Operation and Maintenance Manual

SY80U Excavator

service@sanyamerica.com

SANY Part Number SSY005079161

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SY80U Excavator

Operation and Maintenance Manual

WARNING

Read and understand all safety precautions and instructions in this manual and the machine labels before operating or maintaining the machine. Failure to do so could result in death or serious injury. Keep this manual with the machine for reference.

This manual is prepared by SANY Technical Publications,
while deemed to be accurate, is based upon technical information provided.

This manual provides safety and basic information for operation and maintenance of the machine.

It is the responsibility of the owner, user, properly trained operator, and lessor to be knowledgeable of, and comply with, all industry standards, government regulations, workplace rules, and other directives that may govern and/or apply to this equipment as well as ts environment/conditions of use.

Contact a SANY dealer for additional information or assistance.

SANY
318 Cooper Circle
Peachtree City, Georgia 30269
www.sanyamerica.com
Phone: 470-552-SANY (7269)
www.sanyamerica.com/find-a-dealer

WARNING

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.

WARNING

CALIFORNIA PROPOSITION 65 WARNING

The battery posts, terminals, and related accessories contain chemical lead and lead compounds, chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm. Wash hands after handling.

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Chapter 1

Introduction

About This Manual

This manual provides operation and maintenance information for the SY80U Excavator.

WARNING

Unsafe operation and maintenance of this machine could result in death or serious injury. This machine must be operated and maintained by trained and experienced personnel. Do not operate or work on this machine without first reading and understanding this Operation and Maintenance Manual supplied with the machine.

It is important to read and understand this manual before beginning any operation or service. All personnel involved with this machine should read this manual periodically to remain knowledgeable on its operation and service.

Items addressed in this manual are designed to help the operator or service personnel:

- Understand the controls and operation of the machine.
- Point out possible hazardous situations when operating or maintaining the machine.
- Increase machine efficiency during operation.
- Prolong the service life of the machine.
- Reduce maintenance costs.

Continuing improvements in the design of this machine can lead to changes which may not be covered in this manual. Contact a SANY dealer for the latest available information on the machine or to answer any questions regarding information in this manual.

Documentation Package

This documentation applies only to this machine and should not be used with any other machine. The documentation for this machine includes the following items:

Operation and Maintenance Manual

A copy of this manual must be stored in the machine or be accessible to the operator at all times. If the machine is sold, a copy of this manual must be provided to the new owner.

A copy of the Operation and Maintenance Manual should be made available to maintenance personnel when servicing the machine.

Parts Manual

The parts manual consists of parts lists and matching drawings used for ordering parts as needed. The parts manual must be made available to all service personnel.

Maintenance Log

The Maintenance Log lists regularly scheduled maintenance that should be performed by the operator or service personnel. All maintenance performed on the machine must be recorded in the Maintenance Log.

Organization of This Manual

Introduction

Contains an overview of this manual, serial number information, and SANY contact information.

Safety

Hazard alerts used throughout the manual are explained. General and product-specific safety information is provided for this manual.

Machine Controls

An overview of controls and the operating systems is provided in this section.

Machine Operation

Detailed prestart checks, operating procedures, end-of-day checks, general operating instructions, and storage information.

Maintenance

Provides routine maintenance procedures and fluid specifications.

Specifications

General dimensions and weight of the machine, and systems/components performance information.

Optional Equipment

Provides general hydraulic installation and removal information on the optional equipment.

Machine Applications

This excavator is a multipurpose construction machine used primarily for digging or loading earth and stones. It can also be used for grading, slope-trimming, lifting, breaking, demolishing, and trenching. It can perform the functions of a bulldozer, loader, and crane.

This excavator can also operate a variety of optional equipment.

SANY assumes no responsibility for any consequence caused by use outside this specified range.

Machine Directions

In this manual, the front, back, left, and right directions indicate the moving direction as viewed from the operator seat.

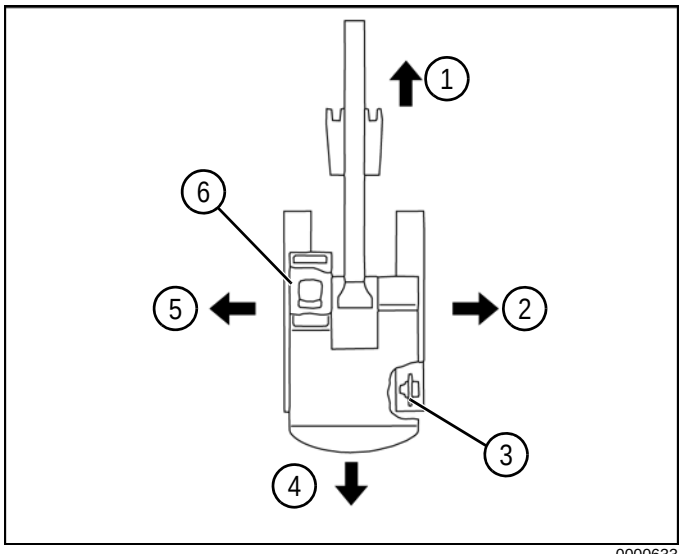

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Figure 1-1

1) Front
2) Right
3) Sprocket
4) Back
5) Left
6) Operator seat

Serial Number Location

Identification plates are located in various places on the excavator. These list model and serial numbers that will be needed by a SANY dealer when ordering replacement parts or providing assistance for your machine.

Machine Identification Plate

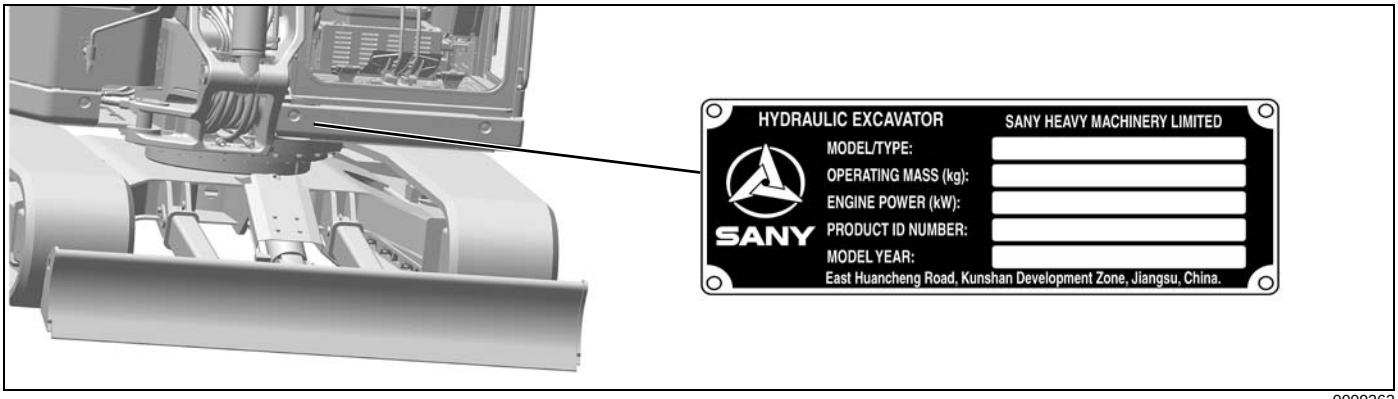

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Figure 1-2

The machine identification plate is on the lower right front of the cab.

Frame Serial Number

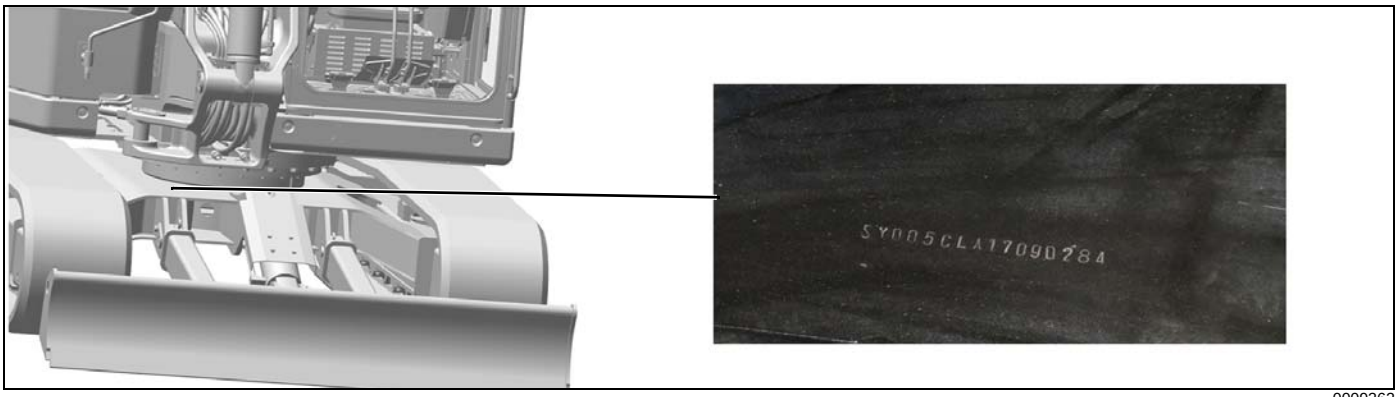

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Figure 1-3

The frame serial number is stamped on the front of the travel carriage frame.

Travel Motor Identification Plate

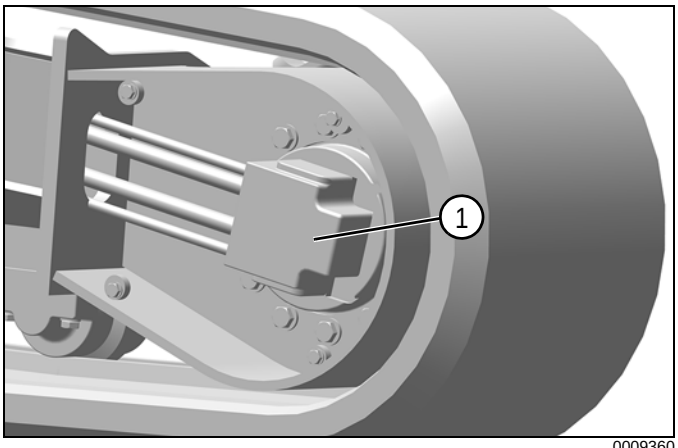

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Figure 1-4

An identification plate (1) is on each travel motor. Remove the cover plates to access the travel motors.

Swing Motor Identification Plate

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Figure 1-5

The swing motor identification plate (1) is on the side of the swing motor.

Engine Identification Plate

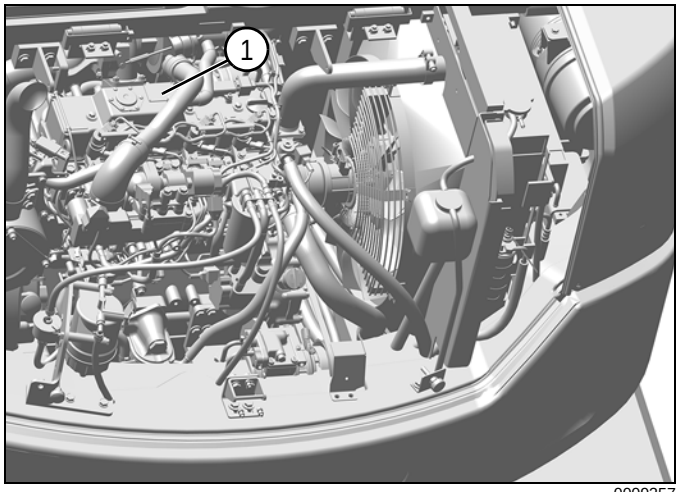

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Figure 1-6

The engine identification plate (1) is on the top of the engine.

SANY Contact Information

SANY
318 Cooper Circle
Peachtree City, GA 30269
www.sanyamerica.com
Phone: 470-552-SANY (7269)
To find a dealer, go to:
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Record of Serial Number and Dealer Information

Use this table to record the product information related to this machine.	
Machine Serial Number	
Engine Serial Number	
Right Travel Motor Serial Number	
Left Travel Motor Serial Number	
Swing Motor Serial Number	
Hydraulic Pump Serial Number	
Frame Serial Number	
Dealer Name: Address:	
Phone Numbers:	

Correction Request Form

If you find a problem with this manual, make a copy of this page, complete the form below, and send it to SANY.

Correction Request Form	
Date of This Notification:	
Owner/Operator Name:	
Company Name:	
Department:	
Address:	
Phone:	
Email:	
Machine Model and Serial Number	
Description of Problem (wrong information, unclear or erroneous procedure, etc.)	
Corrective Action Taken (if any)	

Glossary of Acronyms

ANSI – American National Standards Institute

BHL – Backhoe Loader

CCTV – Closed-Circuit Television

DEF – Diesel Exhaust Fluid

DPF – Diesel Particulate Filter

DVR – Digital Video Recorder

EAT – Exhaust Aftertreatment

ECM – Engine Control Module

GPS – Global Positioning System

HEST – High Exhaust System Temperatures

HCU - Hydraulic Control Unit

ISO – International Organization for Standardization

KD – Kickdown

LCD – Liquid Crystal Display

LED – Light-Emitting Diode

OEM – Original Equipment Manufacturer

OSHA – Occupational Safety and Health Administration

PPE – Personal Protective Equipment

PQR – Procedure Qualification Report

ROPS – Rollover Protective Structure

SAE – See SAE International

SCA – Supplemental Coolant Additive

SDS – Safety Data Sheet

VDC – Volts Direct Current

WPS – Weld Procedure Specification

Chapter 2

Safety

General Safety

This section provides detailed information on basic safety precautions and preventive measures that should be followed during the operation and maintenance of this machine.

Hazard Alerts in This Manual

Hazard alerts in this manual are used to alert operators, job supervisors, maintenance staff, and job site workers to hazardous operating practices and maintenance procedures. Hazard alerts are used throughout this manual. Each hazard alert contains a hazard-alert symbol and a signal word to identify the hazard's degree of consequence if the message is ignored.

The following American National Standards Institute (ANSI) and International Organization for Standardization (ISO) signal words are used to warn of potentially hazardous situations that may lead to damage, personal injury, or even death. In this manual and on the machine decals, different signal words or illustrations are used to express the potential level of hazard.

DANGER

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

WARNING

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

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in injury.

NOTICE!

NOTICE is used to address practices not related to personal injury.

This symbol is used within a graphic to alert the user not to do something.

Operator Safety Information

It is impossible to compile a list of safety precautions that covers every situation. However, there are basic principles that must be followed when operating this machine:

- Only qualified personnel who have been specifically trained on this machine are permitted to operate and/or work on this machine.
- The seat belt must be worn by the operator at all times.
- Operator aids such as warning lights, horns, or buzzers, along with displays on the monitors, are designed to alert the operator to potential problems. Sole reliance on these operator aids in place of good operating practices can lead to an accident. Inspect the operator aids of this machine daily and make sure each operator aid is in normal working condition. Any faults found shall be reported to a SANY dealer. Stop all work immediately if any operator aid is not working properly.
- All accident prevention guidelines, operating instructions, etc., are based on the intended usage of the machine.
- Read and understand this manual and any accompanying manuals before operating this machine.
- This manual must be readily available to the operator at all times and must remain in the cab while the machine is in use.
- Make sure all personnel in the working area around the machine are thoroughly familiar with safe operating practices stated in this manual.
- Review the local, state, and federal regulations and standards regarding this machine and its operation. Work practice requirements may vary among government regulations, industry standards, and employer policies. A thorough knowledge of all such relevant work rules is required before operating this machine or performing maintenance on it.
- Check the Maintenance log before the start of each workday shift. Make sure routine maintenance has been performed as stated in this manual. Do not operate a damaged or poorly maintained machine.
- Only the operator is to be on the machine while it is in operation.
- Be sure all underground utilities have been marked before excavating.

Mount and Dismount the Machine

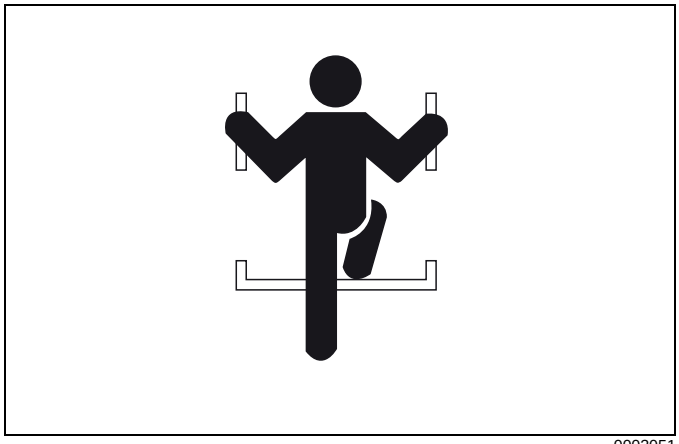

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Figure 2-1

Mounting or dismounting the machine presents hazards. Observe the following:

- Always make sure the hydraulic lockout control lever is in the locked (closed) position before entering or exiting the machine.
- Always make sure the machine is at a complete stop before entering or exiting the machine. Never jump on or off the machine.
- Never exit or enter the machine by any means other than the provided grab handles and steps.
- Always face the machine as you mount and dismount.
- Always maintain three-point contact (both feet and one hand, or one foot and both hands) with the grab handles, steps, and deck for proper support.
- Wear safety shoes with slip-resistant soles.
- Do not walk on any surface of the machine if its slip-resistant material is missing or excessively worn. Do not step on surfaces of the machine that are not approved for walking or working. Keep all walking and working surfaces of the machine clean, dry, and slip-resistant.
- Always keep grab handles, steps, and walkway areas clean and clear of mud, oil, grease, or similar debris. If these areas are damaged, have them repaired or replaced immediately.

Machine Safety

Authorized Use of This Machine

This excavator is a multipurpose construction machine used primarily for digging or loading earth and stones. It can also be used for grading, slope-trimming, lifting, breaking, demolishing, and trenching. It can perform the functions of a bulldozer, loader, and a crane.

SANY assumes no responsibility for any consequence caused by use outside this specified range.

Unauthorized Use of This Machine

Unauthorized uses include, but are not limited to, the following:

- Transporting riders on the machine or in the cab.
- Towing or pushing other equipment.

Unauthorized Machine Modifications

Do not perform any unauthorized machine modifications.

Do not add additional weight (attachments, etc.) to the machine. Do not exceed the gross weight.

Escape Tool

NOTE: *Inspect the escape tool periodically. Replace the escape tool if it appears damaged or unable to break the cab window for emergency exit.*

As a precaution, always keep an escape tool in the cab.

Fire Safety

Fuel, oil, and some engine coolants are flammable. Observe the following:

- Keep open flames, airborne sparks, and burning embers away from the machine.
- Shut down the engine and do not smoke when refueling or servicing the machine.
- Add oil, fuel, or engine coolant in a well-ventilated area.
- Clean up any spilled fluids immediately.
- Check the machine daily for debris buildup.

Electrical Fires

Short circuits, damaged wiring, or overcharging battery can cause fires. Observe the following:

- Check the wiring on the machine for damage when doing a prestart check. Contact a SANY dealer to repair or replace any damaged wiring.
- Make sure the battery is operating in its recommended range.
- Never install aftermarket electrical equipment without approval from a SANY dealer.

Fire Extinguisher

Always keep the fire extinguisher in the cab. Read the instructions on the fire extinguisher carefully and know how to use it in an emergency.

Inspect the condition of the fire extinguisher daily. If damaged, replace the extinguisher immediately.

Make sure the fire extinguisher is within the listed inspection period. Replace the fire extinguisher immediately if it has reached its expiration date.

The fire extinguisher must be at least a 2.5 lb. Class ABC rated fire extinguisher (National Fire Protection Association [NFPA] 10 Standard for Portable Fire Extinguishers).

In Case of Fire

If a fire occurs on the machine:

1. Immediately press the emergency stop switch to shut down the machine. Never continue operating the machine.
2. Get clear of the machine and immediately call for help. Always have a list of emergency phone numbers available.
3. Exit the area and remain clear of the machine until the fire response team gives permission to come near the machine.
4. If using a fire extinguisher, always aim the extinguisher nozzle at the base of the fire.

Crushing Hazard

Keep your body inside the windows and door during operation or travel.

Keep all guards in place on the machine.

Never remove the side window of the machine. If this window becomes damaged or broken, replace it immediately.

Block off the area where the machine is being operated and keep all unnecessary personnel out of the work area.

Diesel Engine Exhaust

WARNING

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.

WARNING

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, use an exhaust pipe extension to vent the exhaust to the outdoors. If an exhaust pipe extension is not available, open doors and use fans to supply fresh air into the area.

Machine Decals

All safety and warning decals must be in place, undamaged, and visible. Become familiar with the location and content of all decals on the machine. Walk around the machine and review each of them. Decals provide important instructions and warnings and must be read and understood prior to any operational or maintenance function.

Contact a SANY dealer for replacement decals if needed.

NOTE: *When replacing decals, make sure they are placed in the proper locations. Contact a SANY dealer if you have any questions about their meaning and placement.*

Maintenance Safety

SANY cannot foresee every circumstance that might involve a hazard in operation or maintenance. Therefore, the hazard alerts in this manual and on the machine may not include all possible safety precautions.

Make sure all procedures and actions can be safely performed without damaging the machine or causing injury. When unsure about the safety of a procedure, contact a SANY dealer.

Before carrying out any repair, read all the safety messages on the machine associated with the procedure.

Wear and use the proper personal protective equipment (PPE), including (but not limited to) safety shoes, a hard hat, gloves, and goggles.

When carrying out any operation with two or more workers, always agree on the operating procedure before starting.

Always perform the lockout/tagout procedure before servicing the machine.

Always inform fellow workers before starting any step of the operation.

Keep all tools in good condition, know how to use them, and use the correct ones. Thoroughly check all tools before starting any procedure.

Park the machine on a hard, level surface, lower the work equipment, move the hydraulic lockout control lever to the locked (closed) position, and block the tracks to prevent the machine from moving before performing any maintenance or repairs.

Before disconnecting or removing components of the hydraulic system, relieve the system pressure to prevent hydraulic fluid from spraying out. See “Relieve the Hydraulic System Pressure” on page 5-32.

The engine coolant and oil in the machine may be hot even after the engine is stopped. Wait for the cooling and oil systems to cool before working on them.

When checking the machine with the engine running (e.g., measuring oil pressure, revolving speed, or temperature), take extreme care to avoid rotating or moving parts.

Turn the battery disconnect switch to OFF unless electrical power is required for the procedure.

NOTE: *The electrical circuit remains active to a few components even when the battery disconnect switch is in the OFF position.*

When removing hoses or lines, close all openings using caps and plugs. If any fuel or oil leaks, clean it up immediately.

When installing high-pressure hoses, make sure they are not twisted. Damaged hoses are dangerous and should be replaced. Be extremely careful when installing hoses for high-pressure circuits. Make sure fittings are correctly installed and tightened.

When assembling or installing parts, always tighten them to the specified torque. When installing protective parts (such as guards), or parts that vibrate or rotate at high speed, make sure they are installed correctly.

Lockout/Tagout Procedure

Always perform the lockout/tagout procedure before servicing the machine.

Clean the Machine

Always use hot water and mild, nonflammable, grease-cutting soaps or cleaning agents to clean the machine.

Never use flammable or caustic cleaning agents.

Never use high-pressure steam cleaners to clean the machine.

Always lubricate the machine thoroughly after cleaning to remove any water or soap residue.

Keep the cab, windows, mirrors, and lights clean.

Fluid Systems

Adding Fluids to the Machine

When adding fluids to the machine, be aware that fluid systems may be under pressure and hot.

Refueling

When adding fuel, shut down the machine before removing the fuel tank cap.

Fuel spills present a hazard if not cleaned up immediately.

Refuel only in a well-ventilated area. Never smoke or allow open flames nearby while refueling the machine.

Do not top off the fuel tank.

High-Pressure Fluid Lines

WARNING

- **Never perform inspections or replace items while any system is under pressure. Working on a system under pressure could lead to serious injury.**
- **Never use your hands to check or feel for leaks. Always wear personal protective equipment (PPE), and use a piece of wood or cardboard to check for leaks.**
- **If high-pressure fluids penetrate skin or get into eyes, seek medical attention immediately.**

Failure to follow these warnings can result in death or serious injury.

Check for cracks in the lines or hoses and for swelling in the hoses.

NOTE: *If there is any leakage from a line or hose, the surrounding area may be wet or have an accumulation of dust and dirt at the site of a leak.*

Replace lines and hoses immediately if swelling, cracking, or leaks are found or if failure occurs.

Accumulator

This machine is equipped with an accumulator charged with high-pressure nitrogen gas. Do not disassemble the accumulator.

Never expose the accumulator to temperatures over 140°F (60°C) or to open flames.

Never weld on the accumulator.

Never strike the accumulator.

If the accumulator needs service, contact a SANY dealer.

Electrical System

Always clean the electrical system using only industry-approved electrical cleaners.

Never use caustic soaps, high-pressure water, or steam cleaners to clean the electrical system. These could damage the system or cause intermittent system failures.

Battery Safety

When working with battery, always work in a well-ventilated area. Battery present a hazard, especially when they have been in use for a long period of time. The following are some basic precautions for working around battery:

- Always wear personal protective equipment (PPE).
- Battery gases are extremely explosive. Smoking, sparks, or open flames could cause an explosion. When opening a battery compartment, always allow ample time for battery gases to escape.
- If the battery is corroded, clean it with a mixture of warm water and baking soda.
- If battery acid gets on skin or in eyes, flush the area immediately with fresh water and seek medical attention.

Check the battery's condition only with proper test equipment.

Disconnect the Battery

When disconnecting the battery, always disconnect the negative (-) cable first, then disconnect the positive (+) cable.

NOTE: *Disconnecting the cables between the battery may not completely interrupt the electrical system.*

Job Safety

It is the owner's/operator's responsibility to replace any safety decals that are damaged or missing from the machine.

Never leave the machine running while it is unattended. Always park the machine in a safe, level area, lower any work equipment to the ground, move the hydraulic lockout control lever to the locked (closed) position, and shut down the engine before exiting the machine. Secure the machine to prevent tampering by unauthorized personnel.

Before starting any work operations, travel, or maintenance procedures, make sure all personnel are a safe distance from all points of the machine. Never allow anyone to stand near the machine while it is in operation or under maintenance or repair.

It is the responsibility of the operator's employer to conduct periodic safety training and familiarize all personnel with emergency procedures.

If pedestrians are in the area, sound the horn and proceed slowly.

When working with another person on a job site, make sure that all personnel involved understand all industry-standard hand signals that are to be used.

The operator shall respond to operating signals from the proper signal person only, but shall obey a stop signal at any time from anyone.

The operator must always be able to see the work location. If this is not possible, then a signalman must be used. If visibility becomes blocked for any reason, stop operation immediately.

If the machine is equipped with operator aids, the Occupational Safety and Health Administration (OSHA) requires this equipment to be used when operating the machine.

Personal Protective Equipment (PPE)

Before using personal protective equipment (PPE), make sure it is in good working condition.

Hearing Protection

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protection to protect against loud noise.

Travel and Operation Precautions

Confirm the relative positions of the undercarriage and operator before operating the machine.

Traveling with the machine may present hazards. When traveling with the machine, always travel in a safe, controlled manner, and remain alert at all times. Be sure the areas around the machine are clearly visible.

When traveling over rough ground, travel at a low speed and steer carefully. Whenever possible, avoid traveling over obstacles or raised areas. Traveling over obstacles or raised areas could result in loss of control or damage to the machine. When traveling over raised areas, always travel at a low speed.

During travel, always maintain a safe distance from people and surrounding objects. Always check to make sure areas such as bridges and roadways will support the weight of the machine before attempting to cross.

Before traveling in public areas, always gain approval from local authorities and follow their instructions.

Raise work equipment 8 in.–12 in. (20 cm–30 cm) above the ground when traveling.

When traveling or operating in shallow water, be aware of its depth and current.

Inclined Areas

Traveling on an incline can be dangerous. In order to prevent tipping, loss of control, or a rollover, it is important to follow these rules:

- Always check the firmness of the inclined surface before attempting to travel on it.
- Always travel straight up or straight down an incline.
- Avoid turning on an incline.
- Avoid sudden stops.

Snow or Frozen Surfaces

Be careful when traveling or operating the machine on frozen or snow-covered surfaces. The ability to maneuver the machine is seriously affected. The machine may not respond as expected when turning. Other precautions are:

- Avoid any rapid movement, acceleration, or quick stopping. Always be aware of the increased stopping distance required on these surfaces.
- Avoid deep snow or frozen bodies of water.
- Even a slight incline may cause the machine to slip. Be extra careful when working on an inclined surface covered with snow or ice.
- When traveling or moving the machine on a snow-covered incline, allow the machine to come to a stop slowly.

Avoid Backover Accidents

Keep the windows, mirrors, and lights clean and in good condition.

Before moving the machine, make sure all bystanders are clear of the intended path.

Before moving the machine, warn others with the horn.

Use a signalman if the view is obstructed when backing up. Keep the signalman in view at all times.

Dust and Chemical Hazards

Hazardous dust or chemicals present a serious danger when they are released or mishandled. All workers involved should use approved personal protective equipment (PPE) and follow all environmental safety regulations.

Consult the Safety Data Sheet (SDS) for guidelines on personal protective equipment (PPE), proper handling and cleanup, and correct reporting agencies if needed.

Environmental Precautions

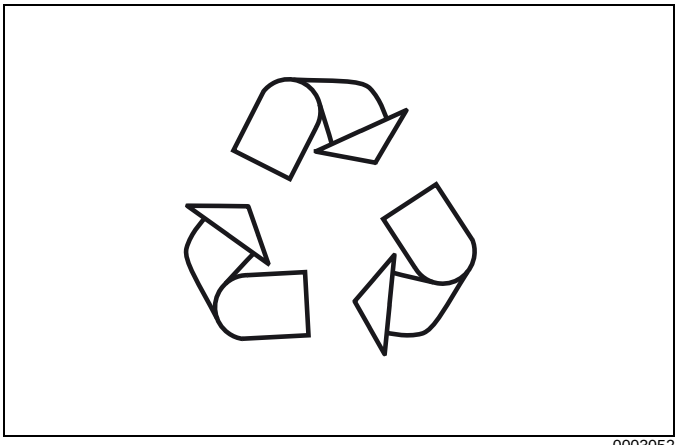

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Figure 2-2

Oil and coolants poured onto the ground, into bodies of water, into storm drains, or tossed into trash cans (even in a sealed container) can contaminate and pollute soil, groundwater, streams, and rivers.

Recycling used oil, coolants, and filters helps conserve natural resources and is good for the environment.

Obey all regulations when disposing of harmful items such as oil, fuel, filters, battery, hydraulic oil, engine coolant, and used parts.

Precautions in High-Voltage Areas

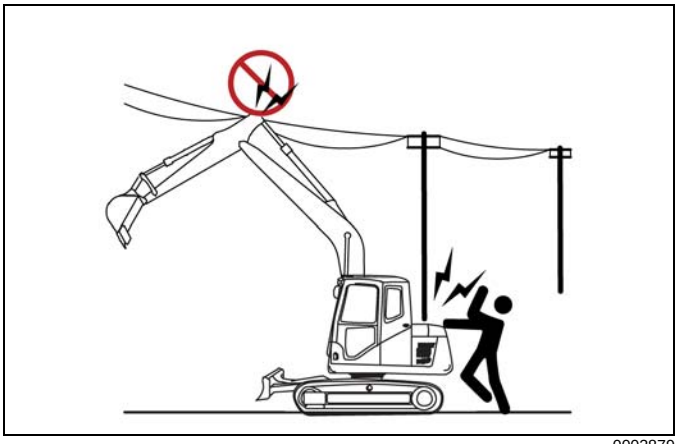

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Figure 2-3

WARNING

Overhead power lines carry high-voltage electricity that can discharge to the ground through the machine, even without direct contact with the machine's structure. Avoid direct contact with high-voltage power lines while operating. High-voltage contact could result in equipment damage, death, or serious injury.

Stay clear of overhead power lines. They are an electrical hazard. Treat all overhead power lines as being energized and not insulated.

Be sure all underground utilities have been marked before excavating.

Chapter 3

Machine Controls

Machine Overview

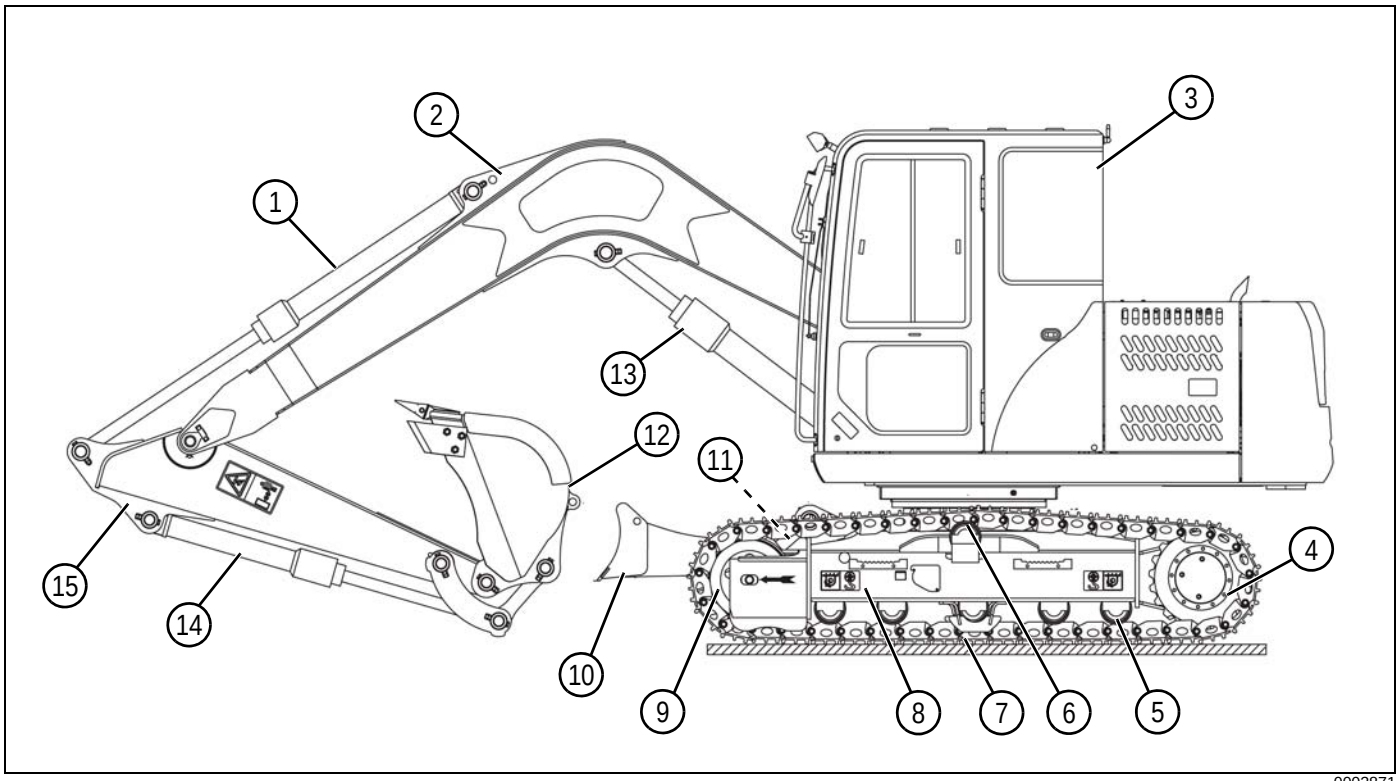

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Figure 3-1

1) Arm cylinder
2) Boom
3) Cab
4) Drive sprocket
5) Track roller
6) Carrier roller
7) Track
8) Track frame
9) Idler
10) Dozer blade
11) Dozer blade cylinder
12) Bucket
13) Boom cylinder
14) Bucket cylinder
15) Arm

Monitor

The monitor (1) is located on the right front of the cab and displays machine operating information and provides access to change system parameters.

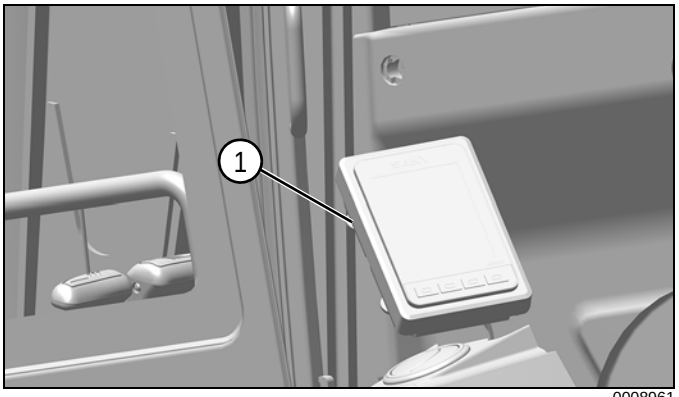

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Figure 3-2

Daily Maintenance Information Screen

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Figure 3-3

When the key switch is turned to ON, the monitor displays the Daily Maintenance Information screen.

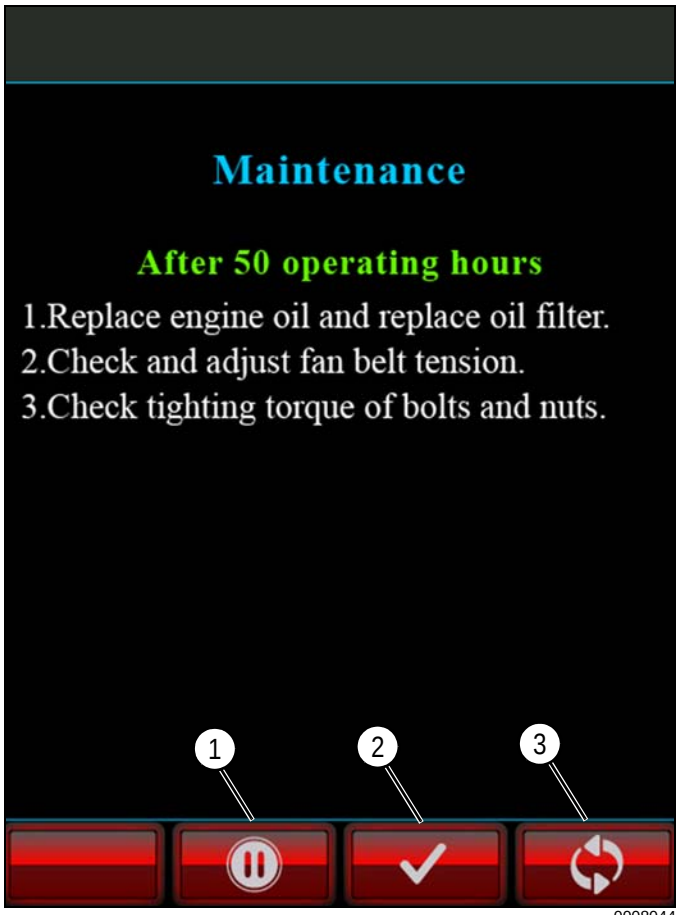
Checklist steps 1–7 should be completed before starting the machine. See “Prestart Checks and Adjustments” on page 4-5.

Start the machine and warm it up before operating the engine and hydraulic system (checklist step 8). See “Starting the Engine” on page 4-13.

Press the button below the check mark icon (1) to confirm all checks and procedures have been completed. The screen will change to the home screen. See “Home Screen” on page 3-5.

Maintenance Information Screen

NOTE: *If maintenance is required, the Maintenance information screen will display instead of the Daily Maintenance Information screen.*



0008044

Figure 3-4

The Maintenance information screen will display instead of the Daily Maintenance Information screen at each maintenance interval:

- Press the button below the pause icon (1) to pause or continue the display of maintenance information screens.
- Press the button below the check mark icon (2) to confirm completion of maintenance displayed on the screen. When prompted to reset the maintenance

icon on the home screen, enter the password “53188” to clear the maintenance prompt.

- Press the button below the return icon (3) to return to the previous screen.

Home Screen

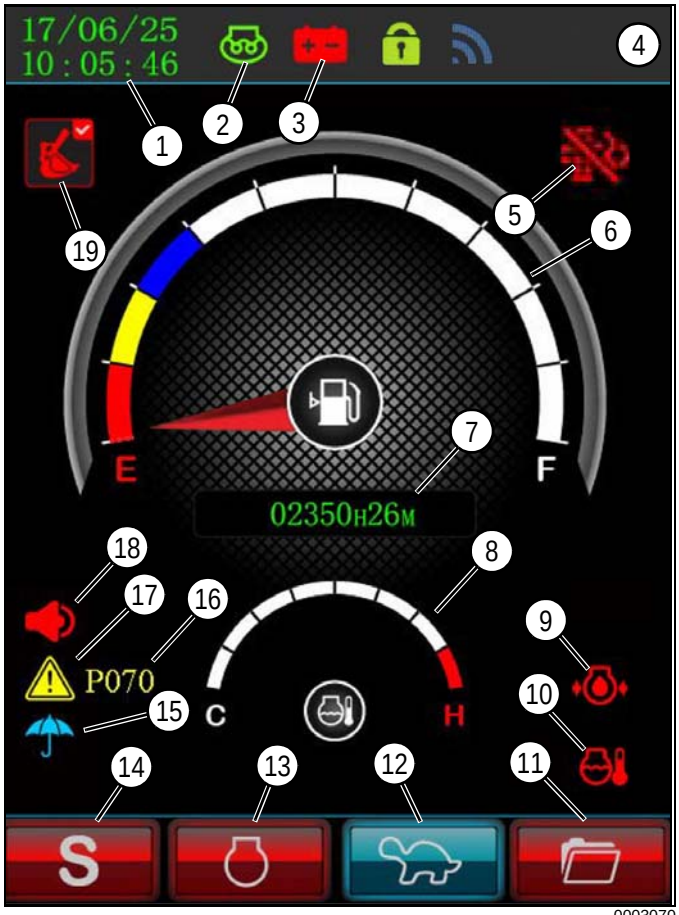
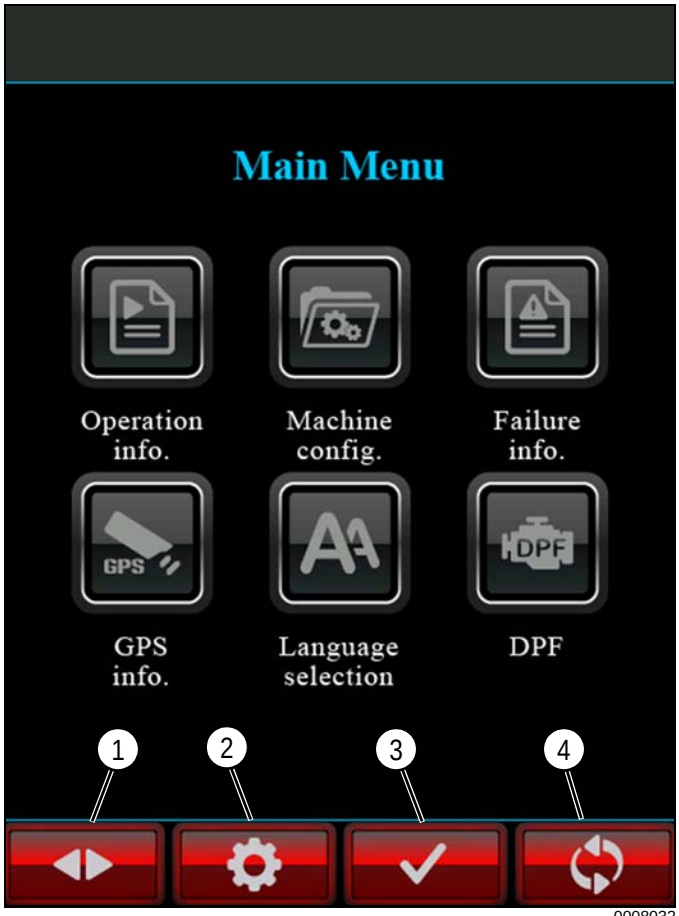


Figure 3-5

The home screen displays real-time machine operating information and provides access to change system parameters.

Item	Home Screen Display	Function
1	Time and date	Displays the current date (YY/MM/DD) and time (HH/MM/SS). See “Date and Time Setup Screen” on page 3-13.
2	Preheat icon	When this icon illuminates, the engine is in preheating mode. See “Cold Weather Engine Starting” on page 4-14.
3	Battery charge icon	Working Mode: S ECO H Throttle position: Displays the current throttle position from 1_11. It is adjusted with the throttle control dial. See “Throttle Control Dial” on page 3-18.
4	Working Mode and Throttle position	Displays the current throttle position from 0–100% in 10% increments. It is adjusted with the throttle control dial. See “Throttle Control Dial” on page 3-18.
5	DPF regeneration inhibit icon	Regeneration is inhibited when this icon is illuminated. See “Diesel Particulate Filter (DPF) Screens” on page 3-13.
6	Fuel level gauge	Displays the fuel level.
7	Operating hours	Displays the total number of machine operating hours.
8	Engine coolant temperature gauge	Displays the engine coolant temperature.
9	Engine oil pressure alarm	When the oil pressure is low, this icon illuminates as a warning.
10	Coolant temperature alarm	When the coolant temperature is high, this icon illuminates as a warning.
11	Main Menu (folder) icon	Press the button below the icon to access the Main Menu screen.
12	High/low travel speed icon	Press the button below the icon to select high travel speed (rabbit icon) or low travel speed (turtle icon).
13	Auto-idle icon	Press the button below the icon to enable or disable the auto-idle function. This function will reduce fuel consumption and noise levels during periods of inactivity.
14	Work mode icon	Displays the machine work mode. The machine is equipped with the standard (S) working mode only.
15	Maintenance prompt icon	The blue umbrella icon will illuminate if any scheduled maintenance is due. See “Maintenance Information Screen” on page 3-4.
16	Failure code	Failure code illuminates when an abnormality is detected. See “Failure Codes Screen” on page 3-9.
17	Failure information icon	Indicates that an abnormality has occurred. See “Failure Codes Screen” on page 3-9.
18	Severe failure alarm icon	When this icon illuminates, shut down the engine immediately to prevent severe damage to the machine. Check for failure codes that may be displayed. See “Failure Codes Screen” on page 3-9. Contact a SANY dealer for further information.
19	Operating mode icon	Indicates the selected work tool or equivalent one-way or two-way operating mode. See “Operating Mode Screen” on page 3-11.

Main Menu Screen



0008032

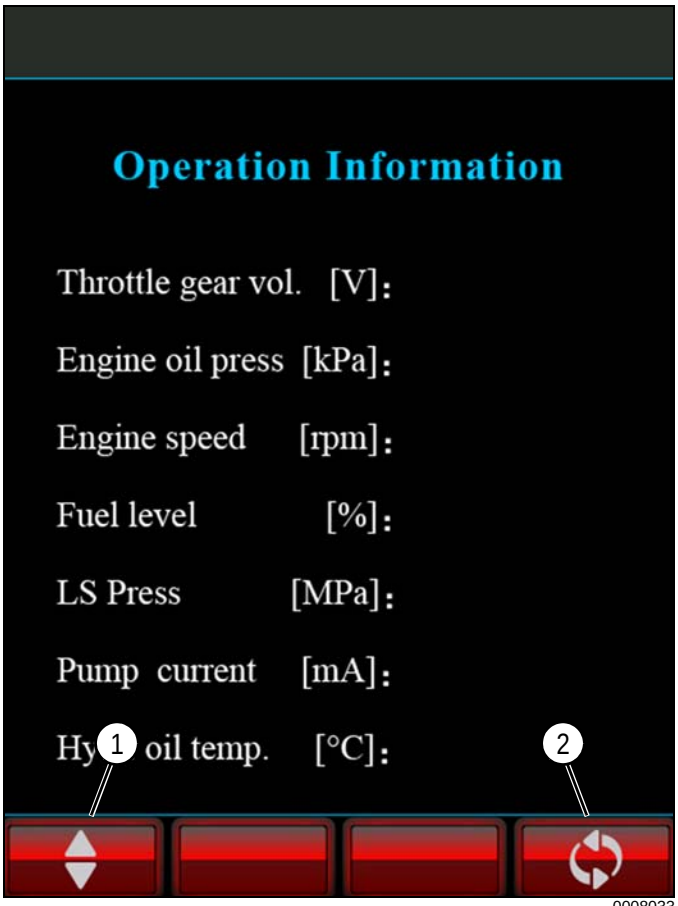
Figure 3-6

The Main Menu screen is accessed by pressing the button below the folder icon on the home screen. See See “Home Screen” on page 3-5.

The Main Menu screen displays the main signals to and from the system controller, including real-time running information, machine configuration, detailed failure information, available languages, and maintenance information. The Main Menu options include:

- Operation Information – Displays real-time engine operating values, fuel level, and load sense pressure with the engine running.
- Machine Configuration – Displays basic information of the machine.
- Failure Information – Displays detailed failure codes recorded by the machine.
- Global Positioning System (GPS) Information – Not used at this time in North America.
- Language Selection – Select the language that displays information on all display screens.
- Maintenance Table – Displays when the machine is due for maintenance. If maintenance is not due, the Maintenance Table screen will not open. The Maintenance Table screen is also used to reset the service timer.
- Press the button below the left/right arrow icon (1) to scroll to and illuminate the selected icon.
- Press the button below the gear icon (2) to display the System Setup screen, which is password-protected for use by SANY only.
- Press the button below the check mark icon (3) to access an active machine function display.
- Press the button below the return icon (4) to return to the previous screen.

Operation Information Screen



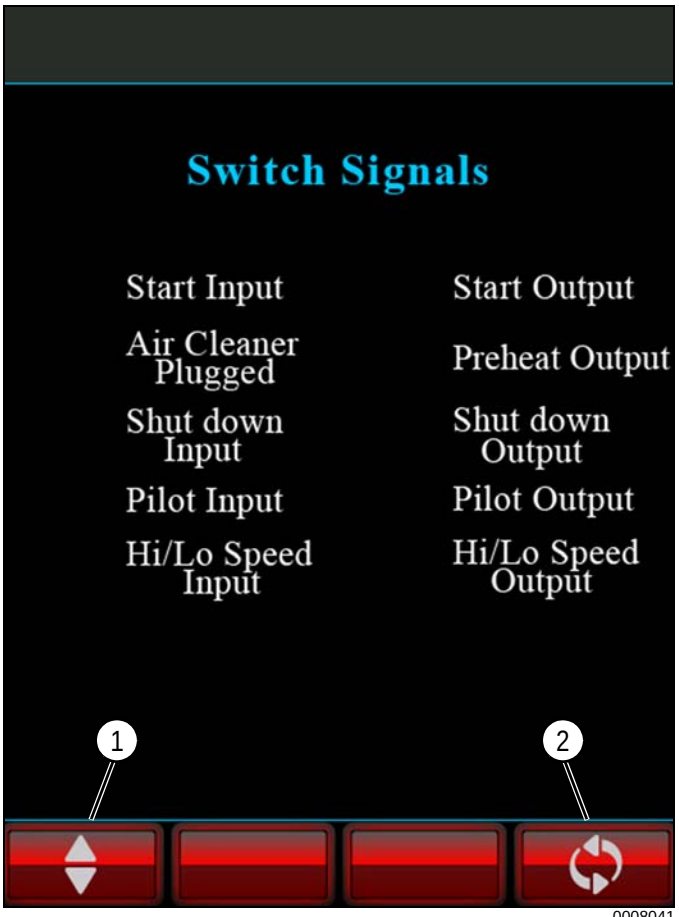
0008033

Figure 3-7

The Operation Information screen displays real-time engine operating values, fuel level, and load sense (LS) pressure with the engine running:

- Press the button below the up/down arrow icon (1) to scroll to the next active machine function page.
- Press the button below the return icon (2) to return to the Main Menu screen.

Switch Signals Screen



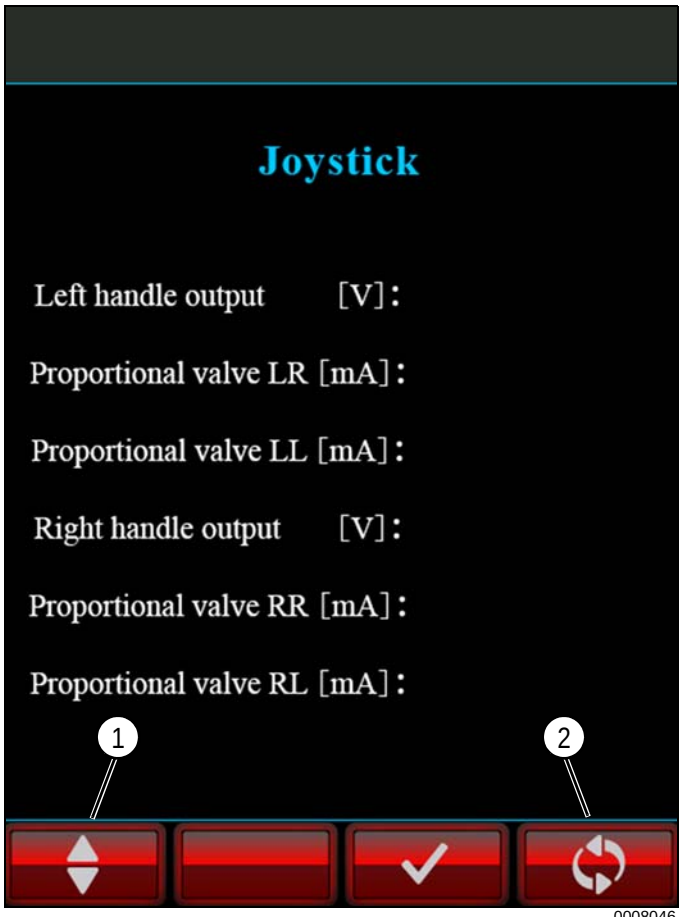
0008041

Figure 3-8

The Switch Signals screen enables the operator to monitor the input and output of switch functions:

- Press the button below the up/down arrow icon (1) to scroll to the next active machine function page.
- Press the button below the return icon (2) to return to the Main Menu screen.

Joystick Screen



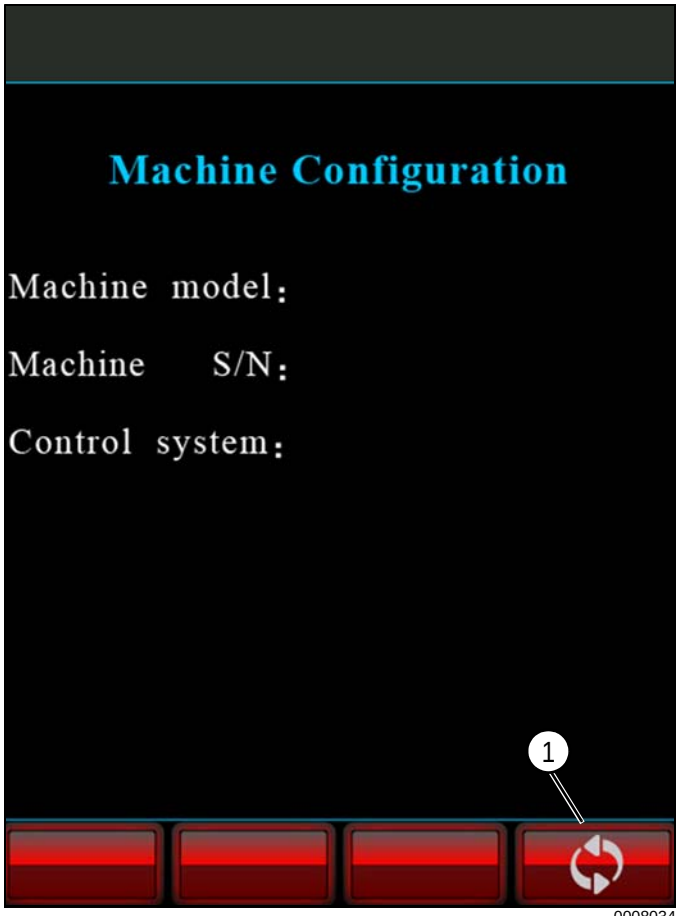
0008046

Figure 3-9

The Joystick screen displays real-time joystick control valve information:

- Press the button below the up/down arrow icon (1) to scroll to the next active machine function page.
- Press the button below the return icon (2) to return to the Main Menu screen.

Machine Configuration Screen



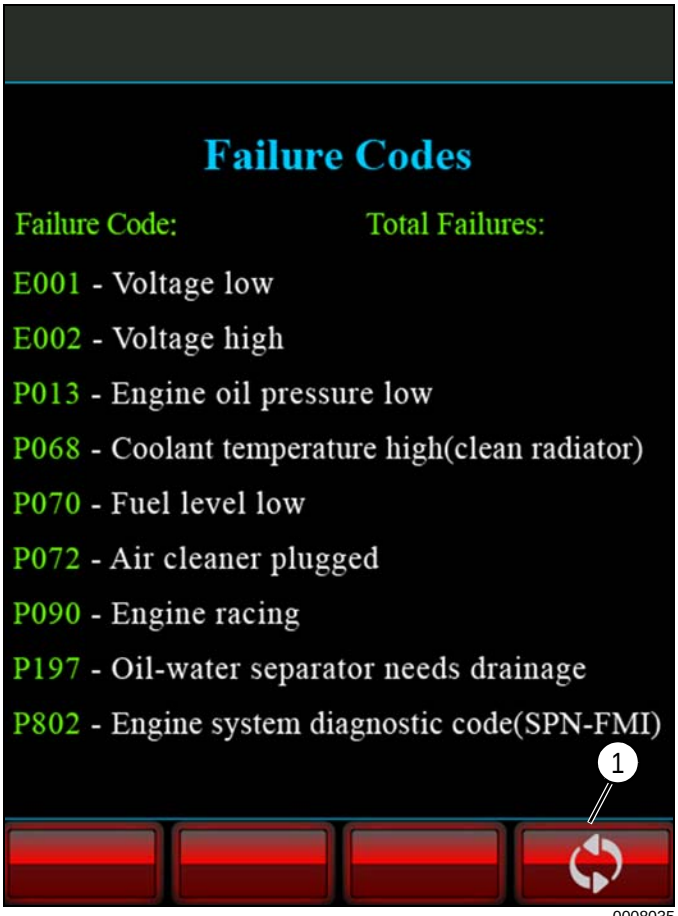
0008034

Figure 3-10

Accessed from the Main Menu screen, the Machine Configuration screen displays machine model number, serial number, and control system information.

Press the button below the return icon (1) to return to the previous screen.

Failure Codes Screen



0008035

Figure 3-11

The Failure Codes screen is accessed from the Main Menu screen.

When a failure occurs, the failure information icon will change color to blue and the failure code will be displayed on the home screen.

The Failure Codes screen displays possible failure codes.

Press the button below the return icon (1) to return to the previous screen.

NOTE: *SPN and FMI codes are engine diagnostic failure codes.*

Global Positioning System (GPS) Information Screen

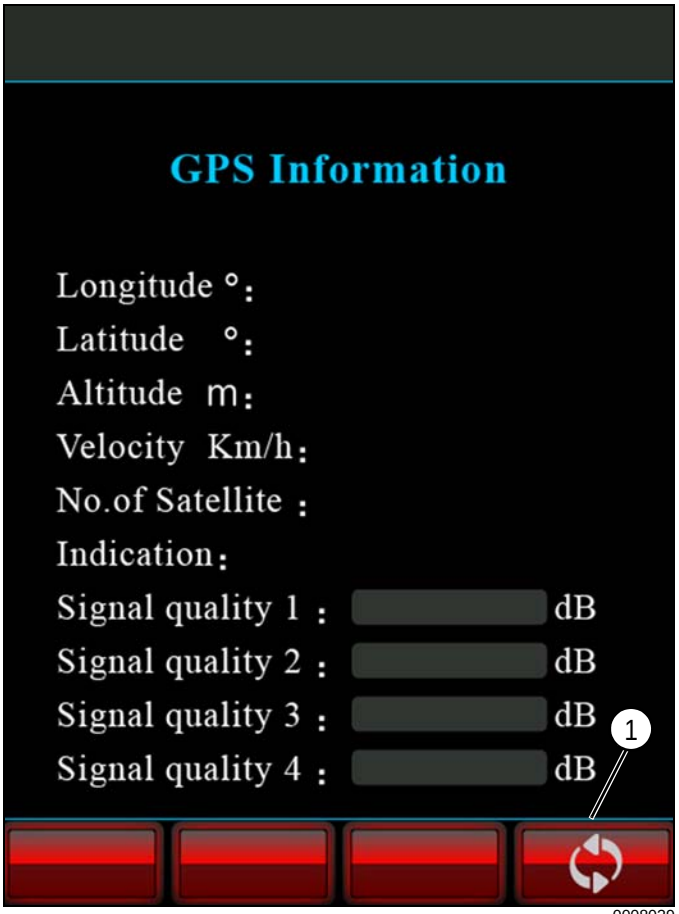


Figure 3-12

NOTE: *Global Positioning System (GPS) is not used at this time in North America.*

Press the button below the return icon (1) to return to the previous screen.

Language Selection Screen

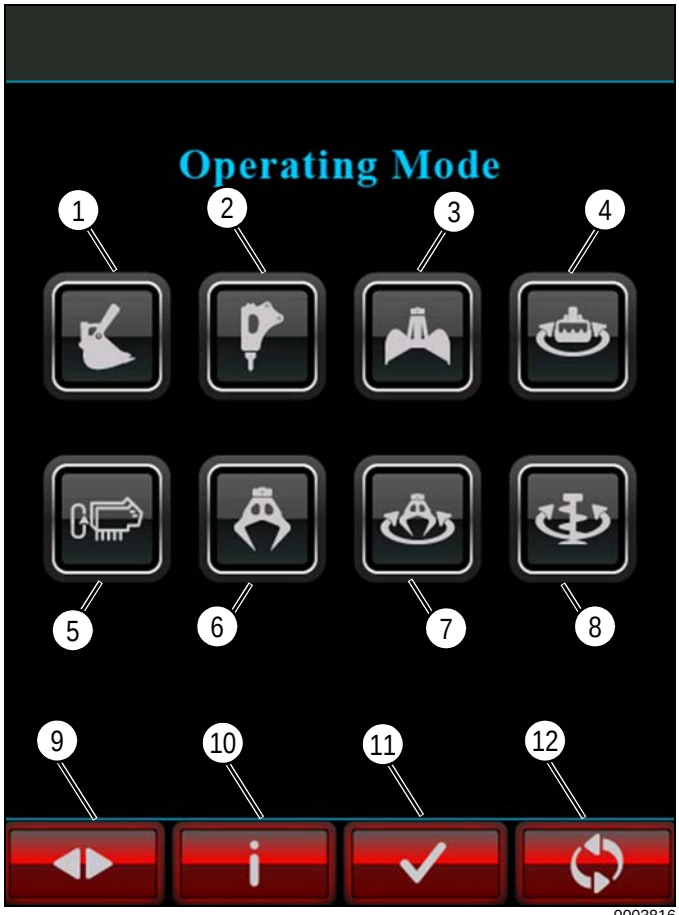
Figure 3-13

Accessed through the Main Menu screen, the Language Selection screen allows selection of the language that will display on all screens.

To change the language setting:

- Press the button below the up/down arrow icon (1) to select the desired language.
- Press the button below the check mark icon (2) to confirm the selected language.
- Press the button below the return icon (3) to return to the previous screen.

Operating Mode Screen



0003816

Figure 3-14

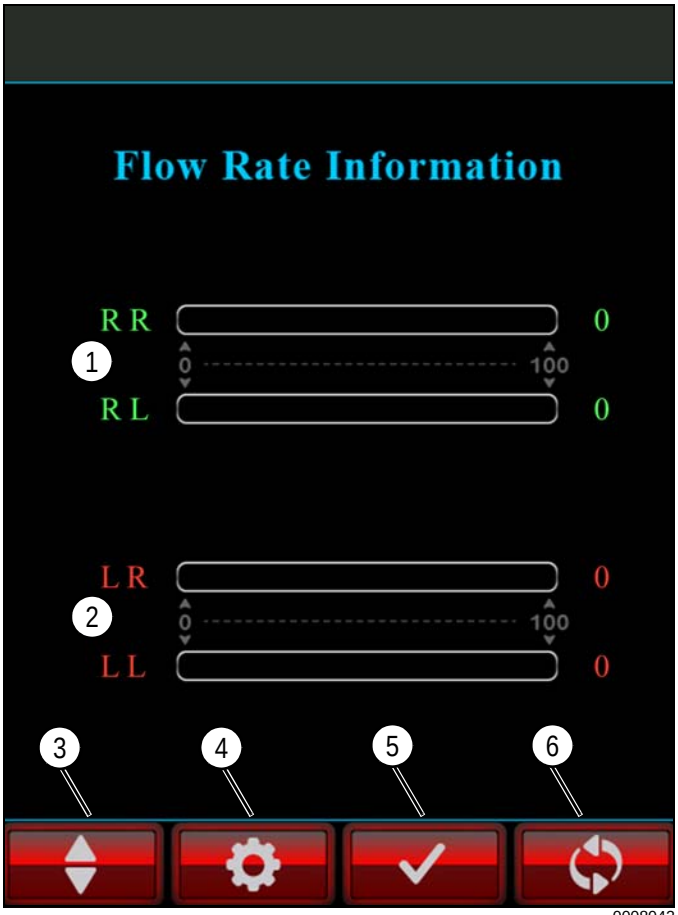
The Operating Mode screen is used to select a work tool or the equivalent one-way or two-way flow required:

- Bucket (default) (1)
- Breaker (2)
- Clamshell bucket (3)
- Tilt bucket (4)
- Brush cutter (5)
- Grapple (6)
- Rotary grapple (7)
- Auger (8)

The Operating Mode screen displays the bucket (1) as the default operation. The auxiliary ports are used for hydraulic work tools. Select the proper work tool icon prior to operating it.

- Press the button below the left/right arrow icon (9) to scroll to and illuminate the selected work tool icon.
- Press the button below the information icon (10) to access the Flow Rate Information screen. Flow rate for a work tool can be adjusted on this page. See “Flow Rate Information Screen” on this page.
- Press the button below the check mark icon (11) to confirm the selected work tool.
- Press the button below the return icon (12) to return to the previous screen.

Flow Rate Information Screen



0008042

Figure 3-15

NOTE: *Check the work tool operator manual for hydraulic flow rate information and follow all optional equipment information and safety precautions.*

The Flow Rate Information screen displays the flow rate, from 0% to 100%, of the hydraulic work tool selected in the Operating Mode screen:

- RR and RL (1) are for setting right joystick high-pressure, high-flow auxiliary circuit.
- LR and LL (2) are for setting left joystick low-pressure, low-flow quick coupler circuit.
- Press the button below the up/down arrow icon (3) to select the hydraulic flow rate to adjust.
- Press the button below the gear icon (4) to access the Flow Rate Setting screen.
- Press the button below the check mark icon (5) to display a service screen that is password-protected.

- Press the button below the return icon (6) to return to the previous screen.

Flow Rate Setting Screen

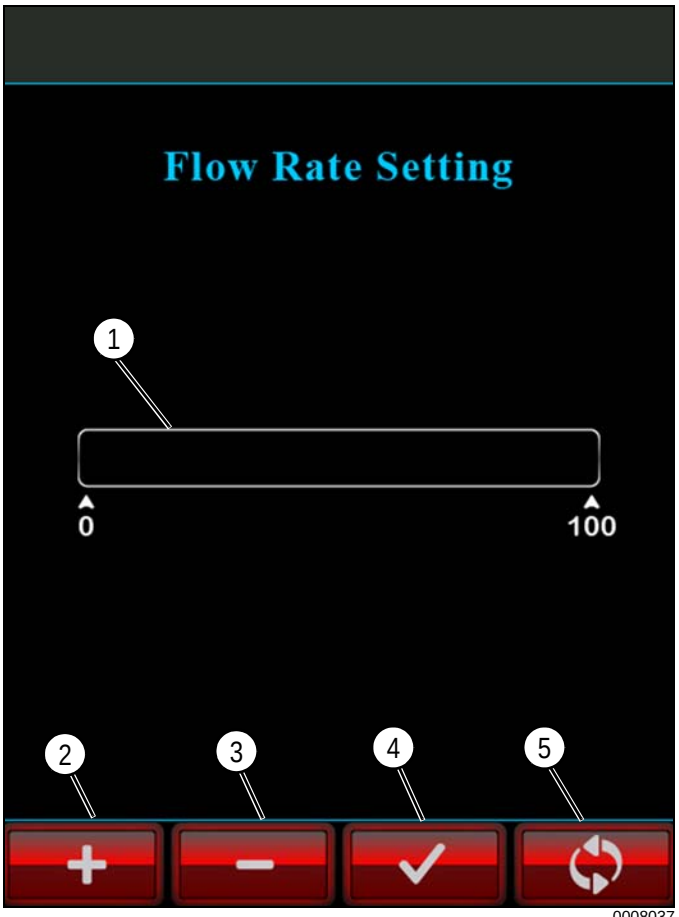


Figure 3-16

NOTE: *Check the work tool operator manual for hydraulic flow rate information.*

The Flow Rate Setting screen displays the flow rate information of the operating mode of the hydraulic work tool selected in the Flow Rate Information screen.

NOTES:

- *When the bar graph (1) has been set to the highest level, the flow rate is at its maximum (100).*
- *When the bar graph has been set to its lowest level (shown, no bar is visible), the flow is blocked and no hydraulic oil will flow.*

Flow rate of the selected function in the Flow Rate Information screen can be adjusted in the bar graphic in the Flow Rate Setting screen.

- Press the button below the plus icon (2) to increase the length of the bar graph, which will increase the flow rate.
- Press the button below the minus icon (3) to decrease the length of the bar graph, which will lower the flow rate.
- Press the button below the check mark icon (4) to confirm the flow rate adjustment.
- Press the button below the return icon (5) to return to the previous screen.

Quick Coupler Control Screen

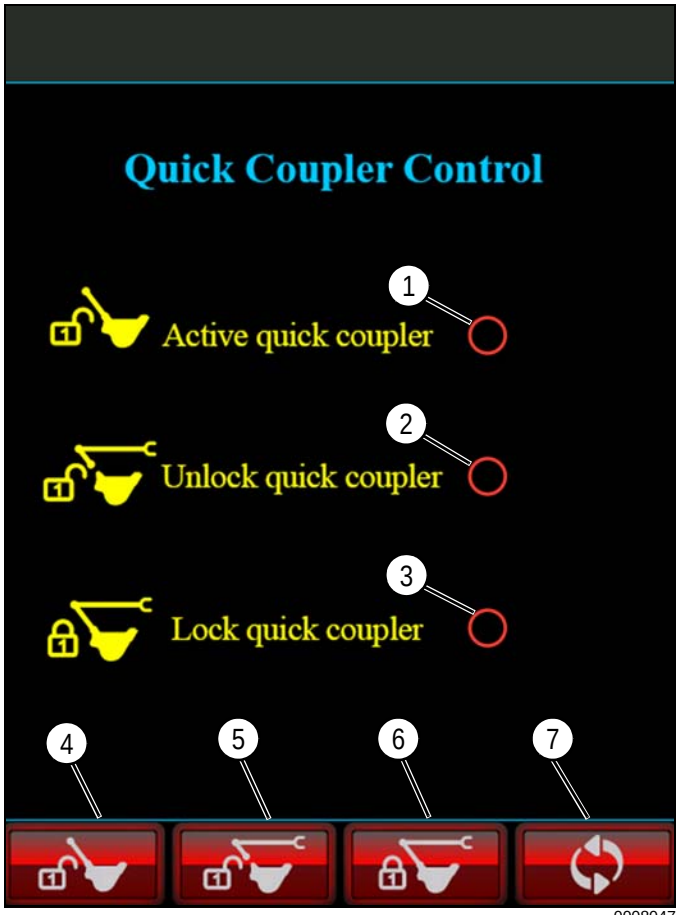


Figure 3-17

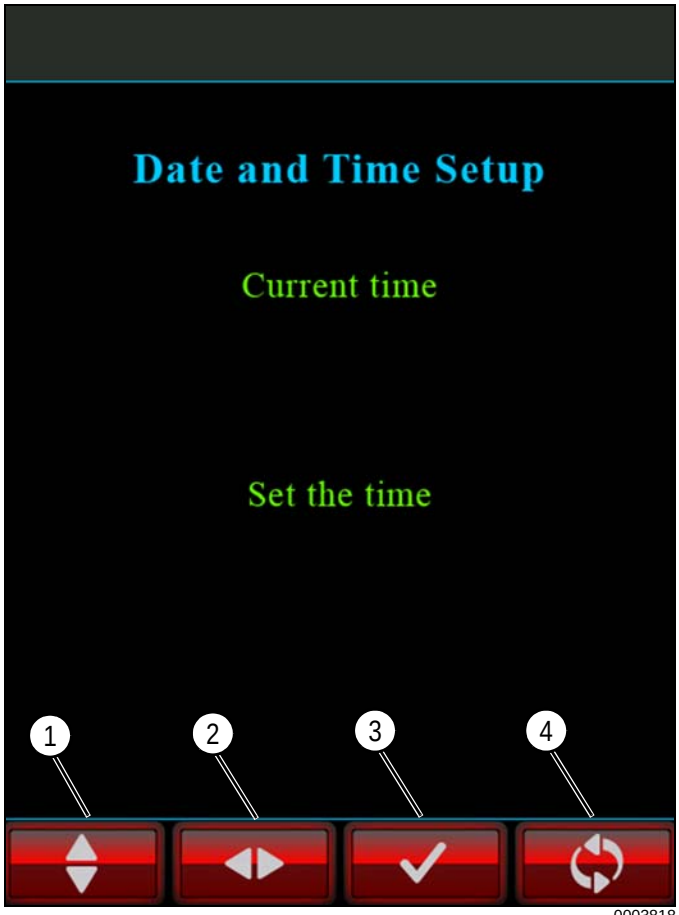
The Quick Coupler Control screen allows the operator to lock and unlock the quick coupler:

- Press the button below the active icon (4) to activate the quick coupler function. The active quick coupler display (1) will flash and a short alarm will sound. When selected, the unlock and lock functions (2, 3) can be activated.
- Press the button below the unlock icon (5) to select the unlock quick coupler function. The unlock quick coupler (2) display will flash. Press and hold the unlock quick coupler button on the left joystick to allow the quick coupler to be opened.
- Press the button below the lock icon (6) to select the lock quick coupler function. The lock quick coupler (3) display will flash. Press and hold the lock quick

coupler button on the left joystick to allow the quick coupler to be closed.

- Press the button below the return icon (7) to return to the Function List screen.

Date and Time Setup Screen



0003818

Figure 3-18

The Date and Time Setup screen is accessed by pressing the button below the Auto-idle icon (3) on the Home Screen.

The Date and Time Setup screen allows changes to the date, time, and time zone:

- Press the button below the up/down icon (1) to increase the value of the selected position.
- Press the button below the left/right icon (2) to select the position for adjustment.
- Press the button below the check mark icon (3) to confirm the adjustment.
- Press the button below the return icon (4) to return to the previous screen.

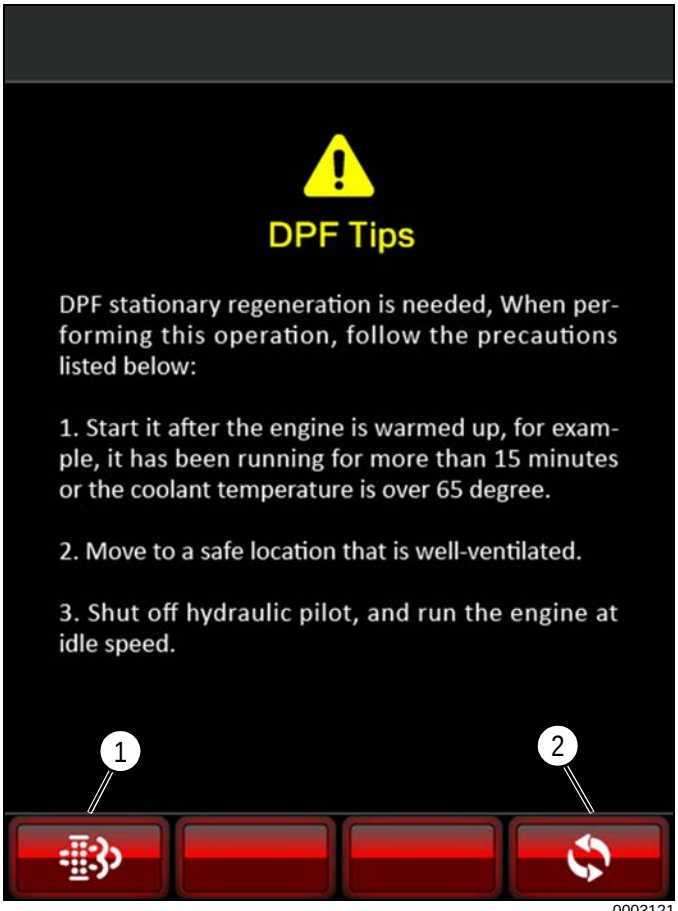
System Unlocked Screen

SANY factory and authorized service only.

Reserved Function

Not used at this time; reserved for future function.

Diesel Particulate Filter (DPF) Screens



0003121

Figure 3-19

When exhaust particulate deposits (soot) build up, the diesel particulate filter (DPF) will need stationary regeneration to remove the soot. Performing the stationary regeneration process will make sure the machine does not operate in a derated mode where the engine rpm and power are reduced due to the exhaust becoming clogged with soot.

The system will prompt the operator to start regeneration with the DPF Tips screen. Read and understand the operation procedures and precautions before starting stationary regeneration.

NOTE: *Press the button below the return icon (2) to return to the previous screen.*

WARNING

- **The exhaust temperature during DPF regeneration can reach approximately 1100°F (600°C). Make sure there are no flammable materials around the exhaust system or machine. Do not touch any part of the exhaust system.**
- **Exhaust gas contains carbon monoxide. Carbon monoxide is an invisible and odorless gas, and is toxic. Operate the engine only in a well-ventilated area.**

Failure to follow these warnings could result in death or serious injury.

NOTICE!

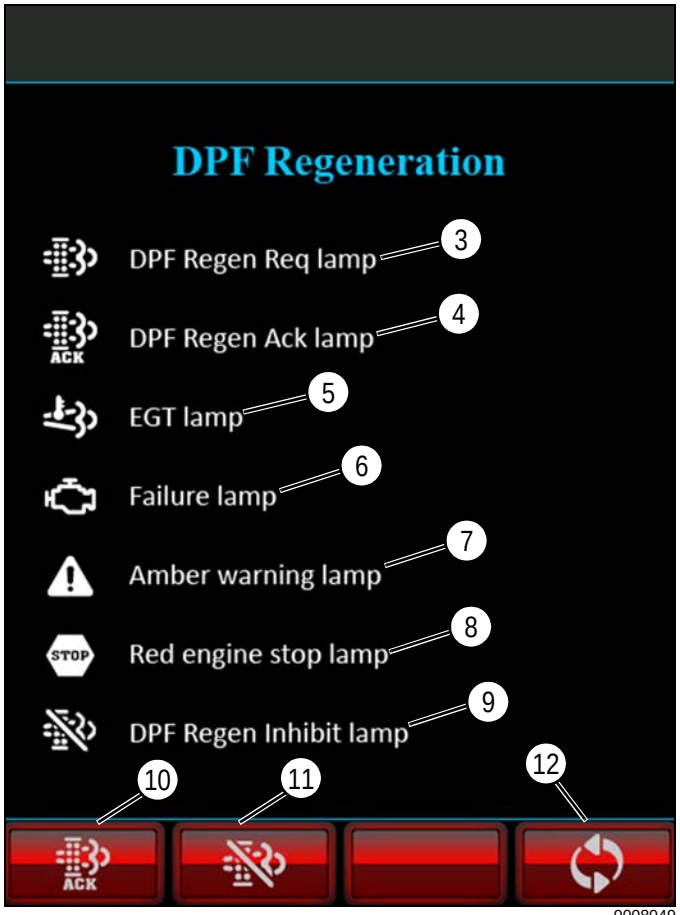
When performing DPF stationary regeneration, start the engine and allow it to run for more than 15 minutes or the coolant temperature is over 149°F (65°C). Do not start the regeneration process before the engine is at operating temperature.

Failure to follow this notice could damage the machine or cause it to operate improperly.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Start the engine and park in a safe location where the exhaust pipe will not face any combustible surface. See “Starting the Engine” on page 4-13.
3. Move the hydraulic lockout control lever to the locked (closed) position and run the engine at low idle. See “Hydraulic Lockout Control Lever” on page 3-19.

NOTE: *Make sure the DPF regeneration icon (1) is illuminated. See “Regeneration Inhibit Switch” on page 3-17.*

4. Press the button below the DPF regeneration icon for the DPF Regeneration screen.
5. Press the button below the return icon (2) to return to the previous screen.



0008049

Figure 3-20

NOTES:

- *Once started, the DPF regeneration cycle can be inhibited and restarted without interrupting the cycle by repeating step 5. If the button below the DPF Regen Inhibit icon (11) is pressed, regeneration will not be allowed and a warning light will display on the home screen.*
- *The stationary regeneration process will take approximately 25 to 30 minutes.*

6. With regeneration enabled and no other warnings illuminated, press the button below the DPF Regen Ack (acknowledge) icon (10) to begin the stationary regeneration process. The engine speed will gradually increase to approximately 2000 rpm during the regeneration process:
   - After the stationary regeneration process begins, the failure lamp (6) and the amber warning lamp (7) turn off.
   - Simultaneously, the DPF Regen lamp message (3) and the DPF Regen Ack lamp (4) message will flash.

- The DPF Regen lamp message will go out. Simultaneously, the DPF Regen Ack lamp message and exhaust gas temperature (EGT) lamp message (5) will illuminate steadily.

NOTICE!

If the Red engine stop lamp (8) illuminates, shut down the engine immediately. Contact a SANY dealer for further information.

Failure to follow this notice could damage the machine or cause it to operate improperly.

NOTE: *A DPF regeneration in-progress message will display on the DPF Regeneration screen with a caution message of high exhaust temperatures.*

7. When the regeneration cycle is complete, the engine returns to low idle and a manual DPF regeneration completed message is displayed. The DPF Regen Ack icon extinguishes automatically.
8. If it is necessary to abort the stationary regeneration, press the button below the DPF regeneration inhibit icon (11). The DPF Regen Inhibit lamp (9) will illuminate and the regeneration cycle will be stopped. Shut down the engine. See “Engine Shutdown” on page 4-16.

NOTE: *Press the button below the return icon (12) to return to the previous screen.*

Switches

Switch Panel

000899

Figure 3-21

1) START/stop switch	7) Wiper switch
2) Auto-idle switch	8) Washer switch
3) Economy (ECO) switch	9) Overload alarm (not used)
4) Work light switch	10) Regeneration inhibit switch
5) Travel alarm cancel switch	11) Quick coupler switch
6) Beacon light cancel switch	12) Auxiliary (Aux) switch

START/stop Switch

Use the START-stop switch (1) to start and stop the engine in addition to the key switch.

To start the machine with the START-stop switch:

1. Turn the key switch to ON.

2. Press and hold the START-stop switch until the engine starts, then release the switch.

To stop the machine with the START-stop switch:

1. Press and hold the START-stop switch until the engine stops, then release the switch.
2. Turn the key to the OFF position.

Auto-Idle Switch

The auto-idle switch (2) enables and disables the engine auto function. The auto-idle switch LED lights are off or on to indicate system status:

LED lights off = auto-idle disabled.

LED lights on = auto-idle enabled.

3. Enable auto-idle when using the machine with long pauses in work operations. auto-idle reduces engine wear and reduces fuel consumption by 5% to 10%.

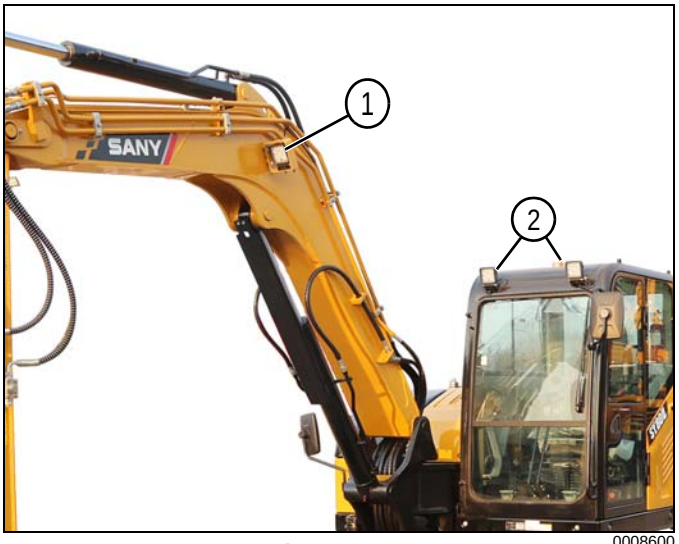
Economy (ECO) Switch

The economy (ECO) switch (3) enables the economy mode when the machine is not working under heavy loads.

When the ECO mode is activated the switch will be illuminated, and when in power mode, the switch will not be illuminated.

Work Light Switch

The work light switch (4) turns the work lights on and off.



0008600

Figure 3-22

There are three work lights:

- One work light (1) on the boom.
- Two work lights (2) on the cab roof.

Travel Alarm Cancel Switch

The travel alarm cancel switch (5) turns the audible alarm and beacon light (6) on and off. Turn on the travel alarm whenever the machine is being operated to increase job site safety.

Beacon Light Cancel Switch

The beacon light cancel switch (6) turns the beacon light on or off.

NOTE: *The beacon is on the top right of the cab.*

Windshield Wiper Switch

NOTICE!

Cleaning a dry windshield can cause premature wear or damage to wiper blades. Press the windshield washer switch to spray windshield washer fluid on the windshield before turning on the windshield wiper.

When it is raining or if the front windshield is dirty, press the windshield wiper switch (7) to activate the windshield wiper.

Windshield Washer Switch

NOTICE!

Before pushing the windshield washer switch, make sure the front windshield of the cab is closed.

1. Press the windshield washer switch (8) to spray windshield washer fluid onto the windshield.
2. When pressing the switch, it continues to spray windshield washer fluid.
3. The switch returns automatically to the original position when released, and the spray of windshield washer fluid stops.

Overload Alarm

The overload alarm (9) is not used at this time.

Regeneration Inhibit Switch

NOTICE!

Operating the machine with the regeneration inhibit switch turned on for an extended period of time will cause the soot level to increase and can result in damage to the exhaust aftertreatment system.

Use the regeneration inhibit switch (10) to deactivate automatic regeneration. The LED status light on the switch will illuminate while automatic regeneration is inhibited.

The regeneration inhibit switch should be used when the machine is operated in an environment not suitable for regeneration, such as in confined areas, near flammable materials, or other areas that could create a safety hazard. The operator should turn off the regeneration inhibit switch as soon as possible to avoid soot buildup. If the operator inhibits automatic regeneration for an extended period of time, the DPF system will become clogged, causing the engine machine to operate in a derate mode where the engine rpm and power will be reduced and the machine will require stationary regeneration.

NOTE: *When the switch is off, the LED status light on the regeneration inhibit switch is off and the engine will perform a regeneration automatically when needed.*

Quick Coupler

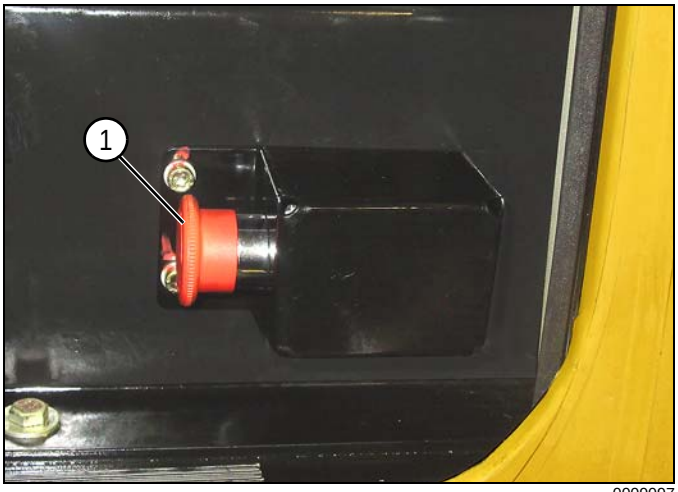
The quick coupler switch (11) engages and disengages the quick coupler for quick installation and removal of optional equipment.

Auxiliary (Aux) Switch

The auxiliary switch (12) is used for hydraulic control of an attachment on the boom.

NOTE: *Review the operator instructions of the attachment before connecting the hydraulics and operating.*

Emergency Stop Switch



0009097

Figure 3-23

NOTE: *The emergency stop switch is on the left side of the operator seat base.*

When pressed, the emergency stop switch (1) will shut off power to the engine's electronic control module (ECM) and the engine will shut down.

Turn the emergency stop switch knob counterclockwise, as indicated on the knob face, to reset the switch from the stopped position.

Key Switch

0009064

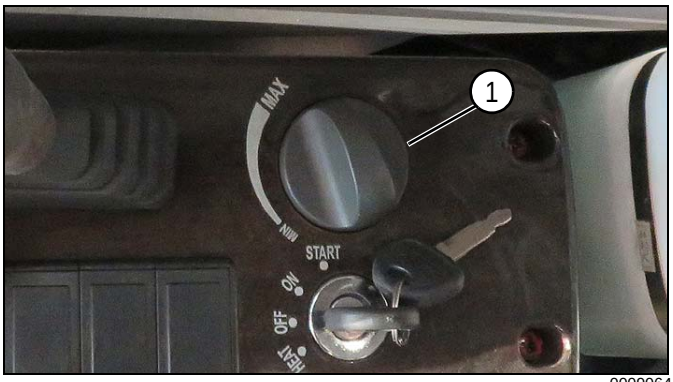
Figure 3-24

The key switch (1) is used to start or stop the engine. There are four positions on the start switch:

- OFF: When the key switch is turned to OFF, the engine is shut down, power to the electrical system is shut off, and the key can be removed or inserted.
- ON: When the key switch is turned to ON, the electrical system is energized.
- START: When the key switch is turned to START, the starter motor will crank the engine. Release the key after the engine has started and the key switch will return to ON, allowing the engine to run and maintain power to the electrical systems.

- HEAT: Turn the key switch to HEAT and release. The key switch returns to OFF. The preheat cycle begins if the ambient temperature is below a preset value. When the preheat cycle begins, a preheat icon is illuminated on the monitor home screen. When the preheat cycle is complete, the preheat icon is not illuminated.

Throttle Control Dial



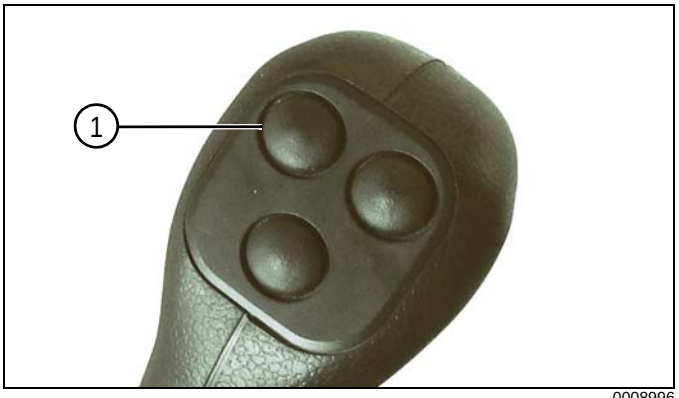
0009064

Figure 3-25

The throttle control dial (1) adjusts the engine speed and output power. Turn the dial clockwise to increase engine speed, and counterclockwise to decrease engine speed:

- MIN (low idle): Turn the throttle control dial fully counterclockwise.
- MAX (high idle): Turn the throttle control dial fully clockwise.

Horn Button



0008996

Figure 3-26

The horn button (1) is on top of the right joystick. Press the horn button to sound the horn.

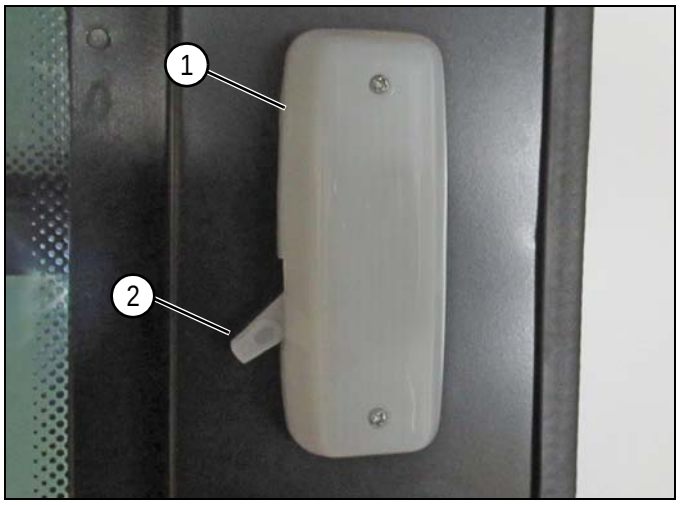
Auxiliary Hydraulic Switch

0008997

Figure 3-27

- The auxiliary hydraulic switch (1) is on top of the right joystick. The auxiliary hydraulic switch is used for optional one-way or two-way flow equipment.

Cab Light



0002754

Figure 3-28

The cab light (1) is turned on and off by moving the switch (2) up or down.

The cab light can be turned on only when the key switch is in the ON position.

Cigarette Lighter (12V)

The cigarette lighter is in the console below the monitor screen.

Press the cigarette lighter (1) in to activate the lighter. The lighter will pop out when ready to be used.

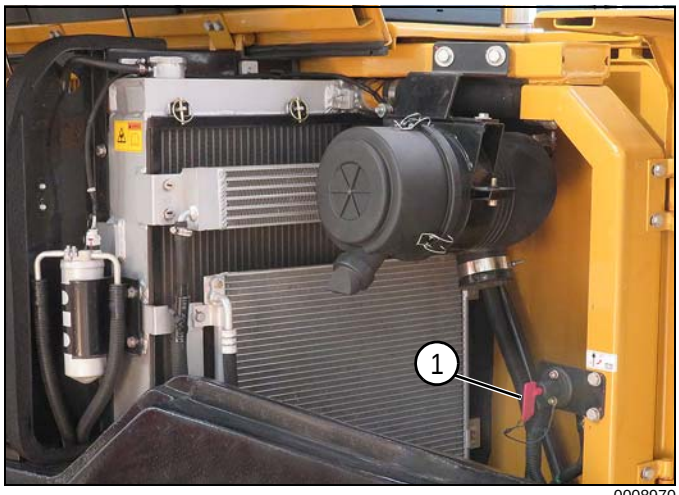
With the lighter removed, the power outlet (12V) can be used to charge or operate 12-volt electronic devices.

Battery Disconnect Switch

NOTICE!

- **Never turn the battery disconnect switch to OFF while the engine is running. This can damage the electrical system or cause the machine to operate improperly.**
- **After machine shutdown, wait at least 1 minute for the engine control module (ECM) to complete its shutdown before turning the battery disconnect switch to OFF.**

Failure to follow this notice could damage the machine or cause it to operate improperly.



0008970

Figure 3-29

The battery disconnect switch (1) is behind the right rear access door. Turn the switch to the OFF position to isolate the battery from the electrical system when securing the machine for the day, or as needed for maintenance tasks. The red battery disconnect switch handle can be removed in the OFF position to secure the machine.

Controls

Hydraulic Lockout Control Lever

0009099

Figure 3-30

WARNING

Always place the hydraulic lockout control lever in the locked (closed) position before leaving the seat. Unintended movement of the joysticks or travel control levers/pedals could result in death or serious injury.

NOTE: *Keep all the control levers in a neutral position when moving the hydraulic lockout control lever to the unlocked (open) position.*

The hydraulic lockout control lever (1) disables or enables the hydraulic function for work equipment, swing and travel control, and optional equipment.

Move the hydraulic lockout control lever forward to the unlocked (open) position to enable hydraulic controls.

Pull the hydraulic lockout control lever to the locked (closed) position to disable hydraulic controls.

NOTICE!

If any part of the machine moves when the hydraulic lockout control lever is in the locked (closed) position, shut down the engine immediately and contact a SANY dealer.

Joystick Controls

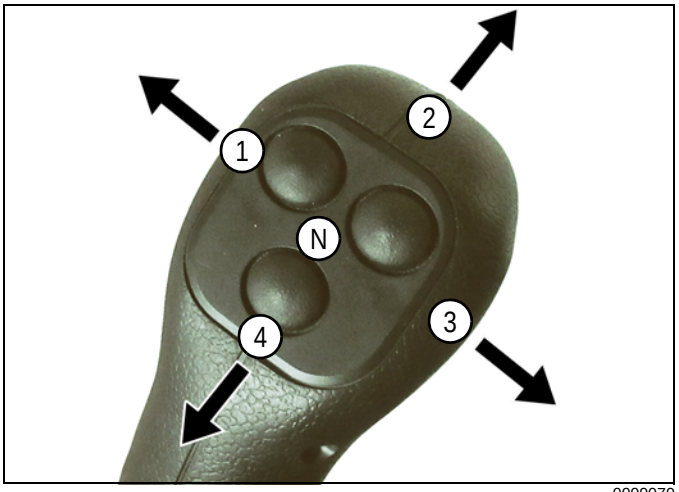
WARNING

Prevent unexpected movement of the machine. Know the positions and functions of both joysticks before operation. Failure to follow this warning could result in death or serious injury.

NOTE: *There are two operating modes available for the joystick controls: the Society of Automotive Engineers (SAE) mode and the Backhoe Loader (BHL) mode. Swing and bucket functions are the same for the SAE and BHL modes.*

Joystick SAE Mode

Left Joystick–SAE Mode



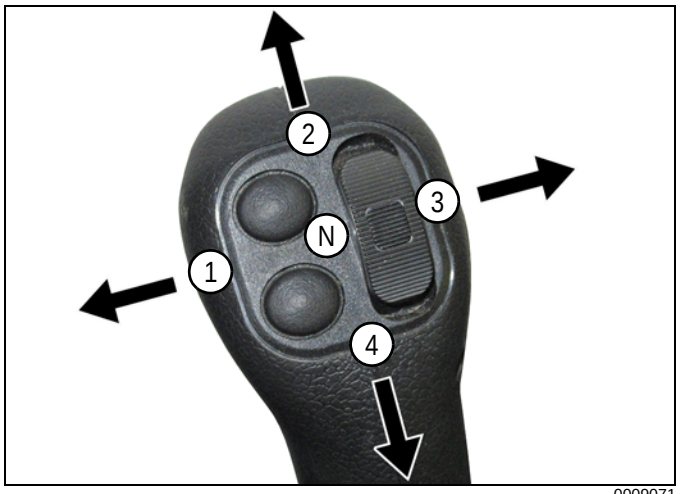
0009070

Figure 3-31

The SAE mode uses the left joystick to control the arm and upper structure.

- Swing the upper structure to the left (1)
- Arm out (2)
- Swing the upper structure to the right (3)
- Arm in (4)
- Neutral (N)

Right Joystick–SAE Mode



0009071

Figure 3-32

The SAE mode uses the right joystick to control the boom and bucket:

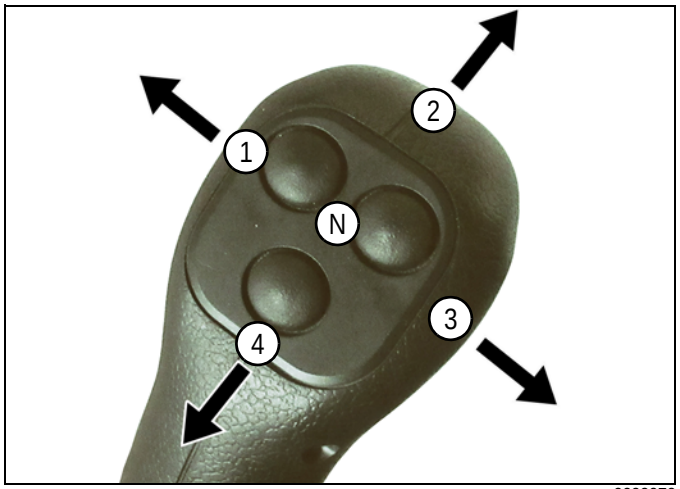
- Bucket dig (1)
- Boom down (2)
- Bucket dump (3)
- Boom up (4)
- Neutral (N)

NOTES:

- *The joystick controls return to the neutral position automatically when released. The functions of the machine will stop.*

Joystick BHL Mode

Left Joystick–BHL Mode



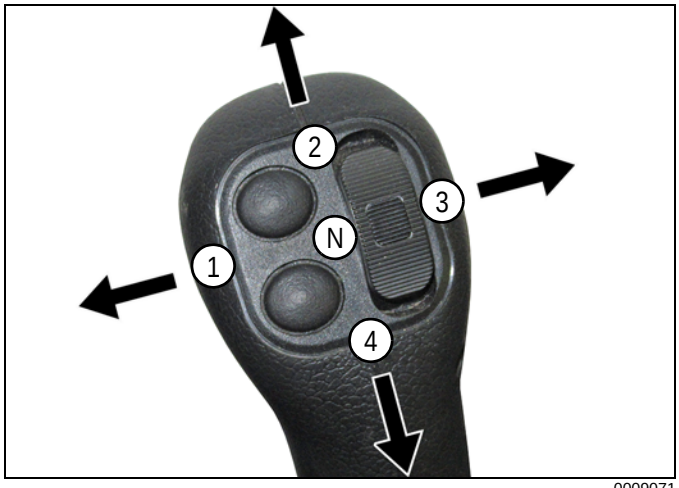
0009070

Figure 3-33

The BHL mode uses the left joystick to control the boom and upper structure:

- Swing the upper structure to the left (1)
- Boom down (2)
- Swing the upper structure to the right (3)
- Boom up (4)
- Neutral (N)

Right Joystick–BHL Mode



0009071

Figure 3-34

The BHL mode uses the right joystick to control the arm and bucket:

- Bucket dig (1)
- Arm out (2)
- Bucket dump (3)
- Arm in (4)
- Neutral (N)

NOTES:

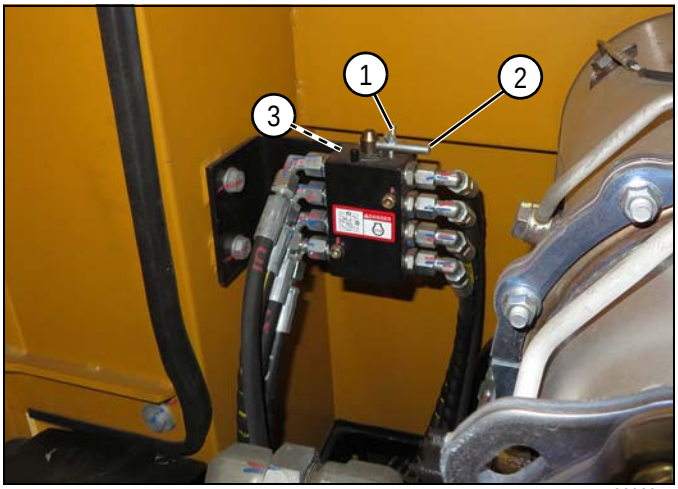
- *The joystick controls return to the neutral position automatically when released. The functions of the machine will stop.*
- *In longitudinal excavation, rotate the undercarriage so the travel motors are behind the upper structure to maximize the stability and lift capacity of the machine.*

Pattern Change (SAE/BHL) Valve

NOTICE!

Shut down the engine before adjusting the pattern change (SAE/BHL) valve.

Failure to follow this notice could damage the environment, the machine, or cause the machine to operate improperly.



0008971

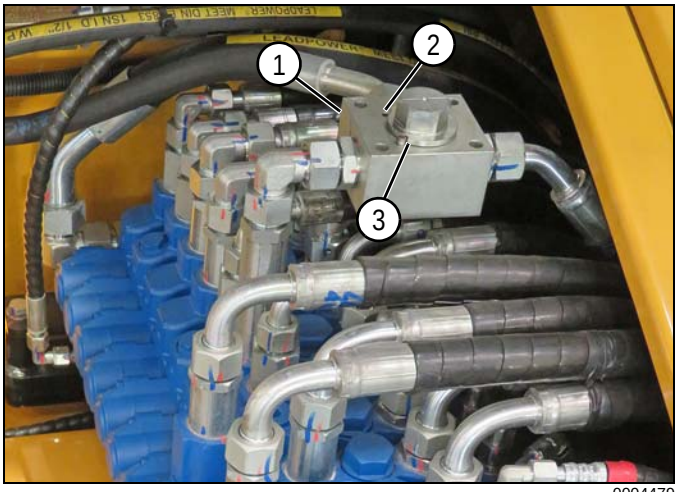
Figure 3-35

The pattern change (SAE/BHL) valve changes control of the boom and arm from one joystick to the other. It is located in the left rear of the engine compartment. Position the SAE/BHL pattern card (not shown) in the right cab window holder to match the current position. The SAE pattern is on one side of the card, and the BHL pattern is on the other side.

To change the operation mode, perform the following steps:

1. Turn the engine off. See “Engine Shutdown” on page 4-16.
2. Open the engine hood. See “Engine Hood” on page 5-13.
3. Loosen the wing nut (1).
4. Rotate the bar (2) to the operator-preferred mode position.
5. Tighten the wing nut into the threaded hole (3) to secure.
6. Close and secure the engine hood.

Return Flow Selector Valve



0004479

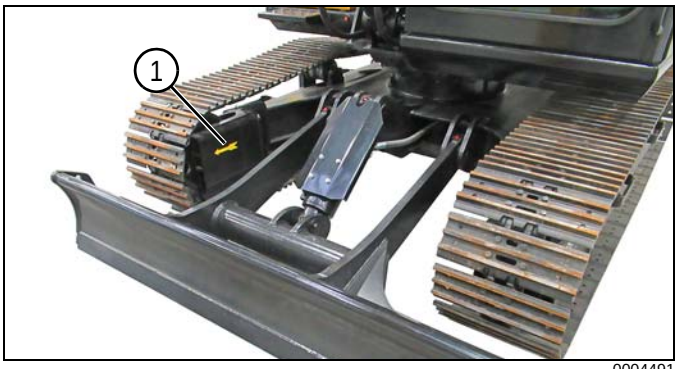
Figure 3-36

The return flow selector valve (1) has a one-way (3) or two-way (2) position (shown) for operating optional equipment. It is on the side of the fuel tank.

A variety of optional one-way and two-way flow equipment is available for use on this machine. A hydraulic breaker is an example of one-way flow equipment. A tilt bucket is an example of two-way flow equipment.

NOTE: *Check the work tool operator manual for hydraulic flow rate information.*

Direction Arrow



0004491

Figure 3-37

The direction arrow (1) on each of the track frames indicates forward movement of the machine. Check these arrows before using the travel control levers/pedals. The drive sprocket is at the rear of the track frame.

If the track frame is facing backward, the travel direction will be opposite the maneuvering direction of the travel control lever/pedal. The machine will move forward when you pull the control levers backward, and backward when you push them forward. Left and right control directions are also reversed when the track frame faces backward.

Travel Control Levers and Pedals

0009032

Figure 3-38

WARNING

Take extra care when using the travel control pedals to steer the machine. Never place your feet on the travel control pedals unless you are driving or steering the machine. It could cause unexpected movement.

Failure to follow these warnings could result in death or serious injury.

NOTE: *The direction arrow on the inside of each track frame indicates forward movement of the machine. Check these arrows before using the travel control levers/pedals. See “Direction Arrow” on page 3-22.*

The travel control levers (1) or pedals (1) are used to change the machine travel direction. See “Moving the Machine” on page 4-17.

Dozer Blade Control Lever

0008998

Figure 3-39

The dozer blade control lever (1) is on the right side of the operator seat.

1. The dozer blade has a lock button (2) that must be pushed in order to move lever.
   - Move the lever forward to lower the dozer blade.
   - Move the lever backward to raise the dozer blade.

NOTE: *The dozer blade control lever will return to the neutral position when released.*

Windshield

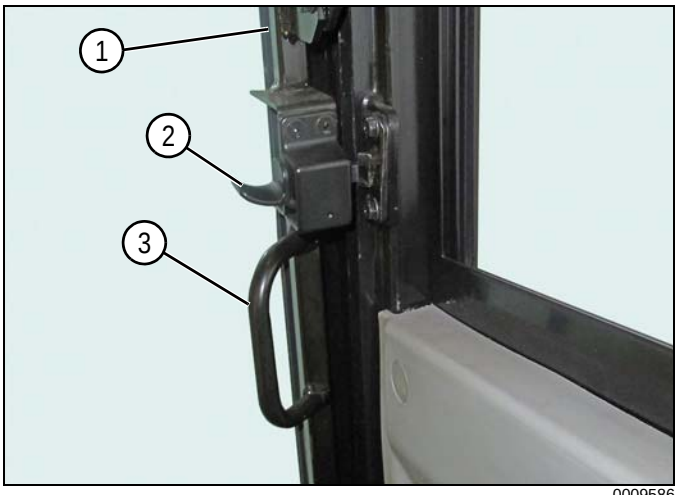
Opening the Windshield

WARNING

- **Avoid sudden movement of the machine or work equipment.**
- **Always place the hydraulic lockout control lever in the locked (closed) position before opening or closing the windshield.**

Failure to follow this warning could result in death or serious injury.

1. Before opening the front windshield (1), park the machine on level ground, lower the work equipment to the ground, and stop the engine. See “Maintenance Safety” on page 2-4.
2. Place the hydraulic lockout control lever in the locked (closed) position. Pull the hydraulic control lever to the locked (closed) position to disable hydraulic controls. See “Hydraulic Lockout Control Lever” on page 3-19.



0009586

Figure 3-40

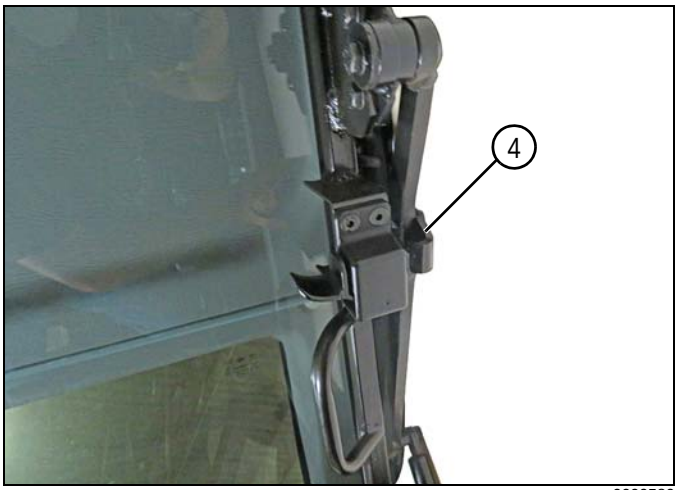
NOTE:

- *The right side windshield grip (3) and latch (2) are shown. The left side is similar.*

3. While sitting in the operator seat, push the left and right latch levers (2) downward to unlock the windshield latches.
4. Grasp the right and left handles (3) and firmly move the windshield up and back to secure it open.

CAUTION

When open, the windshield must be secured to the roof of the cab. If it is not secure, the windshield may slide down unexpectedly and result in injury or damage to the machine.



0009589

Figure 3-41

The windshield latches will lock to secure the windshield open when the latches engage the catches (4).

NOTES:

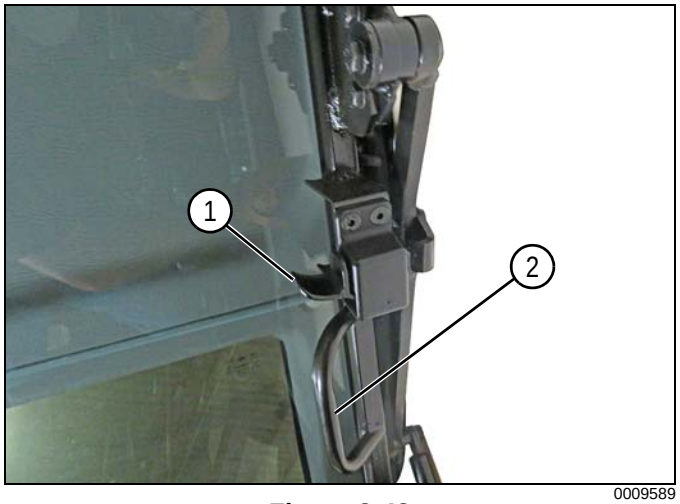
- *Both latches must engage the catches to properly secure the front windshield in the open position.*
- *The right side windshield latch is shown. The left side windshield latch is similar.*

Closing the Windshield

CAUTION

Close the front windshield slowly to avoid injury or machine damage.

1. Before closing the windshield, park the machine on level ground, lower the work equipment to the ground, and stop the engine. See “Maintenance Safety” on page 2-4.
2. Move the hydraulic lockout control lever to the locked (closed) position. Pull the hydraulic control lever to the locked (closed) position to disable hydraulic controls. See “Hydraulic Lockout Control Lever” on page 3-19.



0009589

Figure 3-42

3. While sitting in the operator seat, release the windshield latches (1) to unlock the windshield.
4. Make sure both latches are unlocked by using the left and right grips (2) to move the windshield forward.
5. Slowly move the windshield forward and down into the closed position.

NOTE: *The right side windshield latch and grip are shown. The left side is similar.*

Figure 3-43

6. When the front windshield reaches the lowered position, firmly push forward on the left and right grips (2). The latch levers (1) will spring into the locked position to secure the windshield in the closed position.

Lower Front Windshield

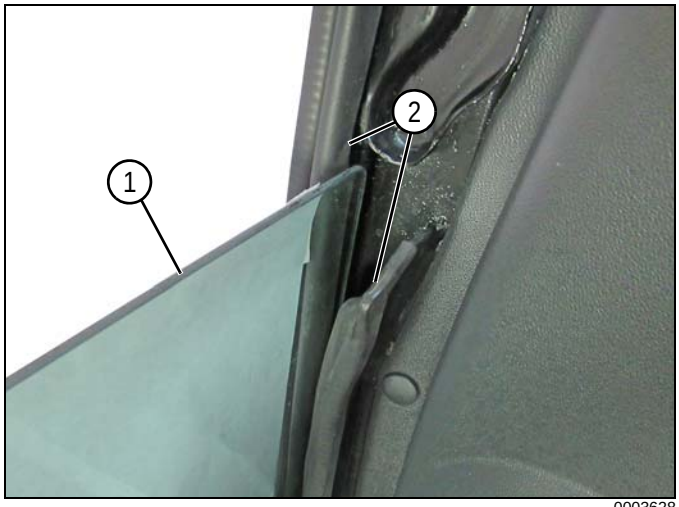


Figure 3-44

1. Raise the windshield before removing the lower front windshield (1). See “Opening the Windshield” on page 3-23.

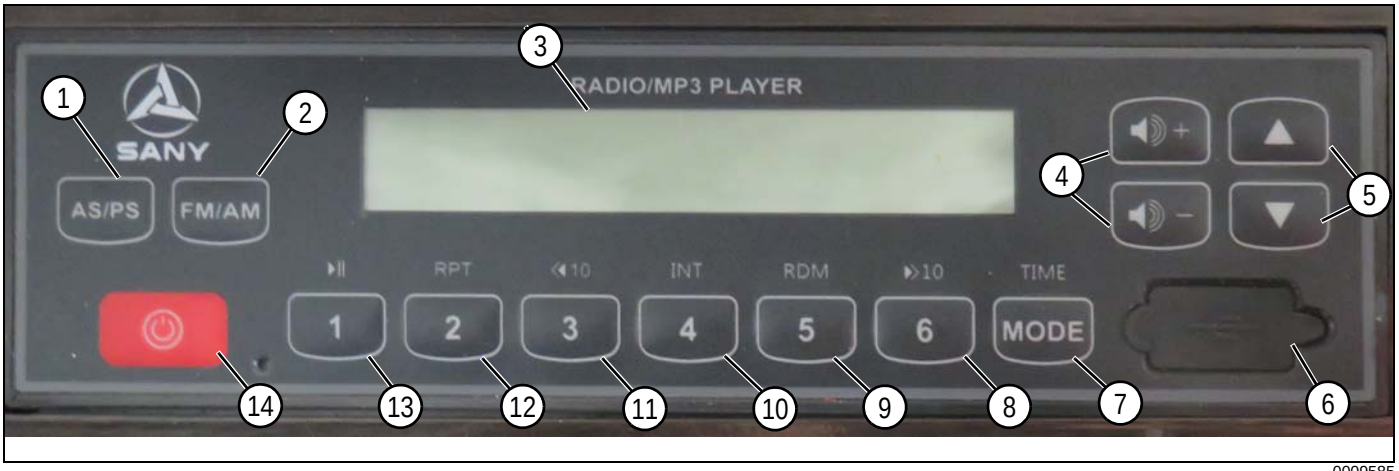
NOTES:

- *Sand or dust accumulated along the bottom of the lower front windshield and seals (2) may make it difficult to remove or install.*
- *Make sure the bottom of the lower front windshield and the seals are clean before removing or installing the windshield.*

2. Firmly hold the top of the lower front windshield and lift upward for removal.

Radio/MP3 Player

Radio/MP3 Player Control Panel



0009585

Figure 3-45

1 Automatic scan/preset station (AS/PS) selector button	8 Preset radio station 6: USB function—select the next folder
2 FM/AM selector button	9 Preset radio station 5: USB function—random play
3 Liquid crystal display (LCD)	10 Preset radio station 4: USB function—intermittent play
4 Volume (VOL) + and – control buttons	11 Preset radio station 3: USB function—select the previous folder
5 Tuning control buttons	12 Preset radio station 2: USB function – repeat
6 USB input	13 Preset radio station 1: USB function–play/pause
7 MODE/TIME display button	14 Power button

WARNING

Turn the radio volume down to a level that allows you to hear traffic signals such as a horn, siren, and bystanders. Failure to follow this warning could result in death or serious injury.

NOTICE!

The radio could be easily damaged if penetrated by water. When washing the machine, take care to prevent water from getting on the radio. If water does get on the radio, wipe the radio using a dry cloth.

Auto Scan/Preset Station (AS/PS) Button

Use the AS/PS button (1) to begin the automatic scan (AS) feature through the preset stations (PS), or to automatically load the preset station buttons.

Press and release the AS/PS button once to begin the auto scan feature. Each preset station will play for 10 seconds with the station frequency blinking on the LCD (3). Press the AS/PS button once more to remain on the current station.

Press and hold the AS/PS button for 2 seconds to activate the auto programming feature. In auto programming, the six radio stations with the strongest signals are stored in the six preset station buttons (8–13).

FM/AM Selector Button

Press the FM/AM selector button (2) to toggle between AM and FM bands.

Liquid Crystal Display (LCD)

The radio band (AM or FM), the currently tuned radio station frequency, the preset station number, and the current time are shown on the liquid crystal display (LCD) (3).

Volume Control Buttons

Press the plus (+) or minus (–) buttons (4) to set the volume.

Tuning Buttons

Press the upper or lower TUNING buttons (5) for the following operations.

Radio/USB mode:

Press and release to search station frequency automatically.

Press and hold to search station frequency manually.

Time adjust mode:

Press and release up and down arrows to adjust time.

USB Input

Use the USB input (6) to insert a USB device (memory and other electronics) to be read/played in the device. When a USB device is plugged into the USB input, press the SRC button to toggle between the USB port and the radio.

MP3 and WMA audio files, USB 1.1 format, and FAT16/FAT32 files are supported.

MODE/TIME Button

Press and hold the MODE /TIME button (7) to toggle between the USB input and the radio.

Press and hold the MODE button to access the bass level adjustment.

Press the button again to access the treble adjustment.

Press the button once more to adjust the balance (between the in-cab speakers).

When a sound mode setting is selected, use the VOL + and – buttons (8) to adjust the level for the selected setting.

The current radio station frequency displays if the button is not pressed within 5 seconds.

Press the MODE/TIME button to display the local time for 5 seconds. The display reverts to the current station after 5 seconds. Set the current time by holding the button and using the tuning buttons to change the displayed time.

Preset Radio Station 6: USB Function—Select Next Folder

Radio mode:

Press and hold button 6 (8) to assign the current radio station to that button. Afterwards, press and release the button to select its preselected station.

USB function:

Press and release the preset radio station button 6. USB function—select next folder button to select the next folder of available songs.

Preset Radio Station 5: USB Function—Random Play

Radio mode:

Press and hold button 5 (9) to assign the current radio station to that button. Press and release the button to select its preselected station.

USB function:

Press and release the preset radio station button 5. USB function— randomly play songs in the selected folder.

Preset Radio Station 4: USB Function—Intermittent Play

Radio mode:

Press and hold button 4 (10) to assign the current radio station to that button. Press and release the button to select its preselected station.

USB function:

Press and release the preset radio station button 4. USB function—to intermittently play songs in the selected folder.

Preset Radio Station 3: USB Function—Select Previous Folder

Radio mode:

Press and hold button 3 (11) to assign the current radio station to that button. Press and release the button to select its preselected station.

USB function:

Press and release the preset radio station button 3. USB function—select next folder button to select the previous folder of available songs.

Preset Radio Station 2: USB Function—Repeat

Radio mode:

Press and hold button 2 (12) to assign the current radio station to that button. Press and release the button to select its preselected station.

USB function:

Press and release the preset radio station 2. USB function—repeat selected folder.

Preset Radio Station 1: USB Function—Play/Pause Button

Radio mode:

Press and hold the button 1 (13) to assign the current radio station to that button. Press and release the button to select its preselected station.

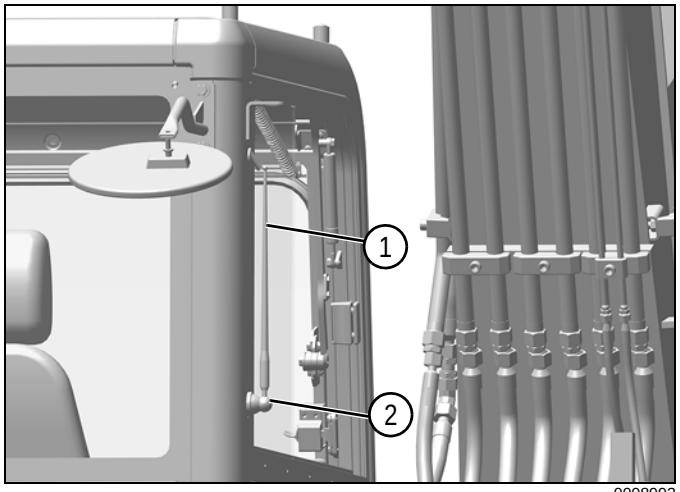
USB function:

Press and release the preset radio station 1. USB function—play/pause button to toggle between the play and pause mode as necessary

Power Button

Press and release the power button (14) to turn the radio on. Press and hold it to turn the radio off. Press and release the button when the radio is on to mute the volume. The time of day will display on the LCD when the radio is turned off and the key switch is ON. The radio band and station number will be displayed when the radio is on.

Antenna



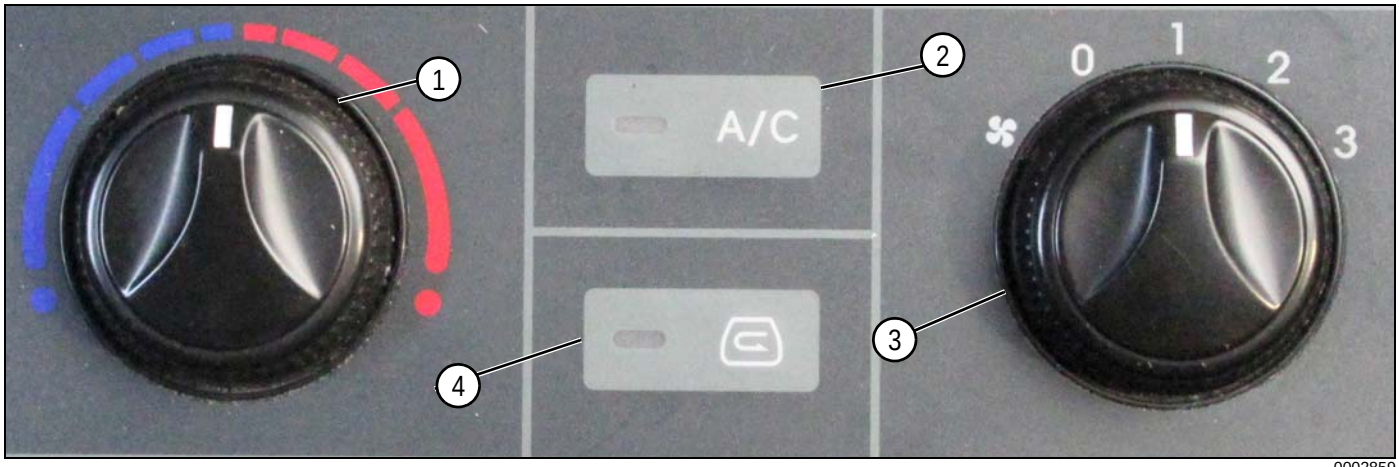
0008993

Figure 3-46

If the radio signal received is weak or noisy, reposition the antenna (1) on the right rear of the cab by loosening the wing nut (2).

Heating and Air Conditioning System

Heating and Air Conditioning Control Panel



0002859

Figure 3-47

Item	Control	Operation	Function
1	Temperature adjustment dial	Rotate to the right.	Increases the temperature inside the cab.
		Rotate to the left.	Decreases the temperature inside the cab.
2	Air conditioning power switch	Press and release.	Turns the air conditioning system on or off.
3	Blower speed adjustment dial	Rotate to the right (0 to 3).	Increases the blower speed – air volume output increases.
		Rotate to the left (3 to 0).	Decreases the blower speed – air volume output decreases.
4	Fresh-air/recirculation switch	Press and release.	Indicator lamp illuminated – recirculated-air mode.
			Indicator lamp off – fresh-air mode.

Heating and Air Conditioning System Operation

NOTICE!

If water gets on the control panel, a failure may result. Always keep this component dry. Failure to do so can result in damage to the machine, personal property, and/or the environment, or cause the machine to operate improperly.

1. Start the engine. See “Starting the Engine” on page 4-13.

NOTE: *In cooling mode, when the temperature inside the cab reaches the preset temperature, the air conditioner power switch will be turned on/off automatically to maintain the temperature inside the cab. The indicator lamp stays on.*

2. Select the heating or cooling mode.
   - Cooling mode: Press the air conditioning power switch to turn on the air conditioning system. The indicator lamp will light. Turn the temperature adjustment dial to the left to the desired position.

- Heating mode: Press the air conditioning power switch to turn the air conditioning system off. The indicator lamp will go out. Turn the temperature adjustment dial to the right to the desired position.

3. Turn the blower speed adjustment dial to the right, to positions 1, 2, or 3. The blower fan will start and begin to deliver air to the cab.
4. To switch off the air conditioner blower, turn the blower speed adjustment dial to 0.

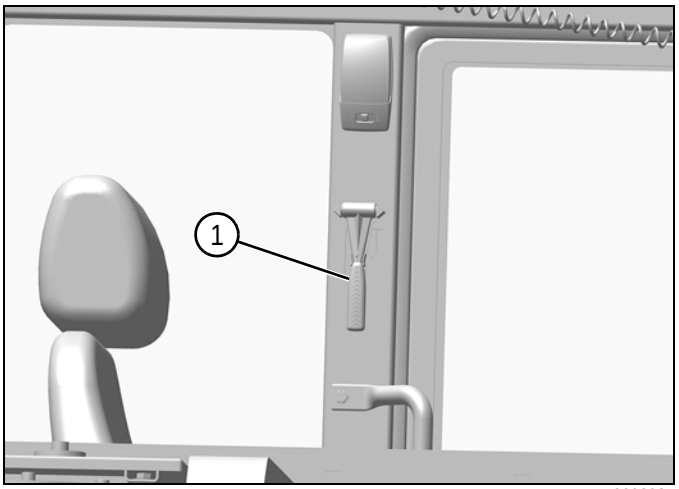
Air Outlet

There are multiple air outlets for operator comfort and windshield defrosting.

Ventilation

When the air conditioning is used for extended periods, the fresh air/recirculation switch should be switched to fresh-air mode every hour to ventilate the cab.

Escape Tool



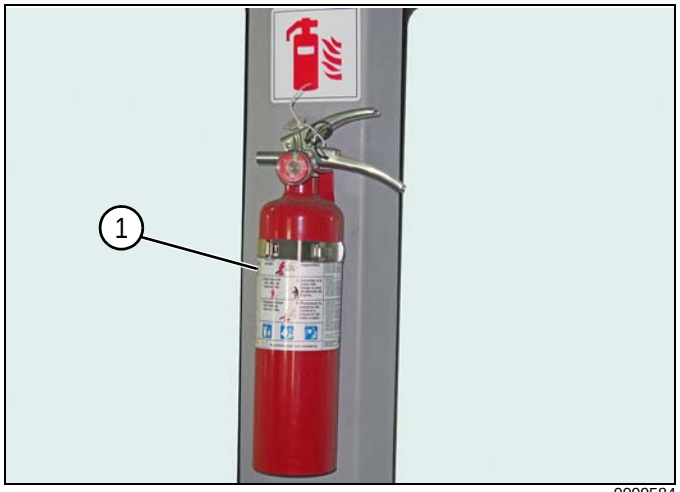
0008987

Figure 3-48

If the cab door or windshield cannot be opened during an emergency, the escape tool (1) can be used to break a cab window. The escape tool is inside the cab under the interior light.

To use the escape tool, grasp the handle and remove it from the holder. Firmly strike a cab window to break it.

Fire Extinguisher



0009584

Figure 3-49

Always keep a fire extinguisher in the cab. Read the instructions on the fire extinguisher carefully and know how to use it in an emergency.

Inspect the condition of the fire extinguisher daily. If damaged, replace the extinguisher immediately.

Make sure the fire extinguisher is within the listed inspection period. Replace the fire extinguisher immediately if it has reached its expiration date.

The fire extinguisher must be at least a 2.5 lb. Class ABC rated fire extinguisher (National Fire Protection Association [NFPA] 10 Standard for Portable Fire Extinguishers).

Chapter 4

Machine Operation

Work Area

The work area is where the actual job is performed. Within the work area are hazard areas. Hazard areas immediately surround the machine where personnel may be at risk due to the machine's operation and movement.

All personnel within the work area must wear appropriate personal protective equipment (PPE).

The machine operator is responsible for the safety of all personnel within the hazard area.

General Job Safety

See "Maintenance Safety" on page 2-4.

Operator's Responsibilities

- Reject the job site if there are doubts regarding safety.
- Become familiar with the work area and surroundings before beginning work.
- Read and completely understand the instructions in this manual prior to operation.
- Know and obey all operating procedures, applicable laws, and regulations.
- Know and follow the requirements for safe operation.
- Know and use the required safety precautions and protective devices.
- Know and use the correct hand signals that will be used between the machine operator and a signal person.
- Stop machine operations immediately if any defects endangering safety are found.
- Maintain complete control of the machine at all times.
- Before leaving the cab, make sure that all control devices are set to the neutral or low-idle position, and that the engine is shut down.
- Give warning signals when necessary.

Seat Belt Usage

Always wear the seat belt when operating the machine. See "Seat Belt" on page 4-12.

WARNING

The seat belt is designed to protect the operator from danger, especially when the machine is traveling. Failure to wear a seat belt when operating the machine could result in death or serious injury.

Operation and Maintenance Manual Check

Make sure that this Operation and Maintenance Manual remains in the cab and is available to the operator at all times.

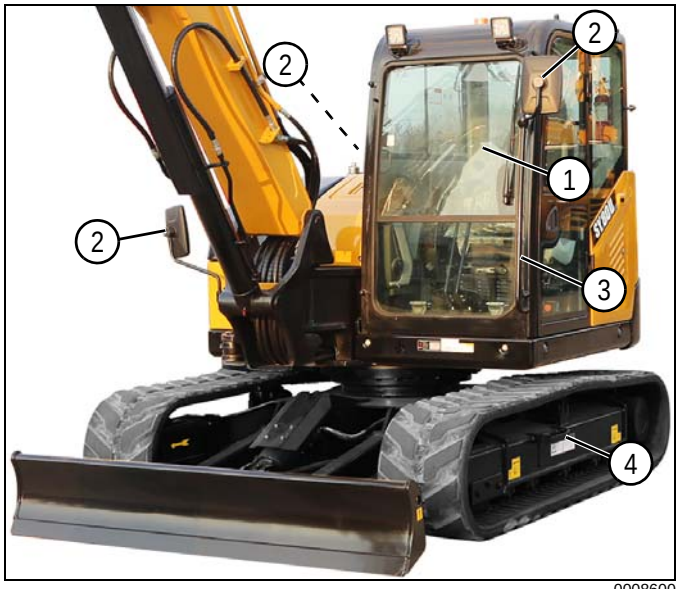
Daily Maintenance Record Check

Check the Maintenance Log to verify that all required maintenance checks have been performed before operating the machine. If these checks and actions have not been performed, notify your supervisor.

NOTE: *See "Maintenance Log" on page 1-2, and "Maintenance Information" on page 5-4.*

Clean the Machine

Clean the Machine Exterior



0008600

Figure 4-1

NOTE: *Clean the grab handle and step of any grease or debris to allow a firm grip when entering or exiting the cab area.*

Make sure the following items are clean before operating the machine:

- Windows (1)
- Mirrors (2)
- Grab handles (3)
- Steps (4)

Clean the Cab Interior

CAUTION

Never allow passengers to ride inside or on the machine. Never bring objects into the cab that could restrict your movement or vision in any manner that could result in injury.

Remove all debris from inside the cab to prevent interference with machine operation.

Check that the escape tool and fire extinguisher are present. See “Fire Extinguisher” on page 3-30 and “Escape Tool” on page 3-30.

Prestart Checks and Adjustments

Complete the following checks and adjustments before starting the engine each day:

- Check the Maintenance Log to verify that all required maintenance checks have been performed before operating the machine.
- Check fluid levels. See “Fluid Level Checks” on page 4-6.
- Check the machine for loose hardware, fluid leaks, and any other signs of damage.
- Inspect the engine compartment for combustible debris that may come in contact with hot engine components. Clear all debris from the engine and engine compartment.
- Check for a loose or damaged engine fan belt and air conditioner compressor belt.
- Check the undercarriage (track, sprockets, rollers, and guards) for damage, wear, loose fasteners, and roller oil leaks.
- Check the bucket or optional equipment for damage. Lubricate work equipment as necessary. See “Lubrication and Grease” on page 5-7.
- Check the air filter. See “Check the Air Filters” on page 5-21.
- Clean the mirrors and check them for damage. Adjust the mirrors so the area behind the machine is visible from the operator seat. See “Mirror Adjustment” on page 4-12.
- Check the seat belt and buckle for damage or wear. See “Seat Belt” on page 4-12.
- Check the monitor in the cab for proper operation and maintenance information. See “Daily Maintenance Information Screen” on page 3-4 and “Maintenance Information Screen” on page 3-4.

Fluid Level Checks

NOTE: *Complete the following procedures in this section before starting the engine.*

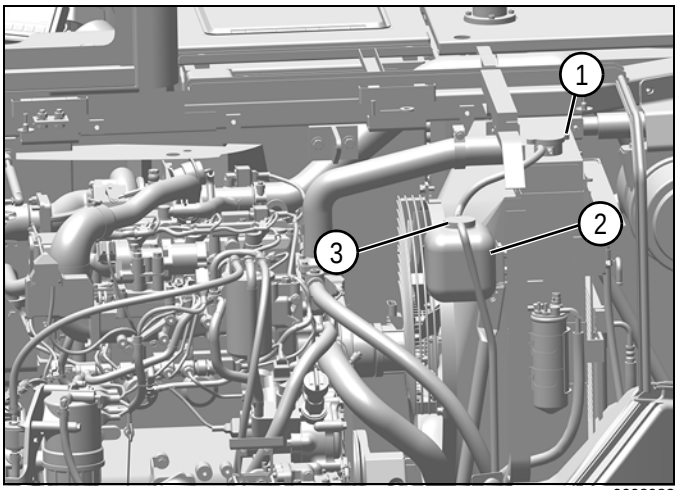
Check Engine Coolant Level

WARNING

- **Engine coolant is toxic. Avoid inhaling or ingesting engine coolant. If eyes or skin are contaminated by engine coolant, wash the affected area with plenty of water and seek medical treatment immediately.**
- **Engine coolant may be under pressure when the engine is hot. Contact with hot engine coolant could result in death or serious injury. Allow the engine to cool before removing the radiator cap.**

Failure to follow these warnings could result in death or serious injury.

1. Prepare the machine for maintenance. See “Maintenance Safety” on page 2-4.



0008983

Figure 4-2

NOTICE!

If the overflow tank is empty, there may be an engine coolant leak. Inspect for engine coolant leaks and repair if found. If a leak is not found, check the engine coolant level in the radiator.

Failure to follow this notice could damage the machine or cause it to operate improperly.

Contact a SANY dealer for additional information.

2. Open the engine hood. See “Engine Hood” on page 5-13.
3. Open right rear access door. See “Right Rear Access Door” on page 5-15.

CAUTION

Do not remove the radiator cap while the engine is hot. Engine coolant is under pressure. Allow the engine to cool before removing the radiator cap. Failure to follow this warning could result in death or serious injury.

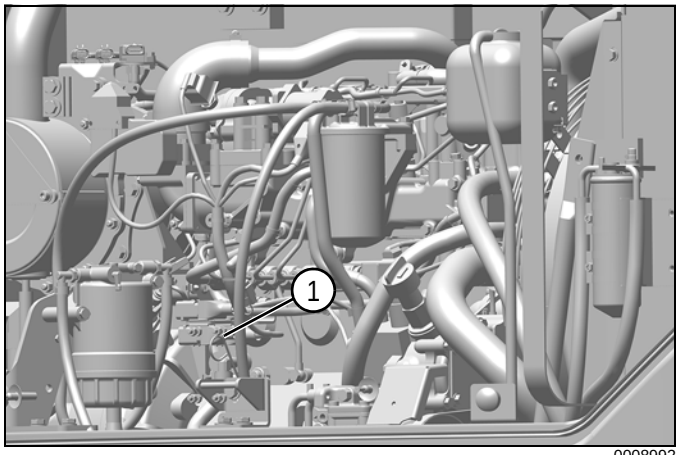
4. If the overflow tank is empty:
   - Slowly loosen and remove the radiator cap (1).
   - Check engine coolant level in the radiator.
   - Add engine coolant until the level reaches the radiator filler opening.
5. Install the radiator cap after filling.
6. Verify that the engine coolant level in the overflow tank (2) is between the FULL and LOW marks.
7. If the engine coolant level in the overflow tank is low:
   - Remove the filler cap (3).
   - Add engine coolant through the fill opening of the overflow tank until the engine coolant is at the FULL mark.
   - Install the filler cap.

Check Engine Oil Level

NOTICE!

Dispose of used oil in accordance with all applicable environmental regulations. Failure to do so could result in damage to the environment.

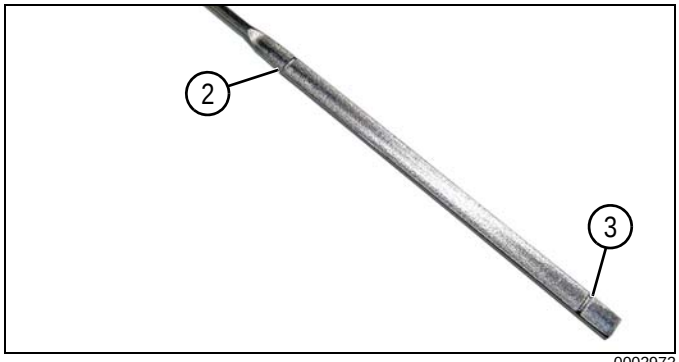
1. Prepare the machine for maintenance. See “Maintenance Safety” on page 2-4.
2. Open the engine hood. See “Engine Hood” on page 5-13.



0008992

Figure 4-3

3. Remove the dipstick (1) and wipe the engine oil off with a clean cloth and install the dipstick.



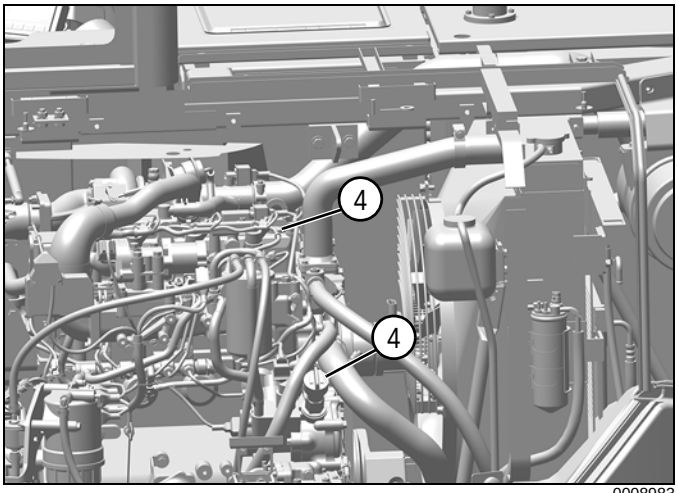
0002972

Figure 4-4

4. Remove the dipstick. Make sure the oil level is between the upper mark (2) and the lower mark (3).
5. Install the dipstick.

NOTICE!

Do not add oil past the upper mark on the dipstick, as this may result in engine damage.



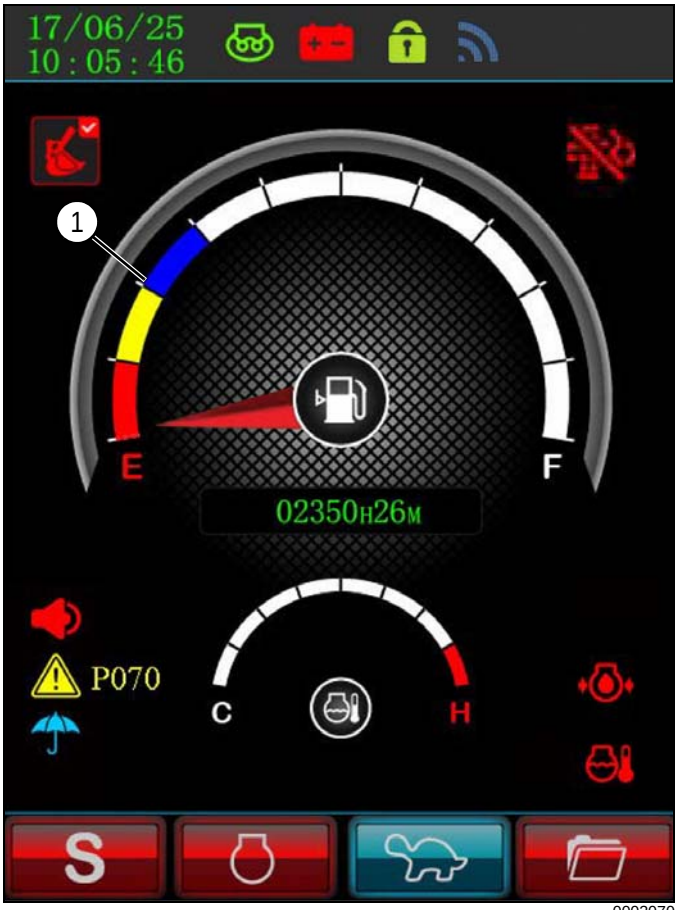
0008983

Figure 4-5

NOTE: *The engine has two engine oil filler caps, one on the valve cover and one near the fuel pump. Either cap may be removed to add engine oil.*

6. If it is necessary to add engine oil:
   - Remove the filler cap (4).
   - Add engine oil.
   - Recheck the level on the dipstick.
7. Install the filler cap after filling.
8. If the oil level is above the upper mark on the dipstick, drain the excess oil. See “Change the Engine Oil and Filter” on page 5-19.

Check the Fuel Level



0003070

Figure 4-6

1. Turn the key switch to ON to activate the monitor. Check the fuel level (1) on the monitor.
2. Turn the key switch to OFF.

Add Fuel

WARNING

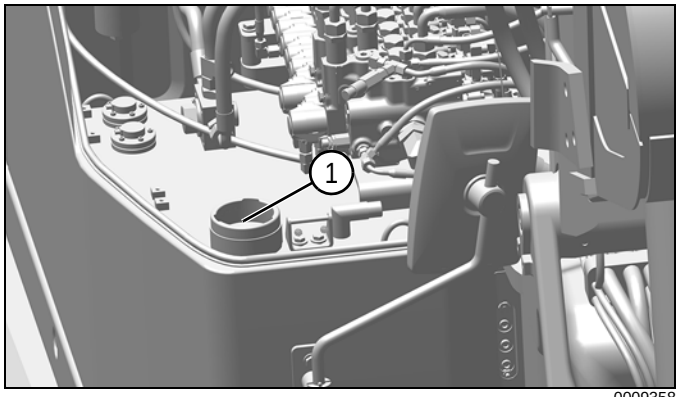
- **Fuel or fuel vapors that come into contact with hot surfaces or electrical components can cause a fire.**
- **Never service the fuel system near an open flame or while smoking.**
- **Clean up spilled fuel immediately.**

Failure to follow these warnings could result in death or serious injury.

NOTICE!

Contaminated fuel can cause engine damage or improper machine operation. Fill the fuel tank with fresh, clean diesel fuel only.

1. Prepare the machine for maintenance. See “Maintenance Safety” on page 2-4.
2. Open right front access door.See “Right Front Access Door” on page 5-15.
3. Remove the fuel tank filler cap. See “Fuel Tank Filler Cap” on page 5-16.



0009358

Figure 4-7

4. Make sure the fuel tank strainer (1) is in place and not damaged.
5. Add fuel. Never overfill the fuel tank. Stop fueling if fuel spills over the fuel fill strainer. Make sure the fueling nozzle does not damage the fuel fill strainer.
6. Install the fuel filler cap after fueling.

Check and Drain the Primary Fuel Filter/Water Separator

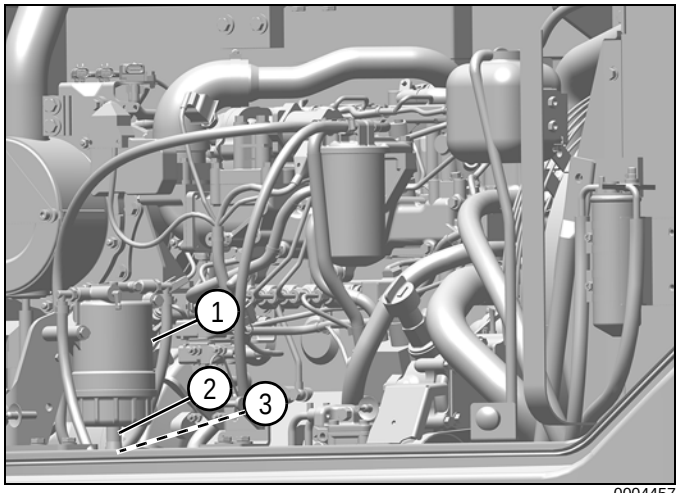
WARNING

- **Fuel or fuel vapors that come into contact with hot surfaces or electrical components can cause a fire.**
- **Never service the fuel system near an open flame or while smoking.**
- **Clean up spilled fuel immediately.**

Failure to follow these warnings could result in death or serious injury.

NOTICE!

Dispose of contaminated fuel or water in accordance with all applicable environmental regulations. Failure to do so could result in damage to the environment.



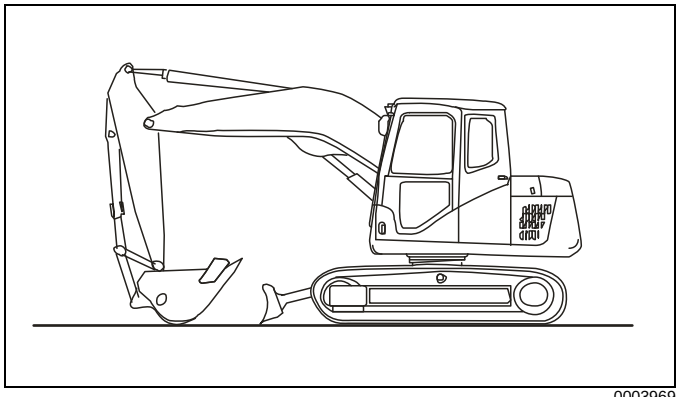
0004457

Figure 4-8

The primary fuel filter/water separator (1) filters and separates water and sediment from diesel fuel. Complete the following steps to drain water and sediment from the primary fuel filter/water separator.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open the engine hood. See “Engine Hood” on page 5-13.
3. Route the drain hose (3) into a suitable container.
4. Open the drain valve (2) and drain the water and sediment.
5. When only clean fuel flows through the drain valve, close and tighten the valve.
6. Start the engine and check for leaks. See “Starting the Engine” on page 4-13.

Check the Hydraulic Oil Level

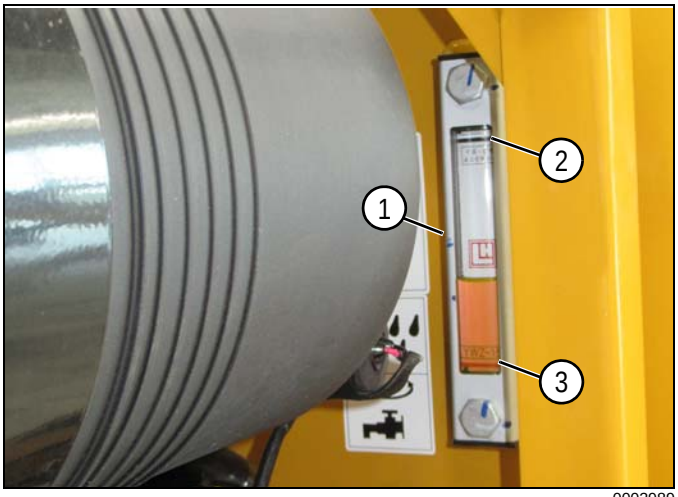


0003969

Figure 4-9

NOTE: *The work equipment should be positioned as shown above before checking the hydraulic oil level.*

1. Prepare the machine for maintenance. See “Maintenance Safety” on page 2-4.
2. Open the right rear access door. See “Right Rear Access Door” on page 5-15.



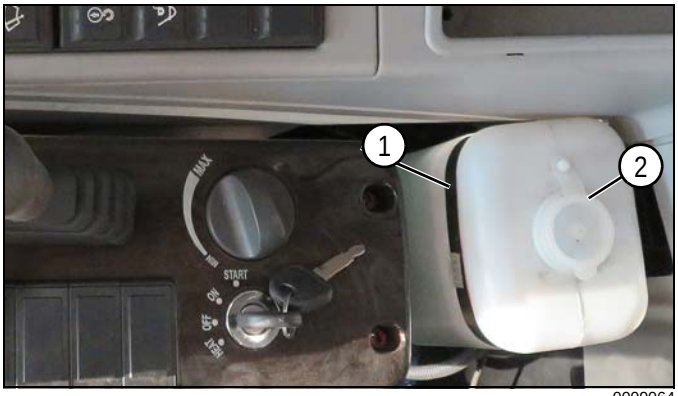
0003989

Figure 4-10

3. Check the hydraulic oil level in the hydraulic tank through the sight gauge (1). The hydraulic oil level should be between the high level (2) and low level (3) marks.
4. If the level is below the low mark, add hydraulic oil. See “Add Hydraulic Oil” on page 5-32.

Check and Fill the Windshield Washer Fluid

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0009064

Figure 4-11

NOTE: *Keep dust and dirt out of the windshield washer tank when adding window washer fluid.*

2. The windshield washer tank (1) is located in the machine cab, at the rear of the right control console.
3. Check the fluid level in the windshield washer tank.
4. If necessary, remove the filler cap (2) and add windshield washer fluid. See “Windshield Washer Fluid” on page 5-4.
5. Install the filler cap after filling.

Electrical Components Check

If fuses fail frequently, the wiring harness must be inspected for broken or damaged wire insulation or a component placing a high electrical load on the system. Contact a SANY dealer for more information.

- Check the fuse panel for blown fuses, fuses of incorrect capacity, open or short circuits, and loose connections. Replace blown fuses and fuses with an incorrect amperage rating, and tighten loose connections as necessary. See “Fuses” on page 5-16.
- Make sure the battery cables and wires are clean and in good condition when inspecting the battery, starting motor, and alternator. See “Battery” on page 5-29.
- Clean the area around the battery of combustible materials.

For additional information about troubleshooting faults in the electrical system, contact a SANY dealer.

Horn Function Check

1. Turn the key switch to ON.

0008997

Figure 4-12

2. The horn sounds when the horn button (1) is pressed. If the horn does not sound, check the fuse condition. See “Fuses” on page 5-16.

For additional information, contact a SANY dealer.

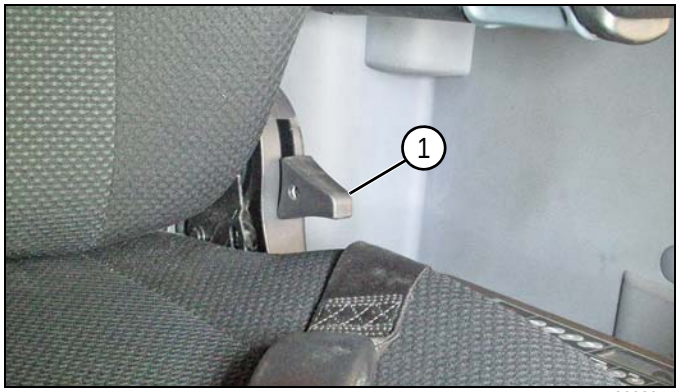
Seat and Seat Belt

0009022

Figure 4-13

This machine is equipped with a seat (1) that can be adjusted forward, backward, and for back-support tilt. A mechanical suspension device under the seat adjusts per operator weight and reduces vibration.

Seat Backrest Angle Adjustment



0003047

Figure 4-14

When seated, lift and hold the backrest adjustment lever (1) on the lower left side of the backrest. Lean forward or back to move the backrest to the desired position. Release the lever to lock the backrest in the desired position.

Seat Weight Suspension Adjustment

0003044

Figure 4-15

Use the weight suspension adjustment lever (1), below the front edge of the seat, to adjust the seat suspension:

1. Pull out on the end of the adjustment lever (1) until it clears the seat.
2. Rotate the adjustment lever clockwise to increase the weight setting, and counterclockwise to decrease the weight adjustment.
3. When the desired weight is displayed on the weight dial (2), rotate the lever to its storage position (as shown) and push the lever against the seat base.

NOTE: *To achieve the best adjustment, adjust the reading on the dial (2) to the weight of the operator.*

Seat Headrest Adjustment

0003049

Figure 4-16

Move the headrest (1) up or down.

Seat Forward/Backward Position Adjustment

0003043

Figure 4-17

When seated, lift and hold the position adjustment lever (1) and slide the seat forward or backward to the desired position. Release the lever to lock the seat in place.

Armrest Angle Adjustment

0003045

Figure 4-18

NOTE: *The right armrest is shown. The left armrest is similar.*

Adjust the armrest angle by rotating the dial (1) at the bottom of the armrest.

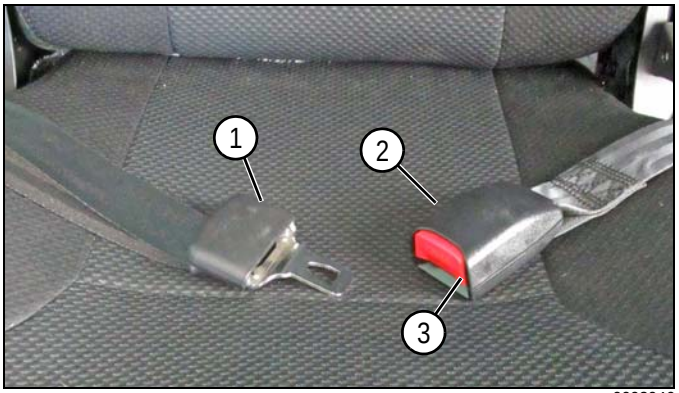
Both armrests can be moved up and down to allow the operator greater access to the side consoles or for operator comfort.

Seat Belt

WARNING

- **Check the condition of the seat belt, buckle, and latch plate before using the machine. If the seat belt shows wear or damage, the seat belt must be replaced before using the machine.**
- **Always keep the seat belt fastened during machine operation. Never twist the seat belt when fastening it.**

Contact a SANY dealer for more information. Failure to follow these warnings could result in death or serious injury.



0003046

Figure 4-19

1. Grasp the latch plate (1) and pull upward to lengthen the belt. Insert the latch plate into the buckle (2) until it locks.

WARNING

Keep belt slack to no more than 1 in. (25 mm). Belt slack beyond this amount could significantly reduce your protection in an accident.

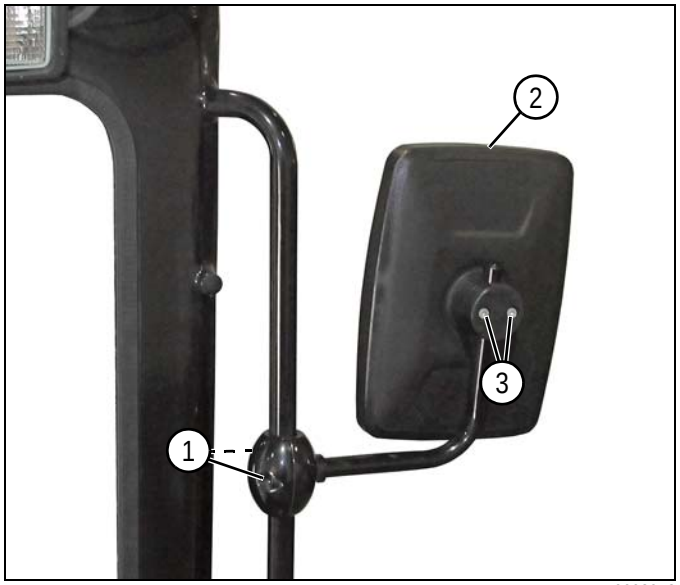
Failure to follow this warning could result in death or serious injury.

2. The belt should be placed as low as possible on your hips, not on your waist. Pull on the loose belt from the latch plate to tighten it.
3. Press the red button (3) on the buckle to release the latch plate.

WARNING

Contact a SANY dealer if the seat belt fails any of these checks, or fails to fasten or unfasten. Failure to follow this warning could result in death or serious injury.

Mirror Adjustment



0003042

Figure 4-20

NOTE: *The left mirror is shown. The mirror on the right grab handle is similar.*

Loosen the fasteners (1 and 3) and position the mirror (2) for the best visibility. Tighten the fasteners securely.

Starting the Engine

WARNING

- **Before starting the engine or leaving the operator seat, make sure the hydraulic lockout control lever is in the locked (closed) position. If the hydraulic system is not locked out, unintentional machine operation may occur and could result in death or serious injury.**
- **Confirm that the surrounding area is clear of personnel and obstructions, and sound the horn before starting the engine.**
- **Always start the engine from the operator seat. Never start the engine by shorting the starter solenoid or starter relay.**
- **Never use ether starting fluid to start the engine. Ether is highly flammable and can cause a fire or an explosion.**
- **Exhaust gas contains carbon monoxide. Carbon monoxide is an invisible and odorless gas, and is toxic. Provide adequate ventilation when starting the engine in a confined space.**

Failure to follow these warning could result in death or serious injury.

1. Check the fluid levels before starting the engine. Drain the water and sediment from the fuel water separator daily. See “Check and Drain the Primary Fuel Filter/Water Separator” on page 4-8.
2. Turn the battery disconnect switch to ON. See “Battery Disconnect Switch” on page 3-19.
3. When in the operator seat, buckle the seat belt. See “Seat Belt” on page 4-12.

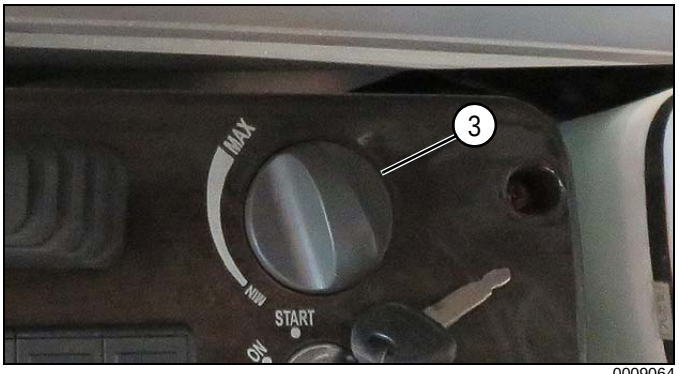
0009099

Figure 4-21

WARNING

The machine should not move when the hydraulic lockout control lever is in the locked (closed) position. If it does, contact a SANY dealer. Failure to correct this could result in death or serious injury.

4. Move the hydraulic lockout control lever (1) to the locked (closed) position (2). If it is in the unlocked (open) position, the engine will not start.
5. Make sure the control levers/pedals and joysticks are in the neutral position, move freely, and return to the neutral position when released.



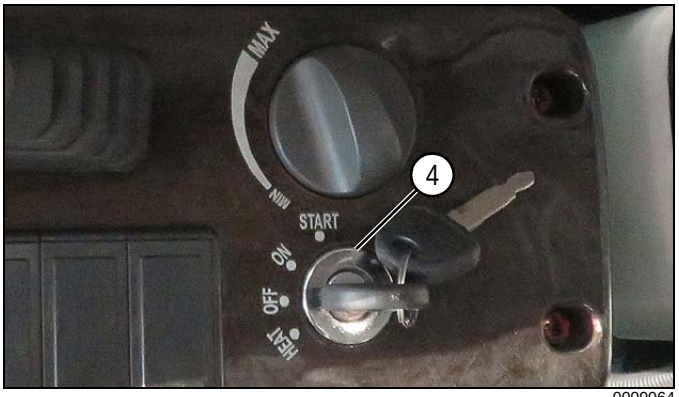
0009064

Figure 4-22

NOTICE!

Before starting the engine, make sure that the throttle control dial is at MIN (low idle). Starting with the throttle control dial at MAX (high idle) will accelerate the engine and could damage it.

6. Set the throttle control dial (3) to MIN (low idle).



0009064

Figure 4-23

7. Turn the key switch (4) to ON and check the monitor. If all readings are normal and no fault codes are present, the display will return to the default page within 2 seconds.
8. Sound the horn to warn personnel that the machine is being started.

NOTICE!

Never crank the engine for more than 15 seconds.

If the engine fails to start after 15 seconds, stop and allow the starter motor to cool for at least 2 minutes before attempting another start.

Failure to follow this notice could damage the machine or cause it to operate improperly.

If the engine fails to start after five attempts, contact a SANY dealer.

9. Turn the key switch to START. When the engine starts, release the key. It will return to ON.

Idling the Engine

Idling the engine for long periods wastes fuel and causes carbon formation, oil dilution, formation of lacquer or gummy deposits on the valves, pistons and rings, and rapid accumulation of sludge in the engine.

Allow the engine to idle until the engine coolant temperature reaches a normal operating temperature.

Cold Weather Engine Starting

WARNING

- **Before starting the engine or leaving the operator seat, make sure the hydraulic lockout control lever is in the locked (closed) position. If the hydraulic system is not locked, unintentional machine operation may occur.**
- **Confirm that the surrounding area is clear of personnel and obstructions, and sound the horn before starting the engine.**
- **Always start the engine from the operator seat. Never start the engine by shorting the starter solenoid or starter relay.**
- **Never use ether starting fluid to start the engine. Ether is highly flammable and can cause a fire or an explosion.**
- **Exhaust gas contains carbon monoxide. Carbon monoxide is an invisible and odorless gas, and is toxic. Provide adequate ventilation when starting the engine in a confined space.**

Failure to follow these warnings could result in death or serious injury.

1. Check the fluid levels before starting the engine. Drain the water and sediment from the primary fuel filter/water separator daily. See “Check and Drain the Primary Fuel Filter/Water Separator” on page 4-8.
2. Turn the battery disconnect switch to ON. See “Battery Disconnect Switch” on page 3-19.
3. When in the operator seat, buckle the seat belt. See “Seat Belt” on page 4-12.
4. Move the hydraulic control lever to the locked (closed) position. If it is in the unlocked (open) position, the engine will not start. See “Hydraulic Lockout Control Lever” on page 3-19.
5. Make sure the control levers/pedals are in the neutral position, move freely, and return to the neutral position when released.

NOTICE!

Before starting the engine, make sure that the throttle control dial is at MIN (low idle). Starting with the throttle control dial at MAX (high idle) will accelerate the engine and could damage it.

6. Set the throttle control dial to MIN (low idle).
7. Turn the key switch to the HEAT position and release. The key switch returns to OFF. The preheat cycle begins if the coolant temperature is below a preset temperature. When the preheat cycle begins, a preheat icon is illuminated on the home screen. When the preheat cycle is complete, the preheat icon will turn off. See “Home Screen” on page 3-5.
8. Turn the key switch to ON and check the monitor. If all readings are normal and no fault codes are present, the display will return to the default page within 2 seconds.
9. Sound the horn to warn personnel that the machine is being started.

NOTICE!

- **Never crank the engine for more than 15 seconds. If the engine fails to start after 15 seconds, stop and allow the starter motor to cool for at least 2 minutes before attempting another start.**
- **If the engine fails to start after five attempts, contact a SANY dealer.**

Failure to follow this notice could damage the machine or cause it to operate improperly.

10. Turn the key switch to START. When the engine starts, release the key. The key will return to the ON position.

NOTE: *If the engine fails to start after preheating, wait at least 5 seconds before repeating the process.*

11. Allow the engine to idle until the hydraulic oil reaches a temperature of 140°F (60°C) before using the machine. Once the hydraulic oil reaches 140°F (60°C) complete the warm-up operation. See “Warm-up Operation” on page 4-15.

NOTICE!

When the temperature is below 32°F (0°C), and mud is built up on the tracks, swing the upper structure 90° and raise the machine so that one track is off the ground. Rotate the track forward and backward to remove mud from the sprocket, track rollers, and idlers. Repeat for the other side.

Warm-up Operation

WARNING

- **In case of emergency, irregular engine operation, or other faults, turn the key switch to OFF to stop the engine.**
- **Insufficient warm-up of the machine may cause slow response or abrupt movement during operation, resulting in serious accidents. Warm-up is especially necessary in cold areas.**
- **Operating the machine before the hydraulic oil is warmed to operating temperature may cause slow control response or abrupt movement during operation.**

Failure to follow these warnings could result in death or serious injury.

Do not operate the machine immediately after starting the engine. Allow the machine and hydraulic system to warm up. Check the following items:

1. Deactivate the auto idle function after starting the engine, and adjust the throttle so the engine runs unloaded at 1400 rpm for 5 minutes.
2. Adjust the throttle so the engine runs at 1600 rpm, then slowly operate the bucket for 5 minutes.
3. Adjust the throttle so the engine runs at a high rpm, then operate the boom, arm, and bucket for 5 to 10 minutes.

Repeat all movements several times and stop the warm-up process. Check the monitor for normal operating readings after the warm-up process.

New Machine Break-in

NOTICE!

The machine has been thoroughly tested and adjusted before shipment. However, initial operation of the machine under severe conditions can adversely affect the performance of the new machine or shorten the machine life. SANY recommends a break-in period of 100 service hours for a new machine.

Properly breaking in a new machine is crucial for long service life by allowing time for internal engine parts to break in. Make sure the machine is in normal working condition before proceeding with the break-in.

NOTE: *Make sure the machine is in normal working condition before proceeding with break-in. Contact a SANY dealer.*

1. Start and run the engine at a low idle until it reaches proper operating temperatures. Do not move the controls or the throttle.
2. Avoid operating the machine under heavy loads or at high speeds during the break-in period. Operate as much as possible in the 1/2 to 3/4 throttle or load range. Do not operate this machine with a full load during the break-in period.
3. Avoid sudden starts, movements, or stops.
4. Monitor the instruments frequently, especially the engine oil pressure and coolant temperature. Shut down the machine at the first indication of an abnormal reading.
5. Avoid running the engine at idle for long periods of time.
6. Manage engine power to allow acceleration to governed speed when conditions require more power. Do not over-rev the engine.
7. Always allow the engine to cool before shutting it off.
8. After shutting off the engine, check the fluid levels.

Engine Shutdown

NOTICE!

- **Stopping the engine before it cools can accelerate engine component wear. Never abruptly shut down the engine, except in an emergency.**
- **Never stop the engine suddenly when it is overheated. Run the engine at low idle to allow it to cool down gradually before shutting it down.**

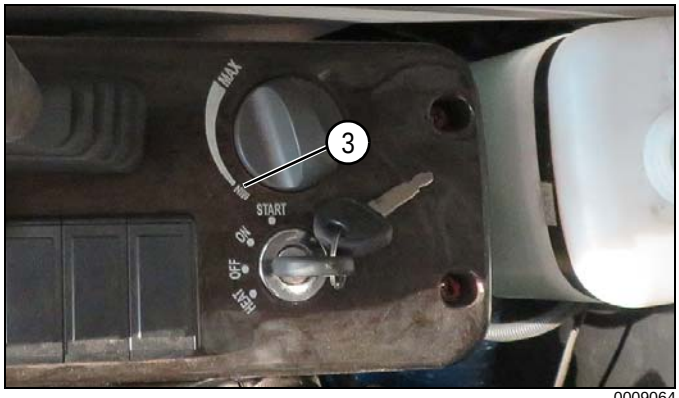
Failure to follow this notice could damage the machine or cause it to operate improperly.

1. Park the machine on a firm, level surface.
2. Lower the bucket or optional equipment to the ground.

0009099

Figure 4-24

3. Move the hydraulic control lever (1) to the locked (closed) position (2).



0009064

Figure 4-25

4. Adjust the throttle control dial (3) to MIN (low idle) and allow the engine to idle for 5 minutes to cool down.
5. Turn the key switch to OFF and remove the key.

Inspection after Engine Shutdown

1. After shutting down the engine, conduct a walk-around inspection. Check the work equipment, the exterior of the machine, and the undercarriage.
2. Check for fluid leaks.
3. Fill the fuel tank with diesel fuel.
4. To prevent fires, clean the engine compartment of combustible debris.
5. Clean mud from the tracks and undercarriage.

Moving the Machine

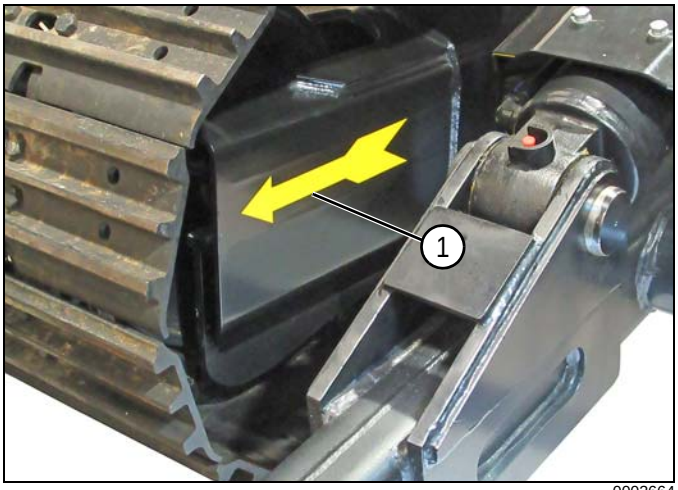
Machine Moving Precautions

WARNING

- **Check the surroundings and sound the horn before moving the machine.**
- **Personnel are not allowed to approach the machine without operator approval.**
- **The rear of the machine is a blind spot. Use the mirrors and be extremely careful when backing the machine. Use a signal person as needed.**

Failure to follow these warnings could result in death or serious injury.

Standard Travel Direction



0003664

Figure 4-26

CAUTION

Travel with the undercarriage reversed could pose a hazard resulting in injury.

The directional arrow (1) on the inside of each track frame indicates forward direction of the machine. Check these arrows before using the travel control levers/pedals. The track drive sprocket is at the rear of the track frame. If the track frame is facing backward, the travel direction will be opposite the maneuvering direction of the travel control lever/pedal.

This means the machine will move forward when you pull the control levers backward, and backward when you push the control levers forward. Left and right control directions are also reversed when the track frame faces backward.

Travel Control

NOTICE!

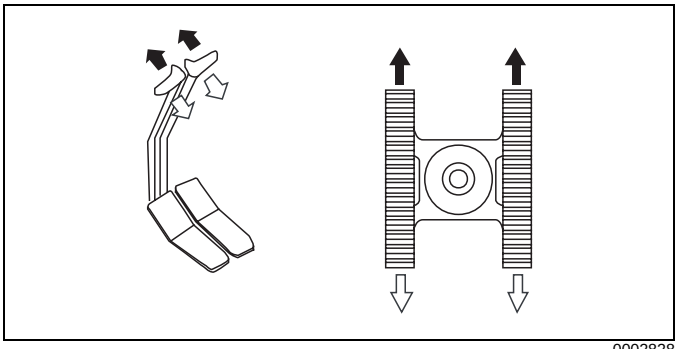
Stop the machine for 5 minutes after every 15 minutes of travel. Prolonged travel may strain the travel motors.

0009064

Figure 4-27

Adjust the throttle control dial (1) to MAX (high idle).

Forward Travel



0002828

Figure 4-28

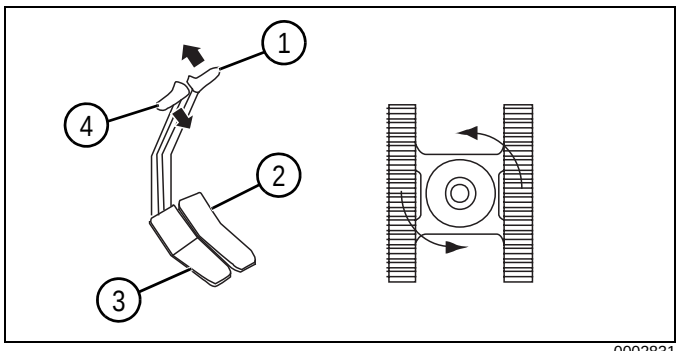
Push both travel control levers equally or press the top of both foot pedals equally to move the machine forward.

Backward Travel

Pull both travel control levers equally or press the bottom of both foot pedals equally to move the machine backwards.

Spot Turning

To the Left



0002831

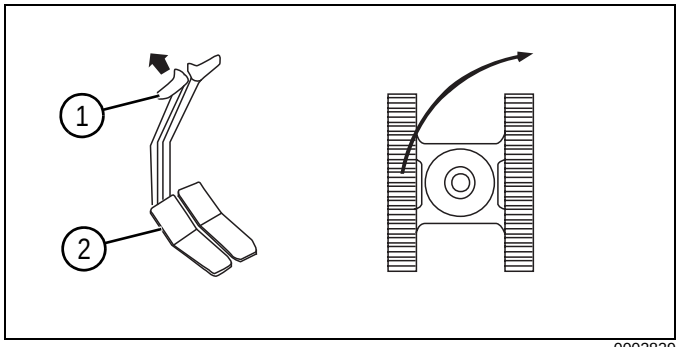
Figure 4-29

Simultaneously push the right travel control lever (1) or press the top of the right foot pedal (2) and pull the left travel control lever (4) or press the bottom of the left foot pedal (3) to rotate the machine to the left.

To the Right

Simultaneously push the left travel control lever (1) or press the top of the left foot pedal (2) and pull the right travel control lever (4) or press the bottom of the right foot pedal (3) to rotate the machine to the right.

Right Turn

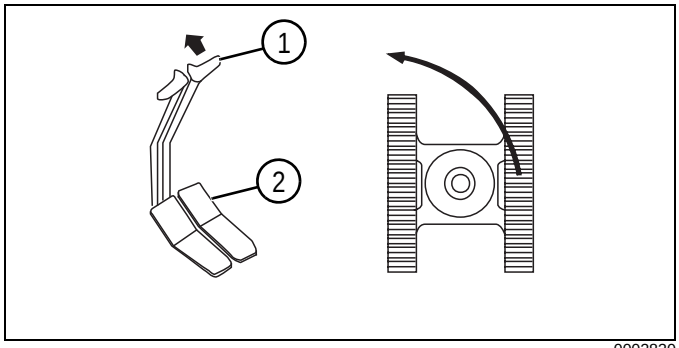


0002829

Figure 4-30

Push the left travel control lever (1) or press the top of the left foot pedal (2) with the right travel control lever and foot pedal in the neutral position to turn the machine to the right.

Left Turn

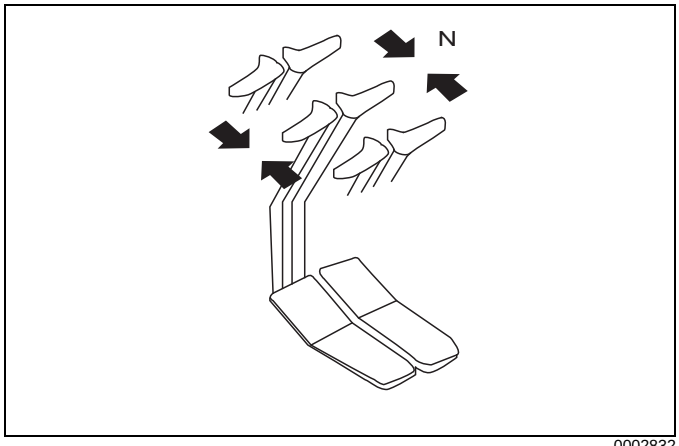


0002830

Figure 4-31

Push the right travel control lever (1) or press the top of the right foot pedal (2) with the left travel control lever and foot pedal in the neutral position to turn the machine to the left.

Stopping the Machine



0002832

Figure 4-32

NOTICE!

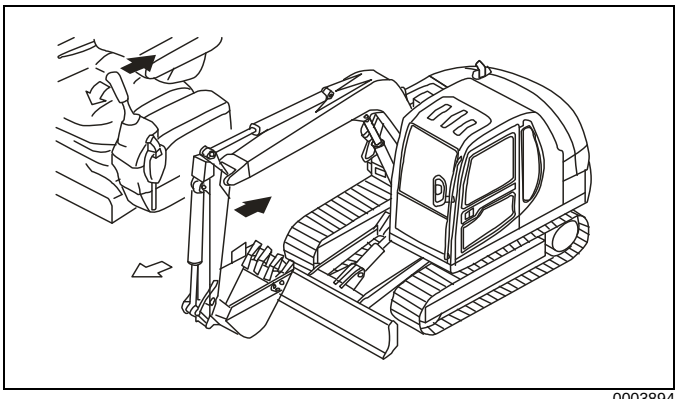
Do not stop the machine suddenly, except in an emergency. Failure to follow this notice could result in machine damage.

The joysticks will return to the neutral position when released, and the work equipment will hold its position.

Slowly move the travel control levers/pedals to the neutral (N) position. The travel brake will stop and hold the machine automatically.

Work Equipment Control and Operation

Arm Control–SAE Mode



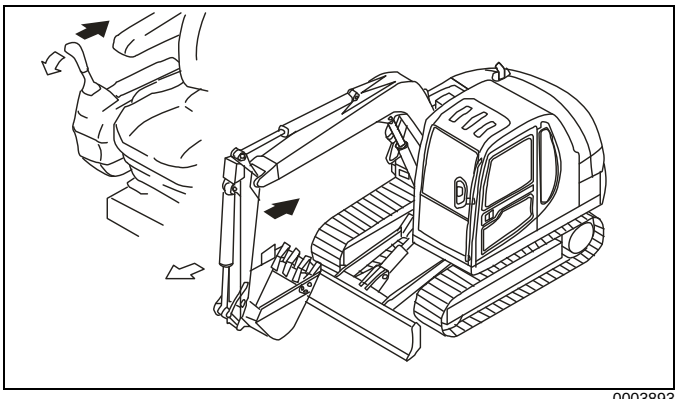
0003894

Figure 4-33

To extend the arm, push the left joystick.

To retract the arm, pull the left joystick.

Arm Control–BHL Mode



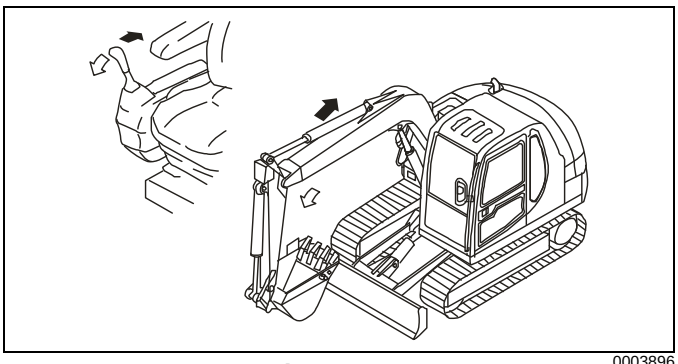
0003893

Figure 4-34

To extend the arm, push the right joystick.

To retract the arm, pull the right joystick.

Boom Control–SAE Mode



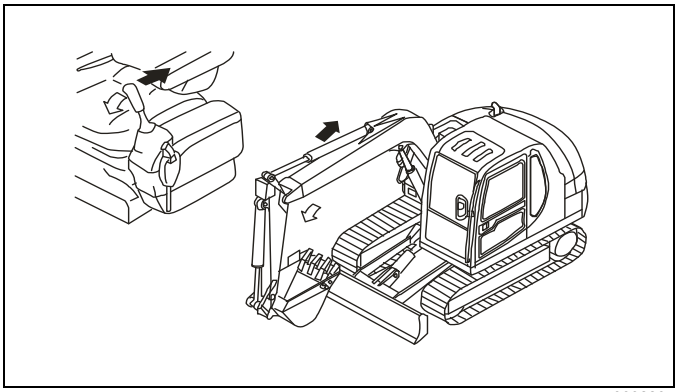
0003896

Figure 4-35

To lower the boom, push the right joystick.

To raise the boom, pull the right joystick.

Boom Control–BHL Mode



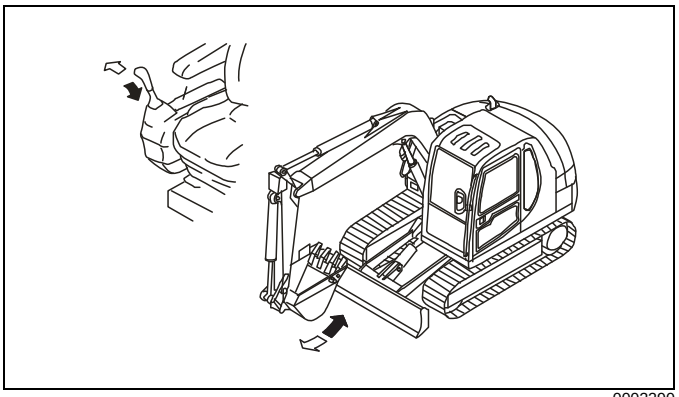
0003895

Figure 4-36

To raise the boom, pull the left joystick.

To lower the boom, push the left joystick.

Bucket Control



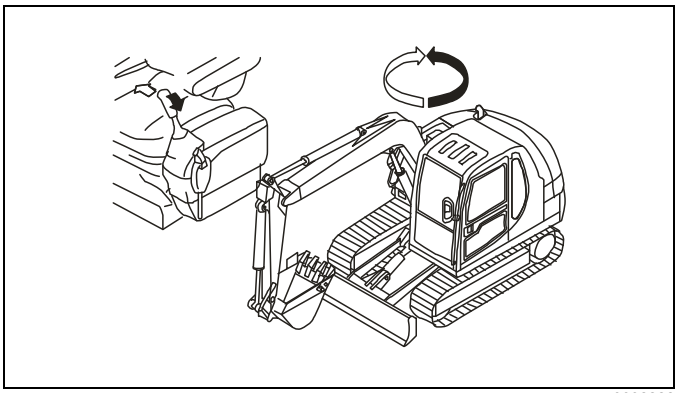
0002290

Figure 4-37

To uncurl the bucket, move the right joystick to the right.

To curl the bucket, move the right joystick to the left.

Swing Control



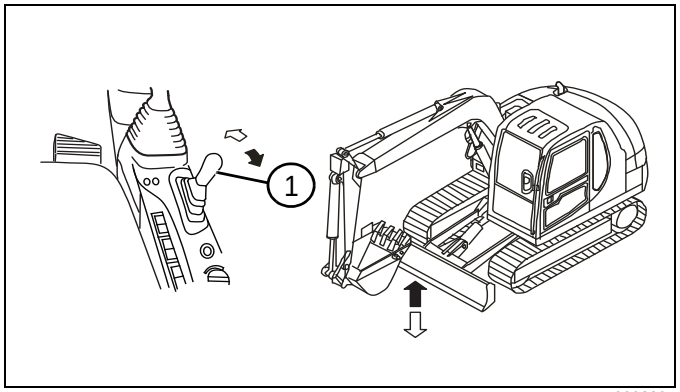
0002288

Figure 4-38

Move the left joystick to the right to swing the machine to the right.

Move the left joystick to the left to swing the machine to the left.

Dozer Blade Control Lever



0003897

Figure 4-39

To raise the dozer blade, pull the dozer blade control lever (1) to the rear.

To lower the dozer blade, push the dozer blade control lever forward.

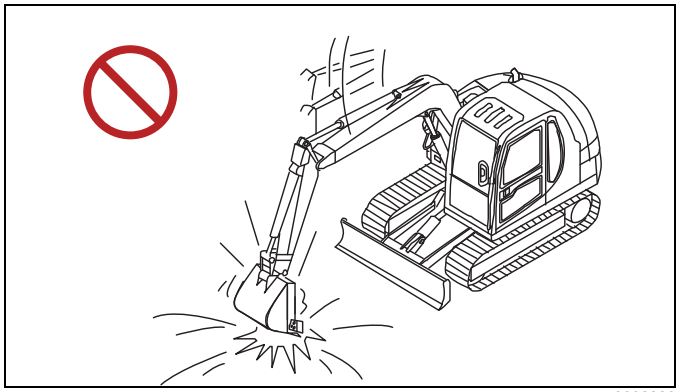
Restricted Operation

CAUTION

- **Use caution when operating work equipment while the machine is traveling.**
- **When the engine auto idle is on, moving any control lever increases the engine speed.**
- **Avoid sudden stops when operating work equipment. Hydraulic shock can damage the hydraulic system.**
- **Avoid any working conditions that may cause the machine to tip over.**
- **Avoid moving any control lever or pedal to abruptly change the direction of the machine.**
- **Do not operate the machine on any ground that lacks sufficient support.**
- **Do not attempt work operations such as scraping, digging, etc., with the hydraulic cylinder fully extended.**

Failure to follow these precautions could result in injury or damage to the machine.

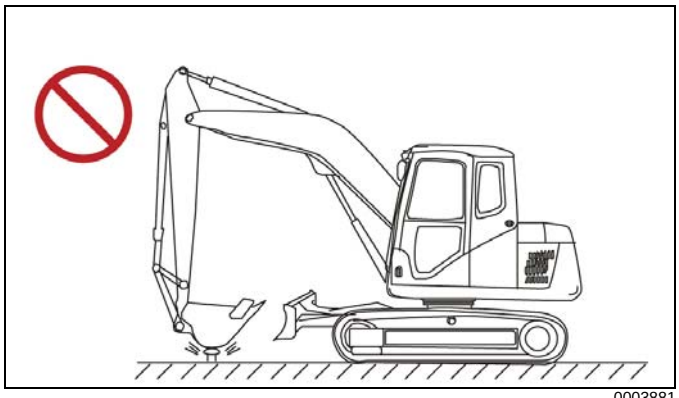
Never Operate with Bucket Force



0003880

Figure 4-40

Never use the landing force of the bucket for excavating, digging, breaking, or pile-driving operation. Such operations may reduce the service life of the machine.

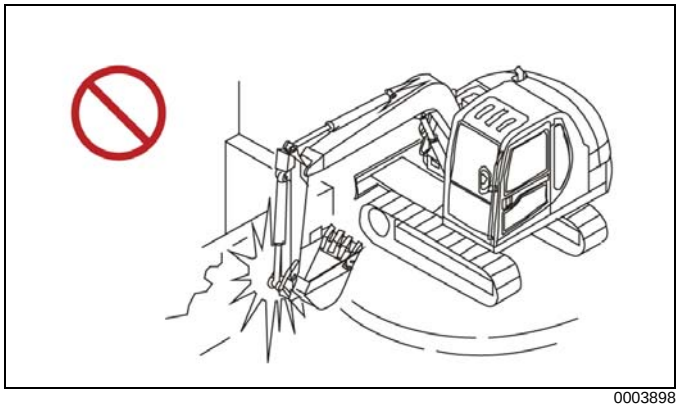


0003881

Figure 4-41

To avoid hydraulic cylinder damage, do not use the bucket to strike or compact the ground.

Never Use Swing Force

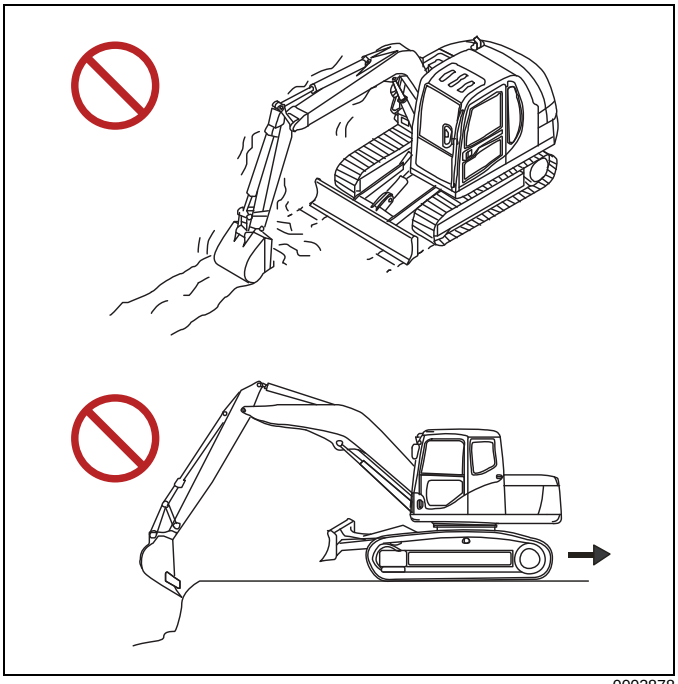


0003898

Figure 4-42

Never use swing force to compact the ground or to break objects. Such operation is very dangerous and may reduce the service life of the machine.

Never Use Travel Force

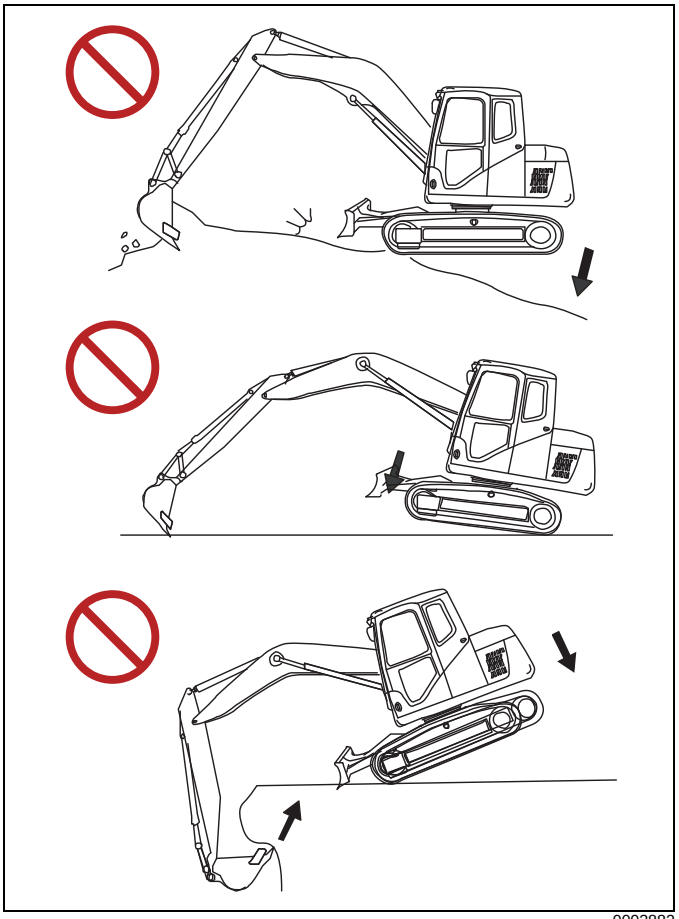


0003878

Figure 4-43

Never use the machine's travel force to cut the bucket into the ground to excavate. Such an operation may damage the machine or the work equipment.

Never Operate Using Machine Weight

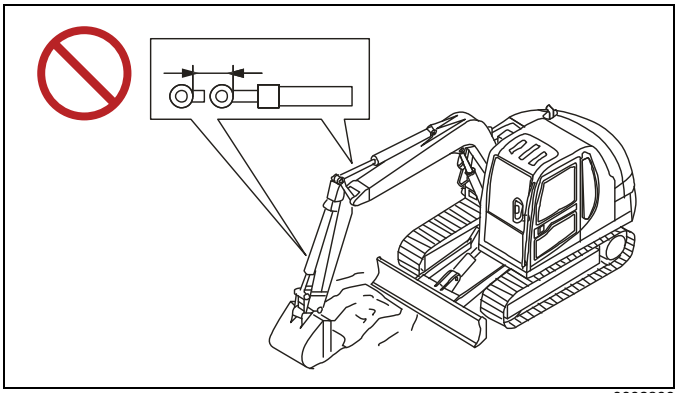


0003882

Figure 4-44

Never raise the rear or front of the machine to use the machine's weight to excavate. Operating while using the machine's weight may damage the machine.

Do Not Operate a Cylinder to the Stroke End



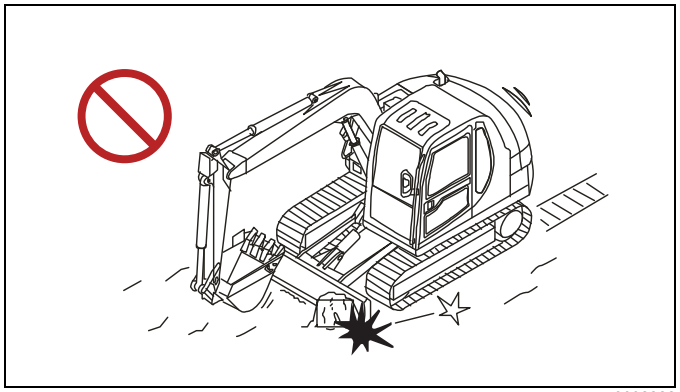
0003899

Figure 4-45

Avoid operating the machine with any cylinder fully retracted or extended.

If the cylinder piston reaches its end of stroke, continued use of the work equipment could damage that cylinder.

Avoid Dozer Blade Impact

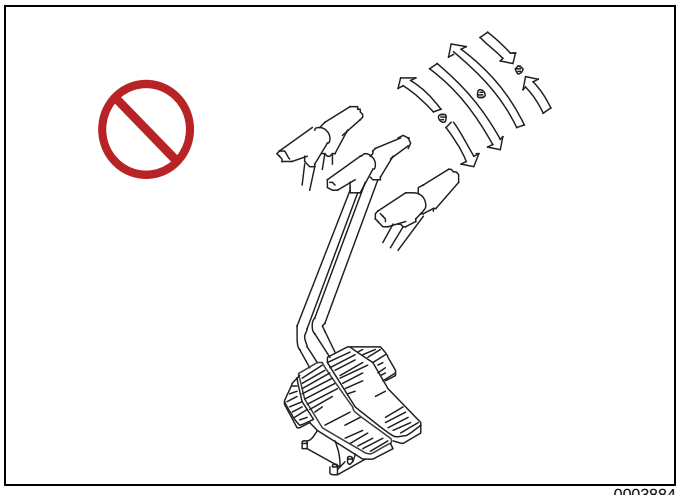


0003883

Figure 4-46

Do not strike rocks or other hard objects with the dozer blade. This can shorten the service life of the dozer blade or the hydraulic cylinder.

Avoid Shifting Travel Directions Suddenly



0003884

Figure 4-47

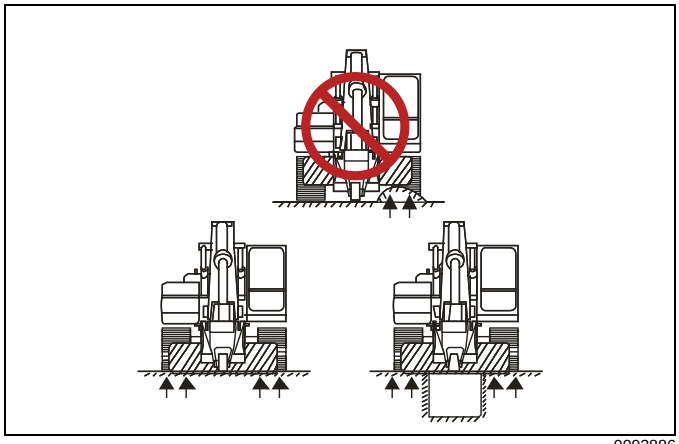
Avoid moving the control levers quickly from forward travel to reverse travel.

Never move the control levers quickly from high speed to neutral.

Excavating Hard or Rocky Ground

Use alternate work equipment to break up hard ground before excavation to prevent machine damage.

Support the Dozer Blade



0003886

Figure 4-48

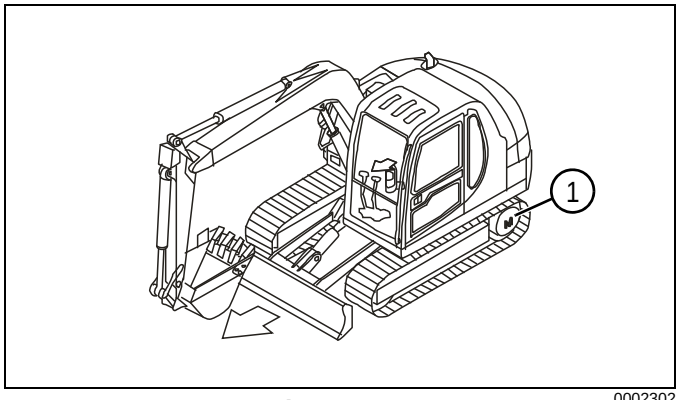
When the dozer blade is used as a stabilizer, never use just one end of the blade to support the machine.

Travel

General Travel Instructions

CAUTION

Use a signal person when driving or operating the machine in confined areas. Use standard hand signals before starting the machine. Failure to follow this precaution could result in injury.



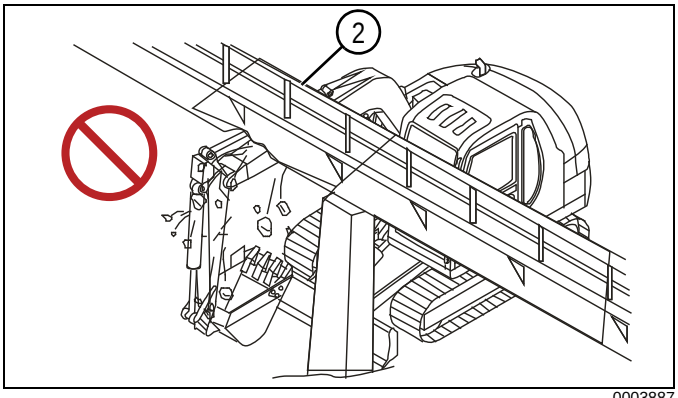
0002302

Figure 4-49

The machine's travel direction is controlled by the travel control levers/pedals and the location of the travel motors relative to the cab.

When the travel motors (1) are positioned behind the cab, press the top of the travel control pedals or push the travel control levers to move the machine forward.

Select a flat travel surface and travel in a straight line. Turn the machine slowly and gradually.



0003887

Figure 4-50

Never let the machine make contact with power lines or bridges (2).

Do not drive or swing the machine on broken stones, rugged surfaces, steel bars, or scrap iron. This could cause personal injury or damage to the track.

Slow the speed of the machine when traveling on uneven ground. A lower speed reduces the possibility of machine damage.

Do not operate the machine on a surface covered by small stones that could cause track skidding or damage.

Avoid premature track wear or damage. Do not operate the machine on new asphalt or other hot surfaces.

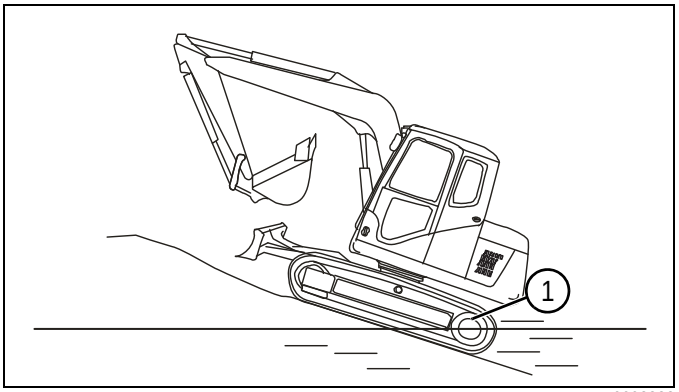
Do not allow fuels, oils, salt, or chemical solvents to make contact with the tracks. These substances will erode the track links and cause rusting and peeling. Wash these substances off the tracks immediately with clean water.

Do not operate the machine in a marine environment. Salt in seawater can damage the track shoe cores.

Travel at High Speed

When traveling at high speeds, position the idlers to the front of the cab. See "Standard Travel Direction" on page 4-17.

Operating in Water



0003888

Figure 4-51

NOTICE!

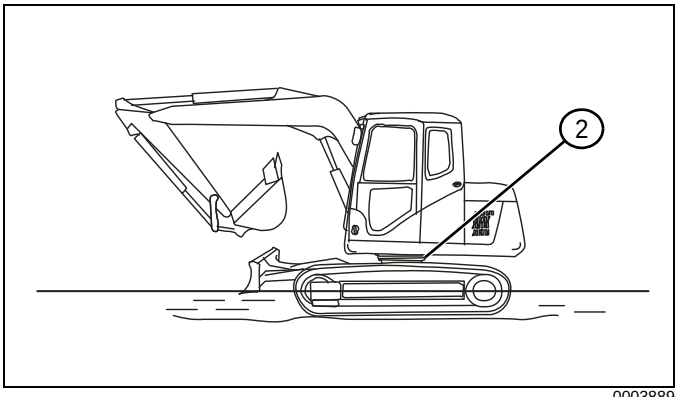
- **Operate the machine slowly when traveling through water. Check the depth of the water with the bucket.**
- **Do not operate the machine in a marine environment. Salt in seawater can damage the track shoe cores.**
- **When driving the machine out of water on a grade steeper than 15°, the rear of the upper structure may be submerged in water and the radiator fan may sustain water damage.**

Failure to follow this notice could damage the machine or cause it to operate improperly.

Do not drive the machine into water where the water depth is above the center of the final drive sprocket (1).

Grease the parts that have been submerged until the old grease has been displaced from the bearing (especially from the bucket pin). See “Recommended Lubricants, Fuel, and Engine Coolant” on page 5-7.

Make sure that the job site surface is hard enough for the machine.



0003889

Figure 4-52

Continuously monitor the condition of the machine when operating in water. Move the machine to a different location if necessary.

Make sure that the swing bearing, swing drive gear, or swivel area (2) do not become submerged in water.

NOTE: *If the swing bearing, swing drive gear, or swivel area have been submerged in water, they must be cleaned. Lubricate the swing drive gear and swing bearing.*

Travel on an Incline

Precautions When Traveling on an Incline

WARNING

- **Operating the machine on an incline may cause the machine to become unstable.**
- **Use caution when operating the machine on inclines and use a lower engine speed.**
- **Operate the machine slowly and monitor machine movement.**
- **Do not travel on an incline with the bucket loaded or with a lifted load.**
- **Do not swing a loaded bucket toward the downhill direction.**
- **Build a platform on an incline so the machine can be operated on a level surface.**

Failure to follow these warnings could result in death or serious injury.

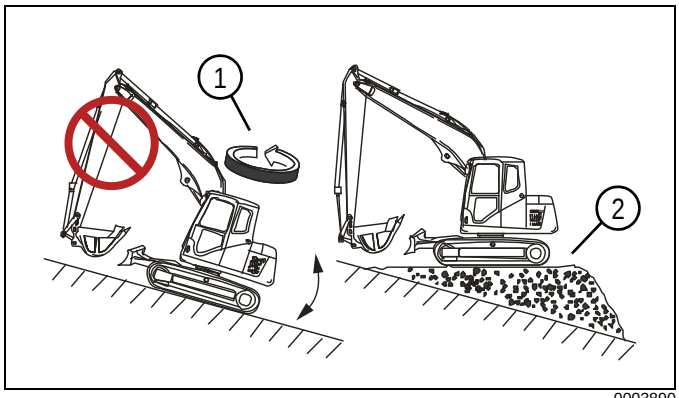
NOTICE!

The engine may be damaged if the machine is operated on an incline greater than 25°.

Tipping over may result if the machine is on uneven ground or on a slope. To avoid such accidents, follow the instructions when the machine is operated on uneven ground or on a slope:

- Keep the engine running at a low speed.
- Choose low-speed travel mode. See “Home Screen” on page 3-5.
- Operate slowly and observe the motion of the machine.
- Do not attempt to travel on a slope with the bucket loaded or with a load lifted.
- Never attempt to travel up or down a slope with a grade greater than 25°. Never attempt to cross a slope with a grade greater than 15°.

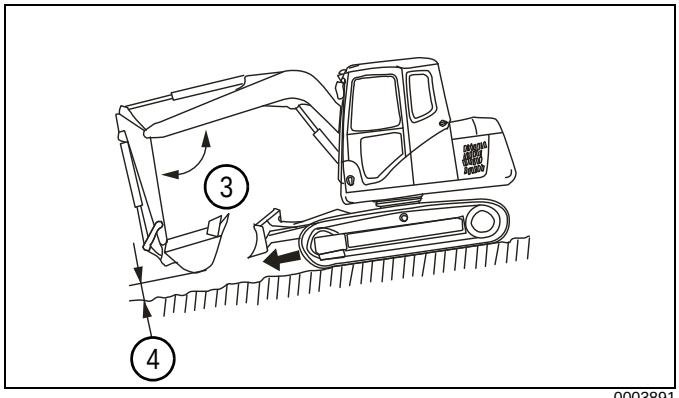
- Always keep the seat belt fastened.
- Point the bucket toward the travel direction and 8 in.–12 in. (20 cm–30 cm) off the ground. Travel at low speed.
- Do not attempt to change direction on a slope. Only perform a direction change on an even and solid surface.
- If the engine stalls on a slope, see “Engine Stalls on an Incline” on page 4-26.
- Before traveling up a steep slope, allow the machine to warm up sufficiently so it can perform well.
- Avoid crossing inclines as much as possible. Slipping or rolling over may occur.



0003890

Figure 4-53

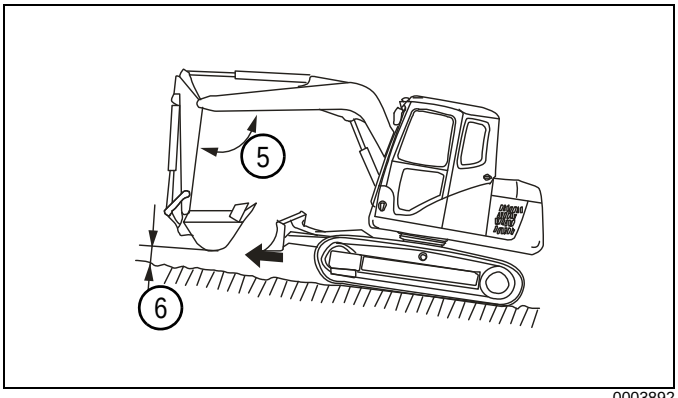
- Do not swing (1) the upper structure on a slope. Do not swing the upper structure to the downhill direction. The machine may tip over. If such an operation is necessary, swing the upper structure and the boom with great care.
- Build a platform (2) on an incline so the machine can be operated on a level surface.



0003891

Figure 4-54

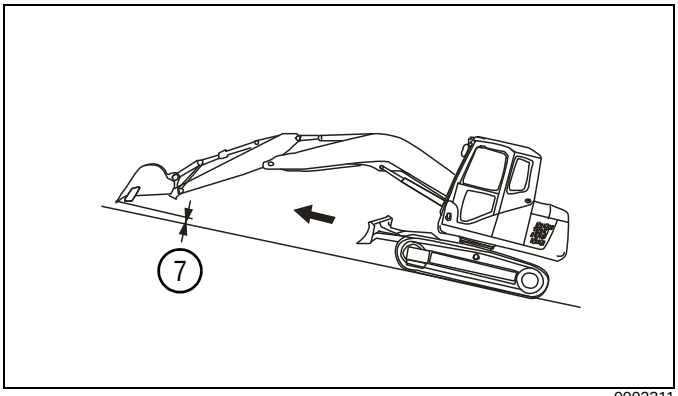
- When traveling down a grade greater than 15°, the work equipment should be positioned in front of the cab. Keep the boom-arm angle between 90° and 110° (3) and the bucket 8 in.–12 in. (20 cm–30 cm) (4) above the ground. Travel at a low speed.



0003892

Figure 4-55

- When traveling up a grade greater than 15°, the work equipment should be positioned in front of the cab. Keep the boom-arm angle between 90° and 110° (5) and the bucket 8 in.–12 in. (20 cm–30 cm) (6) above the ground. Travel at a low speed.



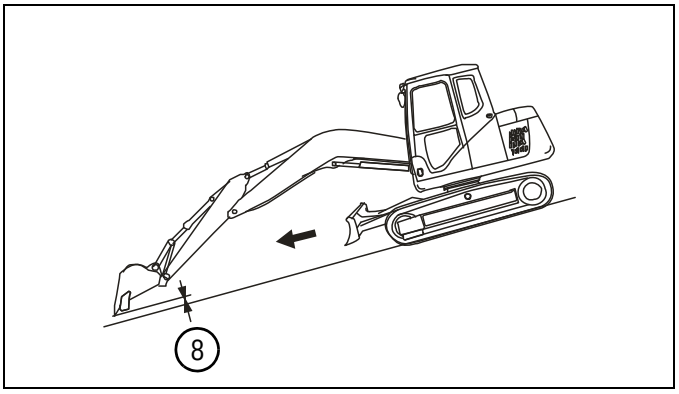
0002311

Figure 4-56

NOTICE!

When traveling up a grade, make sure the directional arrows are in the uphill direction. If not, the tracks may loosen and slip, resulting in damage or misalignment. Use the arm to help the machine travel uphill as necessary.

- Extend the boom and arm uphill and keep them 8 in.–12 in. (20 cm–30 cm) (7) off the ground. Travel at a low speed.



0002312

Figure 4-57

- When traveling downhill, keep the bucket in the travel direction and 8 in.–12 in. (20 cm–30 cm) (8) above the ground. Lower the bucket immediately if the machine slips or loses balance. Travel at a low speed.

Engine Stalls on an Incline

Before traveling up a steep incline, allow the machine to warm to normal operating temperatures.

If the engine stalls when the machine is on an incline, lower the bucket to the ground immediately, move all control levers to the neutral position, and restart the engine.

When the engine stalls on an incline, do not use the joystick to swing the machine. The upper structure will swing due to its weight.

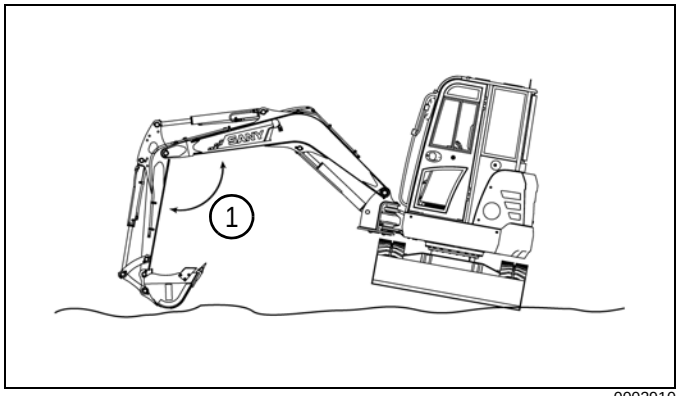
Operating on Soft Ground

- **Wide track shoes are intended for operation on soft ground.**
- **Inspect the track shoe fasteners on a regular basis.**

Choose the proper track shoes when operating the machine on soft ground. Place steel plates on soft ground to support the machine. Soft ground may cave in and cause the machine to roll over.

Removing a Stuck Machine

Be careful when operating on soft terrain to avoid becoming stuck.



0002910

Figure 4-58

If your machine becomes stuck, perform the following procedures to free the machine:

WARNING

Use caution when placing cribbing under the track. The machine is supported only by the boom and could drop without warning. Failure to follow this warning could result in death or serious injury.

One Track Stuck

1. Position the boom and arm at an angle (1) between 90° and 110°.
2. Pivot the upper structure to position the boom over the track that is stuck.
3. Curl the bucket so that the back of the bucket touches the ground.
4. Lower the boom to raise the track.

WARNING

Rotating tracks are dangerous. Stay away from rotating tracks. Failure to follow this warning could result in death or serious injury.

5. Remove mud buildup by operating the lifted track forward and backward.
6. Place cribbing under the track to provide a firm surface if necessary.
7. Raise the boom to lower the track onto the cribbing.
8. Drive the machine out of the mud.

Two Tracks Stuck

1. Position the boom and arm at an angle between 90° and 110°.
2. Pivot the upper structure to position the boom over the front of the machine.
3. Curl the bucket so the back of the bucket touches the ground.
4. Lower the boom to raise the front of the tracks off the ground.
5. Place cribbing under the tracks to provide a firm surface if necessary.
6. Raise the boom to lower the tracks onto the cribbing.
7. Cut the bucket into the ground in front of the machine. Retract the arm (as with normal excavating) while driving the machine forward out of the mud.

If the machine does not move, tow the machine. See “Towing the Machine” on page 4-27.

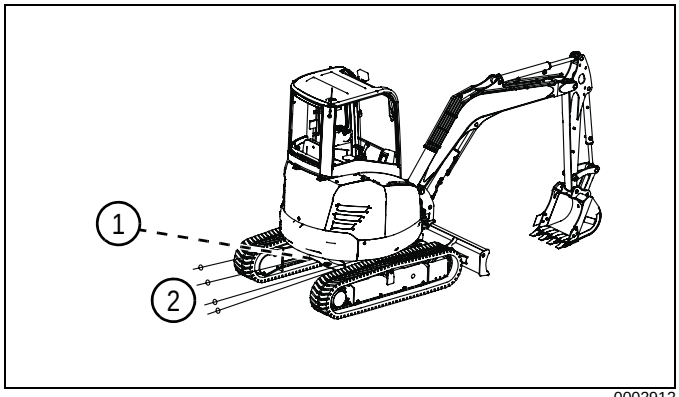
If the machine is not operational, it may need to be moved using a lifting device. See “Lifting the Machine” on page 4-35.

Towing the Machine

WARNING

- **Do not exceed the wire rope(s) rated capacity.**
- **Never use a broken chain, worn wire rope(s), or a bent tow hook to tow the machine.**
- **Never jerk the wire rope(s).**

Failure to follow these warnings could result in death or serious injury.



0002912

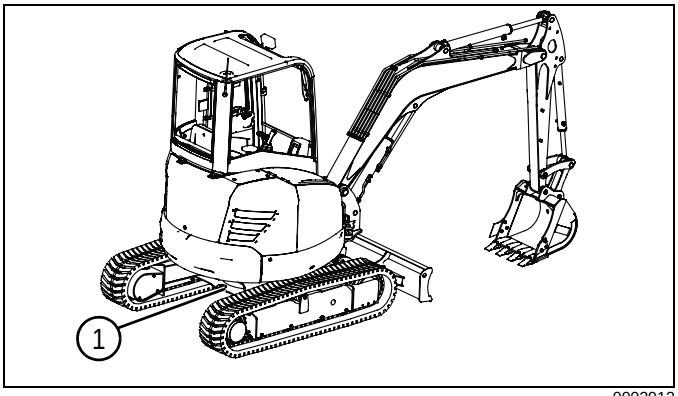
Figure 4-59

If the machine is trapped in mud and is unable to get out under its own power, use wire rope(s) (2) attached to the frame (1) to assist in its removal.

Towing Hook for a Light Load

NOTICE!

- **A shackle must be used.**
- **Keep the wire ropes horizontal and parallel to the tracks.**
- **Drive the machine at low speed.**



0002913

Figure 4-60

The machine is equipped with a light-load towing point/hole (1) on the frame that can be used to tow a light load.

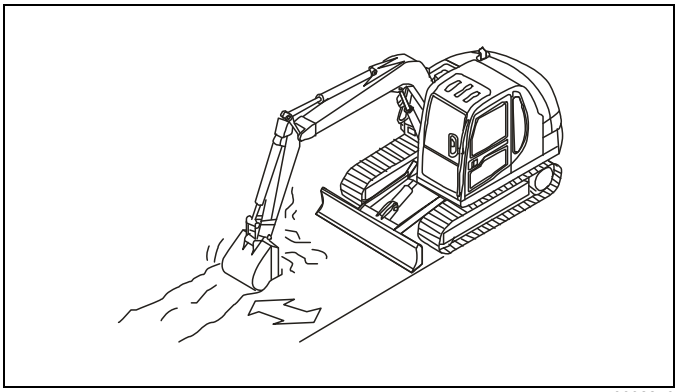
Recommended Operations

NOTICE!

- **Avoid sudden stops when lowering the boom. Hydraulic shock can damage the hydraulic system.**
- **Avoid extending the arm cylinder while in full travel. This can damage the hydraulic cylinder.**
- **Do not allow the bucket to come in contact with the tracks when excavating at an angle.**
- **Do not allow the boom or arm hydraulic cylinder’s hoses to come into contact with the ground.**

Operate the machine using the following applications. The scope of application can also be expanded by using various optional attachments.

Trenching Work



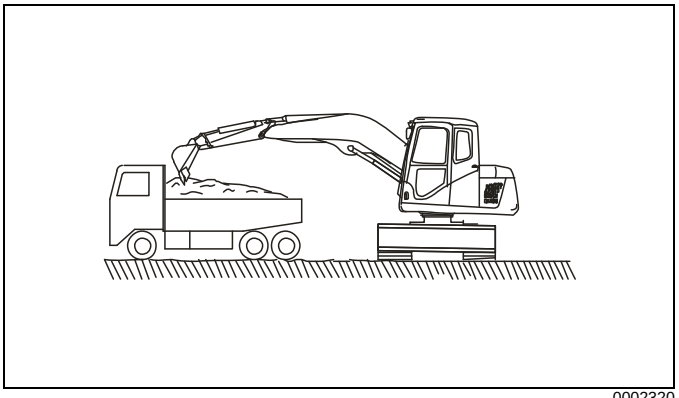
0002319

Figure 4-61

When performing trenching work, install a bucket that matches the width of the trench and keep the tracks parallel with the trench.

When excavating a trench, always start from the sides, then remove the earth in the middle.

Vehicle Loading



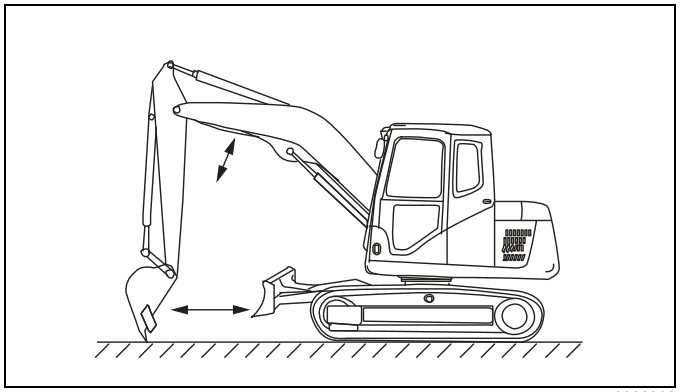
0002320

Figure 4-62

To increase efficiency, load the dump truck from behind instead of from the side.

When loading a dump truck, do not swing the bucket over the truck cab or any people on the job site.

Leveling Operation



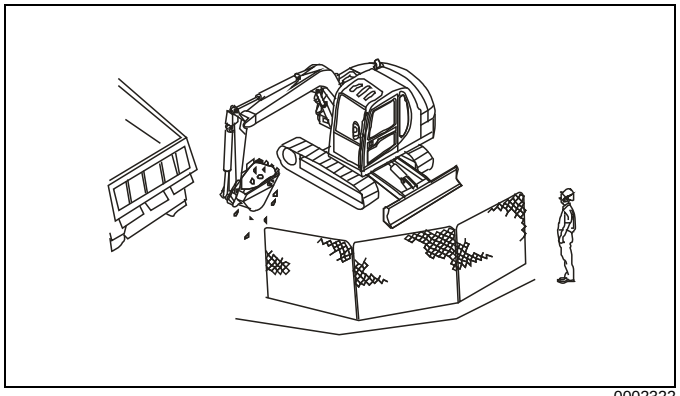
0003902

Figure 4-63

1. Choose the light-load mode when performing a leveling operation. Roll the bucket out and hold it slightly ahead of the arm.
2. Raise the boom slowly and retract the arm at the same time. Once the arm passes the vertical position, lower the boom slowly and keep the bucket moving parallel to the ground.

NOTE: *Do not drag or push the bucket on the ground while the machine is traveling.*

Operating Precautions



0002322

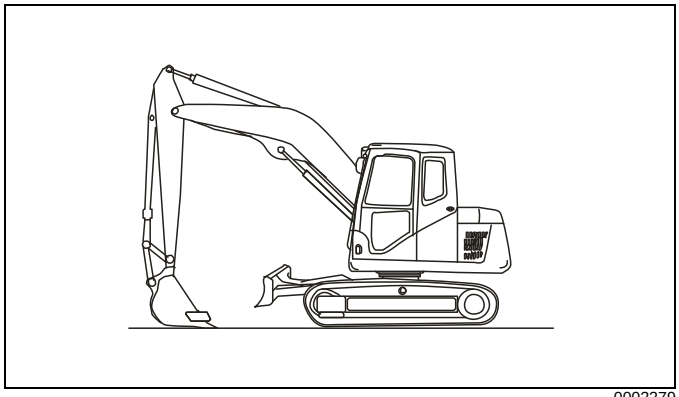
Figure 4-64

- Always wear appropriate personal protective equipment (PPE) and clothing during operation.
- Clear all personnel and obstacles around the machine and the work area. Inspect the machine and its surroundings during operation. Be careful not to allow the upper structure to hit any objects when operating the machine in narrow or confined spaces.
- Operate the machine on a hard, level surface. When working in a ditch or on a road shoulder, keep the tracks perpendicular to the work face and the travel motors at the rear of the machine. Placing the machine in this position helps facilitate escape if a collapse occurs.

- When working under a cliff or high embankment, make sure the work area is secure.
- Do not allow the arm to interfere with the tracks during operation.
- Do not use the swinging force of the machine to move rocks or break walls.
- Adjust the length and depth of the cut so the bucket is full after each cycle.
- To improve efficiency, a full bucket is more important than loading speed.
- Do not use the side of the bucket to level materials or strike objects.

Park the Machine

1. Move the machine to a solid, level surface.



0002279

Figure 4-65

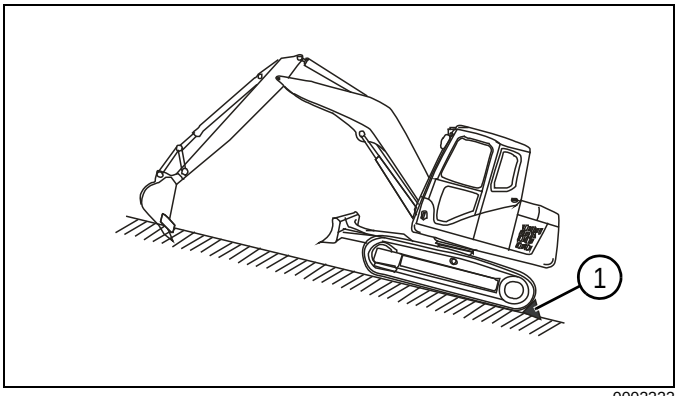
2. Lower the bucket and dozer blade to the ground.
3. Move the throttle control dial to MIN (low idle). Run the engine at idle for 5 minutes to cool it down.

0009099

Figure 4-66

4. Move the hydraulic control lever (1) to the locked (closed) position (2).
5. Turn the key switch to OFF and remove the key.
6. Close the windows and cab door.
7. Turn the battery disconnect switch to OFF.
8. Close and lock all doors.

Parking the Machine on a Grade



0002323

Figure 4-67

CAUTION

Avoid parking the machine on a grade when possible. Machine rollover can cause injury.

If it is necessary to park the machine on a grade:

1. Firmly set the bucket teeth and dozer blade into the ground.
2. Move the hydraulic lockout control lever to the locked (closed) position.
3. Turn the key switch to OFF and remove the key.
4. Close the windows and cab door.
5. Turn the battery disconnect switch to OFF.
6. Close and lock all doors. See “Doors, Filler Cap, and Hood” on page 5-13.
7. Securely chock (1) the tracks.

Cold Weather Operation

Operation in Cold Weather

When operating the machine in low temperatures, the engine may be difficult to start, the fuel line may freeze, and oil may become more viscous. Select fuels and lubricants according to the air temperature.

Engine Coolant in Cold Weather

See “Recommended Lubricants, Fuel, and Engine Coolant” on page 5-7.

Battery in Cold Weather

WARNING

Before proceeding with any battery maintenance procedure, observe the following precautions:

- **The top of the battery must be kept clean to prevent plugging of the battery vents. Regularly wash the top of the battery to prevent the battery vents from plugging.**
- **Battery gases are explosive. Never smoke around a battery or expose it to sparks or open flames. Work in a well-ventilated area.**
- **Wear personal protective equipment (PPE) when working with a battery.**
- **Battery acid can cause burns or injury. If battery acid makes contact with your skin or eyes, flush the area immediately with fresh water and seek medical attention.**

Failure to follow these warnings could result in death or serious injury.

In cold climates, battery efficiency will decline. Electrolyte can freeze if the battery charge is low. Keep the battery charged near 100% and in a warm area if possible.

After Daily Operation

WARNING

Rotating tracks are dangerous. Stay away from rotating tracks.

Failure to follow this warning could result in death or serious injury.

NOTICE!

Fill the fuel tank to its maximum level after operation to prevent moisture in the fuel tank from condensing at low temperatures, which could result in fuel-line freeze.

Mud and water accumulation on the undercarriage can affect normal operation of the machine. Make sure to perform the following actions after daily operation:

- Remove mud and water from the machine. Mud, dirt, and water can damage the seals.
- Park the machine on a firm, dry surface.
- If possible, park the machine on boards, to prevent the tracks from sinking into soft ground. Normal operation can fail if the machine becomes stuck.
- Open the drain valve of the primary fuel filter/water separator and discharge the water in the fuel system.

After operating the machine in water or mud, perform the following procedures to drain water from the undercarriage and extend its service life:

1. Run the engine at low speed and swing the upper structure 90° so the work equipment is sideways.
2. Raise the machine so one side of the tracks is off the ground. Rotate the track back and forth to shake the mud off. Repeat this procedure on the other track.

Machine Storage in Cold Weather

- Clean the machine.
- Check the engine coolant and engine oil levels, and check for leaks. The machine is normally filled to withstand a maximum low temperature of -40°F (-40°C). Change the fuel, hydraulic oil, and gear oil with new fluids that meet the air temperature requirements as necessary.
- Check the hydraulic motors, hydraulic cylinders, pumps, circuits, and swivels for leaks. Check all cylinder rods for scratches and corrosion. Apply grease to exposed cylinder rods.

- Remove and charge the battery. When the battery is fully charged, store it indoors.
- Start and run the machine on a monthly basis.
- Clean the battery terminals as necessary. Apply a coat of dielectric grease to the terminals.

After the Cold Season

Replace the fuel and engine oil with fuel and oil of the specified viscosity. See “Recommended Lubricants, Fuel, and Engine Coolant” on page 5-7.

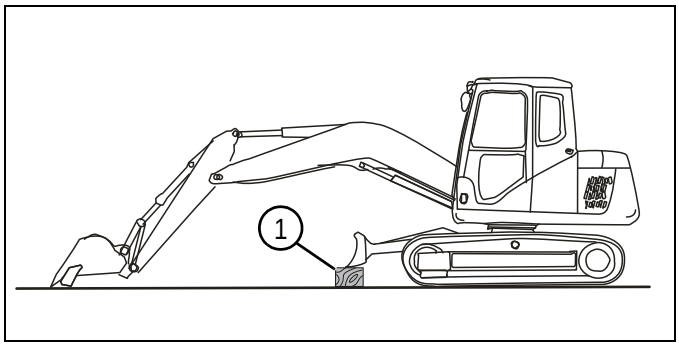
NOTE: *If permanent ethylene glycol engine coolant was not used and ethanol engine coolant is used as an alternative, drain and flush the cooling system completely and add new ethylene glycol engine coolant to the cooling system.*

Long-Term Storage

Prepare for Long-Term Storage

NOTICE!

Extend the bucket and arm and lower the boom to prevent the cylinder rods from rusting.



0003967

Figure 4-68

Perform the following procedures before storing the machine:

- Fill the fuel tank, apply lubricant, and change the engine oil before storage.
- Clean and wash all components and park the machine indoors. If indoor storage is not possible, park the machine on a firm, level surface. Cover the machine if possible.
- Extend the bucket, arm, and boom and support the dozer blade on a block (1).
- Apply a thin film of grease to any exposed surfaces of the hydraulic cylinder rods.
- Disconnect the negative battery cable or remove the battery and store it.
- If the ambient temperature is expected to drop below 32°F (0°C), check the engine coolant mixture ratios and add concentrated engine coolant to the cooling system if necessary.
- Close and lock all doors. See “Doors, Filler Cap, and Hood” on page 5-13.

During Storage

WARNING

During indoor storage, if anti-rusting operation is performed, open the windows and doors to provide proper ventilation and avoid gas poisoning.

During the storage period, operate the machine on a monthly basis to prevent rust and seizing of moving parts and to lubricate the seals. Charge the battery at this time.

Removing from Storage

NOTICE!

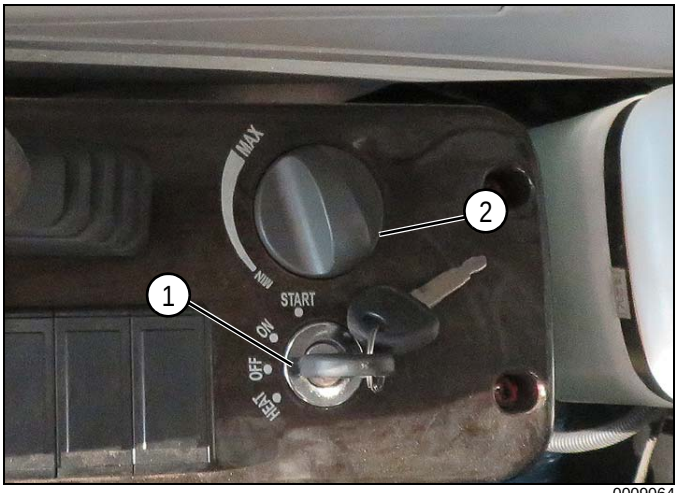
If no monthly rust-proofing maintenance was performed, contact a SANY dealer for additional information before using the machine.

Follow the procedures below before using a machine that has been stored for a prolonged period of time:

- Clean the grease from the cylinder rods.
- Add oil or apply lubricant to all parts or components. See “Recommended Lubricants, Fuel, and Engine Coolant” on page 5-7.

Starting the Engine after Long-Term Storage

Follow the procedures below when starting the engine after long-term storage. See “Starting the Engine” on page 4-13.



0009064

Figure 4-69

1. Turn the key switch (1) to ON.
2. Adjust the throttle control dial (2) to MAX (high idle) for 3 seconds.
3. Adjust the throttle control dial to MIN (low idle) and start the engine.
4. After all components have reached normal operating temperature, run the engine for an additional 5 minutes.

Transportation Information

Transportation Method

Applicable laws and regulations must be observed when transporting the machine.

- When transporting the machine on a trailer, confirm the length, width, height, and weight capacity of the trailer before loading.
- Investigate the road conditions in advance (for example, dimension restrictions, weight restrictions, and traffic regulations).
- The machine may need to be disassembled to meet the local dimension and/or weight limits.

NOTE: *The machine's shipping weight and dimensions may vary depending on its tracks and work equipment.*

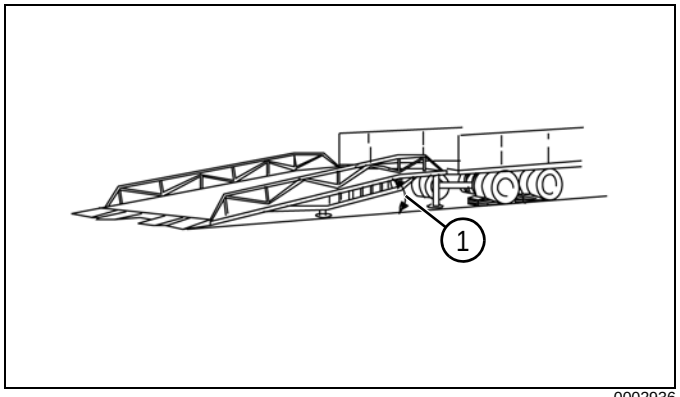
Loading and Unloading

WARNING

- **To prevent the machine from tipping over, select a firm and level location that is a safe distance from any road or structure.**
- **Make sure the trailer is properly chocked to prevent any movement.**
- **Use an access ramp with enough length, strength, and width to properly support the machine. The ramp grade should not exceed 15°.**
- **Drive slowly at the junction of the ramp and the trailer. The machine may shift suddenly due to a change in its center of gravity.**
- **Use a signal person to alert the operator to any potential hazards.**

Failure to follow these warnings could result in death or serious injury.

- Deactivate the auto idle mode before loading or unloading; otherwise, the machine may move suddenly.
- Adjust the throttle control dial to MIN (low idle). Operating the engine at high speed could result in sudden, unexpected movement.
- Position the trailer and machine on solid, level ground and keep the machine a safe distance away from roads during loading and unloading operations.

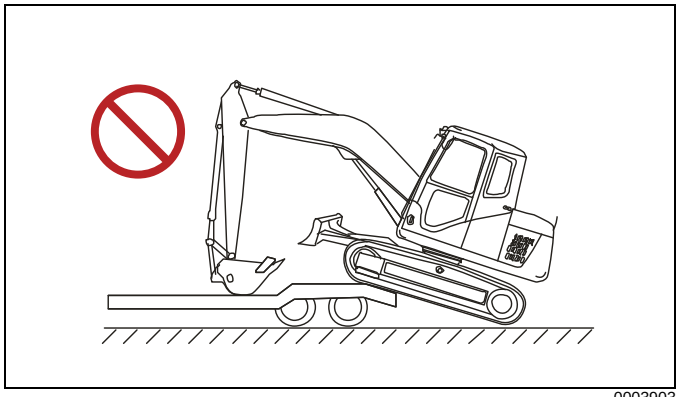


0002936

Figure 4-70

- Make sure the loading ramps have adequate width, length, thickness, and strength. The maximum angle of the ramps is 15° (1).
- Never change direction on the access ramp. If repositioning the machine is necessary, back up, re-orient the machine, and drive up or down the ramps.
- Use care when driving over the joints between the trailer and the ramps.
- Swinging the upper structure may cause the machine to tip over and result in personal injury. Retract and lower the arm and swing the upper structure slowly to achieve the optimal balance.
- Never operate any control levers other than the travel levers when the machine is on a ramp.
- Clean the landing platform, ramps, and trailer floor before loading or unloading. Grease, mud, or ice on the trailer, landing platform, and ramps can cause the machine to slide and tip over.

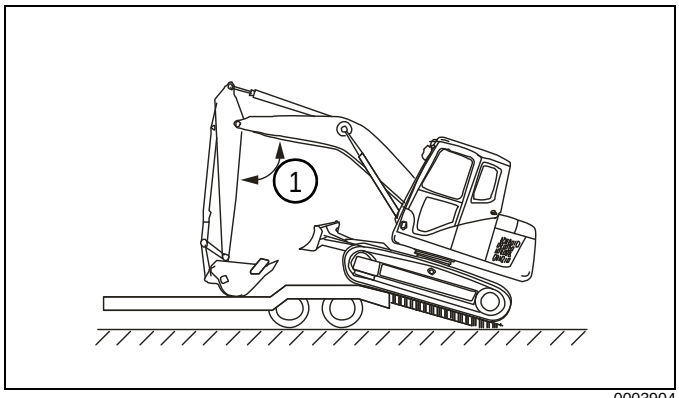
Loading the Machine



0003903

Figure 4-71

NOTE: *Do not load or unload the machine without a landing platform or ramps.*

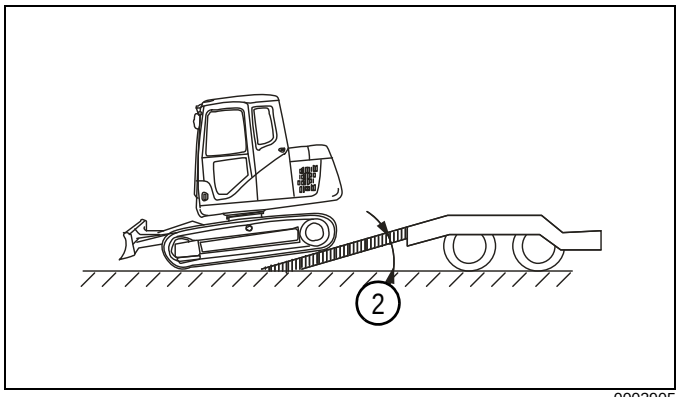


0003904

Figure 4-72

Use a landing platform or ramps when loading or unloading the machine.

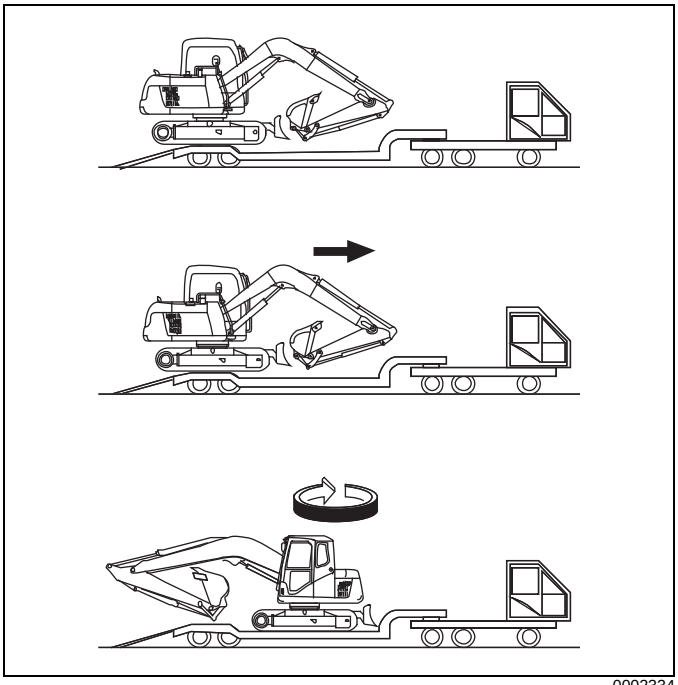
When loading the excavator with work equipment installed, place the work equipment in the front and travel forward. Keep the boom-arm angle between 90° and 110° (1).



0003905

Figure 4-73

When loading the excavator without equipment installed, travel in reverse up the ramps. Maintain the ramps to no more of an angle than 15° (2).

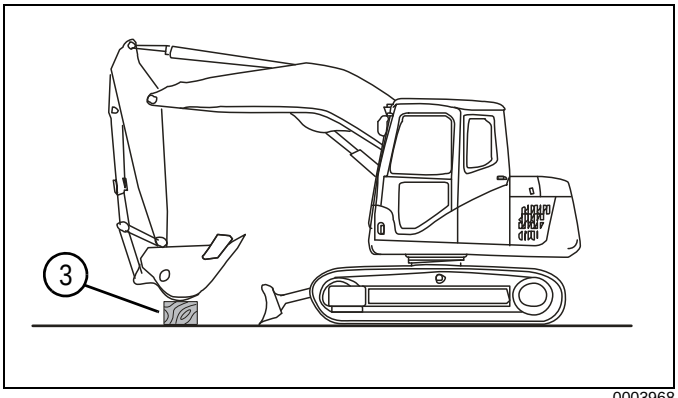


0002334

Figure 4-74

Use the following procedures during loading:

1. Align the centerline of the machine to the trailer centerline.
2. Slowly drive the machine up the ramps.
3. When the machine tilts toward the trailer side, lower the bucket close to the trailer floor. Drive slowly until the tracks are completely on the trailer.
4. Slightly raise the bucket. Retract the arm and keep it in a lower position. Slowly swing the upper structure 180°. Lower the dozer blade.
5. Fully curl the bucket and arm. Slowly lower the boom.



0003968

Figure 4-75

NOTE: *To avoid damage to the bucket cylinder, place a wood block (3) between the bucket cylinder and the trailer floor. Slowly lower the bucket cylinder onto the wood block.*

6. Stop the engine and turn the key to ON.

7. Operate the joysticks until the pressure inside the hydraulic cylinders is fully released.
8. Move the hydraulic control lever to the locked (closed) position.
9. Turn the key to OFF and remove from the key switch.
10. Close the cab window and door.

NOTICE!

- **Never turn the battery disconnect switch to OFF while the engine is running. This can damage the electrical system or cause the machine to operate improperly.**
- **After machine shutdown, wait at least 1 minute for the engine control module (ECM) to complete its shutdown before turning the battery disconnect switch to OFF.**

Failure to follow this notice could cause damage to the machine or cause it to operate improperly.

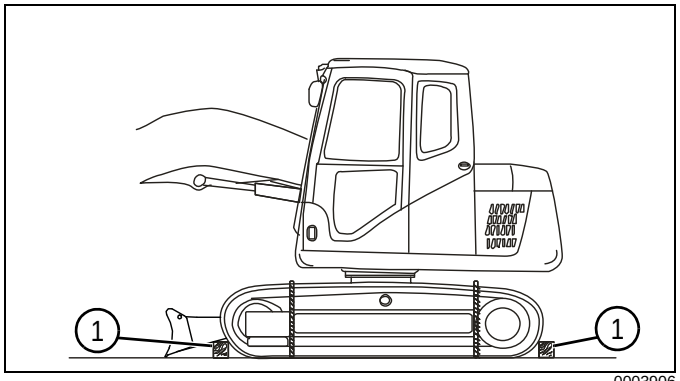
11. Turn the battery disconnect switch to OFF.
12. Lock all doors, filler cap, and hood. See “Doors, Filler Cap, and Hood” on page 5-13.
13. Cover the exhaust opening to prevent contamination.

Securing the Machine

NOTICE!

To avoid damage to the machine during transportation:

- **Lower the radio antenna and position the mirror inward toward the cab.**
- **Secure any removed parts to the trailer.**
- **Put a wood block between the bucket cylinder and the trailer floor to help prevent damage to the bucket cylinder.**
- **Secure chains and wire ropes to the machine frame.**
- **Prevent chains and wire ropes from crossing or pressing against hydraulic lines or hoses to avoid damage and leaks.**



0003906

Figure 4-76

When the machine has been loaded, follow these procedures to tie it down:

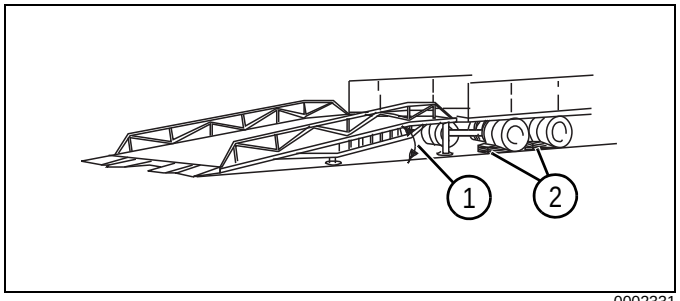
1. Prevent machine movement during transportation by placing chocks (1) at both ends of the tracks.
2. Secure the machine firmly in place with chains or wire ropes to prevent it from sliding.

Unloading the Machine

NOTICE!

- **Use extreme care when the machine drives over the joint area between the trailer and the ramps.**
- **Avoid damage caused by unexpected movement of the work equipment.**
- **Maintain the boom-arm angle between 90° and 110°.**
- **Unloading the machine with the arm retracted may cause damage to the machine.**

1. Always load/unload the machine on firm, level ground and keep the machine a safe distance away from roads.

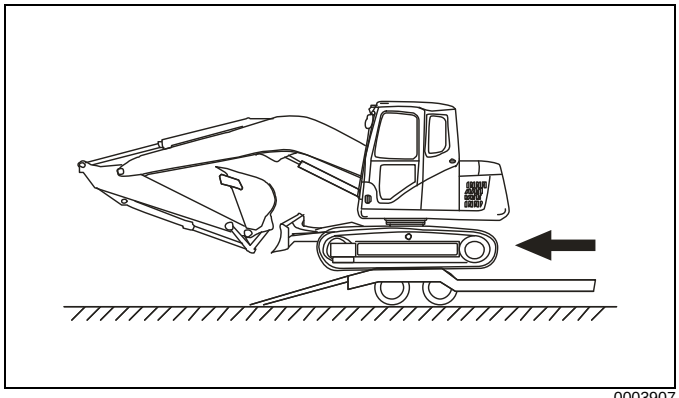


0002331

Figure 4-77

2. Park the trailer properly and place chocks (2) behind the trailer wheels. Place the ramps between the trailer and the machine. Adjust the distance between ramps to match the distance between the tracks.
3. Make sure the loading ramps have adequate width, length, thickness, and strength. The maximum angle of the ramps is 15° (1).
4. Remove the chains and wire ropes that secure the machine.

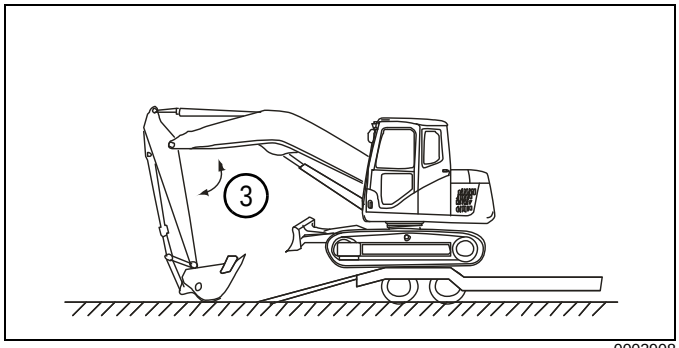
5. Start the engine.
6. Allow the engine to reach operating temperature.
7. Push the hydraulic lockout lever to the unlocked (open) position.



0003907

Figure 4-78

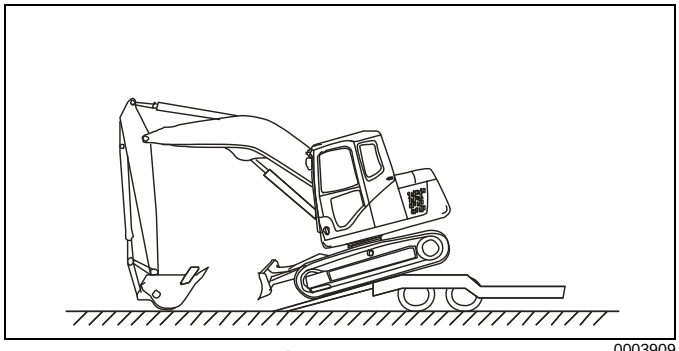
8. Raise the work equipment and retract the arm toward the boom. Drive the machine slowly.



0003908

Figure 4-79

9. Stop the machine when it travels over the rear wheels of the trailer and toward the ramps.
10. Adjust the boom-arm angle between 90° and 110° (3) and lower the bucket so the flat surface is in contact with the ground.



0003909

Figure 4-80

11. Drive the machine slowly onto the ramps.
12. Operate the boom and the arm slowly when the machine is on the ramps. Allow the machine to descend slowly until it comes in contact with the ground.

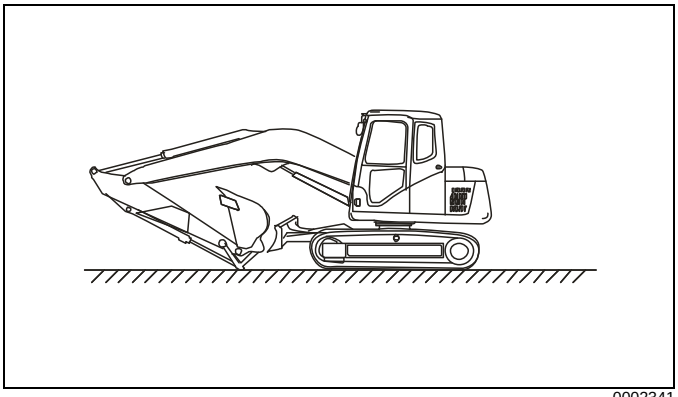
Lifting the Machine

WARNING

- **Make sure all lifting devices are in safe operating condition and with sufficient capacity rating to safely support the intended load.**
- **Never lift the machine with a person inside the cab.**
- **Allow no one to stand close to or under a lifted machine.**
- **Always lift with the longitudinal centerlines of the upper structure and undercarriage parallel to each other.**
- **Keep the hydraulic lockout control lever in the locked (closed) position to prevent unexpected movement of the machine.**

Failure to follow these warnings could result in death or serious injury.

NOTE: *The lifting procedure applies to standard machines. For operating weight of the machine, see “Technical Specifications” on page 6-4.*



0002341

Figure 4-81

1. Fully extend the arm cylinder and the bucket cylinder, raise the dozer blade, and lower the boom.
2. Move the hydraulic control lever to the locked (closed) position.
3. Turn the key to OFF and remove from the key switch.
4. Close the cab window and door.
5. Turn the battery disconnect switch to OFF.
6. Lock all doors and hoods. See “Doors, Filler Cap, and Hood” on page 5-13.
7. Cover the exhaust opening to prevent contamination.

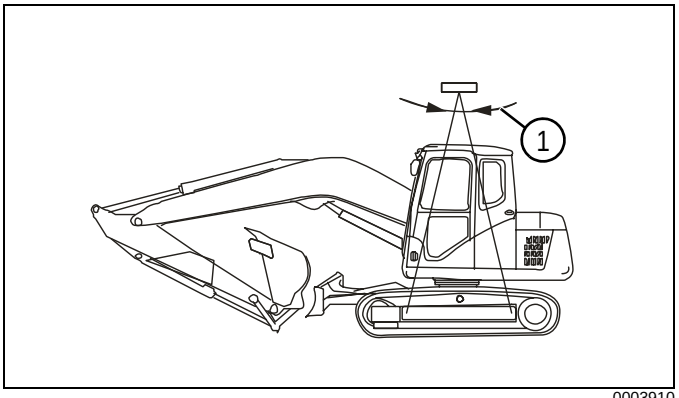


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Figure 4-82

NOTE: *Keep the lifting devices between 30° and 40° (1).*

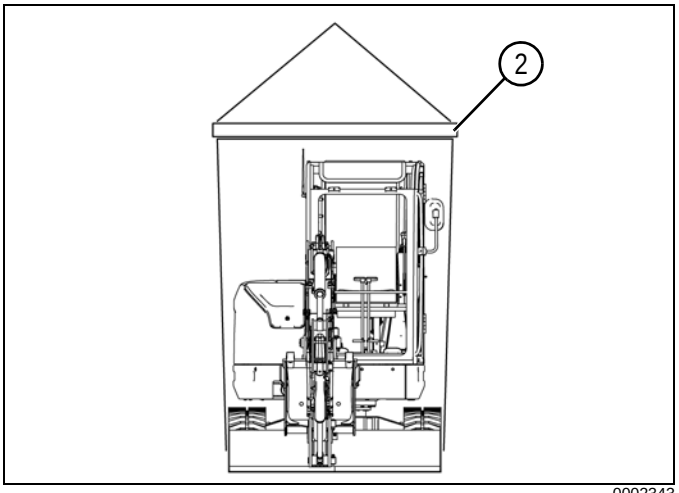

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Figure 4-83

8. Use wire ropes and a container spreader bar (2) that have adequate length to prevent machine damage.
9. Pass the wire ropes under the tracks as shown and anchor the ropes on the crane hook.
10. Lift the machine 10 in.–12 in. (25 cm–30 cm) and check its balance. If it is not balanced, lower the machine to the ground and adjust the boom or dozer blade positions.

Chapter 5

Maintenance

Maintenance Information

Do not perform any maintenance and/or repairs unless the procedures are covered in this manual. Always follow all safety precautions. Read and understand the Safety section of this manual before proceeding with any inspection or maintenance procedures. See “Maintenance Safety” on page 2-4.

Checks Before Maintenance or Repairs

Review the Maintenance Log and follow these points:

- Avoid working on the machine while the engine is running unless required to do so in the procedure. If the engine must remain running during a procedure, always have a person in the cab who can correctly operate the machine and who is in clear contact with you at all times.
- Contact a SANY dealer if you are unable to perform the procedures listed in this manual or if additional procedures are required.
- Always use the proper tools when performing any maintenance procedures.

Checks After Maintenance or Repairs

Before starting the machine after maintenance or repairs, verify the following:

- If necessary, have a coworker inspect your work for correct and proper completion.
- Complete the Maintenance Log.
- Check for leaks in the system you have maintained.
- Verify there are no abnormal sounds coming from the engine or hydraulic system.
- Check for any loose or abnormal movement in the system you have maintained.
- Check for any overheating in the system you have maintained.

After performing maintenance or repairs to the machine, always take time to inventory your tools, parts used, and fasteners to make sure none of these items were left on or inside the machine. Return the machine to its proper location.

Hour Meter Reading

Record the hour meter reading daily. Confirm hour meter readings with the required maintenance intervals listed in this manual.

Genuine SANY Parts

Use genuine SANY replacement parts when repairing or replacing machine components. Failure to do so may result in premature system or part failure.

SANY-Approved Lubricants

Always use SANY-approved lubricants and engine coolants. Never mix different lubricant brands or viscosities. The use of unapproved lubricants and engine coolants, or mixing different lubricant brands or viscosities, may result in shortened service life or system failure.

Windshield Washer Fluid

Use clean automotive windshield washer fluid only. Do not mix concentrates into the windshield washer fluid.

Oil and Filter Inspection

NOTICE!

Failure to inspect oils and filters for contamination may result in damage to the machine or cause improper operation.

After changing the engine or hydraulic oil or filters, inspect them for contamination. If contamination is found, send a sample of the oil for testing to help determine the cause. Consult with a SANY dealer before operating the machine.

Collect Oil Samples

Collect and send oil samples for testing in accordance to the maintenance schedule. Obtain and follow the instructions within an Oil Analysis Sample Kit from a SANY dealer.

Fuel Strainer

The fuel tank strainer should always be installed when fueling the machine. The fuel tank strainer prevents larger dirt and other contaminates from entering the fuel system. The fuel tank strainer does not filter out very small or non-solid impurities.

Preventing Contamination

Clean dirt, dust, and debris from the hydraulic tank filler cap or cover before opening. Make sure objects do not fall into the tank and contaminate fluids during servicing. If any object falls into any tank, remove it immediately. Failure to do so could result in component malfunction, damage to the machine, or improper machine operation.

Installation of Hydraulic Hoses

When disassembling parts sealed by O-rings or gaskets, clean the surfaces before installing the new parts. Always install new O-rings and gaskets.

Never kink or twist a hydraulic hose during removal or installation. Hydraulic hoses that have been kinked or twisted can be damaged internally, which can considerably shorten the service life of the hose.

Securing Access Covers and Compartment Doors

When servicing the machine with any access cover or compartment door open, use the lock latch or bar to secure the cover or compartment door in the open position. Covers and doors that are not locked in the open position can shut unexpectedly and cause injury.

Cleaning the Machine

Never clean the machine with caustic chemicals or steam cleaners. Instead, use mild soaps and a pressure washer to clean the machine. Always protect electrical parts when cleaning the machine. Never flood or pressure-wash the inside of the cab. Use only nonflammable cleaning solvents. Never use flammable liquids to clean parts or systems.

Weld, Drill, Cut, or Grind on the Machine

NOTICE!

Contact a SANY dealer before beginning any welding repairs. Any welding repairs on the machine must be performed by personnel who are qualified and certified to perform repairs that require welding. Owners are responsible for the structural integrity of any completed repair.

- **After turning off the key switch, wait 1 minute before disconnecting the battery. Disconnect the negative battery cable from the negative (-) post of the battery and all electrical control modules prior to welding.**
- **The welding ground cable must be connected no more than 3.3 ft. (1 m) from the welding area. The welding cable must be connected directly to the part being welded. Do not ground through bearings, hydraulic cylinder pins, or work equipment pins.**
-

Failure to disconnect the negative battery cable could result in damage to the machine or cause the machine to operate improperly.

Inspection and Maintenance for Severe Operating Conditions

If the machine will be operating under adverse conditions:

- Check and clean any electrical components to prevent any accumulated corrosion.
- Check and clean any areas where extreme heat is present, such as the exhaust system, manifold, and turbocharger.

For heavy-load operation, add grease to the pins of the work equipment prior to each operation. Cycle the operation of all working parts several times before filling with additional grease.

Mud, Rain, or Snow Conditions

Before operating the machine in wet locations, inspect connectors for looseness. Tighten connectors to prevent moisture contamination which could cause electrical shorts.

After operating the machine, clean the machine and inspect for missing or loose fasteners.

Near Ocean (Salt Air) Environments

Before operating the machine, inspect for any signs of corrosion. Apply grease where rust is found.

After operating the machine, thoroughly wash away the salt residue, apply grease where rust is found, and perform maintenance carefully on the electric components to prevent corrosion.

Dusty Environments

Clean the following components:

- Engine air filter: Clean the dust valve frequently. Immediately service the air filter and air filter housing if an air filter restriction warning is displayed. See “Check the Air Filters” on page 5-21.
- Radiator: Clean the radiator core frequently to prevent blockage.
- Fuel system: Drain water/sediment frequently from the fuel/water separator.
- Fresh-air and recirculation filters: Replace the filters frequently.

Cold Environments

In extremely cold environments, 32°F (0°C) or below, lubricate only with the oils as shown in “Recommended Lubricants, Fuel, and Engine Coolant” on page 5-7.

SANY recommends the use of fuels identified in “Recommended Lubricants, Fuel, and Engine Coolant” on page 5-7 for extremely cold environments.

Prior to starting the engine, make sure the battery is fully charged and the battery case and the cables have not cracked.

Other Weather Environments

NOTE: *If there is evidence of overheating of bearings or bushings, loose parts, or rust during regular inspection, increase the frequency of lubrication.*

Based on experience and suggestions by lubricating oil suppliers, the lubricating intervals listed in the “Maintenance Schedule” on page 5-9 apply only to normal operating conditions. In harsh environments, including those with dusty and corrosive air, abnormal external temperature, extremely heavy loads, frequent operating times, longtime duty cycle, etc., lubricating intervals should be shortened.

Maintenance Log

Check the Maintenance Log if all tasks have been completed before and after servicing or operating the machine. The maintenance log lists regularly scheduled maintenance that should be performed by the operator or service personnel. All maintenance performed on the machine must be recorded in the Maintenance Log.

Daily Inspection and Maintenance

Do the following before operation with the engine off:

- Perform daily service as necessary.
- Inspect the machine for loose or missing components.
- Clean the operator station.
- Check all controls for smooth operation and make sure they return to the neutral position.
- Make sure all safety decals are in place and are legible.
- Make sure safety equipment is in place and in operating condition.
- Check for fluid leaks.

Check the following after operation with the engine off and cool:

- Check service points for wear or damage.
- Clean the operator station.
- Check for fluid leaks.
- Check for loose or missing fasteners and components.

Check the following during operation with the engine running:

- Monitor the control panel for normal machine operating parameters.
- Make sure that the machine operates normally.
- Check for fluid leaks.

Recommended Lubricants, Fuel, and Engine Coolant

NOTICE!

Never mix lubricants of different types or viscosities (weights), and never overfill the system that is being serviced. Failure to follow these standards can damage the machine or cause improper machine operation.

Always use SANY-approved lubricants, engine coolants, and filters. SANY is not responsible for damage caused by using unauthorized lubricants and engine coolants.

Hydraulic Oil Description

Hydraulic oil is an important part of the hydraulic system. Hydraulic oil lubricates hydraulic system components, carries heat away from components, and contains anti-corrosion additives and detergents.

Hydraulic system malfunctions are often caused by poor machine maintenance practices. Following the guidelines below will result in proper hydraulic system maintenance:

- Do not use any additives with the hydraulic oil.
- Replace hydraulic oil that has been subjected to overheating or damaged components.
- Change the hydraulic filter as recommended.
- Keep the tank filled to the full level of hydraulic oil.
- Keep the oil cooler free of dust and debris.
- Cap and plug all openings after removing components for service or repair.

Lubrication and Grease

Always use clean extreme pressure (EP) grease when greasing the machine. Avoid using low-viscosity greases. SANY recommends EP 2 or equivalent grease designed for:

- Heavy-duty bearings and general industrial lubrication.
- Heavy-duty plain and rolling element bearings operating under severe conditions, including shock loading in wet environments.

Windshield Washer Fluid

Only use clean automotive windshield washer fluid. Do not mix concentrates into the washer fluid. In cold weather areas, use washer fluid with a low-temperature rating.

Fuel

- **Fuel or fuel vapors that come into contact with hot surfaces or electrical components can cause a fire.**
- **Never service the fuel system near an open flame or while smoking.**
- **Clean up spilled fuel immediately.**

Failure to follow these warnings could result in death or serious injury.

NOTICE!

Never dilute fuels. Damage to the injection system can result, causing the machine to operate improperly.

Observe the following when adding fuel:

- Use #2 diesel fuel. In cold weather climates, use a mixture of #2 diesel and #1 diesel fuels.
- Use only ultra-low sulfur fuel, with a limit of S<15 mg/kg for all normal operations.
- SANY does not recommend the use of any diesel fuel with a cetane level less than 40.
- Do not use gasoline, kerosene, or any unapproved fuels in the fuel system.
- If fuel waxing or bacterial growth occurs in the fuel system, contact a SANY dealer.
- Make sure there is no water or foreign material in the fuel. Take appropriate precautions to prevent fuel contamination during refueling.

Engine Coolant

Engine coolant is an important fluid protecting against both engine coolant boiling and freezing. Anti-freezing engine coolant is also necessary in regions where freezing protection is unnecessary.

- If using concentrated engine coolant, use distilled water to dilute per instructions on engine coolant container. Natural water, such as river water and well water (hard water) contain large amounts of minerals (calcium, magnesium, etc.) which can form scale in the engine and radiator. Mineral scale is not easily removed and can cause overheating.
- Precautions in this manual must be followed when working with engine coolants.
- Some engine coolants are flammable. Keep them away from open fire.
- If the engine is overheating, wait for the engine to cool down before refilling engine coolant.

Engine Oil Viscosity/Temperature Data

Component or System	Oil Type	Ambient Temperature								
		-22°F (-30°C)	-4°F (-20°C)	14°F (-10°C)	32°F (0°C)	50°F (10°C)	68°F (20°C)	86°F (30°C)	104°F (40°C)	122°F (50°C)
Engine	Engine oil					SAE 30				
				SAE 10W						
				SAE 10W-30						
					SAE 15W-40					
Swing machinery case	Gear oil				SAE 30					
Idler					SAE 30					
Final drive					SAE 30					
Hydraulic system	Hydraulic oil				SAE 10W					
					SAE 10W-30					
					SAE 15W-40					
				ISO VG32						
						ISO VG46				
							ISO VG68			
Fuel tank	Diesel fuel					ASTM D 975 No.2				
					GB252 Super-20 diesel fuel					
				GB252 Super-35 diesel fuel						
Grease fitting	Grease					NLGI No.2				
Cooling system	Engine coolant	See the engine manual or contact a SANY dealer for the recommended engine coolant.								

Fluid Capacities

Model	Capacities				
	Fuel Tank	Hydraulic Oil Tank	Engine Oil	Cooling System	Final Drive
SY80U	39.6 gal. (150 L)	31.7 gal. (120 L)	2.6 gal. (10 L)	2.9 gal. (10.8 L)	0.3 gal. (1.1 L) each

- When operating the machine in temperatures below 32°F (0°C), use SAE 10W, SAE 10W-30, or SAE 15W-40 engine oil.
- Sulfur oxide is a byproduct of diesel fuel combustion. When sulfur oxide is combined with water, sulphuric acid is created. Always use ultra-low sulfur diesel (ULSD) that contains less than 0.2% sulfur to prevent potential engine damage from sulfur oxide.
- If low-quality fuels are used, the oil change interval must be decreased due to shortened engine oil life.

Maintenance Schedule

NOTICE!

Failure to perform the following procedures when and as directed could result in machine damage and improper machine operation.

NOTE: *The lubricating intervals listed in the following tables apply only to normal operating conditions. In harsh environments, including those with dusty or corrosive air, extreme temperatures, heavy loads, frequent operating times, and long duty cycles, lubricating intervals should be shortened.*

Daily Maintenance and Inspection

- Inspect the machine for loose or missing components.
- Clean the cab.
- Check the seat belt and buckle for damage or wear. Replace as necessary.
- Make sure all safety decals are in place and are legible.
- Make sure safety equipment is in place and in operating condition.
- Check all controls for smooth operation and make sure they return to the neutral position.
- Check for fluid leaks.
- Check for the Operation and Maintenance Manual. (See page 1-2.)
- Lubricate the work equipment. (See page 5-42.)
- Check the air filters. (See page 5-21.)
- Check the escape tool. (See page 3-30.)
- Check the fire extinguisher. (See page 3-30.)
- Check the engine oil level. (See page 4-7.)
- Check the engine coolant level. (See page 4-6.)
- Check the hydraulic oil level. (See page 5-32.)
- Drain water from the primary fuel filter/water separator. (See page 4-8.)
- Check that the engine fan belt tension. (See page 5-20.)
- Check the air conditioner compressor belt. (See page 5-26.)

When Required

- Check the cooling package. (See page 5-24.)
- Check the track tension. (See page 5-38.)
- Check the windshield washer fluid. (See page 4-9.)
- Replace the bucket teeth. (See page 5-48.)
- Replace the bucket. (See page 5-49.)
- Check the air filters if a restriction warning is displayed. (See page 5-21.)

After the First 50 Hours

- Initial change of the engine oil and filter. (See page 5-19.)
- Check and adjust the track tension. (See page 5-38.)

Weekly or Every 50 Hours

- Lubricate the bucket linkage pins. (See page 5-46.)
- Check the battery. (See page 5-29.)
- Drain water and sediment from the fuel tank. (See page 5-27.)
- Check the hydraulic hoses, lines, and connectors. (See page 5-37.)
- Check the final drive oil level. (See page 5-39.)
- Check the final drive motor mounting fasteners. (See page 5-40.)
- Check the exhaust system. (See page 5-22.)

Every 100 Hours

Make sure all daily and 50-hour maintenance tasks have been completed before proceeding with the 100-hour maintenance tasks.

- Lubricate the machine. (See page 5-11.)

Every 250 Hours

NOTE: *Make sure all daily, 50-hour, and 100-hour maintenance tasks have been completed before proceeding with the 250-hour maintenance tasks.*

- Check the doors and hood. (See “Doors, Filler Cap, and Hood” on page 5-13.)
- Check the track tension. (See page 5-38.)
- Inspect and adjust the air conditioner compressor belt tension. (See page 5-26.)
- Change the engine oil and filter. (See page 5-19.)

Every 3 Months or 500 Hours

NOTE: *Make sure all daily, 50-hour, 100-hour, and 250-hour maintenance tasks have been completed before proceeding with the 500-hour maintenance tasks.*

- Lubricate the swing gear. (See page 5-44.)
- Lubricate the swing pinion gear. (See page 5-44.)
- Lubricate the swing bearing. (See page 5-43.)
- Inspect and clean the radiator, hydraulic oil cooler, and condenser fins. (See page 5-24.)
- Replace the secondary fuel filter. (See page 5-28.)
- Replace the primary fuel filter/water separator filter element. (See page 5-29.)
- Replace the primary and secondary air filters. (See page 5-21.)
- Replace the cab ventilation filter. (See page 5-27.)
- Change the final drive oil. (See page 5-40.)
- Collect an engine oil sample. (See page 5-20.)
- Collect a hydraulic oil sample. (See page 5-36.)
- Collect final drive oil samples (both). (See page 5-39.)
- Inspect the engine coolant pump. (See page 5-25.)

Every 6 Months or 1000 Hours

NOTE: *Make sure all daily, 50-hour, 100-hour, 250-hour, and 500-hour maintenance tasks have been completed before proceeding with the 1000-hour maintenance tasks.*

- Pressure wash and clean the entire machine. Do a complete machine structural inspection.
- Check the fuel tank strainer. (See page 5-27.)
- Check the fuel lines for leaks or damage. Replace as necessary.
- Check the accumulator function. (See page 5-31.)
- Check the fan belt tension. (See page 5-20.)
- Clean the hydraulic oil suction strainer. (See page 5-36.)
- Replace the hydraulic oil return filter. (See page 5-34.)
- Replace the hydraulic oil pilot filter. (See page 5-34.)

Every 1500 Hours

Inspect the engine crankcase breather system. (See page 5-23.)

Annually or Every 2000 Hours

NOTE: *Make sure all daily, 50-hour, 100-hour, 250-hour, and 1000-hour maintenance tasks have been completed before proceeding with the 2000-hour maintenance tasks.*

- Inspect the condition of the seat belt, buckle, and latch plate. If there is wear or damage replace immediately.
- Check the alternator. (See page 5-22.)
- Check the starter. (See page 5-22.)
- Check the engine valve clearance. (Contact a SANY dealer for more information.)
- Clean the hydraulic oil suction strainer. (See page 5-36.)
- Change the hydraulic oil. (See page 5-37.)
- Change the engine coolant. (See page 5-23.)
- Change the final drive oil. (See page 5-40.)

Annually or Every 4000 Hours

Check the air conditioning compressor function and check for leaks. (See page 5-26 for heating and air conditioning system service intervals.)

Hydraulic Breaker Maintenance Interval

Hydraulic oil breaks down faster on machines equipped with a hydraulic breaker than on machines equipped with a bucket.

Change the hydraulic oil and filters every 400 hours on breaker-equipped machines.

NOTICE!

The hydraulic oil filter must be replaced after 250 hours with a breaker operating rate above 50%.

See “Change the Hydraulic Oil” on page 5-37.

After Maintenance Is Completed

Record the completion of all of the maintenance tasks in the Maintenance Log. If authorized, remove all lockout/tagout warnings and machine-securing elements and fully activate the machine. Return the machine to operation.

Lubrication and Maintenance Charts

Lubricants minimize wear between moving parts. Insufficient lubrication will lead to excessive wear and damage to components. Engine oil is critical for engine operation. Never use lubricants that are not SANY-approved.

Clean grease fittings before applying grease. Use a grease gun to pump grease into the fitting until old grease begins to escape. Clean off any grease that has escaped.

Shown below are the lubrication points that must be maintained according to the lubrication chart. See “Lubrication Points” on page 5-42.

0008600

Figure 5-1

Lubrication Chart								
Item	Maintenance Items	Qty. of Fittings	Lubrication Interval					Lubricant
			50 hr.	100 hr.	250 hr.	500 hr.	1000 hr.	
1	Arm cylinder pins	2		○				Grease
2	Boom to arm connecting pin	1		○				
3	Boom pin	1		○				
4	Swing gear	1		○		○		
5	Final drive	1		○		○		Gear Oil
6	Swing drive	2					○	Grease
7	Boom swing pin	2		○				
8	Dozer blade pins	2		○				
9	Dozer blade cylinder pins	2		○				
10	Swing cylinder	2		○				
11	Boom cylinder pins	2		○				
12	Bucket linkage pins	3	○					
13	Bucket cylinder pins	2		○				

Replacement Item Service Intervals								
Replacement Item	When Required	8 hr.	50 hr.	100 hr.	250 hr.	500 hr.	1000 hr.	2000 hr.
Engine oil and filter		○	▲		△			
Engine coolant		○						△
Fuel filter/water separator element		□				△		
Fuel filter						△		
Primary air filter	△					△		
Secondary air filter	△					△		
Hydraulic tank breather filter						△		
Hydraulic suction strainer	△						□	
Hydraulic return filter							△	
Hydraulic pilot filter							△	
Hydraulic oil								△
Final drive oil					▲	△		

This chart indicates the service intervals for replacement items. The following symbols indicate the type of service:

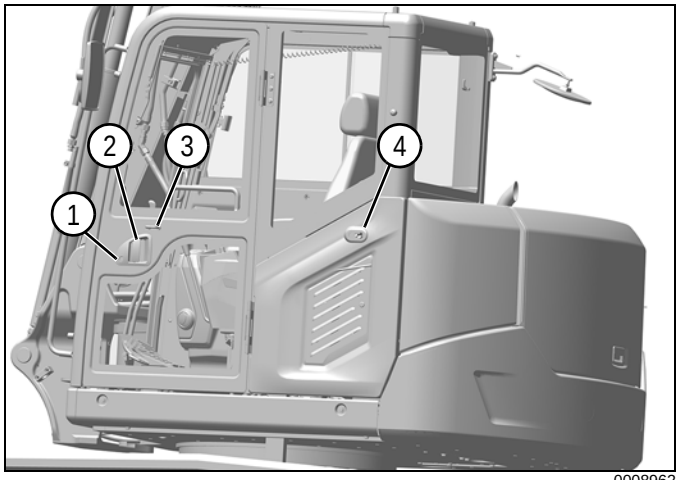
- ○ Maintenance/lubrication.
- △ Replace.
- ▲ Initial replacement on a new machine.
- □ Clean or drain as applicable.

Doors, Filler Cap, and Hood

The following can be locked using the machine key to prevent unauthorized access:

- Cab door
- Engine hood
- Left and right rear access doors
- Right front access door

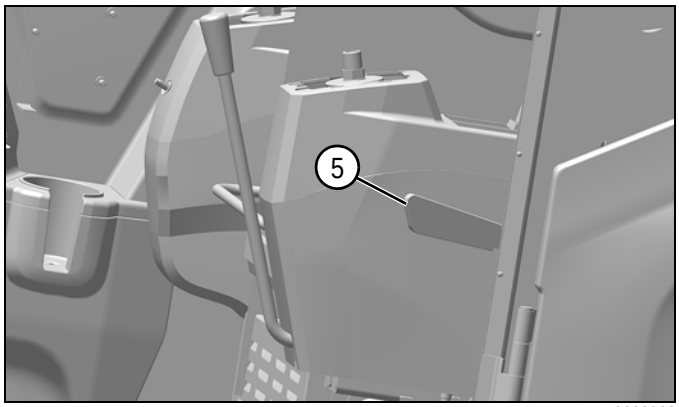
Cab Door



0008962

Figure 5-2

1. Unlock cab door with key (1).
2. Pull door handle (2) outwardly and swing door open.
3. Secure the cab door after opening using the cab door latch (3) to engage the cab door catch (4).



0008960

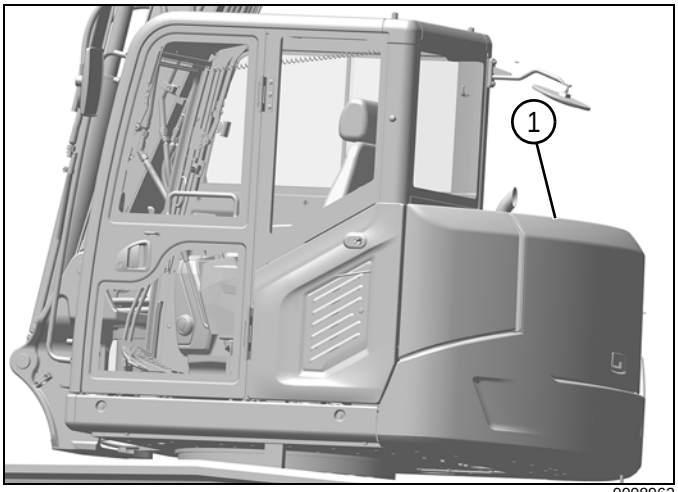
Figure 5-3

4. To release the cab door catch, push down on the release lever (5) on the left side of the operator seat.
5. Close door and lock with the key.

Engine Hood

Opening the Engine Hood

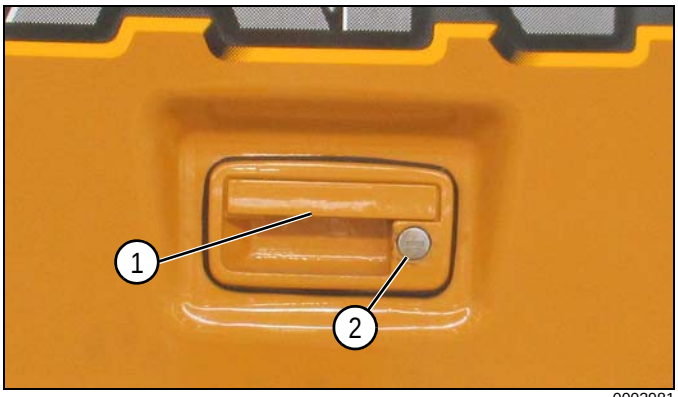
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0008962

Figure 5-4

2. Engine hood (1) is located at the rear of the machine.



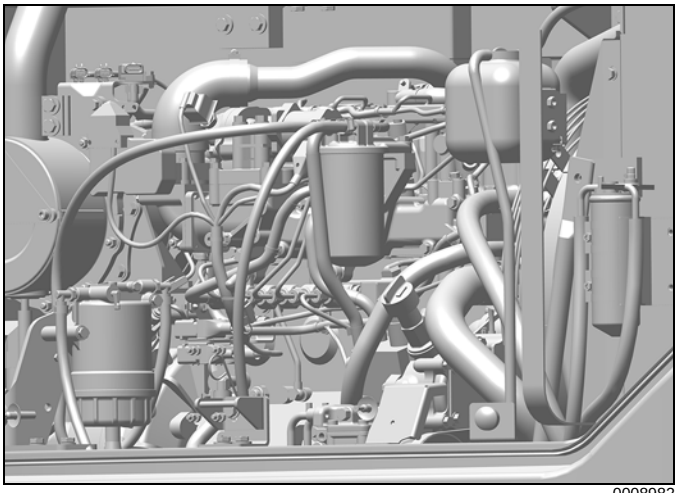
0003981

Figure 5-5

3. Insert the key into the key slot (2).

NOTE: *Insert the key all the way into the lock. The key may break if turned before it is fully inserted.*

4. Turn the key counterclockwise to unlock. Pull on the latch (1) to open the engine hood.

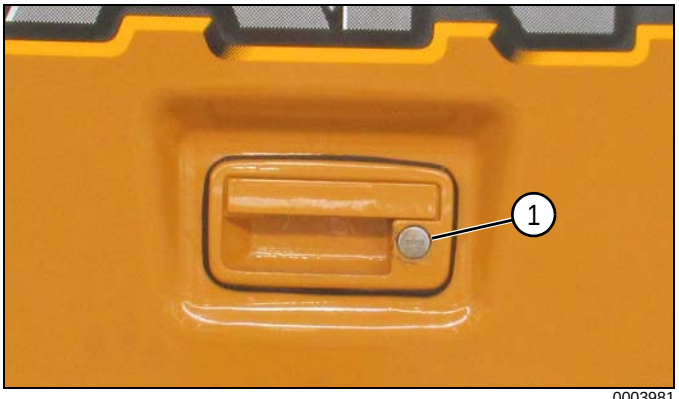


0008982

Figure 5-6

5. Position the engine hood in the fully open position. Two pneumatic cylinders hold the engine hood open. Opening the engine hood provides access to the:
   - Engine oil filter and dipstick
   - Engine oil filler cap
   - Engine coolant overflow tank
   - Secondary fuel filter
   - Engine coolant pump and fan
   - Other engine components
   - Primary fuel filter/water separator
   - Secondary fuel filter
   - Air conditioning receiver drier
   - Exhaust aftertreatment components

Closing the Engine Hood

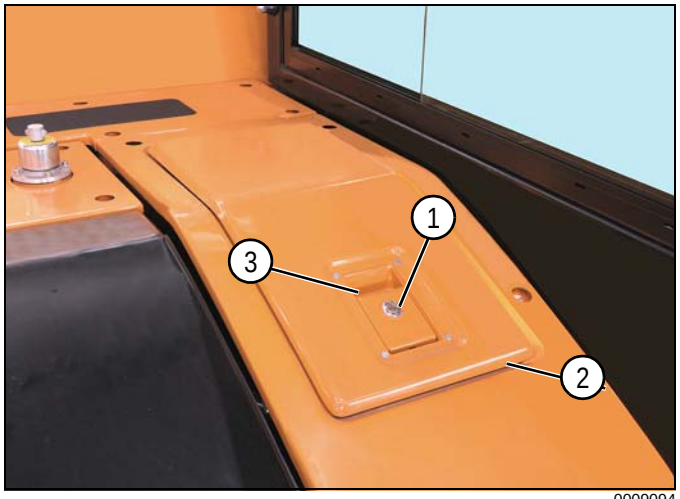


0003981

Figure 5-7

1. Close the engine hood until it latches.
2. Insert the key into the key slot (1) and turn the key clockwise to lock.
3. Remove the key after locking.

Left Front Access Door



0009094

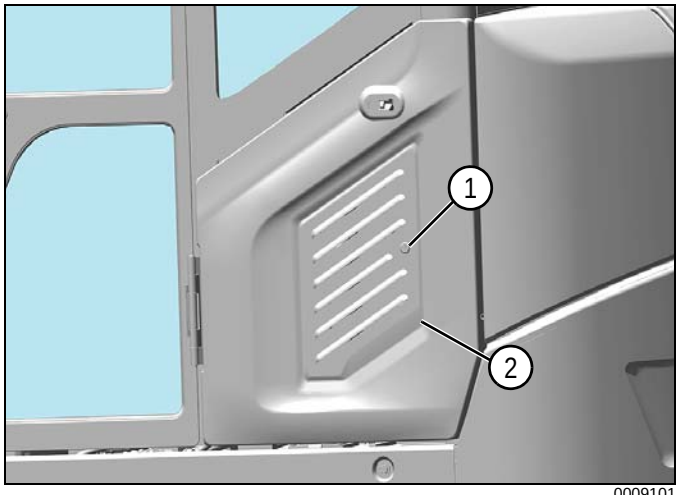
Figure 5-8

1. Insert the key into the key slot (1) of the left front access door (2).

NOTE: *Insert the key all the way into the lock. The key may break if turned before it is fully inserted.*

2. Turn the key counterclockwise to unlock. Pull on the latch (3) to open the left front access door.
3. The right rear access door provides access to the:
   - Swing motor
   - Accumulator
4. Close the left front access door and lock, using the key lock.

Fresh-Air Access Door



0009101

Figure 5-9

1. Insert the key into the key slot (1) of the fresh-air access door (2).

NOTE: *Insert the key all the way into the lock. The key may break if turned before it is fully inserted.*

2. Turn the key counterclockwise to unlock.

The fresh-air access door provides access to the:

- Fresh-air filter
- Fuse panel

Right Rear Access Door

1. Unlock and lift the latch (1) on the engine hood.
2. Open right rear access door.

0008970

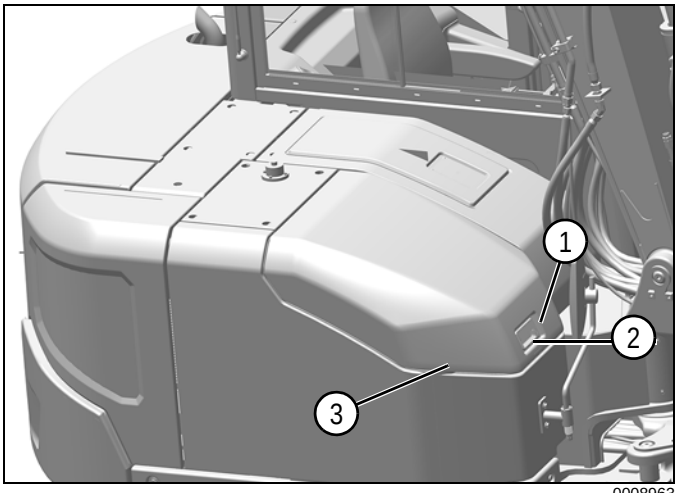
Figure 5-10

The right rear access door provides access to the:

- Engine air cleaner
- Engine coolant reservoir
- Battery and battery disconnect switch
- Engine cooling package
- Air conditioning receiver/dryer
- Hydraulic oil level sight glass

3. Close the right rear access door and secure using the key lock.

Right Front Access Door



0008963

Figure 5-11

1. Use the key to unlock (1) and pull upward on the latch (2) to open the right front access door (3). The right front access door provides access to the following:

- Fuel tank
- Pilot line filter
- Main hydraulic pump

2. Close the access panel and secure using the key lock.

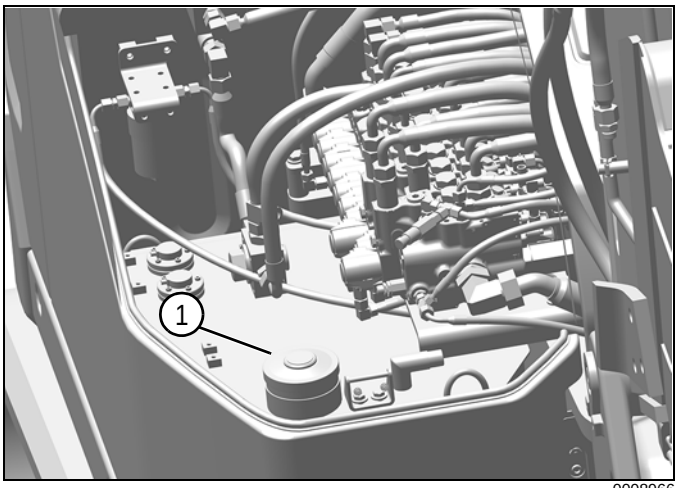
Fuel Tank Filler Cap

NOTICE!

To prevent damage to the filler cap:

- **Make sure the gasket in the filler cap is clean. If the gasket is contaminated by dirt or debris the gasket will be damaged, causing the filler cap to seal improperly.**

1. Open right front access door. See “Right Front Access Door” on page 5-15.



0008966

Figure 5-12

2. Loosen fuel tank filler cap (1) by tuning in a counterclockwise rotation.
3. Install fuel filler cap by turning in a clockwise rotation.

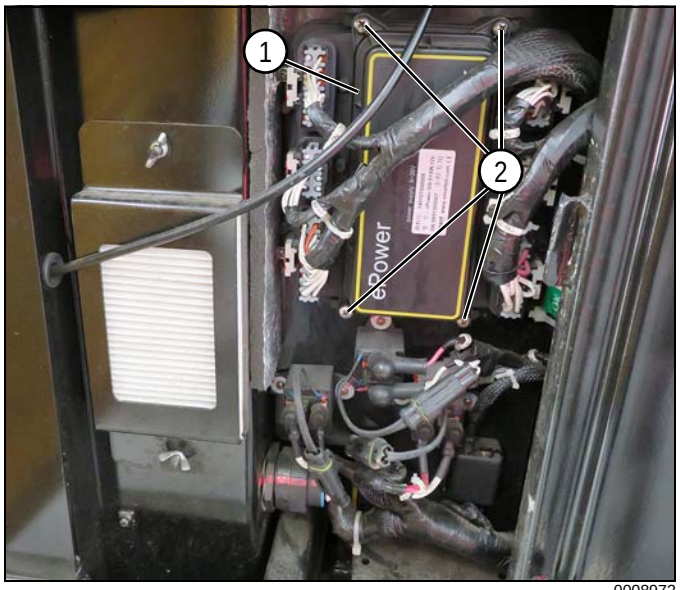
Fuses

Access the Fuse Panel

If an electrical component fails, check the fuse first.

NOTE: *Always turn the battery disconnect switch to OFF before checking or replacing fuses. See “Battery Disconnect Switch” on page 3-19.*

1. Open fresh-air access door on machine. See “Fresh-Air Access Door” on page 5-14.



0008972

Figure 5-13

2. Remove the four fasteners (2) from the fuse cover (1) to access the fuses.
3. Use the fuse removal and installation tool to pull a blown fuse and install a new fuse.
4. Spare fuses can be used for replacing a blown fuse. Always replace a fuse with a fuse of the same amperage rating.

Fuse Circuits

0009125

Figure 5-14

Fuse	Amperage	Circuit
F1	10A	Charging indicator
F2	10A	Epad power
F3	10A	Silicon oil fan
F4	15A	Work light
F5	20A	Reserve
F6	15A	Cigarette lighter
F7	20A	A/C
F8	5A	High/Low speed switch, Horn, Emergency stop switch
F9	15A	Radio, Horn

Fuse	Amperage	Circuit
F10	15A	Display
F11	25A	A/C fan
F12		Not used
F13	20A	ECU
F14	10A	Actuation circuit
F15	20A	EGR power
F16	10A	Radio
F17	10A	GPS

Relay Circuits

Contact a SANY dealer for troubleshooting electrical problems with the machine.

Relay	Amperage	Circuit
K3	12V/35A	Starting
K5		Horn
K6		Work lights
K7		Cold weather starting
K8		Monitor power down
K9		Spare
K12		HVAC system fan
K13		AC compressor

Maintenance Procedures

Engine

WARNING

Maintenance and service must be performed with the engine off unless otherwise indicated:

- **Shut off the engine before opening the engine hood.**
- **Remove the key and turn the battery disconnect switch to OFF.**

Failure to follow these warnings could result in death or serious injury.

CAUTION

- **Do not perform engine maintenance when the engine is hot. Hot engine oil or engine components may cause severe burns.**
- **Allow the engine to cool before performing engine maintenance.**

Failure to follow this caution could result in injury.

Engine Inspection

Always shut down the engine and turn the battery disconnect switch to OFF (unless otherwise specified) before inspecting the engine or performing maintenance or service procedures.

Regular inspection of the engine and engine compartment helps identify potential problems and prevent defects that may lead to service interruption and costly repair.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Shut the engine off and open the engine hood and left and right access doors.
3. Inspect the engine and engine compartment for:
   - Oil, fuel, and coolant leaks.
   - Loose fasteners and connections.
   - Worn or loose belts.
   - Damaged hoses and wiring harnesses.

Prestart Inspection

For more information, see “Daily Inspection and Maintenance” on page 5-6.

Prestart Check	Reference
Check the engine coolant level and add as necessary.	See “Check Engine Coolant Level” on page 4-6.
Check the engine oil level.	See “Check Engine Oil Level” on page 4-7.
Check the fuel level and add as necessary.	See “Check the Hydraulic Oil Level” on page 4-9.
Drain water from the primary fuel filter/water separator.	See “Check and Drain the Primary Fuel Filter/Water Separator” on page 4-8.
Check the hydraulic oil level and add as necessary.	See “Check the Hydraulic Oil Level” on page 4-9.
Check the electrical wires and connectors for damage.	See “Electrical Components Check” on page 4-10.
Check the horn operation.	See “Horn Function Check” on page 4-10.

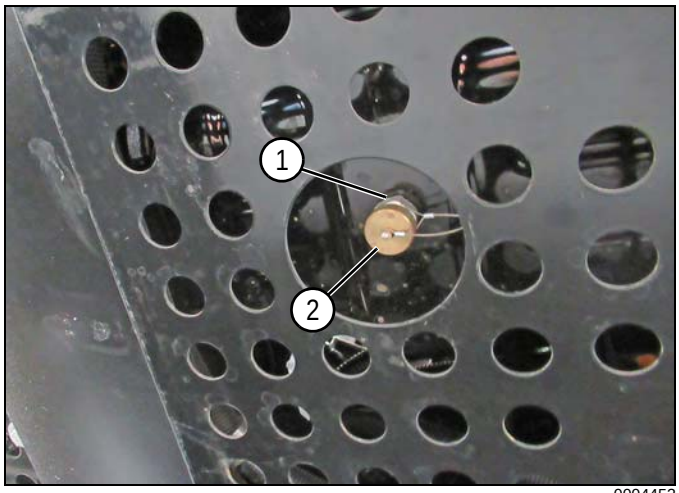
Change the Engine Oil and Filter

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.

NOTICE!

Dispose of used engine oil in accordance with all applicable environmental regulations. Failure to do so could damage the environment.

NOTE: *For engine oil capacity, see “Fluid Capacities” on page 5-8.*

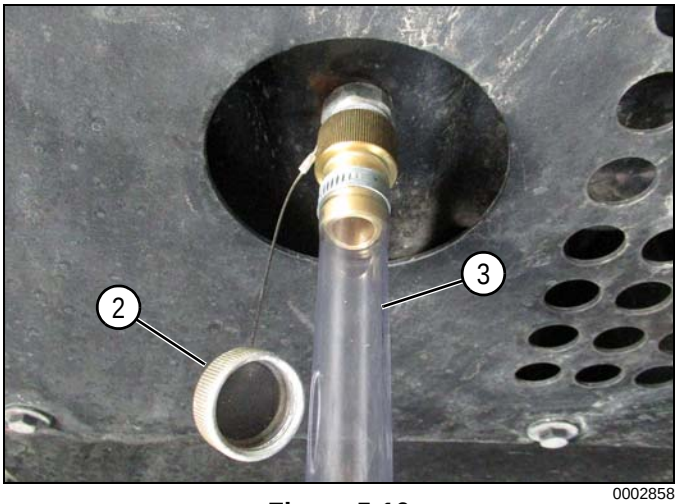


0004453

Figure 5-15

2. Place a suitable container under the drain valve (1). Remove the dust cap (2).

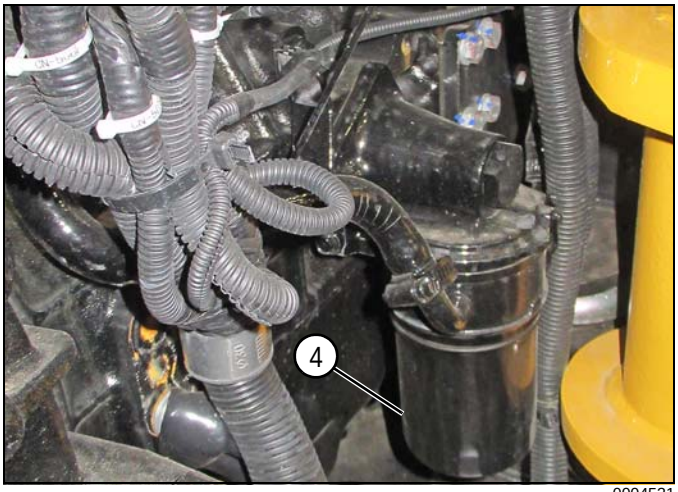
NOTE: *The oil drain tube requires a special connector to open the spring-loaded drain valve on the engine oil pan. Contact a SANY dealer for more information.*



0002858

Figure 5-16

3. Thread the drain tube (3) onto the drain plug until the valve opens. Allow the oil to drain.
4. Remove the engine oil drain tube.
5. Install the dust cap and tighten it securely.



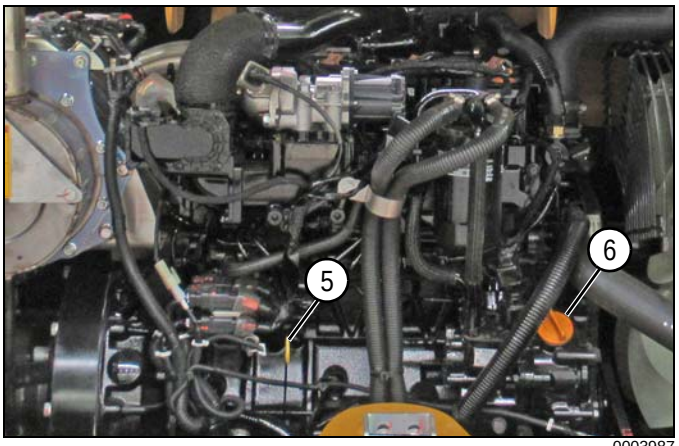
0004531

Figure 5-17

6. Open the engine hood and place a suitable container under the engine oil filter (4). Remove the engine oil filter.
7. Clean the engine oil filter housing mating surface as necessary to remove O-ring residue, and inspect the threads.
8. Apply a thin layer of engine oil to the new oil filter O-ring gasket.
9. Install the new oil filter by hand until the oil filter O-ring touches the oil filter housing.

   Tighten the oil filter 3/4 to 1 full turn by hand to securely install the oil filter.

NOTE: *Overtightening the filter may damage the O-ring, resulting in an oil leak.*



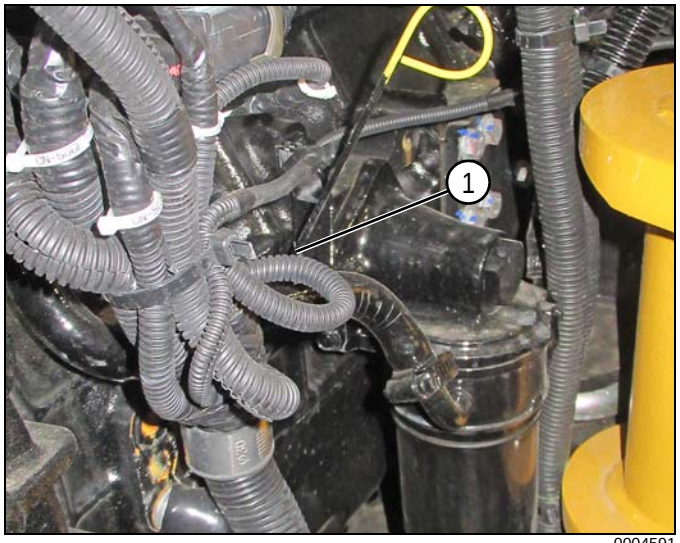
0003987

Figure 5-18

10. Remove the engine oil filler cap (6) and add engine oil until the level is at the upper mark on the dipstick (5). See “Check Engine Oil Level” on page 4-7.
11. Install the engine oil filler cap.
12. Start and run the engine at low idle for 5 minutes.
13. Stop the engine and check the engine oil level. Add oil as necessary.

Collect an Engine Oil Sample

1. Obtain an Oil Analysis Sample Kit from a SANY dealer.
2. Operate the machine until the engine oil is up to normal operating temperature.
3. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0004591

Figure 5-19

NOTICE!

It is critical that all material used to collect the sample is absolutely clean. Failure to adhere to this warning can cause equipment damage and contaminate the sample.

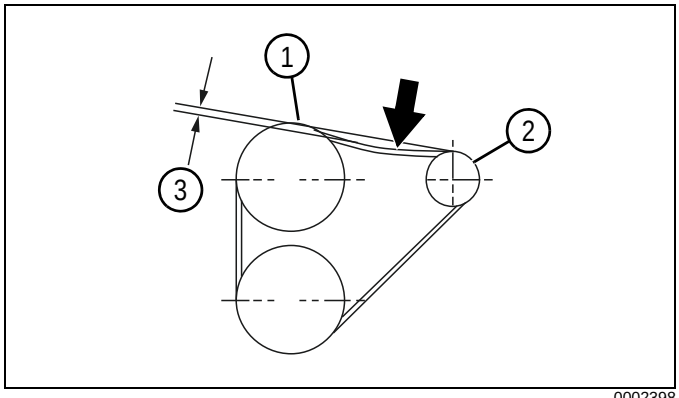
4. Clean the area around the engine oil dipstick and remove the dipstick (1).
5. Insert the oil sample tube into the dipstick tube and collect a sample of engine oil. Replace the dipstick.
6. Send the sample for testing in accordance with the instructions packaged with the sample kit.

Check and Adjust the Fan Belt Tension

NOTICE!

- **A loose fan belt may cause improper battery charging, engine overheating, or accelerated fan belt wear.**
- **An overtightened fan belt may cause damage to the belt, the bearings in the alternator, and the engine coolant pump.**

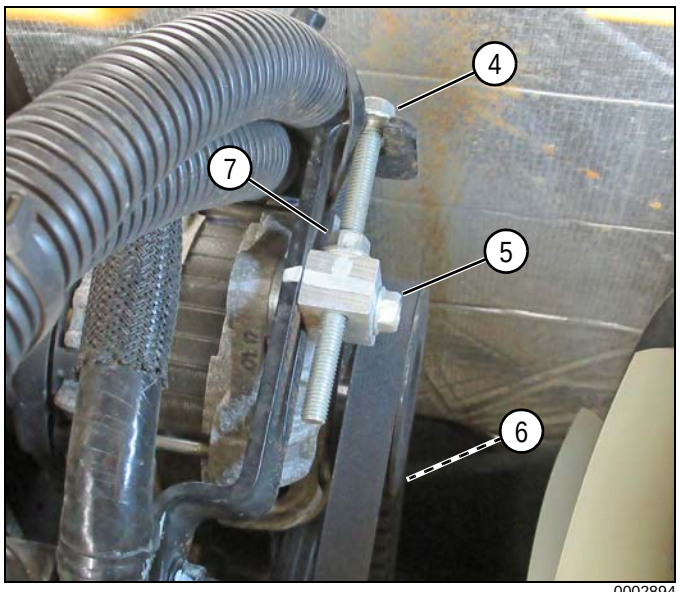
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0002398

Figure 5-20

2. Use a tensioning gauge to check the tension of the fan belt by pressing down on the fan belt between the fan pulley (1) and the alternator pulley (2) with a force of 22 lb-ft. (98 N•m). The fan belt must deflect (3) 0.28 in.–0.39 in. (7 mm–10 mm).



0002894

Figure 5-21

3. Adjust the belt if it is outside of specification. Loosen the adjusting plate fastener (5), alternator bracket fastener (6), and tension adjuster locknut (7).
4. Turn the tension adjuster (4) to achieve the specified belt tension.
5. Tighten the adjusting plate fastener, alternator bracket fastener, and tension adjuster locknut.
6. Check the fan belt tension to confirm adjustment.

Replace the Fan Belt

Visually inspect the condition of the fan belt. Belts that have been exposed to oil or engine coolant, or show signs of damage or wear, must be replaced.

Contact a SANY dealer for replacement of engine belts.

Check the Air Filters

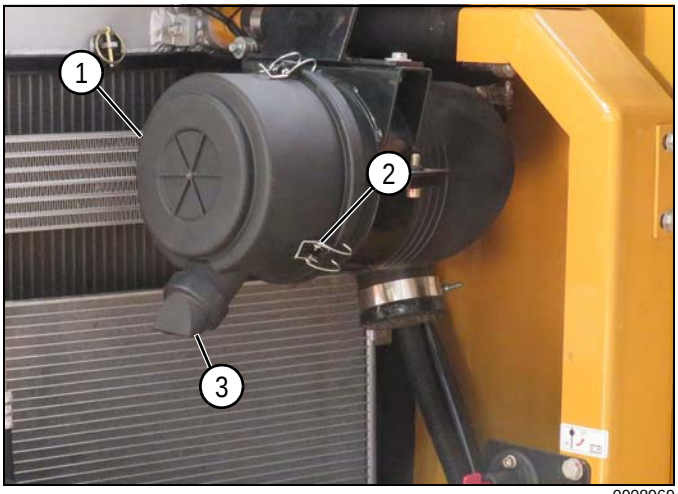
NOTICE!

Shut off the engine to prevent dirt from entering the engine and causing damage when checking or replacing the air filters.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open engine hood. See “Engine Hood” on page 5-13.
3. Open the right rear access door to access the air filter housing. See “Right Rear Access Door” on page 5-15.

Check

When dust buildup reaches a certain level, the air filter restriction warning will appear on the monitor screen.

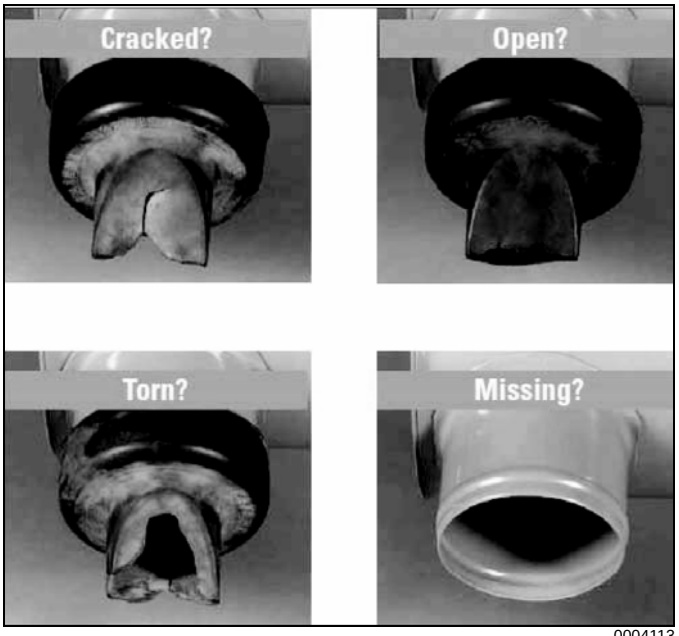


0008969

Figure 5-22

The dust valve (3) is at the bottom of the end cover (1).

NOTE: *If the dust valve is cracked, torn, remains open, or is missing, dust particles that are normally expelled can reenter the filter housing and deposit themselves on the filter, shortening the air filter service life.*



0004113

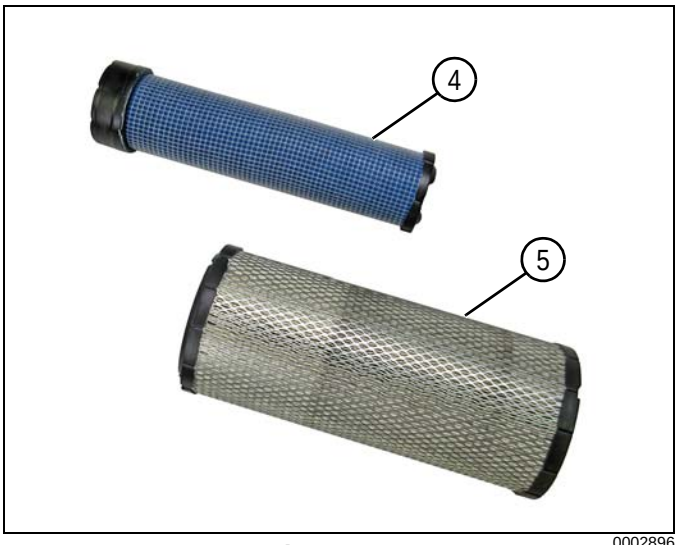
Figure 5-23

Check the condition of the dust valve and replace it if required. When the engine is off, the dust valve should be closed. If it is not replace the dust valve.

Replace the Air Filters

- Replace the primary air filter and secondary air filter whenever the air filter restriction warning is displayed.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open engine hood. See “Engine Hood” on page 5-13.
3. Open the machine’s right rear access door and locate the air filter housing. See “Right Rear Access Door” on page 5-15.
4. Release the three latches (2) and remove the end cover (1).



0002896

Figure 5-24

NOTE: *Clean the interior of the housing before removing the primary filter element.*

5. Remove the primary filter element (5) and then the secondary filter element (4).
6. Installation is in the reverse order of removal.

Check the Alternator

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Start the machine.
3. Check the alternator for abnormal noise and operation. If the alternator is malfunctioning, the brushes or bearings may have reached the end of their service life and may need to be replaced. Contact a SANY dealer for additional information.

Check the Starter

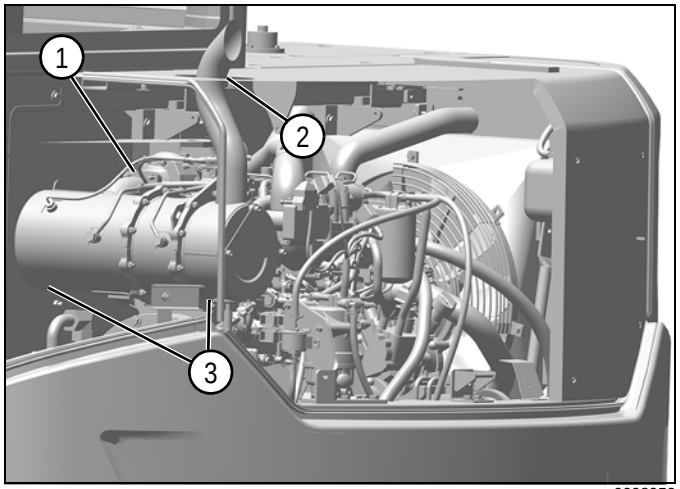
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. With the aid of an assistant, start the engine.
3. Check the starter motor for abnormal noise and operation. If the starter is malfunctioning, contact a SANY dealer for additional information.

Check the Exhaust System

WARNING

Never operate a machine with a damaged or defective exhaust system, exhaust leaks, or restrictions. Failure to follow this warning could result in death or serious injury.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open the engine hood. See “Engine Hood” on page 5-13.



0008959

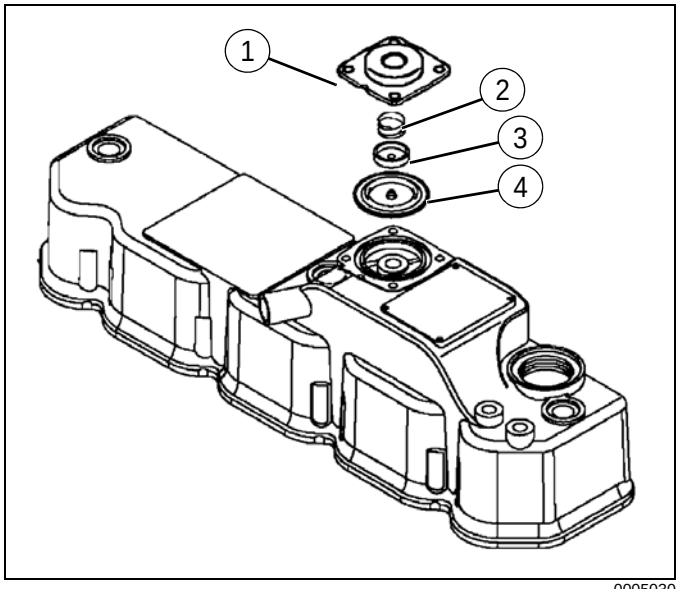
Figure 5-25

3. Inspect the exhaust aftertreatment components (3) for leaks or signs of damage.
4. Check the aftertreatment inlet pipe (1) for leaks or signs of damage.
5. Make sure the exhaust pipe (2) is clear and not restricted.

NOTE: *If any abnormality is found, contact a SANY dealer for repairs.*

Inspect the Engine Crankcase Breather System

NOTE: *The crankcase breather system is required to be inspected every 1500 hours to maintain the emission requirements of the engine.*



0005030

Figure 5-26

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open the engine hood. See “Engine Hood” on page 5-13.
3. Remove the fasteners and diaphragm cover (1).
4. Remove the spring (2), diaphragm plate (3), and diaphragm (4).
5. Inspect the diaphragm for damage and the spring, for distortion. Replace components if necessary.
6. Install the diaphragm, diaphragm plate, spring and diaphragm cover. Tighten the fasteners.
7. Close the engine hood.

The crankcase breather system has a spring-backed diaphragm in the valve cover. When the crankcase pressure reaches a predetermined level, the diaphragm opens a passage that allows crankcase fumes to be routed to the intake manifold.

Engine Cooling System

Change the Engine Coolant

WARNING

- **Engine coolant is toxic. Avoid inhaling or ingesting engine coolant. If eyes or skin are contaminated by coolant, wash the affected area with plenty of water and seek medical treatment immediately.**
- **Do not remove the radiator cap while the engine is hot. Engine coolant may be under pressure when the engine is hot. Avoid contact with hot engine coolant. Allow the engine to cool before removing the radiator cap.**

Failure to follow these warnings could result in death or serious injury.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open and secure the engine hood. See “Engine Hood” on page 5-13.
3. Open the right rear access door. See “Right Rear Access Door” on page 5-15.

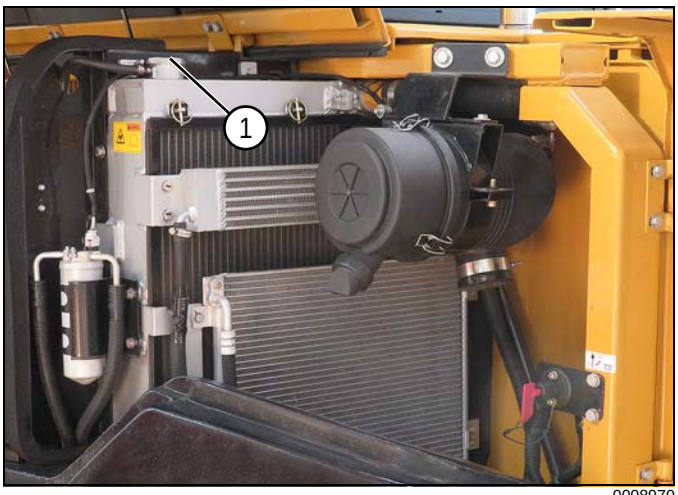


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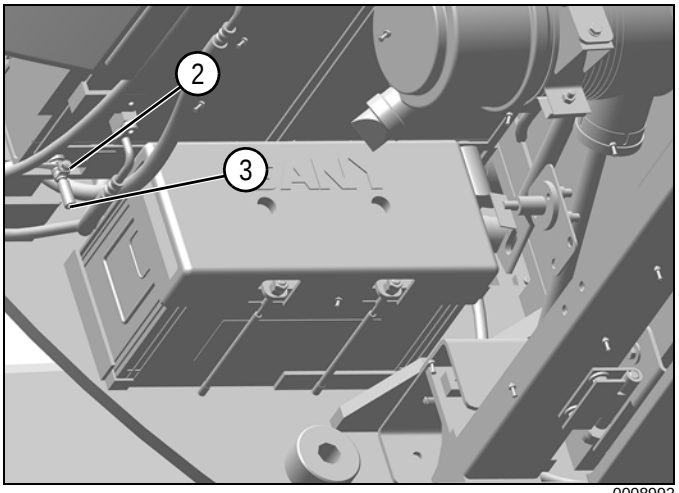
Figure 5-27

CAUTION

Do not remove the radiator cap while the engine is hot. Engine coolant is under pressure. Allow the engine to cool before removing the radiator cap. Failure to follow this warning could result in death or serious injury.

4. Slowly loosen and remove the radiator cap (1).



0008992

Figure 5-28

NOTE: *For engine cooling system capacities, see "Fluid Capacities" on page 5-8.*

5. Follow the drain hose (3) from the drain valve (2) to where it exits the bottom of the machine. Place an appropriately sized container under the drain hose. Open the drain valve and allow the engine coolant to drain.

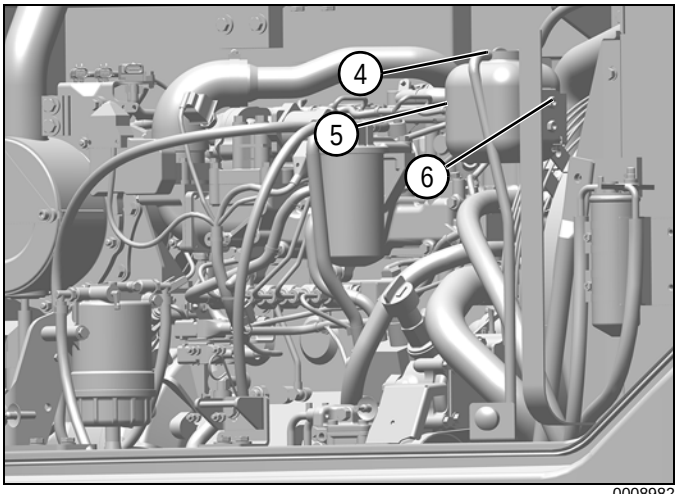


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Figure 5-29

NOTICE!

Dispose of the engine coolant in accordance with all applicable environmental regulations. Failure to do so could result in damage to the environment.

6. Remove overflow tank cap (4), the fasteners (6), and the overflow tank (5). Pour the contents into a container.
7. Install the overflow tank and tighten the fasteners.
8. Close the drain valve. Add new engine coolant until the level reaches the radiator filler opening. With the radiator cap removed, run the engine at low idle for 5 minutes, and then at high speed for 5 minutes, to bleed air from the cooling system.
9. Top off the radiator and fill the overflow tank until the engine coolant is between the FULL and LOW marks.
10. Install radiator cap and overflow tank cap.

Inspect and Clean the Cooling Package

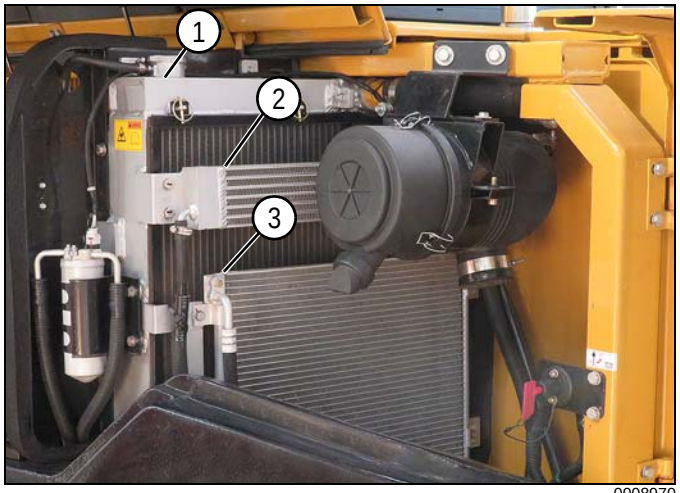
WARNING

- **Do not allow compressed air, pressurized water, or steam to come into contact with skin. Always wear goggles, gloves, and other personal protective equipment (PPE).**
- **Failure to follow these warnings could result in death or serious injury.**

NOTICE!

- **Compressed air, high-pressure water, or steam can damage the cooling fins if the nozzle is too close to the fins. To prevent cooling fin damage, keep the nozzle at a safe distance while cleaning.**
- **Damaged cooling fins may lead to leaks and overheating. In dusty environments, inspect the cooling fins daily regardless of the maintenance schedule.**

1. Prepare the machine for service. See "Maintenance Safety" on page 2-4.
2. Open the engine hood. See "Engine Hood" on page 5-13.
3. Open the right rear access door. See "Right Rear Access Door" on page 5-15.



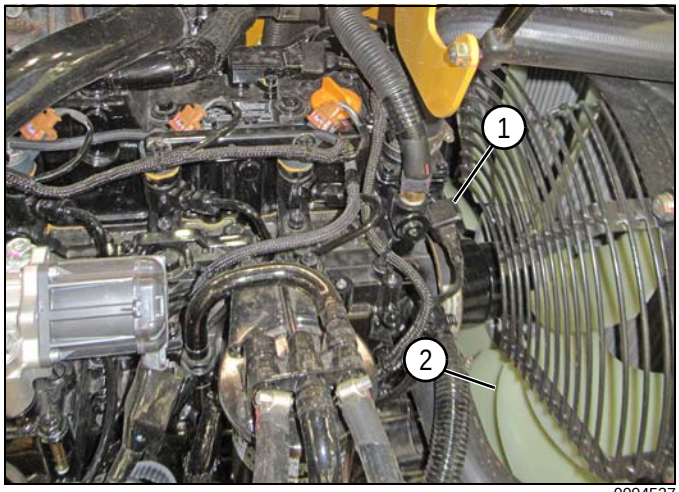
0008970

Figure 5-30

4. Check the front and rear of the radiator (1), hydraulic oil cooler (2), and the air conditioner condenser (3) for dirt or debris.
5. Use compressed air or pressurized water in the opposite direction of the airflow through the cooling package (engine side out through radiator) to clean the cooling package.
6. Check the fins for deformation, corrosion, and cracks after cleaning. Repair the component immediately if damaged cooling fins are found.

Inspect the Engine Coolant Pump

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open the engine hood. See “Engine Hood” on page 5-13.



0004537

Figure 5-31

3. The engine coolant pump (1) is behind and connected to the engine fan (2).
4. Check if the engine fan pulley has any play by pulling and pushing the fan pulley from side to side.
5. If the fan pulley has play, the bearings inside the engine coolant pump are worn and the engine coolant pump must be replaced.
6. Look for signs of leaking coolant at the hose connections and underneath the coolant pump.

NOTE: *Contact a SANY dealer for replacement of engine components.*

Heating and Air Conditioning System

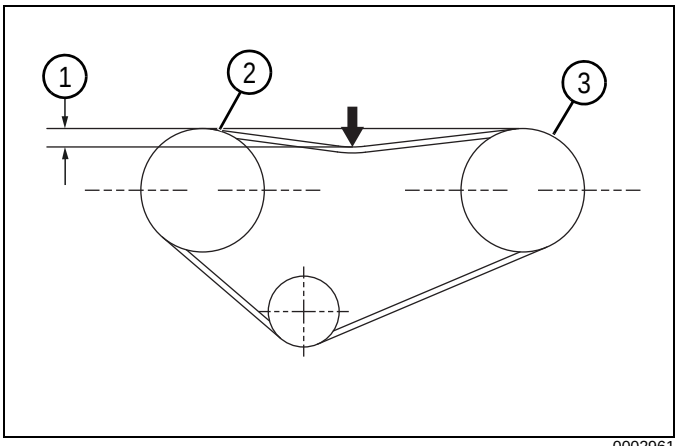
NOTE: *When the air conditioning will not be used for an extended period of time, it should be operated for 3 to 5 minutes each month to lubricate compressor components and air conditioning system seals.*

Item	Description	Service Interval
Refrigerant (R134a)	Check for leaks in lines, fittings, and components.	Daily
Condenser	Check if condenser fins are plugged.	When required
Compressor	Check the compressor function and for leaks.	Every 4000 service hours
V-belt	Check tension.	Every 250 service hours
	Check for damage, wear, and deterioration.	
Blower speed adjustment dial	Check fan motor and fan operation.	Daily
	Check speed adjustment function.	
Temperature adjustment dial	Check for normal operation.	Daily
Fasteners	Check for missing or loose fasteners.	Every 6 months

Check and Adjust the Air Conditioner Compressor Belt Tension

Check the Air Conditioner Compressor Belt Tension

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0002961

Figure 5-32

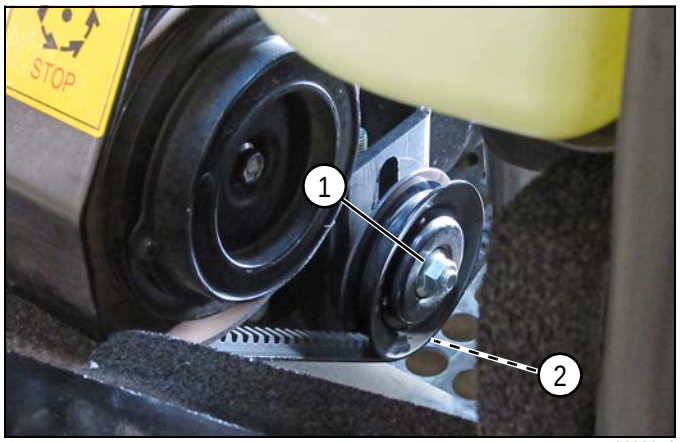
2. Using a tensioning gauge, press down on the belt halfway between the drive belt pulley (3) and the compressor belt pulley (2) with a force of 143 lb-ft (637 N) for a new belt and a force of 99 lb-ft (441 N•m) for a used belt. The belt must deflect (1) 0.20 in.–0.31 in. (5 mm–8 mm).

Adjust the Air Conditioner Compressor Belt Tension

NOTICE!

Check the pulleys and V-belt for damage and wear. Make sure that the V-belt does not rub against the bottom groove of the pulleys.

A newly installed V-belt must be readjusted after operating the machine for 1 hour.



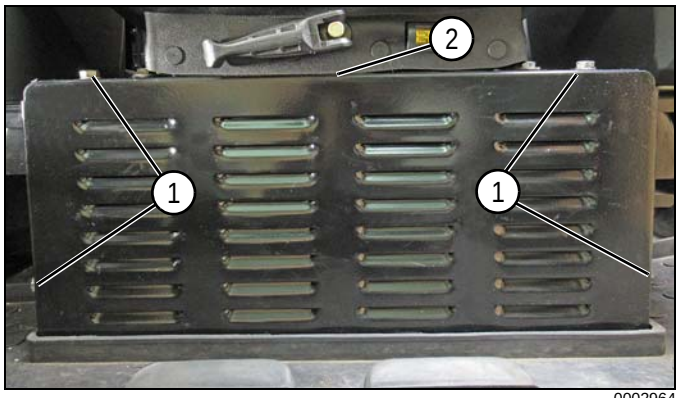
0002958

Figure 5-33

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Loosen the belt adjustment pulley locknut (1) and turn the tension adjuster (2) to achieve the correct belt tension.
3. Tighten the belt adjustment pulley locknut.

Replace the Ventilation Filter

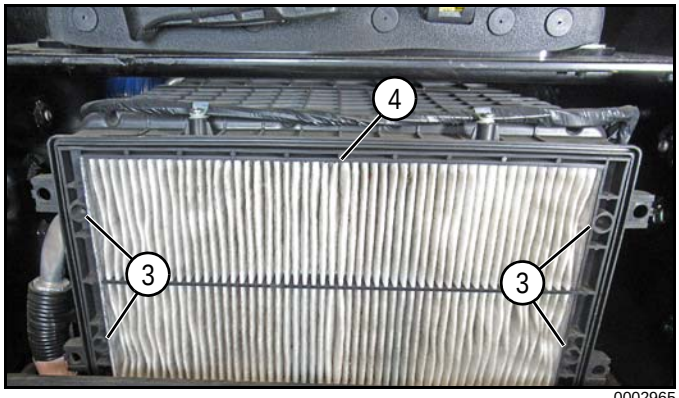
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0002964

Figure 5-34

2. Remove the four fasteners (1) securing the ventilation filter cover (2) beneath the seat. Remove the ventilation filter cover.



0002965

Figure 5-35

3. Remove the four fasteners (3) securing the ventilation filter (4).
4. Remove and replace the ventilation air filter.
5. Install the ventilation filter cover.

Check Heating and Air Conditioning System Operation

See “Heating and Air Conditioning Control Panel” on page 3-29.

1. Turn the temperature adjustment dial to the right and check if heat is present.
2. Turn the temperature adjustment dial to the left and check if the air temperature decreases.
3. Check the fresh air/recirculation switch function.
4. Check the air conditioning power switch function.

Fuel System

Bleed the Fuel System

NOTE: *Air trapped in the fuel system may cause engine starting failure or abnormal running.*

After servicing the fuel system or running out of fuel, the key switch should be turned to ON for 2 to 3 minutes before attempting to start the engine. The lift pump will bleed air from the system.

Check the Fuel Tank Strainer

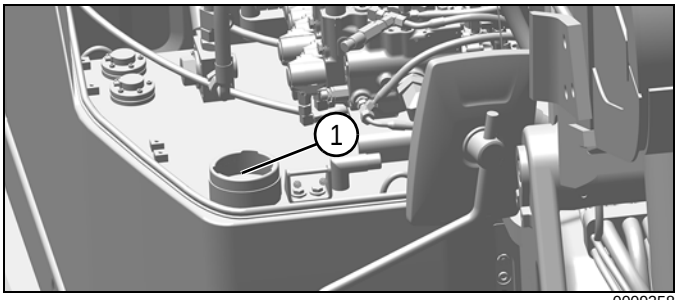


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Figure 5-36

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open the right front access door. See “Right Front Access Door” on page 5-15.
3. Remove the fuel tank filler cap. See “Fuel Tank Filler Cap” on page 5-16.
4. Inspect the fuel tank strainer (1) for torn or contaminated strainer mesh. Replace a damaged or missing fuel strainer with a new one.
5. Install the fuel tank filler cap.

Drain Water/Sediment from the Fuel Tank

WARNING

- **Fuel or fuel vapors that come into contact with hot surfaces or electrical components can cause a fire.**
- **Never service the fuel system near an open flame or while smoking.**
- **Clean up spilled fuel immediately.**

Failure to follow these warnings could result in death or serious injury.

NOTICE!

- **Cleanliness is important when working with an open fuel system. Contaminated fuel can result in engine damage.**
- **Dispose of fuel and filters in accordance with all applicable environmental regulations. Failure to do so could result in damage to the environment.**

NOTE: *Use diesel fuel to clean the inside of the fuel tank. Never use trichloroethane to clean the fuel tank.*

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.

NOTE: *For fuel tank capacity, see “Fluid Capacities” on page 5-8.*

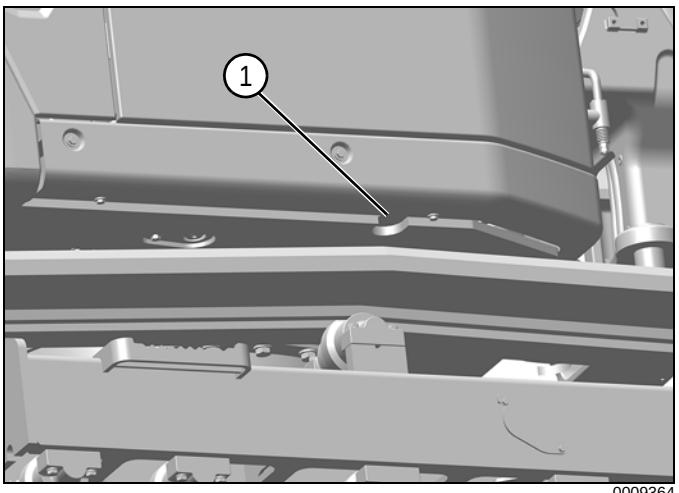

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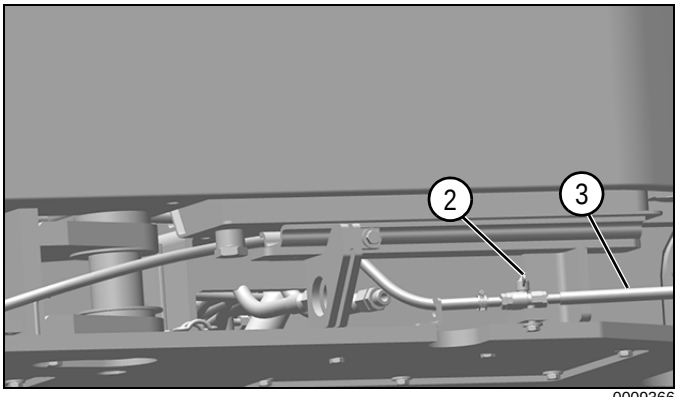
Figure 5-37

2. Access to the fuel drain valve is located under the fuel tank (1).



0009366

Figure 5-38

NOTE: *View is shown with the side panel removed for better clarity.*

3. Follow the drain hose (3) from the drain valve (2) to where it exits the bottom of the machine. Place an appropriately sized container under the drain hose.
4. Open the drain valve to drain water and sediment that may have accumulated on the bottom of the tank. Do not allow any fuel to splash out of the container.
5. When only clean fuel drains from the fuel tank, close the drain valve.
6. If the fuel tank is completely drained, the system must be bled after refilling. See “Bleed the Fuel System” on page 5-27.

Replace the Secondary Fuel Filter

WARNING

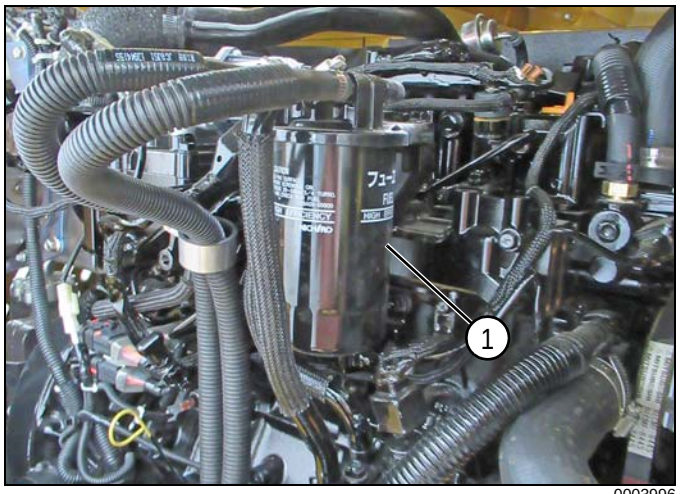
- **Components and oil remain hot when the engine is stopped, which may cause severe burns. Wait until components and oil are cool before you proceed.**
- **Never service the fuel system near an open flame or while smoking.**
- **Fuel that comes into contact with hot surfaces or electrical components can cause a fire. Clean up any fuel spills immediately.**

Failure to follow these warnings could result in death or serious injury.

NOTICE!

- **Cleanliness is important when working with an open fuel system. Contaminated fuel can result in engine damage.**
- **Dispose of contaminated fuel and filters in accordance with all applicable environmental regulations. Failure to do so could result in damage to the environment.**

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0003996

Figure 5-39

2. Place an appropriately sized container under the fuel filter (1) to collect any spilled fuel.
3. Remove the fuel filter with a fuel filter wrench.

NOTE: *Always use SANY-approved fuel filters.*

4. Clean the mounting base of the fuel filter, and fill the new fuel filter with clean fuel. Apply a thin film of fuel to the O-ring and install the new fuel filter on the filter housing.

5. When the fuel filter O-ring touches the filter housing, turn the fuel filter an additional 1/2 turn. Overtightening the filter may damage the O-ring, resulting in a fuel leak.
6. Bleed trapped air from the fuel system. See “Bleed the Fuel System” on page 5-27.
7. Start the engine and check the fuel filter for leaks.

Replace the Primary Fuel Filter/Water Separator Filter Element

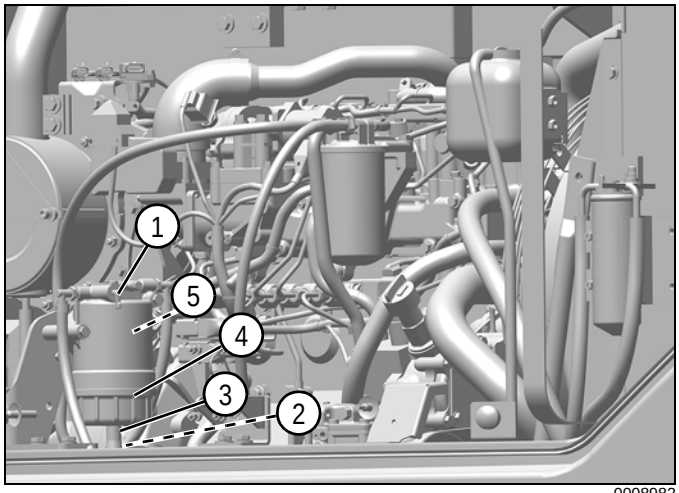
WARNING

- **Fuel or fuel vapors that come into contact with hot surfaces or electrical components can cause a fire that could result in death or serious injury.**
- **Never service the fuel system near an open flame or while smoking.**
- **Clean up spilled fuel immediately.**

Failure to follow these warnings could result in death or serious injury.

NOTICE!

Dispose of contaminated fuel or water in accordance with all applicable environmental regulations. Failure to do so could result in damage to the environment.



0008982

Figure 5-40

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open the engine hood. See “Engine Hood” on page 5-13.

NOTICE!

Open and close the fuel shutoff and drain valves by hand. Never use tools to open or close the valves.

3. Turn the fuel shutoff valve (1) to OFF.
4. Route the drain hose (2) into a suitable container.
5. Open the drain valve (3) and drain the fuel water separator.
6. Close the drain valve.
7. Remove the filter housing (4) and filter element (5) from the filter housing.
8. Clean the filter housing with clean fuel.
9. Replace the filter element and make sure it is securely seated within the filter housing and fill the filter housing with clean fuel.
10. Reinstall the filter housing.
11. Turn the fuel shutoff valve (1) to the ON position.
12. Start the engine and check for leaks. If leaks are found, stop the engine and perform necessary repairs.
13. Close the engine hood.

Battery

Check the Battery

WARNING

Before proceeding with any battery maintenance procedure, observe the following:

- **The top of the battery must be kept clean to prevent plugging of the battery vents. Regularly clean the top of the battery to prevent the battery vents from plugging.**
- **Battery gases are explosive. Never smoke around battery or expose them to sparks or open flames. Work in a well-ventilated area.**
- **Wear personal protective equipment (PPE) when working with battery.**
- **Battery acid can cause burns or injury. If battery acid makes contact with your skin or eyes, flush the area immediately with fresh water and seek medical attention.**

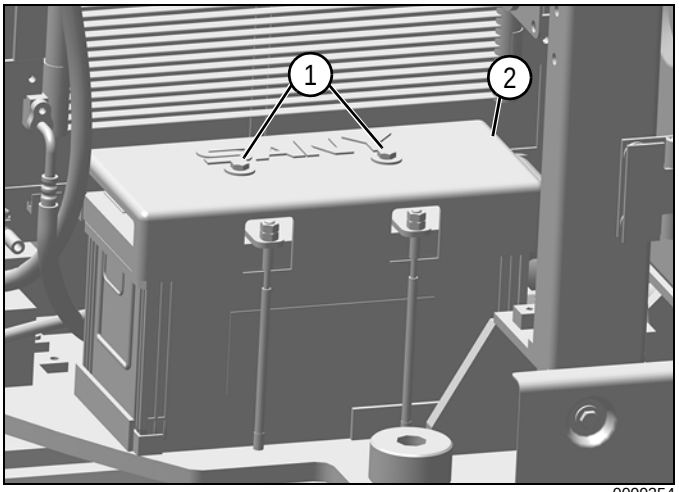
Failure to follow these warnings could result in death or serious injury.

NOTICE!

After machine shutdown, wait at least 1 minute for the engine control module (ECM) to complete its shutdown before disconnecting the battery. Failure to observe and follow this notice can damage the machine or cause it to operate improperly.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.

2. Open the right rear access door. See “Right Rear Access Door” on page 5-15.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-19.



0009354

Figure 5-41

4. Remove the fasteners (1) securing the battery cover (2). Remove the battery cover.
5. Remove any tools, parts, or debris from the battery compartment.
6. Check the ground and the positive terminals/cables for corrosion or loose connections under the protective covers. Clean the area with a mixture of baking soda and warm water and tighten fasteners as needed.
7. Wipe down the battery and terminals with a clean cloth.
8. Use a corrosion preventative coating on the battery terminals.
9. Install the battery cover.
10. Close and secure right rear access door and engine hood.

Remove the Battery

WARNING

Before proceeding with any battery maintenance procedure, observe the following:

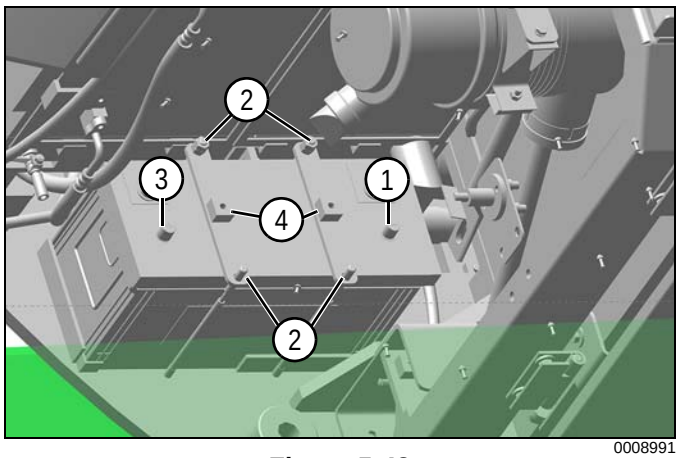
- **The top of the battery must be kept clean to prevent plugging of the battery vents. Regularly clean the top of the battery to prevent the battery vents from plugging.**
- **Battery gases are explosive. Never smoke around battery or expose them to sparks or open flames. Work in a well-ventilated area.**
- **Wear personal protective equipment (PPE) when working with battery.**
- **Battery acid can cause burns or injury. If battery acid makes contact with your skin or eyes, flush the area immediately with fresh water and seek medical attention.**

Failure to follow these warnings could result in death or serious injury.

NOTICE!

After machine shutdown, wait at least 1 minute for the engine control module (ECM) to complete its shutdown before disconnecting the battery. Failure to observe and follow this notice can damage the machine or cause it to operate improperly.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Open the right rear access door. See “Right Rear Access Door” on page 5-15.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-19.
4. Remove the battery cover. See “Check the Battery” on page 5-29.



0008991

Figure 5-42

5. Note where the cables are attached. Disconnect the ground terminals (1) first, followed by the positive terminals (3).
6. Remove the fasteners (2) securing the battery hold-down (4). Remove the battery hold-down.
7. Check that all cables and parts are out of the way, then lift the battery out of the battery compartment.
8. Clean the battery and terminals. See “Check the Battery” on page 5-29.
9. Clean the battery tray.
10. Installation is in the reverse order of removal. Install the terminals in the same positions from which they were removed. Connect the positive terminals first, followed by the ground terminals.

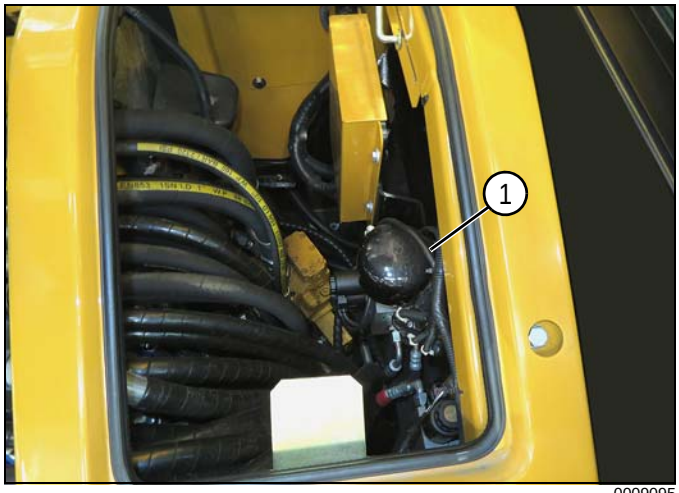
Hydraulic System

Check the Accumulator Function

WARNING

- **The accumulator contains pressurized nitrogen. Improper handling is extremely dangerous.**
- **Do not drill holes on the accumulator or place it close to fire or a high-heat source.**
- **Do not weld any part on the accumulator.**
- **Air in the accumulator must be released upon disposal.**
- **See “Checks Before Maintenance or Repairs” on page 5-4 for special precautions that need to be taken when working with or around the accumulator.**
- **Contact a SANY dealer for additional information.**

Failure to follow these warnings could result in death or serious injury.



0009095

Figure 5-43

NOTE: *The pilot valve accumulator is located behind the left front access door. See “Left Front Access Door” on page 5-14.*

The pilot valve accumulator (1) allows the operator to lower hydraulic functions within 15 minutes of an engine shutdown with the key switch in the ON position.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-4.
2. Lower the work equipment to 18 in.-24 in. (0.45m–0.6m) from the ground.
3. Shut down the engine.
4. Turn the key switch ON.

0009100

Figure 5-44

5. Move the hydraulic lockout control lever (1) to the unlocked (open) position.
6. Use the joystick control to lower the boom.

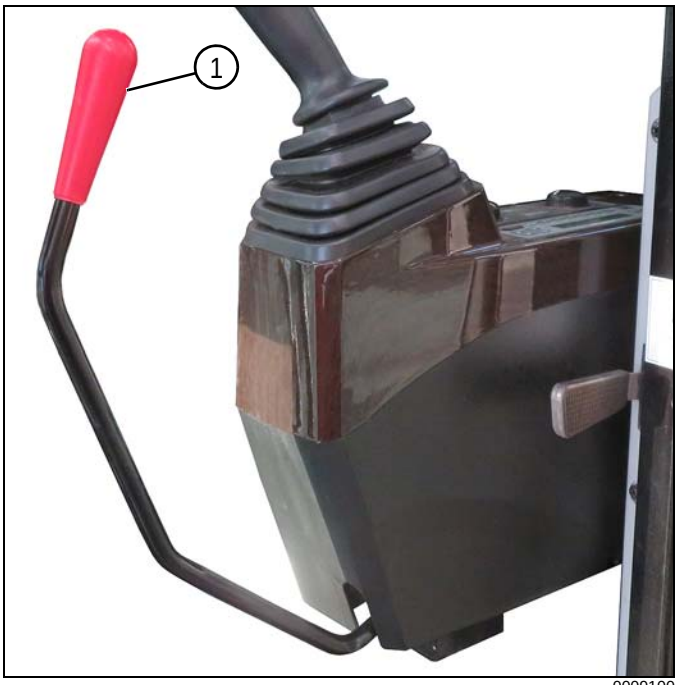
NOTE: *If there is no movement, contact a SANY dealer.*

NOTE: *Start the engine and run it at low idle for about 5 minutes to repressurize the accumulator.*

Relieve the Hydraulic System Pressure

NOTE: *Hydraulic system pressure must be relieved before disconnecting or servicing hydraulic system components.*

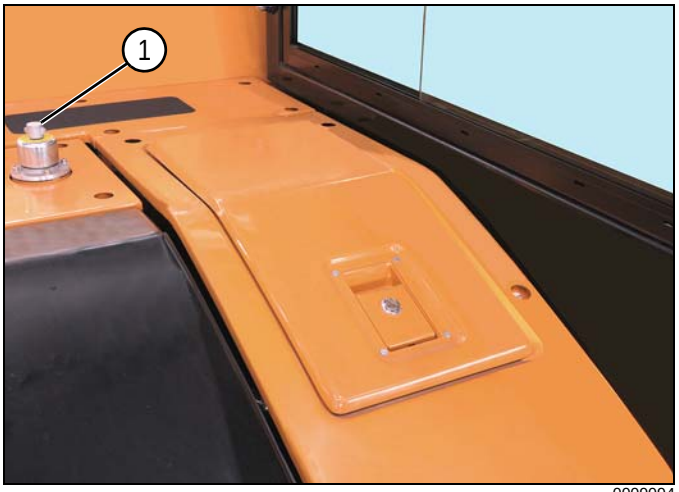
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Turn the key switch to ON. Do not start the engine.



0009100

Figure 5-45

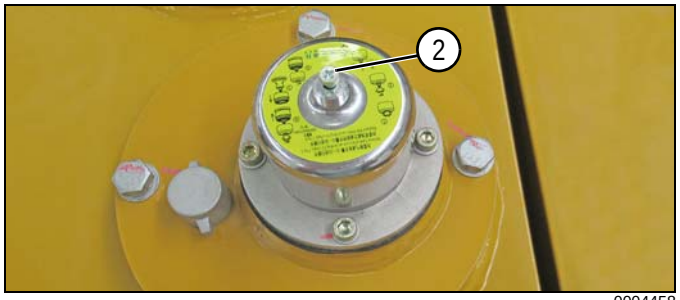
3. Set the hydraulic lockout control lever to the unlocked (open) position.
4. Fully cycle each pedal, joystick, and travel control two to three times to release the system pressure remaining in the hydraulic lines.
5. Turn the key switch to OFF.



0009094

Figure 5-46

6. Remove the wing nut cover (1) from the pressure relief valve.



0004458

Figure 5-47

7. Press the valve (2) to relieve the hydraulic tank pressure.
8. Install the wing nut cover.

Check the Hydraulic Oil Level

See “Check the Hydraulic Oil Level” on page 4-9.

Add Hydraulic Oil

WARNING

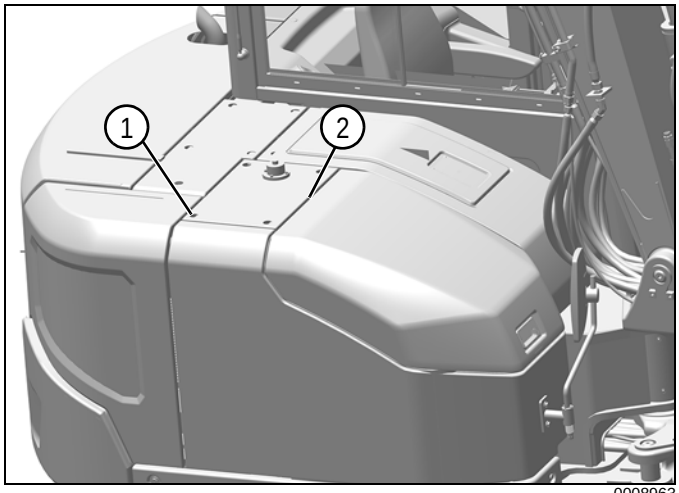
- **Allow the hydraulic system to cool before servicing. Hot oil may cause burns or other serious injury.**
- **The hydraulic tank may be under pressure, and hydraulic oil may be present at the filler cap. Relieve any pressure to prevent injury.**

Failure to follow this warning could result in death or serious injury.

NOTICE!

Filling the hydraulic tank past the recommended maximum level may result in hydraulic system damage.

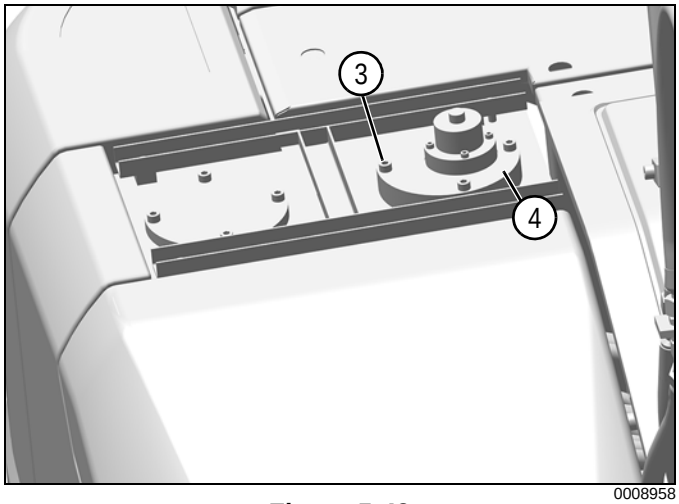
1. Position the work equipment as shown on the hydraulic tank decal. See “Check the Hydraulic Oil Level” on page 4-9.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
3. Relieve system pressure. See “Relieve the Hydraulic System Pressure” on page 5-32.



0008963

Figure 5-48

4. Remove the four fasteners (1) that secure the panel (2) to the machine.



0008958

Figure 5-49

5. Remove four fasteners and washers (3) and remove the breather (4).
6. Slowly add hydraulic oil to the return chamber of the hydraulic tank. Monitor the hydraulic oil level as it is added. See “Check the Hydraulic Oil Level” on page 4-9.
7. Install the hydraulic oil return filter cover.
8. Start the engine.

0009100

Figure 5-50

9. Set the hydraulic control lever (5) to the unlocked (open) position.
10. Run the engine at low idle for 10 minutes to vent air from the hydraulic system.
11. Shut down engine speed and check the hydraulic oil level on sight glass. If hydraulic oil is needed repeat steps 5-9.
12. Install the panel.

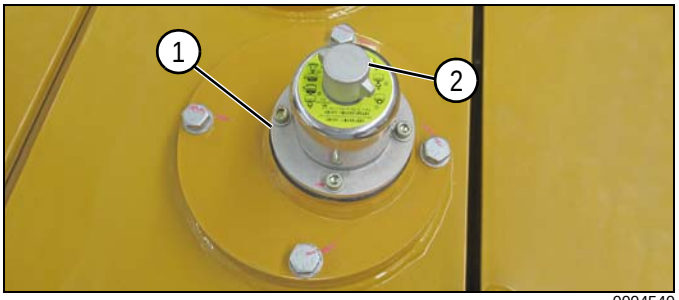
Replace the Hydraulic Tank Breather Filter Element

WARNING

- **Allow the hydraulic system to cool before servicing. Hot oil may cause burns or other serious injury.**
- **The hydraulic tank may be under pressure, and hydraulic oil may be present at the filler cap. Relieve any pressure to prevent injury.**

Failure to follow this warning could result in death or serious injury.

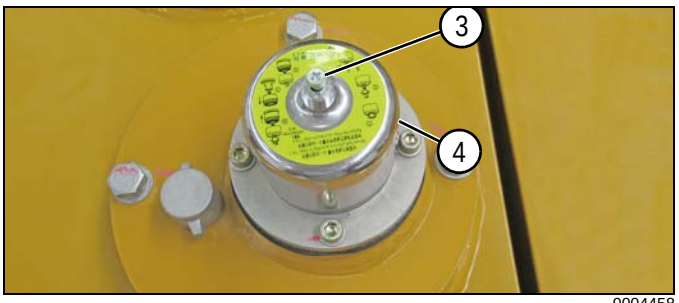
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0004540

Figure 5-51

2. Clean the top of the hydraulic tank and remove contaminants from around the breather valve (1).
3. Remove the wing nut cover (2).



0004458

Figure 5-52

4. Press the relief valve button (3) to release pressure in the hydraulic tank.
5. Clean and remove the breather cover (4).
6. Inspect the filter element. Replace the filter element as needed.
7. Install the filter and tighten the breather cover.
8. Install wing nut cover.

NOTICE!

Dispose of the filter in accordance with all applicable environmental regulations. Failure to do so could damage the environment.

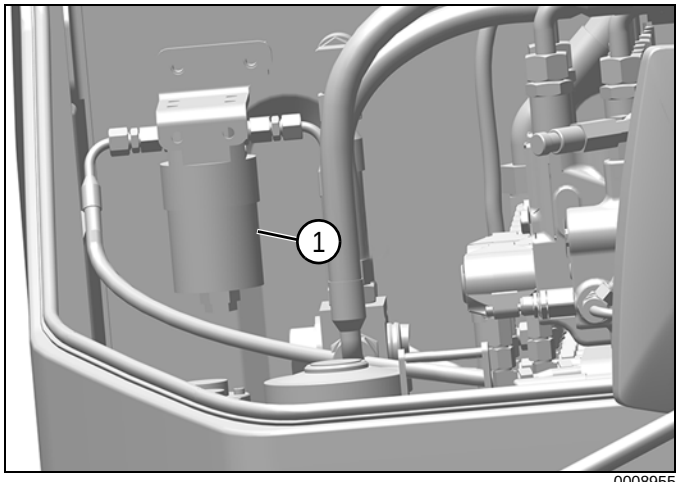
Replace the Hydraulic Oil Pilot Filter

WARNING

- **Allow the hydraulic system to cool before servicing. Hot oil may cause burns or other serious injury.**
- **The hydraulic tank may be under pressure, and hydraulic oil may be present at the filler cap. Relieve any pressure to prevent injury.**

Failure to follow this warning could result in death or serious injury.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Relieve system pressure. See “Relieve the Hydraulic System Pressure” on page 5-32.
3. Open the right front access door. See “Right Front Access Door” on page 5-15.



0008955

Figure 5-53

4. Place a container under the pilot filter bowl (1) to catch any spilled oil.
5. Loosen and remove the pilot filter bowl.

NOTICE!

Dispose of the contaminated oil and filter in accordance with all applicable environmental regulations. Failure to do so could damage the environment.

6. Remove the filter element from the housing. Clean the interior of the housing and bowl.
7. Install a new filter element, gasket, and O-ring.
8. Install the filter bowl and tighten securely.
9. Close the right front access door.
10. To purge air from the system, start the engine and run it at low idle for 10 minutes.
11. Check the hydraulic oil level and add hydraulic oil as needed. See “Check the Hydraulic Oil Level” on page 4-9.

Replace the Hydraulic Oil Return Filter

WARNING

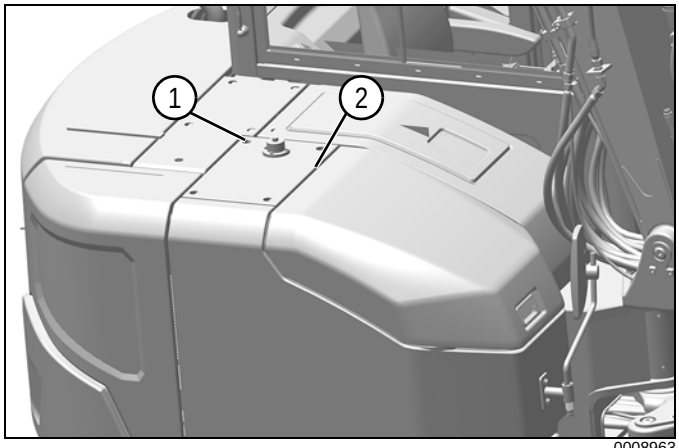
- **Allow the hydraulic system to cool before servicing. Hot oil may cause burns or other serious injury.**
- **The hydraulic tank may be under pressure, and hydraulic oil may be present at the filler cap. Relieve any pressure to prevent injury.**

Failure to follow this warning could result in death or serious injury.

NOTICE!

Examine the return filter for metal chips and debris. An excessive amount of bronze and steel chips indicates that the hydraulic pump or a hydraulic motor has been damaged. Rubber debris indicates seal and/or gasket damage. Inspect these components before filling the hydraulic tank and returning the machine to service.

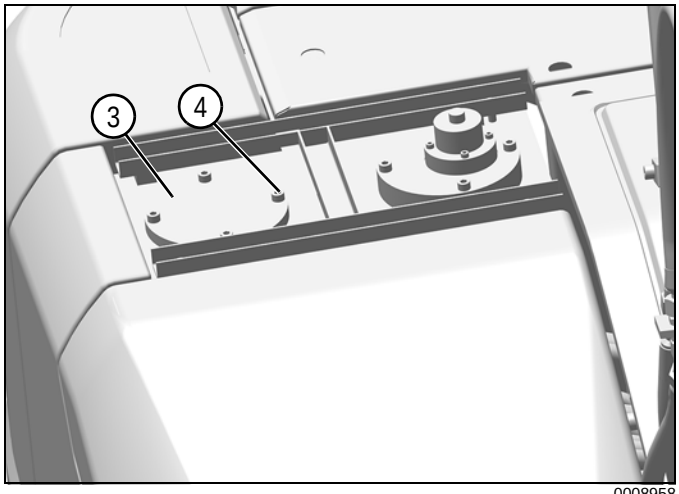
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Relieve system pressure. See “Relieve the Hydraulic System Pressure” on page 5-32.



0008963

Figure 5-54

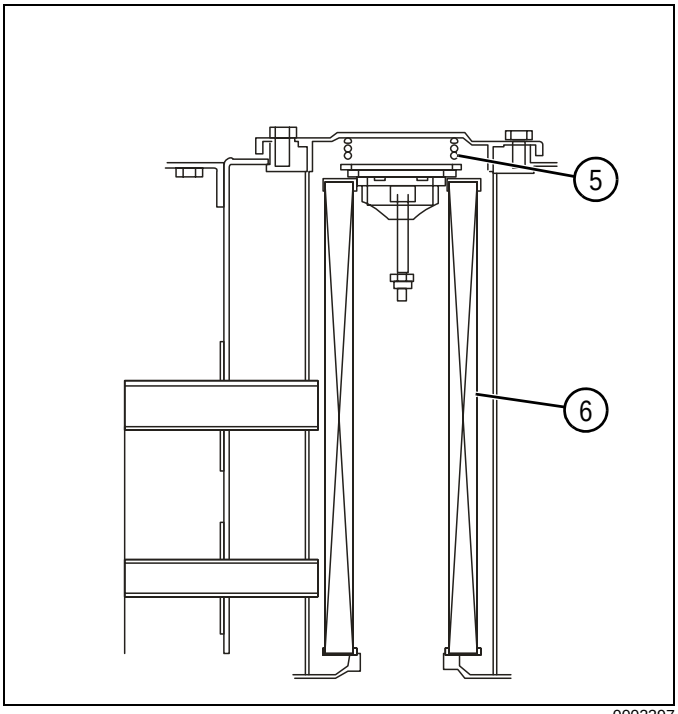
3. Remove the four fasteners (1) that secure the panel (2) to machine. Remove the panel.



0008958

Figure 5-55

4. Clean the top of the hydraulic tank and remove contaminants from around the return filter cover (3).
5. Loosen the four fasteners (4) securing the return filter cover. Push the cover down against spring pressure while removing the fasteners. Remove the cover.



0002397

Figure 5-56

6. Remove the spring (5) and return filter (6).

NOTICE!

Dispose of the contaminated oil and filter in accordance with all applicable environmental regulations. Failure to do so could damage the environment.

7. Dispose of the used return filter and spring. Install a new return filter and spring.
8. Install a new O-ring for the return filter cover. Tighten the fasteners securely.
9. To purge air from the system, start the engine and run it at low idle for 10 minutes.
10. Check the hydraulic oil level and add hydraulic oil as needed. See “Check the Hydraulic Oil Level” on page 4-9.

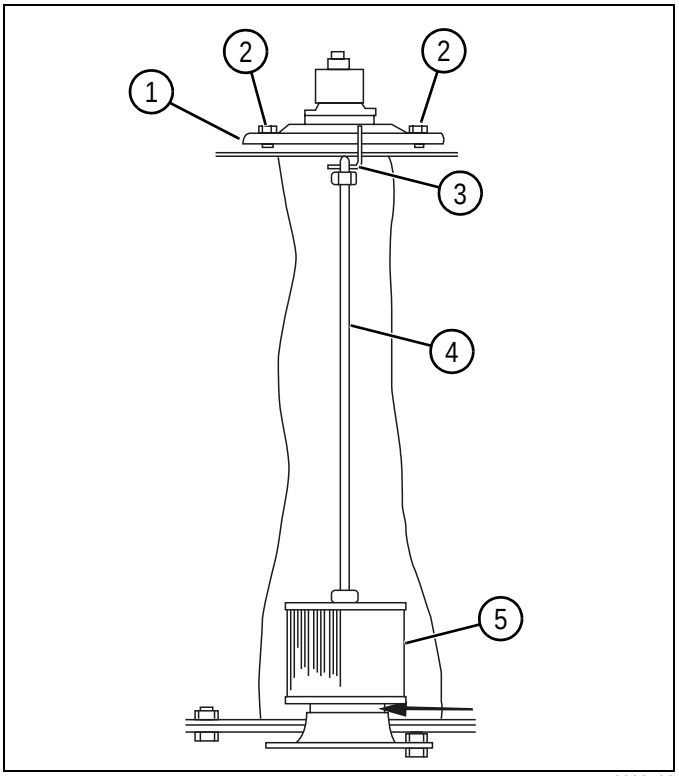
Clean and Replace the Hydraulic Oil Suction Strainer

WARNING

- **Allow the hydraulic system to cool before servicing. Hot oil may cause burns or other serious injury.**
- **The hydraulic tank may be under pressure, and hydraulic oil may be present at the filler cap. Relieve any pressure to prevent injury.**

Failure to follow these warnings could result in death or serious injuries.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Relieve the system pressure. See “Relieve the Hydraulic System Pressure” on page 5-32.
3. Remove the top access panel. See “Add Hydraulic Oil” on page 5-32.



0002408

Figure 5-57

4. Clean the top of the hydraulic tank and remove contaminants from around the suction strainer cover (1).
5. Loosen the four fasteners (2) securing the suction strainer cover. Push the cover down against spring pressure while removing the fasteners. Remove the cover.
6. Remove the spring (3), rod (4), and suction strainer (5).
7. Clean the suction strainer of any contaminants. Inspect and replace if damaged.

NOTICE!

Dispose of the strainer in accordance with all applicable environmental regulations. Failure to do so could damage the environment.

8. Install the suction strainer in the hydraulic tank.
9. Install a new O-ring for the suction strainer cover. Tighten the fasteners securely.

NOTE: *Use the extrusion on the bottom of the cap to hold the spring in place.*

10. To purge air from the system, start the engine and run it at low idle for 10 minutes.
11. Check the hydraulic oil level and add hydraulic oil as needed. See “Check the Hydraulic Oil Level” on page 4-9.

Collect Hydraulic Oil Sample

1. Obtain an Oil Analysis Sample Kit from a SANY dealer.
2. Operate the machine until the hydraulic oil is up to normal operating temperature.
3. Prepare the machine for service. See “Maintenance Safety” on page 2-4.

NOTICE!

It is critical that all materials used to collect the sample are absolutely clean. Failure to adhere to this warning can cause equipment damage and contaminate the samples.

4. Remove the hydraulic oil return filter cover. See “Replace the Hydraulic Oil Return Filter” on page 5-34.
5. Insert the oil sample tube into the hydraulic tank and collect a sample of hydraulic oil.
6. Install the hydraulic oil return filter cover.

Send the sample for testing in accordance with the instructions packaged with the sample kit.

Change the Hydraulic Oil

WARNING

- **Allow the hydraulic system to cool before servicing. Hot oil may cause burns or other serious injury.**
- **The hydraulic tank may be under pressure, and hydraulic oil may be present at the filler cap. Relieve any pressure to prevent injury.**

Failure to follow this warning could result in death or serious injury.

NOTICE!

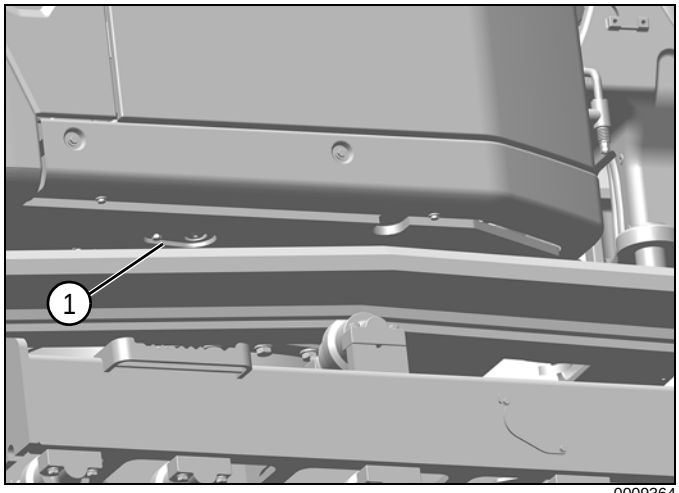
- **If the hydraulic oil is contaminated (discolored or containing debris), collect an oil sample for testing. Find and correct the cause of the contamination before changing the hydraulic oil.**
- **Dispose of the hydraulic oil and filters in accordance with all applicable environmental regulations.**

Failure to do so could result in damage to the environment.

NOTES:

- *Always use the same type and grade of hydraulic oil.*
- *Hydraulic oil deteriorates faster on machines equipped with a hydraulic breaker than on machines equipped with a bucket.*

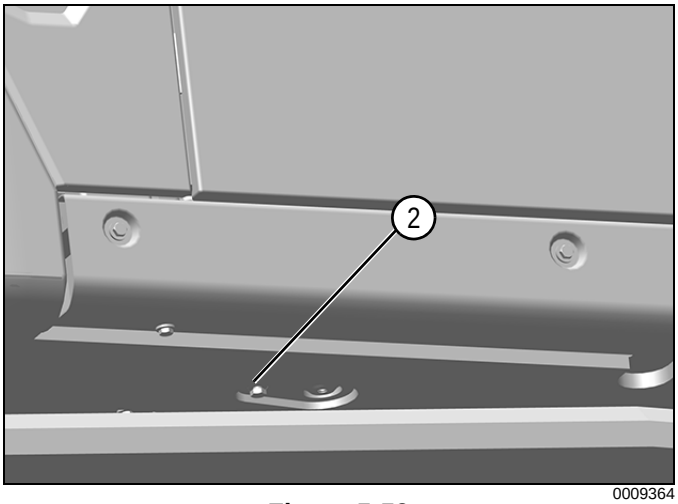
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0009364

Figure 5-58

2. Under the hydraulic tank, locate the hydraulic tank access hole (1) in the belly plate. Rotate the upper structure so the access hole is more easily accessible between the tracks.
3. Relieve the system pressure. See “Relieve the Hydraulic System Pressure” on page 5-32.



0009364

Figure 5-59

NOTE: *For hydraulic tank capacity, see “Fluid Capacities” on page 5-8.*

4. Place a suitable container under the hydraulic tank drain plug (2). Remove the drain plug and allow the oil to drain.
5. Install the hydraulic tank drain plug.
6. Clean the oil suction strainer. See “Clean and Replace the Hydraulic Oil Suction Strainer” on page 5-36.
7. Fill the hydraulic tank to the specified level. See “Add Hydraulic Oil” on page 5-32.

Check the Hydraulic Hoses, Lines, and Connectors

0009095

Figure 5-60

Check all hoses and lines for leaks. Contact a SANY dealer to replace damaged or leaking hoses or lines immediately. Any hydraulic pump lines or connectors connected to the engine compartment must be replaced if damaged.

Make sure there is sufficient clearance between all hydraulic lines and hoses and the high-temperature engine components. Make sure there is no friction between them. Make sure no hydraulic lines and hoses come in direct, unprotected contact with each other.

Track Assembly

Check the Track Tension

NOTICE!

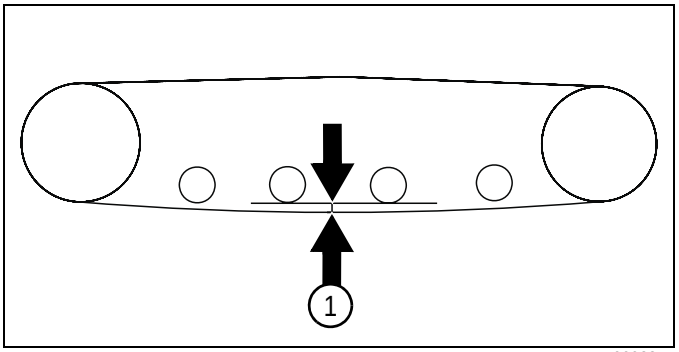
Remove gravel or mud buildup between the sprocket and the track before checking track tension.

1. Use the bucket as a support to lift the track on one side.

WARNING

After elevating, make sure the elevated machine is adequately supported. Failure to support the machine may cause serious injury or death.

2. Support the elevated side of the machine with suitable jack stands.
3. Rotate the track one full revolution.
4. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0002345

Figure 5-61

5. Use a straightedge to measure the track sag (1) between the tread of the roller and the rail surface of the track.
6. Normal track sag is 0.59 in.–0.98 in. (15 mm–25 mm). If the track sag is outside of this range, the track tension must be adjusted.

Adjust the Track Tension

WARNING

- **The track tension grease fitting is under extreme pressure. Grease can exit the grease valve and cause serious injury.**
- **Wear safety goggles, gloves, and other personal protective equipment (PPE) to prevent serious injury.**
- **Do not stand directly in front of the track tension grease fitting valve when loosening the valve.**

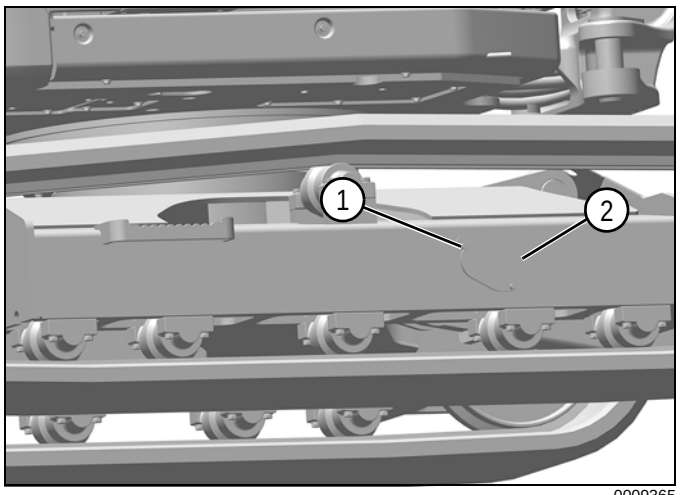
Failure to follow these warnings could result in death or serious injury.

WARNING

- **If the track remains too tight after opening the track tension grease valve, or if the track remains too loose after adding grease to the track tension grease fitting, never attempt to remove the track or remove the track adjuster.**
- **Pressurized grease inside the track adjuster may cause serious injury if any component is disassembled before pressure is released. If this occurs, contact a SANY dealer for further instructions.**

Failure to follow these precautions could result in injury.

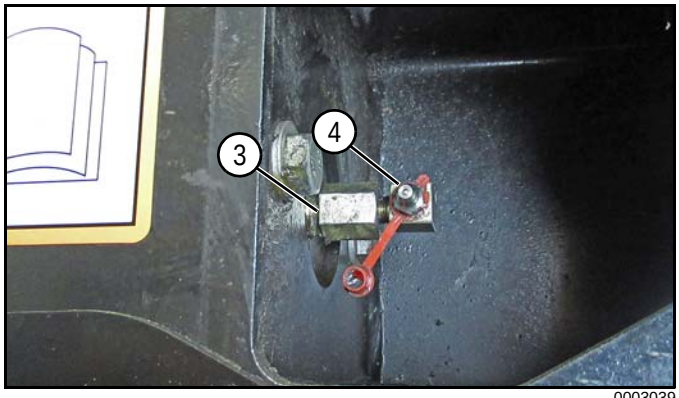
1. Use the bucket as a support to lift the track on one side.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0009365

Figure 5-62

3. Loosen two fasteners (1) securing the track tension adjuster cover (2). Rotate the cover open.



0003039

Figure 5-63

Increase the Track Tension

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Make sure that the grease valve (3) is closed tightly.
3. Using a grease gun, pump grease into the grease fitting (4) while observing idler movement.
4. Rotate the track one full revolution. Check the track tension to confirm adjustment.
5. Position the adjuster cover and tighten the fasteners.

Decrease the Track Tension

NOTICE!

Remove gravel or mud buildup between the sprocket and the track before reducing track tension.

1. Slowly open the grease valve (3) while observing idler movement. Grease should come out from behind the grease valve.

NOTE: *If grease does not come out, slowly rotate the track in both directions. When grease begins to flow, stop and continue the adjustment.*

2. When the track sag is within specification, tighten the grease valve to 44 lb-ft–59 lb-ft (60 N•m–80 N•m).
3. Rotate the track one full revolution. Check track tension to confirm adjustment.
4. Position the adjuster cover and tighten the fasteners.

NOTICE!

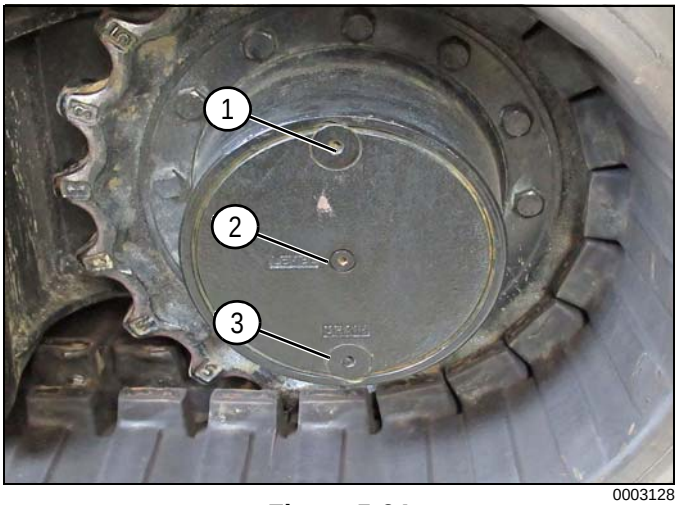
Dispose of used grease in accordance with all applicable environmental regulations. Failure to do so could damage the environment.

Check and Add Final Drive Oil

CAUTION

- **Allow the final drive to cool before servicing. Hot oil may cause burns or other serious injury.**
- **Wear safety goggles, gloves, and other personal protective equipment (PPE) to prevent serious injury.**
- **The final drive oil may be under pressure. Remove the plugs slowly to prevent injury.**

Failure to follow these precautions could result in injury.



0003128

Figure 5-64

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Park the machine to position the drain plug (3) at the bottom of one of the final drives.
3. Slowly loosen the oil level plug (2) to relieve any internal pressure.
4. The oil should be at or near the lower edge of the oil level plug opening.
5. If necessary, remove the fill plug (1) and add oil. See “Engine Oil Viscosity/Temperature Data” on page 5-8.
6. Install the oil level and fill plugs, and tighten to 12.5 lb-ft (17 N•m).
7. Repeat this procedure on the other final drive.

Collect Final Drive Oil Sample

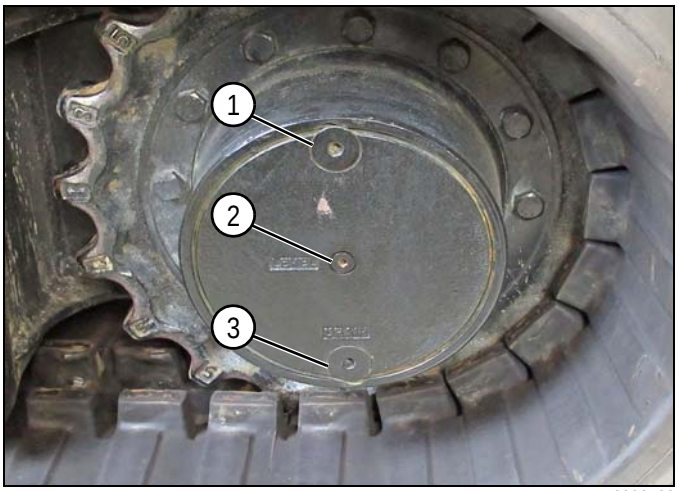
1. Obtain an Oil Analysis Sample Kit from a SANY dealer.
2. Operate the machine to normal operating temperature.
3. Prepare the machine for service. See “Maintenance Safety” on page 2-4.

NOTICE!

It is critical that all material used to collect the sample is absolutely clean. Failure to follow this notice can cause equipment damage and contaminate the sample.

4. Remove the final drive check plug. See “Check and Add Final Drive Oil” on page 5-39.
5. Insert the oil sample tube into the final drive and collect a sample of final drive oil. Install the final drive check plug.
6. Send the sample for testing in accordance with the instructions packaged with the sample kit.

Change the Final Drive Oil



0003128

Figure 5-65

CAUTION

- **Allow the final drive to cool before servicing. Hot oil may cause burns or other serious injury. Wear safety goggles, gloves, and other personal protective equipment (PPE) to prevent serious injury.**
- **The final drive oil may be under pressure. Remove the plugs slowly to prevent injury.**

Failure to follow these precautions could result in injury.

NOTICE!

Dispose of oil in accordance with all applicable environmental regulations. Failure to do so could result in damage to the environment.

NOTE: *If the final drive oil is cold, it should be warmed prior to changing. Use the bucket as a support to lift the track on one side. Move the throttle control dial to MIN (low idle) and operate the raised track for 5 minutes. Lower the track.*

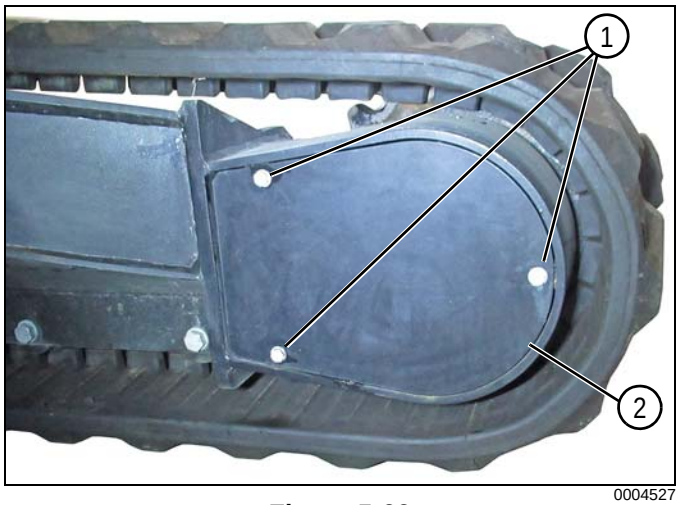
1. Park the machine to position the drain plug (3) at the bottom of one of the final drives.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
3. Place a suitable container under the final drive.
4. Slowly loosen and remove the oil level plug (2) and fill plug (1) to relieve any internal pressure.

NOTE: *For final drive oil capacity, see “Fluid Capacities” on page 5-8.*

5. Remove the drain plug and allow the oil to drain.
6. Install the drain plug and tighten to 12.5 lb-ft (17 N•m).
7. Add new fluid through the fill plug opening. Fill until the gear oil is at the lower edge of the level plug opening. See “Engine Oil Viscosity/Temperature Data” on page 5-8.
8. Install the oil level and fill plugs and tighten to 12.5 lb-ft (17 N•m).
9. Repeat this procedure on the other final drive.

Check the Final Drive Motor Mounting Fasteners

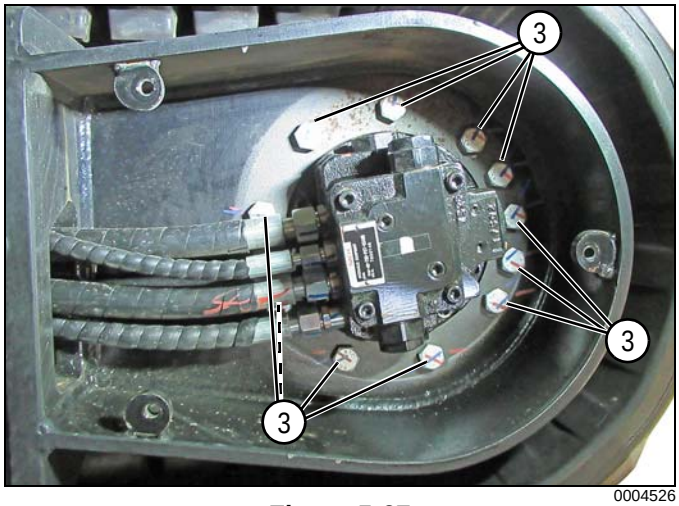
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0004527

Figure 5-66

2. Remove the three fasteners (1) and remove the travel motor cover (2). The right side is shown, the left side is similar.



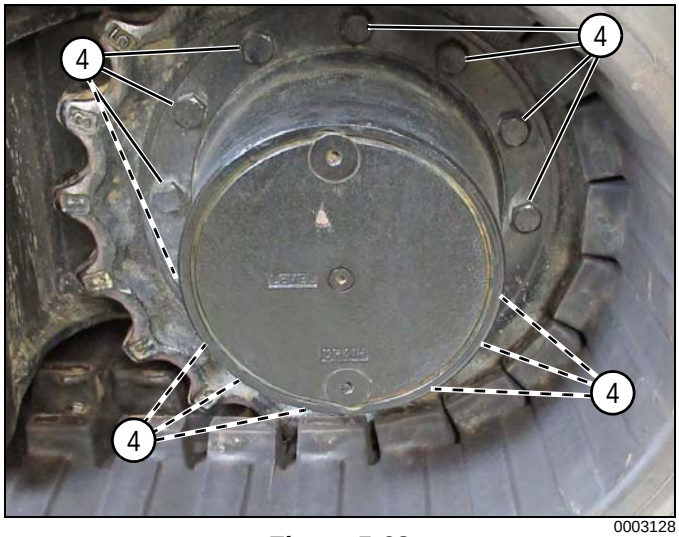
0004526

Figure 5-67

3. Make sure all hoses are tightly connected and not leaking. Inspect hoses for wear or damage.
4. Inspect all of the final drive mounting fasteners (3) for rust, damage, or looseness.

NOTE: *Use thread-lock compound when tightening loose fasteners or installing new fasteners.*

5. Replace any damaged or defective fasteners and tighten any loose fasteners. Final drive mounting fasteners are tightened to 117 lb-ft–144 lb-ft (158 N•m–196 N•m).
6. Install the travel motor cover (2) and secure with fasteners (1). The travel motor cover fasteners are tightened to 33 lb-ft–43 lb-ft (45 N•m–59 N•m).



0003128

Figure 5-68

7. Inspect the sprocket mounting bolts (4) on the opposite side of the track for rust, damage, or looseness.

NOTE: *Use thread-lock compound when tightening loose fasteners or installing new fasteners.*

8. Replace any damaged or defective fasteners and tighten any loose fasteners. The sprocket mounting bolts are tightened to 117 lb-ft–144 lb-ft (158 N•m–196 N•m).

Lubrication

Lubrication Points

0008600

Figure 5-69

1) Arm cylinder pin
2) Boom to arm connecting pin
3) Arm cylinder base end pin
4) Boom to base connecting pin
5) Swing bearing
6) Boom swing pin
7) Dozer blade end pins
8) Dozer blade cylinder end pins
9) Swing cylinder rod end pin
10) Swing cylinder base end pin
11) Swing gear
12) Swing drive
13) Boom cylinder base end pin
14) Boom cylinder rod end pin
15) Bucket linkage pin
16) Bucket cylinder rod end pin
17) Bucket cylinder base end pin

NOTE: *See “Lubrication and Maintenance Charts” on page 5-11 for additional information.*

NOTE: *A new machine must be greased every 8 hours within the initial 50 service hours.*

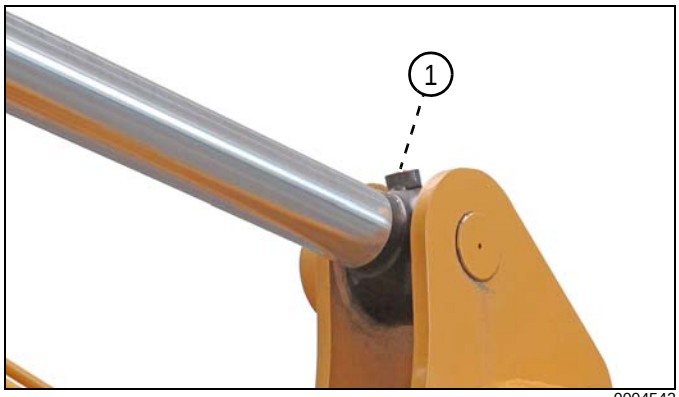
If the lubricated location produces abnormal noise, additional lubrication is required besides regular maintenance.

More frequent lubrication is required when the machine is operated with heavy optional equipment (e.g., a hydraulic breaker).

After operating in water, grease the machine to expel any water from the lubrication points.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.
2. Using a grease gun, pump grease into the grease fittings.
3. Clean off all excess grease.

Arm Cylinder Rod End Pin

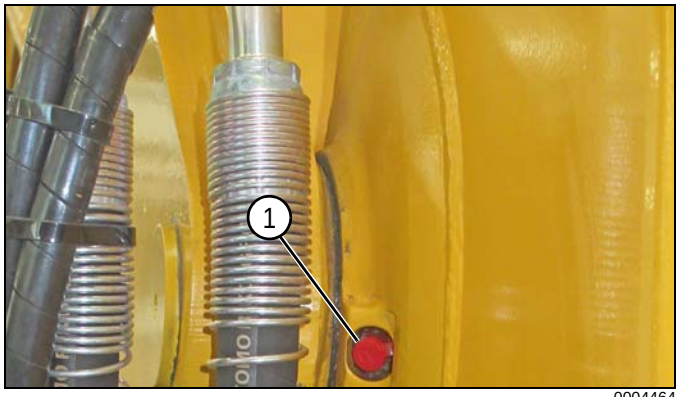


0004542

Figure 5-70

1. Remove the grease fitting cap (1).
2. Grease the arm cylinder rod end pin.
3. Install the grease fitting cap.

Boom to Arm Connecting Pin

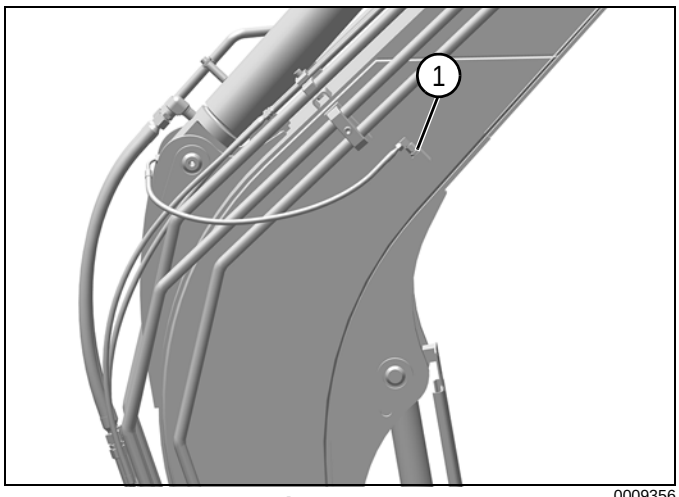


0004464

Figure 5-71

1. Remove the grease fitting cap (1).
2. Grease the boom to arm connecting pin fitting.
3. Install the grease fitting cap.

Arm Cylinder Base End Pin



0009356

Figure 5-72

1. Remove the grease fitting cap (1).
2. Grease the arm cylinder base end pin at the manifold fitting.
3. Install the cap.

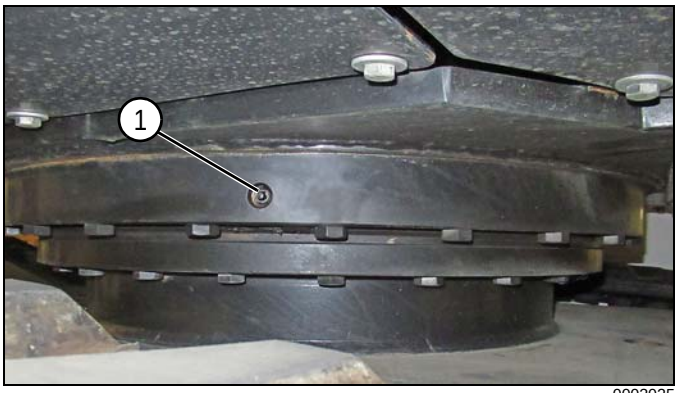
Boom to Base Connecting Pin

0009124

Figure 5-73

1. Remove the grease fitting cap (1).
2. Grease the boom to base connecting pin.
3. Install grease fitting caps.

Swing Bearing



0003025

Figure 5-74

1. Remove the grease fitting caps.
2. Grease the two fittings of the swing bearing (1).

NOTE: *Only one fitting is shown.*

3. Start the engine and raise the bucket 0.8 in.–1.2 in. (20 mm–30 mm) above the ground. Swing the upper structure 45 degrees (1/8 turn) in each direction.
4. Shut down the machine.
5. Repeat steps 1 through 3 until grease appears from the swing bearing seal.
6. Install the grease fitting caps.

Boom Swing Pin

0009098

Figure 5-75

1. Remove the grease fitting caps (1).
2. Grease the boom swing pin.
3. Install the grease fitting caps.

Swing Cylinder Base End Pin

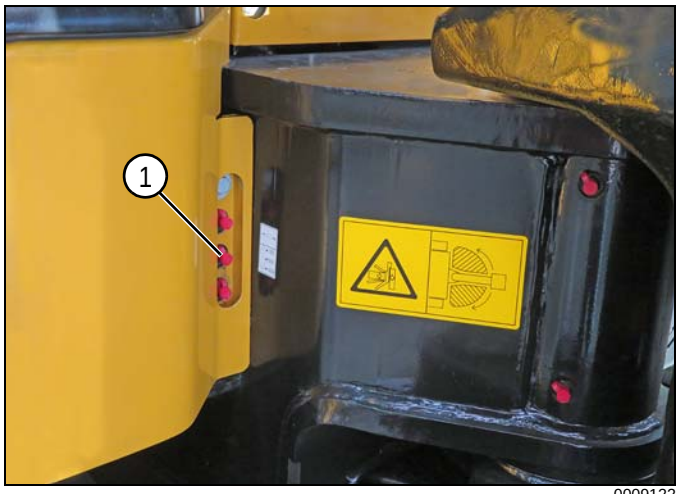
0009122

Figure 5-76

NOTE: *The swing cylinder base end must be greased after every 100 hours of use.*

1. Remove the grease fitting cap (1).
2. Grease the swing cylinder base end.
3. Install the grease fitting cap.

Swing Gear



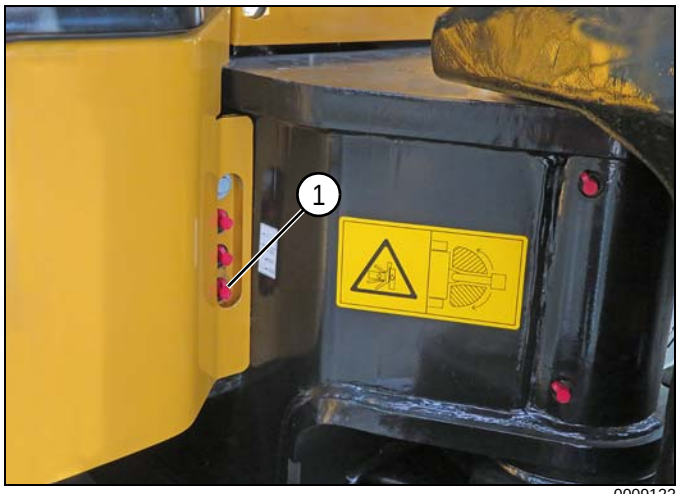
0009122

Figure 5-77

NOTE: *The swing gear must be greased after every 500 hours.*

1. Remove grease fitting cap (1).
2. Grease the swing gear fitting.
3. Install the grease cap.

Swing Pinion Gear



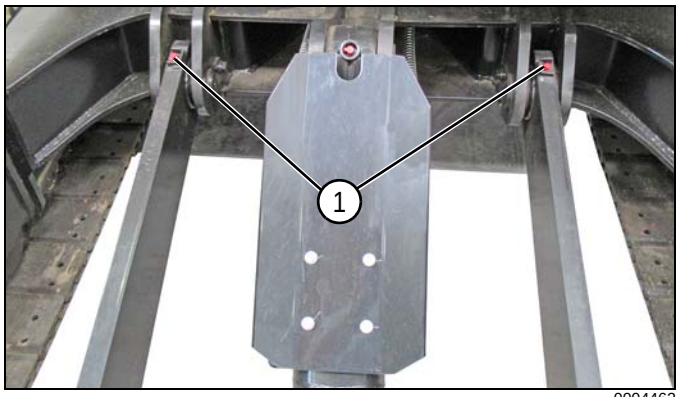
0009122

Figure 5-78

NOTE: *The swing drive must be greased after every 1000 hours of use.*

1. Remove the grease fitting cap (1).
2. Grease the swing drive.
3. Install the grease fitting cap.

Dozer Blade End Pins



0004462

Figure 5-79

1. Remove the grease fitting caps (1).
2. Grease the two dozer blade linkage pins.
3. Install the grease fitting caps.

Dozer Blade Cylinder End Pins

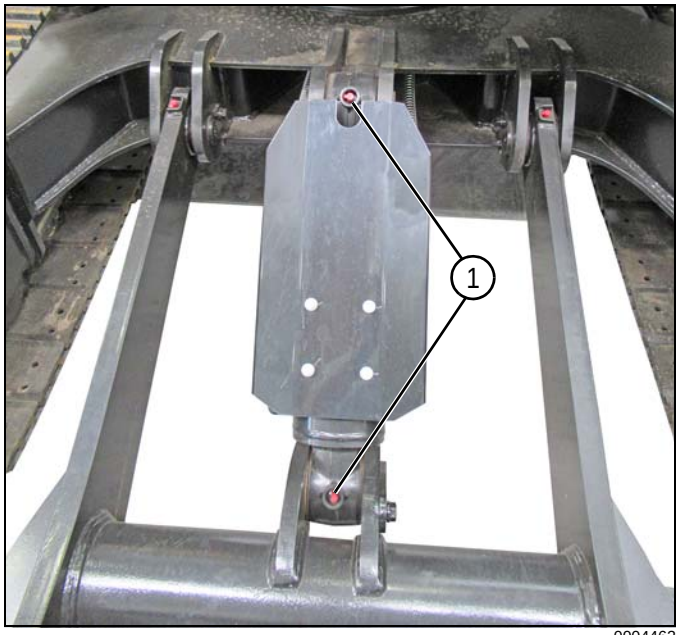


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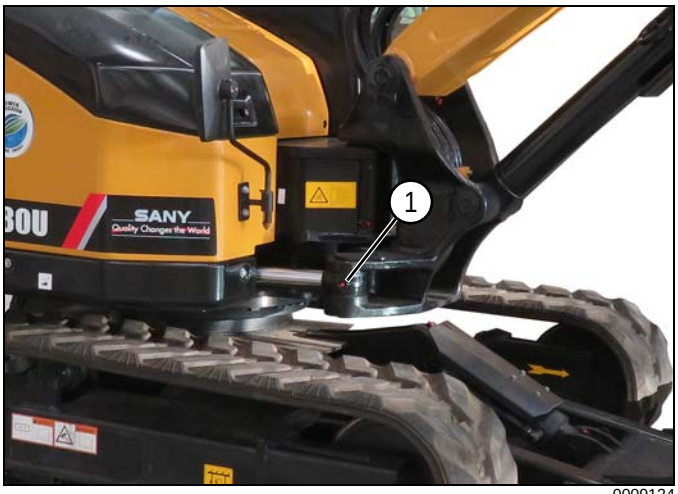
Figure 5-80

1. Remove the grease fitting caps (1).
2. Grease the dozer blade cylinder end pins.
3. Install the grease fitting caps.

Boom Swing Cylinder Rod End Pin



0009124

Figure 5-81

1. Remove the grease fitting cap (1).
2. Grease the swing cylinder rod end pin.
3. Install the grease fitting cap.

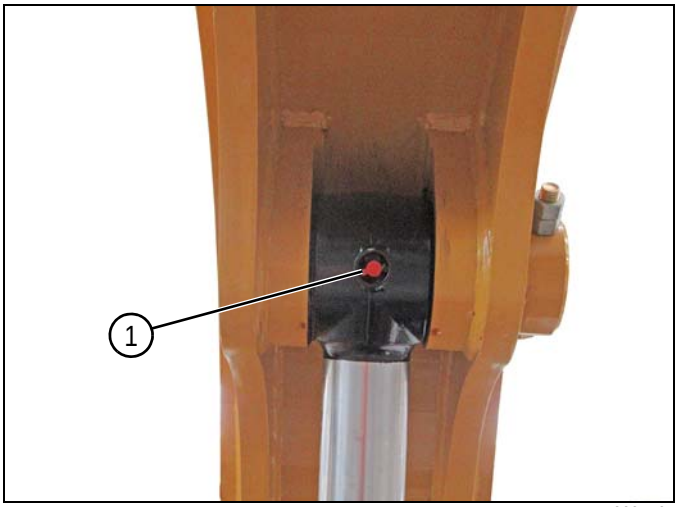
Boom Cylinder Base End Pin

0009122

Figure 5-82

1. Remove the grease fitting cap (1).
2. Grease the boom cylinder base end pin.
3. Install the grease fitting cap.

Boom Cylinder Rod End Pin

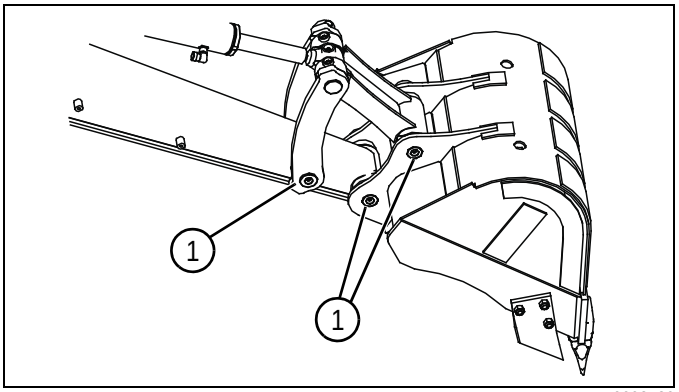


0004461

Figure 5-83

1. Remove the grease fitting cap (1).
2. Grease the boom cylinder rod end pin.
3. Install the grease fitting cap.

Bucket Linkage Pins

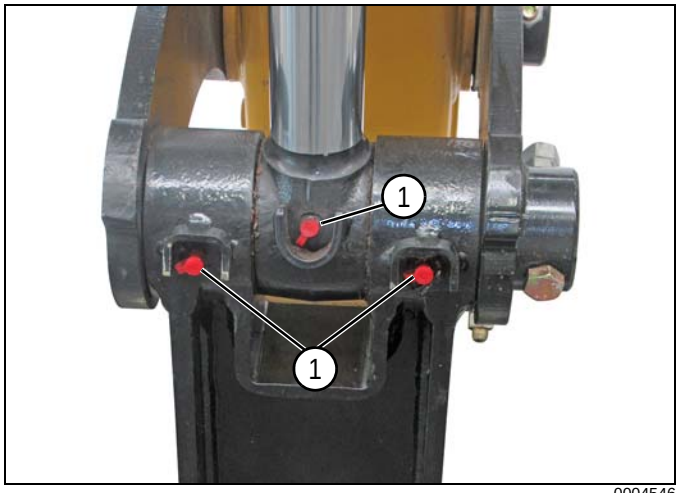


0003189

Figure 5-84

1. Remove the grease fitting caps.
2. Grease the bucket linkage pins (1).
3. Install the grease fitting caps.

Bucket Cylinder Rod End Pin

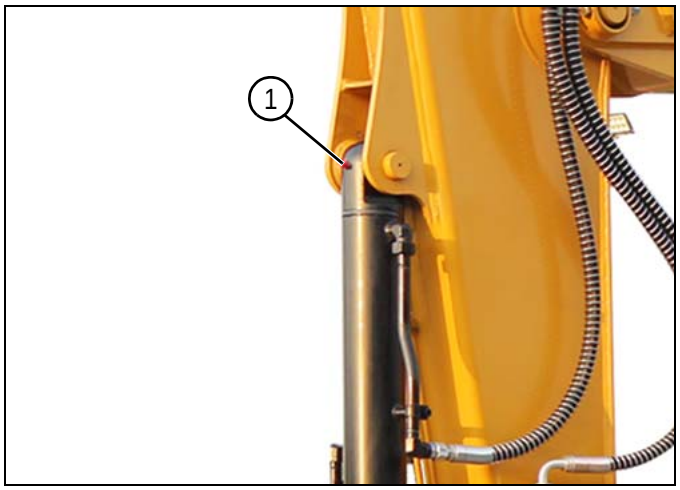


0004546

Figure 5-85

1. Remove the grease fitting caps (1).
2. Grease the bucket cylinder rod end pin.
3. Install the grease fitting caps.

Bucket Cylinder Base End Pin



0004547

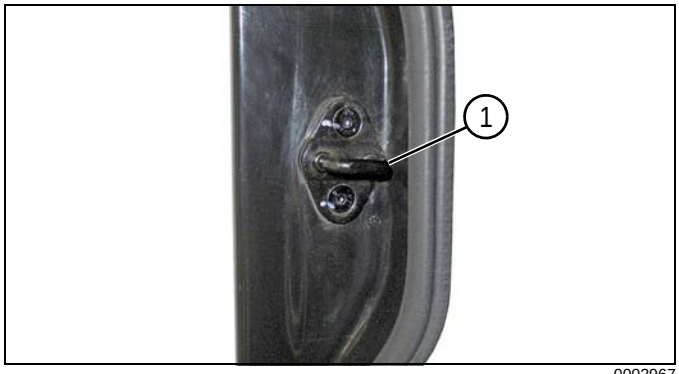
Figure 5-86

1. Remove the grease fitting cap (1).
2. Grease the bucket cylinder base end pin.
3. Install the grease fitting cap.

Cab

Inspect the Cab Door Lock Catch

Check the cab door lock for loose or damaged components.

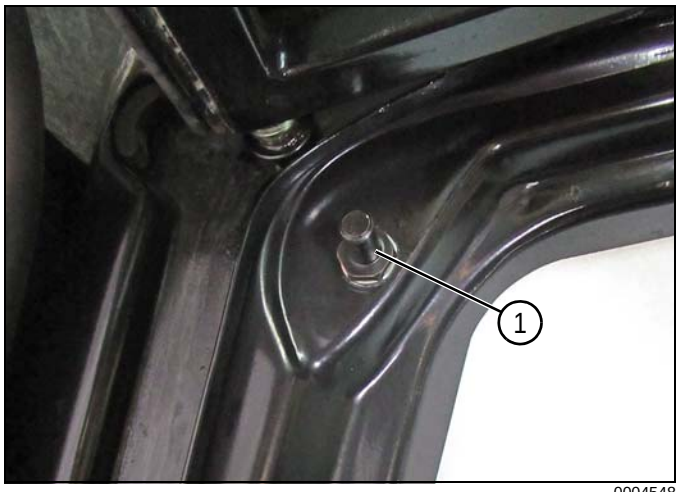


0002967

Figure 5-87

Check the cab door lock catch (1) to make sure it is tight and not damaged.

Inspect the Front Windshield Lock Catch

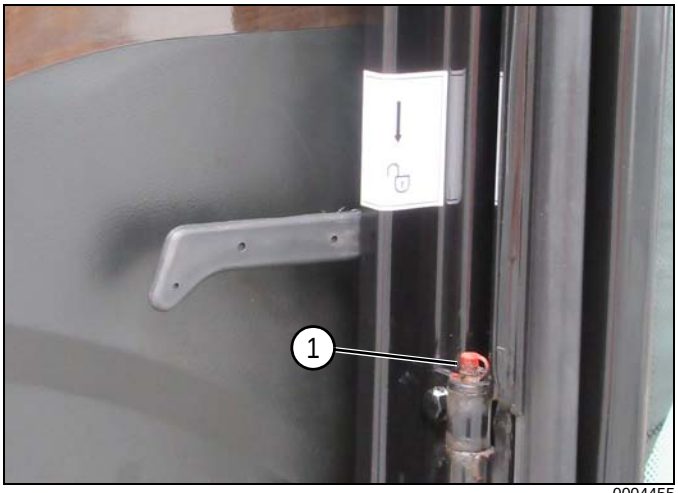


0004548

Figure 5-88

Check the windshield lock catches (1) inside the cab (one on each side). Make sure they are tight and not damaged.

Inspect and Lubricate the Cab Door Hinges

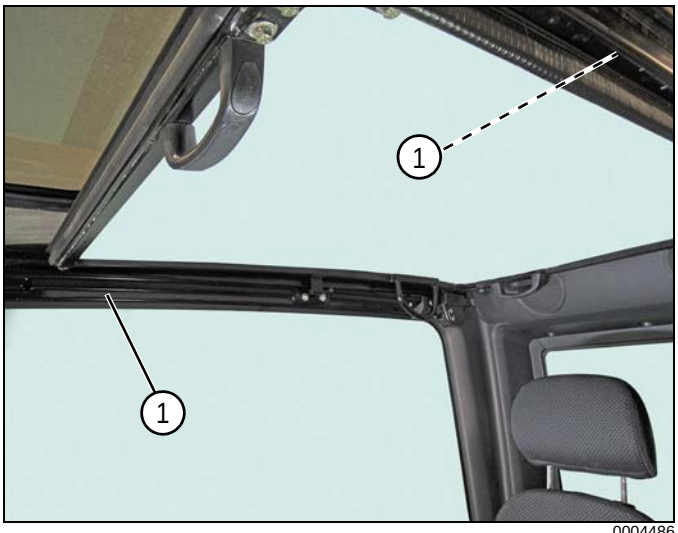


0004455

Figure 5-89

1. Remove the protective cover (1).
2. Grease the two cab door hinges until grease comes out of the hinge. Wipe off excess grease.
3. Install the grease fitting cap.

Inspect and Lubricate the Front Windshield Slide Rails



0004486

Figure 5-90

Apply silicone lubricant to the front windshield slide rails (1) on both sides of the cab door ceiling.

Inspect and Tighten the Windshield Wiper Arm Nut

0008980

Figure 5-91

Raise the nut cap at the end of the wiper arm and check the nut (1). If the nut is loose, tighten it to 26–33 lb-ft (35–40 N•m).

Bucket

Replace the Bucket Teeth

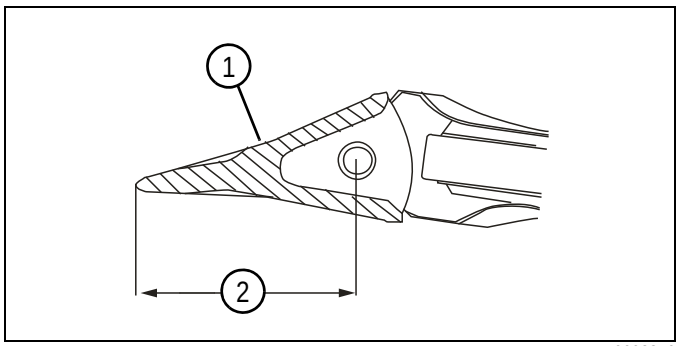
WARNING

- **Unexpected machine movement can be dangerous when replacing the bucket teeth. Place the bucket on a stable work surface. Shut down the engine and lock out the control levers.**
- **Roll pins may eject with extreme force when removed. Do not allow anyone to stand in front of the pins during pin removal.**
- **Metal fragments from roll pins and tools may break off during roll pin removal and installation. Wear safety goggles, gloves, and other personal protective equipment (PPE) to prevent serious injury.**

Failure to follow these warnings could result in death or serious injury.

NOTE: *Bucket teeth must be replaced before the bucket tooth adapter wears out.*

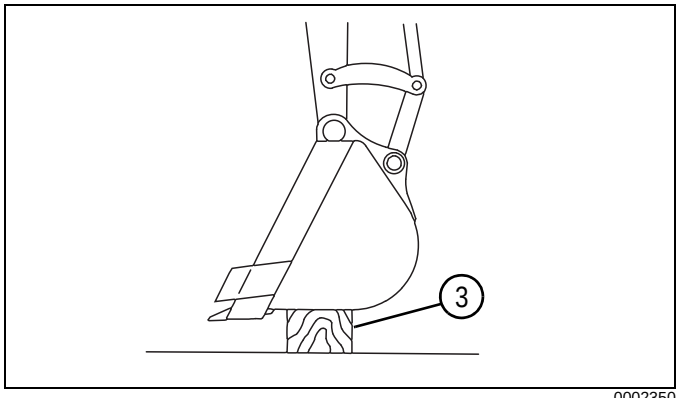
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0002349

Figure 5-92

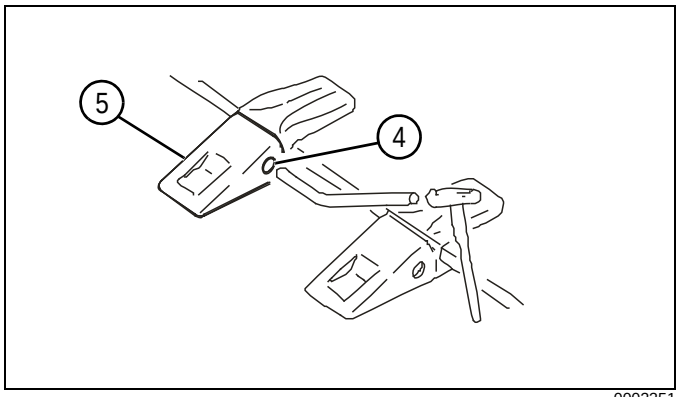
2. Measure the length of the bucket teeth (1). If the bucket teeth are worn more than the service limit dimension (2), replace the bucket teeth.
   - The dimension of new bucket teeth is 5.90 in. (150 mm).
   - The minimum service limit of bucket teeth is 2.95 in. (75 mm).



0002350

Figure 5-93

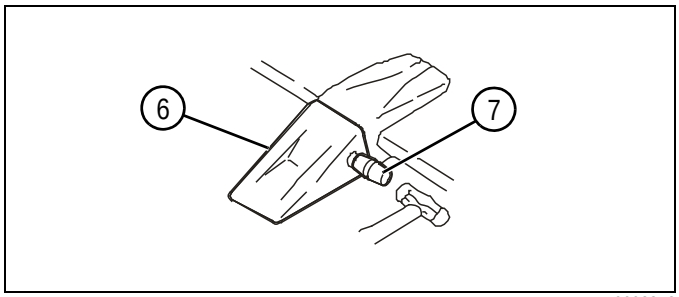
3. Select a stable work surface. Move the hydraulic controls to the locked position. Keep the bottom of the bucket level on a wooden block (3).



0002351

Figure 5-94

4. Remove the roll pins (4) and worn bucket teeth (5).



0002352

Figure 5-95

5. Install new bucket teeth (6) and roll pins (7) in the reverse order of removal.

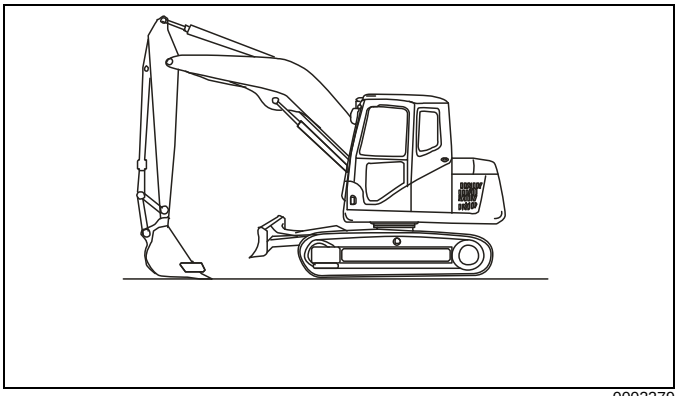
Replace the Bucket

CAUTION

- **Keep fingers and other body parts away from pinch points to prevent crushing injuries while removing or installing the bucket. Never put your finger into the pin bore during alignment.**
- **Secure buckets after removal and before servicing.**
- **Bucket pins may be ejected with extreme force when removed forcefully. Do not allow anyone to stand in front of the pins during removal.**
- **Never stand or place your feet or other body part under the bucket when removing bucket pins.**

Failure to follow these precautions could result in injury.

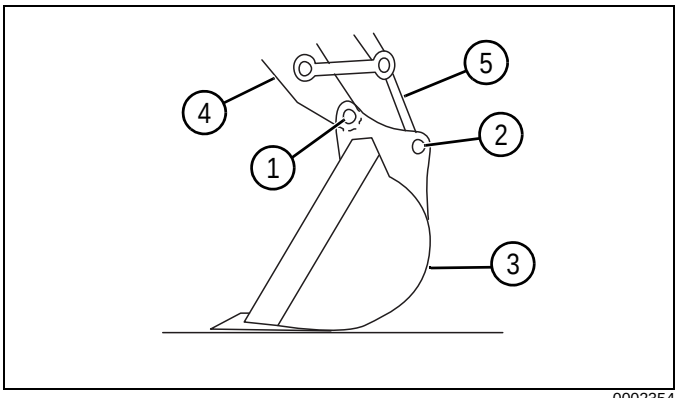
1. Prepare the machine for service. See “Maintenance Safety” on page 2-4.



0002279

Figure 5-96

2. Lower the bucket to the ground and support the bucket to prevent it from rolling over when the bucket pin is removed.



0002354

Figure 5-97

3. Remove the bucket pin hardware and bucket pins (1 and 2) and remove the bucket (3) from the arm (4) and linkage (5).
4. Clean the pins and pin bores. Lubricate the pin bores with grease.
5. Align the arm with a new bucket. Make sure the bucket is secured and will not move.
6. Align the arm and bucket and install the bucket pin. Install the retaining fasteners into the pin.
7. Align the linkage to the bucket and install the bucket pin. Install the retaining fasteners into the pin.
8. Grease the bucket pins.

Start the engine and run it at low idle. Operate the bucket by slowly curling it in both directions to check for binding.

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Chapter 6

Specifications

Machine Dimensions

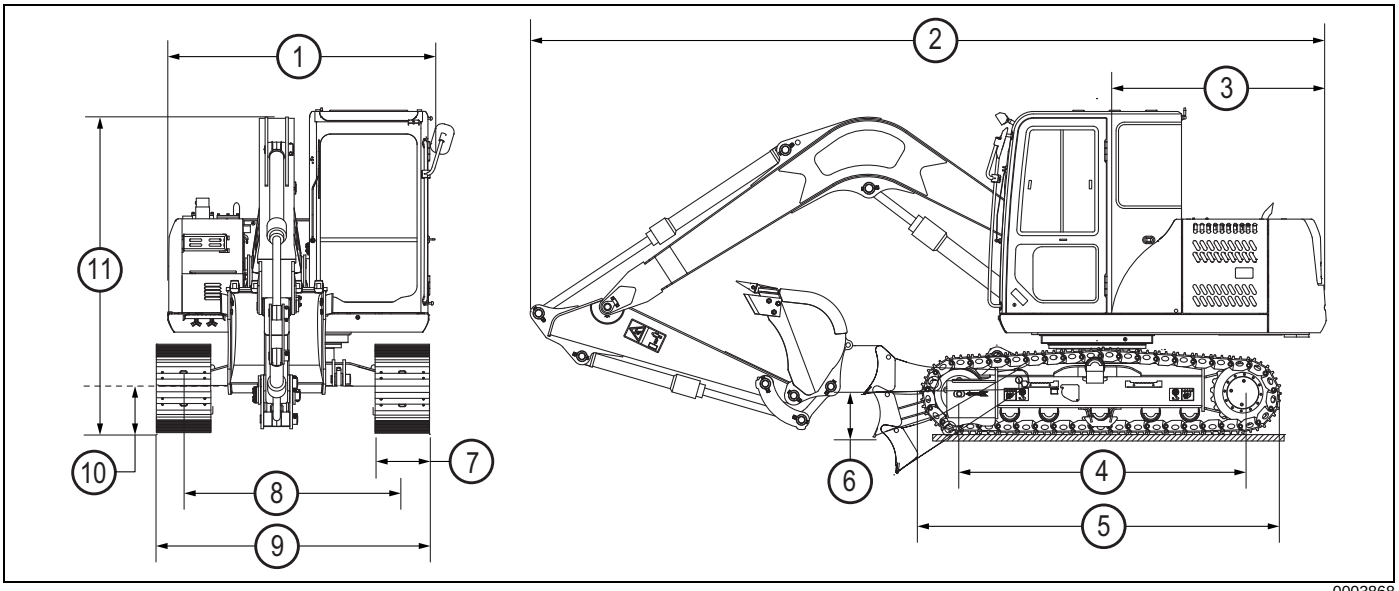
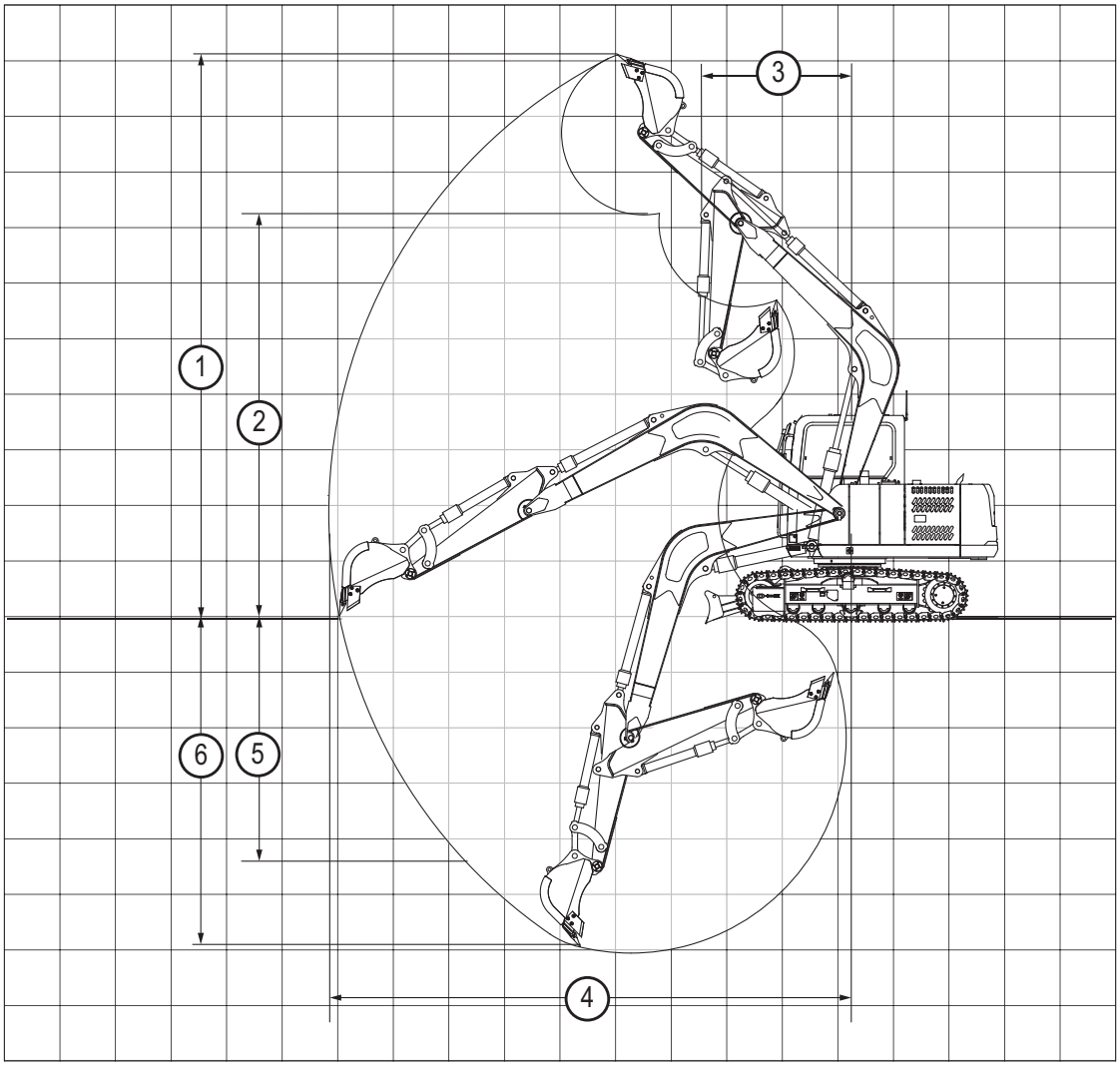


Figure 6-1

Item	Description	Dimensions
1	Upper structure width	7 ft. 3 in. (2.20 m)
2	Transport length	23 ft. 0 in. (7.01 m)
3	Tail swing radius	4 ft. 10 in. (1.48 m)
4	Track length on ground	7 ft. 7 in. (2.32 m)
5	Track length	9 ft. 7 in. (2.92 m)
6	Blade height	1 ft. 4 in. (.41 m)
7	Standard track width	1 ft. 6 in. (.45 m)
8	Track gauge	5 ft. 9 in. (1.75 m)
9	Transport width	7 ft. 3 in. (2.20 m)
10	Minimum ground clearance	1 ft. 3 in. (.37 m)
11	Transport height	8 ft. 4 in. (2.55 m)

Operating Range



0003869

Figure 6-2

Item	Description	Dimensions
1	Maximum cutting height	24 ft. 0 in. (7.32 m)
2	Maximum dumping height	17 ft. 10 in. (5.43 m)
3	Minimum swing radius	7 ft. 11 in. (2.40 m)
4	Maximum reach at ground level	23 ft. 4 in. (7.12 m)
5	Maximum vertical wall digging depth	8 ft. 2 in. (2.49 m)
6	Maximum digging depth	14 ft. 11 in. (4.54 m)

Technical Specifications

Description	Specification
Operating weight	19,401 lb. (8800 kg)
Bucket capacity	98.88 cu ft (2.8 m^3)
Yanmar engine	4TNV98CT
Rated power (kW/rpm)	(53.7 kW) at 2000 rpm
Travel speed (high/low)	High speed 2.8 mph (4.5 km/h) Low speed 1.6 mph (2.5 km/h)
Swing speed (maximum)	10.2 rpm

Chapter 7

Optional Equipment

Optional Equipment Selection

Consult a SANY dealer before installing any optional equipment on the machine. Depending on the type of optional equipment selected, protective structures (such as front guards or top guards) may need to be installed on the machine.

Only install SANY-approved optional equipment. SANY assumes no responsibility for accidents, loss, or failures caused by any unapproved optional equipment.

Read Equipment Instructions

Read and understand the optional equipment manual before installing and operating any optional equipment. Do not exceed the manufacturer's specifications for maximum flow and pressure of optional equipment.

If the optional equipment manual is missing or damaged, contact the manufacturer of the optional equipment to obtain a replacement.

Installation and Removal Precautions

NOTICE!

The following precautions must be strictly observed when selecting, installing, and operating optional equipment. Failure to follow this notice can damage the machine or cause it to operate improperly.

- Follow the instructions in this manual and in the optional equipment manual.
- Remove and install equipment only on a firm, level surface.
- Use an appropriate lifting device when handling heavy objects.
- Never stand under a suspended load.
- Make sure the machine is well-balanced and supported whenever installing or removing optional equipment.

For additional information about removal and installation of optional equipment, consult a SANY dealer.

Equipment Operation Precautions

NOTICE!

The following precautions must be strictly observed when selecting, installing, and operating optional equipment. Failure to follow this notice can damage the machine or cause it to operate improperly.

- Prior to the operation, move the machine to a safe area and test its operation.
- Be aware of how the machine will move with an optional piece of equipment, since the machine's center of gravity and working range may change.
- Make sure the machine is well-balanced.
- Maintain a safe distance from all surrounding barriers during machine operations.
- In order to prevent the machine from tipping over, never swing, lower, or stop the machine suddenly.
- In order to prevent impact that may cause the machine to tip over, never raise or lower the boom suddenly.
- Install front guards on the machine as necessary per the nature of the optional equipment.

Install Optional Equipment

WARNING

- **Do not release the equipment unless it is on the ground or on a solid, supportive surface. Block or support the equipment to prevent rolling or tipping.**
- **Hydraulic systems operate under high pressure. Escaping hydraulic oil under pressure is dangerous. Always relieve pressure before disconnecting hoses.**

Failure to follow these warnings could result in death or serious injury.

1. Prepare machine for service. See “Maintenance Safety” on page 2-4.
2. Relieve system pressure. See “Relieve the Hydraulic System Pressure” on page 5-32.

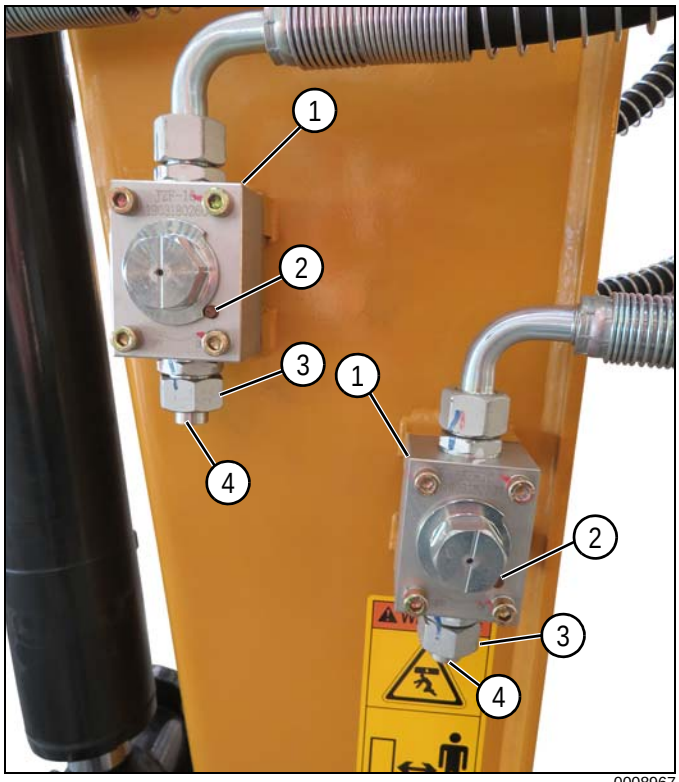


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Figure 7-1

NOTE: *The stop valves are located on each side of the boom.*

3. Turn both stop valves (1) to the closed position (2) as shown.

NOTICE!

Dispose of hydraulic oil according to all applicable environmental regulations. Failure to follow this notice could damage the environment.

4. Place a suitably sized container under the hydraulic connections to catch any residual hydraulic oil.
5. Remove the caps (3) and plugs (4) from the hydraulic lines.
6. Connect the optional equipment to the machine according to the manufacturer’s instructions.
7. Connect the optional equipment hydraulic lines and operate the optional equipment according to the manufacturer’s instructions. Turn the stop valves to the open position.

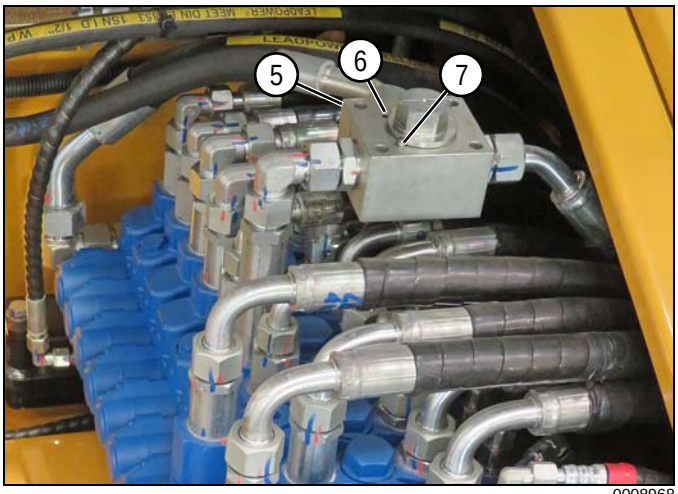

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Figure 7-2

8. Adjust the return flow selector valve (5) according to the optional equipment being installed. The return flow selector valve is located behind the right front access door. It regulates the direction of hydraulic oil flow. There are one-way (6) or two-way (7) positions for operating optional equipment.

NOTE: *A variety of optional one-way and two-way flow equipment is available for use on this machine. A hydraulic breaker is an example of one-way flow equipment; a bucket thumb or shear are examples of two-way flow equipment.*

9. Select the correct operating mode from the monitor. See “Operating Mode Screen” on page 3-11.
10. Check the hydraulic oil level. See “Check the Hydraulic Oil Level” on page 4-9.

Remove Optional Equipment

WARNING

- **Do not release the equipment unless it is on the ground or on a solid, supportive surface. Block or support the equipment to prevent rolling or tipping.**
- **Hydraulic systems operate under high pressure. Hydraulic oil escaping under pressure is dangerous. Always relieve pressure before disconnecting hoses.**

Failure to follow these warnings could result in death or serious injury.

1. Prepare machine for service. See “Maintenance Safety” on page 2-4.
2. Relieve system pressure. See “Relieve the Hydraulic System Pressure” on page 5-32.

NOTICE!

Dispose of the hydraulic oil according to all applicable environmental regulations. Failure to follow this notice could damage the environment.

3. Turn both stop valves (1) to the closed position (2) as shown.
4. Place a suitably sized container under the hydraulic connection to catch any residual hydraulic oil.
5. Disconnect the optional equipment hydraulic lines according to the manufacturer’s instructions.

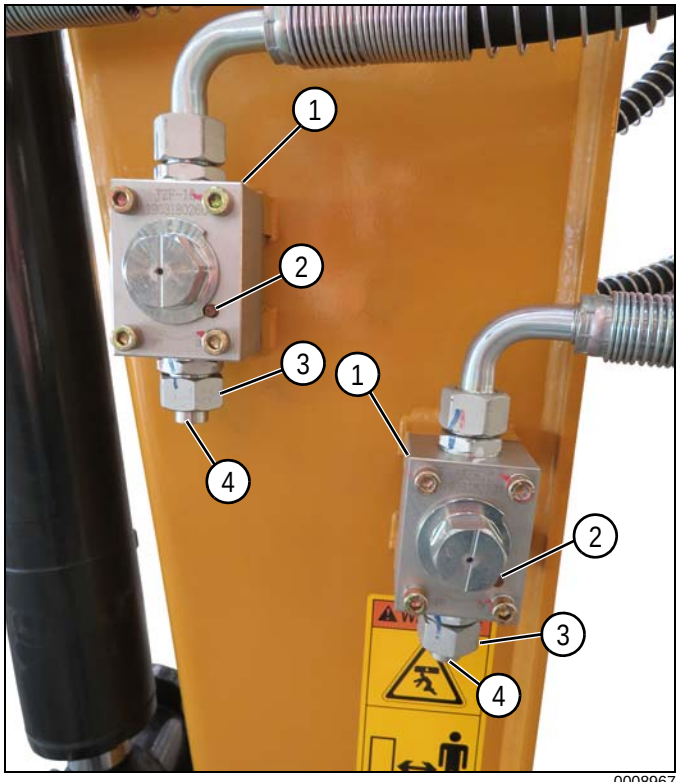

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Figure 7-3

6. Install the plugs (4) and then the caps (3) on the hydraulic lines.
7. Disconnect the optional equipment from the machine according to the manufacturer’s instructions.
8. Adjust the return flow selector valve as necessary. See “Return Flow Selector Valve” on page 3-22.
9. Select the correct operating mode from the monitor. See “Operating Mode Screen” on page 3-11.
10. Check the hydraulic oil level. See “Check the Hydraulic Oil Level” on page 4-9.

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