Operation and Maintenance Manual

SY215C LC/SY225C LC Excavator

service@sanyamerica.com

SANY Part Number SSY004846200

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SANY

SY215C LC/SY225C LC Excavator

Operation and Maintenance Manual

WARNING!

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operating or maintaining it. Failure to do this could result in death or serious injury.

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
NO.8 Beiqing Road,
Huilongguan, Changping District,
Beijing, China, 102206

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.

SANY
318 Cooper Circle
Peachtree City, GA 30269
www.sanyamerica.com
Phone: 470-552-SANY (7269)

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

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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SANY

Introduction

ABOUT THIS MANUAL

This manual provides operation and maintenance information for the SY215C LC/SY225C LC excavators.

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 the 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 Equipment

This section provides information on the optional equipment that can be used with this machine.

MACHINE APPLICATIONS

The 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).

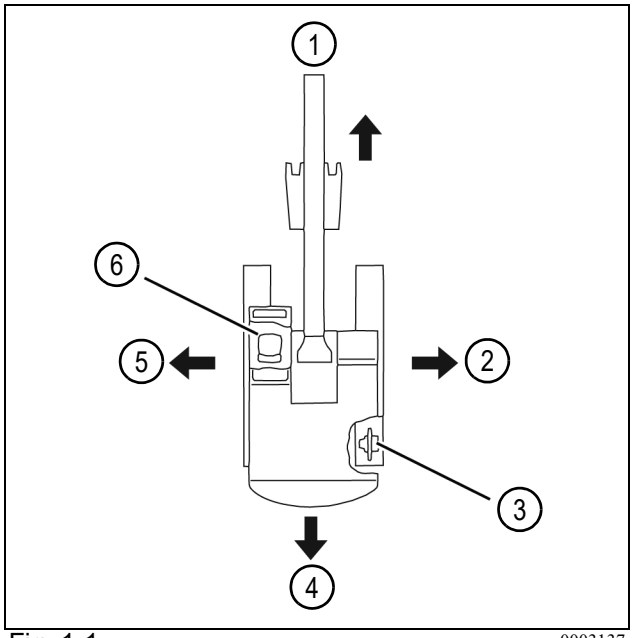

Fig. 1-1 0003137

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

SERIAL NUMBER LOCATION

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

Product Identification Plate

The product identification plate is on the lower right side of the operator station.

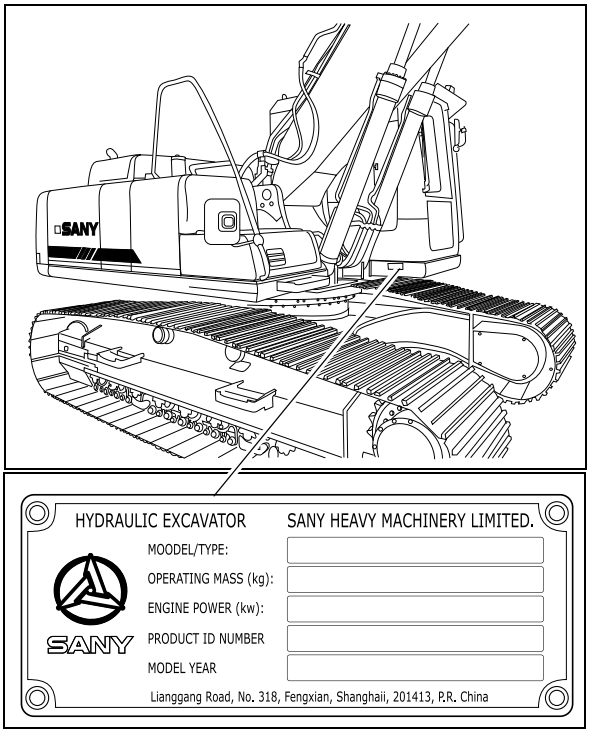

Fig. 1-2

SANY CONTACT INFORMATION

SANY
318 Cooper Circle
Peachtree City, GA 30269
www.sanyamerica.com
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.	
Swing Motor Serial No.	
Hydraulic Pump Serial No.	
Dealer Name: Address:	
Phone Numbers:	

CORRECTION REQUEST FORM

If you find a problem in 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 Record

SAE – Society of Automotive Engineers

SCA – Supplemental Coolant Additive

SDS – Safety Data Sheet

WPS – Weld Procedure Specification

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SANY

Safety

GENERAL SAFETY

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

Hazard Alerts in This Manual

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

The following American National Standards Institute (ANSI) and International Organization for Standardization (ISO) signal words are used to warn of a potentially hazardous situation 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.

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.

OPERATOR SAFETY INFORMATION

It is impossible to compile a list of safety precautions that cover 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 all are 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 local, state, and federal regulations and standards regarding this machine and its operation. Work practice requirements may vary among government regulations, industry standards, and employer policies. A thorough knowledge of all such relevant work rules is required before operating this machine or performing maintenance on it.
- Check the maintenance log before the start of each workday shift. Make sure routine maintenance has been performed as stated in this manual. Do not operate a damaged or 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

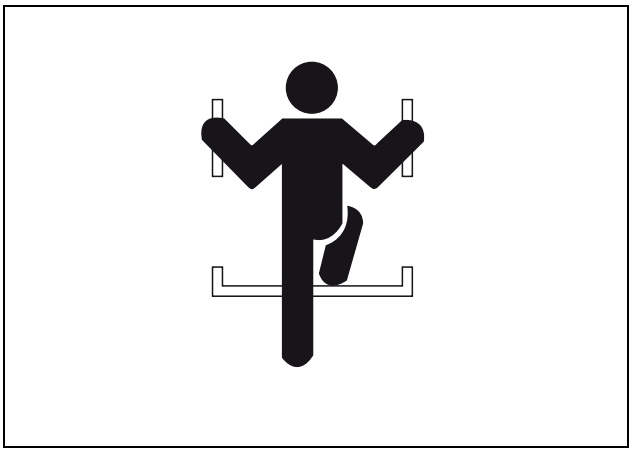


Fig. 2-1

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 means other than the provided grab handles and steps.
- Always face the machine as you mount and dismount.
- Always maintain three-point contact (both feet and one hand, or one foot and both hands) with the grab handles, steps, and deck for proper support.
- Wear 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. It can perform the functions of bulldozer, loader, and crane. SANY assumes no responsibility for any consequence caused by use outside this specified range.

Unauthorized Use of This Machine

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

- Transporting people on the machine or in the cab.
- Overloading the machine beyond its capacity.

Unauthorized Machine Modifications

Do not perform any unauthorized machine modifications.

Escape Tool

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

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

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 any damaged wiring.
- Make sure the battery is operating in its recommended range.
- Never install aftermarket electrical equipment without approval from a SANY dealer.

Fire Extinguisher

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

Crushing Hazard

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

Keep all guards in place on the machine.

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

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

Diesel Engine Exhaust

WARNING!

CALIFORNIA PROPOSITION 65 WARNING

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

WARNING!

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

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 some procedures, 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 5-21.

The engine coolant and oil in the machine may be hot even after the engine is stopped. Wait for engine coolant 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 off unless it is needed for the procedure.

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

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

When assembling or installing parts, always tighten them to the specified torques. 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 Fluid Lines

WARNING!

- **Never perform repairs to items while any system is under pressure.**
- **Never use your hands to check or feel for leaks. Always wear safety glasses and leather gloves, and use a piece of wood or cardboard to check for leaks.**
- **If high-pressure fluids penetrate skin or get into eyes, seek medical attention immediately.**

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

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

NOTE: If there is any leakage from a line or hose, the surrounding area may be wet.

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

Accumulator

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

Never expose the accumulator to temperatures above 140ºF (60ºC) or to open flames.

Never weld on the accumulator.

Never strike the accumulator.

If the accumulator needs service, contact a SANY dealer.

Electrical System

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.

Always clean the electrical system using only SANY-approved electrical cleaners. Contact a SANY dealer for approved electrical cleaners.

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 only 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 job site, make sure that all personnel involved understand all industry-standard hand signals that are to be used.

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

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

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

Personal Protective Equipment (PPE)

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

Hearing Protection

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

Travel and Operation Precautions

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

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

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

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

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

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

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

Inclined Areas

Traveling on an incline can be dangerous. 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

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.

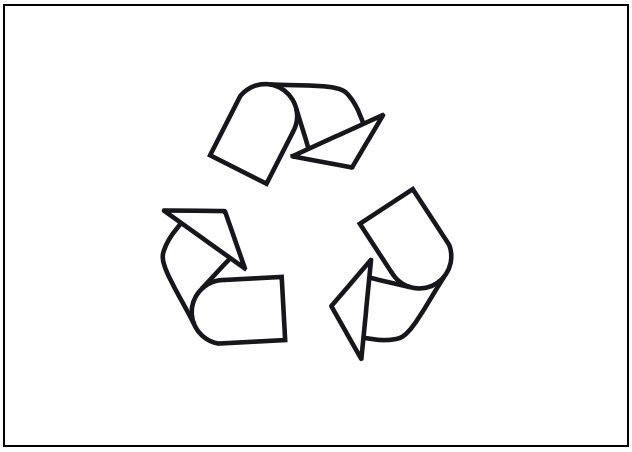


Fig. 2-2 0003055

Precautions in High-Voltage Areas

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.

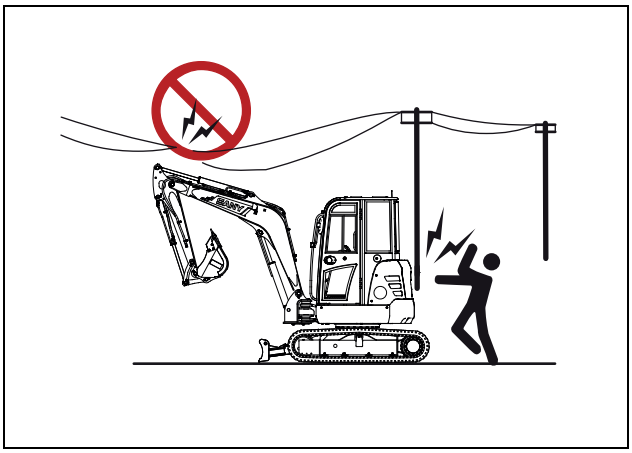


Fig. 2-3 0003056

SANY

Machine Controls

EXTERIOR COMPONENTS

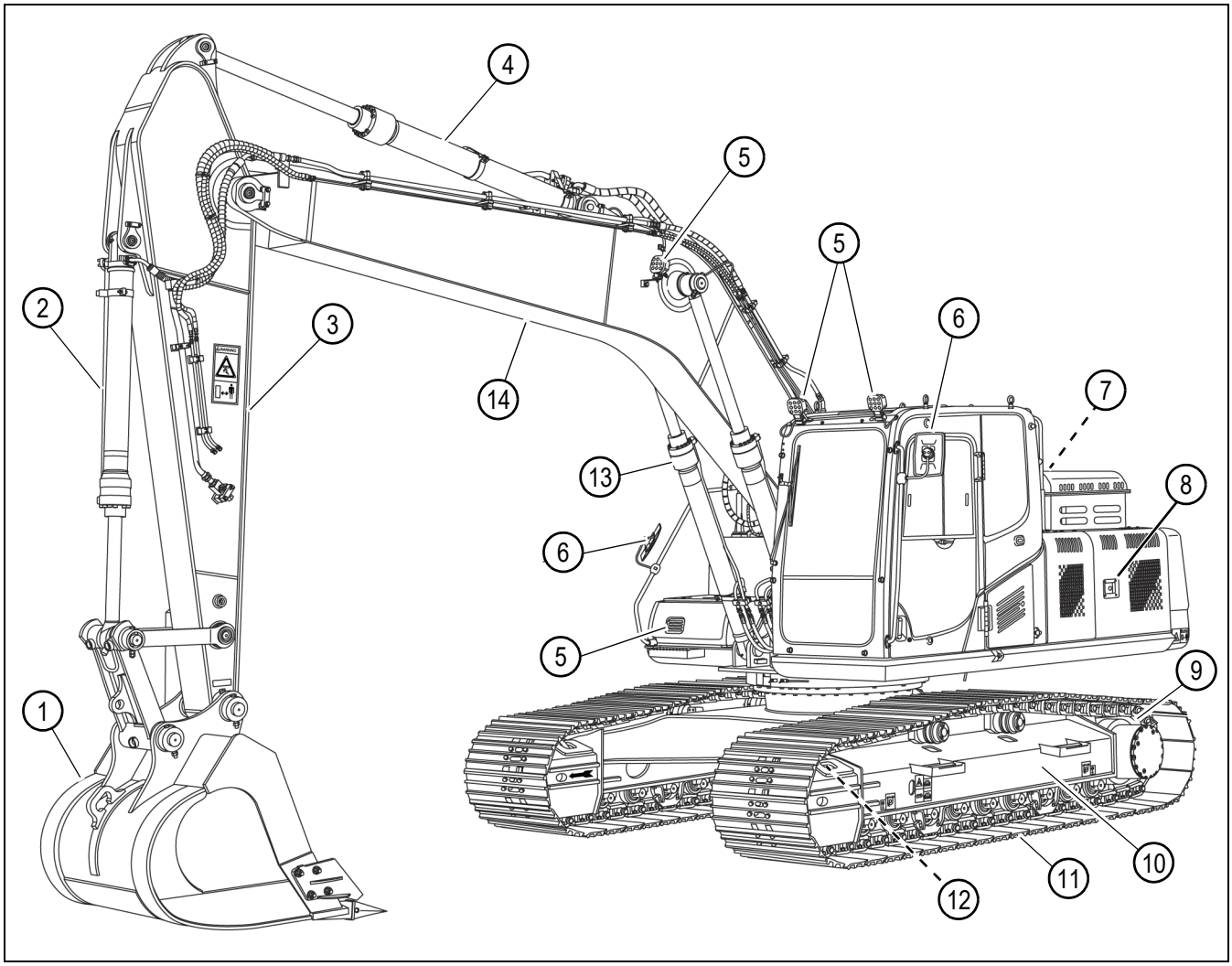


Fig. 3-1 0004585

1. Bucket
2. Bucket cylinder
3. Arm
4. Arm cylinder
5. Work light
6. Mirror
7. Engine cover
8. Battery compartment
9. Drive sprocket
10. Track frame
11. Track shoe
12. Idler
13. Boom cylinder
14. Boom

CAB INTERIOR

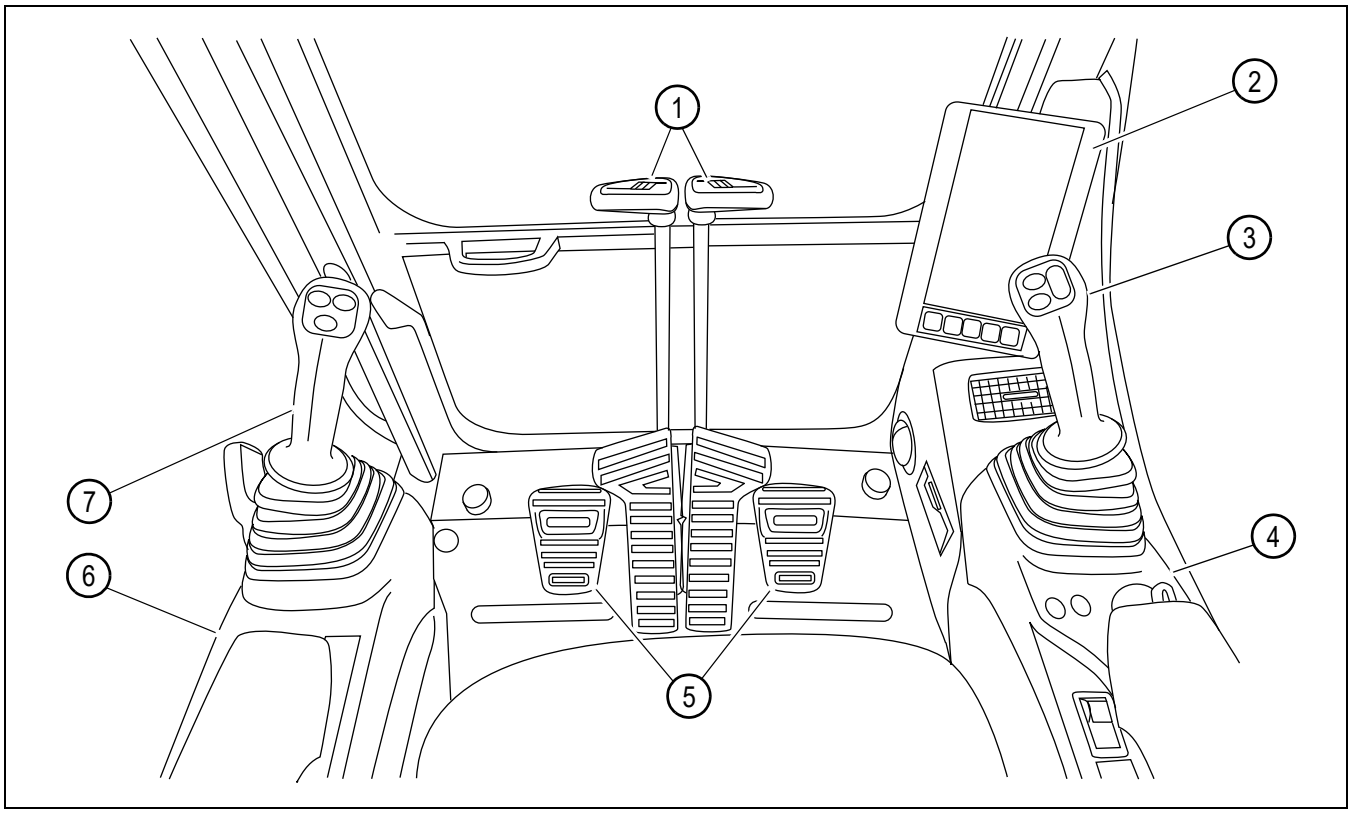


Fig. 3-2

1. Travel control levers/pedals (See page 3-23.)
2. Monitor (See page 3-27.)
3. Right joystick (See page 3-13.)
4. Right control console (See page 3-13.)
5. Footrests
6. Left control console (See page 3-8.)
7. Left joystick (See page 3-8.)

MACHINE CONTROLS

Seat and Seat Belt

A multi-position, adjustable seat is provided for operator comfort. The front/rear positions, up/down positions, and the seat back angle can be adjusted.

- The headrest (1) can be raised and lowered.
- The seat has two armrests. The armrest angle can be adjusted by rotating dials (2).
- The seat belt (3) is provided to keep the operator securely in the operator's seat.
- Lever (4) adjusts the upper seat mount forward or backward.
- Switch (5) adjusts the air suspension seat up or down.
- Adjusting lever (6) adjusts the seat and control consoles forward or backward.
- Seat bottom lever (7) adjusts the seat bottom forward or backward.
- Seat bottom lever (8) adjusts the seat bottom angle.

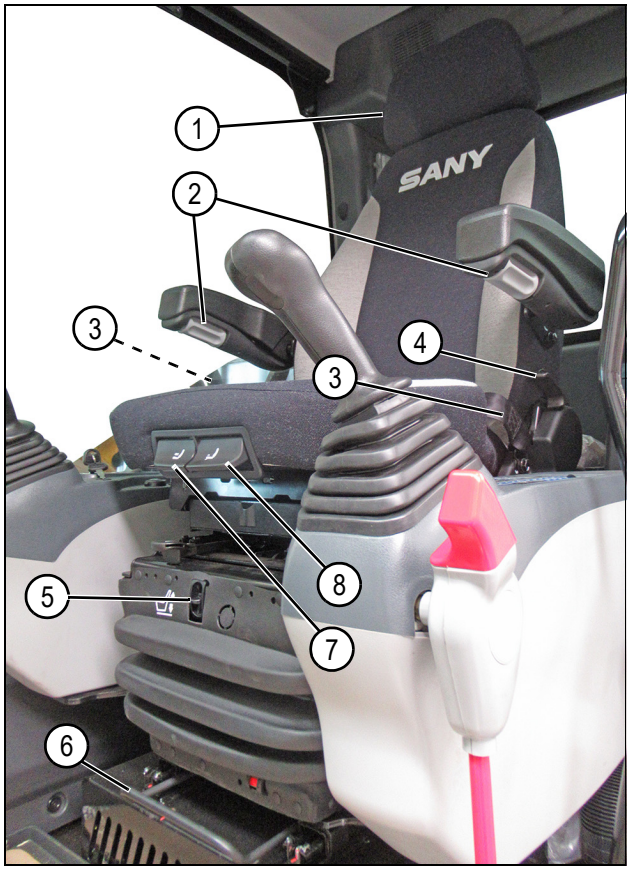


Fig. 3-3 0003760

- Heat switch (9) turns the heated seat on and off.
- Lumbar adjustment (10) increases or decreases the lumbar support in the backrest.

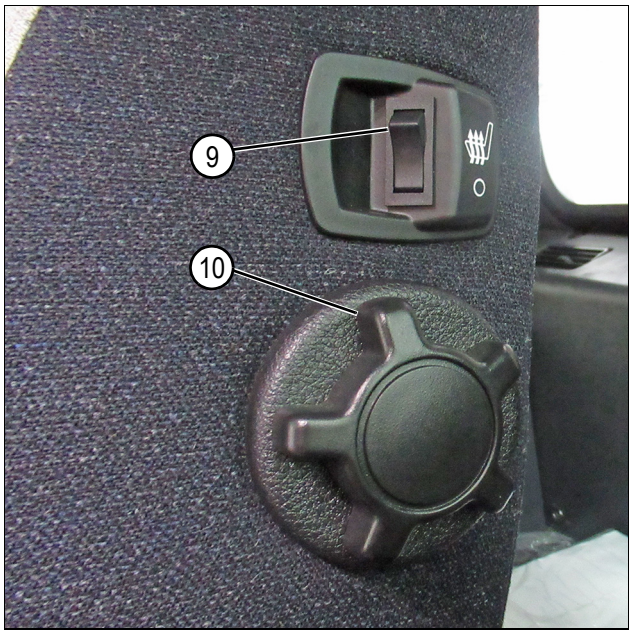


Fig. 3-4 0003765

Hydraulic Lockout Control Lever

WARNING!

Always place the hydraulic lockout control lever in the locked (closed) position before leaving the cab. When this lever is not in the locked (closed) position, any unintended movement of the joysticks or travel control levers may cause death or injury.

Avoid moving either joystick or travel control levers/pedals when you move the hydraulic lockout control lever to an unlocked (open) or locked (closed) position. Failure to observe and follow this warning could result in death or injury.

Use the hydraulic lockout control lever to enable or disable the hydraulic functions.

- Move the hydraulic lockout control lever to the locked (closed) position (1). The machine will not move, even when the controls are manipulated.

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. Contact a SANY dealer to solve this problem. Failure to do so can result in damage to the machine.

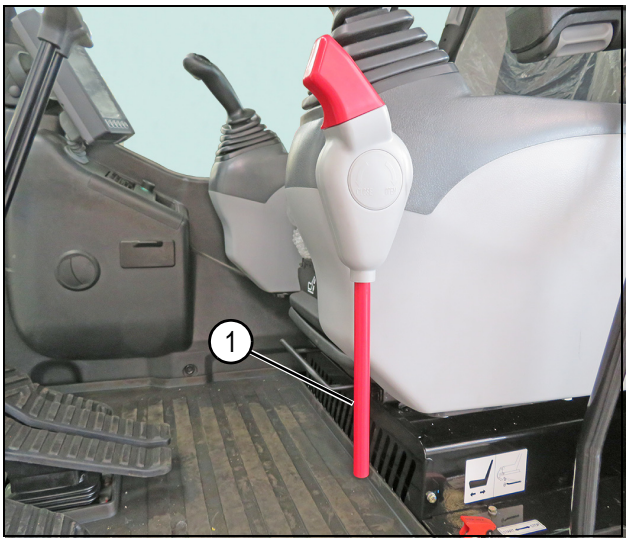


Fig. 3-5 0004579

- Move the hydraulic lockout control lever to the unlocked (open) position (2). The machine will now move in accordance with the joysticks and other control levers.

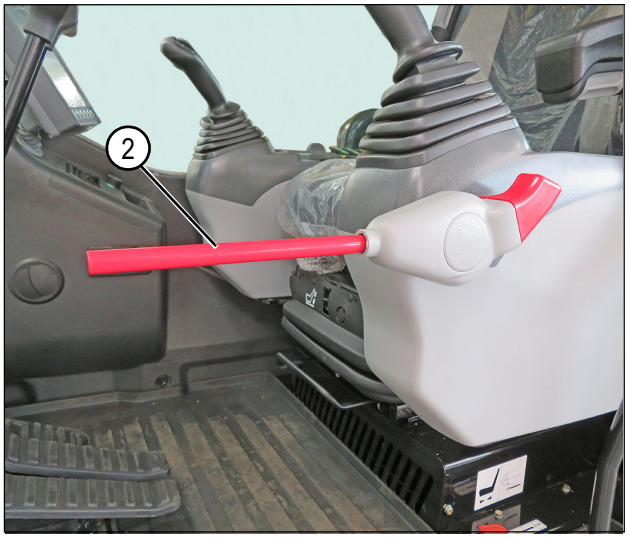


Fig. 3-6 0004580

Emergency Stop Switch

The engine emergency stop switch (1) is beneath a red cover (2) below the hydraulic lockout control lever.

The emergency stop switch stops the engine by opening the circuit ground to the engine control module (ECM).

The switch is normally in the forward position with its red cover down and over it during regular operation.

In case of an emergency, raise the red cover and push the switch to the opposite position (backward) to shut down the engine.

Closing the red cover down over the emergency stop switch forces the switch back to its original position for normal machine operation.

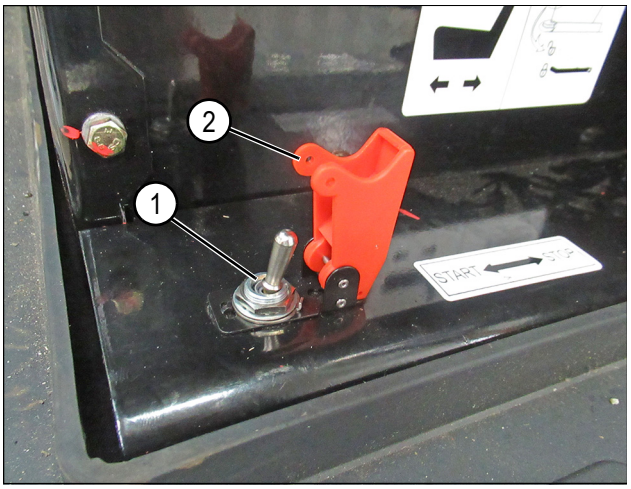
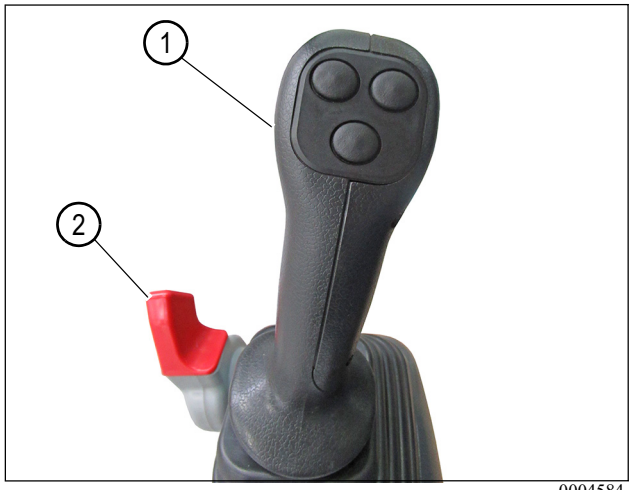


Fig. 3-7 0004582

Left Control Console

The left control console contains the following items:

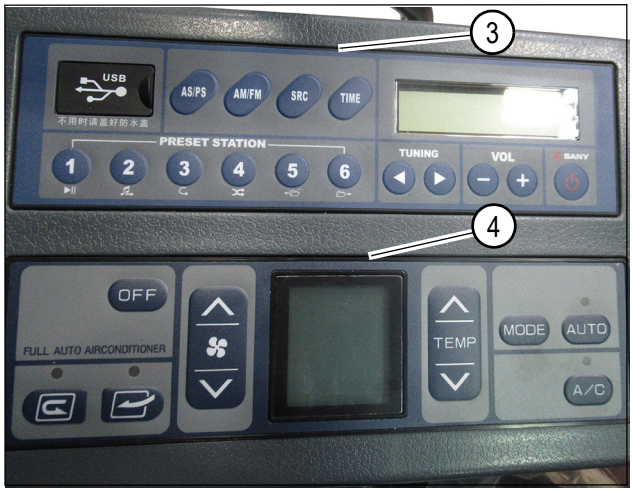
- Left joystick (1)
- Hydraulic lockout control lever (2)



0004584

Fig. 3-8

- Radio control panel (3)
- Climate control panel (4)



0004583

Fig. 3-9

Left Joystick Buttons

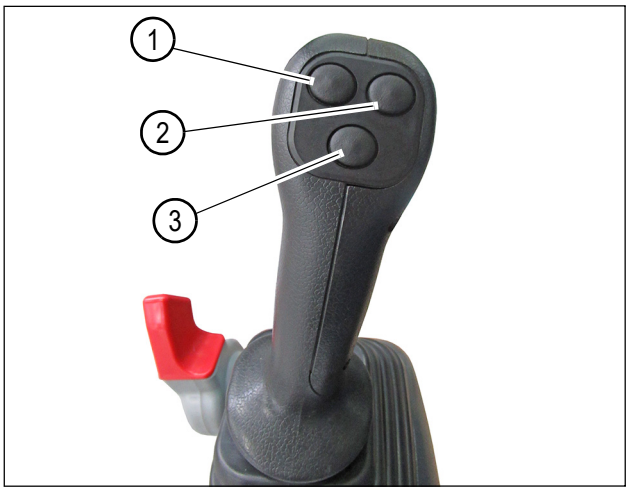
NOTE: Joystick buttons on the machine may be configured differently from the following description. Consult the decals inside the cab to determine joystick button functions.

The left joystick contains three buttons:

- The top left button (1) and top right button (2) are used for optional work tools with rotational capability.

NOTE: Refer to the manufacturer's documentation for specific information about the work tool.

- Press the button (3) to operate the horn.



0004584

Fig. 3-10

Climate Control Panel

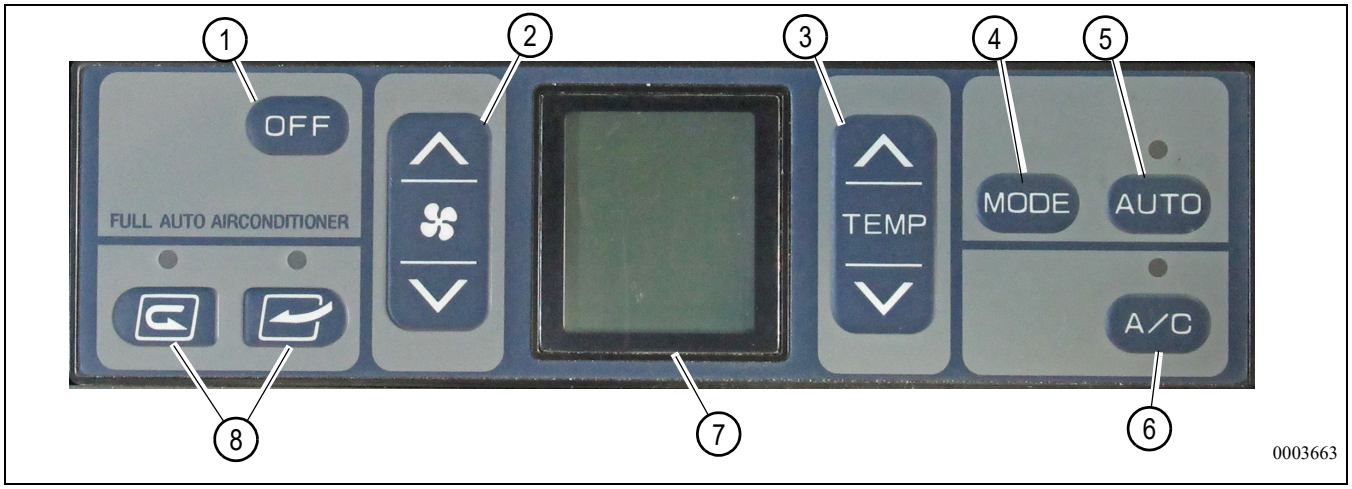


Fig. 3-11

1. OFF
2. Fan speed control
3. Temperature selection
4. Vent mode selection
5. Automatic temperature control selection
6. Air conditioning power
7. Display screen
8. Fresh air/recirculation selection

Power button (1) – Press this button to power down the air conditioning system.

NOTE: The fan will stop and the display screen (7) will shut off.

Fan speed control (2) – Press this button to set the fan speed to any of six levels.

Temperature selection (3) – Press this button to set the inside cab temperature between 65°F–90°F (18°C–32°C).

NOTE: With the air conditioning on, press and hold both the up and down arrows for 3 seconds to toggle between Fahrenheit (F) and Celsius (C) temperature display.

Vent mode selection (4) – Press this button to select which vent or vents should be used for airflow inside the cab:

- Windshield vent only
- Upper body vent only
- Upper body and rear window vents
- Foot vent (under the operator seat), upper body, and rear window vents
- Foot vent only
- Windshield and foot vents

Automatic temperature control (5) – Press this button to use the selected vent outlets and fresh air/recirculation mode to automatically maintain the selected temperature.

NOTE: With automatic temperature control selected, the fan HIGH speed will remain on until the selected temperature is reached.

Air conditioner power (6) – Press this button to switch the air conditioner on or off.

Display screen (7) – Shows the selected temperature, fan speed, and vent selection during operation.

Fresh air/recirculation selection (8) – Press these buttons to choose either recirculated air inside the cab or fresh air from outside.

Sunlight sensor (9) – is on the front of the air conditioning duct below the monitor.

- Adjusts the airflow to match the variation of temperature caused by direct sunlight.
- Do not cover or obstruct this sensor.

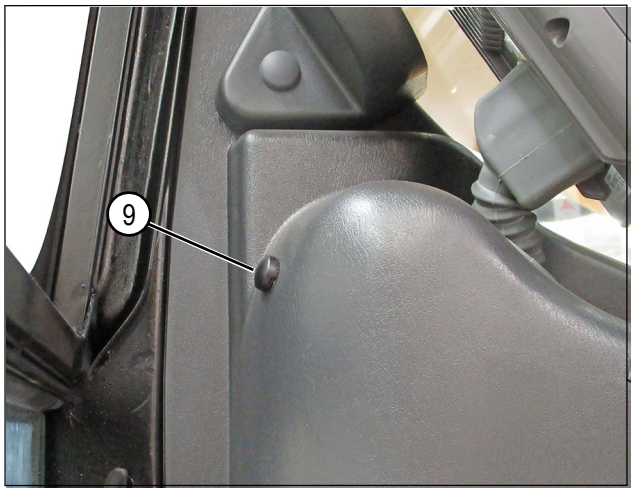


Fig. 3-12 0004588

NOTICE!

If the control panel or sunlight sensor gets wet, a failure may result. Always keep these components clean and dry. Failure to do so can result in damage to the machine or cause the machine to operate improperly.

If there is a problem with the air conditioning unit, an air conditioner controller failure is shown on the display screen. If this occurs, contact a SANY dealer.

Radio Control Panel

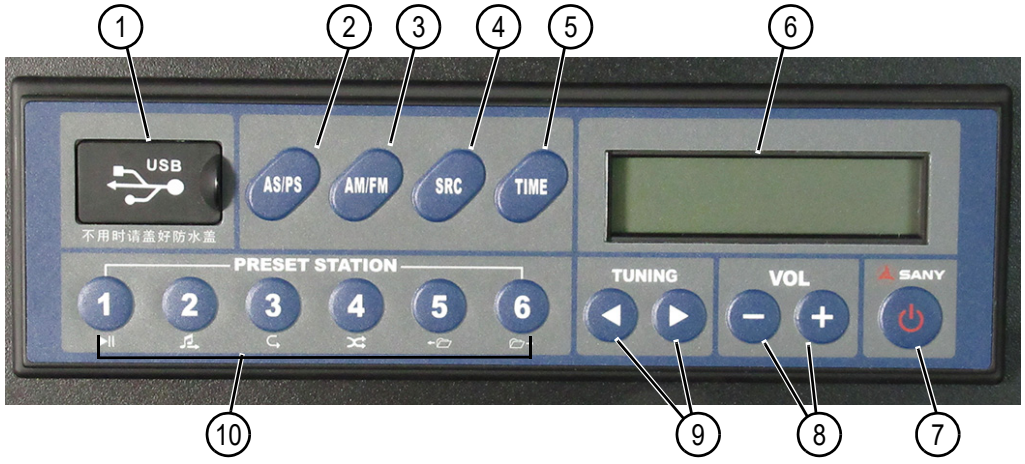


Fig. 3-13

1. USB input
2. AS/PS button
3. AM/FM selector
4. Audio selection
5. Time display
6. Display screen
7. Power button
8. Volume control
9. Tuning buttons
10. Preset station buttons

USB input (1) – Use this input to connect other sound devices with a USB cable.

AS/PS button (2) – Use this button to automatically scan (AS) through the preset stations (PS) or to automatically load the preset station buttons.

- Press the AS/PS button once to begin the auto scan feature. Each preset station will play for 10 seconds with the station frequency blinking (on and off) on the display screen (6). Press the AS/PS button once more to remain on the current station.
- Press and hold the AS/PS button for two 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).

AM/FM selector (3) – Press this button to toggle between AM and FM bands.

Audio selection (4) – Use this button to adjust the sound quality:

- Press and hold the button to access the bass level adjustment.
- Press it again to set the treble.
- Press it once more to set the balance (between the in-cab speakers).

Once selected, use the VOL + and - buttons to adjust the level for the selected setting.

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

Time display (5) – Press this button to display the local time for 5 seconds. The display reverts to the current station after 5 seconds. Set the current time by holding the button and using the tuning buttons to change the displayed time.

Display screen (6) – The band (AM or FM), the currently tuned radio station frequency, the preset station number, and the current time are shown on the display screen.

Power (7) – Press this button to mute the radio. Hold the button to turn the radio on or off. The current time will appear on the display screen when the radio is turned on.

Volume control (8) – Use the plus (+) and minus (-) buttons to set the volume.

Tuning control (9) – Press these buttons to seek the next radio station.

Preset stations (10) – Press and hold any of these six buttons to assign the current radio station to that button. Afterwards, press and release any of the buttons to select its preselected station.

Right Control Console

The right control console contains the following items:

- Right joystick (1)
- Key switch (2)
- Throttle control dial (3)
- Work light switch (4)
- Windshield wiper switch (5)
- Windshield washer switch (6)
- Warning beacon switch (7)
- Travel alarm silence switch (8)
- Regeneration disable switch (9)
- Stationary regeneration switch (10)
- 12V power supply socket (11)

Fig. 3-14 0004589

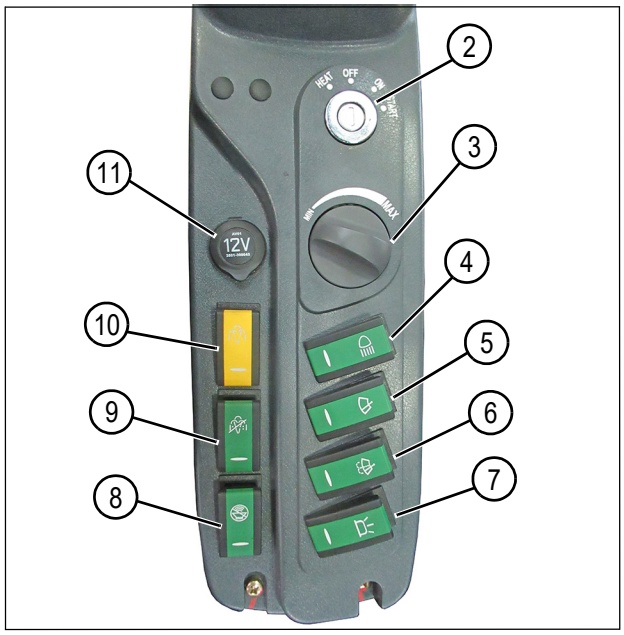


Fig. 3-15 0004590

Right Joystick Buttons

NOTE: The joystick buttons and slide switch on the machine may be configured differently from the following description. Consult the decals inside the cab to determine joystick button functions.

Fig. 3-16 0004590

The right joystick contains two buttons and a slide switch.

- Press button (1) for a brief increase in operating pressure and resulting force to the work equipment.

NOTE: See “Optional Equipment Control” on page 7-3.

- Switch (2) operates proportional work tool hydraulics.
- Button (3) is not used.

Key Switch

NOTICE!

Except for emergencies, never shut down the engine while it is running at high speed. Stopping the engine at high speed can damage the machine or cause it to run improperly.

The key switch is used for the following functions:

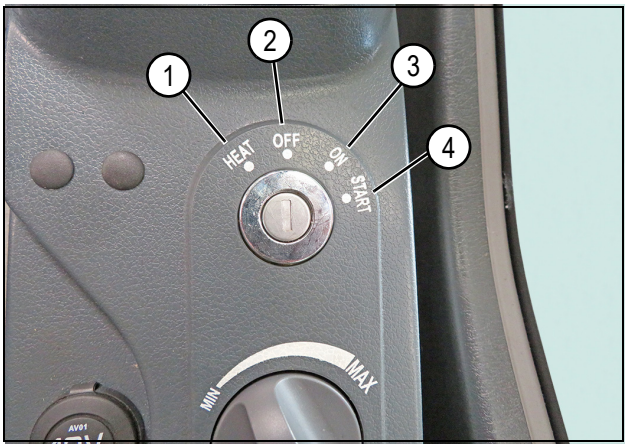


Fig. 3-17 0004577

- HEAT (1) – Turn the key at this position to preheat the engine for cold-weather starting as required. An icon on the display will illuminate. The key returns to the OFF position when released. When the icon darkens the engine can be started.
- OFF (2) – This position allows you to insert and remove the key. The engine is shut down (or remains off) and there is no power to any of the electrical system switches.
- ON (3) – This position allows the engine to remain running (if already started) and also allows electrical current to all of the electrical system switches.
- START (4)– Hold the key at this position to start the engine, then immediately release it after the engine has started. The key returns to the ON position when released.

Throttle Control Dial

Use the throttle control dial to adjust the engine speed. Turn the throttle clockwise to increase the engine speed, and counterclockwise to decrease the engine speed.

- Low idle (MIN): Turn it fully counterclockwise.
- High idle (MAX): Turn it fully clockwise.

Fig. 3-18 0004591

12V Power Supply Socket

Use the 12V socket (1) to power or charge 12V electronics.

Fig. 3-19 0004590

Stationary Regeneration Switch

The stationary regeneration switch (1) activates the diesel particulate filter (DPF) regeneration system.

Fig. 3-20 0004590

Stationary regeneration is required if the yellow diesel particulate filter icon (2) on the monitor home screen is on or flashing, or if the yellow check engine icon (3) on the monitor home screen is on, which indicates an increasing level of soot buildup in the exhaust system. Soot buildup occurs after continued operation with the regeneration inhibit switch set to the on position, and its icon (4) is displayed.

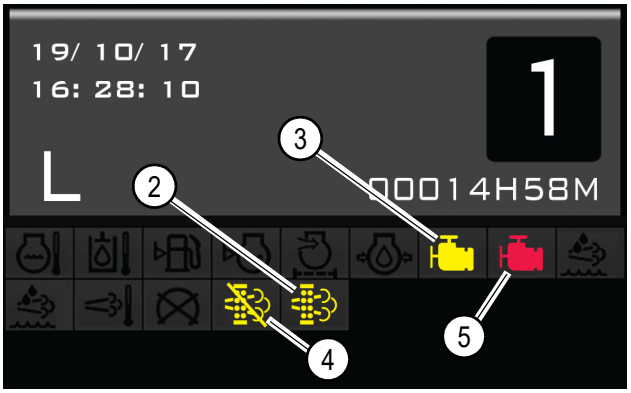


Fig. 3-21 0004592

NOTICE!

If the red stop engine icon (5) illuminates, shut down the engine as soon as it is safe to do so and immediately contact a SANY dealer for service support. Failure to do so could result in engine damage.

Regeneration Disable Switch

The regeneration disable switch (1) disables the automatic DPF cleaning system. When this switch is in the ON position, an icon will appear on the monitor.

Use the regeneration disable switch when high temperatures from automatic regeneration pose a risk due to surroundings.

Fig. 3-22 0004590

An icon (2) appears in the system service icon area of the monitor home screen when this switch is on.

Fig. 3-23 0004607

NOTICE!

Running the machine with automatic exhaust cleaning disabled for an extended period of time will cause the soot level to increase and can damage the exhaust system aftertreatment system.

Travel Alarm Silence Switch

The silence travel alarm switch (1) temporarily silences the travel alarm.

Fig. 3-24 0004590

Work Light Switch

The work light switch (1) turns the work lights on and off.

Fig. 3-25 0004590

There are four work lights:

- One on the left side of the boom (1)
- Two on top of the cab (2)
- One on the front upper structure (3)

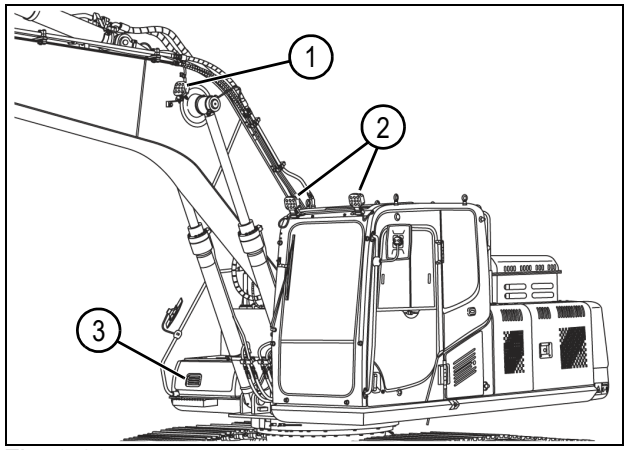


Fig. 3-26 0004587

Windshield Wiper Switch

The windshield wiper switch (1) activates the windshield wiper

NOTICE!

Make sure the windshield of the cab is closed before activating the windshield wiper. Use the windshield washer switch before using the wiper switch on a dry windshield. Failure to do so can damage the machine, personal property, or cause the machine to operate improperly.

Fig. 3-27 0004590

Windshield Washer Switch

Press the windshield washer switch (2) to spray windshield washer fluid. Hold the switch down to keep spraying. The flow of windshield washer fluid stops and the switch returns to its off position when released.

Travel Alarm Switch

The travel alarm switch (3) turns the warning beacon and audible alarm on and off.

Joystick Controls

WARNING!

To prevent injury when a joystick is moved unexpectedly, never extend any part of your body outside the cab window while the machine is running. Know the positions and functions of each joystick. Failure to observe and follow this warning may cause unexpected movement of the machine, which could result in death or injury.

SAE/BHL Joystick Operating Modes

There are two operating modes available for the joysticks:

- Society of Automotive Engineers (SAE) mode
- Backhoe Loader (BHL) mode

Pattern Change (SAE/BHL) Valve

NOTICE!

Shut down the engine before adjusting the pattern change (SAE/BHL) valve. Failure to follow this notice could damage the machine or cause the machine to operate improperly.

The pattern change valve (1) is behind the left-front door, below the engine air cleaner.

The valve changes control of the boom and the arm from one joystick to the other. The position shown is the SAE mode position. To change to the BHL position, pull up on the pin and rotate the bar to the right. Release the pin to lock the bar in place:

- In SAE mode, the arm is controlled using the left joystick, and the boom is controlled using the right joystick.
- In BHL mode, the arm is controlled using the right joystick, and the boom is controlled using the left joystick.

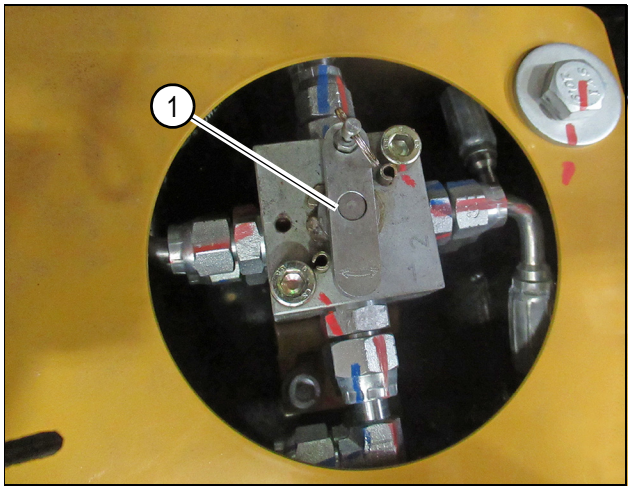


Fig. 3-28 0004593

SAE Mode

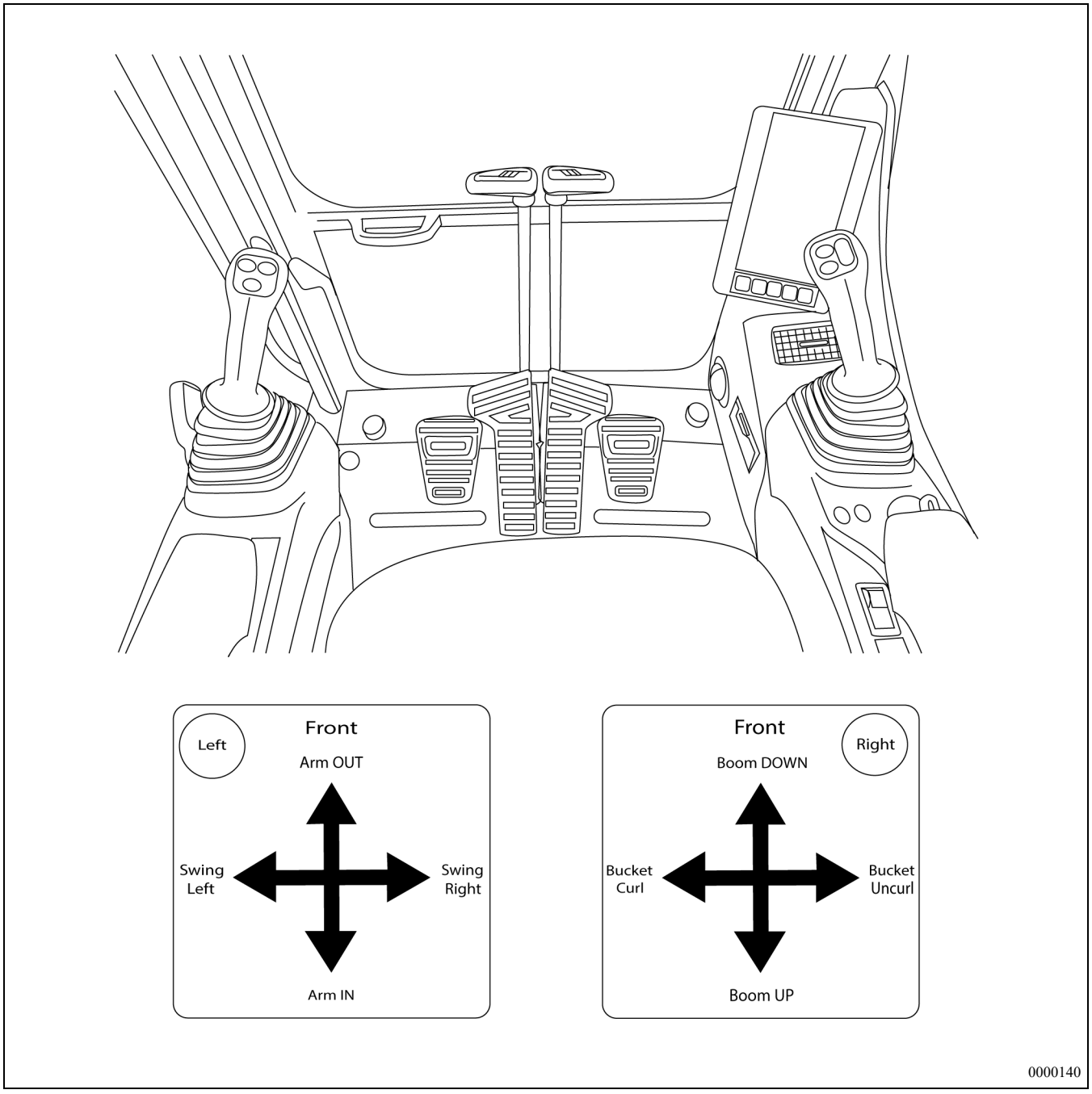


Fig. 3-29

NOTE: When the joystick is released, it returns to the neutral position and machine movement stops.

BHL Mode

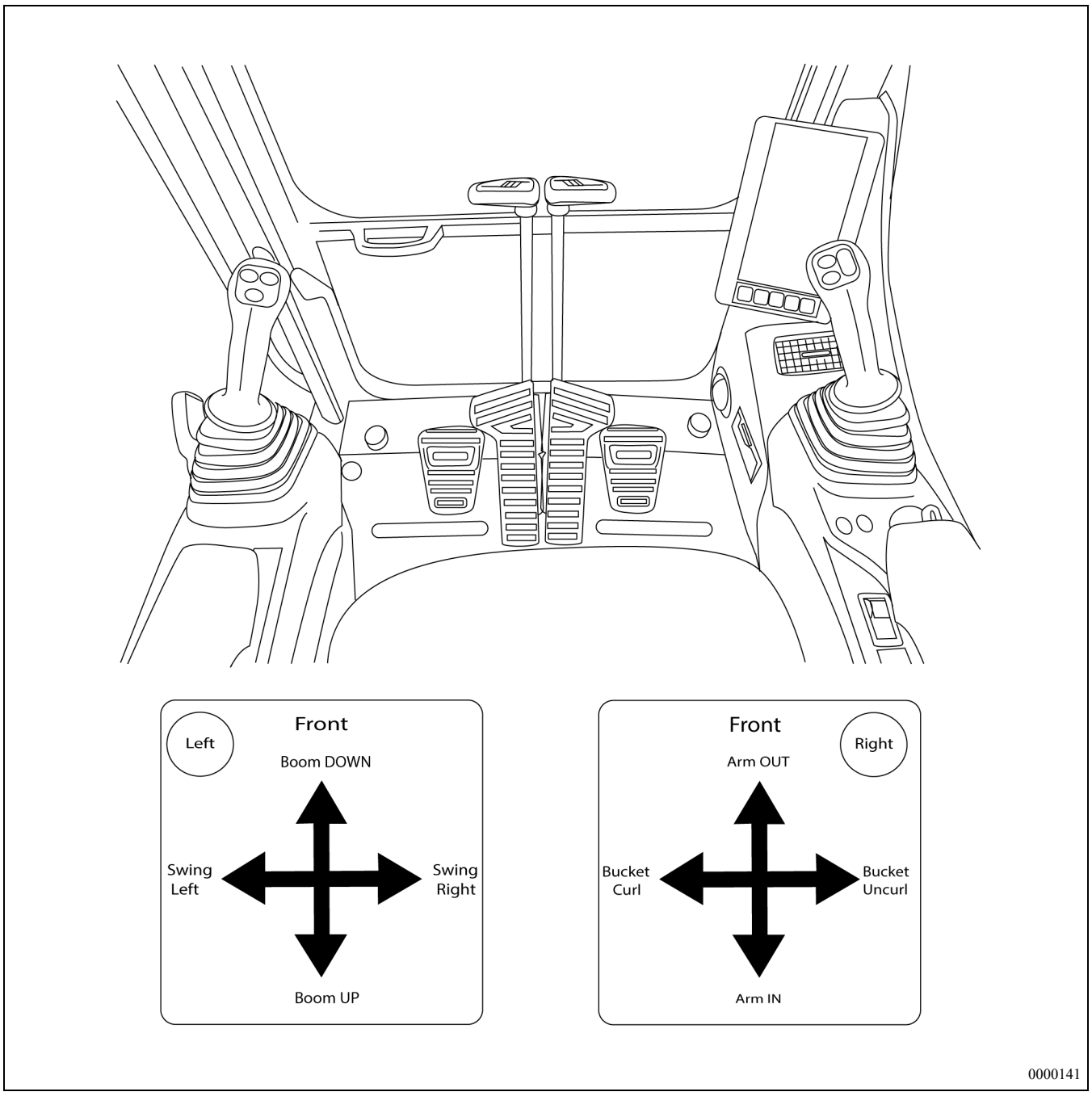


Fig. 3-30

NOTE: When the joystick is released, it returns to the neutral position and machine movement stops.

Travel Control Levers/Pedals

WARNING!

Take extra care when using the pedals to steer the machine. Never rest your foot on a pedal unless you are traveling or steering the machine. Failure to observe and follow this warning could cause unexpected movement of the machine, which could result in death or injury.

Always note the following before operating the travel lever/pedal controls:

- 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 this direction.
- When the cab faces backward, the travel direction will be the reverse of the figure shown here. (The machine moves forward when you pull control levers, and backward when you push them.)

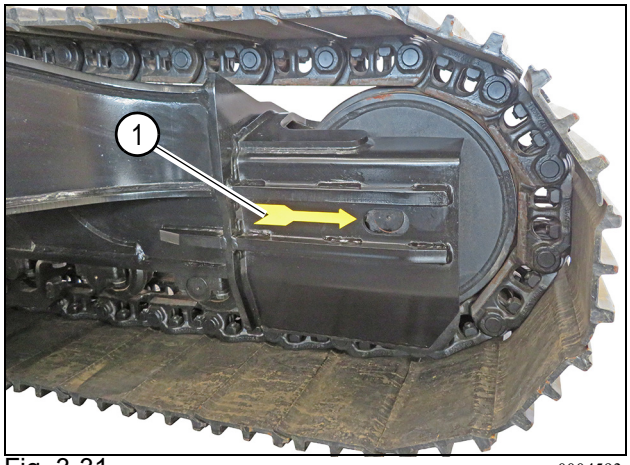


Fig. 3-31 0004593

The travel control levers/pedals consist of the following:

- Travel control levers (2).
- Travel control pedals (3).

NOTE: Footrests (4) are not control devices.

- When a travel control lever or pedal is released, it returns to the neutral position and machine movement stops.

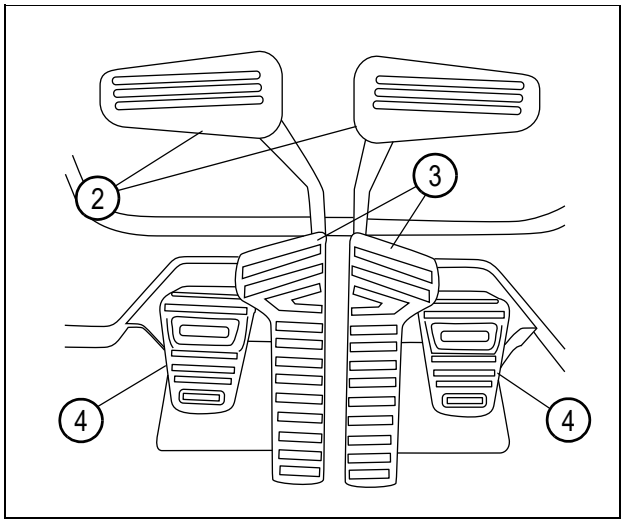


Fig. 3-32

Use the travel control levers and pedals to change the travel direction of the machine:

- Forward travel (1) – Push the control lever (pedal tilts forward).
- Backward travel (2) – Pull the control lever (pedal tilts backward).
- Neutral position (N) – Machine stops.

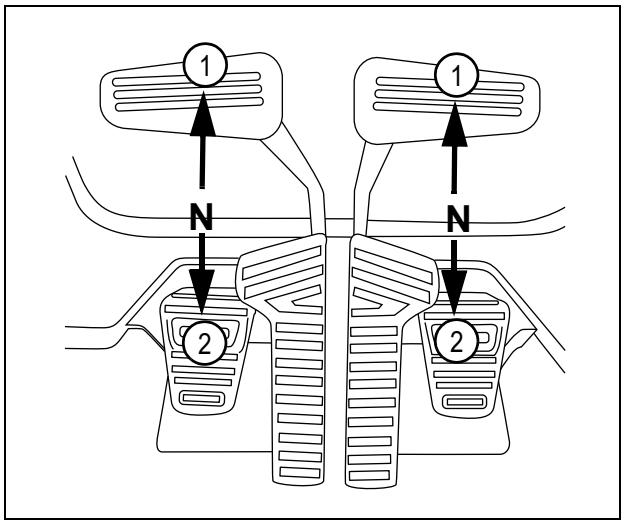


Fig. 3-33

Auto Idle Function

The auto idle function automatically activates when the machine engine is started to reduce fuel consumption and noise levels.

With the engine running, the auto idle function works as described below:

- When the joysticks and travel control levers/pedals remain in their neutral positions for at least 5 seconds, engine speed drops to the factory-set auto idle speed (approximately 1300 rpm–1400 rpm).

NOTE: When engine speed is set below the factory set auto idle speed, the auto idle function will not change the engine speed.

- If either of the joysticks or travel control levers/pedals are operated, or the throttle control dial is adjusted while the engine is at the lower, factory-set auto idle speed, the engine speed automatically returns to its higher, previously set level or the newly set level.
- When the engine is shut down and then restarted, the auto idle function is automatically reactivated.

Batteries

There are two 12V batteries (3) connected in series that provide 24V power to the machine electrical system. These batteries are under a protective cover (2) behind the left-rear door below the power disconnect switch (1).

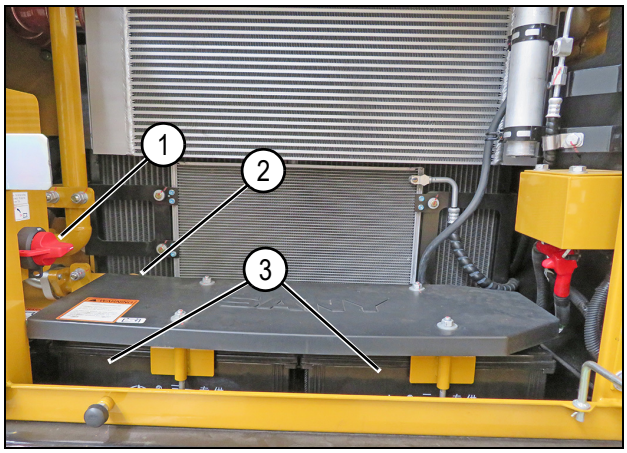


Fig. 3-34 0004574

24V Power Supply Socket

Use the 24V socket (1) to power or charge 24V electronics only.

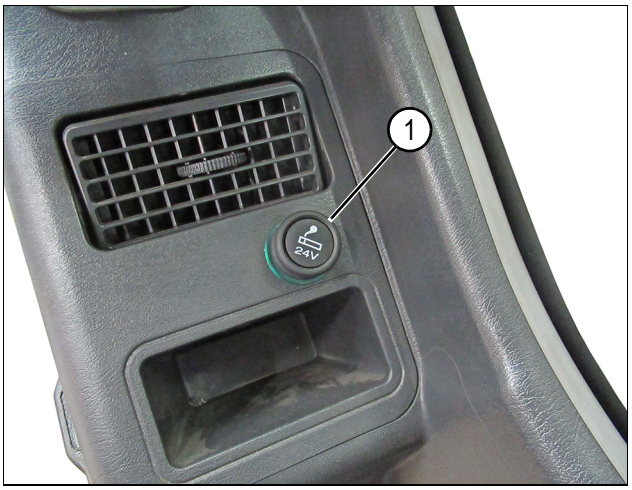


Fig. 3-35 0003805

Battery Disconnect Switch

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.

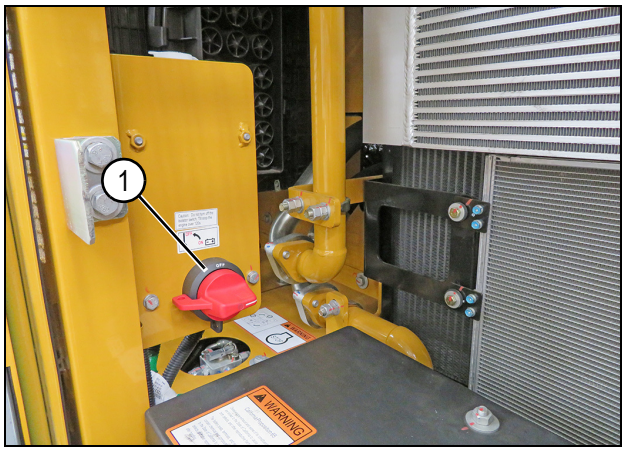


Fig. 3-36 0004575

NOTICE!

- **Never turn the battery disconnect switch to OFF while the engine is running.**
- **After machine shutdown, wait at least 1 minute for the engine control module (ECM) to complete its shutdown before turning the battery disconnect switch to OFF.**

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

To disconnect the battery power from the machine:

1. Move the key switch to OFF.
2. Open the left rear access door.
3. Turn the battery disconnect switch (1) to the OFF position.
4. Close the left rear access door.

Fuses

NOTICE!

- **A fuse should be replaced if it is corroded, produces white powder, or becomes loose in the fuse panel.**
- **Before replacing a fuse, make sure the key switch is in the OFF position and the batteries are disconnected.**
- **Always replace a fuse with one of the same capacity. Never replace a fuse with one of a higher capacity.**

Failure to observe and follow this notice can damage the machine or cause it to operate improperly.

Open the fuse box door (1) in the cab behind the seat to access fuses (2):

Fuse Locations, Circuits and Ratings		
Fuse Number	**Circuit**	**Amperage**
F1	Starting circuit	20A
F2	Seat heater	5A
F3	Display	10A
F4	Working light	15A
F5	Cab light	15A
F6	Travel alarm	5A
F7	ECM power	30A
F8	Radio	10A
F9	DEF sensor	10A
F10	Air conditioner	20A
F11	DEF SM	15A
F12	DEF Power	5A
F13	DEF heater	15A
F14	Pilot control	10A
F15	GPS and 12V Converter	20A
F16	Washer and wiper	5A
F17	Horn	5A

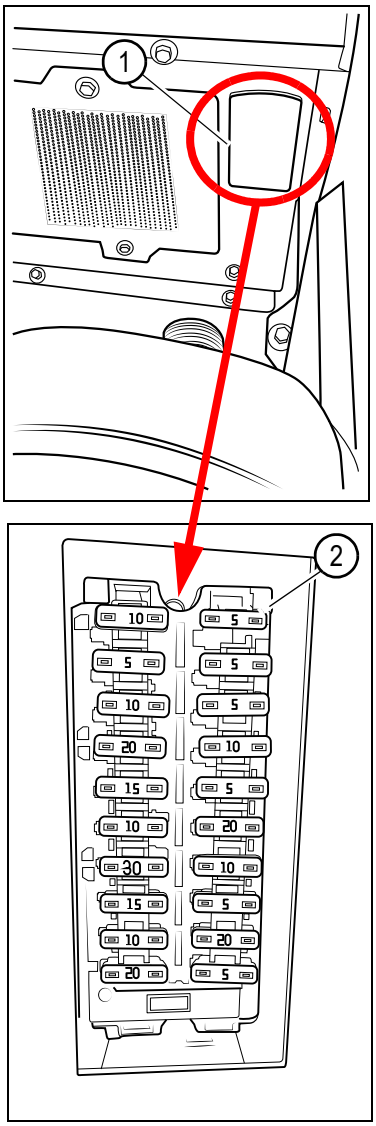


Fig. 3-37

F18	Travel alarm	5A
F19	2834 Controller	10A
F20	Ignition	5A

MONITOR

When the key switch is in the ON position, the monitor is energized and the home screen appears.

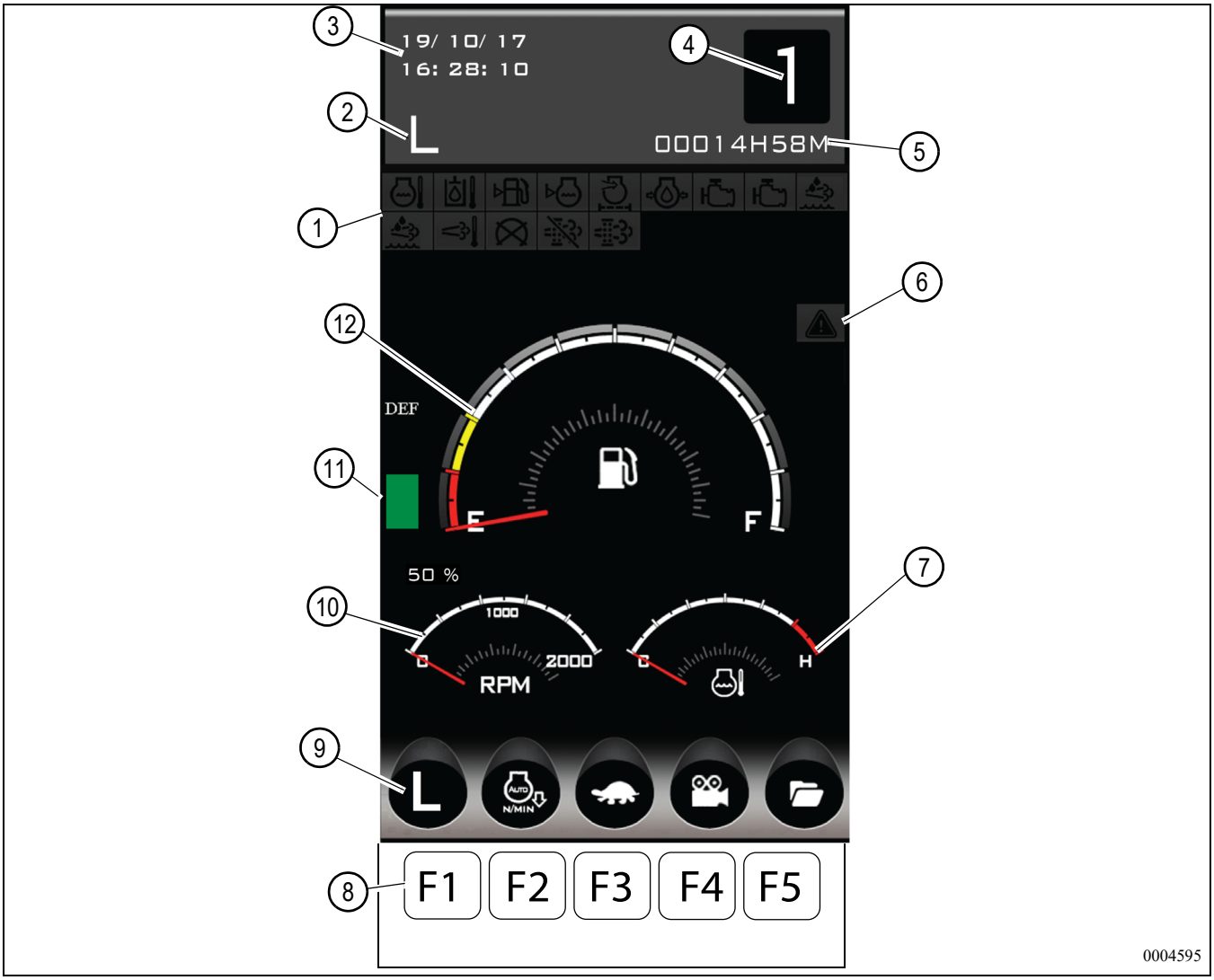


Fig. 3-38

1. System service icons
2. Work mode
3. Date and time
4. Throttle control dial setting
5. Machine service hours
6. Machine fault icon
7. Engine coolant temperature
8. Function buttons
9. Function icons
10. Engine speed (tachometer)
11. Diesel exhaust fluid (DEF) level
12. Fuel level

Home Screen

Home Screen Display Icons

Engine Speed

This gauge displays the number of revolutions per minute (rpm) the engine is running, with 0 rpm (engine off) at the left and 2000 rpm at the right.

Diesel Exhaust Fluid (DEF) Level

This display shows a graphic and numeric indication of the diesel exhaust fluid level in the DEF tank. The number 100 displays beneath a solid frame when the DEF tank is full. The number gradually decreases and the frame gradually lowers as the DEF level lowers.

Fuel Level

This gauge displays the level of diesel fuel in the fuel tank.

System Service Icons

These icons illuminate to signal that a specific system requires attention. Yellow indicates that service should be obtained as soon as practical. Red indicates that the machine should be shut down and service obtained immediately.

Work Mode

This single-letter icon is a visual indication on the home screen of how much power is being delivered. There are three different work modes:

- H: Heavy-duty - Provides 90%–100% of the machine's rated power.
- S: Standard duty - Provides 80%–90% percent of the machine's rated power.
- L: Light duty - Provides up to 80% of the machine's rated power.

Throttle Control Dial Setting

This numeric indicator shows the current engine speed level. The range is from 1 – 11.

Date and Time

This display shows the date and time and follows the format selected in the System Setup monitor screen.

Machine Service Hours

This indicator shows the total number of hours that the machine has been in service.

Machine Fault Icon

Normally off, this illuminated triangle only displays when an error condition occurs. To see the specific error code, press F5 to access the Main Menu screen, then press F1 to navigate to the error codes icon, and F3 to confirm that selection.

Periodic Maintenance Prompt

This illuminated umbrella icon will display only when the next set of scheduled maintenance procedures is required. To see the specific required maintenance, press F5 to access the Main Menu screen, then press F1 to navigate to the Maintenance Info icon, and F3 to confirm that selection.

Installed Equipment

This icon indicates which optional equipment (bucket, breaker, or shear) is attached as selected in the Tool Select monitor screen.

Engine Coolant Temperature

This gauge indicates the coolant temperature in either degrees Fahrenheit (°F) or degrees Celsius (°C), depending on which unit of measure was selected (imperial or metric) in the System Setup monitor screen.

Home Screen Function Icons and Function Buttons

NOTE: Use the home screen function icons and function keys as follows:

- F1 is not enabled on this screen.
- Press F2 to enable and disable auto idle.

NOTE: The icon changes to red when this function is disabled.

- Press F3 to choose between slow travel speed mode (turtle icon) and fast travel speed mode (rabbit icon).

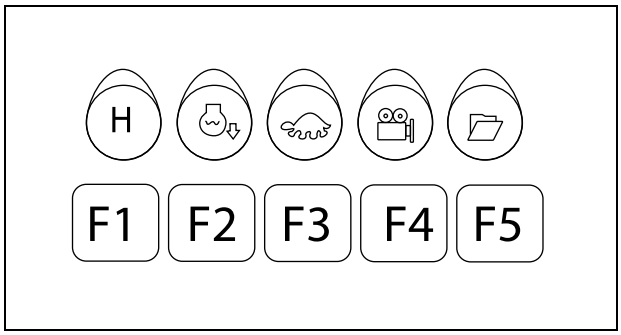


Fig. 3-39 0000031

NOTE: Use the turtle mode when more power but less travel speed is required. Use the rabbit mode when more travel speed but less power is required.

- Press F4 to activate the rearview camera, and press F5 (ESC) to exit the camera mode.
- Press F5 to proceed to the Main Menu screen.

Main Menu Screen

NOTE: The Main Menu screen displays icons for various options that can be accessed using the function keys at the bottom of the screen. Each icon will be highlighted as it is selected.

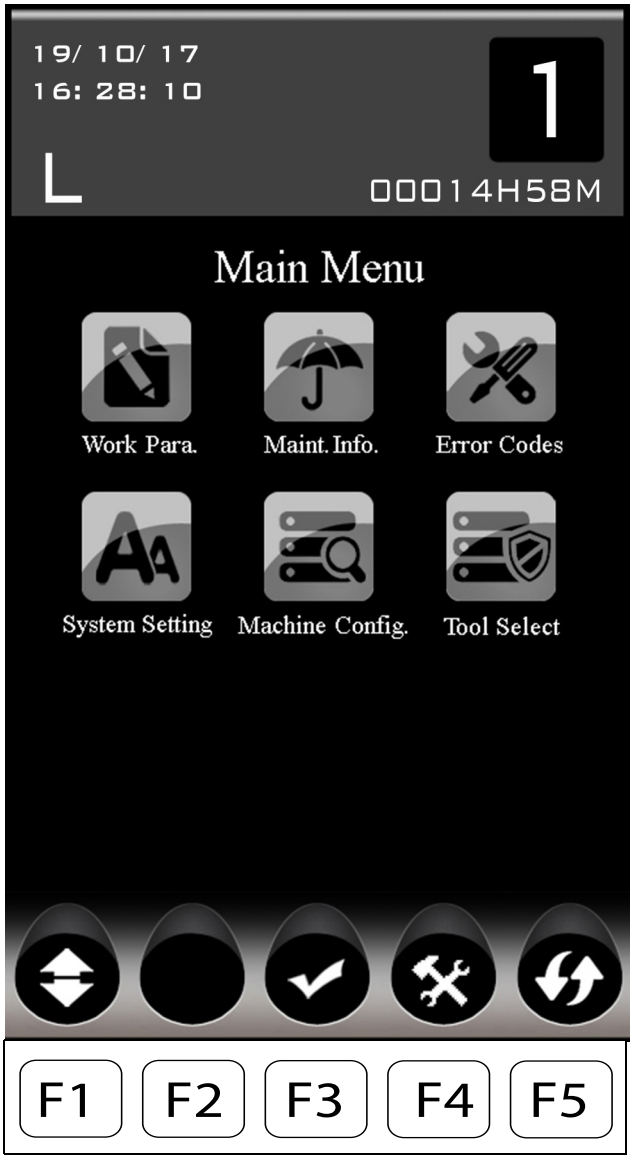


Fig. 3-40 0004549

1. Press F5 at the home screen to access this screen.

   - Work Parameters (password required) – Informational screens that show data about the various machine systems.

   NOTE: See “Password Screen” on page 3-31.

   - Maintenance Information (no password required) – Informational screen(s) are viewable only when maintenance is required.
   - Error Codes (no password required) – Displays specific codes if a fault condition occurs.
   - System Setting (no password required) – Screens that allow for language, units of measure, time, and date selection.
   - Machine Configuration (for factory use only).
   - Tool Selection (no password required) – Screens that provide for adjustment of the hydraulic oil flow to attached equipment.

2. Press F1 to navigate to the desired icon.
3. Press F3 to confirm the selection and proceed to the next screen.

NOTE:

- F4 is for use only by SANY factory technicians.
- Press F5 to return to the home screen without selecting any icon.

Password Screen

NOTE: This screen appears whenever the Work Parameters icon is selected on the Main Menu screen.

1. Enter the five-digit password: 31868. Each digit is indicated by an asterisk (*) standing for a value from 0 to 9. A number initially appears where the cursor is located, then changes to an asterisk.
2. Press F1 to increase the digit.
3. Press F2 to move horizontally between digits.
4. Press F3 after keying in the five-digit password to proceed to the selected menu screen.

   NOTE: Press F5 to return to the Main Menu screen without entering a password.

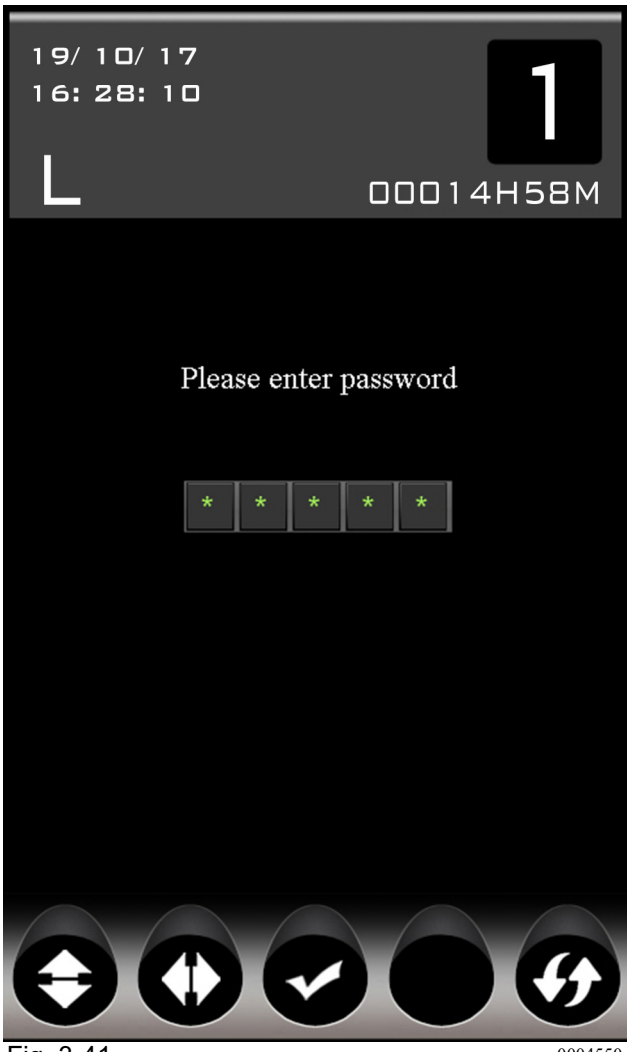


Fig. 3-41 0004550

Work Parameters Screens

These screens are for SANY technician use only and require a password.

Maintenance Info Screen

NOTE: Use this screen to view which procedures are required for the machine when the periodic maintenance umbrella icon illuminates on the home screen.

1. Press F1 once at the Main Menu screen to navigate to the Maintenance Info icon.

   NOTE: No password is required for this screen.

2. Press F3 to access the maintenance information screen.

   - No maintenance screen will appear if the umbrella icon is off and no periodic maintenance is required.
   - The screen on the right is typical, in this case a 50-hour maintenance schedule.
   - Consecutive screens will display if extensive periodic maintenance is required.

3. Do the following:

   - Press F3 on this screen, enter the password after completion of the maintenance procedures, then turn the key switch to OFF, and then back to ON to confirm the selection and clear the umbrella icon from the home screen.
   - Press F5 to return to the Main Menu screen without making any changes.

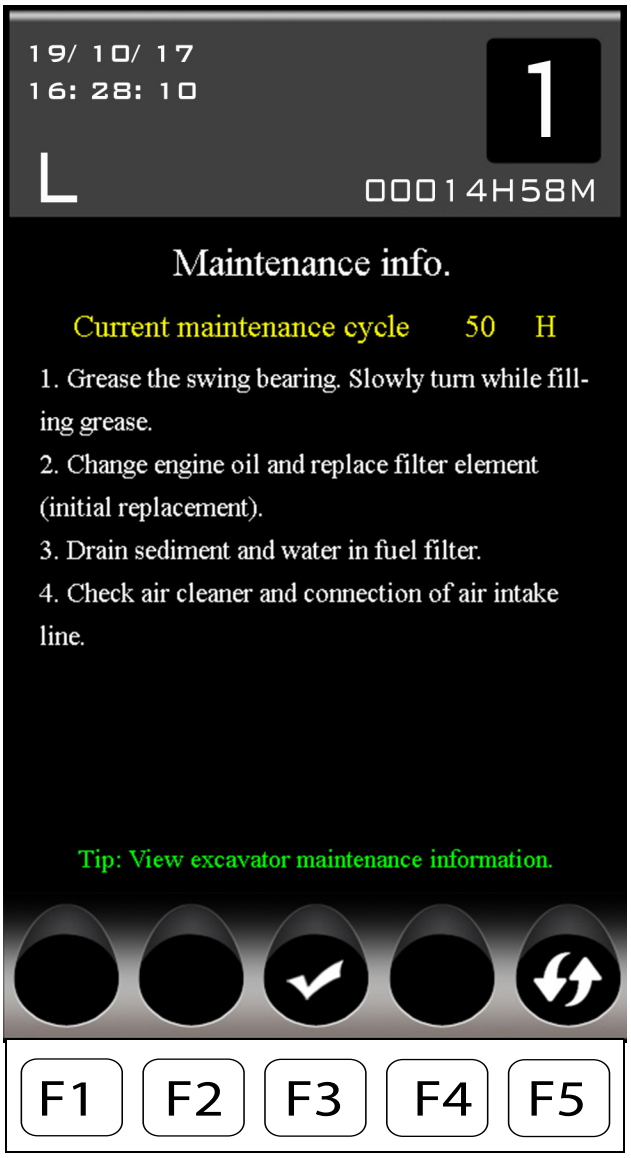


Fig. 3-42 0004551

Error Codes Screen

NOTE: Use this screen to view the specific error code(s) for the machine when the Machine Fault icon illuminates on the home screen.

1. Press F1 twice at the Main Menu screen to navigate to the Error Codes icon.

2. Press F3 to see the Error Codes screen showing the specific error code (or codes) and description(s).

   - No error codes will display if the Machine Fault icon on the home screen is off.

3. Contact a SANY dealer for more information about specific error codes and what actions to take.

   NOTE:

   - Press F5 to return to the Main Menu screen.

   - The Machine Fault icon on the home screen is self-resetting and goes out when the fault condition is corrected.

Fig. 3-43 0004564

System Setting Menu Screen

NOTE: Use this screen to access other screens to set various parameters.

1. Press F1 three times at the Main Menu screen to navigate to the System Setting icon, then press F3.
2. Press F1 to scroll through the list of choices.
3. Do the following:
   - Press F3 to confirm your selection and proceed to the next screen.
   - Press F5 to return to the Main Menu screen without choosing any option.

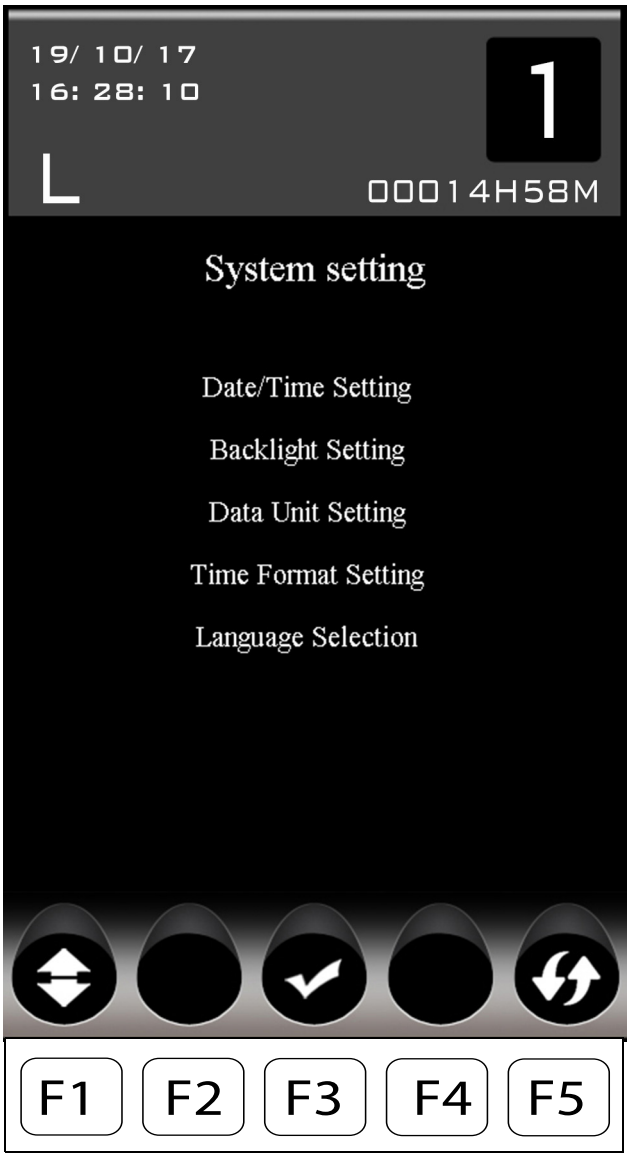


Fig. 3-44 0004556

Date/Time Setting Screen

1. Navigate to this option on the System Settings screen, then press F3.

2. Press F1 or F2 to increase or decrease the value in the blinking year parameter.

3. Press F4 to advance to the next blinking category (month).

   NOTE:

   - Repeat steps 2 and 3 to set and advance through the remaining categories.

   - Contact a SANY dealer if you do not have the time zone information (number of time zones east or west of 0° longitude).

4. Do the following:

   - Press F3, then turn the key switch to OFF, and then back to ON, to confirm the selection.

   - Press F5 to return to the System Setting screen without making any changes.

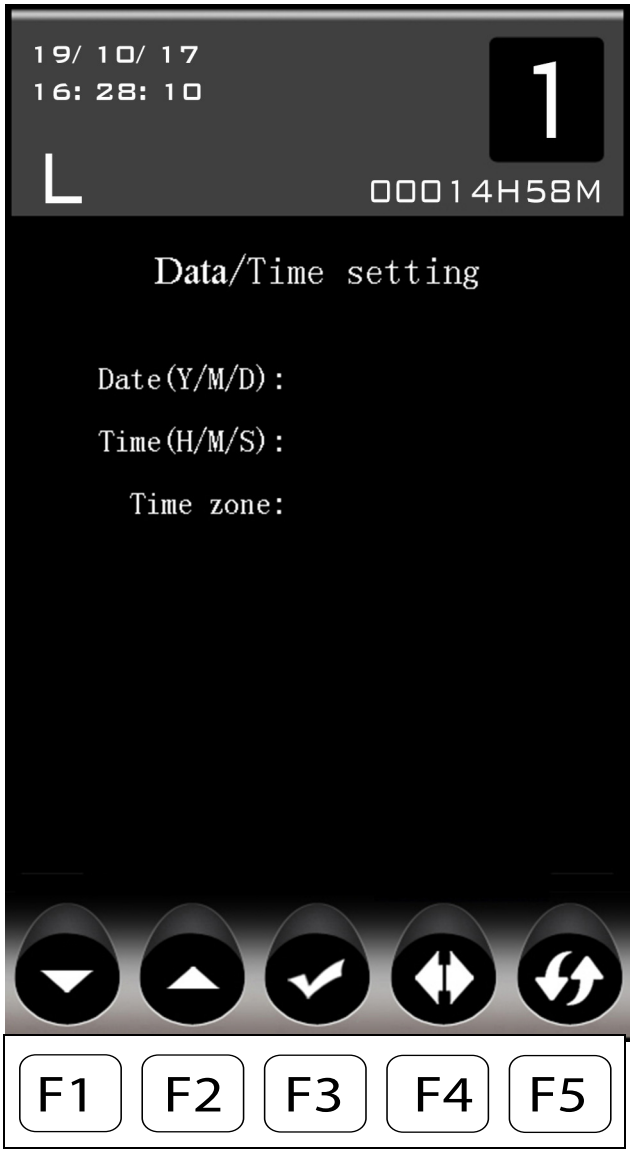


Fig. 3-45 0004557

Screen Backlight

NOTE: Use this screen to adjust the screen brightness for better readability.

1. Navigate to this option on the System Settings screen, then press F3.
2. Press F1 to decrease the screen brightness.
3. Press F2 to increase the screen brightness.

   NOTE:

   - The number will change and the progress box will fill and empty to graphically indicate the screen brightness percentage as set by the F1 and F2 buttons.
   - The available range is 10%–100%.

4. Then do the following:

   - Press F3, turn the key switch to OFF, and then back to ON, to confirm the selection.
   - Press F5 to return to the Main Menu screen without making any changes.

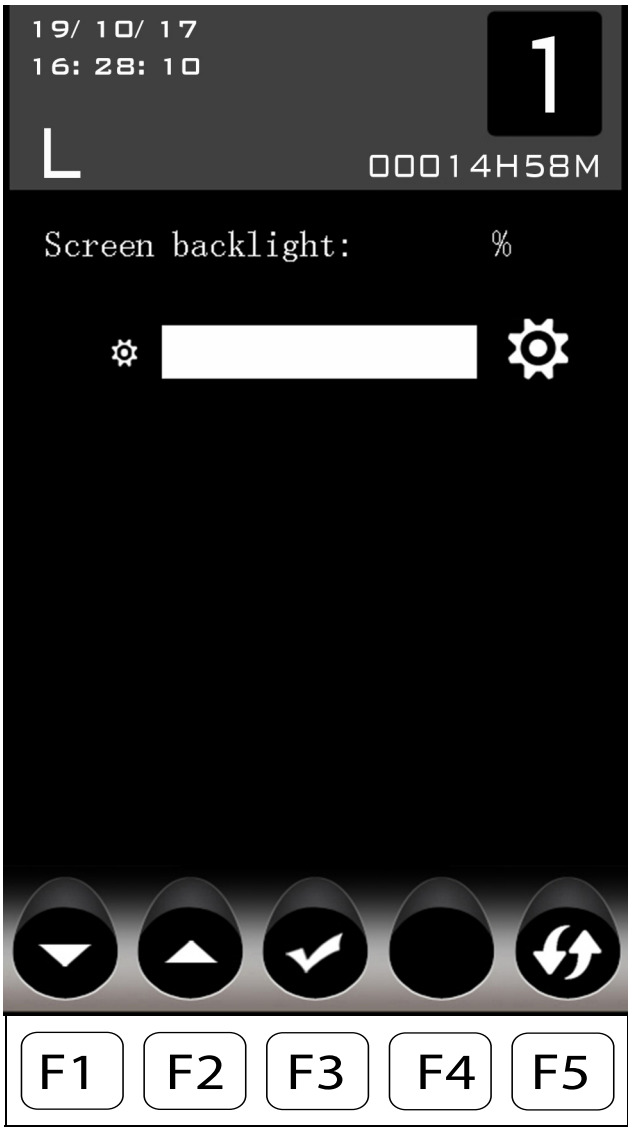


Fig. 3-46 0004557

Data Unit Setting Screen

NOTE: Use this screen to select the units of measure (metric or imperial) displayed on the monitor.

1. Navigate to this option on the System Setting screen, then press F3.

2. Press F1 to move between the two options.

3. Then do the following:

   - Press F3, then turn the key switch to OFF, and then back to ON, to confirm the selection.

   - Press F5 to return to the System Setting screen without making any changes.

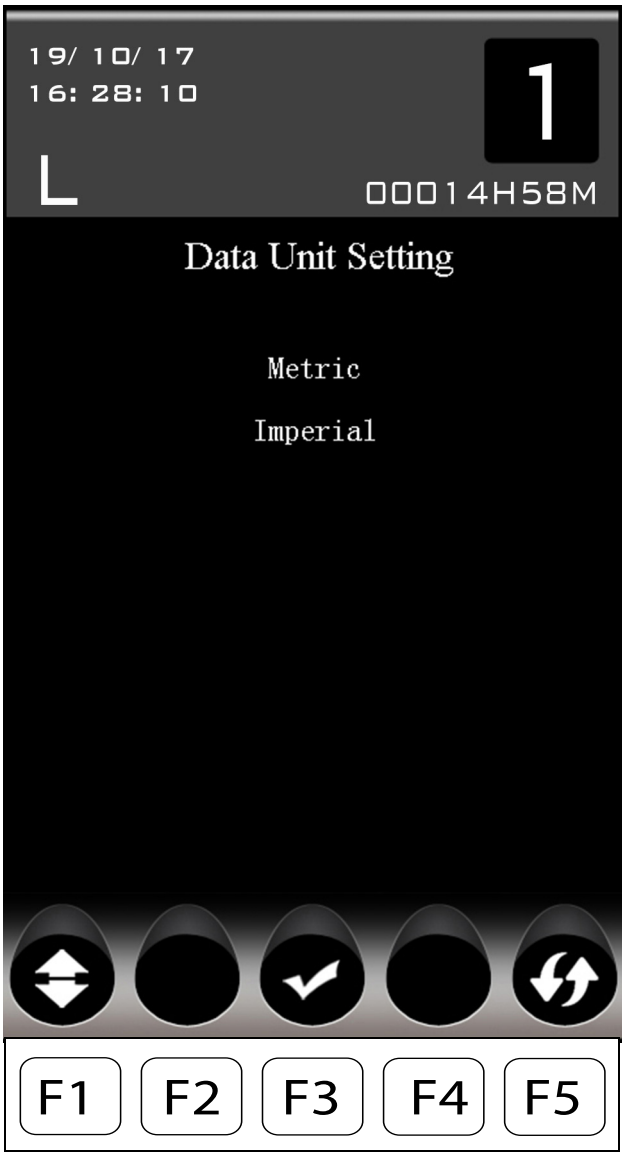


Fig. 3-47 0004560

Time Format Setting Screen

NOTE: Use this screen to select how the current time is displayed.

1. Navigate to this option on the System Setting screen, then press F3.

2. Press F1 to move between the two options.

3. Then do the following:

   - Press F3, turn the key switch to OFF, and then back to ON, to confirm the selection.

   - Press F5 to return to the System Setting screen without making any changes.

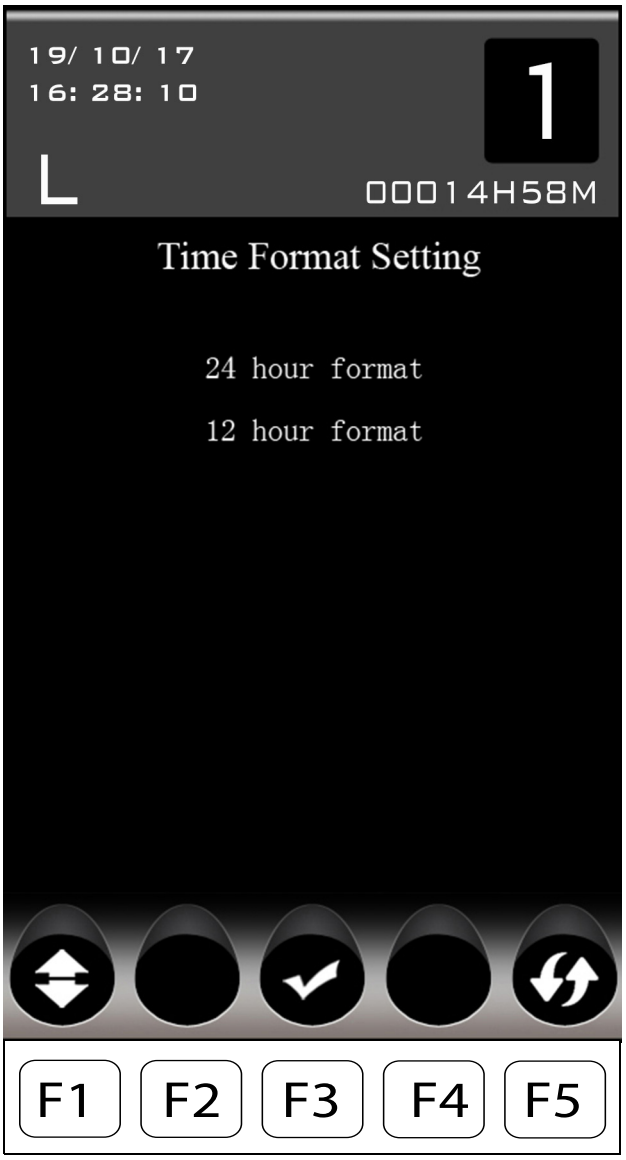


Fig. 3-48 0004561

Language Setting Screen

1. Navigate to this option on the System Setting screen, then press F3.

2. Press F1 and F2 to move up or down through the language options.

3. Then do the following:

   - Press F3, turn the key switch to OFF, and then back to ON, to confirm the selection.

   - Press F5 to return to the System Setting screen without making any changes.

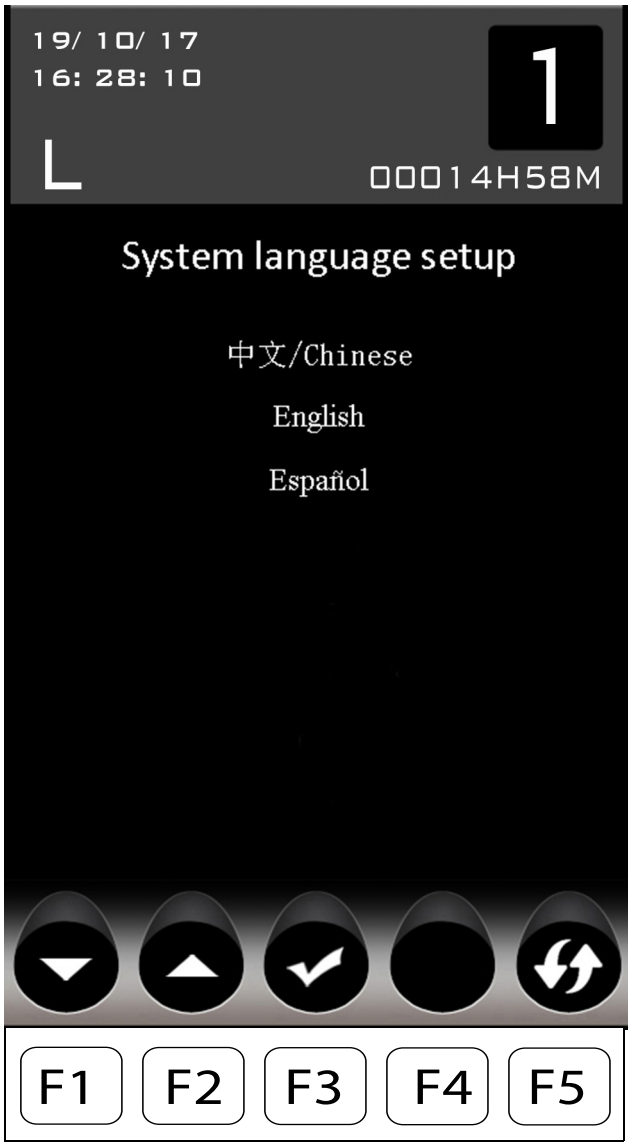


Fig. 3-49 0004567

Machine Configuration Screen

This screen is for SANY technician use only and requires a password.

Tool Select Screen

NOTE: Use the Tool Select screen to specify which equipment is attached to the machine and adjust the hydraulic oil flow for the equipment if needed.

1. Press F1 five times at the Main Menu screen to navigate to the Tool Select option, then press F3.

   NOTE: No password is required for this screen.

2. Press F1 and F2 to scroll up and down the displayed list.

   NOTE: The quick coupler is only available on the SY225C LC machine.

3. Then do the following:

   - Press F3 to confirm the selection and proceed to the next screen.
   - Press F5 to return immediately to the Main Menu screen without specifying any tool.

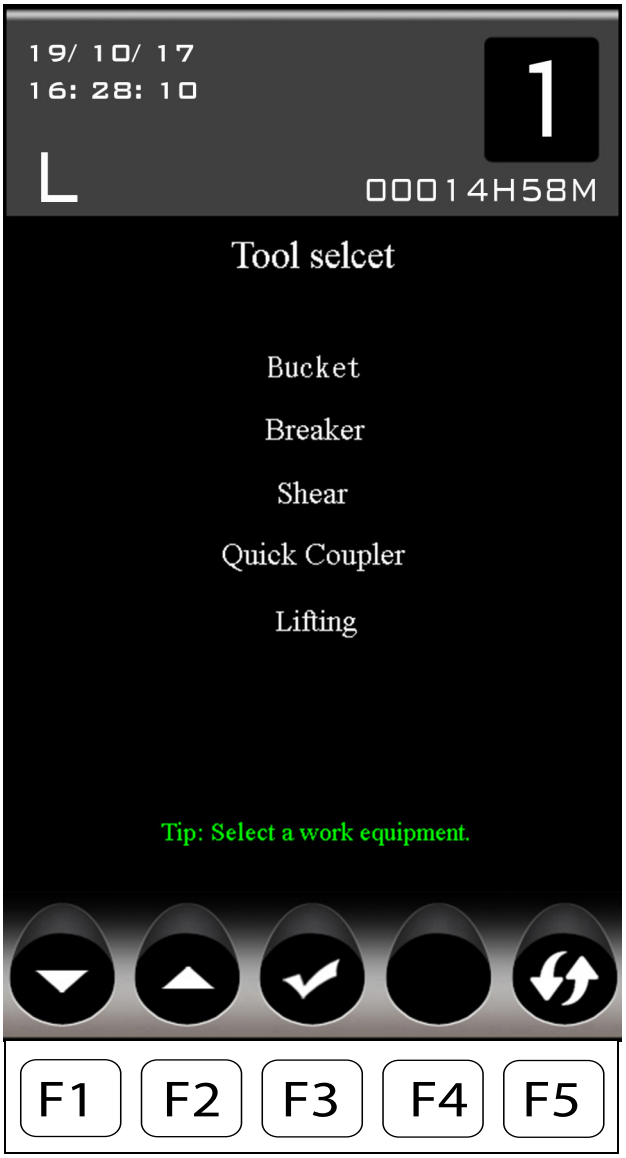


Fig. 3-50 0004566

Bucket

Selecting the bucket option returns you to the Main Menu screen and places the bucket icon (1) on the home screen.

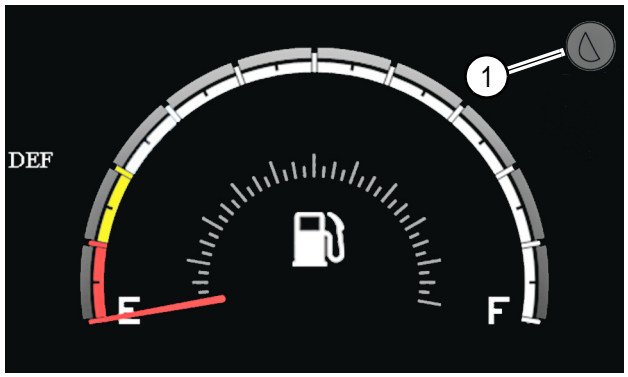


Fig. 3-51 0004596

Breaker

Use this screen to enable the right joystick rocker switch for the breaker or other one-way flow equipment operation, and to adjust the hydraulic oil flow for this tool.

1. Press F1 or F2 to increase or decrease the hydraulic oil flow rate as needed.

   NOTE:

   - The available range is 13.2 gpm–105.6 gpm (50 Lpm–400 Lpm).
   - The numeric values for liters per minute and gallons per minute will change, and the progress box will fill and empty to graphically indicate the chosen hydraulic oil flow rate.

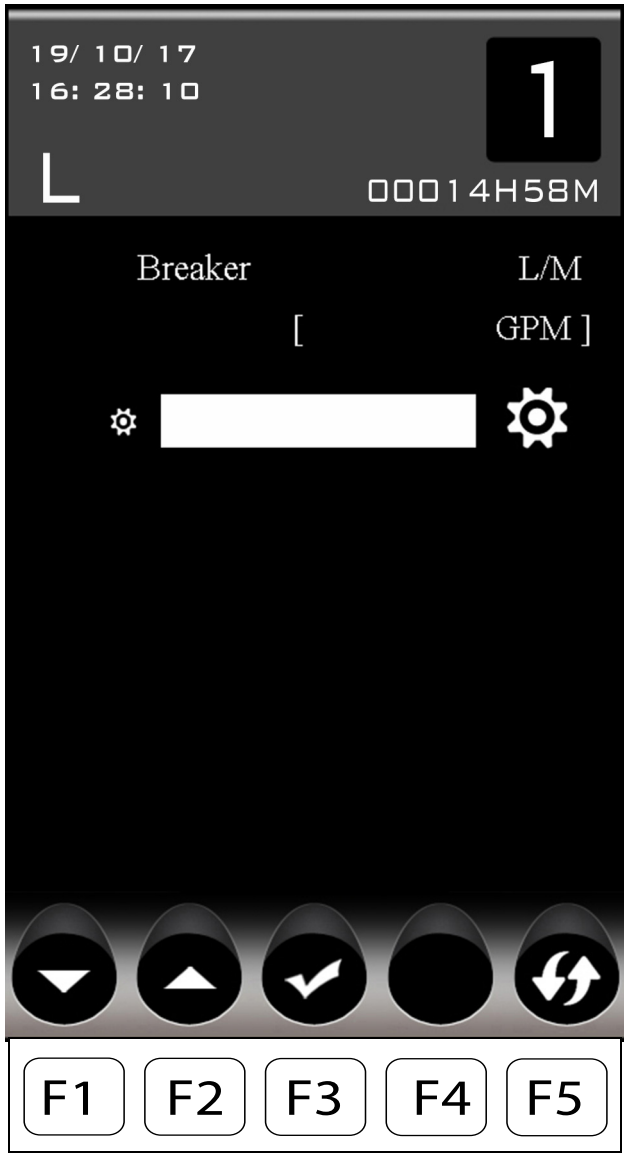


Fig. 3-52 0004566

2. Then do either of the following:

   - Press F3, turn the key switch to OFF, and then back to ON, to enable the rocker switch on the right joystick for one-way flow equipment operation, to confirm the hydraulic oil flow rate, and to place the breaker icon (1) on the home screen.

   - Press F5 to return to the Tool Select screen without making any changes.

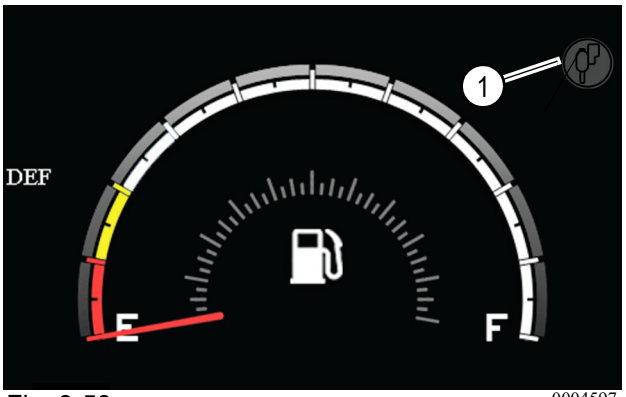


Fig. 3-53 0004597

Shear

NOTE: Use this screen to enable the joystick switches for shear or other two-way flow tool operation, and to adjust the hydraulic oil flow for this tool.

1. Press F1 or F2 to change the hydraulic oil flow rate for rotation of this tool.

The range available is 10.5 gpm–18.4 gpm (40 Lpm–70 Lpm).

The numeric values for liters per minute and gallons per minute will change and the progress box will fill and empty to graphically indicate the chosen hydraulic oil flow rate.

2. Press F4 to move to the open/close hydraulic oil flow rate adjustment for this tool.

3. Press F1 or F2 to change the hydraulic oil flow rate for the open/close action of this tool.

   NOTE:

   - The available range is 13.2 gpm–5.6 gpm (50 Lpm–400 Lpm).

   - The numeric values for liters per minute and gallons per minute will change, and the progress box will fill and empty to graphically indicate the chosen hydraulic oil flow rate.

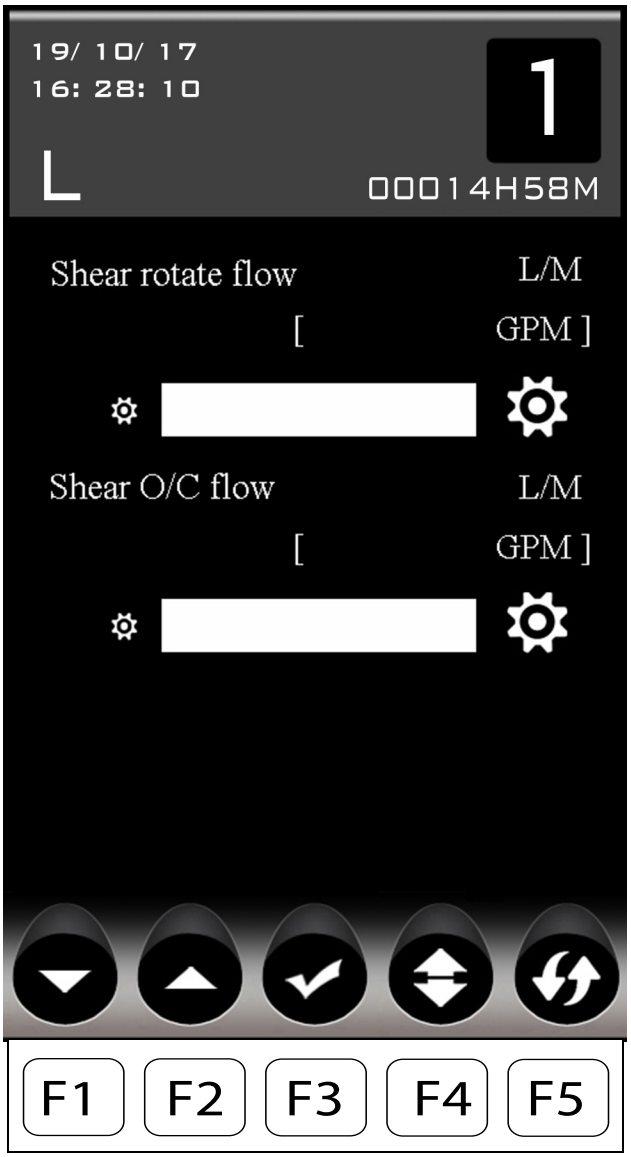


Fig. 3-54 0004563

4. Then do either of the following:

    - Press F3, turn the key switch to OFF, and then back to ON, to enable the joystick switches for two-way flow tool operation, to confirm the hydraulic oil flow rates, and to place the shear icon (1) on the home screen.

    - Press F5 to return to the Tool Select screen without making any changes.

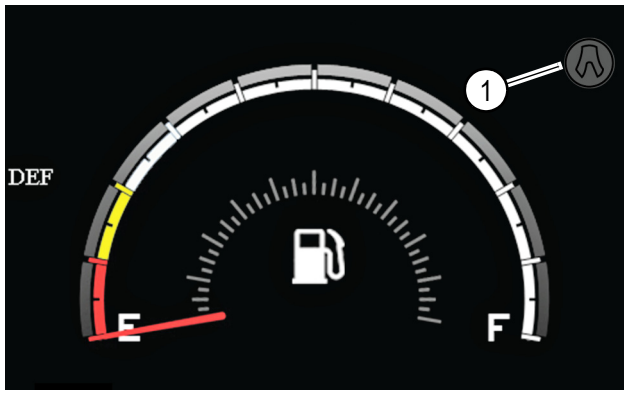


Fig. 3-55 0004598

Quick Coupler Screen (SY225C LC Only)

The Quick Coupler screen displays the hydraulic oil pressures (1) and operates the quick coupler (if equipped) for attaching and removing work tools.

1. Press F2 to activate the quick coupler function.

2. Press F1 to unlock the quick coupler and allow removal of the work tool.

3. Press F3 to lock the quick coupler to secure the work tool.

4. Press F2 to deactivate the quick coupler function.

    - Press F5 to return to the Tool Select screen.

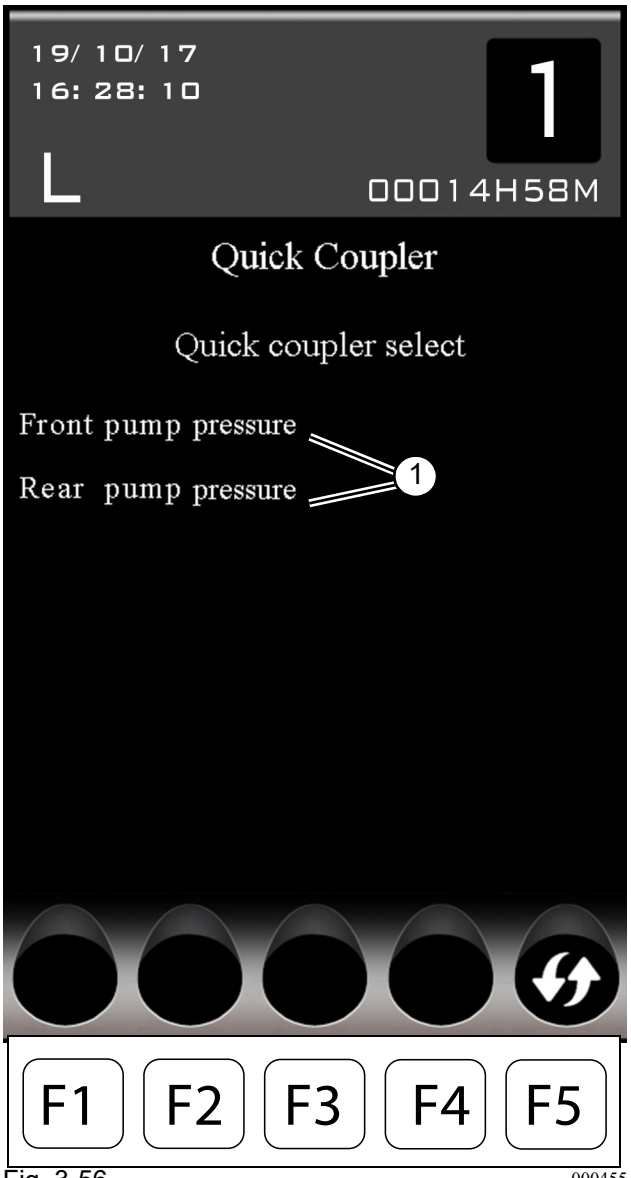


Fig. 3-56 000455

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SANY

Machine Operation

WORK AREA

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

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

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

GENERAL JOB SAFETY

NOTE: See "Job Safety" on page 2-11.

Operator Responsibilities

The machine operator must perform the following:

- Reject the job site if there are doubts regarding safety.
- Become familiar with the work area and surroundings before beginning work.
- Read and completely understand the instructions in this manual prior to operation.
- Know and obey all operating procedures, applicable laws, and regulations.
- Know and follow the requirements for safe operation.
- Know and use the required safety precautions and protective devices.
- Know and use the correct hand signals 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

This manual must be readily available to the operator at all times and must remain on the machine while it is in use.

Daily Maintenance Record Check

Check the Maintenance Record 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 the proper authority. See “Maintenance Log” on page 1-3 and “Maintenance Schedule” on page 5-15.

CLEANING THE MACHINE

Cleaning the Machine Exterior

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 these items are cleaned before operating the machine:

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

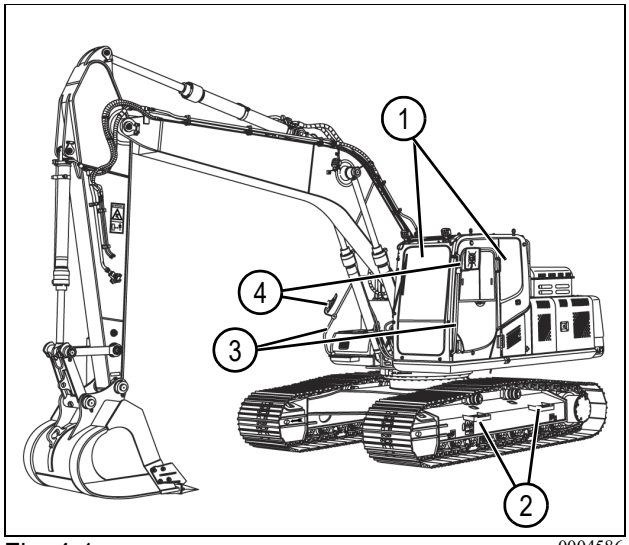

Fig. 4-1 0004586

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, which could result in injury.

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

Check that the escape tool and fire extinguisher are present. See “Check the Final Drive” on page 5-52 and “Check the Fire Extinguisher” on page 5-55.

PRESTART CHECKS AND ADJUSTMENTS

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

- Check the maintenance log to verify that all required maintenance checks have been performed before operating the machine.
- Check the machine for loose hardware, fluid leaks, and any other signs of damage. Make repairs as necessary.
- 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 (tracks, sprockets, rollers, and guards) for damage, wear, loose fasteners, and oil leaks. Make repairs as necessary.
- Check the bucket or optional equipment for damage. Clean and check the rearview mirrors and side mirrors for damage. Repair if necessary. Adjust the mirrors so the area behind the machine is visible from the operator seat.
- Check the seat belt and buckle for damage or wear. Replace if necessary.
- Check the monitor in the cab. Replace or repair any malfunctioning parts and components. See “Daily or 10 Hours” on page 5-15.

Mirror Adjustment

See “Adjust the Mirrors” on page 5-73.

Check Fluid Levels

Complete the following procedures before starting the engine:

Engine Coolant Level

See “Check the Engine Coolant Level” on page 5-47.

Engine Oil Level

See “Check the Engine Oil Level” on page 5-48.

Fuel Level

See “Check the Fuel Level” on page 5-56.

Diesel Exhaust Fluid (DEF) Level

See “Check the Diesel Exhaust Fluid (DEF) Level” on page 5-36.

Primary Fuel Filter/Water Separator

See “Drain the Primary Fuel Filter” on page 5-81.

Hydraulic Oil Level

See “Check the Hydraulic Oil Tank Level” on page 5-70.

Windshield Washer Fluid

See “Check the Windshield Washer Fluid and Windshield Wiper” on page 5-101.

Electrical Component Checks

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.**
- **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 3-26.**
- **Clear 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.
- Check 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

Check the Fuses

Check the fuses. See “Fuses” on page 3-26.

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. Complete all prestart checks and adjustments. See “Prestart Checks and Adjustments” on page 4-6.
2. Turn the battery disconnect switch to the ON position. See “Battery Disconnect Switch” on page 3-25.
3. When in the operator seat, buckle the seat belt. See “Seat and Seat Belt” on page 3-5.
4. Move the hydraulic lockout control lever (1) to the locked (closed) position. If the hydraulic lockout control lever is in the unlocked (open) position, the engine will not start.

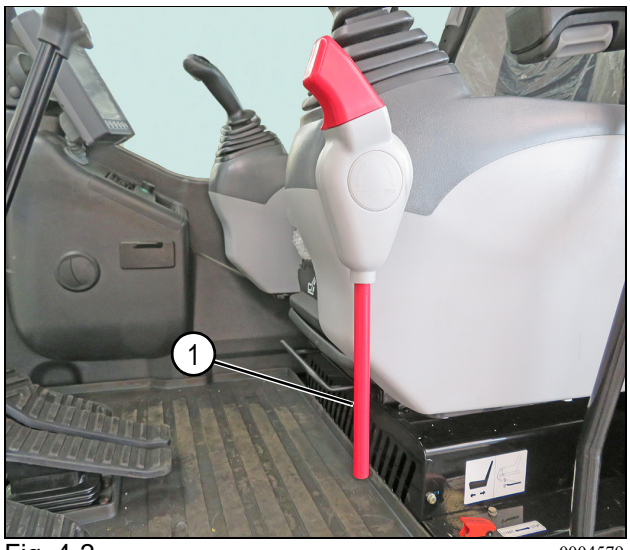

Fig. 4-2 0004579

5. Make sure the emergency stop switch is set to its forward position with the red cover (2) over it.

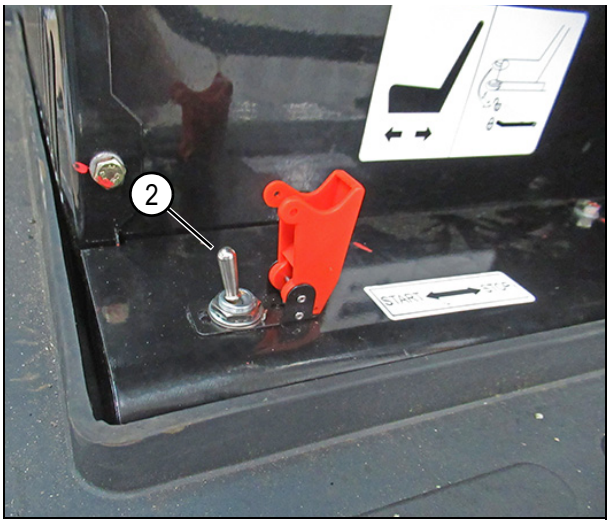

Fig. 4-3 0004651

NOTICE!

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

6. Turn the throttle control dial (4) counterclockwise to the MIN (3) position.

Fig. 4-4 0004591

7. Turn the key switch to ON.

   NOTE: The monitor will display the home screen a few seconds after the key is turned ON.

The home screen includes:

- System date and time (5)
- Service hours (6)
- System status and service indicators (7)
- Machine fault indicator (8)
- Engine coolant temperature (9)
- Engine speed (rpm) (10)
- DEF level gauge (11)
- Fuel level gauge (12)

NOTE: A warning indicator (8) illuminates in yellow if a failure is detected.

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

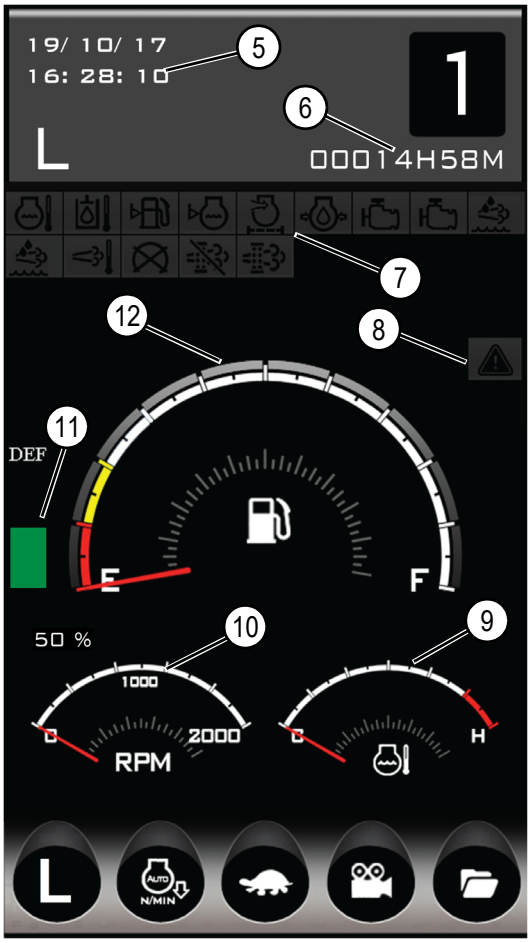

Fig. 4-5 0004595

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, 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.

9. Turn the key switch to START, then immediately release it when the engine starts.
10. Immediately check for black exhaust smoke, very loud noise, or excessive vibration. If found, shut down immediately and notify a SANY dealer.
11. Check the engine monitoring instruments and monitor for any warning indicators after starting.
12. Shut down the engine if a warning indicator is shown on the display screen and contact a SANY dealer.

Cold Weather Starting

WARNING!

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

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

1. Complete all prestart checks and adjustments. See “Prestart Checks and Adjustments” on page 4-6.
2. Check the fluid levels before starting the engine. Drain water and sediment from the fuel water separator once a week. See “Drain the Primary Fuel Filter” on page 5-81.
3. Turn the battery disconnect switch to the ON position. See “Battery Disconnect Switch” on page 3-25.
4. When in the operator seat, buckle the seat belt. See “Seat and Seat Belt” on page 3-5.

5. Move the hydraulic lockout control lever (1) to the locked (closed) position. If the hydraulic lockout control lever is in the unlocked (open) position, the engine will not start.

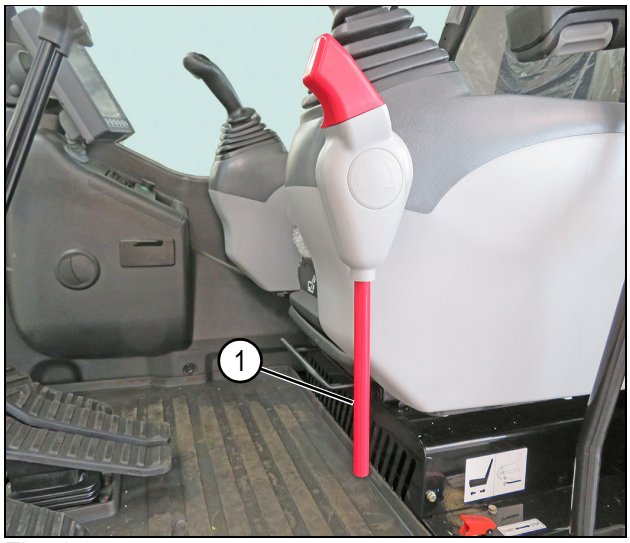

Fig. 4-6 0004579

6. Make sure the emergency stop switch (2) is set to its forward position with the red cover (3) over it.

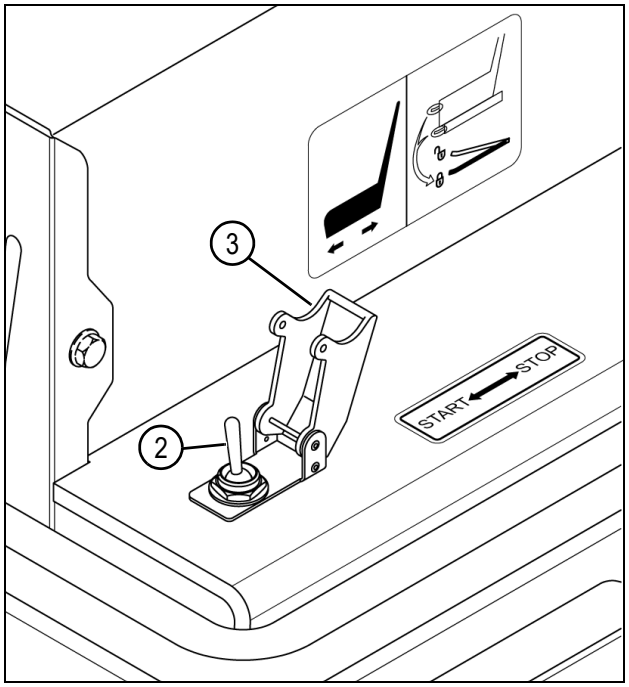

Fig. 4-7 0003750

NOTICE!

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

7. Turn the throttle control dial (4) counterclockwise to the MIN (3) position.

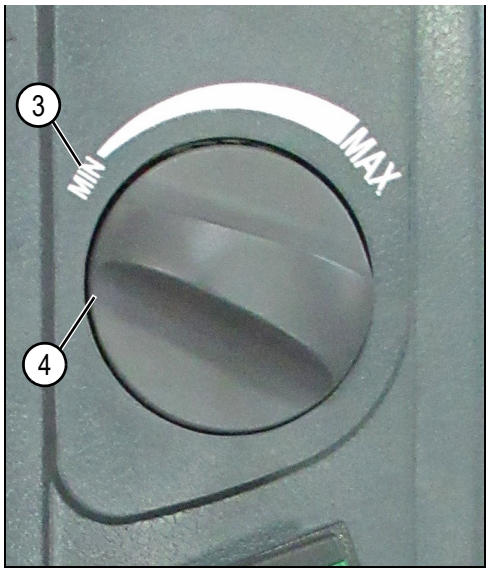

Fig. 4-8 0004591

8. Turn the key switch to the HEAT position (5) and release. The key switch returns to the OFF position (6). The preheat cycle begins if the engine coolant temperature is less than a preset value. When the preheat cycle begins, a preheat icon is illuminated on the home screen. When the preheat cycle is complete, the preheat icon will turn off.

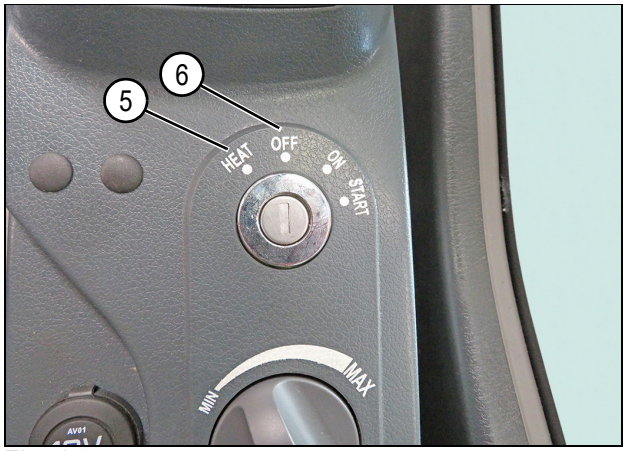

Fig. 4-9 0004577

9. Turn the key switch to ON.

   NOTE: The monitor will display the home screen a few seconds after the key is turned ON.

The home screen includes:

- System date and time (7)
- Service hours (8)
- Machine fault indicator (9)
- Periodic maintenance prompt (10)
- Engine coolant temperature (11)
- Engine speed (rpm) (12)
- DEF level gauge (13)
- Fuel level gauge (14)

NOTE: A warning indicator (10) illuminates in yellow if a failure is detected.

10. Sound the horn to warn personnel the machine is being started.

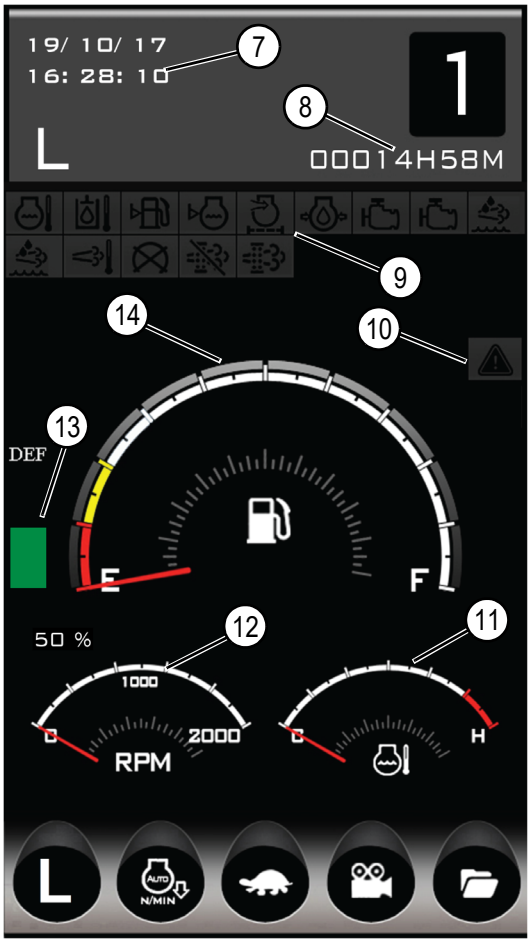

Fig. 4-10 0004595

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, 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.

11. Turn the key switch to START, then immediately release it when the engine starts.

12. Immediately check for black exhaust smoke, very loud noise, or excessive vibration. If found, shut down immediately and notify a SANY dealer.

13. Check the engine monitoring instruments and monitor for any warning indicators after starting.

14. Shut down the engine if a warning indicator is shown on the display screen and contact a SANY dealer.

Warm-up Operation

WARNING!

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

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

NOTICE!

- **Never operate the machine immediately after starting the engine.**
- **Allow the engine to warm to 140°F (60°C), and the hydraulic oil to warm to 104°F (40°C), before beginning operations.**

Perform the following warm-up procedures:

1. Deactivate the auto idle mode after starting the engine and adjust the throttle so the engine runs unloaded at 1250 rpm for 5 minutes.
2. Adjust the throttle so the engine runs at 1400 rpm, then slowly operate the bucket for 5 minutes.
3. Adjust the throttle so the engine runs at maximum rpm, then operate the boom, arm, and bucket for 5 to 10 minutes.
4. Repeat all movements several times and stop the warm-up process. Check the gauges 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

WARNING!

When working with any open electrical power circuit, 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 observe and follow this warning could result in death or injury.

CAUTION!

Before proceeding with any battery maintenance procedure, remember and follow these points:

- **Battery gases are explosive. Never smoke around batteries or expose them to sparks or open flames.**
- **Wear personal protective equipment when working with batteries.**
- **Work in a well-ventilated area.**
- **If battery acid contacts your skin or eyes, flush the area immediately with fresh water and seek medical attention.**

Failure to observe and follow this caution could result in injury.

NOTICE!

The starting system voltage and the battery voltage in the boosting machine should be no more than 24 VDC. Never use a welder or equipment with a higher voltage system to jump-start the machine. Using a 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, have no corrosion, and be suitable for the amperage. All clamps must be securely attached to their jumper cable ends.

Set all controls to their neutral positions.

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

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

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

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 ground (black) terminal (–) of the charged battery.

5. Clamp the other end of the second jumper cable to the ground (black) terminal (–) or an unpainted part of the structure of the machine with the drained battery.

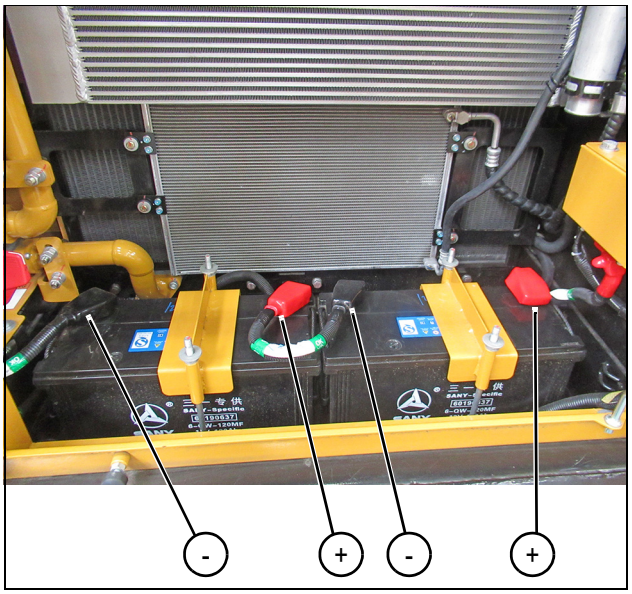

Fig. 4-11 0003759

NOTICE!

Make sure all jumper cables are clamped to their connections securely. Failure to observe and follow this notice can damage the machine or cause it to operate improperly.

6. Start the engine of the machine with the charged battery and run it at medium speed.

7. Attempt to start the engine of the machine with the drained battery. Retry every 3 minutes if the engine will not start.

   NOTE: Contact a SANY dealer if the engine will not start after five attempts.

8. Disconnect the jumper cables from the machine that had the drained battery, in reverse order as above.

9. Disconnect the cables from the machine with the charged battery in the same way.

New Machine Break-in

NOTICE!

This machine has undergone thorough adjustment and testing before delivery. Allow the machine to operate in medium-duty applications to break in the engine and hydraulic system. Failure to properly break in a new machine may shorten the service life of the machine.

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, allowing time for internal engine parts to break in properly. Make sure the machine is in normal working condition before proceeding with break-in. Contact a SANY dealer for details on breaking in the engine.

1. Start and run the engine at a low idle until it reaches proper operating temperatures. Do not move the controls or the throttle.

2. Avoid operating the machine under heavy loads or at high speeds during the break-in period. Operate as much as possible in the 1/2 to 3/4 throttle or load range. Do not operate this machine with a full load during the break-in period.

3. Avoid sudden starts, movements, or stops.

4. Monitor the instruments frequently, especially the engine oil pressure and coolant temperature. Shut down the machine at the first indication of an abnormal reading.

5. Avoid running the engine at idle for long periods of time. Manage engine power to allow acceleration to governed speed when conditions require more power. Do not over-rev the engine.

6. Always allow the engine to cool before shutting it off.

7. After shutting off the engine, check the fluid levels.

Engine Shutdown Procedure

NOTICE!

- **To avoid accelerated engine component wear, always allow the engine to idle for 5 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 gradually before shutting it down.**

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

1. Park the machine on a flat, level, stable surface.
2. Lower the work equipment to the ground.
3. Adjust the throttle control dial to MIN (low idle) and allow the engine to idle for 5 minutes to cool down.
4. Turn the key switch to OFF.
5. With the engine off and the key in the ON position, raise the hydraulic control lever to the unlocked (open) position and operate all hydraulic controls to relieve the hydraulic system pressure.
6. Turn the key switch to OFF and remove the key. Put the hydraulic lockout control lever back to the locked (closed) position.

Inspection After Engine Shutdown

1. After shutting down the engine, conduct a walk-around inspection. Check the work equipment, the exterior of the machine, and the undercarriage.
2. Check all fluid and oil levels.
3. Fill the fuel tank with diesel fuel. See “Fill the Fuel Tank” on page 5-57.
4. To prevent fires, clear the engine compartment of combustible debris.

1. 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 operator 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 observe and follow these warnings could result in death or injury.

NOTICE!

- **Standard travel direction: The idlers are in the front of the track frame, and the travel motors are at the rear of the track frame. If the travel motors are at 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 15 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.

1. Rotate the throttle control dial (2) clockwise to MAX (high idle) (1).

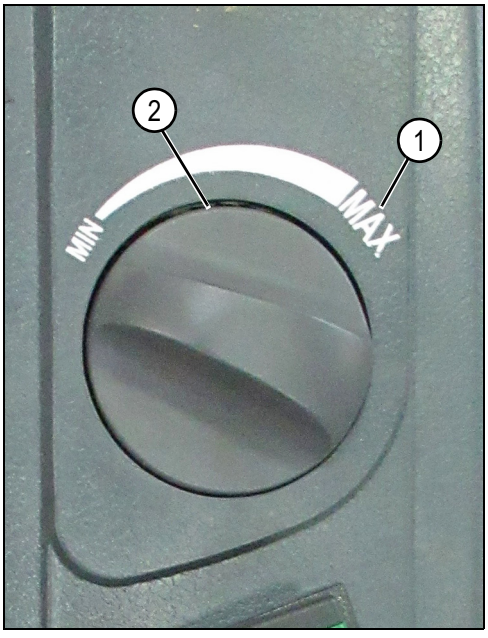

Fig. 4-12 0004591

2. Place the hydraulic lockout control lever (3) in the unlocked (open) position.

3. Check the surroundings and sound the horn before moving the machine.

4. Raise work equipment a minimum of 16 in.–20 in. (40 cm–50 cm) above the ground.

5. Retract the boom for good visibility.

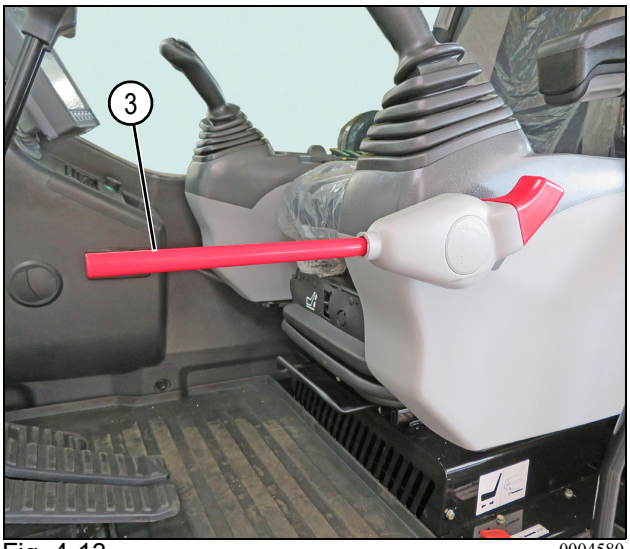

Fig. 4-13 0004580

Track Direction

A direction arrow (1) on each of the track frames indicates the forward direction of the undercarriage. Check these arrows before using the travel control levers/pedals. When possible, face the cab in the direction of the arrow. 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 normal position.

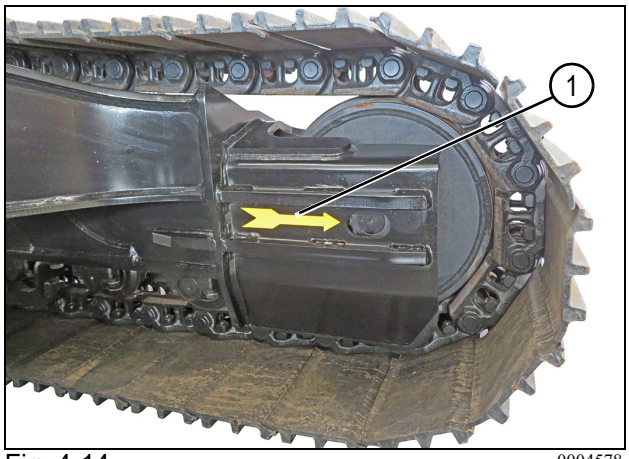

Fig. 4-14 0004578

Travel with Undercarriage Reversed.

WARNING!

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

When the cab faces in the opposite direction of the arrows on the track frames, the machine moves forward when you pull the travel controls, and backward when you push the travel controls.

SANY does not recommend traveling with the undercarriage reversed.

Always keep in mind that with the undercarriage reversed, the travel controls will be working in the opposite direction from normal travel

Stopping the Machine

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

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.

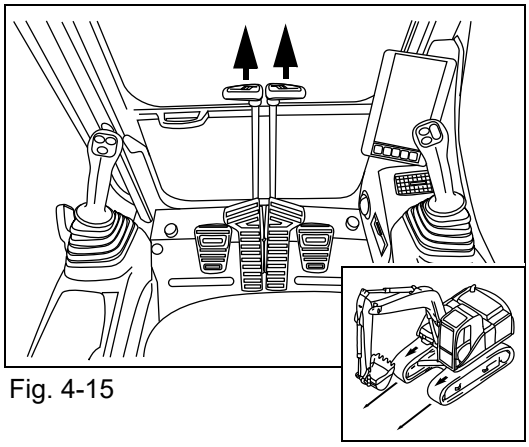

Fig. 4-15

Right Turn

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

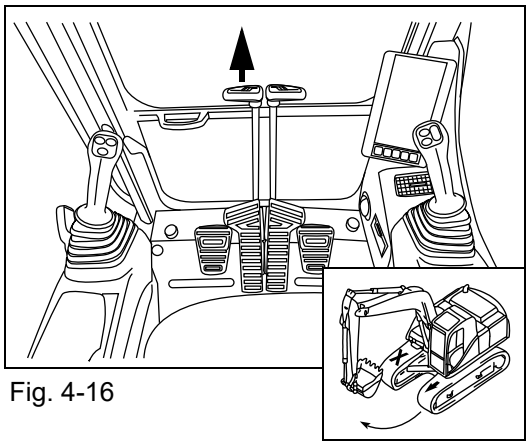

Fig. 4-16

Left Turn

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

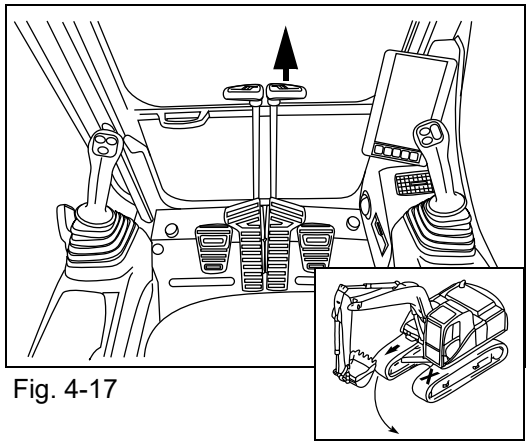

Fig. 4-17

Spot Turning

To the Left

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

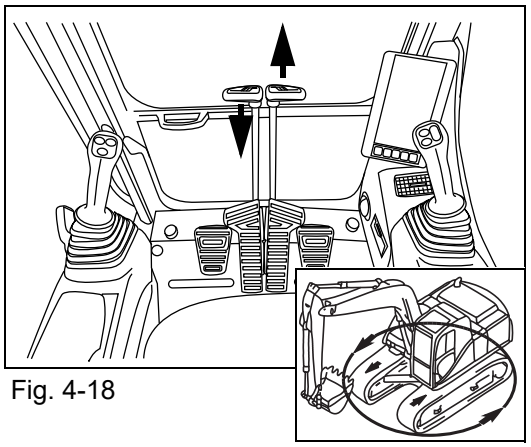

Fig. 4-18

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.

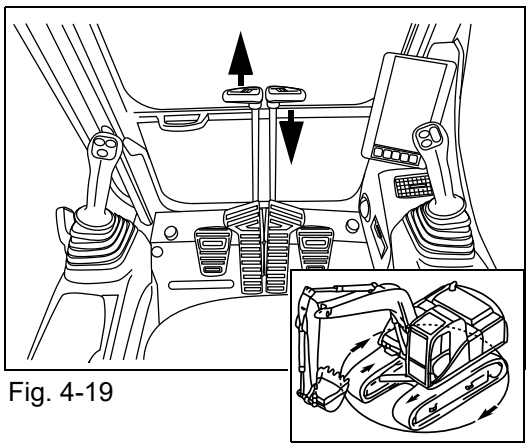

Fig. 4-19

Incline

Observe the following when operating a machine on a slope:

- Do not travel on a slope exceeding 15° (26.8%) side to side or 35° (70%) fore and aft.
- The hydraulic tank must be more than half full.
- Avoid holes, rocks, extremely soft surfaces, and other obstacles that might subject the machine to undue stresses and possible tipover.
- Position the bucket 16 in. to 20 in. (40 cm to 50 cm) above the ground while traveling.
- Always set the throttle control dial to maintain a slow speed while traveling up or down a slope.
- Do not turn the machine while on a slope.
- Do not travel in reverse on a slope.

WORK EQUIPMENT CONTROLS

WARNING!

Never allow any personnel to be within 26 ft. (8 m) of the machine while it is moving.

Be aware of all crush points on the machine and ensure that all personnel keep clear of these areas.

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

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

To change the operating mode. See “Check the Pattern Change (SAE/BHL) Valve” on page 5-79.

Swing – SAE/BHL Mode

NOTE: The swing function is the same for SAE and BHL modes.

To swing the upper structure to the right, move the left joystick to the right.

To swing the upper structure to the left, move the left joystick to left.

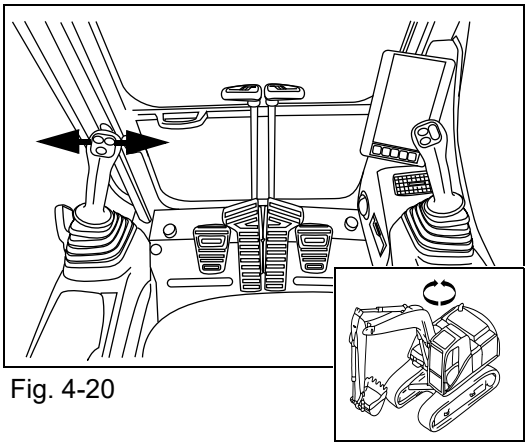

Fig. 4-20

Arm – SAE Mode

To extend the arm, push the left joystick.

To retract the arm, pull the left joystick.

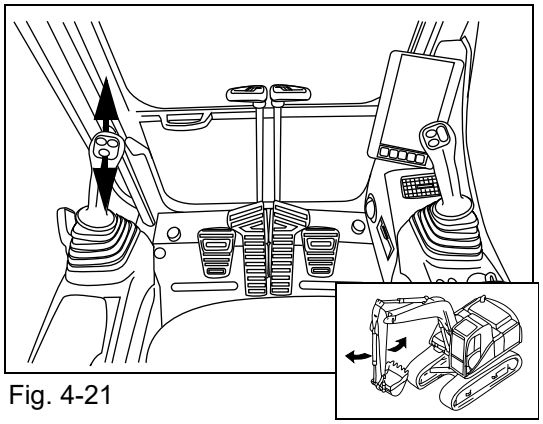

Fig. 4-21

Arm – BHL Mode

To extend the arm, push the right joystick.

To retract the arm, pull the right joystick.

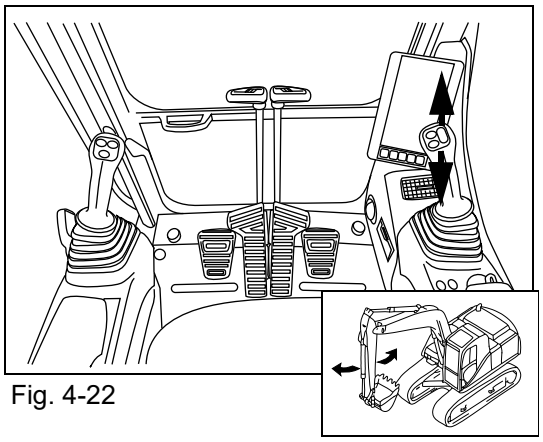

Fig. 4-22

Boom – SAE Mode

To raise the boom, pull the right joystick.

To lower the boom, push the right joystick.

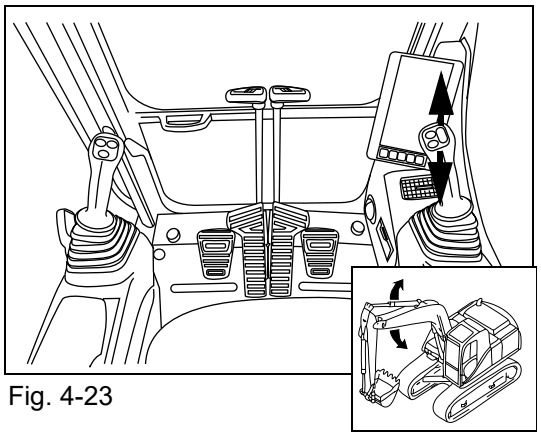

Fig. 4-23

Boom – BHL Mode

To raise the boom, pull the left joystick.

To lower the boom, push the left joystick.

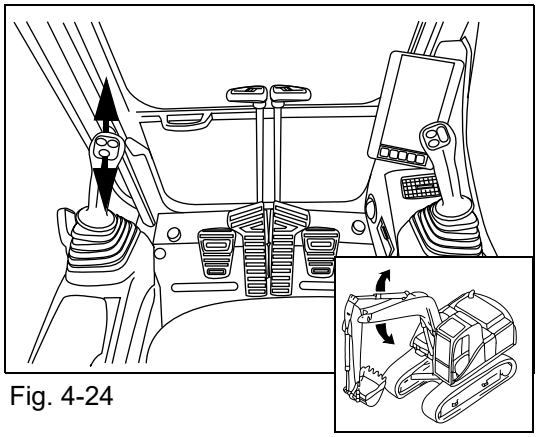

Fig. 4-24

Bucket – SAE/BHL Mode

NOTE: The bucket function is the same for SAE and BHL.

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

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

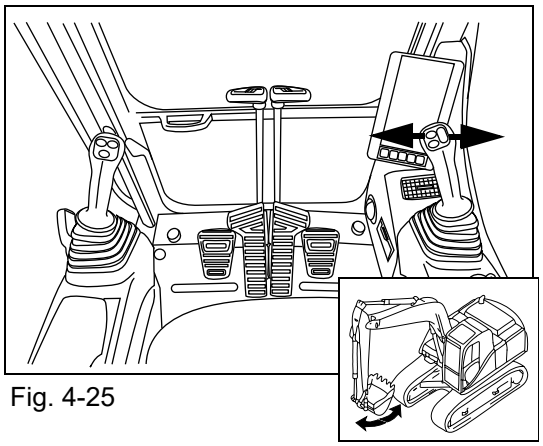

Fig. 4-25

RESTRICTED OPERATION

WARNING!

- **Use caution when operating work equipment while the machine is traveling.**
- **Use caution when operating work equipment while the machine is traveling.**
- **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

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.

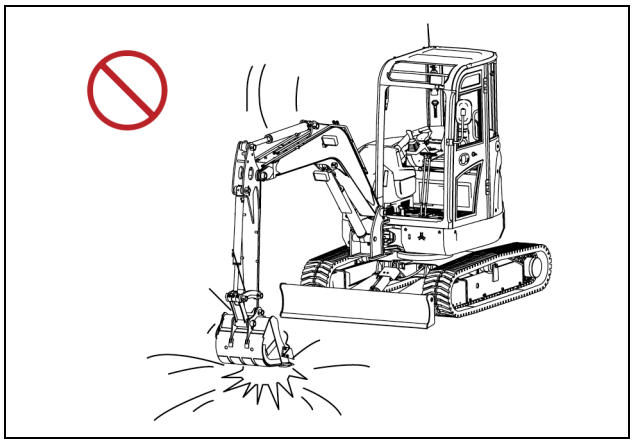

Fig. 4-26 0002866

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

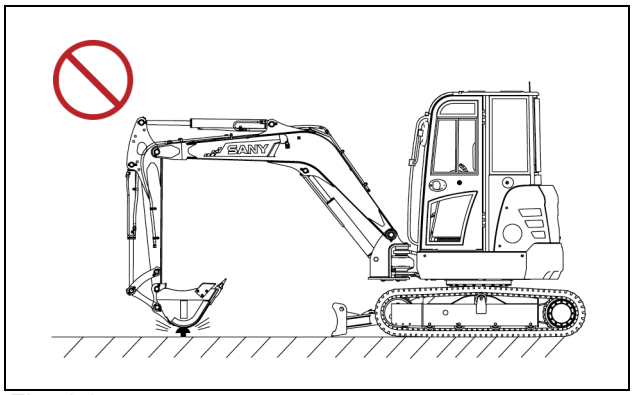

Fig. 4-27 0002868

Never Use Swing Force.

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.

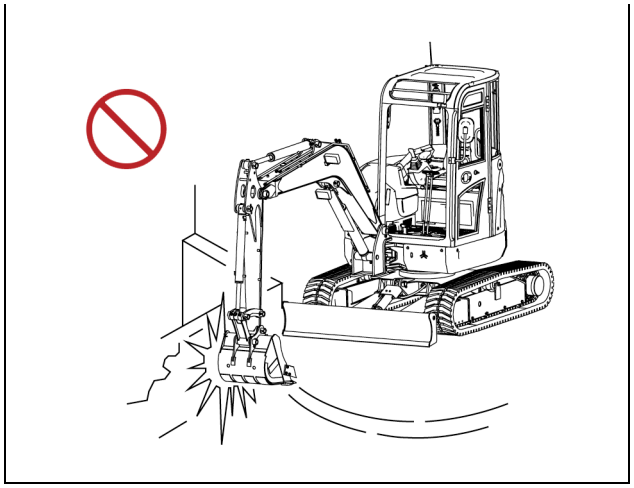

Fig. 4-28 0002846

Never Use Traveling Force.

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.

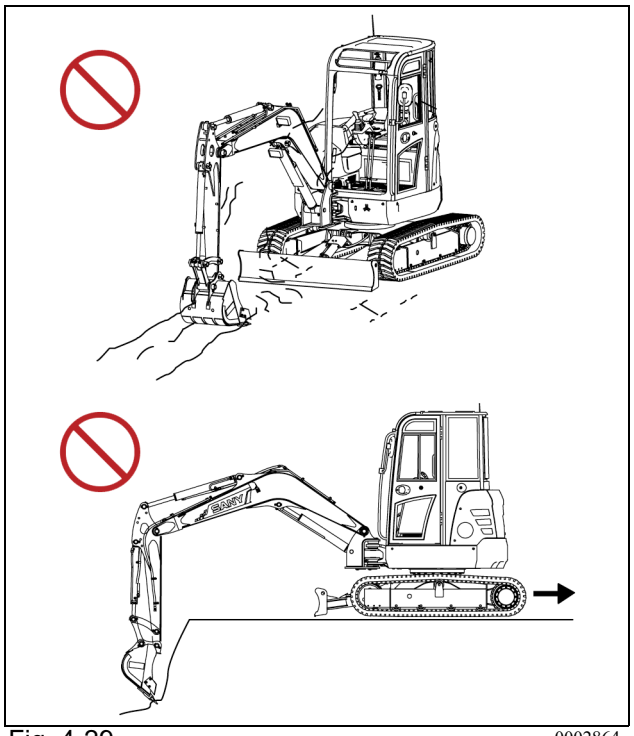

Fig. 4-29 0002864

Never Operate Using Machine Weight.

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.

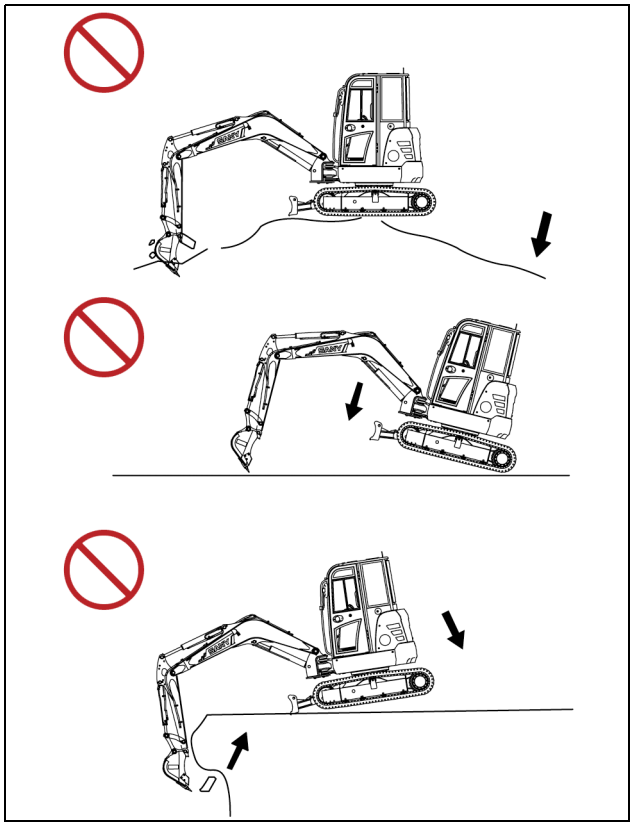

Fig. 4-30 0002870

Do Not Operate a Cylinder to the Stroke End

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.

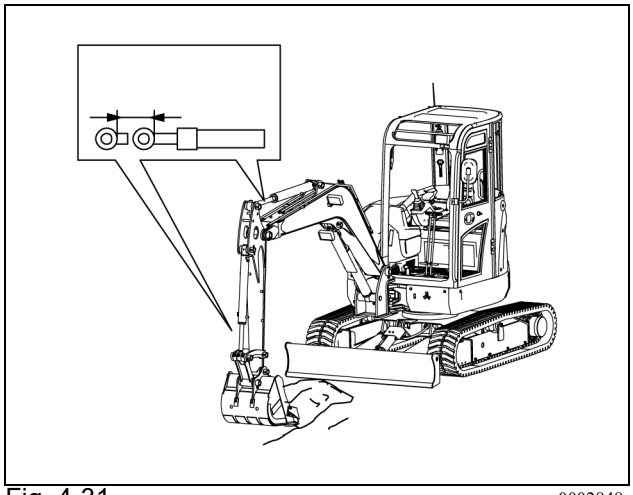

Fig. 4-31 0002848

Avoid Dozer Blade Impact

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.

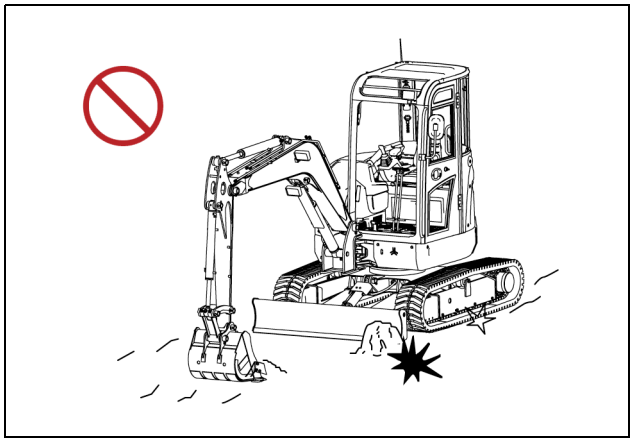

Fig. 4-32 0002874

Support Dozer Blade

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

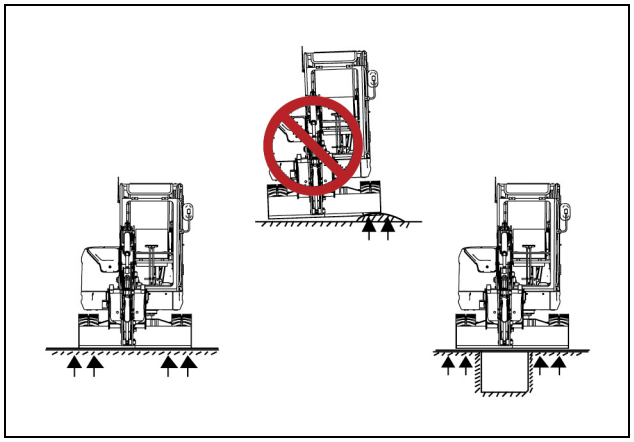

Fig. 4-33 0002876

Avoid Shifting Travel Direction Suddenly

- Never jerk the control levers. Jerking the control levers can cause travel motor strain and shorten the service life.
- Avoid moving the control levers quickly from forward travel to reverse travel.
- Never quickly move the control levers from high speed to neutral.

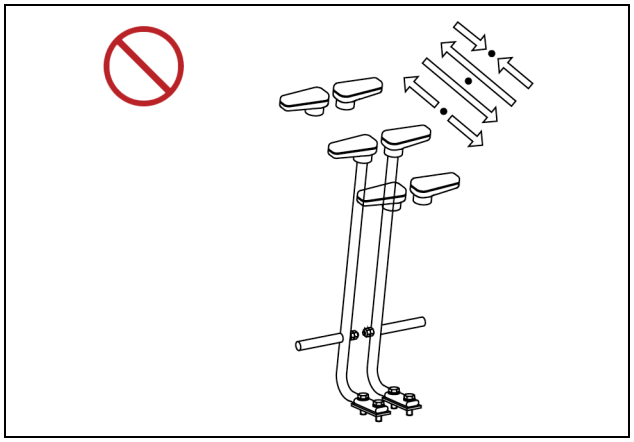

Fig. 4-34 0002876

Excavating Hard Ground

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

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 (1) are positioned behind the cab, press the top of the travel control pedals or push the travel control levers to move the machine forward.
- Select a flat travel surface and travel in a straight line. If possible, turn the machine slowly and gradually.

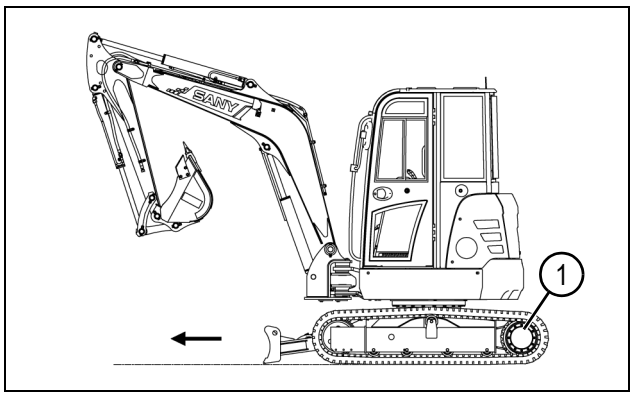

Fig. 4-35 0002878

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

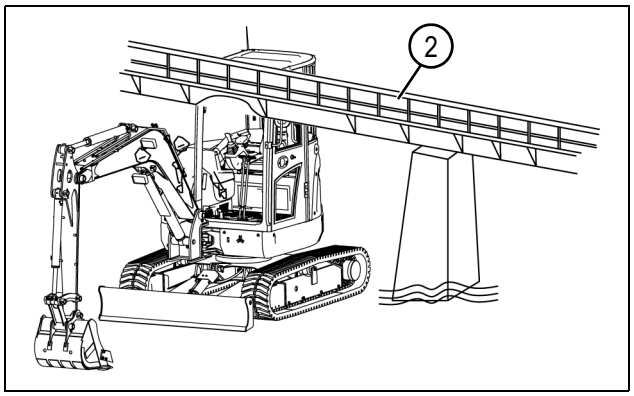

Fig. 4-36 0002880

- Do not drive or swing the machine on broken stones, rugged surfaces, steel bars, or scrap iron. This could cause personal injury or track damage.
- Do not perform operations where the rubber tracks may skid. This can cause early track wear.
- Slow the machine when traveling on uneven ground. A lower speed reduces the possibility of machine damage.

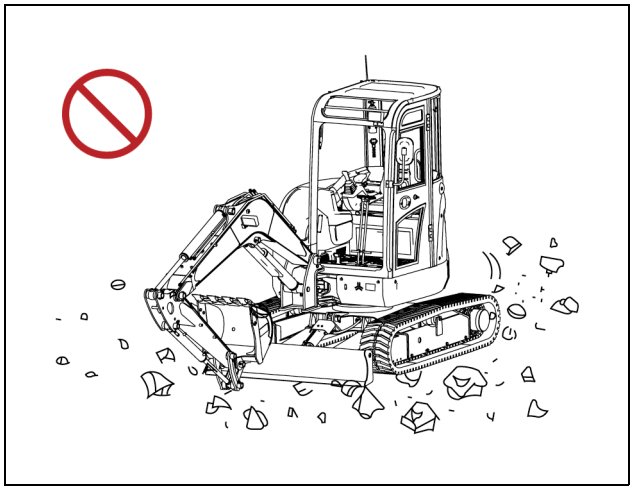

Fig. 4-37 0002882

- Do not operate the machine on a surface covered by small stones that could cause track skidding or damage.
- Avoid premature track wear or damage. Do not operate the machine on new asphalt or other hot surfaces.
- Do not allow fuels, oils, salt, or chemical solvents to make contact with the tracks. These substances will erode the track links and cause rusting and peeling. Wash these substances off the tracks immediately with clean water.
- Avoid operation of the machine in a marine environment. Salt in seawater can damage the tracks. Rinse the tracks if they were exposed to salt or salt water.

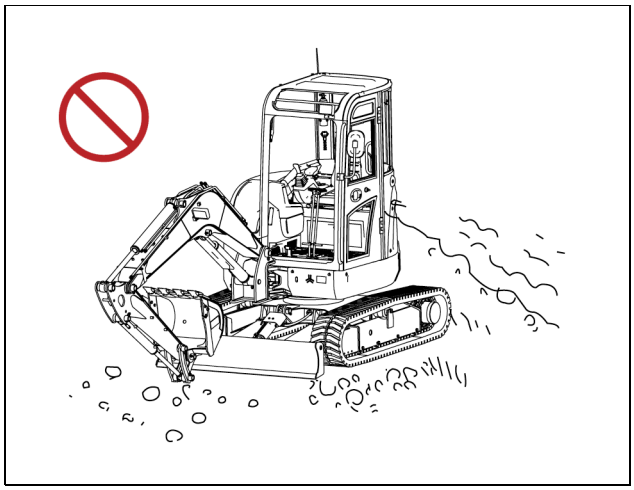

Fig. 4-38 0002884

Operations in Water

NOTICE!

- **Operate the machine slowly when traveling through water. Check the depth of the water with the bucket. Do not operate the machine in a marine environment. Salt in seawater can damage the tracks.**
- **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 damage the machine or cause the equipment to operate improperly.**

Observe the following when operating the machine in water:

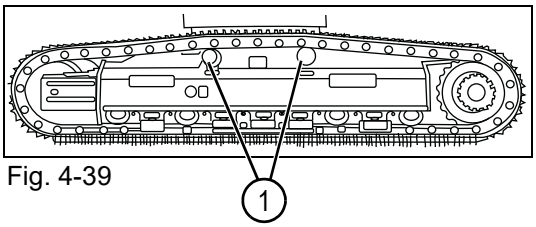

Fig. 4-39

- Do not drive the machine where the water level could reach the center of the carrier rollers (1).
- Grease the parts that have been submerged until the old grease has been displaced from the bearing (especially from the bucket pin).
- Do not operate the machine in water unless the work site foundation is strong enough to properly support 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 have been submerged in water, they must be cleaned. Lubricate the swing drive gear and swing bearing.

Precautions When Driving on an Incline

WARNING!

- **Operating 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 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 grade greater than 30°. Never attempt to cross a slope on a grade greater than 15°.
- Always keep the seat belt fastened.
- Point the bucket 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.
- Before traveling up a steep slope, allow the machine to warm up sufficiently so it performs well.

- Avoid crossing inclines as much as possible. Slipping or rolling over may occur.
- Do not swing (1) the upper structure on a slope.
- Do not swing the upper structure to the downhill direction; the machine may tip over. If such an operation is necessary, swing the upper structure and the boom with great care.
- Do not swing a loaded bucket to the downhill direction. Build a platform (2) on an incline so the machine can be operated on a level surface.

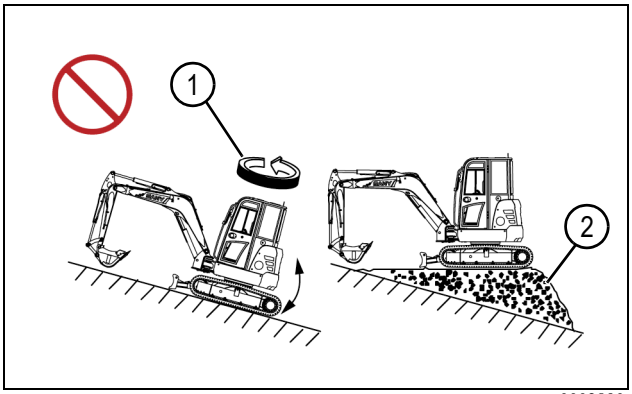

Fig. 4-40 0002890

- When traveling down a grade greater than 15°, the work equipment should be positioned in front of the cab with the final drive sprockets (4) in the uphill direction. Keep the boom-arm angle between 90° and 110° (3) and the bucket 8 in.–12 in. (20 cm–30 cm) (5) above the ground.

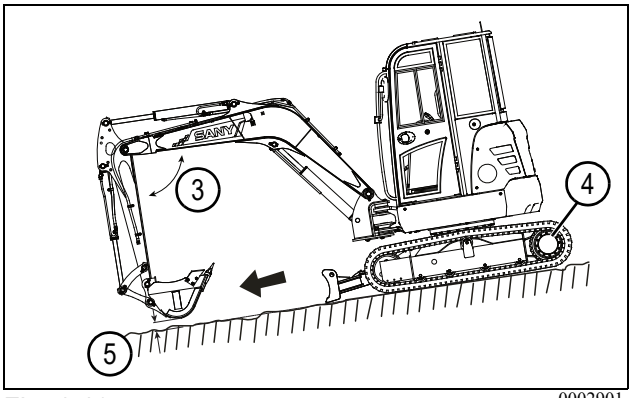

Fig. 4-41 0002901

- When traveling up a grade greater than 15°, the work equipment should be positioned in front of the cab with the final drive sprockets (7) in the downhill direction. Keep the boom-arm angle between 90° and 110° (6) and the bucket, 8 in.–12 in. (20 cm–30 cm) (8) above the ground.

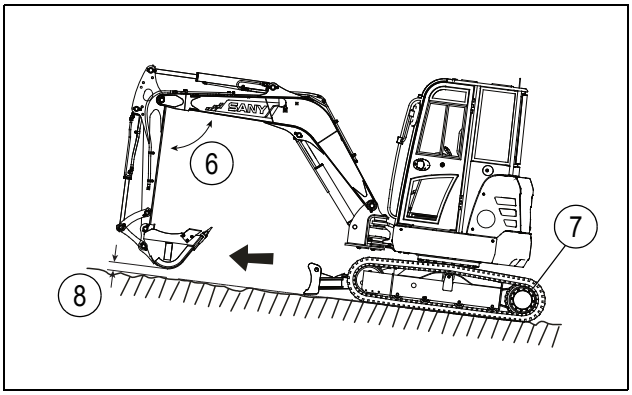

Fig. 4-42 0002903

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 them 8 in.–12 in. (20 cm–30 cm) (9) off the ground. Travel at low speed.
- When traveling uphill, keep the tracks in the forward direction.
- When traveling downhill, keep the bucket in the traveling direction and 8 in.–12 in. (20 cm–30 cm) (10) above the ground. Lower the bucket immediately if the machine slips or loses balance.

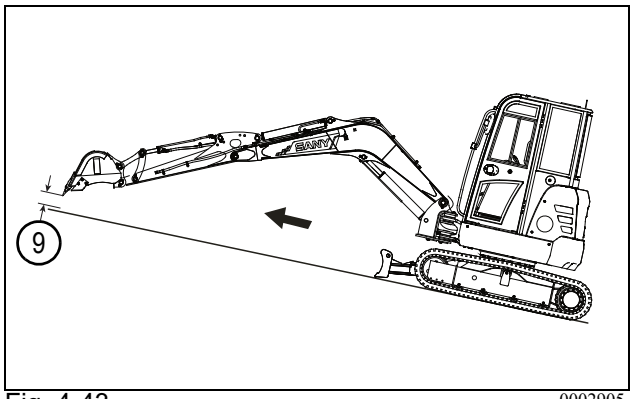

Fig. 4-43 0002905

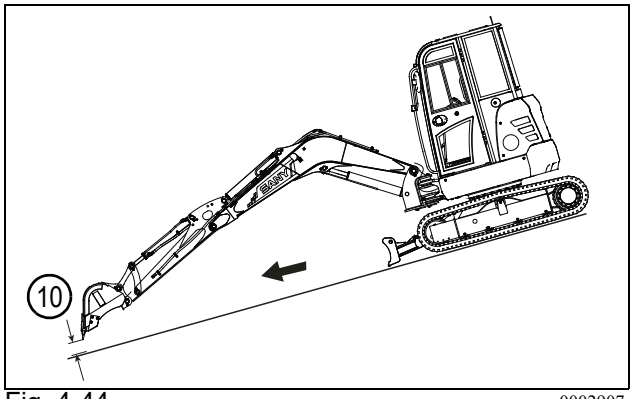

Fig. 4-44 0002907

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, move the hydraulic lockout control lever to the locked (closed) position, and restart the engine.

When the engine stalls on an incline, do not use the left joystick to swing the machine.

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 shoes 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. See “Removing a Stuck Machine” on page 4-37.

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 the back of the bucket contacts the ground.
4. Lower the boom to lift 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 the back of the bucket contacts the ground.
4. Lower the boom to lift the front of the tracks.
5. Place cribbing under the tracks to provide a firm surface as necessary.
6. 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.

Towing the Machine

WARNING!

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

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

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

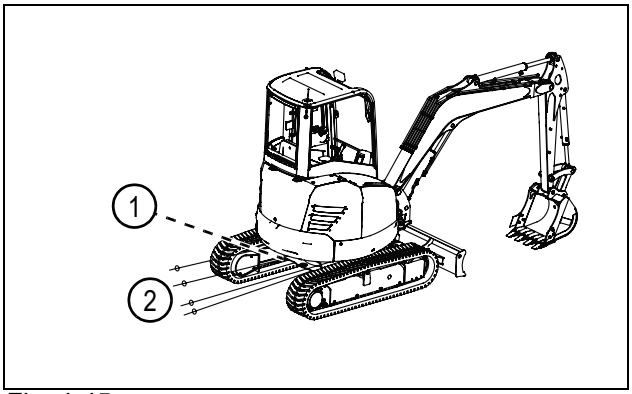

Fig. 4-45 0002911

Towing Hole for a Light Load.

NOTICE!

- **Make sure the wire ropes used for towing the machine are strong enough.**
- **A shackle must be used.**
- **Keep the wire ropes horizontal and parallel to the tracks.**
- **Drive the machine at low speed.**

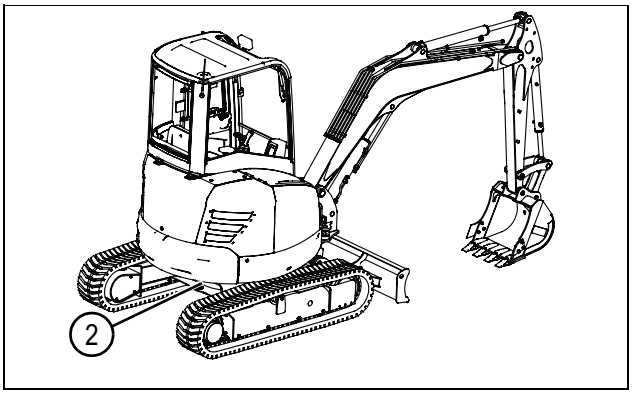

Fig. 4-46 0002913

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

RECOMMENDED OPERATIONS

WARNING!

- **Contact the proper authority before any digging to make sure that all underground hazards have been located.**
- **To avoid injury, never allow any personnel to be within the work zone of the machine.**
- **Be aware of all crush points on the machine and make sure that 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.**

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

Backhoe Operation

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

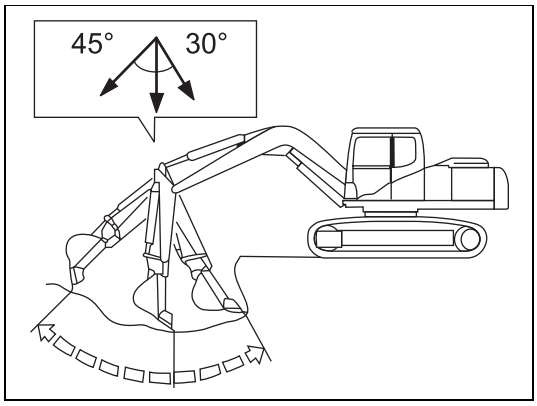

Fig. 4-47

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

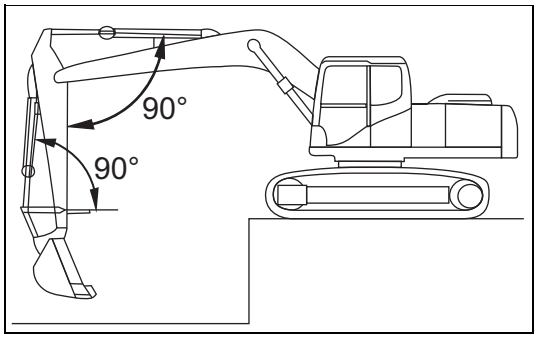

Fig. 4-48

Digging a Trench

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, excavate the sides first, then remove the middle.

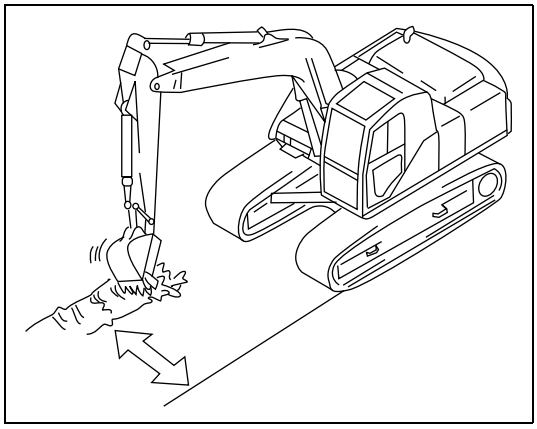

Fig. 4-49

Vehicle Loading

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

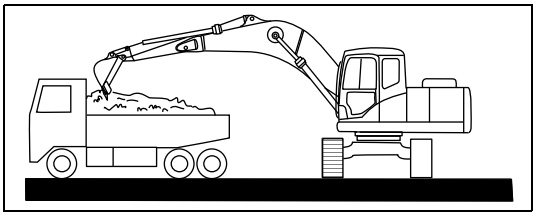

Fig. 4-50

Leveling Operation

1. Choose the light-load mode when performing a leveling operation. Roll the bucket out and hold it slightly ahead of the arm.

2. Raise the boom slowly and retract the arm at the same time. Once the arm passes the vertical position, lower the boom slowly and keep the bucket moving parallel to the ground.

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

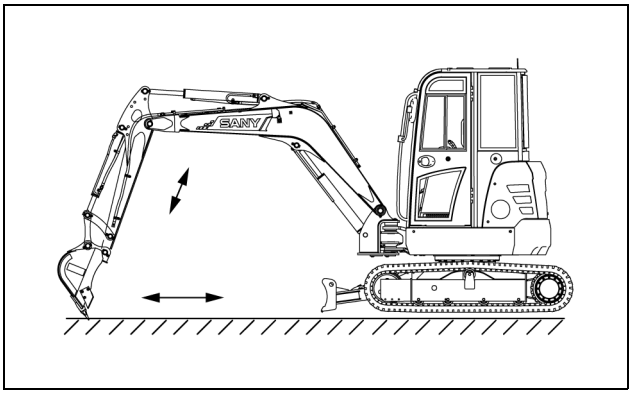

Fig. 4-51 0002921

Operating Precautions

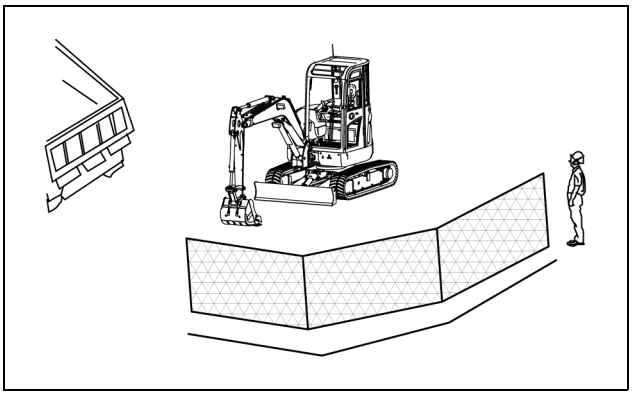
Fig. 4-52 0002923

- Always wear appropriate personal protective equipment (PPE) and clothing during operation.
- Clear all personnel and obstacles from 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 and level surface. When working in a ditch or on a road shoulder, keep the tracks perpendicular to the work face and the travel motors at the rear of the machine. Placing the machine in this position helps facilitate escape if a collapse occurs.
- When working under a cliff or high embankment, make sure the work area is secure.
- Do not allow the arm to interfere with the tracks during operation.
- Do not use the swinging force of the machine to move rocks or break walls.
- Adjust the length and depth of the cut so the bucket is full after each cycle.
- To improve efficiency, a full bucket is more important than loading speed.
- Do not use the side of the bucket to level materials or strike objects.

COLD WEATHER OPERATION

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

Engine Coolant in Cold Weather

If the ambient temperature is expected to drop below 32°F (0°C), check the engine coolant mixture ratios. Add concentrated engine coolant to the cooling system if necessary.

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 these warnings 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 keep the battery 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 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. See “Replace the Batteries” on page 5-31.
- 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 AND STORE THE MACHINE

Overnight Storage

1. Park the machine on a flat, level, stable surface away from people, traffic, or other machines.
2. Lower the work equipment 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. Turn the key switch to OFF.
5. With the engine not running and the hydraulic lockout control lever in the unlocked (open) position (1), turn the key switch to the ON position and operate all joysticks and levers to relieve the hydraulic system pressure.
6. Turn the key switch to the OFF position and remove the key.

   NOTE: Always remove the key and take it with you, even when you are leaving the machine for only a moment. This prevents unauthorized operation of the machine.

7. Place the hydraulic lockout control lever in the locked (closed) position.
8. Close and lock the windows.
9. Exit the cab and lock the cab door.
10. Turn the battery disconnect switch to the OFF position.
11. Fill the fuel tank.

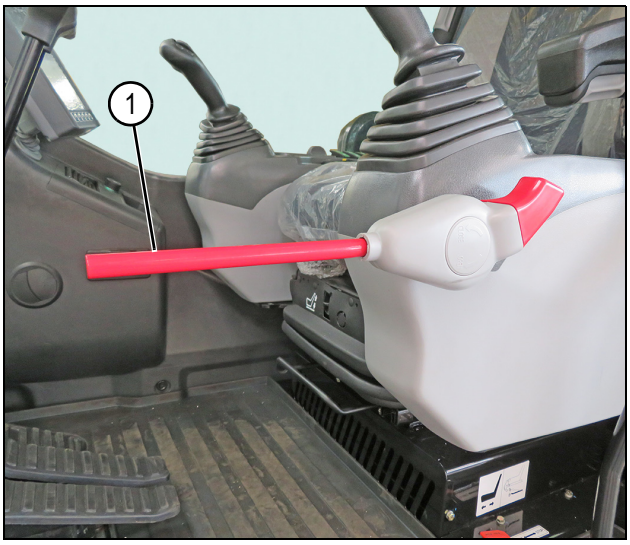

Fig. 4-53 0004580

12. Make sure the following items are secured and locked:

    - Diesel exhaust fluid (DEF) tank compartment (1)
    - Engine hood (2)
    - Left rear door (3)
    - Air conditioning fresh-air inlet door (4)
    - Cab door (5)

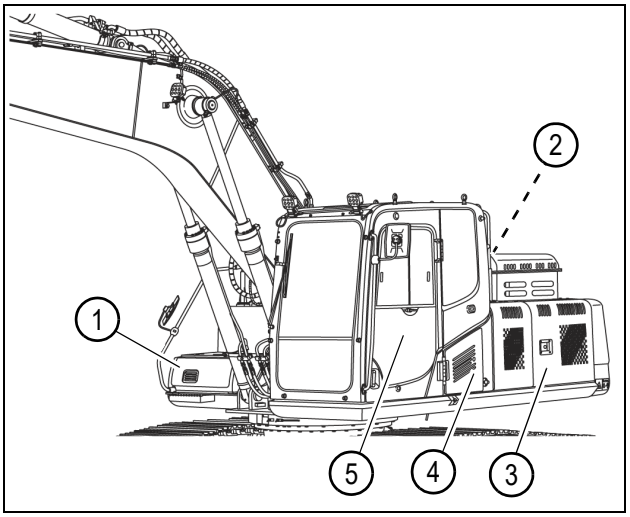

Fig. 4-54 0004587

    - Fuel tank filler cap (6)
    - Right rear door (7)

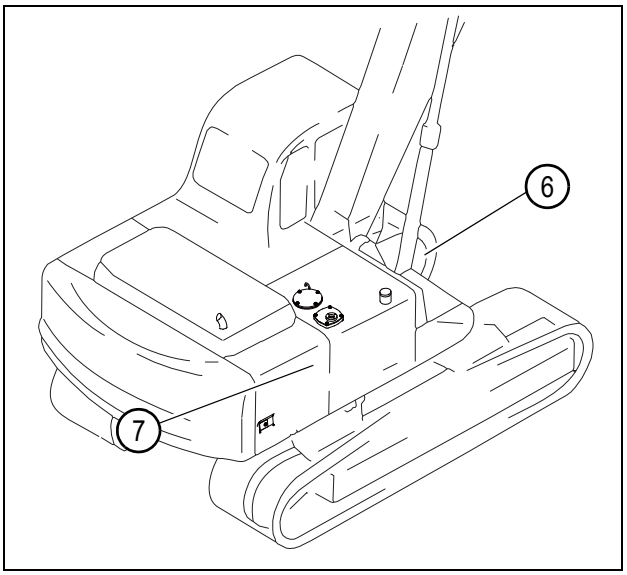

Fig. 4-55

End-of-Workday Checks

1. Collect any trash or debris from the cab and deposit it in 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.

Short-Term Storage

NOTE: Short-term storage is defined as a storage period of 30 days or less.

Complete the "Overnight Storage" on page 4-45 procedure, and then:

- Clean the machine.
- Keep it dry.
- Keep it fully lubricated.
- Cover it to protect it from dust.
- Turn the battery disconnect switch to OFF.

Long-Term Storage

NOTICE!

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

NOTE: Long-term storage is defined as a storage period of more than 30 days.

Proper preparation for long-term storage will reduce the chances of machine damage and deterioration.

1. Park the machine in a secure location and position the work equipment with the arm and bucket fully extended. Support the dozer blade on a block.
2. Move the throttle control dial to MIN (low idle). Run the engine at idle for 5 minutes to cool it down.
3. Shut down the engine.
4. With the engine not running and the hydraulic lockout control lever in the unlocked (open) position (1), turn the key switch to the ON position and operate all joysticks and levers to relieve the hydraulic system pressure.
5. Turn the key switch to the OFF position and remove the key.

   NOTE: Always remove the key and take it with you, even when you are leaving the machine for only a moment. This prevents unauthorized operation of the machine.
6. Place the hydraulic lockout control lever in the locked (closed) position.

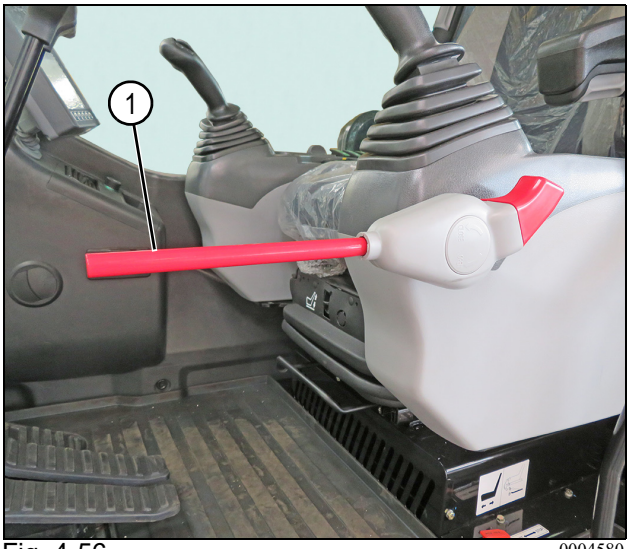

Fig. 4-56 0004580

7. Close and lock the windows.

8. Disconnect the negative battery cables or remove the batteries from the machine. See “Replace the Batteries” on page 5-31.

9. Apply a thin layer of grease to any exposed surfaces of the hydraulic cylinder rods.

10. 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.

11. Close and lock all doors.

During Storage

WARNING!

When operating the machine indoors, open the windows and doors to provide proper ventilation and avoid gas poisoning. Failure to follow this warning could result in death or serious injury.

Once a month during storage, do the following:

1. Start the machine. See “Starting the Engine” on page 4-9.

2. Drive the machine a short distance. See “Warm-up Operation” on page 4-16.

3. Cycle each hydraulic cylinder a few times to coat cylinder rods and seals with oil. See “Work Equipment Controls” on page 4-26.

4. Apply a thin layer of grease to any exposed surfaces of the hydraulic cylinder rods.

5. Turn on the air conditioner for 3 to 5 minutes to lubricate the compressor and related parts.

6. Return the machine to the proper storage location and condition.

7. Check the fuel for water contamination. Drain the fuel and replace the filters as necessary. See “Drain the Fuel Tank” on page 5-56 and “Replace the Primary and Secondary Fuel Filter” on page 5-80.

8. Check the engine oil for water contamination. See “Collect Oil Samples” on page 5-73.

9. Examine the exterior of the machine for signs of rust or damage and repair as necessary.

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 operation.

Starting the Engine After Long-Term Storage

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

1. Turn the key switch to ON (1).

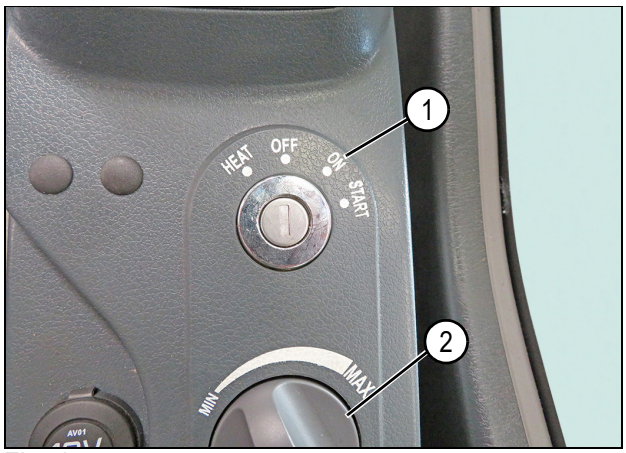

Fig. 4-57 0004577

2. Adjust the throttle control dial (2) to MAX (high idle) (4) for 3 seconds.
3. Adjust the throttle control dial to MIN (low idle) (3) and start the engine. See “Starting the Engine” on page 4-9.
4. Run the engine for 5 minutes after the engine and all components have reached normal operating temperature.

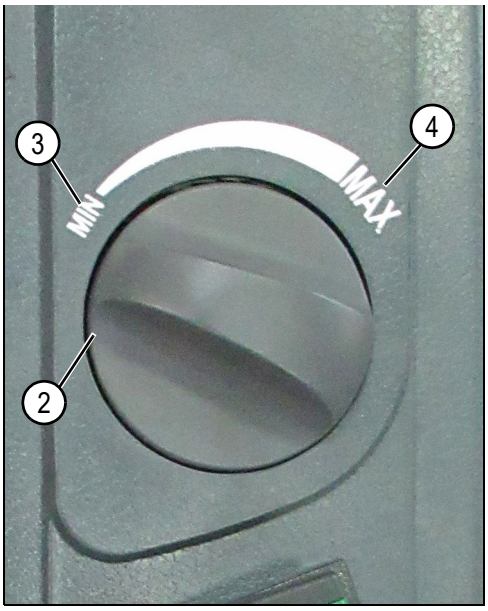

Fig. 4-58 0004591

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 avoid a machine tipover, do the following when loading or unloading:

- **Select a firm and level location a safe distance from any road or structure.**
- **Make sure that the trailer wheels are 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 center of gravity.**
- **Use a signal person to observe and alert the operator of any potential hazards.**

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

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

Loading the Machine

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

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

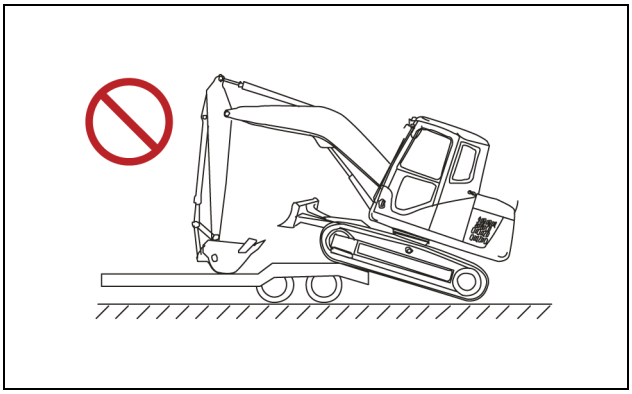
Fig. 4-59 0003903

1. Clean the tracks.
2. Align the centerline of the machine to the trailer centerline.
3. Deactivate the auto idle function. See “Auto Idle Function” on page 3-24.

NOTE: When loading the excavator with work equipment installed, place the work equipment in the front and travel forward.

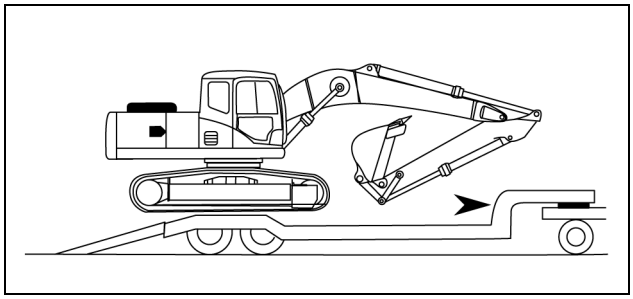
Fig. 4-60 0004599

NOTE: When loading the excavator without work equipment installed, travel in reverse up the ramps. Position the ramps at no more of an angle than 15°.

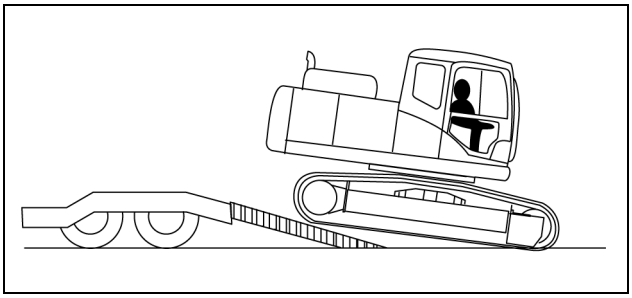
Fig. 4-61 0004602

4. Slowly drive the machine up the ramps.
5. 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.
6. Slowly raise the work equipment until it’s high enough to avoid hitting the trailer or truck.

7. Swing the machine so the work equipment faces the back of the trailer.

8. Place a support block on the trailer under the work equipment. Fully extend the bucket cylinder and arm cylinder.

9. Lower the work equipment onto the support block.

10. Shut down the engine.

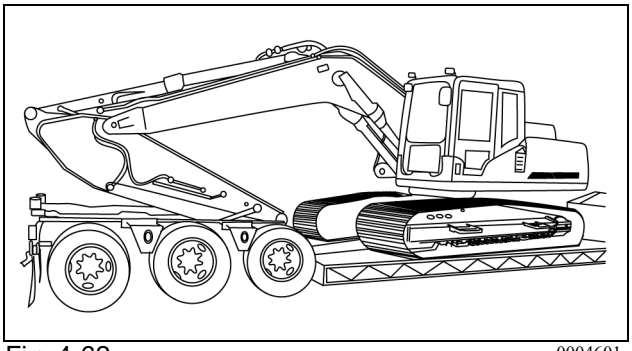

Fig. 4-62 0004601

11. With the engine off and the hydraulic lockout control lever in the unlocked (open) position, turn the key switch to the ON position and operate all joysticks and levers to relieve the hydraulic system pressure.

12. Turn the key switch to the OFF position and remove the key.

13. Place the hydraulic lockout control lever in the locked (closed) position.

14. Close and lock the windows.

15. Exit the cab and lock the cab 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 damage the machine or cause improper machine operation.

16. Turn the battery disconnect to the OFF position. See “Battery Disconnect Switch” on page 3-25.

17. Make sure the following items are secured and locked:
    - Engine hood (2)
    - Left rear door (3)
    - Air conditioning fresh-air inlet door (4)
    - Cab door (5)
    - Diesel exhaust fluid (DEF) tank compartment (6)

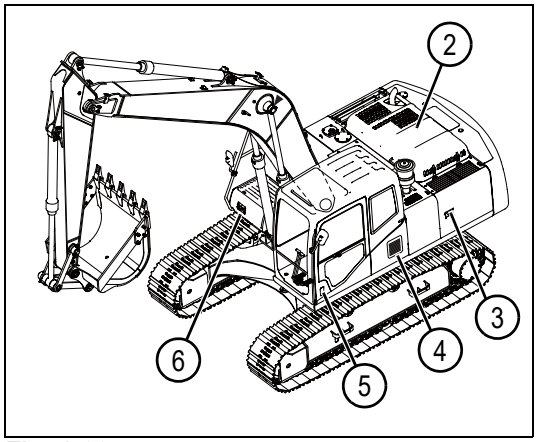

Fig. 4-63

- Fuel tank filler cap (7)
- Right rear door (8)

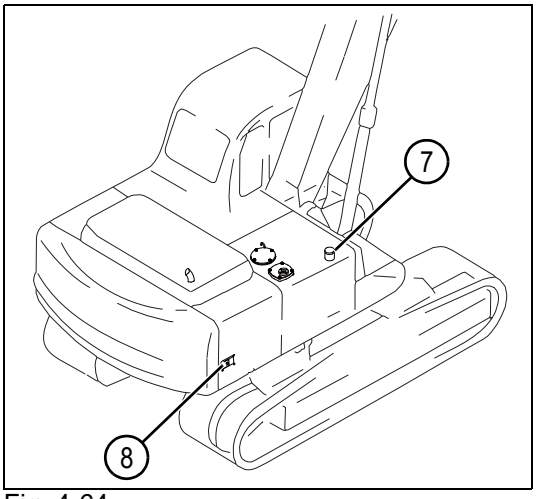

Fig. 4-64

18. Turn the outside mirrors inward to their storage position. See “Adjust the Mirrors” on page 5-73.
19. one mirror (9) is cab-mounted. The other mirrors are attached to the right side of the upper structure.
20. Cover the exhaust opening to prevent contamination.

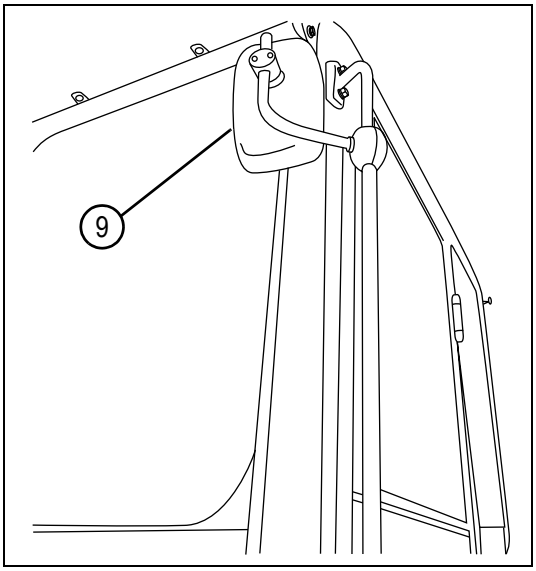

Fig. 4-65

NOTICE!

To avoid damage to the machine during transportation:

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

21. Prevent machine movement during transportation by placing chocks (10) at both ends of the tracks.

22. Secure the machine firmly in place with tie-downs to prevent any movement.

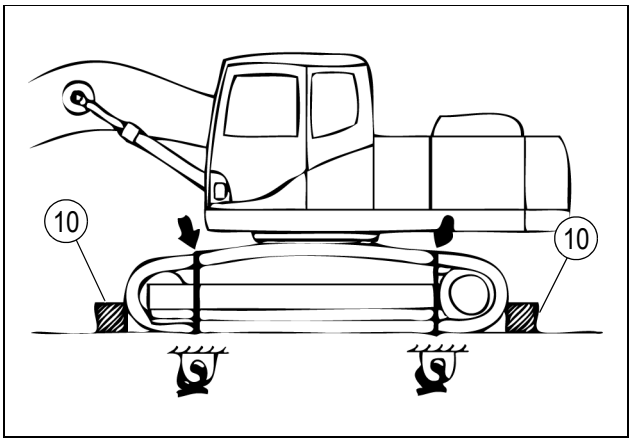

Fig. 4-66 0004603

Unloading the Machine

NOTICE!

- **Select a location that is firm, 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 damage it.**
- **Unloading the machine with the arm retracted may damage 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. Chock the trailer wheels to prevent movement of the trailer during unloading.

4. Make sure the loading ramps have adequate width, length, thickness, and strength. The maximum angle of the ramps is 15°.

5. Remove the tie-downs that secure the machine to the trailer.

6. Position the mirrors so the operator has a clear view to the front and rear of the machine. See “Adjust the Mirrors” on page 5-73.

7. Start the engine and allow it to idle until operating temperature is reached.

8. Put the hydraulic lockout control lever in the unlocked (open) position.

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

10. Stop the machine when it travels over the rear wheels of the trailer and toward the ramps.

11. Adjust the boom-arm angle between 90° and 110° and lower the bucket so the flat surface is in contact with the ground.

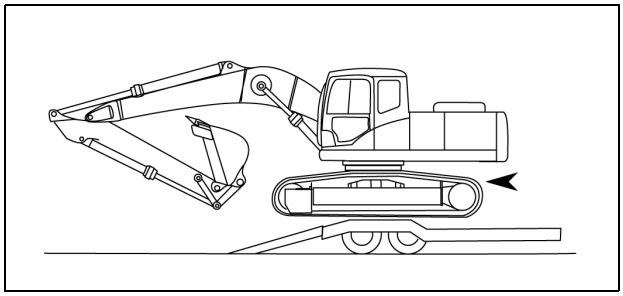

Fig. 4-67 0000731

12. Drive the machine slowly onto the ramps.

13. 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.

14. Park the machine at the desired location.

15. Run the engine at low idle for 5 minutes to cool down. Park the machine at the desired location.

16. Shut off the engine.

17. With the engine off and the hydraulic lockout control lever in the unlocked (open) position, turn the key switch to the ON position and operate all joysticks and levers to relieve the hydraulic system pressure

18. Turn the key to the OFF position and remove it from the switch.

19. Turn the battery disconnect switch to OFF. See “Battery Disconnect Switch” on page 3-25.

Lifting the Machine

WARNING!

- **Make sure all lifting devices are in safe operating condition 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 – SY215C LC" on page 6-7 or "Technical Specifications– SY225C LC" on page 6-13.

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 from the key switch.
5. Close the cab window and door.
6. Turn the battery disconnect switch to OFF. See "Battery Disconnect Switch" on page 3-25.
7. Make sure the following items are secured and locked:
   - Engine hood (1)
   - Left rear door (2)
   - Air conditioning fresh-air inlet door (3)
   - Cab door (4)
   - Diesel exhaust fluid (DEF) tank compartment (5)

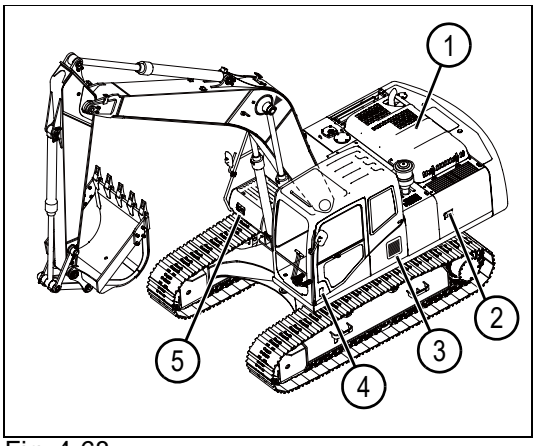

Fig. 4-68

   - Fuel tank filler cap (6)
   - Right rear door (7)

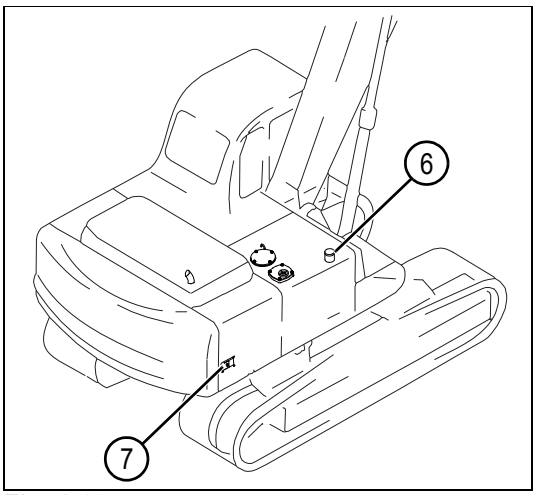

Fig. 4-69

8. Turn the outside mirrors (8) inward to their storage position. See “Adjust the Mirrors” on page 5-73.

9. Cover the exhaust opening to prevent contamination.

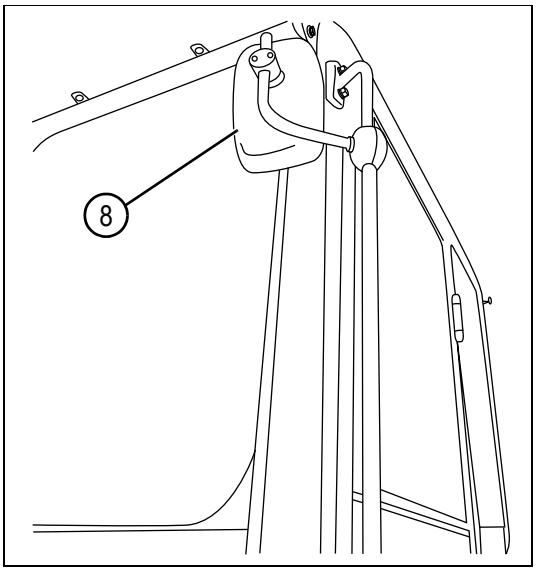

Fig. 4-70

10. Use chains or wire ropes and a container spreader bar (9) with adequate strength and length to prevent machine damage. See “Technical Specifications – SY215C LC” on page 6-7.

11. Connect the chains or wire ropes to the lift/tie-down points (10).

12. 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.

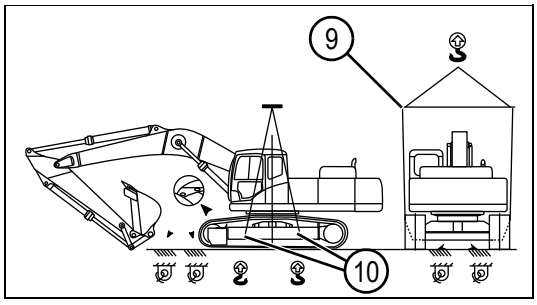

Fig. 4-71

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SANY

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 2-8.

Checks Before Maintenance or Repairs

Review the Maintenance Log and follow these points:

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

Checks After Maintenance or Repairs

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

- If necessary, have a coworker inspect your work for correct and proper completion.
- Complete the Maintenance Log.
- Check for leaks in the system that had maintenance or repairs.
- Verify there are no abnormal sounds coming from the engine or hydraulic system.
- Check for any loose parts 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 be sure none of these items were left on or inside the machine. Return the machine to its proper location.

Hour Meter Reading

Record the hour meter reading daily. Confirm hour meter readings with the required maintenance intervals listed in this manual. When a maintenance service is due, an umbrella symbol will appear on the display.

Genuine SANY Replacement Parts

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

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

Collect Oil Sample

Collect and send an oil sample for testing in accordance with the maintenance schedule. Obtain and follow the instructions within an oil analysis sample kit from a SANY dealer.

Fuel Tank Strainer

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

Preventing Contamination

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

Installation of Hydraulic Hoses

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

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

Securing Access Covers and Compartment Doors

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

Cleaning the Machine

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

Weld, Drill, Cut, or Grind on the Machine

NOTICE!

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

- **After turning off the key switch, wait 1 minute before disconnecting the battery. Disconnect the negative battery cable from the negative (-) post of the battery prior to welding.**
- **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 result in damage to the machine or cause the machine to operate improperly.

Inspection and Maintenance in Adverse Environments

If the machine will be operating under adverse conditions:

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

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

Mud, Rain, or Snow Conditions

Before operating the machine, 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 evacuator frequently. Immediately service the air filter and housing if an air filter restriction indicator is displayed. See “Replace the Engine Air Filter” on page 5-40.
- 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 cold environments (32°F [0°C] or below), lubricate only with the oils and fuels shown in “Recommended Lubricants, Fuel, and Engine Coolant” on page 5-10. Prior to starting the engine, make sure the battery is fully charged and the battery case and the cables have not cracked.

Other Weather Environments

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

Based on experience and suggestions by lubricating oil suppliers, the lubricating intervals listed in the “Maintenance Schedule” on page 5-15 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 5-15 until enough experience is obtained to establish a new schedule.

Check the 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.

Daily Inspection and Maintenance

Do the following before operation with the engine off:

- Perform daily service as necessary.
- Inspect the machine for loose or missing components.
- Clean the 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.
- Make sure safety equipment is in place and in operating condition.
- Check for fluid leaks.

Check the following during operation with the engine running:

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

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.

RECOMMENDED LUBRICANTS, FUEL, AND ENGINE COOLANT

NOTICE!

Never mix lubricants of different types or viscosities (weights), and never overfill the system that is being serviced. Failure to follow this notice could damage the machine or cause it to operate improperly.

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 oil filter as recommended.
- Keep the hydraulic oil tank filled to the full level with hydraulic oil.
- Keep the hydraulic 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 grease. SANY recommends EP2 or equivalent designed lubricants 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.

Diesel Exhaust Fluid (DEF)

Any DEF that meets DIN 70700 or ISO 2224101.

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 ppm (S≤15 PPM) 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 that 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 the engine against overheating and freezing.

- If using concentrated engine coolant, use distilled water to dilute per instructions on engine coolant container. Natural water contains large amounts of minerals 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.

Engine Oil Viscosity/Temperature Data

Temperature °F (°C) / Oil Type	-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
NGLI #2 molybdenum disulfide lithium-based grease	■	
NGLI #1 molybdenum disulfide lithium-based grease		■

NOTE: Always use clean EP (extreme pressure) grease when applying grease to the machine. Avoid using low-viscosity grease.

Industrial Gear Oil/Temperature Data

Temperature °F (°C) / Oil Type	-4 (-20)	14 (-10)	32 (0)	50 (10)	68 (20)	86 (30)	104 (40)	122 (50)
Gear oil with EP additive API GL4 or GL5		■	■	■	■	■	■	

NOTE: Any brand meeting AGMA standard 9005-D94, ISO 3448 grade 220 is acceptable.

Hydraulic Oil/Temperature Data

Temperature °F (°C) / Oil Type	-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 generally arctic areas where ambient temperatures can reach -22°F (-30°C) during operation.

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 hydraulic oil tank filled.
- Cap and plug all openings after removing components for service or repair.

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 Oil Tank	Swing Drive Oil	Swing Bearing Grease	Final Drive Oil (Each Side)	Engine Coolant
89.5 gal. (340 L)	5 gal. (18.9 L)	7.1 gal. (27 L)	60.5 gal. (230 L)	1.0 gal. (4.0 L)	75 lb. (34 kg)	1.5 gal. (5.5 L) (each side)	7.3 gal. (27.6 L)

Other Approved Products

NOTICE!

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

Approved products 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 2-8.
5. Allow the machine to cool before performing maintenance.

When Required

- Check air conditioner fresh-air and recirculation filters. (See page 5-27.)
- Perform a stationary regeneration. (See page 5-85.)
- Replace engine air filter. (See page 5-40.)
- Replace hydraulic system breather filter. (See page 5-68.)
- Check radiator, oil cooler, and air conditioner condenser. (See page 5-83.)
- Check the track tension. (See page 5-96.)
- Replace the bucket teeth. (See page 5-99.)
- Check the windshield washer fluid. (See page 5-10.)

Daily or 10 Hours

- Lubricate the work equipment. (See page 5-102.)
- Check decals. (See page 5-34.)
- Check sheet metal. (See page 5-84.)
- Check idler wheels. (See page 5-73.)
- Drain the primary fuel filter/water separator. (See page 5-81.)
- Check the hydraulic pump mounting fasteners. (See page 5-82.)

- Check the hydraulic tank oil level. (See page 5-70.)
- Check the hydraulic line connections. (See page 5-59.)
- Check the pattern change (SAE/BHL) valve. (See page 5-79.)
- Check the engine coolant level. (See page 5-47.)
- Check the engine oil level. (See page 5-48.)
- Check and adjust the air conditioner compressor belt. (See page 5-24.)
- Check the engine accessory belt. (See page 5-44.)
- Check the crankcase breather tube. (See page 5-34.)
- Check the air intake and charge air piping. (See page 5-28.)
- Check the aftertreatment exhaust piping. (See page 5-23.)
- Check the swing drive. (See page 5-88.)
- Check the escape tool. (See page 5-52.)
- Check the fire extinguisher. (See page 5-55.)
- Check the front window locks. (See page 5-55.)
- Adjust the mirrors. (See page 5-73.)
- Check the electrical system. (See page 5-40.)
- Check the fuel level. (See page 5-56.)
- Check the operator controls. (See page 5-78.)
- Check the operating functions. (See page 5-77.)
- Check air conditioning operation. (See page 5-23.)

After the First 50 Hours

Initial change of the engine oil and the filter. (See page 5-49.)

Weekly or 50 Hours

- Lubricate the work equipment. (See page 5-102.)
- Check the engine air filter system. (See page 5-42.)
- Check the batteries. (See page 5-29.)

- Check the hydraulic hoses and lines. (See page 5-58.)
- Check the final drive oil level. (See page 5-53.)
- Check the carrier roller fasteners. (See page 5-94).
- Check the track fasteners. (See page 5-95).
- Check and adjust the track tension. (See page 5-96.)
- Check the final drive. (See page 5-52.)

Monthly or 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 doors and locks. (See page 5-34.)
- Check the grab handles and steps. (See page 5-58.)
- Perform a structural inspection. (See page 5-86.)
- Initial replacement of the hydraulic pilot oil filter element. (See page 5-66.)
- Initial replacement of the hydraulic oil tank return filter. (See page 5-70.)
- Check the track assemblies. (See page 5-95.)
- Check and adjust track tension. (See page 5-96.)
- Check windshield washer fluid and windshield wiper. (See page 5-101.)
- Check the electrical system. (See page 5-40.)

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.

- Replace the primary and secondary fuel filter. (See page 5-80.)
- Collect an engine oil sample. (See page 5-74.)
- Collect a hydraulic oil sample. (See page 5-74.)
- Collect a final drive oil sample. (See page 5-76.)
- Collect a swing drive oil sample. (See page 5-76.)
- Clean and check the upper structure and undercarriage. (See page 5-99.)

- Check the swing grease bath level. (See page 5-93.)
- Check the swing drive fasteners. (See page 5-89.)
- Lubricate the swing drive bearing. (See page 5-87.)
- Check the final drive. (See page 5-52.)
- Check the hydraulic oil pump. (See page 5-68.)
- Check the hydraulic hoses and lines. (See page 5-58.)
- Check the radiator, hydraulic oil cooler, and air conditioner condenser fins. (See page 5-83.)
- Check the air conditioner fresh-air and recirculation filters. (See page 5-27.)
- Replace the hydraulic system breather filter. (See page 5-68.)
- Change the engine oil and filter. (See page 5-49.)
- Replace the primary and secondary fuel filter. (See page 5-80.)
- Change the swing drive oil. (See page 5-90.)
- Check the seat belt and buckle. (See page 5-84.)
- Replace the engine air filter. (See page 5-40.)
- Check the stationary regeneration. (See page 5-85.)

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 accumulator function. (See page 5-22.)
- Check the fuel tank strainer. (See page 5-57.)
- Replace the hydraulic pilot oil filter element. (See page 5-66.)
- Replace the hydraulic oil tank return filter. (See page 5-70.)
- Check the fuel lines. (See page 5-56.)
- Check the aftertreatment exhaust piping. (See page 5-23.)
- Replace the diesel exhaust fluid (DEF) tank filter. (See page 5-38.)

Annually or 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.

- Perform a structural inspection. (See page 5-86.)
- Change the crankcase ventilation filter. (See page 5-34.)
- Check the swing bearing fasteners. (See page 5-87.)
- Check hydraulic hoses and lines. (See page 5-58.)
- Change the hydraulic oil. (See page 5-61.)
- Replace the diesel exhaust fluid (DEF) pump filter. (See page 5-35.)
- Replace the engine air filter. (See page 5-40.)
- Change the engine coolant. (See page 5-45.)
- Check the crankcase breather tube. (See page 5-34.)
- Change final drive oil. (See page 5-54.)

Hydraulic Breaker Maintenance Interval

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

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

NOTICE!

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

See “Change the Hydraulic Oil” on page 5-61.

After Maintenance is Completed

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

Lubrication Chart

Lubricate the work equipment at the points indicated in the following illustration and as shown in the decal next to the cab door.

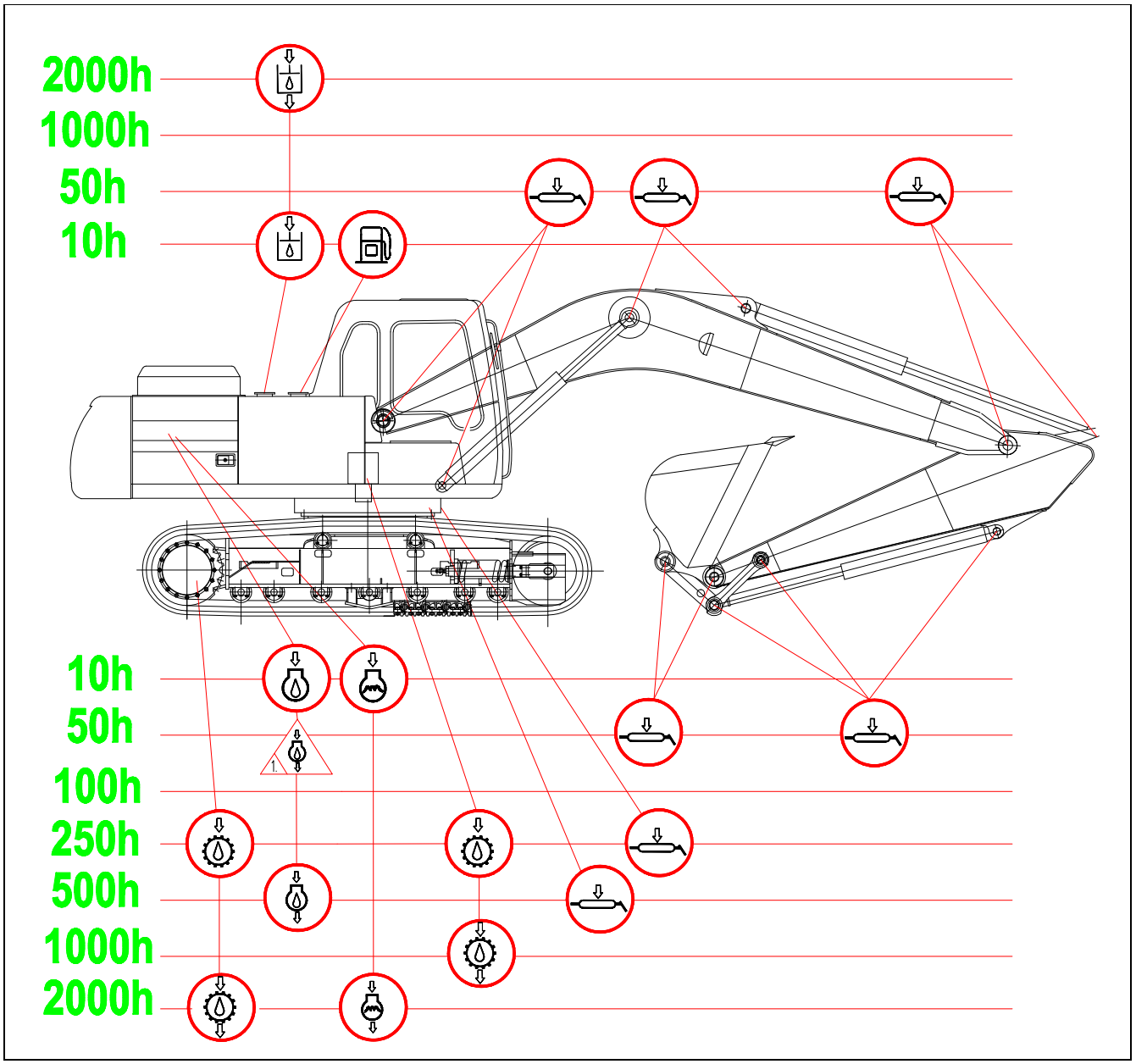


Fig. 5-1

0003799

MAINTENANCE PROCEDURES

Relieve Hydraulic System Pressure

1. Park the machine on a flat, level surface, and position the work equipment as shown on the hydraulic tank level decal.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
3. Turn the key switch to ON.
4. Place the hydraulic lockout lever in the open (unlocked) position.
5. Cycle the joystick controls and travel control levers and pedals to relieve pressure in the hydraulic circuits.
6. Turn the key switch to OFF and place the hydraulic lockout lever in the closed (locked) position.
7. Clean the top of the hydraulic tank.
8. Remove the wing nut (1) from the breather valve.

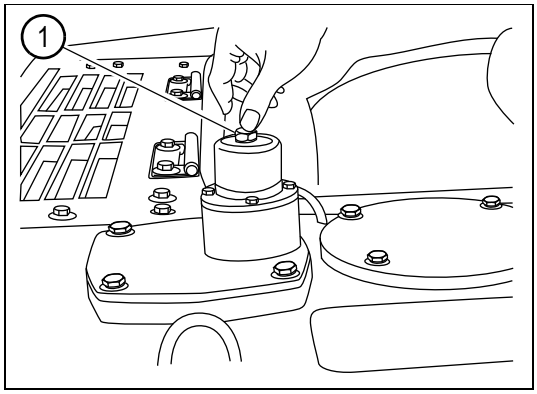


Fig. 5-2

9. Press the hydraulic tank vent button (2) to relieve pressure in the hydraulic tank.
10. Install the wing nut.

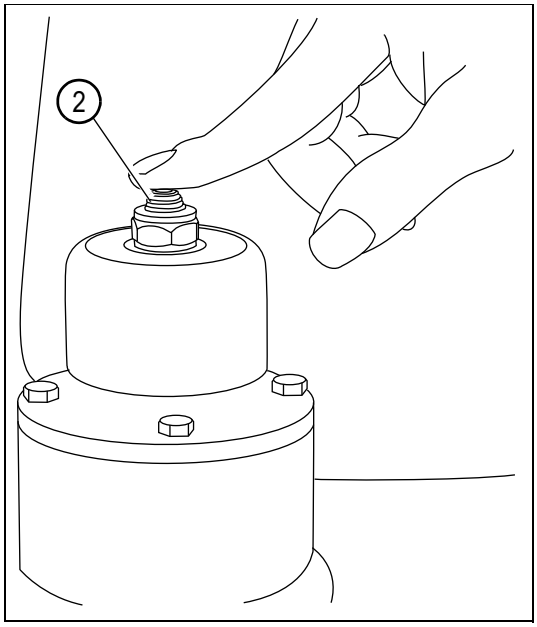


Fig. 5-3

Check Accumulator Function

NOTE: Perform this procedure every 6 months (1000 hours) of service on machines with optional equipment attached. Perform this procedure annually (or every 2000 hours) on machines with a bucket attached.

1. Position the work equipment (1) 18 in.–24 in. (457 mm–610 mm) from the ground.

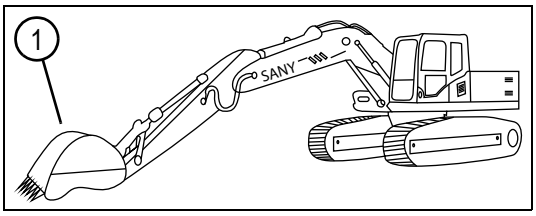


Fig. 5-4

2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
3. Shut down the engine.
4. Turn the key switch to the ON position.
5. Place the hydraulic lockout control lever (2) in the open (unlocked) position.

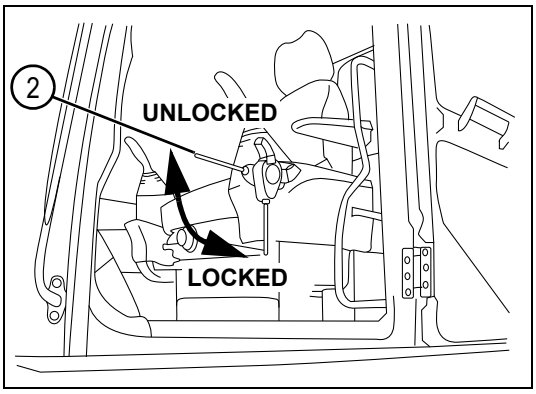


Fig. 5-5

6. Move the right joystick down.
7. If the boom goes down, to the ground no action is needed.
8. If the boom does not go down to the ground, contact a SANY dealer.
9. Start the engine and run it at idle speed for about 1 minute to repressurize the accumulator.

Check the Aftertreatment Exhaust Piping

WARNING!

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

CAUTION!

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

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Open the engine cover.
3. Locate the exhaust system (2) under the engine cover, next to the engine.
4. Inspect the exhaust system and its mount for leaks or signs of damage.
5. Check the connection to the expansion pipe (1) for leaks or signs of damage.
6. Make sure the exhaust pipe is clear and not restricted.

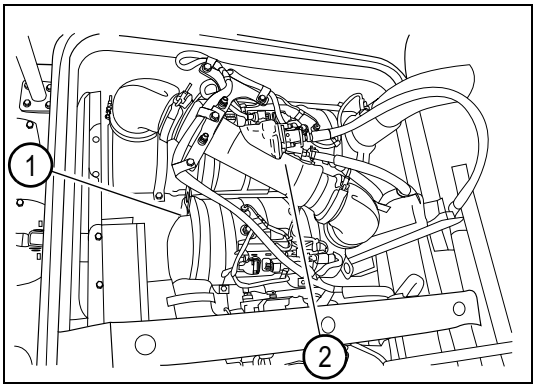


Fig. 5-6

Check the Air Conditioning Operation

CAUTION!

The air conditioning system is under pressure Working on it could create a hazardous situation, which could result in injury. Contact a SANY dealer for repairs.

With the engine running:

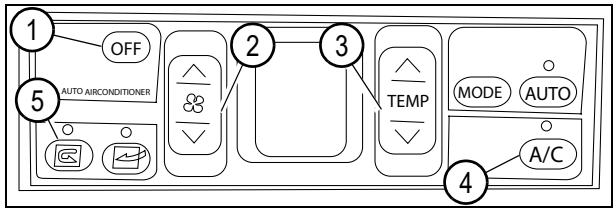


Fig. 5-7

- Press the OFF button (1) and make sure no heat is present.
- Press the fan switch (2) to check start-up, airflow, and adjust the fan speed.
- Press the temperature control button (3) to adjust the heat temperature and check if the air temperature changes from warm to hot.
- Press the A/C button (4) and check if the air temperature changes from warm to cool.
- Check the recirculated/fresh air control switch (5) function.

Check and Adjust the Air Conditioner Compressor Belt

Check the Air Conditioner Compressor Belt

CAUTION!

Make sure the engine is off and that all rotating parts inside the engine compartment have stopped moving. Failure to follow this caution could result in injury.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Open the engine cover.
3. Remove fasteners (1) that secure the shroud around the A/C compressor and drive belt. Remove shroud from machine.
4. Check for damaged pulleys, worn V-groove and V-belt.
5. Make sure the V-belt does not rub against the bottom of the V-groove.

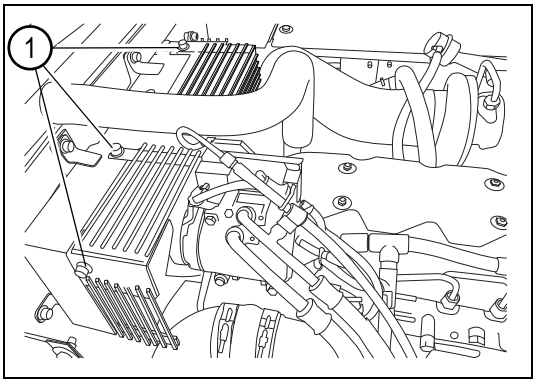


Fig. 5-8

6. Examine the belt for signs of damage.
7. Press down on the belt halfway between the compressor pulley and the drive pulley.
8. The belt should deflect 0.20 in.–0.31 in. (5 mm–8 mm) when pressed with a force of 80–120 lbf (356–534 N).
9. Adjust belt tension as necessary.
10. Install the shroud.

Adjust the Air Conditioner Compressor Belt

NOTE: Do not repair the air conditioning system beyond the tasks described in this manual.

CAUTION!

Make sure the engine is off and that all rotating parts inside the engine compartment have stopped moving. Failure to follow this caution could result in injury.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Open the engine cover.
3. Remove fasteners (1) that secure the shroud around the air conditioner compressor and drive belt. Remove shroud from machine.

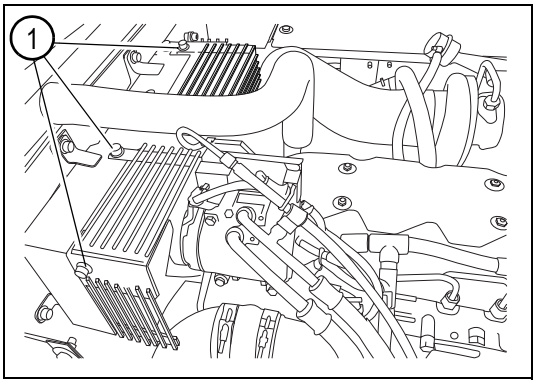


Fig. 5-9

4. Loosen the compressor bracket fasteners (2).

NOTE: Not all bracket fasteners are shown.

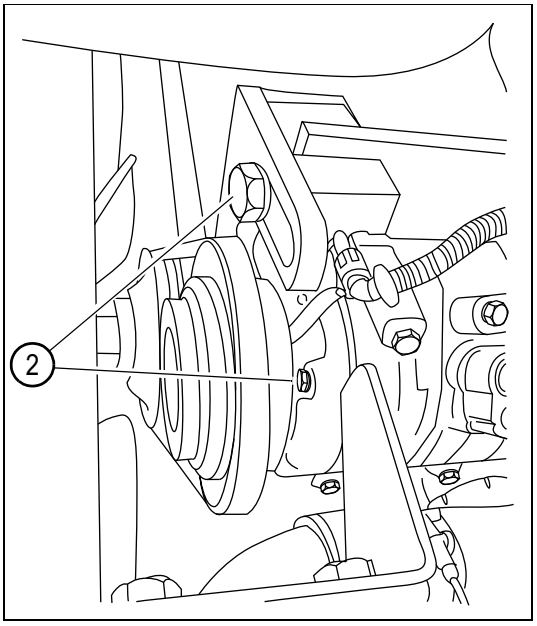


Fig. 5-10

5. Loosen the jam nut (3) on the tension adjustment bolt (4).

6. Turn the tension adjustment bolt (4) to adjust the belt tension.

   - The belt should deflect 0.20 in.–0.31 in. (5 mm–8 mm) when pressed with a force of 80–120 lbf (356–534 N).

   - Using a belt tension gauge, the belt tension should measure a minimum of 80 lbf (355 N) and a maximum of 120 lbf (534 N).

   NOTE: If the belt is out of the tension range, replace the belt and perform the belt tension check again.

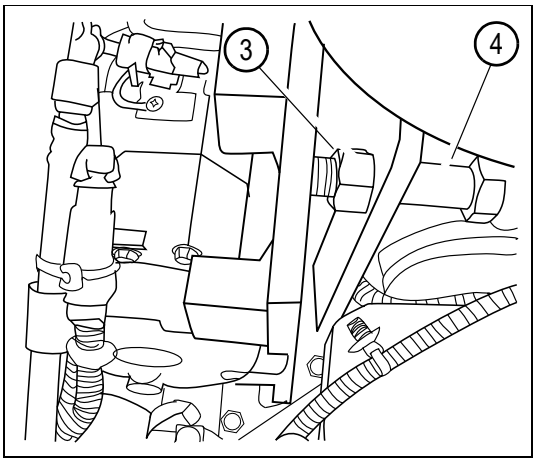


Fig. 5-11

7. Tighten the jam nut (3) to lock the tension adjustment bolt (4) in place.

8. Tighten the compressor bracket fasteners (2).

   NOTE: 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: Newly installed V-belts need to be adjusted after the first hour of operation.

Check the Air Conditioner Fresh-Air and Recirculation Filters

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Unlock and open the fresh-air filter door (1).

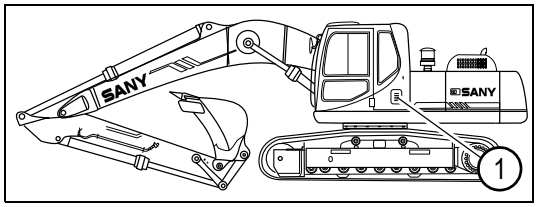


Fig. 5-12

3. Remove hardware (2) that secures the fresh-air filter (3).
4. Remove the filter (3).
5. Clean the filter using compressed air.

   NOTE: Replace the filter after cleaning the filter five times or if the filter cannot be cleaned.

6. Install or replace the filter.
7. Install the hardware (2).
8. Close and lock the door (1).

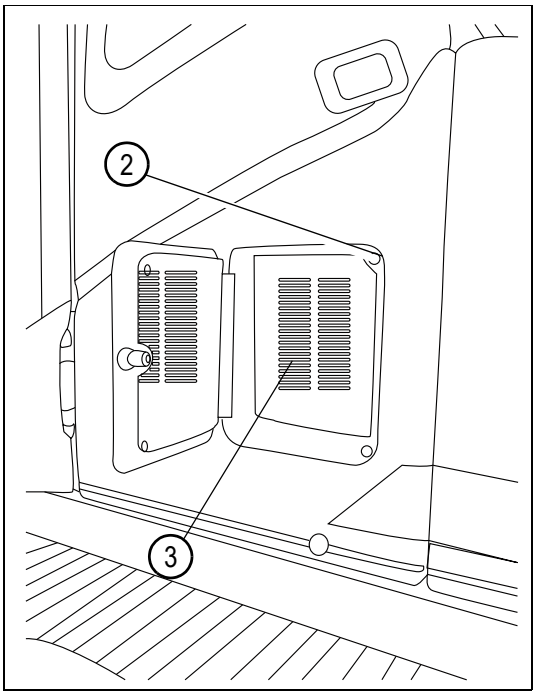


Fig. 5-13

9. Remove fasteners (4) that secure the cabin air-filter cover (5).

   NOTE: The cabin air filter is located behind the seat.

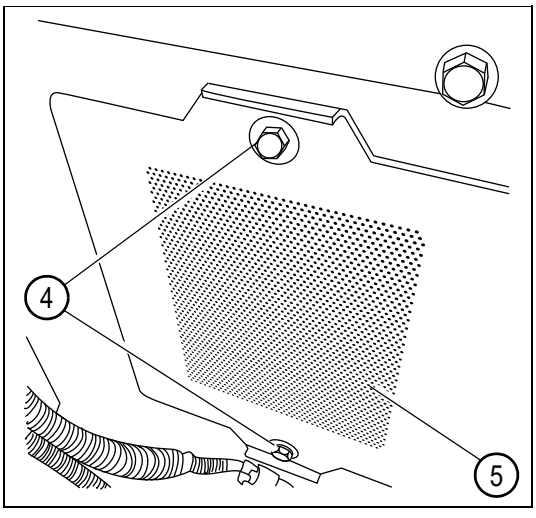


Fig. 5-14

10. Remove hardware (6) that secures the cabin air filter (7).

11. Remove the cabin air filter (7).

12. Clean with compressed air.

    NOTE: Replace the cabin air filter after five cleanings or if the filter cannot be cleaned.

13. Install or replace the filter (7) and hardware (6).

14. Install the filter cover (5) and fasteners (4).

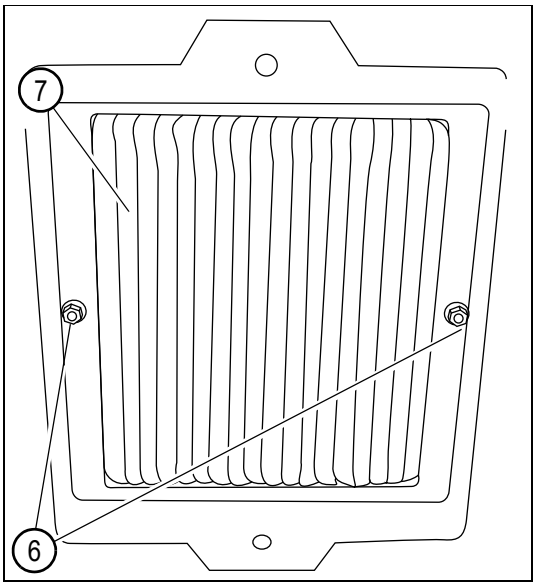


Fig. 5-15

Check the Air Intake and Charge Air Pipes

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Inspect the intake piping daily for wear points and damage to piping, loose hose clamps, and punctures that can damage the engine.

3. Replace damaged pipes and tighten loose hose clamps as necessary to prevent the air system from leaking.

   NOTE: Tighten hose clamps (1) to 72 lb-in (8 N•m).

4. Check for corrosion under the hose clamps and hoses of the intake system piping. Corrosion can allow corrosive products and dirt to enter the intake system. Disassemble and clean as required.

5. Inspect the charge-air piping and hoses for leaks, holes, cracks, or loose connections.

6. Tighten the hose clamps as necessary.

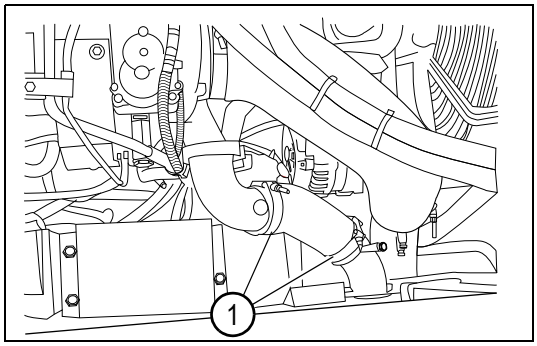


Fig. 5-16

Check the Backup Camera

1. Turn the key switch to the ON position.
2. Push button F4 on the monitor to activate the backup camera and view activity behind the machine.
3. Make sure the backup camera (1) is operating correctly and is free of all obstructions.

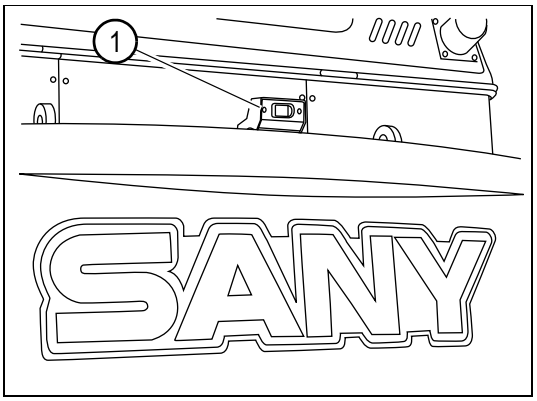


Fig. 5-17

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 service. See “Maintenance Safety” on page 2-8.
2. The batteries are under the cover (1) behind the left rear door.
3. Allow several minutes for any accumulated battery gases to clear before servicing the batteries.
4. Turn the battery disconnect switch to the OFF position.

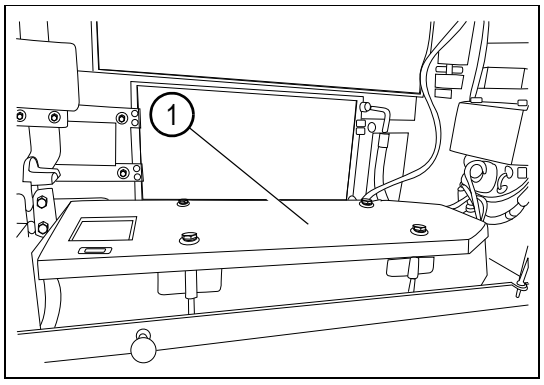


Fig. 5-18

NOTICE!

- **There are two 12-volt batteries connected in series to provide 24 volts to the electrical system.**
- **After machine shutdown, wait at least 1 minute for the Engine Control Module (ECM) to complete its shutdown before disconnecting the battery.**

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

5. Remove the battery cover.
6. Check the top surfaces and all battery connections (2) for signs of corrosion or dirt buildup.
7. Use a clean rag to wipe any dirt from the batteries.

   NOTE: If corrosion is found, flush the area with a battery cleaning solution.

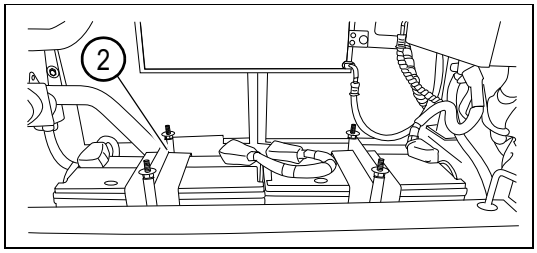


Fig. 5-19

8. Remove any trash, tools, parts, or debris from the battery compartment.
9. Install the cover (1).
10. Turn the battery disconnect switch to the ON position.

Replace 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 service. See “Maintenance Safety” on page 2-8.
2. Turn the battery disconnect switch to the OFF position.
3. Allow several minutes for any accumulated battery gases to clear before servicing the batteries.
4. The batteries are under the cover (1) behind the left rear door.

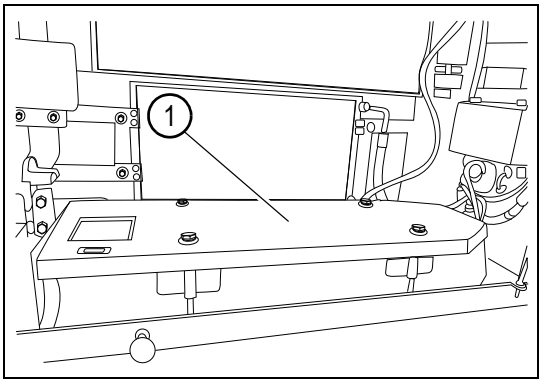


Fig. 5-20

NOTICE!

There are two 12-volt batteries connected in series to provide 24 volts to the electrical system.

5. Disconnect the black ground (-) battery cables first, then disconnect the red positive (+) cables.

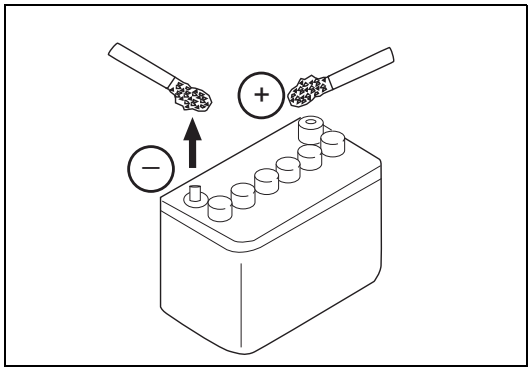


Fig. 5-21

6. Remove the battery hold-down bracket (2).

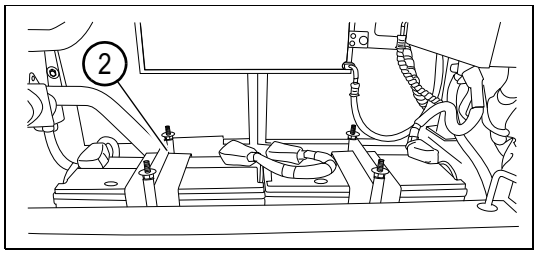


Fig. 5-22

7. Remove the battery (or batteries).

8. Install the new battery (or batteries).

9. Install the battery hold-down bracket (2) over the batteries and secure it.

10. Connect the red positive (+) cables.

11. Connect the black ground (-) cables.

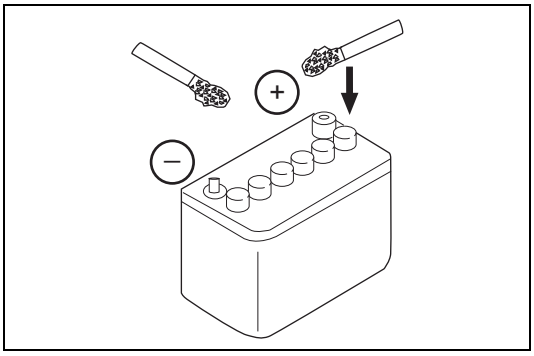


Fig. 5-23

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

NOTICE!

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

12. Install the battery cover (1) and hardware.

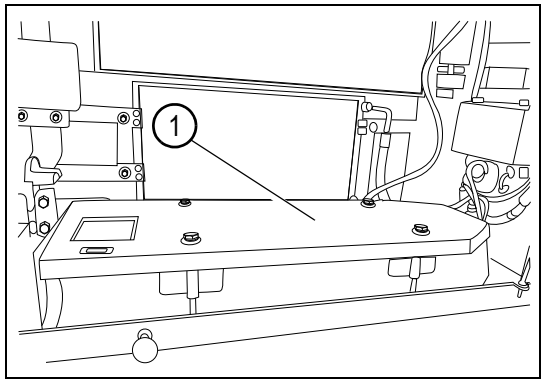


Fig. 5-24

Replace the Bucket

CAUTION!

- **Keep fingers and other body parts away from pinch points to prevent crushing injuries while removing or installing the bucket. Never put your finger into the pin bore during alignment.**
- **Secure bucket after removal and before servicing.**
- **Bucket pins may be ejected with extreme force when removed forcefully. Do not allow anyone to stand in front of the pins during removal.**
- **Never stand or place your feet or other body part under the bucket when removing bucket pins.**

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

Remove the Bucket

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Lower the bucket to the ground and support the bucket to prevent it from rolling over when the bucket pin is removed.
3. Remove the bucket pin hardware and bucket pins (1) and (2) and remove the bucket (3) from the arm (4) and linkage (5).
4. Clean the pins and pin bores. Lubricate the pin bores with grease.

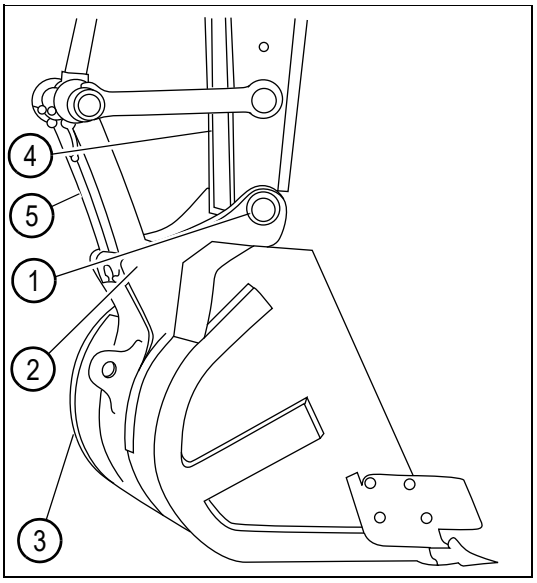


Fig. 5-25

Install the Bucket

1. Align the arm with the new bucket. Make sure the bucket is secured and will not move.
2. Align the arm and bucket and install the bucket pin. Install the retaining fasteners into the pin.
3. Align the linkage to the bucket and install the bucket pin. Install the retaining fasteners into the pin.
4. Grease the bucket pins at grease fittings.
5. Start the engine and run it at low idle. Operate the bucket by slowly curling it in both directions to check for binding.

Check Doors and Locks

1. Check the cab door, all access doors, and locks to make sure they close and lock properly.

2. Repair or replace any damage to the cab door, access doors, or locks.

Check the Crankcase Breather Tube

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Visually inspect the crankcase breather tube (1) for the following conditions.

   - Cracks
   - Restriction
   - Material deterioration
   - General damage

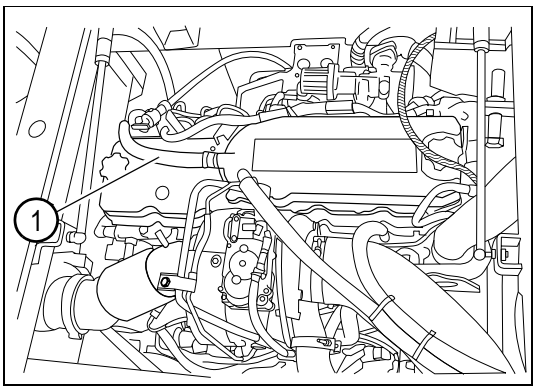


Fig. 5-26

NOTE: If any of the above conditions exist, replace the crankcase breather tube.

Replace the Crankcase Ventilation Filter

Replace the crankcase ventilation filter every 4000 hours.

Check the Decals

All safety decals must be visible and complete. See “Machine Decals” on page 2-3 for additional information.

Replace the Diesel Exhaust Fluid (DEF) Pump Filter

CAUTION!

It is critical when working with the DEF system that all materials used are absolutely clean. Dispose of the DEF pump filter in accordance with all applicable environmental regulations. Failure to follow this caution could result in damage to the machine or environment.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Open the right engine cover.
3. The DEF pump (1) is mounted on the right side center of the machine near the case drain filter.
4. Remove the DEF pump filter housing (2) from the bottom of the pump.
5. Replace the DEF pump filter element with a new one.
6. Replace the filter housing O-ring with a new one and install the filter housing.

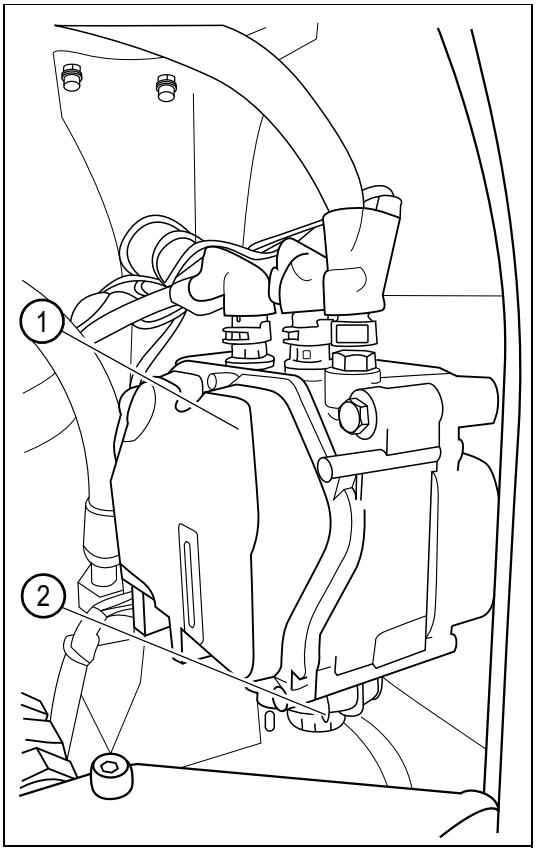


Fig. 5-27

Check the Diesel Exhaust Fluid (DEF) Level

Check the DEF level (1) on the monitor home screen.

NOTE: The DEF tank should be at least 10% full.

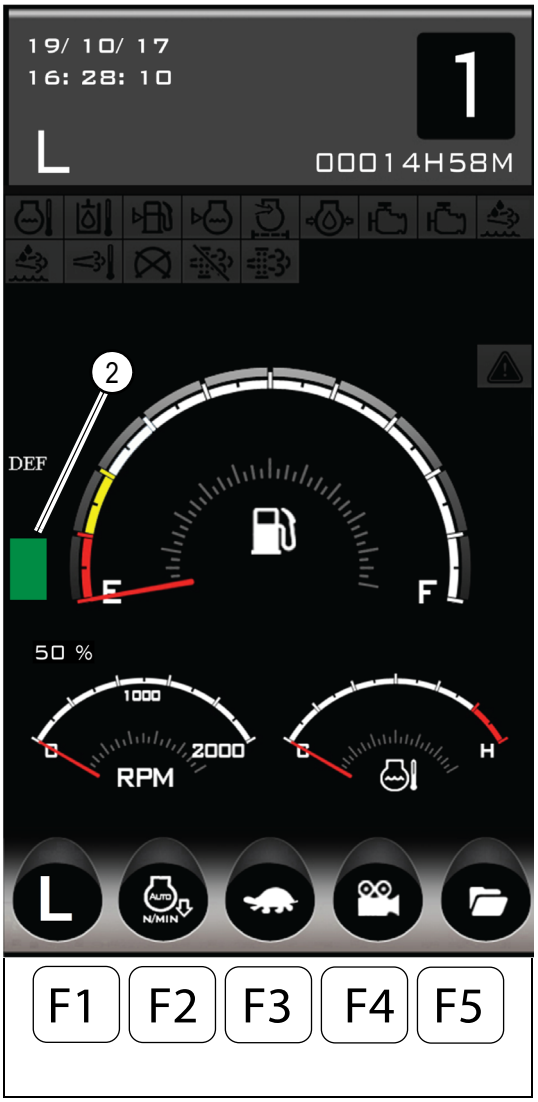


Fig. 5-28 0004595

Fill the Diesel Exhaust Fluid (DEF) Tank

CAUTION!

It is critical when working with the DEF system that all materials used are absolutely clean. Failure to follow this caution can cause equipment damage.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Open the DEF compartment cover (1) on the right front side of the machine.

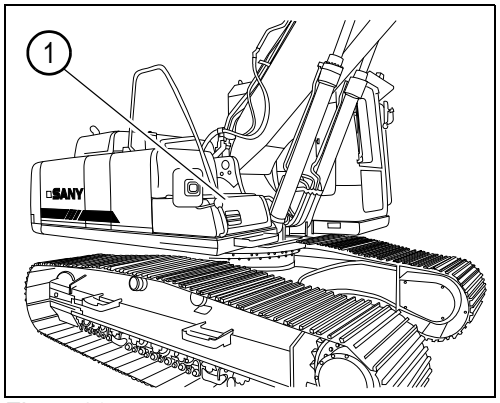


Fig. 5-29

3. Remove the DEF tank cap (2), then add DEF through the filler neck as needed.

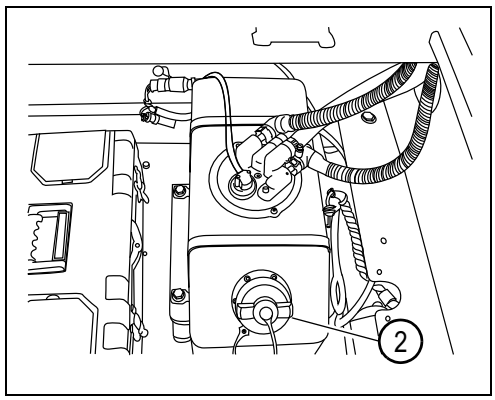


Fig. 5-30

4. Install the DEF tank cap (2) and close the DEF compartment door.

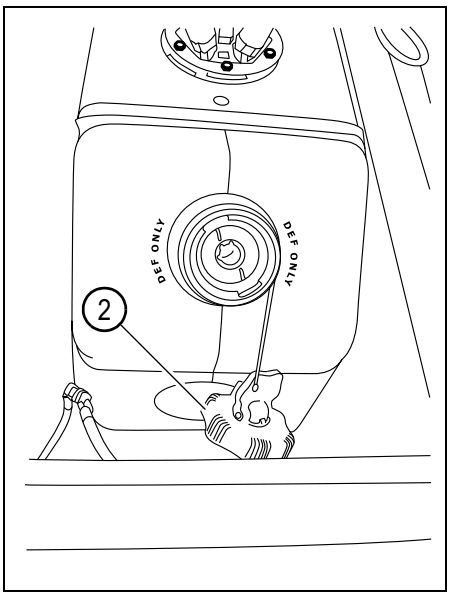


Fig. 5-31

Replace the Diesel Exhaust Fluid (DEF) Tank Filter

CAUTION!

It is critical when working with the DEF system that all materials used are absolutely clean. Failure to follow this caution can cause equipment damage.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Open the DEF compartment door (1) on the right front side of the machine.

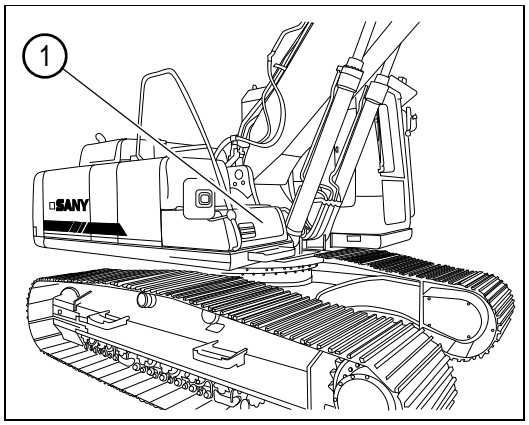


Fig. 5-32

3. Disconnect the DEF sending unit electrical connector (2).
4. Disconnect the two DEF and engine coolant hoses from the DEF sending unit and mark the hose locations.
5. Remove the DEF sending unit fasteners, then lift the DEF sending unit (3) from the tank.

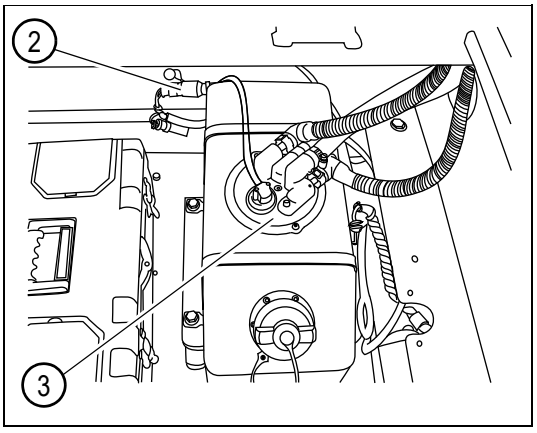


Fig. 5-33

6. Remove the old DEF tank filter (4) and replace it with a new filter.

7. Install the DEF sending unit (3) in the DEF tank.

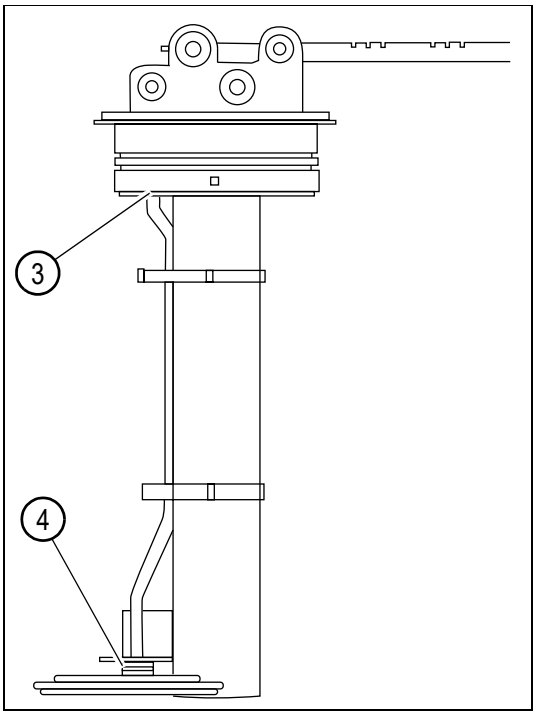


Fig. 5-34

8. Install the fasteners to secure the DEF sending unit (3) to the tank.

9. Connect the DEF and engine coolant hoses.

10. Connect the DEF sending unit electrical connector (2).

11. Remove the DEF tank cap (5), then add DEF through the filler neck as needed.

12. Install the DEF tank cap (5), then close the DEF compartment door.

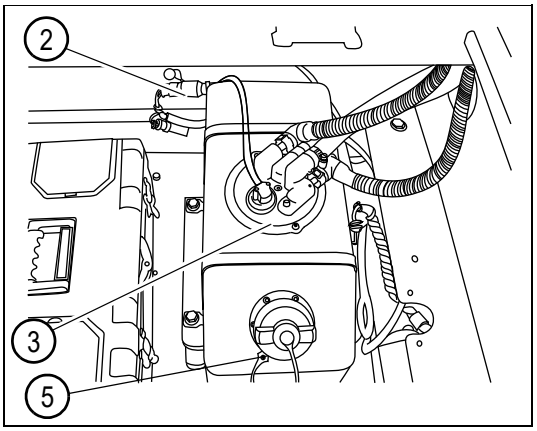


Fig. 5-35

Check the Electrical System

The electrical system check should start with the fuse box. The fuse box is at the left rear of the operator seat.

If a fuse is corroded, or a white powdery substance can be seen on it, contact a SANY dealer for repair information regarding the electrical circuit in question.

Inspect all electrical equipment. Replace all faulty items, including loose electrical connectors, worn or degraded wiring, cables, etc.

Locate and remove 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.

Replace the Engine Air Filter

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. The air filter housing is behind the left front door.
3. Squeeze the dust evacuator (2) mounted on the end cap of the filter housing (1) to release any dust or debris.

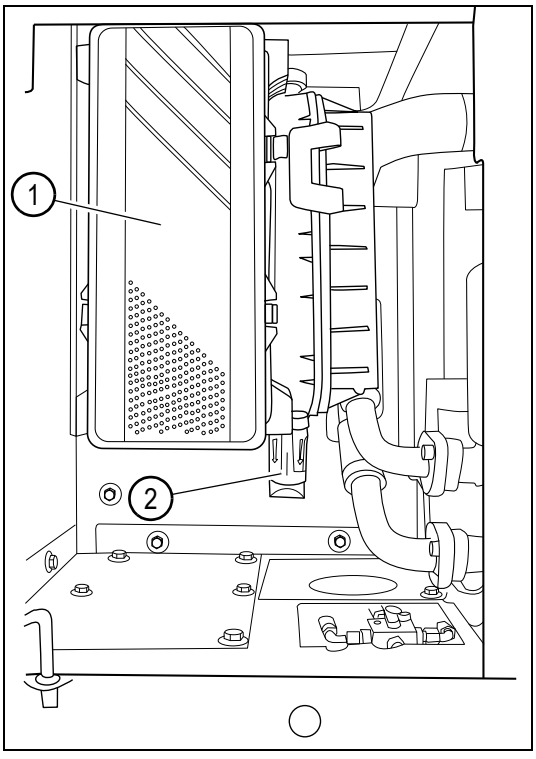


Fig. 5-36

4. Open the air filter housing (4) and remove the primary air filter (3).

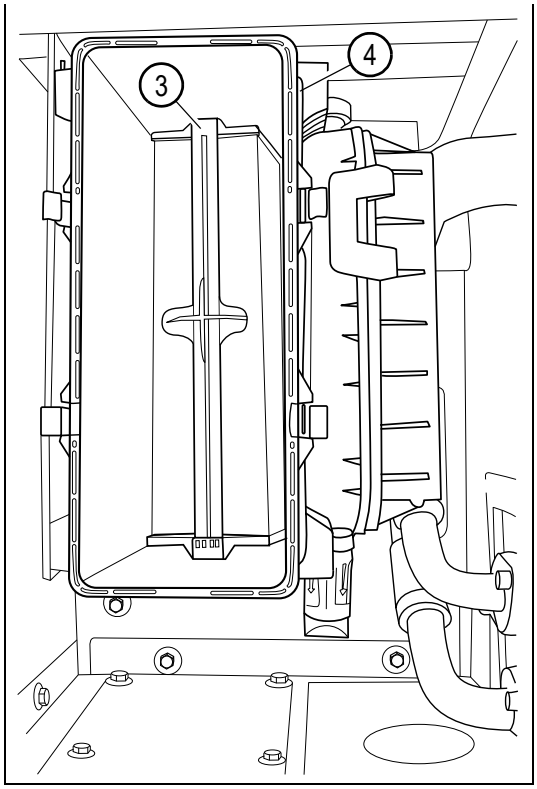


Fig. 5-37

5. Clean the inside of the air filter housing with a clean cloth.
6. Remove the secondary air filter (5).
7. Replace the secondary air filter.
8. Replace the primary air filter.
9. Close the air filter housing.

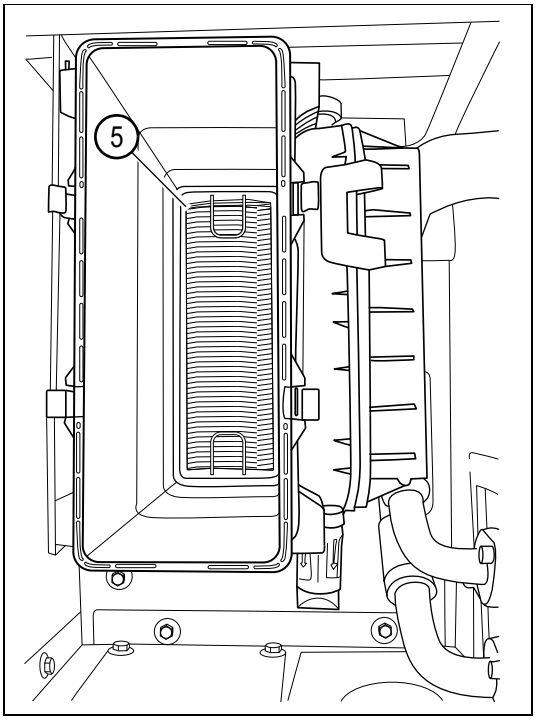


Fig. 5-38

Check the Engine Air Filter System

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Locate the air filter housing behind the left front door.

3. Squeeze the dust evacuator (2) mounted on the end cap of the filter housing (1) to release any dust or debris.

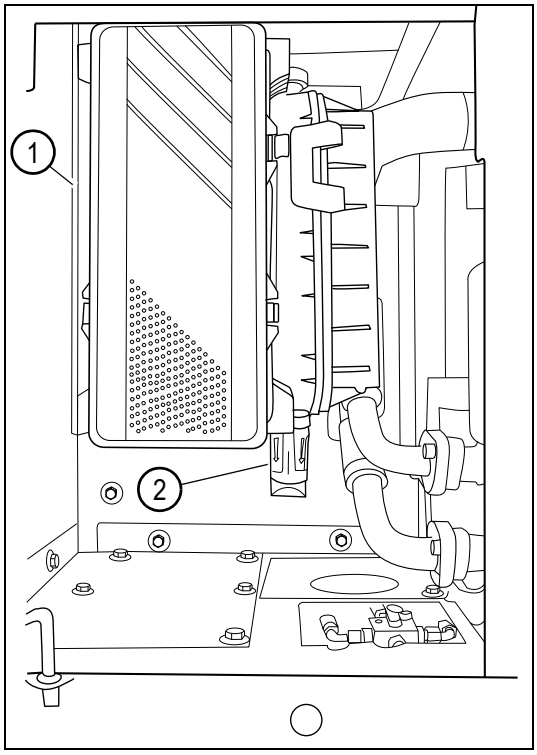


Fig. 5-39

4. Check the condition of the dust evacuator and replace if required.

   NOTE: If the dust evacuator is cracked, torn, remains open, or is missing, dust particles that are normally expelled can collect on the air filter and shorten the air filter service life.

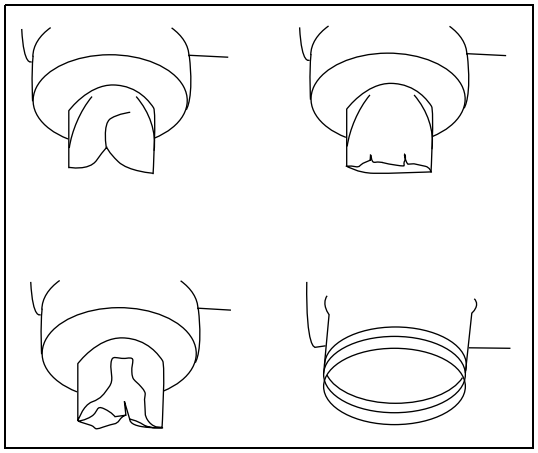


Fig. 5-40

NOTICE!

Do not attempt to clean the air filter. Failure to replace a damaged, damp, or clogged air filter could cause the engine or machine to operate improperly.

5. Open the air filter housing and remove the primary air filter (3).

6. Inspect the air filter for damage, dampness, or dust.

   NOTE: If you find any damage or moisture in the filter, replace it.

7. Clean the inside of the air filter housing with a clean cloth.

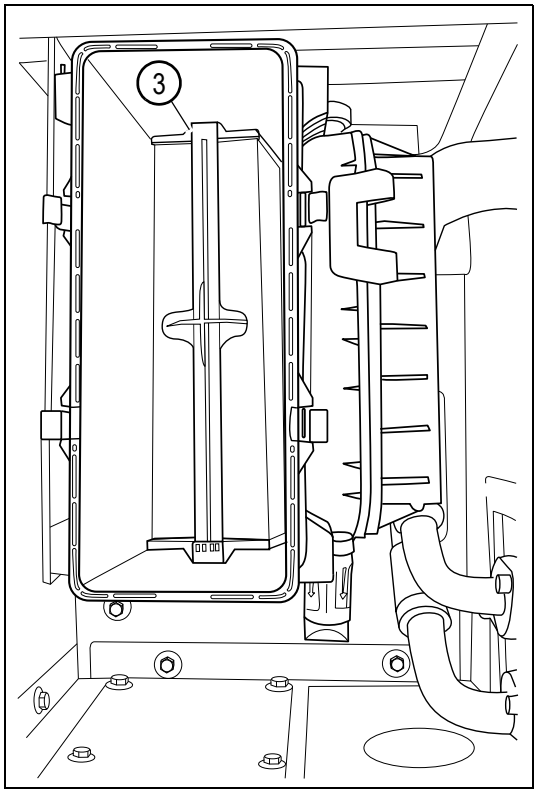


Fig. 5-41

8. Inspect the secondary air filter (4). Replace as necessary.

9. Install the primary air filter.

10. Close the air filter housing (1).

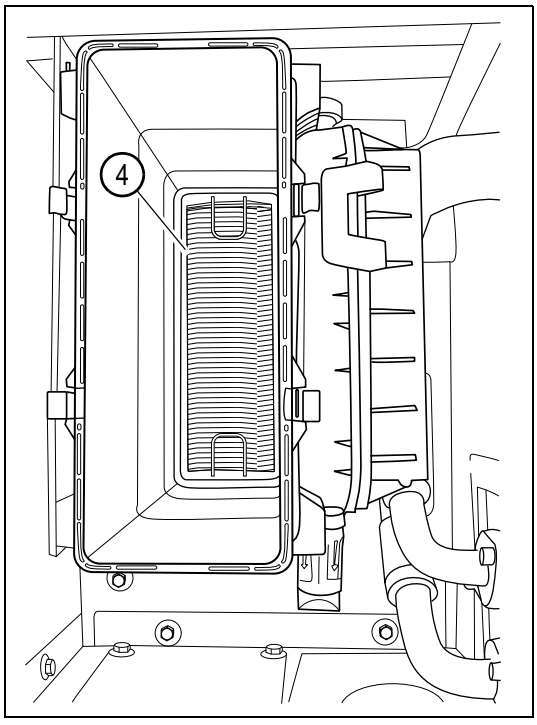


Fig. 5-42

Check the Engine Belts

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Open the engine cover (1).

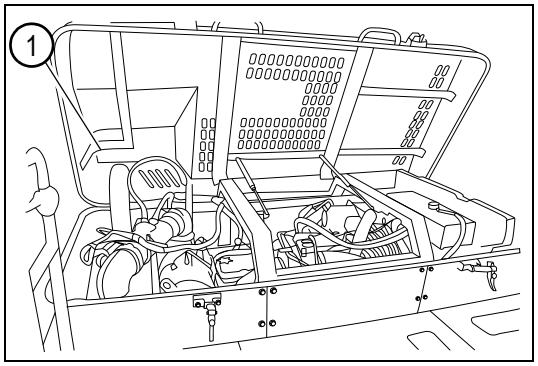


Fig. 5-43

3. Locate the air conditioner compressor (2) and alternator belts (3) and inspect the belts for items listed below:

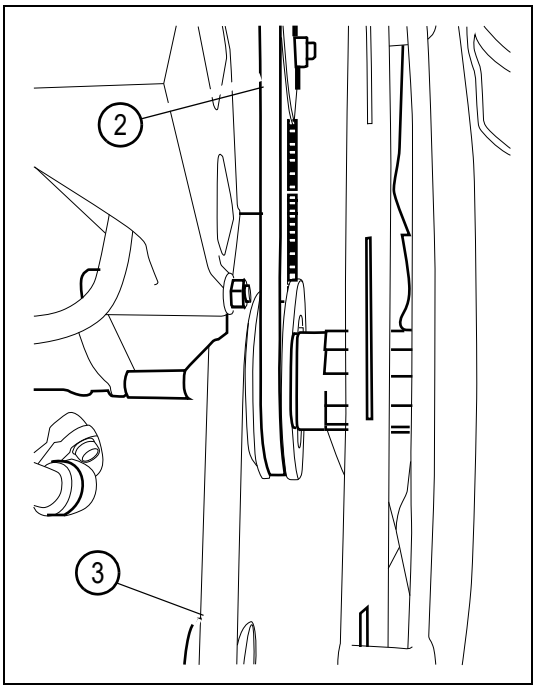


Fig. 5-44

   - Abrasion: The belt appears shiny, glazed, or fabric is exposed. This is a sign that the belt is in contact with an object, such as a flange or fastener.
   - Chunk-out: Chunks of rubber material have broken off from the belt. The belt can fail at any moment. Heat, age, and stress are the primary contributors.
   - Pulling: Belt material is sheared off from the ribs. Lack of tension, misalignment, worn pulleys, or a combination of these are factors.
   - 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 along the length of a rib or ribs. With continuous exposure to high temperatures, the stress of bending around the pulley leads to cracking.
   - Misalignment: Side walls of the belt may appear glazed, or the edge-cord may become frayed. A noticeable noise may result.

Change the Engine Coolant

WARNING!

Engine coolant is toxic. Avoid inhaling or ingesting engine coolant. If eyes or skin are contaminated by coolant, wash the affected area with plenty of water and seek medical treatment immediately.

Do not remove the radiator cap while the engine is hot. Engine coolant is 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. Position the upper structure as shown to allow access to the radiator drain valve.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

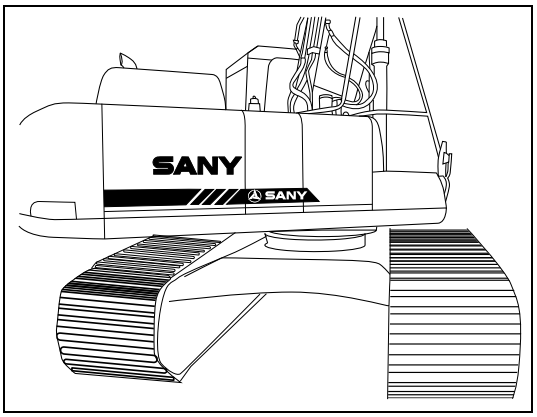


Fig. 5-45

3. Open the engine cover (1).
4. Slowly loosen the expansion tank cap to relieve any engine cooling system pressure.
5. Remove the expansion tank cap when engine cooling system pressure has been relieved.
6. Remove the bottom access panel.
7. Place an appropriately sized container under the radiator drain hose (2). For engine coolant capacity See “Capacities” on page 5-13

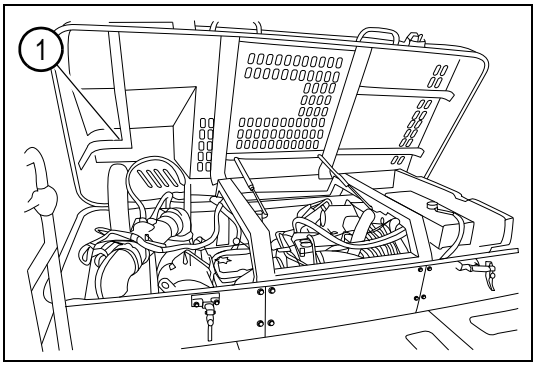


Fig. 5-46

8. Open the radiator drain valve (3).

9. Allow the engine coolant to completely drain into the container.

10. When the engine cooling system is empty, close the radiator drain valve.

NOTICE!

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

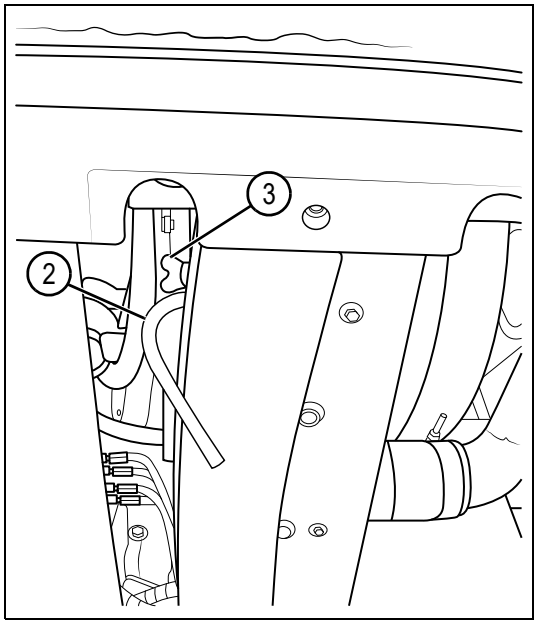


Fig. 5-47

11. Add new engine coolant through the expansion tank until the engine coolant level reaches the bottom of the filler neck.

12. Install the expansion tank cap.

13. Start the engine and run it at low idle for several minutes to allow engine coolant to circulate.

14. Shut down the engine, then check the engine coolant level.
See “Check the Engine Coolant Level” on page 5-47.

15. Install the bottom access cover.

16. Close the engine cover.

Check the Engine Coolant Level

WARNING!

- **Engine coolant is toxic. Avoid inhaling or ingesting engine coolant. If eyes or skin are contaminated by coolant, wash the affected area with plenty of water and seek medical treatment immediately.**
- **Do not remove the radiator cap while the engine is hot. Engine coolant is 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.

NOTICE!

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

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

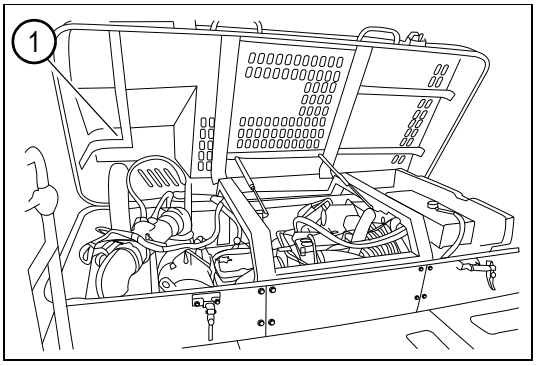


Fig. 5-48

2. Open the engine cover (1).

3. Check the engine coolant level in the sight glass on the side of the expansion tank. The acceptable engine coolant level is the middle of the sight glass.

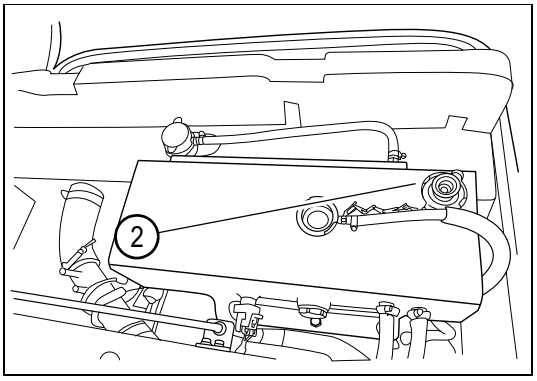


Fig. 5-49

Check the Engine Oil Level

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Open the engine cover (1).

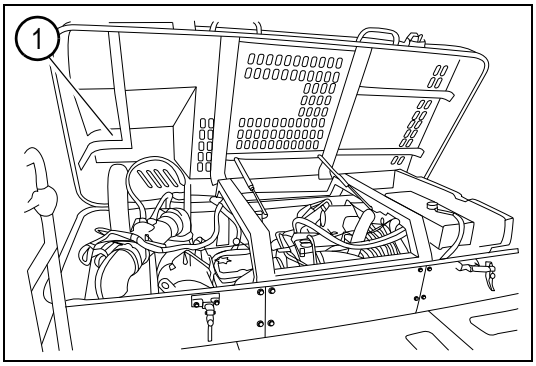


Fig. 5-50

3. Remove the engine oil dipstick (2) from the engine, wipe it with a clean cloth, then insert the dipstick into the holder.

4. Remove the dipstick and note the oil level. Install the dipstick.

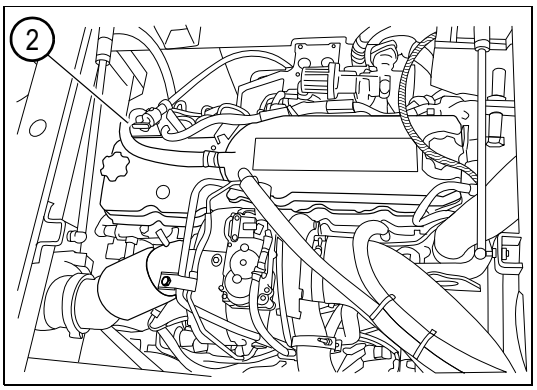


Fig. 5-51

NOTE: The oil level should be within the etched area (3) of the dipstick.

5. If the oil level is not within the etched area, remove the engine oil filler cap and add oil until the level is within the etched area.

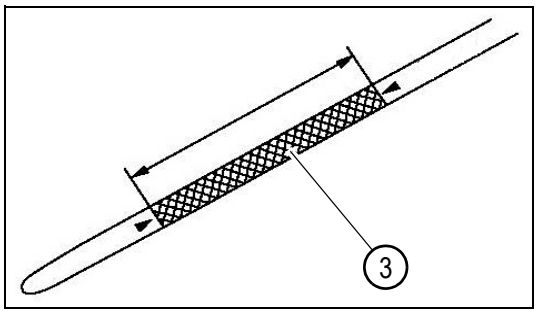


Fig. 5-52

NOTICE!

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

6. Install the oil filler cap (4).

7. Start and run the engine at low idle for several minutes and check for oil leaks.

8. Shut down the engine, wait several minutes, then remove the dipstick (2), note the oil level, and insert the dipstick.

   NOTE: The oil level should be within the etched area of the dipstick.

9. Remove the oil filler cap (2), add engine oil as needed, then install the oil filler cap.

10. Close the engine cover (1).

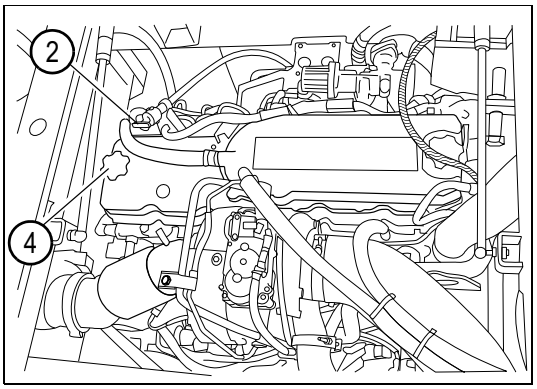


Fig. 5-53

Change the Engine Oil and Filter.

WARNING!

Do not perform this procedure when the engine is hot. Wait for the engine to cool before proceeding. Failure to follow this warning could result in burns or other serious injury.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Open the engine cover (1).

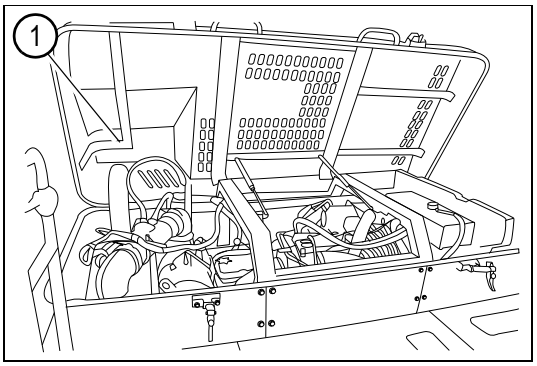


Fig. 5-54

3. Loosen the engine oil filler cap (2).

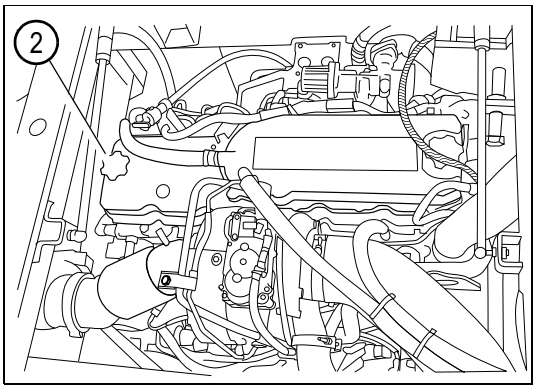


Fig. 5-55

4. Remove the engine compartment bottom cover (3).

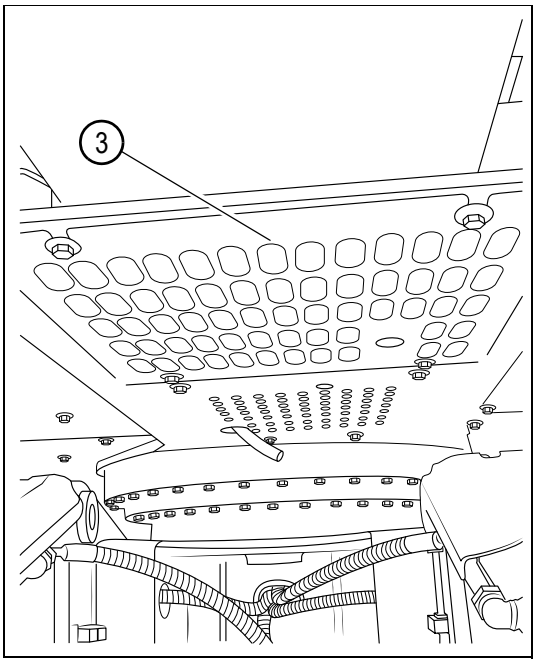


Fig. 5-56

5. Place an appropriately sized container under the engine oil drain valve (4).See “Capacities” on page 5-13 for more information.
6. Open the engine oil drain valve.
7. Collect a sample of the engine oil for analysis. See “Collect Oil Samples” on page 5-73. (If necessary.)
8. Allow the engine oil to completely drain into the container.
9. Close the engine oil drain valve.
10. Install the bottom cover (3).

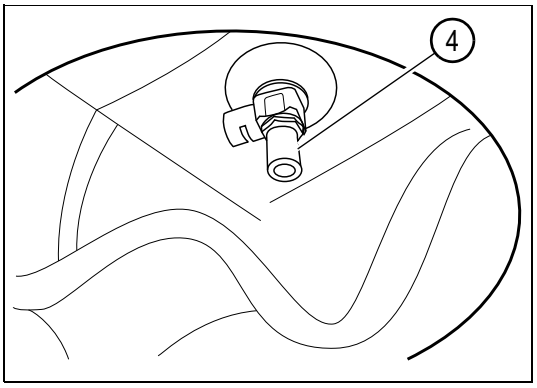


Fig. 5-57

NOTICE!

Dispose of drained oil in accordance with local environmental regulations. Failure to do so could result in damage to the environment.

11. The engine oil filter (5) is behind the right rear door.

12. Place a catch container under the engine oil filter.

13. Remove the oil filter.

14. Inspect the drained oil and the filter for metal particles and foreign material.

15. Clean the engine oil filter mating surface.

16. Apply a thin film of clean engine oil to the new filter gasket.

17. Install the new engine oil filter until the filter gasket makes contact with the filter mating surface, then tighten the filter 3/4 turn more.

18. Remove the engine oil filler cap (2) and add engine oil. See “Capacities” on page 5-13.

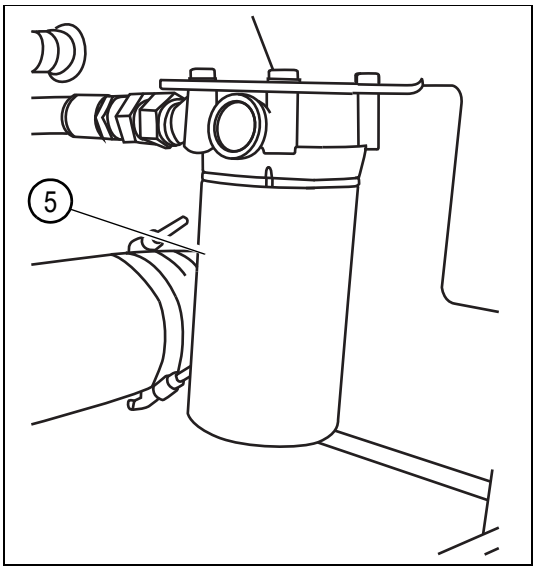


Fig. 5-58

NOTICE!

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

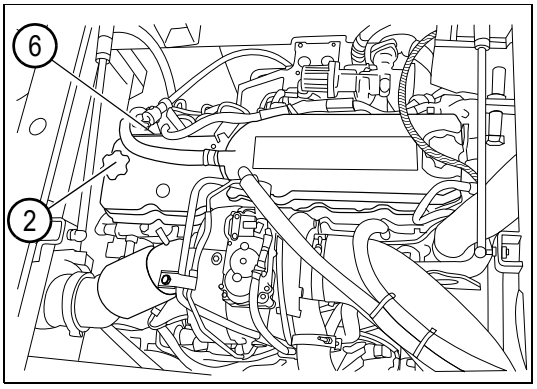


Fig. 5-59

19. Install the engine oil filler cap.

20. Remove the engine oil dipstick (6) from the engine, wipe it with a clean cloth, then insert the dipstick in its holder.

21. Remove the dipstick, note the oil level. Install the dipstick.

    NOTE: The oil level should be within the etched area (8). If the oil is not within the etched area, remove the engine oil filler cap, then add oil until the level is within the etched area.

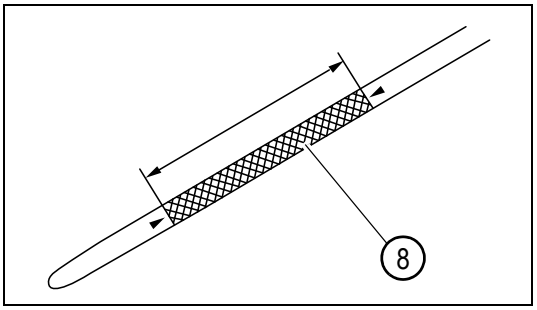


Fig. 5-60

22. Start and run the engine at low idle for several minutes, shut off the engine, and check for oil leaks.

23. Check the oil level. Add oil as needed.

Check the Final Drive

NOTE: Perform this procedure after the first 50 hours or week of service, then every 500 hours or 3 months afterwards.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Relieve hydraulic system pressure. See “Relieve Hydraulic System Pressure” on page 5-21.
3. Remove the final drive covers (1).

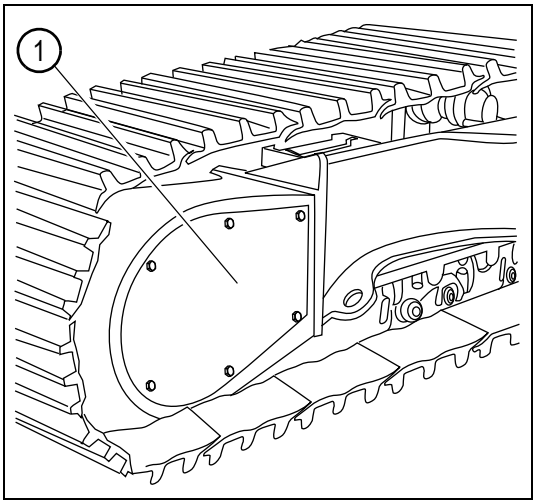


Fig. 5-61

4. Inspect the travel motor (2) to make sure all hoses are secured.
5. Check for leaks.
6. Make sure all fasteners (3), including the final drive motor mounting fasteners, are present and tight.
7. Replace any damaged or defective fasteners and tighten any loose fasteners.

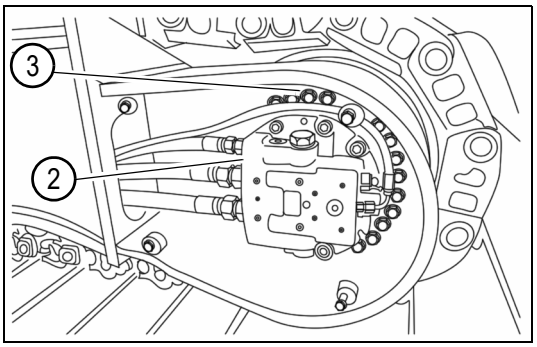


Fig. 5-62

NOTE: Use anaerobic thread sealant when installing loose fasteners and installing new fasteners. Tighten fasteners securely.

8. Install the final drive covers (1).

Check the Final Drive Oil Level

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.

1. Park the machine on a flat, level surface, positioning the oil drain plug (1) on the final drive cover at the bottom and the oil level mark parallel with the ground.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
3. Remove any dirt from around the oil level inspection check plug (2).
4. Slowly loosen oil level inspection check plug to relieve pressure within the final drive.
5. Remove the oil level inspection check plug (2) and observe that the oil level is within 0.4 in. (10 mm) of the bottom of the plug hole.

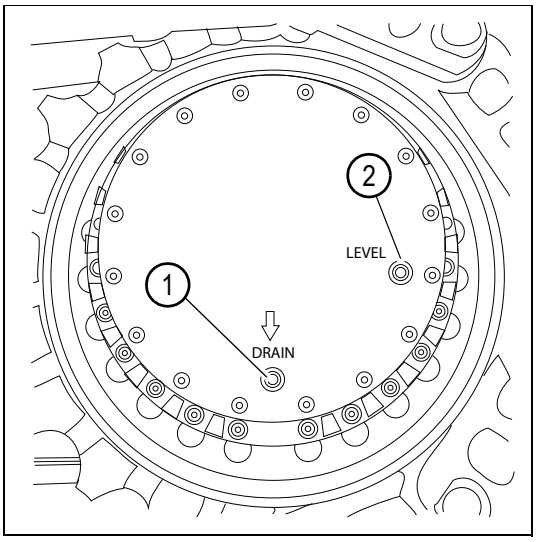


Fig. 5-63

6. Add oil through the check plug hole (2) as necessary until the level is within 0.4 in. (10 mm) of the bottom of the plug hole (2).
7. Replace the O-ring on the check plug.
8. Install the check plug.
9. Repeat steps 3–8 for the opposite final drive.

Change the 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.

1. Park the machine on a flat, level surface, positioning the oil drain plug (1) on the final drive cover at the bottom and the oil level mark parallel with the ground.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
3. Remove any dirt from around the oil level inspection check plug (2) and the drain plug (1).
4. Place an appropriately sized container under the drain plug (1). See “Capacities” on page 5-13.
5. Slowly loosen oil level inspection check plug to relieve pressure within the final drive.
6. Remove the drain plug (1).
7. Allow the oil to drain completely.

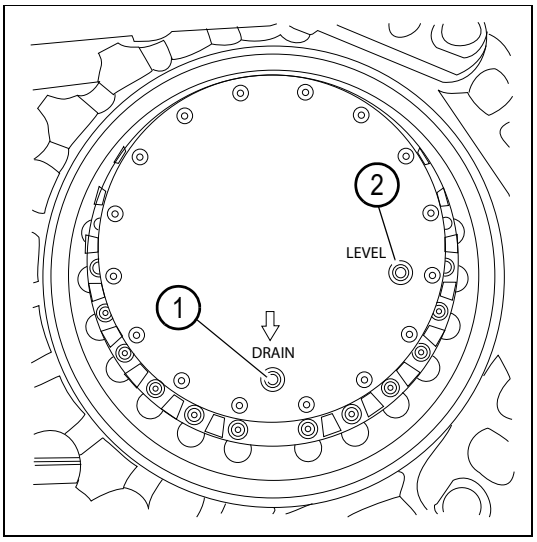


Fig. 5-64

NOTICE!

Dispose of drained oil in accordance with local environmental regulations. Failure to do so could result in damage to the environment.

8. Replace the O-ring on the oil level inspection check plug and the drain plug.
9. Install the drain plug.
10. Add oil through the check plug hole (2) to a point 0.4 in. (10 mm) below the bottom of the plug hole.
11. Install the check plug.
12. Repeat steps 3–11 for the opposite final drive.

Check the Fire Extinguisher

NOTICE!

- **Always keep the fire extinguisher in the cab. Read the instructions on the fire extinguisher carefully and know how to use it in an emergency.**
- **Inspect the condition of the fire extinguisher daily. If damaged, replace it immediately.**
- **Make sure the fire extinguisher is within the listed inspection period. Replace the fire extinguisher immediately if it has reached its expiration date.**

Check that the fire extinguisher (1) is on the back wall of the cab and is charged. Replace as necessary.

The fire extinguisher must be at least a 2.5 lb class “A, B, C” fire-rated extinguisher (National Fire Protection Association [NFPA] 10 Standard for Portable Fire Extinguishers).

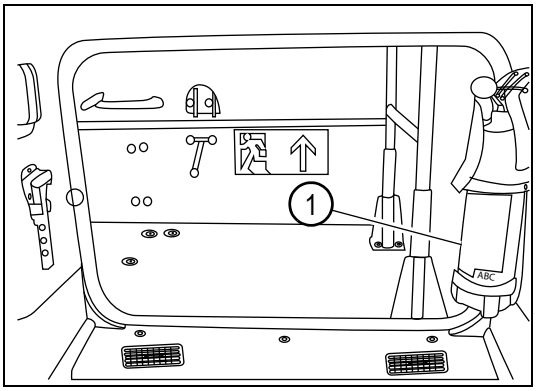


Fig. 5-65

Check the Escape Tool

Check that the escape tool (1) is installed inside the cab.

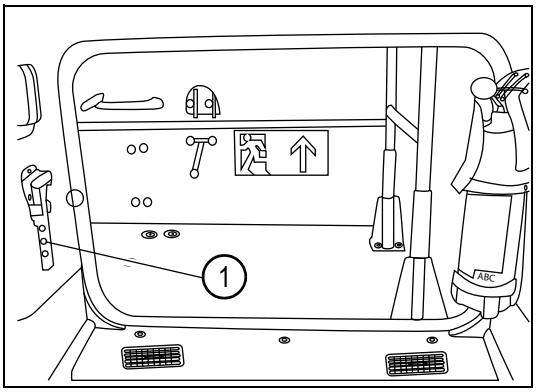


Fig. 5-66

Check the Front Window Locks

Push up on the handles (1) to check that the front window locks are fully engaged. Make sure the window does not move while operating the machine.

WARNING!

Failure to lock the front window in place could allow it to open without warning, resulting in death or serious injury.

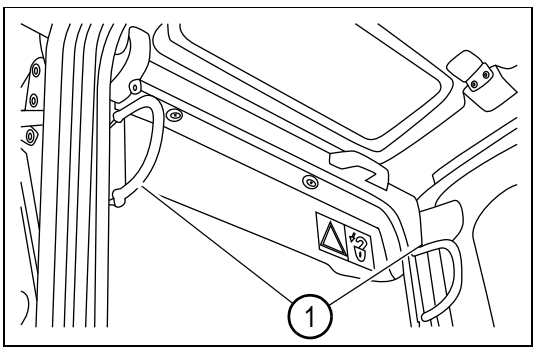


Fig. 5-67

Check the Fuel Level

Turn the key switch to ON and check the fuel level displayed (1) on the system monitor.

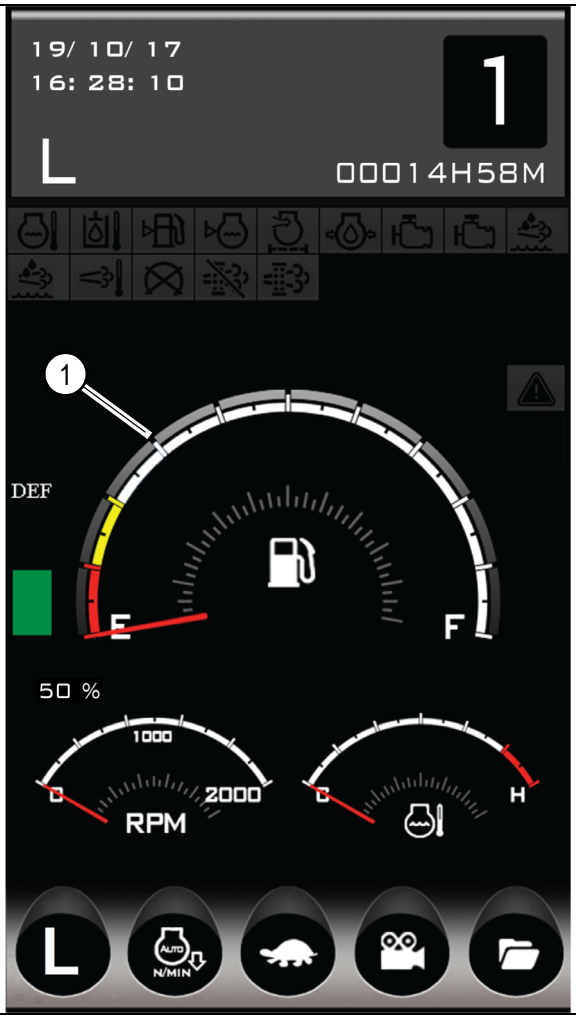


Fig. 5-68 0004595

Check the Fuel Lines

Inspect all fuel lines and hoses on the machine and the engine. Replace as necessary.

Drain the Fuel Tank

1. Park the machine on a flat, level surface, and position the upper structure to allow access to the right cover plate under the fuel tank.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
3. Open the right access door.
4. Direct the drain tube (1) from the fuel tank down through the floor grating (2).

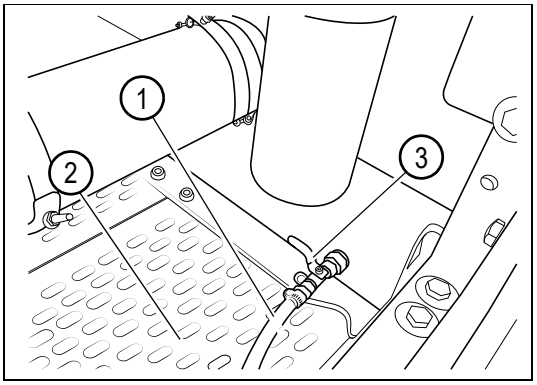


Fig. 5-69

5. Place an appropriately sized container under the end of drain tube (3).

6. Open the drain valve (3).

7. Close the drain valve when the fuel flow is free of water and contaminants.

NOTICE!

Dispose of the contaminated fuel in accordance with local environmental regulations. Failure to do so could result in damage to the environment.

8. Unlock and remove the fuel tank filler cap (4).

9. Add fuel to the system as necessary.

10. Start the engine and allow it to run at low idle.

11. Check for leaks in the fuel system.

12. Repair any leaks.

13. Close and lock the right access door.

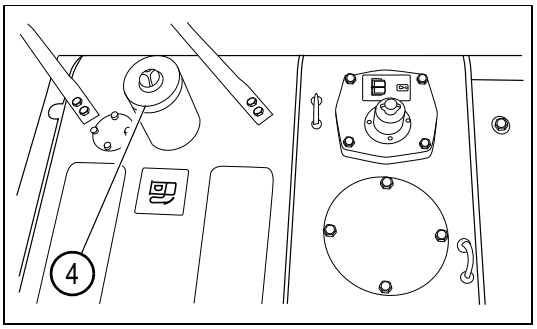


Fig. 5-70

Fill the Fuel Tank

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Remove the fuel tank cap (1).

3. Add clean, fresh fuel as needed until the tank is full.

4. Install the fuel tank cap.

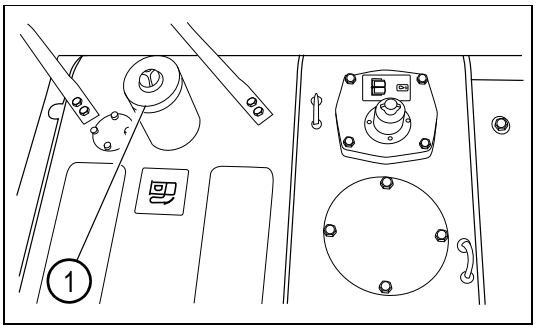


Fig. 5-71

Check the Fuel Tank Strainer

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Unlock and remove the fuel tank filler cap (1).

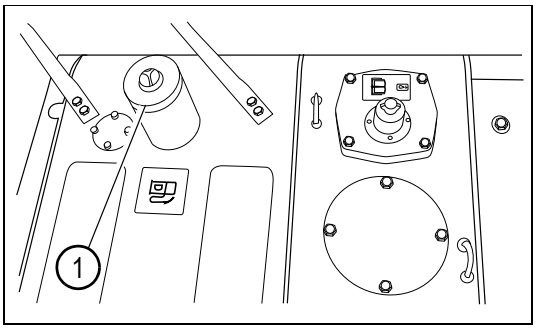


Fig. 5-72

3. Remove the fuel tank strainer element (2) from the fuel tank filler neck.
4. Clean and inspect the fuel tank strainer.
5. Install or replace the fuel tank strainer.
6. Install and lock the fuel tank filler cap.

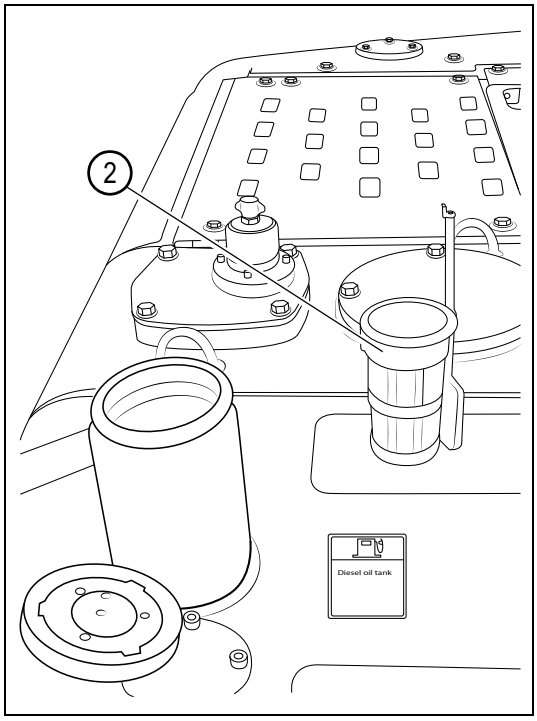


Fig. 5-73

Check the Grab Handles and Steps

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Check the mounting fasteners on 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.
5. Clean the grab handles and steps.

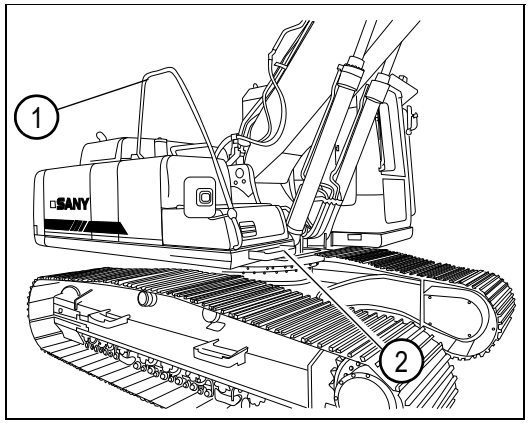


Fig. 5-74

Check the Hydraulic Hoses and Lines

Check all hydraulic hoses and lines for leaks. Replace damaged or leaking hydraulic hoses and lines immediately.

Make sure there is sufficient distance between all lines and hoses and the high-temperature engine components (for example, the exhaust system).

Prepare the machine for service. See “Maintenance Safety” on page 2-8. Examine hydraulic hoses and lines for the following:

- Couplings that are cracked or have become loose.
- Damage, cuts, or abrasions.

- Hardening, chapping, or burning of hose.
- Cracks, or serious corrosion on the couplings.
- Leaks at the couplings.
- Twisted, broken, flat, or distorted hose or lines.
- Blisters or softness in the external hose layer.

Add Hydraulic Oil

CAUTION!

Hydraulic oil may be hot and under pressure. Always wait for the machine to cool down before attempting to open the hydraulic oil system. Failure to follow this process could result in injury.

1. Park the machine on a flat, level surface, and position the work equipment as shown on the hydraulic tank level decal.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
3. Start engine and allow to idle for 1 minute.
4. Shut down the engine.
5. Turn the key switch to ON.
6. Place the hydraulic lockout lever in the open (unlocked) position.
7. Cycle the joystick controls and travel control levers and pedals to relieve pressure in the hydraulic circuits.
8. Turn the key switch to OFF and place the hydraulic lockout lever in the closed (locked) position.
9. Remove the wing nut (1) from the breather valve.

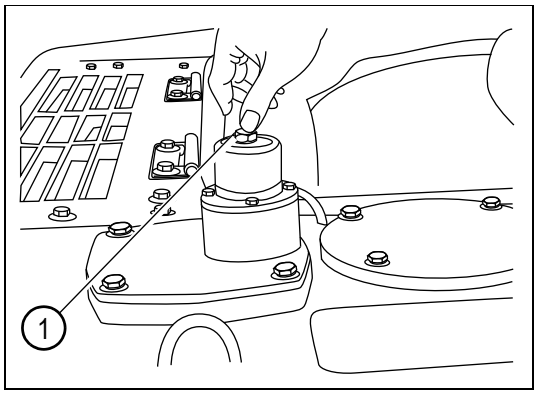


Fig. 5-75

10. Press the hydraulic tank vent button (2) to relieve pressure in the hydraulic tank.

11. Install the wing nut.

12. Clean the top of the hydraulic tank.

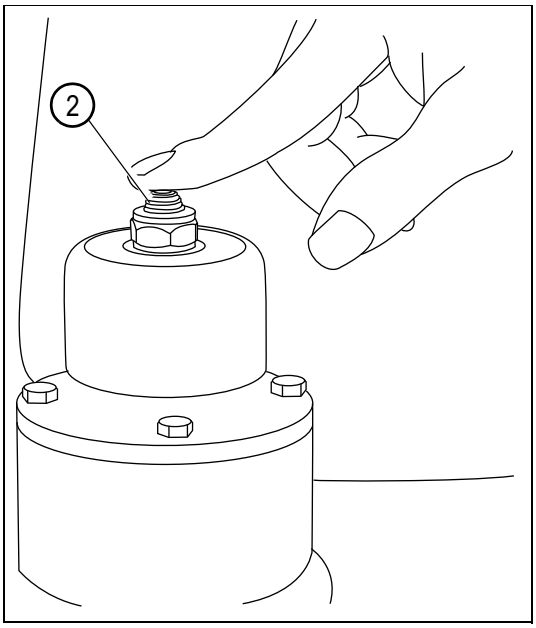


Fig. 5-76

13. Remove the hydraulic suction strainer cover (3).

CAUTION!

Hydraulic oil may be hot and under pressure. Always use caution when opening the hydraulic system. Failure to follow this process could result in injury.

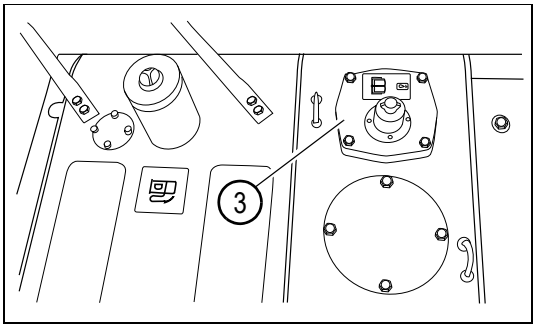


Fig. 5-77

14. Add hydraulic oil to the tank through the suction strainer opening.

15. Check the hydraulic oil level using the sight glass on the side of the hydraulic tank. Be sure the hydraulic oil level is between the marks on the sight glass decal.

NOTICE!

Do not overfill the hydraulic tank. This could result in machine damage and improper machine operation.

16. Install the suction strainer cover and secure using the fasteners.

17. Start the engine.

18. Run the engine for 10 minutes to circulate hydraulic oil through the hydraulic system.

19. Check the hydraulic oil level. See “Check the Hydraulic Oil Tank Level” on page 5-70.

20. Check for leaks.

Change the Hydraulic Oil

CAUTION!

Hydraulic oil may be hot and under pressure. Always wait for the machine to cool down before attempting to open the hydraulic oil system. Failure to follow this process could result in injury.

NOTICE!

If a breaker attachment is be used, change hydraulic oil and filters every 500 hours to avoid damage to the machine.

1. Park the machine on a flat, level surface, and position the work equipment as shown on the hydraulic tank decal.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
3. Start and idle the engine for 1 minute.
4. Shut down the engine.
5. Turn the key switch to ON.
6. Place the hydraulic lockout lever in the open (unlocked) position.
7. Cycle the joysticks controls and travel control levers and pedals to relieve pressure in the hydraulic circuits.
8. Turn the key switch to OFF and place the hydraulic lockout lever in the closed (locked) position.
9. Clean the top of the hydraulic tank.
10. Remove the wing nut (1) from the breather valve.

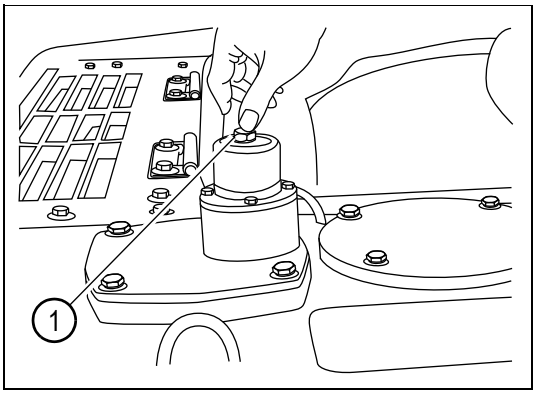


Fig. 5-78

11. Press the hydraulic tank vent button (2) to relieve pressure in the hydraulic tank.

12. Install the wing nut (1).

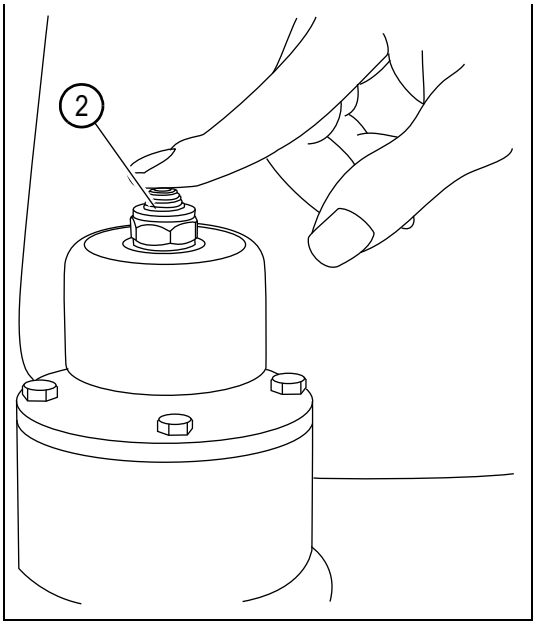


Fig. 5-79

13. Remove the hydraulic suction strainer cover (3).

14. Collect a hydraulic oil sample. See “Collect a Hydraulic Oil Sample” on page 5-74. (If necessary.)

15. Place the suction strainer cover back over the opening. Do not secure at this time.

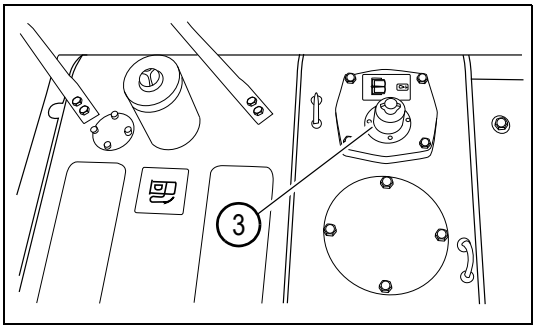


Fig. 5-80

16. Remove the bottom cover (4) to access the hydraulic tank drain plug.

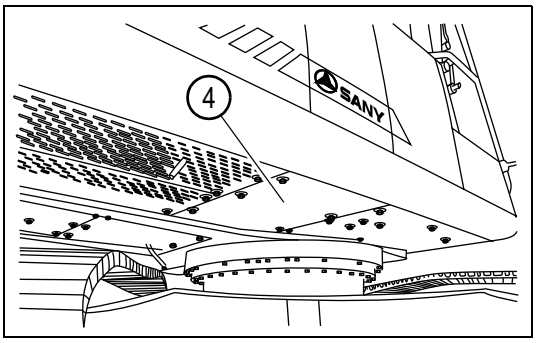


Fig. 5-81

17. Clean the area around the hydraulic tank drain plug (5).

18. Place an appropriately sized container under the drain plug. See “Capacities” on page 5-13.

19. Remove the drain plug and allow the tank to drain.

NOTICE!

Dispose of used hydraulic oil properly. Failure to do so could result in damage to the environment.

20. Replace the O-ring on the drain plug.

21. Install the drain plug.

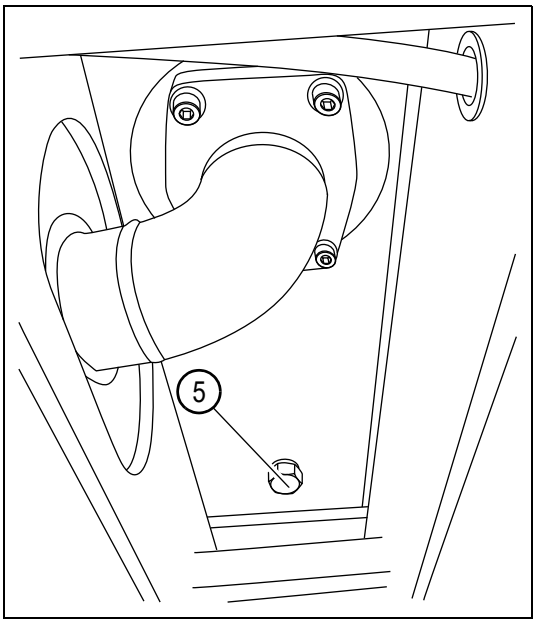


Fig. 5-82

22. Remove the hydraulic return filter cover (6).

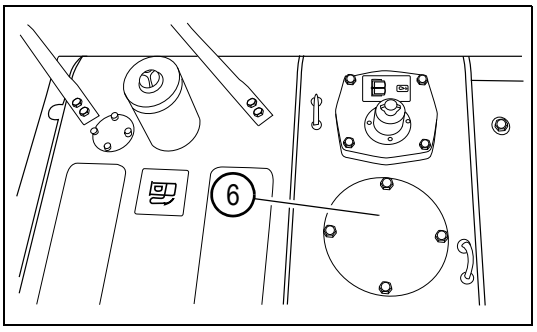


Fig. 5-83

23. Remove the spring (7) and withdraw the filter (8).

24. Check the bottom of the return filter housing and remove any debris.

25. Insert a new filter in the return filter housing.

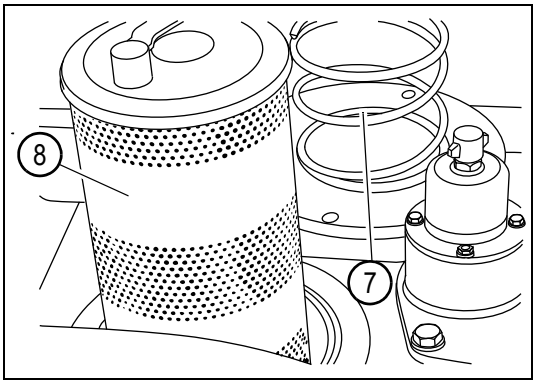


Fig. 5-84

26. Replace the O-ring (9).

27. Position the spring (7) on top of the filter (8).

28. Install the hydraulic return filter cover (6) and tighten the fasteners.

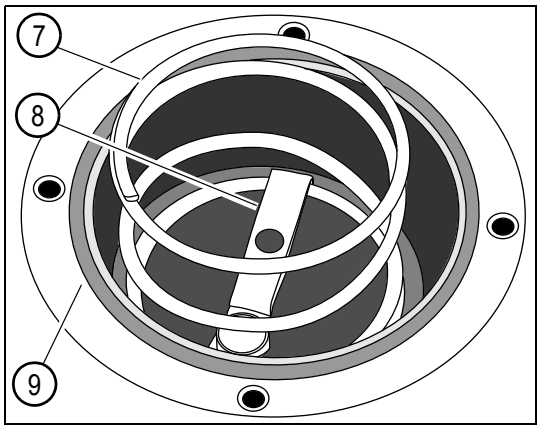


Fig. 5-85

29. Remove the hydraulic suction strainer cover (3), then use a pull rod (10) to remove the strainer (11).

30. Clean the strainer of all debris.

    NOTE: Replace the strainer if damaged.

31. Replace the O-ring (9).

32. Install the strainer.

33. Replace the hydraulic system breather filter. See “Replace the Hydraulic System Breather Filter” on page 5-68.

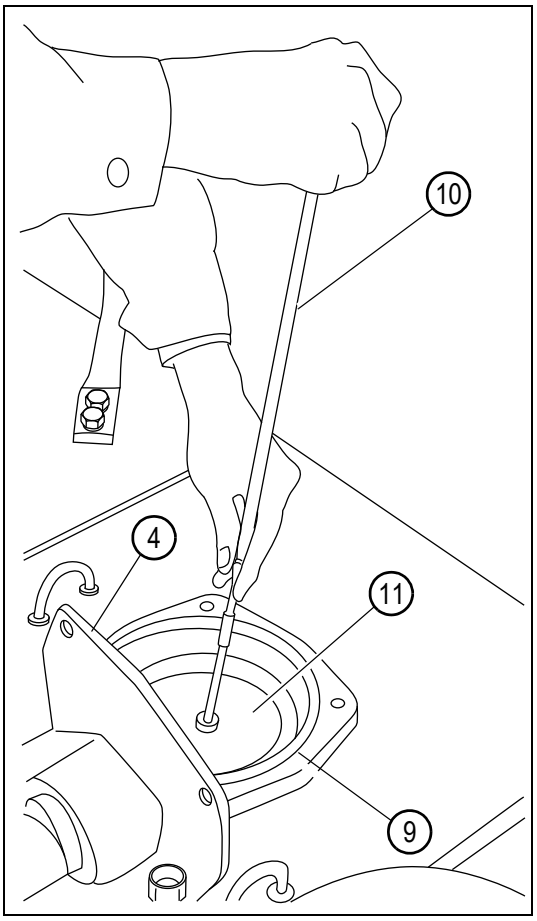


Fig. 5-86

34. Add hydraulic oil to the tank through the suction strainer opening until the hydraulic oil level displays full in the sight glass (12) on the hydraulic tank.

35. Inspect and clean the suction strainer. Replace the suction strainer as needed.

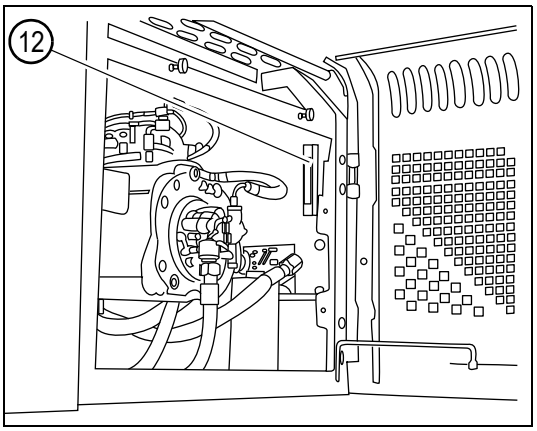


Fig. 5-87

36. Install the suction strainer cover (3) and fasteners.

37. Start the engine.

38. Run the engine for 10 minutes to circulate the oil in the hydraulic system.

39. Check the oil level in the tank and add oil if needed.

40. Check for leaks.

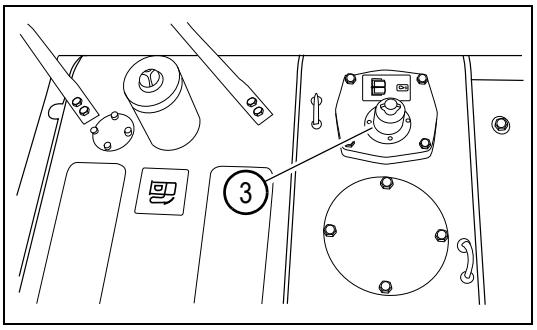


Fig. 5-88

Replace the Hydraulic Pilot Filter Element

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Start and idle the engine for 1 minute.
3. Shut down the engine.
4. Turn the key switch to ON.
5. Place the hydraulic lockout lever in the open (unlocked) position.
6. Cycle the joysticks controls and travel control levers and pedals to relieve pressure in the hydraulic circuits.
7. Turn the key switch to OFF and place the hydraulic lockout lever in the closed (locked) position.
8. Remove the wing nut (1) from the breather valve.

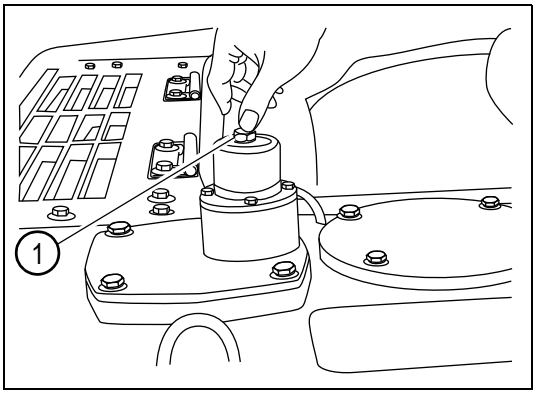


Fig. 5-89

9. Press the hydraulic tank vent button (2) to relieve pressure in the hydraulic tank.
10. Install the wing nut.

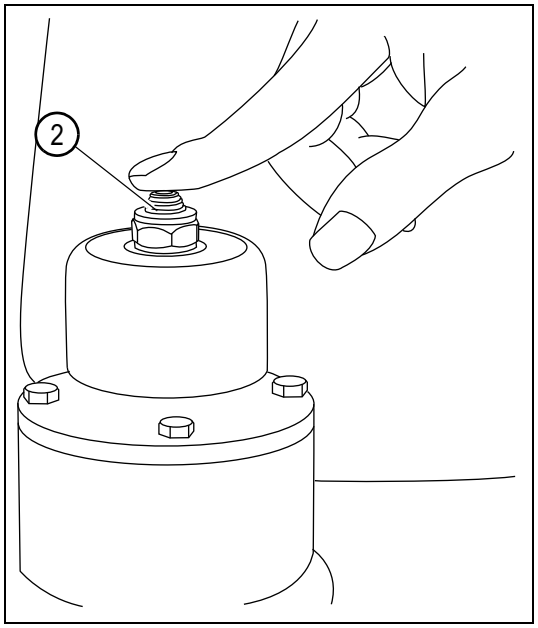


Fig. 5-90

11. Open the right rear door and locate the hydraulic pilot filter housing (3) behind the hydraulic oil filter.

12. Place an appropriately sized container under the pilot filter housing to catch leaking oil.

NOTICE!

Dispose of drained oil in accordance with local environmental regulations. Failure to do so could result in damage to the environment.

13. Remove the pilot filter housing.

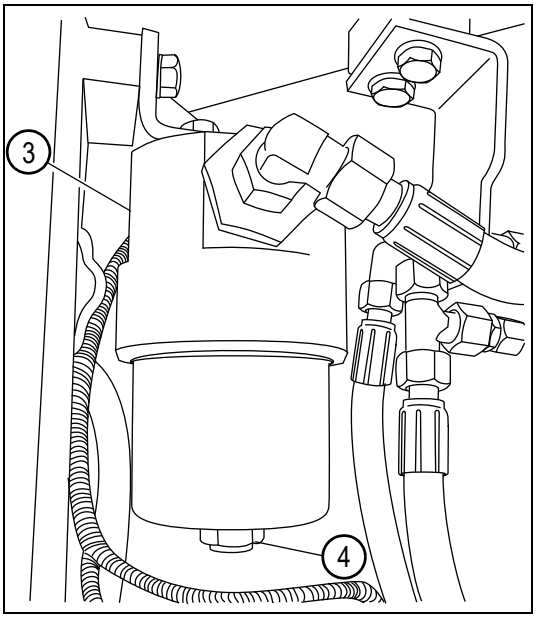


Fig. 5-91 0000271

14. Remove the filter element (5) from the filter housing.

15. Clean the inside of the filter housing with clean fuel.

16. Install a new gasket and O-ring.

17. Install a new pilot filter element inside the housing.

18. Install the pilot filter housing.

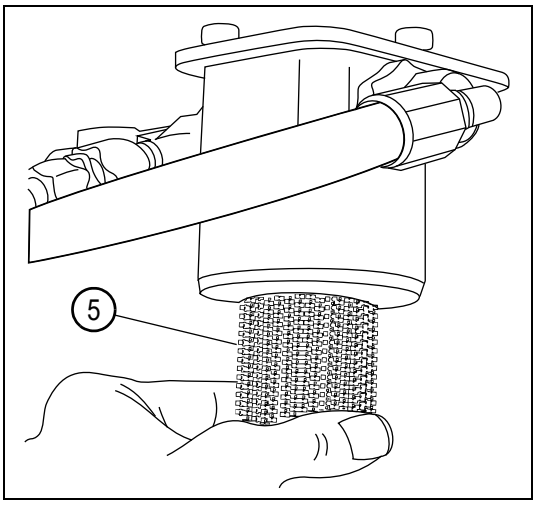


Fig. 5-92 0000198

Check the Hydraulic Pump

CAUTION!

Hydraulic pump may be hot. Always wait for the machine to cool before servicing the hydraulic oil system. Failure to do so could result in injury.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Start the engine.
3. Check the hydraulic pump (1) for leaks, function, and abnormal noise.
4. Shut down the engine.

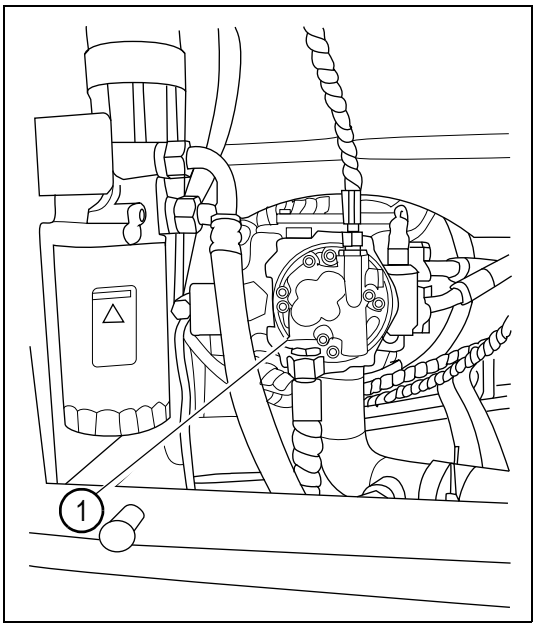


Fig. 5-93

Replace the Hydraulic System Breather Filter

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Clean the top of the hydraulic tank around the breather housing (1).

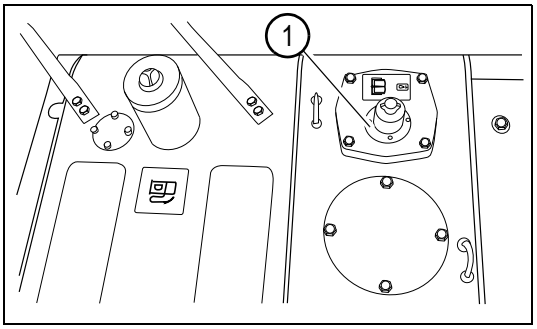


Fig. 5-94

3. Remove the wing nut (2) from the breather valve.

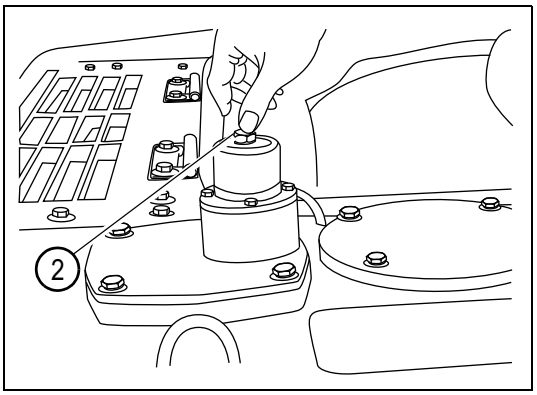


Fig. 5-95

4. Press the hydraulic tank vent button (3) to relieve pressure in the hydraulic tank.

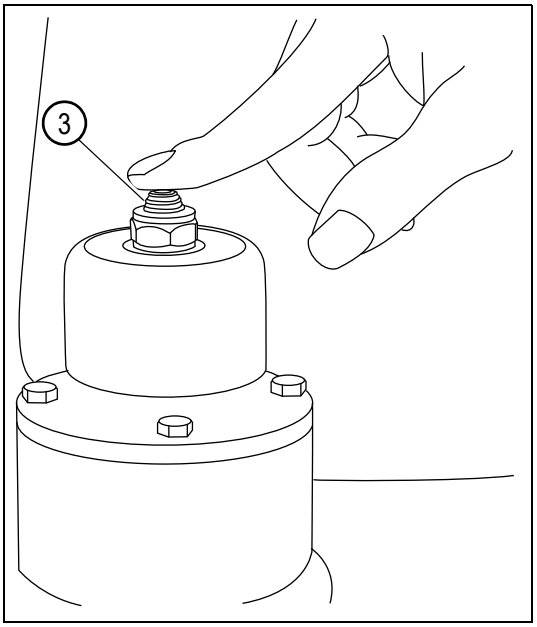


Fig. 5-96

5. Remove the breath filter element cover (4) from the breather valve (5) and discard.
6. Install a new breather filter element (5).
7. Install the breather filter element cover (4).
8. Install the wing nut (2).

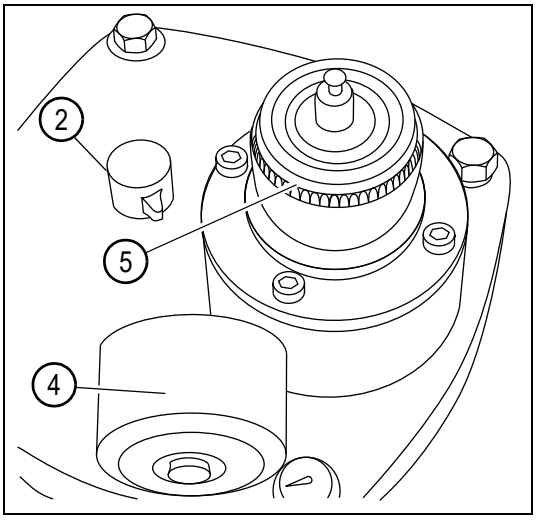


Fig. 5-97

Check the Hydraulic Oil Tank Level

1. Park the machine on a flat, level surface, and position the work equipment as shown on the hydraulic tank decal.

2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

3. Open the right rear door (1).

4. Check the tank for leaks, exterior rust, and other damage.

5. Check the oil level using the sight glass (2) on the side of the hydraulic tank. Make sure the oil level is between the level marks in the sight glass.

6. Add hydraulic oil to the system as necessary.

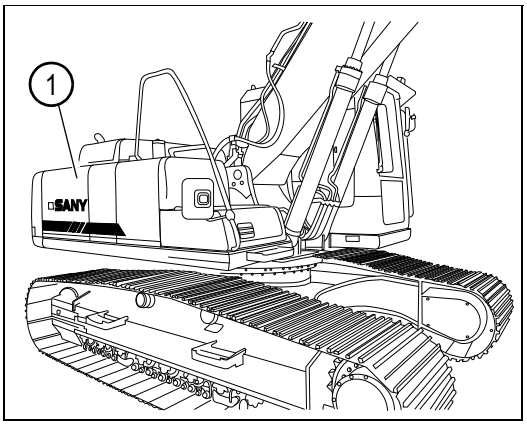


Fig. 5-98

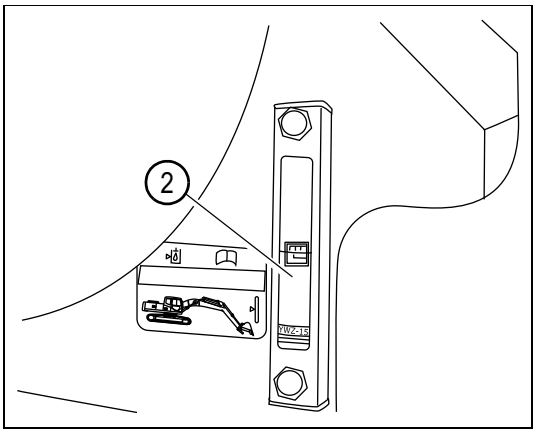


Fig. 5-99

Replace the Hydraulic Tank Return Filter

CAUTION!

Hydraulic oil may be hot and under pressure. Always wait for the machine to cool down before attempting to open the hydraulic oil system. Failure to do so could result in injury.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Remove the wing nut (1) from the breather valve.

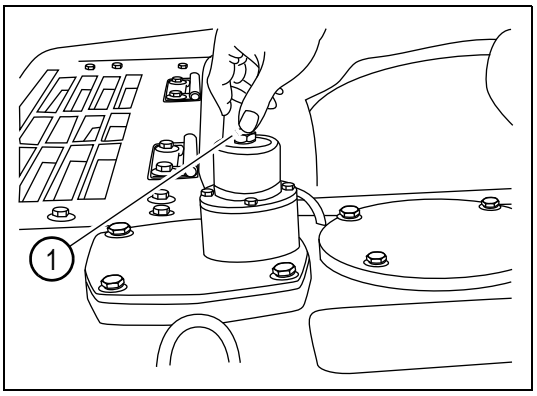


Fig. 5-100

3. Press the hydraulic tank vent button (2) to relieve pressure in the tank.

4. Install the wing nut (1).

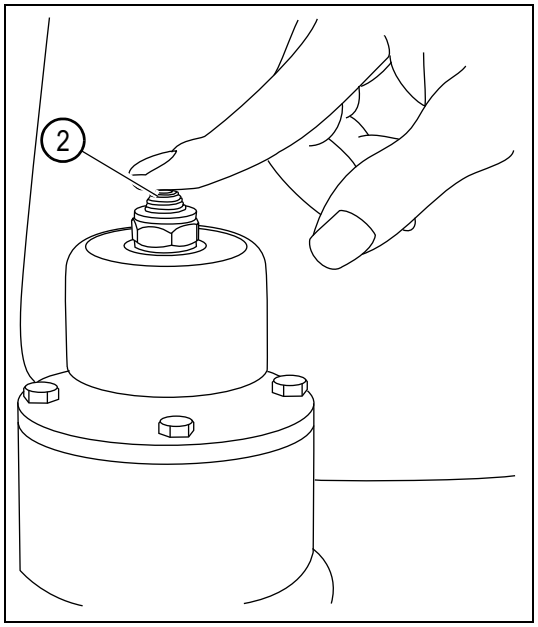


Fig. 5-101

5. Remove the hydraulic oil return filter cover (3).

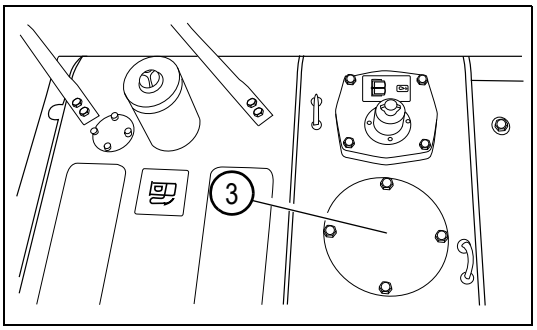


Fig. 5-102

6. Remove the spring (4), and the oil filter (5).
7. Check the bottom of the return oil filter housing and remove any debris.
8. Install a new filter in the return oil filter housing.

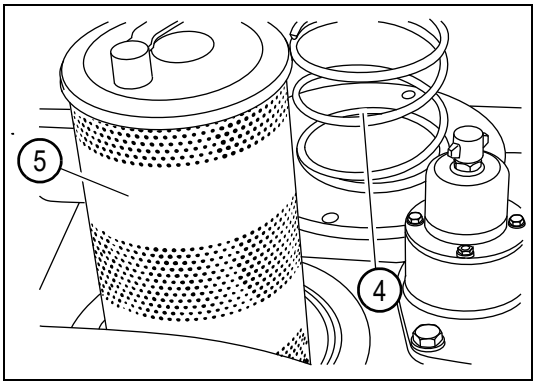


Fig. 5-103

9. Replace the O-ring (6).
10. Position the spring (4) on top of the filter (5)**.**

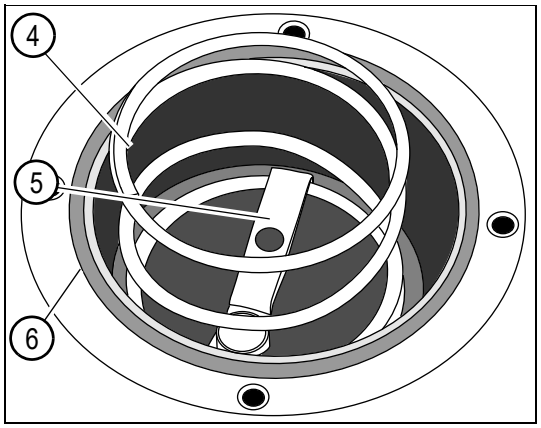


Fig. 5-104

11. Install the return filter cover (3) and the fasteners.
12. Start and run the engine for 10 minutes to circulate oil in the hydraulic system.
13. Check the oil level in the hydraulic tank and add oil if needed. See “Capacities” on page 5-13.
14. Check for leaks.

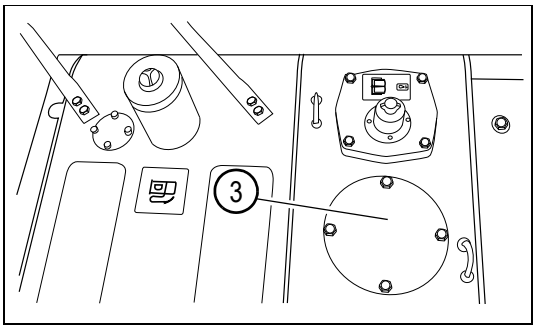


Fig. 5-105

Check the Idler.

Prepare the machine for service. See “Maintenance Safety” on page 2-8. Check the idler (1) for cracks and distortion

NOTE: If the idler is cracked or distorted, contact a SANY dealer for replacement.

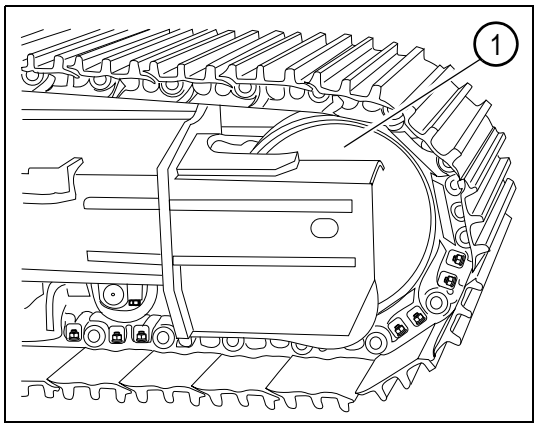


Fig. 5-106

Adjust the Mirrors

Adjust both of the outside mirrors for clear vision and safe driving.

One mirror (1) is cab-mounted. The other mirror is attached to the right side of the upper structure. See “Exterior Components” on page 3-3 for the mirror locations.

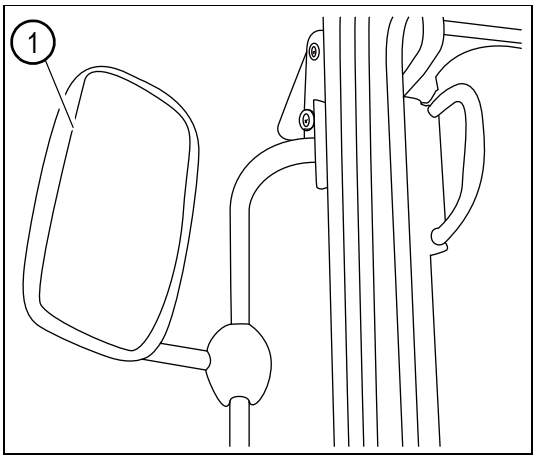


Fig. 5-107

Collect Oil Samples

1. Obtain an Oil Analysis Sample Kit from a SANY dealer.
2. Operate the machine until the lubricant in the compartment being tested is up to normal operating temperature.

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.

3. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
4. Obtain and send the oil sample for testing in accordance with the instructions included with the sample kit.

Collect an Engine Oil Sample

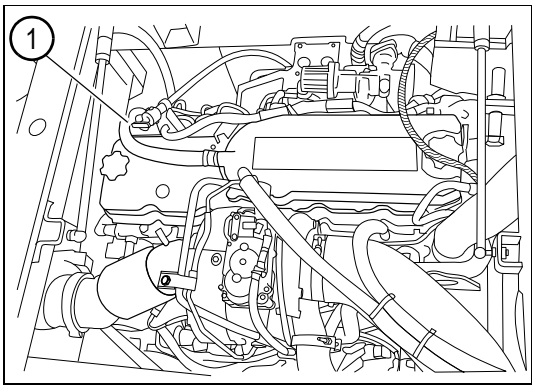


Fig. 5-108

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Start the engine and operate the machine until all systems reach normal operating temperatures.
3. Shut down the engine and open the engine cover.
4. Clean the area around the engine oil dipstick (1).
5. Remove the dipstick.
6. Insert the oil sample tube into the dipstick tube.
7. Collect a sample of engine oil.
8. Remove the oil sample tube.
9. Install the dipstick.
10. Follow the instructions included with the sample kit to send the sample for testing.

Collect a Hydraulic Oil Sample

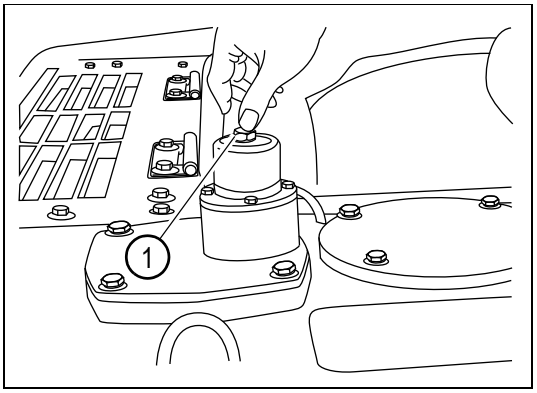


Fig. 5-109

1. Start the engine and operate the machine until all systems reach normal operating temperatures.
2. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
3. Clean the top of the hydraulic oil tank.
4. Remove the wing nut (1) from the breather valve.

5. Press the hydraulic tank vent button (2) to relieve pressure in the hydraulic oil tank.

6. Reinstall the wing nut (1).

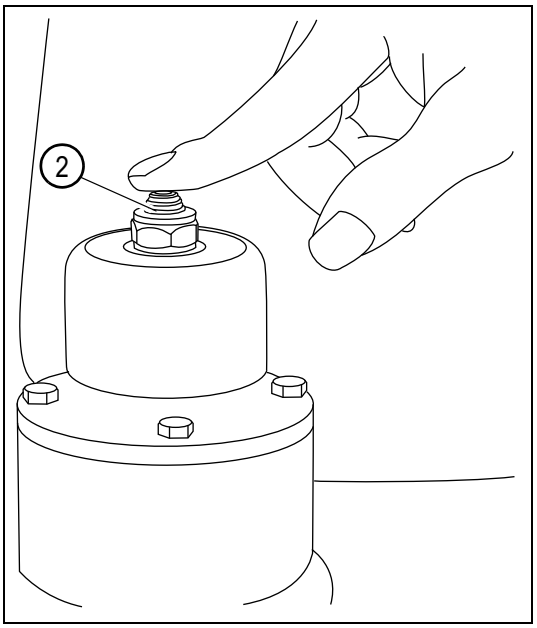


Fig. 5-110

7. Remove the hydraulic oil suction strainer cover (3).

8. Insert the oil sample tube into the hydraulic oil tank.

9. Collect a sample of hydraulic oil.

10. Remove the oil sample tube.

11. Replace the hydraulic oil suction strainer cover (3).

12. Follow the instructions included with the sample kit to send the sample for testing.

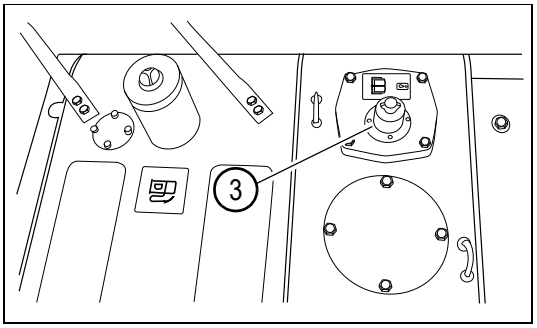


Fig. 5-111

Collect a Final Drive Oil Sample

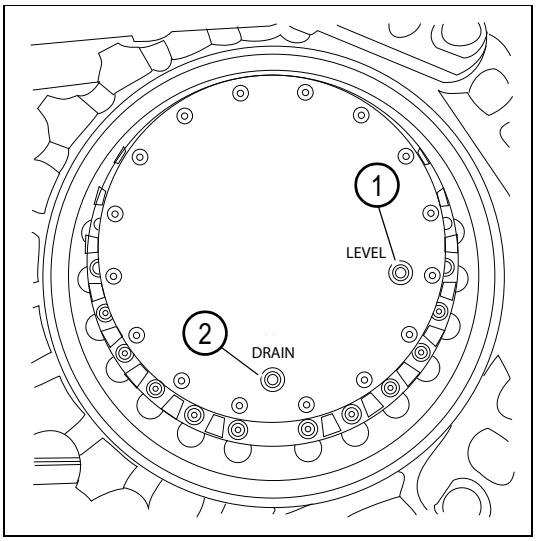


Fig. 5-112

1. Start the engine and operate the machine until all systems reach normal operating temperatures.
2. Park the machine on a flat, level surface, placing the oil drain plug (1) on the final drive cover at the bottom, and the oil level mark parallel with the ground.
3. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
4. Remove any dirt from the area around the oil level check plug (2).
5. Slowly loosen the oil level check plug to relieve pressure within the final drive.
6. Remove the oil level check plug.
7. Insert the oil sample tube into the oil level check plug hole.
8. Collect a sample of oil from the final drive.
9. Remove the oil sample tube.
10. Install the oil level check plug.

    NOTE: Repeat preceding steps for the other final drive as needed.

11. Follow the instructions included with the sample kit to send the sample for testing.

Collect a Swing Drive Oil Sample

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Start the engine and operate the machine until all systems reach normal operating temperatures.
3. Shut down the engine.
4. Remove the dipstick from the swing drive.
5. Insert the oil sample tube into the swing drive dipstick tube.
6. Collect a sample of swing drive oil.
7. Remove the oil sample tube.
8. Install the dipstick.
9. Follow the instructions included with the sample kit to send the sample for testing.

Check Operating Functions

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Turn the key switch to ON to provide power to the machine and check that all functions in the cab work correctly.

   NOTE: Do not start the engine.

3. Make sure that the following devices work properly:

   - Horn (1)

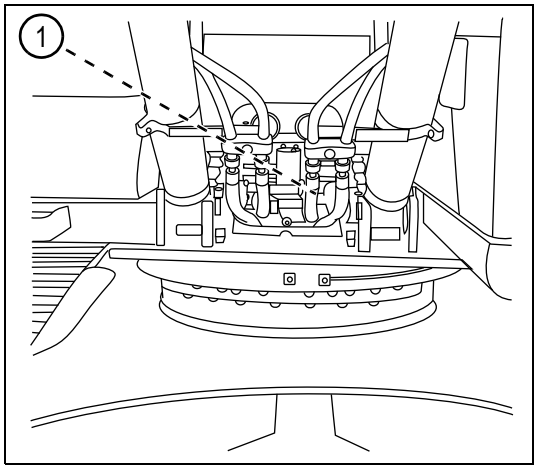


Fig. 5-113

   - Work light (2)

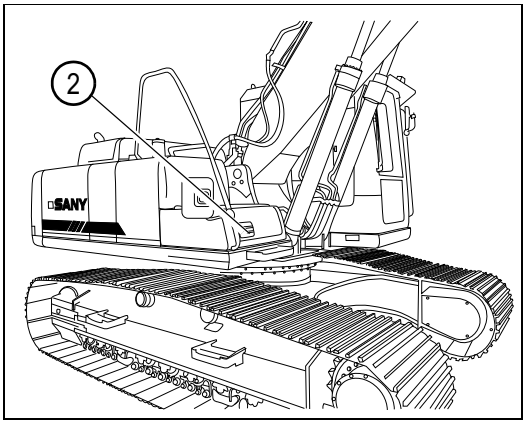


Fig. 5-114

   - Headlights (3)

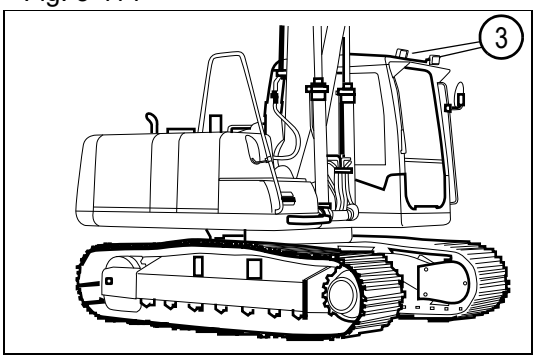


Fig. 5-115

- Boom work light (4)

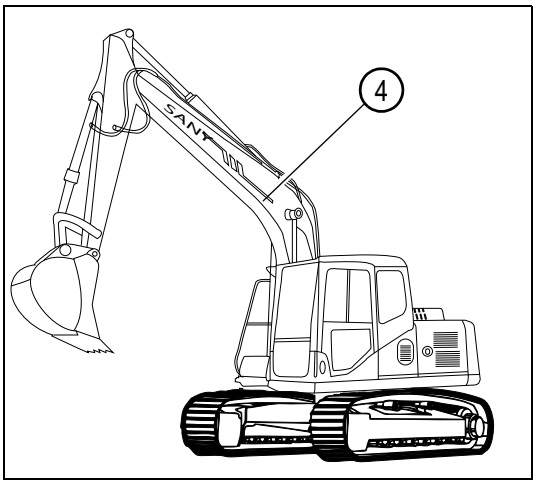


Fig. 5-116

- Windshield wiper (5)
- Windshield washer (6)

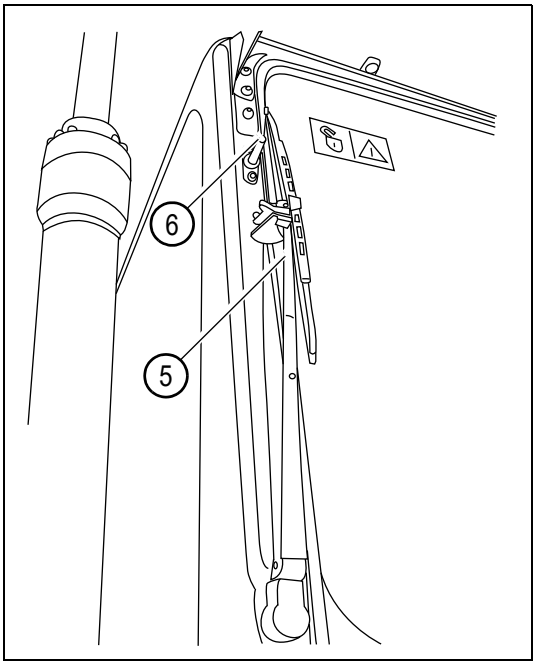


Fig. 5-117

Check the Operator Controls

Check the joysticks (1) and travel controls (2) for smooth operation with the key switch (3) in the OFF position. All joysticks and travel controls should return to neutral freely, and there should not be any excessive play in them.

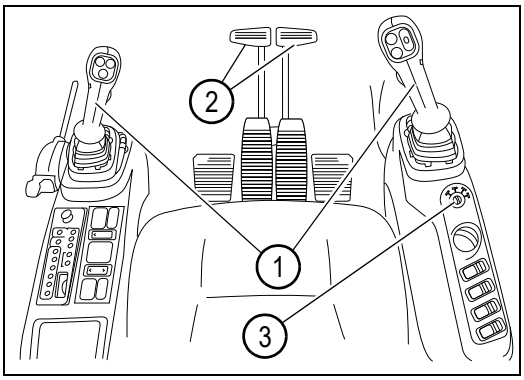


Fig. 5-118

Check the Pattern Change (SAE/BHL) Valve

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 environment, damage to the machine, or cause the machine to operate improperly.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. The pattern change (SAE/BHL) valve (1) is below the engine air cleaner (2) behind the left door.

3. Pull up on the spring-loaded pin and rotate the retaining bar to release the lock pin.

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

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

   - In BHL (Backhoe Loader) mode, the arm is controlled by the right joystick and the boom is controlled by the left joystick.

   NOTE: Both patterns are printed on a card that is posted on the right-hand window. Make sure the card matches the machine operation. If it does not, turn the card over to display the correct pattern.

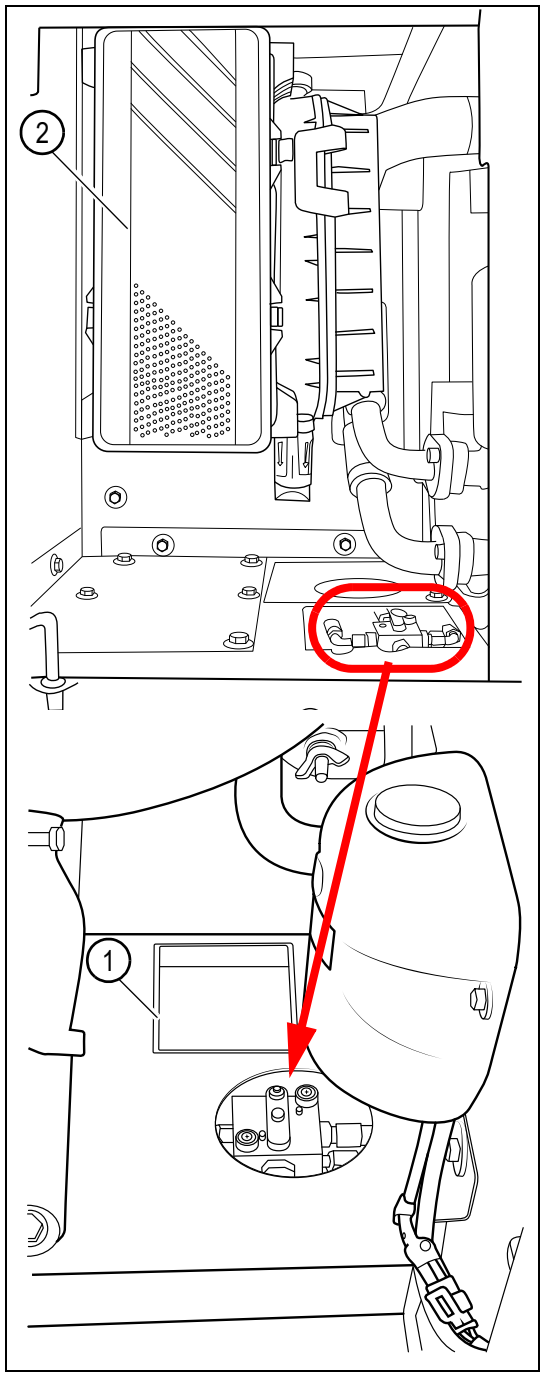


Fig. 5-119

Replace the Primary and Secondary Fuel Filter

WARNING!

Never service the fuel system near an open flame or while smoking. Failure to follow this warning may result in death or serious injury.

NOTE: Perform this task after the initial week or 50 hours of service, and then every 3 months or 500 hours.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. The primary fuel filter (1) is behind the right rear door.
3. Place an appropriately sized container under the fuel filter.
4. Slowly loosen the priming pump knob (2).
5. Open the drain valve (3) to allow all water and fuel to drain from the filter.
6. Remove the filter.

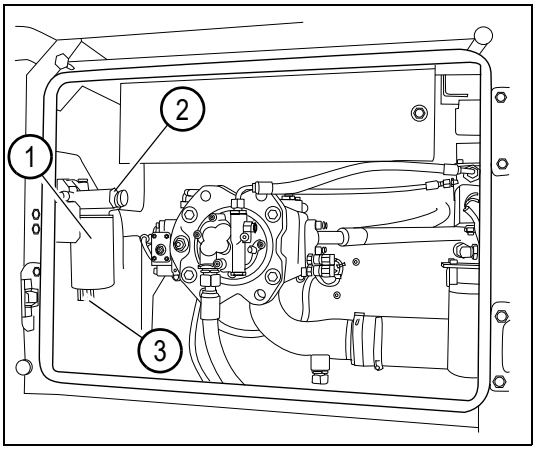


Fig. 5-120

NOTICE!

Dispose of the filter and fuel in accordance with local environmental regulations. Failure to do so could result in damage to the environment.

7. Fill the filter with clean fuel.
8. Install the filter.
9. Place an appropriately sized container under the secondary fuel filter (4).
10. Remove the secondary fuel filter from the filter mount (5).
11. Clean the bottom of the filter mount.

NOTICE!

Do not fill the new fuel filter before installation.

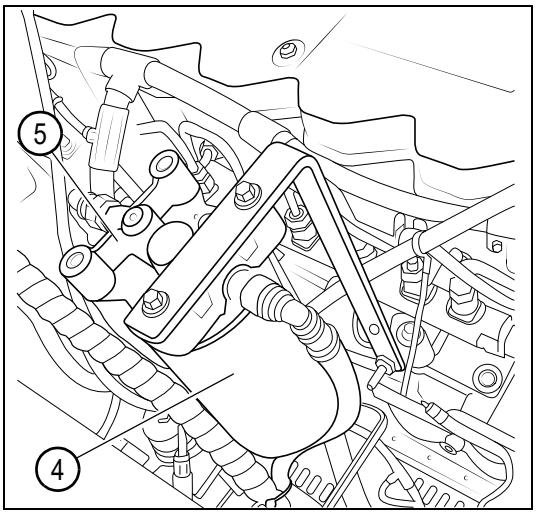


Fig. 5-121

12. Install a new secondary filter onto the filter mount until the gasket contacts the filter mount.

13. Tighten the secondary filter an additional 1/4 turn.
14. Pump the priming knob until resistance is felt.
15. Tighten the priming pump knob.
16. Start the engine and run at low idle.
17. Check for leaks in the fuel system.
18. Shut down the engine.

Drain the Primary Fuel Filter

WARNING!

Never service the fuel system near an open flame or while smoking. Failure to follow this warning may result in death or serious injury.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. The primary fuel filter (1) is behind the right rear door.
3. Place an appropriately sized container under the primary fuel filter.

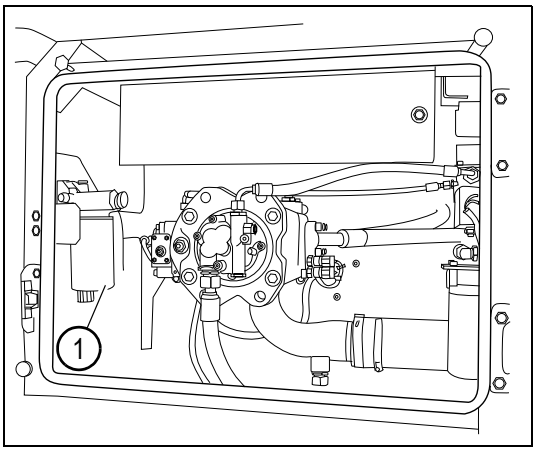


Fig. 5-122

4. Turn the fuel system primary knob (2) 1/4 turn counterclockwise.
5. Open the drain valve (3) to allow all water and/or contaminated fuel to drain from the filter.

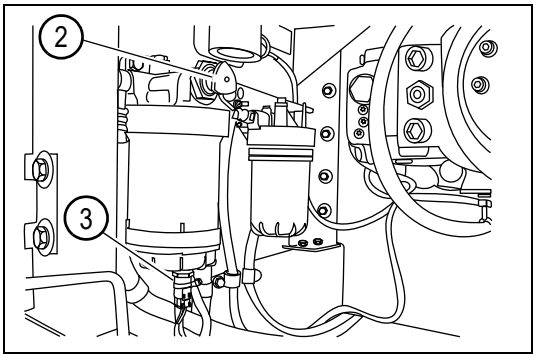


Fig. 5-123 0000273

NOTICE!

Dispose of contaminated fuel in accordance with local environmental regulations. Failure to do so could result in damage to the environment.

6. Close the drain valve when the fuel is free of water and contamination.
7. Close the fuel system primary knob by turning 1/4 turn clockwise.

NOTE: SANY recommends draining the fuel tank and replacing the filter if an excessive amount of water or contaminant was found while draining the fuel filter.

Check the Hydraulic Pump Mounting Fasteners

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Inspect the hydraulic pump for loose, broken, or missing pump mounting fasteners (1).

   NOTE: Not all pump mounting fasteners (1) are shown here. Be sure to inspect all pump mounting fastener locations.

3. Tighten any loose fasteners to 36 lb-ft (49 N•m).

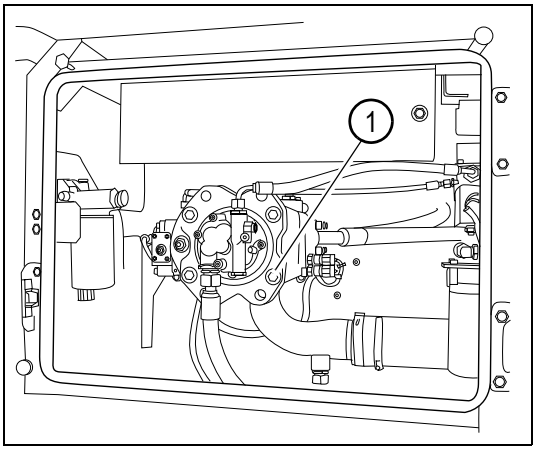


Fig. 5-124

NOTICE!

Do not overtighten the hydraulic pump mounting fasteners. This could result in machine damage and improper machine operation.

Check the Radiator, Oil Cooler, and Air Conditioner Condenser

WARNING!

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

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Open the left rear door.
3. Clean the radiator (1), air conditioner condenser (2), and hydraulic oil cooler (3) using low-pressure compressed air.

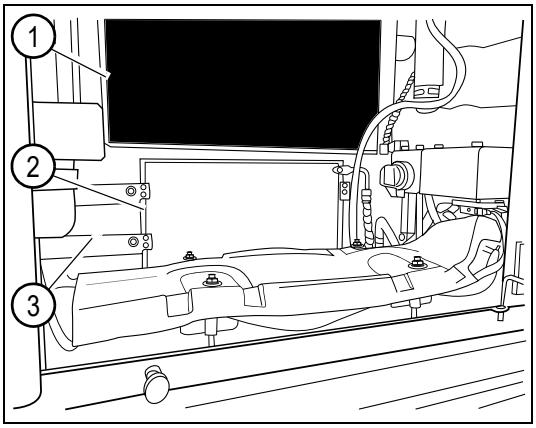


Fig. 5-125

NOTICE!

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

4. Clean out any debris that has accumulated during operations and cleaning.
5. Close the left rear door.

Check the 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.**
- **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 these warnings could result in death or serious injury.

Make sure the seat belt (1) is not damaged (cut, frayed, etc.) and is in proper working condition, especially if it has been subjected to severe stress.

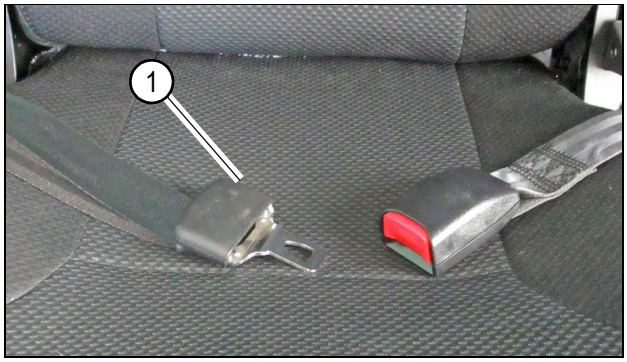


Fig. 5-126 0003046

Check the Sheet Metal

Check all sheet-metal covers and doors for damage, loose connections, or missing fasteners.

NOTE: Repair or replace sheet metal as needed using SANY-approved parts.

Check the Stationary Regeneration

NOTE: Perform this procedure to activate the stationary exhaust cleaning system when the yellow Diesel Particulate Filter icon (1) on the monitor home screen is either on or flashing, or if the yellow Check Engine icon (2) on the monitor home screen is on, each of which indicate increasing levels of soot buildup in the exhaust system. This occurs after continued operation with the Regeneration Inhibit switch set to the ON position and its icon displays (3).

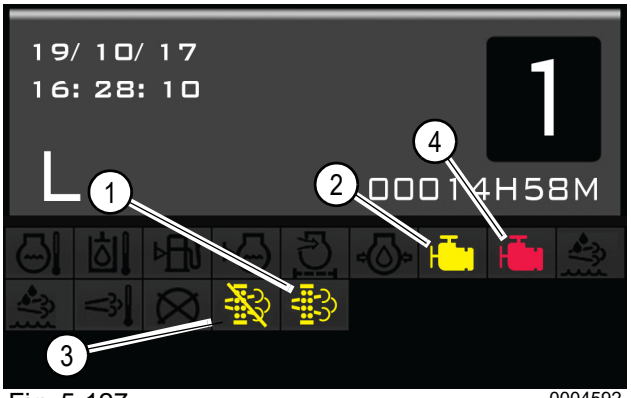


Fig. 5-127 0004592

NOTICE!

If the red Stop Engine icon (4) illuminates, shut down the engine as soon as it is safe to do so and immediately contact SANY to arrange for service support. Failure to so could result in engine damage.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Make sure the machine is in a safe location where the exhaust pipe outlet will not face any combustible materials.

CAUTION!

The engine exhaust will be very hot. Make sure that the machine is not in a combustible area. Failure to follow this caution could result in injury.

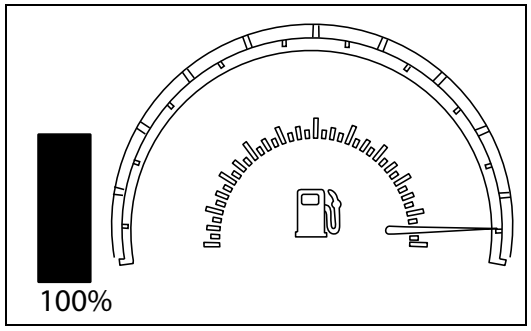


Fig. 5-128

3. Make sure both the DEF and fuel tanks are full, as shown by their indicators on the monitor home screen.

4. Place the hydraulic lockout lever in the closed (locked) position.

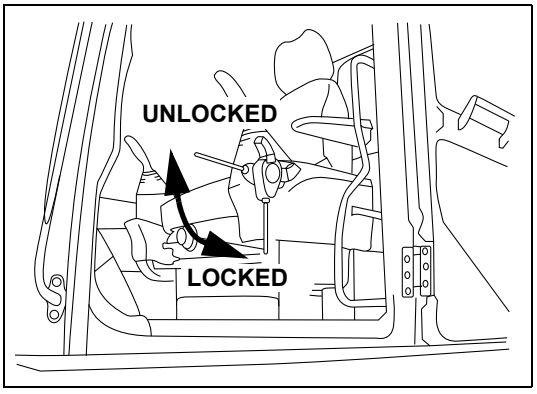


Fig. 5-129

5. With the engine running at low idle, press the regeneration switch (5) on the right control console.

   NOTE: Do not move the hydraulic lockout control lever or throttle control dial during cleaning. Regeneration will stop if either the throttle dial or hydraulic lockout lever is moved, resulting in the process having to be started again.

Fig. 5-130 0004590

During the regeneration process:

- The High Exhaust System Temperature (HEST) icon (6) will appear on the monitor home screen.
- The Diesel Particulate Filter icon will be on and the yellow Check Engine icon may be on.
- The engine speed may increase.
- The turbocharger sound may change.

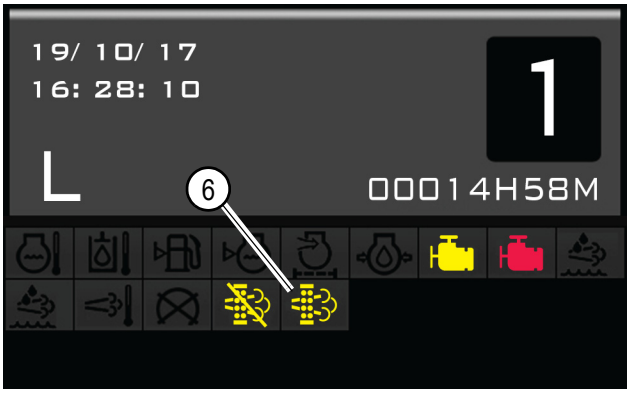


Fig. 5-131 0004592

When the regeneration process is complete:

- The HEST icon, Diesel Particulate Filter icon, and the yellow Check Engine icon will turn off.
- The engine returns to low idle speed.
- The turbocharger sound returns to normal.

6. Allow the engine to idle for 10 to 15 minutes to cool to normal operating temperatures before resuming work.

Perform a Structural Inspection

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Thoroughly wash the machine.
3. Inspect the machine structure for signs of damage or excessive wear.

Lubricate the Swing Drive Bearing

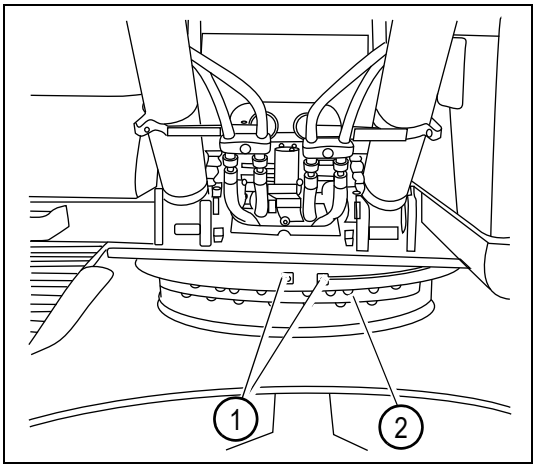


Fig. 5-132

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Grease the fittings (1) on the swing drive bearing until grease seeps out of the seal (2).
3. Check the seal (2) condition.

   NOTE: If damaged, replace the seal immediately.
4. Start the engine.
5. Lift the arm off the ground.
6. Rotate the upper structure 90° and repeat steps 1 and 2.
7. Repeat until a full 360° rotation has been made.
8. Shut down the engine.

Check the Swing Bearing Fasteners

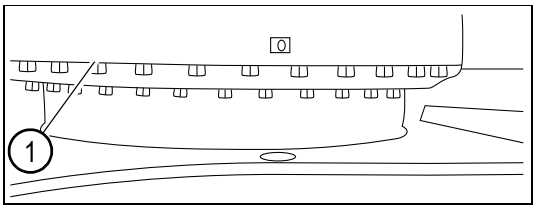


Fig. 5-133

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Inspect both rows of swing bearing mounting fasteners (1) for missing or damage fasteners.
3. Start the engine and turn the cab 90° to the right.
4. Shut down the engine.
5. Repeat steps 1 through 3 until inspection of all of the fasteners is completed.

   NOTE: Contact a SANY dealer if any fasteners are missing. Torque fasteners 879 lb-ft to 1073 lb-ft (1176 N•m to 1470 N•m).

Check the Swing Drive

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Inspect the swing drive (1) for damage.

NOTICE!

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 result in damage to the swing drive.

3. Remove the dipstick (2) from the swing drive and note the oil level.

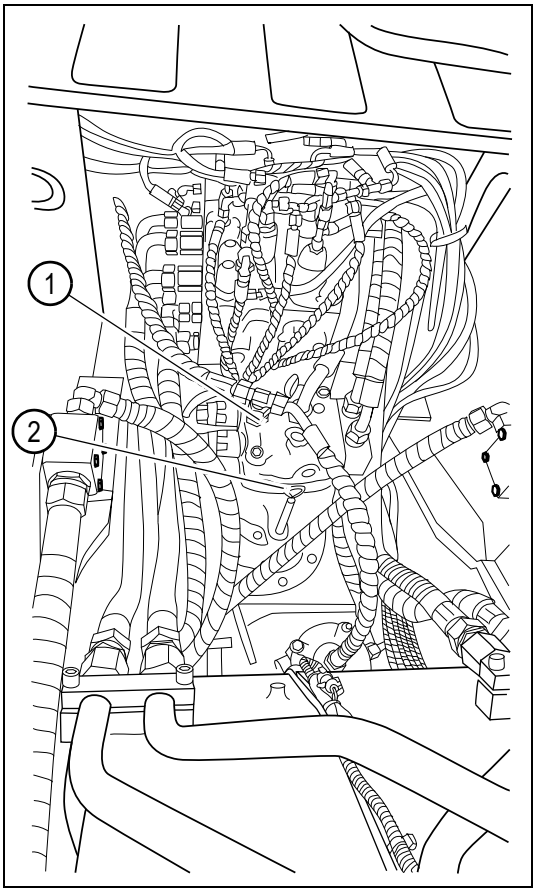


Fig. 5-134

NOTE: The oil level should be within the etched area (3).

4. Install the dipstick.

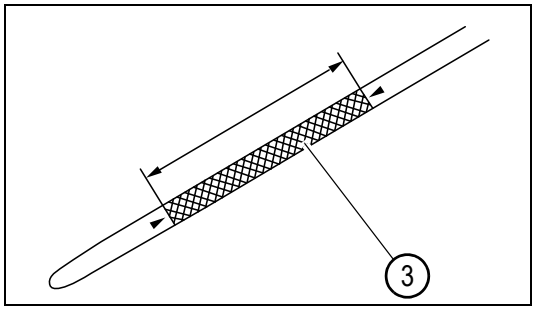


Fig. 5-135

5. Remove the oil filler cap (4) to add oil as needed. Install the cap.

NOTICE!

Do not overfill. This could result in machine damage and improper machine operation.

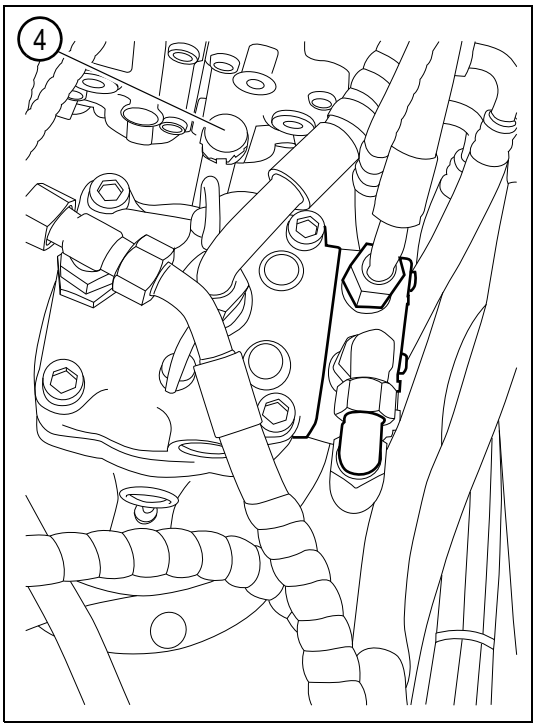


Fig. 5-136

Check the Swing Drive Fasteners

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Check the swing drive for missing or broken mounting fasteners (1).
3. Tighten loose fasteners.

NOTICE!

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 result in damage to the swing drive.

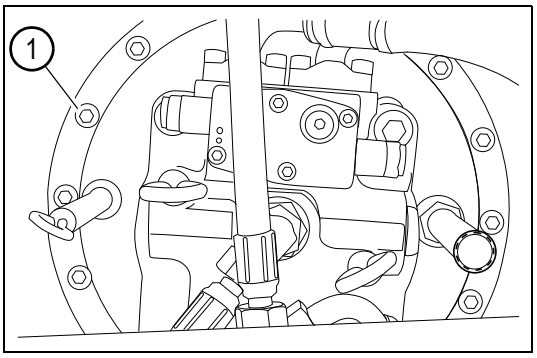


Fig. 5-137

Change the Swing Drive Oil

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Start the engine.

3. Rotate the upper structure 90° in both directions five times to warm the oil. If the weather temperature is below 0° F (-18° C), rotate the upper structure 90° in both directions 10 times.

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.

4. Shut down the engine.

5. Locate the swing drive (1).

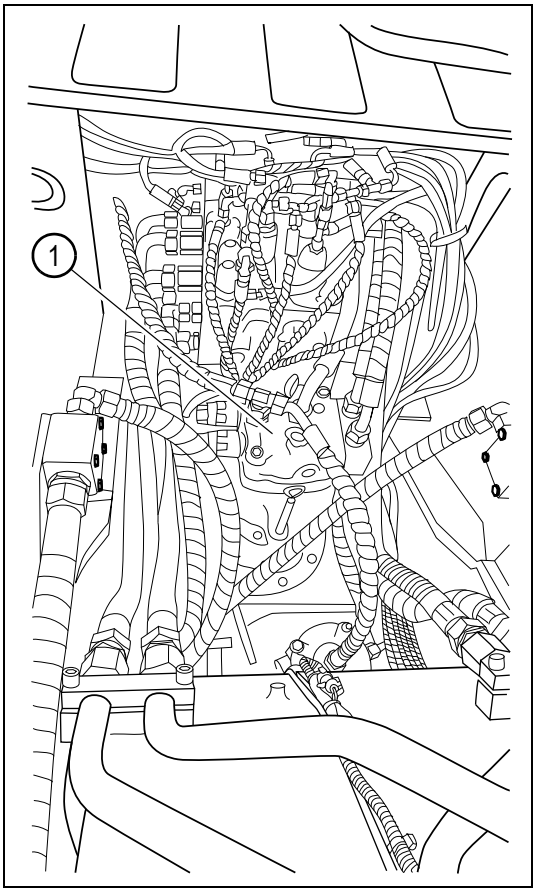


Fig. 5-138

6. Loosen the swing drive oil fill cap (2).

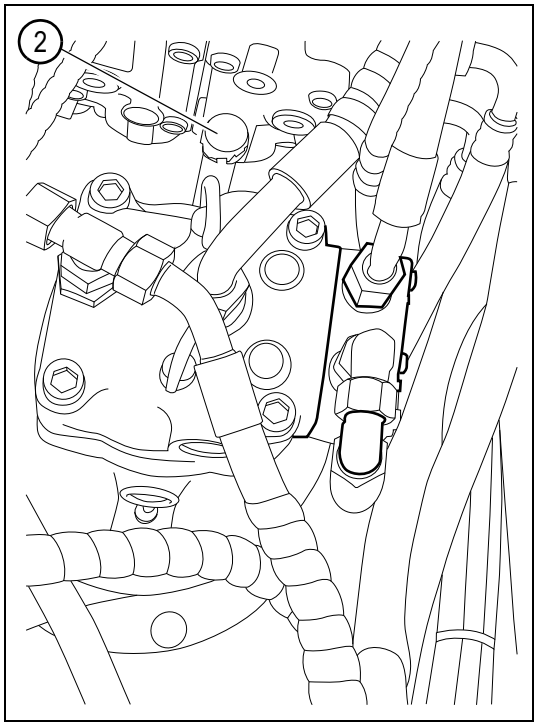


Fig. 5-139

7. Remove the bottom cover (3) for access to the swing drive drain hose.

8. Place an appropriately sized container under the oil drain hose.See “Capacities” on page 5-13.

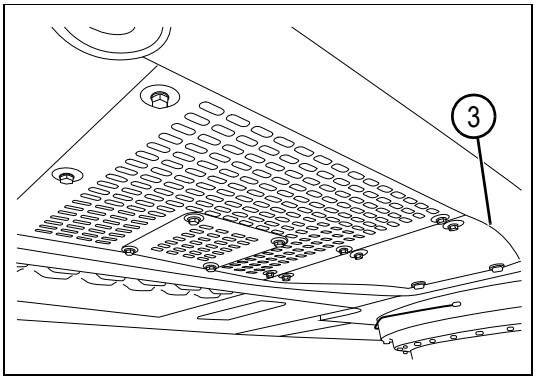


Fig. 5-140

9. Open the drain valve (4) and allow the oil to drain.

10. Close the drain valve.

NOTICE!

Dispose of the drained oil in accordance with local environmental regulations. Failure to do so could result in damage to the environment.

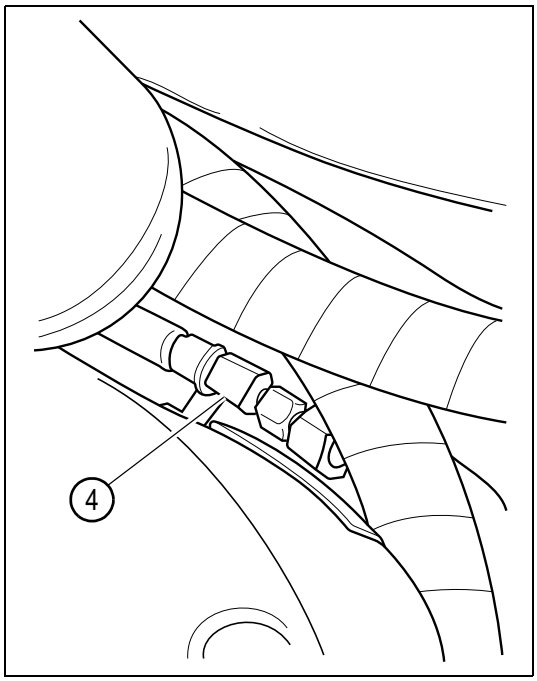


Fig. 5-141

11. Install the bottom cover (3).

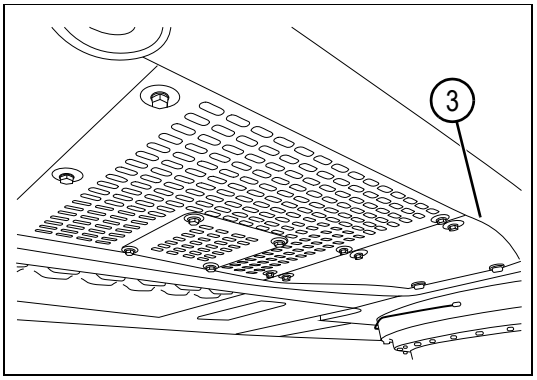


Fig. 5-142

12. Remove the swing drive oil fill cap (5).

13. Fill the swing drive with clean oil.

NOTICE!

Do not overfill the swing drive with oil. Failure to observe and follow this notice could result in damage to the swing drive.

14. Remove the swing drive oil dipstick (6) and note the oil level.

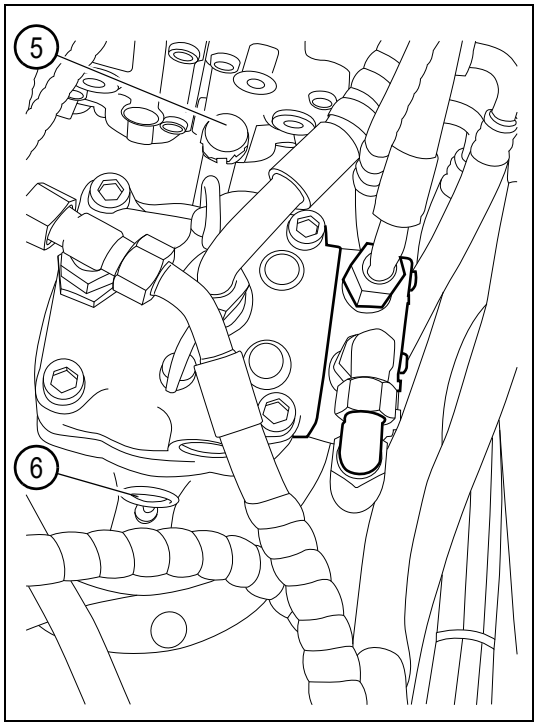


Fig. 5-143

NOTE: The oil level should be within the etched area (7). Add oil as necessary.

15. Install and tighten the oil fill cap (5).

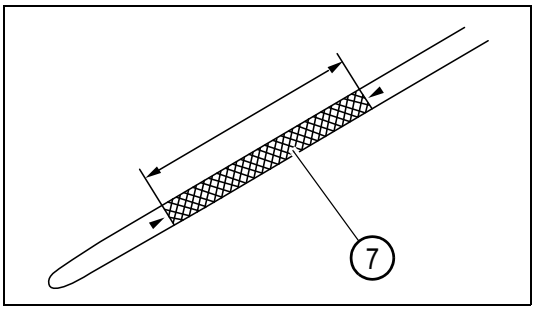


Fig. 5-144

Check the Swing Grease Bath Level

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Locate the swing circle bath checkpoint (1).

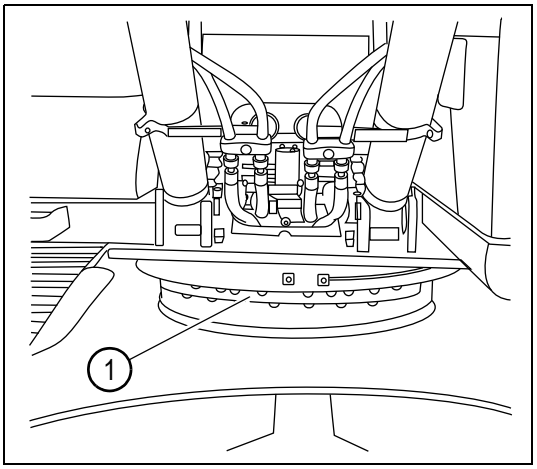


Fig. 5-145

3. Remove the inspection/fill cover (2).

4. Insert a ruler into the grease through the inspection/ filler hole.

5. Check the grease level.

   NOTE: The minimum level is 0.75 in. (19 mm).

6. Check the grease color.

   NOTE: Milk-white grease indicates that the grease has been contaminated and must be replaced.

7. Add grease through the inspection/filler hole as needed.

8. Install the inspection/fill cover (2).

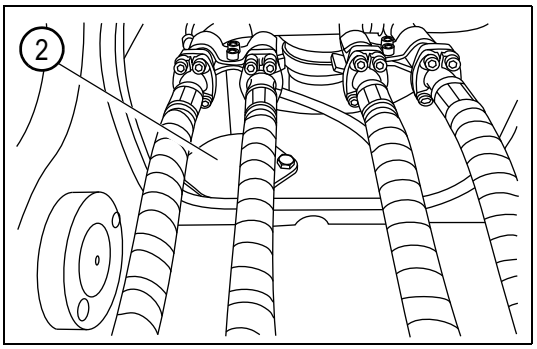


Fig. 5-146

Check the Carrier Roller Fasteners

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Inspect the carrier roller mounting fasteners (1) that secure the upper rollers to the track frame for rust, damage, or looseness.

3. Replace any damaged or defective fasteners and tighten any loose fasteners.

   NOTE: Use anaerobic sealant when tightening loose fasteners and installing new fasteners. Tighten the fasteners 399–485 lb-ft (540–658 N•m).

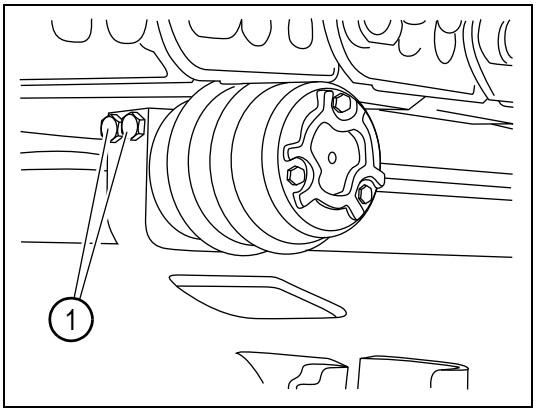


Fig. 5-147

Check the Track Assemblies

NOTE: Use a pry bar to shift and/or lift track shoes as needed to perform this procedure.

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Remove as much accumulated dirt as possible from the track assemblies.
3. Check track shoes (1) for damage, wear, unevenness, looseness, raised sections, and binding of track shoes, or any other abnormality.

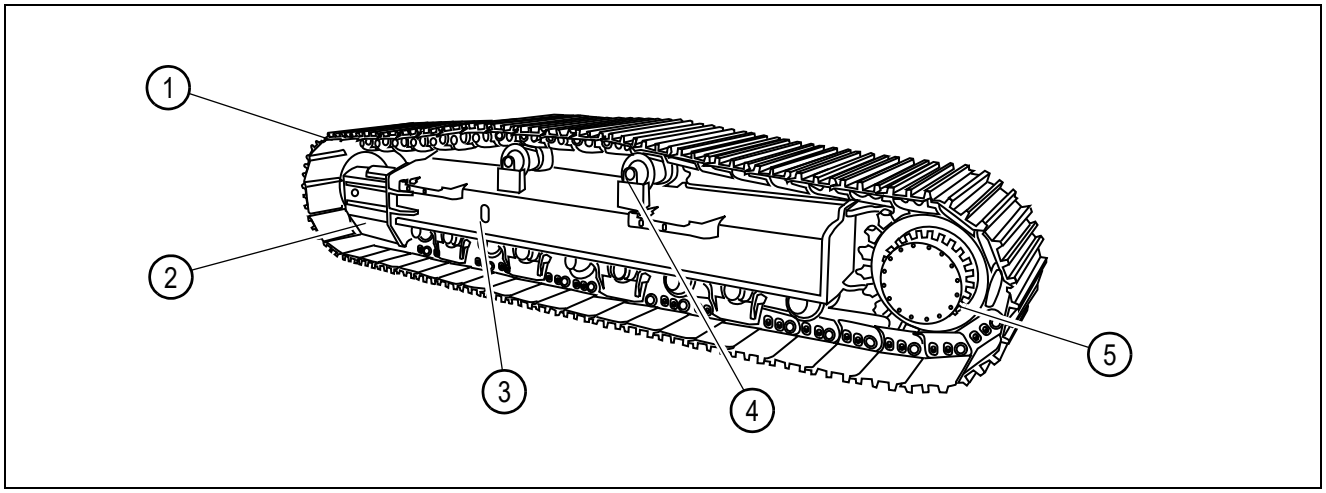


Fig. 5-148

4. Replace track shoes as necessary.
5. Check the idler (2), track rollers (3), and carrier rollers (4) for wear and proper operation.
6. Check the track final drives (5) for wear and proper operation.

Check the Track Fasteners

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Make sure that all fasteners are in place for each track shoe (1), and not broken, bent, damaged, or loose.
3. Replace any broken, bent, or damaged fasteners.
4. Tighten all loose fasteners.

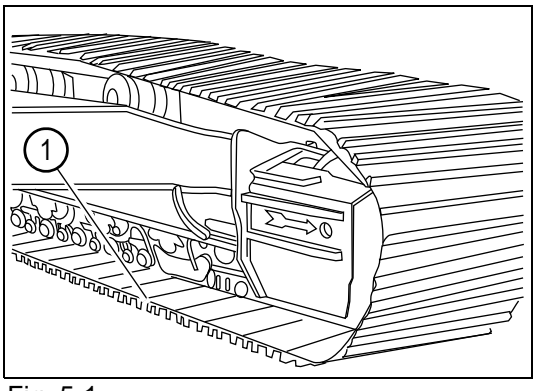


Fig. 5-1

NOTE: Tighten the fasteners in sequence, making sure the hardware and track shoe are in close contact with the link mating surface.

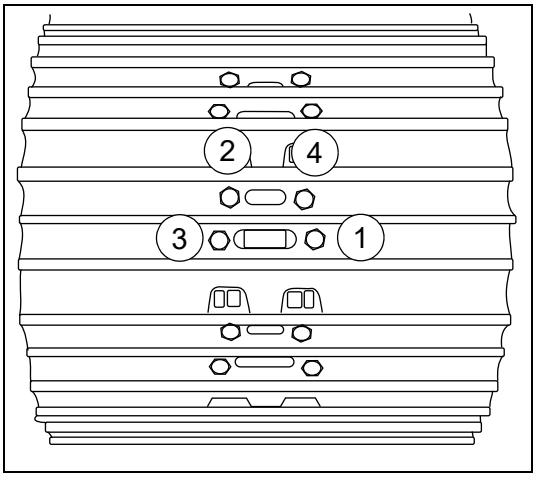


Fig. 5-149

Check and Adjust Track Tension

Check Track Tension

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Clean the track, rollers, and frame.
3. Drive the machine forward two machine-lengths on a flat, level, stable surface.
4. Park and prepare the machine for service.
5. Lay a taut string or straightedge from the forward carrier roller to the idler.

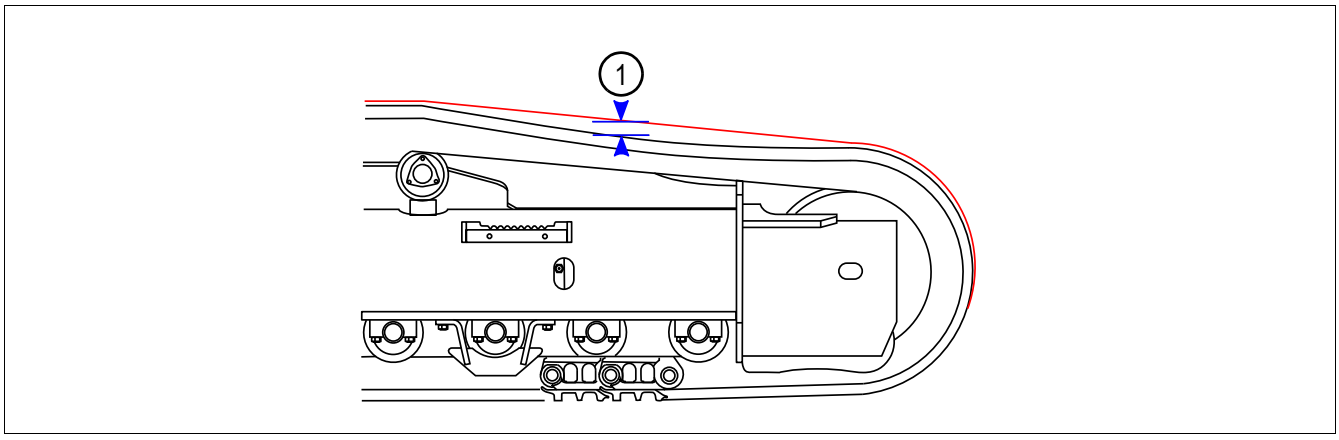


Fig. 5-150

6. Measure the gap at location (1) (to the top of the track shoe).

7. Lay a taut string or straightedge from the rear carrier roller to the sprocket.

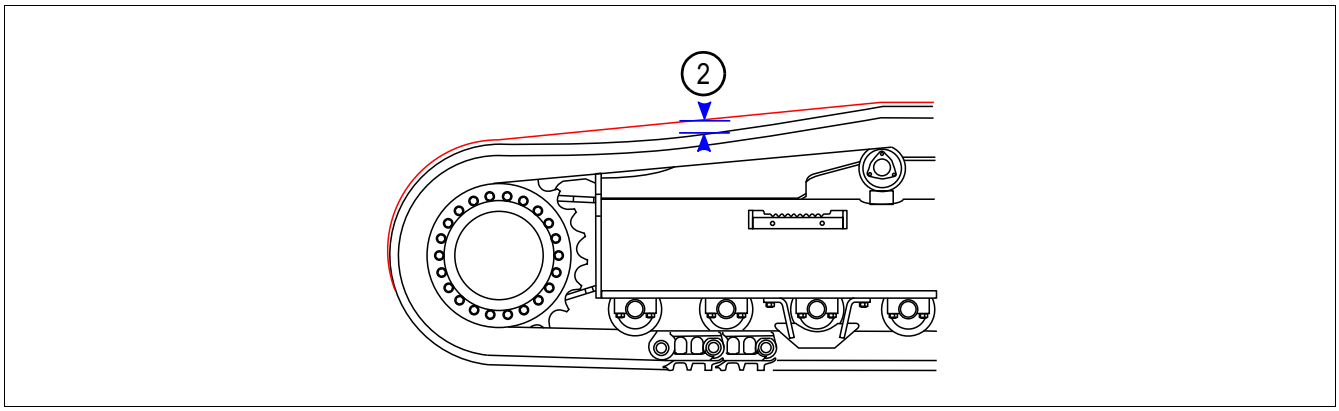


Fig. 5-151

8. Measure the gap at location (2) (to the top of the track shoe).
9. Add dimensions (1) and (2).

   NOTE: The total should be 3–4 in. (76.2–101.6 mm).

10. Adjust the track tension as needed.

Increase the Track Tension

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. To increase track tension, add grease through the grease fitting (1).

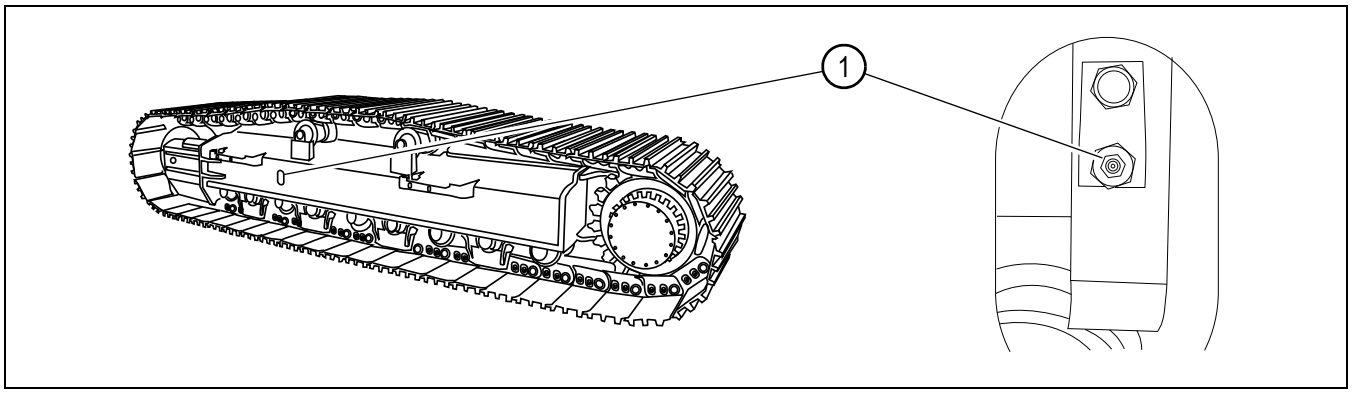


Fig. 5-152

3. Slowly move the machine forward two machine-lengths.
4. Stop the machine and verify that the track tension now meets the requirement in “Check and Adjust Track Tension” on page 5-96.
5. Adjust the track tension as needed.

Decrease the Track Tension

WARNING!

- **The track tension grease fitting is under extreme pressure, grease can exit the grease valve at high pressure 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. Make sure there is no gravel or mud between the sprocket and the track shoe before releasing track tension.
2. Do not loosen the grease fitting (1).
3. Position yourself off to the side, not in front of the grease valve (2).
4. Using the proper tools, slowly loosen the grease valve (2) counterclockwise in 90° increments (1/4 turn) to decrease track tension.

   NOTE: The grease will come out from behind the grease valve.

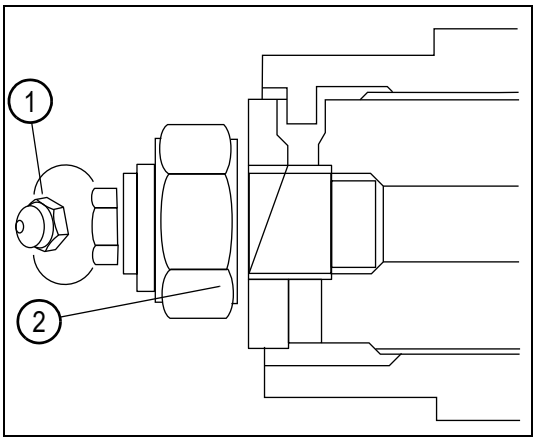


Fig. 5-153

5. Move the machine back and forth for a short distance if the grease does not come out smoothly.
6. Check track tension. When it is correct, turn the grease valve (2) clockwise until it is tight.
7. Move the machine forward at low idle speed for a distance equivalent to the length of an unfolded track.
8. Stop the machine.
9. Check track for proper tension. Adjust the track tension as needed.

Clean and Check the Upper Structure and Undercarriage

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.

Throughly wash the exterior of the machine, then check the entire structure of the machine for signs of damage or excessive wear.

NOTE: 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 2-8.
2. Turn the battery disconnect switch to the OFF position. See “Battery Disconnect Switch” on page 3-25.
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).

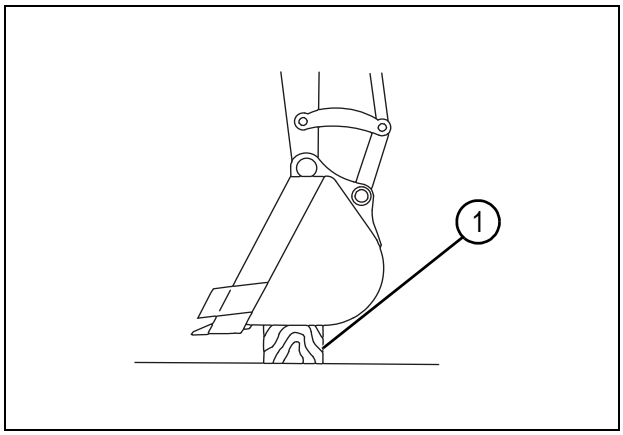


Fig. 5-154 0002350

4. Remove the roll pins (2) and worn bucket teeth (3).

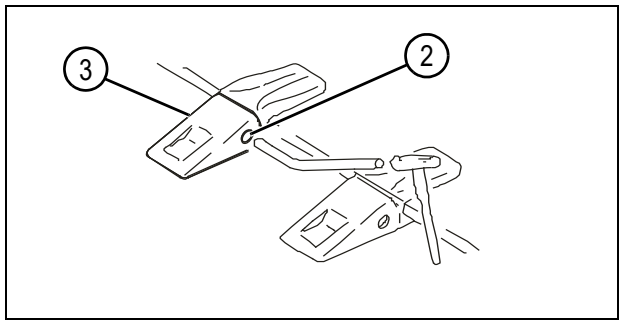


Fig. 5-155 0002351

5. Install new bucket teeth (4) and roll pins (5) in the reverse order of removal.

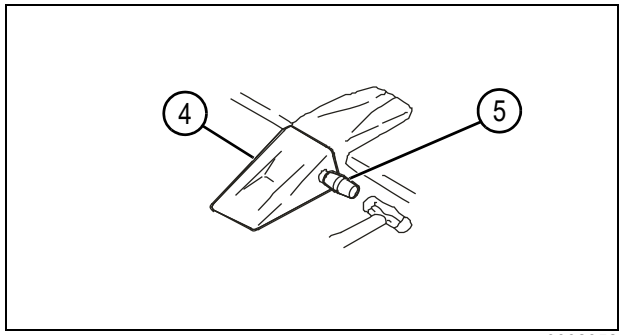


Fig. 5-156 0002352

Check the Windshield Washer Fluid and Windshield Wiper

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.

2. Check the washer fluid level inside the windshield washer tank (1), located behind the left front door.

   NOTE: Use windshield washer fluid appropriate for very cold or winter climates as required.

3. Remove cap (2) and add windshield washer fluid as necessary.

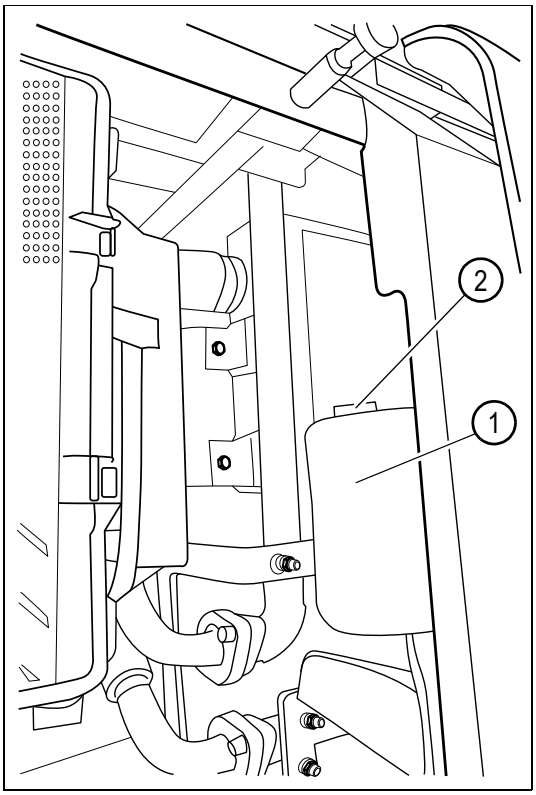


Fig. 5-157

4. Check the operation of the windshield washer nozzle (3) and wiper (4) to make sure there is no smearing across the windshield during operation. Replace the wiper blade with a new one if smearing does occur.

5. Adjust the spray nozzle (3) to make sure fluid spray is properly directed.

NOTICE!

Do not operate the wiper on a dry window. Failure to observe and follow this could result in machine damage and improper machine operation.

6. Inspect the windshield wiper for excessive wear. Replace as necessary.

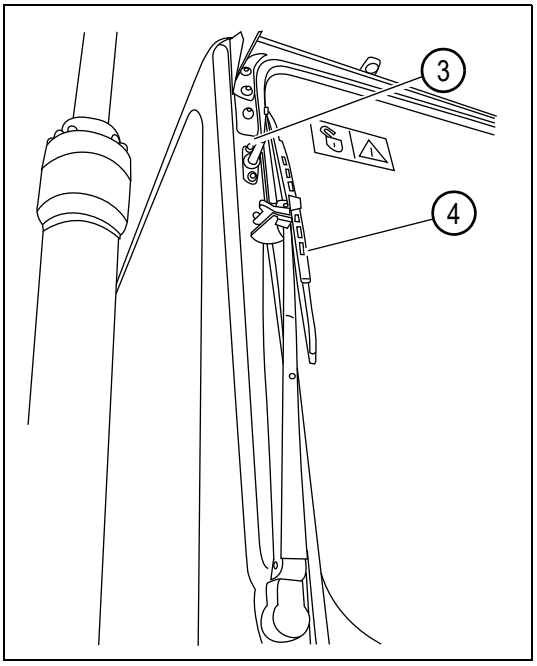


Fig. 5-158

Lubricate the Work Equipment

Grease the work equipment at the lubrication points as indicated in the following illustration and as shown in the decal next to the cab door.

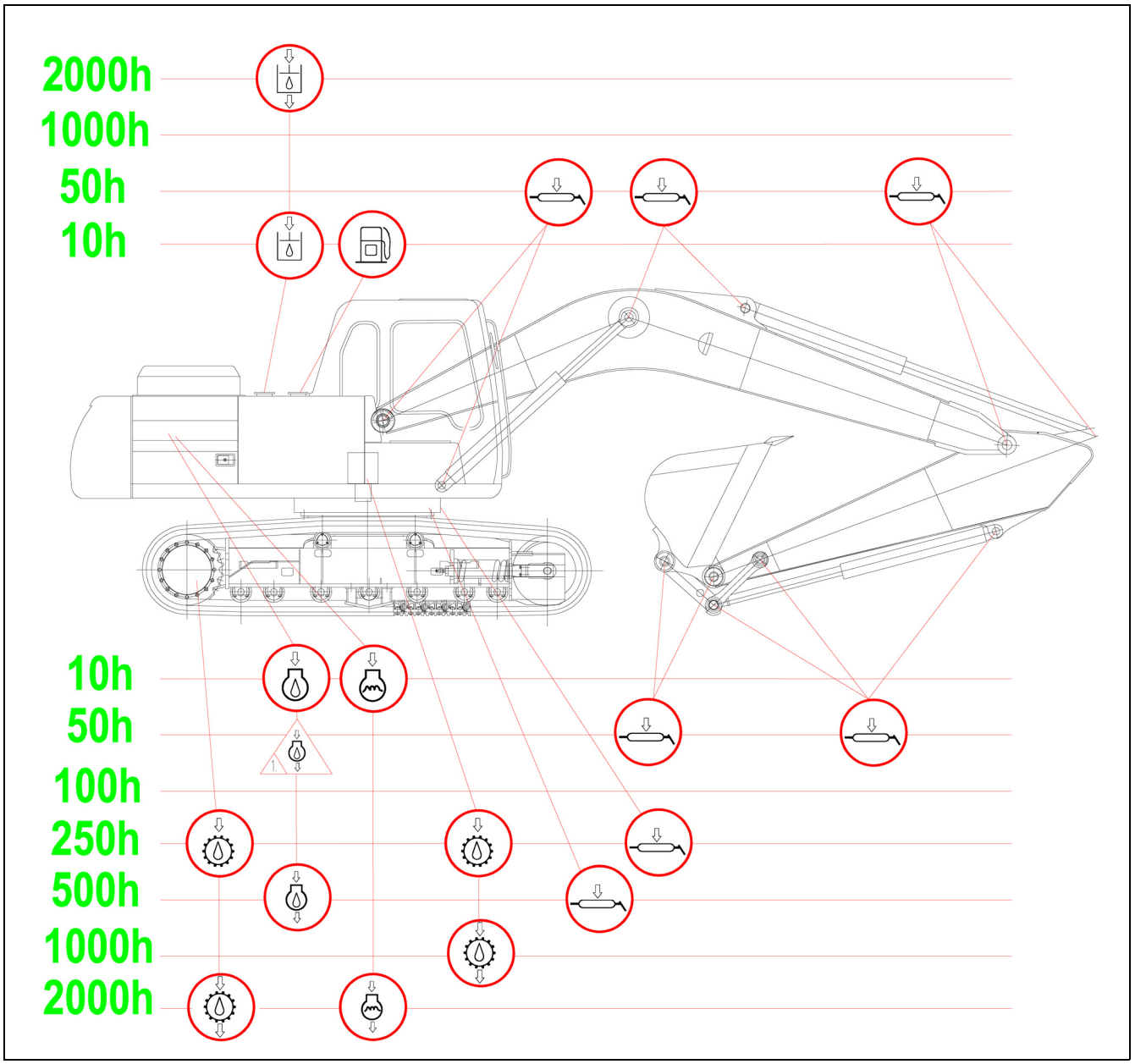


Fig. 5-159

0003799

1. Prepare the machine for service. See “Maintenance Safety” on page 2-8.
2. Grease the two boom pin grease fittings (1).
3. Grease the two boom cylinder rod end pin grease fittings (2).
4. Grease the arm cylinder head end pin grease fitting (3).

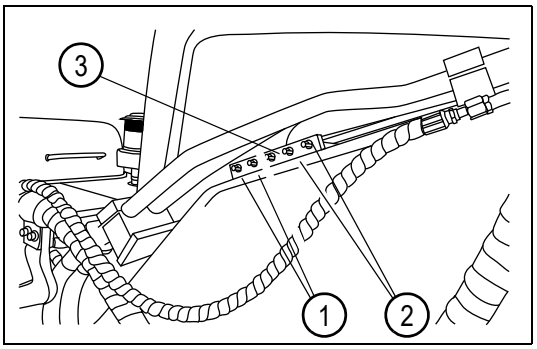


Fig. 5-160

5. Grease the two boom cylinder head end pin grease fittings (4).

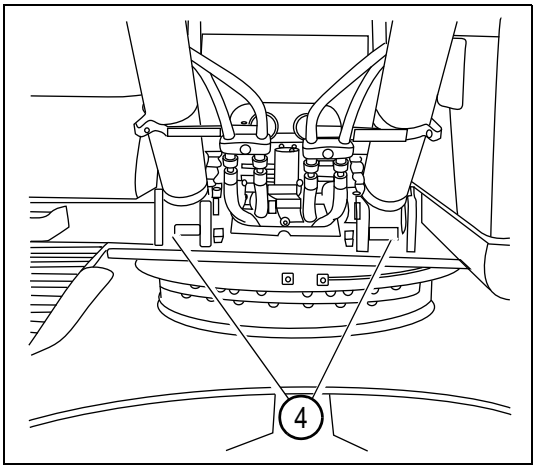


Fig. 5-161

6. Grease the H-link grease fitting (5).
7. Grease the bucket cylinder rod end grease fitting (6).
8. Grease the H-link grease fitting (7).

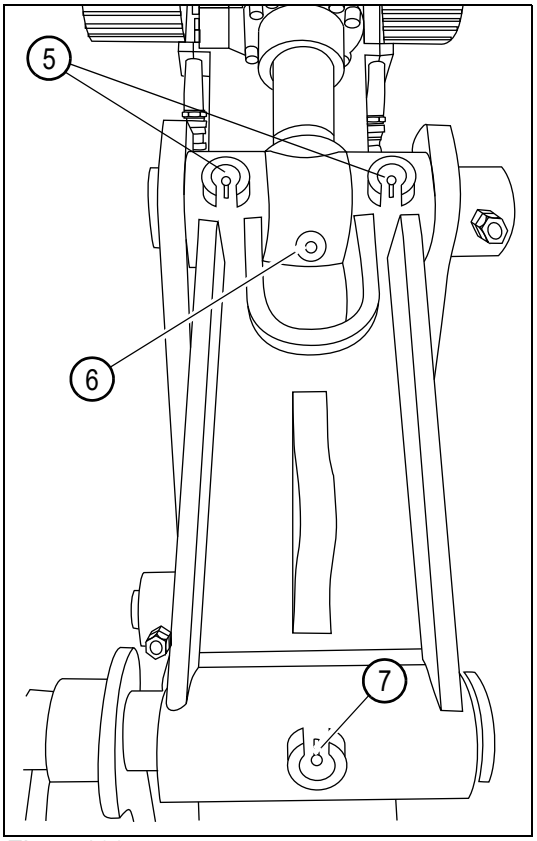


Fig. 5-162

9. Grease both bucket pin grease fittings (8).

10. Grease the single bucket linkage grease fitting (9).

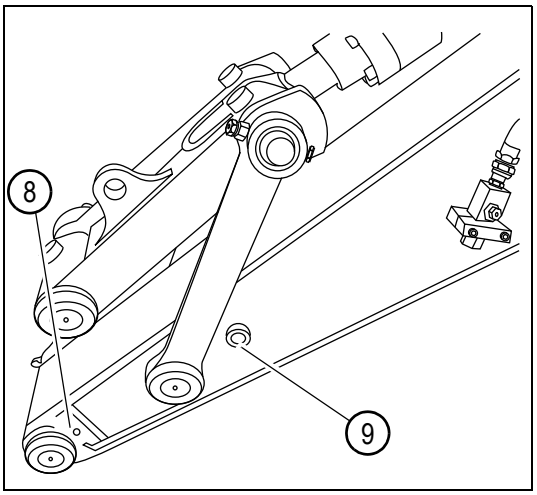


Fig. 5-163

11. Grease the bucket cylinder head end grease fitting (10).

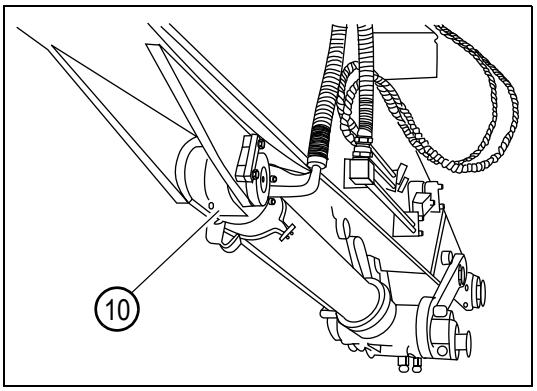


Fig. 5-164

12. Grease the arm cylinder rod end grease fitting (11).

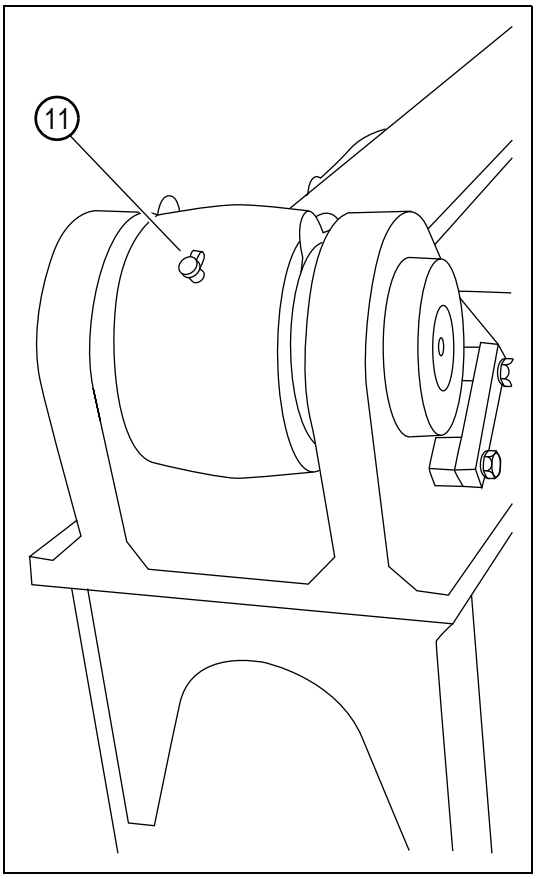


Fig. 5-165

13. Grease the two arm pin grease fittings (12).

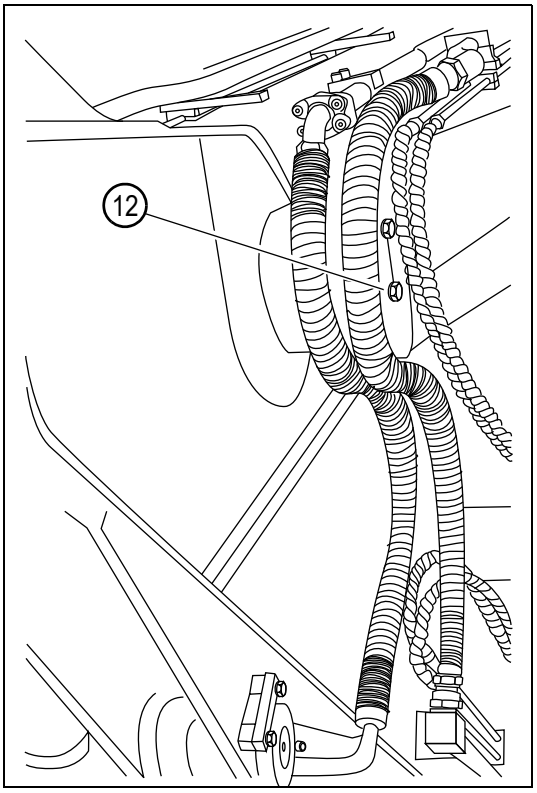


Fig. 5-166

MACHINE STORAGE

Follow these procedures when placing the machine in storage. Store the machine in a secure area free of public access. When your storage area is near an ocean or other saltwater environment, it is important to be aware of salt damage. Contact a SANY dealer for additional storage procedures if this is case.

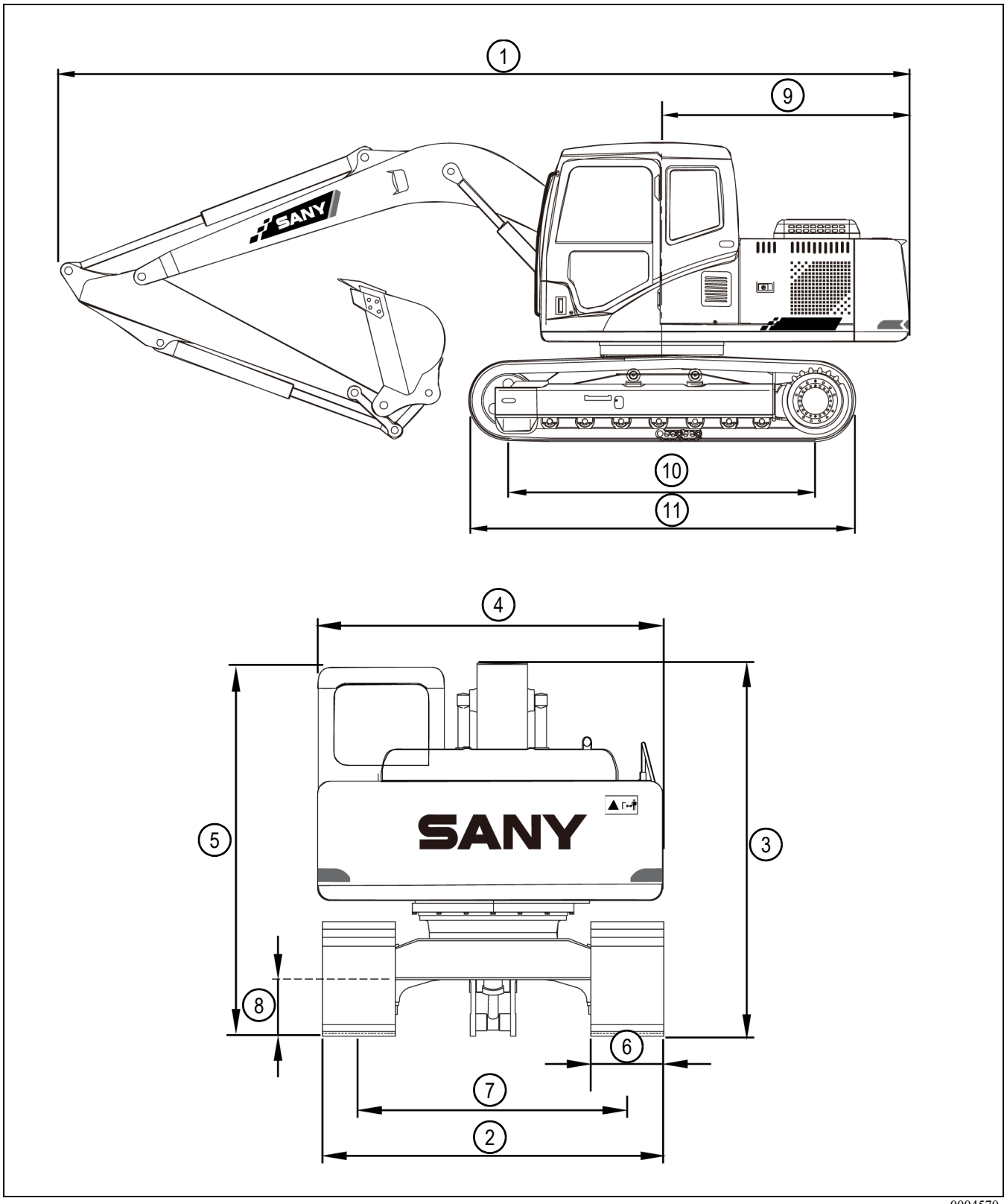
For information on short-term storage, see “End-of-Workday Checks” on page 4-46.

For information on long-term storage, see “Long-Term Storage” on page 4-47.

SANY

Specifications

MACHINE DIMENSIONS – SY215C LC



0004570

Fig. 6-1

Machine Dimensions – SY215C LC

Dimensions	Standard	Long Arm
Boom options	Standard Boom 18 ft. 8 in. (5.7 m)	
Arm length / weight	9 ft. 7 in. (2.92 m) 1668 lb. (756.7 kg)	11 ft. 6 in. (3.52 m) 2016 lb. (914.5 kg)
* Weight (transport)	49,403 lb. (22,409 kg)	49,755 lb. (22,568 kg)
** Operating weight	51,919 lb. (23,550 kg)	52,272 lb. (23,710 kg)
1. Transport length	31 ft. 11 in. (9.73 m)	31 ft. 11 in. (9.73 m)
2. Transport width	10 ft. 5 in. (3.18 m)	10 ft. 5 in. (3.18 m)
3. Transport height	11 ft. 1 in. (3.37 m)	11 ft. 8 in. (3.55 m)
4. Upper width	8 ft. 11 in. (2.71 m)	8 ft. 11 in. (2.71 m)
5. Cab height	10 ft. (3.05 m)	10 ft. (3.05 m)
6. Track shoe width (standard)	31 in. (0.80 m)	31 in. (0.8 m)
7. Track gauge	7 ft. 10 in. (2.38 m)	7 ft. 10 in. (2.38 m)
8. Minimum ground clearance	19 in. (0.48 m)	19 in. (0.48 m)
9. Tail swing radius	9 ft. 6 in. (2.89 m)	9 ft. 6 in. (2.89 m)
10. Length idler center to sprocket center	11 ft. 11 in. (3.64 m)	11 ft. 11 in. (3.64 m)
11. Track length	14 ft. 7 in. (4.45 m)	14 ft. 7 in. (4.45 m)
* No operator, 15% fuel tank, without bucket. ** With 165 lb. (74.8 kg) operator, full fuel tank, without bucket.		

OPERATING RANGES – SY215C LC

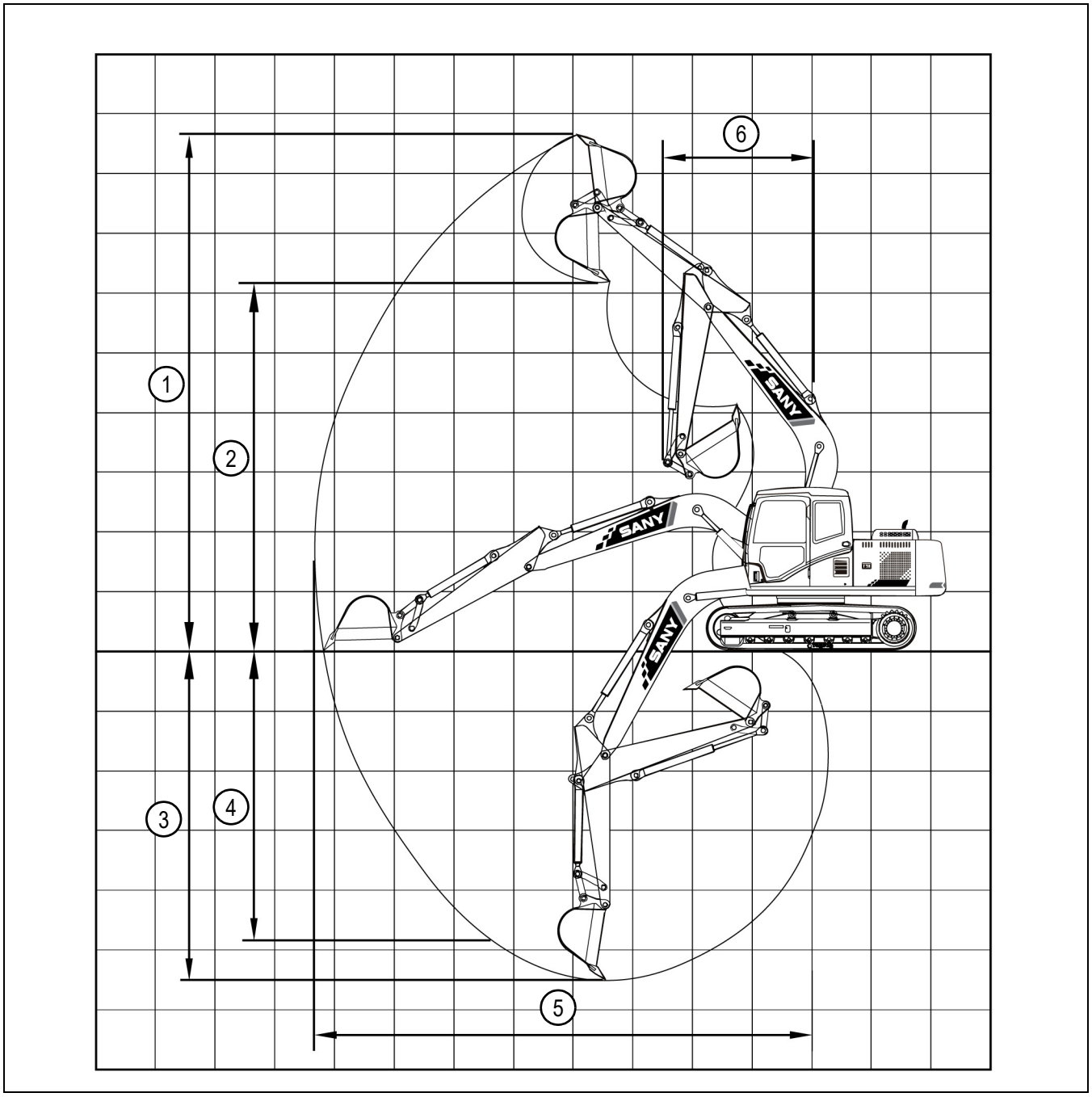


Fig. 6-2

0004571

Operating Ranges – SY215C LC

Dimensions	Standard 9 ft. 7 in. (2.93 m)	Long Arm 11 ft. 6 in. (3.5 m)
1. Maximum digging height	30 ft. 1 in. (9.18 m)	31 ft. 7 in. (9.63 m)
2. Maximum dumping height	21 ft. 11 in. (6.67 m)	22 ft. 10 in. (6.95 m)
3. Maximum digging depth	21 ft. 8 in. (6.6 m)	23 ft. 3 in. (7.08 m)
4. Maximum vertical wall digging depth	19 ft. 7 in. (5.98 m)	22 ft. 3 in. (6.78 m)
5. Maximum digging reach	33 ft. 10 in. (10.31 m)	34 ft. 5 in. (10.48 m)
6. Minimum swing radius	12 ft. 3 in. (3.73 m)	12 ft. 2 in. (3.73 m)

LIFT CHART STANDARD ARM – SY215C LC

Load Point Height (LPH)	Rated capacity in pounds (kg)										
	Load Point Radius (LPR)										
	9.8 ft. (3.0 m)		14.8 ft. (4.5 m)		19.7 ft. (6 m)		24.6 ft. (7.5 m)		Lift capacity at max. radius		
	End	Side	End	Side	End	Side	End	Side	End	Side	Radius
24.6 ft. (7.5 m)					*9407 (*4267)	*9407 (*4267)			*10,463 (*4746)	*10,463 (*4746)	20.1 ft. (6.1 m)
19.7 ft. (6.0 m)					*10,179 (*4617)	*10,179 (*4617)			*10,617 (*4816)	9590 (4350)	23.8 ft. (7.2 m)
14.8 ft. (4.5 m)					*11,374 (*5159)	*11,374 (*5159)	*10,882 (*4936)	9054 (4107)	*10,933 (*5155)	8276 (3958)	26.0 ft. (7.9 m)
9.8 ft. (3.0 m)			*16,718 (*7583)	*16,718 (*7583)	*13,245 (*6008)	12,081 (5480)	*11,707 (*5310)	8827 (4004)	*11,365 (*5155)	7401 (3357)	27.1 ft. (8.3 m)
4.9 ft. (1.5 m)			*20,477 (*9288)	16,987 (7705)	*15,196 (*6893)	11,552 (5240)	*12,705 (*5763)	8569 (3887)	11,102 (5036)	7394 (3354)	27.3 ft. (8.3 m)
0.0 ft. (0.0 m)	*15,126 (*6861)	*15,126 (*6861)	*22,677 (*10,286)	16,378 (7429	*16,654 (*7554)	11,175 (5069)	12,714 (5767)	8375 (3799)	11,378 (5161)	7538 (3419)	26.6 ft. (8.1 m)
-4.9 ft. (-1.5 m)	*24,132 (*10,946)	*24,132 (*10,946)	*23,219 (*10,532)	16,195 (7346)	17,174 (7790)	11,010 (4994)	12,648 (5737)	8314 (3771)	10,655 (4833)	8144 (3694)	24.9 ft. (7.6 m)
-9.8 ft. (-3.0 m)	*31,713 (*14,385)	30,785 (13,964)	*22,174 (*10,058)	17,401 (7401)	*16,543 (*7504)	11,074 (5023)			*14,268 (*6472)	9597 (4345)	22.1 ft. (6.7 m)
-14.8 ft. (-4.5 m)	*26,358 (*11,956)	*26,358 (*11,956)	*18,682 (*8474)	16,788 (7615)					*15,278 (*6930)	13,373 (6066)	17.4 ft. (5.3 m)

Capacities marked with an asterisk (*) are limited by hydraulic capacities.	
NOTE 1	Lift capacities shown are without power boost feature.
NOTE 2	Lift capacities shown do not exceed 75% of minimum tipping loads or 87% of hydraulic capacities.
NOTE 3	Least stable position is over the side.
NOTE 4	Lift capacities apply only to the machine as originally manufactured and normally equipped by the manufacturer.
NOTE 5	Included in this mass are 2.62 ft. (800 mm) triple grouser shoes, 18.7 ft. (5700 mm) boom, 9.59 ft. (2925 mm) arm, all operating fluids, and a 174.2 lb. (75 kg) operator.
NOTE 6	Lift capacities are in compliance with ISO 10567:2007
NOTE 7	The load point is the centerline of the bucket pivot mounting pin on the arm.
NOTE 8	No bucket.

TECHNICAL SPECIFICATIONS – SY215C LC

Description	Specifications
Operating weight (with operator, standard bucket, and full fuel tank)	51,919 lb. (23,550 kg)
Engine type	CUMMINS® QSB6.7
Maximum engine power (gross)	163.6 hp/122.0 kW
Engine displacement	408.9 cu. in. (6.7 L)
Maximum arm digging force (SAE)	23,155 lb-ft (103.0 kN)
Number of upper rollers	2
Number of lower rollers	9
Fuel tank capacity	89.5 gal. (340.0 L)
Diesel exhaust fluid (DEF) capacity	5.0 gal. (19.0 L)
Hydraulic tank capacity	60.5 gal. (230.0 L)
Cooling system capacity	7.3 gal. (27.6 L)
Engine oil capacity	7.1 gal. (27.0 L)
Ground pressure	5.3 psi (36.3 kPa)
Boom length	18 ft.8 in. (5.70 m)
Stick (arm) length	9 ft. 7 in. (2.93 m)
Grade capability (maximum)	35°
Main hydraulic pump	Axial piston with variable displacement
Main hydraulic pump operating flow (maximum)	117.3 gpm (444.0 Lpm)
Main hydraulic pump operating pressure (maximum)	4975 psi (34.3 MPa)
Main hydraulic pump power boost pressure (maximum)	5410 (37.3 MPa)
Swing motor	Axial piston with swing brake
Swing speed (maximum)	10.9 rpm
Swing pressure (maximum)	3989 psi (27.5 MPa)
Travel motor	Axial piston with park brake
Travel speed	1.9/3.3 mph (3.1/5.3 kph)
Travel pressure (maximum)	4975 psi (34.3 MPa)
Travel effort	40,466 lb-ft (180.0 kN)
Bucket breakout	28,551 lb-ft (127.0 kN)

MACHINE DIMENSIONS – SY225C LC

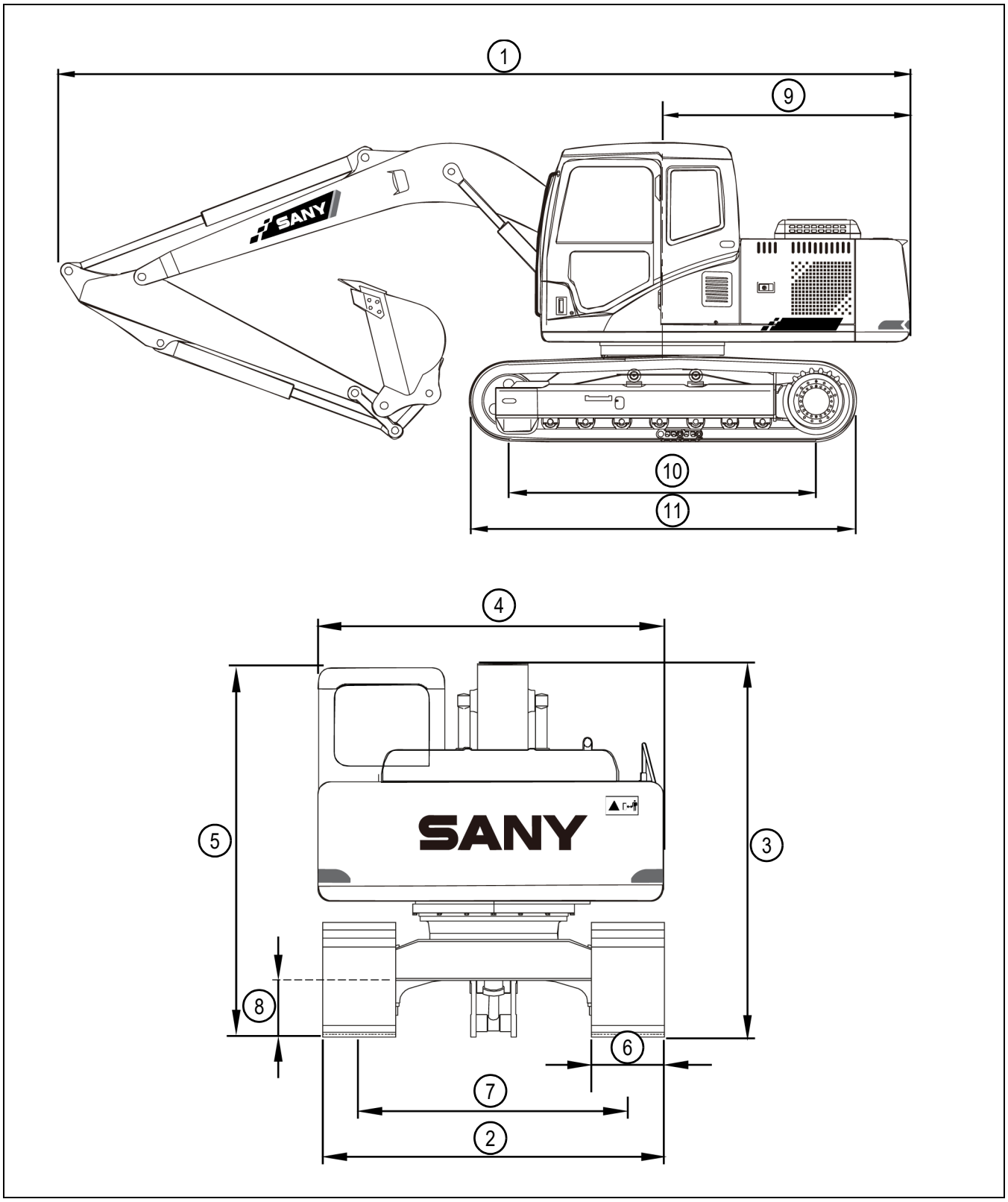


Fig. 6-3

0004570

Machine Dimensions – SY225C LC

Description	Dimension
Boom length	18 ft. 8 in. (5.7 m)
Arm length	9 ft. 7 in. (2.92 m)
* Operating weight	54,013 lb. (24,500 kg)
1. Transport length	31 ft. 11 in. (9.73 m)
2. Transport width	11 ft. 1 in. (3.39 m)
3. Transport height	11 ft. 1 in. (3.37 m)
4. Upper structure width	8 ft. 11 in. (2.71 m)
5. Cab height	10 ft. 0 in. (3.05 m)
6. Track shoe width (standard)	2 ft. 7 in. (0.8m)
7. Track gauge	8 ft. 6 in. (2.59 m)
8. Minimum ground clearance	1 ft 7 in. (0.48 m)
9. Tail swing radius	9 ft. 6 in. (2.89 m)
10. Length idler center to sprocket center	12 ft. 7 in. (3.83 m)
11. Track length	15 ft. 3 in. (4.64 m)
* With 165 lb. (74.8 kg) operator, full fuel tank, without bucket.	

OPERATING RANGES – SY225C LC

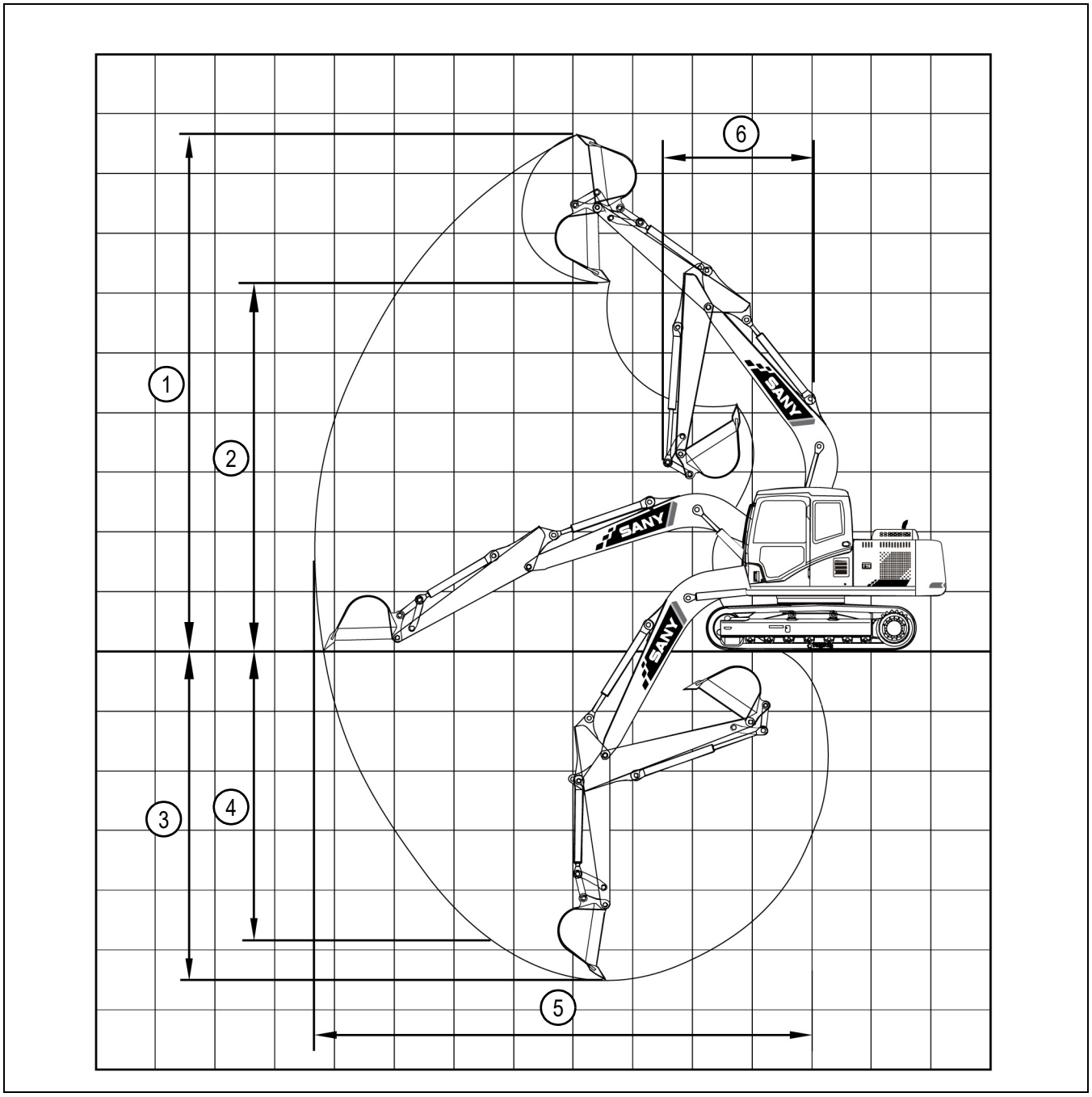


Fig. 6-4

0004571

Operating Ranges – SY225C LC

Description	Range
1. Maximum digging height	30 ft. 1 in. (9.18 m)
2. Maximum dumping height	21 ft. 11 in. (6.67 m)
3. Maximum digging depth	21 ft. 8 in. (6.6 m)
4. Maximum vertical wall digging depth	19 ft. 7 in. (5.98 m)
5. Maximum digging reach	33 ft. 10 in. (10.31 m)
6. Minimum swing radius	12 ft. 3 in. (3.73 m)

LIFT CHART STANDARD ARM – SY225C LC

Load Point Height (LPH)	Rated capacity in pounds (kg)										
	Load Point Radius (LPR)										
	9.8 ft. (3 m)		14.8 ft. (4.5 m)		19.7ft. (6 m)		24.6 ft. (7.5 m)		Lift capacity at max. radius		
	End	Side	End	Side	End	Side	End	Side	End	Side	Radius
24.6 ft. (7.5 m)					*9,407 (*4267)	*9,407 (*4267)			*10,463 (*4746)	*10,463 (*4746)	20.1 ft. (6.1 m)
19.7 ft. (6.0 m)					*10,179 (*4617)	*10,179 (*4617)			*10,617 (*4816)	10,088 (4576)	23.8 ft. (7.2 m)
14.8 ft. (4.5 m)					*11,374 (*5159)	*11,374 (*5159)	*10,882 (*4936)	9535 (4325)	*10,933 (*4959)	8726 (3958)	26.0 ft. (7.9 m)
9.8 ft. (3.0 m)			16,718 (7583)	*16,718 (*7583)	*13,245 (*6008)	12,712 (5766)	*11,707 (*5310)	9308 (4222)	*11,365 (*5155)	8051 (3652)	27.1 ft. (8.3 m)
4.9 ft. (1.5 m)			*20,477 (*9288)	17,906 (8122)	*15,196 (*6893)	12,183 (5526)	*12,705 (*5763)	9050 (4105)	11,629 (5275)	7818 (3546)	27.3 ft. (8.3 m)
0.0 ft. (0.0 m)	*15,126 (*6861)	*15,126 (*6861)	*22,677 (*10,268)	17,297 (7846)	*16,654 (*7554)	11,806 (5355)	13,316 (6040)	8854 (4016)	11,920 (5407)	7972 (3616)	26.6 ft. (8.1 m)
-4.9 ft. (-1.5 m)	*24,132 (*10,946)	*24,132 (*10,946)	*23,219 (*10,532)	17,144 (7763)	17,245 (7822)	11,640 (5280)	13,250 (6010)	8794 (3989)	11,413 (5177)	8613 (3907)	24.9 ft. (7.6 m)
-9.8 ft. (-3.0 m)	*31,713 (*14,385)	31,713 (14,385)	*22,174 (*10,058)	17,238 (7819)	*16,543 (*7504)	11,713 (5313)			*14,268 (*6472)	10,124 (4592)	22.1 ft. (6.7 m)
-14.8 ft. (-4.5 m)	*26,358 (*11,956)	*26,358 (*11,956)	*18,682 (*8474)	17,708 (8032)					*15,278 (*6930)	14,107 (6399)	17.4 ft. (5.3 m)

Capacities marked with an asterisk (*) are limited by hydraulic capacities.

NOTE 1	Lift capacities shown are without power boost feature.
NOTE 2	Lift capacities shown do not exceed 75% of minimum tipping loads or 87% of hydraulic capacities.
NOTE 3	Least stable position is over the side.
NOTE 4	Lift capacities apply only to the machine as originally manufactured and normally equipped by the manufacturer.
NOTE 5	Included in this mass are 2.62 ft. (800 mm) triple grouser shoes, 18.7 ft. (5700 mm) boom, 9.59 ft. (2925 mm) arm, all operating fluids, and a 174.2 lb. (75 kg) operator.
NOTE 6	Lift capacities are in compliance with ISO 10567:2007
NOTE 7	The load point is the centerline of the bucket pivot mounting pin on the arm.
NOTE 8	No bucket

TECHNICAL SPECIFICATIONS– SY225C LC

Description	Specifications
Operating weight (with operator, standard bucket, and full fuel tank)	54,013 lb. (24,500 kg)
Engine type	CUMMINS® QSB6.7
Maximum engine power (gross)	163.6 hp/122.0 kW
Engine displacement	408.9 cu. in. (6.7 L)
Maximum arm digging force (SAE)	23,155 lb-ft (103.0 kN)
Number of upper rollers	2
Number of lower rollers	9
Fuel tank capacity	89.5 gal. (340.0 L)
Diesel exhaust fluid (DEF) capacity	5.0 gal. (19.0 L)
Hydraulic tank capacity	60.5 gal. (230.0 L)
Cooling system capacity	7.3 gal. (27.6 L)
Engine oil capacity	7.1 gal. (27.0 L)
Ground pressure	4.6 psi (32.0 kPa)
Boom length	18 ft 8 in. (5.70 m)
Arm length	9 ft. 7 in. (2.93 m)
Grade capability (maximum)	35°
Main hydraulic pump	Axial piston with variable displacement
Main hydraulic pump operating flow (maximum)	117.3 gpm (444.0 Lpm)
Main hydraulic pump operating pressure (maximum)	4975 psi (34.3 MPa)
Main hydraulic pump power boost pressure (maximum)	5410 (37.3 MPa)
Swing motor	Axial piston with swing brake
Swing speed (maximum)	10.9 rpm
Swing pressure (maximum)	3989 psi (28.0 MPa)
Travel motor	Axial piston with park brake
Travel speed	2.1/3.2 mph (3.3/5.1 kph)
Travel pressure (maximum)	4975 psi (34.3 MPa)
Travel effort	40,466 lb-ft (180.0 kN)
Bucket breakout	28,551 lb-ft (127.0 kN)

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SANY

Optional Equipment

OPTIONAL EQUIPMENT SAFETY

NOTICE!

The following precautions must be strictly observed when selecting, installing, and operating optional equipment. Failure to observe and follow this notice can damage the machine or cause it to operate improperly.

Optional Equipment Selection

Consult a SANY dealer before installing any optional equipment on your machine. Depending on the type of optional equipment selected, protective structures (such as front guards or top guards) may need to be installed on the machine.

Only install SANY-approved optional equipment. SANY assumes no responsibility for accidents, loss, or failures caused by any optional equipment.

Read Equipment Instructions

Read and understand the optional equipment manual before installing and operating any optional equipment. Do not exceed the manufacturer's specifications for maximum flow and pressure of optional equipment.

If your optional equipment manual is missing or damaged, contact the manufacturer of the optional equipment to obtain a new one.

Removal and Installation Precautions

When removing or installing optional equipment, observe the following:

- Follow the instructions in this manual and the optional equipment manual.
- Remove and install equipment only on a hard, 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 your machine is well balanced and supported whenever you add or remove optional equipment.
- For more information about removal and installation, consult a SANY dealer.

Optional Equipment Operation Precautions

Keep the following procedures in mind when operating any optional equipment:

- Prior to the operation, move your machine to a safe area and test its operation.
- Become aware of how the machine will move with an optional piece of equipment, including it's center of gravity and working range.
- Make sure the machine is well balanced and does not lean to one side.
- Maintain a safe distance from all surrounding barriers during machine operations.
- To prevent the machine from tipping over, never swing, lower, or stop your machine suddenly.
- To prevent impact that may cause the machine to tip over, never raise or lower the boom suddenly.

OPTIONAL EQUIPMENT CONTROL

There is a variety of optional one-way flow and two-way flow equipment that can be used on this machine. A hydraulic breaker is an example of one-way flow equipment, while a shear is an example of two-way flow equipment.

Equipment Control Elements

The equipment control elements include two stop valves and a selector valve. The two stop valves are on the arm, and the selector valve is near the boom base in the center of the machine.

Stop Valves

Stop valves (1) control the flow of hydraulic oil to and from the equipment:

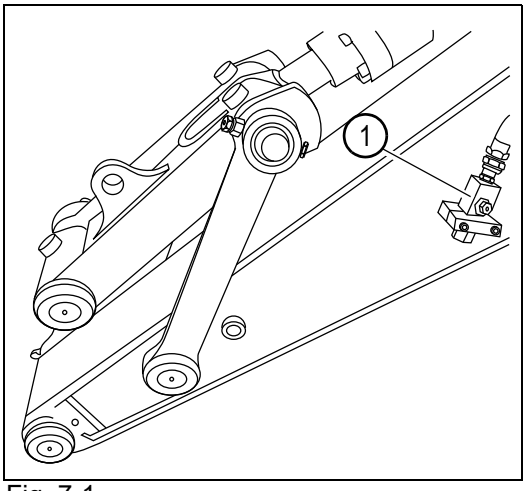

Fig. 7-1

- Open position (2) (line parallel to flow) allows flow of hydraulic oil.

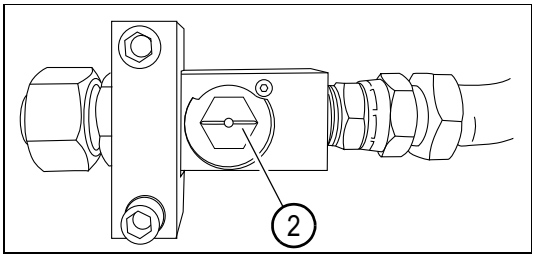

Fig. 7-2

- Closed position (3) (line perpendicular to flow) stops flow of hydraulic oil.

  NOTE: Place the valve in the closed position when removing or installing optional equipment.

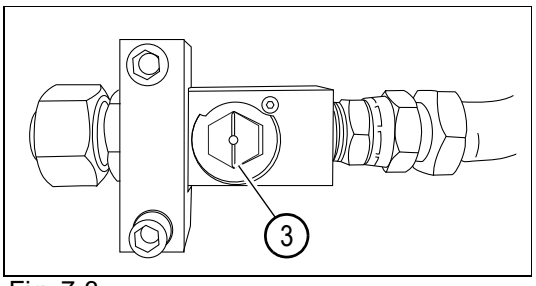

Fig. 7-3

Return Flow Selector Valve

The return flow selector valve (1) can change the direction of hydraulic oil flow. The direction of hydraulic oil flow is determined by the attached optional equipment.

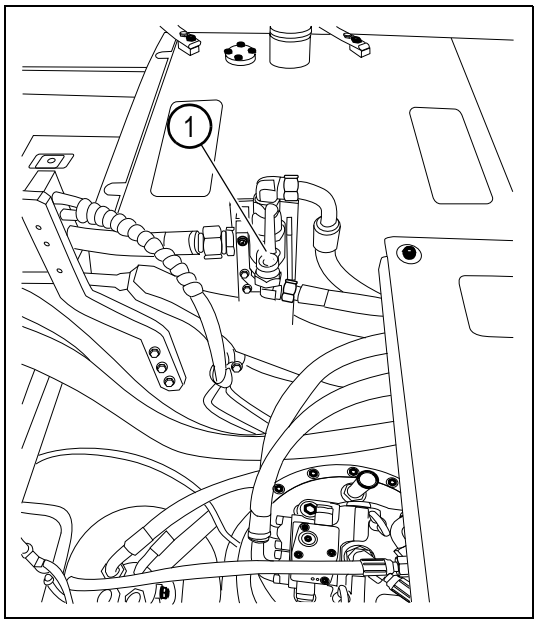

Fig. 7-4

One-Way Hydraulic Attachment

Use this position for breaker attachment.

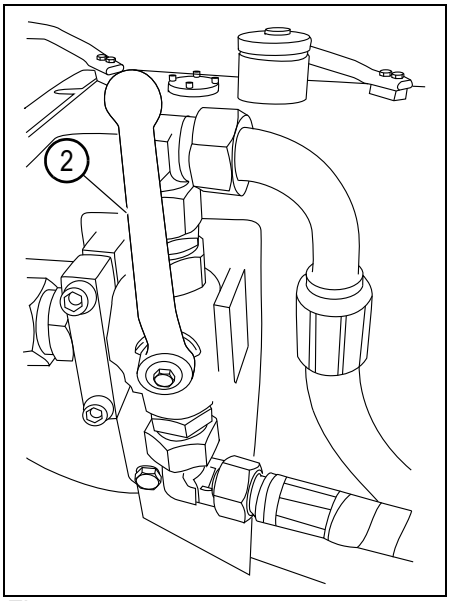

Fig. 7-5

Bidirectional Hydraulic Attachment

Use this position for shear attachment.

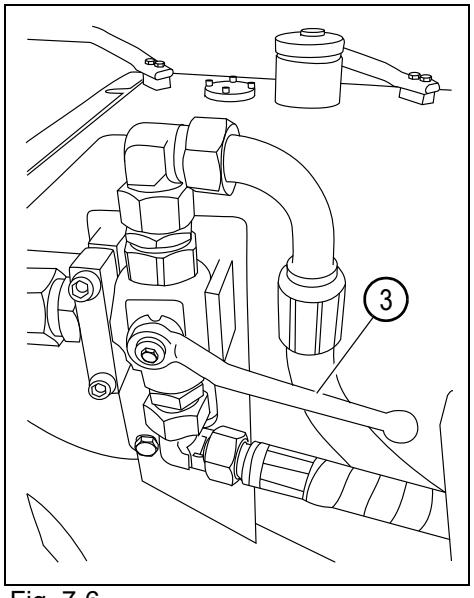

Fig. 7-6

With the handle positioned up (2), oil in the return circuit will bypass the hydraulic oil cooler and the return filter, meeting the low back-pressure requirement of most hydraulic hammers.

OPTIONAL EQUIPMENT OPERATION

There are two pairs of hydraulic lines at the end of the arm. The main auxiliary lines (the larger lines) power the optional equipment. The secondary auxiliary lines (the smaller lines) rotate the optional equipment.

Attach Optional Equipment

WARNING!

- **Do not release equipment unless it is on the ground or on a solid, supportive surface. Block or support equipment to prevent rolling or tipping that could result in death or injury.**
- **Hydraulic systems operate under extremely high pressure. Escaping hydraulic oil under pressure is dangerous and could result in death or injury.**

Always relieve pressure before disconnecting hoses.

NOTE: The following procedure details replacement of a bucket with hydraulically operated equipment. Use steps appropriate for your situation when changing between different types of working equipment.

1. Lower the work equipment to the ground.
2. Shut down the engine.
3. Turn the key switch to ON.
4. Place the hydraulic lockout control lever in the unlocked (open) position (1).
5. Fully cycle each pedal, joystick, and control lever two to three times to release the internal pressure remaining in the hydraulic lines.
6. Place the hydraulic lockout control lever in the locked (closed) position (2).

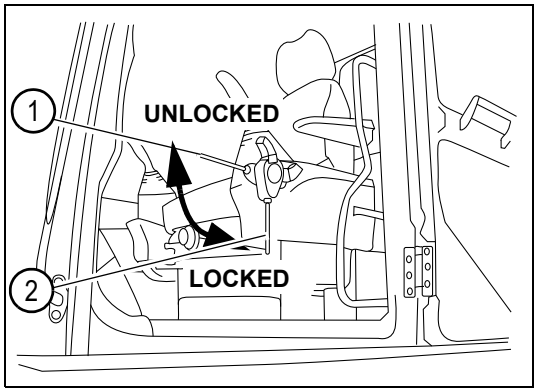

Fig. 7-7

7. Remove the wing nut (3) from the hydraulic tank breather valve.

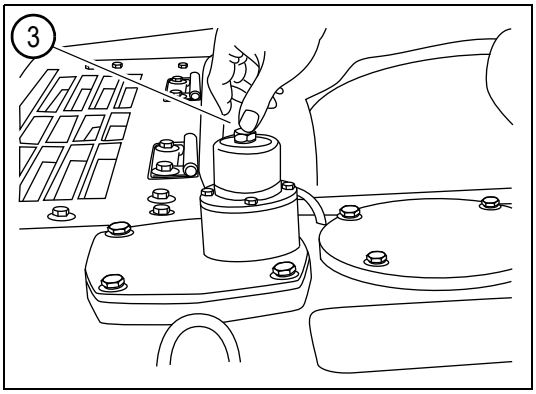

Fig. 7-8

8. Press the hydraulic tank vent button (4) to relieve pressure in the hydraulic tank.

9. Install the wing nut (3).

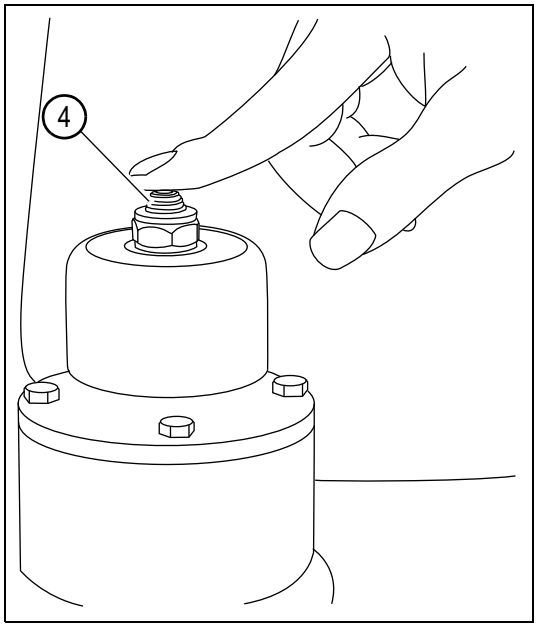

Fig. 7-9

10. Turn both stop valves to the closed position (5) (valve stem line perpendicular to flow).

    NOTE: Place a container under one of the stop valves to catch any residual hydraulic oil.

11. Remove the cap (6) from the end of this stop valve and allow any residual hydraulic oil to drain into the container.

12. Repeat steps 11 and 12 on the other stop valve.

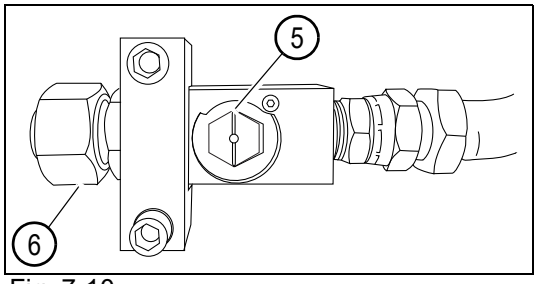

Fig. 7-10

NOTICE!

Dispose of drained hydraulic oil properly. Failure to do so could damage the environment.

13. Mount optional equipment and connect the hydraulic lines in accordance with the manufacturer's instructions.

    NOTE: Connection sizes may vary.

14. Turn the stop valves to the open position (7) (valve stem line parallel to flow).

15. Place the return flow selector valve in the proper position for one-way or two-way flow to match the requirements of the attachment. (See "Return Flow Selector Valve" on page 7-4.)

16. Set the monitor to the correct attachment.

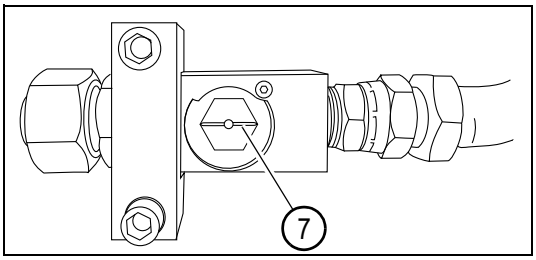

Fig. 7-11

Optional Equipment Control

WARNING!

Do not touch the joystick control buttons when you are not operating the attachments. Accidental operation of an attachment could result in death or injury.

The proportional switch and push buttons on the left joystick (1) and right joystick (2) control equipment operation.

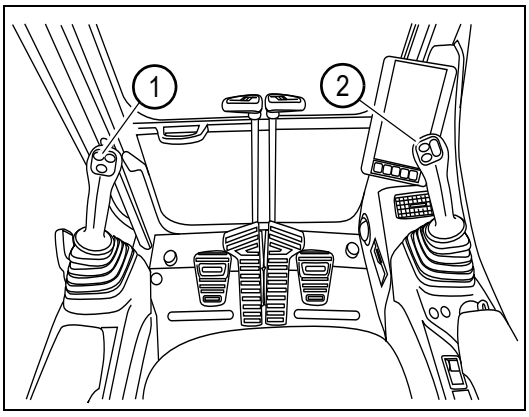

Fig. 7-12

Proportional Flow Control

The rocker switch (1) on the right joystick controls flow in the main auxiliary lines.

- Press the upper part of the switch (1) on the right joystick to send flow down the right side of the arm.
- Press the lower part of the switch (1) on the right joystick to send flow down the left side of the arm.
- Release the switch to stop operation of the tool.

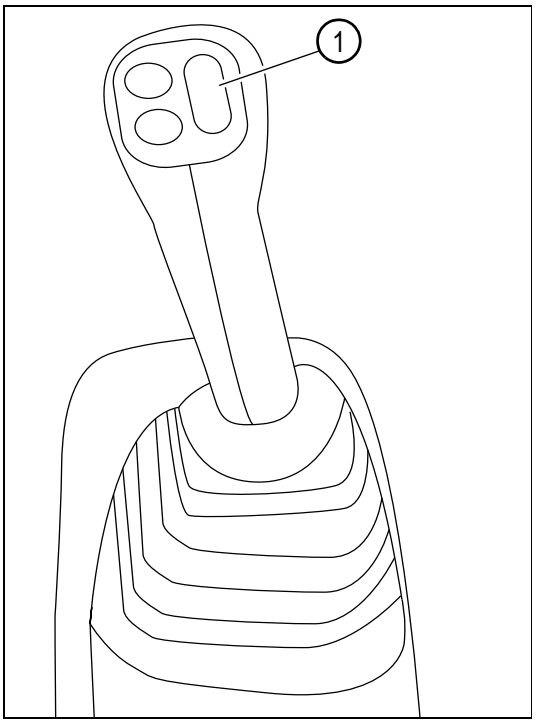

Fig. 7-13

Rotational Flow Control

The two buttons at the top of the left joystick control flow in the secondary auxiliary lines.

Press the left button (2) on the left joystick to rotate the attachment to the left.

Press the right button (3) on the left joystick to rotate the attachment to the right.

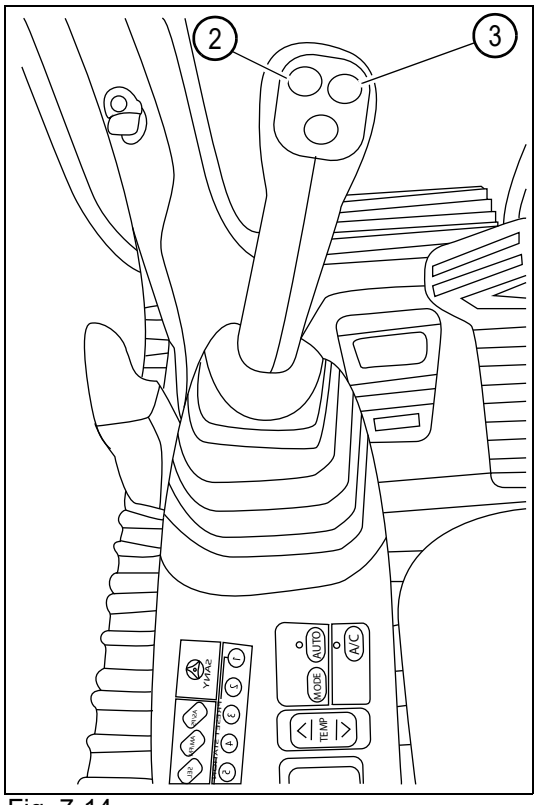

Fig. 7-14

Disconnect Optional Equipment

NOTE: The following procedure details replacement of hydraulically operated equipment with a bucket. Use the appropriate steps for your situation if replacing one hydraulically operated equipment with another.

1. Lower the work equipment to the ground.
2. Shut down the engine.
3. Turn the key switch to ON.
4. Place the hydraulic lockout control lever in the unlocked (open) position (1).
5. Fully cycle each pedal, joystick, and control lever two to three times to release pressure in the hydraulic lines.
6. Place the hydraulic lockout lever in the locked (closed) position (2).
7. Remove the wing nut (3) from the hydraulic tank breather valve.

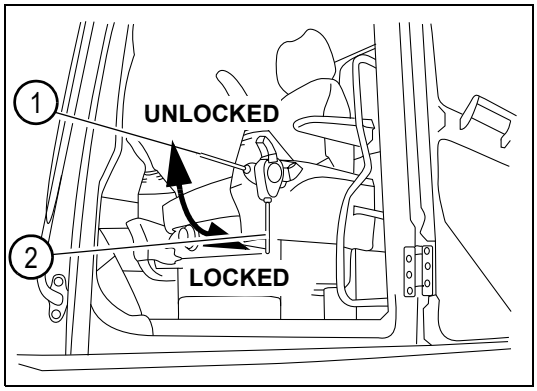

Fig. 7-15

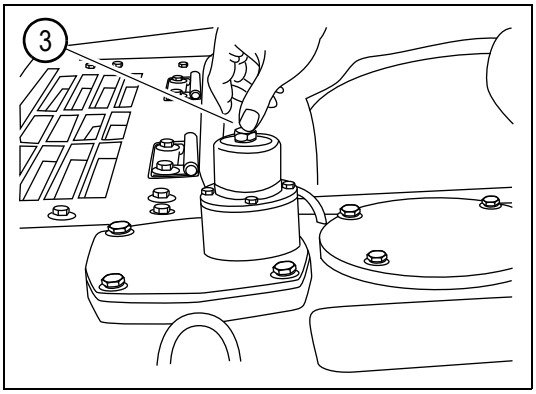

Fig. 7-16

8. Press the vent button (4) to relieve pressure in the hydraulic tank.

9. Install the wing nut (5).

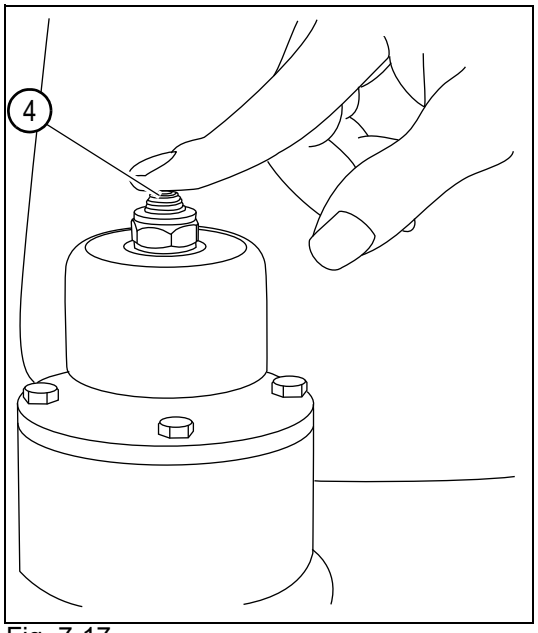

Fig. 7-17

10. Turn both stop valves to the closed position (valve stem line perpendicular to flow).

    NOTE: Place a suitably sized container under the first attachment hose to be disconnected to catch any residual hydraulic oil.

11. Disconnect the attachment hose from this stop valve and allow any residual hydraulic oil to drain into the container.

12. Install plug to opening of attachment hose.

13. Install cap (6) to the open stop valve outlet.

14. Repeat steps 11 through 13 on the other stop valve.

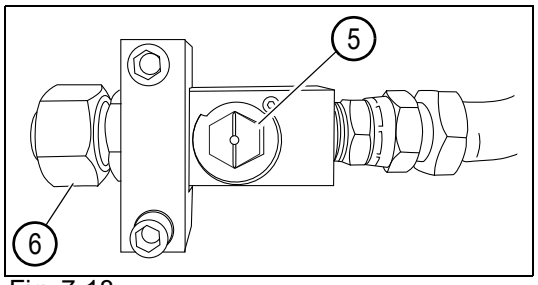

Fig. 7-18

NOTICE!

Dispose of drained hydraulic oil properly. Failure to do so could damage the environment.

15. Remove the attachment in accordance with the manufacturer's instructions.

16. Check the oil level in the hydraulic tank and top off as necessary. See "Hydraulic Oil/Temperature Data" on page 5-13 and "Capacities" on page 5-13.

17. Set the monitor for the correct work mode.

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