

Product: BACKHOE LOADER  
Model: 424B BACKHOE LOADER JRC  
Configuration: 424B Backhoe Loader JRC05546-UP (MACHINE)

## Operation and Maintenance Manual 424B Backhoe Loader

Media Number -SEBU9088-02

Publication Date -01/09/2013

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s03548206

## Foreword

### 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** - This product can expose you to chemicals including ethylene glycol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to:

[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

**Do not ingest this chemical. Wash hands after handling to avoid incidental ingestion.**



**WARNING** - This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information go to:

[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

**Wash hands after handling components that may contain lead.**

## Literature Information

This manual should be stored in the operator's compartment in the literature holder or seat back literature storage area.

This manual contains safety information, operation instructions, transportation information, lubrication information, and maintenance information.

Some photographs or illustrations in this publication show details or attachments that can be different from your machine. Guards and covers might have been removed for illustrative purposes.

Continuing improvement and advancement of product design might have caused changes to your machine which are not included in this publication. Read, study, and keep this manual with the machine.

Whenever a question arises regarding your machine, or this publication, please consult your Cat dealer for the latest available information.

## **Safety**

The safety section lists basic safety precautions. In addition, this section identifies the text and locations of warning signs and labels used on the machine.

Read and understand the basic precautions listed in the safety section before operating or performing lubrication, maintenance, and repair on this machine.

## **Operation**

The operation section is a reference for the new operator and a refresher for the experienced operator. This section includes a discussion of gauges, switches, machine controls, attachment controls, transportation, and towing information.

Photographs and illustrations guide the operator through correct procedures of checking, starting, operating, and stopping the machine.

Operating techniques outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the machine and its capabilities.

## **Maintenance**

The maintenance section is a guide to equipment care. The Maintenance Interval Schedule (MIS) lists the items to be maintained at a specific service interval. Items without specific intervals are listed under the "When Required" service interval. The Maintenance Interval Schedule lists the page number for the step-by-step instructions required to accomplish the scheduled maintenance. Use the Maintenance Interval Schedule as an index or "one safe source" for all maintenance procedures.

### **Maintenance Intervals**

Use the service hour meter to determine servicing intervals. Calendar intervals shown (daily, weekly, monthly, etc.) can be used instead of service hour meter intervals if the calendar intervals

provide more convenient servicing schedules and approximate the indicated service hour meter reading. Perform the recommended service at the interval that occurs first.

Under severe, dusty, or wet operating conditions, more frequent lubrication than is specified in the maintenance intervals chart might be necessary.

Perform service on items at multiples of the original requirement. For example, at every 500 service hours or 3 months, also service those items listed under every 250 service hours or monthly and every 10 service hours or daily.

## Certified Engine Maintenance

Proper maintenance and repair are essential to keep the engine and machine systems operating correctly. As the heavy-duty off-road diesel engine owner, you are responsible for the performance of the required maintenance listed in the Owner Manual, Operation and Maintenance Manual, and Service Manual.

It is prohibited for any person engaged in the business of repairing, servicing, selling, leasing, or trading engines or machines to remove, alter, or to render inoperative, any emission-related device or element of design installed on or in an engine or machine that is in compliance with all applicable regulations of the intended country to which it has been shipped. Certain elements of the machine and engine such as the exhaust system, fuel system, electrical system, intake air system, and cooling system may be emission-related and should not be altered unless approved by Caterpillar.

## Machine Capacity

Additional attachments or modifications may exceed machine design capacity which can adversely affect performance characteristics. Included would be stability and system certifications such as brakes, steering, and rollover protective structures (ROPS). Contact your Cat dealer for further information.

## Product Identification Number

Effective First Quarter 2001 the Product Identification Number (PIN) has changed from 8 to 17 characters. To provide uniform equipment identification, construction equipment manufacturers are moving to comply with the latest version of the product identification numbering standard. Non-road machine PINs are defined by ISO 10261. The new PIN format will apply to all machines and generator sets. The PIN plates and frame marking will display the 17 character PIN. The new format will look like the following:



Where:

1. World Manufacturing Code (characters 1-3)
2. Machine Descriptor (characters 4-8)
3. Check Character (character 9)
4. Machine Indicator Section (MIS) or Product Sequence Number (characters 10-17). These were previously referred to as the Serial Number.

Machines and generator sets produced before First Quarter 2001 will maintain their 8 character PIN format.

Components such as engines, transmissions, axles, and work tools will continue to use an 8 character Serial Number (S/N).

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## Safety Signs and Labels

SMCS - 1000; 4450; 4480; 4490; 7000; 7405; 7451; 7606

There are several specific warning signs on this machine. The exact location of the hazards and the description of the hazards are reviewed in this section. Please become familiarized with all warning signs.

Make sure that all of the warning signs are legible. Clean the warning signs or replace the warning signs if you cannot read the words. Replace the illustrations if the illustrations are not legible. When you clean the warning signs, use a cloth, water, and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the safety signs. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the warning sign. Loose adhesive will allow the warning sign to fall.

Replace any safety sign that is damaged, or missing. If a safety sign is attached to a part that is replaced, install a safety sign on the replacement part. Any Cat dealer can provide new safety signs.

## Do Not Operate



Illustration 1

g03090879

This warning label is located above the right side console.



**Do not operate or work on this machine unless you have read and understand the instructions and warnings in the Operation and Maintenance Manuals. Failure to follow the instructions or heed the warnings could result in injury or death. Contact your Caterpillar dealer for replacement manuals. Proper care is your responsibility.**

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## Improper Attachment of Work Tools



Illustration 2

g03090880

This warning label is located above the right side console.



**Improper attachment of implements could result in injury or death.**

**Do not operate this machine until you have positive indication that the coupler pins are fully engaged. Follow recommended procedure in Operation and Maintenance Manual.**

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## Parking Brake and Transmission Neutral Lock

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Illustration 3

g03090881

This warning label is located above the right side console.



**Always engage the parking brake and transmission neutral lock before dismounting the machine, operating the backhoe or engaging the boom lock for the transport position. Failure to do so could allow unexpected machine movement, resulting in personal injury or death.**

## Keep Clear



Illustration 4

g03090896

This warning label is located on the cab structure in the rear at the bottom.



**Crush hazard; This is not an entrance or exit. Stay clear of this area when the machine is operating. Start and operate the backhoe from the operator seat only. Failure to follow these warnings could result in injury or death.**

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## Stay Clear

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Illustration 5

g03090898

This warning label is located on both sides of the boom.



**Stay clear of this area when machine is operating. You can be crushed by swinging boom.**

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## Pressurized System

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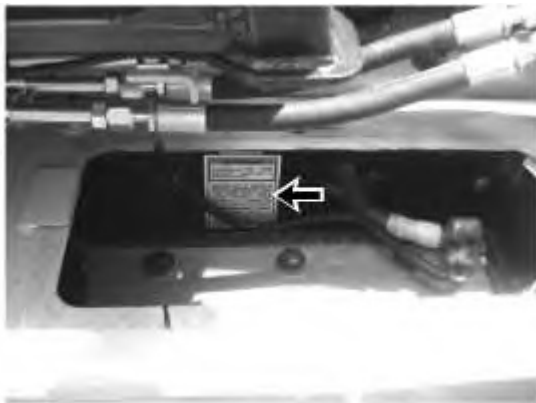
This warning label is located on Radiator top flange rear cap.



**Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.**

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## Batteries



This warning label is located on the inside of the battery compartment.



**Improper jumper cable connections can cause explosion resulting in personal injury. Batteries may be located in separate compartments, always connect positive (+) cable to positive (+) terminal of battery connected to starter solenoid and negative (-) cable from external source to engine block or frame.**

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## Brace The Lift Cylinder on Single Tilt Machines

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Illustration 8

g03090900

This warning label is located on the loader lift arm by the loader lift arm brace.



**When performing any work underneath a raised loader lift arm, the loader lift arm brace must be in place. Install the loader lift arm brace as follows.**

- 1. Empty loader bucket, raise loader arms to maximum height with the bucket in the dump position.**
- 2. Remove cotter pin from brace retaining pin and lower brace down over lift cylinder rod. Install retaining pin through lower holes of the service brace and install cotter pin in retaining pin.**
- 3. Slowly lower loader arms until brace contacts the top of the lift cylinder and bosses on loader arm.**
- 4. To remove loader lift arm brace, reverse procedure.**

**Failure to follow this procedure can result in death or serious injury if the loader arms are accidentally lowered.**

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**Ether**

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Illustration 9

g03090902

This warning label is located above the right side console.



**Do not spray ether into engine when using thermal starting aid to start engine. Personal injury and machine damage could result. Follow procedure in the Operation and Maintenance Manual.**

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## Backhoe Stabilizer



**Use Stabilizer Lock When Servicing Under Machine Chassis With Stabilizer Legs Extended.**

**Failure to Lock Stabilizers May Result in Serious Injury or Death.**

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This warning label is located on the cab structure in the rear at the bottom.

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Illustration 10

g03178697

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## General Hazard Information

SMCS - 7000

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Illustration 1

g03090918

Attach a “Do Not Operate” warning tag or a similar warning tag to the start switch or to the controls before you service the equipment or before you repair the equipment. These warning tags (Special Instruction, SEHS7332) are available from your Cat dealer.

Know the width of your equipment in order to maintain proper clearance when you operate the equipment near fences or near boundary obstacles.

Be aware of high voltage power lines and power cables that are buried. If the machine comes in contact with these hazards, serious injury or death may occur from electrocution.

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Illustration 2

g03090920

Wear a hard hat, protective glasses, and other protective equipment, as required.

Do not wear loose clothing or jewelry that can snag on controls or on other parts of the equipment.

Make sure that all protective guards and all covers are secured in place on the equipment.

Keep the equipment free from foreign material. Remove debris, oil, tools, and other items from the deck, from walkways, and from steps.

Secure all loose items such as lunch boxes, tools, and other items that are not a part of the equipment.

Know the appropriate work site hand signals and the personnel that are authorized to give the hand signals. Accept hand signals from one person only.

Do not smoke when you service an air conditioner. Also, do not smoke if refrigerant gas may be present. Inhaling the fumes that are released from a flame that contacts air conditioner refrigerant can cause bodily harm or death. Inhaling gas from air conditioner refrigerant through a lighted cigarette can cause bodily harm or death.

Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.

Obey all local regulations for the disposal of liquids.

Use all cleaning solutions with care. Report all necessary repairs.

Do not allow unauthorized personnel on the equipment.

Unless you are instructed otherwise, perform maintenance with the equipment in the servicing position. Refer to Operation and Maintenance Manual for the procedure for placing the equipment in the servicing position.

## **Pressure Air and Water**

Pressurized air and/or water can cause debris and/or hot water to be blown out. This could result in personal injury.

When pressure air and/or pressure water is used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye protection includes goggles or a protective face shield.

The maximum air pressure for cleaning purposes must be below 205 kPa (30 psi). The maximum water pressure for cleaning purposes must be below 275 kPa (40 psi).

## Trapped Pressure

Pressure can be trapped in a hydraulic system. Releasing trapped pressure can cause sudden machine movement or attachment movement. Use caution if you disconnect hydraulic lines or fittings. High-pressure oil that is released can cause a hose to whip. High-pressure oil that is released can cause oil to spray. Fluid penetration can cause serious injury and possible death.

## Fluid Penetration

Pressure can be trapped in the hydraulic circuit long after the engine has been stopped. The pressure can cause hydraulic fluid or items such as pipe plugs to escape rapidly if the pressure is not relieved correctly.

Do not remove any hydraulic components or parts until pressure has been relieved or personal injury may occur. Do not disassemble any hydraulic components or parts until pressure has been relieved or personal injury may occur. Refer to the Service Manual for any procedures that are required to relieve the hydraulic pressure.

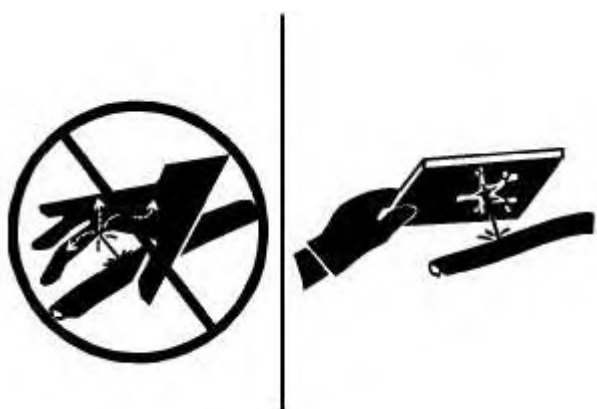


Illustration 3

g03090925

Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

## Containing Fluid Spillage

Care must be taken in order to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the equipment. Prepare to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Tools and Shop Products Guide" for the following items:

- Tools that are suitable for collecting fluids and equipment that is suitable for collecting fluids
- Tools that are suitable for containing fluids and equipment that is suitable for containing fluids

Obey all local regulations for the disposal of liquids.



Illustration 4

g03090926

Cat equipment and replacement parts that are shipped from Caterpillar are asbestos free. Caterpillar recommends the use of only genuine Cat replacement parts. Use the following guidelines when you handle any replacement parts that contain asbestos or when you handle asbestos debris.

Use caution. Avoid inhaling dust that might be generated when you handle components that contain asbestos fibers. Inhaling this dust can be hazardous to your health. The components that may contain asbestos fibers are brake pads, brake bands, lining material, clutch plates, and some gaskets. The asbestos that is used in these components is bound in a resin or sealed in some way. Normal handling is not hazardous unless airborne dust that contains asbestos is generated.

If dust that may contain asbestos is present, there are several guidelines that should be followed:

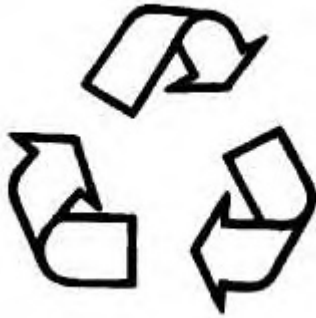
- Never use compressed air for cleaning.
- Avoid brushing materials that contain asbestos.
- Avoid grinding materials that contain asbestos.
- Use a wet method in order to clean up asbestos materials.
- A vacuum cleaner that is equipped with a high efficiency particulate air filter (HEPA) can also be used.
- Use exhaust ventilation on permanent machining jobs.
- Wear an approved respirator if there is no other way to control the dust.



- Comply with applicable rules and regulations for the work place. In the United States, use Occupational Safety and Health Administration (OSHA) requirements. These OSHA requirements can be found in "29 CFR 1910.1001".
- Obey environmental regulations for the disposal of asbestos.
- Stay away from areas that might have asbestos particles in the air.

## Dispose of Waste Properly

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Illustration 5

g03090929

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Refer to Special Publication, NENG2500, "Tools and Shop Products Guide" for the following items:

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# Crushing Prevention and Cutting Prevention

## SMCS - 7000

Support the equipment properly before you perform any work or maintenance beneath that equipment. Do not depend on the hydraulic cylinders to hold up the equipment. Equipment can fall if a control is moved, or if a hydraulic line break.

Do not work beneath the cab of the machine unless the cab is properly supported.

Unless you are instructed otherwise, never attempt adjustments while the machine is moving or while the engine is running.

Never jump across the starter solenoid terminals in order to start the engine. Unexpected machine movement could result.

Whenever there are equipment control linkages the clearance in the linkage area will change with the movement of the equipment or the machine. Stay clear of areas that may have a sudden change in clearance with machine movement or equipment movement.

Stay clear of all rotating and moving parts.

If there is a need to remove guards in order to perform maintenance, always install the guards after the maintenance is performed.

Keep objects away from moving fan blades. The fan blade will throw objects or cut objects.

Do not use a kinked wire cable or a frayed wire cable. Wear gloves when you handle wire cable. When you strike a retainer pin with force, the retainer pin can fly out. The loose retainer pin can injure personnel. Make sure that the area is clear of people when you strike a retainer pin. To avoid injury to your eyes, wear protective glasses when you strike a retainer pin.

Chips or other debris can fly off an object when you strike the object. Make sure that no one can be injured by flying debris before striking any object.

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## Burn Prevention

SMCS - 7000

Do not touch any part of an operating engine. Allow the engine to cool before any maintenance is performed on the engine. Relieve all pressure in the air system, in the oil system, in the lubrication system, in the fuel system, or in the cooling system before any lines, fittings, or related items are disconnected.

## Coolant

When the engine is at operating temperature, the engine coolant is hot. The coolant is also under pressure. The radiator and all lines to the heaters or to the engine contain hot coolant.

Any contact with hot coolant or with steam can cause severe burns. Allow cooling system components to cool before the cooling system is drained.

Check the coolant level only after the engine has been stopped.

Ensure that the filler cap is cool before removing the filler cap. The filler cap must be cool enough to touch with a bare hand. Remove the filler cap slowly in order to relieve pressure.

Cooling system conditioner contains alkali. Alkali can cause personal injury. Do not allow alkali to contact the skin, the eyes, or the mouth.

## Oils

Hot oil and hot components can cause personal injury. Do not allow hot oil to contact the skin. Also, do not allow hot components to contact the skin.

Remove the hydraulic tank filler cap only after the engine has been stopped. The filler cap must be cool enough to touch with a bare hand. Follow the standard procedure in this manual in order to remove the hydraulic tank filler cap.

## Batteries

The liquid in a battery is an electrolyte. Electrolyte is an acid that can cause personal injury. Do not allow electrolyte to contact the skin or the eyes.

Do not smoke while checking the battery electrolyte levels. Batteries give off flammable fumes which can explode.

Always wear protective glasses when you work with batteries. Wash hands after touching batteries. The use of gloves is recommended.

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# Fire Prevention and Explosion Prevention

SMCS - 7000

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Illustration 1

g03090959

All fuels, most lubricants, and some coolant mixtures are flammable.

Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire. Fire may cause personal injury and property damage.

Remove all flammable materials such as fuel, oil, and debris from the machine. Do not allow any flammable materials to accumulate on the machine.

Store fuels and lubricants in properly marked containers away from unauthorized persons. Store oily rags and any flammable materials in protective containers. Do not smoke in areas that are used for storing flammable materials.

Do not operate the machine near any flame.

Exhaust shields (if equipped) protect hot exhaust components from oil spray or fuel spray in a break in a line, in a hose, or in a seal. Exhaust shields must be installed correctly.

Do not weld on lines or on tanks that contain flammable fluids. Do not flame cut lines or tanks that contain flammable fluid. Clean any such lines or tanks thoroughly with a nonflammable solvent prior to welding or flame cutting.

Check all electrical wires daily. Repair any wires that are loose or frayed before you operate the machine. Clean all electrical connections and tighten all electrical connections.

Dust that is generated from repairing nonmetallic hoods or nonmetallic fenders can be flammable and/or explosive. Repair such components in a well ventilated area away from open flames or sparks.

Inspect all lines and hoses for wear or for deterioration. The hoses must be properly routed. The lines and the hoses must have adequate support and secure clamps. Tighten all connections to the recommended torque. Leaks can cause fires.



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Illustration 2

g03090960

Use caution when you are refueling a machine. Do not smoke while you are refueling a machine. Do not refuel a machine near open flames or sparks. Always stop the engine before refueling. Fill the fuel tank outdoors.

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Illustration 3

g03090961

Gases from a battery can explode. Keep any open flames or sparks away from the top of a battery. Do not smoke in battery charging areas.

Never check the battery charge by placing a metal object across the terminal posts. Use a voltmeter or a hydrometer.

Improper jumper cable connections can cause an explosion that can result in injury. Refer to the Operation Section of this manual for specific instructions.

Do not charge a frozen battery. This may cause an explosion.

## Fire Extinguisher

Make sure that a fire extinguisher is available. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instruction plate.

## Ether

Ether is flammable and poisonous. Use ether in well ventilated areas. Do not smoke while you are replacing an ether cylinder or while you are using an ether spray.

Do not store ether cylinders in living areas or in the operator compartment of a machine. Do not store ether cylinders in direct sunlight or in temperatures above 49 °C (120 °F). Keep ether cylinders away from open flames or sparks.

Dispose of used ether cylinders properly. Do not puncture an ether cylinder. Keep ether cylinders away from unauthorized personnel.

Do not spray ether into an engine if the machine is equipped with a thermal starting aid for cold weather starting.

## Lines, Tubes, and Hoses

Do not bend high-pressure lines. Do not strike high-pressure lines. Do not install any lines that are bent or damaged.

Repair any lines that are loose or damaged. Leaks can cause fires. Consult your Cat dealer for repair or for replacement parts.

Check lines, tubes, and hoses carefully. Do not use your bare hand to check for leaks. Use a board or cardboard to check for leaks. Tighten all connections to the recommended torque.

Replace the parts if any of the following conditions are present:

- End fittings are damaged or leaking.
- Outer coverings are chafed or cut.
- Wires are exposed.
- Outer coverings are ballooning.
- Flexible part of the hoses is kinked.
- Outer covers have embedded armoring.
- End fittings are displaced.

Make sure that all clamps, guards, and heat shields are installed correctly. During machine operation, this will help to prevent vibration, rubbing against other parts, and excessive heat.

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