

521G
Stage IV
Wheel Loader

SERVICE MANUAL

Part number 48082189

English

February 2017

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CASE
CONSTRUCTION



SERVICE MANUAL

**521G WHEEL LOADER XR-EH, NEW CAB TIER4B
521G WHEEL LOADER XT-EH, NEW CAB TIER4B
521G ZBAR-EH, NEW CAB TIER4B**

Link Product / Engine

Product	Market Product	Engine
521G ZBAR-EH, NEW CAB TIER4B	Europe	F4HFE413N*B001

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INTRODUCTION

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Safety rules

Personal safety



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

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

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

 CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: Notice indicates a situation that, if not avoided, could result in machine or property damage.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: Note indicates additional information that clarifies steps, procedures, or other information in this manual.

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Personal safety

Carefully read this Manual before proceeding with maintenance, repairs, refuelling or other machine operations.

Repairs have to be carried out only by authorized and instructed staff; specific precautions have to be taken when grinding, welding or when using mallets or heavy hammers.

Non-authorized persons are not allowed to repair or carry out maintenance on this machine. Do not carry out any work on the equipment without prior authorization.

Ask your employer about the safety instructions in force and safety equipment.

Nobody should be allowed in the cab during machine maintenance unless he is a qualified operator helping with the maintenance work.

If it is necessary to move the equipment to carry out repairs or maintenance, do not lift or lower the equipment from any other position than the operator's seat.

Never carry out any operation on the machine when the engine is running, except when specifically indicated.

Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.

All repair and maintenance operations should be carried out with the greatest care and attention.

Service stairs and platforms used in a workshop or in the field should be built in compliance with the safety rules in force.

Any functional disorders, especially those affecting the safety of the machine, should therefore be rectified immediately.

⚠ DANGER

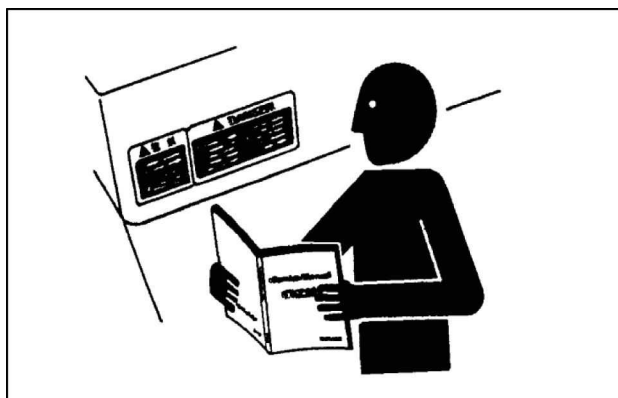
Unexpected movement!

Make sure parking brake is applied. Secure machine with wheel chocks.

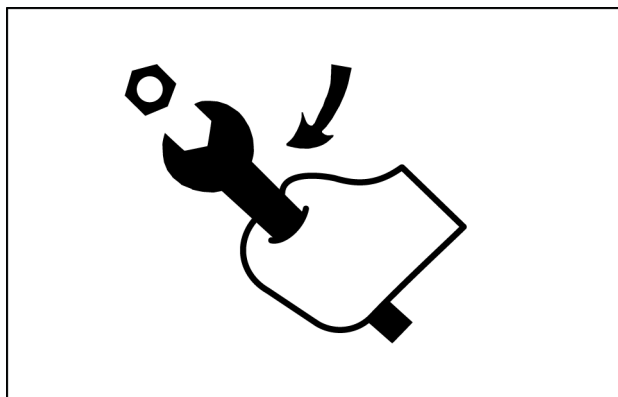
Failure to comply will result in death or serious injury.

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Before performing any work on the machine, attach a maintenance in progress tag. This tag can be applied on the left-hand control lever, safety lever or cab door.



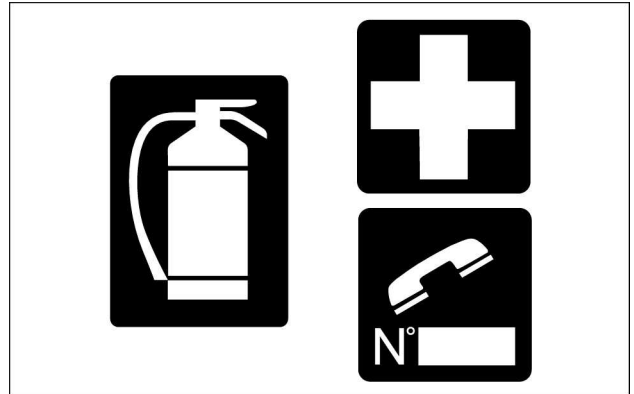
TULI12WEX2004AA 1



TULI12WEX2005AA 2

Emergency

Be prepared for emergencies. Always keep a fire extinguisher and first aid kit readily available. Ensure that the fire extinguisher is serviced in accordance with the manufacturer's instructions.



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Equipment

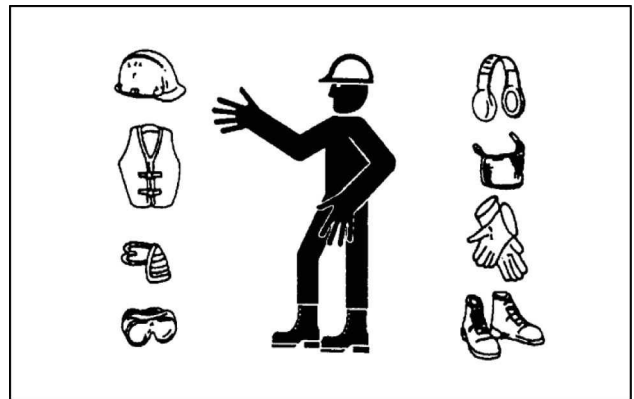
Wear close fitting clothing and safety equipment appropriate for the job:

- Safety helmet
- Safety shoes
- Heavy gloves
- Reflective clothing
- Wet weather clothing

If working conditions require, the following personal safety equipment should be on hand:

- Respirators (or dust proof masks)
- Ear plugs or acoustic ears protections
- Goggles with lateral shield or masks for eye protection

Do not wear rings, wristwatches, jewelry, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get caught into moving parts.



TULI12WEX2008AA 4

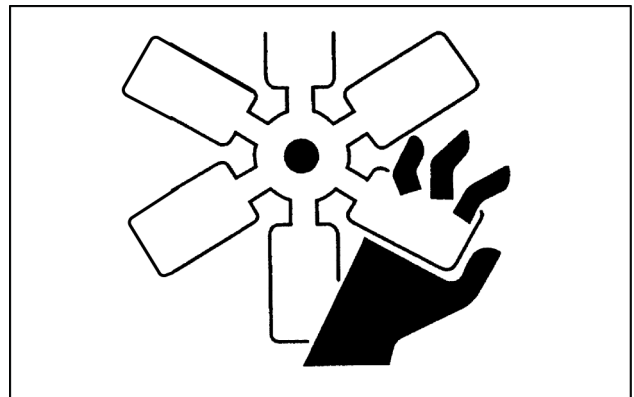
Engine - Radiator

Never leave the engine running in enclosed spaces without proper ventilation which is able to evacuate toxic exhaust gases- Keep the exhaust manifold and tube free from combustible materials.

Do not refuel with the engine running, especially if hot, as this increases fire hazard in case of fuel spillage.

Never attempt to check or adjust the belts when the engine is running.

Never lubricate the machine with the engine running.



TULI12WEX2009AA 5

Pay attention to rotating components and do not allow anyone to approach these areas to avoid becoming entangled.

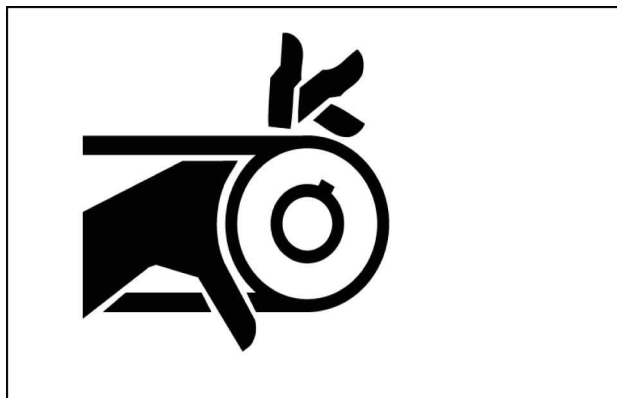
Hands, clothing or tools getting caught in the fan blades or engine belts, can cause amputations, violent hemorrhages and generate conditions of grave danger. For this reason avoid touching or approaching all rotating or moving parts.

A surging spray of the coolant from the radiator can cause serious burns and scalds.

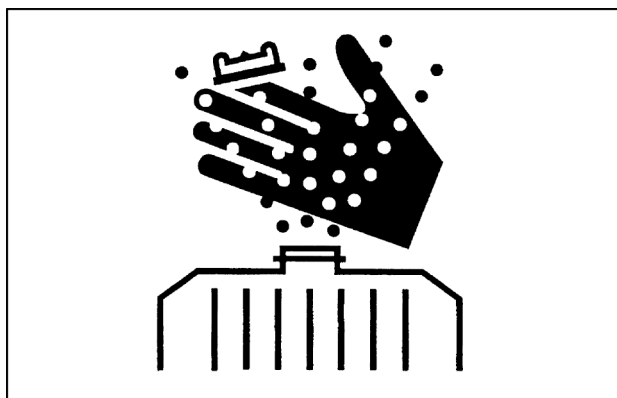
Before checking the coolant level, shut-off the engine and allow machine to cool down the radiator and hoses. Slowly unscrew the cap to release any residual pressure.

If it is necessary to remove the cap while engine is hot, wear safety clothes and equipment, then loosen the cap slowly to relieve the pressure gradually.

When checking the fuel, oil and coolant levels, use lights and lamps explicitly designated as explosion proof. If these types of lamps are not used, fires or explosions may occur.



TULI12WEX2010AA 6



TULI12WEX2011AA 7

Hydraulic systems

Jets of fluids under pressure can penetrate the skin causing serious injuries.

Avoid this hazard by relieving pressure before disconnecting hydraulic or other lines.

Relieve the residual pressure by moving the hydraulic control levers several times.

Tighten all connections before applying pressure.

To protect the eyes wear a facial shield or safety goggles.

Protect your hands and body from possible jets of fluids under pressure.

Swallowing hydraulic oil is a severe health hazard.



TULI12WEX2012AA 8

When hydraulic oil has been swallowed, avoid vomiting, but consult a doctor or go to a hospital.

If an accident occurs, see a doctor familiar with this type of injury immediately.

Any fluid penetrating the skin must be removed within a few hours to avoid serious infections.

Flammable splashes may originate because of heating near lines with fluids under pressure, resulting in serious burns. Do not weld or use torches near lines containing fluids or other flammable materials.

Lines under pressure can accidentally be pierced when the heat expands beyond the area immediately heated.

Arrange for temporary fire resistant shields to protect hoses or other components during welding or torch use.

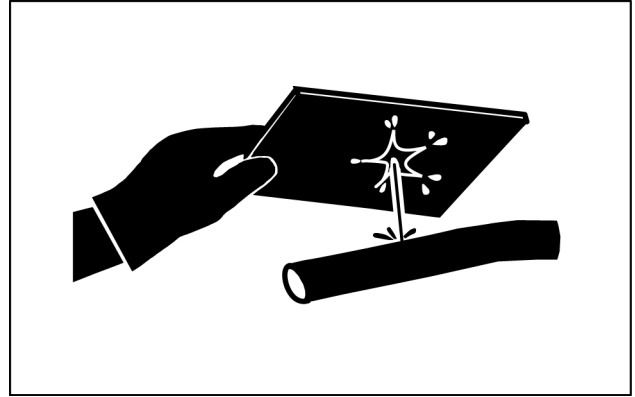
Have any visible leakage repaired immediately.

Discharged oil pollutes the environment. Soak up any oil that has spilled with a proper binding agent. Sweep up binding agent and dispose of it separately from other waste.

Never search for leakages with fingers; instead, use a piece of cardboard and always wear goggles.

Never repair a damaged line; always replace it. Replace hydraulic hoses immediately on detecting any damaged or moist areas.

Always store hydraulic oil in the original containers.



TULI12WEX2013AA 9

Hoses and tubes

Always replace hoses and tubes if the cone end or the end connections on the hose are damaged.

When installing a new hose, loosely connect each end and make sure the hose takes up the correct position before tightening the connections. Clamps should be tightened sufficiently to hold the hose without crushing and to prevent chafing.

After replacing a hose on a moving component, check that the hose does not fall by moving the component through the complete range of travel. Be sure any hose which has been installed is not kinked or twisted.

Hose connections which are damaged, dented, crushed or leaking, restrict oil flow and the productivity of the components being served. Connectors which show signs of movement from the original position have failed and will ultimately separate completely.

A hose with a frayed outer sheath will allow water penetration. Concealed corrosion of the wire reinforcement could subsequently occur along the hose length with resultant hose failure.

Ballooning of the hose indicates an internal leakage due to structural failure. This condition rapidly deteriorates and total hose failure soon occurs.

Kinked, crushed, stretched or deformed hoses generally suffer internal structural damage which can result in oil restriction, a reduction in the speed of operation and ultimate hose failure.

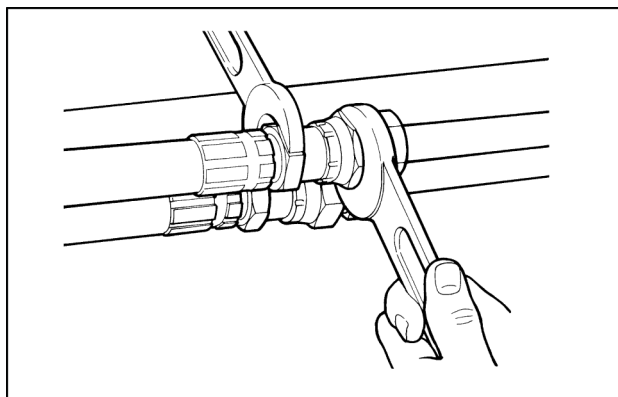
Free-moving, unsupported hoses must never be allowed to touch each other or related working surfaces. This causes chafing which reduces hose life.

O-rings

Replace O-rings, seal rings and gaskets whenever they are disassembled.

Never mix new and old seals or O-rings, regardless of condition. Always lubricate new seal rings and O-rings with hydraulic oil before installation to relevant seats.

This will prevent the O-rings from rolling over and twisting during mounting which will jeopardize sealing.



TULI12WEX2014AA 10

Battery

Batteries give off explosive gases.

Never handle open flames and unshielded light sources near batteries. (No smoking is addressed in the next instruction).

To prevent any risk of explosion, observe the following instructions:

- When disconnecting the battery cables, always disconnect the negative (-) cable first.
- To reconnect the battery cables, always connect the negative (-) cable last.
- Never short-circuit the battery terminals with metal objects.
- Do not weld, grind or smoke near a battery.

Battery electrolyte causes severe burns. The battery contains sulphuric acid. Avoid any contact with the skin, eyes or clothing.

Treatment:

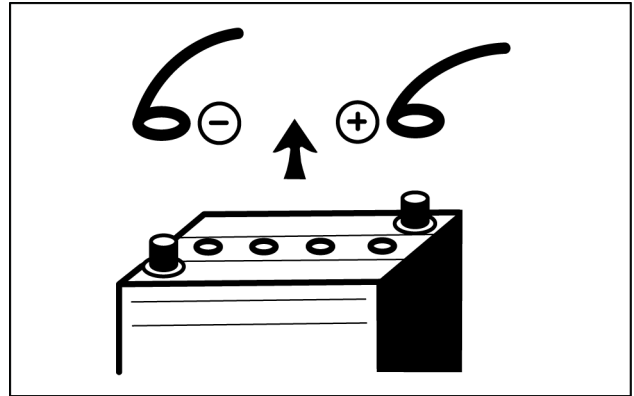
- **EXTERNAL:** Rinse well with water, removing any soiled clothing.
- **INTERNAL:** Avoid vomiting. Drink water to rinse your mouth. Consult a doctor.
- **EYES:** Rinse abundantly with water for **15 min** and consult a doctor.
- When the electrolyte of a battery is frozen, it can explode if you attempt to charge the battery or if you try to start the engine using a booster battery. Always keep the battery charged to prevent the electrolyte freezing.

Provide good ventilation when changing a battery or using a battery in an enclosed space. Always protect your eyes when working near a battery.

Never set tools down on the battery. They may induce a short circuit, causing irreparable damage to the battery and injuring persons.

Never wear metal necklaces, bracelets or watch straps when working on the battery. The metal parts may induce a short circuit resulting in burns.

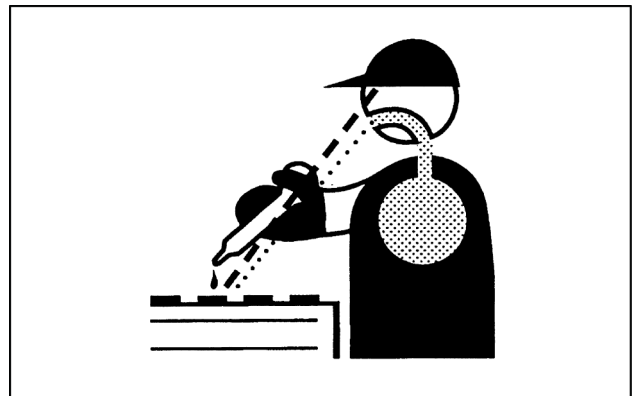
Dispose of used batteries separately from other waste in the interests of environmental protection.



TULI12WEX2015AA 11



TULI12WEX2016AA 12



TULI12WEX2017AA 13

Flammable liquids

When handling flammable liquids:

- Do not smoke.
- Keep away from unshielded light sources and open flames.

Fuels often have a low flash point and are readily ignited.

Never attempt to extinguish burning liquids with water. Use:

- Dry powder
- Carbon dioxide
- Foam

Water used for extinguishing purposes would vaporize instantaneously on contact with burning substances and spread burning oil, for example, over a wide area. Water generates short circuits in the electrical system, possibly producing new hazards.

Stay away from open flames during refilling of hydraulic oil or fuel.

Fuel or oil spills can cause slipping hazards; thoroughly contain and clean affected areas.

Always tighten the safety plugs of fuel tank and hydraulic oil tank firmly.

Never use fuel to clean machine parts that will be exposed to dirt or debris.

Use a non-flammable product for cleaning parts.

Always perform fuel or oil refilling in well aired and ventilated areas.

During refuelling hold the pistol firmly and always keep it in contact with the filler neck until the end of the refuelling, to avoid arcing due to static electricity.

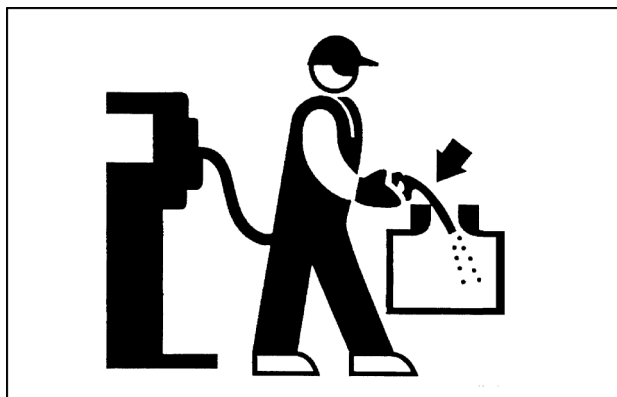
Do not overfill the tank but leave a space for fuel expansion.

Never refuel when the engine is running.

Take all the necessary safety measures when welding, grinding or when working near an exposed flame.



TULI12WEX2016AA 14



TULI12WEX2018AA 15



TULI12WEX2019AA 16

Tires

Before inflating the tires, always check the condition of rims and the outer condition of tires for the presence of dents, cuts, tears of reinforcement plies or other faults. Before inflating a tire, make sure that there are no nearby persons, then position yourself at tread side.

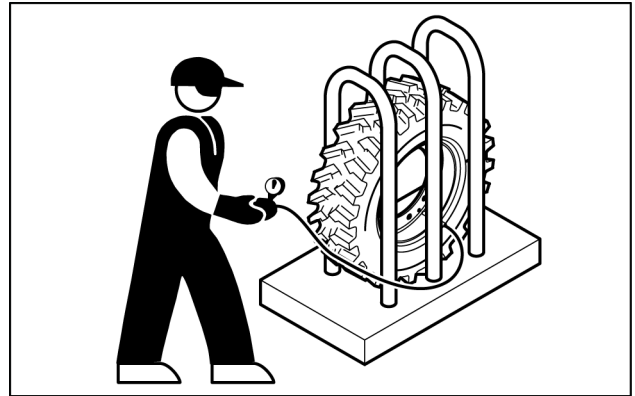
When inflating tires, ensure tire pressure does not exceed that prescribed by the tire manufacturer. Ensure that the pressure of the right tire corresponds to the pressure of the left tire.

NOTE: The front and rear tire pressures may be different.

Never use reconditioned rims because possible welds, heat treatments or brazings not performed correctly can weaken the wheels and cause damage or failure. Deflate the tires before their disassembly.

Before taking out possible jammed objects from the rims, it is necessary to deflate the tires. Inflate tires by means of an inflation pistol complete with extension and pressure control valve.

Use an inflation cage.



TULI12WEX2020AA 17

Cleaning

Clean the exterior of all components before carrying out any form of repair. Dirt and dust can reduce the efficient working life of a component and lead to costly replacement.

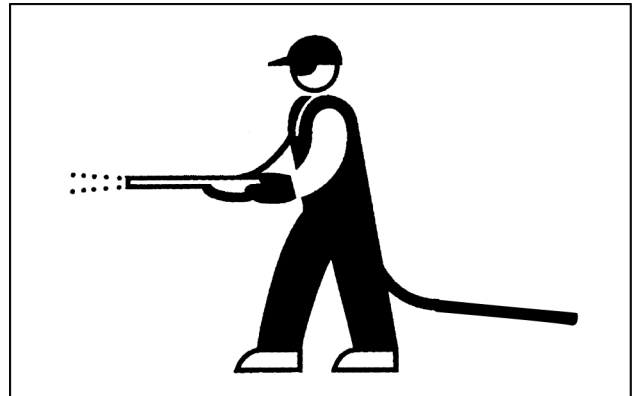
Solvents should be checked that they are suitable for the cleaning of components and also that they do not risk the personal safety of the user.

Dirt, oil, grease and scattered tools are dangerous for people, because they can create slipping or tripping hazards.

For machine cleaning, use a jet of warm water or steam under pressure and commercial detergents. Never use fuel, petroleum or solvents, because they can leave an oily residue that attracts dust, and solvents (even if weak) damage the paint and can lead to the formation of rust.

Never use water jets or steam on sensors, connectors or other electric components.

Avoid direct spray of seals and seams to prevent water penetration inside the cab.



TULI12WEX2021AA 18

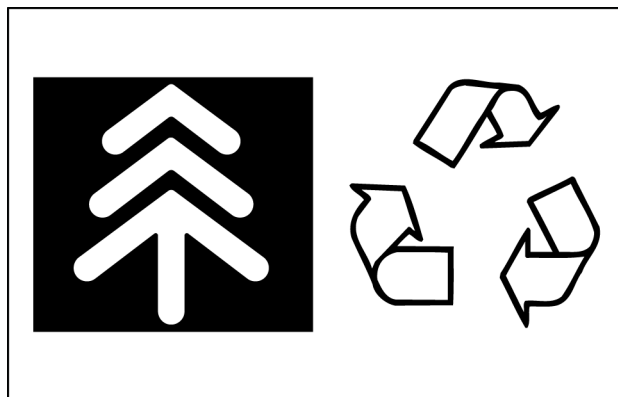
Waste disposal

Improperly disposing of waste can threaten the environment.

Each country has its own Regulations on this subject. It is therefore advisable to prepare suitable containers to collect and store momentarily all solid and fluid materials that must not be scattered in the environment to avoid pollution.

These products will be delivered at preset intervals following the forward environmental regulation.

Below are listed some products from the machine requiring disposal:



TULI12WEX2022AA 19

- Lubricating oil
- Brake system oil
- Coolant mixture, condensation rests and pure antifreeze
- Fuel
- Filter elements, oil and fuel filters
- Filter elements, air filters
- Battery

Also polluted rags, paper, sawdust and gloves must be disposed in compliance with the same procedures.

Do not use food or beverage containers that may mislead someone into drinking from them. Do not pour waste onto the ground, down a drain, or into any water source. Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service centre to recover and recycle used air conditioning refrigerants. Obtain information on the proper way to recycle or dispose of waste from your local environmental or recycling centre, or from your Dealer.

Basic instructions - Important notice regarding equipment servicing

All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The information in this manual is up-to-date at the date of the publication. It is the policy of the manufacturer for continuous improvement. Some information could not be updated due to modifications of a technical or commercial type, or changes to the laws and regulations of different countries.

In case of questions, refer to your CASE CONSTRUCTION Sales and Service Networks.

Basic instructions - How to use the maintenance standard and precautions

Application

WHEN THE MACHINE IS NEW

Confirm that the performances are in accordance with standard specifications as compared to the performance standards.

AT SPECIFIC SELF INSPECTION (RULE BY COUNTRY)

Use the data for the criterion, for the purpose of correction, adjustment and replacement.

WHEN PERFORMANCES ARE DETERIORATED

Determine whether it is caused by a fault or end of service life after long hours of operation, to be used for safety and economical considerations.

WHEN MAIN COMPONENTS ARE REPLACED

For example, use data to restore performances of pumps and others.

Terminology

STANDARD VALUES

Values to be used to condition or assemble a new machine. Where special notes are not given, these values represent standard specifications (machine with standard attachments and standard tires).

REFERENCE VALUES FOR REMEDY

Values at which readjustment is required. In order to ensure performance and safety it is strictly prohibited to use the machine over the specified values.

SERVICE LIMIT

This is the limit value at which reconditioning is impossible without replacement of parts. If the value is expected to exceed the service limit before next inspection and correction are performed, replace the parts immediately. The operation over the specified values causes increase of damage and requires the down time of machine, and also causes safety problems.

Cautions to be exercised at judgment

EVALUATION OF MEASURED DATA

Disagreement of measuring conditions, variations of data peculiar to a new machine, and measuring errors are to be evaluated. Determine generally at what levels measured values are located, instead of determining whether or not values fall within or run out of the reference values.

DETERMINING CORRECTION, ADJUSTMENT OR REPLACEMENT

Machine performances deteriorate with time as parts wear and some deteriorated performances may be restored to new levels. Therefore, determine correction, adjustment or replacement, depending upon the operating hours, kind of work and circumstances in which the machine is placed, and condition the machine performances to its most desirable levels.

Other cautions to be exercised

PARTS LIABLE TO DEGRADE

Rubber products, such as, hydraulic hoses, O-rings, and oil seals deteriorate with time; replace them at regular intervals or at overhauls.

PARTS REQUIRING REGULAR REPLACEMENT

Critical hoses that are necessary to secure safety, we designate as Very Important Parts (V.I.P.) and recommend that they should be replaced regularly.

INSPECTION AND REPLACEMENT OF OILS AND GREASES

In performing maintenance, it is necessary for the user to familiarize themselves with the machine and handle safely. Use caution when inspecting and replacing oils and grease. Refer to the Operators Manuals as well.

Basic instructions - Precaution for disassembly and assembly

Preparations for disassembly

- Thoroughly wash the machine before bringing it into the shop. Bringing a dirty machine into the shop may cause machine components to be contaminated during disassembling/assembling, resulting in damage to machine components, as well as decreased efficiency in service work.
- Be sure to thoroughly understand all disassembling/assembling procedures beforehand, to help avoid incorrect disassembling of components as well as personal injury.
- Check and record the items listed below to prevent problems from occurring in the future.
 1. The machine model, machine serial number, and hour meter reading.
 2. Reason for disassembly (symptoms, failed parts, and causes).
 3. Clogging of filters and oil, water or air leaks, if any.
 4. Capacities and condition of lubricants.
 5. Loose or damaged parts.
- Prepare the necessary tools to be used and the area for disassembling work.
- Wear appropriate clothing, safety shoes, safety helmet, goggles, and clothes with long sleeves.
- Confirm ready access to a first-aid kit and fire extinguisher, as well as appropriate emergency personnel contacts in the case of a medical accident or fire.
- Before performing any work on the machine, follow lockout/tagout procedures by attaching a “maintenance in progress tag”. This tag can be applied on the left-hand control lever, safety lever or cab door. Notify those with access to the machine that you will be performing the maintenance.

Disassembling and assembling hydraulic equipment

- Before removing lines, release the pressure of hydraulic oil tank, or open the cover on the return side to tank, and take out the filter.
- Drain the oil in removed lines into an appropriate container to prevent oil contamination.
- Protect open connections with plugs or caps to prevent oil from leaking and debris from contaminating the system.
- Thoroughly clean the outside of components before disassembling, and drain hydraulic oil and gear oil before disassembly.

Disassembling hydraulic equipment

- Impaired performance and function of hydraulic equipment after unauthorized service may not be covered under warranty by the manufacturer. Consult your local dealer for service.
- If it is unavoidably necessary to disassemble and modify, it should be carried out by experts or personnel qualified through service training.
- Make match mark on parts for reassembling.
- Before disassembling, read instructions in advance, and determine if the service is required to be performed by an authorized dealer.
- Use appropriate specialty tools and jigs if required.
- If parts can not be removed as specified by the procedure, never force removal. Check for other failures that may be causing binding or interference.
- Inspect parts for wear and clearance; record the measured values. Replace components if the values fall outside of the recommended range.
- If an abnormality is detected, repair or replace the parts.
- When removing parts, use appropriate markings or labels to ensure they can be reinstalled in the correct order and location without confusion.
- For common parts, pay attention to the quantity and locations of each group of components.

Reassembling hydraulic equipment

- Clean parts in a well ventilated room.
- Remove residual oil with compressed air, and apply fresh hydraulic oil or gear oil to surfaces before reassembly.
- Replace removed o-rings, back-up rings and oil seals with new ones. Apply gear oil on them before reassembling.
- Thoroughly clean and dry surfaces on which liquid sealant must be reapplied.
- Before assembling, remove rust preventives on new parts.
- Use special tools to fit bearings, bushing and oil seal.
- Assemble parts matching to the marks.
- After completion, check that there is no omission of parts.

Basic instructions - Electrical equipment precautions

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.

Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.

Failure to comply could result in death or serious injury.

W0111A

- The disassembly of electrical equipment is not allowed.
- Handle equipment with care so as not to drop it or bump it.
- Connector should be removed by unlocking while holding the connector.
- Never disconnect electrical plugs by pulling on the wires. Always use only the electrical connectors to make the disconnection.
- Check that connector is connected and locked completely.
- Engine key off before removing and connecting connector.
- Engine key off before touching terminals of starter and alternator.
- Wash machine with care so as not to splash water on electrical equipment and connector.
- If water has entered a sealed connection, thoroughly dry both connectors before reconnecting
- Remove battery grounding terminal before beginning work close to battery and battery relay with tools.

Consumables - Biodiesel Fuel

Fatty Acid Methyl Ester Biodiesel (Biodiesel Fuel) consists of a family of fuels derived from vegetable oils treated with methyl esters.

NOTICE: Biodiesel fuel blends are approved for your engine only if they comply with Specification Standards EN 14214 or ASTM D6751.

NOTICE: verify with your local dealer which blends are approved for your engine. Use of biodiesel fuel that do not comply with the Standards EN14214 or ASTM D6751 could lead to severe damage to engine and fuel system. Use of non-approved biodiesel fuels may void warranty coverage.

Biodiesel Fuel Usage Conditions

Biodiesel fuels must be purchased from a trusted supplier that understands the product and maintains good fuel quality. Biodiesel fuels must be pre-blended by the supplier. Mixing biodiesel fuels on site can result in an incorrect mixture which can damage engine and fuel system.

Engine performance is effected by the use of biodiesel fuels. There may be up to 12 percent reduction in power or torque depending on the blend used.

NOTICE: DO NOT modify the engine and/or fuel injection pump settings to recover reduced performance.

The reduced power must be accepted if using any biodiesel fuel blends.

NOTICE: the use of high biodiesel fuel blends is not recommended in cold weather conditions.

Using biodiesel fuels may require changing engine oil, engine oil filters, and fuel filter elements more frequently. Biodiesel fuels can remove rust and other particles that adhere to the inside of the fuel tank. These particles are trapped by vehicle filters and may cause shortened filter life or filter blockages. Blockages are more common in cold weather conditions. Consult your dealer for information on cold weather operation and proper maintenance intervals when using any biodiesel fuel blend.

Biodiesel fuel may degrade natural rubber gaskets and hoses, as it is more solvent than petro-diesel. Frequently inspect hoses and other engine components when using biodiesel fuel.

DO NOT allow water to collect in the fuel or storage tanks. Biodiesel fuel attracts moisture from the atmosphere. Keep fuel tanks and storage tanks as full as possible to limit the amount of air and water vapors. It may be necessary to drain machine fuel filter more frequently. Potential oxidation and stability could create a problem with fuel stored in the machine.

Biodiesel Storage

NOTICE: DO NOT store machines for more than six months with biodiesel blends in the fuel system. DO NOT store biodiesel fuel in on-site storage tanks for more than six months.

If long periods of storage are required, run the machine for 20 hours using regular diesel fuel to flush the biodiesel fuel from the engine fuel system.

NOTICE: Biodiesel fuels must not be stored in on-site storage tanks for more than six months. Any spillage of biodiesel fuels must be cleaned up immediately before it can cause damage to the environment or the paint finish of the machine. Before using biodiesel fuel blends, you should consult with your dealer to receive full information about the approved blend for your machine and any detailed conditions of its usage. Failure to follow the requirements and conditions of biodiesel fuel usage will void your machine's warranty.

NOTE: B7 is the highest biodiesel (7% blend) that should be used in this machine.

Consumables

Capacities and specifications

Engine		
Type of oil		CASE AKCELA UNITEK 10W-40
Technical specifications		SAE 10W-40 API CJ-4
CASE CONSTRUCTION specifications		MAT3521
Type of oil		CASE AKCELA UNITEK SSL 0W-40 (cold weather)
Technical specifications		SAE 0W-40 API CJ-4
CASE CONSTRUCTION specifications		MAT3521
Capacity (with filter change)		10.9 L (11.5 US qt)
Total capacity in system		11.8 L (12.5 US qt)
Cooling system		
Type of coolant		CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT
CASE CONSTRUCTION specifications		MAT3624
System capacity		23 L (24.3 US qt)
Fuel system		
System capacity		189 L (49.9 US gal)
Hydraulic system		
Type of fluid		CASE AKCELA HYDRAULIC EXCAVATOR FLUID
Technical specifications		ISO VG-46
CASE CONSTRUCTION specifications		MAT3509
Total system capacity		90.1 L (23.8 US gal)
Reservoir capacity		56.8 L (15.0 US gal)
Transmission		
Type of oil		CASE AKCELA NEXPLORE™ FLUID
Technical specifications		SAE 10W - 30 API GL-4 ISO VG-32/46
CASE CONSTRUCTION specifications		MAT 3525
Service capacity - with filter change		18.9 L (20.0 US qt)
Axles		
Type of oil		CASE AKCELA TRANSAXLE FLUID 80W-140
Technical specifications		SAE 80W-140 API GL-4
CASE CONSTRUCTION specifications		MAT 3510
Front axle (Standard and Heavy Duty)		22 L (23.2 US qt)
Rear axle (Standard and Heavy Duty)		22 L (23.2 US qt)
DEF/AdBLUE®		
Technical specifications		ISO 22241-1
CASE CONSTRUCTION specifications		ES-BS001
Total capacity (*)		26.7 L (28.2 US qt)
Grease fittings, as required		
CASE CONSTRUCTION specifications		MAT3550 Grade C

NOTICE: (*) some liters always remain in the **DEF/AdBLUE®** reservoir. This allows for correct functioning of the wheel loader components. **DO NOT** overfill the **DEF/AdBLUE®** tank. The tank is full when the **DEF/AdBLUE®** fluid level in the tank reaches the bottom of the fill neck. Adequate air volume must be present in the top of the tank for proper functionality of the after treatment system.

Hydraulic contamination

Contamination in the hydraulic system is a major cause of the malfunction of hydraulic components. Contamination is any foreign material in the hydraulic oil.

Contamination can enter the hydraulic system in several ways:

- When you drain the oil or disconnect any line
- When you disassemble a component
- From normal wear of the hydraulic components
- From damaged seals or worn seals
- From a damaged component in the hydraulic system

All hydraulic systems operate with some contamination. The design of the components in this hydraulic system permits efficient operation with a small amount of contamination. An increase in this amount of contamination can cause problems in the hydraulic system.

The following list includes some of these problems:

- Cylinder rod seals that leak
- Control valve spools that do not return to neutral
- Movement of control valve spools is difficult
- Hydraulic oil that becomes too hot
- Pump gears, housing, and other parts that wear rapidly
- Relief valves or check valves held open by dirt
- Quick failure of components that have been repaired
- Slow cycle times or a lack of power.

If your machine has any of these problems, check the hydraulic oil for contamination.

There are two types of contamination: microscopic and visible.

Microscopic contamination occurs when very fine particles of foreign material are suspended in the hydraulic oil. These particles are too small to see or feel. Microscopic contamination can be found by identification of the following problems or by testing in a laboratory.

Examples of problems caused by microscopic contamination:

- Cylinder rod seals that leak
- Control valve spools that do not return to neutral
- The hydraulic system has a high operating temperature

Visible contamination is foreign material that can be found by sight, touch, or odor. Visible contamination can cause a sudden failure of components.

Examples of problems caused by visible contamination:

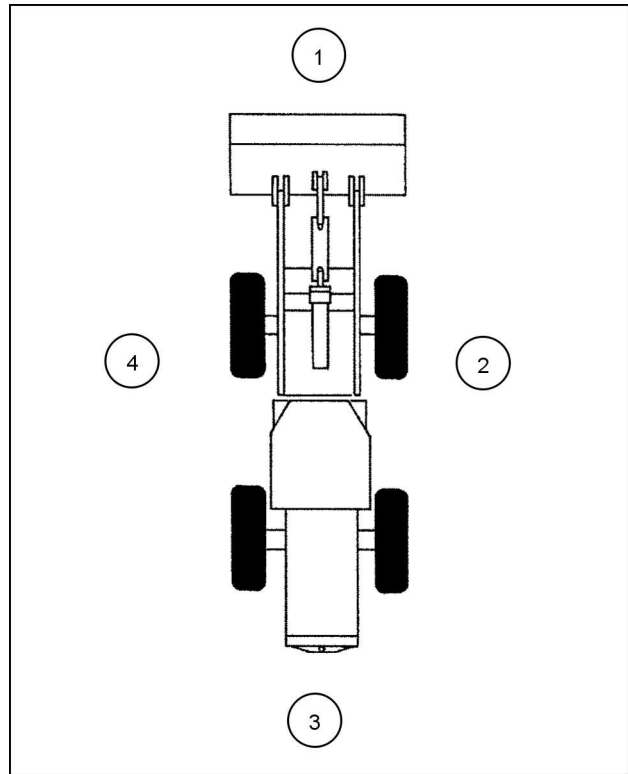
- Particles of metal or dirt in the oil
- Air in the oil
- Dark or thick oil
- Oil with an odor of burned oil
- Water in the oil

If you find contamination, use a portable filter to clean the hydraulic system.

Product identification

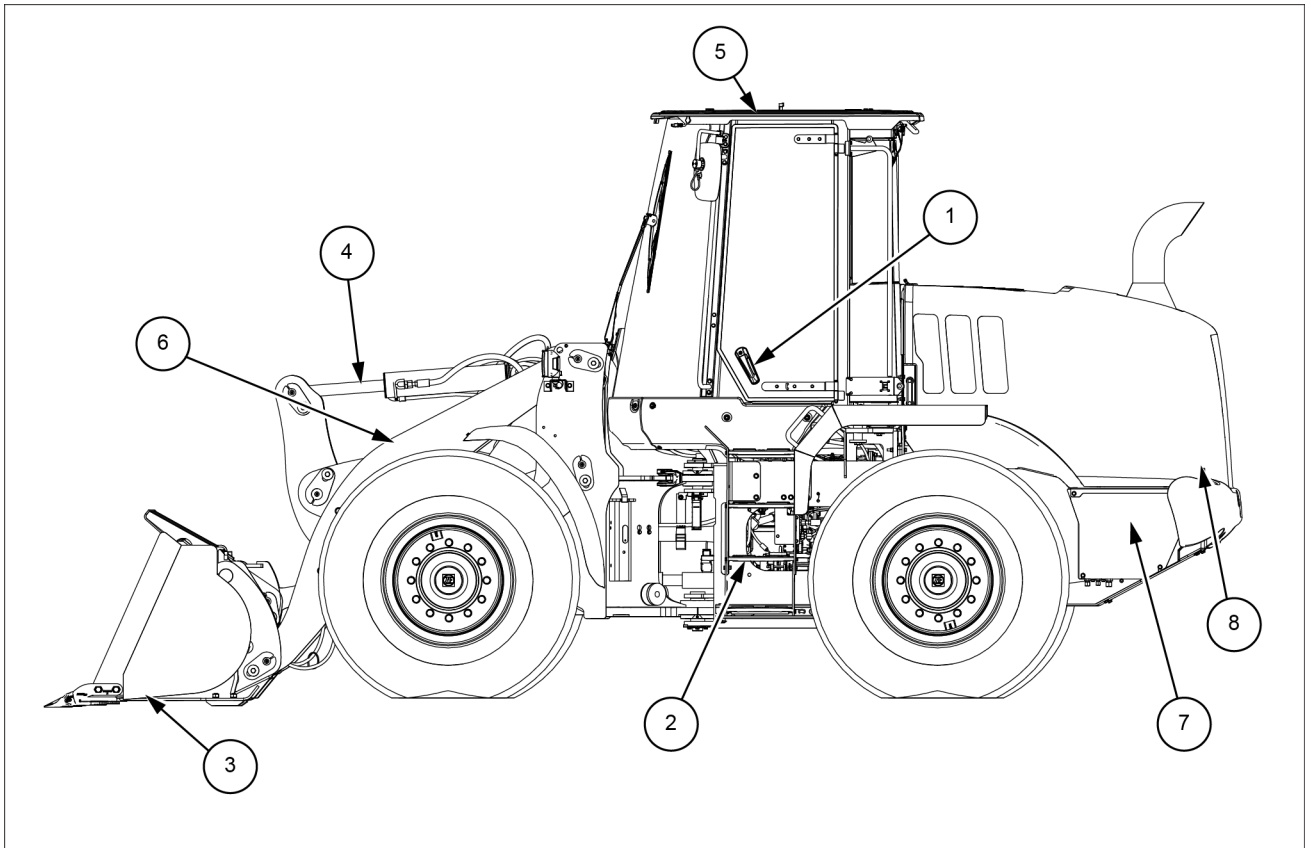
The terms right-hand, left-hand, front, and rear are used in this manual to indicate the sides as they are seen from the operator's seat.

1. Front
2. Right-hand
3. Rear
4. Left-hand



RCPH10WHL003BAH 1

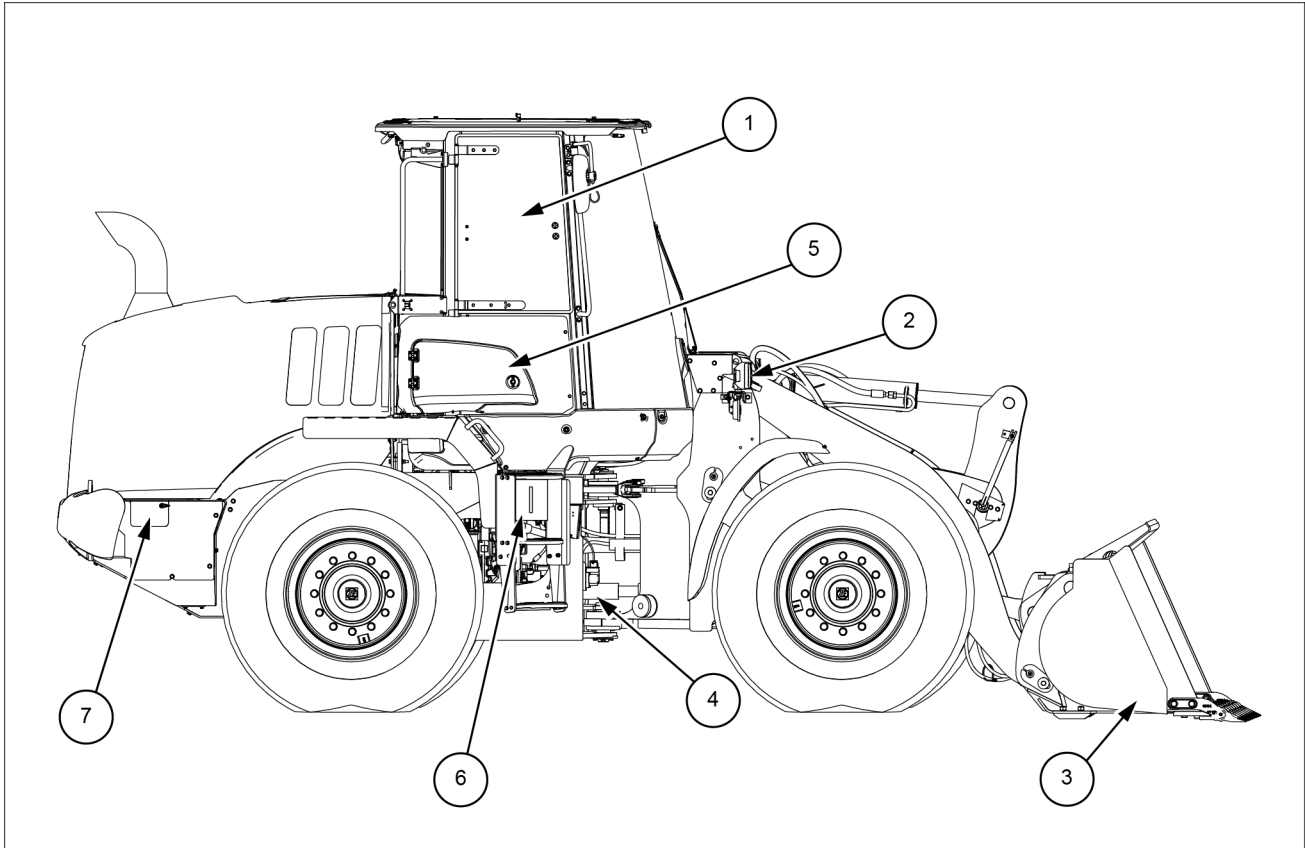
Product identification - Identification of machine components



LEIL16WHL1254FB 1

- | | |
|----------------------------|---|
| 1. Cab door and hand holds | 5. Roll Over Protection System (ROPS) cab |
| 2. Steps | 6. Loader lift arm |
| 3. Bucket (Z-bar version) | 7. Battery compartment |
| 4. Bucket cylinder | 8. Timed disconnect switch and optional battery jump post |

INTRODUCTION



LEIL16WHL1255FB 2

- | | |
|---------------------------|--|
| 1. Cab side window | 5. Cab air filter door |
| 2. Driving lights | 6. Windshield washer reservoir |
| 3. Bucket (Z-bar version) | 7. DIESEL EXHAUST FLUID (DEF)/AdBLUE® fill tank |
| 4. Drive shaft | |



SERVICE MANUAL

Engine

**521G WHEEL LOADER XR-EH, NEW CAB TIER4B
521G WHEEL LOADER XT-EH, NEW CAB TIER4B
521G ZBAR-EH, NEW CAB TIER4B**

Contents

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[10.216] Fuel tanks	10.2
[10.202] Air cleaners and lines	10.3
[10.500] Selective Catalytic Reduction (SCR) exhaust treatment.....	10.4
[10.400] Engine cooling system	10.5
[10.414] Fan and drive	10.6
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Engine - 10

Engine and crankcase - 001

**521G WHEEL LOADER XR-EH, NEW CAB TIER4B
521G WHEEL LOADER XT-EH, NEW CAB TIER4B
521G ZBAR-EH, NEW CAB TIER4B**

Contents

Engine - 10

Engine and crankcase - 001

TECHNICAL DATA

Engine	
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SERVICE

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Engine - General specification

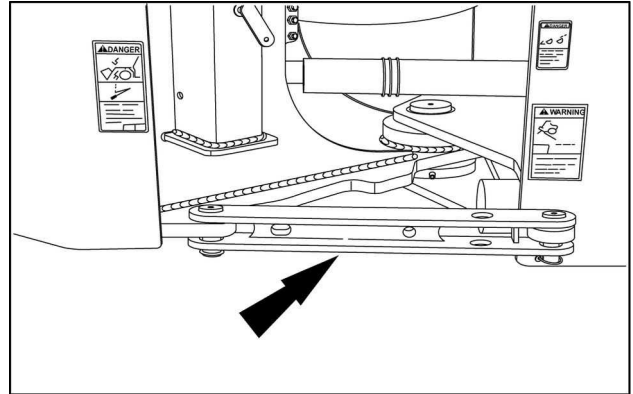
Engine with 4 Speed Transmission	
A. Low idle	1020 – 1080 RPM
Alternate low idle	870 – 930 RPM
Alternate Accelerated Idle	1270 – 1330 RPM
B. Maximum No Load RPM	2074 – 2244 RPM
C. Converter Stall	1950 – 2030 RPM
D. Hydraulic Stall	2020 – 2220 RPM
E. Converter and Hydraulic Stall	1400 – 1600 RPM
Temperature of the torque converter oil	82 – 104 °C (180 – 219 °F)
Temperature of the hydraulic oil	54 – 57 °C (129 – 135 °F)

NOTE: hydraulic stall and converter and hydraulic stall RPM values are read with the lift arms raised, the bucket held in rolled back position, and the engine at Wide Open Throttle (WOT) in maximum power mode with the transmission in manual mode and in third gear.

Engine - Remove

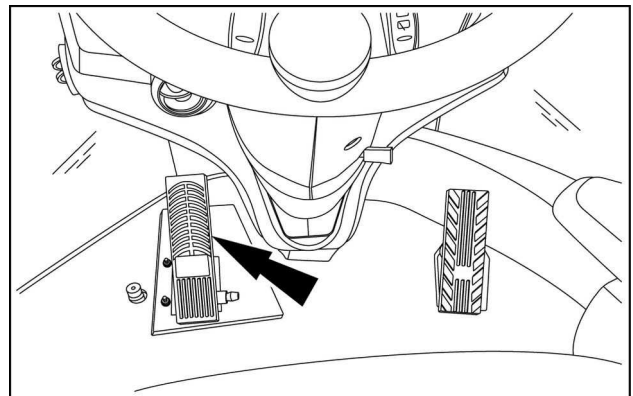
NOTE: emissions sensors mounted in the exhaust stream are sensitive to extreme vibrations. Use of tools that generate extreme vibrations, such as impact wrenches and hammers, will result in damage to emission sensors. Avoid using these tools during any service procedure in close proximity of emission sensors. If the use of these tools cannot be avoided, remove the sensors using extreme caution prior to performing any service procedure.

1. Park the machine on a level surface and lower the bucket to the ground. Put the articulation lock in the LOCKED position.



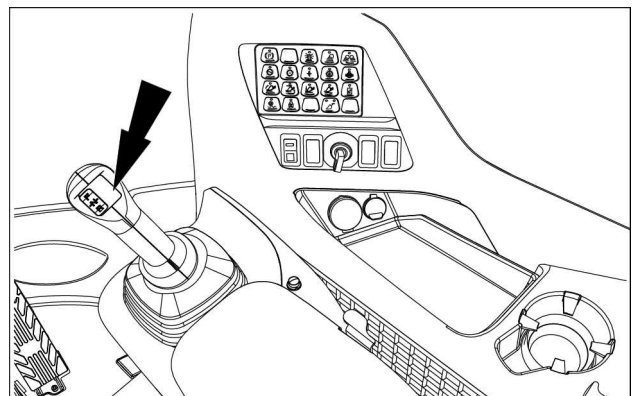
RAPH12WEL1412AA 1

2. Turn the engine OFF. Actuate the brake pedal several times to discharge the brake accumulators.



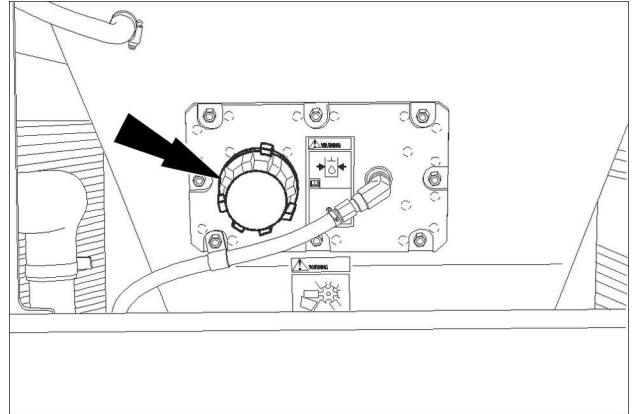
LEIL15WHL0564AA 2

3. Turn the key switch to the ON position. Move the control lever(s) back and forth minimally 30 times to release pressure from the hydraulic circuit. Put the key switch to the OFF position.



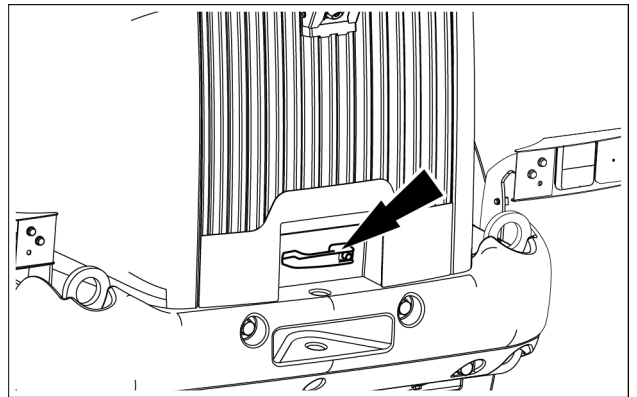
LEIL16WHL1286AA 3

4. Slowly loosen the hydraulic reservoir filler cap to release air pressure in the hydraulic reservoir.



RCPH10WHL099BAL 4

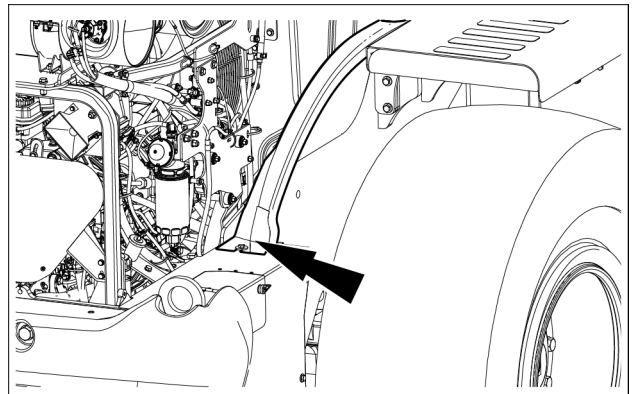
5. Raise the engine hood using the handle hood under the rear grill.



LEIL16WHL2016AB 5

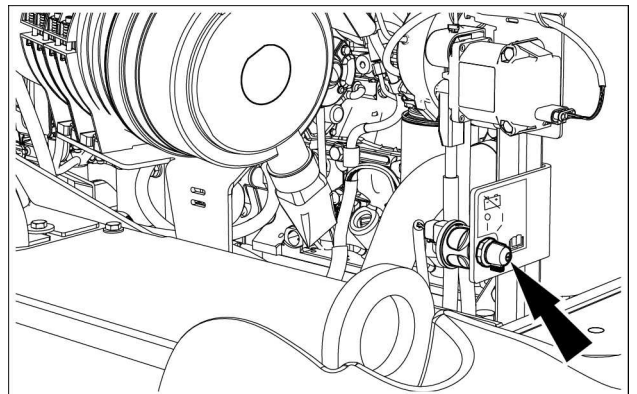
6. Remove the retaining bolts of the inner fender panels.

NOTE: right-hand side of the machine is shown. The operation is similar for the left-hand side.



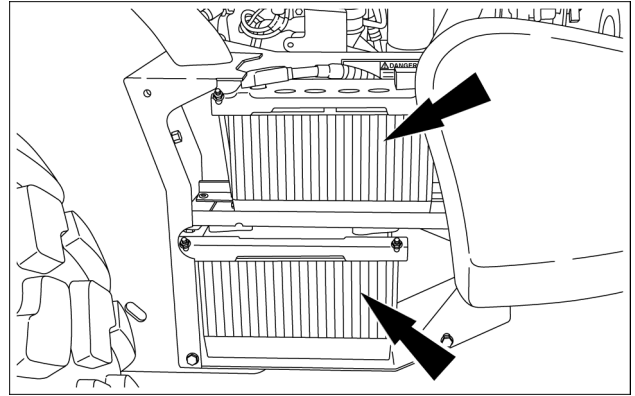
LEIL16WHL1378AB 6

7. Locate the timed disconnect switch under the engine hood, on the left-hand side of the machine. Turn the timed disconnect switch to the OFF position.



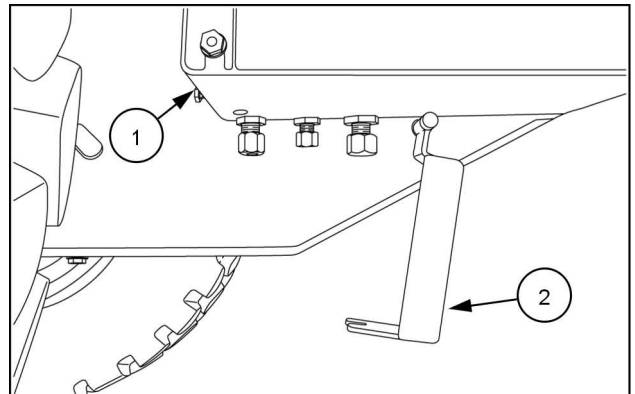
LEIL16WHL1382AB 7

8. Remove the two battery covers. Disconnect the batteries from the machine.



LEIL16WHL1225AA 8

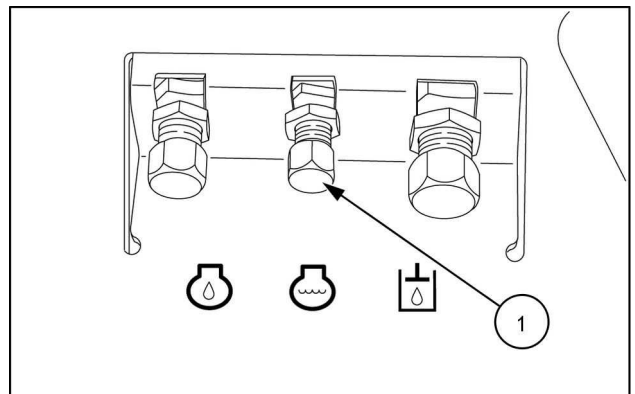
9. Loosen the screw (1) and open the access cover (2) under the battery.



RAPH12WEL1494AA 9

10. Place a suitable container below the radiator drain. Remove the drain plug (1) and radiator cap to drain the engine coolant into the container. then reinstall the radiator cap after the coolant has drained.

NOTE: see machine specifications for cooling system volume.

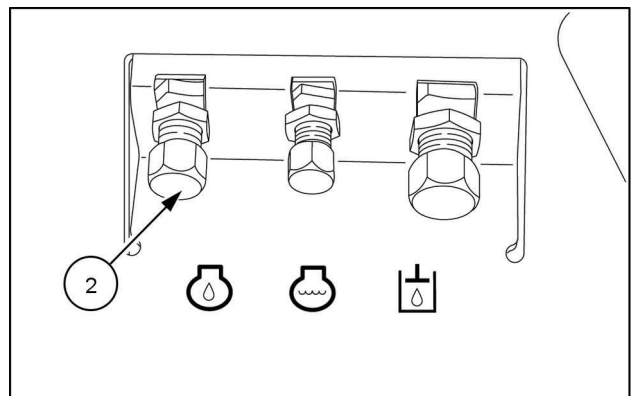


RAPH12WEL1411AA 10

11. Place a suitable container below the engine oil drain. Remove the engine oil cap (2) to drain the engine oil into the container. Then reinstall the engine oil cap after the engine oil has drained.

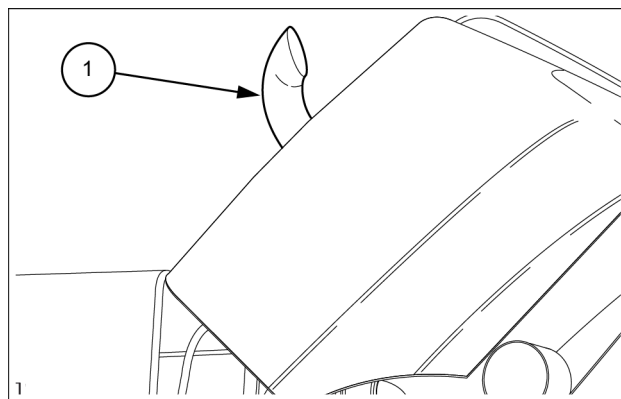
NOTE: see machine specifications for cooling system volume.

NOTE: after draining the engine oil, disconnect the drain hose from the frame to aid in removal of engine.



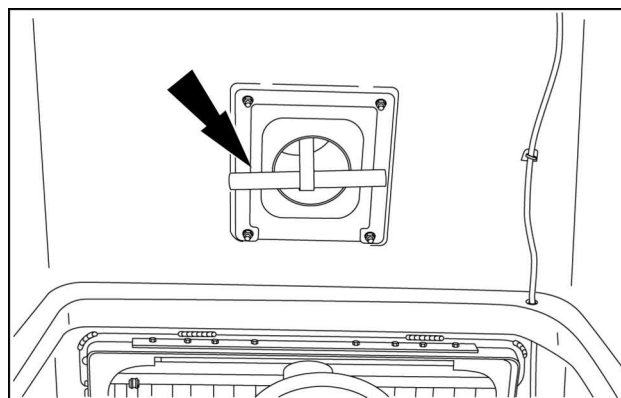
RAPH12WEL1411AA 11

12. Double up a nylon lifting strap and slide the strap through the exhaust stack (1), located on the engine hood.



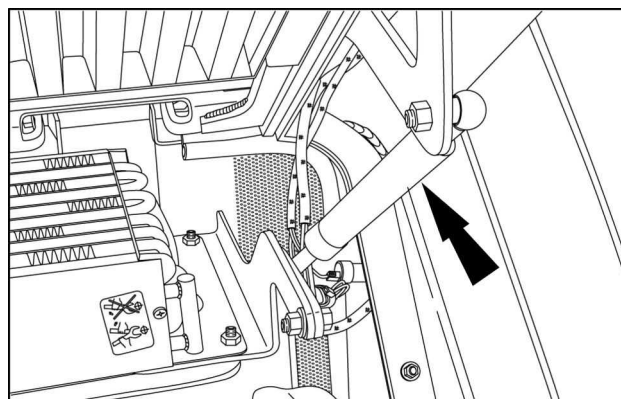
LEIL14WHL0400AB 12

13. Place a solid steel bar through the nylon strap. Raise the engine hood and release the tension on the lifting motor.



RAPH12WEL1458AA 13

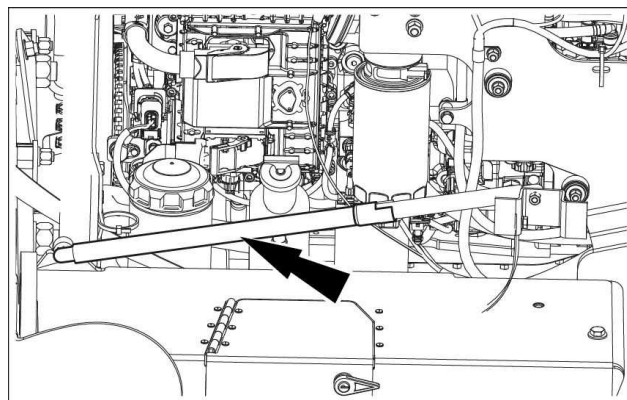
14. Remove the right-hand gas strut from the engine hood.
Remove the left-hand gas strut from the engine hood.



RAPH12WEL1489AA 14

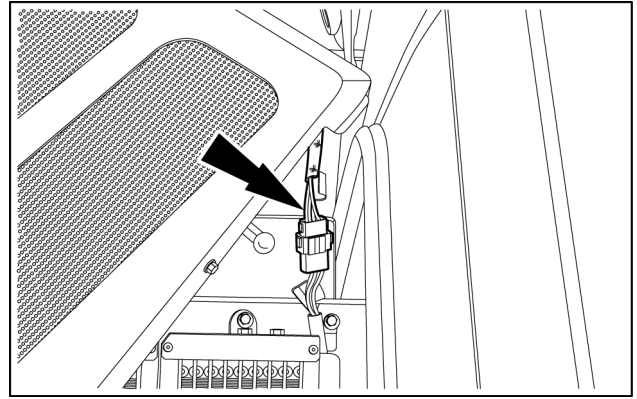
15. Remove the gas spring to separate the engine hood from the rear chassis.

NOTE: engine hood is NOT shown.



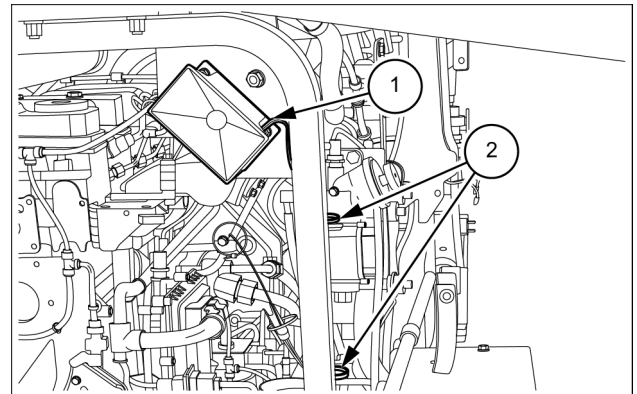
LEIL16WHL1432AB 15

16. Disconnect the hood wiring harness connector from the rear chassis wiring harness connector. Identify and tag the connectors to aid in reassembly.



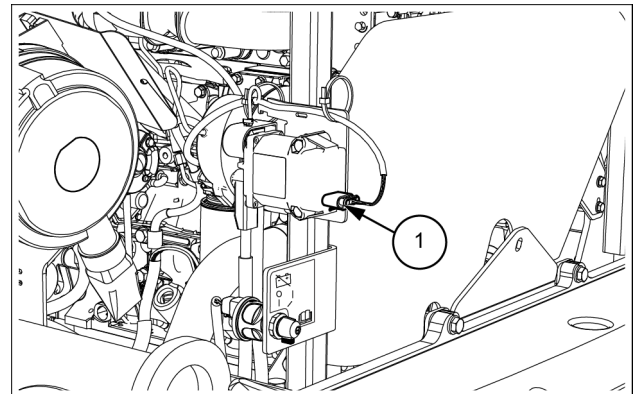
LEIL15WHL0142AB 16

17. Tag and disconnect the backup alarm connector (1). Remove the two straps cable tie (2).



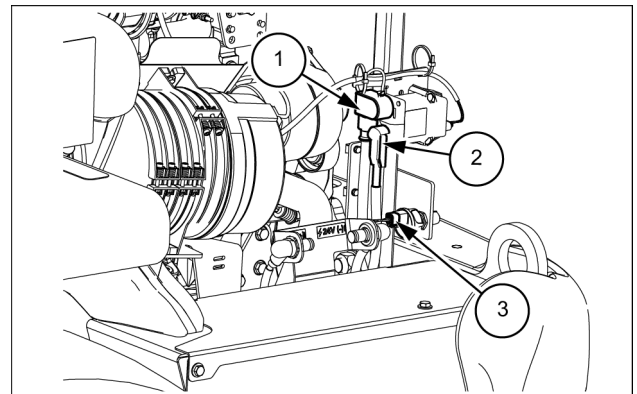
LEIL15WHL0143AB 17

18. Remove the connector (1) from the battery isolator.



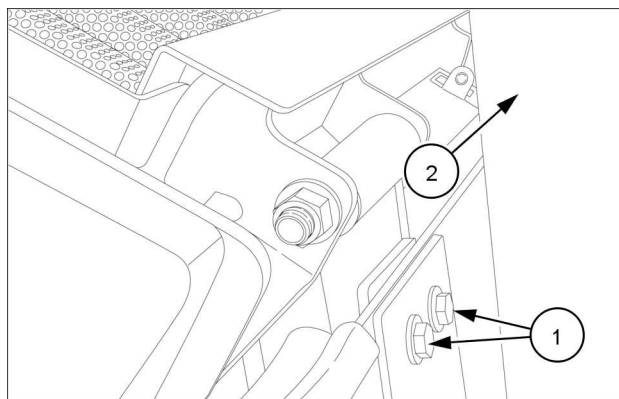
LEIL16WHL1381AB 18

19. Tag and disconnect the battery to isolator cable (1) and the isolator to starter cable (2) from the battery isolator. Disconnect the connector (3) from the timed disconnect switch.



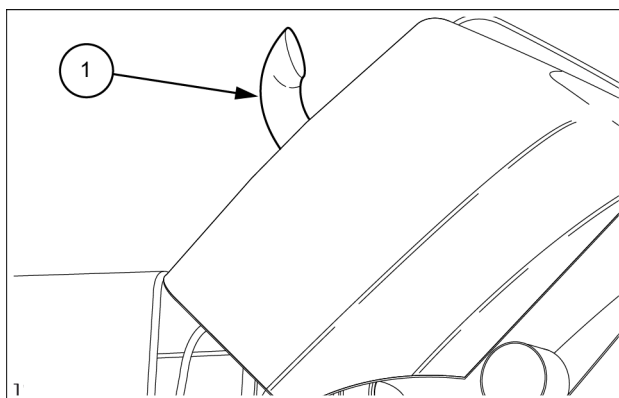
LEIL16WHL1342AB 19

20. With the assistance of another technician, balance the engine hood and remove the hood hinge mounting bolts **(1)** near the cab **(2)** from the cooler frame. Repeat the procedure for the other side.



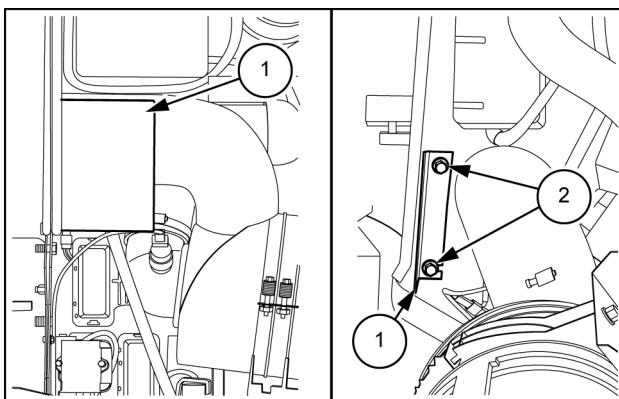
RAPH12WEL1461AA 20

21. Carefully raise and remove the engine hood from the machine. Lower the engine hood onto a suitable platform. Disconnect the lifting equipment from the exhaust stack **(1)**.



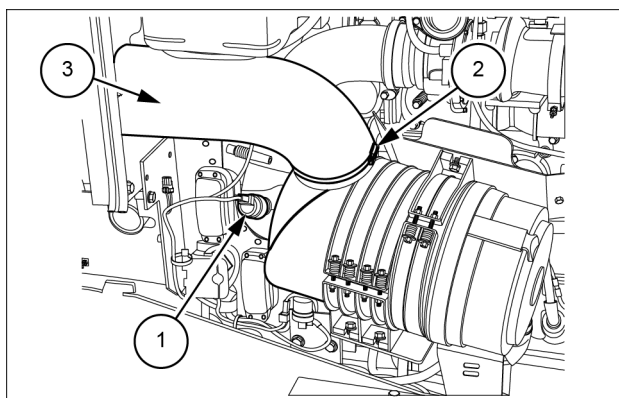
LEIL14WHL0400AB 21

22. Loosen the two bolts **(2)** and the related washers to remove the bracket **(1)** of the relay decal.



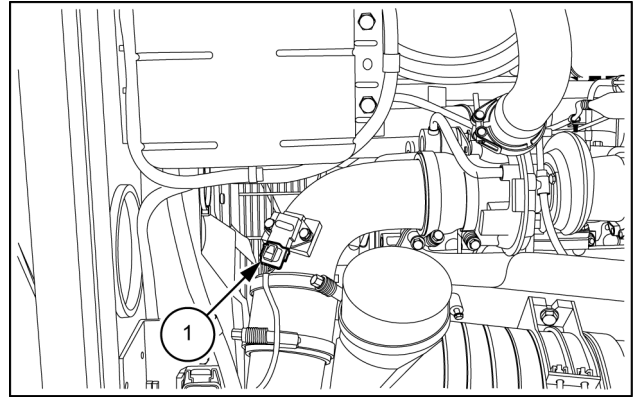
LEIL15WHL0195AB 22

23. Tag and disconnect the engine wiring harness connector from the air filter sensor **(1)**. Loosen the clamp **(2)** on the air intake hose **(3)** and disconnect the hose.



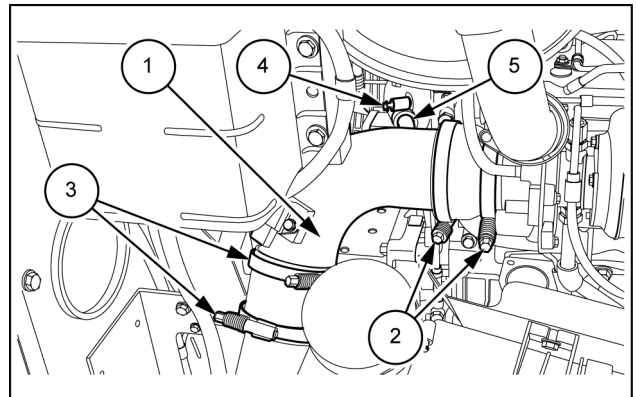
LEIL15WHL0196AB 23

24. Tag and disconnect the engine wiring harness connector from the air inlet humidity sensor **(1)**.



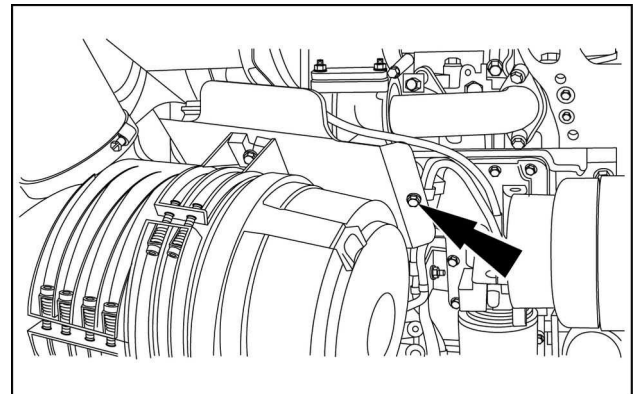
LEIL15WHL0197AB 24

25. Loosen the clamps **(2)** on the turbocharger.
26. Loosen the clamps **(3)** on the air filter housing.
27. Loosen the clamp **(4)** on the crankcase vent hose **(5)**.
28. Remove the intake air hose **(1)**. Cover the turbocharger inlet to prevent debris entry.



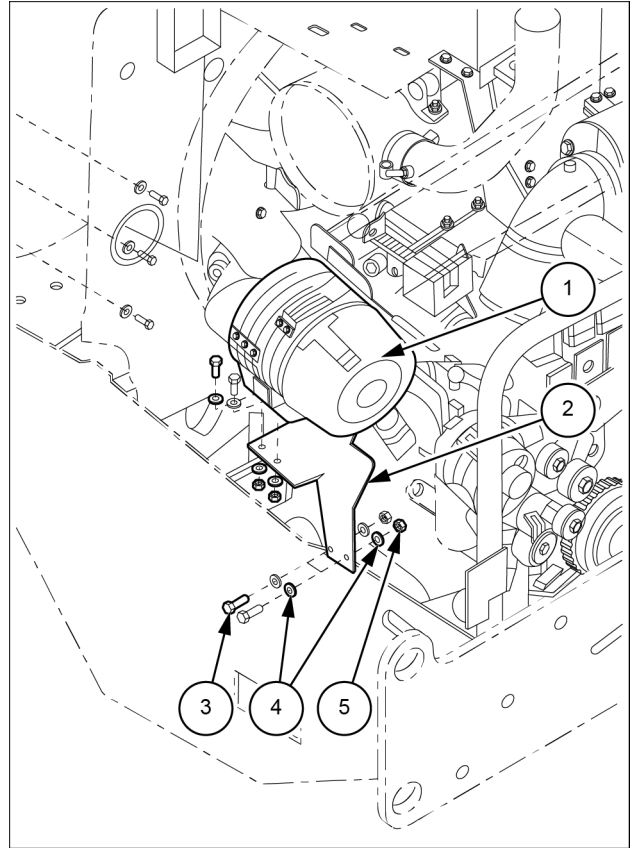
LEIL15WHL0198AB 25

29. Loosen the bolt to separate the P-clamp (of the alternate hose) on the engine side of the heat shield.



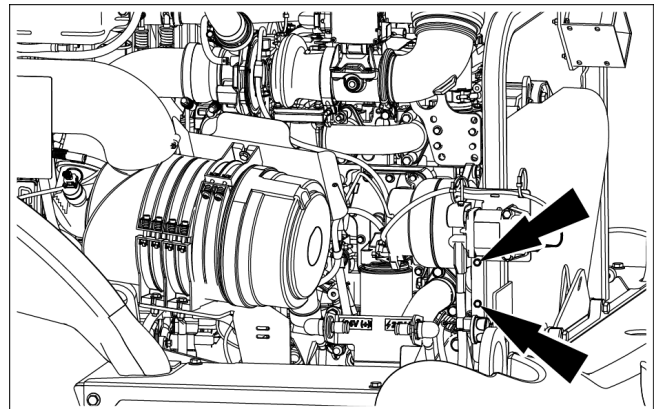
LEIL15WHL0148AA 26

30. Remove the two securing bolts (3), the four washers (4), and two nuts (5). Remove the bracket (2) with the air filter (1) as an assembly.

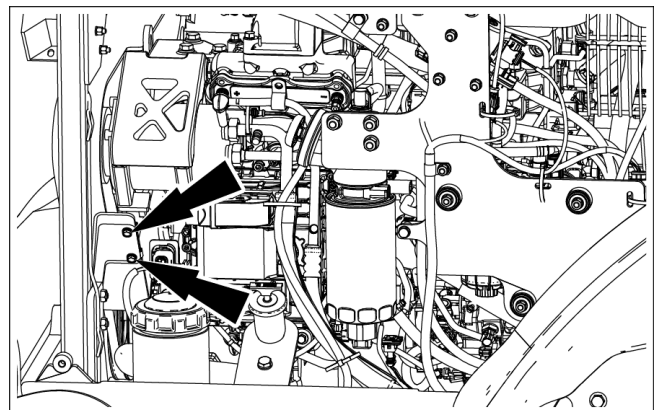


LEIL15WHL0171BB 27

31. Remove the four mounting bolts and the four washers from the belt cover. Remove the cover.

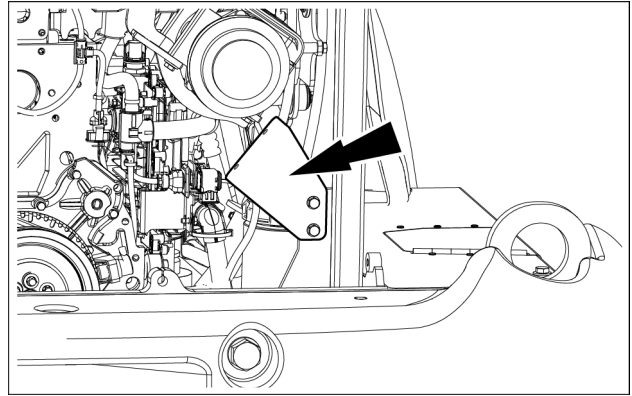


LEIL16WHL1311AB 28



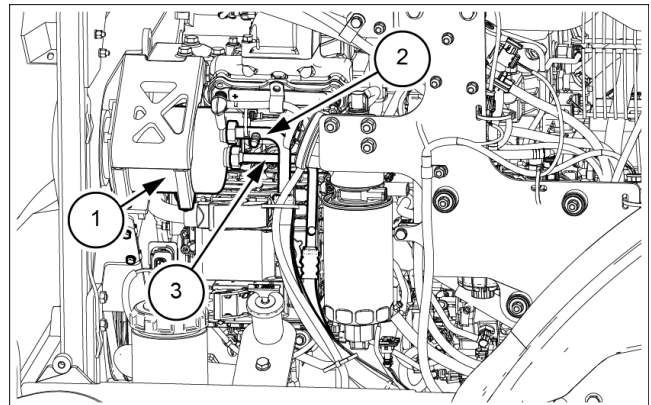
LEIL16WHL1362AB 29

32. After removing the belt cover, remove the cover mounting bracket from the right rear side of machine frame.



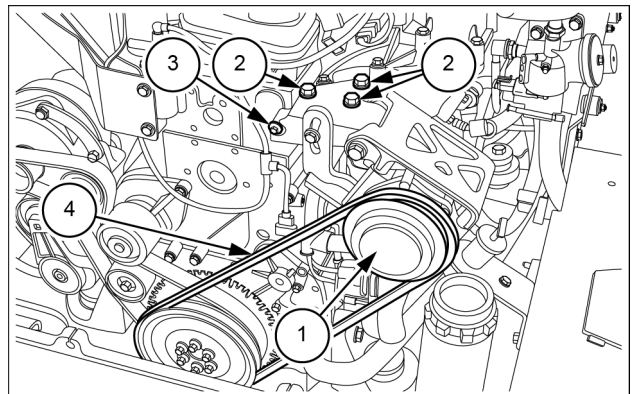
LEIL16WHL1343AB 30

33. If machine is equipped with the air conditioning system, identify, tag, and disconnect the engine wiring harness connectors from the air compressor clutch connector (1). Recovery the refrigerant, as indicated in **Air conditioning - Service instruction (50.200)**. Disconnect the low-pressure line (2) from the suction port and the high-pressure line (3) from the discharge port, located on the compressor. Immediately install protective caps on the open ports and lines.



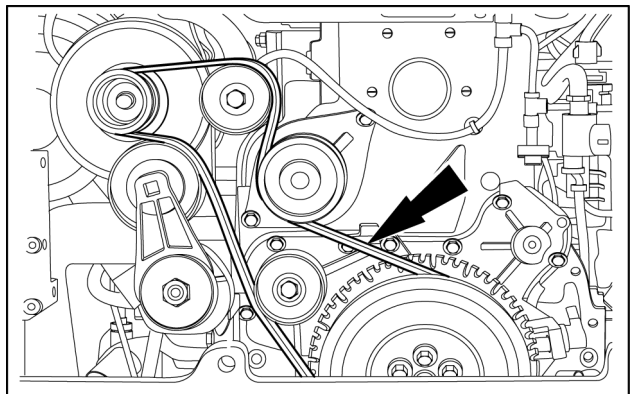
LEIL16WHL1349AB 31

34. Remove the belt (4). Remove the three mounting bolts (2). Remove the bolt (3) and carefully remove the compressor (1) with the support bracket.



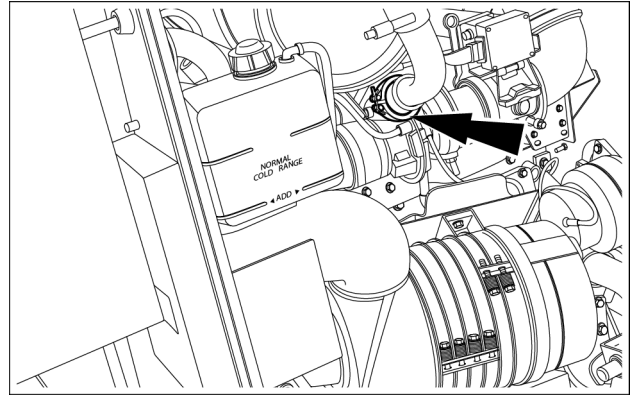
LEIL16WHL1380AB 32

35. Remove the drive belt from the engine.



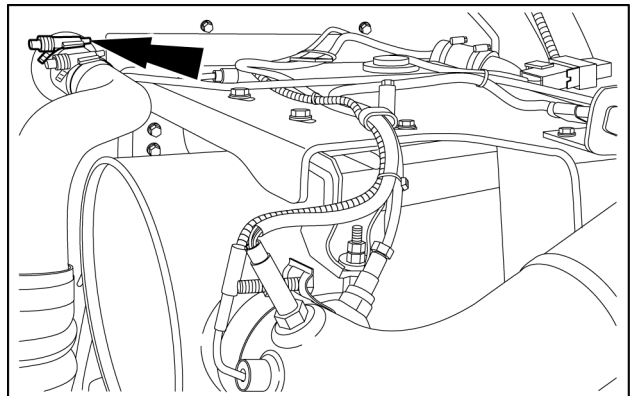
LEIL15WHL0192AB 33

36. Loosen the clamp. Remove and discard the O-ring and the air intake tube of the turbocharger.



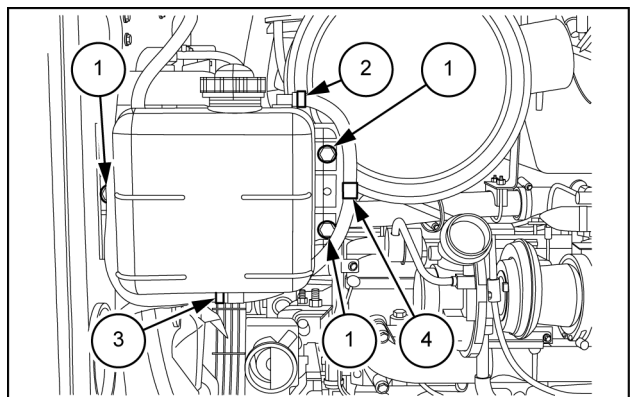
LEIL16WHL1346AB 34

37. Loosen the clamp of the hose of the after cooler inlet and remove the hose.



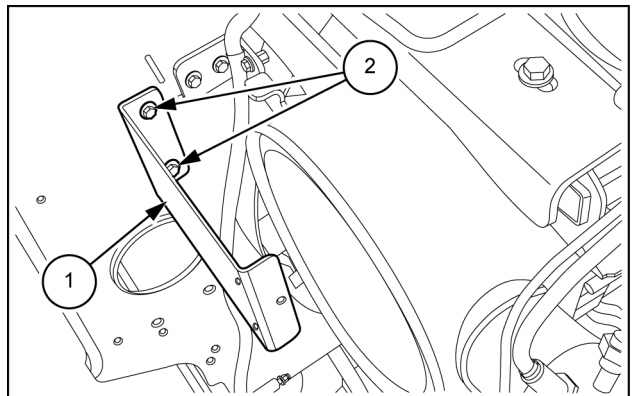
LEIL15WHL0263AB 35

38. Remove the clamp **(2)** and the clamp **(3)**. Separate the clamp **(4)** from the bracket of the coolant overflow tank. Loosen the bolts **(1)** to remove the coolant tank.



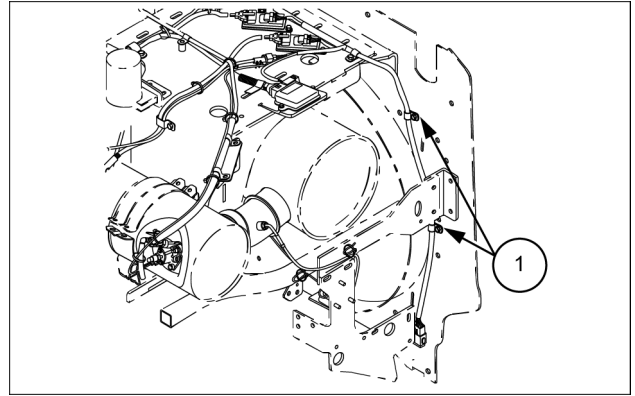
LEIL15WHL0264AB 36

39. Remove the bolts and the washers **(2)** to separate the bracket **(1)** of the overflow tank from the rear plate of the cooling system frame.



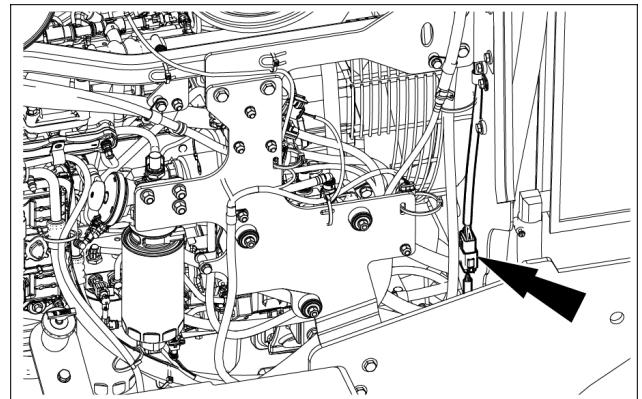
LEIL15WHL0265AB 37

40. Loosen the bolts **(1)** and remove the two clamps to separate the SCR sensor wiring harness from the rear chassis.



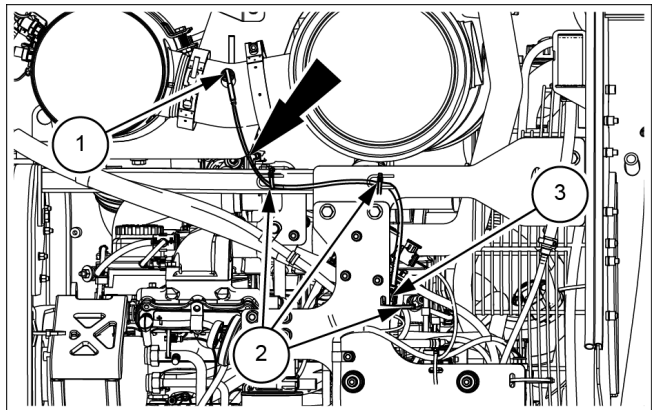
LEIL15WHL0272AB 38

41. Tag and disconnect the SCR sensor connector from the rear chassis harness connector.



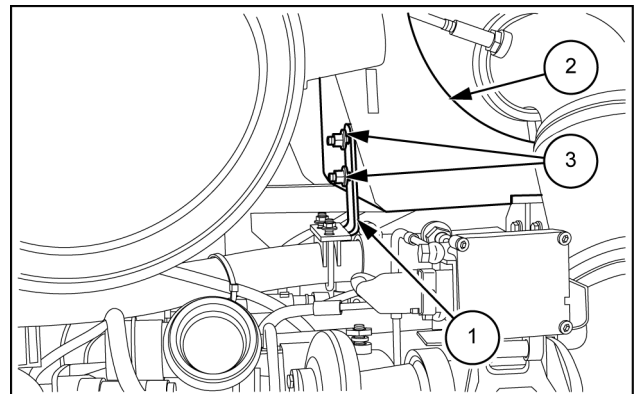
LEIL16WHL1347AB 39

42. Loosen the hexagonal nut of the temperature sensor **(1)**. Disconnect the temperature sensor **(1)** on the exhaust pipe (DOC to SCR).
43. Tag and disconnect the wire harness **(3)** of the rear chassis wiring harness of the temperature sensor **(1)**. Cut the straps **(2)** that hold the sensor lead.



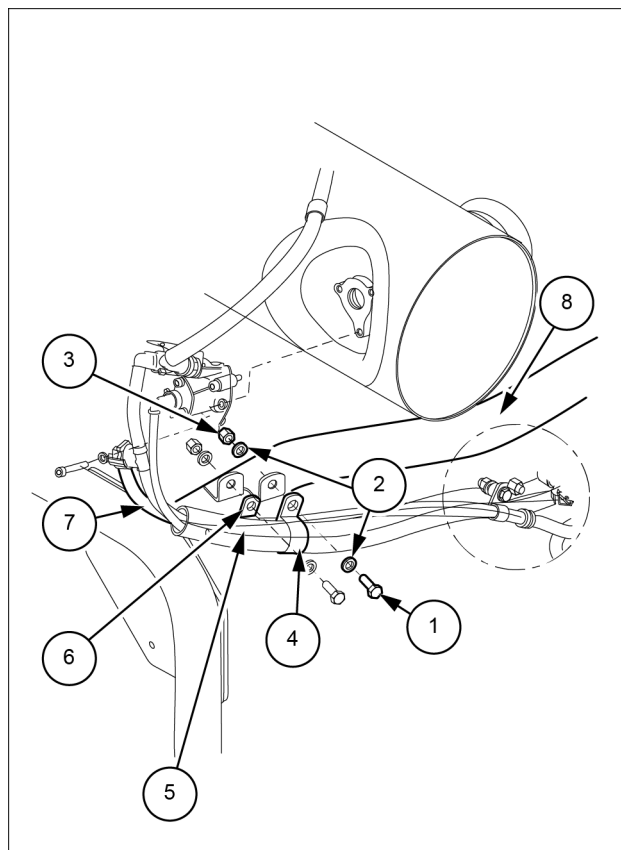
LEIL16WHL1348AB 40

44. Remove the bolts, the washers, and the nuts **(3)** to separate the bracket **(2)** of the tube radiator from the muffler support **(1)**.



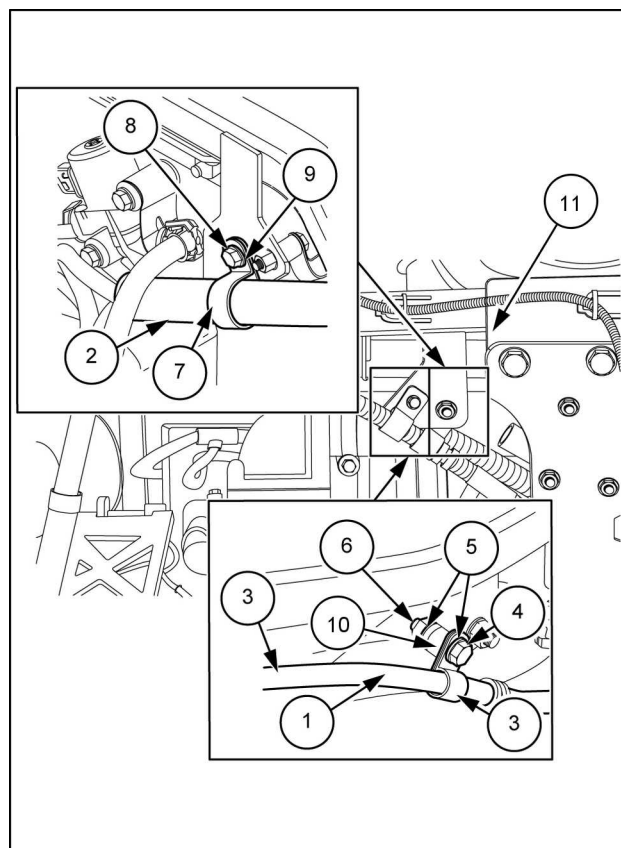
LEIL15WHL0267AB 41

45. Remove the two bolts (1), the four washers (2), and the two nuts (3) to separate the clamps (4) and (6) from the bracket (8).
Remove the clamp (4) from the DEF bundle (5). Remove the clamp (6) from the hose coolant assembly (7).



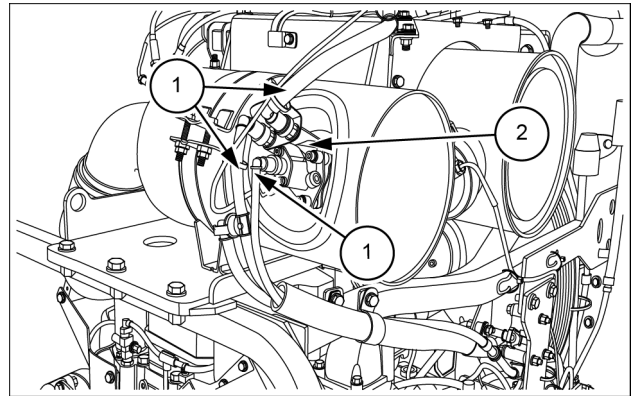
LEIL15WHL0193BB 42

46. Remove the two bolts (4), the washers (5), the spacer (10), and the nut (6) to separate the clamp (3) from the bracket (11). Remove the clamp (3) from the hose coolant assembly (1).
47. Remove the two bolts (8), the washers (9), and the nut (6) to separate the clamp (7) from the bracket (11). Remove the clamp (7) from the DEF bundle (2).



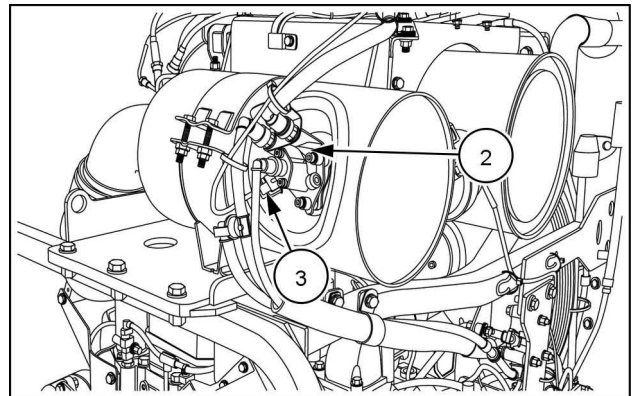
LEIL15WHL0261BB 43

48. Drain the engine coolant.
Disconnect the hoses (1) from the Dosing Module (2).



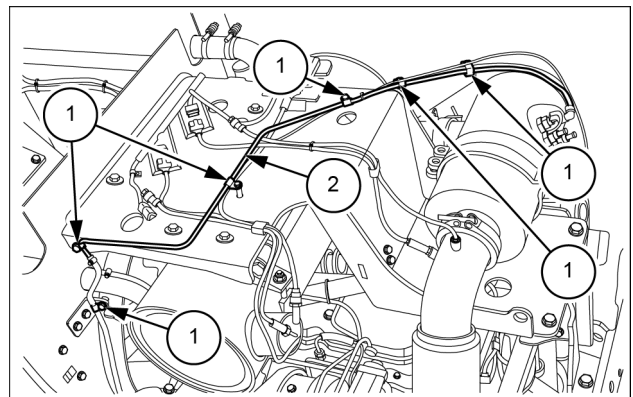
LEIL15WHL0323AB 44

49. Disconnect the electrical connector (3) from the Dosing Module (2).



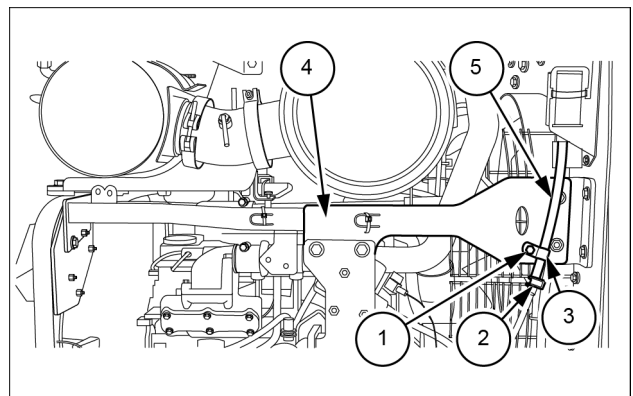
LEIL15WHL0176AA 45

50. Loosen the bolt to remove the P-clamps (1). Disconnect the return coolant hose (2) and remove it from the machine.



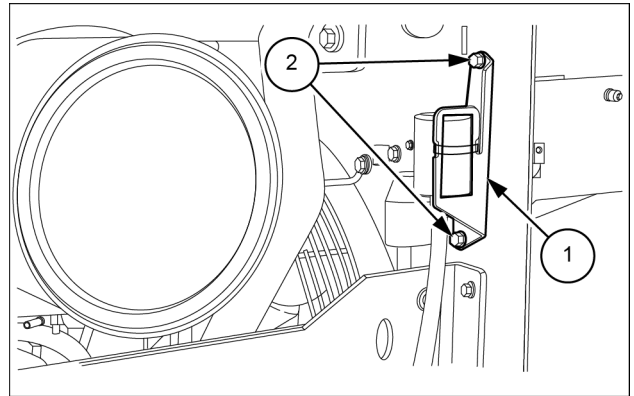
LEIL15WHL0270AB 46

51. Loosen the bolt (1) and remove the P-clamp (3) from the supply module support (4). Remove the P-clamp (2). Tag and disconnect the hose (5) from the DEF/AdBLUE® tank vent filter.



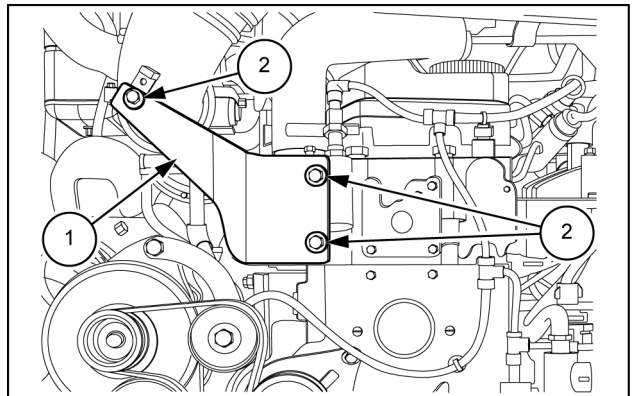
LEIL15WHL0269AB 47

52. Remove the bolts **(2)** to remove the **DEF/AdBLUE®** tank vent filter **(1)** from the rear plate of the cooling system frame.



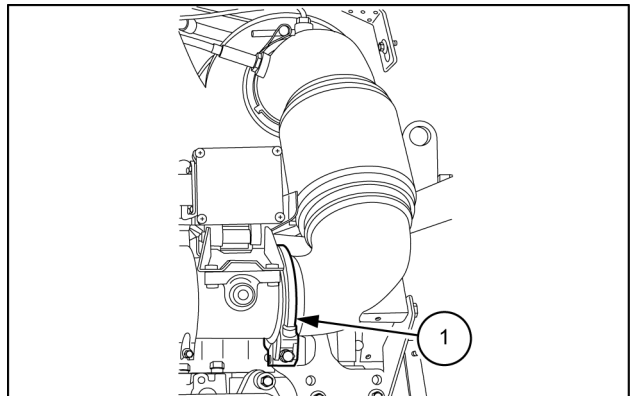
LEIL15WHL0268AB 48

53. Remove the bolts **(2)** and washers to remove the bracket **(1)** from the engine.



LEIL15WHL0191AB 49

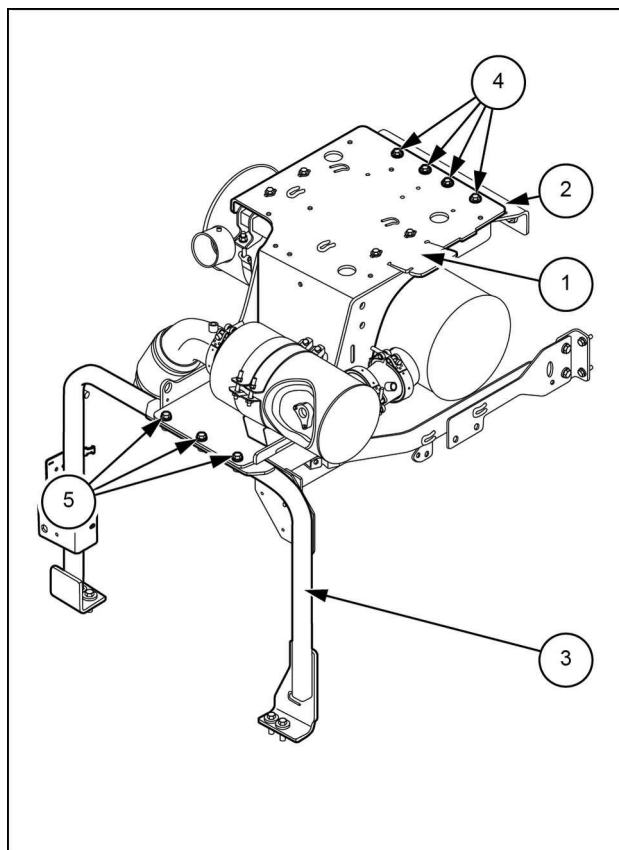
54. Loosen the clamp **(1)** to separate the exhaust flap from the inlet DOC pipe.



LEIL15WHL0172AB 50

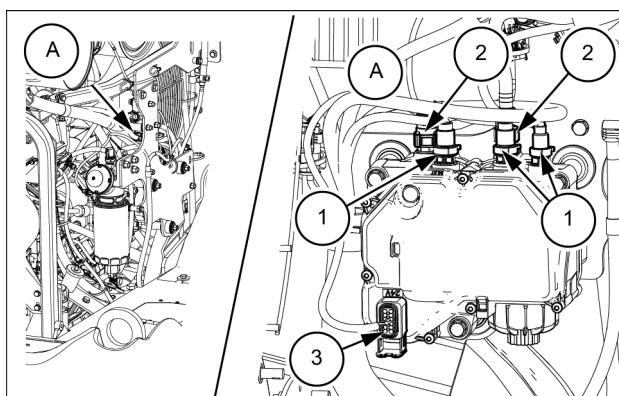
55. Attach a suitable lifting straps to support the muffler support (1) with the Diesel Oxidation Catalyst (DOC) (6) and the Selective Catalytic Reduction muffler (SCR) (7).
56. Remove the bolts (4) and (5) with their related washers to separate the muffler support (1) from the support structures (2) and (3).
57. Remove the muffler support (1), the SCR and the SCR sensor harness as an assembly.

NOTE: do not damage the muffler support during removal.



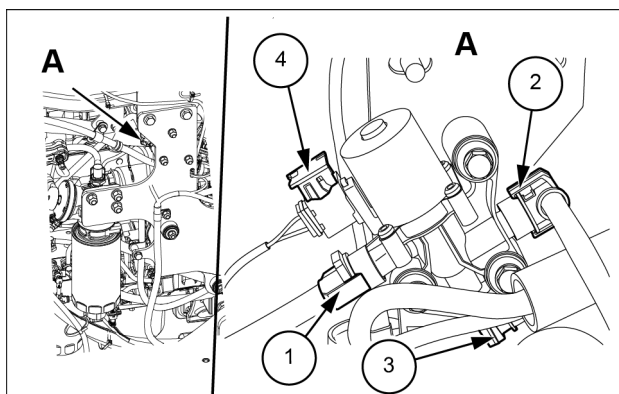
LEIL16WHL1345BB 51

58. Tag and disconnect the DEF/AdBLUE® supply and return lines (1) from the supply module. Tag and disconnect the coolant water supply and return lines (2) from the supply module. Tag and disconnect the wiring harness (3) from the supply module.



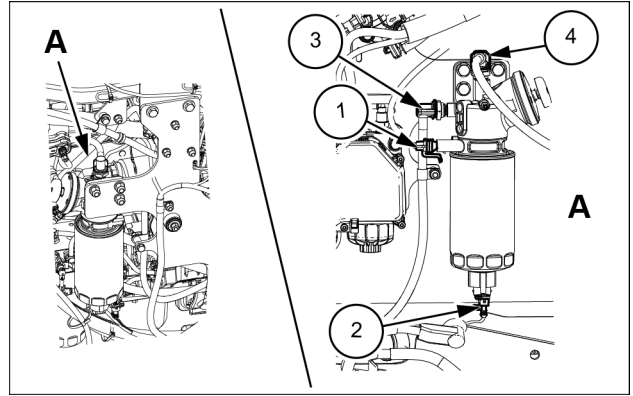
LEIL16WHL1497AB 52

59. Push inward on the fitting retaining clip and disconnect the coolant outlet (2), the coolant inlet (1) and by-pass (3) lines from the heater control valve. Tag and disconnect the machine wiring harness (4) from the heater control valve.



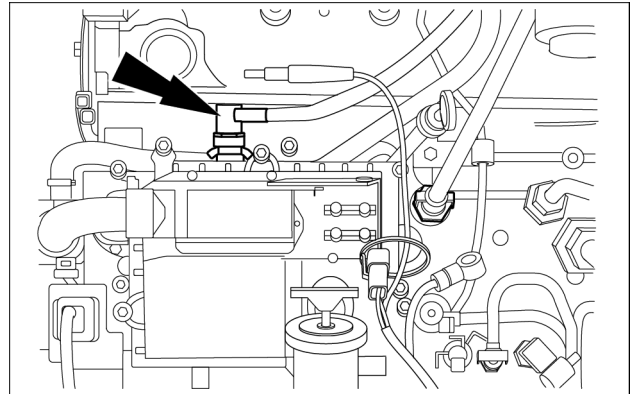
LEIL16WHL1375AB 53

60. Tag and disconnect the fuel filter heater wire (1) and the water sensor (2). Drain the fuel filter and disconnect the inlet fuel line (3) and outlet fuel line (4) from the fuel filter head. Plug the lines and cap the fittings.



LEIL16WHL1374AB 54

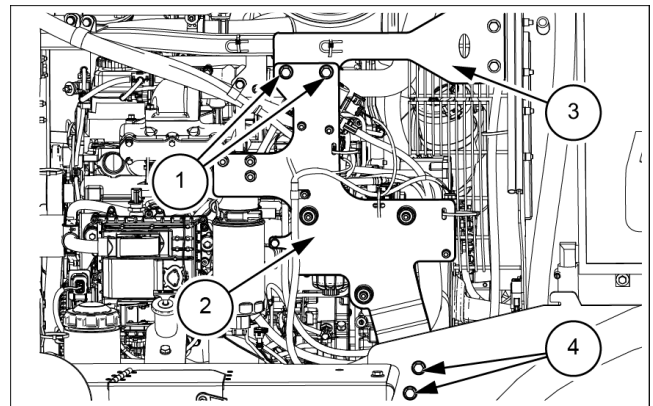
61. Remove the fuel line from the top of the ECU (Engine Control Unit). Plug the line and cap the fitting.



LEIL15WHL0306AB 55

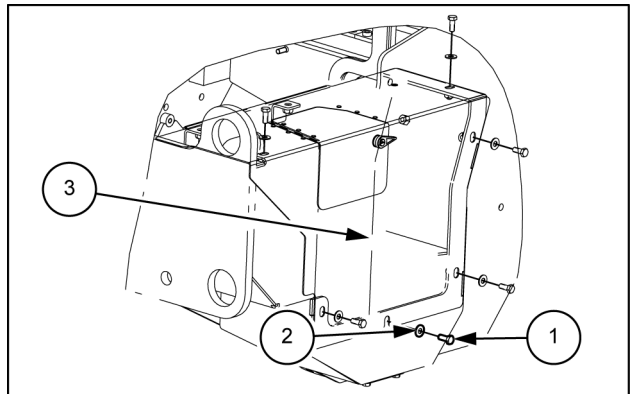
62. Remove the two bolts (1), the washers, and the nuts to separate the bracket (2) of the supply module from the support (3). Remove the two bolts (4), the washers, and the nuts to separate the bracket (2) of the supply module from the rear chassis. Remove the bracket (2) of the supply module, with the supply module, the DEF/AdBLUE® Heater Control valve and the fuel pre-filter as an assembly.

NOTE: pay attention to supply module and heater valve.



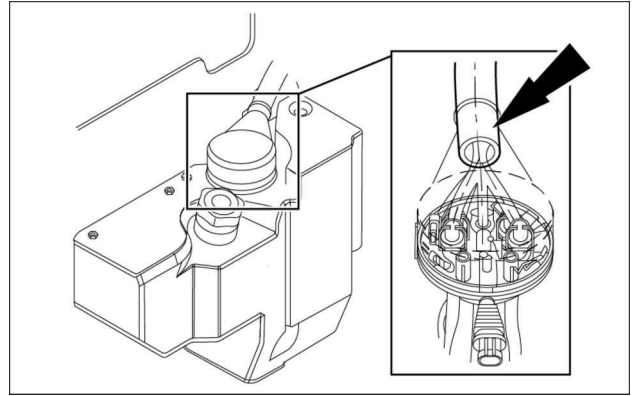
LEIL16WHL1373AB 56

63. Remove the six bolts (1) and the six washer (2). Remove the DEF/AdBLUE® storage tank cover (3) located on the right-hand side of the machine.



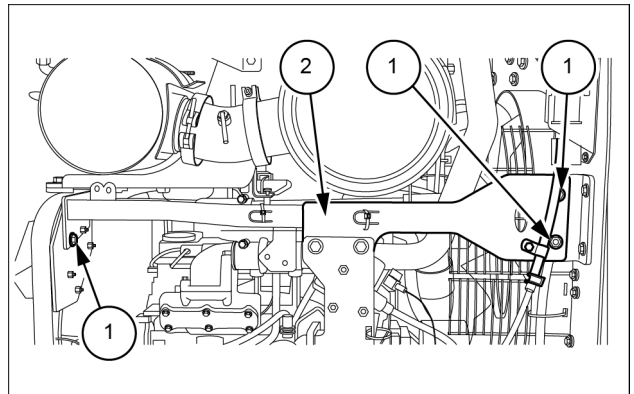
LEIL15WHL0303AB 57

64. Tag and disconnect the wire harness and **DEF/AdBLUE®** supply and return lines from the **DEF/AdBLUE®** storage tank. Cap the supply lines.



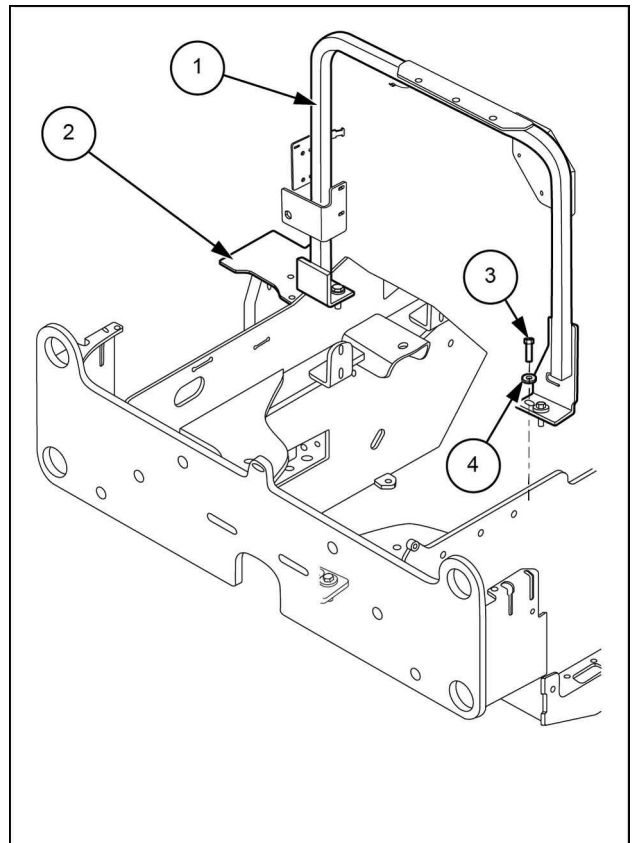
LEIL15WHL0304AA 58

65. Remove the bolts (1), the washers, and the nuts to remove the supply module support (2).



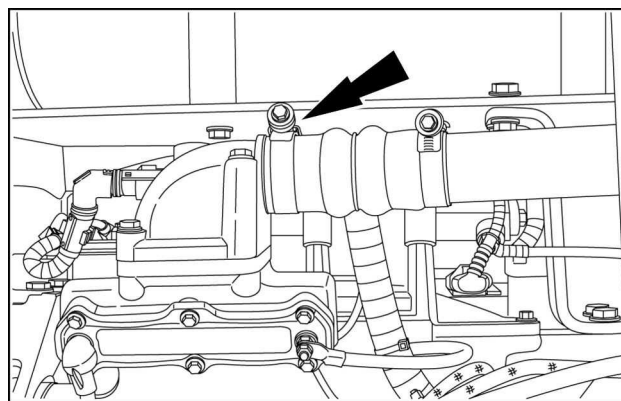
LEIL15WHL0276AB 59

66. Remove the four bolts (3) and the four washers (4) to remove the support structures (1) from the rear chassis (2).



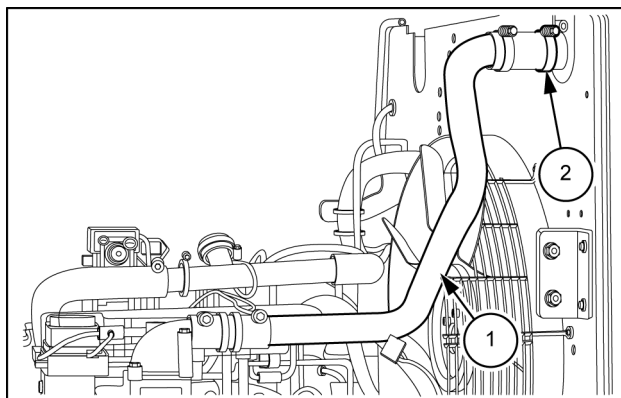
LEIL16WHL1344BB 60

67. Loosen the clamp on the intake manifold that secures the after cooler output hose.



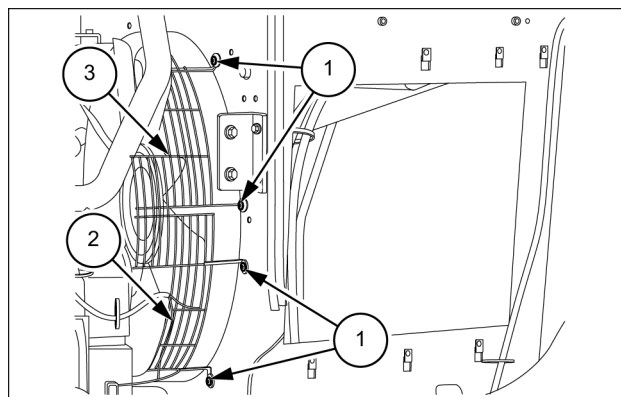
RAPH12WEL1464AA 61

68. Loosen the clamp (2) on the after cooler and remove the output hose (1) of the after cooler from the inter-cooler.



LEIL15WHL0277AB 62

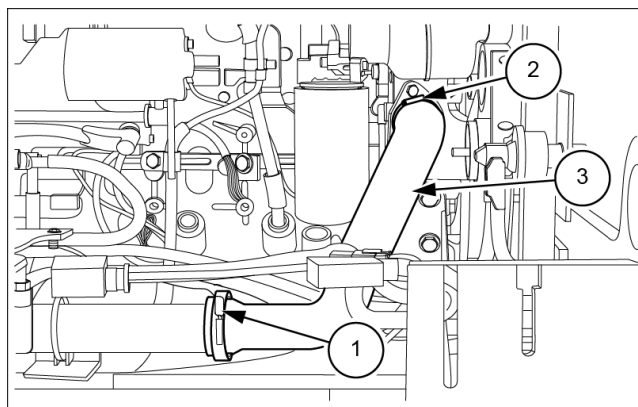
69. Remove the cooling fan screen (3) and the bottom cooling fan screen (2) removing the four bolts (1) and the related nuts.



LEIL15WHL0301AB 63

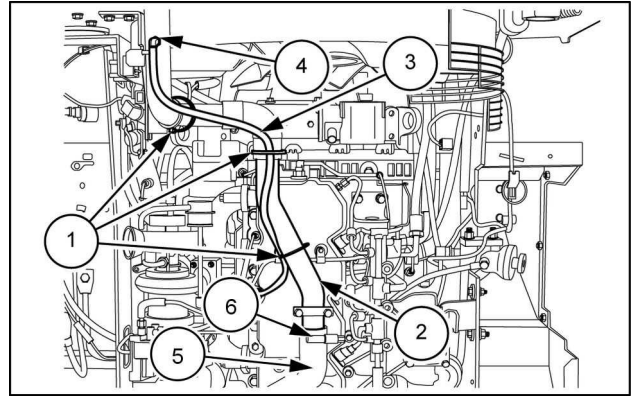
70. Loosen the clamps (1) and (2) to remove the bottom hose coolant (3) from the engine.

NOTE: the battery cover plate has been hidden for clarify.



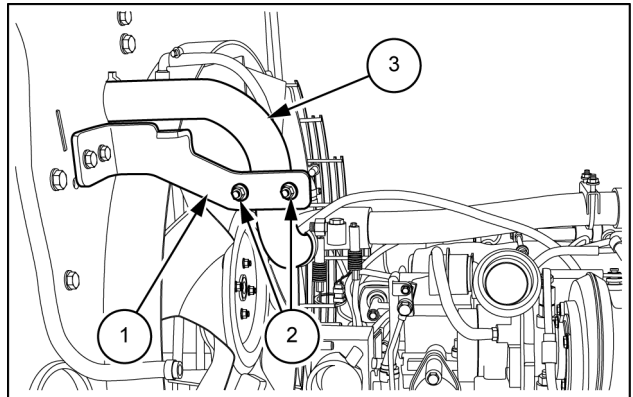
LEIL15WHL0278AB 64

71. Cut the tie straps **(1)** and remove the clamp **(4)**. Separate the breather hose **(3)** from the radiator hose **(2)**. Loosen clamp **(6)** from the hose **(5)**. Loosen clamp on the engine then remove the hose **(5)**.



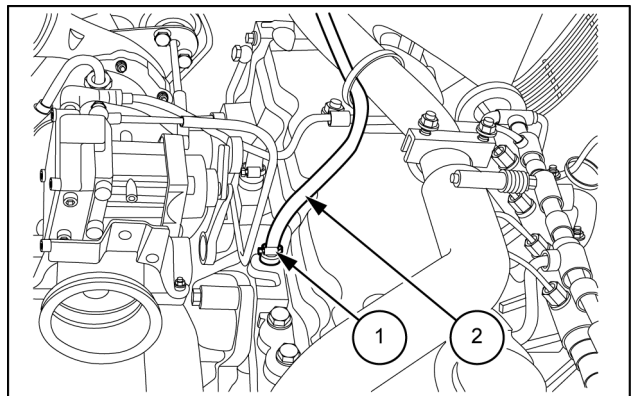
LEIL15WHL0279AB 65

72. Remove the nuts **(2)** from the U-bolt clamp, to separate the radiator hose **(3)** from the bracket **(1)**.



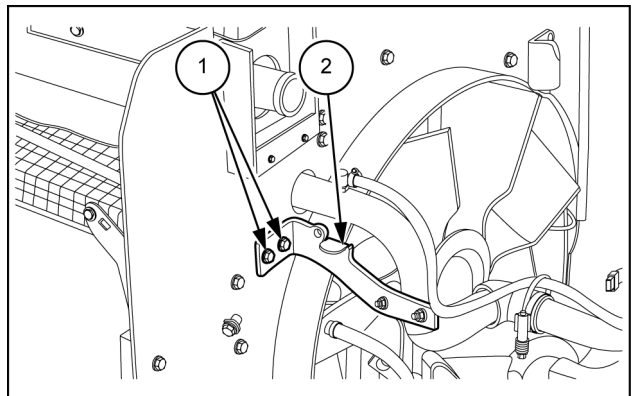
LEIL15WHL0280AB 66

73. Remove the clamp **(1)** to disconnect the breather hose **(2)** from the engine.



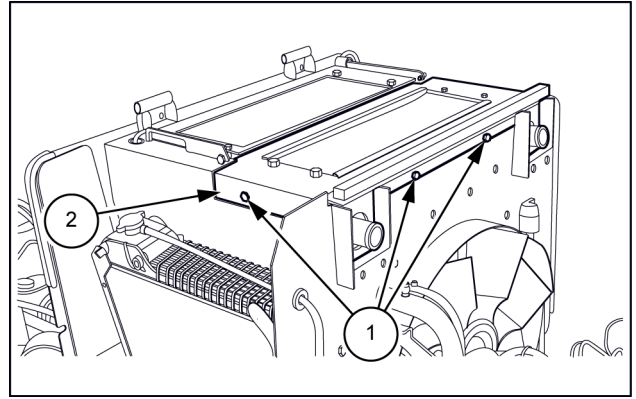
LEIL15WHL0291AB 67

74. Remove the bolts **(1)**, the washers, and the nuts to remove the bracket **(2)** from the rear plate of the cooling system frame.



LEIL15WHL0292AB 68

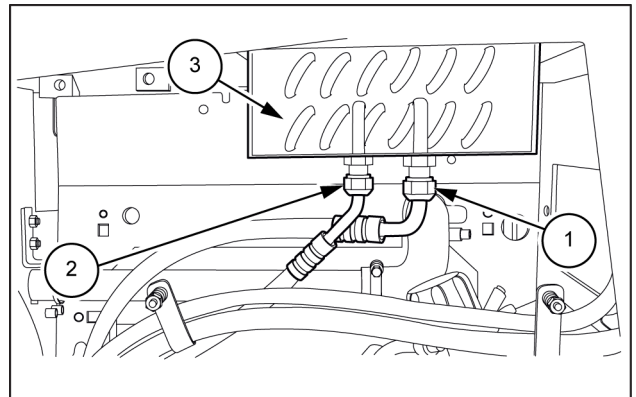
75. Remove the bolts (1), the washers, and the nuts. Remove the bracket (2) and the intercooler from the rear plate of the cooling system frame as an assembly.



LEIL15WHL0294AB 69

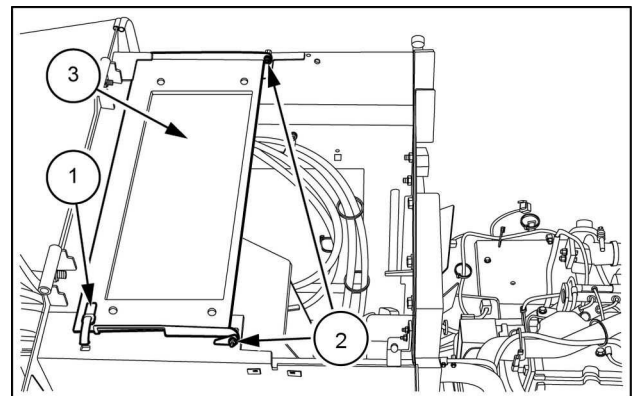
76. Disconnect and plug the hoses (1) and (2) from the air conditioning condenser (3).

NOTE: pay attention to drain the refrigerant **R134A**.



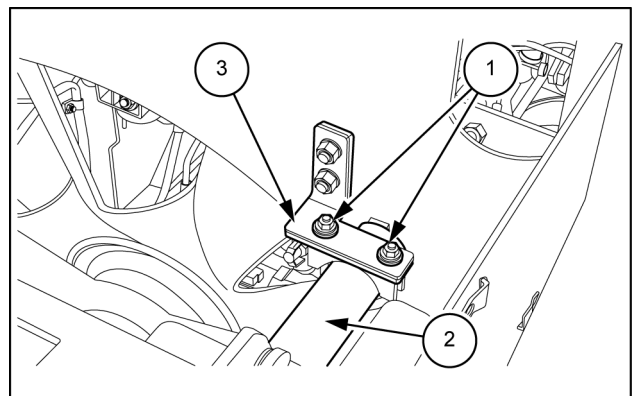
LEIL15WHL0296AB 70

77. Unlatch the air conditioning condenser clamp (1).
78. Rotate the air conditioning condenser up. Remove the two retaining bolts (2), the washers, and the nuts located on each side. Move the air conditioning condenser (3) back from the cooling system frame.



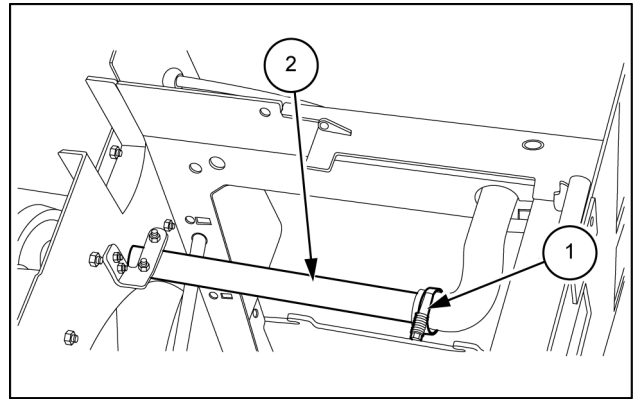
LEIL15WHL0295AB 71

79. Loosen the flange nuts (1) to remove the upper radiator hose (2). Remove the bracket (3) that hold the upper radiator hose (2).



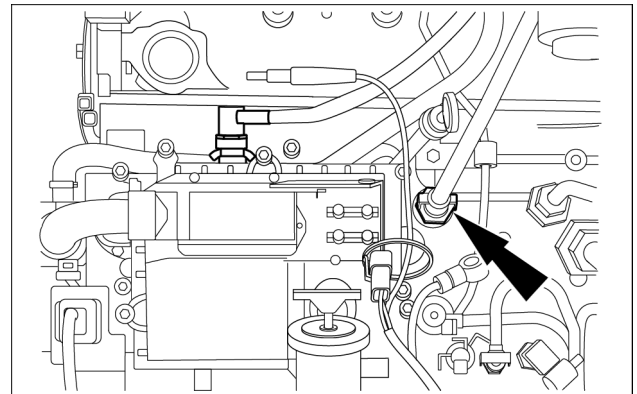
LEIL15WHL0293AB 72

80. Remove the clamp (1) and extract the upper radiator hose (2).



LEIL15WHL0297AB 73

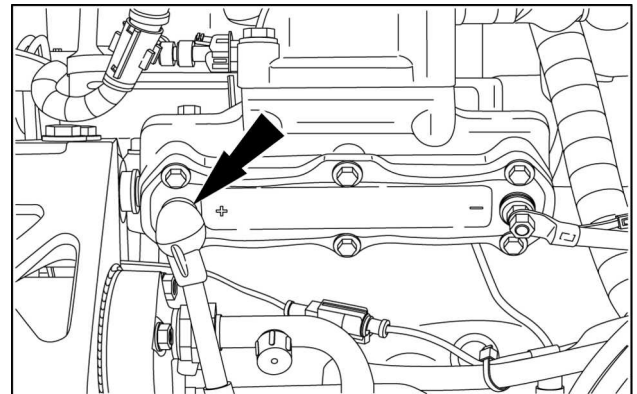
81. Remove the coolant hose.
Plug the line and cap the fitting.



LEIL15WHL0306AB 74

82. Tag and remove the grid heater cable.

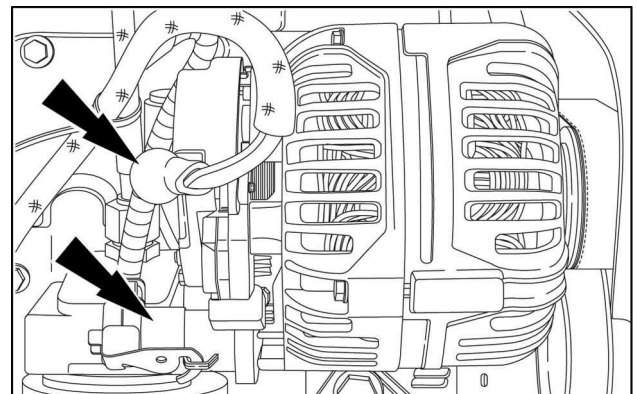
NOTE: hold the rear nut with a second wrench to prevent grid heater damage.



RAPH12WEL1478AA 75

83. Disconnect the wiring from the alternator. Identify and tag the wires to aid in reassembly.

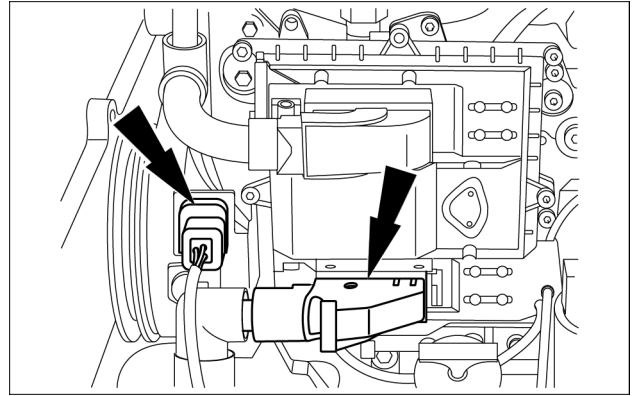
NOTE: move the wires away from the engine.



RAPH12WEL1468AA 76

84. Disconnect the wiring harnesses from the EDC17 controller.

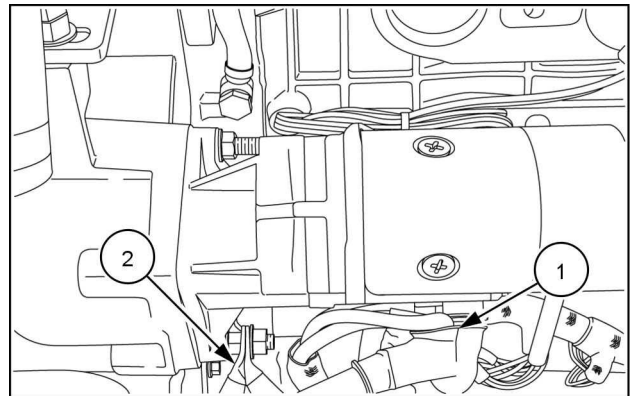
NOTE: lifting up on the lever will release the connector from the controller.



LEIL15WHL0302AA 77

85. Mark and tag the positive cables (1) to aid in reassembly. Remove the positive cables from the starter. Tag and disconnect the ground cable and ground strap (2) from the starter.

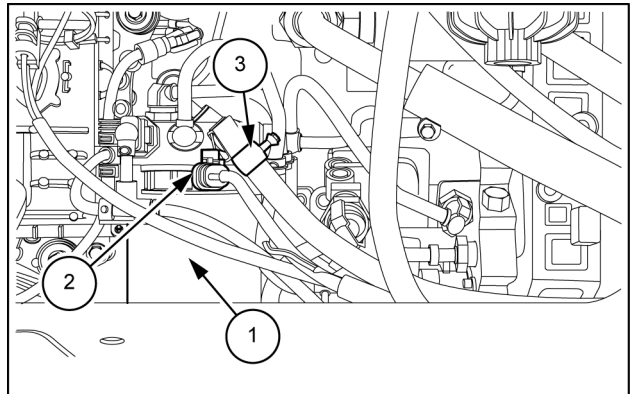
NOTE: move the starter cables away from the engine.



RAPH12WEL1474AA 78

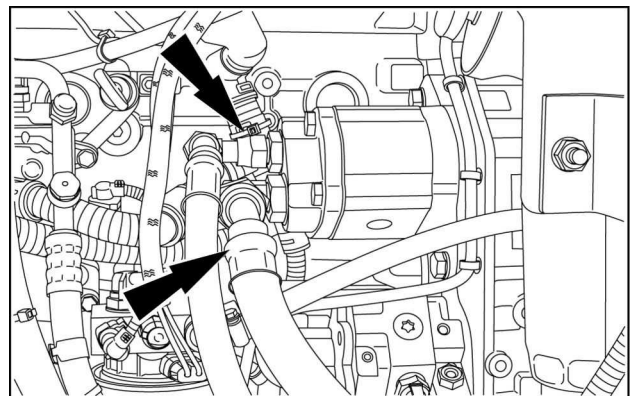
86. Tag and disconnect wire harness (2) from the primary fuel filter (1).
87. Remove the fuel line (3) from the top of the primary fuel filter (1). Plug the line and cap the fitting.

NOTE: make note on how fuel lines are routed.



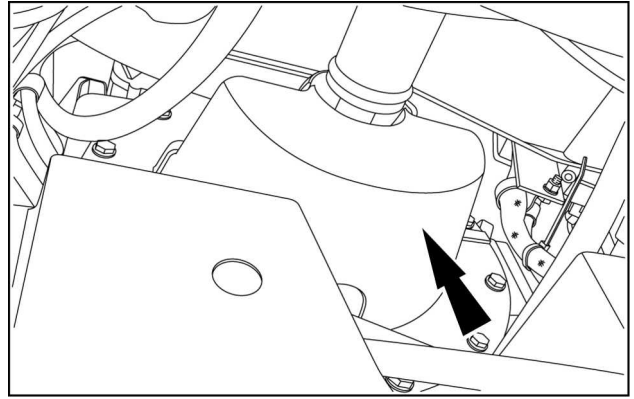
LEIL15WHL0298AB 79

88. Connect a vacuum pump to the hydraulic reservoir. Turn the vacuum on. Tag and remove the hydraulic lines from the brake system pump. Plug the lines and cap the fitting.



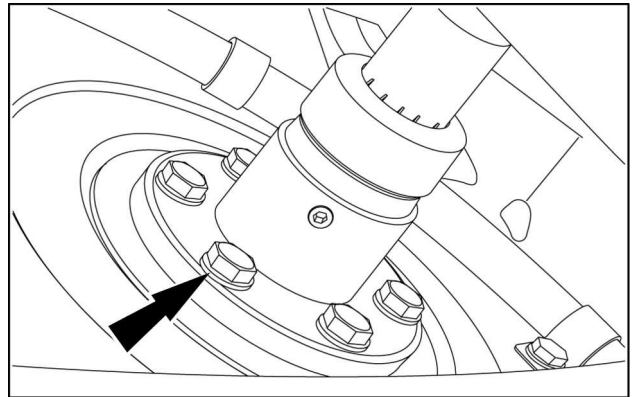
RAPH12WEL1480AA 80

89. Remove the lower cover of the drive shaft.



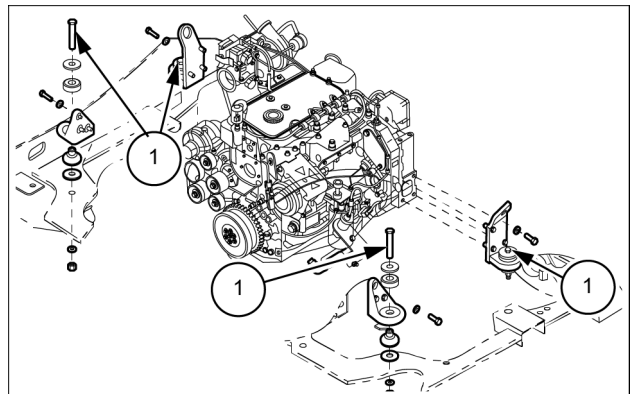
RAPH12WEL1481AA 81

90. Remove the drive shaft bolts from the flywheel. Move the drive shaft clear of the flywheel.

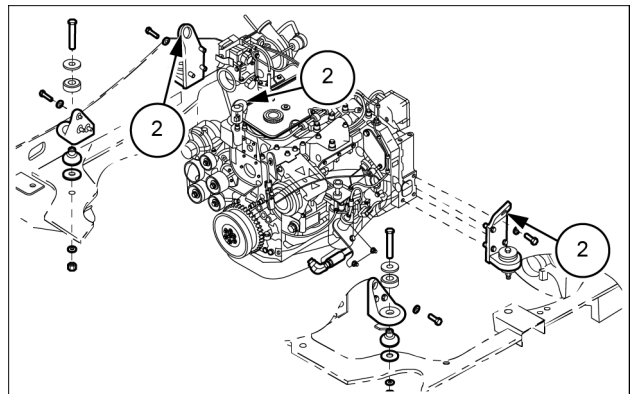


RAPH12WEL1421AA 82

91. Connect a suitable lifting equipment to the engine lifting brackets **(2)**. Take up all slack in lifting equipment. Remove the engine mounting bolts **(1)**.
92. Slowly raise engine from rear chassis. Be sure that all the wire harness connections and the hoses have been disconnected and are clear of the engine. Guide the oil drain hose from the frame as the engine is lifted. Remove the engine from machine.



LEIL15WHL0299AB 83



LEIL15WHL0300AB 84

Engine - Install

WARNING

Hot liquid under pressure!

Never remove the filler cap or the recovery tank cap while the engine is running or the coolant is hot. Let the system cool. Turn the filler cap to the first notch and allow any pressure to escape, and then remove the filler cap. Loosen the recovery tank cap slowly to allow any pressure to escape.

Failure to comply could result in death or serious injury.

W0296A

NOTE: *emissions sensors mounted in the exhaust stream are sensitive to extreme vibrations. Use of tools that generate extreme vibrations, such as impact wrenches and hammers, will result in damage to emission sensors. Avoid using these tools during any service procedure in close proximity of emission sensors. If the use of these tools cannot be avoided, remove the sensors using extreme caution prior to performing any service procedure.*

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