

**I02IG
I12IG
Tier 4B (final)
Wheel Loader**

SERVICE MANUAL

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SERVICE MANUAL

**1021G WHEEL LOADER XR-EH, NEW CAB TIER4B NA
1021G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA
1121G WHEEL LOADER XR-EH, NEW CAB TIER4B NA
1121G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA**

Link Product / Engine

Product	Market Product	Engine
1021G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA	North America	F2CFE614H*B004
1021G WHEEL LOADER XR-EH, NEW CAB TIER4B NA	North America	F2CFE614H*B004

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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.

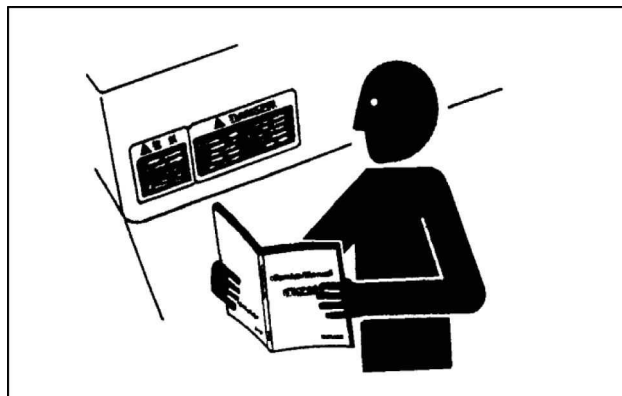
Never carry out any operation on the machine when the engine is running, except when specifically indicated.

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

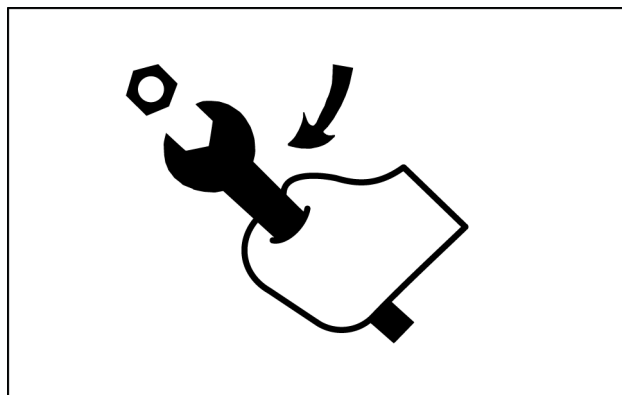
All repair and maintenance operations should be carried out with the greatest care and attention.

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.



TULI12WEX2004AA 1



TULI12WEX2005AA 2

⚠ DANGER

Unexpected movement!

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

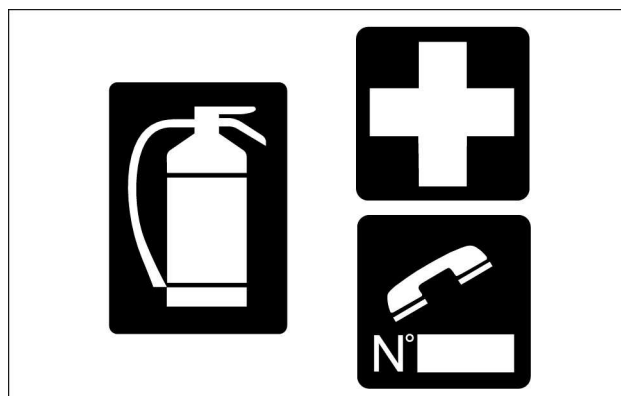
Failure to comply will result in death or serious injury.

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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.

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.



SMIL12WEX0174AA 3

Equipment

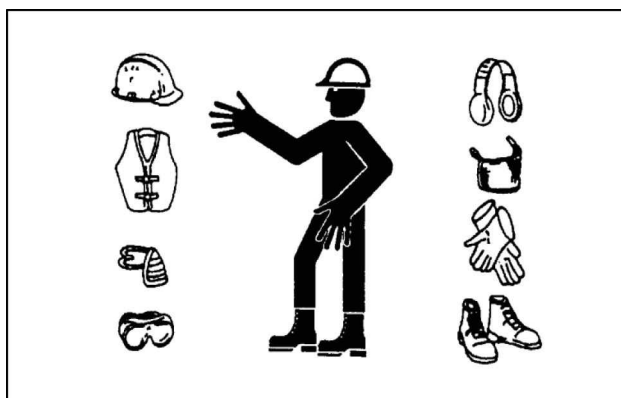
Wear close fitting clothing and safety equipment appropriate for the job:

- 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

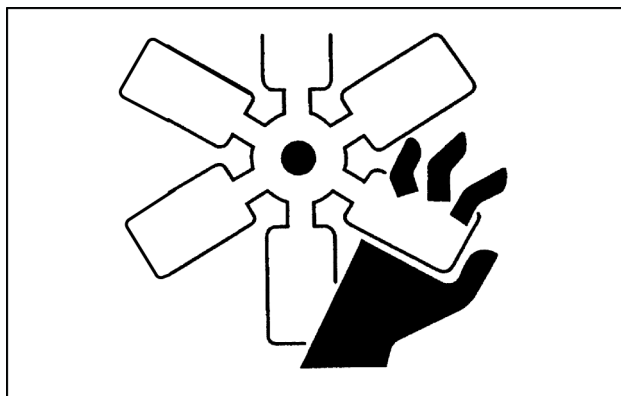
Engine - Radiator

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.

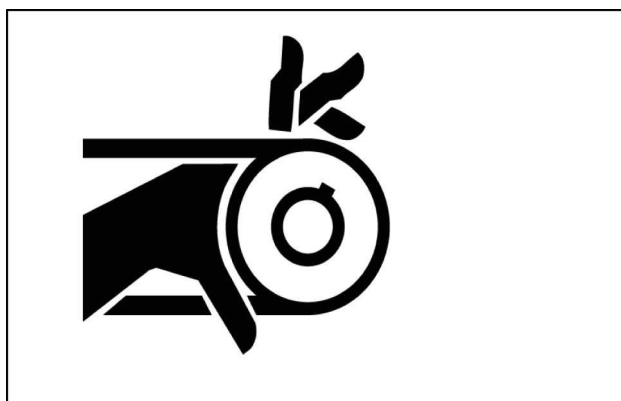
Hands, clothing or tools getting caught in the fan blades or engine belts, can cause amputations, violent hemorrhages and generate conditions of grave danger. For this reason avoid touching or approaching all rotating or moving parts.

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

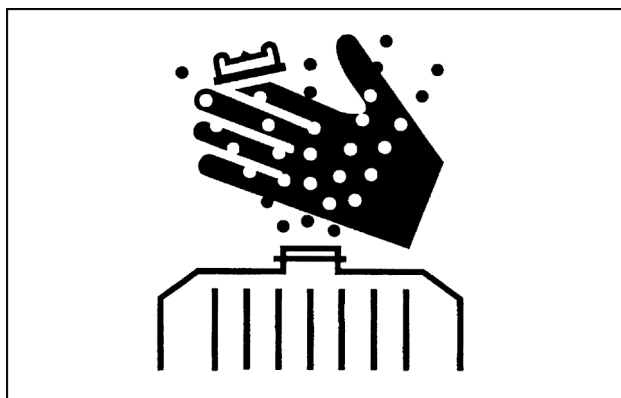
Before checking the coolant level, shut-off the engine and allow machine to cool down the radiator and hoses. Slowly unscrew the cap to release any residual pressure.

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.

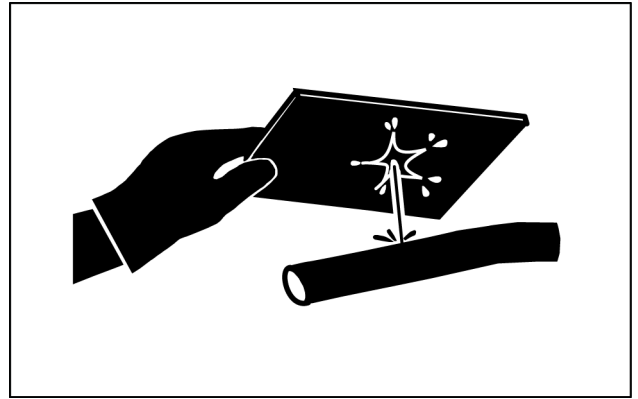
Have any visible leakage repaired immediately.

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.

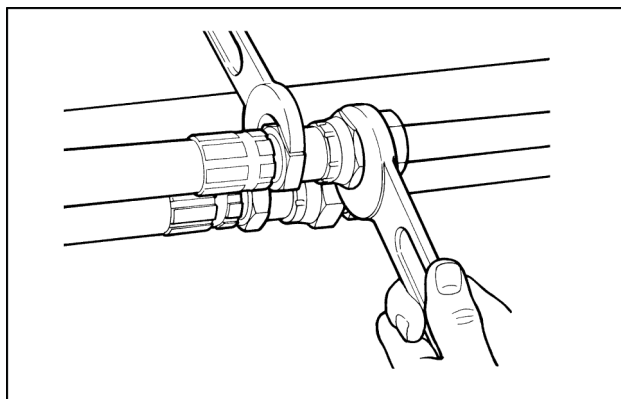
Free-moving, unsupported hoses must never be allowed to touch each other or related working surfaces. This causes chafing which reduces hose life.

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:

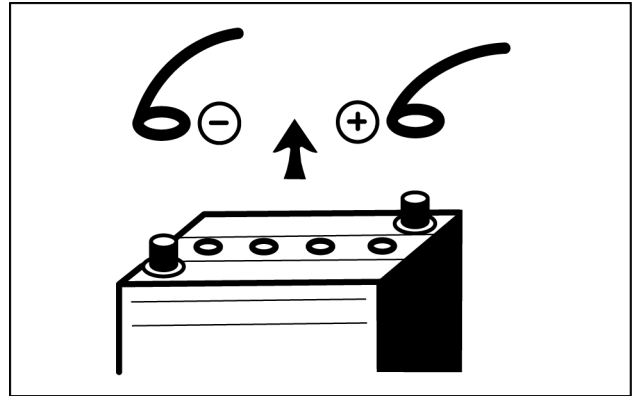
- **EXTERNAL:** Rinse well with water, removing any soiled clothing.
- **INTERNAL:** Avoid vomiting. Drink water to rinse your mouth. Consult a doctor.
- **EYES:** Rinse abundantly with water for **15 min** and consult a doctor.
- When the electrolyte of a battery is frozen, it can explode if you attempt 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.

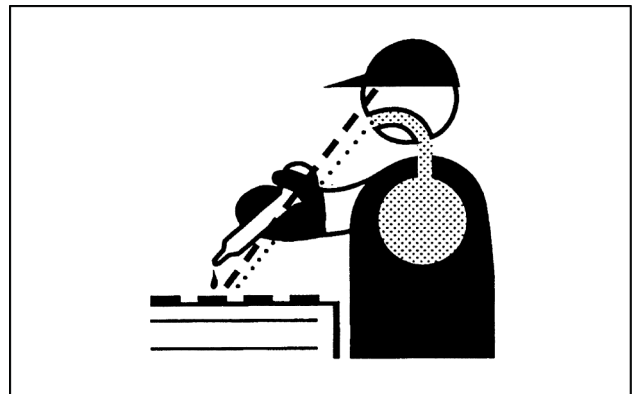
Dispose of used batteries separately from other waste in the interests of environmental protection.



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.

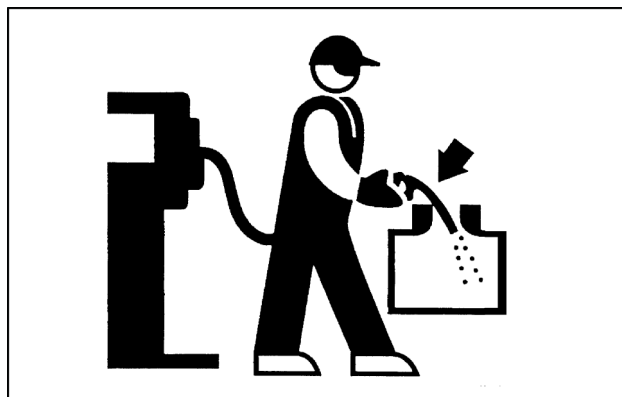
Do not overfill the tank but leave a space for fuel expansion.

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.

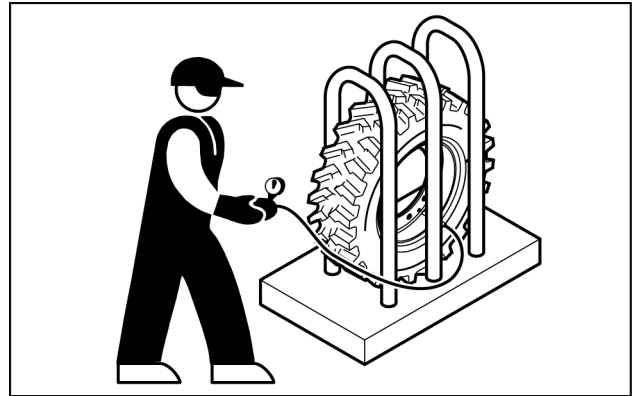
When inflating tires, ensure tire pressure does not exceed that prescribed by the tire manufacturer. Ensure that the pressure of the right tire corresponds to the pressure of the left tire.

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.



TUL112WEX2020AA 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.

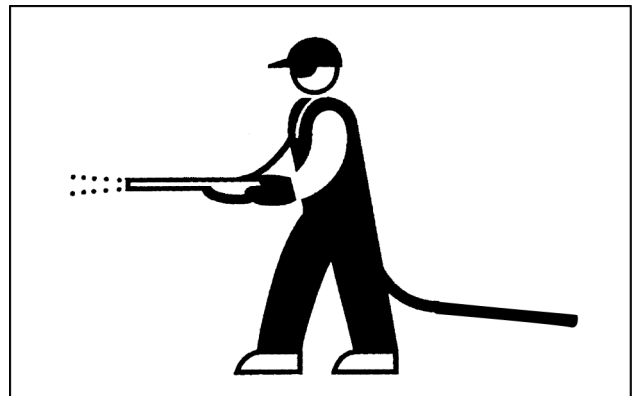
Solvents should be checked that they are suitable for the cleaning of components and also that they do not risk the personal safety of the user.

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.



TUL112WEX2021AA 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.

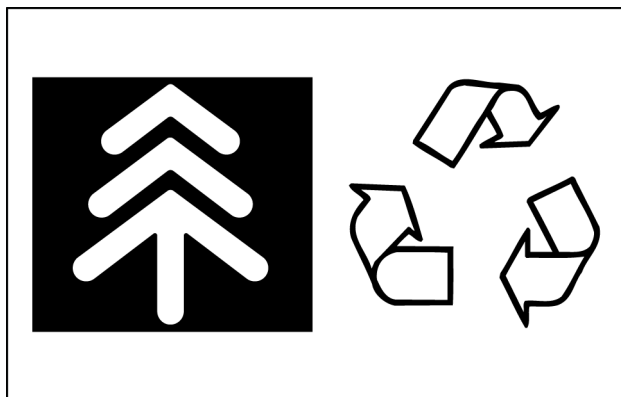
These products will be delivered at preset intervals following the forward environmental regulation.

Below are listed some products from the machine requiring disposal:

- 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.



TULI12WEX2022AA 19

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 does 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 three months with biodiesel blends in the fuel system. DO NOT store biodiesel fuel in on-site storage tanks for more than three 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 3 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

1021G Capacities and specifications

Engine		
Type of oil	CASE AKCELA UNITEK NO. 1™ SBL CJ-4	
Technical specifications	SAE 10W-40 API CJ-4	
CASE CONSTRUCTION specifications	MAT3521	
Type of oil	CASE AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40 (cold weather)	
Technical specifications	SAE 0W-40 API CJ-4	
CASE CONSTRUCTION specifications	MAT3521	
Capacity (with filter change)	28.5 l (30.1 US qt)	
Cooling system		
Type of coolant	CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT	
System capacity	56.8 l (60.0 US qt)	
Fuel system		
System capacity	473.0 l (125.0 US gal)	
Hydraulic system		
Type of fluid	CASE AKCELA HY-TRAN® ULTRACTION	
Technical specifications	ISO VG-46	
CASE CONSTRUCTION specifications	MAT 3540	
Technical specifications	CASE AKCELA HY-TRAN® ULTRACTION SSL (low temperature)	
CASE CONSTRUCTION specifications	MAT 3541	
Total system capacity	250.0 l (66.0 US gal)	
Reservoir capacity	134.0 l (35.4 US gal)	
Transmission		
Type of oil	CASE AKCELA NEXPLORE™ FLUID	
Service capacity - with filter change	45.4 l (48.0 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	42.0 l (44.4 US qt)	
Rear axle	42.0 l (44.4 US qt)	
Front axle with axle cooler	51.5 L (54.4 US qt)	
Rear axle with axle cooler	46.7 L (49.3 US qt)	
Heavy duty Front axle	62.0 l (65.5 US qt)	
Heavy duty Front axle with cooler	71.5 L (75.6 US qt)	
Heavy duty Rear axle	42.0 l (44.4 US qt)	
Heavy duty Rear axle with cooler	46.7 L (49.3 US qt)	
DEF/AdBLUE®		
Technical specifications	ISO 22241-1	
CASE CONSTRUCTION specifications	ES-BS001	
Total capacity (*)	90.8 L (95.9 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.

1121G Capacities and specifications

Engine		
	Type of oil	CASE AKCELA UNITEK NO. 1™ SBL CJ-4
	Technical specifications	SAE 10W-40 API CJ-4
	CASE CONSTRUCTION specifications	MAT3521
	Type of oil	CASE AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40 (cold weather)
	Technical specifications	SAE 0W-40 API CJ-4
	CASE CONSTRUCTION specifications	MAT3521
	Capacity (with filter change)	28.5 l (30.1 US qt)
Cooling system		
	Type of coolant	CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT
	CASE CONSTRUCTION specifications	MAT3624
	System capacity	56.8 l (60.0 US qt)
Fuel system		
	System capacity	473.0 l (125.0 US gal)
Hydraulic system		
	Type of fluid	CASE AKCELA HY-TRAN® ULTRACTION
	Technical specifications	ISO VG-46
	CASE CONSTRUCTION specifications	MAT 3540
	Technical specifications	CASE AKCELA HY-TRAN® ULTRACTION SSL (low temperature)
	CASE CONSTRUCTION specifications	MAT 3541
	Total system capacity	250.0 l (66.0 US gal)
	Reservoir capacity	134.0 l (35.4 US gal)
Transmission		
	Type of oil	CASE AKCELA NEXPLORE™ FLUID
	Service capacity - with filter change	45.4 l (48.0 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)	62 L (65.5 US qt)
	Rear axle (Standard and Heavy Duty)	64.0 l (67.6 US qt)
	Front axle with axle cooler (Standard and Heavy Duty)	71.5 L (75.6 US qt)
	Rear axle with axle cooler (Standard and Heavy Duty)	68.7 L (72.6 US qt)
DEF/AdBLUE®		
	Technical specifications	ISO 22241-1
	CASE CONSTRUCTION specifications	ES-BS001
	Total capacity (*)	90.8 L (95.9 US qt)
Grease fittings, as required		CASE AKCELA MOLY GREASE
	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

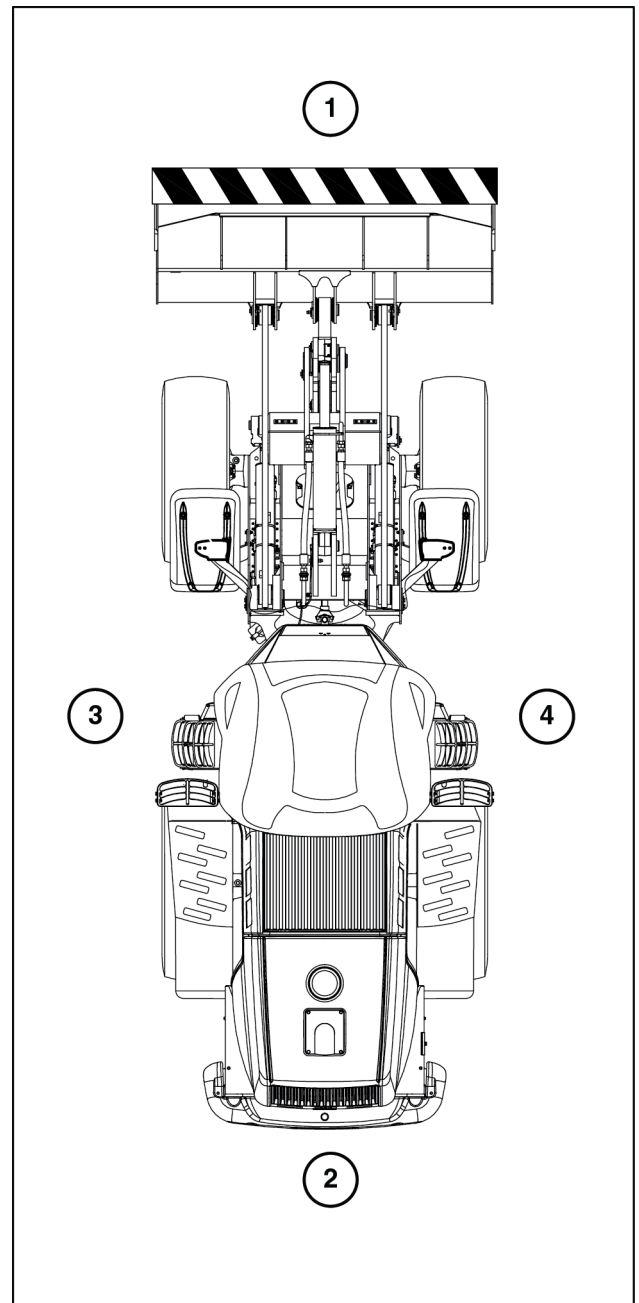
If you find contamination, use a portable filter to clean the hydraulic system.

Product identification - Machine orientation

MACHINE SIDES

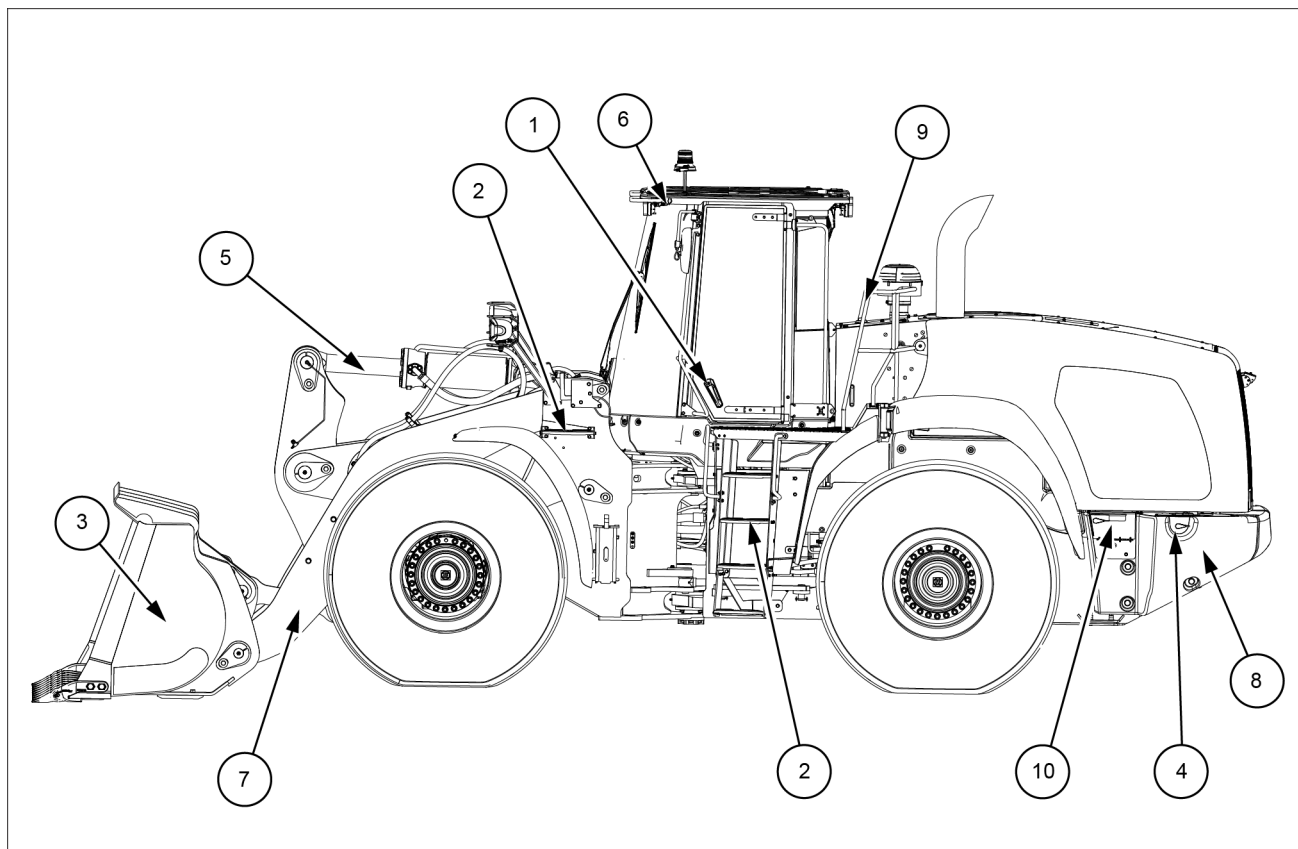
The terms “right-hand”, “left-hand”, “front”, and “rear”, when used in this manual, indicate the sides of the machine as they are seen from the operator's seat.

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



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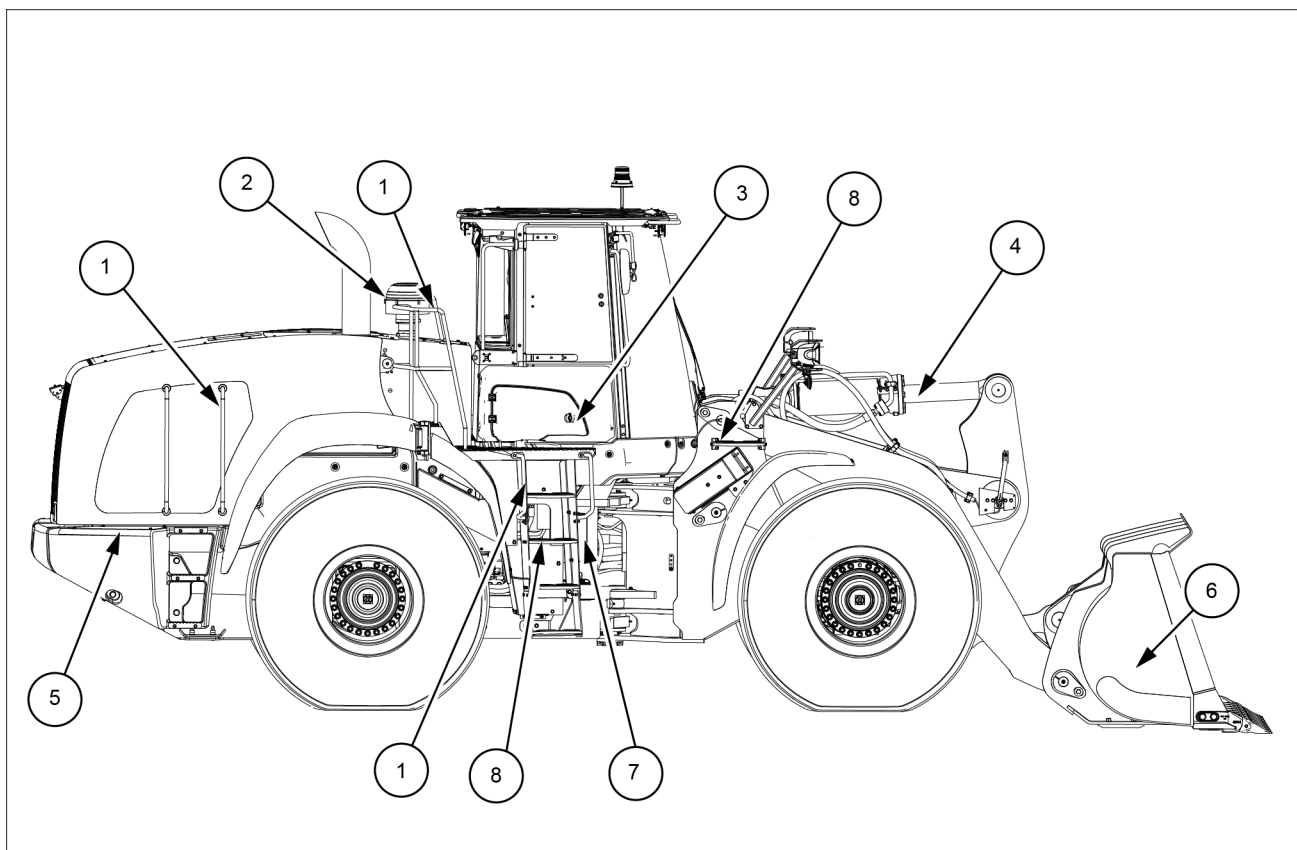
Product identification



LEIL17WHL1734FB 1

- | | |
|--|---|
| 1. Cab door and hand holds | 6. Roll Over Protection System (ROPS) cab |
| 2. Steps | 7. Loader lift arms |
| 3. Bucket (Z-bar version) | 8. Battery access |
| 4. Timed disconnect switch and battery jump post | 9. Hand rails |
| 5. Bucket cylinder | 10. Fuel/ DEF/AdBLUE® fill tanks |

INTRODUCTION



LEIL17WHL1733FB 2

- | | |
|--------------------------|--------------------------------|
| 1. Hand rails | 5. Battery access |
| 2. Pre-cleaner | 6. Bucket (Z-bar version) |
| 3. Cab air filter access | 7. Windshield washer reservoir |
| 4. Bucket cylinder | 8. Steps |



SERVICE MANUAL

Engine

**1021G WHEEL LOADER XR-EH, NEW CAB TIER4B NA
1021G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA
1121G WHEEL LOADER XR-EH, NEW CAB TIER4B NA
1121G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA**

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[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
[10.310] Aftercooler.....	10.7
[10.304] Engine lubrication system.....	10.8



Engine - 10

Engine and crankcase - 001

**1021G WHEEL LOADER XR-EH, NEW CAB TIER4B NA
1021G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA
1121G WHEEL LOADER XR-EH, NEW CAB TIER4B NA
1121G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA**

Contents

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Engine and crankcase - 001

TECHNICAL DATA

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General specification (*)	3
Engine horse power (*)	3
Engine horse power (*)	4

SERVICE

Engine

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Test	47

(*) See content for specific models

Engine - General specification

1021G WHEEL LOADER XR-EH, NEW CAB TIER4B NA	NA
1021G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA	NA

Engine with 4 Speed Transmission	
A. Low idle	870-930 RPM
Alternate low idle	670-730 RPM
Alternate Accelerated Idle	1270-1330 RPM
B. Maximum No Load RPM	2217-2267 RPM
C. Converter Stall (manual 3 rd gear or higher)	2000-2150 RPM
D. Hydraulic Stall	1885-2195 RPM
E. Converter & Hydraulic Stall	1487-1797 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 & Hydraulic Stall RPM values are read while the lift arms are rising with the bucket held rolled back and the engine at Wide Open Throttle (WOT) in max power mode.

Engine - General specification

1121G WHEEL LOADER XR-EH, NEW CAB TIER4B NA	NA
1121G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA	NA

Engine with 4 Speed Transmission	
A. Low idle	870-930 RPM
Alternate low idle	670-730 RPM
Alternate Accelerated Idle	1270-1330 RPM
B. Maximum No Load RPM	2256-2306 RPM
C. Converter Stall	1937-2087 RPM
D. Hydraulic Stall	1885-2195 RPM
E. Converter & Hydraulic Stall	1487-1797 RPM
Temperature of the torque converter oil	82 – 104 °C (180 – 219 °F)
Temperature of the hydraulic oil	54 – 57 °C (129 – 135 °F)

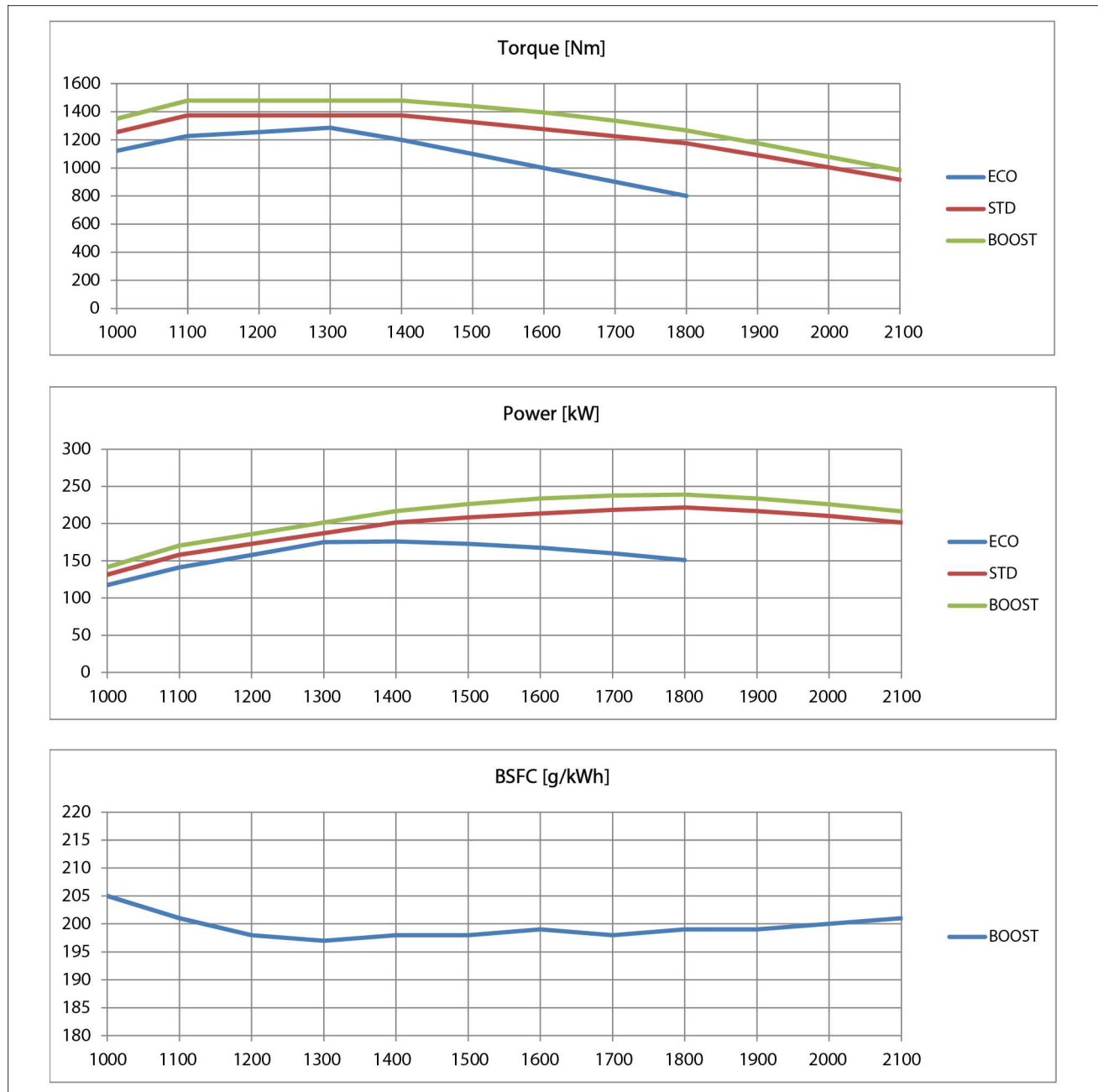
NOTE: hydraulic Stall and Converter & Hydraulic Stall RPM values are read while the lift arms are rising with the bucket held rolled back and the engine at Wide Open Throttle (WOT) in max power mode.

Engine - Engine horse power

1021G WHEEL LOADER XR-EH, NEW CAB TIER4B NA	NA
1021G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA	NA

Design characteristics	
Displacement	8710 cm³ (531.5 in³)
Engine Configuration	6 cylinder in line, 4 stroke
Intake Air	Turbocharged, 4 valves/cyl
Fuel injection	High pressure common rail
EGR	No

Performance	
Altitude Capability	3000 m (9842.5 ft)
High Idle Speed	2287 RPM
Low Idle Speed	700 RPM
Rated Power	216 kW at 2100 RPM
Peak Torque	1479 N·m at 1400 RPM



LEIL17WHL0362GA 1

NOTE: performances detected at engine test bench.

NOTE: BSFC indicates the Brake Specific Fuel Consumption.

Engine - Engine horse power

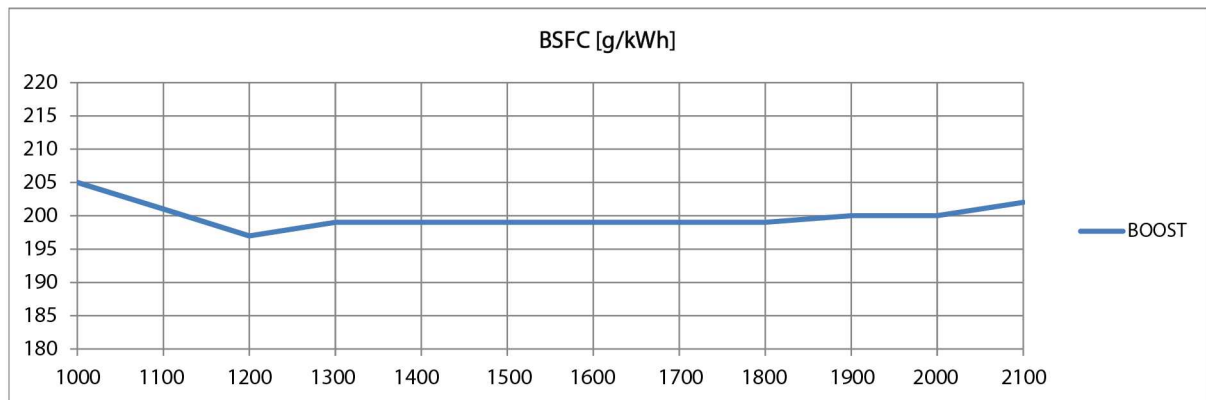
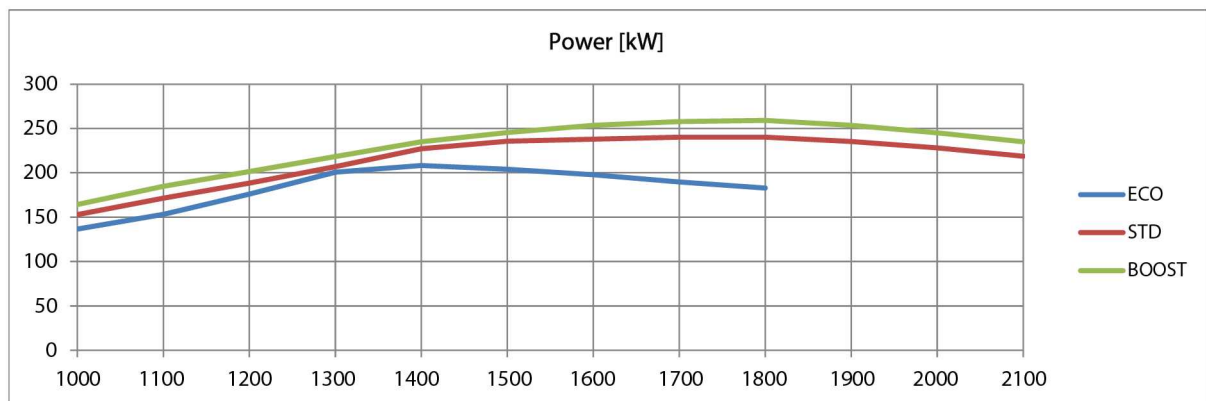
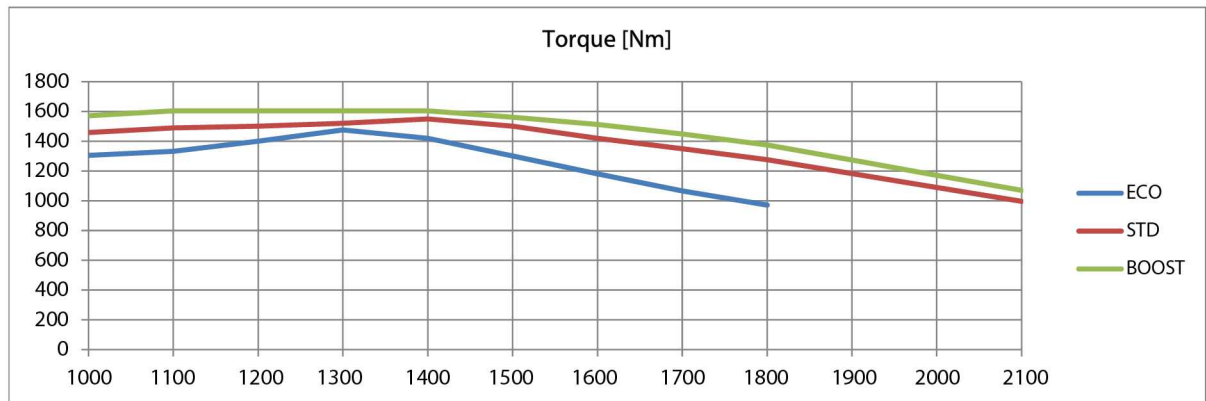
1121G WHEEL LOADER XR-EH, NEW CAB TIER4B NA	NA
1121G WHEEL LOADER ZBAR-EH, NEW CAB TIER4B NA	NA

Design characteristics	
Displacement	8710 cm³ (531.5 in³)
Engine Configuration	6 cylinder in line, 4 stroke
Intake Air	Turbocharged, 4 valves/cyl
Fuel injection	High pressure common rail
EGR	No

Performance	
Altitude Capability	3000 m (9842.5 ft)

Engine - Engine and crankcase

High Idle Speed	2287 RPM
Low Idle Speed	700 RPM
Rated Power	235 kW at 2100 RPM
Peak Torque	1604 N·m at 1400 RPM



LEIL17WHL0363GA 1

NOTE: performances detected at engine test bench.

NOTE: BSFC indicates the Brake Specific Fuel Consumption.

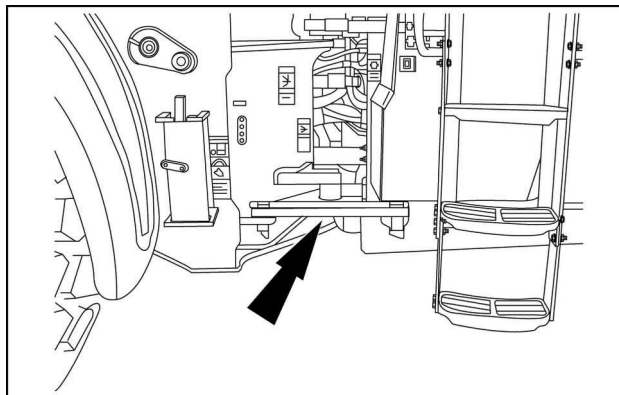
Engine - Remove

Prior operation:

Engine hood - Remove (90.105)

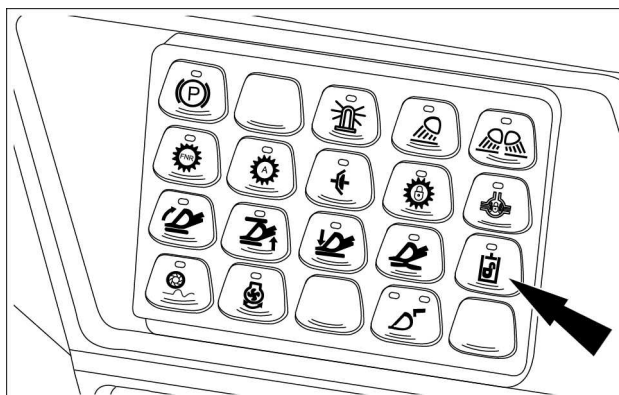
NOTE: emissions sensors mounted in the exhaust stream are sensitive to extreme vibrations. Use of tools that generate extreme vibrations, such as impact wrenches and hammers, will result in damage to emission sensors. Avoid using these tools during any service procedure in close proximity of emission 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 (1) in LOCKED position.



LEIL15WHL1782AA 1

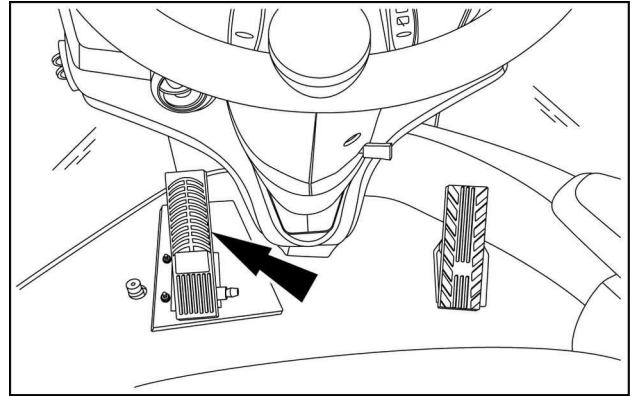
2. Push the hydraulic functions lock-out switch in the normal operation position.



LEIL16WHL1125AA 2

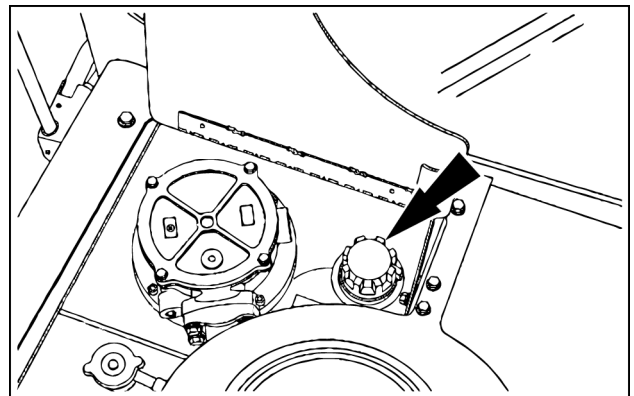
3. Move the loader hydraulic control handle to the raise and lower position in order to release any hydraulic pressure in the lift circuit.
4. Move the loader control handle in and out of the tilt position several times, this will relieve any pressure in the pilot accumulator.
5. Release the pressure in the ride control accumulator with the bleeder valve in the ride control valve load travel stabilizer.

6. Actuate the brake pedal several times to discharge brake accumulators.



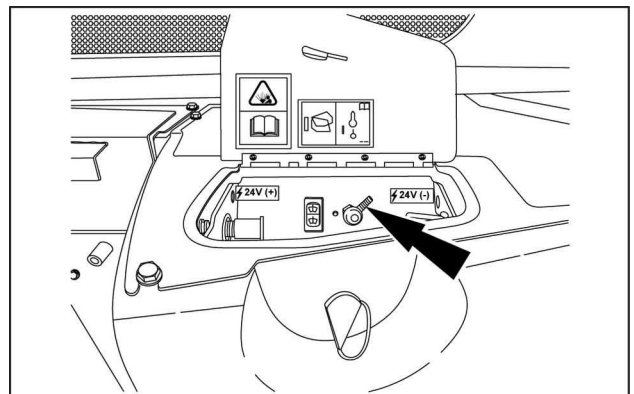
LEIL15WHL0564AA 3

7. Slowly loosen the filler cap on the hydraulic oil tank to release air pressure.



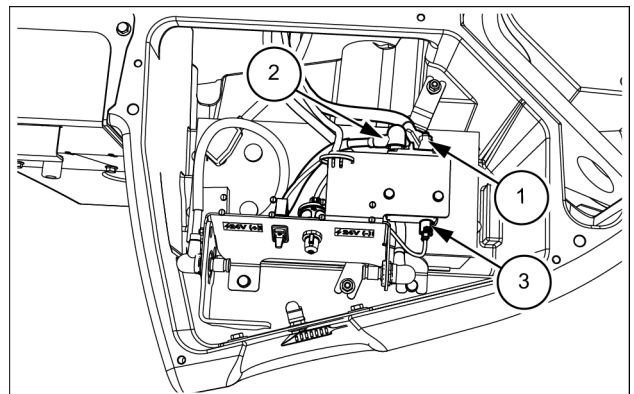
LEIL15WHL0825AA 4

8. Locate the timed disconnect switch in the battery box. Put the timed disconnect switch in the OFF position.



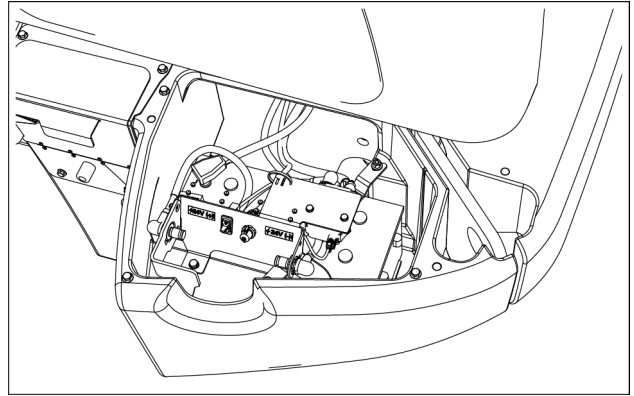
LEIL15WHL0663AA 5

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

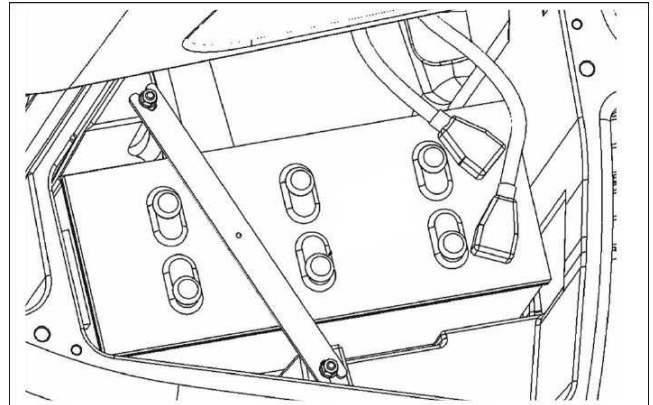


LEIL16WHL1528AB 6

10. Loosen and remove the bolts that hold the battery cover in place on both the left-hand and right-hand rear of the machine.
Disconnect the battery cable from the battery.



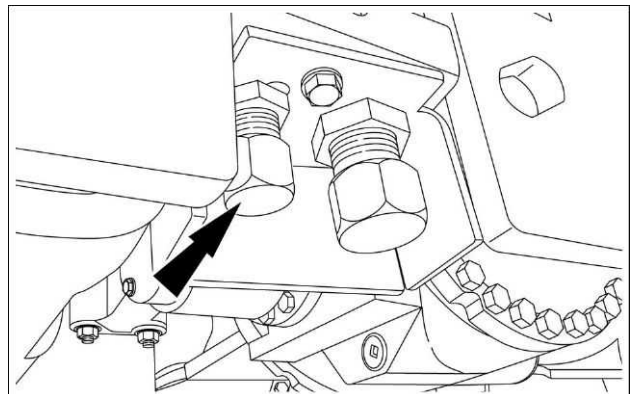
LEIL16WHL0891AB 7



LEIL15WHL1489AA 8

11. Open the access cover.
Place a suitable container below radiator drain, remove the radiator cap and coolant drain plug (arrow) to drain the engine coolant. Reinstall the drain plug and radiator cap after the coolant has drained.

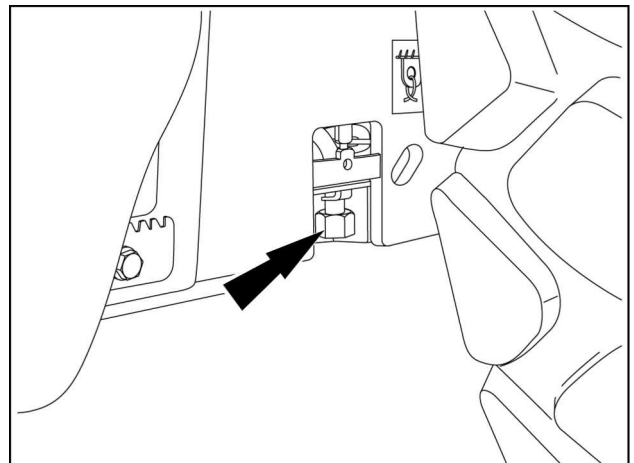
NOTE: see machine specifications for cooling system volume.



LEIL15WHL0719AB 9

12. Open the access cover.
Place a suitable container below the engine oil drain. Remove the drain plug and drain the oil into the container. Reinstall drain plug.

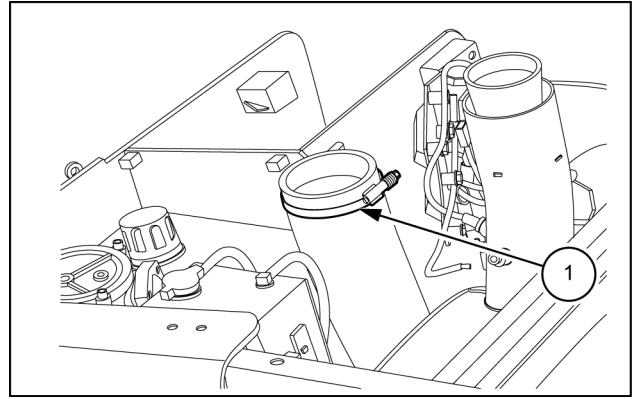
NOTE: see machine specifications for engine oil sump volume.



RCPH11WHL104AAH 10

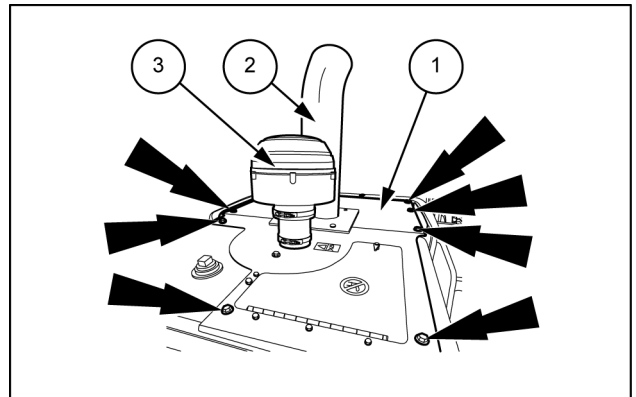
13. Loosen the hose clamp **(1)** on the air intake hose under the air inlet engine hood.

NOTICE: for clarity the engine hood compartment top cover is not shown in the figure.



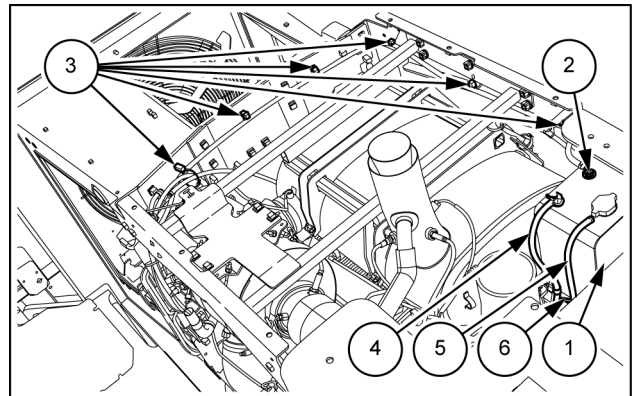
LEIL15WHL0673AB 11

14. Remove the mounting bolts (arrows) from engine compartment top cover **(1)**.
15. Attach a suitable lifting device and lift strap to the engine compartment cover and exhaust stack. Carefully remove the cover **(1)**, the exhaust stack **(2)** and the precleaner **(3)** as an assembly.



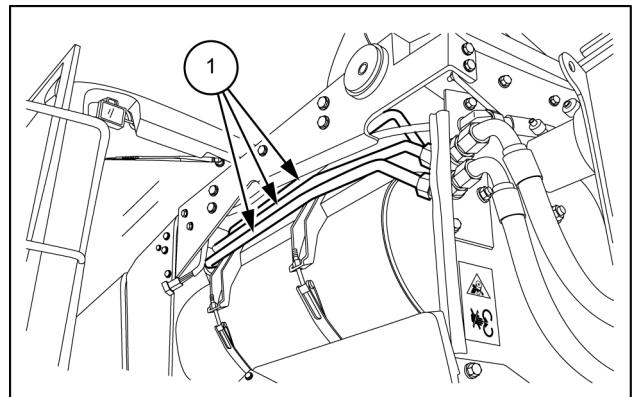
LEIL15WHL0679AB 12

16. Disconnect the deaeration tank overflow hose **(2)** from the coolant tank **(1)**. Remove the P-clamps **(3)** that secure the overflow hose **(2)** to the wall and brackets. Tag and remove the overflow hose **(2)** from the engine and engine wall. Disconnect the hoses **(4)**, **(5)** and **(6)** from the coolant tank **(1)**.



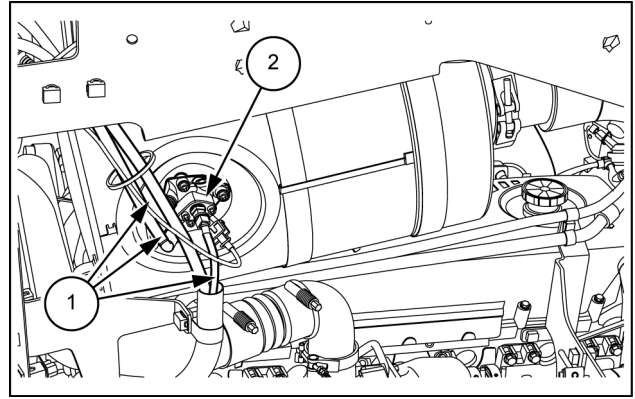
LEIL15WHL0667AB 13

17. Remove the hydraulic oil lines **(1)** and the related fittings.



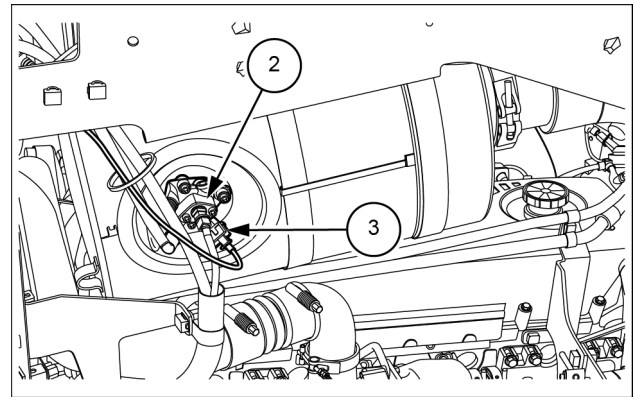
LEIL15WHL0682AB 14

18. Disconnect the hoses (1) from the Dosing Module (2).



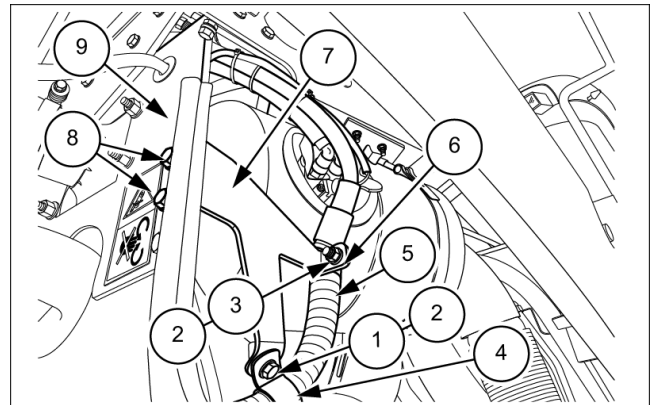
LEIL15WHL0675AB 15

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



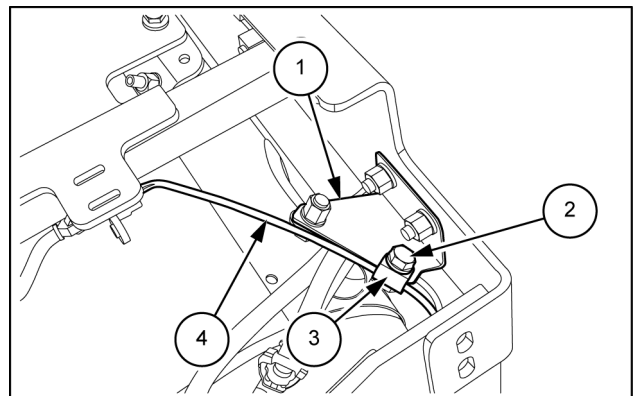
LEIL15WHL0821AB 16

20. Remove the two bolts (1), the four washers (2), and the two nuts (3) to separate the P-clamps (4) and (6) from the bracket (8). Remove the P-clamps (4) and (6) from the DEF/AdBLUE® bundle (5).
21. Remove the two bolts (8) with related washers and the nuts to separate the bracket (7) from the engine wall (9).



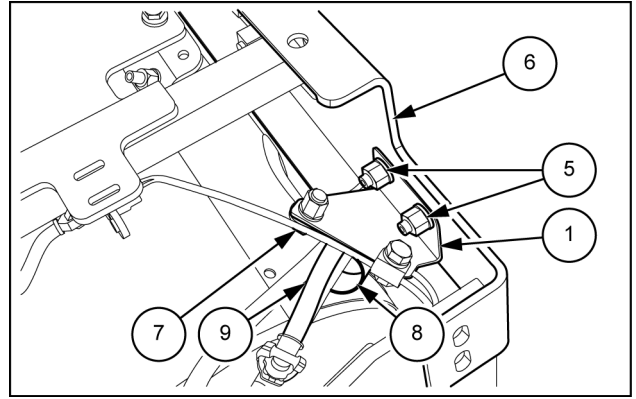
LEIL15WHL0812AB 17

22. Remove the bolt (2) and the related washers and nut to separate the P-clamp (3) from the bracket (1). Remove the P-clamp (3) from the sensors wiring harness (4).



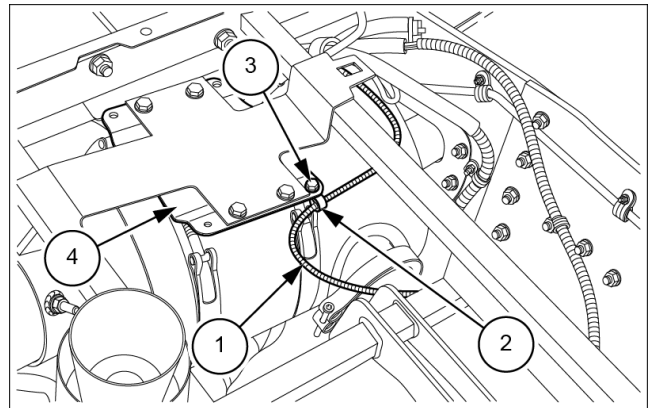
LEIL15WHL0822AB 18

23. Remove the two bolts (5) and the related washers and nuts to separate the bracket (1) from the support (6).
24. Remove the bolt (7) and the related washers and nut to separate the P-clamp (8) from the DEF/AdBlue® bundle (9).



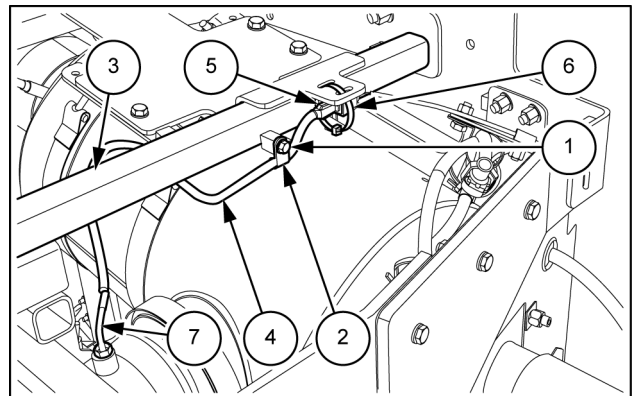
LEIL15WHL0823AB 19

25. Loosen the bolt (3). Remove the P-clamp (2) that secure the sensor wiring harness (1) of the inlet temperature sensor to the DOC mounting plate (4).



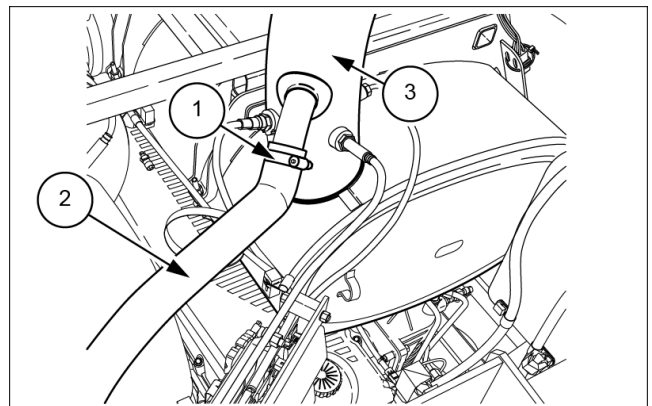
LEIL15WHL1312AB 20

26. Loosen the bolt (1) and remove the P-clamp (2) from the supply module support (3).
27. Remove the P-clamp (2) from the temperature sensor (DOC to SCR) wire (4). Cut the tie strap (6).
28. Disconnect the sensor from the sensors wiring harness (5). Loosen the hexagonal nut of the temperature sensor (7) (DOC to SCR). Remove the temperature sensor (7).



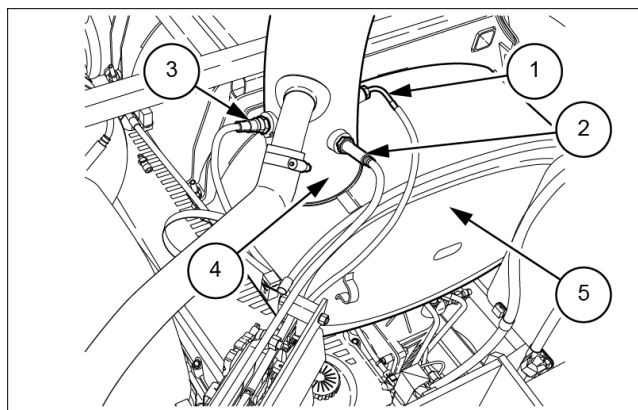
LEIL15WHL0824AB 21

29. Loosen the P-clamp (1) of the air intake aspirator engine hose (2). Disconnect the air intake aspirator engine hose (2) from the outlet of the Selective Catalytic Reduction (SCR) (3).



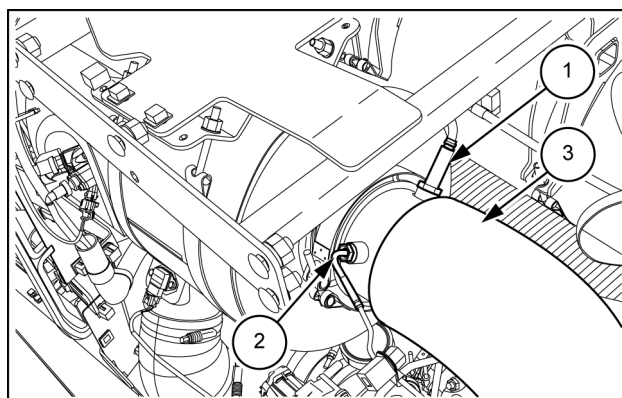
LEIL15WHL0811AB 22

30. Loosen the hexagonal nut of the outlet temperature sensor **(1)**.
Loosen the hexagonal nut of outlet the Nitrogen Oxides (NOx) sensor **(2)**.
Loosen the hexagonal nut of the ammonia (NH3) sensor **(3)**.
Remove any straps holding the sensor wiring harness to the others. Disconnect the temperature sensor **(1)**, NOx, sensor **(2)** and the NH3 **(3)** sensor from the outlet **(4)** of the Selective Catalytic Reduction (SCR) **(5)**.



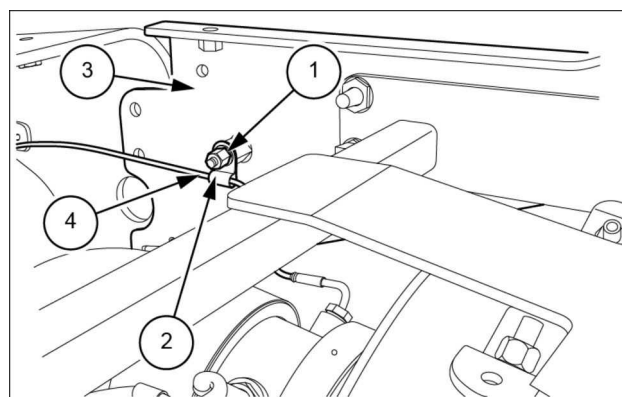
LEIL15WHL0672AB 23

31. Locate the inlet temperature sensor **(1)** and the inlet NOx sensor **(2)** on the inlet of the Diesel Oxidation Catalyst (DOC) **(3)**.
Loosen the hexagonal nut of the inlet temperature sensor **(1)** and the inlet NOx sensor **(2)**.
Disconnect the sensors **(1)** and **(2)** from the inlet of the Diesel Oxidation Catalyst (DOC) **(3)**.



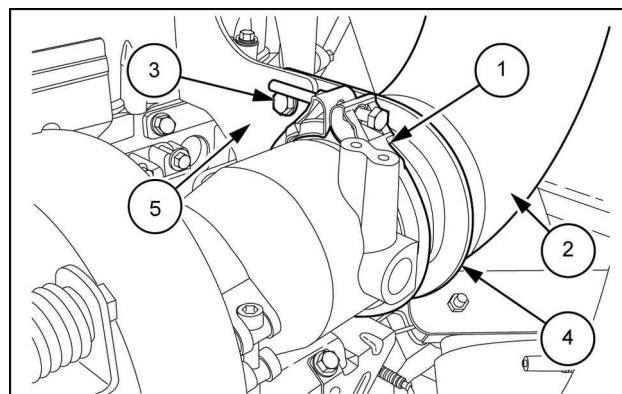
LEIL15WHL0671AB 24

32. Loosen the hexagonal nut **(1)**, with related washer, spacer, and bolt. Separate the P-clamp **(2)** that secure the wiring harness **(4)** of the DOC inlet temperature sensor from the support bracket **(3)**.



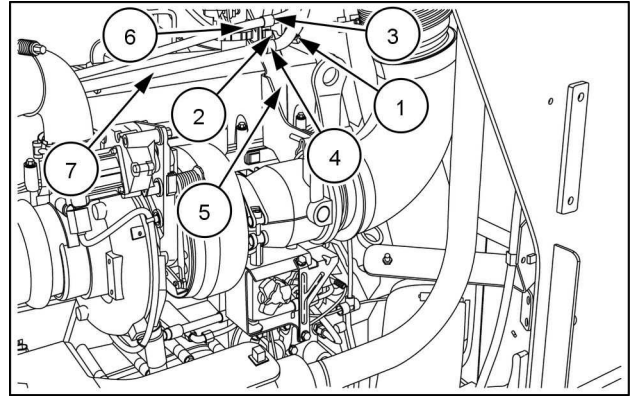
LEIL15WHL1141AB 25

33. Remove the two bolts **(3)** and the related washers and nuts to separate the exhaust support bracket **(5)** from the U-clamp **(4)**.
34. Remove the clamp **(1)** from the inlet Diesel Oxidation Catalyst (DOC) pipe **(2)**.
Discard the gasket.



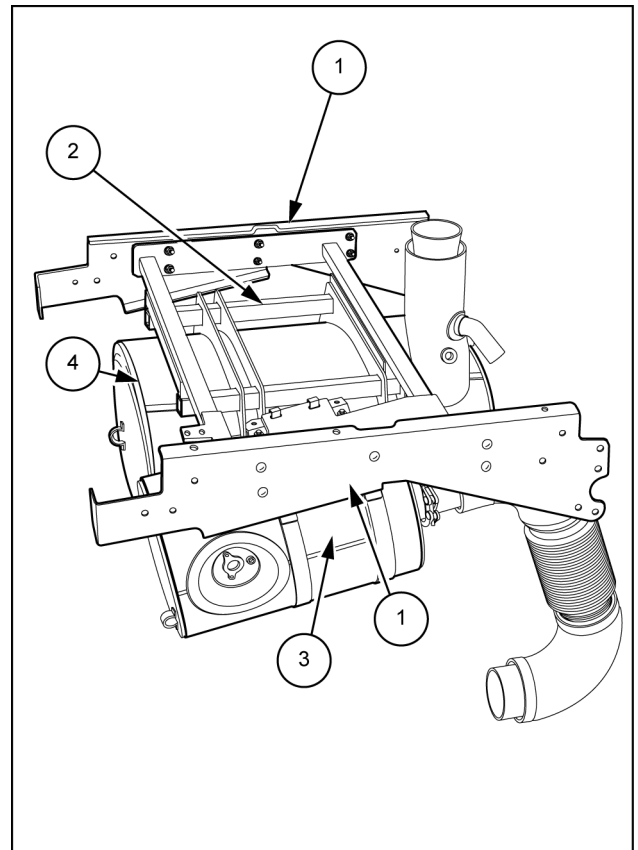
LEIL15WHL0826AB 26

35. Remove the P-clamp (1).
Loosen the bolt (2) to separate the P-clamps (3) and (4) from the exhaust support bracket (5).
Remove the P-clamps (3) and (4) from the hoses (6) and (7).



LEIL15WHL0831AA 27

36. Attach a suitable lifting strap on the brackets (hydraulic to cooling) (1) to support the muffler frame (2) with the Diesel Oxidation Catalyst (DOC) (3) and the Selective Catalytic Reduction muffler (SCR) (4).



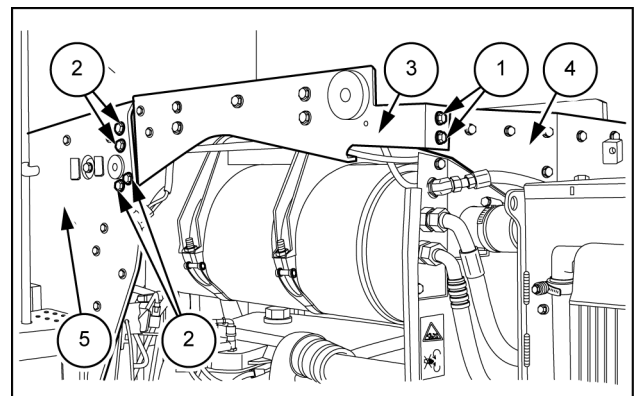
LEIL15WHL0836BB 28

37. Remove the two bolts (1) with related washers and nuts to separate the bracket (hydraulic to cooling) (3) from the engine wall (4).
38. Remove the four bolts (2) with related washers and nuts to separate the bracket (hydraulic to cooling) (3) from the hydraulic tank (5).

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

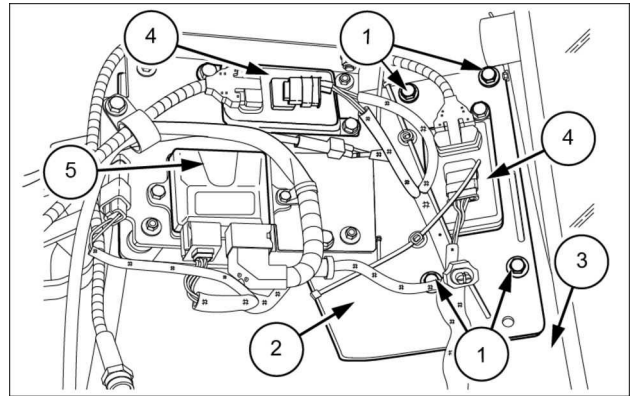
39. Remove the brackets (3), the muffler frame, the DOC and the SCR as an assembly.

NOTE: do not damage the muffler support during removal.



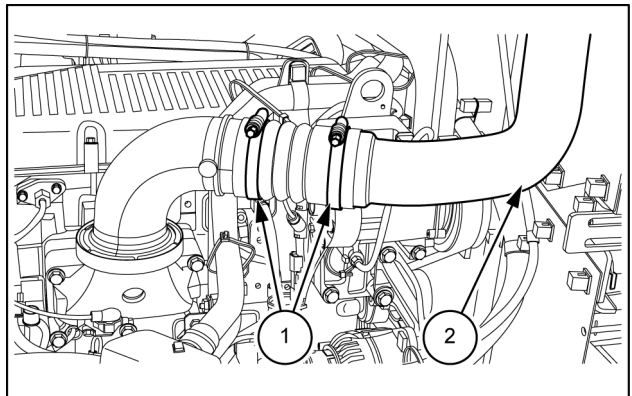
LEIL15WHL0837AB 29

40. Loosen the bolts (1) to remove the sensor mounting bracket (2) with the two the NOx sensor modules (4) and the NH3 Electronic Control Unit (5) from the hydraulic tank (3).



LEIL15WHL1328AB 30

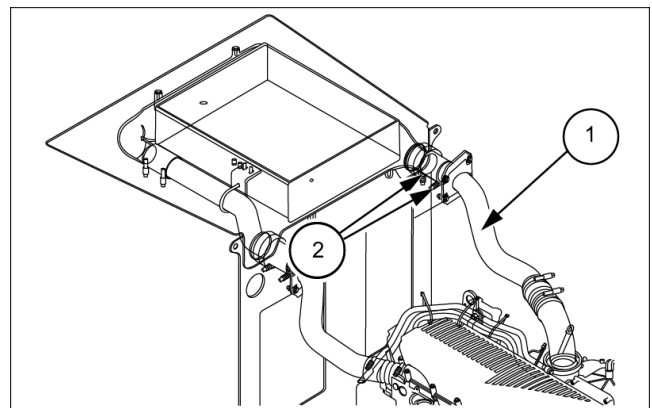
41. Loosen the two clamps (1) from the intercooler tube (2).



LEIL15WHL0835AB 31

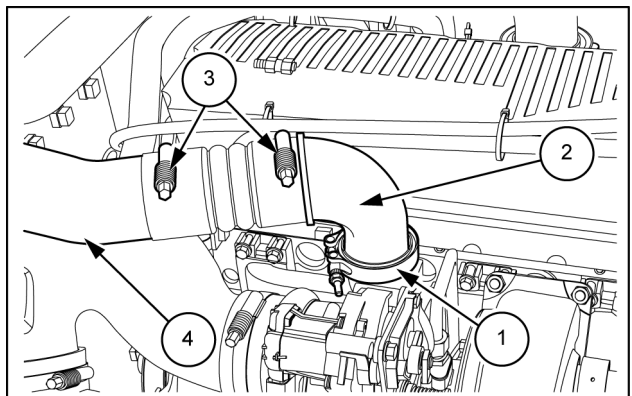
42. Loosen the clamps (2) from the intercooler tube (1). Remove the intercooler tube (1) through the engine wall.

NOTE: for clarity, the engine wall is not shown in the figure.



LEIL15WHL1165AB 32

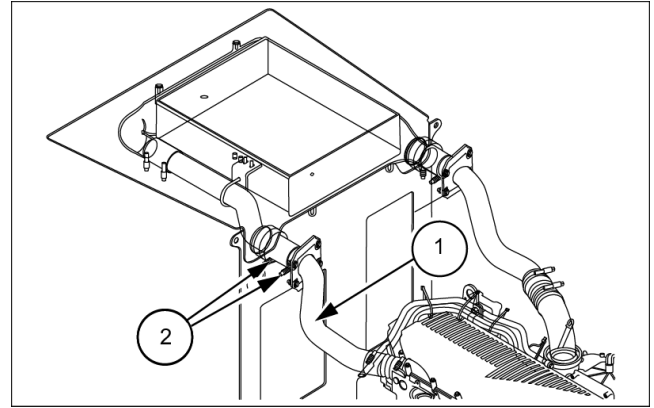
43. Loosen the V-band clamp (1). Remove the O-ring and the air intake elbow (2) of the turbocharger. Loosen the clamps (3). Remove the air intake tube (4) of the turbocharger. Cover the turbocharger inlet to prevent debris entry.



LEIL15WHL0847AB 33

44. Loosen the clamps **(2)** from the air intake tube **(1)** and remove the tube through the engine wall.

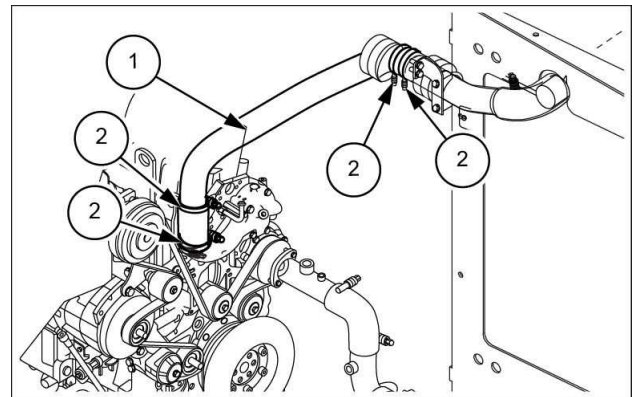
NOTE: for clarity, the engine wall is not shown in the figure.



LEIL15WHL1084AB 34

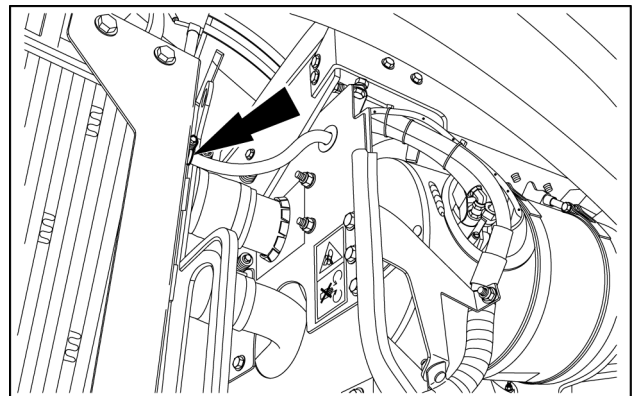
45. Loosen the clamps **(2)** to remove the upper radiator tube **(1)** through the engine wall.

NOTE: for clarity, the engine wall is not shown in the figure.



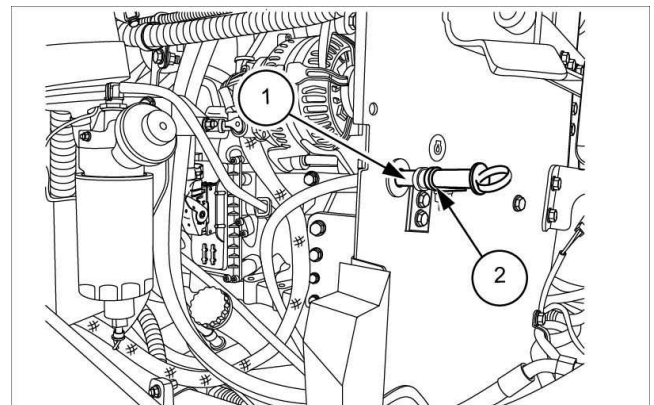
LEIL15WHL1147AB 35

46. Loosen the clamp of the overflow hose to the radiator.



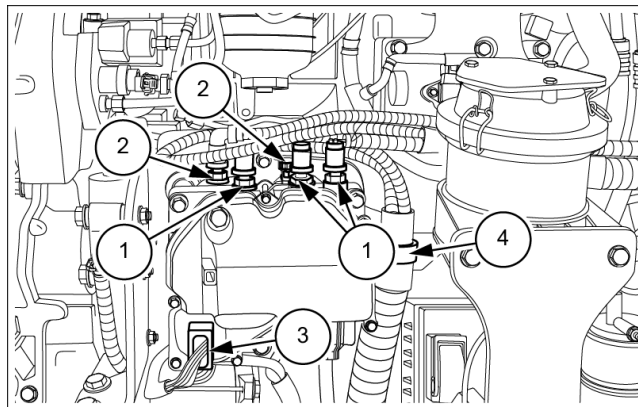
LEIL15WHL1288AB 36

47. Remove the oil dipstick P-clamp **(2)**.
Pull the oil dipstick tube **(1)** through the wall.



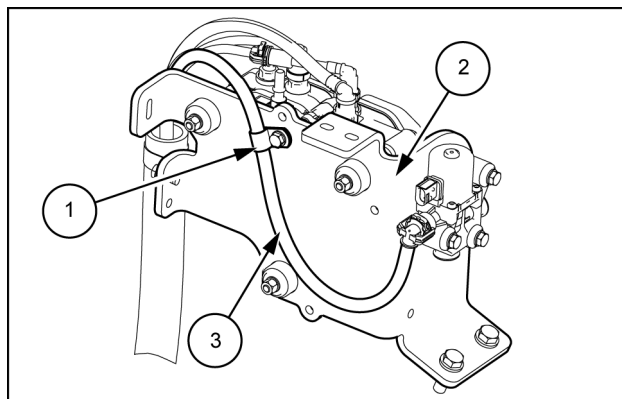
LEIL15WHL0819AB 37

48. 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.
49. Remove the P-clamp (4) to separate the DEF/ADBLUE® bundle from the supply module.



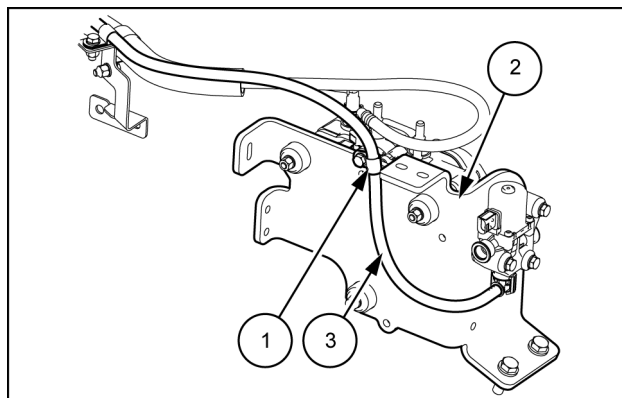
LEIL15WHL0813AB 38

50. Remove the P-clamp (1) to separate the coolant inlet hose (3) from the supply module bracket (2).



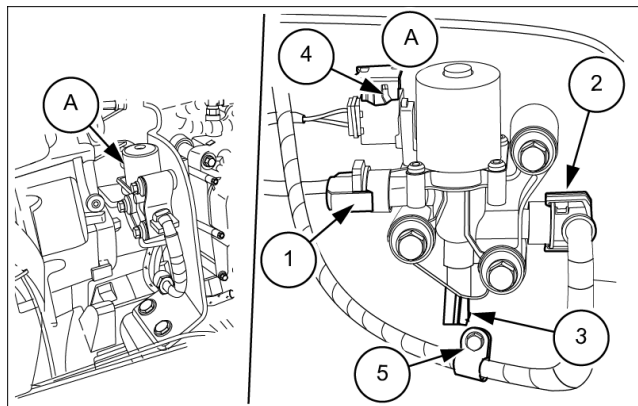
LEIL15WHL0843AB 39

51. Remove the P-clamp (1) the coolant by-pass line (3) from the supply module bracket (2).



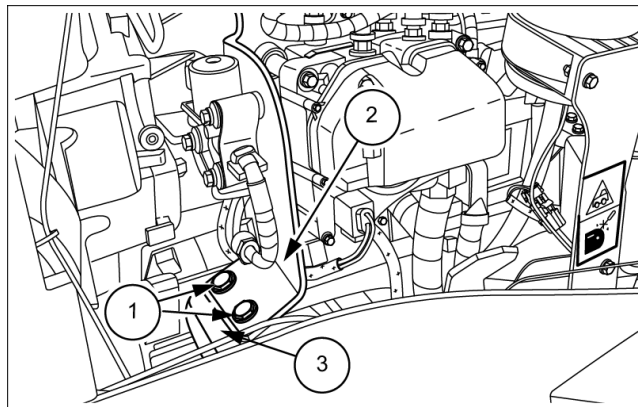
LEIL15WHL0844AB 40

52. Remove the P-clamp (5). 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.



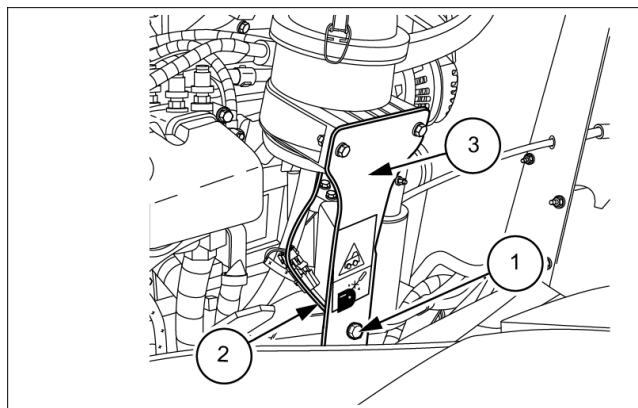
LEIL15WHL0816AB 41

53. Remove the two bolts **(1)**, with related washers and nut to separate the supply module bracket **(2)** from the left-hand side chassis **(3)**.



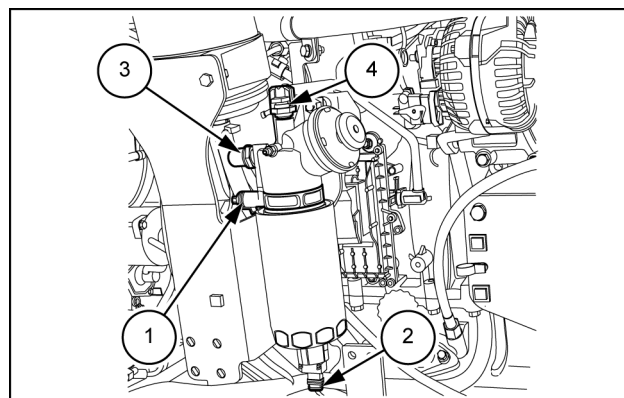
LEIL15WHL0841AB 42

54. Loosen the bolt **(1)** to disconnect the wire **(2)** and related P-clamp from the support bracket **(3)** of the crankcase vent filter.



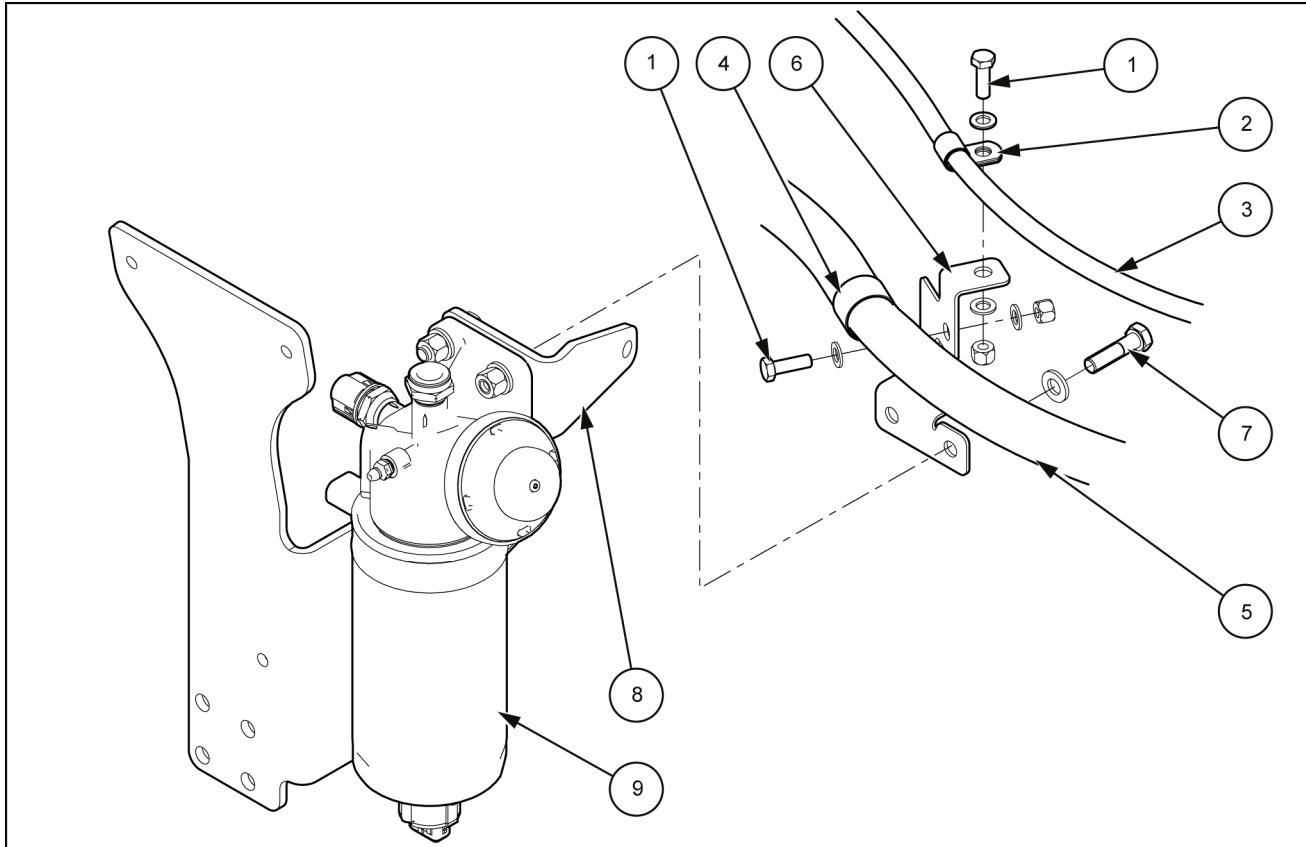
LEIL15WHL1139AB 43

55. 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.



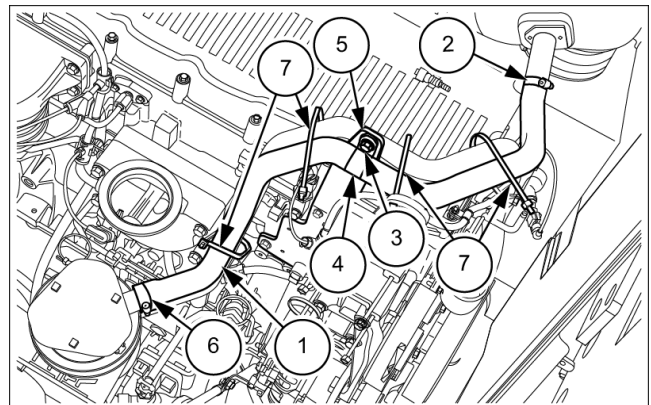
LEIL15WHL0846AB 44

56. Remove the bolts (1), with related washers and nuts to separate the P-clamps (2) and (4) from the bracket (6). Remove the P-clamp (2) from the coolant by-pass hose (3). Remove the P-clamp (4) from the DEF/ Adblue® bundle hose (5).
57. Remove the two bolts (7), with related washers and nuts to separate the bracket (6) from the fuel filter / engine breather filter bracket (8) and from the fuel filter (9). Remove the fuel filter (9).



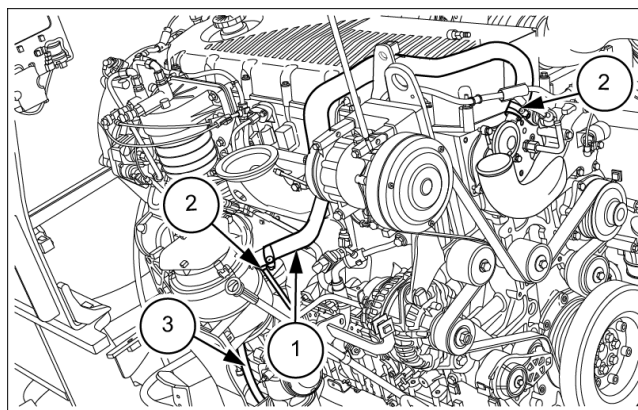
LEIL15WHL0845FB 45

58. Loosen the clamp (2) on the crankcase vent hose (1).
59. Remove the bolt (3) with related washers and nut to separate the two clamps (4) from the hose support bracket (5).
60. Loosen the clamp (6) on the crankcase vent hose (1).
61. Cut the straps (7).
62. Remove the crankcase vent hose (1).



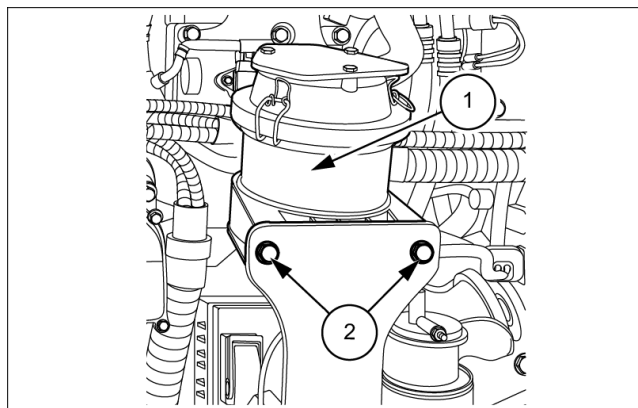
LEIL15WHL0669AB 46

63. Loosen the P-clamps **(2)** on the engine to crankcase vent filter hose **(1)**.
64. Remove the engine to the crankcase vent filter hose **(1)**.
65. Remove the drain hose filter **(3)** from the crankcase vent filter.



LEIL15WHL0670AB 47

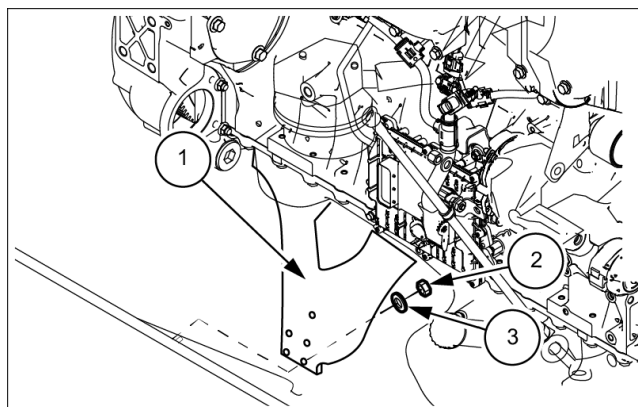
66. Loosen the bolts **(2)** to remove the crankcase vent filter **(1)** from the machine.



LEIL15WHL1138AB 48

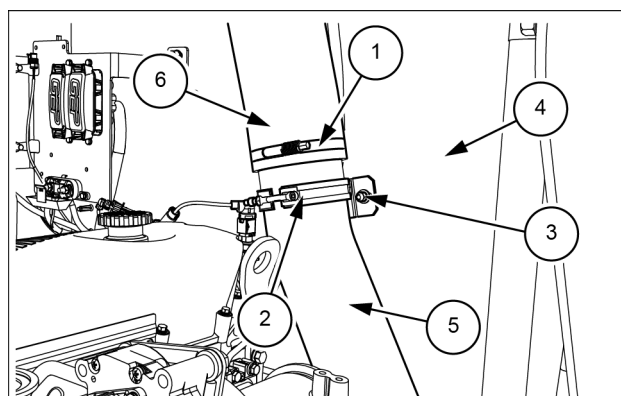
67. Loosen the four nuts **(2)** and related washers **(3)** that hold the support bracket **(1)** of the crankcase vent filter to the rear chassis.

NOTE: one of these four nuts **(2)** is used to secure a P-clamp that hold the wiring harness to the support bracket **(1)**.



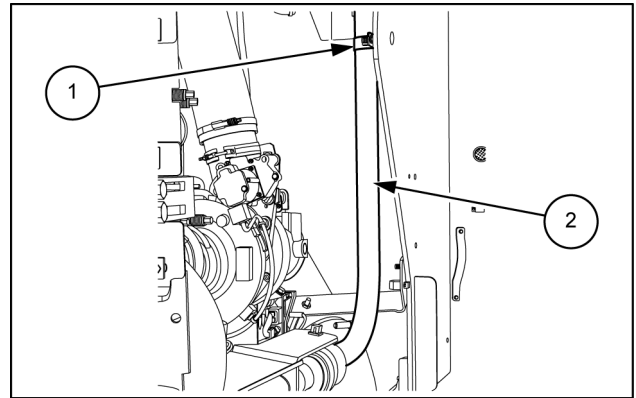
LEIL15WHL1140AB 49

68. Loosen the clamps **(1)** and **(2)**.
69. Separate the upper air intake hose **(6)** from the air intake pipe **(5)**. Remove the upper air intake hose **(6)**.
70. Loosen the two nuts **(3)** and related washer to remove the clamp **(2)** from the hydraulic tank **(4)**.



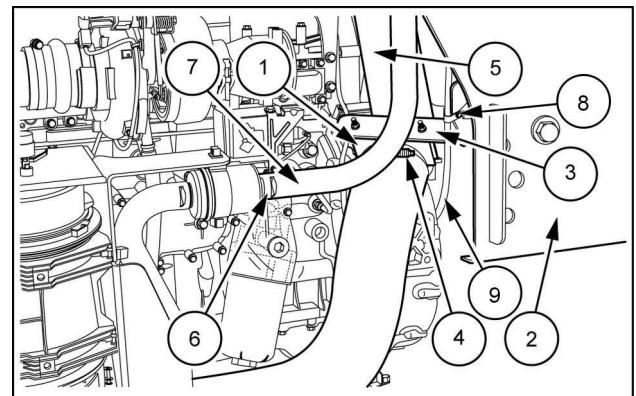
LEIL16WHL1526AB 50

71. Remove the P-clamp **(1)**.
Remove the air intake aspirator hose **(2)**.



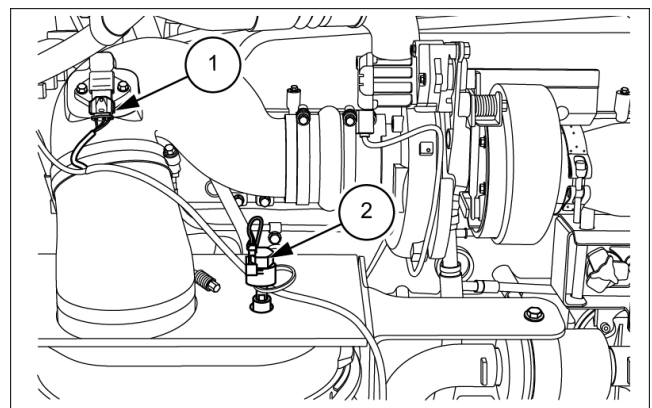
LEIL15WHL1059AB 51

72. Loosen the clamp **(6)** to separate the air intake aspirator hose **(7)** from the check valve.
73. Remove the P-clamp **(8)** to separate the rear chassis harness **(9)** from the air intake bracket **(3)**.
74. Remove the U-bolt **(1)** from the air intake bracket **(3)**.
75. Remove the air intake bracket **(3)** from the hydraulic tank **(3)**.
Loosen the clamp **(4)**. Remove the air intake pipe **(5)**.



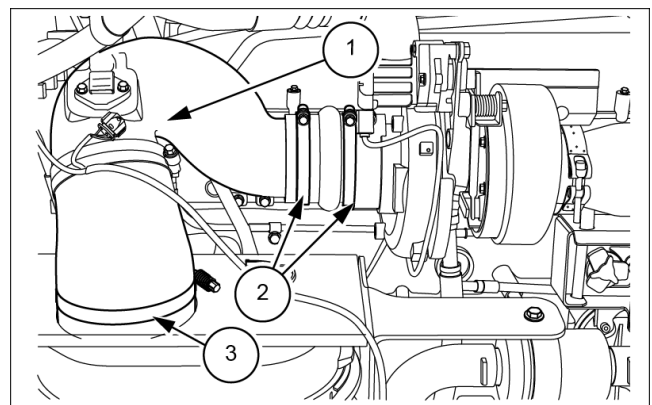
LEIL15WHL1060AB 52

76. Tag and disconnect the engine wiring harness connector from the air filter sensor **(2)**.
77. Tag and disconnect the engine wiring harness connector from the air inlet humidity sensor **(1)**.



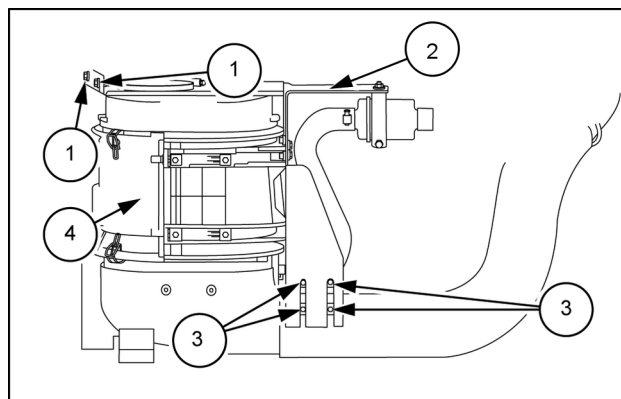
LEIL15WHL0848AB 53

78. Loosen the clamps **(2)** on the turbocharger.
79. Loosen the clamp **(3)** on the air filter housing.
80. Remove the air intake hose **(1)**.
Cover the turbocharger inlet to prevent debris entry.



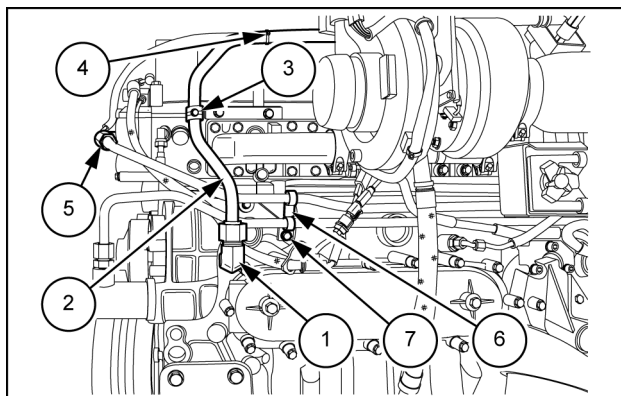
LEIL15WHL0849AB 54

81. Remove the bolts **(1)** with related washers and nuts to separate the air cleaner bracket **(2)** engine wall.
82. Remove the four nuts and washers **(3)**.
Extract the air cleaner **(4)** as an assembly.



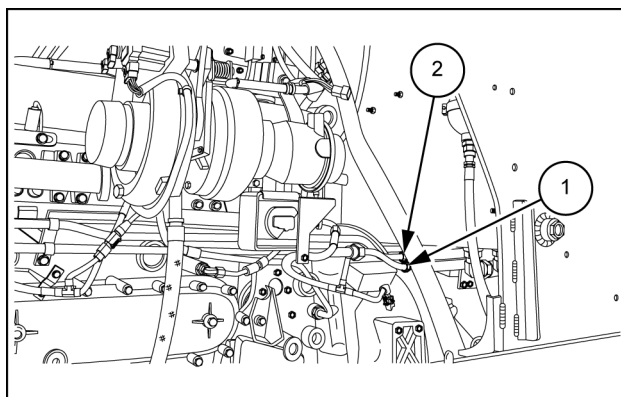
LEIL15WHL1057AB 55

83. Disconnect the elbow **(1)**. Remove the P-clamp **(3)**.
Cut the straps **(4)**. Remove the hose fill **(2)**.
84. Remove the P-clamps **(7)** and **(6)**.
85. Disconnect the tube **(5)**.



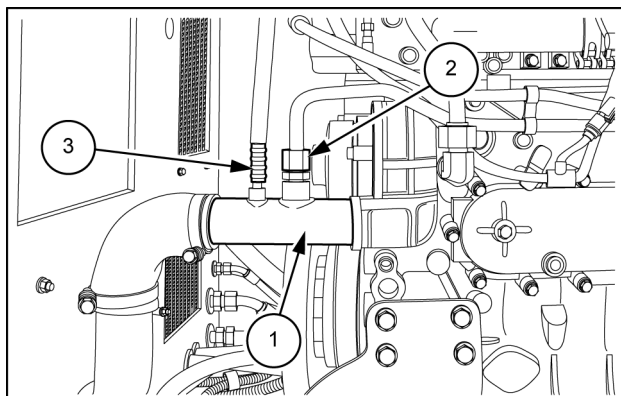
LEIL15WHL1071AB 56

86. Disconnect and remove the tubes **(1)** and **(2)**.



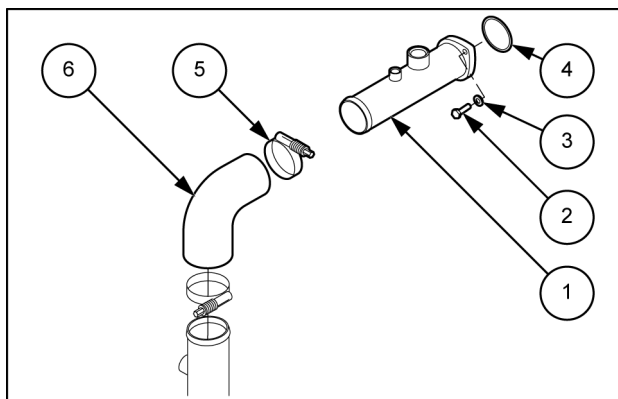
LEIL15WHL1072AB 57

87. Disconnect the engine coolant line **(2)** from the zinc lower radiator tube **(1)**.
Disconnect the dosing module coolant line **(3)** from the lower radiator tube **(1)**.



LEIL15WHL1053AB 58

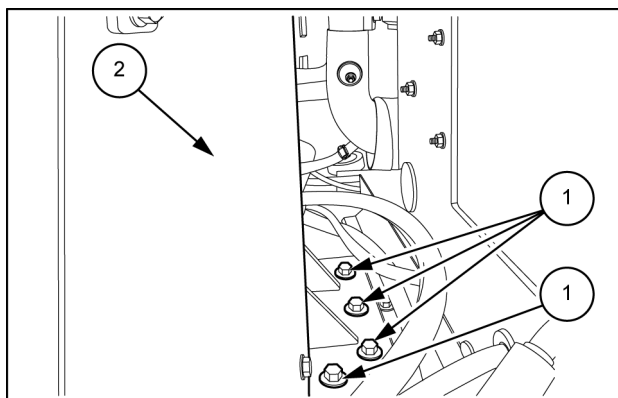
88. Remove the bolts (2) and the washers (3). Loosen the clamp (5) to separate the zinc lower radiator tube (1) from the elbow radiator hose (6). Remove the zinc lower radiator tube (1) and discard the O-ring (4).



LEIL15WHL1054AB 59

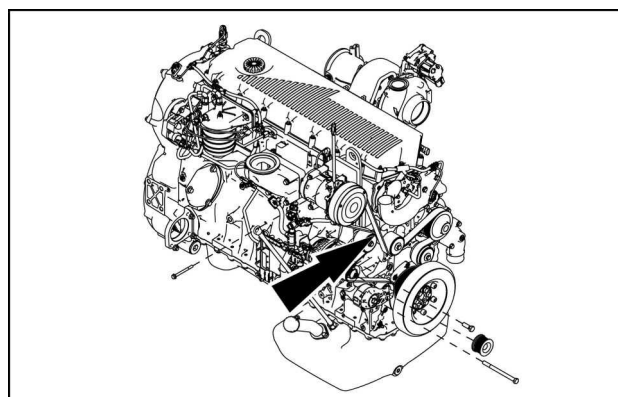
89. Attach lifting equipment to the engine wall (2). Remove the engine wall's hold-down bolts (1). Lift and remove the engine wall (2).

NOTE: prior to remove the engine wall to be sure that all the P-clamp installed on the wall are be removed.



LEIL15WHL1055AB 60

90. Remove the drive belt from the engine.



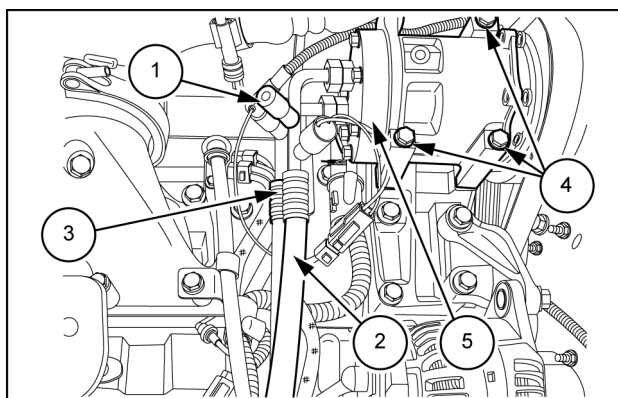
LEIL15WHL0772AA 61

91. If machine is equipped with the air conditioning system, identify, tag, and disconnect the engine wiring harness connectors (1).

Recovery the refrigerant, as indicated in **Air conditioning - Service instruction (50.200)**.

Disconnect the low-pressure line (3) from the suction port (compressor to condenser hose) and hose (2) of the high pressure line from the discharge port (cab to compressor hose) of the air-conditioning compressor. Immediately install protective caps on the open ports and lines.

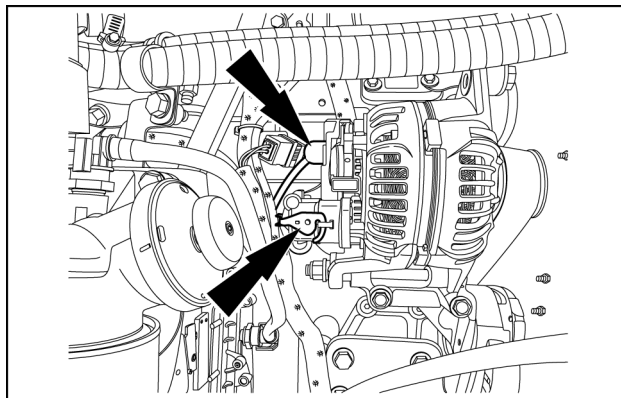
92. Remove the four bolts (4). Remove the air-conditioning compressor (5) from the machine.



LEIL15WHL1056AB 62

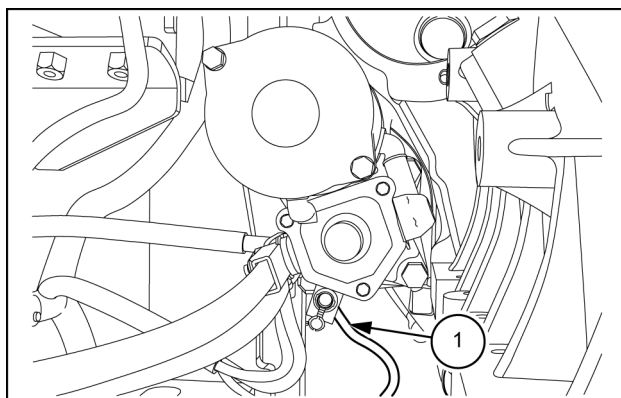
93. Disconnect the wires from the alternator. Identify and tag the wires to aid in reassembly.

NOTE: move the wires away from the engine.



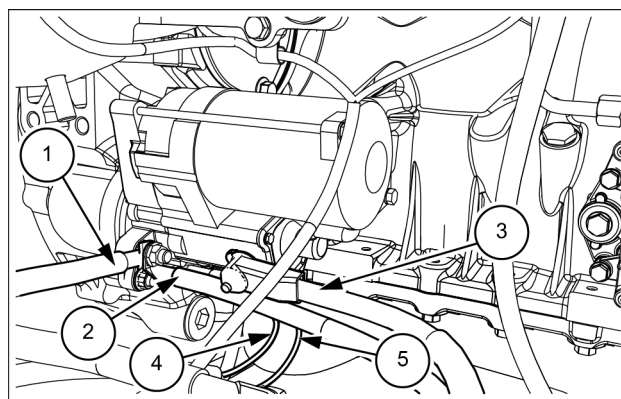
LEIL15WHL0818AB 63

94. Place an identification tag on the starter switch wire (1). Remove the starter switch wire (1) from the engine starter.



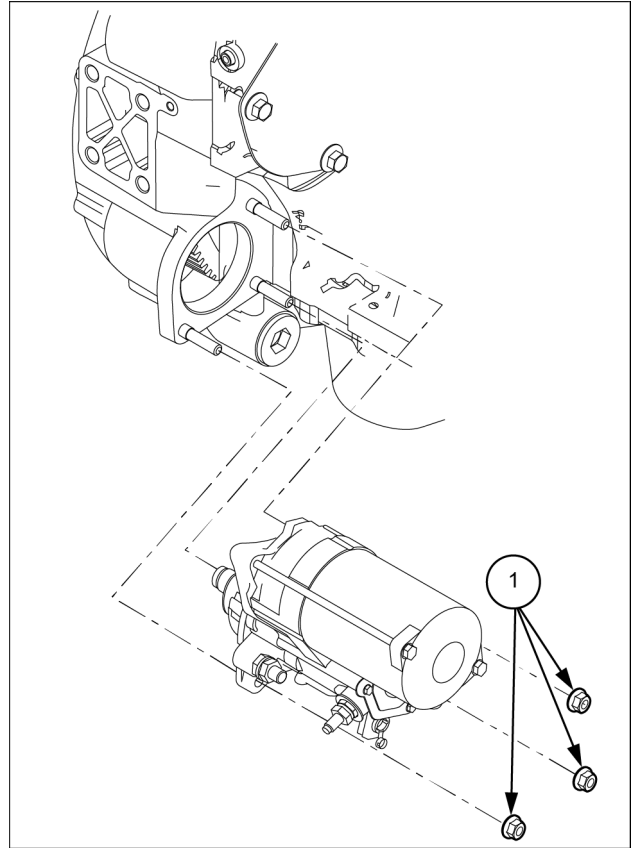
LEIL15WHL1299AB 64

95. Place identification tags on the cables. Remove the negative cable (starter to ground) (1), the negative cable (battery to starter) (2) from the engine starter. Remove the positive cable (battery isolator to starter) and the connectors (4) and (5) from the engine starter.



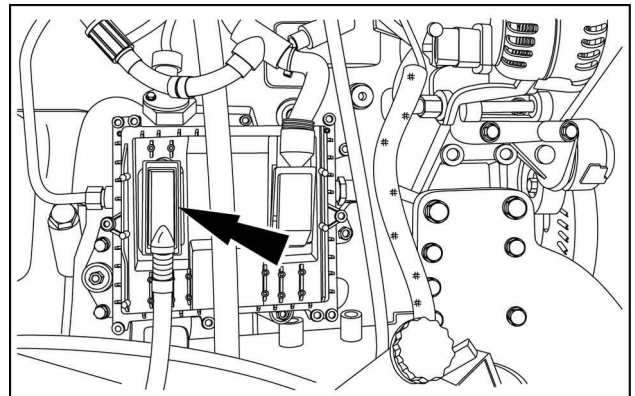
LEIL16WHL1527AB 65

96. Remove the three nuts **(1)** from the engine starter.
Remove the engine starter.



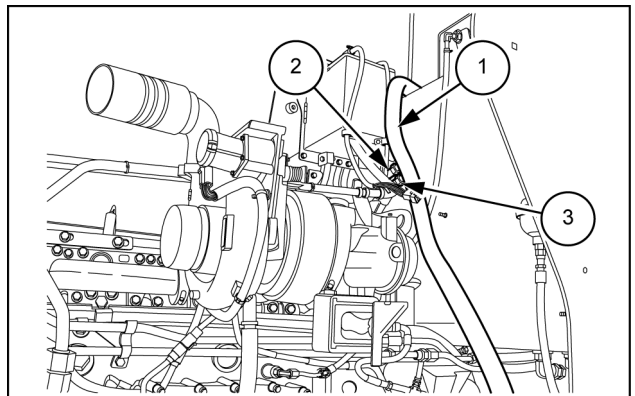
LEIL15WHL1331BB 66

97. Tag and disconnect the electrical connector from the engine control unit.



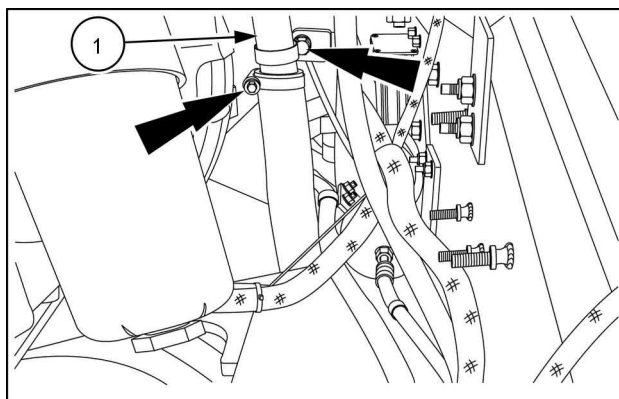
LEIL15WHL1085AA 67

98. Disconnect the hydraulic fittings **(2)** and **(3)** from the hydraulic oil supply tube **(1)**.



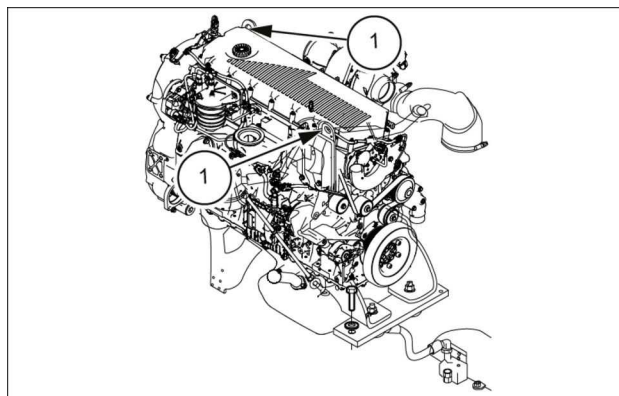
LEIL15WHL0833AB 68

99. Disconnect the hydraulic oil supply tube (1) loosening the two P-clamps.



LEIL15WHL0834AA 69

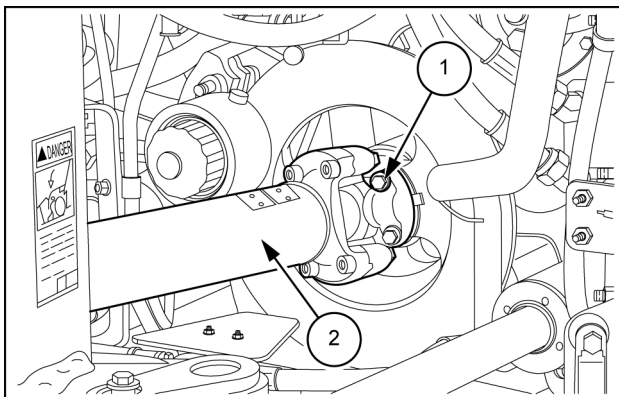
100. Connect a suitable lifting equipment to the engine lifting brackets (1).
Take up all slack in lifting equipment.



LEIL15WHL1086AB 70

101. Loosen and remove the bolts (1) that fasten the center drive shaft (2) to the transmission.

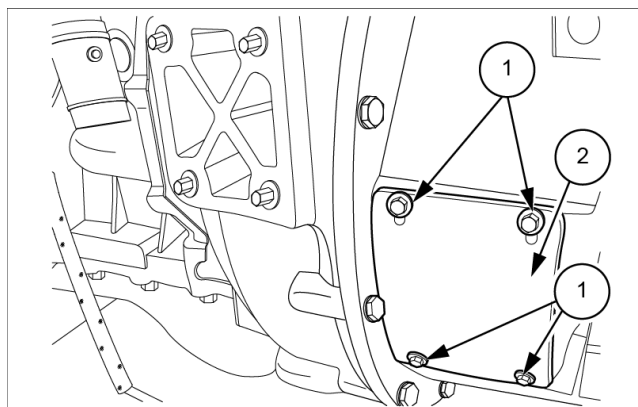
NOTICE: the bolts (1) that fasten the center drive shaft (2) to the transmission must be replaced when removed.



LEIL15WHL1207AB 71

NOTE: steps 102 and 103 are related only to CASE CONSTRUCTION 1021G.

102. Remove the bolts (1) and related washers.
Remove the converter housing cover plate (2) and remove the flex plate bolts.



LEIL15WHL1330AB 72

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