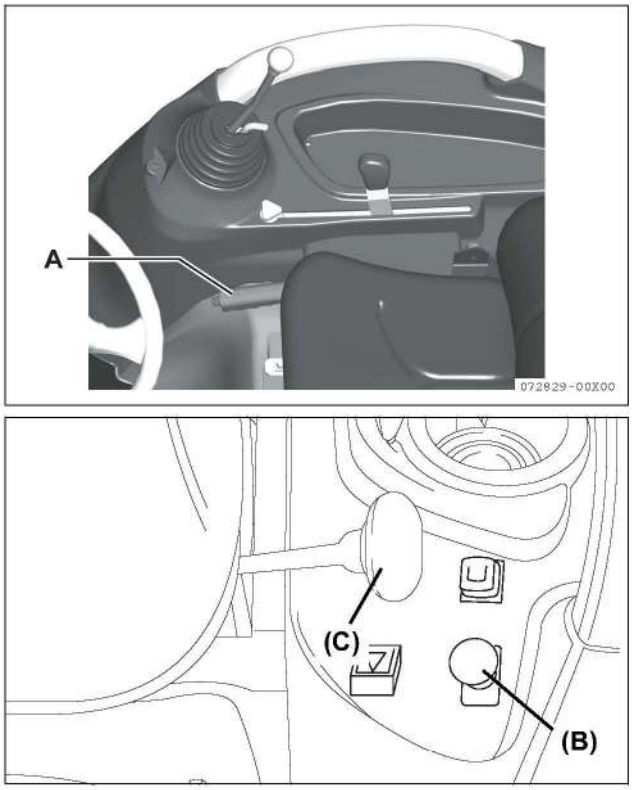


Fig 8-3

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

IMPORTANT

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

4. Select travel speed

■ Range shift lever (SA424)

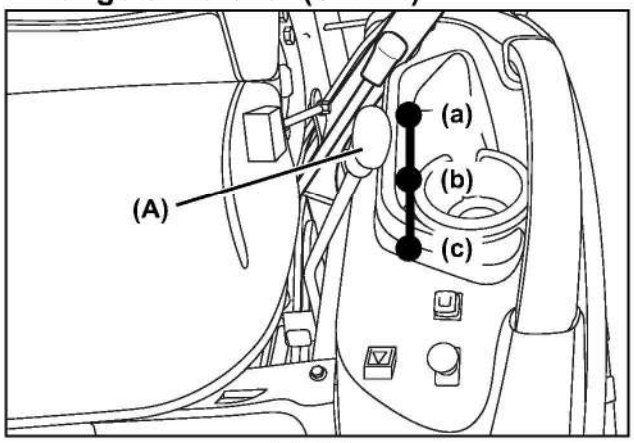


Fig 8-4

(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

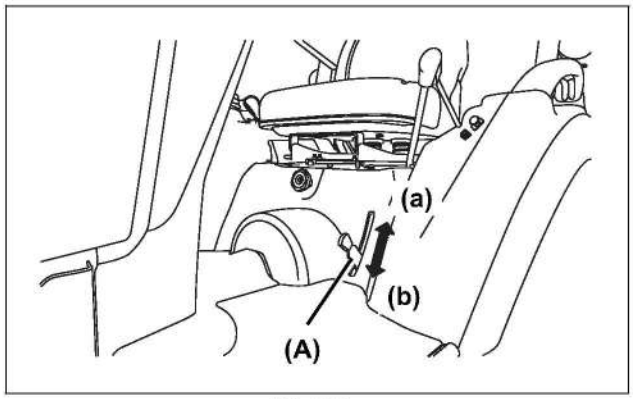


Fig 8-5

(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 excessive 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.

5. 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.

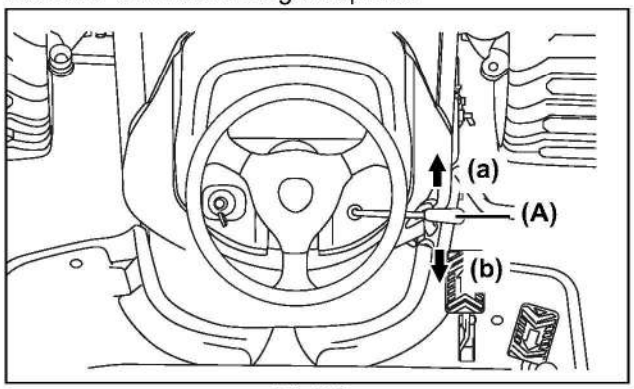


Fig 8-6

(A) Throttle control lever

(a) Push forward to increase the engine speed (min^{-1} (rpm))

(b) Pull backward to decrease the engine speed (min^{-1} (rpm))

6. 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>

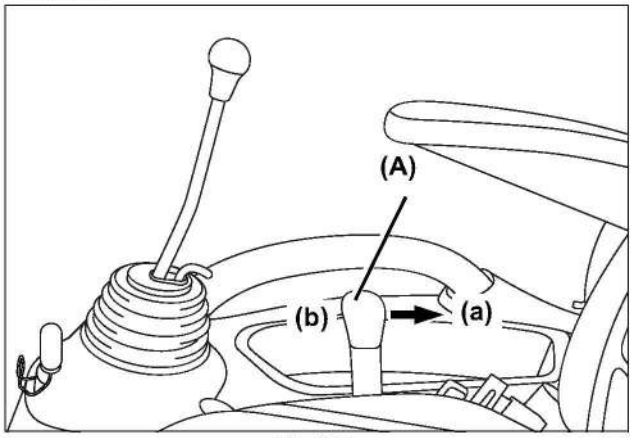


Fig 8-7

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

<SA424>

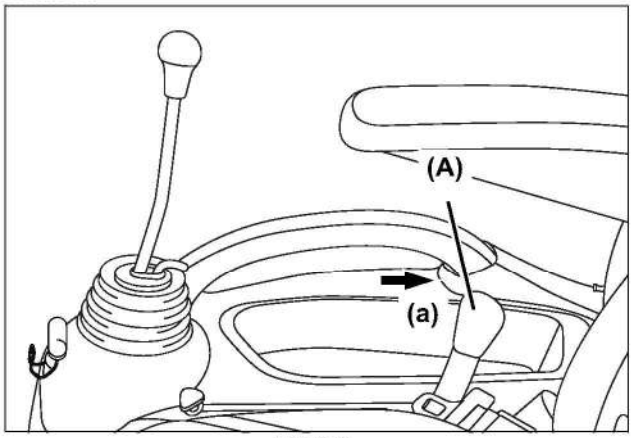


Fig 8-8

(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

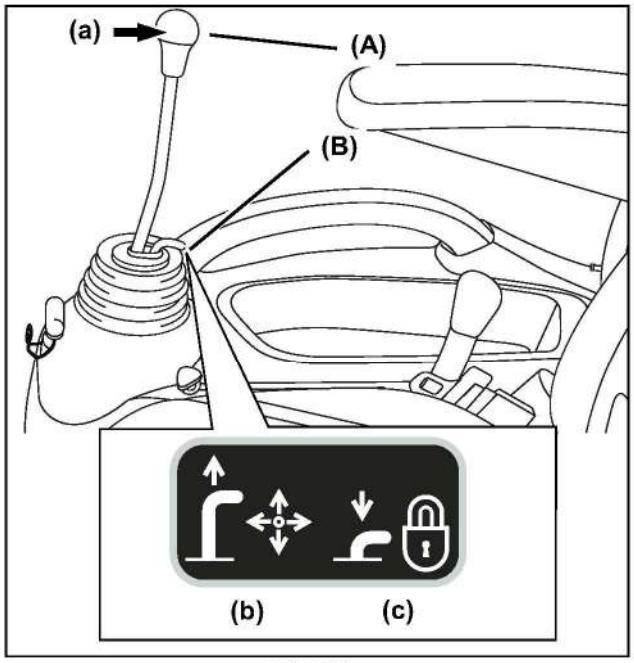


Fig 8-9

(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

■ Disengage the Parking Brake

1. Press the top button on the parking brake lever (Fig 8-10, A) down.
2. Press the parking brake lever down.

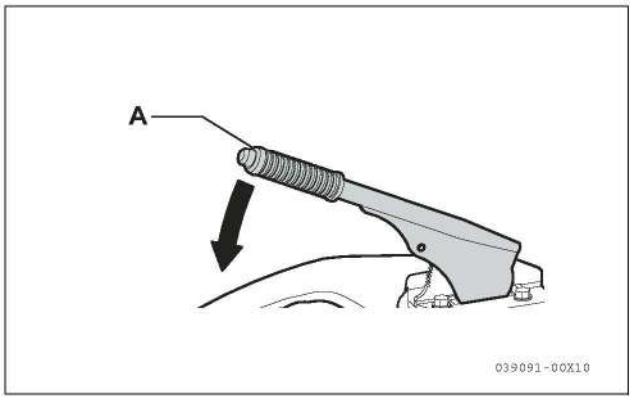


Fig 8-10

(A) Parking brake lever

■ Depress slowly the forward and reverse drive pedal

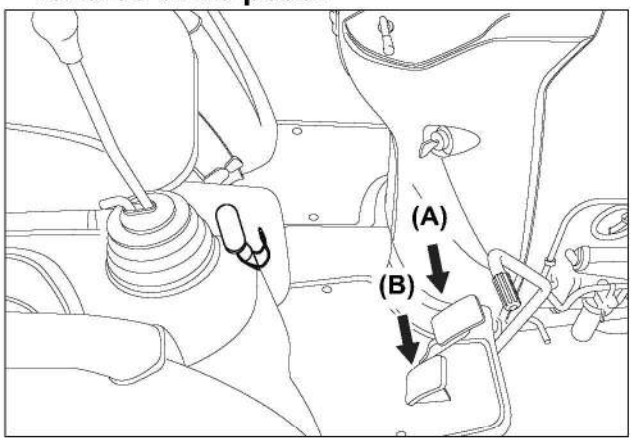


Fig 8-11

(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.
- If the forward and reverse drive pedal is depressed with the parking brake applied, to get up from seat will make engine shut down for the emergency stop circuit activated.

7. Stop the Tractor

⚠ WARNING

Avoid injury!

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

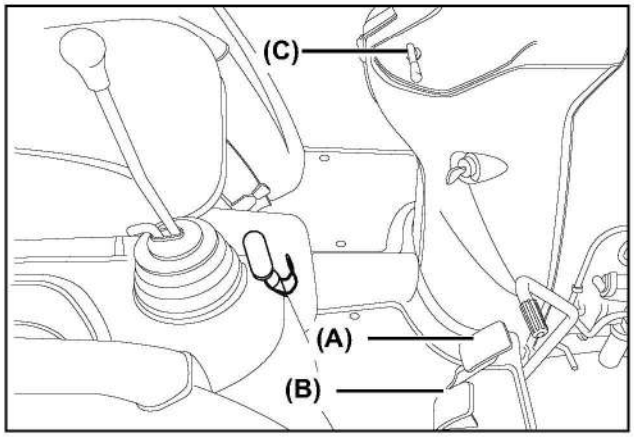
■ Stopping Procedure

1. Push down Power Take Off (PTO) switch (Fig 8-12, D) 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. (SA424)
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 N (neutral) position:**
    - **whether the engine is running or stopped**
    - **the tractor 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 "Lock and Set the Parking Brake" on page 7-4.
8. Turn the starter key switch to OFF position.



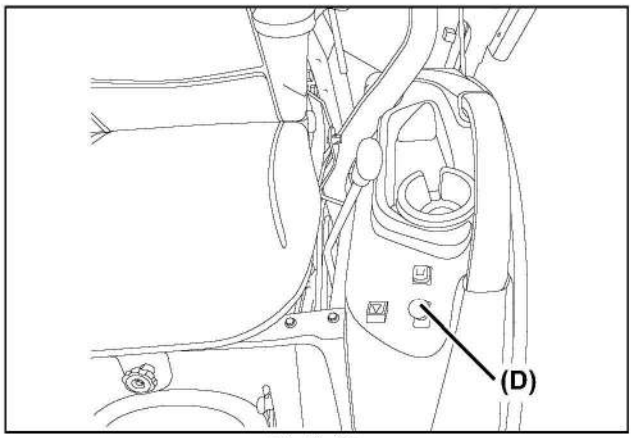


Fig 8-12

(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 "Lock and Set the Parking Brake" on page 7-4.

*When you stop the tractor, do not leave anything on the seat. The seat switch continues to operate, which can cause flat battery.

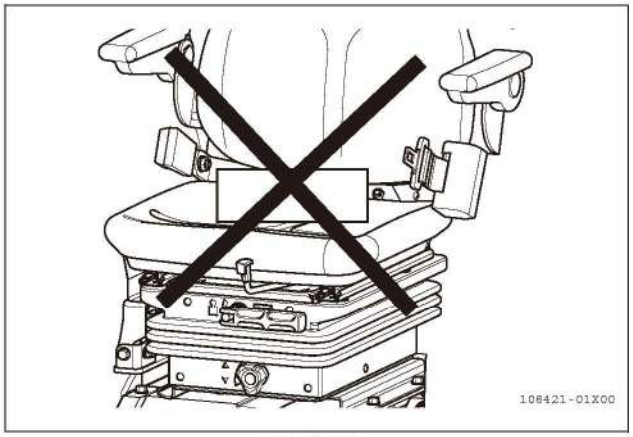


Fig 8-13

8. Operator presence warning

This tractor has the operator presence control function to make alarm with the operator presence warning lamp blinking in case that operator gets up from seat without applying parking brake.

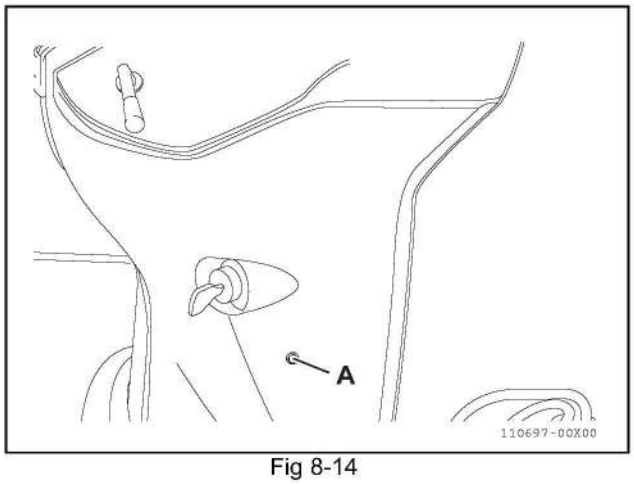


Fig 8-14

(A) Operator presence warning lamp

1. Leave the machine with the engine running, Forward/reverse drive pedal in "N (Neutral)", Seat Switch ON, PTO switch OFF, and parking brake OFF.

Engine	Running
Forward/reverse drive pedal	"N" (Neutral)
Parking brake	OFF
PTO switch	OFF
Seat switch	ON (in sitting position)

2. Then get up from seat (seat switch OFF) to make the engine stop with alarm and the operator presence warning lamp blinking.

Engine	Running
Forward/reverse drive pedal	"N" (Neutral)
Parking brake	ON
PTO switch	OFF
Seat switch	OFF (not in sitting position)

*Apply the parking brake to turn off the alarm and lamp.

* Even with engine stopped and the key switch in "OFF" position, to get up from seat (seat switch OFF) without applying parking brake will make alarm work with the operator presence warning lamp blinking.

9. 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.

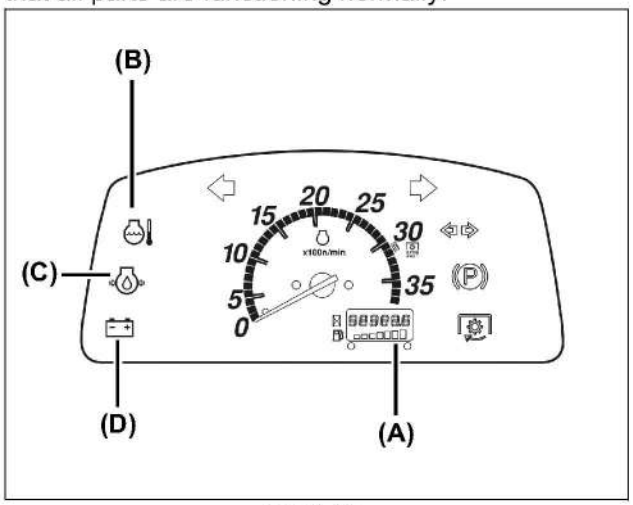


Fig 8-15

(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 14-5.

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.

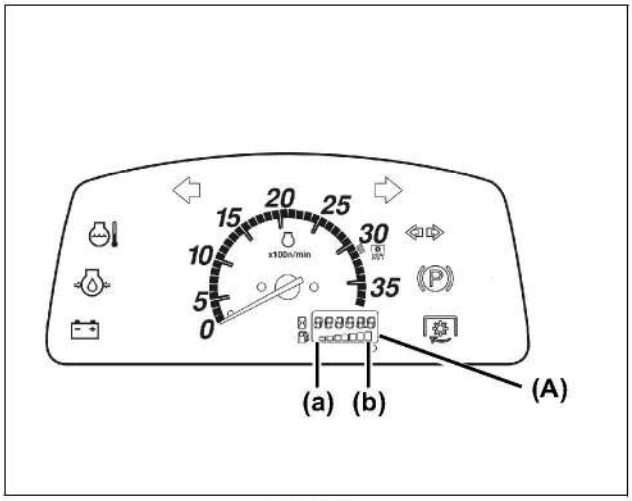


Fig 8-16

(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 14-4.

■ Coolant temperature warning light

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

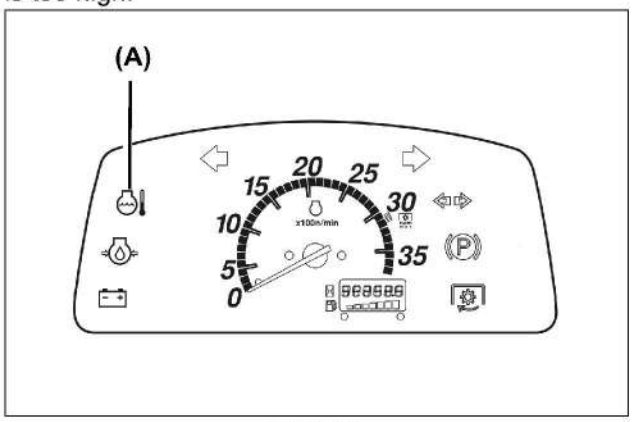


Fig 8-17

(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.

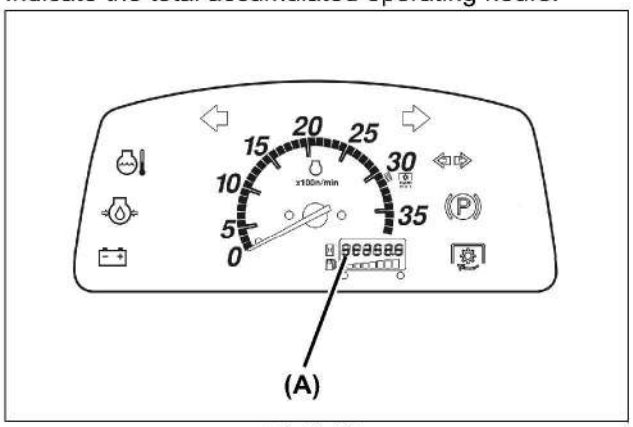


Fig 8-18

(A) Hour meter

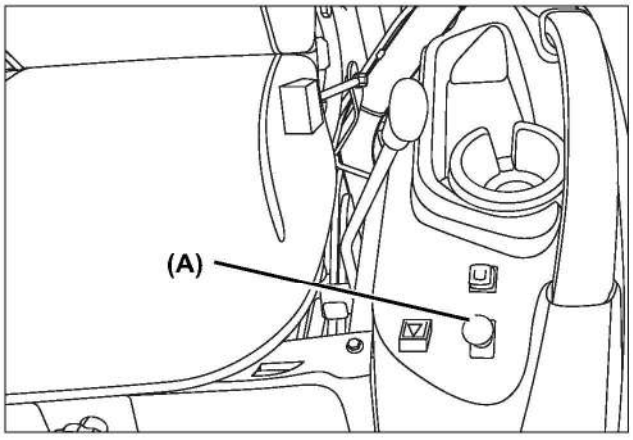
10. Use the Brake

■ Engage the Parking Brake

⚠ WARNING

- **Before leaving the tractor unattended:**
  - **always engage the parking brake securely, for details, see "Lock and Set the Parking Brake" on page 7-4**
  - **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 (Fig 8-19, A) to OFF position.
2. Pull the parking brake lever (Fig 8-19, B) upward.
3. Make sure the parking brake is securely locked.



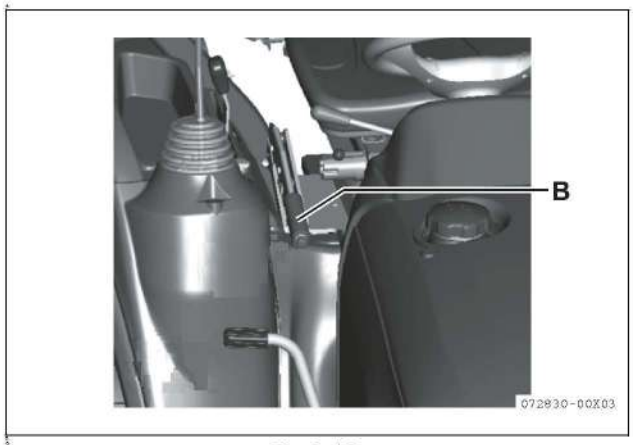


Fig 8-19

(A) Power Take Off (PTO) switch
(B) Parking brake lever

⚠ 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 "Lock and Set the Parking Brake" on page 7-4**

■ Disengage the Parking Brake

1. Push the parking brake lever downward to unlock the parking brake.
2. Make sure that the parking brake is unlocked.

11. Practices for Safe Operation

■ Differential Lock (SA424)

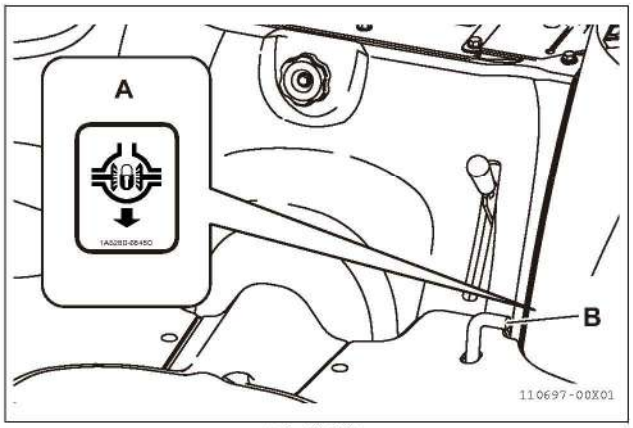


Fig 8-20

(A) Decal
(B) Differential lock pedal

⚠ 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:

- Depress brake pedals to equalize traction.
- Then release the differential lock pedal.

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

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

IMPORTANT

- To prevent damage to the differential gears, always disengage 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.

Engage the Differential Lock

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

Disengage the Differential Lock

1. Release the differential lock pedal completely.

■ Drive the tractor on road

IMPORTANT

- Always decrease the engine speed when using the differential lock.
- To prevent transmission damage, always unlock the differential lock while only one rear wheel is rotating.
- If the differential lock does not disengage when the foot is removed from the differential lock pedal, try stepping lightly on the brake pedals several times.

⚠ 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.**
- **Use the turn signal lights during turning.**
- **Perform the following precautions:**
  - **always ensure the hazard lights are clean and clearly visible**

1. Turn the headlights ON.
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.

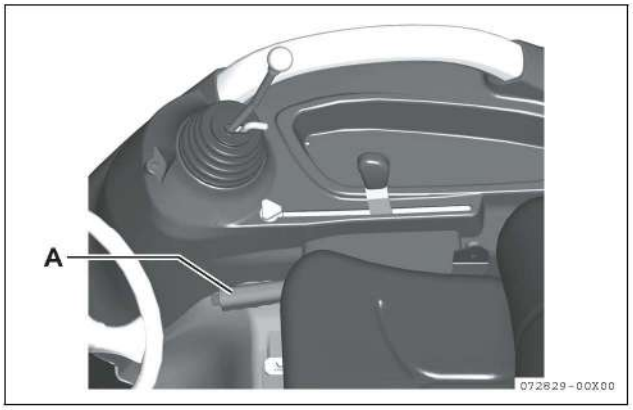
4. Disengage the 4-wheel drive to prevent excessive tire wear.
5. Do not under any circumstances coast downhill.
6. Check whether the 4-wheel drive is engaged.
7. The braking characteristics differ between the 2-wheel drive and 4-wheel drive. Always be aware of the current drive mode and drive accordingly.
8. Always slow down before turning. High speed turns can cause the tractor to tip over.
9. Strictly observe all the currently effective local traffic and safety laws and regulations.
10. Always travel at a speed such that the tractor can be controlled and is stable.
11. Do not engage the differential lock while traveling on roads. The preceding action can make the tractor uncontrollable.
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 16 km/h.

■ Push or Tow the Tractor (SA221)

⚠ WARNING

- **When towing the tractor:**
  - **travel slower than 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 (Fig 8-21, B) to OFF position.
2. Disengage the parking brake.
3. Disengage the 4-wheel drive. See "Tips on the 4-Wheel Drive" on page 8-7



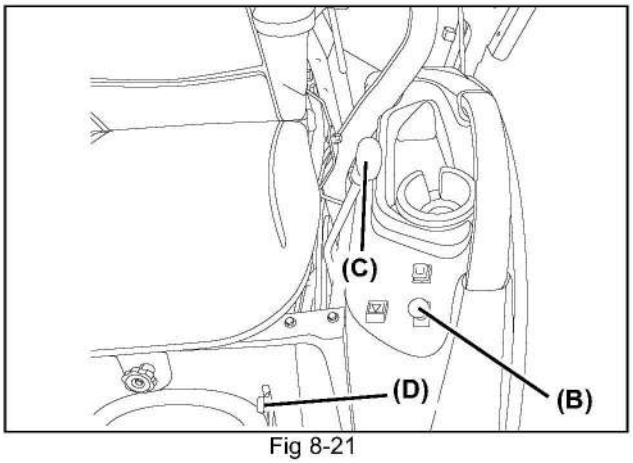


Fig 8-21

(A) Parking brake 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.

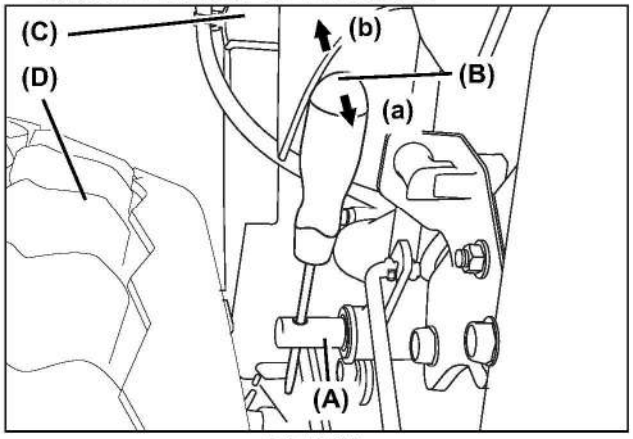


Fig 8-22

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 in gear position.
(b) Pushing the screw driver forward to the neutral gear position.

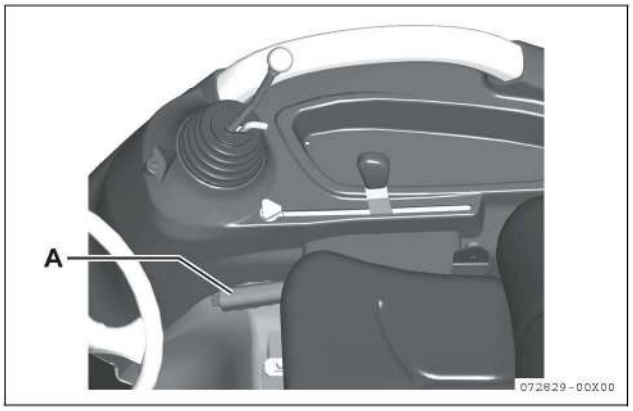
5. Push the screw driver forward until the shaft can rotate forward.
6. Make sure that the tractor can be moved by hand and take the screw driver off the hole.
7. After pushing or towing the tractor, return the shaft to the original position by pulling the screw driver backward.

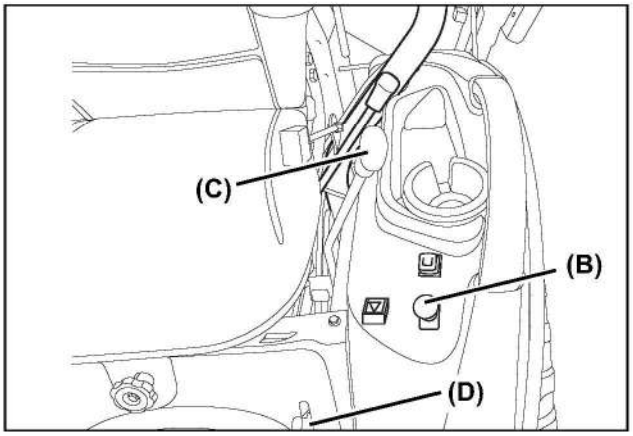
■ Push or Tow the Tractor (SA424)

⚠ WARNING

- **To avoid serious injury, never stay in the area between the tractor and trailer or towed equipment.**
- **When towing the tractor:**
  - **travel slower than 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 (Fig 8-23, B) to OFF position.
2. Disengage the differential lock.
3. Disengage the parking brake.
4. Move the range shift lever (Fig 8-23, C) to N (neutral) position.
5. Disengage the 4-wheel drive.





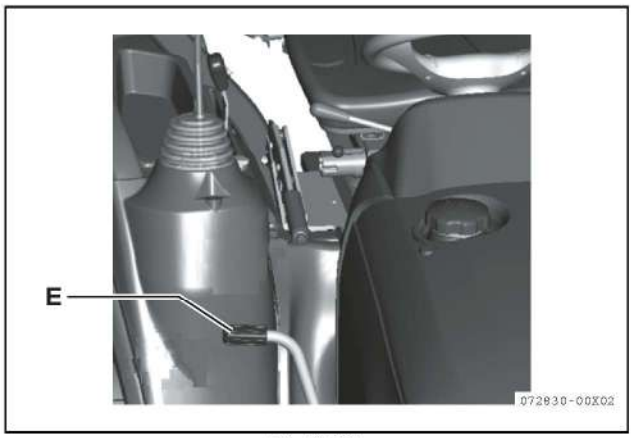


Fig 8-23

(A) Parking brake lever
(B) Power Take Off (PTO) switch
(C) Range shift lever (SA424)
(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 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!

- **Never stay in the area between the tractor and trailer or towed equipment.**
- **If the towed equipment is not equipped with brakes:**
  - **travel slower than 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 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.
- 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 pedal.

■ 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 dipper stick, 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 "Lock and Set the Parking Brake" on page 7-4.
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.

■ 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 "Lock and Set the Parking Brake" on page 7-4**
- **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 FRONT HITCH" on page 12-1**

1. Before approaching a slope, set the range shift lever to the slow position. (SA424)

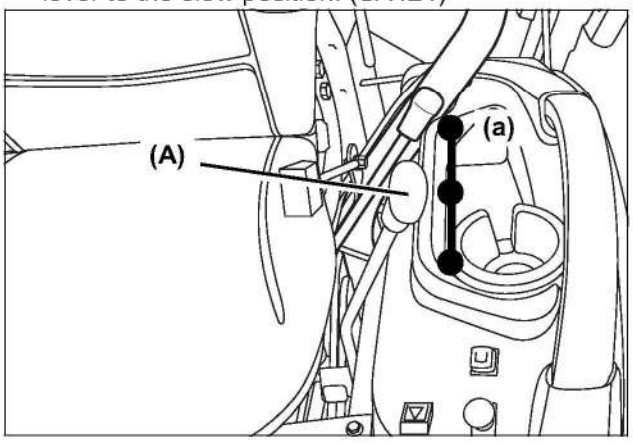


Fig 8-24

(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.

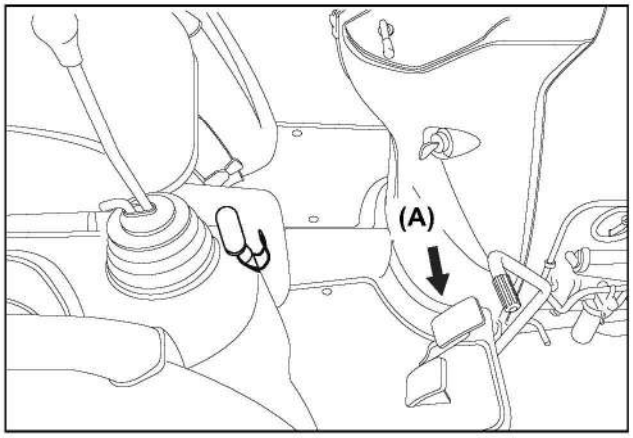


Fig 8-25

(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.**

■ 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

12. Differential lock (SA424)

⚠ 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.

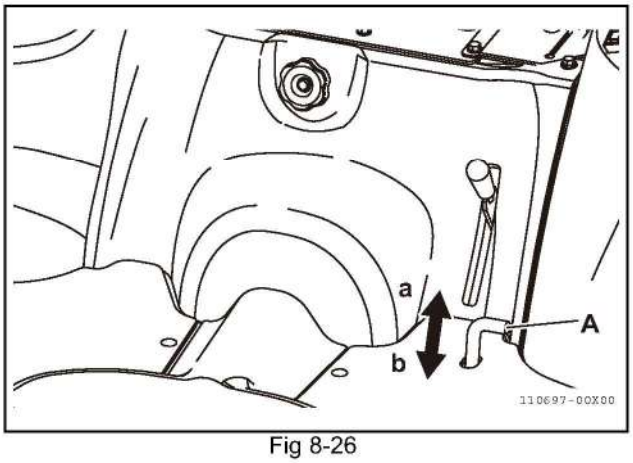


Fig 8-26

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 "Lock and Set the Parking Brake" on page 7-4 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 min^{-1} (rpm) or more while Power Take Off (PTO) switch is ON position.

■ Rear Power Take Off (PTO)

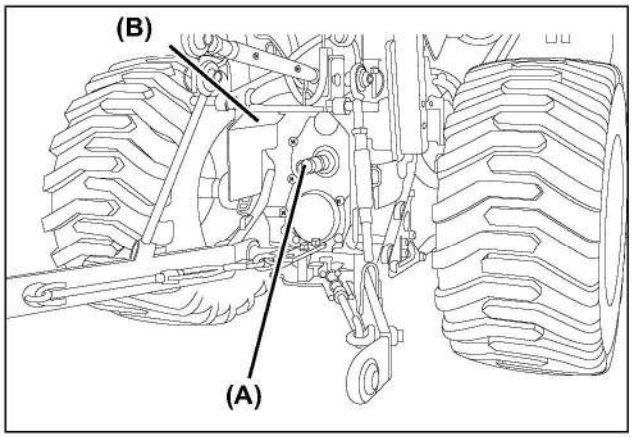


Fig 9-1

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

■ Mid-Power Take Off (PTO)

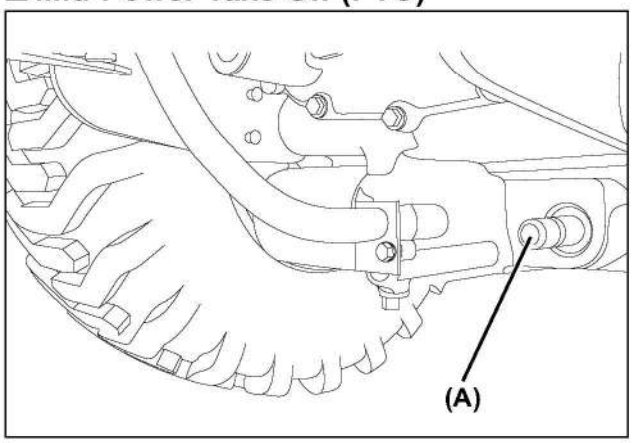


Fig 9-2

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

■ Engage Power Take Off (PTO) (without the operator on the operator seat)

NOTE

- For safety, the operator must be seated in the operator's seat when turning ON the PTO switch. If the operator gets off the machine with the PTO switch ON, normally, the safety mechanism stops the engine automatically. However, if you are using a stationary work attachment such as chippers, if you wish to leave while running the PTO, follow the steps below.

1. Leave the machine with the engine running, Forward/reverse drive pedal in "N (Neutral)", PTO lever position in “REAR (Rear PTO only)”, PTO switch OFF, and parking brake ON.

Engine	Running
Forward/reverse drive pedal	"N" (Neutral)
Parking brake	ON
Seat switch	OFF (not in sitting position)
PTO lever position	Rear (Rear PTO only)
PTO switch	OFF

2. Make sure that any person or obstacle is not under or around the tractor, then switch ON the PTO switch to keep working.

Engine	Running
Forward/reverse drive pedal	"N" (Neutral)
Parking brake	ON
Seat switch	OFF (not in sitting position)
PTO lever position	Rear (Rear PTO only)
PTO switch	ON

3. Turn off the PTO switch, then shift the PTO lever to the “FRONT (BOTH MID AND REAR PTO engaged)” position.

Engine	Running
Forward/reverse drive pedal	"N" (Neutral)
Parking brake	ON
Seat switch	OFF (not in sitting position)
PTO lever position	FRONT (Both Rear and MID PTO)
PTO switch	OFF

4. Then switch ON the PTO switch and make sure the PTO shafts won't be rotated.

Engine	Running
Forward/reverse drive pedal	"N" (Neutral)
Parking brake	ON
Seat switch	OFF (not in sitting position)
PTO lever position	FRONT (Both Rear and MID PTO)
PTO switch	ON

*Engine won't be shut down in this condition.
*In case that PTO shaft is rotating in this condition, there is something problem in the system. Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ 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.

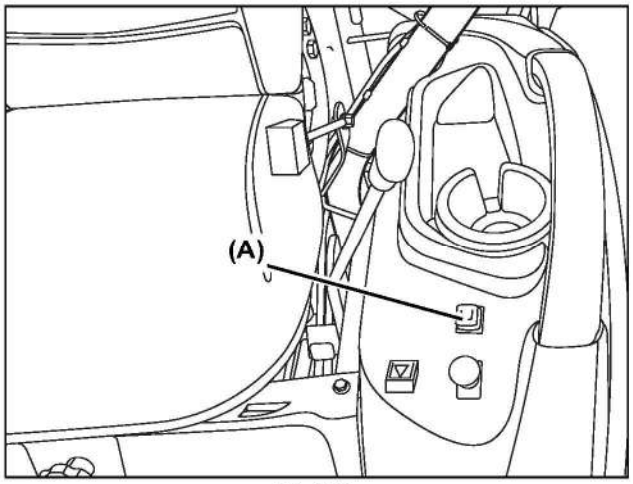


Fig 9-3

(A) Reverse override switch

1. Sit on the operator seat.
2. Engage the parking brake securely, for details, see "Lock and Set the Parking Brake" on page 7-4.

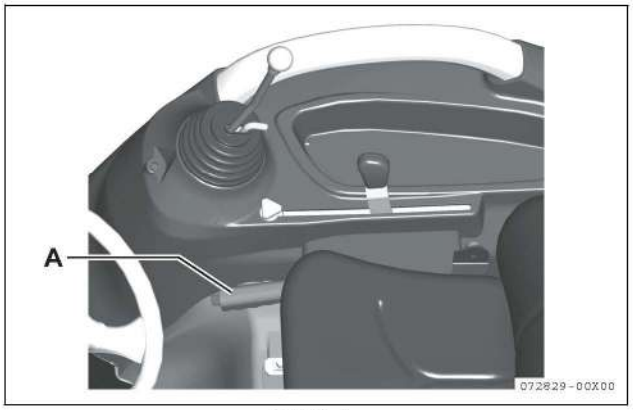


Fig 9-4

(A) Parking brake lever

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

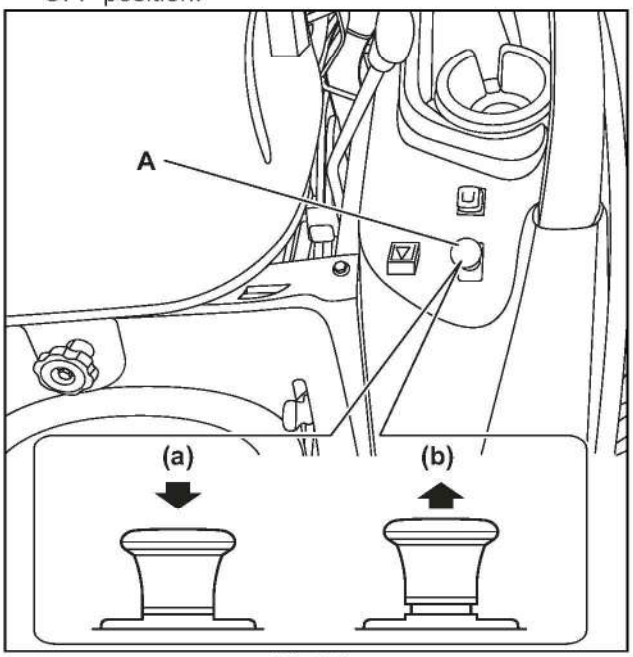


Fig 9-5

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

4. Start the engine.
5. Adjust the engine speed to 1500 min^{-1} (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.

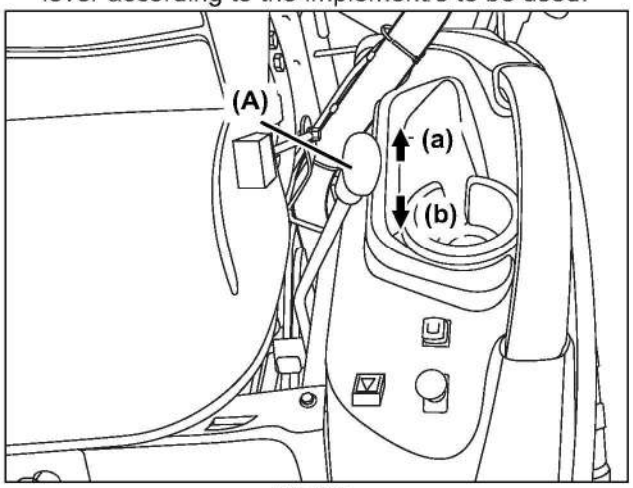


Fig 9-6

(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.

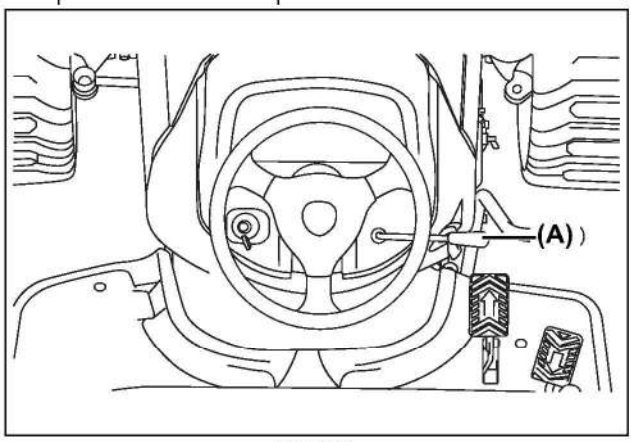


Fig 9-7

(A) Throttle control lever

NOTE

- When the engine speed is 3100 min^{-1} (rpm), the Mid-Power Take Off (PTO) rotates at approximately 2000 min^{-1} (rpm).
- When the engine speed is 3100 min^{-1} (rpm), the Rear Power Take Off (PTO) rotates at approximately 540 min^{-1} (rpm).

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

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

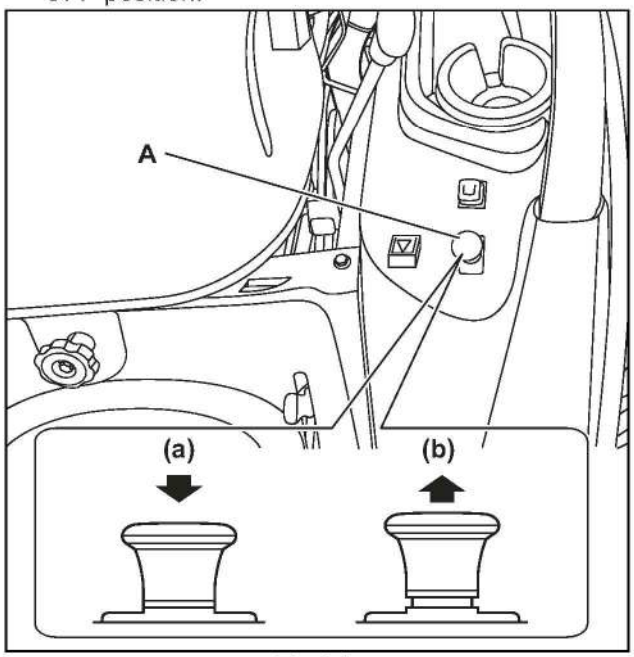


Fig 9-8

(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 operator seat.

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

1. Park the tractor safely and securely.
   - For details, see "Safe Practices for Parking the Tractor" on page 1-6.
2. Shut off the engine.
3. Chock all the tires safely and securely.

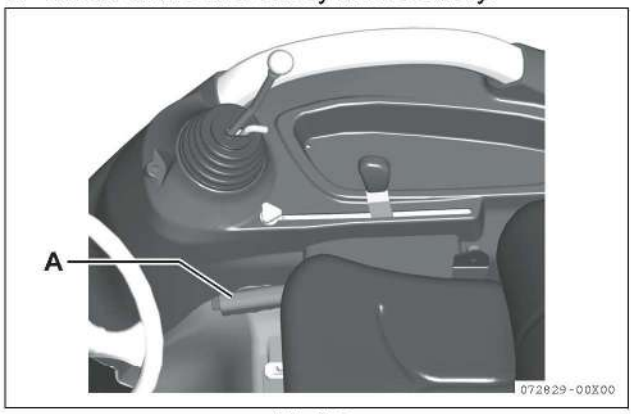


Fig 9-9

(A) Parking brake lever

4. Move the range shift lever to the N (neutral) position (SA424) 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.

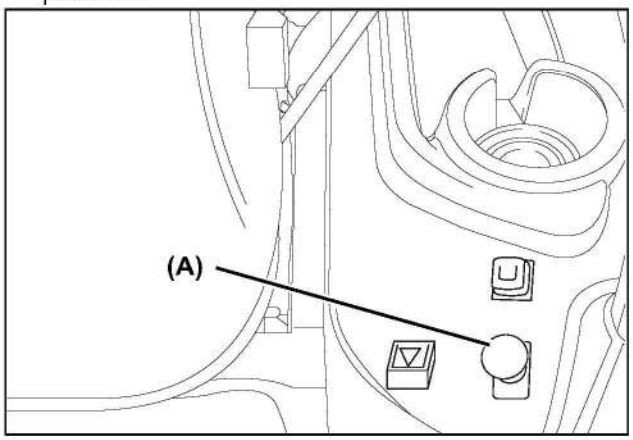


Fig 9-10

(A) Power Take Off (PTO) switch

3. PTO drive shaft

⚠ WARNING

- **Observe the drive line manufacturer's instructions, regarding the drive line mounting angle and the length of overlaps on the drive shafts.**

IMPORTANT

- The PTO transmission system has no one-way clutch.
- When you fit an implement rotating tools in high speed such as a rotary mower, leaf blower and grass catcher, be sure to select and use a drive shaft with a one-way clutch.
- Before attaching the PTO drive shaft to tractor and implement, be sure to check and adjust the drive shaft length to avoid transmission damage.
- Minimum overlap at extended fully should be 100 mm.
- If the length of drive shaft is too short, it causes damage to the PTO shaft and transmission of tractor and/or implement by slipping out the drive shaft when lowering the implement.
- Minimum clearance to the female shaft end at the fully retracted position should be 25 mm.
- If the length of drive shaft is too long, it causes damage to the PTO shaft and transmission of tractor and/or implement when lifting the implement.

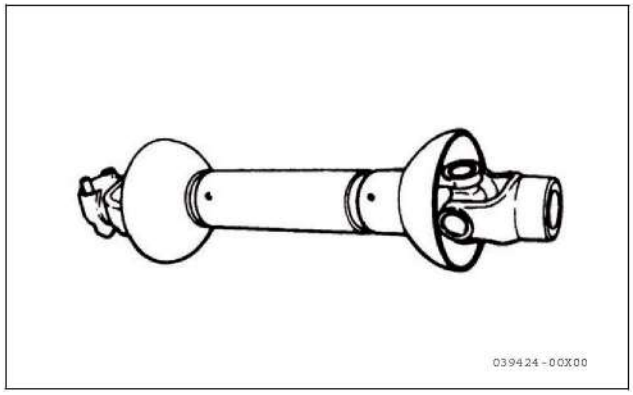


Fig 9-11

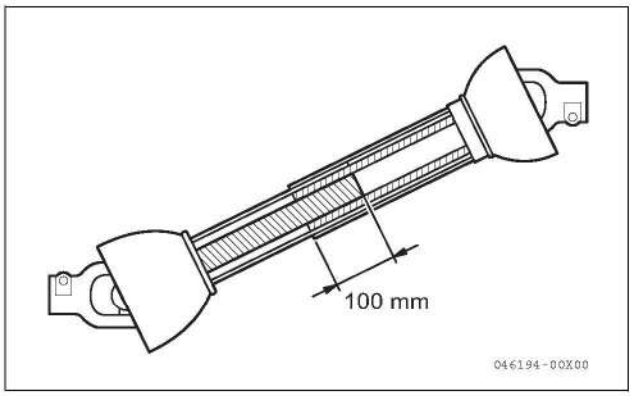


Fig 9-12

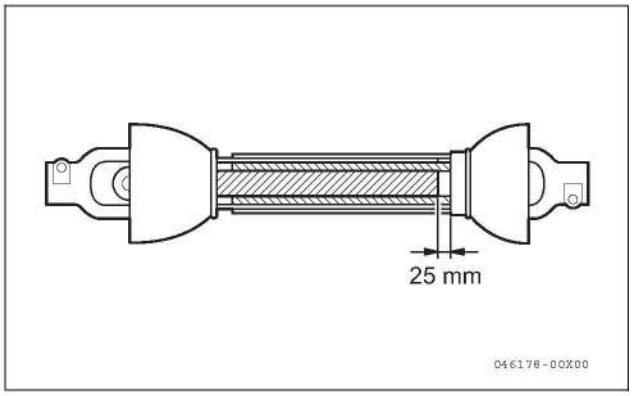


Fig 9-13

4. Connecting PTO shaft

1. If the implement will be connected to 3-point hitch, make sure that the drawbar will not interfere and remove it if necessary.
2. Attach the implement to 3-point hitch before connecting the PTO drive shaft.
3. Connect the drive shaft to the PTO shaft. If necessary, turn the shaft by hand to line up the spines.
4. Make sure that the PTO drive shaft yoke end locking devices are securely latched on shafts of the tractor and implement.

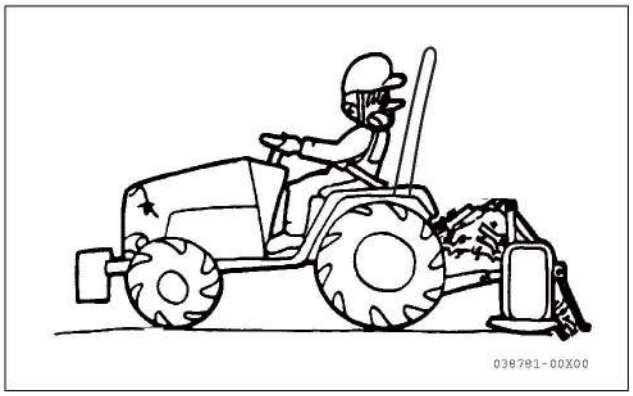


Fig 9-14

5. 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.**

6. 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.

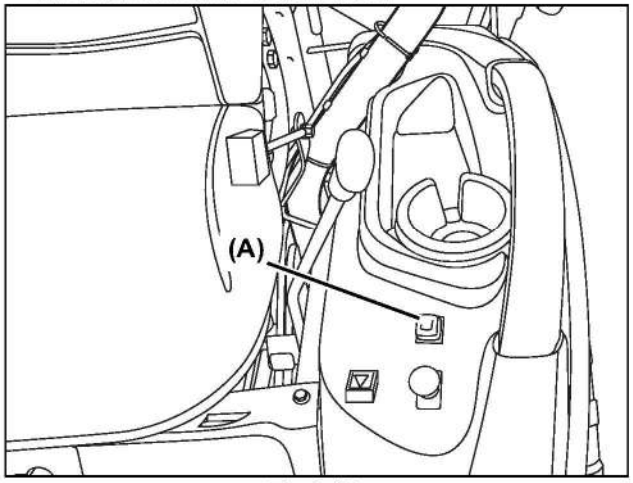


Fig 9-15

(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.**

■ Use Front Power Take Off (PTO) (optional)

1. Use the Front PTO switch to turn on/off the Front PTO.

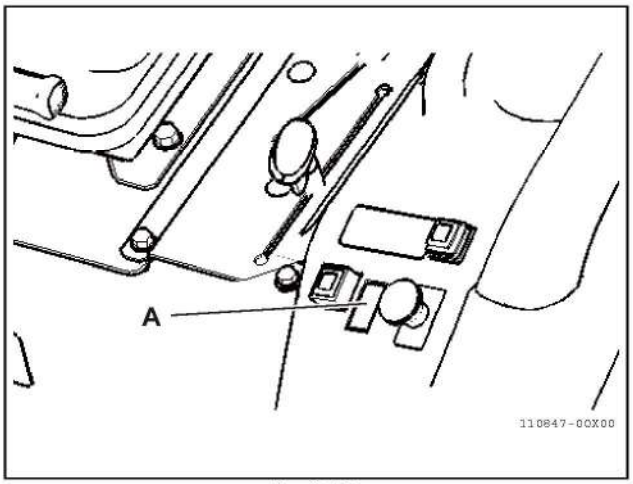


Fig 9-16

(A) Front Power Take Off (PTO) switch

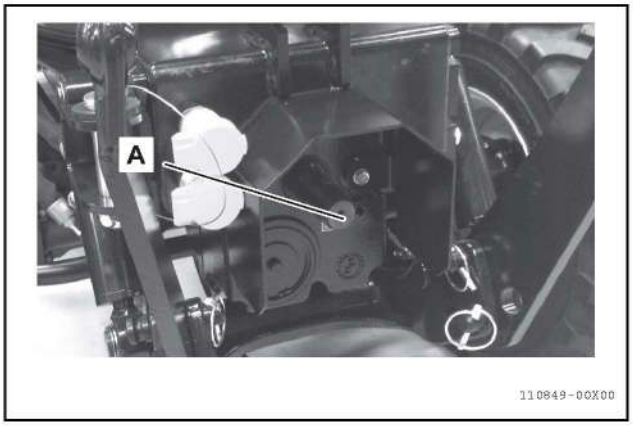


Fig 9-17

(A) Front Power Take Off (PTO)

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.

- Do not approach the 3-point hitch when operating it!

1. 3-Point Hitch

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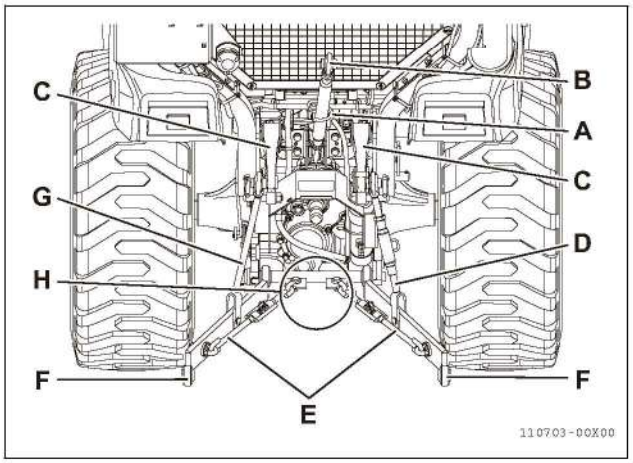


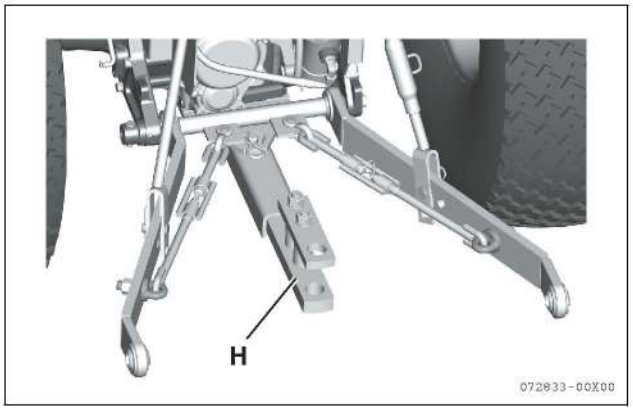
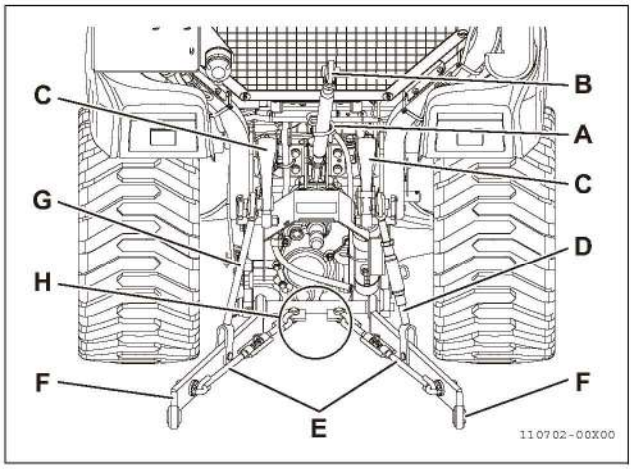


Fig 10-1

(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) Drawbar

<SA221>



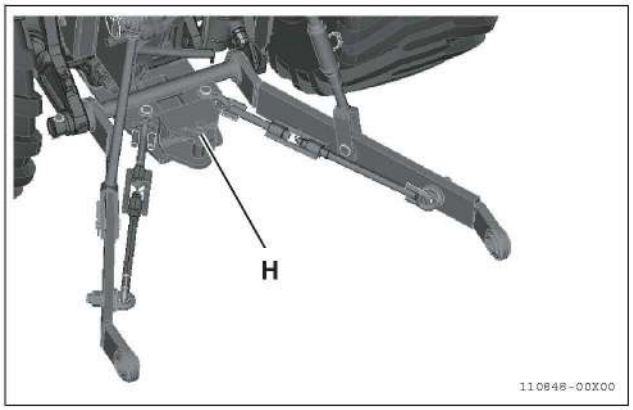


Fig 10-2

(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) Drawbar

■ 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 (Fig 10-3, A) 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 (Fig 10-3, B) to set the desired lowest position of the implement from the ground.

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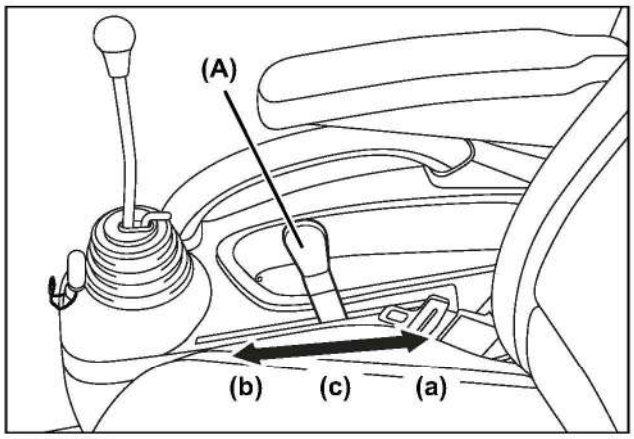

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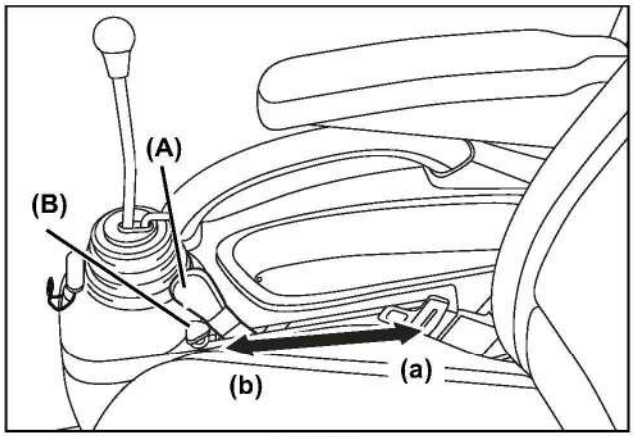

Fig 10-3

(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

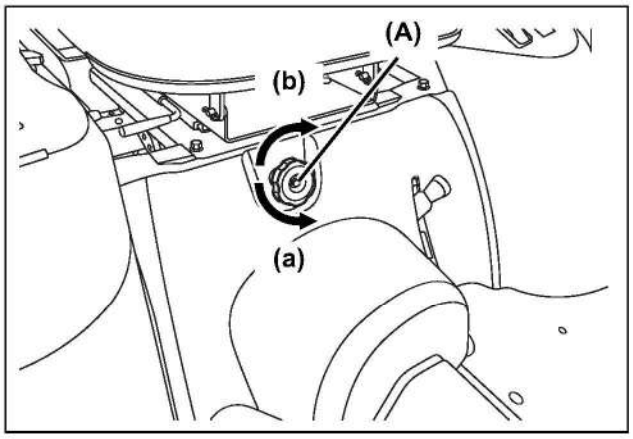

Fig 10-4

(A) Hydraulic flow control/stop knobs

(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 "Lock and Set the Parking Brake" on page 7-4 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 10-5, B) to the implement.
5. As necessary, unhook the top link (Fig 10-5, A) from the top link hook, and connect to the implement.
6. Use lynch pin to secure the implement.

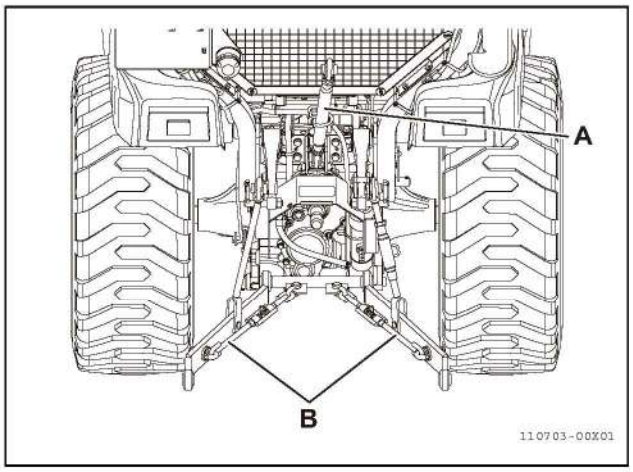

Fig 10-5

(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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 10-6, A) by lowering the implement to the ground.
4. Loosen the locknut (Fig 10-6, C).
   Rotate the top link body to lengthen or shorten the top link, as required (Fig 10-6, D).

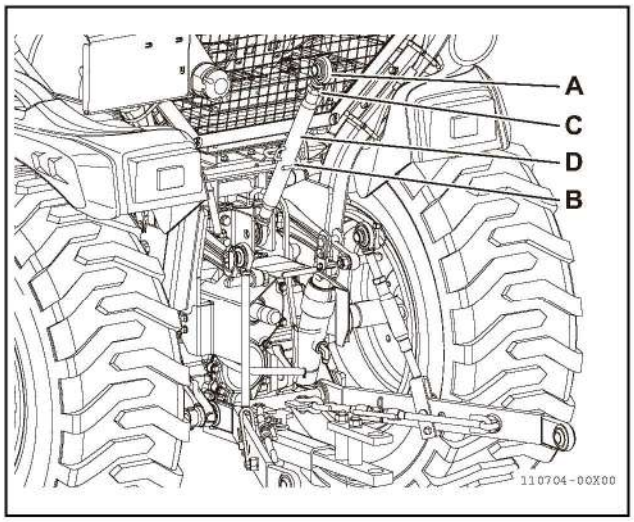

Fig 10-6

(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 "6. Safe Practices for Parking the Tractor" on page 1-6.
2. Chock all the tires safely and securely.
3. Lower the implement to the ground.
4. Loosen the locknut (Fig 10-7, A) located on the lift link right (Fig 10-7, B).
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.

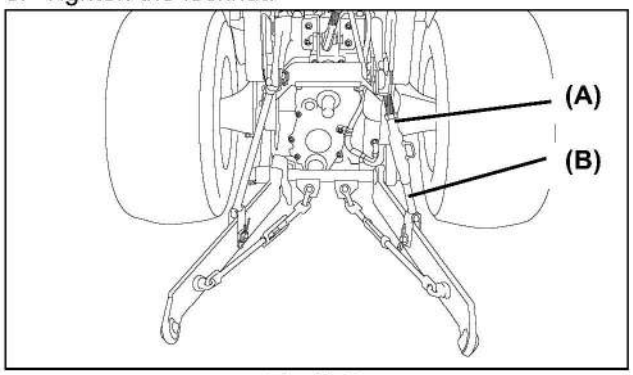

Fig 10-7

(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 "6. Safe Practices for Parking the Tractor" on page 1-6.
2. Chock all the tires safely and securely.
3. Lower the implement to the ground.
4. Remove the hairpin clip (Fig 10-8, A).
5. Rotate the turnbuckle (Fig 10-8, B) to adjust the length of the check chain.
6. Install the hairpin clip.

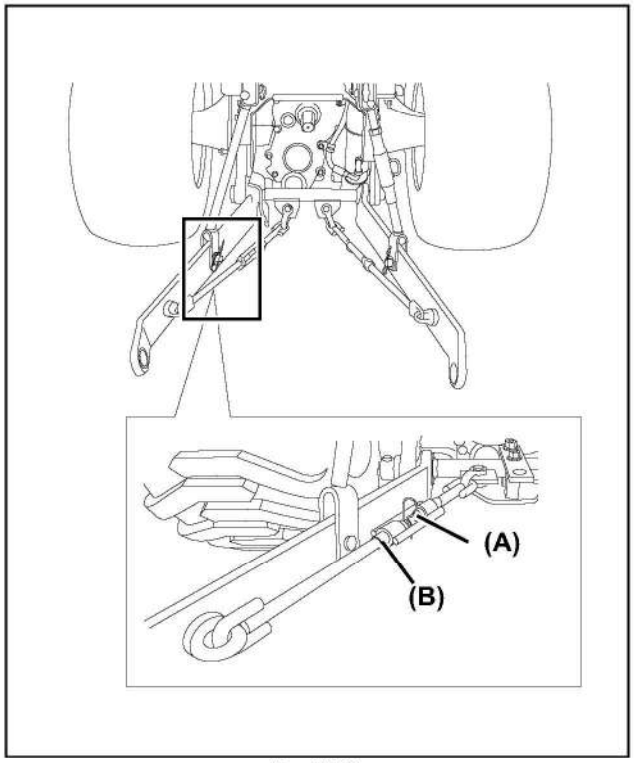

Fig 10-8

(A) Hairpin clip
(B) Turnbuckle

■ 3-Point Hitch Kit Contents

Table 10-1

Parts No.	Name	Qty		Remarks
		SA221	SA424	
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)
1A8330-72101	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)
1A8330-72301	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 (SA424)

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.

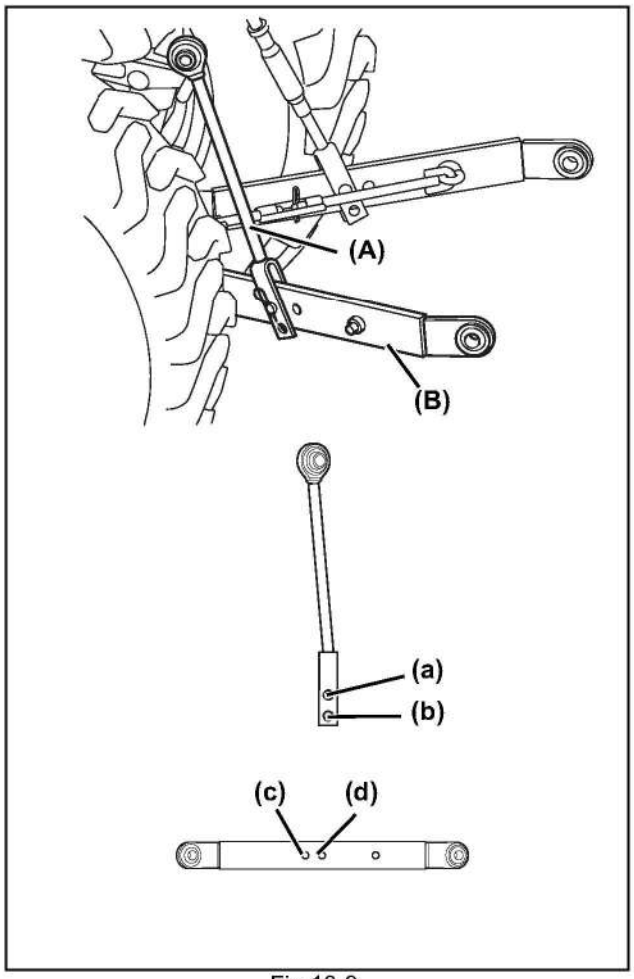

Fig 10-9

(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

3. Drawbar

⚠ 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.**
- **Stay clear from the area between tractor and trailed vehicle.**

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 250 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 (Fig 10-10, A).
2. Remove the pin (Fig 10-10, B).
3. Align the hole (Fig 10-10, C) 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 pin and hairpin clip to secure the drawbar to the drawbar bracket.

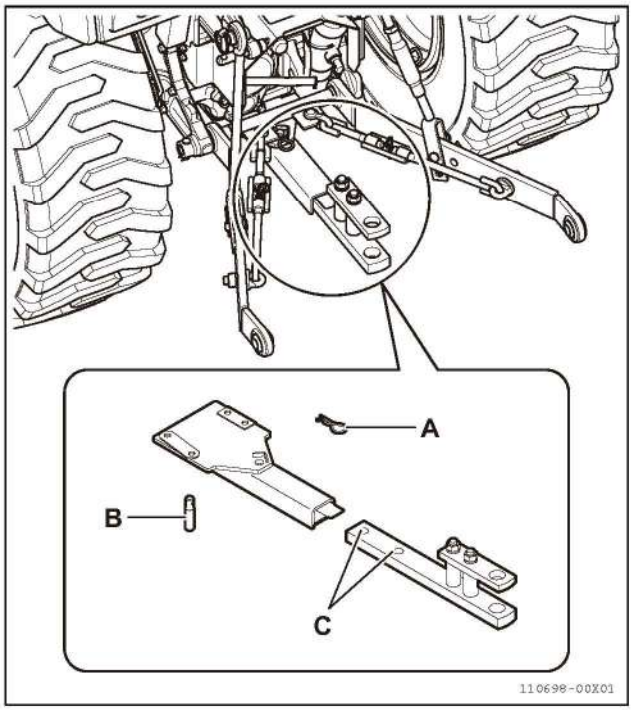

Fig 10-10

(A) Hairpin clip
(B) Pin
(C) Hole for attaching the drawbar

■ 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.

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 (Fig 11-1, A) to raise and lower the implement that is attached to the 3-point hitch.

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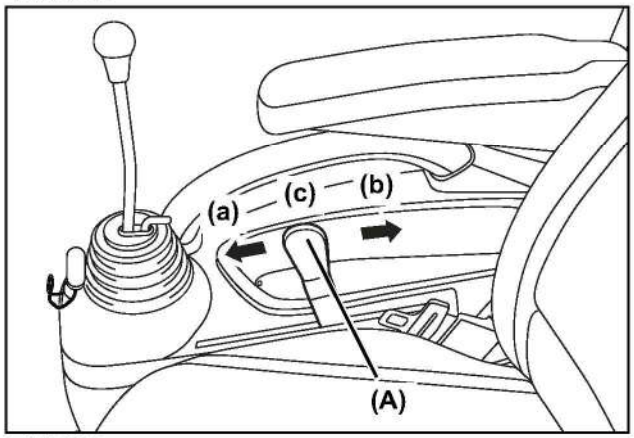

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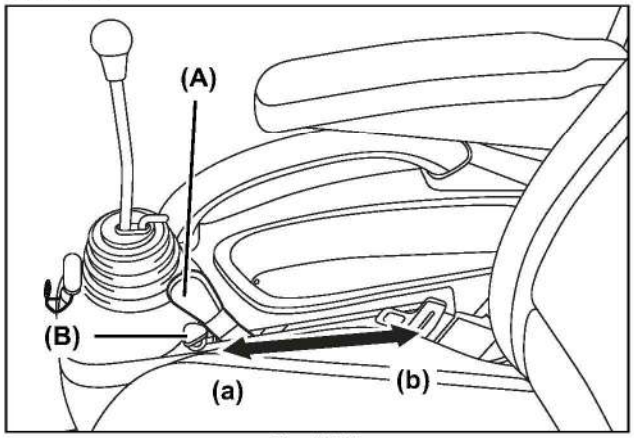


Fig 11-1

(A) 3-point hitch control lever
(B) Position stop knob (SA424)
(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 (Fig 11-1, B) 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

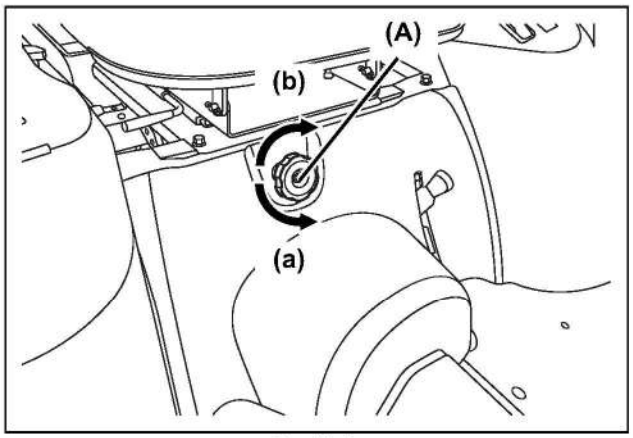


Fig 11-2

(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 (Fig 11-3, A) (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.

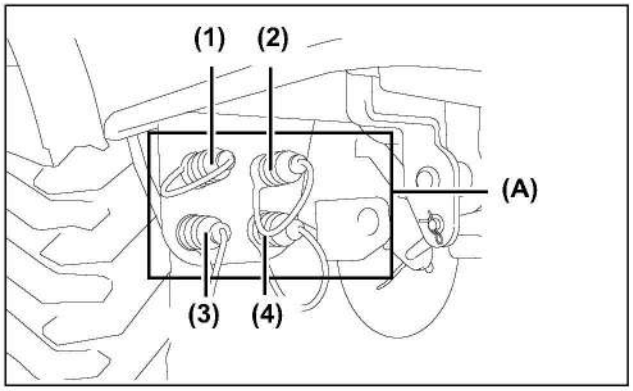


Fig 11-3

(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.

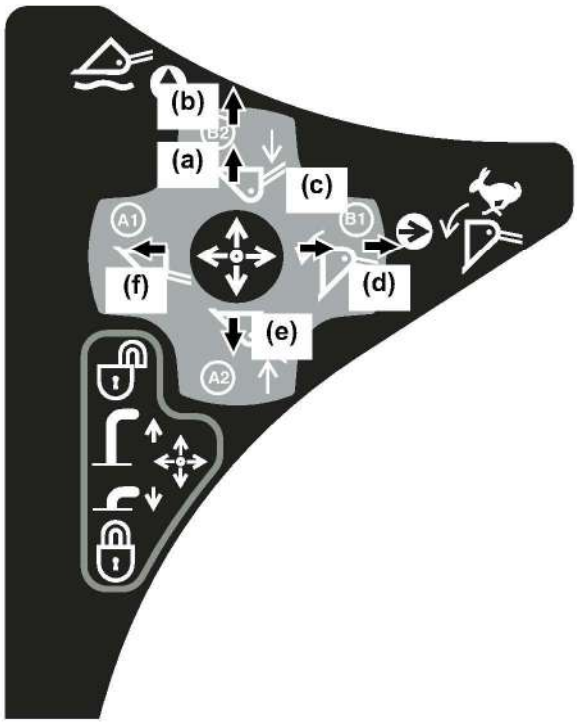


Fig 11-4

(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 (Fig 11-5, B) to lock the implement control lever (Fig 11-5, A) 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:
   - Push up the implement control lever lock.

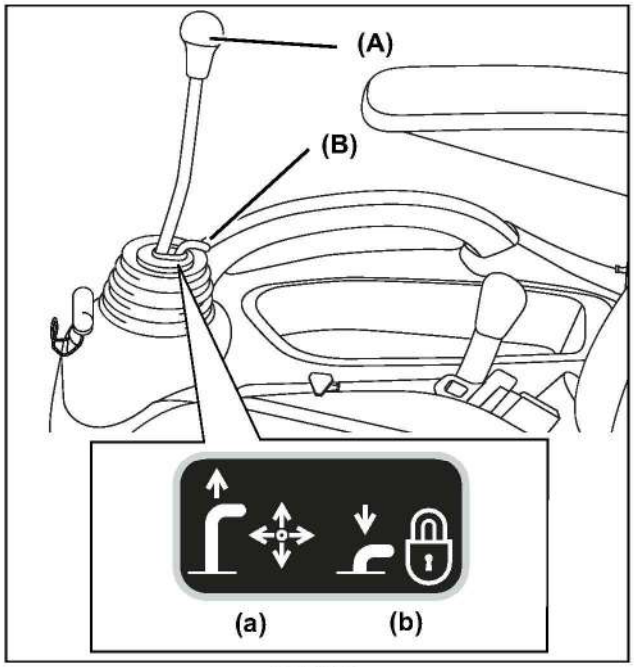


Fig 11-5

(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 (Fig 11-5, A) has been locked with the implement control lever lock (Fig 11-5, 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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*.

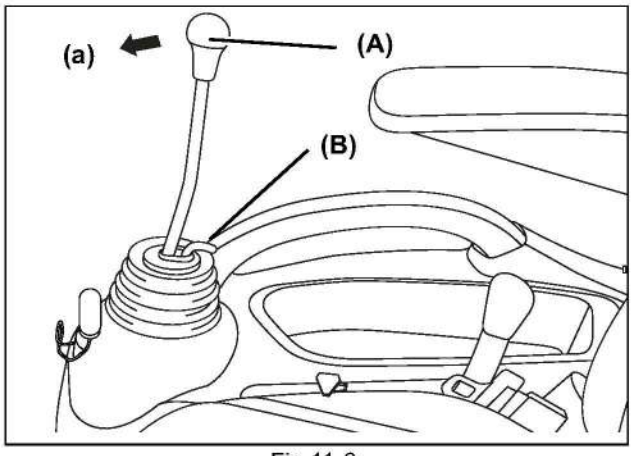


Fig 11-6

(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 FRONT HITCH

⚠ 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).

Table 12-1

Model	Tire Size			Tire Air Pressure (MPa)
SA221	Front	R3	18 x 8.50-10 4PR	0.15
	Rear		26 x 12.00-12 4PR	0.14
	Front	R4	18 x 8.50-10 6PR	0.24
	Rear		26 x 12.00-12 4PR	0.14
SA424	Front	R3	23 x 8.50-12 4PR	0.16
	Rear		36 x 13.50-15 4PR	0.14
	Front	R4	23 x 8.50-12 6PR	0.34
	Rear		14-17.5 4PR	0.14

- 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 the 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 Wheel

⚠ 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 2.7 metric tons (3 tons).**
- **Always support the implement using fixed stands or any suitable blocking devices with a capacity of more than 2.7 metric tons (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

Table 12-2

Model		Tightening Torque (N·m)
SA221	R3	172 to 190
	R4	172 to 190
SA424	R3	172 to 190
	R4	172 to 190

- Tighten the front wheel bolts (Fig 12-1, A) in a crisscross sequence.

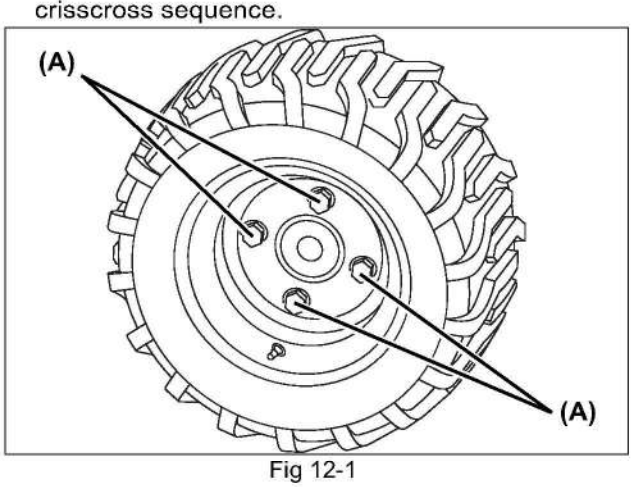


Fig 12-1

(A) Front wheel bolts (4 pcs)

Rear Wheel

Table 12-3

Model		Tightening Torque (N·m)
SA221	R3	108 to 127
	R4	108 to 127
SA424	R3	108 to 127
	R4	108 to 127

- Tighten the rear wheel bolts (Fig 12-2, A) in a crisscross sequence.

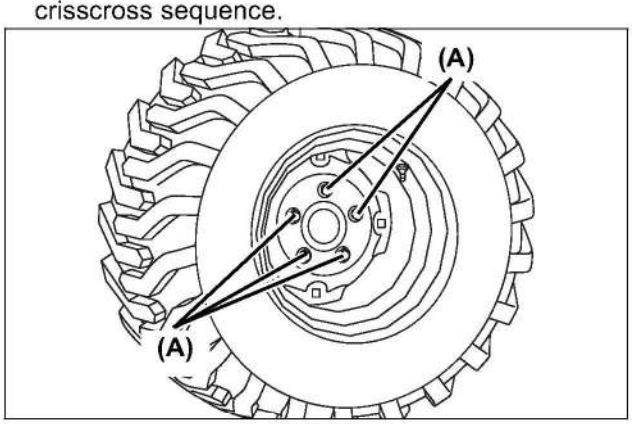


Fig 12-2

(A) Rear wheel bolts (SA221: 5 pcs, SA424: 6 pcs)

■ Select the Front Tire Rolling Direction

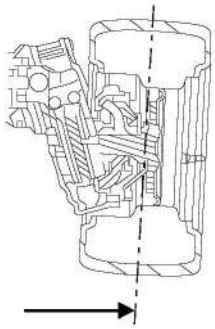
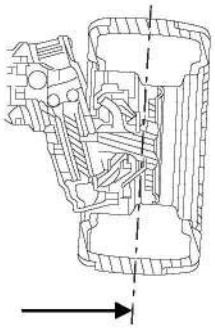
⚠ WARNING

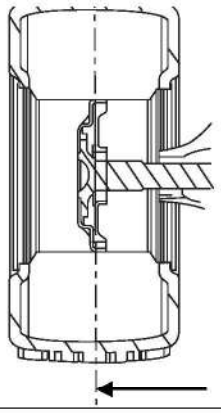
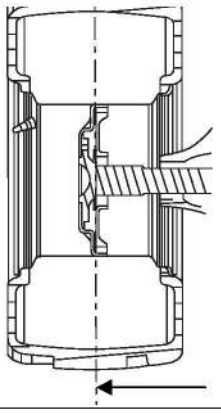
Avoid injury!

- **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 2.7 metric tons (3 tons).**
- **Securely support the tractor with rigid stands or jack stands with a capacity of more than 2.7 metric tons (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)

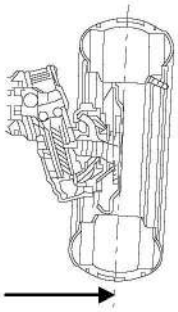
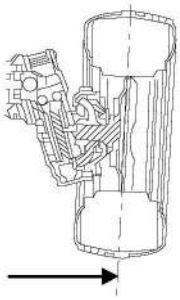
Table 12-4

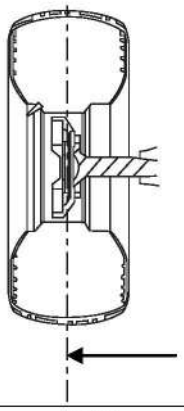
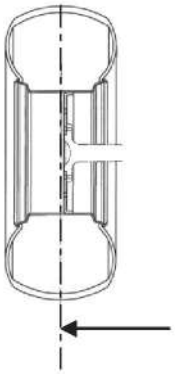
		Front	
		Front R3 (18 × 8.50-10)	Front R4 (18 × 8.50-10)
Wheel pattern			
Tread	mm	894	894
Ply		4	6

		Rear	
		Rear R3 (26 × 12.00-12)	Rear R4 (26 × 12.00-12)
Wheel pattern			
Tread	mm	894	894
Ply		4	4

Tire Tread (SA424)

Table 12-5

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

		Rear	
		Rear R3 (36 x 13.50-15)	Rear R4 (14-17.5)
Wheel pattern			
Tread	mm	1079	1080
Ply		4	6

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 2.7 metric tons (3 tons).**
- **Securely support the tractor with rigid stands or jack stands with a capacity of more than 2.7 metric tons (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. Front Hitch

Be sure to use the front hitch of the tractor for towing tractor.

1. Make sure that the transmission-hydraulic system oil level is to full mark on dipstick. If tractor is to be towed with front end raised, add oil the until the oil level reaches to full mark.
2. Make sure that the differential lock is not engaged.
3. Place the range shift lever and the main shift lever in the neutral position.
4. Check local regulations for towing.

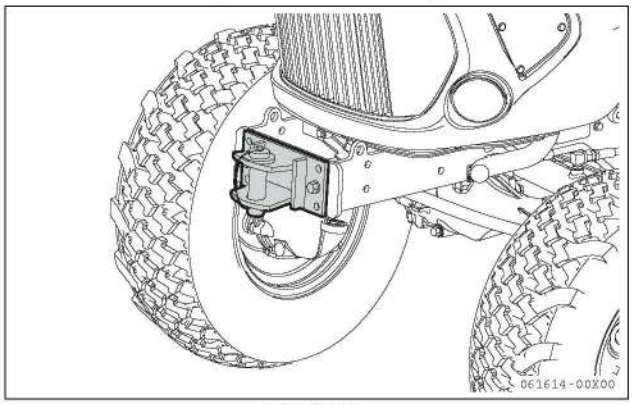


Fig 12-3

5. Jack-up

⚠ WARNING

- **Before working under the tractor or an implement, always first lower to the ground all attached implements.**
- **Use a safe lifting device.**
- **Securely support the tractor with rigid stands or jack stands.**
- **Put wheel chocks in front and behind all wheels still in contact with the ground.**
- **Be very careful when attempting to remove wheels from the tractor.**

1. Park the tractor securely and place chocks before and after the front and rear wheels.
   Engage the parking brake securely.
2. Jack up the front end of tractor.
   Firmly support the front axle bracket (Fig 12-4, A) of the tractor front end by hoist or jack, then set the rigid stands under the front axle bracket (Fig 12-4, A).

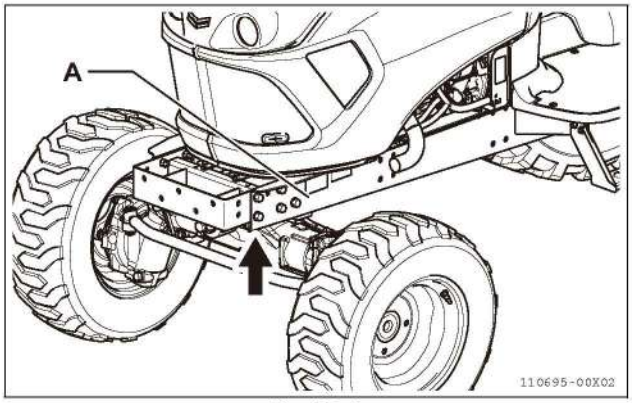


Fig 12-4

(A) Jacking point at front

3. Jack up the rear end of tractor.
   Firmly support the rear axle housing (Fig 12-5, A) of the tractor rear end by hoist or jack, then set the rigid stands under the rear axle housing (Fig 12-5, B).

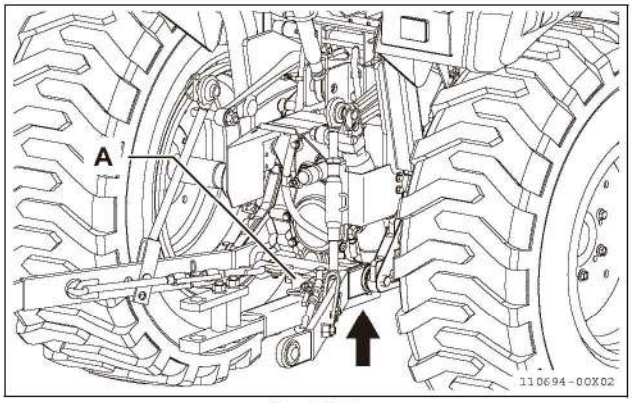


Fig 12-5

(A) Jacking points at rear

6. 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 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

Table 12-6

Model	Maximum Load Per Front/Rear Tire			
	Tire Size		Ply Rating	Capacity (kg)
SA221	R3	18 x 8.50-10	4	375
	R4	18 x 8.50-10	6	505
SA424	R3	23 x 8.50-12	4	506
	R4	23 x 8.50-12	6	820

- 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.

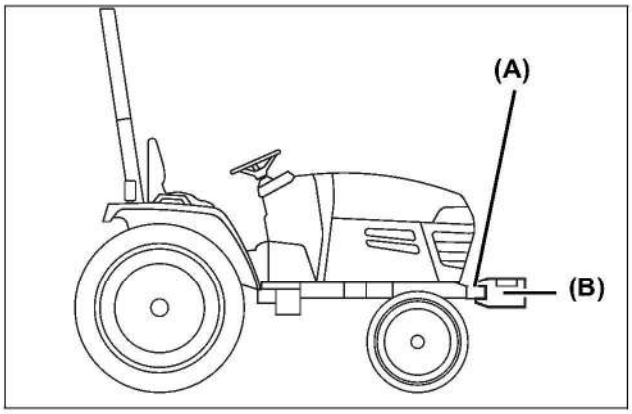


Fig 12-6

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

NOTE

- The front weight mounting bracket is optional parts as well as weights.
- The maximum of 20 kg × 5 pieces front weights can be mounted.
- Front loader with loader bucket or without bucket can be used as ballast weight.
- Any model utilizing backhoe requires a mounted front loader during operation.

■ Mounting bracket with front tow hitch

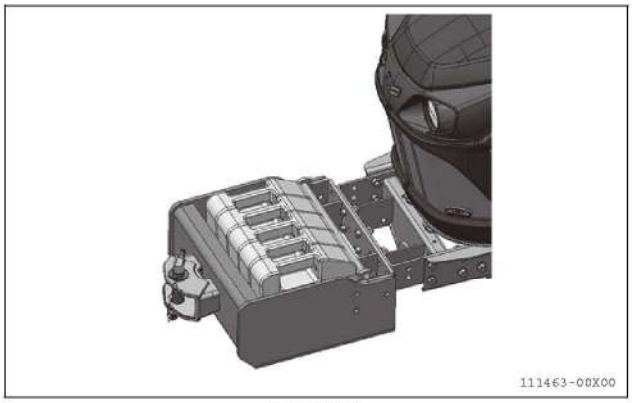


Fig 12-7

1. Hang front weights on the mounting bracket. (Maximum mounting numbers: 5)

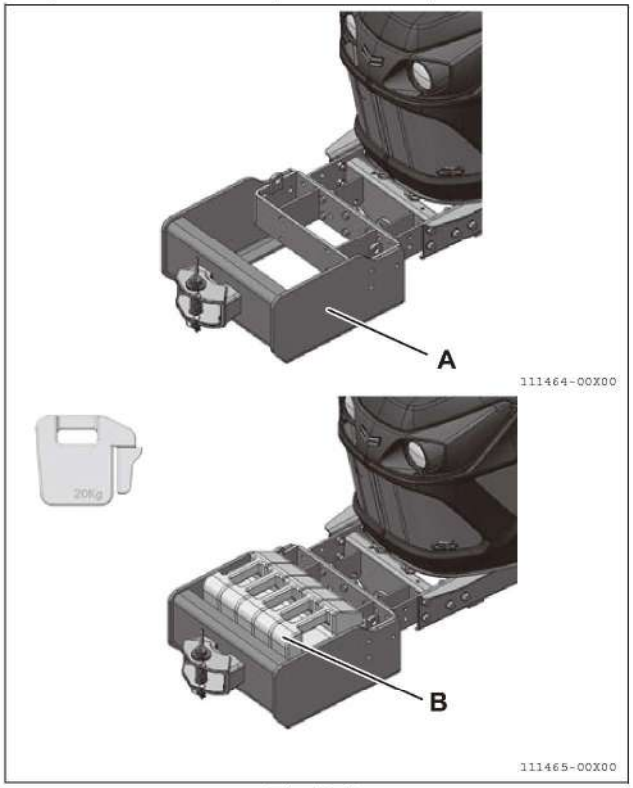


Fig 12-8

(A) Mounting bracket with front tow hitch
(B) Front weights

2. Fix front weights with the parallel pin and hairpin clip.

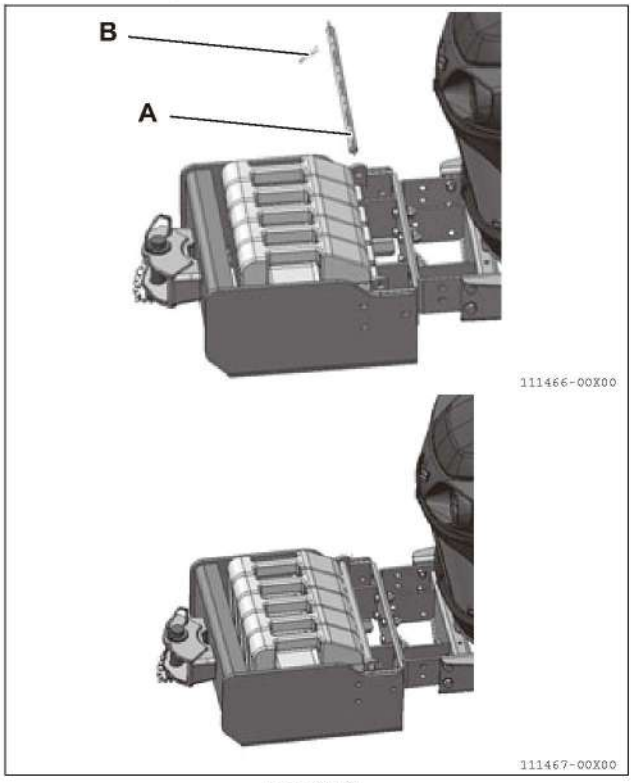


Fig 12-9

(A) Parallel pin
(B) Hairpin clip

■ Front weight with front tow hitch pin

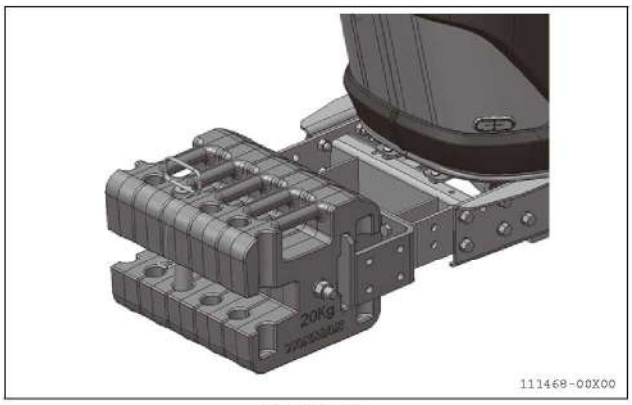


Fig 12-10

1. Install the lock pin to fix front weight position.

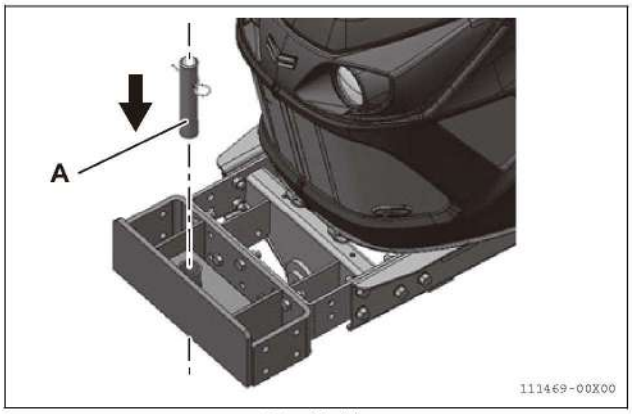


Fig 12-11

(A) Lock pin

2. Hang 2 or 5 front weights on the mounting bracket.

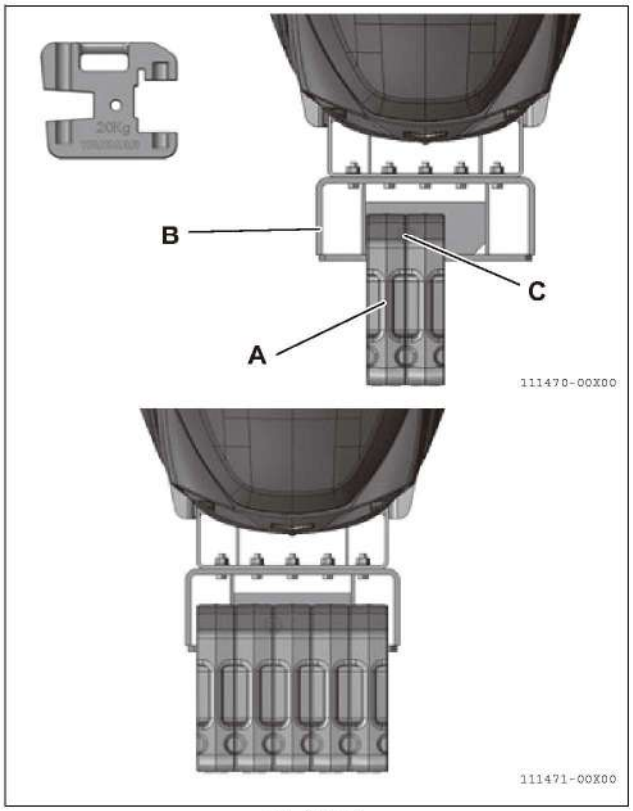


Fig 12-12

(A) Front weight
(B) Mounting bracket
(C) Lock pin position

<Mounting 2 weights>

Fig 12-13

<Mounting 5 weights>

Fig 12-14

3. Fix front weights with the threaded bolt, washers, and nuts.

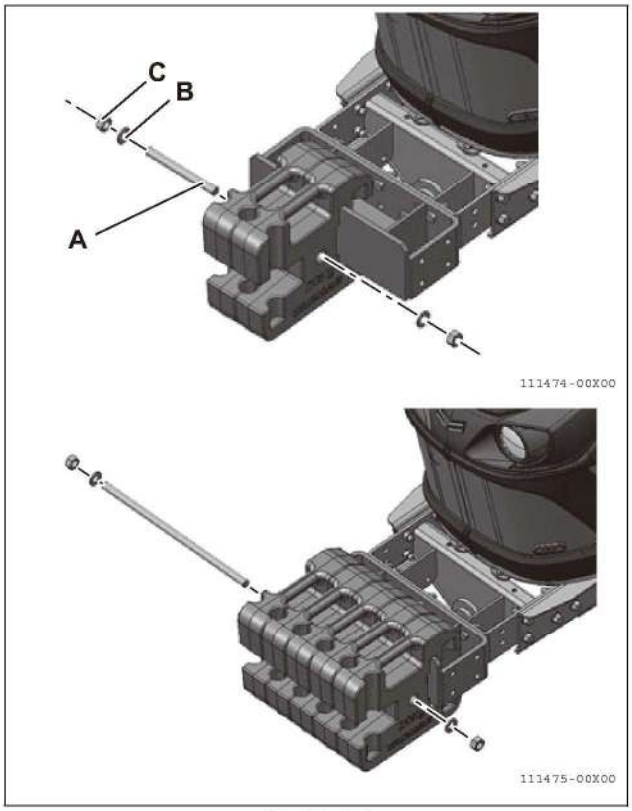


Fig 12-15

(A) Threaded bolt
(B) Washer
(C) Nut

<Mounting 2 weights>

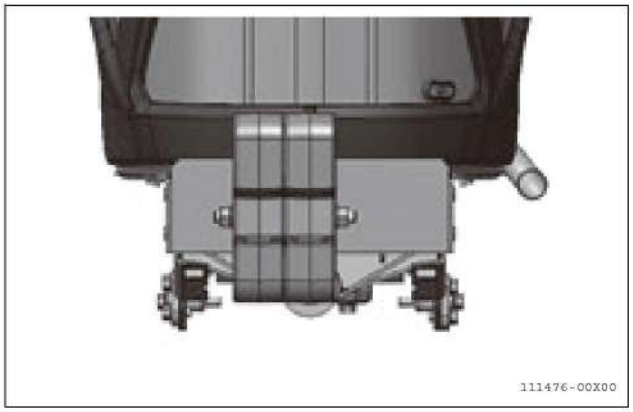


Fig 12-16

<Mounting 5 weights>

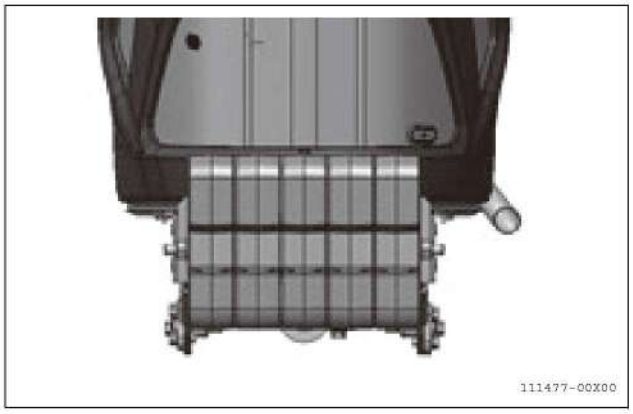


Fig 12-17

4. Set the front tow hitch pin.

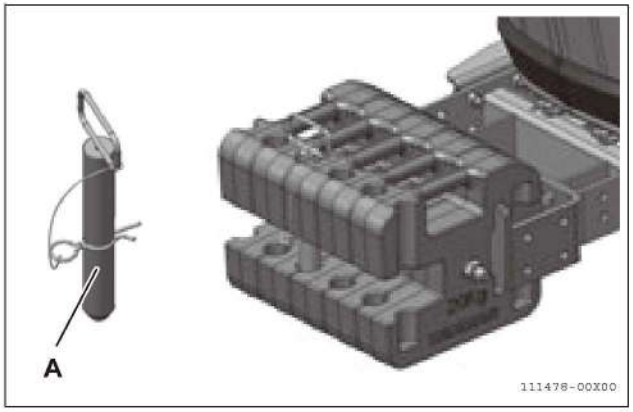


Fig 12-18

(A) Front tow hitch pin

■ 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.**

Table 12-7

Model	Maximum Load Per Front/Rear Tire			
	Tire Size		Ply Rating	Capacity (kg)
SA221	R3	26 x 12.0-12	4	810
	R4	26 x 12.0-12	4	810
SA424	R3	36 x 13.50-15	4	1180
	R4	14-17.5	4	1700

■ 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

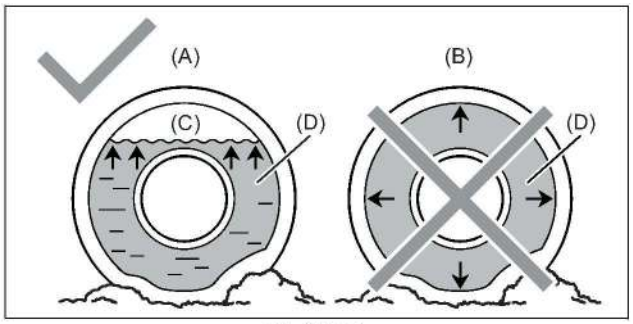


Fig 12-19

(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

7. Electric Power Outlet

This tractor has two electric power outlets.
One is under the seat, the other is behind the seat for work lamp.

■ Work lamp connector

The work lamp connector with wire harness for work lamp connection is equipped.
Only use a work lamp that is 12-2.4 A (35 W) or less.
If you would like to obtain and install a work lamp, consult your YANMAR tractor dealer.

■ 12 V DC Socket (Option)

This socket can be used with various electrical appliances.

8. Trailer Electrical Outlet

The 7 pin type trailer socket is provided for use with trailer or implement.

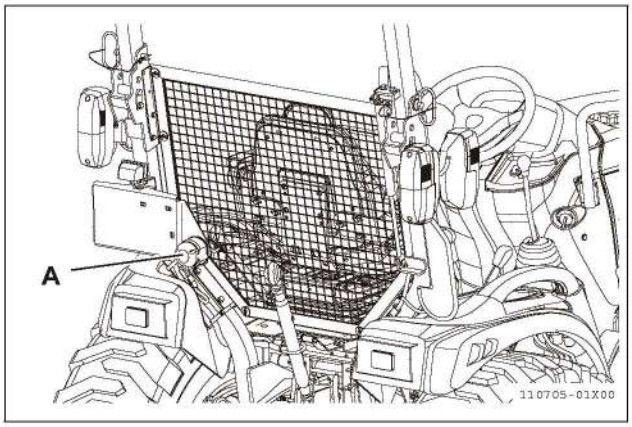


Fig 12-20

(A) Trailer socket

Table 12-8

Function of each terminal in trailer socket (Fig 12-20)		
Terminal	Function	Color of wire harness
1	Turn signal (L)	Green/Yellow
2	–	–
3	Ground	Black
4	Turn signal (R)	Green
5	Tail (R)	Gray
6	Brake stop	Blue
7	Tail (L)	Gray

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.

Table 13-1

1. Maintenance Check List

Topic		Time	✔: By user ●:By autorized Yanmar dealer or distributor									
			Service Intervals									
			Daily	If Necessary	Every 50 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 2000 hours	Every 1 year	Every 2 years
Engine Oil Level	Check	Daily	✔									
Transmission Hydraulic Oil Level	Check	Daily	✔									
Tire Air Pressure	Check	Daily	✔									
Grille	Check	Daily	✔									
Fuel Tank	Check/Refill	Daily	✔									
Rubber Dust Unloading Valve	Check	Daily	✔									
Radiator Hose and Clamp	Check	Daily | Every 500hr or 2 years whichever occurs first	✔				●*1					●*1
	Replace	If Necessary		●								
Radiator Cooling Screen	Check	Daily	✔									
Safety Systems	Check	Daily	✔									
Radiator Cooling Fins	Clean	Every 50 hr			✔							
Cooling System	Check	Daily	✔									
Coolant	Flush/ Change	Every 2000hr or 2 years whichever occurs first								●*1		●*1
Fuel Line	Check	Daily | Every 500hr or 2 years whichever occurs first	✔				●*1					●*1
	Replace	If Necessary		●								
Power Steering Line	Check	Daily | Every 500hr or 2 years whichever occurs first	✔				●*1					●*1
	Replace	If Necessary		●								
Seatbelt	Check	Daily | Every 500hr or 2 years whichever occurs first	✔				●*1					●*1
	Replace	If necessary		●								
Roll-Over Protective Structure (ROPS)	Check	Daily | Every 500hr or 2 years whichever occurs first	✔				●*1					●*1
	Replace	If necessary		●								
Headlights, Hazard Lights, and all other lights (lights and/or bulbs).	Check	Daily | Every 500hr or 2 years whichever occurs first	✔				●*1					●*1
	Replace	If necessary		✔								
Fan and Alternator Belt	Inspect	Every 50 hr			✔							
	Adjust	50/250 hr and every 250hr after or every year whichever occurs first			●1st time	●*1					●*1	
	Replace	If Necessary		●								
Air Cleaner Element	Check/ Clean	Every 250 hr and if necessary		✔		●*3						
	Replace	Every 500 hr or every year whichever occurs first and if necesary		●			●*1				●*1	
Fuses	Replace	If necessary		●								
Battery Condition	Check	Every 50hr			✔							
Fuel Filter	Replace	Every 500 hr or every 2 years whichever occurs first					●*1					●*1

Topic		Time	✔: By user ●:By autorized Yanmar dealer or distributor									
			Service Intervals									
			Daily	If Necessary	Every 50 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 2000 hours	Every 1 year	Every 2 years
Fuel/Water Separator	Check	Daily	✔									
	Drain	Every 50 hr and if necessary		✔	✔							
	Replace	Every 500 hr or every 2 years whichever occurs first					●*1					●*1
Wheel Bolt Tightening Torque	Check	After one hour of break -in and every 50 hr | Every 250 hr or every 1 year whichever occurs first			✔*2	●*1					●*1	
Engine Oil	Change	Every 250 hr or every year whichever occurs first				●*1					●*1	
Engine Oil Filter	Replace	Every 250 hr or every year whichever occurs first				●*1					●*1	
Transmission Hydraulic Oil	Change	50/500 hr and every 500hr after			●1st time		●					
Transmission Hydraulic Oil Filter	Replace	50/500 hr and every 500hr after			●1st time		●					
HST Hydraulic filter	Replace	50/500 hr and every 500hr after			●1st time		●					
Hydraulic hose	Check	Daily | Every 500hr or 2 years whichever occurs first	✔				●*1					●*1
	Replace	If Necessary		●								
Grease fittings	Grease	Every 50 hr			✔*4							
Front Axle Pivot	Grease	Every 50hr			✔*4							
Air Intake Hoses and Clamps	Check	50/250 hr and every 250hr after or every year whichever occurs first			●1st time	●*1					●*1	
	Replace	If Necessary		●								
Front Axle Gear Oil	Check	Every 50hr			✔							
	Change	Every 500hr					●					
Brake	Check	Daily	✔									
	Adjust	Every 500hr					●					
	Replace	If necessary		●								
Engine Valve Clearance*6	Adjust	Every 1000hr						●				
Fuel Injection Nozzle*6	Check	Every 1500hr							●			
Intake/exhaust valve seats*6	Clean	Every 2000hr								●		
Governer lever and engine speed control*6	Check and adjust	Every 250hr				●						
Crankcase breather system*6	Inspect	Every 1500hr							●			

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

NOTE

● Check the wheel bolt tightening torque after one hour of break-in.

CAB type

Periodic inspection list (CAB type)

Topic		Time	✔: By user ●:By autorized Yanmar dealer or distributor									
			Service Intervals									
			Daily	If Necessary	Every 50 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 2000 hours	Every 1 year	Every 2 years
External air introduction filter	Clean	Every 250 hr and if necessary		✔		●*3						
	Replace	Every 500hr or 2 years whichever occurs first					●*1					●*1
Warm water piping	Check	Every 500hr or 2 years whichever occurs first					●*1					●*1
	Replace	If Necessary		●								
Wascher Liquid tank	Check/refill	Daily	✔									

Attachments*6

Periodic inspection list (Attachments*6)

Topic		Time	✔: By user ●:By autorized Yanmar dealer or distributor									
			Service Intervals									
			Daily	If Necessary	Every 50 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 3000 hours	Every 1 year	Every 2 years
Front Lift hydraulic lines. Check for leakages	Check	Daily | 50/500 hr and every 500 hr after	✔		●1st time		●					
Front lift	Grease	Every 50 hr			✔*4							
Front Lift and front PTO bolts on torque	Check	50/500 hr and every 500 hr after			●1st time		●*1					●*1
Front PTO grease nipples	Grease	Every 500 hr					●					
Front PTO gear oil*5	Check	Every 250 hr				●						
	Replace	Every 500hr or every year whichever occurs first					●*1				●*1	
Front PTO oil filter*5	Clean	Every 500hr or every year whichever occurs first					●*1				●*1	
	Replace	If Necessary		●								
Drawbar	Grease	Every 50 hr			✔							
	Check	50/500 hr and every 500hr after			●1st time		●					

*1 Whichever occurs first.

*2 Check the Wheel bolt Tightening torque after one hour of break -in

*3 At Dusty Conditions: Clean filter once every 50 operating hours.

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

*5 For SA424 only

*6 Dealer can find descriptions of this maintenance on YDS (Manual, Bulletin or Service News)

2. Diesel Fuel Specifications

2-1. Diesel fuel regulation

Diesel fuel should comply with the EN590:96.

2-2. Additional technical fuel requirement

- Sulphur content not greater than 10 mg/kg (15 mg/kg at point of final distribution)
- Cetane number not less than 45

2-3. Bio-diesel fuel

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.

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 90 % (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 European standard EN14214 and EN590-2009 (for Oxidation stability)" in Europe.
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.

Consult your YANMAR tractor dealer before using the recommended biodiesel.

The engine of this machine uses precision parts in the fuel injection parts to comply with emission regulations. When storing fuel to be used, avoid using containers made of zinc plated steel sheet, but use resin or stainless metal containers. If the zinc or lead material melt into the fuel, it may cause engine malfunction.

3. Lubricants

Table 13-2

No.	Locations		Capacities			Lubricants	
			UNIT	SA221	SA424		
1	Fuel		L	23.0		No.2-D diesel fuel No.1-D diesel fuel if temperature is below -10°C (14°F)	
2	Coolant		L	CAB: 3.3 ROPS: 2.8		High Quality Permanent Type Antifreeze (Ethylene Glycol with corrosion and rust inhibitor chemicals) Coolant Mixture Ratio Distilled Water 50%: Antifreeze 50%	
3	Engine crankcase (with filter)		L	2.9	3.4	ACEA Service Categories E3, E4, or E5 SAE 10W-30 or SAE 10W-40	
4	Transmission hydraulic oil		L	15.5		Hydraulic/Transmission Fluid (TF500A)	
5	Front axle gear oil		L	3.0		SAE 80W-90 gear oil	
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 2000 hours
  - if the tractor is operated for more than 2000 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 authentic parts. Non-authentic 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

Table 13-3

Item	Part Number	
	SA221	SA424
Engine Oil Filter	119305-35160	
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
1 Amp Fuse	1A8426-52800	
5 Amp Fuse	198535-52110	
10 Amp Fuse	198535-52120	
15 Amp Fuse	198535-52130	
20 Amp Fuse	198535-52140	
50 Amp Slow Blow Fuse	1E8720-83120	
80 Amp Slow Blow Fuse	198153-51700	
Battery	1A842E-51510	
Headlights Bulb	1A8330-53250	
Front Turn Signal Lights Bulb (CAB)		
Front Turn Signal Lights Bulb (ROPS)	1A8060-53420	
Rear Turn Signal Lights Bulb (CAB)		
Rear Turn Signal Lights Bulb (ROPS)	1A7400-53530	
Tail Lights Bulb (CAB)		
Tail Lights Bulb (ROPS)	1E9170-81270	
Width Indicator Lamp Bulb (CAB)		
Width Indicator Lamp Bulb (ROPS)	1A8060-53410	

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 2.7 metric tons (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 "Lock and Set the Parking Brake" on page 7-4.**
- **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.**

1. 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

2. 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

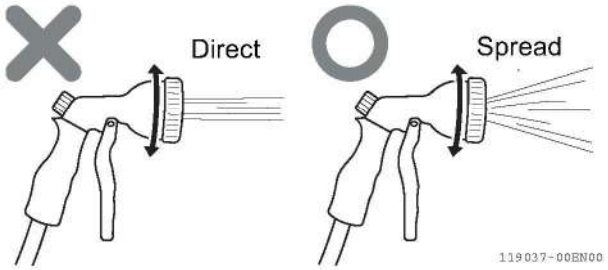
- **Read the DANGER, WARNING and CAUTION statements on the safety alert decals on the tractor.**
- **Before starting the engine:**
  - **remain seated on the operator seat**
  - **move the range shift lever to the N (neutral) position**
  - **push down Power Take Off (PTO) switch to OFF position**
  - **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.**

3. Clean the tractor

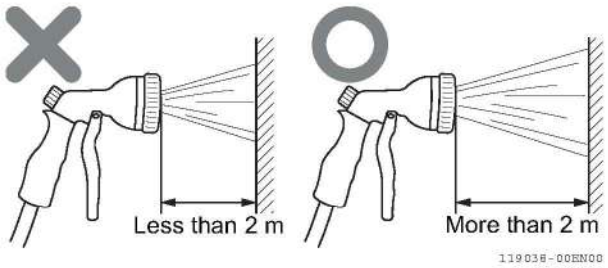
⚠ WARNING

- **Clean the tractor at the flat and stable place. If not, the tractor may move and cause injury.**
- **When cleaning with a high pressure cleaner, place the cleaner nozzle in the "spread" position and keep the cleaner nozzle at least 2 m from the tractor.**
  [If you do not obey]
  - **may cause fire due to damage or disconnect of electrical wiring**
  - **high pressure oil may blow out and cause injury due to damage of the hydraulic hose**

<Do not wash the tractor with "direct" position>



<Do not wash the tractor near>



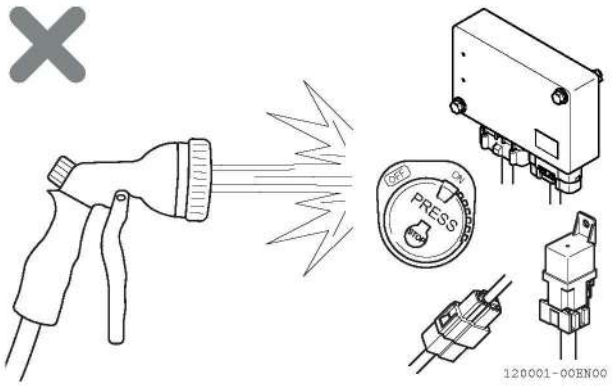
Wash the tractor with water on the same day you worked and then clean the tractor as follows.

- Remove the objects and debris that are pinched or wrapped around rotating parts
- Wipe off the wetness well
- Apply grease to parts easily rust
- Lubricate to rotating and sliding parts
- Apply grease to each grease injection part (grease nipple)

When water or mud water gets into the electrical component connection (coupler), wipe it off with a clean cloth.

IMPORTANT

- If the tractor is inappropriately washed, it may cause malfunction or damage.
  - safety label and sticker may be peeled off
  - electronic components, engine and transmission may cause a failure by water invasion
  - damage to tires, oil seals, rubber such as crawlers, resin covers, glass, etc. may occur
  - coating and plating surface may be peel
- When washing the tractor with a high pressure cleaner, do not use to following parts. It may cause failure of electrical parts.
  - instrument panel
  - steering area
  - hydraulic/travel control lever area
  - battery area
  - other electrical components (switches, sensors, lamps, controllers, etc.)
- Do not splash water to the air cleaner or engine area. It may cause a failure.



4. 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
2. Pick up the hood open bar (Fig 14-1, A) from the right side of the operator seat.

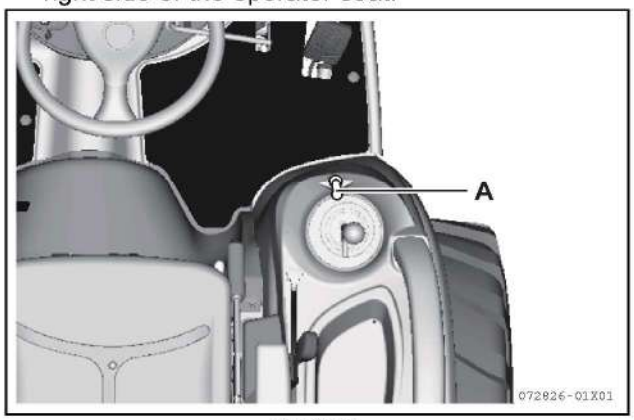


Fig 14-1

(A) Hood open bar

3. Insert the hood open bar to the rubber slit of the hood (Fig 14-2, A).

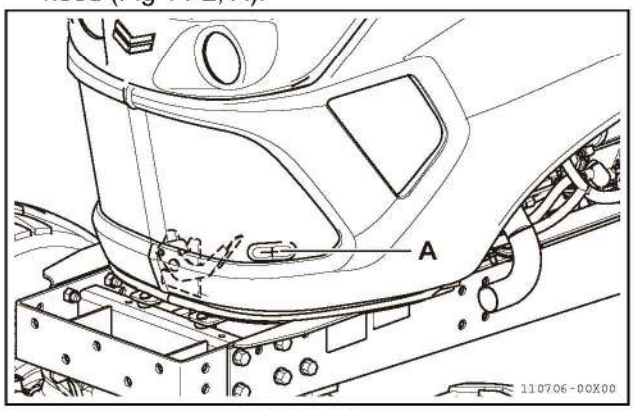


Fig 14-2

(A) Rubber slit of the hood

4. Push the hood release lever (Fig 14-3, A) with the hood open bar to unlatch the hood lock.

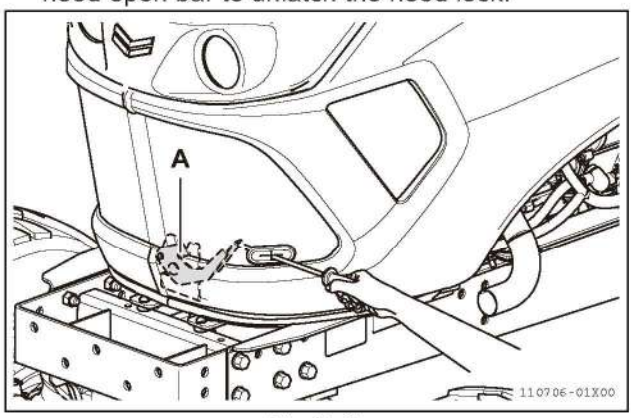


Fig 14-3

(A) Hood release lever

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

■ Close the Hood

⚠ CAUTION

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

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.

IMPORTANT

- Close the hood completely, otherwise the dust may enter and radiator screen clogged.

5. 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

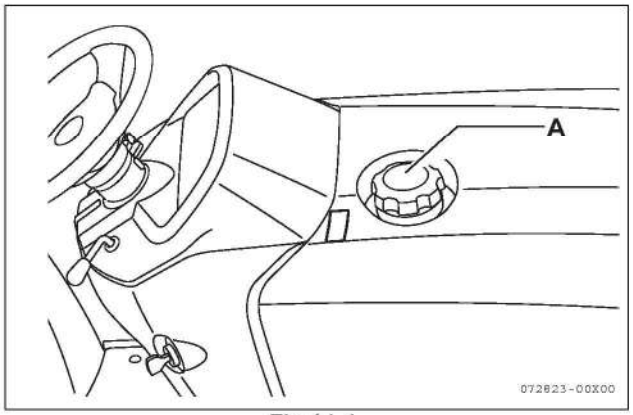


Fig 14-4

(A) Fuel filler cap

■ Inspecting and refilling the washer tank (CAB type)

The washer tank is attached to the rear of the CAB inside (right side). If the washer liquid is low and it does not spurt fully, remove the filler port and refill the washer liquid. The capacity of the tank is 1.0 L. Although the ratio of water and washer liquid is 1:1, the mixing rate differs depending on the external temperature. Please follow the instruction manual for the washer liquid.

<CAB rear part>

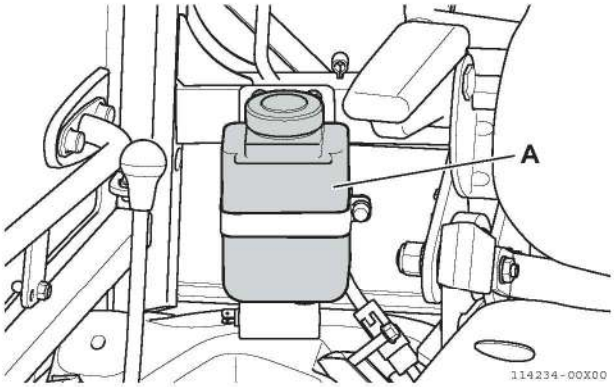


Fig 14-5

Washer tank

■ 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.
- Before adding the engine oil, always:
  - shut off the engine
  - allow the engine to cool down for several minutes

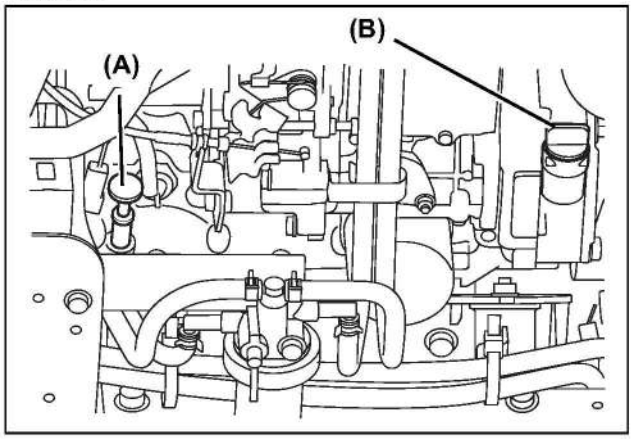
NOTE
- Make sure that the engine is cold before checking the engine oil level.

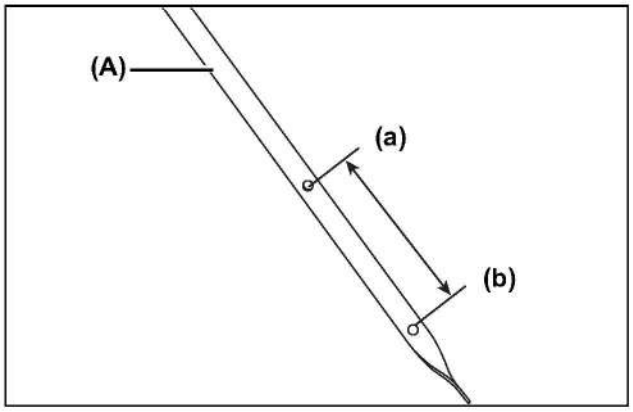
1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Allow the engine to cool down for several minutes.
5. Raise the hood.

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 (Fig 14-6, A).
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.

<SA221>





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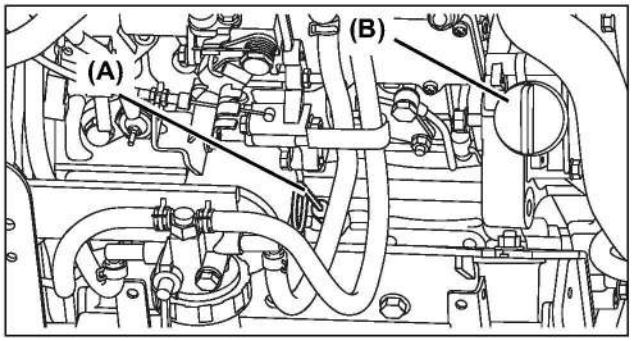


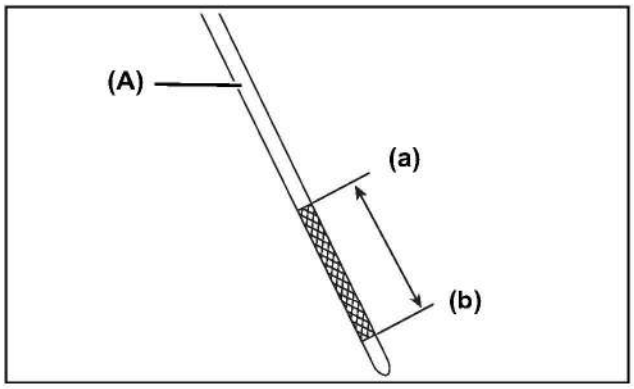


Fig 14-6

(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 (Fig 14-6, B).
- 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 (Fig 14-6, A) 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 and dipstick, carefully clean the area around the transmission hydraulic oil filler cap and dipstick.
- 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.

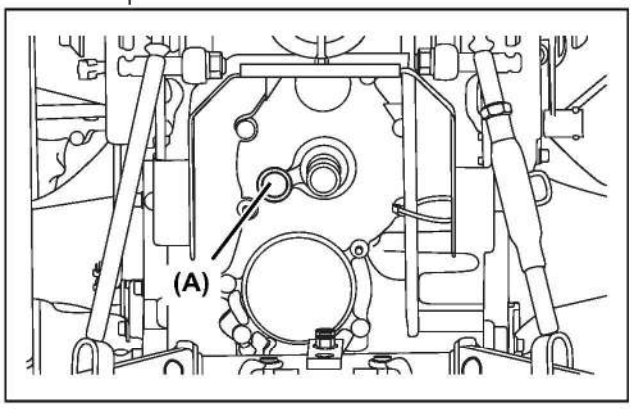


Fig 14-7

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

●How to view the gauge window

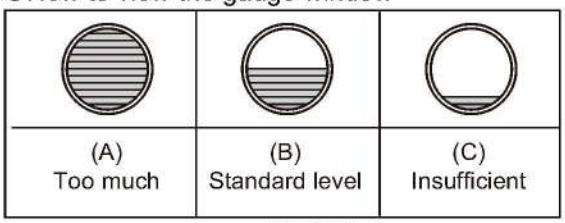


Fig 14-8

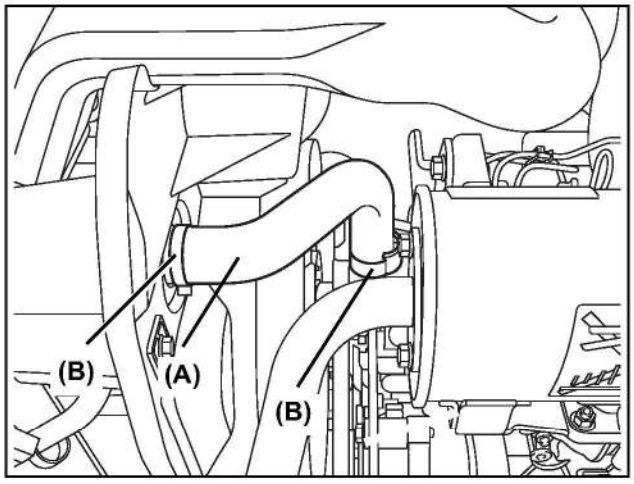
■ Clean the Radiator Hoses and Clamps

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 14-9, A·C) for any damages and cracks.
7. Replace any damaged hoses.
8. Check for loosen hose clamps (Fig 14-9, B).
9. Replace as necessary.
10. Lower the hood.



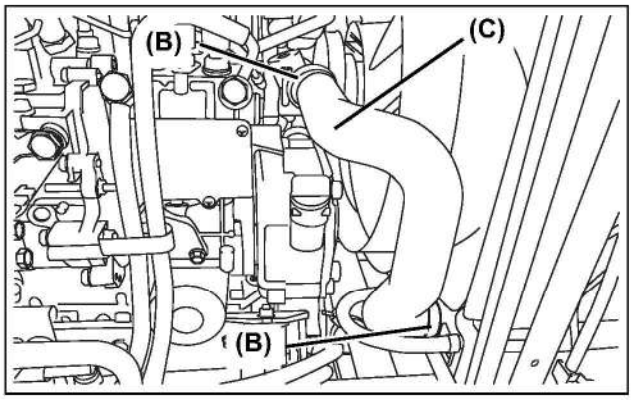


Fig 14-9

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

■ Check 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 if water is present in the fuel/water separator
6. For details how to drain the fuel/water separator , see "Check and Drain the Fuel/Water Separator" on page 14-18.

■ Clean 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 210 kPa (30 psi).**

⚠ 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.**

IMPORTANT

- Keep the 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 14-10, A).
7. Remove straw and dust attached from the radiator cooling screen.

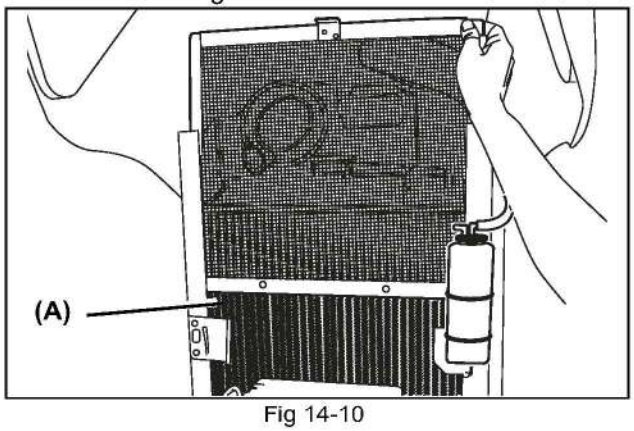


Fig 14-10

(A) Radiator cooling screen

■ 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 (Fig 14-11, A) for dirt, grass clippings and debris.
2. Clean the front grille screen with a brush or cloth.

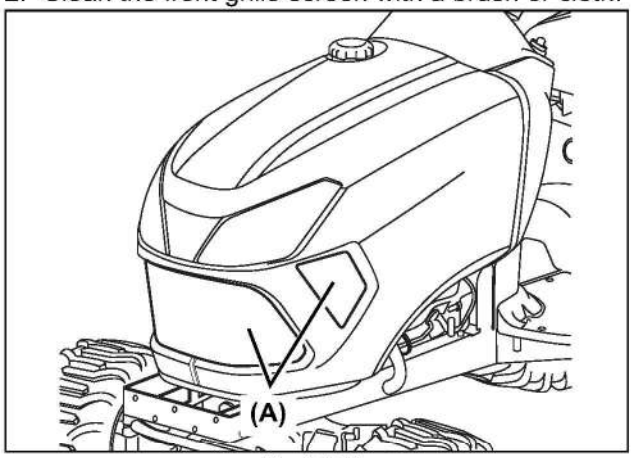


Fig 14-11

(A) Front grille screen

■ Check the Fuel Line

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

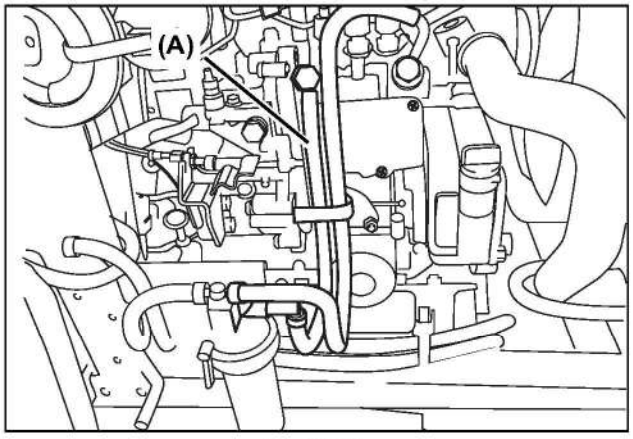


Fig 14-12

(A) Fuel line

■ 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 14-13, A):
   - If the engine is warm, the coolant level must be between the full line (Fig 14-13, a) and the low line (Fig 14-13, b).
   - If the engine is cold, the coolant level must be at the low line on the reserve tank.

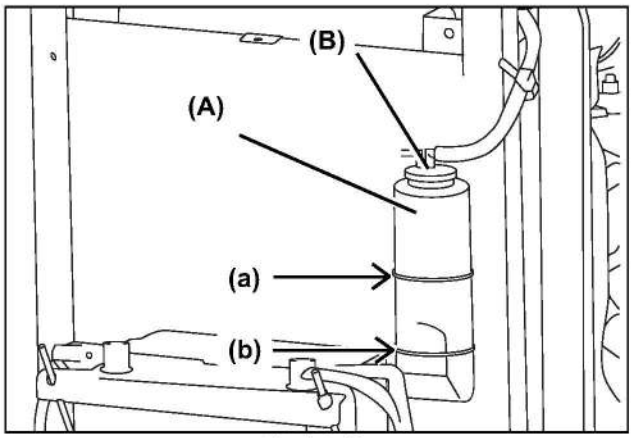


Fig 14-13

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

7. When necessary, remove the reserve tank cap (Fig 14-13, B) 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.

■ 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 "Lock and Set the Parking Brake" on page 7-4), or depress the brake pedal.
3. Release the forward and reverse drive pedal to N (neutral) position.
4. Pull up Power Take Off (PTO) switch (Fig 14-14, A) to ON position.
5. Turn the starter key switch to the START position.

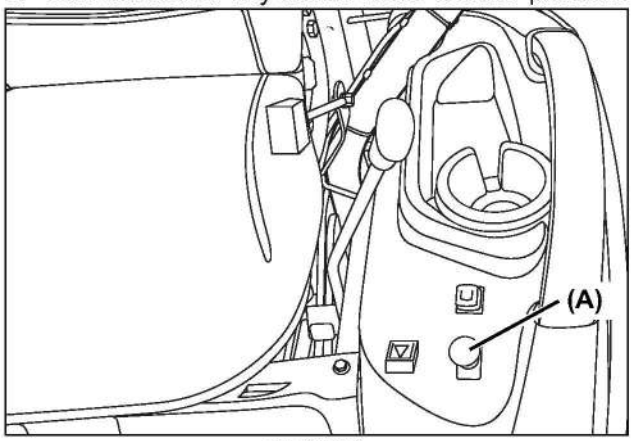


Fig 14-14

(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.

Key switch	START
Forward/reverse drive pedal	"N" (Neutral)
PTO switch	OFF
3 point hitch control lever	Lowest position (SA424) "N" (Neutral) (SA221)
Seat switch	ON (sitting position)

- After starting the engine, if seat switch or parking brake isn't ON, the engine stops.
- For example, if the operator gets off the machine without applying the parking brake, the engine stops.

2. Parking Brake Safety Switch

1. Sit on the operator seat.
2. Engage the parking brake securely, for details, see "Lock and Set the Parking Brake" on page 7-4.
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 "Lock and Set the Parking Brake" on page 7-4.
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 "Lock and Set the Parking Brake" on page 7-4), or depress the brake pedal.
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 or release brake pedal.
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 "Lock and Set the Parking Brake" on page 7-4.
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.

IMPORTANT
- 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 Seatbelt

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

■ Check the Headlights, Hazard Lights, etc.

For details, see "3. Bulb" on page 15-6.

■ Check the Roll-Over Protective Structure (ROPS type)

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 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 "6. Safe Practices for Parking the Tractor" on page 1-6.
2. Shut off the engine.
3. Check all the tires safely and securely.
4. Engage the parking brake. For details, see "Lock and Set the Parking Brake" on page 7-4.
5. Confirm that the parking brake 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.

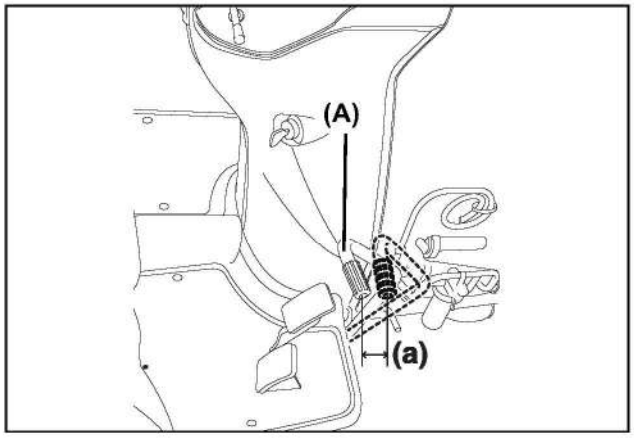


Fig 14-15

(A) Brake pedal
(a) 73±3 mm

8. Check the free play of the brake pedal.
   - The brake pedal free play must be within 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**
- **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.

■ Check and Clean the Rubber Dust Unloading Valve

IMPORTANT: Avoid damage!

Always operate the engine with:

- The air filter element installed.
- The rubber dust unloading valve installed.

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
2. Shut off the engine.
3. Allow the engine to cool down for several minutes.
4. Raise the hood to access the rubber dust unloading valve.

Clean the dust unloading valve by squeezing the valve. Replace the valve as necessary.

6. Check and Replace as Necessary

■ Inspect and replace 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 14-24.

■ Replace hoses with clamps and lines

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Replace the Fuses

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

■ Replace the Light Bulbs

For details, see "3. Bulb" on page 15-6.

■ Check and Drain the Fuel/Water Separator

For details, see "Check and Drain the Fuel/Water Separator" on page 14-18.

■ Replace the Retractable Seatbelt

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Service the Air Cleaner Element

For details, see ""Service the Air Cleaner Element"" on page 14-23.

■ Replace the Brake

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Replace the Roll-Over Protective Structure (ROPS type)

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Cleaning the external air introduction filter (CAB type)

For details, see "Cleaning the external air introduction filter (CAB type)" on page 14-22.

7. First 50 Hours

■ Change the Transmission Hydraulic Oil

For maintenance work, see "Transmission Hydraulic Oil" on page 14-30.

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

For maintenance work, see "Change the Transmission Hydraulic Oil, Replace the Transmission Hydraulic Oil Filter and HST Hydraulic Oil Filter" on page 14-30.

■ Adjust the Alternator/Fan Belt

For maintenance work, for details, see ""Service the Alternator/Fan Belt"" on page 14-24.

■ Check the Air Intake Hoses and Clamps

For details, see "Check the Air Intake Hoses and Clamps" on page 14-22.

8. Every 50 Hours

■ Check the Front Axle 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

IMPORTANT

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

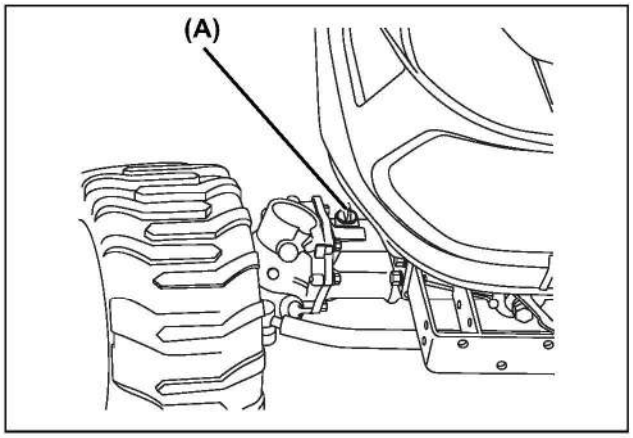


Fig 14-16

(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

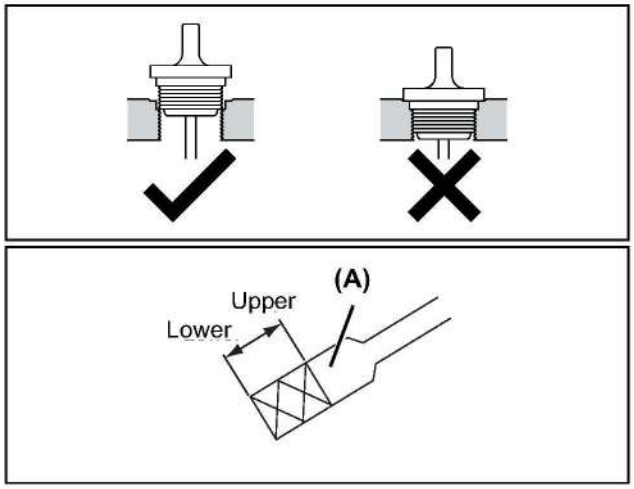


Fig 14-17

(A) Dipstick

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

■ 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 14-24.

■ Clean the Radiator Cooling Fins

⚠ WARNING

Avoid injury!
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 210 kPa (30 psi).**

⚠ 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.**

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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

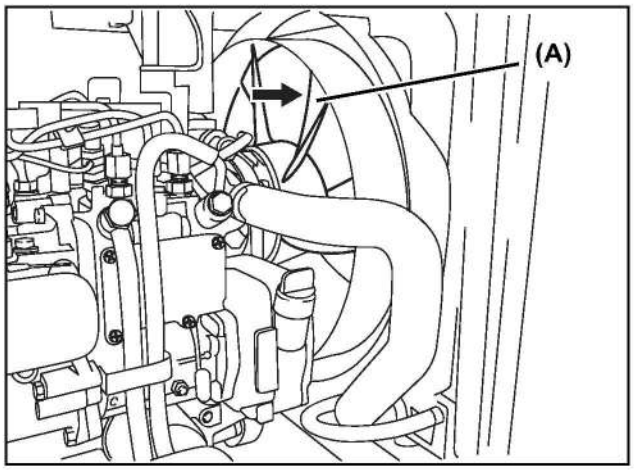


Fig 14-18

(A) Rear to front direction

■ Check and 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 14-19, A) to the OFF (closed) position (Fig 14-19, C).

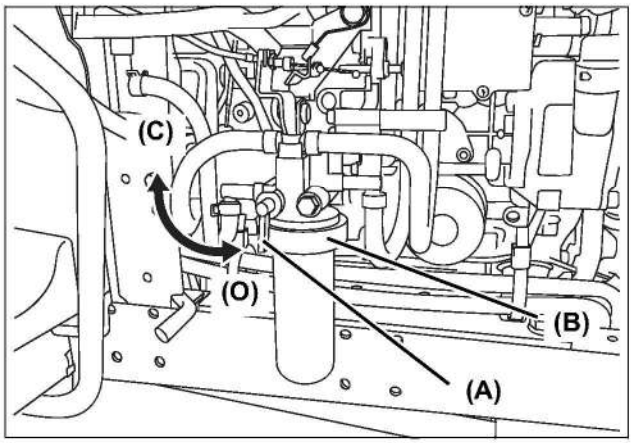


Fig 14-19

(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 (Fig 14-19, B) 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 (Fig 14-19, O).

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.

■ Grease Fittings

IMPORTANT

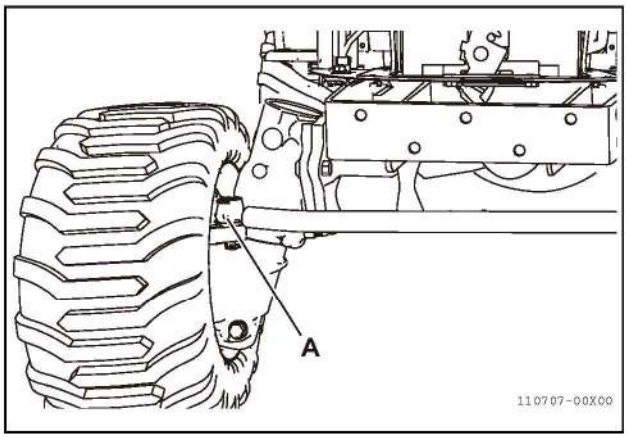
- Use the recommended greases by Yanmar.
  - the preceding procedure prevents premature wear or failure of the parts and components
- The recommended greases by Yanmar perform efficiently in an average ambient temperature range from -29 to +135 °C (-20 to +275 °F).
- When intending to operate the tractor 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.



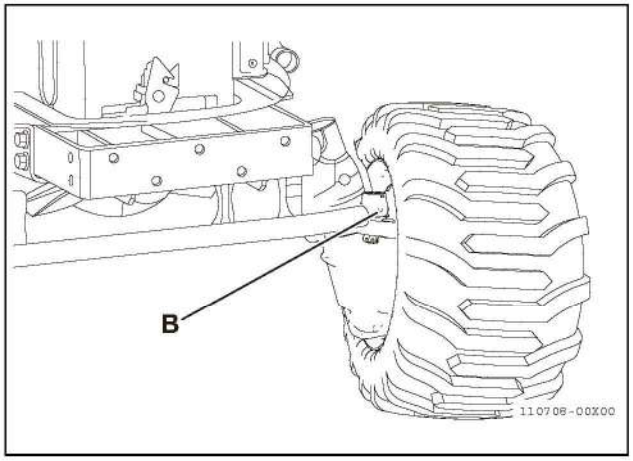


Fig 14-20

(A) Right tie rod end (grease fitting)
(B) Left tie rod end (grease fitting)

2. Lubricate the Hood Lock

Lubricate the hood lock (Fig 14-21, A) with SUPER LUBE ® lubricants once every 50 operating hours. SUPER LUBE ® is a registered trademark of Synco Chemical Corp ®.

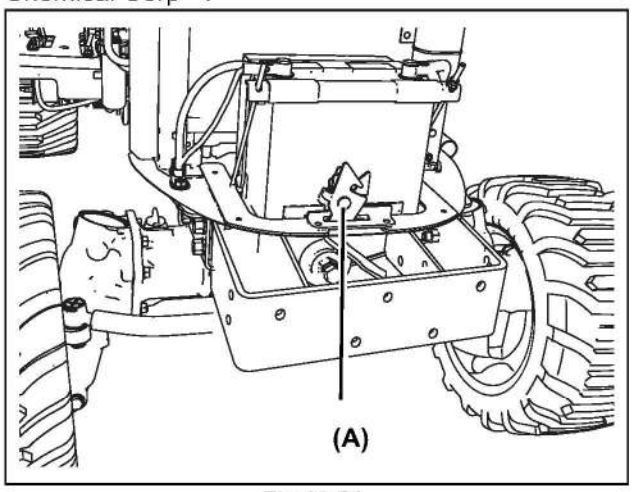


Fig 14-21

(A) Hood lock

3. Lubricate the Grease Fittings on the Linkages of the Brake and the Drive Pedalst

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.

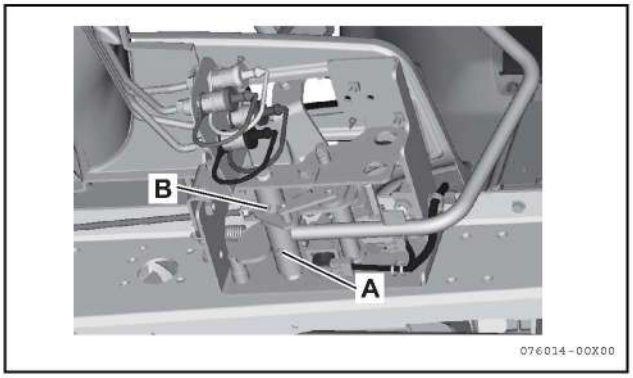


Fig 14-22

(A) Brake link grease fittings
(B) Forward and reverse drive pedal link grease fittings

NOTE

- The linkages grease fitting of the brake and drive pedals are located on the center-right side below the tractor.

4. Lubricate the Implement Control Lever Linkage

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

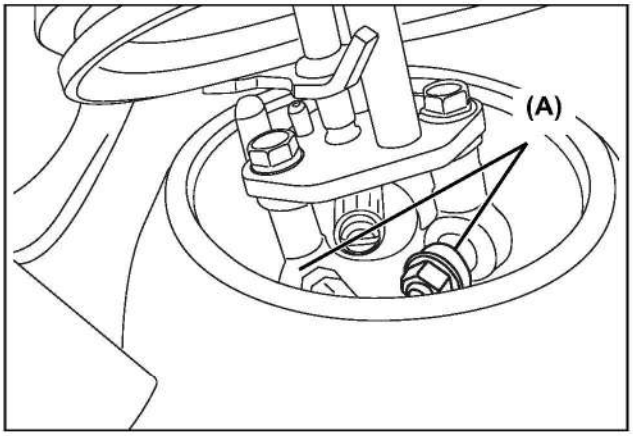


Fig 14-23

(A) Implement control lever linkage

5. Lubricate the 3-Point Hitch

Lubricate the ball joints (Fig 14-24, A) with SUPER LUBE ® lubricants once every 50 operating hours. SUPER LUBE ® is a registered trademark of Synco Chemical Corp ®.

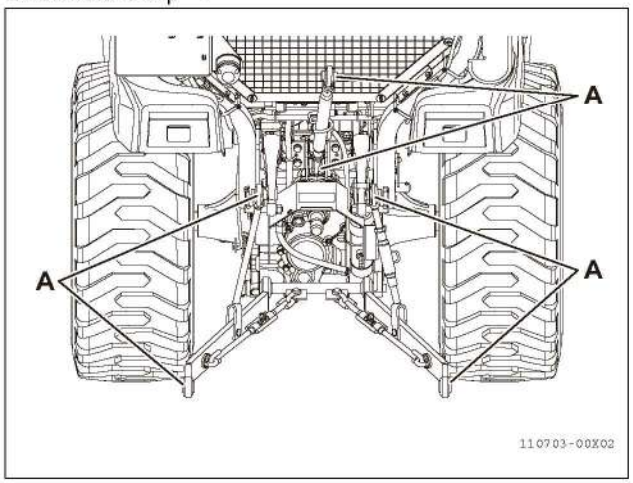


Fig 14-24

(A) Ball joints (6 pieces)

■ Check the Wheel Bolt Tightening Torque

Service Intervals

- 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 Battery Condition

For maintenance work, for details, see "Chapter 15. SERVICE THE ELECTRICAL SYSTEM".

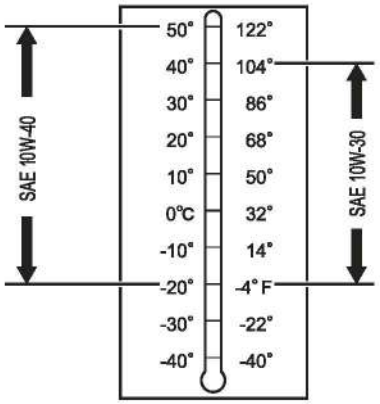
9. Every 250 Hours

■ 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 oil change.

The following oils are recommended:



Engine Crankcase

Table 14-1

Capacity	Lubricant
Approximately 2.9 Litre (SA221) Approximately 3.4 Litre (SA424)	ACEA Service Categories E6 or higher SAE 10W-30 or SAE 10W-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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 14-25, A).

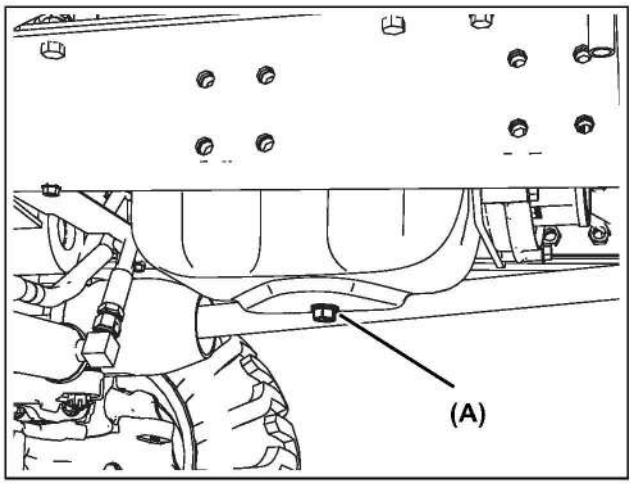


Fig 14-25

(A) Engine oil drain plug

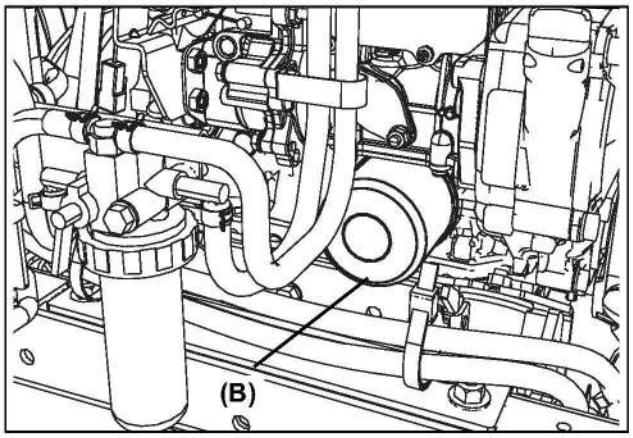
⚠ CAUTION

When 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 (Fig 14-26, B).

<SA221>



<SA424>

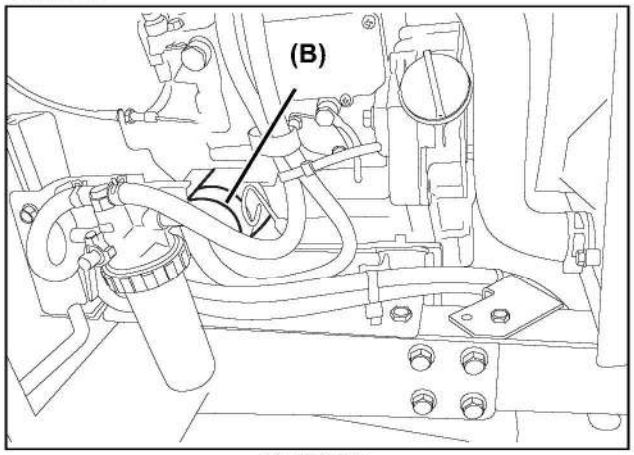


Fig 14-26

(B) Engine oil filler

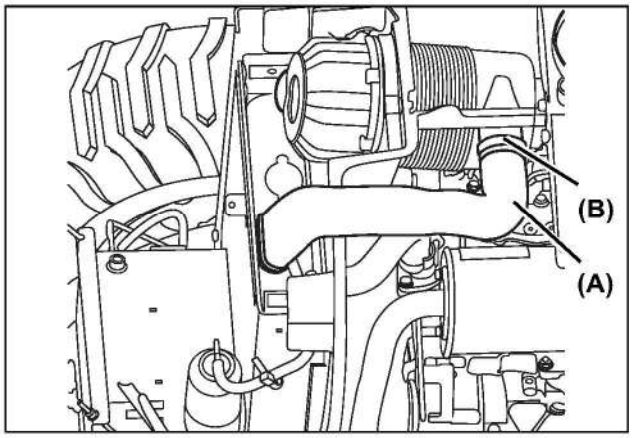
NOTE

- 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 2.9 Litre (SA221) or 3.4 Litre (SA424) 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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.



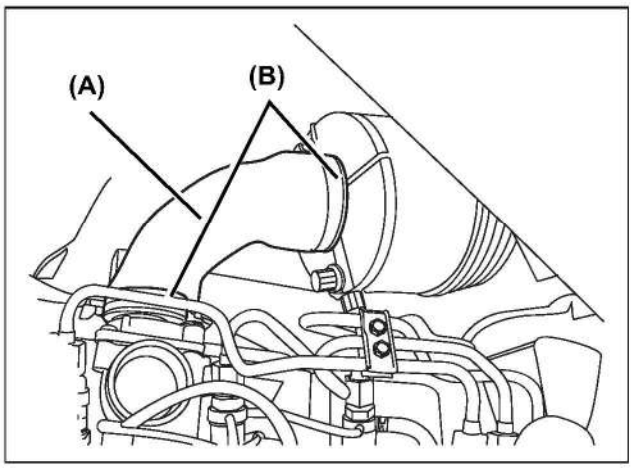


Fig 14-27

(A) Air intake hose
(B) Hose clamps

NOTE

- The illustration of the tractor shown does not have hood.
- Above illustration shows SA424.

■ Cleaning the external air introduction filter (CAB type)

Cleaning the external air introduction filter <CAB type>
If the external air introduction filter is stained and clogged, the blow-out amount of the external introduction air will reduce.

Cleaning procedure

1. The filter can be removed by removing 2 bolts.

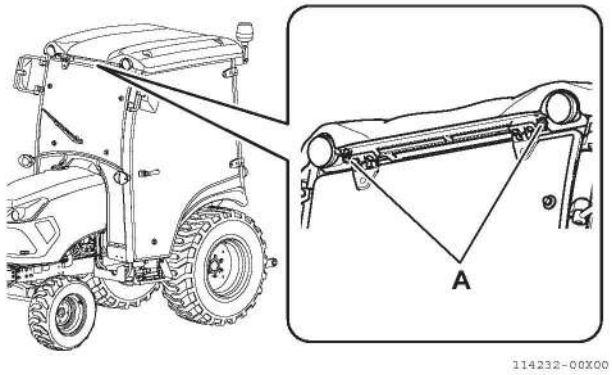


Fig 14-28

(A) Bolts

2. Blow compressed air to the filter part and remove the stain.

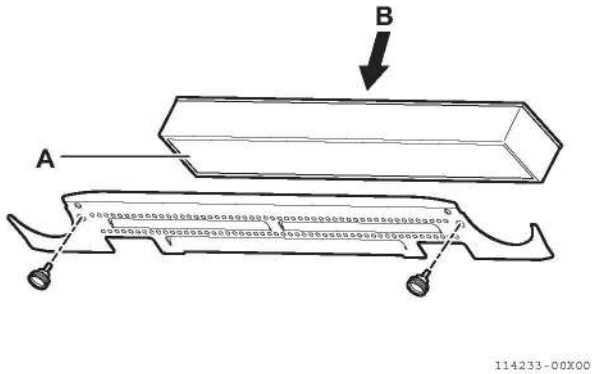


Fig 14-29

(A) Filter
(B) Compressed air

3. If the stain is excessive, replace with a new filter.
*If mud is on the panel, rinse the panel with water, dry it, and then attach.

IMPORTANT

- Do not rinse the filter with water.
- When removing stain on the filter part using compressed air, blow air from the direction indicated by the arrow mark (opposite direction toward the air flow) in the drawing.

■ 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**

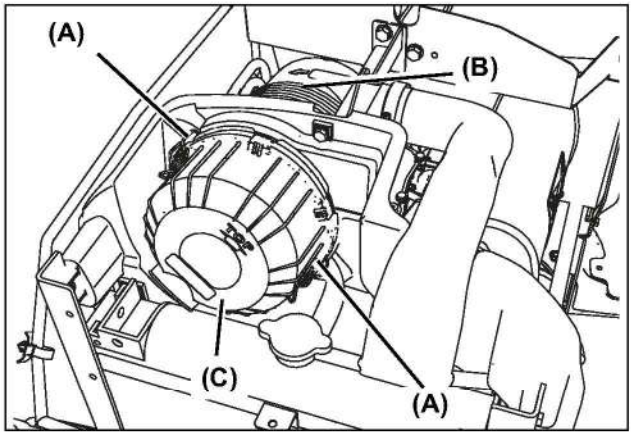
IMPORTANT

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 inner filter seal.

■ Service the Air Filter

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 14-30, A).
   - The latch hooks secures the air cleaner canister cover to the air cleaner canister (Fig 14-30, B).



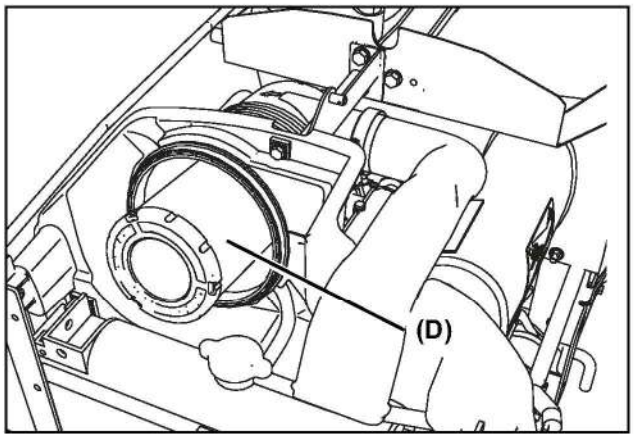


Fig 14-30

(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 (Fig 14-30, C).
9. Remove the air filter.
10. Clean the air filter (Fig 14-30, D) 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 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

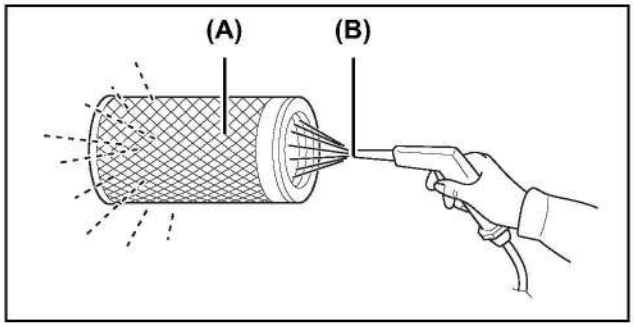


Fig 14-31

(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 outer filter at least once a year.

■ Check the Wheel Bolt Tightening Torque

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

■ Check and Adjust Governer lever and engine speed control

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.**

■ Check the Alternator/Fan Belt Tension

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

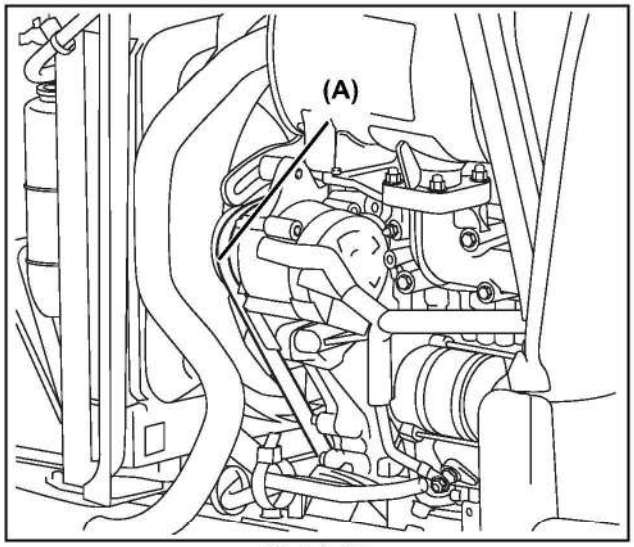


Fig 14-32

(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 10 to 15 mm.
8. If the deflection is not as specified, adjust the tension of the alternator/fan belt.

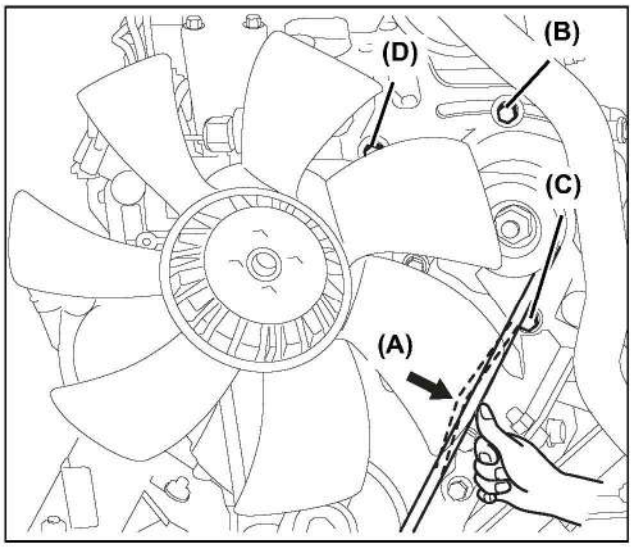


Fig 14-33

(A) 10 to 15 mm
(B) Adjusting bolt
(C) Mounting bolt
(D) Fixing bolt

NOTE
- The above illustration shows SA221.

■ Adjust the Alternator/Fan Belt Tension

1. Loosen the adjusting bolt (Fig 14-33, B).
2. Loosen the mounting bolt (Fig 14-33, C).
3. Loosen the fixing bolt (Fig 14-33, D).
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.

■ 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

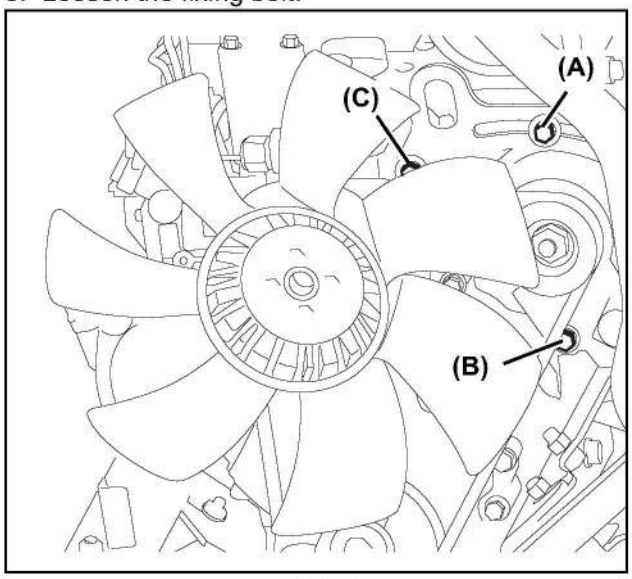


Fig 14-34

(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 (Fig 14-35, C), fan sheave and crankshaft sheave (Fig 14-35, D).
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.

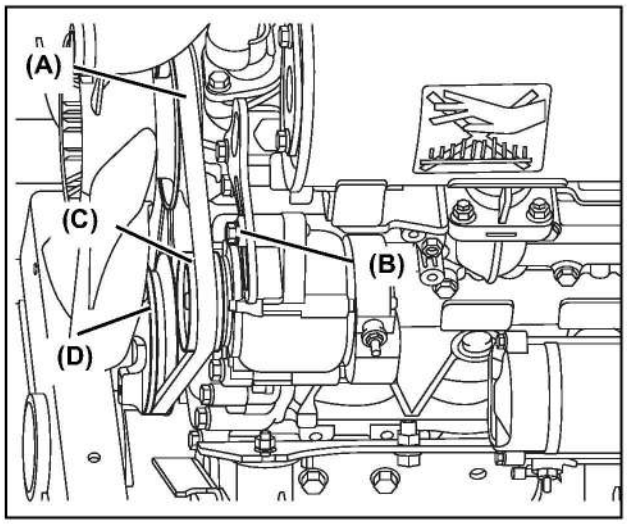


Fig 14-35

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

10. Every 500 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 14-36, A) to the OFF (closed) position (Fig 14-36, C).

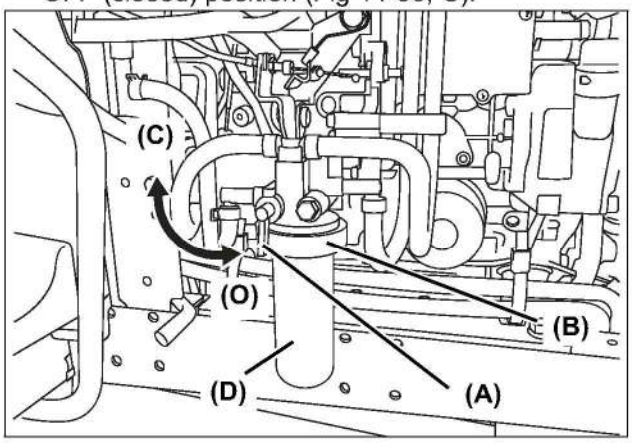


Fig 14-36

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

6. Turn the sediment bowl locking collar (Fig 14-36, B) counterclockwise to unlock the sediment bowl (Fig 14-36, D).
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. Install 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.

■ Replacing the external air introduction filter (CAB type)

If the external air introduction filter is stained and clogged, the blow-out amount of the external introduction air will reduce.

Replace procedure

1. The filter can be removed by removing 2 bolts.

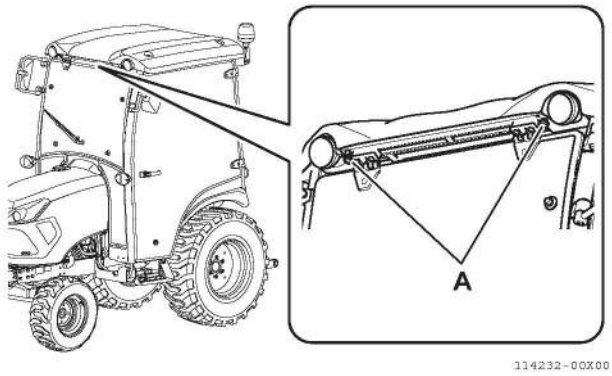


Fig 14-37

(A) Bolts

2. Replace with a new filter.

*If mud is on the panel, rinse the panel with water, dry it, and then attach.

IMPORTANT

- Do not rinse the filter with water.
- When removing stain on the filter part using compressed air, blow air from the direction indicated by the arrow mark (opposite direction toward the air flow) in the drawing.

Product name, code No.

Name	Code No.
Air conditioner external air filter	1A8322-87990

■ Change the Front Axle Gear Oil

IMPORTANT

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

Front Axle Gear Oil

Table 14-2

Capacity	Lubricant
Approximately 3.0 Litre	SAE 80W-90 gear oil

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

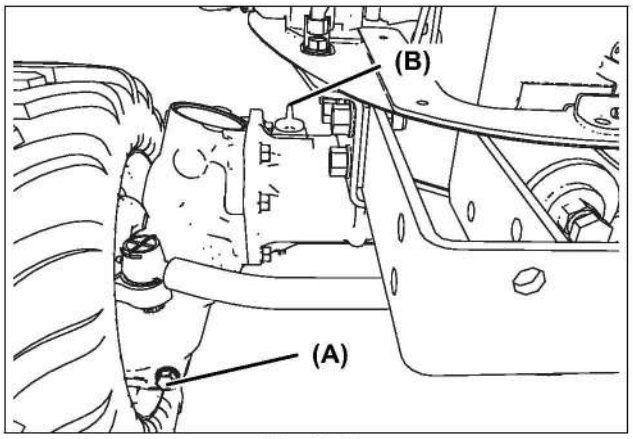


Fig 14-38

NOTE

- This illustration shown from front side.

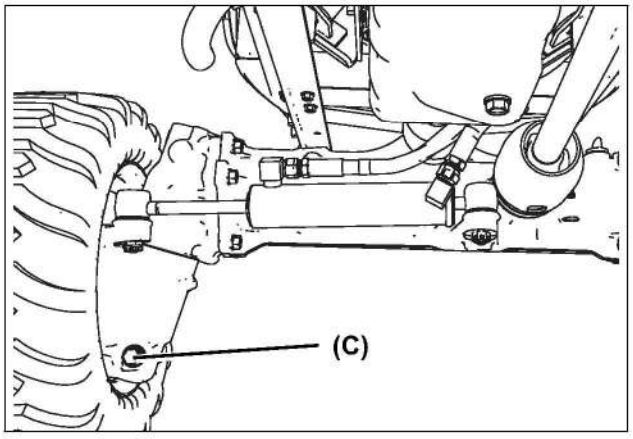


Fig 14-39

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 3.0 Litre 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.

■ Adjust the Brake

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

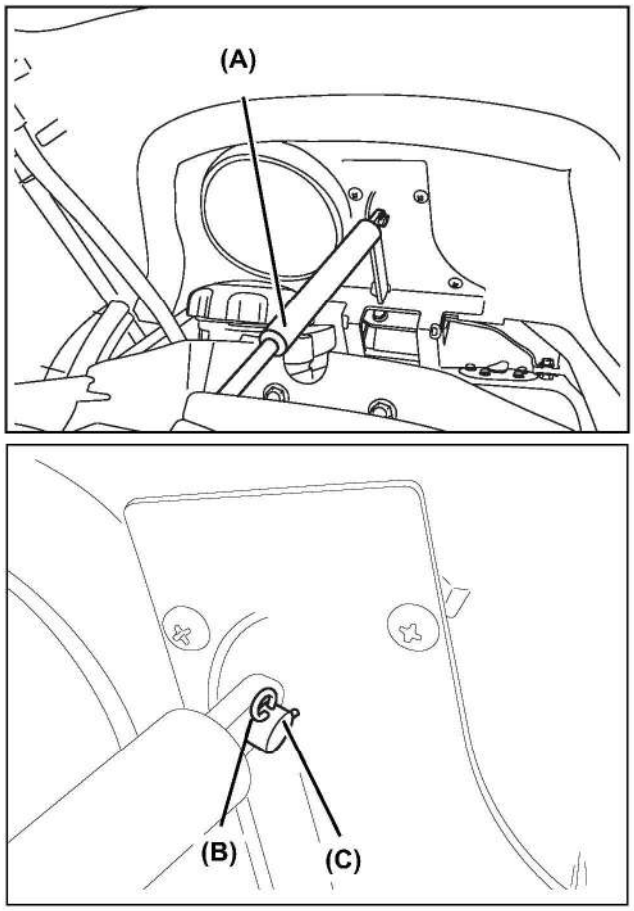


Fig 14-40

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

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

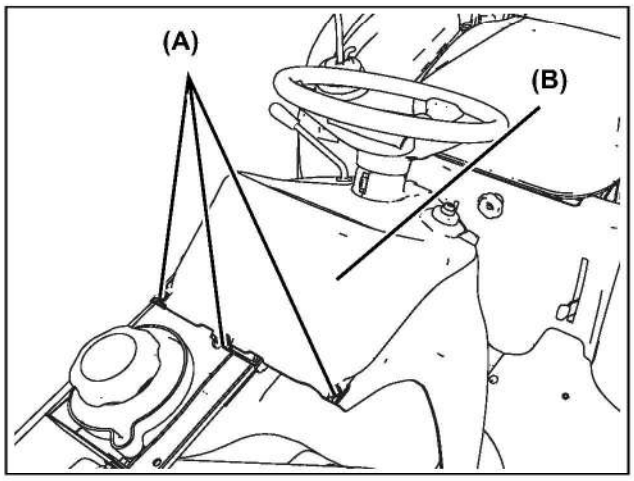


Fig 14-41

(A) Tightening bolts
(B) Top dashboard cover

10.Remove the bolt from the left dashboard cover.

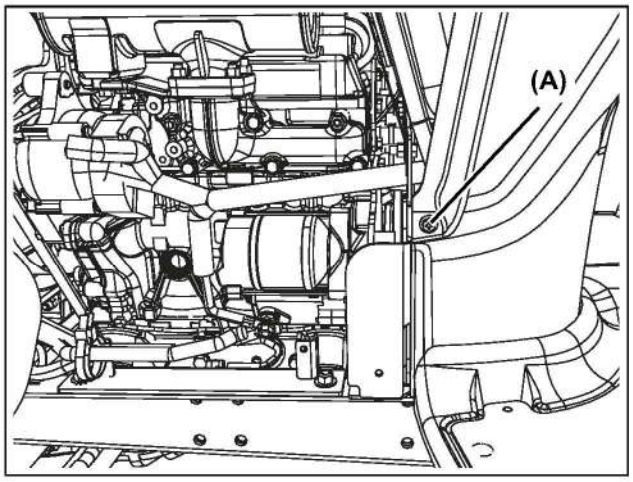


Fig 14-42

(A) Tightening bolt

11.Remove the bolt from the right dashboard cover.

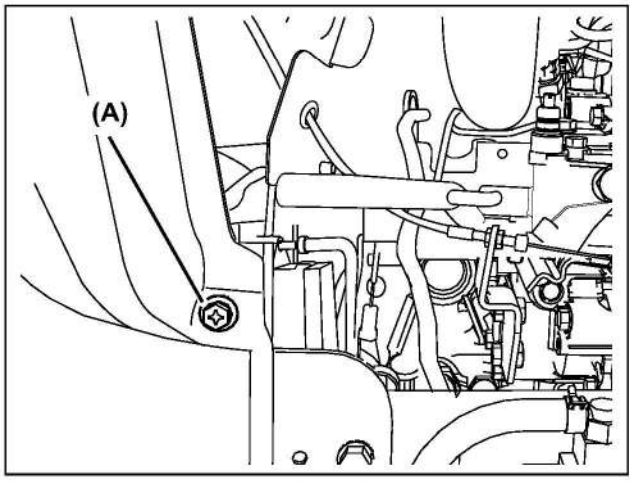


Fig 14-43

(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.

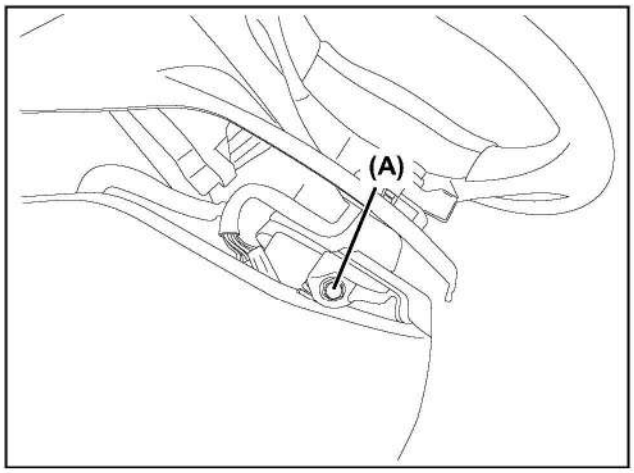


Fig 14-44

(A) Tightening bolt

14.Remove the right and left dashboard cover.

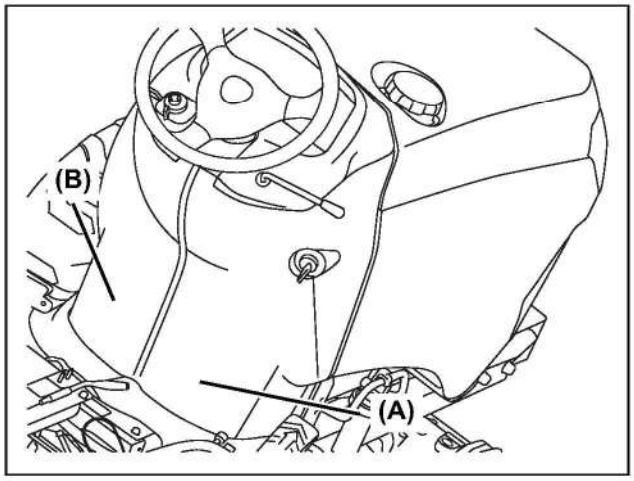


Fig 14-45

(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.

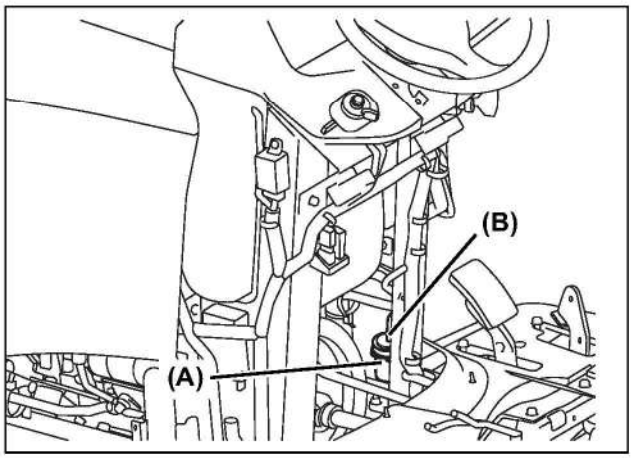


Fig 14-46

(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.

■ Check the Seatbelt

- Always ensure that all the seatbelt mounting hardwares are in good working condition.
- Replace any damaged hardware.

■ Check the Roll-Over Protective Structure (ROPS type)

For details, see "Check the Roll-Over Protective Structure (ROPS type)" on page 14-13.

■ Check the Headlights, Hazard Lights, etc.

For details, see "3. Bulb" on page 15-6.

■ Transmission Hydraulic Oil

Transmission

Table 14-3

Capacity	Lubricant
Approximately 15.5 Litre	Hydraulic/Transmission Fluid (TF500A)

■ 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

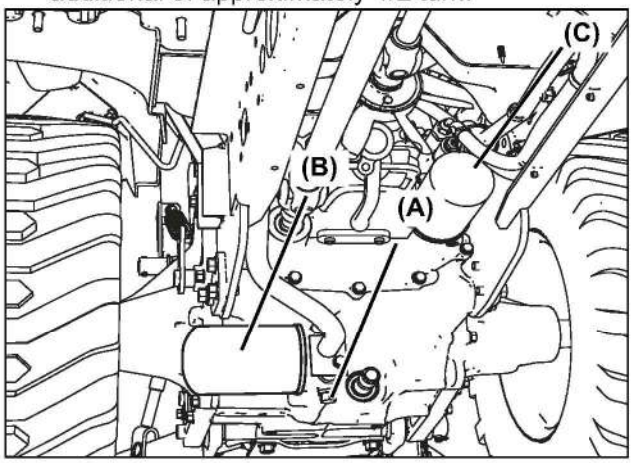


Fig 14-47

(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 15.5 Litre 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.

■ Check the Warm Water piping (CAB type)

⚠ 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.**

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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 the fuel rubber hoses for any leaks or damages.

■ Check the Radiator Hoses and Clamps

For details, see "Clean the Radiator Hoses and Clamps" on page 14-7.

■ Check the Hydraulic Hoses

For details, see "Check the Hydraulic Hoses" on page 14-14.

■ Check the Power Steering Line

For details, see "Check the Power Steering Line" on page 14-13.

■ Check the Fuel Line

For details, see ""Check the Fuel Line"" on page 14-9.

■ Replace the Air Cleaner Element

For details, see "Service the Air Cleaner Element" on page 14-23.

11. Every 1000 Hours

■ Adjust the Engine Valve Clearance

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

12. Every 1500 Hours

■ Check fuel injection nozzles

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ Inspect crankcase breather system

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

13. Every 2000 Hours

■ Clean intake/exhaust valve seats

Contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

■ 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.**

1. Drain the Cooling System

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

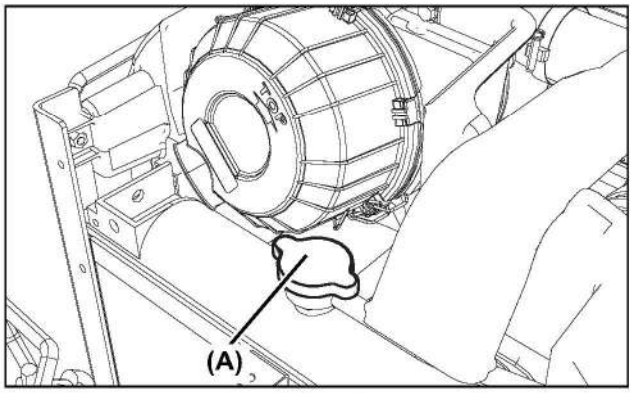


Fig 14-48

(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.

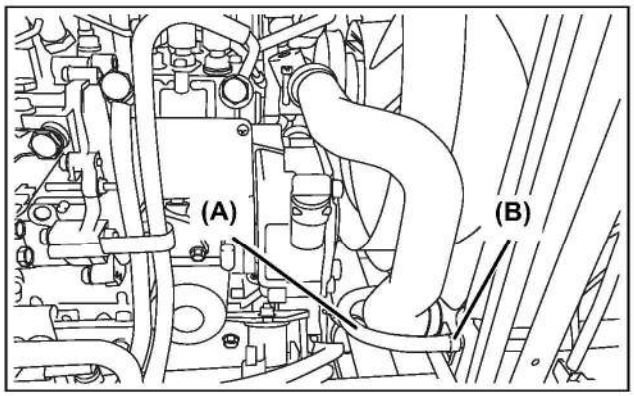


Fig 14-49

(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.

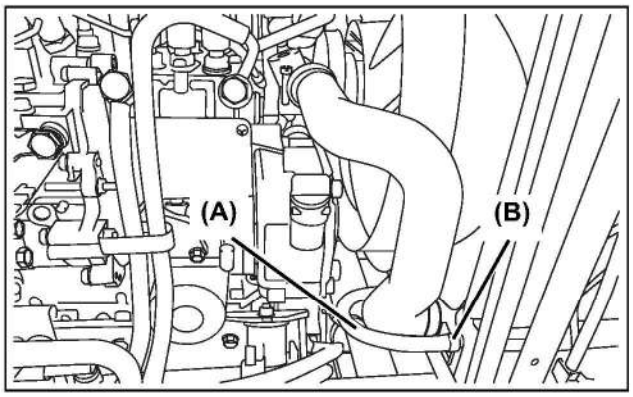


Fig 14-50

(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 2.8 Litre 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 2000 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.

14. 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.**

15. Emission Control System

The engine, including the emissions control system, shall be operated, used and maintained in accordance with the instructions provided to the end-users in order to maintain the emissions performance of the engine.

No deliberate tampering with or misuse of the engine emissions control system should take place.

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.

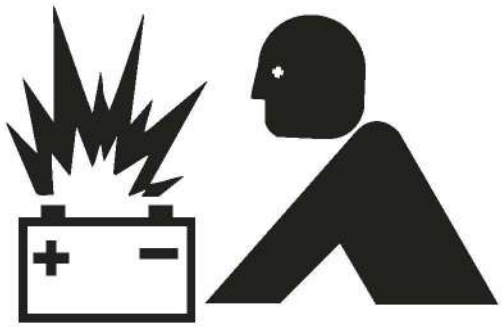
1. Battery

⚠ WARNING

- The battery posts, terminals and associated accessories contain lead and lead compounds that are known to cause cancer and reproductive harm.
- After handling the battery, wash the hands thoroughly.

■ Service the Battery Safely

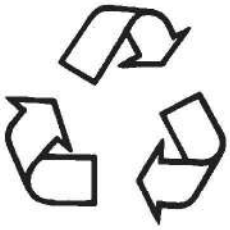
⚠ WARNING



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 11 V or lower, replace the battery with a new one.

IMPORTANT

- When replacing the battery, be sure to use the battery of the model specified.
- For environmental protection and recycle of representations, do not throw away or dump the old battery. Bring the old battery to the shop where you purchase a new battery for recycle.

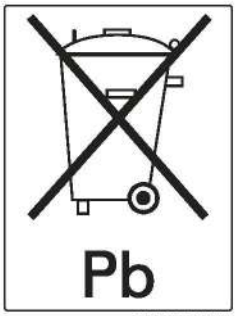


Fig 15-1

■ Remove and Install the Battery

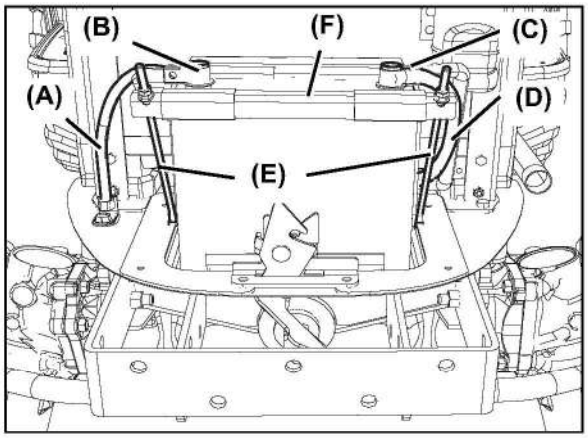


Fig 15-2

(A) Negative (–) cable
(B) Negative (–) terminal
(C) Positive (+) terminal red cover
(D) Positive (+) cable
(E) Threaded rods
(F) Bracket

■ Remove the Battery

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 15-2, B).
7. Remove the nuts, washer faced nuts, the threaded rods (Fig 15-2, E) and the bracket (Fig 15-2, F).
8. Pull out the battery slightly to access the disconnection of the positive (+) terminal.
9. Pull up the positive (+) terminal red cover (Fig 15-2, C).
10. Disconnect the positive (+) battery terminal.
11. Remove the battery.

■ 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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 3.8 Litre 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 16 °C (60 °F) 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.**

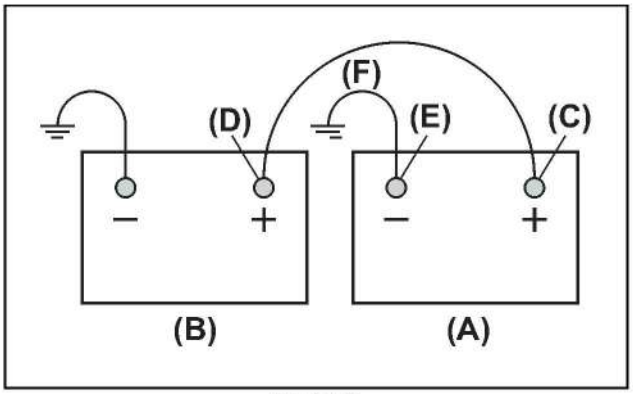


Fig 15-3

(A) Booster battery
(B) Battery on a disabled tractor
(C) Positive (+) post of booster battery
(D) Positive (+) battery terminal on a disabled vehicle
(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 (Fig 15-3, C).

4. Connect the other end of positive (+) booster cable to the positive (+) battery terminal on the disabled tractor (Fig 15-3, D).
5. Connect one end of the negative (–) booster cable to the negative (–) post of booster battery (Fig 15-3, E).
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.

■ Battery cut-off switch

⚠ CAUTION

- **Never turn power off on the battery cut-off switch while the engine is running. This could result in serious damage to the tractor's electrical components.**

When battery cut-off switch is in OFF position, battery is electrically disconnected from tractor electrical and electronic systems.
Moving switch to ON position reconnects battery into system.

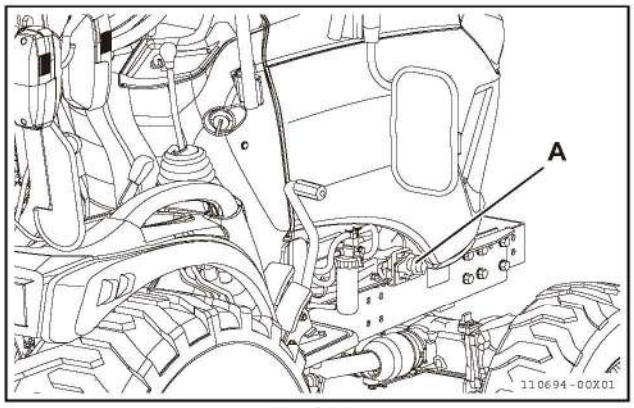


Fig 15-4

(A) Battery cut-off switch

IMPORTANT

- During a long storage period, always turn battery cut-off to OFF position. The battery could lose power if the battery cut-off switch is left ON.

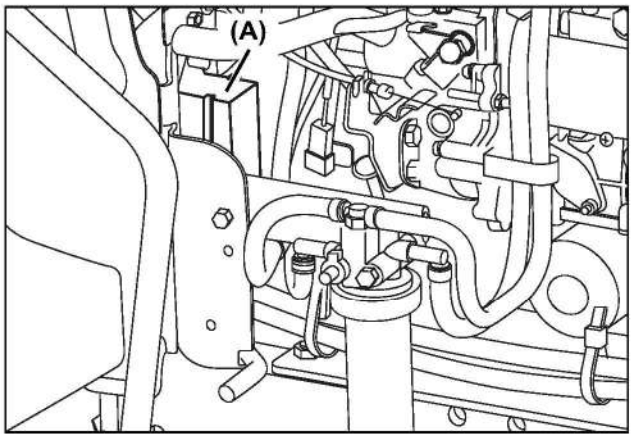
2. Fuses

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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 15-5, A) and remove the cover.
7. Locate the fuses, refer to the illustration shown (Fig 15-5).
8. Remove the blown fuse from its 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.



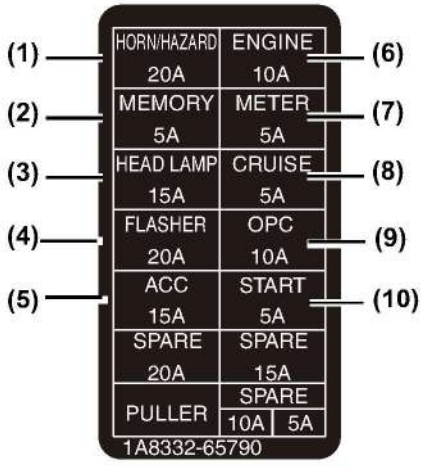


Fig 15-5

(A) Fuse holder cover
(1) Horn/hazard fuse: 15A
(2) Memory fuse: 5A
(3) Head lamp fuse: 15A
(4) Flasher fuse: 15A
(5) Accessories fuse: 15A
(6) Engine Fuse: 5A
(7) Meter fuse: 5A
(8) Cruise control fuse: 5A
(9) OPC fuse: 5A
(10)Starter fuse: 5A

■ Check the Seat Switch Fuse

1. Park the tractor safely and securely.
   • For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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 fuse, refer to the illustration shown (Fig 15-6).
7. Check the fuse.

IMPORTANT
- When the fuses is blown, contact YOUR LOCAL YANMAR TRACTOR DEALER.

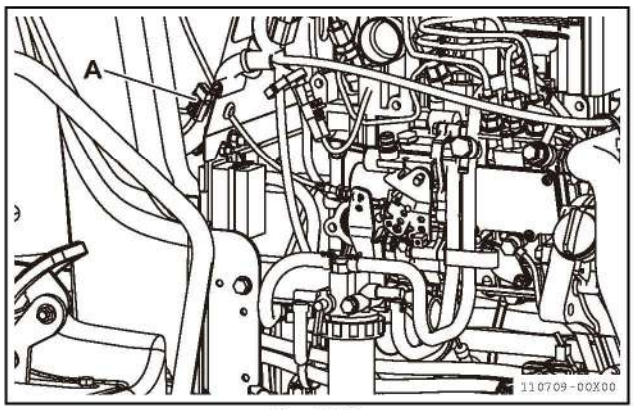


Fig 15-6

(A) Seat switch fuse: 1A

■ Check the Alternator Fuse and the Main Fuse

1. Park the tractor safely and securely.
   • For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
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 (Fig 15-7).
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.

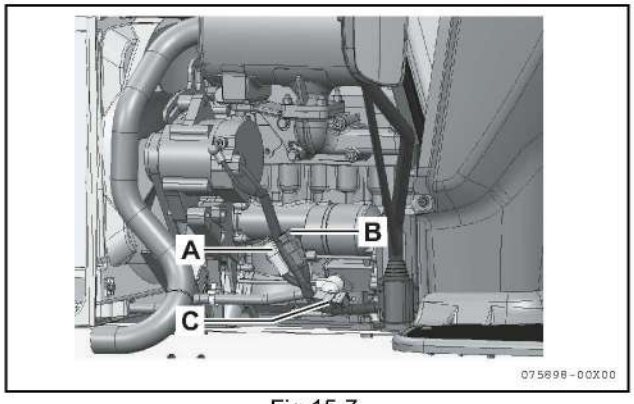


Fig 15-7

(A) Alternator fuse: 80A
(B) Main fuse: 40A
(C) Start/Lamp fuse: 40A

■ Check the CAB Fuse (CAB type)

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
2. Shut off the engine.
3. Chock all the tires safely and securely.
4. Locate the fuses, refer to the illustration shown (It is located on the upper right side of the operator's seat.) (Fig 15-8).
5. Check the fuses.

IMPORTANT

When any of the fuses is blown, contact YOUR LOCAL YANMAR TRACTOR DEALER.

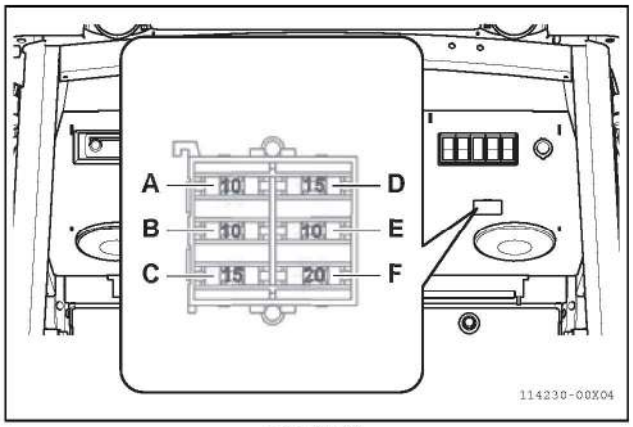


Fig 15-8

(A) Front and rear wiper fuse: 10A
(B) Rear work lamp fuse: 10A
(C) Beacon lamp, Radio and room lamp fuse: 15A
(D) 12V socket fuse: 15A
(E) Front work lamp fuse: 10A
(F) Heating blower fuse: 20A

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 "6. Safe Practices for Parking the Tractor" on page 1-6.
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.

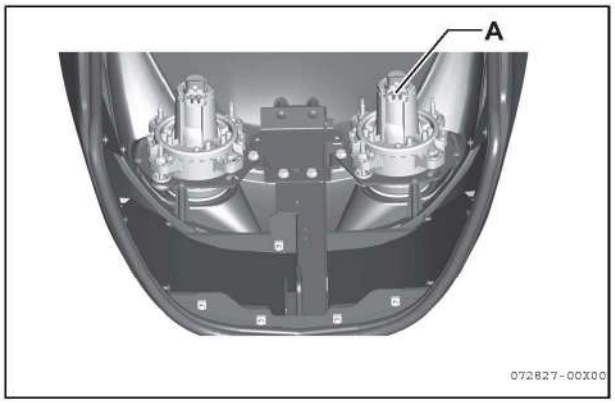


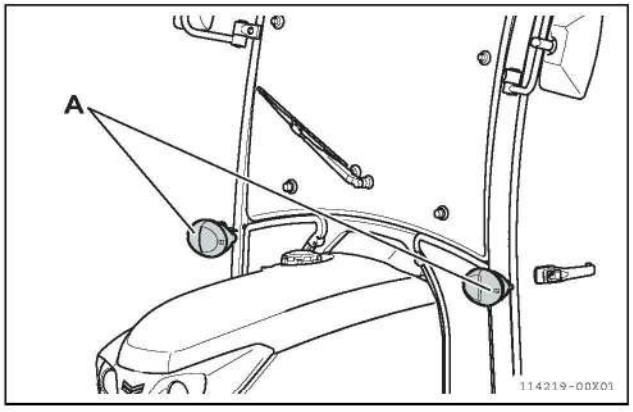
Fig 15-9

(A) Headlights bulb

■ Replace the Turn Signal/Hazard Lights Bulb (CAB type)

NOTE
- Service the turn signal/hazard lights, after removing the front or rear lenses.
- Please use 12V21W clear/yellow bulb.

1. Park the tractor safely and securely.
   - For details, see "Safe Practices for Parking the Tractor" on page 1-6.
2. Shut off the engine.
3. Allow the engine to cool down for several minutes.
4. Remove the key.
5. Turn the socket anti-clockwise.
6. Push in the bulb and turn it anti-clockwise to remove.
7. Push in the new bulb and turn it clockwise.
8. Turn the socket clockwise.



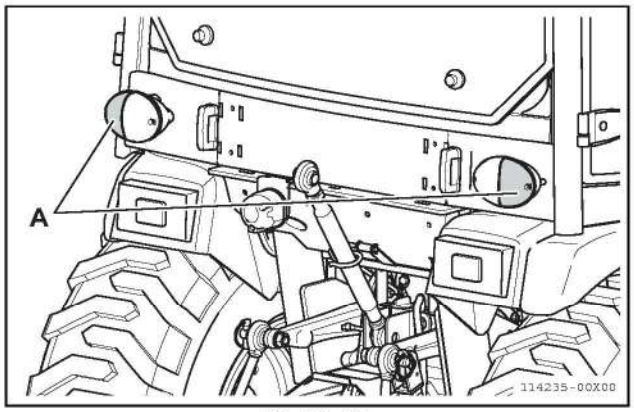


Fig 15-10

(A) Turn Signal/Hazard Lights

■ Replace the Tail Lights Bulb (CAB type)

NOTE
- The tail lights can be serviced after removing the rear lens assembly.
- Please use 12V 21W/5W bulb.

1. Park the tractor safely and securely.
   - For details, see "Safe Practices for Parking the Tractor" on page 1-6.
2. Shut off the engine.
3. Allow the engine to cool down for several minutes.
4. Remove the key.
5. Turn the socket anti-clockwise.
6. Push in the bulb and turn it anti-clockwise to remove.
7. Push in the new bulb and turn it clockwise.
8. Turn the socket clockwise.

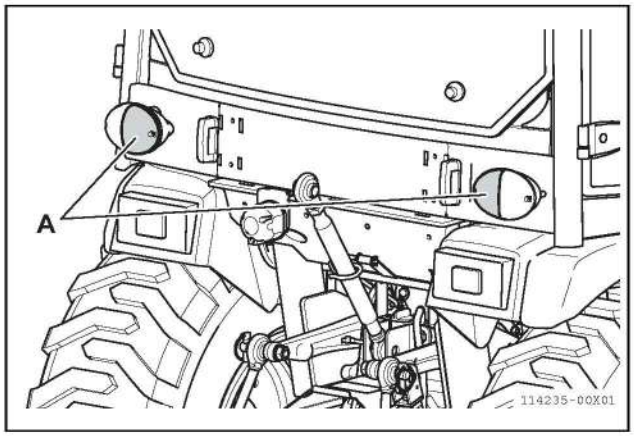


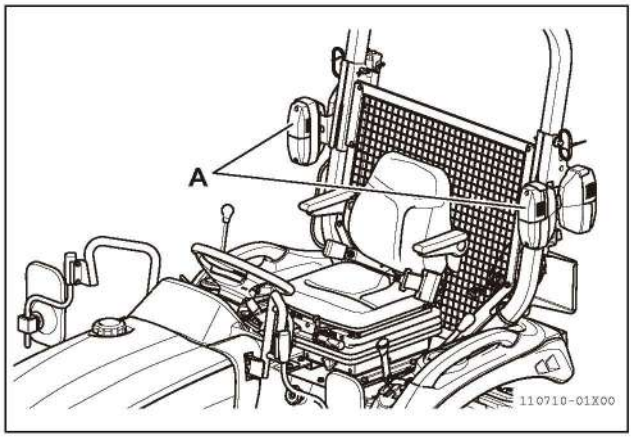
Fig 15-11

(A) Tail lights

■ Replace the Turn Signal/Hazard Lights Bulb (ROPS type)

NOTE
- Service the turn signal/hazard lights, after removing the front or rear lenses.
- Please use 12V21W clear/yellow bulb.

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
2. Shut off the engine.
3. Allow the engine to cool down for several minutes.
4. Remove the key.
5. Turn the socket anti-clockwise.
6. Push in the bulb and turn it anti-clockwise to remove.
7. Push in the new bulb and turn it clockwise.
8. Turn the socket clockwise.



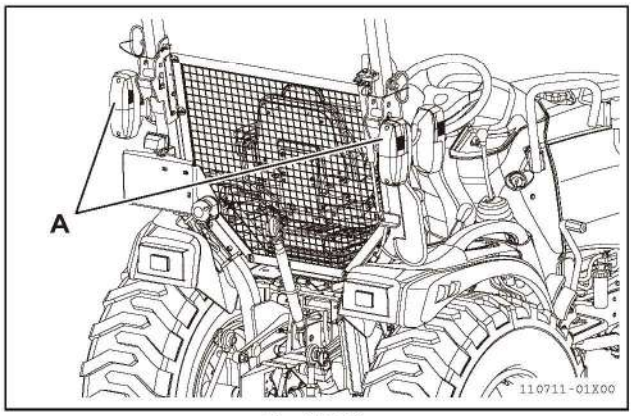


Fig 15-12

(A) Turn Signal/Hazard Lights

■ Replace the Tail Lights Bulb (ROPS type)

NOTE
- The tail lights can be serviced after removing the rear lens assembly.
- Please use 12V 21W/5W bulb.

1. Park the tractor safely and securely.
   - For details, see "6. Safe Practices for Parking the Tractor" on page 1-6.
2. Shut off the engine.
3. Allow the engine to cool down for several minutes.
4. Remove the key.
5. Turn the socket anti-clockwise.
6. Push in the bulb and turn it anti-clockwise to remove.
7. Push in the new bulb and turn it clockwise.
8. Turn the socket clockwise.

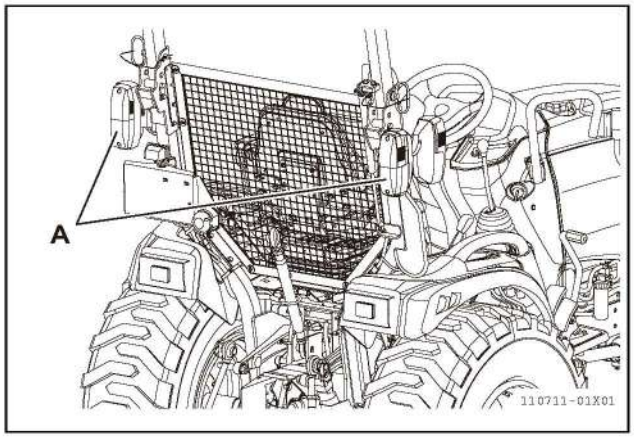


Fig 15-13

(A) Tail lights

4. Headlights

■ Adjust the Headlights

The headlights are adjustable.
If headlights adjustment is required, contact YOUR LOCAL YANMAR TRACTOR DEALER for technical assistance.

16. STORAGE 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.**

■ 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.

■ Battery

During a long storage period, always turn battery cut-off to OFF position. The battery could lose power if the battery cut-off switch is left ON.
(Refer to page 15-4)

3. 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 (12 V).
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.

■ Engine

Table 17-1

<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.
<table><tr><td>Key switch</td><td>START</td></tr><tr><td>Forward/reverse drive pedal</td><td>"N" (Neutral)</td></tr><tr><td>PTO switch</td><td>OFF</td></tr><tr><td>3 point hitch control lever</td><td>Lowest position (SA424)
"N" (Neutral) (SA221)</td></tr><tr><td>Seat switch</td><td>ON (sitting position)</td></tr></table>• 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 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

The problem is:	The possible cause(s) are:	Remedy:
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 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 problem is:	The possible cause(s) are:	Remedy:
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
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

■ Electrical System

Table 17-2

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

<table>
<tr><th>The problem is:</th><th>The possible cause(s) are:</th><th>Remedy:</th></tr>
<tr><td rowspan="3">The starter does not turn</td><td>1. A problem in the starter</td><td>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</td></tr>
<tr><td>2. A problem in the battery</td><td>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</td></tr>
<tr><td>3. A problem in the electrical</td><td>3. Electrical system
• Check whether the interface combination functions correctly.
<table><tr><td>Key switch</td><td>START</td></tr><tr><td>Forward/reverse drive pedal</td><td>"N" (Neutral)</td></tr><tr><td>PTO switch</td><td>OFF</td></tr><tr><td>3 point hitch control lever</td><td>Lowest position (SA424)
"N" (Neutral) (SA221)</td></tr><tr><td>Seat switch</td><td>ON (sitting position)</td></tr></table>• contact YOUR LOCAL YANMAR TRACTOR DEALER</td></tr>
</table>

The problem is:	The possible cause(s) are:	Remedy:
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 12 V. • 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

■ Brakes

Table 17-3

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

■ Steering

Table 17-4

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

■ Body and Machinery

Table 17-5

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 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. INDEX

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https://www.yanmar.com

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OPERATION MANUAL

SA221/SA424

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