YANMAR

OPERATION & MAINTENANCE MANUAL

WHEEL LOADER

V3-6
V4-6

V3-6: S/N 61521 & Above
V4-6: S/N 61569 & Above

Read this manual carefully to learn how to operate and service your machine correctly.
Failure to do so could result in personal injury or equipment damage

This manual should be considered a permanent part of your machine and should remain with the machine when you sell it.

This machine is of metric design, and consequently the measurements in this manual are also metric.
Use only metric hardware and tools as specified.

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

Warranty is provided as a part of Yanmar's product support program for customers who operate and maintain their equipment as described in this manual. Should the equipment be abused, or modified to change its performance beyond the original factory specifications, the warranty will become void and field improvements under warranty may be denied. Setting fuel delivery above specifications or otherwise overpowering machines will result in such action.

All information, illustrations and specifications in this manual are based on the latest product information available at the time of publication. The right is reserved to make changes at any time without notice.

REFERENCE INFORMATION

Write the correct information for your YANMAR Wheel Loader in the spaces bellow.
Always use these numbers when referring to your YANMAR Wheel Loader.

Model name : _____
Serial Number : _____
Engine Serial Number : _____

Your YANMAR Wheel Loader
Dealer : _____
Address : _____
Phone : _____

California Proposition 65 Warning

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

California Proposition 65 Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and reproductive harm.
Wash hands after handling.

1. Introduction

This Operation and Maintenance Manual for the YANMAR V3-6 / V4-6 Wheel Loader is designed to provide you with important information and suggestions necessary for using the machine with safety and efficiency. Please be sure to read through the manual before using the machine, to make yourself familiar with the procedures and instructions for operating, inspecting and servicing. Keep in mind that failure to observe the precautions given in the manual or using any procedures not prescribed in the manual may cause a serious accident.

⚠ WARNING

Improper use of the machine may lead to hazards which can result in death or serious injury. Personnel engaged in operating and maintaining the machine are required to familiarize themselves with the contents of the manual before setting about their job.

- **Do not attempt to operate the machine before making yourself familiar with the contents of the manual.**

- **Be sure to store this manual in the storage for the operation & maintenance manual so that personnel responsible for using the machine can refer it anytime.**
  Location for the storage for the operation & maintenance manual (Refer to 12-6. for its location)-
  Canopy specification : the lower part of the operator's seat
  Cabin specification : inside the back pocket of the operator's seat

- **If the manual should be lost or damaged, promptly order a new copy from the dealer.**

- **When you transfer the machine to another user, always transfer the manual as well.**

- **We at YANMAR provide customers with products in compliance with all applicable regulations and industrial standards. If you are using a YANMAR machine purchased abroad, the machine may lack some safety devices. Please consult your dealer to confirm whether or not that machine is in compliance with all applicable regulations and industrial standards.**

- **Some machine specifications may differ from those which are described in this manual because of improvements in its design and performance. If you have any questions about the contents of the manual, don't hesitate to contact your dealer.**

- **Important safety instructions have been presented throughout this manual, and have been summarized in PART ONE : SAFETY. Be sure to review these pages and pay heed to those safety instructions before proceeding to operate the machine.**

2. Safety Information

- The following Signal Words have been used in this Manual and on the Safety Signs to indicate the seriousness of the hazards that could be encountered by failing to comply with the applicable Product Warnings, as follows:

⚠ DANGER

The word "DANGER" indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. "DANGER" is limited to the most extreme situations.

⚠ WARNING

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

⚠ CAUTION

The word "CAUTION" indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT

The signal Word "IMPORTANT" has been utilized in this Manual to denote those User Directions that must be followed to assure the safe operation and maintenance of the Wheel Loader.

- **WARNING** : Never attempt to operate or service this Wheel Loader until you have first read and understood all of the applicable Product Warnings and User Directions that are set forth in this Manual and on the Safety Signs that are affixed to this Wheel Loader.

  The failure to comply with all relevant Safety Instructions could result in bodily injury.

- **WARNING** : Never modify the design of this Wheel Loader or its engine; never remove or disable any of the installed safety guards or devices; and never use any unauthorized attachments in the operation of this equipment.

  The implementation of any unauthorized design modifications or the use of unauthorized attachments could result in bodily injury.

  Furthermore, since those actions would expressly violate the terms of Yanmar's Product Warranty, the applicable Warranty would also be voided.

3. Product Overview

3-1. Intended uses

The V3-6 / V4-6 Wheel Loader is intended to perform the following works:

- Digging
- Leveling of ground
- Loading

The machine should not be used for unintended works

For the details of how to work with the machine, refer to OPERATION Section "13-11. Operations using the wheel loader".

3-2. Break in period

The machine should not be subjected to severe stresses and loads during the initial break in period although it has been prepared well and stringently inspected before shipping. Otherwise the machine's performance may be affected and its service life shortened. Thus it is essential to break in the machine for the first approx. 100 service hours (reading of the hour meter).

In breaking in the machine:

- You should warm up the engine by idling for 5 minutes before starting operations.
- You should not operate the machine under heavy loads or at high speed.
- You should not start and accelerate the engine too abruptly, or stop it too abruptly.
- You should not change travel direction too abruptly.

The safety instructions for operation and maintenance that are presented in this Manual are applicable to each of the intended tasks. Never misuse this machine by violating the applicable safety instructions or by attempting to perform unintended tasks, because of the danger of serious bodily injury.

3-3. Conditions to insure compliance with EPA emission standards
Conditions de conformité avec les standards d'émission EPA

An EPA approved engine has been installed in this machine. The following are the conditions that must be met to assure that emissions during operation will meet EPA standards. Always comply with all of these requirements.

- The prevailing atmospheric conditions should be as follows.

(1) Ambient temperature : -4 to 104°F (-20 to 40°C)
(2) Relative humidity : 80% or lower

- The fuel and lube oil used should be as follows.

(1) Fuel : Diesel light oil ASTM D975 No.1D S15, S500 or No.2D S15, S500 (ISO 8217 DMX)

- The fuel cetane number should be equal to 45 or higher.
- The sulfur content must not exceed 0.5% by volume. Less than 0.05% is preferred.
  In general, using a high sulfur fuel may possible result in corrosion inside the cylinder.
  Especially in U.S.A. and Canada, Ultra Low Sulfur fuel should be used.
- The water and sediment in the fuel should not exceed 0.05% by volume.

(2) Lube oil : Type API, class CD

- Never remove the seals limiting the amount of fuel injected and the speed.
- Always perform the required periodic maintenance.
  Follow the basic guidelines outlined in Section "25. Maintenance Table" of this manual, and keep a record of the results. Pay particular attention to these important points: replacing the lube oil and lube oil filter; cleaning the air cleaner element and the radiator fins.

Un moteur thermique agréé EPA est installé sur cette machine. A la suite figurent les conditions d'utilisation permettant de satisfaire au standard EPA; il est impératif de les respecter.

- *Environnement extérieur:*

(1) Température ambiante : -4 à 104°F (-20 à 40°C)
(2) Humidité relative : 80 % au moins

- *Carburant et huiles à utiliser*

(1) Carburant : Diesel léger ASTM D975 N° 1D S15, S500 ou N° 2D S15, S500 (ISO 8217 DMX)

- *L'indice de cétane du carburant doit être égal ou supérieur à 45.*
- *La teneur en souffre ne doit pas dépasser 0,5% par volume. Moins de 0,05% est préférable.*
  En général, l'utilisation d'un carburant à teneur élevée en souffre peut entraîner une corrosion à l'intérieur du vérin.
  Aux U.S.A. et au Canada notamment, l'utilisation d'un carburant à très basse teneur en souffre est recommandée.
- *L'eau et les sédiments présents dans le carburant ne doivent pas dépasser 0,05% par volume.*

(2) Huiles : type API, classe CD

- *Ne pas retirer les joints limitant la quantité de carburant injecté et la vitesse*
- *Respecter les inspections périodiques*
  Suivre les indications figurant dans ce manuel (Table de maintenance 24) et garder une trace des résultats. Faire très attention aux points importants suivant: remplacer l'huile et le filtre à huile, nettoyer l'élément de filtre à air et le radiateur.

3-4. Emission system warranty
Garantie du systéme antipollution

Yanmar Co., Ltd. limited emission control system warranty - U.S.A. only

■ Your warranty rights and obligations

• California

The California Air Resources Board (CARB), the Environmental Protection Agency (EPA) and Yanmar Co., Ltd. hereafter referred to as Yanmar, are pleased to explain the **emission control system warranty** on your industrial compression-ignition engine. In California, model year 2000 or later off-road compression-ignition engines must be designed, built and equipped to meet the State's stringent anti-smog standards. In all states, 1998 and later non-road compression-ignition engines must be designed, built and equipped to meet the United States EPA emissions standards. Yanmar warrants the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

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

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

■ Manufacturer's Warranty Period

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

Engine Type	Warranty Period by Number of Years or Hours of Operation
Constant speed engines rated at or above 50 hp SAE (37 kW)	The warranty period is five (5) years or 3,000 hours of use, whichever occurs first. In the absence of a device to measure the hours of use, the engine has a warranty period of five (5) years.
Constant speed engines rated under 50 hp SAE (37 kW) with rated speeds greater than or equal to 3,000 rpm	The warranty period is two (2) years or 1,500 hours of use, whichever occurs first. In the absence of a device to measure the hours of use, the engine has a warranty period of two (2) years.
Constant speed engines rated under 50 hp SAE (37 kW) and engines rated at or above 26 hp SAE (19 kW) with rated speeds less than 3,000 rpm	The warranty period is five (5) years or 3,000 hours of use, whichever occurs first. In the absence of a device to measure the hours of use, the engine has a warranty period of five (5) years.
Engines rated at or above 26 hp SAE (19 kW)	The warranty period is five (5) years or 3,000 hours of use, whichever occurs first. In the absence of a device to measure the hours of use, the engine has a warranty period of five (5) years.
Engines rated under 26 hp SAE (19 kW)	The warranty period is two (2) years or 1,500 hours of use, whichever occurs first. In the absence of a device to measure the hours of use, the engine has a warranty period of two (2) years.

■ Warranty Coverage

This warranty is transferable to each subsequent purchaser for the duration of the warranty period. Repair or replacement of any warranted part will be performed at an authorized Yanmar industrial engine dealer or distributor.

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

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

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

■ Warranted Parts

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

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

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

■ Exclusions

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

■ Owner's Warranty Responsibilities

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

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

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

You are responsible for initiating the warranty process. You must present your engine to a Yanmar dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible. If you have any questions regarding your warranty rights and responsibilities, or would like information on the nearest Yanmar dealer or authorized service center, you should contact Yanmar America Corporation at 1-770-877-9894.

Garantie du système antipollution limité de Yanmar Co., Ltd. - états-unis uniquement

■ *Vos droits et obligations en vertu de la garantie*

• Californie

Le California Air Resources Board (CARB), l'agence de protection de l'environnement (EPA) et Yanmar Co., Ltd. ci-après appelé Yanmar, ont le plaisir de vous présenter la ***garantie du système antipollution*** *de votre moteur industriel à allumage par compression. En Californie, les modèles 2000 ou ultérieurs de moteurs hors-route à allumage par compression doivent être conçus, construits et équipés pour répondre aux normes anti-smog strictes de l'État. Dans les États, les modèles 1998 et ultérieurs de moteurs hors route à allumage par compression doivent être conçus, construits et équipés pour répondre aux normes antipollution de l'EPA des États-Unis. Yanmar garantit le système antipollution de votre moteur pendant les périodes présentées ci-dessous à condition que votre moteur ne fasse pas l'objet d'un usage abusif, de négligences ou d'un entretien inapproprié.*

Votre système antipollution peut comprendre des pièces telles que le système d'injection de carburant, le système d'admission d'air, le système de contrôle électronique et le système EGR (Recirculation des gaz d'échappement). Il peut également inclure des tuyaux, courroies, connecteurs et autres ensembles de pièces du système antipollution.

En présence de condition couverte par la garantie, Yanmar réparera gratuitement votre moteur hors route à allumage par compression, le diagnostic étant inclus ainsi que les pièces et la main d'oeuvre.

■ Période de garantie du fabricant

Les modèles 1998 ou ultérieurs de moteurs hors route à allumage par compression certifiés et marqués sont garantis pour les périodes présentées ci-dessous. Si une pièce du système antipollution de votre moteur s'avère défectueuse durant la période de garantie applicable, la pièce sera remplacée par Yanmar.

Type de moteur	Période de garantie par nombre d'années et heures de fonctionnement
Moteurs à vitesse constante d'au mo'ins 50 hp SAE (37 kW)	La période de garantie est de cinq (5) ans ou de 3000 heures d'utilisation, quelle que soit la première occurrence. En l'absence d'un dispositif de mesure des heures d'utilisation, le moteur bénéficie d'une période de garantie de cinq (5) ans.
Moteurs à vitesse constante de 50 hp SAE (37 kW) maximum présentant des vitesses nominales supérieures ou égales à 3000 tr/min	La période de garantie est de deux (2) ans ou de 1500 heures d'utilisation, quelle que soit la première occurrence. En l'absence d'un dispositif de mesure des heures d'utilisation, le moteur bénéficie d'une période de garantie de deux (2) ans.
Moteurs à vitesse constante de 50 hp SAE (37 kW) maximum et moteurs d'au moins 26 hp SAE (19 kW) présentant des vitesses nominales inférieures à 3000 tr/min	La période de garantie est de cinq (5) ans ou de 3000 heures d'utilisation, quelle que soit la première occurrence. En l'absence d'un dispositif de mesure des heures d'utilisation, le moteur bénéficie d'une période de garantie de cinq (5) ans.
Moteurs d'au moins 26 hp SAE (19 kW)	La période de garantie est de cinq (5) ans ou de 3000 heures d'utilisation, quelle que soit la première occurrence. En l'absence d'un dispositif de mesure des heures d'utilisation, le moteur bénéficie d'une période de garantie de cinq (5) ans.
Moteurs de 26 hp SAE (19 kW) maximum	La période de garantie est de deux (2) ans ou de 1500 heures d'utilisation, quelle que soit la première occurrence. En l'absence d'un dispositif de mesure des heures d'utilisation, le moteur bénéficie d'une période de garantie de deux (2) ans.

■ Couverture de la garantie

La présente garantie est transférable à tout acheteur ultérieur pendant la période de garantie. La réparation ou le remplacement de toute pièce sous garantie sera effectuée par un distributeur ou revendeur agréé de moteurs industriels Yanmar.

Les pièces sous garanties, dont le remplacement n'est pas prévu à titre d'entretien requis dans le guide d'utilisation, seront garanties pour la période de garantie. Les pièces sous garanties, dont le remplacement est prévu à titre d'entretien requis dans le guide d'utilisation, sont garanties pour la période précédent le premier remplacement prévu. Toute pièce réparée ou remplacée au titre de la présente garantie sera garantie pour le reste de la période de garantie.

Pendant la période de garantie, Yanmar est responsable des dommages aux autres éléments du moteur dus à la défaillance de toute pièce sous garantie pendant la période de garantie.

Toute pièce de rechange, qui est à tous points de vue fonctionnellement identique à la pièce d'équipement d'origine, peut être utilisée pour l'entretien ou la réparation de votre moteur, et ne réduira pas les obligations de Yanmar en vertu de la garantie. Les pièces ajoutées ou modifiées qui ne font pas l'objet d'une homologation ne peuvent être utilisées. L'utilisation de toute pièce ajoutée ou modifiée ne faisant pas l'objet d'une homologation donnera lieu à un refus de la réclamation au titre de la garantie.

■ *Pièces sous garantie*

La présente garantie couvre les éléments du moteur qui font partie du système antipollution du moteur fourni par Yanmar à l'acheteur au détail d'origine. Ces éléments peuvent comprendre les éléments suivants :

- *Système d'injection*
- *Système de contrôle électronique*
- *Système d'enrichissement de démarrage à froid*
- *Tubulure d'admission*
- *Systèmes de turbocompresseur*
- *Tubulure d'échappement*
- *Système EGR*
- *Système de recyclage des gaz de carter*
- *Tuyaux, courroies, connecteurs et ensembles de pièces associés aux systèmes antipollution*

Étant donné que les pièces du système antipollution peuvent varier légèrement d'un modèle à un autre, certains modèles ne peuvent pas contenir toutes ces pièces et d'autres modèles peuvent contenir les équivalents fonctionnels.

■ *Exclusions*

Les défaillances autres que celles résultant des défauts de pièce et / ou de main d'oeuvre ne sont pas couvertes par la présente garantie. La garantie ne s'étend pas à ce qui suit : les dysfonctionnements dus à un usage abusif, une mauvaise utilisation, un réglage inadéquat, une modification, une altération, une manipulation intempestive, une déconnexion, un entretien inapproprié ou inadéquat, les dommages accidentels dus à l'utilisation de carburants et d'huiles de graissage non-recommandés et le remplacement d'éléments superflus effectué en relation avec l'entretien prévu. Yanmar décline toute responsabilité pour les dommages accessoires ou consécutifs tels que la perte de temps, la gêne, l'impossibilité d'utiliser l'équipement / le moteur ou la perte commerciale.

■ *Responsabilités du propriétaire en vertu de la garantie*

En tant que propriétaire du moteur, vous êtes responsable de l'exécution de l'entretien nécessaire indiqué dans votre guide d'utilisation.

les reçus, couvrant les travaux d'entretien de votre moteur hors route à allumage par compression, mais Yanmar ne peut refuser la garantie uniquement en raison d'absence de reçus, ou pour défaut d'avoir suivi tout le programme d'entretien.

Yanmar peut refuser d'honorer la couverture de garantie de votre moteur hors route à allumage par compression si la défaillance d'une pièce est due à un usage abusif, une négligence, un entretien inapproprié ou à des modifications non approuvées.

Votre moteur est conçu pour fonctionner au carburant diesel uniquement. L'utilisation de tout autre carburant peut entraîner la panne définitive de votre moteur conformément aux exigences applicables en matière d'émissions.

Vous êtes responsable de l'initiation du processus de garantie. Vous devez présenter votre moteur à un revendeur Yanmar dès qu'un problème se présente. Les réparations couvertes par la garantie doivent être exécutées par le revendeur le plus rapidement possible. Si vous avez des questions concernant vos droits et obligations en vertu de la garantie, ou souhaitez obtenir des informations sur le revendeur Yanmar ou le centre de service agréé le plus proche, vous devez contacter Yanmar America Corporation au 1-770-877-9894.

4. Operation License

Before you operate this machine, confirm the licensing requirements that are applicable to the operation of this machine.

Comply with all applicable laws.

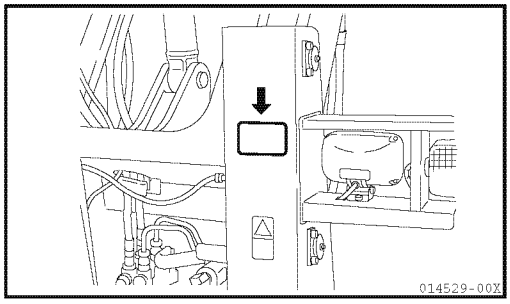
Ask your dealer about licensing requirements.

5. Ordering Replacement Parts and Service Call

5-1. Location of machine serial number plate

The machine serial number plate is located in the upper part of the mast on the right side of the front frame.

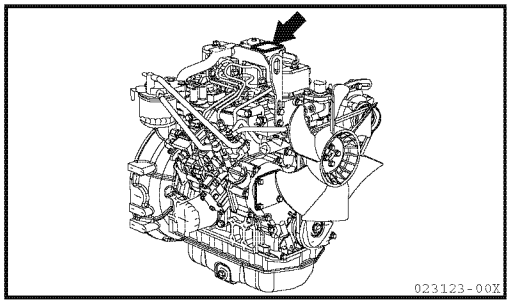
Do not take off this plate



5-2. Location of engine serial number plate

The engine serial number plate is located on the top of the cylinder head cover.

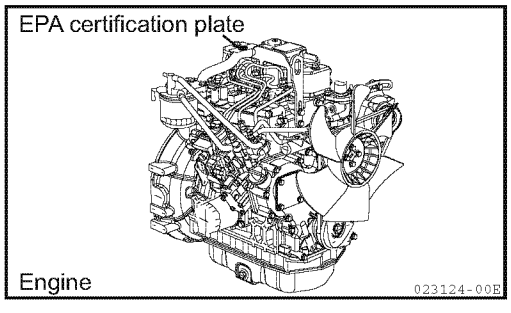
Do not take off this plate



5-3. Location of EPA emission control plate
Localisation de la plaque signalétique EPA

The EPA emission control labels are located on the engine as illustrated at right.
Never remove the labels for any reason.

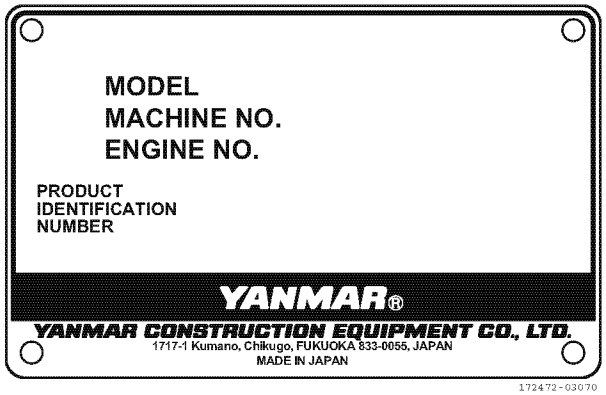
La plaque signalétique est fixée sur le moteur (voir illustration à droite).
En aucun cas ne retirer cette plaque.



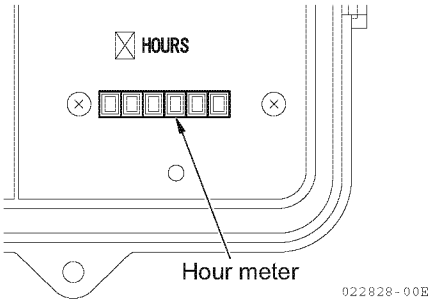
5-4. Ordering replacement parts and service calls

When ordering replacement parts or calling for service, let your dealer know the model designation, the machine serial number, and the engine serial number on the machine serial number plate as well as the reading of the hour meter.

• Machine serial number plate



• Hour meter



6. Contents

MAINTENANCE

SPECIFICATIONS AND DIMENSIONAL DIAGRAMS

OPTIONAL PARTS AND ATTACHMENTS

NOTES

SAFETY

⚠ WARNING

Never attempt to operate or service this Wheel Loader until you have first read and understood all of the applicable Safety Instructions that are set forth in this Manual.

The failure to comply with all relevant Safety Instructions could result in bodily injury.

7. Basic Precautions

⚠ WARNING These instructions should be strictly followed for the safety of you, others and your machine.

Follow safety rules at your workplace

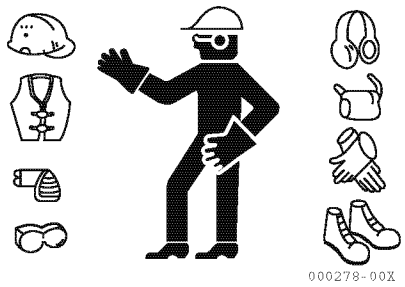
- The operation and servicing of this machine is restricted to qualified persons.
- When operating or servicing the machine, follow all the safety rules, precautions and procedures.
- Any work performed by a team or with a signal person should be conducted in accordance with signals agreed on beforehand.

Install safety devices

- Make sure that all guards and covers are installed in their correct position. If any of them are damaged, repair them immediately.
- The proper use of all safety devices, such as lock lever, should be well understood by the machine operator.
- Never remove the safety devices. Always make sure that they operate properly.
  For lock lever, refer to Section "12-3. Control levers and pedals".
- Incorrect operation of the safety devices could cause serious bodily injury.

Wear proper clothing and safety items

- Do not wear loose clothing or jewelry that can be caught on the control levers and other machine parts. Also avoid wearing working clothes stained with oil as they can ignite.
- Be sure to wear a helmet, safety goggles, safety shoes, a mask, gloves and other protective items, as appropriate.
  Take particular precautions when generating metal debris, when striking metal objects with a hammer or when cleaning components with compressed air.
  Also make sure there are no persons near the machine.



For driving the pins, refer to Section "26-2-4. Replacing the bucket".
For cleaning the elements, refer to Section "26-6-3. Checking and cleaning the air cleaner element".

Alcohol

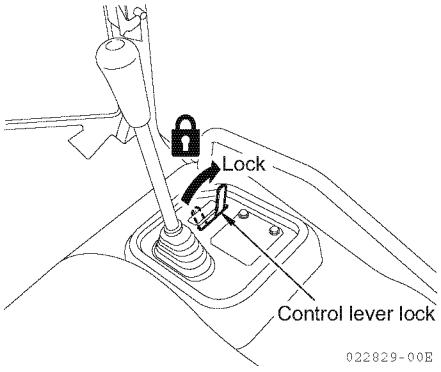
- Never operate the machine while you are under the influence of alcohol or when you are ill or feel unwell as this results in accidents.

Avoid unauthorized modifications

- Modifications not recommended by YANMAR may cause safety hazards.
- When you wish to modify your machine, contact your dealer. The implementation of unauthorized modifications or the use of unauthorized attachments could result in bodily injury, since those actions would also violate the terms of YANMAR's Warranty, it would be avoided.

Always lock up your machine when leaving the operator's seat

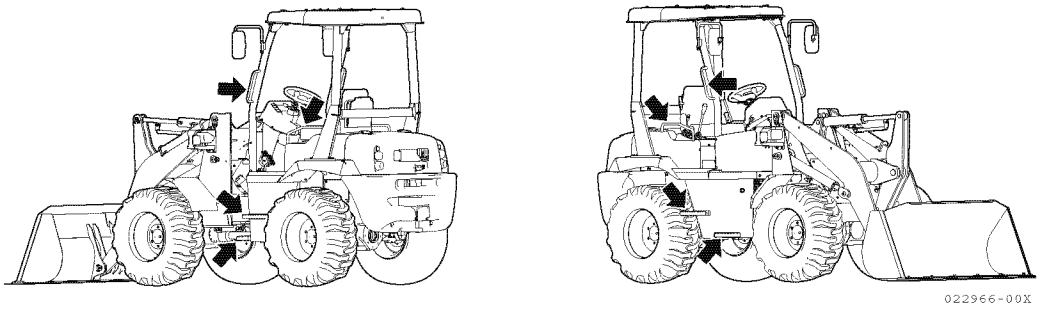
- When leaving the operator's seat, be sure to place the lock lever in the lock position, to prevent accidental machine movement which could result in bodily injury.
- When you leave the machine:
  (1) Lower the bucket to the ground.
  (2) Place the lock lever in the lock position.
  (3) Stop the engine.
  (4) Set all the locks in to the lock position.
  (5) Be sure to take the key out of the starter switch.



For information on parking the machine, refer to Section "13-7. Parking the machine".

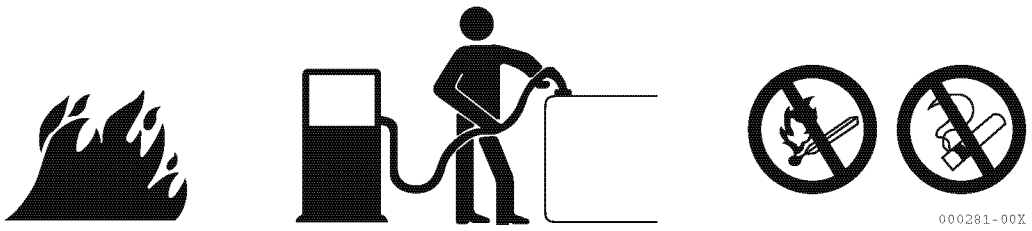
Use handrails and steps when getting on and off

- Do not jump on or off the machine. Never get on or off a machine in motion as it may result in bodily injury.
- When getting on and off the machine, face the machine and use the handrails and steps.
- Do not use control levers as handrails.
- Make sure that you maintain three point contact with the handrails or the steps.
- If the handrails and the steps are soiled with oil or dirt, clean them off immediately. Repair any damaged parts and retighten any loose bolts.



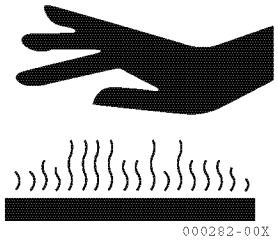
Keep fuel and oil away from sources of ignition

- Open flames can ignite fuel, oil, hydraulic oil or anti-freeze solutions, which are flammable and dangerous. Special attention must be paid to the following matters.
  - Keep flammable materials away from lighted cigarettes or matches, or any other sources of ignition.
  - Never refuel while the engine is running. Smoking during refueling must be strictly prohibited.
  - Firmly tighten the caps on the fuel and oil tanks.
  - Store fuel and oil in a cool and well-ventilated place where they are not subjected to direct sunlight.
  - Fuel and oil must be stored in a place which meets all applicable safety regulations. Unauthorized persons should not be allowed entry.



Avoid removing filler caps while temperatures are high

- The engine coolant, engine oil and hydraulic oil are hot and under pressure immediately after the machine stops operation. Removing caps, draining coolant or oil, or replacing a filter at such a time may cause burns. Allow temperatures to cool down and follow the procedures in this manual.
- When removing the radiator cap, stop the engine and allow the coolant to cool down, then turn the cap slowly to relieve all pressures.
- Before removing the cap from the hydraulic oil tank, stop the engine and turn the cap slowly to relieve all pressure to prevent oil from spouting out.

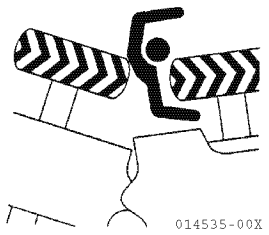


Avoid harmful asbestos dust

- Air containing asbestos dust is carcinogenic and is hazardous to humans. Inhalation of the air may cause lung cancer. When handling materials that may contain asbestos, keep in mind that:
  - Compressed air must not be used for cleaning.
  - Water must be used to clean the machine to prevent asbestos from scattering in the air.
  - You must work on the windward side when operating the machine in a place where there may be asbestos dust.
  - You should wear breathing apparatus as necessary.

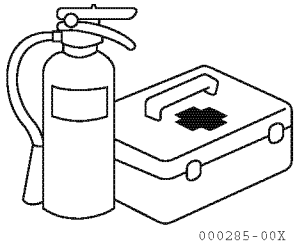
Prevent crush injuries by the implements

- Keep hands, arms and all other parts of your body away from all the moving parts, particularly between the implements and the machine and between the hydraulic cylinder and the implements, as pinch points are created in those areas.



Keep a fire extinguisher and first aid kit handy

- The workplace must be provided with a fire extinguisher. Read instructions on the label to familiarize yourself with how to use it.
- Keep a first aid kit in a prescribed place.
- Advise what to do in the event of fire or accidents.
- Indicate who to contact in an emergency and keep their telephone number in a prominent place.



Precautions for installing optional parts and attachments

- When installing or using optional attachments, read the operating instructions for the attachments and the Manual Sections relating to the installation of attachments.
- Use only attachments authorized by YANMAR. The use of unauthorized attachments may affect not only the safety of the machine but also the proper operation and life of the machine.
- The use of unauthorized attachments would also violate the terms of YANMAR's Warranty, so that it would be voided.

Caution for cabin glass

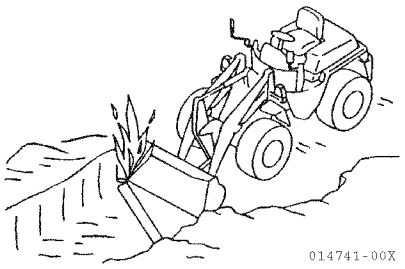
- If the glass of the cabin should be broken by accident, it is very dangerous since the operator's body might contact the implement directly.
  Immediately stop working to replace the broken glass with a new one.

8. Operating Precautions

⚠ WARNING These instructions should be strictly followed for the safety of you, others and your machine.

8-1. Precautions before starting the engine

Ensure the safety of your workplace



- Before starting the machine, check to see if there are any hazards in your working area.
- Examine the terrain and soil, and decide the best way to do the work.
- When working on the street, provide a signal person or fence for the safety of vehicles and pedestrians.
- If there are underground utilities at the work site, such as water pipes, gas pipes, high-voltage conduits or others, contact the responsible companies to locate them exactly, so as not to damage them.
- Before operating the machine in water, or crossing a creek, confirm the condition of the submerged ground, the water depth and the water flow speed, and make sure that the depth is within the allowable level.

For allowable water depth, refer to Section "13-12. Precautions for working".

Prevent fire

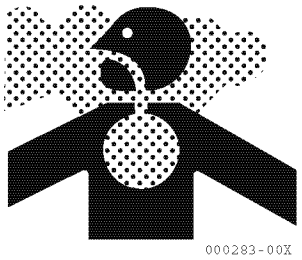
- Wood chips, dead leaves, trash and other flammable materials in proximity to the engine are hazardous as they may cause fire. Always check and keep your machine clear of these flammable materials.
- Check for any leaks from fuel, lube oil or hydraulic oil lines. Repair faults and clean spilled oil as necessary.
  For additional information, refer to Section "13-1. Checking before starting the engine".
- Check to see where fire extinguishers are located and know how to use them.

Inspect around the operator's seat

- Dirt, oil and snow on the floor, levers, handrails or steps are slippery and hazardous. Remove them all completely.
- Keep parts and tools away from the operator's seat as they may damage the control levers or switches or create any other hazards.

Provide adequate ventilation when working in an enclosed area

Engine exhaust fumes are harmful to the human body and their inhalation is extremely hazardous. When starting the engine in an enclosed area, open the windows and doors for ventilation. Also do not idle the engine unnecessarily or leave the engine running while the machine is not in use.



Keep the mirrors and lights clean and operational at all times

- Position the rearview mirrors such that they can be viewed easily from the operator's seat, and keep their surfaces clean. If the mirrors are broken, replace them with new ones.
- Check to see that the headlights operate properly before you begin work with the machine.

Fasten the seatbelt

- For your safety, ROPS (Roll-Over Protective Structure)/FOPS (Falling Objects Protective Structures) with a seatbelt is installed.
- Always fasten the seatbelt across the pelvic region and adjust snugly before you operate the machine.
  Never fasten a seatbelt across the abdomen.
- The seatbelt must be replaced after an accident.
- In addition the seat and seat mounting must be checked by your dealer after an accident has occurred.
- If the seat and seat mounting are damaged, they must be replaced.

ROPS/FOPS

- Never modify the structural member of ROPS/FOPS.
- If ROPS/FOPS is damaged, replace it immediately to prevent bodily injury.
  Never repair or modify it.

Caution for the protection of plants from hot wind

The hot wind of the high temperature is exhausted from the muffler and the radiator.
If this hot wind hits plants directly, they will die.
Give a cover board to protect plants from the hot wind when working near the arranging fence or plant.

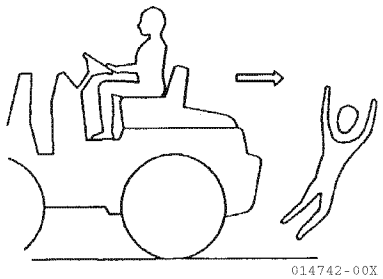
8-2. Precautions for starting the engine, working and parking

Signal before starting the engine

- Make sure there are no persons near the machine before getting on it.
- Never start the engine when the "SERVICING IN PROGRESS" tag is attached to the control system.
- Sound the horn to alert people nearby before starting the engine.
- Be sure to start the engine and operate the machine from the operator's seat only.
- Do not allow any other persons to get on the machine.
- Check the reverse gear alarm for proper operation.

Make sure that noone is in your travel path when you move the machine forward or in reverse

- Before you operate the machine or the implement:
- Sound the horn to alert people around you.
- Make sure that noone is on or near the machine.
- Use a signal person when you operate the machine in reverse, because of restricted visibility in the rear.
- Use a signal person when the work site is hazardous or whenever visibility is poor.
- Allow noone to enter the machine's travel path.
  Strictly observe the above precautions even though the machine is equipped with a back-up alarm and rearview mirrors.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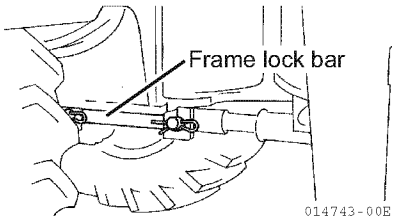
Checking frame lock bar

- Before starting to travel with or do work with the vehicle, confirm that the frame lock bar has been removed and is properly stored.



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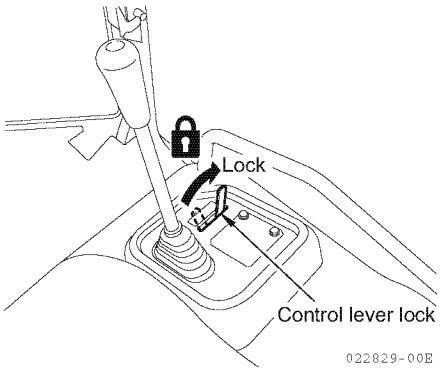
Precautions for traveling

- Raise the bucket approximately 10 in. (25 cm) above the ground, and travel on flat, smooth roads, if possible.
- Set the lock lever to the lock position.
- When traveling in a rough terrain, travel at slow speeds and change direction gradually, when necessary.
- If the engine stops during traveling, you will lose the ability to steer the vehicle. In that event, immediately apply the brakes and stop the vehicle.



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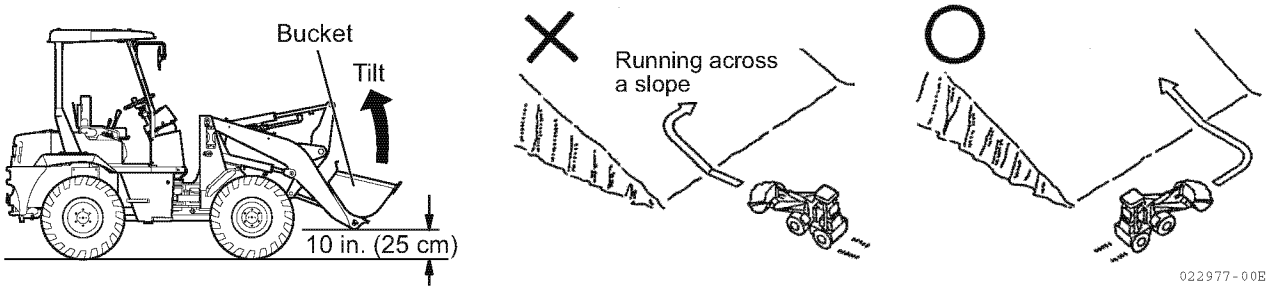
Running the machine on a slope

- Run the machine carefully on a slope to avoid overturning or skidding sidewards.
- When running the machine on a slope, keep the bucket 8 to 12 in. (20 to 30 cm) above the ground so that you can immediately lower it to the ground and stop the machine in an emergency.
- Never turn the machine on a slope or run it across the slope.
  Move down to flat ground and then make a turn.
- On grasses, dead leaves or a wet metal plate, even with a slight gradient, the machine will easily slip. Under those circumstances, run the machine carefully at low speed to prevent it from skidding.
- When the machine is descending a slope, travel slowly while applying the engine brake.
- If the engine stops on a slope, immediately step hard on the brakes, lower the bucket to the ground, and apply the parking brakes to stop the vehicle.
- When the bucket is full, move forward to go up a slope but move in reverse to go down a slope.

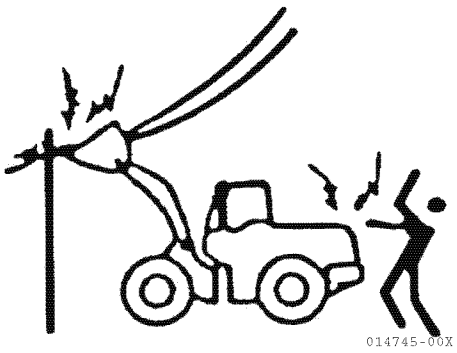


⚠ DANGER

Keep away from electric power lines

- Working in the vicinity of overhead electric power lines presents a very serious hazard and special precautions must be taken. For purposes of this manual you are considered to be working in the vicinity of overhead power lines when the attachment or load of your wheel loader, in any position, can reach to within the minimum distances shown below.
- The following procedures are effective in preventing accidents or injuries.
  1) Wear shoes with rubber or leather soles.
  2) Use a signal person to warn the operator when the machine is getting too close to a power line.
- If the machine should contact a wire, the operator must not leave the seat.
- When working near power lines, caution all ground personnel to stand clear of the machine.
- To determine the transmission voltage at the working site, contact the electric utility concerned.

	Transmission voltage (V)	Minimum safe distance [ft. (mm)]
Power distribution	100/200 or less	6.6 (2000) or more
	6600 or less	6.6 (2000) or more
Transmission line	22000 or less	9.8 (3000) or more
	66000 or less	13.1 (4000) or more
	154000 or less	16.4 (5000) or more
	275000 or less	23.0 (7000) or more



Precautions for working

- Do not approach the edge of a precipice without using great care.
  When dumping loads over the edge of a precipice, first create an earthen barrier near the edge of the precipice.
- Be careful not to bump the bucket against a dump truck, the side of a ditch or other obstacles.
- Never fill the bucket with materials in excess of the allowable load limit, nor perform any other unsafe operations, to prevent a serious accident.
- Do not use the bucket as a crane nor permit any person to ride on the bucket.
- When loading the machine onto a truck or transporting it on a truck, never carry a load in the bucket to avoid a roll over. Remember that the machine may also roll over if the bucket is filled with a heavy load while operating in rough terrain.
- Never dig, load nor unload materials with the bucket while the vehicle is being steered to the right or left. When performing those tasks, be sure to steer the vehicle straight.
- Never drop the bucket to the earth with great force, nor operate the bucket with abrupt movements. Too heavy a force on the bucket may cause the machine to be damaged or cause it to roll over.
- Do not move forward with the bucket raised too high. Doing this will cause the machine to rock excessively, resulting in damage to the machine or causing a roll over.
- After dumping the content of the bucket or reaching the top of a slope, the engine load will be decreased so that the machine will speed up abruptly. At that point, be sure to slow down to avoid creating a hazard.
- When loading materials onto a truck, be sure that you are upwind to avoid blowing dust.
- When the bucket is full, do not start, turn, or stop abruptly.
- When loading materials onto a truck, make sure that noone is nearly and be careful not to allow materials to fall off of the truck deck.

Work only where visibility is good

- When working in a dark place, light up the area with the head lights, and prepare extra lighting equipment as necessary.
- Stop working when fog, snow or rain impedes your view.

Work carefully in a snow-covered areas

- Snow-covered ground and icy roads are dangerous as they may cause the machine to skid even on a slight slope. Run the machine at low speed, and never start, stop or turn abruptly on such ground or under such road conditions.
- Be careful removing snow as road shoulders or other hazards may be buried under snow.
- When traveling on a snow-covered road, be sure install chains on the tires.
- Do not brake the machine on a snow-covered slope. Instead, lower the bucket to the ground, to stop the machine.
- Load stability will lessen on snow-covered ground, so adjust load to prevent the machine from skidding.

Prevent bumping the implements

- When traveling through tunnels or under bridges, or working at a site near other overhead obstacles, operate the machine carefully so as not to bump the boom, arm, or the implement against those overhead obstacles.

Important for braking

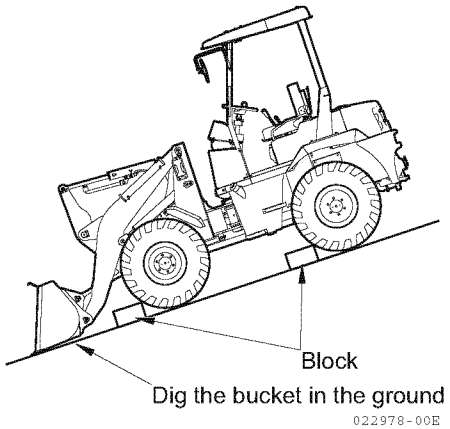
- Do not place your foot on the brake pedal until needed.
- Do not pump the brake unnecessarily.
- When going down on a slope, be sure to apply the engine brake as well as stepping on the brake pedal.

Unstable ground creates a high possibility of overturn

- Keep away from cliffs, road shoulders or trenches if possible as the ground near them is unstable. The ground may crumble due to the weight or vibrations of the machine, resulting in an overturn or fall of the machine. Be particularly careful when working immediately after rainstorm or after blasting as the ground may be unstable.
- Ground-fills or ground near a ditch may be unstable and may crumble due to the weight or vibrations of the machine, causing the machine to tilt. Much caution must be taken in working in these areas.
- When working in an area where is a high possibility of falling rocks, wear a hard-hat and stay under the canopy.

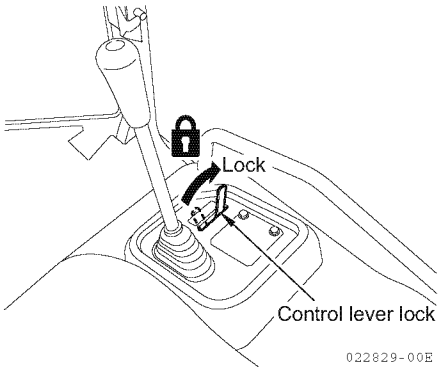
Parking the machine

- Park on level ground. If park on a slope is unavoidable, block the tires with solid pieces of wood and dig the bucket into the ground. (See the illustration at right.)



- If necessary to park the machine on the side of a road, set up a warning flag, fence, or lamp that can be easily recognized by passing cars and pedestrians but does not impede them.
  For parking procedures, refer to Section "13-7. Parking the machine".

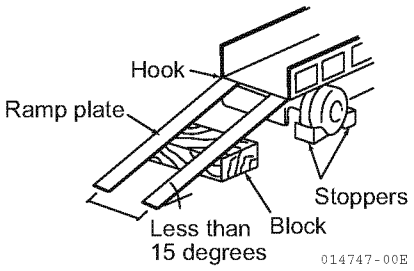
- When leaving the operator's seat, do the following:
  (1) Be sure to place the bucket on the ground.
  (2) Set the lock lever to the lock position.
  (3) Stop the engine.
  (4) Set all the locks to the lock position.
  (5) Be sure to take the key out of the starter switch.
  For information about parking procedures, refer to Section "13-7. Parking the machine".



8-3. Precautions for transportation

Precautions for loading and unloading the machine

- Be careful in loading and unloading the machine, because it is a job of high hazard potential.
- Load or unload the machine at a low engine speed, and low travel speed.
- Load or unload the machine on the level, solid ground away from the shoulder of the road.
- Use ramp plates of adequate strength with hooks on their ends.
  Check to see that the ramp plates are wide, long, and thick enough to sustain the load so that you can load or unload the machine safely. Support the ramp plates with blocks, to provide additional strength.



- Securely hook the ramp plates to the deck of the truck so that they will not come off.
- Remove grease, oil, and other slippery deposits from the ramp plates, and remove mud from the tires to prevent the machine from skidding on the ramp plates.
- Do not load or unload the machine if the ramp plates are slippery because of rain, snow or ice.
- Never change travel direction while on the ramp plates. If you need to change travel direction, go down the ramp plates, and change direction on the ground.
- After loading the machine, block it with lumber and secure the machine with a chain or a wire rope so that the machine will not move during transit.

  For instructions on loading and unloading the machine, refer to Section "14. Transportation".

  For instructions on securing the machine, refer to Section "14. Transportation".

Precautions for transporting

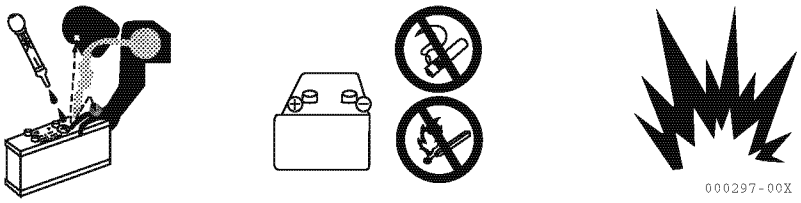
- Transport the machine safely in accordance with applicable law.
- Select a travel route consistent with the width, height and weight of the machine loaded on the truck.

8-4. Precautions for the battery

⚠ DANGER

Be careful in handling the battery

- The battery electrolyte contains dilute sulfuric acid, which can severely burn the eyes or skin. Always wear safety goggles and protective clothing when servicing the battery. If contact with the eyes or skin should occur, flush with a large amount of water and obtain prompt medical treatment.
- Because flammable hydrogen gas is produced by the battery, ignition and explosion may occur. Keep flames and sparks away from the battery.
- Do not use or charge the battery if the battery electrolyte level is below the lower limit. Doing so may cause the battery to explode. Always check the battery electrolyte level before starting the engine. If the electrolyte level is low, add distilled water to the upper limit.
- If you swallow battery electrolyte by mistake, drink a large amount of water, milk, or fresh eggs, and obtain medical treatment immediately.
- Before checking or handling the battery, be sure to stop the engine and turn the starter switch to the "OFF" position.
- Be careful not to cause a short circuit by placing a tool across the terminals of the battery.
- If a terminal connection is loose, sparks may be generated due to contact failure, causing possible ignition and explosion. Be sure to connect the terminals securely.



⚠ WARNING

Observe the procedures for starting the engine using booster cables

- When you start the engine using booster cables, wear safety goggles.
- If you start the engine by taking electric power from another machine, do not allow your machine to contact the other machine.
- To connect the booster cables, begin with the positive terminal, and to disconnect them, begin with the negative terminal (ground side).
- If a tool simultaneously touches the positive terminal and the machine, potentially hazardous sparks may be generated.
- Do not connect the booster cables to the terminals in reverse polarity. In other words, never connect the negative terminal on one machine to the positive terminal on the other machine.
- As the last step, connect the negative booster cable terminal to the upper structure frame. At that time, sparks will be generated. Consequently, connect the terminal to a point as far away from the battery as possible.

  For information about starting the engine using booster cables, refer to Section "18-3. If the battery is overdischarged".

8-5. Precautions for towing

Hook the wire rope on the frame when towing

- Improper towing procedures can cause death or serious injury.
- When towing a machine with another machine, use a wire rope strong enough to sustain the machine weight.
- Never tow a machine on a slope.
- Do not use a towing rope that is kinked, distorted or damaged.
- Do not ride on the towing cable or on the wire rope.
- When connecting an object to be towed, make sure that no person enters the space between the machine and the object.
- The hook provided on the machine is intended for stabilizing the machine during transporting. Never use it for towing.

For information about towing the machine, refer to Section "18-2. Towing".

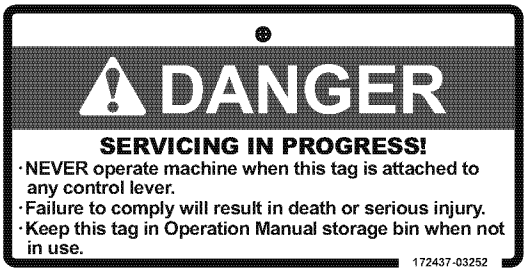
9. Precautions for Servicing

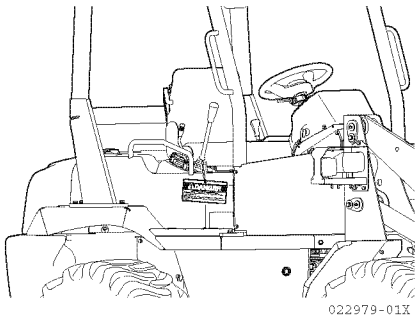
⚠ WARNING Neglecting these instructions may cause extreme hazards.

9-1. Precautions before servicing

Attach the "SERVICING IN PROGRESS" tag to an implement control lever

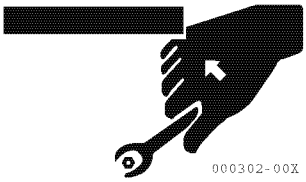
- If another person should start the engine or operate the control levers while service is in progress, the service personnel can sustain serious bodily injury.
  Attach the "SERVICING IN PROGRESS" tag indicating "Servicing in Progress" to one of the implement control levers.
  The "SERVICING IN PROGRESS" tag is enclosed with the Operation Manual.
  Article number : 172437-03252





Use appropriate tools

- Using damaged or worn tools or using tools inappropriate for the required application is very dangerous, and may also cause damage to the machine. Make sure to use the tools that are appropriate for the specific job.
  For information about tools, refer to Section "23-1. Required tools".

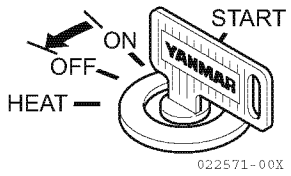


Periodically replace the parts essential to safety

- Aging or damage to the parts listed below can cause a fire.
  Make sure that they are replaced periodically.
  - Fuel system : Fuel hose and fuel tube cap
  - Hydraulic system : Outlet hose of main pump
- The parts listed above must be replaced periodically even if no abnormality is found in them. (They age with time.)
- If any abnormality is found in them, replace or repair the parts even though the suggested replacement time has not been reached.
  For information about replacing essential safety parts, refer to Section "24. Replacing Essential Parts Periodically".

Stop the engine before beginning the inspection and servicing

- Be sure to stop the engine before performing inspection and servicing.
- If necessary to perform service while running the engine, as when cleaning the inside of the radiator, be sure to set the lock lever to the lock position and do the job together with a partner. (One should take the operator's seat so that he or she can stop the engine at any time.)
  That person must be careful not to touch any levers in the cabin.
- Be extremely careful not to contact the moving fan or fan or fan belt, or any hot surfaces.



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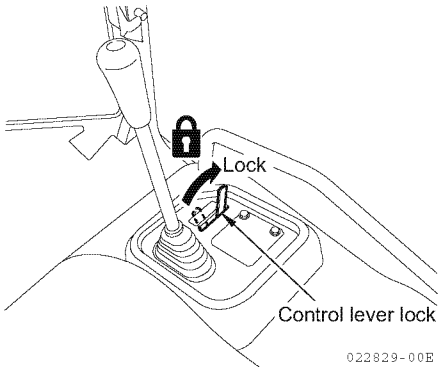
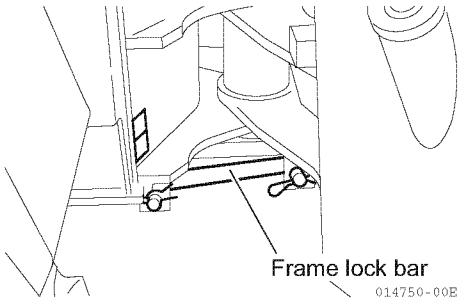


022829-00E

Lock the front and rear frames

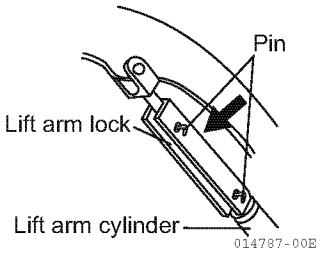
- Lock the front and rear frames by installing the frame lock bar.



014750-00E

Implement drop-prevention device

- When inspecting or servicing the machine with the implement raised, always support the lift arm by installing the lift arm lock as indicated below, to prevent it from dropping. Also, place the implement control lever in the Neutral position and engage the control lever lock.



014787-00E

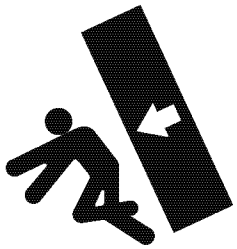
9-2. Precautions during servicing

Keep unauthorized persons away

- Never admit any persons into the work area who are not taking part in the work. Be conscious of the safety of other persons.
  Be especially careful when grinding, welding, or using a large hammer.

Removed attachments

- When an attachment is placed on the ground or against a wall after removing it or prior to reinstalling it, be sure that it is stable to prevent it from falling down.

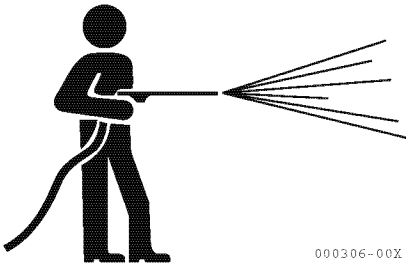


Working under the machine

- Before performing service or repairs underneath the machine, place the implement on the ground in its lowest position.
- Be sure to apply blocks to the tires to lock them securely.
- Never perform service underneath the machine if it is not completely stable.

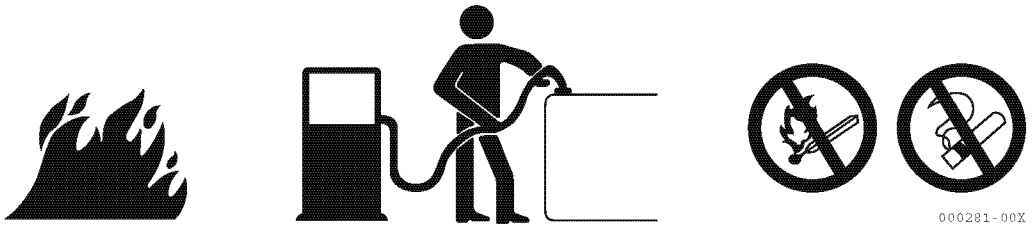
Keep the machine clean

- Spilled oil or grease, or scattered parts are dangerous and can cause falls. Keep the machine clean.
- Getting water into the electrical system may cause it to malfunction, resulting in faulty operation of the machine. Also it may permit electrical leaks that could cause a fire or electric shocks.
- Never clean the sensors, connectors or the operator's seat with water or steam.



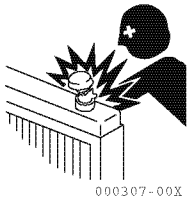
Precautions for fueling and oiling

- Spilled fuel and oil could cause a fire and they are dangerously slippery. Wipe up spills immediately.
- Close the fuel cap and oil cap securely.
- Never use fuel for cleaning.
- Provide good ventilation when replenishing fuel or oil.



Radiator cooling water level

- Before checking the radiator cooling water level, stop the engine and wait until the engine and the radiator have cooled down.
- Slowly loosen the cap to release the inner pressure before removing the cap.

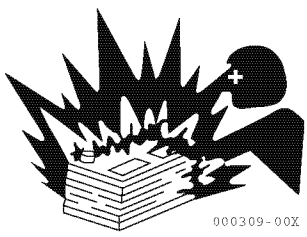


Use an explosion-proof lighting source

- Use an explosion-proof lighting source when checking the fuel, the oil, the cooling water, or the battery electrolyte. Failure to use a explosion-proof lighting source may cause ignition to occur, inducing an explosion.

Precautions for handling battery

- When welding or repairing the electrical system, disconnect the negative terminal of the battery to interrupt the electric circuit.

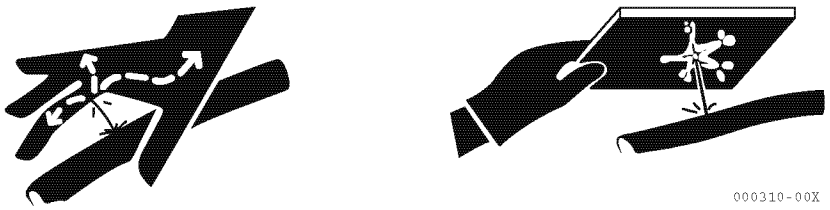


Handling high-pressure hoses

- Leaks of fuel and oil could cause a fire.
- Do not bend a high-pressure hose forcibly, or strike it with a hard object. Because abnormally bent or damaged piping, tubes, and hoses easily burst under high pressure, never use them.

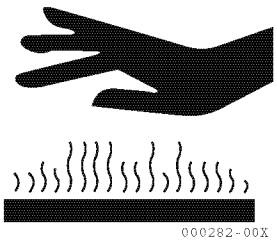
Be careful of hot oil under high-pressure

- The hydraulic system for the implement operates under high pressure.
  When replenishing or draining hydraulic oil, be sure to first relieve the high pressure.
- The emission of hot oil under high-pressure from a small leak could result in serious bodily injury. Wear safety goggles and thick gloves when checking for leaks. Use a piece of cardboard or a plywood block to detect emissions of hot oil.
  If the hot oil should contact your body, obtain prompt medical treatment.



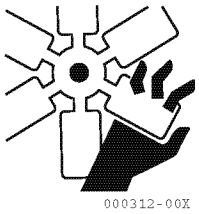
Be careful when servicing systems under high temperature and high pressure

- The engine cooling water and each lube oil system are still under high temperature and pressure immediately after the engine has stopped. Removing caps, draining oil and water, or replacing filter elements at that time may cause a burn. Wait until the temperature drops, then begin servicing in accordance with the procedures described in this manual.
  For cleaning the inside of the cooling system, refer to Section "26-2. Nonperiodic services".
  For checking the level of the cooling water and the hydraulic oil, refer to Section "26-3. Checking before start-up".
  For checking the oil levels in various systems and replenishing the oil, refer to Section "25-3 to 5. Periodic services".
  For replacing the oils in various systems and replacing the filter elements, refer to Section "25-6 to 8. Periodic services".



Rotating radiator fan and fan belt

- Never contact the rotating radiator fan or fan belt with any object.
- Contacting the rotating radiator fan or fan belt with any object can result in serious bodily injury.



Jacking up the machine

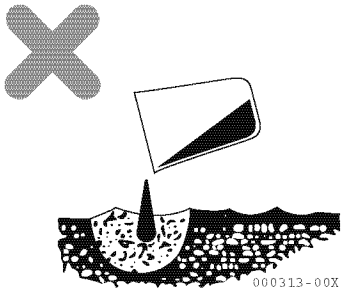
- When in speeding or servicing the machine, be sure to lock the front and rear frames with the frame lock bar, place the control lever in the neutral position and set the control lever safety lock to the lock position to block both the implement and the machine.
- After applying stoppers to the wheels that are not to be jacked up, jack up the machine. Then place blocks under the raised wheels.

Servicing the tires

- When necessary to remove, repair, or reinstall tires, obtain qualified professional assistance, because special tools and skills are required.

Processing wastes

- Do not dispose of waste oil in the sanitary sewer system.
- Always drain the oil from the machine into a secure container, and never directly to the ground.
- When disposing of toxic wastes such as fuel, oil, cooling water, solvent, filters, and spent batteries, comply with all applicable disposal regulation.



9-3. Precautions for tires

Handling the tires

The tires must be used under the prescribed conditions to ensure long life. Otherwise they may sustain heat damage due to abnormal heat build-up or road damage due to the sharp edges of stones and rocks, possibly causing serious bodily injury.

To ensure safety, observe the following:

- Maintain the prescribed air pressure. Insufficient air pressure may induce abnormal heat build-up.
  Proper air pressure--See Section "13-16. Handling the tires".
- Avoid excessive loads.
  Proper weight--Normal weight of bucket content with standard boom:
  V3-6 : 1962 lbf. (890 kgf)
  V4-6 : 2579 lbf. (1170 kgf)
- Use the specified tires.
  The recommended air pressures and allowable speeds given in this Manual are for general reference. In practice, they may vary with the types of tires and operating conditions. For more information, contact your, dealer or the tire manufacturer.

When the tires installed on the wheels are heated, they will give off ignitable gases. If those gases catch fire, the tire may explode, causing serious bodily injury. Such an explosion, unlike a puncture, will produce great destructive force. For this reason, when tires are installed on the wheels, never:

- Weld on the rim.
- Permit a fire near the wheels and tires.

If you use incorrect procedures when replacing servicing the wheels and tires, serious bodily injury could result. Consult your dealer or the tire manufacturer when necessary to replace or service the wheels and tires.

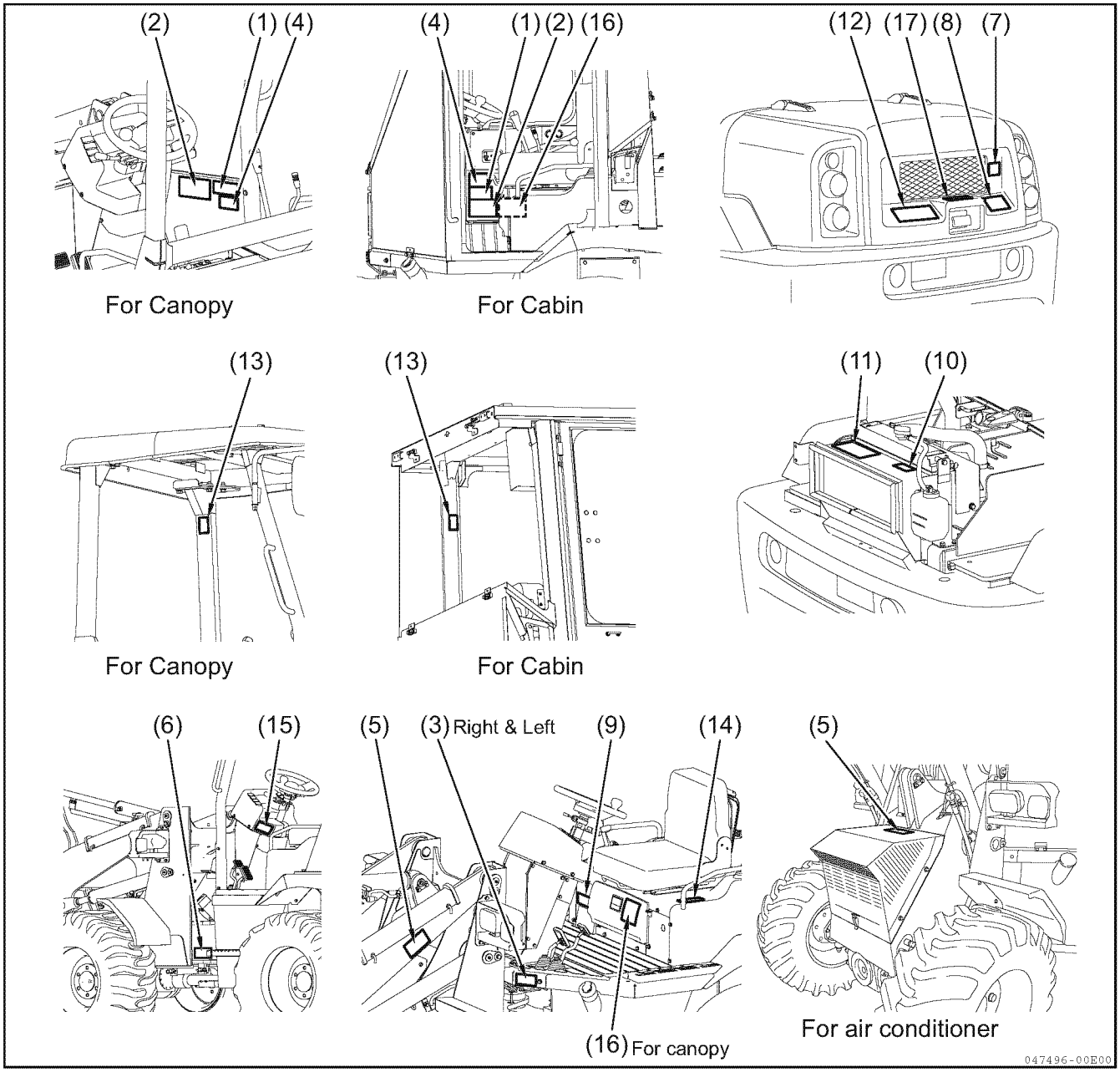
10. Safety Messages (Warning Labels)

There are a number of Warning Labels on the machine. Full descriptions of all Warning Labels and their locations are reviewed in this section. Periodically confirm whether all Warning Labels are still mounted in their correct locations and can be easily read.

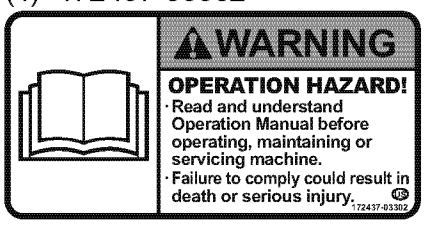
If a warning label is missing, damaged or cannot be read, it must be promptly replaced. Also, if a warning label was mounted on a part which is replaced, a new warning label must be installed on the replaced part.

Contact your dealer to obtain new labels. The part code number is shown on each warning label as well as on the reproductions in this manual.

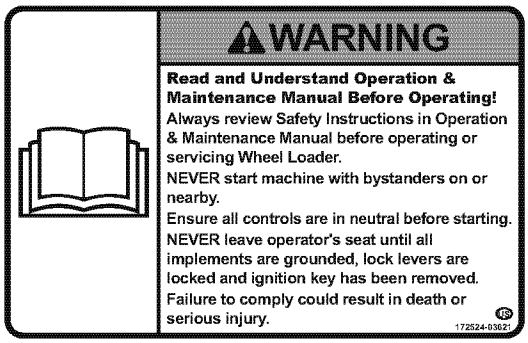
10-1. Location of warning labels



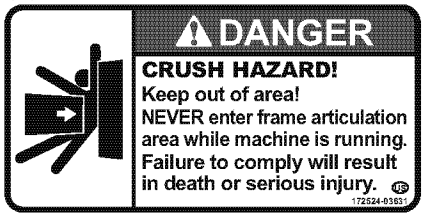
(1) 172437-03302



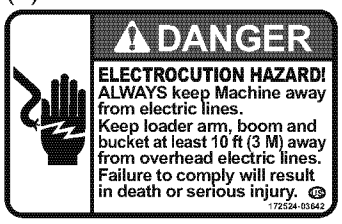
(2) 172524-03621



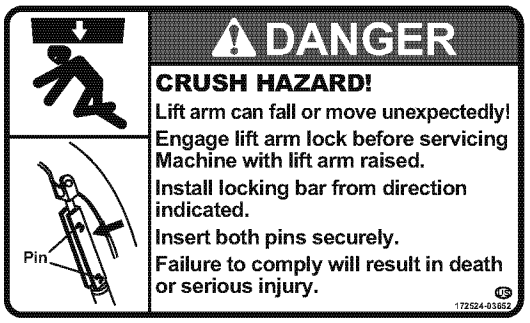
(3) 172524-03631



(4) 172524-03642

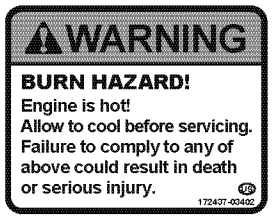


(5) 172524-03652

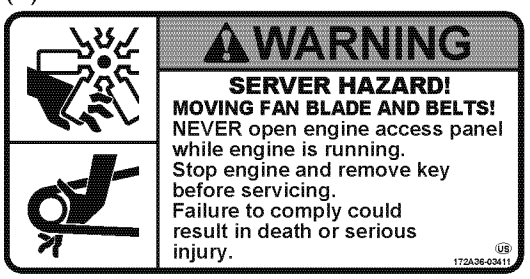


(6) 172524-03671

(7) 172437-03402

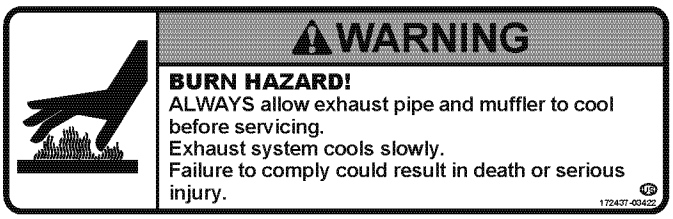


(8) 172A36-03411

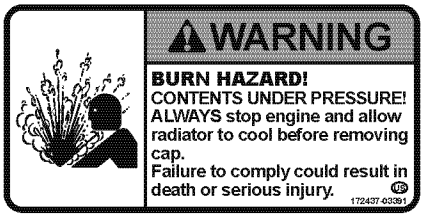


(9) 172437-03322

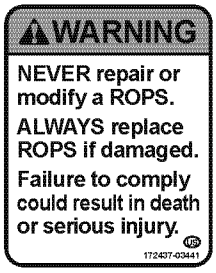
(12) 172437-03422



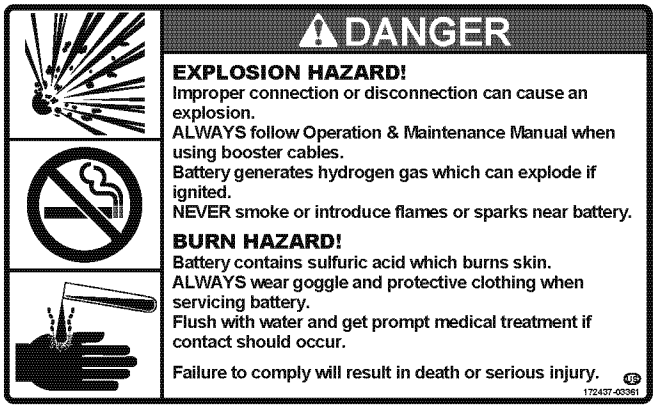
(10) 172437-03391



(13) 172437-03441



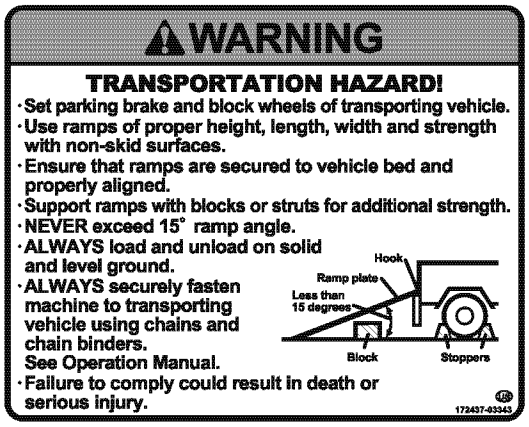
(11) 172437-03361



(14) 172524-03471

(15) 172437-03312

(16) 172437-03343

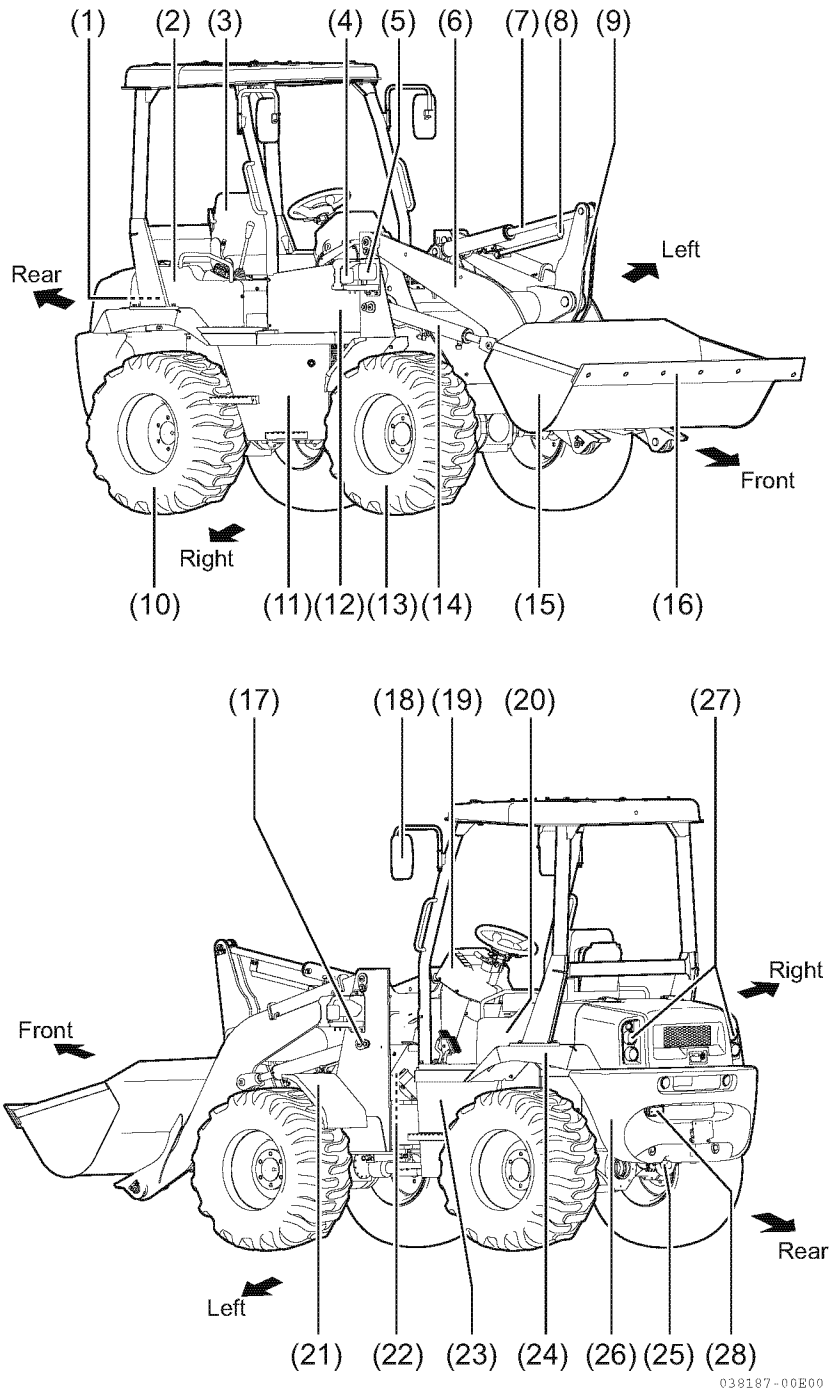


(17) 172538-03750

OPERATION

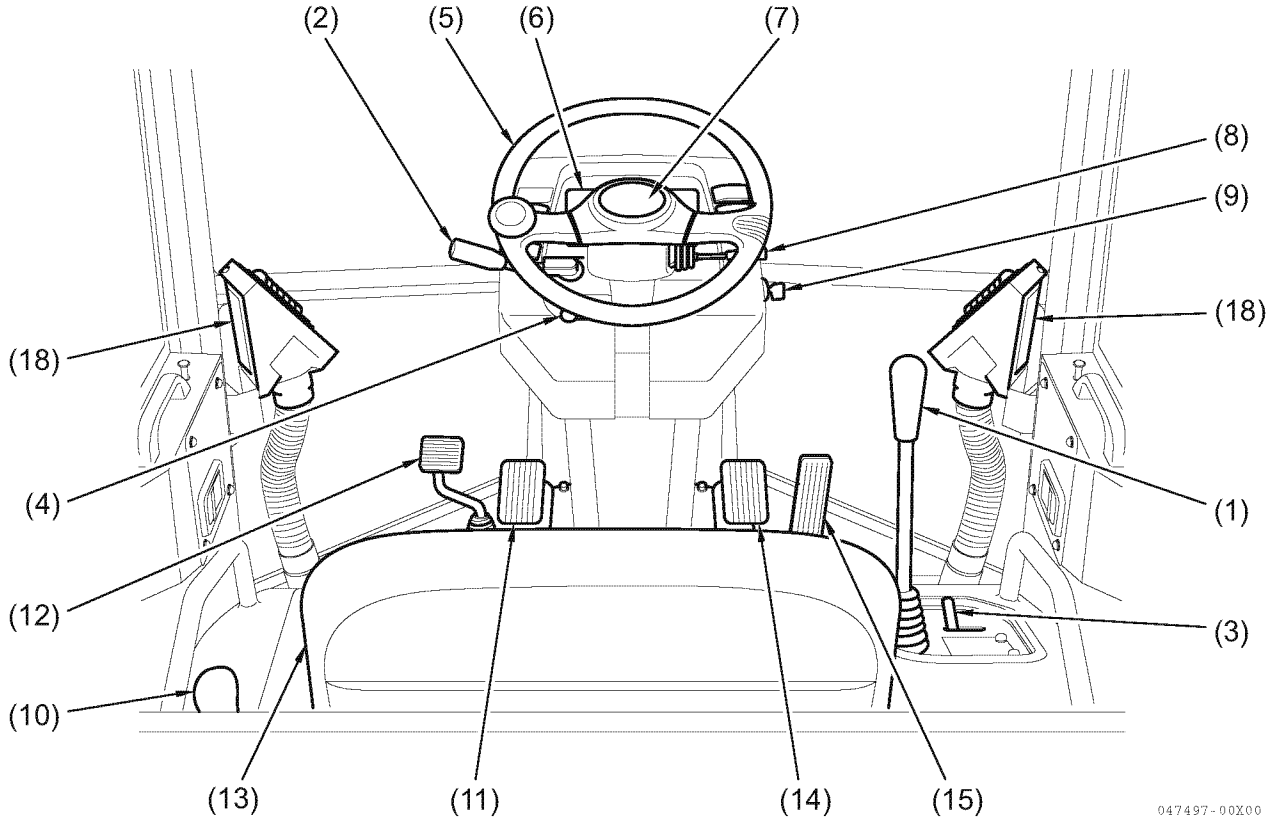
11. Identification of Important Parts

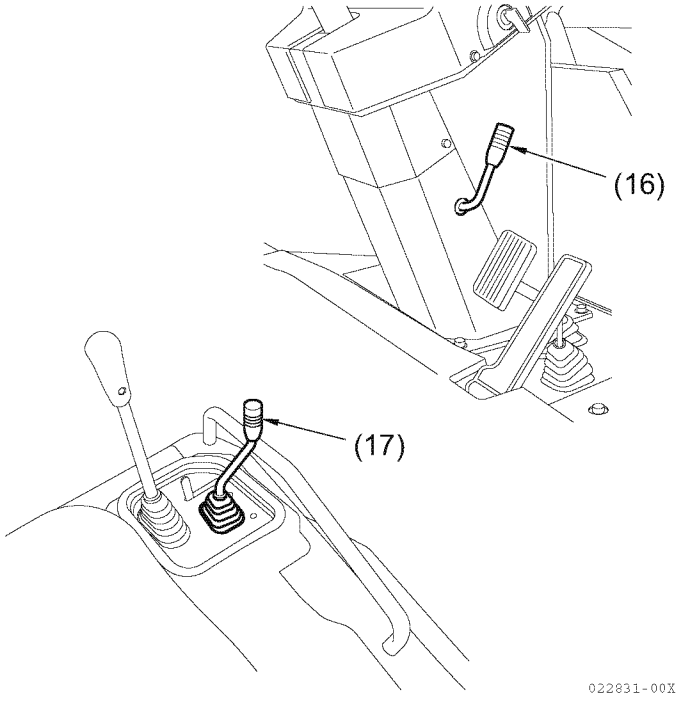
11-1. Overview of the machine



No.	Parts
1	Battery
2	Engine hood
3	Operator's seat
4	Combination lamp
5	Head light
6	Lift arm
7	Bucket cylinder
8	Auto-leveler
9	Bell crank
10	Rear tire
11	Hydraulic oil tank
12	Front cover
13	Front tire
14	Lift cylinder
15	Bucket
16	Bolt-on cutting edge
17	Front frame
18	Rearview mirror
19	Instrument panel
20	Air cleaner
21	Front fender
22	Frame lock bar
23	Fuel tank
24	Rear fender
25	Muffler
26	Counterweight
27	Rear combination lamp
28	Back-up light

11-2. Controls and switches



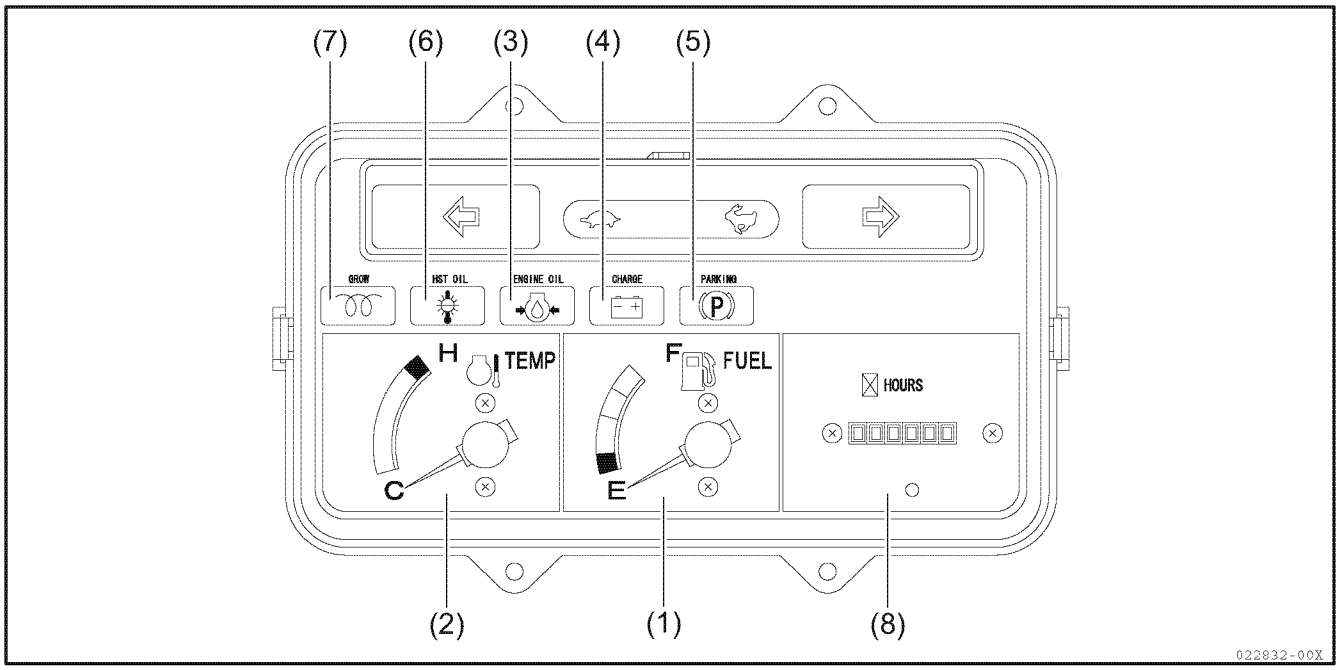


No.	Parts
1	Control lever
2	F-R change lever
3	Control lever lock
4	F-R change lever lock
5	Steering wheel
6	Instrument panel
7	Horn switch
8	Turn signal switch
9	Starter switch
10	Parking brake lock release lever
11	Inching pedal
12	Parking brake lock pedal
13	Operator's seat
14	Brake pedal
15	Accelerator pedal
16	Maximum speed limit lever (Optional)
17	P.T.O. lever
18	Air outlet (for cabin)

12. Description of Control Devices

This section describes the various control devices necessary to operate the machine. In order to ensure safety and comfort in working with the machine, it is imperative for you to fully understand how to operate and interact with these devices.

12-1. Instrument panel (Gauges and indicators)



When the key is in the "ON" position, the engine oil pressure (3) and alternator charge (4) lights must come on. Normally, those two lights go off after the engine is started. When there is any failure during operation, a lamp lights and a buzzer sounds.
(If the key is in the "ON" position and any light does not turn on, check the bulb.)

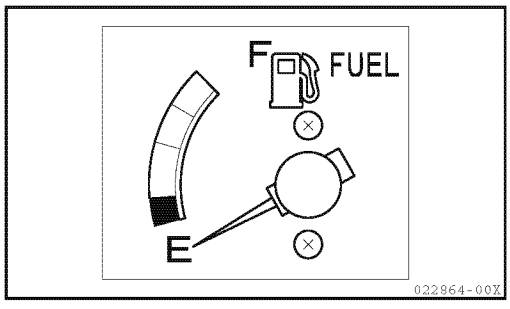
(1) Fuel meter

This meter works only when the key is in the "ON" position, and it indicates the fuel amount in the fuel oil tank.

- The gauge may not indicate correct level immediately after the starter switch is turned to "ON" position.

  F : Full

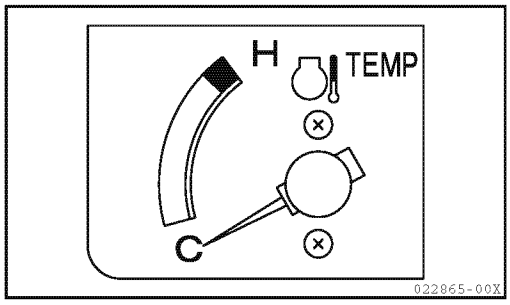
  E : Empty (Resupply fuel)



(2) Engine coolant temperature gauge

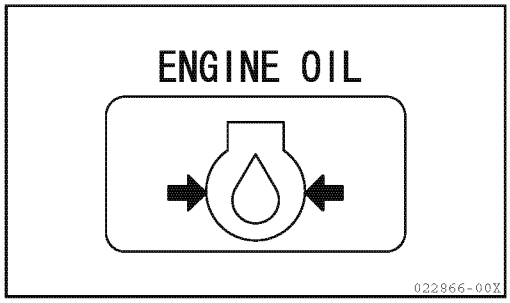
The pointer should be in the green zone during operation. When the pointer is in the red zone, idle the engine for a few minutes and then stop the engine.

After the engine has cooled, inspect for low coolant level in sub-tank, incorrect fan belt tension or plugged radiator fins. Take necessary corrective actions.



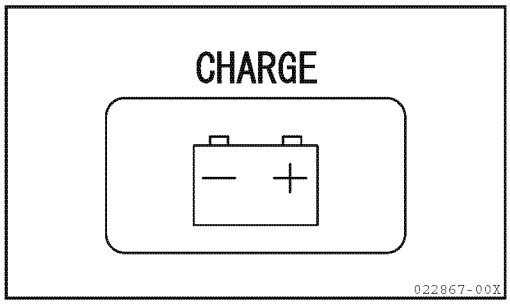
(3) Engine oil pressure indicator lamp

When the starter switch is turned to the "ON" position, the lamp lights, and when the engine is started, the lamp goes out. If the lamp lights while the engine is running, stop the engine immediately and check the cause of the trouble.



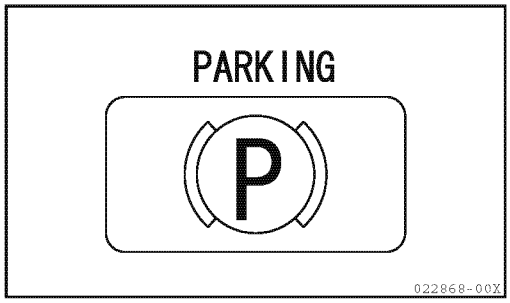
(4) Battery charge indicator lamp

When the starter switch is turned to the "ON" position, the lamp lights, and when the engine is started and battery is charging, the lamp goes out. If the lamp lights while the engine is running, the charging circuit is defective.



(5) Parking brake lamp

When the starter switch is turned to the "ON" position and the parking brake lock pedal is pressed down, the parking lamp goes on.



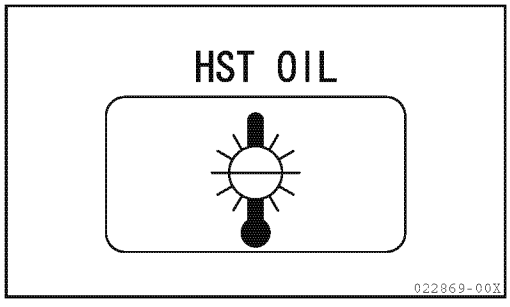
(6) HST oil temperature pilot lamp

⚠ CAUTION

If the machine is operated in disregard of this indicator light (over-heated condition), failure of the gaskets and seals and damage to the pump and motor could result.

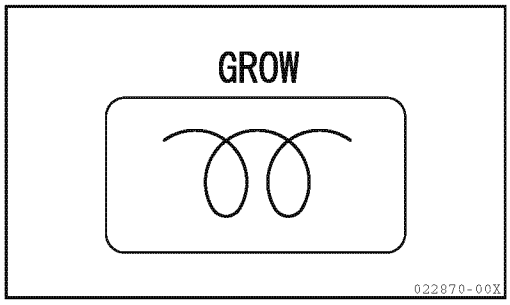
When the HST oil over-heats during operation, this lamp lights.

In that event, stop the machine and check the amount of oil in the hydraulic oil tank. If the amount is sufficient, resume operation after pausing for a while.



(7) Air preheater pilot lamp

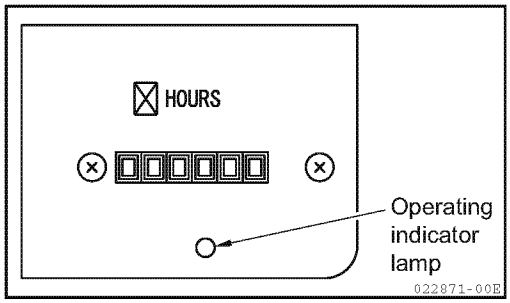
This lamp lights when the starter switch is turned to the "HEAT" position, and it will go out in about 15 seconds. This indicates that the preheating operation is finished. (This is used in cold weather)



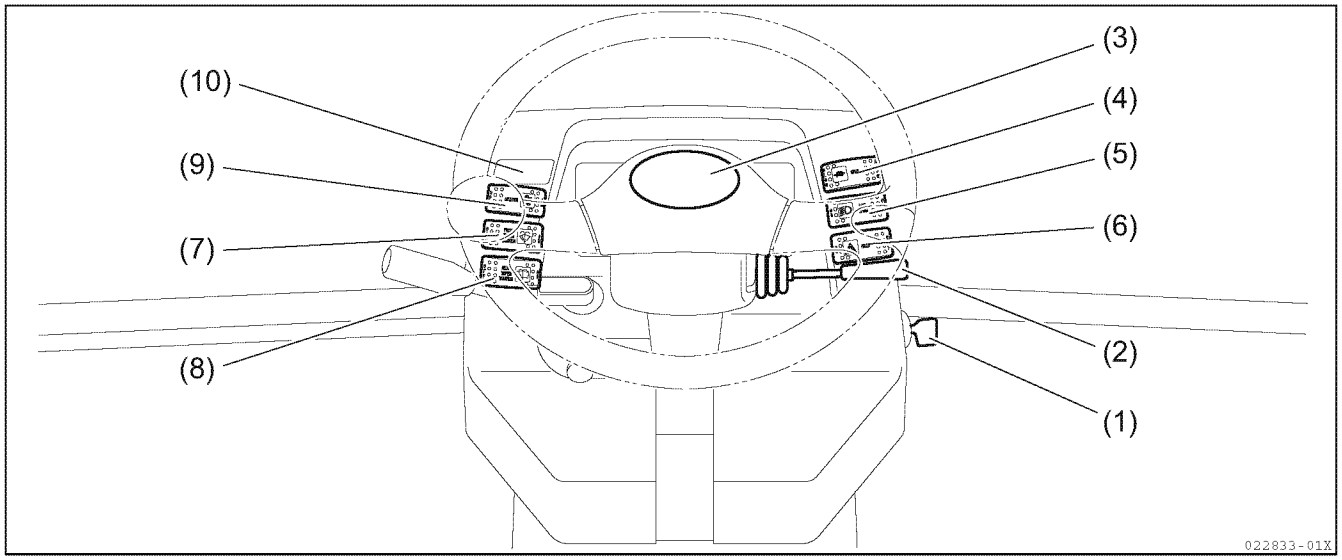
(8) Hour meter

The readout of the hour meter represents the operating time of the engine, which is used for scheduling inspecting, servicing and oiling.

- While the engine is running, the number indicated on the hour meter continues increasing even when the machine is not moved.
- The hour meter is working when the operating indicator lamp is blinking.



12-2. Switch



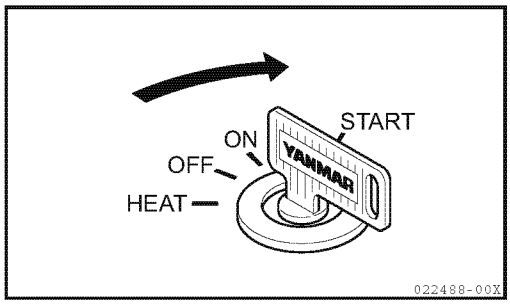
⚠ CAUTION

Never turn the starter switch to the "START" position while the engine is running.

(1) Starter switch

OFF

Turn the key to the "OFF" position to stop the engine or to remove the key.



ON

Turn the key to the "ON" position to connect the electrical circuits.
(Key position while running)

START

Turn the key to the "START" position to start the engine. Release the key after the engine is started, and it will return to the "ON" position.

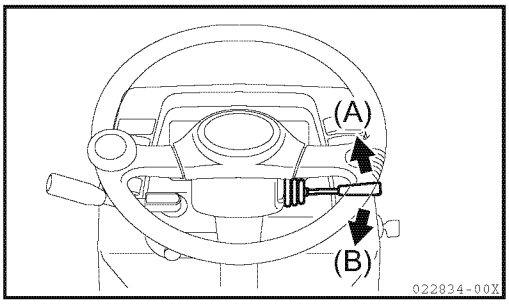
Note that the starter does not rotate unless the F-R change lever is set to the "N" (neutral) position.

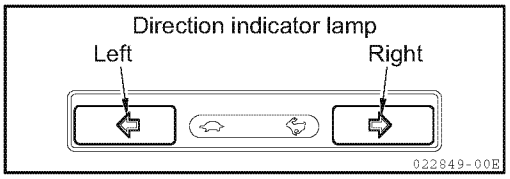
HEAT

Hold the key in "HEAT" position to activate the preheat circuit and warm up intake air to start the engine easier in cold weather.

(2) Turn signal lever

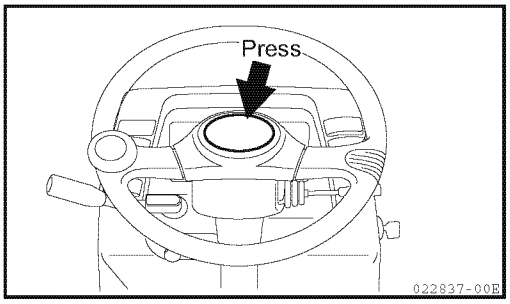
When this lever is activated, a turn signal lamp unit flash, indicating the machine's intended turning direction.
After turning the machine, return the lever to the neutral position by hand.
(A) : Left turn
(B) : Right turn





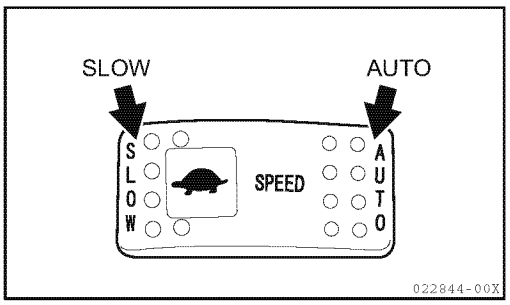
(3) Horn switch

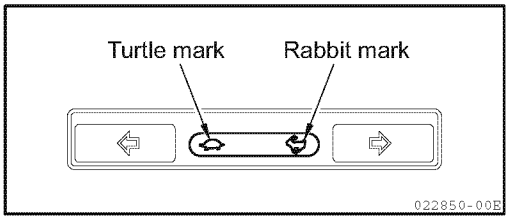
Press the switch on the central portion of the steering wheel to sound the horn.



(4) Low speed-automatic select switch

This switch is used to switch the between the low speed fixed mode and the automatic mode.
ON : The turtle mark on the monitor is turned on.
V3-6 :
The speed is set between 0 to 3.73 MPH (0 to 6 km/hr.)
V4-6 :
The speed is set between 0 to 3.60 MPH (0 to 5.8 km/hr.)
(Low speed fixed mode)
OFF : The rabbit mark on the monitor is turned on.
The speed is set between 0 to 11.81 MPH (0 to 19 km/hr.)
(Automatic mode)

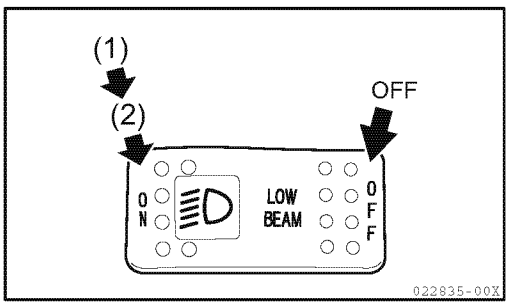




(5) Light switch

⚠ CAUTION

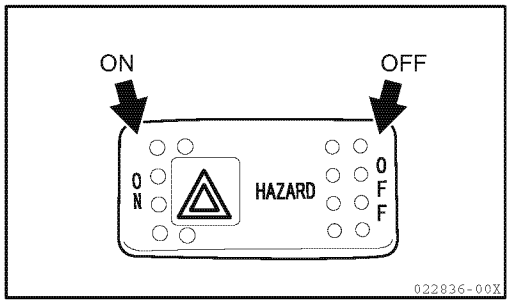
When traveling on the road at night, turn on the head lights and the width indicators and beware of oncoming vehicles.

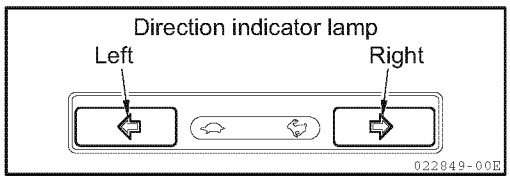


Position (1) : The width indicators are turned on.
Position (2) : The width indicators and the lights are turned on.
Position (OFF) : Turned off.

(6) Hazard switch

If this switch is moved to the "ON" position, the hazard lights will go on.





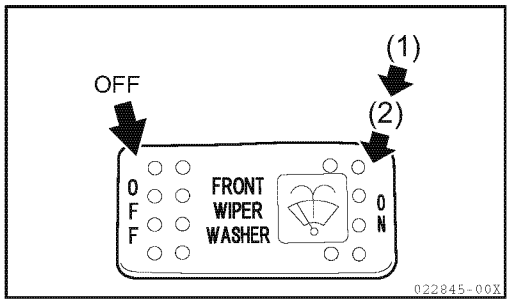
(7) Front wiper switch (cabin specification)

The wiper on the front glass is activated.

Position (1) : The wiper is activated.

Position (2) : Press the (1) further to spray the washer liquid. The washer switch (2) is optional.

Position (OFF) : The wiper is off.



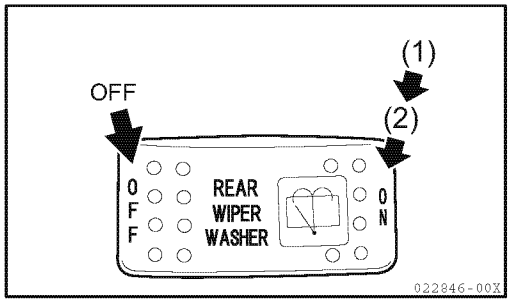
(8) Rear wiper switch (cabin specification)

The wiper on the rear glass is activated.

Position (1) : The wiper is activated.

Position (2) : Press the (1) further to spray the washer liquid. The washer switch (2) is optional.

Position (OFF) : The wiper is off.



IMPORTANT

- **If the wiper is operated with the windshield dry, the glass may be damaged. Be sure to operate the wiper only when the windshield is wet.**
- **The wiper blade may freeze in cold weather. Do not attempt to move it, as it may result in damage to the wiper motor.**

(9) Heater switch (cabin specification)

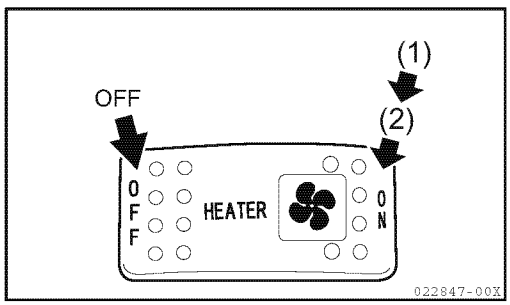
Pressing the switch warms up the air in the cabin.

Position (1) : Low

Position (2) : High

Position (OFF) : Stop

Press the switch to operate the heater after the engine cooling water has been warmed up. If temperature of the cooling water is low, no warm air is blown from the heater.

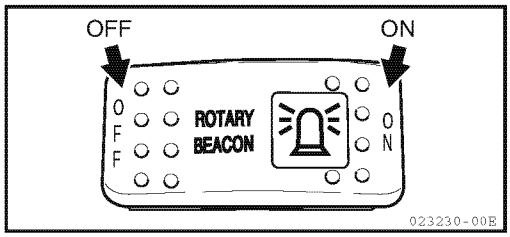


(10) Rotary beacon (optional)

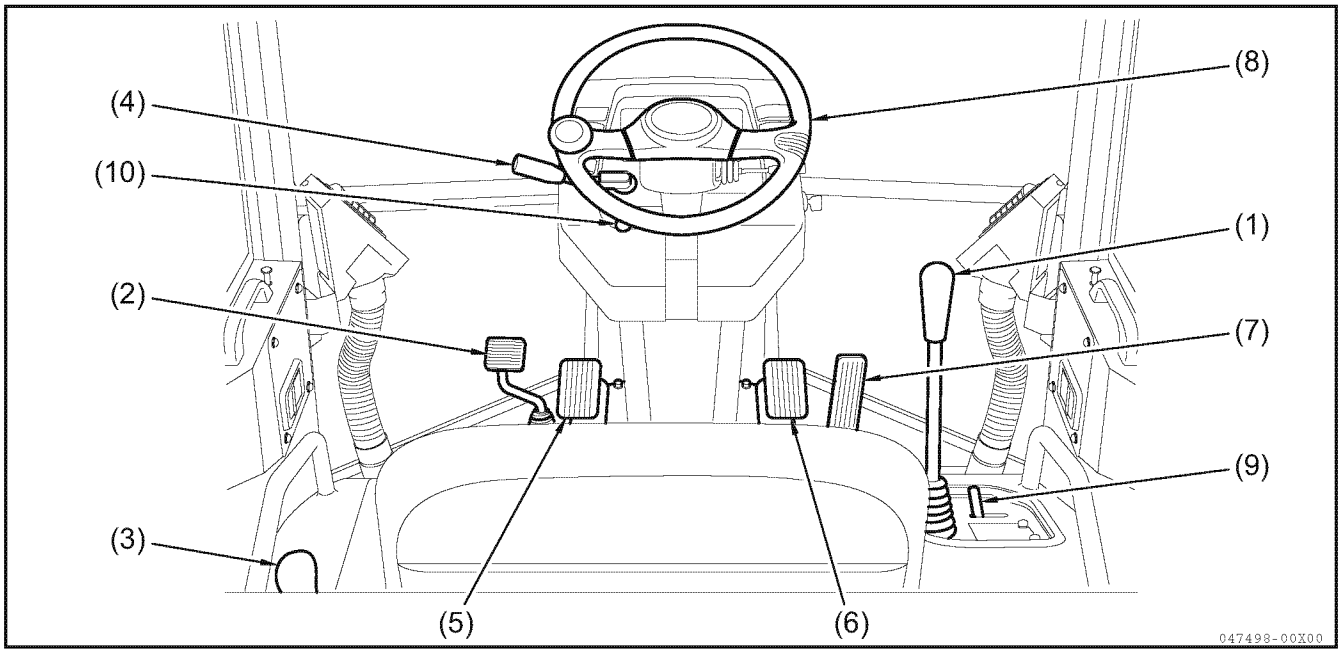
The rotary beacon is activated.

ON: The rotary beacon goes on.

OFF: The rotary beacon goes out.



12-3. Control levers and pedals

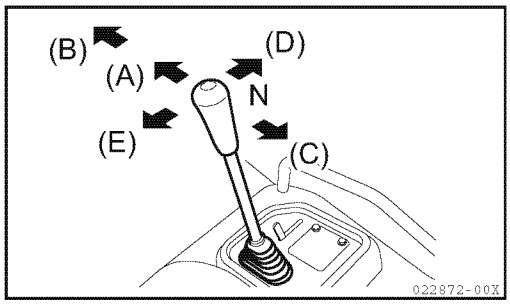


(1) Control lever

The lever is used to operate the lift arm and the bucket.

- Lift arm operation...(A) : Down, (B) : Float, (C) : Up
- Bucket operation...(D) : Dump, (E) : Tilt
- N : Neutral

  When the lever is released, it will return to neutral except for lift arm float position. The machine will remain positioned.



Up

The lift arm will go up. When the lever is released, it will return to the "NEUTRAL" position automatically, and the lift arm will remain positioned.

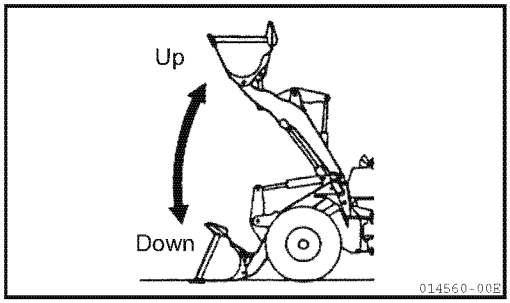
Down

The lift arm will come down. When the lever is released, it will return to the "NEUTRAL" position automatically, and the lift arm will remain positioned.

Float

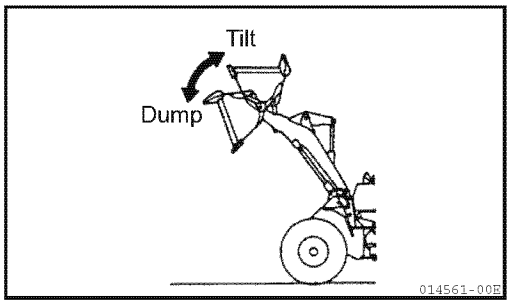
The lift arm and bucket will drop to the ground by gravity and will stop.

If this mode is used for operation on a concrete-covered ground or land-leveling operation, the bucket will follow the contour of the ground without floating the front wheels, so the work can be performed efficiently.



(Auto-leveler tilt) backward

When the lever is set to the "TILT" position, it is held in the "TILT" position and the bucket which is in the dumped state starts to be tilted backward stops at the position even with the ground. At the same time, the lever is automatically returned to the "NEUTRAL" position.



(Dump) forward

The bucket is dumped forward.

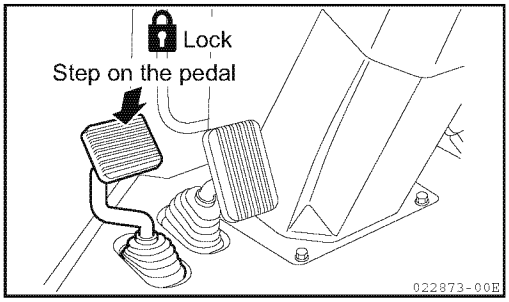
When the lever is released, it will return to the "NEUTRAL" position automatically, and the bucket can be stopped at any angle.

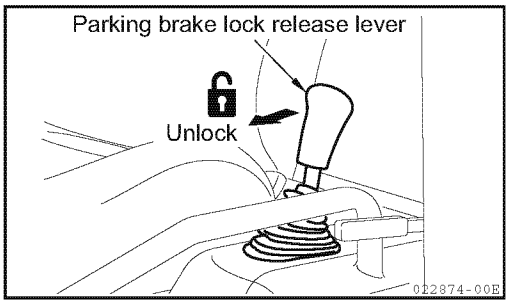
(2) Parking brake lock pedal

(3) Parking brake lock release lever

⚠ CAUTION

- **Be sure to apply the parking brake when parking or leaving the machine.**
- **If there is nothing for it but to park the machine on a slope, step on the brake pedal hard, lock the parking brake lock pedal and put the wheel stoppers under the wheels.**





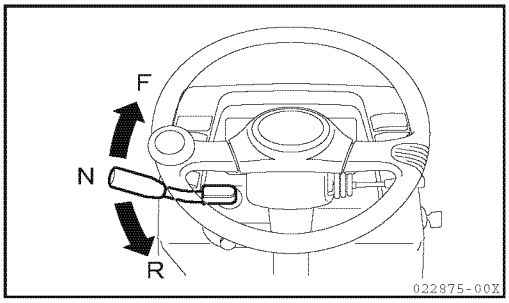
IMPORTANT

- **Do not apply the parking brake while running the machine except in an emergency. Otherwise, apply the parking brake only after the machine stops.**
- **Because the pressure of the HST will not increase while the parking brake is applied, the machine cannot be started while the parking brake is in that position.**

(4) F-R change lever

Set this lever to F for traveling forward, R for traveling in reverse, and N for stopping the machine.

- The engine will not start unless the F-R change lever is set to the "N" position.

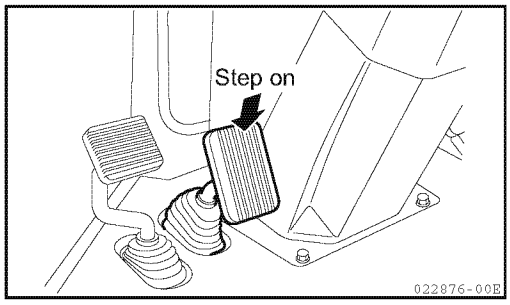


(5) Inching pedal (Clutch pedal)

⚠ CAUTION

Do not put your foot on this pedal unnecessarily.

This pedal is used to connect or disconnect the engine power transmitted to each operating part. When stepping on the pedal, the power is disconnected, and when releasing it, the power is connected.

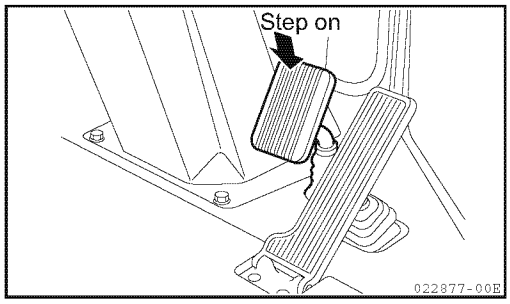


(6) Brake pedal

⚠ WARNING

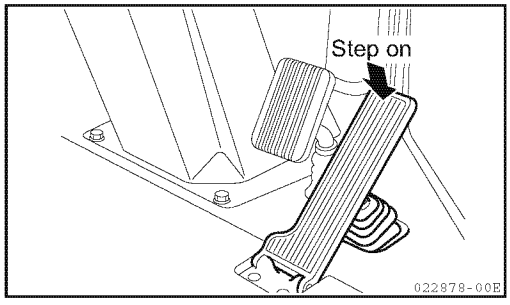
- **When going down a slope, be sure to apply the engine brake.**
- **Do not pump the brake pedal unnecessarily.**
- **Do not put your foot on the pedal unnecessarily.**

The brake pedal is used to apply the brake to stop the machine temporarily or after running it.
When stepping on the brake pedal, the power is disconnected and the brake is applied.



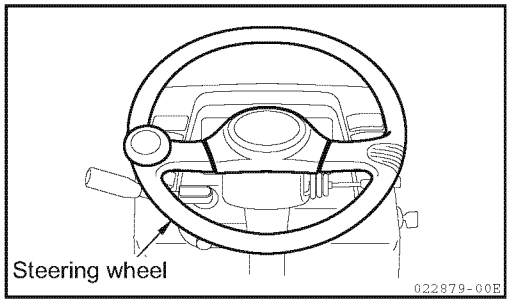
(7) Accelerator pedal

When this pedal is pressed, the number of engine revolutions are increased accordingly.

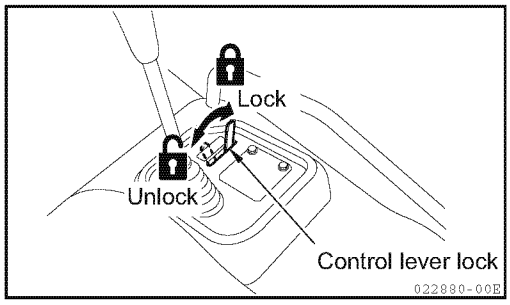


(8) Steering wheel

The steering wheel is used to steer the machine.
The machine will turn in the direction in which the steering wheel has been turned.



(9) Control lever lock

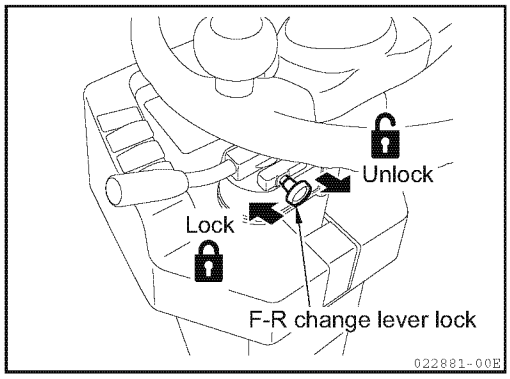


⚠ WARNING

- **When leaving the operator's seat, be sure to place the control lever lock in the lock position. Carelessly touching the unlocked control lever may cause unexpected movement, which could result in bodily injury.**
- **The control lever cannot be locked if the control lever lock is not securely set in the lock position.**
- **With this lock, the control lever can be deactivated.**
- **Be sure to set the control lever lock in the lock position after putting the bucket on the ground when the loader is not being used.**

This is a locking device for the control lever.

(10) F-R change lever lock

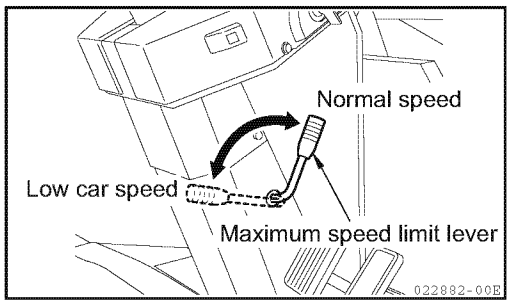


⚠ WARNING

Be sure to set the lever lock in the lock position to park the machine or do the maintenance work. Carelessly touching the unlocked F-R change lever may cause unexpected movement, which could result in bodily injury.

This is a locking device for the F-R change lever.
Press the knob to lock the F-R change lever.

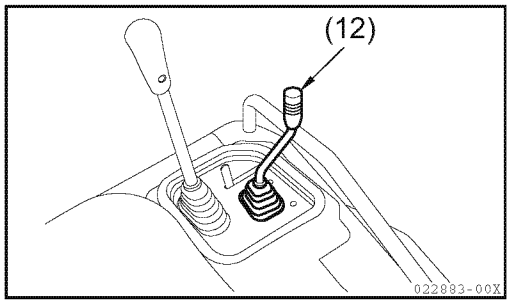
(11) Maximum speed limit lever (Optional)



For the operations that require the maximum engine speed use and low car speed, such as rotary snow plow and power sweeper, pulling the lever forward results in obtaining the suitable running speed.
Returning the lever to its original position results in getting back to the normal speed.

(12) P.T.O. lever

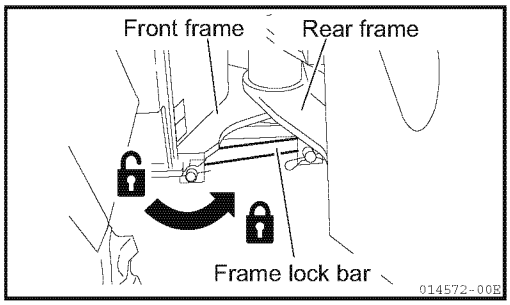
This lever is operated to use the oil pressure for other hydraulic devices as the power source.



12-4. Frame lock bar

⚠ WARNING

Be sure to install the frame lock bar before servicing or transporting the machine.



The frame lock bar locks the front and rear frames together so that they will not bend while the machine is being serviced or transported.

Remove the snap pin (on the front side only) for the frame lock bar, roll the bar in the arrowed direction in the right figure and hold it on the rear frame side with the snap pin.

12-5. Engine hood

⚠ WARNING

Do not open engine hood while the engine is running.

Rotating fan, moving fan belt and high temperature components can cause personal injury.

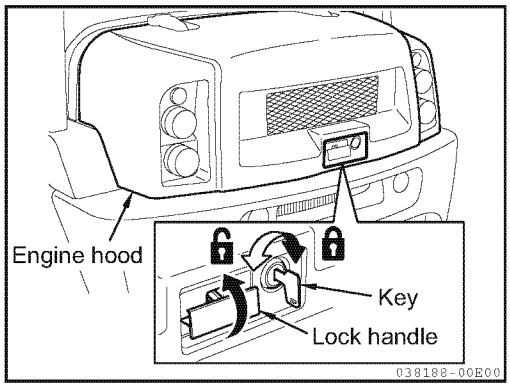
⚠ CAUTION

When the engine hood is closed, make sure that it is securely locked.

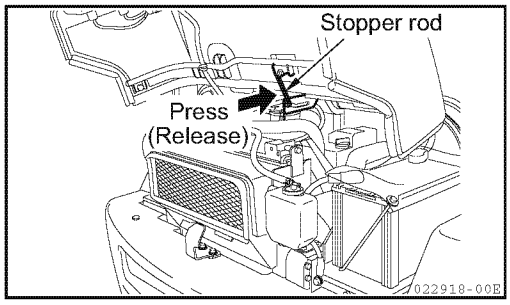
Open and close the engine hood according to the following procedure:

1) Opening the engine hood

When the key is turned in the counterclockwise direction, the lock is released. Hold the lock handle of the engine hood and open. When the engine hood is fully opened, it is locked by the stopper rod.



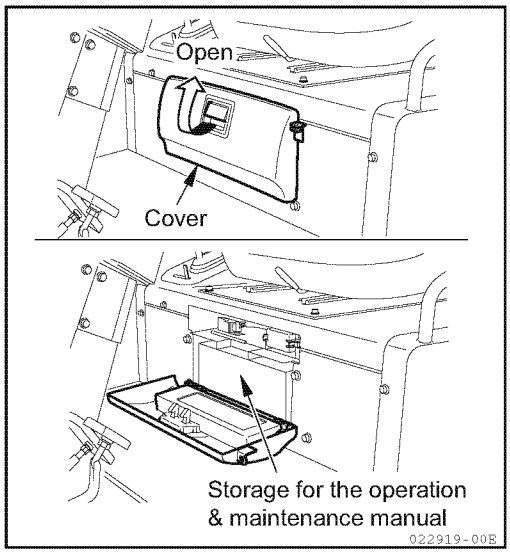
2) Closing the engine hood
Lift up the engine hood a little, release the lock by pressing the stopper rod, lift down the engine hood silently, and lock it.



12-6. Storage for the operation & maintenance manual

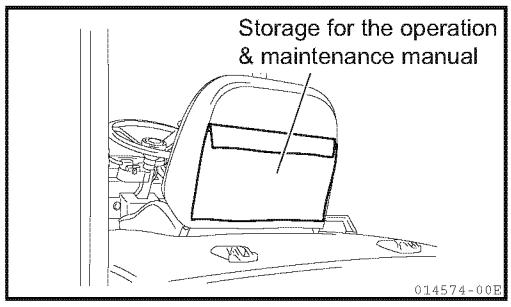
- Storage for the operation & maintenance manual
Standard and canopy specification :
stored in the lower part of the seat.

Canopy specification



Cabin specification :
stored in the back pocket of the seat.

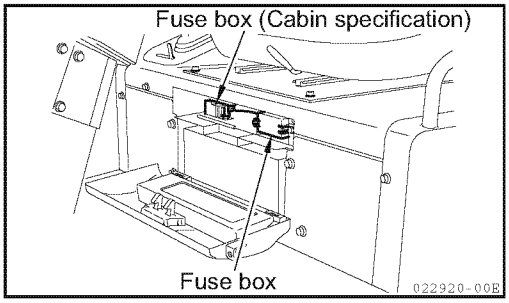
Cabin specification

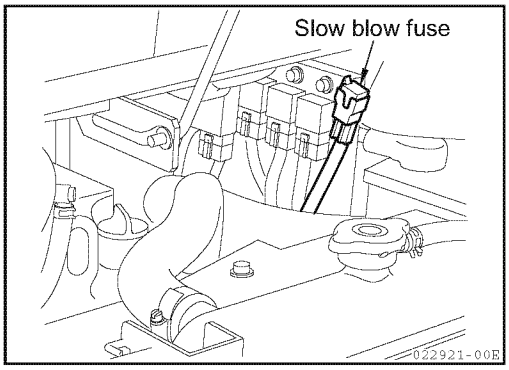


12-7. Fuse box

IMPORTANT

- **When replacing a fuse, be sure to turn off the electric power by setting the starter switch key to the "OFF" position.**
  Using fuse larger than the rated capacity, or shorting onto fuse holder could damage the gauges, electrical equipment and wiring.
- **If a new fuse blows out immediately after replacement, some electrical problems may exist. Contact the nearest dealer.**





Two types of fuses are adopted in electric wiring circuit.

Type	Purpose
Blade fuse	(1) Protect the electrical components from the overcurrent, which exceeds allowable value of the electrical components. (2) Protect the line from the overcurrent, which exceeds allowable value of the wiring, caused by the problems of electrical components.
Slow blow fuse	Protect the electrical components and wiring from burnout by the overcurrent in the circuit, where a high-capacity current flows, caused by some problems (short-circuit by disconnection, etc.).

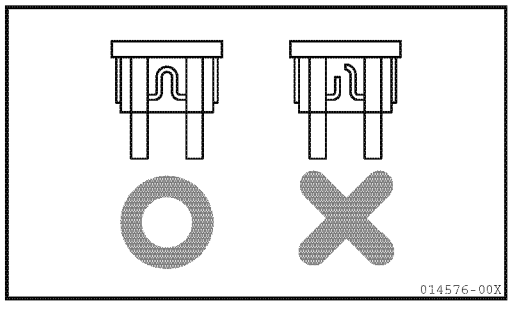
When a device does not activate, check the fuse for blowout.

To check and replace the fuse with a new one:

1) Turn the starter switch to the "OFF" position.
2) Open the fuse box and take fuse out.
3) When the fuse is damaged as illustrated on the right, replace it with a new one.

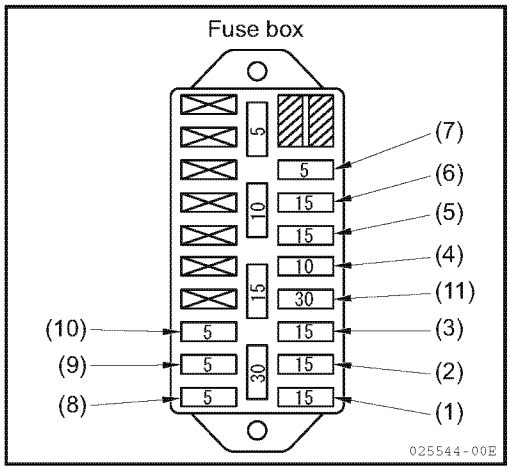
- The extra fuse is attached to the fuse box cover.

Machine side



Blade fuse

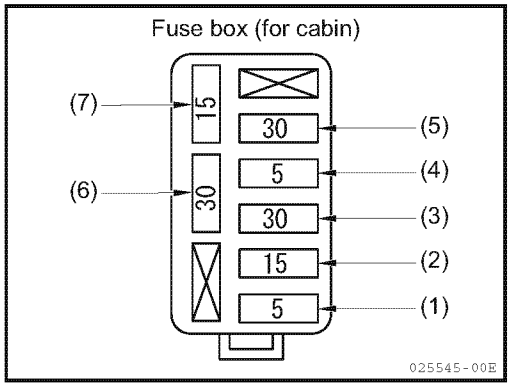
No.	Capacity	Circuit name
1	15A	Stop lamp, Horn, Buzzer Parking lamp & flasher
2	15A	Meter (turn), Hazard
3	15A	Head lamp, Meter (illumination) Switch lamp
4	10A	12V Outlet
5	15A	Fuel feed pump, Timer, Rectifier Engine stop solenoid,(Immobilizer)
6	15A	Proximity sensor, CV solenoid, Parking relay Engine oil pressure lamp, HST oil temp. lamp LO-HI lamp, HST motor solenoid,(A/C) Travel relay, Auto leveler relay HST pump solenoid, Back lamp relay Back buzzer relay, Hour meter, Fuel meter
7	5A	Back buzzer, Back lamp
8	5A	Starter relay
9	5A	Flasher lamp (left)
10	5A	Flasher lamp (right)
11	30A	(A/C)



<Fuse for cabin>

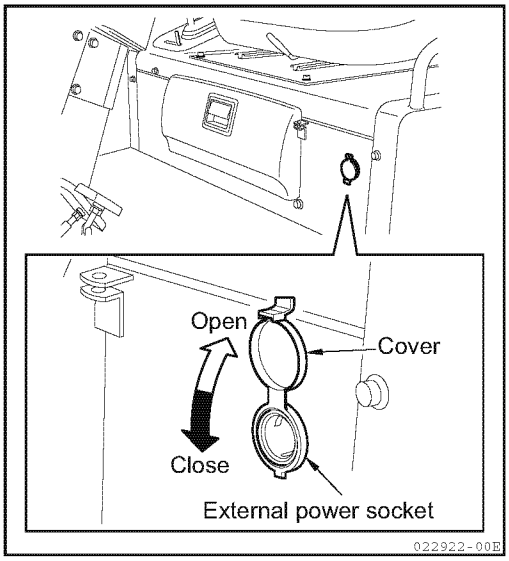
The fuses are installed in the upper front within the cabin.

No.	Capacity	Circuit name
1	5A	Room lamp
2	15A	(Rotary beacon)
3	30A	(Work lamp)
4	5A	Relay
5	30A	Heater,(Radio),(A/C) (Window washer) Wiper
6	30A	Spare fuse
7	15A	



12-8. External power socket

This socket can be used as a power source of electric products. Be sure to observe the following conditions for use. It can be used when the starter switch is in the "ON" position. Use in the electric products with 12V specification and maximum 120W (10A) or below.



IMPORTANT

- **Ensure closing the cover when the external power is not in use, as leaving the cover open may result in contamination entry.**
- **The prolonged use in the engine stop condition may cause the battery to go flat.**

12-9. Operator's seat

⚠ WARNING

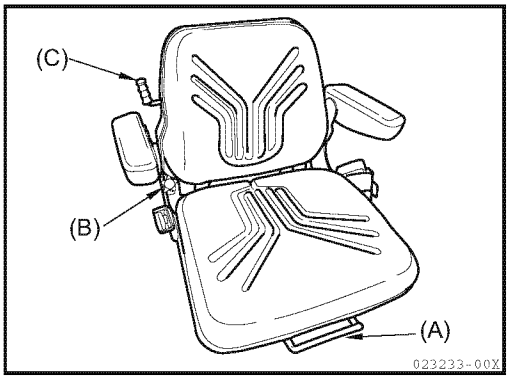
Be sure to adjust the seat slide to obtain the best operating position whenever a new operator begins work.

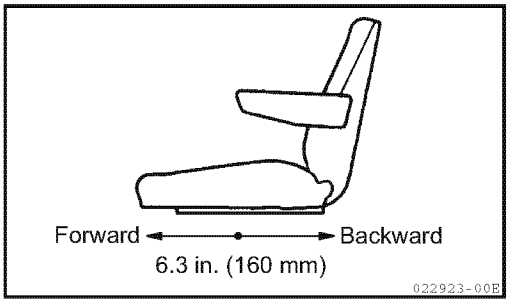
Adjust the seat so that the operator can easily operate the control levers in good posture.

Seat position control

■ **Fore / aft adjustment**

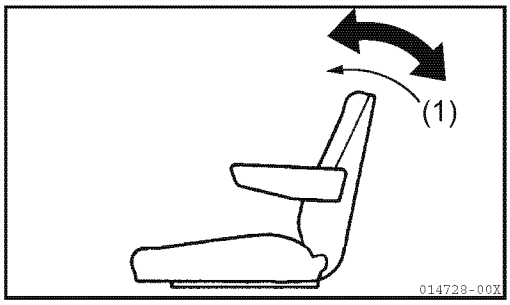
1) Pull lever (A) upward to slide the seat forward and backward.
   (Adjustable amount : 3.54 in. (90mm))





■ Backrest adjustment

1) Pull lever (B) upward to latch the desired position.

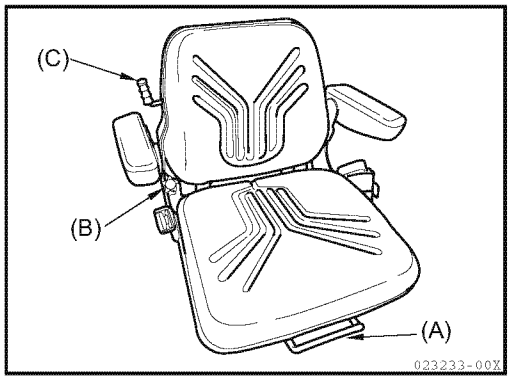


■ Armrests

1) The armrest can be folded up if required.

■ Weight adjustment

1) The seat can be adjusted for the driver's weight with the seat empty.
2) The adjustment is made by pressing the actuator lever (C) down, from the upper to the lower position.
3) The driver weight setting is shown by the position of the lever on the scale.
4) Pressing the actuator lever beyond the furthest notch until it stops will return the setting to 110.23 lb. (50 kg).



12-10. Fuel cap with lock

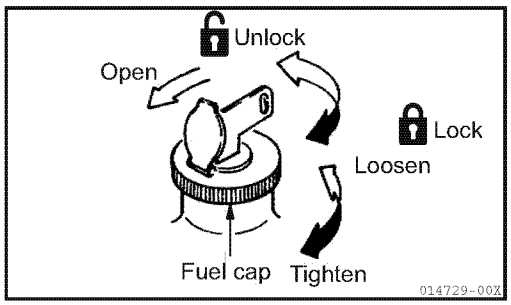
Use the starter switch key to lock and unlock the fuel cap.

■ Unlocking the fuel cap

1) Open the fuel cap cover and insert the key, and then turn it counterclockwise to unlock.
2) Turn the fuel cap counterclockwise to remove.

■ Locking the fuel cap

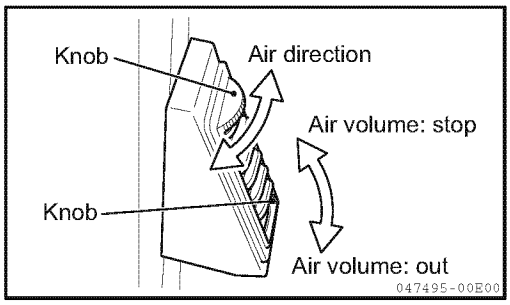
1) Install the fuel cap and turn clockwise.
2) Turn the key clockwise to lock.
3) Remove the key.

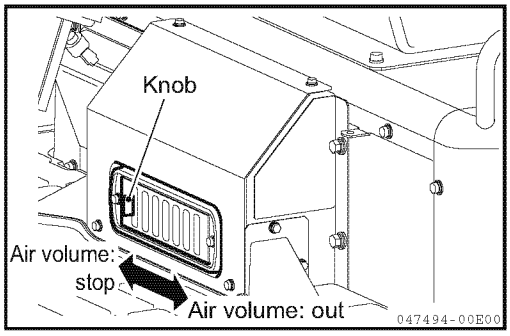


12-11. Air outlet (for cabin)

Adjustment of air volume and air direction.

The air knob is used to adjust the air volume and air direction.





13. Operating Instructions

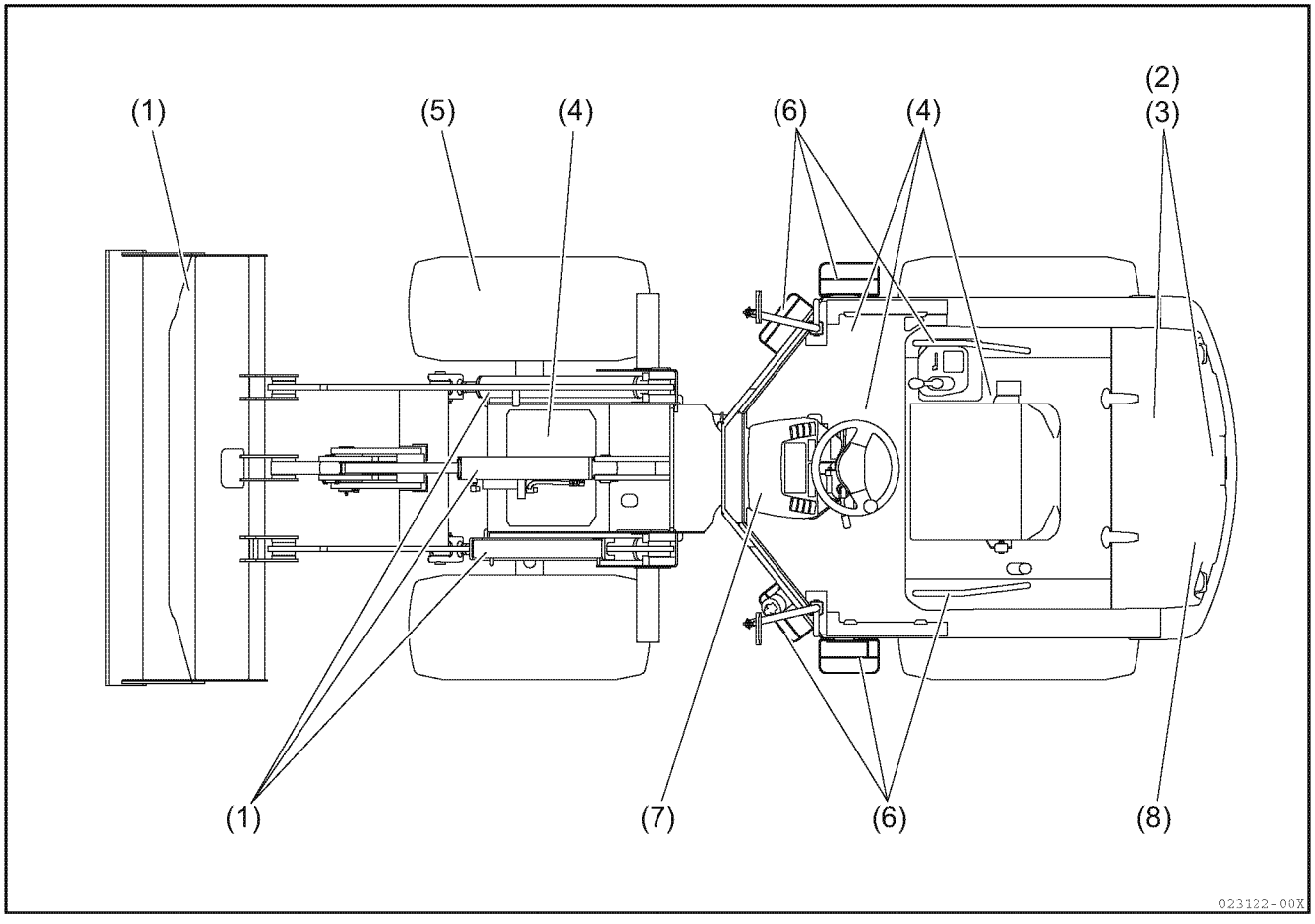
13-1. Checking before starting the engine

13-1-1. Walkaround check (visual inspection)

Before starting the engine, visually check the outside and underside of the machine as follows:
Check bolts and nuts for loose connections; check the fuel, oil, and water for leaks; and also check the implement and the hydraulics to see that they are operating properly. In addition, check the electrical wiring for loose connections and for dust deposits in the heat build-up areas.
Check the following points before initial start-up for the day.

⚠ WARNING

- **If there are any combustibles in any heat build-up areas, or if there are any fuel and/or oil leaks, a fire can result.**
- **Check for possible fire causes carefully. If there is anything abnormal, be sure to take corrective action or contact your dealer.**



(1) Checking the implement, hydraulic cylinders, linkages, and hoses for damage

Check the implement, hydraulic cylinders, linkages, and hoses for damage.

If you find any abnormalities, take corrective action.

(2) Removing dust deposits from around the engine, battery, and radiator

Check to see that there are no dust deposits or other combustibles around the engine, on the radiator or in other heat build-up areas. If there are any, remove them.

(3) Checking the engine and its accessories for oil and water leaks

Check the engine for oil leaks and the cooling water system for water leaks.

If there are any, take corrective action.

(4) Checking the hydraulics, hydraulic oil tank, hoses, and joints for oil leaks

Check for oil leaks. If there are any, take corrective action.

(5) Check the tires for damage and wear, and check for loose wheel nuts

Check the tires for cracks, peeling or other damage. If the wheel nuts are loose, retighten them. If any abnormality is found in a fire, repair or replace it. If the valve cap is lost, be sure to replace it.

(6) Checking the handrails and steps for breakage and loose bolts

If any are broken or any bolt is loosened, take corrective action.

(7) Checking the gauges and the monitor for breakage and loose bolts

Check the gauges and the monitor for breakage and loose bolts. If there are any, replace with new ones. Retighten bolts if necessary. Clean the surfaces of the gauges and monitors if dirty.

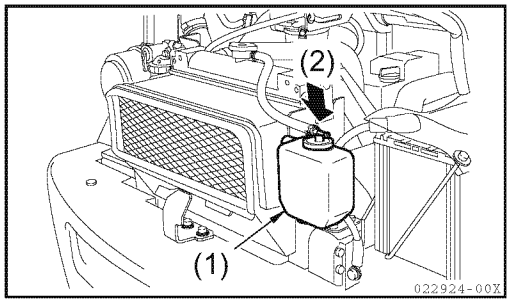
13-1-2. Check the following points before initial start-up for the day

■ **Checking and replenishing the cooling water**

⚠ WARNING

Do not remove the cap from the radiator unless refilling the coolant.
Touching the radiator cap immediately after the engine is stopped may cause a burn.
Check the cooling water level in the sub-tank when the engine is cool.

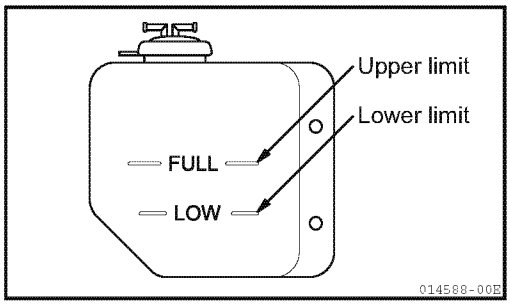
1) Open the engine hood. Then check whether the cooling water level in the sub-tank (1) is between the FULL and LOW marks. If the water level is below the LOW mark, refill the sub-tank (1) up to the FULL mark from the water supply port (2) of the sub-tank (1).
When the cooling water level in the radiator decreases, the cooling water is automatically supplied from the sub-tank (1).



For the cooling water to be used, refer to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".

2) After replenishing, securely tighten the radiator cap.

3) If the sub-tank (1) is empty, check for leaks and the cooling water level in the radiator.
If the water level is low, refill the radiator first, then the sub-tank.



4) If the cooling water level is appropriate, close the engine hood.

IMPORTANT
When the engine hood is closed, make sure that the lock lever is engaged.

■ Checking and replenishing the fuel

⚠ WARNING

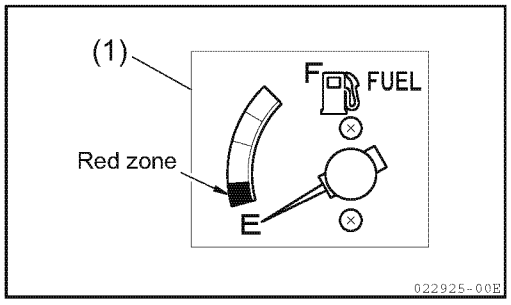
- **To prevent a fire, do not supply fuel too much. If the fuel overflows, dry all the spilt fuel.**
- **Keep sources of ignition away when refueling.**

⚠ CAUTION

- **Do not remove the strainer from the supply port of the fuel tank when supplying fuel.**
- **Be careful not to allow water settled at the bottom of the fuel container or dirt on refueling equipment to enter the fuel tank.**

1) Turn the starter switch to the "ON" position, and check the fuel level with the fuel level gauge (1).

   - When the fuel level gauge pointer is in the "Red zone", approximately 2.9 Gals. (11 L) of fuel are left in the tank.

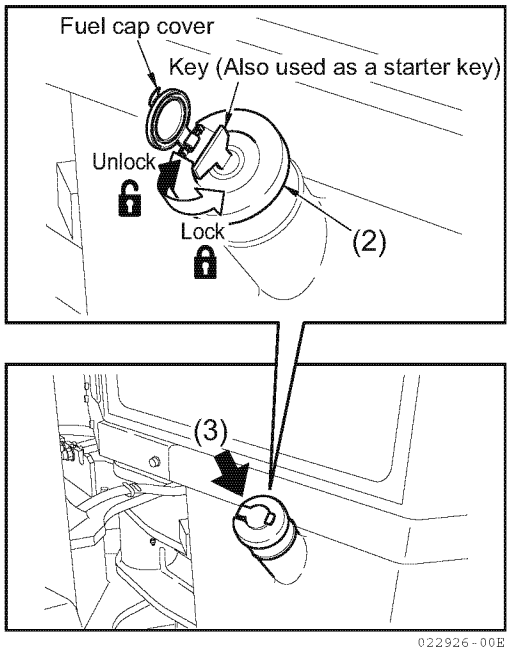


2) If the fuel level is low, remove the fuel tank cap (2) with the key and replenish the specified from the fuel supply port (3). Check the fuel level gauge (1) when replenishing.

   - Capacity.....14.5 Gals. (55 L)

   For the quality of the fuel to be used, refer to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".

3) After refueling, securely retighten the fuel cap (2).

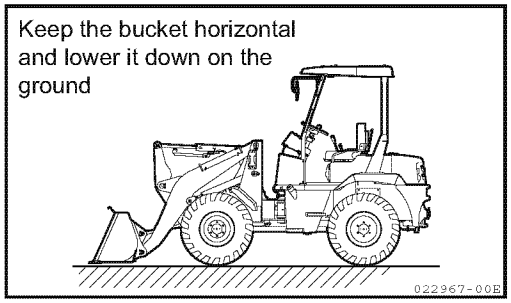


■ **Checking and replenishing the hydraulic oil in the tank**

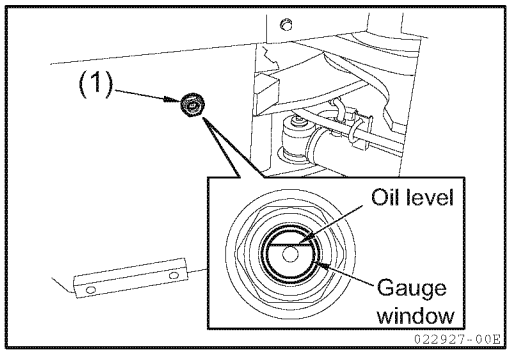
⚠ WARNING

When removing the plug from the oil supply port, slowly loosen it to release pressure in the tank.

1) Set the machine in the position as shown in right figure to check the hydraulic oil level.



2) Check the oil level with the oil level gauge (1) on the side of the hydraulic oil tank. Check that the oil level is between the upper and lower limit marks.

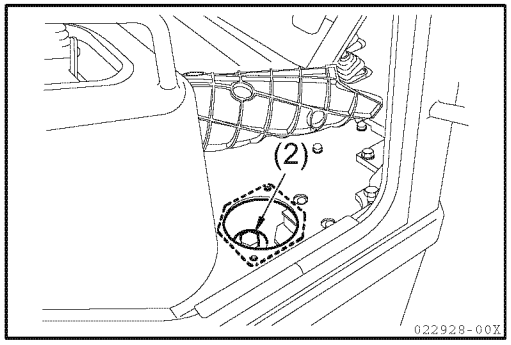


IMPORTANT

Do not replenish hydraulic oil above the upper limit mark on the oil level gauge. An excessive amount of hydraulic oil may damage the hydraulic system due to stress placed on its components or cause a dangerous high-pressure oil leak.

3) Replenish oil from the oil supply port (2) if the oil level is at the lower limit or less.

   For the quality of the oil to be used, refer to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".



Note :

Note that the oil level varies with oil temperature.

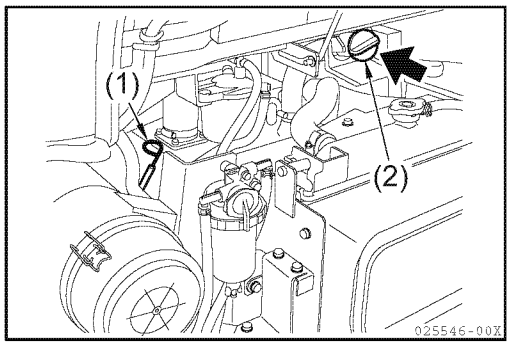
When reading the oil level, follow these guidelines:

- *Before start-up, the oil level should read around the midpoint of the gauge scale (oil temperature : 50 to 86°F (10 to 30°C)).*
- *At normal operation, the oil level should read around the upper limit mark of the oil gauge scale (oil temperature : 122 to 176°F (50 to 80°C).*

■ Checking and replenishing the engine oil

⚠ WARNING

At operating temperature, oil and dipstick areas are hot. Do not allow hot oil or components to contact skin to prevent bodily injury.
Check oil level and refill oil after engine has cooled down.



1) Open the engine hood.

2) Pull the dipstick out and wipe it with a rag to remove oil deposits.

3) Insert the dipstick into the dipstick tube fully, then draw it out.

4) If the dipstick is wet above the midpoint between the H and L marks, the engine oil level is appropriate. If the oil level is below the midpoint between the H and L marks, refill engine oil through the oil supply port (2). Even if the expected operating time is not long, when the oil level is below the midpoint, oil should be refilled.

5) If the engine oil level is above the H mark, remove an excessive amount of oil through the drain plug, then recheck the engine oil level.

6) After verifying that the amount of engine oil is appropriate, securely retighten the oil supply port cap and close the engine hood.

For the quality of the engine oil to be used, refer to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".

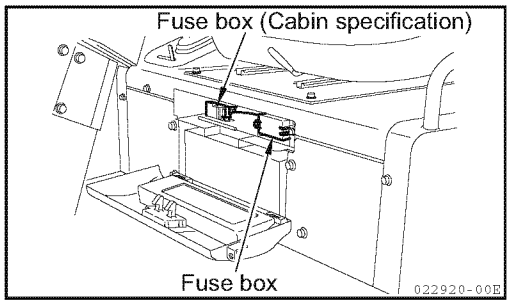
IMPORTANT

When checking the engine oil level after starting up the engine, stop the engine and allow more than 15 minutes for the engine to cool down.
If the vehicle is slanted, reposition the vehicle to ensure it is level before checking the engine oil level.
Keep in mind that excess engine oil must not be disposed of on the ground or the road.

■ Checking the electric equipment

⚠ WARNING

When a fuse blows out frequently, contact your Yanmar authorized dealer.



Check fuses for damage, wiring for poor connections or short circuits, and battery terminals for corrosion or loose fits. Take corrective action.

Take special care to check the wiring for:

- Battery
- Starter
- Alternator

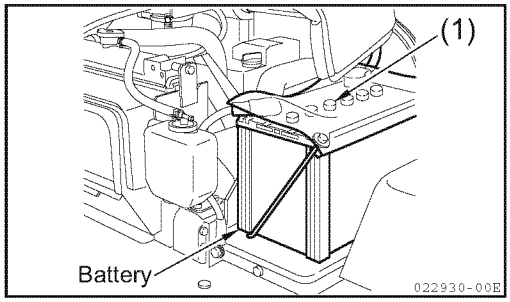
Consult your dealer to locate faults and repair.

■ Checking and replenishing the battery electrolyte

⚠ WARNING

- **The battery generates flammable gas and it can cause a fire and explosion.**
  Keep sparks or flames away from the battery.
- **Battery electrolyte is a strong acid. To avoid serious injury, do not allow the electrolyte to contact the skin or splash into the eyes.**

Follow the procedure below before operating the machine.

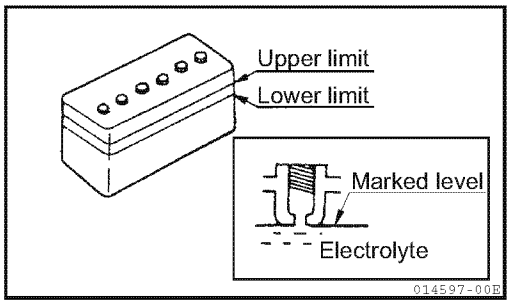


1) Open the engine hood.

2) Remove the cap (1), and add distilled water to the marked level (0.39 to 0.47 in. (10 to 12 mm) above the pole plates) if the battery electrolyte level is low.
   If any battery electrolyte is spilled, add dilute sulfuric acid.

3) If distilled water is added to one cell, add it to the other cells, as well.

4) Clean the bleeder of the battery cap and securely tighten the cap.



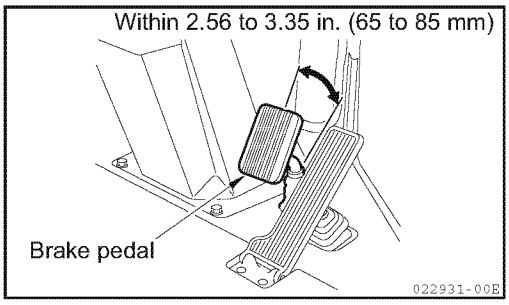
IMPORTANT

If there is a possibility of freezing temperatures during the night, do not add distilled water until ready to operate the machine the next morning, to prevent the battery from freezing.

■ Checking the brake pedal and inching pedal

Check that the pedal stroke of the pedal is 2.56 to 3.35 in. (65 to 85mm).

If the condition mentioned above is not satisfied or the inching pedal does not work well, refer to Section "26-2. Nonperiodic services".



■ Checking the tires

- **Air pressure**

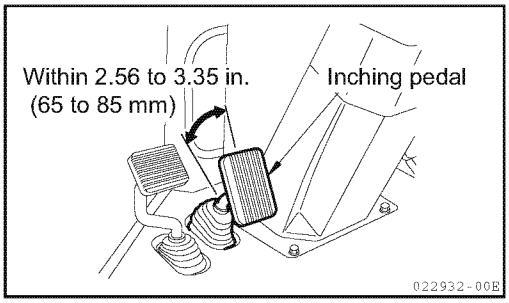
  V3-6 : 28.44 PSI (196.1 kPa)

  V4-6 : 31.28 PSI (215.8 kPa)

<Checking and adjusting air pressure>

Measure the air pressure.

Check the tires for scuffs, cracks, and nails or other metal objects that could cause damage, and take necessary action.



■ **The parking brake lock pedal works well.**

When the parking brake lock pedal is pressed down, it is normal for it to lock within 5 to 7 notches.

■ **The horn and the back buzzer sound normally.**

■ **The lamps flash normally, and they are not dirty or damaged.**

■ **The color and sound of the exhaust fumes and exhaust system are normal.**

■ **The instruments work normally.**

■ **The play of the steering wheel is adequate, and the steering wheel works normally.**

■ **The rearview mirrors are positioned in the proper directions, and they are not dirty or damaged.**

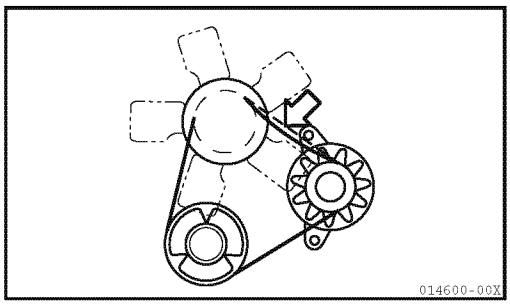
■ **The fan belt tension is adequate.**

⚠ CAUTION

Excessive fan belt tension may put excessive pressure on the bearings, causing a malfunction. Be sure to adjust the tension within specifications.

Check the fan belt tension by applying force to ft with a finger and observing the deflection. Also check for cracks and peeling.

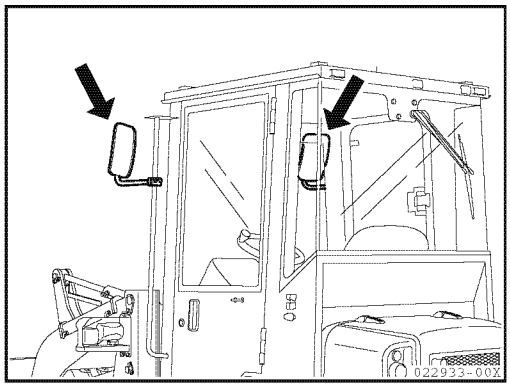
- Force applied : Approximately 22.1 lbs. (10 kg)
- Deflection : 0.39 to 0.59 in. (10 to 15 mm)



■ **The license plate is not dirty or damaged.**
(Only for licensed machines)

13-1-3. Adjusting the rearview mirrors

While seated in the operator's seat, adjust the rearview mirrors so that you can see behind you clearly.



⚠ WARNING

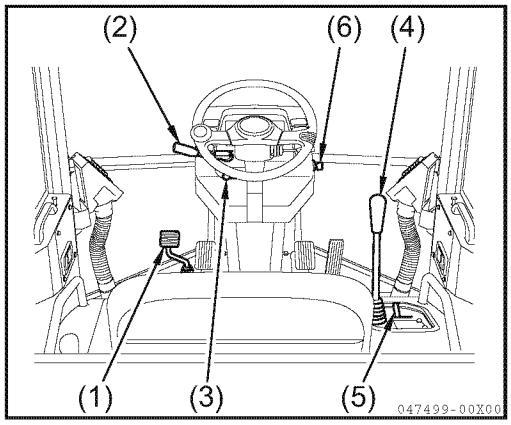
Be sure to adjust the seat slide to obtain the best operating position whenever a new operator begins work.

Adjust the seat so that the operator can easily operate the control and other levers and step on the brake pedal in good posture.

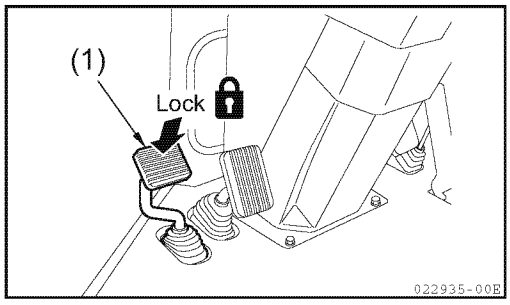
13-1-4. Operating and checking instructions before starting up the engine

⚠ WARNING

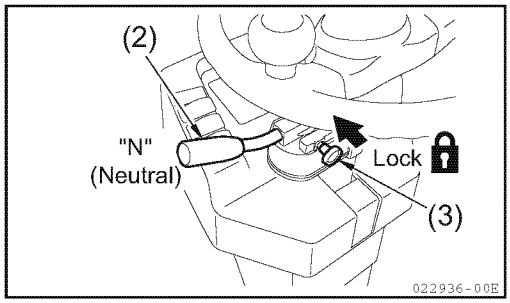
- **Accidentally operating a control lever can cause the machine to move suddenly, possibly causing a serious accident.**
  When leaving the operator's seat, be sure to place the lock levers securely in the lock position.
- **Clean any dust from the starter, alternator, and battery with a wet cloth before starting the engine.**



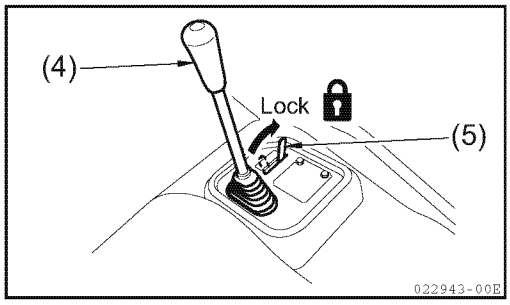
1) Check that the parking brake lock pedal (1) is in the lock position.



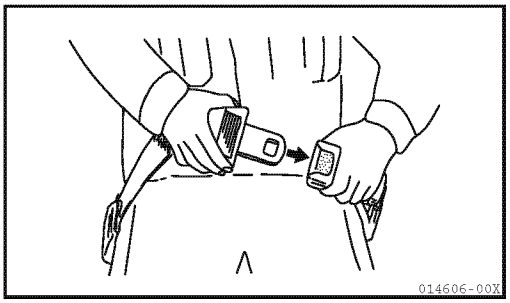
2) Make sure that the F-R change lever (2) is in the neutral position "N" and locked with the F-R change lever lock (3).
   The engine cannot be started unless the F-R change lever (2) is in the neutral position "N".



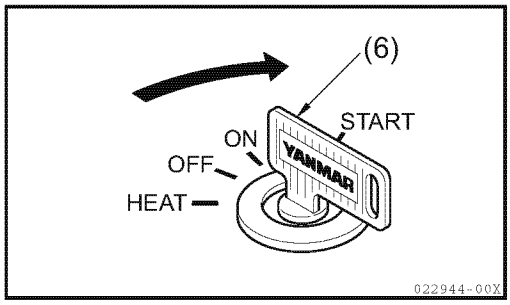
3) Make sure that the bucket is on the ground and that the control lever (4) is locked with the control lever lock (5).



4) Fasten the seatbelt snugly.



5) Insert the key (6) into the starter switch and turn it to "ON". Make sure that engine oil pressure and battery charge lamps go on.

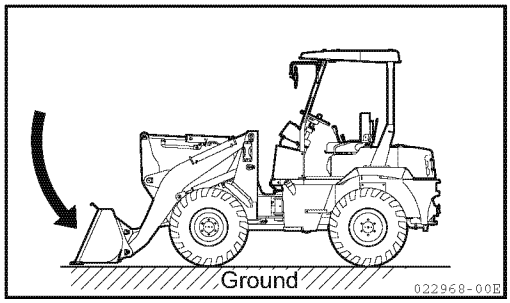


13-2. Starting up the engine

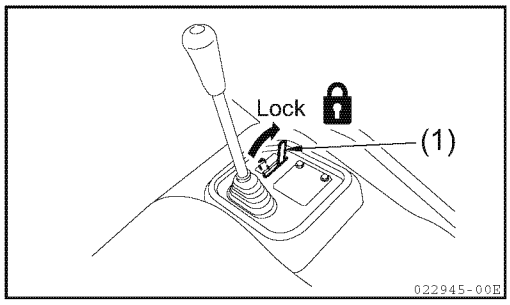
⚠ WARNING

- **First check that there are no people or obstacles around the machine.**
- **Be sure that you are seated in the operator's seat when starting the engine.**
- **When starting the engine indoors, be sure that there is adequate ventilation so that the exhaust can escape.**

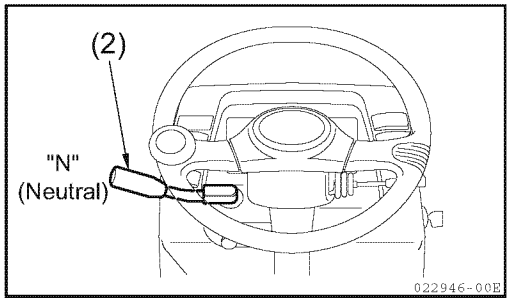
1) Place the implement on the ground.



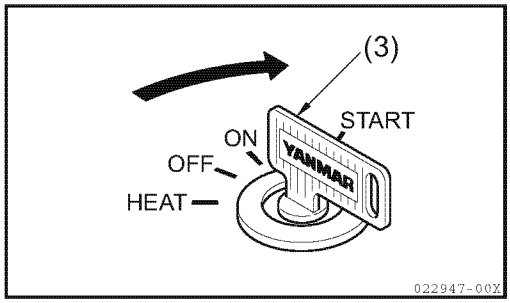
2) Set the control lever to the neutral position and lock it with the control lever lock.



3) Set the F-R change lever (2) to the neutral position "N". The engine cannot be started unless the F-R change lever (2) is in the neutral position "N".



4) Step on the inching pedal, and turn the starter switch to the "START" position to start the engine.

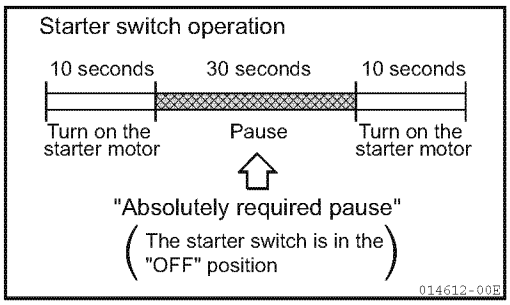


5) Release the key immediately after the engine has started.
   The key automatically returns to the "ON" position. Make sure that no abnormality is detected in the engine. If any abnormal sound is heard, stop the engine and investigate the cause.
   The pilot lamp for engine oil pressure is normally off. If it is on, a problem exists in the engine oil system or the electric circuit.
   Immediately stop the engine and investigate the cause.

IMPORTANT

To protect the starter motor and the battery:

- **Do not keep the key in the "START" position for more than 10 seconds.**
- **When you fail to start the engine, do not start the engine immediately again, but return the switch to the "OFF" position and wait for approximately 30 seconds, then try to start the engine again.**
- **Never turn the key to the "START" position while the engine is running. Keep the key in the "ON" position while the engine is running.**
- **Do not leave the starter switch in the "ON" position after the fuel is exhausted. Doing so will cause a problem in the feed pump due to operating in the absence of fuel.**



13-3. Operating and checking instructions after starting the engine

⚠ CAUTION

Be sure to engage the parking brake while warming up.

To distribute lube oil sufficiently to all bearings, warm up the machine with no load for approximately five minutes after starting the engine. Applying a load to the engine immediately after starting it may cause an engine seizure or other damage.

After warming up, perform the following checks while moving the machine slowly.

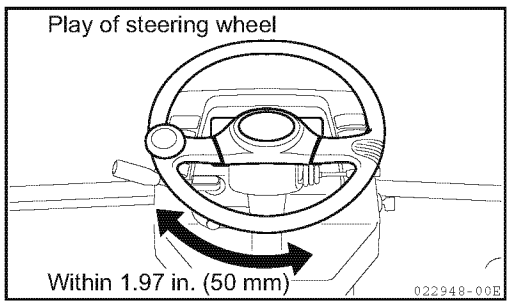
1) Check the color of the exhaust fumes, hunting of the engine revolution, and engine sounds for abnormality. If anything is abnormal, take corrective action.

2) Set the control lever lock to the "LOCK" position, and make sure that you cannot operate the implement with the control lever. If anything is abnormal, take corrective action.

3) Make sure that you can operate the implement properly with the control lever after unlocking the control lever lock. If anything is abnormal, take corrective action.

4) Check that no abnormal noise is heard from the hydraulic pump. If any abnormal noise is heard, take corrective action.

5) Check that the play of the steering wheel is 1.97 in. (50 mm) or less and that the steering wheel can be turned smoothly clockwise or counterclockwise to the maximum steering angle. If anything is abnormal, take corrective action.



6) Step on the accelerator pedal slowly until it reaches the stopper to check that the engine speed increases smoothly up to the maximum. Release the accelerator pedal to check that the pedal returns to the neutral position and the engine speed decreases to the idling speed. If anything is abnormal, take corrective action.

Ask your dealer to repair any abnormalities found in the steps 1) to 6) above.

13-4. Traveling

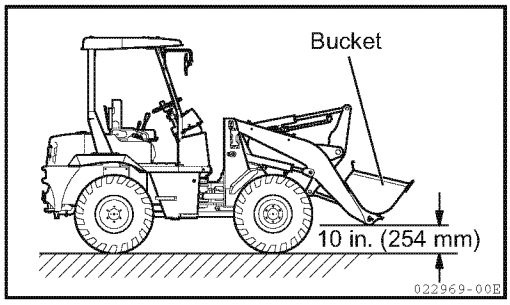
⚠ WARNING

- Make sure that no persons are on or near the machine and sound a signal before operating the machine.
  Clear all people from the working area.
  Because there is a blind area behind the machine, be careful when traveling in reverse.
- To start driving on a slope, slowly step on the accelerator pedal.
- Do not operate the lift arm and the bucket when driving. Otherwise, the machine may vibrate violently, causing mechanical problems or the machine may roll over.
- Do not travel transversely on a slope as the machine may skid or roll over.
- Do not change the direction of the machine on a slope, as it may cause the machine to skid or roll over.

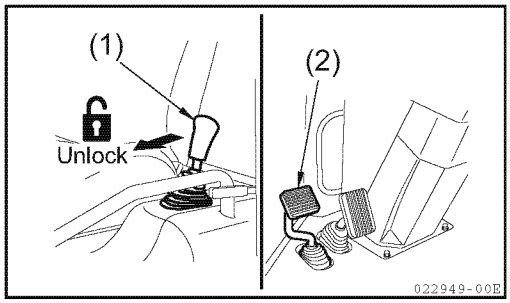
⚠ WARNING

- When traveling on rough ground, select the most level surface available.
  Do not change direction abruptly.
- Avoid obstacles by driving around them.
  Driving over obstacles may cause the machine to change course unexpectedly, or to roll over.
- Do not travel near a cliff or on the shoulder of a road. If the ground crumbles because of the weight and vibration of the machine, the machine could roll over or fall down.

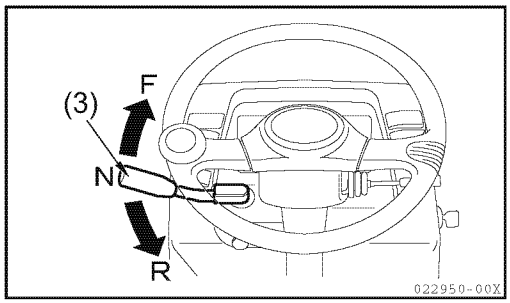
1) Tilt the bucket backward, and raise the lift arm about 10 in. (254 mm) from the ground.



2) Move the parking brake lock release lever (1) to the "Unlock" position and release the parking brake lock pedal (2).



3) Set F-R change lever (3) to the "F" or "R" position, and lock the control lever for safety.
Step on the accelerator pedal slowly to start the machine.



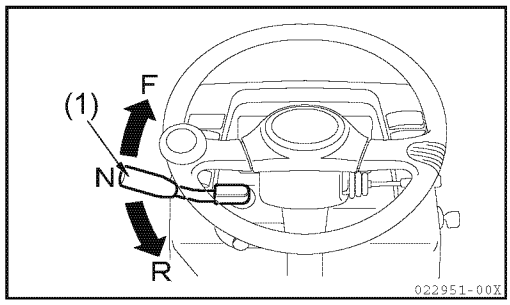
13-5. Changing between forward and reverse

⚠ WARNING

- **Make sure that it is safe before changing direction.**
  Because there is a blind spot behind the machine, be careful when traveling in reverse.
- **Except in an emergency, avoid changing the direction between forward and reverse, shifting from forward or reverse to neutral, or braking abruptly when traveling at high speed.**

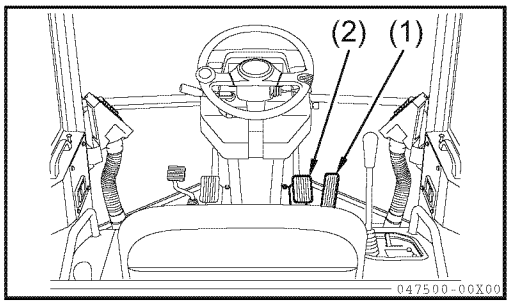
IMPORTANT
For safety and to reduce shock, slow down the speed before changing between forward and reverse.

Set the F-R change lever (1) to the desired position.

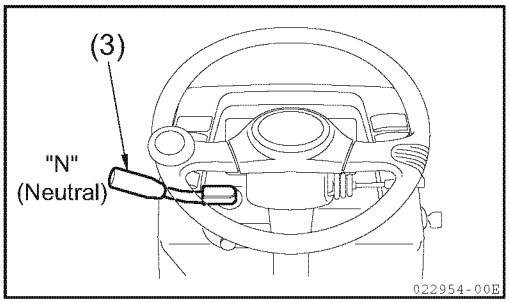


13-6. Stopping the machine

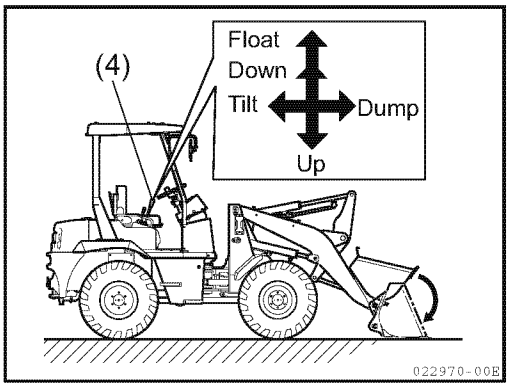
1) Release the accelerator pedal (1) and step on the brake pedal (2) slowly to stop the machine.



2) Shift the F-R change lever (3) to the "Neutral" position.



3) Lower the lift arm by shifting the control lever (4) to the "Down" position and slowly place the bucket on the ground.



4) Apply the parking brake.

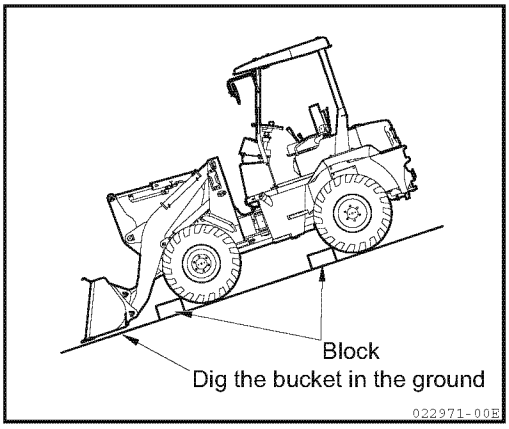
5) Idle the engine for about 5 minutes to cool the heated parts down gradually.

6) Return the starter switch to the "OFF" position to stop the engine, and remove the key.

13-7. Parking the machine

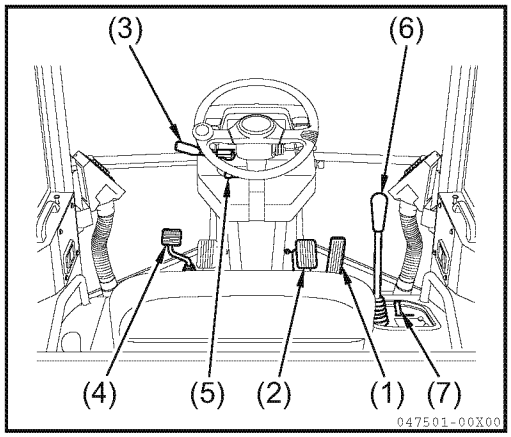
⚠ WARNING

- **Do not stop the machine suddenly, but try to stop with a safety margin.**
- **Do not park on a slope.**
  If it is unavoidable to park on a slope, block the wheels with solid pieces of wood, and dig the bucket into the ground.
- **Do not touch the control levers accidentally. Otherwise, the implement or the machine may move unexpectedly, causing a serious accident.**
  When leaving the operator's seat, be sure to place the lock levers securely in the lock position and remove the starter switch key.
- **Because the machine is equipped with HST, the wheels are not locked when the engine has stopped and it could start to move when parked on an incline. Be sure to apply the parking brake and block the tires, if the ground is not level.**

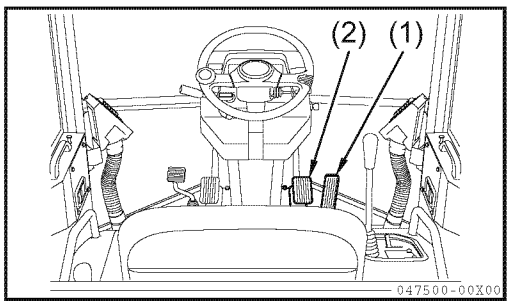


IMPORTANT

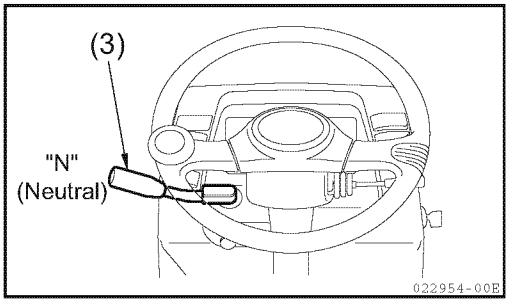
Do not brake with the parking brake lock pedal while running the machine, except in an emergency. Apply the parking brake after the machine has stopped.



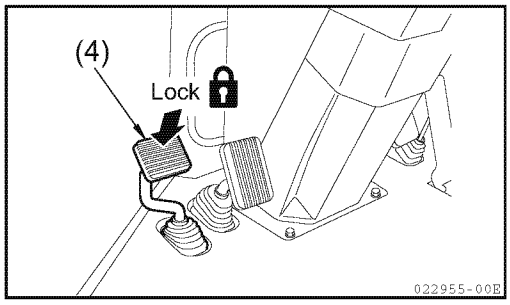
1) Release the accelerator pedal (1) and step on the brake pedal (2) to stop the machine.



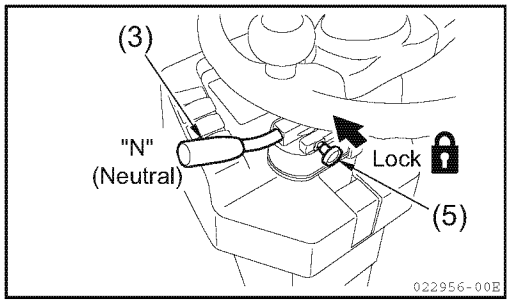
2) Shift the F-R change lever (3) to the "Neutral" position.



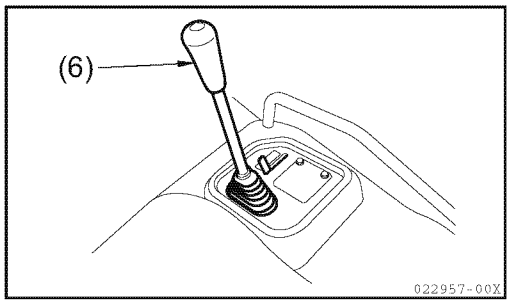
3) Step on the parking brake lock pedal (4) to apply the parking brake.



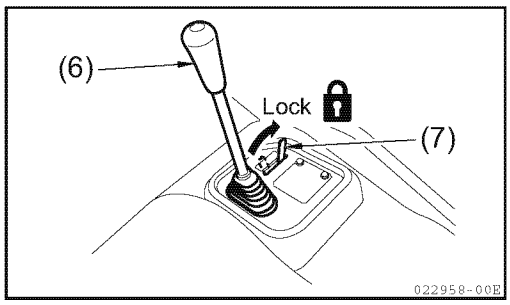
4) Apply the F-R change lever lock (5) to the F-R change lever (3).



5) Operate the control lever (6) to place the bucket slowly on the ground.



6) Apply the control lever lock (7) to lock the control lever (6).



13-8. Steering

⚠ CAUTION

If turns are made at high speed, the machine may roll over. Be sure to reduce the speed before turning.

When changing the machine direction, slow down the engine rotation speed so that turns are made slowly and smoothly.

13-9. Running the machine on slopes

13-9-1. Running the machine on slopes

- When traveling on a downward slope, reduce the engine revolutions as much as possible.
- Do not travel on slopes of 20 degrees or more, as the machine may roll over.

13-9-2. Stopping on downward slopes

When stopping the machine on a downward slope, release the accelerator pedal and press down the brake pedal just before stopping the machine.

Before leaving the machine, follow the procedures described in Section "13-7. Parking the machine".

13-9-3. Starting the machine on upward slopes

⚠ CAUTION

- **When starting on an upward slope, increase the engine revolutions slowly. It is very dangerous to start abruptly because the front wheels could jump and the machine could roll over.**
- **When traveling on a slope, do not change direction abruptly, and never operate the lift arm and bucket.**

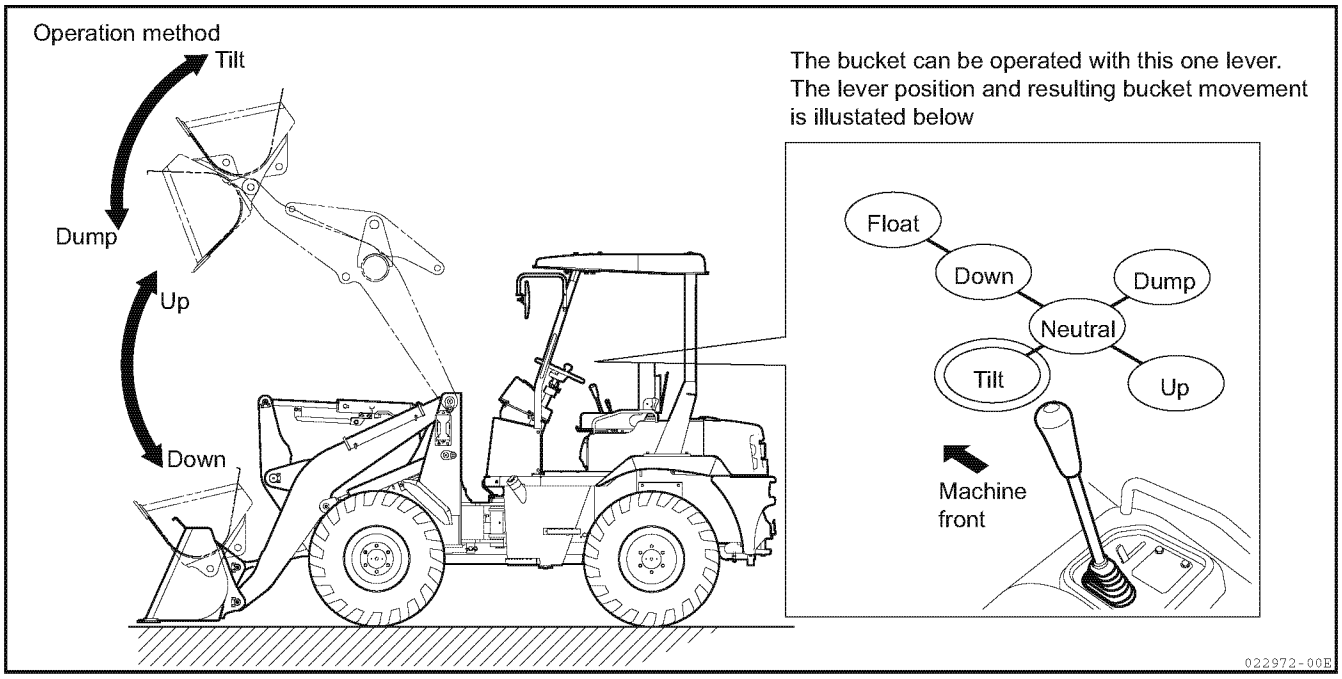
13-10. Operation the implement

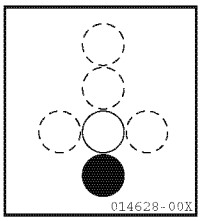
⚠ WARNING

- The implement is only suitable for digging, loading and leveling ground. If you have to suspend a load, consult your dealer.
- Do not carry anyone on the implement. This could cause an accident when you raise, lower, or operate the implement.
- Do not ride with anyone in the machine. This may cause an operation mistake or a fall accident.
- Avoid work in which the rear of the machine leaps up from the ground. Sudden leaping up of the rear of the machine may cause the machine to roll over or roll forward.
- Do not operate the machine roughly. Rough operation may cause bodily injury to people nearby due to scattered debris.
- Do not dig into the ground by using the reaction force of the machine.
  The reaction may cause the machine to roll over backwards.
- Do not operate the machine unless you are sitting in the operator's seat. Otherwise you could be injured by the moving parts of the implement.
- Operation while inattentive or daydreaming is dangerous.
- Do not carry more than the allowable load, and do not operate the machine aggressively, to avoid bodily injury.
- Do not load on one side only during operation. It may cause the machine to sustain damage or to roll over if it is being driven on unlevel ground.
- Never dig the ground or load or unload unless the front and rear frames are both straight.
- Never plunge the bucket into ground with great force, and never operate the bucket abruptly.
  The shock may cause the machine to be damaged or cause the operator to fall off.
- Do not travel forward with the load in a dumping position. Otherwise the machine may vibrate violently causing the machine to be damaged, or cause the operator to fall off.

⚠ CAUTION

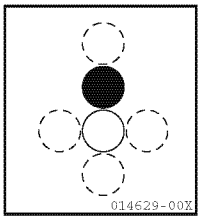
- Position the machine on a stable ground before beginning work. Working on a slope or the shoulder of a road can cause the machine to slip or roll over.
- Because there is a blind area behind the machine, make sure that no one is behind the machine before traveling in reverse.





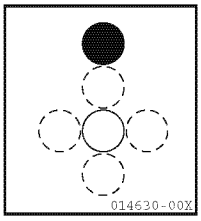
(UP)

The bucket goes upward. When the lever is released, the lever returns to the "NEUTRAL" position automatically, and the bucket will remain positioned.



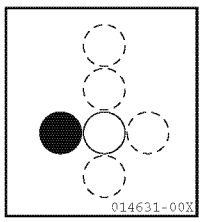
(DOWN)

The bucket comes downward. When the lever is released, the lever returns to the "NEUTRAL" position automatically, and the bucket will remain positioned.



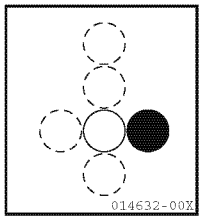
(FLOAT)

The bucket comes down to the ground by gravity and stops.
If this mode is used for operation on concrete-covered ground or in a land-leveling operation, the bucket will follow the contour of the ground without lifting the front wheels, so the operation can be performed efficiently.



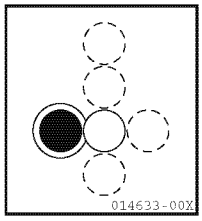
(TILT) backwards

The bucket is tilted backwards. When the lever is released, the lever returns to the "NEUTRAL" position automatically, and the bucket will remain positioned.



(DUMP) forward

The bucket is dumped forward. When the lever is released, the lever returns to the "NEUTRAL" position automatically, and the bucket will remain positioned.



(AUTO-LEVELER, TILT)

Shift the lever to tilt position to hold the bucket from dump to tilt; stops on the ground at level position, at the same time, the lever returns to the "NEUTRAL" position automatically.

13-11. Operations using the wheel loader

You can greatly widen the range of work described here by using optional attachments.

13-11-1. Digging

⚠ WARNING

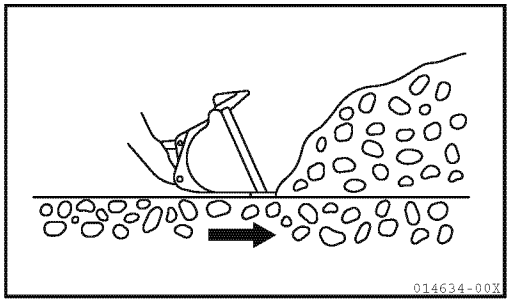
Never dig the ground or scoop up the earth unless the front and rear frames are both straight.

IMPORTANT

Tire slip shortens the life of the tire. Avoid skidding.

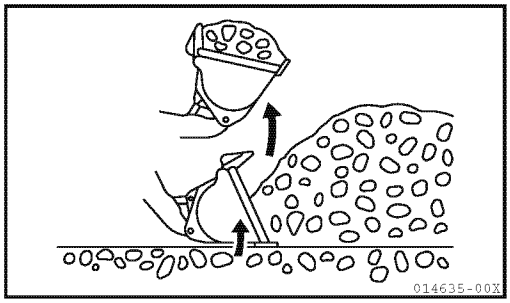
- When loading from the earth and sand piled on the ground, scoop up them while moving forward. If the tires start to slip due to too large load, raise the bucket angle to reduce the load.

1) Insert the bucket into the pile or ground level, while driving the machine forward.

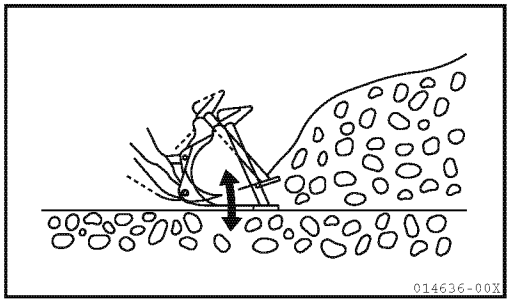


2) After the bucket has been inserted sufficiently, set the control lever to the lift arm "UP" position while driving the machine forward. Set the control lever to the bucket "TILT" position in order to load up it fully.

   Put the load in the center of the bucket. Do not load up the bucket on one side only.

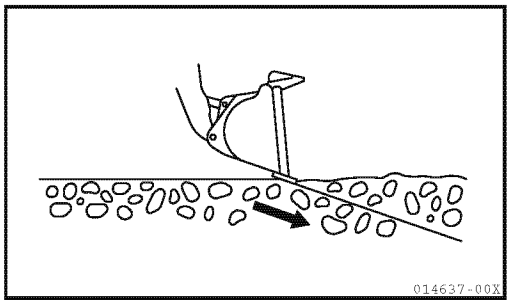


3) When scooping up the earth, move the control lever right and left to move the bucket teeth up and down.

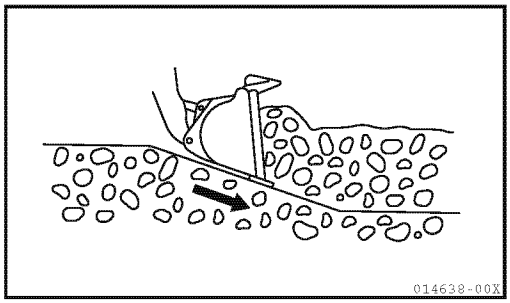


- As illustrated below, dig into the ground or scoop loads on a level ground with the bucket teeth lowered a little, while moving forward. Do not load up the bucket on one side only.

1) Position the bucket teeth slightly downwards.

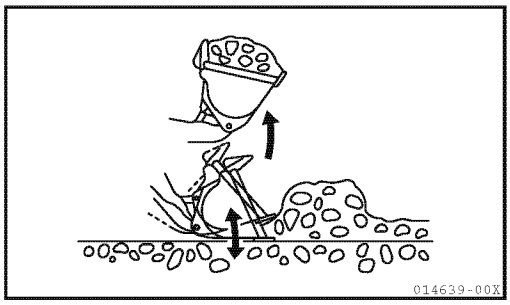


2) Push the control lever forward slightly while driving the machine forward, to dig into the ground little by little, starting from the surface.

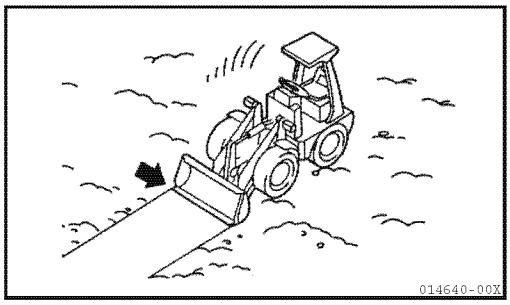


3) Move the machine forward while adjusting the digging depth with the control lever.

   When digging the ground with the bucket, avoid applying the digging force to the bucket on one side only.



13-11-2. Leveling



⚠ WARNING

If you level the ground while moving the machine in reverse, do not tilt the bucket more than 20 degrees.

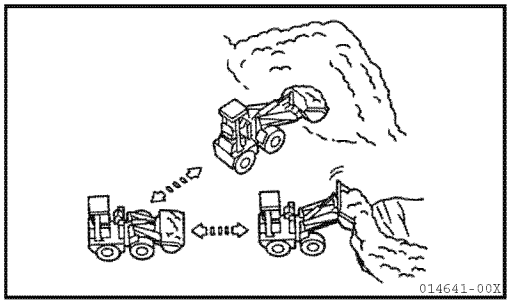
1) Scoop up a load in the bucket, and dump the load little by little while driving the machine in reverse, to scatter the load.

2) After dumping the bucket, let the bucket's cutting edges touch the surface of the ground, and drive the machine in reverse while dragging the bucket to level the ground.

3) Put another load in the bucket, set the lift arm to "FLOAT" with the bucket horizontal, and drive the machine in reverse to finish leveling the ground.

   Be sure to level the ground while driving the machine in reverse.

13-11-3. Load and carry



⚠ WARNING

When carrying a load, run the machine while keeping the bucket low so as to keep the center of gravity low. This procedure is to be used when performing a continuous series of scooping, carrying, and dumping operations using the wheel loader.

Be sure to maintain level carrying course.

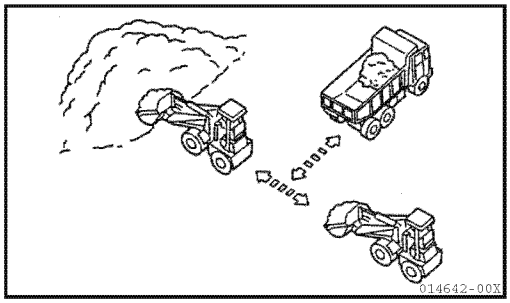
13-11-4. Loading

Select an efficient method which minimizes the steering and traveling distance burdens, considering the terrain.

IMPORTANT

- **Tire slip shortens the life of the tire. Avoid skidding.**
- **Avoid excessive swinging of the bucket.**

■ **Cross-drive loading**



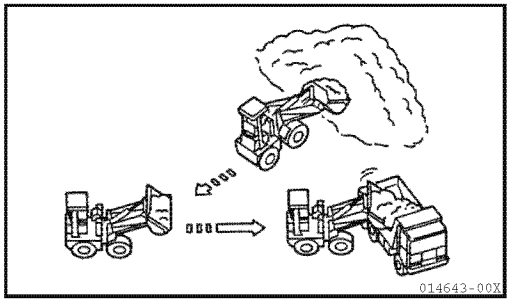
⚠ WARNING

- **Always level the work site. If you must raise the lift arm with a load in the bucket, avoid dangerous maneuvers such as high speed turns and sudden braking.**
- **Do not plunge into a pile of earth or rocks at high speed. These actions could be dangerous.**

Insert the bucket into the pile at ground level, perpendicular to the wheel loader.

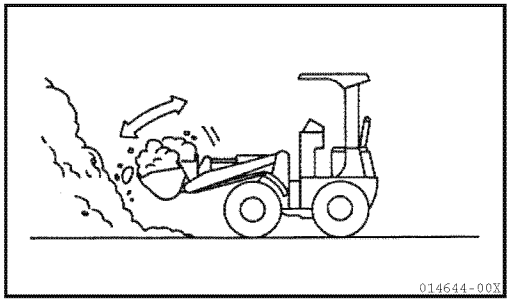
After scooping up the earth, back up the wheel loader and then back the dump truck in between the wheel loader and the pile. Dump the load into the truck, and pull the truck forward. This operation minimizes the cycle time required for loading.

■ **V-shape loading**



Park the truck at an angle of approximately 60 degrees to the direction in which the wheel loader scoops up the earth. After scooping up the earth, reverse the wheel loader, steer the wheel loader so that it will face the truck at a right angle, and move the wheel loader to dump the earth into the truck. To increase efficiency, reduce the steering angle as much as possible.

When you raise the lift arm to the maximum height with the bucket full, shake the bucket on the ground first to stabilize the load and then raise the lift arm carefully so that the load will not fall backwards.

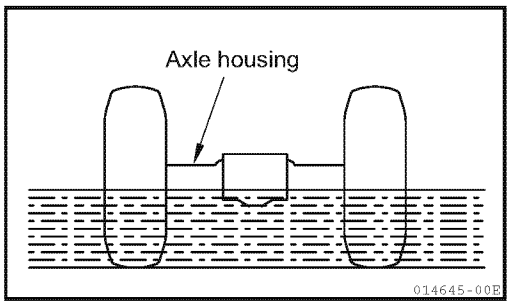


- **Precautions for raking up**

When raking up the earth pile, be careful that the rear of the machine will not touch the ground.

13-12. Precautions for working

13-12-1. Allowable water depth



Do not drive the machine into the water or a muddy place deeper than the maximum allowable water depth which is no higher than the bottom of the axle housing.
After completing operation, wash the machine and apply grease to the parts which have been submerged in water.

13-12-2. Brake failure

If the machine does not stop even if you step on the brake pedal, apply the parking brake.

13-12-3. Precautions for going up and down a slope

⚠ WARNING

When parking the machine on a slope, plunge the teeth of the bucket into the ground, step on the parking brake lock pedal to lock it, and block the tires.

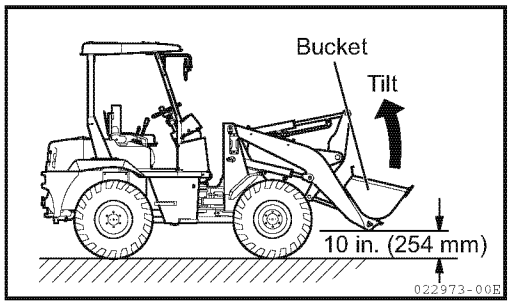
■ **Lower the center of gravity when steering**

When steering on a slope, lower the implement to maintain a low center of gravity.

■ **Setting up to go up or down a slope**

⚠ WARNING

Driving the machine on a slope with the bucket high can cause the machine to roll over.



Drive the machine with the bucket fully tilted and the bottom of the bucket approximately 10 in. (254 mm) above the ground.

■ **Going up a slope**

⚠ WARNING

When driving the machine on a slope, do not change the direction of the machine suddenly.
Do not operate the lift arm or the bucket while driving the machine on a slope.

Slowly step on the accelerator pedal while releasing the parking brake to start driving the machine.
Sudden starting of the machine may cause the front wheels to leap up dangerously.

■ **Going down a slope**

When you go down a slope, too frequent use of the foot brake may cause the brake to be damaged due to overheating. Going down on a slope, be sure to apply the engine brake.

■ **Engine stall**

If the engine stalls on a slope, immediately apply the parking brake and place the implement down on the ground to stop the machine. Set the F-R change lever to the "N" position and step on the inching pedal to restart the machine.

13-12-4. Precautions for traveling

See your Yanmar dealer authorized and obey all local traffic laws and restrictions when driving on a public road.

⚠ WARNING

- **You are not permitted to drive the machine on a public road, unless the machine is equipped with safety devices that include head lights, turn signals, rear-view mirrors, rear reflectors, and a horn.**
- **When running the machine, pay careful attention to other vehicles and people. (Observe all traffic laws.)**
- **Do not run the machine with the bucket loaded. This is dangerous because braking or turning can cause the machine to roll over.**
- **You may not run the machine on a public road while towing a trailer.**

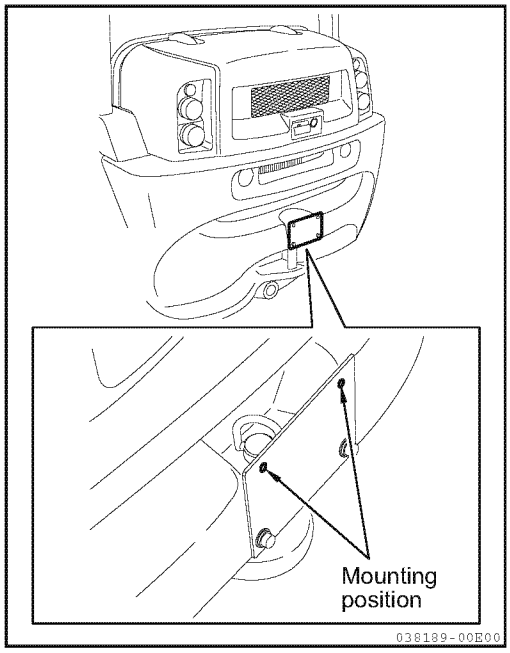
Avoid long-distance runs at high speed. Such running greatly increases heat generation in the tires, and may shorten tire life. If traveling on public roads, is unavoidable, always observe the following:

- **Procedure**

When traveling on a public road, be sure that you obtain a license plate, where required.

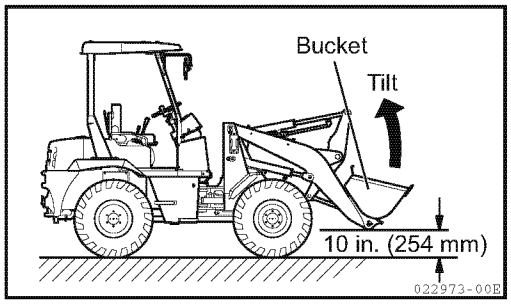
When running the machine on a public road, be sure to take along your driver's license, observe all traffic laws, and keep safety in mind.

Mount a license plate on the rear of the machine.



- **Setup for traveling on a public road**

When traveling on a public road, fully tilt the bucket and keep the bottom of the bucket approximately 10 in. (254 mm) above the ground.



- Perform start-up checks before driving the machine.
- The adequate tire air pressure is:
  V3-6 : 28.44 PSI (196.1 kPa)
  V4-6 : 31.28 PSI (215.8 kPa)
- Check the air pressure of the tires before driving, when the tires are not hot.
- Stop for 30 minutes every one hour driving, check the tires and other parts for any abnormality, as well as the engine oil level, and cooling water level.
- Run the machine with the bucket empty.
- Do not run the machine with calcium chloride or dry ballast in the tires.

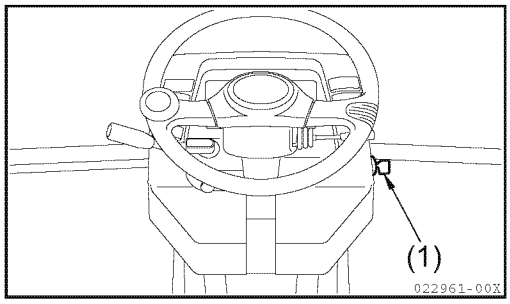
13-13. Inspection requirements after completing operation

Check the engine cooling water temperature, the engine oil pressure, and the residual quantity of the fuel with the applicable meters or lamps.

13-14. Stopping the engine

IMPORTANT

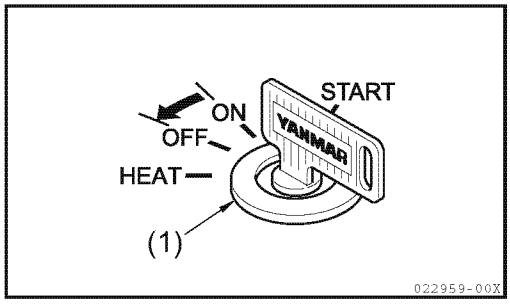
- **Stopping the engine immediately after running at high speed may shorten the engine life. Do not stop the engine suddenly except in case of emergency.**
- **If the engine is overheated, do not stop the engine immediately. Gradually lower the engine temperature by running the engine at medium rotational speed before stopping the engine.**



1) Idle the engine for approximately five minutes with no load.
   (The engine temperature gradually lowers.)

2) To stop the engine, set the key of the starter switch (1) to the "OFF" position.

3) Take the key out of the starter switch (1).



13-15. Inspection requirements after stopping the engine

1) Check the oil and water systems for leaks, and check the implement, the machine, and the undercarriage while walking around them.
   If there are any oil or water leaks or any abnormalities, take corrective action.

2) Fully refill the fuel tank.

3) Check that there are no combustibles in the engine compartment, to prevent fires.

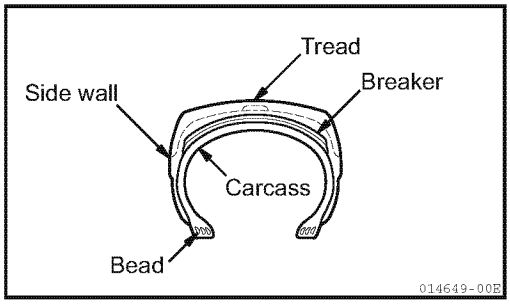
4) Remove mud adhering to the undercarriage.

13-16. Handling the tires

13-16-1. Precautions for handling the tires

Damaged tires as described below must be replaced with new ones for safety's sake.

- Tires with the bead wires broken, bent, or heavily deformed.
- Excessively worn tires with the carcass ply (except for the breaker) exposed across more than 1/4 of the circumference.
- Tires with the carcass damaged across more than 1/3 of the tire width.
- Tires with ply separation.
- Tires with radial cracks reaching the carcass.
- Tires which can no longer be used due to deformation or cracks.



13-16-2. Air pressure of the tires

Too low air pressure in a tire will tend to cause overloading, and too high air pressure can cause tire damage or tire failure. Adjust the air pressure according to the specifications.

Check the tires for scuffs, cracks and nails or other metal objects that could cause damage, and check for abnormal wear, as well as the air pressure.

Always clear stones away from the working site and maintain it clean to prolong the tire life.

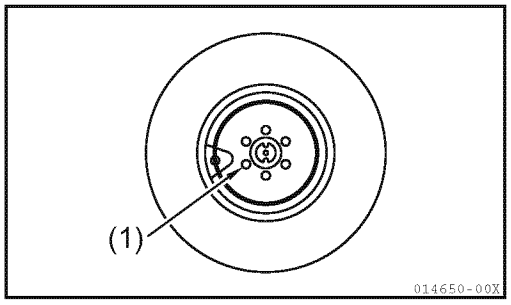
- Air pressure
  V3-6 : 28.44 PSI (196.1 kPa)
  V4-6 : 31.28 PSI (215.8 kPa)

⚠ CAUTION

When pumping up tires, use a clip-on chuck and extension hose long enough to allow you to stand on one side of, not in front of or over the tire assembly.

13-16-3. Replacing the tire

■ Removing the tire



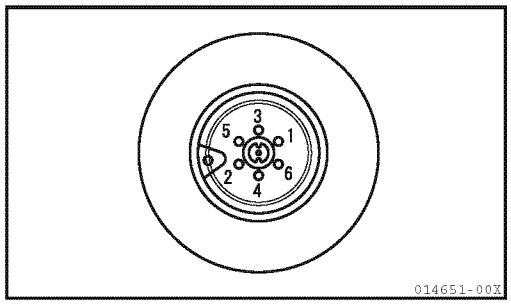
1) Place the implement on the ground and apply the parking brake.

2) Loosen all the wheel hub bolts (1) one turn.

3) Hold the machine up.

4) Remove the wheel bolts (1) to replace the tire.

■ Installing the tire



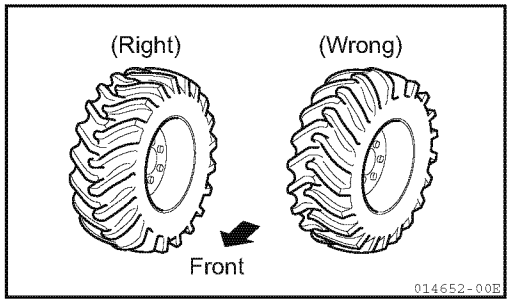
1) Clean the area where the hub comes in.

2) Lightly tighten the wheel hub bolts in the order illustrated right with the tire held up.

3) Temporarily tighten the wheel hub bolts, place the machine back down on the ground, and fully tighten the wheel hub bolts to the specified torque.

   Tightening torque :
   296.6 to 325.5 ft•lbf. (401.8 to 441.0 N•m)

■ Installing direction of the tire



As the tire tread pattern is a lug type (which can provide large towing force and buoyancy), be careful about the direction of the tread pattern when installing the tire.

⚠ CAUTION

Do not attempt to mount a tire if you do not have the proper equipment and experience to perform the job. Contact your dealer.

14. Transportation

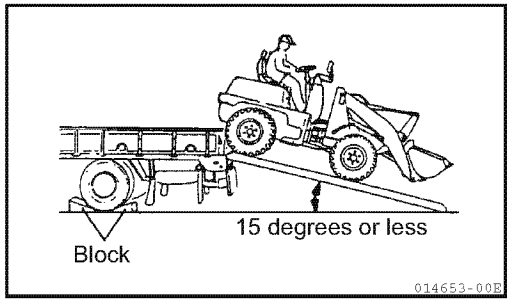
14-1. Loading and unloading the machine

⚠ WARNING

- **Use ramp plates of adequate strength having hooks. Check to see that the ramp plates are wide, long, and thick enough to safely sustain the machine so that you can load or unload safely. To prevent the ramp plates from bending too much, support them with blocks.**
- **Load or unload the machine on level, solid ground far away from the shoulder of the road.**
- **Remove mud, grease, and other slippery deposits from the tires, and grease, oil, and ice deposits from the ramp plates to prevent the machine from skidding.**
- **Never change the travel direction on the ramp plates. If you need to change the travel direction, go back down on the ramp plates, then do this.**
- **Load or unload the machine at a low engine speed.**
- **Assign an assistant to guide the movement of the machine, and follow his signals to load or unload the machine carefully.**

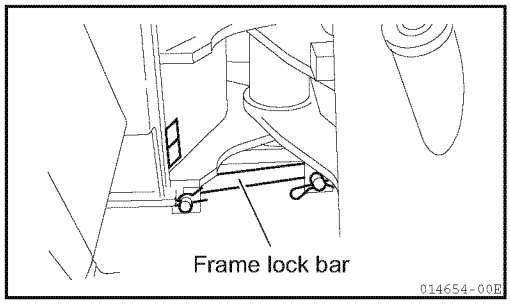
To load or unload the machine, use the following procedures:

1) Firmly brake the truck and apply wheel stoppers.
   Securely install the ramp plates on the bed of the truck in a position where the center of the truck aligns with the center of the machine. Make sure that the left and right ramp plates are at the same level.
   The ramp plates should be set at an angle of less than 15 degrees.



2) Slowly drive the machine toward the ramp plates.
Move the machine in reverse to load it onto the truck. To unload it from the truck, move it forward.

- Drive the machine with the bucket lowered near the ground (approximately 10 in. (254 mm) above the ground).



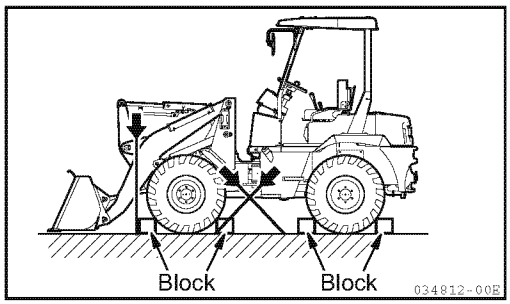
3) After loading the machine onto the truck, install the frame lock bar.

14-2. Precautions for loading the machine

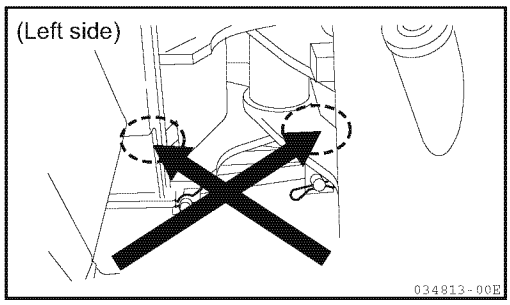
After loading the machine in the proper position on the truck, secure the machine as follows:

1) Slowly lower the implement on the bed of the truck.

2) Before transporting the machine, be sure to install the frame lock bar.

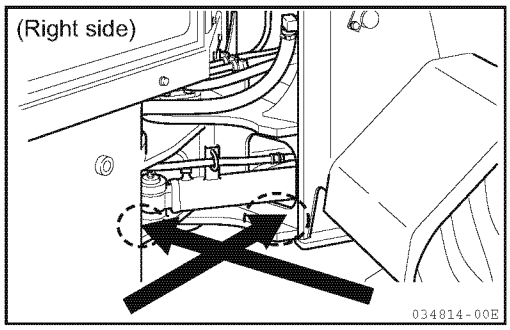


3) Be sure to lock the control lever with the control lever lock.
Because the machine is equipped with HST, setting the F-R change lever to the neutral position cannot block the wheels with the engine stopped.



4) Stop the engine with the starter switch in "OFF" position.
Take out the starter switch key.

5) Apply the parking brake, place blocks in the front and rear of the tires, and secure the machine frame with a chain or a wire rope from the underside of the frame, and secure the machine with a chain or a wire rope so that the machine will not move during transportation.



IMPORTANT

When securing the machine frame with a chain or a wire rope, do not place a chain or a wire rope over or against hydraulic lines, hoses or wiring harnesses.

14-3. Precautions for transporting the machine

⚠ WARNING

Select a route based on the road width and clearance, and the height and weight of the machine.

For safer transportation, comply with all local regulations and laws.

15. Care and Service in Cold Weather

15-1. Preparing for cold weather

In cold weather, you may have difficulty in starting the engine or the cooling water may freeze.
So take measures as follows:

15-1-1. Fuel and lube oil

Use low viscosity fuel and lube oil. For the specified viscosities, refer to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".

15-1-2. Cooling water

⚠ WARNING

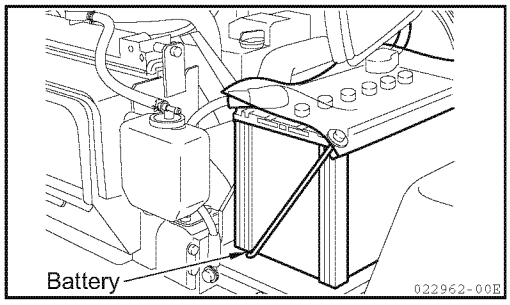
Anti-freeze is flammable. When handling anti-freeze, keep away from any sources of ignition.

IMPORTANT
Never use an anti-freeze containing methanol, ethanol, or propanol.

For the timing of cooling water change and the mixing ratio of the anti-freeze, refer to Section "26-2. Nonperiodic services".

Note :
Because a YANMAR genuine long-life coolant (LLC) is added to the cooling water, you need not change it until the temperature falls below -31°F (-35°C).
If the temperature falls below -31°F (-35°C), refer to Section "26-2. Nonperiodic services" to control the density of the cooling water.

15-1-3. Battery



⚠ WARNING

- **The battery generates flammable gas and it can cause a fire and an explosion. Keep sparks or flames away from the battery.**
- **Battery electrolyte is strong acid. To avoid serious injury, do not allow the electrolyte to contact skin or splash into eyes.**
- **If the electrolyte contacts your skin or gets in your eyes, flush immediately with large amounts of water, and obtain medical treatment at once.**

Battery performance is reduced as the temperature goes down. When the battery charging rate is low, the battery electrolyte will easily freeze. Keep the charging rate close to 100% (full charging) and keep the battery warm for easy start the next day.

Note :

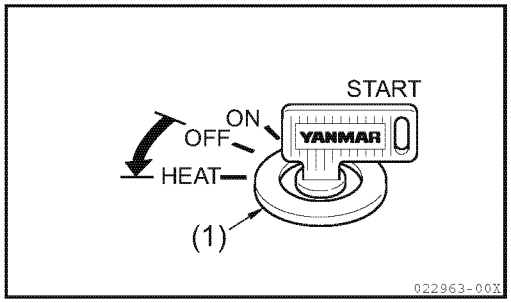
Measure the specific gravity of the electrolyte to determine the charging rate using the conversion table given below.

Electrolyte temperature / Charging rate	68°F (20°C)	32°F (0°C)	14°F (-10°C)	-4°F (-20°C)
100%	1.28	1.29	1.30	1.31
90%	1.26	1.27	1.28	1.29
80%	1.24	1.25	1.26	1.27
75%	1.23	1.24	1.25	1.26

Add distilled water immediately before starting up the machine if necessary because the battery electrolyte can freeze over night in cold weather.

15-2. Cold weather start

When the temperature drops below 23°F (-5°C), engine starting is made difficult. Start the engine according to the following instructions.



1) Set the F-R change lever to the "N" position, and step on the inching pedal.

2) Step on the accelerator pedal.

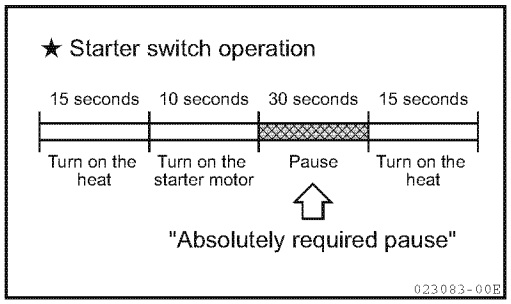
3) Set the starter switch to the "HEAT" position, and send an electric current for about 10 to 15 seconds to warm the intake air. At this time, the glow pilot lamp goes on.

4) After the lamp goes out, turn the starter switch to the "START" position to start the engine.

5) After the engine has started, release the key immediately.

IMPORTANT

Never send an electric current to the starter motor for more than 10 seconds at a time. If the engine fails to start, return the starter switch to the "OFF" position. Wait for about 30 seconds to protect the starter motor and battery, then try again.



15-3. Precautions after a day's work

To prevent the machine from getting stuck in the morning due to frozen deposits on the tires, be sure to observe the following precautions.

- Remove mud or water adhering to the machine. If any mud or water droplets adhering to the hydraulic cylinder rods get into the seals, the seals could be damaged.

- Park the machine on solid, dry ground.
  If no solid, dry ground is available, lay plates on the ground and park the machine on the plates to prevent the tires from sticking to the ground.

- Drain the water accumulated in the fuel system by turning on the drain cock, to prevent freezing.

- As battery performance is reduced in low temperatures, cover the battery or move it to a warm place, and reinstall it in the machine on the next morning.
  If the level of the battery electrolyte is low, add distilled water. To prevent the battery performance down in cold weather, cover the battery to keep it warm or remove it from the machine and keep it in a warm place. Install the battery in the machine just before starting the operation.

15-4. After cold weather ends

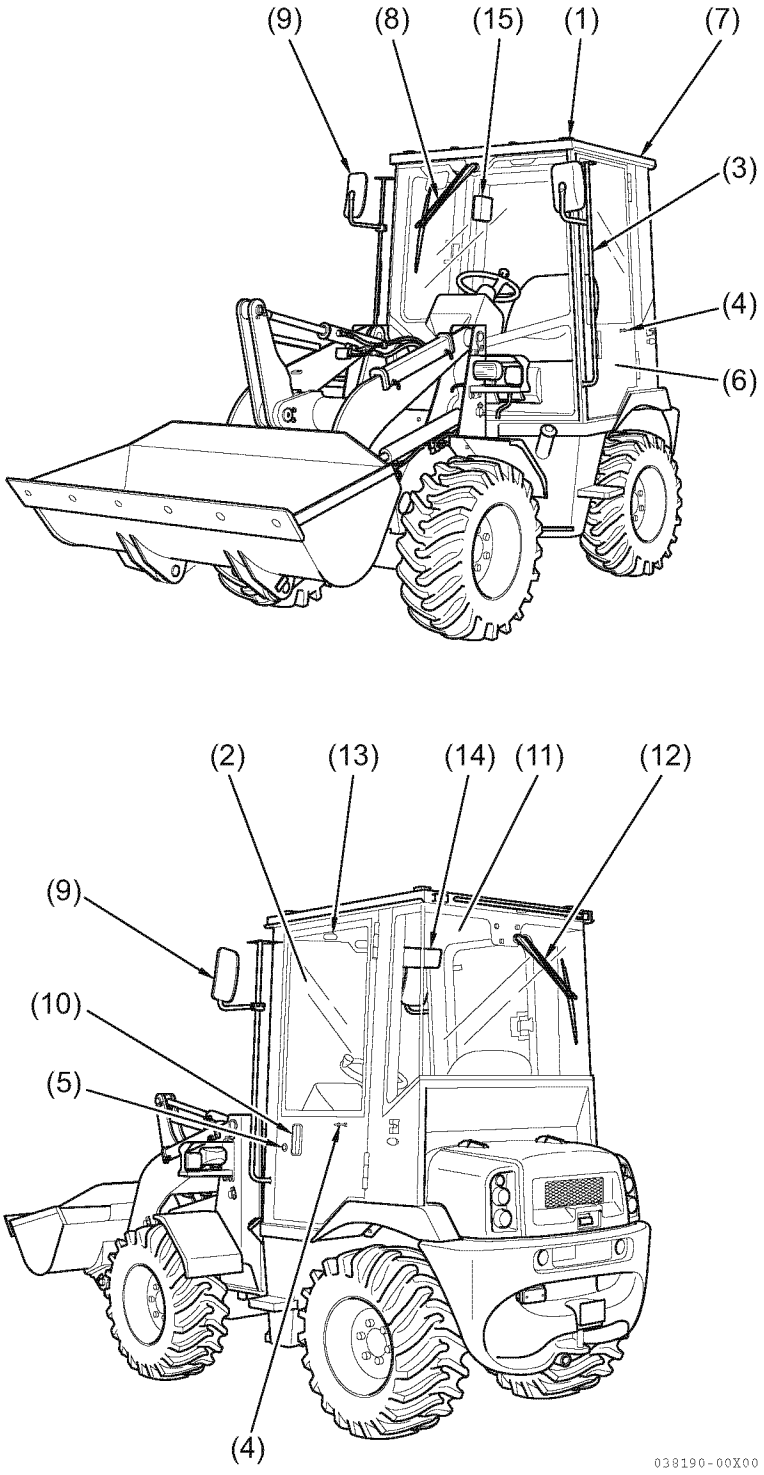
When the temperature rises, do the following:

- Replace the lube oil and fuel with ones of the specified viscosities according to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".

- If you have added an AF-PT anti-freeze (for one winter season only), fully drain the cooling system, flush the inside of the cooling system well, and fill the cooling water tank with tap water.

16. Handling the Cabin

16-1. Overview of the cabin



No.	Parts
1	Hook
2	Side window
3	Grip
4	Striker
5	Key (Right, Left)
6	Side door (Right, Left)
7	Cabin body
8	Front wiper
9	Mirror
10	Outer handle
11	Rear window
12	Rear wiper
13	Room lamp
14	Room mirror
15	Radio (Optional)

16-2. Handling the devices in the cabin

⚠ WARNING

- **When you work with the side door open, securely latch the side door. If unlatched, the door may close suddenly due to shock, causing your hand to be caught.**
- **Make sure that no other person is nearly before opening or closing the rear window. Otherwise, the door may bump the person causing bodily injury.**
- **Do not drive the machine or work with the rear window open.**
  Leaving the rear window open may cause the hinges to be damaged due to vibration or shock.
- **Do not allow any person other than the operator to enter the cabin.**

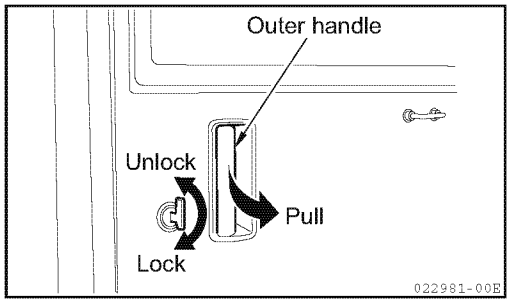
16-2-1. Opening or closing the side door

■ From outside

1) Turn the starter switch key to unlock the side door.

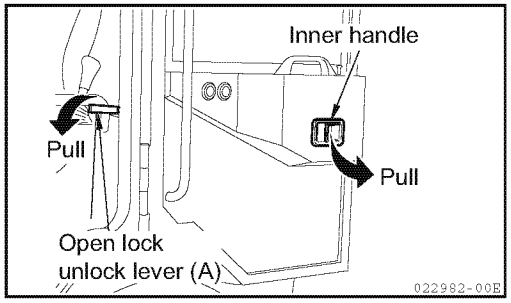
2) Pull the outdoor handle to open the side door.

3) Close the side door and turn the key to lock the door.



IMPORTANT

When the side door is locked, if you forcibly open it with the outer handle it will be damaged.



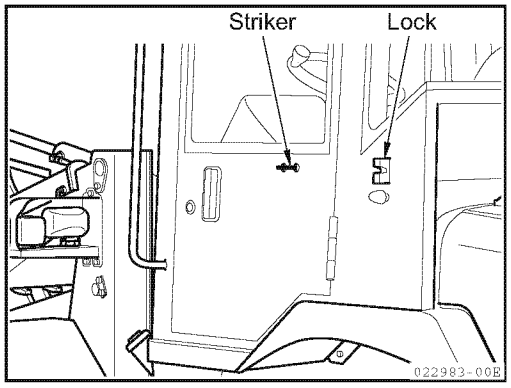
■ From inside

Pull the inner handle forward to open the side door.

■ Latching the side door open

1) To latch the side door open, secure the striker to the lock part.

2) To close the latched side door, unlatch it by pull the lever (A) and close the door by hand. At this point, make sure that the side door is securely locked.

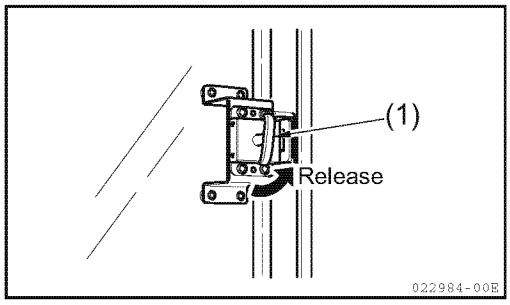


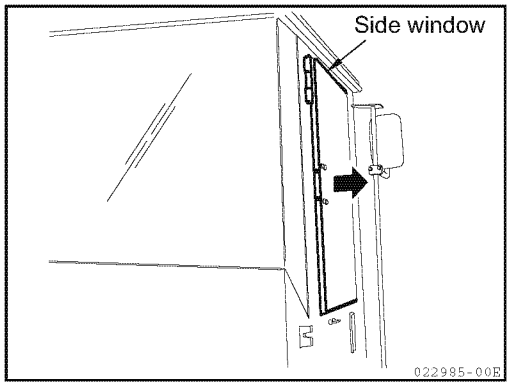
16-2-2. Opening and closing the side window

⚠ WARNING

After closing the side glass, make sure that the lock lever is securely locked.

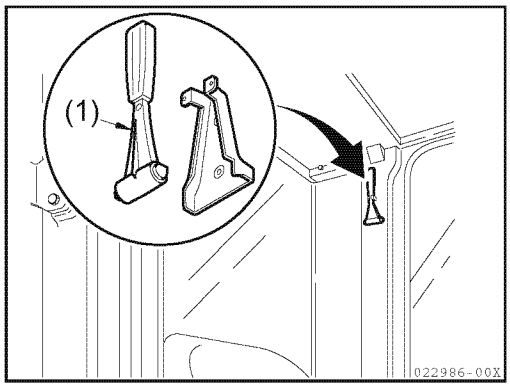
When taking the outer air, turn the catch handle (1) in the right door glass and push out the glass outside until the "click" lock sound is heard.
When closing, pull the catch handle (1) inward until the "click" lock sound is heard.



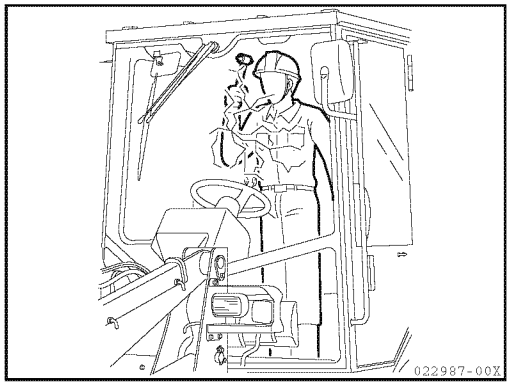


16-2-3. Emergency escape hammer

In case the cabin door cannot be opened, the hammer (1) is located for escaping from the operator's cabin in emergency.



To escape, crack the window glass with the hammer (1) by beating in.



IMPORTANT

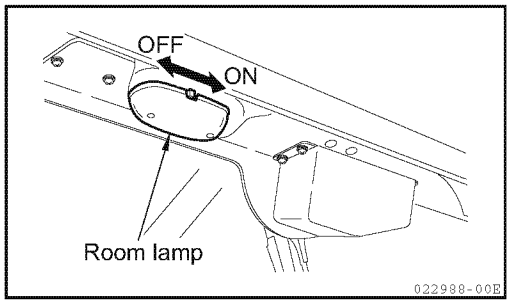
- **Get rid of the glass fragment from the window frame to avoid getting injured by the glass and fragment at the time of escape.**
- **Also, watch your step for the cracked and fallen glass fragment that may be slippery.**

16-2-4. Room lamp

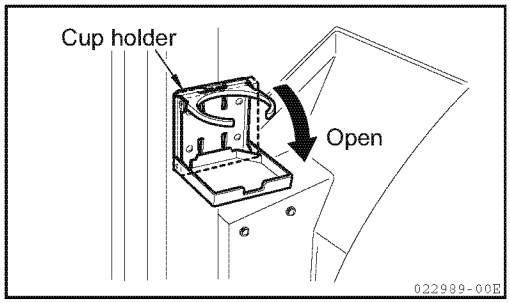
The room lamp can be turned on.

Position (ON) : Turned on

Position (OFF) : Turned off

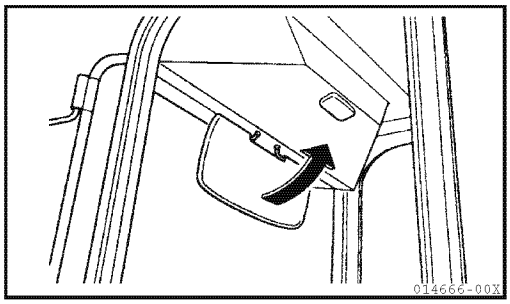


16-2-5. Cup holder (optional)



16-2-6. Sun visor

1) Angle of the sun visor must be adjusted after the operator's seat has been adjusted to the best operating position.
2) Move the sun visor to the desired position



⚠ CAUTION

Store the sun visor when you ride to the machine or get out of the machine.

17. Long-term Storage

17-1. Before storing

When storing the machine for a long period, do the following:

- Clean all parts and store the machine indoors.
  If you have to store the machine outdoors, park the machine on level ground and cover it with a protective sheet.
- Apply lube oil and grease to the machine and replace the engine oil.
- Apply a little amount of antirust to exposed parts of the hydraulic cylinder rods.
- Fill the battery with distilled water up to the upper level mark. After the battery has recharged, disconnect the negative terminal, and cover the battery or remove the battery from the machine.
- Add an anti-freeze to the cooling water if the air temperature can fall below 32°F (0°C).
  Because YANMAR genuine long-life coolant (LLC) is added to the cooling water, you need not change it unless the temperature falls below -31°F (-35°C).
  If the temperature falls below -31°F (-35°C), refer to Section "26-2. Nonperiodic services" to adjust the density of the cooling water.
- Lock the control lever and the F-R change lever with their lever locks and apply parking brake with the parking brake lock pedal.

⚠ WARNING

Before using the machine again wipe antirust off the hydraulic cylinder rod.
When you have to operate the machine indoors for the antirust procedure, be sure to ventilate the area by opening windows and doors to prevent asphyxiation.

Antirust

When stored near the sea or in a place exposed to sea breezes, the machine easily becomes rusty. Carefully apply antirust to all exposed parts of the piston rods and cover the machine with a polyethylene sheet or oil paper.
Some antirust solvents damage rubber materials. Be sure to use the recommended antirust.

17-2. Storing

⚠ WARNING

When you have to operate the machine indoors for the antirust procedure, be sure to ventilate the area well by opening windows and doors to prevent asphyxiation.

Move the machine at least once a month to form new oil films on all the moving parts during long-term storage, and recharge the battery at the same time.
When operating the implement, wipe the antirust off the hydraulic cylinder rod.

17-3. Using the machine again

IMPORTANT
When reusing a machine which has not received antirust procedure once a month, consult your dealer.

To use the machine again after a long period of storage:

- Drain water from the fuel tank, oil pan and other cases by removing the plugs.
- Wipe antirust off the hydraulic cylinder rod.
- Apply a generous amount of grease to the pivot pin on the implement.
- After starting the engine, warm-up and break in the machine fully.

18. Troubleshooting

18-1. When out of fuel

When the machine has run out of fuel, replenish fuel and bleed the fuel system of air.

■ **Procedure for air release**

1) Refill the fuel tank.

2) Turn the fuel cock to the "OPEN" position.

3) Turn the starter switch to the "ON" position and keep it there for 10 to 25 seconds. Then the air will be released.

18-2. Towing

⚠ WARNING

- **Incorrect methods or improper procedures could result in bodily injury.**
- **Keep in mind that the brakes will not work if the braking system has sustained any damage.**

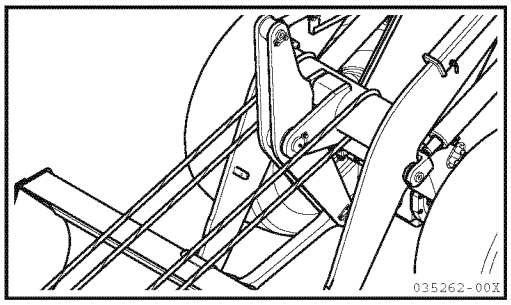
IMPORTANT

- **Tow the machine to a place where you can check and service it. Do not tow the machine a long distance.**
- **When towing a disabled machine, consult your dealer for assistance.**

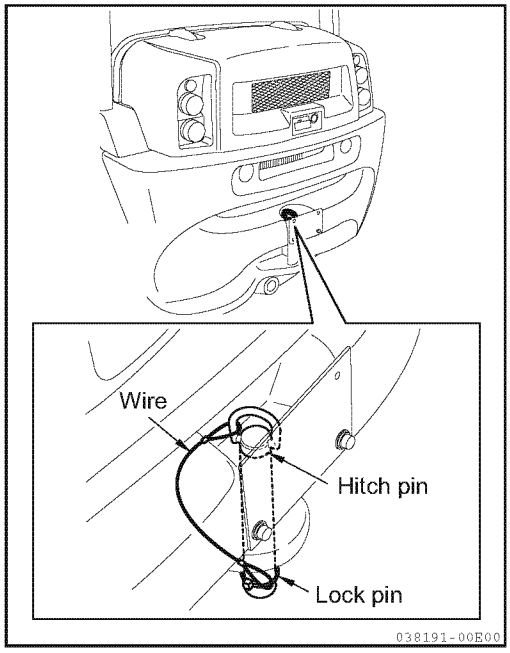
Do not tow the machine unless absolutely necessary. In doing so, be careful of the following:

- Before releasing the brake, apply blocks to the tires to secure the machine and prevent it from moving.

- Towing the machine is only performed at a low speed of 1.24 MPH (2 km/h) or less to move it a few meters to a suitable place for repair.
  Towing should be performed only in an emergency.
  If you have to move the machine a long distance, transport it.



- If the towing rope or bar is damaged, install a shield board on the towing machine to protect the operator.
- If the steering wheel or the brake of the towed machine cannot be operated, do not permit any person to ride in the machine.
- Make sure that the towing rope or bar are strong enough to tow the machine. If the faulty towed machine should get stuck in the mud or climb a slope, the towing rope or bar must be strong enough to sustain one and a half times the weight of the machine.
- When using the hitch pin, make sure that the lock pin is installed as shown in the figure to prevent the hitch pin coming off.



- Reduce the angle of the towing rope as much as possible. Align the towing machine with the towed machine. The angle between the two center lines of both the machines should be less than 30 degrees. And adjust the angle of the towing rope to be horizontal as much as possible.
- Sudden movement of the machine overloads the towing rope or bar and may cause it to be broken. Move the machine slowly at a constant speed.
- Normally use a towing machine which has the same performance characteristics as the towed one. Make sure that the towing machine has sufficient braking performance, weight, and power, and can control the disabled machine as well as itself on a slope or road.
- If necessary to tow the disabled machine on a slope, in order to obtain sufficient towing force and braking performance, you may have to use a more powerful machine to maintain control and avoid a roll over.
- The towing force required is dependent on the conditions under which the machine will be towed. A flat and level place requires a minimum of towing force, and a slope or a rough road requires a maximum of towing force.

18-2-1. When the engine can work

- If the power transmission system and the steering wheel can be operated and the engine is running, towing may only be required to pull the machine out of the mud or to move it a short distance to a road.

- An operator must be in the machine to steer it while it is being towed.

18-2-2. When the engine cannot work

- Remove the steering cylinder because the steering wheel cannot be operated.

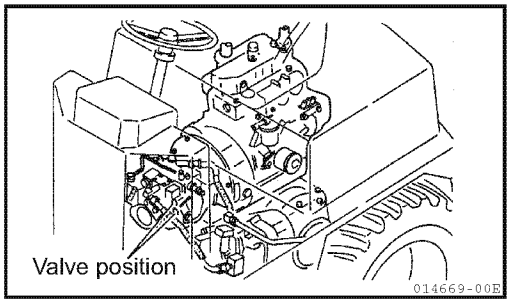
- Slowly tow the machine at a speed of less than 1.24 MPH (2.0 km/h) or less.

- To tow a machine with its engine stopped, follow the procedure on the next page.

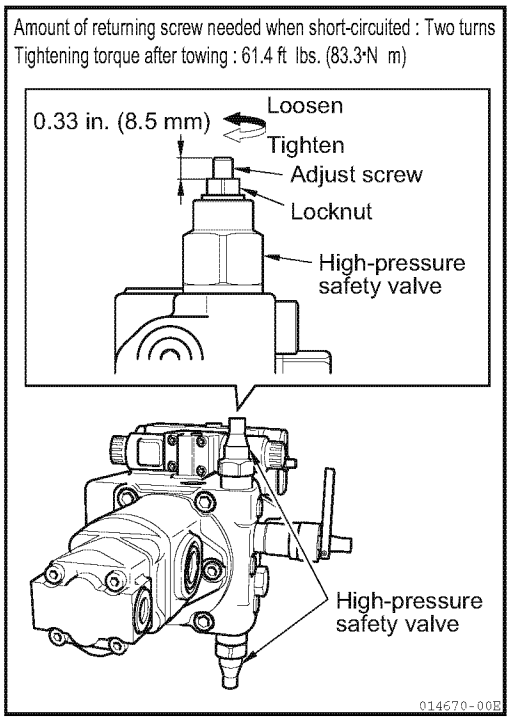
<Short-circuit the main circuit of the HST>
If the motor has failed, the main circuit can be short-circuited by removing the cap, loosening the locknut and tightening the adjust screw of the two high-pressure safety valves mounted on the pump.

Return everything to the original condition after towing.

The installing position of the high-pressure safety valves



High-pressure valves : Detailed diagram of the HST pump

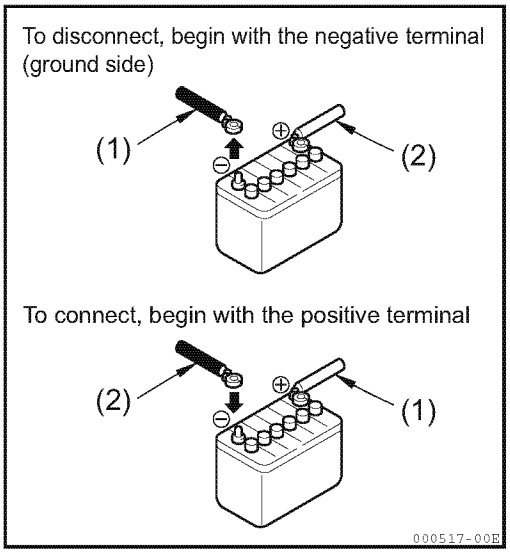


- Securely connect the two towing machines to the towed machine, release the parking brake of the towed machine, and remove the blocks from its tires to begin towing.

18-3. If the battery is overdischarged

⚠ WARNING

- Stop the engine and turn the starter switch key to the "OFF" position before checking or servicing the battery.
- Remove the dust accumulated on the top of the battery with a wet cloth before starting the engine.
- Flammable hydrogen gas is produced by the battery. Keep flames, sparks away from the battery.
- The battery electrolyte is a strong acid containing dilute sulfuric acid, and it is dangerous.
  If the battery electrolyte gets into your eyes or contacts your skin, immediately flush them with large amounts of water, and obtain medical treatment at once.
- Be sure to wear safety goggles when handling a battery.
- To disconnect the terminals, begin with the negative terminal (ground side); to connect the terminals, begin with the positive terminal.
  If a tool touches both the positive terminal and the machine, hazardous sparks may be generated.
- If a terminal is loose, hazardous sparks may be generated due to poor contact, which could cause ignition and explosion.
  Be sure to securely connect the terminals.



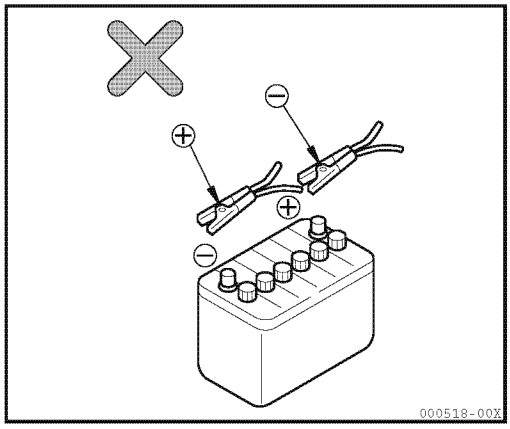
18-3-1. Starting the engine using booster cables

To start the engine using booster battery cables, do the following.

■ **Precautions for connecting and disconnecting the booster cables**

⚠ WARNING

- When you start the engine using booster cables, wear safety goggles.
- If you start the engine by taking electric power from another machine, do not allow contact between your machine and the other machine.
- To connect the booster cables, begin with the positive terminal, and to disconnect them, begin with the negative terminal (ground side).
- If a tool touches the positive terminal and the machine at the same time, hazardous sparks may be generated.
- Do not connect the booster cables to terminals of reverse polarity. That is, never connect a negative terminal on one machine to the positive terminal on the other machine.
- As the last step, connect the negative booster cable to the upperstructure. At this time, sparks will be generated. Connect the terminal to a point as far away from the battery as possible.



IMPORTANT

- The booster battery cables capacity and the clip size should be suitable for the battery size.
- The battery of the normal machine should be the same capacity as that of the machine in trouble.
- Check the booster battery cables and clips for an absence of damage, cracks, and corrosion.
- Securely connect the clips.

■ Connecting the booster battery cables

Turn the starter switch to the "OFF" position, and connect the booster battery cables as follows:

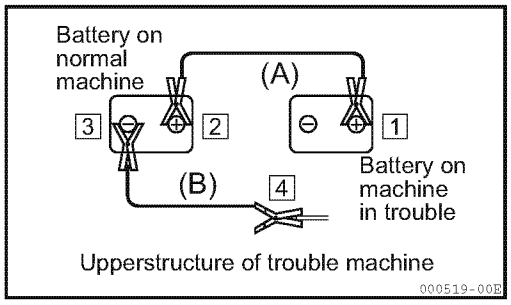
1) Turn the starter switches on the normal machine and the machine in trouble to the "OFF" position.

2) Connect the clip of the booster battery cables (A) (normally red) to the positive terminal on the machine in trouble.

3) Connect the other clip of the booster battery cables (A) to the positive terminal on the normal machine.

4) Connect the clip of the booster battery cables (B) (normally black) to the negative terminal on the normal machine.

5) Connect the other clip of the booster battery cables (B) to the engine block of the machine in trouble.



■ Starting the engine

1) Make sure that the clips are securely connected to the battery terminals.

2) Start the engine on the normal machine, and increase the engine speed to the maximum.

3) Turn the starter switch on the machine in trouble to the "START" position to start the engine.
   If the engine does not start, wait for more than two minutes and retry starting. (At this point, do not stop the engine on the normal machine and keep engine speed at full.)

■ Disconnecting the booster battery cables

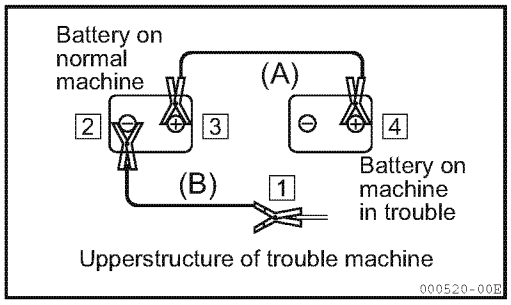
After the engine on the machine in trouble has started, disconnect the booster battery cables in the reverse order of the connecting procedure.

1) Remove the clip of the booster battery cables (B) from the engine block on the machine in trouble.

2) Remove the clip of the booster battery cables (B) from the negative terminal on the normal machine.

3) Remove the clip of the booster battery cables (A) from the positive terminal on the normal machine.

4) Remove the clip of the booster battery cables (A) from the positive terminal on the machine in trouble.



18-4. Troubleshooting

18-4-1. Engine and electrical equipment

If any abnormality arises with the machine while you are operating it, immediately locate the cause and service or adjust the machine. Failure to do so may cause greater damage or a fatal accident. Check the following items and take corrective action.

Problem		Cause	Measure
Engine	Steam comes out of top of radiator.	• Shortage of cooling water	• Check cooling water level Refill, if necessary (Check cooling water for leak from water port.)
	Water temp gauge indicates the red zone	• Loose fan belt	• Adjust belt tension
		• Buildup of dust and water scale accumulated in cooling system	• Replace cooling water Clean inside of cooling water system
		• Defective thermostat	• Replace thermostat
		• Clogged radiator fin or inclined fin	• Clean or repair fin
		• Defective electrical system	• Check or replace electrical system
	Starter motor turns but does not start engine.	• Shortage of fuel	• Refill fuel tank
		• Air in fuel system	• Repair air leak Bleed fuel system of air
		• Defective fuel injection pump or deteriorated nozzle performance	• Replace pump or nozzle
		• Improper compression	• Contact dealer for repair
		• Defective feed pump	• Contact dealer for repair
		• Damaged key stop solenoid. Link disengagement	• Contact dealer for repair
	Dark fumes comes out of machine.	• Clogged air cleaner element	• Clean or repair element
		• Deteriorated nozzle performance	• Replace nozzle
		• Improper compression	• Contact dealer for repair
	Fume color is white or bluish white.	• Too much oil in oil pan	• Reduce oil in oil pan to specified level
		• Improper fuel	• Replace fuel with recommended one
		• Worn cylinder or piston ring	• Contact dealer for repair
Electrical equipment	Turning on starter switch does not start starter motor	• Defective wiring system	• Check and repair wiring system
		• Defective starter switch	• Replace starter switch
		• Insufficiently charged battery	• Recharge battery
		• Slow blow fuse blown e	• Replace slow blow fuse
		• Defective starter motor	• Contact dealer for repair
		• Defective safety start switch	• Contact dealer for repair
		• Connection failure of starter relay	• Check and repair loosened terminals
	Maximum engine speed does not provide enough lamp brightness.	• Defective wiring system	• Check terminals for loose connection Repair terminal, if necessary
		• Defective alternator or regulator	• Contact dealer for repair
		• Grounding failure	• Check and repair loosened ground connection
	During engine operation, lamp is extremely bright, and frequently burns out.	• Defective regulator	• Replace regulator • Contact dealer for repair
	Electrolyte leaks from battery.		
	Speed of starter motor is too low.	• Defective wiring system	• Check and repair wiring system
		• Insufficiently charged battery	• Recharge battery
		• Defective starter motor	• Contact dealer for repair

18-4-2. Machine body

Problem		Cause	Measure
Machine body	Work implement does not work properly, lacks power or speed	• Insufficient hydraulic oil • Hydraulic oil filter clogging • Defective hydraulic cylinder • Defective control valve • Defective hydraulic pump • Loosened implement wire	• Resupply • Replace • Contact dealer for repair • Contact dealer for repair • Contact dealer for repair • Check and repair loosened wire
	Unintentional drop of implement	• Dirt or grit in the control valve • Worn spool or chipped casing of control valve • Dirt or grit in the main relief or overload relief valve • Damaged seat surface of main relief or overload relief valve • Oil leakage from hydraulic cylinder • Internal oil leakage of hydraulic cylinder	• Contact dealer for repair • Contact dealer for repair • Contact dealer for repair • Contact dealer for repair • Contact dealer for repair • Contact dealer for repair
	Cannot be steered or hard to steer	• Frame lock bar is not released • Low pressure or malfunction of orbit roll relief valve • Damage of hydraulic pump for steering	• Release • Contact dealer for repair • Contact dealer for repair
	Brake does not work effectively	• Loosened brake rod or lock nut • Wear of brake cam lever • Wear of brake disc	• Check, adjust and retighten • Contact dealer for repair • Contact dealer for repair
	Cannot travel or travels slowly	• Insufficient hydraulic oil • H.S.T. pump strainer clogging • Lack of warming-up operation • Electrical malfunction of F-R change lever • Malfunction of H.S.T. pump and motor • Loosened inching rod	• Resupply • Replace • Perform warming-up operation • Contact dealer for repair • Contact dealer for repair • Check and repair loosened inching rod

MAINTENANCE

19. Precautions for Servicing

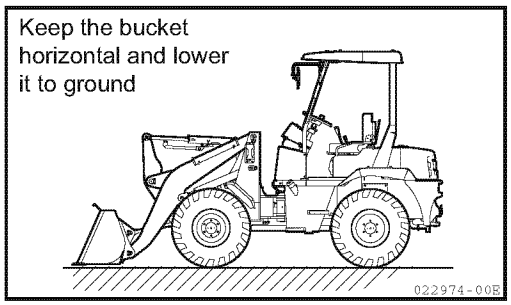
Do not use any inspection or servicing procedures that are not described and recommended in this manual.

Park the machine on solid, level ground to inspect and service it.

Set up the machine to make it ready for checking and servicing.

For checking and servicing, position the machine in the way described below unless otherwise specified.

- Lower the implement to the ground as shown in the right figure.
- Place individual control levers in the NEUTRAL or HOLD position.
- Place the lever lock in the LOCK position.
- Apply the parking brake by stepping on the parking brake lock pedal.
- Apply stopping blocks to the front and back of the tires.
- Lock the front and rear frames with the frame lock bar.



Check the hour meter

Read the hour meter every day to check to see if any service item has reached the time prescribed for implementation.

Use YANMAR genuine replacement parts

Use YANMAR genuine parts specified in the Parts Catalog.

Use YANMAR genuine lube oil and grease

Use YANMAR genuine lube oil and grease of specified viscosity based on the temperature.

Use clean lube oil and grease

Use clean lube oil, grease, and containers and prevent dust from mixing into them.

Clean the machine

Clean the machine for easy isolation of faulty parts.

Particularly clean the grease nipple, breather, and the oil level gauge glass and prevent dust from entering them.

Be careful of high water and oil temperatures

It is dangerous to replace the oil, the cooling water and the filter immediately after stopping the engine. Wait until their temperatures drop.

When the engine oil is too cool, heat the oil to adequate temperature (approximately 68°F to 104°F (20°C to 40°C)) before draining oil to improve draining efficiency.

Check the drained oil and the old filter element

When replacing the engine oil, the hydraulic oil, or the filter element, check the drained oil and the old filter element for metallic dust and foreign solid deposits.

Observe precautions for replenishing oil

If a strainer is mounted on the oil port, do not remove the strainer to replenish oil.

Be careful of dust

When checking or replacing the oil, prevent dust contamination.

Attach the warning tag

When the oil or the cooling water is drained, attach the "SERVICING IN PROGRESS" tag to the operator's seat so that other persons will not start the engine.

Observe the warning labels

Observe the warning labels affixed to the machine.

Observe the precautions for welding

- Make sure to disconnect the battery cables (positive and negative terminals).
- Do not apply more than 200 V continuously.
- Ground the machine within 39.37 in. (1000 mm) from the welded part.
- Make sure that there is no seal or bearing between the welded part and the grounded part.
- Do not ground around the pins on the implement or the hydraulic cylinder.
- Do not weld or blow out any pipes or tubes containing fuel or oil.

Be careful of fire

Clean parts with noncombustible detergent or light oil. When using light oil, keep it away from fire.

Clean mating surfaces before assembly

When you have removed a part with an O-ring or a gasket seal, clean the mating surfaces before installing the new part.

At this point, do not fail to refit the O-ring or the gasket.

Do not drop anything from your breast pocket

When you open the engine hood and attempt to look down into the inside of the machine, remove loose items from your breast pocket to eliminate the risk that they may drop into the machine.

Check the undercarriage

After the machine is used at a rocky place, check the undercarriage for damage. Check for loose bolts and nuts, cracks, wear, and other damage.

Observe the precautions for cleaning the machine

- Do not water the electrical equipment or the connectors.
- Do not splash water on the monitors in the cabin.
- Do not spray high-pressure water directly at the radiator and the oil cooler.

Check before and after working

If the machine is to be used in mud, rain, snow, or on a beach, check for loose plugs and cocks before working. After working, clean the machine and check each part for cracks and damage and check for loose or missing bolts and nuts. Apply grease earlier than usual. Particularly apply grease every day to the pins on the implement which are submerged in mud.

Also, during heavy work, supply grease at intervals shorter than those specified in the periodic inspection procedure.

Observe the precautions for working in a dusty place

If you use the machine in a dusty place, be careful of the following:

- Check the air cleaner for clogging carefully.
  Clean the air cleaner element earlier than scheduled.
- Clean the radiator fin earlier to prevent it from clogging.
- Clean or replace the fuel filter element earlier than scheduled.
- Clean the electric equipment, especially the starter motor and the generator, to avoid dust deposits.

Do not mix oils

Never mix oils of different makes or types. If you have to replenish an oil with a different make or type than the one already in the tank, remove the remaining oil completely.

20. Basic Servicing Practices

- Use YANMAR genuine replacement parts.

- Do not mix oils of different makes and types when replacing or replenishing oil.

- The following types of oil and cooling water are used in the factory for shipping unless otherwise specified:

Item	Type
Engine oil	Engine oil SAE10W30, CD class
Transfer and axle	BP tractran UTH, BP tractran 9
Hydraulic oil	YANMAR SUPER HYDRO. OIL (ISO VG46)
Pins	Lithium-base EP Grease No.2
Fuel	No.3 Diesel light oil
Engine cooling water	YANMAR genuine long-life coolant (LLC) 51% added

20-1. Oils, fuel, and cooling water

20-1-1. Oils

- Because the oil is used in the engine and implement under extreme conditions (high temperature and pressure), it deteriorates as time elapses.
  Be sure to use oils of the grades which are specified in the Operation & Maintenance Manual and suitable for the operating temperature range.
  Even if the oil is not contaminated, be sure to replace the oil within the specified service hours.

- Oil is equivalent to blood in a human body. Be careful in handling it so that impurities (water, metallic dust, and foreign solids) will not be mixed into it.
  Most machine failures are caused by impurities in the oils.
  Be careful not to mix impurities into the oils especially after storing the machine and replenishing oils.

- Do not mix oils of different makes and types.

- Use the specified amount of oil.
  Larger or smaller amounts of oil than specified may cause machine problems.

- If the oil becomes cloudy, it may suggest that water or air could have been mixed into the hydraulic system. If this event happens, ask your dealer.

- Be sure to replace the oil filter element with a new one when changing the oil.

- To know what condition the machine is in, it is recommended that you analyze the properties of the oil periodically.
  Ask your dealer for more information on this issue.

20-1-2. Fuel

- Because the fuel injection pump is a precision device, using a fuel containing water or dust will cause problems.

- Be careful that impurities will not be mixed into the fuel especially after storing the machine and refueling.

- Be sure to use a fuel recommended in the Operation & Maintenance Manual.
  In addition, keep in mind that you should use a fuel appropriate for the operating temperature range because it will freeze at temperatures lower than -5°F (-15°C).

- Fully refuel every day after finishing the work so that the moisture in the fuel tank will not condense and water will not mix with the fuel.

- Before starting the engine, or ten minutes after refueling, drain any deposits and water through the drain plug on the fuel tank.

- If the fuel level becomes low or the filter element is replaced, the air should be released from the fuel system.

20-1-3. Cooling water

- Because unpotable water may contain much calcium and impurities, using it will cause water scale to build up in the engine or the radiator, causing poor heat exchange and overheating.
  Never use water which is not potable for cooling purposes.

- When using an anti-freeze, observe the precautions described in the Operation & Maintenance Manual.

- The YANMAR machine is shipped with YANMAR genuine anti-freeze. The anti-freeze is anticorrosive to protect the cooling system.
  Because the anti-freeze can be used continuously over two years, you need not remove it in hot weather.

⚠ DANGER

Keep sources of ignition away from the anti-freeze because it is flammable.

- The mixing ratio of the anti-freeze to the water differs based on air temperature.
  For the mixing ratio, refer to Section "26-2-1. Cleaning the inside of the cooling system".

- If the engine is overheated, replenish the cooling water after the engine has cooled down.

- Shortage of cooling water will cause the cooling system not only to overheat but also to corrode due to air which comes in the system.

20-1-4. Grease

- Grease ensures smooth operation of moving parts such as connectors and prevent operating noises.

- The nipples not listed on the pages for periodic service are those for overhaul. Normally it is not necessary to refill them.
  Grease them if any abnormal condition arises after long term use.

- Wipe the extruded old grease off with a rag after greasing.
  Carefully wipe the old grease off completely from all moving parts which are easily worn by adhered sand or dust.

20-1-5. Storing the oil and fuel

- Store the oil and fuel indoors so that they will not be contaminated by impurities such as water or dust.

- When you store oil or fuel in drums for a long period, position them so that their outlets align in a straight line (to prevent moisture absorption).
  When storing the oil or the fuel outdoors, cover the drums with a waterproof sheet.

- To avoid deterioration caused by long-term storage, use the oil on a first-in first-out basis.

20-1-6. Filter

- The filters are very important parts which prevent impurities from getting into critical devices through the lube oil, fuel and air systems.
  Replace the filter elements periodically according to the instructions of the Operation & Maintenance Manual.
  Under difficult conditions, you need to replace the filter elements earlier than suggested in the Operation & Maintenance Manual depending on the type of oil and fuel (sulfur content).

- Never reuse the filter elements (cartridge type) by cleaning them.

- When replacing an oil filter element, check that no metallic dust or foreign solids are present on the old filter. If they are found to be present, contact the nearest dealer.

- Do not unpack the filter element before use.

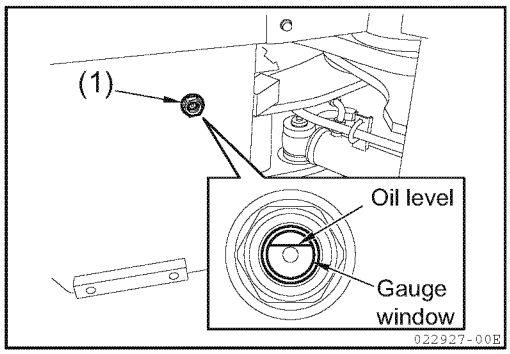
- Use YANMAR genuine filter elements.

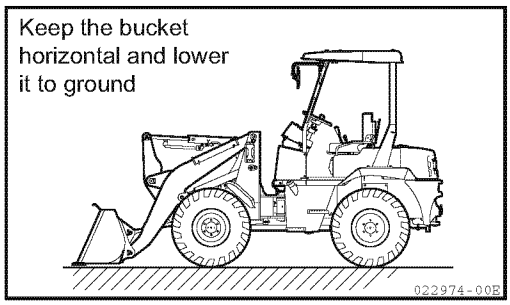
20-2. Electrical equipment

- If electrical equipment gets wet or wiring insulation is broken, electric leaks may occur and the machine may malfunction which is very dangerous.
- Check the fan belt for tension and damage, and also check the battery for electrolyte level.
- Never disconnect or disassemble the electrical equipment mounted on the machine.
- Do not mount any electrical equipment other than those items provided by YANMAR.
- Be careful not to spray water on the electrical equipment when washing the machine or operating in the rain.
- After working near the sea, take necessary precautions to protect the electrical equipment from corrosion.

20-3. Hydraulic system

- The hydraulic system is hot during and immediately after operation. It is also given high pressure during operation. Therefore, check and service the hydraulic system carefully as follows:
  - Park the machine in the posture illustrated at right for checking.
  - Be sure to stop the engine.
  - Wait until the temperature drops sufficiently and then start the maintenance.
  - Do not suddenly remove any connecting parts of the hydraulic equipment and hoses. Otherwise oil may spout out due to residual pressure in the equipment or the hoses. Be sure to slowly loosen the connecting parts to release pressure and then remove them.
  - When disassembling or replacing the hydraulic pump, the hydraulic cylinders, or the hydraulic motor and piping, gradually loosen the oil port of the hydraulic oil tank to release pressure.
  - It is necessary to check the hydraulic oil level after changing the filter element, and also after performing hydraulic system maintenance.
  - After removing the hydraulic hoses and piping, check the O-ring and the packing for damage, before reinstalling them.
    Replace them if they are damaged.
  - Bleed the hydraulic circuit of air after cleaning or replacing the hydraulic oil filter element and strainer or removing the hydraulic cylinder or piping for repair or replacement.





Bleed the hydraulic circuit of air according to the following procedure:

1) Set the engine speed to medium (1500 to 2000 RPM). That is, set the accelerator pedal in the middle of the stroke.

⚠ WARNING

Before performing the following steps, be sure to apply the parking brake and place the F-R change levers in the "NEUTRAL" position.

2) Slowly operate each cylinder 4 or 5 times to about 4.0 in. (100 mm) before both stroke ends.

3) Operate each cylinder 4 or 5 times to both stroke ends.

- Operating the hydraulic cylinder suddenly to the stroke ends without bleeding it of air could cause piston seal damage.
- If air is left in the hydraulic circuit, the air is compressed or expanded according to the load applied and the hydraulic equipment does not operate smoothly.
  Air in the hydraulic circuit may shorten the service life of the hydraulic pump.

4) Check the hydraulic oil level and replenish oil to the specified level if necessary.

21. Consumables

Replace consumable parts such as filter elements, air cleaner elements and bucket teeth periodically or before they reach their wear limits.
Periodic replacement prevents malfunction of the machine. When you replace a part, be sure to use a Yanmar genuine part.
When ordering consumables, let us know the parts numbers given in the parts catalog.

List of consumables

The numbers of the parts in ( ) represent those which must be replaced at the same time.

Item	Name	Q'ty	Replacing time interval
Engine oil filter	Oil filter 80×80 L	1	Every 250 service hours (At first 50 service hours)
Hydraulic oil tank return filter	Filter element	1	Every 500 service hours (At first 250 service hours)
Fuel filter	Fuel filter element	1	Every 500 service hours
Air cleaner	Element (outer) Safety element	1	Every 500 service hours
HST filter	Filter	1	Every 500 service hours (At first 250 service hours)
Bucket	Flat claw 1570 (for V3-6) Flat claw 1690 (for V4-6) Bolt (fine 14 x 35) Spring washer 14 Nut (fine 14)	1 1 (6) (6) (6)	-
Tire	Tire (V3-6) Standard tire : 12.5/70-16-6PR Tire (V4-6) Standard tire : 15.5/60-18-8PR	2 2 2 2	-

22. Fueling, Oiling and Greasing Based on Temperature Range

22-1. Fuel and oil

Select fuel and oil based on to the air temperature range.
The prescribed amount of oil means the total amount of oil included in the piping and equipment.
The amount of oil to be changed means the amount of oil replaced in checking and servicing.
If you start the engine at air temperatures lower than 32°F (0°C), use SAE10W, SAE10W-30, or SAE15W-40 even if the temperature in the daytime rises to 50°F (10°C) or so.

22-2. Cooling water

Because a YANMAR genuine long-life coolant (LLC) is added to the cooling water, you need not change it unless the temperature falls bellow -31°F (-35°C).
If the temperature falls below -31°F (-35°C), refer to Section "26-2. Nonperiodic services" to control the density of the cooling water.

Part to be refilled	Oil type	Recommendations with regard to temperature ranges -30 -20 -10 0 10 20 30 40 50°C		Prescribed amount of oil Qts. (L)		Amount of oil to be changed Qts. (L)	
				V3-6	V4-6	V3-6	V4-6
Engine oil pan	Engine oil	SAE 30 CD SAE 10W CD SAE 10W-30 CD SAE 15W-40 CD		5.39 (5.1)	8.35 (7.9)	4.97 (4.7)	7.82 (7.4)
Transfer	Transmission oil	BP tractran UTH, BP tractran 9		Shared with the rear axle			
Hydraulic oil system	Hydraulic oil	ISO VG46		In the tank 11.1 Gals. (42 L) Other parts 2.6 Gals. (10 L)		11.1 Gals. (42 L)	
Axle	Transmission oil	BP tractran UTH, BP tractran 9		Front 6.87 (6.5) Rear 8.99 (8.5)	Front 7.93 (7.5) Rear 10.04 (9.5)	Front 6.87 (6.5) Rear 8.99 (8.5)	Front 7.93 (7.5) Rear 10.04 (9.5)
Pins	Grease	Lithium-base EP grease No.2		-			
Fuel tank	Light oil	No.2-D No.3-D No.3-D (S)		14.5 Gals. (55 L)		-	
Cooling system	Water	YANMAR genuine long-life coolant (LLC) added	Radiator	4.44 (4.2)	4.97 (4.7)	-	
			Subtank	0.42 (0.4)			

23. Standard Tightening Torque for Bolts and Nuts

23-1. Required tools

The following tools are required for servicing.
If the tools listed below are damaged, order them from your dealer.

No.	Name	Part number	Q'ty
1	Screw driver (universal system)	104200-92350	1
2	Open end wrench 10×12	28110-100120	1
3	Open end wrench 12×14	28110-120140	1
4	Open end wrench 19×22	28110-190220	1
5	Open end wrench 22×24	28110-220240	1
6	Hub nut wrench 30	172527-05110	1
7	Close end wrench 14×17	28160-140170	1
8	Grease injector 800	933110-09802	1

23-2. Torque table

Bolts or nuts in the metric system should be tightened at the torque described below unless specified otherwise.

Item		Thread size × pitch	Tightening torque ft•lbf (N•m)	Remarks
Hexagon bolt (7T) Nut	Coarse threads	M6 × 1	7.23 to 8.68 (9.8 to 11.8)	1) Apply 80% tightening torque when tightened to aluminum. 2) Apply 60% tightening torque for 4T bolt and lock nut. 3) Use fine thread screws for engine only.
		M8 × 1.25	16.6 to 21.0 (22.6 to 28.4)	
		M10 × 1.5	32.6 to 43.4 (44.1 to 58.8)	
		M12 × 1.75	57.9 to 72.3 (78.5 to 98.1)	
		M14 × 2	86.8 to 108.5 (117.7 to 147.1)	
		M16 × 2	123.0 to 151.9 (166.7 to 206.0)	
		M18 × 2.5	173.6 to 209.8 (235.4 to 284.4)	
		M20 × 2.5	238.7 to 296.6 (323.6 to 402.1)	
	Fine threads	M14 × 1.5	94.0 to 108.5 (127.5 to 147.1)	
		M16 × 1.5	155.5 to 177.2 (210.8 to 240.3)	
Hexagon bolt (10.9T) (ROPS)		M10 × 1.5	32.6 to 43.4 (44.1 to 58.8)	Apply the Tree Bond 1324
		M12 × 1.75	57.9 to 72.3 (78.5 to 98.1)	
PT plug		1/8	7.2 (9.8)	
		1/4	14.5 (19.6)	
		3/8	21.7 (29.4)	
		1/2	43.4 (58.8)	
Pipe joint bolt		M8	9.4 to 12.3 (12.7 to 16.7)	
		M12	18.1 to 25.3 (24.5 to 34.3)	
		M14	28.9 to 36.2 (39.2 to 49.0)	
		M16	36.2 to 43.4 (49.0 to 58.8)	
Seat belt bolt		7/16-20-UNF	32.5 to 43.4 (44.1 to 58.8)	

IMPORTANT

If a part to be tightened is made of resin like a panel board, excessive tightening torque may damage the tightened part. Be careful when tightening.

24. Replacing Essential Parts Periodically

For safe operation, the machine must be serviced periodically. To increase safety, be sure to periodically replace the parts listed in the table of safety parts on the next page. A fire could result if they deteriorate or are damaged.

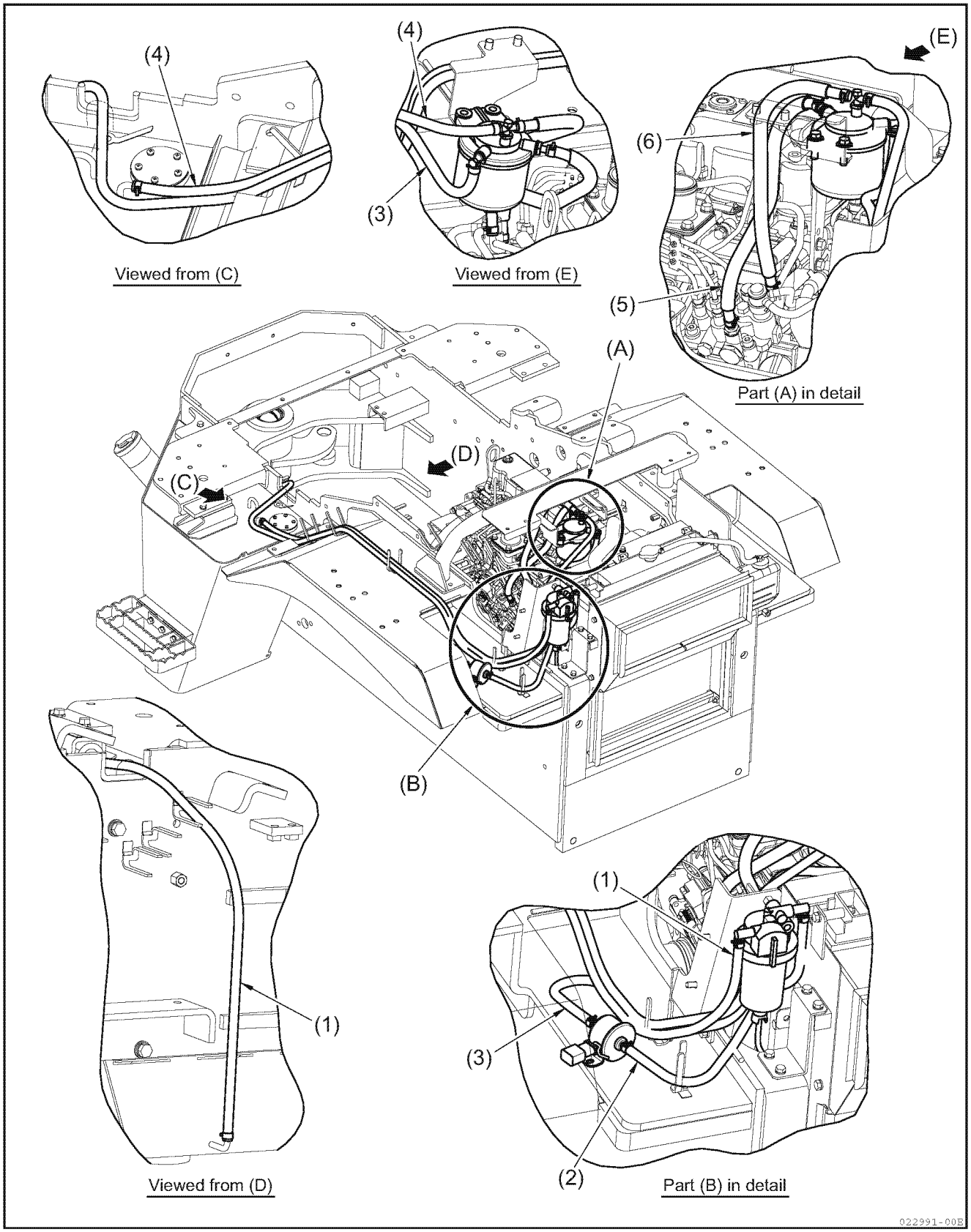
These parts are vulnerable to age and wear and it is difficult to determine the degree to which, they have deteriorated on the occasion of periodic service. To maintain their proper functions at all times, therefore, replace them with new ones after using them for a specific period of time even if no abnormality is found with the parts.
If you find abnormalities in these parts before their scheduled replacement time is reached, repair or replace them immediately.
If a hose clamp is deformed or cracked, replace it immediately.
Check the hydraulic hoses (which are not periodic replacement parts). If any abnormality is found in them, retighten them or replace them immediately.

When replacing the hydraulic hoses, replace the O-rings and seals at the same time.

Ask your dealer to replace any essential part.

■ List of safety parts

No.	Safety parts to be replaced periodically	Q'ty	Replacement time intervals
(1)	Fuel hose (fuel tank to water separator)	1	Every 2 years
(2)	Fuel hose (water separator to feed pump)	1	
(3)	Fuel hose (feed pump to fuel filter)	1	
(4)	Fuel hose (fuel filter to fuel tank)	1	
(5)	Fuel hose (fuel filter to fuel injection nozzle)	1	
(6)	Fuel hose (fuel Injection nozzle to fuel filter)	1	
(7)	Steering hose (steering unit to oil hydraulic pump)	1	
(8)	Steering hose (steering unit to hydraulic oil tank)	1	
(9)-1	Steering hose (steering cylinder to steering unit)	1	
(9)-2	Steering hose (steering cylinder to steering unit)	1	
(10)	Steering cylinder (packing seal to O-ring)	1	
(11)	Lift cylinder hose (control valve to lift cylinder)	4	
(12)	Dump cylinder hose (control valve to dump cylinder)	2	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Part (A) in detail
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Part (B) in detail
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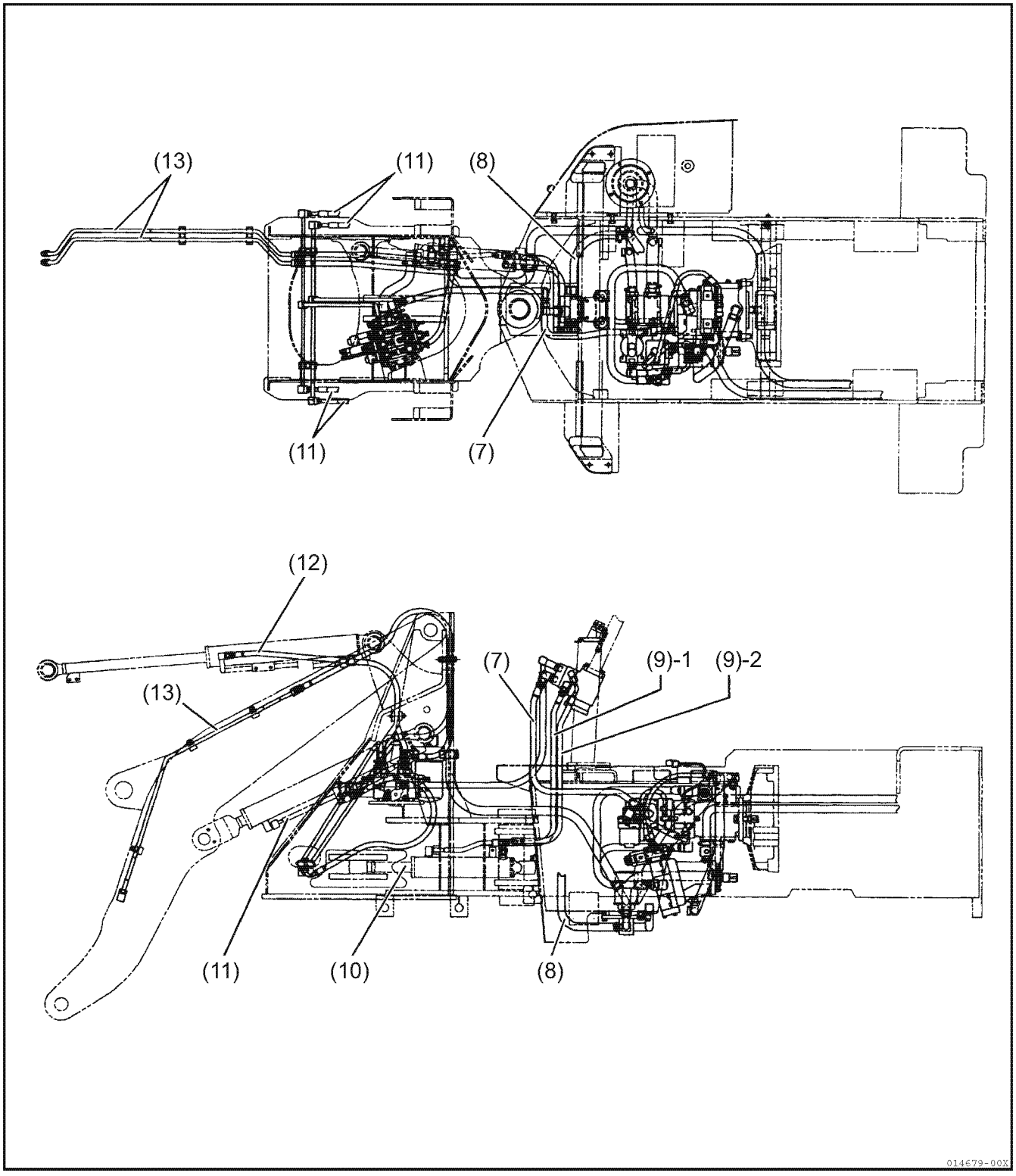
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25. Maintenance Table

Daily and periodic inspection are important to keep the machine in its best condition. The following is a summary of inspection and servicing items by inspection interval. Periodic inspection intervals vary depending on the use, loads, fuels and lube oils used and handling conditions, and are hard to establish definitively. The following should be treated only as a general standard.
When the time for an inspection approaches, study the relevant pages in the Operation & Maintenance Manual. Keep a record of daily operation and the results of maintenance work.

25-1. Table of service time intervals

Check and service points	Page
■ **After first 50 hours (only for a new machine)**	
Replace the engine oil and the engine oil filter	3-23
■ **After first 100 hours (only for a new machine)**	
Replacement of the front and rear axle gear oils	3-23
■ **After first 250 hours (only for a new machine)**	
Replace the hydraulic oil return filter	3-23
Replacement of hydraulic oil in the tank and cleaning of the suction filter	3-23
Replace the HST oil filter element	3-23
■ **Nonperiodic servicing**	
Cleaning the inside of the cooling system	3-24
Adjustment of the inching pedal	3-28
Adjustment of the brake pedal	3-28
Adjustment of the parking brake lock pedal	3-29
Replacing the bucket	3-30
Replacing the bolt-on cutting edge	3-31
■ **Checking before start-up**	
Checking and replenishing the cooling water	3-32
Checking and replenishing the fuel in the fuel tank	3-33
Checking and replenishing the hydraulic oil in the hydraulic oil tank	3-34
Checking and replenishing the engine oil	3-35
Checking and adjusting the fan belt tension	3-36
Checking the electric wiring	3-37
Checking and replenishing the battery electrolyte	3-38
Checking the brake pedal	3-39
Checking the inching pedal	3-39
Checking the tires	3-39
Checking the parking brake lock pedal	3-40
Does the horn sound properly? Does the back buzzer sound properly?	3-40
Do the lamps light properly? Are they not dirty or damaged?	3-40
Are the color of the engine exhaust fumes and the sound of the engine exhaust system normal?	3-40
Do the instruments work properly?	3-40
Is the play of the steering wheel proper? Does the steering wheel work properly?	3-40
Are the rear-view mirrors positioned in the proper direction? Are they not dirty or damaged?	3-40
Is the license plate dirty or damaged? (only for licensed vehicles)	3-40

Check and service points	Page
■ **Maintenance every 50 service hours**	
Draining the water and deposit in the fuel tank	3-41
Greasing	3-42
Cleaning the water separator element	3-43
■ **Maintenance every 100 service hours**	
Greasing	3-44
Checking and replenishing the front and rear axle gear oil (The rear axle shares the oil supply port with the transfer)	3-45
■ **Maintenance every 250 service hours**	
Replacing the engine oil and the engine oil filter	3-46
Checking and cleaning the radiator fin	3-48
Checking and cleaning the air cleaner element	3-49
Adjusting the governor lever and accelerator device	3-51
■ **Maintenance every 500 service hours**	
Replacing the fuel filter element	3-52
Replacing the air cleaner element	3-54
Replacing the front and rear axle gear oil (The rear axle shares the oil supply port with the transfer.)	3-55
Replacing the hydraulic oil return filter	3-56
Replacing the H S T. oil filter	3-57
■ **Maintenance every 1000 service hours**	
Replacing the oil in the hydraulic oil tank and cleaning the suction filter	3-58
Checking and adjusting the fuel injection valve	Ask your dealer
Checking and adjusting the intake and exhaust valve clearance	Ask your dealer
Checking and adjusting of fuel injection pressure and atomizing condition	Ask your dealer
Retightening the cylinder head bolts	Ask your dealer
■ **Maintenance every 2000 service hours**	
Check and replace fuel oil pipe, cooling water pipe	Ask your dealer
Lapping the intake and exhaust valve	Ask your dealer
Check fuel pump adjust	Ask your dealer
Clean and checking the cooling water system	Ask your dealer

■ List of periodic inspection and servicing

*Applicable to models with the relevant equipment ◇ : Check ○ : Supply ● : Replace □ : Adjust (clean) ■ : Oil & grease

Check & service items			Daily	Every 50	Every 100	Every 250	Every 500	Every 1000 hrs
General	Check falling off, breakage of parts		◇					
	Check loosened bolts & nuts, retighten		◇					
	Check engine condition		◇					
	Clean		□					
Lube oil	Front axle gear oil	Check, resupply			□			
		Replace			● 1st time		●	
	Rear axle gear oil	Check, resupply			□			
		Replace					●	
Hydraulic system	Hydraulic oil	Check, resupply	◇					
		Replace						●
	Clean suction filter					● 1st time		●
	Replace return filter					● 1st time	●	
	HST oil filter					● 1st time	●	
	Check for abnormality of hydraulic pump		◇					
Grease	Check grease-up positions, grease			■	■			
Steering equipment	*Check performance of F-R change lever		◇					
	*Check performance, play of steering wheel		◇					
	*Brake pedal	Stroke	◇					
		Performance	◇					
	*Inching pedal	Stroke	◇					
		Performance	◇					
	*Parking brake	Stroke	◇					
		Performance	◇					
	Check performance of accel. lever		◇					
Electric equipment	Check front & work lights, horn		◇					
	Check hour meter function		◇					
	Check function of change, oil and pilot lamps		◇					
	Check wire breakage, short-circuits, loosened terminals retighten		◇					
	Check, supply battery electrolyte		◇					
	Check specific gravity of electrolyte						□As required	

◇ : Check ○ : Supply ● : Replace □ : Adjust (clean) ■ : Oil & grease

Check & service items		Daily	Every 50	Every 100	Every 250	Every 500	Every 1000	Every 2000 hrs
Fuel oil	Check & supply of oil to the tank	◇						
	Drain the fuel tank		□					
	Clean the oil/water separator		□					
	Replace the fuel filter element					●		
Lube oil	Check the quantity of engine oil	◇						
	Replace the engine oil		● 1st time		●			
	Replace the engine oil filter element		● 1st time		●			
Cooling water	Check & supply of cooling water	◇						
	Clean radiator fins				□			
	Check the fan-belt tension	◇ (□)						
	Replace the cooling water						● within one year	
	Clean & check the cooling water system							● within two year
Rubber hose	Check & replace fuel oil pipe, cooling water pipe							●
Operation system	Check & adjust governor lever, accelerator	◇			□			
Intake system	Clean air cleaner & replace element				□	●		
	*Check turbocharger, adjust						□	
Cylinder head	Adjust the intake and exhaust valve clearance						□	
	Lapping the intake and exhaust valve							□
	Retightening the cylinder head bolts						□	
Fuel pump & injection valve	Check fuel valve nozzle, clean						□	
	Check & adjustment of fuel injection pressure & atomizing condition						□	
	Check fuel pump, adjust							□

Note :

1) When machine is used at dusty worksites clean and replace filter element twice or more frequently than specified in the table.

2) Execution of periodic inspection and servicing is indispensable to conform the EPA emission control regulations.
Keep a record of the results.

26. Procedures for Maintenance

26-1. First services

Service the new machine after first 50, 100 and 250 service hours as follows:

26-1-1. After first 50 hours

- Replace the engine oil and the engine oil filter. For these procedures, refer to Section "26-6. Maintenance every 250 service hours".

26-1-2. After first 100 hours

- For the replacement of the front and rear axle gear oils, refer to Section "26-7. Maintenance every 500 service hours".

26-1-3. After first 250 hours

- Replace the hydraulic oil return filter. For the procedure, refer to Section "26-7. Maintenance every 500 service hours".
- For the replacement of hydraulic oil in the tank and cleaning of the suction filter, refer to Section "26-8. Maintenance every 1000 service hours".
- Replace the HST oil filter element. For this procedure, refer to Section "26-7. Maintenance every 500 service hours".

26-2. Nonperiodic services

26-2-1. Cleaning the inside of the cooling system

⚠ WARNING

- **The cooling water is very hot immediately after the engine has stopped. Discharging the cooling water immediately after the engine has stopped may cause burns. Start cleaning the inside of the cooling system after the engine has cooled down sufficiently.**
- **Stepping into the area behind the machine while the engine is running to clean the inside of the cooling system is very dangerous, because you may not be visible from the operator's seat and the machine could start moving.**
  Also, contacting the radiator fan or fan belt could result in serious bodily injury.
  Never step into the area behind the machine while the engine is running.
- **Do not remove the radiator cap while the cooling water temperature in the radiator is high. Hot water may spout from the radiator.**
  When you remove the radiator cap, after the water has cooled down, slowly turn the radiator cap to release the internal pressure before removing it.

Clean the inside of the cooling system and replace the anti-freeze according to the following table.

Anti-freeze type	Cleaning inside of cooling system and replacing anti-freeze
YANMAR Super Long-Life Coolant (LLC anti-freeze) (All season type for anticorrosion)	Every 2 years (autumn)
LLC anti-freeze (all season type)	Every 1 year (autumn)
AF-PT anti-freeze (winter, one season type)	Every 6 months (spring, autumn) Add anti-freeze only in autumn
No anti-freeze	Every 6 months

Park the machine on level ground to clean or replace the cooling water.
The YANMAR Long-Life Coolant has antirust effect in addition to anti-freeze effect.
Though the mixing ratio of an anti-freeze to water varies with the air temperature, at least 30 % of anti-freeze by volume is required to obtain antirust effect.
Determine the mixing ratio of the anti-freeze to water on the basis of the lowest past temperature, referring to the ratio table below.
Actually set the temperature 18°F (10°C) lower than the lowest temperature.

Table of mixing ratio of anti-freeze to water

Lowest temperature		°F (°C)	23 (-5)	14 (-10)	5 (-15)	-4 (-20)	-13 (-25)	-22 (-30)	-31 (-35)	-40 (-40)
V3-6	Amount of anti-freeze	Qts. (L)	0.63 (0.6)	1.06 (1.0)	1.48 (1.4)	1.69 (1.6)	1.90 (1.8)	2.11 (2.0)	2.43 (2.3)	2.64 (2.5)
	Amount of water	Qts. (L)	4.23 (4.0)	3.81 (3.6)	3.38 (3.2)	3.17 (3.0)	2.96 (2.8)	2.75 (2.6)	2.43 (2.3)	2.22 (2.1)
V4-6	Amount of anti-freeze	Qts. (L)	0.74 (0.7)	1.16 (1.1)	1.69 (1.6)	1.90 (1.8)	2.22 (2.1)	2.43 (2.3)	2.75 (2.6)	2.96 (2.8)
	Amount of water	Qts. (L)	4.65 (4.4)	4.23 (4.0)	3.70 (3.5)	3.49 (3.3)	3.17 (3.0)	2.96 (2.8)	2.64 (2.5)	2.43 (2.3)

Note :

At the delivery from the factory, water and anti-freeze are mixed in the ratio shown above for the -31°F (-35°C) temperature.

⚠ WARNING

Keep fire away from the anti-freeze because it is flammable.

Use tap water. If you use river or well water, consult your dealer.

Use a densitometer to control the mixing ratio.

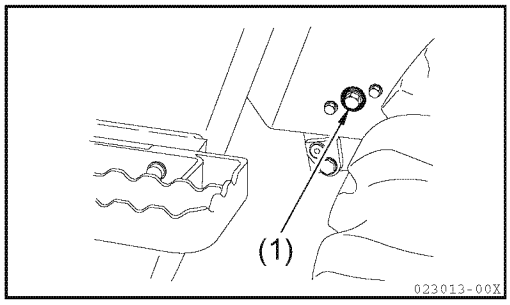
⚠ WARNING

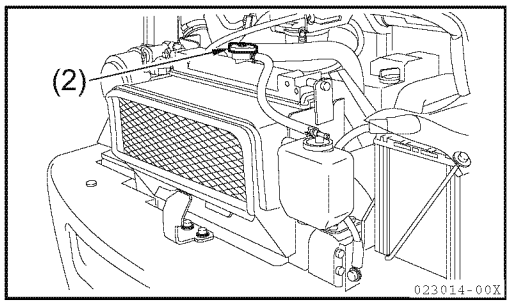
When removing the drain plug, be careful that the anti-freeze does not contact your eyes or skin.

Cleaning procedure

■ Things to prepare

- Container for cooling water
  Capacity : 6.34 Qts. (6L) or more
- Hose for delivering the water





1) Put the container under the drain plug (1).

2) Open the engine hood, slowly remove the radiator cap (2), pour the washing agent into the radiator and mount the cap (2).

3) Run the engine until the water temperature rises to 176°F (80°C) or more and idle the engine for 10 to 15 minutes. Then stop the engine.

4) After the engine has cooled down, slowly loosen and remove the drain plug (1) and remove the radiator cap (1) while draining the water.
   When the drain plug (1) is removed, the water in the radiator and the cylinder block of the engine is completely discharged.

5) After the water is completely discharged, reinstall the drain plug (1) and pour tap water through the water supply port of the radiator.

6) When the inside of the cooling system is filled with water, remove the drain plug (1), idle the engine and wash the cooling water system with running water until clean water comes out.
   While washing with running water, always keep the cooling system filled with water by adjusting the amount of water to be drained out and poured in. For this, hold the hose for supplying water on the water supply port of the radiator.

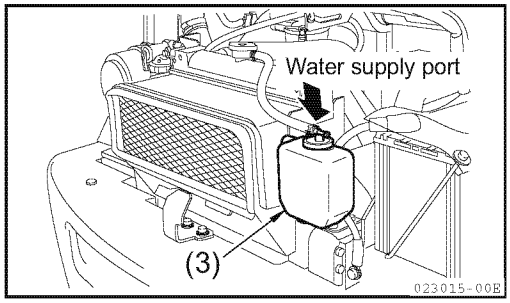
7) After washing with running water, stop the engine, stop pouring water, discharge water completely and then mount the drain plug (1).

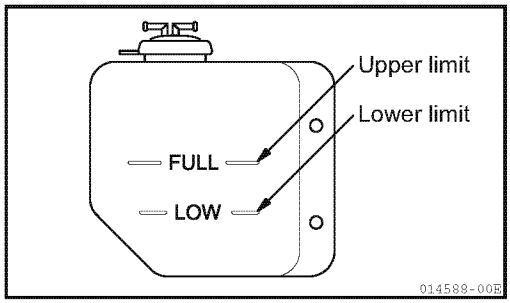
8) Pour anti-freeze-added water through the water supply port.

9) To bleed the cooling system of air, idle the engine for 5 to 6 minutes and then run the engine without load at high speed for 5 to 6 minutes. (While running the engine, keep the radiator cap (2) off.)

10) Approximately 5 minutes after stopping the engine, pour anti-freeze-added water up to the water supply port and install the cap (2).

11) Discharge the cooling water in the sub-tank (3), wash the inside of the sub-tank (3) and pour anti-freeze-added water up to the upper limit (FULL).



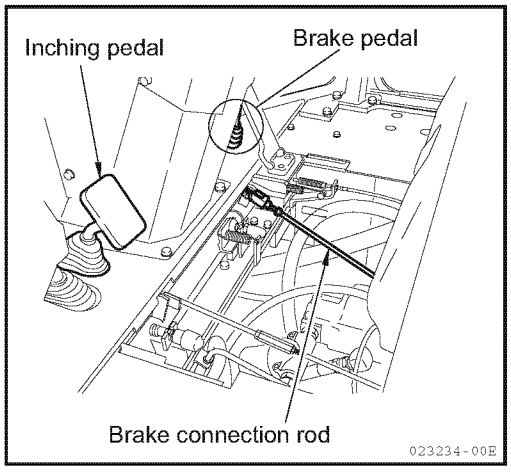


IMPORTANT

Washing method differs depending on the manufacturer of the washing agent. Follow the instructions of the manufacturer.

26-2-2. Adjustment of the inching pedal and brake pedal

When pedal stroke is more than 3.35 in. (85 mm), adjust the inching pedal by loosening the locknut and adjusting the length of inching connection rod so that the pedal stroke becomes 2.56 to 3.35 in. (65 to 85 mm).



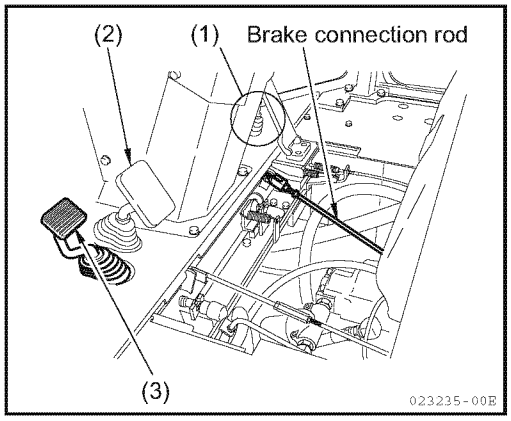
26-2-3. Adjustment of the parking brake lock pedal

Adjust the position of the parking brake lock pedal with the brake connection rod so that the parking brake works within 5 to 7 notches.

Note :

The brake pedal (1), inching pedal (2), and parking pedal (3) are adjusted by one brake connection rod.

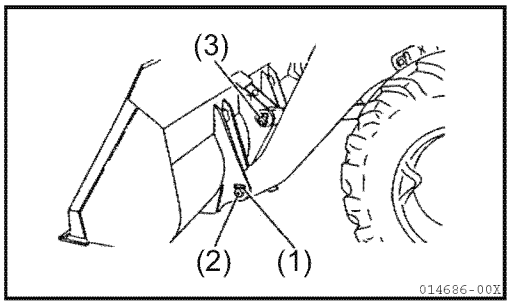
When all pedals cannot be adjusted, consult your dealer.



26-2-4. Replacing the bucket

⚠ WARNING

Work on a level, solid surface. If two or more persons work together, communicate by signal agreed upon before hand.



Replace the bucket according to the following procedure:

1) Park the machine on level, flat ground, and lower the bucket to the ground.

2) Stop the engine.
   After moving the control lever to release the pressure of the hydraulic system, set the lever in the "N" position and lock it with the control lever lock set in the "Lock" position.

3) Clean around the bucket pin to prevent foreign material from entering.

4) Loosen the lock plate holding bolts and remove the lock plate (1).

5) Remove the hinge pins (2) on both sides and the link pin (3).

IMPORTANT

Keep bucket pins away from dirt or mud.

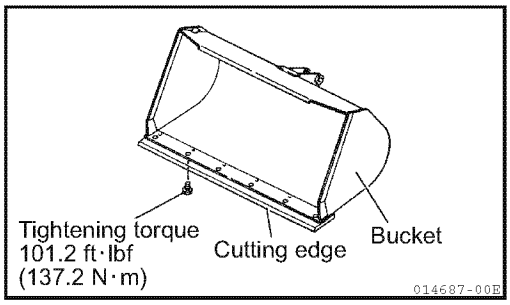
6) After the bucket has been replaced, insert the hinge pins (2), while aligning the lift arm bore holes with the bucket bore holes, and insert the link pin (3). Before inserting the pins, apply grease to them and the bushings.

7) Reinstall the lock plates (1) and lock plate holding bolts.

8) Grease all connecting parts.

26-2-5. Replacing the bolt-on cutting edge

If the bolt-on cutting edge is not replaced at proper time intervals, the bucket may be damaged. Replace it at the scheduled time intervals.



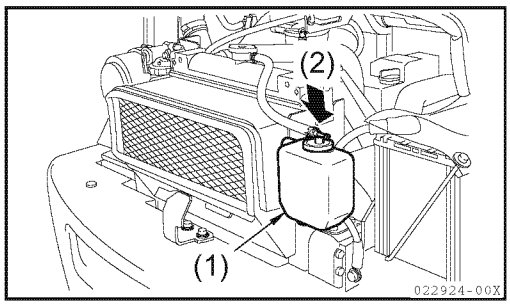
26-3. Checking before start-up

26-3-1. Checking and replenishing the cooling water

⚠ WARNING

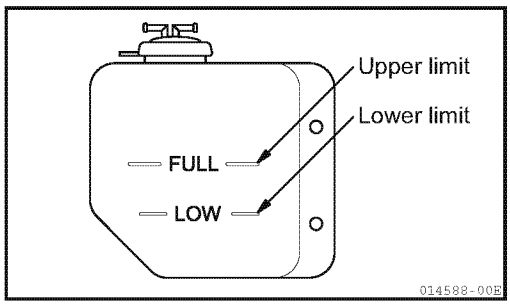
Normally do not open the radiator cap.
You may get scalded if you touch the radiator cap immediately after the engine is stopped.
Check the cooling water in the sub-tank when the engine is cool.

1) Open the engine hood to check to see that the cooling water level is between the FULL and LOW marks on the sub-tank (1) (illustrated at right). If the cooling water level is low, add cooling water to the FULL mark through the port (2) of the sub-tank (1).
   When the cooling water in the radiator reduces to the critical level, some amount of water is automatically supplied to the radiator from the sub-tank.
   For the cooling water to be used, refer to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".



2) Securely close the cap after replenishing.

3) If the sub-tank (1) is empty, check the sub-tank for leaks and then check the cooling water level in the radiator. If the cooling water is insufficient, refill the radiator and then the sub-tank with cooling water.



4) If the cooling water level is proper, close the engine hood.

IMPORTANT
When the engine hood is closed, check to see that the lever is placed securely in the LOCK position.

26-3-2. Checking and replenishing the fuel in the fuel tank

⚠ WARNING

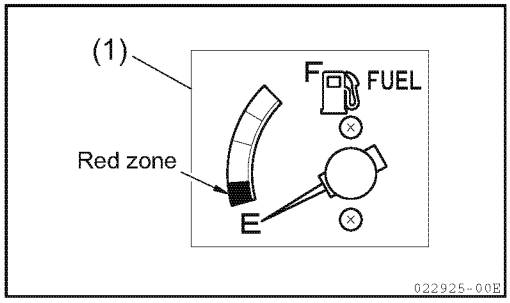
- **Be careful not to overfill the fuel tank because it could cause a fire. If overfilled, completely wipe off the spilled fuel.**
- **When refueling, keep lighted cigarettes and other source of ignition away from the fuel supply port.**

⚠ CAUTION

- **Do not remove the strainer from the fuel supply port of the fuel tank before refilling fuel.**
- **Be careful not to allow water settled at the bottom of the fuel container or dirt on refueling equipment to enter the fuel tank.**

1) Turn the starter switch to the "ON" position, and check the fuel level with the fuel level gauge (1).

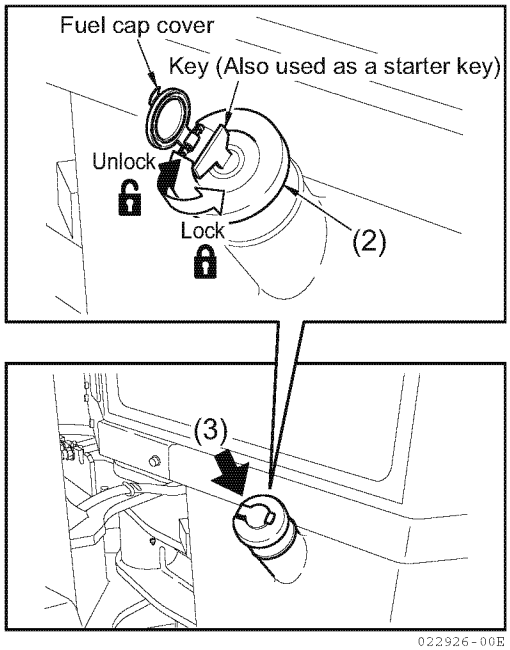
   - When the fuel level gauge pointer is in the "Red Zone", approximately 2.9 Gals. (11 L) of fuel are left in the tank.



2) When the fuel oil level is low, remove the fuel tank cap (2) by using the starter key and refill the tank with the specified fuel from the fuel supply port (3).
   Refill the fuel tank while checking the fuel level gauge (1).

   - Capacity...14.5 Gals. (55 L)

   See Section "22. Fueling, Oiling and Greasing Based on Temperature Range" for fuel recommendations.



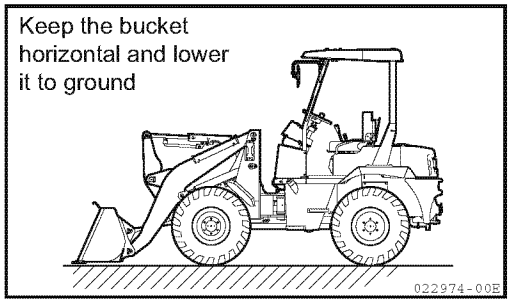
3) After refueling, securely close the fuel tank cap (2).

26-3-3. Checking and replenishing the hydraulic oil in the hydraulic oil tank

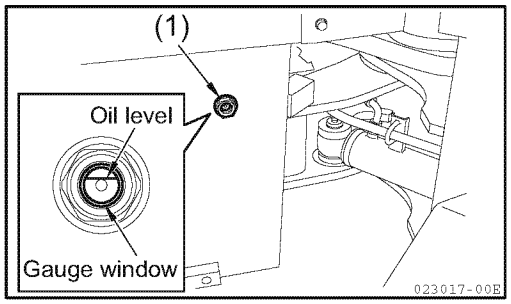
⚠ WARNING

When removing the plug of the oil supply port, slowly loosen it to release pressure in the tank.

1) When checking the hydraulic oil level, position the machine as shown in the right figure.



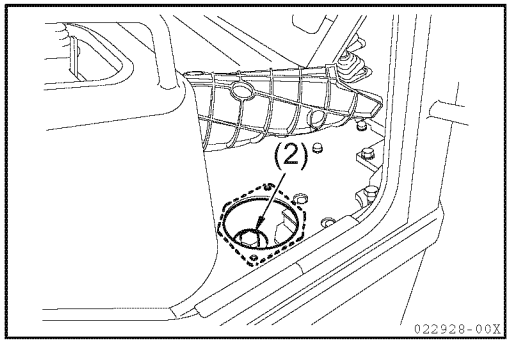
2) Check the oil level with the oil level gauge (1) on the side of the tank.
   Check that the oil level is between the upper and lower limit marks.



IMPORTANT

Do not supply oil above the UPPER limit mark. Excessive oil can damage the hydraulic system or cause a dangerous high pressure leak.

3) Replenish oil from the oil supply port (2) if the oil level is at the lower limit or less.
   See Section "22. Fueling, Oiling and Greasing Based on Temperature Range" for oil to be used.



Note :

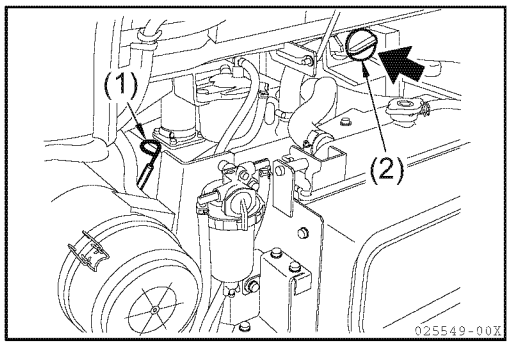
As the oil level varies with oil temperatures check the oil level based on the following guidelines:

- *Before start-up : Near the middle of the level gauge (oil temperature 50 to 86°F (10 to 30°C))*
- *During normal operation : Near the upper limit of the level gauge (oil temperature 122 to 176°F (50 to 80°C))*

26-3-4. Checking and replenishing the engine oil

⚠ WARNING

At operating temperature, the oil and dipstick areas are hot. Do not allow hot oil or components to contact the skin to prevent bodily injury.
Check oil level and refill oil after engine has cooled down sufficiently.



1) Open the engine hood, pull out the oil dipstick (1), and wipe it off with a cloth.

2) Insert the oil dipstick (1) fully and pull it out again.

3) Check to see that the oil level is above the middle between the upper and lower limit marks.
Open the cap of the oil supply port (2) and replenish oil if the oil level is lower.

4) Even when you operate the machine for a short time, replenish engine oil if the engine oil level is lower than the middle.
See Section "22. Fueling, Oiling and Greasing Based on Temperature Range".

5) If the engine oil level is proper, securely close the oil supply port cap (2) and close the engine hood.

IMPORTANT

- **If you must check the engine oil level after the engine has started, stop the engine and wait for 15 minutes before checking.**
- **If the machine is inclined, make it horizontal before checking the engine oil level.**

26-3-5. Checking and adjusting the fan belt tension

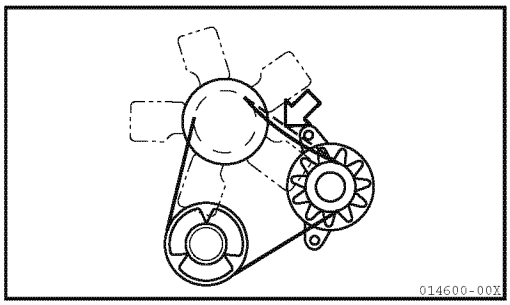
■ **Check the fan belt tension**

⚠ WARNING

- **Stop the engine, take out the starter switch key, and attach the "Servicing in Progress" tag to the switch.**
- **The fan belt is hot immediately after the engine is stopped.**
  Do not adjust the fan belt tension immediately after stopping the engine.
  Adjust the fan belt tension after all of the parts of the engine have fully cooled down.

■ **Things to prepare**

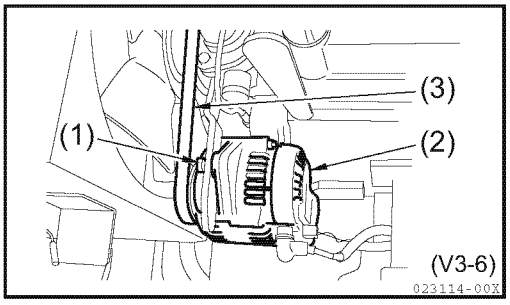
- Wooden lever (such as the handle of a hammer)



1) Open the engine hood.

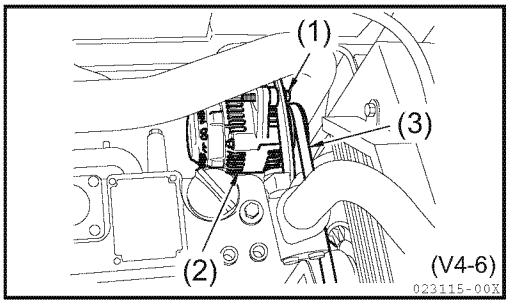
2) Loosen the alternator mounting bolt (1).

3) Insert a wooden lever between the alternator (2) and the cylinder block, and move the alternator (2) so that the fan belt tension should be slacked approximately 0.39 to 0.59 in. (10 to 15 mm) with a pressing force of 22.1 lbs (10 kg).



4) Retighten the mounting bolt to secure the alternator (2).

5) Check the pulleys, the V-groove, and the fan belt (3) for damage, and check that the fan belt (3) does not touch the bottom of the V-groove.



6) If the fan belt (3) cannot be adjusted due to elongation or damage, replace the fan belt with a new one.
(Fan belt size : A38)

IMPORTANT

When a new fan belt is installed, it will tend to loosen in short time.

Hence the new fan belt must be checked and adjusted the tension after the first 20 and 50 service hours.

26-3-6. Checking the electric wiring

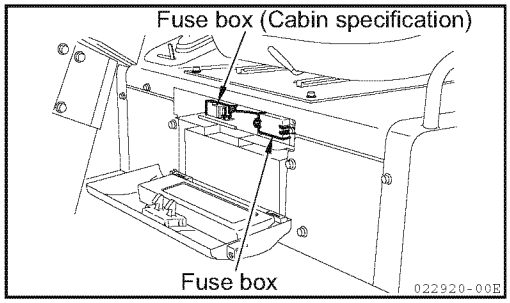
⚠ CAUTION

Whenever a fuse blows out or there are any marks made by a short circuit in the electric wiring, contact your dealer to investigate the cause and repair it.

Check the fuses for damage, the wiring for poor connections or short circuits, and the battery terminals for corrosion and loose connectors. Take corrective action.

Check the following items, in particular:

- Battery
- Starter
- Alternator



26-3-7. Checking and replenishing the battery electrolyte

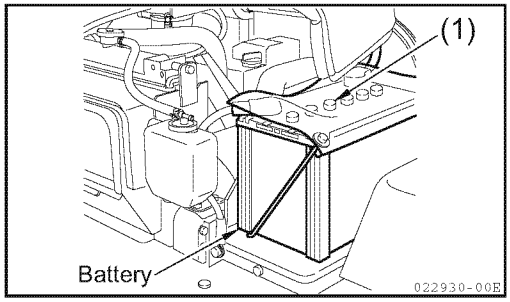
⚠ WARNING

- **The battery generates flammable gas and can cause a fire and an explosion.**
  Keep sparks or flames away from the battery.
- **Battery electrolyte is strong acid. To avoid serious injury, do not allow the electrolyte to contact skin or splash into eyes.**
  If you touch the electrolyte, flush it out with plenty of water and consult a doctor.
- **Always wear safety goggles and protective clothing.**

Do these steps before starting the machine.

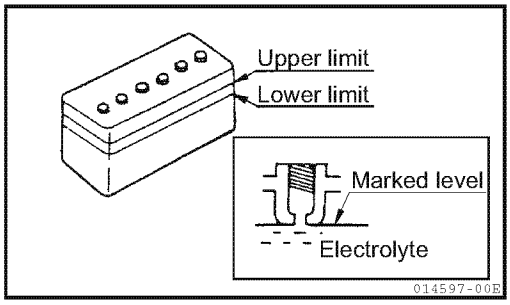
1) Open the engine hood.

2) When the electrolyte level is below the marked level in the battery, remove the cap (1) and replenish distilled water to the marked level (0.39 to 0.47 in. (10 to 12 mm) above the pole plates). If any electrolyte is spilled, add dilute sulfuric acid.



3) If some distilled water is added to one cell, add it to the other cells, as well.

4) Clean the bleeder of the battery cap and securely tighten the cap.



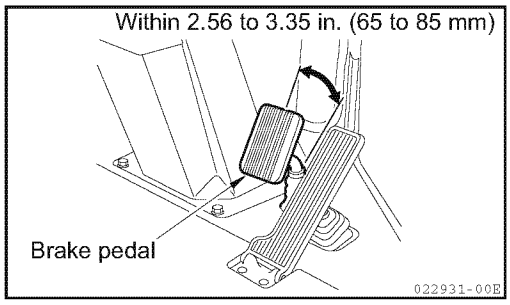
IMPORTANT

When you have to replenish the distilled water, do this immediately before starting up the engine to prevent the water from freezing if the weather is very cold.

26-3-8. Checking the brake pedal and inching pedal.

Check whether the pedal stroke of the pedal is 2.56 to 3.35 in. (65 to 85mm).

If the condition mentioned above is not satisfied or the inching pedal does not work well, refer to Section "26-2. Nonperiodic services".

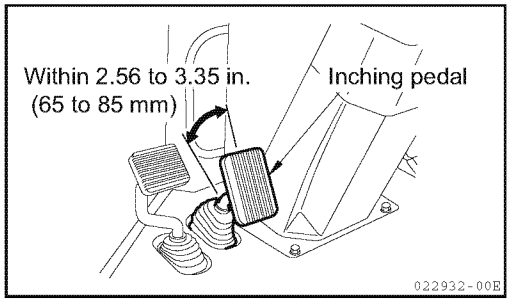


26-3-9. Checking the tires

Air pressure

V3-6.....28.44 PSI (196.1 Kpa)

V4-6.....31.28 PSI (215.8 Kpa)



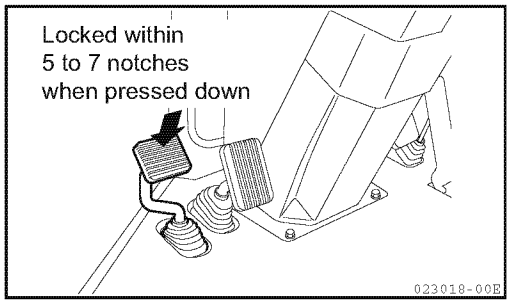
[Checking and adjustment]

Measure the air pressure of each tire before starting operations. Also, check the tires for scuffs, cracks and nails or other metal objects that could cause damage.

Take necessary actions.

26-3-10. Checking the parking brake lock pedal

If the parking brake lock pedal is pressed down and locked within 5 to 7 notches, it is working properly, If not, refer to Section "26-2. Nonperiodic services".



26-3-11. Does the horn sound properly? Does the back buzzer sound properly?

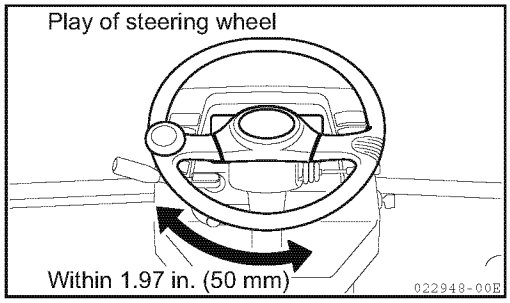
26-3-12. Do the lamps light properly? Are they not dirty or damaged?

26-3-13. Are the color of the engine exhaust fumes and the sound of the engine exhaust system normal?

26-3-14. Do the instruments work properly?

26-3-15. Is the play of the steering wheel proper? Does the steering wheel work properly?

If the play is less than 1.97 in. (50 mm) along the circumference of the steering wheel, it is proper. If the play is more than 1.97 in. (50 mm) or the steering wheel does not operate properly, consult your dealer.



26-3-16. Are the rear-view mirrors positioned in the proper direction? Are they not dirty or damaged?

26-3-17. Is the license plate dirty or damaged? (only for licensed vehicles)

26-4. Maintenance every 50 service hours

26-4-1. Draining the water and deposit in the fuel tank

⚠ WARNING

Keep sparks, flames and lighted cigarettes away.

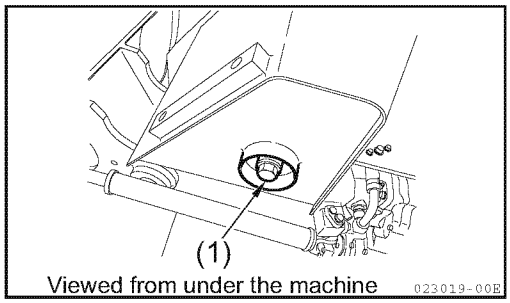
■ **Things to prepare**

- Container for fuel waste

1) Put the container for fuel waste under the drain plug (1).

2) Remove the drain plug (1) to discharge the water, and dirt deposits with the fuel from the fuel tank.
   Take care that you are not splashed by the fuel.

3) When clean fuel starts to come out, install and tighten the drain plug (1).

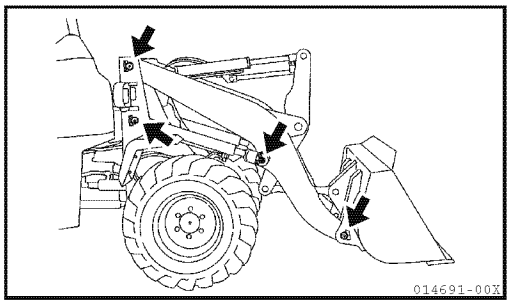


26-4-2. Greasing

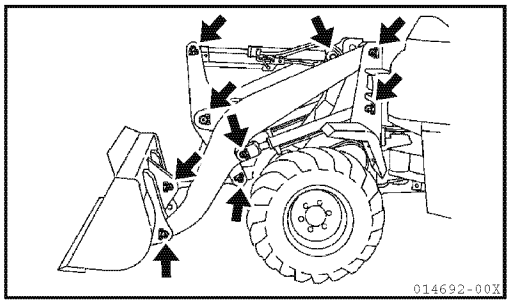
IMPORTANT

Grease the fittings thoroughly after washing the machine or after operation in the rain, on soft ground, or in muddy water.

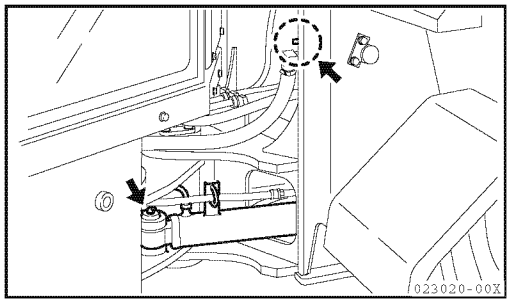
1) Lower the lift arm until the bucket reaches the ground, and stop the engine.



2) Clean the grease fittings designated with arrows on the right, and grease them using a grease gun.



3) After greasing, wipe off the old excessive grease.



26-4-3. Cleaning the water separator element

⚠ WARNING

- **Keep sparks, flames and lit cigarettes away.**
- **At the operating temperature, the engine components are hot and can cause a burn.**
- **Disconnect the ground of the battery and clean the element after the engine has cooled sufficiently.**
- **Fuel oil leaked or spilled onto hot surfaces or electrical components could cause a fire.**
- **Drain the fuel from the water separator into a container before removing the water separator retainer ring.**

■ **Things to prepare**

- Container for fuel waste

1) Open the engine hood.

2) Take out the hose connected to the drain cock on the bottom of the cup from the engine hood and place it in a container.

3) Loosen the drain cock three or four turns.

4) Loosen the air bleeder bolt two or three turns with a cross-head screwdriver or a hexagon wrench to drain water from the cup if the fuel waste does not drain away smoothly.

5) After setting the cock to the closed position, loosen the retainer ring to remove the cup, and drain water from the cup. Do not lose the red ring in the cup.

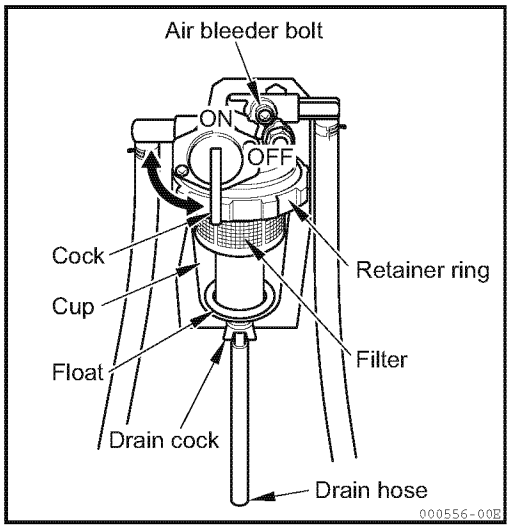
6) After draining, securely tighten the air bleeder bolt and the drain cock.

7) Remove the element and clean it and the inside of the cup using light oil or wash oil.

8) Check the O-ring and if it is damaged or deformed, replace it with a new one.

9) Install the element and the cup and turn the cock to the open position.

10) Close the engine hood.



26-5. Maintenance every 100 service hours

Perform the maintenance every 50 service as well.

26-5-1. Greasing

IMPORTANT

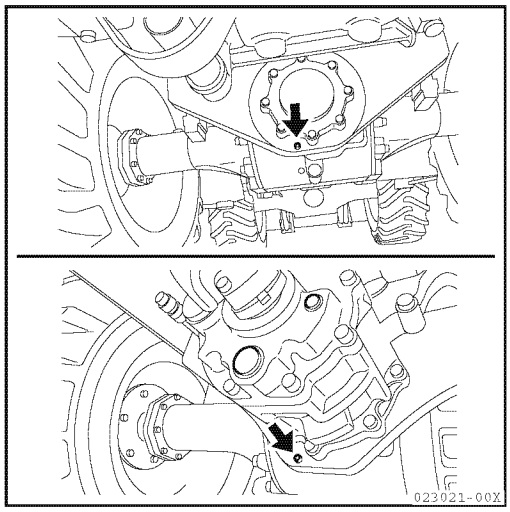
Grease the fittings thoroughly after washing the machine or after operation in the rain, on soft ground, or in muddy water.

1) Lower the lift arm down until the bucket reaches the ground, and stop the engine.

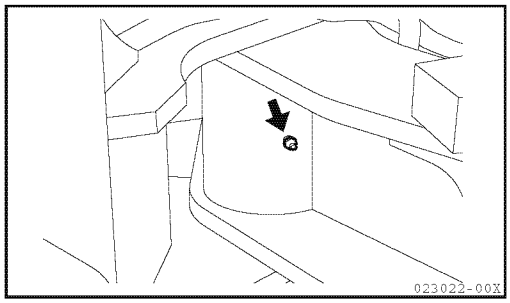
2) Clean the grease fittings designated with arrows on the right, and grease them using a grease gun.

3) After greasing, wipe off the old excessive grease.

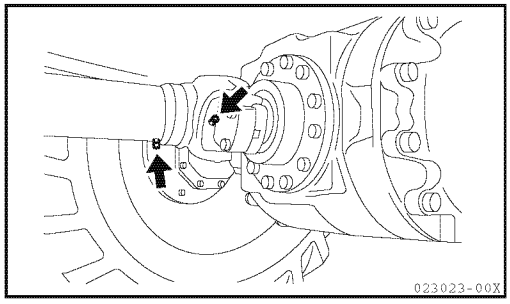
1. Oscillation : 2 places



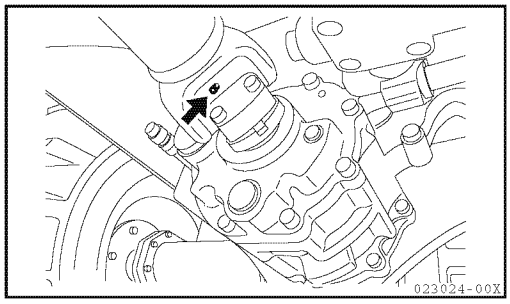
2. Center pin : 1 place



3. Drive shaft (front side) : 2 places



4. Drive shaft (rear axle side) : 1 place



26-5-2. Checking and replenishing the front and rear axle gear oil (The rear axle shares the oil supply port with the transfer)

⚠ WARNING

- **Before checking the oil level, apply the parking brake and lock the front and rear frames with the frame lock bar.**
- **The gear oil and casing of transfer are very hot immediately after the machine operation stops, and can cause bodily injury.**

If you find oil leaks in the axle case, check the oil level.

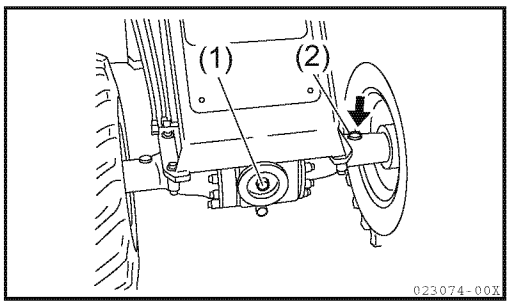
IMPORTANT

When checking the oil level, place the vehicle on stable ground on which it is horizontal. (If the vehicle is slanted to the right or left, the oil level reading will not be correct.)

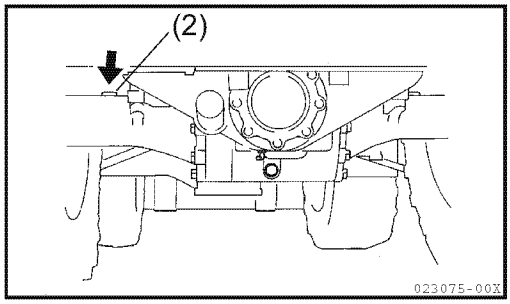
Remove the oil check bolt (1) and check whether the oil comes out through the oil check port. If the oil level is too low, replenish the oil through the oil supply port (2) port.

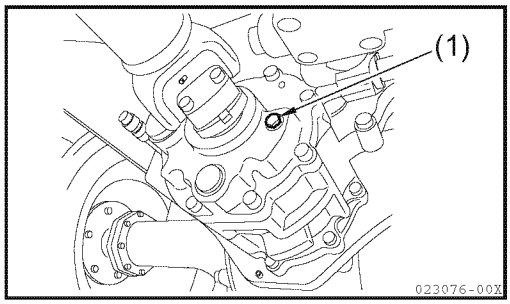
For oil recommendations, refer to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".

Front axle



Rear axle





26-6. Maintenance every 250 service hours

Perform the maintenance every 50 service hours as well.

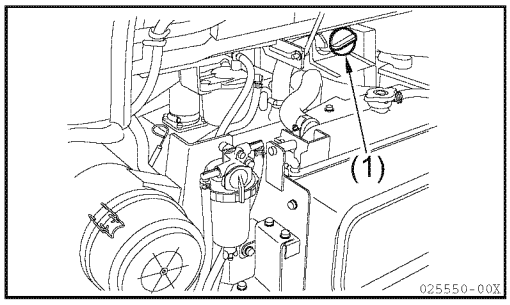
26-6-1. Replacing the engine oil and the engine oil filter

⚠ WARNING

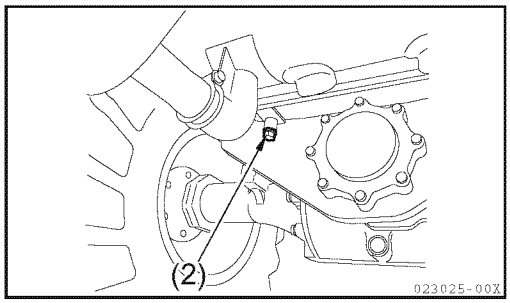
Hot oil and components can cause bodily injury.
Do not allow hot oil or components to touch the skin.
Replace oil and filter cartridge after oil and components have cooled sufficiently.

■ **Things to prepare**

- Filter wrench (for cartridge filter)
- Container for waste oil . Capacity of 7.93 Qts. (7.5 L) or more
- Replacement new oil....V3-6 : 4.97 Qts. (4.7 L)
  V4-6 : 7.82 Qts. (7.4 L)



1) Open the engine hood and remove the oil supply port cap (1).

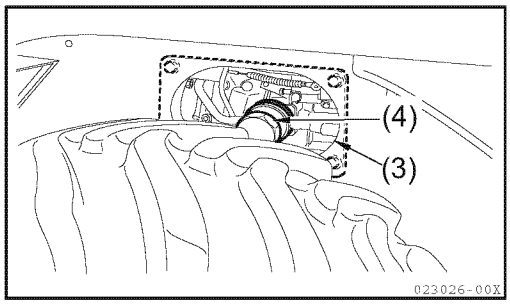


2) Put the container for the waste oil under the plug (2).

3) Slowly remove the drain plug (2) so that you will not be splashed with oil and discharge the waste oil.

4) Check the waste oil, and contact the nearest dealer if many metallic particles or foreign objects are mixed in it.

5) Reinstall the drain plug (2).



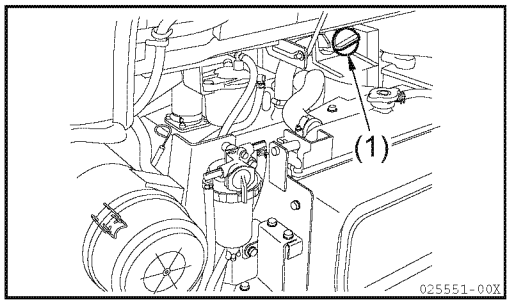
6) Remove the cover (3) in the left tire side, and turn the filter cartridge (4) counterclockwise using the filter wrench to remove it.

7) Remove the oil filter and wait for 10 to 15 minutes.

8) Wipe dirt or oil from the filter mount using a cloth moistened with light oil.

9) Apply engine oil to the packing surface of a new oil filter cartridge.

10) Mount the filter cartridge and turn it two thirds of a turn after the packing surface has contacted with the filter mount.



11) After replacing the oil filter cartridge, supply the engine oil to the upper limit mark on the oil dipstick through the oil supply port (1).

12) Idle the engine for several minutes and then stop the engine. 10 to 15 minutes after that, check that the oil level is above the middle between the upper and lower limit marks.

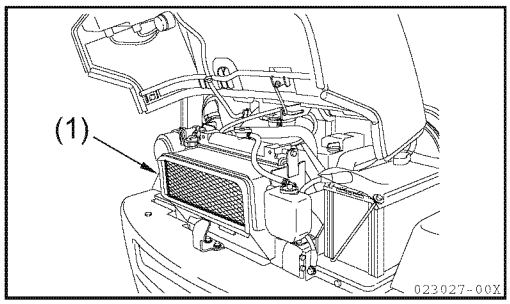
13) Properly tighten the oil supply port cap.

26-6-2. Checking and cleaning the radiator fin

⚠ WARNING

- **Never attempt servicing while engine is running or immediately after stopping machine operation.**
- **Use compressed air to clean the element.**
- **Whenever using compressed air for cleaning, check that there are no people around the place, and wear protective goggles, clothing and safety shoes. The maximum compression pressure should be less than 99.54 PSI (686.5 Kpa) for cleaning purposes.**

1) Open the engine hood.



2) Clean off the mud, dirt or leaves in the radiator fin (1) by blowing compressed air or by flushing with steam.

IMPORTANT

- **Always blow the compressed air from a little distance away to prevent the fin from being damaged.**
- **The damaged fins will cause water leaks and overheating.**

3) Check that radiator fins (1) are straight and ail the dirt is removed.

4) Close the engine hood.

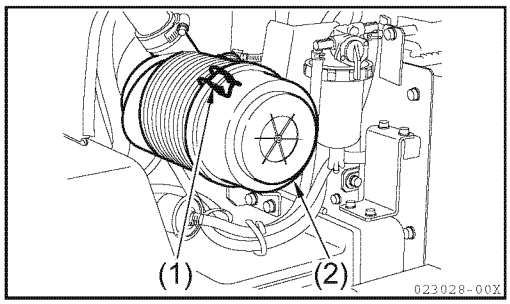
26-6-3. Checking and cleaning the air cleaner element

⚠ WARNING

- **Never attempt servicing while the engine is running or immediately after stopping machine operation.**
- **Use compressed air to clean the element.**
- **Whenever using compressed air for cleaning, check that there are no people around the place, and wear protective goggles, clothing and safety shoes. The maximum compression pressure should be less than 99.54 PSI (686.5 Kpa) for cleaning purposes.**

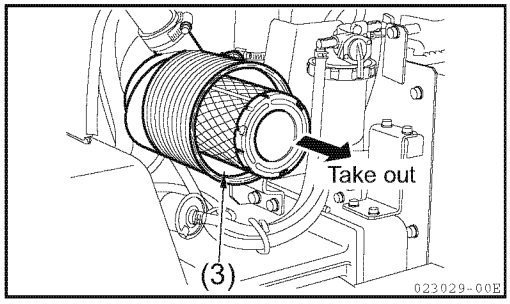
1) Open the engine hood.

2) Open the two clips (1) to remove the cover (2).

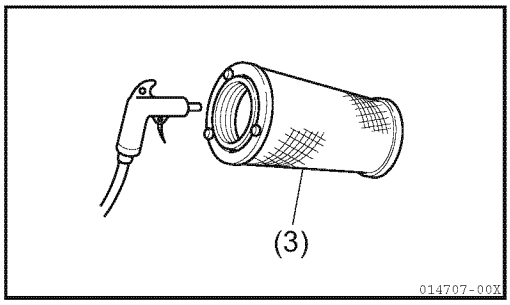


3) Take out the element (3).
   Cover the connector side at the back of the air cleaner body, with a clean cloth and tape to prevent dirt from entering.

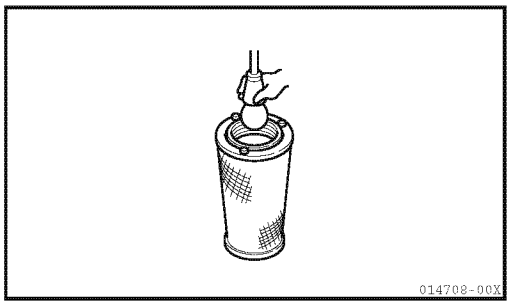
4) Clean the inside of the dust cup and the inside of the body.



5) Blow dry compressed air (99.54 PSI (686.5 Kpa) or less) from inside the element (3) along the pleats to roughly remove the dirt. Then blow compressed air from outside the element along the pleats to remove the dirt. Then blow it again from inside the element.



6) After cleaning, illuminate the element from inside using a light bulb and check it. If there are any small holes or thin parts, replace the element.



IMPORTANT

- **When cleaning the element, do not knock it or strike it against other objects. Otherwise the element may be damaged.**
- **Replace the element with a new one if the pleat, gasket or seal is damaged.**

7) Remove the clean cloth and the tape shielding the connector in the back.

8) Mount the cleaned element (3).

9) Install the cover (2) and close the clips (1) to hold it.

10) Close the engine hood.

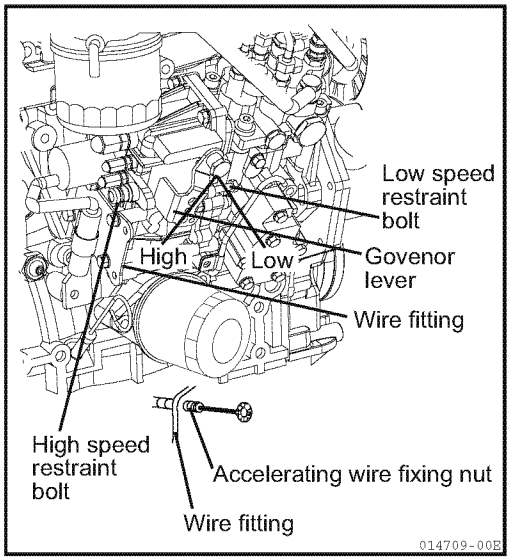
26-6-4. Adjusting the governor lever and accelerator device

The governor lever and the accelerator devices (accelerator lever, petal, etc.) of the auxiliary machinery are connected by an accelerator wire.
If the wire becomes stretched or the connections loose deviation in the position may result and make operation unsafe. Inspect the wire periodically and adjust if necessary.

1) Check to see that the governor lever on the engine side is touching the restraint bolt of the high speed side when the accelerator device is in the high speed position.

2) Check to see that the governor lever is touching the restraint bolt of the low speed side when the accelerator device is in the low speed position.

3) If the governor lever does not touch the restraint bolt for either the high or low speed side when you check them, loosen the setting screws on the fittings for the accelerator wire and adjust the position of the wire.



⚠ CAUTION

Never remove the restraint bolt for the fuel injection pump or the restraint bolt on the amount of fuel injected. Doing so will impair safe operation and lower the efficiency of the engine and shorten its life.

26-7. Maintenance every 500 service hours

Perform the maintenance every 50, 100 and 250 service hours, as well.

26-7-1. Replacing the fuel filter element

⚠ WARNING

- **Keep sparks, flames and lighted cigarettes away.**
- **At operating temperature, the engine components are hot and can cause a burn. Disconnect the battery ground and clean the element after the engine has cooled sufficiently.**
- **Fuel oil leaked or spilled onto hot surfaces or electrical components may cause a fire.**

■ **Things to prepare**

- Container for fuel

1) Open the engine hood.

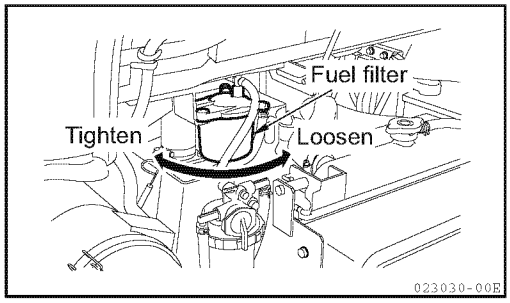
2) Place the container for fuel under the fuel filter.

3) Turn the fuel filter cartridge counterclockwise with the filter wrench to remove it.

4) Clean the filter mount and apply engine oil to the seal surface of a new fuel filter, then mount the filter. At that time, fill the filter with fuel.

5) After replacing the fuel filter element, release air. (Refer to next page.)

6) After air release, start the engine and check for fuel leak.
   If there is nothing wrong, stop the engine and close the engine hood.



IMPORTANT

So that the filter cartridge should not be too tightened, turn it lightly until the seal surface contacts with the filter mount, then tighten the filter by 2/3 of a turn.

How to release air:

This machine is equipped with an automatic air release device (solenoid pump). Release air according to the procedure.

1) Fill up the fuel tank.

2) Apply the parking brake, set the F-R change lever to the neutral position and apply the F-R change ever lock.

3) Turn the starter switch to the "ON" position to turn on electricity for approximately 10 to 15 seconds. (Air is normally released in 10 to 15 seconds automatically.)

4) Turn the starter switch to the "START" position to start the engine.

IMPORTANT

If the engine is not started after this procedure, turn the starter switch to the "OFF" position and at least a minute later turn it to the "START" position again to restart the engine.

When you refuel, release air in the same way. After the engine starts, sometimes it revolves irregularly. In this case, turn the starter switch to the "OFF" position, wait for one minute or more and turn the starter switch to the "START" position again.

26-7-2. Replacing the air cleaner element

⚠ WARNING

Never attempt replacing the air cleaner element while the engine is running.
Replace the air cleaner element after the engine is stopped and has cooled sufficiently.

1) Open the engine hood.

2) Open the two clips (1) to remove the cover (2).

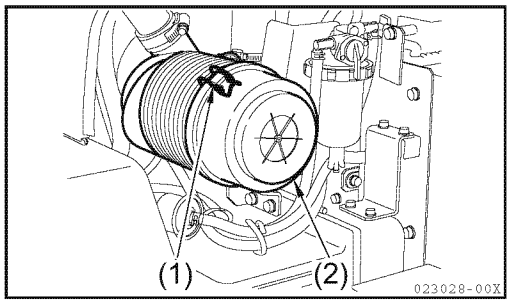
3) Take out the element (3).
Cover the connector side at the back of the air cleaner body using a clean cloth and tape to prevent dirt entering.

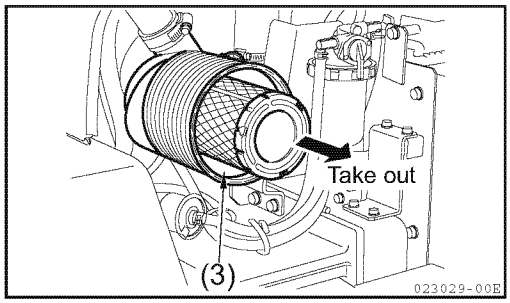
4) Clean the dust cup and the inside of the body.
Remove the clean cloth and the tape covering the connector in the inside of the body.

5) Install a new element.

6) Install the cover (2) and close the clips (1) to hold it.

7) Close the engine hood.





26-7-3. Replacing the front and rear axle gear oil
(The rear axle shares the oil supply port with the transfer.)

⚠ WARNING

The gear oil and casing of the reduction gearbox are hot immediately after stopping machine operation, and can cause bodily injury.

■ **Things to prepare**

- Container for waste oil...Capacity more than amount of oil to be replaced
- Amount of oil to be replaced

Specified amount of oil	V3-6	V4-6
Front axle Qts. (L)	6.87 (6.5)	7.93 (7.5)
Rear axle Qts. (L)	8.99 (8.5)	10.04 (9.5)

1) Place a container for waste oil under the drain plug (1).

2) Remove the drain plug (1). To let the used oil out quickly, remove the oil check bolt (2) while the used oil is warm.
(The front and rear axle oil replacement procedures are the same.)

3) Tighten the drain plug (1), then remove the oil check bolt (2).

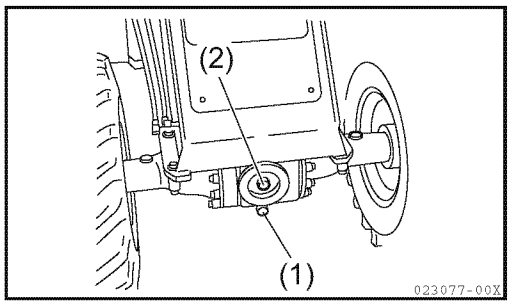
4) Supply oil until oil starts flowing out of the oil check bolt hole.

5) Tighten the oil check bolt (2). For oil recommendations, refer to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".

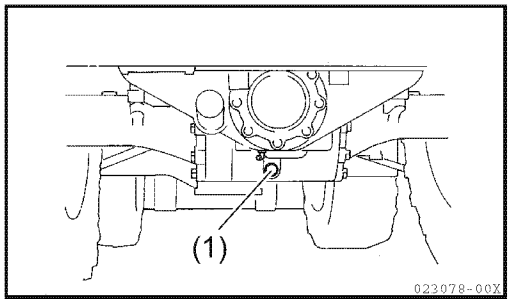
⚠ CAUTION

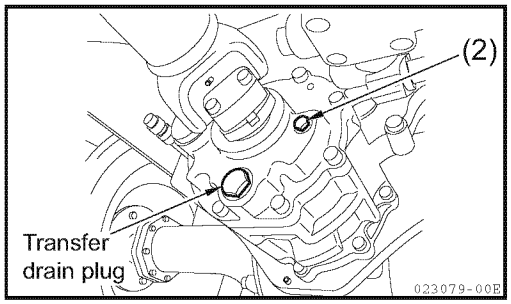
When replacing the rear axle oil, also remove the transfer drain plug to drain the used oil.

Front axle



Rear axle





26-7-4. Replacing the hydraulic oil return filter

⚠ WARNING

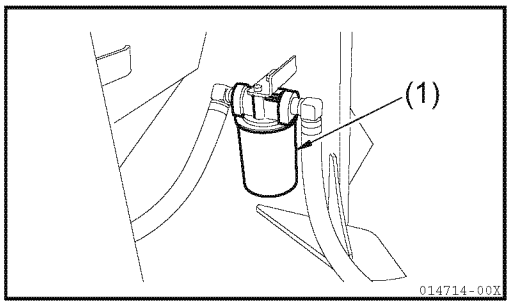
The hydraulic oil and the tank are very hot and under high pressure during normal operation, and immediately after stopping the operation.
Remove the lid and replace the filter only after the engine is stopped and the oil has cooled down.

■ **Things to prepare**

- Container for waste oil...More than 1.05 Qts. (1 L)
- Amount of oil for refill...Approx. 1.05 Qts. (1 L)

1) Lower the bucket to the ground, apply the parking brake, and stop the engine.

2) Place a container for waste oil under the return filter (1).



3) Turn the return filter (cartridge type) counterclockwise to remove it.

4) Wipe the dust and oil deposits off the return filter holder with a light-oil-moistened rag. Then install a new filter.

5) When installing a new filter, apply hydraulic oil to the packing surface.

6) Turn the filter clockwise until the packing comes in contact with the holder, and then tighten it two-thirds of a turn.

7) After having installed the new filter, idle the engine for a while and check the contact surfaces for oil leaks.

8) Stop the engine. Then check that the oil level is between the UPPER and LOWER limit marks, referring to Section "26-3. Checking before start-up". If the oil level is too low, replenish oil.
For oil recommendations, refer to Section "22. Fueling, Oiling and Greasing Based on Temperature Range".

26-7-5. Replacing the H.S.T. oil filter

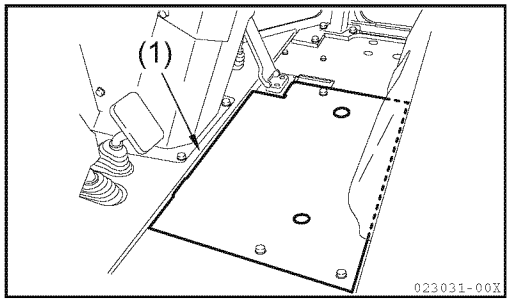
⚠ WARNING

The hydraulic oil and the tank are very hot and under high pressure during normal operation and immediately after stopping the operation. Replace the filter after the engine is stopped and the oil has cooled down.

■ **Things to prepare**

- Container for waste oil

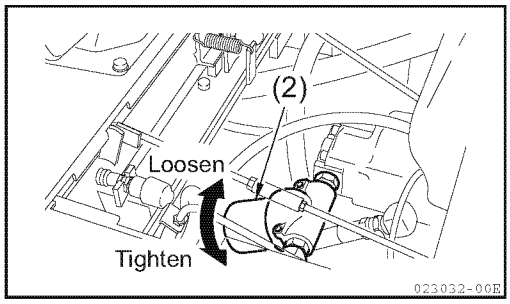
1) Remove the floor plate (1).



2) Turn the oil filter (2) (cartridge type) counterclockwise to remove it.

3) Wipe the dust and oil deposits off the filter holder with a light-oil-moistened rag.

4) When installing the new filter, apply a coat of engine oil to the packing surface.



5) Turn the filter clockwise until the packing comes in contact with the holder, and then tighten in two thirds of a turn.

6) After having installed the new filter, idle the engine for a while and check the contact surfaces for oil leaks.

7) Install the floor plate (1).

26-8. Maintenance every 1000 service hours

Also perform the maintenance every 50, 100, 250 and 500 service hours as well.

26-8-1. Replacing the oil in the hydraulic oil tank and cleaning the suction filter

⚠ WARNING

- **The hydraulic oil and the tank are very hot and under high pressure during the operation and immediately after the operation.**
- **Replace the oil and clean the filter only when the engine is stopped and the tank is cool enough to touch with your bare hand.**
- **The plug may pop out and the hydraulic oil may spout out if the pressure is not released. Slowly loosen the plug to release the pressure from inside the tank.**

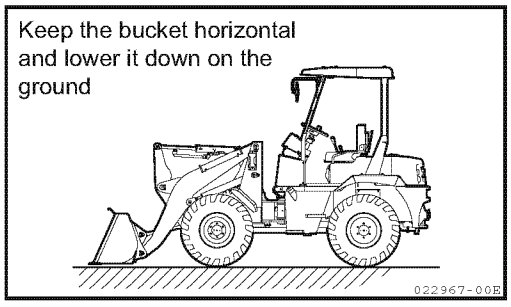
■ **Things to prepare**

- Container for the waste oil
  Capacity of 11.10 Gals. (42 L) or more
- New hydraulic oil...11.10 Gals. (42 L)
  (When all oil from all hydraulic equipment, pipes and hoses is drained, the amount of new oil to be needed is 13.74 Gals. (52 L).)

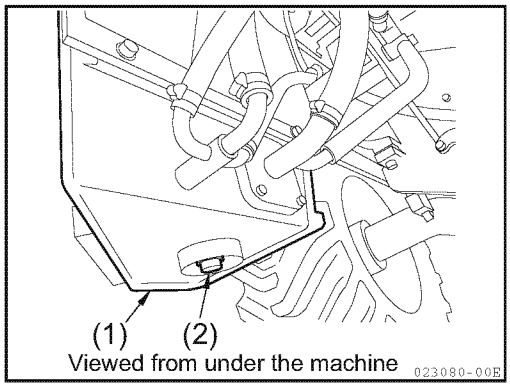
1) Keep the bucket horizontal and lower the lift arm to put the bucket on the ground.

2) Apply the parking brake and stop the engine.

3) Place a container for waste oil under the drain plug (2) located on the bottom of the hydraulic oil tank (1).



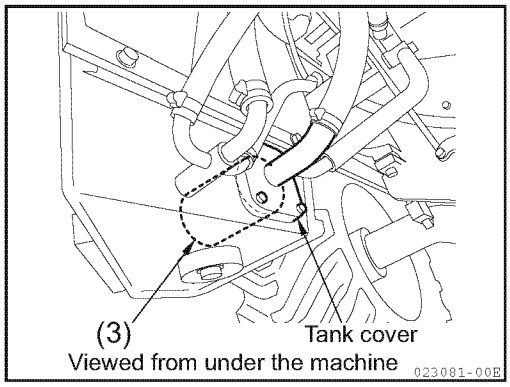
4) Remove the drain plug (2) to drain the oil. Take care that the oil does not splash when removing the drain plug (2).
   After draining the used oil through the hydraulic oil drain plug, remove the tank cover and the suction filter (3) to clean the hydraulic oil tank.



IMPORTANT
Check the O-ring on the drain plug for cracks, and damage. If it is damaged, replace it with a new one. (Oil leak prevention)

5) After discharging the cleaning oil, tighten the drain plug.
   Tightening torque :
   115.7 to 137.3 ft•lbf. (156.8 to 186.2 N•m)

6) Remove the filter element and remove dirt from the filter element and wash it using a washing agent or light oil.



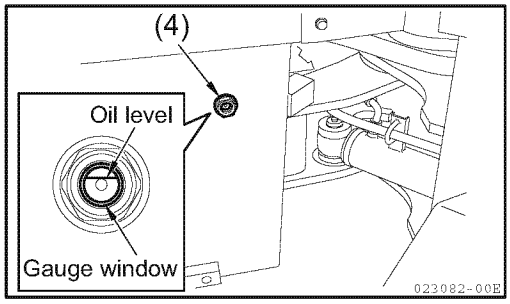
IMPORTANT
Do not allow any dirt to enter the tank when mounting the filter.

   See Section "22. Fueling, Oiling and Greasing Based on Temperature Range" for hydraulic oil to be used.

7) Wipe off the cover mount surface using a cloth and check the O-ring, and if the O-ring is damaged, replace it with a new one, then mount the cover.

8) Supply oil to the specified level. Check the oil level with the oil level gauge on the tank side and do not fill the tank beyond the middle between the upper and lower limit marks.

9) After replacing the oil, move all control levers to the neutral position and idle the engine for approximately 2 to 3 minutes and then begin the operation of the machine.



26-9. Engine and associated parts

IMPORTANT

Because special tools and professional skill are required to perform the following procedures for checking, adjusting and retightening, ask your dealer for these procedures:

■ Maintenance every 1000 service hours

- Checking and adjusting the fuel injection valve.
- Checking and adjusting the intake and exhaust valve clearance.
- Checking and adjusting of fuel injection pressure and atomizing condition.
- Retightening the cylinder head bolt.

■ Maintenance every 2000 service hours

- Check and replace fuel oil pipe, cooling water pipe.
- Lapping the intake and exhaust valve.
- Check fuel pump adjust.
- Clean and check the cooling water system.

27. Periodic Replacement of Safety Related Parts

It is strongly recommended that the operator inspect and service the vehicle at regular time intervals to ensure safety in operation. In addition, to enhance operational safety, be sure to replace the parts listed below as scheduled.
The parts listed below are prone to aging, wear and degradation with time. It is not easy to determine when to replace them based on the results of the periodic inspections. Therefore, it is essential to replace those parts with new ones at the prescribed service times in order to maintain the safety of the vehicle, even if you do not find anything wrong with those parts.
If, however, you should find something abnormal with any of those parts before their scheduled replacement, repair or replace them immediately.

	Parts to be replaced periodically	Replacement time intervals
1	Hydraulic hose for steering system	Every 2 years
2	Packing seal and O-ring for steering cylinder	Every 2 years
3	Fuel hose	Every 2 years

SPECIFICATIONS AND DIMENSIONAL DIAGRAMS

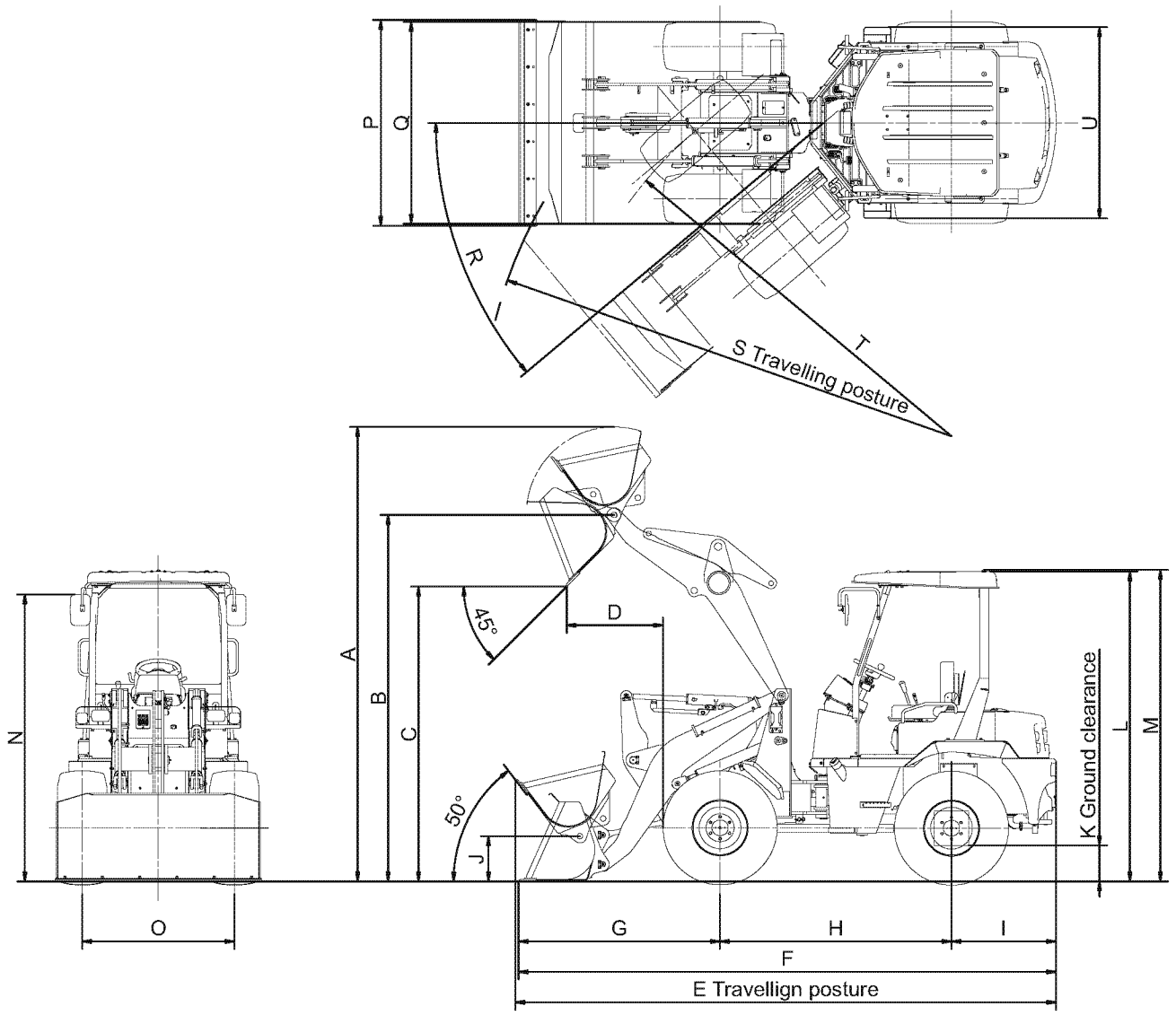
28. Specifications and Dimensional Diagrams

Model				V3-6	
				Canopy	Cabin
Efficiency	Bucket capacity		cu.ft (m^3)	14.12 (0.4)	
	Operating load		lbf (kgf)	1962 (890)	
	Operation speed	Up	sec.	4.5	
		Down	sec.	2.5	
		Forward	sec.	0.8	
	Travel speed	Forward	MPH (km/h)	0 to 11.8 (0 to 19.0) [low speed hold 3.7 (6)]	
		Backward	MPH (km/h)	0 to 11.8 (0 to 19.0) [low speed hold 3.7 (6)]	
	Maximum tractive force		lb (kg)	5512 (2500)	
	Min. turning radius	Utmost outer end	in. (mm)	141.14 (3585)	
		Utmost outer wheel center	in. (mm)	120.47 (3060)	
	Articulation angle		degrees	40	
	Oscillation angle		degrees	±8	
Main dimensions and operating mass	Overall length (with bucket on the ground/traveling posture)		in. (mm)	158.07 (4015)/159.06 (4040)	
	Overall width (machine width/bucket width)		in. (mm)	61.81 (1570)/61.81 (1570)	61.81 (1570)/61.81 (1570)
	Overall height (machine body/rearview mirror)		in. (mm)	97.44 (2475)/89.57 (2275)	95.87 (2435)/89.37 (2270)
	Bucket width		in. (mm)	61.81 (1570)	
	Wheel base		in. (mm)	68.90 (1750)	
	Tread		in. (mm)	46.46 (1180)	
	Minimum ground clearance		in. (mm)	10.24 (260)	
	Tilt back angle of bucket (on ground/traveling posture)		degrees	42/50	
	Dump angle of bucket		degrees	45	
	Dumping clearance		in. (mm)	83.86 (2130)	
	Dumping reach		in. (mm)	30.71 (780)	
	Hinge pin height		in. (mm)	105.12 (2670)	
	Operating mass		lb (kg)	6801 (3085)	7154 (3245)
	Base machine dry mass		lb (kg)	5721 (2595)	6074 (2755)
Engine	Model			3TNV88-BNKAH	
	Type			Vertical three cylinder water-cooled direct injection diesel engine	
	Displacement		cu.in (L)	100.20 (1.642)	
	Rated output		HP (kw)/rpm	30.3 (22.6)/2500	
	Max. torque		ft•lbs. (N•m)/rpm	78.3 (106.1)/1500	
	No. of cylinders - Bore x stroke			3-88×90	
	Compression pressure		PSI (kpa)	497.48 (3430) (at 250 rpm)	
	Nozzle injection pressure		PSI (kpa)	2842.7 (19600)	
	Fan belt size			A38 (JIS)	
Transmission	Type			Automatic Hydrostatic Transmission	
	Driving method			4WD	
	No. of speeds			F2, R2 (automatic speed change, low speed hold)	
	Tire size			12.5/70-16-6PR	
Brake	Service brake type			Fulley-enclosed, wet, multiple disc	
	Operation method			Mechanical	
	Parking brake type			Fulley-enclosed, wet, multiple disc, mechanical	
Steering method				Articulated frame	
Battery type				115D31R	

Model				V4-6	
				Canopy	Cabin
Efficiency	Bucket capacity		cu.ft (m^3)	17.66 (0.5)	
	Operating load		lbf (kgf)	2579 (1170)	
	Operation speed	Up	sec.	5.0	
		Down	sec.	3.0	
		Forward	sec.	1.0	
	Travel speed	Forward	MPH (km/h)	0 to 11.8 (0 to 19.0) [low speed hold 3.6 (5.8)]	
		Backward	MPH (km/h)	0 to 11.8 (0 to 19.0) [low speed hold 3.6 (5.8)]	
	Maximum tractive force		lb (kg)	6504 (2950)	
	Min. turning radius	Utmost outer end	in. (mm)	152.56 (3875)	
		Utmost outer wheel center	in. (mm)	128.54 (3265)	
	Articulation angle		degrees	40	
	Oscillation angle		degrees	±8	
Main dimensions and operating mass	Overall length (with bucket on the ground/traveling posture)		in. (mm)	173.23 (4400)/174.21 (4425)	
	Overall width (machine width/bucket width)		in. (mm)	64.96 (1650)/66.54 (1690)	64.96 (1650)/66.54 (1690)
	Overall height (machine body/rearview mirror)		in. (mm)	100.79 (2560)/92.91 (2360)	99.21 (2520)/92.72 (2355)
	Bucket width		in. (mm)	66.54 (1690)	
	Wheel base		in. (mm)	74.80 (1900)	
	Tread		in. (mm)	48.82 (1240)	
	Minimum ground clearance		in. (mm)	12.20 (310)	
	Tilt back angle of bucket (on ground/traveling posture)		degrees	42/50	
	Dump angle of bucket		degrees	45	
	Dumping clearance		in. (mm)	95.28 (2420)	
	Dumping reach		in. (mm)	31.10 (790)	
	Hinge pin height		in. (mm)	118.31 (3005)	
	Operating mass		lb (kg)	8058 (3655)	8411 (3815)
	Base machine dry mass		lb (kg)	6978 (3165)	7330 (3325)
Engine	Model			4TNV88-BNKAH	
	Type			Vertical four cylinder water-cooled direct injection diesel engine	
	Displacement		cu.in (L)	133.58 (2.189)	
	Rated output		HP (kw)/rpm	40.4 (30.1)/2500	
	Max. torque		ft•lbs. (N•m)/rpm	104.9 (142.2)/1500	
	No. of cylinders - Bore x stroke			4-88×90	
	Compression pressure		PSI (kpa)	497.48 (3430) (at 250 rpm)	
	Nozzle injection pressure		PSI (kpa)	2842.7 (19600)	
	Fan belt size			A38 (JIS)	
Transmission	Type			Automatic Hydrostatic Transmission	
	Driving method			4WD	
	No. of speeds			F2, R2 (automatic speed change, low speed hold)	
	Tire size			15.5/60-18-8PR	
Brake	Service brake type			Fulley-enclosed, wet, multiple disc	
	Operation method			Mechanical	
	Parking brake type			Fulley-enclosed, wet, multiple disc, mechanical	
Steering method				Articulated frame	
Battery type				115D31R	

■ Model view and working range Unit : in. (mm)

Outline drawing of wheel loader with canopy : V3-6, V4-6



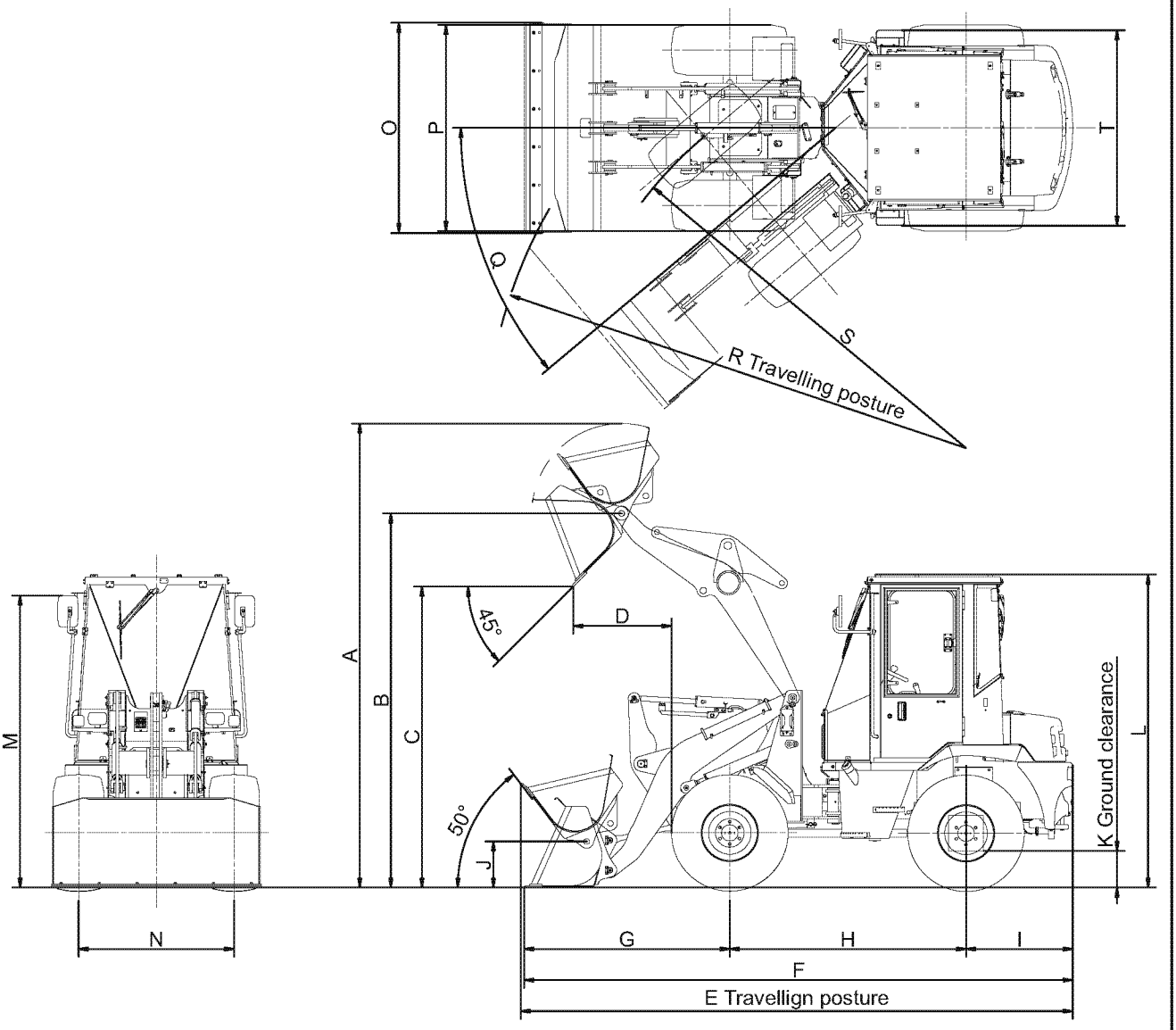
	A	B	C	D	E	F	G
V3-6	131.50(3340)	105.12(2670)	83.86(2130)	30.71(780)	159.06(4040)	158.07(4015)	59.65(1515)
V4-6	146.85(3730)	118.31(3005)	95.28(2420)	31.10(790)	175.39(4455)	174.21(4425)	65.16(1655)

	H	I	J	K	L	M	N
V3-6	68.90(1715)	29.53(750)	13.00(330)	10.23(260)	96.85(2460)	97.24(2470)	89.57(2275)
V4-6	74.80(1900)	33.86(870)	14.57(370)	11.61(295)	88.39(2545)	100.59(2555)	92.72(2355)

	O	P	Q	R	S	T	U
V3-6	46.46(1180)	61.81(1570)	59.06(1500)	40°	141.14(3585)	120.47(3060)	61.81(1570)
V4-6	48.82(1240)	66.54(1690)	64.76(1645)		152.56(3875)	128.54(3265)	61.81(1570)

■ Model view and working range Unit : in. (mm)

Outline drawing of wheel loader with cabin : V3-6, V4-6



	A	B	C	D	E	F	G
V3-6	131.50(3340)	105.12(2670)	83.86(2130)	30.71(780)	159.06(4040)	158.07(4015)	59.65(1515)
V4-6	146.85(3730)	118.31(3005)	95.28(2420)	31.10(790)	175.39(4455)	174.21(4425)	65.16(1655)

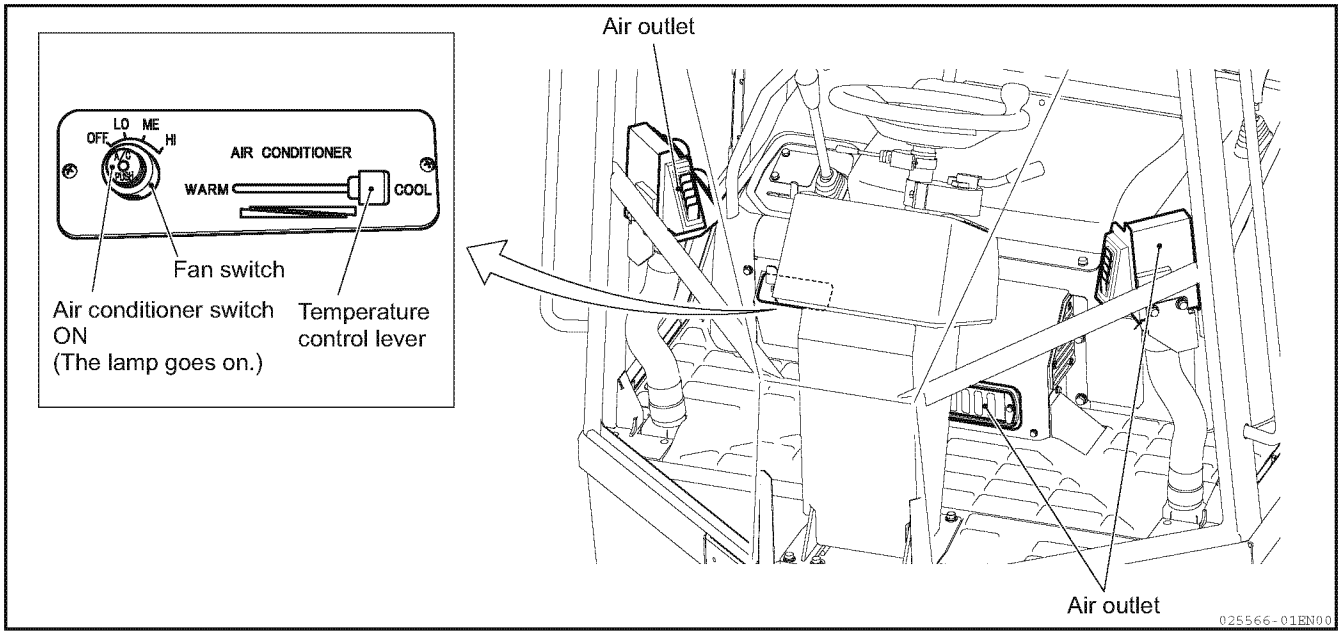
	H	I	J	K	L	M	N
V3-6	68.90(1715)	29.53(750)	13.00(330)	10.23(260)	95.87(2435)	89.37(2270)	46.46(1180)
V4-6	74.80(1900)	33.86(870)	14.57(370)	11.61(295)	99.21(2520)	92.52(2350)	48.82(1240)

	O	P	Q	R	S	T
V3-6	61.81(1570)	59.06(1500)	40°	141.14(3585)	120.47(3060)	61.81(1570)
V4-6	66.54(1690)	64.76(1645)		152.56(3875)	128.54(3265)	61.81(1570)

OPTIONAL PARTS AND ATTACHMENTS

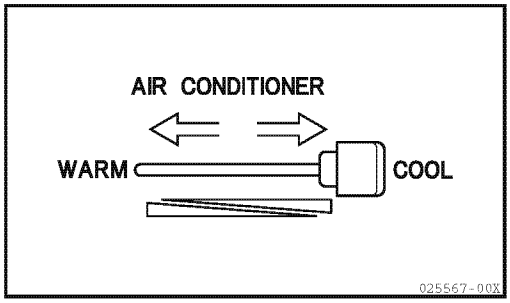
29. Handling Air Conditioner (for Cabin)

29-1. Description of lever and switches for air conditioner



29-1-1. Temperature control lever

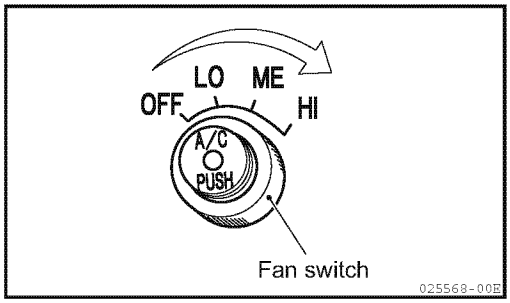
It is used to control the temperature of the air blown by the air conditioner.



29-1-2. Fan switch

It is used to set the air volume at one of the three levels.

LO : Low
ME : Medium
HI : High
OFF : Stop



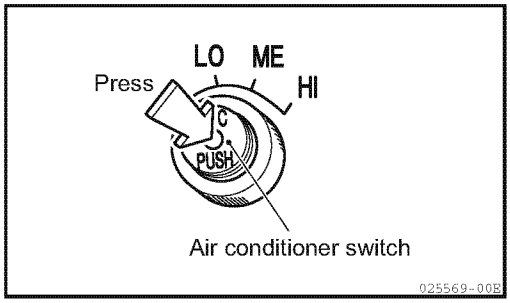
29-1-3. Air conditioner switch

It is used to turn the compressor ON or OFF.


The compressor is turned OFF : The lamp goes off.


The compressor is turned ON : The lamp goes on.

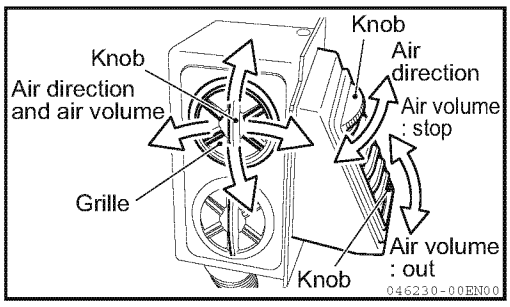
Press the switch in the OFF state to turn the compressor ON, and press it again to turn the compressor OFF. When the fan switch is at the OFF position, the lamp does not go on and the compressor does not work even if the air conditioner switch is turned ON.



29-1-4. Air outlet

Adjustment of air volume and air direction

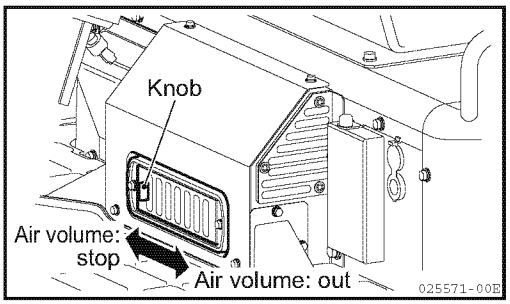
The air outlet knob is used to adjust the air volume and air direction.



- Set the fan switch for ventilation to apply preload to the inside of the cabin when the air conditioner is not used, so that no dust can come into the cabin easily during operation.

IMPORTANT

Be sure to turn the air conditioner ON after starting the engine to prevent excessive force to the compressor etc.



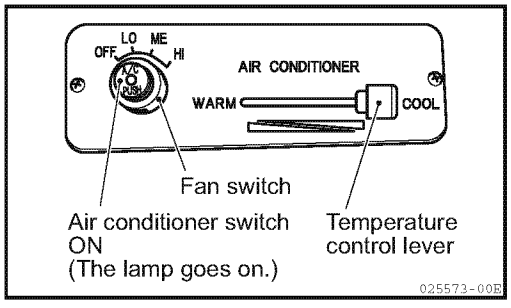
29-2. How to use air conditioner

⚠ CAUTION

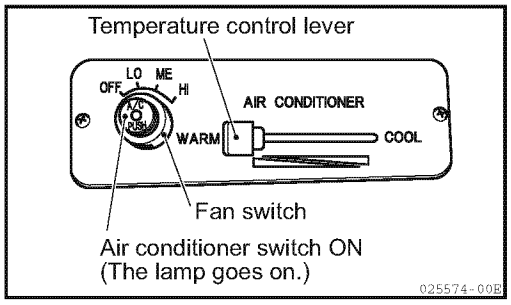
- **The eyes might get sore from smoking when the cabin is air conditioned. Ventilate the cabin by opening the window slightly when smoking.**
- **Some mist might blow off with cooled air when the cabin is air conditioned. This occurs because the water particles in the wet air are frozen and blown out. So, it is not abnormal.**
- **When using the air conditioner after parking the cabin in the hot weather, ventilate the cabin by opening the door and windows to let the hot air inside go out of the cabin so that the air-conditioning can work efficiently.**
- **Take care to adjust the temperature properly not to cool the air inside the cabin too long because it is not good for the operator's health.**
- **If the air does not blow off, the air volume is small or the cabin is not air conditioned well when the air conditioner is turned ON, turn the air conditioner switch OFF and ask your dealer to check the air conditioner. If you keep using the air conditioner in the abnormal state, it will cause damage to the fan motor or the compressor.**
- **Even in the seasons when the air conditioner is not used, operate the air conditioner for a few minutes once or twice every two or three weeks. That prevents the rotating parts such as the compressor from running out of oil, which prevents malfunction of the parts in turn.**

29-2-1. Air conditioning

1) Set the fan switch at any of the three positions (Low, Medium or High).
2) Set the temperature control lever at the COOL position (the right position).
3) Turn the air conditioner switch ON. (The lamp goes on.)
4) Adjust the temperature inside the cabin properly with the temperature control lever and the fan switch after the cabin is cooled off.



29-2-2. Heating



1) Set the fan switch at any of the three positions (Low, Medium or High).

2) Set the temperature control lever at the WARM position (the left position).

3) Turn the air conditioner switch OFF. (The lamp goes off.)

29-2-3. Heating for dehumidification

(In the case that the window glass tends to get fogged in rainy weather in spring or autumn.)
With the heating turned on, turn the air conditioner switch ON (the lamp goes on).

- If the temperature inside the cabin is low, dehumidification might not work because the compressor does not operate even if the air conditioner switch is turned ON.

29-2-4. Stop

1) Turn the air conditioner switch OFF. (The lamp goes off.)

2) Turn the fan switch OFF.

- The air conditioner also stops only by turning the fan switch OFF.

29-3. Maintenance, inspection and servicing of air conditioner

Daily maintenance and periodic inspection and servicing are required for the air conditioner to use it comfortably in the best condition.
Proper maintenance allows reduction in trouble and longer life of the air conditioner.
Exact inspection and servicing prevent trouble and reduce the cost for repair.
It is recommended that the rubber hoses and electrical wires should be replaced every two years to use the air conditioner in the best condition.

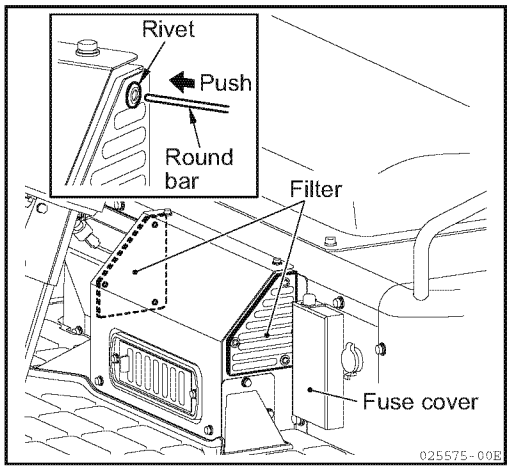
List of inspection items for air conditioner

	Part	Check item	Servicing
Daily inspection	Filter, dust-proof net	Check the filter and dust-proof net for clogging.	Clean
	Condenser	Check the cover and the fin for contamination and clogging.	Clean
	Compressor driving belt	Check the belt for tension and damage.	Repair or replace
	Sight glass	Check the refrigerant quantity.	

29-3-1. Cleaning filter and dust-proof net

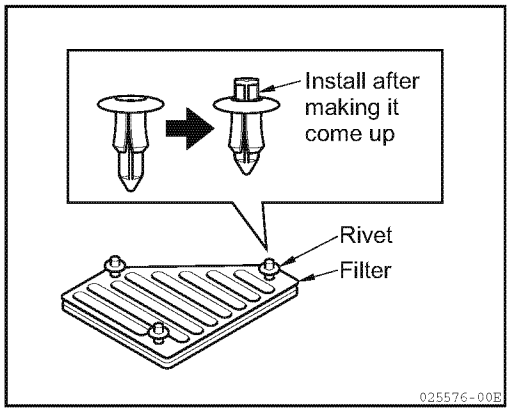
■ **Filter**

1) Remove the filter after pushing the round bar in the center of the rivets (3 places).

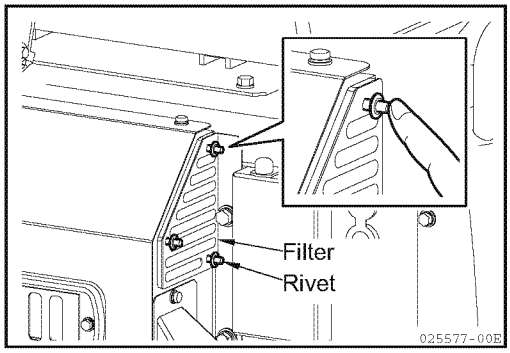


2) Remove the rivets from the filter and wash mud or dirt off with water.

3) Install the rivets to the filter. When installing, install after making the heads in the center of rivets come up.

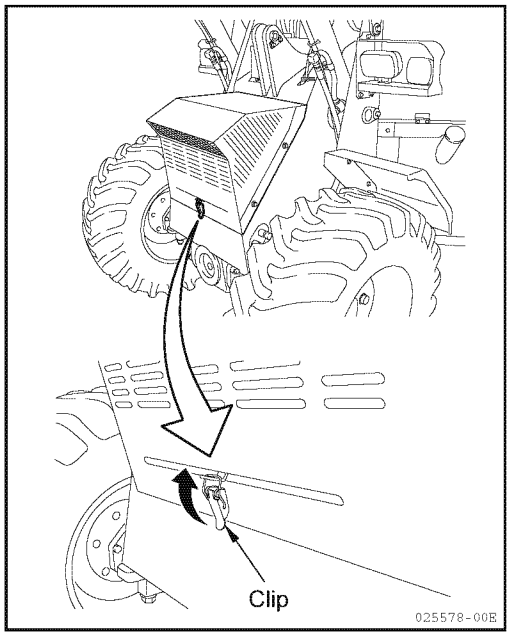


4) After installing the filter, push the center of rivets (3 places) with a finger to fix them.

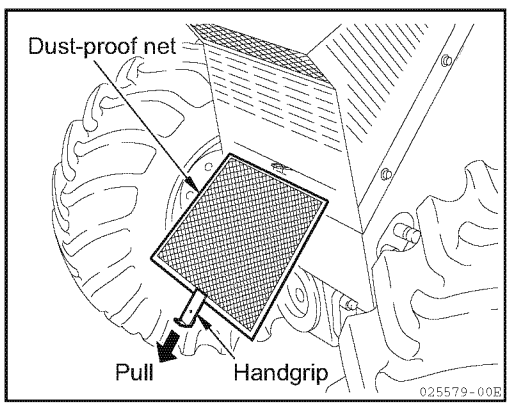


■ Dust-proof net

1) Remove the clip and pull out the dust-proof net in forward.



2) Blow off the clogged mud or dirt with the compressed air or wash it off with water.
3) Install the dust-proof net by placing the handgrip of the dust-proof net in forward and close the clip to fix it.

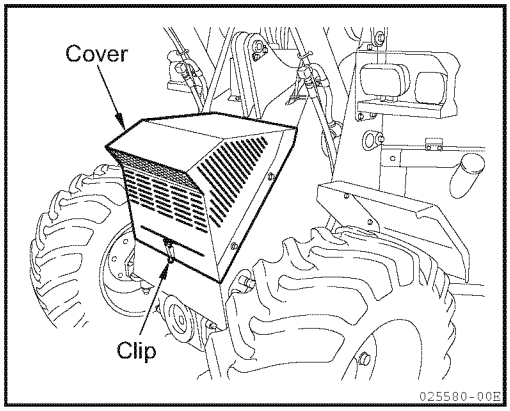


29-3-2. Checking and cleaning condenser

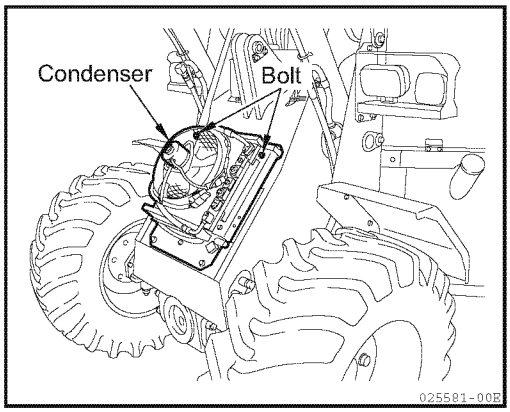
⚠ WARNING

- **Be sure to stop the engine and remove the starter key before checking and servicing the condenser.**
- **Be sure to reinstall the cover and other parts, which have been removed for checking and servicing, to their original positions after completion of the work.**

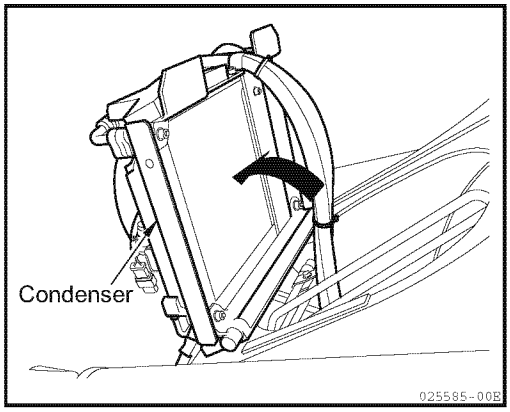
1) Remove the clip, pull out the dust-proof net, and then remove the cover.



2) Remove two of the condenser installation bolts in the upper side, and turn over the condenser in the forward side.



- If there is some mud or dirt on the fin, it causes the degradation of the air conditioner performance. Wash it off from the fin with water by using a soft brush.
- If the fin is crushed or deformed, it also causes the deterioration of the air conditioner performance. Repair it with a screwdriver or the like while taking care not to damage the fin.



29-3-3. Checking and servicing compressor driving belt

⚠ WARNING

Stop the engine and remove the starter key before checking and adjusting the compressor driving belt.

Press the middle of the condenser driving belt to check the slack of the condenser driving belt.

Driving belt
Pressing load : Approx. 22 lbs. (98.1 N)
Adequate slack : 0.3 to 0.35 in. (8 to 9 mm)

If the slack of the belt is inadequate, adjust it according to the following procedure :

1) Remove the cover to press the middle of the belt with a load of approximately 22 lbs. (98.1 N).
   Adjust the belt tension by tightening the tension pulley bolt and lock nut, tighten the adjust nut so that the slack of the belt should be adequate.

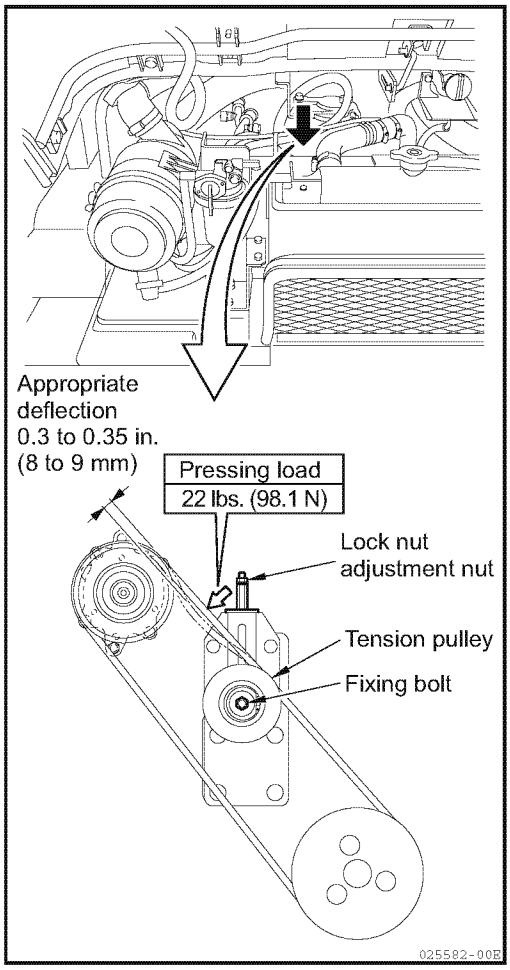
- If the belt tension cannot be adjusted to the specified slack since the belt has lost its elasticity, replace the belt with a new one.

2) Tighten the tension pulley bolt.

3) Check if each pulley or the belt is damaged especially if the belt has contact with the bottom of the pulley groove.

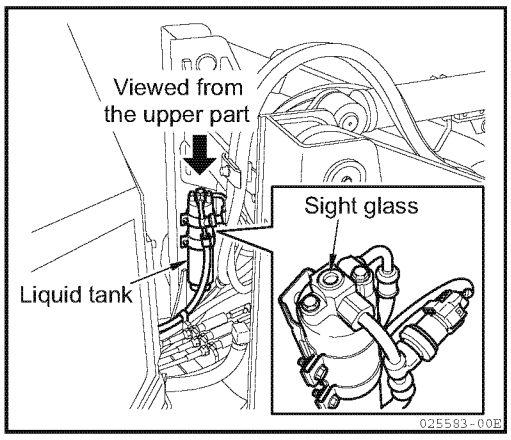
- If there are any cuts on the belt or cracks in it, replace it with a new one.

Compressor driving belt :
Mitsuboshi : REMF-1600 or its equivalent



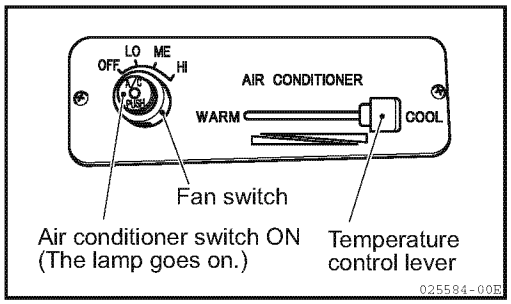
29-3-4. Checking refrigerant quantity

See the flow of the refrigerant air foam from the sight glass (inspection window) of the liquid tank according to the following procedure to check the refrigerant quantity.



1) Start the engine and run it at the maximum speed.
2) Set the fan switch at "High".
3) Set the temperature control lever at "COOL" (the right position).
4) Turn the air conditioner switch ON. (The lamp goes on.)

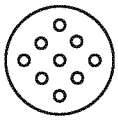
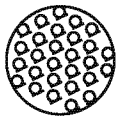
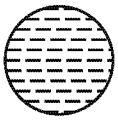
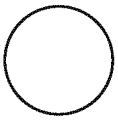
5) Check the refrigerant condition from the sight glass and compare it with the check list shown below.



IMPORTANT

If the refrigerant quantity is not normal, ask your dealer for check and repair.

Check list for refrigerant quantity

Cooler state	Normal	Abnormal		
Temperature of high and low pressure pipes	Temperature difference is big. High pressure pipe : hot Low pressure pipe : cold Compressor discharge side temp. : 158°F (70°C) Compressor intake side temp. : 41°F (5°C)	High pressure pipe is warm and low pressure pipe is rather cold. Temperature difference is not so big.	There is almost no difference in temperature between high and low pressure pipes.	High pressure pipe is hot and low pressure pipe is rather warm. There is some difference in temperature between them.
Sight glass	Almost transparent. Even if air foam flow is seen, it becomes transparent as the engine speed changes.  001312-00X *1	Air foam flow can always be seen. It is sometimes transparent or white.  001313-00X	Flow of mist or the like can be seen slightly.  001314-00X	No air foam flow can be seen by fully opening cabin windows, idling engine, and rotating fan to the maximum.  001315-00X *2
Pipe joints	Normal	Some parts are contaminated by oil.	Some parts are badly contaminated by oil.	Normal
Refrigerant quantity	The quantity is adequate and normal.	Refrigerant might leak in a small amount from some part.	Almost all refrigerant leaks and does not remain.	Refrigerant is too much.

**1 : When the outside air temperature is low, air foam might be seen even if the refrigerant quantity is adequate.*

**2 : No air foam can be seen either when there is no refrigerant. Therefore, be sure to check the difference in temperature between the high and low pressure pipes.*

30. Optional Parts and Attachments

The following options are available. Select options useful for your work.
If you need an option, contact the dealer.

- Standard bucket
  [V3-6 (0.4 m^3), V4-6 (0.5 m^3)]
- For lightload bucket
  [V3-6 (0.5 m^3), V4-6 (0.6 m^3)]
- For super-lightload bucket
  [V3-6 (0.6 m^3), V4-6 (0.8 m^3)]
- Cutting edge
- Teeth
- Quick holder (attachment holder)

⚠ WARNING

Machine maximum payload with standard bucket is:
V3-6.....1962.1 lb (890 kg)
V4-6.....2579.4 lb (1170 kg)

Operate within in the maximum payload weight limits indicated above, when using a standard bucket. Do not overload the machine. Exceeding the maximum payload is hazardous, and could cause the machine to roll over.

NOTES

31. Maintenance Log

Maintenance log

Date	Machine hours	Service performed

Date	Machine hours	Service performed

Date	Machine hours	Service performed

Date	Machine hours	Service performed

32. Notes

Notes

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WHEEL LOADER

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