Operation and Maintenance Manual

SY155U Excavator

service@sanyamerica.com

SANY Part Number SSY005079291

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SY155U 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 it. Failure to follow safety messages could result in death or serious injury. Keep this manual with the machine for reference.

This manual and its contents prepared by SANY Technical Publications, while deemed to be accurate, is based upon technical information provided and for equipment designed, manufactured, and tested by:

SANY Heavy Machinery CO., LTD
SANY Industry Town
Lianggang Road, No. 318
Fengxian, Shanghai, China 201413

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 its environment/conditions of use.

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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 SY155U excavator.

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.

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 the operation and maintenance manual should remain in the machine at all times.

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

Table of Contents

This section provides a list of the general topics in each chapter, along with their page numbers.

Introduction

This section provides an overview of this manual, serial number information, and SANY contact information.

Safety

This section provides general and product-specific safety information for this machine. It explains the hazard alerts used throughout the manual.

Machine Controls

This section provides an overview of all controls and operating systems.

Machine Operation

This section provides detailed prestart checks, operating procedures, end-of-day checks, and storage information.

Maintenance

This section provides routine maintenance procedures and fluid specifications.

Specifications

This section provides general dimensions and weight of the machine, and systems/components performance information.

Optional Attachment

This section provides information on operation of the attachments that can be used with this machine.

Machine Applications

SANY excavators are designed for the following operations:

- Digging
- Leveling
- Loading
- Demolishing

Machine Directions

In this manual, the front, back, left, and right directions indicate the moving direction when viewed from the operator seat (see Fig. 1-1).

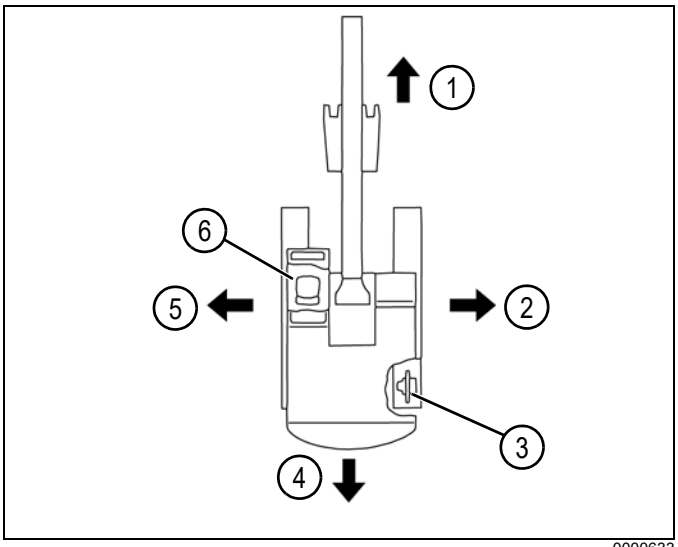

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Figure 1-1

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

Serial Number Location

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

Product Identification Plate

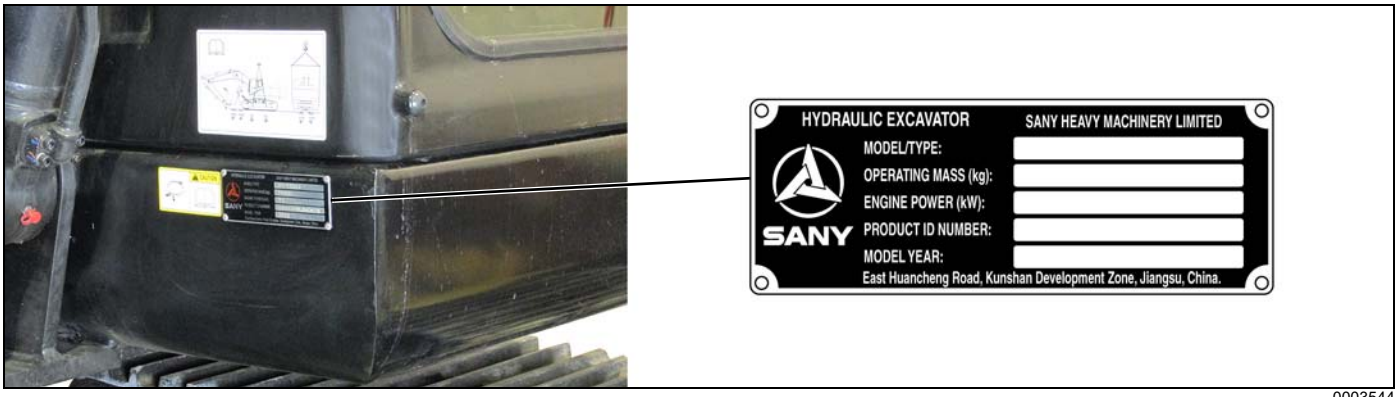

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Figure 1-2

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

Frame Serial Number

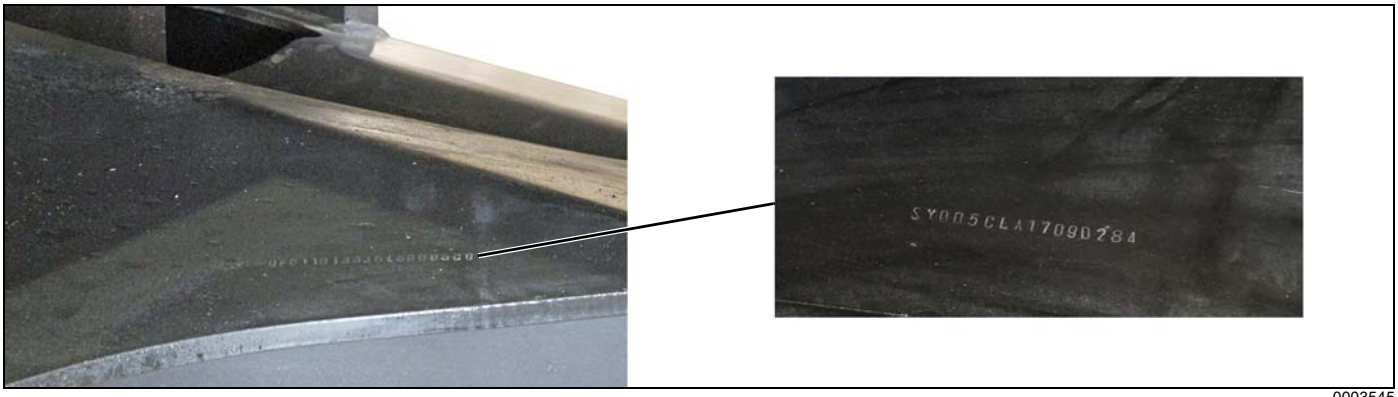

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Figure 1-3

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

Swing Motor Identification Plate

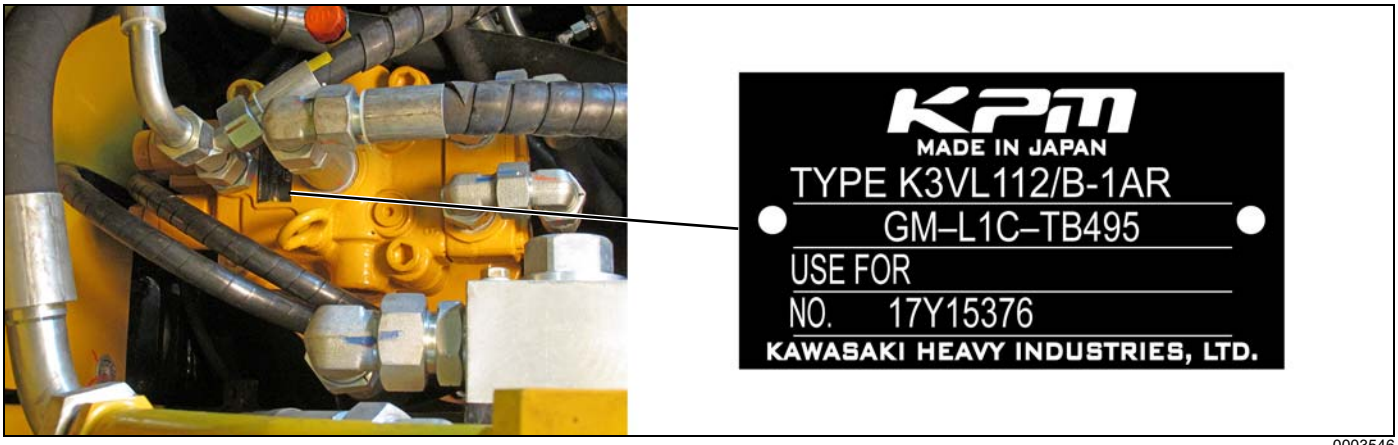

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Figure 1-4

The identification plate is on the top of the swing motor.

Engine Identification Plate

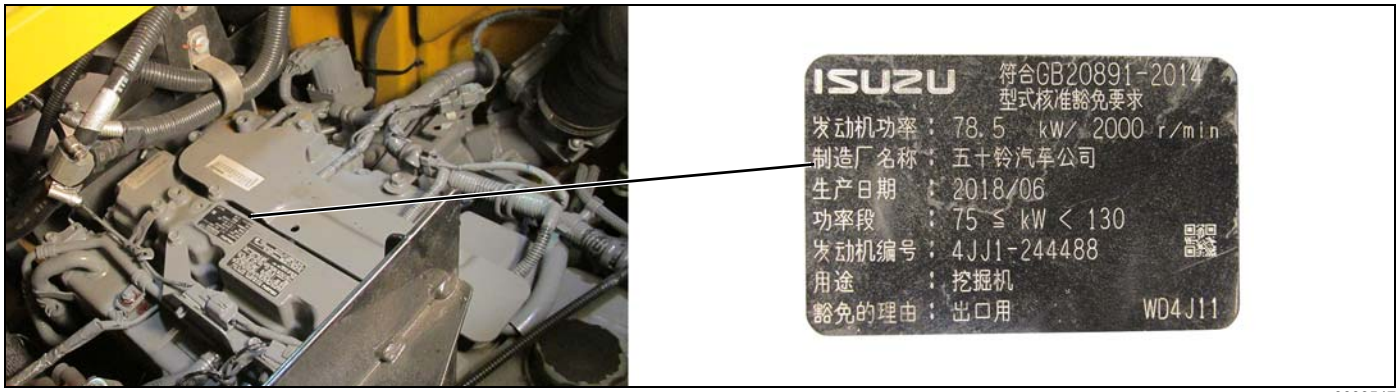

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Figure 1-5

The identification plate is on the top of the engine.

Hydraulic Pump Identification Plates

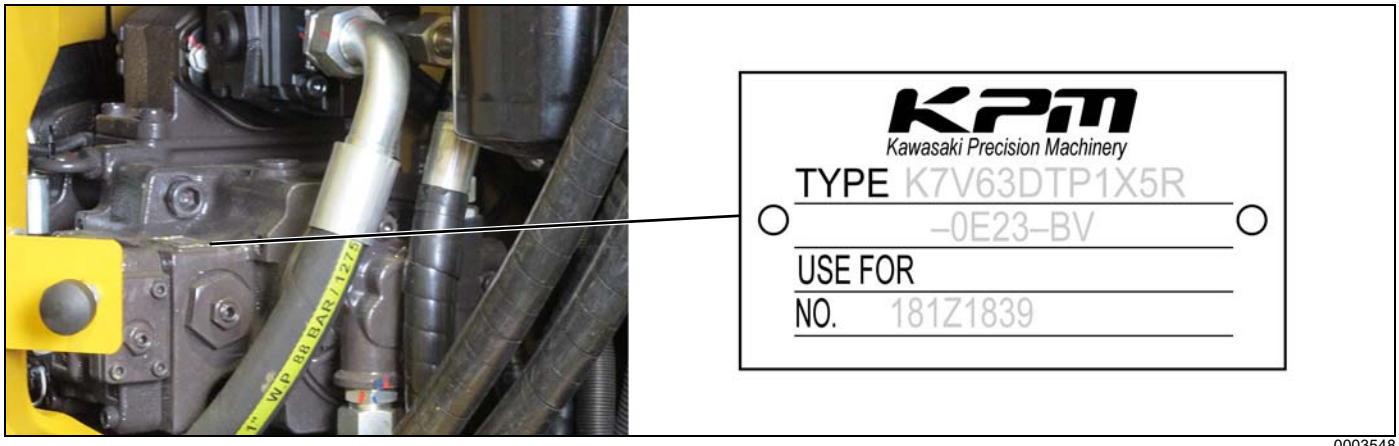

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Figure 1-6

The identification plate is on the top of the hydraulic pump.

Travel Motor Identification Plate

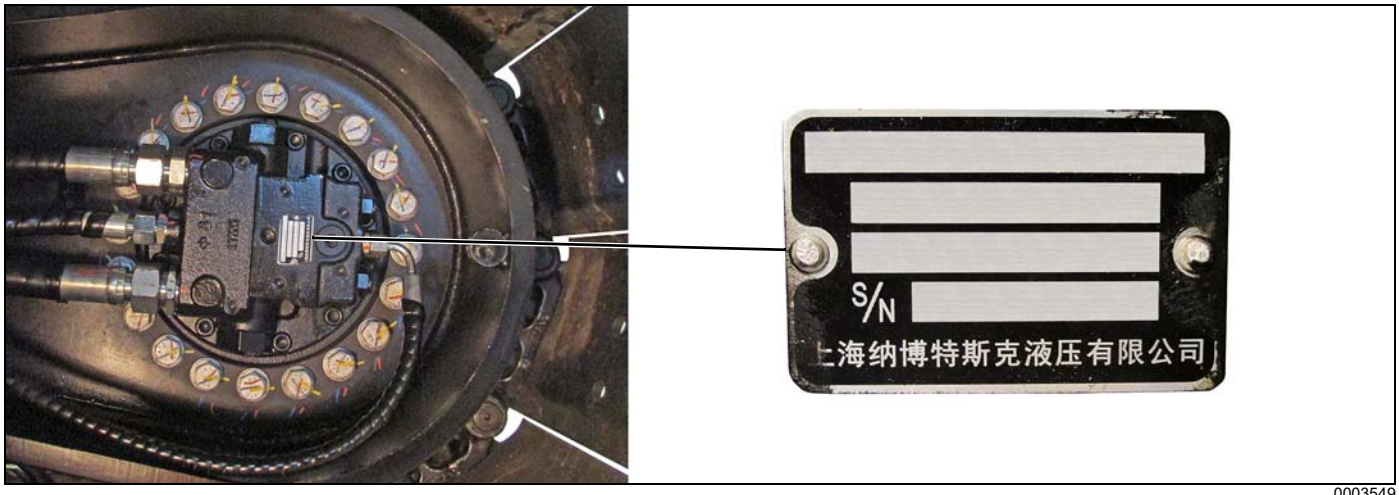

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Figure 1-7

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

SANY Contact Information

SANY
318 Cooper Circle
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Phone: 470-552-SANY (7269)
Fax: 770-632-7820

Record of Serial Number and Dealer Information

Use this table to record the product information related to this machine.	
Machine Serial No.	
Engine Serial No.	
Right Travel Motor Serial No.	
Left Travel Motor Serial No.	
Swinging Drive Motor Serial No.	
Hydraulic Pump Serial No.	
Dealer Name: Address:	
Email:	
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
Your Name
Company Name
Department
Street Address
City, State, and ZIP/Postal Code
Phone
E-mail
Machine Model and Serial No.
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
DEF – Diesel Exhaust Fluid
DPF – Diesel Particulate Filter
ECM – Engine Control Module
GPS – Global Positioning System
HEST – High Exhaust System Temperatures
ISO – International Organization for Standardization
LCD – Liquid Crystal Display
OEM – Original Equipment Manufacturer
OSHA – Occupational Safety and Health Administration
PPE – Personal Protective Equipment
PQR – Procedure Qualification Report
ROPS – Rollover Protective Structure
SAE – Society of Automotive Engineers
SCA – Supplemental Coolant Additive
SDS – Safety Data Sheet
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 jobsite 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, 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 the 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.
- Inspect 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 improperly maintained machine.
- Only the operator should be on the machine while it is in operation.
- Be sure all underground utilities have been marked before excavating.

Mount and Dismount the Machine

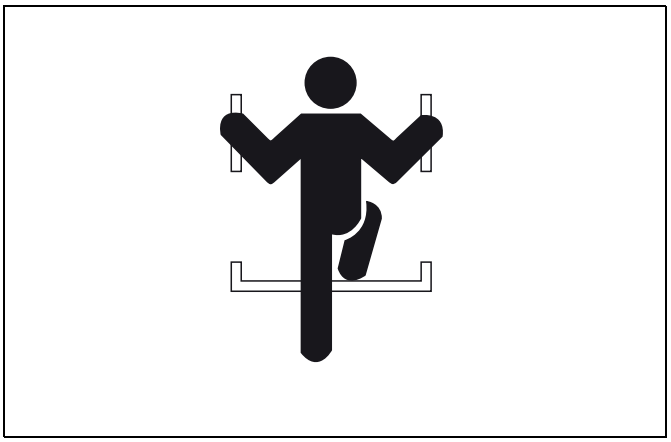

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Figure 2-1

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

- Always make sure the machine is at a complete stop before entering or exiting the machine. Never jump on or off the machine.
- Never exit or enter the cab by any other means 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 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 multipurpose construction machine is used primarily for digging or loading earth and stones. It can also be used for grading, slope-trimming, lifting, breaking, demolishing, and trenching. 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 people on the machine or in the cab.
- Attaching cables, chains, or other items to the machine to transport objects.
- Overloading the machine beyond its capacity.

Unauthorized Machine Modifications

Do not perform any unauthorized machine modifications.

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 batteries 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 and 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 a fire extinguisher on the machine. 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 located on the lower left of the seat 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 emergency 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.

Perform the lockout/tagout procedure in accordance with company policy.

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, 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 fluids from spraying out. See “Relieve Hydraulic System Pressure” on page 5-39.

The engine coolant and oils 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.

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

When installing high-pressure hoses, make sure they are not twisted. Damaged hoses are dangerous and should be replaced. Take extreme caution 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

Perform the lockout/tagout procedure on the machine in accordance with company policy.

Cleaning 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.

Never mix gasoline with diesel fuel. Gasoline is extremely flammable and could cause an explosion.

Always allow room for the fuel to expand when filling the fuel tank.

High-Pressure Oil Lines

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 safety glasses and protective gloves and use a piece of wood or cardboard to check for leaks.

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.*

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

If high-pressure oils penetrate skin or get into eyes, seek medical attention immediately.

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 to be serviced, contact a SANY dealer.

Electrical System

Always clean the electrical system using only SANY-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 batteries, always work in a well-ventilated area. Batteries 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 batteries:

- 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 the skin or in the eyes, flush the area immediately with fresh water and seek medical attention.

Check the battery's condition with proper test equipment.

Disconnect the Battery

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

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, lock the controls, and secure the machine to prevent tampering by unauthorized personnel. Shut down the engine before exiting the machine.

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 jobsite, 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, 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 a suitable hearing protective device to protect against loud noises.

Travel and Operation Precautions

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.

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:

- 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

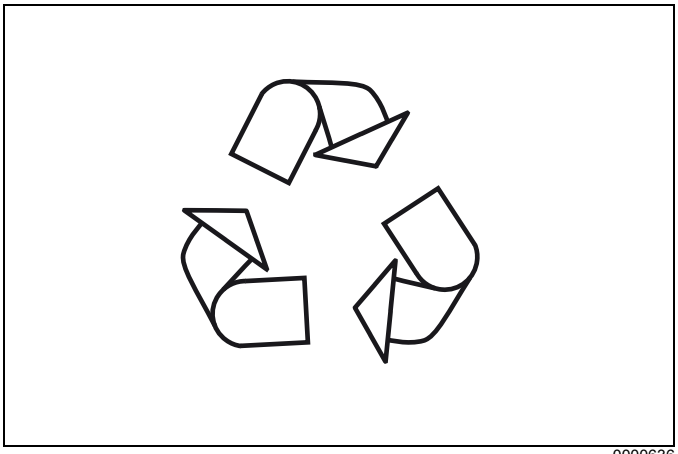

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Figure 2-2

Oils 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 the 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, batteries, hydraulic oil, and used parts.

Precautions in High-Voltage Areas

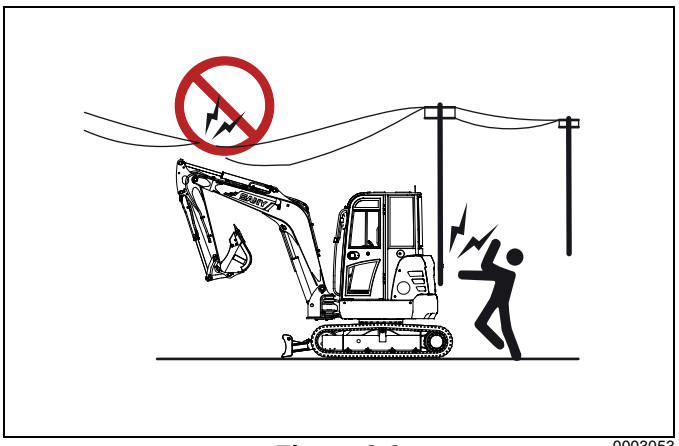

Figure 2-3 0003053

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

Exterior Components

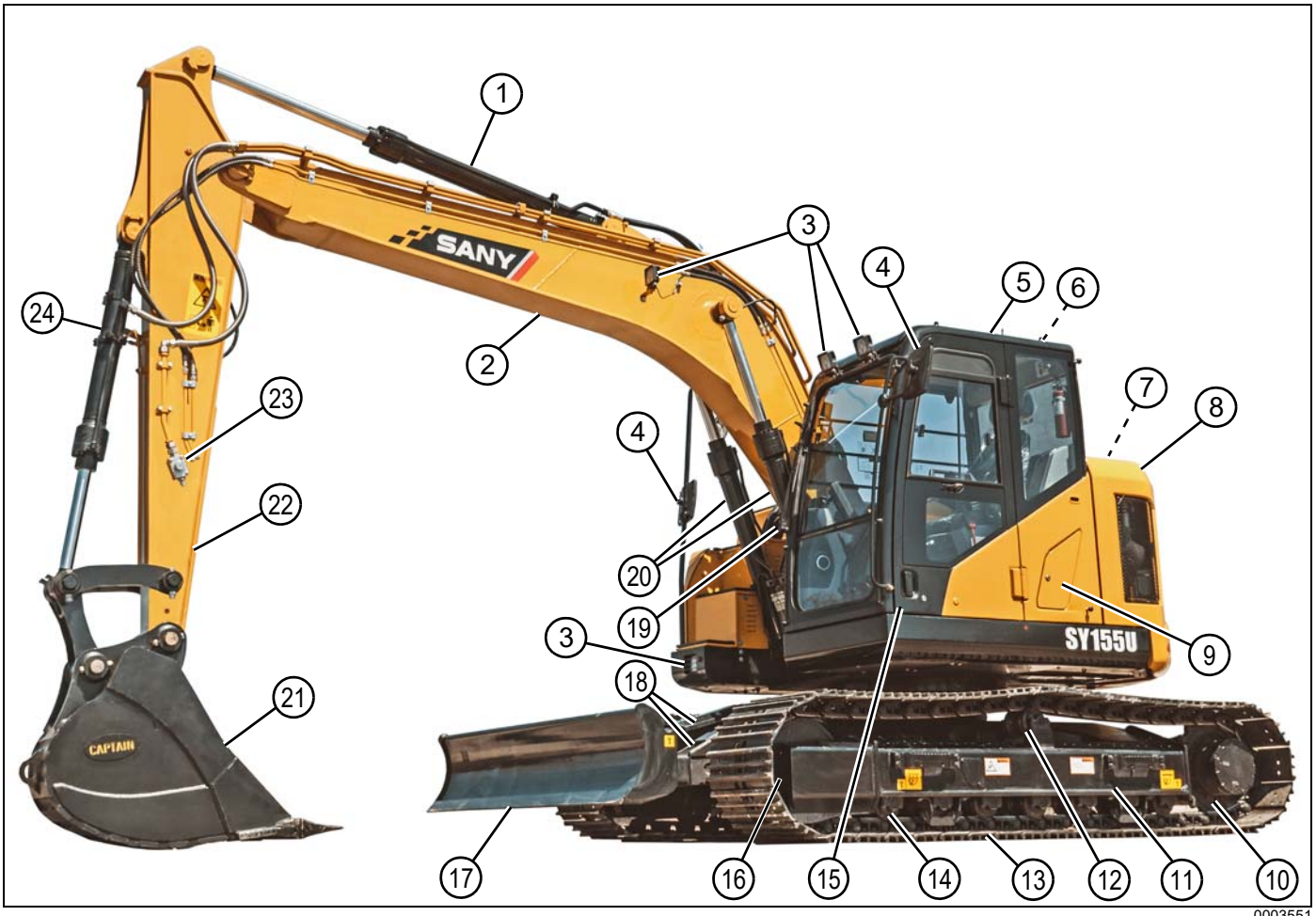

Figure 3-1

1 Arm cylinder
2 Boom
3 Work lights
4 Mirrors
5 Cab
6 Beacon light
7 Top engine compartment cover
8 Left rear access door
9 Fresh-air filter access door
10 Sprocket
11 Track frame
12 Carrier roller
13 Track
14 Track roller
15 Door
16 Idler
17 Dozer blade
18 Dozer blade cylinders
19 Windshield wiper
20 Boom cylinders
21 Bucket
22 Arm
23 Stop valve
24 Bucket cylinder

Controls

Figure 3-2

1 Left joystick (page 3-8)
2 Climate control panel (page 3-20)
3 Left console (page 3-7)
4 Hydraulic lockout control lever (page 3-6)
5 Emergency stop switch (page 3-15)
6 Footrests
7 Travel control pedals (page 3-6)
8 Travel control levers (page 3-6)
9 Sunlight sensor (page 3-19)
10 Monitor console (page 3-15)
11 Right console (page 3-7)
12 Dozer blade control lever (page 3-7)
13 Right joystick (page 3-9)
14 Radio (page 3-21)

Hydraulic Lockout Control Lever

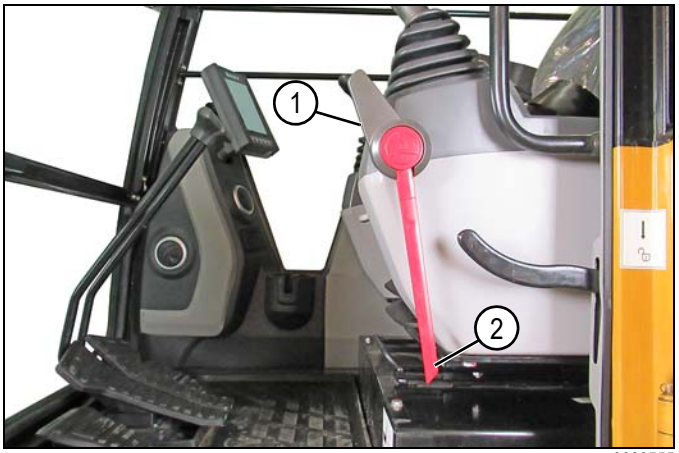

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Figure 3-3

WARNING

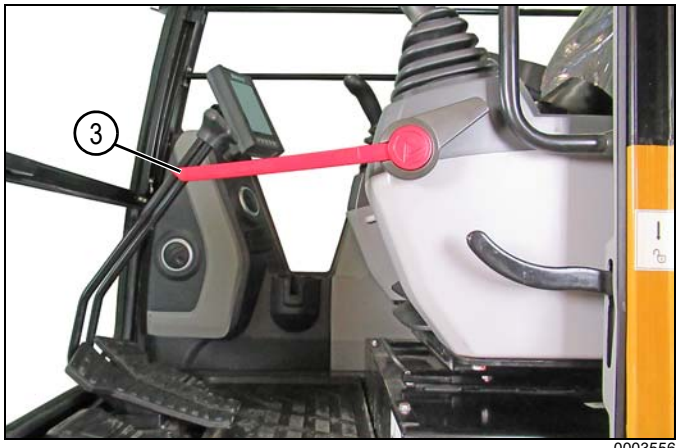
Always place the hydraulic lockout control lever in the locked (closed) position before leaving the seat. Failure to follow this warning, and unintended movement of the joysticks or travel control levers/pedals, could result in death or serious injury.

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. Failure to follow this notice could damage the machine or cause improper operation.

Moving the hydraulic lockout control lever (1) down to the locked (closed) position (2) disables the hydraulic system. The machine will not move, even if the controls are moved.

Use the hydraulic lockout control lever when parking the machine, leaving the cab, or performing routine service procedures and inspections, to prevent accidental movement of the machine.

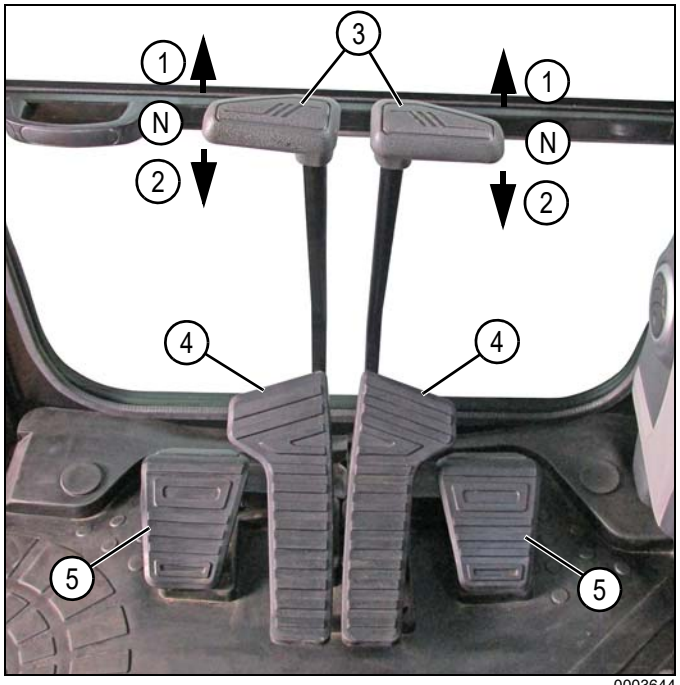


0003556

Figure 3-4

Moving the hydraulic lockout control lever up to the unlocked (open) position (3) enables the hydraulic system. The machine will now respond to the commands sent by the joysticks and other controls.

Travel Control Levers/Pedals



0003644

Figure 3-5

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, to avoid causing unexpected movement.**

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

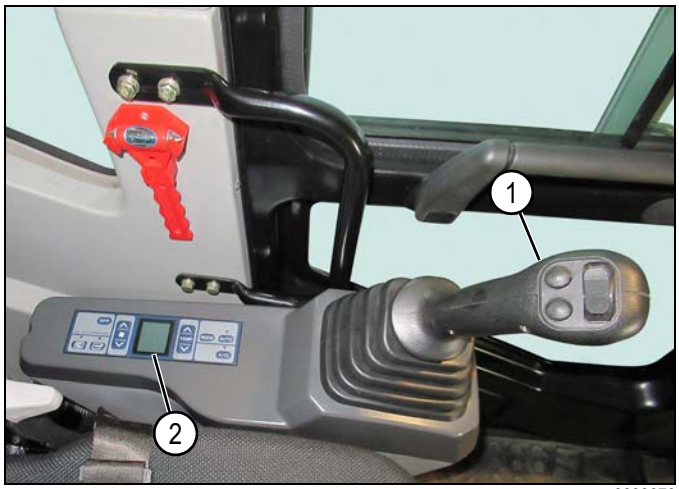
NOTE: *The track frame is facing forward when the drive sprocket is to the rear of the operator. All travel controls are reversed when the machine is facing rearward (travel sprocket is forward of operator).*

The travel control levers (3) or pedals (4) are used to change the machine's traveling direction.

- Forward travel: Push the control levers or pedals forward (1).
- Backward travel: Pull the control levers backward (2).
- Neutral position (N): The machine stops.

NOTE: *The footrests (5) are not control devices.*

Left Console

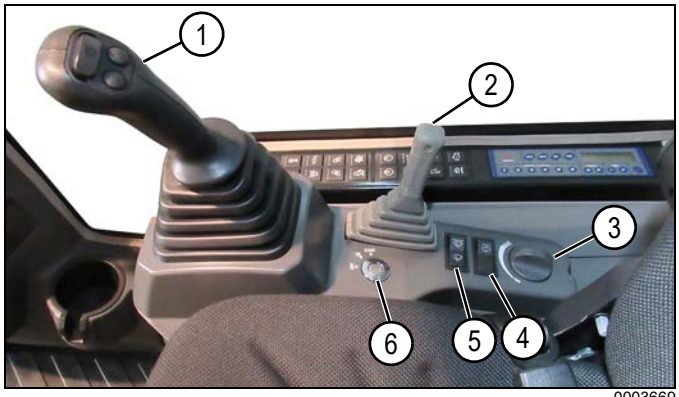


0003670

Figure 3-6

The left console contains the left joystick (1) and climate control panel (2). For additional information on the left joystick, see "Left Joystick" on page 3-8. For the climate control panel, see "Climate Control Panel" on page 3-20.

Right Console

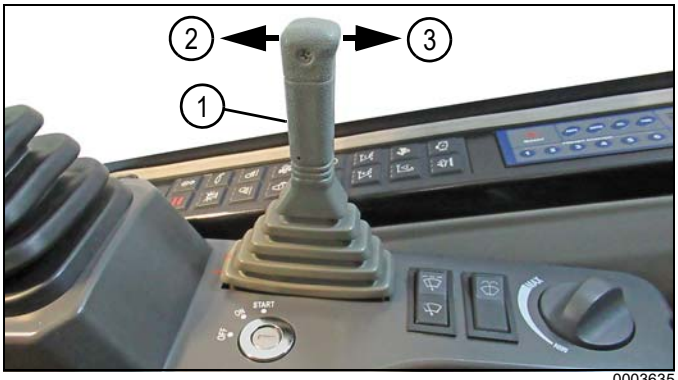


0003669

Figure 3-7

The right control console contains the right joystick (1), dozer blade control lever (2), throttle control dial (3), windshield washer switch (4), windshield wiper switch (5), and the key switch (6).

Dozer Blade Control Lever



0003635

Figure 3-1

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

- Move the lever forward (2) to lower the dozer blade.
- Move the lever backward (3) to raise the dozer blade.

NOTE: *When the dozer blade control lever is released, it will return to the neutral position.*

Throttle Control Dial

0003635

Figure 3-8

The throttle control dial (1) is used to adjust the engine speed. Turn the dial clockwise to increase engine speed. Turn the dial 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.

NOTE: *The throttle control dial position is displayed on the monitor home screen. See "Home Screen" on page 3-24.*

Windshield Washer Switch

0003635

Figure 3-9

NOTICE!

Before pressing the windshield washer switch, make sure that the windshield of the cab is closed. See “Sunlight Sensor” on page 3-19.

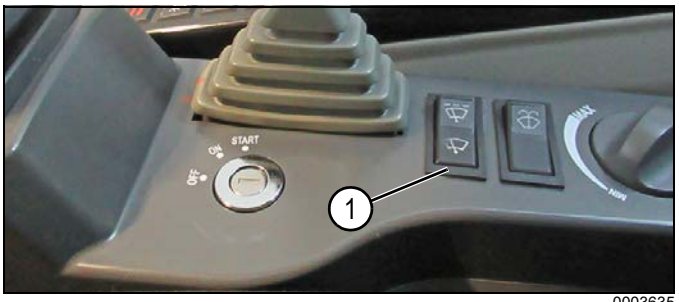
NOTE: *The battery disconnect switch and the key switch must be in the ON position to operate the windshield washer system.*

Press the windshield washer switch (1) to spray washer fluid onto the windshield to clean it.

Press and hold the switch to continue spraying washer fluid as needed.

The switch returns automatically to the off position when released, and the spray of washer fluid stops.

Windshield Wiper Switch



0003635

Figure 3-10

NOTICE!

Before activating the wiper on a dry windshield, press the windshield washer switch to spray washer fluid on the windshield to prevent damage to the wiper blade or windshield.

Use the windshield wiper switch (1) to activate the windshield wiper.

The windshield wiper switch has two operating positions. In the center position, the windshield wiper operates at low speed. To the right, the windshield wiper operates at high speed. Press the switch to the left to turn the windshield wiper off.

Key Switch

0003635

Figure 3-11

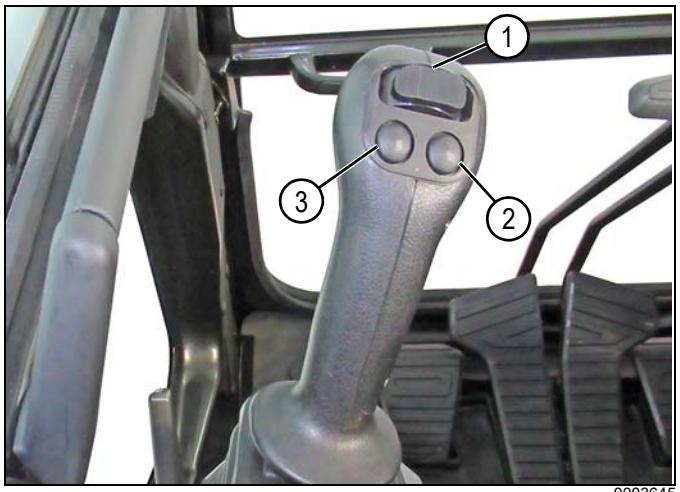
The key switch (1) is used to turn on the vehicle electrical system and start or stop the engine. There are three positions on the start switch:

- 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 turn on and engage the engine flywheel. 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. See “Starting the Engine” on page 4-16.

NOTE: *In cold weather, the engine may automatically enter a engine preheat cycle when the key switch is turned to ON. While in the preheat cycle, the preheat icon is illuminated on the monitor home screen and the engine glow plugs are energized. After the engine glow plugs are heated for a set period of time, the preheat cycle is complete. The preheat icon is no longer illuminated and the engine can be started.*

Left Joystick

Left Joystick Switches



0003645

Figure 3-12

WARNING

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

NOTE: *There are two operating modes available for the joystick controls: SAE (Society of Automotive Engineers) mode and the BHL (Backhoe Loader) mode. The swing and bucket functions are the same for both modes. See "Joystick SAE Mode" on page 3-16 and "Joystick BHL Mode" on page 3-16.*

- The toggle switch (1), located on the top of the left joystick, controls optional attachments that have a rotational hydraulic circuit by moving the switch to the left for counterclockwise operation, and to the right for clockwise operation.
- The bottom right button (2), located on the top right side of left joystick, is not used on this machine.
- The left accessory button (3), located on the top left side of left joystick, controls the accessory function.

Right Joystick

Right Joystick Switches

0006346

Figure 3-13

WARNING

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

NOTE: *There are two operating modes available for the joystick controls: SAE (Society of Automotive Engineers) mode and the BHL (Backhoe Loader) mode. The swing and bucket functions are the same for both modes. See "Joystick SAE Mode" on page 3-16 and "Joystick BHL Mode" on page 3-16.*

- The toggle switch (1), located on the top of the right joystick, is used for optional attachments with one-way or two-way hydraulic flow.
- The joystick button (2), located on the top of the right joystick, is not used on this machine.
- The horn button (3), located on the top of the right joystick, is used to sound the horn.

Switches

Switch Console

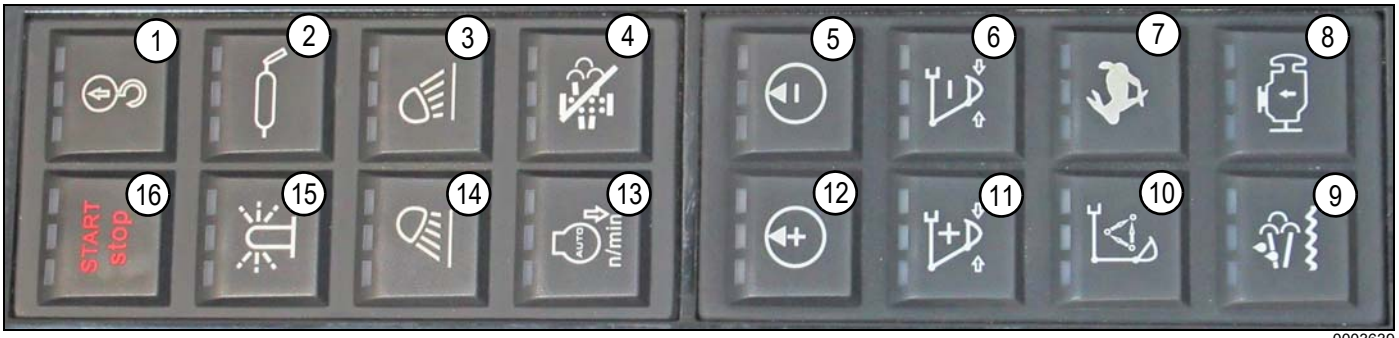


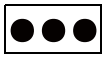
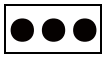
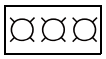
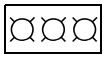
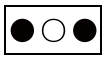
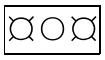
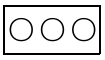
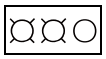
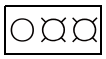
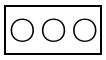
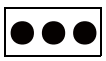
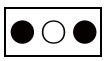
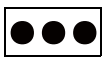
Figure 3-14

1 Overload alarm switch (not equipped)
2 Lubrication system switch (not equipped)
3 Rear work light switch (not equipped)
4 Regeneration inhibit switch
5 AUX flow rate (–) switch
6 AUX pressure (–) switch
7 Hydraulic travel motor mode switch
8 Engine escape mode switch
9 Manual regeneration switch
10 Work mode switch
11 AUX pressure (+) switch
12 AUX flow rate (+) switch
13 Auto idle switch
14 Front work lights switch
15 Beacon light switch
16 Start-Stop switch

The switch console consists of 16 switches with LED status lights to indicate the operating mode and a cigarette lighter/12V accessory outlet. See “Cigarette Lighter (12V)” on page 3-14.

Switch Icons and Status Indication

Item	LED Indication	LED Color – Status	Indication
1			Not equipped
2			Not equipped
3			Not equipped
4	●●●	Red	Automatic regeneration inhibited
5	●●●	Red	Flow rate of AUX (– –)
	☼☼○	Red – flashing	AUX (+) valve error
	○☼☼	Red – flashing	AUX (–) valve error
6	●●●	Red	Maximum (Max) pressure of AUX (– –) (optional)

Item	LED Indication	LED Color – Status	Indication
7		None	Slow travel mode
		Red	Fast travel mode
8		Red	Selective Catalytic Reduction (SCR) mode
		Red – flashing	Torque limited due to low engine oil pressure, high engine coolant temperature, or engine air filter blockage.
		Red – flashing	SCR inlet temperature sensor error, which will affect the fan speed.
9		Red	Manual regeneration on
		Red – flashing	SCR system error
NOTE: *No LED indicator lights illuminated = the system or component is disabled or off unless otherwise noted.*			
10		Red	Heavy duty work mode (H)
		Red	Standard duty work mode (S)
		Red – left and right alternate flashing	Breaker work mode (B)
		None	Light duty work mode (L)
11		Red	Maximum (Max) pressure of AUX (++) (optional)
12		Red	Flow rate of AUX (++)
		Red – flashing	AUX (+) flow rate control valve error
		Red – flashing	AUX (–) valve error
13		Red	Auto idle disabled
		Red	Auto idle enabled
14		Red	LED indicator lights on = front work lights on
15		Red	Beacon light is on and the audible travel alarm will beep.
16		Red	Start-stop
NOTE: *No LED indicator lights illuminated = the system or component is disabled or off unless otherwise noted.*			

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 (4) to deactivate automatic regeneration. The LED status lights on the switch will illuminate while automatic regeneration is inhibited.

The regeneration inhibit switch should be used when the machine is operating 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 machine to operate in a de-rate mode where engine rpm and power will be reduced and the machine will require a stationary regeneration.

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

Auxiliary Flow Rate and Pressure Switches

The auxiliary flow rate and pressure switches control the hydraulic flow (measured in gallons per minute [GPM] or liters per minute [LPM], and pressure going to optional attachments.

- Flow GPM/LPM = attachment speed.
- Pressure = attachment working force.

NOTICE!

Auxiliary flow rate and pressure adjustments need to be made by a service technician when installing an optional attachment. Access to the password protected maintenance and service screen is required for flow rate and pressure displays.

The attachment operating manual will provide these settings. The following switches adjust the auxiliary flow rate and pressure and are only to be used by a service technician:

- Switch (5) decreases the hydraulic flow rate.
- Switch (12) increases the hydraulic flow rate.
- Switch (6) decreases the hydraulic pressure.
- Switch (11) increases the hydraulic pressure.

Hydraulic Travel Motor Mode Switch

Use the hydraulic travel motor mode switch (7) to select the fast travel mode. When selected, the LED status lights on the hydraulic travel motor mode switch are illuminated.

NOTE: *When the hydraulic travel motor mode switch is off, the machine is in the slow travel mode and all three LED status lights on the switch are off.*

Use fast travel mode when moving the machine long distances between work areas.

Engine Escape Mode Switch

When certain engine conditions occur, such as an exhaust malfunction or a regeneration process is required and not performed, the engine may operate in a de-rate mode where engine rpm and power are reduced.

NOTICE!

Only use the engine escape mode switch for emergencies or moving the machine for servicing. Damage to the machine may occur if the fault causing the engine power to de-rate is not corrected.

0003717

Figure 3-15

The engine icon (17) on the monitor will be illuminated red when the engine is operating in a de-rate power mode. Under emergency situations, or moving the machine for servicing, you can temporarily disable the engine power restrictions using the engine escape mode switch (8). When the escape mode is activated, the engine icon (17) will change from red to green.

Manual Regeneration Switch

Typically, regeneration occurs automatically with no operator interaction required. However, if for some reason the automatic regeneration process is interrupted or the regeneration inhibit switch is activated for an extended period of time, soot will build up and increase exhaust back pressure. Eventually, the DPF system will become clogged and the manual regeneration icon (18) will flash yellow, indicating that a manual regeneration must be initiated. Use the manual regeneration switch (9) to initiate a stationary regeneration. See “Manual Regeneration” on page 4-20.

A regeneration does not have to be performed immediately after the manual regeneration icon flashes yellow, but ignoring the warning will change the regeneration indicator to a red status, where immediate stationary regeneration is required.

NOTE: *Unlike automatic regenerations, stationary regenerations require that the machine be parked with the engine running and equipment not operated until the entire regeneration process is completed.*

Refer to “Manual Regeneration” on page 4-20.

Work Mode Switch

Use the work mode switch (10) to switch between light duty work mode (L), breaker work mode (B), standard duty work mode (S), and heavy duty work mode (H).

The selected work mode letter L, B, S, or H (19) will appear on the display monitor as well.

NOTE: *The number (20) to the right of the work mode on the display monitor is the throttle dial position indicator, and displays from 1–10.*

0003695

Figure 3-16

NOTE: *LED status lights on the work mode switch will illuminate to indicate the mode selected as follows:*

- No LED indicator lights = light duty work mode (L).
- One LED indicator light = breaker work mode (B).
- Two LED indicator lights = standard duty work mode (S).
- All three LED indicator lights = heavy duty work mode (H).

Auto Idle Switch

The auto idle switch (13) enables or disables the auto idle function. The auto idle switch LED lights are on or off to indicate system status:

LED lights off = auto idle disabled.

LED lights on = auto idle enabled.

Enable auto idle when using the machine with long pauses in work operations. Auto idle reduces engine speed when the machine is not being operated. This reduces fuel consumption by 5% to 10% and reduces engine wear.

Auto Idle Function

0003636

Figure 3-17

The auto idle function will reduce fuel consumption and noise levels during periods of inactivity.

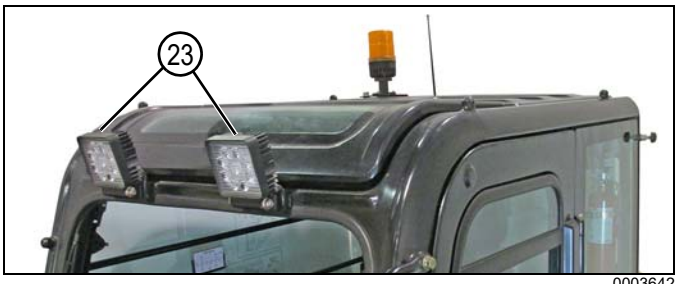
Pressing the auto idle switch on the right switch console activates/deactivates the auto idle function after the engine is started. See “Switch Console” on page 3-10.

With the engine running, the auto idle function works as follows:

- If the joysticks (21) and travel controls (22) remain in their neutral positions for 5 seconds or longer, the engine idle speed drops from the currently set idle speed to the factory-set auto idle speed (approximately 1350–1400 rpm).
- If either of the joysticks or the travel controls are operated, or if the throttle control dial is adjusted while the engine is idling at the auto idle speed, the engine speed automatically returns to its higher, previously set level or the newly set level.

Front Work Lights Switch

The front work lights switch (14) turns the four front work lights on and off (the switch LED lights are on).

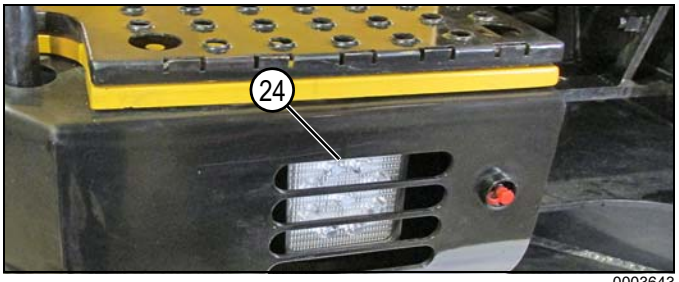


0003642

Figure 3-18

There are four front work lights:

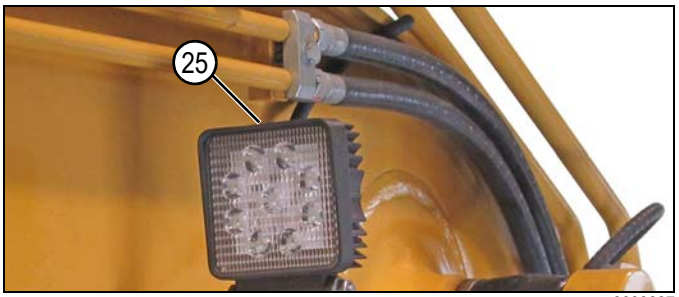
- Two work lights (23) on the upper forward cab.



0003643

Figure 3-19

- One work light (24) below the bottom right step.



0003687

Figure 3-20

- One work light (25) on the left side of the boom.

Travel Alarm Switch

The travel alarm switch (15) turns the beacon light and alarm on and off. The left and right LED switch status lights illuminate when the switch is on, and an audible travel alarm will beep. Turn on the travel alarm whenever the machine is being operated to increase jobsite safety.

Start-Stop Switch

Use the start-stop switch (16) 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 to stop the engine, then release the switch.
2. Turn the key switch to OFF.

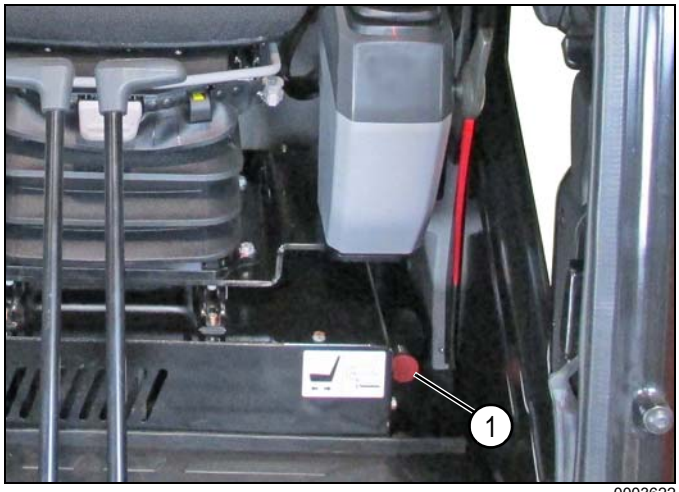
Cigarette Lighter (12V)

0003638

Figure 3-21

3. Press the cigarette lighter (1) in to activate. The lighter will pop out when ready. With the lighter removed, the 12V power outlet can be used to charge or operate 12V electronic devices.

Emergency Stop Switch



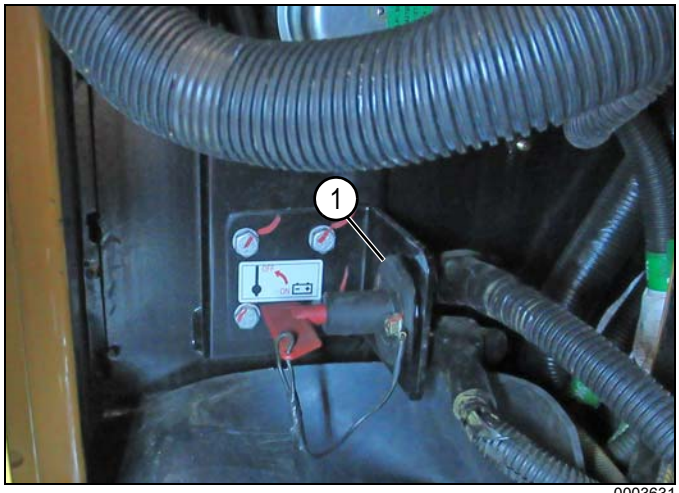
0003622

Figure 3-22

If an emergency stop and quick shutdown is required, or the engine cannot be stopped normally, push the emergency stop switch (1).

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

Battery Disconnect Switch



0003631

Figure 3-23

NOTICE!

- **Never turn the battery disconnect switch to OFF while the engine is running.**
- **After the machine is shut down, 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 improper operation.

The machine is equipped with a battery disconnect switch (1). When the switch is moved to the OFF position, electrical power is disconnected from all machine systems. Turn the power off when securing the machine for the day, or as needed when performing service.

To disconnect the battery power from the machine:

1. Move the key switch to OFF. Wait for all systems to shut down.
2. Open the left rear access door. See “Left Rear Access Door” on page 4-7.
3. Turn the battery disconnect switch (1) to the OFF position.
4. Close the left rear access door.

Monitor Console

0003637

Figure 3-24

The monitor (2) displays machine status information, warnings, and error messages. The operator can access various screens on the monitor, allowing machine settings to be changed. See “Monitor” on page 3-24.

The ashtray (3) is located on the monitor console.

Climate control vents (4) on the monitor console can be opened, closed, and rotated as needed for operator comfort or window defrost.

Joystick Modes

WARNING

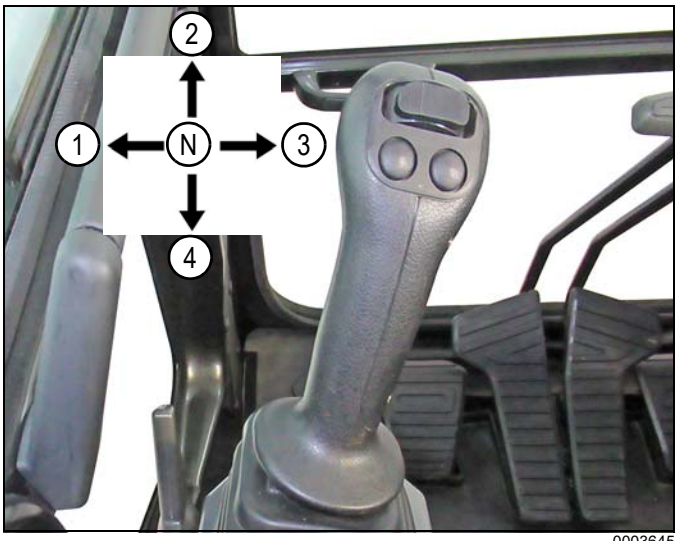
Prevent unexpected movement of the machine. Know the positions and functions of the joysticks before operation. Failure to follow this warning could result in death or serious injury.

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

Joystick SAE Mode

The joystick SAE mode is set with the pattern change valve. See “Pattern Change (SAE/BHL) Valve” on page 3-17.

Left Joystick—SAE Mode



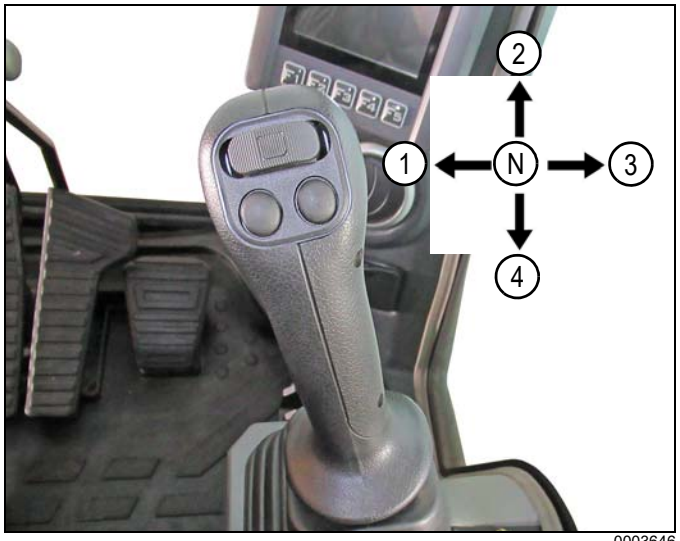
0003645

Figure 3-25

In the SAE mode, the left joystick controls the arm and upper structure as follows:

- 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



0003646

Figure 3-26

In the SAE mode, the right joystick controls the boom and bucket as follows:

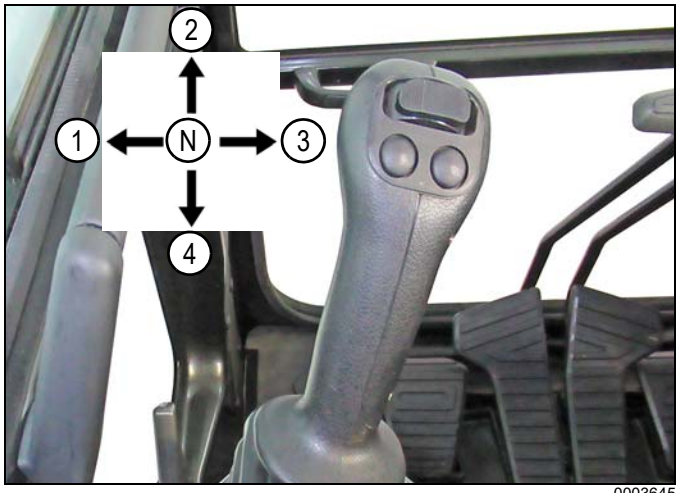
- Bucket curl (1)
- Boom down (2)
- Bucket uncurl (3)
- Boom up (4)
- Neutral (N)

NOTE: *When the joystick is released, it will return to the neutral position and the machine functions will stop.*

Joystick BHL Mode

The joystick BHL mode is set with the pattern change valve. See “Pattern Change (SAE/BHL) Valve” on page 3-17.

Left Joystick—BHL Mode



0003645

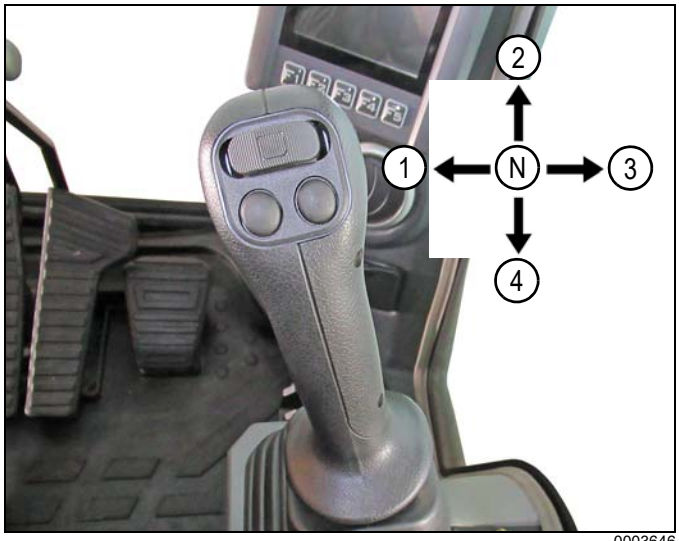
Figure 3-27

In the BHL mode, the left joystick controls the boom and upper structure as follows:

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

NOTE: *When the joystick is released, it will return to the neutral position and the machine functions will stop.*

Right Joystick—BHL Mode



0003646

Figure 3-28

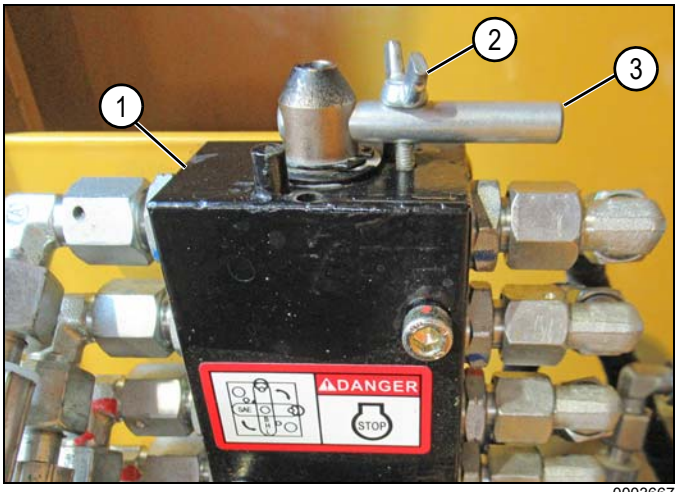
In the BHL mode, the right joystick controls the arm and bucket:

- Bucket curl (1)
- Arm out (2)
- Bucket uncurl (3)
- Arm in (4)
- Neutral (N)

NOTE: *When the joystick is released, it will return to the neutral position and the machine functions will stop.*

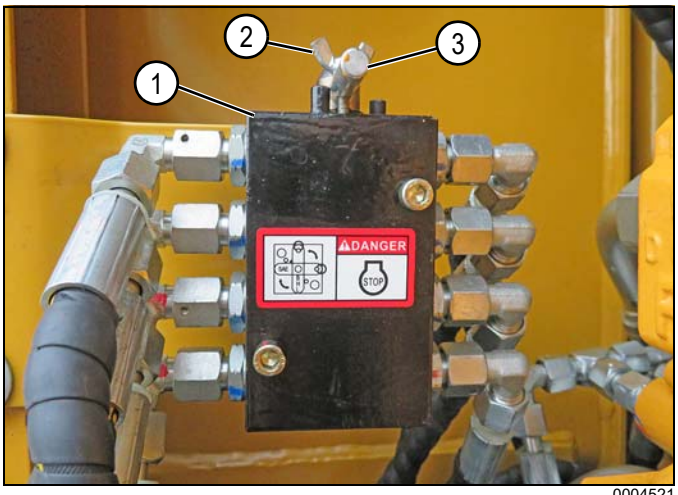
Pattern Change (SAE/BHL) Valve

The pattern change valve (1) is located inside the right front access door.



0003667

Figure 3-29 SAE Mode



0004521

Figure 3-30 BHL Mode

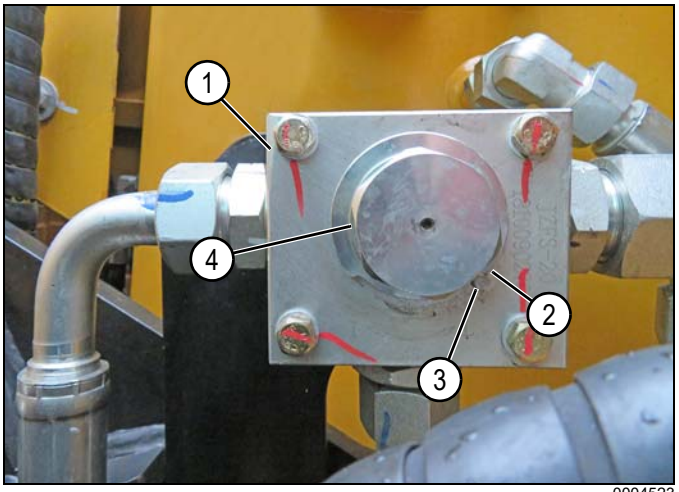
NOTICE!

Shut down the engine and relieve hydraulic system pressure before adjusting the pattern change (SAE/BHL) valve. Failure to follow this notice could result in damage to the machine or cause the machine to operate improperly.

The pattern change valve changes the control patterns of the left and right joysticks. See “Joystick SAE Mode” on page 3-16 and “Joystick BHL Mode” on page 3-16.

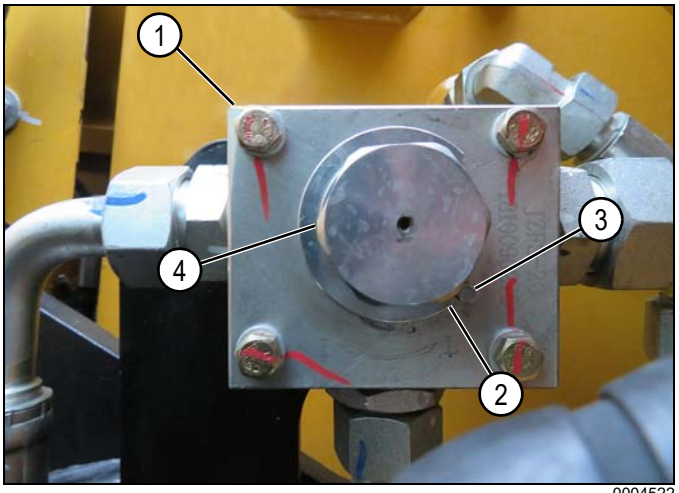
NOTE: To switch the pattern change valve from SAE to BHL, loosen or remove the fastener (2) from the threaded hole and rotate the valve handle (3) 90°. Install and tighten the fastener to lock the pattern change valve in the desired position.

Return Flow Selector Valve



0004523

Figure 3-31 One-way Flow



0004522

Figure 3-32 Two-way Flow

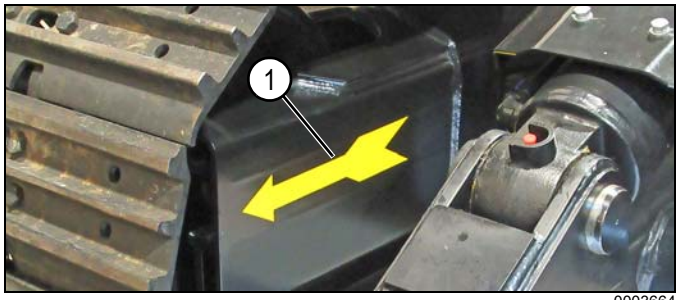
The return flow selector valve (1) has a one-way or two-way position for operating optional attachments. It is on the left side of the hydraulic oil tank.

Set the valve by turning the valve knob (4) clockwise or counterclockwise until the stops (2) on the knob contact the stop pin (3):

- Turn the valve clockwise until the stop is reached for one-way flow.
- Turn the valve counterclockwise until the stop is reached for two-way flow.

A variety of optional one-way and two-way flow attachments are available for use on this machine. A breaker is an example of a one-way flow attachment, and a shear is an example of a two-way flow attachment.

Directional Arrow



0003664

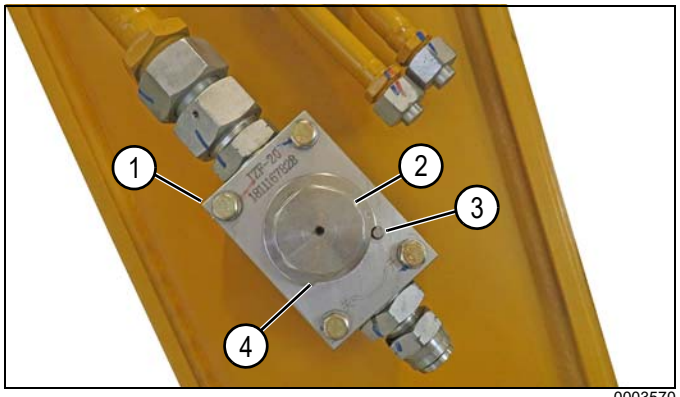
Figure 3-33

The directional arrow (1) on the inside of each track frame indicates the forward direction of the undercarriage. Check these arrows before using the travel control levers. When possible, face the cab in this direction.

NOTE: *When the operator cab faces backward, the travel direction will be the reverse of the normal travel control functions. (The machine moves forward when you pull the control levers backward, and the machine moves backward when you push the control levers forward.)*

NOTE: *The right side directional arrow is shown. The left side is similar.*

Stop Valve



0003570

Figure 3-34

Two stop valves (1) are mounted on the arm to aid in the removal and installation of optional equipment by shutting off hydraulic flow when optional equipment is removed. See “Install Optional Equipment” on page 7-3.

NOTE: *The right side of the arm stop valve is shown. The left side is similar.*

The stop valve is shown in the closed position. To open the valve, turn the valve knob (2) counterclockwise until the stop (4) makes contact with the stop pin (3).

Sunlight Sensor

0003632

Figure 3-35

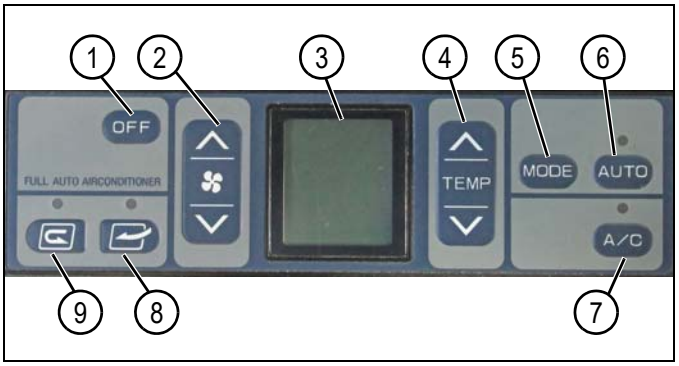
NOTICE!

Never place objects around the sunlight sensor, and keep it clean to make sure the automatic functions of the climate control system operate properly.

- The sunlight sensor (1) is on the front of the monitor console. The sunlight sensor adjusts the climate control system airflow to match the changes of temperature caused by direct sunlight.

Climate Control System

Climate Control Panel



0003663

Figure 3-36

1. OFF button
2. Fan speed button
3. Liquid Crystal Display
4. Temperature (TEMP) selection button
5. Vent MODE selection
6. Automatic (AUTO) temperature button
7. Air conditioning (A/C) button
8. Fresh-air button
9. Recirculated-air button

Climate Control System Operation

NOTICE!

If water gets in the control panel or the sunlight sensor, a failure may result. Always keep these components clear and free of water. Failure to follow this notice could damage the machine or cause it to operate improperly.

NOTE: *Check the fuses if there is a problem with the climate control panel operation. Check the sunlight sensor for blockage or damage if there is a problem with the climate control system. Contact a SANY dealer for further information.*

AUTO Button

Press the AUTO button to turn on the automatic temperature control function. The cab temperature will be maintained at the set temperature displayed on the LCD screen (3).

NOTE: *A sunlight sensor adjusts the airflow of the climate control system when the cab is in direct sunlight. See “Sunlight Sensor” on page 3-19.*

OFF Button

Press the OFF button (1) to shut off the fan and all heating and cooling functions.

NOTE: *To turn on heating and cooling functions, press the fan speed button or the AUTO button.*

Fan Speed Control

Press the fan speed button (2) up or down arrow to set the fan speed to any of six levels. In AUTO mode, the fan will remain on high speed until the selected temperature is reached.

LCD Screen

The LCD screen (3) shows the preset temperature, fan speed, and vent selection during operation.

Temperature Selection Control

Press the TEMP up or down arrow (4) to control the inside cab temperature between 63°F and 90°F (18°C and 32°C). Press and hold both the up and down arrows for about 5 seconds to toggle between Fahrenheit (°F) and Celsius (°C) temperature display.

Vent Mode Selection

Press the vent MODE selection button (5) to select which vent or vents are used for airflow inside the cab:

- Floor vent only.
- All vents (front, rear, and floor).
- Front and rear vents only.

Automatic Temperature Control (AUTO)

Press AUTO (6) to activate the automatic temperature control system. The climate control panel will automatically adjust fan speed, outlet vents, and air source to achieve and maintain the selected temperature. The desired temperature can be changed while in AUTO mode. Any other selection will deactivate the automatic temperature control.

Air Conditioning (AC) Power

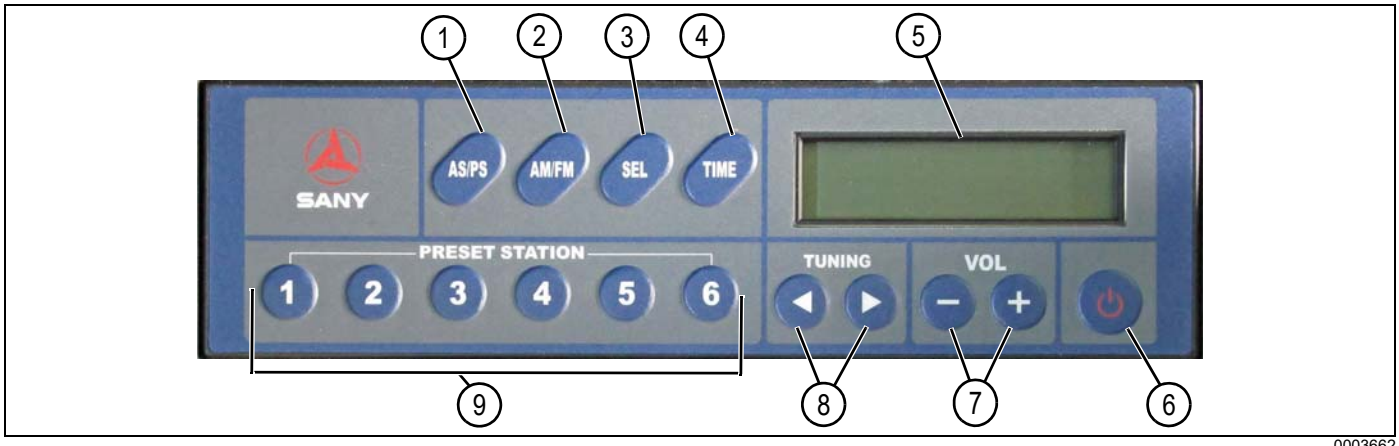
Press the A/C power button (7) to switch the air conditioning system on and off.

Fresh-Air or Recirculated-Air Selection

Press the fresh-air button (8) or recirculation-air button (9) to choose either filtered fresh-air from outside or recirculated-air from inside the cab.

Radio

Radio Control Panel



0003662

Figure 3-37

1 AS/PS selector button
2 AM/FM selector button
3 Sound mode adjustment button (SEL)
4 Time display button
5 Liquid crystal display (LCD)
6 Power button
7 Volume (VOL) + and – control buttons
8 Tuning ◄ and ► control buttons
9 Preset station buttons

Radio Operation

NOTE: *The key switch must be ON for the radio to operate.*

Auto Scan/Preset Station (AS/PS) Button

Press and release the AS/PS button (1) to begin the auto scan feature, where each preset station will play for 5 seconds with the currently playing station frequency blinking on the display. 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 buttons (1–6).

PRESET STATION Buttons

Press and hold any of the six PRESET STATION buttons (9) to assign the current radio station to that button. When stations have been assigned to the buttons, press and release a preset station button to select its station.

AM/FM Selector Button

Press the AM/FM selector button (2) to toggle between AM1/AM2 and FM1/FM2/FM3 bands. Each band can have different preset stations selected.

LCD

Displays the band (either AM or FM), currently tuned radio station frequency, preset station number, and current time on the LCD screen (5).

Sound Mode Adjustment Button (SEL)

Use the SEL sound mode adjustment button (3) to adjust the sound tones and speaker balance. Each time the SEL button is pressed, the display will cycle to adjustment options as follows:

- Press and hold the SEL button to access the bass adjustment.
- Press and release the SEL button again to access the treble adjustment.
- Press and release the SEL button again to access the speaker balance.

With the preferred sound mode option selected, use the VOL plus (+) or minus (–) buttons (7) to adjust the level.

NOTE: *If the sound mode adjustment button is not pressed after 5 seconds, the display defaults back to the current radio station frequency.*

TIME Button

Press and release the TIME button (4) to display the set time for 5 seconds.

While the time is being displayed, press and hold the TIME button to enter the time set screen. The hour numbers will flash. Press the TUNING arrow buttons (8) to set the desired hour.

To set the minutes, press and release the TIME button again and the minute numbers will flash. Press the tuning arrow buttons to set the desired minutes.

Press and release the TIME button to leave the time set screen and return to time display for 5 seconds. After 5 seconds, the time display will return to the radio display.

Power Button

Press and release the power button (6) to turn the radio on. The currently selected radio station frequency will appear on the display screen when the radio is turned on. Press and release the power button to mute the radio. Press and hold the power button to turn the radio off.

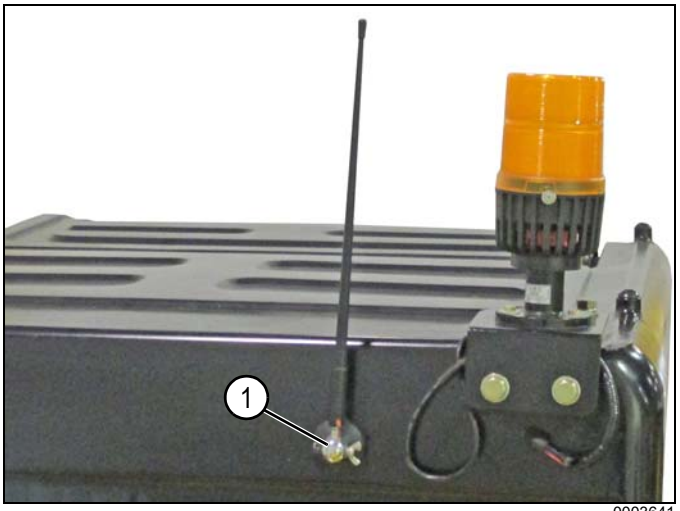
Volume Control Buttons

Press the VOL + or – button (7) to increase or decrease the volume.

Tuning Buttons

Press the left ◄ or right ► TUNING arrow buttons (8) to search for the next available radio station frequency within range.

Antenna



0003641

Figure 3-38

If the radio signal received is weak or noisy, raise the antenna (1) on the right rear of the cab.

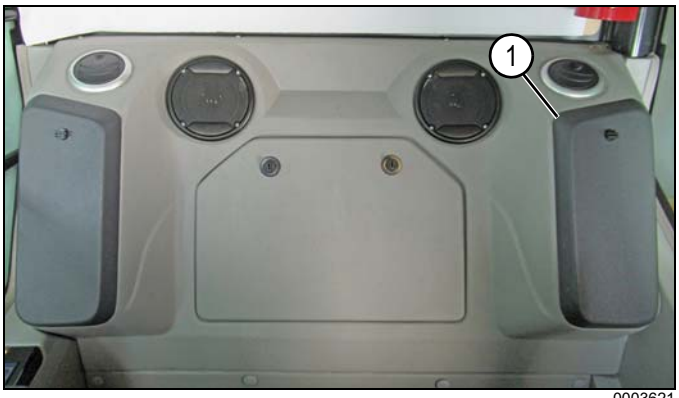
Fuse Location

Fuses protect electrical circuits from excessive power draws. When a fuse is blown, it indicates the circuit's current draw has exceeded the fuse's amperage rating due to a short or faulty electrical component. If a fuse repeatedly blows, 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 repairs.

NOTICE!

- **A fuse should be replaced if it is blown, corroded, or becomes loose in the fuse block.**
- **Before replacing a fuse, make sure the key switch is in the OFF position and the battery disconnect switch is in the OFF position. See "Battery Disconnect Switch" on page 3-15.**
- **Always replace a fuse with one of the same amperage rating.**
- **Never replace a fuse with one rated at a higher amperage. Using a higher amperage fuse on a circuit rated for a lower current can cause a fire or damage the electrical circuit's components in case of a short or excessive power draw.**

Fuse Panel

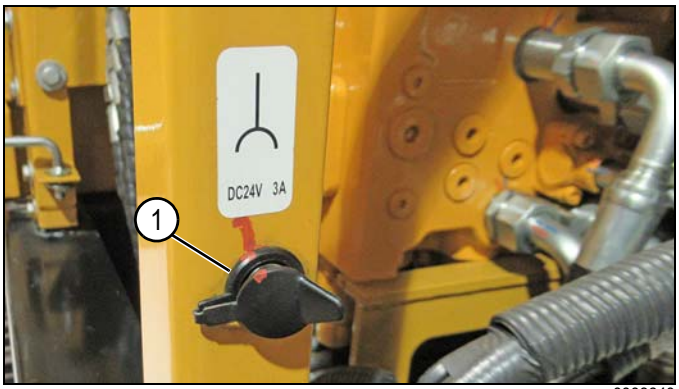


0003621

Figure 3-39

The main fuse panel (1) is on the left side of the cab behind the seat. Remove the fusebox cover to access the fuses. See "Fuses" on page 4-9.

Accessory Light Outlet (24V)

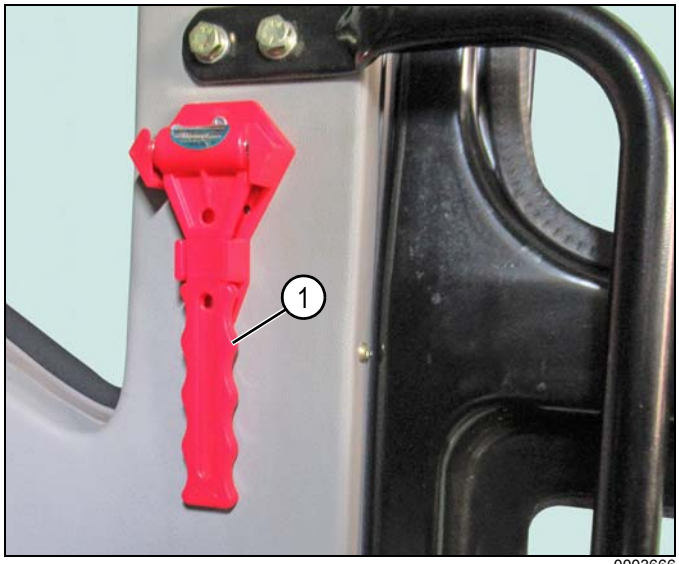


0003640

Figure 3-40

A 24V outlet (1) inside the right front access door compartment is used for powering an accessory light.

Escape Tool



0003666

Figure 3-41

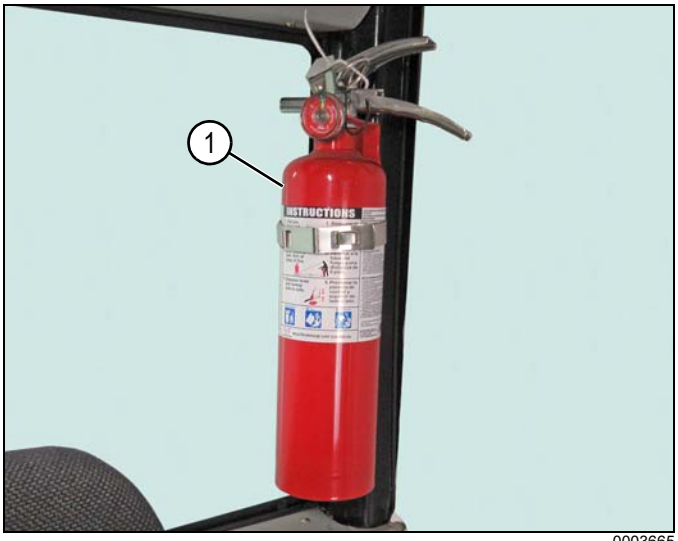
If the cab door, windshield, or escape hatch cannot be opened during an emergency, the escape tool (1) can be used to break a cab window. The escape tool is inside the cab to the left of the seat.

CAUTION

When breaking a window, protect or shield your eyes from flying glass. Failure to protect your eyes could result in serious injury.

To break a cab window, strike it with the escape tool off-center near a corner or window edge.

Fire Extinguisher



0003665

Figure 3-42

NOTICE!

Always keep a fire extinguisher on the machine. 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.

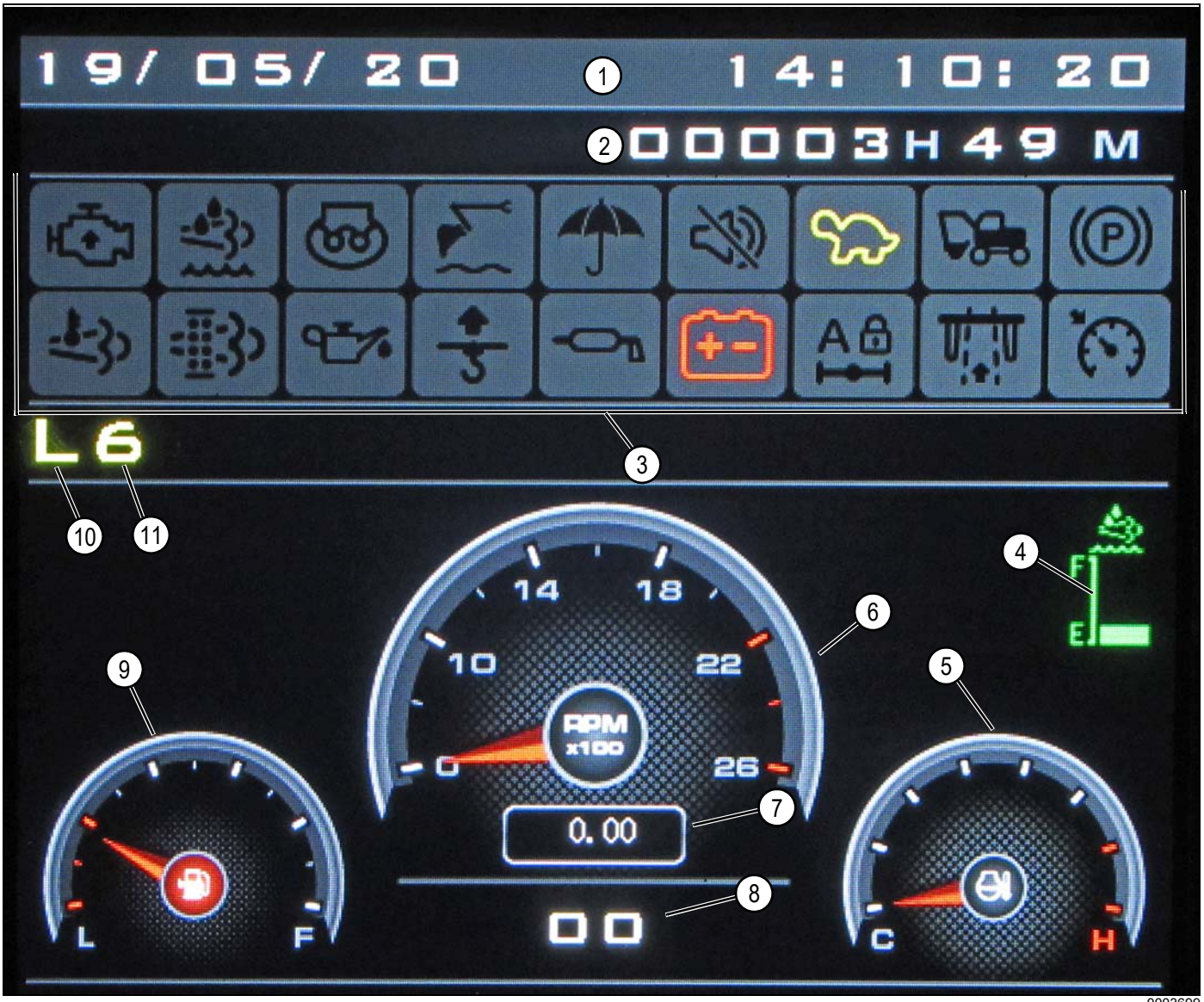
The fire extinguisher must be at least a 2.5 lb. class ABC rated fire extinguisher (National Fire Protection Association [NFPA] 10 Standard for Portable Fire Extinguishers).

The fire extinguisher (1) is behind the seat on the left side pillar.

Monitor

The monitor displays machine operating information and provides access to change system parameters. The monitor will display when the battery is connected and the key switch is in the ON position.

Home Screen



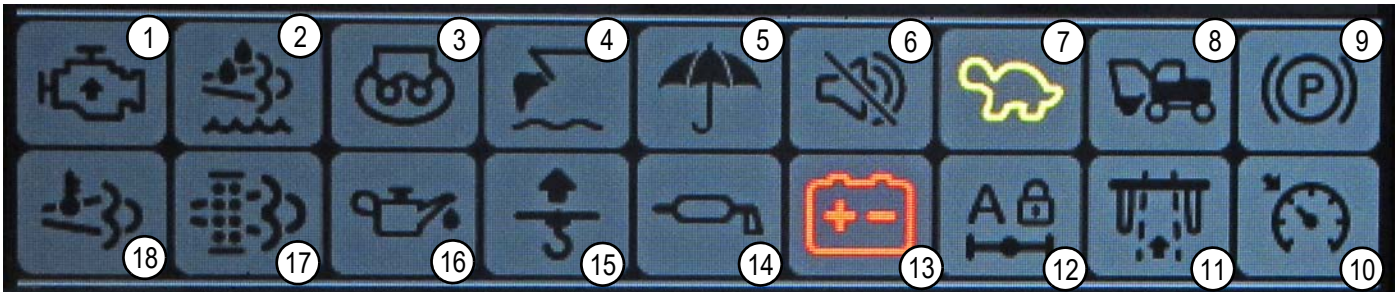
0003699

Figure 3-43

Item	Home Screen Display	Function	Description
1	Date and time	Displays the current date and time.	Date (YY/MM/DD) and Time (HH/MM/SS)
2	Operating hours	Displays the total number of machine operating hours.	
3	Function icons	Displays information for machine systems.	

Item	Home Screen Display	Function	Description
4	DEF fluid level	Indicates the level of DEF in the tank.	Green = 10%–100% Yellow = 5%–10% Red = < 2.5%
5	Engine coolant temperature gauge	Indicates the engine coolant temperature.	122°F–230°F (50°C–110°C)
6	Engine rpm gauge	This gauge indicates the number of revolutions per minute (rpm) that the engine is running.	
7	Engine rpm indication	Digital rpm display.	
8	Engine load rate (%)	Indicates the hydraulic load percentage to the engine.	
9	Fuel level gauge	Indicates the level of diesel fuel in the tank.	
10	Work mode indication	Indicates the current work mode by letter designation.	L = Light duty S = Standard duty H = Heavy duty B = Breaker
11	Throttle dial indication	Indicates the current throttle dial position number.	1 = Lowest throttle 10 = Highest throttle

Function Icons



0003717

Figure 3-44

Item	Icon – Function	LED Color – Status	Indication
1	Engine icon	Green Red	Engine escape mode active. Engine power is reduced.
2	Regeneration icon	Green Yellow – flashing Yellow – steady Red – steady Red – slow flash Red – fast flash	Auto regeneration. Manual regeneration request. Manual regeneration on. Engine power notice. Engine power early warning. Engine power final warning.
3	Preheat icon – illuminates when the engine is in the engine preheating mode.	Red	Engine preheat is on.
4	Not used.		
5	Maintenance prompt icon – illuminates if any scheduled maintenance is due.	Yellow Green	Fault code exists. Internal circulation.
6	Alarm silence icon – illuminates when the audible alarm is off.	Red	Alarm is silenced.
7	High/low speed icon – the monitor will display a rabbit icon in high speed mode, and it will display a turtle icon in low speed mode.	Yellow Red	Low speed mode. High speed mode.
8	Not used.		
9	Park brake icon – (not equipped)		
10	Cruise control icon – (not equipped)		

Item	Icon – Function	LED Color – Status	Indication
11	Not used.		
12	Not used.		
13	Battery charge icon – illuminates when the battery is discharging.	Red	Battery is not charging.
14	Lubrication system icon – (not equipped).		
15	Overload alarm icon – (not equipped).		
16	Engine oil pressure icon – illuminates when the oil pressure is low or an oil change is required.	Yellow Red	Engine oil change required. Engine oil pressure low.
17	Manual regeneration icon.	Yellow – flashing Yellow – steady Red	Manual regeneration requested. Manual regeneration on. Diesel Particulate Filter (DPF) change required.
18	High Exhaust System Temperature (HEST) icon.	Yellow	Exhaust temperature is high.

Home Screen Functions

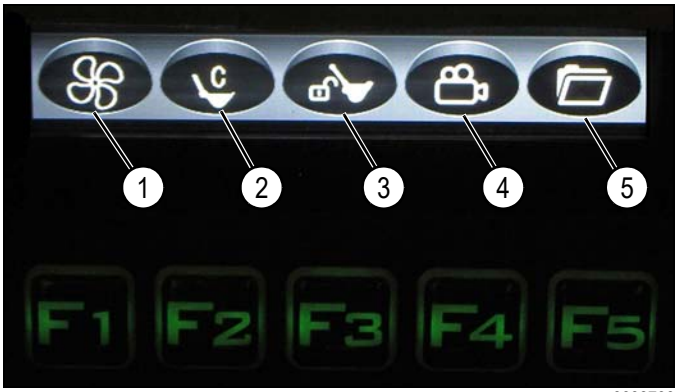


Figure 3-45

NOTE: *Icons are displayed above the function buttons F1 – F5 and change when a menu option is selected.*

Home screen icons and function buttons:

- F1 button – not functional on this screen. Icon for this button displays either a fan (shown), indicating the climate control system is in ventilation-only mode, or a snowflake icon, indicating the climate control system is on.
- F2 button – opens the Tool Select screen. The icon for this button displays the current work tool selection (bucket, breaker, shear, or quick coupler). See “Tool Select Screen” on page 3-28.
- F3 button – opens the Quick Coupler screen. The icon for this button displays the current status of the quick coupler. See “Quick Coupler Screen” on page 3-29.
- F4 button – displays the output from the rearview camera.
- F5 button – opens the Main Menu screen.

Work Accessory Selection

Tool Select Screen

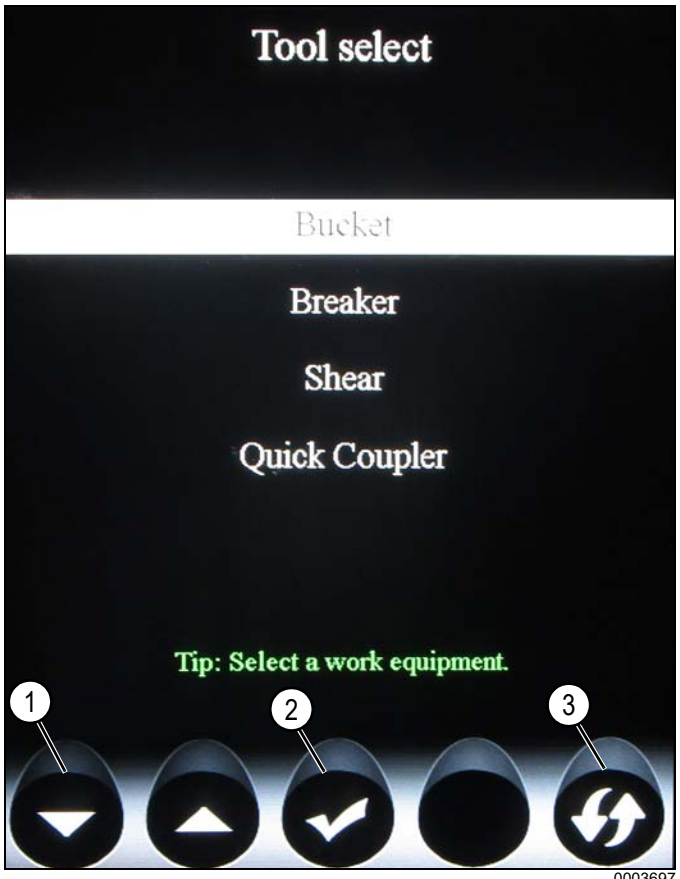


Figure 3-46

Press F2 from the home screen to display the Tool Select screen with the following options:

- Bucket
- Breaker
- Shear
- Quick Coupler

1. Press the F1 button below the down arrow icon (1) to scroll through tool options.
2. Press the F3 button below the check mark icon (2) to select the tool to operate.
3. Press the F5 button below the return arrow icon (3) to return to the previous screen.

NOTE: *On the home screen, the selected tool icon is displayed above the F2 button.*

NOTE: *You can also access the Tool Select screen from the Main Menu. See “Main Menu Screen” on page 3-30.*

Quick Coupler Operation

Quick Coupler Screen

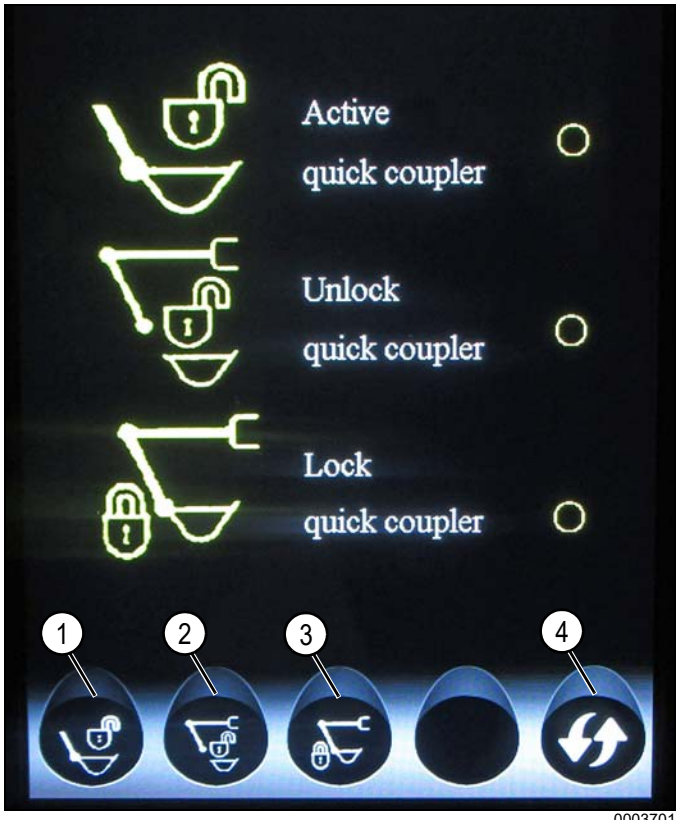


Figure 3-47

1. Press the F3 button from the home screen to display the three quick coupler operations:
   - Activate/Deactivate
   - Unlock
   - Lock
2. Press the F1 button below the Active quick coupler icon (1) to activate the quick coupler function. The Active quick coupler status will be highlighted and the audible alarm will sound.

NOTE: *The activate quick coupler function must be selected before the unlock and lock functions can be selected.*

3. Press the F2 button below the Unlock quick coupler icon (2) and then press and hold the quick coupler button on the left joystick to unlock quick coupler.
4. Move the machine arm to the work equipment to be attached and align quick coupler with the work equipment.
5. Press the F3 button below the Lock quick coupler icon (3) to lock the quick coupler.
6. Press the F1 button below the Active quick coupler icon (1) to deactivate the quick coupler function.
7. Press the F5 button below the return arrow icon (4) to return to the home screen.

Rearview Camera Screen

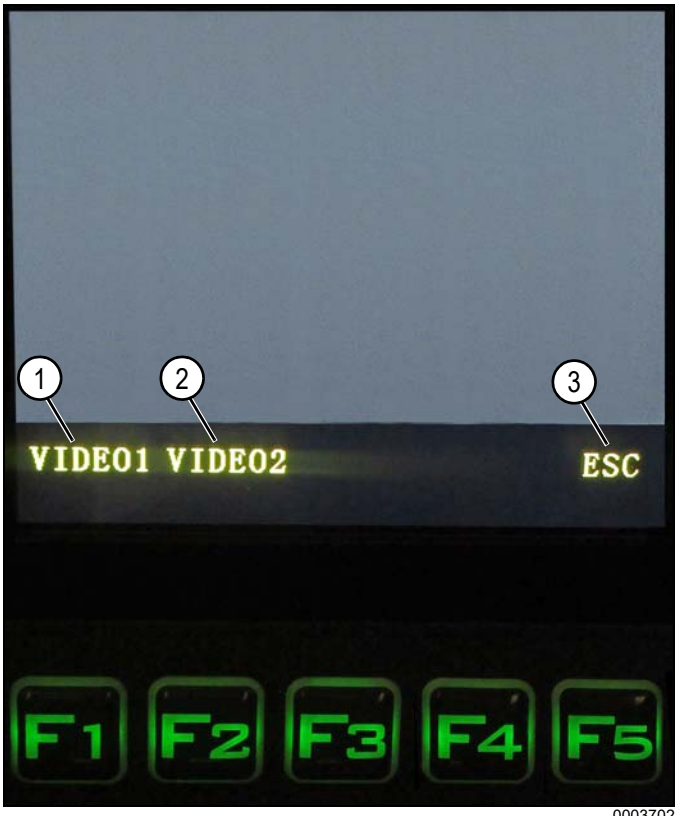


Figure 3-48

NOTE: *The rearview camera output on the home screen is displayed when the key switch is in the ON position.*

1. Press the F4 button from the home screen to display the rearview camera screen:
2. Press the F1 button below the VIDEO1 icon (1) to select the Video1 (rearview camera) source as the input. The F2 button below the VIDEO2 icon (2) is not used.
3. Press the F5 button below the ESC icon (3) to return to the home screen.

Main Menu Screen

Figure 3-49

Press the F5 button from the home screen to display the Main Menu screen. The Main Menu screen consists of the following six options:

- Work Parameters
- Maint. Information
- Fault Information
- System Setting
- Machine Configuration
- Tool Select

Work Parameter Screen

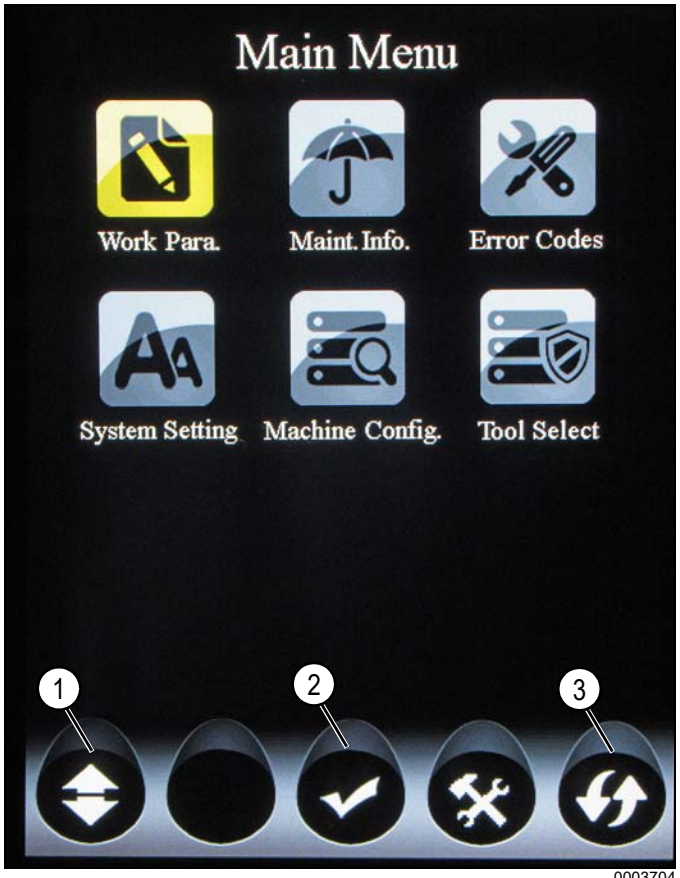


Figure 3-50

1. Press the F1 button below the up/down arrow icon (1) from the Main Menu screen to highlight the Work Para. (Parameter) icon, then press the F3 button below the check mark icon (2) to accept the selection.
2. Press the F1 button below the up/down arrow icon to scroll through the work parameter screens to display the following signal screens:
   - Engine and throttle signals
   - Input switch signals
   - Output switch signals
   - Pilot pressure signals
   - Main pump signals
3. Press the F5 button below the return arrow icon (3) to return to the Main Menu screen.

Engine and Throttle Signals Screen

The Engine & Throttle Signals screen displays important engine parameters that can aid in troubleshooting.

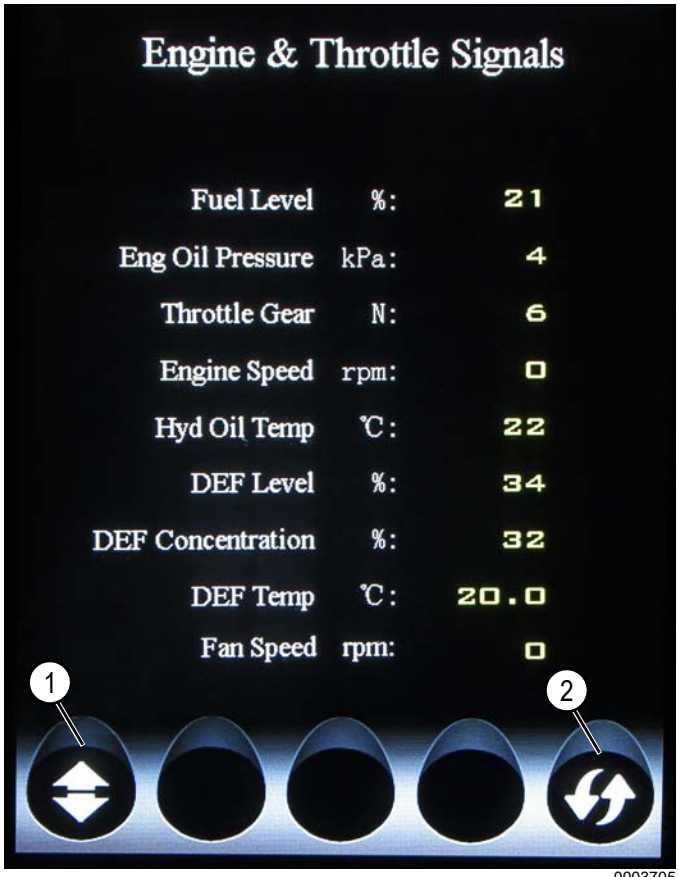


Figure 3-51

Press the F1 button below the up/down arrow icon (1) to scroll to the next screen, or press the F5 button below the return arrow icon (2) to return to the Main Menu screen.

Input Switch Signals Screen

The Input Switch Signals screen shows the inputs that are currently active. This screen can be used to check for faulty switch inputs by a service technician.

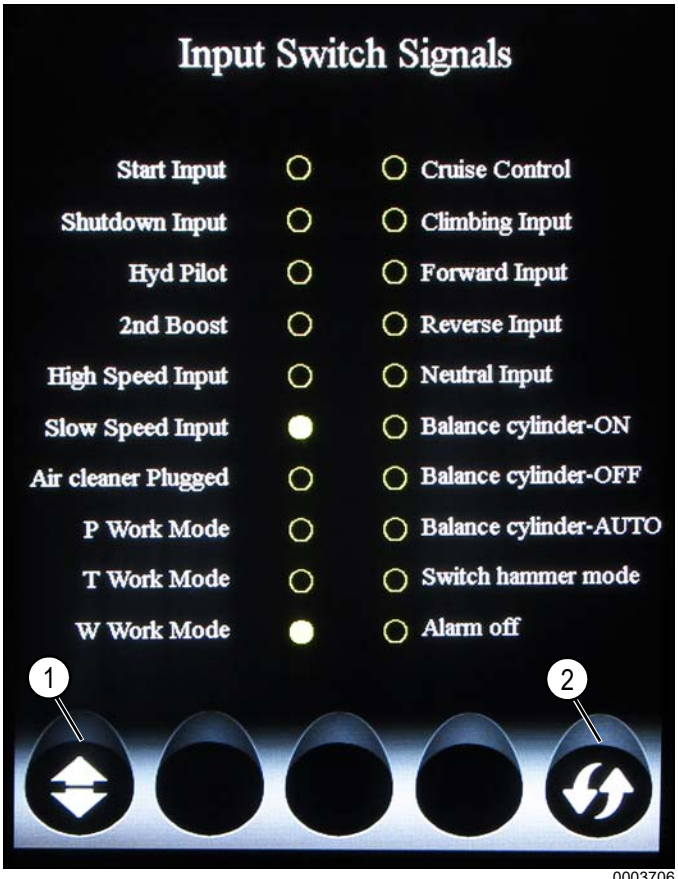


Figure 3-52

Press the F1 button below the up/down arrow icon (1) to scroll to the next screen, or press the F5 button below the return arrow icon (2) to return to the Main Menu screen.

Output Switch Signals Screen

The Output Switch Signals screen shows the switch outputs that are currently active. This screen can be used to check for faulty switches by a service technician.

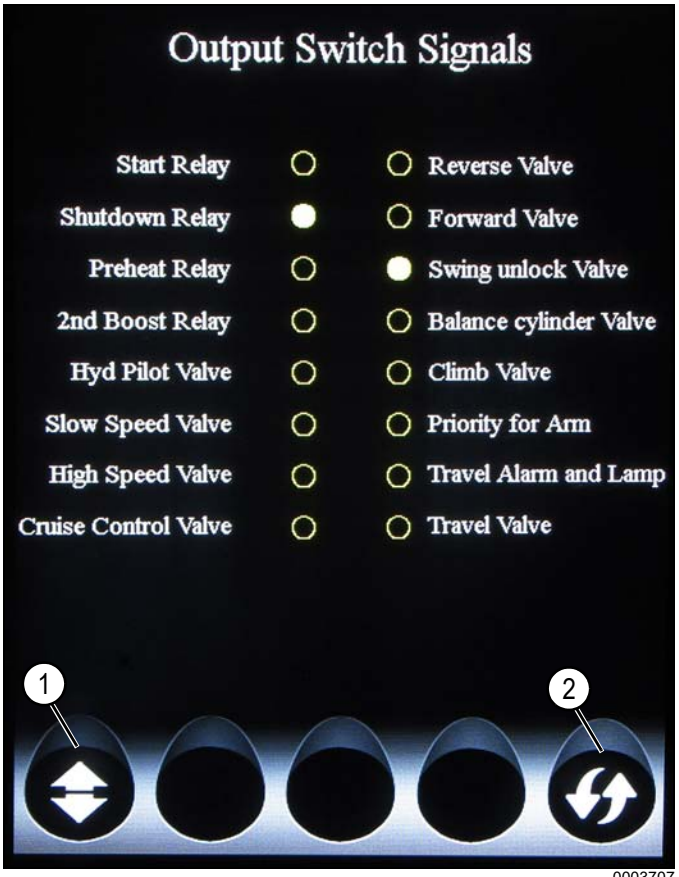


Figure 3-53

Press the F1 button below the up/down arrow icon (1) to scroll to the next screen, or press the F5 button below return arrow icon (2) to return to the Main Menu screen.

Pilot Pressure Signals Screen

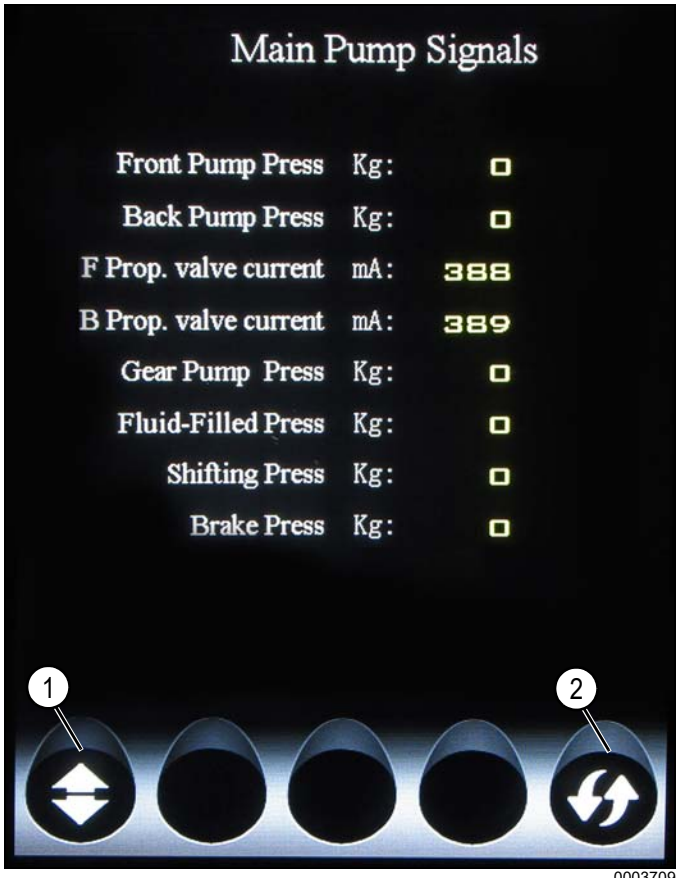
The Pilot Pressure Signals screen shows the hydraulic pressures at hydraulic pilot lines on the main control valve. This screen can be used to check for faulty hydraulic circuits by a service technician.

Figure 3-54

Press the F1 button below the up/down arrow icon (1) to scroll to the next screen, or press the F5 button below the return arrow icon (2) to return to the Main Menu screen.

Main Pump Signals Screen

The Main Pump Signals screen displays pressures and electrical control valve currents at the hydraulic pumps. A service technician can use these signals to diagnose hydraulic pump problems.



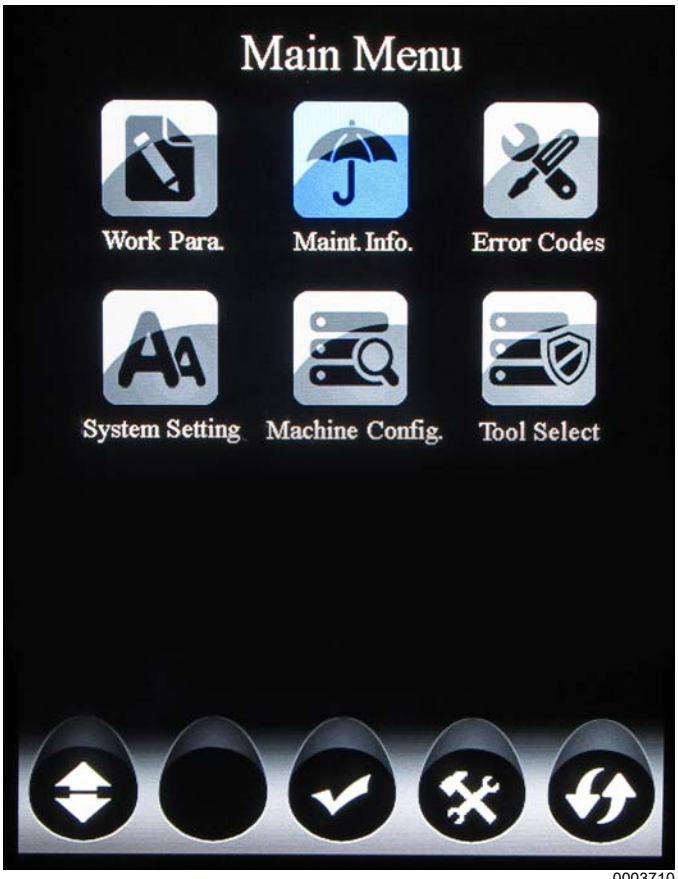
0003709

Figure 3-55

Press the F1 button below the up/down arrow icon (1) to scroll to the next screen, or press the F5 button below the return arrow icon (2) to return to the Main Menu screen.

Maintenance Information Screen

The Maintenance Information Screen is accessed through the Main Menu screen.



0003710

Figure 3-56

NOTE: *The* Maintenance Information Screen (*Maint. Info. screen) is for SANY technician use only and requires a password.*

Fault Information Screen

The fault information screen is accessed through the Main Menu screen. Follow the steps below to access the information.

Figure 3-57

1. Press the F1 button below the up/down arrow icon (1) from the Main Menu screen to highlight Error Codes.
2. Press the F3 button below the check mark icon (2) to display the Fault Information screens.

   NOTE: *Three Fault Information screens display electrical, engine, and hydraulic error code information.*

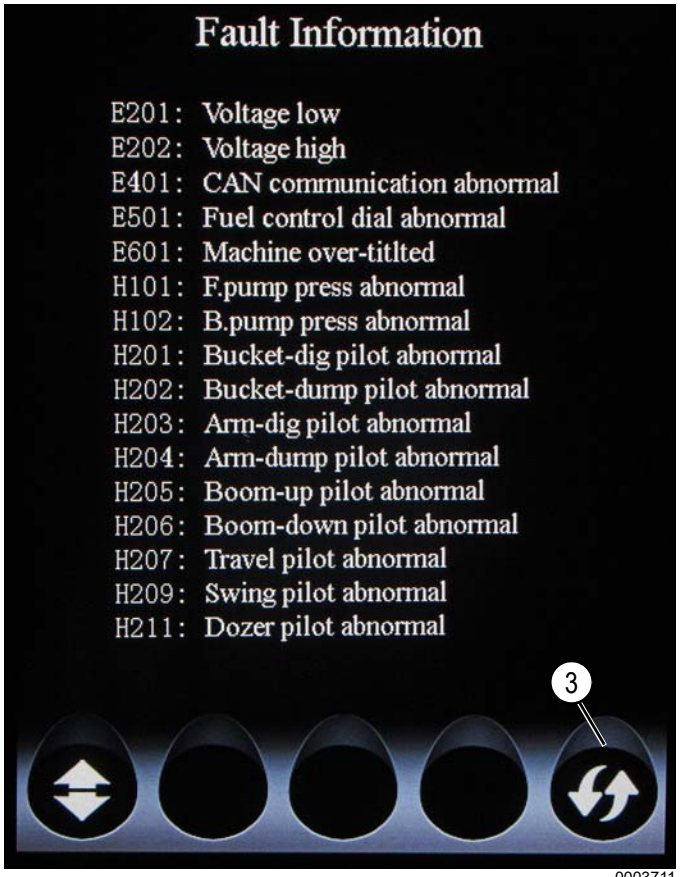


Figure 3-58

1. Press the F1 button below the up/down arrow icon (1) to scroll to the next screen.
2. Press the F5 button below the return arrow icon (3) to return to the Main Menu screen.

NOTE: *Contact a SANY dealer for information about clearing fault codes.*

System Setting Screen

The system setting screens are accessed through the Main Menu screen. Follow the steps below to access the menu.

0003712

Figure 3-59

1. Press the F1 button below the up/down arrow icon (1) from the Main Menu screen to highlight System Setting.
2. Press the F3 button below the check mark icon (2) to open the System Setting screen.

0003715

Figure 3-60

The System Setting screen displays the following setting options that can be changed:

- Date/Time Setting
- Backlight Setting
- Data Unit Setting
- Time Format Setting
- Language Selection

1. Press the F1 button below the up/down arrow icon to highlight the setting to change.
2. Press the F3 button below the check mark icon to accept the selection.
3. After selecting the setting to be changed, press the F1 button below the up/down arrow icon to change values, or press the F4 button below the left/right arrow icon (not shown) to scroll to the next value to change. Press the F1 button below the up/down arrow icon to change the value.
4. Press the F3 button below the check mark icon to accept the values entered.
5. Press the F5 button below the return arrows icon (3) to return to the Main Menu screen.

Machine Configuration Screen

The machine configuration screen is accessed through the Main Menu Screen. Follow the steps below to access the menu.

Figure 3-61

1. Press the F1 button below the up/down arrow icon (1) from the Main Menu screen to highlight Machine Config.
2. Press the F3 button below the check mark icon (2) to open the Machine Configuration screen.

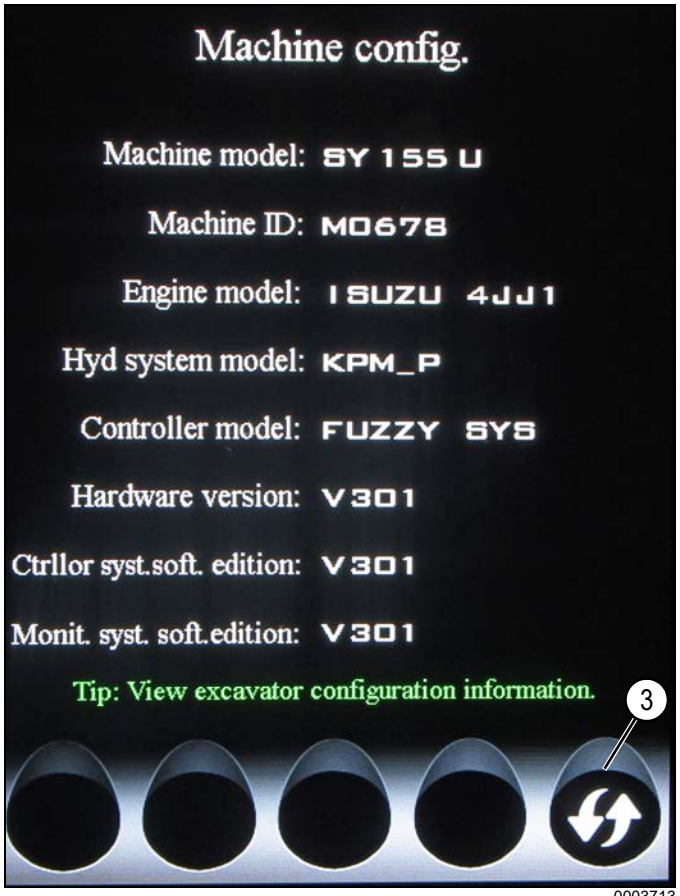


Figure 3-62

The Machine Configuration screen displays the machine configuration information for installed operating systems.

You may need to provide this information when requesting vehicle information or talking with a service technician.

Press the F5 button below the return arrow icon (3) to return to the Main Menu screen.

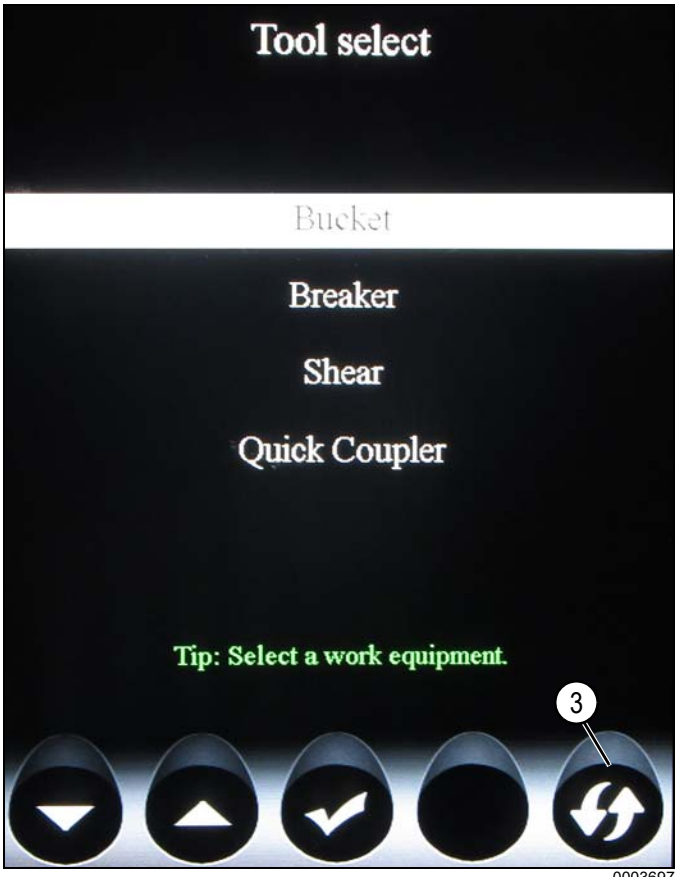
Tool Select Screen

The Tool Select Screen is accessed through the Main Menu Screen. Follow the steps below to access the menu.

0003696

Figure 3-63

1. Press the F1 button below the up/down arrow icon (1) from the Main Menu screen to highlight Tool Select.
2. Press the F3 button below the check mark icon (2) to open the Tool Select screen.



0003697

Figure 3-64

1. Press the F1 button below the down arrow icon to select the tool to operate, then press the F3 button below the check mark icon to accept it.
2. Press the F5 button below the return arrow icon (3) to complete the change and return to the Main Menu screen.

NOTE: *The Tool Select screen can also be accessed from the Home screen.*

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Chapter 4

Machine Operation

Work Area

The work area is where the actual job is performed. Within the work area there 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 "Job Safety" on page 2-6 for additional information.

Operator's Responsibilities

- Reject the job site if there are any 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 signalman.
- 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.

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.

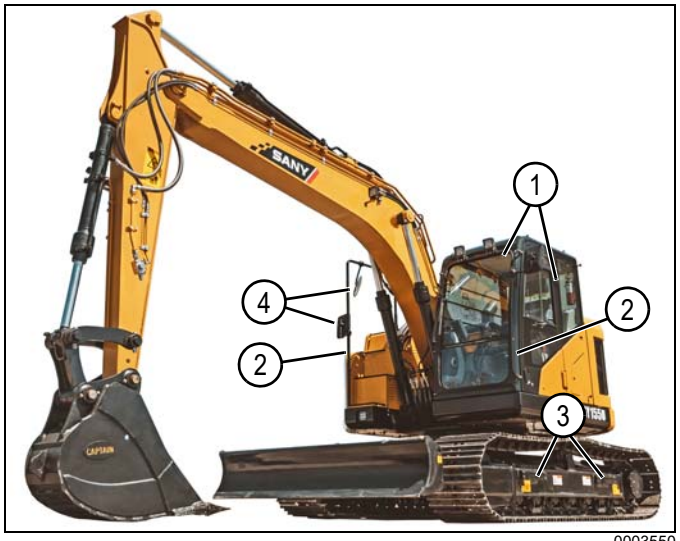
Daily Maintenance Record Check

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 "Daily Inspection and Maintenance" on page 5-6.*

Cleaning the Machine

Cleaning the Machine Exterior



0003550

Figure 4-1

NOTE: *Clean the grab handles and steps 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)
- Grab handles (2)
- Steps (3)
- Mirrors (4)

Cleaning the Cab Interior

CAUTION

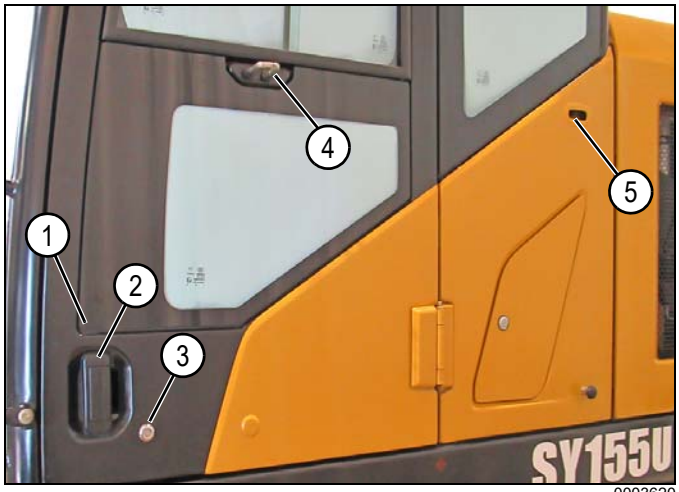
Never allow passengers to ride inside or on the machine. Never bring objects into the cab that could restrict your movement or vision in any manner that could result in injury.

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

Check that the escape tool and fire extinguisher are present. See “Fire Extinguisher” on page 3-23 and “Escape Tool” on page 3-23.

Doors, Panels, Covers, and Filler Cap

Cab Door



0003620

Figure 4-2

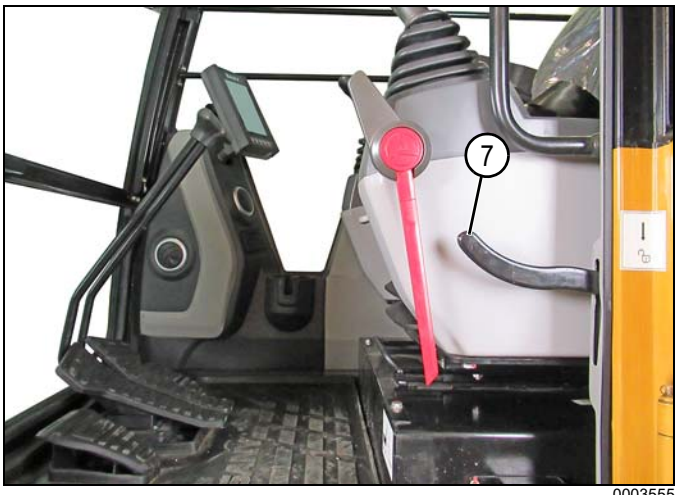
The cab door (1) can be locked from the outside when closed using the cab door lock (3).

To open the cab door from the outside, unlock and pull the handle (2). Swing the cab door open until the catch (4) engages the cab door latch (5), securing it in the opened position.

0003688

Figure 4-3

From inside the cab, press down on the cab door release lever (6) to open the cab door. Swing the door fully open until the catch (4) engages the cab door latch (5).

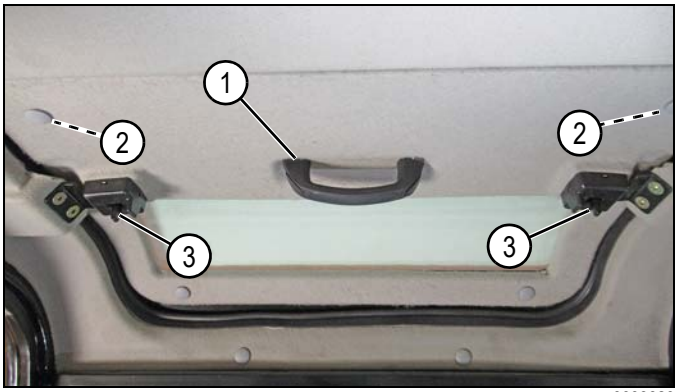


0003555

Figure 4-4

To release the door from the opened position, push down on the release lever (7).

Emergency Escape Hatch



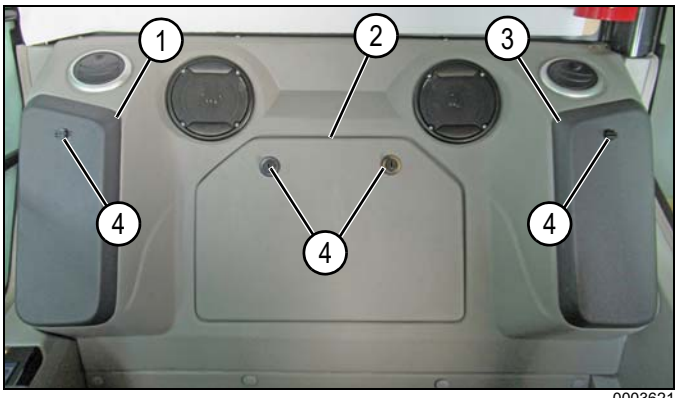
0003629

Figure 4-5

The emergency escape hatch (1) can be used to exit the machine if the cab door or windshield cannot be opened during an emergency.

To open the emergency escape hatch, press the left and right latches (3) and push up. The emergency escape hatch is supported in the open position by two pneumatic cylinders (2).

Cab Access Panels



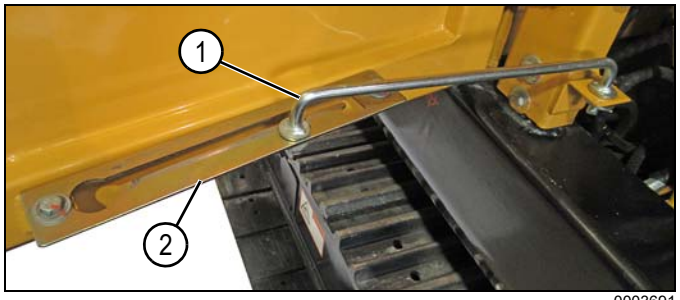
0003621

Figure 4-6

- Climate control system ducting is behind the climate system ducting access panel (1).
- The electronic control module (ECM) is behind the ECM access panel (2).
- The fuse panel is behind the fuse panel access panel (3).

NOTE: *The access panels can be unlocked and locked by turning the fasteners (4) 1/4 turn.*

Door Support Rod



0003691

Figure 4-7

The access and top engine compartment doors use a support rod (1) and support bracket (2) to prevent it from closing unexpectedly. Guide the support rod into the appropriate support bracket slot to secure the door in the open position.

NOTE: Move the support rod out of the support bracket slot to allow the access door to close.

Right Front Access Door

0003622

Figure 4-8

Opening the Right Front Access Door

To open the access door (1), unlock and pull the latch (2). When fully open, place the access door support rod in the support bracket slot to prevent it from closing unexpectedly. See “Door Support Rod” on page 4-6.

Closing the Right Front Access Door

Move the support rod out of the slot in the support bracket to close the access door. See “Door Support Rod” on page 4-6. Close the access door until it is latched.

Right Rear Access Door

0003623

Figure 4-9

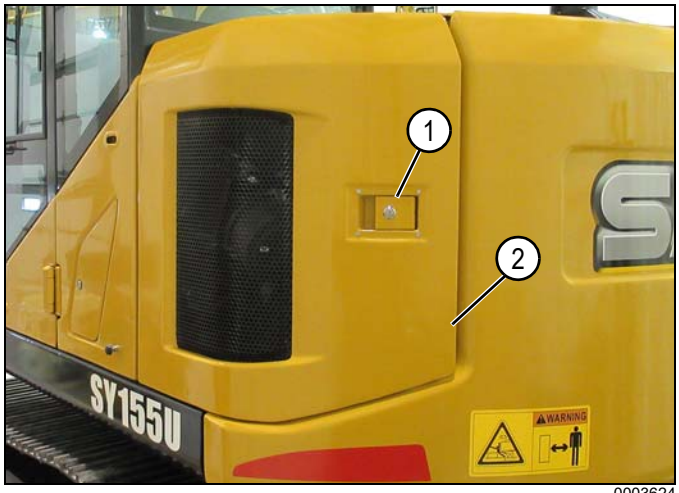
Opening the Right Rear Access Door

To open the access door (1), unlock and pull the latch (2). When fully open, place the access door support rod in the support bracket slot to prevent it from closing unexpectedly. See “Door Support Rod” on page 4-6.

Closing the Right Rear Access Door

Move the support rod out of the slot in the support bracket to close the access door. See “Door Support Rod” on page 4-6. Close the access door until it is latched.

Left Rear Access Door



0003624

Figure 4-10

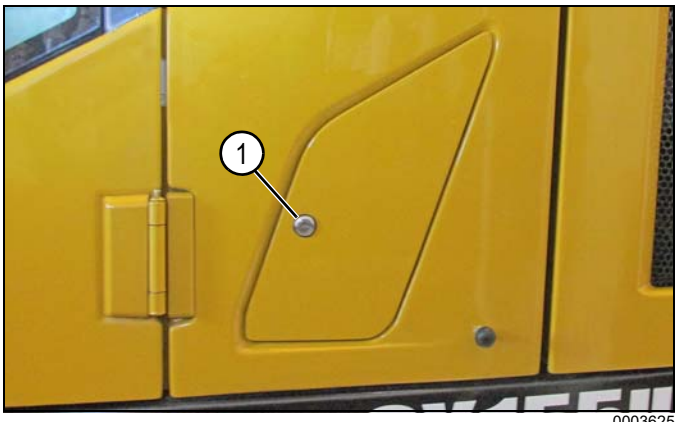
Opening the Left Rear Access Door

To open the access door (2), unlock and pull the latch (1). When fully open, place the access door support rod in the support bracket slot to prevent it from closing unexpectedly. See “Door Support Rod” on page 4-6.

Closing the Left Rear Access Door

Move the support rod out of the slot in the support bracket to close the access door. See “Door Support Rod” on page 4-6. Close the access door until latched.

Fresh Air Filter Access Door

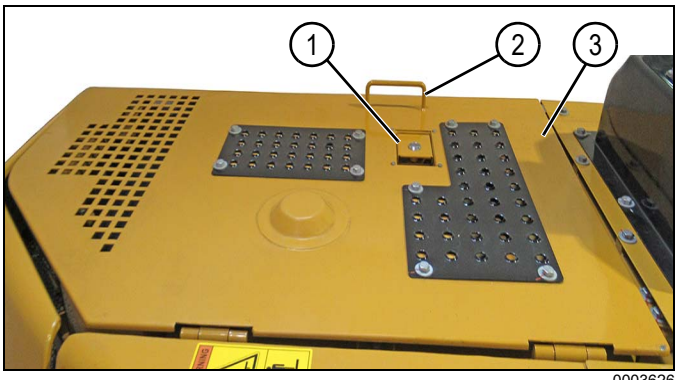


0003625

Figure 4-11

Unlock and open the fresh-air filter access door (1) to access the fresh-air filter. When closed, the fresh-air access door needs to be locked.

Engine Compartment Door



0003626

Figure 4-12

Opening the Engine Compartment Door

To open the engine compartment door (3), unlock and pull up on the latch (1). Use the handle (2) to pull the door open. When fully open, place the access door support rod in the support bracket slot to prevent it from closing unexpectedly. See “Door Support Rod” on page 4-6.

Closing the Engine Compartment Door

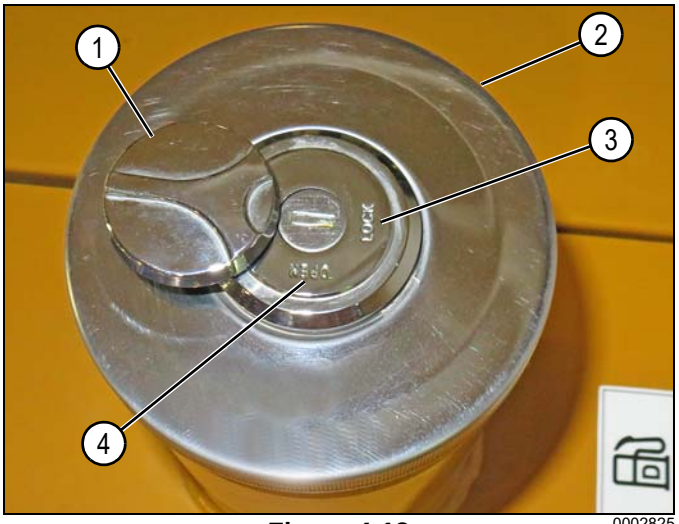
Move the support rod out of the slot in the support bracket to close the access door. See “Door Support Rod” on page 4-6. Use the handle (2) to lower the door until latched.

Fuel Tank Filler Cap

NOTICE!

- **Make sure the O-ring on the filler cap is clean. If the O-ring is contaminated by dirt or debris, it could be damaged and not seal properly.**
- **Inspect the O-ring for wear or damage. Replace if necessary.**
- **Make sure the filler cap is fully seated before turning the key to lock or open the cap.**
- **Close the lock shield when not in use to prevent dirt and debris from entering the lock.**

Failure to follow this notice could damage the machine or cause improper operation.



0002825

Figure 4-13

Opening the Fuel Tank Filler Cap

1. Slide open the lock shield (1) on the filler cap (2).
2. Insert the key into the lock.

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

3. Turn the key from position (3) clockwise until the lock points to position (4) and remove the filler cap.
   - Position (3): Locked
   - Position (4): Open

Closing the Fuel Tank Filler Cap

1. Install the filler cap (2) onto the filler tube.
2. Insert the key into the lock.
3. Turn the key from position (4) counterclockwise until the lock points to position (3). Remove the key.
4. Close the lock shield (1).

Prestart Checks and Adjustments

CAUTION

Perform inspections and have needed issues resolved before operation. Failure to observe and follow this caution could result in injury.

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 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 the undercarriage (track, sprockets, rollers, and guards) for damage, wear, loose fasteners, and fluid leaks.
- Check the bucket or optional equipment for damage. Lubricate the work equipment as necessary. See “Lubrication” on page 5-59.
- Clean and check the mirrors for damage. Adjust the mirrors so the areas to the sides and behind the machine are visible from the operator seat. See “Mirrors” on page 4-15.
- 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. See “Monitor” on page 3-24.
- Check the fire extinguisher. See “Fire Extinguisher” on page 3-23.
- Check the escape tool. See “Escape Tool” on page 3-23.

Electrical Components Check

NOTICE!

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. Failure to follow this notice may result in damage to the machine.

- **Regularly wash the top of the battery to prevent the battery vents from plugging.**
- **Check the fuse panel for blown fuses, fuses of incorrect capacity, open or short circuits, and loose connections. Replace blown fuses and fuses of incorrect amperage rating, and tighten loose connections as necessary. See “Fuses” on page 4-9.**
- **Make sure the battery cables and wires are clean and in good condition when inspecting the battery, starting motor, and alternator. See “Check the Batteries” on page 5-36.**
- **Clean the area around the battery of combustible materials.**

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

Check the following electrical components:

- Check monitor operation.
- Check for blown or loose fuses.
- Make sure the fuses have the proper rating for each circuit.
- Make sure the battery terminal connectors are clean, secure, and free of dirt and debris.
- Inspect the electrical wires and cables for worn or damaged insulation.
- Make sure the vents on top of the batteries are free of any dirt or debris.
- Check if the rear camera is operating (if equipped).
- Check for proper windshield wiper operation.

Lights and Warning Devices

With the key switch ON, check the following for proper operation:

- Horn
- Work lights
- Radio
- Beacon light
- Cab ventilation fan

Fuses

NOTICE!

- **If fuses frequently fail, there may be a short circuit in the cables or component placing a high electrical load on the circuit. Contact a SANY dealer for electrical troubleshooting.**
- **A fuse should be replaced if it is blown, corroded, or becomes loose in the fuse block.**
- **Before replacing a fuse, make sure the key switch is in the OFF position and the battery disconnect switch is in the OFF position. (See “Battery Disconnect Switch” on page 3-15.)**
- **Always replace a fuse with one of the same rating. Using a higher amperage fuse on a circuit rated for a lower current can cause a fire or damage the electrical circuit’s components in case of a short or excessive power draw.**

Check the Fuses

0003580

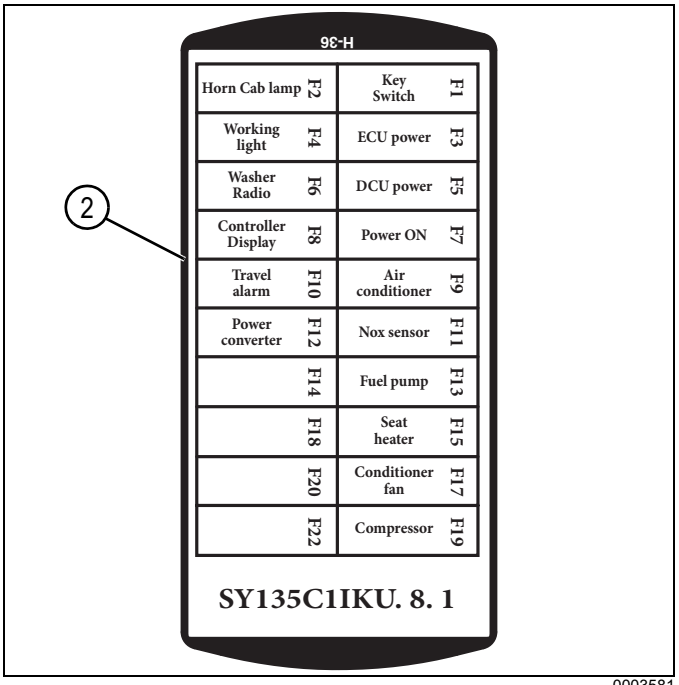
Figure 4-14

NOTE: *Before replacing a fuse, make sure the key switch is in the OFF position and the batteries are disconnected.*

NOTICE!

- **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, and repaired as necessary. Contact a SANY dealer for electrical troubleshooting. Failure to follow this notice could damage the machine or cause improper machine operation.**

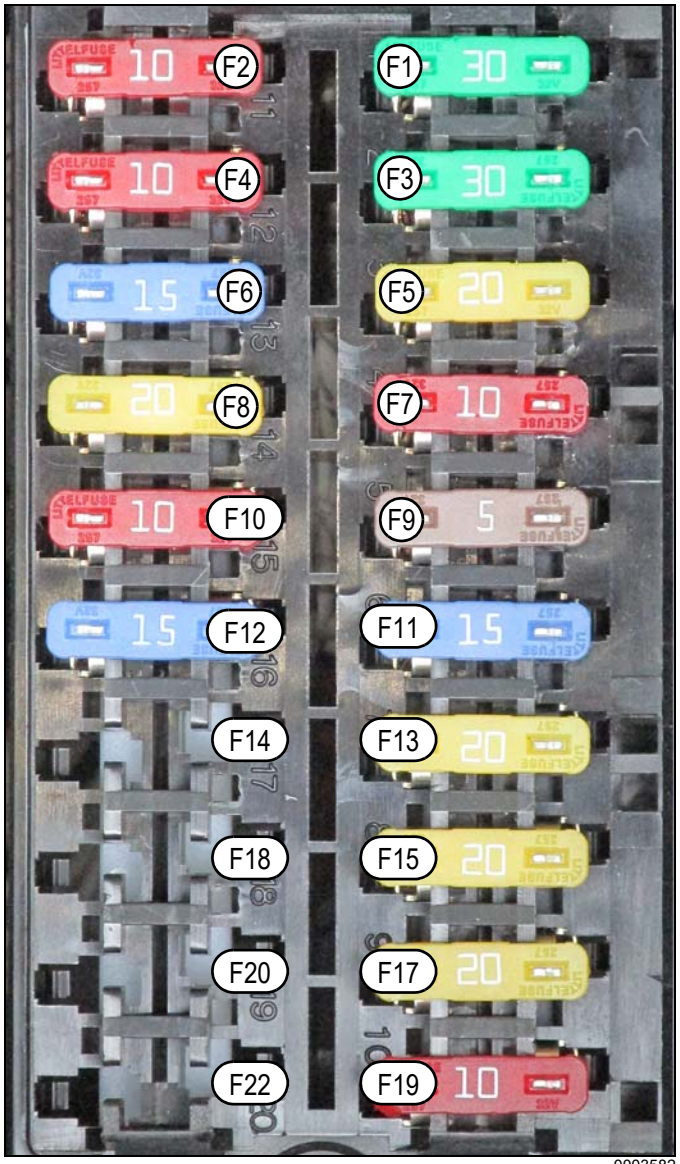
1. Prepare the machine for service. See “Maintenance Safety” on page 2-5.
2. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
3. Disconnect the negative battery cables from the batteries.
4. The fuse panel (2) is located on the left side of the seat.



0003581

Figure 4-15

5. Remove the fuse panel cover (1) and inspect for blown fuses. Replace a blown fuse with a fuse of the same amperage rating.



0003582

Figure 4-16

Fuse Locations, Circuits, and Amperages		
Fuse Number	**Circuit**	**Amperage**
F1	Key Switch	30A
F2	Horn, Cab Lamp	10A
F3	ECU Power	30A
F4	Working Light	10A
F5	Diesel Control Unit (DCU) Power	20A
F6	Windshield Wiper and Washer, Radio	15A
F7	Power ON	10A
F8	Monitor	20A
F9	Air Conditioner	5A
F10	Travel Alarm	10A
F11	NOx Sensor	15A
F12	Power Converter	15A
F13	Fuel Pump	20A
F14	Not Used	-
F15	Seat Heater	20A
F16	Not Used	-
F17	Conditioner Fan	20A
F18	Not Used	-
F19	Compressor	10 A
F20	Not Used	-

Seat and Seat Belt

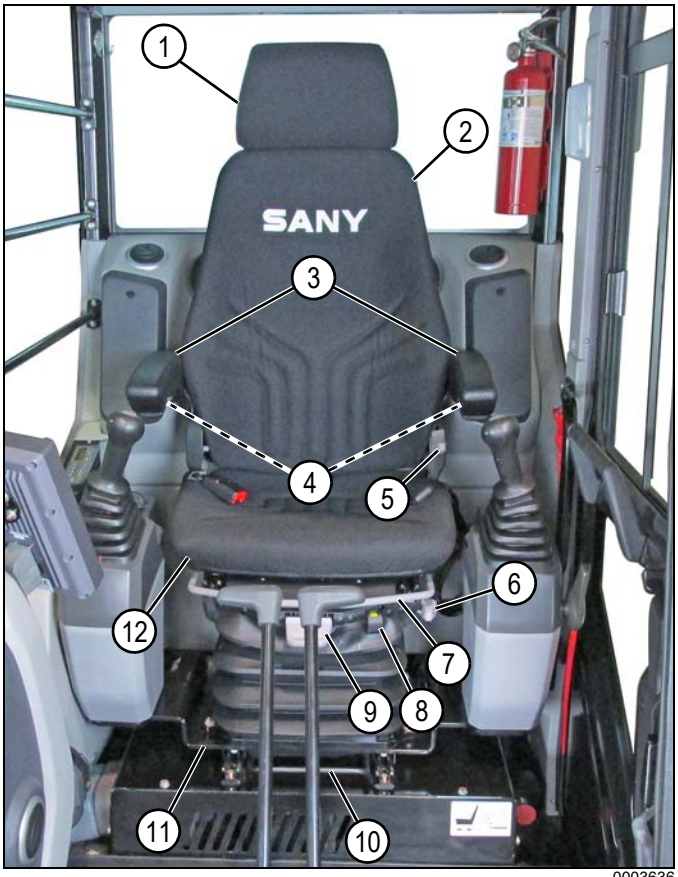


Figure 4-17

- Headrest Adjustment – The headrest (1) can be moved up or down on the backrest (2). Adjust the headrest to the same height as the operator's head.
- Armrest Adjustment – Turn the dial (4) under each armrest (3) to adjust the angle of the armrest up or down.
- Backrest Angle Adjustment – Pull up on the backrest adjustment lever (5) to adjust the angle of the backrest to the desired position. Release the backrest adjustment lever to lock the seat backrest in position.
- Seat Forward/Backward Position Lock – Move the position lock lever (6) to allow the seat to move forward and backward. Move the position lever forward, then firmly move the seat backward to lock it into position.
- Seat Forward/Backward Position Adjustment – Lift and hold the forward and backward lever (7) to slide the seat (12) to the desired position. Release the lever to lock the seat in position.
- Seat Base Forward/Backward Position Adjustment – Lift and hold the seat base adjustment lever (10) to slide the seat base (11) and control consoles forward or backward. Release the lever to lock the seat base in position.

- Air Ride Seat Adjustment – Pull the air ride seat adjustment lever (9) up to raise the seat. Press the lever down to lower the seat. This will adjust the proper air ride for the weight of the operator. The height adjustment setting is indicated in the adjustment window (8).

NOTE: *The battery must be connected and the key switch must be in the ON position to raise the seat up. The seat can be lowered with the key switch in the OFF position.*

- Lumbar Adjustment

0003686

Figure 4-18

NOTE: *The lumbar adjustment knob is on the left rear side of the backrest.*

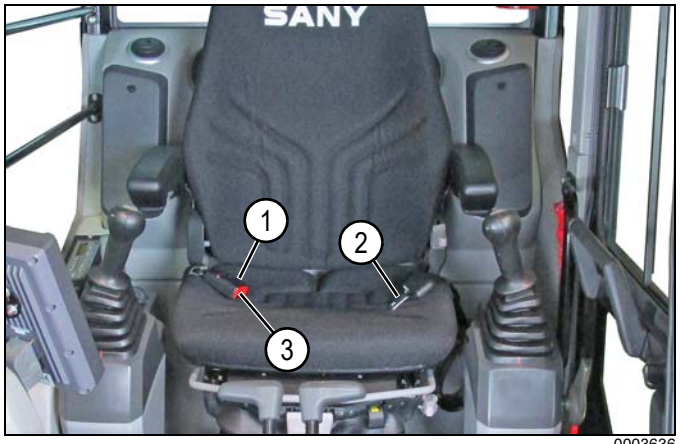
Turn the lumbar adjustment knob (1) clockwise to increase lumbar support, and counterclockwise to decrease it.

Seat Belt

WARNING

- **Inspect the seat belt. Replace the seat belt immediately if the webbing is frayed or cut, if the buckle is damaged or malfunctions, or if the mounting hardware is loose. Replace according to seat belt manufacturer's instructions.**
- **Always keep the seat belt fastened during machine operation. Never twist the seat belt when fastening it.**

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



0003636

Figure 4-19

Buckle the Seat Belt

Hold the latch plate (2) and pull upward to lengthen the belt. Insert the latch plate into the buckle (1) until it locks. Pull on the loose belt from the latch plate to tighten.

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.

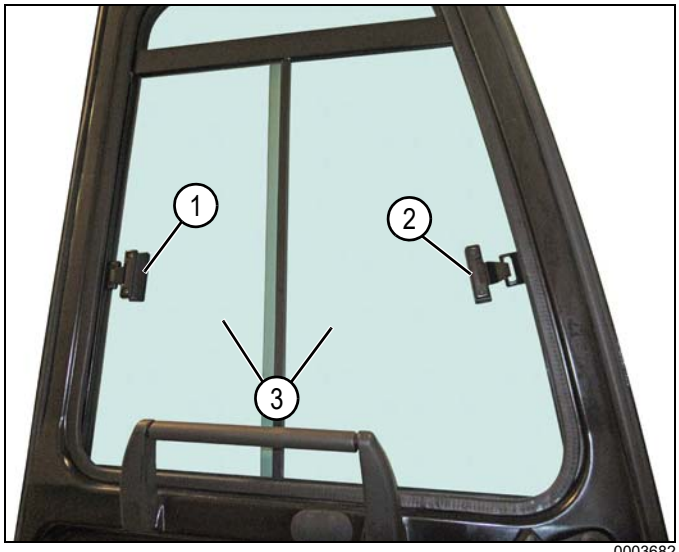
Unbuckle the Seat Belt

To unbuckle the seat belt, 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 release. Failure to follow this warning could result in death or serious injury.

Cab Door Windows



0003682

Figure 4-20

To open the cab door windows, press the rear window latch (1) or forward window latch (2) and slide the rear or forward door windows (3) open as needed.

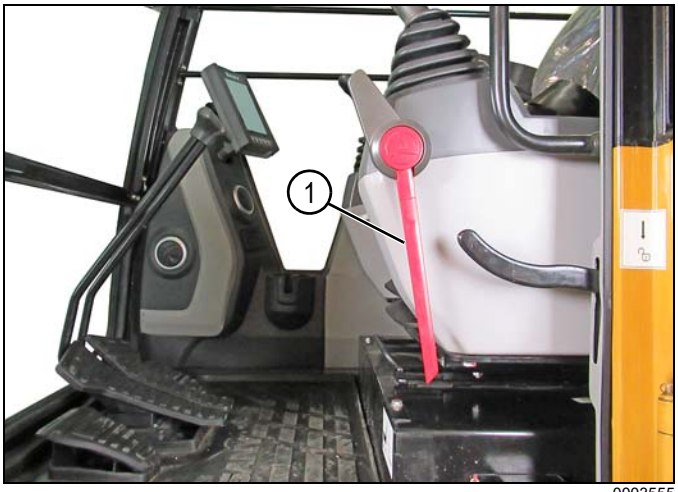
Windshield

0003550

Figure 4-21

The windshield (1) can be opened and stored on the ceiling of the cab.

Opening the Windshield



0003555

Figure 4-22

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 cause death or serious injury.

1. Before opening the front windshield, park the machine on level ground, lower the work equipment to the ground, and stop the engine.
2. Place the hydraulic lockout control lever (1) in the locked (closed) position.

CAUTION

When open, the windshield must be latched securely to the ceiling of the cab. If it is not secured properly, the windshield may slide down unexpectedly and result in personal injury or damage to the machine.

0003684

Figure 4-23

3. From the operator seat, pull both windshield latches (2). This disengages the windshield latches from the closed position.

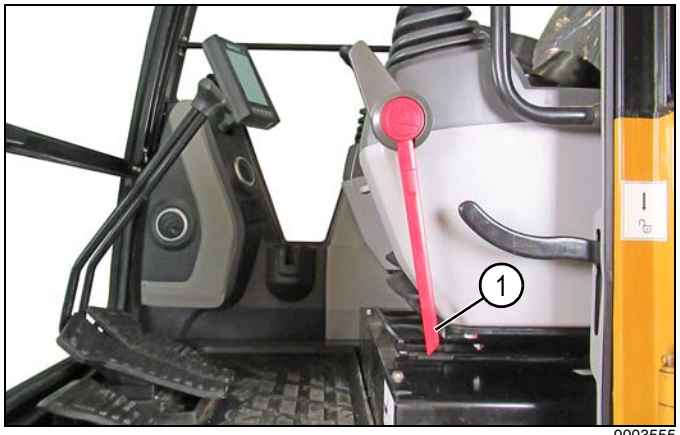
0003630

Figure 4-24

NOTE: *The right side of the windshield is shown. The left side is similar.*

4. Using the handles (3), lift the windshield up and to the rear of the cab ceiling until it is latched in the open position.

Closing the Windshield



0003555

Figure 4-25

CAUTION

Close the windshield slowly to avoid pinching hands or fingers. Failure to follow this caution could result in personal 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.
2. Move the hydraulic lockout control lever (1) to the locked (closed) position.

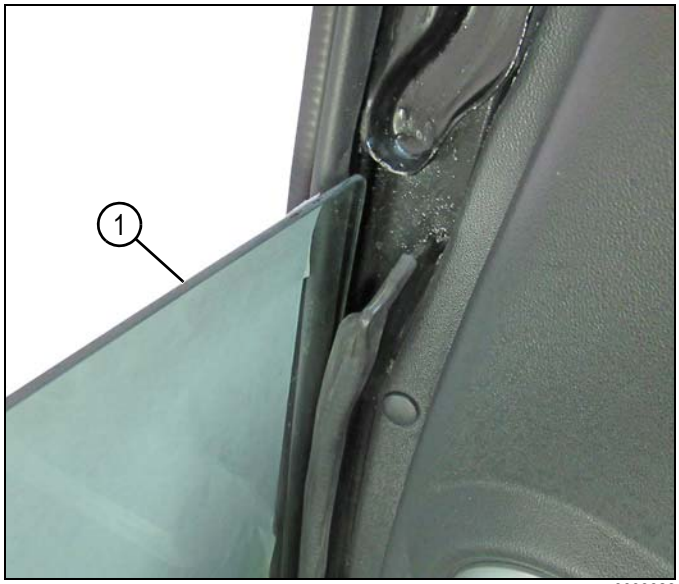
0003685

Figure 4-26

3. Hold the left and right handles (2) and pull down on both windshield release latches (3).
4. Move the windshield forward and down while maintaining a firm hold on the handles.
5. When the windshield reaches the lowered position, firmly push the left and right handles forward at the top of the windshield to engage the latches.

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

Lower Front Windshield



0003628

Figure 4-27

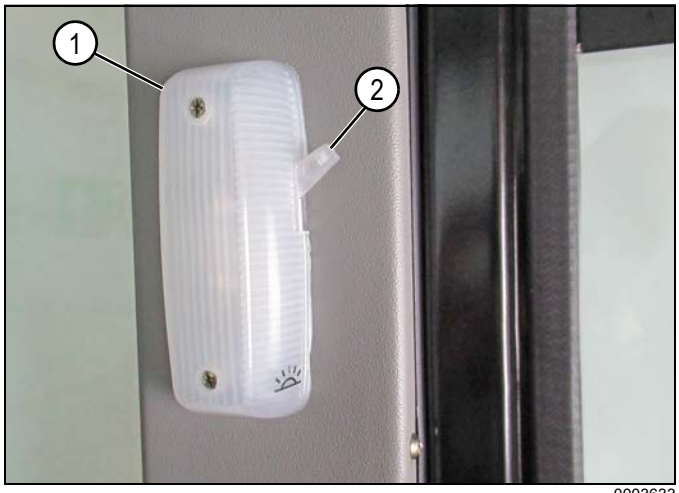
1. Raise the windshield before removing the lower front windshield. See “Opening the Windshield” on page 4-13.

NOTE: *Make sure the bottom of the lower front windshield and the seal are clean. Accumulated dirt may make the windshield difficult to remove or install.*

2. Firmly hold the top of the lower front windshield (1) and lift upward for removal.

NOTE: *The lower front windshield is curved and will only install as removed.*

Cab Light



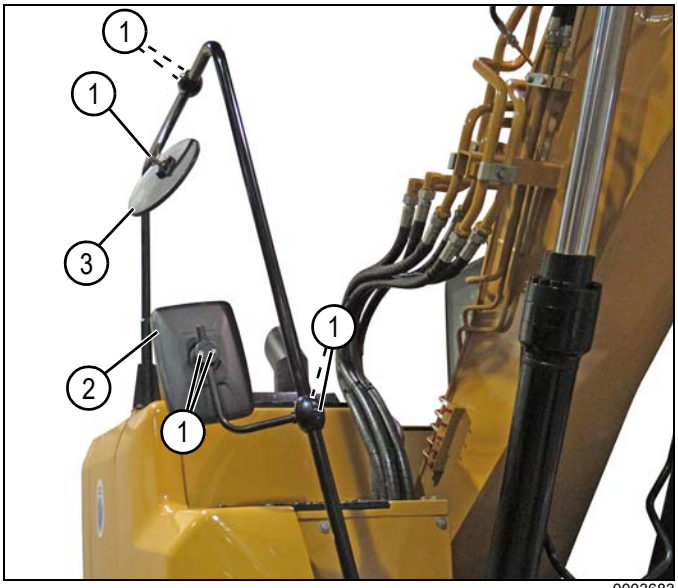
0003633

Figure 4-28

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

NOTE: *The battery must be connected and the key switch must be in the ON position for the cab light to operate properly.*

Mirrors



0003683

Figure 4-29

The machine has two mirrors (2) and one convex mirror (3) for viewing around the machine.

To position the mirrors, loosen the mounting fasteners (1). When positioned properly, tighten the mounting fasteners securely.

NOTE: The right mirror is shown. The left side is similar.

Check Fluid Levels

Complete the following procedures before starting the engine:

- Engine Coolant Level – See “Check the Engine Coolant Level” on page 5-14.
- Engine Oil Level – See “Check the Engine Oil Level” on page 5-15.
- Fuel Level – See “Check the Fuel Level” on page 5-16.
- DEF Level – See “Check the Diesel Exhaust Fluid (DEF) Level” on page 5-16.
- Fuel Water Separator – See “Check the Primary Fuel Filter/Water Separator” on page 5-17.
- Hydraulic Oil Level – See “Check the Hydraulic Oil Level” on page 5-17.
- Windshield Washer Fluid – See “Check Windshield Washer Fluid” on page 5-18.

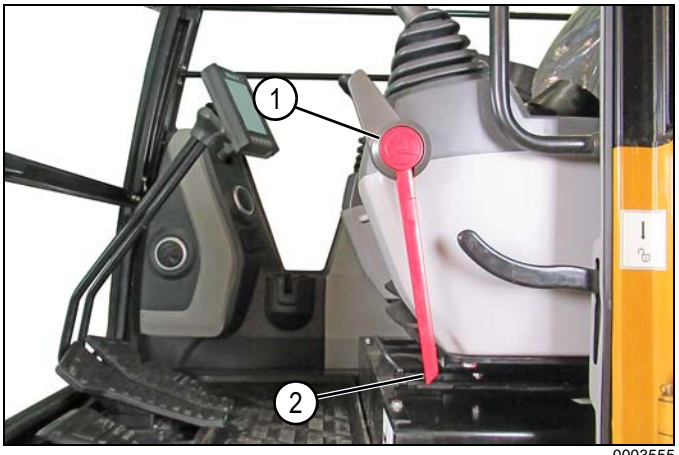
Starting the Engine

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, 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. Make sure all daily maintenance checks have been completed. See daily maintenance on page 5-12.
2. Turn the battery disconnect switch to ON. See “Battery Disconnect Switch” on page 3-15.
3. When in the operator seat, buckle the seat belt. See “Seat Belt” on page 4-12.
4. Check that the emergency stop switch is in the run position. See “Emergency Stop Switch” on page 3-15.



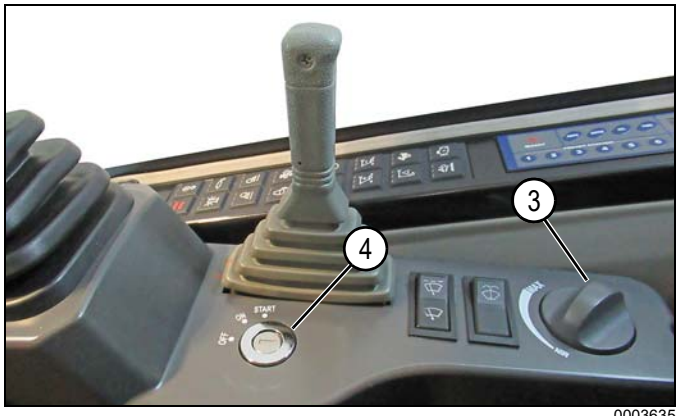
0003555

Figure 4-30

WARNING

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

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



0003635

Figure 4-31

NOTICE!

Before starting the engine, make sure 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.

7. Set the throttle control dial (3) to MIN.
8. Turn the key switch (4) to the ON position and check the monitor. If all readings are normal and no fault codes are present, the display will return to the default screen within 2 seconds.
9. Sound the horn to warn personnel that the machine is being started.

NOTICE!

In order to prevent starter damage, do not operate the starter motor for more than 15 seconds. If the engine does not start, allow the starter motor to cool for at least 15 seconds. If the engine does not start the second time, turn the key switch to OFF and wait a minimum of 2 minutes before trying to start the engine again. If the engine fails to start after five attempts, contact a SANY dealer.

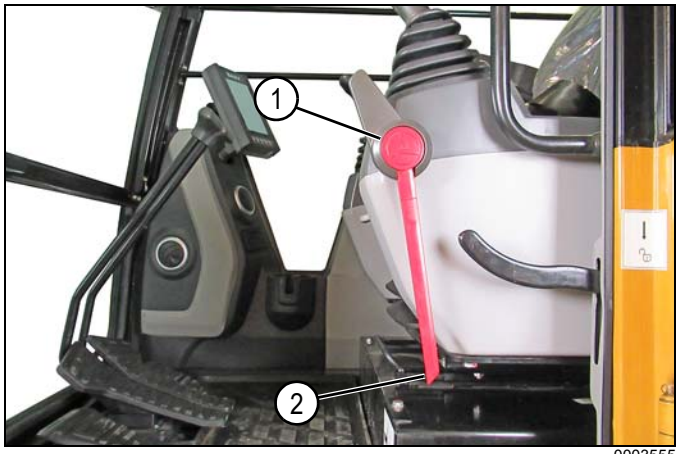
10. To start the engine, turn the key switch to START. When the engine starts, release the key. The key will return to ON.

Cold Weather Engine Starting

WARNING

- **Sound the horn before starting the engine and after confirming that the machine's surroundings are clear of personnel and obstructions.**
- **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 that could result in death or serious injury.**
- **Exhaust gas contains carbon monoxide. Carbon monoxide is an invisible and odorless gas. Carbon monoxide is toxic and could result in death or serious injury. Provide adequate ventilation when starting the engine in a confined space.**

1. Check the fluid levels before starting the engine. Drain the water and sediment from the primary fuel filter/water separator once a week. See "Check the Primary Fuel Filter/Water Separator" on page 5-17.
2. Turn the battery disconnect switch to ON. See "Battery Disconnect Switch" on page 3-15.
3. When in the operator seat, buckle the seat belt. See "Seat Belt" on page 4-12.
4. Check that the emergency stop switch is in the run position. See "Emergency Stop Switch" on page 3-15.



0003555

Figure 4-32

WARNING

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

5. 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.
6. Make sure the control levers and pedals are in the neutral position, move freely, and return to the neutral position when released.

NOTICE!

Before starting the engine, make sure 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 cause damage to the engine.

7. Set the throttle control dial to MIN.
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.

0003717

Figure 4-33

NOTE: *The preheat cycle automatically begins if the engine coolant temperature is less than a preset value. When the preheat cycle begins, the preheat icon (3) is illuminated on the home screen. When the preheat cycle is complete, the preheat icon will turn off.*

NOTICE!

Do not attempt to start the engine until the preheat icon is off. Failure to follow this notice may damage the machine.

9. Sound the horn to warn personnel that the machine is being started.

NOTICE!

In order to prevent starter damage, do not operate the starter motor for more than 15 seconds. If the engine does not start. allow the starter motor to cool for at least 2 minutes. If the engine does not start the second time, turn the key switch to OFF and wait a minimum of 2 minutes before trying to start the engine again.

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

10. Turn the key switch to START. The starter motor will crank the engine. After the engine has started, release the key and the key switch will return to the ON position.

NOTE: *If the engine fails to start after preheating, wait at least 15 seconds before repeating the process.*

11. Allow the engine to idle until the hydraulic oil reaches 104°F (40°C) before using the machine. Once the hydraulic oil reaches 104°F (40°C) complete the warm-up operation. See “Machine Warm-up” on page 4-18.
12. 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 the mud from the sprocket, track rollers, and idlers.

Machine Warm-up

CAUTION

Do not operate any control levers or pedals when the hydraulic oil temperature is below 104°F (40°C). Always warm up the machine until the hydraulic oil temperature rises to an operational level. Failure to follow this caution could damage the machine.

NOTICE!

- **In case of emergency, irregular engine operation, or other faults, turn the key switch to the OFF position 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. Complete the following warm-up procedure:

1. Deactivate the Auto-Idle mode after starting the engine, and adjust the throttle so that the engine runs unloaded at 1400 rpm for 5 minutes.
2. Adjust the throttle so the engine runs at 1500 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 procedures several times and stop the warm-up process. Check the monitor and indicators for normal operating readings after the warm-up process.

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 temperature reaches 140°F (60°C) before beginning operation.

Jump-Start the Engine

CAUTION

When working with any live electrical power circuit, make sure to remove any metal objects (rings, watches, jewelry, etc.) that could come in contact with electrical circuits and cause a short circuit.

Battery gases are explosive and can cause injury. Never smoke around batteries or expose them to sparks or open flames. Work in a well-ventilated area.

Wear personal protective equipment (PPE) when working with batteries. Burns or injury can occur 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 precautions could result in machine damage or serious injury.

NOTICE!

The starting system voltage and the battery voltage in the boosting machine should be no more than 24V. Never use a welder or equipment with a higher voltage system to jump-start the machine. Using higher voltage to jump-start the engine may damage the electrical system or cause an unexpected explosion or fire. Always jump-start the engine with equal voltages.

The jumper cables and their clamps must be undamaged, free of corrosion, suitable for the battery amperage, and securely attached.

All machine controls must be set in their neutral position.

Use caution when disconnecting jumper cables after both engines are running. Never allow the jumper cable clamps to touch each other.

Failure to follow this notice could damage the machine or cause improper machine operation.

1. Make sure that the key switches of both machines are OFF.

NOTE: *Make sure that all jumper cables are securely clamped to their connections. Failure to follow this notice could result in damage to the machine or cause the machine to operate improperly.*

2. Clamp one end of a jumper cable to the positive (+) red terminal of the drained battery.
3. Clamp the other end of the same jumper cable to the positive (+) red terminal of the charged battery.
4. Clamp one end of a second jumper cable to the negative (-) black terminal of the charged battery.
5. Clamp the other end of the second jumper cable to the negative (-) black terminal of the discharged battery or an unpainted area of the chassis of the machine with the drained battery.
6. Start the engine of the machine with the charged battery and run it at medium speed.

NOTICE!

Prevent starter damage. Do not operate the starter motor for more than 15 seconds when starting the engine. If the engine does not start, stop and allow the starter motor to cool for at least 2 minutes before attempting another start. If the engine does not start the second time, turn the key switch to OFF and wait a minimum of 2 minutes before trying to start the engine again.

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

7. Attempt to start the engine of the machine with the drained battery. Retry after 3 minutes if the engine will not start.
8. Perform steps 2 through 5 in reverse order to disconnect the jumper cables from the machine with the drained battery and from the machine with the charged battery.

New Machine Break-In

NOTE: *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 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.*

1. Start the engine and run at a low idle until it reaches proper operating temperatures. Do not move the controls.
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 low 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 down.
8. After shutting down the engine, check the fluid levels.

Manual Regeneration

WARNING

The engine exhaust will be very hot. Make sure the machine is not in a highly combustible area. Failure to follow this warning could cause a fire or explosion, resulting in death or serious injury.

A manual regeneration is required when the regeneration icon is flashing yellow. See “Function Icons” on page 3-26.

NOTICE!

If the flashing yellow regeneration icon is ignored for too long, the regeneration icon remains on, the engine icon turns red and engine power is reduced. Park the machine and perform a manual regeneration. After regeneration, full engine power is restored.

1. Start the engine.
2. Make sure the machine is in a safe location where the exhaust pipe outlet will not face any combustible surface.
3. Run the engine at low idle. Engine speed must be below 1400 rpm to for regeneration to be initiated and maintained.
4. Move the hydraulic lockout control lever into the unlocked (open) position. See “Hydraulic Lockout Control Lever” on page 3-6.
5. Press the manual regeneration switch on the right console. See “Manual Regeneration Switch” on page 3-12.

NOTE: The engine speed and turbocharger sounds may increase, the High Exhaust System Temperature (HEST) lamp may illuminate, and the regeneration lamp will flash.

NOTE: *Do not move the hydraulic lockout control lever or throttle control dial during regeneration. Regeneration will stop if either the hydraulic lockout control lever or throttle control dial is moved, which will require the process to be started again.*

6. During regeneration, the regeneration icon displays a steady yellow. See “Function Icons” on page 3-26.
7. When the regeneration is complete, the engine will return to idle speed, and the HEST and regeneration lamps will turn off.

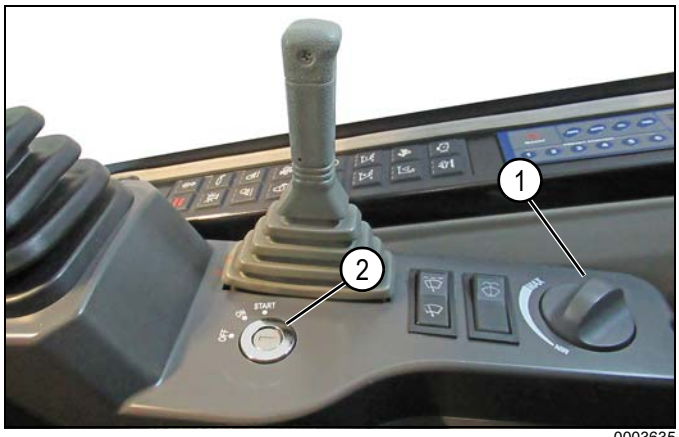
Engine Shutdown

NOTICE!

- **To avoid accelerated engine component wear, always allow the engine to idle for five minutes to decrease the engine temperature before shutting the engine off. 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 the engine to cool down gradually before shutting down the engine.**

Failure to follow this notice may result in machine damage.

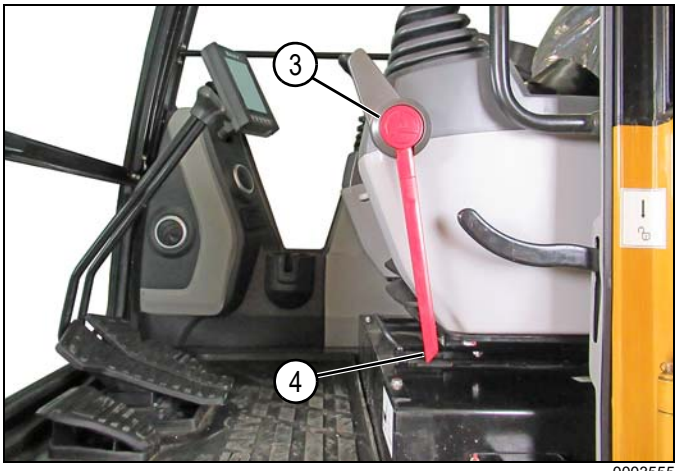
1. Park the machine on a firm, level surface.
2. Lower the bucket or optional equipment to the ground.



0003635

Figure 4-34

3. Adjust the throttle control dial (1) to MIN (low idle) and allow the engine to idle for 5 minutes to cool down.
4. Turn the key switch (2) to the OFF position and allow the engine to stop.



0003555

Figure 4-35

5. Turn the key switch (2) to ON.

NOTE: *The hydraulic lockout control lever must be in the unlocked (open) position to relieve hydraulic system pressure.*

6. Operate all hydraulic controls to relieve hydraulic system pressure.
7. Turn the key switch to the OFF position and remove the key.
8. Move the hydraulic lockout control lever (3) to the locked (closed) position (4).

Inspection after Engine Shutdown

1. After shutting down the engine, conduct a walk-around inspection. Check the work equipment, exterior of the machine, and the undercarriage. Check for fluid leaks.
2. Fill the fuel tank with diesel fuel. See “Fuel” on page 5-8.
3. To prevent fires, clean the engine compartment of combustible debris.
4. Clean mud from the tracks and undercarriage.

Travel Operations

Machine Moving Precautions

WARNING

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

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

NOTICE!

- **Standard travel direction: The idlers are in the front of the track assemblies, and the travel motors with the sprockets are at the rear of the track assemblies. If the travel motors are in the front of the machine, the travel control pedals will operate in reverse. Check the position of the travel motors before traveling.**
- **Stop the machine for 5 minutes after every 20 minutes of traveling. Prolonged traveling may strain the travel motors.**

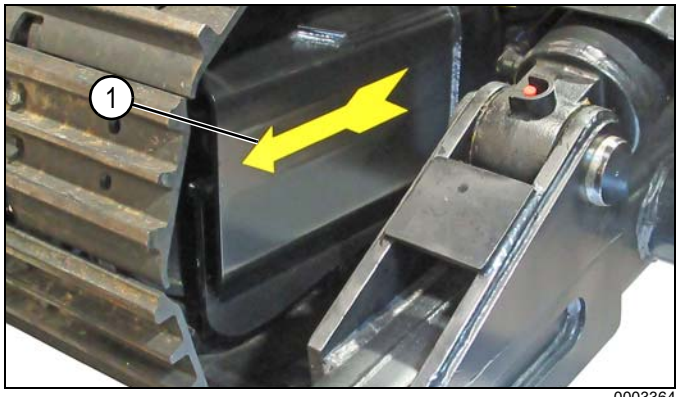
NOTE: *Check the direction of the track frame before operating the travel control levers/pedals. If the sprockets are in the front, the machine will move in the opposite direction of the travel control levers/pedals.*

0003635

Figure 4-36

1. Adjust the throttle control dial (1) to MAX (high idle).
2. Raise work equipment a minimum of 16 in.–20 in. (40 cm–50 cm) above the ground.
3. Retract the boom to make sure good visibility is obtained.

Directional Arrow



0003364

Figure 4-37

The directional arrow (1) on each of the two track frames indicates the forward direction of the undercarriage. Check these arrows before using the travel control levers. When possible, face the cab in the direction of the arrows as this is the normal position.

NOTE: *When traveling in areas where the machine will be exposed to surrounding hazards, rough surfaces or tight maneuvering, travel with the undercarriage in the forward position.*

Travel with Undercarriage Reversed

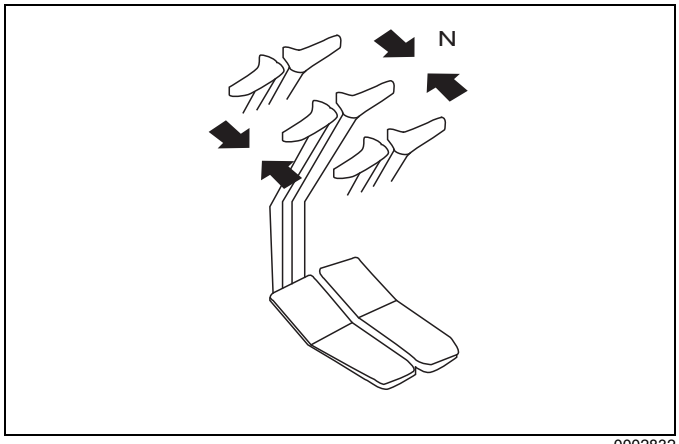
CAUTION

Travel with the undercarriage reversed could pose a hazard. Failure to observe and follow this caution could result in injury.

When the cab faces backward, the machine moves forward when the control levers are pulled and backward when pushed.

SANY does not recommend traveling with the undercarriage reversed.

Stopping the Machine



0002832

Figure 4-38

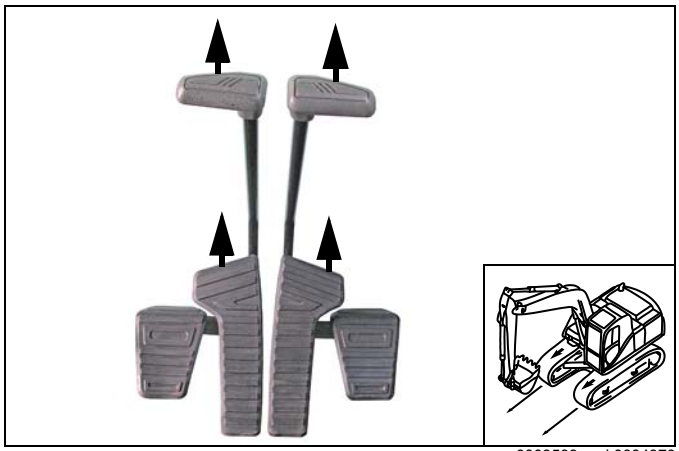
NOTICE!

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.

Forward Travel



0003599 and 0004370

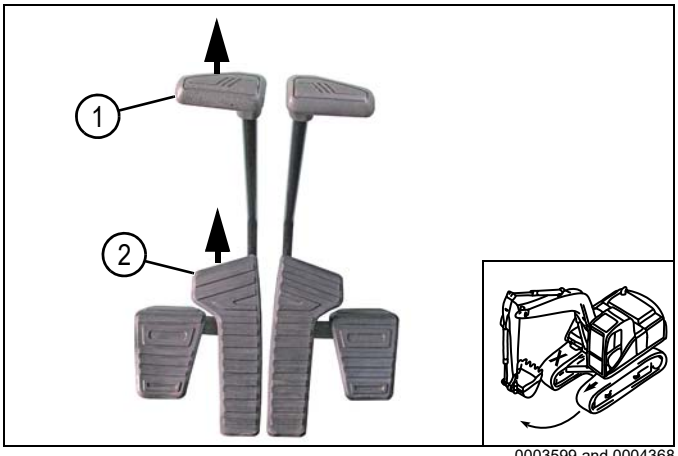
Figure 4-39

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 backward.

Right Turn

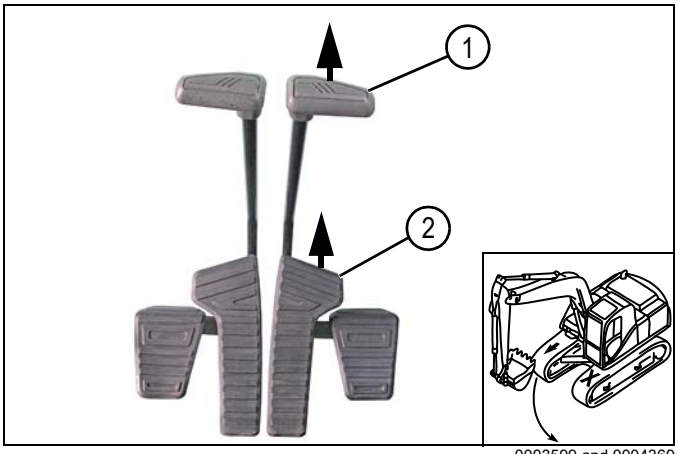


0003599 and 0004368

Figure 4-40

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



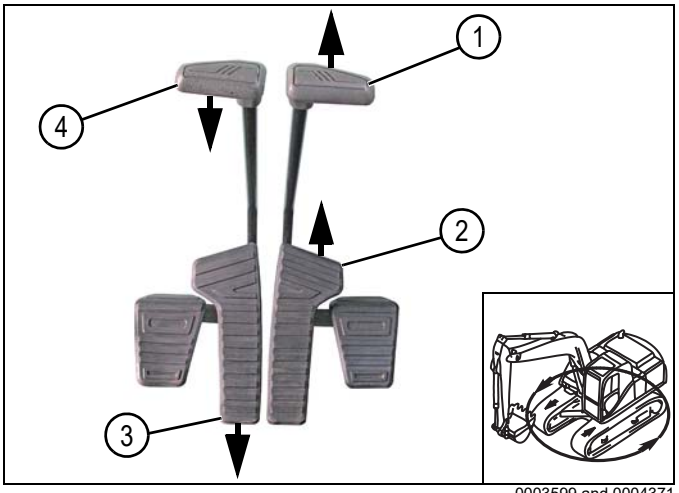
0003599 and 0004369

Figure 4-41

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.

Spot Turning

To the Left



0003599 and 0004371

Figure 4-42

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 or press the top of the left foot pedal and pull the right travel control lever or press the bottom of the right foot pedal to rotate the machine to the right.

Work Equipment Control and Operation

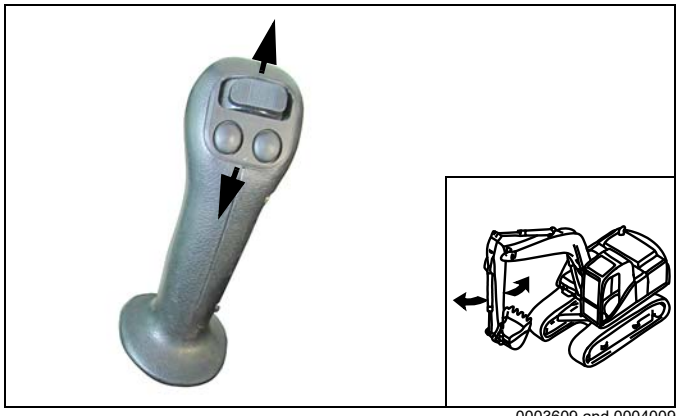
Pattern Change (SAE/BHL) Valve Operation

The pattern change (SAE/BHL) valve changes control of the boom and arm from one joystick to the other.

- In SAE (Society of Automotive Engineers) mode, the arm is controlled using the left joystick, and the boom is controlled using the right joystick.
- In BHL (Backhoe Loader) mode, the arm is controlled using the right joystick, and the boom is controlled using the left joystick.

To change the operating mode, see “Pattern Change (SAE/BHL) Valve” on page 3-17.

Arm Control – SAE Mode



0003609 and 0004009

Figure 4-43

To extend the arm push the left joystick.

To retract the arm pull the left joystick.

Arm Control – BHL Mode

0003610 and 0004009

Figure 4-44

To extend the arm push the right joystick.

To retract the arm pull the right joystick.

Boom Control – SAE Mode

0003610 and 0004010

Figure 4-45

To raise the boom pull the right joystick.

To lower the boom push the right joystick.

Boom Control – BHL Mode

0003609 and 0004010

Figure 4-46

To raise the boom pull the left joystick.

To lower the boom push the left joystick.

Bucket Control – SAE/BHL Mode

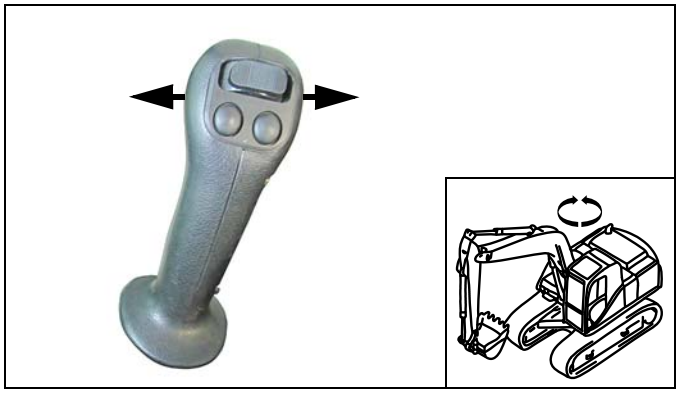
0003610 and 0004011

Figure 4-47

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

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

Swing Control – SAE/BHL Mode



0003609 and 0004008

Figure 4-48

To swing the machine to the right move the left joystick to the right.

To swing the machine to the left move the left joystick to the left.

Dozer Blade Control Lever

0003635

Figure 4-49

To raise to the dozer blade pull the dozer blade control lever.

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

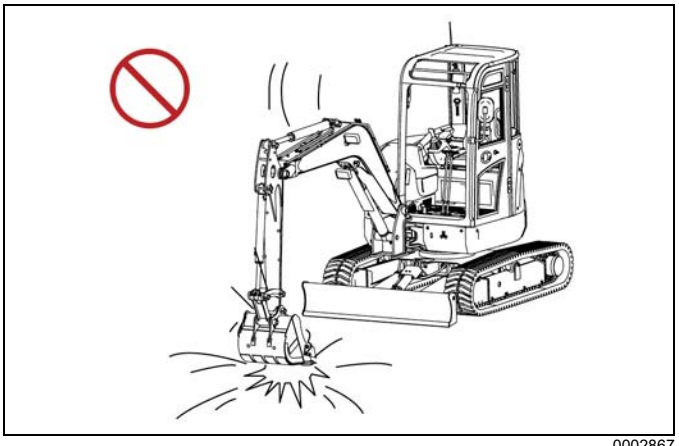
Restricted Operation

WARNING

- **Use caution when operating work equipment while the machine is traveling.**
- **When the engine auto idle is on, moving any control lever will increase the engine speed.**
- **Do not operate the machine on any ground that lacks sufficient support.**
- **Avoid any working conditions that may cause the machine to tip over.**
- **Do not attempt work operations such as scraping, digging, etc., with the hydraulic cylinder fully extended.**

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

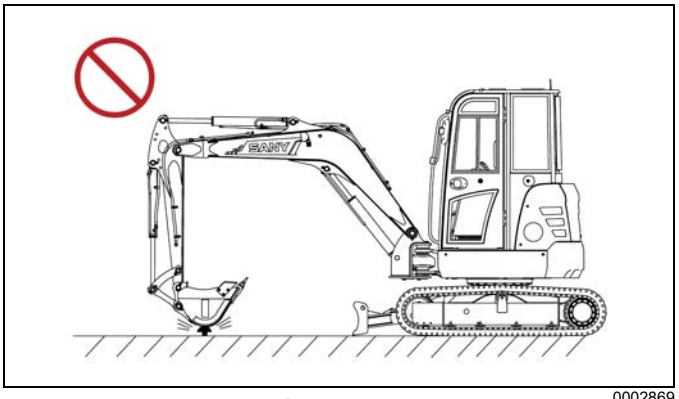
Never Operate with Bucket Force



0002867

Figure 4-50

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.

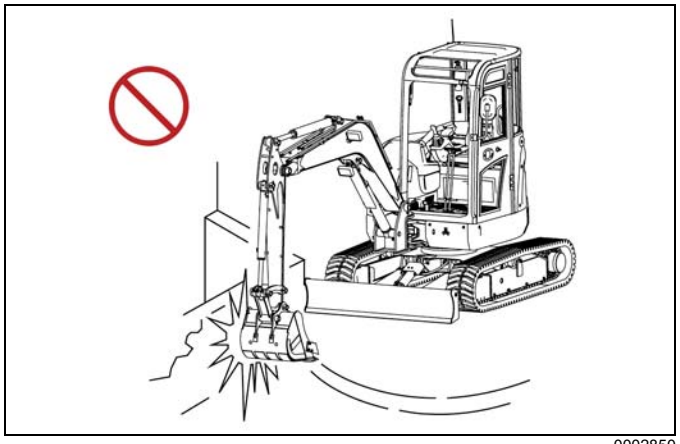


0002869

Figure 4-51

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

Never Use Swing Force

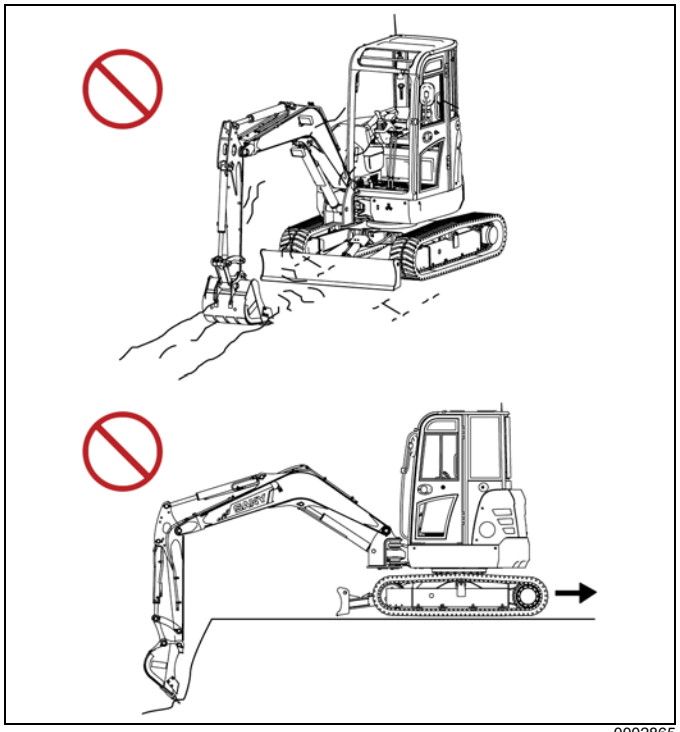


0002850

Figure 4-52

Never use the 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 Traveling Force



0002865

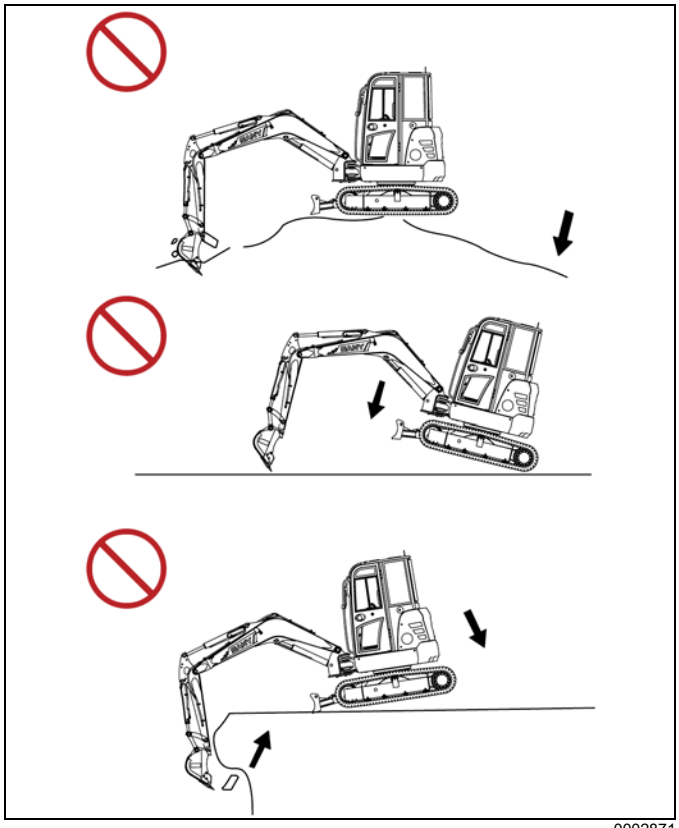
Figure 4-53

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

Excavating Hard or Rocky Ground

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

Never Operate Using Machine Weight

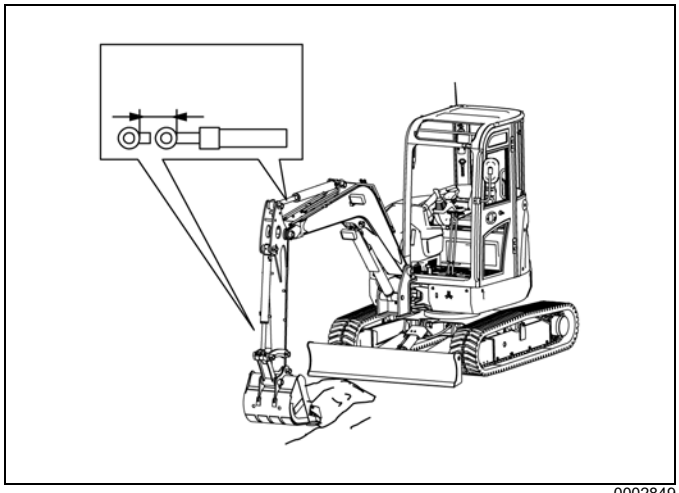


0002871

Figure 4-54

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



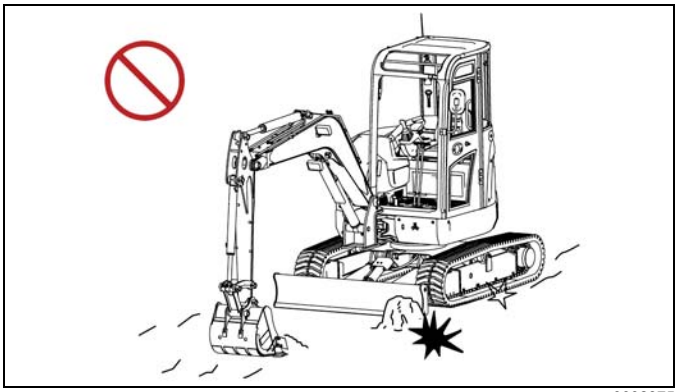
0002849

Figure 4-55

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

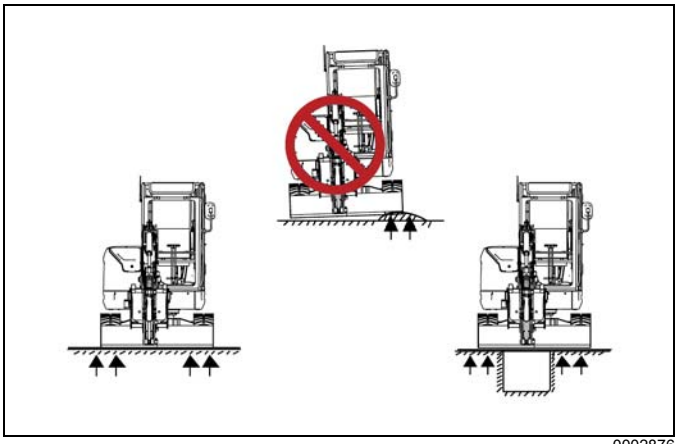


0002875

Figure 4-56

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.

Support the Dozer Blade

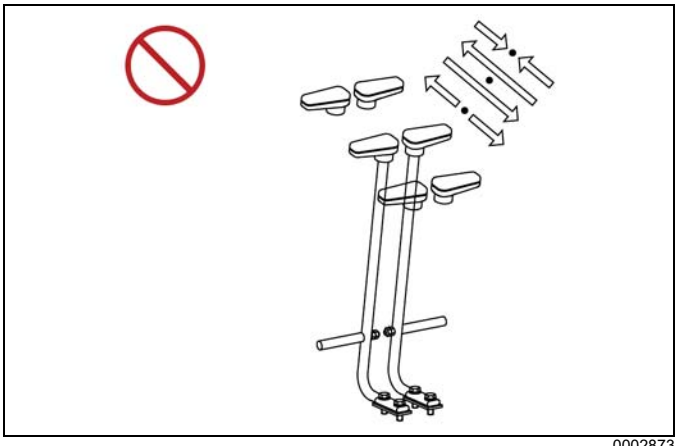


0002876

Figure 4-57

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

Avoid Shifting Travel Directions Suddenly



0002873

Figure 4-58

- Never push or pull the control levers suddenly to prevent sudden movement.
- Avoid moving the control levers quickly from forward travel to reverse travel.
- Never move the control levers quickly from high speed to neutral.

General Travel Instructions

CAUTION

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

- 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 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. If possible, turn the machine slowly and gradually.
- Never let the machine make contact with power lines or bridges.

Operating in Water

NOTICE!

- **Operate the machine slowly when traveling through water. Check the depth of the water with the bucket.**
- **When driving the machine out of water on a grade steeper than 15°, the rear of the upper structure may be submerged in water. The radiator fan may sustain water damage that can result in damage to the machine or cause the equipment to operate improperly.**
- Do not drive the machine into water where the water depth is above the carrier rollers.
- Grease the parts that have been submerged until the old grease has been displaced from the bearings and the bucket pins.
- Make sure that the job site surface is firm enough for the machine.
- 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, and swivel 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.*

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.**

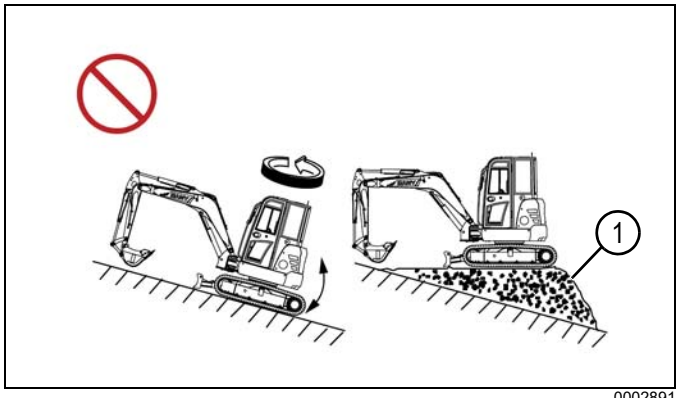
Failure to follow these warnings could result in death or serious injury.

NOTICE!

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

The machine could tip over as of a result of being on uneven ground or a slope. To avoid such accidents, follow these instructions when the machine is operated on uneven ground or on a slope:

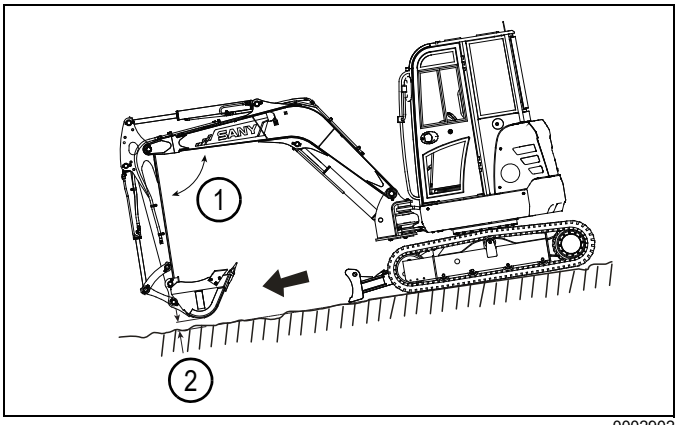
- Keep the engine running at a low speed.
- Choose low-speed travel mode.
- Operate slowly and observe the motion of the machine.
- Do not attempt to travel on a slope with the bucket loaded or with a load lifted.
- Never attempt to travel up or down a slope with a grade greater than 30°. Never attempt to cross a slope with a grade greater than 15°.
- Always keep the seat belt fastened.
- Keep the bucket pointed toward the traveling direction and 16 in. – 20 in. (40 cm – 50 cm) off the ground. Travel at low speed.
- Do not attempt to change direction on a slope, or the machine may slip and tip over. Only perform a direction change on an even and solid surface.
- If the engine stalls on a slope, lower the bucket to the ground immediately, neutralize all control levers, and restart the engine.
- For proper machine operation while traveling up a steep slope, allow the engine and hydraulic system to warm up to operating temperature.
- Avoid crossing inclines as much as possible. Slipping or rolling over may occur.



0002891

Figure 4-59

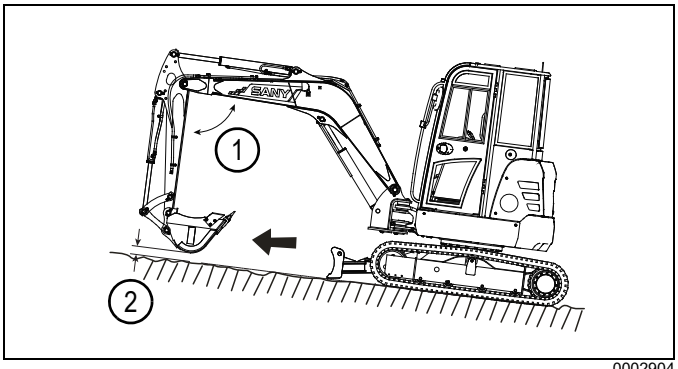
- Do not swing the upper structure to the downhill direction; the machine may tip over. If such an operation is necessary, carefully swing the upper structure and the boom.
- Do not swing a loaded bucket to the downhill direction. Build a platform (1) on an incline so the machine can be operated on a level surface.



0002902

Figure 4-60

- 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° (1) and the bucket 16 in.–20 in. (40 cm–50 cm) (2) above the ground.

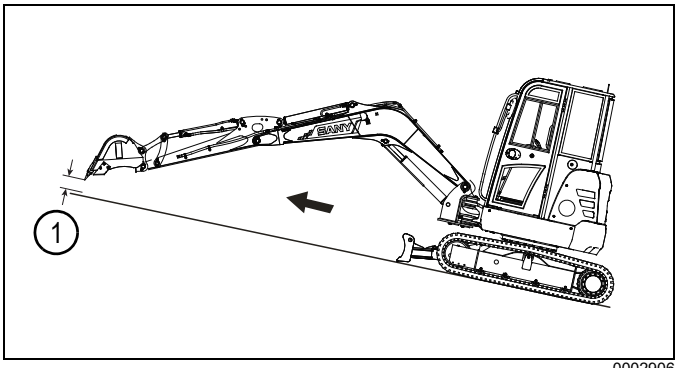


0002904

Figure 4-61

- 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° (1) and the bucket 16 in.–20 in. (40 cm–50 cm) (2) above the ground.

NOTE: *When traveling up a grade, make sure the sprockets are in the downhill direction. If the sprockets are not in the downhill direction, the tracks may loosen and result in slippage damage or misalignment.*



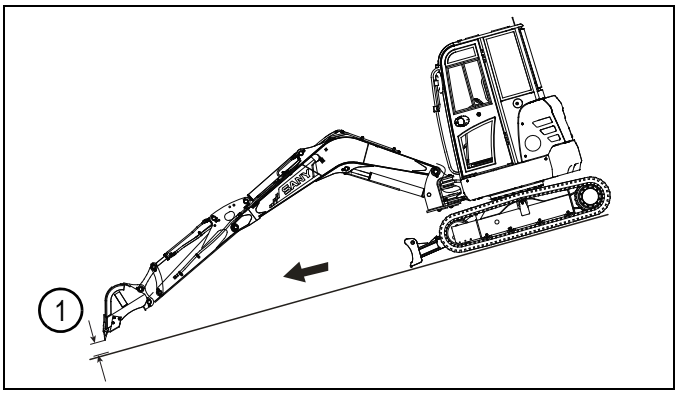
0002906

Figure 4-62

NOTE: *The tracks may slip when the machine is traveling uphill. Use the arm to help the machine travel uphill as necessary.*

- To maintain machine balance on an incline, extend the boom and arm uphill and keep the bucket 16 in.–20 in. (40 cm–50 cm) (1) off the ground. Travel at a low speed.

NOTE: *When traveling uphill, keep the tracks in the forward direction.*



0002908

Figure 4-63

- When traveling downhill, keep the bucket in the traveling direction and 16 in.–20 in. (40 cm–50 cm) (1) above the ground. Lower the bucket immediately if the machine slips or loses balance.

Engine Stalls on an Incline

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

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 move the hydraulic lockout control lever to the unlocked (open) position, restart the engine.

When the engine stalls on an incline, do not allow the upper structure to swing.

Operating on Soft Ground

NOTICE!

- **Rugged terrain could cause wide tracks with wide shoes to bend or come loose and damage other track components.**
- **Wide track hoes are intended for operation on soft ground.**
- **Inspect the track shoe fasteners on a regular basis.**

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

The machine may get stuck when operating on soft ground. If the machine gets stuck. See “Removing a Stuck Machine” on page 4-30.

Removing a Stuck Machine

Be careful when operating on soft terrain and avoid becoming stuck. If the machine becomes stuck in the mud, perform the following procedures to free the machine:

WARNING

Use caution when placing cribbing under the track, since the machine is supported only by the boom and could drop without warning causing injury or death.

One Track 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 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.
5. Place cribbing under the track to provide a firm surface as necessary.
6. Raise the boom to lower the track onto the cribbing.
7. 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 that the back of the bucket touches the ground.
4. Lower the boom to raise the front of the tracks.
5. Place cribbing under the track to provide a firm surface as 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.

Recommended Operations

WARNING

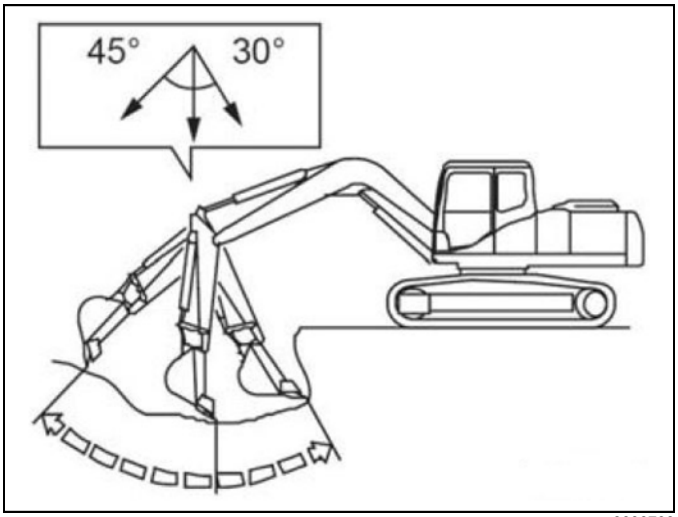
- **Contact the site supervisor before any digging to make sure that all underground hazards have been located. Failure to follow this warning could result in death or serious injury.**
- **To avoid injury, never allow any personnel within the work zone of the machine.**
- **Be aware of all crush points on the machine and make sure all personnel keep clear of these areas to prevent injury.**
- **To prevent injuries, avoid moving any travel control lever or pedal to abruptly change the direction of the machine, and avoid stopping the machine suddenly by releasing the lever or pedal while traveling at high speed.**

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.**

The machine can be used for the following operations. The scope of operation can also be expanded by using various optional attachments.

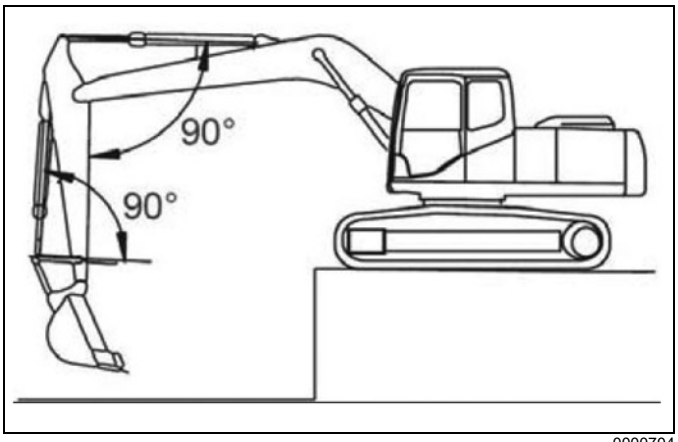
Backhoe Operation



0000703

Figure 4-64

Backhoe operation is used for digging an area lower than the machine. The digging range of the arm is between 30° and 45°. The angle may vary according to the digging depth.

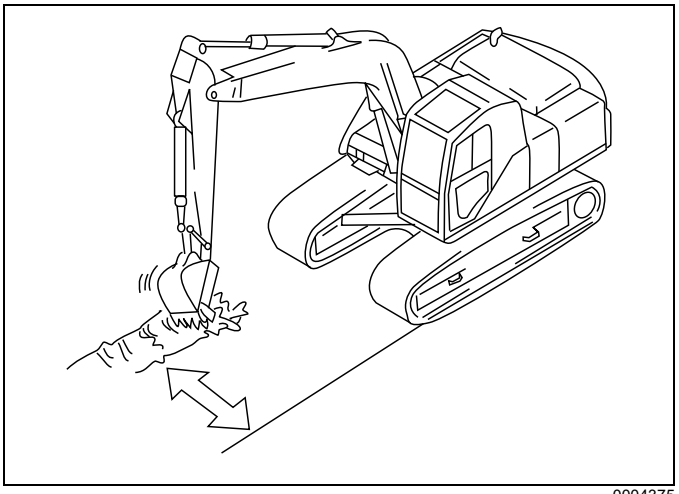


0000704

Figure 4-65

Maximum digging force can be obtained when the angle between the boom and arm and the angle between the bucket cylinder and the bucket linkage are both at 90°.

Trenching Work

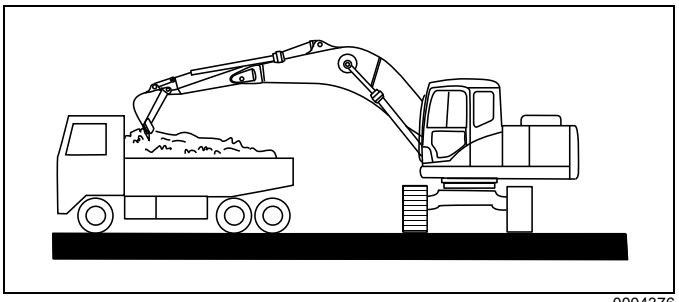


0004375

Figure 4-66

Trench work can be done efficiently by using a suitable bucket and positioning the tracks parallel to the trench line. When digging a wider trench, first excavate the sides of the trench, then remove the middle.

Vehicle Loading

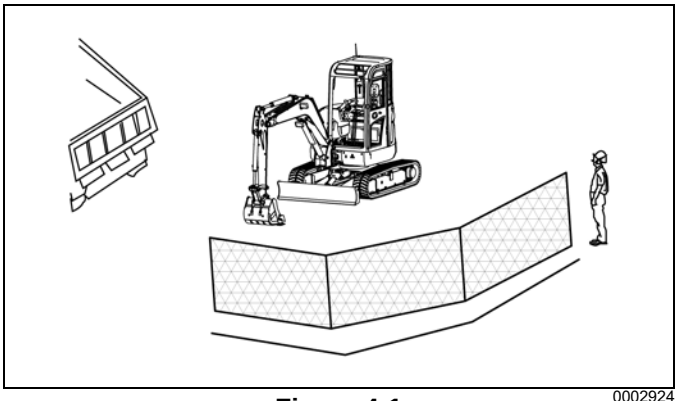


0004376

Figure 4-67

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

Operation Precautions

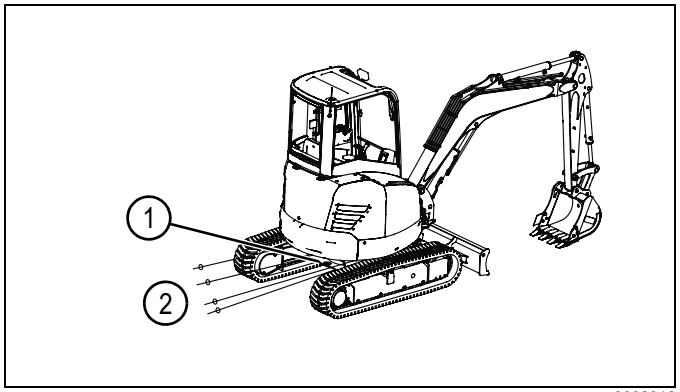


0002924

Figure 4-1

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

Towing the Machine



0002912

Figure 4-68

WARNING

- **Make sure the chains or wire ropes used for towing the machine are properly rated for the machine weight.**
- **Never use a broken chain, worn wire rope, or a bent tow hook to tow the machine.**
- **Never jerk the chain or wire rope.**

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

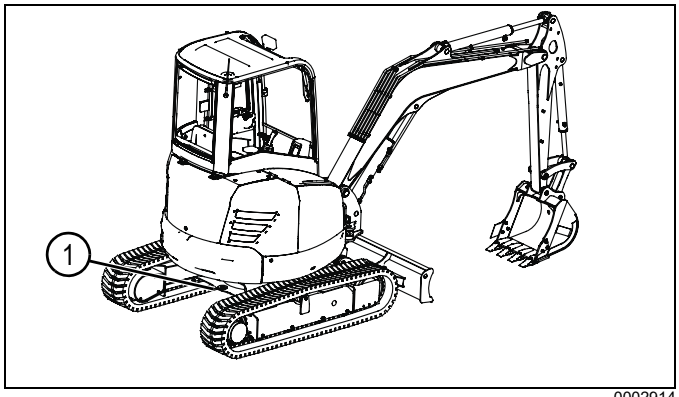
If the machine is trapped in mud and is unable to get out under its own power, use wire rope(s) (2) attached to the frame (1) to assist in its removal.

Towing Point for a Light Load

WARNING

- **Make sure the equipment used for towing has the correct capacity rating.**
- **A shackle must be used.**
- **Keep the wire ropes/slings horizontal and parallel to the tracks.**
- **Drive the machine at low speed.**
- **Never use a broken chain, worn wire rope, or a bent tow hook to tow the machine.**
- **Never jerk the chain or wire rope.**

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



0002914

Figure 4-69

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

Bucket Remove and Install

CAUTION

- **Driving a pin with a hammer can cause metal pieces to fly off, leading to injuries. Make sure the surrounding area is clear of all personnel, and wear goggles, a hard hat, protective gloves, and other personal protective equipment (PPE) during these operations.**
- **Do not stand behind the bucket when removing pins. Keep hands and feet clear of the underside of the bucket during removal.**
- **Do not use hands or fingers to aid in bore alignment.**

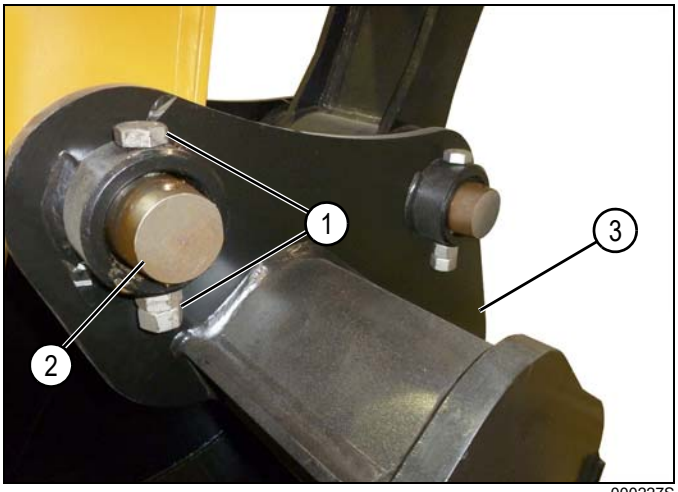
Failure to follow this caution could result in injury.

Remove the Bucket

1. Prepare the machine for service. See “Maintenance Safety” on page 2-5.

NOTE: *Before removing the pins, slowly lower the bucket to a level where it just touches the ground. If too much down force is used, resistance on the pins could increase, causing difficulty during removal.*

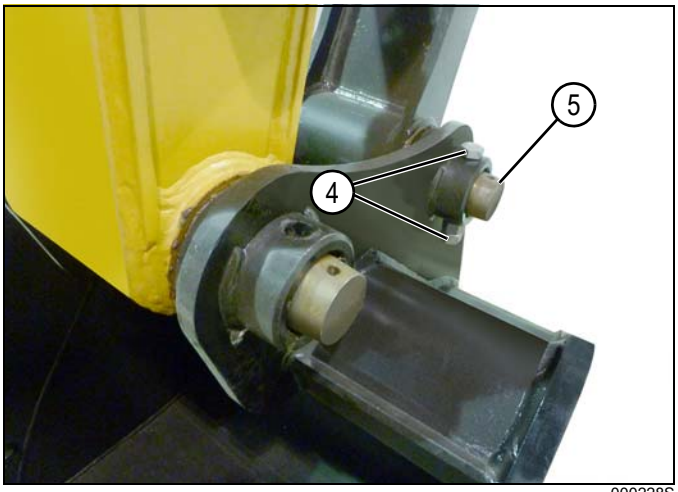
2. Place the bucket on level ground and block the bucket to prevent movement.



000227S

Figure 4-70

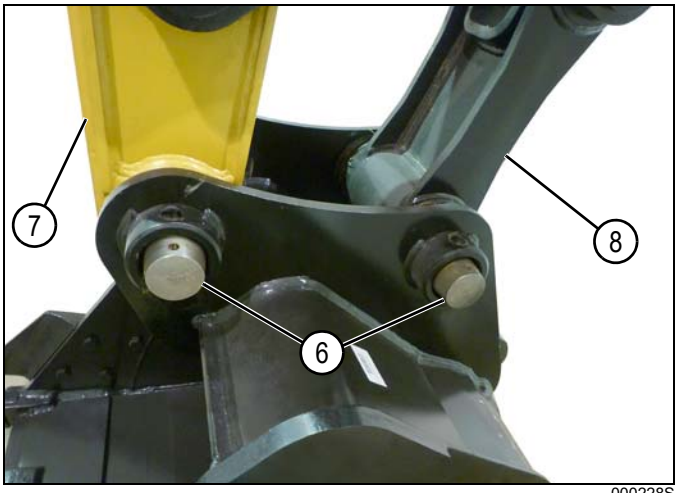
3. Remove two retaining nuts and fastener (1) that secure the arm attachment pin (2) to the bucket (3).



000228S

Figure 4-71

4. Remove two retaining nuts and fastener (4) that secure the link assembly attachment pin (5) to the to the bucket.



000228S

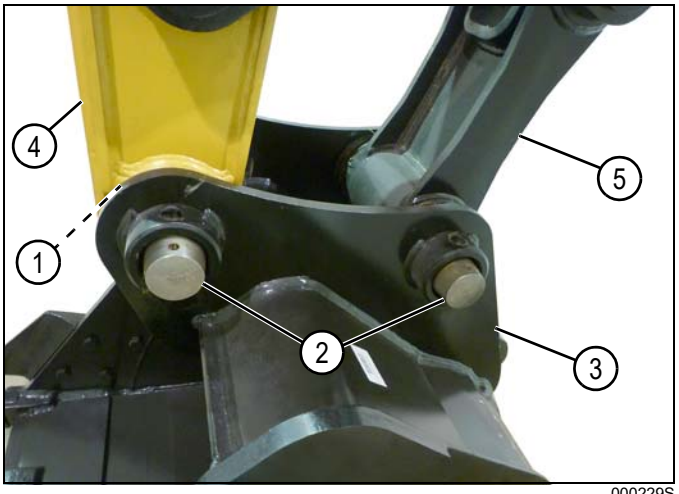
Figure 4-72

5. Remove both attachment pins (6) from the arm (7) and link assembly (8).
6. Carefully raise the boom away from the bucket.

NOTE: *Be sure to note the location and quantity of shims to aid in the installation.*

Install the Bucket

1. Clean the attachment pins and pin bores of any dirt and debris.
2. Lower the boom, aligning the arm bore with the bucket attachment pin bore.
3. Apply a light coat of grease to the attachment pins.



000229S

Figure 4-73

4. Install the shims (1) as noted during the removal and install attachment pins (2) securing the bucket (3) to the arm (4) and link assembly (5).

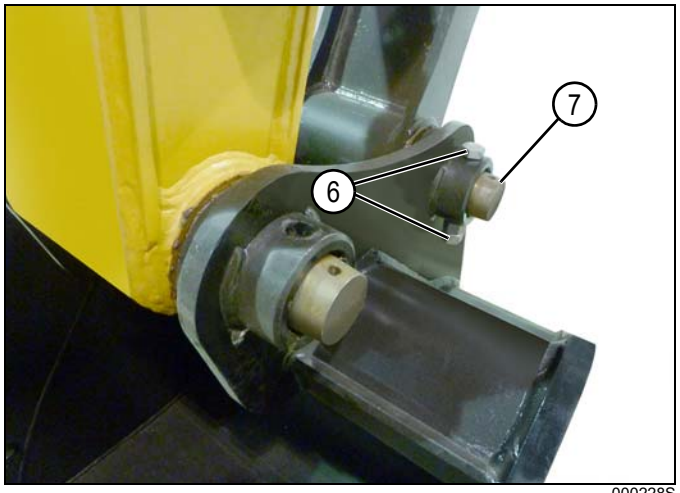


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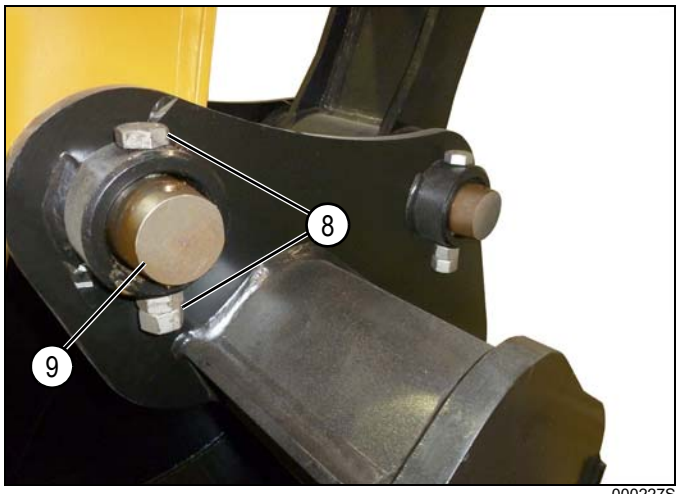
Figure 4-74

5. Install the retaining fastener and nuts (6), securing the link attachment pin (7) to the bucket.



000227S

Figure 4-75

6. Install the retaining fastener and nuts, securing the arm attachment pin to the bucket.
7. Apply grease to the attachment pins until the grease escapes from around the pins. Wipe off excess grease upon completion.

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 5-8.

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 batteries or expose them to sparks or open flames. Work in a well-ventilated area.**
- **Wear personal protective equipment (PPE) when working with batteries.**
- **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 this warning could result in death or serious injury.

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

Track Cleaning in Cold Weather

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 the mud from the sprocket, track rollers, and idlers.

After the Cold Season

- Replace the fuel and engine oil with fuel and oil of the specified viscosity.

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. Add new ethylene glycol engine coolant to the cooling system.

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.
- Clean the battery terminals as necessary. Apply a coat of dielectric grease to the terminals.
- Start and run the machine on a monthly basis.

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.

NOTE: *For machines on muddy job sites, it is recommended that the operator clean the mud from the tracks and rollers after each shift. After each shift, it is recommended that the operator drain the water from the water separator.*

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, which can prevent the tracks from sinking into soft ground. Normal operation can fail if the machine becomes stuck.
- Open the drain valve of the fuel water separator daily 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 to extend its service life:

- Run the engine at low speed and swing the upper structure 90° so the work equipment is sideways.
- Raise the machine so that 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.

Park the Machine

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

0003554

Figure 4-76

2. Lower the equipment 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. Extend this cool-down time in hot weather.
4. With the engine not running and the hydraulic lockout control lever in the unlocked (open) position, turn the key switch to the ON position, operate all joysticks and levers to relieve the hydraulic system pressure.

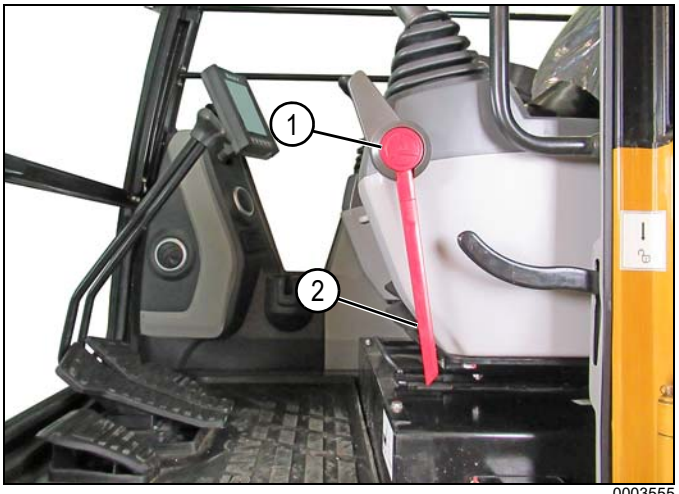


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Figure 4-77T

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

End-of-Workday Checks

1. Collect any trash or debris from the cab and deposit it into a proper disposal container.
2. Remove all built-up mud or debris on the undercarriage and machine exterior.
3. Inspect the machine work equipment, machine exterior, and undercarriage for signs of fluid leaks or damage.
4. In oceanic (salt-air) environments, thoroughly wash away any salt residue. Apply grease where rust is found, and perform maintenance on the electrical components to prevent corrosion.

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.

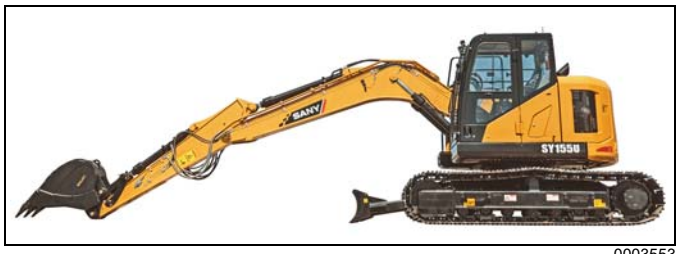

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Figure 4-78

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.
- Apply a thin layer of grease to any exposed surfaces of the hydraulic cylinder rods.
- Disconnect the negative battery cables or remove the batteries from the machine. See “Replace the Batteries” on page 5-37.

- 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.

During Storage

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.

After operating the machine perform the following procedures:

- Extend the bucket, arm, and boom and support the dozer blade on a block.
- Apply a thin layer of grease to any exposed surfaces of the hydraulic cylinder rods.
- Disconnect the negative battery cables or remove the batteries from the machine. See “Replace the Batteries” on page 5-37.
- Close and lock all doors.

Return to Service

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.
- Check the fuel and engine oil for contamination.
- Examine the exterior of the machine for signs of rust or damage. Repair or replace as necessary.
- Start the machine and test all operations.

Starting the Engine after Long-Term Storage

Follow the procedures below when starting the engine after long-term storage.

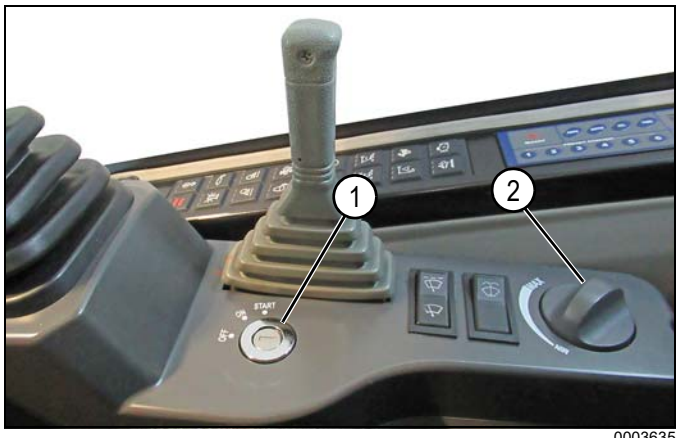

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Figure 4-79

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. See “Starting the Engine” on page 4-16.
4. Run the engine for 5 minutes after the engine and all components have reached normal operating temperature.

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 signalman 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 a solid, level ground and keep the machine a safe distance away from roads during loading and unloading operations.
- Make sure the loading ramps have adequate width, length, thickness, and strength. The maximum angle of the ramps is 15°.
- 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

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

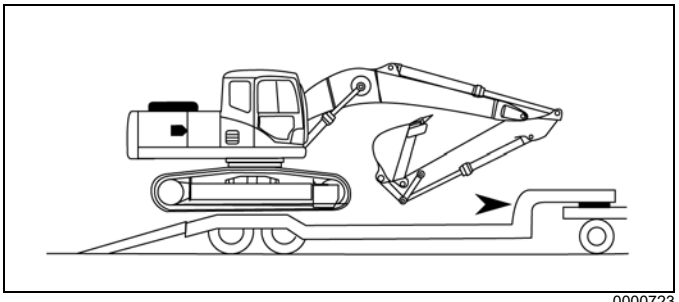

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Figure 4-80

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.

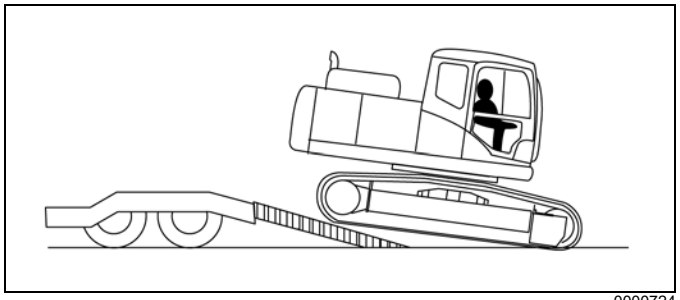

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Figure 4-81

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

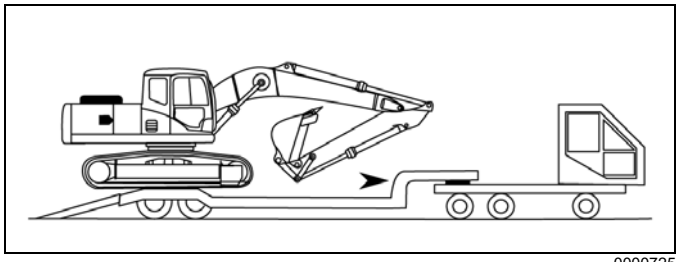

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Figure 4-82

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.

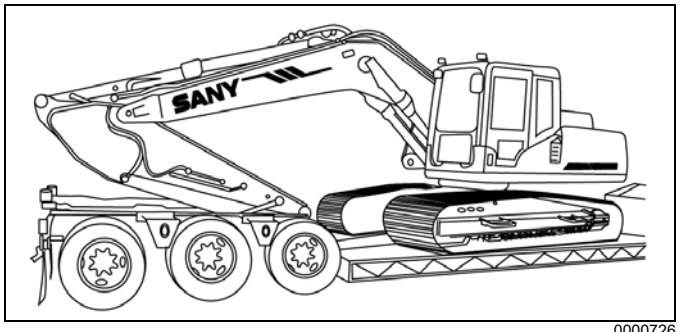

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Figure 4-83

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.

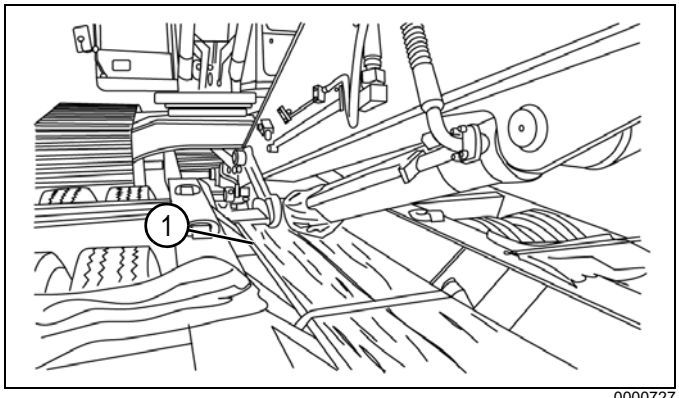

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Figure 4-84

NOTE: *To avoid damage to the bucket cylinder, place wood (1) between the bucket cylinder and the trailer floor. Slowly lower the bucket cylinder onto the wood block.*

6. Stop the engine and turn key to ON.
7. Operate the joysticks until the pressure inside the hydraulic cylinders is fully released.
8. Move the hydraulic lockout control lever to the locked (closed) position.
9. Turn the key to OFF and remove from the key switch.
10. Make sure the cab windows are closed and exit the cab. Close the door.

NOTICE!

- **Never turn the battery disconnect switch to OFF while the engine is running. This can damage the electrical system or cause improper machine operation.**
- **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 improper machine operation.

11. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
12. Lock all doors and hoods.
13. Cover the exhaust opening to prevent contamination.

NOTICE!

To avoid damage to the machine during transportation:

- **Lower the radio antenna and position the mirrors inward toward the cab.**
- **Secure any removed parts to the trailer.**
- **Secure chains and wire ropes to the machine frame.**
- **Prevent chains and wire ropes from crossing or pressing against the hydraulic lines or hoses that could result in damage and leaks.**

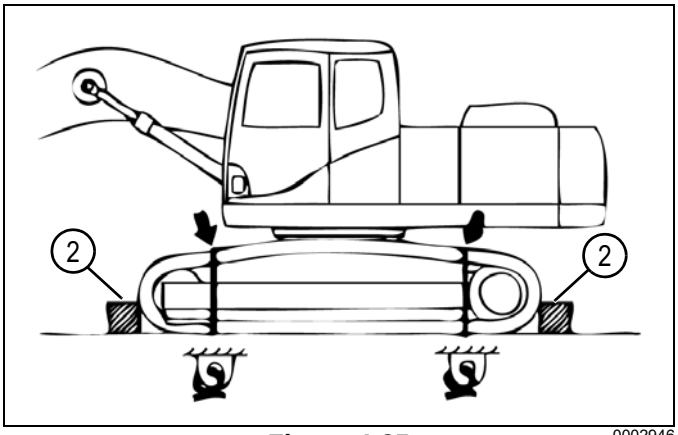

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Figure 4-85

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

Unloading the Machine

NOTICE!

- **Select a location that is firm and level and a safe distance from any road or structure.**
- **Make sure the trailer is properly chocked to prevent any movement.**
- **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 an angle of 90° to 110° between the boom and arm.**
- **Unloading the machine with the arm retracted may cause damage to the machine.**
- **Use a signalman to observe and alert the operator of any potential hazards.**

1. Always load/unload the machine on firm, level ground and keep the machine a safe distance away from roads.
2. Park the trailer properly and place chocks 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°.
4. Remove the chains or wire ropes that secure the machine.
5. Start the engine.
6. Turn the hydraulic lockout control lever to the unlock (open) position.

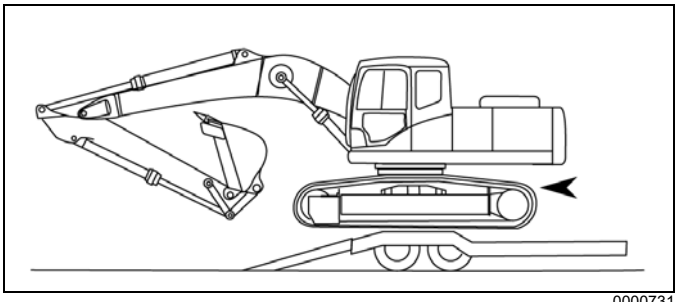

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Figure 4-86

7. Raise the work equipment and retract the arm toward the boom. Drive the machine slowly.
8. Stop the machine when it travels over the rear wheels of the trailer and toward the ramps.
9. Adjust the boom-arm angle between 90° and 110° and lower the bucket so that the flat surface is in contact with the ground.
10. Drive the machine slowly onto the ramps.
11. 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.
12. Park the machine at the desired location.
13. Run the engine at low idle for 5 minutes to let it cool down.
14. Shut off the engine.
15. Turn the key to the ON position and operate all joysticks and lever to relieve the hydraulic system pressure.
16. Move the hydraulic lockout control lever to the locked (closed) position.
17. Turn the key to the OFF position and remove it from the switch.
18. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

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 6-6.*

1. Park the machine on firm, level ground, raise the dozer blade, and swing the upper structure to the rear of the machine.
2. Fully extend the arm cylinder and the bucket cylinder. Raise the boom.
3. Move the hydraulic lockout control lever to the locked (closed) position.
4. Turn the key to OFF and remove it from the switch.
5. Close the cab window and door.
6. Turn the battery disconnect switch to OFF.
7. Lock all doors and hoods.
8. Cover the exhaust opening to prevent contamination.

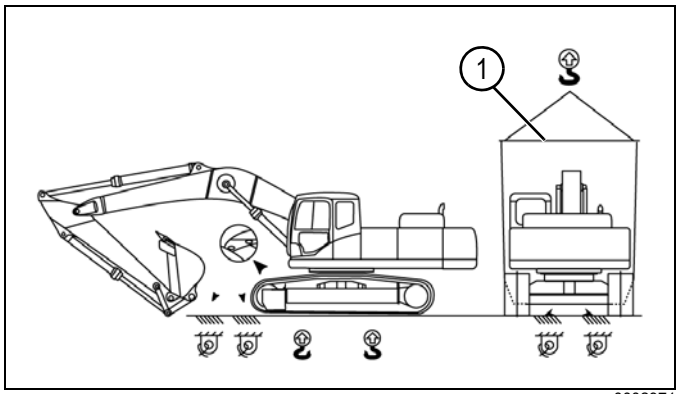

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Figure 4-87

9. Use wire ropes and a container spreader bar (1) that have adequate length to prevent machine damage.
10. Pass the wire ropes under the tracks as shown, and anchor the ropes on the crane hook.
11. 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.

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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 2-5.

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

With the engine off:

- Verify all steps listed in this book have been followed.
- 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 (on the monitor home screen) on a daily basis. Confirm hour meter readings with the required maintenance intervals listed in this manual. See “Monitor” on page 3-24.

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.

Oil and Filter Inspection

NOTICE!

Failure to inspect hydraulic oil for contamination may damage the hydraulic system or cause the machine to operate improperly.

Always inspect the drained oil and used filter for metal particles and impurities. If any foreign material is found, send a sample of the drained oil for testing. See “Collect Oil Samples” on page 5-56.

Fuel Strainer

The fuel strainer should always be installed when fueling the machine. The fuel strainer prevents larger dirt and other contaminates from entering the fuel system. The fuel 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.

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 open 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!

Disconnect the battery and all electrical control modules prior to welding. Failure to do this could result in damage to the machine and personal property or cause the machine to operate improperly.

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. Remove the negative battery cable from the negative (-) post of the battery.**
- **The welding ground cable must be connected within 3.3 ft. (1 m) of 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 damage the machine or cause the machine to operate improperly.

Daily Inspection and Maintenance

With the engine off, check the following before operation:

- Perform daily service as necessary.
- Inspect the machine for loose or missing fasteners and components.
- Clean the cab.
- 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.
- Check for fluid leaks.

With the engine running, check the following operations:

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

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

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

Inspection and Maintenance for Severe Operating Conditions

If the machine will be operating under adverse conditions:

- Check and clean electrical components to remove 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, inspect each connector for looseness.

After operating the machine, clean the machine and inspect for missing or loose fasteners. Add oil and lubricating grease as needed.

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 electrical components to prevent corrosion.

Dusty Environments

Clean the following components:

- Engine air filter: Clean the dust valve frequently.
- Radiator: Clean the radiator core frequently to prevent blockage.
- Fuel equipment: Drain sediment frequently.
- Fresh-air and recirculation filters: Clean the filters frequently.

Cold Environments

In extremely cold environments, 32°F (0°C) or below, lubricate only with the oils as shown in “Engine Oil Viscosity/Temperature Data” on page 5-9. SANY recommends the use of fuels identified in “Fuel” on page 5-8 for extremely cold environments. Prior to starting the engine, make sure the battery is fully charged and the cables have not cracked.

Contact a SANY dealer for assistance if the machine will be operated in freezing temperatures where the aid of an auxiliary heating device is needed.

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 5-12 apply only to normal operating conditions. In harsh environments, including those with dusty and corrosive air, abnormal external temperature, extremely heavy overload, frequent operating times, longtime duty cycle, etc., lubricating intervals should be shortened. Always follow the “Maintenance Schedule” on page 5-12 until enough experience is obtained to establish a new schedule.

Check the Maintenance Log

Check the maintenance log if all tasks have been completed before 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.

Recommended Lubricants, Fuel, and Engine Coolant

NOTICE!

Never mix lubricants of different types or viscosities (weight), never overfill the system that is being serviced. Failure to follow these standards can damage the machine or may 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 in 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 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

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!

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 or a mixture of #2 diesel and #1 diesel fuels in cold weather climates.
- 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 overheating 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) contains 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 before refilling engine coolant.

NOTE: *See the engine manual or contact a SANY dealer for the recommended engine coolant.*

Engine Oil Viscosity/Temperature Data

Oil Type	Temperature °F (°C)								
	-22 (-30)	-4 (-20)	5 (-15)	32 (0)	50 (10)	68 (20)	86 (30)	104 (40)	122 (50)
SAE 15W-40									
SAE 10W-30									
SAE 5W-30									
SAE 5W-40									
SAE 40W									

NOTE: *Due to its comparatively better lubricating characteristics (including improved oil consumption, engine operation in frigid climates, and continued lubrication in high temperatures), SAE 15W-40 is recommended for most climates. In some circumstances, short-term use of low-viscosity engine oil in temperatures below 23°F (-5°C) is acceptable; however, long-term use can reduce engine life.*

Lubricating Grease/Temperature Data

Grease Type	Summer	Winter
NGL1 #2 molybdenum disulfide lithium-based grease		
NGL1 #1 molybdenum disulfide lithium-based grease		

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

Industrial Gear Oil/Temperature Data

Oil Type	Temperature °F (°C)							
	-4 (-20)	14 (-10)	32 (0)	50 (10)	68 (20)	86 (30)	104 (40)	122 (50)
220 LS2 (85W-140)								

NOTE: *Any brand meeting AGMA standard 9005-D94, ISO 3448 grade 220 is acceptable. Short-term use of low-viscosity engine oil in cold temperatures (below 23°F [-5°C]) promotes engine life. Long-term use of low-viscosity engine oil can reduce engine life.*

Hydraulic Oil/Ambient Temperature Data

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 in the hydraulic oil.
- Change the hydraulic oil that has been subjected to overheating or damaged components.
- Change the hydraulic filter as recommended.
- Keep the hydraulic oil tank filled.
- Keep the oil cooler free of dust and debris.
- Cap and plug all openings after removing components for service or repair.

Oil Type	Temperature °F (°C)								
	-22 (-30)	-4 (-20)	14 (-10)	32 (0)	50 (10)	68 (20)	86 (30)	104 (40)	122 (50)
ISO VG 46 anti-wear hydraulic oil									
ISO VG 32 low-temperature anti-wear hydraulic oil									

NOTE: *Selection of the proper hydraulic oil is based on local operating climate and conditions.*

- Use ISO VG 46 anti-wear hydraulic oil in general temperate climates.
- Use ISO VG 32 low-temperature anti-wear hydraulic oil (pour point is -43.6°F [-42°C]) in general arctic areas where ambient temperatures can reach -22°F (-30°C) during operation.

Capacities

The capacities shown in the table are approximate. For exact capacities, use the inspection points, inspection plugs, dipsticks, and sight glasses.

Capacities							
Fuel	**DEF**	**Engine Oil**	**Hydraulic Tank**	**Swing Drive Oil**	**Swing Bearing Grease**	**Final Drive Oil (Each Side)**	**Engine Coolant**
55.5 gal. (210 L)	5.3 gal. (20 L)	4.0 gal. (15 L)	27.2 gal. (103 L)	0.8 gal. (3 L)	75 lb. (34 kg)	0.6 gal. (2.2 L)	5.1 gal. (19.3 L)

Other Approved Lubricants

NOTICE!

Commercially available lubricants and additives may cause harm. Use only the lubricants recommended in this manual. The use of other lubricants could damage the machine and cause it to operate improperly.

Approved lubricants include:

- Any anaerobic sealant (thread-locking compound) having properties that offer high temperature performance and oil tolerance to prevent the loosening of fasteners.
- Any lithium grease-based spray lubricant.
- Mineral spirits, Type II odorless and/or Class 1 (high flash point).

Maintenance Schedule

Secure the Machine for Maintenance

NOTICE!

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

1. Park the machine on a flat, firm surface.
2. Obtain the maintenance log for this machine and complete it at the close of all maintenance procedures.
3. Read and understand all of the procedures to be performed.
4. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
5. Allow the machine to cool before performing maintenance.

When Required

- Replace the primary air filter whenever the air filter restriction warning is displayed. (See page 5-19.)
- Perform a manual (stationary) regeneration. (See page 4-20.)
- Check the track tension. (See page 5-49.)
- Replace the bucket teeth. (See page 5-64.)
- Check the windshield washer fluid. (See page 5-18.)

Daily or Every 10 Hours

- Check the decals. (See page 2-4.)
- Check the sheet metal. (See page 5-63.)
- Inspect the track idler. (See page 5-48.)
- Drain the primary fuel filter/water separator. (See page 5-17.)
- Check the hydraulic pump mounting fasteners. (See page 5-47.)
- Check the hydraulic oil level. (See page 5-17.)
- Check the hydraulic hoses, lines, and connectors (See page 5-45.)
- Check the engine coolant level. (See page 5-14.)
- Check the engine oil level. (See page 5-15.)
- Check the engine serpentine belt. (See page 5-22.)
- Check the air conditioner compressor belt. (See page 5-28.)
- Check the diesel exhaust fluid (DEF) level. (See page 5-16.)
- Check the seat belt and buckle. (See page 4-12.)
- Check the escape tool. (See page 3-23.)
- Check the fire extinguisher. (See page 3-23.)
- Check the electrical system. (See page 5-36.)
- Check the fuel level. (See page 5-16.)
- Check the climate control system. (See page 3-20.)
- Check the operation and maintenance manual. (See page 5-65.)
- Check the swing drive oil level. (See page 5-54.)

After the First 50 Hours

Initial change of the engine oil and the filter. (See page 5-20.)

Weekly or Every 50 Hours

- Lubricate the work equipment. (See page 5-59.)
- Check the engine air filter system. (See page 5-19.)
- Check the batteries. (See page 5-36.)
- Check hydraulic hoses for wear or damage. (See page 5-45.)
- Check the final drive oil level. (See page 5-52.)
- Check the final drive mounting fasteners. (See page 5-52.)
- Check the carrier roller. (See page 5-49.)
- Check the carrier roller mounting fasteners. (See page 5-49.)
- Check the track shoe fasteners. (See page 5-48.)
- Check and adjust the track tension. (See page 5-49.)
- Check the engine exhaust system mounting hardware. (See page 5-30.)

Monthly or Every 250 Hours

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

- Check the cab door, access doors, and locks. (See page 5-62.)
- Check the grab handles and steps. (See page 5-62.)
- Check the windshield washer and windshield wiper switches for proper operation. (See page 5-63.)
- Check the fuses. (See page 4-9.)
- Check the track assembly. (See page 5-48.)

- Replace the hydraulic pilot line filter element (initial). (See page 5-41)

Every 3 Months or 500 Hours

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

- Clean and check the upper structure and undercarriage. (See page 5-64.)
- Collect an engine oil sample. (See page 5-56.)
- Collect a hydraulic oil sample. (See page 5-57.)
- Collect a swing drive oil sample. (See page 5-58.)
- Collect a final drive oil sample. (Both sides, see page 5-58.)
- Check the swing drive mounting fasteners. (See page 5-55.)
- Check swing drive bearing fasteners. (See page 5-56.)
- Change the swing drive oil. (See page 5-55.)
- Check/add swing pinion gear grease. (See page 5-54.)
- Replace the hydraulic system breather filter. (See page 5-41.)
- Check the air conditioner condenser cooler fins. (See page 5-25.)
- Check the radiator and oil cooler fins. (page 5-25.)
- Check the hydraulic pump. (See page 5-47.)
- Check the air conditioner fresh air and recirculation filters. (See page 5-29.)
- Change the engine oil and filter. (See page 5-20.)
- Replace the primary fuel filter element. (See page 5-34.)
- Replace the secondary fuel filter. (See page 5-33.)
- Replace the secondary engine air filter. (See page 5-19.)
- Check the final drive hoses. (See page 5-51.)
- Check the final drive mounting fasteners. (See page 5-52.)

Every 6 Months or 1000 Hours

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

- Check the fuel tank strainer. (See page 5-35.)
- Inspect the fuel lines. (See page 5-33.)
- Check the aftertreatment exhaust piping. (See page 5-30.)
- Replace the hydraulic pilot line filter element. (See page 5-41.)
- Check the accumulator function. (See page 5-38.)
- Replace the Diesel Exhaust Fluid (DEF) tank filter. (See page 5-32.)
- Replace the Diesel Exhaust Fluid (DEF) pump filter. (See page 5-31.)
- Replace the hydraulic tank return line filter. (See page 5-42.)
- Replace the hydraulic pilot line filter element. (See page 5-41.)
- Drain the charge air cooler. (See page 5-26.)

Annually or Every 2000 Hours

NOTE: *Make sure all daily, 50-hour, 250-hour, 500-hour, and 1000-hour maintenance tasks have been completed before proceeding with the 2000-hour maintenance tasks.*

- Pressure-wash and clean the entire machine. Do a complete machine structural inspection.
- Change the engine coolant. (See page 5-23.)
- Change the final drive oil. (See page 5-53.)
- Clean and inspect the hydraulic oil suction strainer. (See page 5-43.)
- Change the hydraulic oil. (See page 5-46.)

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. See “Change the Hydraulic Oil” on page 5-46.

NOTICE!

The hydraulic oil filter must be replaced after 250 hours with a breaker operating rate above 50%. Failure to follow this notice could result in damage to the machine.

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.

Maintenance Procedures

Fluid Level Checks

Check the Engine Coolant Level

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

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.

NOTICE!

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

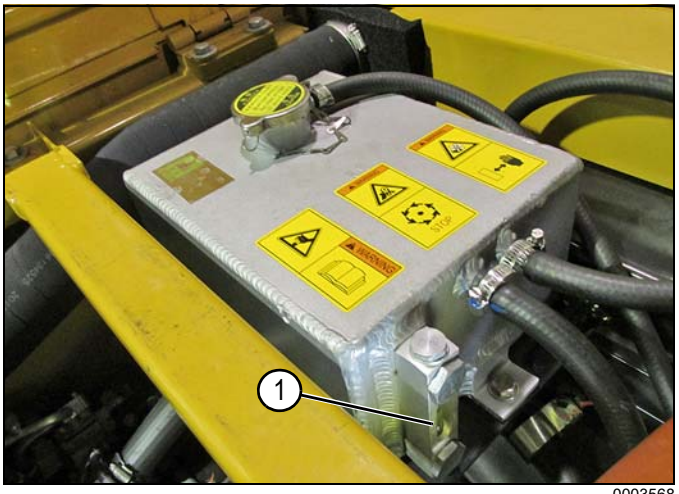

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Figure 5-1

1. Check the engine coolant level on the engine coolant recovery tank sight glass (1). The engine coolant level should be between the high and low marks of the recovery tank sight glass.
2. Add more engine coolant if necessary. See “Add Engine Coolant” on page 5-14.
3. Close the engine compartment cover.

Add Engine Coolant

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.**
- **Do not remove the expansion tank 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.

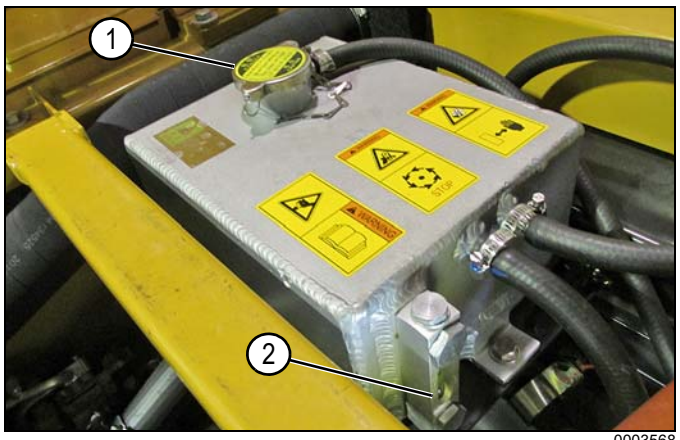

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Figure 5-2

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Check the engine coolant level. See “Check the Engine Coolant Level” on page 5-14.

NOTE: *See “Recommended Lubricants, Fuel, and Engine Coolant” on page 5-8.*

5. If the engine coolant level is low, remove the cap (1) and add engine coolant as necessary to a level between the low and high marks on the recovery tank sight glass (2).
6. Start the engine and run it at low idle for 5 minutes.
7. Shut down the engine.
8. Check the engine coolant level. Add more engine coolant if necessary.
9. Close the engine compartment cover.

Check the Engine Oil Level

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.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

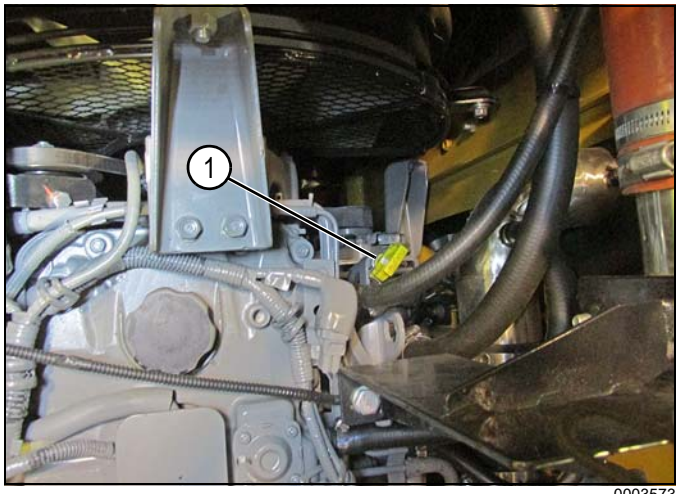

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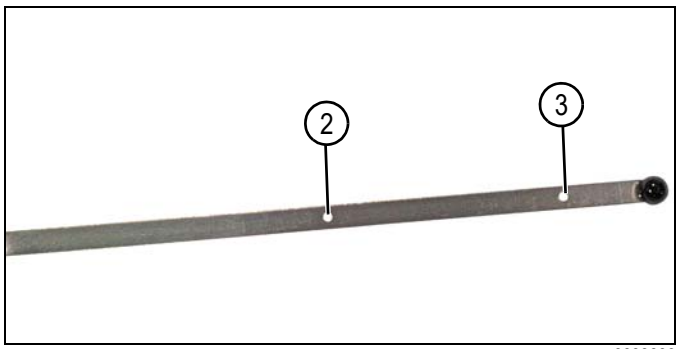
Figure 5-3

4. Remove the dipstick (1), wipe oil off with a clean rag, insert dipstick, and remove to note the engine oil level.

NOTE: *The oil level should be between the add engine oil mark (3) and maximum engine oil level mark (2).*



0003600

Figure 5-4

5. Install the dipstick. If engine oil is needed, see “Add Engine Oil” on page 5-15.

Add Engine Oil

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.

NOTICE!

Do not overfill the engine with oil. This could result in machine damage and improper machine operation.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

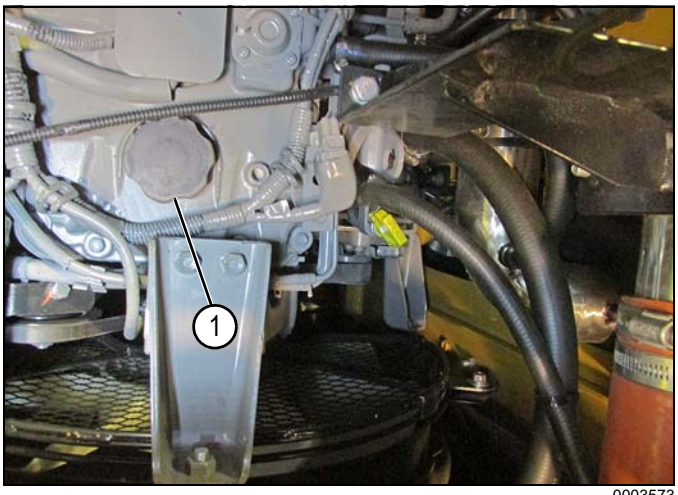


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Figure 5-5

4. Remove the engine oil filler cap (1) and add oil as necessary.

NOTE: *See “Recommended Lubricants, Fuel, and Engine Coolant” on page 5-8.*

5. Check the engine oil level. See “Check the Engine Oil Level” on page 5-15.
6. Install the engine oil filler cap.
7. Close the engine compartment cover.

Check the Fuel Level

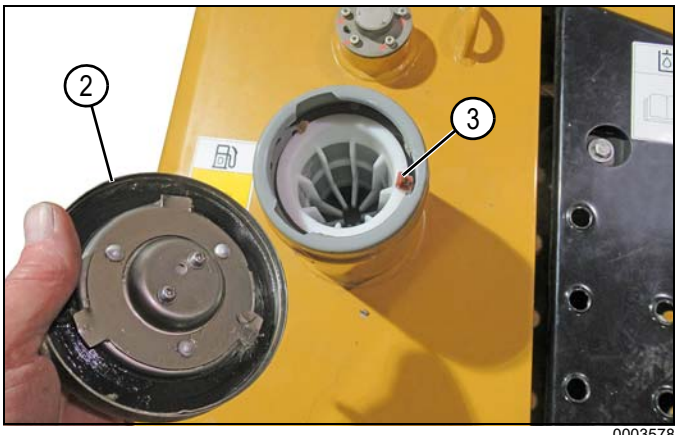
0003695

Figure 5-6

1. Turn the key switch to the ON position.
2. Check the fuel level display (1) on the monitor system home screen.

NOTE: *If the fuel level is low, proceed to "Add Fuel" on page 5-16.*

Add Fuel



0003578

Figure 5-7

1. Prepare the machine for checks and inspections. See "Maintenance Safety" on page 2-5.
2. Turn the battery disconnect switch to OFF. See "Battery Disconnect Switch" on page 3-15.
3. Open the appropriate access covers or compartment doors. See "Doors, Panels, Covers, and Filler Cap" on page 4-5.
4. Remove the fuel tank cap (2).

NOTE: *See "Fuel" on page 5-8 for fuel specifications.*

5. Add fuel as needed until the tank is full. The fuel float gauge (3) will rise when the tank is nearly full.

Check the Diesel Exhaust Fluid (DEF) Level

1. Prepare the machine for checks and inspections. See "Maintenance Safety" on page 2-5.

0003695

Figure 5-8

2. Turn the key switch to the ON position and check the DEF level display (1) on the system monitor.

Add Diesel Exhaust Fluid (DEF)

1. Prepare the machine for checks and inspections. See "Maintenance Safety" on page 2-5.
2. Open the appropriate access covers or compartment doors. See "Doors, Panels, Covers, and Filler Cap" on page 4-5.
3. Turn the battery disconnect switch to OFF. See "Battery Disconnect Switch" on page 3-15.

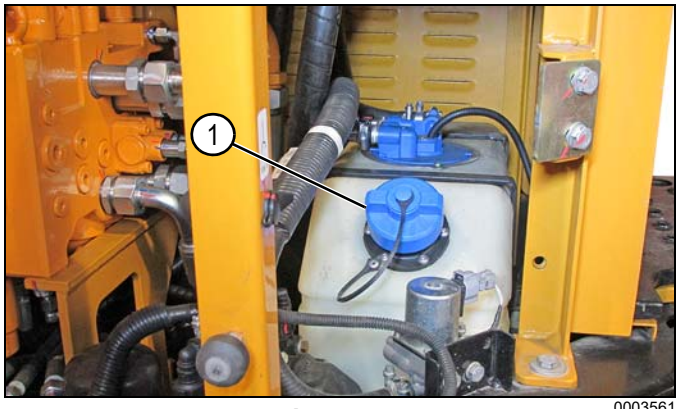


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Figure 5-9

4. Remove the DEF tank cap (1) and add DEF until full.

NOTE: *See "Recommended Lubricants, Fuel, and Engine Coolant" on page 5-8.*

5. Install the DEF tank cap and close the compartment door.

Check 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.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

NOTICE!

Dispose of fuel and filter in accordance with all applicable environmental regulations. Failure to follow this notice could damage the environment.

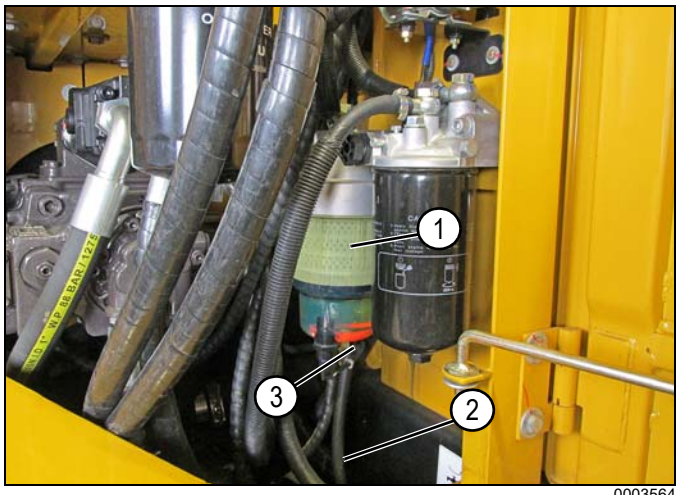

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Figure 5-10

4. Locate the primary fuel filter/water separator (1).
5. Place an appropriately sized container under the end of the drain hose (2).

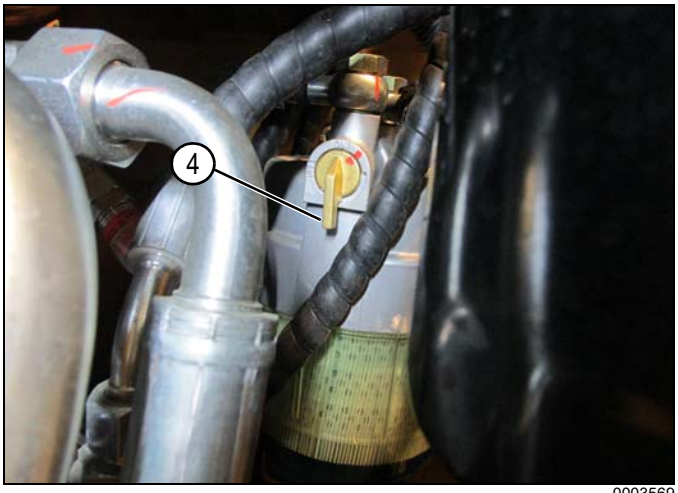

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Figure 5-11

6. Turn the fuel filter shutoff valve (4) 1/4 turn counterclockwise to the OFF position.

NOTES: *Avoid draining the fuel filter completely. Air could enter the fuel system.*

7. Open the drain valve (3) to allow all water and/or contaminated fuel to drain from the filter.

NOTE: *If an excessive amount of water or contaminant is found while draining the fuel filter, SANY recommends draining the fuel tank completely.*

8. Close the drain valve when the flow from the primary fuel filter is free of water and contamination.
9. Turn the fuel shutoff valve 1/4 turn clockwise to the ON position.
10. Close the access door.

Check the Hydraulic Oil Level

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 pressure to prevent injury.**

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

1. Park the machine in a secure location and position the work equipment as needed to check the hydraulic oil level. See “Park the Machine” on page 4-36.
2. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

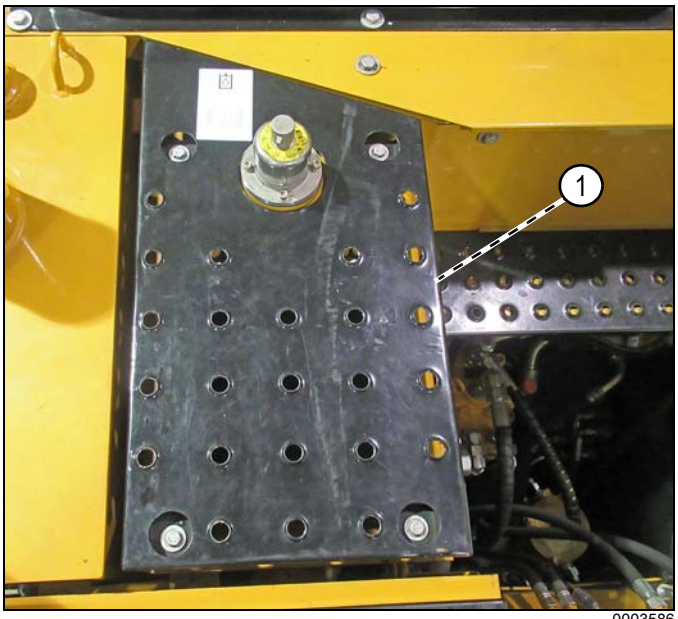

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Figure 5-12

4. Check the hydraulic tank (1) for leaks, exterior rust, and other damage.

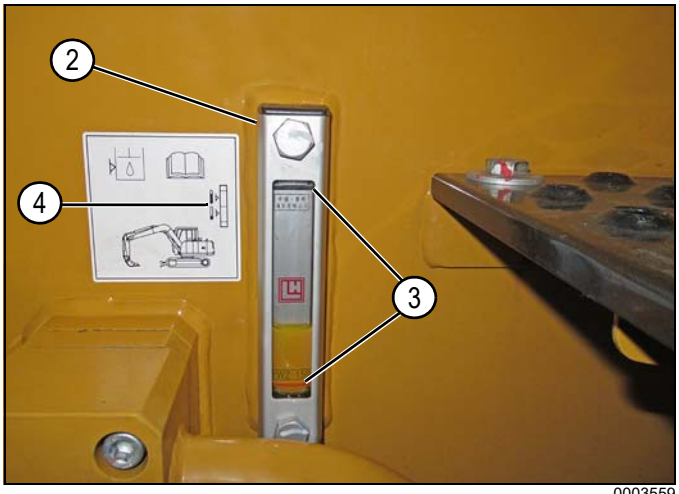

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Figure 5-13

5. Check the hydraulic oil level using the sight glass (2) on the side of the tank facing the cab. Make sure the oil level is between the level marks (3) as shown on the sight glass decal (4).
6. If necessary, add hydraulic oil to the system. See “Add Hydraulic Oil” on page 5-40.

Check Windshield Washer Fluid

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

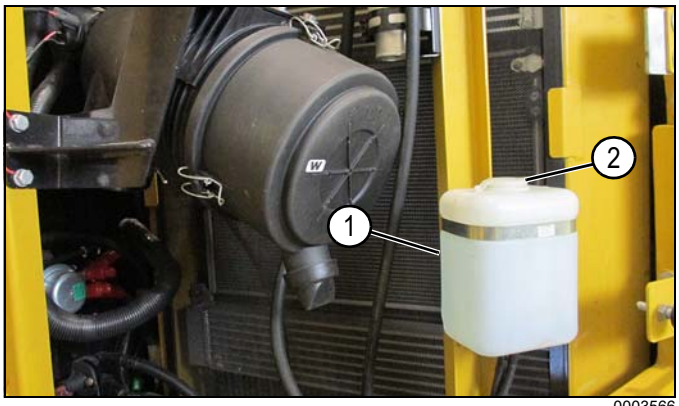

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Figure 5-14

4. Check the washer fluid level inside the windshield washer reservoir (1).

NOTE: *Use washer fluid appropriate for use in cold or winter climates as required.*

NOTICE!

Never use tap water, dirty water, or fluids that could freeze, clog, or damage the windshield washer system. Using these fluids could cause damage to the windshield washer system or cause improper washer operation.

5. If the level is low, remove the cap (2) and add windshield washer fluid as necessary.

Engine Inspection and Maintenance

WARNING

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

- **Shut off the engine before opening the engine cover.**
- **Remove the key and turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.**

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

Engine Inspection

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

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Inspect the engine and engine compartment for the following:
   - Oil, fuel, and engine coolant leaks.
   - Loose fasteners and connections.
   - Worn or loose drive belts.
   - Damaged hoses and wiring harnesses.
   - Engine air filter.

Check the Crankcase Breather Tube

WARNING

- **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.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

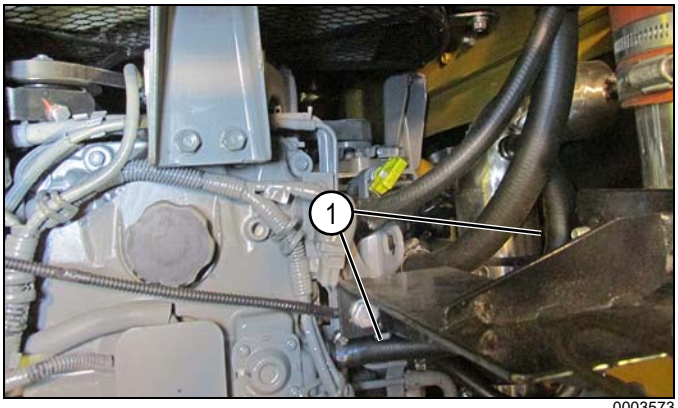

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Figure 5-15

4. Check the crankcase breather tube (1) for cuts, holes, and worn areas. Replace if needed.

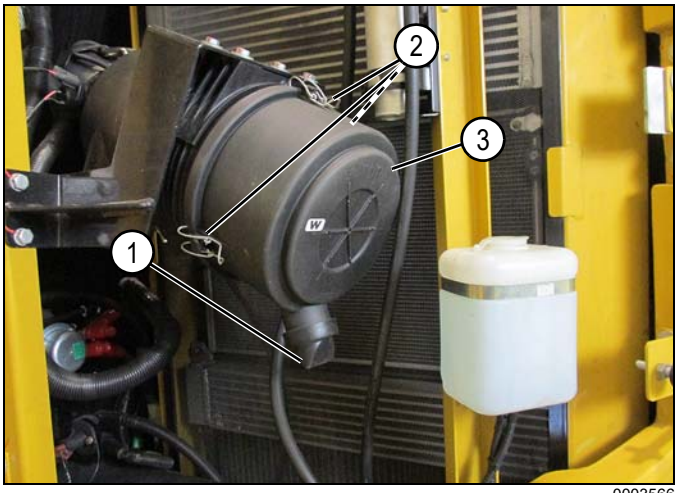
Check and Replace the Engine Air Filter System

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

NOTICE!

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

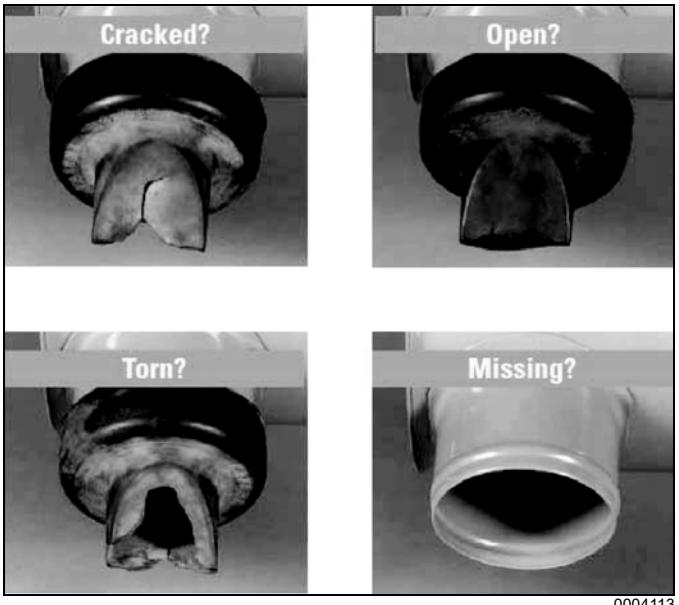
Failure to follow this notice could damage the machine or cause it to operate improperly.



0003566

Figure 5-16

4. Squeeze the dust valve (1) mounted on the end cap (3) of the filter housing to release any dust or debris.

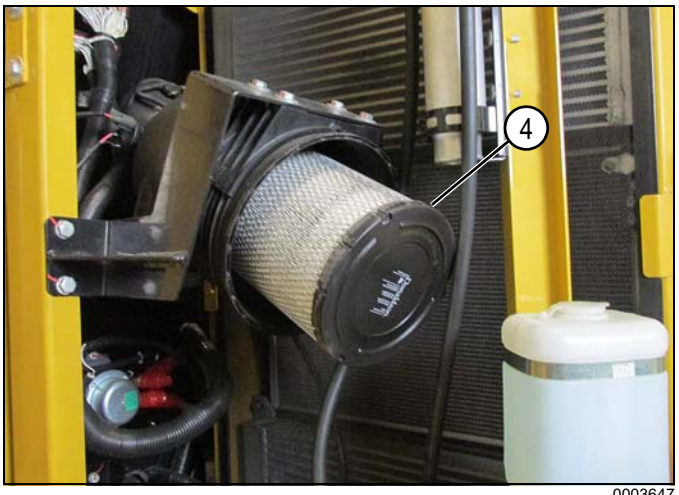


0004113

Figure 5-17

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.*

5. Check the condition of the dust valve and replace it if required.
6. Release the three latches (2) and remove the air filter end cap (3).



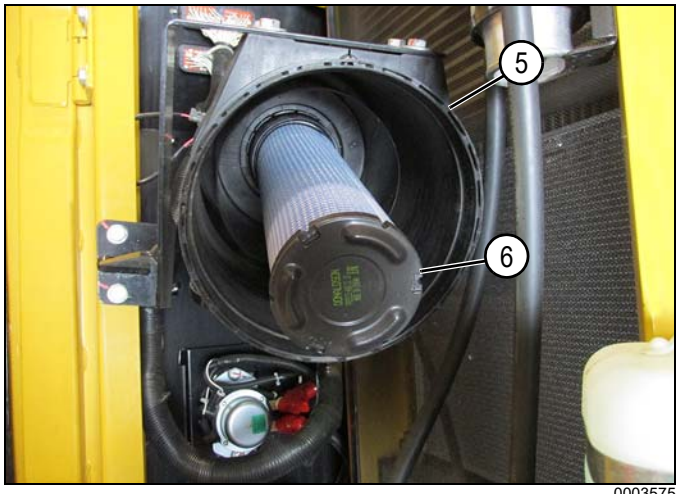
0003647

Figure 5-18

7. Remove the primary air filter (4).
8. Inspect the air filter for damage, dampness, or dust. Replace as necessary.

NOTICE!

Always replace the air filter, and never attempt to clean and reuse a dirty or clogged air filter. Failure to follow this instruction could result in machine damage and improper machine performance.



0003575

Figure 5-19

9. Clean the inside of the air filter housing (5) with a clean cloth before replacing the secondary air filter (6).
10. Install the air filter housing end cap on the housing, making sure that the dust valve is pointing down. Secure the end cap to the housing using the latches.
11. Close the battery and air filter access door.

Change the Engine Oil and Filter

Replace the engine oil after the initial 50 hours of service, then every 500 hours.

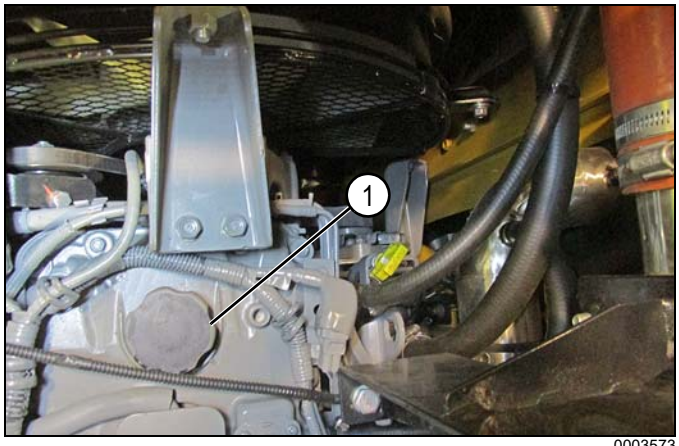
WARNING

- **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.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

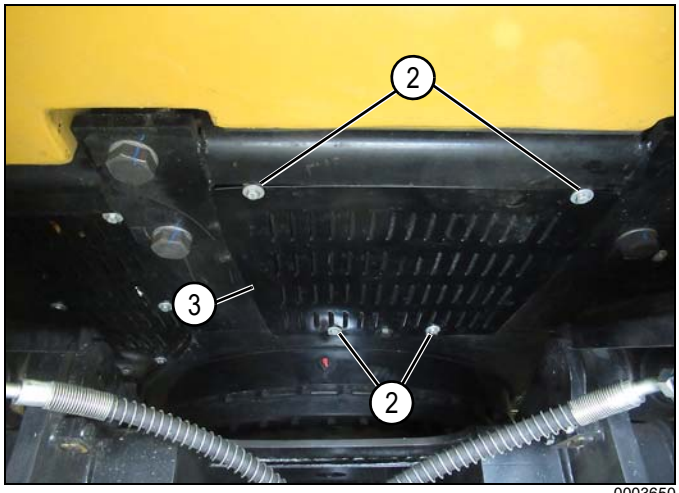
4. Collect an engine oil sample before replacing the engine oil. See “Collect an Engine Oil Sample” on page 5-56.



0003573

Figure 5-20

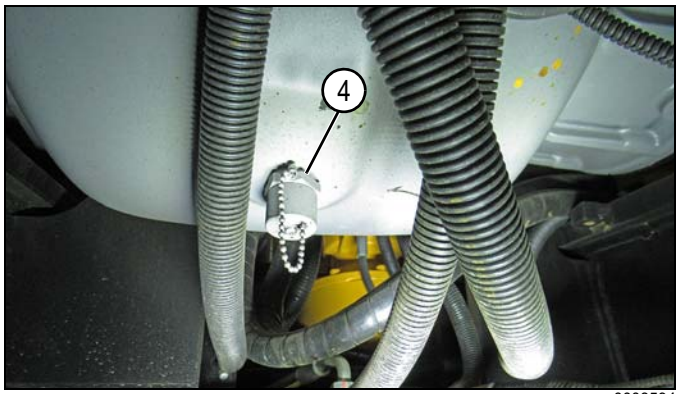
5. Loosen the engine oil filler cap (1).



0003650

Figure 5-21

6. Remove four fasteners (2) and the bottom access panel (3).



0003594

Figure 5-22

7. Place an appropriately sized container under the engine oil drain valve (4).

NOTE: *For engine oil capacity, see “Capacities” on page 5-11.*

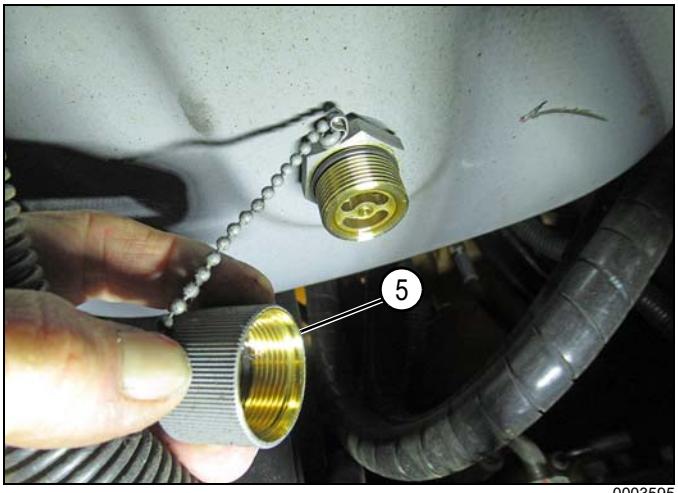


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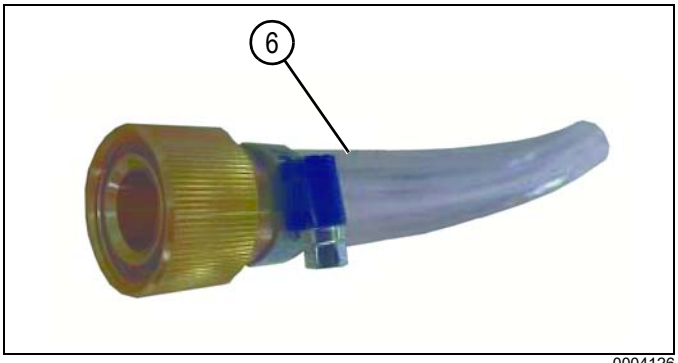
Figure 5-23

8. Remove the drain valve cap (5).



0004126

Figure 5-24

9. Attach a drain hose (6) to the drain valve.

NOTE: *The drain tube must have a special connector that opens the spring loaded engine oil drain valve. Contact a SANY dealer for more information.*

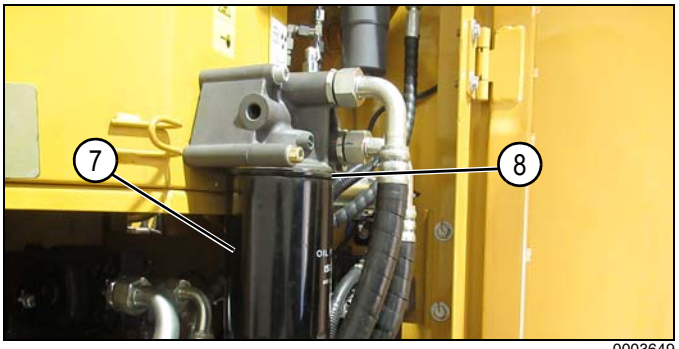
10. Open the drain valve by turning the valve counterclockwise until oil begins to flow through the drain tube.

NOTICE!

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

NOTE: *Inspect the drained oil and filter for signs of metal particles and foreign material. Contact a SANY dealer for an oil analysis sample kit if any abnormality is found.*

11. Close the drain valve, remove the drain hose, and install the drain valve cap.



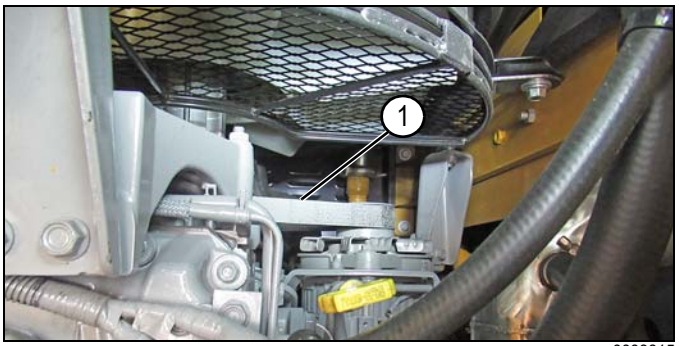
0003649

Figure 5-25

12. Place a container under the engine oil filter (7).
13. Remove the engine oil filter.
14. Clean the engine oil filter mount (8) and oil filter mounting surface.
15. Apply a thin film of clean engine oil to the new filter gasket.
16. Install the new engine oil filter on its mount until the filter gasket makes contact with the filter mount, then hand-tighten the filter 3/4 turn more.
17. Add engine oil. See “Add Engine Oil” on page 5-15.
18. Start and run the engine, check for engine oil pressure, and check for leaks. Shut off the engine and recheck the engine oil level.

Inspect the Engine Serpentine Belt

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003615

Figure 5-26

4. Inspect the engine serpentine belt (1) for the following:
   - Abrasion: The belt appears shiny or glazed, or fabric is exposed. This is a sign that the belt is in contact with an object, such as a flange or fastener.
   - Delamination: Chunks of rubber material have broken from the belt. At this stage, the belt can fail at any moment. Heat, age, and stress are the primary contributors.
   - Pulling: Belt material is sheared from the ribs.

Lack of tension, misalignment, worn pulleys, or a combination of these factors can cause the following:

- Uneven rib wear: The belt shows damage to the side, with the possibility of breaks in the tensile cord or jagged-edged ribs. A thumping/grinding noise may also be heard when running.
- Improper installation: A belt rib begins separating from the strands. If left unattended, the cover will often separate, causing the belt to unravel.
- Cracking: Small visible cracks appear along the length of a rib or ribs. With continuous exposure to high temperatures, the stress of bending around the pulleys leads to cracking.
- Misalignment: The side walls of the belt may appear glazed, or the edge-cord may become frayed. A noticeable noise may result.
- Gravel penetration: Small pinholes are visible on the back side of the belt. Bumps may be visible, and fabric around the holes can be frayed, indicating damage from foreign objects such as dirt, gravel, or similar debris.

NOTE: *Contact a SANY dealer to replace a damaged belt.*

Adjust Engine Serpentine Belt Tension

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

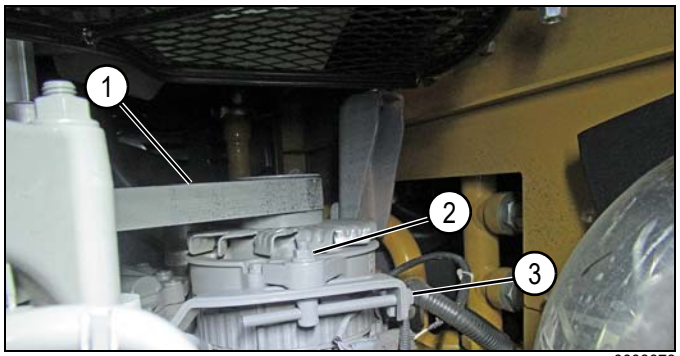


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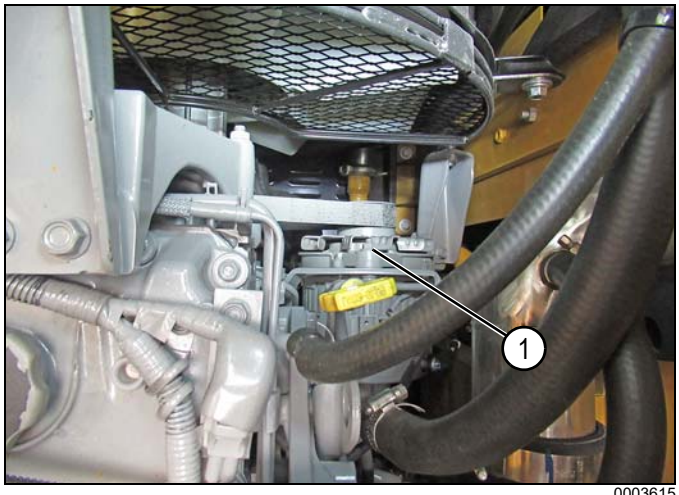
Figure 5-27

4. Press down on the engine serpentine belt (1) between the engine pulleys. The belt should deflect 0.20 in.–0.30 in. (5 mm–8 mm) when pressed with a force of 14.5 lb-ft (19.5 N•m).
5. To adjust tension, loosen the adjustment locking nut (2).
6. Loosen the lower alternator fastener.
7. Adjust the tension by turning adjustment bolt (3) clockwise to increase tension, and counterclockwise to release tension.
8. When the tension is correct, tighten the adjustment locking nut.
9. Tighten the lower alternator fastener.
10. Close the engine access cover.

Check the Alternator

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003615

Figure 5-28

4. Check the alternator for abnormal noise and operation.

NOTE: *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 checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the key switch to the START position and listen for abnormal noise and operation.

   Some symptoms that may indicate a faulty starter:

   - High-pitched screeching sounds.
   - Grinding noise.
   - Intermittent whirring sound (starter not engaging engine flywheel).
   - Starter turns engine over slowly.
   - Burning smell or smoke coming from the starter.
4. If the starter is malfunctioning, contact a SANY dealer for additional information.

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 expansion tank 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. Swing the upper structure to allow access to the drain valve beneath the radiator.
2. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
3. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
4. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
5. Allow the engine to cool.

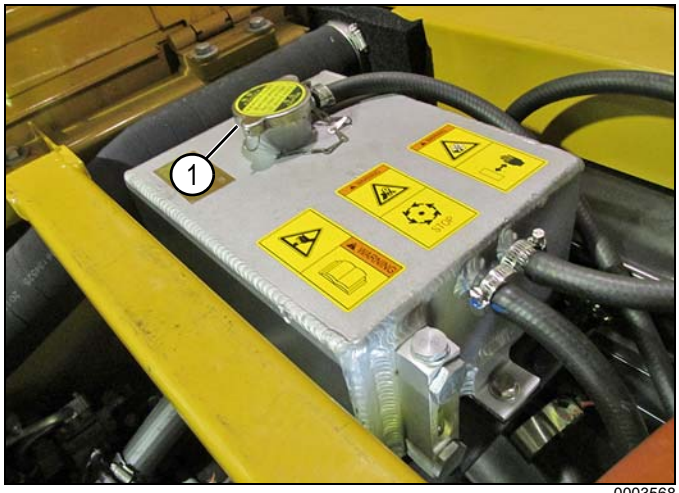


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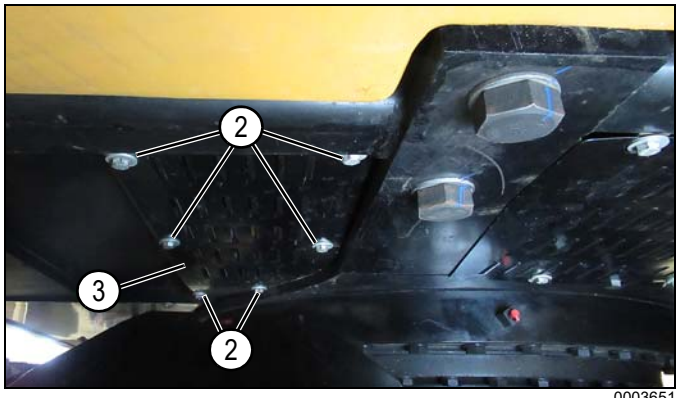
Figure 5-29

6. Slowly open the engine coolant expansion tank filler cap (1) to release the cooling system pressure. Remove the cap when all pressure has been relieved.



0003651

Figure 5-30

7. Under the rear of the machine, remove the six fasteners (2) and the radiator drain access plate (3).

NOTICE!

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

NOTE: *For the capacity of the engine cooling system, see "Capacities" on page 5-11.*

8. Place an appropriately sized container under the radiator drain hose (4).

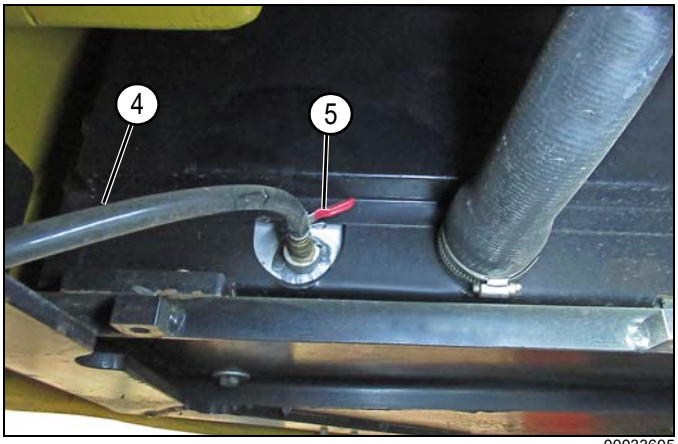


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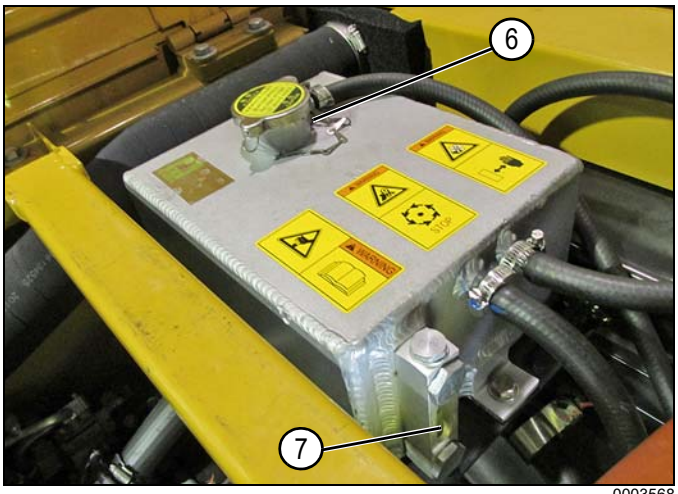
Figure 5-31

9. Open the radiator drain valve (5) and allow the engine coolant to drain into the container.
10. Close the radiator drain valve after the engine cooling system is empty.
11. Secure the radiator drain access plate with the six fasteners. Tighten securely.



0003568

Figure 5-32

12. Add new engine coolant into the engine coolant expansion tank filler neck (6) until the engine coolant level is between the low and high marks on the sight glass (7).
13. Start the engine and run it at low idle speed for about 5 minutes to allow the engine coolant level to drop.
14. Shut down the engine and allow to cool.
15. Check the engine coolant level.
16. Add new engine coolant to the engine coolant expansion tank until it is between the low and high marks on the sight glass (7).
17. Install the engine coolant expansion tank filler cap and close the engine cover.

Inspect and Clean the Air Conditioner Condenser Fins

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

NOTICE!

- **Compressed air can damage 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.**

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

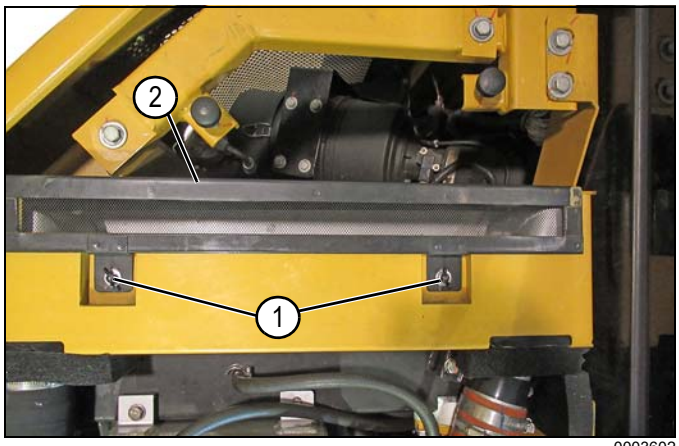


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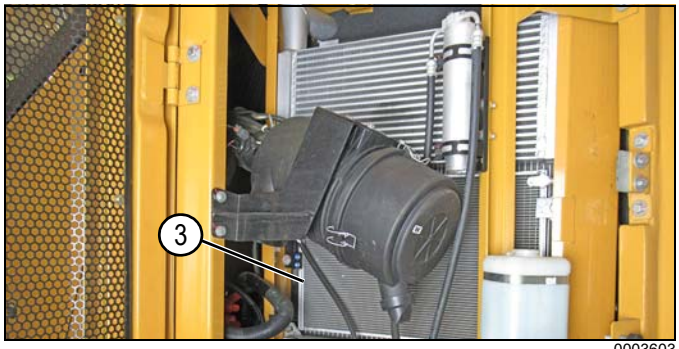
Figure 5-33

4. Remove two wing nut fasteners (1).
5. Pull up and remove the screen (2). Clean the screen with compressed air.



0003603

Figure 5-34

6. Clean the air conditioner condenser fins (3) with compressed air.
7. Inspect the area below the radiators and remove any debris that has accumulated during operations.
8. Install the screen and secure with two wing nut fasteners.
9. Close the left rear access door.

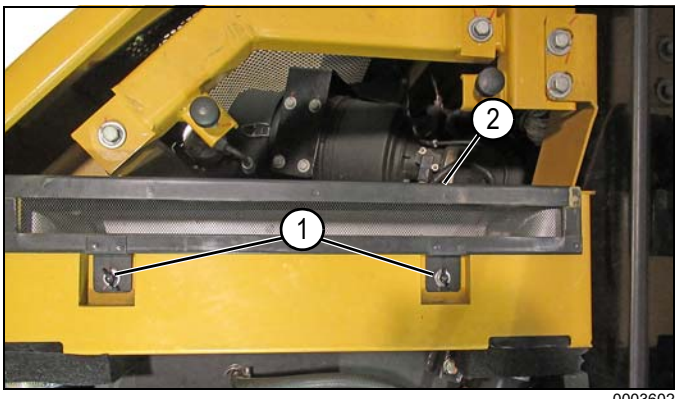
Inspect and Clean the Radiator and Oil Cooler Fins

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

NOTICE!

- **Compressed air 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.**

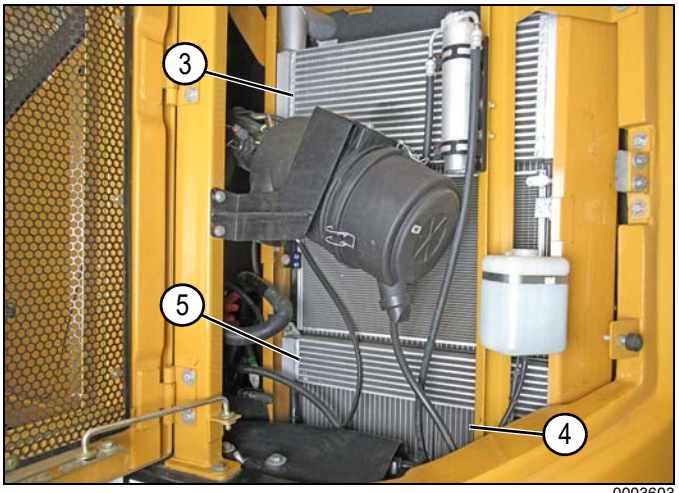
Failure to follow this notice could damage the machine or cause it to operate improperly.



0003602

Figure 5-35

4. Remove the two wing nut fasteners (1).
5. Pull up and remove the screen (2). Clean the screen with compressed air.



0003603

Figure 5-36

6. Clean the turbocharger charge air cooler (3), engine coolant radiator (4), and diesel fuel oil cooler (5) with compressed air.
7. Inspect the area below the radiators and remove any debris that has accumulated during operations.
8. Install and secure the screen with the two wing nut fasteners.
9. Close the battery and air filter access panel.

Drain the Charge Air Cooler

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

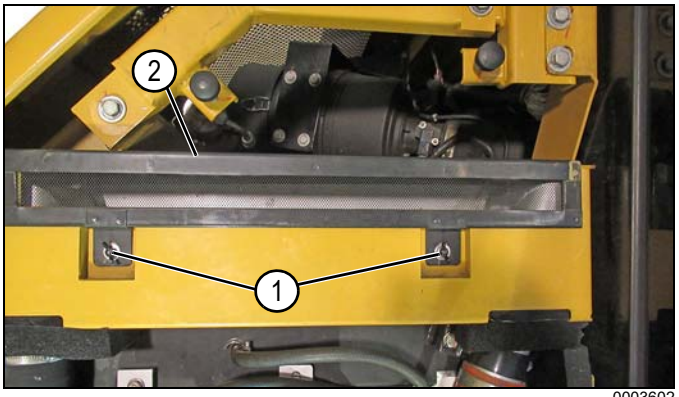


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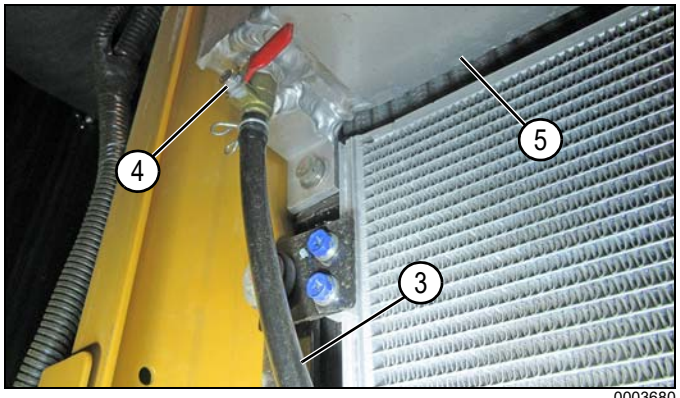
Figure 5-37

4. Remove the two wing nut fasteners (1).
5. Pull up and remove the screen (2). Clean the screen with compressed air.



0003680

Figure 5-38

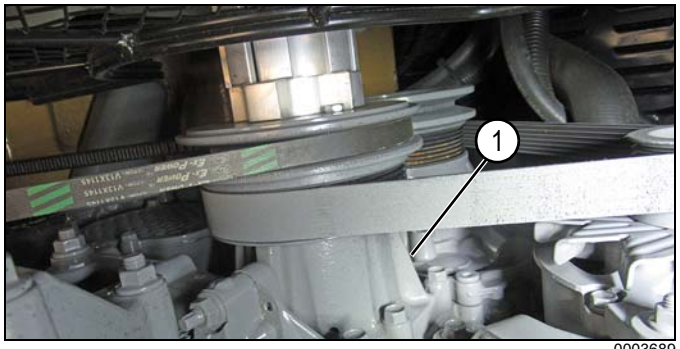
6. Place a suitable catch container under the end of drain hose (3).
7. Open the drain valve (4) and allow any accumulated oil in the charge air cooler (5) to drain.

NOTICE!

Dispose of oil in accordance with all applicable environmental regulations. Failure to follow this notice could damage the environment.

8. Close the drain valve, install the screen with the two wing nut fasteners, and close the covers.

Inspect the Engine Coolant Pump



0003689

Figure 5-39

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Check the engine coolant pump (1) for signs of leakage. This indicates a faulty seal on the pump shaft.
5. If the fan pulley has play, the bearings inside the engine coolant pump are worn. Contact a SANY dealer for replacement of an engine coolant pump.

Heating and Air Conditioning System

Check the Air Conditioning System

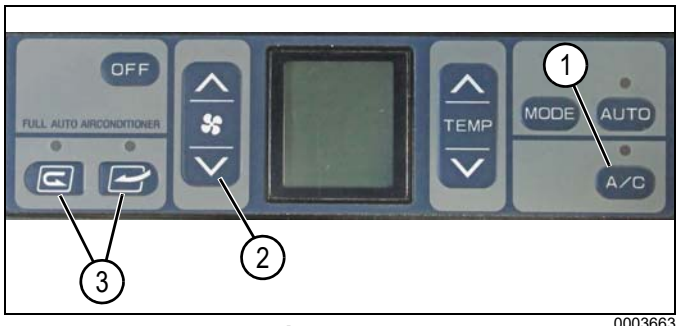
While checking the air conditioning system, also check the following:

Air Conditioning System	
Assembly/ Component	**Check(s)**
Hose and line assembly	Check the hoses and lines for cracks and leaks.
	Check for loose connections or loose fasteners.
Connecting fasteners	Check if connection is loose, check for loose or damaged connecting fasteners.
Drive belt	Check for deterioration due to heavy wear, scarring, and cracking.
Condenser assembly	Check for blockage by debris (garbage, dust, grass, etc.).
Refrigerant leak	Check for leaks at line and hose connections.
Noise	Check compressor (not under load).
	Check condenser and evaporator fans.

NOTE: *If any abnormalities are discovered, contact a SANY dealer. Do not repair the air conditioning system beyond the tasks described in this manual.*

CAUTION

This system is under pressure. Working on it could create a hazardous situation, which could result in injury. Contact a SANY dealer if repairs are required.



0003663

Figure 5-40

1. Inside the cab, press the A/C power key (1) to turn on the air conditioning system. Check start-up, air flow control (3), and fan speed control (2). See “Climate Control System” on page 3-20.
2. Shut down the engine.
3. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
4. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
5. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

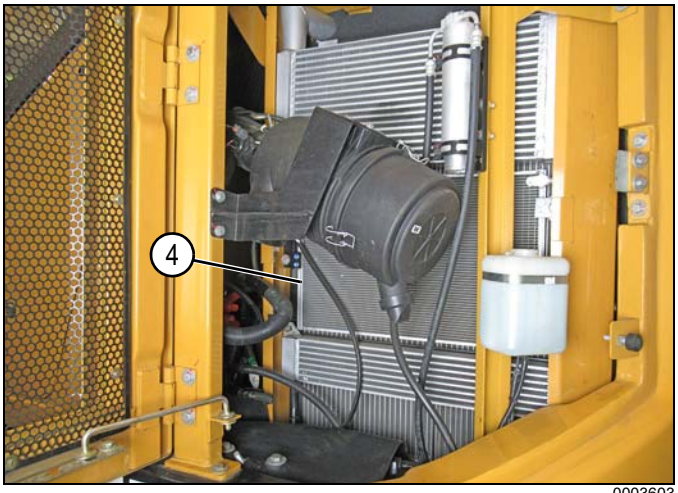


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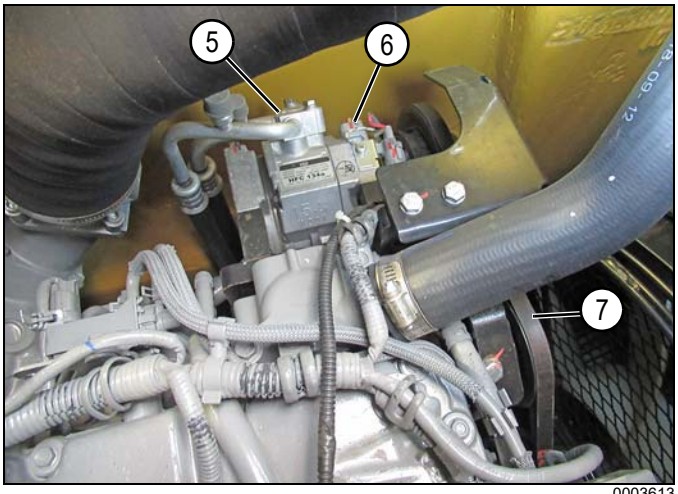
Figure 5-41

6. Check the air conditioner condenser (4) for leaks.



0003613

Figure 5-42

7. Check the air conditioner compressor (6) for:
   - Refrigerant leaks at the hose and line connections (5).
   - Loose, worn, or twisted drive belt (7).

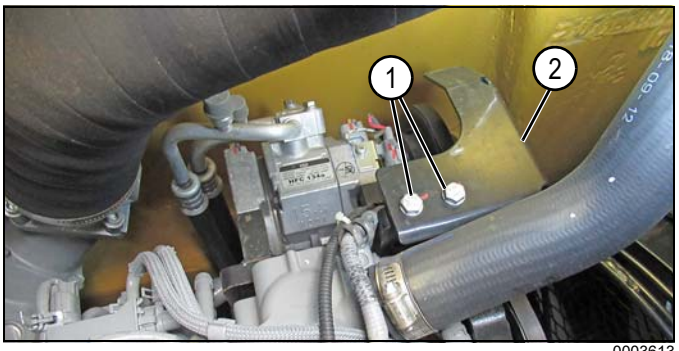
Check the Air Conditioner Compressor Belt

CAUTION

- **Make sure that the engine is off and that all rotating parts inside the engine compartment have stopped moving. Failure to do so could result in injury.**
- **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.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003613

Figure 5-43

4. Remove the two fasteners (1) that secure the belt shroud (2).

0003681

Figure 5-44

5. Check the belt (3) for signs of damage.
6. Press down on the belt between the air conditioner compressor pulley and the drive pulley. The belt should deflect 0.20 in.–0.31 in. (5 mm–8 mm) when pressed with a force of 43 lb-ft (58.3 N•m).
7. Adjust belt tension if necessary. See “Adjust the Air Conditioner Compressor Belt” on page 5-28.
8. Install the shroud and secure it in place.

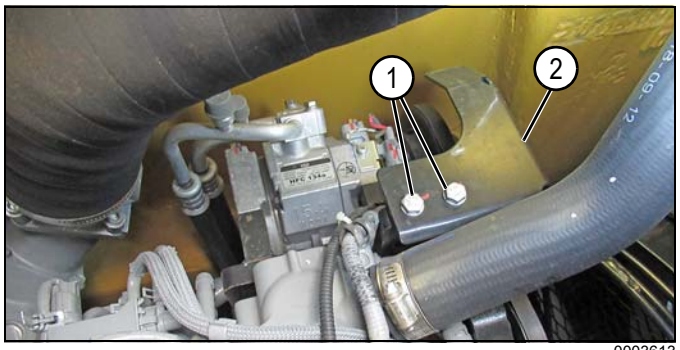
Adjust the Air Conditioner Compressor Belt

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.

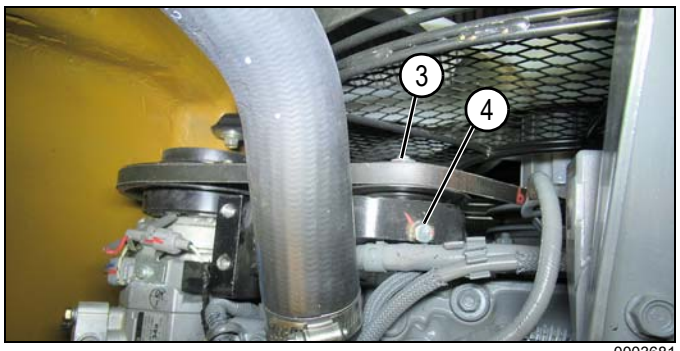
1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003613

Figure 5-45

4. Remove the two fasteners and washers (1) that secure the belt shroud (2).
5. Check for damaged pulleys and belt.



0003681

Figure 5-46

6. Loosen the pulley fastener (3).
7. Turn the adjustment fastener (4) to adjust the belt tension. The belt should deflect 0.20 in.–0.30 in. (5 mm–8 mm) when pressed with a force of 14.3 lb-ft (19.5 N•m).
8. Replace the belt if:
   - It has stretched and there is little margin left for adjustment.
   - Cuts or cracks are found in the belt.
   - The belt slips or squeals.

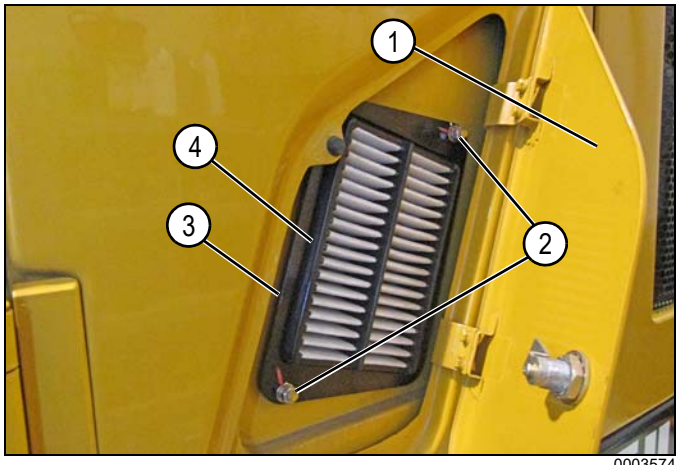
NOTE: *Contact a SANY dealer for belt replacement.*

9. Tighten the pulley fastener (3).

NOTE: *Newly installed V-belts need to be checked and adjusted if necessary after the first hour of operation.*

10. Install the belt shroud and secure it in place.

Check Air Conditioner Fresh Air and Recirculation Filters



0003574

Figure 5-47

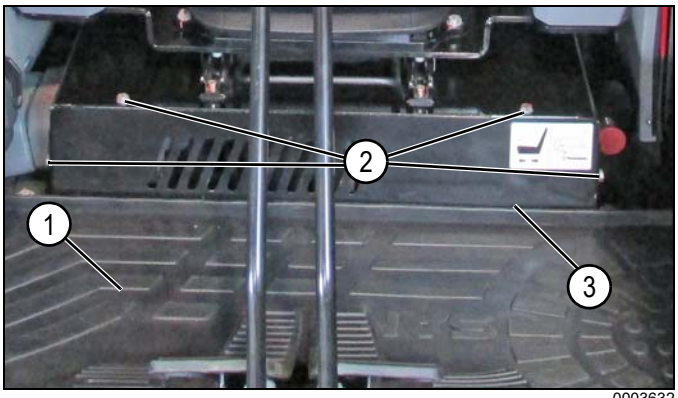
Fresh Air Filter

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the compartment door (1). See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Remove two fasteners (2) and the retaining plate (3) that secure the fresh air filter (4).
5. Remove the fresh air filter.
6. Clean the fresh air filter with compressed air.

NOTE: *After cleaning the fresh air filter five times, or if the filter cannot be cleaned, replace it with a new one.*

7. Install the filter, retaining plate, and fasteners.
8. Close and lock the access panel.

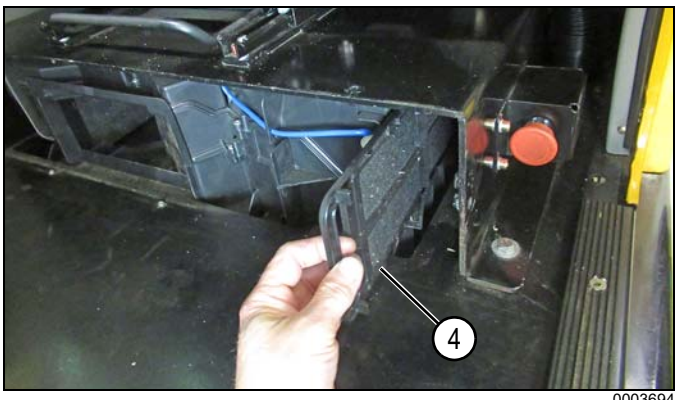
Recirculation Air Filter



0003632

Figure 5-48

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Remove the cab floor mat (1).
5. Remove the four fasteners (2) and the cover (3).



0003694

Figure 5-49

6. Remove the recirculation air filter (4).
7. Clean the filter with compressed air.
8. Install the recirculation air filter.
9. Secure the cover with four fasteners.
10. Position the floor mat on the cab floor.

Exhaust System

Check the Exhaust System

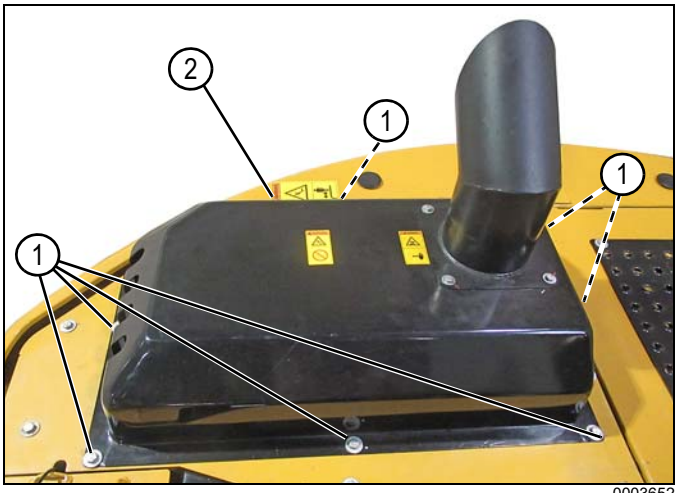
WARNING

Never operate a machine with a defective exhaust system. Exhaust leaks or a restricted or damaged exhaust system could result in death or serious injury.

CAUTION

Make sure that the engine is off and that the exhaust components have cooled to a point where they can be touched without burning. Failure to do so could result in injury.

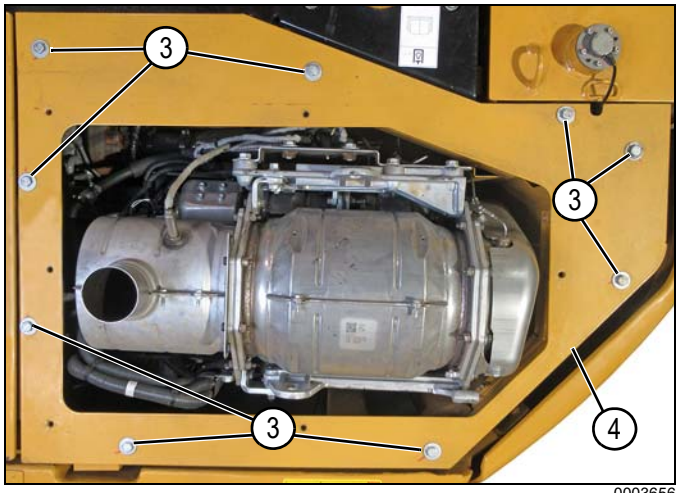
1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003652

Figure 5-50

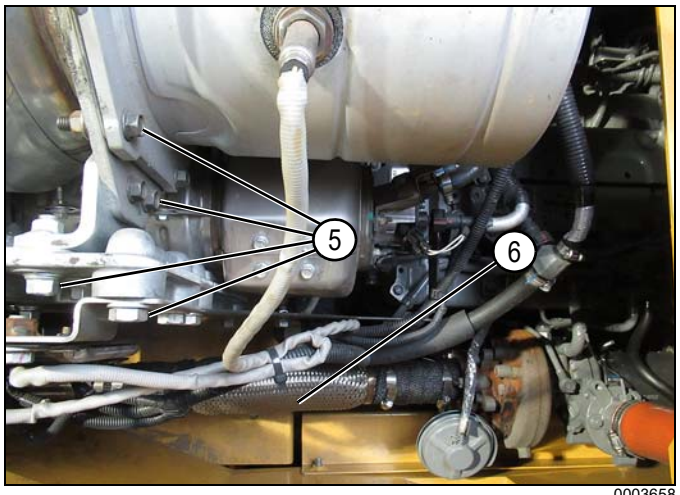
4. Remove seven fasteners (1) and remove the exhaust system cover (2).



0003656

Figure 5-51

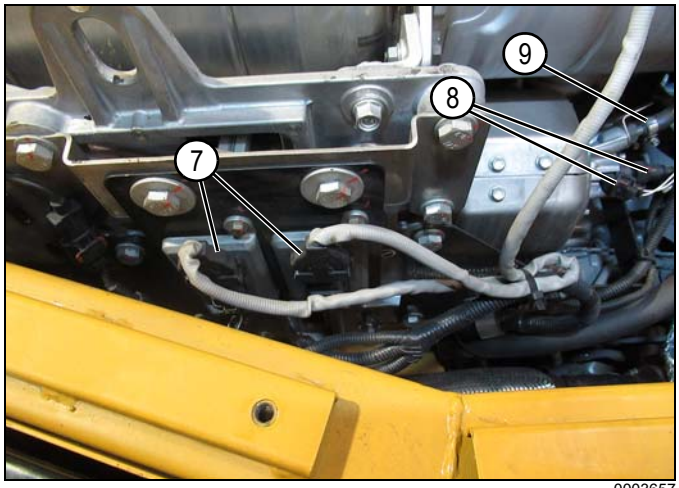
5. Remove nine fasteners (3) and remove the panel (4).



0003658

Figure 5-52

6. Check the connection to the expansion pipe (6) for leaks or signs of damage. If any abnormality is found, contact a SANY dealer for repairs.
7. Check the exhaust system for loose, missing, or damaged fasteners (5). Tighten loose fasteners and replace missing or damaged components as needed.



0003657

Figure 5-53

8. Check all electrical (7 and 8) and fluid (9) connectors for loose connections. Tighten as needed.

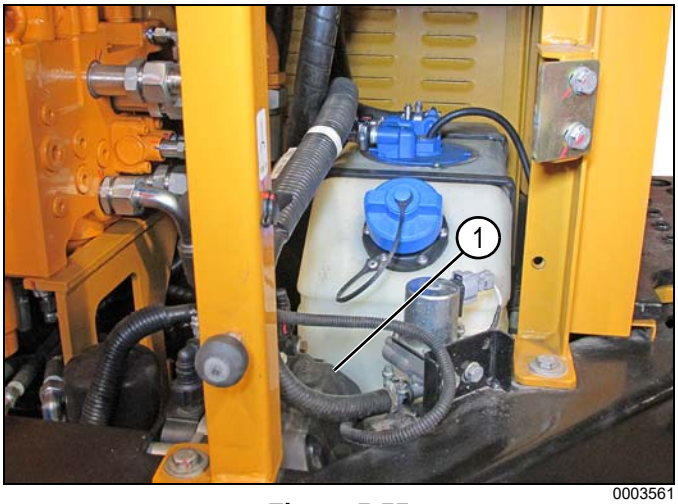
0003656

Figure 5-54

9. Inspect the diesel oxidation catalyst/selective catalytic reduction (DOC/SCR) assembly (10) and its mount for leaks or signs of damage.
10. Be sure the exhaust outlet (11) is clear and not restricted.
11. Install the panel.
12. Replace the exhaust system cover and close the appropriate access covers or compartment doors.

Replace the Diesel Exhaust Fluid (DEF) Pump Filter

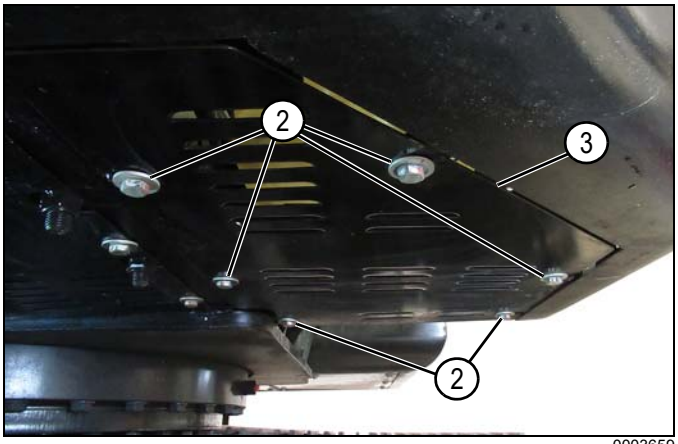
1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003561

Figure 5-55

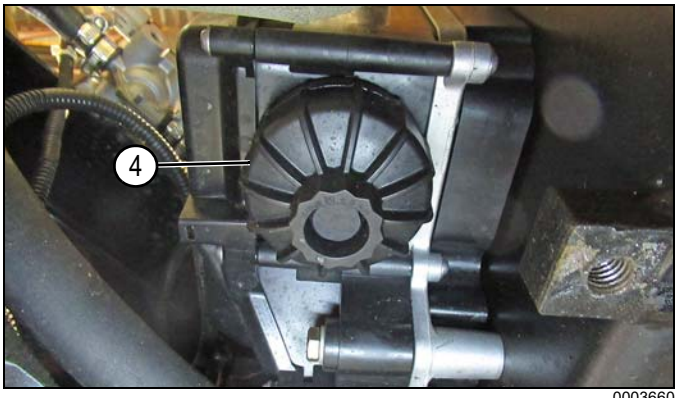
4. Locate the DEF pump (1).



0003659

Figure 5-56

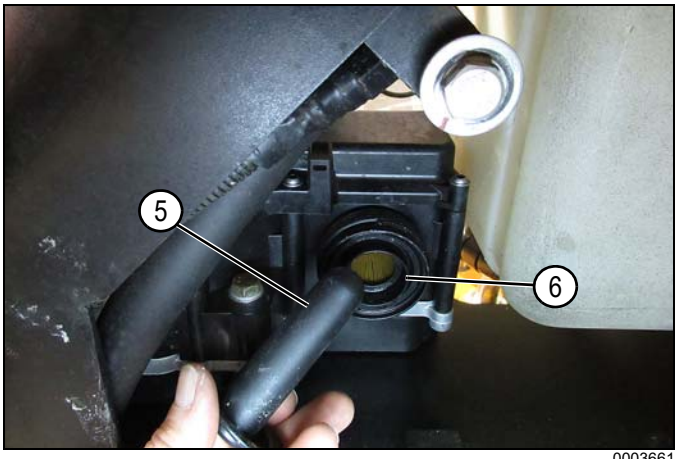
5. Remove six fasteners (2) and the DEF pump access panel (3) from under the machine.



0003660

Figure 5-57

6. Remove the filter cover (4).



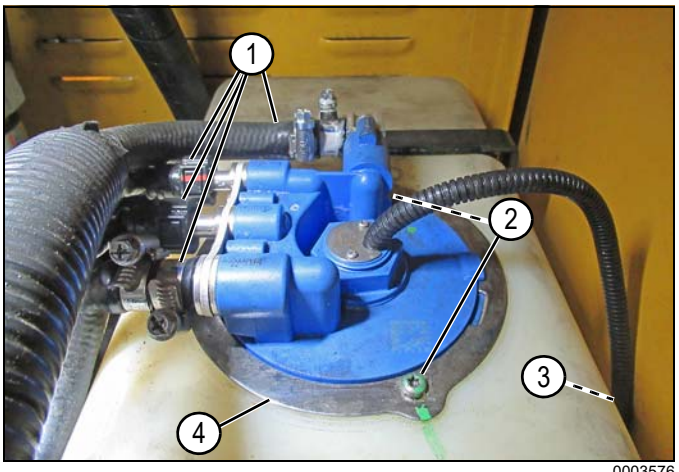
0003661

Figure 5-58

7. Remove the filter seal (5) and filter element (6).
8. Install a new filter element.
9. Install the filter seal and filter cover. Tighten the filter cover.
10. Install the DEF pump access panel.
11. Start the engine and check for leaks.

Replace the Diesel Exhaust Fluid (DEF) Tank Filter

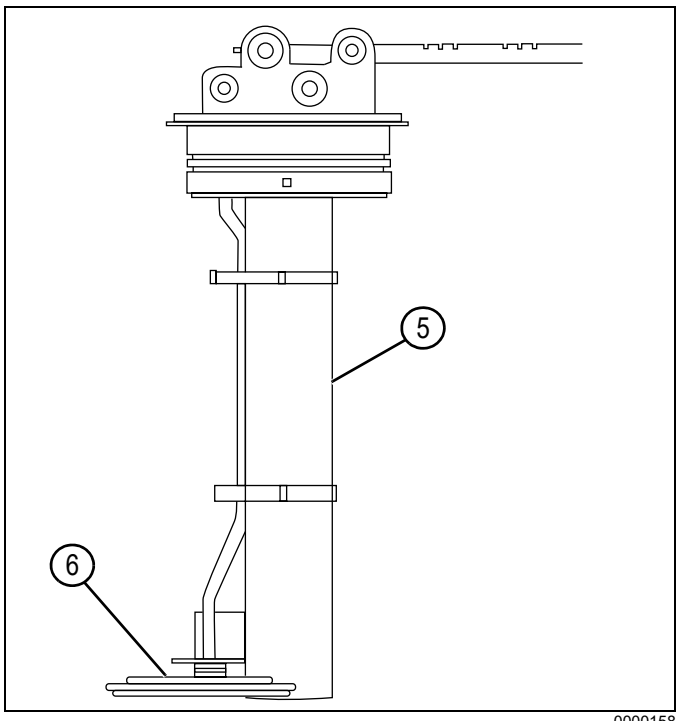
1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003576

Figure 5-59

4. Tag and disconnect the four DEF hoses (1). Cap and plug all openings.
5. Disconnect the DEF sending unit wiring harness connector (3).
6. Remove two fasteners (2) from the DEF sending unit cover (4).



0000158

Figure 5-60

7. Remove the DEF sending unit (5) from the tank.
8. Remove and replace the DEF suction filter (6).
9. Install the DEF sending unit in the tank and secure fasteners.
10. Connect the DEF hoses.
11. Connect the DEF sending unit wiring harness connector.

Fuel System

Inspect the Fuel Lines

CAUTION

Failure to perform this procedure as directed could result in a fire during operation, which could result in injury.

Inspect all the steel, plastic, and rubber fuel lines, including those on the engine.

- Replace any fuel lines that show signs of deterioration, wear, damage, or leaks.
- Contact a SANY dealer for repairs on the fuel system.

Drain 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.**

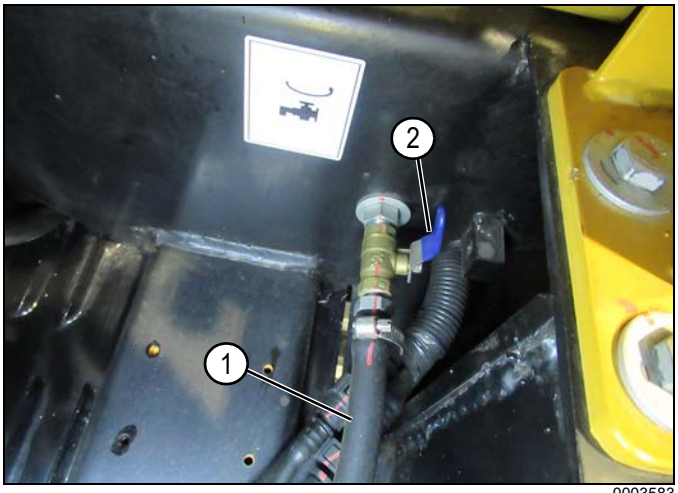
Failure to follow these warnings could result in death or serious injury.

NOTICE!

Use diesel fuel to clean the inside of the fuel tank. Never use trichloroethane to clean the fuel tank.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

NOTE: *For capacity of the fuel tank “Capacities” on page 5-11.*



0003583

Figure 5-61

4. Place a suitable container under the end of drain hose (1) to collect the drained fuel.

NOTICE!

Dispose of fuel in accordance with all applicable environmental regulations. Failure to follow this notice could damage the environment.

5. Open the drain valve (2) to drain water and sediment accumulated on the bottom of the tank. Do not allow the fuel to splash out of the container.
6. Close the drain valve when clean fuel drains from the fuel tank.
7. Add fuel to the system as necessary.
8. Start the engine and allow it to run at idle speed.
9. Check for leaks in the fuel system.
10. Repair any leaks.

Replace the Secondary Fuel Filter

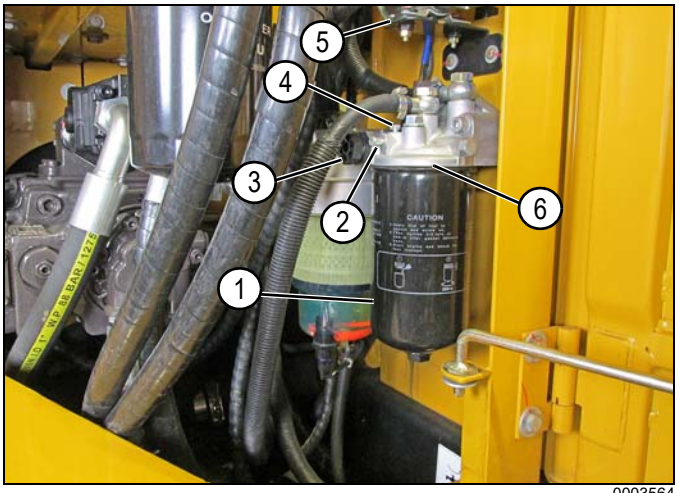
WARNING

- **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.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.

2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003564

Figure 5-62

4. Remove the secondary fuel filter (1). There is a wrench fitting on the bottom for removal.

CAUTION

- **Cleanliness is important when working with an open fuel system. Contaminated fuel can result in engine damage.**
- **Dispose of fuel and filter in accordance with all applicable environmental regulations. Failure to follow this caution could damage the environment.**

5. Apply fresh fuel oil to the gasket on the new filter.
6. Tighten the filter until it makes contact with the filter base (6). Tighten an additional 2/3 turn or 18 lb-ft (25 N•m).
7. Turn the key switch to the ON position. This allows the electric fuel feed pump (5) to operate as needed.
8. Open the fuel bleeder plug (4). Do not remove the plug.
9. Turn the primer plunger (3) counterclockwise until it can be pulled out.
10. Press and release the primer plunger (more than 20 times) to fill the filter with fuel.
11. When the filter is full, close the fuel bleeder plug and wipe fuel from around the vent opening (2).
12. Push in and turn the primer knob clockwise to secure the primer plunger.

NOTE: *Air trapped in the fuel system may cause engine starting failure or abnormal running. Make sure trapped air is released after water and sediment in the water separator have been drained, the filter has been changed, the priming pump filter has been cleaned, and/or the fuel tanks have been drained.*

13. Start the engine and allow it to run at idle speed. See “Starting the Engine” on page 4-16.
14. Check for leaks in the fuel system.
15. Shut down the engine.
16. Close the right rear access panel.

Replace the Primary Fuel Filter/Water Separator Element

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.

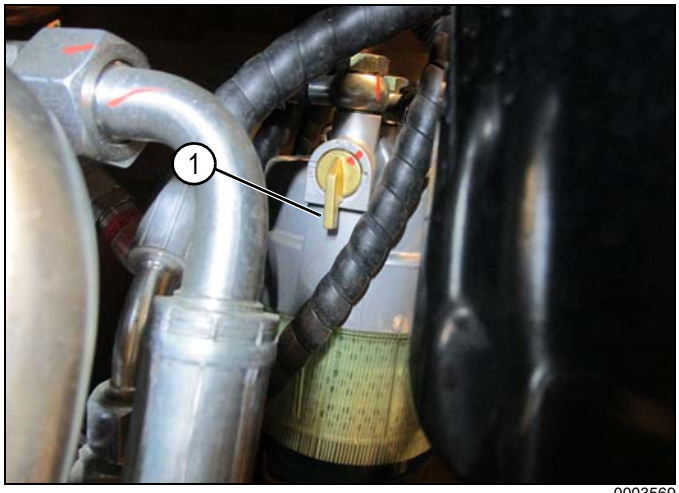
- **Never service the fuel system near an open flame or while smoking.**
- **Fuel that comes into contact with hot surfaces or electrical components can cause a fire. Clean up any fuel spills immediately.**

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 fuel and filter in accordance with all applicable environmental regulations. Failure to follow this notice could result in damage to the environment.**

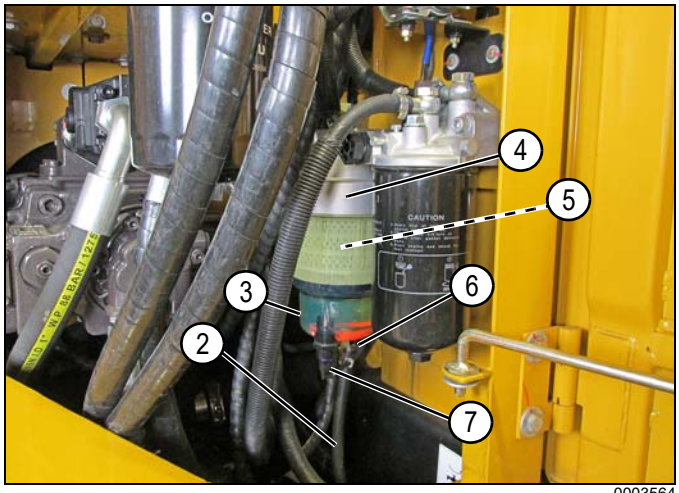
1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003569

Figure 5-63

4. Turn the fuel shutoff valve (1) 1/4 turn counterclockwise to the OFF position.



0003564

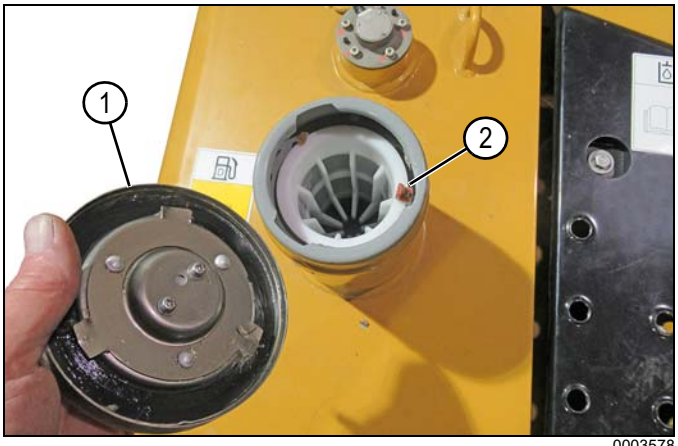
Figure 5-64

5. Place an appropriately sized container under the end of the fuel drain hose (2).
6. Open the drain valve (6) to allow all water and fuel to drain from the filter.
7. Disconnect the water-in-fuel sensor connector (7).

NOTE: *Disconnect the fuel drain hose from the drain valve if the drain hose is in the way of the wrench fitting on the bottom of the filter housing.*

8. Remove the filter housing (3).
9. Remove the paper filter (5) from the filter body (4).
10. Replace the paper filter and make sure it is securely seated within the filter body.
11. Fill the filter housing with clean fuel.
12. Install the filter housing.
13. Turn the fuel shutoff valve (1) 1/4 turn clockwise to the ON position.
14. Start the engine and allow it to run at idle speed. See “Starting the Engine” on page 4-16.
15. Check for leaks in the fuel system.
16. Shut down the engine.
17. Close the right rear access panel.

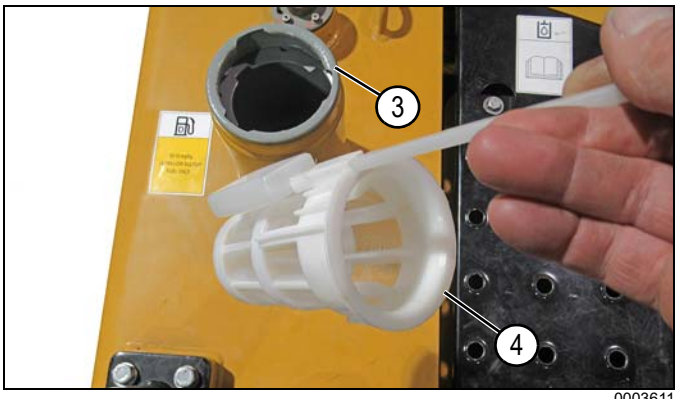
Check the Fuel Tank Strainer



0003578

Figure 5-65

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Remove the fuel tank filler cap (1).



0003611

Figure 5-66

5. Gently pull up on the fuel float gauge (2) and lift the fuel tank strainer (4) out of the tank filler neck (3).
6. Clean and inspect the fuel tank strainer. Replace a damaged or missing fuel strainer with a new one.
7. Install the new (or cleaned) fuel tank strainer.
8. Install and lock the fuel tank filler cap.

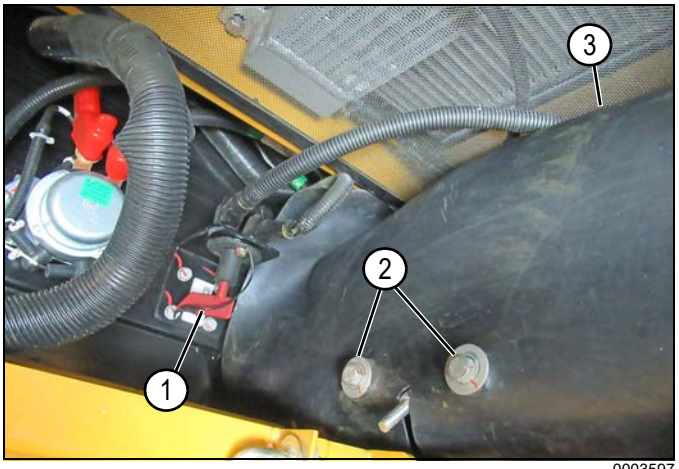
Electrical System

Disconnect the Electrical Power

WARNING

When working with any open electrical power source, make sure that your hands are free of any metal objects (rings, watches, jewelry, etc.) that could come in contact with electrical power points. Failure to avoid this hazardous situation could result in death or serious injury.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.



0003597

Figure 5-67

3. Turn the battery disconnect switch (1) to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Remove the two fasteners and washers (2) that secure the cover (3) over the batteries.

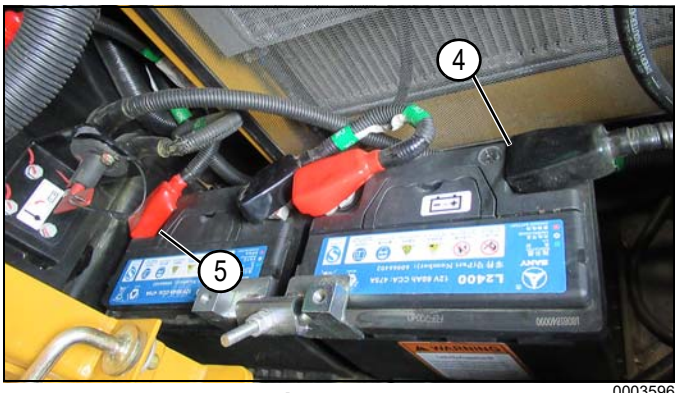


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Figure 5-68

5. Remove the black (ground) cable (4) from the battery posts first, then remove the red (positive) cable (5) from the battery post.
6. To reconnect power, reverse the process as described in step 4, connecting the red cable first, followed by the black cable.
7. Install and secure the battery cover.
8. Turn the battery disconnect switch to ON. See “Battery Disconnect Switch” on page 3-15.

Check the Electrical System

The electrical system should be inspected, starting with the fuse box. The fuse box is located on the left, behind the operator’s seat.

NOTE: *See “Fuse Location” on page 3-22 for fuse location and other data.*

If a fuse is corroded, or if a white powder can be seen on it, contact a SANY dealer for repair information regarding the electrical system.

Inspect all electrical equipment. If necessary, remove and replace items, including loose connectors, worn or degraded wiring, cables, etc:

- Locate and correct the cause of any electrical faults.
- Use only genuine SANY parts and fuses.
- Shut down the engine immediately if a fault occurs with the power supply.
- Do not modify the electrical system without prior authorization from SANY.

Check the Batteries

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 wash the top of the battery to prevent the battery vents from plugging.**
- **Battery gases are explosive. Never smoke around batteries or expose them to sparks or open flames. Work in a well-ventilated area.**
- **Wear personal protective equipment (PPE) when working with batteries.**
- **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.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.

2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

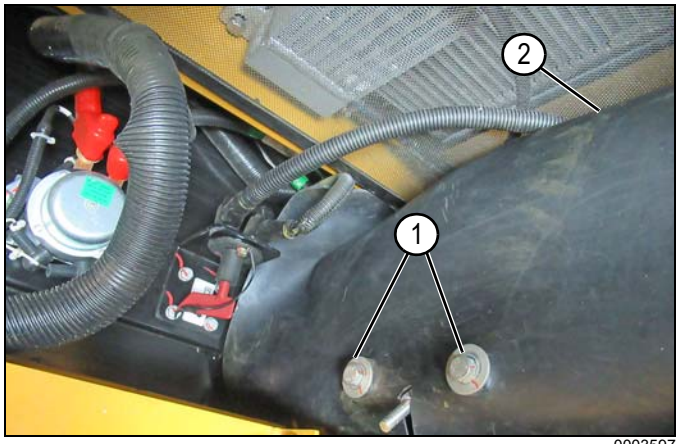

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Figure 5-69

4. Remove the two fasteners (1) that secure the battery cover (2).

NOTE: *Allow several minutes for any accumulated battery gases to clear before servicing the batteries.*

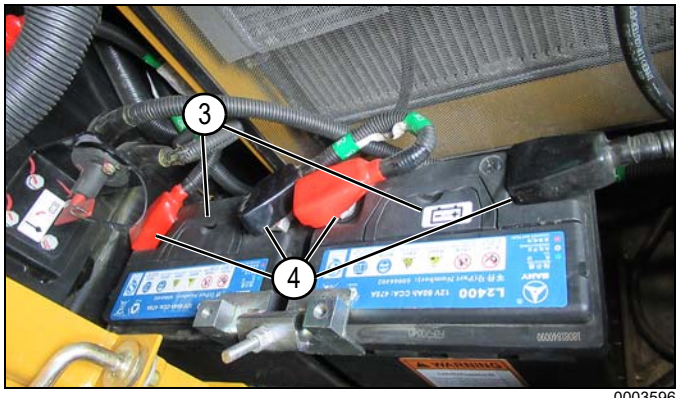

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Figure 5-70

5. Check the top surfaces (3) and all the battery connections (4) for signs of corrosion or dirt buildup. Use a clean rag to wipe any dirt from the batteries.

NOTE: *If corrosion is found, clean the area with a mixture of baking soda and warm water.*

6. Remove any debris, tools, or parts from the battery compartment.
7. Install the cover.
8. Close the access panel.

Replace the Batteries

NOTICE!

Dispose of batteries in accordance with all applicable environmental regulations. Failure to follow this notice could damage the environment.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.

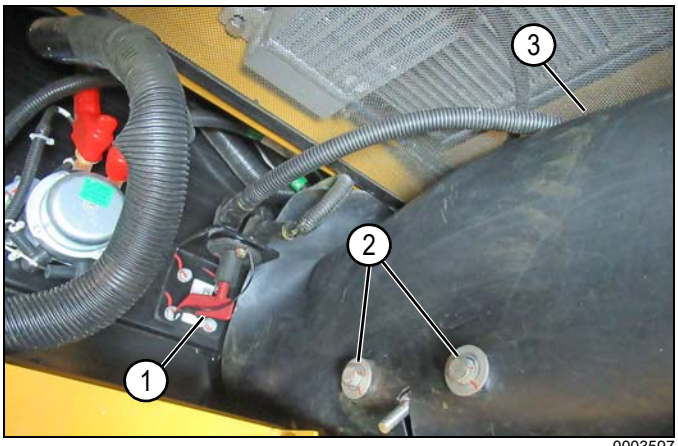

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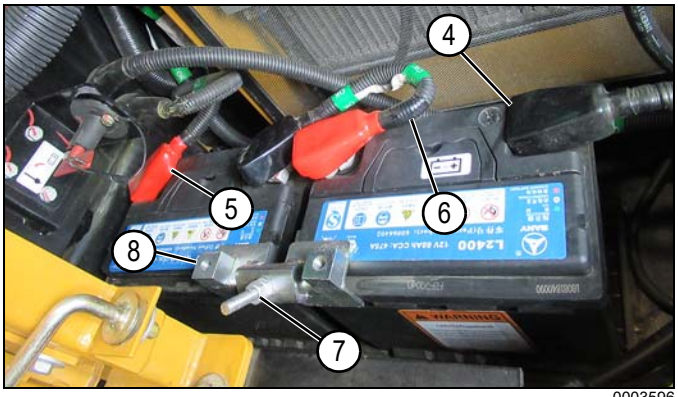
Figure 5-71

3. Turn the battery disconnect switch (1) to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Remove two fasteners (2), then remove the cover (3).



0003596

Figure 5-72

5. Disconnect the black ground (-) battery cable (4) first, then disconnect the red positive (+) cable (5).
6. Remove the jumper cable (6).
7. Loosen the fastener (7) until the hold-down bracket (8) can be removed from the batteries.
8. Remove the failed battery (or batteries).
9. Install the new battery (or batteries).

10. Install the battery hold-down bracket over the batteries and secure it in place by tightening the fastener.
11. Install the jumper cable to the batteries.
12. Connect the red positive (+) cables first. Connect the black ground (-) cables last.

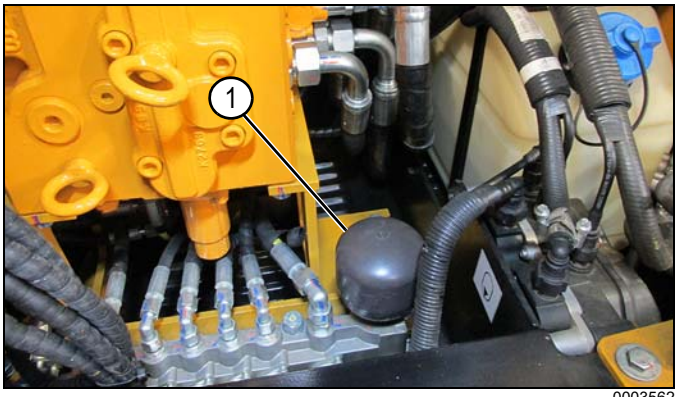
NOTE: *The two 12-volt batteries are connected in a series. Be sure they are installed in the same manner.*

13. Install the cover and secure with the fasteners.

Hydraulic System

Inspect the Accumulator

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003562

Figure 5-73

4. The accumulator (1) is inside the front right access door.
5. Inspect the accumulator and surrounding surfaces for signs of leaks and worn or damaged hoses.
6. If any damage is found, repair it immediately.

Check the Accumulator Function

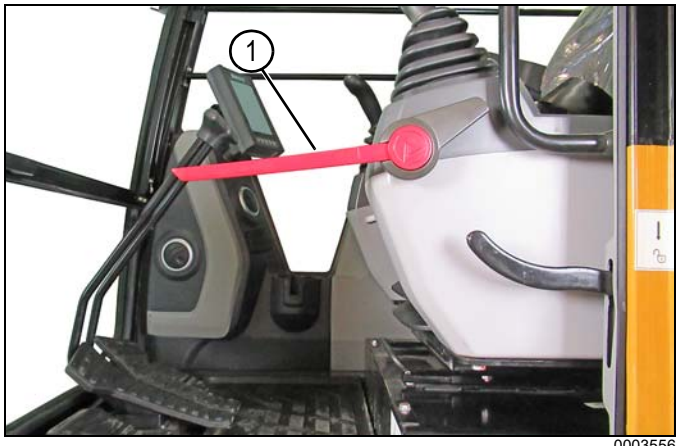
WARNING

- **The accumulator contains pressurized nitrogen. Improper handling is extremely dangerous.**
- **Do not drill holes in 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 “Accumulator” on page 2-6 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.

The accumulator allows the operator to lower hydraulic equipment 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 2-5.
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.



0003556

Figure 5-74

5. Move the hydraulic lockout control lever (1) to the unlocked (open) position.
6. Use the joystick control to lower the boom.
7. The boom should lower.

NOTE: *If there is no movement, contact a SANY dealer.*

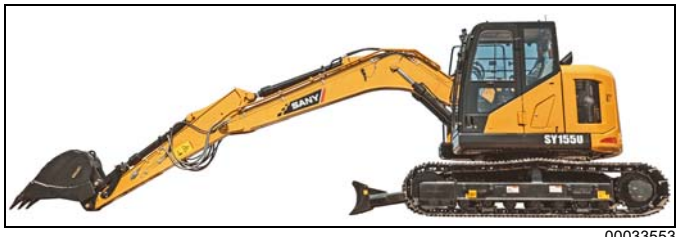
8. Start the engine and run it at low idle for about 5 minutes to repressurize the accumulator.

Relieve Hydraulic System Pressure

CAUTION

- **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 pressure to prevent injury.**

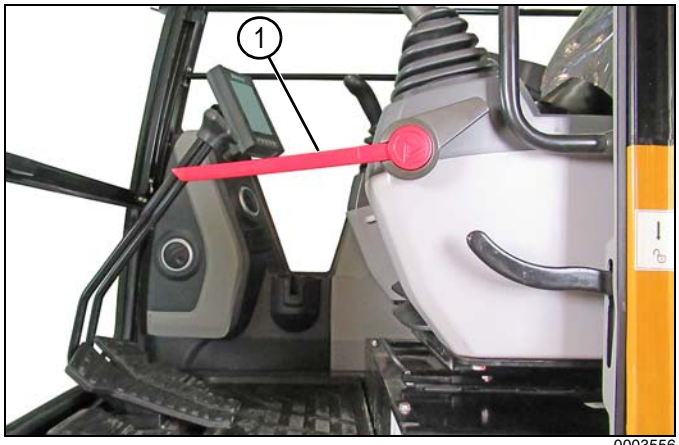
Failure to follow these warnings could result in death or serious injury.



00033553

Figure 5-75

1. Park the machine in a secure location and position the work equipment with the arm and bucket fully extended.
2. Shut down the engine.
3. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
4. Turn the key switch to ON.



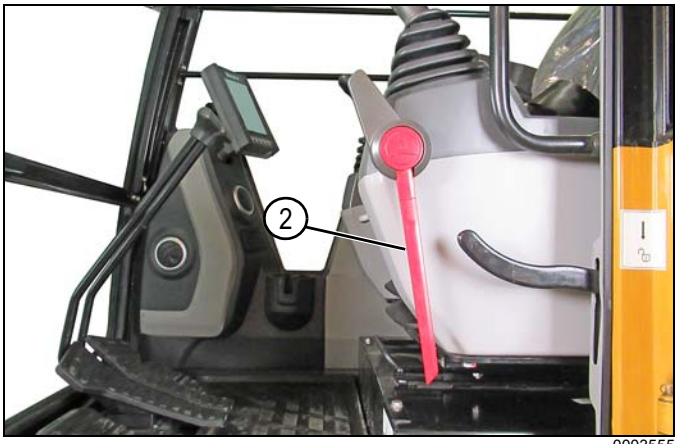
0003556

Figure 5-76

5. Set the hydraulic lockout control lever to the unlocked (open) position (1).

NOTE: *See “Hydraulic Lockout Control Lever” on page 3-6 for additional information.*

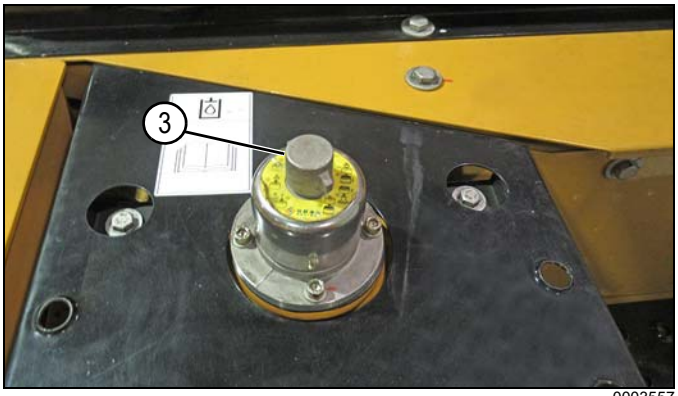
6. Fully cycle each joystick, and travel control lever/pedals two to three times within 15 seconds to release hydraulic pressure remaining in the hydraulic system.



0003555

Figure 5-77

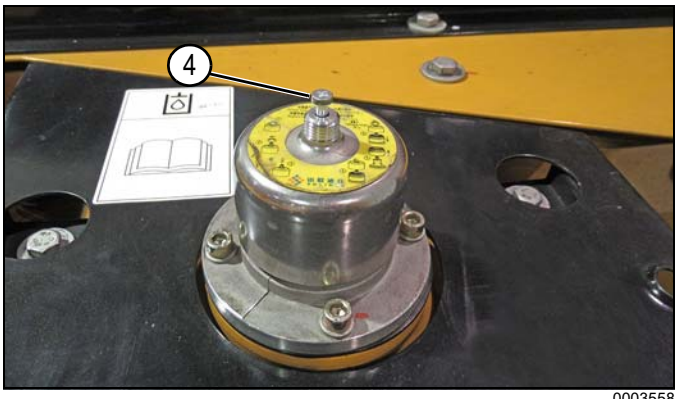
7. Turn the key switch to OFF.
8. Move hydraulic lockout control lever (2) to the locked (closed) position.



0003557

Figure 5-78

9. Remove the vent cap (3) from the breather valve.



0003558

Figure 5-79

10. Press the vent button (4) to relieve pressure in the hydraulic tank.
11. Install the vent cap.

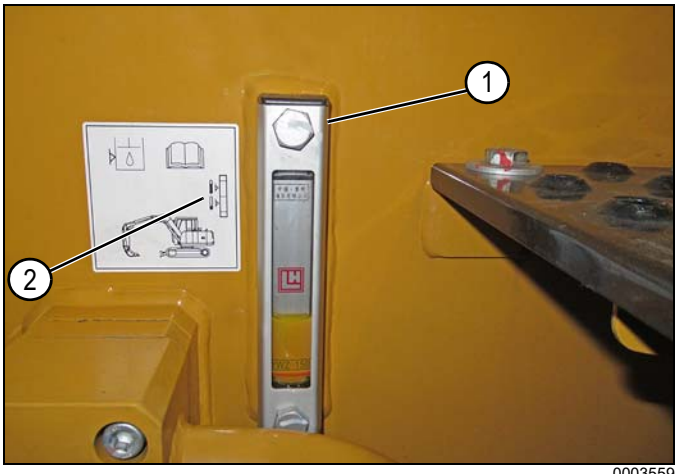
Add Hydraulic Oil

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 pressure to prevent injury.**

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

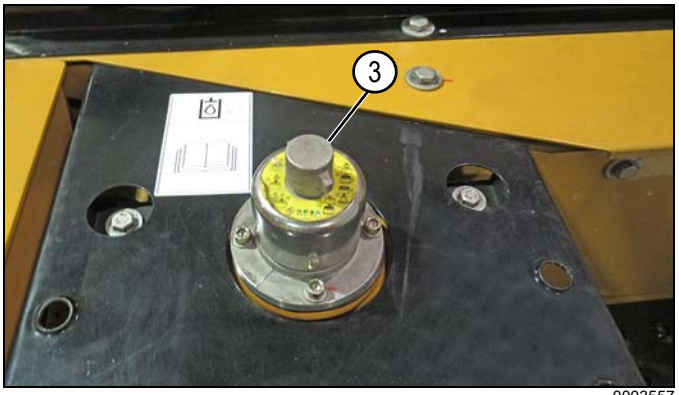
1. Prepare the machine for service. See “Maintenance Safety” on page 2-5.
2. Relieve system pressure. See “Relieve Hydraulic System Pressure” on page 5-39.



0003559

Figure 5-80

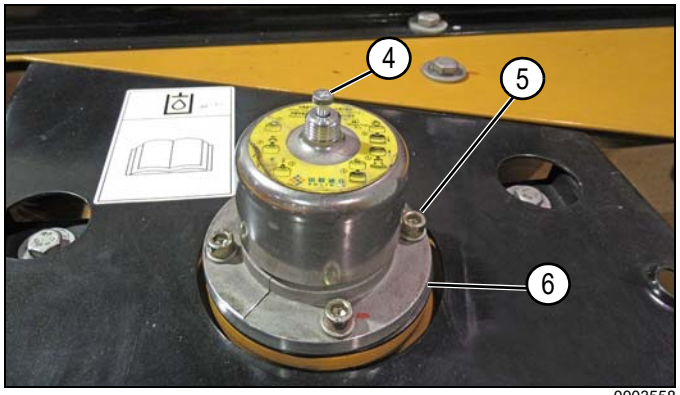
3. Check the oil level using the sight glass (1) on the side of the tank. Make sure the hydraulic oil level is between the level marks as shown on the decal (2).



0003557

Figure 5-81

4. If it is necessary to add hydraulic oil, remove the vent cap (3).



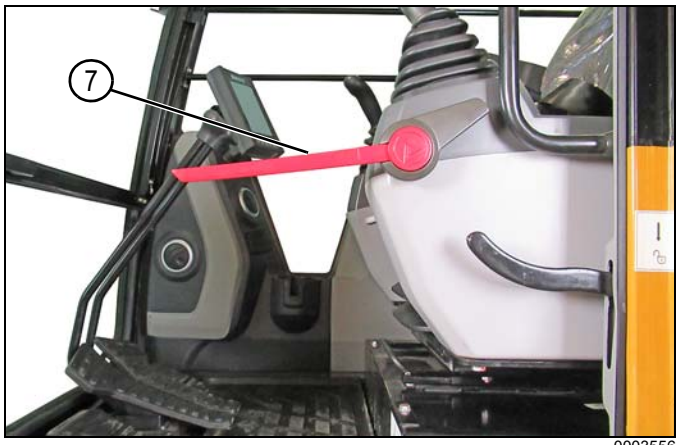
0003558

Figure 5-82

5. Press the vent button (4) to relive any pressure in the hydraulic tank.
6. Remove the four fasteners and washers (5) and remove the breather (6) from the machine.

NOTE: *See “Hydraulic Oil/Ambient Temperature Data” on page 5-10 for oil specifications.*

7. Add hydraulic oil as needed.
8. Install the breather, securing it to the hydraulic tank with four fasteners.
9. Start the engine.



0003556

Figure 5-83

10. Set the hydraulic lockout control lever (7) to the unlocked (open) position.

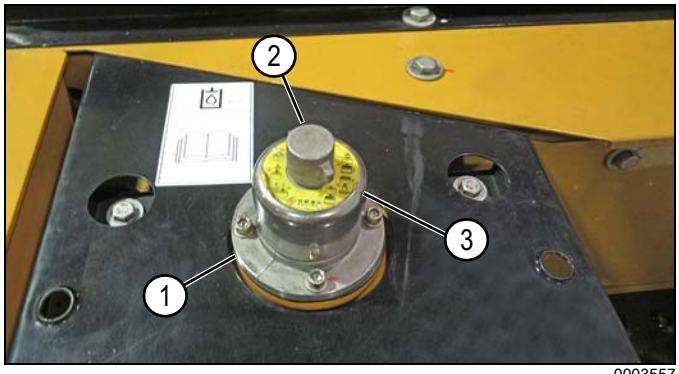
NOTE: *See “Hydraulic Lockout Control Lever” on page 3-6 for additional information.*

11. Run the engine at low idle for 10 minutes to vent air from the hydraulic system.
12. Shut down the engine.

Replace the Hydraulic System Breather Filter

Depending on the work environment and the degree of contamination, the filter may need to be replaced more frequently than every 500 hours.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
3. Clean around the top of breather valve (1).



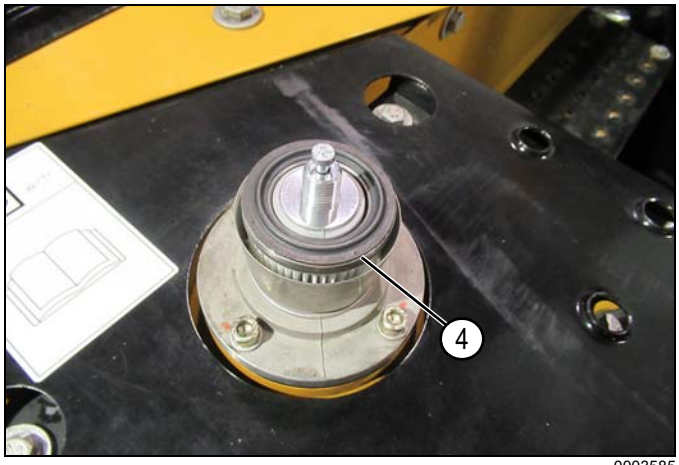
0003557

Figure 5-84

4. Remove the vent cap (2) from the top of the breather valve.
5. Remove and clean the breather filter cover (3).

NOTICE!

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



0003585

Figure 5-85

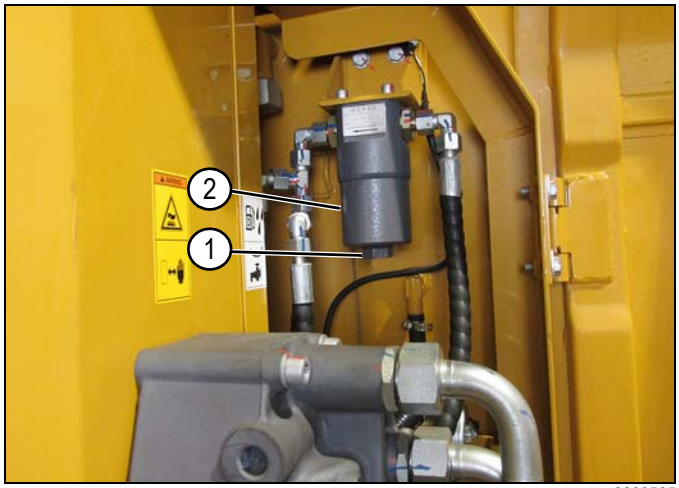
6. Remove the breather filter element (4).
7. Install the new breather filter element.
8. Install the breather filter cover.
9. Install the vent cap.

Replace the Hydraulic Pilot Line Filter Element

NOTE: *Perform this procedure after the first 250 hours, every 1000 service hours, or at least once a year, whichever occurs first.*

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

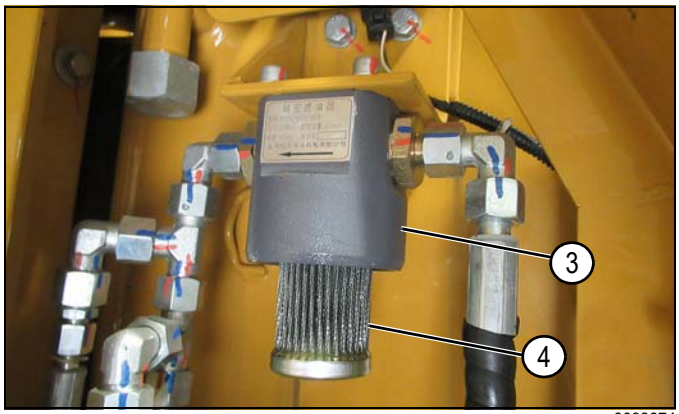
Dispose of hydraulic oil and filters in accordance with all applicable environmental regulations. Failure to follow this notice could damage the environment.



0003565

Figure 5-86

4. Use a wrench on the hex end (1) at the bottom of the filter housing to loosen the pilot filter housing.
5. Place an appropriately sized container underneath the filter housing to catch any oil that may leak out.
6. Remove the filter housing (2).



0003674

Figure 5-87

7. Remove the filter element (4) from the housing (3).
8. Clean the inside of the pilot filter housing.

NOTE: *Be careful not to cross-thread the filter housing during installation so the mating surfaces seal correctly.*

9. Install a new filter element inside the filter housing.
10. Install the filter housing.
11. Close the right rear access panel.
12. Set the hydraulic lockout control lever to the locked (closed) position.

NOTE: *See "Hydraulic Lockout Control Lever" on page 3-6 for additional information.*

13. Bleed air from the system by starting the engine and allowing it to run at low idle for 10 minutes.

Replace the Hydraulic Tank Return Filter

WARNING

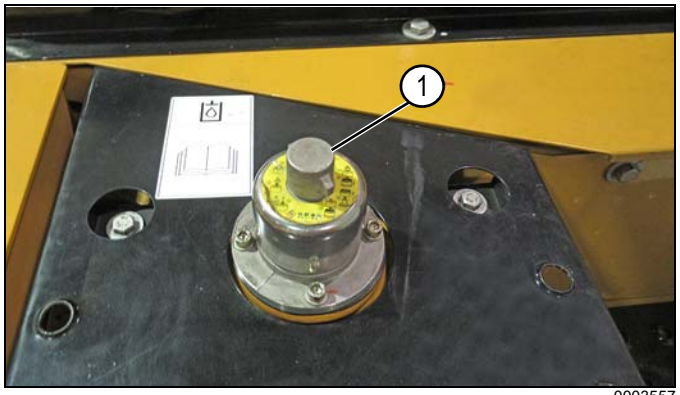
- **Allow the hydraulic system to cool before servicing. Hot oil may cause burns or other serious injury.**
- **The hydraulic tank may be under pressure, and hydraulic oil may be present at the filler cap. Relieve pressure to prevent injury.**

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

0003551

Figure 5-88

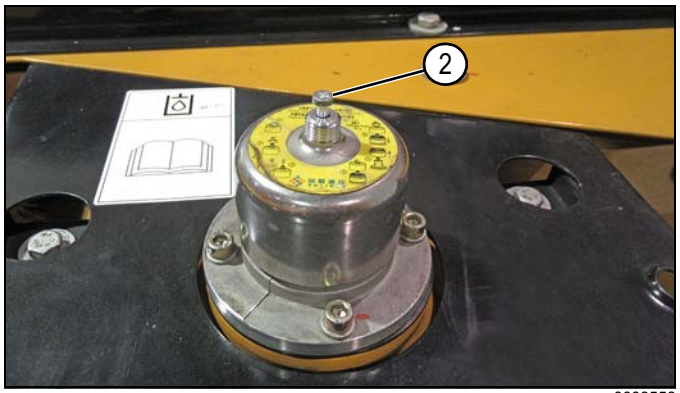
1. Park the machine in a secure location and position the work equipment as shown.
2. Prepare the machine for checks and inspections. See "Maintenance Safety" on page 2-5.
3. Turn the battery disconnect switch to OFF. See "Battery Disconnect Switch" on page 3-15.



0003557

Figure 5-89

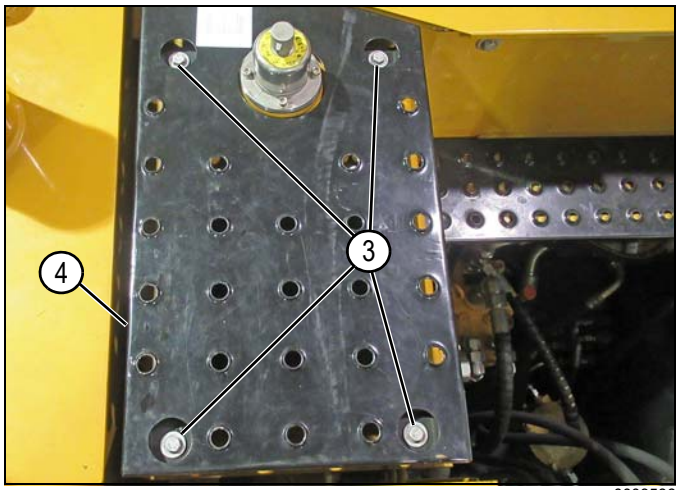
4. Remove the vent cap (1) from the breather valve.



0003558

Figure 5-90

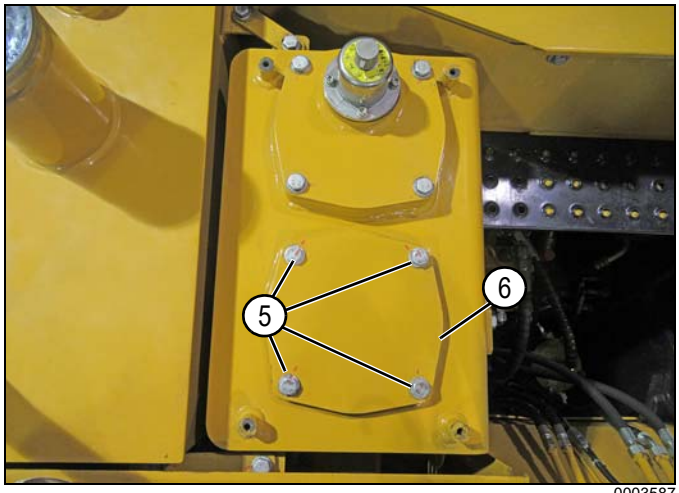
5. Press the vent button (2) to release any pressure.
6. Install the vent cap.



0003586

Figure 5-91

7. Remove the four fasteners (3) and the plate (4).



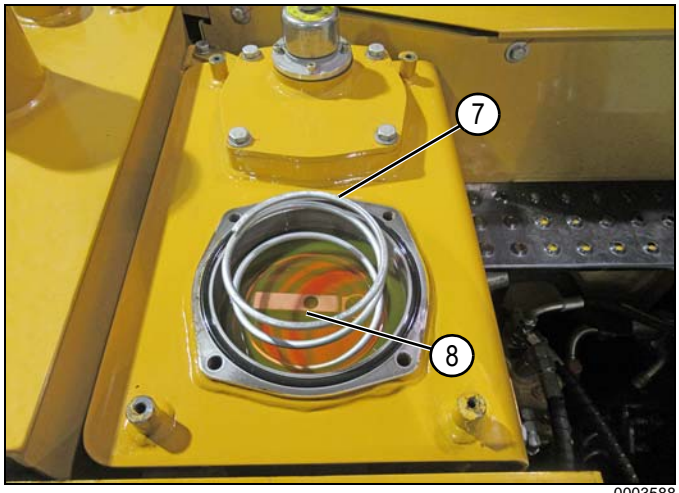
0003587

Figure 5-92

NOTE: *The internal spring may cause the filter cover may move up while the fasteners are being removed. Press down on the cover while removing the fasteners.*

NOTE: *When the cover is removed, cover the filter opening to prevent dirt and debris from falling into the hydraulic tank.*

8. Remove four fasteners and washers (5), and remove the filter cover (6).



0003588

Figure 5-93

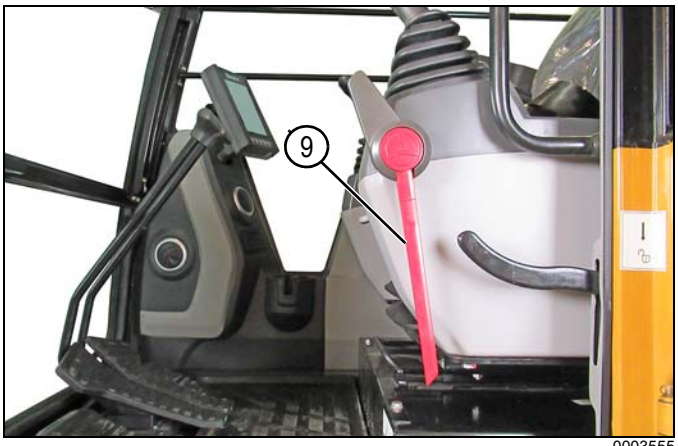
9. Remove the filter spring (7) and filter (8).

NOTICE!

Dispose of the hydraulic oil and filters in accordance with all applicable environmental regulations. Failure to follow this notice could damage the environment.

10. Remove the filter element and O-ring from the filter housing.
11. Remove all debris from inside the filter housing.
12. Install a new return filter and O-ring with the solid end down.
13. Install the return filter in the filter housing.
14. Install the filter spring on top of the filter housing.
15. Hold the filter cover down to secure with the four fasteners.

NOTE: *If not changing the hydraulic oil, fill the tank at this time. See “Add Hydraulic Oil” on page 5-40.*



0003555

Figure 5-94

16. Move the hydraulic lockout control lever (9) to the locked (closed) position.

NOTE: *See “Hydraulic Lockout Control Lever” on page 3-6 for additional information.*

17. Start and run the engine at low idle for 10 minutes to vent air from the hydraulic system.
18. Shut down the engine.
19. Check for leaks.

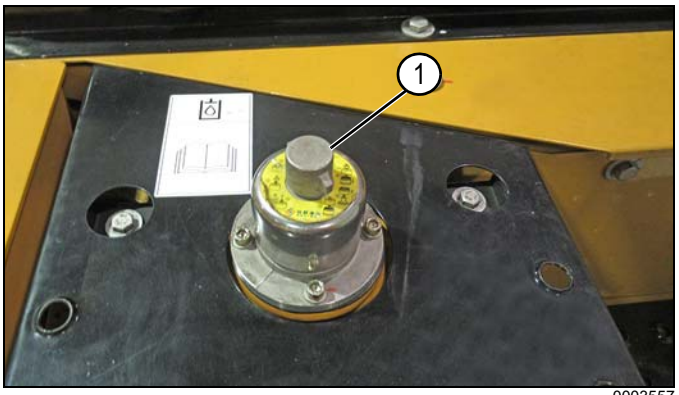
Clean and Replace the Hydraulic Oil Suction Strainer

0003551

Figure 5-95

1. Park the machine in a secure location and position the work equipment as shown.

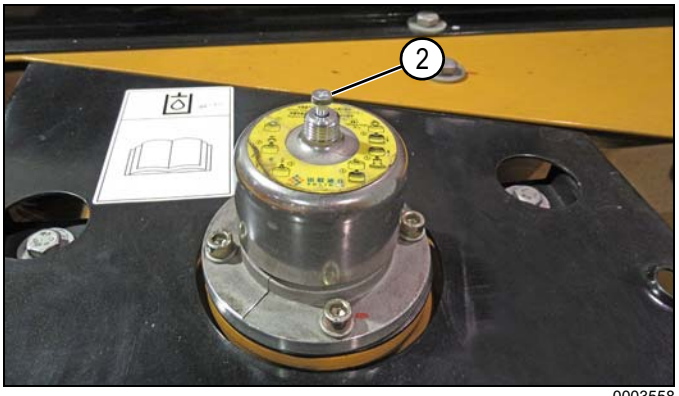
2. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003557

Figure 5-96

4. Remove the vent cap (1) from the breather valve.



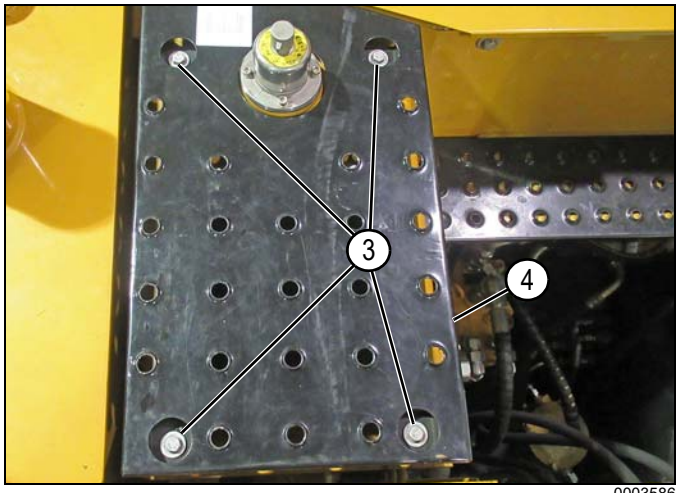
0003558

Figure 5-97

5. Press the vent button (2) to release any pressure.
6. Install the vent cap.

NOTES:

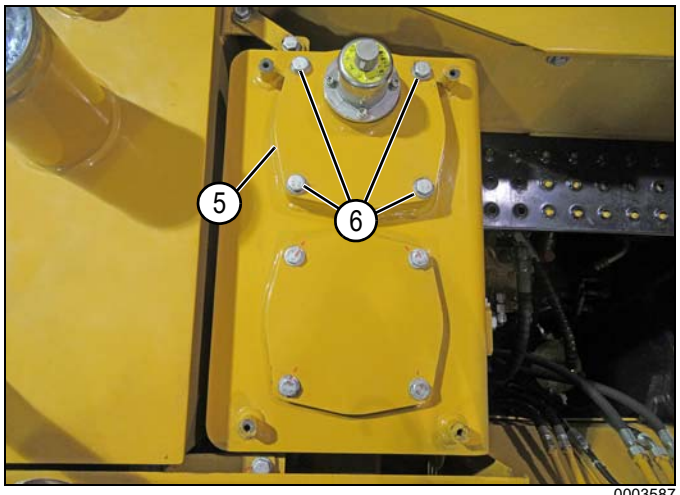
- *The internal spring may cause the filter cover to move up while the fasteners are being removed. Press down on the cover while removing the fasteners.*
- *When the cover is removed, cover the filter opening to prevent dirt and debris from falling into the hydraulic tank.*



0003586

Figure 5-98

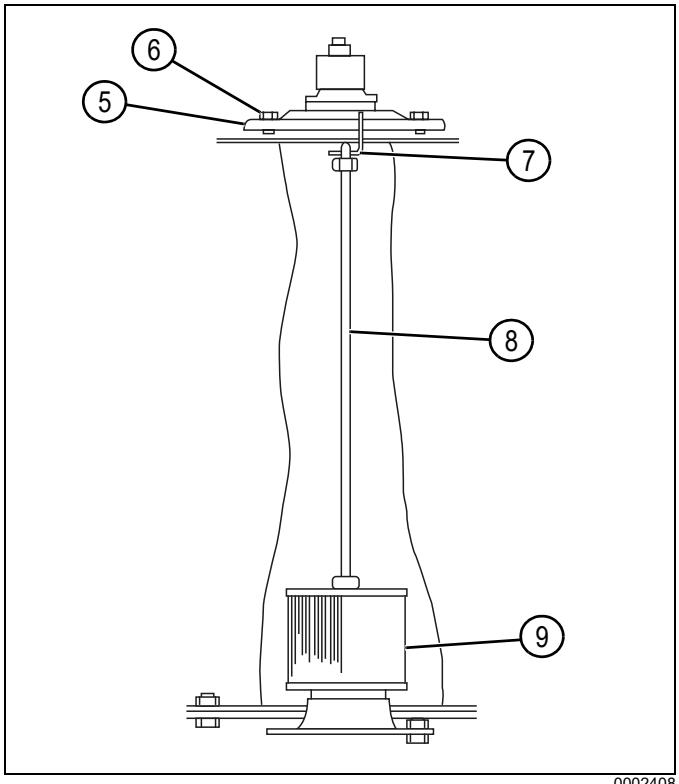
7. Remove the four fasteners (3) and the plate (4).



0003587

Figure 5-99

8. Clean the top of the hydraulic tank and remove contaminants from around the suction strainer cover.
9. Loosen the four fasteners (6) that secure the suction strainer cover (5). Push the cover down against the spring pressure while removing the fasteners.
10. Remove the suction strainer cover.



0002408

Figure 5-100

11. Remove the spring (7), rod (8), and suction strainer (9).
12. Clean the suction strainer of any contaminants. Inspect and replace if damaged.
13. Install the suction strainer to the boss of the hydraulic tank.
14. Install a new O-ring for the suction strainer cover.
15. Tighten the cover fasteners securely.

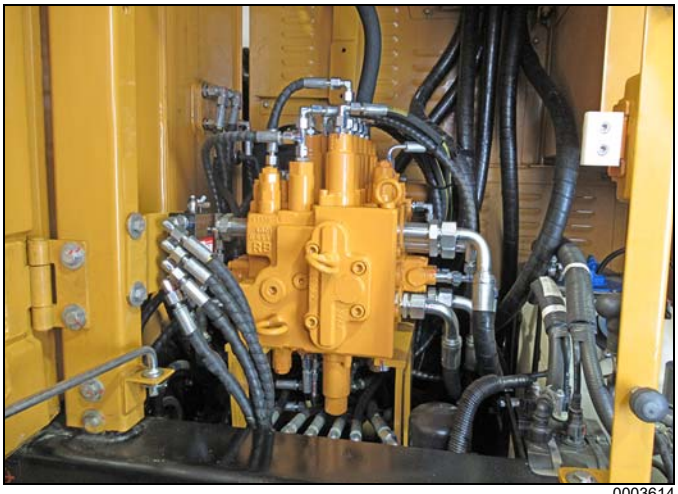
NOTE: *Use the extrusion on the bottom of the cap to hold the spring in place.*

16. To purge air from the system, start the engine and run it at low idle for 10 minutes.
17. Check the hydraulic oil level and add hydraulic oil as needed. See “Check the Hydraulic Oil Level” on page 5-17.

NOTICE!

Dispose of hydraulic oil and the strainer in accordance with all applicable environmental regulations. Failure to follow this notice could damage the environment.

Check the Hydraulic Hoses



0003614

Figure 5-101

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Check all lines and hoses for leaks. Repair or replace as needed.
5. Make sure there is a sufficient distance between all lines and hoses and high-temperature engine components.

Examine hoses for the following:

- Cracked or loose hose couplings.
- Damage, cuts, or abrasions in the external rubber layer.
- Hardening, chapping, or burning of the hose.
- Cracks, damage, or serious corrosion on the couplings.
- Leaks at the hose couplings.
- Twisted, broken, flat, or distorted hose.
- Blisters, leaks, or softness in the external hose layer.

If any damage is found, contact a SANY dealer.

Change the Hydraulic Oil

WARNING

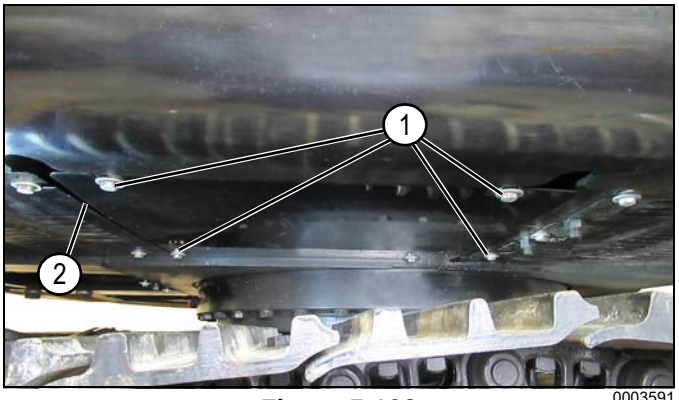
- **Allow the hydraulic system to cool before servicing. Hot oil may cause burns or other serious injury.**
- **The hydraulic tank may be under pressure, and hydraulic oil may be present at the filler cap. Relieve pressure to prevent injury.**

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

NOTICE!

If the breaker attachment is used, replace the hydraulic oil every 400 hours to prevent damage to the machine. Failure to perform this task could result in machine damage or improper machine operation.

1. Swing the upper structure to position the drain plug beneath the hydraulic tank, between the tracks.
2. Park the machine in a secure location and position the work equipment with the arm and bucket fully extended.
3. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
4. Shut down the engine.
5. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
6. Relieve System pressure. See “Relieve Hydraulic System Pressure” on page 5-39.
7. Collect a hydraulic oil sample before replacing the hydraulic oil. See “Collect a Hydraulic Oil Sample” on page 5-57.



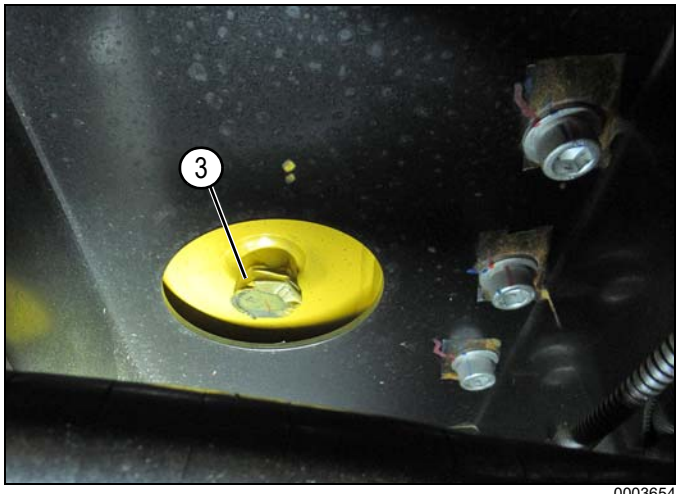
0003591

Figure 5-102

8. Remove four fasteners (1) and remove the panel (2) from under the hydraulic tank.

NOTICE!

Dispose of hydraulic oil and filters in accordance with all applicable environmental regulations. Failure to follow this notice could damage the environment.

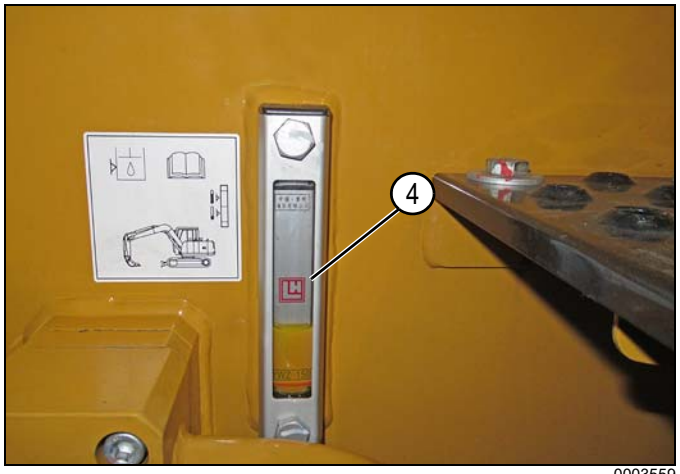


0003654

Figure 5-103

NOTE: *For the oil capacity of the hydraulic tank, see “Capacities” on page 5-11.*

9. Place a suitable container under the drain plug.
10. Remove the drain plug (3). Allow the hydraulic tank to drain completely.
11. Replace the O-ring.
12. Install and tighten the plug after draining.



0003559

Figure 5-104

13. Add hydraulic oil (see “Add Hydraulic Oil” on page 5-40) until the level is midway between the marks on the sight glass (4).

NOTE: *See “Hydraulic Oil/Ambient Temperature Data” on page 5-10.*

14. Start the engine.

15. Set the hydraulic lockout control lever to the unlocked (open) position.

NOTE: *See “Hydraulic Lockout Control Lever” on page 3-6 for additional information.*

16. Idle the engine for 10 minutes to purge air from the hydraulic system.
17. Check for leaks.
18. Shut down the engine.
19. Check for leaks. Tighten connections if leaks are found.
20. Install the panel under the hydraulic tank with four fasteners.

Check the Hydraulic Pump

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 pressure to prevent injury.**

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

0003612

Figure 5-105

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Start the engine.

NOTE: *Contact a SANY dealer if any abnormality is found.*

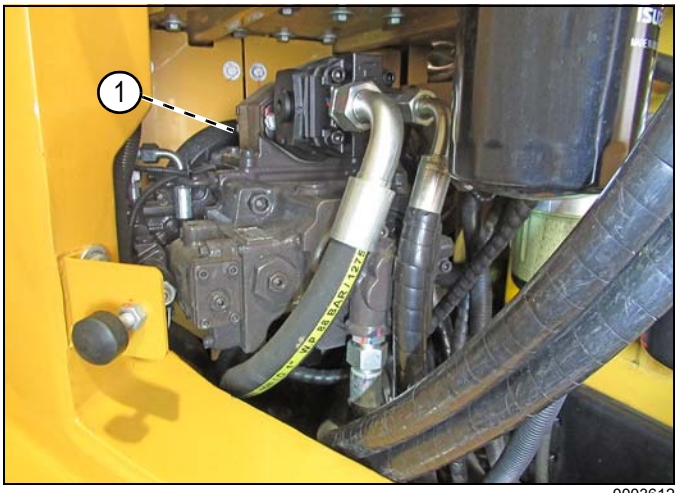
4. Inspect the hydraulic pump (1) for leaks, noise, and function. Repair as needed.
5. Shut down the engine.
6. Close the right rear access panel.

Check the Hydraulic Pump Mounting Fasteners

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

NOTICE!

Do not overtighten the mounting fasteners. This could result in machine damage and improper machine operation.

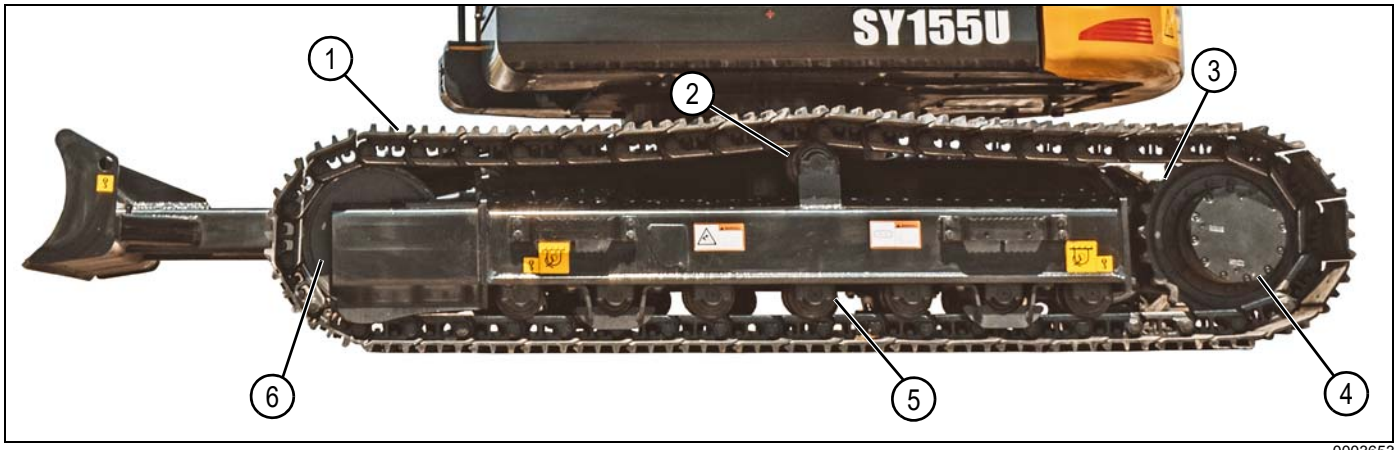


0003612

Figure 5-106

4. Inspect the hydraulic pump for loose, broken, or missing pump mounting fasteners (1). Replace any missing or damaged fasteners.
5. Inspect the pump for leaks or cracking at the mounting fastener locations.
6. Close the right rear access door.

Track Frame



0003653

Figure 5-107

1 Track
2 Carrier roller
3 Sprocket
4 Final drive
5 Track roller
6 Idler

Track Inspection and Lubrication

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

NOTE: *Use a pry bar to shift and/or lift the track shoes as needed to perform this procedure.*

4. Check the track (1) for damage, wear, unevenness, looseness, raised sections, tightening of track shoes, or any other abnormalities. Replace track shoes as necessary.
5. Check the idler (6), carrier roller (2), and track rollers (5) for wear and proper operation. If any are damaged, contact a SANY dealer for repair/replacement.
6. Check the sprocket (3) for wear and proper operation. If damaged, contact a SANY dealer for repair/replacement.
7. Make sure the track groove is fully engaged over the idler (6).
8. Check for visible damage to final drive (4) and its cover mounting bolts.
9. Remove as much accumulated dirt as possible from the undercarriage. Excess dirt requires more energy to operate the tracks and causes severe wear of the moving parts.

Check the Track Shoe Fasteners

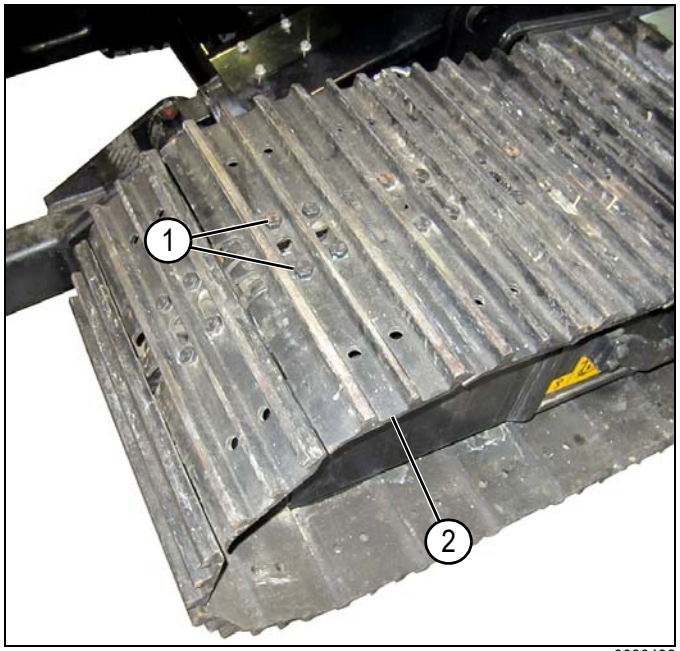


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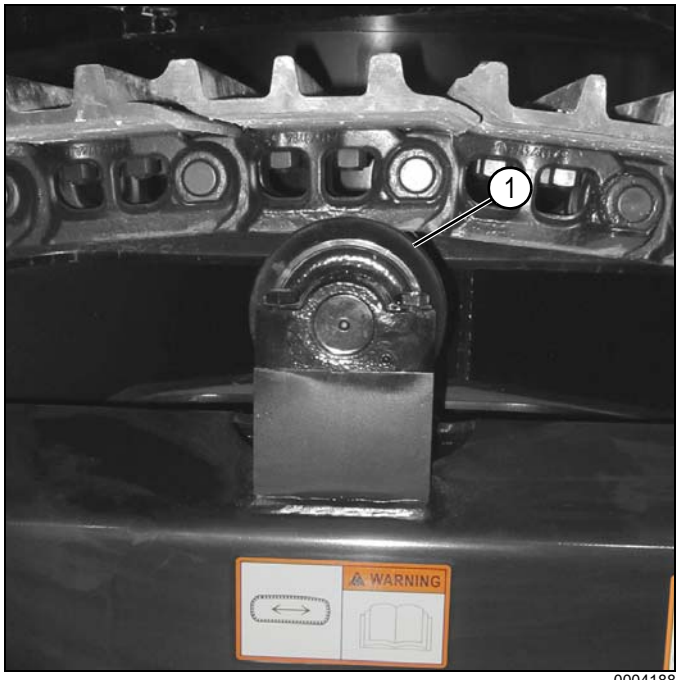
Figure 5-108

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
3. Make sure that all of the retaining fasteners (1) are properly in place at each pair of track shoes (2) and are not broken, bent, damaged, or loose.
4. Replace any fasteners that are broken, bent, or damaged. Tighten any loose fasteners.

Check the Carrier Roller

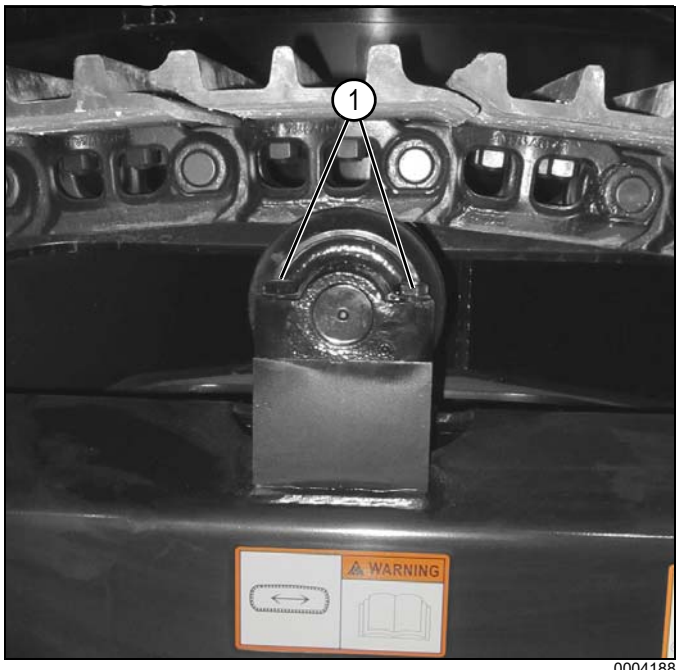


0004188

Figure 5-109

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
3. Check the carrier roller (1) for cracks and distortion. If the carrier roller is cracked or distorted, contact a SANY dealer.

Check Carrier Roller Mounting Fasteners



0004188

Figure 5-110

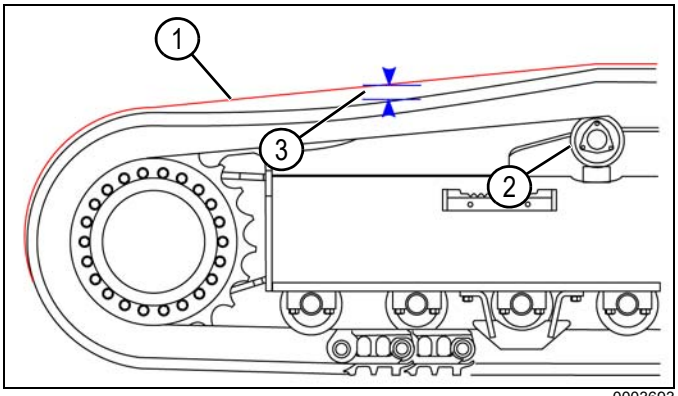
1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
3. Inspect the mounting fasteners (1) that secure the carrier roller to the track frame for rust, damage, or looseness.

NOTE: *Use anaerobic thread-lock compound when tightening and installing fasteners.*

4. Replace any damaged or defective fasteners and tighten any loose fasteners.

Check and Adjust the Track Tension

1. If the track tension is noticeably loose, operate the machine with the engine at idle speed.
2. Travel forward about 13 ft. (4 m) on a flat, level, and stable surface.
3. Stop the machine.
4. Shut down the engine.
5. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
6. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0003693

Figure 5-111

7. Place a straightedge (1) on the track above the carrier roller (2).
8. Measure the track-sag value (3), the distance between the straightedge and the track, using a ruler.

NOTE: *The acceptable range is 0.4 in.–1.2 in. (10 mm–30 mm).*

9. If the track sag is outside the acceptable range, adjust track tension as needed.

Increase the Track Tension

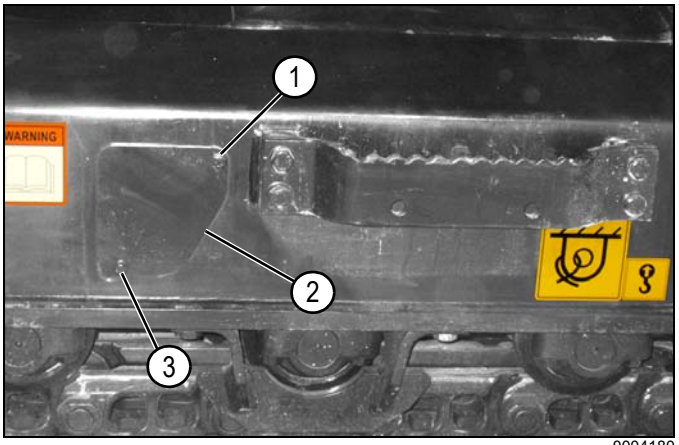


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Figure 5-112

1. Loosen the upper access panel fastener (1).
2. Remove the lower access panel fastener (3) and swing the access panel (2) up.
3. Tighten the upper access panel fastener to hold the access panel in place.

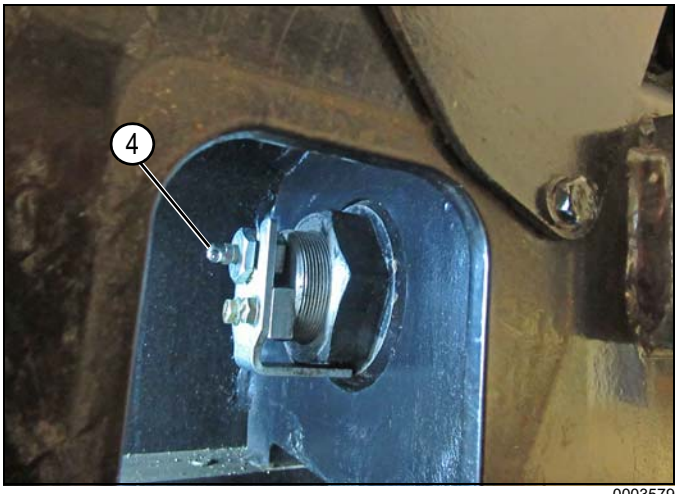

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Figure 5-113

4. Add grease through the grease fitting (4). This will move the idler and increase the track tension.
5. Slowly move the machine forward 23 ft.–26 ft. (7 m–8 m).
6. Stop the machine.
7. Check the track tension.
8. Add grease until an acceptable range is reached.

NOTE: *If the tension is still loose, contact a SANY dealer to determine the cause and remedy.*

9. Swing the access panel into place and install the lower fastener.

Decrease the Track Tension

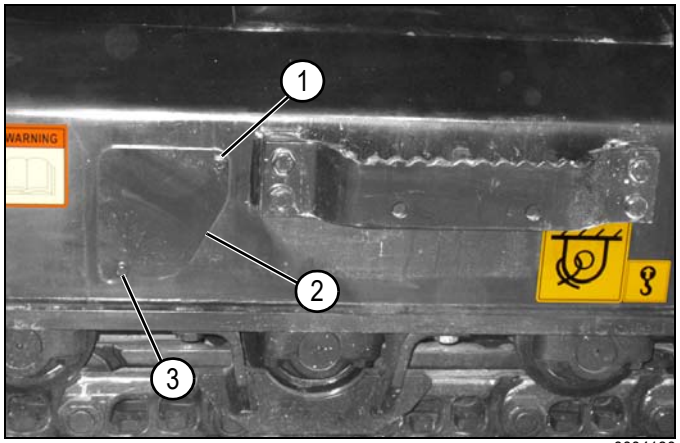

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Figure 5-114

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.

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Loosen the upper access panel fastener (1).
5. Remove the lower access panel fastener (3), and swing the access panel (2) up. Tighten the upper access panel fastener to hold the access panel in place.
6. Clear any gravel or mud from between the sprocket and the track link before decreasing track tension.

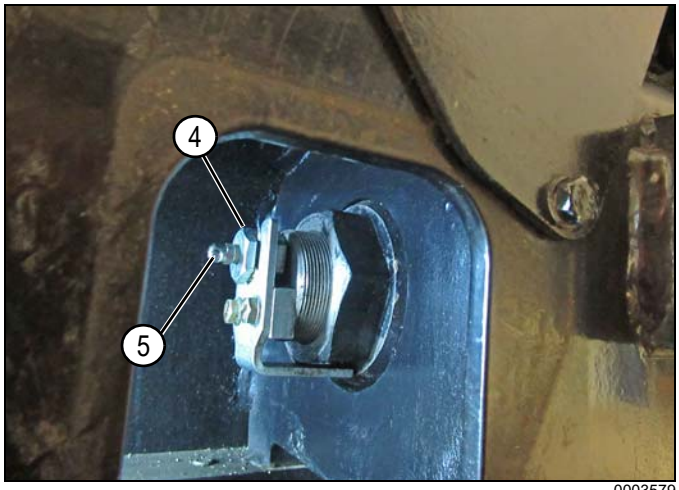

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Figure 5-115

7. Position yourself to the side of the grease valve (4).

NOTE: *Do not turn the grease fitting (5).*

8. Using the proper tools, slowly turn the grease valve (4) counterclockwise in 90° (1/4 turn) increments to decrease track tension.
9. If the grease does not come out smoothly, move the machine back and forth for a short distance.
10. Check the track tension. When the tension is correct, turn the grease valve (4) clockwise to tighten it.

CAUTION

- **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.**

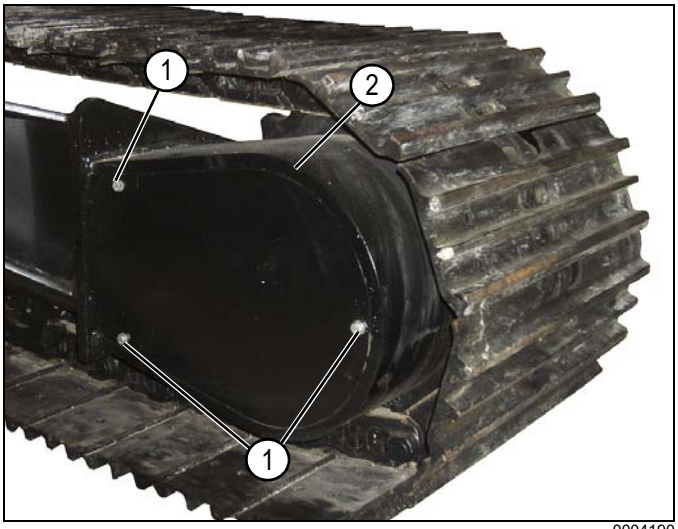
Failure to follow these precautions could result in injury.

11. Drive the machine forward at low idle speed for a distance equivalent to one full revolution of the track.
12. Park the machine.
13. Check the track tension again. Adjust if it is still out of the acceptable range.

Final Drive

Check the Final Drive Hoses

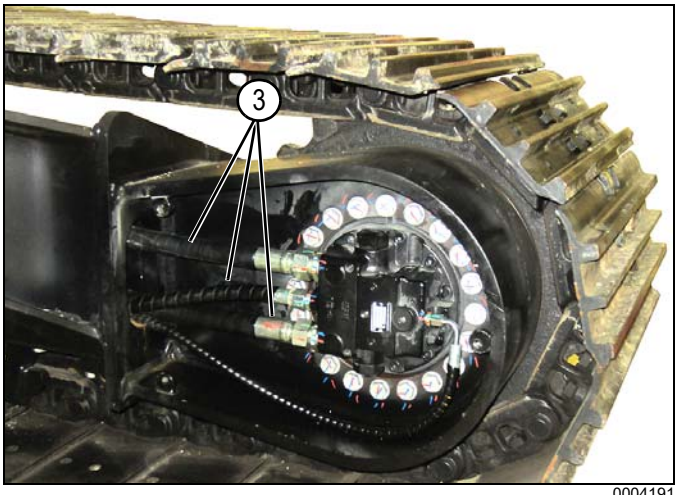
1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.



0004190

Figure 5-116

4. Remove the three fasteners (1) and remove the final drive cover (2).



0004191

Figure 5-117

5. Inspect the final drive to make sure that all hydraulic hoses (3) are properly tightened to specification.

NOTE: *Replace any damaged or missing fasteners and tighten any loose fasteners. Use anaerobic thread-lock compound when reinstalling loose fasteners and installing new fasteners.*

6. Check for leaks.

NOTE: *Contact a SANY dealer if any abnormalities are found.*

Check the Final Drive Mounting Fasteners

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

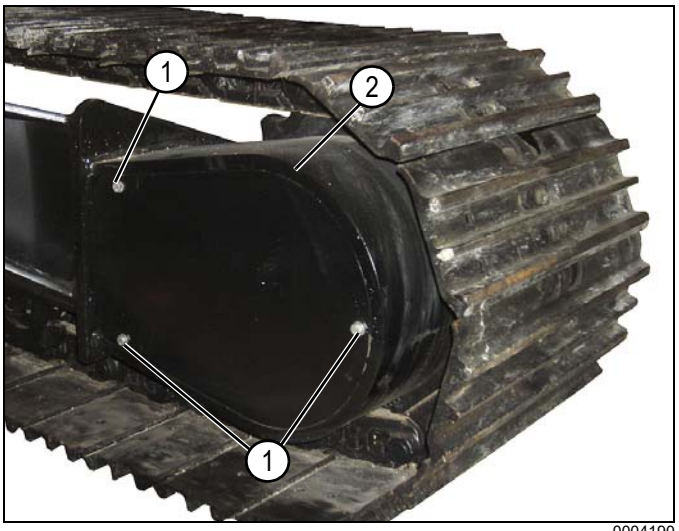


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Figure 5-118

4. Remove three fasteners (1) and remove the final drive cover (2).

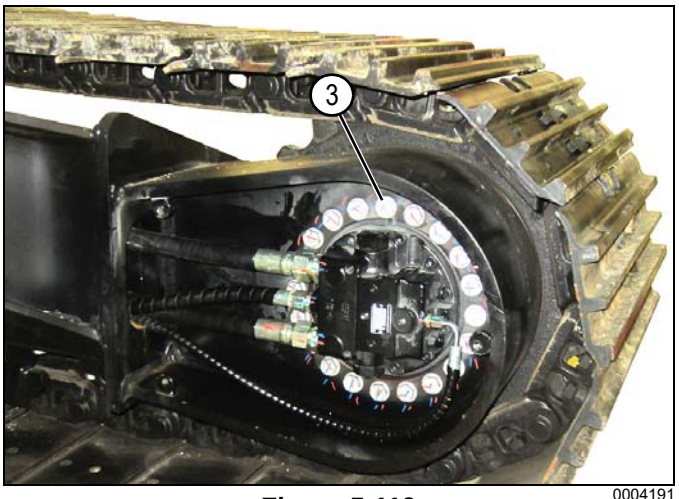

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Figure 5-119

5. Inspect all of the final drive mounting fasteners (3) for rust, damage, or looseness.

NOTE: *Use anaerobic thread-lock compound when tightening loose fasteners and installing new fasteners.*

6. Replace any damaged or defective fasteners and tighten any loose fasteners. Contact a SANY dealer if any abnormalities are found.

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.

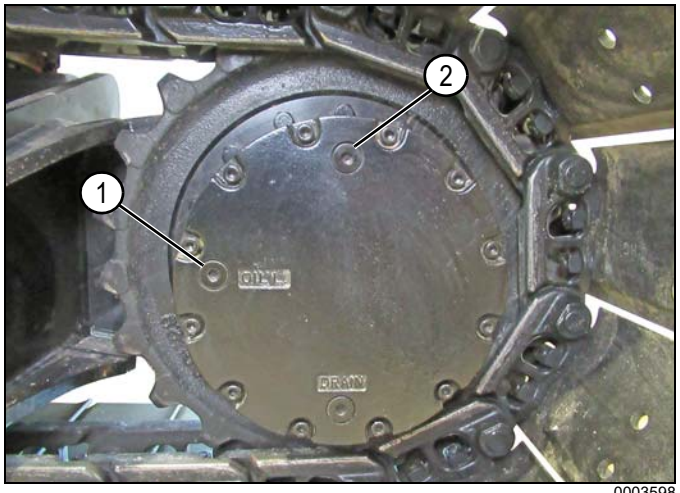

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Figure 5-120

1. Position the machine on a flat, level surface.
2. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
3. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
4. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
5. Remove the oil level check hole plug (1) and visually check if the oil level is within 0.4 in. (10 mm) of the bottom of the oil level check hole.

NOTE: *For the oil capacity of the final drive, see “Capacities” on page 5-11.*

6. If the oil level is low, add oil through the oil filler hole (2) until the level is within 0.4 in. (10 mm) of the oil level check hole.

NOTICE!

Overfilling the final drive case may damage the case seals. This could result in machine damage and improper machine operation.

7. Replace the O-ring on each plug.
8. Install and tighten the plugs.

NOTICE!

If oil leaks are found during the oil level inspection, stop the inspection to locate and repair the cause of the oil leaks. Failure to do this could result in machine damage and improper machine operation.

9. Check for external leaks.

Change Final Drive Oil

WARNING

- **Allow the hydraulic system to cool before servicing. Hot hydraulic 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 pressure to prevent injury.**

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

If the hydraulic oil is contaminated (discolored or containing debris), change the oil regardless of the service interval hours on the machine. If possible, find the cause of the contamination before changing the hydraulic oil.

1. Position the machine on a flat, level surface.
2. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
3. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
4. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
5. Collect a final drive oil sample before changing the final drive oil. See “Collect a Final Drive Oil Sample” on page 5-58.

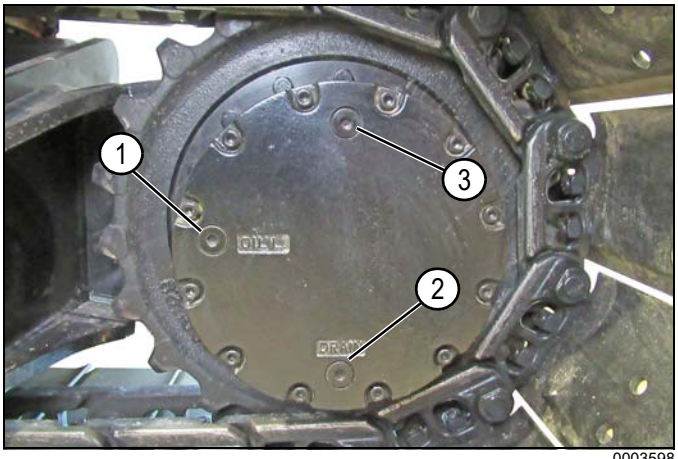

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Figure 5-121

6. Place a suitably sized container under the final drive drain plug (2).
7. Loosen the final drive drain plug slowly to relieve remaining hydraulic system pressure.
8. Remove the oil level check plug (1) and allow the oil to drain.

NOTE: *For the oil capacity of the final drive, see “Capacities” on page 5-11.*

NOTICE!

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

9. Replace the O-ring on the drain plug.
10. Install and tighten the drain plug.
11. Remove the oil filler plug (3) and add oil until the level is within 0.4 in. (10 mm) of the bottom of the check hole.

NOTICE!

Overfilling the final drive case may damage the case seals. This could result in machine damage and improper machine operation.

12. Replace the O-rings on the oil level check plug, oil filler plug and the oil level check plug.
13. Install and tighten the oil filler plug and oil level check plug.

NOTICE!

If oil leaks are found during the oil level inspection, stop the inspection to locate and repair the cause of the oil leaks. Failure to do this could result in machine damage and improper machine operation.

14. Check for external leaks.
15. Repeat this process for the other final drive.

Swing Drive

Check and Add Swing Pinion Gear Grease

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

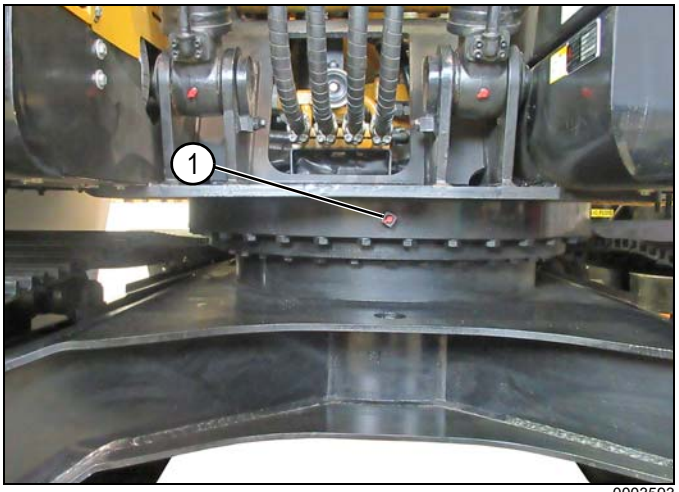

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Figure 5-122

3. Locate the swing pinion gear grease fitting (1).

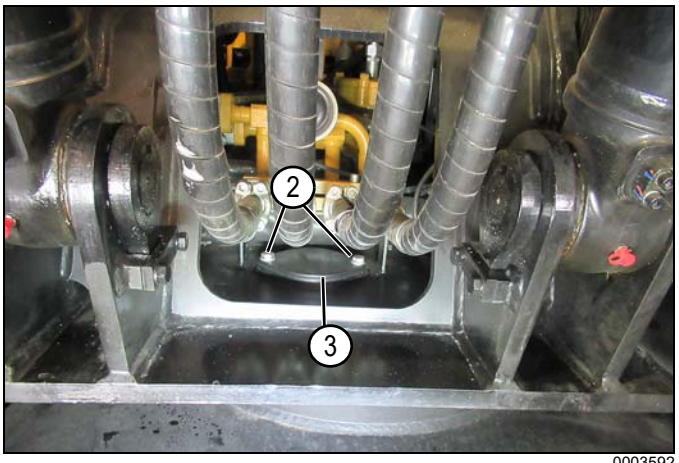

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Figure 5-123

4. Remove the two fasteners (2) and remove the cover (3) to open the inspection/filler hole.
5. Check the grease level by inserting a ruler into the grease through the inspection/filler hole. The minimum level is 3/4 in. (19 mm).
6. If the grease level is low, add grease through the inspection/filler hole as needed. See “Lubrication and Grease” on page 5-8 for additional information on grease type.
7. Check the grease color to see if it is milk white.

NOTE: *Milk white grease indicates that the grease has been contaminated. Contact a SANY dealer for information on changing the grease.*

8. Install the cover on the inspection/filler hole.

Check the Swing Drive Oil Level

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

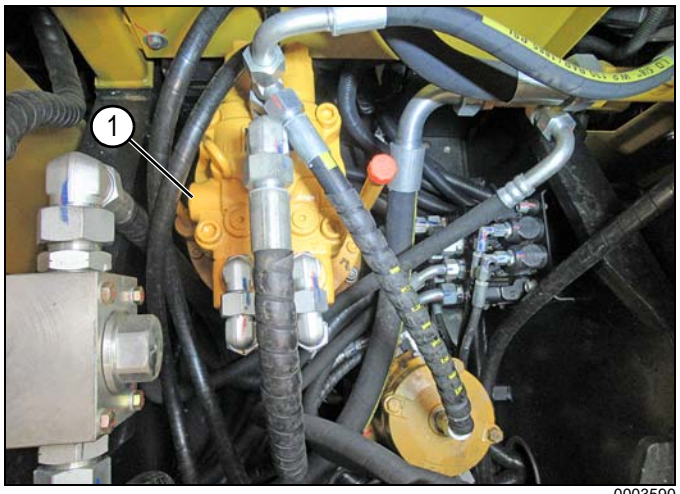

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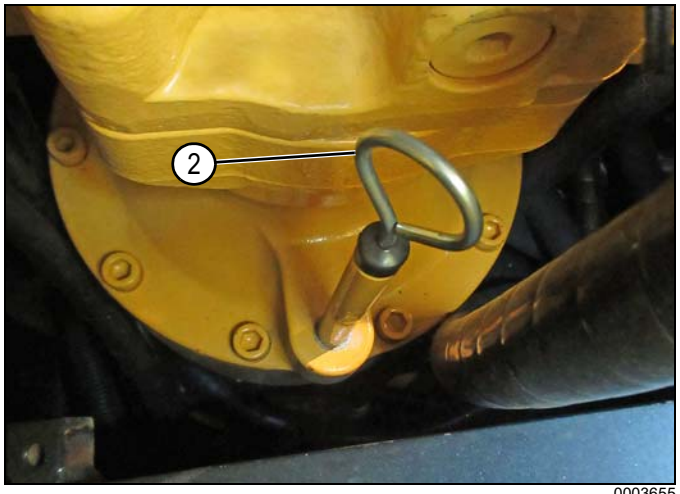
Figure 5-124

4. Inspect the swing drive (1) for leaks or damage. Contact a SANY dealer if any damage is found.



0003655

Figure 5-125

5. Remove the dipstick (2) from the swing drive.

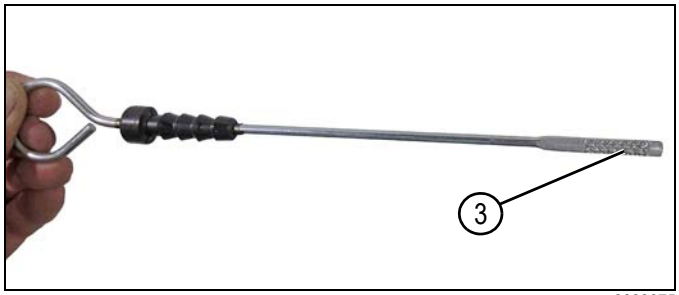


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Figure 5-126

6. The oil level should be within the etched area (3).
7. Install the dipstick.
8. If necessary, remove the oil filler cap and add oil as needed.
9. Install the cap.

Check the Swing Drive Mounting Fasteners

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

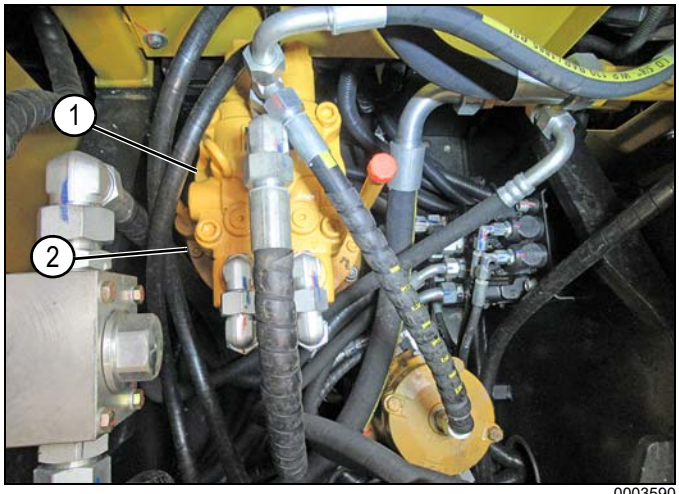

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Figure 5-127

3. Check the swing drive (1) for missing or broken mounting fasteners (2). If fasteners are missing or broken, contact a SANY dealer for repair information.
4. Tighten any loose fasteners.

Change the Swing Drive Oil

CAUTION

The engine and oil could be hot. Be sure to use personal protective equipment (PPE). Failure to follow this caution could result in injury.

1. Start the engine.
2. In an open area, rotate the upper structure 90° in both directions five times to warm the oil. In cold weather conditions below 0°F (-18°C), rotate the upper structure 90° in both directions 10 times.
3. Shut down the engine.
4. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
5. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
6. Collect a swing drive oil sample before replacing the swing drive oil. See “Collect a Swing Drive Oil Sample” on page 5-58.

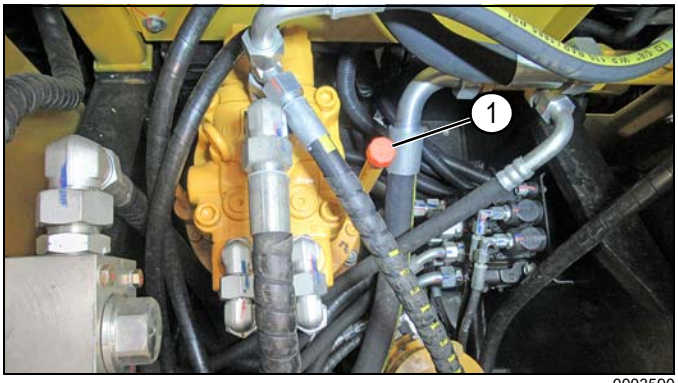

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Figure 5-128

7. Loosen the swing drive gearbox oil fill cap (1).

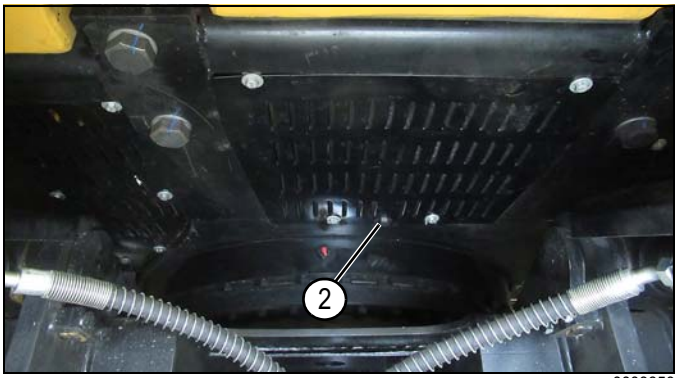

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Figure 5-129

8. Place an appropriately sized container beneath the swing drive drain plug (2) under the back of the machine. See “Capacities” on page 5-11.

NOTICE!

Dispose of oil in accordance with all applicable environmental regulations. Failure to follow this notice could damage the environment.

9. Remove the swing drive gearbox drain plug and allow all the oil to drain into the container.
10. Install the swing drive gearbox drain plug after completely drained.
11. Remove the swing drive oil fill cap.
12. Fill the swing drive with clean oil through the oil fill cap hole. See “Industrial Gear Oil/Temperature Data” on page 5-10 for oil specifications.

NOTE: *See “Capacities” on page 5-11 for proper swing drive oil capacity.*

13. Remove the swing drive gearbox oil dipstick and note the oil level.

NOTICE!

- **Do not overfill the swing drive with oil. Failure to follow this notice could result in damage to the swing drive.**
- **If oil leaks are found during the oil-level inspection, stop the inspection. Locate and repair the cause of the oil leak. Failure to do so could damage the swing drive.**

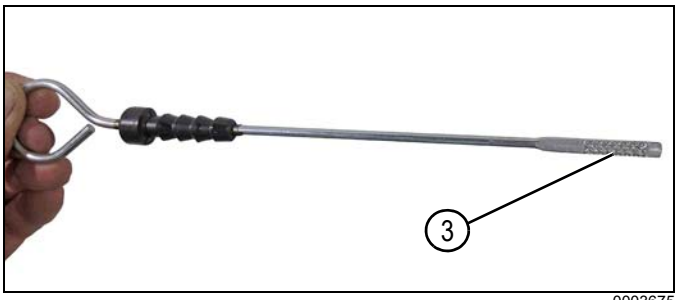

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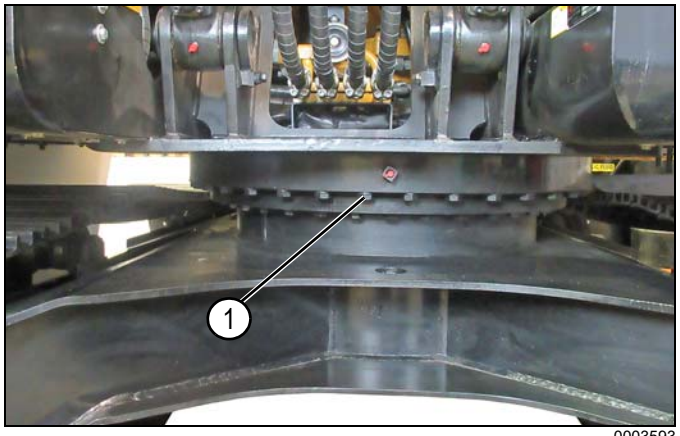
Figure 5-130

NOTE: *The oil level should be within the etched area (3). Add oil as necessary.*

14. Install and tighten the swing drive oil fill cap.

Inspect the Swing Bearing Fasteners

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.



0003593

Figure 5-131

2. Inspect the swing bearing mounting fasteners (1) for damage.
3. Start the engine, and rotate the upper structure 90° to the right (to gain access to the remaining fasteners). See “Starting the Engine” on page 4-16.
4. Shut the engine down. See “Engine Shutdown” on page 4-21.
5. Repeat steps 1 through 4 until all fasteners have been inspected. If any fasteners are missing or damaged, contact a SANY dealer.

Collect Oil Samples

1. Obtain an oil analysis sample kit from a SANY dealer.
2. Operate the machine until the lubricant is at normal operating temperature.
3. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.

NOTICE!

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

4. Send the sample for testing in accordance with the instructions packaged with the oil analysis sample kit.

Collect an Engine Oil Sample

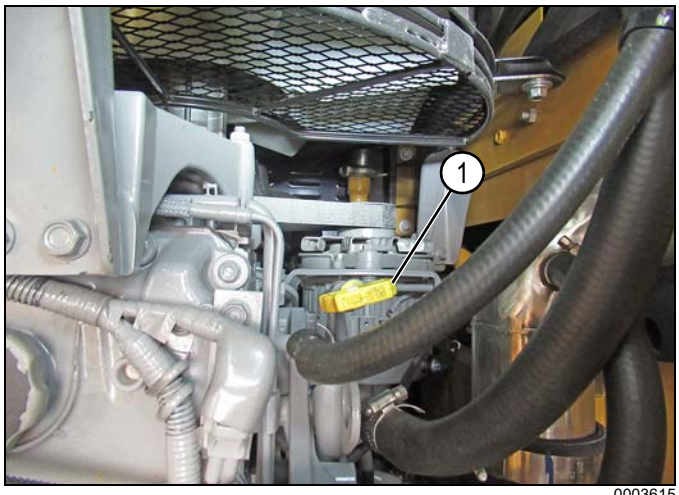
1. Obtain an oil analysis sample kit from a SANY dealer.
2. Operate the machine until the engine oil is up to normal operating temperature.
3. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.

4. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
5. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

NOTICE!

It is critical that all material used to collect the sample is absolutely clean.

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



0003615

Figure 5-132

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

Collect a Hydraulic Oil Sample

1. Obtain an oil analysis sample kit from a SANY dealer.
2. Start the engine and operate the machine for the hydraulic oil system to reach normal operating temperatures.
3. Shut down the engine.
4. Clean the top of the hydraulic tank.

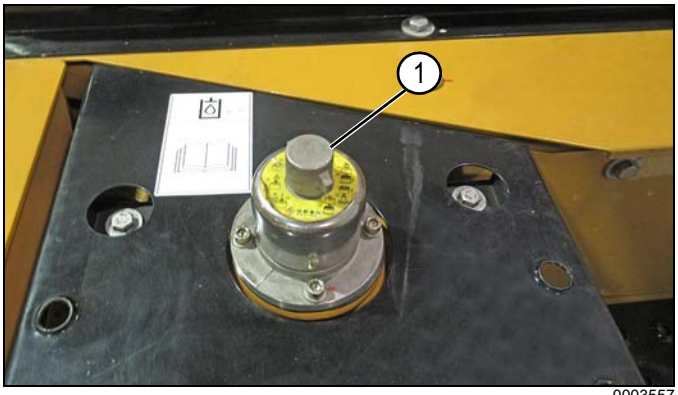


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Figure 5-133

5. Remove the vent cap (1) from the breather valve.

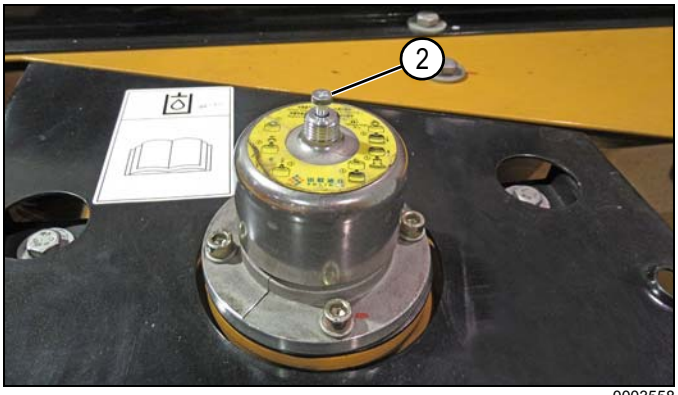

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Figure 5-134

6. Press the hydraulic tank vent button (2) to relieve pressure in the hydraulic tank.
7. Install the vent cap.

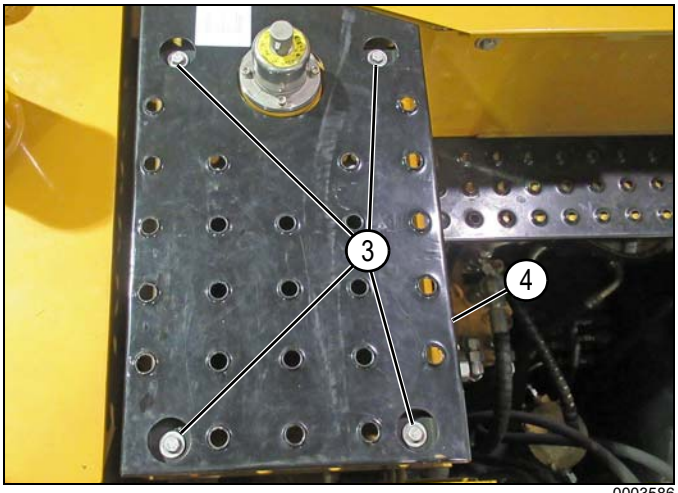

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Figure 5-135

8. Remove the four fasteners (3) and the plate (4).

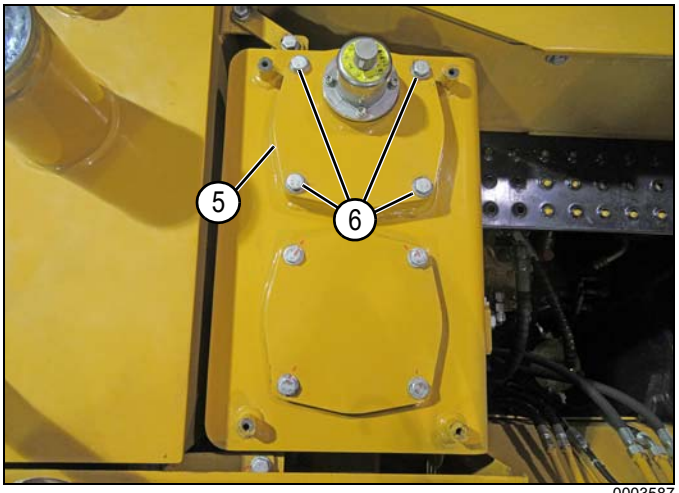

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Figure 5-136

9. Remove the four fasteners (6) and remove the hydraulic suction strainer cover (5).
10. Insert the oil sample tube into the hydraulic oil tank.
11. Collect a sample of hydraulic oil.
12. Remove the oil sample tube.
13. Install the hydraulic suction strainer cover.
14. Send the sample for testing in accordance with the instructions packaged with the oil analysis sample kit.

Collect a Final Drive Oil Sample

1. Obtain an oil analysis sample kit from a SANY dealer.
2. Start the engine and operate the machine for the system to reach normal operating temperatures.

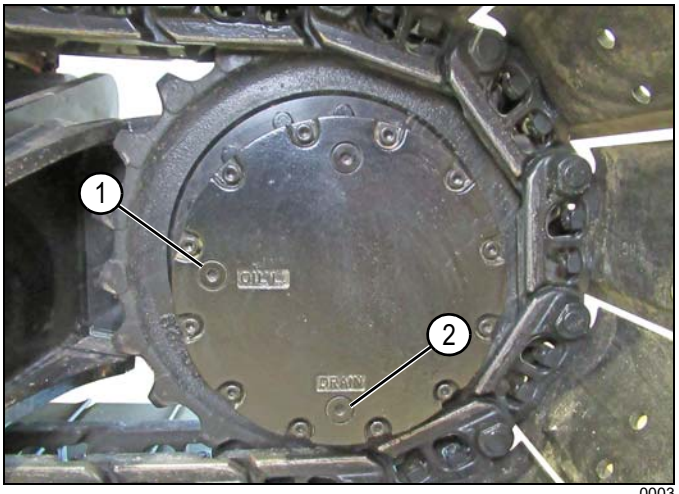

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Figure 5-137

3. Park the machine on a flat, level surface, placing the oil drain plug (2) on the final drive cover at the bottom.
4. Remove any dirt from around the check plug (1).
5. Slowly loosen the check plug to relieve pressure within the final drive.
6. Remove the check plug.
7. Insert the oil sample tube into the check plug hole.
8. Collect a sample of oil from the final drive.
9. Remove the oil sample tube.
10. Install the check plug.

NOTE: *Repeat preceding steps for the other final drive as needed.*

11. Send the sample for testing in accordance with the instructions packaged with the oil analysis sample kit.

Collect a Swing Drive Oil Sample

1. Obtain an oil analysis sample kit from a SANY dealer.
2. Start the engine and operate the machine for the system to reach normal operating temperatures.
3. Shut down the machine.
4. Clean around the dipstick (1) to prevent contamination of the sample.

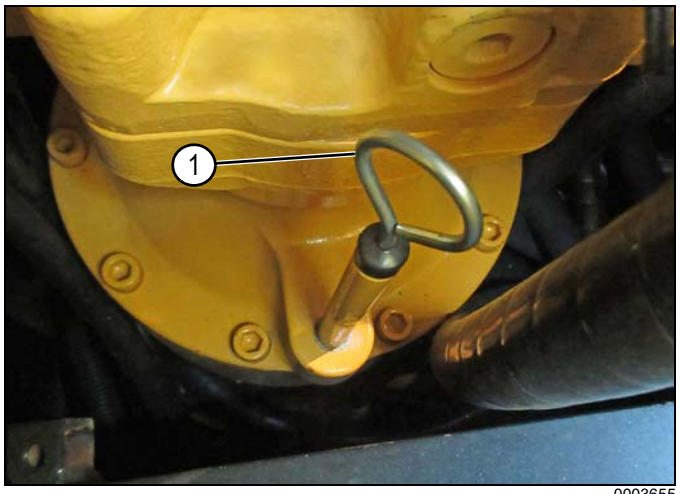

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Figure 5-138

5. Remove the dipstick from the swing drive.
6. Insert the oil sample tube into the dipstick tube.
7. Collect a sample of swing drive oil.
8. Remove the oil sample tube.
9. Install the swing drive dipstick.
10. Send the sample for testing in accordance with the instructions packaged with the oil analysis sample kit.

Lubrication

Lubrication Points

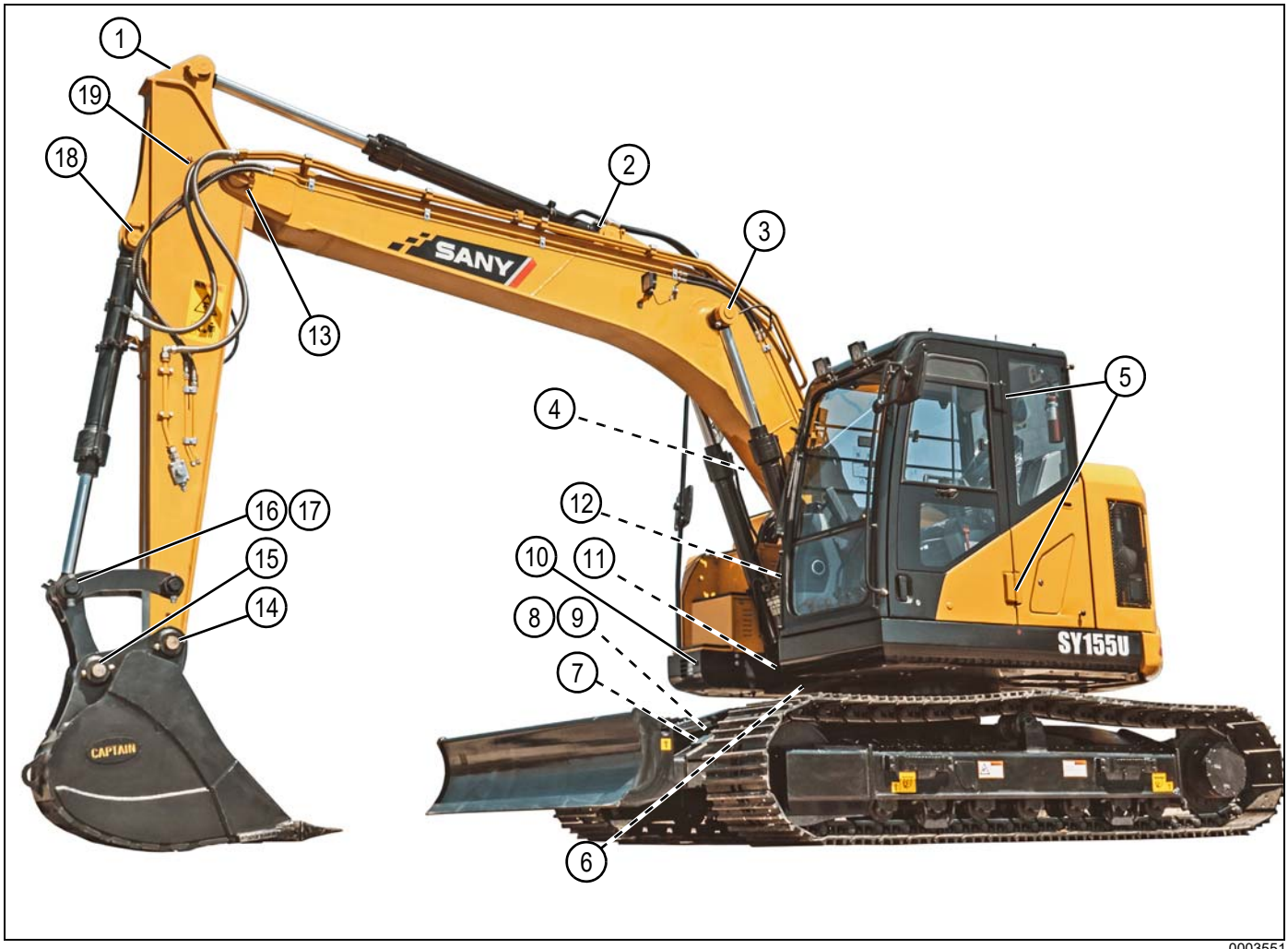

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Figure 5-139

1 Arm cylinder rod end
2 *Arm cylinder base end
3 *Boom cylinder rod end (2)
4 Grease manifold
5 Door hinges
6 Swivel bearing (2)
7 Dozer blade cylinder base end (2)
8 Dozer blade boom cylinder rod end (2)
9 Dozer linkage pivot pin (2)
10 Swing gear
11 Boom cylinder base end
12 *Boom pivot pin (2)
13 Boom to arm pin (2)
14 Arm to bucket pivot pin
15 Bucket to bucket linkage pin
16 Bucket cylinder rod end
17 Bucket linkage to bucket cylinder rod end pin
18 Bucket cylinder base end
19 Boom to arm pivot pin

* These items are lubricated through the grease manifold (4).

NOTE: *See “Lubricating Grease/Temperature Data” on page 5-9 for the correct type of grease.*

Safety When Lubricating

Before lubricating any grease fittings:

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

Boom Cylinder Base Ends and Swing Bearing Fitting

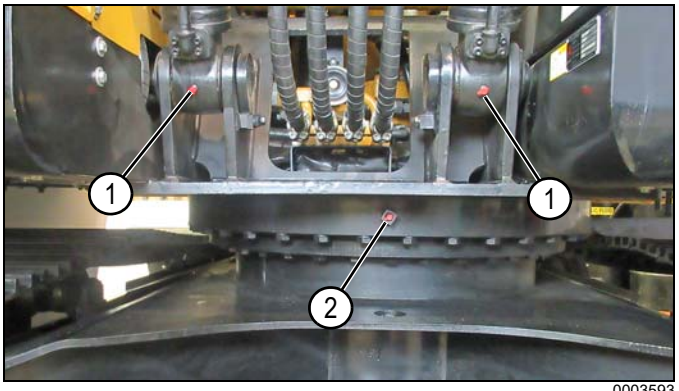

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Figure 5-140

1. Grease the two boom cylinder base end grease fittings (1).
2. Grease the swing bearing fitting (2).

NOTE: *There are two swing bearing grease fittings (front and back).*

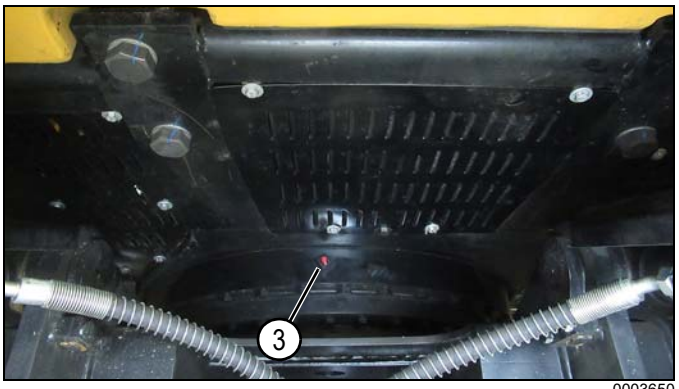

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Figure 5-141

3. Apply grease to the swing bearing fitting (3) on the opposite side.
4. Check the seal condition. If it leaks, replace the seal immediately. Contact a SANY dealer.
5. Start the engine.
6. Lift the arm off the ground.
7. Rotate the upper structure 90° and repeat steps 1 and 2.
8. Repeat until a full 360° rotation has been made.
9. Shut down the engine.

Swing Gear

0003572

Figure 5-142

Grease the swing gear through grease fitting (1).

Boom Manifold

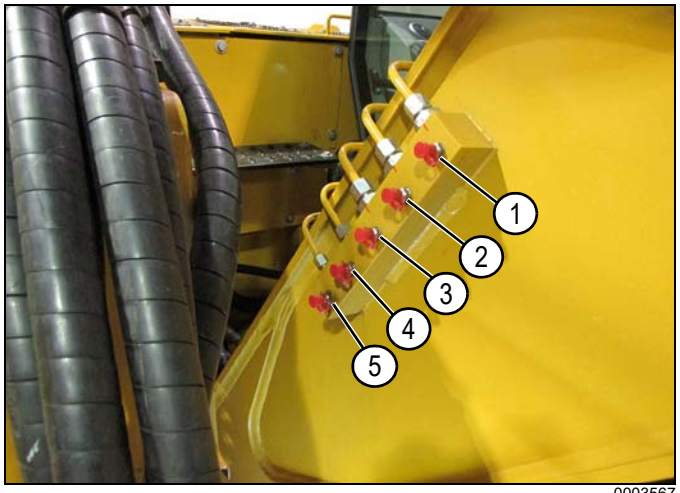

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Figure 5-143

At the grease manifold for the boom, grease the fittings for:

- Right-side boom cylinder rod end (1).
- Boom arm cylinder base end (2).
- Left-side boom cylinder rod end (3).
- Left-side boom pivot pin (4).
- Right-side boom pivot pin (5).

Bucket Arm

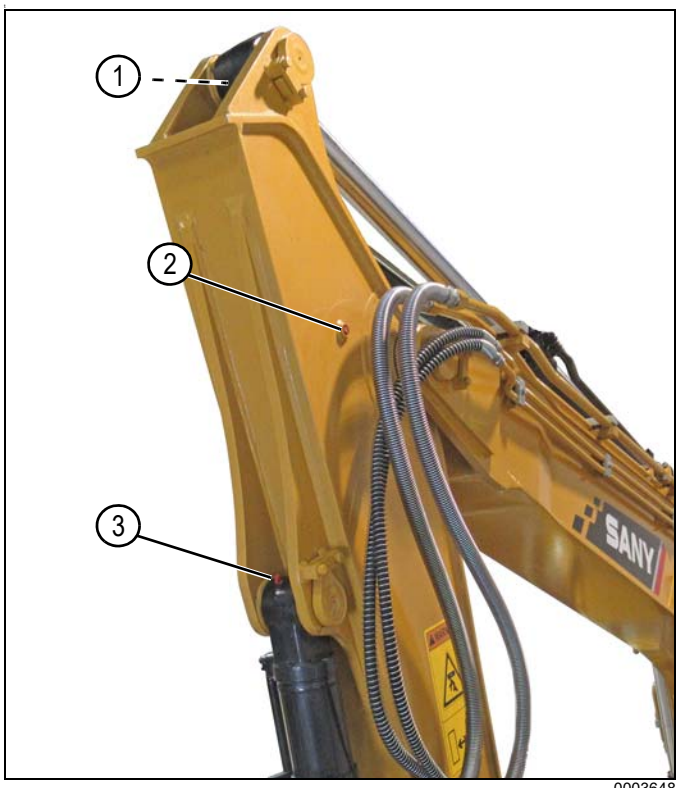

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Figure 5-144

1. Grease the arm cylinder rod end grease fitting (3).
2. Grease the boom to arm pivot pin grease fitting (2).
3. Grease the bucket cylinder base end grease fitting (1).

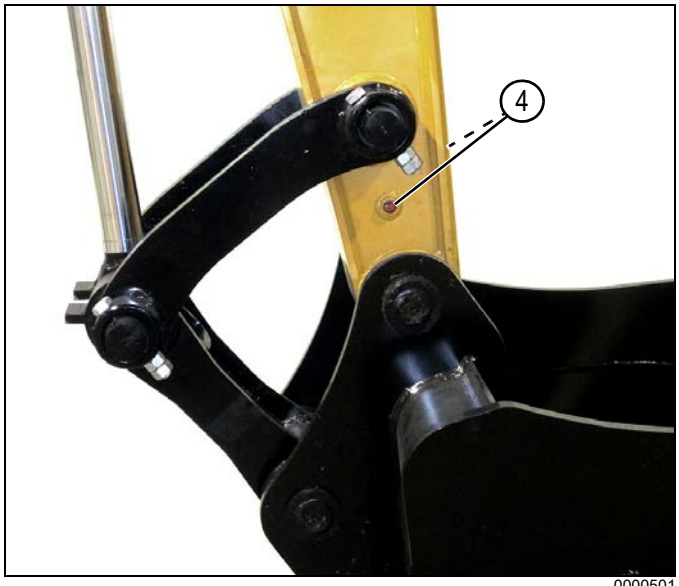

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Figure 5-145

4. Grease the two arm to bucket pivot grease fittings (4).

Bucket

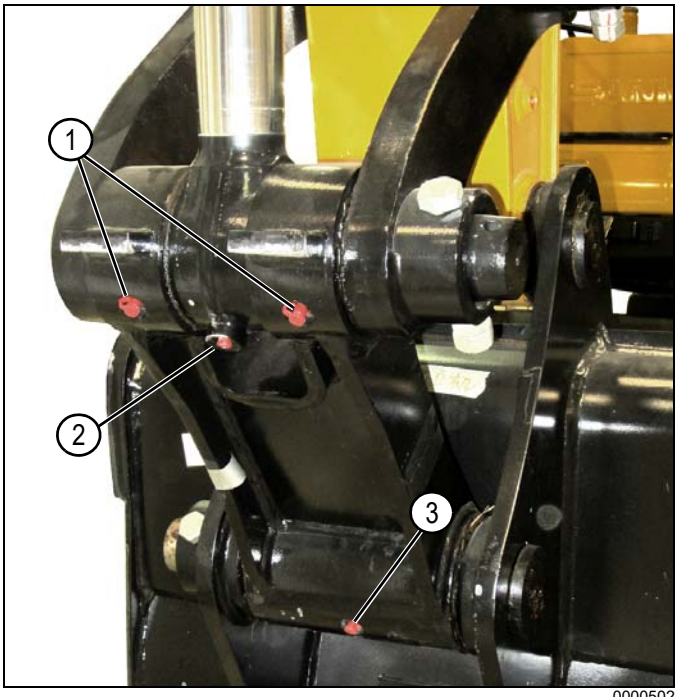

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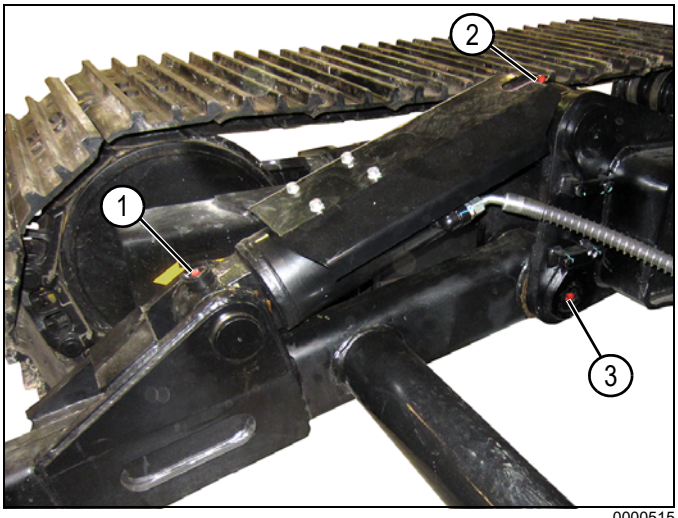
Figure 5-146

1. Grease the bucket rod pin grease fittings (1).
2. Grease the bucket cylinder rod end grease fitting (2).
3. Grease the bucket to bucket linkage pin grease fitting (3).

Dozer Blade Cylinder Ends and Pivot Pins



0000515

Figure 5-147

1. Grease the dozer blade cylinder rod end (1) and base end (2) grease fittings.
2. Grease the dozer linkage pivot pin grease fittings (3).

Lubricate the Cab Door Hinges and Front Window Slide Rail

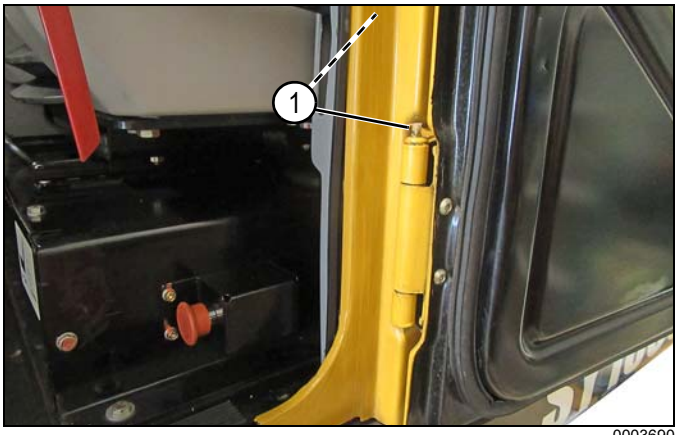


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Figure 5-148

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Grease the two cab door hinges (1) until grease comes out of the hinge.
5. Wipe off excess grease.

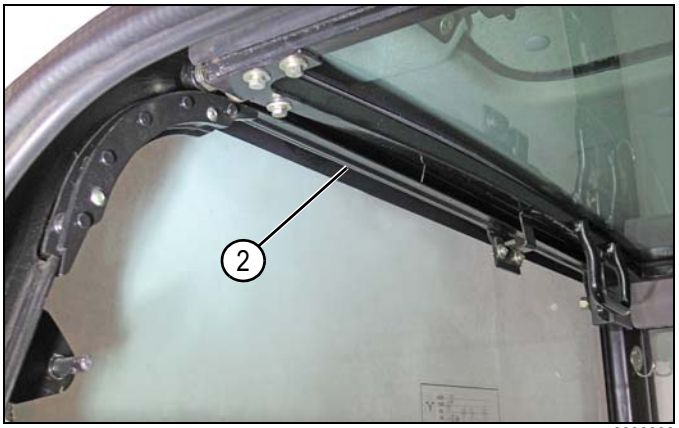

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Figure 5-149

6. Apply a lubricating silicone to the slide rails (2) on both sides of the cab door ceiling.

Cab

Check the Grab Handles and Steps

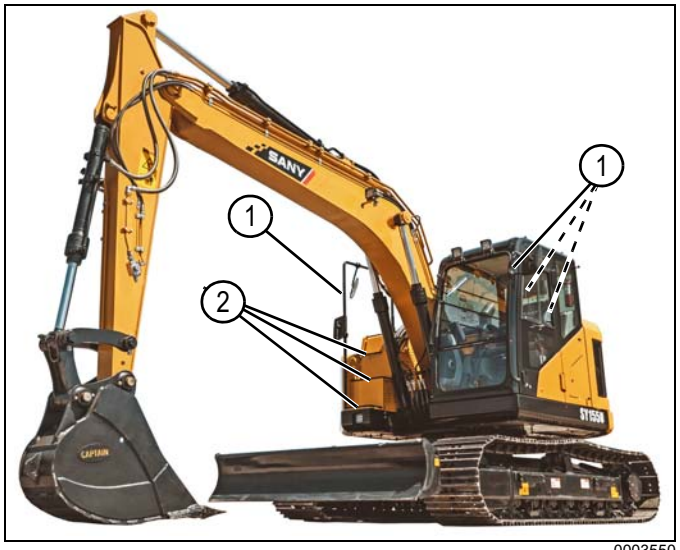

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Figure 5-150

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Check the mounting fasteners on the grab handles (1).
3. Replace any missing or damaged mounting fasteners and tighten any loose fasteners.
4. Remove any tools, lubricants, or debris from the steps (2). Never allow loose items to remain on the machine.

Check the Cab Door, Access Doors, Covers, and Locks

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Inspect the cab door (1), access doors (3), and their locks to be sure they close and lock properly.

NOTE: *Properly operating doors and access panels are important for the security of the machine.*

5. Repair or replace any damaged doors, access panels, or locks immediately.

Inspect Windshield Wiper and Washer Nozzle

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Check the washer fluid level inside the windshield washer reservoir. See “Check Windshield Washer Fluid” on page 5-18.

NOTICE!

Do not operate the wiper on a dry window. Doing so could result in machine damage and improper machine operation.

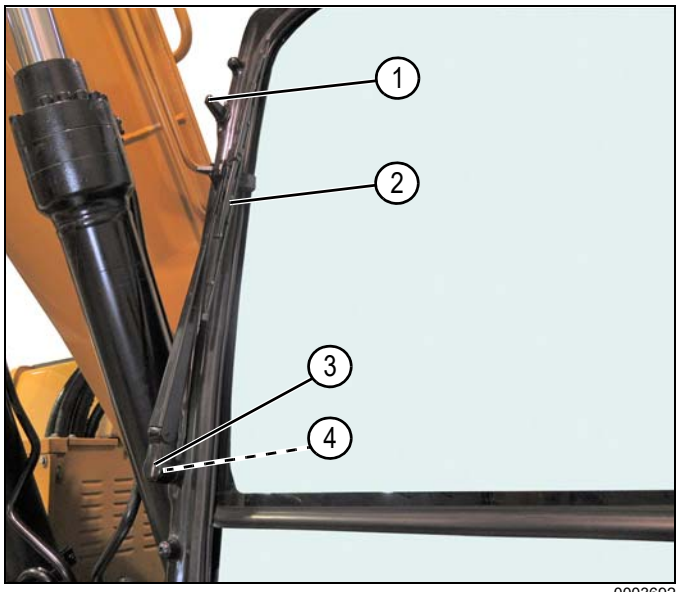

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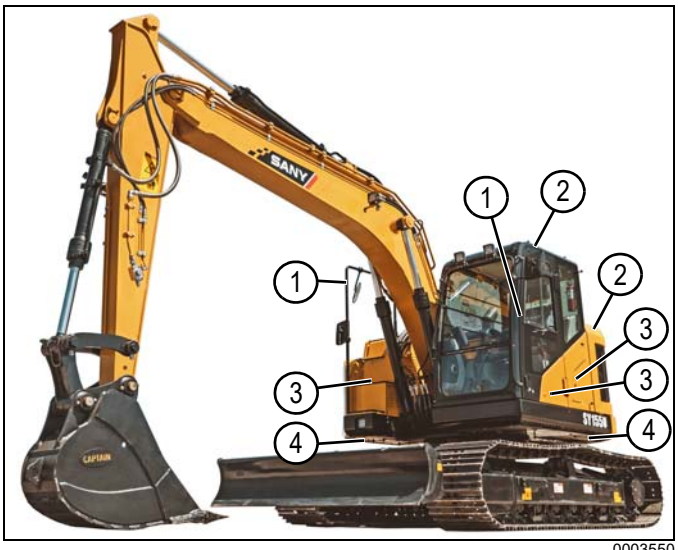
Figure 5-151

3. Check the operation of the windshield washer nozzle (1) and wiper (2) to make sure there is no smearing across the windshield during operation. Replace the wiper blade if smearing occurs.
4. If necessary, adjust the spray nozzle to make sure the fluid spray is properly directed.
5. Lift the cover (3) and make sure the wiper arm nut (4) is tight. If the wiper arm nut is loose, tighten it to 26 lb-ft–33 lb-ft (35 N•m–40 N•m).

Check Locks, Doors, and Metal Panels

Check the Sheet Metal



0003550

Figure 5-152

1. Prepare the machine for checks and inspections. See “Maintenance Safety” on page 2-5.
2. Open the appropriate access covers or compartment doors. See “Doors, Panels, Covers, and Filler Cap” on page 4-5.
3. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.
4. Check grab handles (1) and doors (3) for damage or loose fasteners. Tighten fasteners or replace parts as needed.
5. Check for missing or damaged sheet metal panels (2) and belly plate covers (4), and for loose connections or missing fasteners. Replace panels or fasteners as needed.

Check the Upper Structure and Undercarriage

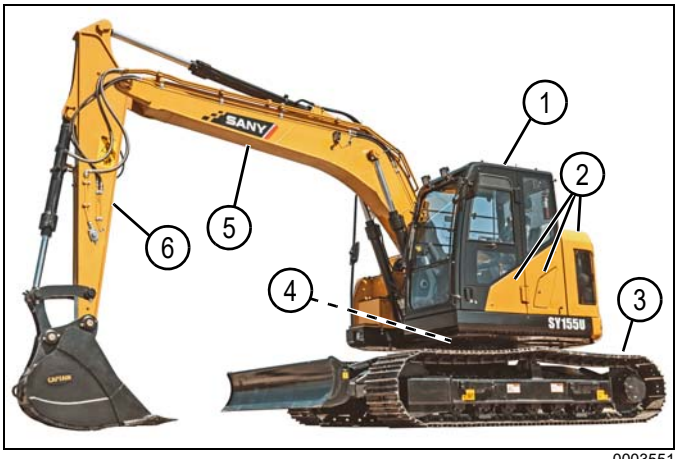


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Figure 5-153

1	Cab	4	Swing turntable
2	Covers and doors	5	Boom
3	Track	6	Arm

The machine consists of two major component groups:

- The undercarriage with its various components and assemblies.
- The upper structure with its various components and assemblies.

Check all identified structural components for cracks or distortion. Notify a SANY dealer if any cracks or distortion are found.

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 checks and inspections. See “Maintenance Safety” on page 2-5.
2. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-15.

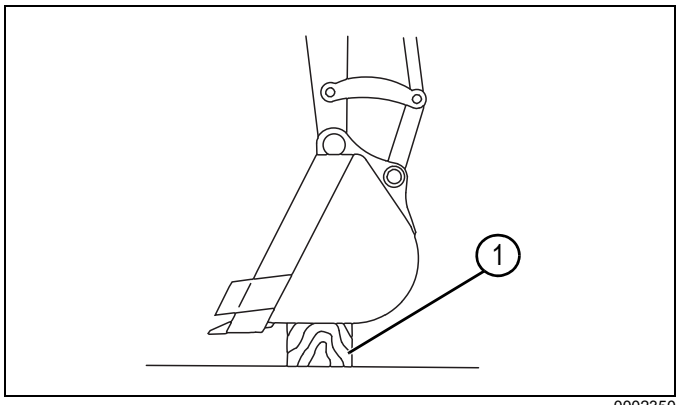

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Figure 5-154

3. Select a stable work surface. Move the hydraulic controls to the neutral position. Keep the bottom of the bucket level on a wooden block (1).

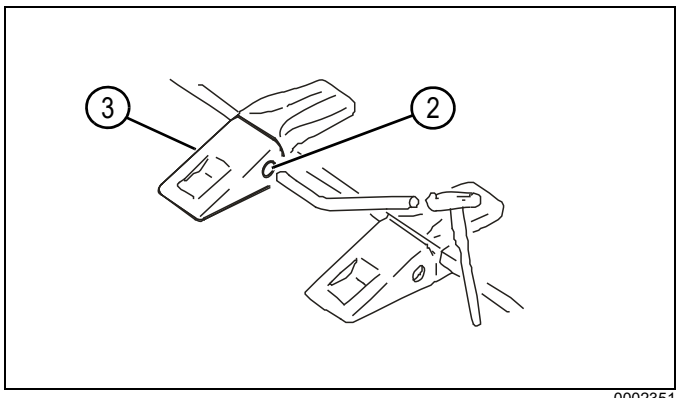

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Figure 5-155

4. Remove the roll pins (2) and worn bucket teeth (3).

NOTE: *New bucket teeth and roll pins must be installed in the reverse order of removal.*

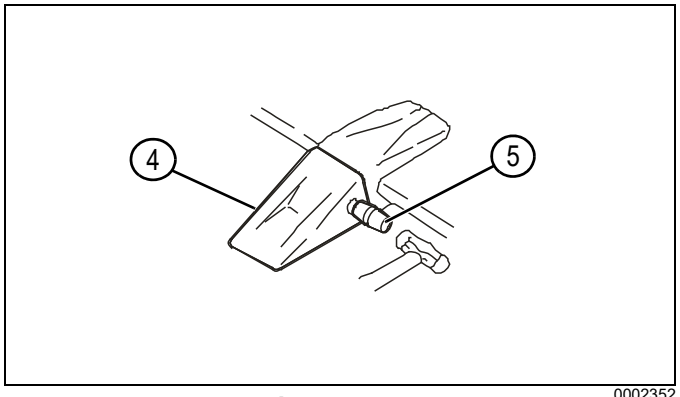

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Figure 5-156

5. Install new bucket teeth (4) and roll pins (5) in the reverse order of removal.

Check the Operation and Maintenance Manual

Make sure the Operation and Maintenance Manual is always stored in the cab. If the Operation and Maintenance Manual is damaged or missing, contact a SANY dealer for a replacement.

NOTICE!

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

Always inspect drained engine and hydraulic oil along with the used filter for metal particles and impurities. A small amount of metal particles may be expected with normal wear. A sample of the drained oil should be sent out for testing to verify.

An excessive amount of metal particles or large debris may be an indication of internal damage to the system, consult your SANY dealer before operating the machine.

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Chapter 6

Specifications

Machine Dimensions

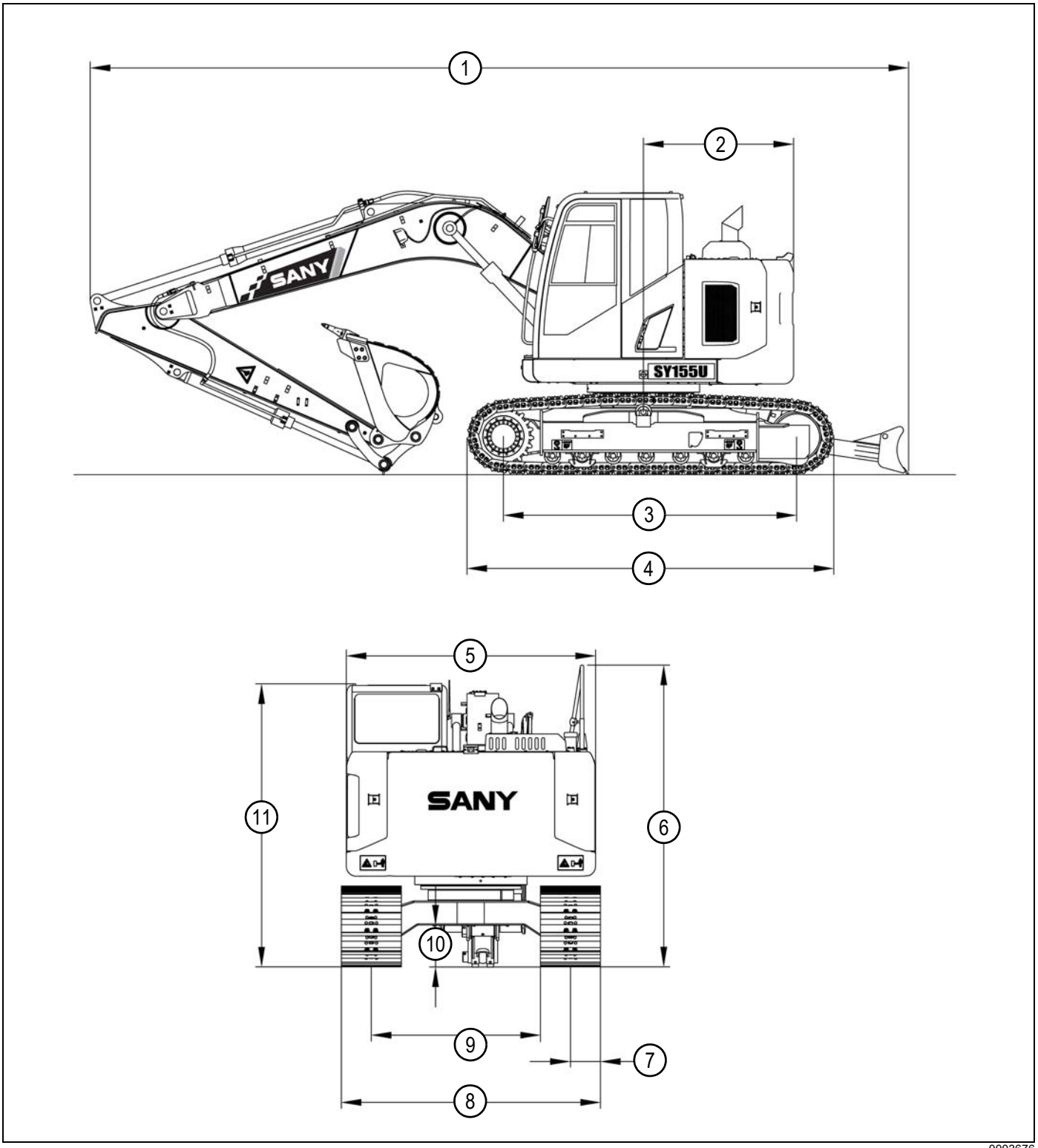

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Figure 6-1

Item	Description	Dimensions
1	Transport length	26 ft. 9 in. (8.178 m)
2	Tail swing radius	4 ft. 11 in. (1.5 m)
3	Center idler to center sprocket length	9 ft. 7 in. (2.93 m)
4	Track length	12 ft. (3.665 m)
5	Upper structure width	8 ft. 2 in. (2.49 m)
6	Transport height	9 ft. 9 in. (3.022 m)
7	Track shoe width (standard)	2 ft. (0.6 m)
8	Transport width	8 ft. 6 in. (2.59 m)
9	Track gauge	6 ft. 6 in. (1.99 m)
10	Minimum ground clearance	1 ft. 5 in. (0.425 m)
11	Cab height	9 ft. 3 in. (2.82 m)
	Boom length	15 ft. 1 in. (4.6 m)
	Arm length	8 ft. 2 in. (2.5 m)

Working Range

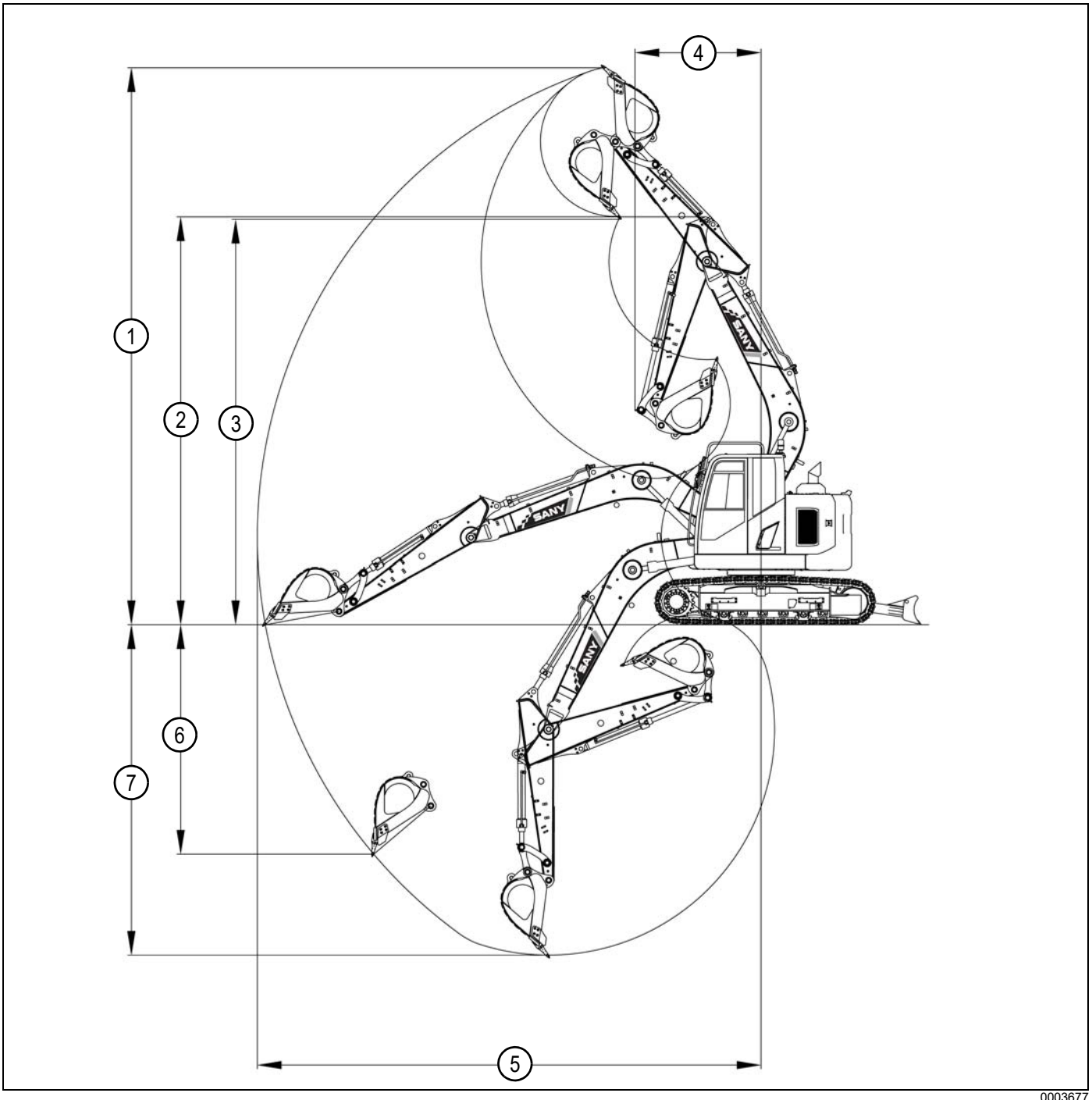

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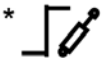
Figure 6-2

Item	Description	Dimensions
1	Maximum cutting height	30 ft. 3 in. (9.218 m)
2	Maximum height at minimum swing radius	22 ft. 1.7 in. (6.749 m)
3	Maximum dumping height	22 ft. 1 in. (6.755 m)
4	Minimum swing radius	6 ft. 10.1 in. (2.086 m)
5	Maximum digging reach	27 ft. 4.2 in. (8.338 m)
6	Maximum vertical wall digging depth	12 ft. 9 in. (3.888 m)
7	Maximum digging depth	17 ft. 11 in. (5.469 m)
	Maximum dozer raising height	1 ft. 7.8 in. (504 mm)
	Maximum dozer lowering depth	1 ft. 1.8 in. (350 mm)

Technical Specifications

Item	Specifications
Overall weight	35,384 lb. (16034 kg)
Standard bucket capacity	21.19 $ft.^3$ (0.6 m^3)
Blade width and height	102 in. x 18.89 in. (2590 mm x 480 mm)
Travel speed (high/low)	High speed 3.3 mph (5.3 km/h)/slow speed 1.9 mph (3.1 km/h)
Grade ability	35°
Swing speed	20.5–26.5 seconds
Engine model	ISUZU AR-4JJ1XASC
Rated power (kW/rpm)	105.2 hp (78.5 kW) at 2000 rpm

Lift Chart



[m] / [ft]	MAX		2.0 6.6		3.0 9.8		4.0 13.1		5.0 16.4		6.0 19.7		7.0 23.0	
7.0 23.0	*2536 *5591	*2536 5591					*3353 *7392	*3353 *7392						
6.0 19.7	*2216 *4885	*2216 4885					*4053 *8935	3630 8002	*3310 *7297	2685 5919				
5.0 16.4	*2073 *4570	1993 4394					*4203 *9266	3592 7919	*3944 *8695	2683 5915	*2590 *5710	2060 4541		
4.0 13.1	*2016 *4445	1762 3885			*4736 *10441	*4736 *10441	*4643 *10236	3485 7683	*4146 *9140	2626 5789	*3822 *8426	2046 4510		
3.0 9.8	*2019 *4451	1624 3580			*6858 *15119	4604 10150	*5314 *11715	3323 7325	*4484 *9885	2536 5590	*3967 *8746	1999 4407		
2.0 6.6	*2073 *4570	1547 3411			*8370 *18453	4235 9336	*6031 *13296	3138 6918	*4855 *10703	2430 5357	*4144 *9136	1939 4274	*2549 *5620	1572 3465
1.0 3.3	*2183 *4813	1519 3349			*6651 *14663	3976 8765	*6547 *14434	2978 6565	*5144 *11341	2332 5141	*4278 *9431	1880 4144	*2748 *6058	1543 3401
0 0	*2366 *5216	1538 3391			*6813 *15020	3865 8520	*6703 *14778	2874 6336	*5253 *11581	2258 4978	*4293 *9464	1833 4041		
-1.0 -3.3	*2659 *5862	1611 3551	*4686 *10331	*4686 *10331	*8485 *18706	3836 8456	*6484 *14295	2823 6223	*5115 *11277	2216 4885	*4163 *9178	1852 4082		
-2.0 -6.6	*3151 *6947	1762 3885	*7212 *15900	5993 13212	*7511 *16559	3851 8490	*5892 *12990	2817 6210	*4659 *10271	2207 4865	*3559 *7846	1811 3992		[kg]
-3.0 -9.8	*3048 *6720	2049 4517	*7480 *16491	6083 13411	*6070 *13382	3906 8611	*4842 *10675	2851 6285	*3697 *8150	2241 4940				
-4.0 -13.1	*2372 *5229	*2372 *5229			*3876 *8545	*3876 *8545	*2956 *6517	2945 6492						[lb]

[m] / [ft]	MAX		2.0 6.6		3.0 9.8		4.0 13.1		5.0 16.4		6.0 19.7		7.0 23.0	
7.0 23.0	*2536 *5591	*2536 *5591					*3353 *7392	*3353 *7392						
6.0 19.7	*2216 *4885	*2216 *4885					*4053 *8935	3630 8003	*3310 *7297	2685 5919				
5.0 16.4	*2073 *4570	1993 4394					*4203 *9266	3592 7919	3589 7912	2683 5915	*2590 *5710	2060 4541		
4.0 13.1	*2016 *4445	1762 3885			*4736 *10441	*4736 *10441	4618 10180	3485 7683	3532 7787	2626 5789	2801 6175	2046 4511		
3.0 9.8	*2019 *4451	1624 3580			6114 13479	4604 10150	4455 9821	3323 7326	3442 7588	2536 5591	2754 6072	1999 4407		
2.0 6.6	*2073 *4570	1547 3411			5745 12666	4235 9337	4270 9414	3138 6918	3336 7355	2430 5357	2694 5939	1939 4275	2220 4894	1572 3466
1.0 3.3	2159 4760	1519 3349			5485 12092	3976 8766	4110 9061	2978 6565	3238 7139	2332 5141	2635 5809	1880 4145	2190 4828	1543 3402
0 0	2190 4828	1538 3391			5375 11850	3865 8521	4006 8832	2874 6336	3164 6975	2258 4978	2588 5706	1833 4041		
-1.0 -3.3	2293 5055	1611 3552	*4868 *10732	*4686 *10331	5346 11786	3836 8457	3956 8721	2823 6224	3122 6883	2216 4885	2607 5747	1852 4083		
-2.0 -6.6	2496 5503	1762 3885	*7212 *15900	5993 13212	5361 11819	3851 8490	3949 8706	2817 6210	3113 6863	2207 4866	2566 5657	1811 3993		[kg]
-3.0 -9.8	2878 6345	2049 4517	*7480 *16491	6083 13411	5416 11940	3906 8611	3984 8783	2851 6285	3147 6938	2241 4941				
-4.0 -13.1	*2372 *5229	*2372 *5229			*3876 *8545	*3876 *8545	*2956 *6517	2945 6492						[lb]

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Figure 6-3

Lift Chart (Continued)

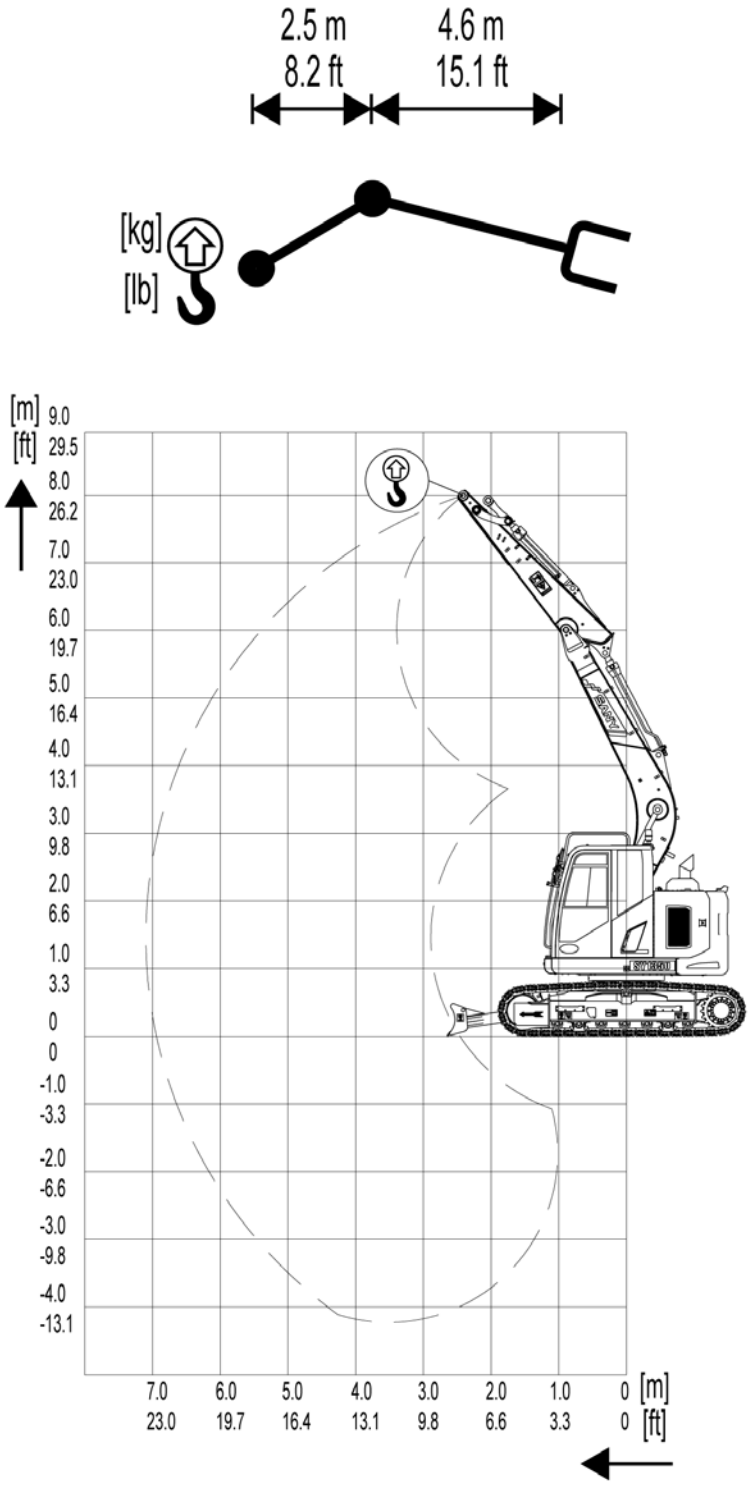

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Figure 6-4

NOTES:

- *Lift capacities marked with an asterisk (*) do not exceed 75% of minimum tipping loads or 87% of hydraulic capacities.*
- *Do not attempt to lift or hold any load that is greater than these rated values at their specified lift-point radius and height.*
- *The lift point is located at the arm lifting eye without bucket.*
- *The weight of slings and any auxiliary lifting devices shall be deducted from the rated load to determine the net load that may be lifted.*
- *Lift capacities are based on the machine standing on a firm, uniform supporting surface. The user shall make allowances for job conditions such as soft or uneven ground.*
- *The operator should be fully acquainted with the operator's manual and the operating safety manual furnished by the manufacturer before operating the machine.*
- *The least stable position is over the side.*
- *Lift capacities apply only to the machine as originally manufactured and normally equipped by the manufacturer.*
- *The total weight of the machine is 35,348 lb. (16034 kg). Included in this weight are 600 mm triple grouser shoes, 15.09 ft. (4.6 m) boom, 8.2 ft. (2.5 m) arm, 8377.5 lb. (3800 kg) counterweight, all operating fluids and a 165.3 lb. (75 kg) operator.*
- *Lift capacities are in compliance with ISO 10567:2007*

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Chapter 7

Optional Equipment

Optional Equipment Selection

Consult a SANY dealer before installing any optional equipment on the machine.

Only install SANY-approved optional equipment. SANY assumes no responsibility for accidents, loss, or failures caused by 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 hydraulic flow and pressure of the optional equipment.

If the optional equipment manual is missing or damaged, contact the manufacturer of the optional equipment to obtain a replacement.

Removal and Installation Precautions

NOTICE!

The following precautions must be strictly observed when selecting, installing, and operating optional equipment. Failure to follow this notice can result in poor performance or damage to the machine.

- Follow the instructions in this manual and in the optional equipment manual.
- Remove and install optional equipment only on a firm, level surface.
- Use an appropriate lifting device when handling objects weighing more than 55 lb. (25 kg).
- Never stand under a suspended load.
- Make sure the machine is well-balanced and supported whenever installing or removing optional equipment.

For additional information on removing and installing optional equipment, consult a SANY dealer.

Operation Precautions

NOTICE!

The following precautions must be strictly observed when selecting, installing, and operating optional equipment. Failure to follow this notice can result in poor performance or damage to the machine.

- Prior to operation, move the machine to a safe area and test its operation.
- Be aware of how the machine will move with optional equipment installed, 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.
- To prevent the machine from tipping over, never swing, lower, or stop the machine suddenly.
- 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 extremely 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 the machine for service. See “Maintenance Safety” on page 2-5.
2. Relieve system pressure. See “Relieve Hydraulic System Pressure” on page 5-39.

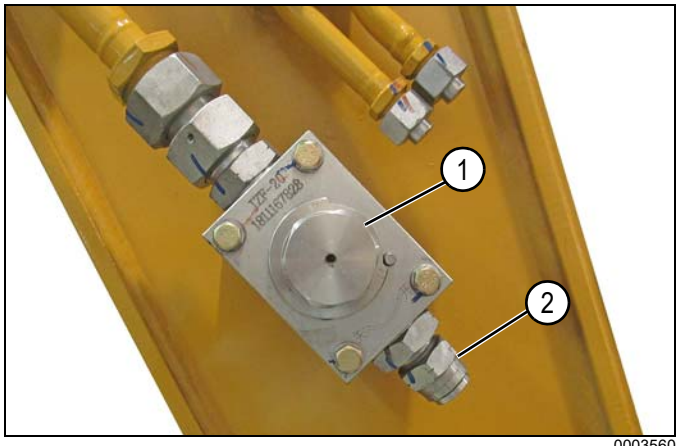

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Figure 7-1

NOTE: *The stop valves are located on each side of the arm, if equipped.*

3. Turn both stop valves (1) to the closed position as shown in the illustration.

NOTICE!

Dispose of hydraulic oil in accordance with local environmental regulations. Failure to do so could damage the environment.

4. Place an appropriately sized container under the hydraulic connection to catch any residual hydraulic oil.
5. Remove the fitting plug (2), if installed.
6. Connect the optional equipment to the machine in accordance with the manufacturer’s instructions.
7. Connect the optional equipment hydraulic lines and bleed the hydraulic system in accordance with the manufacturer’s instructions.
8. Turn both stop valves to the open position.

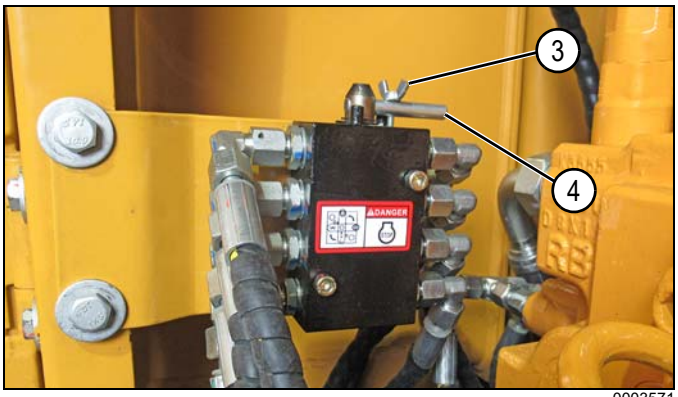

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Figure 7-2

9. Loosen the wing fastener (3) until the valve handle (4) can be moved.
10. Turn the pattern change (SAE/BHL) valve handle to the proper position. See “Pattern Change (SAE/BHL) Valve Operation” on page 4-24.
11. Tighten the wing fastener in the new position.
12. Set the monitor to the correct work mode. See “Work Mode Switch” on page 3-13.
13. Set the monitor to the correct work accessory. See “Work Accessory Selection” on page 3-28.
14. Check the hydraulic oil level. See “Check the Hydraulic Oil Level” on page 5-17.

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 extremely 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 the machine for service. See “Maintenance Safety” on page 2-5.
2. Relieve system pressure. See “Relieve Hydraulic System Pressure” on page 5-39.

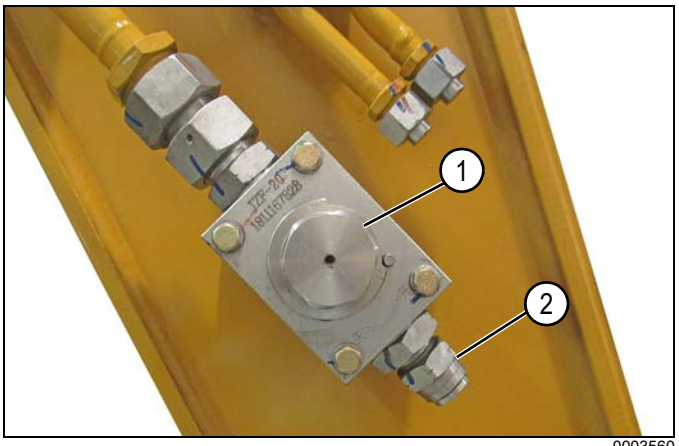

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Figure 7-3

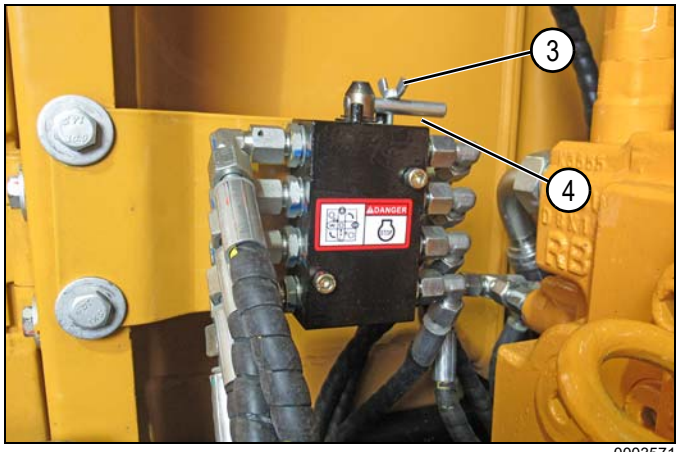
NOTE: *The stop valves are located on each side of the arm, if equipped.*

3. Turn both stop valves (1) to the closed position as shown in the illustration.

NOTICE!

Dispose of hydraulic oil in accordance with local environmental regulations. Failure to follow this notice could damage the environment.

4. Place a suitably sized container under the hydraulic connection to catch any residual hydraulic oil.
5. Disconnect the optional equipment hydraulic lines in accordance with the manufacturer’s instructions.
6. Install both fitting plugs (2).
7. Disconnect the optional equipment from the machine in accordance with the manufacturer’s instructions.



0003571

Figure 7-4

15. Loosen the wing fastener (3) until the valve handle (4) can be moved.
8. Turn the pattern change (SAE/BHL) valve handle to the proper position. See “Pattern Change (SAE/BHL) Valve Operation” on page 4-24.
9. Tighten the wing fastener in the new position.
10. Set the monitor to the correct work mode. See “Work Mode Switch” on page 3-13.
11. Set the monitor to the correct work accessory. See “Work Accessory Selection” on page 3-28.
16. Check the hydraulic oil level. See “Check the Hydraulic Oil Level” on page 5-17.

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